Corrib
natural gas

AN BORD PLEANÁLA
TIME _____ BY _____
30 JUN 2004
LTR-DATED _____ FROM _____
PL _____

Corrib Gas Field Development

Environmental Impact Statement

Prepared in respect of the proposed Bellanaboy Bridge Gas Terminal and associated Srahmore Peat Deposition Site.

Volume 1:
Technical appendix 2
Proposed Bellanaboy Bridge Gas Terminal Bellanaboy Bridge Bellagelly South Co. Mayo

Earthworks

Prepared on behalf of
Shell E&P Ireland Limited
Corrib House
52 Lower Leeson Street
Dublin 2
by
RSKENSR Environment Limited
Spring Lodge,
172 Chester Road, Helsby,
Cheshire, WA6 OAR, UK



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December 2003

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Arup Consulting Engineers

Shell E & P Ireland Ltd

Corrib Terminal: Bellanaboy Bridge

Earthworks Report

December 2003

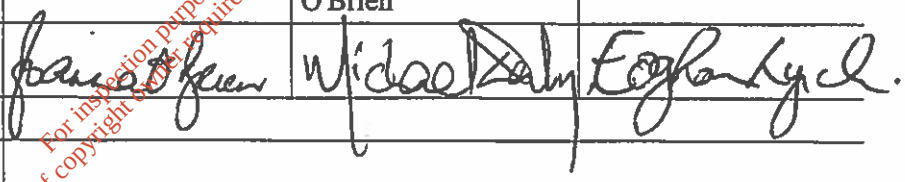
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15 Oliver Plunkett Street, Cork
Tel +353 021 4277670 Fax +353 021 4272345
www.arup.ie

Job number C1157.10

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Document title	Earthworks Report		File reference
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			Prepared by	Checked by	Approved by
		Name	MD, JO'B, CH, SG	Michael Daly, Joanna O'Brien	Eoghan Lynch
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CONTENTS

		Page
1.	**INTRODUCTION**	**1**
1.1	General	1
1.2	Description of Earthworks	1
1.3	Content of Report	1
2.	**DESIGN INFORMATION**	**3**
2.1	Site Datum	3
2.2	Topographical Survey	3
2.3	Site Investigation Information	3
2.4	Terminal Platform	5
2.5	Access to the Site	5
2.6	Temporary Construction Facility	5
2.7	Administration Buildings	5
3.	**GEOTECHNICAL INTERPRETATION**	**7**
3.1	Brief Description of the Site	7
3.2	Brief Description of Work to be Undertaken	7
3.3	Basis of Design	8
3.4	Material Classification	8
3.5	Ground Conditions within the Excavated Terminal Footprint	10
3.6	Re-use of Materials Excavated on Site	10
3.7	Geotechnical Design	11
3.8	Groundwater Control	12
3.9	Monitoring and Instrumentation	14
4.	**TERMINAL SLOPE STABILITY**	**16**
4.1	Introduction	16
4.2	Cut Slope Stability	16
4.3	Slope stability and groundwater	16
4.4	Slope stability and surface water drainage	17
4.5	Local stability of Cut Slope	17
4.6	Up hill slope stability of Peat Layer	17
4.7	Stability of Peat in Areas of Fill	17
4.8	Fill Slope Stability	18
4.9	Stability of Fill Area	18
5.	**ACCESS ROADS**	**20**
5.1	General	20
5.2	Site Investigation Interpretation	22
5.3	Stability Calculations	23
5.4	Construction Sequence	23
6.	**SETTLEMENT PONDS**	**25**
6.1	General	25
6.2	Site Investigation	25
6.3	Stability Calculations	26
6.4	Construction Sequence	27
6.5	Piped Drain to Settlement Ponds	28
7.	**ADMINISTRATION BUILDING / WAREHOUSE CAR PARK**	**29**
7.1	General	29

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7.2	Site Investigation	29
7.3	Slab Design	29
7.4	Pile Design	29
7.5	Construction Sequence	29
8.	**TEMPORARY CONSTRUCTION FACILITY**	**31**
8.1	General	31
8.2	Site Investigation	31
8.3	Stability Calculations	31
8.4	Construction Sequence	31
9.	**DIGITAL GROUND MODEL**	**33**
9.1	General	33
9.2	Description of DGM	33
9.3	DGM Material Surfaces	34
9.4	Terminal Platform Surface	34
9.5	Cut and Fill Volume Calculation Methodology	38
10.	**MATERIAL BALANCE**	**40**
10.1	General	40
10.2	Description of Material Volumes	40
10.3	Summary	43
11.	**EARTHWORKS CONSTRUCTION SEQUENCE**	**44**
11.1	General	44
11.2	Seasonal Impacts	44
11.3	Upgrade of Public Road Haul Route	44
11.4	Site Works	44
12.	**REFERENCES**	**50**

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APPENDICES

APPENDIX A
Earthworks and Roads Drawings

APPENDIX B
AMEC Civils Design Philosophy Document L3882-030-0389

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1. INTRODUCTION

1.1 General

Shell E & P Ireland Ltd (Shell) propose to submit a planning application for the development of a Gas Reception Terminal associated with the Corrib Gas Field at Bellanaboy Bridge, County Mayo.

1.2 Description of Earthworks

Figure 1.1 presents the layout of the site, identifying some of the main elements associated with the earthworks.

The earthworks phase of the development involves:

- the upgrading of access roads within the site
- the creation of new access roads where necessary
- the installation of new drains and settlement ponds
- the excavation of peat, mineral soil and rock to create a horizontal terminal platform measuring approximately 12 hectares in plan (ref. Figure 1.1)
- the creation of an area for administration buildings and associated car park
- the creation of a temporary truck parking and temporary construction facility.

All excavated peat will be removed from site. The transportation of the peat from the site and the reception of the peat at the deposition site are not covered by this document. In a number of areas, peat strengthening techniques will be used to increase the strength of the peat so that it can be left in-situ and not removed from site. This is the case around the settlement ponds, under the access roads, administration buildings and temporary construction facilities.

The mineral soils and rock will be used as fill on site as required for the creation of the terminal platform and the upgrading of emergency access roads.

Fill material will also be imported onto the site for drainage, surface dressing, and other uses.

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1.3 Content of Report

This report outlines the design associated with the earthworks that was carried out to accompany the planning application. These issues include:

- Geotechnical interpretation of the site
- Assessment of the stability of the cut and fill slopes created on the site and the reinforcement of slopes where necessary
- Description of digital ground modelling carried out on the site
- Preliminary design of access roads on the site
- Assessment of the stability of the settlement ponds
- Preliminary design of the administration building car park and temporary truck park
- Preliminary design of the temporary construction facility
- Summary of the material balance associated with the earthworks

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- Description of the sequence of construction of the earthworks

This report should be read in conjunction with all other information submitted with the planning application, particularly the following:

- Site Drainage Planning Report
- Geology, Hydrogeology and Global Stability Planning Report

The AMEC Document, "Civils Design Philosophy Document", document no. L3882-030-0389, presents the foundation philosophy for the terminal and administration buildings and is included as Appendix B to this report for reference.

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10cm



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P1	28.11.03	MD	Issued for Planning	EL

Legend:

Job Title
CORRIB TERMINAL:
BELLANABOY BRIDGE

Drawing Title
SITE LAYOUT

Drawing Status
PLANNING

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15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
EMail cork@arup.com
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Drawing No. RP005-Fig1
Rev. P1

2. DESIGN INFORMATION

2.1 Site Datum

All elevations and levels are to the Malin Head Ordnance Datum.

2.2 Topographical Survey

The site topography, see Figure 2.1, is referenced to Ordnance Datum at Malin Head using the Ordnance Bench Mark at Bellanaboy Bridge. This benchmark is 13.192mAOD Malin Head.

The topographical data used in the study was taken from a survey carried out by DMC Surveys. This survey was referenced to a Temporary Bench Mark (TBM) at the site which resulted in levels that are the equivalent to 1.621m higher than levels taken to the Malin Head Ordnance Datum. The topographical data was therefore converted to Malin Head Datum by reducing all levels by 1.621m.

2.3 Site Investigation Information

A number of site investigations have been carried out on the site since 2001. The extent, purpose and summary findings of the site investigations are given below. The location of all the site investigation work is shown on Figures 2.2 to 2.7. The resulting logs from the site investigations are not included with this report but can be viewed on request to Shell E&P Ireland Limited.

All of the site investigation studies listed below, except for SI No. 4, were referenced to the TBM at the site referred to in Section 2.1 above. Consequently, the elevations recorded on any of the logs from the above site investigation studies are 1.621m higher than the equivalent Malin Head Ordnance Datum level. Therefore to convert the elevations recorded on the logs to the Malin Head Ordnance Datum, subtract 1.621m.

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2.3.1 Site Investigation No. 1

2.3.1.1 Site Investigation No. 1A

March 2001 to February 2002 Minerex Environmental Ltd – Figure 2.2

This site investigation was carried out to determine the groundwater regime on site and to gather environmental base line data. The investigation found that there is a perched water table within the peat, particularly in the upper areas of the site. The bedrock water table at the top of the site is some 6 to 9m below existing ground levels. At lower elevations the bedrock water table lies within the peat indicating possible upward flow of water in these areas.

The fieldwork comprised the following:

- 50 gouge core holes to refusal in the mineral soils underlying the peat
- 7 boreholes for the installation of piezometers to monitor ground water levels.

2.3.1.2 Site Investigation No. 1B

April to May 2001, Irish Geotechnical Services Limited – Figure 2.3

This site investigation was carried out to determine the ground conditions in the upper strata of the terminal. It was located within and around the area to be excavated to construct the terminal footprint. The boreholes show that the site is overlain by blanket peat bog varying in thickness from 1.0m to 4.0m with the thickness increasing down slope. The peat is underlain by a clay layer which varies in thickness from 0.2m to 2m, and similar to the peat, increases in

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thickness down slope. The clay is underlain by a sand layer which is described as possible weathered rock. All boreholes were taken to refusal and this in general was within the upper 2m of the sand layer.

The fieldwork comprised the following:

- 26 light cable percussion boreholes
- Mackintosh probing and trial pitting

2.3.1.3 Site Investigation No. 1C

April to May 2001, Irish Drilling Limited – Figure 2.4

This site investigation was carried out to investigate the nature of the bedrock within the area to be excavated for the terminal platform. The investigation showed the bedrock to be a micaceous Schist. The intact bedrock is overlain by a weathered layer, the thickness of which increases down slope. Depth to bedrock varies across the site being shallowest (approximately 3m) near the top of the hill and increasing to 9m along the south side of the terminal.

The fieldwork comprised the following:

- 22 rotary cored drillholes (4 no. to the north east of the terminal footprint)
- 17 Packer tests in the rotary cored holes
- 81 In-situ vane tests (which were spread over the entire site)

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2.3.2 Site Investigation No. 2

July to November 2002, Fugro Limited – Figure 2.5

This investigation was carried out to investigate ground conditions in the area to the east and north east of the terminal with particular attention being paid to the strength and deformation parameters of the peat.

The fieldwork comprised the following:

- 160 CPTs
- 12 light cable percussion boreholes
- 7 rotary cored drillholes
- 36 In situ shear vane test locations
- 27 Mostap sample locations
- 5 Plate Load tests

2.3.3 Site Investigation No. 3

August 2003, Lankelma Seacore Offshore (LSO) – Figure 2.6

This site investigation was carried out to determine ground conditions in the area the northeast of the Terminal. The site investigation fieldwork comprised the following:

- 8 light cable percussion boreholes
- 9 rotary cored drillholes
- 10 CPTs

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2.3.4 Site Investigation No. 4

November 2003 – ongoing, Irish Drilling Limited/Lankelma/Fugro – Figure 2.7

This site investigation is being carried out to gather further information in a number of areas of the site. These are the settlement ponds, the existing roads, the administration building area, the area to the south of the terminal, the mineral soils for classification and groundwater control within the terminal footprint.

The fieldwork comprises the following:

- 88 no. CPTs, geonor vane and mostap sampling
- 17 no. light cable percussion boreholes
- 15 no. rotary cored boreholes
- 1 no. pumping well
- 15 no. trial pits
- 288 no. cobra probes
- Resistivity traverse along the existing roads.

2.4 Terminal Platform

The layout of the Terminal Platform is as specified in the AMEC Drawing "Overall Plot Plan".

The elevation of the Terminal Platform has been selected at 33.4mAOD (Malin Head) in order to optimise the material balance for the earthworks on the site.

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2.5 Access to the Site

The Main Access Road from the R314 will be capable of withstanding the volume of traffic required during construction. The road will be 15m wide as far as the turning to the Administration Buildings and 10m from there to the Temporary Construction Facility.

A new road will be required to the west of the Main Access Road to provide access to the Administration Buildings and the Terminal Platform

A new access road from the R314 will be installed to facilitate access to the new settlement ponds for construction and maintenance purposes. This access will be 8m wide.

The Emergency Access Roads will be 6m wide and be capable of facilitating emergency services vehicles.

2.6 Temporary Construction Facility

A temporary construction facility area measuring 1 hectare is required for the main civil and mechanical phase of the works.

2.7 Administration Buildings

The location of the administration building area is as specified in the AMEC Drawing "Overall Plot Plan". The level of the administration building area has been set at 33.5mAOD.

The design of the foundations of the administration building is not covered by this document, however it is understood that the buildings will be supported by piles and concrete slabs and

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that all of the peat beneath the administration building area will be strengthened to facilitate installation.

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BELLANABOY Td.

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Rev.	Date	By	Description	Chd By
P1	28.11.03	MD	Issued for Planning	JOB

Job Title
CORRIB TERMINAL:
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Drawing Title
TOPOGRAPHICAL SURVEY
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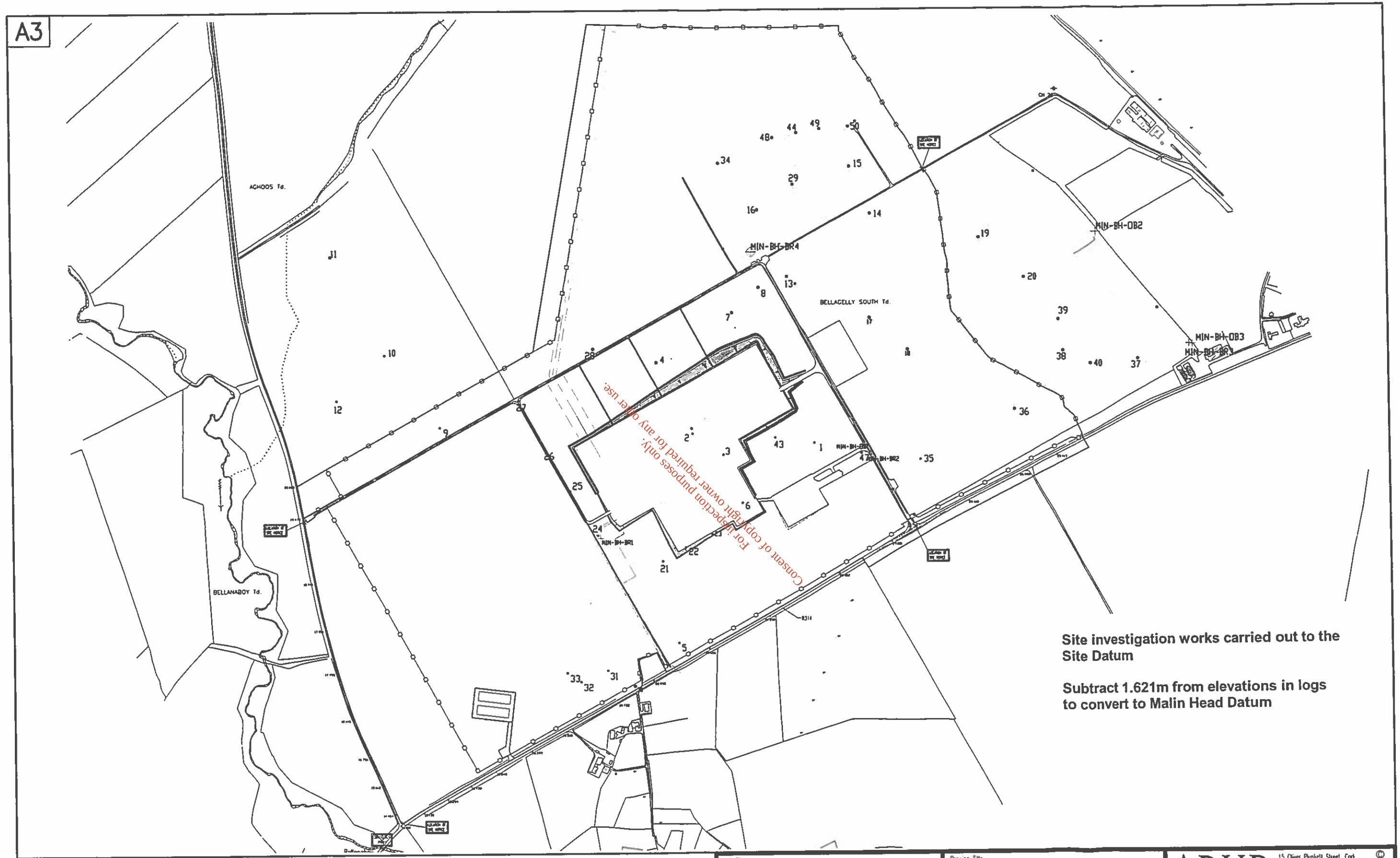
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Job No. C1157.10 | Drawing No. RP005-Fig2.1 | Rev. P1

A3



Site investigation works carried out to the Site Datum

Subtract 1.621m from elevations in logs to convert to Malin Head Datum

LEGEND:

o GOUGE CORE

+ PIEZOMETER BOREHOLES

Rev	Date	By	Description	Chkd By
A	DEC '03	JOB	PLANNING	EJL

Job Title: CORRIB TERMINAL: BELLANABOY BRIDGE

Drawing Title: SITE INVESTIGATION WORK MARCH-2001 TO FEBRUARY 2002 MINEREX ENVIRONMENTAL LTD.

Drawing Status: PLANNING

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Job No. C1157.10 | Drawing No. FIG 2.2 | Rev. A

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o BOREHOLES

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A	DEC 02		PLANNING	MD.

Job Title: CORRIB TERMINAL: BELLANABOY BRIDGE

Drawing Title: SITE INVESTIGATION WORK APRIL-MAY 2001: IRISH GEOTECHNICAL SERVICES LTD.

Drawing Status: PLANNING

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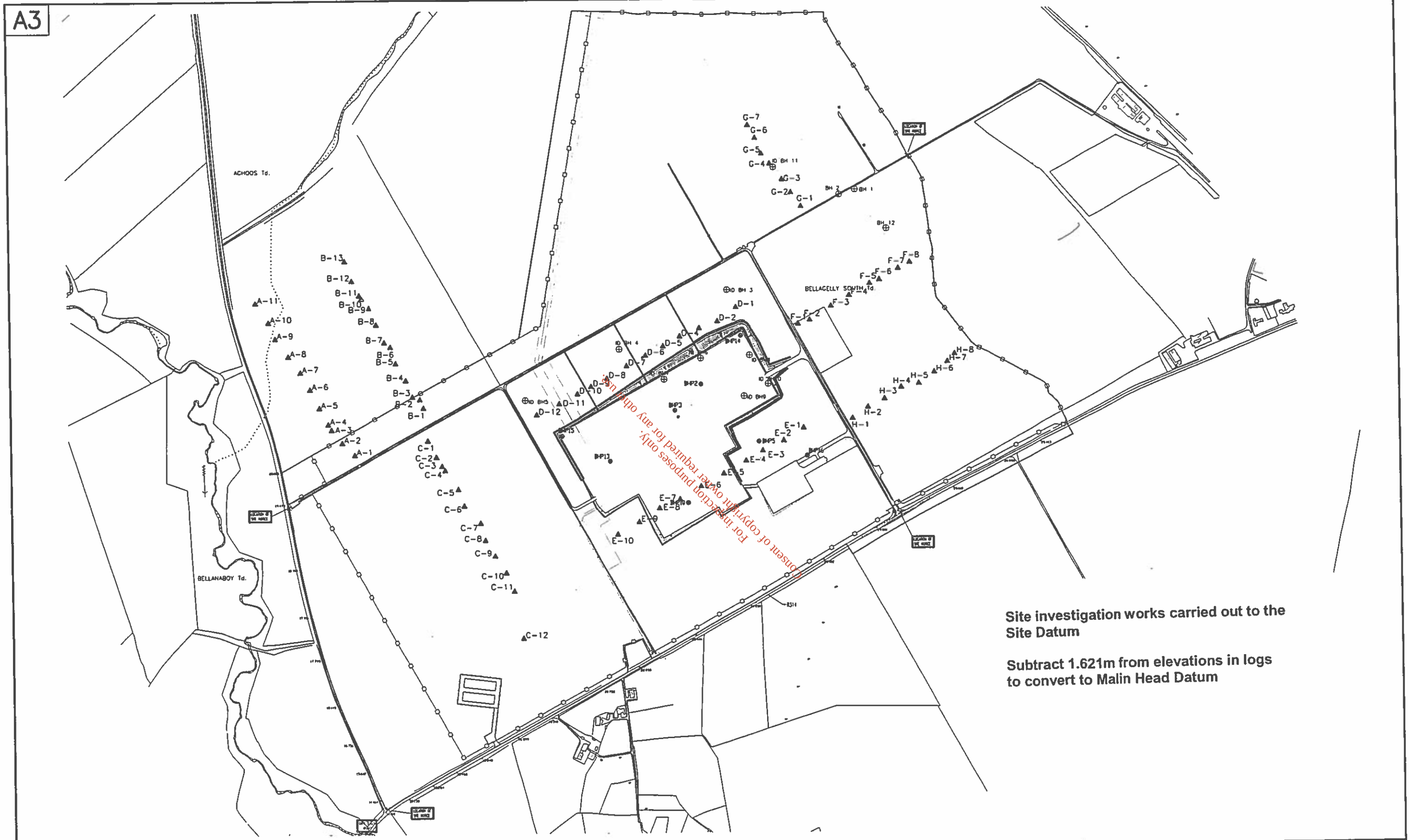
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Job No C1157.10 Drawing No FIG. 2.3 Rev. A

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Subtract 1.621m from elevations in logs to convert to Malin Head Datum

LEGEND:
△ VANE TEST
⊕ COREHOLES

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A	DEC '03	JOB	PLANNING	ETL

Job Title: CORRIB TERMINAL: BELLANABOY BRIDGE

Drawing Title: SITE INVESTIGATION WORK APRIL - MAY 2001: IRISH DRILLING LTD

Drawing Status: PLANNING.

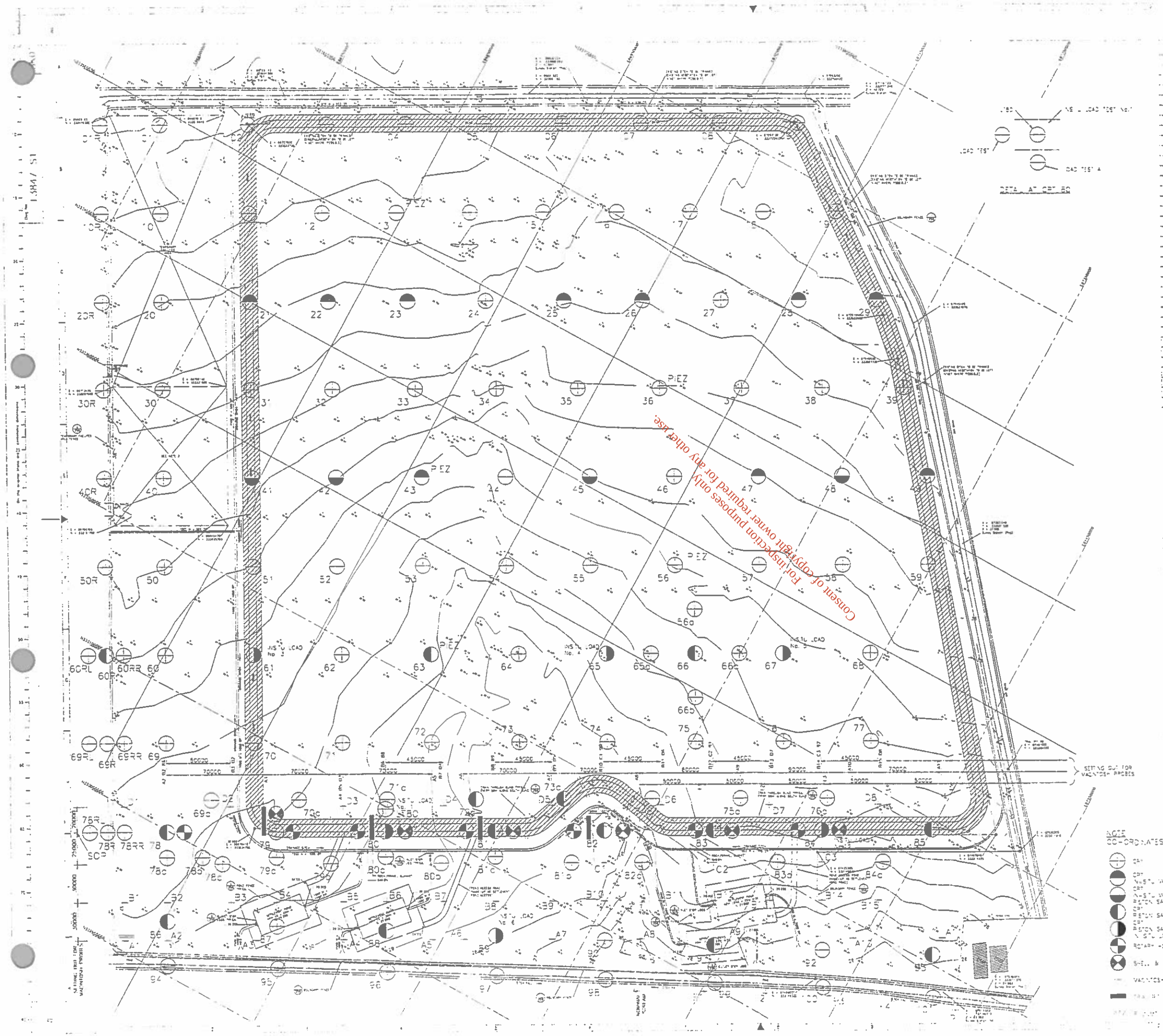
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EMail cork@arup.com
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Job No: C1157.10 | Drawing No: FIG: 2.4 | Rev: A

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Job Title	CORRIB GAS TERMINAL
Drawing Title	FUGRO SI WORK, 2002
Scales	NTS
File Ref	B.1.
Drn JOB	Date DEC 02 Chd MD Approved ETL
Job No.	C1157-10
Drg No.	FIGURE 2.5(a)
Rev	—

03	1100 NORTHINGS / EASTINGS ADDED
02	ISSUED FOR CONSTRUCTION
01	

12847 CORRIB GAS RECEPTION TERMINAL
CORRIB FIELD DEVELOPMENT
BELLANABOY BRIDGE GAS TERMINAL

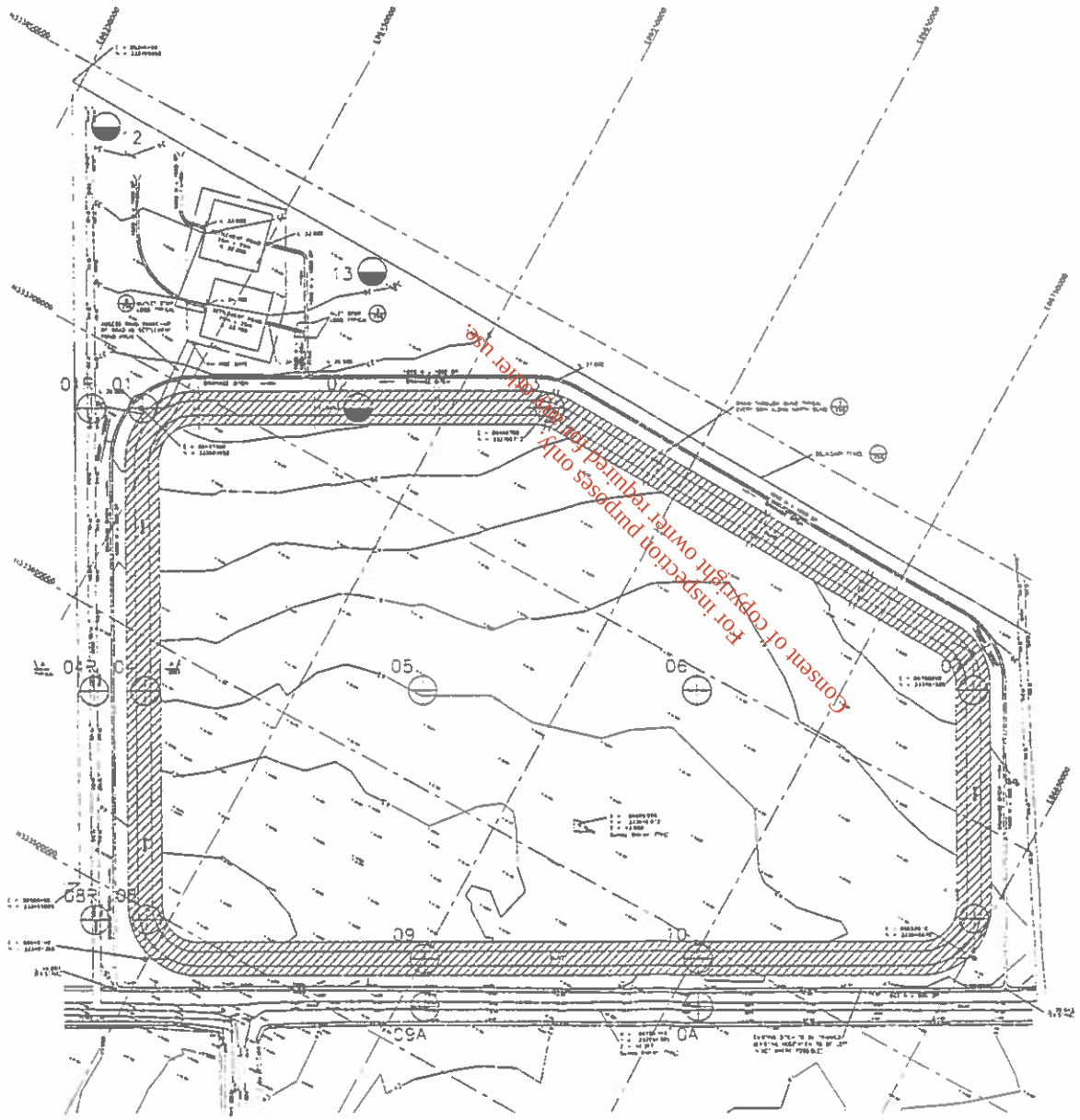
Enterprise Oil — Corrib Natural Gas

ASI Corrib JV — amec

EAST REPOSITORY AREA
SITE INVESTIGATION
1861 SI

NOTE
CO-ORDINATES RELATE TO NATIONAL GRID

CPT	105 OFF
CPT	10 OFF
CPT / WATER VANE TEST	4 OFF
CPT / WATER VANE TEST / PISTON SAMPLE	1 OFF
CPT / PISTON SAMPLE	14 OFF
CPT / PISTON SAMPLE / WATER VANE TEST	6 OFF
ROTARY HOLE	7 OFF
SHELL & AUGER HOLE	8 OFF
VIBROCORE BORE	42 OFF
TRIAL PIT	4 OFF
WELL	6 OFF



	864380CC	333683CCC	✓
	864 90CC	333673CCC	✓
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C3	865870CC	333765CCC	✓
C4	864850CC	333580CCC	✓
C4R	864760CC	333570CCC	✓
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Site investigation works carried out to the Site Datum

Subtract 1.621m from elevations in logs to convert to Malin Head Datum

ARUP Consulting Engineers	15 Oliver Plunkett Street Cork Tel: +353 (0)21 427 7670 Fax: +353 (0)21 427 2345
Status	PLANNING
Job Title	CORRIB GAS TERMINAL
Drawing Title	FUGRO S.I. WORK - 2002.
Scales NTS	File Ref B1
Drn JOB Date DEC'03	Chd JOB Approved EJL
Job No. C1157.10	Drg No. FIGURE 2.56 Rev -

Enterprise Oil

Corrib

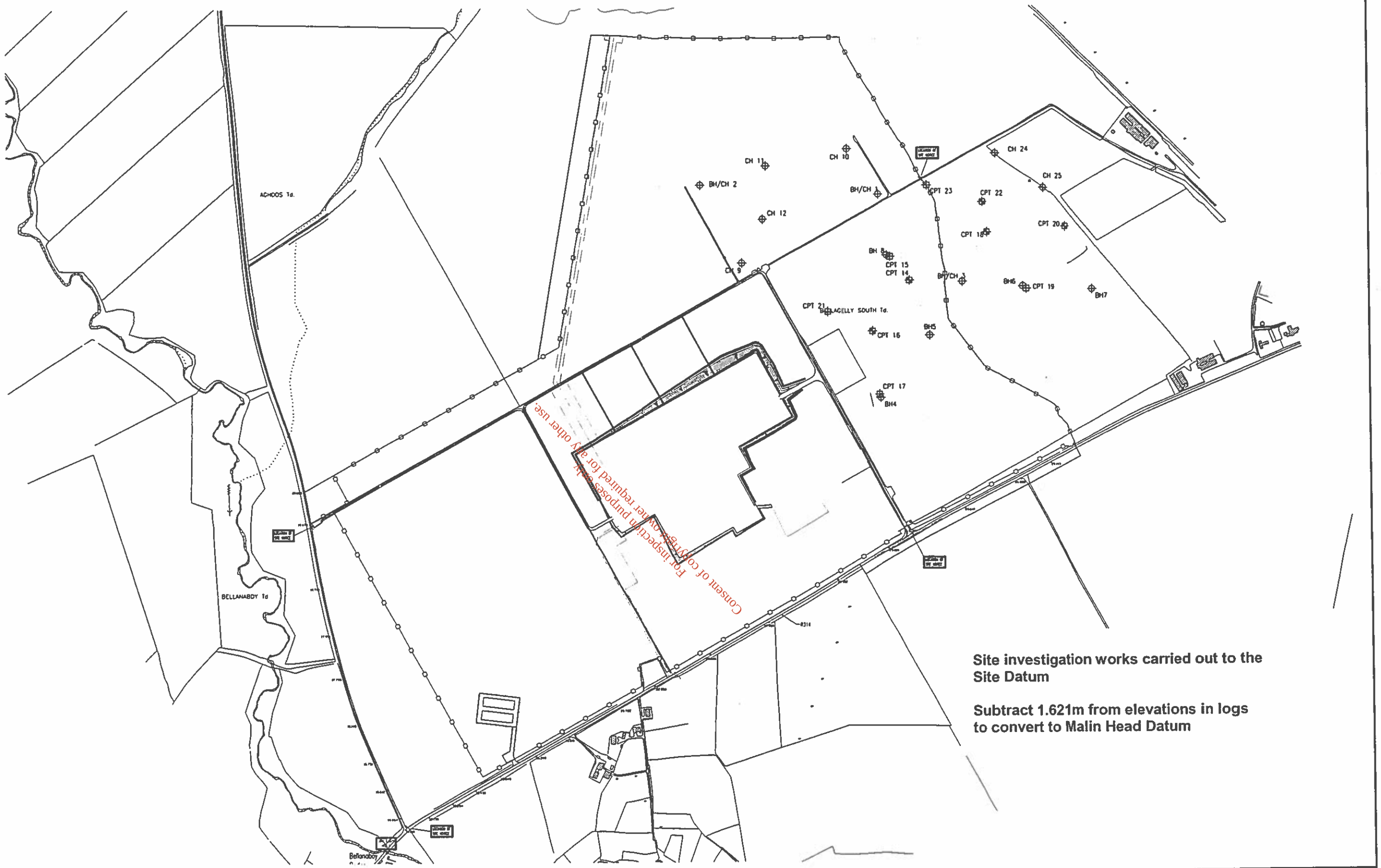
ASI Corrib JV

amec

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A3



Site investigation works carried out to the Site Datum

Subtract 1.621m from elevations in logs to convert to Malin Head Datum

LEGEND:

- CPT
- COREHOLE / BOREHOLE

Rev	Date	By	Description	Chd By
A	DEC 03	JOB	PLANNING	EJL

Job Title: CORRIB TERMINAL: BELLANABOY BRIDGE

Drawing Title: SITE INVESTIGATION WORK AUGUST 2003 - LANKELMA SEACORE OFF-SHORE

Drawing Status: PLANNING

ARUP Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
Email cork@arup.com
DUBLIN CORK LIMERICK

Scales: NTS | Original in: JOB | Checked: MD | Approved: EJL | Date: DEC'03

Job No: C1157.10 | Drawing No: Fig: 2.6 | Rev: A

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Status	PLANNING
Job Title	CORRIB GAS TERMINAL
Drawing Title	ON GOING SI WORK 2003
Scales NTS	File Ref B.1
Dm JOB Date DEC '03	Chd MD Approved EJL
Job No. C1157.10	Drg No. FIG 2.1 Rev A

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Corrib Terminal: Bellanaboy Bridge

Earthworks Report

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Arup Consulting Engineers

Shell E & P Ireland Ltd

Corrib Terminal: Bellanaboy Bridge

Earthworks Report

December 2003

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Arup Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel +353 021 4277670 Fax +353 021 4272345
www.arup.ie

Job number C1157.10

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CONTENTS

		Page
1.	**INTRODUCTION**	1
1.1	General	1
1.2	Description of Earthworks	1
1.3	Content of Report	1
2.	**DESIGN INFORMATION**	3
2.1	Site Datum	3
2.2	Topographical Survey	3
2.3	Site Investigation Information	3
2.4	Terminal Platform	5
2.5	Access to the Site	5
2.6	Temporary Construction Facility	5
2.7	Administration Buildings	5
3.	**GEOTECHNICAL INTERPRETATION**	7
3.1	Brief Description of the Site	7
3.2	Brief Description of Work to be Undertaken	7
3.3	Basis of Design	8
3.4	Material Classification	8
3.5	Ground Conditions within the Excavated Terminal Footprint	10
3.6	Re-use of Materials Excavated on Site	10
3.7	Geotechnical Design	11
3.8	Groundwater Control	12
3.9	Monitoring and Instrumentation	14
4.	**TERMINAL SLOPE STABILITY**	16
4.1	Introduction	16
4.2	Cut Slope Stability	16
4.3	Slope stability and groundwater	16
4.4	Slope stability and surface water drainage	17
4.5	Local stability of Cut Slope	17
4.6	Up hill slope stability of Peat Layer	17
4.7	Stability of Peat in Areas of Fill	17
4.8	Fill Slope Stability	18
4.9	Stability of Fill Area	18
5.	**ACCESS ROADS**	20
5.1	General	20
5.2	Site Investigation Interpretation	22
5.3	Stability Calculations	23
5.4	Construction Sequence	23
6.	**SETTLEMENT PONDS**	25
6.1	General	25
6.2	Site Investigation	25
6.3	Stability Calculations	26
6.4	Construction Sequence	27
6.5	Piped Drain to Settlement Ponds	28
7.	**ADMINISTRATION BUILDING / WAREHOUSE CAR PARK**	29
7.1	General	29

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EPA Export 08-07-2014:23:43:00

7.2	Site Investigation	29
7.3	Slab Design	29
7.4	Pile Design	29
7.5	Construction Sequence	29
8.	**TEMPORARY CONSTRUCTION FACILITY**	**31**
8.1	General	31
8.2	Site Investigation	31
8.3	Stability Calculations	31
8.4	Construction Sequence	31
9.	**DIGITAL GROUND MODEL**	**33**
9.1	General	33
9.2	Description of DGM	33
9.3	DGM Material Surfaces	34
9.4	Terminal Platform Surface	34
9.5	Cut and Fill Volume Calculation Methodology	38
10.	**MATERIAL BALANCE**	**40**
10.1	General	40
10.2	Description of Material Volumes	40
10.3	Summary	43
11.	**EARTHWORKS CONSTRUCTION SEQUENCE**	**44**
11.1	General	44
11.2	Seasonal Impacts	44
11.3	Upgrade of Public Road Haul Route	44
11.4	Site Works	44
12.	**REFERENCES**	**50**

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APPENDICES

APPENDIX A
Earthworks and Roads Drawings

APPENDIX B
AMEC Civils Design Philosophy Document L3882-030-0389

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1. INTRODUCTION

1.1 General

Shell E & P Ireland Ltd (Shell) propose to submit a planning application for the development of a Gas Reception Terminal associated with the Corrib Gas Field at Bellanaboy Bridge, County Mayo.

1.2 Description of Earthworks

Figure 1.1 presents the layout of the site, identifying some of the main elements associated with the earthworks.

The earthworks phase of the development involves:

- the upgrading of access roads within the site
- the creation of new access roads where necessary
- the installation of new drains and settlement ponds
- the excavation of peat, mineral soil and rock to create a horizontal terminal platform measuring approximately 12 hectares in plan (ref. Figure 1.1)
- the creation of an area for administration buildings and associated car park
- the creation of a temporary truck parking and temporary construction facility.

All excavated peat will be removed from site. The transportation of the peat from the site and the reception of the peat at the deposition site are not covered by this document. In a number of areas, peat strengthening techniques will be used to increase the strength of the peat so that it can be left in-situ and not removed from site. This is the case around the settlement ponds, under the access roads, administration buildings and temporary construction facilities.

The mineral soils and rock will be used as fill on site as required for the creation of the terminal platform and the upgrading of emergency access roads.

Fill material will also be imported onto the site for drainage, surface dressing, and other uses.

1.3 Content of Report

This report outlines the design associated with the earthworks that was carried out to accompany the planning application. These issues include:

- Geotechnical interpretation of the site
- Assessment of the stability of the cut and fill slopes created on the site and the reinforcement of slopes where necessary
- Description of digital ground modelling carried out on the site
- Preliminary design of access roads on the site
- Assessment of the stability of the settlement ponds
- Preliminary design of the administration building car park and temporary truck park
- Preliminary design of the temporary construction facility
- Summary of the material balance associated with the earthworks

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- Description of the sequence of construction of the earthworks

This report should be read in conjunction with all other information submitted with the planning application, particularly the following:

- Site Drainage Planning Report
- Geology, Hydrogeology and Global Stability Planning Report

The AMEC Document, "Civils Design Philosophy Document", document no. L3882-030-0389, presents the foundation philosophy for the terminal and administration buildings and is included as Appendix B to this report for reference.

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2. DESIGN INFORMATION

2.1 Site Datum

All elevations and levels are to the Malin Head Ordnance Datum.

2.2 Topographical Survey

The site topography, see Figure 2.1, is referenced to Ordnance Datum at Malin Head using the Ordnance Bench Mark at Bellanaboy Bridge. This benchmark is 13.192mAOD Malin Head.

The topographical data used in the study was taken from a survey carried out by DMC Surveys. This survey was referenced to a Temporary Bench Mark (TBM) at the site which resulted in levels that are the equivalent to 1.621m higher than levels taken to the Malin Head Ordnance Datum. The topographical data was therefore converted to Malin Head Datum by reducing all levels by 1.621m.

2.3 Site Investigation Information

A number of site investigations have been carried out on the site since 2001. The extent, purpose and summary findings of the site investigations are given below. The location of all the site investigation work is shown on Figures 2.2 to 2.7. The resulting logs from the site investigations are not included with this report but can be viewed on request to Shell E&P Ireland Limited.

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All of the site investigation studies listed below, except for SI No. 4, were referenced to the TBM at the site referred to in Section 2.1 above. Consequently, the elevations recorded on any of the logs from the above site investigation studies are 1.621m higher than the equivalent Malin Head Ordnance Datum level. Therefore to convert the elevations recorded on the logs to the Malin Head Ordnance Datum, subtract 1.621m.

2.3.1 Site Investigation No. 1

2.3.1.1 Site Investigation No. 1A

March 2001 to February 2002 Minerex Environmental Ltd – Figure 2.2

This site investigation was carried out to determine the groundwater regime on site and to gather environmental base line data. The investigation found that there is a perched water table within the peat, particularly in the upper areas of the site. The bedrock water table at the top of the site is some 6 to 9m below existing ground levels. At lower elevations the bedrock water table lies within the peat indicating possible upward flow of water in these areas.

The fieldwork comprised the following:

- 50 gouge core holes to refusal in the mineral soils underlying the peat
- 7 boreholes for the installation of piezometers to monitor ground water levels.

2.3.1.2 Site Investigation No. 1B

April to May 2001, Irish Geotechnical Services Limited – Figure 2.3

This site investigation was carried out to determine the ground conditions in the upper strata of the terminal. It was located within and around the area to be excavated to construct the terminal footprint. The boreholes show that the site is overlain by blanket peat bog varying in thickness from 1.0m to 4.0m with the thickness increasing down slope. The peat is underlain by a clay layer which varies in thickness from 0.2m to 2m, and similar to the peat, increases in

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thickness down slope. The clay is underlain by a sand layer which is described as possible weathered rock. All boreholes were taken to refusal and this in general was within the upper 2m of the sand layer.

The fieldwork comprised the following:

- 26 light cable percussion boreholes
- Mackintosh probing and trial pitting

2.3.1.3 Site Investigation No. 1C

April to May 2001, Irish Drilling Limited – Figure 2.4

This site investigation was carried out to investigate the nature of the bedrock within the area to be excavated for the terminal platform. The investigation showed the bedrock to be a micaceous Schist. The intact bedrock is overlain by a weathered layer, the thickness of which increases down slope. Depth to bedrock varies across the site being shallowest (approximately 3m) near the top of the hill and increasing to 9m along the south side of the terminal.

The fieldwork comprised the following:

- 22 rotary cored drillholes (4 no. to the north east of the terminal footprint)
- 17 Packer tests in the rotary cored holes
- 81 In-situ vane tests (which were spread over the entire site)

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2.3.2 Site Investigation No. 2

July to November 2002, Fugro Limited – Figure 2.5

This investigation was carried out to investigate ground conditions in the area to the east and north east of the terminal with particular attention being paid to the strength and deformation parameters of the peat.

The fieldwork comprised the following:

- 160 CPTs
- 12 light cable percussion boreholes
- 7 rotary cored drillholes
- 36 In situ shear vane test locations
- 27 Mostap sample locations
- 5 Plate Load tests

2.3.3 Site Investigation No. 3

August 2003, Lankelma Seacore Offshore (LSO) – Figure 2.6

This site investigation was carried out to determine ground conditions in the area the northeast of the Terminal. The site investigation fieldwork comprised the following:

- 8 light cable percussion boreholes
- 9 rotary cored drillholes
- 10 CPTs

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2.3.4 Site Investigation No. 4

November 2003 – ongoing, Irish Drilling Limited/Lankelma/Fugro – Figure 2.7

This site investigation is being carried out to gather further information in a number of areas of the site. These are the settlement ponds, the existing roads, the administration building area, the area to the south of the terminal, the mineral soils for classification and groundwater control within the terminal footprint.

The fieldwork comprises the following:

- 88 no. CPTs, geonor vane and mostap sampling
- 17 no. light cable percussion boreholes
- 15 no. rotary cored boreholes
- 1 no. pumping well
- 15 no. trial pits
- 288 no. cobra probes
- Resistivity traverse along the existing roads.

2.4 Terminal Platform

The layout of the Terminal Platform is as specified in the AMEC Drawing "Overall Plot Plan".

The elevation of the Terminal Platform has been selected at 33.4mAOD (Malin Head) in order to optimise the material balance for the earthworks on the site.

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2.5 Access to the Site

The Main Access Road from the R314 will be capable of withstanding the volume of traffic required during construction. The road will be 15m wide as far as the turning to the Administration Buildings and 10m from there to the Temporary Construction Facility.

A new road will be required to the west of the Main Access Road to provide access to the Administration Buildings and the Terminal Platform

A new access road from the R314 will be installed to facilitate access to the new settlement ponds for construction and maintenance purposes. This access will be 8m wide.

The Emergency Access Roads will be 6m wide and be capable of facilitating emergency services vehicles.

2.6 Temporary Construction Facility

A temporary construction facility area measuring 1 hectare is required for the main civil and mechanical phase of the works.

2.7 Administration Buildings

The location of the administration building area is as specified in the AMEC Drawing "Overall Plot Plan". The level of the administration building area has been set at 33.5mAOD.

The design of the foundations of the administration building is not covered by this document, however it is understood that the buildings will be supported by piles and concrete slabs and

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that all of the peat beneath the administration building area will be strengthened to facilitate installation.

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3. GEOTECHNICAL INTERPRETATION

3.1 Brief Description of the Site

The site lies on the southern flank of a very gently sloped hillock that peaks at 45m AOD. The site slope, measuring directly down the slope, is 1.5°. The site topography, shown to ordnance datum at Malin is shown in Figure 2.1.

There is a layer of blanket peat bog mantling the site. It varies in thickness within the terminal footprint from 2.2m in the northeast to 3.6m in the southwest. The peat is underlain by a clay layer that thickens to the southwest and is, in turn, underlain by a sand layer believed to be derived partially from the in-situ weathering of the underlying bedrock, a micaceous Schist from the Inver Formation, and partially through downhill movement of eroded material. The depth of mineral soils generally increases to the southwest. Depth to bedrock varies across the site being shallowest (approximately 3m) near the top of the hill to in excess of 9m along the south side of the terminal.

Groundwater levels vary across the site. The peat layer is effectively a perched water layer over the upper areas of the site. The underlying mineral soils are relatively dry here and the groundwater level in the bedrock is 6 to 9m below current ground levels. Along the southern areas of the site the bedrock water table is within the peat. General permeability values for the different strata are all very low with the peat being the lowest at 10^{-8} to 10^{-9}. The most permeable layer is the fractured rock layer and permeability values of 10^{-6} have been recorded here. The aquifer classification by the Geological Survey of Ireland describes the Inver Schist Formation as a poor aquifer that is generally poor in terms of groundwater resources.

The geology of the site as a whole and the hydrogeology is described in detail in The Geology, Hydrogeology and Global Stability Planning Report.

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3.2 Brief Description of Work to be Undertaken

It is proposed to excavate a level platform, some 12 hectares in size, to accommodate the gas terminal works. The platform will be cut to a level of 33.4m above ordnance at Malin Head (AOD). The existing ground levels vary from 43mAOD in the northeast of the proposed terminal area to 30mAOD in the southwest. The general slope is diagonally across the terminal footprint from the northeast to the southwest.

It is proposed to take the excavated peat off site as well as any surplus mineral soil. Suitable soils and excavated rock will be used as fill material on site within the terminal and on site roads.

The excavation will result in cut slopes along the northeast corner of the site. There will be a maximum of approximately 10m of excavation in this area and the slopes will be cut through the peat, mineral soils, non-intact rock and intact rock. In the southwest, where the existing ground is below the level of the platform, it will be necessary to excavate the soft peat and any underlying soft soils and fill back up to the platform level of 33.4mAOD. It is intended to use most of the material won on site as fill. A maximum of 7m of fill will be required. In certain instances it will be necessary to import stone fill. This is when it is required before it can be won on site and where a particular specification is required, for example for surface dressing.

It will be necessary to upgrade the existing roads on site to carry the construction traffic and long-term gas terminal operational traffic. Settlement ponds will be required to treat the surface water run-off during construction and a hardstanding area will be required for the temporary construction facilities.

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3.3 Basis of Design

In order to excavate the level platform and construct the Corrib Gas Terminal it has been necessary to demonstrate/satisfy the following:

a) Stability of all cut slopes to achieved factors of safety of 1.4 and better for all modes of failure.
b) Buildability and stability of all works associated with excavation of slopes
c) Overall stability of the peat layer on the ground above the terminal
d) Control of groundwater and surface water on the cut slopes
e) Control of groundwater within Terminal excavation, during construction and long-term
f) Classification of excavated materials to determine quantities of suitable and unsuitable materials
g) Traffickability of excavated surface for construction plant
h) Stability of cut peat in areas of fill
i) Buildability of platform in areas of fill
j) Stability of slope constructed using the fill material
k) Overall stability of fill material placed on mineral soil
l) Excavation of the terminal will not adversely change the groundwater regime both within and external to the site.
m) Global and local stability of settlement ponds
n) Buildability of settlement ponds
o) Stability and strength of widened roads to carry construction traffic
p) Stability and strength of hardstanding to carry construction facility loads

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All the above design considerations are dealt with in a number of planning reports, namely:

- Geology, Hydrogeology and Global Stability Planning Report – d, e & l
- Earthworks Planning Report – a, b, c, f, g, h, i, j, k, m, n, o & p
- Drainage Planning Report – design of drainage system to carry surface and groundwater run-off.

3.4 Material Classification

The nature of the material to be excavated to create the Terminal footprint at 33.4m AOD Malin Head has been determined from the site investigation detailed in Section 2.3. A number of cross sections through the Terminal, identifying the strata and their expected depths, are shown in Figures 3.1 to 3.12. The figures show an exaggerated vertical scale to enable borehole/corehole details to be easily shown. The excavated materials are classified below.

3.4.1 Peat – Organic Soil – unsuitable material

The entire footprint of the terminal is covered by peat as detailed in the Geology, Hydrogeology, and Global Stability Planning Report. The peat is thinnest in the northeast corner as determined by IGSL BHP14 where the peat is 2.2m thick. The peat increases in thickness toward the southwest corner where IGSL BHW8 is located. The peat thickness recorded here is 3.7m thick. See Figure 3.14 for details on peat thickness across the terminal footprint.

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The peat is an unsuitable material both for supporting load and for re-use. All peat excavated will be removed off site. All permanent excavated peat faces will be supported. Temporary exposed peat faces or slopes will only occur during the peat removal phase of construction.

It is proposed to re-instate and refurbish the existing drains on site immediately as a measure to drain the peat layer and improve its strength. These drains were installed originally by Coillte to facilitate the forestry of the site.

3.4.2 Mineral Soil – Inorganic Soil – unsuitable and suitable material

In general there is a layer of firm to stiff grey sandy gravely CLAY overlying dense to very dense light green clayey slightly gravely SAND. This latter layer is believed to be derived partially from the in-situ weathering of the underlying bedrock and partially through downhill movement of eroded material.

The clay layer varies in thickness from 0.2m in IGSL BHP14 in the northeast corner of the site to 2.2m in IGSL BHW7 in the southwest corner of the site. The increasing thickness of the clay layer follows the same pattern as the surface peat layer. Soft clay underlying the peat is only encountered in IGSL BHA5. This soft material will have to be locally removed. The grading curves for this cohesive material are presented in Figures 3.15, 3.17 and 3.18

There is little variation in the sand layer. The grading curves for the particle size distribution tests are presented in Figures 3.16, 3.17 and 3.18. The samples from the trial pits have the highest percentage of fines. It is likely to be due to the sampling method which minimises the loss of fines when compared to the extraction of the soil in the shell in the light cable percussion drilling method.

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The sand varies from medium dense to very dense and rapidly gains strength with depth. Most of the light cable percussion boreholes met with refusal within 2 metres of the top of the sand layer.

Some laboratory testing, apart from the particle size distribution curves, was carried out on the mineral soils materials. These tests indicate, with low CBR (Californian Bearing Ratio) and low MCV values that these soils will be prone to rapid deterioration when trafficked in wet conditions and will be very sensitive to moisture changes. The formation surface of the terminal will be protected with a geotextile and capping layer to form a trafficking and working surface. Consideration will also be given, where appropriate, to the strengthening of various temporary and permanent excavation levels by the addition of cement based binders to improve strength and traffickability.

If necessary, unsuitable mineral soils may be strengthened, again using cement based binders, to make them suitable for use as general fill.

3.4.3 Rock – suitable material

The rock encountered within the Terminal footprint is micaceous Schist. The rock has been sub-divided into non-intact rock and intact rock. A total core recovery (TCR) of the order of 90% is used to differentiate between the two sub-divisions. The upper layers of the non-intact rock are highly to completely weathered and the material was recovered as sands and gravels in the coreholes. The thickness of the weathered zone increases with decreasing elevation on site. IGSL BH3 and IGSL BHP14, in the north eastern corner of the Terminal area encountered slight to moderately weathered intact bedrock within 3 to 3.5m of the surface whereas IGSL BHP10 and IGSL BHP15 encountered similar rock between 6 and 9m below ground level. The highly weathered zones of bedrock are expected to be readily excavated as the rock is weak to moderately weak and generally non-intact. However this material will degrade during handling. The slightly weathered to fresh bedrock will be excavated by rock breaking as joint spacing is close. The slightly weathered to fresh bedrock is not expected to degrade significantly on handling.

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3.5 Ground Conditions within the Excavated Terminal Footprint

The expected ground conditions at the excavated platform level of 33.4m AOD are presented in Figure 3.13. The north eastern corner of the site will be excavated through to the intact bedrock whilst the south western corner will be excavated to the top of firm soil to remove the peat and levels brought back up to 33.4m AOD Malin.

In areas where rock is exposed the ground surface conditions will be capable of handling site traffic without the need for any surface dressing. In areas where the terminal formation level is in mineral soils the excavated surface shall be graded to falls to facilitate the run-off of surface water and minimise deterioration of the soils. Falls between 1:100 and 1:150 will be used.

In areas of fill, see Figure 3.13, general fill material from the site will be used to bring ground levels up to 33.4m AOD Malin. The fill material and the underlying mineral soils will be subject to settlement with time so foundations for all structures and services will be piled.

3.6 Re-use of Materials Excavated on Site

The National Roads Authority (NRA) Specification for Road Works classifies earthworks materials in tables 6/1, 6/2, and 6/3. The specifications range from unsuitable material Classes U1 and U2 (Clause 601) to specialise fill for reinforced earth structures.

The material on site, based primarily on the particle size distribution curves falls into Classes 1 and 2. In general, with strict control on the moisture content, the suitable material will be used as a general fill. Site investigation no. 4 will facilitate further refinement and better definition of the classification of the excavated materials. Table 3.1 below details the NRA classification of the materials to be excavated on site and their end use.

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Table 3.1 Material Classification

Soil/Rock Type	NRA Classification	Comments
Peat	Class U1	This material cannot be used in the permanent works unless processed to meet requirement of Table 6/1 of the NRA Specification for Roadworks.
Clay	Class U1 or Class 2C	Clay with LL>80% and PL>55% is Class U1 material. No Atterberg Limits tests are currently available for this clay material. On the basis of the particle size distribution curves the material this material is suitable for Class 2C. This material will be suitable for landscaping purposes but additional tests such as MCV, mc and undrained shear strength of the remoulded material are required to determine how it can be handled on site and to determine additional uses. The re-use of this material is expected to be very weather dependent. Results from the laboratory tests show the materials tested to be more Class U1 rather than Class 2C. Class U1 material from the mineral soils will be removed off site.
Sand	Class 2	Again this layer will be suitable as a general fill material. Its handling will be weather dependent but it will not be as sensitive as the clay layer. Again further testing needs to be carried out on this material to determine how best to handle the material on site. This will determine whether or not it needs to be stockpiled prior to re-use. The laboratory tests generally indicate poor CBR and MCV results. On one compaction test the natural moisture content was seen to be well above optimum moisture content.
Non-Intact Rock	Class 6B possibly, otherwise Class 1	Classes 1 and 6B are the only classes of granular material that permit the use of argillaceous rock or gravel. However for Class 6B the fines portion must be non-plastic and for both Class 6B and Class 1C the material must have a 10%fines value of 50kN. It is expected that the moderately to highly weathered non-intact rock will not achieve this value. This means that it will be subject to fragmentation and degradation during handling on site. This material will be used as a general fill on site.
Intact Rock	Class 6B possibly, otherwise Class 1	Similar to non-intact rock. In general only the slightly to fresh rock is expected to be suitable for Classes 1C and 6B. The intact rock will be used as a general fill on site. The fresh to slightly weathered rock will be used as a drainage layer under the fill on the terminal footprint.

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3.7 Geotechnical Design

The main areas of geotechnical design for the construction of the gas terminal are considered to be as follows:

Terminal slope stability – excavation of the terminal and the creation of the cut and fill slopes. Details of this work are given in Section 4.

Access Roads – the existing roads on the site need to widened and upgraded to cater for the traffic expected during the excavation of the peat and its removal off site. The east west road along the northern boundary of the site needs to be upgraded and widened to cater for some

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construction traffic and for emergency traffic in the long-term. Details of the design of the roads are given in Section 5.

Settlement Ponds – it is necessary to settle the fines suspended in the surface water run-off, especially during the construction phase of the terminal. The settlement ponds will be located to the southwest of the terminal to take advantage of the lower lying ground to facilitate gravity drainage of the run-off. Details of the design of the drainage system are given in *RP006 - Site Drainage Planning Report*. The details of the geotechnical design of the settlement ponds and their stability are given in Section 6.

Administration Area Truck Park/Car Park – in order to minimise the volumes of peat to be excavated and removed off site it has been decided not to remove the peat from under the area of the Administration Block and the associated car park. The car park area will be used for truck parking during the excavation of the peat and also as a temporary construction facility. Details of the geotechnical design for this area are given in Section 7. This includes the details of the strengthening of the ground for the installation of the piled foundations, the pile and slab design.

Temporary Construction Facility – a hardstanding, 1 hectare in size is required as a Temporary Construction Facility (TFC). The design for the construction and stability of this area is given in Section 8.

3.8 Groundwater Control

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The control of groundwater and surface water will play a key role in the safe and successful execution of the earthworks. The construction works must maintain the balance of surface run-off and the rate of infiltration, principally to avoid the accumulation of excess water on, within or below the peat deposits. For the operation phase, a similar balance is required to maintain long-term stability.

As described in PR004 - Geology, Hydrogeology and Global Stability Planning Report - the presence of a near-surface water table in the peat and the saturated nature of the underlying mineral soils shall mean that water can be expected to flow into any excavation that extends more than a metre below ground level. Inflows will however be relatively small due to the low permeability of the materials being excavated. Any water however could cause softening and deterioration of the excavated surface and excavated materials.

Construction of the terminal will require excavations up to 10m deep, so to minimise the inflows of water into the excavations during construction dewatering and groundwater control measures will be implemented both before and during the works. The removal of the peat blanket could facilitate an increased recharge of the groundwater within the terminal footprint following construction. The measures to be taken to control surface water and groundwater before, during and after construction are described in detail in Section 3 of the site drainage report – *RP006 – Site Drainage Planning Report* and in Section 11.7 of *RP004 – Geology, Hydrogeology and Global Stability Planning Report.* Brief details are given below.

3.8.1 Groundwater Control Measures Prior to Earthworks

The site is currently covered by a series of ditches that drain surface water and locally control the groundwater within the peat. Within the site area the ditches generally run roughly east-west across the site, connecting into a ditch (D12) that runs roughly north-south along the west side of the terminal area. Most of the rainfall runs off the vegetated ground surface and into the open ditch system, feeding into local streams, rivers and ultimately Carrowmore Lake. It is proposed, before excavation works commence, to clean out and reinstate these drainage

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ditches to improve surface run-off and encourage drainage in the upper 1.5m depth of the peat layer. The drainage ditches will be cleared to a depth of 1.4m and will be locally widened with sandbag weirs to create mini-settling ponds prior to exiting into the main north-south (D12) ditch. These drainage re-instatement measures will be in place well in advance of construction works and will provide control on surface drainage.

In order to provide some level of control on the site's groundwater, it is proposed to install a system of dewatering vacuum wells to remove water from the underlying mineral soils and bedrock. This will also promote under-drainage of the peat. The wells will be sealed within the peat and vacuum assisted to help suck the water out of the relativity low permeability soils.

In order to achieve the maximum effect, the sub-surface drainage measures will be installed and operated for some time before the construction works commence. This vacuum dewatering well system will be a temporary measure used in advance of and during construction.

Over this period, the surface and sub-surface drainage will generate some control on the water movement within the peat and underlying soils and at least locally reduce the amount of water within the strata to be excavated. These control measures will lead to a reduction of seepage into the excavations, will improve the excavated surface condition and the condition of the materials being excavated.

3.8.2 Groundwater Control Measures During Earthworks

With the above control measures operating, the main source of water to be drained will be the accumulation of rainwater falling within the excavation. During the excavation of the terminal area the base of the excavated areas will be sloped to facilitate the drainage of the 'free' water from the peat and any surface water through shallow ditches (gripes) across the slopes to local sump areas. From these sumps the water will be pumped up to the existing surface drains to then fall to the settlement ponds for removal of the suspended solids. This system of shallow drains cut into the mineral soil surface and sumps will advance across the site as the excavation of the peat progresses. In the initial stages of the works the water removed from the excavation will drain through the surface ditches into the existing drainage outfall from the site area. The works will commence with the construction of the permanent settlement ponds and once completed all surface water will be diverted through the ponds.

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At cut slopes, permanent surface drains will be installed at the toe of the slope. The existing pre-construction drainage system will intercept surface run-off outside the terminal excavation whilst the toe drain will collect water from the slope surface. Permanent face drains will also be installed within the cut slope to keep the cut face essentially dry and to stop seepage erosion both during and after construction.

3.8.3 Long Term Groundwater Control Measures

Given the low permeability of the peat it effectively acts as a blanket over the site. This minimises direct downward recharge of the groundwater by rainfall. The excavation of the terminal removes the peat layer. In order to ensure that this does not adversely impact the ground water regime within and around the terminal post construction, both surface and groundwater drainage will be provided within the terminal area. Surface drains will be provided within and around the terminal area to intercept surface rainfall. To assist in the long-term control of the groundwater, a deep drain will be installed along the southern end of the terminal, on the terminal side of the sheet-piled wall. The purpose of this drain is to collect the surface water percolating through the fill and groundwater rising from the underlying mineral soils by means of a more permeable rockfill layer placed underneath the fill and connecting to the perimeter land drain. This helps prevent build up of groundwater pressures underneath the fill and in the areas south of the terminal footprint.

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Elsewhere within the site, outside the terminal footprint, the peat is to be left in-situ. Within the terminal platform area a separate closed drainage system that will be subject to monitoring will be provided to accommodate all surface run-off from paved and built areas.

3.9 Monitoring and Instrumentation

Instrumentation is required to monitor the performance of the earthworks and validate the design. Instrumentation will be installed to monitor ground levels and groundwater level before, during and after the construction of the terminal. This shall take the form of instrumentation to detect horizontal and vertical movements of the ground and water pressures within the soil mass. Areas surrounding and within the terminal footprint will be monitored.

The monitoring carried out before construction will establish the base line data. It will be necessary to establish a number of survey stations that will not be affected by the works. This will be done by constructing survey stations on the high ground and taking the foundations down to a stiff or dense or better bearing stratum.

Continuous monitoring of the instrumentation will be carried out to allow on-going geotechnical interpretation and assessment of the ground's response to the construction works. The actual ground response will be compared to the expected or predicted response. Should observed behaviour move outside that predicted, contingency measures will be implemented as required. These contingency measures will be developed in advance of the works and both the design and the construction teams will take the appropriate actions when necessary. During the detailed design stage it is proposed to draw up a table indicating the predicted/expected behaviour of the ground in response to the works. Trigger levels and actions to be taken for the varying levels of response will be documented in the table.

The general areas to be monitored are shown on Figure 3.19. Particular emphasis will be placed on the areas to the north and south of the terminal and the area around the settlement ponds. In effect monitoring will be concentrated within areas down slope from the construction works to detect any unexpected changes in the condition of the peat deposits in these areas. The area of fill within the terminal footprint will also be monitored for settlement and ground water levels. The monitoring zones shown in Figure 3.19 are in addition to the groundwater monitoring points already installed as part the site investigation works done to date. The types of instrumentation to be installed on site are detailed in Table 3.2 below.

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Table 3.2 – Monitoring Instrumentation

Description	Purpose	Location
Survey Stations	To provide points which are fixed both horizontally and vertically, from which accurate and reliable survey information can be read.	See Figure 3.19
Settlement Plates	To measure settlement in the vertical direction	See Figure 3.19
Inclinometers	To measure horizontal displacement profiles in the ground	See Figure 3.19
Standpipe piezometers	To measure groundwater levels and facilitate water sampling	See Figure 3.19
Electrical piezometers	To measure groundwater pressures where the physical response is delayed due to the low permeability of the soils.	See Figure 3.19

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The instrumentation will be installed and commissioned before commencement of the construction works on the site. The instrumentation used will be simple and robust with some redundancy built-in to allow for breakages or failure. Sampling of groundwater for analysis of water quality will be facilitated if required. A geotechnical engineer will carry out monitoring and interpretation on-site and will produce interpretive reports at regular intervals on the ground's response to the works. A handover report shall also be complied upon completion of the works detailing the full results over the whole construction period. Monitoring will be continued after the end of the construction works.

The frequency of data readings will be highest during the construction phase of the project after which the frequency of monitoring will slowly reduce. The rate of reduction will be determined by the response of the ground during and after the construction of the terminal.

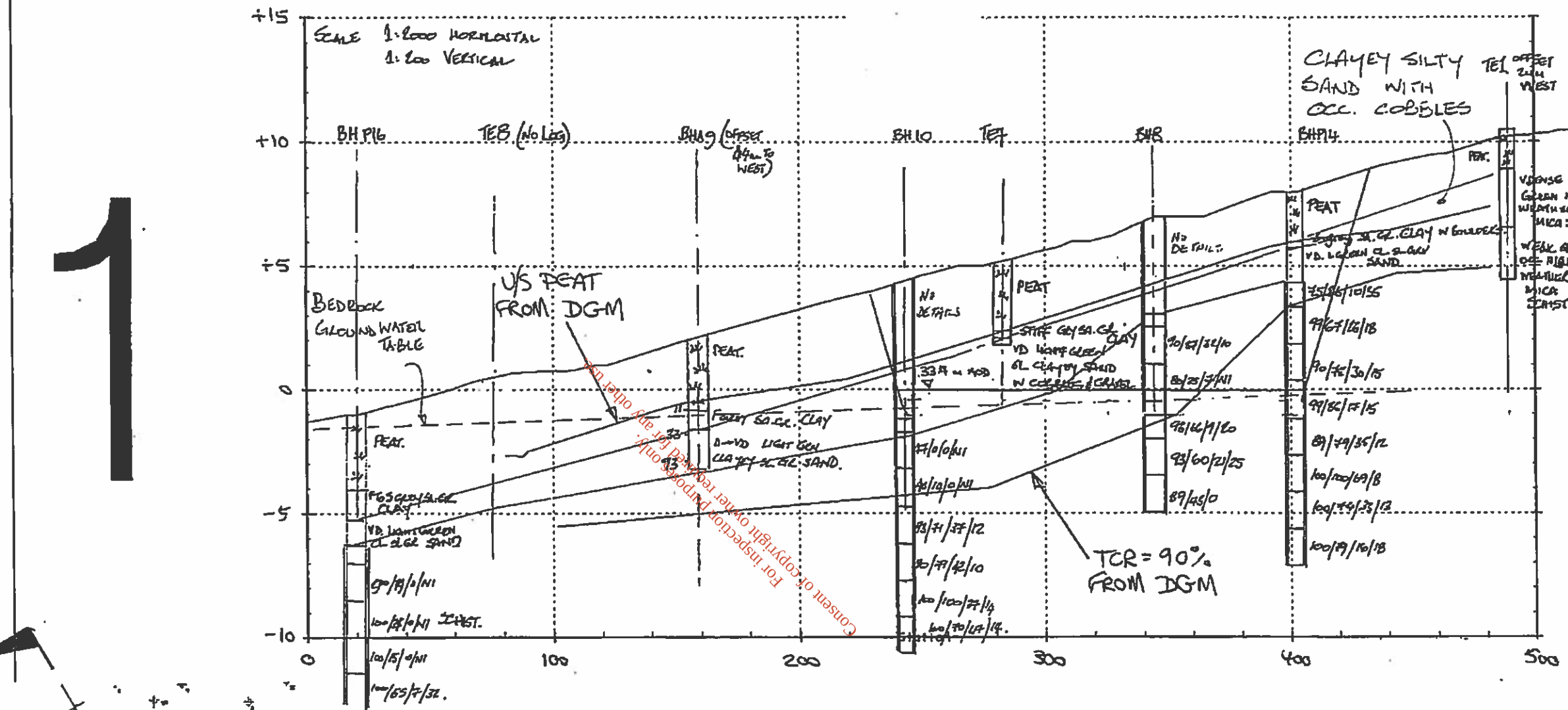
In addition to the ground and groundwater instrumentation, noise and vibration monitoring will be carried out at regular intervals during the construction works. Before the main works commence trial sheet pile installations will be undertaken and noise and vibrations will be monitored. This is normally carried out as part of any piling installation work is to determine that noise and vibration levels for the chosen installation method are within those set out in the Environmental Impact Statement. Monitoring will be undertaken during the construction phase to check for compliance and contingency measures put in place if required.

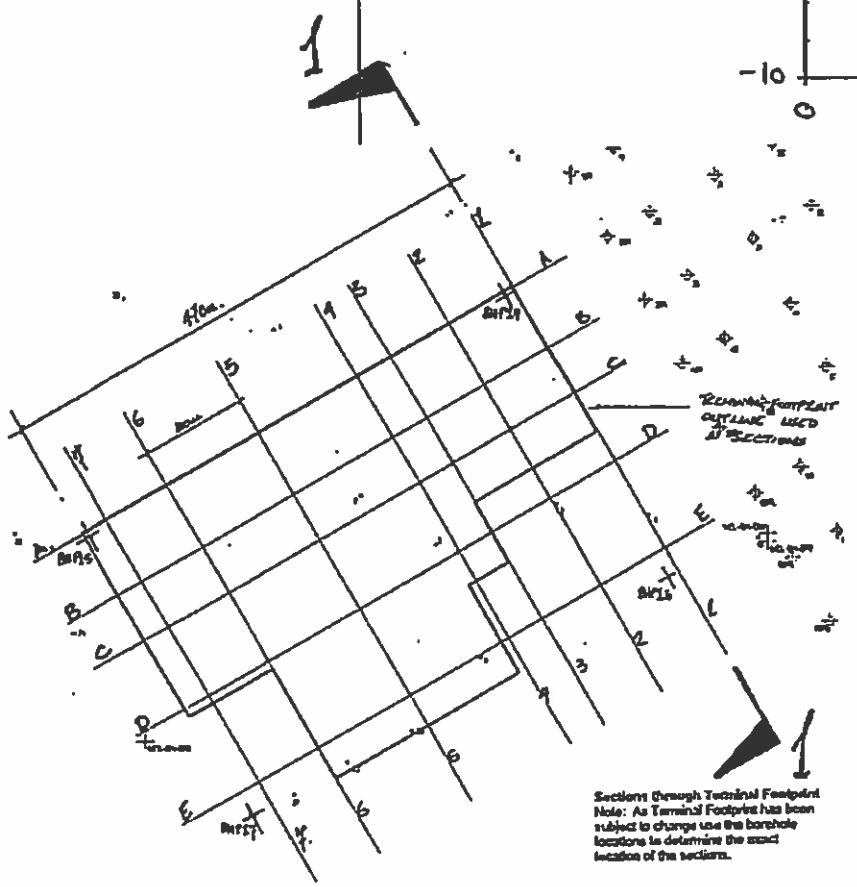
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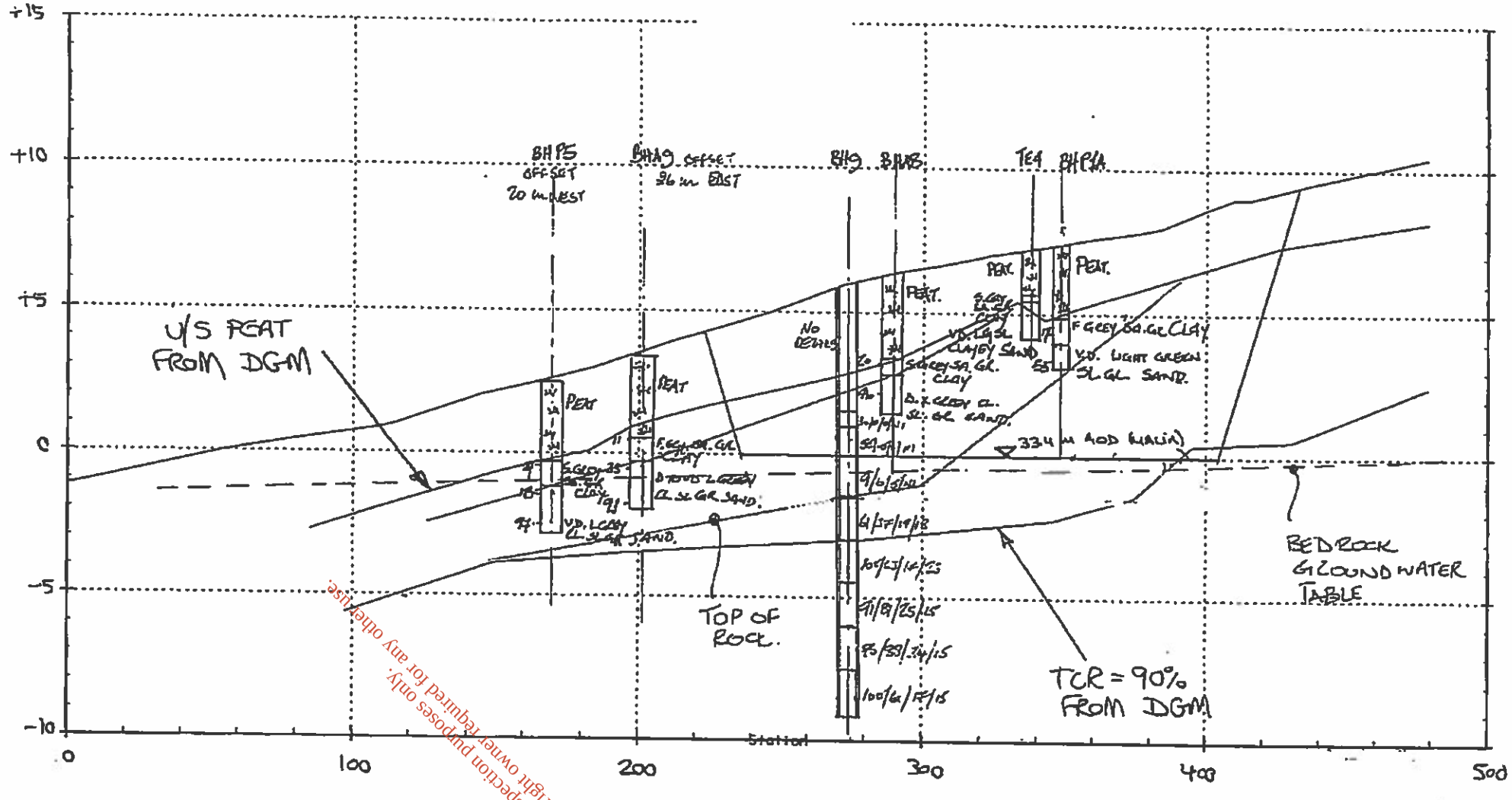


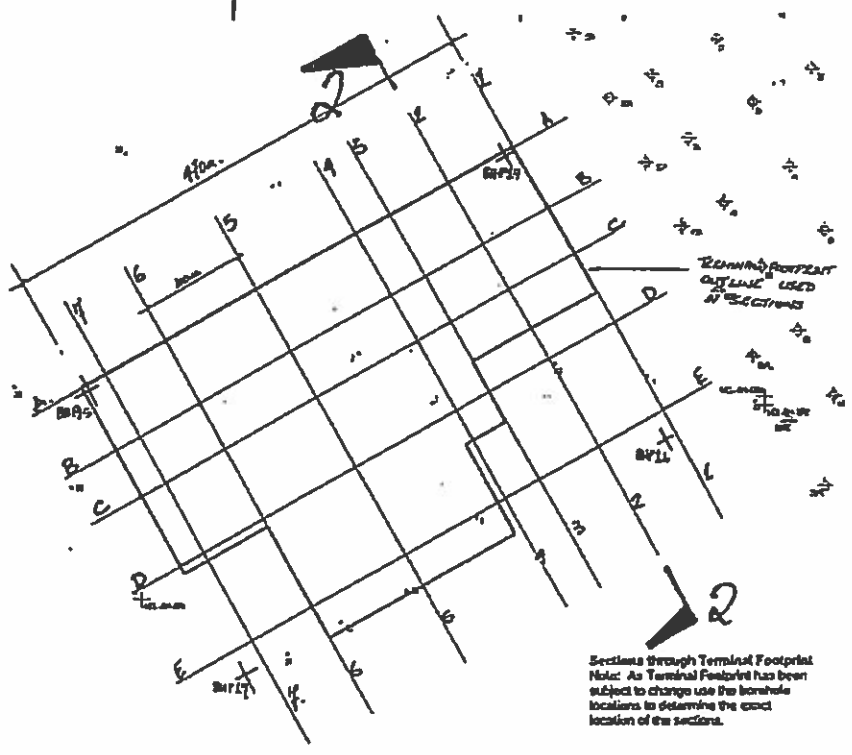


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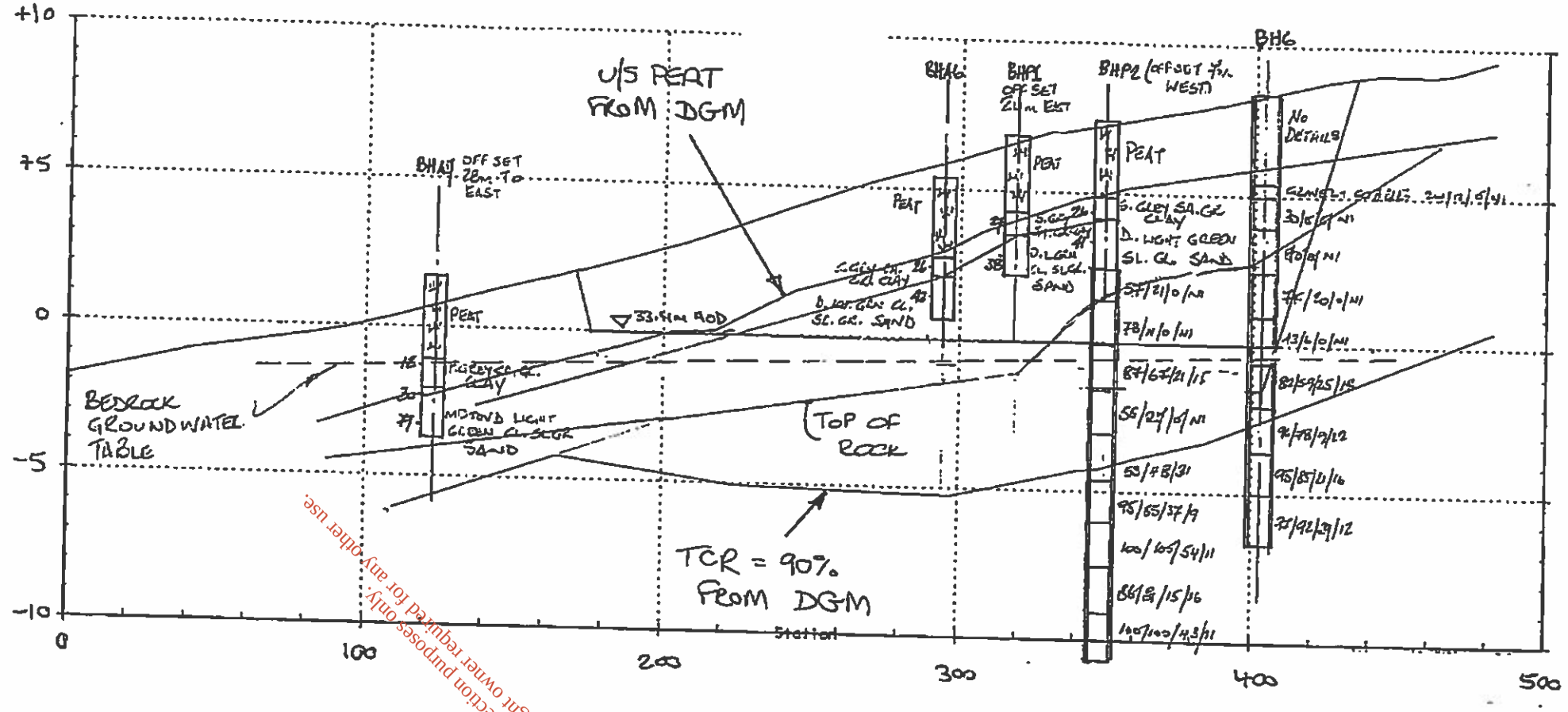


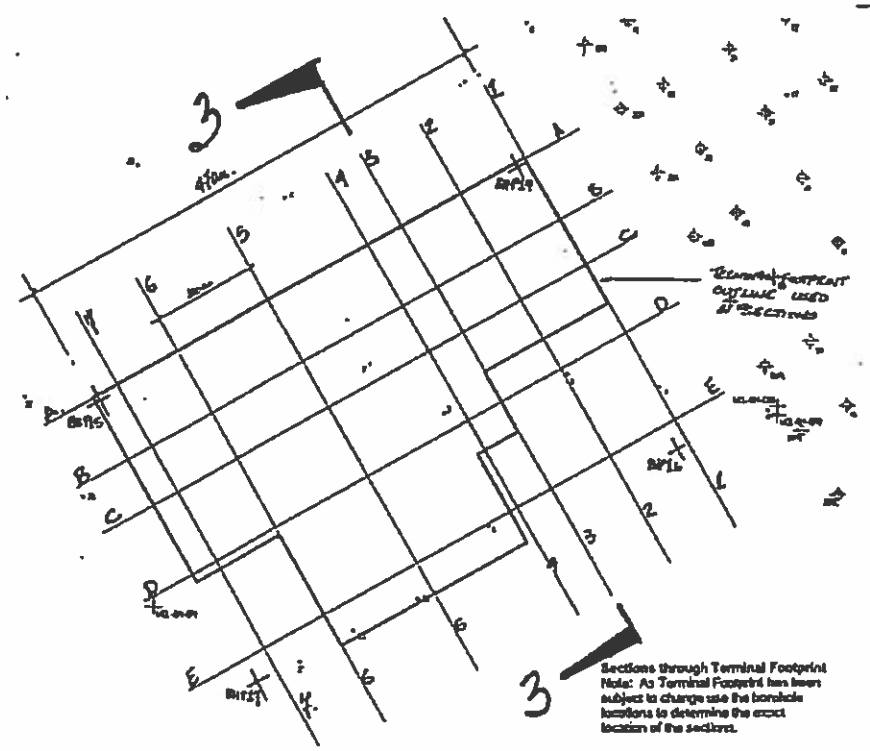


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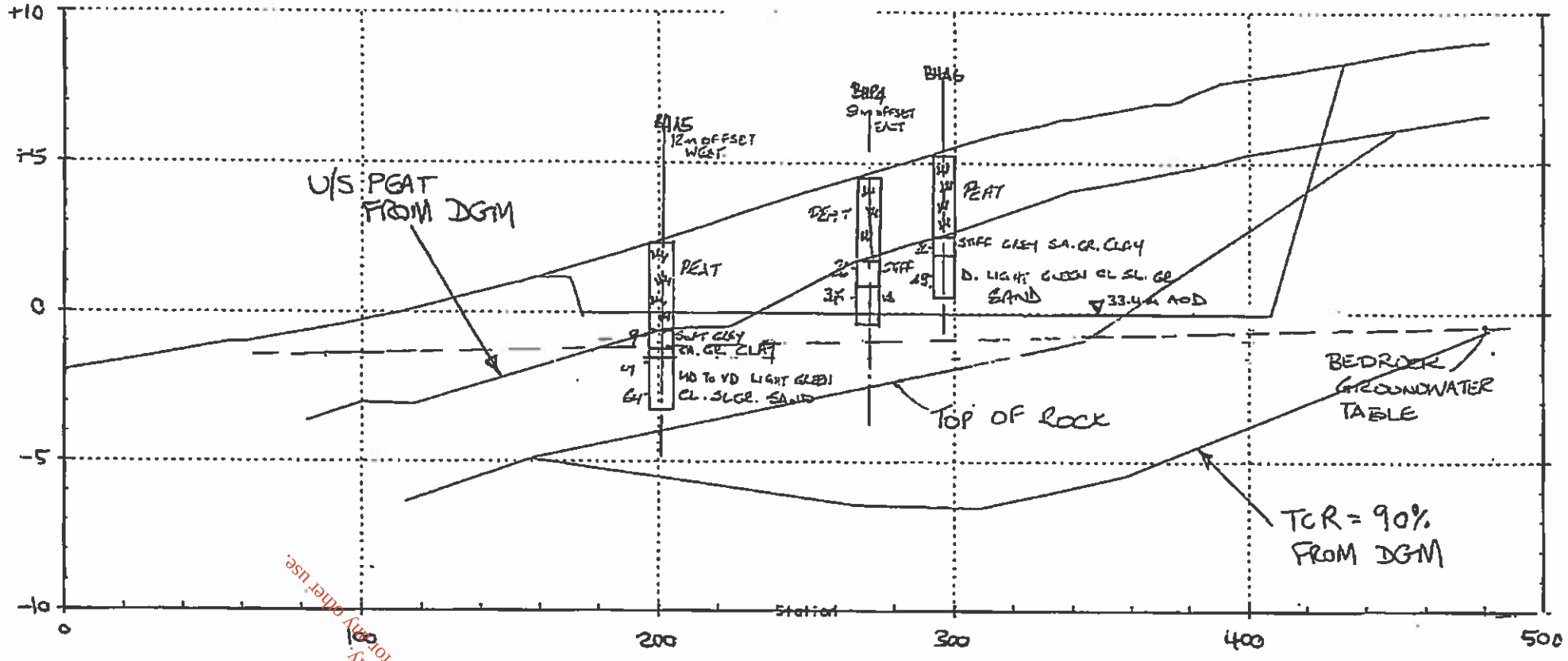


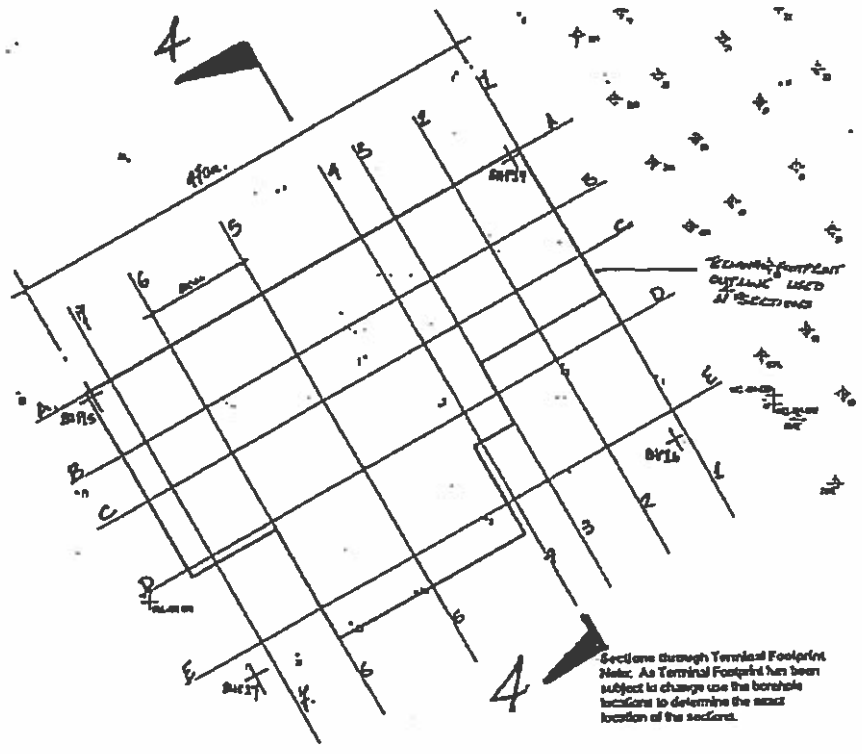
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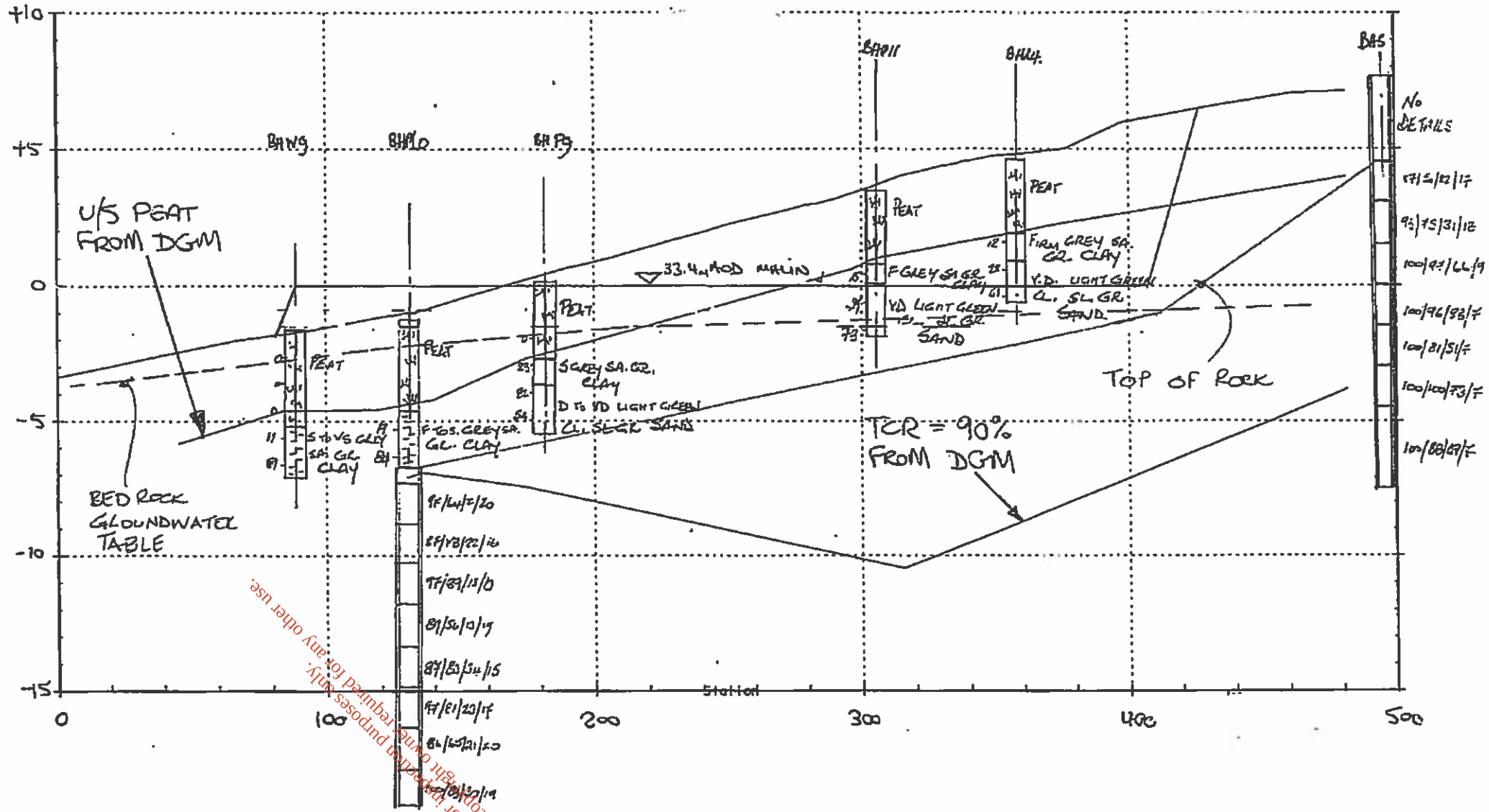


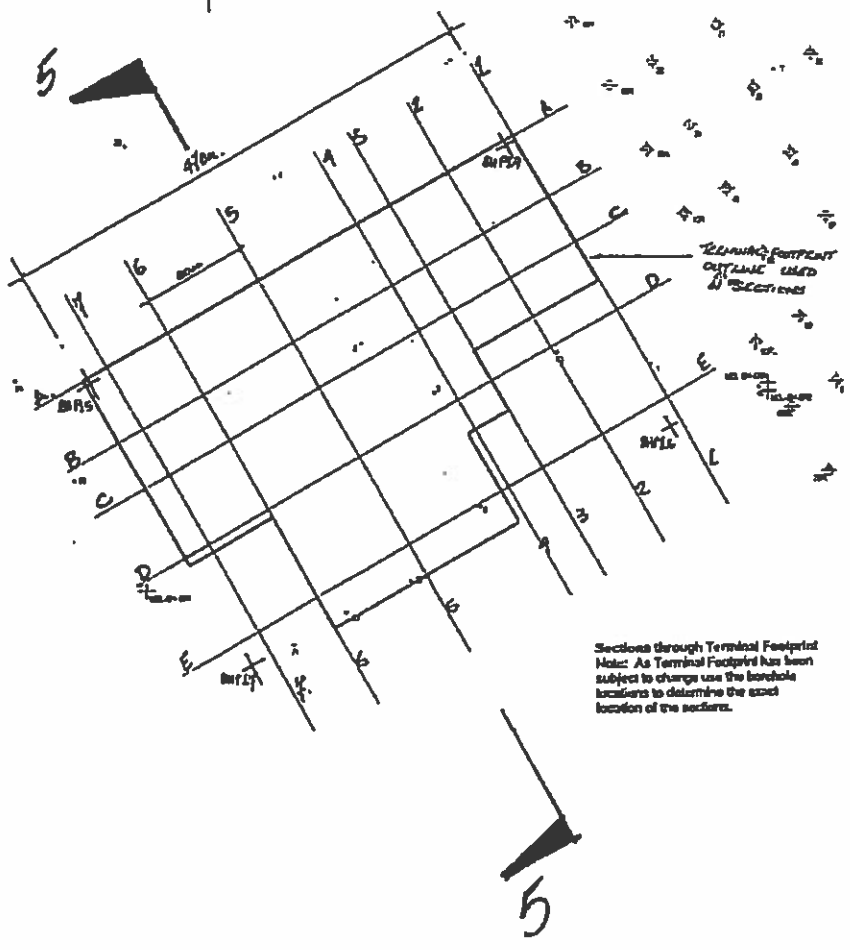


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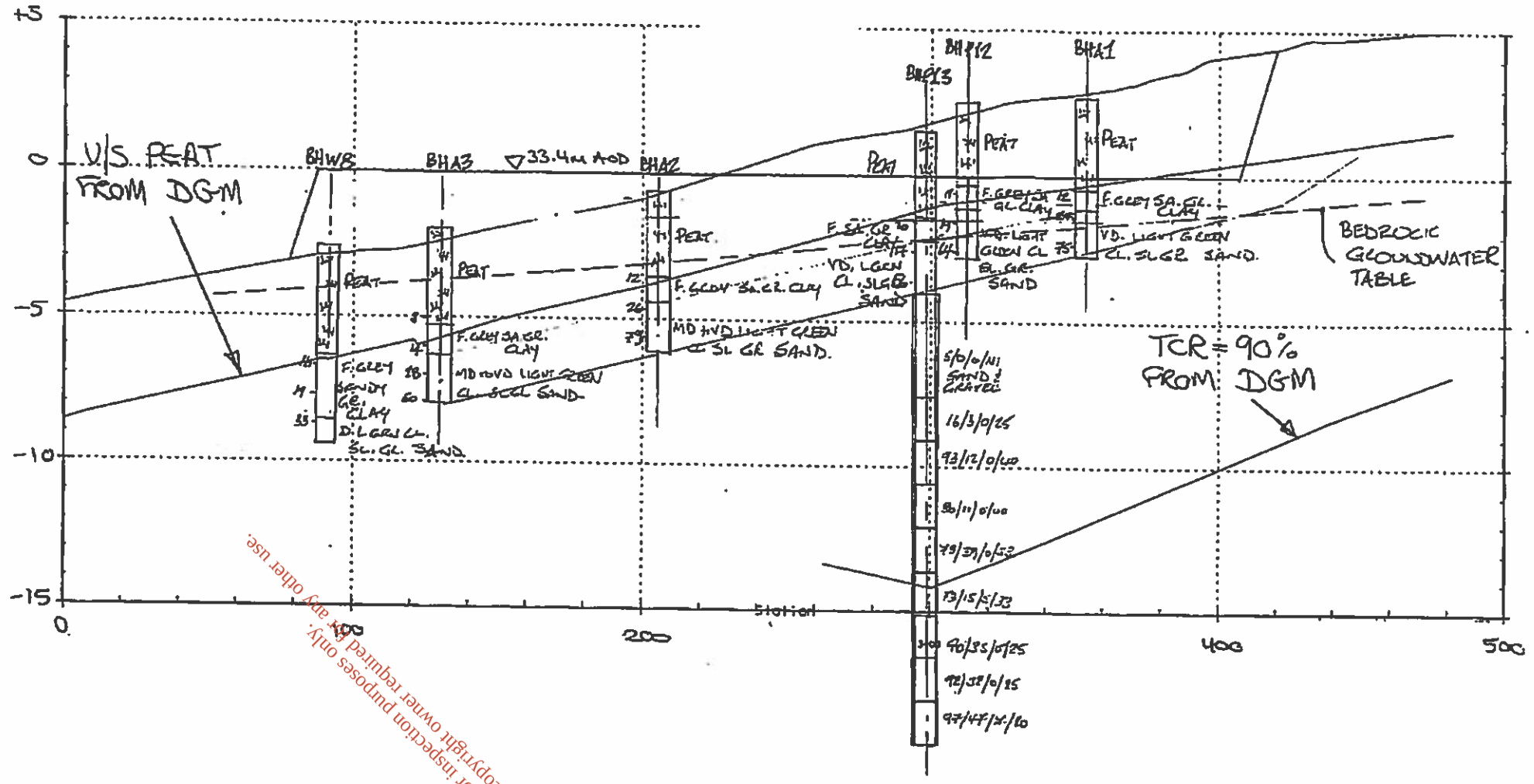


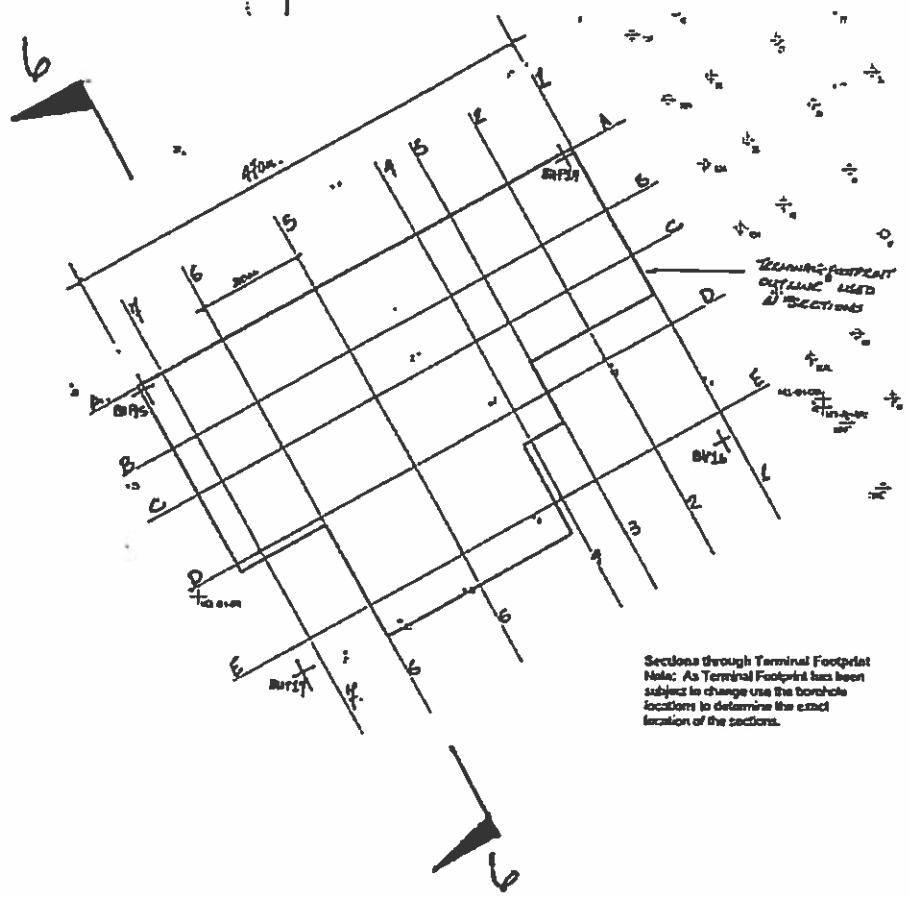


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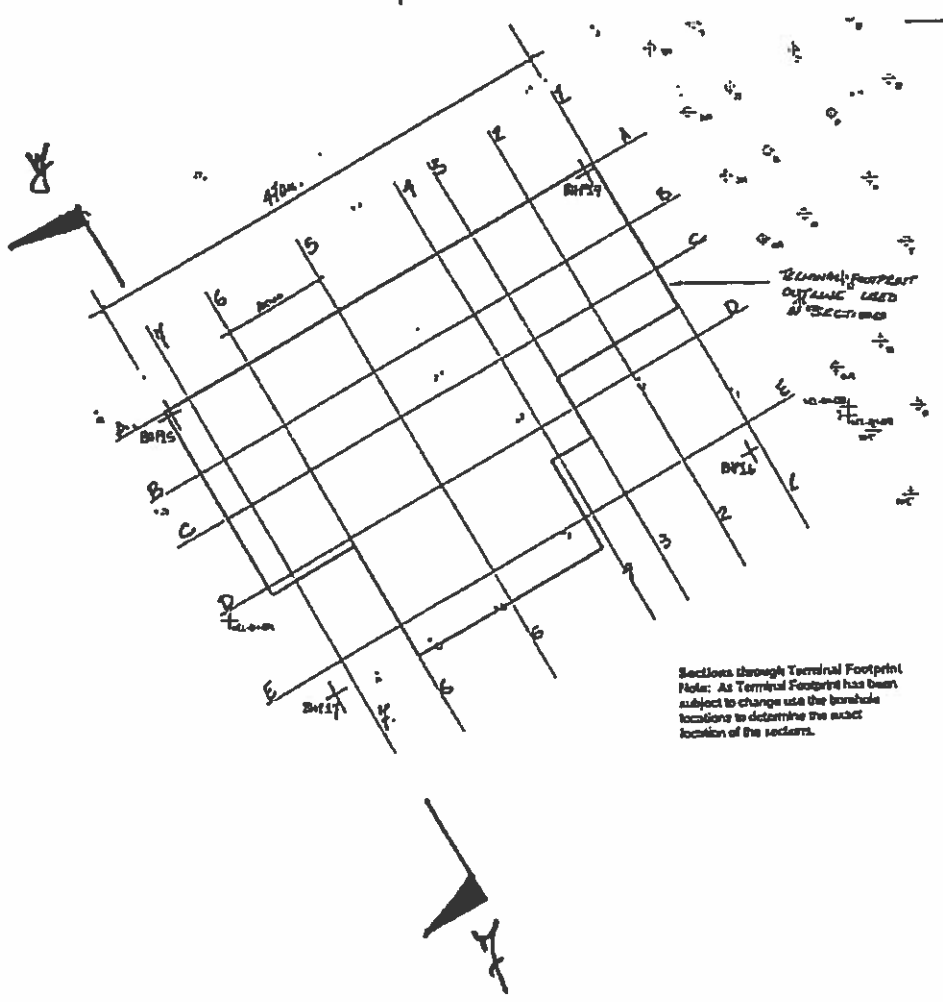


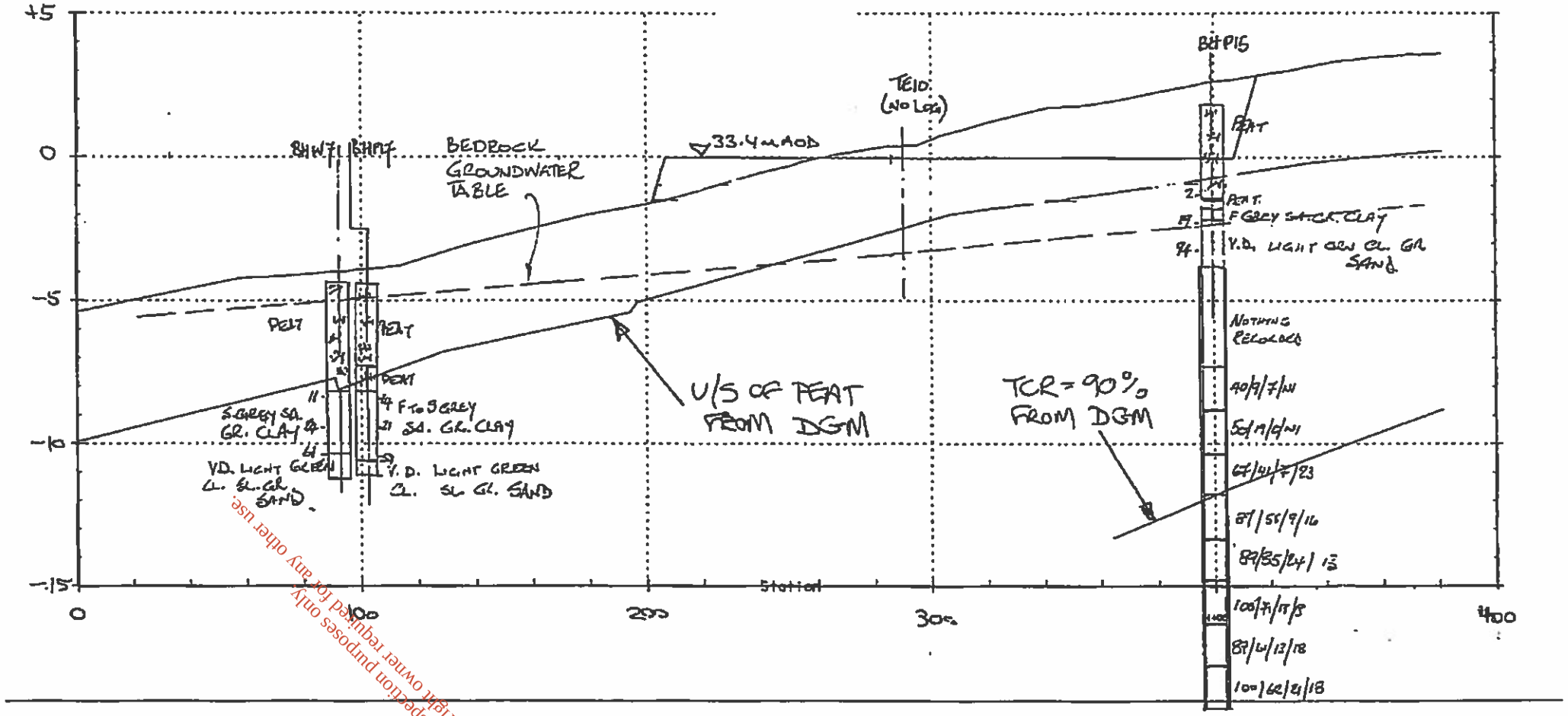


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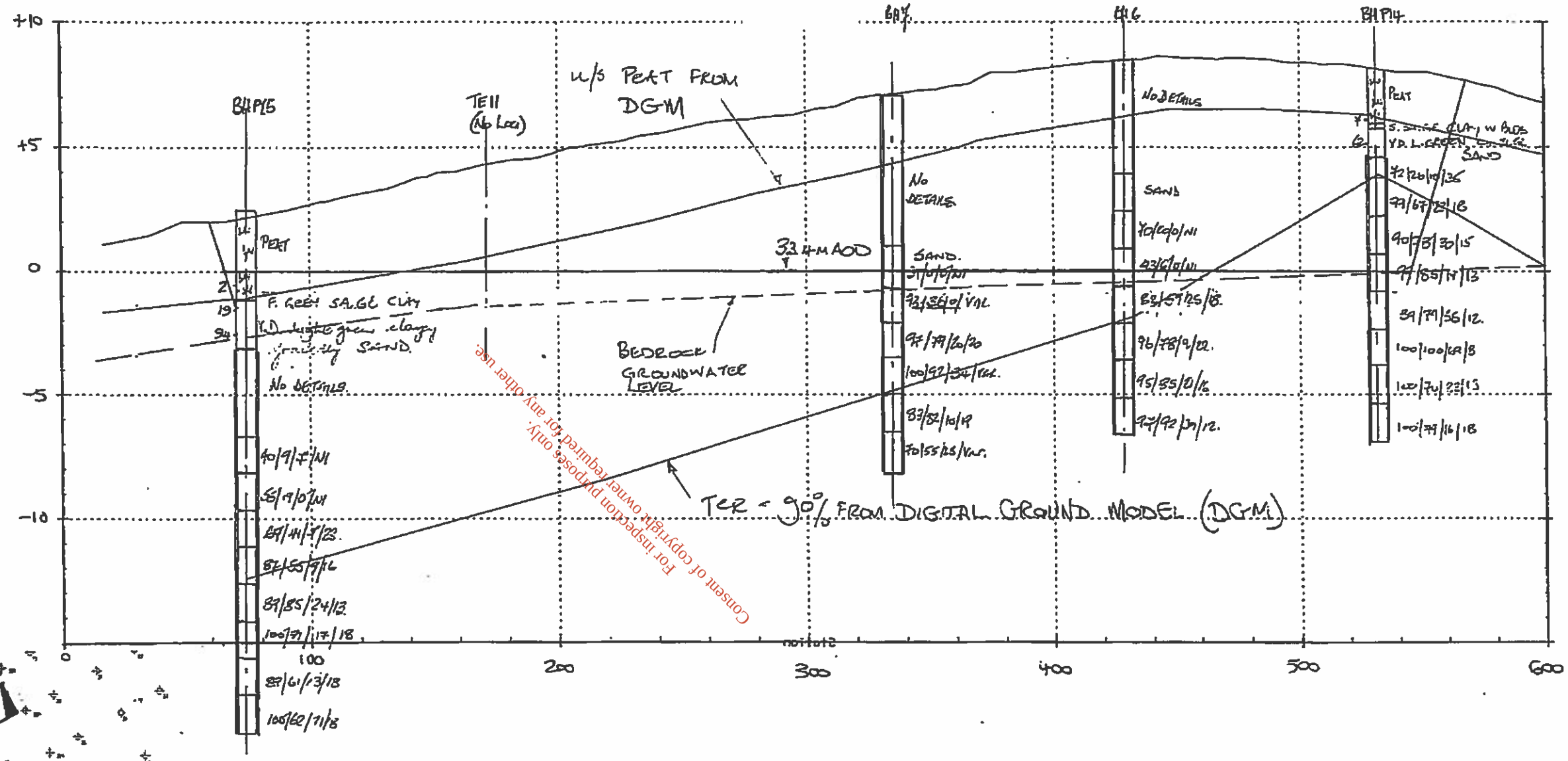
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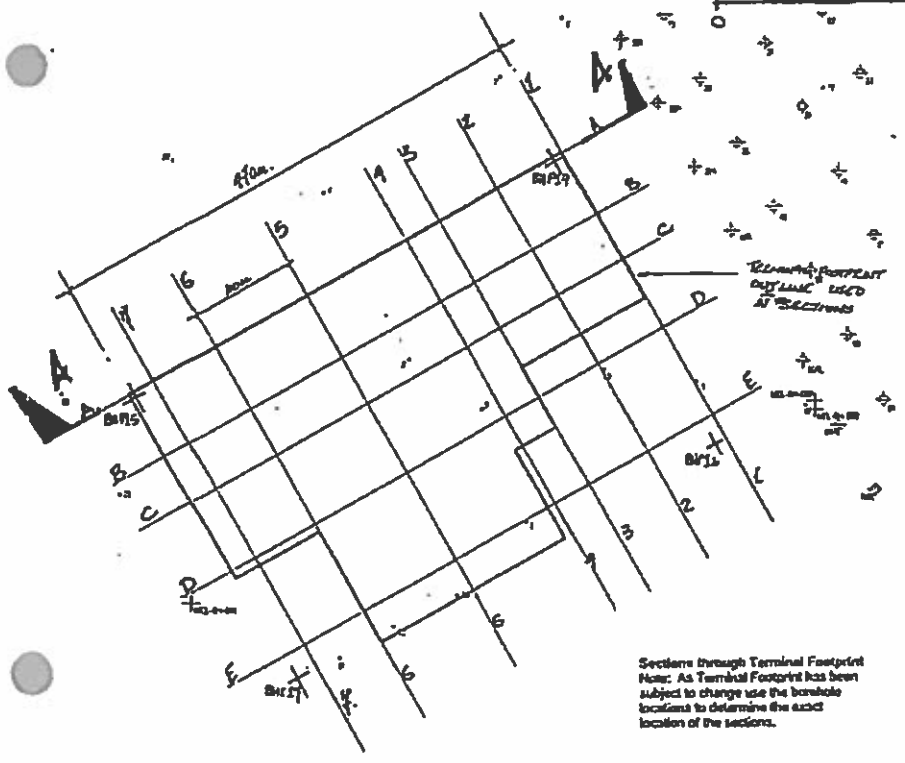
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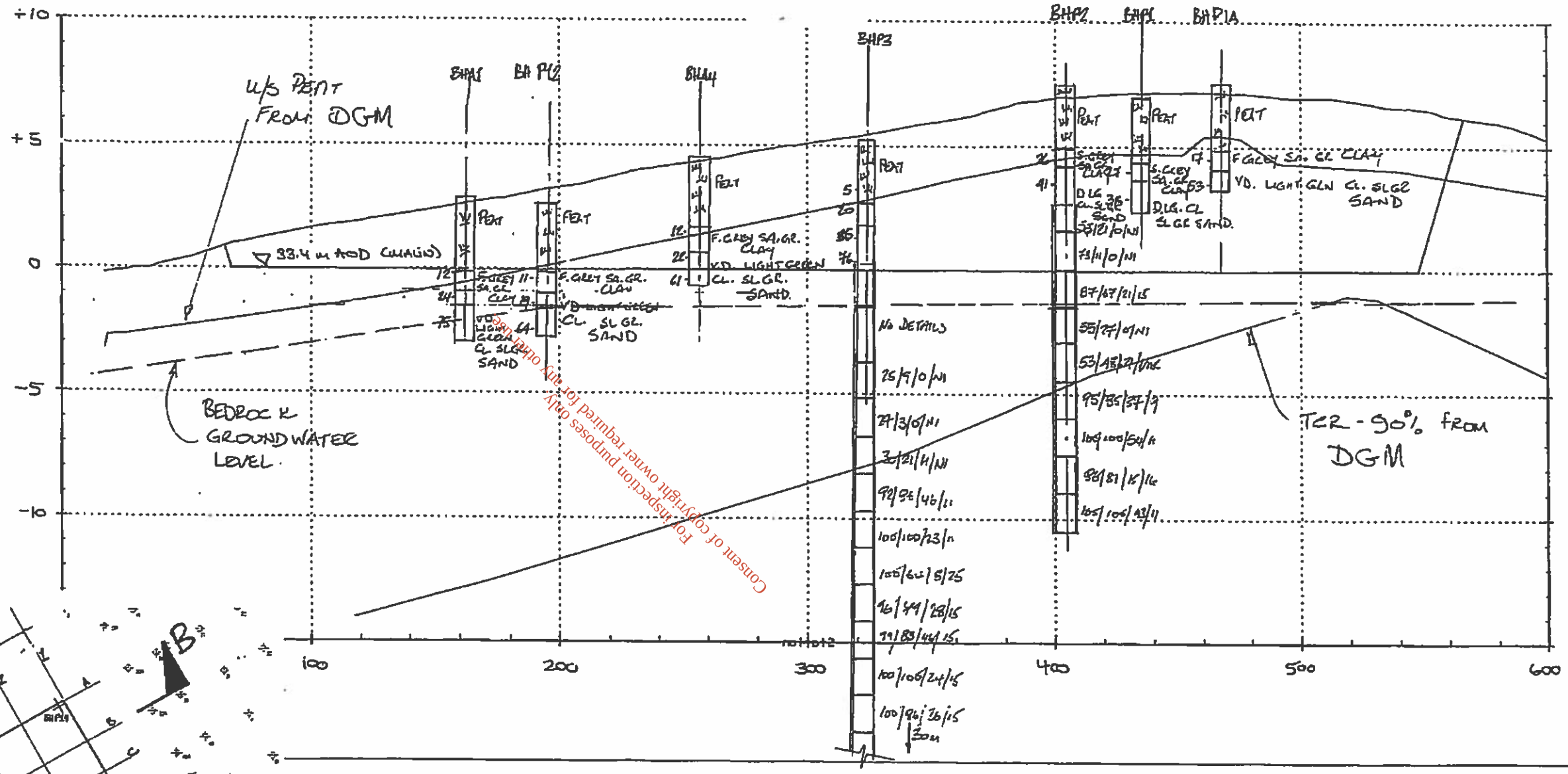


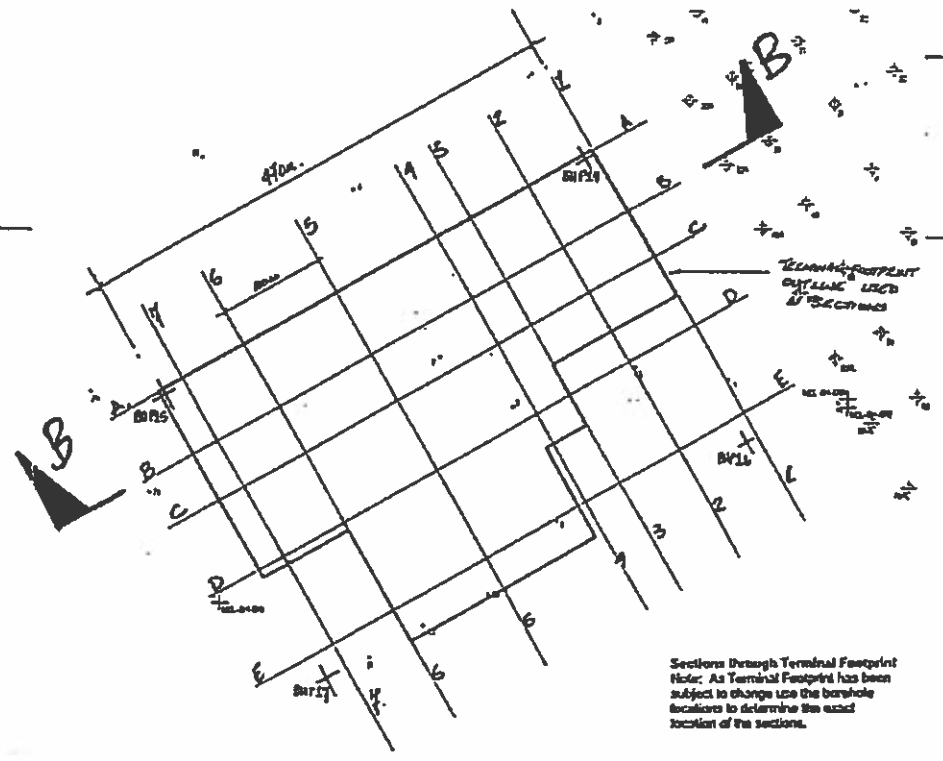
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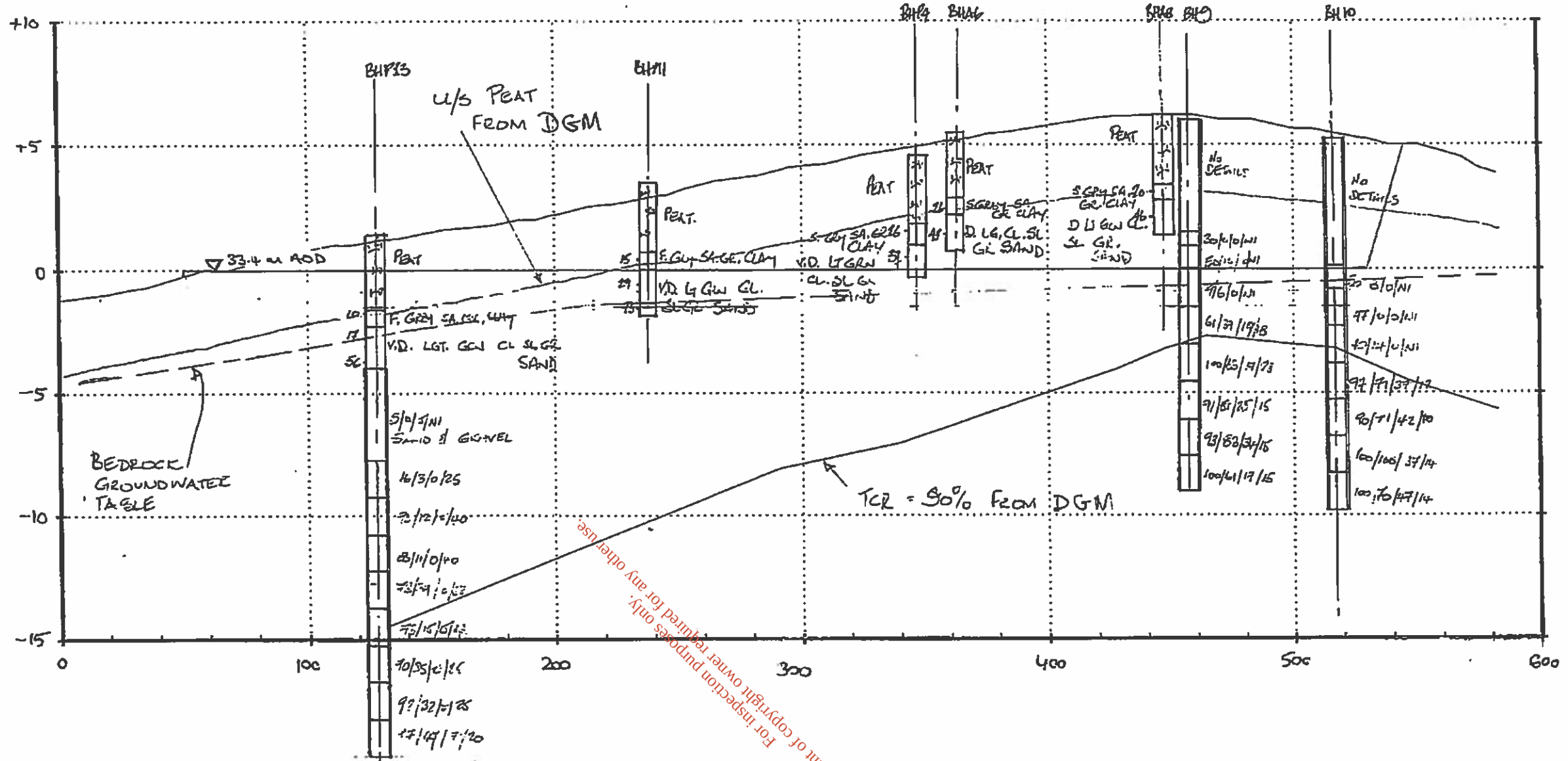


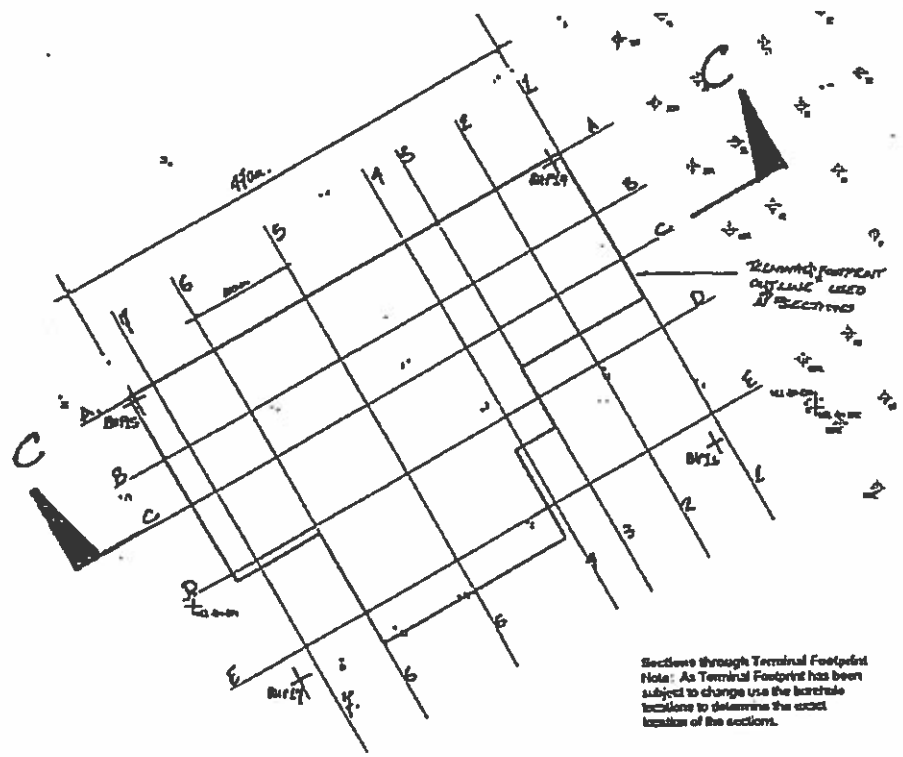
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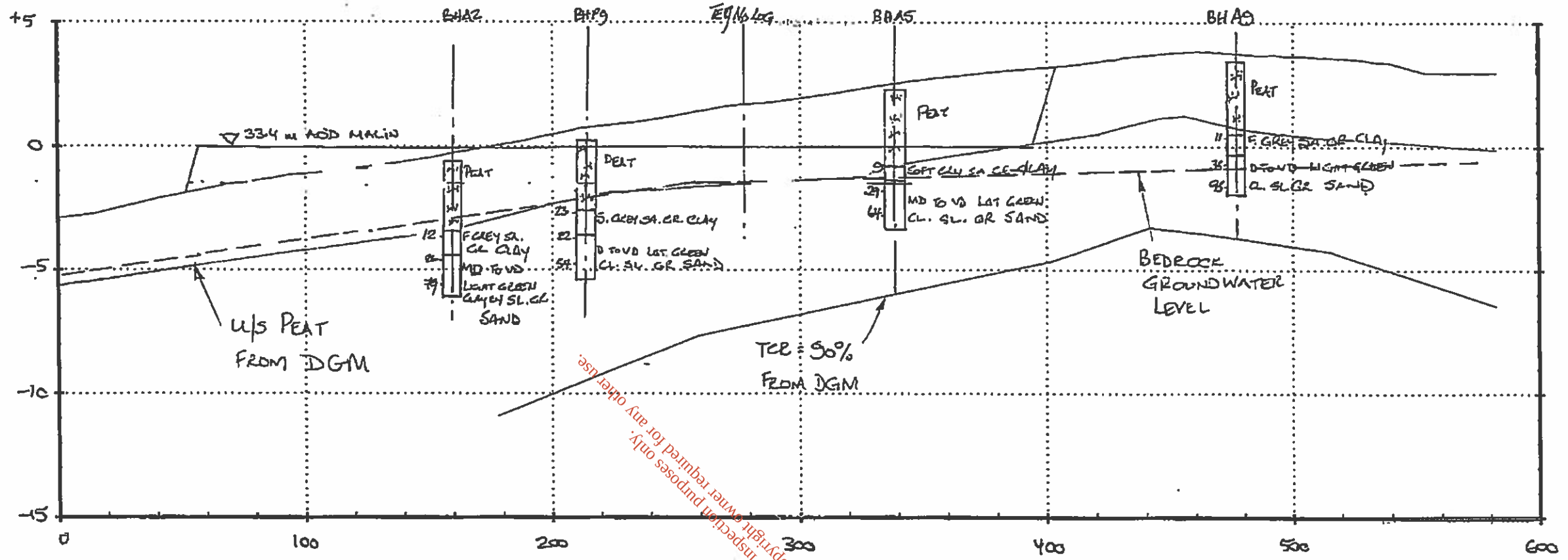


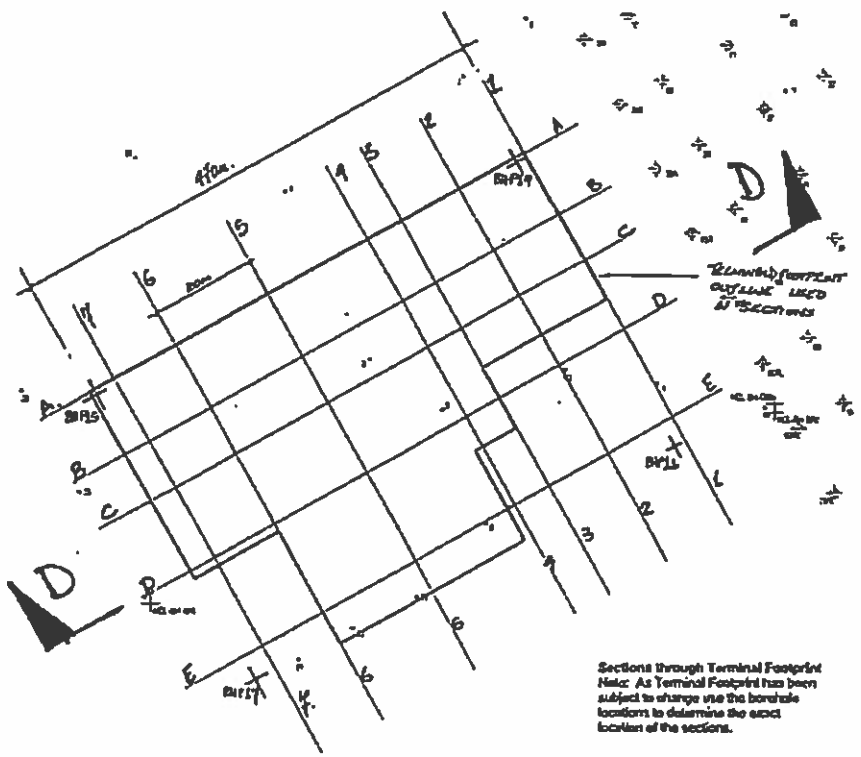


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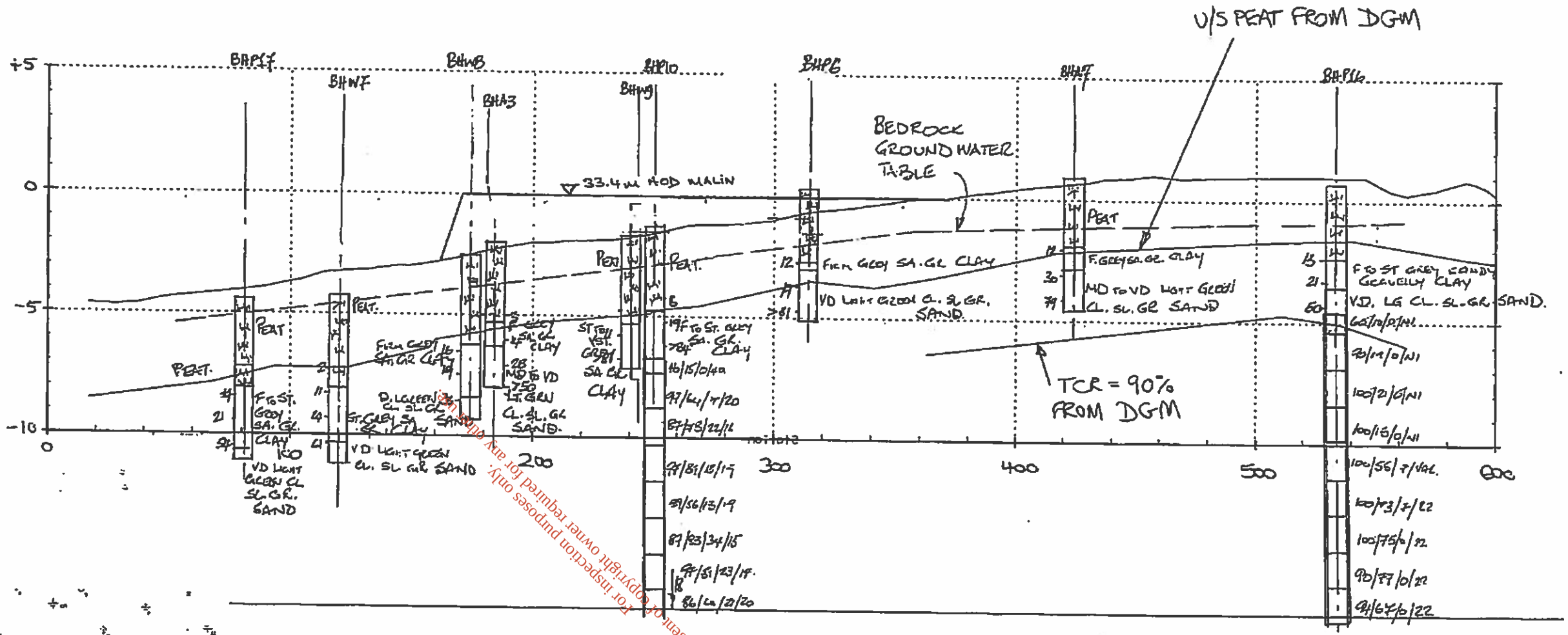
Sections through Terminal Footprint
Note: As Terminal Footprint has been subject to change use the borehole locations to determine the exact location of the sections.

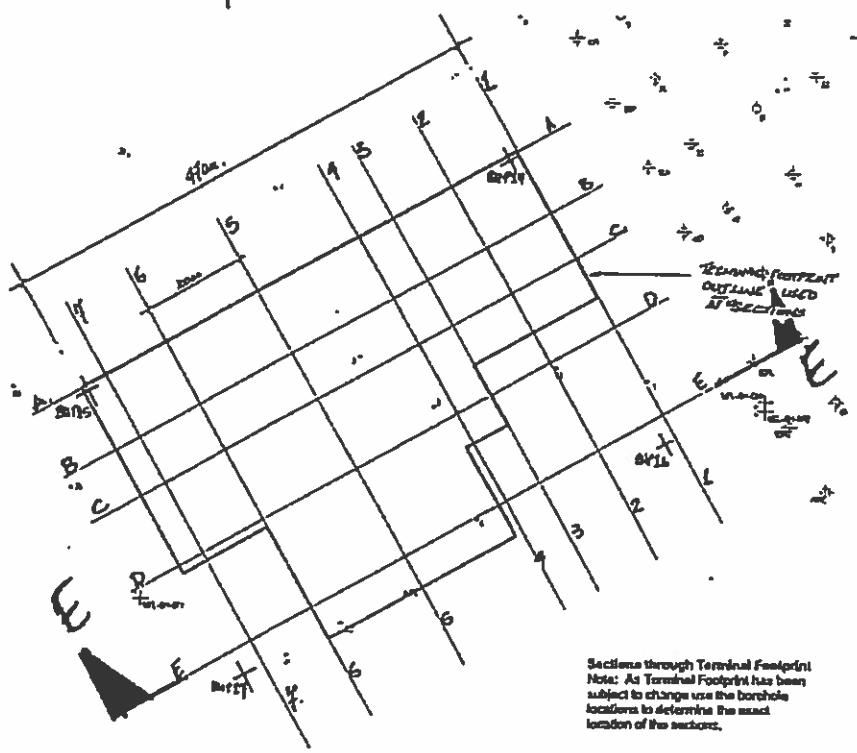
ARUP	15 Oliver Plunkett St. Cork Tel: +353 (0)21 4277670 Fax: +353 (0)21 4272345		
Status	DESIGN		
Job Title	CORRIB TERMINAL		
Drawing Title	GEO SECTION D THRU TERMINAL		
Scales	1:2000H, 1:200V	File Ref	Mat. Cl.
Drn J O'Brien	Date Oct '03	Chd	Approved
Job No. C1157.10	Drg. No. FIG 3.11		Rev. C

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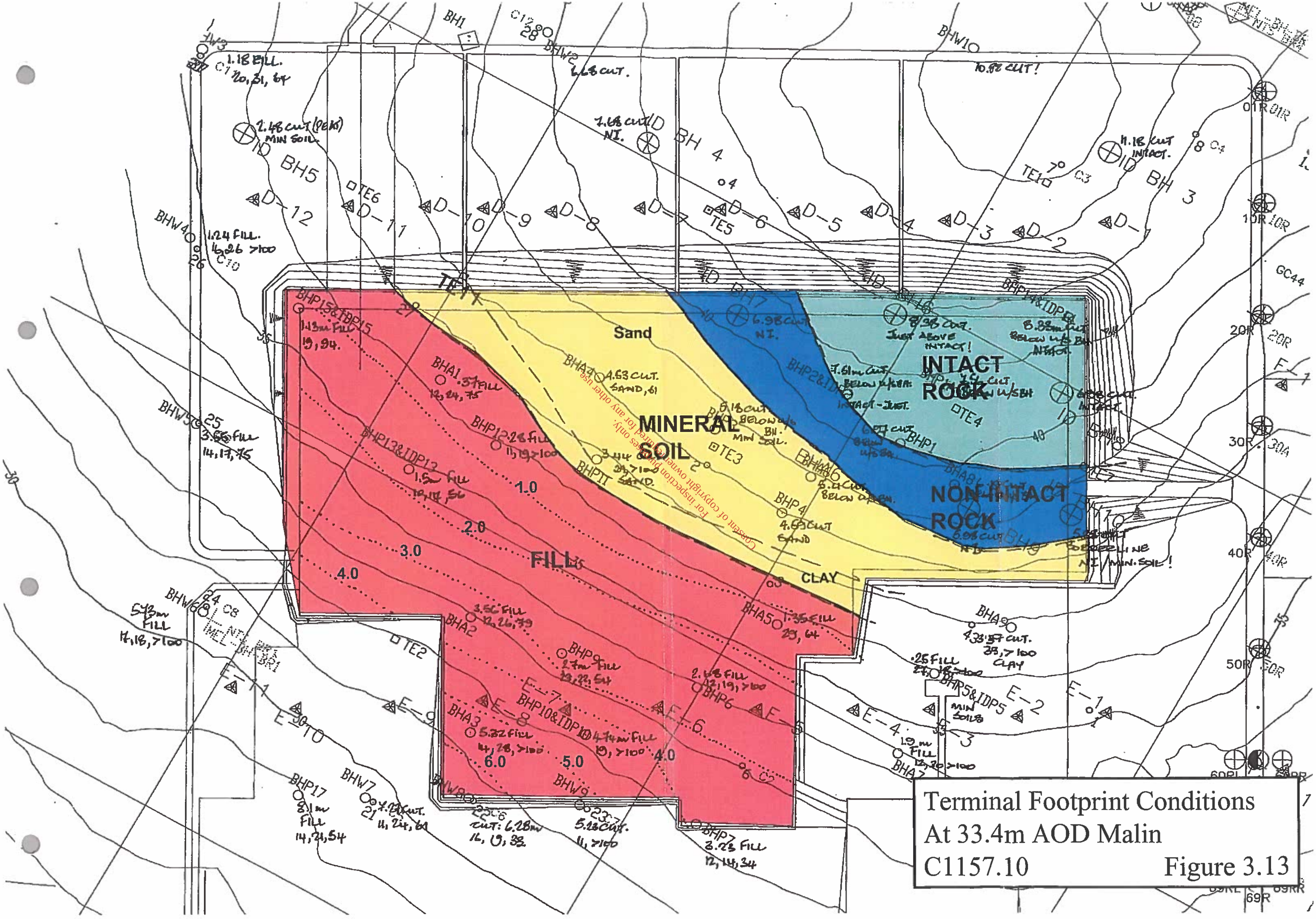




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Status	DESIGN		
Job Title	CORRIB TERMINAL		
Drawing Title	GEO SECTION E THRU TERMINAL		
Scales	1:2000H, 1:200V	File Ref.	Mat. Cl.
Drn J O'Brien	Date Oct '03	Chd	Approved
Job No. C1157.10	Drg. No. FIG 3.12		Rev. C

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Terminal Footprint Conditions
At 33.4m AOD Malin
C1157.10 Figure 3.13

PEAT THICKNESS AND VON POST CLASSIFICATION

PEAT THICKNESS

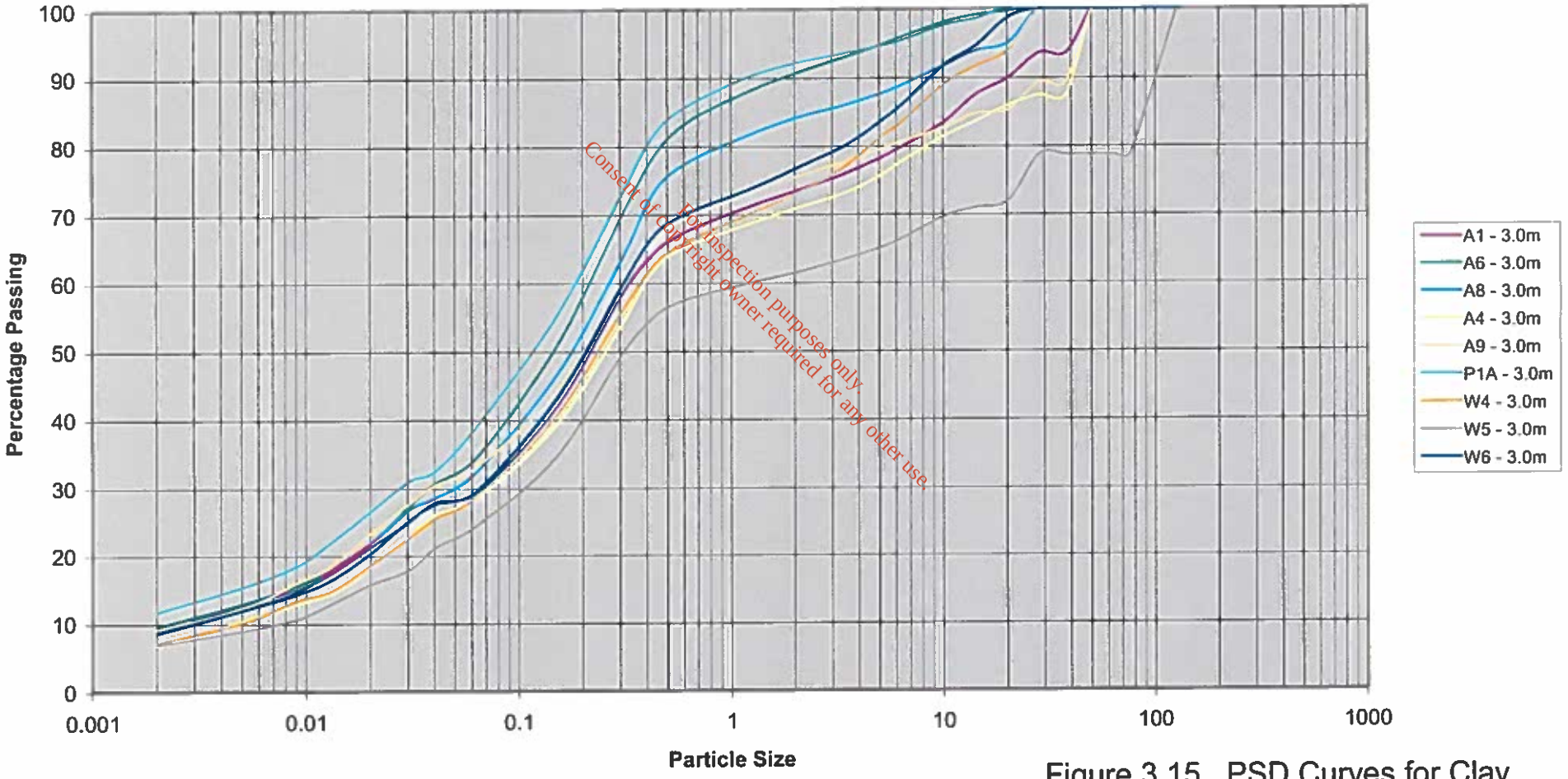
VON POST CLASSIFICATION IN 0.5m INTERVALS COMMENCING AT GROUND LEVEL.

ARUP Consulting Engineers	15 Oliver Plunkett Street Cork Tel: +353 (0)21 427 7670 Fax: +353 (0)21 427 2345
Status	PLANNING
Job Title	CORRIB GAS TERMINAL
Drawing Title	PEAT THICKNESS / VON POST.
Scales 1:1000.	File Ref B1
Drn JOB Date DEC '03	Chd MD Approved EJC.
Job No. C1151.10	Drg No. Fig 3.14 Rev A

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Corrib Terminal
Particle Size Distribution - IGSL Data
CLAY LAYER



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Figure 3.15 PSD Curves for Clay

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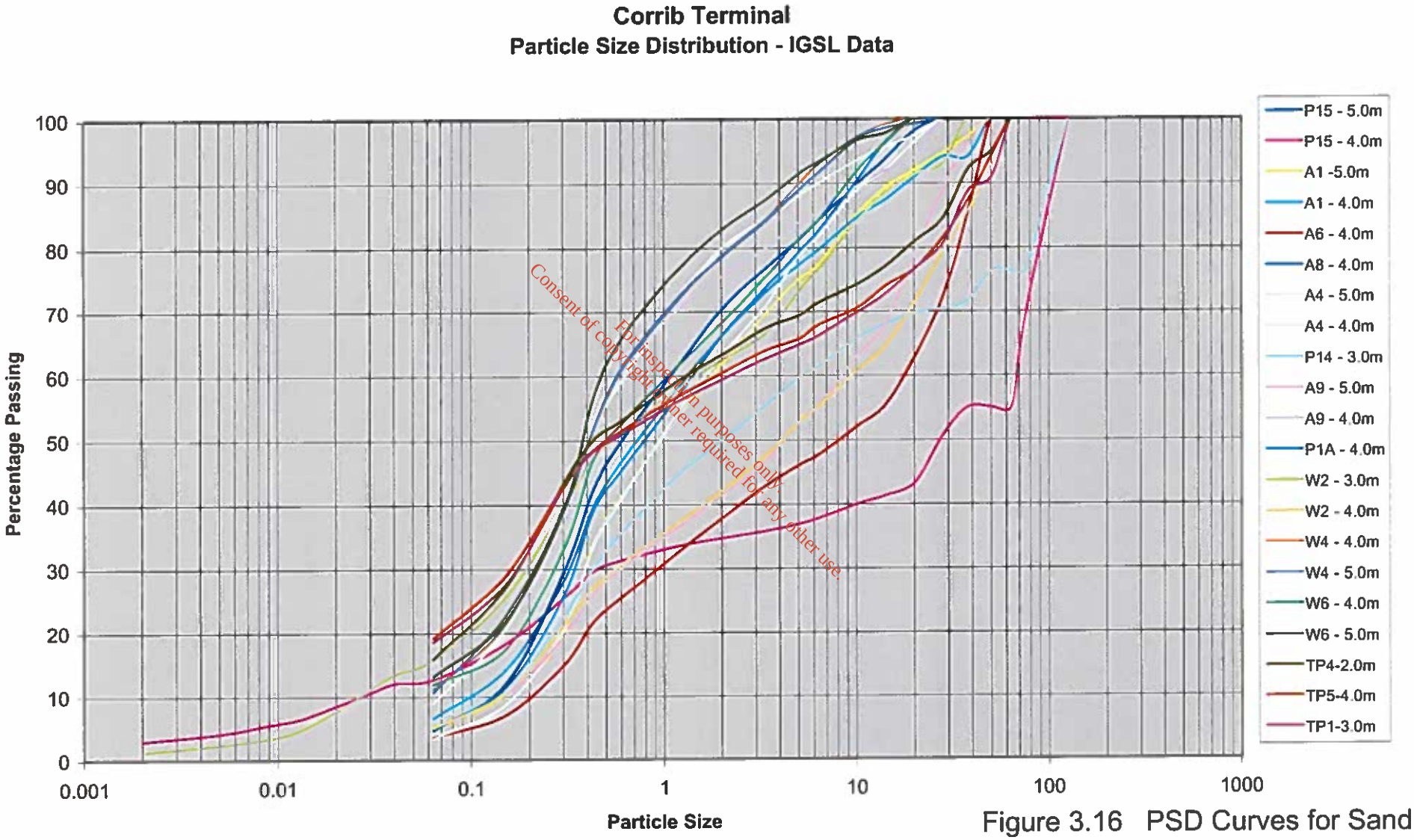
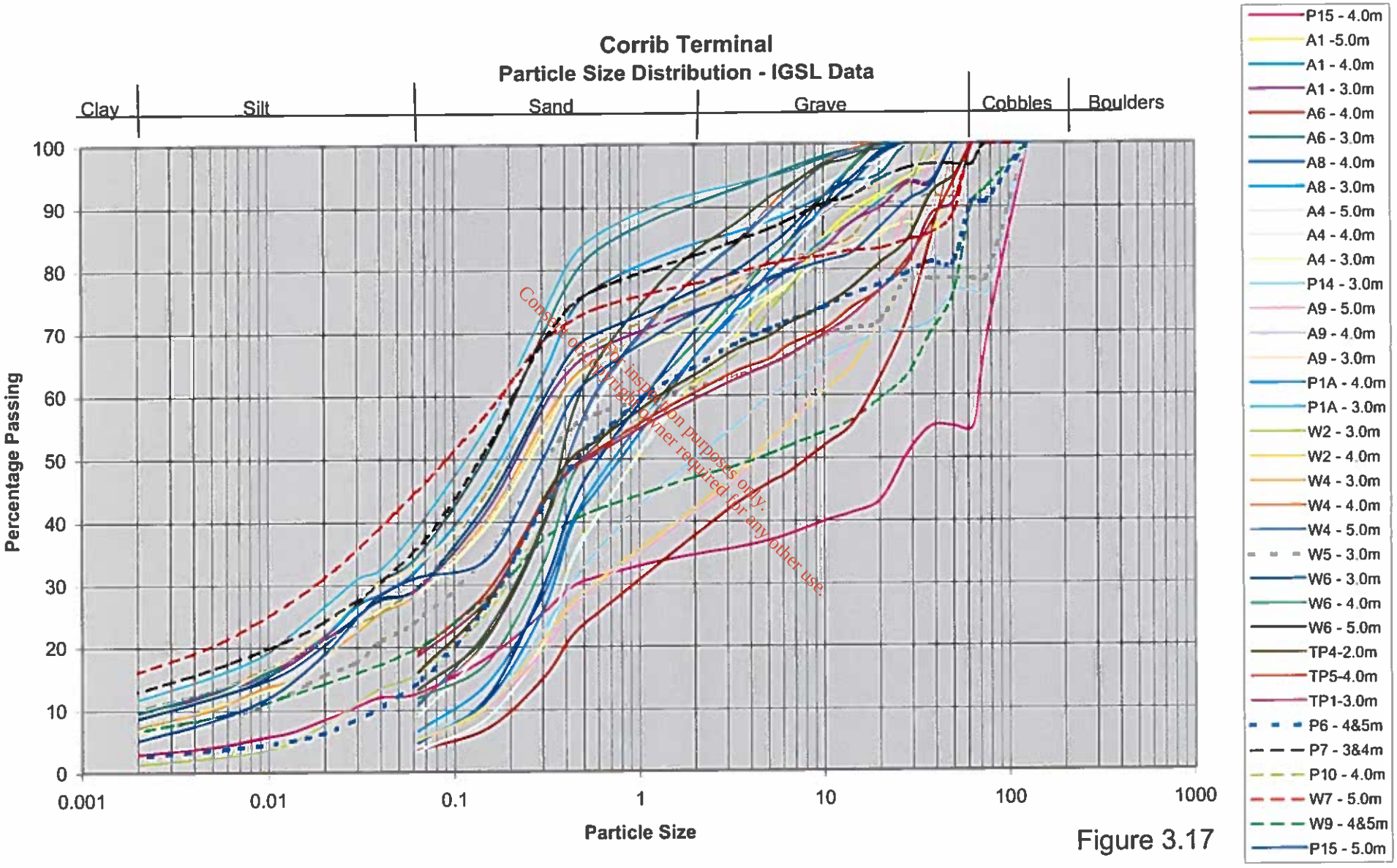


Figure 3.16 PSD Curves for Sand

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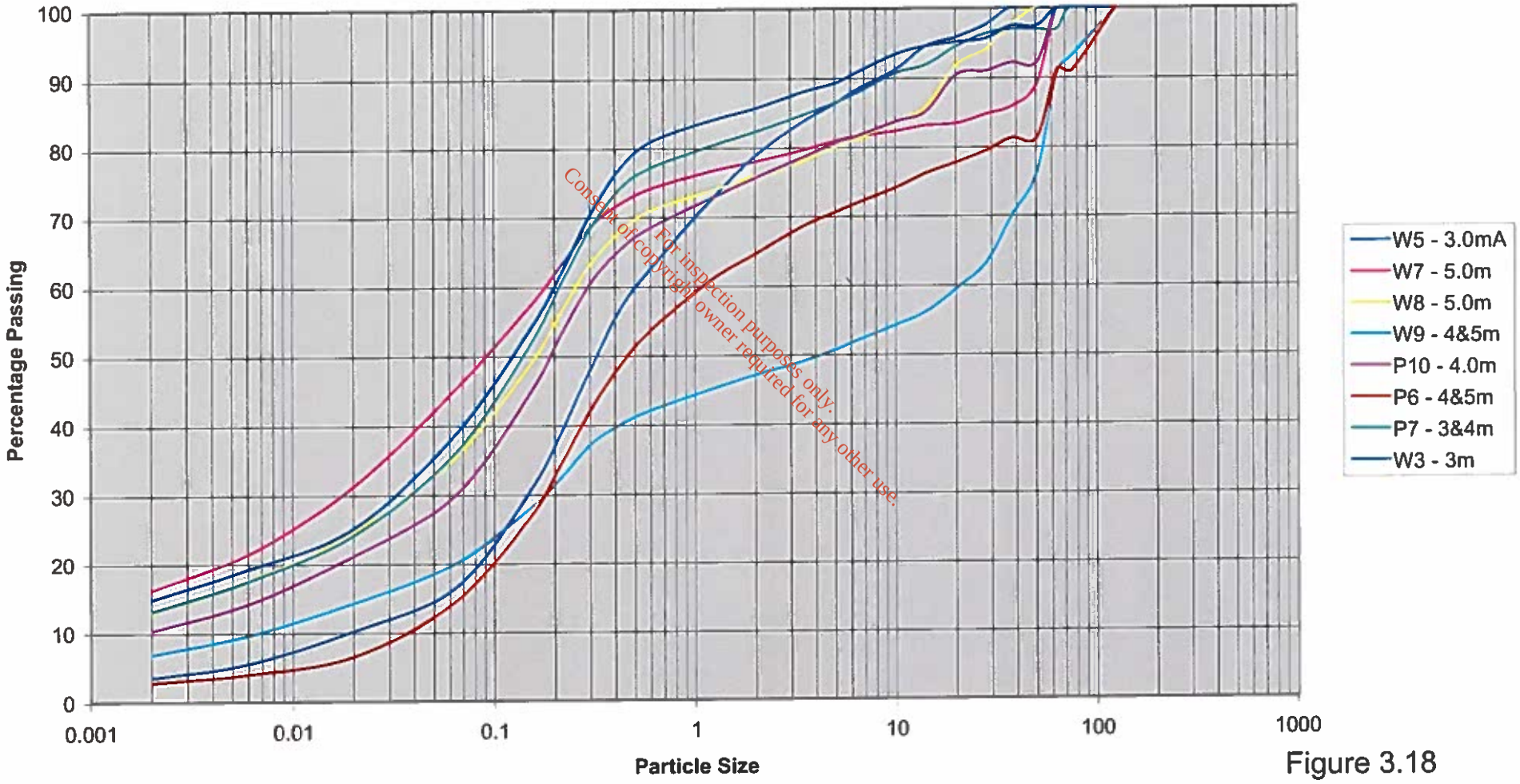


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Figure 3.17

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Corrib Terminal
Particle Size Distribution - LTG Data



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Figure 3.18

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10cm - SCALE WITH CAUTION AS DISTORTION CAN OCCUR

A3

10cm

AGHDOS Td

BELLAGELLY SOUTH Td.

BELLANABOY Td.

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Rev	Date	By	Description	Chd By
P1	Dec 08	JOB	ISSUED FOR PLANNING	EJL

Legend:

- x WATER MONITORING
- INCLINOMETERS
- SURVEY STATIONS
- SETTLEMENT STATIONS

Job Title: CORRIB TERMINAL: BELLANABOY BRIDGE

Drawing Title: MONITORING LOCATIONS.

Drawing Status: PLANNING

ARUP Consulting Engineers
15 Olaf Plunkett Street, Cork
Tel 021-4277670 Fax 021-4277345
DUBLIN CORK LIMERICK

Scales: N.T.S | Originator: E Cuesl | Checked: JOB | Approved: E Lynch | Date: Nov '08

Job No: C1157.10 | Drawing No: Figure 3.19 | Rev: P1

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APPENDIX 3A RISK ASSESSMENT

Geotechnical Risk Register

A Geotechnical Risk Register has been compiled to show the degree of risk attached to various elements of the design. The purpose of the register is to provide an outline description of the hazard, identify the potential likely cause, describe the consequence or impact of the hazard and identify the design and construction controls to be implemented in order to reduce the probability to a tolerable level. The overall application of the risk register will allow the management of geotechnical risk.

Whilst probability of a hazard occurring can be reduced to a minimum by geotechnical design, the probability cannot be reduced below Negligible. The likelihood of a hazard occurring has been judged on a qualitative scale. The scale has been derived from Clayton (2001) see Table 3A.1 below.

Table 3A. 1 Qualitative Probability Scales

Scale	Probability (P)	Chance, per section of Works
1	Negligible	< 10 %
2	Unlikely	10 – 30 %
3	Likely	30 – 50 %
4	Probable	50 – 70 %
5	Very Likely	> 70 %

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The severity of the risk (R) is also assessed qualitatively and depends on the risk tolerance. The risk results from the combination of the hazard and the impact/consequence. A similar qualitative scale has been derived for the impact of the hazard (Table 3A.2).

Table 3A.2 Qualitative Impact Scales

Scale	Impact (I)
5	Very High
4	High
3	Medium
2	Low
1	Very Low

The impact of a hazard manifesting itself can be either financial, health & safety or environmental or combinations of all three.

The degree of risk is determined by combining the probability and impact assessments, R = P x I. It has been judged against a third qualitative scale, the Risk Rating, which includes a descriptive response. The Risk Rating scale is given in Table 3.

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Table 3A.3 Qualitative Risk Scales

Risk (R)	Risk Rating	Response
1 to 4	Trivial	Monitor
5 to 8	Tolerable	Regular Attention
9 to 12	Substantial	Early Attention
13 to 25	Intolerable	Unacceptable

The probability of a hazard manifesting itself can be reduced by adequate geotechnical design and sound construction techniques but the impact cannot be influenced.

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No.	Hazard	Cause	Potential Impact	Design Controls	Construction Controls	After Control			Contingency Measures
						P	I	R	
1	Access over soft ground	Ground too soft; the upper strong vegetated layer has been broken; plant too heavy; existence of bogholes.	Not possible to carry out works; plant sinks into the soft ground; project delayed.	Specify the use of low ground pressure plant; use of bog mats; working platforms of stone laid on geotextiles; strengthening the ground work outwards from ground already strengthened; Avoidance or removal of 'extremely soft' material (such as bogholes) prior to starting construction. Installation of drainage to drain soft upper ground to improve strength.	Supervision staff on site fully briefed on ground conditions on site. Thorough induction of all personnel in the strength of the ground and issues associated with this ground. Employment of personnel familiar with the ground conditions existing on site, and working in soft ground. Site walkovers at start of each day to inspect ground conditions and to alert construction personnel to ' potential risk' areas.	1	3	3	Provision of bogmats; low ground pressure vehicles to be available on site at all times; schedule flexibility, where possible, to work around soft areas.
2	Unexpected ground conditions	ground conditions differing from those indicated in site investigation information	Slows down construction progress; design changes required	Carry out extensive site investigation. Selection of conservative design parameters to allow for variable conditions on site. Monitoring and observation method proposed as part of construction controls.	Thorough monitoring of all works. Personnel involved in monitoring thoroughly familiar with the findings of the site investigation. Construction personnel briefed on expected ground conditions and to alert supervision / monitoring staff to any non-foreseen conditions. Work to stop and impact on design to be reviewed.	3	1	3	Works to be stopped and the ground conditions reviewed. Contingency rock bolting design to be prepared for the intact rock stratum, contingency soil nailing to be prepared for non-intact and mineral soils, contingency provisions for additional strengthening of peat.
3	Failure of excavated cut slope	Encountering previously unknown weaker zone within the rock or mineral soils, unexpected jointing of bedrock, permeability locally greater that expected. Unexpected variability in the ground conditions	Slowing down of construction work/ additional materials to be excavated.	Use of conservative soil strength parameters and groundwater levels in design; selection of shallow slopes in non-intact rock. Use of benches at changes in slope.	Provision and monitoring of instrumentation to record ground movement and groundwater pressures. Careful monitoring and logging of ground conditions as work progresses and thorough familiarisation of supervisory staff with expected ground conditions. Design team to be alerted to changes.	1	2	2	Work to be stopped locally, ground conditions to be reviewed, slope to be cut at shallower angle or strengthened with soil nailing in mineral soils and non-intact rock. Rock bolting to be considered in intact rock. Strengthening to be carried out in the peat stratum.
4	Failure of sheet piled peat face	Sheet piling embedment not sufficient, propping of sheet piling not sufficient. Peat depths in excess of those expected from site investigation findings. Over excavation.	delay of construction work. Collapse and failure of retained peat.	Use of conservative soil strength and deformation parameters for design. Conservative design of propping system. Design check of implications of over excavation. Minimum embedment depths and maximum excavation levels to be clearly specified on the construction drawings	Provision and monitoring of instrumentation to record ground movement and groundwater pressures. Thorough monitoring and recording of depths of embedment achieved. Where embedment depths are less than specified design team to be advised. Provision of additional temporary propping systems to be available on site during excavation phase. Monitoring of sheet pile movements during construction.	1	2	2	Work to be stopped locally, construction method and ground conditions to be reviewed. Additional strengthening of peat stratum to be undertaken. Additional propping of the wall to be installed.
5	Failure of access road	Failure of strengthening of peat system, failure of sheet pile retaining system	Loss of access to works area, delay to construction works	Use of conservative soil strength parameters for strengthened soil for design. Use of conservative sheet pile sections and design of tie where appropriate.	Regular monitoring of the surface of the road for signs of failure, monitoring of sheet piles for movement and regular reporting of construction conditions to the on site design monitoring team.	1	1	1	Work to be stopped locally. Traffic restrictions. Additional strengthening beneath and adjacent to the road to be undertaken.

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No.	Hazard	Cause	Potential Impact	Design Controls	Construction Controls	After Control			Contingency Measures
						P	I	R	
7	Failure of excavated surface in the Terminal platform area	Material too soft and too wet to be trafficked. Strength parameters of trafficking surface underestimated. Over trafficking of some areas.	Loss of access to areas of work, slowing down of progress in excavation, restricted access to areas within terminal footprint leading to congestion in some areas and an increased risk of danger to operatives	Design capping layer and geotextile to deal with very low CBR values. Use lime or cement stabilisation to improve strength of formation level.	Monitor condition of formation level, place temporary haul roads in areas of better ground. Ensure use of proper tracked plant with minimal use of 'wheeled' vehicles within the Terminal footprint. Ensure loading of vehicles is at or below the design maximum. Maintain effective surface drainage.	1	1	1	Carry out strengthening of surface either by lime/cement stabilisation or by placingan increased thickness of capping layer. Stop access to 'wheeled' plant. Improve and/or install additional drainage.
8	Failure of gabion walls	Sliding along the base of the gabion, underestimation of imposed loads on gravity structure, underestimation of ground bearing pressures.	Movement of gabions on the upper slopes, danger to operatives working within the terminal platform below.	Use of conservative strength parameters in design, assumption of conservative groundwater levels and choice of conservative factors of safety. Clear specification of required formation level conditions for the gabion walls. Production of table of gabion wall configurations for variety of conditions likely to be encountered on site.	Detailed knowledge amongst the supervising personnel of the design requirements and sensitivity of design to the variable conditions likely to be encountered on site. Properly installed and propped temporary works that will allow proper excavation to formation level and allow for preparation of formation level to match design requirements. Monitor movements. Maintain effective drainage.	1	3	3	Provision of 'bench' on down slope side of gabions to prevent sudden failure conditions. Carry out additional strengthening of ground behind the gabion wall. Increase width of gabion wall
9	Difficulties in excavation of rock	Frequency of rock jointing overestimated and rock strength underestimated.	Delays to works, increased noise levels due to additional rock breaking requirements. Rock splitting techniques, required. (Blasting will not be used.)	Carry out extensive site investigation into the in-situ condition of the bedrock and determine the frequency and orientation of joints and rock strength. Design for conservative slopes within bedrock. Provide provisional design for the use of pre-splitting techniques.	Supervision staff to have detailed knowledge of design proposals and findings of site investigation work. Detailed monitoring to be carried out during construction works. Site staff to have appropriate skills in the proposed pre-splitting techniques proposed.	1	1	1	Carry out non-explosive pre-splitting of rock body using expansive grouts or similar.
10	Failure of slopes excavated in rock	Frequency and orientation of joints underestimated and strength of rock overestimated	Delays to work, reduced slopes in rock surfaces.	Carry out extensive site investigation into the in-situ condition of the bedrock and determine the frequency and orientation of joints and rock strength. Design for conservative slopes within bedrock.	Supervision staff to have detailed knowledge of design proposals and findings of site investigation work. Detailed monitoring to be carried out during construction works. Removal of unstable blocks.	1	1	1	Stop work locally and review rock face conditions. Carry out bolting of rock blocks to rock body. Netting to contain local spalling.
11	Failure of Dewatering Process	Dewatering wells too widely spaced, pumps not adequately sized for conditions encountered	Delays to works, reduced access to the lower end of the site. Poorer ground conditions that allowed for in design.	Carry out detailed site investigation to measure permeabilities of the varying strata. Carry out dewatering trial to determine design of dewatering system.	Supervising staff fully briefed on the details of the dewatering system and the drawdown expected. Full monitoring of wells and observation points by experienced personnel.	1	1	1	Install additional wells at closer spacings and use additional pumping power.
12	Soil Strengthening – strength not achieved or deformation failure	Overestimation of strength and deformation parameter during design. Installation procedures not adequate	Delays to works.	Use of conservative design parameters for strength and deformation – to be determined from on site trials and also from experience worldwise within the industry. Restrict access to heavy traffic to allow conservative gains in strength.	Supervising staff to be fully briefed on strengthening method and rate of strength gain. Detailed monitoring to be carried out to check strength gain is in line with design requirements. Use reputable specialist contractor with proven track record	1	2	2	Re-do strengthening process. Increase binder content. Also consider the use of structural piles and surface load transfer platform to carry loads.
13	Ground Strengthening – creation of dust	Control of construction methods inadequate	Cement powder being blown around the site.	Provide detailed method statement on correct procedures for the strengthening process. Site trials to be carried out to determine appropriateness of method statement.	Construction staff to be fully briefed on the installation procedures for strengthening the ground. Strict supervision to be undertaken on all strengthening processes	1	1	1	Review operational control methods. The use of column stabilisation (through a geotextile and stone blanket) minimises the potential for cement to be blown around above ground.

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No.	Hazard	Cause	Potential Impact	Design Controls	Construction Controls	After Control			Contingency Measures
						P	I	R	
14	Ground strengthening - leaching of cement	Groundwater contamination	Contaminated groundwater entering local water courses	Pre construction laboratory and site trials to assess quality of groundwater leachate from strengthened peat	Sampling and testing of groundwater runoff.	1	3	3	Treatment of water before discharge.
15	Flooding	Extended periods of wet weather and under-design of drainage for the temporarily prevailing conditions	Cessation of work, deterioration of working surfaces.	Review rainfall historic patterns in the locality from Met Eireann. Use conservative design parameters for the design storm event. Show that the extreme rainfall event such as on September 19th 2003 in Pollatomish can be catered for.	All drains to be correctly installed on site and maintained in good working order. Supervising staff to be fully conversant with weather forecasts and appropriate pumping facilities to be put in place during the construction phase.	1	1	1	Provision of additional pumping capacity on-site.
16	Ground failure around drainage pipe to the settlement ponds	Low strength within the ground local to the pipe. Support of trench inadequate during excavation.	Delay to works	Carry out detailed site investigation around the site investigation along pipe route. Use conservative design parameters for ground strength and deformation characteristics. Design robust temporary works structures. Require contractor to provide detailed construction method statement.	Supervision staff to be fully briefed on the ground conditions, design requirements and construction methodology. Strict supervision to ensure construction carried out as detailed in the method statement.	1	2	2	Carry out additional strengthening of the peat. Install king posts if necessary to minimise embedment requirements of sheet piling.
17	Failure of settlement ponds - structurally	Low strength in the ground local to the ponds. Support of sides inadequate during excavation.	Delay.	Carry out detailed site investigation around the area of the settlement ponds. Use conservative design parameters for ground strength and deformation characteristics. Design robust structures. Require contractor to provide detailed construction method statement.	Supervision staff to be fully briefed on the ground conditions, design requirements and construction methodology. Strict supervision to ensure construction carried out as detailed in the method statement. Monitoring of sheet pile movements during construction.	1	2	2	Extend strengthened zone around sheet piles. Use king posts to reduce the embedment requirement for the sheet piles.
18	Failure of ponds – in adequate settlement in pond	Excess velocity of water flowing through the pond. Excess levels of sediment in the water discharged from the pond.	Excessive sediment in streams down hill of site and in Carrowmore Lake	Design ponds to proven Bord na Moná standards. Use conservative rainfall figures for the design storm event. Use conservative values for ground permeabilities within the terminal.	Monitor pond to determine quality of water discharging to the D16. Clean out drains and add intermediate mini settling/stilling ponds.	1	3	3	Add flocculation agent.
19	Material quantities	Insufficient material for fill, large quantities of unsuitable materials.	Additional materials to be imported to and exported from site. Delay to schedule.	Carry out detailed site investigation. Obtain good understanding of strata make up and distribution on site. Allow for stabilising mineral soils.	Carefully excavate and store all materials on site. All excavation surfaces to be cut to slopes to facilitate run off of surface water. Works to be sequenced to minimise double handling of materials sensitive to moisture.	1	2	2	Remove unsuitable material off-site and import additional suitable material.
20	Bog Slide	Insufficient understanding of the mechanisms of failure, inadequate site investigation information from the site and inadequate design. Improper construction method, controls or sequence of construction. Inadequate drainage systems installed for the control of ground and surface water.	Movement of peat down slope, stoppage of works, loss of plant, danger to operatives and to the public.	Carry out detailed site investigation. Obtain good understanding of stability of site and possible mechanism that might trigger ground movement. Design conservatively to eliminate all mechanisms likely to trigger movement.	Provision and monitoring of instrumentation to record ground movement and groundwater pressures. Ensure strict control of all construction practices so that all works on site are within design conditions. Daily site inspection looking for evidence of movements.	1	5	5	Cease operations, remove material, provide additional drainage, provide toe weighting.

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4. TERMINAL SLOPE STABILITY

4.1 Introduction

This section describes in detail the design work done for the stability of the cut and fill slopes within the terminal footprint.

4.2 Cut Slope Stability

The cut slopes will be excavated to the following slopes:

Intact rock

Intact rock is generally considered to be the material where total core recovery (TCR) was generally in excess of 90% and the material recovered had a significant percentage of solid core recovery and rock quality designation. The intact rock will be excavated to a 1 in 1 slope. Joints are generally sub-vertical and where they daylight on the cut slope they will be examined by a competent geotechnical engineer/geologist to determine their stability. If required the upper block will be removed or bolted to the underlying rock.

The extent of intact rock to be excavated is small. The site investigation coreholes show low Rock Quality Designation (RQD) values for the rock. The rock will be removed using by rock breakers and heavy plant. Non-explosive pre-splitting will only be used, if at all, where rock breakers and heavy plant prove unsuccessful.

Non-intact rock

Non-intact rock is all the material cored above the intact rock except that recovered as sand. Light cable percussive drilling was not possible in this material as it met with refusal. Slopes will be excavated in this material at 1 vertical to 3 horizontal. This is a very conservative slope for this material but as the mineral soils will be excavated to the same angle it removes the need for clear identification of the interface between the mineral soils and non-intact rock.

Mineral soil

Mineral soils will be excavated to a cut slope of 1 vertical to 3 horizontal. This is a conservative slope for this material.

Peat

Although the peat can be seen to stand vertically in the quarry to the east of the site, given the peat's variability it is proposed to provide a retaining system around the entire terminal platform. In areas of cut gabion gravity retaining wall structures will be used. A factor of safety of 1.5 is provided for sliding. The peat will be temporarily retained (i.e., during the construction phase) by sheet piles in areas of fill.

A shelf, varying in width between 2 and 3 metres will be formed in front of the gabion retaining walls. There will be a cross fall towards the terminal to ensure no ponding of water on this shelf.

4.3 Slope stability and groundwater

The expected groundwater yield is low and can be readily controlled. Please refer to the Geology, Hydrogeology and Global Stability Report. A series of face drains will be installed to a depth of 0.9m in the cut slopes to effect drainage of the groundwater and to stop seepage and unravelling at the face.

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4.4 Slope stability and surface water drainage

A series of pre-construction drainage measures, such as the cleaning out of all existing surface drains on the terminal site, will be carried out. The existing drains at 150m spacing run east to west. These will ensure that only the rainfall landing in the immediate vicinity of the excavated slope and on the slope itself runs over the cut surface. A drain will be constructed at the toe of the slope to catch this run-off.

4.5 Local stability of Cut Slope

A series of longitudinal sections were developed along the perimeter of the terminal and are presented in Appendix 4, pages 4A, 11 - 16. These sections detail the expected depths for the various strata in the cut slopes. Examination of the sections yielded two critical locations for analyses for stability. These are the maximum height of cut slope in the north east of the site, and the maximum cut slope in mineral soils only (i.e., where the top of the rock is below the platform level). These locations are shown on pages 4A - 10 and 15. The calculations for local slope stability for the conditions just described are presented in Appendix 4A. The soil strength and deformation parameters are also presented in Appendix 4A in Table 4A.1

4.6 Up hill slope stability of Peat Layer

In general all cut peat faces are supported by a gabion retaining wall. The wall is designed for the horizontal load applied by the peat conservatively assuming zero shear strength within the peat. Consideration has also been given to the 'global stability' of the peat uphill of the terminal. An examination of the topography of the site shows that the uphill section slopes 'directly' into the excavation only in the northeast corner of the terminal. See Appendix 4B, page 4B-13. Elsewhere the ground slopes either away from the excavation or at an angle substantially less than 90° to the excavated face.

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To ensure against failure of the peat uphill of the excavation the gabion retaining wall has been designed to withstand the horizontal force from the peat, conservatively assuming total failure along the interface between the peat and the mineral soils. The ground water is conservatively taken to coincide with the ground surface behind the wall. The resultant downhill horizontal load from the weight of the peat is approximately 70kN and this is taken in conjunction with the local peat 'active' load to design the gabion retaining wall. These analyses are presented in Appendix 4B along with details of soil strength and deformation parameters in Tables 4B.1 and 4B.2.

The gabion retaining walls will be constructed by first strengthening the peat. This will be by means of strengthening the peat by mixing it with dry cement and/or by the installation of sheet piles to retain the peat in the temporary condition. For conservative design the strengthened parameters of peat are not used in the analyses.

4.7 Stability of Peat in Areas of Fill

To the south of the site the ground levels are below the proposed terminal platform level of 33.4m AOD and it is necessary to remove the soft peat layer and bring the levels back up to 33.4m AOD. In the temporary construction condition the peat will be retained using sheet piles. These sheet piles are required to retain the unexcavated peat only until the terminal fill is placed.

The height of retained material varies across the site with a maximum retained height of approximately 3.65m. This is the cross-section that has been analysed, see Appendix 4C, page 4C – 6, as displacements and structural loading of the sheet pile member are a maximum at this location.

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The sheet piling equipment will access the site along a purpose built access track running along the retained edge of the sheet pile. Soil strengthening will be carried out along this access road and within the retained peat. This is achieved by the addition of dry powder cement to the peat. The effect of the soil strengthening is to stiffen the peat resulting in a material with properties similar to a firm to stiff clay.

The length of the sheet pile has been determined by the ground conditions. Sheet piles will be driven to a depth of 6m below ground level for a retained height of 3.65m. This depth corresponds with the depth to the top of the mineral soil.

Analyses have been carried out to determine the stability and displacements of the sheet piles during the excavation of the peat for the terminal platform. Details of these analyses are presented in Appendix 4C. Details of the soil parameters used are given Table 4C.1

4.8 Fill Slope Stability

As the sheet pile is used as a temporary retaining system for the peat the fill material on site is designed to be self-supporting. This is done by means of incorporating a layered wraparound geotextile system within the fill. The purpose of this is two-fold: it makes the sheet pile redundant once the fill is placed thus reducing the durability requirements and also prevents the fill exerting any downhill lateral load on the in-situ peat.

The geotextile wraparound has been designed in two parts. The slope at the top of the terminal platform has been designed using the two-wedge failure method as specified in BS8006: 1995 (Strengthened /Reinforced Soils and other Fills). The vertical wraparound wall has been designed using the coherent gravity method as specified in BS8006.

Local bearing and sliding capacity checks have been carried out for the reinforced soil block as required by BS8006.

The fill slope analysed, see Appendix 4D, page 4D – 22, is located at the maximum height of vertical fill and maximum slope height. This is the same location as for the sheet pile wall design in Appendix 4C. Details of the analyses are presented in Appendix 4D.

Stability of the reinforced soil block as part of an overall slip failure is considered in Appendix 4E.

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4.9 Stability of Fill Area

The global stability of the fill in the south-western half of the terminal has been analysed. The analyses determine the factors of safety against the block of fill sliding down hill.

As described above, the face of the fill will be constructed as a geotextile wraparound structure. This will prevent the fill material from applying load to the peat. This element of the terminal fill has been modelled as a very stiff material with a friction angle of 90° allowing it to stand vertically. The size of the area of this reinforced fill is 3m, as described in Appendix 4D.

Two cross sections have been analysed one at the location of the maximum height of terminal fill and slope, the same as the Appendix 4D, and a second on the southeast edge of the terminal. See Appendix 4E, pages 4E 8 and 10. Both analyses were carried out using a slip circle analysis to determine the factor of safety against sliding or rotational failure of the terminal fill against the underlying mineral soils and non-intact rock.

The peat layer on the retained side of the sheet pile wall have not been modelled as a stratum, due to program constraints however its effect has been modelled using a uniform load at the surface of the mineral soils on the retained side of the sheet pile.

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Details of the analyses of the stability of the fill area within the terminal are presented in Appendix 4E and the soil parameters are given in Table 4E.1.

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Appendix 4A - Cut Slope Stability Calculations

Introduction

A series of longitudinal sections have been developed along the perimeter of the terminal. These sections, Appendix 4A – 11 to 16, illustrate the depth of peat, mineral soils, non-intact rock and intact rock that will be excavated to form the cut slopes. Also shown are the locations where the slopes transition from cut to fill for the terminal platform level of 33.4m AOD.

Following examination of the longitudinal sections a number of locations are considered critical for the examination of the slope stability. These are as follows:

- Maximum cut slope through peat, mineral soil, non-intact rock and intact rock
- Maximum cut slope through peat and mineral soils only

These two conditions have been analysed and are presented in this appendix. The program SLOPE has been used for the analyses and a description of the program is also attached. The cross sections analysed are shown in detail in sketches on Appendix 4A - 17.

Soil Parameters

The soil parameters shown in Table 4A.1 are used in the slope analyses. Slope calculates the submerged unit weight of soil itself and the data inputted to the program is the bulk density of a unit volume of soil above the water table (γ) and the bulk density of a unit volume of soil below the water table (γ (')). As the soil above the water table is at or near full saturation the values are the same for the analyses. Lower bound values of the density of the mineral soils are used resulting in lower effective pressure being generated in the design. This leads to more conservative design in slope analyses.

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Table 4A.1 Soil Parameters

Soil Type	γ/ γ (') (kN/m^3)	ϕ_u/ ϕ' deg.	C_u/C' (kN/m^3)	Comments
Gabion	-/15	-/45°	-/100	Parameters model the meshing and stone infill
Peat	11/11	-/25°	3/0	
Clay	18/18	-/30°	40/0	
Sand – upper	19/19	-/33°	40/0	
Sand – lower	19/19	-/34°	55/0	
Non-Intact rock	20/20	-/40°	75/0	Modelled conservatively as a firm to stiff clay
Intact rock	22/22	-/45°	100/50	Modelled conservatively as a stiff to hard clay

Groundwater Conditions

Onerous groundwater conditions are assumed for the cut slope stability calculations. Monitoring of groundwater on the site indicates that over the upper levels of the site there is a perched water table within the peat. Pre-construction drains, some 1.4m in depth and at 150m spacing are to be installed in the peat over the terminal footprint and surrounding areas. Depth to the ground water within the bedrock is at or below the terminal platform level. Face drainage (900mm deep counterfort drains) will be installed within the face of the cut slopes and the groundwater seepage will be drained to a

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perimeter drain installed around the edge of the terminal platform. See PR006 – Site Drainage Planning Report for details. Groundwater levels are conservatively taken through out the cut slope cross section to be at 0.5m below finished surface levels except in the vicinity of the toe drain. The cross section, conservatively, does not model the two separate water bodies, namely the perched water table in the peat and the bedrock water table, as being separated.

Summary of Results

It can be seen that for drained conditions a factor of safety of 1.5 (greater than the recommended 1.3 to 1.4 FOS suggested by BS 6031: 1981 Cl. 6.5.1.2) and greater has been achieved for the proposed slope configurations. Undrained conditions yield greater factors of safety. Details of the runs carried out for the analyses are given in Table 4A.2 below. For location of the sections see pages App. 4A – 10 and 15.

Table 4A.2 Details of Analyses Runs

File Name	Analysis Carried Out	Factor of Safety
App 4A_Stability Max Cut No1 – **Run 1**	Maximum Cut Height Slope, Long Term, Failure Plane at Peat/Clay Interface	**7.376** – unrealistic slip circle failure
App 4A_Stability Max Cut No1 – **Run 1a**	Maximum Cut Height Slope, Long Term, Failure Plane at Clay/Sand Interface	**4.712**
App 4A_Stability Max Cut No2 – **Run 2**	Maximum Cut Height Slope, Long Term, Failure Plane at Sand / Non Intact Rock Interface	**1.645**
App 4A_Stability Max Cut No3 – **Run 3**	Maximum Cut Height Slope, Long Term, Failure Plane at Non-Intact Rock / Rock Interface	**1.738**
App 4A_Stability Max Cut No4 – **Run 4**	Maximum Cut Height Slope, Short Term, Failure Plane at Peat/Clay Interface	**7.433** - unrealistic slip circle failure
App 4A_Stability Max Cut No4 – **Run 4a**	Maximum Cut Height Slope, Short Term, Failure Plane at Clay/Sand Interface	**6.942**
App 4A_Stability Max Cut No5 – **Run 5**	Maximum Cut Height Slope, Short Term, Failure Plane at Sand / Non Intact Rock Interface	**3.263**
App 4A_Stability Max Cut No6 – **Run 6**	Maximum Cut Height Slope, Short Term, Failure Plane at Non-Intact Rock / Rock Interface	**4.061**
App 4A_Stability Max Mineral Cut No1 – **Run 7**	Maximum Mineral Soil Cut Slope, Long Term, Failure Plane at Peat/Clay Interface	**6.353** – unrealistic slip circle failure
App 4A_Stability Max Mineral Cut No1 – **Run 7a**	Maximum Mineral Soil Cut Slope, Long Term, Failure Plane at Clay / Upper Sand Interface	**1.964**
App 4A_Stability Max Mineral Cut No2 – **Run 8**	Maximum Mineral Soil Cut Slope, Long Term, Failure Plane at Clay / Upper Sand Interface	**1.510**
App 4A_Stability Max Mineral Cut No3 – **Run 9**	Maximum Mineral Soil Cut Slope, Long Term, Failure Plane at Upper Sand / Lower Sand Interface	**1.666**
App 4A_Stability Max Mineral Cut No4 – **Run 10**	Maximum Mineral Soil Cut Slope, Long Term, Failure Plane at Lower Sand / Non-Intact Rock Interface	**3.048**
App 4A_Stability Max Mineral Cut No5 – **Run 11**	Maximum Mineral Soil Cut Slope, Short Term, Failure Plane at Peat/Clay Interface	**6.122** – unrealistic slip circle failure
App 4A_Stability Max Mineral Cut No5 – **Run 11a**	Maximum Mineral Soil Cut Slope, Short Term, Failure Plane at Clay / Upper Sand Interface	**4.574**
App 4A_Stability Max Mineral Cut No6 – **Run 12**	Maximum Mineral Soil Cut Slope, Short Term, Failure Plane at Clay / Upper Sand Interface	**3.384**
App 4A_Stability Max Mineral Cut No7 – **Run 13**	Maximum Mineral Soil Cut Slope, Short Term, Failure Plane at Upper Sand / Lower Sand Interface	**3.014**
App 4A_Stability Max Mineral Cut No8 – **Run 14**	Maximum Mineral Soil Cut Slope, Short Term, Failure Plane at Lower Sand / Non-Intact Rock Interface	**3.444**

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Brief Technical Description

SLOPE

SLOPE is a program which is used for analysing the stability of slopes. The program is also applicable to earth pressure and bearing capacity problems. The methods are applicable also to rock slopes and waste heaps.

Summarised below are the main features of the program:

Analysis Methods

Swedish Circle (Fellenius)

Bishop's methods

Janbu's methods

Both **circular** and **non-circular** slip surfaces can be analysed. Circular surfaces are defined by a rectangular grid of centres and either a number of different radii, a common point through which all circles pass or a tangent surface which the circle almost touches. Non-circular slip surfaces are defined individually.

The section to be analysed is represented by a series of **soil or rock strata** with boundaries defined by cartesian co-ordinates.

A variety of methods for modelling **pore water pressure** distribution are permitted, as follows:

- Simple **hydrostatic pore pressure** distribution below a phreatic surface. Several phreatic surfaces can specified between set upper and lower levels for each problem.
- A user-defined **"piezometric"** pore pressure distribution below a phreatic surface.
- An overall **Ru value.**

In addition a maximum pore pressure suction in a soil can be specified.

Submerged or partially submerged slopes can be analysed.

Soil strengths may be represented by specifying:

- Cohesion (c) and/or angle of shearing resistance (ϕ).
- Linear variations of cohesion with depth and/or overburden pressure.

Horizontal acceleration of the slip mass (to model earthquake loading) can be included.

External loads (e.g. due to buildings or strut forces in excavations) can be applied to the surface.

The computed **factor of safety** can refer either to the soil strength ($c + \sigma_n' \tan\phi$, where σ_n' is the effective normal stress) along the slip surface or to the magnitude of the applied loads. The loads can be specified to be causing the failure in the case of bearing capacity problems or to be preventing the failure as in the case of anchor forces.

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App. A-1-1	A

Member / Location

Drg. Ref. Slope Stability

Job Title Coach Terminal

Made by Job Date 31 October 03 Chd. EJR

Reference	Calculation	Result

Terminal Side Slopes:

locations to be examined.

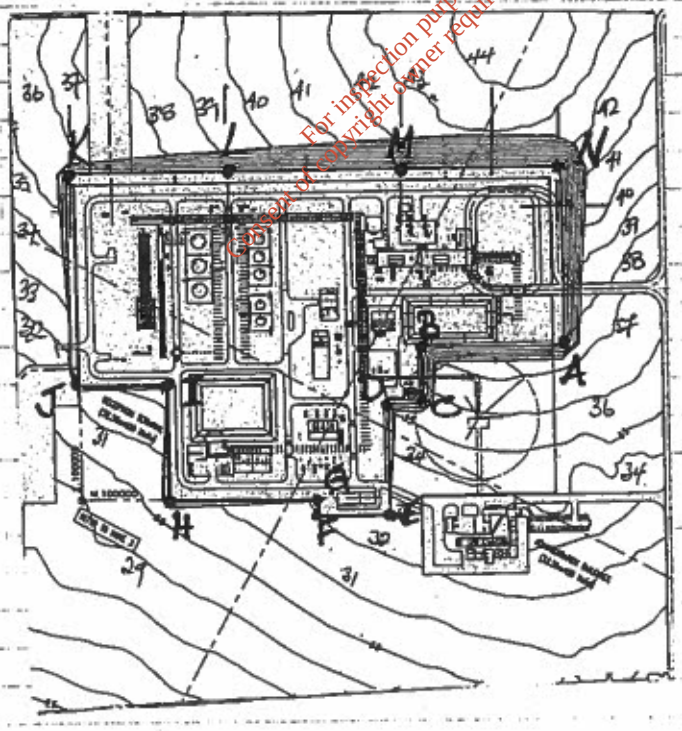
* 1. - Max cut at north east corner between M & N.

2. - Cut at M - intersection with 12m ASD contour (Now Critical)

* 3. - Cut M to L - between contours 40 & 41 (Max mineral soil face)

4. - Cut at K - north west corner

5. - Between N & A - at intersection with level 10.5m ASD. (not as critical as No 3.



Initially look at Max Cut - No 1 and max cut in mineral soils - No 3. for locations & sections see pages: App 4 A - 10 &

A

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157:10	APP A.A2	A

Member / Location

Drg. Ref. Slide Slope Stability

Job Title Combe Terminal

Made by SOB Date 31/10/03 Chd.

Reference	Calculation	Result

Soil Properties:

Drained / Undrained Conditions

4. see following page for values used & why

Soil Type	γ/γ'	Cu/C'	φ/φ'
PEAT	11/-	3/0*	0/25°*
CLAY	18/8+	40/0	0/30°*
SAND	19/9+	0/0	0/33°
NON INTACT ROCK	20/10	75/-	-/40
INTACT ROCK	22/12	100/50	-/45

* - Ages Records suggests higher figures

Second sand layer added to represent lower more dense material - only changed γ & φ' - 19kN/m³ & 34° Cu = 55kN/m²

1:3 slope for Mineral Soil

$\tan^{-1} 0.333 = 18.43°$

FOS of 1.2 on tanφ gives, FOS 1.5 gives.

φ	$\frac{\tan\phi}{1.2}$	$\tan^{-1}\left(\frac{\tan\phi}{1.2}\right)$	$\tan^{-1}\left(\frac{\tan\phi}{1.5}\right)$
36°	.606	31.2°	25.84°
34°	.562	29.34°	24.2°
32°	.521	27.51°	22.6°
30°	.481	25.7°	21.05°

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 4 : A 1 3	A

Member / Location

Drg. Ref. Slope Stability.

Job Title Cosris Tenunal

Made by JoB Date 31 Oct 03 Chd. EJL

Reference	Calculation	Result
A		

γ/γ' Values

Note the figures given on the previous page are for above and below the water table. The figures assume the soil is saturated or near saturated above the water table.

In choosing the values for γw the mineral soils the lower bound values are used for conservative design. This reduces the effective stress that can be generated to resist sliding. Higher values of γ are used in determining active pressures in the sheetpile calculations - again to design conservatively

SLOPE analyses:

The program itself computes the buoyant weight. When using the program the input required is the bulk density of a unit volume of soil above & below the water table. As we are

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ARUP Calculation Sheet

Job No. C1157.10 | Sheet No. App: 4A-4 | Rev. A

Member / Location

Drg. Ref.

Job Title Corrib Terminal | Made by JoB. | Date Dec 03. | Chd. EJL

Reference	Calculation	Result
1 A	assuming fully saturated or near saturated conditions above the water table the figures entered into the program are the same.	
	GROUNDWATER LEVELS:	
	Across the northern cut face maximum water levels are in north east corner at 33.0m AOD approximately. The construction drains some 1.4m deep are to be constructed at frequent centre across the Terminal area. For very conservative design the water table for the Slope analyses is taken to be 0.5m below ground level and continuous through out the depth. The perched water table in the peat is not separately modelled.	See drg Calleary 03E-01-A-A1-07 Rev C. / at frequent centre (150m). / Robust
	Note in the design of the gabion wall the water table within the peat is taken to be locally at ground level for robust design	

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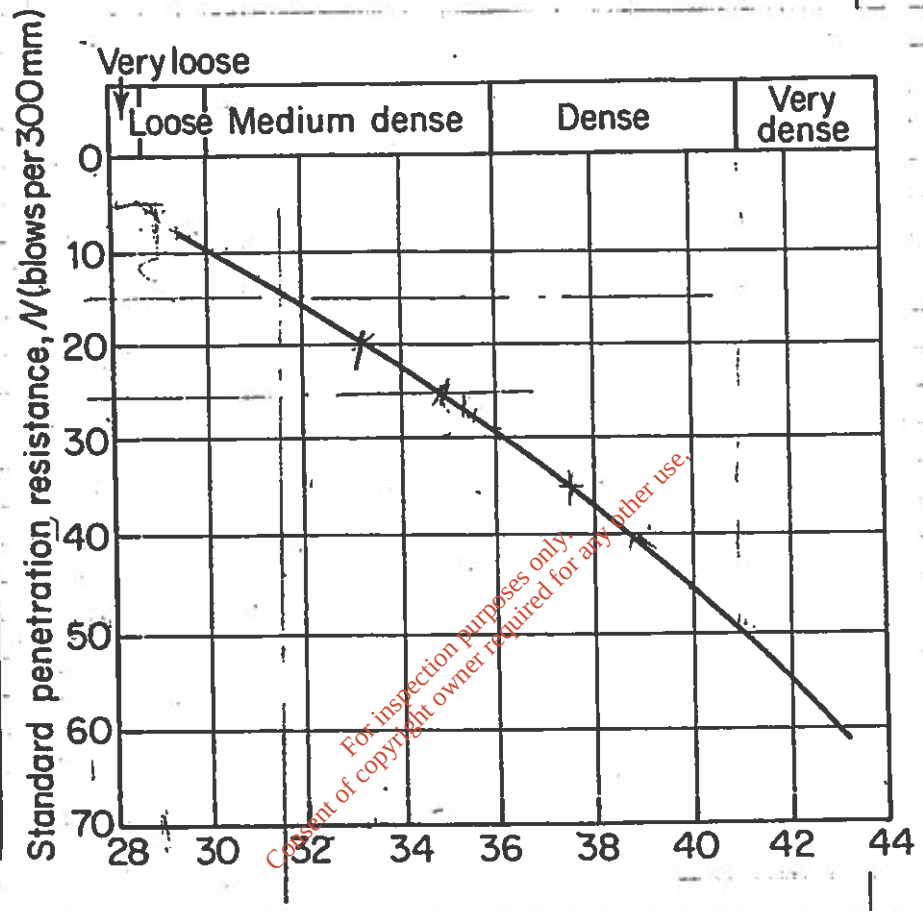
G 10
Rev 0

ARUP

Calculation Sheet

Job No.	C1157.10
Sheet No.	APP 4.A -5
Rev.	
Member / Location	SIDE SLOPES TO TERMINAL.
Drg. Ref.	
Job Title	CORELS TERMINAL
Made by	JOB
Date	03 Nov 2003
Chd.	

Reference	Calculation	Result



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from Terlinden.

Correlation between SPT and cohesionless soils.

Correlation SPT to ϕ.

SPT	ϕ
10	30°
15	31°
20	33°
25	35°
30	36°
35	37°
40	38°
45	40°
50	41°

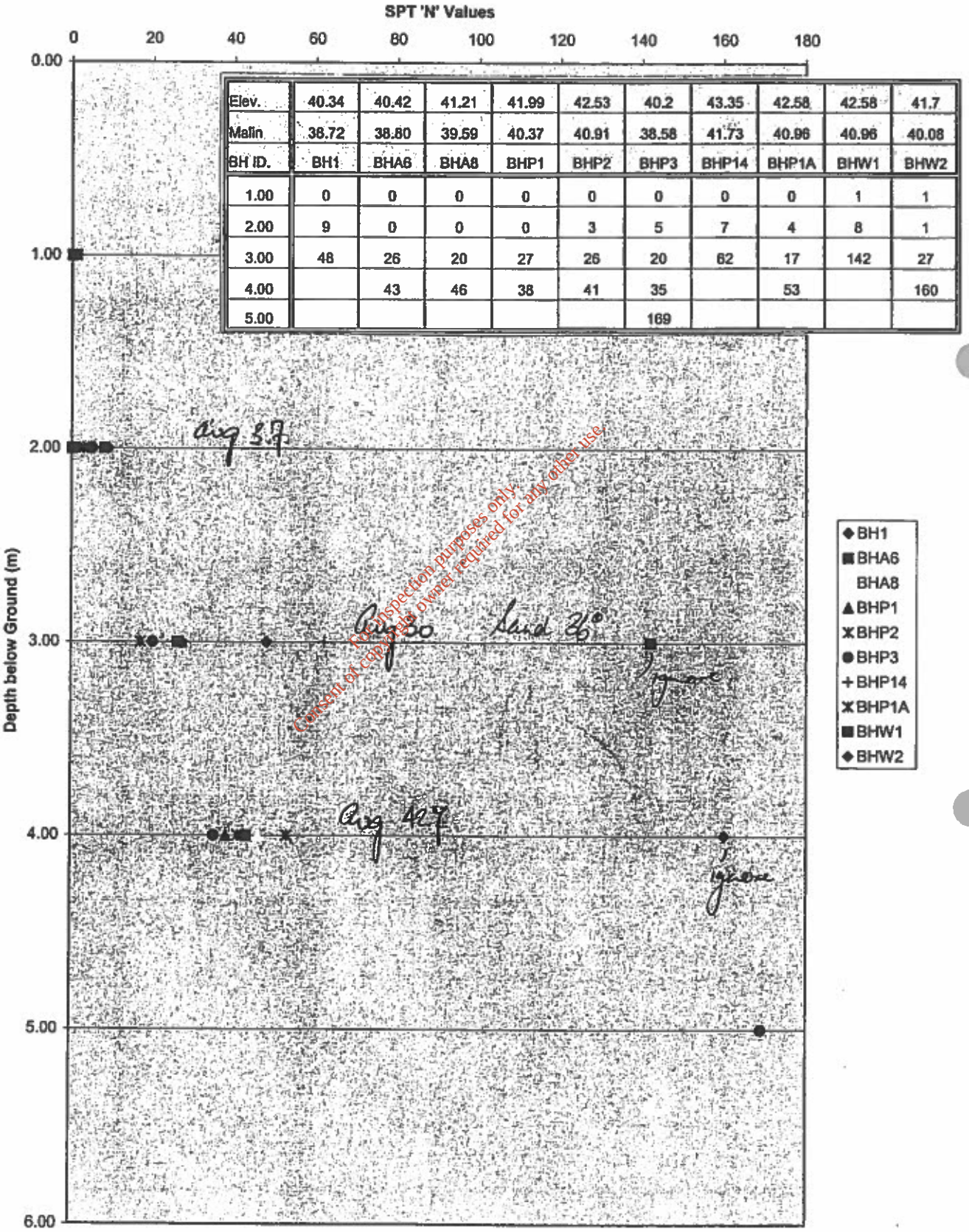
Average SPT in sand layer ~25

Sand - Low plasticity & Non plastic

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APPEN 4-A -6

STP Results above 38.4m AOD

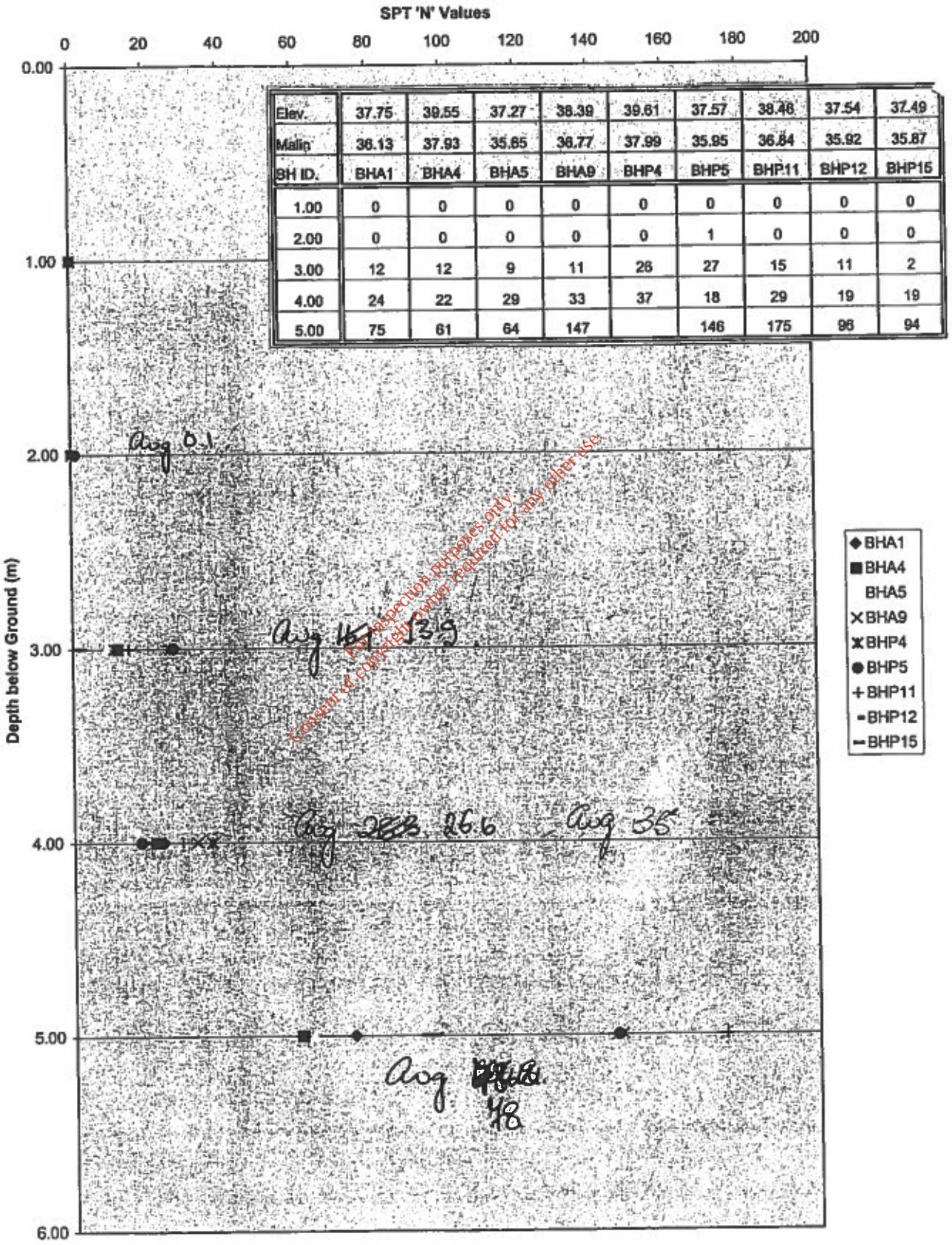


Elev.	40.34	40.42	41.21	41.99	42.53	40.2	43.35	42.58	42.58	41.7
Malin	38.72	38.80	39.59	40.37	40.91	38.58	41.73	40.96	40.96	40.08
BH ID.	BH1	BHA6	BHA8	BHP1	BHP2	BHP3	BHP14	BHP1A	BHW1	BHW2
1.00	0	0	0	0	0	0	0	0	1	1
2.00	9	0	0	0	3	5	7	4	8	1
3.00	48	26	20	27	26	20	62	17	142	27
4.00		43	46	38	41	35		53		160
5.00						169				

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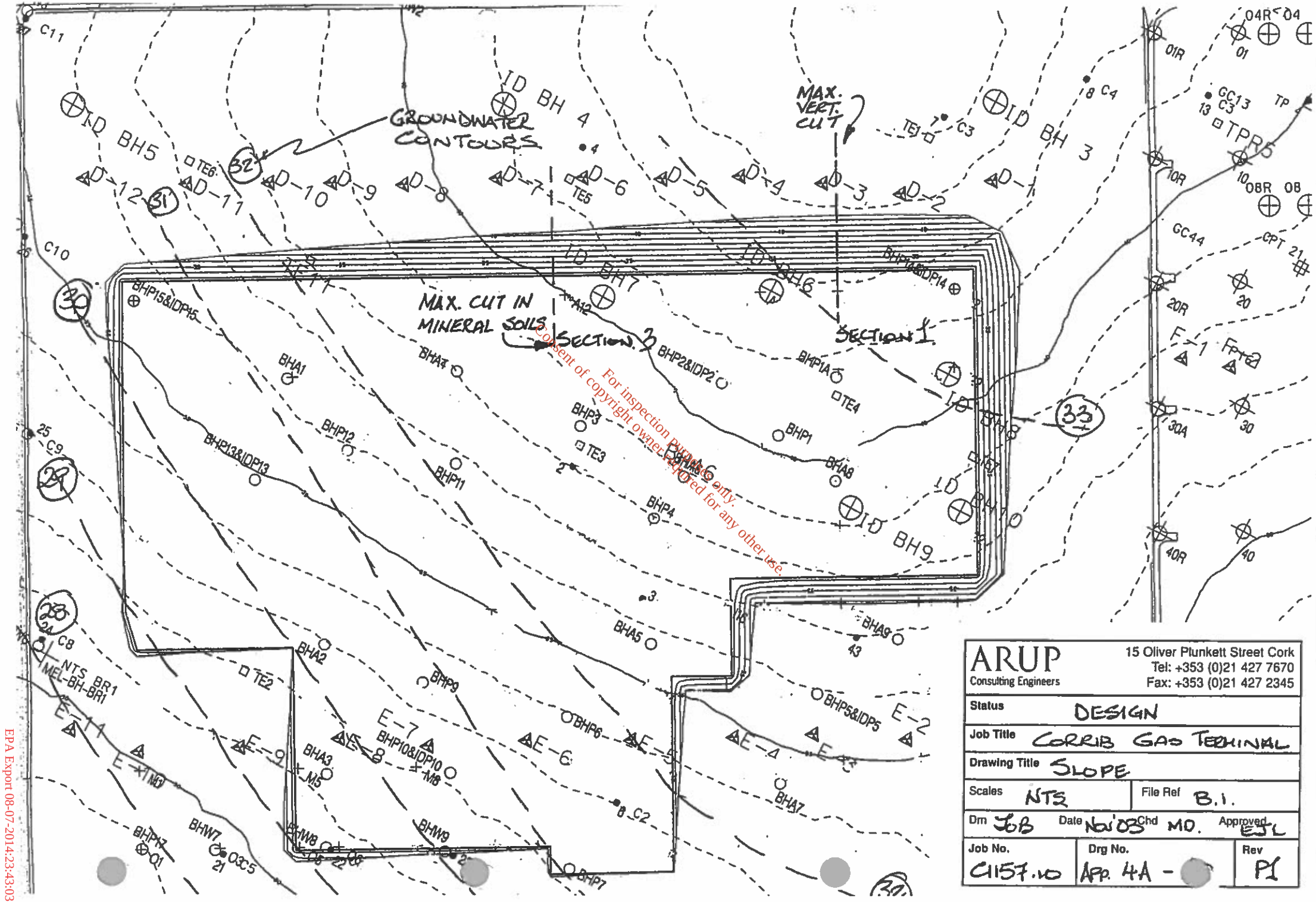
SPT Results for 38.4 to 35.4



Elev.	37.75	39.55	37.27	38.39	39.61	37.57	38.46	37.54	37.49
Malin	36.13	37.93	35.65	36.77	37.99	35.95	36.84	35.92	35.87
BH ID.	BHA1	BHA4	BHA5	BHA9	BHP4	BHP5	BHP11	BHP12	BHP15
1.00	0	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	1	0	0	0
3.00	12	12	9	11	26	27	15	11	2
4.00	24	22	29	33	37	18	29	19	19
5.00	75	61	64	147		146	175	96	94

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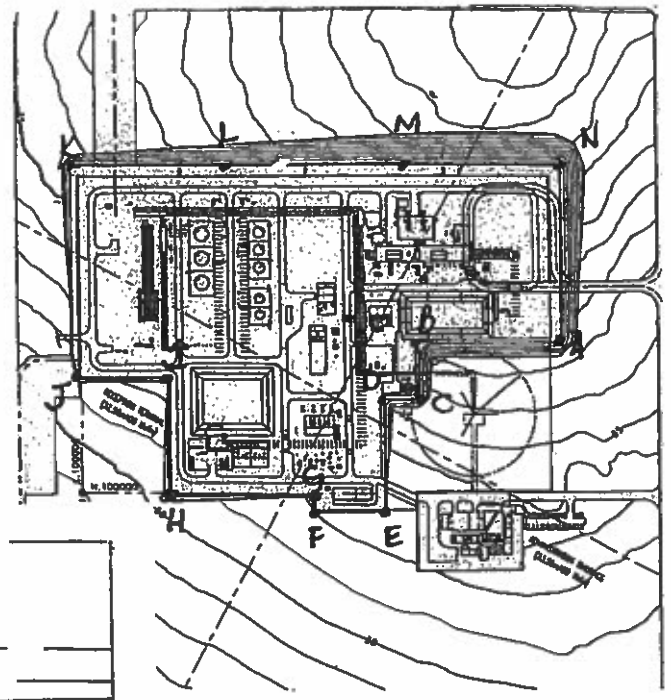
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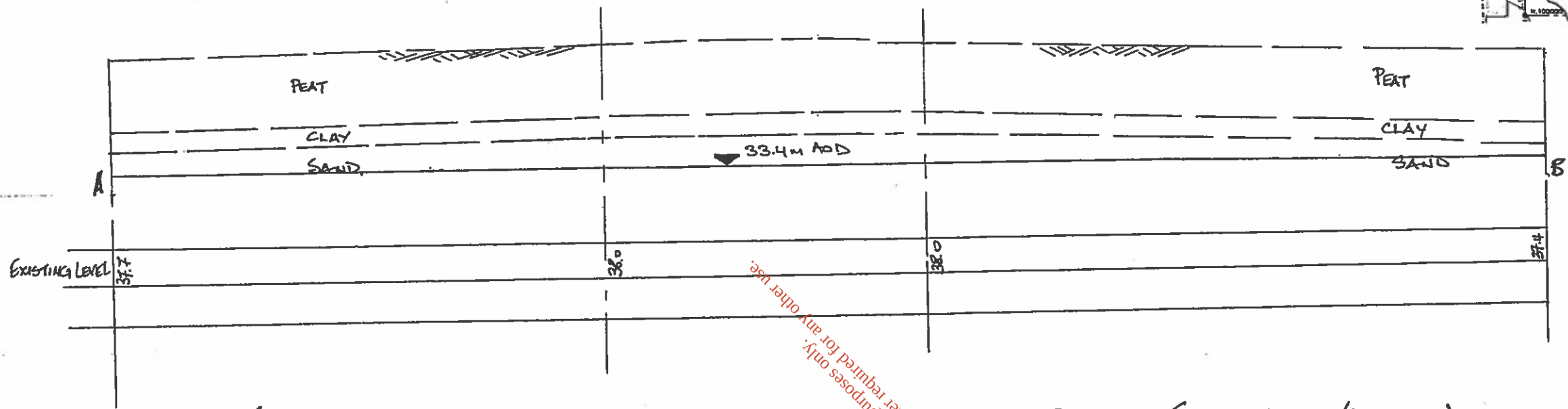
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Status: DESIGN		
Job Title: CORRIB GAS TERMINAL		
Drawing Title: SLOPE		
Scales: NTS	File Ref: B.1.	
Drn: JOB	Date: Nov'03 Chd: MO.	Approved: EJL
Job No.: C157.10	Drg No.: APP. 4A -	Rev: P1

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GABIONS IN PEAT
1:3 CUT SLOPE IN MINERAL SOILS



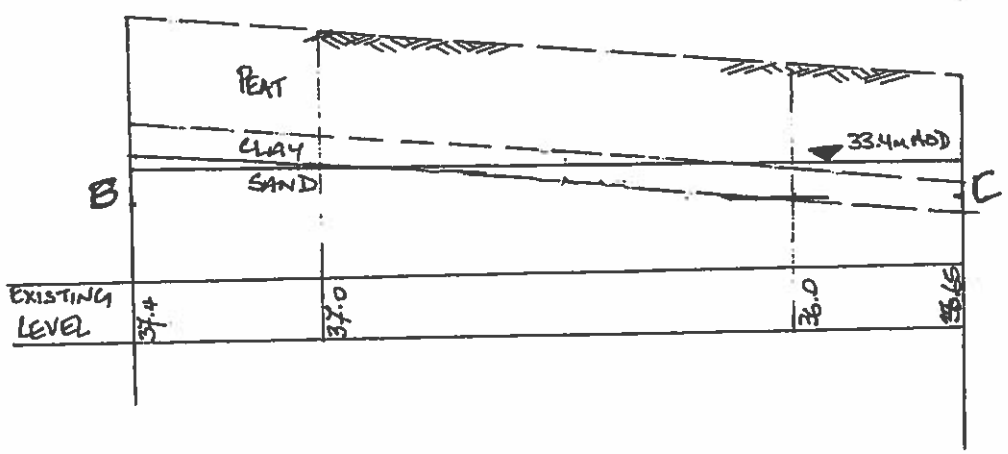
SCALE 1:500 HORIZONTAL
1:200 VERTICAL.

ELEVATION OF CUT AT NORTH EDGE OF FLARE AREA (LOOKING SOUTH)

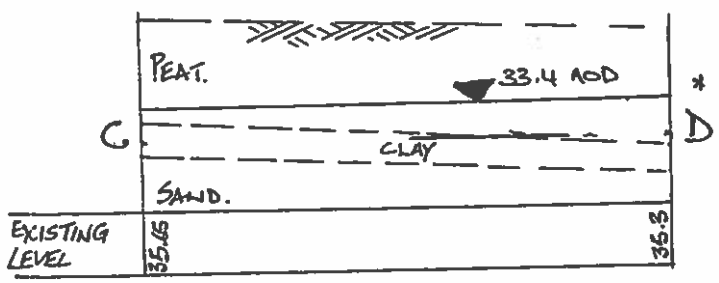
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Status PLANNING		
Job Title CORRIB GAS TERMINAL		
Drawing Title PERIMETER SECTIONS		
Scales AS SHOWN	File Ref B.1	
Drn JOB Date NOV '03	Chd MD	Approved EJL
Job No. C1157.10	Drg No. APP: 4A - 11	Rev A.

GABIONS IN PEAT
1:3 CUT SLOPE IN MINERAL SOILS

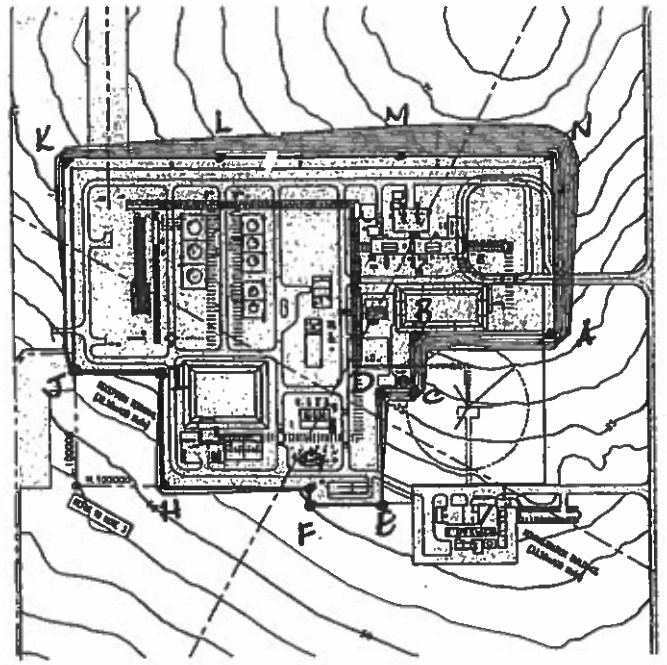


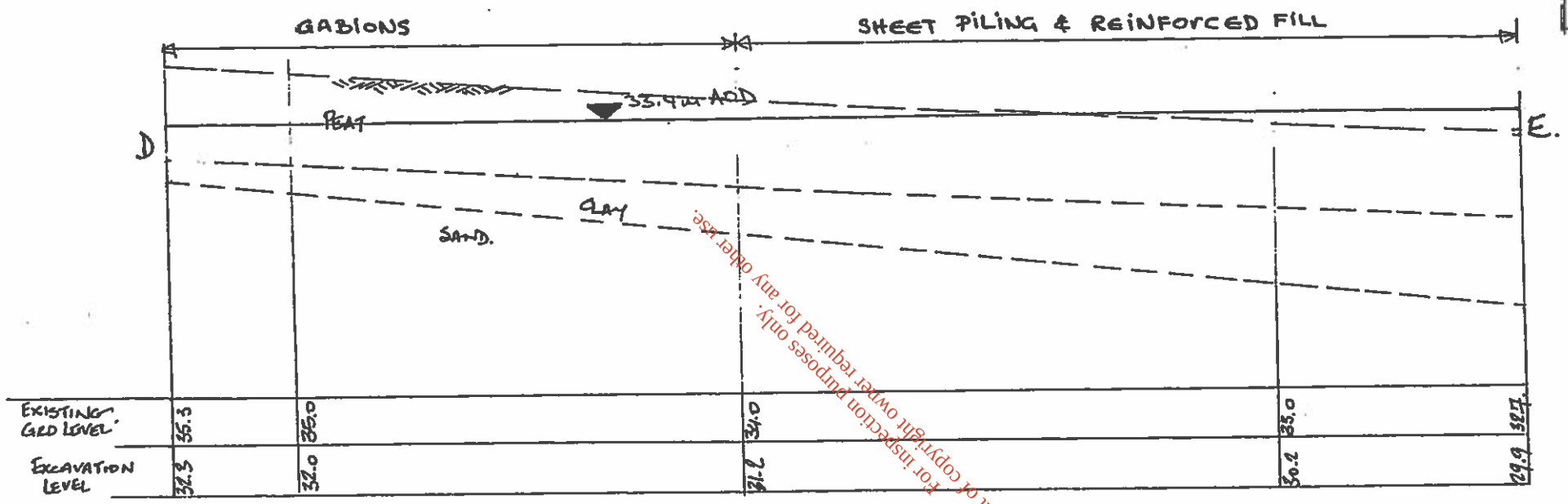
GABIONS IN PEAT
1:3 CUT SLOPE IN MINERAL SOILS



D IS CLOSE TO BH45 WHICH HAS SOFT CLAY UNDERLYING THE PEAT ALLOW FOR EXCAVATION TO 3.6m BGL.

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EXISTING GRD LEVEL	35.3	35.0	34.0	33.0	32.5
EXCAVATION LEVEL	34.3	32.0	31.2	30.2	29.9

SCALE 1:500 HORIZONTAL
1:200 VERTICAL

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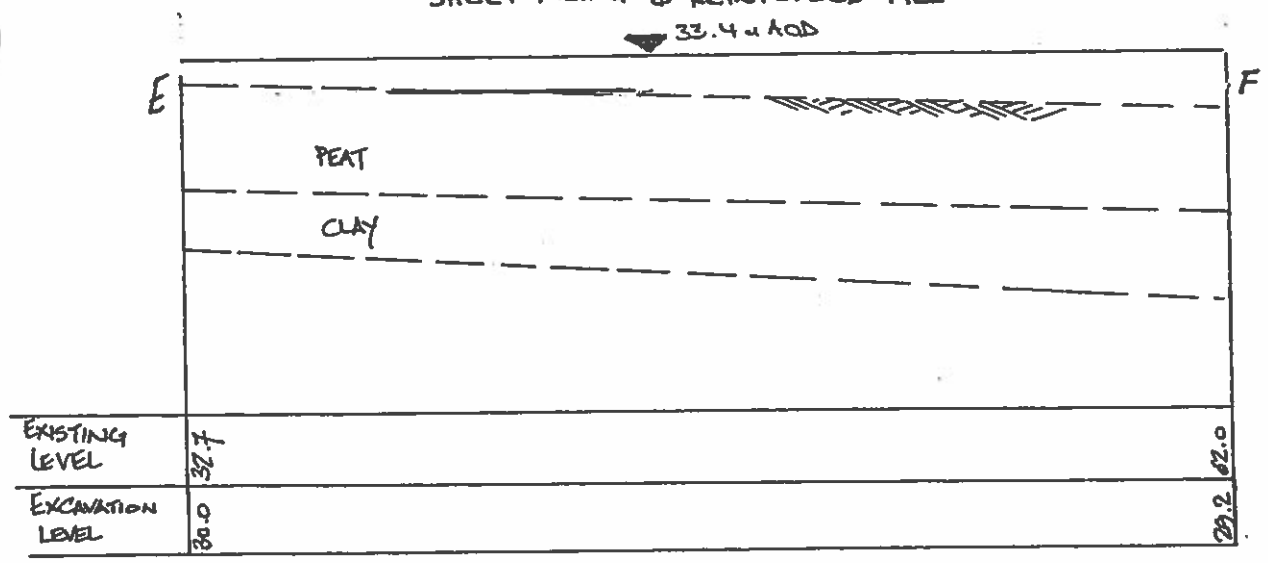
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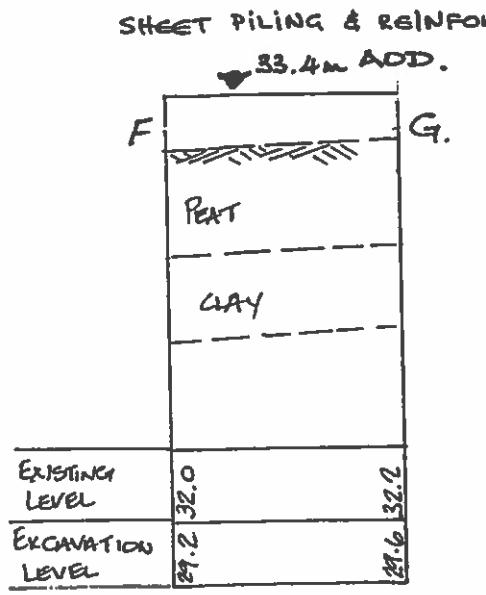
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Job Title CORRIB GAS TERMINAL			
Drawing Title PERIMETER SECTIONS			
Scales AS SHOWN	File Ref B1.		
Drn JOB	Date NOV'03	Chd MD	Approved EJL
Job No. C1157.10	Drg No. APP 4A – 12		Rev A.

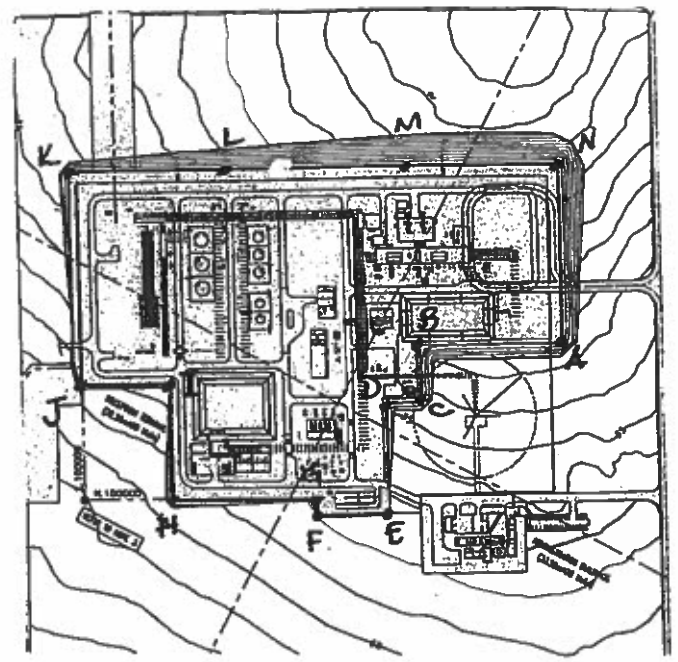
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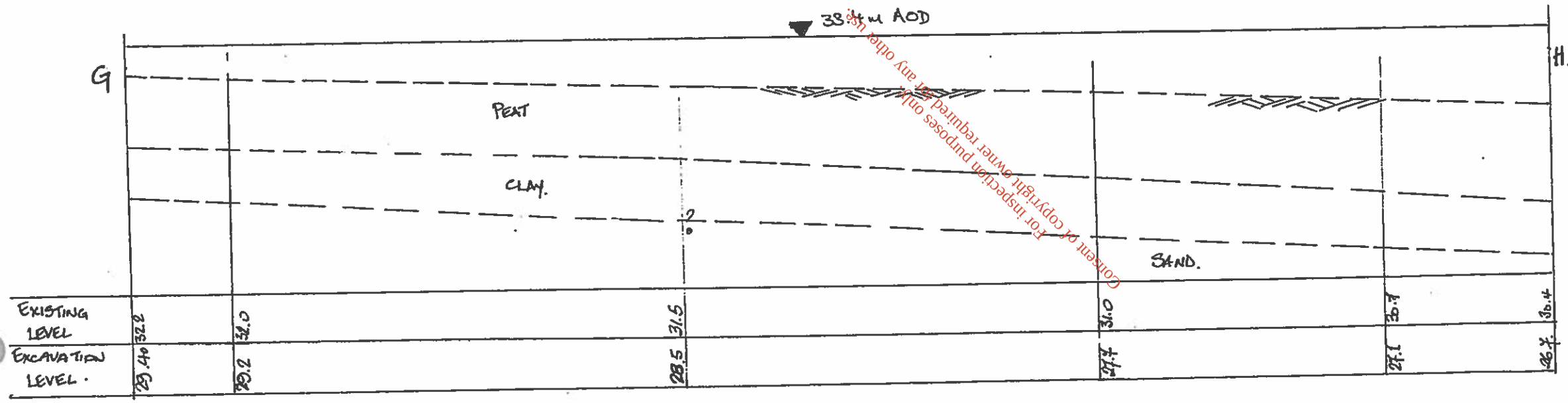
SHEET PILING & REINFORCED FILL



SHEET PILING & REINFORCED FILL





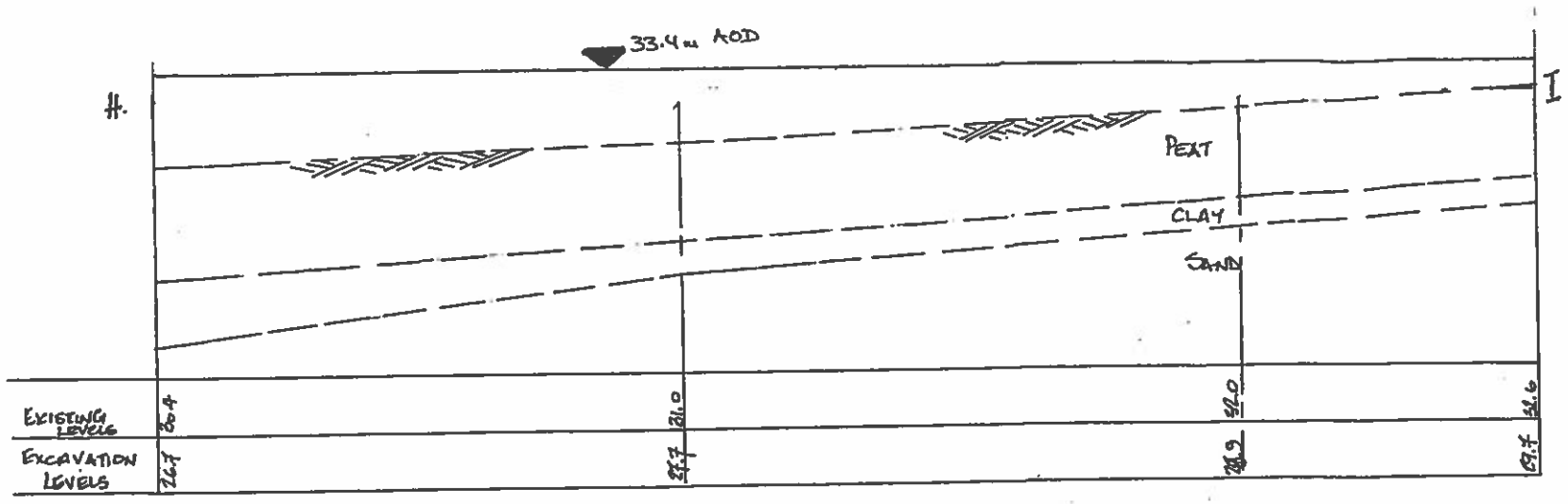


SHEET PILING & REINFORCED FILL

SCALE 1:500 HORIZONTAL
1:200 VERTICAL.

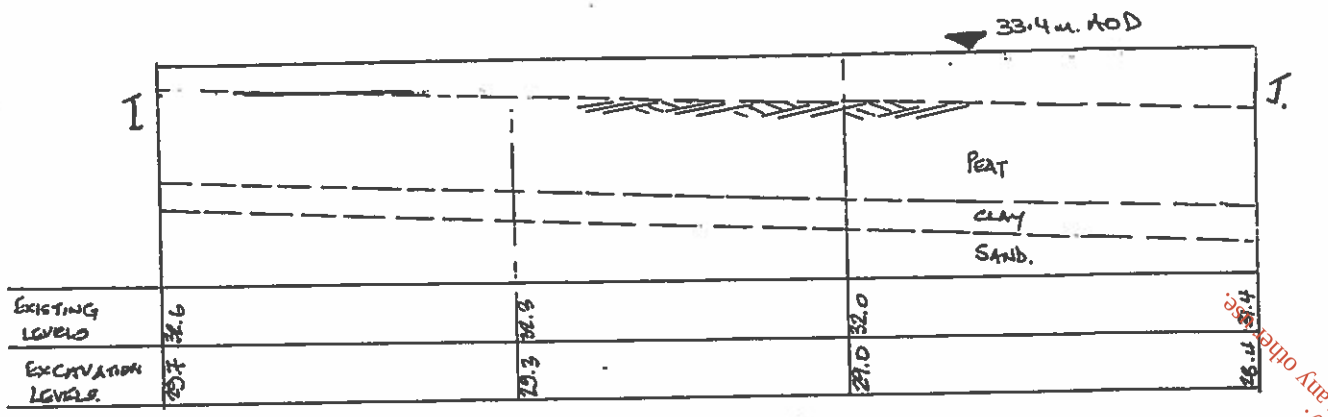
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Status PLANNING		
Job Title CORRIB GAS TERMINAL		
Drawing Title PERIMETER SECTIONS		
Scales AS SHOWN	File Ref B1	
Drn JOB Date NOV 08 Chd MD	Approved EJL	
Job No. C1157.10	Drg No. APP 4A – 13	Rev A.



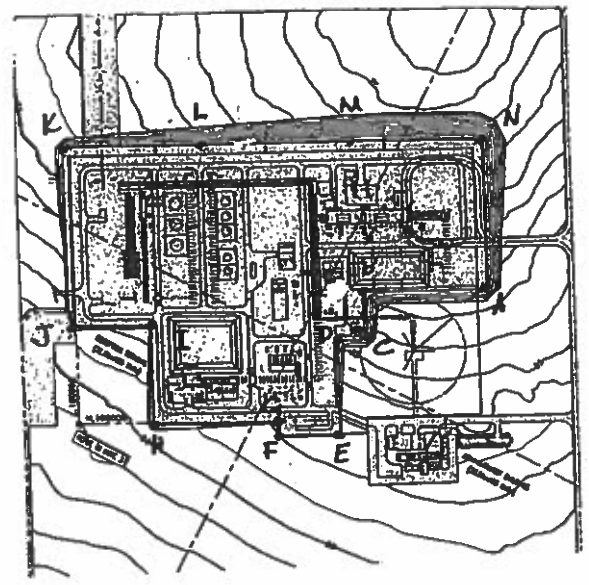
PEAT RETAINED DURING CONSTRUCTION PHASE BY SHEET PILING.

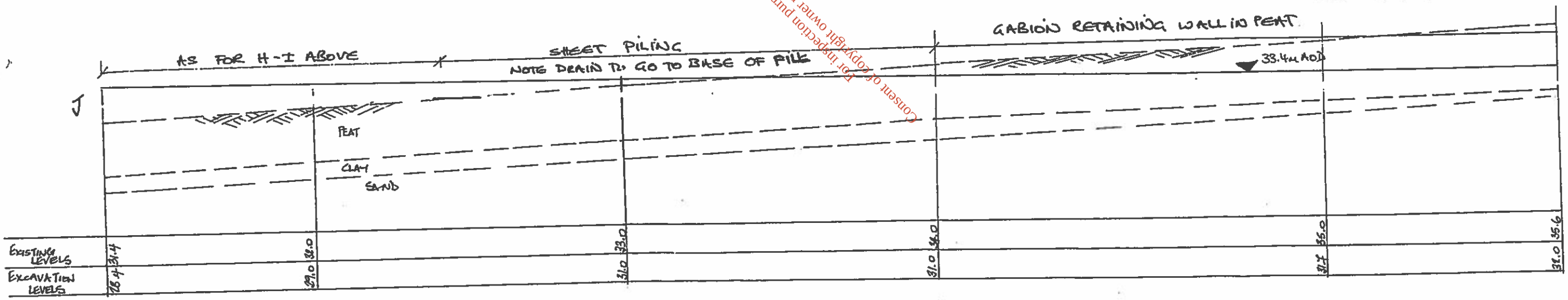
FILL REINFORCED – 1:3 SLOPE ABOVE TOP OF PEAT



SHEET PILED IN THE PEAT
FILL REINFORCED ABOVE AND BELOW SHEET PILE

SLOPE IN FILL ABOVE SHEET PILE 1:3





SCALE: 1:500 HORIZONTAL
1:200 VERTICAL

REDUCED SCALE FOR REPORT (85%)

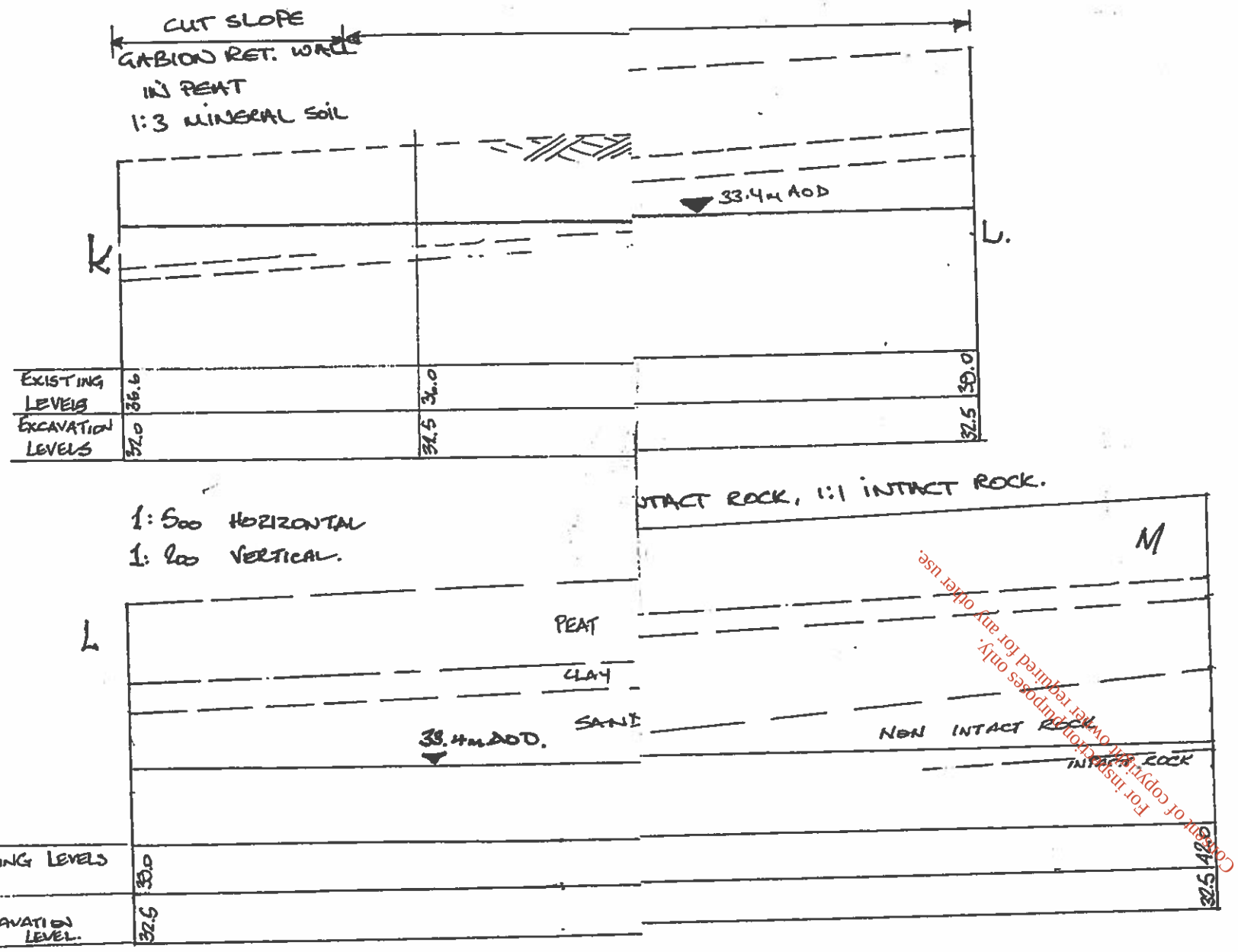
ARUP Consulting Engineers	15 Oliver Plunkett Street Cork Tel: +353 (0)21 427 7670 Fax: +353 (0)21 427 2345	
Status PLANNING		
Job Title CORRIB GAS TERMINAL		
Drawing Title PERIMETER SECTIONS		
Scales AS SHOWN	File Ref B.1	
Drn JOB Date NOV'03 Chd MD Approved EJL		
Job No. C1157.10	Drg No. APP4A - 14	Rev A

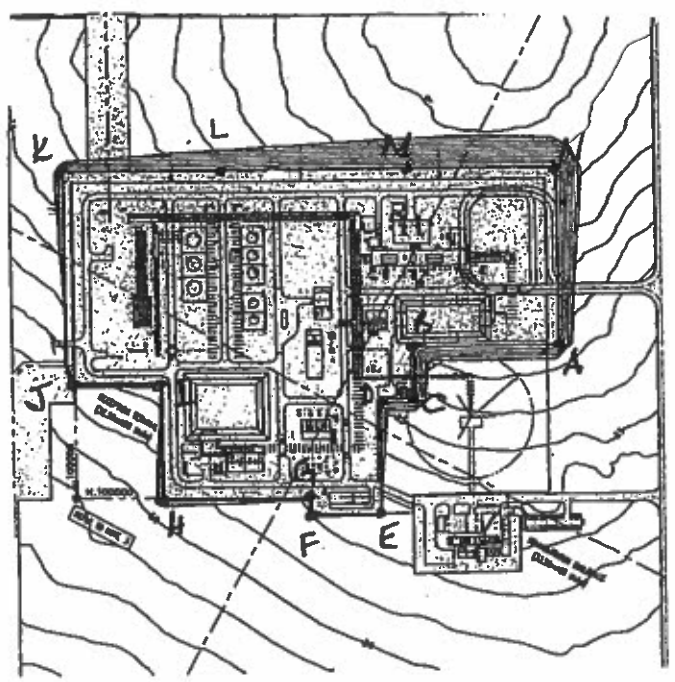
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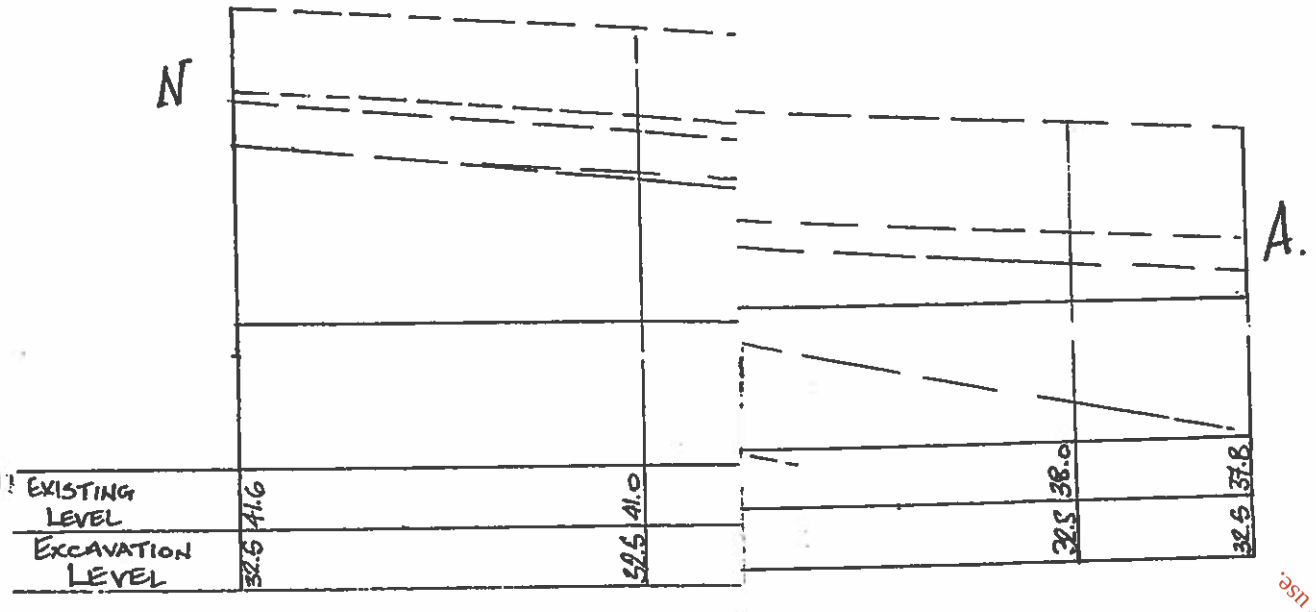
ARUP
15 Oliver Plunkett St. C
Tel: +353 (0)21 4277
Fax: +353 (0)21 4272

MD EIL
PP4A - 15 Rev. A



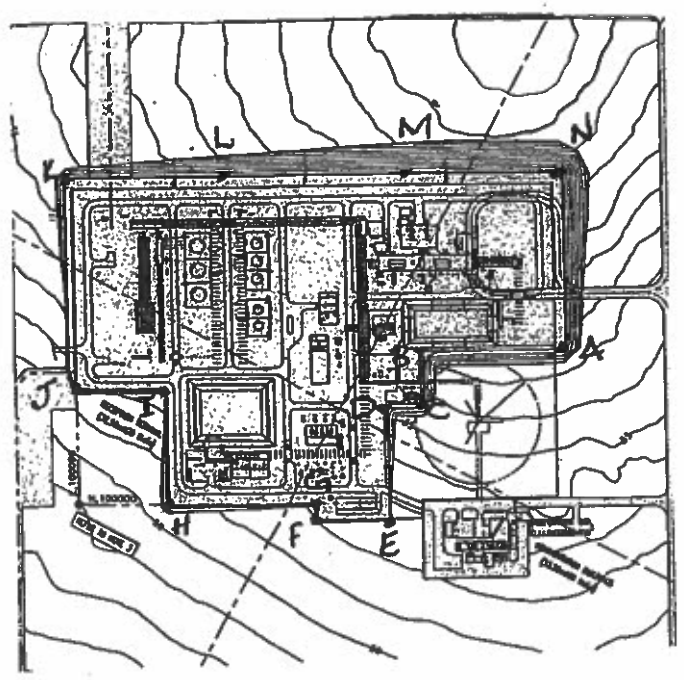


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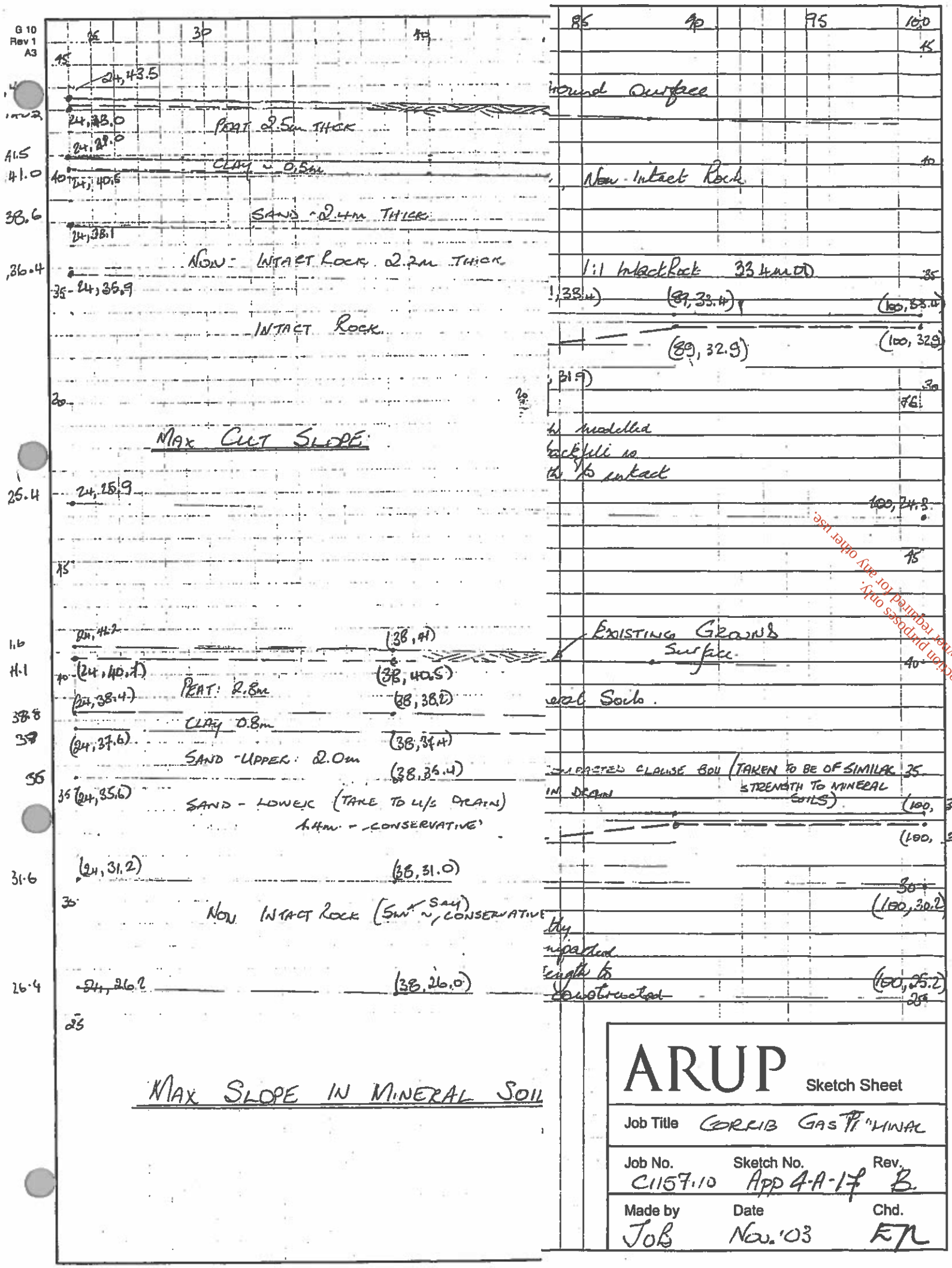
SCALE 1:500 HORIZONTAL -PEAT
1:200 VERTICAL

CHECKING OF DAYLIGHTING JOINTS



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G 10
Rev 1
A3



ARUP Sketch Sheet

Job Title CORRIB GAS PT "MINAL

Job No.	Sketch No.	Rev.
C1157.10	App 4-A-17	B.

Made by	Date	Chd.
JoB	Nov. '03	EN

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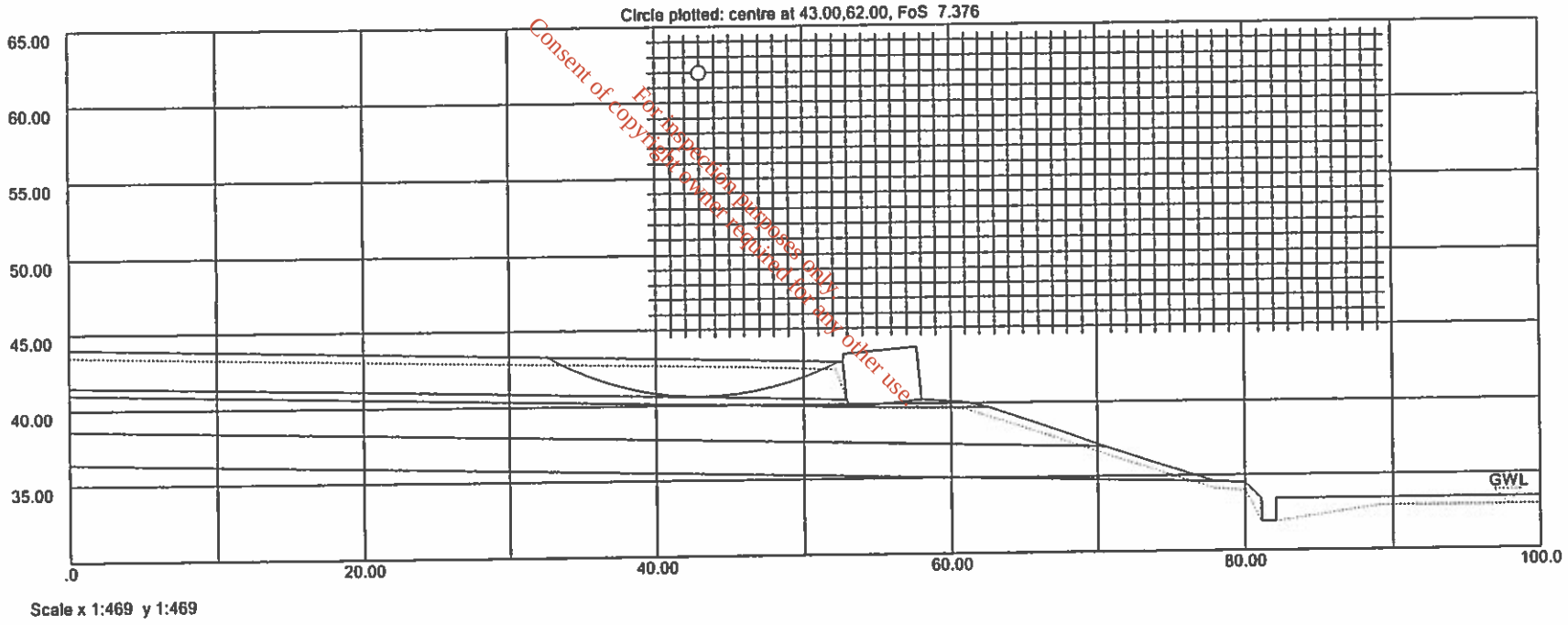
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA:Cut 1 : 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No1.sld	



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Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A: Lun 1: 02	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No1.sld	JB

Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Clay Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	46.00	52.20	52.65	52.70	52.80
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X --> 53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.00	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X --> 78.00	80.00	81.10	81.60	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.
6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X --> 100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 3

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	4.359	153.7	12.55	10.06	126.3
40.00	46.00	5.358	173.9	11.15	15.31	170.7
40.00	47.00	6.358	191.9	10.33	21.24	219.3
40.00	48.00	7.358	208.3	9.788	27.78	271.9
40.00	49.00	8.357	223.6	9.407	34.88	328.1
40.00	50.00	9.357	237.9	9.138	42.45	387.9
40.00	51.00	10.36	251.3	8.896	50.66	450.7
40.00	52.00	11.36	263.7	8.715	59.24	516.3
40.00	53.00	12.36	276.0	8.552	68.42	585.1
40.00	54.00	13.36	287.8	8.410	78.10	656.8
40.00	55.00	14.36	299.0	8.285	88.25	731.1
40.00	56.00	15.36	309.8	8.176	98.83	808.1
40.00	57.00	16.36	320.2	8.081	109.8	887.5
40.00	58.00	17.36	330.5	8.001	121.2	969.6
40.00	59.00	18.35	339.8	7.939	132.7	1053.
40.00	60.00	19.35	349.3	7.871	144.8	1140.

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40.00	61.00	20.35	358.6	7.809	157.3	1229.
40.00	62.00	21.35	367.6	7.754	170.2	1320.
40.00	63.00	22.35	376.4	7.703	183.4	1413.
40.00	64.00	23.35	385.0	7.657	196.9	1508.
41.00	45.00	4.381	154.2	12.51	10.18	127.3
41.00	46.00	5.381	174.3	11.12	15.44	171.7
41.00	47.00	6.381	192.3	10.31	21.38	220.5
41.00	48.00	7.380	208.7	9.777	27.93	273.1
41.00	49.00	8.380	223.7	9.388	35.07	329.2
41.00	50.00	9.380	238.0	9.066	42.89	388.9
41.00	51.00	10.38	251.5	8.803	51.32	451.8
41.00	52.00	11.38	264.3	8.589	60.28	517.7
41.00	53.00	12.38	276.6	8.428	69.61	586.7
41.00	54.00	13.38	287.8	8.296	79.32	658.1
41.00	55.00	14.38	299.0	8.170	89.65	732.4
41.00	56.00	15.38	309.8	8.061	100.4	809.4
41.00	57.00	16.38	320.2	7.967	111.6	888.9
41.00	58.00	17.38	330.2	7.884	123.1	970.8
41.00	59.00	18.38	340.0	7.811	135.1	1055.
41.00	60.00	19.38	349.5	7.746	147.4	1142.
41.00	61.00	20.38	358.7	7.688	160.1	1230.
41.00	62.00	21.38	367.6	7.635	173.1	1321.
41.00	63.00	22.38	376.4	7.588	186.4	1415.
41.00	64.00	23.38	384.9	7.544	200.1	1510.
42.00	45.00	4.404	154.7	12.46	10.29	128.2
42.00	46.00	5.404	174.8	11.10	15.56	172.8
42.00	47.00	6.403	192.6	10.25	21.60	221.5
42.00	48.00	7.403	209.1	9.664	28.38	274.2
42.00	49.00	8.403	224.4	9.218	35.86	330.6
42.00	50.00	9.403	238.2	8.905	43.81	390.1
42.00	51.00	10.40	251.6	8.643	52.41	453.0
42.00	52.00	11.40	264.3	8.435	61.53	519.0
42.00	53.00	12.40	276.4	8.266	71.12	587.9
42.00	54.00	13.40	288.0	8.126	81.18	659.6
42.00	55.00	14.40	299.1	8.007	91.67	734.0
42.00	56.00	15.40	310.2	7.903	102.6	811.2
42.00	57.00	16.40	320.5	7.814	114.0	890.8
42.00	58.00	17.40	330.6	7.736	125.7	972.8
42.00	59.00	18.40	339.8	7.677	137.6	1057.
42.00	60.00	19.40	349.2	7.616	150.1	1143.
42.00	61.00	20.40	358.4	7.560	163.0	1232.
42.00	62.00	21.40	367.4	7.511	176.2	1323.
42.00	63.00	22.40	376.1	7.466	189.7	1416.
42.00	64.00	23.40	384.6	7.425	203.6	1512.
42.00	64.00	23.40		Weight too small		
43.00	45.00	4.427	155.3	12.42	10.40	129.1
43.00	46.00	5.426	175.3	10.85	16.02	173.8
43.00	47.00	6.426	192.9	9.976	22.31	222.5
43.00	48.00	7.426	209.4	9.403	29.29	275.4
43.00	49.00	8.426	224.5	8.978	36.95	331.8
43.00	50.00	9.425	238.7	8.664	45.20	391.5
43.00	51.00	10.43	252.1	8.421	53.98	454.6
43.00	52.00	11.42	264.3	8.240	63.15	520.4
43.00	53.00	12.42	276.4	8.082	72.92	589.3
43.00	54.00	13.42	287.9	7.950	83.15	661.1
43.00	55.00	14.42	299.0	7.839	93.83	735.5
43.00	56.00	15.42	309.7	7.744	104.9	812.6
43.00	57.00	16.42	320.0	7.662	116.4	892.1
43.00	58.00	17.42	330.0	7.591	128.3	974.1
43.00	59.00	18.42	339.7	7.527	140.6	1058.
43.00	60.00	19.42	349.1	7.471	153.3	1145.
43.00	60.00	19.42		Weight too small		
43.00	61.00	20.42	358.2	7.421	166.3	1234.
43.00	61.00	20.42		Weight too small		
43.00	62.00	21.42	367.2	7.376	179.6	1325.
43.00	62.00	21.42		Weight too small		
43.00	63.00	22.42		Disturbing moment < 0		
43.00	64.00	23.42		Disturbing moment < 0		
44.00	45.00	4.449	155.8	11.82	11.00	130.1
44.00	46.00	5.449	175.6	10.42	16.73	174.8
44.00	47.00	6.449	193.1	9.627	23.13	223.6
44.00	48.00	7.449	209.3	9.086	30.43	276.5
44.00	49.00	8.448	224.6	8.698	38.29	333.0
44.00	50.00	9.448	238.7	8.411	46.71	392.9
44.00	51.00	10.45	252.0	8.189	55.68	455.9
44.00	52.00	11.45	264.6	8.013	65.15	522.1
44.00	53.00	12.45	276.7	7.869	75.11	591.1
44.00	54.00	13.45	288.2	7.750	85.54	662.9
44.00	55.00	14.45	299.2	7.650	96.41	737.5
44.00	56.00	15.45	309.9	7.564	107.7	814.6
44.00	56.00	15.45		Weight too small		
44.00	57.00	16.45	319.7	7.497	119.2	893.8
44.00	57.00	16.45		Weight too small		
44.00	58.00	17.45	329.7	7.432	131.3	975.9
44.00	58.00	17.45		Weight too small		
44.00	59.00	18.45		Disturbing moment < 0		
44.00	60.00	19.45		Disturbing moment < 0		
44.00	61.00	20.45		Disturbing moment < 0		
44.00	62.00	21.45		Disturbing moment < 0		
44.00	63.00	22.44		Disturbing moment < 0		
44.00	64.00	23.44		Disturbing moment < 0		
45.00	45.00	4.472	156.0	11.21	11.69	131.1
45.00	46.00	5.472	175.8	9.977	17.63	175.9
45.00	47.00	6.472	193.5	9.243	24.33	224.9
45.00	48.00	7.471	209.4	8.762	31.69	277.7
45.00	49.00	8.471	224.3	8.417	39.71	334.2
45.00	50.00	9.471	238.4	8.160	48.30	394.1
45.00	51.00	10.47	251.6	7.961	57.44	457.2
45.00	52.00	11.47	264.1	7.802	67.09	523.4
45.00	53.00	12.47	276.1	7.673	77.22	592.5
45.00	53.00	12.47		Weight too small		
45.00	54.00	13.47	287.6	7.566	87.81	664.4
45.00	54.00	13.47		Weight too small		
45.00	55.00	14.47		Disturbing moment < 0		
45.00	56.00	15.47		Disturbing moment < 0		
45.00	57.00	16.47		Disturbing moment < 0		
45.00	58.00	17.47		Disturbing moment < 0		
45.00	59.00	18.47	356.4	29560.	0.2177	6435.
45.00	60.00	19.47	369.4	351.7	21.55	7581.
45.00	61.00	20.47	381.7	196.2	44.82	8795.
45.00	62.00	21.47	393.8	144.2	69.89	10080.
45.00	63.00	22.47	406.4	119.0	96.03	11430.
45.00	64.00	23.47	418.9	103.9	123.6	12840.
46.00	45.00	4.495	156.4	10.61	12.46	132.1
46.00	46.00	5.495	175.9	9.533	18.56	177.0
46.00	47.00	6.494	193.5	8.875	25.47	226.1
46.00	48.00	7.494	209.6	8.440	33.07	279.1
46.00	49.00	8.494	224.5	8.131	41.29	335.7
46.00	50.00	9.494	238.2	7.903	50.05	395.6
46.00	50.00	9.494		Slip too small to split into minimum no. of slices		
46.00	51.00	10.49	251.4	7.726	59.39	458.8
46.00	51.00	10.49		Weight too small		
46.00	52.00	11.49		Disturbing moment < 0		

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46.00	53.00	12.49	Disturbing moment < 0			
46.00	54.00	13.49	Disturbing moment < 0			
46.00	55.00	14.49	313.9	270.4	17.16	4661.
46.00	56.00	15.49	328.6	143.0	39.67	5673.
46.00	57.00	16.49	343.1	105.8	64.08	6779.
46.00	58.00	17.49	357.4	88.18	90.25	7958.
46.00	59.00	18.49	371.4	78.00	118.1	9211.
46.00	60.00	19.49	385.2	71.42	147.5	10530.
46.00	61.00	20.49	398.2	66.67	178.9	11930.
46.00	62.00	21.49	412.4	62.85	213.4	13410.
46.00	63.00	22.49	425.8	60.39	247.6	14950.
46.00	64.00	23.49	438.9	56.36	280.0	15780.
47.00	45.00	4.523	157.1	10.07	13.26	133.6
47.00	46.00	5.523	176.5	9.113	19.61	178.7
47.00	47.00	6.522	194.1	8.526	26.74	228.0
47.00	48.00	7.522	210.2	8.137	34.56	281.2
47.00	48.00	7.522	Weight too small			
47.00	49.00	8.521	Disturbing moment < 0			
47.00	50.00	9.521	Disturbing moment < 0			
47.00	51.00	10.52	264.2	189.5	14.80	2804.
47.00	52.00	11.52	281.4	98.71	37.38	3689.
47.00	53.00	12.52	297.8	74.46	62.52	4655.
47.00	54.00	13.52	314.1	63.73	89.46	5701.
47.00	55.00	14.52	330.1	57.70	118.3	6826.
47.00	56.00	15.52	346.3	53.50	150.3	8040.
47.00	57.00	16.52	361.2	50.93	183.1	9324.
47.00	58.00	17.52	376.3	49.15	217.4	10680.
47.00	59.00	18.52	391.2	47.87	253.2	12120.
47.00	60.00	19.52	406.4	45.72	289.3	13230.
47.00	61.00	20.52	419.6	43.87	318.9	13990.
47.00	62.00	21.52	432.3	43.32	340.6	14760.
47.00	63.00	22.52	Disturbing moment < 0			
47.00	64.00	23.52	Disturbing moment < 0			
48.00	45.00	4.552	157.8	9.619	14.06	135.2
48.00	46.00	5.552	177.2	8.748	20.63	180.5
48.00	46.00	5.552	Weight too small			
48.00	47.00	6.551	Disturbing moment < 0			
48.00	48.00	7.551	220.9	109.5	16.28	1783.
48.00	49.00	8.550	241.1	63.97	40.12	2566.
48.00	50.00	9.550	260.8	51.64	66.56	3430.
48.00	51.00	10.55	279.8	46.10	95.38	4397.
48.00	52.00	11.55	298.6	42.75	127.5	5452.
48.00	53.00	12.55	316.2	40.91	161.0	6588.
48.00	54.00	13.55	333.6	39.82	196.1	7809.
48.00	55.00	14.55	350.7	39.12	233.0	9114.
48.00	56.00	15.55	367.3	38.68	271.5	10500.
48.00	57.00	16.55	383.4	36.95	308.4	11400.
48.00	58.00	17.55	398.1	36.20	335.5	12150.
48.00	59.00	18.55	411.6	36.42	354.4	12910.
48.00	60.00	19.55	Disturbing moment < 0			
48.00	61.00	20.55	Disturbing moment < 0			
48.00	62.00	21.54	Disturbing moment < 0			
48.00	63.00	22.54	Disturbing moment < 0			
48.00	64.00	23.54	Disturbing moment < 0			
49.00	45.00	4.581	162.4	511.1	1.423	727.5
49.00	46.00	5.581	180.7	56.46	24.38	1377.
49.00	47.00	6.580	213.1	41.55	50.85	2113.
49.00	48.00	7.580	236.6	36.28	81.33	2951.
49.00	49.00	8.579	258.4	34.13	113.9	3887.
49.00	50.00	9.579	279.5	33.11	148.6	4924.
49.00	51.00	10.58	299.7	32.62	185.4	6050.
49.00	52.00	11.58	319.2	32.43	224.2	7272.
49.00	53.00	12.58	338.3	32.29	266.1	8593.
49.00	54.00	13.58	356.5	31.20	305.4	9999.
49.00	55.00	14.58	372.2	30.91	331.7	10250.
49.00	56.00	15.58	Disturbing moment < 0			
49.00	57.00	16.58	Disturbing moment < 0			
49.00	58.00	17.58	Disturbing moment < 0			
49.00	59.00	18.58	Disturbing moment < 0			
49.00	60.00	19.57	Disturbing moment < 0			
49.00	61.00	20.57	Disturbing moment < 0			
49.00	62.00	21.57	Disturbing moment < 0			
49.00	63.00	22.57	Disturbing moment < 0			
49.00	64.00	23.57	Disturbing moment < 0			
50.00	45.00	4.610	176.7	32.60	45.75	1492.
50.00	46.00	5.610	205.2	29.07	77.77	2261.
50.00	47.00	6.609	231.7	27.80	113.2	3140.
50.00	48.00	7.609	256.6	27.48	150.8	4145.
50.00	49.00	8.608	279.6	27.51	190.8	5249.
50.00	50.00	9.608	301.9	27.73	232.8	6455.
50.00	51.00	10.61	323.3	27.56	276.5	7620.
50.00	52.00	11.61	342.7	27.00	308.4	8326.
50.00	53.00	12.61	Disturbing moment < 0			
50.00	54.00	13.61	Disturbing moment < 0			
50.00	55.00	14.61	Disturbing moment < 0			
50.00	56.00	15.61	Disturbing moment < 0			
50.00	57.00	16.60	Disturbing moment < 0			
50.00	58.00	17.60	Disturbing moment < 0			
50.00	59.00	18.60	Disturbing moment < 0			
50.00	60.00	19.60	Disturbing moment < 0			
50.00	61.00	20.60	Disturbing moment < 0			
50.00	62.00	21.60	Disturbing moment < 0			
50.00	63.00	22.60	Disturbing moment < 0			
50.00	64.00	23.60	Disturbing moment < 0			
51.00	45.00	4.639	196.1	24.32	91.65	2229.
51.00	46.00	5.639	226.4	24.10	131.0	3158.
51.00	47.00	6.638	253.9	24.35	172.9	4210.
51.00	48.00	7.638	280.0	24.77	217.1	5370.
51.00	49.00	8.637	304.1	24.41	261.4	6382.
51.00	50.00	9.637	324.0	24.65	286.7	7066.
51.00	51.00	10.64	Disturbing moment < 0			
51.00	52.00	11.64	Disturbing moment < 0			
51.00	53.00	12.64	Disturbing moment < 0			
51.00	54.00	13.64	Disturbing moment < 0			
51.00	55.00	14.63	Disturbing moment < 0			
51.00	56.00	15.63	Disturbing moment < 0			
51.00	57.00	16.63	Disturbing moment < 0			
51.00	58.00	17.63	Disturbing moment < 0			
51.00	59.00	18.63	Disturbing moment < 0			
51.00	60.00	19.63	Disturbing moment < 0			
51.00	61.00	20.63	Disturbing moment < 0			
51.00	62.00	21.63	Disturbing moment < 0			
51.00	63.00	22.63	Disturbing moment < 0			
51.00	64.00	23.63	Disturbing moment < 0			
52.00	45.00	4.668	219.1	23.10	129.1	3982.
52.00	46.00	5.668	250.7	23.34	174.9	4882.
52.00	47.00	6.667	279.2	23.05	221.4	5304.
52.00	48.00	7.667	Disturbing moment < 0			
52.00	49.00	8.666	Disturbing moment < 0			
52.00	50.00	9.666	Disturbing moment < 0			
52.00	51.00	10.67	Disturbing moment < 0			
52.00	52.00	11.67	Disturbing moment < 0			
52.00	53.00	12.66	Disturbing moment < 0			
52.00	54.00	13.66	Disturbing moment < 0			

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EPA Export 08-07-2014:23:43:03

52.00	55.00	14.66	Disturbing moment < 0			
52.00	56.00	15.66	Disturbing moment < 0			
52.00	57.00	16.66	Disturbing moment < 0			
52.00	58.00	17.66	Disturbing moment < 0			
52.00	59.00	18.66	420.8	60010.	0.2443	14660.
52.00	60.00	19.66	427.6	438.0	35.34	15480.
52.00	61.00	20.66	434.3	229.3	71.09	16300.
52.00	62.00	21.66	440.7	159.2	107.6	17120.
52.00	63.00	22.66	446.0	119.7	145.4	17400.
52.00	64.00	23.66	451.9	99.44	183.1	18200.
53.00	45.00	4.697	244.9	24.73	152.5	3771.
53.00	46.00	5.697	Disturbing moment < 0			
53.00	47.00	6.696	Disturbing moment < 0			
53.00	48.00	7.696	Disturbing moment < 0			
53.00	49.00	8.695	Disturbing moment < 0			
53.00	50.00	9.695	Disturbing moment < 0			
53.00	51.00	10.69	Disturbing moment < 0			
53.00	52.00	11.69	Disturbing moment < 0			
53.00	53.00	12.69	Disturbing moment < 0			
53.00	54.00	13.69	Disturbing moment < 0			
53.00	55.00	14.69	380.6	335.0	34.65	11610.
53.00	56.00	15.69	388.1	176.2	70.51	12420.
53.00	57.00	16.69	395.4	123.3	107.3	13230.
53.00	58.00	17.69	402.2	97.12	144.7	14050.
53.00	59.00	18.69	408.8	81.42	182.6	14870.
53.00	60.00	19.69	414.8	70.82	221.5	15690.
53.00	61.00	20.69	420.9	63.39	260.5	16510.
53.00	62.00	21.69	426.8	57.81	299.8	17330.
53.00	63.00	22.69	432.3	53.49	339.5	18160.
53.00	64.00	23.69	438.0	49.99	379.8	18990.
54.00	45.00	4.823	Disturbing moment < 0			
54.00	46.00	5.801	Disturbing moment < 0			
54.00	47.00	6.786	Disturbing moment < 0			
54.00	48.00	7.774	Disturbing moment < 0			
54.00	49.00	8.765	Disturbing moment < 0			
54.00	50.00	9.758	330.3	233.3	32.20	7514.
54.00	51.00	10.75	338.6	123.0	67.35	8285.
54.00	52.00	11.75	346.2	87.39	103.6	9057.
54.00	53.00	12.74	353.6	69.93	140.7	9836.
54.00	54.00	13.74	360.7	59.51	178.4	10620.
54.00	55.00	14.74	367.6	52.61	216.8	11400.
54.00	56.00	15.73	374.1	47.72	255.4	12190.
54.00	57.00	16.73	380.2	44.06	294.6	12980.
54.00	58.00	17.73	386.4	41.22	334.1	13770.
54.00	59.00	18.73	392.3	38.94	374.0	14560.
54.00	60.00	19.73	398.0	37.09	414.1	15360.
54.00	61.00	20.73	403.7	35.53	454.7	16160.
54.00	62.00	21.72	409.1	34.21	495.5	16950.
54.00	63.00	22.72	414.2	33.05	537.0	17750.
54.00	64.00	23.72	419.4	32.08	578.2	18550.
55.00	45.00	5.144	302.3	54.40	49.52	2694.
55.00	46.00	6.071	307.8	41.71	84.79	3536.
55.00	47.00	7.017	313.8	39.31	120.7	4744.
55.00	48.00	7.977	319.7	40.09	157.4	6310.
55.00	49.00	8.946	325.8	36.26	194.5	7053.
55.00	50.00	9.921	331.9	33.63	232.1	7806.
55.00	51.00	10.90	337.8	31.71	270.1	8565.
55.00	52.00	11.88	Not converged (increase iterations?)			
55.00	53.00	12.87	349.3	29.09	347.2	10100.
55.00	54.00	13.86	354.6	28.13	386.5	10870.
55.00	55.00	14.85	360.1	27.35	425.9	11650.
55.00	56.00	15.84	365.4	26.69	465.6	12430.
55.00	57.00	16.83	370.7	26.13	505.6	13210.
55.00	58.00	17.82	376.0	25.64	545.8	13990.
55.00	59.00	18.81	381.0	25.22	586.1	14780.
55.00	60.00	19.81	385.8	24.84	626.6	15570.
55.00	61.00	20.80	390.7	24.51	667.3	16360.
55.00	62.00	21.80	395.5	24.21	708.2	17150.
55.00	63.00	22.79	400.3	23.94	749.6	17950.
55.00	64.00	23.79	404.9	23.69	790.9	18740.
56.00	45.00	4.912	250.8	22.96	172.2	3955.
56.00	46.00	5.908	263.0	21.88	214.3	4687.
56.00	47.00	6.903	273.6	21.23	256.2	5440.
56.00	48.00	7.899	283.3	20.83	297.9	6205.
56.00	49.00	8.894	292.2	20.53	339.8	6976.
56.00	50.00	9.885	299.7	20.38	380.0	7743.
56.00	51.00	10.87	306.2	20.29	419.2	8506.
56.00	52.00	11.86	312.5	20.23	458.6	9276.
56.00	53.00	12.85	318.7	20.17	498.2	10050.
56.00	54.00	13.84	324.8	20.12	538.2	10830.
56.00	55.00	14.84	330.6	20.07	578.4	11610.
56.00	56.00	15.83	336.3	20.02	618.9	12390.
56.00	57.00	16.83	341.8	19.96	659.9	13170.
56.00	58.00	17.86	352.2	19.53	718.7	14030.
56.00	59.00	18.85	357.6	19.48	760.9	14820.
56.00	60.00	19.85	362.9	19.45	803.1	15620.
56.00	61.00	20.84	367.9	19.42	845.1	16410.
56.00	62.00	21.84	372.8	19.39	887.0	17200.
56.00	63.00	22.83	377.6	19.37	929.1	18000.
56.00	64.00	23.83	383.3	19.87	974.5	19370.
57.00	45.00	4.790	205.6	15.08	267.0	4027.
57.00	46.00	5.783	218.4	14.70	313.3	4606.
57.00	47.00	6.777	229.0	14.92	355.0	5297.
57.00	48.00	7.806	241.7	15.04	403.6	6070.
57.00	49.00	8.801	250.3	15.36	443.7	6816.
57.00	50.00	9.797	258.2	15.66	483.5	7570.
57.00	51.00	10.79	265.6	15.93	522.8	8331.
57.00	52.00	11.79	272.7	16.17	562.6	9097.
57.00	53.00	12.79	279.2	16.40	601.5	9866.
57.00	54.00	13.78	285.6	16.59	641.3	10640.
57.00	55.00	14.78	291.8	16.76	681.0	11410.
57.00	56.00	15.78	297.8	16.91	721.0	12190.
57.00	57.00	16.78	303.7	17.05	761.1	12970.
57.00	58.00	17.77	309.3	17.16	801.5	13760.
57.00	59.00	18.77	315.0	17.27	842.2	14540.
57.00	60.00	19.77	320.3	17.36	882.9	15330.
57.00	61.00	20.77	325.5	17.44	924.2	16120.
57.00	62.00	21.77	330.7	17.51	965.4	16910.
57.00	63.00	22.77	335.7	17.58	1007.	17700.
57.00	64.00	23.77	340.7	17.64	1049.	18490.
58.00	45.00	4.746	156.1	11.77	289.5	3406.
58.00	46.00	5.746	Not converged (increase iterations?)			
58.00	47.00	6.746	190.0	12.59	425.2	5355.
58.00	48.00	7.746	201.0	12.72	472.3	6808.
58.00	49.00	8.746	210.6	13.00	515.9	6709.
58.00	50.00	9.746	219.3	13.33	558.0	7440.
58.00	51.00	10.75	227.4	13.66	599.0	8185.
58.00	52.00	11.75	235.0	13.98	639.5	8938.
58.00	53.00	12.75	242.1	14.26	679.8	9697.
58.00	54.00	13.75	248.9	14.53	720.0	10460.
58.00	55.00	14.75	255.5	14.78	760.0	11230.
58.00	56.00	15.75	261.7	15.00	800.0	12000.

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EPA Export 08-07-2014:23:43:03

58.00	57.00	16.75	267.7	15.20	840.3	12780.
58.00	58.00	17.75	273.6	15.39	880.6	13550.
58.00	59.00	18.75	279.3	15.56	920.9	14330.
58.00	60.00	19.75	284.9	15.72	961.3	15120.
58.00	61.00	20.75	290.3	15.87	1002.	15900.
58.00	62.00	21.75	295.6	16.00	1043.	16680.
58.00	63.00	22.75	300.7	16.12	1084.	17470.
58.00	64.00	23.75	305.8	16.23	1125.	18260.
59.00	45.00	4.790	112.5	10.10	277.8	2805.
59.00	46.00	5.789	132.0	10.63	354.8	3771.
59.00	47.00	6.788	149.1	11.24	429.5	4829.
59.00	48.00	7.786	164.4	11.89	502.0	5969.
59.00	49.00	8.785	Not converged (increase iterations?)			
59.00	50.00	9.784	187.2	12.12	615.3	7459.
59.00	51.00	10.78	196.1	12.34	661.3	8160.
59.00	52.00	11.78	204.2	12.60	705.5	8887.
59.00	53.00	12.78	211.8	12.86	748.7	9629.
59.00	54.00	13.78	218.9	13.12	790.9	10380.
59.00	55.00	14.78	225.7	13.38	832.6	11140.
59.00	56.00	15.78	232.1	13.61	874.0	11900.
59.00	57.00	16.78	238.3	13.84	915.0	12660.
59.00	58.00	17.77	244.3	14.05	955.9	13430.
59.00	59.00	18.77	250.0	14.25	996.6	14200.
59.00	60.00	19.77	255.6	14.44	1037.	14970.
59.00	61.00	20.77	260.9	14.61	1078.	15750.
59.00	62.00	21.77	266.2	14.77	1119.	16530.
59.00	63.00	22.77	271.4	14.92	1160.	17310.
59.00	64.00	23.77	276.4	15.07	1200.	18090.
60.00	45.00	4.840	70.03	10.07	217.5	2190.
60.00	46.00	5.839	90.10	10.13	300.3	3041.
60.00	47.00	6.837	Not converged (increase iterations?)			
60.00	48.00	7.836	123.7	10.92	458.3	5005.
60.00	49.00	8.835	138.3	11.44	534.3	6111.
60.00	50.00	9.834	151.6	11.98	608.4	7288.
60.00	51.00	10.83	163.5	12.04	676.3	8139.
60.00	52.00	11.83	Not converged (increase iterations?)			
60.00	53.00	12.83	181.3	12.28	779.9	9577.
60.00	54.00	13.83	189.1	12.45	827.2	10300.
60.00	55.00	14.83	196.4	12.64	873.3	11040.
60.00	56.00	15.83	203.3	12.84	918.4	11790.
60.00	57.00	16.82	210.0	13.03	962.7	12540.
60.00	58.00	17.82	216.3	13.22	1006.	13310.
60.00	59.00	18.82	222.3	13.40	1050.	14070.
60.00	60.00	19.82	228.2	13.58	1093.	14840.
60.00	61.00	20.82	233.9	13.75	1136.	15610.
60.00	62.00	21.82	239.4	13.90	1178.	16380.
60.00	63.00	22.82	244.7	14.06	1221.	17160.
60.00	64.00	23.82	249.9	14.20	1263.	17940.
61.00	45.00	4.890	Weight too small			
61.00	46.00	5.889	51.22	11.14	204.5	2278.
61.00	47.00	6.887	Not converged (increase iterations?)			
61.00	48.00	7.886	84.50	10.89	369.3	4024.
61.00	49.00	8.885	99.19	11.16	449.7	5020.
61.00	50.00	9.884	112.8	11.52	528.5	6088.
61.00	51.00	10.88	125.6	11.93	605.7	7224.
61.00	52.00	11.88	137.5	12.36	681.4	8425.
61.00	53.00	12.88	148.7	12.52	754.3	9441.
61.00	54.00	13.88	158.1	12.50	816.3	10210.
61.00	55.00	14.88	166.2	12.59	869.4	10940.
61.00	56.00	15.88	173.7	12.68	919.8	11660.
61.00	57.00	16.87	181.1	12.85	972.4	12490.
61.00	58.00	17.87	187.4	12.92	1017.	13140.
61.00	59.00	18.87	193.8	13.06	1064.	13890.
61.00	60.00	19.87	200.0	13.20	1110.	14650.
61.00	61.00	20.87	206.0	13.34	1156.	15420.
61.00	62.00	21.87	211.8	13.48	1201.	16190.
61.00	63.00	22.87	217.3	13.61	1246.	16960.
61.00	64.00	23.87	222.7	13.74	1291.	17730.
62.00	45.00	4.997	Weight too small			
62.00	46.00	5.980	Weight too small			
62.00	47.00	6.968	Weight too small			
62.00	48.00	7.959	Not converged (increase iterations?)			
62.00	49.00	8.952	64.10	11.78	335.0	3947.
62.00	50.00	9.946	77.18	11.82	414.7	4904.
62.00	51.00	10.94	89.60	12.00	493.9	5928.
62.00	52.00	11.94	101.4	12.26	572.2	7016.
62.00	53.00	12.93	112.6	12.57	649.5	8165.
62.00	54.00	13.93	123.3	12.91	725.8	9372.
62.00	55.00	14.93	133.6	13.28	801.0	10630.
62.00	56.00	15.93	143.0	13.14	870.9	11440.
62.00	57.00	16.93	151.1	13.12	931.4	12220.
62.00	58.00	17.92	158.3	13.17	985.1	12970.
62.00	59.00	18.92	165.0	13.21	1037.	13700.
62.00	60.00	19.92	171.5	13.28	1087.	14430.
62.00	61.00	20.92	177.7	13.36	1136.	15180.
62.00	62.00	21.92	183.8	13.45	1185.	15940.
62.00	63.00	22.92	189.6	13.54	1233.	16710.
62.00	64.00	23.92	195.2	13.64	1281.	17470.
63.00	45.00	5.235	Radius too small			
63.00	46.00	6.205	Weight too small			
63.00	47.00	7.175	Weight too small			
63.00	48.00	8.145	Weight too small			
63.00	49.00	9.118	Weight too small			
63.00	50.00	10.10	Weight too small			
63.00	51.00	11.08	61.28	12.61	302.7	4828.
63.00	52.00	12.06	72.26	12.61	460.5	5808.
63.00	53.00	13.05	82.83	12.73	538.0	6849.
63.00	54.00	14.04	93.02	12.92	615.0	7946.
63.00	55.00	15.03	102.8	13.16	691.2	9098.
63.00	56.00	16.02	112.3	13.44	766.7	10300.
63.00	57.00	17.01	121.5	13.74	841.4	11560.
63.00	58.00	18.01	130.3	13.86	914.8	12680.
63.00	59.00	19.00	138.2	13.71	981.3	13450.
63.00	60.00	20.00	145.2	13.68	1040.	14240.
63.00	61.00	20.99	151.6	13.71	1094.	15000.
63.00	62.00	21.99	157.6	13.73	1145.	15720.
63.00	63.00	22.98	163.4	13.77	1195.	16460.
63.00	64.00	23.98	169.5	13.87	1250.	17340.
64.00	45.00	5.478	Radius too small			
64.00	46.00	6.447	Radius too small			
64.00	47.00	7.418	Weight too small			
64.00	48.00	8.388	Weight too small			
64.00	49.00	9.358	Weight too small			
64.00	50.00	10.33	Weight too small			
64.00	51.00	11.30	Weight too small			
64.00	52.00	12.27	Weight too small			
64.00	53.00	13.24	59.51	13.28	432.2	5739.
64.00	54.00	14.22	68.93	13.26	508.4	6739.
64.00	55.00	15.20	78.11	13.33	584.5	7792.

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EPA Export 08-07-2014:23:43:03

64.00	56.00	16.18	87.03	13.47	660.2	8896.
64.00	57.00	17.16	95.71	13.66	735.6	10050.
64.00	58.00	18.15	104.1	13.89	810.3	11250.
64.00	59.00	19.13	112.4	14.13	884.5	12500.
64.00	60.00	20.12	120.3	14.40	958.0	13790.
64.00	61.00	21.11	127.9	14.30	1029.	14710.
64.00	62.00	22.10	134.8	14.17	1093.	15490.
64.00	63.00	23.09	141.0	14.14	1151.	16270.
64.00	64.00	24.08	146.7	14.15	1204.	17040.
65.00	45.00	5.787		Radius too small		
65.00	46.00	6.734		Radius too small		
65.00	47.00	7.680		Radius too small		
65.00	48.00	8.636		Weight too small		
65.00	49.00	9.601		Weight too small		
65.00	50.00	10.57		Weight too small		
65.00	51.00	11.54		Weight too small		
65.00	52.00	12.51		Weight too small		
65.00	53.00	13.48		Weight too small		
65.00	54.00	14.45		Weight too small		
65.00	55.00	15.42	58.17	13.84	481.3	6661.
65.00	56.00	16.39	66.55	13.79	557.4	7685.
65.00	57.00	17.36	74.63	13.83	632.4	8748.
65.00	58.00	18.34	82.55	13.94	707.2	9859.
65.00	59.00	19.31	90.30	14.09	781.7	11010.
65.00	60.00	20.29	97.88	14.27	855.7	12210.
65.00	61.00	21.28	105.3	14.48	929.4	13460.
65.00	62.00	22.26	112.5	14.71	1002.	14740.
65.00	63.00	23.24	119.6	14.88	1075.	15990.
65.00	64.00	24.23	126.2	14.67	1143.	16760.
66.00	45.00	6.111		Radius too small		
66.00	46.00	7.057		Radius too small		
66.00	47.00	8.003		Radius too small		
66.00	48.00	8.950		Radius too small		
66.00	49.00	9.896		Slip too small to split into minimum no. of slices		
66.00	50.00	10.84		Weight too small		
66.00	51.00	11.80		Weight too small		
66.00	52.00	12.76		Weight too small		
66.00	53.00	13.72		Weight too small		
66.00	54.00	14.69		Weight too small		
66.00	55.00	15.66		Weight too small		
66.00	56.00	16.63		Weight too small		
66.00	57.00	17.60	56.51	14.38	524.4	7540.
66.00	58.00	18.57	64.33	14.27	603.0	8607.
66.00	59.00	19.54	71.86	14.27	680.1	9704.
66.00	60.00	20.51	79.08	14.34	755.2	10830.
66.00	61.00	21.49	86.07	14.46	829.0	11990.
66.00	62.00	22.46	92.93	14.61	902.5	13180.
66.00	63.00	23.44	99.66	14.78	975.6	14420.
66.00	64.00	24.41	106.3	14.98	1048.	15700.
67.00	45.00	6.434		Radius too small		
67.00	46.00	7.380		Radius too small		
67.00	47.00	8.327		Radius too small		
67.00	48.00	9.273		Radius too small		
67.00	49.00	10.22		Radius too small		
67.00	50.00	11.17		Radius too small		
67.00	51.00	12.11		Weight too small		
67.00	52.00	13.06		Weight too small		
67.00	53.00	14.00		Weight too small		
67.00	54.00	14.96		Weight too small		
67.00	55.00	15.92		Weight too small		
67.00	56.00	16.88		Weight too small		
67.00	57.00	17.85		Weight too small		
67.00	58.00	18.82		Weight too small		
67.00	59.00	19.79	54.57	14.92	560.9	8067.
67.00	60.00	20.76	61.91	14.76	641.9	9474.
67.00	61.00	21.73	69.04	14.70	721.6	10610.
67.00	62.00	22.70	75.93	14.71	799.8	11770.
67.00	63.00	23.67	82.56	14.79	876.1	12950.
67.00	64.00	24.64	88.92	14.90	950.2	14160.
68.00	45.00	6.758		Radius too small		
68.00	46.00	7.704		Radius too small		
68.00	47.00	8.650		Radius too small		
68.00	48.00	9.596		Radius too small		
68.00	49.00	10.54		Radius too small		
68.00	50.00	11.49		Radius too small		
68.00	51.00	12.44		Radius too small		
68.00	52.00	13.38		Weight too small		
68.00	53.00	14.33		Weight too small		
68.00	54.00	15.27		Weight too small		
68.00	55.00	16.22		Weight too small		
68.00	56.00	17.17		Weight too small		
68.00	57.00	18.12		Weight too small		
68.00	58.00	19.08		Weight too small		
68.00	59.00	20.04		Weight too small		
68.00	60.00	21.00		Weight too small		
68.00	61.00	21.97	52.45	15.46	591.2	9141.
68.00	62.00	22.94	59.37	15.25	674.3	10280.
68.00	63.00	23.91	66.15	15.14	756.6	11450.
68.00	64.00	24.88	72.74	15.10	837.5	12650.
69.00	45.00	7.081		Radius too small		
69.00	46.00	8.027		Radius too small		
69.00	47.00	8.973		Radius too small		
69.00	48.00	9.920		Radius too small		
69.00	49.00	10.87		Radius too small		
69.00	50.00	11.81		Radius too small		
69.00	51.00	12.76		Radius too small		
69.00	52.00	13.70		Radius too small		
69.00	53.00	14.65		Slip too small to split into minimum no. of slices		
69.00	54.00	15.60		Weight too small		
69.00	55.00	16.54		Weight too small		
69.00	56.00	17.49		Weight too small		
69.00	57.00	18.44		Weight too small		
69.00	58.00	19.38		Weight too small		
69.00	59.00	20.33		Weight too small		
69.00	60.00	21.28		Weight too small		
69.00	61.00	22.24		Weight too small		
69.00	62.00	23.20		Weight too small		
69.00	63.00	24.16	50.54	15.96	620.0	9897.
69.00	64.00	25.12	56.88	15.74	702.1	11050.
70.00	45.00	7.404		Radius too small		
70.00	46.00	8.351		Radius too small		
70.00	47.00	9.297		Radius too small		
70.00	48.00	10.24		Radius too small		
70.00	49.00	11.19		Radius too small		
70.00	50.00	12.14		Radius too small		
70.00	51.00	13.08		Radius too small		
70.00	52.00	14.03		Radius too small		
70.00	53.00	14.97		Radius too small		
70.00	54.00	15.92		Radius too small		
70.00	55.00	16.87		Weight too small		
70.00	56.00	17.81		Weight too small		
70.00	57.00	18.76		Weight too small		

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EPA Export 08-07-2014:23:43:03

70.00	58.00	19.71	Weight too small
70.00	59.00	20.65	Weight too small
70.00	60.00	21.60	Weight too small
70.00	61.00	22.54	Weight too small
70.00	62.00	23.49	Weight too small
70.00	63.00	24.44	Weight too small
70.00	64.00	25.40	Weight too small
71.00	45.00	7.728	Radius too small
71.00	46.00	8.674	Radius too small
71.00	47.00	9.620	Radius too small
71.00	48.00	10.57	Radius too small
71.00	49.00	11.51	Radius too small
71.00	50.00	12.46	Radius too small
71.00	51.00	13.41	Radius too small
71.00	52.00	14.35	Radius too small
71.00	53.00	15.30	Radius too small
71.00	54.00	16.24	Radius too small
71.00	55.00	17.19	Radius too small
71.00	56.00	18.14	Slip too small to split into minimum no. of slices
71.00	57.00	19.08	Weight too small
71.00	58.00	20.03	Weight too small
71.00	59.00	20.98	Weight too small
71.00	60.00	21.92	Weight too small
71.00	61.00	22.87	Weight too small
71.00	62.00	23.81	Weight too small
71.00	63.00	24.76	Weight too small
71.00	64.00	25.71	Weight too small
72.00	45.00	8.051	Radius too small
72.00	46.00	8.997	Radius too small
72.00	47.00	9.944	Radius too small
72.00	48.00	10.89	Radius too small
72.00	49.00	11.84	Radius too small
72.00	50.00	12.78	Radius too small
72.00	51.00	13.73	Radius too small
72.00	52.00	14.68	Radius too small
72.00	53.00	15.62	Radius too small
72.00	54.00	16.57	Radius too small
72.00	55.00	17.51	Radius too small
72.00	56.00	18.46	Radius too small
72.00	57.00	19.41	Radius too small
72.00	58.00	20.35	Weight too small
72.00	59.00	21.30	Weight too small
72.00	60.00	22.25	Weight too small
72.00	61.00	23.19	Weight too small
72.00	62.00	24.14	Weight too small
72.00	63.00	25.08	Weight too small
72.00	64.00	26.03	Weight too small
73.00	45.00	8.375	Radius too small
73.00	46.00	9.321	Radius too small
73.00	47.00	10.27	Radius too small
73.00	48.00	11.21	Radius too small
73.00	49.00	12.16	Radius too small
73.00	50.00	13.11	Radius too small
73.00	51.00	14.05	Radius too small
73.00	52.00	15.00	Radius too small
73.00	53.00	15.94	Radius too small
73.00	54.00	16.89	Radius too small
73.00	55.00	17.84	Radius too small
73.00	56.00	18.78	Radius too small
73.00	57.00	19.73	Radius too small
73.00	58.00	20.68	Radius too small
73.00	59.00	21.62	Radius too small
73.00	60.00	22.57	Weight too small
73.00	61.00	23.51	Weight too small
73.00	62.00	24.46	Weight too small
73.00	63.00	25.41	Weight too small
73.00	64.00	26.35	Weight too small
74.00	45.00	8.602	Radius too small
74.00	46.00	9.635	Radius too small
74.00	47.00	10.59	Radius too small
74.00	48.00	11.54	Radius too small
74.00	49.00	12.48	Radius too small
74.00	50.00	13.43	Radius too small
74.00	51.00	14.38	Radius too small
74.00	52.00	15.32	Radius too small
74.00	53.00	16.27	Radius too small
74.00	54.00	17.21	Radius too small
74.00	55.00	18.16	Radius too small
74.00	56.00	19.11	Radius too small
74.00	57.00	20.05	Radius too small
74.00	58.00	21.00	Radius too small
74.00	59.00	21.95	Radius too small
74.00	60.00	22.89	Radius too small
74.00	61.00	23.84	Weight too small
74.00	62.00	24.78	Weight too small
74.00	63.00	25.73	Weight too small
74.00	64.00	26.68	Weight too small
75.00	45.00	8.967	Radius too small
75.00	46.00	9.939	Radius too small
75.00	47.00	10.89	Radius too small
75.00	48.00	11.84	Radius too small
75.00	49.00	12.80	Radius too small
75.00	50.00	13.75	Radius too small
75.00	51.00	14.70	Radius too small
75.00	52.00	15.65	Radius too small
75.00	53.00	16.59	Radius too small
75.00	54.00	17.54	Radius too small
75.00	55.00	18.48	Radius too small
75.00	56.00	19.43	Radius too small
75.00	57.00	20.38	Radius too small
75.00	58.00	21.32	Radius too small
75.00	59.00	22.27	Radius too small
75.00	60.00	23.22	Radius too small
75.00	61.00	24.16	Radius too small
75.00	62.00	25.11	Radius too small
75.00	63.00	26.05	Weight too small
75.00	64.00	27.00	Weight too small
76.00	45.00	9.292	Radius too small
76.00	46.00	10.24	Radius too small
76.00	47.00	11.20	Radius too small
76.00	48.00	12.15	Radius too small
76.00	49.00	13.10	Radius too small
76.00	50.00	14.05	Radius too small
76.00	51.00	15.01	Radius too small
76.00	52.00	15.96	Radius too small
76.00	53.00	16.91	Radius too small
76.00	54.00	17.86	Radius too small
76.00	55.00	18.81	Radius too small
76.00	56.00	19.75	Radius too small
76.00	57.00	20.70	Radius too small
76.00	58.00	21.65	Radius too small
76.00	59.00	22.59	Radius too small
76.00	60.00	23.54	Radius too small

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76.00	61.00	24.48	Radius too small
76.00	62.00	25.43	Radius too small
76.00	63.00	26.38	Radius too small
76.00	64.00	27.32	Radius too small
77.00	45.00	9.596	Radius too small
77.00	46.00	10.55	Radius too small
77.00	47.00	11.50	Radius too small
77.00	48.00	12.45	Radius too small
77.00	49.00	13.41	Radius too small
77.00	50.00	14.36	Radius too small
77.00	51.00	15.31	Radius too small
77.00	52.00	16.26	Radius too small
77.00	53.00	17.22	Radius too small
77.00	54.00	18.17	Radius too small
77.00	55.00	19.12	Radius too small
77.00	56.00	20.07	Radius too small
77.00	57.00	21.02	Radius too small
77.00	58.00	21.97	Radius too small
77.00	59.00	22.92	Radius too small
77.00	60.00	23.86	Radius too small
77.00	61.00	24.81	Radius too small
77.00	62.00	25.75	Radius too small
77.00	63.00	26.70	Radius too small
77.00	64.00	27.65	Radius too small
78.00	45.00	9.901	Radius too small
78.00	46.00	10.85	Radius too small
78.00	47.00	11.81	Radius too small
78.00	48.00	12.76	Radius too small
78.00	49.00	13.71	Radius too small
78.00	50.00	14.66	Radius too small
78.00	51.00	15.62	Radius too small
78.00	52.00	16.57	Radius too small
78.00	53.00	17.52	Radius too small
78.00	54.00	18.47	Radius too small
78.00	55.00	19.43	Radius too small
78.00	56.00	20.38	Radius too small
78.00	57.00	21.33	Radius too small
78.00	58.00	22.28	Radius too small
78.00	59.00	23.24	Radius too small
78.00	60.00	24.19	Radius too small
78.00	61.00	25.13	Radius too small
78.00	62.00	26.08	Radius too small
78.00	63.00	27.02	Radius too small
78.00	64.00	27.97	Radius too small
79.00	45.00	10.21	Radius too small
79.00	46.00	11.16	Radius too small
79.00	47.00	12.11	Radius too small
79.00	48.00	13.06	Radius too small
79.00	49.00	14.02	Radius too small
79.00	50.00	14.97	Radius too small
79.00	51.00	15.92	Radius too small
79.00	52.00	16.87	Radius too small
79.00	53.00	17.83	Radius too small
79.00	54.00	18.78	Radius too small
79.00	55.00	19.73	Radius too small
79.00	56.00	20.68	Radius too small
79.00	57.00	21.64	Radius too small
79.00	58.00	22.59	Radius too small
79.00	59.00	23.54	Radius too small
79.00	60.00	24.49	Radius too small
79.00	61.00	25.44	Radius too small
79.00	62.00	26.40	Radius too small
79.00	63.00	27.35	Radius too small
79.00	64.00	28.29	Radius too small
80.00	45.00	10.48	Radius too small
80.00	46.00	11.48	Weight too small
80.00	47.00	12.48	Weight too small
80.00	48.00	13.48	Weight too small
80.00	49.00	14.48	Weight too small
80.00	50.00	15.48	Weight too small
80.00	51.00	16.48	Weight too small
80.00	52.00	17.47	Weight too small
80.00	53.00	18.47	Weight too small
80.00	54.00	19.08	Radius too small
80.00	55.00	20.04	Radius too small
80.00	56.00	20.99	Radius too small
80.00	57.00	21.94	Radius too small
80.00	58.00	22.89	Radius too small
80.00	59.00	23.84	Radius too small
80.00	60.00	24.80	Radius too small
80.00	61.00	25.75	Radius too small
80.00	62.00	26.70	Radius too small
80.00	63.00	27.65	Radius too small
80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small
81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small
81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.68	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small
82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small
82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small

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EPA Export 08-07-2014:23:43:03

83.00	45.00	10.92	Radius too small			
83.00	46.00	11.88	Radius too small			
83.00	47.00	12.85	Radius too small			
83.00	48.00	13.83	Radius too small			
83.00	49.00	14.80	Radius too small			
83.00	50.00	15.78	Radius too small			
83.00	51.00	16.77	Radius too small			
83.00	52.00	17.75	Radius too small			
83.00	53.00	18.74	Radius too small			
83.00	54.00	19.73	Radius too small			
83.00	55.00	20.71	Radius too small			
83.00	56.00	21.70	Radius too small			
83.00	57.00	22.70	Radius too small			
83.00	58.00	23.69	Radius too small			
83.00	59.00	24.68	Radius too small			
83.00	60.00	25.67	Radius too small			
83.00	61.00	26.67	Radius too small			
83.00	62.00	27.66	Weight too small			
83.00	63.00	28.65	Weight too small			
83.00	64.00	29.65	Weight too small			
84.00	45.00	11.23	Radius too small			
84.00	46.00	12.17	Radius too small			
84.00	47.00	13.12	Radius too small			
84.00	48.00	14.08	Radius too small			
84.00	49.00	15.04	Radius too small			
84.00	50.00	16.00	Radius too small			
84.00	51.00	16.97	Radius too small			
84.00	52.00	17.95	Radius too small			
84.00	53.00	18.92	Radius too small			
84.00	54.00	19.90	Radius too small			
84.00	55.00	20.88	Radius too small			
84.00	56.00	21.86	Radius too small			
84.00	57.00	22.85	Radius too small			
84.00	58.00	23.83	Radius too small			
84.00	59.00	24.82	Radius too small			
84.00	60.00	25.81	Radius too small			
84.00	61.00	26.80	Radius too small			
84.00	62.00	27.79	Radius too small			
84.00	63.00	28.78	Radius too small			
84.00	64.00	29.77	Radius too small			
85.00	45.00	11.63	Disturbing moment < 0			
85.00	46.00	12.54	Radius too small			
85.00	47.00	13.46	Radius too small			
85.00	48.00	14.39	Radius too small			
85.00	49.00	15.33	Radius too small			
85.00	50.00	16.28	Radius too small			
85.00	51.00	17.24	Radius too small			
85.00	52.00	18.20	Radius too small			
85.00	53.00	19.16	Radius too small			
85.00	54.00	20.13	Radius too small			
85.00	55.00	21.10	Radius too small			
85.00	56.00	22.07	Radius too small			
85.00	57.00	23.04	Radius too small			
85.00	58.00	24.02	Radius too small			
85.00	59.00	25.00	Radius too small			
85.00	60.00	25.98	Radius too small			
85.00	61.00	26.96	Radius too small			
85.00	62.00	27.95	Radius too small			
85.00	63.00	28.93	Radius too small			
85.00	64.00	29.92	Radius too small			
86.00	45.00	12.09	FoS > 1000			
86.00	46.00	12.97	FoS > 1000			
86.00	47.00	13.86	FoS > 1000			
86.00	48.00	14.77	FoS > 1000			
86.00	49.00	15.69	FoS > 1000			
86.00	50.00	16.62	Disturbing moment < 0			
86.00	51.00	17.55	Radius too small			
86.00	52.00	18.50	Radius too small			
86.00	53.00	19.44	Radius too small			
86.00	54.00	20.40	Radius too small			
86.00	55.00	21.36	Radius too small			
86.00	56.00	22.32	Radius too small			
86.00	57.00	23.28	Radius too small			
86.00	58.00	24.25	Radius too small			
86.00	59.00	25.22	Radius too small			
86.00	60.00	26.19	Radius too small			
86.00	61.00	27.17	Radius too small			
86.00	62.00	28.14	Radius too small			
86.00	63.00	29.12	Radius too small			
86.00	64.00	30.10	Radius too small			
87.00	45.00	11.60	Radius too small			
87.00	46.00	13.46	Disturbing moment < 0			
87.00	47.00	14.32	86.34	260200.	0.003984	1037.
87.00	48.00	15.20	FoS > 1000			
87.00	49.00	16.10	FoS > 1000			
87.00	50.00	17.00	Disturbing moment < 0			
87.00	51.00	17.92	FoS > 1000			
87.00	52.00	18.84	Disturbing moment < 0			
87.00	53.00	19.78	Disturbing moment < 0			
87.00	54.00	20.71	Disturbing moment < 0			
87.00	55.00	21.66	FoS > 1000			
87.00	56.00	22.61	Disturbing moment < 0			
87.00	57.00	23.56	Radius too small			
87.00	58.00	24.52	Radius too small			
87.00	59.00	25.48	Radius too small			
87.00	60.00	26.44	Radius too small			
87.00	61.00	27.40	Radius too small			
87.00	62.00	28.37	Radius too small			
87.00	63.00	29.34	Radius too small			
87.00	64.00	30.32	Radius too small			
88.00	45.00	11.60	Radius too small			
88.00	46.00	12.60	Radius too small			
88.00	47.00	13.60	Radius too small			
88.00	48.00	15.69	166.6	73180.	0.02663	1949.
88.00	49.00	16.56	141.3	152200.	0.01180	1797.
88.00	50.00	17.44	Disturbing moment < 0			
88.00	51.00	18.33	100.0	192000.	0.007762	1490.
88.00	52.00	19.24	Disturbing moment < 0			
88.00	53.00	20.15	Disturbing moment < 0			
88.00	54.00	21.07	FoS > 1000			
88.00	55.00	22.00	FoS > 1000			
88.00	56.00	22.94	Disturbing moment < 0			
88.00	57.00	23.88	FoS > 1000			
88.00	58.00	24.82	FoS > 1000			
88.00	59.00	25.77	FoS > 1000			
88.00	60.00	26.72	FoS > 1000			
88.00	61.00	27.68	Disturbing moment < 0			
88.00	62.00	28.64	Disturbing moment < 0			
88.00	63.00	29.60	Radius too small			
88.00	64.00	30.56	Radius too small			
89.00	45.00	11.60	Radius too small			
89.00	46.00	12.60	Radius too small			
89.00	47.00	13.60	Radius too small			
89.00	48.00	14.60	Radius too small			

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89.00	49.00	15.60		Radius too small			
89.00	50.00	17.92	237.7	50150.	0.05886		2952.
89.00	51.00	18.79	208.8	38200.	0.07293		2786.
89.00	52.00	19.67	183.4	48040.	0.05464		2625.
89.00	53.00	20.57	160.8	796800.	0.003098		2468.
89.00	54.00	21.47		Disturbing moment < 0			
89.00	55.00	22.38	122.6	197400.	0.01089		2149.
89.00	56.00	23.30	106.2	224800.	0.008825		1984.
89.00	57.00	24.23		Disturbing moment < 0			
89.00	58.00	25.16		FoS > 1000			
89.00	59.00	26.10		FoS > 1000			
89.00	60.00	27.04		FoS > 1000			
89.00	61.00	27.98		FoS > 1000			
89.00	62.00	28.93		Disturbing moment < 0			
89.00	63.00	29.88		FoS > 1000			
89.00	64.00	30.84		FoS > 1000			

WORST CASE : WATER CASE 1 OF 1

Centre at (43.00,62.00)
Iterations: 6
Net vertical force [kN]: .0
Net horiz force [kN]: -2.503E-6
Inclination of interslice forces [°]: 1.101
Radius 21.42m
Horiz acceleration [kg]: .0
Slip weight [kN] 367.2
Disturbing moment [kN m]: 179.6
Restoring moment [kN m]: 1325.

Factor of Safety: 7.376

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	32.54	43.31	-5.000	.0	.0	.0
2	33.53	42.78	.0	0.02331	1.213	.0
3	35.21	42.05	7.000	0.1412	7.351	2.450
4	36.94	41.45	12.53	0.3103	16.15	7.050
5	38.72	41.01	16.55	0.4767	24.81	13.69
6	40.52	40.72	19.03	0.5995	31.20	18.11
7	42.35	40.59	19.95	0.6522	33.95	19.91
8	44.18	40.61	19.31	0.6239	32.47	18.65
9	46.00	40.79	17.11	0.5194	27.04	14.64
10	47.87	41.14	13.02	0.3538	18.41	8.476
11	49.69	41.65	7.301	0.1715	8.927	2.665
12	51.47	42.32	.0	0.03077	1.601	.0
13	52.51	42.80	-13.65	.0	-2.503E-6	.0

Slice Strength Parameters

Slice No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.4663	.0	2.734	2.964	1.382
2	.0	0.4663	3.500	15.66	16.70	4.799
3	.0	0.4663	9.765	28.13	29.30	5.329
4	.0	0.4663	14.54	38.18	38.98	5.765
5	.0	0.4663	17.79	45.31	45.63	6.093
6	.0	0.4663	19.49	49.18	49.20	6.304
7	.0	0.4663	19.63	49.59	49.63	6.388
8	.0	0.4663	18.21	46.51	46.92	6.337
9	.0	0.4663	15.07	41.24	42.29	6.378
10	.0	0.4663	10.16	30.61	32.21	6.024
11	.0	0.4663	3.650	17.09	18.71	5.493
12	.0	0.4663	.0	2.926	3.356	1.565

Slice No.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0

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ARUP

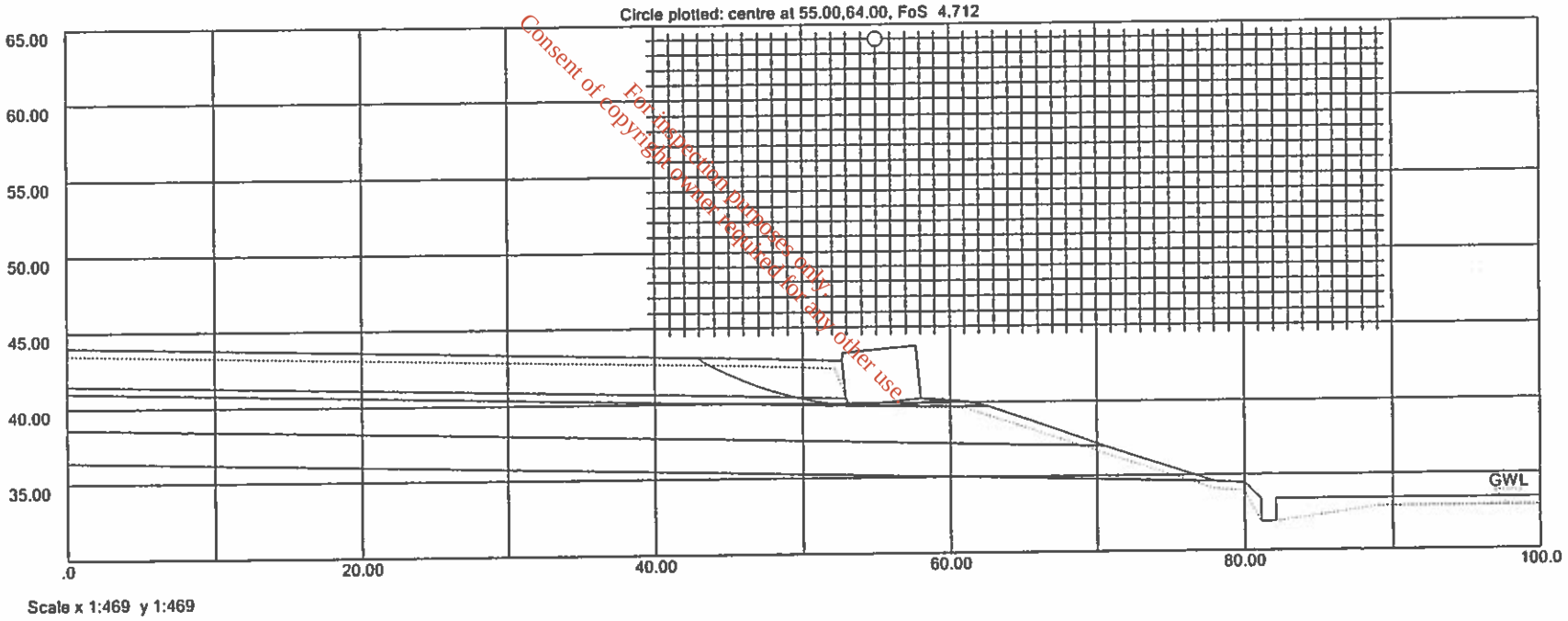
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA: Run 1A: 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No1a.sld	



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Notes
Maximum Cut height slope stability for Gabion walls/Cut Slopes
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]	Shear Strength Parameters	Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X --> 53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X --> 78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.

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6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X --> 100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	4.858	222.0	13.78	15.93	219.4
40.00	46.00	5.858	248.4	12.32	23.42	288.4
40.00	47.00	6.858	271.8	11.45	31.72	363.3
40.00	48.00	7.858	293.7	10.86	40.89	444.0
40.00	49.00	8.857	314.0	10.40	50.93	529.9
40.00	50.00	9.857	333.3	10.07	61.64	620.7
40.00	51.00	10.86	351.5	9.779	73.24	716.2
40.00	52.00	11.86	368.3	9.549	85.44	815.9
40.00	53.00	12.86	384.7	9.341	98.49	920.0
40.00	54.00	13.86	400.7	9.190	111.9	1028.
40.00	55.00	14.86	415.9	9.044	126.1	1141.
40.00	56.00	15.86	430.4	8.917	140.9	1257.
40.00	57.00	16.86	444.5	8.807	156.3	1376.
40.00	58.00	17.86	458.1	8.711	172.2	1500.
40.00	59.00	18.85	471.4	8.626	188.5	1626.
40.00	60.00	19.85	484.2	8.550	205.4	1756.
40.00	61.00	20.85	496.4	8.490	222.6	1889.
40.00	62.00	21.85	508.6	8.427	240.4	2026.
40.00	63.00	22.85	520.5	8.370	258.8	2166.
40.00	64.00	23.85	532.1	8.318	277.5	2309.
41.00	45.00	4.881	222.6	13.73	16.09	220.9
41.00	46.00	5.881	249.0	12.32	23.55	290.1
41.00	47.00	6.881	272.4	11.45	31.88	365.1
41.00	48.00	7.880	294.4	10.79	41.33	445.8
41.00	49.00	8.880	314.4	10.29	51.67	531.7
41.00	50.00	9.880	333.7	9.949	62.58	622.7
41.00	51.00	10.88	351.8	9.646	74.46	718.2
41.00	52.00	11.88	368.9	9.403	87.02	818.2
41.00	53.00	12.88	385.2	9.204	100.2	922.4
41.00	54.00	13.88	400.6	9.054	113.8	1031.
41.00	55.00	14.88	415.6	8.910	128.3	1143.
41.00	56.00	15.88	430.1	8.787	143.3	1259.
41.00	57.00	16.88	444.1	8.681	158.8	1379.
41.00	58.00	17.88	458.1	8.589	174.9	1502.
41.00	59.00	18.88	471.3	8.506	191.5	1629.
41.00	60.00	19.88	484.2	8.433	208.6	1759.
41.00	61.00	20.88	496.7	8.367	226.2	1893.
41.00	62.00	21.88	508.8	8.308	244.3	2029.
41.00	63.00	22.88	520.7	8.254	262.8	2169.
41.00	64.00	23.88	532.3	8.205	281.8	2312.
41.00	64.00	23.88	Weight too small			
42.00	45.00	4.904	223.2	13.71	16.22	222.4
42.00	46.00	5.904	249.6	12.19	23.92	291.6

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42.00	47.00	6.903	273.0	11.27	32.55	366.8
42.00	48.00	7.903	294.7	10.58	42.32	447.6
42.00	49.00	8.903	314.9	10.09	52.90	533.6
42.00	50.00	9.903	333.7	9.740	64.12	624.5
42.00	51.00	10.90	351.9	9.468	76.08	720.3
42.00	52.00	11.90	369.0	9.235	88.84	820.4
42.00	53.00	12.90	385.3	9.045	102.2	924.7
42.00	54.00	13.90	400.9	8.887	116.3	1033.
42.00	55.00	14.90	415.9	8.753	130.9	1145.
42.00	56.00	15.90	430.3	8.639	146.0	1262.
42.00	57.00	16.90	444.3	8.539	161.8	1381.
42.00	58.00	17.90	457.8	8.452	178.0	1505.
42.00	59.00	18.90	470.9	8.375	194.8	1632.
42.00	60.00	19.90	483.7	8.306	212.1	1762.
42.00	60.00	19.90		Weight too small		
42.00	61.00	20.90	496.2	8.245	229.9	1895.
42.00	61.00	20.90		Weight too small		
42.00	62.00	21.90	508.4	8.188	248.2	2033.
42.00	62.00	21.90		Weight too small		
42.00	63.00	22.90		Disturbing moment < 0		
42.00	64.00	23.90		Disturbing moment < 0		
43.00	45.00	4.927	223.9	13.38	16.73	223.8
43.00	46.00	5.926	249.9	11.87	24.71	293.2
43.00	47.00	6.926	273.3	10.97	33.60	368.5
43.00	48.00	7.926	294.9	10.33	43.52	449.4
43.00	49.00	8.926	315.0	9.870	54.26	535.6
43.00	50.00	9.925	333.9	9.520	65.77	626.6
43.00	51.00	10.92	351.7	9.260	78.01	722.3
43.00	52.00	11.92	368.8	9.043	90.99	822.8
43.00	53.00	12.92	385.2	8.864	104.6	927.5
43.00	54.00	13.92	400.8	8.715	118.9	1036.
43.00	55.00	14.92	415.8	8.578	133.5	1146.
43.00	56.00	15.92	429.5	8.470	149.0	1262.
43.00	57.00	16.92	443.6	8.376	165.0	1382.
43.00	57.00	16.92		Weight too small		
43.00	58.00	17.92	457.1	8.294	181.5	1505.
43.00	58.00	17.92		Weight too small		
43.00	59.00	18.92		Disturbing moment < 0		
43.00	60.00	19.92		Disturbing moment < 0		
43.00	61.00	20.92		Disturbing moment < 0		
43.00	62.00	21.92		Disturbing moment < 0		
43.00	63.00	22.92		Disturbing moment < 0		
43.00	64.00	23.92		Disturbing moment < 0		
44.00	45.00	4.949	224.3	12.88	17.49	225.3
44.00	46.00	5.949	250.5	11.46	25.75	295.1
44.00	47.00	6.949	273.6	10.62	34.90	370.6
44.00	48.00	7.948	294.7	10.01	45.03	450.7
44.00	49.00	8.948	314.9	9.587	56.02	537.0
44.00	50.00	9.948	333.8	9.268	67.79	628.3
44.00	51.00	10.95	351.7	9.019	80.29	724.1
44.00	52.00	11.95	368.7	8.819	93.48	824.3
44.00	53.00	12.95	384.9	8.655	107.3	928.8
44.00	54.00	13.95	400.4	8.517	121.8	1037.
44.00	54.00	13.95		Weight too small		
44.00	55.00	14.95	415.4	8.401	136.9	1150.
44.00	55.00	14.95		Weight too small		
44.00	56.00	15.95		Disturbing moment < 0		
44.00	57.00	16.95		Disturbing moment < 0		
44.00	58.00	17.95		Disturbing moment < 0		
44.00	59.00	18.95		Disturbing moment < 0		
44.00	60.00	19.95		Disturbing moment < 0		
44.00	61.00	20.95		Disturbing moment < 0		
44.00	62.00	21.94	535.7	412.7	26.36	10880.
44.00	63.00	22.94	551.9	222.9	55.42	12350.
44.00	64.00	23.94	566.6	160.0	86.83	13890.
45.00	45.00	4.972	224.9	12.26	18.52	227.0
45.00	46.00	5.972	250.8	10.99	27.01	296.8
45.00	47.00	6.971	273.8	10.23	36.40	372.3
45.00	48.00	7.971	295.4	9.690	46.81	453.6
45.00	49.00	8.971	315.4	9.302	58.06	540.1
45.00	50.00	9.971	334.3	9.008	70.09	631.4
45.00	51.00	10.97	352.1	8.779	82.85	727.4
45.00	51.00	10.97		Weight too small		
45.00	52.00	11.97		Disturbing moment < 0		
45.00	53.00	12.97		Disturbing moment < 0		

45.00	54.00	13.97		Disturbing moment < 0		
45.00	55.00	14.97		Disturbing moment < 0		
45.00	56.00	15.97		Disturbing moment < 0		
45.00	57.00	16.97	465.5	304.1	23.44	7130.
45.00	58.00	17.97	483.7	162.0	51.92	8409.
45.00	59.00	18.97	501.6	110.3	82.57	9766.
45.00	60.00	19.97	519.2	97.17	115.3	11200.
45.00	61.00	20.97	536.6	84.79	149.9	12710.
45.00	62.00	21.97	553.6	76.70	186.4	14300.
45.00	63.00	22.97	570.5	71.02	224.7	15960.
45.00	64.00	23.97	588.1	64.53	266.4	17190.
46.00	45.00	4.995	225.2	11.68	19.55	228.5
46.00	46.00	5.994		Not converged (increase iterations?)		
46.00	47.00	6.994	273.8	9.840	37.99	373.8
46.00	48.00	7.994	295.3	9.352	48.67	455.1
46.00	49.00	8.994	315.3	8.999	60.18	541.6
46.00	49.00	8.994		Weight too small		
46.00	50.00	9.993		Disturbing moment < 0		
46.00	51.00	10.99		Disturbing moment < 0		
46.00	52.00	11.99		Disturbing moment < 0		
46.00	53.00	12.99	402.6	186.9	25.36	4738.
46.00	54.00	13.99	423.3	108.4	54.07	5863.
46.00	55.00	14.99	443.5	82.87	85.35	7072.
46.00	56.00	15.99	463.3	70.32	119.0	8365.
46.00	57.00	16.99	482.6	62.94	154.8	9741.
46.00	58.00	17.99	502.4	57.56	194.8	11210.
46.00	59.00	18.99	521.2	54.26	235.1	12760.
46.00	60.00	19.99	539.8	51.85	277.3	14380.
46.00	61.00	20.99	557.7	48.20	315.9	15230.
46.00	62.00	21.99	574.2	46.49	345.6	16070.
46.00	63.00	22.99		Disturbing moment < 0		
46.00	64.00	23.99		Disturbing moment < 0		
47.00	45.00	5.022	226.0	11.18	20.64	230.7
47.00	46.00	6.021	251.7	10.12	29.72	300.8
47.00	47.00	7.021	274.1	9.515	39.52	376.0
47.00	47.00	7.021		Weight too small		
47.00	48.00	8.021		Disturbing moment < 0		
47.00	49.00	9.020	326.6	424.2	5.821	2469.
47.00	50.00	10.02	351.0	100.6	33.05	3405.
47.00	51.00	11.02	374.8	68.95	64.24	4429.
47.00	52.00	12.02	397.7	56.84	97.54	5544.
47.00	53.00	13.02	419.9	50.58	133.5	6750.
47.00	54.00	14.02	442.3	46.38	173.7	8057.
47.00	55.00	15.02	463.3	43.92	215.0	9444.
47.00	56.00	16.02	484.2	42.31	258.1	10920.
47.00	57.00	17.02	504.4	41.24	301.1	12420.
47.00	58.00	18.02	524.1	38.66	342.2	13230.
47.00	59.00	19.02	542.0	38.07	369.2	14050.
47.00	60.00	20.02		Disturbing moment < 0		
47.00	61.00	21.02		Disturbing moment < 0		
47.00	62.00	22.02		Disturbing moment < 0		
47.00	63.00	23.01		Disturbing moment < 0		
47.00	64.00	24.01		Disturbing moment < 0		
48.00	45.00	5.050	226.7	10.73	21.70	233.0
48.00	45.00	5.050		Weight too small		
48.00	46.00	6.049		Disturbing moment < 0		
48.00	47.00	7.049	287.2	87.69	22.96	2013.
48.00	48.00	8.048	315.6	54.26	53.51	2903.
48.00	49.00	9.048	342.7	44.38	87.68	3891.
48.00	50.00	10.05	368.9	39.34	126.7	4986.
48.00	51.00	11.05	394.1	36.95	167.2	6177.
48.00	52.00	12.05	418.8	35.52	210.2	7467.
48.00	53.00	13.05	441.6	34.58	255.9	8850.
48.00	54.00	14.05	464.5	34.04	303.4	10330.
48.00	55.00	15.05	486.4	32.32	346.6	11200.
48.00	56.00	16.05	506.1	32.05	374.7	12010.
48.00	57.00	17.04		Disturbing moment < 0		
48.00	58.00	18.04		Disturbing moment < 0		
48.00	59.00	19.04		Disturbing moment < 0		
48.00	60.00	20.04		Disturbing moment < 0		
48.00	61.00	21.04		Disturbing moment < 0		
48.00	62.00	22.04		Disturbing moment < 0		
48.00	63.00	23.04		Disturbing moment < 0		
48.00	64.00	24.04		Disturbing moment < 0		

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EPA Export 08-07-2014:23:43:04

49.00	45.00	5.077	238.1	61.82	22.77	1408.
49.00	46.00	6.077	272.5	39.22	56.78	2227.
49.00	47.00	7.077	304.5	33.43	94.38	3155.
49.00	48.00	8.076	334.6	31.00	135.4	4197.
49.00	49.00	9.076	363.4	29.84	179.3	5350.
49.00	50.00	10.08	390.7	29.11	227.3	6616.
49.00	51.00	11.08	417.2	28.87	276.6	7985.
49.00	52.00	12.07	442.7	28.06	326.7	9168.
49.00	53.00	13.07	464.7	27.60	359.8	9929.
49.00	54.00	14.07	Disturbing moment < 0			
49.00	55.00	15.07	Disturbing moment < 0			
49.00	56.00	16.07	Disturbing moment < 0			
49.00	57.00	17.07	Disturbing moment < 0			
49.00	58.00	18.07	Disturbing moment < 0			
49.00	59.00	19.07	Disturbing moment < 0			
49.00	60.00	20.07	Disturbing moment < 0			
49.00	61.00	21.07	Disturbing moment < 0			
49.00	62.00	22.07	Disturbing moment < 0			
49.00	63.00	23.07	Disturbing moment < 0			
49.00	64.00	24.07	Disturbing moment < 0			
50.00	45.00	5.105	255.8	28.30	79.91	2261.
50.00	46.00	6.105	292.4	26.18	123.2	3224.
50.00	47.00	7.104	326.3	25.39	169.9	4314.
50.00	48.00	8.104	357.2	25.16	219.6	5526.
50.00	49.00	9.104	388.6	25.84	274.3	7089.
50.00	50.00	10.10	416.1	24.67	322.3	7952.
50.00	51.00	11.10	Disturbing moment < 0			
50.00	52.00	12.10	Disturbing moment < 0			
50.00	53.00	13.10	Disturbing moment < 0			
50.00	54.00	14.10	Disturbing moment < 0			
50.00	55.00	15.10	Disturbing moment < 0			
50.00	56.00	16.10	Disturbing moment < 0			
50.00	57.00	17.10	Disturbing moment < 0			
50.00	58.00	18.10	Disturbing moment < 0			
50.00	59.00	19.10	Disturbing moment < 0			
50.00	60.00	20.10	Disturbing moment < 0			
50.00	61.00	21.10	Disturbing moment < 0			
50.00	62.00	22.10	Disturbing moment < 0			
50.00	63.00	23.10	Disturbing moment < 0			
50.00	64.00	24.10	610.2	1137.	16.98	19300.
51.00	45.00	5.133	278.2	22.92	135.1	3095.
51.00	46.00	6.133	316.1	22.59	186.1	4204.
51.00	47.00	7.132	351.5	22.69	240.0	5446.
51.00	48.00	8.132	383.8	22.05	291.6	6428.
51.00	49.00	9.131	Disturbing moment < 0			
51.00	50.00	10.13	Disturbing moment < 0			
51.00	51.00	11.13	Disturbing moment < 0			
51.00	52.00	12.13	Disturbing moment < 0			
51.00	53.00	13.13	Disturbing moment < 0			
51.00	54.00	14.13	Disturbing moment < 0			
51.00	55.00	15.13	Disturbing moment < 0			
51.00	56.00	16.13	Disturbing moment < 0			
51.00	57.00	17.13	Disturbing moment < 0			
51.00	58.00	18.13	Disturbing moment < 0			
51.00	59.00	19.13	Disturbing moment < 0			
51.00	60.00	20.13	560.9	486.9	32.86	16000.
51.00	61.00	21.13	570.2	205.2	82.09	16840.
51.00	62.00	22.13	579.1	133.5	132.5	17690.
51.00	63.00	23.13	587.8	100.8	183.9	18530.
51.00	64.00	24.13	596.1	82.02	236.3	19380.
52.00	45.00	5.161	302.6	21.73	178.0	3868.
52.00	46.00	6.160	341.7	21.38	235.8	5041.
52.00	47.00	7.160	Disturbing moment < 0			
52.00	48.00	8.160	Disturbing moment < 0			
52.00	49.00	9.159	Disturbing moment < 0			
52.00	50.00	10.16	Disturbing moment < 0			
52.00	51.00	11.16	Disturbing moment < 0			
52.00	52.00	12.16	Disturbing moment < 0			
52.00	53.00	13.16	Disturbing moment < 0			
52.00	54.00	14.16	Disturbing moment < 0			
52.00	55.00	15.16	Disturbing moment < 0			
52.00	56.00	16.16	506.8	295.1	43.19	12740.
52.00	57.00	17.16	516.6	145.5	93.24	13570.
52.00	58.00	18.16	526.6	99.54	144.7	14400.
52.00	59.00	19.16	Not converged (increase			

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			iterations?)			
52.00	60.00	20.15	544.5	64.16	250.4	16070.
52.00	61.00	21.15	552.9	55.49	304.7	16910.
52.00	62.00	22.15	561.1	49.35	359.6	17750.
52.00	63.00	23.15	569.0	44.76	415.3	18590.
52.00	64.00	24.15	577.0	41.19	471.8	19430.
53.00	45.00	5.188	Disturbing moment < 0			
53.00	46.00	6.188	Disturbing moment < 0			
53.00	47.00	7.188	Disturbing moment < 0			
53.00	48.00	8.187	Disturbing moment < 0			
53.00	49.00	9.187	Disturbing moment < 0			
53.00	50.00	10.19	Disturbing moment < 0			
53.00	51.00	11.19	Disturbing moment < 0			
53.00	52.00	12.19	447.5	170.2	43.80	7456.
53.00	53.00	13.19	458.4	82.51	94.24	7776.
53.00	54.00	14.18	469.1	55.11	146.3	8064.
53.00	55.00	15.18	479.1	41.70	199.3	8311.
53.00	56.00	16.18	488.5	33.63	253.3	8518.
53.00	57.00	17.18	497.6	28.19	308.1	8684.
53.00	58.00	18.18	506.3	24.22	363.6	8807.
53.00	59.00	19.18	514.8	21.15	420.2	8885.
53.00	60.00	20.18	523.0	18.72	477.0	8927.
53.00	61.00	21.18	530.9	16.71	534.3	8926.
53.00	62.00	22.18	538.6	15.00	592.1	8881.
53.00	63.00	23.18	546.3	13.54	649.7	8790.
53.00	64.00	24.18	553.6	12.24	708.2	8668.
54.00	45.00	5.257	Disturbing moment < 0			
54.00	46.00	6.247	Disturbing moment < 0			
54.00	47.00	7.240	Disturbing moment < 0			
54.00	48.00	8.235	382.9	91.88	36.42	3346.
54.00	49.00	9.231	395.7	41.22	86.00	3545.
54.00	50.00	10.23	407.3	26.96	137.3	3702.
54.00	51.00	11.22	418.6	20.10	190.0	3819.
54.00	52.00	12.22	429.1	15.95	243.9	3891.
54.00	53.00	13.22	438.9	13.12	298.5	3918.
54.00	54.00	14.22	448.4	11.01	354.1	3899.
54.00	55.00	15.22	457.4	9.342	410.3	3833.
54.00	56.00	16.22	466.0	7.982	467.0	3720.
54.00	57.00	17.21	474.7	6.899	524.0	3615.
54.00	58.00	18.21	483.2	6.471	581.3	3762.
54.00	59.00	19.21	491.3	6.250	639.0	3994.
54.00	60.00	20.21	499.2	6.066	697.1	4228.
54.00	61.00	21.21	506.6	5.910	755.3	4464.
54.00	62.00	22.21	514.1	5.777	813.9	4702.
54.00	63.00	23.21	521.7	5.671	873.1	4951.
54.00	64.00	24.21	528.9	5.570	932.3	5193.
55.00	45.00	5.499	351.8	13.91	96.90	1320.
55.00	46.00	6.452	362.4	9.500	146.0	1387.
55.00	47.00	7.418	372.8	7.675	197.8	1518.
55.00	48.00	8.391	382.8	6.680	250.6	1724.
55.00	49.00	9.370	392.1	6.357	304.1	1933.
55.00	50.00	10.35	401.5	6.000	357.9	2140.
55.00	51.00	11.34	410.4	5.735	412.3	2364.
55.00	52.00	12.33	419.3	5.537	467.1	2586.
55.00	53.00	13.32	427.9	5.380	522.3	2810.
55.00	54.00	14.31	436.2	5.254	578.1	3037.
55.00	55.00	15.30	444.3	5.151	634.2	3267.
55.00	56.00	16.30	452.0	5.061	690.9	3497.
55.00	57.00	17.29	459.8	4.991	747.7	3731.
55.00	58.00	18.28	467.4	4.931	804.7	3968.
55.00	59.00	19.28	474.6	4.881	861.8	4206.
55.00	60.00	20.28	481.8	4.838	919.3	4447.
55.00	61.00	21.27	489.0	4.799	977.4	4690.
55.00	62.00	22.27	496.0	4.766	1036.	4935.
55.00	63.00	23.27	502.8	4.737	1094.	5182.
55.00	64.00	24.26	509.5	4.712	1153.	5430.
56.00	45.00	5.225	286.7	9.595	219.1	2102.
56.00	46.00	6.225	301.2	8.856	271.3	2402.
56.00	47.00	7.225	314.5	8.385	323.2	2710.
56.00	48.00	8.225	326.8	8.036	375.5	3018.
56.00	49.00	9.225	339.1	8.253	431.2	3559.
56.00	50.00	10.23	348.9	7.480	481.2	3600.
56.00	51.00	11.23	359.1	7.229	534.9	3867.
56.00	52.00	12.23	368.7	7.005	589.7	4131.
56.00	53.00	13.23	378.2	6.822	644.4	4396.

E.P.A. Export 08-07-2014:23:43:04

56.00	54.00	14.22	387.4	6.660	699.7	4660.
56.00	55.00	15.22	396.2	6.517	755.4	4923.
56.00	56.00	16.22	404.9	6.390	811.6	5186.
56.00	57.00	17.22	413.2	6.275	868.2	5448.
56.00	58.00	18.22	421.4	6.171	925.2	5710.
56.00	59.00	19.22	429.3	6.077	982.5	5970.
56.00	60.00	20.22	437.0	5.991	1040.	6231.
56.00	61.00	21.22	444.6	5.912	1098.	6491.
56.00	62.00	22.22	452.0	5.839	1156.	6751.
56.00	63.00	23.22	459.2	5.772	1215.	7011.
56.00	64.00	24.22	466.3	5.711	1273.	7271.
57.00	45.00	5.236	255.5	7.696	349.0	2692.
57.00	46.00	6.236	271.5	7.364	406.7	2995.
57.00	47.00	7.236	285.2	7.230	461.7	3338.
57.00	48.00	8.236	297.8	7.163	515.6	3693.
57.00	49.00	9.236	309.5	7.110	569.4	4049.
57.00	50.00	10.24	320.2	7.058	623.4	4400.
57.00	51.00	11.24	330.5	7.014	677.3	4751.
57.00	52.00	12.24	340.3	6.969	731.4	5097.
57.00	53.00	13.24	349.7	6.921	786.0	5440.
57.00	54.00	14.24	359.6	7.254	844.5	6126.
57.00	55.00	15.24	368.2	7.218	899.7	6493.
57.00	56.00	16.24	375.6	6.770	951.0	6438.
57.00	57.00	17.24	383.7	6.694	1007.	6739.
57.00	58.00	18.24	391.5	6.610	1063.	7028.
57.00	59.00	19.24	399.2	6.539	1120.	7323.
57.00	60.00	20.24	406.7	6.470	1177.	7613.
57.00	61.00	21.24	414.1	6.402	1234.	7902.
57.00	62.00	22.24	421.4	6.339	1292.	8188.
57.00	63.00	23.24	428.4	6.278	1350.	8474.
57.00	64.00	24.24	435.5	6.220	1408.	8758.
58.00	45.00	5.247	214.9	7.785	407.8	3175.
58.00	46.00	6.247	236.6	7.246	494.4	3583.
58.00	47.00	7.247	252.2	7.222	558.3	4032.
58.00	48.00	8.247	265.9	7.180	617.4	4433.
58.00	49.00	9.247	278.1	7.157	674.7	4829.
58.00	50.00	10.25	289.5	7.156	730.9	5230.
58.00	51.00	11.25	299.9	7.154	786.8	5629.
58.00	52.00	12.25	309.9	7.154	842.2	6025.
58.00	53.00	13.25	319.3	7.143	898.1	6415.
58.00	54.00	14.25	328.4	7.135	953.6	6804.
58.00	55.00	15.25	337.2	7.122	1009.	7187.
58.00	56.00	16.25	345.6	7.118	1065.	7581.
58.00	57.00	17.25	353.7	7.097	1121.	7957.
58.00	58.00	18.25	361.7	7.058	1178.	8312.
58.00	59.00	19.25	369.3	7.031	1234.	8679.
58.00	60.00	20.25	376.7	7.002	1291.	9041.
58.00	61.00	21.25	383.9	6.972	1348.	9400.
58.00	62.00	22.25	391.9	7.303	1411.	10300.
58.00	63.00	23.25	398.5	7.276	1468.	10680.
58.00	64.00	24.25	404.3	6.870	1521.	10450.
59.00	45.00	5.257	167.8	7.497	393.4	2949.
59.00	46.00	6.257	Not converged (increase iterations?)			
59.00	47.00	7.257	212.6	8.202	588.1	4824.
59.00	48.00	8.257	229.5	7.929	668.9	5303.
59.00	49.00	9.257	243.0	7.535	734.6	5536.
59.00	50.00	10.26	255.2	7.644	796.8	6091.
59.00	51.00	11.26	266.2	7.637	856.8	6543.
59.00	52.00	12.26	276.4	7.626	915.9	6985.
59.00	53.00	13.26	286.3	7.624	974.2	7427.
59.00	54.00	14.26	295.6	7.621	1032.	7865.
59.00	55.00	15.26	304.4	7.617	1089.	8297.
59.00	56.00	16.26	312.9	7.609	1147.	8725.
59.00	57.00	17.26	321.1	7.596	1204.	9148.
59.00	58.00	18.26	329.0	7.582	1262.	9565.
59.00	59.00	19.26	336.5	7.560	1319.	9974.
59.00	60.00	20.26	343.9	7.540	1377.	10380.
59.00	61.00	21.26	351.1	7.518	1435.	10790.
59.00	62.00	22.26	358.1	7.494	1493.	11180.
59.00	63.00	23.26	365.1	7.467	1551.	11580.
59.00	64.00	24.26	371.8	7.439	1609.	11970.
60.00	45.00	5.268	117.5	8.503	325.4	2767.
60.00	46.00	6.268	142.0	8.363	430.0	3596.
60.00	47.00	7.268	Not converged (increase			

			iterations?)			
60.00	48.00	8.268	182.9	8.715	630.8	5497.
60.00	49.00	9.268	200.6	8.984	727.5	6535.
60.00	50.00	10.27	215.4	8.707	810.3	7055.
60.00	51.00	11.27	227.6	8.532	879.0	7500.
60.00	52.00	12.27	Not converged (increase iterations?)			
60.00	53.00	13.27	248.8	8.425	1007.	8487.
60.00	54.00	14.27	258.5	8.360	1069.	8938.
60.00	55.00	15.27	267.7	8.334	1130.	9416.
60.00	56.00	16.27	276.5	8.313	1190.	9891.
60.00	57.00	17.27	284.9	8.292	1249.	10360.
60.00	58.00	18.27	293.0	8.274	1309.	10830.
60.00	59.00	19.27	300.8	8.256	1368.	11290.
60.00	60.00	20.27	308.3	8.233	1426.	11740.
60.00	61.00	21.27	315.8	8.206	1486.	12190.
60.00	62.00	22.27	322.8	8.186	1544.	12640.
60.00	63.00	23.27	329.7	8.160	1603.	13080.
60.00	64.00	24.27	336.5	8.132	1662.	13510.
61.00	45.00	5.279	51.23	10.42	199.8	2082.
61.00	45.00	5.279	Weight too small			
61.00	46.00	6.279	73.65	9.675	304.6	2947.
61.00	46.00	6.279	Weight too small			
61.00	47.00	7.279	Not converged (increase iterations?)			
61.00	47.00	7.279	Weight too small			
61.00	48.00	8.279	Not converged (increase iterations?)			
61.00	48.00	8.279	Weight too small			
61.00	49.00	9.278	148.9	9.781	625.5	6118.
61.00	50.00	10.28	165.8	9.904	725.5	7185.
61.00	51.00	11.28	181.6	10.09	823.1	8302.
61.00	52.00	12.28	195.7	9.822	912.0	8958.
61.00	53.00	13.28	207.2	9.640	985.6	9502.
61.00	54.00	14.28	217.6	9.491	1054.	10000.
61.00	55.00	15.28	Not converged (increase iterations?)			
61.00	56.00	16.28	Not converged (increase iterations?)			
61.00	57.00	17.28	Not converged (increase iterations?)			
61.00	58.00	18.28	253.9	9.230	1310.	12090.
61.00	59.00	19.28	262.0	9.184	1372.	12600.
61.00	60.00	20.28	269.9	9.144	1433.	13100.
61.00	61.00	21.28	277.4	9.106	1494.	13600.
61.00	62.00	22.28	284.6	9.065	1554.	14090.
61.00	63.00	23.28	291.7	9.029	1615.	14580.
61.00	64.00	24.28	298.6	8.993	1675.	15060.
62.00	45.00	5.289	Weight too small			
62.00	45.00	5.289	Weight too small			
62.00	46.00	6.289	Weight too small			
62.00	46.00	6.289	Weight too small			
62.00	47.00	7.289	51.52	11.06	257.7	2851.
62.00	47.00	7.289	Weight too small			
62.00	48.00	8.289	Not converged (increase iterations?)			
62.00	48.00	8.289	Weight too small			
62.00	49.00	9.289	85.30	10.47	457.3	4788.
62.00	49.00	9.289	Weight too small			
62.00	50.00	10.29	100.8	10.57	555.9	5870.
62.00	50.00	10.29	Weight too small			
62.00	51.00	11.29	115.4	10.77	653.8	7041.
62.00	51.00	11.29	Weight too small			
62.00	52.00	12.29	129.3	11.03	750.4	8273.
62.00	52.00	12.29	Weight too small			
62.00	53.00	13.29	142.6	11.31	845.6	9567.
62.00	53.00	13.29	Weight too small			
62.00	54.00	14.29	155.0	11.37	938.3	10670.
62.00	54.00	14.29	Weight too small			
62.00	55.00	15.29	183.1	11.06	1047.	11590.
62.00	56.00	16.29	193.2	10.88	1120.	12190.
62.00	57.00	17.29	202.6	10.72	1189.	12750.
62.00	58.00	18.29	Not converged (increase iterations?)			
62.00	59.00	19.29	Not converged (increase			

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EPA Export 08-07-2014:23:43:04

				iterations?)		
62.00	60.00	20.29		Not converged (increase iterations?)		
62.00	61.00	21.29	236.3	10.33	1451.	14980.
62.00	62.00	22.29	244.0	10.25	1514.	15520.
62.00	63.00	23.29	251.4	10.19	1577.	16060.
62.00	64.00	24.29	258.6	10.12	1639.	16590.
63.00	45.00	5.311		Weight too small		
63.00	46.00	6.309		Weight too small		
63.00	46.00	6.309		Weight too small		
63.00	47.00	7.307		Weight too small		
63.00	47.00	7.307		Weight too small		
63.00	48.00	8.306		Weight too small		
63.00	48.00	8.306		Weight too small		
63.00	49.00	9.305		Weight too small		
63.00	49.00	9.305		Weight too small		
63.00	50.00	10.30	61.36	11.73	380.1	4457.
63.00	50.00	10.30		Weight too small		
63.00	51.00	11.30	75.00	11.57	475.4	5498.
63.00	51.00	11.30		Weight too small		
63.00	52.00	12.30	88.16	11.57	571.1	6607.
63.00	52.00	12.30		Weight too small		
63.00	53.00	13.30	100.8	11.68	666.4	7781.
63.00	53.00	13.30		Weight too small		
63.00	54.00	14.30	113.0	11.85	761.2	9017.
63.00	54.00	14.30		Weight too small		
63.00	55.00	15.30	124.8	12.06	855.2	10310.
63.00	55.00	15.30		Weight too small		
63.00	56.00	16.30	136.2	12.30	948.3	11670.
63.00	56.00	16.30		Weight too small		
63.00	57.00	17.30	146.8	12.15	1037.	12600.
63.00	57.00	17.30		Weight too small		
63.00	58.00	18.30	156.1	12.03	1115.	13420.
63.00	58.00	18.30		Weight too small		
63.00	59.00	19.30	164.4	11.99	1184.	14200.
63.00	59.00	19.30		Weight too small		
63.00	60.00	20.30		Not converged (increase iterations?)		
63.00	60.00	20.30		Weight too small		
63.00	61.00	21.30	179.8	11.89	1317.	15660.
63.00	61.00	21.30		Weight too small		
63.00	62.00	22.30	187.1	11.94	1381.	16490.
63.00	62.00	22.30		Weight too small		
63.00	63.00	23.30	208.9	11.74	1484.	17420.
63.00	64.00	24.30	216.4	11.64	1550.	18030.
64.00	45.00	5.478		Radius too small		
64.00	46.00	6.450		Radius too small		
64.00	47.00	7.429		Weight too small		
64.00	47.00	7.429		Weight too small		
64.00	48.00	8.413		Weight too small		
64.00	48.00	8.413		Weight too small		
64.00	49.00	9.401		Weight too small		
64.00	49.00	9.401		Weight too small		
64.00	50.00	10.39		Weight too small		
64.00	50.00	10.39		Weight too small		
64.00	51.00	11.38		Weight too small		
64.00	51.00	11.38		Weight too small		
64.00	52.00	12.38	55.65	12.82	400.3	5131.
64.00	52.00	12.38		Weight too small		
64.00	53.00	13.37	67.19	12.59	491.7	6190.
64.00	53.00	13.37		Weight too small		
64.00	54.00	14.36	78.49	12.52	584.1	7310.
64.00	54.00	14.36		Weight too small		
64.00	55.00	15.36	89.51	12.55	676.6	8488.
64.00	55.00	15.36		Weight too small		
64.00	56.00	16.36	100.2	12.64	769.0	9723.
64.00	56.00	16.36		Weight too small		
64.00	57.00	17.35	110.7	12.79	861.1	11010.
64.00	57.00	17.35		Weight too small		
64.00	58.00	18.35	120.9	12.97	952.7	12360.
64.00	58.00	18.35		Weight too small		
64.00	59.00	19.35	130.7	13.16	1044.	13740.
64.00	59.00	19.35		Weight too small		
64.00	60.00	20.34	139.9	12.88	1129.	14550.
64.00	60.00	20.34		Weight too small		

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64.00	61.00	21.34	148.2	12.75	1206.	15370.
64.00	61.00	21.34		Weight too small		
64.00	62.00	22.34	155.6	12.68	1275.	16170.
64.00	62.00	22.34		Weight too small		
64.00	63.00	23.34		Not converged (increase iterations?)		
64.00	63.00	23.34		Weight too small		
64.00	64.00	24.34		Not converged (increase iterations?)		
64.00	64.00	24.34		Weight too small		
65.00	45.00	5.787		Radius too small		
65.00	46.00	6.734		Radius too small		
65.00	47.00	7.680		Radius too small		
65.00	48.00	8.636		Weight too small		
65.00	49.00	9.601		Weight too small		
65.00	50.00	10.57		Weight too small		
65.00	51.00	11.55		Weight too small		
65.00	51.00	11.55		Weight too small		
65.00	52.00	12.53		Weight too small		
65.00	52.00	12.53		Weight too small		
65.00	53.00	13.51		Weight too small		
65.00	53.00	13.51		Weight too small		
65.00	54.00	14.50	51.03	13.75	424.4	5835.
65.00	54.00	14.50		Weight too small		
65.00	55.00	15.48	61.78	13.47	512.9	6909.
65.00	55.00	15.48		Weight too small		
65.00	56.00	16.47	71.61	13.34	602.4	8037.
65.00	56.00	16.47		Weight too small		
65.00	57.00	17.46	81.20	13.31	692.5	9219.
65.00	57.00	17.46		Weight too small		
65.00	58.00	18.45	90.78	13.35	782.8	10450.
65.00	58.00	18.45		Weight too small		
65.00	59.00	19.44	100.1	13.44	873.0	11740.
65.00	59.00	19.44		Weight too small		
65.00	60.00	20.44	109.2	13.57	963.1	13070.
65.00	60.00	20.44		Weight too small		
65.00	61.00	21.43	118.2	13.73	1053.	14450.
65.00	61.00	21.43		Weight too small		
65.00	62.00	22.42	126.8	13.76	1141.	15700.
65.00	62.00	22.42		Weight too small		
65.00	63.00	23.42	135.0	13.49	1225.	16520.
65.00	63.00	23.42		Weight too small		
65.00	64.00	24.41	142.3	13.35	1300.	17350.
65.00	64.00	24.41		Weight too small		
66.00	45.00	6.111		Radius too small		
66.00	46.00	7.057		Radius too small		
66.00	47.00	8.003		Radius too small		
66.00	48.00	8.950		Radius too small		
66.00	49.00	9.896		Slip too small to split into minimum no. of slices		
66.00	50.00	10.84		Weight too small		
66.00	51.00	11.80		Weight too small		
66.00	52.00	12.76		Weight too small		
66.00	53.00	13.72		Weight too small		
66.00	54.00	14.69		Weight too small		
66.00	55.00	15.67		Weight too small		
66.00	55.00	15.67		Weight too small		
66.00	56.00	16.65		Weight too small		
66.00	56.00	16.65		Weight too small		
66.00	57.00	17.63	57.82	14.23	537.2	7644.
66.00	57.00	17.63		Weight too small		
66.00	58.00	18.61	66.49	14.06	624.3	8779.
66.00	58.00	18.61		Weight too small		
66.00	59.00	19.59	75.07	13.99	712.3	9964.
66.00	59.00	19.59		Weight too small		
66.00	60.00	20.58	83.56	13.98	800.7	11200.
66.00	60.00	20.58		Weight too small		
66.00	61.00	21.57	91.93	14.03	889.2	12470.
66.00	61.00	21.57		Weight too small		
66.00	62.00	22.55	100.2	14.11	977.8	13800.
66.00	62.00	22.55		Weight too small		
66.00	63.00	23.54	108.3	14.23	1066.	15170.
66.00	63.00	23.54		Weight too small		
66.00	64.00	24.53	116.3	14.36	1155.	16580.
66.00	64.00	24.53		Weight too small		

E.P.A. Export 08-07-2014:23:43:04

67.00	45.00	6.434		Radius too small		
67.00	46.00	7.380		Radius too small		
67.00	47.00	8.327		Radius too small		
67.00	48.00	9.273		Radius too small		
67.00	49.00	10.22		Radius too small		
67.00	50.00	11.17		Radius too small		
67.00	51.00	12.11		Weight too small		
67.00	52.00	13.06		Weight too small		
67.00	53.00	14.00		Weight too small		
67.00	54.00	14.96		Weight too small		
67.00	55.00	15.92		Weight too small		
67.00	56.00	16.88		Weight too small		
67.00	57.00	17.85		Weight too small		
67.00	58.00	18.82		Weight too small		
67.00	59.00	19.79	54.81	14.89	563.5	8389.
67.00	59.00	19.79		Weight too small		
67.00	60.00	20.77	62.54	14.69	648.7	9530.
67.00	60.00	20.77		Weight too small		
67.00	61.00	21.75	70.24	14.59	734.8	10720.
67.00	61.00	21.75		Weight too small		
67.00	62.00	22.73	77.88	14.54	821.5	11950.
67.00	62.00	22.73		Weight too small		
67.00	63.00	23.71	85.45	14.55	908.5	13220.
67.00	63.00	23.71		Weight too small		
67.00	64.00	24.69	92.94	14.60	995.8	14540.
67.00	64.00	24.69		Weight too small		
68.00	45.00	6.758		Radius too small		
68.00	46.00	7.704		Radius too small		
68.00	47.00	8.650		Radius too small		
68.00	48.00	9.596		Radius too small		
68.00	49.00	10.54		Radius too small		
68.00	50.00	11.49		Radius too small		
68.00	51.00	12.44		Radius too small		
68.00	52.00	13.38		Weight too small		
68.00	53.00	14.33		Weight too small		
68.00	54.00	15.27		Weight too small		
68.00	55.00	16.22		Weight too small		
68.00	56.00	17.17		Weight too small		
68.00	57.00	18.12		Weight too small		
68.00	58.00	19.08		Weight too small		
68.00	59.00	20.04		Weight too small		
68.00	60.00	21.00		Weight too small		
68.00	61.00	21.97	52.45	15.46	591.2	9141.
68.00	62.00	22.94	59.41	15.25	674.7	10290.
68.00	63.00	23.91	66.37	15.11	759.3	11480.
68.00	64.00	24.89	73.31	15.05	844.5	12710.
68.00	64.00	24.89		Weight too small		
69.00	45.00	7.081		Radius too small		
69.00	46.00	8.027		Radius too small		
69.00	47.00	8.973		Radius too small		
69.00	48.00	9.920		Radius too small		
69.00	49.00	10.87		Radius too small		
69.00	50.00	11.81		Radius too small		
69.00	51.00	12.76		Radius too small		
69.00	52.00	13.70		Radius too small		
69.00	53.00	14.65		Slip too small to split into minimum no. of slices		
69.00	54.00	15.60		Weight too small		
69.00	55.00	16.54		Weight too small		
69.00	56.00	17.49		Weight too small		
69.00	57.00	18.44		Weight too small		
69.00	58.00	19.38		Weight too small		
69.00	59.00	20.33		Weight too small		
69.00	60.00	21.28		Weight too small		
69.00	61.00	22.24		Weight too small		
69.00	62.00	23.20		Weight too small		
69.00	63.00	24.16	50.54	15.96	620.0	9897.
69.00	64.00	25.12	56.88	15.74	702.1	11050.
70.00	45.00	7.404		Radius too small		
70.00	46.00	8.351		Radius too small		
70.00	47.00	9.297		Radius too small		
70.00	48.00	10.24		Radius too small		
70.00	49.00	11.19		Radius too small		
70.00	50.00	12.14		Radius too small		
70.00	51.00	13.08		Radius too small		

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70.00	52.00	14.03	Radius too small
70.00	53.00	14.97	Radius too small
70.00	54.00	15.92	Radius too small
70.00	55.00	16.87	Weight too small
70.00	56.00	17.81	Weight too small
70.00	57.00	18.76	Weight too small
70.00	58.00	19.71	Weight too small
70.00	59.00	20.65	Weight too small
70.00	60.00	21.60	Weight too small
70.00	61.00	22.54	Weight too small
70.00	62.00	23.49	Weight too small
70.00	63.00	24.44	Weight too small
70.00	64.00	25.40	Weight too small
71.00	45.00	7.728	Radius too small
71.00	46.00	8.674	Radius too small
71.00	47.00	9.620	Radius too small
71.00	48.00	10.57	Radius too small
71.00	49.00	11.51	Radius too small
71.00	50.00	12.46	Radius too small
71.00	51.00	13.41	Radius too small
71.00	52.00	14.35	Radius too small
71.00	53.00	15.30	Radius too small
71.00	54.00	16.24	Radius too small
71.00	55.00	17.19	Radius too small
71.00	56.00	18.14	Slip too small to split into minimum no. of slices
71.00	57.00	19.08	Weight too small
71.00	58.00	20.03	Weight too small
71.00	59.00	20.98	Weight too small
71.00	60.00	21.92	Weight too small
71.00	61.00	22.87	Weight too small
71.00	62.00	23.81	Weight too small
71.00	63.00	24.76	Weight too small
71.00	64.00	25.71	Weight too small
72.00	45.00	8.051	Radius too small
72.00	46.00	8.997	Radius too small
72.00	47.00	9.944	Radius too small
72.00	48.00	10.89	Radius too small
72.00	49.00	11.84	Radius too small
72.00	50.00	12.78	Radius too small
72.00	51.00	13.73	Radius too small
72.00	52.00	14.68	Radius too small
72.00	53.00	15.62	Radius too small
72.00	54.00	16.57	Radius too small
72.00	55.00	17.51	Radius too small
72.00	56.00	18.46	Radius too small
72.00	57.00	19.41	Radius too small
72.00	58.00	20.35	Weight too small
72.00	59.00	21.30	Weight too small
72.00	60.00	22.25	Weight too small
72.00	61.00	23.19	Weight too small
72.00	62.00	24.14	Weight too small
72.00	63.00	25.08	Weight too small
72.00	64.00	26.03	Weight too small
73.00	45.00	8.375	Radius too small
73.00	46.00	9.321	Radius too small
73.00	47.00	10.27	Radius too small
73.00	48.00	11.21	Radius too small
73.00	49.00	12.16	Radius too small
73.00	50.00	13.11	Radius too small
73.00	51.00	14.05	Radius too small
73.00	52.00	15.00	Radius too small
73.00	53.00	15.94	Radius too small
73.00	54.00	16.89	Radius too small
73.00	55.00	17.84	Radius too small
73.00	56.00	18.78	Radius too small
73.00	57.00	19.73	Radius too small
73.00	58.00	20.68	Radius too small
73.00	59.00	21.62	Radius too small
73.00	60.00	22.57	Weight too small
73.00	61.00	23.51	Weight too small
73.00	62.00	24.46	Weight too small
73.00	63.00	25.41	Weight too small
73.00	64.00	26.35	Weight too small
74.00	45.00	8.682	Radius too small

EPA Export 08-07-2014:23:43:04

74.00	46.00	9.635	Radius too small
74.00	47.00	10.59	Radius too small
74.00	48.00	11.54	Radius too small
74.00	49.00	12.48	Radius too small
74.00	50.00	13.43	Radius too small
74.00	51.00	14.38	Radius too small
74.00	52.00	15.32	Radius too small
74.00	53.00	16.27	Radius too small
74.00	54.00	17.21	Radius too small
74.00	55.00	18.16	Radius too small
74.00	56.00	19.11	Radius too small
74.00	57.00	20.05	Radius too small
74.00	58.00	21.00	Radius too small
74.00	59.00	21.95	Radius too small
74.00	60.00	22.89	Radius too small
74.00	61.00	23.84	Weight too small
74.00	62.00	24.78	Weight too small
74.00	63.00	25.73	Weight too small
74.00	64.00	26.68	Weight too small
75.00	45.00	8.987	Radius too small
75.00	46.00	9.939	Radius too small
75.00	47.00	10.89	Radius too small
75.00	48.00	11.84	Radius too small
75.00	49.00	12.80	Radius too small
75.00	50.00	13.75	Radius too small
75.00	51.00	14.70	Radius too small
75.00	52.00	15.65	Radius too small
75.00	53.00	16.59	Radius too small
75.00	54.00	17.54	Radius too small
75.00	55.00	18.48	Radius too small
75.00	56.00	19.43	Radius too small
75.00	57.00	20.38	Radius too small
75.00	58.00	21.32	Radius too small
75.00	59.00	22.27	Radius too small
75.00	60.00	23.22	Radius too small
75.00	61.00	24.16	Radius too small
75.00	62.00	25.11	Radius too small
75.00	63.00	26.05	Weight too small
75.00	64.00	27.00	Weight too small
76.00	45.00	9.292	Radius too small
76.00	46.00	10.24	Radius too small
76.00	47.00	11.20	Radius too small
76.00	48.00	12.15	Radius too small
76.00	49.00	13.10	Radius too small
76.00	50.00	14.05	Radius too small
76.00	51.00	15.01	Radius too small
76.00	52.00	15.96	Radius too small
76.00	53.00	16.91	Radius too small
76.00	54.00	17.86	Radius too small
76.00	55.00	18.81	Radius too small
76.00	56.00	19.75	Radius too small
76.00	57.00	20.70	Radius too small
76.00	58.00	21.65	Radius too small
76.00	59.00	22.59	Radius too small
76.00	60.00	23.54	Radius too small
76.00	61.00	24.48	Radius too small
76.00	62.00	25.43	Radius too small
76.00	63.00	26.38	Radius too small
76.00	64.00	27.32	Radius too small
77.00	45.00	9.596	Radius too small
77.00	46.00	10.55	Radius too small
77.00	47.00	11.50	Radius too small
77.00	48.00	12.45	Radius too small
77.00	49.00	13.41	Radius too small
77.00	50.00	14.36	Radius too small
77.00	51.00	15.31	Radius too small
77.00	52.00	16.26	Radius too small
77.00	53.00	17.22	Radius too small
77.00	54.00	18.17	Radius too small
77.00	55.00	19.12	Radius too small
77.00	56.00	20.07	Radius too small
77.00	57.00	21.02	Radius too small
77.00	58.00	21.97	Radius too small
77.00	59.00	22.92	Radius too small
77.00	60.00	23.86	Radius too small

77.00	61.00	24.81	Radius too small
77.00	62.00	25.75	Radius too small
77.00	63.00	26.70	Radius too small
77.00	64.00	27.65	Radius too small
78.00	45.00	9.901	Radius too small
78.00	46.00	10.85	Radius too small
78.00	47.00	11.81	Radius too small
78.00	48.00	12.76	Radius too small
78.00	49.00	13.71	Radius too small
78.00	50.00	14.66	Radius too small
78.00	51.00	15.62	Radius too small
78.00	52.00	16.57	Radius too small
78.00	53.00	17.52	Radius too small
78.00	54.00	18.47	Radius too small
78.00	55.00	19.43	Radius too small
78.00	56.00	20.38	Radius too small
78.00	57.00	21.33	Radius too small
78.00	58.00	22.28	Radius too small
78.00	59.00	23.24	Radius too small
78.00	60.00	24.19	Radius too small
78.00	61.00	25.13	Radius too small
78.00	62.00	26.08	Radius too small
78.00	63.00	27.02	Radius too small
78.00	64.00	27.97	Radius too small
79.00	45.00	10.21	Radius too small
79.00	46.00	11.16	Radius too small
79.00	47.00	12.11	Radius too small
79.00	48.00	13.06	Radius too small
79.00	49.00	14.02	Radius too small
79.00	50.00	14.97	Radius too small
79.00	51.00	15.92	Radius too small
79.00	52.00	16.87	Radius too small
79.00	53.00	17.83	Radius too small
79.00	54.00	18.78	Radius too small
79.00	55.00	19.73	Radius too small
79.00	56.00	20.68	Radius too small
79.00	57.00	21.64	Radius too small
79.00	58.00	22.59	Radius too small
79.00	59.00	23.54	Radius too small
79.00	60.00	24.49	Radius too small
79.00	61.00	25.44	Radius too small
79.00	62.00	26.40	Radius too small
79.00	63.00	27.35	Radius too small
79.00	64.00	28.29	Radius too small
80.00	45.00	10.48	Radius too small
80.00	46.00	11.48	Weight too small
80.00	47.00	12.48	Weight too small
80.00	48.00	13.48	Weight too small
80.00	49.00	14.48	Weight too small
80.00	50.00	15.48	Weight too small
80.00	51.00	16.48	Weight too small
80.00	52.00	17.47	Weight too small
80.00	53.00	18.47	Weight too small
80.00	54.00	19.08	Radius too small
80.00	55.00	20.04	Radius too small
80.00	56.00	20.99	Radius too small
80.00	57.00	21.94	Radius too small
80.00	58.00	22.89	Radius too small
80.00	59.00	23.84	Radius too small
80.00	60.00	24.80	Radius too small
80.00	61.00	25.75	Radius too small
80.00	62.00	26.70	Radius too small
80.00	63.00	27.65	Radius too small
80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small
81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small

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81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.68	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small
82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small
82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small
83.00	45.00	10.92	Radius too small
83.00	46.00	11.88	Radius too small
83.00	47.00	12.85	Radius too small
83.00	48.00	13.83	Radius too small
83.00	49.00	14.80	Radius too small
83.00	50.00	15.78	Radius too small
83.00	51.00	16.77	Radius too small
83.00	52.00	17.75	Radius too small
83.00	53.00	18.74	Radius too small
83.00	54.00	19.73	Radius too small
83.00	55.00	20.71	Radius too small
83.00	56.00	21.70	Radius too small
83.00	57.00	22.70	Radius too small
83.00	58.00	23.69	Radius too small
83.00	59.00	24.68	Radius too small
83.00	60.00	25.67	Radius too small
83.00	61.00	26.67	Radius too small
83.00	62.00	27.66	Weight too small
83.00	63.00	28.65	Weight too small
83.00	64.00	29.65	Weight too small
84.00	45.00	11.23	Radius too small
84.00	46.00	12.17	Radius too small
84.00	47.00	13.12	Radius too small
84.00	48.00	14.08	Radius too small
84.00	49.00	15.04	Radius too small
84.00	50.00	16.00	Radius too small
84.00	51.00	16.97	Radius too small
84.00	52.00	17.95	Radius too small
84.00	53.00	18.92	Radius too small
84.00	54.00	19.90	Radius too small
84.00	55.00	20.88	Radius too small
84.00	56.00	21.86	Radius too small
84.00	57.00	22.85	Radius too small
84.00	58.00	23.83	Radius too small
84.00	59.00	24.82	Radius too small
84.00	60.00	25.81	Radius too small
84.00	61.00	26.80	Radius too small
84.00	62.00	27.79	Radius too small
84.00	63.00	28.78	Radius too small
84.00	64.00	29.77	Radius too small
85.00	45.00	11.63	Disturbing moment < 0
85.00	46.00	12.54	Radius too small
85.00	47.00	13.46	Radius too small
85.00	48.00	14.39	Radius too small
85.00	49.00	15.33	Radius too small
85.00	50.00	16.28	Radius too small

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85.00	51.00	17.24		Radius too small		
85.00	52.00	18.20		Radius too small		
85.00	53.00	19.16		Radius too small		
85.00	54.00	20.13		Radius too small		
85.00	55.00	21.10		Radius too small		
85.00	56.00	22.07		Radius too small		
85.00	57.00	23.04		Radius too small		
85.00	58.00	24.02		Radius too small		
85.00	59.00	25.00		Radius too small		
85.00	60.00	25.98		Radius too small		
85.00	61.00	26.96		Radius too small		
85.00	62.00	27.95		Radius too small		
85.00	63.00	28.93		Radius too small		
85.00	64.00	29.92		Radius too small		
86.00	45.00	12.09		FoS > 1000		
86.00	46.00	12.97		FoS > 1000		
86.00	47.00	13.86		FoS > 1000		
86.00	48.00	14.77		FoS > 1000		
86.00	49.00	15.69		FoS > 1000		
86.00	50.00	16.62		Disturbing moment < 0		
86.00	51.00	17.55		Radius too small		
86.00	52.00	18.50		Radius too small		
86.00	53.00	19.44		Radius too small		
86.00	54.00	20.40		Radius too small		
86.00	55.00	21.36		Radius too small		
86.00	56.00	22.32		Radius too small		
86.00	57.00	23.28		Radius too small		
86.00	58.00	24.25		Radius too small		
86.00	59.00	25.22		Radius too small		
86.00	60.00	26.19		Radius too small		
86.00	61.00	27.17		Radius too small		
86.00	62.00	28.14		Radius too small		
86.00	63.00	29.12		Radius too small		
86.00	64.00	30.10		Radius too small		
87.00	45.00	11.60		Radius too small		
87.00	46.00	13.46		Disturbing moment < 0		
87.00	47.00	14.32	86.34	260200.	0.003984	1037.
87.00	48.00	15.20		FoS > 1000		
87.00	49.00	16.10		FoS > 1000		
87.00	50.00	17.00		Disturbing moment < 0		
87.00	51.00	17.92		FoS > 1000		
87.00	52.00	18.84		Disturbing moment < 0		
87.00	53.00	19.78		Disturbing moment < 0		
87.00	54.00	20.71		Disturbing moment < 0		
87.00	55.00	21.66		FoS > 1000		
87.00	56.00	22.61		Disturbing moment < 0		
87.00	57.00	23.56		Radius too small		
87.00	58.00	24.52		Radius too small		
87.00	59.00	25.48		Radius too small		
87.00	60.00	26.44		Radius too small		
87.00	61.00	27.40		Radius too small		
87.00	62.00	28.37		Radius too small		
87.00	63.00	29.34		Radius too small		
87.00	64.00	30.32		Radius too small		
88.00	45.00	11.60		Radius too small		
88.00	46.00	12.60		Radius too small		
88.00	47.00	13.60		Radius too small		
88.00	48.00	15.69	166.6	73180.	0.02663	1949.
88.00	49.00	16.56	141.3	152200.	0.01180	1797.
88.00	50.00	17.44		Disturbing moment < 0		
88.00	51.00	18.33	100.0	192000.	0.007762	1490.
88.00	52.00	19.24		Disturbing moment < 0		
88.00	53.00	20.15		Disturbing moment < 0		
88.00	54.00	21.07		FoS > 1000		
88.00	55.00	22.00		FoS > 1000		
88.00	56.00	22.94		Disturbing moment < 0		
88.00	57.00	23.88		FoS > 1000		
88.00	58.00	24.82		FoS > 1000		
88.00	59.00	25.77		FoS > 1000		
88.00	60.00	26.72		FoS > 1000		
88.00	61.00	27.68		Disturbing moment < 0		
88.00	62.00	28.64		Disturbing moment < 0		
88.00	63.00	29.60		Radius too small		
88.00	64.00	30.56		Radius too small		
89.00	45.00	11.60		Radius too small		

EPA Export 08-07-2014:23:43:04

89.00	46.00	12.60		Radius too small			
89.00	47.00	13.60		Radius too small			
89.00	48.00	14.60		Radius too small			
89.00	49.00	15.60		Radius too small			
89.00	50.00	17.92	237.7	50150.	0.05886	2952.	
89.00	51.00	18.79	208.8	38200.	0.07293	2786.	
89.00	52.00	19.67	183.4	48040.	0.05464	2625.	
89.00	53.00	20.57	160.8	796800.	0.003098	2468.	
89.00	54.00	21.47		Disturbing moment < 0			
89.00	55.00	22.38	122.6	197400.	0.01089	2149.	
89.00	56.00	23.30	106.2	224800.	0.008825	1984.	
89.00	57.00	24.23		Disturbing moment < 0			
89.00	58.00	25.16		FoS > 1000			
89.00	59.00	26.10		FoS > 1000			
89.00	60.00	27.04		FoS > 1000			
89.00	61.00	27.98		FoS > 1000			
89.00	62.00	28.93		Disturbing moment < 0			
89.00	63.00	29.88		FoS > 1000			
89.00	64.00	30.84		FoS > 1000			

WORST CASE : WATER CASE 1 OF 1
Centre at (55.00,64.00)
Iterations: 7
Net vertical force [kN]: .0
Net horiz force [kN]: 11.56E-6
Inclination of interslice forces (°): 8.014
Radius 24.26m
Horiz acceleration [kg]: .0
Slip weight [kN] 509.5
Disturbing moment [kN m]: 1153.
Restoring moment [kN m]: 5430.

Factor of Safety: 4.712

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	42.72	43.07	-5.000	.0	.0	.0
2	43.65	42.55	-38.15E-6	0.1482	1.053	.0
3	44.81	41.98	5.475	0.6961	4.944	1.499
4	46.00	41.47	10.32	1.560	11.08	5.324
5	47.10	41.06	14.06	2.502	17.77	9.878
6	48.22	40.70	17.25	3.493	24.81	14.88
7	49.36	40.40	19.89	4.449	31.60	19.78
8	50.77	40.11	22.37	5.455	38.75	25.03
9	52.20	39.90	24.01	6.185	43.93	28.82
10	52.65	39.85	11.99	6.290	44.68	7.185
11	52.70	39.85	10.65	6.292	44.69	5.668
12	52.90	39.83	5.274	6.276	44.58	1.390
13	53.10	39.81	-38.15E-6	6.227	44.23	.0
14	53.20	39.80	-0.06542	6.191	43.97	.0
15	53.22	39.80	-0.05379	6.180	43.89	.0
16	53.26	39.80	-0.03475	6.160	43.75	.0
17	53.34	39.79	.0	6.120	43.47	.0
18	54.39	39.74	0.2253	5.385	38.25	0.002537
19	55.43	39.74	.0	4.240	30.12	.0
20	56.22	39.77	-0.4607	3.093	21.97	.0
21	57.65	39.88	-1.975	0.5966	4.237	.0
22	58.00	39.92	-2.474	0.1938	1.376	.0
23	59.57	40.17	-5.353	.0	11.56E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.4663	.0	2.571	2.629	1.226
2	.0	0.4663	2.738	9.860	10.07	3.046
3	.0	0.4663	7.897	16.84	17.11	3.216
4	.0	0.4663	12.19	20.83	20.97	3.105
5	.0	0.4663	15.65	25.48	25.47	3.303
6	.0	0.4663	18.57	29.51	29.34	3.513
7	.0	0.5774	21.13	42.05	41.64	6.414
8	.0	0.5774	23.19	47.89	47.41	8.030
9	.0	0.5774	18.00	15.89	15.78	4.407
10	.0	0.5774	11.32	2.021	2.011	0.8327
11	.0	0.5774	7.960	9.897	9.862	4.771
12	.0	0.5774	2.637	10.48	10.46	5.743
13	.0	0.5774	.0	5.553	5.553	3.206
14	.0	0.6494	.0	1.271	1.273	0.8267

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15	.0	0.6494	.0	2.147	2.151	1.397
16	.0	0.6494	.0	4.143	4.153	2.697
17	.0	0.6494	0.1126	57.27	57.70	37.39
18	.0	0.6494	0.1126	59.64	60.76	39.38
19	.0	0.6494	.0	46.05	47.44	30.81
20	.0	0.5774	.0	84.16	87.79	50.69
21	.0	0.5774	.0	11.36	12.01	6.936
22	.0	0.5774	.0	4.617	4.966	2.867

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0
22	.0	.0	.0	.0

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ARUP

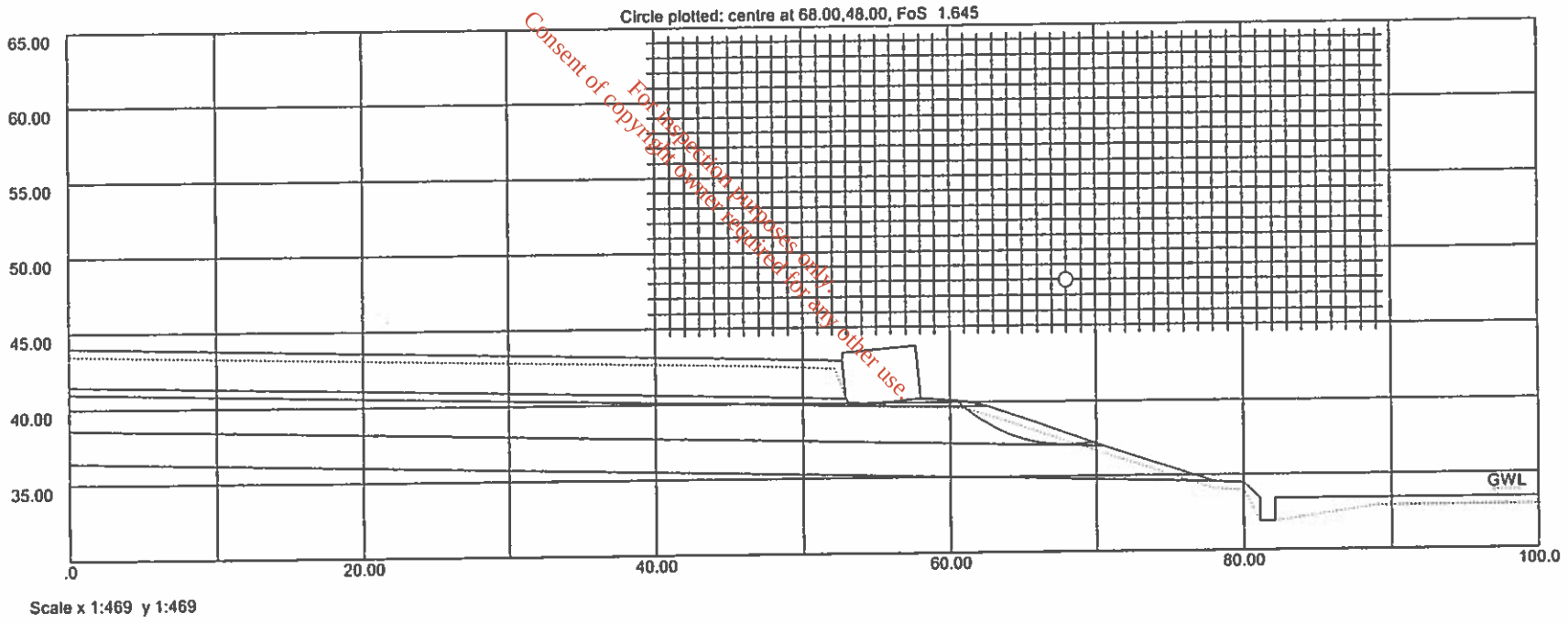
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Rw2-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No2.sld	



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Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Sand / Non Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]	Shear Strength Parameters	Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X --> 53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X --> 78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.

6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X --> 100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	7.250	791.3	20.41	79.25	1617.
40.00	46.00	8.258	857.2	18.39	106.2	1954.
40.00	47.00	9.257	918.5	17.08	135.4	2312.
40.00	48.00	10.26	976.4	16.12	166.9	2691.
40.00	49.00	11.26	1029.	15.38	200.4	3081.
40.00	50.00	12.26	1081.	14.78	236.5	3496.
40.00	51.00	13.26	1130.	14.30	274.6	3927.
40.00	52.00	14.26	1177.	13.90	314.6	4374.
40.00	53.00	15.26	1222.	13.57	356.4	4837.
40.00	54.00	16.26	1265.	13.29	400.0	5315.
40.00	55.00	17.26	1309.	13.04	445.8	5813.
40.00	56.00	18.25	1347.	12.82	492.0	6306.
40.00	56.00	18.25		Weight too small		
40.00	57.00	19.25	1392.	20.23	472.6	9562.
40.00	58.00	20.25	1434.	24.58	466.4	11460.
40.00	59.00	21.25	1476.	29.77	452.1	13460.
40.00	60.00	22.25		Disturbing moment < 0		
40.00	61.00	23.25		Disturbing moment < 0		
40.00	62.00	24.25		Disturbing moment < 0		
40.00	63.00	25.25		Disturbing moment < 0		
40.00	64.00	26.25		Disturbing moment < 0		
41.00	45.00	7.280	793.1	20.04	81.12	1626.
41.00	46.00	8.280	859.5	18.15	108.3	1964.
41.00	47.00	9.280	919.3	16.83	137.8	2319.
41.00	48.00	10.28	976.6	15.86	170.0	2697.
41.00	49.00	11.28	1031.	15.12	204.7	3095.
41.00	50.00	12.28	1083.	14.54	241.4	3510.
41.00	51.00	13.28	1132.	14.08	280.1	3942.
41.00	52.00	14.28		Not converged (increase iterations?)		
41.00	53.00	15.28		Not converged (increase iterations?)		
41.00	53.00	15.28		Weight too small		
41.00	54.00	16.28	1268.	19.08	370.3	7064.
41.00	55.00	17.28	1314.	24.36	363.5	8854.
41.00	56.00	18.28		Disturbing moment < 0		
41.00	57.00	19.28		Disturbing moment < 0		
41.00	58.00	20.28		Disturbing moment < 0		
41.00	59.00	21.28		Disturbing moment < 0		
41.00	60.00	22.28		Disturbing moment < 0		
41.00	61.00	23.28		Disturbing moment < 0		
41.00	62.00	24.28		Disturbing moment < 0		
41.00	63.00	25.28		Disturbing moment < 0		

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41.00	64.00	26.28		Disturbing moment < 0			
42.00	45.00	7.303	794.6	19.61	83.27	1633.	
42.00	46.00	8.303	860.6	17.75	111.1	1972.	
42.00	47.00	9.303	921.7	16.48	141.5	2331.	
42.00	48.00	10.30	978.8	15.55	174.2	2709.	
42.00	49.00	11.30	1031.	14.83	209.1	3100.	
42.00	50.00	12.30	1082.	14.27	246.2	3514.	
42.00	51.00	13.30	1131.	13.83	285.3	3945.	
42.00	51.00	13.30		Weight too small			
42.00	52.00	14.30		Disturbing moment < 0			
42.00	53.00	15.30		Disturbing moment < 0			
42.00	54.00	16.30		Disturbing moment < 0			
42.00	55.00	17.30		Disturbing moment < 0			
42.00	56.00	18.30		Disturbing moment < 0			
42.00	57.00	19.30		Disturbing moment < 0			
42.00	58.00	20.30		Disturbing moment < 0			
42.00	59.00	21.30		Disturbing moment < 0			
42.00	60.00	22.30	1555.	597.4	38.54	23020.	
42.00	61.00	23.30	1598.	257.6	99.27	25570.	
42.00	62.00	24.30		Disturbing moment < 0			
42.00	63.00	25.30		Disturbing moment < 0			
42.00	64.00	26.30		Disturbing moment < 0			
43.00	45.00	7.326	796.3	19.11	85.88	1642.	
43.00	46.00	8.326		Not converged (increase iterations?)			
43.00	47.00	9.325	922.2	16.06	145.6	2338.	
43.00	48.00	10.33	979.3	15.18	178.9	2716.	
43.00	49.00	11.32	1033.	14.51	214.5	3113.	
43.00	49.00	11.32		Weight too small			
43.00	50.00	12.32		Disturbing moment < 0			
43.00	51.00	13.32		Disturbing moment < 0			
43.00	52.00	14.32		Disturbing moment < 0			
43.00	53.00	15.32		Disturbing moment < 0			
43.00	54.00	16.32		Disturbing moment < 0			
43.00	55.00	17.32		Disturbing moment < 0			
43.00	56.00	18.32	1397.	414.9	40.80	16930.	
43.00	57.00	19.32	1444.	106.8	103.2	19280.	
43.00	58.00	20.32	1491.	127.7	170.0	21780.	
43.00	59.00	21.32	1537.	99.29	235.3	23360.	
43.00	60.00	22.32		Disturbing moment < 0			
43.00	61.00	23.32		Disturbing moment < 0			
43.00	62.00	24.32		Disturbing moment < 0			
43.00	63.00	25.32		Disturbing moment < 0			
43.00	64.00	26.32		Disturbing moment < 0			
44.00	45.00	7.349	797.3	18.51	89.06	1648.	
44.00	46.00	8.348	862.7	16.86	117.8	1987.	
44.00	47.00	9.348	923.3	15.72	149.2	2346.	
44.00	48.00	10.35		Disturbing moment < 0			
44.00	49.00	11.35		Disturbing moment < 0			
44.00	50.00	12.35		Disturbing moment < 0			
44.00	51.00	13.35		Disturbing moment < 0			
44.00	52.00	14.35	1213.	1016.	11.03	11210.	
44.00	53.00	15.35	1267.	188.6	70.35	13270.	
44.00	54.00	16.35	1319.	114.5	135.0	15460.	
44.00	55.00	17.35	1372.	84.10	209.6	17630.	
44.00	56.00	18.35	1422.	70.94	280.3	19890.	
44.00	57.00	19.35		Disturbing moment < 0			
44.00	58.00	20.35		Disturbing moment < 0			
44.00	59.00	21.35		Disturbing moment < 0			
44.00	60.00	22.34		Disturbing moment < 0			
44.00	61.00	23.34		Disturbing moment < 0			
44.00	62.00	24.34		Disturbing moment < 0			
44.00	63.00	25.34		Disturbing moment < 0			
44.00	64.00	26.34		Disturbing moment < 0			
45.00	45.00	7.371	798.2	17.84	92.72	1654.	
45.00	46.00	8.371		Disturbing moment < 0			
45.00	47.00	9.371		Disturbing moment < 0			
45.00	48.00	10.37		Disturbing moment < 0			
45.00	49.00	11.37	1061.	1194.	6.535	7805.	
45.00	50.00	12.37	1121.	148.3	65.22	9674.	
45.00	51.00	13.37	1178.	88.62	131.8	11680.	
45.00	52.00	14.37	1237.	65.86	206.3	13590.	
45.00	53.00	15.37	1292.	56.39	278.3	15690.	
45.00	54.00	16.37	1345.	50.33	352.9	17760.	
45.00	55.00	17.37		Disturbing moment < 0			

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45.00	56.00	18.37		Disturbing moment < 0			
45.00	57.00	19.37		Disturbing moment < 0			
45.00	58.00	20.37		Disturbing moment < 0			
45.00	59.00	21.37		Disturbing moment < 0			
45.00	60.00	22.37		Disturbing moment < 0			
45.00	61.00	23.37		Disturbing moment < 0			
45.00	62.00	24.37		Disturbing moment < 0			
45.00	63.00	25.37	1689.	215.2	98.67	21240.	
45.00	64.00	26.37	1718.	97.74	218.6	21370.	
46.00	45.00	7.394		Disturbing moment < 0			
46.00	46.00	8.394		Disturbing moment < 0			
46.00	47.00	9.394	947.8	202.6	30.73	6226.	
46.00	48.00	10.39	1017.	81.73	97.56	7974.	
46.00	49.00	11.39	1082.	58.47	166.1	9710.	
46.00	50.00	12.39	1144.	48.86	237.3	11590.	
46.00	51.00	13.39	1203.	42.99	312.6	13440.	
46.00	52.00	14.39	1260.	37.51	392.8	14730.	
46.00	53.00	15.39		Disturbing moment < 0			
46.00	54.00	16.39		Disturbing moment < 0			
46.00	55.00	17.39		Disturbing moment < 0			
46.00	56.00	18.39		Disturbing moment < 0			
46.00	57.00	19.39		Disturbing moment < 0			
46.00	58.00	20.39		Disturbing moment < 0			
46.00	59.00	21.39		Disturbing moment < 0			
46.00	60.00	22.39	1585.	518.7	32.97	17100.	
46.00	61.00	23.39	1615.	110.1	155.9	17170.	
46.00	62.00	24.39	1645.	60.16	285.8	17190.	
46.00	63.00	25.39	1673.	40.47	423.7	17150.	
46.00	64.00	26.39	1700.	30.01	567.8	17040.	
47.00	45.00	7.418	820.3	158.6	28.98	4597.	
47.00	46.00	8.418	899.2	63.23	96.92	6128.	
47.00	47.00	9.418	971.2	46.39	166.9	7742.	
47.00	48.00	10.42	1040.	38.50	240.7	9269.	
47.00	49.00	11.42	1106.	33.46	319.1	10680.	
47.00	50.00	12.42	1170.	29.82	401.9	11990.	
47.00	51.00	13.42		Disturbing moment < 0			
47.00	52.00	14.42		Disturbing moment < 0			
47.00	53.00	15.42		Disturbing moment < 0			
47.00	54.00	16.42		Disturbing moment < 0			
47.00	55.00	17.42		Disturbing moment < 0			
47.00	56.00	18.41		Disturbing moment < 0			
47.00	57.00	19.41		Disturbing moment < 0			
47.00	58.00	20.41	1505.	154.5	87.94	13590.	
47.00	59.00	21.41	1536.	61.27	221.1	13550.	
47.00	60.00	22.41	1565.	37.17	361.9	13450.	
47.00	61.00	23.41	1594.	26.13	509.4	13310.	
47.00	62.00	24.41	1621.	20.45	661.6	13530.	
47.00	63.00	25.41	1648.	17.49	816.2	14280.	
47.00	64.00	26.41	1673.	15.47	972.0	15040.	
48.00	45.00	7.443	841.4	41.21	137.4	5662.	
48.00	46.00	8.442	920.9	32.24	212.4	6848.	
48.00	47.00	9.442	994.1	27.66	293.8	8120.	
48.00	48.00	10.44	1065.	24.99	379.3	9482.	
48.00	49.00	11.44		Disturbing moment < 0			
48.00	50.00	12.44		Disturbing moment < 0			
48.00	51.00	13.44		Disturbing moment < 0			
48.00	52.00	14.44		Disturbing moment < 0			
48.00	53.00	15.44		Disturbing moment < 0			
48.00	54.00	16.44		Disturbing moment < 0			
48.00	55.00	17.44	1389.	780.3	13.56	10580.	
48.00	56.00	18.44	1422.	71.08	147.8	10510.	
48.00	57.00	19.44	1453.	35.75	290.8	10390.	
48.00	58.00	20.44		Not converged (increase iterations?)			
48.00	59.00	21.44	1512.	19.32	590.5	11410.	
48.00	60.00	22.44	1541.	16.31	742.9	12120.	
48.00	61.00	23.44	1568.	14.32	896.8	12840.	
48.00	62.00	24.44	1596.	12.90	1051.	13560.	
48.00	63.00	25.44	1622.	11.84	1207.	14290.	
48.00	64.00	26.44	1648.	11.02	1364.	15030.	
49.00	45.00	7.467	865.8	24.41	237.5	5799.	
49.00	46.00	8.467	946.6	21.63	324.5	7019.	
49.00	47.00	9.467	1021.	19.02	412.0	7837.	
49.00	48.00	10.47		Disturbing moment < 0			
49.00	49.00	11.47		Disturbing moment < 0			

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ARUP

Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A; Rev 2-06	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No2.sld	

49.00	50.00	12.47		Disturbing moment < 0			
49.00	51.00	13.47		Disturbing moment < 0			
49.00	52.00	14.47		Disturbing moment < 0			
49.00	53.00	15.46	1299.	125.1	63.76	7977.	
49.00	54.00	16.46	1333.	38.97	206.4	8042.	
49.00	55.00	17.46	1365.	24.76	352.2	8722.	
49.00	56.00	18.46	1398.	18.76	500.5	9389.	
49.00	57.00	19.46	1428.	15.44	650.4	10040.	
49.00	58.00	20.46	1458.	13.37	800.9	10710.	
49.00	59.00	21.46	1487.	11.95	953.2	11390.	
49.00	60.00	22.46	1515.	10.92	1107.	12090.	
49.00	61.00	23.46	1543.	10.14	1261.	12790.	
49.00	62.00	24.46	1570.	9.530	1417.	13510.	
49.00	63.00	25.46	1597.	9.041	1574.	14230.	
49.00	64.00	26.46	1623.	8.641	1733.	14970.	
50.00	45.00	7.492	890.7	17.90	331.4	5931.	
50.00	46.00	8.491		Disturbing moment < 0			
50.00	47.00	9.491		Disturbing moment < 0			
50.00	48.00	10.49		Disturbing moment < 0			
50.00	49.00	11.49		Disturbing moment < 0			
50.00	50.00	12.49		Disturbing moment < 0			
50.00	51.00	13.49	1204.	59.61	104.4	6226.	
50.00	52.00	14.49	1240.	27.50	248.1	6823.	
50.00	53.00	15.49	1275.	18.89	393.1	7427.	
50.00	54.00	16.49	1309.	14.91	539.3	8040.	
50.00	55.00	17.49	1340.	12.66	686.9	8697.	
50.00	56.00	18.49	1372.	11.17	836.3	9339.	
50.00	57.00	19.49	1401.	10.11	987.3	9985.	
50.00	58.00	20.49	1431.	9.348	1139.	10650.	
50.00	59.00	21.49	1460.	8.764	1293.	11330.	
50.00	60.00	22.49	1488.	8.304	1448.	12020.	
50.00	61.00	23.49	1516.	7.934	1604.	12720.	
50.00	62.00	24.49	1543.	7.631	1761.	13440.	
50.00	63.00	25.49	1569.	7.377	1919.	14160.	
50.00	64.00	26.49	1594.	7.158	2080.	14890.	
51.00	45.00	7.516		Disturbing moment < 0			
51.00	46.00	8.516		Disturbing moment < 0			
51.00	47.00	9.516		Disturbing moment < 0			
51.00	48.00	10.52		Disturbing moment < 0			
51.00	49.00	11.51	1101.	40.06	126.6	5074.	
51.00	50.00	12.51	1140.	21.03	267.4	5625.	
51.00	51.00	13.51	1178.	15.09	410.4	6192.	
51.00	52.00	14.51	1214.	12.20	555.1	6775.	
51.00	53.00	15.51	1249.	10.51	701.4	7372.	
51.00	54.00	16.51	1283.	9.406	849.2	7988.	
51.00	55.00	17.51	1316.	8.626	998.5	8613.	
51.00	56.00	18.51	1346.	8.080	1149.	9285.	
51.00	57.00	19.51	1375.	7.630	1301.	9929.	
51.00	58.00	20.51	1404.	7.283	1455.	10590.	
51.00	59.00	21.51	1434.	7.002	1610.	11270.	
51.00	60.00	22.51	1462.	6.763	1768.	11960.	
51.00	61.00	23.51	1489.	6.560	1929.	12650.	
51.00	62.00	24.51	1515.	6.384	2092.	13360.	
51.00	63.00	25.51	1541.	6.230	2258.	14070.	
51.00	64.00	26.51	1566.	6.097	2425.	14790.	
52.00	45.00	7.541		Disturbing moment < 0			
52.00	46.00	8.540		Disturbing moment < 0			
52.00	47.00	9.540	991.3	31.31	126.6	3965.	
52.00	48.00	10.54	1034.	16.91	264.6	4475.	
52.00	49.00	11.54	1075.	12.37	406.0	5020.	
52.00	50.00	12.54	1114.	10.16	548.8	5573.	
52.00	51.00	13.54	1152.	8.860	693.1	6141.	
52.00	52.00	14.54	1188.	8.012	839.0	6723.	
52.00	53.00	15.54	1223.	7.423	986.3	7322.	
52.00	54.00	16.54	1256.	6.987	1135.	7932.	
52.00	55.00	17.54	1288.	6.650	1286.	8555.	
52.00	56.00	18.54	1317.	6.393	1441.	9213.	
52.00	57.00	19.54	1347.	6.167	1598.	9858.	
52.00	58.00	20.54	1376.	5.977	1758.	10510.	
52.00	59.00	21.54	1404.	5.817	1921.	11170.	
52.00	60.00	22.54	1431.	5.680	2086.	11850.	
52.00	61.00	23.54	1459.	5.566	2254.	12540.	
52.00	62.00	24.54	1485.	5.463	2423.	13240.	
52.00	63.00	25.54	1510.	5.373	2595.	13940.	
52.00	64.00	26.53	1535.	5.293	2769.	14660.	

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ARUP

Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A. Rev 2-07	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No2.sld	

53.00	45.00	7.565	870.1	27.93	105.5	2947.	
53.00	46.00	8.565	919.7	14.10	241.8	3429.	
53.00	47.00	9.565	964.5	10.38	378.7	3932.	
53.00	48.00	10.56	1008.	8.538	518.9	4431.	
53.00	49.00	11.56	1049.	7.511	661.1	4966.	
53.00	50.00	12.56	1088.	6.864	805.6	5530.	
53.00	51.00	13.56	1125.	6.410	951.1	6097.	
53.00	52.00	14.56	1161.	6.071	1100.	6676.	
53.00	53.00	15.56	1195.	5.805	1252.	7266.	
53.00	54.00	16.56	1228.	5.590	1407.	7867.	
53.00	55.00	17.56	1259.	5.416	1566.	8481.	
53.00	56.00	18.56	1289.	5.265	1728.	9098.	
53.00	57.00	19.56	1317.	5.162	1893.	9769.	
53.00	58.00	20.56	1345.	5.054	2059.	10410.	
53.00	59.00	21.56	1373.	4.966	2228.	11060.	
53.00	60.00	22.56	1399.	4.888	2400.	11730.	
53.00	61.00	23.56	1425.	4.820	2574.	12410.	
53.00	62.00	24.56	1450.	4.759	2751.	13090.	
53.00	63.00	25.56	1475.	4.705	2930.	13780.	
53.00	64.00	26.56	1499.	4.657	3111.	14490.	
54.00	45.00	7.614	851.4	9.010	337.4	3040.	
54.00	46.00	8.610	899.4	7.446	474.1	3530.	
54.00	47.00	9.606	944.1	6.588	612.8	4037.	
54.00	48.00	10.60	986.5	6.043	754.7	4560.	
54.00	49.00	11.60	1026.	5.671	898.7	5096.	
54.00	50.00	12.60	1064.	5.386	1047.	5640.	
54.00	51.00	13.60	1099.	5.162	1200.	6194.	
54.00	52.00	14.59	1133.	4.984	1356.	6758.	
54.00	53.00	15.59	1166.	4.837	1516.	7331.	
54.00	54.00	16.59	1198.	4.713	1678.	7908.	
54.00	55.00	17.59	1229.	4.551	1843.	8386.	
54.00	56.00	18.59	1258.	4.475	2011.	9000.	
54.00	57.00	19.59	1285.	4.404	2183.	9615.	
54.00	58.00	20.59	1311.	4.364	2357.	10290.	
54.00	59.00	21.59	1338.	4.315	2534.	10940.	
54.00	60.00	22.59	1364.	4.272	2713.	11590.	
54.00	61.00	23.59	1389.	4.234	2894.	12250.	
54.00	62.00	24.59	1414.	4.199	3078.	12920.	
54.00	63.00	25.58	1437.	4.169	3263.	13600.	
54.00	64.00	26.58	1460.	4.141	3451.	14290.	
55.00	45.00	7.783	860.4	5.939	576.5	3424.	
55.00	46.00	8.759	912.0	5.499	715.5	3935.	
55.00	47.00	9.740	952.3	5.178	860.4	4455.	
55.00	48.00	10.72	991.0	4.947	1010.	4997.	
55.00	49.00	11.71	1027.	4.776	1162.	5550.	
55.00	50.00	12.70	1061.	4.637	1320.	6119.	
55.00	51.00	13.69	1094.	4.529	1479.	6699.	
55.00	52.00	14.68	1126.	4.438	1643.	7291.	
55.00	53.00	15.68	1156.	4.361	1810.	7892.	
55.00	54.00	16.67	1185.	4.294	1980.	8502.	
55.00	55.00	17.66	1213.	4.234	2153.	9117.	
55.00	56.00	18.66	1240.	4.182	2329.	9741.	
55.00	57.00	19.65	1267.	4.136	2508.	10370.	
55.00	58.00	20.65	1291.	4.110	2689.	11050.	
55.00	59.00	21.65	1316.	4.073	2872.	11700.	
55.00	60.00	22.64	1339.	4.036	3059.	12350.	
55.00	61.00	23.64	1362.	4.008	3246.	13010.	
55.00	62.00	24.64	1385.	3.982	3435.	13680.	
55.00	63.00	25.64	1408.	3.960	3627.	14360.	
55.00	64.00	26.63	1430.	3.939	3820.	15050.	
56.00	45.00	7.639	790.6	3.928	715.5	2811.	
56.00	46.00	8.638	837.9	3.807	861.4	3280.	
56.00	47.00	9.638	880.7	3.712	1014.	3762.	
56.00	48.00	10.64	920.7	3.647	1169.	4262.	
56.00	49.00	11.64	958.8	3.595	1329.	4778.	
56.00	50.00	12.64	994.9	3.551	1494.	5307.	
56.00	51.00	13.64	1029.	3.516	1663.	5848.	
56.00	52.00	14.64	1061.	3.490	1835.	6402.	
56.00	53.00	15.64	1093.	3.464	2011.	6968.	
56.00	54.00	16.64	1122.	3.446	2190.	7545.	
56.00	55.00	17.64	1152.	3.418	2371.	8103.	
56.00	56.00	18.64	1180.	3.405	2554.	8698.	
56.00	57.00	19.64	1206.	3.394	2741.	9302.	
56.00	58.00	20.63	1231.	3.380	2931.	9907.	
56.00	59.00	21.63	1257.	3.372	3121.	10520.	

EPA Export 08-07-2014:23:43:04

56.00	60.00	22.63	1280.	3.378	3314.	11190.
56.00	61.00	23.74	1351.	3.805	3650.	13890.
56.00	62.00	24.73	1373.	3.786	3844.	14550.
56.00	63.00	25.73	1393.	3.773	4040.	15240.
56.00	64.00	26.72	1413.	3.763	4237.	15940.
57.00	45.00	7.663	759.8	3.126	888.1	2776.
57.00	46.00	8.663	805.5	3.106	1042.	3235.
57.00	47.00	9.662	847.4	3.089	1201.	3710.
57.00	48.00	10.66	885.1	3.071	1366.	4196.
57.00	49.00	11.66	922.6	3.048	1536.	4680.
57.00	50.00	12.66	956.9	3.041	1708.	5193.
57.00	51.00	13.66	990.0	3.036	1884.	5721.
57.00	52.00	14.66	1022.	3.032	2065.	6260.
57.00	53.00	15.66	1052.	3.030	2248.	6811.
57.00	54.00	16.66	1080.	3.031	2432.	7372.
57.00	55.00	17.66	1108.	3.033	2620.	7945.
57.00	56.00	18.66	1135.	3.034	2811.	8527.
57.00	57.00	19.66	1161.	3.037	3003.	9119.
57.00	58.00	20.66	1186.	3.041	3196.	9721.
57.00	59.00	21.66	1209.	3.042	3394.	10320.
57.00	60.00	22.66	1233.	3.047	3592.	10940.
57.00	61.00	23.66	1256.	3.053	3791.	11570.
57.00	62.00	24.66	1278.	3.058	3991.	12210.
57.00	63.00	25.66	1301.	3.063	4194.	12850.
57.00	64.00	26.66	1322.	3.068	4397.	13490.
58.00	45.00	7.688	724.9	2.609	1049.	2738.
58.00	46.00	8.687	768.7	2.622	1212.	3178.
58.00	47.00	9.687	809.4	2.623	1380.	3621.
58.00	48.00	10.69	845.8	2.632	1554.	4090.
58.00	49.00	11.69	881.2	2.646	1730.	4578.
58.00	50.00	12.69	914.3	2.661	1909.	5079.
58.00	51.00	13.69	946.1	2.675	2092.	5595.
58.00	52.00	14.69	976.4	2.688	2278.	6122.
58.00	53.00	15.69	1005.	2.701	2466.	6662.
58.00	54.00	16.68	1034.	2.700	2658.	7175.
58.00	55.00	17.68	1061.	2.711	2851.	7731.
58.00	56.00	18.68	1087.	2.724	3046.	8297.
58.00	57.00	19.68	1112.	2.736	3243.	8873.
58.00	58.00	20.68	1137.	2.748	3442.	9458.
58.00	59.00	21.68	1161.	2.760	3643.	10050.
58.00	60.00	22.68	1183.	2.768	3847.	10650.
58.00	61.00	23.68	1206.	2.778	4054.	11260.
58.00	62.00	24.68	1228.	2.790	4259.	11890.
58.00	63.00	25.68	1249.	2.802	4466.	12520.
58.00	64.00	26.68	1270.	2.814	4674.	13150.
59.00	45.00	7.712	685.3	2.530	1198.	3031.
59.00	46.00	8.712	727.2	2.273	1368.	3110.
59.00	47.00	9.711	766.6	2.293	1544.	3541.
59.00	48.00	10.71	802.5	2.313	1723.	3985.
59.00	49.00	11.71	836.0	2.339	1908.	4462.
59.00	50.00	12.71	867.9	2.360	2092.	4955.
59.00	51.00	13.71	899.2	2.376	2281.	5419.
59.00	52.00	14.71	928.7	2.398	2472.	5930.
59.00	53.00	15.71	957.0	2.420	2666.	6452.
59.00	54.00	16.71	984.2	2.440	2862.	6985.
59.00	55.00	17.71	1010.	2.460	3061.	7529.
59.00	56.00	18.71	1036.	2.479	3261.	8083.
59.00	57.00	19.71	1060.	2.497	3463.	8647.
59.00	58.00	20.71	1084.	2.515	3667.	9221.
59.00	59.00	21.71	1107.	2.533	3870.	9804.
59.00	60.00	22.71	1131.	2.535	4077.	10340.
59.00	61.00	23.71	1152.	2.548	4288.	10920.
59.00	62.00	24.71	1174.	2.564	4497.	11530.
59.00	63.00	25.71	1195.	2.579	4706.	12140.
59.00	64.00	26.71	1215.	2.595	4917.	12760.
60.00	45.00	7.737	639.8	2.980	1309.	3900.
60.00	46.00	8.736	682.6	2.729	1504.	4105.
60.00	47.00	9.736	720.7	2.553	1693.	4323.
60.00	48.00	10.74	754.6	2.073	1871.	3878.
60.00	49.00	11.74	787.2	2.095	2059.	4314.
60.00	50.00	12.74	817.7	2.120	2250.	4771.
60.00	51.00	13.73	847.7	2.146	2444.	5244.
60.00	52.00	14.73	876.4	2.177	2639.	5746.
60.00	53.00	15.73	903.9	2.207	2837.	6260.
60.00	54.00	16.73	930.2	2.235	3037.	6787.

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ARUP
Corrib Gas Terminal
Maximum Cut Slope Stability
Job No. c1157 Sheet No. 4A-Rev 02-07 Rev.
Drg. Ref.
Made by DAH Date 08-Dec-2003 Date Stability Max Cut No2 sld Checked

60.00	55.00	17.73	956.3	2.241	3239.	7260.
60.00	56.00	18.73	981.1	2.264	3443.	7795.
60.00	57.00	19.73	1005.	2.287	3648.	8341.
60.00	58.00	20.73	1028.	2.308	3855.	8896.
60.00	59.00	21.73	1051.	2.328	4063.	9461.
60.00	60.00	22.73	1073.	2.348	4273.	10030.
60.00	61.00	23.73	1095.	2.368	4484.	10620.
60.00	62.00	24.73	1115.	2.384	4697.	11200.
60.00	63.00	25.73	1135.	2.403	4910.	11800.
60.00	64.00	26.73	1155.	2.422	5123.	12410.
61.00	45.00	7.761		Not converged (increase iterations?)		
61.00	46.00	8.761		Not converged (increase iterations?)		
61.00	47.00	9.760		Not converged (increase iterations?)		
61.00	48.00	10.76	702.3	2.613	1991.	5202.
61.00	49.00	11.76	733.8	2.378	2185.	5196.
61.00	50.00	12.76	764.5	2.077	2377.	4939.
61.00	51.00	13.76	792.4	1.964	2574.	5055.
61.00	52.00	14.76	820.4	1.992	2773.	5526.
61.00	53.00	15.76	847.3	2.017	2975.	6001.
61.00	54.00	16.76	873.3	2.040	3178.	6485.
61.00	55.00	17.76	898.3	2.070	3383.	7002.
61.00	56.00	18.76	922.5	2.098	3589.	7530.
61.00	57.00	19.76	945.9	2.125	3797.	8069.
61.00	58.00	20.76	968.7	2.151	4006.	8618.
61.00	59.00	21.76	991.4	2.156	4217.	9093.
61.00	60.00	22.76	1013.	2.178	4429.	9647.
61.00	61.00	23.76	1034.	2.199	4642.	10210.
61.00	62.00	24.76	1055.	2.220	4857.	10780.
61.00	63.00	25.76	1075.	2.240	5073.	11360.
61.00	64.00	26.76	1094.	2.257	5292.	11940.
62.00	45.00	7.786		Not converged (increase iterations?)		
62.00	46.00	8.785		Not converged (increase iterations?)		
62.00	47.00	9.785		Not converged (increase iterations?)		
62.00	48.00	10.78		Not converged (increase iterations?)		
62.00	49.00	11.78		Not converged (increase iterations?)		
62.00	50.00	12.78	707.1	2.615	2470.	6459.
62.00	51.00	13.78	735.5	2.426	2674.	6489.
62.00	52.00	14.78	762.6	2.257	2877.	6493.
62.00	53.00	15.78	788.2	1.999	3078.	6154.
62.00	54.00	16.78	813.3	1.895	3283.	6224.
62.00	55.00	17.78	837.8	1.923	3491.	6713.
62.00	56.00	18.78	861.5	1.949	3700.	7210.
62.00	57.00	19.78	884.7	1.966	3910.	7685.
62.00	58.00	20.78	907.1	1.993	4121.	8213.
62.00	59.00	21.78	929.0	2.019	4334.	8751.
62.00	60.00	22.78	950.2	2.045	4548.	9298.
62.00	61.00	23.78	970.3	2.071	4757.	9851.
62.00	62.00	24.78	990.6	2.095	4973.	10420.
62.00	63.00	25.78	1011.	2.098	5191.	10890.
62.00	64.00	26.78	1030.	2.119	5409.	11460.
63.00	45.00	7.810		Not converged (increase iterations?)		
63.00	46.00	8.810		Not converged (increase iterations?)		
63.00	47.00	9.809		Not converged (increase iterations?)		
63.00	48.00	10.81		Not converged (increase iterations?)		
63.00	49.00	11.81		Not converged (increase iterations?)		
63.00	50.00	12.81		Not converged (increase iterations?)		
63.00	51.00	13.81	671.3	2.571	2703.	6949.
63.00	52.00	14.81	699.4	2.680	2922.	7831.
63.00	53.00	15.81	725.9	2.525	3136.	7920.
63.00	54.00	16.81	750.9	2.376	3347.	7951.
63.00	55.00	17.81	775.5	2.355	3564.	8392.

EPA Export 08-07-2014:23:43:04

63.00	56.00	18.81	797.3	2.027	3762.	7627.
63.00	57.00	19.81	819.7	1.847	3973.	7337.
63.00	58.00	20.81	841.7	1.874	4186.	7846.
63.00	59.00	21.81	863.2	1.903	4400.	8371.
63.00	60.00	22.81	884.2	1.921	4615.	8864.
63.00	61.00	23.81	904.8	1.937	4831.	9359.
63.00	62.00	24.80	924.9	1.961	5049.	9903.
63.00	63.00	25.80	944.5	1.985	5267.	10460.
63.00	64.00	26.80	963.8	2.008	5487.	11020.
64.00	45.00	7.834	343.9	4.681	788.4	3691.
64.00	46.00	8.834		Not converged (increase iterations?)		
64.00	47.00	9.834		Not converged (increase iterations?)		
64.00	48.00	10.83		Not converged (increase iterations?)		
64.00	49.00	11.83		Not converged (increase iterations?)		
64.00	50.00	12.83		Not converged (increase iterations?)		
64.00	51.00	13.83		Not converged (increase iterations?)		
64.00	52.00	14.83		Not converged (increase iterations?)		
64.00	53.00	15.83		Not converged (increase iterations?)		
64.00	54.00	16.83	682.4	2.557	3336.	8532.
64.00	55.00	17.83	706.7	2.653	3558.	9440.
64.00	56.00	18.83	730.1	2.525	3777.	9534.
64.00	57.00	19.83	753.1	2.398	3991.	9570.
64.00	58.00	20.83	774.6	2.275	4204.	9566.
64.00	59.00	21.83	795.3	2.115	4416.	9340.
64.00	60.00	22.83	815.6	1.939	4630.	8975.
64.00	61.00	23.83	835.7	1.838	4847.	8909.
64.00	62.00	24.83	855.5	1.865	5065.	9447.
64.00	63.00	25.83	875.0	1.890	5284.	9985.
64.00	64.00	26.83	894.1	1.904	5504.	10480.
65.00	45.00	7.859		Weight too small		
65.00	45.00	7.859	256.3	1.913	455.8	872.0
65.00	46.00	8.859		Weight too small		
65.00	46.00	8.859	275.2	1.937	539.7	1045.
65.00	47.00	9.858	354.5	4.386	1116.	4894.
65.00	48.00	10.86		Not converged (increase iterations?)		
65.00	49.00	11.86		Not converged (increase iterations?)		
65.00	50.00	12.86		Not converged (increase iterations?)		
65.00	51.00	13.86		Not converged (increase iterations?)		
65.00	52.00	14.86		Not converged (increase iterations?)		
65.00	53.00	15.86		Not converged (increase iterations?)		
65.00	54.00	16.86		Not converged (increase iterations?)		
65.00	55.00	17.86	633.7	2.620	3466.	9081.
65.00	56.00	18.86	658.3	2.576	3702.	9536.
65.00	57.00	19.86	681.1	2.563	3928.	10070.
65.00	58.00	20.86	703.1	2.683	4153.	11140.
65.00	59.00	21.85	724.4	2.582	4375.	11300.
65.00	60.00	22.85	745.2	2.467	4595.	11340.
65.00	61.00	23.85	765.0	2.355	4813.	11330.
65.00	62.00	24.85	784.7	2.245	5027.	11280.
65.00	63.00	25.85	803.6	2.083	5244.	10920.
65.00	64.00	26.85	822.1	1.931	5463.	10550.
66.00	45.00	7.883	214.4	1.745	430.1	750.3
66.00	46.00	8.883		Weight too small		
66.00	46.00	8.883	232.5	1.758	514.9	905.3
66.00	47.00	9.883		Weight too small		
66.00	47.00	9.883	249.8	1.781	601.4	1071.
66.00	48.00	10.88		Weight too small		
66.00	48.00	10.88	266.4	1.810	689.7	1248.
66.00	49.00	11.88		Not converged (increase iterations?)		

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66.00	50.00	12.88		Not converged (increase iterations?)		
66.00	51.00	13.88		Not converged (increase iterations?)		
66.00	52.00	14.88		Not converged (increase iterations?)		
66.00	53.00	15.88		Not converged (increase iterations?)		
66.00	54.00	16.88		Not converged (increase iterations?)		
66.00	55.00	17.88		Not converged (increase iterations?)		
66.00	56.00	18.88		Not converged (increase iterations?)		
66.00	57.00	19.88		Not converged (increase iterations?)		
66.00	58.00	20.88	627.1	2.641	4003.	10570.
66.00	59.00	21.88	649.6	2.603	4241.	11040.
66.00	60.00	22.88	671.0	2.578	4473.	11530.
66.00	61.00	23.88	690.8	2.637	4697.	12380.
66.00	62.00	24.88	710.7	2.672	4922.	13150.
66.00	63.00	25.88	730.1	2.574	5147.	13250.
66.00	64.00	26.88	748.8	2.470	5368.	13260.
67.00	45.00	7.908	169.5	1.677	372.8	625.3
67.00	46.00	8.908	187.3	1.665	457.9	762.3
67.00	47.00	9.907		Slip too small to split into minimum no. of slices		
67.00	48.00	10.91		Weight too small		
67.00	48.00	10.91	219.7	1.687	631.0	1065.
67.00	49.00	11.91		Weight too small		
67.00	49.00	11.91	234.9	1.710	719.8	1231.
67.00	50.00	12.91		Weight too small		
67.00	50.00	12.91	249.4	1.737	809.3	1406.
67.00	51.00	13.91		Not converged (increase iterations?)		
67.00	51.00	13.91	263.7	1.767	900.7	1591.
67.00	52.00	14.91	363.8	4.832	1888.	9122.
67.00	53.00	15.91	397.7	4.626	2210.	10220.
67.00	54.00	16.91	429.9	4.492	2527.	11350.
67.00	55.00	17.90	460.8	4.414	2840.	12540.
67.00	56.00	18.90	489.9	4.374	3149.	13770.
67.00	57.00	19.90	518.5	4.267	3454.	14740.
67.00	58.00	20.90	544.4	4.035	3730.	15050.
67.00	59.00	21.90	567.7	3.804	3986.	15160.
67.00	60.00	22.90		Not converged (increase iterations?)		
67.00	61.00	23.90	612.0	3.499	4479.	15670.
67.00	62.00	24.90	633.1	2.659	4718.	12550.
67.00	63.00	25.90	653.2	2.623	4953.	12990.
67.00	64.00	26.90	672.6	2.619	5185.	13580.
68.00	45.00	7.932	123.6	1.701	287.5	489.1
68.00	46.00	8.932	139.5	1.673	364.2	609.5
68.00	47.00	9.932	155.6	1.653	448.5	741.4
68.00	48.00	10.93	170.9	1.645	534.6	879.4
68.00	49.00	11.93		Weight too small		
68.00	49.00	11.93	185.7	1.647	622.3	1025.
68.00	50.00	12.93		Weight too small		
68.00	50.00	12.93	200.0	1.658	711.4	1180.
68.00	51.00	13.93		Weight too small		
68.00	51.00	13.93	213.7	1.677	800.8	1343.
68.00	52.00	14.93		Weight too small		
68.00	52.00	14.93	227.1	1.699	892.0	1516.
68.00	53.00	15.93		Not converged (increase iterations?)		
68.00	53.00	15.93	240.1	1.724	984.1	1697.
68.00	54.00	16.93		Not converged (increase iterations?)		
68.00	54.00	16.93	252.7	1.751	1077.	1886.
68.00	55.00	17.93	364.6	5.057	2316.	11710.
68.00	56.00	18.93	395.1	4.890	2637.	12900.
68.00	57.00	19.93	424.1	4.774	2954.	14100.
68.00	58.00	20.93	451.6	4.700	3265.	15350.
68.00	59.00	21.93	479.0	4.652	3575.	16630.
68.00	60.00	22.93	504.5	4.388	3867.	16970.
68.00	61.00	23.93	527.6	4.162	4133.	17200.

EPA Export 08-07-2014:23:43:04

68.00	62.00	24.93	549.8	3.975	4397.	17480.
68.00	63.00	25.93		Not converged (increase iterations?)		
68.00	64.00	26.93		Not converged (increase iterations?)		
69.00	45.00	7.957	80.30	1.809	193.0	349.1
69.00	46.00	8.957	93.23	1.763	253.3	446.6
69.00	47.00	9.956	106.9	1.726	322.9	557.4
69.00	48.00	10.96	120.6	1.701	398.8	678.4
69.00	49.00	11.96	134.7	1.681	481.9	810.1
69.00	50.00	12.96	148.6	1.668	569.3	949.8
69.00	51.00	13.96		Weight too small		
69.00	51.00	13.96	162.1	1.663	657.8	1094.
69.00	52.00	14.95		Weight too small		
69.00	52.00	14.95	175.3	1.665	747.8	1245.
69.00	53.00	15.95		Weight too small		
69.00	53.00	15.95	187.9	1.675	837.7	1404.
69.00	54.00	16.95		Weight too small		
69.00	54.00	16.95	200.4	1.690	929.7	1572.
69.00	55.00	17.95	57.74	10.93	698.7	7638.
69.00	55.00	17.95	212.6	1.709	1022.	1747.
69.00	56.00	18.95	74.36	10.17	910.2	9255.
69.00	56.00	18.95	224.5	1.730	1116.	1931.
69.00	57.00	19.95	91.40	9.673	1131.	10940.
69.00	57.00	19.95	236.1	1.753	1211.	2123.
69.00	58.00	20.95	354.6	5.414	2657.	14380.
69.00	59.00	21.95	382.6	5.257	2978.	15650.
69.00	60.00	22.95	409.2	5.138	3293.	16920.
69.00	61.00	23.95	435.0	5.053	3607.	18220.
69.00	62.00	24.95	460.1	4.853	3914.	18990.
69.00	63.00	25.95	483.2	4.610	4195.	19340.
69.00	64.00	26.95	504.7	4.378	4459.	19520.
70.00	45.00	7.981		Weight too small		
70.00	46.00	8.981	52.35	1.947	145.7	283.6
70.00	47.00	9.981	62.41	1.898	193.2	366.7
70.00	48.00	10.98	73.26	1.852	249.7	462.5
70.00	49.00	11.98	85.15	1.809	316.7	572.9
70.00	50.00	12.98	97.26	1.777	390.1	693.4
70.00	51.00	13.98	109.6	1.753	469.6	823.1
70.00	52.00	14.98		Weight too small		
70.00	52.00	14.98	122.3	1.731	556.1	962.6
70.00	53.00	15.98		Weight too small		
70.00	53.00	15.98	135.0	1.717	645.8	1109.
70.00	54.00	16.98		Weight too small		
70.00	54.00	16.98	147.2	1.708	735.8	1257.
70.00	55.00	17.98		Weight too small		
70.00	55.00	17.98	159.2	1.705	827.2	1411.
70.00	56.00	18.98		Weight too small		
70.00	56.00	18.98	170.8	1.711	918.5	1571.
70.00	57.00	19.98	51.34	11.90	671.9	7997.
70.00	57.00	19.98	182.3	1.721	1012.	1741.
70.00	58.00	20.98	65.92	11.05	871.3	9630.
70.00	58.00	20.98	193.7	1.734	1106.	1918.
70.00	59.00	21.98	81.00	10.48	1081.	11330.
70.00	59.00	21.98	204.7	1.751	1201.	2102.
70.00	60.00	22.98	96.40	10.09	1298.	13100.
70.00	60.00	22.98	215.6	1.770	1296.	2294.
70.00	61.00	23.98	336.9	5.876	2906.	17080.
70.00	62.00	24.98	362.8	5.714	3227.	18440.
70.00	63.00	25.98	387.9	5.579	3545.	19780.
70.00	64.00	26.98	412.1	5.475	3860.	21130.
71.00	45.00	8.012		Weight too small		
71.00	46.00	9.010		Weight too small		
71.00	47.00	10.01		Weight too small		
71.00	48.00	11.01		Weight too small		
71.00	49.00	12.01		Weight too small		
71.00	50.00	13.01	50.94	1.969	208.9	411.2
71.00	51.00	14.00	60.79	1.935	268.3	519.2
71.00	52.00	15.00	71.41	1.896	337.1	639.2
71.00	53.00	16.00	82.51	1.863	412.9	769.4
71.00	54.00	17.00		Weight too small		
71.00	54.00	17.00	93.82	1.836	494.6	908.0
71.00	55.00	18.00		Weight too small		
71.00	55.00	18.00	105.5	1.810	583.0	1055.
71.00	56.00	19.00		Weight too small		

71.00	56.00	19.00	117.1	1.791	673.6	1207.
71.00	57.00	20.00		Weight too small		
71.00	57.00	20.00	128.2	1.779	763.8	1359.
71.00	58.00	21.00		Weight too small		
71.00	58.00	21.00	139.4	1.768	856.1	1514.
71.00	59.00	22.00		Weight too small		
71.00	59.00	22.00	150.3	1.765	949.5	1676.
71.00	60.00	23.00	57.16	12.10	810.5	9809.
71.00	60.00	23.00	161.1	1.767	1044.	1845.
71.00	61.00	24.00	70.48	11.42	1008.	11510.
71.00	61.00	24.00	171.6	1.775	1139.	2021.
71.00	62.00	25.00	84.20	10.95	1214.	13280.
71.00	62.00	25.00	182.1	1.786	1235.	2205.
71.00	63.00	26.00	98.20	10.60	1427.	15120.
71.00	63.00	26.00	192.4	1.799	1331.	2395.
71.00	64.00	27.00	112.4	10.34	1645.	17020.
71.00	64.00	27.00	202.5	1.815	1429.	2592.
72.00	45.00	8.135		Weight too small		
72.00	46.00	9.120		Weight too small		
72.00	47.00	10.11		Weight too small		
72.00	48.00	11.10		Weight too small		
72.00	49.00	12.09		Weight too small		
72.00	50.00	13.08		Weight too small		
72.00	51.00	14.08		Weight too small		
72.00	52.00	15.07		Weight too small		
72.00	53.00	16.07		Weight too small		
72.00	54.00	17.06	50.20	1.950	272.2	530.8
72.00	55.00	18.06	59.74	1.954	342.1	668.5
72.00	56.00	19.06		Weight too small		
72.00	56.00	19.06	69.57	1.940	417.7	810.2
72.00	57.00	20.05		Weight too small		
72.00	57.00	20.05	79.74	1.917	499.6	957.9
72.00	58.00	21.05		Weight too small		
72.00	58.00	21.05	90.22	1.893	587.4	1112.
72.00	59.00	22.05		Weight too small		
72.00	59.00	22.05	100.6	1.873	677.5	1269.
72.00	60.00	23.04		Weight too small		
72.00	60.00	23.04	110.9	1.857	768.6	1427.
72.00	61.00	24.04		Weight too small		
72.00	61.00	24.04	121.1	1.842	860.9	1586.
72.00	62.00	25.04		Weight too small		
72.00	62.00	25.04	131.1	1.830	953.8	1746.
72.00	63.00	26.04	60.99	12.46	930.1	11590.
72.00	63.00	26.04	141.0	1.825	1048.	1912.
72.00	64.00	27.04	73.17	11.88	1124.	13350.
72.00	64.00	27.04	150.7	1.826	1142.	2084.
73.00	45.00	8.378		Radius too small		
73.00	46.00	9.337		Weight too small		
73.00	47.00	10.30		Weight too small		
73.00	48.00	11.28		Weight too small		
73.00	49.00	12.25		Weight too small		
73.00	50.00	13.23		Weight too small		
73.00	51.00	14.22		Weight too small		
73.00	52.00	15.20		Weight too small		
73.00	53.00	16.19		Weight too small		
73.00	54.00	17.18		Weight too small		
73.00	55.00	18.17		Weight too small		
73.00	56.00	19.16		Weight too small		
73.00	57.00	20.15		Weight too small		
73.00	58.00	21.14		Weight too small		
73.00	58.00	21.14	51.44	1.941	346.6	672.8
73.00	59.00	22.14		Weight too small		
73.00	59.00	22.14	60.22	1.954	422.1	824.9
73.00	60.00	23.13		Weight too small		
73.00	60.00	23.13	69.38	1.967	503.8	991.2
73.00	61.00	24.13		Weight too small		
73.00	61.00	24.13	78.90	1.957	591.8	1158.
73.00	62.00	25.12		Weight too small		
73.00	62.00	25.12	88.42	1.942	682.2	1325.
73.00	63.00	26.12		Weight too small		
73.00	63.00	26.12	97.77	1.926	773.0	1489.
73.00	64.00	27.11		Weight too small		
73.00	64.00	27.11	107.1	1.910	865.0	1652.
74.00	45.00	8.682		Radius too small		
74.00	46.00	9.635		Radius too small		

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EPA Export 08-07-2014:23:43:04

74.00	47.00	10.59	Radius too small			
74.00	48.00	11.54	Radius too small			
74.00	49.00	12.50	Weight too small			
74.00	50.00	13.46	Weight too small			
74.00	51.00	14.43	Weight too small			
74.00	52.00	15.40	Weight too small			
74.00	53.00	16.37	Weight too small			
74.00	54.00	17.35	Weight too small			
74.00	55.00	18.33	Weight too small			
74.00	56.00	19.32	Weight too small			
74.00	57.00	20.30	Weight too small			
74.00	58.00	21.29	Weight too small			
74.00	59.00	22.27	Weight too small			
74.00	60.00	23.26	Weight too small			
74.00	60.00	23.26	Weight too small			
74.00	61.00	24.25	Weight too small			
74.00	61.00	24.25	Weight too small			
74.00	62.00	25.24	Weight too small			
74.00	62.00	25.24	53.26	1.945	426.9	830.5
74.00	63.00	26.23	Weight too small			
74.00	63.00	26.23	61.56	1.962	508.6	997.7
74.00	64.00	27.22	Weight too small			
74.00	64.00	27.22	70.12	1.901	595.6	1180.
75.00	45.00	8.987	Radius too small			
75.00	46.00	9.939	Radius too small			
75.00	47.00	10.89	Radius too small			
75.00	48.00	11.84	Radius too small			
75.00	49.00	12.80	Radius too small			
75.00	50.00	13.75	Radius too small			
75.00	51.00	14.70	Radius too small			
75.00	52.00	15.66	Weight too small			
75.00	53.00	16.62	Weight too small			
75.00	54.00	17.58	Weight too small			
75.00	55.00	18.55	Weight too small			
75.00	56.00	19.52	Weight too small			
75.00	57.00	20.50	Weight too small			
75.00	58.00	21.47	Weight too small			
75.00	59.00	22.45	Weight too small			
75.00	60.00	23.43	Weight too small			
75.00	61.00	24.41	Weight too small			
75.00	62.00	25.40	Weight too small			
75.00	62.00	25.40	Weight too small			
75.00	63.00	26.38	Weight too small			
75.00	63.00	26.38	Weight too small			
75.00	64.00	27.37	Weight too small			
75.00	64.00	27.37	Weight too small			
76.00	45.00	9.292	Radius too small			
76.00	46.00	10.24	Radius too small			
76.00	47.00	11.20	Radius too small			
76.00	48.00	12.15	Radius too small			
76.00	49.00	13.10	Radius too small			
76.00	50.00	14.05	Radius too small			
76.00	51.00	15.01	Radius too small			
76.00	52.00	15.96	Radius too small			
76.00	53.00	16.91	Radius too small			
76.00	54.00	17.86	Radius too small			
76.00	55.00	18.82	Weight too small			
76.00	56.00	19.78	Weight too small			
76.00	57.00	20.74	Weight too small			
76.00	58.00	21.70	Weight too small			
76.00	59.00	22.67	Weight too small			
76.00	60.00	23.64	Weight too small			
76.00	61.00	24.62	Weight too small			
76.00	62.00	25.59	Weight too small			
76.00	63.00	26.57	Weight too small			
76.00	64.00	27.55	Weight too small			
76.00	64.00	27.55	Weight too small			
77.00	45.00	9.596	Radius too small			
77.00	46.00	10.55	Radius too small			
77.00	47.00	11.50	Radius too small			
77.00	48.00	12.45	Radius too small			
77.00	49.00	13.41	Radius too small			
77.00	50.00	14.36	Radius too small			
77.00	51.00	15.31	Radius too small			
77.00	52.00	16.26	Radius too small			

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77.00	53.00	17.22	Radius too small
77.00	54.00	18.17	Radius too small
77.00	55.00	19.12	Radius too small
77.00	56.00	20.07	Radius too small
77.00	57.00	21.03	Radius too small
77.00	58.00	21.98	Weight too small
77.00	59.00	22.94	Weight too small
77.00	60.00	23.90	Weight too small
77.00	61.00	24.86	Weight too small
77.00	62.00	25.83	Weight too small
77.00	63.00	26.80	Weight too small
77.00	64.00	27.77	Weight too small
78.00	45.00	9.901	Radius too small
78.00	46.00	10.85	Radius too small
78.00	47.00	11.81	Radius too small
78.00	48.00	12.76	Radius too small
78.00	49.00	13.71	Radius too small
78.00	50.00	14.66	Radius too small
78.00	51.00	15.62	Radius too small
78.00	52.00	16.57	Radius too small
78.00	53.00	17.52	Radius too small
78.00	54.00	18.47	Radius too small
78.00	55.00	19.43	Radius too small
78.00	56.00	20.38	Radius too small
78.00	57.00	21.33	Radius too small
78.00	58.00	22.28	Radius too small
78.00	59.00	23.24	Radius too small
78.00	60.00	24.19	Radius too small
78.00	61.00	25.14	Weight too small
78.00	62.00	26.10	Weight too small
78.00	63.00	27.06	Weight too small
78.00	64.00	28.02	Weight too small
79.00	45.00	10.21	Radius too small
79.00	46.00	11.16	Radius too small
79.00	47.00	12.11	Radius too small
79.00	48.00	13.06	Radius too small
79.00	49.00	14.02	Radius too small
79.00	50.00	14.97	Radius too small
79.00	51.00	15.92	Radius too small
79.00	52.00	16.87	Radius too small
79.00	53.00	17.83	Radius too small
79.00	54.00	18.78	Radius too small
79.00	55.00	19.73	Radius too small
79.00	56.00	20.68	Radius too small
79.00	57.00	21.64	Radius too small
79.00	58.00	22.59	Radius too small
79.00	59.00	23.54	Radius too small
79.00	60.00	24.49	Radius too small
79.00	61.00	25.44	Radius too small
79.00	62.00	26.40	Radius too small
79.00	63.00	27.35	Radius too small
79.00	64.00	28.30	Weight too small
80.00	45.00	10.48	Radius too small
80.00	46.00	11.48	Weight too small
80.00	47.00	12.48	Weight too small
80.00	48.00	13.48	Weight too small
80.00	49.00	14.48	Weight too small
80.00	50.00	15.48	Weight too small
80.00	51.00	16.48	Weight too small
80.00	52.00	17.47	Weight too small
80.00	53.00	18.47	Weight too small
80.00	54.00	19.08	Radius too small
80.00	55.00	20.04	Radius too small
80.00	56.00	20.99	Radius too small
80.00	57.00	21.94	Radius too small
80.00	58.00	22.89	Radius too small
80.00	59.00	23.84	Radius too small
80.00	60.00	24.80	Radius too small
80.00	61.00	25.75	Radius too small
80.00	62.00	26.70	Radius too small
80.00	63.00	27.65	Radius too small
80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small

EPA Export 08-07-2014:23:43:04

81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small
81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.68	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small
82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small
82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small
83.00	45.00	10.92	Radius too small
83.00	46.00	11.88	Radius too small
83.00	47.00	12.85	Radius too small
83.00	48.00	13.83	Radius too small
83.00	49.00	14.80	Radius too small
83.00	50.00	15.78	Radius too small
83.00	51.00	16.77	Radius too small
83.00	52.00	17.75	Radius too small
83.00	53.00	18.74	Radius too small
83.00	54.00	19.73	Radius too small
83.00	55.00	20.71	Radius too small
83.00	56.00	21.70	Radius too small
83.00	57.00	22.70	Radius too small
83.00	58.00	23.69	Radius too small
83.00	59.00	24.68	Radius too small
83.00	60.00	25.67	Radius too small
83.00	61.00	26.67	Radius too small
83.00	62.00	27.66	Weight too small
83.00	63.00	28.65	Weight too small
83.00	64.00	29.65	Weight too small
84.00	45.00	11.23	Radius too small
84.00	46.00	12.17	Radius too small
84.00	47.00	13.12	Radius too small
84.00	48.00	14.08	Radius too small
84.00	49.00	15.04	Radius too small
84.00	50.00	16.00	Radius too small
84.00	51.00	16.97	Radius too small
84.00	52.00	17.95	Radius too small
84.00	53.00	18.92	Radius too small
84.00	54.00	19.90	Radius too small
84.00	55.00	20.88	Radius too small
84.00	56.00	21.86	Radius too small
84.00	57.00	22.85	Radius too small
84.00	58.00	23.83	Radius too small
84.00	59.00	24.82	Radius too small
84.00	60.00	25.81	Radius too small
84.00	61.00	26.80	Radius too small
84.00	62.00	27.79	Radius too small

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84.00	63.00	28.78	Radius too small			
84.00	64.00	29.77	Radius too small			
85.00	45.00	11.63	Disturbing moment < 0			
85.00	46.00	12.54	Radius too small			
85.00	47.00	13.46	Radius too small			
85.00	48.00	14.39	Radius too small			
85.00	49.00	15.33	Radius too small			
85.00	50.00	16.28	Radius too small			
85.00	51.00	17.24	Radius too small			
85.00	52.00	18.20	Radius too small			
85.00	53.00	19.16	Radius too small			
85.00	54.00	20.13	Radius too small			
85.00	55.00	21.10	Radius too small			
85.00	56.00	22.07	Radius too small			
85.00	57.00	23.04	Radius too small			
85.00	58.00	24.02	Radius too small			
85.00	59.00	25.00	Radius too small			
85.00	60.00	25.98	Radius too small			
85.00	61.00	26.96	Radius too small			
85.00	62.00	27.95	Radius too small			
85.00	63.00	28.93	Radius too small			
85.00	64.00	29.92	Radius too small			
86.00	45.00	12.09	FoS > 1000			
86.00	46.00	12.97	FoS > 1000			
86.00	47.00	13.86	FoS > 1000			
86.00	48.00	14.77	FoS > 1000			
86.00	49.00	15.69	FoS > 1000			
86.00	50.00	16.62	Disturbing moment < 0			
86.00	51.00	17.55	Radius too small			
86.00	52.00	18.50	Radius too small			
86.00	53.00	19.44	Radius too small			
86.00	54.00	20.40	Radius too small			
86.00	55.00	21.36	Radius too small			
86.00	56.00	22.32	Radius too small			
86.00	57.00	23.28	Radius too small			
86.00	58.00	24.25	Radius too small			
86.00	59.00	25.22	Radius too small			
86.00	60.00	26.19	Radius too small			
86.00	61.00	27.17	Radius too small			
86.00	62.00	28.14	Radius too small			
86.00	63.00	29.12	Radius too small			
86.00	64.00	30.10	Radius too small			
87.00	45.00	11.60	Radius too small			
87.00	46.00	13.46	Disturbing moment < 0			
87.00	47.00	14.32	86.34 260200. 0.003984 1037.			
87.00	48.00	15.20	FoS > 1000			
87.00	49.00	16.10	FoS > 1000			
87.00	50.00	17.00	Disturbing moment < 0			
87.00	51.00	17.92	FoS > 1000			
87.00	52.00	18.84	Disturbing moment < 0			
87.00	53.00	19.78	Disturbing moment < 0			
87.00	54.00	20.71	Disturbing moment < 0			
87.00	55.00	21.66	FoS > 1000			
87.00	56.00	22.61	Disturbing moment < 0			
87.00	57.00	23.56	Radius too small			
87.00	58.00	24.52	Radius too small			
87.00	59.00	25.48	Radius too small			
87.00	60.00	26.44	Radius too small			
87.00	61.00	27.40	Radius too small			
87.00	62.00	28.37	Radius too small			
87.00	63.00	29.34	Radius too small			
87.00	64.00	30.32	Radius too small			
88.00	45.00	11.60	Radius too small			
88.00	46.00	12.60	Radius too small			
88.00	47.00	13.60	Radius too small			
88.00	48.00	15.69	166.6 73180. 0.02663 1949.			
88.00	49.00	16.56	141.3 152200. 0.01180 1797.			
88.00	50.00	17.44	Disturbing moment < 0			
88.00	51.00	18.33	100.0 192000. 0.007762 1490.			
88.00	52.00	19.24	Disturbing moment < 0			
88.00	53.00	20.15	Disturbing moment < 0			
88.00	54.00	21.07	FoS > 1000			
88.00	55.00	22.00	FoS > 1000			
88.00	56.00	22.94	Disturbing moment < 0			
88.00	57.00	23.88	FoS > 1000			

EPA Export 08-07-2014:23:43:04

88.00	58.00	24.82		FoS > 1000		
88.00	59.00	25.77		FoS > 1000		
88.00	60.00	26.72		FoS > 1000		
88.00	61.00	27.68		Disturbing moment < 0		
88.00	62.00	28.64		Disturbing moment < 0		
88.00	63.00	29.60		Radius too small		
88.00	64.00	30.56		Radius too small		
89.00	45.00	11.60		Radius too small		
89.00	46.00	12.60		Radius too small		
89.00	47.00	13.60		Radius too small		
89.00	48.00	14.60		Radius too small		
89.00	49.00	15.60		Radius too small		
89.00	50.00	17.92	237.7	50150.	0.05886	2952.
89.00	51.00	18.79	208.8	38200.	0.07293	2786.
89.00	52.00	19.67	183.4	48040.	0.05464	2625.
89.00	53.00	20.57	160.8	796800.	0.003098	2468.
89.00	54.00	21.47		Disturbing moment < 0		
89.00	55.00	22.38	122.6	197400.	0.01089	2149.
89.00	56.00	23.30	106.2	224800.	0.008825	1984.
89.00	57.00	24.23		Disturbing moment < 0		
89.00	58.00	25.16		FoS > 1000		
89.00	59.00	26.10		FoS > 1000		
89.00	60.00	27.04		FoS > 1000		
89.00	61.00	27.98		FoS > 1000		
89.00	62.00	28.93		Disturbing moment < 0		
89.00	63.00	29.88		FoS > 1000		
89.00	64.00	30.84		FoS > 1000		

WORST CASE : WATER CASE 1 OF 1

Centre at (68.00,48.00) Radius 10.93m
Iterations: 8 Horiz acceleration (kg): .0
Net vertical force [kN]: .0 Slip weight [kN] 170.9
Net horiz force [kN]: 18.60E-6 Disturbing moment [kN m]: 534.6
Inclination of interslice forces [°]: 15.70 Restoring moment [kN m]: 879.4

Factor of Safety: 1.645

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x (m)	y (m)	u [kPa]	T	E	E(u)
1	60.41	40.13	-5.145	.0	.0	.0
2	60.86	39.72	-1.150	0.1680	0.5976	.0
3	61.00	39.60	-0.03712	0.2625	0.9338	.0
4	61.01	39.60	.0	0.2682	0.9539	.0
5	61.52	39.20	2.326	0.8040	2.860	0.2704
6	62.05	38.83	4.270	1.563	5.559	0.9115
7	62.60	38.50	5.825	2.422	8.616	1.697
8	63.41	38.08	7.341	3.554	12.64	2.694
9	64.24	37.73	8.073	4.371	15.55	3.259
10	65.10	37.46	8.017	4.704	16.73	3.214
11	65.99	37.26	7.174	4.464	15.88	2.573
12	66.88	37.13	5.548	3.666	13.04	1.539
13	67.79	37.07	3.151	2.433	8.654	0.4965
14	68.69	37.09	.0	1.019	3.623	.0
15	69.27	37.14	-2.404	0.2905	1.033	.0
16	69.84	37.22	-5.102	.0	18.60E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.5774	.0	1.575	1.443	0.8329
2	.0	0.6494	.0	1.086	0.9734	0.6321
3	.0	0.6494	.0	0.06660	0.05969	0.03876
4	.0	0.6494	1.163	5.588	5.468	3.063
5	.0	0.6494	3.298	8.878	8.213	3.949
6	.0	0.6494	5.047	11.57	10.74	4.854
7	.0	0.6494	6.583	19.49	18.17	7.926
8	.0	0.6494	7.707	21.84	20.53	8.803
9	.0	0.6494	8.045	22.85	21.81	9.431
10	.0	0.6494	7.595	22.40	21.86	9.733
11	.0	0.6494	6.361	20.41	20.50	9.627
12	.0	0.6494	4.349	16.89	17.82	9.018
13	.0	0.6494	1.576	11.91	13.43	7.796

14	.0	0.6494	.0	4.425	5.364	3.484
15	.0	0.6494	.0	1.519	1.938	1.259

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0

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ARUP

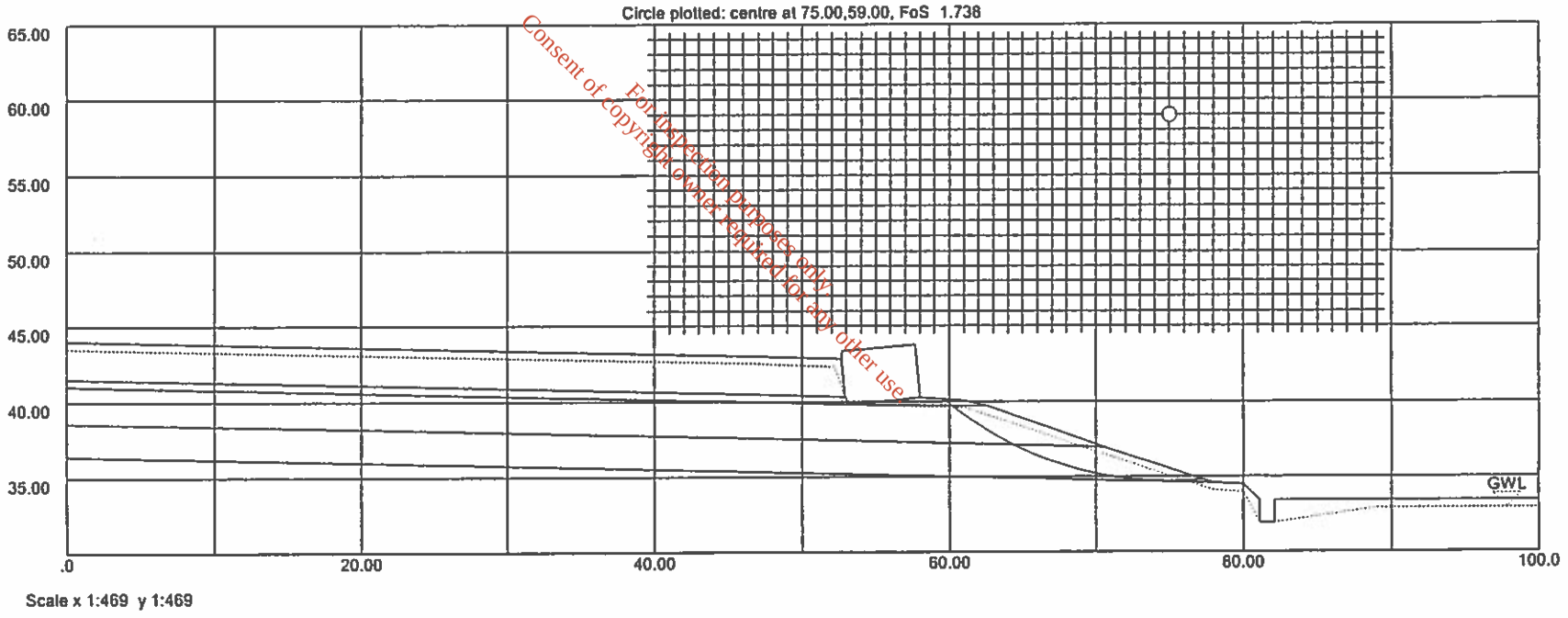
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	AA : Run 3 - 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	05-Dec-2003	Stability Max Cut No3.sld	



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Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Non Intact / Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X --> 53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X --> 78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.

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6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X --> 100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	9.457		Not converged (increase iterations?)		
40.00	46.00	10.46	1755.	26.26	265.0	6960.
40.00	47.00	11.46	1858.	24.47	325.3	7962.
40.00	48.00	12.46	1952.	23.08	389.5	8991.
40.00	49.00	13.46	2043.	22.05	456.9	10080.
40.00	50.00	14.46	2132.	21.21	528.2	11200.
40.00	50.00	14.46		Weight too small		
40.00	51.00	15.46	2222.	27.88	531.4	14820.
40.00	52.00	16.46	2310.	34.48	517.7	17850.
40.00	53.00	17.46		Disturbing moment < 0		
40.00	54.00	18.45		Disturbing moment < 0		
40.00	55.00	19.45		Disturbing moment < 0		
40.00	56.00	20.45		Disturbing moment < 0		
40.00	57.00	21.45		Disturbing moment < 0		
40.00	58.00	22.45		Disturbing moment < 0		
40.00	59.00	23.45		Disturbing moment < 0		
40.00	60.00	24.45	2950.	460.6	90.37	41620.
40.00	61.00	25.45	3019.	403.9	105.7	42680.
40.00	62.00	26.45	3084.	269.0	162.4	43680.
40.00	63.00	27.45	3144.	169.8	262.6	44590.
40.00	64.00	28.45	3204.	110.8	383.0	45490.
41.00	45.00	9.480	1650.	28.15	214.3	6032.
41.00	46.00	10.48	1756.	25.76	270.8	6977.
41.00	47.00	11.48		Not converged (increase iterations?)		
41.00	48.00	12.48	1955.	22.77	396.2	9021.
41.00	49.00	13.48	2050.	29.36	411.8	12090.
41.00	50.00	14.48		Disturbing moment < 0		
41.00	51.00	15.48		Disturbing moment < 0		
41.00	52.00	16.48		Disturbing moment < 0		
41.00	53.00	17.48		Disturbing moment < 0		
41.00	54.00	18.48		Disturbing moment < 0		
41.00	55.00	19.48		Disturbing moment < 0		
41.00	56.00	20.48		Disturbing moment < 0		
41.00	57.00	21.48		Disturbing moment < 0		
41.00	58.00	22.48		Disturbing moment < 0		
41.00	59.00	23.48		Disturbing moment < 0		
41.00	60.00	24.48	2962.	699.0	54.54	38130.
41.00	61.00	25.48	3025.	239.7	162.5	38960.
41.00	62.00	26.48	3086.	131.9	301.1	39720.
41.00	63.00	27.48	3143.	86.81	465.7	40430.
41.00	64.00	28.48	3197.	62.90	652.8	41060.

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42.00	45.00	9.503	1652.	27.47	220.3	6050.
42.00	46.00	10.50	1760.	25.23	277.6	7006.
42.00	47.00	11.50	1863.	27.06	329.5	8917.
42.00	48.00	12.50		Disturbing moment < 0		
42.00	49.00	13.50		Disturbing moment < 0		
42.00	50.00	14.50		Disturbing moment < 0		
42.00	51.00	15.50		Disturbing moment < 0		
42.00	52.00	16.50		Disturbing moment < 0		
42.00	53.00	17.50	2441.	4820.	5.505	26530.
42.00	54.00	18.50	2527.	330.6	87.87	29050.
42.00	55.00	19.50		Disturbing moment < 0		
42.00	56.00	20.50		Disturbing moment < 0		
42.00	57.00	21.50		Disturbing moment < 0		
42.00	58.00	22.50		Disturbing moment < 0		
42.00	59.00	23.50	2898.	477.4	70.66	33740.
42.00	60.00	24.50	2959.	151.7	226.6	34370.
42.00	61.00	25.50	3017.	85.20	410.2	34950.
42.00	62.00	26.50	3075.	57.68	615.0	35470.
42.00	63.00	27.50	3129.	42.69	841.2	35910.
42.00	64.00	28.50	3180.	33.65	1083.	36450.
43.00	45.00	9.525	1654.	27.06	224.4	6073.
43.00	46.00	10.53		Disturbing moment < 0		
43.00	47.00	11.52		Disturbing moment < 0		
43.00	48.00	12.52		Disturbing moment < 0		
43.00	49.00	13.52		Disturbing moment < 0		
43.00	50.00	14.52	2186.	2608.	7.722	20140.
43.00	51.00	15.52	2281.	250.1	89.63	22420.
43.00	52.00	16.52	2375.	139.4	177.2	24700.
43.00	53.00	17.52	2466.	99.18	265.8	26360.
43.00	54.00	18.52		Disturbing moment < 0		
43.00	55.00	19.52		Disturbing moment < 0		
43.00	56.00	20.52		Disturbing moment < 0		
43.00	57.00	21.52		Disturbing moment < 0		
43.00	58.00	22.52	2830.	173.8	169.7	29490.
43.00	59.00	23.52	2890.	81.89	367.3	30080.
43.00	60.00	24.52	2947.	52.04	587.9	30590.
43.00	61.00	25.52	3002.	37.43	828.6	31020.
43.00	62.00	26.52	3054.	29.74	1083.	32220.
43.00	63.00	27.52	3103.	25.50	1338.	34110.
43.00	64.00	28.52	3155.	22.41	1601.	35890.
44.00	45.00	9.548		Disturbing moment < 0		
44.00	46.00	10.55		Disturbing moment < 0		
44.00	47.00	11.55		Disturbing moment < 0		
44.00	48.00	12.55	2005.	334.3	49.06	16400.
44.00	49.00	13.55	2111.	137.1	134.6	18450.
44.00	50.00	14.55	2209.	92.03	223.6	20580.
44.00	51.00	15.55	2307.	70.01	321.5	22500.
44.00	52.00	16.55		Disturbing moment < 0		
44.00	53.00	17.55		Disturbing moment < 0		
44.00	54.00	18.55		Disturbing moment < 0		
44.00	55.00	19.55		Disturbing moment < 0		
44.00	56.00	20.55	2688.	210.0	120.2	25240.
44.00	57.00	21.54		Not converged (increase iterations?)		
44.00	58.00	22.54	2808.	45.94	566.7	26030.
44.00	59.00	23.54	2865.	33.49	816.6	27350.
44.00	60.00	24.54	2920.	27.10	1070.	29010.
44.00	61.00	25.54	2974.	23.15	1325.	30690.
44.00	62.00	26.54	3024.	20.61	1578.	32520.
44.00	63.00	27.54	3076.	18.63	1839.	34260.
44.00	64.00	28.54	3127.	17.14	2102.	36030.
45.00	45.00	9.571		Disturbing moment < 0		
45.00	46.00	10.57	1802.	234.2	54.82	12840.
45.00	47.00	11.57	1918.	103.5	142.3	14720.
45.00	48.00	12.57	2028.	69.21	241.3	16700.
45.00	49.00	13.57	2133.	54.88	342.1	18770.
45.00	50.00	14.57		Disturbing moment < 0		
45.00	51.00	15.57		Disturbing moment < 0		
45.00	52.00	16.57		Disturbing moment < 0		
45.00	53.00	17.57		Disturbing moment < 0		
45.00	54.00	18.57	2542.	299.5	71.10	21290.
45.00	55.00	19.57	2607.	73.43	294.5	21630.
45.00	56.00	20.57	2667.	42.33	537.6	22760.
45.00	57.00	21.57	2727.	30.97	785.4	24320.
45.00	58.00	22.57	2785.	25.03	1035.	25910.

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45.00	59.00	23.57	2841.	21.37	1208.	27520.
45.00	60.00	24.57	2896.	18.90	1543.	29180.
45.00	61.00	25.57	2948.	17.11	1803.	30850.
45.00	62.00	26.57	2998.	15.88	2058.	32690.
45.00	63.00	27.57	3050.	14.84	2322.	34440.
45.00	64.00	28.57	3100.	14.00	2587.	36230.
46.00	45.00	9.594	1706.	87.97	128.4	11300.
46.00	46.00	10.59	1827.	60.85	215.6	13120.
46.00	47.00	11.59	1945.	47.06	320.9	15100.
46.00	48.00	12.59	2055.	38.35	433.1	16610.
46.00	49.00	13.59		Disturbing moment < 0		
46.00	50.00	14.59		Disturbing moment < 0		
46.00	51.00	15.59		Disturbing moment < 0		
46.00	52.00	16.59	2389.	1001.	17.69	17740.
46.00	53.00	17.59	2456.	73.85	249.4	18420.
46.00	54.00	18.59	2520.	40.52	490.7	19880.
46.00	55.00	19.59	2583.	29.11	734.0	21370.
46.00	56.00	20.59	2644.	23.34	980.9	22890.
46.00	57.00	21.59	2701.	19.84	1232.	24440.
46.00	58.00	22.59	2759.	17.54	1484.	26030.
46.00	59.00	23.59	2815.	15.90	1740.	27670.
46.00	60.00	24.59	2869.	14.68	1998.	29330.
46.00	61.00	25.59	2923.	13.74	2259.	31020.
46.00	62.00	26.59	2972.	13.06	2517.	32870.
46.00	63.00	27.59	3023.	12.43	2786.	34630.
46.00	64.00	28.59	3072.	11.90	3060.	36410.
47.00	45.00	9.618	1731.	41.82	278.0	11630.
47.00	46.00	10.62	1853.	35.73	378.7	13530.
47.00	47.00	11.62		Disturbing moment < 0		
47.00	48.00	12.62		Disturbing moment < 0		
47.00	49.00	13.62		Disturbing moment < 0		
47.00	50.00	14.62		Disturbing moment < 0		
47.00	51.00	15.62		Not converged (increase iterations?)		
47.00	52.00	16.62	2367.	39.75	430.2	17100.
47.00	53.00	17.62	2432.	27.84	665.2	18520.
47.00	54.00	18.62	2495.	21.97	909.0	19970.
47.00	55.00	19.61	2557.	18.58	1156.	21470.
47.00	56.00	20.61	2617.	16.37	1405.	23010.
47.00	57.00	21.61	2676.	14.82	1658.	24580.
47.00	58.00	22.61	2734.	13.69	1914.	26200.
47.00	59.00	23.61	2790.	12.82	2172.	27840.
47.00	60.00	24.61	2843.	12.11	2437.	29510.
47.00	61.00	25.61	2898.	11.54	2704.	31210.
47.00	62.00	26.61	2946.	11.11	2976.	33060.
47.00	63.00	27.61	2995.	10.68	3259.	34810.
47.00	64.00	28.61	3044.	10.32	3545.	36600.
48.00	45.00	9.643	1758.	28.41	421.3	11970.
48.00	46.00	10.64		Disturbing moment < 0		
48.00	47.00	11.64		Disturbing moment < 0		
48.00	48.00	12.64		Disturbing moment < 0		
48.00	49.00	13.64	2127.	112.0	117.3	13130.
48.00	50.00	14.64	2202.	41.17	350.6	14440.
48.00	51.00	15.64	2272.	26.88	587.0	15780.
48.00	52.00	16.64	2341.	20.77	826.9	17180.
48.00	53.00	17.64	2406.	17.47	1065.	18610.
48.00	54.00	18.64	2470.	15.31	1312.	20090.
48.00	55.00	19.64	2531.	13.84	1561.	21600.
48.00	56.00	20.64	2592.	12.79	1811.	23160.
48.00	57.00	21.64	2650.	11.95	2070.	24740.
48.00	58.00	22.64	2706.	11.28	2335.	26340.
48.00	59.00	23.64	2761.	10.74	2606.	27980.
48.00	60.00	24.64	2814.	10.28	2884.	29650.
48.00	61.00	25.64	2866.	9.893	3168.	31340.
48.00	62.00	26.64	2912.	9.596	3454.	33150.
48.00	63.00	27.64	2962.	9.295	3749.	34850.
48.00	64.00	28.64	3010.	9.030	4051.	36580.
49.00	45.00	9.668		Disturbing moment < 0		
49.00	46.00	10.67		Disturbing moment < 0		
49.00	47.00	11.67	1949.	435.4	24.49	10660.
49.00	48.00	12.67	2030.	47.21	251.6	11880.
49.00	49.00	13.67	2104.	27.32	482.2	13170.
49.00	50.00	14.67	2178.	20.19	718.1	14500.
49.00	51.00	15.67	2248.	16.57	957.7	15870.
49.00	52.00	16.67	2317.	14.44	1197.	17290.

EPA Export 08-07-2014:23:43:05

49.00	53.00	17.67	2381.	13.03	1438.	18740.
49.00	54.00	18.67	2444.	11.97	1689.	20220.
49.00	55.00	19.66	2505.	11.16	1948.	21740.
49.00	56.00	20.66	2565.	10.51	2214.	23280.
49.00	57.00	21.66	2622.	9.983	2487.	24830.
49.00	58.00	22.66	2678.	9.539	2766.	26390.
49.00	59.00	23.66	2730.	9.164	3052.	27970.
49.00	60.00	24.66	2783.	8.846	3344.	29580.
49.00	61.00	25.66	2834.	8.569	3644.	31220.
49.00	62.00	26.66	2881.	8.362	3947.	33000.
49.00	63.00	27.66	2929.	8.146	4259.	34700.
49.00	64.00	28.66	2976.	7.954	4577.	36410.
50.00	45.00	9.693	Disturbing moment < 0			
50.00	46.00	10.69	1838.	69.99	135.4	9474.
50.00	47.00	11.69	1923.	29.44	362.2	10670.
50.00	48.00	12.69	2002.	20.06	593.7	11910.
50.00	49.00	13.69	2078.	16.04	824.9	13230.
50.00	50.00	14.69	2151.	13.72	1063.	14580.
50.00	51.00	15.69	2220.	12.23	1305.	15960.
50.00	52.00	16.69	2288.	11.15	1556.	17360.
50.00	53.00	17.69	2352.	10.37	1809.	18760.
50.00	54.00	18.69	2417.	9.752	2073.	20220.
50.00	55.00	19.69	2476.	9.235	2347.	21680.
50.00	56.00	20.69	2534.	8.821	2628.	23180.
50.00	57.00	21.69	2590.	8.472	2916.	24700.
50.00	58.00	22.69	2645.	8.175	3211.	26250.
50.00	59.00	23.69	2697.	7.918	3514.	27830.
50.00	60.00	24.69	2748.	7.695	3824.	29430.
50.00	61.00	25.69	2798.	7.499	4140.	31050.
50.00	62.00	26.69	2846.	7.326	4462.	32690.
50.00	63.00	27.69	2891.	7.202	4788.	34490.
50.00	64.00	28.69	2936.	7.064	5122.	36180.
51.00	45.00	9.718	1724.	36.63	227.6	8336.
51.00	46.00	10.72	1815.	21.21	448.1	9506.
51.00	47.00	11.72	1899.	15.86	676.3	10730.
51.00	48.00	12.72	1979.	13.18	909.4	11980.
51.00	49.00	13.72	2053.	11.55	1149.	13280.
51.00	50.00	14.72	2124.	10.44	1394.	14560.
51.00	51.00	15.72	2194.	9.626	1651.	15900.
51.00	52.00	16.72	2259.	8.999	1918.	17260.
51.00	53.00	17.72	2323.	8.516	2191.	18660.
51.00	54.00	18.72	2383.	8.139	2468.	20090.
51.00	55.00	19.71	2442.	7.809	2759.	21540.
51.00	56.00	20.71	2498.	7.531	3057.	23020.
51.00	57.00	21.71	2553.	7.294	3363.	24530.
51.00	58.00	22.71	2606.	7.090	3676.	26060.
51.00	59.00	23.71	2657.	6.912	3995.	27620.
51.00	60.00	24.71	2706.	6.757	4321.	29190.
51.00	61.00	25.71	2754.	6.619	4652.	30790.
51.00	62.00	26.71	2801.	6.498	4989.	32420.
51.00	63.00	27.71	2849.	6.397	5330.	34100.
51.00	64.00	28.71	2892.	6.324	5677.	35900.
52.00	45.00	9.743	1698.	16.31	512.1	8352.
52.00	46.00	10.74	1788.	12.87	738.0	9496.
52.00	47.00	11.74	1873.	10.99	971.1	10680.
52.00	48.00	12.74	1952.	9.794	1215.	11900.
52.00	49.00	13.74	2025.	8.958	1471.	13180.
52.00	50.00	14.74	2093.	8.338	1734.	14460.
52.00	51.00	15.74	2162.	7.874	2005.	15790.
52.00	52.00	16.74	2227.	7.494	2288.	17150.
52.00	53.00	17.74	2288.	7.185	2579.	18530.
52.00	54.00	18.74	2348.	6.927	2879.	19940.
52.00	55.00	19.74	2405.	6.719	3184.	21390.
52.00	56.00	20.74	2460.	6.532	3500.	22860.
52.00	57.00	21.74	2514.	6.371	3822.	24350.
52.00	58.00	22.74	2565.	6.231	4152.	25870.
52.00	59.00	23.74	2615.	6.108	4487.	27410.
52.00	60.00	24.74	2664.	6.001	4828.	28970.
52.00	61.00	25.74	2710.	5.906	5172.	30540.
52.00	62.00	26.74	2756.	5.822	5523.	32150.
52.00	63.00	27.74	2800.	5.746	5879.	33780.
52.00	64.00	28.74	2842.	5.700	6239.	35560.
53.00	45.00	9.768	1674.	10.66	776.3	8275.
53.00	46.00	10.77	1762.	9.290	1013.	9415.
53.00	47.00	11.77	1843.	8.381	1264.	10590.

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53.00	48.00	12.77	1921.	7.747	1525.	11810.
53.00	49.00	13.77	1994.	7.271	1796.	13060.
53.00	50.00	14.77	2060.	6.904	2079.	14360.
53.00	51.00	15.77	2126.	6.608	2371.	15670.
53.00	52.00	16.77	2189.	6.365	2672.	17010.
53.00	53.00	17.77	2249.	6.162	2983.	18380.
53.00	54.00	18.77	2307.	5.991	3301.	19780.
53.00	55.00	19.76	2363.	5.846	3626.	21200.
53.00	56.00	20.76	2418.	5.727	3957.	22660.
53.00	57.00	21.76	2469.	5.627	4289.	24130.
53.00	58.00	22.76	2519.	5.533	4632.	25630.
53.00	59.00	23.76	2568.	5.451	4981.	27150.
53.00	60.00	24.76	2615.	5.378	5335.	28690.
53.00	61.00	25.76	2660.	5.313	5693.	30250.
53.00	62.00	26.76	2706.	5.255	6058.	31830.
53.00	63.00	27.76	2750.	5.202	6428.	33440.
53.00	64.00	28.76	2793.	5.155	6803.	35070.
54.00	45.00	9.809	1653.	7.915	1042.	8243.
54.00	46.00	10.81	1738.	7.241	1294.	9372.
54.00	47.00	11.80	1817.	6.738	1564.	10540.
54.00	48.00	12.80	1890.	6.364	1844.	11740.
54.00	49.00	13.80	1960.	6.075	2135.	12970.
54.00	50.00	14.80	2027.	5.842	2436.	14230.
54.00	51.00	15.80	2089.	5.659	2749.	15560.
54.00	52.00	16.80	2150.	5.503	3067.	16880.
54.00	53.00	17.79	2207.	5.370	3393.	18220.
54.00	54.00	18.79	2263.	5.260	3725.	19600.
54.00	55.00	19.79	2317.	5.166	4064.	21000.
54.00	56.00	20.79	2370.	5.084	4411.	22420.
54.00	57.00	21.79	2421.	5.012	4763.	23870.
54.00	58.00	22.79	2470.	4.949	5122.	25350.
54.00	59.00	23.79	2517.	4.894	5485.	26850.
54.00	60.00	24.79	2563.	4.850	5848.	28360.
54.00	61.00	25.79	2608.	4.810	6217.	29900.
54.00	62.00	26.79	2652.	4.771	6595.	31470.
54.00	63.00	27.79	2695.	4.738	6976.	33050.
54.00	64.00	28.79	2737.	4.707	7361.	34650.
55.00	45.00	9.940	1665.	6.295	1349.	8493.
55.00	46.00	10.93	1744.	5.897	1620.	9601.
55.00	47.00	11.91	1818.	5.599	1920.	10750.
55.00	48.00	12.90	1886.	5.373	2219.	11920.
55.00	49.00	13.89	1952.	5.190	2531.	13140.
55.00	50.00	14.89	2014.	5.046	2849.	14380.
55.00	51.00	15.88	2074.	4.927	3176.	15650.
55.00	52.00	16.87	2131.	4.828	3511.	16950.
55.00	53.00	17.87	2186.	4.744	3852.	18280.
55.00	54.00	18.86	2238.	4.667	4202.	19630.
55.00	55.00	19.86	2290.	4.607	4556.	20990.
55.00	56.00	20.85	2340.	4.554	4916.	22390.
55.00	57.00	21.85	2388.	4.509	5280.	23810.
55.00	58.00	22.85	2435.	4.470	5650.	25250.
55.00	59.00	23.84	2480.	4.436	6024.	26720.
55.00	60.00	24.84	2525.	4.406	6402.	28210.
55.00	61.00	25.84	2566.	4.379	6782.	29700.
55.00	62.00	26.84	2608.	4.356	7168.	31230.
55.00	63.00	27.83	2649.	4.336	7559.	32770.
55.00	64.00	28.83	2689.	4.321	7947.	34340.
56.00	45.00	9.843	1574.	5.184	1556.	8065.
56.00	46.00	10.84	1655.	4.940	1850.	9139.
56.00	47.00	11.84	1731.	4.760	2158.	10270.
56.00	48.00	12.84	1801.	4.619	2476.	11440.
56.00	49.00	13.84	1869.	4.505	2805.	12640.
56.00	50.00	14.84	1931.	4.408	3143.	13860.
56.00	51.00	15.84	1991.	4.335	3485.	15110.
56.00	52.00	16.84	2050.	4.274	3837.	16400.
56.00	53.00	17.84	2106.	4.224	4194.	17710.
56.00	54.00	18.84	2159.	4.181	4556.	19050.
56.00	55.00	19.84	2211.	4.146	4923.	20410.
56.00	56.00	20.84	2260.	4.116	5295.	21800.
56.00	57.00	21.84	2308.	4.091	5672.	23200.
56.00	58.00	22.84	2355.	4.068	6054.	24630.
56.00	59.00	23.94	2464.	4.046	6636.	26850.
56.00	60.00	24.93	2506.	4.029	7026.	28310.
56.00	61.00	25.93	2545.	4.014	7417.	29770.
56.00	62.00	26.92	2585.	4.002	7814.	31270.

E.P.A. Export 08-07-2014:23:43:05

56.00	63.00	27.92	2624.	3.991	8215.	32790.
56.00	64.00	28.91	2663.	3.982	8619.	34320.
57.00	45.00	9.868	1533.	4.301	1815.	7953.
57.00	46.00	10.87	1610.	4.241	2128.	9027.
57.00	47.00	11.87	1683.	4.132	2454.	10140.
57.00	48.00	12.87	1752.	4.047	2788.	11290.
57.00	49.00	13.87	1817.	3.979	3132.	12460.
57.00	50.00	14.87	1877.	3.919	3485.	13660.
57.00	51.00	15.87	1937.	3.872	3848.	14900.
57.00	52.00	16.87	1994.	3.838	4212.	16160.
57.00	53.00	17.87	2049.	3.798	4579.	17390.
57.00	54.00	18.87	2101.	3.775	4954.	18700.
57.00	55.00	19.86	2152.	3.756	5334.	20040.
57.00	56.00	20.86	2202.	3.740	5722.	21400.
57.00	57.00	21.86	2249.	3.728	6112.	22780.
57.00	58.00	22.86	2295.	3.718	6506.	24190.
57.00	59.00	23.86	2339.	3.710	6903.	25610.
57.00	60.00	24.86	2383.	3.704	7305.	27060.
57.00	61.00	25.86	2425.	3.700	7710.	28520.
57.00	62.00	26.86	2465.	3.695	8116.	29990.
57.00	63.00	27.86	2506.	3.693	8527.	31490.
57.00	64.00	28.86	2545.	3.691	8942.	33010.
58.00	45.00	9.893	1484.	3.794	2068.	7845.
58.00	46.00	10.89	1560.	3.713	2398.	8904.
58.00	47.00	11.89	1632.	3.633	2738.	9949.
58.00	48.00	12.89	1699.	3.584	3088.	11070.
58.00	49.00	13.89	1762.	3.546	3444.	12210.
58.00	50.00	14.89	1822.	3.515	3810.	13390.
58.00	51.00	15.89	1879.	3.485	4185.	14590.
58.00	52.00	16.89	1934.	3.468	4562.	15820.
58.00	53.00	17.89	1987.	3.455	4944.	17080.
58.00	54.00	18.89	2039.	3.445	5332.	18370.
58.00	55.00	19.89	2088.	3.439	5723.	19680.
58.00	56.00	20.89	2135.	3.434	6118.	21010.
58.00	57.00	21.89	2181.	3.432	6517.	22370.
58.00	58.00	22.89	2226.	3.431	6920.	23750.
58.00	59.00	23.89	2270.	3.432	7330.	25150.
58.00	60.00	24.89	2313.	3.434	7740.	26580.
58.00	61.00	25.89	2356.	3.424	8152.	27910.
58.00	62.00	26.89	2395.	3.426	8567.	29350.
58.00	63.00	27.89	2435.	3.430	8987.	30830.
58.00	64.00	28.89	2473.	3.435	9409.	32320.
59.00	45.00	9.918	1432.	3.347	2305.	7715.
59.00	46.00	10.92	1505.	3.281	2650.	8694.
59.00	47.00	11.92	1574.	3.247	3004.	9754.
59.00	48.00	12.92	1639.	3.223	3366.	10850.
59.00	49.00	13.92	1701.	3.206	3736.	11980.
59.00	50.00	14.92	1760.	3.194	4113.	13140.
59.00	51.00	15.92	1816.	3.171	4494.	14250.
59.00	52.00	16.92	1869.	3.160	4885.	15440.
59.00	53.00	17.92	1922.	3.156	5283.	16670.
59.00	54.00	18.92	1972.	3.154	5684.	17930.
59.00	55.00	19.91	2021.	3.156	6087.	19210.
59.00	56.00	20.91	2068.	3.158	6494.	20510.
59.00	57.00	21.91	2114.	3.163	6904.	21840.
59.00	58.00	22.91	2158.	3.168	7318.	23180.
59.00	59.00	23.91	2200.	3.174	7733.	24550.
59.00	60.00	24.91	2242.	3.181	8153.	25940.
59.00	61.00	25.91	2282.	3.189	8575.	27350.
59.00	62.00	26.91	2323.	3.197	9004.	28780.
59.00	63.00	27.91	2361.	3.204	9432.	30220.
59.00	64.00	28.91	2399.	3.212	9864.	31690.
60.00	45.00	9.943	1376.	2.973	2525.	7507.
60.00	46.00	10.94	1447.	2.950	2884.	8508.
60.00	47.00	11.94	1514.	2.938	3251.	9552.
60.00	48.00	12.94	1577.	2.926	3625.	10610.
60.00	49.00	13.94	1637.	2.905	4006.	11640.
60.00	50.00	14.94	1695.	2.904	4394.	12760.
60.00	51.00	15.94	1749.	2.907	4787.	13910.
60.00	52.00	16.94	1801.	2.906	5190.	15080.
60.00	53.00	17.94	1851.	2.913	5592.	16290.
60.00	54.00	18.94	1900.	2.921	6000.	17530.
60.00	55.00	19.94	1947.	2.931	6409.	18780.
60.00	56.00	20.94	1994.	2.922	6825.	19950.
60.00	57.00	21.94	2039.	2.931	7244.	21240.

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60.00	58.00	22.94	2083.	2.941	7667.	22550.
60.00	59.00	23.94	2125.	2.951	8093.	23880.
60.00	60.00	24.94	2167.	2.962	8522.	25240.
60.00	61.00	25.94	2207.	2.972	8953.	26610.
60.00	62.00	26.94	2246.	2.984	9387.	28010.
60.00	63.00	27.94	2284.	2.994	9822.	29410.
60.00	64.00	28.94	2320.	3.005	10260.	30820.
61.00	45.00	9.968	1314.	2.692	2712.	7299.
61.00	46.00	10.97	1383.	2.674	3083.	8245.
61.00	47.00	11.97	1448.	2.663	3462.	9221.
61.00	48.00	12.97	1510.	2.666	3848.	10260.
61.00	49.00	13.97	1568.	2.672	4239.	11330.
61.00	50.00	14.97	1623.	2.683	4636.	12440.
61.00	51.00	15.97	1677.	2.690	5037.	13550.
61.00	52.00	16.97	1729.	2.686	5445.	14620.
61.00	53.00	17.97	1777.	2.688	5861.	15750.
61.00	54.00	18.97	1825.	2.700	6277.	16950.
61.00	55.00	19.96	1872.	2.714	6696.	18170.
61.00	56.00	20.96	1917.	2.727	7120.	19410.
61.00	57.00	21.96	1961.	2.741	7545.	20680.
61.00	58.00	22.96	2004.	2.754	7977.	21970.
61.00	59.00	23.96	2045.	2.769	8409.	23280.
61.00	60.00	24.96	2085.	2.783	8844.	24610.
61.00	61.00	25.96	2126.	2.780	9283.	25800.
61.00	62.00	26.96	2165.	2.793	9724.	27160.
61.00	63.00	27.96	2203.	2.807	10170.	28540.
61.00	64.00	28.96	2239.	2.819	10610.	29910.
62.00	45.00	9.993	1246.	2.703	2869.	7902.
62.00	46.00	10.99	1314.	2.449	3254.	7970.
62.00	47.00	11.99	1378.	2.441	3645.	8898.
62.00	48.00	12.99	1438.	2.445	4041.	9880.
62.00	49.00	13.99	1495.	2.458	4442.	10920.
62.00	50.00	14.99	1550.	2.462	4851.	11940.
62.00	51.00	15.99	1603.	2.480	5259.	13040.
62.00	52.00	16.99	1654.	2.496	5675.	14170.
62.00	53.00	17.99	1702.	2.514	6094.	15320.
62.00	54.00	18.99	1748.	2.527	6522.	16480.
62.00	55.00	19.99	1794.	2.534	6949.	17610.
62.00	56.00	20.99	1838.	2.536	7380.	18720.
62.00	57.00	21.99	1881.	2.553	7813.	19950.
62.00	58.00	22.99	1921.	2.571	8238.	21180.
62.00	59.00	23.99	1962.	2.588	8676.	22450.
62.00	60.00	24.99	2002.	2.605	9116.	23740.
62.00	61.00	25.99	2041.	2.620	9564.	25060.
62.00	62.00	26.99	2079.	2.636	10010.	26390.
62.00	63.00	27.99	2117.	2.653	10460.	27750.
62.00	64.00	28.99	2153.	2.669	10910.	29130.
63.00	45.00	10.02		Not converged (increase iterations?)		
63.00	46.00	11.02	1241.	2.772	3370.	9340.
63.00	47.00	12.02	1303.	2.462	3780.	9305.
63.00	48.00	13.02	1362.	2.267	4183.	9482.
63.00	49.00	14.02	1419.	2.272	4594.	10440.
63.00	50.00	15.02	1472.	2.283	5009.	11440.
63.00	51.00	16.02	1523.	2.302	5427.	12500.
63.00	52.00	17.02	1572.	2.323	5849.	13590.
63.00	53.00	18.02	1621.	2.331	6278.	14640.
63.00	54.00	19.02	1666.	2.350	6709.	15770.
63.00	55.00	20.01	1711.	2.370	7144.	16930.
63.00	56.00	21.01	1754.	2.390	7582.	18120.
63.00	57.00	22.01	1796.	2.410	8022.	19330.
63.00	58.00	23.01	1838.	2.429	8465.	20560.
63.00	59.00	24.01	1878.	2.437	8909.	21710.
63.00	60.00	25.01	1916.	2.444	9345.	22840.
63.00	61.00	26.01	1954.	2.461	9796.	24110.
63.00	62.00	27.01	1992.	2.479	10250.	25410.
63.00	63.00	28.01	2028.	2.497	10700.	26720.
63.00	64.00	29.01	2065.	2.514	11160.	28050.
64.00	45.00	10.04		Not converged (increase iterations?)		
64.00	46.00	11.04		Not converged (increase iterations?)		
64.00	47.00	12.04		Not converged (increase iterations?)		
64.00	48.00	13.04	1282.	2.496	4280.	10680.

EPA Export 08-07-2014:23:43:05

64.00	49.00	14.04	1337.	2.292	4705.	10780.
64.00	50.00	15.04	1389.	2.132	5117.	10910.
64.00	51.00	16.04	1440.	2.145	5544.	11890.
64.00	52.00	17.04	1489.	2.160	5974.	12900.
64.00	53.00	18.04	1536.	2.181	6408.	13970.
64.00	54.00	19.04	1581.	2.203	6844.	15080.
64.00	55.00	20.04	1625.	2.226	7282.	16210.
64.00	56.00	21.04	1668.	2.236	7727.	17280.
64.00	57.00	22.04	1710.	2.257	8173.	18450.
64.00	58.00	23.04	1750.	2.278	8622.	19640.
64.00	59.00	24.04	1789.	2.298	9073.	20850.
64.00	60.00	25.04	1826.	2.321	9513.	22080.
64.00	61.00	26.04	1863.	2.342	9965.	23340.
64.00	62.00	27.04	1901.	2.362	10420.	24620.
64.00	63.00	28.04	1937.	2.372	10880.	25920.
64.00	64.00	29.04	1973.	2.378	11340.	26970.
65.00	45.00	10.07		Not converged (increase iterations?)		
65.00	46.00	11.07		Not converged (increase iterations?)		
65.00	47.00	12.07		Not converged (increase iterations?)		
65.00	48.00	13.07		Not converged (increase iterations?)		
65.00	49.00	14.07	1250.	2.548	4723.	12040.
65.00	50.00	15.07	1303.	2.359	5174.	12200.
65.00	51.00	16.07	1353.	2.202	5609.	12350.
65.00	52.00	17.07	1400.	2.029	6042.	12260.
65.00	53.00	18.07	1447.	2.044	6481.	13240.
65.00	54.00	19.07	1492.	2.061	6923.	14270.
65.00	55.00	20.06	1536.	2.084	7365.	15350.
65.00	56.00	21.06	1577.	2.106	7813.	16450.
65.00	57.00	22.06	1618.	2.129	8262.	17590.
65.00	58.00	23.06	1658.	2.152	8713.	18750.
65.00	59.00	24.06	1698.	2.163	9169.	19840.
65.00	60.00	25.06	1736.	2.185	9626.	21030.
65.00	61.00	26.06	1771.	2.207	10070.	22230.
65.00	62.00	27.06	1807.	2.228	10530.	23470.
65.00	63.00	28.06	1843.	2.248	11000.	24730.
65.00	64.00	29.06	1877.	2.269	11460.	26010.
66.00	45.00	10.09		Not converged (increase iterations?)		
66.00	46.00	11.09		Not converged (increase iterations?)		
66.00	47.00	12.09		Not converged (increase iterations?)		
66.00	48.00	13.09		Not converged (increase iterations?)		
66.00	49.00	14.09		Not converged (increase iterations?)		
66.00	50.00	15.09		Not converged (increase iterations?)		
66.00	51.00	16.09	1260.	2.435	5580.	13590.
66.00	52.00	17.09	1309.	2.286	6044.	13810.
66.00	53.00	18.09	1355.	2.156	6492.	14000.
66.00	54.00	19.09	1398.	1.973	6931.	13670.
66.00	55.00	20.09	1441.	1.965	7381.	14500.
66.00	56.00	21.09	1483.	1.984	7832.	15540.
66.00	57.00	22.09	1523.	2.002	8285.	16590.
66.00	58.00	23.09	1563.	2.025	8741.	17700.
66.00	59.00	24.09	1600.	2.046	9200.	18830.
66.00	60.00	25.09	1638.	2.071	9657.	20000.
66.00	61.00	26.09	1674.	2.095	10100.	21170.
66.00	62.00	27.09	1710.	2.106	10570.	22260.
66.00	63.00	28.09	1746.	2.127	11040.	23480.
66.00	64.00	29.09	1780.	2.148	11500.	24710.
67.00	45.00	10.12		Weight too small		
67.00	45.00	10.12	732.8	2.293	1619.	3712.
67.00	46.00	11.12		Not converged (increase iterations?)		
67.00	47.00	12.12		Not converged (increase iterations?)		
67.00	48.00	13.12		Not converged (increase iterations?)		
67.00	49.00	14.12		Not converged (increase		

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				iterations?)		
67.00	50.00	15.12		Not converged (increase iterations?)		
67.00	51.00	16.12		Not converged (increase iterations?)		
67.00	52.00	17.12		Not converged (increase iterations?)		
67.00	53.00	18.12	1257.	2.381	6400.	15240.
67.00	54.00	19.12	1302.	2.253	6874.	15490.
67.00	55.00	20.11	1345.	2.141	7334.	15700.
67.00	56.00	21.11	1385.	2.034	7784.	15830.
67.00	57.00	22.11	1425.	1.896	8239.	15620.
67.00	58.00	23.11	1464.	1.917	8697.	16670.
67.00	59.00	24.11	1502.	1.937	9158.	17740.
67.00	60.00	25.11	1540.	1.956	9621.	18820.
67.00	61.00	26.11	1576.	1.978	10090.	19950.
67.00	62.00	27.11	1610.	2.001	10540.	21090.
67.00	63.00	28.11	1644.	2.023	11010.	22270.
67.00	64.00	29.11	1678.	2.045	11480.	23470.
68.00	45.00	10.14	665.7	2.137	1587.	3392.
68.00	46.00	11.14		Weight too small		
68.00	46.00	11.14	708.0	2.124	1843.	3915.
68.00	47.00	12.14		Not converged (increase iterations?)		
68.00	48.00	13.14		Not converged (increase iterations?)		
68.00	49.00	14.14		Not converged (increase iterations?)		
68.00	50.00	15.14		Not converged (increase iterations?)		
68.00	51.00	16.14		Not converged (increase iterations?)		
68.00	52.00	17.14		Not converged (increase iterations?)		
68.00	53.00	18.14		Not converged (increase iterations?)		
68.00	54.00	19.14		Not converged (increase iterations?)		
68.00	55.00	20.14	1242.	2.374	7160.	17000.
68.00	56.00	21.14	1284.	2.259	7645.	17270.
68.00	57.00	22.14	1324.	2.151	8118.	17460.
68.00	58.00	23.14	1362.	2.056	8578.	17640.
68.00	59.00	24.14	1399.	1.930	9034.	17440.
68.00	60.00	25.14	1436.	1.862	9500.	17690.
68.00	61.00	26.14	1472.	1.881	9966.	18740.
68.00	62.00	27.14	1508.	1.899	10430.	19820.
68.00	63.00	28.14	1541.	1.919	10890.	20900.
68.00	64.00	29.14	1575.	1.940	11360.	22050.
69.00	45.00	10.17	595.9	2.029	1511.	3067.
69.00	46.00	11.17	636.1	2.007	1768.	3548.
69.00	47.00	12.17		Weight too small		
69.00	47.00	12.17	674.4	2.000	2027.	4055.
69.00	48.00	13.17		Weight too small		
69.00	48.00	13.17	710.9	2.002	2291.	4586.
69.00	49.00	14.17		Not converged (increase iterations?)		
69.00	50.00	15.17		Not converged (increase iterations?)		
69.00	51.00	16.17		Not converged (increase iterations?)		
69.00	52.00	17.17		Not converged (increase iterations?)		
69.00	53.00	18.17		Not converged (increase iterations?)		
69.00	54.00	19.17		Not converged (increase iterations?)		
69.00	55.00	20.16		Not converged (increase iterations?)		
69.00	56.00	21.16		Not converged (increase iterations?)		
69.00	57.00	22.16	1217.	2.389	7851.	18750.
69.00	58.00	23.16	1257.	2.291	8346.	19120.
69.00	59.00	24.16	1295.	2.191	8828.	19340.
69.00	60.00	25.16	1331.	2.097	9301.	19500.
69.00	61.00	26.16	1366.	2.010	9767.	19630.

EPA Export 08-07-2014:23:43:05

69.00	62.00	27.16	1401.	1.881	10240.	19250.
69.00	63.00	28.16	1435.	1.830	10700.	19590.
69.00	64.00	29.16	1469.	1.849	11180.	20670.
70.00	45.00	10.19	522.3	1.972	1384.	2729.
70.00	46.00	11.19	561.5	1.934	1641.	3174.
70.00	47.00	12.19	598.8	1.914	1903.	3641.
70.00	48.00	13.19		Weight too small		
70.00	48.00	13.19	634.9	1.906	2169.	4134.
70.00	49.00	14.19		Weight too small		
70.00	49.00	14.19	669.2	1.908	2436.	4648.
70.00	50.00	15.19		Weight too small		
70.00	50.00	15.19	701.6	1.916	2704.	5182.
70.00	51.00	16.19		Not converged (increase iterations?)		
70.00	52.00	17.19		Not converged (increase iterations?)		
70.00	53.00	18.19		Not converged (increase iterations?)		
70.00	54.00	19.19		Not converged (increase iterations?)		
70.00	55.00	20.19		Not converged (increase iterations?)		
70.00	56.00	21.19		Not converged (increase iterations?)		
70.00	57.00	22.19		Not converged (increase iterations?)		
70.00	58.00	23.19		Not converged (increase iterations?)		
70.00	59.00	24.19		Not converged (increase iterations?)		
70.00	60.00	25.19	1220.	2.338	8965.	20970.
70.00	61.00	26.19	1257.	2.247	9458.	21260.
70.00	62.00	27.19	1293.	2.158	9942.	21460.
70.00	63.00	28.19	1327.	2.074	10420.	21600.
70.00	64.00	29.19	1359.	1.994	10890.	21710.
71.00	45.00	10.22	447.9	1.952	1221.	2303.
71.00	46.00	11.22	484.2	1.908	1462.	2790.
71.00	47.00	12.22	520.3	1.873	1720.	3223.
71.00	48.00	13.22	555.0	1.851	1984.	3673.
71.00	49.00	14.22	588.7	1.841	2252.	4146.
71.00	50.00	15.22		Weight too small		
71.00	50.00	15.22	620.9	1.840	2522.	4640.
71.00	51.00	16.22		Weight too small		
71.00	51.00	16.22	651.8	1.845	2793.	5153.
71.00	52.00	17.22		Weight too small		
71.00	52.00	17.22	682.2	1.855	3069.	5691.
71.00	53.00	18.22		Not converged (increase iterations?)		
71.00	54.00	19.21		Not converged (increase iterations?)		
71.00	55.00	20.21		Not converged (increase iterations?)		
71.00	56.00	21.21		Not converged (increase iterations?)		
71.00	57.00	22.21		Not converged (increase iterations?)		
71.00	58.00	23.21		Not converged (increase iterations?)		
71.00	59.00	24.21		Not converged (increase iterations?)		
71.00	60.00	25.21		Not converged (increase iterations?)		
71.00	61.00	26.21		Not converged (increase iterations?)		
71.00	62.00	27.21		Not converged (increase iterations?)		
71.00	63.00	28.21	1213.	2.318	9997.	23170.
71.00	64.00	29.21	1247.	2.234	10490.	23440.
72.00	45.00	10.24	374.7	1.956	1041.	2037.
72.00	46.00	11.24	407.1	1.910	1256.	2398.
72.00	47.00	12.24	440.3	1.869	1492.	2790.
72.00	48.00	13.24	472.8	1.839	1741.	3203.
72.00	49.00	14.24	505.0	1.816	2003.	3638.
72.00	50.00	15.24	536.5	1.800	2272.	4090.
72.00	51.00	16.24		Weight too small		

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72.00	51.00	16.24	567.5	1.793	2545.	4563.
72.00	52.00	17.24		Weight too small		
72.00	52.00	17.24	597.3	1.794	2819.	5056.
72.00	53.00	18.24		Weight too small		
72.00	53.00	18.24	626.5	1.799	3096.	5571.
72.00	54.00	19.24		Weight too small		
72.00	54.00	19.24	654.7	1.809	3375.	6105.
72.00	55.00	20.24		Not converged (increase iterations?)		
72.00	55.00	20.24	682.2	1.822	3656.	6660.
72.00	56.00	21.24		Not converged (increase iterations?)		
72.00	57.00	22.24		Not converged (increase iterations?)		
72.00	58.00	23.24		Not converged (increase iterations?)		
72.00	59.00	24.24		Not converged (increase iterations?)		
72.00	60.00	25.24		Not converged (increase iterations?)		
72.00	61.00	26.24		Not converged (increase iterations?)		
72.00	62.00	27.24		Not converged (increase iterations?)		
72.00	63.00	28.24		Not converged (increase iterations?)		
72.00	64.00	29.24		Not converged (increase iterations?)		
73.00	45.00	10.27	305.6	1.977	864.6	1709.
73.00	46.00	11.27	333.5	1.933	1045.	2020.
73.00	47.00	12.27	362.1	1.893	1246.	2359.
73.00	48.00	13.27	391.3	1.858	1467.	2725.
73.00	49.00	14.27	421.5	1.827	1709.	3121.
73.00	50.00	15.27	451.1	1.803	1961.	3536.
73.00	51.00	16.27	481.1	1.784	2228.	3973.
73.00	52.00	17.27	510.6	1.769	2502.	4427.
73.00	53.00	18.27		Weight too small		
73.00	53.00	18.27	539.1	1.763	2777.	4895.
73.00	54.00	19.26		Weight too small		
73.00	54.00	19.26	566.5	1.763	3052.	5381.
73.00	55.00	20.26		Weight too small		
73.00	55.00	20.26	593.7	1.768	3332.	5890.
73.00	56.00	21.26		Weight too small		
73.00	56.00	21.26	620.5	1.776	3614.	6419.
73.00	57.00	22.26		Not converged (increase iterations?)		
73.00	57.00	22.26	646.5	1.787	3898.	6966.
73.00	58.00	23.26		Not converged (increase iterations?)		
73.00	59.00	24.26		Not converged (increase iterations?)		
73.00	60.00	25.26		Not converged (increase iterations?)		
73.00	61.00	26.26		Not converged (increase iterations?)		
73.00	62.00	27.26		Not converged (increase iterations?)		
73.00	63.00	28.26		Not converged (increase iterations?)		
73.00	64.00	29.26		Not converged (increase iterations?)		
74.00	45.00	10.29	240.9	2.022	693.3	1402.
74.00	46.00	11.29	264.5	1.977	841.8	1664.
74.00	47.00	12.29	288.8	1.936	1008.	1952.
74.00	48.00	13.29	313.9	1.900	1192.	2265.
74.00	49.00	14.29	339.4	1.868	1393.	2602.
74.00	50.00	15.29	366.0	1.838	1615.	2968.
74.00	51.00	16.29	393.7	1.810	1858.	3363.
74.00	52.00	17.29	421.2	1.788	2112.	3776.
74.00	53.00	18.29	448.6	1.770	2378.	4210.
74.00	54.00	19.29	476.3	1.756	2654.	4661.
74.00	55.00	20.29		Weight too small		
74.00	55.00	20.29	503.2	1.747	2933.	5125.
74.00	56.00	21.29		Weight too small		
74.00	56.00	21.29	529.5	1.745	3213.	5606.

EPA Export 08-07-2014:23:43:05

74.00	57.00	22.29		Weight too small		
74.00	57.00	22.29	555.0	1.747	3493.	6104.
74.00	58.00	23.29		Weight too small		
74.00	58.00	23.29	580.3	1.754	3777.	6624.
74.00	59.00	24.29	56.50	10.69	964.1	10310.
74.00	59.00	24.29	605.3	1.762	4064.	7163.
74.00	60.00	25.29	74.70	9.701	1285.	12460.
74.00	60.00	25.29	629.3	1.774	4350.	7716.
74.00	61.00	26.29		Not converged (increase iterations?)		
74.00	62.00	27.29		Not converged (increase iterations?)		
74.00	63.00	28.29		Not converged (increase iterations?)		
74.00	64.00	29.29		Not converged (increase iterations?)		
75.00	45.00	10.32	181.4	2.102	530.5	1115.
75.00	46.00	11.32	200.9	2.054	648.7	1332.
75.00	47.00	12.32	221.1	2.010	781.7	1571.
75.00	48.00	13.32	241.8	1.970	929.2	1831.
75.00	49.00	14.32	264.0	1.933	1096.	2118.
75.00	50.00	15.32	286.8	1.900	1278.	2429.
75.00	51.00	16.32	310.3	1.869	1479.	2764.
75.00	52.00	17.32	334.3	1.841	1697.	3123.
75.00	53.00	18.32	359.6	1.814	1936.	3512.
75.00	54.00	19.31	385.2	1.792	2189.	3921.
75.00	55.00	20.31	411.0	1.773	2454.	4350.
75.00	56.00	21.31		Weight too small		
75.00	56.00	21.31	436.6	1.757	2729.	4796.
75.00	57.00	22.31		Weight too small		
75.00	57.00	22.31	462.2	1.746	3010.	5255.
75.00	58.00	23.31		Weight too small		
75.00	58.00	23.31	487.3	1.739	3292.	5727.
75.00	59.00	24.31		Weight too small		
75.00	59.00	24.31	511.9	1.738	3576.	6216.
75.00	60.00	25.31		Weight too small		
75.00	60.00	25.31	535.7	1.741	3860.	6721.
75.00	61.00	26.31	51.27	11.45	925.5	10590.
75.00	61.00	26.31	559.1	1.747	4145.	7243.
75.00	62.00	27.31	67.57	10.39	1229.	12760.
75.00	62.00	27.31	582.1	1.756	4431.	7782.
75.00	63.00	28.31	84.86	9.655	1554.	15000.
75.00	63.00	28.31	605.1	1.767	4722.	8341.
75.00	64.00	29.31	730.0	3.572	6906.	24670.
76.00	45.00	10.34	127.3	2.239	377.9	846.1
76.00	46.00	11.34	143.0	2.183	468.0	1022.
76.00	47.00	12.34	159.2	2.132	569.7	1215.
76.00	48.00	13.34	176.5	2.084	685.6	1429.
76.00	49.00	14.34	194.6	2.041	815.5	1664.
76.00	50.00	15.34	213.2	2.002	959.1	1920.
76.00	51.00	16.34	233.1	1.963	1121.	2200.
76.00	52.00	17.34	253.7	1.928	1298.	2503.
76.00	53.00	18.34	274.9	1.896	1492.	2828.
76.00	54.00	19.34	297.2	1.866	1705.	3181.
76.00	55.00	20.34	319.9	1.838	1935.	3556.
76.00	56.00	21.34	344.3	1.812	2187.	3963.
76.00	57.00	22.34	368.3	1.791	2448.	4383.
76.00	58.00	23.34		Weight too small		
76.00	58.00	23.34	392.7	1.772	2722.	4824.
76.00	59.00	24.34		Weight too small		
76.00	59.00	24.34	416.7	1.758	3001.	5276.
76.00	60.00	25.34		Weight too small		
76.00	60.00	25.34	440.8	1.747	3285.	5740.
76.00	61.00	26.34		Weight too small		
76.00	61.00	26.34	464.4	1.741	3571.	6217.
76.00	62.00	27.34		Weight too small		
76.00	62.00	27.34	487.6	1.739	3858.	6710.
76.00	63.00	28.34		Weight too small		
76.00	63.00	28.34	510.3	1.741	4146.	7220.
76.00	64.00	29.34	59.97	11.20	1149.	12870.
76.00	64.00	29.34	532.3	1.747	4433.	7743.
77.00	45.00	10.37	80.15	2.451	242.0	593.2
77.00	46.00	11.37	91.82	2.391	304.6	728.3
77.00	47.00	12.37	104.4	2.331	377.8	880.7
77.00	48.00	13.37	118.0	2.272	462.8	1051.

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77.00	49.00	14.37	132.4	2.215	559.7	1240.
77.00	50.00	15.37	147.3	2.163	668.2	1445.
77.00	51.00	16.37	163.6	2.112	792.3	1674.
77.00	52.00	17.37	180.5	2.066	930.1	1922.
77.00	53.00	18.37	198.0	2.025	1082.	2190.
77.00	54.00	19.36	216.8	1.984	1252.	2484.
77.00	55.00	20.36	236.3	1.948	1438.	2800.
77.00	56.00	21.36	256.6	1.913	1641.	3141.
77.00	57.00	22.36	277.4	1.882	1861.	3503.
77.00	58.00	23.36	299.4	1.853	2102.	3895.
77.00	59.00	24.36	322.0	1.826	2357.	4304.
77.00	60.00	25.36		Weight too small		
77.00	60.00	25.36	344.7	1.804	2623.	4733.
77.00	61.00	26.36		Weight too small		
77.00	61.00	26.36	367.8	1.785	2903.	5180.
77.00	62.00	27.36		Weight too small		
77.00	62.00	27.36	390.4	1.770	3184.	5636.
77.00	63.00	28.36		Weight too small		
77.00	63.00	28.36	413.6	1.758	3475.	6107.
77.00	64.00	29.36		Weight too small		
77.00	64.00	29.36	436.0	1.750	3763.	6586.
78.00	45.00	10.39		Weight too small		
78.00	46.00	11.39		Weight too small		
78.00	47.00	12.39	58.18	2.623	213.5	560.0
78.00	48.00	13.39	67.98	2.559	269.7	690.0
78.00	49.00	14.39	78.62	2.492	335.5	836.1
78.00	50.00	15.39	90.13	2.424	411.9	998.6
78.00	51.00	16.39	102.6	2.358	500.3	1180.
78.00	52.00	17.39	115.7	2.294	599.8	1376.
78.00	53.00	18.39	129.8	2.234	712.8	1592.
78.00	54.00	19.39	144.8	2.176	840.3	1829.
78.00	55.00	20.39	160.4	2.125	981.3	2085.
78.00	56.00	21.39	177.3	2.075	1140.	2366.
78.00	57.00	22.39	195.0	2.030	1315.	2668.
78.00	58.00	23.39	213.5	1.988	1506.	2994.
78.00	59.00	24.39	232.8	1.950	1715.	3344.
78.00	60.00	25.39	252.6	1.915	1941.	3717.
78.00	61.00	26.39	273.9	1.881	2189.	4119.
78.00	62.00	27.39		Weight too small		
78.00	62.00	27.39	295.2	1.853	2448.	4537.
78.00	63.00	28.39		Weight too small		
78.00	63.00	28.39	316.8	1.829	2718.	4972.
78.00	64.00	29.39		Weight too small		
78.00	64.00	29.39	338.8	1.808	3001.	5425.
79.00	45.00	10.43		Weight too small		
79.00	46.00	11.43		Weight too small		
79.00	47.00	12.43		Weight too small		
79.00	48.00	13.43		Weight too small		
79.00	49.00	14.43		Weight too small		
79.00	50.00	15.43		Weight too small		
79.00	51.00	16.43	53.59	2.679	263.4	705.7
79.00	52.00	17.42	63.11	2.624	329.1	863.7
79.00	53.00	18.42	73.42	2.554	405.3	1035.
79.00	54.00	19.42	84.69	2.480	493.7	1224.
79.00	55.00	20.42	96.70	2.408	593.7	1430.
79.00	56.00	21.42	109.7	2.337	707.4	1653.
79.00	57.00	22.42	123.3	2.271	833.9	1894.
79.00	58.00	23.42	138.0	2.208	977.0	2157.
79.00	59.00	24.42	153.4	2.152	1134.	2440.
79.00	60.00	25.42	169.9	2.098	1310.	2749.
79.00	61.00	26.41	187.4	2.049	1504.	3082.
79.00	62.00	27.41	205.3	2.006	1713.	3435.
79.00	63.00	28.41	224.4	1.965	1942.	3816.
79.00	64.00	29.41	244.5	1.926	2193.	4224.
80.00	45.00	10.48		Radius too small		
80.00	46.00	11.48		Weight too small		
80.00	47.00	12.48		Weight too small		
80.00	48.00	13.48		Weight too small		
80.00	49.00	14.48		Weight too small		
80.00	50.00	15.48		Weight too small		
80.00	51.00	16.48		Weight too small		
80.00	52.00	17.47		Weight too small		
80.00	53.00	18.47		Weight too small		
80.00	54.00	19.47		Weight too small		
80.00	55.00	20.47		Weight too small		

EPA Export 08-07-2014:23:43:05

80.00	56.00	21.47	57.33	2.656	371.0	985.2
80.00	57.00	22.47	67.65	2.603	458.8	1195.
80.00	58.00	23.47	78.84	2.531	559.5	1416.
80.00	59.00	24.47	90.78	2.454	672.8	1651.
80.00	60.00	25.46	103.7	2.378	801.5	1906.
80.00	61.00	26.46	117.4	2.306	944.8	2179.
80.00	62.00	27.46	132.1	2.239	1105.	2473.
80.00	63.00	28.46	147.2	2.178	1278.	2783.
80.00	64.00	29.46	163.6	2.121	1472.	3123.
81.00	45.00	10.54	Radius too small			
81.00	46.00	11.54	Radius too small			
81.00	47.00	12.54	Radius too small			
81.00	48.00	13.53	Radius too small			
81.00	49.00	14.53	Radius too small			
81.00	50.00	15.53	Radius too small			
81.00	51.00	16.53	Radius too small			
81.00	52.00	17.52	Weight too small			
81.00	53.00	18.52	Weight too small			
81.00	54.00	19.52	Weight too small			
81.00	55.00	20.52	Weight too small			
81.00	56.00	21.52	Weight too small			
81.00	57.00	22.52	Weight too small			
81.00	58.00	23.52	Weight too small			
81.00	59.00	24.52	Weight too small			
81.00	60.00	25.51	Weight too small			
81.00	61.00	26.51	59.57	2.608	479.4	1250.
81.00	62.00	27.51	70.71	2.574	591.7	1523.
81.00	63.00	28.51	82.58	2.505	717.5	1798.
81.00	64.00	29.51	95.20	2.428	857.7	2083.
82.00	45.00	10.68	Radius too small			
82.00	46.00	11.67	Radius too small			
82.00	47.00	12.65	Radius too small			
82.00	48.00	13.64	Radius too small			
82.00	49.00	14.63	Radius too small			
82.00	50.00	15.62	Radius too small			
82.00	51.00	16.62	Radius too small			
82.00	52.00	17.61	Radius too small			
82.00	53.00	18.60	Radius too small			
82.00	54.00	19.60	Radius too small			
82.00	55.00	20.59	Radius too small			
82.00	56.00	21.59	Radius too small			
82.00	57.00	22.58	Weight too small			
82.00	58.00	23.58	Weight too small			
82.00	59.00	24.58	Weight too small			
82.00	60.00	25.57	Weight too small			
82.00	61.00	26.57	Weight too small			
82.00	62.00	27.57	Weight too small			
82.00	63.00	28.57	Weight too small			
82.00	64.00	29.56	Weight too small			
83.00	45.00	10.92	Radius too small			
83.00	46.00	11.88	Radius too small			
83.00	47.00	12.85	Radius too small			
83.00	48.00	13.83	Radius too small			
83.00	49.00	14.80	Radius too small			
83.00	50.00	15.78	Radius too small			
83.00	51.00	16.77	Radius too small			
83.00	52.00	17.75	Radius too small			
83.00	53.00	18.74	Radius too small			
83.00	54.00	19.73	Radius too small			
83.00	55.00	20.71	Radius too small			
83.00	56.00	21.70	Radius too small			
83.00	57.00	22.70	Radius too small			
83.00	58.00	23.69	Radius too small			
83.00	59.00	24.68	Radius too small			
83.00	60.00	25.67	Radius too small			
83.00	61.00	26.67	Radius too small			
83.00	62.00	27.66	Weight too small			
83.00	63.00	28.65	Weight too small			
83.00	64.00	29.65	Weight too small			
84.00	45.00	11.23	Radius too small			
84.00	46.00	12.17	Radius too small			
84.00	47.00	13.12	Radius too small			
84.00	48.00	14.08	Radius too small			
84.00	49.00	15.04	Radius too small			
84.00	50.00	16.00	Radius too small			

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84.00	51.00	16.97	Radius too small			
84.00	52.00	17.95	Radius too small			
84.00	53.00	18.92	Radius too small			
84.00	54.00	19.90	Radius too small			
84.00	55.00	20.88	Radius too small			
84.00	56.00	21.86	Radius too small			
84.00	57.00	22.85	Radius too small			
84.00	58.00	23.83	Radius too small			
84.00	59.00	24.82	Radius too small			
84.00	60.00	25.81	Radius too small			
84.00	61.00	26.80	Radius too small			
84.00	62.00	27.79	Radius too small			
84.00	63.00	28.78	Radius too small			
84.00	64.00	29.77	Radius too small			
85.00	45.00	11.63	Disturbing moment < 0			
85.00	46.00	12.54	Radius too small			
85.00	47.00	13.46	Radius too small			
85.00	48.00	14.39	Radius too small			
85.00	49.00	15.33	Radius too small			
85.00	50.00	16.28	Radius too small			
85.00	51.00	17.24	Radius too small			
85.00	52.00	18.20	Radius too small			
85.00	53.00	19.16	Radius too small			
85.00	54.00	20.13	Radius too small			
85.00	55.00	21.10	Radius too small			
85.00	56.00	22.07	Radius too small			
85.00	57.00	23.04	Radius too small			
85.00	58.00	24.02	Radius too small			
85.00	59.00	25.00	Radius too small			
85.00	60.00	25.98	Radius too small			
85.00	61.00	26.96	Radius too small			
85.00	62.00	27.95	Radius too small			
85.00	63.00	28.93	Radius too small			
85.00	64.00	29.92	Radius too small			
86.00	45.00	12.09	FoS > 1000			
86.00	46.00	12.97	FoS > 1000			
86.00	47.00	13.86	FoS > 1000			
86.00	48.00	14.77	FoS > 1000			
86.00	49.00	15.69	FoS > 1000			
86.00	50.00	16.62	Disturbing moment < 0			
86.00	51.00	17.55	Radius too small			
86.00	52.00	18.50	Radius too small			
86.00	53.00	19.44	Radius too small			
86.00	54.00	20.40	Radius too small			
86.00	55.00	21.36	Radius too small			
86.00	56.00	22.32	Radius too small			
86.00	57.00	23.28	Radius too small			
86.00	58.00	24.25	Radius too small			
86.00	59.00	25.22	Radius too small			
86.00	60.00	26.19	Radius too small			
86.00	61.00	27.17	Radius too small			
86.00	62.00	28.14	Radius too small			
86.00	63.00	29.12	Radius too small			
86.00	64.00	30.10	Radius too small			
87.00	45.00	11.60	Radius too small			
87.00	46.00	13.46	Disturbing moment < 0			
87.00	47.00	14.32	86.34	260200.	0.003984	1037.
87.00	48.00	15.20	FoS > 1000			
87.00	49.00	16.10	FoS > 1000			
87.00	50.00	17.00	Disturbing moment < 0			
87.00	51.00	17.92	FoS > 1000			
87.00	52.00	18.84	Disturbing moment < 0			
87.00	53.00	19.78	Disturbing moment < 0			
87.00	54.00	20.71	Disturbing moment < 0			
87.00	55.00	21.66	FoS > 1000			
87.00	56.00	22.61	Disturbing moment < 0			
87.00	57.00	23.56	Radius too small			
87.00	58.00	24.52	Radius too small			
87.00	59.00	25.48	Radius too small			
87.00	60.00	26.44	Radius too small			
87.00	61.00	27.40	Radius too small			
87.00	62.00	28.37	Radius too small			
87.00	63.00	29.34	Radius too small			
87.00	64.00	30.32	Radius too small			
88.00	45.00	11.60	Radius too small			

EPA Export 08-07-2014:23:43:05

88.00	46.00	12.60		Radius too small		
88.00	47.00	13.60		Radius too small		
88.00	48.00	15.69	166.6	73180.	0.02663	1949.
88.00	49.00	16.56	141.3	152200.	0.01180	1797.
88.00	50.00	17.44		Disturbing moment < 0		
88.00	51.00	18.33	100.0	192000.	0.007762	1490.
88.00	52.00	19.24		Disturbing moment < 0		
88.00	53.00	20.15		Disturbing moment < 0		
88.00	54.00	21.07		FoS > 1000		
88.00	55.00	22.00		FoS > 1000		
88.00	56.00	22.94		Disturbing moment < 0		
88.00	57.00	23.88		FoS > 1000		
88.00	58.00	24.82		FoS > 1000		
88.00	59.00	25.77		FoS > 1000		
88.00	60.00	26.72		FoS > 1000		
88.00	61.00	27.68		Disturbing moment < 0		
88.00	62.00	28.64		Disturbing moment < 0		
88.00	63.00	29.60		Radius too small		
88.00	64.00	30.56		Radius too small		
89.00	45.00	11.60		Radius too small		
89.00	46.00	12.60		Radius too small		
89.00	47.00	13.60		Radius too small		
89.00	48.00	14.60		Radius too small		
89.00	49.00	15.60		Radius too small		
89.00	50.00	17.92	237.7	50150.	0.05886	2952.
89.00	51.00	18.79	208.8	38200.	0.07293	2786.
89.00	52.00	19.67	183.4	48040.	0.05464	2625.
89.00	53.00	20.57	160.8	796800.	0.003098	2468.
89.00	54.00	21.47		Disturbing moment < 0		
89.00	55.00	22.38	122.6	197400.	0.01089	2149.
89.00	56.00	23.30	106.2	224800.	0.008025	1984.
89.00	57.00	24.23		Disturbing moment < 0		
89.00	58.00	25.16		FoS > 1000		
89.00	59.00	26.10		FoS > 1000		
89.00	60.00	27.04		FoS > 1000		
89.00	61.00	27.98		FoS > 1000		
89.00	62.00	28.93		Disturbing moment < 0		
89.00	63.00	29.88		FoS > 1000		
89.00	64.00	30.84		FoS > 1000		

WORST CASE : WATER CASE 1 OF 1

Centre at (75.00,59.00)
Iterations: 11
Net vertical force [kN]: .0
Net horiz force [kN]: 13.35E-6
Inclination of interslice forces [°]: 16.11
Radius 24.31m
Horiz acceleration [%g]: .0
Slip weight [kN] 511.9
Disturbing moment [kN m]: 3576.
Restoring moment [kN m]: 6216.

Factor of Safety: 1.738

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	59.62	40.17	-5.341	.0	.0	.0
2	60.18	39.73	-1.050	0.1991	0.6892	.0
3	60.32	39.62	-38.15E-6	0.2957	1.024	.0
4	61.00	39.12	4.782	1.192	4.127	1.143
5	61.79	38.59	7.539	2.867	9.926	2.842
6	62.60	38.09	9.916	4.903	16.98	4.916
7	63.46	37.60	11.97	7.179	24.86	7.164
8	64.33	37.15	13.61	9.447	32.71	9.262
9	65.02	36.49	15.41	11.95	41.37	11.87
10	67.35	35.92	16.06	13.46	46.61	12.90
11	68.91	35.46	15.57	13.66	47.29	12.12
12	70.50	35.11	13.93	12.43	43.02	9.707
13	71.89	34.89	11.70	10.30	35.68	6.839
14	73.28	34.75	8.619	7.440	25.76	3.715
15	74.69	34.69	4.717	4.233	14.66	1.112
16	76.09	34.71	-38.15E-6	1.269	4.394	.0
17	77.37	34.80	-5.000	.0	13.35E-6	.0

Slice Strength Parameters

No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.5774	.0	2.090	1.910	1.103
2	.0	0.6494	.0	1.201	1.081	0.7021
3	.0	0.6494	2.391	9.362	8.666	4.324
4	.0	0.6494	6.160	16.97	15.92	6.528
5	.0	0.6494	8.727	22.45	21.07	8.281
6	.0	0.6494	10.94	27.86	26.14	9.977
7	.0	0.6494	12.79	31.33	29.44	10.93
8	.0	0.8391	14.51	57.94	54.14	25.60
9	.0	0.8391	15.74	63.31	59.79	28.67
10	.0	0.8391	15.82	65.01	62.36	30.71
11	.0	0.8391	14.75	62.78	61.55	31.48
12	.0	0.8391	12.81	49.41	49.74	26.64
13	.0	0.8391	10.16	42.35	44.01	24.96
14	.0	0.8391	6.668	32.74	35.45	21.89
15	.0	0.8391	2.358	20.66	23.79	17.18
16	.0	0.8391	.0	6.388	7.951	6.672

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0

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ARUP

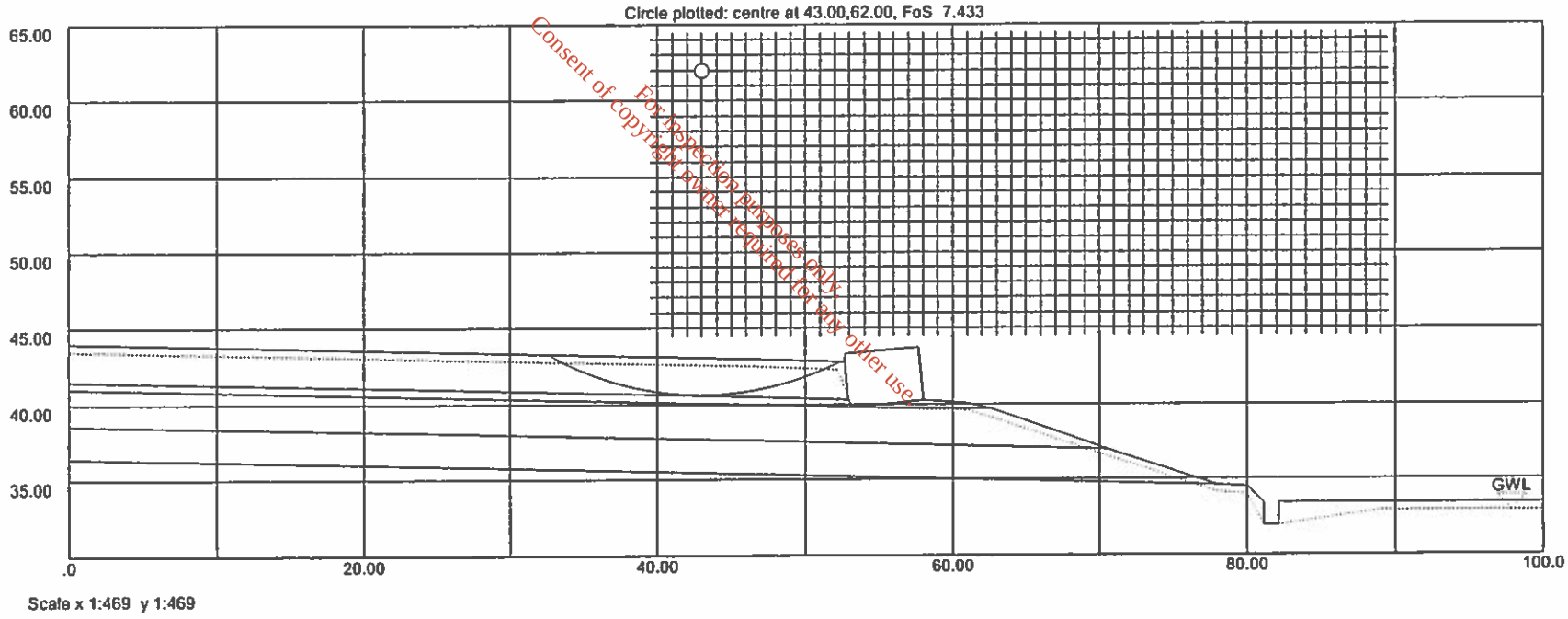
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A:Run4:01.	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No4.sld	



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Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Clay Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Drained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Drained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Drained	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Drained	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Dr	20.00	20.00	Undrained	.0	75.00
7	Rock (Drained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X -->						
		53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X -->						
		78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.
6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	33.90	.	31.90	.	32.90

Stratum	Material	X -->
		100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 3

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	4.359	153.7	12.77	10.06	128.5
40.00	46.00	5.358	173.9	11.32	15.31	173.3
40.00	47.00	6.358	191.9	10.47	21.24	222.4
40.00	48.00	7.358	208.3	9.917	27.78	275.5
40.00	49.00	8.357	223.6	9.525	34.88	332.2
40.00	50.00	9.357	237.9	9.245	42.45	392.4
40.00	51.00	10.36	251.3	8.997	50.66	455.8
40.00	52.00	11.36	263.7	8.815	59.24	522.2
40.00	53.00	12.36	276.0	8.647	68.42	591.6
40.00	54.00	13.36	287.8	8.499	78.10	663.8
40.00	55.00	14.36	299.0	8.371	88.25	738.7
40.00	56.00	15.36	309.8	8.259	98.83	816.3
40.00	57.00	16.36	320.2	8.161	109.8	896.3
40.00	58.00	17.36	330.5	8.078	121.2	978.9
40.00	59.00	18.35	339.8	8.017	132.7	1064.
40.00	60.00	19.35	349.3	7.946	144.8	1151.
40.00	61.00	20.35	358.6	7.883	157.3	1240.
40.00	62.00	21.35	367.6	7.826	170.2	1332.
40.00	63.00	22.35	376.4	7.774	183.4	1426.
40.00	64.00	23.35	385.0	7.726	196.9	1522.
41.00	45.00	4.381	154.2	12.72	10.18	129.5
41.00	46.00	5.381	174.3	11.30	15.44	174.3
41.00	47.00	6.381	192.3	10.46	21.38	223.6
41.00	48.00	7.380	208.7	9.903	27.93	276.6
41.00	49.00	8.380	223.7	9.505	35.07	333.3
41.00	50.00	9.380	238.0	9.174	42.89	393.5
41.00	51.00	10.38	251.5	8.903	51.32	456.9
41.00	52.00	11.38	264.3	8.683	60.28	523.4
41.00	53.00	12.38	276.6	8.516	69.61	592.8
41.00	54.00	13.38	287.8	8.383	79.32	665.0
41.00	55.00	14.38	299.0	8.253	89.65	739.9
41.00	56.00	15.38	309.8	8.141	100.4	817.4
41.00	57.00	16.38	320.2	8.044	111.6	897.5
41.00	58.00	17.38	330.2	7.959	123.1	980.0
41.00	59.00	18.38	340.0	7.883	135.1	1065.
41.00	60.00	19.38	349.5	7.816	147.4	1152.
41.00	61.00	20.38	358.7	7.756	160.1	1241.
41.00	62.00	21.38	367.6	7.702	173.1	1333.
41.00	63.00	22.38	376.4	7.653	186.4	1427.
41.00	64.00	23.38	384.9	7.608	200.1	1523.
42.00	45.00	4.404	154.7	12.68	10.29	130.4
42.00	46.00	5.404	174.8	11.27	15.56	175.4
42.00	47.00	6.403	192.6	10.40	21.60	224.5
42.00	48.00	7.403	209.1	9.786	28.38	277.7
42.00	49.00	8.403	224.4	9.327	35.86	334.5
42.00	50.00	9.403	238.2	9.008	43.81	394.6
42.00	51.00	10.40	251.6	8.739	52.41	458.0
42.00	52.00	11.40	264.3	8.525	61.53	524.5
42.00	53.00	12.40	276.4	8.351	71.12	593.9
42.00	54.00	13.40	288.0	8.207	81.18	666.2

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42.00	55.00	14.40	299.1	8.085	91.67	741.1
42.00	56.00	15.40	310.2	7.976	102.6	818.7
42.00	57.00	16.40	320.5	7.884	114.0	898.7
42.00	58.00	17.40	330.6	7.804	125.7	981.2
42.00	59.00	18.40	339.8	7.746	137.6	1066.
42.00	60.00	19.40	349.2	7.682	150.1	1153.
42.00	61.00	20.40	358.4	7.625	163.0	1243.
42.00	62.00	21.40	367.4	7.573	176.2	1334.
42.00	63.00	22.40	376.1	7.527	189.7	1428.
42.00	64.00	23.40	384.6	7.485	203.6	1524.
42.00	64.00	23.40		Weight too small		
43.00	45.00	4.427	155.3	12.62	10.40	131.3
43.00	46.00	5.426	175.3	11.01	16.02	176.3
43.00	47.00	6.426	192.9	10.11	22.31	225.5
43.00	48.00	7.426	209.4	9.518	29.29	278.7
43.00	49.00	8.426	224.5	9.080	36.95	335.5
43.00	50.00	9.425	238.7	8.757	45.20	395.8
43.00	51.00	10.43	252.1	8.507	53.98	459.2
43.00	52.00	11.42	264.3	8.324	63.15	525.7
43.00	53.00	12.42	276.4	8.161	72.92	595.1
43.00	54.00	13.42	287.9	8.025	83.15	667.3
43.00	55.00	14.42	299.0	7.911	93.83	742.3
43.00	56.00	15.42	309.7	7.813	104.9	819.8
43.00	57.00	16.42	320.0	7.728	116.4	899.9
43.00	58.00	17.42	330.0	7.654	128.3	982.3
43.00	59.00	18.42	339.7	7.589	140.6	1067.
43.00	60.00	19.42	349.1	7.531	153.3	1154.
43.00	60.00	19.42		Weight too small		
43.00	61.00	20.42	358.2	7.479	166.3	1244.
43.00	61.00	20.42		Weight too small		
43.00	62.00	21.42	367.2	7.433	179.6	1335.
43.00	62.00	21.42		Weight too small		
43.00	63.00	22.42		Disturbing moment < 0		
43.00	64.00	23.42		Disturbing moment < 0		
44.00	45.00	4.449	155.8	12.01	11.00	132.2
44.00	46.00	5.449	175.6	10.57	16.77	177.2
44.00	47.00	6.449	193.1	9.751	23.23	226.5
44.00	48.00	7.449	209.3	9.193	30.43	279.7
44.00	49.00	8.448	224.6	8.791	38.29	336.6
44.00	50.00	9.448	238.7	8.496	46.71	396.9
44.00	51.00	10.45	252.0	8.268	55.68	460.3
44.00	52.00	11.45	264.6	8.087	65.15	526.9
44.00	53.00	12.45	276.7	7.939	75.11	596.3
44.00	54.00	13.45	288.2	7.816	85.54	668.6
44.00	55.00	14.45	299.2	7.712	96.41	743.5
44.00	56.00	15.45	309.9	7.623	107.7	821.0
44.00	56.00	15.45		Weight too small		
44.00	57.00	16.45	319.7	7.557	119.2	901.0
44.00	57.00	16.45		Weight too small		
44.00	58.00	17.45	329.7	7.489	131.3	983.5
44.00	58.00	17.45		Weight too small		
44.00	59.00	18.45		Disturbing moment < 0		
44.00	60.00	19.45		Disturbing moment < 0		
44.00	61.00	20.45		Disturbing moment < 0		
44.00	62.00	21.45		Disturbing moment < 0		
44.00	63.00	22.44		Disturbing moment < 0		
44.00	64.00	23.44		Disturbing moment < 0		
45.00	45.00	4.472	156.0	11.39	11.69	133.1
45.00	46.00	5.472	175.8	10.11	17.63	178.2
45.00	47.00	6.472	193.5	9.351	24.33	227.5
45.00	48.00	7.471	209.4	8.859	31.69	280.8
45.00	49.00	8.471	224.3	8.503	39.71	337.6
45.00	50.00	9.471	238.4	8.238	48.30	397.9
45.00	51.00	10.47	251.6	8.033	57.44	461.4
45.00	52.00	11.47	264.1	7.870	67.09	528.0
45.00	53.00	12.47	276.1	7.737	77.22	597.4
45.00	53.00	12.47		Weight too small		
45.00	54.00	13.47	287.6	7.626	87.81	669.7
45.00	54.00	13.47		Weight too small		
45.00	55.00	14.47		Disturbing moment < 0		
45.00	56.00	15.47		Disturbing moment < 0		
45.00	57.00	16.47		Disturbing moment < 0		
45.00	58.00	17.47		Disturbing moment < 0		
45.00	59.00	18.47	356.4	27440.	0.2177	5974.
45.00	60.00	19.47	369.4	324.5	21.55	6994.

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45.00	61.00	20.47	381.7	180.0	44.82	8069.
45.00	62.00	21.47	393.8	131.6	69.89	9197.
45.00	63.00	22.47	406.4	108.1	96.03	10380.
45.00	64.00	23.47	418.9	93.96	123.6	11610.
46.00	45.00	4.495	156.4	10.75	12.46	134.0
46.00	46.00	5.495	175.9	9.649	18.56	179.1
46.00	47.00	6.494	193.5	8.971	25.47	228.5
46.00	48.00	7.494	209.6	8.522	33.07	281.8
46.00	49.00	8.494	224.5	8.204	41.29	338.8
46.00	50.00	9.494	238.2	7.972	50.05	399.0
46.00	50.00	9.494		Slip too small to split into minimum no. of slices		
46.00	51.00	10.49	251.4	7.789	59.39	462.5
46.00	51.00	10.49		Weight too small		
46.00	52.00	11.49		Disturbing moment < 0		
46.00	53.00	12.49		Disturbing moment < 0		
46.00	54.00	13.49		Disturbing moment < 0		
46.00	55.00	14.49	313.9	250.3	17.16	4295.
46.00	56.00	15.49	328.6	131.4	39.67	5211.
46.00	57.00	16.49	343.1	96.51	64.08	6184.
46.00	58.00	17.49	357.4	79.94	90.25	7215.
46.00	59.00	18.49	371.4	70.31	118.1	8303.
46.00	60.00	19.49	385.2	64.05	147.5	9448.
46.00	61.00	20.49	398.2	59.51	178.9	10650.
46.00	62.00	21.49	412.4	55.80	213.4	11910.
46.00	63.00	22.49	425.8	53.38	247.6	13220.
46.00	64.00	23.49	438.9	49.30	280.0	13810.
47.00	45.00	4.523	157.1	10.20	13.26	135.2
47.00	46.00	5.523	176.5	9.207	19.61	180.5
47.00	47.00	6.522	194.1	8.603	26.74	230.0
47.00	48.00	7.522	210.2	8.202	34.56	283.5
47.00	48.00	7.522		Weight too small		
47.00	49.00	8.521		Disturbing moment < 0		
47.00	50.00	9.521		Disturbing moment < 0		
47.00	51.00	10.52	264.2	175.7	14.80	2600.
47.00	52.00	11.52	281.4	90.60	37.38	3386.
47.00	53.00	12.52	297.8	67.73	62.52	4234.
47.00	54.00	13.52	314.1	57.51	89.46	5145.
47.00	55.00	14.52	330.1	51.71	118.3	6118.
47.00	56.00	15.52	346.3	47.60	150.3	7153.
47.00	57.00	16.52	361.2	45.05	183.1	8248.
47.00	58.00	17.52	376.3	43.26	217.4	9403.
47.00	59.00	18.52	391.2	41.92	253.2	10620.
47.00	60.00	19.52	406.4	39.68	289.3	11480.
47.00	61.00	20.52	419.6	37.62	318.9	12000.
47.00	62.00	21.52	432.3	36.75	340.6	12520.
47.00	63.00	22.52		Disturbing moment < 0		
47.00	64.00	23.52		Disturbing moment < 0		
48.00	45.00	4.552	157.8	9.715	14.06	136.5
48.00	46.00	5.552	177.2	8.820	20.63	182.0
48.00	46.00	5.552		Weight too small		
48.00	47.00	6.551		Disturbing moment < 0		
48.00	48.00	7.551	220.9	101.4	16.28	1652.
48.00	49.00	8.550	241.1	58.44	40.12	2344.
48.00	50.00	9.550	260.8	46.64	66.56	3104.
48.00	51.00	10.55	279.8	41.23	95.38	3932.
48.00	52.00	11.55	298.6	37.87	127.5	4830.
48.00	53.00	12.55	316.2	35.98	161.0	5793.
48.00	54.00	13.55	333.6	34.79	196.1	6822.
48.00	55.00	14.55	350.7	33.98	233.0	7916.
48.00	56.00	15.55	367.3	33.42	271.5	9073.
48.00	57.00	16.55	383.4	31.51	308.4	9719.
48.00	58.00	17.55	398.1	30.46	335.5	10220.
48.00	59.00	18.55	411.6	30.28	354.4	10730.
48.00	60.00	19.55		Disturbing moment < 0		
48.00	61.00	20.55		Disturbing moment < 0		
48.00	62.00	21.54		Disturbing moment < 0		
48.00	63.00	22.54		Disturbing moment < 0		
48.00	64.00	23.54		Disturbing moment < 0		
49.00	45.00	4.581	162.4	478.2	1.423	680.7
49.00	46.00	5.581	188.7	51.81	24.30	1263.
49.00	47.00	6.580	213.1	37.47	50.85	1905.
49.00	48.00	7.580	236.6	32.25	81.33	2623.
49.00	49.00	8.579	258.4	29.99	113.9	3416.
49.00	50.00	9.579	279.5	28.82	148.6	4283.

EPA Export 08-07-2014:23:43:05

49.00	51.00	10.58	299.7	28.17	185.4	5224.
49.00	52.00	11.58	319.2	27.82	224.2	6237.
49.00	53.00	12.58	338.3	27.51	266.1	7321.
49.00	54.00	13.58	356.5	26.21	305.4	8003.
49.00	55.00	14.58	372.2	25.57	331.7	8481.
49.00	56.00	15.58		Disturbing moment < 0		
49.00	57.00	16.58		Disturbing moment < 0		
49.00	58.00	17.58		Disturbing moment < 0		
49.00	59.00	18.58		Disturbing moment < 0		
49.00	60.00	19.57		Disturbing moment < 0		
49.00	61.00	20.57		Disturbing moment < 0		
49.00	62.00	21.57		Disturbing moment < 0		
49.00	63.00	22.57		Disturbing moment < 0		
49.00	64.00	23.57		Disturbing moment < 0		
50.00	45.00	4.610	176.7	29.20	45.75	1336.
50.00	46.00	5.610	205.2	25.53	77.77	1985.
50.00	47.00	6.609	231.7	24.05	113.2	2723.
50.00	48.00	7.609	256.6	23.50	150.8	3545.
50.00	49.00	8.608	279.6	23.32	190.8	4449.
50.00	50.00	9.608	301.9	23.34	232.8	5432.
50.00	51.00	10.61	323.3	22.96	276.5	6348.
50.00	52.00	11.61	342.7	22.02	308.4	6792.
50.00	53.00	12.61		Disturbing moment < 0		
50.00	54.00	13.61		Disturbing moment < 0		
50.00	55.00	14.61		Disturbing moment < 0		
50.00	56.00	15.61		Disturbing moment < 0		
50.00	57.00	16.60		Disturbing moment < 0		
50.00	58.00	17.60		Disturbing moment < 0		
50.00	59.00	18.60		Disturbing moment < 0		
50.00	60.00	19.60		Disturbing moment < 0		
50.00	61.00	20.60		Disturbing moment < 0		
50.00	62.00	21.60		Disturbing moment < 0		
50.00	63.00	22.60		Disturbing moment < 0		
50.00	64.00	23.60		Disturbing moment < 0		
51.00	45.00	4.639	196.1	20.80	91.65	1906.
51.00	46.00	5.639	226.4	20.29	131.0	2658.
51.00	47.00	6.638	253.9	20.28	172.9	3505.
51.00	48.00	7.638	280.0	20.46	217.1	4441.
51.00	49.00	8.637	304.1	19.83	261.4	5183.
51.00	50.00	9.637	324.0	19.55	286.7	5606.
51.00	51.00	10.64		Disturbing moment < 0		
51.00	52.00	11.64		Disturbing moment < 0		
51.00	53.00	12.64		Disturbing moment < 0		
51.00	54.00	13.64		Disturbing moment < 0		
51.00	55.00	14.63		Disturbing moment < 0		
51.00	56.00	15.63		Disturbing moment < 0		
51.00	57.00	16.63		Disturbing moment < 0		
51.00	58.00	17.63		Disturbing moment < 0		
51.00	59.00	18.63		Disturbing moment < 0		
51.00	60.00	19.63		Disturbing moment < 0		
51.00	61.00	20.63		Disturbing moment < 0		
51.00	62.00	21.63		Disturbing moment < 0		
51.00	63.00	22.63		Disturbing moment < 0		
51.00	64.00	23.63		Disturbing moment < 0		
52.00	45.00	4.668	219.1	18.94	129.1	2445.
52.00	46.00	5.668	250.7	18.93	174.9	3310.
52.00	47.00	6.667	279.2	18.37	221.4	4067.
52.00	48.00	7.667		Disturbing moment < 0		
52.00	49.00	8.666		Disturbing moment < 0		
52.00	50.00	9.666		Disturbing moment < 0		
52.00	51.00	10.67		Disturbing moment < 0		
52.00	52.00	11.67		Disturbing moment < 0		
52.00	53.00	12.66		Disturbing moment < 0		
52.00	54.00	13.66		Disturbing moment < 0		
52.00	55.00	14.66		Disturbing moment < 0		
52.00	56.00	15.66		Disturbing moment < 0		
52.00	57.00	16.66		Disturbing moment < 0		
52.00	58.00	17.66		Disturbing moment < 0		
52.00	59.00	18.66	420.8	42980.	0.2443	10500.
52.00	60.00	19.66	427.6	313.2	35.34	11070.
52.00	61.00	20.66	434.3	163.7	71.09	11640.
52.00	62.00	21.66	440.7	113.5	107.6	12210.
52.00	63.00	22.66	446.0	84.99	145.4	12360.
52.00	64.00	23.66	451.9	70.55	183.1	12910.
53.00	45.00	4.697	244.9	19.55	152.5	2981.

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53.00	46.00	5.697		Disturbing moment < 0		
53.00	47.00	6.696		Disturbing moment < 0		
53.00	48.00	7.696		Disturbing moment < 0		
53.00	49.00	8.695		Disturbing moment < 0		
53.00	50.00	9.695		Disturbing moment < 0		
53.00	51.00	10.69		Disturbing moment < 0		
53.00	52.00	11.69		Disturbing moment < 0		
53.00	53.00	12.69		Disturbing moment < 0		
53.00	54.00	13.69		Disturbing moment < 0		
53.00	55.00	14.69	380.6	236.9	34.65	8209.
53.00	56.00	15.69	388.1	124.4	70.51	8772.
53.00	57.00	16.69	395.4	86.72	107.3	9306.
53.00	58.00	17.69	402.2	68.23	144.7	9872.
53.00	59.00	18.69	408.8	57.16	182.6	10440.
53.00	60.00	19.69	414.8	49.70	221.5	11010.
53.00	61.00	20.69	420.9	44.46	260.5	11580.
53.00	62.00	21.69	426.8	40.53	299.8	12150.
53.00	63.00	22.69	432.3	37.49	339.5	12730.
53.00	64.00	23.69	438.0	35.03	379.8	13300.
54.00	45.00	4.823		Disturbing moment < 0		
54.00	46.00	5.801		Disturbing moment < 0		
54.00	47.00	6.786		Disturbing moment < 0		
54.00	48.00	7.774		Disturbing moment < 0		
54.00	49.00	8.765		Disturbing moment < 0		
54.00	50.00	9.758	330.3	161.3	32.20	5195.
54.00	51.00	10.75	338.6	84.95	67.35	5722.
54.00	52.00	11.75	346.2	60.32	103.6	6251.
54.00	53.00	12.74	353.6	48.24	140.7	6786.
54.00	54.00	13.74	360.7	41.04	178.4	7323.
54.00	55.00	14.74	367.6	36.27	216.8	7862.
54.00	56.00	15.73	374.1	32.90	255.4	8404.
54.00	57.00	16.73	380.2	30.39	294.6	8948.
54.00	58.00	17.73	386.4	28.41	334.1	9494.
54.00	59.00	18.73	392.3	26.85	374.0	10040.
54.00	60.00	19.73	398.0	25.57	414.1	10590.
54.00	61.00	20.73	403.7	24.50	454.7	11140.
54.00	62.00	21.72	409.1	23.60	495.5	11700.
54.00	63.00	22.72	414.2	22.81	537.0	12250.
54.00	64.00	23.72	419.4	22.14	578.2	12800.
55.00	45.00	5.144	302.3	41.50	49.52	2055.
55.00	46.00	6.071	307.8	30.65	84.79	2598.
55.00	47.00	7.017	313.8	27.56	120.7	3326.
55.00	48.00	7.977	319.7	26.90	157.4	4234.
55.00	49.00	8.946	325.8	24.38	194.5	4743.
55.00	50.00	9.921	331.9	22.65	232.1	5259.
55.00	51.00	10.90	337.8	21.40	270.1	5780.
55.00	52.00	11.88	343.6	20.44	308.5	6305.
55.00	53.00	12.87	349.3	19.68	347.2	6834.
55.00	54.00	13.86	354.6	19.06	386.5	7366.
55.00	55.00	14.85	360.1	18.55	425.9	7901.
55.00	56.00	15.84	365.4	18.13	465.6	8439.
55.00	57.00	16.83	370.7	17.76	505.6	8979.
55.00	58.00	17.82	376.0	17.44	545.8	9521.
55.00	59.00	18.81	381.0	17.17	586.1	10060.
55.00	60.00	19.81	385.8	16.93	626.6	10610.
55.00	61.00	20.80	390.7	16.72	667.5	11160.
55.00	62.00	21.80	395.5	16.52	708.5	11710.
55.00	63.00	22.79	400.3	16.35	749.6	12260.
55.00	64.00	23.79	404.9	16.20	790.9	12810.
56.00	45.00	4.912	250.8	15.89	172.2	2736.
56.00	46.00	5.908	263.0	15.01	214.3	3216.
56.00	47.00	6.903	273.6	14.51	256.2	3717.
56.00	48.00	7.899	283.3	14.19	297.9	4220.
56.00	49.00	8.894	292.2	13.97	339.8	4745.
56.00	50.00	9.885	299.7	13.85	380.0	5265.
56.00	51.00	10.87	306.2	13.80	419.2	5785.
56.00	52.00	11.86	312.5	13.76	458.6	6310.
56.00	53.00	12.85	318.7	13.73	498.2	6839.
56.00	54.00	13.84	324.8	13.69	538.2	7370.
56.00	55.00	14.84	330.6	13.67	578.4	7904.
56.00	56.00	15.83	336.3	13.64	618.9	8441.
56.00	57.00	16.83	341.8	13.61	659.9	8979.
56.00	58.00	17.86	352.2	13.27	718.7	9540.
56.00	59.00	18.85	357.6	13.25	760.9	10080.
56.00	60.00	19.85	362.9	13.23	803.1	10630.

EPA Export 08-07-2014:23:43:05

56.00	61.00	20.84	367.9	13.22	845.1	11170.
56.00	62.00	21.84	372.8	13.21	887.0	11720.
56.00	63.00	22.83	377.6	13.20	929.1	12270.
56.00	64.00	23.83	383.3	13.61	974.5	13270.
57.00	45.00	4.790	205.6	11.51	267.0	3073.
57.00	46.00	5.783	210.4	10.79	313.3	3380.
57.00	47.00	6.777	229.0	10.74	355.0	3814.
57.00	48.00	7.806	241.7	10.67	403.6	4305.
57.00	49.00	8.801	250.3	10.82	443.7	4800.
57.00	50.00	9.797	258.2	10.97	483.5	5306.
57.00	51.00	10.79	265.6	11.13	522.8	5818.
57.00	52.00	11.79	272.7	11.26	562.6	6336.
57.00	53.00	12.79	279.2	11.40	601.5	6859.
57.00	54.00	13.78	285.6	11.52	641.3	7384.
57.00	55.00	14.78	291.8	11.62	681.0	7913.
57.00	56.00	15.78	297.8	11.71	721.0	8445.
57.00	57.00	16.78	303.7	11.80	761.1	8979.
57.00	58.00	17.77	309.3	11.87	801.5	9515.
57.00	59.00	18.77	315.0	11.94	842.2	10050.
57.00	60.00	19.77	320.3	12.00	882.9	10590.
57.00	61.00	20.77	325.5	12.05	924.2	11140.
57.00	62.00	21.77	330.7	12.10	965.4	11680.
57.00	63.00	22.77	335.7	12.14	1007.	12220.
57.00	64.00	23.77	340.7	12.18	1049.	12770.
58.00	45.00	4.746	156.1	9.502	289.5	2750.
58.00	46.00	5.746	174.7	9.916	361.3	3503.
58.00	47.00	6.746	190.0	9.778	425.2	4158.
58.00	48.00	7.746	201.0	9.615	472.3	4541.
58.00	49.00	8.746	210.6	9.653	515.9	4980.
58.00	50.00	9.746	219.3	9.769	558.0	5451.
58.00	51.00	10.75	227.4	9.916	599.0	5940.
58.00	52.00	11.75	235.0	10.07	639.5	6440.
58.00	53.00	12.75	242.1	10.22	679.8	6948.
58.00	54.00	13.75	248.9	10.36	720.0	7462.
58.00	55.00	14.75	255.5	10.50	760.0	7981.
58.00	56.00	15.75	261.7	10.63	800.0	8503.
58.00	57.00	16.75	267.7	10.74	840.3	9029.
58.00	58.00	17.75	273.6	10.85	880.6	9558.
58.00	59.00	18.75	279.3	10.96	920.9	10090.
58.00	60.00	19.75	284.9	11.05	961.3	10620.
58.00	61.00	20.75	290.3	11.14	1002.	11160.
58.00	62.00	21.75	295.6	11.22	1043.	11700.
58.00	63.00	22.75	300.7	11.29	1084.	12240.
58.00	64.00	23.75	305.8	11.36	1125.	12780.
59.00	45.00	4.790	112.5	8.522	277.8	2367.
59.00	46.00	5.789	132.0	8.792	354.8	3119.
59.00	47.00	6.788	149.1	9.169	429.5	3930.
59.00	48.00	7.786	164.4	9.598	502.0	4818.
59.00	49.00	8.785	177.3	9.434	565.7	5337.
59.00	50.00	9.784	187.2	9.356	615.3	5757.
59.00	51.00	10.78	196.1	9.360	661.3	6195.
59.00	52.00	11.78	204.2	9.441	705.5	6661.
59.00	53.00	12.78	211.8	9.540	748.7	7142.
59.00	54.00	13.78	218.9	9.653	790.9	7635.
59.00	55.00	14.78	225.7	9.772	832.6	8136.
59.00	56.00	15.78	232.1	9.889	874.0	8643.
59.00	57.00	16.78	238.3	10.01	915.0	9156.
59.00	58.00	17.77	244.3	10.12	955.9	9673.
59.00	59.00	18.77	250.0	10.23	996.6	10190.
59.00	60.00	19.77	255.6	10.33	1037.	10720.
59.00	61.00	20.77	260.9	10.43	1078.	11240.
59.00	62.00	21.77	266.2	10.52	1119.	11770.
59.00	63.00	22.77	271.4	10.61	1160.	12300.
59.00	64.00	23.77	276.4	10.70	1200.	12840.
60.00	45.00	4.840	70.03	8.951	217.5	1947.
60.00	46.00	5.839	90.10	8.750	300.3	2627.
60.00	47.00	6.837	107.8	8.874	380.2	3374.
60.00	48.00	7.836	123.7	9.124	458.3	4182.
60.00	49.00	8.835	138.3	9.441	534.3	5045.
60.00	50.00	9.834	151.6	9.794	608.4	5959.
60.00	51.00	10.83	163.5	9.651	676.3	6527.
60.00	52.00	11.83	173.0	9.562	730.7	6987.
60.00	53.00	12.83	181.3	9.519	779.9	7424.
60.00	54.00	13.83	189.1	9.531	827.2	7884.
60.00	55.00	14.83	196.4	9.572	873.3	8359.

60.00	56.00	15.83	203.3	9.632	918.4	8846.
60.00	57.00	16.82	210.0	9.703	962.7	9341.
60.00	58.00	17.82	216.3	9.780	1006.	9843.
60.00	59.00	18.82	222.3	9.858	1050.	10350.
60.00	60.00	19.82	228.2	9.939	1093.	10860.
60.00	61.00	20.82	233.9	10.02	1136.	11380.
60.00	62.00	21.82	239.4	10.10	1178.	11900.
60.00	63.00	22.82	244.7	10.17	1221.	12420.
60.00	64.00	23.82	249.9	10.25	1263.	12950.
61.00	45.00	4.890	Weight too small			
61.00	46.00	5.889	51.22	10.10	204.5	2066.
61.00	47.00	6.887	68.60	9.565	287.7	2752.
61.00	48.00	7.886	84.50	9.459	369.3	3493.
61.00	49.00	8.885	99.19	9.538	449.7	4289.
61.00	50.00	9.884	112.8	9.718	528.5	5135.
61.00	51.00	10.88	125.6	9.955	605.7	6030.
61.00	52.00	11.88	137.5	10.23	681.4	6970.
61.00	53.00	12.88	148.7	10.22	754.3	7709.
61.00	54.00	13.88	158.1	10.03	816.3	8190.
61.00	55.00	14.88	166.2	9.955	869.4	8656.
61.00	56.00	15.88	173.7	9.805	919.8	9110.
61.00	57.00	16.87	181.1	9.947	972.4	9673.
61.00	58.00	17.87	187.4	9.897	1017.	10060.
61.00	59.00	18.87	193.8	9.919	1064.	10550.
61.00	60.00	19.87	200.0	9.953	1110.	11050.
61.00	61.00	20.87	206.0	9.994	1156.	11550.
61.00	62.00	21.87	211.8	10.04	1201.	12060.
61.00	63.00	22.87	217.3	10.09	1246.	12570.
61.00	64.00	23.87	222.7	10.14	1291.	13080.
62.00	45.00	4.997	Weight too small			
62.00	46.00	5.980	Weight too small			
62.00	47.00	6.968	Weight too small			
62.00	48.00	7.959	50.30	10.86	254.7	2767.
62.00	49.00	8.952	64.10	10.45	335.0	3499.
62.00	50.00	9.946	77.18	10.32	414.7	4279.
62.00	51.00	10.94	89.60	10.34	493.9	5105.
62.00	52.00	11.94	101.4	10.44	572.2	5976.
62.00	53.00	12.93	112.6	10.61	649.5	6890.
62.00	54.00	13.93	123.3	10.81	725.8	7845.
62.00	55.00	14.93	133.6	11.04	801.0	8839.
62.00	56.00	15.93	143.0	10.75	870.9	9363.
62.00	57.00	16.93	151.1	10.59	931.4	9859.
62.00	58.00	17.92	158.3	10.49	985.1	10340.
62.00	59.00	18.92	165.0	10.42	1037.	10800.
62.00	60.00	19.92	171.5	10.37	1087.	11280.
62.00	61.00	20.92	177.7	10.35	1136.	11760.
62.00	62.00	21.92	183.8	10.34	1185.	12250.
62.00	63.00	22.92	189.6	10.34	1233.	12750.
62.00	64.00	23.92	195.2	10.34	1281.	13250.
63.00	45.00	5.235	Radius too small			
63.00	46.00	6.205	Weight too small			
63.00	47.00	7.175	Weight too small			
63.00	48.00	8.145	Weight too small			
63.00	49.00	9.118	Weight too small			
63.00	50.00	10.10	Weight too small			
63.00	51.00	11.08	61.28	11.19	362.7	4283.
63.00	52.00	12.06	72.26	11.05	460.5	5087.
63.00	53.00	13.05	82.83	11.03	538.0	5932.
63.00	54.00	14.04	93.02	11.09	615.0	6817.
63.00	55.00	15.03	102.8	11.20	691.2	7741.
63.00	56.00	16.02	112.3	11.35	766.7	8702.
63.00	57.00	17.01	121.5	11.53	841.4	9699.
63.00	58.00	18.01	130.3	11.53	914.8	10550.
63.00	59.00	19.00	138.2	11.25	981.3	11040.
63.00	60.00	20.00	145.2	11.10	1040.	11550.
63.00	61.00	20.99	151.6	11.00	1094.	12030.
63.00	62.00	21.99	157.6	10.92	1145.	12500.
63.00	63.00	22.98	163.4	10.86	1195.	12980.
63.00	64.00	23.98	169.5	10.87	1250.	13580.
64.00	45.00	5.478	Radius too small			
64.00	46.00	6.447	Radius too small			
64.00	47.00	7.418	Weight too small			
64.00	48.00	8.388	Weight too small			
64.00	49.00	9.358	Weight too small			
64.00	50.00	10.33	Weight too small			

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EPA Export 08-07-2014:23:43:05

64.00	51.00	11.30		Weight too small			
64.00	52.00	12.27		Weight too small			
64.00	53.00	13.24	59.51	11.79	432.2	5096.	
64.00	54.00	14.22	68.93	11.64	508.4	5919.	
64.00	55.00	15.20	78.11	11.60	584.5	6779.	
64.00	56.00	16.18	87.03	11.62	660.2	7675.	
64.00	57.00	17.16	95.71	11.70	735.6	8606.	
64.00	58.00	18.15	104.1	11.81	810.3	9571.	
64.00	59.00	19.13	112.4	11.95	884.5	10570.	
64.00	60.00	20.12	120.3	12.11	958.0	11600.	
64.00	61.00	21.11	127.9	11.90	1029.	12240.	
64.00	62.00	22.10	134.8	11.66	1093.	12740.	
64.00	63.00	23.09	141.0	11.51	1151.	13250.	
64.00	64.00	24.08	146.7	11.41	1204.	13750.	
65.00	45.00	5.787		Radius too small			
65.00	46.00	6.734		Radius too small			
65.00	47.00	7.680		Radius too small			
65.00	48.00	8.636		Weight too small			
65.00	49.00	9.601		Weight too small			
65.00	50.00	10.57		Weight too small			
65.00	51.00	11.54		Weight too small			
65.00	52.00	12.51		Weight too small			
65.00	53.00	13.48		Weight too small			
65.00	54.00	14.45		Weight too small			
65.00	55.00	15.42	58.17	12.30	481.3	5918.	
65.00	56.00	16.39	66.55	12.13	557.4	6764.	
65.00	57.00	17.36	74.63	12.08	632.4	7636.	
65.00	58.00	18.34	82.55	12.08	707.2	8541.	
65.00	59.00	19.31	90.30	12.13	781.7	9478.	
65.00	60.00	20.29	97.88	12.21	855.7	10450.	
65.00	61.00	21.28	105.3	12.32	929.4	11450.	
65.00	62.00	22.26	112.5	12.44	1002.	12470.	
65.00	63.00	23.24	119.6	12.52	1075.	13450.	
65.00	64.00	24.23	126.2	12.21	1143.	13950.	
66.00	45.00	6.111		Radius too small			
66.00	46.00	7.057		Radius too small			
66.00	47.00	8.003		Radius too small			
66.00	48.00	8.950		Radius too small			
66.00	49.00	9.896		Slip too small to split into minimum no. of slices			
66.00	50.00	10.84		Weight too small			
66.00	51.00	11.80		Weight too small			
66.00	52.00	12.76		Weight too small			
66.00	53.00	13.72		Weight too small			
66.00	54.00	14.69		Weight too small			
66.00	55.00	15.66		Weight too small			
66.00	56.00	16.63		Weight too small			
66.00	57.00	17.60	56.51	12.79	524.4	6708.	
66.00	58.00	18.57	64.33	12.59	603.8	7591.	
66.00	59.00	19.54	71.86	12.49	680.1	8493.	
66.00	60.00	20.51	79.08	12.46	755.2	9413.	
66.00	61.00	21.49	86.07	12.49	829.0	10350.	
66.00	62.00	22.46	92.93	12.55	902.5	11330.	
66.00	63.00	23.44	99.66	12.63	975.6	12330.	
66.00	64.00	24.41	106.3	12.74	1048.	13350.	
67.00	45.00	6.434		Radius too small			
67.00	46.00	7.380		Radius too small			
67.00	47.00	8.327		Radius too small			
67.00	48.00	9.273		Radius too small			
67.00	49.00	10.22		Radius too small			
67.00	50.00	11.17		Radius too small			
67.00	51.00	12.11		Weight too small			
67.00	52.00	13.06		Weight too small			
67.00	53.00	14.00		Weight too small			
67.00	54.00	14.96		Weight too small			
67.00	55.00	15.92		Weight too small			
67.00	56.00	16.88		Weight too small			
67.00	57.00	17.85		Weight too small			
67.00	58.00	18.82		Weight too small			
67.00	59.00	19.79	54.57	13.30	560.9	7458.	
67.00	60.00	20.76	61.91	13.05	641.9	8375.	
67.00	61.00	21.73	69.04	12.90	721.6	9310.	
67.00	62.00	22.70	75.93	12.83	799.8	10260.	
67.00	63.00	23.67	82.56	12.81	876.1	11230.	
67.00	64.00	24.64	88.92	12.85	950.2	12210.	

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68.00	45.00	6.758		Radius too small			
68.00	46.00	7.704		Radius too small			
68.00	47.00	8.650		Radius too small			
68.00	48.00	9.596		Radius too small			
68.00	49.00	10.54		Radius too small			
68.00	50.00	11.49		Radius too small			
68.00	51.00	12.44		Radius too small			
68.00	52.00	13.38		Weight too small			
68.00	53.00	14.33		Weight too small			
68.00	54.00	15.27		Weight too small			
68.00	55.00	16.22		Weight too small			
68.00	56.00	17.17		Weight too small			
68.00	57.00	18.12		Weight too small			
68.00	58.00	19.08		Weight too small			
68.00	59.00	20.04		Weight too small			
68.00	60.00	21.00		Weight too small			
68.00	61.00	21.97	52.45	13.81	591.2	8164.	
68.00	62.00	22.94	59.37	13.52	674.3	9114.	
68.00	63.00	23.91	66.15	13.32	756.6	10080.	
68.00	64.00	24.88	72.74	13.21	837.5	11060.	
69.00	45.00	7.081		Radius too small			
69.00	46.00	8.027		Radius too small			
69.00	47.00	8.973		Radius too small			
69.00	48.00	9.920		Radius too small			
69.00	49.00	10.87		Radius too small			
69.00	50.00	11.81		Radius too small			
69.00	51.00	12.76		Radius too small			
69.00	52.00	13.70		Radius too small			
69.00	53.00	14.65		Slip too small to split into minimum no. of slices			
69.00	54.00	15.60		Weight too small			
69.00	55.00	16.54		Weight too small			
69.00	56.00	17.49		Weight too small			
69.00	57.00	18.44		Weight too small			
69.00	58.00	19.38		Weight too small			
69.00	59.00	20.33		Weight too small			
69.00	60.00	21.28		Weight too small			
69.00	61.00	22.24		Weight too small			
69.00	62.00	23.20		Weight too small			
69.00	63.00	24.16	50.54	14.29	620.0	8857.	
69.00	64.00	25.12	56.88	13.98	702.1	9817.	
70.00	45.00	7.404		Radius too small			
70.00	46.00	8.351		Radius too small			
70.00	47.00	9.297		Radius too small			
70.00	48.00	10.24		Radius too small			
70.00	49.00	11.19		Radius too small			
70.00	50.00	12.14		Radius too small			
70.00	51.00	13.08		Radius too small			
70.00	52.00	14.03		Radius too small			
70.00	53.00	14.97		Radius too small			
70.00	54.00	15.92		Radius too small			
70.00	55.00	16.87		Weight too small			
70.00	56.00	17.81		Weight too small			
70.00	57.00	18.76		Weight too small			
70.00	58.00	19.71		Weight too small			
70.00	59.00	20.65		Weight too small			
70.00	60.00	21.60		Weight too small			
70.00	61.00	22.54		Weight too small			
70.00	62.00	23.49		Weight too small			
70.00	63.00	24.44		Weight too small			
70.00	64.00	25.40		Weight too small			
71.00	45.00	7.728		Radius too small			
71.00	46.00	8.674		Radius too small			
71.00	47.00	9.620		Radius too small			
71.00	48.00	10.57		Radius too small			
71.00	49.00	11.51		Radius too small			
71.00	50.00	12.46		Radius too small			
71.00	51.00	13.41		Radius too small			
71.00	52.00	14.35		Radius too small			
71.00	53.00	15.30		Radius too small			
71.00	54.00	16.24		Radius too small			
71.00	55.00	17.19		Radius too small			
71.00	56.00	18.14		Slip too small to split into minimum no. of slices			
71.00	57.00	19.08		Weight too small			

E.P.A. Export 08-07-2014:23:43:05

71.00	58.00	20.03	Weight too small
71.00	59.00	20.98	Weight too small
71.00	60.00	21.92	Weight too small
71.00	61.00	22.87	Weight too small
71.00	62.00	23.81	Weight too small
71.00	63.00	24.76	Weight too small
71.00	64.00	25.71	Weight too small
72.00	45.00	8.051	Radius too small
72.00	46.00	8.997	Radius too small
72.00	47.00	9.944	Radius too small
72.00	48.00	10.89	Radius too small
72.00	49.00	11.84	Radius too small
72.00	50.00	12.78	Radius too small
72.00	51.00	13.73	Radius too small
72.00	52.00	14.68	Radius too small
72.00	53.00	15.62	Radius too small
72.00	54.00	16.57	Radius too small
72.00	55.00	17.51	Radius too small
72.00	56.00	18.46	Radius too small
72.00	57.00	19.41	Radius too small
72.00	58.00	20.35	Weight too small
72.00	59.00	21.30	Weight too small
72.00	60.00	22.25	Weight too small
72.00	61.00	23.19	Weight too small
72.00	62.00	24.14	Weight too small
72.00	63.00	25.08	Weight too small
72.00	64.00	26.03	Weight too small
73.00	45.00	8.375	Radius too small
73.00	46.00	9.321	Radius too small
73.00	47.00	10.27	Radius too small
73.00	48.00	11.21	Radius too small
73.00	49.00	12.16	Radius too small
73.00	50.00	13.11	Radius too small
73.00	51.00	14.05	Radius too small
73.00	52.00	15.00	Radius too small
73.00	53.00	15.94	Radius too small
73.00	54.00	16.89	Radius too small
73.00	55.00	17.84	Radius too small
73.00	56.00	18.78	Radius too small
73.00	57.00	19.73	Radius too small
73.00	58.00	20.68	Radius too small
73.00	59.00	21.62	Radius too small
73.00	60.00	22.57	Weight too small
73.00	61.00	23.51	Weight too small
73.00	62.00	24.46	Weight too small
73.00	63.00	25.41	Weight too small
73.00	64.00	26.35	Weight too small
74.00	45.00	8.682	Radius too small
74.00	46.00	9.635	Radius too small
74.00	47.00	10.59	Radius too small
74.00	48.00	11.54	Radius too small
74.00	49.00	12.48	Radius too small
74.00	50.00	13.43	Radius too small
74.00	51.00	14.38	Radius too small
74.00	52.00	15.32	Radius too small
74.00	53.00	16.27	Radius too small
74.00	54.00	17.21	Radius too small
74.00	55.00	18.16	Radius too small
74.00	56.00	19.11	Radius too small
74.00	57.00	20.05	Radius too small
74.00	58.00	21.00	Radius too small
74.00	59.00	21.95	Radius too small
74.00	60.00	22.89	Radius too small
74.00	61.00	23.84	Weight too small
74.00	62.00	24.78	Weight too small
74.00	63.00	25.73	Weight too small
74.00	64.00	26.68	Weight too small
75.00	45.00	8.987	Radius too small
75.00	46.00	9.939	Radius too small
75.00	47.00	10.89	Radius too small
75.00	48.00	11.84	Radius too small
75.00	49.00	12.80	Radius too small
75.00	50.00	13.75	Radius too small
75.00	51.00	14.70	Radius too small
75.00	52.00	15.65	Radius too small

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75.00	53.00	16.59	Radius too small
75.00	54.00	17.54	Radius too small
75.00	55.00	18.48	Radius too small
75.00	56.00	19.43	Radius too small
75.00	57.00	20.38	Radius too small
75.00	58.00	21.32	Radius too small
75.00	59.00	22.27	Radius too small
75.00	60.00	23.22	Radius too small
75.00	61.00	24.16	Radius too small
75.00	62.00	25.11	Radius too small
75.00	63.00	26.05	Weight too small
75.00	64.00	27.00	Weight too small
76.00	45.00	9.292	Radius too small
76.00	46.00	10.24	Radius too small
76.00	47.00	11.20	Radius too small
76.00	48.00	12.15	Radius too small
76.00	49.00	13.10	Radius too small
76.00	50.00	14.05	Radius too small
76.00	51.00	15.01	Radius too small
76.00	52.00	15.96	Radius too small
76.00	53.00	16.91	Radius too small
76.00	54.00	17.86	Radius too small
76.00	55.00	18.81	Radius too small
76.00	56.00	19.75	Radius too small
76.00	57.00	20.70	Radius too small
76.00	58.00	21.65	Radius too small
76.00	59.00	22.59	Radius too small
76.00	60.00	23.54	Radius too small
76.00	61.00	24.48	Radius too small
76.00	62.00	25.43	Radius too small
76.00	63.00	26.38	Radius too small
76.00	64.00	27.32	Radius too small
77.00	45.00	9.596	Radius too small
77.00	46.00	10.55	Radius too small
77.00	47.00	11.50	Radius too small
77.00	48.00	12.45	Radius too small
77.00	49.00	13.41	Radius too small
77.00	50.00	14.36	Radius too small
77.00	51.00	15.31	Radius too small
77.00	52.00	16.26	Radius too small
77.00	53.00	17.22	Radius too small
77.00	54.00	18.17	Radius too small
77.00	55.00	19.12	Radius too small
77.00	56.00	20.07	Radius too small
77.00	57.00	21.02	Radius too small
77.00	58.00	21.97	Radius too small
77.00	59.00	22.92	Radius too small
77.00	60.00	23.86	Radius too small
77.00	61.00	24.81	Radius too small
77.00	62.00	25.75	Radius too small
77.00	63.00	26.70	Radius too small
77.00	64.00	27.65	Radius too small
78.00	45.00	9.901	Radius too small
78.00	46.00	10.85	Radius too small
78.00	47.00	11.81	Radius too small
78.00	48.00	12.76	Radius too small
78.00	49.00	13.71	Radius too small
78.00	50.00	14.66	Radius too small
78.00	51.00	15.62	Radius too small
78.00	52.00	16.57	Radius too small
78.00	53.00	17.52	Radius too small
78.00	54.00	18.47	Radius too small
78.00	55.00	19.43	Radius too small
78.00	56.00	20.38	Radius too small
78.00	57.00	21.33	Radius too small
78.00	58.00	22.28	Radius too small
78.00	59.00	23.24	Radius too small
78.00	60.00	24.19	Radius too small
78.00	61.00	25.13	Radius too small
78.00	62.00	26.08	Radius too small
78.00	63.00	27.02	Radius too small
78.00	64.00	27.97	Radius too small
79.00	45.00	10.21	Radius too small
79.00	46.00	11.16	Radius too small
79.00	47.00	12.11	Radius too small

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79.00	48.00	13.06	Radius too small
79.00	49.00	14.02	Radius too small
79.00	50.00	14.97	Radius too small
79.00	51.00	15.92	Radius too small
79.00	52.00	16.87	Radius too small
79.00	53.00	17.83	Radius too small
79.00	54.00	18.78	Radius too small
79.00	55.00	19.73	Radius too small
79.00	56.00	20.68	Radius too small
79.00	57.00	21.64	Radius too small
79.00	58.00	22.59	Radius too small
79.00	59.00	23.54	Radius too small
79.00	60.00	24.49	Radius too small
79.00	61.00	25.44	Radius too small
79.00	62.00	26.40	Radius too small
79.00	63.00	27.35	Radius too small
79.00	64.00	28.29	Radius too small
80.00	45.00	10.48	Radius too small
80.00	46.00	11.48	Weight too small
80.00	47.00	12.48	Weight too small
80.00	48.00	13.48	Weight too small
80.00	49.00	14.48	Weight too small
80.00	50.00	15.48	Weight too small
80.00	51.00	16.48	Weight too small
80.00	52.00	17.47	Weight too small
80.00	53.00	18.47	Weight too small
80.00	54.00	19.08	Radius too small
80.00	55.00	20.04	Radius too small
80.00	56.00	20.99	Radius too small
80.00	57.00	21.94	Radius too small
80.00	58.00	22.89	Radius too small
80.00	59.00	23.84	Radius too small
80.00	60.00	24.80	Radius too small
80.00	61.00	25.75	Radius too small
80.00	62.00	26.70	Radius too small
80.00	63.00	27.65	Radius too small
80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small
81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small
81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.60	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small
82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small

82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small
83.00	45.00	10.92	Radius too small
83.00	46.00	11.88	Radius too small
83.00	47.00	12.85	Radius too small
83.00	48.00	13.83	Radius too small
83.00	49.00	14.80	Radius too small
83.00	50.00	15.78	Radius too small
83.00	51.00	16.77	Radius too small
83.00	52.00	17.75	Radius too small
83.00	53.00	18.74	Radius too small
83.00	54.00	19.73	Radius too small
83.00	55.00	20.71	Radius too small
83.00	56.00	21.70	Radius too small
83.00	57.00	22.70	Radius too small
83.00	58.00	23.69	Radius too small
83.00	59.00	24.68	Radius too small
83.00	60.00	25.67	Radius too small
83.00	61.00	26.67	Radius too small
83.00	62.00	27.66	Weight too small
83.00	63.00	28.65	Weight too small
83.00	64.00	29.65	Weight too small
84.00	45.00	11.23	Radius too small
84.00	46.00	12.17	Radius too small
84.00	47.00	13.12	Radius too small
84.00	48.00	14.08	Radius too small
84.00	49.00	15.04	Radius too small
84.00	50.00	16.00	Radius too small
84.00	51.00	16.97	Radius too small
84.00	52.00	17.95	Radius too small
84.00	53.00	18.92	Radius too small
84.00	54.00	19.90	Radius too small
84.00	55.00	20.88	Radius too small
84.00	56.00	21.86	Radius too small
84.00	57.00	22.85	Radius too small
84.00	58.00	23.83	Radius too small
84.00	59.00	24.82	Radius too small
84.00	60.00	25.81	Radius too small
84.00	61.00	26.80	Radius too small
84.00	62.00	27.79	Radius too small
84.00	63.00	28.78	Radius too small
84.00	64.00	29.77	Radius too small
85.00	45.00	11.63	Disturbing moment < 0
85.00	46.00	12.54	Radius too small
85.00	47.00	13.46	Radius too small
85.00	48.00	14.39	Radius too small
85.00	49.00	15.33	Radius too small
85.00	50.00	16.28	Radius too small
85.00	51.00	17.24	Radius too small
85.00	52.00	18.20	Radius too small
85.00	53.00	19.16	Radius too small
85.00	54.00	20.13	Radius too small
85.00	55.00	21.10	Radius too small
85.00	56.00	22.07	Radius too small
85.00	57.00	23.04	Radius too small
85.00	58.00	24.02	Radius too small
85.00	59.00	25.00	Radius too small
85.00	60.00	25.98	Radius too small
85.00	61.00	26.96	Radius too small
85.00	62.00	27.95	Radius too small
85.00	63.00	28.93	Radius too small
85.00	64.00	29.92	Radius too small
86.00	45.00	12.09	FoS > 1000
86.00	46.00	12.97	FoS > 1000
86.00	47.00	13.86	FoS > 1000
86.00	48.00	14.77	FoS > 1000
86.00	49.00	15.69	FoS > 1000
86.00	50.00	16.62	Disturbing moment < 0
86.00	51.00	17.55	Radius too small
86.00	52.00	18.50	Radius too small
86.00	53.00	19.44	Radius too small
86.00	54.00	20.40	Radius too small
86.00	55.00	21.36	Radius too small
86.00	56.00	22.32	Radius too small
86.00	57.00	23.28	Radius too small

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86.00	58.00	24.25	Radius too small			
86.00	59.00	25.22	Radius too small			
86.00	60.00	26.19	Radius too small			
86.00	61.00	27.17	Radius too small			
86.00	62.00	28.14	Radius too small			
86.00	63.00	29.12	Radius too small			
86.00	64.00	30.10	Radius too small			
87.00	45.00	11.60	Radius too small			
87.00	46.00	13.46	Disturbing moment < 0			
87.00	47.00	14.32	86.34	2.463E+6	0.003984	9814.
87.00	48.00	15.20	FoS > 1000			
87.00	49.00	16.10	FoS > 1000			
87.00	50.00	17.00	Disturbing moment < 0			
87.00	51.00	17.92	FoS > 1000			
87.00	52.00	18.84	Disturbing moment < 0			
87.00	53.00	19.78	Disturbing moment < 0			
87.00	54.00	20.71	Disturbing moment < 0			
87.00	55.00	21.66	FoS > 1000			
87.00	56.00	22.61	Disturbing moment < 0			
87.00	57.00	23.56	Radius too small			
87.00	58.00	24.52	Radius too small			
87.00	59.00	25.48	Radius too small			
87.00	60.00	26.44	Radius too small			
87.00	61.00	27.40	Radius too small			
87.00	62.00	28.37	Radius too small			
87.00	63.00	29.34	Radius too small			
87.00	64.00	30.32	Radius too small			
88.00	45.00	11.60	Radius too small			
88.00	46.00	12.60	Radius too small			
88.00	47.00	13.60	Radius too small			
88.00	48.00	15.69	166.6	519300.	0.02663	13830.
88.00	49.00	16.56	141.3	1.190E+6	0.01180	14040.
88.00	50.00	17.44	Disturbing moment < 0			
88.00	51.00	18.33	100.0	1.843E+6	0.007762	14300.
88.00	52.00	19.24	Disturbing moment < 0			
88.00	53.00	20.15	Disturbing moment < 0			
88.00	54.00	21.07	FoS > 1000			
88.00	55.00	22.00	FoS > 1000			
88.00	56.00	22.94	Disturbing moment < 0			
88.00	57.00	23.88	FoS > 1000			
88.00	58.00	24.82	FoS > 1000			
88.00	59.00	25.77	FoS > 1000			
88.00	60.00	26.72	FoS > 1000			
88.00	61.00	27.68	Disturbing moment < 0			
88.00	62.00	28.64	Disturbing moment < 0			
88.00	63.00	29.60	Radius too small			
88.00	64.00	30.56	Radius too small			
89.00	45.00	11.60	Radius too small			
89.00	46.00	12.60	Radius too small			
89.00	47.00	13.60	Radius too small			
89.00	48.00	14.60	Radius too small			
89.00	49.00	15.60	Radius too small			
89.00	50.00	17.92	237.7	316000.	0.05686	18600.
89.00	51.00	18.79	208.8	259900.	0.07293	18960.
89.00	52.00	19.67	183.4	352800.	0.05464	19280.
89.00	53.00	20.57	160.8	6.313E+6	0.003098	19560.
89.00	54.00	21.47	Disturbing moment < 0			
89.00	55.00	22.38	122.6	1.833E+6	0.01089	19960.
89.00	56.00	23.30	106.2	2.274E+6	0.008825	20070.
89.00	57.00	24.23	Disturbing moment < 0			
89.00	58.00	25.16	FoS > 1000			
89.00	59.00	26.10	FoS > 1000			
89.00	60.00	27.04	FoS > 1000			
89.00	61.00	27.98	FoS > 1000			
89.00	62.00	28.93	Disturbing moment < 0			
89.00	63.00	29.88	FoS > 1000			
89.00	64.00	30.84	FoS > 1000			

WORST CASE : WATER CASE 1 OF 1

Centre at (43.00,62.00)
Iterations: 5
Net vertical force [kN]: .0
Net horiz force [kN]: 4.649E-6
Inclination of interslice forces

Radius 21.42m
Horiz acceleration [kg]: .0
Slip weight [kN] 367.2
Disturbing moment [kN m]: 179.6
Restoring moment [kN m]: 1335.

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[°]: 0.9030

Factor of Safety: 7.433

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	32.54	43.31	-5.000	.0	.0	.0
2	33.53	42.78	.0	0.01446	0.9174	.0
3	35.21	42.05	7.000	0.1098	6.969	2.450
4	36.94	41.45	12.53	0.2484	15.76	7.850
5	38.72	41.01	16.55	0.3857	24.47	13.69
6	40.52	40.72	19.03	0.4879	30.96	18.11
7	42.35	40.59	19.95	0.5330	33.82	19.91
8	44.18	40.61	19.31	0.5118	32.47	18.65
9	46.00	40.79	17.11	0.4280	27.16	14.64
10	47.87	41.14	13.02	0.2938	18.64	8.476
11	49.69	41.65	7.301	0.1453	9.216	2.665
12	51.47	42.32	.0	0.02957	1.876	.0
13	52.51	42.80	-13.65	.0	4.649E-6	.0

Slice Strength Parameters

Slice No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	.0	2.734	2.834	3.369
2	3.000	.0	3.500	15.66	16.68	5.491
3	3.000	.0	9.765	28.13	29.33	5.491
4	3.000	.0	14.54	38.18	39.02	5.491
5	3.000	.0	17.79	45.31	45.66	5.491
6	3.000	.0	19.49	49.18	49.21	5.491
7	3.000	.0	19.63	49.59	49.63	5.491
8	3.000	.0	18.21	46.51	46.89	5.491
9	3.000	.0	15.07	41.24	42.24	5.697
10	3.000	.0	10.16	30.61	32.16	5.697
11	3.000	.0	3.650	17.09	18.69	5.697
12	3.000	.0	.0	2.926	3.470	3.435

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0

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ARUP

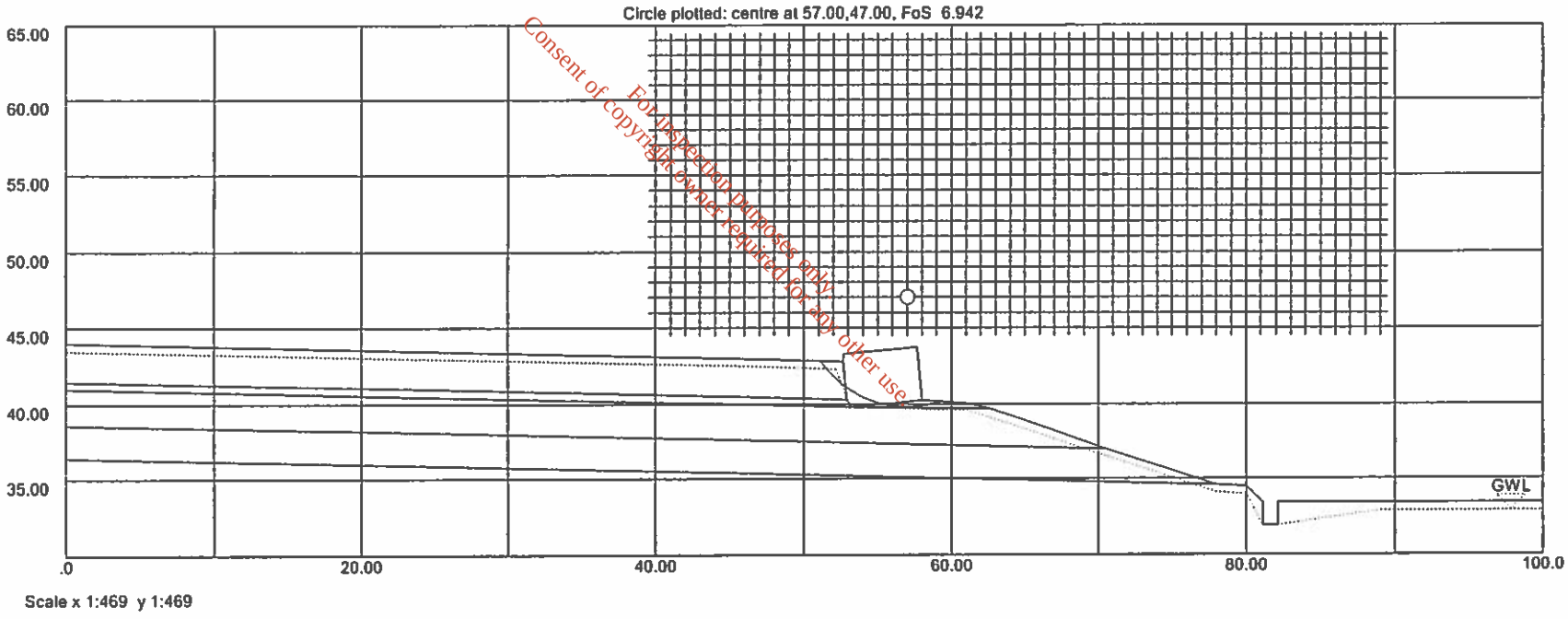
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A: Rev 4A:0	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Cut No4a.sld	JB



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Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL (kN/m3)	Unit Weight Below GWL (kN/m3)		Shear Strength Parameters Phi or Phi0 (°)	c or c0' (kPa)
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Drained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Drained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Drained	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Drained	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Dr	20.00	20.00	Undrained	.0	75.00
7	Rock (Drained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X -->						
		53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X -->						
		78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.
6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X -->
		100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

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Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	4.858	222.0	60.37	15.93	961.5
40.00	46.00	5.858	248.4	54.20	23.42	1269.
40.00	47.00	6.858	271.8	50.58	31.72	1604.
40.00	48.00	7.858	293.7	48.05	40.89	1965.
40.00	49.00	8.857	314.0	46.12	50.93	2349.
40.00	50.00	9.857	333.3	44.70	61.64	2755.
40.00	51.00	10.86	351.5	43.45	73.24	3182.
40.00	52.00	11.86	368.3	42.48	85.44	3629.
40.00	53.00	12.86	384.7	41.59	98.49	4096.
40.00	54.00	13.86	400.7	40.93	111.9	4581.
40.00	55.00	14.86	415.9	40.30	126.1	5083.
40.00	56.00	15.86	430.4	39.76	140.9	5603.
40.00	57.00	16.86	444.5	39.29	156.3	6140.
40.00	58.00	17.86	458.1	38.87	172.2	6692.
40.00	59.00	18.85	471.4	38.51	188.5	7260.
40.00	60.00	19.85	484.2	38.18	205.4	7843.
40.00	61.00	20.85	496.4	37.93	222.6	8441.
40.00	62.00	21.85	508.6	37.66	240.4	9054.
40.00	63.00	22.85	520.5	37.41	258.8	9681.
40.00	64.00	23.85	532.1	37.19	277.5	10320.
41.00	45.00	4.881	222.6	60.19	16.09	968.2
41.00	46.00	5.881	249.0	54.20	23.55	1277.
41.00	47.00	6.881	272.4	50.57	31.88	1612.
41.00	48.00	7.880	294.4	47.74	41.33	1973.
41.00	49.00	8.880	314.4	45.63	51.67	2358.
41.00	50.00	9.880	333.7	44.17	62.58	2764.
41.00	51.00	10.88	351.8	42.87	74.46	3192.
41.00	52.00	11.88	368.9	41.83	87.02	3640.
41.00	53.00	12.88	385.2	40.97	100.2	4106.
41.00	54.00	13.88	400.6	40.34	113.8	4592.
41.00	55.00	14.88	415.6	39.72	128.3	5095.
41.00	56.00	15.88	430.1	39.19	143.3	5615.
41.00	57.00	16.88	444.1	38.73	158.8	6151.
41.00	58.00	17.88	458.1	38.33	174.9	6704.
41.00	59.00	18.88	471.3	37.97	191.5	7272.
41.00	60.00	19.88	484.2	37.66	208.6	7856.
41.00	61.00	20.88	496.7	37.37	226.2	8454.
41.00	62.00	21.88	508.8	37.12	244.3	9067.
41.00	63.00	22.88	520.7	36.89	262.8	9694.
41.00	64.00	23.88	532.3	36.68	281.8	10330.
41.00	64.00	23.88	Weight too small			
42.00	45.00	4.904	223.2	60.10	16.22	974.8
42.00	46.00	5.904	249.6	53.67	23.92	1284.
42.00	47.00	6.903	273.0	49.78	32.55	1620.
42.00	48.00	7.903	294.7	46.82	42.32	1981.
42.00	49.00	8.903	314.9	44.74	52.90	2366.
42.00	50.00	9.903	333.7	43.26	64.12	2773.
42.00	51.00	10.90	351.9	42.08	76.08	3201.
42.00	52.00	11.90	369.0	41.08	88.84	3650.
42.00	53.00	12.90	385.3	40.27	102.2	4117.

EPA Export 08-07-2014:23:43:05

42.00	54.00	13.90	400.9	39.59	116.3	4602.
42.00	55.00	14.90	415.9	39.02	130.9	5106.
42.00	56.00	15.90	430.3	38.52	146.0	5626.
42.00	57.00	16.90	444.3	38.10	161.8	6163.
42.00	58.00	17.90	457.8	37.72	178.0	6716.
42.00	59.00	18.90	470.9	37.39	194.8	7285.
42.00	60.00	19.90	483.7	37.10	212.1	7869.
42.00	60.00	19.90		Weight too small		
42.00	61.00	20.90	496.2	36.82	229.9	8466.
42.00	61.00	20.90		Weight too small		
42.00	62.00	21.90	508.4	36.57	248.2	9077.
42.00	62.00	21.90		Weight too small		
42.00	63.00	22.90		Disturbing moment < 0		
42.00	64.00	23.90		Disturbing moment < 0		
43.00	45.00	4.927	223.9	58.65	16.73	981.4
43.00	46.00	5.926	249.9	52.25	24.71	1291.
43.00	47.00	6.926	273.3	48.44	33.60	1628.
43.00	48.00	7.926	294.9	45.72	43.52	1990.
43.00	49.00	8.926	315.0	43.77	54.26	2375.
43.00	50.00	9.925	333.9	42.31	65.77	2783.
43.00	51.00	10.92	351.7	41.16	78.01	3211.
43.00	52.00	11.92	368.8	40.21	90.99	3658.
43.00	53.00	12.92	385.2	39.42	104.6	4124.
43.00	54.00	13.92	400.8	38.76	118.9	4609.
43.00	55.00	14.92	415.8	38.26	133.5	5110.
43.00	56.00	15.92	429.5	37.78	149.0	5628.
43.00	57.00	16.92	443.6	37.36	165.0	6163.
43.00	57.00	16.92		Weight too small		
43.00	58.00	17.92	457.1	36.99	181.5	6714.
43.00	58.00	17.92		Weight too small		
43.00	59.00	18.92		Disturbing moment < 0		
43.00	60.00	19.92		Disturbing moment < 0		
43.00	61.00	20.92		Disturbing moment < 0		
43.00	62.00	21.92		Disturbing moment < 0		
43.00	63.00	22.92		Disturbing moment < 0		
43.00	64.00	23.92		Disturbing moment < 0		
44.00	45.00	4.949	224.3	56.48	17.49	987.9
44.00	46.00	5.949	250.5	50.39	25.75	1298.
44.00	47.00	6.949	273.6	46.02	34.90	1634.
44.00	48.00	7.948	294.7	44.30	45.03	1995.
44.00	49.00	8.948	314.9	42.47	56.02	2379.
44.00	50.00	9.948	333.8	41.09	67.79	2785.
44.00	51.00	10.95	351.7	40.01	80.29	3212.
44.00	52.00	11.95	368.7	39.14	93.48	3659.
44.00	53.00	12.95	384.9	38.43	107.3	4124.
44.00	54.00	13.95	400.4	37.83	121.8	4607.
44.00	54.00	13.95		Weight too small		
44.00	55.00	14.95	415.4	37.32	136.9	5108.
44.00	55.00	14.95		Weight too small		
44.00	56.00	15.95		Disturbing moment < 0		
44.00	57.00	16.95		Disturbing moment < 0		
44.00	58.00	17.95		Disturbing moment < 0		
44.00	59.00	18.95		Disturbing moment < 0		
44.00	60.00	19.95		Disturbing moment < 0		
44.00	61.00	20.95		Disturbing moment < 0		
44.00	62.00	21.94	535.7	642.1	26.36	16930.
44.00	63.00	22.94	551.9	337.2	55.42	18690.
44.00	64.00	23.94	566.6	236.3	86.83	20520.
45.00	45.00	4.972	224.9	53.56	18.52	992.1
45.00	46.00	5.972	250.8	48.18	27.01	1301.
45.00	47.00	6.971	273.8	44.98	36.40	1638.
45.00	48.00	7.971	295.4	42.69	46.81	1998.
45.00	49.00	8.971	315.4	41.03	58.06	2382.
45.00	50.00	9.971	334.3	39.77	70.09	2788.
45.00	51.00	10.97	352.1	38.79	82.85	3214.
45.00	51.00	10.97		Weight too small		
45.00	52.00	11.97		Disturbing moment < 0		
45.00	53.00	12.97		Disturbing moment < 0		
45.00	54.00	13.97		Disturbing moment < 0		
45.00	55.00	14.97		Disturbing moment < 0		
45.00	56.00	15.97		Disturbing moment < 0		
45.00	57.00	16.97	465.5	481.1	23.44	11280.
45.00	58.00	17.97	483.7	246.9	51.92	12820.
45.00	59.00	18.97	501.6	174.7	82.57	14430.
45.00	60.00	19.97	519.2	139.7	115.3	16110.

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45.00	61.00	20.97	536.6	119.1	149.9	17860.
45.00	62.00	21.97	553.6	105.5	186.4	19670.
45.00	63.00	22.97	570.5	95.94	224.7	21560.
45.00	64.00	23.97	588.1	86.28	266.4	22980.
46.00	45.00	4.995	225.2	50.95	19.55	996.1
46.00	46.00	5.994	251.0	46.08	28.32	1305.
46.00	47.00	6.994	273.8	43.19	37.99	1641.
46.00	48.00	7.994	295.3	41.12	48.67	2001.
46.00	49.00	8.994	315.3	39.62	60.18	2385.
46.00	49.00	8.994		Weight too small		
46.00	50.00	9.993		Disturbing moment < 0		
46.00	51.00	10.99		Disturbing moment < 0		
46.00	52.00	11.99		Disturbing moment < 0		
46.00	53.00	12.99	402.6	296.6	25.36	7521.
46.00	54.00	13.99	423.3	164.1	54.07	8873.
46.00	55.00	14.99	443.5	120.7	85.35	10300.
46.00	56.00	15.99	463.3	99.25	119.0	11810.
46.00	57.00	16.99	482.6	86.50	154.8	13390.
46.00	58.00	17.99	502.4	77.24	194.8	15050.
46.00	59.00	18.99	521.2	71.35	235.1	16770.
46.00	60.00	19.99	539.8	66.98	277.3	18580.
46.00	61.00	20.99	557.7	62.02	315.9	19590.
46.00	62.00	21.99	574.2	59.65	345.6	20610.
46.00	63.00	22.99		Disturbing moment < 0		
46.00	64.00	23.99		Disturbing moment < 0		
47.00	45.00	5.022	226.0	48.71	20.64	1005.
47.00	46.00	6.021	251.7	44.25	29.72	1315.
47.00	47.00	7.021	274.1	41.78	39.52	1651.
47.00	47.00	7.021		Weight too small		
47.00	48.00	8.021		Disturbing moment < 0		
47.00	49.00	9.020	326.6	709.5	5.821	4130.
47.00	50.00	10.02	351.0	155.6	33.85	5266.
47.00	51.00	11.02	374.8	100.9	64.24	6482.
47.00	52.00	12.02	397.7	79.77	97.54	7781.
47.00	53.00	13.02	419.9	68.66	133.5	9162.
47.00	54.00	14.02	442.3	61.18	173.7	10630.
47.00	55.00	15.02	463.3	56.61	215.0	12170.
47.00	56.00	16.02	484.2	53.44	258.1	13790.
47.00	57.00	17.02	504.4	51.24	301.1	15430.
47.00	58.00	18.02	524.1	47.83	342.2	16370.
47.00	59.00	19.02	542.0	46.97	369.2	17340.
47.00	60.00	20.02		Disturbing moment < 0		
47.00	61.00	21.02		Disturbing moment < 0		
47.00	62.00	22.02		Disturbing moment < 0		
47.00	63.00	23.01		Disturbing moment < 0		
47.00	64.00	24.01		Disturbing moment < 0		
48.00	45.00	5.050	226.7	46.77	21.70	1015.
48.00	45.00	5.050		Weight too small		
48.00	46.00	6.049		Disturbing moment < 0		
48.00	47.00	7.049	287.2	136.0	22.96	3123.
48.00	48.00	8.048	315.6	78.02	53.51	4174.
48.00	49.00	9.048	342.7	60.62	87.68	5315.
48.00	50.00	10.05	368.9	51.67	126.7	6548.
48.00	51.00	11.05	394.1	47.08	167.2	7870.
48.00	52.00	12.05	418.8	44.15	210.2	9281.
48.00	53.00	13.05	441.6	42.11	255.9	10780.
48.00	54.00	14.05	464.5	40.72	303.4	12360.
48.00	55.00	15.05	486.4	38.43	346.6	13320.
48.00	56.00	16.05	506.1	37.98	374.7	14230.
48.00	57.00	17.04		Disturbing moment < 0		
48.00	58.00	18.04		Disturbing moment < 0		
48.00	59.00	19.04		Disturbing moment < 0		
48.00	60.00	20.04		Disturbing moment < 0		
48.00	61.00	21.04		Disturbing moment < 0		
48.00	62.00	22.04		Disturbing moment < 0		
48.00	63.00	23.04		Disturbing moment < 0		
48.00	64.00	24.04		Disturbing moment < 0		
49.00	45.00	5.077	238.1	90.77	22.77	2067.
49.00	46.00	6.077	272.5	53.06	56.78	3013.
49.00	47.00	7.077	304.5	42.97	94.38	4055.
49.00	48.00	8.076	334.6	38.41	135.4	5200.
49.00	49.00	9.076	363.4	35.94	179.3	6444.
49.00	50.00	10.08	390.7	34.26	227.3	7786.
49.00	51.00	11.08	417.2	33.34	276.6	9221.
49.00	52.00	12.07	442.7	32.01	326.7	10460.

EPA Export 08-07-2014:23:43:05

49.00	53.00	13.07	464.7	31.38	359.8	11290.
49.00	54.00	14.07	Disturbing moment < 0			
49.00	55.00	15.07	Disturbing moment < 0			
49.00	56.00	16.07	Disturbing moment < 0			
49.00	57.00	17.07	Disturbing moment < 0			
49.00	58.00	18.07	Disturbing moment < 0			
49.00	59.00	19.07	Disturbing moment < 0			
49.00	60.00	20.07	Disturbing moment < 0			
49.00	61.00	21.07	Disturbing moment < 0			
49.00	62.00	22.07	Disturbing moment < 0			
49.00	63.00	23.07	Disturbing moment < 0			
49.00	64.00	24.07	Disturbing moment < 0			
50.00	45.00	5.105	255.8	34.52	79.91	2758.
50.00	46.00	6.105	292.4	30.73	123.2	3785.
50.00	47.00	7.104	326.3	28.99	169.9	4926.
50.00	48.00	8.104	357.2	28.12	219.6	6176.
50.00	49.00	9.104	388.6	28.12	274.3	7712.
50.00	50.00	10.10	416.1	26.72	322.3	8612.
50.00	51.00	11.10	Disturbing moment < 0			
50.00	52.00	12.10	Disturbing moment < 0			
50.00	53.00	13.10	Disturbing moment < 0			
50.00	54.00	14.10	Disturbing moment < 0			
50.00	55.00	15.10	Disturbing moment < 0			
50.00	56.00	16.10	Disturbing moment < 0			
50.00	57.00	17.10	Disturbing moment < 0			
50.00	58.00	18.10	Disturbing moment < 0			
50.00	59.00	19.10	Disturbing moment < 0			
50.00	60.00	20.10	Disturbing moment < 0			
50.00	61.00	21.10	Disturbing moment < 0			
50.00	62.00	22.10	Disturbing moment < 0			
50.00	63.00	23.10	Disturbing moment < 0			
50.00	64.00	24.10	610.2	1220.	16.96	20860.
51.00	45.00	5.133	278.2	24.75	135.1	3344.
51.00	46.00	6.133	316.1	23.72	186.1	4415.
51.00	47.00	7.132	351.5	23.33	240.0	5598.
51.00	48.00	8.132	383.8	22.28	291.6	6497.
51.00	49.00	9.131	Disturbing moment < 0			
51.00	50.00	10.13	Disturbing moment < 0			
51.00	51.00	11.13	Disturbing moment < 0			
51.00	52.00	12.13	Disturbing moment < 0			
51.00	53.00	13.13	Disturbing moment < 0			
51.00	54.00	14.13	Disturbing moment < 0			
51.00	55.00	15.13	Disturbing moment < 0			
51.00	56.00	16.13	Disturbing moment < 0			
51.00	57.00	17.13	Disturbing moment < 0			
51.00	58.00	18.13	Disturbing moment < 0			
51.00	59.00	19.13	Disturbing moment < 0			
51.00	60.00	20.13	560.9	491.1	32.86	16140.
51.00	61.00	21.13	570.2	207.5	82.09	17030.
51.00	62.00	22.13	579.1	135.5	132.5	17950.
51.00	63.00	23.13	587.8	102.6	183.9	18870.
51.00	64.00	24.13	596.1	83.83	236.3	19810.
52.00	45.00	5.161	302.6	20.81	178.0	3705.
52.00	46.00	6.160	341.7	20.09	235.8	4737.
52.00	47.00	7.160	Disturbing moment < 0			
52.00	48.00	8.160	Disturbing moment < 0			
52.00	49.00	9.159	Disturbing moment < 0			
52.00	50.00	10.16	Disturbing moment < 0			
52.00	51.00	11.16	Disturbing moment < 0			
52.00	52.00	12.16	Disturbing moment < 0			
52.00	53.00	13.16	Disturbing moment < 0			
52.00	54.00	14.16	Disturbing moment < 0			
52.00	55.00	15.16	Disturbing moment < 0			
52.00	56.00	16.16	506.8	274.5	43.19	11850.
52.00	57.00	17.16	516.6	136.0	93.24	12680.
52.00	58.00	18.16	526.6	93.46	144.7	13520.
52.00	59.00	19.16	535.7	72.93	197.1	14370.
52.00	60.00	20.15	544.5	60.83	250.4	15230.
52.00	61.00	21.15	552.9	52.87	304.7	16110.
52.00	62.00	22.15	561.1	47.24	359.6	16990.
52.00	63.00	23.15	569.0	43.06	415.3	17880.
52.00	64.00	24.15	577.0	39.81	471.8	18780.
53.00	45.00	5.188	Disturbing moment < 0			
53.00	46.00	6.188	Disturbing moment < 0			
53.00	47.00	7.188	Disturbing moment < 0			

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53.00	48.00	8.187	Disturbing moment < 0			
53.00	49.00	9.187	Disturbing moment < 0			
53.00	50.00	10.19	Disturbing moment < 0			
53.00	51.00	11.19	Disturbing moment < 0			
53.00	52.00	12.19	447.5	161.6	43.80	7076.
53.00	53.00	13.19	458.4	80.44	94.24	7581.
53.00	54.00	14.18	469.1	55.22	146.3	8079.
53.00	55.00	15.18	479.1	42.99	199.3	8569.
53.00	56.00	16.18	488.5	35.73	253.3	9050.
53.00	57.00	17.18	497.6	30.91	308.1	9522.
53.00	58.00	18.18	506.3	27.46	363.6	9984.
53.00	59.00	19.18	514.8	24.83	420.2	10430.
53.00	60.00	20.18	523.0	22.80	477.0	10870.
53.00	61.00	21.18	530.9	21.16	534.3	11300.
53.00	62.00	22.18	538.6	19.80	592.1	11720.
53.00	63.00	23.18	546.3	18.67	649.7	12130.
53.00	64.00	24.18	553.6	17.68	708.2	12520.
54.00	45.00	5.257	Disturbing moment < 0			
54.00	46.00	6.247	Disturbing moment < 0			
54.00	47.00	7.240	Disturbing moment < 0			
54.00	48.00	8.235	382.9	92.98	36.42	3366.
54.00	49.00	9.231	395.7	43.54	86.00	3745.
54.00	50.00	10.23	407.3	29.84	137.3	4098.
54.00	51.00	11.22	418.6	23.39	190.0	4445.
54.00	52.00	12.22	429.1	19.61	243.9	4783.
54.00	53.00	13.22	438.9	17.12	298.5	5112.
54.00	54.00	14.22	448.4	15.34	354.1	5430.
54.00	55.00	15.22	457.4	13.99	410.3	5738.
54.00	56.00	16.22	466.0	12.92	467.0	6036.
54.00	57.00	17.21	474.7	12.06	524.0	6322.
54.00	58.00	18.21	483.2	11.70	581.3	6801.
54.00	59.00	19.21	491.3	11.51	639.0	7357.
54.00	60.00	20.21	499.2	11.37	697.1	7928.
54.00	61.00	21.21	506.6	11.27	755.3	8513.
54.00	62.00	22.21	514.1	11.19	813.9	9112.
54.00	63.00	23.21	521.7	11.14	873.1	9724.
54.00	64.00	24.21	528.9	11.10	932.3	10350.
55.00	45.00	5.499	351.8	16.02	94.90	1521.
55.00	46.00	6.452	362.4	11.92	146.0	1740.
55.00	47.00	7.418	372.8	10.24	197.8	2025.
55.00	48.00	8.391	382.8	9.531	250.6	2388.
55.00	49.00	9.370	392.1	9.118	304.1	2773.
55.00	50.00	10.35	401.5	8.876	357.9	3177.
55.00	51.00	11.34	410.4	8.732	412.3	3600.
55.00	52.00	12.33	419.3	8.652	467.1	4041.
55.00	53.00	13.32	427.9	8.614	522.3	4499.
55.00	54.00	14.31	436.2	8.603	578.1	4974.
55.00	55.00	15.30	444.3	8.615	634.2	5464.
55.00	56.00	16.30	452.0	8.639	690.9	5969.
55.00	57.00	17.29	459.8	8.678	747.7	6489.
55.00	58.00	18.28	467.4	8.728	804.7	7023.
55.00	59.00	19.28	474.6	8.786	861.8	7572.
55.00	60.00	20.28	481.8	8.847	919.3	8134.
55.00	61.00	21.27	489.0	8.911	977.4	8709.
55.00	62.00	22.27	496.0	8.979	1036.	9297.
55.00	63.00	23.27	502.8	9.049	1094.	9898.
55.00	64.00	24.26	509.5	9.121	1153.	10510.
56.00	45.00	5.225	286.7	8.494	219.1	1861.
56.00	46.00	6.225	301.2	8.023	271.3	2176.
56.00	47.00	7.225	314.5	7.767	323.2	2510.
56.00	48.00	8.225	326.8	7.605	375.5	2856.
56.00	49.00	9.225	339.1	7.885	431.2	3400.
56.00	50.00	10.23	348.9	7.512	481.2	3615.
56.00	51.00	11.23	359.1	7.564	534.9	4046.
56.00	52.00	12.23	368.7	7.622	589.7	4494.
56.00	53.00	13.23	378.2	7.695	644.4	4959.
56.00	54.00	14.22	387.4	7.772	699.7	5438.
56.00	55.00	15.22	396.2	7.853	755.4	5932.
56.00	56.00	16.22	404.9	7.935	811.6	6440.
56.00	57.00	17.22	413.2	8.010	868.2	6962.
56.00	58.00	18.22	421.4	8.102	925.2	7496.
56.00	59.00	19.22	429.3	8.187	982.5	8043.
56.00	60.00	20.22	437.0	8.272	1040.	8603.
56.00	61.00	21.22	444.6	8.356	1098.	9175.
56.00	62.00	22.22	452.0	8.441	1156.	9759.

EPA Export 08-07-2014:23:43:06

56.00	63.00	23.22	459.2	8.525	1215.	10350.
56.00	64.00	24.22	466.3	8.609	1273.	10960.
57.00	45.00	5.236	255.5	7.345	349.8	2569.
57.00	46.00	6.236	271.5	7.011	406.7	2851.
57.00	47.00	7.236	285.2	6.942	461.7	3205.
57.00	48.00	8.236	297.8	6.957	515.6	3587.
57.00	49.00	9.236	309.5	6.997	569.4	3985.
57.00	50.00	10.24	320.2	7.045	623.4	4392.
57.00	51.00	11.24	330.5	7.099	677.3	4808.
57.00	52.00	12.24	340.3	7.151	731.4	5230.
57.00	53.00	13.24	349.7	7.199	786.0	5658.
57.00	54.00	14.24	359.6	7.542	844.5	6369.
57.00	55.00	15.24	368.2	7.593	899.7	6831.
57.00	56.00	16.24	375.6	7.349	951.0	6988.
57.00	57.00	17.24	383.7	7.472	1007.	7522.
57.00	58.00	18.24	391.5	7.567	1063.	8046.
57.00	59.00	19.24	399.2	7.675	1120.	8595.
57.00	60.00	20.24	406.7	7.780	1177.	9155.
57.00	61.00	21.24	414.1	7.881	1234.	9726.
57.00	62.00	22.24	421.4	7.980	1292.	10310.
57.00	63.00	23.24	428.4	8.077	1350.	10900.
57.00	64.00	24.24	435.5	8.168	1408.	11500.
58.00	45.00	5.247	214.9	8.032	407.8	3276.
58.00	46.00	6.247	236.6	7.719	494.4	3816.
58.00	47.00	7.247	252.2	7.291	558.3	4070.
58.00	48.00	8.247	265.9	7.204	617.4	4448.
58.00	49.00	9.247	278.1	7.215	674.7	4860.
58.00	50.00	10.25	289.5	7.266	730.9	5311.
58.00	51.00	11.25	299.9	7.330	786.8	5767.
58.00	52.00	12.25	309.9	7.401	842.2	6233.
58.00	53.00	13.25	319.3	7.465	898.1	6704.
58.00	54.00	14.25	328.4	7.509	953.6	7160.
58.00	55.00	15.25	337.2	7.549	1009.	7618.
58.00	56.00	16.25	345.6	7.584	1065.	8077.
58.00	57.00	17.25	353.7	7.615	1121.	8537.
58.00	58.00	18.25	361.7	7.640	1178.	8998.
58.00	59.00	19.25	369.3	7.663	1234.	9459.
58.00	60.00	20.25	376.7	7.683	1291.	9920.
58.00	61.00	21.25	383.9	7.700	1348.	10380.
58.00	62.00	22.25	391.9	7.994	1411.	11280.
58.00	63.00	23.25	398.5	8.012	1468.	11760.
58.00	64.00	24.25	404.3	7.745	1521.	11780.
59.00	45.00	5.257	167.8	8.255	393.4	3247.
59.00	46.00	6.257	191.5	8.379	492.1	4123.
59.00	47.00	7.257	212.6	8.599	588.1	5057.
59.00	48.00	8.257	229.5	8.194	668.9	5481.
59.00	49.00	9.257	243.0	7.948	734.6	5839.
59.00	50.00	10.26	255.2	7.855	796.8	6259.
59.00	51.00	11.26	266.2	7.828	856.8	6707.
59.00	52.00	12.26	276.4	7.828	915.9	7170.
59.00	53.00	13.26	286.3	7.845	974.2	7643.
59.00	54.00	14.26	295.6	7.870	1032.	8121.
59.00	55.00	15.26	304.4	7.896	1089.	8602.
59.00	56.00	16.26	312.9	7.923	1147.	9086.
59.00	57.00	17.26	321.1	7.947	1204.	9570.
59.00	58.00	18.26	329.0	7.971	1262.	10060.
59.00	59.00	19.26	336.5	7.989	1319.	10540.
59.00	60.00	20.26	343.9	8.008	1377.	11030.
59.00	61.00	21.26	351.1	8.025	1435.	11510.
59.00	62.00	22.26	358.1	8.039	1493.	12000.
59.00	63.00	23.26	365.1	8.050	1551.	12480.
59.00	64.00	24.26	371.8	8.061	1609.	12970.
60.00	45.00	5.268	117.5	9.712	325.4	3161.
60.00	46.00	6.268	142.0	9.306	430.0	4001.
60.00	47.00	7.268	163.4	9.221	531.7	4903.
60.00	48.00	8.268	182.9	9.290	630.8	5860.
60.00	49.00	9.268	200.6	9.427	727.5	6858.
60.00	50.00	10.27	215.4	9.034	810.3	7320.
60.00	51.00	11.27	227.6	8.805	879.0	7739.
60.00	52.00	12.27	238.4	8.674	944.4	8192.
60.00	53.00	13.27	248.8	8.604	1007.	8668.
60.00	54.00	14.27	258.5	8.564	1069.	9156.
60.00	55.00	15.27	267.7	8.544	1130.	9653.
60.00	56.00	16.27	276.5	8.534	1190.	10150.
60.00	57.00	17.27	284.9	8.531	1249.	10660.

60.00	58.00	18.27	293.0	8.532	1309.	11170.
60.00	59.00	19.27	300.8	8.536	1368.	11670.
60.00	60.00	20.27	308.3	8.540	1426.	12180.
60.00	61.00	21.27	315.8	8.538	1486.	12690.
60.00	62.00	22.27	322.8	8.547	1544.	13200.
60.00	63.00	23.27	329.7	8.550	1603.	13700.
60.00	64.00	24.27	336.5	8.552	1662.	14210.
61.00	45.00	5.279	51.23	9.571	199.8	1912.
61.00	45.00	5.279		Weight too small		
61.00	46.00	6.279	73.65	8.589	304.6	2616.
61.00	46.00	6.279		Weight too small		
61.00	47.00	7.279	93.94	8.291	408.0	3383.
61.00	47.00	7.279		Weight too small		
61.00	48.00	8.279	112.5	8.268	509.1	4210.
61.00	48.00	8.279		Weight too small		
61.00	49.00	9.278	148.9	10.60	625.5	6629.
61.00	50.00	10.28	165.8	10.54	725.5	7648.
61.00	51.00	11.28	181.6	10.58	823.1	8710.
61.00	52.00	12.28	195.7	10.20	912.0	9301.
61.00	53.00	13.28	207.2	9.944	985.6	9802.
61.00	54.00	14.28	217.6	9.754	1054.	10280.
61.00	55.00	15.28	227.4	9.622	1120.	10780.
61.00	56.00	16.28	236.6	9.526	1185.	11290.
61.00	57.00	17.28	245.4	9.457	1248.	11800.
61.00	58.00	18.28	253.9	9.405	1310.	12320.
61.00	59.00	19.28	262.0	9.365	1372.	12850.
61.00	60.00	20.28	269.9	9.332	1433.	13370.
61.00	61.00	21.28	277.4	9.305	1494.	13900.
61.00	62.00	22.28	284.6	9.280	1554.	14430.
61.00	63.00	23.28	291.7	9.261	1615.	14950.
61.00	64.00	24.28	298.6	9.243	1675.	15480.
62.00	45.00	5.289		Weight too small		
62.00	45.00	5.289		Weight too small		
62.00	46.00	6.289		Weight too small		
62.00	46.00	6.289		Weight too small		
62.00	47.00	7.289	51.52	10.04	257.7	2588.
62.00	47.00	7.289		Weight too small		
62.00	48.00	8.289	68.90	9.374	357.6	3352.
62.00	48.00	8.289		Weight too small		
62.00	49.00	9.289	85.30	9.113	457.3	4167.
62.00	49.00	9.289		Weight too small		
62.00	50.00	10.29	100.8	9.053	555.9	5033.
62.00	50.00	10.29		Weight too small		
62.00	51.00	11.29	115.4	9.096	653.8	5947.
62.00	51.00	11.29		Weight too small		
62.00	52.00	12.29	129.3	9.206	750.4	6908.
62.00	52.00	12.29		Weight too small		
62.00	53.00	13.29	142.6	9.354	845.6	7910.
62.00	53.00	13.29		Weight too small		
62.00	54.00	14.29	155.0	9.270	938.3	8697.
62.00	54.00	14.29		Weight too small		
62.00	55.00	15.29	183.1	11.41	1047.	11950.
62.00	56.00	16.29	193.2	11.14	1120.	12480.
62.00	57.00	17.29	202.6	10.93	1189.	12990.
62.00	58.00	18.29	211.6	10.76	1256.	13520.
62.00	59.00	19.29	220.2	10.63	1322.	14050.
62.00	60.00	20.29	228.5	10.52	1387.	14590.
62.00	61.00	21.29	236.3	10.42	1451.	15130.
62.00	62.00	22.29	244.0	10.35	1514.	15670.
62.00	63.00	23.29	251.4	10.28	1577.	16210.
62.00	64.00	24.29	258.6	10.22	1639.	16750.
63.00	45.00	5.311		Weight too small		
63.00	46.00	6.309		Weight too small		
63.00	46.00	6.309		Weight too small		
63.00	47.00	7.307		Weight too small		
63.00	47.00	7.307		Weight too small		
63.00	48.00	8.306		Weight too small		
63.00	48.00	8.306		Weight too small		
63.00	49.00	9.305		Weight too small		
63.00	49.00	9.305		Weight too small		
63.00	50.00	10.30	61.36	10.44	380.1	3969.
63.00	50.00	10.30		Weight too small		
63.00	51.00	11.30	75.00	10.13	475.4	4810.
63.00	51.00	11.30		Weight too small		
63.00	52.00	12.30	88.16	9.998	571.1	5710.

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EPA Export 08-07-2014:23:43:06

63.00	52.00	12.30		Weight too small		
63.00	53.00	13.30	100.8	9.971	666.4	6645.
63.00	53.00	13.30		Weight too small		
63.00	54.00	14.30	113.0	10.01	761.2	7622.
63.00	54.00	14.30		Weight too small		
63.00	55.00	15.30	124.8	10.10	855.2	8639.
63.00	55.00	15.30		Weight too small		
63.00	56.00	16.30	136.2	10.22	948.3	9696.
63.00	56.00	16.30		Weight too small		
63.00	57.00	17.30	146.8	9.948	1037.	10320.
63.00	57.00	17.30		Weight too small		
63.00	58.00	18.30	156.1	9.697	1115.	10810.
63.00	58.00	18.30		Weight too small		
63.00	59.00	19.30	164.4	9.530	1184.	11290.
63.00	59.00	19.30		Weight too small		
63.00	60.00	20.30	172.2	9.385	1251.	11740.
63.00	60.00	20.30		Weight too small		
63.00	61.00	21.30	179.8	9.273	1317.	12210.
63.00	61.00	21.30		Weight too small		
63.00	62.00	22.30	187.1	9.187	1381.	12690.
63.00	62.00	22.30		Weight too small		
63.00	63.00	23.30	208.9	11.76	1484.	17450.
63.00	64.00	24.30	216.4	11.62	1550.	18010.
64.00	45.00	5.478		Radius too small		
64.00	46.00	6.450		Radius too small		
64.00	47.00	7.429		Weight too small		
64.00	47.00	7.429		Weight too small		
64.00	48.00	8.413		Weight too small		
64.00	48.00	8.413		Weight too small		
64.00	49.00	9.401		Weight too small		
64.00	49.00	9.401		Weight too small		
64.00	50.00	10.39		Weight too small		
64.00	50.00	10.39		Weight too small		
64.00	51.00	11.38		Weight too small		
64.00	51.00	11.38		Weight too small		
64.00	52.00	12.38	55.65	11.45	400.3	4585.
64.00	52.00	12.38		Weight too small		
64.00	53.00	13.37	67.19	11.10	491.7	5456.
64.00	53.00	13.37		Weight too small		
64.00	54.00	14.36	78.49	10.90	584.1	6367.
64.00	54.00	14.36		Weight too small		
64.00	55.00	15.36	89.51	10.81	676.6	7315.
64.00	55.00	15.36		Weight too small		
64.00	56.00	16.36	100.2	10.80	769.0	8302.
64.00	56.00	16.36		Weight too small		
64.00	57.00	17.35	110.7	10.83	861.1	9325.
64.00	57.00	17.35		Weight too small		
64.00	58.00	18.35	120.9	10.90	952.7	10380.
64.00	58.00	18.35		Weight too small		
64.00	59.00	19.35	130.7	10.99	1044.	11470.
64.00	59.00	19.35		Weight too small		
64.00	60.00	20.34	139.9	10.60	1129.	11960.
64.00	60.00	20.34		Weight too small		
64.00	61.00	21.34	148.2	10.34	1206.	12470.
64.00	61.00	21.34		Weight too small		
64.00	62.00	22.34	155.6	10.17	1275.	12970.
64.00	62.00	22.34		Weight too small		
64.00	63.00	23.34	162.6	10.01	1341.	13430.
64.00	63.00	23.34		Weight too small		
64.00	64.00	24.34	169.4	9.886	1406.	13900.
64.00	64.00	24.34		Weight too small		
65.00	45.00	5.787		Radius too small		
65.00	46.00	6.734		Radius too small		
65.00	47.00	7.680		Radius too small		
65.00	48.00	8.636		Weight too small		
65.00	49.00	9.601		Weight too small		
65.00	50.00	10.57		Weight too small		
65.00	51.00	11.55		Weight too small		
65.00	51.00	11.55		Weight too small		
65.00	52.00	12.53		Weight too small		
65.00	52.00	12.53		Weight too small		
65.00	53.00	13.51		Weight too small		
65.00	53.00	13.51		Weight too small		
65.00	54.00	14.50	51.83	12.32	424.4	5228.
65.00	54.00	14.50		Weight too small		

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65.00	55.00	15.48	61.78	11.93	512.9	6118.
65.00	55.00	15.48		Weight too small		
65.00	56.00	16.47	71.61	11.69	602.4	7042.
65.00	56.00	16.47		Weight too small		
65.00	57.00	17.46	81.28	11.55	692.5	8001.
65.00	57.00	17.46		Weight too small		
65.00	58.00	18.45	90.78	11.49	782.8	8995.
65.00	58.00	18.45		Weight too small		
65.00	59.00	19.44	100.1	11.48	873.0	10020.
65.00	59.00	19.44		Weight too small		
65.00	60.00	20.44	109.2	11.51	963.1	11080.
65.00	60.00	20.44		Weight too small		
65.00	61.00	21.43	118.2	11.57	1053.	12180.
65.00	61.00	21.43		Weight too small		
65.00	62.00	22.42	126.8	11.50	1141.	13120.
65.00	62.00	22.42		Weight too small		
65.00	63.00	23.42	135.0	11.14	1225.	13640.
65.00	63.00	23.42		Weight too small		
65.00	64.00	24.41	142.3	10.88	1300.	14150.
65.00	64.00	24.41		Weight too small		
66.00	45.00	6.111		Radius too small		
66.00	46.00	7.057		Radius too small		
66.00	47.00	8.003		Radius too small		
66.00	48.00	8.950		Radius too small		
66.00	49.00	9.896		Slip too small to split into minimum no. of slices		
66.00	50.00	10.84		Weight too small		
66.00	51.00	11.80		Weight too small		
66.00	52.00	12.76		Weight too small		
66.00	53.00	13.72		Weight too small		
66.00	54.00	14.69		Weight too small		
66.00	55.00	15.67		Weight too small		
66.00	55.00	15.67		Weight too small		
66.00	56.00	16.65		Weight too small		
66.00	56.00	16.65		Weight too small		
66.00	57.00	17.63	57.82	12.64	537.2	6792.
66.00	57.00	17.63		Weight too small		
66.00	58.00	18.61	66.49	12.38	624.3	7728.
66.00	58.00	18.61		Weight too small		
66.00	59.00	19.59	75.07	12.21	712.3	8696.
66.00	59.00	19.59		Weight too small		
66.00	60.00	20.58	83.56	12.11	800.7	9695.
66.00	60.00	20.58		Weight too small		
66.00	61.00	21.57	91.93	12.06	889.2	10730.
66.00	61.00	21.57		Weight too small		
66.00	62.00	22.55	100.2	12.06	977.8	11790.
66.00	62.00	22.55		Weight too small		
66.00	63.00	23.54	108.3	12.08	1066.	12880.
66.00	63.00	23.54		Weight too small		
66.00	64.00	24.53	116.3	12.13	1155.	14000.
66.00	64.00	24.53		Weight too small		
67.00	45.00	6.434		Radius too small		
67.00	46.00	7.380		Radius too small		
67.00	47.00	8.327		Radius too small		
67.00	48.00	9.273		Radius too small		
67.00	49.00	10.22		Radius too small		
67.00	50.00	11.17		Radius too small		
67.00	51.00	12.11		Weight too small		
67.00	52.00	13.06		Weight too small		
67.00	53.00	14.00		Weight too small		
67.00	54.00	14.96		Weight too small		
67.00	55.00	15.92		Weight too small		
67.00	56.00	16.88		Weight too small		
67.00	57.00	17.85		Weight too small		
67.00	58.00	18.82		Weight too small		
67.00	59.00	19.79	54.81	13.27	563.5	7475.
67.00	59.00	19.79		Weight too small		
67.00	60.00	20.77	62.54	12.98	648.7	8420.
67.00	60.00	20.77		Weight too small		
67.00	61.00	21.75	70.24	12.79	734.8	9395.
67.00	61.00	21.75		Weight too small		
67.00	62.00	22.73	77.88	12.66	821.5	10400.
67.00	62.00	22.73		Weight too small		
67.00	63.00	23.71	85.45	12.58	908.5	11430.
67.00	63.00	23.71		Weight too small		

EPA Export 08-07-2014:23:43:06

67.00	64.00	24.69	92.94	12.55	995.8	12500.
67.00	64.00	24.69		Weight too small		
68.00	45.00	6.758		Radius too small		
68.00	46.00	7.704		Radius too small		
68.00	47.00	8.650		Radius too small		
68.00	48.00	9.596		Radius too small		
68.00	49.00	10.54		Radius too small		
68.00	50.00	11.49		Radius too small		
68.00	51.00	12.44		Radius too small		
68.00	52.00	13.38		Weight too small		
68.00	53.00	14.33		Weight too small		
68.00	54.00	15.27		Weight too small		
68.00	55.00	16.22		Weight too small		
68.00	56.00	17.17		Weight too small		
68.00	57.00	18.12		Weight too small		
68.00	58.00	19.08		Weight too small		
68.00	59.00	20.04		Weight too small		
68.00	60.00	21.00		Weight too small		
68.00	61.00	21.97	52.45	13.81	591.2	8164.
68.00	62.00	22.94	59.41	13.51	674.7	9117.
68.00	63.00	23.91	66.37	13.30	759.3	10100.
68.00	64.00	24.89	73.31	13.15	844.5	11110.
68.00	64.00	24.89		Weight too small		
69.00	45.00	7.081		Radius too small		
69.00	46.00	8.027		Radius too small		
69.00	47.00	8.973		Radius too small		
69.00	48.00	9.920		Radius too small		
69.00	49.00	10.87		Radius too small		
69.00	50.00	11.81		Radius too small		
69.00	51.00	12.76		Radius too small		
69.00	52.00	13.70		Radius too small		
69.00	53.00	14.65		Slip too small to split into minimum no. of slices		
69.00	54.00	15.60		Weight too small		
69.00	55.00	16.54		Weight too small		
69.00	56.00	17.49		Weight too small		
69.00	57.00	18.44		Weight too small		
69.00	58.00	19.38		Weight too small		
69.00	59.00	20.33		Weight too small		
69.00	60.00	21.28		Weight too small		
69.00	61.00	22.24		Weight too small		
69.00	62.00	23.20		Weight too small		
69.00	63.00	24.16	50.54	14.29	620.0	8057.
69.00	64.00	25.12	56.88	13.98	702.1	9017.
70.00	45.00	7.404		Radius too small		
70.00	46.00	8.351		Radius too small		
70.00	47.00	9.297		Radius too small		
70.00	48.00	10.24		Radius too small		
70.00	49.00	11.19		Radius too small		
70.00	50.00	12.14		Radius too small		
70.00	51.00	13.08		Radius too small		
70.00	52.00	14.03		Radius too small		
70.00	53.00	14.97		Radius too small		
70.00	54.00	15.92		Radius too small		
70.00	55.00	16.87		Weight too small		
70.00	56.00	17.81		Weight too small		
70.00	57.00	18.76		Weight too small		
70.00	58.00	19.71		Weight too small		
70.00	59.00	20.65		Weight too small		
70.00	60.00	21.60		Weight too small		
70.00	61.00	22.54		Weight too small		
70.00	62.00	23.49		Weight too small		
70.00	63.00	24.44		Weight too small		
70.00	64.00	25.40		Weight too small		
71.00	45.00	7.728		Radius too small		
71.00	46.00	8.674		Radius too small		
71.00	47.00	9.620		Radius too small		
71.00	48.00	10.57		Radius too small		
71.00	49.00	11.51		Radius too small		
71.00	50.00	12.46		Radius too small		
71.00	51.00	13.41		Radius too small		
71.00	52.00	14.35		Radius too small		
71.00	53.00	15.30		Radius too small		
71.00	54.00	16.24		Radius too small		
71.00	55.00	17.19		Radius too small		

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71.00	56.00	18.14	Slip too small to split into minimum no. of slices
71.00	57.00	19.08	Weight too small
71.00	58.00	20.03	Weight too small
71.00	59.00	20.98	Weight too small
71.00	60.00	21.92	Weight too small
71.00	61.00	22.87	Weight too small
71.00	62.00	23.81	Weight too small
71.00	63.00	24.76	Weight too small
71.00	64.00	25.71	Weight too small
72.00	45.00	8.051	Radius too small
72.00	46.00	8.997	Radius too small
72.00	47.00	9.944	Radius too small
72.00	48.00	10.89	Radius too small
72.00	49.00	11.84	Radius too small
72.00	50.00	12.78	Radius too small
72.00	51.00	13.73	Radius too small
72.00	52.00	14.68	Radius too small
72.00	53.00	15.62	Radius too small
72.00	54.00	16.57	Radius too small
72.00	55.00	17.51	Radius too small
72.00	56.00	18.46	Radius too small
72.00	57.00	19.41	Radius too small
72.00	58.00	20.35	Weight too small
72.00	59.00	21.30	Weight too small
72.00	60.00	22.25	Weight too small
72.00	61.00	23.19	Weight too small
72.00	62.00	24.14	Weight too small
72.00	63.00	25.08	Weight too small
72.00	64.00	26.03	Weight too small
73.00	45.00	8.375	Radius too small
73.00	46.00	9.321	Radius too small
73.00	47.00	10.27	Radius too small
73.00	48.00	11.21	Radius too small
73.00	49.00	12.16	Radius too small
73.00	50.00	13.11	Radius too small
73.00	51.00	14.05	Radius too small
73.00	52.00	15.00	Radius too small
73.00	53.00	15.94	Radius too small
73.00	54.00	16.89	Radius too small
73.00	55.00	17.84	Radius too small
73.00	56.00	18.78	Radius too small
73.00	57.00	19.73	Radius too small
73.00	58.00	20.68	Radius too small
73.00	59.00	21.62	Radius too small
73.00	60.00	22.57	Weight too small
73.00	61.00	23.51	Weight too small
73.00	62.00	24.46	Weight too small
73.00	63.00	25.41	Weight too small
73.00	64.00	26.35	Weight too small
74.00	45.00	8.682	Radius too small
74.00	46.00	9.635	Radius too small
74.00	47.00	10.59	Radius too small
74.00	48.00	11.54	Radius too small
74.00	49.00	12.48	Radius too small
74.00	50.00	13.43	Radius too small
74.00	51.00	14.38	Radius too small
74.00	52.00	15.32	Radius too small
74.00	53.00	16.27	Radius too small
74.00	54.00	17.21	Radius too small
74.00	55.00	18.16	Radius too small
74.00	56.00	19.11	Radius too small
74.00	57.00	20.05	Radius too small
74.00	58.00	21.00	Radius too small
74.00	59.00	21.95	Radius too small
74.00	60.00	22.89	Radius too small
74.00	61.00	23.84	Weight too small
74.00	62.00	24.78	Weight too small
74.00	63.00	25.73	Weight too small
74.00	64.00	26.68	Weight too small
75.00	45.00	8.987	Radius too small
75.00	46.00	9.939	Radius too small
75.00	47.00	10.89	Radius too small
75.00	48.00	11.84	Radius too small
75.00	49.00	12.80	Radius too small

EPA Export 08-07-2014:23:43:06

75.00	50.00	13.75	Radius too small
75.00	51.00	14.70	Radius too small
75.00	52.00	15.65	Radius too small
75.00	53.00	16.59	Radius too small
75.00	54.00	17.54	Radius too small
75.00	55.00	18.48	Radius too small
75.00	56.00	19.43	Radius too small
75.00	57.00	20.38	Radius too small
75.00	58.00	21.32	Radius too small
75.00	59.00	22.27	Radius too small
75.00	60.00	23.22	Radius too small
75.00	61.00	24.16	Radius too small
75.00	62.00	25.11	Radius too small
75.00	63.00	26.05	Weight too small
75.00	64.00	27.00	Weight too small
76.00	45.00	9.292	Radius too small
76.00	46.00	10.24	Radius too small
76.00	47.00	11.20	Radius too small
76.00	48.00	12.15	Radius too small
76.00	49.00	13.10	Radius too small
76.00	50.00	14.05	Radius too small
76.00	51.00	15.01	Radius too small
76.00	52.00	15.96	Radius too small
76.00	53.00	16.91	Radius too small
76.00	54.00	17.86	Radius too small
76.00	55.00	18.81	Radius too small
76.00	56.00	19.75	Radius too small
76.00	57.00	20.70	Radius too small
76.00	58.00	21.65	Radius too small
76.00	59.00	22.59	Radius too small
76.00	60.00	23.54	Radius too small
76.00	61.00	24.48	Radius too small
76.00	62.00	25.43	Radius too small
76.00	63.00	26.38	Radius too small
76.00	64.00	27.32	Radius too small
77.00	45.00	9.596	Radius too small
77.00	46.00	10.55	Radius too small
77.00	47.00	11.50	Radius too small
77.00	48.00	12.45	Radius too small
77.00	49.00	13.41	Radius too small
77.00	50.00	14.36	Radius too small
77.00	51.00	15.31	Radius too small
77.00	52.00	16.26	Radius too small
77.00	53.00	17.22	Radius too small
77.00	54.00	18.17	Radius too small
77.00	55.00	19.12	Radius too small
77.00	56.00	20.07	Radius too small
77.00	57.00	21.02	Radius too small
77.00	58.00	21.97	Radius too small
77.00	59.00	22.92	Radius too small
77.00	60.00	23.86	Radius too small
77.00	61.00	24.81	Radius too small
77.00	62.00	25.75	Radius too small
77.00	63.00	26.70	Radius too small
77.00	64.00	27.65	Radius too small
78.00	45.00	9.901	Radius too small
78.00	46.00	10.85	Radius too small
78.00	47.00	11.81	Radius too small
78.00	48.00	12.76	Radius too small
78.00	49.00	13.71	Radius too small
78.00	50.00	14.66	Radius too small
78.00	51.00	15.62	Radius too small
78.00	52.00	16.57	Radius too small
78.00	53.00	17.52	Radius too small
78.00	54.00	18.47	Radius too small
78.00	55.00	19.43	Radius too small
78.00	56.00	20.38	Radius too small
78.00	57.00	21.33	Radius too small
78.00	58.00	22.28	Radius too small
78.00	59.00	23.24	Radius too small
78.00	60.00	24.19	Radius too small
78.00	61.00	25.13	Radius too small
78.00	62.00	26.08	Radius too small
78.00	63.00	27.02	Radius too small
78.00	64.00	27.97	Radius too small

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79.00	45.00	10.21	Radius too small
79.00	46.00	11.16	Radius too small
79.00	47.00	12.11	Radius too small
79.00	48.00	13.06	Radius too small
79.00	49.00	14.02	Radius too small
79.00	50.00	14.97	Radius too small
79.00	51.00	15.92	Radius too small
79.00	52.00	16.87	Radius too small
79.00	53.00	17.83	Radius too small
79.00	54.00	18.78	Radius too small
79.00	55.00	19.73	Radius too small
79.00	56.00	20.68	Radius too small
79.00	57.00	21.64	Radius too small
79.00	58.00	22.59	Radius too small
79.00	59.00	23.54	Radius too small
79.00	60.00	24.49	Radius too small
79.00	61.00	25.44	Radius too small
79.00	62.00	26.40	Radius too small
79.00	63.00	27.35	Radius too small
79.00	64.00	28.29	Radius too small
80.00	45.00	10.48	Radius too small
80.00	46.00	11.48	Weight too small
80.00	47.00	12.48	Weight too small
80.00	48.00	13.48	Weight too small
80.00	49.00	14.48	Weight too small
80.00	50.00	15.48	Weight too small
80.00	51.00	16.48	Weight too small
80.00	52.00	17.47	Weight too small
80.00	53.00	18.47	Weight too small
80.00	54.00	19.08	Radius too small
80.00	55.00	20.04	Radius too small
80.00	56.00	20.99	Radius too small
80.00	57.00	21.94	Radius too small
80.00	58.00	22.89	Radius too small
80.00	59.00	23.84	Radius too small
80.00	60.00	24.80	Radius too small
80.00	61.00	25.75	Radius too small
80.00	62.00	26.70	Radius too small
80.00	63.00	27.65	Radius too small
80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small
81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small
81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.68	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small

EPA Export 08-07-2014:23:43:06

82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small
82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small
83.00	45.00	10.92	Radius too small
83.00	46.00	11.88	Radius too small
83.00	47.00	12.85	Radius too small
83.00	48.00	13.83	Radius too small
83.00	49.00	14.80	Radius too small
83.00	50.00	15.78	Radius too small
83.00	51.00	16.77	Radius too small
83.00	52.00	17.75	Radius too small
83.00	53.00	18.74	Radius too small
83.00	54.00	19.73	Radius too small
83.00	55.00	20.71	Radius too small
83.00	56.00	21.70	Radius too small
83.00	57.00	22.70	Radius too small
83.00	58.00	23.69	Radius too small
83.00	59.00	24.68	Radius too small
83.00	60.00	25.67	Radius too small
83.00	61.00	26.67	Radius too small
83.00	62.00	27.66	Weight too small
83.00	63.00	28.65	Weight too small
83.00	64.00	29.65	Weight too small
84.00	45.00	11.23	Radius too small
84.00	46.00	12.17	Radius too small
84.00	47.00	13.12	Radius too small
84.00	48.00	14.08	Radius too small
84.00	49.00	15.04	Radius too small
84.00	50.00	16.00	Radius too small
84.00	51.00	16.97	Radius too small
84.00	52.00	17.95	Radius too small
84.00	53.00	18.92	Radius too small
84.00	54.00	19.90	Radius too small
84.00	55.00	20.88	Radius too small
84.00	56.00	21.86	Radius too small
84.00	57.00	22.85	Radius too small
84.00	58.00	23.83	Radius too small
84.00	59.00	24.82	Radius too small
84.00	60.00	25.81	Radius too small
84.00	61.00	26.80	Radius too small
84.00	62.00	27.79	Radius too small
84.00	63.00	28.78	Radius too small
84.00	64.00	29.77	Radius too small
85.00	45.00	11.63	Disturbing moment < 0
85.00	46.00	12.54	Radius too small
85.00	47.00	13.46	Radius too small
85.00	48.00	14.39	Radius too small
85.00	49.00	15.33	Radius too small
85.00	50.00	16.28	Radius too small
85.00	51.00	17.24	Radius too small
85.00	52.00	18.20	Radius too small
85.00	53.00	19.16	Radius too small
85.00	54.00	20.13	Radius too small
85.00	55.00	21.10	Radius too small
85.00	56.00	22.07	Radius too small
85.00	57.00	23.04	Radius too small
85.00	58.00	24.02	Radius too small
85.00	59.00	25.00	Radius too small
85.00	60.00	25.98	Radius too small
85.00	61.00	26.96	Radius too small
85.00	62.00	27.95	Radius too small
85.00	63.00	28.93	Radius too small
85.00	64.00	29.92	Radius too small
86.00	45.00	12.09	FoS > 1000
86.00	46.00	12.97	FoS > 1000
86.00	47.00	13.86	FoS > 1000
86.00	48.00	14.77	FoS > 1000
86.00	49.00	15.69	FoS > 1000
86.00	50.00	16.62	Disturbing moment < 0
86.00	51.00	17.55	Radius too small
86.00	52.00	18.50	Radius too small
86.00	53.00	19.44	Radius too small
86.00	54.00	20.40	Radius too small

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86.00	55.00	21.36		Radius too small		
86.00	56.00	22.32		Radius too small		
86.00	57.00	23.28		Radius too small		
86.00	58.00	24.25		Radius too small		
86.00	59.00	25.22		Radius too small		
86.00	60.00	26.19		Radius too small		
86.00	61.00	27.17		Radius too small		
86.00	62.00	28.14		Radius too small		
86.00	63.00	29.12		Radius too small		
86.00	64.00	30.10		Radius too small		
87.00	45.00	11.60		Radius too small		
87.00	46.00	13.46		Disturbing moment < 0		
87.00	47.00	14.32	86.34	2.463E+6	0.003984	9814.
87.00	48.00	15.20		FoS > 1000		
87.00	49.00	16.10		FoS > 1000		
87.00	50.00	17.00		Disturbing moment < 0		
87.00	51.00	17.92		FoS > 1000		
87.00	52.00	18.84		Disturbing moment < 0		
87.00	53.00	19.78		Disturbing moment < 0		
87.00	54.00	20.71		Disturbing moment < 0		
87.00	55.00	21.66		FoS > 1000		
87.00	56.00	22.61		Disturbing moment < 0		
87.00	57.00	23.56		Radius too small		
87.00	58.00	24.52		Radius too small		
87.00	59.00	25.48		Radius too small		
87.00	60.00	26.44		Radius too small		
87.00	61.00	27.40		Radius too small		
87.00	62.00	28.37		Radius too small		
87.00	63.00	29.34		Radius too small		
87.00	64.00	30.32		Radius too small		
88.00	45.00	11.60		Radius too small		
88.00	46.00	12.60		Radius too small		
88.00	47.00	13.60		Radius too small		
88.00	48.00	15.69	166.6	519300.	0.02663	13830.
88.00	49.00	16.56	141.3	1.190E+6	0.01180	14040.
88.00	50.00	17.44		Disturbing moment < 0		
88.00	51.00	18.33	100.0	1.843E+6	0.007762	14300.
88.00	52.00	19.24		Disturbing moment < 0		
88.00	53.00	20.15		Disturbing moment < 0		
88.00	54.00	21.07		FoS > 1000		
88.00	55.00	22.00		FoS > 1000		
88.00	56.00	22.94		Disturbing moment < 0		
88.00	57.00	23.88		FoS > 1000		
88.00	58.00	24.82		FoS > 1000		
88.00	59.00	25.77		FoS > 1000		
88.00	60.00	26.72		FoS > 1000		
88.00	61.00	27.68		Disturbing moment < 0		
88.00	62.00	28.64		Disturbing moment < 0		
88.00	63.00	29.60		Radius too small		
88.00	64.00	30.56		Radius too small		
89.00	45.00	11.60		Radius too small		
89.00	46.00	12.60		Radius too small		
89.00	47.00	13.60		Radius too small		
89.00	48.00	14.60		Radius too small		
89.00	49.00	15.60		Radius too small		
89.00	50.00	17.92	237.7	316000.	0.05886	18600.
89.00	51.00	18.79	208.8	259900.	0.07293	18960.
89.00	52.00	19.67	183.4	352800.	0.05464	19280.
89.00	53.00	20.57	160.8	6.313E+6	0.003098	19560.
89.00	54.00	21.47		Disturbing moment < 0		
89.00	55.00	22.38	122.6	1.833E+6	0.01089	19960.
89.00	56.00	23.30	106.2	2.274E+6	0.008825	20070.
89.00	57.00	24.23		Disturbing moment < 0		
89.00	58.00	25.16		FoS > 1000		
89.00	59.00	26.10		FoS > 1000		
89.00	60.00	27.04		FoS > 1000		
89.00	61.00	27.98		FoS > 1000		
89.00	62.00	28.93		Disturbing moment < 0		
89.00	63.00	29.88		FoS > 1000		
89.00	64.00	30.84		FoS > 1000		

WORST CASE : WATER CASE 1 OF 1
Centre at (57.00,47.00) Radius 7.236m
Iterations: 5 Horiz acceleration (kg): .0

EPA Export 08-07-2014:23:43:06

ARUP

Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA:2 of AA:18	

Drg. Ref.

Made by	Date	Date	Checked
DAH	08-Dec-2003	Stability Max Cut No4a.sl	

Net vertical force [kN]: .0
Net horiz force [kN]: 0.01089
Inclination of interslice forces [°]: 23.53

Slip weight [kN] 285.2
Disturbing moment [kN m]: 461.7
Restoring moment [kN m]: 3205.

Factor of Safety: 6.942

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	51.07	42.85	-5.111	.0	.0	.0
2	51.46	42.32	38.15E-6	0.2804	0.6439	.0
3	51.83	41.94	3.707	0.8732	2.592	0.6871
4	52.20	41.59	7.148	1.688	5.644	2.555
5	52.57	41.28	.0	2.583	9.236	.0
6	52.65	41.22	-1.675	2.793	10.10	.0
7	52.70	41.18	-2.691	2.955	10.78	.0
8	52.82	41.09	-5.171	3.473	12.97	.0
9	52.90	41.04	-6.821	3.464	13.15	.0
10	53.20	40.84	-10.45	3.523	13.97	.0
11	53.84	40.49	-7.090	3.891	16.05	.0
12	54.51	40.20	-4.405	4.239	17.68	.0
13	55.21	39.99	-2.420	4.235	17.69	.0
14	56.02	39.83	-1.051	5.095	21.38	.0
15	56.83	39.77	-0.6042	4.883	20.49	.0
16	57.65	39.79	-1.084	3.360	14.08	.0
17	58.00	39.83	-1.575	2.524	10.57	.0
18	58.72	39.97	-3.128	1.248	5.229	.0
19	59.42	40.18	-5.391	.0	0.01089	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	19.07E-6	1.138	1.034	1.906
2	3.000	.0	1.854	2.668	2.837	1.549
3	3.000	.0	5.427	4.344	4.660	1.549
4	3.000	.0	3.574	5.548	5.875	1.430
5	3.000	.0	.0	1.420	1.487	0.3139
6	3.000	.0	.0	1.118	1.172	0.1871
7	3.000	.0	.0	3.657	3.827	0.4469
8	100.0	.0	.0	2.675	2.302	9.667
9	100.0	.0	.0	10.76	9.416	35.81
10	100.0	.0	.0	26.02	23.49	73.08
11	100.0	.0	.0	31.15	28.99	73.08
12	100.0	.0	.0	35.60	34.01	73.08
13	40.00	.0	.0	44.35	43.39	32.76
14	40.00	.0	.0	47.77	47.75	32.76
15	40.00	.0	.0	49.27	50.98	32.76
16	40.00	.0	.0	11.92	13.07	14.09
17	40.00	.0	.0	4.258	6.440	29.19
18	40.00	.0	.0	1.533	4.157	29.19

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0

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ARUP

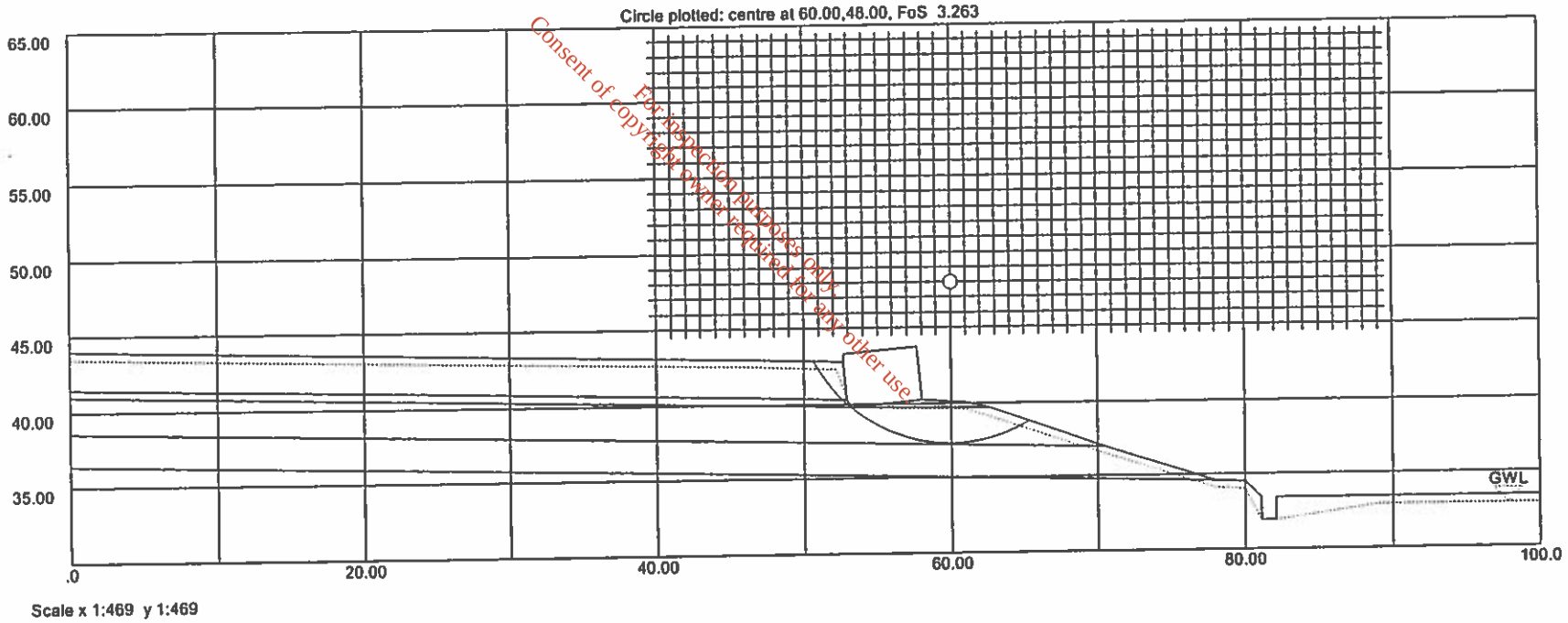
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	AA: Run 5 - 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	05-Dec-2003	Stability Max Cut No5.sld	



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Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Run5-02	
Drg. Ref.		
Made by DAH	Date 05-Dec-2003	Data Stability Max Cut No5.sld Checked

Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Sand / Non Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL (kN/m3)	Unit Weight Below GWL (kN/m3)		Shear Strength Parameters Phi or Phi0 (°)	c or c0' (kPa)
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Drained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Drained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Drained	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Drained	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Dr	20.00	20.00	Undrained	.0	75.00
7	Rock (Drained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	43.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X --> 53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	39.00
2	2	.	39.90	.	40.25	40.10	39.70	39.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X --> 78.00	80.00	81.10	81.20	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.
6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X --> 100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x (m)	Slip Centre y (m)	Radius (m)	Slip Weight (kN)	Comment/ FoS	Disturbing Moment (kN m)	Restoring Moment (kN m)
40.00	45.00	7.258	791.3	50.69	79.25	4017.
40.00	46.00	8.258	857.2	45.65	106.2	4850.
40.00	47.00	9.257	918.5	42.36	135.4	5733.
40.00	48.00	10.26	976.4	39.94	166.9	6665.
40.00	49.00	11.26	1029.	38.13	200.4	7641.
40.00	50.00	12.26	1081.	36.63	236.5	8663.
40.00	51.00	13.26	1130.	35.42	274.6	9726.
40.00	52.00	14.26	1177.	34.42	314.6	10830.
40.00	53.00	15.26	1222.	33.58	356.4	11970.
40.00	54.00	16.26	1265.	32.88	400.0	13150.
40.00	55.00	17.26	1309.	32.22	445.8	14370.
40.00	56.00	18.25	1347.	31.73	492.0	15610.
40.00	56.00	18.25		Weight too small		
40.00	57.00	19.25	1392.	40.92	472.6	19340.
40.00	58.00	20.25	1434.	46.81	466.4	21830.
40.00	59.00	21.25	1476.	53.98	452.1	24400.
40.00	60.00	22.25		Disturbing moment < 0		
40.00	61.00	23.25		Disturbing moment < 0		
40.00	62.00	24.25		Disturbing moment < 0		
40.00	63.00	25.25		Disturbing moment < 0		
40.00	64.00	26.25		Disturbing moment < 0		
41.00	45.00	7.280	793.1	49.73	81.12	4034.
41.00	46.00	8.280	859.5	44.97	108.3	4868.

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41.00	47.00	9.280	919.3	41.73	137.8	5750.
41.00	48.00	10.28	976.6	39.30	170.0	6683.
41.00	49.00	11.28	1031.	37.44	204.7	7662.
41.00	50.00	12.28	1083.	35.98	241.4	8683.
41.00	51.00	13.28	1132.	34.80	280.1	9747.
41.00	52.00	14.28	1177.	33.88	320.2	10850.
41.00	53.00	15.28	1222.	33.06	362.6	11990.
41.00	53.00	15.28		Weight too small		
41.00	54.00	16.28	1268.	39.77	370.3	14730.
41.00	55.00	17.28	1314.	46.92	363.5	17060.
41.00	56.00	18.28		Disturbing moment < 0		
41.00	57.00	19.28		Disturbing moment < 0		
41.00	58.00	20.28		Disturbing moment < 0		
41.00	59.00	21.28		Disturbing moment < 0		
41.00	60.00	22.28		Disturbing moment < 0		
41.00	61.00	23.28		Disturbing moment < 0		
41.00	62.00	24.28		Disturbing moment < 0		
41.00	63.00	25.28		Disturbing moment < 0		
41.00	64.00	26.28		Disturbing moment < 0		
42.00	45.00	7.303	794.6	48.64	83.27	4050.
42.00	46.00	8.303	860.6	43.98	111.1	4885.
42.00	47.00	9.303	921.7	40.79	141.5	5769.
42.00	48.00	10.30	978.8	38.47	174.2	6702.
42.00	49.00	11.30	1031.	36.73	209.1	7679.
42.00	50.00	12.30	1082.	35.34	246.2	8701.
42.00	51.00	13.30	1131.	34.23	285.3	9765.
42.00	51.00	13.30		Weight too small		
42.00	52.00	14.30		Disturbing moment < 0		
42.00	53.00	15.30		Disturbing moment < 0		
42.00	54.00	16.30		Disturbing moment < 0		
42.00	55.00	17.30		Disturbing moment < 0		
42.00	56.00	18.30		Disturbing moment < 0		
42.00	57.00	19.30		Disturbing moment < 0		
42.00	58.00	20.30		Disturbing moment < 0		
42.00	59.00	21.30		Disturbing moment < 0		
42.00	60.00	22.30	1555.	850.5	38.54	32780.
42.00	61.00	23.30	1598.	359.5	99.27	35690.
42.00	62.00	24.30		Disturbing moment < 0		
42.00	63.00	25.30		Disturbing moment < 0		
42.00	64.00	26.30		Disturbing moment < 0		
43.00	45.00	7.326	796.3	47.35	85.88	4067.
43.00	46.00	8.326	861.4	42.75	114.7	4901.
43.00	47.00	9.325	922.2	39.75	145.6	5787.
43.00	48.00	10.33	979.3	37.56	178.9	6720.
43.00	49.00	11.32	1033.	35.89	214.5	7699.
43.00	49.00	11.32		Weight too small		
43.00	50.00	12.32		Disturbing moment < 0		
43.00	51.00	13.32		Disturbing moment < 0		
43.00	52.00	14.32		Disturbing moment < 0		
43.00	53.00	15.32		Disturbing moment < 0		
43.00	54.00	16.32		Disturbing moment < 0		
43.00	55.00	17.32		Disturbing moment < 0		
43.00	56.00	18.32	1397.	595.0	40.80	24280.
43.00	57.00	19.32	1444.	261.2	103.2	26950.
43.00	58.00	20.32	1491.	174.4	170.0	29630.
43.00	59.00	21.32	1537.	133.7	235.3	31460.
43.00	60.00	22.32		Disturbing moment < 0		
43.00	61.00	23.32		Disturbing moment < 0		
43.00	62.00	24.32		Disturbing moment < 0		
43.00	63.00	25.32		Disturbing moment < 0		
43.00	64.00	26.32		Disturbing moment < 0		
44.00	45.00	7.349	797.3	45.85	89.06	4083.
44.00	46.00	8.348	862.7	41.74	117.8	4918.
44.00	47.00	9.348	923.3	38.89	149.2	5805.
44.00	48.00	10.35		Disturbing moment < 0		
44.00	49.00	11.35		Disturbing moment < 0		
44.00	50.00	12.35		Disturbing moment < 0		
44.00	51.00	13.35		Disturbing moment < 0		
44.00	52.00	14.35	1213.	1493.	11.93	16470.
44.00	53.00	15.35	1267.	267.9	76.35	18850.
44.00	54.00	16.35	1319.	157.9	135.0	21310.
44.00	55.00	17.35	1372.	112.7	209.6	23620.
44.00	56.00	18.35	1422.	92.74	280.3	26000.
44.00	57.00	19.35		Disturbing moment < 0		
44.00	58.00	20.35		Disturbing moment < 0		
44.00	59.00	21.35		Disturbing moment < 0		
44.00	60.00	22.34		Disturbing moment < 0		
44.00	61.00	23.34		Disturbing moment < 0		
44.00	62.00	24.34		Disturbing moment < 0		
44.00	63.00	25.34		Disturbing moment < 0		
44.00	64.00	26.34		Disturbing moment < 0		
45.00	45.00	7.371	798.2	44.21	92.72	4099.
45.00	46.00	8.371		Disturbing moment < 0		
45.00	47.00	9.371		Disturbing moment < 0		
45.00	48.00	10.37		Disturbing moment < 0		
45.00	49.00	11.37	1061.	1772.	6.535	11580.
45.00	50.00	12.37	1121.	218.4	65.22	13720.
45.00	51.00	13.37	1178.	120.8	131.8	15920.
45.00	52.00	14.37	1237.	87.12	206.3	17980.
45.00	53.00	15.37	1292.	72.47	278.3	20130.
45.00	54.00	16.37	1345.	62.82	352.9	22170.
45.00	55.00	17.37		Disturbing moment < 0		
45.00	56.00	18.37		Disturbing moment < 0		
45.00	57.00	19.37		Disturbing moment < 0		
45.00	58.00	20.37		Disturbing moment < 0		
45.00	59.00	21.37		Disturbing moment < 0		
45.00	60.00	22.37		Disturbing moment < 0		
45.00	61.00	23.37		Disturbing moment < 0		
45.00	62.00	24.37		Disturbing moment < 0		
45.00	63.00	25.37	1689.	311.5	98.67	30730.
45.00	64.00	26.37	1718.	145.0	218.6	31690.
46.00	45.00	7.394		Disturbing moment < 0		
46.00	46.00	8.394		Disturbing moment < 0		
46.00	47.00	9.394	947.8	292.7	30.73	8996.
46.00	48.00	10.39	1017.	112.2	97.56	10950.
46.00	49.00	11.39	1082.	77.02	166.1	12790.
46.00	50.00	12.39	1144.	62.13	237.3	14750.
46.00	51.00	13.39	1203.	53.37	312.6	16680.
46.00	52.00	14.39	1260.	46.42	392.8	18230.
46.00	53.00	15.39		Disturbing moment < 0		
46.00	54.00	16.39		Disturbing moment < 0		
46.00	55.00	17.39		Disturbing moment < 0		
46.00	56.00	18.39		Disturbing moment < 0		
46.00	57.00	19.39		Disturbing moment < 0		
46.00	58.00	20.39		Disturbing moment < 0		
46.00	59.00	21.39		Disturbing moment < 0		
46.00	60.00	22.39	1585.	756.0	32.97	24920.
46.00	61.00	23.39	1615.	165.4	155.9	25780.
46.00	62.00	24.39	1645.	93.23	285.8	26640.
46.00	63.00	25.39	1673.	64.89	423.7	27490.
46.00	64.00	26.39	1700.	49.90	567.8	28340.
47.00	45.00	7.418	820.3	224.8	28.98	6514.
47.00	46.00	8.418	899.2	84.37	96.92	8178.
47.00	47.00	9.418	971.2	59.08	166.9	9860.

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47.00	48.00	10.42	1040.	47.83	240.7	11510.
47.00	49.00	11.42	1106.	41.29	319.1	13180.
47.00	50.00	12.42	1170.	36.67	401.9	14740.
47.00	51.00	13.42		Disturbing moment < 0		
47.00	52.00	14.42		Disturbing moment < 0		
47.00	53.00	15.42		Disturbing moment < 0		
47.00	54.00	16.42		Disturbing moment < 0		
47.00	55.00	17.42		Disturbing moment < 0		
47.00	56.00	18.41		Disturbing moment < 0		
47.00	57.00	19.41		Disturbing moment < 0		
47.00	58.00	20.41	1505.	233.6	87.94	20540.
47.00	59.00	21.41	1536.	96.37	221.1	21310.
47.00	60.00	22.41	1565.	61.00	361.9	22070.
47.00	61.00	23.41	1594.	44.81	509.4	22830.
47.00	62.00	24.41	1621.	36.01	661.6	23830.
47.00	63.00	25.41	1648.	30.97	816.2	25280.
47.00	64.00	26.41	1673.	27.53	972.0	26760.
48.00	45.00	7.443	841.4	51.49	137.4	7075.
48.00	46.00	8.442	920.9	39.93	212.4	8483.
48.00	47.00	9.442	994.1	33.96	293.8	9978.
48.00	48.00	10.44	1065.	30.47	379.3	11560.
48.00	49.00	11.44		Disturbing moment < 0		
48.00	50.00	12.44		Disturbing moment < 0		
48.00	51.00	13.44		Disturbing moment < 0		
48.00	52.00	14.44		Disturbing moment < 0		
48.00	53.00	15.44		Disturbing moment < 0		
48.00	54.00	16.44		Disturbing moment < 0		
48.00	55.00	17.44	1389.	1177.	13.56	15950.
48.00	56.00	18.44	1422.	112.5	147.8	16630.
48.00	57.00	19.44	1453.	59.51	290.8	17300.
48.00	58.00	20.44	1483.	41.63	439.4	18290.
48.00	59.00	21.44	1512.	33.24	590.5	19630.
48.00	60.00	22.44	1541.	28.26	742.9	21000.
48.00	61.00	23.44	1568.	24.97	896.8	22390.
48.00	62.00	24.44	1596.	22.66	1051.	23820.
48.00	63.00	25.44	1622.	20.94	1207.	25270.
48.00	64.00	26.44	1648.	19.62	1364.	26750.
49.00	45.00	7.467	865.8	29.97	237.5	7120.
49.00	46.00	8.467	946.6	26.28	324.5	8529.
49.00	47.00	9.467	1021.	23.08	412.8	9510.
49.00	48.00	10.47		Disturbing moment < 0		
49.00	49.00	11.47		Disturbing moment < 0		
49.00	50.00	12.47		Disturbing moment < 0		
49.00	51.00	13.47		Disturbing moment < 0		
49.00	52.00	14.47		Disturbing moment < 0		
49.00	53.00	15.46	1299.	197.2	63.76	12570.
49.00	54.00	16.46	1333.	64.32	206.4	13270.
49.00	55.00	17.46	1365.	41.10	352.2	14480.
49.00	56.00	18.46	1398.	31.40	500.5	15720.
49.00	57.00	19.46	1428.	26.12	650.4	16990.
49.00	58.00	20.46	1458.	22.84	800.9	18290.
49.00	59.00	21.46	1487.	20.59	953.2	19620.
49.00	60.00	22.46	1515.	18.97	1107.	20990.
49.00	61.00	23.46	1543.	17.74	1261.	22380.
49.00	62.00	24.46	1570.	16.80	1417.	23800.
49.00	63.00	25.46	1597.	16.04	1574.	25260.
49.00	64.00	26.46	1623.	15.43	1733.	26730.
50.00	45.00	7.492	890.7	21.62	331.4	7164.
50.00	46.00	8.491		Disturbing moment < 0		
50.00	47.00	9.491		Disturbing moment < 0		
50.00	48.00	10.49		Disturbing moment < 0		
50.00	49.00	11.49		Disturbing moment < 0		
50.00	50.00	12.49		Disturbing moment < 0		
50.00	51.00	13.49	1204.	94.62	104.4	8982.
50.00	52.00	14.49	1240.	44.25	248.1	10980.
50.00	53.00	15.49	1275.	30.80	393.1	12110.
50.00	54.00	16.49	1309.	24.62	539.3	13280.
50.00	55.00	17.49	1340.	21.08	686.1	14480.
50.00	56.00	18.49	1372.	18.79	836.3	15720.
50.00	57.00	19.49	1401.	17.20	987.3	16980.
50.00	58.00	20.49	1431.	16.05	1139.	18290.
50.00	59.00	21.49	1460.	15.17	1293.	19620.
50.00	60.00	22.49	1488.	14.49	1448.	20980.
50.00	61.00	23.49	1516.	13.95	1604.	22370.
50.00	62.00	24.49	1543.	13.51	1761.	23790.
50.00	63.00	25.49	1569.	13.12	1919.	25190.
50.00	64.00	26.49	1594.	12.79	2080.	26590.
51.00	45.00	7.516		Disturbing moment < 0		
51.00	46.00	8.516		Disturbing moment < 0		
51.00	47.00	9.516		Disturbing moment < 0		
51.00	48.00	10.52		Disturbing moment < 0		
51.00	49.00	11.51	1101.	61.71	126.6	7816.
51.00	50.00	12.51	1140.	33.03	267.4	8832.
51.00	51.00	13.51	1178.	24.09	410.4	9888.
51.00	52.00	14.51	1214.	19.78	555.1	10980.
51.00	53.00	15.51	1249.	17.27	701.4	12110.
51.00	54.00	16.51	1283.	15.64	849.2	13280.
51.00	55.00	17.51	1316.	14.50	998.5	14480.
51.00	56.00	18.51	1346.	13.68	1149.	15720.
51.00	57.00	19.51	1375.	13.05	1301.	16980.
51.00	58.00	20.51	1404.	12.57	1455.	18280.
51.00	59.00	21.51	1434.	12.14	1610.	19550.
51.00	60.00	22.51	1462.	11.79	1768.	20850.
51.00	61.00	23.51	1489.	11.49	1929.	22170.
51.00	62.00	24.51	1515.	11.24	2092.	23510.
51.00	63.00	25.51	1541.	11.02	2258.	24880.
51.00	64.00	26.51	1566.	10.83	2425.	26270.
52.00	45.00	7.541		Disturbing moment < 0		
52.00	46.00	8.540		Disturbing moment < 0		
52.00	47.00	9.540	991.3	46.77	126.6	5923.
52.00	48.00	10.54	1034.	25.89	264.6	6852.
52.00	49.00	11.54	1075.	19.27	406.0	7824.
52.00	50.00	12.54	1114.	16.11	548.8	8840.
52.00	51.00	13.54	1152.	14.28	693.1	9895.
52.00	52.00	14.54	1188.	13.10	839.0	10990.
52.00	53.00	15.54	1223.	12.29	986.3	12120.
52.00	54.00	16.54	1256.	11.70	1135.	13280.
52.00	55.00	17.54	1288.	11.22	1286.	14440.
52.00	56.00	18.54	1317.	10.83	1441.	15610.
52.00	57.00	19.54	1347.	10.52	1598.	16820.
52.00	58.00	20.54	1376.	10.26	1758.	18050.
52.00	59.00	21.54	1404.	10.05	1921.	19300.
52.00	60.00	22.54	1431.	9.867	2086.	20580.
52.00	61.00	23.54	1459.	9.711	2254.	21880.
52.00	62.00	24.54	1485.	9.578	2423.	23210.
52.00	63.00	25.54	1510.	9.464	2595.	24560.
52.00	64.00	26.53	1535.	9.362	2769.	25920.
53.00	45.00	7.565	870.1	40.43	105.5	4266.
53.00	46.00	8.565	919.7	21.13	241.8	5109.
53.00	47.00	9.565	964.5	15.88	378.7	6016.
53.00	48.00	10.56	1008.	13.26	518.9	6880.
53.00	49.00	11.56	1049.	11.88	661.1	7854.
53.00	50.00	12.56	1088.	11.01	805.6	8869.
53.00	51.00	13.56	1125.	10.42	951.1	9915.

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EPA Export 08-07-2014:23:43:06

53.00	52.00	14.56	1161.	9.969	1100.	10960.
53.00	53.00	15.56	1195.	9.619	1252.	12040.
53.00	54.00	16.56	1228.	9.342	1407.	13150.
53.00	55.00	17.56	1259.	9.122	1566.	14280.
53.00	56.00	18.56	1289.	8.938	1728.	15450.
53.00	57.00	19.56	1317.	8.789	1893.	16630.
53.00	58.00	20.56	1345.	8.650	2059.	17810.
53.00	59.00	21.56	1373.	8.548	2228.	19050.
53.00	60.00	22.56	1399.	8.455	2400.	20290.
53.00	61.00	23.56	1425.	8.375	2574.	21560.
53.00	62.00	24.56	1450.	8.305	2751.	22850.
53.00	63.00	25.56	1475.	8.245	2930.	24150.
53.00	64.00	26.56	1499.	8.192	3111.	25480.
54.00	45.00	7.614	851.4	13.56	337.4	4575.
54.00	46.00	8.610	899.4	11.45	474.1	5429.
54.00	47.00	9.606	944.1	10.33	612.8	6328.
54.00	48.00	10.60	986.5	9.622	754.7	7262.
54.00	49.00	11.60	1026.	9.126	898.7	8201.
54.00	50.00	12.60	1064.	8.755	1047.	9169.
54.00	51.00	13.60	1099.	8.471	1200.	10160.
54.00	52.00	14.59	1133.	8.246	1356.	11180.
54.00	53.00	15.59	1166.	8.064	1516.	12220.
54.00	54.00	16.59	1198.	7.911	1678.	13270.
54.00	55.00	17.59	1229.	7.635	1843.	14070.
54.00	56.00	18.59	1258.	7.557	2011.	15200.
54.00	57.00	19.59	1285.	7.488	2183.	16350.
54.00	58.00	20.59	1311.	7.433	2357.	17520.
54.00	59.00	21.59	1338.	7.388	2534.	18720.
54.00	60.00	22.59	1364.	7.351	2713.	19940.
54.00	61.00	23.59	1389.	7.320	2894.	21180.
54.00	62.00	24.59	1414.	7.293	3078.	22450.
54.00	63.00	25.58	1437.	7.272	3263.	23730.
54.00	64.00	26.58	1460.	7.254	3451.	25040.
55.00	45.00	7.783	868.4	9.327	576.5	5377.
55.00	46.00	8.759	912.0	8.750	715.5	6261.
55.00	47.00	9.740	952.3	8.350	860.4	7184.
55.00	48.00	10.72	991.0	8.065	1010.	8146.
55.00	49.00	11.71	1027.	7.866	1162.	9140.
55.00	50.00	12.70	1061.	7.705	1320.	10170.
55.00	51.00	13.69	1094.	7.584	1479.	11220.
55.00	52.00	14.68	1126.	7.480	1643.	12290.
55.00	53.00	15.68	1156.	7.393	1810.	13380.
55.00	54.00	16.67	1185.	7.322	1980.	14500.
55.00	55.00	17.66	1213.	7.262	2153.	15640.
55.00	56.00	18.66	1240.	7.211	2329.	16800.
55.00	57.00	19.65	1267.	7.168	2508.	17980.
55.00	58.00	20.65	1291.	7.131	2689.	19180.
55.00	59.00	21.65	1316.	7.101	2872.	20400.
55.00	60.00	22.64	1339.	7.071	3059.	21630.
55.00	61.00	23.64	1362.	7.050	3246.	22890.
55.00	62.00	24.64	1385.	7.033	3435.	24160.
55.00	63.00	25.64	1408.	7.017	3627.	25450.
55.00	64.00	26.63	1430.	7.004	3820.	26750.
56.00	45.00	7.639	790.6	5.848	715.5	4184.
56.00	46.00	8.638	837.9	5.775	861.4	4975.
56.00	47.00	9.638	880.7	5.728	1014.	5805.
56.00	48.00	10.64	920.7	5.709	1169.	6672.
56.00	49.00	11.64	958.8	5.691	1329.	7564.
56.00	50.00	12.64	994.9	5.680	1494.	8487.
56.00	51.00	13.64	1029.	5.676	1663.	9441.
56.00	52.00	14.64	1061.	5.682	1835.	10420.
56.00	53.00	15.64	1093.	5.686	2011.	11440.
56.00	54.00	16.64	1122.	5.697	2190.	12470.
56.00	55.00	17.64	1152.	5.711	2371.	13540.
56.00	56.00	18.64	1180.	5.724	2554.	14620.
56.00	57.00	19.64	1206.	5.740	2741.	15730.
56.00	58.00	20.63	1231.	5.754	2931.	16860.
56.00	59.00	21.63	1257.	5.772	3121.	18020.
56.00	60.00	22.63	1280.	5.792	3314.	19190.
56.00	61.00	23.74	1351.	6.730	3658.	24560.
56.00	62.00	24.73	1373.	6.721	3844.	25840.
56.00	63.00	25.73	1393.	6.726	4040.	27170.
56.00	64.00	26.72	1413.	6.731	4237.	28520.
57.00	45.00	7.663	759.8	4.645	888.1	4125.
57.00	46.00	8.663	805.5	4.698	1042.	4894.
57.00	47.00	9.662	847.4	4.744	1201.	5698.
57.00	48.00	10.66	885.1	4.784	1366.	6537.
57.00	49.00	11.66	922.6	4.826	1536.	7411.
57.00	50.00	12.66	956.9	4.869	1708.	8315.
57.00	51.00	13.66	990.0	4.908	1884.	9249.
57.00	52.00	14.66	1022.	4.946	2065.	10210.
57.00	53.00	15.66	1052.	4.983	2248.	11200.
57.00	54.00	16.66	1080.	5.023	2432.	12220.
57.00	55.00	17.66	1108.	5.061	2620.	13260.
57.00	56.00	18.66	1135.	5.096	2811.	14320.
57.00	57.00	19.66	1161.	5.133	3003.	15410.
57.00	58.00	20.66	1186.	5.170	3196.	16520.
57.00	59.00	21.66	1209.	5.201	3394.	17650.
57.00	60.00	22.66	1233.	5.236	3592.	18800.
57.00	61.00	23.66	1256.	5.270	3791.	19980.
57.00	62.00	24.66	1278.	5.304	3991.	21170.
57.00	63.00	25.66	1301.	5.337	4194.	22380.
57.00	64.00	26.66	1322.	5.370	4397.	23610.
58.00	45.00	7.688	724.9	3.850	1049.	4040.
58.00	46.00	8.687	768.7	3.952	1212.	4791.
58.00	47.00	9.687	809.4	4.041	1380.	5578.
58.00	48.00	10.69	845.8	4.117	1554.	6398.
58.00	49.00	11.69	881.2	4.191	1730.	7252.
58.00	50.00	12.69	914.3	4.263	1909.	8136.
58.00	51.00	13.69	946.1	4.326	2092.	9049.
58.00	52.00	14.69	976.4	4.386	2278.	9990.
58.00	53.00	15.69	1005.	4.443	2466.	10960.
58.00	54.00	16.68	1034.	4.497	2658.	11950.
58.00	55.00	17.68	1061.	4.549	2851.	12970.
58.00	56.00	18.68	1087.	4.601	3046.	14010.
58.00	57.00	19.68	1112.	4.650	3243.	15080.
58.00	58.00	20.68	1137.	4.696	3442.	16160.
58.00	59.00	21.68	1161.	4.742	3643.	17270.
58.00	60.00	22.68	1183.	4.784	3847.	18400.
58.00	61.00	23.68	1206.	4.823	4054.	19550.
58.00	62.00	24.68	1228.	4.865	4259.	20720.
58.00	63.00	25.68	1249.	4.906	4466.	21910.
58.00	64.00	26.68	1270.	4.945	4674.	23110.
59.00	45.00	7.712	685.3	3.505	1198.	4199.
59.00	46.00	8.712	727.2	3.423	1368.	4983.
59.00	47.00	9.711	766.6	3.531	1544.	5452.
59.00	48.00	10.71	802.5	3.629	1723.	6254.
59.00	49.00	11.71	836.0	3.715	1908.	7087.
59.00	50.00	12.71	867.9	3.800	2092.	7950.
59.00	51.00	13.71	899.2	3.877	2281.	8843.
59.00	52.00	14.71	928.7	3.948	2472.	9762.
59.00	53.00	15.71	957.0	4.016	2666.	10710.
59.00	54.00	16.71	984.2	4.080	2862.	11680.
59.00	55.00	17.71	1010.	4.140	3061.	12670.

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EPA Export 08-07-2014:23:43:06

59.00	56.00	18.71	1036.	4.199	3261.	13690.
59.00	57.00	19.71	1060.	4.254	3463.	14730.
59.00	58.00	20.71	1084.	4.307	3667.	15790.
59.00	59.00	21.71	1107.	4.360	3870.	16880.
59.00	60.00	22.71	1131.	4.411	4077.	17980.
59.00	61.00	23.71	1152.	4.455	4280.	19100.
59.00	62.00	24.71	1174.	4.503	4497.	20250.
59.00	63.00	25.71	1195.	4.550	4706.	21410.
59.00	64.00	26.71	1215.	4.595	4917.	22590.
60.00	45.00	7.737	639.8	4.575	1309.	5988.
60.00	46.00	8.736	682.6	3.760	1504.	5657.
60.00	47.00	9.736	720.7	3.575	1693.	6052.
60.00	48.00	10.74	754.6	3.263	1871.	6104.
60.00	49.00	11.74	787.2	3.359	2059.	6916.
60.00	50.00	12.74	817.7	3.447	2250.	7757.
60.00	51.00	13.73	847.7	3.531	2444.	8627.
60.00	52.00	14.73	876.4	3.609	2639.	9524.
60.00	53.00	15.73	903.9	3.682	2837.	10450.
60.00	54.00	16.73	930.2	3.751	3037.	11390.
60.00	55.00	17.73	956.3	3.817	3239.	12360.
60.00	56.00	18.73	981.1	3.880	3443.	13360.
60.00	57.00	19.73	1005.	3.940	3648.	14370.
60.00	58.00	20.73	1028.	3.997	3855.	15410.
60.00	59.00	21.73	1051.	4.052	4063.	16470.
60.00	60.00	22.73	1073.	4.106	4273.	17540.
60.00	61.00	23.73	1095.	4.157	4484.	18660.
60.00	62.00	24.73	1115.	4.206	4697.	19760.
60.00	63.00	25.73	1135.	4.255	4910.	20890.
60.00	64.00	26.73	1155.	4.303	5123.	22050.
61.00	45.00	7.761	575.9	5.080	1289.	6548.
61.00	46.00	8.761	626.3	4.872	1562.	7611.
61.00	47.00	9.760	667.5	4.085	1789.	7308.
61.00	48.00	10.76	702.3	3.699	1991.	7364.
61.00	49.00	11.76	733.8	3.461	2185.	7563.
61.00	50.00	12.76	764.5	3.274	2377.	7784.
61.00	51.00	13.76	792.4	3.265	2574.	8403.
61.00	52.00	14.76	820.4	3.345	2773.	9276.
61.00	53.00	15.76	847.3	3.420	2975.	10170.
61.00	54.00	16.76	873.3	3.492	3178.	11100.
61.00	55.00	17.76	898.3	3.560	3383.	12040.
61.00	56.00	18.76	922.5	3.625	3589.	13010.
61.00	57.00	19.76	945.9	3.687	3797.	14000.
61.00	58.00	20.76	968.7	3.747	4006.	15010.
61.00	59.00	21.76	991.4	3.804	4217.	16040.
61.00	60.00	22.76	1013.	3.859	4429.	17090.
61.00	61.00	23.76	1034.	3.912	4642.	18160.
61.00	62.00	24.76	1055.	3.963	4857.	19250.
61.00	63.00	25.76	1075.	4.013	5073.	20360.
61.00	64.00	26.76	1094.	4.060	5292.	21480.
62.00	45.00	7.786	504.6	5.416	1197.	6481.
62.00	46.00	8.785	555.2	5.112	1486.	7599.
62.00	47.00	9.785	601.2	4.952	1771.	8771.
62.00	48.00	10.78	642.4	4.513	2034.	9179.
62.00	49.00	11.78	676.6	4.052	2257.	9147.
62.00	50.00	12.78	707.1	3.770	2470.	9314.
62.00	51.00	13.78	735.5	3.575	2674.	9559.
62.00	52.00	14.78	762.6	3.421	2877.	9842.
62.00	53.00	15.78	788.2	3.298	3078.	10150.
62.00	54.00	16.78	813.3	3.206	3283.	10790.
62.00	55.00	17.78	837.8	3.354	3491.	11710.
62.00	56.00	18.78	861.5	3.419	3700.	12650.
62.00	57.00	19.78	884.7	3.481	3910.	13610.
62.00	58.00	20.78	907.1	3.541	4121.	14590.
62.00	59.00	21.78	929.0	3.599	4334.	15600.
62.00	60.00	22.78	950.2	3.655	4548.	16620.
62.00	61.00	23.78	970.3	3.713	4757.	17660.
62.00	62.00	24.78	990.6	3.765	4973.	18720.
62.00	63.00	25.78	1011.	3.815	5191.	19800.
62.00	64.00	26.78	1030.	3.864	5405.	20900.
63.00	45.00	7.810	427.4	6.205	1093.	6410.
63.00	46.00	8.810	478.5	5.611	1338.	7509.
63.00	47.00	9.809	524.4	5.299	1634.	8662.
63.00	48.00	10.81	567.2	5.115	1929.	9866.
63.00	49.00	11.81	607.5	4.970	2221.	11040.
63.00	50.00	12.81	641.5	4.498	2473.	11120.
63.00	51.00	13.81	671.3	4.160	2703.	11240.
63.00	52.00	14.81	699.4	3.925	2922.	11470.
63.00	53.00	15.81	725.9	3.746	3136.	11750.
63.00	54.00	16.81	750.9	3.601	3347.	12050.
63.00	55.00	17.81	775.5	3.587	3564.	12780.
63.00	56.00	18.81	797.3	3.387	3762.	12740.
63.00	57.00	19.81	819.7	3.324	3973.	13210.
63.00	58.00	20.81	841.7	3.383	4186.	14160.
63.00	59.00	21.81	863.2	3.440	4400.	15140.
63.00	60.00	22.81	884.2	3.495	4615.	16130.
63.00	61.00	23.81	904.8	3.549	4831.	17140.
63.00	62.00	24.80	924.9	3.600	5049.	18180.
63.00	63.00	25.80	944.5	3.650	5267.	19230.
63.00	64.00	26.80	963.8	3.699	5487.	20290.
64.00	45.00	7.834	343.9	8.033	788.4	6333.
64.00	46.00	8.834	395.5	6.688	1108.	7412.
64.00	47.00	9.834	442.7	6.010	1422.	8546.
64.00	48.00	10.83	485.7	5.628	1729.	9729.
64.00	49.00	11.83	526.0	5.393	2032.	10960.
64.00	50.00	12.83	564.1	5.247	2332.	12230.
64.00	51.00	13.83	599.6	5.020	2623.	13170.
64.00	52.00	14.83	628.7	4.648	2872.	13350.
64.00	53.00	15.83	656.3	4.359	3107.	13540.
64.00	54.00	16.83	682.4	4.139	3336.	13810.
64.00	55.00	17.83	706.7	3.965	3558.	14110.
64.00	56.00	18.83	730.1	3.822	3777.	14430.
64.00	57.00	19.83	753.1	3.700	3991.	14770.
64.00	58.00	20.83	774.6	3.594	4204.	15110.
64.00	59.00	21.83	795.3	3.510	4416.	15500.
64.00	60.00	22.83	815.6	3.445	4630.	15950.
64.00	61.00	23.83	835.7	3.425	4847.	16600.
64.00	62.00	24.83	855.5	3.476	5065.	17600.
64.00	63.00	25.83	875.0	3.524	5284.	18620.
64.00	64.00	26.83	894.1	3.572	5504.	19660.
65.00	45.00	7.859	Weight too small			
65.00	45.00	7.859	256.3	7.198	455.8	3281.
65.00	46.00	8.859	Weight too small			
65.00	46.00	8.859	275.2	7.207	539.7	3890.
65.00	47.00	9.858	354.5	7.546	1116.	8419.
65.00	48.00	10.86	398.6	6.661	1438.	9582.
65.00	49.00	11.86	439.2	6.153	1753.	10790.
65.00	50.00	12.86	477.7	5.831	2065.	12040.
65.00	51.00	13.86	513.8	5.621	2372.	13330.
65.00	52.00	14.86	548.1	5.481	2675.	14660.
65.00	53.00	15.86	579.8	5.227	2968.	15520.
65.00	54.00	16.86	607.6	4.896	3223.	15780.
65.00	55.00	17.86	633.7	4.622	3466.	16020.
65.00	56.00	18.86	658.3	4.407	3702.	16320.
65.00	57.00	19.86	681.1	4.235	3928.	16640.

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EPA Export 08-07-2014:23:43:06

65.00	58.00	20.86	703.1	4.087	4153.	16980.
65.00	59.00	21.85	724.4	3.960	4375.	17320.
65.00	60.00	22.85	745.2	3.846	4595.	17680.
65.00	61.00	23.85	765.0	3.746	4813.	18030.
65.00	62.00	24.85	784.7	3.657	5027.	18390.
65.00	63.00	25.85	803.6	3.597	5244.	18860.
65.00	64.00	26.85	822.1	3.544	5463.	19360.
66.00	45.00	7.883	214.4	7.301	430.1	3140.
66.00	46.00	8.883		Weight too small		
66.00	46.00	8.883	232.5	7.230	514.9	3723.
66.00	47.00	9.883		Weight too small		
66.00	47.00	9.883	249.8	7.210	601.4	4336.
66.00	48.00	10.88		Weight too small		
66.00	48.00	10.88	266.4	7.217	689.7	4977.
66.00	49.00	11.88	348.3	7.690	1379.	10600.
66.00	50.00	12.88	386.9	6.952	1702.	11830.
66.00	51.00	13.88	423.2	6.484	2020.	13100.
66.00	52.00	14.88	458.1	6.171	2334.	14400.
66.00	53.00	15.88	491.3	5.954	2644.	15740.
66.00	54.00	16.88	522.6	5.802	2950.	17120.
66.00	55.00	17.88	552.4	5.553	3248.	18030.
66.00	56.00	18.88	579.0	5.234	3512.	18380.
66.00	57.00	19.88	603.4	4.960	3762.	18660.
66.00	58.00	20.88	627.1	4.739	4003.	18970.
66.00	59.00	21.88	649.6	4.554	4241.	19310.
66.00	60.00	22.88	671.0	4.396	4473.	19660.
66.00	61.00	23.88	690.8	4.263	4697.	20020.
66.00	62.00	24.88	710.7	4.141	4922.	20390.
66.00	63.00	25.88	730.1	4.032	5147.	20750.
66.00	64.00	26.88	748.8	3.933	5368.	21110.
67.00	45.00	7.908	169.5	8.011	372.8	2987.
67.00	46.00	8.908	187.3	7.734	457.9	3542.
67.00	47.00	9.907		Slip too small to split into minimum no. of slices		
67.00	48.00	10.91		Weight too small		
67.00	48.00	10.91	219.7	7.508	631.0	4737.
67.00	49.00	11.91		Weight too small		
67.00	49.00	11.91	234.9	7.468	719.8	5376.
67.00	50.00	12.91		Weight too small		
67.00	50.00	12.91	249.4	7.462	809.3	6039.
67.00	51.00	13.91	66.53	8.618	670.0	5774.
67.00	51.00	13.91	263.7	7.469	900.7	6727.
67.00	52.00	14.91	363.8	7.478	1888.	14120.
67.00	53.00	15.91	397.7	6.982	2210.	15430.
67.00	54.00	16.91	429.9	6.640	2527.	16780.
67.00	55.00	17.90	460.8	6.394	2840.	18160.
67.00	56.00	18.90	489.9	6.217	3149.	19570.
67.00	57.00	19.90	518.5	5.991	3454.	20690.
67.00	58.00	20.90	544.4	5.666	3730.	21140.
67.00	59.00	21.90	567.7	5.377	3986.	21430.
67.00	60.00	22.90	590.3	5.139	4235.	21770.
67.00	61.00	23.90	612.0	4.937	4479.	22120.
67.00	62.00	24.90	633.1	4.765	4718.	22480.
67.00	63.00	25.90	653.2	4.613	4953.	22850.
67.00	64.00	26.90	672.6	4.479	5185.	23220.
68.00	45.00	7.932	123.6	9.512	287.5	2735.
68.00	46.00	8.932	139.5	9.070	364.2	3304.
68.00	47.00	9.932	155.6	8.684	448.5	3895.
68.00	48.00	10.93	170.9	8.370	534.6	4474.
68.00	49.00	11.93		Weight too small		
68.00	49.00	11.93	185.7	8.163	622.3	5080.
68.00	50.00	12.93		Weight too small		
68.00	50.00	12.93	200.0	8.028	711.4	5711.
68.00	51.00	13.93		Weight too small		
68.00	51.00	13.93	213.7	7.948	800.8	6365.
68.00	52.00	14.93		Weight too small		
68.00	52.00	14.93	227.1	7.895	892.0	7042.
68.00	53.00	15.93	63.06	9.145	699.8	6400.
68.00	53.00	15.93	240.1	7.867	984.2	7742.
68.00	54.00	16.93	82.01	8.326	952.6	7682.
68.00	54.00	16.93	252.7	7.857	1077.	8463.
68.00	55.00	17.93	364.6	7.670	2316.	17760.
68.00	56.00	18.93	395.1	7.261	2637.	19150.
68.00	57.00	19.93	424.1	6.962	2954.	20560.
68.00	58.00	20.93	451.6	6.739	3265.	22010.
68.00	59.00	21.93	479.0	6.561	3575.	23460.
68.00	60.00	22.93	504.5	6.187	3867.	23930.
68.00	61.00	23.93	527.6	5.887	4133.	24330.
68.00	62.00	24.93	549.8	5.645	4397.	24820.
68.00	63.00	25.93	570.4	5.397	4639.	25040.
68.00	64.00	26.93	590.8	5.201	4886.	25410.
69.00	45.00	7.957	80.30	12.39	193.0	2393.
69.00	46.00	8.957	93.23	11.62	253.3	2942.
69.00	47.00	9.956	106.9	10.85	322.9	3504.
69.00	48.00	10.96	120.6	10.29	398.8	4105.
69.00	49.00	11.96	134.7	9.852	481.9	4748.
69.00	50.00	12.96	148.6	9.391	569.3	5346.
69.00	51.00	13.96		Weight too small		
69.00	51.00	13.96	162.1	9.068	657.8	5965.
69.00	52.00	14.95		Weight too small		
69.00	52.00	14.95	175.3	8.834	747.8	6606.
69.00	53.00	15.95		Weight too small		
69.00	53.00	15.95	187.9	8.678	837.7	7269.
69.00	54.00	16.95		Weight too small		
69.00	54.00	16.95	200.4	8.556	929.7	7954.
69.00	55.00	17.95	57.74	9.862	698.7	6891.
69.00	55.00	17.95	212.6	8.470	1022.	8660.
69.00	56.00	18.95	74.36	9.013	910.2	8204.
69.00	56.00	18.95	224.5	8.410	1116.	9387.
69.00	57.00	19.95	91.40	8.437	1131.	9544.
69.00	57.00	19.95	236.1	8.370	1211.	10130.
69.00	58.00	20.95	354.6	8.083	2657.	21470.
69.00	59.00	21.95	382.6	7.696	2978.	22920.
69.00	60.00	22.95	409.2	7.405	3293.	24390.
69.00	61.00	23.95	435.0	7.177	3607.	25890.
69.00	62.00	24.95	460.1	6.850	3914.	26810.
69.00	63.00	25.95	483.2	6.509	4195.	27310.
69.00	64.00	26.95	504.7	6.210	4459.	27690.
70.00	45.00	7.981		Weight too small		
70.00	46.00	8.981	52.35	16.64	145.7	2424.
70.00	47.00	9.981	62.41	15.31	193.2	2958.
70.00	48.00	10.98	73.26	14.20	249.7	3545.
70.00	49.00	11.98	85.15	13.13	316.7	4158.
70.00	50.00	12.98	97.26	12.25	390.1	4780.
70.00	51.00	13.98	109.6	11.59	469.6	5443.
70.00	52.00	14.98		Weight too small		
70.00	52.00	14.98	122.3	11.00	556.1	6115.
70.00	53.00	15.98		Weight too small		
70.00	53.00	15.98	135.0	10.44	645.8	6741.
70.00	54.00	16.98		Weight too small		
70.00	54.00	16.98	147.2	10.04	735.8	7387.
70.00	55.00	17.98		Weight too small		
70.00	55.00	17.98	159.2	9.737	827.2	8054.
70.00	56.00	18.98		Weight too small		

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EPA Export 08-07-2014:23:43:06

70.00	56.00	18.98	170.8	9.517	918.5	8742.
70.00	57.00	19.98	51.34	10.77	671.9	7237.
70.00	57.00	19.98	182.3	9.341	1012.	9449.
70.00	58.00	20.98	65.92	9.844	871.3	8577.
70.00	58.00	20.98	193.7	9.203	1106.	10180.
70.00	59.00	21.98	81.00	9.198	1081.	9942.
70.00	59.00	21.98	204.7	9.098	1201.	10920.
70.00	60.00	22.98	96.40	8.731	1298.	11340.
70.00	60.00	22.98	215.6	9.017	1296.	11690.
70.00	61.00	23.98	336.9	8.668	2906.	25190.
70.00	62.00	24.98	362.8	8.269	3227.	26690.
70.00	63.00	25.98	387.9	7.956	3545.	28210.
70.00	64.00	26.98	412.1	7.707	3860.	29750.
71.00	45.00	8.012		Weight too small		
71.00	46.00	9.010		Weight too small		
71.00	47.00	10.01		Weight too small		
71.00	48.00	11.01		Weight too small		
71.00	49.00	12.01		Weight too small		
71.00	50.00	13.01	50.94	18.78	208.9	3922.
71.00	51.00	14.00	60.79	17.12	268.3	4592.
71.00	52.00	15.00	71.41	15.61	337.1	5261.
71.00	53.00	16.00	82.51	14.38	412.9	5937.
71.00	54.00	17.00		Weight too small		
71.00	54.00	17.00	93.82	13.45	494.6	6653.
71.00	55.00	18.00		Weight too small		
71.00	55.00	18.00	105.5	12.63	583.0	7363.
71.00	56.00	19.00		Weight too small		
71.00	56.00	19.00	117.1	11.89	673.6	8011.
71.00	57.00	20.00		Weight too small		
71.00	57.00	20.00	128.2	11.36	763.8	8678.
71.00	58.00	21.00		Weight too small		
71.00	58.00	21.00	139.4	10.94	856.1	9366.
71.00	59.00	22.00		Weight too small		
71.00	59.00	22.00	150.3	10.61	949.5	10070.
71.00	60.00	23.00	57.16	10.85	810.5	8790.
71.00	60.00	23.00	161.1	10.35	1044.	10800.
71.00	61.00	24.00	70.48	10.10	1008.	10180.
71.00	61.00	24.00	171.6	10.14	1139.	11540.
71.00	62.00	25.00	84.20	9.550	1214.	11590.
71.00	62.00	25.00	182.1	9.965	1235.	12300.
71.00	63.00	26.00	98.20	9.136	1427.	13030.
71.00	63.00	26.00	192.4	9.828	1331.	13080.
71.00	64.00	27.00	112.4	8.818	1645.	14510.
71.00	64.00	27.00	202.5	9.716	1429.	13880.
72.00	45.00	8.135		Weight too small		
72.00	46.00	9.120		Weight too small		
72.00	47.00	10.11		Weight too small		
72.00	48.00	11.10		Weight too small		
72.00	49.00	12.09		Weight too small		
72.00	50.00	13.08		Weight too small		
72.00	51.00	14.08		Weight too small		
72.00	52.00	15.07		Weight too small		
72.00	53.00	16.07		Weight too small		
72.00	54.00	17.06	50.20	20.57	272.2	5597.
72.00	55.00	18.06	59.74	18.46	342.1	6316.
72.00	56.00	19.06		Weight too small		
72.00	56.00	19.06	69.57	16.84	417.7	7036.
72.00	57.00	20.05		Weight too small		
72.00	57.00	20.05	79.74	15.60	499.6	7795.
72.00	58.00	21.05		Weight too small		
72.00	58.00	21.05	90.22	14.56	587.4	8550.
72.00	59.00	22.05		Weight too small		
72.00	59.00	22.05	100.6	13.60	677.5	9311.
72.00	60.00	23.04		Weight too small		
72.00	60.00	23.04	110.9	12.87	768.6	9892.
72.00	61.00	24.04		Weight too small		
72.00	61.00	24.04	121.1	12.30	860.9	10590.
72.00	62.00	25.04		Weight too small		
72.00	62.00	25.04	131.1	11.86	953.8	11310.
72.00	63.00	26.04	60.99	11.09	931.1	10320.
72.00	63.00	26.04	141.0	11.50	1048.	12040.
72.00	64.00	27.04	73.17	10.45	1124.	11740.
72.00	64.00	27.04	150.7	11.21	1142.	12800.
73.00	45.00	8.378		Radius too small		
73.00	46.00	9.337		Weight too small		
73.00	47.00	10.30		Weight too small		
73.00	48.00	11.28		Weight too small		
73.00	49.00	12.25		Weight too small		
73.00	50.00	13.23		Weight too small		
73.00	51.00	14.22		Weight too small		
73.00	52.00	15.20		Weight too small		
73.00	53.00	16.19		Weight too small		
73.00	54.00	17.18		Weight too small		
73.00	55.00	18.17		Weight too small		
73.00	56.00	19.16		Weight too small		
73.00	57.00	20.15		Weight too small		
73.00	58.00	21.14		Weight too small		
73.00	58.00	21.14	51.44	21.32	346.6	7389.
73.00	59.00	22.14		Weight too small		
73.00	59.00	22.14	60.22	19.31	422.1	8150.
73.00	60.00	23.13		Weight too small		
73.00	60.00	23.13	69.38	17.76	503.8	8950.
73.00	61.00	24.13		Weight too small		
73.00	61.00	24.13	78.90	16.47	591.8	9750.
73.00	62.00	25.12		Weight too small		
73.00	62.00	25.12	88.42	15.28	682.2	10420.
73.00	63.00	26.12		Weight too small		
73.00	63.00	26.12	97.77	14.38	773.0	11110.
73.00	64.00	27.11		Weight too small		
73.00	64.00	27.11	107.1	13.67	865.0	11820.
74.00	45.00	8.682		Radius too small		
74.00	46.00	9.635		Radius too small		
74.00	47.00	10.59		Radius too small		
74.00	48.00	11.54		Radius too small		
74.00	49.00	12.50		Weight too small		
74.00	50.00	13.46		Weight too small		
74.00	51.00	14.43		Weight too small		
74.00	52.00	15.40		Weight too small		
74.00	53.00	16.37		Weight too small		
74.00	54.00	17.35		Weight too small		
74.00	55.00	18.33		Weight too small		
74.00	56.00	19.32		Weight too small		
74.00	57.00	20.30		Weight too small		
74.00	58.00	21.29		Weight too small		
74.00	59.00	22.27		Weight too small		
74.00	60.00	23.26		Weight too small		
74.00	60.00	23.26		Weight too small		
74.00	61.00	24.25		Weight too small		
74.00	61.00	24.25		Weight too small		
74.00	62.00	25.24		Weight too small		
74.00	62.00	25.24	53.26	21.72	426.9	9272.
74.00	63.00	26.23		Weight too small		
74.00	63.00	26.23	61.56	19.88	508.6	10110.
74.00	64.00	27.22		Weight too small		

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EPA Export 08-07-2014:23:43:06

74.00	64.00	27.22	70.12	18.40	595.6	10960.
75.00	45.00	8.987	Radius too small			
75.00	46.00	9.939	Radius too small			
75.00	47.00	10.89	Radius too small			
75.00	48.00	11.84	Radius too small			
75.00	49.00	12.80	Radius too small			
75.00	50.00	13.75	Radius too small			
75.00	51.00	14.70	Radius too small			
75.00	52.00	15.66	Weight too small			
75.00	53.00	16.62	Weight too small			
75.00	54.00	17.58	Weight too small			
75.00	55.00	18.55	Weight too small			
75.00	56.00	19.52	Weight too small			
75.00	57.00	20.50	Weight too small			
75.00	58.00	21.47	Weight too small			
75.00	59.00	22.45	Weight too small			
75.00	60.00	23.43	Weight too small			
75.00	61.00	24.41	Weight too small			
75.00	62.00	25.40	Weight too small			
75.00	62.00	25.40	Weight too small			
75.00	63.00	26.38	Weight too small			
75.00	63.00	26.38	Weight too small			
75.00	64.00	27.37	Weight too small			
75.00	64.00	27.37	Weight too small			
76.00	45.00	9.292	Radius too small			
76.00	46.00	10.24	Radius too small			
76.00	47.00	11.20	Radius too small			
76.00	48.00	12.15	Radius too small			
76.00	49.00	13.10	Radius too small			
76.00	50.00	14.05	Radius too small			
76.00	51.00	15.01	Radius too small			
76.00	52.00	15.96	Radius too small			
76.00	53.00	16.91	Radius too small			
76.00	54.00	17.86	Radius too small			
76.00	55.00	18.82	Weight too small			
76.00	56.00	19.78	Weight too small			
76.00	57.00	20.74	Weight too small			
76.00	58.00	21.70	Weight too small			
76.00	59.00	22.67	Weight too small			
76.00	60.00	23.64	Weight too small			
76.00	61.00	24.62	Weight too small			
76.00	62.00	25.59	Weight too small			
76.00	63.00	26.57	Weight too small			
76.00	64.00	27.55	Weight too small			
76.00	64.00	27.55	Weight too small			
77.00	45.00	9.596	Radius too small			
77.00	46.00	10.55	Radius too small			
77.00	47.00	11.50	Radius too small			
77.00	48.00	12.45	Radius too small			
77.00	49.00	13.41	Radius too small			
77.00	50.00	14.36	Radius too small			
77.00	51.00	15.31	Radius too small			
77.00	52.00	16.26	Radius too small			
77.00	53.00	17.22	Radius too small			
77.00	54.00	18.17	Radius too small			
77.00	55.00	19.12	Radius too small			
77.00	56.00	20.07	Radius too small			
77.00	57.00	21.03	Radius too small			
77.00	58.00	21.98	Weight too small			
77.00	59.00	22.94	Weight too small			
77.00	60.00	23.90	Weight too small			
77.00	61.00	24.86	Weight too small			
77.00	62.00	25.83	Weight too small			
77.00	63.00	26.80	Weight too small			
77.00	64.00	27.77	Weight too small			
78.00	45.00	9.901	Radius too small			
78.00	46.00	10.85	Radius too small			
78.00	47.00	11.81	Radius too small			
78.00	48.00	12.76	Radius too small			
78.00	49.00	13.71	Radius too small			
78.00	50.00	14.66	Radius too small			
78.00	51.00	15.62	Radius too small			
78.00	52.00	16.57	Radius too small			
78.00	53.00	17.52	Radius too small			
78.00	54.00	18.47	Radius too small			
78.00	55.00	19.43	Radius too small			
78.00	56.00	20.38	Radius too small			
78.00	57.00	21.33	Radius too small			
78.00	58.00	22.28	Radius too small			
78.00	59.00	23.24	Radius too small			
78.00	60.00	24.19	Radius too small			
78.00	61.00	25.14	Weight too small			
78.00	62.00	26.10	Weight too small			
78.00	63.00	27.06	Weight too small			
78.00	64.00	28.02	Weight too small			
79.00	45.00	10.21	Radius too small			
79.00	46.00	11.16	Radius too small			
79.00	47.00	12.11	Radius too small			
79.00	48.00	13.06	Radius too small			
79.00	49.00	14.02	Radius too small			
79.00	50.00	14.97	Radius too small			
79.00	51.00	15.92	Radius too small			
79.00	52.00	16.87	Radius too small			
79.00	53.00	17.83	Radius too small			
79.00	54.00	18.78	Radius too small			
79.00	55.00	19.73	Radius too small			
79.00	56.00	20.68	Radius too small			
79.00	57.00	21.64	Radius too small			
79.00	58.00	22.59	Radius too small			
79.00	59.00	23.54	Radius too small			
79.00	60.00	24.49	Radius too small			
79.00	61.00	25.44	Radius too small			
79.00	62.00	26.40	Radius too small			
79.00	63.00	27.35	Radius too small			
79.00	64.00	28.30	Weight too small			
80.00	45.00	10.48	Radius too small			
80.00	46.00	11.48	Weight too small			
80.00	47.00	12.48	Weight too small			
80.00	48.00	13.48	Weight too small			
80.00	49.00	14.48	Weight too small			
80.00	50.00	15.48	Weight too small			
80.00	51.00	16.48	Weight too small			
80.00	52.00	17.47	Weight too small			
80.00	53.00	18.47	Weight too small			
80.00	54.00	19.08	Radius too small			
80.00	55.00	20.04	Radius too small			
80.00	56.00	20.99	Radius too small			
80.00	57.00	21.94	Radius too small			
80.00	58.00	22.89	Radius too small			
80.00	59.00	23.84	Radius too small			
80.00	60.00	24.80	Radius too small			
80.00	61.00	25.75	Radius too small			
80.00	62.00	26.70	Radius too small			
80.00	63.00	27.65	Radius too small			

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80.00	64.00	28.61	Radius too small
81.00	45.00	10.54	Radius too small
81.00	46.00	11.54	Radius too small
81.00	47.00	12.54	Radius too small
81.00	48.00	13.53	Radius too small
81.00	49.00	14.53	Radius too small
81.00	50.00	15.53	Radius too small
81.00	51.00	16.53	Radius too small
81.00	52.00	17.52	Weight too small
81.00	53.00	18.52	Weight too small
81.00	54.00	19.52	Weight too small
81.00	55.00	20.52	Weight too small
81.00	56.00	21.52	Weight too small
81.00	57.00	22.52	Weight too small
81.00	58.00	23.20	Radius too small
81.00	59.00	24.15	Radius too small
81.00	60.00	25.10	Radius too small
81.00	61.00	26.05	Radius too small
81.00	62.00	27.01	Radius too small
81.00	63.00	27.96	Radius too small
81.00	64.00	28.91	Radius too small
82.00	45.00	10.68	Radius too small
82.00	46.00	11.67	Radius too small
82.00	47.00	12.65	Radius too small
82.00	48.00	13.64	Radius too small
82.00	49.00	14.63	Radius too small
82.00	50.00	15.62	Radius too small
82.00	51.00	16.62	Radius too small
82.00	52.00	17.61	Radius too small
82.00	53.00	18.60	Radius too small
82.00	54.00	19.60	Radius too small
82.00	55.00	20.59	Radius too small
82.00	56.00	21.59	Radius too small
82.00	57.00	22.58	Weight too small
82.00	58.00	23.58	Weight too small
82.00	59.00	24.58	Weight too small
82.00	60.00	25.57	Weight too small
82.00	61.00	26.57	Weight too small
82.00	62.00	27.31	Radius too small
82.00	63.00	28.26	Radius too small
82.00	64.00	29.22	Radius too small
83.00	45.00	10.92	Radius too small
83.00	46.00	11.88	Radius too small
83.00	47.00	12.85	Radius too small
83.00	48.00	13.83	Radius too small
83.00	49.00	14.80	Radius too small
83.00	50.00	15.78	Radius too small
83.00	51.00	16.77	Radius too small
83.00	52.00	17.75	Radius too small
83.00	53.00	18.74	Radius too small
83.00	54.00	19.73	Radius too small
83.00	55.00	20.71	Radius too small
83.00	56.00	21.70	Radius too small
83.00	57.00	22.70	Radius too small
83.00	58.00	23.69	Radius too small
83.00	59.00	24.68	Radius too small
83.00	60.00	25.67	Radius too small
83.00	61.00	26.67	Radius too small
83.00	62.00	27.66	Weight too small
83.00	63.00	28.65	Weight too small
83.00	64.00	29.65	Weight too small
84.00	45.00	11.23	Radius too small
84.00	46.00	12.17	Radius too small
84.00	47.00	13.12	Radius too small
84.00	48.00	14.08	Radius too small
84.00	49.00	15.04	Radius too small
84.00	50.00	16.00	Radius too small
84.00	51.00	16.97	Radius too small
84.00	52.00	17.95	Radius too small
84.00	53.00	18.92	Radius too small
84.00	54.00	19.90	Radius too small
84.00	55.00	20.88	Radius too small
84.00	56.00	21.86	Radius too small
84.00	57.00	22.85	Radius too small
84.00	58.00	23.83	Radius too small
84.00	59.00	24.82	Radius too small
84.00	60.00	25.81	Radius too small
84.00	61.00	26.80	Radius too small
84.00	62.00	27.79	Radius too small
84.00	63.00	28.78	Radius too small
84.00	64.00	29.77	Radius too small
85.00	45.00	11.63	Disturbing moment < 0
85.00	46.00	12.54	Radius too small
85.00	47.00	13.46	Radius too small
85.00	48.00	14.39	Radius too small
85.00	49.00	15.33	Radius too small
85.00	50.00	16.28	Radius too small
85.00	51.00	17.24	Radius too small
85.00	52.00	18.20	Radius too small
85.00	53.00	19.16	Radius too small
85.00	54.00	20.13	Radius too small
85.00	55.00	21.10	Radius too small
85.00	56.00	22.07	Radius too small
85.00	57.00	23.04	Radius too small
85.00	58.00	24.02	Radius too small
85.00	59.00	25.00	Radius too small
85.00	60.00	25.98	Radius too small
85.00	61.00	26.96	Radius too small
85.00	62.00	27.95	Radius too small
85.00	63.00	28.93	Radius too small
85.00	64.00	29.92	Radius too small
86.00	45.00	12.09	FoS > 1000
86.00	46.00	12.97	FoS > 1000
86.00	47.00	13.86	FoS > 1000
86.00	48.00	14.77	FoS > 1000
86.00	49.00	15.69	FoS > 1000
86.00	50.00	16.62	Disturbing moment < 0
86.00	51.00	17.55	Radius too small
86.00	52.00	18.50	Radius too small
86.00	53.00	19.44	Radius too small
86.00	54.00	20.40	Radius too small
86.00	55.00	21.36	Radius too small
86.00	56.00	22.32	Radius too small
86.00	57.00	23.28	Radius too small
86.00	58.00	24.25	Radius too small
86.00	59.00	25.22	Radius too small
86.00	60.00	26.19	Radius too small
86.00	61.00	27.17	Radius too small
86.00	62.00	28.14	Radius too small
86.00	63.00	29.12	Radius too small
86.00	64.00	30.10	Radius too small
87.00	45.00	11.60	Radius too small
87.00	46.00	13.46	Disturbing moment < 0
87.00	47.00	14.32	86.34 2.463E+6 0.003984 9814.

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87.00	48.00	15.20		FoS > 1000		
87.00	49.00	16.10		FoS > 1000		
87.00	50.00	17.00		Disturbing moment < 0		
87.00	51.00	17.92		FoS > 1000		
87.00	52.00	18.84		Disturbing moment < 0		
87.00	53.00	19.78		Disturbing moment < 0		
87.00	54.00	20.71		Disturbing moment < 0		
87.00	55.00	21.66		FoS > 1000		
87.00	56.00	22.61		Disturbing moment < 0		
87.00	57.00	23.56		Radius too small		
87.00	58.00	24.52		Radius too small		
87.00	59.00	25.48		Radius too small		
87.00	60.00	26.44		Radius too small		
87.00	61.00	27.40		Radius too small		
87.00	62.00	28.37		Radius too small		
87.00	63.00	29.34		Radius too small		
87.00	64.00	30.32		Radius too small		
88.00	45.00	11.60		Radius too small		
88.00	46.00	12.60		Radius too small		
88.00	47.00	13.60		Radius too small		
88.00	48.00	15.69	166.6	519300.	0.02663	13830.
88.00	49.00	16.56	141.3	1.190E+6	0.01180	14040.
88.00	50.00	17.44		Disturbing moment < 0		
88.00	51.00	18.33	100.0	1.843E+6	0.007762	14300.
88.00	52.00	19.24		Disturbing moment < 0		
88.00	53.00	20.15		Disturbing moment < 0		
88.00	54.00	21.07		FoS > 1000		
88.00	55.00	22.00		FoS > 1000		
88.00	56.00	22.94		Disturbing moment < 0		
88.00	57.00	23.88		FoS > 1000		
88.00	58.00	24.82		FoS > 1000		
88.00	59.00	25.77		FoS > 1000		
88.00	60.00	26.72		FoS > 1000		
88.00	61.00	27.68		Disturbing moment < 0		
88.00	62.00	28.64		Disturbing moment < 0		
88.00	63.00	29.60		Radius too small		
88.00	64.00	30.56		Radius too small		
89.00	45.00	11.60		Radius too small		
89.00	46.00	12.60		Radius too small		
89.00	47.00	13.60		Radius too small		
89.00	48.00	14.60		Radius too small		
89.00	49.00	15.60		Radius too small		
89.00	50.00	17.92	237.7	316000.	0.05886	18600.
89.00	51.00	18.79	208.8	259900.	0.07293	18960.
89.00	52.00	19.67	183.4	352800.	0.05464	19280.
89.00	53.00	20.57	160.8	6.313E+6	0.003098	19560.
89.00	54.00	21.47		Disturbing moment < 0		
89.00	55.00	22.38	122.6	1.833E+6	0.01089	19960.
89.00	56.00	23.30	106.2	2.274E+6	0.008825	20070.
89.00	57.00	24.23		Disturbing moment < 0		
89.00	58.00	25.16		FoS > 1000		
89.00	59.00	26.10		FoS > 1000		
89.00	60.00	27.04		FoS > 1000		
89.00	61.00	27.98		FoS > 1000		
89.00	62.00	28.93		Disturbing moment < 0		
89.00	63.00	29.88		FoS > 1000		
89.00	64.00	30.84		FoS > 1000		

WORST CASE : WATER CASE 1 OF 1

Centre at (60.00,48.00) Radius 10.74m
Iterations: 5 Horiz acceleration (%g): .0
Net vertical force [kN]: .0 Slip weight [kN] 754.6
Net horiz force [kN]: 0.006390 Disturbing moment [kN m]: 187
Inclination of interslice forces [°]: 4.939 Restoring moment [kN m]: 6104

Factor of Safety: 3.263

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	S(u)
1	50.57	42.86	-5.100	.0	.0	.0
2	50.88	42.34	.0	0.02711	0.3137	.0
3	51.63	41.28	10.41	1.427	8.352	5.419
4	52.51	40.31	11.35	4.282	24.92	6.438
5	52.65	40.17	8.750	4.357	25.41	3.829
6	52.70	40.13	7.828	4.426	25.83	3.064
7	52.90	39.95	4.081	4.988	29.16	0.8328
8	53.07	39.80	0.8961	5.580	32.64	0.04015
9	53.20	39.69	1.049	6.067	35.52	0.05505
10	54.21	38.96	8.124	10.20	59.60	3.300
11	55.30	38.35	13.96	14.82	87.00	9.740
12	56.45	37.87	18.47	19.04	111.8	17.06
13	57.65	37.52	21.60	22.00	129.1	23.33
14	58.00	37.45	22.24	22.19	130.3	24.72
15	58.99	37.31	23.39	21.38	125.5	27.36
16	60.00	37.26	23.61	19.73	115.8	27.87
17	61.00	37.31	22.89	17.18	100.9	26.20
18	61.81	37.42	19.20	14.51	85.21	18.43
19	62.60	37.58	14.94	11.43	67.13	11.16
20	63.70	37.92	7.978	6.748	39.66	3.183
21	64.75	38.37	.0	2.357	13.87	.0
22	65.42	38.74	-5.785	.0	0.006390	.0

Slice Strength Parameters

No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	.0	0.8494	0.6847	1.804
2	3.000	.0	5.205	8.558	10.70	3.915
3	3.000	.0	10.88	19.53	23.48	3.915
4	40.00	.0	10.05	4.080	3.229	7.894
5	40.00	.0	8.289	1.748	1.514	2.736
6	40.00	.0	5.955	9.175	8.622	10.79
7	40.00	.0	2.489	8.754	8.458	8.795
8	40.00	.0	0.9727	7.269	7.050	6.952
9	40.00	.0	4.587	63.65	62.43	49.92
10	40.00	.0	11.04	84.34	82.82	49.92
11	40.00	.0	16.21	103.3	101.0	49.92
12	40.00	.0	20.04	119.3	116.6	49.92
13	40.00	.0	21.92	27.36	26.83	14.30
14	40.00	.0	22.81	53.22	52.84	40.16
15	40.00	.0	23.50	54.57	55.71	40.16
16	40.00	.0	23.25	53.67	56.84	40.16
17	40.00	.0	21.05	40.08	44.44	32.49
18	40.00	.0	17.07	34.64	40.63	32.49
19	40.00	.0	11.46	36.73	47.65	45.97
20	40.00	.0	3.989	19.99	32.57	45.97
21	40.00	.0	.0	3.740	11.94	30.38

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0

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2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0

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ARUP

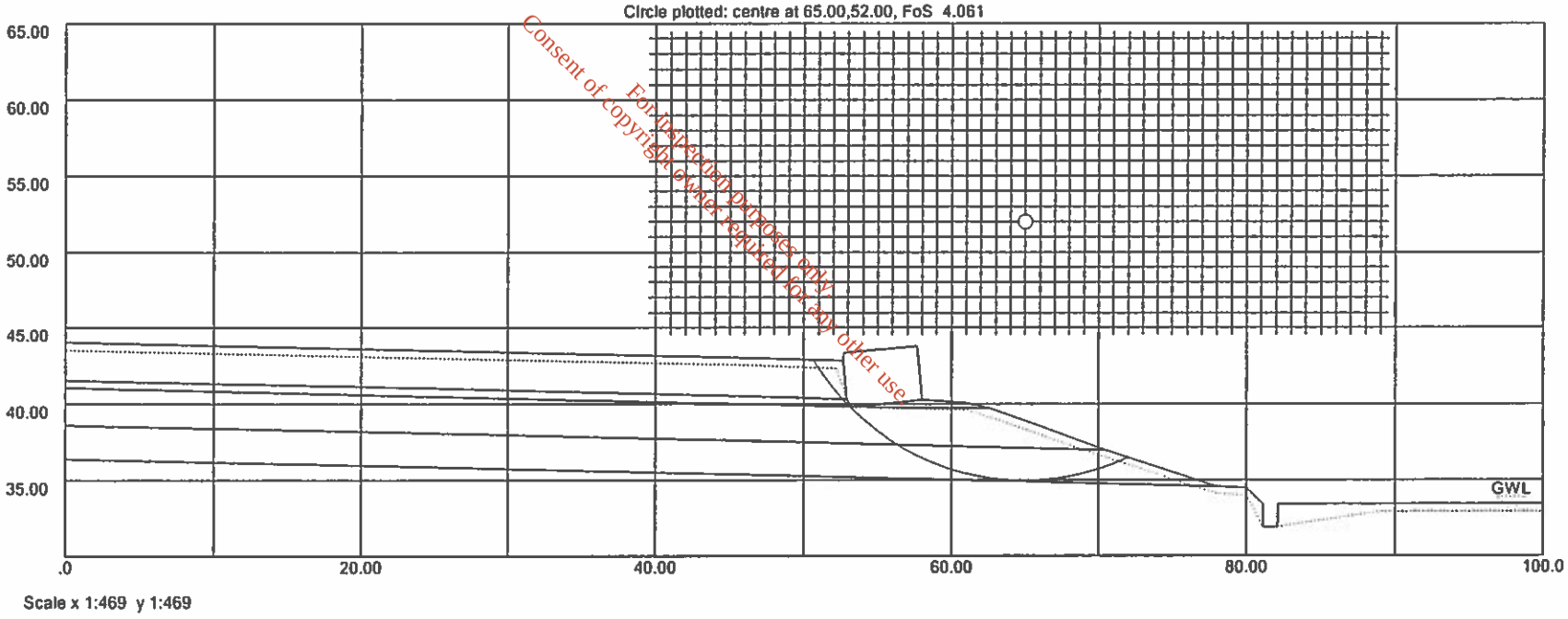
Corrib Gas Terminal

Maximum Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Run 6 - 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	05-Dec-2003	Stability Max Cut No6.sld	



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Notes
Maximum Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Non Intact / Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Drained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Drained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Drained	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Drained	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Dr	20.00	20.00	Undrained	.0	75.00
7	Rock (Drained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	46.00	52.20	52.65	52.70	52.90
1	1	44.00	43.50	43.00	.	42.80	43.30	.
2	2	44.00	43.50	43.00	.	42.80	.	40.30
3	3	41.50	41.00	40.50	.	.	.	40.30
4	4	41.00	40.50	40.00	.	.	.	.
5	6	38.60	38.10	37.60	.	.	.	.
6	6	36.40	35.90	35.40	.	.	.	.
GWL1	-	43.50	43.00	42.50	42.30	.	.	.

Stratum	Material	X -->						
		53.10	53.20	57.65	58.00	61.00	62.60	70.50
1	1	.	.	43.75	40.25	40.10	39.70	37.00
2	2	.	39.80	.	40.25	40.10	39.70	37.00
3	3	.	39.80	.	40.25	40.10	39.70	37.00
4	4	.	39.80	.	.	.	39.70	37.00
5	6	.	.	.	.	.	.	37.00
6	6	.	.	.	.	.	.	.
GWL1	-	39.80	.	.	.	39.60	.	36.50

Stratum	Material	X -->						
		78.00	80.00	81.10	81.10	82.10	82.10	89.00
1	1	34.60	34.50	33.40	31.90	31.90	33.40	.
2	2	34.60	34.50	33.40	31.90	31.90	33.40	.
3	3	34.60	34.50	33.40	31.90	31.90	33.40	.
4	4	34.60	34.50	33.40	31.90	31.90	33.40	.
5	6	34.60	34.50	33.40	31.90	31.90	33.40	.
6	6	34.60	34.50	33.40	31.90	31.90	33.40	.
GWL1	-	34.10	34.00	31.90	.	31.90	.	32.90

Stratum	Material	X -->
		100.0
1	1	33.40
2	2	33.40
3	3	33.40
4	4	33.40
5	6	33.40
6	6	33.40
GWL1	-	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 45.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	45.00	9.457	1646.	58.75	209.2	12290.
40.00	46.00	10.46	1755.	53.68	265.0	14230.
40.00	47.00	11.46	1858.	49.97	325.3	16260.
40.00	48.00	12.46	1952.	47.17	389.5	18370.
40.00	49.00	13.46	2043.	45.04	456.9	20580.
40.00	50.00	14.46	2132.	43.29	528.2	22870.
40.00	50.00	14.46		Weight too small		
40.00	51.00	15.46	2222.	51.42	531.4	27320.
40.00	52.00	16.46	2310.	60.35	517.7	31240.
40.00	53.00	17.46		Disturbing moment < 0		
40.00	54.00	18.45		Disturbing moment < 0		
40.00	55.00	19.45		Disturbing moment < 0		
40.00	56.00	20.45		Disturbing moment < 0		
40.00	57.00	21.45		Disturbing moment < 0		
40.00	58.00	22.45		Disturbing moment < 0		
40.00	59.00	23.45		Disturbing moment < 0		
40.00	60.00	24.45	2950.	676.7	90.37	61150.
40.00	61.00	25.45	3019.	600.2	105.7	63420.
40.00	62.00	26.45	3084.	404.8	162.4	65730.
40.00	63.00	27.45	3144.	259.2	262.6	68070.
40.00	64.00	28.45	3204.	183.9	383.0	70450.
41.00	45.00	9.480	1650.	57.54	214.3	12330.
41.00	46.00	10.48	1756.	52.68	270.8	14270.
41.00	47.00	11.48	1858.	49.17	331.5	16300.
41.00	48.00	12.48	1955.	46.49	396.2	18420.
41.00	49.00	13.48	2050.	54.19	411.8	22310.
41.00	50.00	14.48		Disturbing moment < 0		
41.00	51.00	15.48		Disturbing moment < 0		
41.00	52.00	16.48		Disturbing moment < 0		
41.00	53.00	17.48		Disturbing moment < 0		
41.00	54.00	18.48		Disturbing moment < 0		
41.00	55.00	19.48		Disturbing moment < 0		
41.00	56.00	20.48		Disturbing moment < 0		
41.00	57.00	21.48		Disturbing moment < 0		
41.00	58.00	22.48		Disturbing moment < 0		
41.00	59.00	23.48		Disturbing moment < 0		
41.00	60.00	24.48	2962.	1058.	54.54	57720.
41.00	61.00	25.48	3025.	360.7	162.5	59930.
41.00	62.00	26.48	3086.	206.5	301.1	62180.
41.00	63.00	27.48	3143.	138.4	465.7	64450.
41.00	64.00	28.48	3197.	102.2	652.8	66750.
42.00	45.00	9.503	1652.	56.15	220.3	12370.
42.00	46.00	10.50	1760.	51.54	277.6	14310.
42.00	47.00	11.50	1863.	51.94	329.5	17120.
42.00	48.00	12.50		Disturbing moment < 0		
42.00	49.00	13.50		Disturbing moment < 0		
42.00	50.00	14.50		Disturbing moment < 0		
42.00	51.00	15.50		Disturbing moment < 0		
42.00	52.00	16.50		Disturbing moment < 0		
42.00	53.00	17.50	2441.	7001.	5.505	38540.

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42.00	54.00	18.50	2527.	476.3	87.87	41850.
42.00	55.00	19.50		Disturbing moment < 0		
42.00	56.00	20.50		Disturbing moment < 0		
42.00	57.00	21.50		Disturbing moment < 0		
42.00	58.00	22.50		Disturbing moment < 0		
42.00	59.00	23.50	2898.	740.4	70.66	52310.
42.00	60.00	24.50	2959.	240.1	226.6	54420.
42.00	61.00	25.50	3017.	137.9	410.2	56560.
42.00	62.00	26.50	3075.	95.49	615.0	58720.
42.00	63.00	27.50	3129.	72.41	841.2	60910.
42.00	64.00	28.50	3180.	58.26	1083.	63120.
43.00	45.00	9.525	1654.	55.31	224.4	12410.
43.00	46.00	10.53		Disturbing moment < 0		
43.00	47.00	11.52		Disturbing moment < 0		
43.00	48.00	12.52		Disturbing moment < 0		
43.00	49.00	13.52		Disturbing moment < 0		
43.00	50.00	14.52	2186.	3791.	7.722	29280.
43.00	51.00	15.52	2281.	360.4	89.63	32300.
43.00	52.00	16.52	2375.	200.0	177.2	35430.
43.00	53.00	17.52	2466.	142.8	265.8	37950.
43.00	54.00	18.52		Disturbing moment < 0		
43.00	55.00	19.52		Disturbing moment < 0		
43.00	56.00	20.52		Disturbing moment < 0		
43.00	57.00	21.52		Disturbing moment < 0		
43.00	58.00	22.52	2830.	278.1	169.7	47190.
43.00	59.00	23.52	2890.	133.9	367.3	49190.
43.00	60.00	24.52	2947.	87.12	587.9	51220.
43.00	61.00	25.52	3002.	64.30	828.6	53280.
43.00	62.00	26.52	3054.	51.62	1083.	55930.
43.00	63.00	27.52	3103.	44.16	1338.	59070.
43.00	64.00	28.52	3155.	38.90	1601.	62270.
44.00	45.00	9.548		Disturbing moment < 0		
44.00	46.00	10.55		Disturbing moment < 0		
44.00	47.00	11.55		Disturbing moment < 0		
44.00	48.00	12.55	2005.	481.9	49.06	23640.
44.00	49.00	13.55	2111.	196.6	134.6	26460.
44.00	50.00	14.55	2209.	131.4	223.6	29380.
44.00	51.00	15.55	2307.	99.87	321.5	32110.
44.00	52.00	16.55		Disturbing moment < 0		
44.00	53.00	17.55		Disturbing moment < 0		
44.00	54.00	18.55		Disturbing moment < 0		
44.00	55.00	19.55		Disturbing moment < 0		
44.00	56.00	20.55	2688.	336.6	120.2	40460.
44.00	57.00	21.54	2749.	127.6	331.7	42320.
44.00	58.00	22.54	2808.	78.04	566.7	44220.
44.00	59.00	23.54	2865.	57.38	816.6	46850.
44.00	60.00	24.54	2920.	46.55	1070.	49820.
44.00	61.00	25.54	2974.	39.88	1325.	52850.
44.00	62.00	26.54	3024.	35.45	1578.	55940.
44.00	63.00	27.54	3076.	32.13	1839.	59080.
44.00	64.00	28.54	3127.	29.63	2102.	62290.
45.00	45.00	9.571		Disturbing moment < 0		
45.00	46.00	10.57	1802.	336.4	54.82	18440.
45.00	47.00	11.57	1918.	147.8	142.3	21030.
45.00	48.00	12.57	2028.	98.35	241.3	23740.
45.00	49.00	13.57	2133.	77.63	342.1	26550.
45.00	50.00	14.57		Disturbing moment < 0		
45.00	51.00	15.57		Disturbing moment < 0		
45.00	52.00	16.57		Disturbing moment < 0		
45.00	53.00	17.57		Disturbing moment < 0		
45.00	54.00	18.57	2542.	481.7	71.10	34250.
45.00	55.00	19.57	2607.	122.2	294.5	35980.
45.00	56.00	20.57	2667.	71.32	537.6	38340.
45.00	57.00	21.57	2727.	52.36	785.4	41120.
45.00	58.00	22.57	2785.	42.49	1035.	43970.
45.00	59.00	23.57	2841.	36.40	1288.	46880.
45.00	60.00	24.57	2896.	32.30	1543.	49850.
45.00	61.00	25.57	2948.	29.33	1803.	52880.
45.00	62.00	26.57	2998.	27.19	2058.	55960.
45.00	63.00	27.57	3050.	25.46	2322.	59100.
45.00	64.00	28.57	3100.	24.08	2587.	62300.
46.00	45.00	9.594	1706.	125.1	128.4	16060.
46.00	46.00	10.59	1827.	85.96	215.6	18530.
46.00	47.00	11.59	1945.	65.82	320.9	21120.
46.00	48.00	12.59	2055.	53.64	433.1	23230.

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46.00	49.00	13.59		Disturbing moment < 0		
46.00	50.00	14.59		Disturbing moment < 0		
46.00	51.00	15.59		Disturbing moment < 0		
46.00	52.00	16.59	2389.	1614.	17.69	28550.
46.00	53.00	17.59	2456.	122.0	249.4	30420.
46.00	54.00	18.59	2520.	67.26	490.7	33000.
46.00	55.00	19.59	2583.	48.57	734.0	35650.
46.00	56.00	20.59	2644.	39.12	980.9	38370.
46.00	57.00	21.59	2701.	33.41	1232.	41150.
46.00	58.00	22.59	2759.	29.64	1484.	44000.
46.00	59.00	23.59	2815.	26.96	1740.	46900.
46.00	60.00	24.59	2869.	24.96	1998.	49870.
46.00	61.00	25.59	2923.	23.42	2259.	52900.
46.00	62.00	26.59	2972.	22.23	2517.	55960.
46.00	63.00	27.59	3023.	21.18	2786.	59020.
46.00	64.00	28.59	3072.	20.30	3060.	62130.
47.00	45.00	9.618	1731.	58.11	278.0	16150.
47.00	46.00	10.62	1853.	49.17	378.7	18620.
47.00	47.00	11.62		Disturbing moment < 0		
47.00	48.00	12.62		Disturbing moment < 0		
47.00	49.00	13.62		Disturbing moment < 0		
47.00	50.00	14.62		Disturbing moment < 0		
47.00	51.00	15.62	2298.	131.5	194.0	25510.
47.00	52.00	16.62	2367.	64.98	430.2	27950.
47.00	53.00	17.62	2432.	45.80	665.2	30460.
47.00	54.00	18.62	2495.	36.35	909.0	33040.
47.00	55.00	19.61	2557.	30.89	1156.	35690.
47.00	56.00	20.61	2617.	27.33	1405.	38410.
47.00	57.00	21.61	2676.	24.84	1658.	41190.
47.00	58.00	22.61	2734.	23.01	1914.	44030.
47.00	59.00	23.61	2790.	21.59	2172.	46900.
47.00	60.00	24.61	2843.	20.44	2437.	49790.
47.00	61.00	25.61	2898.	19.50	2704.	52730.
47.00	62.00	26.61	2946.	18.72	2976.	55720.
47.00	63.00	27.61	2995.	18.03	3259.	58760.
47.00	64.00	28.61	3044.	17.45	3545.	61860.
48.00	45.00	9.643	1758.	38.56	421.3	16250.
48.00	46.00	10.64		Disturbing moment < 0		
48.00	47.00	11.64		Disturbing moment < 0		
48.00	48.00	12.64		Disturbing moment < 0		
48.00	49.00	13.64	2127.	178.3	117.3	20910.
48.00	50.00	14.64	2202.	66.15	350.6	23190.
48.00	51.00	15.64	2272.	43.54	587.0	25560.
48.00	52.00	16.64	2341.	33.86	826.9	28000.
48.00	53.00	17.64	2406.	28.64	1065.	30510.
48.00	54.00	18.64	2470.	25.22	1312.	33090.
48.00	55.00	19.64	2531.	22.89	1561.	35740.
48.00	56.00	20.64	2592.	21.22	1811.	38420.
48.00	57.00	21.64	2650.	19.87	2070.	41130.
48.00	58.00	22.64	2706.	18.80	2335.	43890.
48.00	59.00	23.64	2761.	17.92	2606.	46710.
48.00	60.00	24.64	2814.	17.19	2884.	49590.
48.00	61.00	25.64	2866.	16.58	3168.	52520.
48.00	62.00	26.64	2912.	16.07	3454.	55500.
48.00	63.00	27.64	2962.	15.60	3749.	58490.
48.00	64.00	28.64	3010.	15.19	4051.	61550.
49.00	45.00	9.668		Disturbing moment < 0		
49.00	46.00	10.67		Disturbing moment < 0		
49.00	47.00	11.67	1949.	679.0	24.49	16630.
49.00	48.00	12.67	2030.	74.52	251.6	18750.
49.00	49.00	13.67	2104.	43.45	482.2	20950.
49.00	50.00	14.67	2170.	32.36	718.1	23240.
49.00	51.00	15.67	2248.	26.73	957.7	25600.
49.00	52.00	16.67	2317.	23.42	1197.	28040.
49.00	53.00	17.67	2381.	21.25	1438.	30540.
49.00	54.00	18.67	2444.	19.57	1689.	33060.
49.00	55.00	19.66	2505.	18.29	1948.	35630.
49.00	56.00	20.66	2565.	17.28	2214.	38270.
49.00	57.00	21.66	2622.	16.47	2487.	40970.
49.00	58.00	22.66	2678.	15.80	2766.	43720.
49.00	59.00	23.66	2730.	15.24	3052.	46520.
49.00	60.00	24.66	2783.	14.76	3344.	49350.
49.00	61.00	25.66	2834.	14.34	3644.	52240.
49.00	62.00	26.66	2881.	13.98	3947.	55170.
49.00	63.00	27.66	2929.	13.65	4259.	58160.

EPA Export 08-07-2014:23:43:07

49.00	64.00	28.66	2976.	13.37	4577.	61190.
50.00	45.00	9.693	Disturbing moment < 0			
50.00	46.00	10.69	1838.	108.1	135.4	14630.
50.00	47.00	11.69	1923.	46.01	362.2	16670.
50.00	48.00	12.69	2002.	31.65	593.7	18790.
50.00	49.00	13.69	2078.	25.45	824.9	20990.
50.00	50.00	14.69	2151.	21.91	1063.	23280.
50.00	51.00	15.69	2220.	19.62	1305.	25600.
50.00	52.00	16.69	2288.	17.90	1556.	27980.
50.00	53.00	17.69	2352.	16.82	1809.	30420.
50.00	54.00	18.69	2417.	15.80	2073.	32930.
50.00	55.00	19.69	2476.	15.12	2347.	35490.
50.00	56.00	20.69	2534.	14.50	2628.	38110.
50.00	57.00	21.69	2590.	13.98	2916.	40770.
50.00	58.00	22.69	2645.	13.54	3211.	43480.
50.00	59.00	23.69	2697.	13.16	3514.	46250.
50.00	60.00	24.69	2748.	12.83	3824.	49070.
50.00	61.00	25.69	2798.	12.54	4140.	51930.
50.00	62.00	26.69	2846.	12.29	4462.	54850.
50.00	63.00	27.69	2891.	12.07	4788.	57810.
50.00	64.00	28.69	2936.	11.88	5122.	60820.
51.00	45.00	9.718	1724.	55.90	227.6	12720.
51.00	46.00	10.72	1815.	32.74	440.1	14670.
51.00	47.00	11.72	1899.	24.71	676.3	16710.
51.00	48.00	12.72	1979.	20.71	909.4	18830.
51.00	49.00	13.72	2053.	18.27	1149.	20990.
51.00	50.00	14.72	2124.	16.65	1394.	23210.
51.00	51.00	15.72	2194.	15.45	1651.	25510.
51.00	52.00	16.72	2259.	14.53	1910.	27880.
51.00	53.00	17.72	2323.	13.83	2191.	30300.
51.00	54.00	18.72	2383.	13.28	2468.	32770.
51.00	55.00	19.71	2442.	12.80	2759.	35300.
51.00	56.00	20.71	2498.	12.39	3057.	37880.
51.00	57.00	21.71	2553.	12.05	3363.	40520.
51.00	58.00	22.71	2606.	11.76	3676.	43220.
51.00	59.00	23.71	2657.	11.51	3995.	45970.
51.00	60.00	24.71	2706.	11.29	4321.	48760.
51.00	61.00	25.71	2754.	11.09	4652.	51610.
51.00	62.00	26.71	2801.	10.93	4989.	54510.
51.00	63.00	27.71	2849.	10.78	5330.	57460.
51.00	64.00	28.71	2892.	10.65	5677.	60450.
52.00	45.00	9.743	1698.	24.92	512.1	12760.
52.00	46.00	10.74	1788.	19.93	738.0	14710.
52.00	47.00	11.74	1873.	17.20	971.1	16700.
52.00	48.00	12.74	1952.	15.45	1215.	18770.
52.00	49.00	13.74	2025.	14.21	1471.	20910.
52.00	50.00	14.74	2093.	13.34	1734.	23130.
52.00	51.00	15.74	2162.	12.66	2005.	25400.
52.00	52.00	16.74	2227.	12.12	2288.	27730.
52.00	53.00	17.74	2288.	11.68	2579.	30120.
52.00	54.00	18.74	2348.	11.31	2879.	32570.
52.00	55.00	19.74	2405.	11.02	3184.	35090.
52.00	56.00	20.74	2460.	10.76	3500.	37660.
52.00	57.00	21.74	2514.	10.54	3822.	40280.
52.00	58.00	22.74	2565.	10.35	4152.	42960.
52.00	59.00	23.74	2615.	10.18	4487.	45690.
52.00	60.00	24.74	2664.	10.04	4828.	48470.
52.00	61.00	25.74	2710.	9.919	5172.	51290.
52.00	62.00	26.74	2756.	9.809	5523.	54170.
52.00	63.00	27.74	2800.	9.713	5879.	57100.
52.00	64.00	28.74	2842.	9.628	6239.	60070.
53.00	45.00	9.768	1674.	16.44	776.3	12770.
53.00	46.00	10.77	1762.	14.47	1013.	14660.
53.00	47.00	11.77	1843.	13.17	1264.	16640.
53.00	48.00	12.77	1921.	12.27	1525.	18700.
53.00	49.00	13.77	1994.	11.59	1796.	20820.
53.00	50.00	14.77	2060.	11.06	2079.	22990.
53.00	51.00	15.77	2126.	10.65	2371.	25240.
53.00	52.00	16.77	2189.	10.31	2672.	27560.
53.00	53.00	17.77	2249.	10.04	2983.	29940.
53.00	54.00	18.77	2307.	9.807	3301.	32370.
53.00	55.00	19.76	2363.	9.616	3626.	34870.
53.00	56.00	20.76	2418.	9.458	3957.	37420.
53.00	57.00	21.76	2469.	9.333	4289.	40030.
53.00	58.00	22.76	2519.	9.215	4632.	42690.

Consent of copyright owner required for any other use.
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53.00	59.00	23.76	2568.	9.114	4981.	45400.
53.00	60.00	24.76	2615.	9.027	5335.	48160.
53.00	61.00	25.76	2660.	8.953	5693.	50970.
53.00	62.00	26.76	2706.	8.885	6058.	53830.
53.00	63.00	27.76	2750.	8.826	6428.	56740.
53.00	64.00	28.76	2793.	8.774	6803.	59690.
54.00	45.00	9.809	1653.	12.28	1042.	12790.
54.00	46.00	10.81	1738.	11.33	1294.	14660.
54.00	47.00	11.80	1817.	10.62	1564.	16610.
54.00	48.00	12.80	1890.	10.10	1844.	18630.
54.00	49.00	13.80	1960.	9.709	2135.	20730.
54.00	50.00	14.80	2027.	9.397	2436.	22890.
54.00	51.00	15.80	2089.	9.139	2749.	25120.
54.00	52.00	16.80	2150.	8.940	3067.	27420.
54.00	53.00	17.79	2207.	8.775	3393.	29770.
54.00	54.00	18.79	2263.	8.641	3725.	32190.
54.00	55.00	19.79	2317.	8.529	4064.	34660.
54.00	56.00	20.79	2370.	8.433	4411.	37200.
54.00	57.00	21.79	2421.	8.351	4763.	39780.
54.00	58.00	22.79	2470.	8.282	5122.	42420.
54.00	59.00	23.79	2517.	8.224	5485.	45110.
54.00	60.00	24.79	2563.	8.182	5848.	47850.
54.00	61.00	25.79	2608.	8.145	6217.	50640.
54.00	62.00	26.79	2652.	8.110	6595.	53480.
54.00	63.00	27.79	2695.	8.080	6976.	56360.
54.00	64.00	28.79	2737.	8.055	7361.	59300.
55.00	45.00	9.940	1665.	9.726	1349.	13120.
55.00	46.00	10.93	1744.	9.192	1620.	14960.
55.00	47.00	11.91	1818.	8.797	1920.	16890.
55.00	48.00	12.90	1886.	8.510	2219.	18890.
55.00	49.00	13.89	1952.	8.281	2531.	20960.
55.00	50.00	14.89	2014.	8.108	2849.	23100.
55.00	51.00	15.88	2074.	7.967	3176.	25300.
55.00	52.00	16.87	2131.	7.855	3511.	27580.
55.00	53.00	17.87	2186.	7.763	3852.	29910.
55.00	54.00	18.86	2238.	7.686	4202.	32300.
55.00	55.00	19.86	2290.	7.626	4556.	34750.
55.00	56.00	20.85	2340.	7.578	4916.	37250.
55.00	57.00	21.85	2388.	7.540	5280.	39810.
55.00	58.00	22.85	2435.	7.509	5650.	42420.
55.00	59.00	23.84	2480.	7.485	6024.	45090.
55.00	60.00	24.84	2525.	7.466	6402.	47800.
55.00	61.00	25.84	2566.	7.455	6782.	50560.
55.00	62.00	26.84	2608.	7.445	7168.	53370.
55.00	63.00	27.83	2649.	7.439	7559.	56220.
55.00	64.00	28.83	2689.	7.440	7947.	59130.
56.00	45.00	9.843	1574.	8.088	1556.	12580.
56.00	46.00	10.84	1655.	7.802	1850.	14430.
56.00	47.00	11.84	1731.	7.581	2158.	16360.
56.00	48.00	12.84	1801.	7.414	2476.	18360.
56.00	49.00	13.84	1869.	7.282	2805.	20430.
56.00	50.00	14.84	1931.	7.178	3143.	22560.
56.00	51.00	15.84	1991.	7.106	3485.	24770.
56.00	52.00	16.84	2050.	7.045	3837.	27030.
56.00	53.00	17.84	2106.	7.001	4194.	29360.
56.00	54.00	18.84	2159.	6.968	4556.	31750.
56.00	55.00	19.84	2211.	6.944	4923.	34190.
56.00	56.00	20.84	2260.	6.928	5295.	36680.
56.00	57.00	21.84	2308.	6.917	5672.	39230.
56.00	58.00	22.84	2355.	6.911	6054.	41840.
56.00	59.00	23.94	2464.	6.049	6636.	45450.
56.00	60.00	24.93	2506.	6.851	7026.	48140.
56.00	61.00	25.93	2545.	6.859	7417.	50870.
56.00	62.00	26.92	2585.	6.866	7814.	53650.
56.00	63.00	27.92	2624.	6.876	8215.	56480.
56.00	64.00	28.91	2663.	6.887	8619.	59360.
57.00	45.00	9.868	1533.	6.888	1815.	12500.
57.00	46.00	10.87	1610.	6.736	2128.	14340.
57.00	47.00	11.87	1683.	6.622	2454.	16250.
57.00	48.00	12.87	1752.	6.540	2788.	18240.
57.00	49.00	13.87	1817.	6.479	3132.	20290.
57.00	50.00	14.87	1877.	6.430	3485.	22410.
57.00	51.00	15.87	1937.	6.393	3848.	24600.
57.00	52.00	16.87	1994.	6.374	4212.	26850.
57.00	53.00	17.87	2049.	6.367	4579.	29160.

EPA Export 08-07-2014:23:43:07

57.00	54.00	18.87	2101.	6.363	4954.	31520.
57.00	55.00	19.86	2152.	6.364	5334.	33950.
57.00	56.00	20.86	2202.	6.366	5722.	36430.
57.00	57.00	21.86	2249.	6.374	6112.	38960.
57.00	58.00	22.86	2295.	6.386	6506.	41540.
57.00	59.00	23.86	2339.	6.399	6903.	44180.
57.00	60.00	24.86	2383.	6.415	7305.	46860.
57.00	61.00	25.86	2425.	6.432	7710.	49590.
57.00	62.00	26.86	2465.	6.452	8116.	52360.
57.00	63.00	27.86	2506.	6.472	8527.	55190.
57.00	64.00	28.86	2545.	6.493	8942.	58060.
58.00	45.00	9.893	1484.	6.006	2068.	12420.
58.00	46.00	10.89	1560.	5.938	2398.	14240.
58.00	47.00	11.89	1632.	5.894	2738.	16140.
58.00	48.00	12.89	1699.	5.865	3088.	18110.
58.00	49.00	13.89	1762.	5.850	3444.	20150.
58.00	50.00	14.89	1822.	5.842	3810.	22260.
58.00	51.00	15.89	1879.	5.836	4185.	24430.
58.00	52.00	16.89	1934.	5.844	4562.	26660.
58.00	53.00	17.89	1987.	5.855	4944.	28950.
58.00	54.00	18.89	2039.	5.869	5332.	31300.
58.00	55.00	19.89	2088.	5.888	5723.	33700.
58.00	56.00	20.89	2135.	5.910	6118.	36160.
58.00	57.00	21.89	2181.	5.933	6517.	38670.
58.00	58.00	22.89	2226.	5.958	6920.	41230.
58.00	59.00	23.89	2270.	5.982	7330.	43850.
58.00	60.00	24.89	2313.	6.008	7740.	46510.
58.00	61.00	25.89	2356.	6.038	8152.	49220.
58.00	62.00	26.89	2395.	6.067	8567.	51980.
58.00	63.00	27.89	2435.	6.096	8987.	54780.
58.00	64.00	28.89	2473.	6.125	9409.	57630.
59.00	45.00	9.918	1432.	5.351	2305.	12330.
59.00	46.00	10.92	1505.	5.336	2650.	14140.
59.00	47.00	11.92	1574.	5.333	3004.	16020.
59.00	48.00	12.92	1639.	5.340	3366.	17980.
59.00	49.00	13.92	1701.	5.353	3736.	20000.
59.00	50.00	14.92	1760.	5.371	4113.	22090.
59.00	51.00	15.92	1816.	5.395	4494.	24240.
59.00	52.00	16.92	1869.	5.415	4885.	26460.
59.00	53.00	17.92	1922.	5.439	5283.	28730.
59.00	54.00	18.92	1972.	5.465	5684.	31060.
59.00	55.00	19.91	2021.	5.495	6087.	33450.
59.00	56.00	20.91	2068.	5.526	6494.	35890.
59.00	57.00	21.91	2114.	5.559	6904.	38380.
59.00	58.00	22.91	2158.	5.592	7318.	40920.
59.00	59.00	23.91	2200.	5.627	7733.	43510.
59.00	60.00	24.91	2242.	5.661	8153.	46150.
59.00	61.00	25.91	2282.	5.696	8575.	48840.
59.00	62.00	26.91	2323.	5.728	9004.	51580.
59.00	63.00	27.91	2361.	5.763	9432.	54360.
59.00	64.00	28.91	2399.	5.797	9864.	57180.
60.00	45.00	9.943	1376.	4.852	2525.	12250.
60.00	46.00	10.94	1447.	4.867	2884.	14040.
60.00	47.00	11.94	1514.	4.893	3251.	15900.
60.00	48.00	12.94	1577.	4.922	3625.	17840.
60.00	49.00	13.94	1637.	4.955	4006.	19850.
60.00	50.00	14.94	1695.	4.989	4394.	21920.
60.00	51.00	15.94	1749.	5.026	4787.	24060.
60.00	52.00	16.94	1801.	5.058	5190.	26250.
60.00	53.00	17.94	1851.	5.097	5592.	28500.
60.00	54.00	18.94	1900.	5.136	6000.	30820.
60.00	55.00	19.94	1947.	5.178	6409.	33180.
60.00	56.00	20.94	1994.	5.217	6825.	35610.
60.00	57.00	21.94	2039.	5.256	7244.	38080.
60.00	58.00	22.94	2083.	5.295	7667.	40600.
60.00	59.00	23.94	2125.	5.334	8093.	43170.
60.00	60.00	24.94	2167.	5.373	8522.	45790.
60.00	61.00	25.94	2207.	5.412	8953.	48460.
60.00	62.00	26.94	2246.	5.451	9387.	51170.
60.00	63.00	27.94	2284.	5.490	9822.	53930.
60.00	64.00	28.94	2320.	5.529	10260.	56730.
61.00	45.00	9.968	1314.	4.484	2712.	12160.
61.00	46.00	10.97	1383.	4.519	3083.	13930.
61.00	47.00	11.97	1448.	4.558	3462.	15780.
61.00	48.00	12.97	1510.	4.600	3848.	17700.

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61.00	49.00	13.97	1568.	4.644	4239.	19690.
61.00	50.00	14.97	1623.	4.690	4636.	21740.
61.00	51.00	15.97	1677.	4.737	5037.	23860.
61.00	52.00	16.97	1729.	4.782	5445.	26040.
61.00	53.00	17.97	1777.	4.823	5861.	28270.
61.00	54.00	18.97	1825.	4.869	6277.	30560.
61.00	55.00	19.96	1872.	4.915	6696.	32910.
61.00	56.00	20.96	1917.	4.959	7120.	35310.
61.00	57.00	21.96	1961.	5.005	7545.	37760.
61.00	58.00	22.96	2004.	5.048	7977.	40260.
61.00	59.00	23.96	2045.	5.092	8409.	42810.
61.00	60.00	24.96	2085.	5.127	8844.	45340.
61.00	61.00	25.96	2126.	5.161	9283.	47910.
61.00	62.00	26.96	2165.	5.196	9724.	50520.
61.00	63.00	27.96	2203.	5.230	10170.	53170.
61.00	64.00	28.96	2239.	5.264	10610.	55860.
62.00	45.00	9.993	1246.	4.598	2869.	13190.
62.00	46.00	10.99	1314.	4.248	3254.	13820.
62.00	47.00	11.99	1378.	4.296	3645.	15660.
62.00	48.00	12.99	1438.	4.345	4041.	17560.
62.00	49.00	13.99	1495.	4.396	4442.	19530.
62.00	50.00	14.99	1550.	4.445	4851.	21560.
62.00	51.00	15.99	1603.	4.500	5259.	23660.
62.00	52.00	16.99	1654.	4.550	5675.	25820.
62.00	53.00	17.99	1702.	4.600	6094.	28030.
62.00	54.00	18.99	1748.	4.646	6522.	30300.
62.00	55.00	19.99	1794.	4.688	6949.	32580.
62.00	56.00	20.99	1838.	4.728	7380.	34890.
62.00	57.00	21.99	1881.	4.768	7813.	37250.
62.00	58.00	22.99	1921.	4.813	8238.	39650.
62.00	59.00	23.99	1962.	4.852	8676.	42100.
62.00	60.00	24.99	2002.	4.891	9116.	44590.
62.00	61.00	25.99	2041.	4.926	9564.	47120.
62.00	62.00	26.99	2079.	4.963	10010.	49680.
62.00	63.00	27.99	2117.	4.998	10460.	52290.
62.00	64.00	28.99	2153.	5.033	10910.	54930.
63.00	45.00	10.02	1164.	5.356	2875.	15400.
63.00	46.00	11.02	1241.	4.780	3370.	16110.
63.00	47.00	12.02	1303.	4.303	3780.	16260.
63.00	48.00	13.02	1362.	4.162	4183.	17410.
63.00	49.00	14.02	1419.	4.215	4594.	19360.
63.00	50.00	15.02	1472.	4.267	5009.	21370.
63.00	51.00	16.02	1523.	4.312	5427.	23400.
63.00	52.00	17.02	1572.	4.356	5849.	25480.
63.00	53.00	18.02	1621.	4.397	6278.	27610.
63.00	54.00	19.02	1666.	4.440	6709.	29780.
63.00	55.00	20.01	1711.	4.481	7144.	32010.
63.00	56.00	21.01	1754.	4.522	7582.	34280.
63.00	57.00	22.01	1796.	4.562	8022.	36600.
63.00	58.00	23.01	1838.	4.603	8465.	38960.
63.00	59.00	24.01	1878.	4.643	8909.	41360.
63.00	60.00	25.01	1916.	4.687	9345.	43800.
63.00	61.00	26.01	1954.	4.726	9796.	46290.
63.00	62.00	27.01	1992.	4.764	10250.	48810.
63.00	63.00	28.01	2028.	4.801	10700.	51380.
63.00	64.00	29.01	2065.	4.837	11160.	53980.
64.00	45.00	10.04	1071.	5.569	2756.	15350.
64.00	46.00	11.04	1148.	5.297	3297.	17460.
64.00	47.00	12.04	1221.	5.014	3828.	19190.
64.00	48.00	13.04	1282.	4.480	4280.	19170.
64.00	49.00	14.04	1337.	4.205	4705.	19780.
64.00	50.00	15.04	1389.	4.102	5117.	20990.
64.00	51.00	16.04	1440.	4.145	5544.	22980.
64.00	52.00	17.04	1489.	4.188	5974.	25020.
64.00	53.00	18.04	1536.	4.230	6408.	27100.
64.00	54.00	19.04	1581.	4.273	6844.	29240.
64.00	55.00	20.04	1625.	4.315	7282.	31430.
64.00	56.00	21.04	1668.	4.355	7727.	33660.
64.00	57.00	22.04	1710.	4.396	8173.	35930.
64.00	58.00	23.04	1750.	4.436	8622.	38250.
64.00	59.00	24.04	1789.	4.475	9073.	40600.
64.00	60.00	25.04	1826.	4.520	9513.	43000.
64.00	61.00	26.04	1863.	4.560	9965.	45440.
64.00	62.00	27.04	1901.	4.597	10420.	47920.
64.00	63.00	28.04	1937.	4.634	10880.	50430.

EPA Export 08-07-2014:23:43:07

64.00	64.00	29.04	1973.	4.671	11340.	52990.
65.00	45.00	10.07	971.4	5.981	2546.	15220.
65.00	46.00	11.07	1049.	5.554	3110.	17270.
65.00	47.00	12.07	1121.	5.290	3668.	19400.
65.00	48.00	13.07	1189.	5.122	4219.	21610.
65.00	49.00	14.07	1250.	4.696	4723.	22180.
65.00	50.00	15.07	1303.	4.384	5174.	22680.
65.00	51.00	16.07	1353.	4.185	5609.	23470.
65.00	52.00	17.07	1400.	4.061	6042.	24540.
65.00	53.00	18.07	1447.	4.102	6481.	26580.
65.00	54.00	19.07	1492.	4.143	6923.	28680.
65.00	55.00	20.06	1536.	4.185	7365.	30820.
65.00	56.00	21.06	1577.	4.225	7813.	33010.
65.00	57.00	22.06	1618.	4.265	8262.	35240.
65.00	58.00	23.06	1658.	4.305	8713.	37510.
65.00	59.00	24.06	1698.	4.343	9169.	39820.
65.00	60.00	25.06	1736.	4.381	9626.	42180.
65.00	61.00	26.06	1771.	4.425	10070.	44570.
65.00	62.00	27.06	1807.	4.462	10530.	47000.
65.00	63.00	28.06	1843.	4.498	11000.	49470.
65.00	64.00	29.06	1877.	4.535	11460.	51970.
66.00	45.00	10.09	967.1	6.718	2240.	15050.
66.00	46.00	11.09	944.3	6.041	2825.	17070.
66.00	47.00	12.09	1017.	5.626	3406.	19160.
66.00	48.00	13.09	1085.	5.362	3979.	21340.
66.00	49.00	14.09	1148.	5.191	4541.	23580.
66.00	50.00	15.09	1207.	4.968	5093.	25300.
66.00	51.00	16.09	1260.	4.617	5580.	25760.
66.00	52.00	17.09	1309.	4.382	6044.	26490.
66.00	53.00	18.09	1355.	4.218	6492.	27380.
66.00	54.00	19.09	1398.	4.074	6931.	28240.
66.00	55.00	20.09	1441.	4.091	7381.	30200.
66.00	56.00	21.09	1483.	4.129	7832.	32340.
66.00	57.00	22.09	1523.	4.167	8285.	34520.
66.00	58.00	23.09	1563.	4.204	8741.	36750.
66.00	59.00	24.09	1600.	4.241	9200.	39020.
66.00	60.00	25.09	1638.	4.279	9657.	41320.
66.00	61.00	26.09	1674.	4.321	10100.	43660.
66.00	62.00	27.09	1710.	4.356	10570.	46050.
66.00	63.00	28.09	1746.	4.392	11040.	48470.
66.00	64.00	29.09	1780.	4.427	11500.	50920.
67.00	45.00	10.12	Weight too small			
67.00	45.00	10.12	732.8	6.915	1619.	11200.
67.00	46.00	11.12	831.9	6.928	2432.	16850.
67.00	47.00	12.12	905.6	6.231	3035.	18910.
67.00	48.00	13.12	973.4	5.800	3629.	21050.
67.00	49.00	14.12	1038.	5.515	4217.	23260.
67.00	50.00	15.12	1100.	5.320	4798.	25530.
67.00	51.00	16.12	1156.	5.192	5366.	27860.
67.00	52.00	17.12	1209.	4.912	5909.	29020.
67.00	53.00	18.12	1257.	4.635	6400.	29660.
67.00	54.00	19.12	1302.	4.439	6874.	30510.
67.00	55.00	20.11	1345.	4.292	7334.	31480.
67.00	56.00	21.11	1385.	4.176	7784.	32500.
67.00	57.00	22.11	1425.	4.101	8239.	33790.
67.00	58.00	23.11	1464.	4.135	8697.	35970.
67.00	59.00	24.11	1502.	4.170	9158.	38180.
67.00	60.00	25.11	1540.	4.204	9621.	40440.
67.00	61.00	26.11	1576.	4.238	10090.	42740.
67.00	62.00	27.11	1610.	4.276	10540.	45070.
67.00	63.00	28.11	1644.	4.309	11010.	47440.
67.00	64.00	29.11	1678.	4.342	11480.	49840.
68.00	45.00	10.14	665.7	6.890	1587.	10940.
68.00	46.00	11.14	Weight too small			
68.00	46.00	11.14	708.0	6.775	1843.	12490.
68.00	47.00	12.14	788.4	7.320	2547.	18650.
68.00	48.00	13.14	857.2	6.557	3164.	20750.
68.00	49.00	14.14	922.1	6.075	3772.	22920.
68.00	50.00	15.14	983.6	5.752	4373.	25150.
68.00	51.00	16.14	1040.	5.534	4960.	27440.
68.00	52.00	17.14	1096.	5.372	5547.	29800.
68.00	53.00	18.14	1149.	5.242	6127.	32110.
68.00	54.00	19.14	1198.	4.952	6663.	33000.
68.00	55.00	20.14	1242.	4.718	7160.	33780.
68.00	56.00	21.14	1284.	4.540	7645.	34710.

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68.00	57.00	22.14	1324.	4.400	8118.	35720.
68.00	58.00	23.14	1362.	4.290	8578.	36800.
68.00	59.00	24.14	1399.	4.192	9034.	37870.
68.00	60.00	25.14	1436.	4.161	9500.	39530.
68.00	61.00	26.14	1472.	4.192	9966.	41770.
68.00	62.00	27.14	1508.	4.222	10430.	44060.
68.00	63.00	28.14	1541.	4.257	10890.	46370.
68.00	64.00	29.14	1575.	4.288	11360.	48730.
69.00	45.00	10.17	595.9	7.059	1511.	10670.
69.00	46.00	11.17	636.1	6.890	1768.	12180.
69.00	47.00	12.17	Weight too small			
69.00	47.00	12.17	674.4	6.782	2027.	13750.
69.00	48.00	13.17	Weight too small			
69.00	48.00	13.17	710.9	6.713	2291.	15380.
69.00	49.00	14.17	798.7	7.060	3196.	22560.
69.00	50.00	15.17	861.0	6.482	3819.	24750.
69.00	51.00	16.17	920.4	6.094	4432.	27010.
69.00	52.00	17.17	975.6	5.825	5033.	29320.
69.00	53.00	18.17	1029.	5.626	5632.	31690.
69.00	54.00	19.17	1079.	5.483	6221.	34110.
69.00	55.00	20.16	1130.	5.321	6810.	36230.
69.00	56.00	21.16	1175.	5.063	7346.	37190.
69.00	57.00	22.16	1217.	4.848	7851.	38070.
69.00	58.00	23.16	1257.	4.679	8346.	39050.
69.00	59.00	24.16	1295.	4.542	8828.	40100.
69.00	60.00	25.16	1331.	4.429	9301.	41200.
69.00	61.00	26.16	1366.	4.334	9767.	42330.
69.00	62.00	27.16	1401.	4.249	10240.	43490.
69.00	63.00	28.16	1435.	4.229	10700.	45270.
69.00	64.00	29.16	1469.	4.256	11180.	47570.
70.00	45.00	10.19	522.3	7.500	1384.	10380.
70.00	46.00	11.19	561.5	7.222	1641.	11850.
70.00	47.00	12.19	598.8	7.032	1903.	13380.
70.00	48.00	13.19	Weight too small			
70.00	48.00	13.19	634.9	6.901	2169.	14960.
70.00	49.00	14.19	Weight too small			
70.00	49.00	14.19	669.2	6.815	2436.	16680.
70.00	50.00	15.19	Weight too small			
70.00	50.00	15.19	701.6	6.762	2704.	18280.
70.00	51.00	16.19	793.5	7.057	3762.	26550.
70.00	52.00	17.19	850.1	6.568	4388.	28820.
70.00	53.00	18.19	903.2	6.228	5000.	31140.
70.00	54.00	19.19	955.7	5.973	5612.	33520.
70.00	55.00	20.19	1006.	5.783	6217.	35950.
70.00	56.00	21.19	1054.	5.640	6812.	38420.
70.00	57.00	22.19	1100.	5.470	7404.	40900.
70.00	58.00	23.19	1143.	5.227	7947.	41540.
70.00	59.00	24.19	1183.	5.019	8463.	42480.
70.00	60.00	25.19	1220.	4.852	8965.	43500.
70.00	61.00	26.19	1257.	4.713	9458.	44570.
70.00	62.00	27.19	1293.	4.596	9942.	45700.
70.00	63.00	28.19	1327.	4.496	10420.	46850.
70.00	64.00	29.19	1359.	4.410	10890.	48030.
71.00	45.00	10.22	447.9	8.165	1221.	9969.
71.00	46.00	11.22	484.2	7.831	1462.	11450.
71.00	47.00	12.22	520.3	7.554	1720.	12990.
71.00	48.00	13.22	555.0	7.322	1984.	14530.
71.00	49.00	14.22	588.7	7.156	2252.	16120.
71.00	50.00	15.22	Weight too small			
71.00	50.00	15.22	620.9	7.041	2522.	17760.
71.00	51.00	16.22	Weight too small			
71.00	51.00	16.22	651.8	6.959	2793.	19440.
71.00	52.00	17.22	Weight too small			
71.00	52.00	17.22	682.2	6.899	3069.	21170.
71.00	53.00	18.22	775.1	7.215	4237.	30570.
71.00	54.00	19.21	826.8	6.767	4862.	32900.
71.00	55.00	20.21	877.3	6.433	5484.	35280.
71.00	56.00	21.21	925.2	6.189	6093.	37710.
71.00	57.00	22.21	972.4	5.995	6703.	40190.
71.00	58.00	23.21	1018.	5.846	7305.	42710.
71.00	59.00	24.21	1062.	5.677	7904.	44870.
71.00	60.00	25.21	1103.	5.440	8457.	46010.
71.00	61.00	26.21	1140.	5.232	8982.	46990.
71.00	62.00	27.21	1177.	5.060	9493.	48040.
71.00	63.00	28.21	1213.	4.915	9997.	49130.

EPA Export 08-07-2014:23:43:07

71.00	64.00	29.21	1247.	4.791	10490.	50270.
72.00	45.00	10.24	374.7	9.118	1041.	9494.
72.00	46.00	11.24	407.1	8.720	1256.	10950.
72.00	47.00	12.24	440.3	8.342	1492.	12450.
72.00	48.00	13.24	472.8	8.045	1741.	14010.
72.00	49.00	14.24	505.0	7.791	2003.	15610.
72.00	50.00	15.24	536.5	7.569	2272.	17200.
72.00	51.00	16.24		Weight too small		
72.00	51.00	16.24	567.5	7.399	2545.	18830.
72.00	52.00	17.24		Weight too small		
72.00	52.00	17.24	597.3	7.275	2819.	20510.
72.00	53.00	18.24		Weight too small		
72.00	53.00	18.24	626.5	7.180	3096.	22230.
72.00	54.00	19.24		Weight too small		
72.00	54.00	19.24	654.7	7.110	3375.	24000.
72.00	55.00	20.24	63.47	8.751	954.6	8353.
72.00	55.00	20.24	682.2	7.059	3656.	25810.
72.00	56.00	21.24	792.8	7.069	5228.	36950.
72.00	57.00	22.24	841.0	6.724	5857.	39380.
72.00	58.00	23.24	887.2	6.461	6478.	41860.
72.00	59.00	24.24	932.0	6.256	7093.	44370.
72.00	60.00	25.24	974.8	6.095	7699.	46930.
72.00	61.00	26.24	1017.	5.938	8305.	49310.
72.00	62.00	27.24	1057.	5.695	8875.	50550.
72.00	63.00	28.24	1093.	5.486	9402.	51570.
72.00	64.00	29.24	1128.	5.305	9923.	52640.
73.00	45.00	10.27	305.6	10.36	864.6	8961.
73.00	46.00	11.27	333.5	9.897	1045.	10350.
73.00	47.00	12.27	362.1	9.477	1246.	11810.
73.00	48.00	13.27	391.3	9.097	1467.	13340.
73.00	49.00	14.27	421.5	8.723	1709.	14900.
73.00	50.00	15.27	451.1	8.426	1961.	16520.
73.00	51.00	16.27	481.1	8.161	2228.	18180.
73.00	52.00	17.27	510.6	7.916	2502.	19810.
73.00	53.00	18.27		Weight too small		
73.00	53.00	18.27	539.1	7.733	2777.	21470.
73.00	54.00	19.26		Weight too small		
73.00	54.00	19.26	566.5	7.596	3052.	23180.
73.00	55.00	20.26		Weight too small		
73.00	55.00	20.26	593.7	7.484	3332.	24930.
73.00	56.00	21.26		Weight too small		
73.00	56.00	21.26	620.5	7.393	3614.	26720.
73.00	57.00	22.26	60.73	9.147	975.4	8922.
73.00	57.00	22.26	646.5	7.325	3898.	28550.
73.00	58.00	23.26	750.8	7.469	5482.	40950.
73.00	59.00	24.26	796.7	7.098	6117.	43410.
73.00	60.00	25.26	840.7	6.811	6743.	45920.
73.00	61.00	26.26	883.5	6.583	7363.	48470.
73.00	62.00	27.26	924.6	6.402	7975.	51060.
73.00	63.00	28.26	965.4	6.252	8587.	53690.
73.00	64.00	29.26	1004.	6.001	9175.	55060.
74.00	45.00	10.29	240.9	12.09	693.3	8385.
74.00	46.00	11.29	264.5	11.51	841.8	9692.
74.00	47.00	12.29	288.8	10.99	1008.	11070.
74.00	48.00	13.29	313.9	10.51	1192.	12530.
74.00	49.00	14.29	339.4	10.09	1393.	14060.
74.00	50.00	15.29	366.0	9.696	1615.	15660.
74.00	51.00	16.29	393.7	9.297	1858.	17270.
74.00	52.00	17.29	421.2	8.967	2112.	18940.
74.00	53.00	18.29	448.6	8.687	2378.	20660.
74.00	54.00	19.29	476.3	8.407	2654.	22320.
74.00	55.00	20.29		Weight too small		
74.00	55.00	20.29	503.2	8.186	2933.	24010.
74.00	56.00	21.29		Weight too small		
74.00	56.00	21.29	529.5	8.011	3213.	25740.
74.00	57.00	22.29		Weight too small		
74.00	57.00	22.29	555.0	7.874	3493.	27510.
74.00	58.00	23.29		Weight too small		
74.00	58.00	23.29	580.3	7.761	3777.	29310.
74.00	59.00	24.29	56.50	9.697	964.1	9349.
74.00	59.00	24.29	605.3	7.666	4064.	31160.
74.00	60.00	25.29	74.70	8.644	1285.	11110.
74.00	60.00	25.29	629.3	7.595	4350.	33040.
74.00	61.00	26.29	745.2	7.570	6253.	47340.
74.00	62.00	27.29	787.7	7.243	6885.	49870.

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74.00	63.00	28.29	828.9	6.982	7511.	52450.
74.00	64.00	29.29	869.1	6.770	8132.	55060.
75.00	45.00	10.32	181.4	14.61	530.5	7751.
75.00	46.00	11.32	200.9	13.84	648.7	8976.
75.00	47.00	12.32	221.1	13.14	781.7	10270.
75.00	48.00	13.32	241.8	12.53	929.2	11640.
75.00	49.00	14.32	264.0	11.94	1096.	13080.
75.00	50.00	15.32	286.6	11.42	1278.	14590.
75.00	51.00	16.32	310.3	10.94	1479.	16170.
75.00	52.00	17.32	334.3	10.51	1697.	17820.
75.00	53.00	18.32	359.6	10.07	1936.	19500.
75.00	54.00	19.31	385.2	9.684	2189.	21200.
75.00	55.00	20.31	411.0	9.351	2454.	22950.
75.00	56.00	21.31		Weight too small		
75.00	56.00	21.31	436.6	9.044	2729.	24680.
75.00	57.00	22.31		Weight too small		
75.00	57.00	22.31	462.2	8.767	3010.	26390.
75.00	58.00	23.31		Weight too small		
75.00	58.00	23.31	487.3	8.545	3292.	28130.
75.00	59.00	24.31		Weight too small		
75.00	59.00	24.31	511.9	8.364	3576.	29910.
75.00	60.00	25.31		Weight too small		
75.00	60.00	25.31	535.7	8.220	3860.	31730.
75.00	61.00	26.31	51.27	10.40	925.5	9628.
75.00	61.00	26.31	559.1	8.100	4145.	33580.
75.00	62.00	27.31	67.57	9.286	1229.	11410.
75.00	62.00	27.31	582.1	8.003	4431.	35460.
75.00	63.00	28.31	84.86	8.496	1554.	13200.
75.00	63.00	28.31	605.1	7.917	4722.	37380.
75.00	64.00	29.31	730.0	7.773	6906.	53680.
76.00	45.00	10.34	127.3	18.63	377.9	7041.
76.00	46.00	11.34	143.0	17.47	468.0	8176.
76.00	47.00	12.34	159.2	16.47	569.7	9383.
76.00	48.00	13.34	176.5	15.55	685.6	10660.
76.00	49.00	14.34	194.6	14.72	815.5	12010.
76.00	50.00	15.34	213.2	14.00	959.1	13420.
76.00	51.00	16.34	233.1	13.31	1121.	14910.
76.00	52.00	17.34	253.7	12.68	1298.	16460.
76.00	53.00	18.34	274.9	12.12	1492.	18090.
76.00	54.00	19.34	297.2	11.60	1705.	19770.
76.00	55.00	20.34	319.9	11.13	1935.	21530.
76.00	56.00	21.34	344.3	10.63	2187.	23250.
76.00	57.00	22.34	368.3	10.22	2448.	25020.
76.00	58.00	23.34		Weight too small		
76.00	58.00	23.34	392.7	9.866	2722.	26850.
76.00	59.00	24.34		Weight too small		
76.00	59.00	24.34	416.7	9.522	3001.	28570.
76.00	60.00	25.34		Weight too small		
76.00	60.00	25.34	440.8	9.230	3285.	30320.
76.00	61.00	26.34		Weight too small		
76.00	61.00	26.34	464.4	8.991	3571.	32110.
76.00	62.00	27.34		Weight too small		
76.00	62.00	27.34	487.6	8.793	3858.	33920.
76.00	63.00	28.34		Weight too small		
76.00	63.00	28.34	510.3	8.628	4146.	35780.
76.00	64.00	29.34	59.97	10.06	1149.	11550.
76.00	64.00	29.34	532.3	8.497	4433.	37660.
77.00	45.00	10.37	80.15	25.69	242.0	6218.
77.00	46.00	11.37	91.82	23.82	304.6	7257.
77.00	47.00	12.37	104.4	22.14	377.8	8366.
77.00	48.00	13.37	118.0	20.63	462.8	9546.
77.00	49.00	14.37	132.4	19.29	559.7	10790.
77.00	50.00	15.37	147.3	18.13	668.2	12110.
77.00	51.00	16.37	163.6	17.04	792.3	13500.
77.00	52.00	17.37	180.5	16.07	930.1	14950.
77.00	53.00	18.37	198.0	15.23	1082.	16470.
77.00	54.00	19.36	216.8	14.43	1252.	18060.
77.00	55.00	20.36	236.3	13.71	1438.	19710.
77.00	56.00	21.36	256.6	13.06	1641.	21440.
77.00	57.00	22.36	277.4	12.48	1861.	23220.
77.00	58.00	23.36	299.4	11.91	2102.	25030.
77.00	59.00	24.36	322.0	11.38	2357.	26820.
77.00	60.00	25.36		Weight too small		
77.00	60.00	25.36	344.7	10.92	2623.	28660.
77.00	61.00	26.36		Weight too small		

EPA Export 08-07-2014:23:43:07

77.00	61.00	26.36	367.8	10.51	2903.	30520.
77.00	62.00	27.36		Weight too small		
77.00	62.00	27.36	390.4	10.13	3184.	32260.
77.00	63.00	28.36		Weight too small		
77.00	63.00	28.36	413.6	9.799	3475.	34050.
77.00	64.00	29.36		Weight too small		
77.00	64.00	29.36	436.0	9.530	3763.	35860.
78.00	45.00	10.39		Weight too small		
78.00	46.00	11.39		Weight too small		
78.00	47.00	12.39	58.18	33.19	213.5	7067.
78.00	48.00	13.39	67.98	30.50	269.7	8225.
78.00	49.00	14.39	78.62	27.93	335.5	9371.
78.00	50.00	15.39	90.13	25.70	411.9	10580.
78.00	51.00	16.39	102.6	23.72	500.3	11870.
78.00	52.00	17.39	115.7	22.03	599.8	13220.
78.00	53.00	18.39	129.8	20.53	712.8	14630.
78.00	54.00	19.39	144.8	19.18	840.3	16120.
78.00	55.00	20.39	160.4	18.00	981.3	17670.
78.00	56.00	21.39	177.3	16.92	1140.	19280.
78.00	57.00	22.39	195.0	15.95	1315.	20970.
78.00	58.00	23.39	213.5	15.08	1506.	22720.
78.00	59.00	24.39	232.8	14.30	1715.	24530.
78.00	60.00	25.39	252.6	13.61	1941.	26410.
78.00	61.00	26.39	273.9	12.91	2189.	28270.
78.00	62.00	27.39		Weight too small		
78.00	62.00	27.39	295.2	12.30	2448.	30120.
78.00	63.00	28.39		Weight too small		
78.00	63.00	28.39	316.8	11.78	2718.	32020.
78.00	64.00	29.39		Weight too small		
78.00	64.00	29.39	338.8	11.30	3001.	33910.
79.00	45.00	10.43		Weight too small		
79.00	46.00	11.43		Weight too small		
79.00	47.00	12.43		Weight too small		
79.00	48.00	13.43		Weight too small		
79.00	49.00	14.43		Weight too small		
79.00	50.00	15.43		Weight too small		
79.00	51.00	16.43	53.59	37.85	263.4	9968.
79.00	52.00	17.42	63.11	34.07	329.1	11210.
79.00	53.00	18.42	73.42	30.90	405.3	12520.
79.00	54.00	19.42	84.69	28.16	493.7	13900.
79.00	55.00	20.42	96.70	25.84	593.7	15340.
79.00	56.00	21.42	109.7	23.82	707.4	16850.
79.00	57.00	22.42	123.3	22.09	833.9	18420.
79.00	58.00	23.42	138.0	20.54	977.0	20060.
79.00	59.00	24.42	153.4	19.19	1134.	21770.
79.00	60.00	25.42	169.9	17.97	1310.	23540.
79.00	61.00	26.41	187.4	16.88	1504.	25380.
79.00	62.00	27.41	205.3	15.93	1713.	27280.
79.00	63.00	28.41	224.4	15.06	1942.	29250.
79.00	64.00	29.41	244.5	14.22	2193.	31180.
80.00	45.00	10.48		Radius too small		
80.00	46.00	11.48		Weight too small		
80.00	47.00	12.48		Weight too small		
80.00	48.00	13.48		Weight too small		
80.00	49.00	14.48		Weight too small		
80.00	50.00	15.48		Weight too small		
80.00	51.00	16.48		Weight too small		
80.00	52.00	17.47		Weight too small		
80.00	53.00	18.47		Weight too small		
80.00	54.00	19.47		Weight too small		
80.00	55.00	20.47		Weight too small		
80.00	56.00	21.47	57.33	38.14	371.0	14150.
80.00	57.00	22.47	67.65	34.10	450.8	15650.
80.00	58.00	23.47	78.84	30.76	559.5	17210.
80.00	59.00	24.47	90.78	27.99	672.8	18830.
80.00	60.00	25.46	103.7	25.60	801.5	20520.
80.00	61.00	26.46	117.4	23.56	944.8	22260.
80.00	62.00	27.46	132.1	21.79	1105.	24070.
80.00	63.00	28.46	147.2	20.30	1278.	25950.
80.00	64.00	29.46	163.6	18.94	1472.	27880.
81.00	45.00	10.54		Radius too small		
81.00	46.00	11.54		Radius too small		
81.00	47.00	12.54		Radius too small		
81.00	48.00	13.53		Radius too small		
81.00	49.00	14.53		Radius too small		

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81.00	50.00	15.53		Radius too small		
81.00	51.00	16.53		Radius too small		
81.00	52.00	17.52		Weight too small		
81.00	53.00	18.52		Weight too small		
81.00	54.00	19.52		Weight too small		
81.00	55.00	20.52		Weight too small		
81.00	56.00	21.52		Weight too small		
81.00	57.00	22.52		Weight too small		
81.00	58.00	23.52		Weight too small		
81.00	59.00	24.52		Weight too small		
81.00	60.00	25.51		Weight too small		
81.00	61.00	26.51	59.57	30.55	479.4	18480.
81.00	62.00	27.51	70.71	34.21	591.7	20240.
81.00	63.00	28.51	82.58	30.75	717.5	22060.
81.00	64.00	29.51	95.20	27.91	857.7	23940.
82.00	45.00	10.68		Radius too small		
82.00	46.00	11.67		Radius too small		
82.00	47.00	12.65		Radius too small		
82.00	48.00	13.64		Radius too small		
82.00	49.00	14.63		Radius too small		
82.00	50.00	15.62		Radius too small		
82.00	51.00	16.62		Radius too small		
82.00	52.00	17.61		Radius too small		
82.00	53.00	18.60		Radius too small		
82.00	54.00	19.60		Radius too small		
82.00	55.00	20.59		Radius too small		
82.00	56.00	21.59		Radius too small		
82.00	57.00	22.58		Weight too small		
82.00	58.00	23.58		Weight too small		
82.00	59.00	24.58		Weight too small		
82.00	60.00	25.57		Weight too small		
82.00	61.00	26.57		Weight too small		
82.00	62.00	27.57		Weight too small		
82.00	63.00	28.57		Weight too small		
82.00	64.00	29.56		Weight too small		
83.00	45.00	10.92		Radius too small		
83.00	46.00	11.88		Radius too small		
83.00	47.00	12.85		Radius too small		
83.00	48.00	13.83		Radius too small		
83.00	49.00	14.80		Radius too small		
83.00	50.00	15.78		Radius too small		
83.00	51.00	16.77		Radius too small		
83.00	52.00	17.75		Radius too small		
83.00	53.00	18.74		Radius too small		
83.00	54.00	19.73		Radius too small		
83.00	55.00	20.71		Radius too small		
83.00	56.00	21.70		Radius too small		
83.00	57.00	22.70		Radius too small		
83.00	58.00	23.69		Radius too small		
83.00	59.00	24.68		Radius too small		
83.00	60.00	25.67		Radius too small		
83.00	61.00	26.67		Radius too small		
83.00	62.00	27.66		Weight too small		
83.00	63.00	28.65		Weight too small		
83.00	64.00	29.65		Weight too small		
84.00	45.00	11.23		Radius too small		
84.00	46.00	12.17		Radius too small		
84.00	47.00	13.12		Radius too small		
84.00	48.00	14.08		Radius too small		
84.00	49.00	15.04		Radius too small		
84.00	50.00	16.00		Radius too small		
84.00	51.00	16.97		Radius too small		
84.00	52.00	17.95		Radius too small		
84.00	53.00	18.92		Radius too small		
84.00	54.00	19.90		Radius too small		
84.00	55.00	20.88		Radius too small		
84.00	56.00	21.86		Radius too small		
84.00	57.00	22.85		Radius too small		
84.00	58.00	23.83		Radius too small		
84.00	59.00	24.82		Radius too small		
84.00	60.00	25.81		Radius too small		
84.00	61.00	26.80		Radius too small		
84.00	62.00	27.79		Radius too small		
84.00	63.00	28.78		Radius too small		
84.00	64.00	29.77		Radius too small		

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85.00	45.00	11.63	Disturbing moment < 0				
85.00	46.00	12.54	Radius too small				
85.00	47.00	13.46	Radius too small				
85.00	48.00	14.39	Radius too small				
85.00	49.00	15.33	Radius too small				
85.00	50.00	16.28	Radius too small				
85.00	51.00	17.24	Radius too small				
85.00	52.00	18.20	Radius too small				
85.00	53.00	19.16	Radius too small				
85.00	54.00	20.13	Radius too small				
85.00	55.00	21.10	Radius too small				
85.00	56.00	22.07	Radius too small				
85.00	57.00	23.04	Radius too small				
85.00	58.00	24.02	Radius too small				
85.00	59.00	25.00	Radius too small				
85.00	60.00	25.98	Radius too small				
85.00	61.00	26.96	Radius too small				
85.00	62.00	27.95	Radius too small				
85.00	63.00	28.93	Radius too small				
85.00	64.00	29.92	Radius too small				
86.00	45.00	12.09	FoS > 1000				
86.00	46.00	12.97	FoS > 1000				
86.00	47.00	13.86	FoS > 1000				
86.00	48.00	14.77	FoS > 1000				
86.00	49.00	15.69	FoS > 1000				
86.00	50.00	16.62	Disturbing moment < 0				
86.00	51.00	17.55	Radius too small				
86.00	52.00	18.50	Radius too small				
86.00	53.00	19.44	Radius too small				
86.00	54.00	20.40	Radius too small				
86.00	55.00	21.36	Radius too small				
86.00	56.00	22.32	Radius too small				
86.00	57.00	23.28	Radius too small				
86.00	58.00	24.25	Radius too small				
86.00	59.00	25.22	Radius too small				
86.00	60.00	26.19	Radius too small				
86.00	61.00	27.17	Radius too small				
86.00	62.00	28.14	Radius too small				
86.00	63.00	29.12	Radius too small				
86.00	64.00	30.10	Radius too small				
87.00	45.00	11.60	Radius too small				
87.00	46.00	13.46	Disturbing moment < 0				
87.00	47.00	14.32	86.34	2.463E+6	0.003984	9814.	
87.00	48.00	15.20	FoS > 1000				
87.00	49.00	16.10	FoS > 1000				
87.00	50.00	17.00	Disturbing moment < 0				
87.00	51.00	17.92	FoS > 1000				
87.00	52.00	18.84	Disturbing moment < 0				
87.00	53.00	19.78	Disturbing moment < 0				
87.00	54.00	20.71	Disturbing moment < 0				
87.00	55.00	21.66	FoS > 1000				
87.00	56.00	22.61	Disturbing moment < 0				
87.00	57.00	23.56	Radius too small				
87.00	58.00	24.52	Radius too small				
87.00	59.00	25.48	Radius too small				
87.00	60.00	26.44	Radius too small				
87.00	61.00	27.40	Radius too small				
87.00	62.00	28.37	Radius too small				
87.00	63.00	29.34	Radius too small				
87.00	64.00	30.32	Radius too small				
88.00	45.00	11.60	Radius too small				
88.00	46.00	12.60	Radius too small				
88.00	47.00	13.60	Radius too small				
88.00	48.00	15.69	166.6	519300.	0.02663	13830.	
88.00	49.00	16.56	141.3	1.190E+6	0.01180	14040.	
88.00	50.00	17.44	Disturbing moment < 0				
88.00	51.00	18.33	100.0	1.843E+6	0.007762	14300.	
88.00	52.00	19.24	Disturbing moment < 0				
88.00	53.00	20.15	Disturbing moment < 0				
88.00	54.00	21.07	FoS > 1000				
88.00	55.00	22.00	FoS > 1000				
88.00	56.00	22.94	Disturbing moment < 0				
88.00	57.00	23.88	FoS > 1000				
88.00	58.00	24.82	FoS > 1000				
88.00	59.00	25.77	FoS > 1000				

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88.00	60.00	26.72	FoS > 1000				
88.00	61.00	27.68	Disturbing moment < 0				
88.00	62.00	28.64	Disturbing moment < 0				
88.00	63.00	29.60	Radius too small				
88.00	64.00	30.56	Radius too small				
89.00	45.00	11.60	Radius too small				
89.00	46.00	12.60	Radius too small				
89.00	47.00	13.60	Radius too small				
89.00	48.00	14.60	Radius too small				
89.00	49.00	15.60	Radius too small				
89.00	50.00	17.92	237.7	316000.	0.05886	18600.	
89.00	51.00	18.79	208.8	259900.	0.07293	18960.	
89.00	52.00	19.67	183.4	352800.	0.05464	19280.	
89.00	53.00	20.57	160.8	6.313E+6	0.003098	19560.	
89.00	54.00	21.47	Disturbing moment < 0				
89.00	55.00	22.38	122.6	1.833E+6	0.01089	19960.	
89.00	56.00	23.30	106.2	2.274E+6	0.008825	20070.	
89.00	57.00	24.23	Disturbing moment < 0				
89.00	58.00	25.16	FoS > 1000				
89.00	59.00	26.10	FoS > 1000				
89.00	60.00	27.04	FoS > 1000				
89.00	61.00	27.98	FoS > 1000				
89.00	62.00	28.93	Disturbing moment < 0				
89.00	63.00	29.88	FoS > 1000				
89.00	64.00	30.84	FoS > 1000				

WORST CASE : WATER CASE 1 OF 1

Centre at (65.00,52.00)
Radius 17.07m
Iterations: 5
Horiz acceleration [kg]: .0
Net vertical force [kN]: .0
Slip weight [kN] 1400.
Net horiz force [kN]: 0.03368
Disturbing moment [kN m]: 6042.
Inclination of interslice forces [°]: 8.137
Restoring moment [kN m]: 24540.

Factor of Safety: 4.061

Slip surface coordinates

Point	x [m]	y [m]
1	50.59	42.86
2	50.93	42.34
3	51.71	41.29
4	52.57	40.31
5	52.65	40.22
6	52.70	40.17
7	52.90	39.97
8	53.06	39.80
9	53.20	39.67
10	54.66	38.42
11	56.25	37.35
12	57.65	36.60
13	58.00	36.44
14	59.48	35.85
15	61.00	35.41
16	62.60	35.10
17	64.59	34.94
18	66.59	35.01
19	68.57	35.31
20	70.50	35.84
21	71.44	36.20
22	72.11	36.49

Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
-5.100	.0	.0	.0
38.15E-6	0.07363	0.5150	.0
10.22	1.852	8.287	5.221
9.701	5.513	24.42	4.706
8.277	5.630	25.03	3.426
7.410	5.757	25.65	2.746
6.682	5.900	29.95	0.7603
0.9871	7.631	34.31	0.04871
1.262	8.465	38.12	0.07960
13.36	19.72	89.26	8.928
23.71	34.57	156.6	20.11
30.87	44.75	203.0	47.63
32.40	46.34	210.2	52.49
37.86	49.15	223.0	71.65
41.90	50.79	230.5	87.79
39.74	50.13	227.5	78.96
34.88	45.11	204.8	60.83
27.66	35.77	162.5	38.25
18.17	23.38	106.2	16.51
6.551	10.05	45.74	2.146
-38.15E-6	3.888	17.72	.0
-5.000	.0	0.03368	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	19.07E-6	0.9661	0.9214	1.873
2	3.000	.0	5.109	8.766	10.41	3.915
3	3.000	.0	9.960	18.98	22.23	3.916
4	40.00	.0	8.989	2.332	1.970	4.812
5	40.00	.0	7.844	1.708	1.542	2.891
6	40.00	.0	5.655	9.067	8.765	11.44
7	40.00	.0	2.443	8.555	8.468	9.189
8	40.00	.0	1.124	7.478	7.429	7.621
9	40.00	.0	7.312	100.2	100.8	76.77

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10	40.00	.0	18.54	148.2	148.2	76.77
11	75.00	.0	27.29	158.9	152.9	119.2
12	75.00	.0	31.63	34.10	32.53	28.93
13	75.00	.0	35.13	115.1	109.2	119.0
14	75.00	.0	39.88	132.3	127.6	119.0
15	75.00	.0	40.82	144.0	141.5	122.2
16	75.00	.0	37.31	168.6	171.2	150.1
17	75.00	.0	31.27	145.0	155.7	150.1
18	75.00	.0	22.91	110.4	129.9	150.1
19	75.00	.0	12.36	66.95	93.49	150.1
20	75.00	.0	3.275	15.63	30.22	75.61
21	75.00	.0	.0	3.321	13.64	54.28

Slice no.	Surface Load (kPa) Vert	Horiz	Water Pressure on ground surface (kPa) Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0

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ARUP

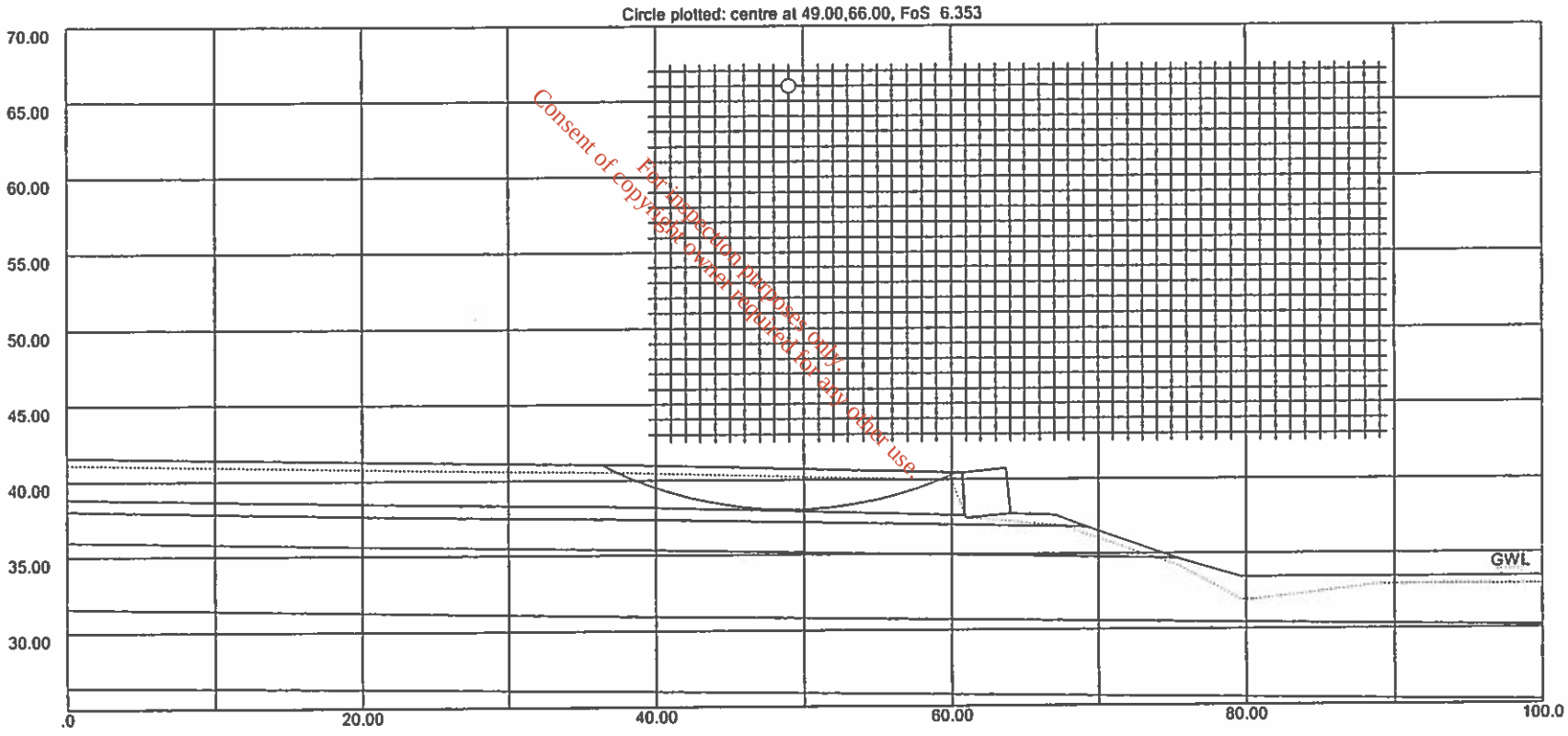
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	AA: Run 1 : 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No1a.sld	JB



Scale x 1:469 y 1:469

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Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Clay Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	36.90	.	34.20	.

Stratum	Material	X --> 79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40

4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
25 in y direction at 1.00m spacing
All circles tangent to stratum no. 3

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment (kN m)	Restoring Moment [kN m]
40.00	43.00	4.847	192.1	10.93	14.87	162.5
40.00	44.00	5.846	214.4	9.992	21.35	213.3
40.00	45.00	6.846	234.8	9.426	28.50	268.6
40.00	46.00	7.846	253.4	9.046	36.26	328.0
40.00	47.00	8.845	270.8	8.776	44.59	391.3
40.00	48.00	9.845	287.0	8.575	53.43	458.1
40.00	49.00	10.84	301.9	8.431	62.63	528.1
40.00	50.00	11.84	316.5	8.310	72.39	601.5
40.00	51.00	12.84	330.4	8.213	82.57	678.1
40.00	52.00	13.84	343.7	8.133	93.15	757.6
40.00	53.00	14.84	356.5	8.067	104.1	840.0
40.00	54.00	15.84	368.8	8.011	115.5	925.1
40.00	55.00	16.84	380.7	7.965	127.2	1013.
40.00	56.00	17.84	392.2	7.924	139.2	1103.
40.00	57.00	18.84	403.4	7.890	151.6	1196.
40.00	58.00	19.84	414.3	7.860	164.3	1291.
40.00	59.00	20.84	424.8	7.834	177.3	1389.
40.00	60.00	21.84	435.1	7.812	190.6	1489.
40.00	61.00	22.84	445.1	7.792	204.2	1591.
40.00	62.00	23.84	455.5	7.771	218.3	1697.
40.00	63.00	24.84	465.1	7.755	232.5	1803.
40.00	64.00	25.84	474.5	7.741	247.0	1912.
40.00	65.00	26.84	483.7	7.729	261.7	2023.
40.00	66.00	27.84	492.7	7.718	276.7	2136.
40.00	67.00	28.84	501.5	7.709	292.0	2251.
41.00	43.00	4.873	192.9	10.23	16.04	164.1
41.00	44.00	5.873	215.2	9.399	22.89	215.2
41.00	45.00	6.872	235.7	8.905	30.40	270.7
41.00	46.00	7.872	254.4	8.573	38.54	330.4
41.00	47.00	8.872	271.3	8.338	47.21	393.7
41.00	48.00	9.871	287.6	8.166	56.42	460.7
41.00	49.00	10.87	303.0	8.034	66.11	531.2
41.00	50.00	11.87	317.9	7.919	76.40	605.1
41.00	51.00	12.87	331.9	7.839	86.99	681.9
41.00	52.00	13.87	345.3	7.773	97.99	761.7
41.00	53.00	14.87	358.1	7.720	109.4	844.4
41.00	54.00	15.87	370.5	7.675	121.1	929.8
41.00	55.00	16.87	382.4	7.638	133.3	1018.
41.00	56.00	17.87	394.0	7.607	145.7	1109.
41.00	57.00	18.87	404.6	7.590	158.3	1201.
41.00	58.00	19.87	415.5	7.567	171.4	1297.
41.00	59.00	20.87	426.1	7.548	184.8	1395.
41.00	60.00	21.87	436.4	7.531	198.5	1495.
41.00	61.00	22.87	446.5	7.517	212.5	1598.
41.00	62.00	23.87	456.3	7.505	226.8	1702.
41.00	63.00	24.87	465.9	7.494	241.4	1809.
41.00	64.00	25.87	475.3	7.485	256.3	1918.
41.00	65.00	26.87	484.6	7.478	271.4	2029.
41.00	66.00	27.87	493.6	7.471	286.8	2143.
41.00	67.00	28.86	502.4	7.465	302.4	2258.

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EPA Export 08-07-2014:23:43:08

42.00	43.00	4.899	193.3	9.950	16.65	165.7
42.00	44.00	5.899	215.9	9.018	24.06	217.0
42.00	45.00	6.898	236.4	8.537	31.96	272.8
42.00	46.00	7.898	254.7	8.222	40.45	332.5
42.00	47.00	8.898	272.2	8.008	49.48	396.2
42.00	48.00	9.897	288.8	7.817	59.31	463.7
42.00	49.00	10.90	304.2	7.700	69.40	534.4
42.00	50.00	11.90	318.9	7.609	79.95	608.4
42.00	51.00	12.90	332.4	7.542	90.84	685.1
42.00	52.00	13.90	345.7	7.485	102.2	765.1
42.00	53.00	14.90	358.6	7.440	114.0	848.0
42.00	54.00	15.90	371.0	7.402	126.1	933.7
42.00	55.00	16.90	383.0	7.371	138.6	1022.
42.00	56.00	17.89	394.6	7.346	151.5	1113.
42.00	57.00	18.89	405.8	7.325	164.7	1206.
42.00	58.00	19.89	416.7	7.307	178.2	1302.
42.00	59.00	20.89	427.8	7.287	192.3	1401.
42.00	60.00	21.89	438.2	7.275	206.4	1502.
42.00	61.00	22.89	448.3	7.265	220.8	1604.
42.00	62.00	23.89	458.2	7.256	235.6	1709.
42.00	63.00	24.89	467.8	7.250	250.6	1817.
42.00	64.00	25.89	477.3	7.244	265.9	1926.
42.00	65.00	26.89	486.5	7.240	281.5	2038.
42.00	66.00	27.89	495.6	7.236	297.3	2151.
42.00	67.00	28.89	503.7	7.243	312.8	2266.
43.00	43.00	4.925	193.8	9.981	16.75	167.1
43.00	44.00	5.925	216.3	8.949	24.45	218.8
43.00	45.00	6.925	236.9	8.352	32.91	274.9
43.00	46.00	7.924	255.4	8.001	41.85	334.9
43.00	47.00	8.924	273.1	7.739	51.54	398.9
43.00	48.00	9.924	289.5	7.579	61.55	466.5
43.00	49.00	10.92	304.5	7.462	71.98	537.2
43.00	50.00	11.92	319.2	7.375	82.90	611.4
43.00	51.00	12.92	333.2	7.307	94.24	688.7
43.00	52.00	13.92	346.6	7.254	106.0	768.9
43.00	53.00	14.92	359.9	7.195	118.5	852.3
43.00	54.00	15.92	372.3	7.161	131.0	938.3
43.00	55.00	16.92	384.4	7.134	143.9	1027.
43.00	56.00	17.92	396.0	7.112	157.2	1118.
43.00	57.00	18.92	406.7	7.100	170.6	1211.
43.00	58.00	19.92	417.7	7.086	184.5	1307.
43.00	59.00	20.92	428.3	7.074	198.7	1406.
43.00	60.00	21.92	438.7	7.065	213.3	1507.
43.00	61.00	22.92	448.8	7.057	228.1	1610.
43.00	62.00	23.92	458.7	7.051	243.3	1715.
43.00	63.00	24.92	468.4	7.047	258.7	1823.
43.00	64.00	25.92	477.9	7.044	274.4	1932.
43.00	65.00	26.92	487.1	7.041	290.3	2044.
43.00	66.00	27.92	496.2	7.040	306.5	2158.
43.00	67.00	28.92	505.1	7.039	323.0	2274.
44.00	43.00	4.952	194.4	9.958	16.93	168.6
44.00	44.00	5.951	216.9	8.966	24.59	220.4
44.00	45.00	6.951	237.2	8.352	33.13	276.7
44.00	46.00	7.950	256.0	7.922	42.57	337.2
44.00	47.00	8.950	273.5	7.642	52.52	401.4
44.00	48.00	9.950	289.6	7.441	63.02	469.0
44.00	49.00	10.95	305.2	7.308	73.92	540.2
44.00	50.00	11.95	319.9	7.216	85.18	614.6
44.00	51.00	12.95	334.2	7.116	97.30	692.3
44.00	52.00	13.95	347.1	7.062	109.4	772.5
44.00	53.00	14.95	360.1	7.018	122.0	855.9
44.00	54.00	15.95	372.6	6.984	134.9	942.1
44.00	55.00	16.95	384.7	6.956	148.2	1031.
44.00	56.00	17.95	396.3	6.935	161.9	1122.
44.00	57.00	18.95	407.6	6.917	175.8	1216.
44.00	58.00	19.95	418.6	6.903	190.2	1313.
44.00	59.00	20.95	429.7	6.883	205.1	1412.
44.00	60.00	21.95	440.2	6.874	220.1	1513.
44.00	61.00	22.95	450.4	6.868	235.4	1617.
44.00	62.00	23.94	460.3	6.863	250.9	1722.
44.00	63.00	24.94	469.3	6.867	266.4	1829.
44.00	64.00	25.94	478.8	6.865	282.5	1939.
44.00	65.00	26.94	488.1	6.864	298.9	2051.
44.00	66.00	27.94	497.2	6.863	315.5	2165.
44.00	67.00	28.94	506.2	6.864	332.4	2281.

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45.00	43.00	4.978	195.0	9.936	17.12	170.1
45.00	44.00	5.977	217.4	8.956	24.80	222.1
45.00	45.00	6.977	237.7	8.348	33.37	278.6
45.00	46.00	7.977	256.4	7.935	42.74	339.2
45.00	47.00	8.976	273.8	7.635	52.87	403.6
45.00	48.00	9.976	290.2	7.403	63.74	471.8
45.00	49.00	10.98	305.7	7.239	75.05	543.3
45.00	50.00	11.98	320.0	7.113	86.83	617.6
45.00	51.00	12.97	334.3	7.014	99.16	695.5
45.00	52.00	13.97	347.8	6.944	111.8	776.3
45.00	53.00	14.97	360.8	6.894	124.8	860.0
45.00	54.00	15.97	373.6	6.839	138.4	946.6
45.00	55.00	16.97	385.7	6.807	152.2	1036.
45.00	56.00	17.97	397.5	6.781	166.3	1128.
45.00	57.00	18.97	408.2	6.767	180.5	1221.
45.00	58.00	19.97	419.3	6.751	195.2	1318.
45.00	59.00	20.97	430.0	6.739	210.3	1417.
45.00	60.00	21.97	440.5	6.730	225.6	1518.
45.00	61.00	22.97	450.7	6.723	241.3	1622.
45.00	62.00	23.97	460.6	6.718	257.2	1728.
45.00	63.00	24.97	470.4	6.715	273.4	1836.
45.00	64.00	25.97	479.9	6.713	290.0	1946.
45.00	65.00	26.97	489.2	6.712	306.7	2059.
45.00	66.00	27.97	498.8	6.705	324.2	2174.
45.00	67.00	28.97	507.8	6.705	341.5	2290.
46.00	43.00	5.004	195.6	9.914	17.31	171.6
46.00	44.00	6.004	217.9	8.947	25.01	223.8
46.00	45.00	7.003	238.2	8.345	33.60	280.4
46.00	46.00	8.003	256.8	7.935	43.00	341.2
46.00	47.00	9.003	274.2	7.637	53.14	405.8
46.00	48.00	10.00	290.6	7.412	63.97	474.1
46.00	49.00	11.00	306.1	7.235	75.45	545.8
46.00	50.00	12.00	320.8	7.092	87.54	620.9
46.00	51.00	13.00	334.9	6.974	100.3	699.2
46.00	52.00	14.00	348.4	6.890	113.2	780.1
46.00	53.00	15.00	360.9	6.822	126.6	863.6
46.00	54.00	16.00	373.5	6.764	140.5	950.4
46.00	55.00	17.00	385.8	6.720	154.7	1040.
46.00	56.00	18.00	397.6	6.688	169.2	1132.
46.00	57.00	19.00	409.0	6.663	184.1	1226.
46.00	58.00	20.00	420.0	6.645	199.2	1323.
46.00	59.00	21.00	431.1	6.618	215.0	1423.
46.00	60.00	22.00	441.6	6.605	230.8	1525.
46.00	61.00	23.00	451.1	6.602	246.6	1628.
46.00	62.00	24.00	461.2	6.594	263.0	1734.
46.00	63.00	25.00	471.0	6.589	279.6	1843.
46.00	64.00	26.00	480.6	6.586	296.6	1953.
46.00	65.00	27.00	489.9	6.584	313.8	2066.
46.00	66.00	28.00	499.1	6.583	331.2	2180.
46.00	67.00	29.00	508.1	6.583	349.0	2297.
47.00	43.00	5.030	196.2	9.892	17.50	173.1
47.00	44.00	6.030	218.4	8.938	25.22	225.4
47.00	45.00	7.029	238.7	8.342	33.83	282.2
47.00	46.00	8.029	257.3	7.935	43.25	343.2
47.00	47.00	9.029	274.6	7.639	53.41	408.0
47.00	48.00	10.03	291.0	7.415	64.25	476.4
47.00	49.00	11.03	306.4	7.239	75.75	548.4
47.00	50.00	12.03	321.1	7.097	87.86	623.6
47.00	51.00	13.03	335.2	6.981	100.6	701.9
47.00	52.00	14.03	348.7	6.883	113.8	783.3
47.00	53.00	15.03	361.7	6.799	127.6	867.7
47.00	54.00	16.03	374.3	6.729	141.9	954.9
47.00	55.00	17.03	386.3	6.677	156.4	1044.
47.00	56.00	18.03	398.2	6.630	171.4	1137.
47.00	57.00	19.03	409.8	6.599	186.5	1231.
47.00	58.00	20.02	420.2	6.569	202.2	1328.
47.00	59.00	21.02	431.1	6.545	218.2	1428.
47.00	60.00	22.02	441.7	6.527	234.4	1530.
47.00	61.00	23.02	452.0	6.514	250.9	1634.
47.00	62.00	24.02	462.0	6.504	267.7	1741.
47.00	63.00	25.02	471.8	6.496	284.7	1849.
47.00	64.00	26.02	481.7	6.482	302.5	1961.
47.00	65.00	27.02	491.1	6.477	320.1	2074.
47.00	66.00	28.02	499.6	6.480	337.6	2188.
47.00	67.00	29.02	508.6	6.478	355.7	2305.

EPA Export 08-07-2014:23:43:08

48.00	43.00	5.056	196.7	9.871	17.68	174.6
48.00	44.00	6.056	219.0	8.929	25.43	227.1
48.00	45.00	7.056	239.1	8.339	34.07	284.1
48.00	46.00	8.055	257.7	7.935	43.50	345.2
48.00	47.00	9.055	275.0	7.642	53.68	410.2
48.00	48.00	10.05	291.3	7.419	64.54	478.8
48.00	49.00	11.05	306.8	7.244	76.05	550.9
48.00	50.00	12.05	321.5	7.102	88.17	626.2
48.00	51.00	13.05	335.5	6.986	100.9	704.8
48.00	52.00	14.05	349.0	6.889	114.1	786.3
48.00	53.00	15.05	362.0	6.806	127.9	870.8
48.00	54.00	16.05	374.5	6.735	142.3	958.1
48.00	55.00	17.05	386.6	6.673	157.1	1048.
48.00	56.00	18.05	398.4	6.618	172.4	1141.
48.00	57.00	19.05	409.8	6.571	188.1	1236.
48.00	58.00	20.05	420.9	6.535	204.1	1334.
48.00	59.00	21.05	431.7	6.505	220.4	1434.
48.00	60.00	22.05	441.6	6.484	236.8	1535.
48.00	61.00	23.05	452.0	6.460	253.8	1640.
48.00	62.00	24.05	462.2	6.442	271.1	1747.
48.00	63.00	25.05	472.1	6.428	288.7	1856.
48.00	64.00	26.05	481.7	6.417	306.5	1967.
48.00	65.00	27.05	491.2	6.408	324.6	2080.
48.00	66.00	28.05	500.5	6.402	342.9	2195.
48.00	67.00	29.05	509.5	6.398	361.5	2313.
49.00	43.00	5.082	197.3	9.850	17.87	176.1
49.00	44.00	6.082	219.5	8.920	25.65	228.8
49.00	45.00	7.082	239.6	8.336	34.30	285.9
49.00	46.00	8.081	258.2	7.936	43.76	347.2
49.00	47.00	9.081	275.5	7.644	53.95	412.4
49.00	48.00	10.08	291.7	7.422	64.83	481.2
49.00	49.00	11.08	307.1	7.248	76.35	553.4
49.00	50.00	12.08	321.8	7.107	88.49	628.9
49.00	51.00	13.08	335.8	6.992	101.2	707.6
49.00	52.00	14.08	349.3	6.895	114.5	789.4
49.00	53.00	15.08	362.3	6.812	128.3	874.0
49.00	54.00	16.08	374.8	6.741	142.6	961.5
49.00	55.00	17.08	386.9	6.680	157.5	1052.
49.00	56.00	18.08	398.6	6.625	172.8	1145.
49.00	57.00	19.08	410.1	6.578	188.5	1240.
49.00	58.00	20.08	421.2	6.535	204.7	1338.
49.00	59.00	21.08	432.0	6.497	221.4	1438.
49.00	60.00	22.08	442.5	6.462	238.5	1541.
49.00	61.00	23.08	452.8	6.434	255.9	1647.
49.00	62.00	24.08	462.9	6.411	273.5	1754.
49.00	63.00	25.08	472.7	6.391	291.4	1863.
49.00	64.00	26.08	481.6	6.380	309.2	1973.
49.00	65.00	27.07	491.2	6.365	327.8	2087.
49.00	66.00	28.07	500.6	6.353	346.7	2202.
49.00	67.00	29.07	509.8	6.705	365.3	2479.
50.00	43.00	5.109	197.9	9.830	18.06	177.6
50.00	44.00	6.108	220.0	8.912	25.86	230.5
50.00	45.00	7.108	240.1	8.333	34.54	287.8
50.00	46.00	8.108	258.6	7.936	44.01	349.3
50.00	47.00	9.107	275.9	7.646	54.22	414.6
50.00	48.00	10.11	292.1	7.426	65.11	483.5
50.00	49.00	11.11	307.5	7.252	76.65	555.9
50.00	50.00	12.11	322.1	7.112	88.81	631.6
50.00	51.00	13.11	336.2	6.997	101.5	710.5
50.00	52.00	14.11	349.6	6.900	114.8	792.4
50.00	53.00	15.11	362.6	6.818	128.7	877.2
50.00	54.00	16.10	375.1	6.747	143.0	964.8
50.00	55.00	17.10	387.2	6.686	157.8	1055.
50.00	56.00	18.10	398.9	6.632	173.1	1148.
50.00	57.00	19.10	410.3	6.584	188.9	1244.
50.00	58.00	20.10	421.4	6.542	205.2	1342.
50.00	59.00	21.10	432.2	6.503	221.8	1443.
50.00	60.00	22.10	442.7	6.469	238.9	1546.
50.00	61.00	23.10	453.0	6.438	256.5	1651.
50.00	62.00	24.10	463.1	6.409	274.4	1759.
50.00	63.00	25.10	473.1	9.199	291.6	2683.
50.00	64.00	26.10	483.1	11.94	307.0	3667.
50.00	65.00	27.10	492.3	14.68	319.9	4697.
50.00	66.00	28.10	502.2	17.44	331.7	5784.
50.00	67.00	29.10	512.2	20.25	342.0	6926.

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51.00	43.00	5.135	198.5	9.810	18.26	179.1
51.00	44.00	6.135	220.6	8.904	26.07	232.2
51.00	45.00	7.134	240.6	8.331	34.77	289.7
51.00	46.00	8.134	259.0	7.936	44.26	351.3
51.00	47.00	9.133	276.3	7.649	54.49	416.8
51.00	48.00	10.13	292.5	7.429	65.40	485.9
51.00	49.00	11.13	307.8	7.257	76.96	558.5
51.00	50.00	12.13	322.5	7.117	89.12	634.3
51.00	51.00	13.13	336.5	7.003	101.9	713.3
51.00	52.00	14.13	349.9	6.906	115.2	795.4
51.00	53.00	15.13	362.9	6.824	129.0	880.4
51.00	54.00	16.13	375.3	6.754	143.4	968.2
51.00	55.00	17.13	387.4	6.692	158.2	1059.
51.00	56.00	18.13	399.2	6.638	173.5	1152.
51.00	57.00	19.13	410.5	6.591	189.3	1248.
51.00	58.00	20.13	421.7	7.576	204.8	1552.
51.00	59.00	21.13	432.7	11.03	220.0	2427.
51.00	60.00	22.13	443.0	14.43	232.1	3349.
51.00	61.00	23.13	454.1	17.82	242.8	4327.
51.00	62.00	24.13	465.1	21.30	251.8	5364.
51.00	63.00	25.13	476.0	24.91	259.3	6460.
51.00	64.00	26.13	486.8	28.71	265.3	7615.
51.00	65.00	27.13	497.6	32.72	269.9	8830.
51.00	66.00	28.13	508.3	36.98	273.2	10100.
51.00	67.00	29.13	519.5	41.96	273.0	11460.
52.00	43.00	5.161	199.1	9.791	18.45	180.6
52.00	44.00	6.161	221.1	8.895	26.29	233.9
52.00	45.00	7.160	241.0	8.328	35.01	291.5
52.00	46.00	8.160	259.5	7.937	44.52	353.3
52.00	47.00	9.160	276.7	7.651	54.76	419.0
52.00	48.00	10.16	292.9	7.433	65.69	488.3
52.00	49.00	11.16	308.2	7.261	77.26	561.0
52.00	50.00	12.16	322.8	7.122	89.44	637.0
52.00	51.00	13.16	336.8	7.008	102.2	716.2
52.00	52.00	14.16	350.2	6.912	115.5	798.4
52.00	53.00	15.16	363.1	6.830	129.4	883.6
52.00	54.00	16.16	375.6	7.165	143.5	1028.
52.00	55.00	17.16	388.0	11.68	156.6	1829.
52.00	56.00	18.16	399.7	16.03	166.8	2674.
52.00	57.00	19.16	412.0	20.44	175.1	3580.
52.00	58.00	20.16	424.2	25.04	181.6	4546.
52.00	59.00	21.16	436.2	29.93	186.3	5576.
52.00	60.00	22.16	448.2	35.20	189.4	6668.
52.00	61.00	23.15	460.0	40.93	191.1	7822.
52.00	62.00	24.15	472.3	47.87	189.2	9056.
52.00	63.00	25.15	484.1	55.20	187.3	10340.
52.00	64.00	26.15	495.7	59.61	185.5	11060.
52.00	65.00	27.15	506.8	61.56	187.9	11570.
52.00	66.00	28.15	517.4	62.17	194.4	12090.
52.00	67.00	29.15	527.5	61.64	204.5	12600.
53.00	43.00	5.187	199.7	9.772	18.64	182.1
53.00	44.00	6.187	221.6	8.887	26.50	235.6
53.00	45.00	7.187	241.5	8.326	35.24	293.4
53.00	46.00	8.186	259.9	7.937	44.77	355.4
53.00	47.00	9.186	277.1	7.653	55.03	421.2
53.00	48.00	10.19	293.2	7.436	65.98	490.6
53.00	49.00	11.19	308.6	7.266	77.56	563.5
53.00	50.00	12.18	323.2	7.127	89.76	639.7
53.00	51.00	13.18	337.2	9.746	102.1	995.4
53.00	52.00	14.18	350.7	15.66	111.6	1748.
53.00	53.00	15.18	364.5	21.57	118.6	2558.
53.00	54.00	16.18	378.3	27.84	123.3	3432.
53.00	55.00	17.18	391.8	34.71	126.0	4372.
53.00	56.00	18.18	405.1	42.39	126.9	5379.
53.00	57.00	19.18	418.7	51.94	124.4	6464.
53.00	58.00	20.18	431.9	62.68	121.4	7609.
53.00	59.00	21.18	444.1	75.86	116.3	8822.
53.00	60.00	22.18	456.8	83.61	112.6	9411.
53.00	61.00	23.18	468.9	86.81	114.2	9912.
53.00	62.00	24.18		Not converged (increase iterations?)		
53.00	63.00	25.18	491.0	83.39	131.0	10930.
53.00	64.00	26.18	501.3	78.81	145.1	11440.
53.00	65.00	27.18	511.1	73.57	162.5	11950.
53.00	66.00	28.18	520.5	68.26	182.7	12470.

EPA Export 08-07-2014:23:43:08

53.00	67.00	29.10	529.5	63.22	205.5	12990.
54.00	43.00	5.213	200.3	9.753	18.83	183.7
54.00	44.00	6.213	222.1	8.880	26.72	237.3
54.00	45.00	7.213	242.0	8.323	35.48	295.3
54.00	46.00	8.212	260.3	7.938	45.03	357.4
54.00	47.00	9.212	277.5	7.656	55.31	423.4
54.00	48.00	10.21	293.8	10.41	65.97	686.5
54.00	49.00	11.21	309.3	18.89	73.34	1385.
54.00	50.00	12.21	325.2	27.59	77.63	2142.
54.00	51.00	13.21	340.6	37.37	79.37	2966.
54.00	52.00	14.21	356.1	49.59	77.96	3866.
54.00	53.00	15.21	371.2	64.57	74.90	4836.
54.00	54.00	16.21	385.3	84.47	69.59	5878.
54.00	55.00	17.21	399.9	111.3	62.84	6993.
54.00	56.00	18.21	414.3	139.5	55.62	7759.
54.00	57.00	19.21	427.7	151.5	54.42	8246.
54.00	58.00	20.21	440.2	147.6	59.18	8738.
54.00	59.00	21.21	451.9	133.9	68.97	9236.
54.00	60.00	22.21	463.0	117.2	83.07	9737.
54.00	61.00	23.21	473.5	101.5	100.9	10240.
54.00	62.00	24.21	483.5	88.20	121.9	10750.
54.00	63.00	25.21	493.0	77.26	145.8	11260.
54.00	64.00	26.21	502.1	68.41	172.2	11780.
54.00	65.00	27.21	510.8	61.23	200.8	12290.
54.00	66.00	28.21	519.3	55.36	231.4	12810.
54.00	67.00	29.21	527.4	50.53	263.9	13330.
55.00	43.00	5.240	200.9	9.735	19.03	185.2
55.00	44.00	6.239	222.6	8.872	26.94	239.0
55.00	45.00	7.239	242.5	8.325	35.73	297.5
55.00	46.00	8.239	261.0	18.92	43.03	814.0
55.00	47.00	9.238	279.5	32.67	45.90	1499.
55.00	48.00	10.24	297.4	49.36	45.61	2251.
55.00	49.00	11.24	315.3	74.21	41.54	3083.
55.00	50.00	12.24	331.9	112.6	35.42	3990.
55.00	51.00	13.24	348.6	181.3	27.44	4975.
55.00	52.00	14.24	365.0	344.4	17.54	6039.
55.00	53.00	15.24	380.8	691.8	9.512	6581.
55.00	54.00	16.24	395.2	719.3	9.808	7055.
55.00	55.00	17.24	408.5	446.1	16.90	7538.
55.00	56.00	18.24	420.8	272.0	29.51	8027.
55.00	57.00	19.23	432.3	182.4	46.71	8521.
55.00	58.00	20.23	443.1	133.1	67.77	9019.
55.00	59.00	21.23	453.3	103.4	92.11	9521.
55.00	60.00	22.23	463.0	84.05	119.3	10030.
55.00	61.00	23.23	472.3	70.73	148.9	10530.
55.00	62.00	24.23	481.1	61.11	180.7	11050.
55.00	63.00	25.23	489.6	53.89	214.5	11560.
55.00	64.00	26.23	497.8	48.31	249.9	12070.
55.00	65.00	27.23	505.7	43.89	286.9	12590.
55.00	66.00	28.23	513.3	40.31	325.2	13110.
55.00	67.00	29.23	520.7	37.36	364.8	13630.
56.00	43.00	5.266	201.6	9.734	19.30	187.9
56.00	44.00	6.265	223.9	29.95	23.86	714.8
56.00	45.00	7.265	245.6	59.38	23.16	1376.
56.00	46.00	8.265	266.3	119.1	17.71	2109.
56.00	47.00	9.264	286.5	294.2	9.940	2924.
56.00	48.00	10.26	Disturbing moment < 0			
56.00	49.00	11.26	Disturbing moment < 0			
56.00	50.00	12.26	Disturbing moment < 0			
56.00	51.00	13.26	Disturbing moment < 0			
56.00	52.00	14.26	Disturbing moment < 0			
56.00	53.00	15.26	Disturbing moment < 0			
56.00	54.00	16.26	398.5	385.3	18.89	7278.
56.00	55.00	17.26	409.8	181.9	42.71	7768.
56.00	56.00	18.26	420.4	118.1	69.96	8263.
56.00	57.00	19.26	430.4	87.57	100.1	8762.
56.00	58.00	20.26	439.9	69.86	132.6	9263.
56.00	59.00	21.26	448.9	58.41	167.2	9768.
56.00	60.00	22.26	457.5	50.44	203.7	10280.
56.00	61.00	23.26	465.8	44.60	241.8	10780.
56.00	62.00	24.26	473.7	40.16	281.3	11300.
56.00	63.00	25.26	481.4	36.67	322.0	11810.
56.00	64.00	26.26	488.8	33.86	364.0	12320.
56.00	65.00	27.26	496.0	31.56	406.9	12840.
56.00	66.00	28.26	503.0	29.64	450.8	13360.

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56.00	67.00	29.26	509.8	28.01	495.5	13880.
57.00	43.00	5.292	205.4	146.4	7.220	1057.
57.00	44.00	6.292	Disturbing moment < 0			
57.00	45.00	7.291	Disturbing moment < 0			
57.00	46.00	8.291	Disturbing moment < 0			
57.00	47.00	9.291	Disturbing moment < 0			
57.00	48.00	10.29	Disturbing moment < 0			
57.00	49.00	11.29	Disturbing moment < 0			
57.00	50.00	12.29	Disturbing moment < 0			
57.00	51.00	13.29	Disturbing moment < 0			
57.00	52.00	14.29	373.2	286.6	22.65	6491.
57.00	53.00	15.29	384.4	133.4	52.30	6978.
57.00	54.00	16.29	394.9	88.29	84.61	7470.
57.00	55.00	17.29	404.6	66.39	120.0	7965.
57.00	56.00	18.29	413.9	53.87	157.1	8463.
57.00	57.00	19.29	422.7	45.75	195.9	8964.
57.00	58.00	20.29	431.2	40.06	236.3	9468.
57.00	59.00	21.29	439.3	35.80	278.0	9973.
57.00	60.00	22.29	447.0	32.67	320.8	10480.
57.00	61.00	23.29	454.5	30.14	364.7	10990.
57.00	62.00	24.29	461.8	28.09	409.5	11500.
57.00	63.00	25.29	468.8	26.40	455.1	12020.
57.00	64.00	26.28	475.7	24.99	501.4	12530.
57.00	65.00	27.28	482.3	23.79	548.5	13050.
57.00	66.00	28.28	488.8	22.75	596.2	13560.
57.00	67.00	29.28	495.1	21.85	644.5	14080.
58.00	43.00	5.318	214.9	82.86	23.21	1923.
58.00	44.00	6.318	242.0	67.33	40.81	2748.
58.00	45.00	7.318	Disturbing moment < 0			
58.00	46.00	8.317	Disturbing moment < 0			
58.00	47.00	9.317	Disturbing moment < 0			
58.00	48.00	10.32	Disturbing moment < 0			
58.00	49.00	11.32	332.6	1204.	4.316	5196.
58.00	50.00	12.32	344.7	158.5	35.78	5674.
58.00	51.00	13.32	355.8	86.94	70.76	6152.
58.00	52.00	14.32	366.1	61.52	107.9	6640.
58.00	53.00	15.31	375.8	48.47	147.1	7132.
58.00	54.00	16.31	385.0	40.57	188.0	7626.
58.00	55.00	17.31	393.7	35.20	230.3	8124.
58.00	56.00	18.31	402.0	31.50	273.8	8623.
58.00	57.00	19.31	410.0	28.67	318.3	9125.
58.00	58.00	20.31	417.6	26.47	363.7	9629.
58.00	59.00	21.31	425.0	24.72	410.0	10140.
58.00	60.00	22.31	432.2	23.29	457.0	10640.
58.00	61.00	23.31	439.1	22.10	504.6	11150.
58.00	62.00	24.31	445.9	21.10	552.9	11660.
58.00	63.00	25.31	452.4	20.24	601.7	12180.
58.00	64.00	26.31	458.8	19.49	651.0	12690.
58.00	65.00	27.31	465.0	18.84	700.7	13200.
58.00	66.00	28.31	471.1	18.27	751.0	13720.
58.00	67.00	29.31	477.1	17.76	801.6	14240.
59.00	43.00	5.344	Disturbing moment < 0			
59.00	44.00	6.344	Disturbing moment < 0			
59.00	45.00	7.344	Disturbing moment < 0			
59.00	46.00	8.343	Disturbing moment < 0			
59.00	47.00	9.343	300.5	236.4	18.37	4342.
59.00	48.00	10.34	312.8	88.46	54.44	4816.
59.00	49.00	11.34	323.9	56.80	93.23	5296.
59.00	50.00	12.34	334.2	43.12	134.1	5780.
59.00	51.00	13.34	343.9	35.51	176.5	6268.
59.00	52.00	14.34	353.0	30.68	220.3	6759.
59.00	53.00	15.34	361.4	27.32	265.3	7248.
59.00	54.00	16.34	369.6	24.89	311.2	7744.
59.00	55.00	17.34	377.5	23.04	357.8	8242.
59.00	56.00	18.34	385.5	21.57	405.2	8743.
59.00	57.00	19.34	392.8	20.40	453.2	9245.
59.00	58.00	20.34	Not converged (increase iterations?)			
59.00	59.00	21.34	406.8	18.62	550.8	10250.
59.00	60.00	22.34	413.5	17.93	600.3	10760.
59.00	61.00	23.34	420.0	17.33	650.2	11270.
59.00	62.00	24.34	426.4	16.81	700.6	11780.
59.00	63.00	25.34	432.6	16.36	751.3	12290.
59.00	64.00	26.34	438.6	15.96	802.4	12800.
59.00	65.00	27.34	444.6	15.60	853.9	13320.

EPA Export 08-07-2014:23:43:08

59.00	66.00	28.34	450.4	15.27	905.6	13830.
59.00	67.00	29.34	456.1	14.98	957.7	14350.
60.00	43.00	5.371		Disturbing moment < 0		
60.00	44.00	6.370		Disturbing moment < 0		
60.00	45.00	7.370	264.1	102.8	33.61	3455.
60.00	46.00	8.370	276.8	53.50	73.37	3925.
60.00	47.00	9.369	288.2	38.16	115.4	4402.
60.00	48.00	10.37	298.7	30.72	159.0	4883.
60.00	49.00	11.37	308.5	26.34	203.8	5367.
60.00	50.00	12.37	317.7	23.46	249.6	5855.
60.00	51.00	13.37	326.5	21.42	296.3	6345.
60.00	52.00	14.37	334.8	19.90	343.6	6837.
60.00	53.00	15.37	347.6	19.85	389.4	7729.
60.00	54.00	16.37	355.3	18.84	437.9	8251.
60.00	55.00	17.37	362.4	18.01	487.1	8771.
60.00	56.00	18.37	369.6	17.33	536.6	9297.
60.00	57.00	19.37	376.5	16.75	586.4	9824.
60.00	58.00	20.37	383.2	16.26	636.6	10350.
60.00	59.00	21.37	389.8	15.84	687.2	10880.
60.00	60.00	22.36	396.1	15.47	738.1	11420.
60.00	61.00	23.36	402.6	15.14	789.4	11950.
60.00	62.00	24.36	408.7	14.84	841.0	12480.
60.00	63.00	25.36	414.7	14.58	892.8	13020.
60.00	64.00	26.36	420.5	14.35	944.8	13560.
60.00	65.00	27.36	426.3	14.13	997.2	14100.
60.00	66.00	28.36	431.9	13.94	1050.	14630.
60.00	67.00	29.36	437.4	13.76	1103.	15180.
61.00	43.00	5.397	222.3	56.11	45.30	2542.
61.00	44.00	6.396	236.0	34.32	87.66	3008.
61.00	45.00	7.396	248.1	26.46	131.8	3487.
61.00	46.00	8.396	258.9	22.37	177.1	3963.
61.00	47.00	9.395	274.1	20.72	226.2	4686.
61.00	48.00	10.40	283.8	19.02	273.2	5196.
61.00	49.00	11.39		Not converged (increase iterations?)		
61.00	50.00	12.39	301.3	16.86	369.0	6222.
61.00	51.00	13.39	309.5	16.14	417.6	6739.
61.00	52.00	14.39	317.3	15.55	466.6	7257.
61.00	53.00	15.39	324.8	15.07	516.1	7777.
61.00	54.00	16.39	332.1	14.67	565.9	8299.
61.00	55.00	17.39	339.1	14.32	616.0	8822.
61.00	56.00	18.39	346.0	14.03	666.4	9347.
61.00	57.00	19.39	352.6	13.77	717.1	9874.
61.00	58.00	20.39	358.9	13.53	768.4	10400.
61.00	59.00	21.39	365.2	13.33	819.7	10930.
61.00	60.00	22.39	371.4	13.15	871.3	11460.
61.00	61.00	23.39	377.5	12.99	923.1	11990.
61.00	62.00	24.39	383.4	12.84	975.2	12520.
61.00	63.00	25.39	389.2	12.71	1028.	13060.
61.00	64.00	26.39	394.9	12.58	1080.	13590.
61.00	65.00	27.39	400.5	12.47	1133.	14130.
61.00	66.00	28.39	406.0	12.37	1186.	14670.
61.00	67.00	29.39	411.7	12.27	1239.	15210.
62.00	43.00	5.507	210.6	12.01	149.4	1795.
62.00	44.00	6.490	221.4	11.44	195.3	2235.
62.00	45.00	7.477	231.4	11.17	241.7	2701.
62.00	46.00	8.468	240.7	11.01	288.6	3177.
62.00	47.00	9.460	249.6	10.84	335.9	3642.
62.00	48.00	10.45	258.0	10.60	383.6	4066.
62.00	49.00	11.45	266.1	10.25	431.7	4424.
62.00	50.00	12.41	274.6	13.07	475.7	6218.
62.00	51.00	13.40	281.3	12.89	521.3	6721.
62.00	52.00	14.40	288.0	12.74	567.2	7226.
62.00	53.00	15.39	294.3	12.61	613.4	7733.
62.00	54.00	16.38	300.5	12.49	659.8	8242.
62.00	55.00	17.41	311.1	12.18	723.0	8805.
62.00	56.00	18.40	317.0	11.30	770.8	8707.
62.00	57.00	19.40	322.8	12.02	818.5	9834.
62.00	58.00	20.39	328.3	11.95	866.1	10350.
62.00	59.00	21.39	333.8	11.89	913.9	10870.
62.00	60.00	22.39	339.2	11.84	961.9	11390.
62.00	61.00	23.38	344.3	11.78	1011.	11900.
62.00	62.00	24.38	349.5	11.73	1059.	12420.
62.00	63.00	25.37	354.6	11.69	1108.	12950.
62.00	64.00	26.37	359.7	11.65	1157.	13470.

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62.00	65.00	27.37	364.7	11.61	1206.	14000.
62.00	66.00	28.37	369.6	11.57	1255.	14520.
62.00	67.00	29.36	374.4	11.53	1305.	15050.
63.00	43.00	5.342	165.5	12.47	197.5	2462.
63.00	44.00	6.335	176.1	12.17	239.8	2918.
63.00	45.00	7.359	188.7	11.76	289.5	3404.
63.00	46.00	8.354	197.8	11.61	333.2	3869.
63.00	47.00	9.349	206.2	11.51	376.9	4337.
63.00	48.00	10.34	214.2	11.42	420.7	4806.
63.00	49.00	11.34	221.8	11.35	464.8	5278.
63.00	50.00	12.34	229.1	11.29	509.2	5752.
63.00	51.00	13.33	236.1	11.24	554.1	6226.
63.00	52.00	14.33	242.9	11.19	599.0	6704.
63.00	53.00	15.33	249.5	11.15	644.3	7184.
63.00	54.00	16.33	255.9	11.11	689.8	7665.
63.00	55.00	17.32	262.1	11.08	735.6	8148.
63.00	56.00	18.32	268.2	11.04	781.6	8633.
63.00	57.00	19.32	274.2	11.01	827.9	9119.
63.00	58.00	20.32	280.1	10.98	874.5	9606.
63.00	59.00	21.32	285.8	10.96	921.4	10100.
63.00	60.00	22.32	291.4	10.93	968.4	10590.
63.00	61.00	23.32	296.9	10.91	1016.	11080.
63.00	62.00	24.32	302.2	10.88	1063.	11570.
63.00	63.00	25.32	307.5	10.86	1111.	12060.
63.00	64.00	26.32	312.7	10.84	1159.	12560.
63.00	65.00	27.31	317.9	10.82	1207.	13060.
63.00	66.00	28.31	322.8	10.79	1256.	13550.
63.00	67.00	29.31	327.7	10.77	1304.	14050.
64.00	43.00	5.296	129.0	10.54	230.4	2429.
64.00	44.00	6.296	140.3	10.48	273.5	2867.
64.00	45.00	7.296	150.5	10.48	316.4	3315.
64.00	46.00	8.296	159.9	10.49	359.4	3770.
64.00	47.00	9.296	168.7	10.51	402.5	4230.
64.00	48.00	10.30	177.0	10.52	445.9	4693.
64.00	49.00	11.30	184.9	10.54	489.5	5159.
64.00	50.00	12.30	192.4	10.55	533.3	5628.
64.00	51.00	13.30	199.6	10.57	577.3	6099.
64.00	52.00	14.30	206.6	10.57	621.6	6573.
64.00	53.00	15.30	213.4	10.58	666.2	7048.
64.00	54.00	16.30	219.8	10.58	711.1	7523.
64.00	55.00	17.30	226.1	10.58	756.1	8002.
64.00	56.00	18.30	232.3	10.58	801.4	8482.
64.00	57.00	19.30	238.3	10.58	846.9	8964.
64.00	58.00	20.30	244.2	10.58	892.6	9447.
64.00	59.00	21.30	249.9	10.58	938.6	9932.
64.00	60.00	22.30	255.5	10.58	984.8	10420.
64.00	61.00	23.30	261.1	10.57	1031.	10910.
64.00	62.00	24.30	266.4	10.57	1078.	11390.
64.00	63.00	25.30	271.7	10.57	1125.	11880.
64.00	64.00	26.30	277.1	10.56	1172.	12380.
64.00	65.00	27.30	282.2	10.55	1219.	12870.
64.00	66.00	28.30	287.2	10.55	1267.	13360.
64.00	67.00	29.30	292.2	10.54	1314.	13860.
65.00	43.00	5.326	95.46	10.81	233.7	2527.
65.00	44.00	6.326	108.0	10.27	281.7	2892.
65.00	45.00	7.325	118.9	10.11	327.6	3311.
65.00	46.00	8.325	128.8	10.06	372.6	3747.
65.00	47.00	9.324	137.9	10.05	417.2	4192.
65.00	48.00	10.32	146.4	10.06	461.6	4644.
65.00	49.00	11.32	154.5	10.08	505.9	5101.
65.00	50.00	12.32	162.2	10.11	550.3	5562.
65.00	51.00	13.32	169.5	10.13	594.8	6025.
65.00	52.00	14.32	176.5	10.15	639.4	6492.
65.00	53.00	15.32	183.3	10.18	684.1	6961.
65.00	54.00	16.32	189.9	10.20	728.9	7432.
65.00	55.00	17.32	196.2	10.21	774.0	7905.
65.00	56.00	18.32	202.4	10.23	819.1	8380.
65.00	57.00	19.32	208.3	10.24	864.6	8855.
65.00	58.00	20.32	214.3	10.25	910.5	9334.
65.00	59.00	21.32	219.9	10.27	955.8	9813.
65.00	60.00	22.32	225.5	10.28	1002.	10290.
65.00	61.00	23.32	231.0	10.29	1048.	10780.
65.00	62.00	24.32	236.3	10.29	1094.	11260.
65.00	63.00	25.32	241.6	10.30	1140.	11750.
65.00	64.00	26.31	246.7	10.31	1187.	12230.

EPA Export 08-07-2014:23:43:08

65.00	65.00	27.31	251.8	10.31	1233.	12720.
65.00	66.00	28.31	256.8	10.32	1280.	13210.
65.00	67.00	29.31	261.7	10.32	1327.	13700.
66.00	43.00	5.360	60.04	11.95	186.3	2227.
66.00	44.00	6.359		Not converged (increase iterations?)		
66.00	45.00	7.359	86.35	11.24	297.1	3330.
66.00	46.00	8.358	97.04	10.77	347.0	3737.
66.00	47.00	9.357	106.7	10.52	395.0	4157.
66.00	48.00	10.36	115.7	10.39	442.1	4592.
66.00	49.00	11.36	124.0	10.31	488.5	5035.
66.00	50.00	12.36	132.0	10.26	534.7	5485.
66.00	51.00	13.36	139.5	10.23	580.6	5940.
66.00	52.00	14.35	146.8	10.21	626.5	6398.
66.00	53.00	15.35	153.7	10.20	672.3	6861.
66.00	54.00	16.35	160.4	10.20	718.2	7325.
66.00	55.00	17.35	166.8	10.20	764.1	7792.
66.00	56.00	18.35	173.1	10.20	810.2	8262.
66.00	57.00	19.35	179.3	10.20	856.3	8734.
66.00	58.00	20.35	185.2	10.20	902.5	9208.
66.00	59.00	21.35	191.0	10.21	948.8	9684.
66.00	60.00	22.35	196.7	10.21	995.3	10160.
66.00	61.00	23.35	202.1	10.21	1042.	10640.
66.00	62.00	24.35	207.6	10.21	1089.	11120.
66.00	63.00	25.35	212.9	10.22	1136.	11600.
66.00	64.00	26.35	218.1	10.22	1183.	12080.
66.00	65.00	27.35	223.3	10.22	1230.	12570.
66.00	66.00	28.35	228.3	10.22	1277.	13050.
66.00	67.00	29.35	233.3	10.22	1325.	13540.
67.00	43.00	5.393		Weight too small		
67.00	44.00	6.392		Weight too small		
67.00	45.00	7.392	53.92	13.26	222.2	2946.
67.00	46.00	8.391	65.28	13.49	278.7	3760.
67.00	47.00	9.391	75.64	12.24	333.0	4075.
67.00	48.00	10.39	85.04	11.02	384.4	4542.
67.00	49.00	11.39	93.74	11.42	434.2	4958.
67.00	50.00	12.39	101.9	11.16	483.0	5392.
67.00	51.00	13.39	109.7	10.98	531.2	5834.
67.00	52.00	14.39	117.1	10.85	578.8	6283.
67.00	53.00	15.39	124.1	10.75	626.3	6735.
67.00	54.00	16.39	130.9	10.68	673.6	7193.
67.00	55.00	17.39	137.5	10.62	720.7	7653.
67.00	56.00	18.39	143.9	10.57	767.8	8117.
67.00	57.00	19.39	150.1	10.53	815.0	8582.
67.00	58.00	20.38	156.1	10.50	862.1	9050.
67.00	59.00	21.38	162.0	10.47	909.3	9521.
67.00	60.00	22.38	167.7	10.45	956.6	9994.
67.00	61.00	23.38	173.3	10.43	1004.	10470.
67.00	62.00	24.38	178.8	10.41	1051.	10940.
67.00	63.00	25.38	184.2	10.39	1099.	11420.
67.00	64.00	26.38	189.5	10.38	1147.	11900.
67.00	65.00	27.38	194.6	10.37	1195.	12380.
67.00	66.00	28.38	199.7	10.35	1242.	12860.
67.00	67.00	29.38	204.6	10.34	1290.	13350.
68.00	43.00	5.488		Weight too small		
68.00	44.00	6.474		Weight too small		
68.00	45.00	7.463		Weight too small		
68.00	46.00	8.455		Weight too small		
68.00	47.00	9.449		Weight too small		
68.00	48.00	10.44	56.69	14.83	296.7	4399.
68.00	49.00	11.44	65.52	13.51	350.6	4735.
68.00	50.00	12.44	73.75	13.22	402.4	5320.
68.00	51.00	13.43	81.51	12.65	452.9	5730.
68.00	52.00	14.43	88.88	12.26	502.4	6157.
68.00	53.00	15.43	95.93	11.97	551.3	6597.
68.00	54.00	16.43	102.7	11.74	599.8	7043.
68.00	55.00	17.42	109.3	11.56	648.0	7493.
68.00	56.00	18.42	115.6	11.42	696.0	7948.
68.00	57.00	19.42	121.8	11.30	744.0	8406.
68.00	58.00	20.42	127.8	11.20	791.8	8867.
68.00	59.00	21.42	133.7	11.11	839.7	9331.
68.00	60.00	22.42	139.4	11.04	887.6	9797.
68.00	61.00	23.42	145.0	10.97	935.6	10270.
68.00	62.00	24.42	150.4	10.92	983.6	10740.
68.00	63.00	25.42	155.8	10.87	1032.	11210.

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68.00	64.00	26.41	161.1	10.82	1080.	11680.
68.00	65.00	27.41	166.3	10.78	1128.	12160.
68.00	66.00	28.41	171.4	10.74	1177.	12640.
68.00	67.00	29.41	176.4	10.71	1225.	13120.
69.00	43.00	5.754		Radius too small		
69.00	44.00	6.701		Weight too small		
69.00	45.00	7.662		Weight too small		
69.00	46.00	8.631		Weight too small		
69.00	47.00	9.606		Weight too small		
69.00	48.00	10.59		Weight too small		
69.00	49.00	11.57		Weight too small		
69.00	50.00	12.56	51.09	15.94	317.2	5057.
69.00	51.00	13.54		Not converged (increase iterations?)		
69.00	52.00	14.53	65.02	14.51	421.6	6117.
69.00	53.00	15.53	72.66	13.74	471.9	6483.
69.00	54.00	16.52	79.23	13.31	521.5	6940.
69.00	55.00	17.51	85.57	12.92	570.4	7371.
69.00	56.00	18.50	91.70	12.62	619.0	7813.
69.00	57.00	19.50	97.67	12.38	667.3	8260.
69.00	58.00	20.49	103.5	12.18	715.4	8711.
69.00	59.00	21.49	109.1	12.01	763.4	9165.
69.00	60.00	22.49	114.6	11.86	811.3	9622.
69.00	61.00	23.48	120.1	11.74	859.1	10080.
69.00	62.00	24.48	125.4	11.63	907.0	10550.
69.00	63.00	25.47	130.6	11.53	954.8	11010.
69.00	64.00	26.47	135.7	11.45	1003.	11480.
69.00	65.00	27.47	140.7	11.37	1051.	11950.
69.00	66.00	28.47	145.6	11.30	1099.	12420.
69.00	67.00	29.46	150.5	11.24	1147.	12890.
70.00	43.00	6.096		Radius too small		
70.00	44.00	7.036		Radius too small		
70.00	45.00	7.976		Weight too small		
70.00	46.00	8.916		Weight too small		
70.00	47.00	9.863		Weight too small		
70.00	48.00	10.82		Weight too small		
70.00	49.00	11.78		Weight too small		
70.00	50.00	12.75		Weight too small		
70.00	51.00	13.73		Weight too small		
70.00	52.00	14.71		Weight too small		
70.00	53.00	15.69	53.81	16.71	391.7	6547.
70.00	54.00	16.67	60.11	15.64	442.8	6927.
70.00	55.00	17.65	66.18	14.86	492.9	7325.
70.00	56.00	18.64		Not converged (increase iterations?)		
70.00	57.00	19.63	77.76	13.81	591.2	8163.
70.00	58.00	20.62	83.32	13.44	639.8	8598.
70.00	59.00	21.61	88.73	13.14	688.1	9040.
70.00	60.00	22.60	94.03	12.89	736.1	9488.
70.00	61.00	23.59	99.22	12.68	784.1	9939.
70.00	62.00	24.58	104.3	12.49	831.9	10390.
70.00	63.00	25.57	109.3	12.33	879.7	10850.
70.00	64.00	26.57	114.2	12.19	927.5	11310.
70.00	65.00	27.56	119.0	12.07	975.3	11770.
70.00	66.00	28.55	123.7	11.96	1023.	12230.
70.00	67.00	29.55	128.4	11.86	1071.	12700.
71.00	43.00	6.438		Radius too small		
71.00	44.00	7.378		Radius too small		
71.00	45.00	8.317		Radius too small		
71.00	46.00	9.257		Weight too small		
71.00	47.00	10.20		Weight too small		
71.00	48.00	11.14		Weight too small		
71.00	49.00	12.08		Weight too small		
71.00	50.00	13.03		Weight too small		
71.00	51.00	13.98		Weight too small		
71.00	52.00	14.94		Weight too small		
71.00	53.00	15.91		Weight too small		
71.00	54.00	16.88		Weight too small		
71.00	55.00	17.85	50.24	17.61	414.8	7306.
71.00	56.00	18.83	55.84	16.64	465.4	7746.
71.00	57.00	19.80	61.20	15.80	515.2	8141.
71.00	58.00	20.78	66.56	15.14	564.4	8548.
71.00	59.00	21.77		Not converged (increase iterations?)		
71.00	60.00	22.75	76.76	14.20	661.7	9395.

EPA Export 08-07-2014:23:43:09

71.00	61.00	23.74	81.70	13.85	709.8	9831.
71.00	62.00	24.72	86.54	13.56	757.9	10270.
71.00	63.00	25.71	91.30	13.31	805.7	10720.
71.00	64.00	26.70	95.98	13.09	853.5	11170.
71.00	65.00	27.69	100.6	12.90	901.3	11630.
71.00	66.00	28.68	105.1	12.73	949.0	12080.
71.00	67.00	29.67	109.6	12.58	996.6	12540.
72.00	43.00	6.770		Radius too small		
72.00	44.00	7.715		Radius too small		
72.00	45.00	8.659		Radius too small		
72.00	46.00	9.599		Radius too small		
72.00	47.00	10.54		Weight too small		
72.00	48.00	11.48		Weight too small		
72.00	49.00	12.42		Weight too small		
72.00	50.00	13.36		Weight too small		
72.00	51.00	14.30		Weight too small		
72.00	52.00	15.24		Weight too small		
72.00	53.00	16.19		Weight too small		
72.00	54.00	17.14		Weight too small		
72.00	55.00	18.10		Weight too small		
72.00	56.00	19.06		Weight too small		
72.00	57.00	20.03		Weight too small		
72.00	58.00	21.00	52.54	17.53	489.0	8572.
72.00	59.00	21.97	57.44	16.64	538.5	8963.
72.00	60.00	22.95	62.22	15.94	587.5	9366.
72.00	61.00	23.92		Not converged (increase iterations?)		
72.00	62.00	24.90	71.51	14.91	684.4	10200.
72.00	63.00	25.88	76.03	14.51	732.5	10630.
72.00	64.00	26.87	80.47	14.18	780.4	11070.
72.00	65.00	27.85	84.85	13.90	828.2	11510.
72.00	66.00	28.83	89.17	13.66	875.9	11960.
72.00	67.00	29.82	93.43	13.44	923.6	12410.
73.00	43.00	7.095		Radius too small		
73.00	44.00	8.041		Radius too small		
73.00	45.00	8.986		Radius too small		
73.00	46.00	9.932		Radius too small		
73.00	47.00	10.88		Radius too small		
73.00	48.00	11.82		Radius too small		
73.00	49.00	12.76		Weight too small		
73.00	50.00	13.70		Weight too small		
73.00	51.00	14.64		Weight too small		
73.00	52.00	15.58		Weight too small		
73.00	53.00	16.52		Weight too small		
73.00	54.00	17.46		Weight too small		
73.00	55.00	18.40		Weight too small		
73.00	56.00	19.35		Weight too small		
73.00	57.00	20.30		Weight too small		
73.00	58.00	21.26		Weight too small		
73.00	59.00	22.22		Weight too small		
73.00	60.00	23.19		Weight too small		
73.00	61.00	24.15	54.36	17.40	562.5	9790.
73.00	62.00	25.12	58.72	16.67	611.3	10190.
73.00	63.00	26.10	63.01	16.06	659.8	10600.
73.00	64.00	27.07	67.23	15.43	707.9	10920.
73.00	65.00	28.05	71.39	15.14	755.9	11440.
73.00	66.00	29.02	75.49	14.77	803.7	11870.
73.00	67.00	30.00	79.52	14.46	851.4	12310.
74.00	43.00	7.421		Radius too small		
74.00	44.00	8.366		Radius too small		
74.00	45.00	9.312		Radius too small		
74.00	46.00	10.26		Radius too small		
74.00	47.00	11.20		Radius too small		
74.00	48.00	12.15		Radius too small		
74.00	49.00	13.09		Radius too small		
74.00	50.00	14.04		Weight too small		
74.00	51.00	14.98		Weight too small		
74.00	52.00	15.92		Weight too small		
74.00	53.00	16.86		Weight too small		
74.00	54.00	17.80		Weight too small		
74.00	55.00	18.74		Weight too small		
74.00	56.00	19.68		Weight too small		
74.00	57.00	20.62		Weight too small		
74.00	58.00	21.56		Weight too small		
74.00	59.00	22.51		Weight too small		

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74.00	60.00	23.46		Weight too small		
74.00	61.00	24.42		Weight too small		
74.00	62.00	25.38		Weight too small		
74.00	63.00	26.34	51.84	18.09	587.1	10620.
74.00	64.00	27.31	55.85	17.33	635.7	11020.
74.00	65.00	28.28	59.79	16.70	683.9	11420.
74.00	66.00	29.25	63.68	16.17	732.0	11830.
74.00	67.00	30.22	67.52	15.63	779.8	12190.
75.00	43.00	7.746		Radius too small		
75.00	44.00	8.692		Radius too small		
75.00	45.00	9.637		Radius too small		
75.00	46.00	10.58		Radius too small		
75.00	47.00	11.53		Radius too small		
75.00	48.00	12.47		Radius too small		
75.00	49.00	13.42		Radius too small		
75.00	50.00	14.37		Radius too small		
75.00	51.00	15.31		Slip too small to split into minimum no. of slices		
75.00	52.00	16.26		Weight too small		
75.00	53.00	17.20		Weight too small		
75.00	54.00	18.14		Weight too small		
75.00	55.00	19.08		Weight too small		
75.00	56.00	20.02		Weight too small		
75.00	57.00	20.96		Weight too small		
75.00	58.00	21.90		Weight too small		
75.00	59.00	22.84		Weight too small		
75.00	60.00	23.78		Weight too small		
75.00	61.00	24.73		Weight too small		
75.00	62.00	25.67		Weight too small		
75.00	63.00	26.63		Weight too small		
75.00	64.00	27.58		Weight too small		
75.00	65.00	28.54		Weight too small		
75.00	66.00	29.50	53.44	17.94	660.5	11850.
75.00	67.00	30.47	57.09	17.29	708.6	12250.
76.00	43.00	8.072		Radius too small		
76.00	44.00	9.017		Radius too small		
76.00	45.00	9.963		Radius too small		
76.00	46.00	10.91		Radius too small		
76.00	47.00	11.85		Radius too small		
76.00	48.00	12.80		Radius too small		
76.00	49.00	13.75		Radius too small		
76.00	50.00	14.69		Radius too small		
76.00	51.00	15.64		Radius too small		
76.00	52.00	16.58		Radius too small		
76.00	53.00	17.53		Weight too small		
76.00	54.00	18.47		Weight too small		
76.00	55.00	19.42		Weight too small		
76.00	56.00	20.36		Weight too small		
76.00	57.00	21.30		Weight too small		
76.00	58.00	22.24		Weight too small		
76.00	59.00	23.18		Weight too small		
76.00	60.00	24.12		Weight too small		
76.00	61.00	25.06		Weight too small		
76.00	62.00	26.00		Weight too small		
76.00	63.00	26.94		Weight too small		
76.00	64.00	27.89		Weight too small		
76.00	65.00	28.84		Weight too small		
76.00	66.00	29.79		Weight too small		
76.00	67.00	30.74		Weight too small		
77.00	43.00	8.397		Radius too small		
77.00	44.00	9.343		Radius too small		
77.00	45.00	10.29		Radius too small		
77.00	46.00	11.23		Radius too small		
77.00	47.00	12.18		Radius too small		
77.00	48.00	13.13		Radius too small		
77.00	49.00	14.07		Radius too small		
77.00	50.00	15.02		Radius too small		
77.00	51.00	15.96		Radius too small		
77.00	52.00	16.91		Radius too small		
77.00	53.00	17.85		Radius too small		
77.00	54.00	18.80		Radius too small		
77.00	55.00	19.74		Weight too small		
77.00	56.00	20.69		Weight too small		
77.00	57.00	21.63		Weight too small		
77.00	58.00	22.58		Weight too small		

EPA Export 08-07-2014:23:43:09

77.00	59.00	23.53	Weight too small
77.00	60.00	24.46	Weight too small
77.00	61.00	25.40	Weight too small
77.00	62.00	26.34	Weight too small
77.00	63.00	27.28	Weight too small
77.00	64.00	28.22	Weight too small
77.00	65.00	29.16	Weight too small
77.00	66.00	30.11	Weight too small
77.00	67.00	31.05	Weight too small
78.00	43.00	8.722	Radius too small
78.00	44.00	9.668	Radius too small
78.00	45.00	10.61	Radius too small
78.00	46.00	11.56	Radius too small
78.00	47.00	12.50	Radius too small
78.00	48.00	13.45	Radius too small
78.00	49.00	14.40	Radius too small
78.00	50.00	15.34	Radius too small
78.00	51.00	16.29	Radius too small
78.00	52.00	17.23	Radius too small
78.00	53.00	18.18	Radius too small
78.00	54.00	19.12	Radius too small
78.00	55.00	20.07	Radius too small
78.00	56.00	21.01	Weight too small
78.00	57.00	21.96	Weight too small
78.00	58.00	22.91	Weight too small
78.00	59.00	23.85	Weight too small
78.00	60.00	24.80	Weight too small
78.00	61.00	25.74	Weight too small
78.00	62.00	26.69	Weight too small
78.00	63.00	27.63	Weight too small
78.00	64.00	28.57	Weight too small
78.00	65.00	29.51	Weight too small
78.00	66.00	30.45	Weight too small
78.00	67.00	31.39	Weight too small
79.00	43.00	9.012	Radius too small
79.00	44.00	9.969	Radius too small
79.00	45.00	10.93	Radius too small
79.00	46.00	11.88	Radius too small
79.00	47.00	12.83	Radius too small
79.00	48.00	13.78	Radius too small
79.00	49.00	14.72	Radius too small
79.00	50.00	15.67	Radius too small
79.00	51.00	16.61	Radius too small
79.00	52.00	17.56	Radius too small
79.00	53.00	18.50	Radius too small
79.00	54.00	19.45	Radius too small
79.00	55.00	20.39	Radius too small
79.00	56.00	21.34	Radius too small
79.00	57.00	22.29	Radius too small
79.00	58.00	23.23	Weight too small
79.00	59.00	24.18	Weight too small
79.00	60.00	25.12	Weight too small
79.00	61.00	26.07	Weight too small
79.00	62.00	27.01	Weight too small
79.00	63.00	27.96	Weight too small
79.00	64.00	28.90	Weight too small
79.00	65.00	29.85	Weight too small
79.00	66.00	30.79	Weight too small
79.00	67.00	31.73	Weight too small
80.00	43.00	9.301	Radius too small
80.00	44.00	10.26	Radius too small
80.00	45.00	11.22	Radius too small
80.00	46.00	12.17	Radius too small
80.00	47.00	13.13	Radius too small
80.00	48.00	14.09	Radius too small
80.00	49.00	15.04	Radius too small
80.00	50.00	15.99	Radius too small
80.00	51.00	16.94	Radius too small
80.00	52.00	17.88	Radius too small
80.00	53.00	18.83	Radius too small
80.00	54.00	19.77	Radius too small
80.00	55.00	20.72	Radius too small
80.00	56.00	21.67	Radius too small
80.00	57.00	22.61	Radius too small
80.00	58.00	23.56	Radius too small

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80.00	59.00	24.50	Radius too small
80.00	60.00	25.45	Weight too small
80.00	61.00	26.39	Weight too small
80.00	62.00	27.34	Weight too small
80.00	63.00	28.28	Weight too small
80.00	64.00	29.23	Weight too small
80.00	65.00	30.18	Weight too small
80.00	66.00	31.12	Weight too small
80.00	67.00	32.07	Weight too small
81.00	43.00	9.590	Radius too small
81.00	44.00	10.55	Radius too small
81.00	45.00	11.50	Radius too small
81.00	46.00	12.46	Radius too small
81.00	47.00	13.42	Radius too small
81.00	48.00	14.38	Radius too small
81.00	49.00	15.33	Radius too small
81.00	50.00	16.29	Radius too small
81.00	51.00	17.25	Radius too small
81.00	52.00	18.21	Radius too small
81.00	53.00	19.15	Radius too small
81.00	54.00	20.10	Radius too small
81.00	55.00	21.05	Radius too small
81.00	56.00	21.99	Radius too small
81.00	57.00	22.94	Radius too small
81.00	58.00	23.88	Radius too small
81.00	59.00	24.83	Radius too small
81.00	60.00	25.77	Radius too small
81.00	61.00	26.72	Weight too small
81.00	62.00	27.66	Weight too small
81.00	63.00	28.61	Weight too small
81.00	64.00	29.56	Weight too small
81.00	65.00	30.50	Weight too small
81.00	66.00	31.45	Weight too small
81.00	67.00	32.39	Weight too small
82.00	43.00	9.596	Radius too small
82.00	44.00	10.60	Radius too small
82.00	45.00	11.60	Radius too small
82.00	46.00	12.60	Radius too small
82.00	47.00	13.60	Radius too small
82.00	48.00	14.60	Radius too small
82.00	49.00	15.60	Radius too small
82.00	50.00	16.58	Radius too small
82.00	51.00	17.54	Radius too small
82.00	52.00	18.49	Radius too small
82.00	53.00	19.45	Radius too small
82.00	54.00	20.41	Radius too small
82.00	55.00	21.37	Radius too small
82.00	56.00	22.32	Radius too small
82.00	57.00	23.26	Radius too small
82.00	58.00	24.21	Radius too small
82.00	59.00	25.15	Radius too small
82.00	60.00	26.10	Radius too small
82.00	61.00	27.04	Radius too small
82.00	62.00	27.99	Radius too small
82.00	63.00	28.94	Weight too small
82.00	64.00	29.88	Weight too small
82.00	65.00	30.83	Weight too small
82.00	66.00	31.77	Weight too small
82.00	67.00	32.72	Weight too small
83.00	43.00	9.596	Radius too small
83.00	44.00	10.60	Radius too small
83.00	45.00	11.60	Radius too small
83.00	46.00	12.60	Radius too small
83.00	47.00	13.60	Radius too small
83.00	48.00	14.60	Radius too small
83.00	49.00	15.60	Radius too small
83.00	50.00	16.60	Radius too small
83.00	51.00	17.60	Radius too small
83.00	52.00	18.60	Radius too small
83.00	53.00	19.74	FoS > 1000
83.00	54.00	20.70	Disturbing moment < 0
83.00	55.00	21.66	FoS > 1000
83.00	56.00	22.61	Disturbing moment < 0
83.00	57.00	23.57	Radius too small
83.00	58.00	24.53	Radius too small

EPA Export 08-07-2014:23:43:09

83.00	59.00	25.48	Radius too small
83.00	60.00	26.42	Radius too small
83.00	61.00	27.37	Radius too small
83.00	62.00	28.32	Radius too small
83.00	63.00	29.26	Radius too small
83.00	64.00	30.21	Radius too small
83.00	65.00	31.15	Weight too small
83.00	66.00	32.10	Weight too small
83.00	67.00	33.04	Weight too small
84.00	43.00	9.596	Radius too small
84.00	44.00	10.60	Radius too small
84.00	45.00	11.60	Radius too small
84.00	46.00	12.60	Radius too small
84.00	47.00	13.60	Radius too small
84.00	48.00	14.60	Radius too small
84.00	49.00	15.60	Radius too small
84.00	50.00	16.60	Radius too small
84.00	51.00	17.60	Radius too small
84.00	52.00	18.60	Radius too small
84.00	53.00	19.60	Radius too small
84.00	54.00	20.60	Radius too small
84.00	55.00	21.60	Radius too small
84.00	56.00	22.90	FoS > 1000
84.00	57.00	23.86	FoS > 1000
84.00	58.00	24.82	Disturbing moment < 0
84.00	59.00	25.77	Disturbing moment < 0
84.00	60.00	26.73	FoS > 1000
84.00	61.00	27.69	Disturbing moment < 0
84.00	62.00	28.64	Disturbing moment < 0
84.00	63.00	29.59	Radius too small
84.00	64.00	30.53	Radius too small
84.00	65.00	31.48	Radius too small
84.00	66.00	32.42	Radius too small
84.00	67.00	33.37	Weight too small
85.00	43.00	9.596	Radius too small
85.00	44.00	10.60	Radius too small
85.00	45.00	11.60	Radius too small
85.00	46.00	12.60	Radius too small
85.00	47.00	13.60	Radius too small
85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	FoS > 1000
85.00	63.00	29.89	FoS > 1000
85.00	64.00	30.85	FoS > 1000
85.00	65.00	31.80	Disturbing moment < 0
85.00	66.00	32.75	FoS > 1000
85.00	67.00	33.69	Disturbing moment < 0
86.00	43.00	9.596	Radius too small
86.00	44.00	10.60	Radius too small
86.00	45.00	11.60	Radius too small
86.00	46.00	12.60	Radius too small
86.00	47.00	13.60	Radius too small
86.00	48.00	14.60	Radius too small
86.00	49.00	15.60	Radius too small
86.00	50.00	16.60	Radius too small
86.00	51.00	17.60	Radius too small
86.00	52.00	18.60	Radius too small
86.00	53.00	19.60	Radius too small
86.00	54.00	20.60	Radius too small
86.00	55.00	21.60	Radius too small
86.00	56.00	22.60	Radius too small
86.00	57.00	23.60	Radius too small
86.00	58.00	24.60	Radius too small

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86.00	59.00	25.60	Radius too small				
86.00	60.00	26.60	Radius too small				
86.00	61.00	27.60	Radius too small				
86.00	62.00	28.60	Radius too small				
86.00	63.00	30.18	Disturbing moment < 0				
86.00	64.00	31.14	FoS > 1000				
86.00	65.00	32.10	FoS > 1000				
86.00	66.00	33.05	Disturbing moment < 0				
86.00	67.00	34.01	Disturbing moment < 0				
87.00	43.00	9.596	Radius too small				
87.00	44.00	10.60	Radius too small				
87.00	45.00	11.60	Radius too small				
87.00	46.00	12.60	Radius too small				
87.00	47.00	13.60	Radius too small				
87.00	48.00	14.60	Radius too small				
87.00	49.00	15.60	Radius too small				
87.00	50.00	16.60	Radius too small				
87.00	51.00	17.60	Radius too small				
87.00	52.00	18.60	Radius too small				
87.00	53.00	19.60	Radius too small				
87.00	54.00	20.60	Radius too small				
87.00	55.00	21.60	Radius too small				
87.00	56.00	22.60	Radius too small				
87.00	57.00	23.60	Radius too small				
87.00	58.00	24.60	Radius too small				
87.00	59.00	25.60	Radius too small				
87.00	60.00	26.60	Radius too small				
87.00	61.00	27.60	Radius too small				
87.00	62.00	28.60	Radius too small				
87.00	63.00	29.60	Radius too small				
87.00	64.00	30.60	Radius too small				
87.00	65.00	31.60	Radius too small				
87.00	66.00	33.34	131.1	1.334E+6	0.002152	2872.	
87.00	67.00	34.30	Disturbing moment < 0				
88.00	43.00	9.596	Radius too small				
88.00	44.00	10.60	Radius too small				
88.00	45.00	11.60	Radius too small				
88.00	46.00	12.60	Radius too small				
88.00	47.00	13.60	Radius too small				
88.00	48.00	14.60	Radius too small				
88.00	49.00	15.60	Radius too small				
88.00	50.00	16.60	Radius too small				
88.00	51.00	17.60	Radius too small				
88.00	52.00	18.60	Radius too small				
88.00	53.00	19.60	Radius too small				
88.00	54.00	20.60	Radius too small				
88.00	55.00	21.60	Radius too small				
88.00	56.00	22.60	Radius too small				
88.00	57.00	23.60	Radius too small				
88.00	58.00	24.60	Radius too small				
88.00	59.00	25.60	Radius too small				
88.00	60.00	26.60	Radius too small				
88.00	61.00	27.60	Radius too small				
88.00	62.00	28.60	Radius too small				
88.00	63.00	29.60	Radius too small				
88.00	64.00	30.60	Radius too small				
88.00	65.00	31.60	Radius too small				
88.00	66.00	32.60	Radius too small				
88.00	67.00	33.60	Radius too small				
89.00	43.00	9.596	Radius too small				
89.00	44.00	10.60	Radius too small				
89.00	45.00	11.60	Radius too small				
89.00	46.00	12.60	Radius too small				
89.00	47.00	13.60	Radius too small				
89.00	48.00	14.60	Radius too small				
89.00	49.00	15.60	Radius too small				
89.00	50.00	16.60	Radius too small				
89.00	51.00	17.60	Radius too small				
89.00	52.00	18.60	Radius too small				
89.00	53.00	19.60	Radius too small				
89.00	54.00	20.60	Radius too small				
89.00	55.00	21.60	Radius too small				
89.00	56.00	22.60	Radius too small				
89.00	57.00	23.60	Radius too small				
89.00	58.00	24.60	Radius too small				

EPA Export 08-07-2014:23:43:09

89.00	59.00	25.60	Radius too small
89.00	60.00	26.60	Radius too small
89.00	61.00	27.60	Radius too small
89.00	62.00	28.60	Radius too small
89.00	63.00	29.60	Radius too small
89.00	64.00	30.60	Radius too small
89.00	65.00	31.60	Radius too small
89.00	66.00	32.60	Radius too small
89.00	67.00	33.60	Radius too small

WORST CASE : WATER CASE 1 OF 1

Centre at (49.00,66.00)
Iterations: 6
Net vertical force (kN): .0
Net horiz force (kN): -3.099E-6
Inclination of interslice forces (°): 1.142

Radius 28.07m
Horiz acceleration (kg): .0
Slip weight (kN) 500.6
Disturbing moment (kN m): 346.7
Restoring moment (kN m): 2202.

Factor of Safety: 6.353

Slip surface coordinates

Point	x (m)	y (m)	Pore Pressure u (kPa)	Interslice forces (kN) T	E	E(u)
1	36.17	41.03	-5.000	.0	.0	.0
2	37.23	40.51	.0	0.02297	1.152	.0
3	38.00	40.17	3.299	0.06498	3.260	0.5440
4	40.28	39.31	11.24	0.2713	13.61	6.320
5	42.63	38.66	17.16	0.5215	26.16	14.72
6	45.02	38.21	21.00	0.7322	36.73	22.05
7	47.45	37.97	22.74	0.8463	42.46	25.86
8	49.89	37.94	22.36	0.8358	41.93	25.01
9	52.32	38.12	19.88	0.7026	35.25	19.75
10	54.72	38.51	15.29	0.4789	24.03	11.69
11	57.08	39.11	8.651	0.2263	11.35	3.742
12	59.38	39.92	.0	0.03387	1.699	.0
13	60.53	40.40	-18.41	.0	-3.099E-6	.0

Slice Strength Parameters

No.	c' (kPa)	Tan phi	Pore Pressure (kPa)	Slice Weight (kN)	Forces on base (kN) Normal	Shear
1	.0	0.4663	.0	2.907	3.097	1.444
2	.0	0.4663	1.649	5.619	5.952	2.129
3	.0	0.4663	7.271	30.82	32.30	6.798
4	.0	0.4663	14.20	49.65	50.96	7.623
5	.0	0.4663	19.08	63.57	64.22	8.266
6	.0	0.4663	21.87	71.87	71.97	8.706
7	.0	0.4663	22.55	74.10	74.10	8.923
8	.0	0.4663	21.12	70.12	70.56	8.900
9	.0	0.4663	17.58	60.10	61.34	8.621
10	.0	0.4663	11.97	44.49	46.49	8.071
11	.0	0.4663	4.326	24.04	26.06	7.235
12	.0	0.4663	.0	3.275	3.710	1.730

Slice no.	Surface Load (kPa) Vert	Horiz	Water Pressure on ground surface (kPa) Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0

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ARUP

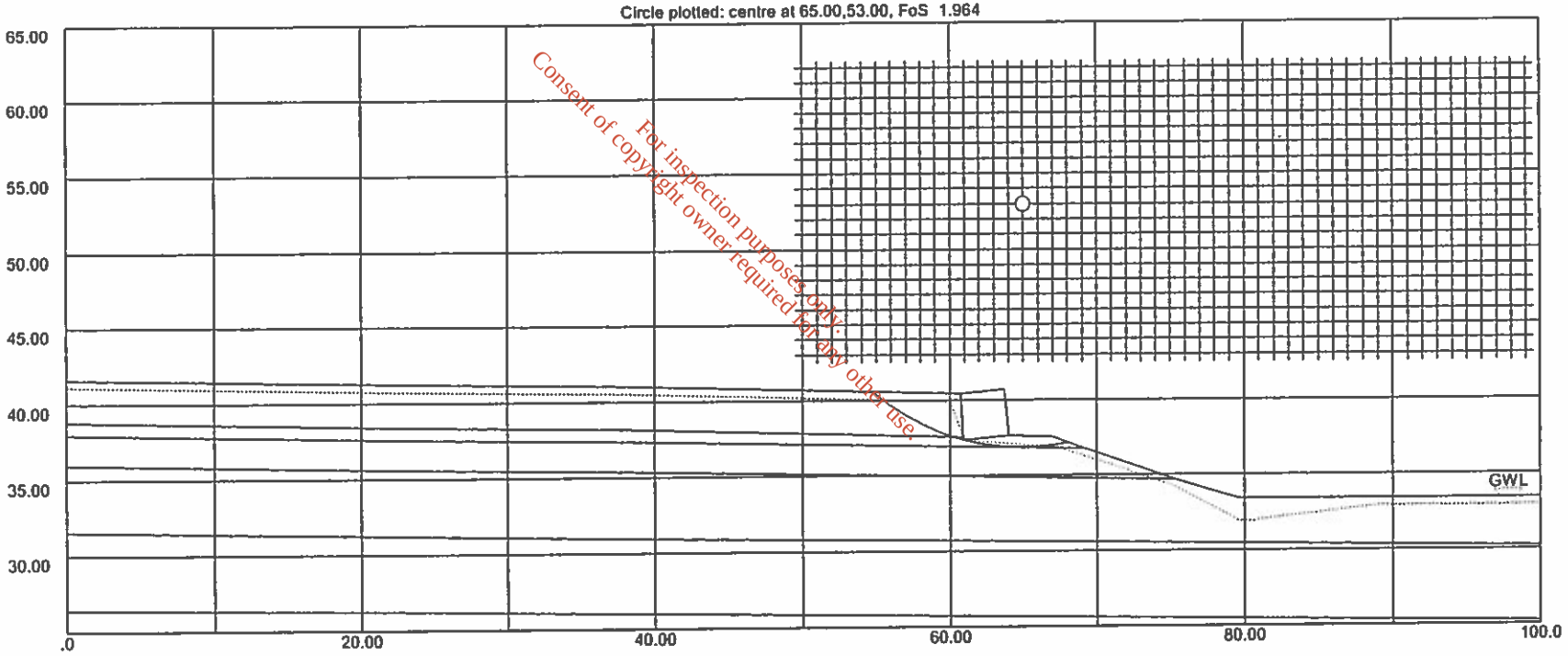
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A:Sun 7a:01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No1.sld	



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Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Upper Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	Shear Strength Parameters c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	36.90	.	34.20	.

Stratum	Material	X --> 79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40

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4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	5.826	314.2	11.18	31.97	357.5
50.00	44.00	6.826	345.0	10.23	44.07	450.6
50.00	45.00	7.825	373.6	9.575	57.54	550.9
50.00	46.00	8.825	399.5	9.106	72.03	656.0
50.00	47.00	9.825	424.4	8.765	87.69	768.7
50.00	48.00	10.82	447.9	8.502	104.4	887.2
50.00	49.00	11.82	470.3	8.293	122.0	1011.
50.00	50.00	12.82	491.6	8.123	140.4	1141.
50.00	51.00	13.82	512.1	7.981	159.8	1275.
50.00	52.00	14.82	531.8	7.862	180.0	1415.
50.00	53.00	15.82	550.8	7.761	200.9	1559.
50.00	54.00	16.82	569.1	7.673	222.6	1708.
50.00	55.00	17.82	586.9	7.596	245.1	1861.
50.00	56.00	18.82	604.2	7.528	268.2	2019.
50.00	57.00	19.82	621.0	8.831	291.6	2575.
50.00	58.00	20.82	637.9	11.65	312.0	3637.
50.00	59.00	21.82	654.7	14.43	329.4	4754.
50.00	60.00	22.82	671.3	17.27	343.6	5934.
50.00	61.00	23.82	687.8	20.20	355.4	7179.
50.00	62.00	24.82	703.7	23.30	364.4	8491.
51.00	43.00	5.845	313.7	11.15	32.11	358.0
51.00	44.00	6.845	344.3	10.20	44.19	450.9
51.00	45.00	7.845	372.1	9.550	57.53	549.4
51.00	46.00	8.844	398.5	9.095	72.10	655.7
51.00	47.00	9.844	423.3	8.757	87.73	768.2
51.00	48.00	10.84	446.7	8.495	104.3	886.4
51.00	49.00	11.84	469.0	8.287	121.9	1010.
51.00	50.00	12.84	490.3	8.118	140.3	1139.
51.00	51.00	13.84	510.6	7.978	159.6	1274.
51.00	52.00	14.84	530.2	7.859	179.8	1413.
51.00	53.00	15.84	549.1	7.758	200.6	1557.
51.00	54.00	16.84	567.7	10.39	220.9	2296.
51.00	55.00	17.84	586.1	13.93	237.3	3307.
51.00	56.00	18.84	604.4	17.49	250.4	4379.
51.00	57.00	19.84	621.8	21.20	260.2	5518.
51.00	58.00	20.84	639.8	25.12	267.8	6727.
51.00	59.00	21.84		Not converged (increase iterations?)		
51.00	60.00	22.84	674.9	33.92	275.9	9357.
51.00	61.00	23.84	693.0	39.48	273.5	10800.
51.00	62.00	24.84	709.9	43.31	277.3	12010.
52.00	43.00	5.864	313.3	11.12	32.24	358.4
52.00	44.00	6.864	343.6	10.18	44.30	451.1
52.00	45.00	7.864	371.3	9.535	57.63	549.5
52.00	46.00	8.864	397.6	9.084	72.16	655.5
52.00	47.00	9.863	422.3	8.748	87.76	767.7
52.00	48.00	10.86	445.6	8.488	104.3	885.6
52.00	49.00	11.86	467.7	8.282	121.8	1009.
52.00	50.00	12.86	488.9	8.113	140.2	1138.
52.00	51.00	13.86	509.5	11.19	158.1	1769.

EPA Export 08-07-2014:23:43:09

52.00	52.00	14.86	529.9	15.86	171.6	2720.
52.00	53.00	15.86	550.0	20.61	181.2	3733.
52.00	54.00	16.86	569.3	25.71	187.4	4817.
52.00	55.00	17.86	588.9	31.20	190.9	5973.
52.00	56.00	18.86	608.7	37.09	189.9	7215.
52.00	57.00	19.86	627.9	45.44	187.6	8527.
52.00	58.00	20.86	646.8	54.19	183.0	9915.
52.00	59.00	21.86	665.4	59.05	179.8	10620.
52.00	60.00	22.86	682.8	60.58	185.1	11210.
52.00	61.00	23.86	699.3	59.73	197.7	11810.
52.00	62.00	24.86	715.0	57.27	216.8	12420.
53.00	43.00	5.883	312.8	11.09	32.37	358.9
53.00	44.00	6.883	343.0	10.16	44.42	451.4
53.00	45.00	7.883	370.5	9.520	57.72	549.5
53.00	46.00	8.883	396.7	9.073	72.23	655.3
53.00	47.00	9.883	421.2	8.740	87.78	767.2
53.00	48.00	10.88	444.6	10.06	104.0	1047.
53.00	49.00	11.88	467.5	16.65	116.2	1934.
53.00	50.00	12.88	489.5	23.29	123.3	2873.
53.00	51.00	13.88	511.7	30.60	126.9	3883.
53.00	52.00	14.88	533.2	39.03	127.3	4969.
53.00	53.00	15.88	555.1	50.23	122.3	6145.
53.00	54.00	16.88	576.2	63.65	116.2	7395.
53.00	55.00	17.88	596.7	78.53	110.0	8637.
53.00	56.00	18.88	616.8	88.62	103.9	9207.
53.00	57.00	19.88	635.3	88.76	110.2	9784.
53.00	58.00	20.88	652.6	83.04	124.9	10370.
53.00	59.00	21.88	668.5	74.98	146.2	10960.
53.00	60.00	22.88	684.0	66.47	173.9	11560.
53.00	61.00	23.88	698.8	58.81	206.8	12160.
53.00	62.00	24.88	712.9	52.28	244.2	12770.
54.00	43.00	5.903	312.3	11.05	32.50	359.3
54.00	44.00	6.902	342.3	10.14	44.53	451.6
54.00	45.00	7.902	369.7	9.509	57.79	549.6
54.00	46.00	8.902	396.2	14.10	71.03	1001.
54.00	47.00	9.902	421.6	23.09	77.94	1862.
54.00	48.00	10.90	446.7	34.75	80.02	2701.
54.00	49.00	11.90	471.6	49.29	76.71	3781.
54.00	50.00	12.90	495.6	68.94	70.54	4863.
54.00	51.00	13.90	519.0	98.34	61.31	6030.
54.00	52.00	14.90	541.9	144.4	50.25	7254.
54.00	53.00	15.90	563.6	184.4	42.29	7797.
54.00	54.00	16.90	583.6	174.5	47.87	8353.
54.00	55.00	17.90	602.2	141.1	63.20	8920.
54.00	56.00	18.90	619.5	109.8	86.51	9496.
54.00	57.00	19.90	635.7	86.58	116.4	10080.
54.00	58.00	20.90	651.0	70.23	151.9	10670.
54.00	59.00	21.90	665.5	58.62	192.2	11260.
54.00	60.00	22.90	679.3	50.16	236.5	11860.
54.00	61.00	23.90	692.5	43.83	284.5	12470.
54.00	62.00	24.90	706.3	38.91	336.3	13080.
55.00	43.00	5.922	311.6	10.98	32.76	359.7
55.00	44.00	6.922	341.5	17.30	43.36	749.9
55.00	45.00	7.921	371.0	34.09	46.58	1588.
55.00	46.00	8.921	399.8	57.22	43.25	2475.
55.00	47.00	9.921	427.5	96.53	35.67	3443.
55.00	48.00	10.92	454.0	186.1	24.18	4500.
55.00	49.00	11.92	479.9	572.8	9.863	5650.
55.00	50.00	12.92		Disturbing moment < 0		
55.00	51.00	13.92		Disturbing moment < 0		
55.00	52.00	14.92	547.8	659.3	11.33	7471.
55.00	53.00	15.92	566.5	230.5	34.82	8028.
55.00	54.00	16.92	583.7	130.3	65.96	8595.
55.00	55.00	17.92	599.9	88.75	103.3	9170.
55.00	56.00	18.92	615.0	66.86	145.8	9752.
55.00	57.00	19.92	630.4	53.55	193.2	10340.
55.00	58.00	20.92	644.1	44.87	243.8	10940.
55.00	59.00	21.92	657.1	38.76	297.5	11530.
55.00	60.00	22.92	669.6	34.27	354.1	12130.
55.00	61.00	23.92	681.7	30.84	413.1	12740.
55.00	62.00	24.92	693.3	28.14	474.4	13350.
56.00	43.00	5.941	313.1	46.93	24.42	1146.
56.00	44.00	6.941	345.9	113.6	17.45	1983.
56.00	45.00	7.941	377.7	499.8	5.801	2899.
56.00	46.00	8.940		Disturbing moment < 0		

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56.00	47.00	9.940		Disturbing moment < 0		
56.00	48.00	10.94		Disturbing moment < 0		
56.00	49.00	11.94		Disturbing moment < 0		
56.00	50.00	12.94		Disturbing moment < 0		
56.00	51.00	13.94	527.5	350.3	20.29	7108.
56.00	52.00	14.94	545.0	130.9	58.57	7666.
56.00	53.00	15.94	561.3	80.16	102.7	8234.
56.00	54.00	16.94	576.5	58.12	151.6	8809.
56.00	55.00	17.94	590.9	45.96	204.3	9391.
56.00	56.00	18.94	604.5	38.33	260.3	9978.
56.00	57.00	19.94	617.5	33.12	319.2	10570.
56.00	58.00	20.94	630.0	30.85	376.0	11600.
56.00	59.00	21.94	642.2	27.03	442.0	11950.
56.00	60.00	22.94	653.8	24.28	509.5	12370.
56.00	61.00	23.94	664.9	22.47	576.3	12950.
56.00	62.00	24.94	675.7	20.90	644.7	13530.
57.00	43.00	5.960		Disturbing moment < 0		
57.00	44.00	6.960		Disturbing moment < 0		
57.00	45.00	7.960	389.5	78.24	53.64	4197.
57.00	46.00	8.960		Disturbing moment < 0		
57.00	47.00	9.960		Disturbing moment < 0		
57.00	48.00	10.96		Disturbing moment < 0		
57.00	49.00	11.96	485.8	394.1	15.65	6169.
57.00	50.00	12.96	504.3	120.1	57.66	6927.
57.00	51.00	13.96	520.0	66.00	110.4	7286.
57.00	52.00	14.96	535.7	47.39	165.1	7825.
57.00	53.00	15.96	550.0	37.51	223.1	8369.
57.00	54.00	16.96	563.6	31.40	284.0	8918.
57.00	55.00	17.96	576.4	27.26	347.4	9470.
57.00	56.00	18.96	588.7	24.29	412.9	10030.
57.00	57.00	19.96	600.4	22.43	480.4	10780.
57.00	58.00	20.96	611.7	20.70	549.4	11370.
57.00	59.00	21.96	622.6	18.91	619.4	11710.
57.00	60.00	22.96	632.7	17.69	690.6	12220.
57.00	61.00	23.96	643.0	16.03	763.2	12240.
57.00	62.00	24.96	653.0	14.59	836.8	12210.
58.00	43.00	5.980	333.5	53.59	59.57	3192.
58.00	44.00	6.979		Disturbing moment < 0		
58.00	45.00	7.979		Disturbing moment < 0		
58.00	46.00	8.979		Disturbing moment < 0		
58.00	47.00	9.979	440.6	301.7	17.03	5137.
58.00	48.00	10.98	458.7	84.79	67.92	5758.
58.00	49.00	11.98	475.0	49.85	123.5	6158.
58.00	50.00	12.98	490.0	35.30	183.0	6460.
58.00	51.00	13.98	504.4	27.07	245.5	6647.
58.00	52.00	14.98	518.0	21.87	310.5	6791.
58.00	53.00	15.98	530.9	18.26	377.5	6891.
58.00	54.00	16.98	543.1	15.57	446.1	6946.
58.00	55.00	17.98	554.6	13.46	516.4	6950.
58.00	56.00	18.98	565.9	11.77	587.7	6915.
58.00	57.00	19.98	576.8	10.35	660.1	6833.
58.00	58.00	20.98	587.3	9.138	733.5	6703.
58.00	59.00	21.98	597.5	8.076	807.8	6525.
58.00	60.00	22.98	607.4	7.132	883.0	6297.
58.00	61.00	23.98	617.0	6.278	959.0	6020.
58.00	62.00	24.98	626.3	5.495	1036.	5691.
59.00	43.00	5.999		Disturbing moment < 0		
59.00	44.00	6.999		Disturbing moment < 0		
59.00	45.00	7.998	388.9	164.9	20.82	3433.
59.00	46.00	8.998	408.0	47.28	76.26	3605.
59.00	47.00	9.998	425.1	27.41	136.3	3735.
59.00	48.00	11.00	440.8	19.14	199.6	3820.
59.00	49.00	12.00	455.3	14.53	265.5	3856.
59.00	50.00	13.00	469.0	11.54	333.3	3847.
59.00	51.00	14.00	481.9	9.406	402.7	3788.
59.00	52.00	15.00	494.2	7.769	473.5	3678.
59.00	53.00	16.00	506.0	6.447	545.4	3517.
59.00	54.00	17.00	517.2	5.336	618.4	3300.
59.00	55.00	18.00	528.2	4.426	692.2	3064.
59.00	56.00	19.00	538.8	4.092	766.4	3136.
59.00	57.00	20.00	549.2	3.972	841.3	3342.
59.00	58.00	21.00	559.3	3.873	916.6	3550.
59.00	59.00	22.00	569.2	3.792	992.3	3762.
59.00	60.00	23.00	578.8	3.723	1068.	3977.
59.00	61.00	24.00	588.2	3.664	1145.	4195.

EPA Export 08-07-2014:23:43:09

ARUP

Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA:Run 4a:06	

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Data Stability Max Minerial Cut No1.sld | Checked JB

59.00	62.00	25.00	597.5	3.615	1222.	4416.
60.00	43.00	6.018	331.3	93.62	20.57	1925.
60.00	44.00	7.018	351.7	25.12	79.34	1993.
60.00	45.00	8.018	369.9	14.14	142.5	2015.
60.00	46.00	9.017	386.3	9.508	208.5	1982.
60.00	47.00	10.02	401.6	6.847	276.5	1893.
60.00	48.00	11.02	415.6	5.064	346.3	1754.
60.00	49.00	12.02	429.0	4.242	416.8	1768.
60.00	50.00	13.02	441.8	3.988	488.2	1947.
60.00	51.00	14.02	454.1	3.802	560.1	2130.
60.00	52.00	15.02	466.0	3.662	632.5	2316.
60.00	53.00	16.02	477.4	3.554	705.4	2507.
60.00	54.00	17.02	488.5	3.468	778.7	2701.
60.00	55.00	18.02	499.3	3.400	852.5	2898.
60.00	56.00	19.02	509.8	3.345	926.7	3099.
60.00	57.00	20.02	520.0	3.299	1001.	3304.
60.00	58.00	21.02	530.0	3.262	1076.	3512.
60.00	59.00	22.02	539.8	3.232	1152.	3723.
60.00	60.00	23.01	549.3	3.207	1228.	3937.
60.00	61.00	24.01	558.6	3.186	1304.	4154.
60.00	62.00	25.01	567.8	3.168	1381.	4374.
61.00	43.00	6.037	309.0	6.324	137.0	866.2
61.00	44.00	7.037	327.0	4.450	204.1	908.1
61.00	45.00	8.037	343.6	3.895	272.3	1061.
61.00	46.00	9.037	359.1	3.586	341.2	1223.
61.00	47.00	10.04	373.4	3.372	410.9	1386.
61.00	48.00	11.04	387.3	3.229	481.0	1553.
61.00	49.00	12.04	400.4	3.126	551.7	1725.
61.00	50.00	13.04	413.1	3.051	622.9	1901.
61.00	51.00	14.04	425.4	2.986	694.7	2074.
61.00	52.00	15.04	437.2	2.944	767.0	2250.
61.00	53.00	16.04	448.6	2.912	839.7	2445.
61.00	54.00	17.04	459.6	2.888	913.0	2637.
61.00	55.00	18.03	470.3	2.870	986.7	2832.
61.00	56.00	19.03	480.8	2.857	1061.	3030.
61.00	57.00	20.03	491.0	2.847	1135.	3232.
61.00	58.00	21.03	500.9	2.841	1210.	3438.
61.00	59.00	22.03	510.6	2.837	1285.	3646.
61.00	60.00	23.03	520.1	2.835	1361.	3858.
61.00	61.00	24.03	529.4	2.835	1437.	4073.
61.00	62.00	25.03	538.6	2.836	1513.	4291.
62.00	43.00	6.056	280.8	3.007	245.5	738.2
62.00	44.00	7.056	298.6	2.819	312.8	881.8
62.00	45.00	8.056	315.1	2.702	380.8	1029.
62.00	46.00	9.056	330.5	2.636	449.4	1185.
62.00	47.00	10.06	345.0	2.596	518.7	1347.
62.00	48.00	11.06	358.7	2.571	588.6	1513.
62.00	49.00	12.06	371.9	2.555	659.1	1684.
62.00	50.00	13.06	384.5	2.547	730.2	1860.
62.00	51.00	14.05	396.3	2.541	802.1	2038.
62.00	52.00	15.05	408.0	2.542	874.1	2222.
62.00	53.00	16.05	419.3	2.545	946.6	2410.
62.00	54.00	17.05	430.3	2.551	1020.	2601.
62.00	55.00	18.05	441.0	2.558	1093.	2796.
62.00	56.00	19.05	451.3	2.567	1167.	2995.
62.00	57.00	20.05	461.5	2.576	1241.	3198.
62.00	58.00	21.05	471.3	2.586	1316.	3403.
62.00	59.00	22.05	480.9	2.596	1391.	3612.
62.00	60.00	23.05	490.3	2.605	1467.	3823.
62.00	61.00	24.05	499.4	2.615	1544.	4037.
62.00	62.00	25.05	508.4	2.625	1621.	4254.
63.00	43.00	6.076	252.8	2.196	326.5	716.9
63.00	44.00	7.075	270.1	2.180	393.8	858.5
63.00	45.00	8.075	286.5	2.181	461.6	1007.
63.00	46.00	9.075	301.8	2.185	530.1	1159.
63.00	47.00	10.07	316.2	2.192	599.3	1314.
63.00	48.00	11.07	329.9	2.213	669.1	1481.
63.00	49.00	12.07	342.9	2.234	739.4	1652.
63.00	50.00	13.07	355.4	2.256	810.4	1828.
63.00	51.00	14.07	367.1	2.274	882.6	2007.
63.00	52.00	15.07	378.6	2.294	955.0	2191.
63.00	53.00	16.07	389.7	2.313	1028.	2378.
63.00	54.00	17.07	400.3	2.331	1102.	2568.
63.00	55.00	18.07	410.7	2.349	1176.	2762.
63.00	56.00	19.07	420.7	2.366	1251.	2960.

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ARUP

Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA:Run 4a:07	

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Data Stability Max Minerial Cut No1.sld | Checked JB

63.00	57.00	20.07	430.8	2.344	1326.	3109.
63.00	58.00	21.07	440.4	2.359	1402.	3308.
63.00	59.00	22.07	449.4	2.371	1479.	3506.
63.00	60.00	23.07	458.5	2.385	1555.	3710.
63.00	61.00	24.07	467.4	2.399	1633.	3917.
63.00	62.00	25.07	476.1	2.412	1710.	4126.
64.00	43.00	6.095	224.6	2.963	380.6	1128.
64.00	44.00	7.095	246.8	2.955	464.7	1373.
64.00	45.00	8.095	258.1	2.304	515.6	1188.
64.00	46.00	9.094	273.0	2.007	584.7	1174.
64.00	47.00	10.09	286.9	1.983	654.7	1298.
64.00	48.00	11.09	300.1	1.998	725.6	1449.
64.00	49.00	12.09	312.7	2.022	797.2	1611.
64.00	50.00	13.09	324.5	2.054	869.4	1786.
64.00	51.00	14.09	336.0	2.087	942.3	1967.
64.00	52.00	15.09	347.3	2.072	1016.	2105.
64.00	53.00	16.09	357.8	2.090	1090.	2280.
64.00	54.00	17.09	368.1	2.113	1165.	2462.
64.00	55.00	18.09	378.2	2.135	1240.	2648.
64.00	56.00	19.09	387.9	2.156	1316.	2837.
64.00	57.00	20.09	397.4	2.176	1392.	3029.
64.00	58.00	21.09	406.7	2.195	1468.	3223.
64.00	59.00	22.09	415.7	2.214	1545.	3421.
64.00	60.00	23.09	424.6	2.232	1623.	3622.
64.00	61.00	24.09	433.2	2.250	1700.	3826.
64.00	62.00	25.09	441.7	2.267	1779.	4032.
65.00	43.00	6.114	193.2	4.399	403.3	1774.
65.00	44.00	7.114	210.8	3.953	475.1	1878.
65.00	45.00	8.114	226.8	3.615	546.6	1976.
65.00	46.00	9.114	241.3	3.334	618.2	2061.
65.00	47.00	10.11	254.8	3.093	689.8	2134.
65.00	48.00	11.11	267.5	2.877	761.8	2192.
65.00	49.00	12.11	279.7	2.680	834.3	2236.
65.00	50.00	13.11	291.2	2.458	907.2	2230.
65.00	51.00	14.11	302.2	2.255	980.8	2212.
65.00	52.00	15.11	312.8	2.215	1054.	2335.
65.00	53.00	16.11	323.2	1.964	1129.	2217.
65.00	54.00	17.11	333.0	1.967	1205.	2370.
65.00	55.00	18.11	342.8	1.989	1280.	2547.
65.00	56.00	19.11	352.3	2.017	1356.	2736.
65.00	57.00	20.11	361.6	2.044	1432.	2928.
65.00	58.00	21.11	370.6	2.070	1509.	3125.
65.00	59.00	22.11	379.4	2.096	1586.	3324.
65.00	60.00	23.11	388.3	2.067	1664.	3439.
65.00	61.00	24.11	396.8	2.086	1742.	3633.
65.00	62.00	25.11	405.1	2.104	1820.	3830.
66.00	43.00	6.133	153.9	6.377	381.7	2434.
66.00	44.00	7.133	172.9	5.631	464.0	2613.
66.00	45.00	8.133	189.6	5.101	542.2	2766.
66.00	46.00	9.133	204.6	4.695	618.3	2903.
66.00	47.00	10.13	218.2	4.374	693.4	3033.
66.00	48.00	11.13	231.2	4.099	768.6	3150.
66.00	49.00	12.13	243.4	3.861	843.2	3255.
66.00	50.00	13.13	254.9	3.645	918.0	3346.
66.00	51.00	14.13	265.9	3.451	992.7	3425.
66.00	52.00	15.13	276.8	3.272	1068.	3493.
66.00	53.00	16.13	287.0	3.104	1143.	3547.
66.00	54.00	17.13	301.5	3.248	1244.	4040.
66.00	55.00	18.13	306.2	2.801	1293.	3620.
66.00	56.00	19.13	315.4	2.636	1368.	3607.
66.00	57.00	20.13	324.5	2.480	1445.	3583.
66.00	58.00	21.13	333.3	2.332	1522.	3549.
66.00	59.00	22.13	341.9	2.193	1599.	3507.
66.00	60.00	23.13	350.3	2.057	1677.	3449.
66.00	61.00	24.13	358.6	1.976	1755.	3467.
66.00	62.00	25.13	366.8	1.997	1833.	3659.
67.00	43.00	6.153	106.2	9.297	295.0	2743.
67.00	44.00	7.152	127.3	8.791	392.4	3450.
67.00	45.00	8.152		Not converged (increase iterations?)		
67.00	46.00	9.152	162.1	6.532	569.5	3720.
67.00	47.00	10.15	176.6	6.067	651.1	3951.
67.00	48.00	11.15	190.1	5.643	730.7	4123.
67.00	49.00	12.15	202.7	5.291	809.3	4282.
67.00	50.00	13.15	214.5	4.997	887.0	4432.

EPA Export 08-07-2014:23:43:09

67.00	51.00	14.15	225.9	4.742	963.9	4571.
67.00	52.00	15.15	236.8	4.511	1041.	4697.
67.00	53.00	16.15	247.2	4.303	1118.	4811.
67.00	54.00	17.15	257.2	4.112	1195.	4912.
67.00	55.00	18.15	266.8	3.933	1272.	5000.
67.00	56.00	19.15	276.2	3.765	1349.	5078.
67.00	57.00	20.15	285.2	3.611	1425.	5145.
67.00	58.00	21.15	294.1	3.466	1502.	5202.
67.00	59.00	22.15	302.7	3.325	1579.	5250.
67.00	60.00	23.15	311.1	3.192	1657.	5287.
67.00	61.00	24.15	324.2	3.371	1766.	5954.
67.00	62.00	25.15	327.1	2.943	1812.	5332.
68.00	43.00	6.172		Weight too small		
68.00	43.00	6.172		Weight too small		
68.00	44.00	7.172		Weight too small		
68.00	44.00	7.172		Weight too small		
68.00	45.00	8.171		Not converged (increase iterations?)		
68.00	45.00	8.171		Weight too small		
68.00	46.00	9.171	76.53	11.04	402.5	4443.
68.00	46.00	9.171		Weight too small		
68.00	47.00	10.17	129.2	8.969	547.2	4908.
68.00	48.00	11.17		Not converged (increase iterations?)		
68.00	49.00	12.17		Not converged (increase iterations?)		
68.00	50.00	13.17	170.0	6.889	802.7	5530.
68.00	51.00	14.17	181.9	6.464	884.0	5714.
68.00	52.00	15.17	193.3	6.112	964.5	5894.
68.00	53.00	16.17	204.0	5.805	1044.	6063.
68.00	54.00	17.17	214.2	5.537	1124.	6221.
68.00	55.00	18.17	224.2	5.296	1203.	6369.
68.00	56.00	19.17	233.9	5.077	1281.	6506.
68.00	57.00	20.17	243.1	4.876	1360.	6631.
68.00	58.00	21.17	252.1	4.689	1439.	6745.
68.00	59.00	22.17	261.1	4.516	1517.	6852.
68.00	60.00	23.17	269.8	4.354	1596.	6947.
68.00	61.00	24.17	278.2	4.197	1675.	7030.
68.00	62.00	25.17	286.3	4.050	1754.	7103.
69.00	43.00	6.191		Weight too small		
69.00	43.00	6.191		Weight too small		
69.00	44.00	7.191		Weight too small		
69.00	44.00	7.191		Weight too small		
69.00	45.00	8.191		Weight too small		
69.00	45.00	8.191		Weight too small		
69.00	46.00	9.190		Weight too small		
69.00	46.00	9.190		Weight too small		
69.00	47.00	10.19	54.21	12.44	330.4	4112.
69.00	47.00	10.19		Weight too small		
69.00	48.00	11.19	66.79	12.24	416.4	5096.
69.00	48.00	11.19		Weight too small		
69.00	49.00	12.19	78.78	11.14	501.5	5584.
69.00	49.00	12.19		Weight too small		
69.00	50.00	13.19	90.02	10.22	583.6	5967.
69.00	50.00	13.19		Weight too small		
69.00	51.00	14.19	100.7	9.684	663.8	6429.
69.00	51.00	14.19		Weight too small		
69.00	52.00	15.19		Not converged (increase iterations?)		
69.00	53.00	16.19		Not converged (increase iterations?)		
69.00	54.00	17.19	160.1	7.544	995.2	7508.
69.00	55.00	18.19	178.7	7.153	1078.	7709.
69.00	56.00	19.19	188.8	6.816	1159.	7902.
69.00	57.00	20.19	198.5	6.516	1241.	8085.
69.00	58.00	21.19	207.6	6.244	1322.	8252.
69.00	59.00	22.19	216.9	5.999	1402.	8414.
69.00	60.00	23.19	225.7	5.776	1483.	8565.
69.00	61.00	24.19	234.4	5.569	1563.	8705.
69.00	62.00	25.19	242.8	5.376	1644.	8835.
70.00	43.00	6.247		Weight too small		
70.00	44.00	7.240		Weight too small		
70.00	44.00	7.240		Weight too small		
70.00	45.00	8.235		Weight too small		
70.00	45.00	8.235		Weight too small		

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70.00	46.00	9.231		Weight too small		
70.00	46.00	9.231		Weight too small		
70.00	47.00	10.23		Weight too small		
70.00	47.00	10.23		Weight too small		
70.00	48.00	11.22		Weight too small		
70.00	48.00	11.22		Weight too small		
70.00	49.00	12.22		Weight too small		
70.00	49.00	12.22		Weight too small		
70.00	50.00	13.22	57.16	13.59	411.3	5591.
70.00	50.00	13.22		Weight too small		
70.00	51.00	14.22		Not converged (increase iterations?)		
70.00	51.00	14.22		Weight too small		
70.00	52.00	15.22	77.40	11.72	574.4	6730.
70.00	52.00	15.22		Weight too small		
70.00	53.00	16.22	86.91	10.97	653.8	7170.
70.00	53.00	16.22		Weight too small		
70.00	54.00	17.21	96.08	10.41	732.3	7623.
70.00	54.00	17.21		Weight too small		
70.00	55.00	18.21	105.0	9.993	810.2	8096.
70.00	55.00	18.21		Weight too small		
70.00	56.00	19.21	113.6	9.661	887.7	8576.
70.00	56.00	19.21		Weight too small		
70.00	57.00	20.21	151.9	8.841	1065.	9418.
70.00	58.00	21.21	161.6	8.417	1149.	9671.
70.00	59.00	22.21	171.0	8.039	1232.	9907.
70.00	60.00	23.21	180.1	7.695	1315.	10120.
70.00	61.00	24.21	189.0	7.383	1398.	10320.
70.00	62.00	25.21	197.7	7.098	1480.	10500.
71.00	43.00	6.452		Weight too small		
71.00	44.00	7.418		Weight too small		
71.00	45.00	8.391		Weight too small		
71.00	46.00	9.370		Weight too small		
71.00	46.00	9.370		Weight too small		
71.00	47.00	10.35		Weight too small		
71.00	47.00	10.35		Weight too small		
71.00	48.00	11.34		Weight too small		
71.00	48.00	11.34		Weight too small		
71.00	49.00	12.33		Weight too small		
71.00	49.00	12.33		Weight too small		
71.00	50.00	13.32		Weight too small		
71.00	50.00	13.32		Weight too small		
71.00	51.00	14.31		Weight too small		
71.00	51.00	14.31		Weight too small		
71.00	52.00	15.30	50.30	14.84	410.5	6091.
71.00	52.00	15.30		Weight too small		
71.00	53.00	16.30	59.23	14.46	489.8	7082.
71.00	53.00	16.30		Weight too small		
71.00	54.00	17.29	67.95	13.17	568.6	7486.
71.00	54.00	17.29		Weight too small		
71.00	55.00	18.28	76.40	12.24	646.5	7915.
71.00	55.00	18.28		Weight too small		
71.00	56.00	19.28	84.61	11.56	723.7	8367.
71.00	56.00	19.28		Weight too small		
71.00	57.00	20.28	92.64	11.03	800.6	8832.
71.00	57.00	20.28		Weight too small		
71.00	58.00	21.27	100.5	10.61	877.2	9311.
71.00	58.00	21.27		Weight too small		
71.00	59.00	22.27	108.2	10.27	953.6	9795.
71.00	59.00	22.27		Weight too small		
71.00	60.00	23.27	115.7	9.984	1030.	10280.
71.00	60.00	23.27		Weight too small		
71.00	61.00	24.26	123.1	9.739	1106.	10780.
71.00	61.00	24.26		Weight too small		
71.00	62.00	25.26	130.3	9.529	1183.	11270.
71.00	62.00	25.26		Weight too small		
72.00	43.00	6.770		Radius too small		
72.00	44.00	7.715		Radius too small		
72.00	45.00	8.661		Radius too small		
72.00	46.00	9.613		Weight too small		
72.00	47.00	10.57		Weight too small		
72.00	47.00	10.57		Weight too small		
72.00	48.00	11.54		Weight too small		
72.00	48.00	11.54		Weight too small		
72.00	49.00	12.51		Weight too small		

EPA Export 08-07-2014:23:43:09

72.00	49.00	12.51		Weight too small		
72.00	50.00	13.49		Weight too small		
72.00	50.00	13.49		Weight too small		
72.00	51.00	14.47		Weight too small		
72.00	51.00	14.47		Weight too small		
72.00	52.00	15.45		Weight too small		
72.00	52.00	15.45		Weight too small		
72.00	53.00	16.44		Weight too small		
72.00	53.00	16.44		Weight too small		
72.00	54.00	17.42		Weight too small		
72.00	54.00	17.42		Weight too small		
72.00	55.00	18.41	53.17	15.62	490.8	7667.
72.00	55.00	18.41		Weight too small		
72.00	56.00	19.40	60.89	14.54	567.7	9256.
72.00	56.00	19.40		Weight too small		
72.00	57.00	20.39	68.44	13.48	644.1	8682.
72.00	57.00	20.39		Weight too small		
72.00	58.00	21.38		Not converged (increase iterations?)		
72.00	58.00	21.38		Weight too small		
72.00	59.00	22.37	83.08	12.05	795.8	9586.
72.00	59.00	22.37		Weight too small		
72.00	60.00	23.36	90.21	11.54	871.3	10060.
72.00	60.00	23.36		Weight too small		
72.00	61.00	24.36	97.21	11.13	946.8	10540.
72.00	61.00	24.36		Weight too small		
72.00	62.00	25.35	104.1	10.78	1022.	11030.
72.00	62.00	25.35		Weight too small		
73.00	43.00	7.095		Radius too small		
73.00	44.00	8.041		Radius too small		
73.00	45.00	8.986		Radius too small		
73.00	46.00	9.932		Radius too small		
73.00	47.00	10.88		Radius too small		
73.00	48.00	11.82		Slip too small to split into minimum no. of slices		
73.00	49.00	12.77		Weight too small		
73.00	49.00	12.77		Weight too small		
73.00	50.00	13.73		Weight too small		
73.00	50.00	13.73		Weight too small		
73.00	51.00	14.70		Weight too small		
73.00	51.00	14.70		Weight too small		
73.00	52.00	15.66		Weight too small		
73.00	52.00	15.66		Weight too small		
73.00	53.00	16.64		Weight too small		
73.00	53.00	16.64		Weight too small		
73.00	54.00	17.61		Weight too small		
73.00	54.00	17.61		Weight too small		
73.00	55.00	18.59		Weight too small		
73.00	55.00	18.59		Weight too small		
73.00	56.00	19.57		Weight too small		
73.00	56.00	19.57		Weight too small		
73.00	57.00	20.55		Weight too small		
73.00	57.00	20.55		Weight too small		
73.00	58.00	21.53	55.45	15.84	570.4	9036.
73.00	58.00	21.53		Weight too small		
73.00	59.00	22.52	62.24	14.66	645.3	9459.
73.00	59.00	22.52		Weight too small		
73.00	60.00	23.51	68.92	13.75	720.0	9897.
73.00	60.00	23.51		Weight too small		
73.00	61.00	24.49	75.50	12.93	794.5	10280.
73.00	61.00	24.49		Weight too small		
73.00	62.00	25.48	82.00	12.45	869.0	10820.
73.00	62.00	25.48		Weight too small		
74.00	43.00	7.421		Radius too small		
74.00	44.00	8.366		Radius too small		
74.00	45.00	9.312		Radius too small		
74.00	46.00	10.26		Radius too small		
74.00	47.00	11.20		Radius too small		
74.00	48.00	12.15		Radius too small		
74.00	49.00	13.09		Radius too small		
74.00	50.00	14.04		Weight too small		
74.00	51.00	14.99		Weight too small		
74.00	52.00	15.94		Weight too small		
74.00	52.00	15.94		Weight too small		
74.00	53.00	16.89		Weight too small		

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74.00	53.00	16.89		Weight too small		
74.00	54.00	17.85		Weight too small		
74.00	54.00	17.85		Weight too small		
74.00	55.00	18.82		Weight too small		
74.00	55.00	18.82		Weight too small		
74.00	56.00	19.79		Weight too small		
74.00	56.00	19.79		Weight too small		
74.00	57.00	20.76		Weight too small		
74.00	57.00	20.76		Weight too small		
74.00	58.00	21.73		Weight too small		
74.00	58.00	21.73		Weight too small		
74.00	59.00	22.71		Weight too small		
74.00	59.00	22.71		Weight too small		
74.00	60.00	23.69	51.14	17.07	575.6	9024.
74.00	60.00	23.69		Weight too small		
74.00	61.00	24.67	57.29	15.78	649.2	10240.
74.00	61.00	24.67		Weight too small		
74.00	62.00	25.65	63.36	14.78	722.6	10680.
74.00	62.00	25.65		Weight too small		
75.00	43.00	7.746		Radius too small		
75.00	44.00	8.692		Radius too small		
75.00	45.00	9.637		Radius too small		
75.00	46.00	10.58		Radius too small		
75.00	47.00	11.53		Radius too small		
75.00	48.00	12.47		Radius too small		
75.00	49.00	13.42		Radius too small		
75.00	50.00	14.37		Radius too small		
75.00	51.00	15.31		Slip too small to split into minimum no. of slices		
75.00	52.00	16.26		Weight too small		
75.00	53.00	17.20		Weight too small		
75.00	54.00	18.15		Weight too small		
75.00	54.00	18.15		Weight too small		
75.00	55.00	19.10		Weight too small		
75.00	55.00	19.10		Weight too small		
75.00	56.00	20.05		Weight too small		
75.00	56.00	20.05		Weight too small		
75.00	57.00	21.01		Weight too small		
75.00	57.00	21.01		Weight too small		
75.00	58.00	21.98		Weight too small		
75.00	58.00	21.98		Weight too small		
75.00	59.00	22.94		Weight too small		
75.00	59.00	22.94		Weight too small		
75.00	60.00	23.91		Weight too small		
75.00	60.00	23.91		Weight too small		
75.00	61.00	24.88		Weight too small		
75.00	61.00	24.88		Weight too small		
75.00	62.00	25.85		Weight too small		
75.00	62.00	25.85		Weight too small		
76.00	43.00	8.072		Radius too small		
76.00	44.00	9.017		Radius too small		
76.00	45.00	9.963		Radius too small		
76.00	46.00	10.91		Radius too small		
76.00	47.00	11.85		Radius too small		
76.00	48.00	12.80		Radius too small		
76.00	49.00	13.75		Radius too small		
76.00	50.00	14.69		Radius too small		
76.00	51.00	15.64		Radius too small		
76.00	52.00	16.58		Radius too small		
76.00	53.00	17.53		Weight too small		
76.00	54.00	18.47		Weight too small		
76.00	55.00	19.42		Weight too small		
76.00	56.00	20.36		Weight too small		
76.00	57.00	21.31		Weight too small		
76.00	57.00	21.31		Weight too small		
76.00	58.00	22.26		Weight too small		
76.00	58.00	22.26		Weight too small		
76.00	59.00	23.21		Weight too small		
76.00	59.00	23.21		Weight too small		
76.00	60.00	24.17		Weight too small		
76.00	60.00	24.17		Weight too small		
76.00	61.00	25.13		Weight too small		
76.00	61.00	25.13		Weight too small		
76.00	62.00	26.10		Weight too small		
76.00	62.00	26.10		Weight too small		

EPA Export 08-07-2014:23:43:10

77.00	43.00	8.397	Radius too small
77.00	44.00	9.343	Radius too small
77.00	45.00	10.29	Radius too small
77.00	46.00	11.23	Radius too small
77.00	47.00	12.18	Radius too small
77.00	48.00	13.13	Radius too small
77.00	49.00	14.07	Radius too small
77.00	50.00	15.02	Radius too small
77.00	51.00	15.96	Radius too small
77.00	52.00	16.91	Radius too small
77.00	53.00	17.85	Radius too small
77.00	54.00	18.80	Radius too small
77.00	55.00	19.74	Weight too small
77.00	56.00	20.69	Weight too small
77.00	57.00	21.63	Weight too small
77.00	58.00	22.58	Weight too small
77.00	59.00	23.53	Weight too small
77.00	60.00	24.47	Weight too small
77.00	60.00	24.47	Weight too small
77.00	61.00	25.42	Weight too small
77.00	61.00	25.42	Weight too small
77.00	62.00	26.38	Weight too small
77.00	62.00	26.38	Weight too small
78.00	43.00	8.722	Radius too small
78.00	44.00	9.668	Radius too small
78.00	45.00	10.61	Radius too small
78.00	46.00	11.56	Radius too small
78.00	47.00	12.50	Radius too small
78.00	48.00	13.45	Radius too small
78.00	49.00	14.40	Radius too small
78.00	50.00	15.34	Radius too small
78.00	51.00	16.29	Radius too small
78.00	52.00	17.23	Radius too small
78.00	53.00	18.18	Radius too small
78.00	54.00	19.12	Radius too small
78.00	55.00	20.07	Radius too small
78.00	56.00	21.01	Weight too small
78.00	57.00	21.96	Weight too small
78.00	58.00	22.91	Weight too small
78.00	59.00	23.85	Weight too small
78.00	60.00	24.80	Weight too small
78.00	61.00	25.74	Weight too small
78.00	62.00	26.69	Weight too small
79.00	43.00	9.012	Radius too small
79.00	44.00	9.969	Radius too small
79.00	45.00	10.93	Radius too small
79.00	46.00	11.88	Radius too small
79.00	47.00	12.83	Radius too small
79.00	48.00	13.78	Radius too small
79.00	49.00	14.72	Radius too small
79.00	50.00	15.67	Radius too small
79.00	51.00	16.61	Radius too small
79.00	52.00	17.56	Radius too small
79.00	53.00	18.50	Radius too small
79.00	54.00	19.45	Radius too small
79.00	55.00	20.39	Radius too small
79.00	56.00	21.34	Radius too small
79.00	57.00	22.29	Radius too small
79.00	58.00	23.23	Weight too small
79.00	59.00	24.18	Weight too small
79.00	60.00	25.12	Weight too small
79.00	61.00	26.07	Weight too small
79.00	62.00	27.01	Weight too small
80.00	43.00	9.301	Radius too small
80.00	44.00	10.26	Radius too small
80.00	45.00	11.22	Radius too small
80.00	46.00	12.17	Radius too small
80.00	47.00	13.13	Radius too small
80.00	48.00	14.09	Radius too small
80.00	49.00	15.04	Radius too small
80.00	50.00	15.99	Radius too small
80.00	51.00	16.94	Radius too small
80.00	52.00	17.88	Radius too small
80.00	53.00	18.83	Radius too small
80.00	54.00	19.77	Radius too small

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ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No. C1157.10 | Sheet No. 4A:Run4a:43 | Rev.

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Data Stability Max Mineral Cut Not Valid | Checked

80.00	55.00	20.72	Radius too small
80.00	56.00	21.67	Radius too small
80.00	57.00	22.61	Radius too small
80.00	58.00	23.56	Radius too small
80.00	59.00	24.50	Radius too small
80.00	60.00	25.45	Weight too small
80.00	61.00	26.39	Weight too small
80.00	62.00	27.34	Weight too small
81.00	43.00	9.590	Radius too small
81.00	44.00	10.55	Radius too small
81.00	45.00	11.50	Radius too small
81.00	46.00	12.46	Radius too small
81.00	47.00	13.42	Radius too small
81.00	48.00	14.38	Radius too small
81.00	49.00	15.33	Radius too small
81.00	50.00	16.29	Radius too small
81.00	51.00	17.25	Radius too small
81.00	52.00	18.21	Radius too small
81.00	53.00	19.15	Radius too small
81.00	54.00	20.10	Radius too small
81.00	55.00	21.05	Radius too small
81.00	56.00	21.99	Radius too small
81.00	57.00	22.94	Radius too small
81.00	58.00	23.88	Radius too small
81.00	59.00	24.83	Radius too small
81.00	60.00	25.77	Radius too small
81.00	61.00	26.72	Weight too small
81.00	62.00	27.66	Weight too small
82.00	43.00	9.596	Radius too small
82.00	44.00	10.60	Radius too small
82.00	45.00	11.60	Radius too small
82.00	46.00	12.60	Radius too small
82.00	47.00	13.60	Radius too small
82.00	48.00	14.60	Radius too small
82.00	49.00	15.60	Radius too small
82.00	50.00	16.59	Radius too small
82.00	51.00	17.54	Radius too small
82.00	52.00	18.49	Radius too small
82.00	53.00	19.45	Radius too small
82.00	54.00	20.41	Radius too small
82.00	55.00	21.37	Radius too small
82.00	56.00	22.32	Radius too small
82.00	57.00	23.26	Radius too small
82.00	58.00	24.21	Radius too small
82.00	59.00	25.15	Radius too small
82.00	60.00	26.10	Radius too small
82.00	61.00	27.04	Radius too small
82.00	62.00	27.99	Radius too small
83.00	43.00	9.596	Radius too small
83.00	44.00	10.60	Radius too small
83.00	45.00	11.60	Radius too small
83.00	46.00	12.60	Radius too small
83.00	47.00	13.60	Radius too small
83.00	48.00	14.60	Radius too small
83.00	49.00	15.60	Radius too small
83.00	50.00	16.60	Radius too small
83.00	51.00	17.60	Radius too small
83.00	52.00	18.60	Radius too small
83.00	53.00	19.74	FoS > 1000
83.00	54.00	20.70	Disturbing moment < 0
83.00	55.00	21.66	FoS > 1000
83.00	56.00	22.61	Disturbing moment < 0
83.00	57.00	23.57	Radius too small
83.00	58.00	24.53	Radius too small
83.00	59.00	25.48	Radius too small
83.00	60.00	26.42	Radius too small
83.00	61.00	27.37	Radius too small
83.00	62.00	28.32	Radius too small
84.00	43.00	9.596	Radius too small
84.00	44.00	10.60	Radius too small
84.00	45.00	11.60	Radius too small
84.00	46.00	12.60	Radius too small
84.00	47.00	13.60	Radius too small
84.00	48.00	14.60	Radius too small
84.00	49.00	15.60	Radius too small

EPA Export 08-07-2014:23:43:10

84.00	50.00	16.60	Radius too small
84.00	51.00	17.60	Radius too small
84.00	52.00	18.60	Radius too small
84.00	53.00	19.60	Radius too small
84.00	54.00	20.60	Radius too small
84.00	55.00	21.60	Radius too small
84.00	56.00	22.90	FoS > 1000
84.00	57.00	23.86	FoS > 1000
84.00	58.00	24.82	Disturbing moment < 0
84.00	59.00	25.77	Disturbing moment < 0
84.00	60.00	26.73	FoS > 1000
84.00	61.00	27.69	Disturbing moment < 0
84.00	62.00	28.64	Disturbing moment < 0
85.00	43.00	9.596	Radius too small
85.00	44.00	10.60	Radius too small
85.00	45.00	11.60	Radius too small
85.00	46.00	12.60	Radius too small
85.00	47.00	13.60	Radius too small
85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	FoS > 1000
86.00	43.00	9.596	Radius too small
86.00	44.00	10.60	Radius too small
86.00	45.00	11.60	Radius too small
86.00	46.00	12.60	Radius too small
86.00	47.00	13.60	Radius too small
86.00	48.00	14.60	Radius too small
86.00	49.00	15.60	Radius too small
86.00	50.00	16.60	Radius too small
86.00	51.00	17.60	Radius too small
86.00	52.00	18.60	Radius too small
86.00	53.00	19.60	Radius too small
86.00	54.00	20.60	Radius too small
86.00	55.00	21.60	Radius too small
86.00	56.00	22.60	Radius too small
86.00	57.00	23.60	Radius too small
86.00	58.00	24.60	Radius too small
86.00	59.00	25.60	Radius too small
86.00	60.00	26.60	Radius too small
86.00	61.00	27.60	Radius too small
86.00	62.00	28.60	Radius too small
87.00	43.00	9.596	Radius too small
87.00	44.00	10.60	Radius too small
87.00	45.00	11.60	Radius too small
87.00	46.00	12.60	Radius too small
87.00	47.00	13.60	Radius too small
87.00	48.00	14.60	Radius too small
87.00	49.00	15.60	Radius too small
87.00	50.00	16.60	Radius too small
87.00	51.00	17.60	Radius too small
87.00	52.00	18.60	Radius too small
87.00	53.00	19.60	Radius too small
87.00	54.00	20.60	Radius too small
87.00	55.00	21.60	Radius too small
87.00	56.00	22.60	Radius too small
87.00	57.00	23.60	Radius too small
87.00	58.00	24.60	Radius too small
87.00	59.00	25.60	Radius too small
87.00	60.00	26.60	Radius too small
87.00	61.00	27.60	Radius too small
87.00	62.00	28.60	Radius too small
88.00	43.00	9.596	Radius too small
88.00	44.00	10.60	Radius too small

88.00	45.00	11.60	Radius too small
88.00	46.00	12.60	Radius too small
88.00	47.00	13.60	Radius too small
88.00	48.00	14.60	Radius too small
88.00	49.00	15.60	Radius too small
88.00	50.00	16.60	Radius too small
88.00	51.00	17.60	Radius too small
88.00	52.00	18.60	Radius too small
88.00	53.00	19.60	Radius too small
88.00	54.00	20.60	Radius too small
88.00	55.00	21.60	Radius too small
88.00	56.00	22.60	Radius too small
88.00	57.00	23.60	Radius too small
88.00	58.00	24.60	Radius too small
88.00	59.00	25.60	Radius too small
88.00	60.00	26.60	Radius too small
88.00	61.00	27.60	Radius too small
88.00	62.00	28.60	Radius too small
89.00	43.00	9.596	Radius too small
89.00	44.00	10.60	Radius too small
89.00	45.00	11.60	Radius too small
89.00	46.00	12.60	Radius too small
89.00	47.00	13.60	Radius too small
89.00	48.00	14.60	Radius too small
89.00	49.00	15.60	Radius too small
89.00	50.00	16.60	Radius too small
89.00	51.00	17.60	Radius too small
89.00	52.00	18.60	Radius too small
89.00	53.00	19.60	Radius too small
89.00	54.00	20.60	Radius too small
89.00	55.00	21.60	Radius too small
89.00	56.00	22.60	Radius too small
89.00	57.00	23.60	Radius too small
89.00	58.00	24.60	Radius too small
89.00	59.00	25.60	Radius too small
89.00	60.00	26.60	Radius too small
89.00	61.00	27.60	Radius too small
89.00	62.00	28.60	Radius too small
90.00	43.00	9.596	Radius too small
90.00	44.00	10.60	Radius too small
90.00	45.00	11.60	Radius too small
90.00	46.00	12.60	Radius too small
90.00	47.00	13.60	Radius too small
90.00	48.00	14.60	Radius too small
90.00	49.00	15.60	Radius too small
90.00	50.00	16.60	Radius too small
90.00	51.00	17.60	Radius too small
90.00	52.00	18.60	Radius too small
90.00	53.00	19.60	Radius too small
90.00	54.00	20.60	Radius too small
90.00	55.00	21.60	Radius too small
90.00	56.00	22.60	Radius too small
90.00	57.00	23.60	Radius too small
90.00	58.00	24.60	Radius too small
90.00	59.00	25.60	Radius too small
90.00	60.00	26.60	Radius too small
90.00	61.00	27.60	Radius too small
90.00	62.00	28.60	Radius too small
91.00	43.00	9.596	Radius too small
91.00	44.00	10.60	Radius too small
91.00	45.00	11.60	Radius too small
91.00	46.00	12.60	Radius too small
91.00	47.00	13.60	Radius too small
91.00	48.00	14.60	Radius too small
91.00	49.00	15.60	Radius too small
91.00	50.00	16.60	Radius too small
91.00	51.00	17.60	Radius too small
91.00	52.00	18.60	Radius too small
91.00	53.00	19.60	Radius too small
91.00	54.00	20.60	Radius too small
91.00	55.00	21.60	Radius too small
91.00	56.00	22.60	Radius too small
91.00	57.00	23.60	Radius too small
91.00	58.00	24.60	Radius too small
91.00	59.00	25.60	Radius too small

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EPA Export 08-07-2014:23:43:10

91.00	60.00	26.60	Radius too small
91.00	61.00	27.60	Radius too small
91.00	62.00	28.60	Radius too small
92.00	43.00	9.596	Radius too small
92.00	44.00	10.60	Radius too small
92.00	45.00	11.60	Radius too small
92.00	46.00	12.60	Radius too small
92.00	47.00	13.60	Radius too small
92.00	48.00	14.60	Radius too small
92.00	49.00	15.60	Radius too small
92.00	50.00	16.60	Radius too small
92.00	51.00	17.60	Radius too small
92.00	52.00	18.60	Radius too small
92.00	53.00	19.60	Radius too small
92.00	54.00	20.60	Radius too small
92.00	55.00	21.60	Radius too small
92.00	56.00	22.60	Radius too small
92.00	57.00	23.60	Radius too small
92.00	58.00	24.60	Radius too small
92.00	59.00	25.60	Radius too small
92.00	60.00	26.60	Radius too small
92.00	61.00	27.60	Radius too small
92.00	62.00	28.60	Radius too small
93.00	43.00	9.596	Radius too small
93.00	44.00	10.60	Radius too small
93.00	45.00	11.60	Radius too small
93.00	46.00	12.60	Radius too small
93.00	47.00	13.60	Radius too small
93.00	48.00	14.60	Radius too small
93.00	49.00	15.60	Radius too small
93.00	50.00	16.60	Radius too small
93.00	51.00	17.60	Radius too small
93.00	52.00	18.60	Radius too small
93.00	53.00	19.60	Radius too small
93.00	54.00	20.60	Radius too small
93.00	55.00	21.60	Radius too small
93.00	56.00	22.60	Radius too small
93.00	57.00	23.60	Radius too small
93.00	58.00	24.60	Radius too small
93.00	59.00	25.60	Radius too small
93.00	60.00	26.60	Radius too small
93.00	61.00	27.60	Radius too small
93.00	62.00	28.60	Radius too small
94.00	43.00	9.596	Radius too small
94.00	44.00	10.60	Radius too small
94.00	45.00	11.60	Radius too small
94.00	46.00	12.60	Radius too small
94.00	47.00	13.60	Radius too small
94.00	48.00	14.60	Radius too small
94.00	49.00	15.60	Radius too small
94.00	50.00	16.60	Radius too small
94.00	51.00	17.60	Radius too small
94.00	52.00	18.60	Radius too small
94.00	53.00	19.60	Radius too small
94.00	54.00	20.60	Radius too small
94.00	55.00	21.60	Radius too small
94.00	56.00	22.60	Radius too small
94.00	57.00	23.60	Radius too small
94.00	58.00	24.60	Radius too small
94.00	59.00	25.60	Radius too small
94.00	60.00	26.60	Radius too small
94.00	61.00	27.60	Radius too small
94.00	62.00	28.60	Radius too small
95.00	43.00	9.596	Radius too small
95.00	44.00	10.60	Radius too small
95.00	45.00	11.60	Radius too small
95.00	46.00	12.60	Radius too small
95.00	47.00	13.60	Radius too small
95.00	48.00	14.60	Radius too small
95.00	49.00	15.60	Radius too small
95.00	50.00	16.60	Radius too small
95.00	51.00	17.60	Radius too small
95.00	52.00	18.60	Radius too small
95.00	53.00	19.60	Radius too small
95.00	54.00	20.60	Radius too small

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Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No. C1157.10 | Sheet No. AA:RevA: 17 | Rev.

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Data Stability Max Minerial Cut Rev1.sld | Checked

95.00	55.00	21.60	Radius too small
95.00	56.00	22.60	Radius too small
95.00	57.00	23.60	Radius too small
95.00	58.00	24.60	Radius too small
95.00	59.00	25.60	Radius too small
95.00	60.00	26.60	Radius too small
95.00	61.00	27.60	Radius too small
95.00	62.00	28.60	Radius too small
96.00	43.00	9.596	Radius too small
96.00	44.00	10.60	Radius too small
96.00	45.00	11.60	Radius too small
96.00	46.00	12.60	Radius too small
96.00	47.00	13.60	Radius too small
96.00	48.00	14.60	Radius too small
96.00	49.00	15.60	Radius too small
96.00	50.00	16.60	Radius too small
96.00	51.00	17.60	Radius too small
96.00	52.00	18.60	Radius too small
96.00	53.00	19.60	Radius too small
96.00	54.00	20.60	Radius too small
96.00	55.00	21.60	Radius too small
96.00	56.00	22.60	Radius too small
96.00	57.00	23.60	Radius too small
96.00	58.00	24.60	Radius too small
96.00	59.00	25.60	Radius too small
96.00	60.00	26.60	Radius too small
96.00	61.00	27.60	Radius too small
96.00	62.00	28.60	Radius too small
97.00	43.00	9.596	Radius too small
97.00	44.00	10.60	Radius too small
97.00	45.00	11.60	Radius too small
97.00	46.00	12.60	Radius too small
97.00	47.00	13.60	Radius too small
97.00	48.00	14.60	Radius too small
97.00	49.00	15.60	Radius too small
97.00	50.00	16.60	Radius too small
97.00	51.00	17.60	Radius too small
97.00	52.00	18.60	Radius too small
97.00	53.00	19.60	Radius too small
97.00	54.00	20.60	Radius too small
97.00	55.00	21.60	Radius too small
97.00	56.00	22.60	Radius too small
97.00	57.00	23.60	Radius too small
97.00	58.00	24.60	Radius too small
97.00	59.00	25.60	Radius too small
97.00	60.00	26.60	Radius too small
97.00	61.00	27.60	Radius too small
97.00	62.00	28.60	Radius too small
98.00	43.00	9.596	Radius too small
98.00	44.00	10.60	Radius too small
98.00	45.00	11.60	Radius too small
98.00	46.00	12.60	Radius too small
98.00	47.00	13.60	Radius too small
98.00	48.00	14.60	Radius too small
98.00	49.00	15.60	Radius too small
98.00	50.00	16.60	Radius too small
98.00	51.00	17.60	Radius too small
98.00	52.00	18.60	Radius too small
98.00	53.00	19.60	Radius too small
98.00	54.00	20.60	Radius too small
98.00	55.00	21.60	Radius too small
98.00	56.00	22.60	Radius too small
98.00	57.00	23.60	Radius too small
98.00	58.00	24.60	Radius too small
98.00	59.00	25.60	Radius too small
98.00	60.00	26.60	Radius too small
98.00	61.00	27.60	Radius too small
98.00	62.00	28.60	Radius too small
99.00	43.00	9.596	Radius too small
99.00	44.00	10.60	Radius too small
99.00	45.00	11.60	Radius too small
99.00	46.00	12.60	Radius too small
99.00	47.00	13.60	Radius too small
99.00	48.00	14.60	Radius too small
99.00	49.00	15.60	Radius too small

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Slope Stability Analysis

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99.00	50.00	16.60	Radius too small
99.00	51.00	17.60	Radius too small
99.00	52.00	18.60	Radius too small
99.00	53.00	19.60	Radius too small
99.00	54.00	20.60	Radius too small
99.00	55.00	21.60	Radius too small
99.00	56.00	22.60	Radius too small
99.00	57.00	23.60	Radius too small
99.00	58.00	24.60	Radius too small
99.00	59.00	25.60	Radius too small
99.00	60.00	26.60	Radius too small
99.00	61.00	27.60	Radius too small
99.00	62.00	28.60	Radius too small

WORST CASE : WATER CASE 1 OF 1

Centre at (65.00,53.00)
Iterations: 8
Net vertical force [kN]: .0
Net horiz force [kN]: 22.41E-6
Inclination of interslice forces (°): 13.80
Radius 16.11m
Horiz acceleration [%g]: .0
Slip weight [kN] 323.2
Disturbing moment [kN m]: 1129.
Restoring moment [kN m]: 2217.

Factor of Safety: 1.964

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	54.76	40.56	-5.141	.0	.0	.0
2	55.45	40.02	.0	0.1953	0.7954	.0
3	56.56	39.28	7.175	1.364	5.554	2.574
4	57.73	38.62	13.39	3.416	13.91	8.962
5	58.94	38.07	18.60	5.899	24.02	17.29
6	60.20	37.62	17.73	8.202	33.40	15.72
7	60.70	37.47	6.779	8.642	35.19	2.298
8	60.90	37.42	2.319	8.664	35.28	0.2688
9	61.00	37.39	0.07843	8.637	35.17	307.6E-6
10	61.09	37.19	1.395	8.004	32.59	0.09732
11	62.79	37.04	2.196	6.664	27.14	0.2411
12	63.70	36.94	2.478	4.451	18.12	0.3070
13	64.00	36.92	2.457	3.890	15.84	0.3019
14	65.28	36.89	1.737	2.830	11.52	0.1509
15	66.56	36.96	.0	1.349	5.492	.0
16	67.00	37.01	-0.0332	0.7071	3.205	.0
17	68.12	37.19	-5.481	.0	22.41E-6	.0

Slice Strength Parameters / Pore Pressure / Slice Weight / Forces on base [kN]

Slice No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Normal	Shear
1	.0	0.4663	.0	1.937	1.863	0.8688
2	.0	0.4663	3.588	10.67	10.54	2.674
3	.0	0.4663	10.28	19.84	19.60	2.725
4	.0	0.4663	15.99	28.35	27.73	2.955
5	.0	0.4663	18.16	35.83	34.73	4.862
6	.0	0.5774	12.25	15.86	15.30	5.170
7	.0	0.5774	4.549	7.871	7.601	3.845
8	.0	0.5774	1.199	4.558	4.410	2.475
9	.0	0.5774	0.7368	42.95	41.94	23.83
10	.0	0.5774	1.795	47.74	47.51	26.48
11	.0	0.5774	2.337	51.64	52.55	29.11
12	.0	0.5774	2.468	10.90	11.27	6.075
13	.0	0.5774	2.097	17.85	18.81	9.310
14	.0	0.5774	0.8687	16.33	18.13	9.824
15	.0	0.5774	.0	4.897	5.678	3.278
16	.0	0.5774	.0	5.924	7.135	4.119

Slice no. / Surface Load [kPa] / Water Pressure on ground surface [kPa]

Slice no.	Surface Load Vert	Surface Load Horiz	Water Pressure Vert	Water Pressure Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0

7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0

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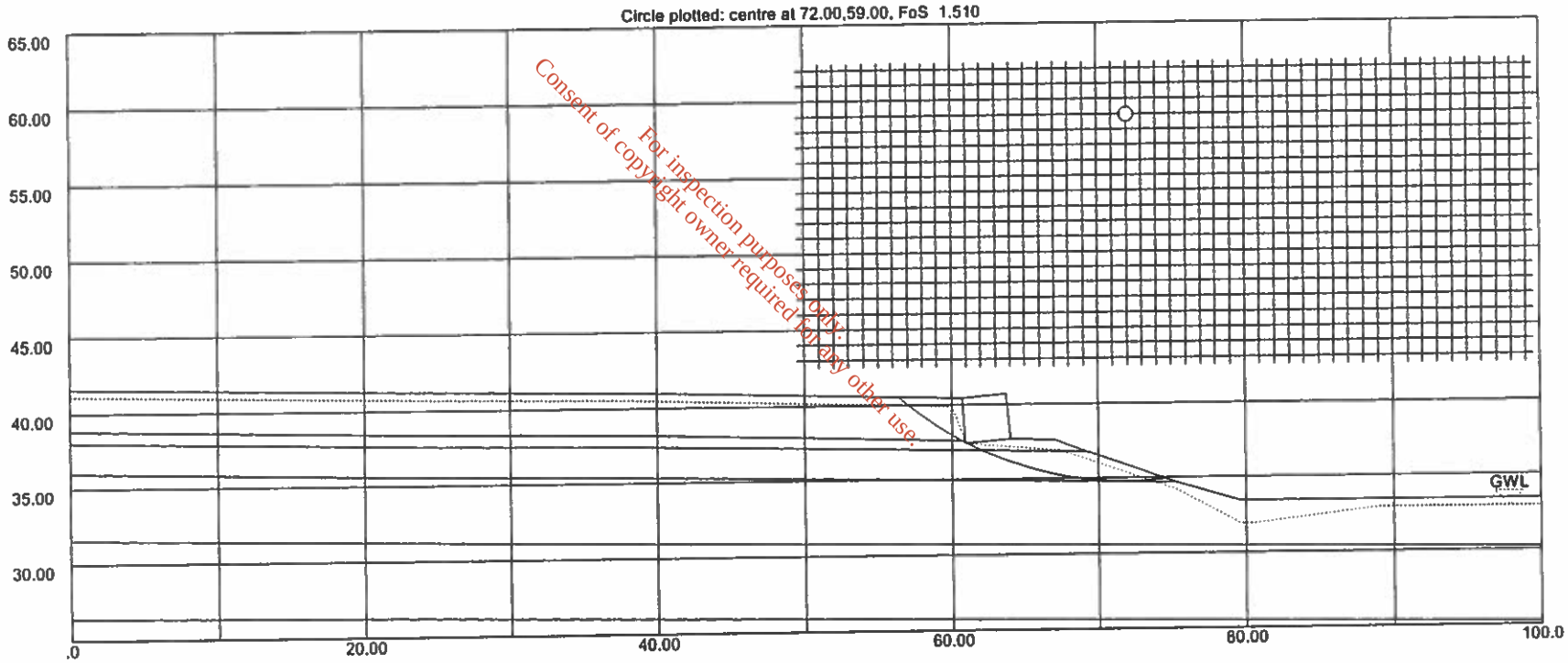
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Rev B : 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No2.sld	



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Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Run 8: 02	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No2.sld	

Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Sand / Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	Shear Strength Parameters c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	36.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.00	34.70	33.40
2	2	.	37.70	37.60	.	36.00	34.70	33.40
3	3	.	37.70	37.60	.	36.00	34.70	33.40
4	4	.	.	.	.	36.00	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	36.90	.	34.20	.

Stratum	Material	X --> 79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40
4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	7.820	826.1	15.96	106.5	1700.
50.00	44.00	8.820	889.6	14.72	137.8	2029.
50.00	45.00	9.819	948.8	13.84	171.7	2376.
50.00	46.00	10.82	1005.	13.18	207.9	2742.
50.00	47.00	11.82	1057.	12.68	246.5	3124.
50.00	48.00	12.82	1108.	12.27	287.2	3523.
50.00	49.00	13.82	1156.	12.88	328.6	4233.
50.00	50.00	14.82	1203.	16.20	362.6	5874.
50.00	51.00	15.82	1250.	19.65	385.4	7572.
50.00	52.00	16.82	1296.	23.29	401.5	9351.
50.00	53.00	17.82	1340.	27.31	410.8	11220.
50.00	54.00	18.82	1385.	32.55	405.7	13210.
50.00	55.00	19.82	1428.	37.82	402.4	15220.
50.00	56.00	20.82	1470.	40.22	403.1	16220.
50.00	57.00	21.82	1510.	39.85	432.4	17230.
50.00	58.00	22.82	1547.	38.24	477.5	18260.
50.00	59.00	23.82	1582.	35.87	538.5	19310.
50.00	60.00	24.82	1616.	33.26	612.8	20380.
50.00	61.00	25.82	1648.	30.71	699.1	21470.
50.00	62.00	26.82	1678.	28.02	799.5	22400.
51.00	43.00	7.839	825.5	15.92	106.9	1702.
51.00	44.00	8.838	888.7	14.69	138.2	2030.
51.00	45.00	9.838	947.7	13.82	172.0	2377.

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51.00	46.00	10.84	1003.	13.17	208.3	2742.
51.00	47.00	11.84	1056.	13.98	245.3	3428.
51.00	48.00	12.84		Not converged (increase iterations?)		
51.00	49.00	13.84	1158.	23.22	288.8	6706.
51.00	50.00	14.84	1207.	28.39	297.3	8440.
51.00	51.00	15.84	1256.	35.10	293.0	10280.
51.00	52.00	16.84	1304.	42.77	285.8	12220.
51.00	53.00	17.84	1350.	49.54	276.5	13700.
51.00	54.00	18.84	1394.	50.35	291.1	14650.
51.00	55.00	19.84	1435.	47.41	329.9	15640.
51.00	56.00	20.84	1473.	42.98	387.4	16650.
51.00	57.00	21.84	1508.	38.33	459.6	17620.
51.00	58.00	22.84	1542.	34.16	548.6	18740.
51.00	59.00	23.84	1574.	29.66	648.3	19230.
51.00	60.00	24.84	1605.	25.45	763.6	19430.
51.00	61.00	25.84	1635.	22.19	883.3	19600.
51.00	62.00	26.84	1663.	19.49	1011.	19710.
52.00	43.00	7.857	824.9	15.88	107.3	1704.
52.00	44.00	8.857	887.8	14.66	138.6	2032.
52.00	45.00	9.857	946.9	14.17	171.3	2427.
52.00	46.00	10.86	1004.	20.82	195.4	4067.
52.00	47.00	11.86	1059.	27.56	206.2	5681.
52.00	48.00	12.86	1113.	36.14	203.9	7369.
52.00	49.00	13.86	1166.	46.80	195.5	9150.
52.00	50.00	14.86	1217.	61.19	180.4	11040.
52.00	51.00	15.86	1267.	71.80	169.7	12180.
52.00	52.00	16.86	1312.	68.67	190.9	13110.
52.00	53.00	17.86	1354.	58.73	238.4	14000.
52.00	54.00	18.86	1393.	48.74	309.1	15060.
52.00	55.00	19.86	1430.	38.61	395.9	15280.
52.00	56.00	20.86	1464.	30.96	499.5	15470.
52.00	57.00	21.85	1497.	25.45	613.3	15610.
52.00	58.00	22.85	1529.	21.23	737.2	15650.
52.00	59.00	23.85	1559.	17.99	869.3	15640.
52.00	60.00	24.85	1587.	15.45	1008.	15570.
52.00	61.00	25.85	1615.	13.38	1154.	15440.
52.00	62.00	26.85	1642.	11.68	1305.	15240.
53.00	43.00	7.876	824.4	15.99	106.9	1709.
53.00	44.00	8.876	888.1	22.30	131.5	2932.
53.00	45.00	9.876	949.8	32.47	139.2	4522.
53.00	46.00	10.88	1010.	46.76	131.4	6144.
53.00	47.00	11.88	1068.	67.39	116.6	7856.
53.00	48.00	12.88	1124.	102.1	94.78	9682.
53.00	49.00	13.88	1177.	132.0	81.00	10690.
53.00	50.00	14.87	1226.	107.3	108.0	11590.
53.00	51.00	15.87	1269.	72.30	164.6	11900.
53.00	52.00	16.87	1309.	49.38	244.8	12090.
53.00	53.00	17.87	1346.	35.40	344.3	12190.
53.00	54.00	18.87	1382.	26.84	456.5	12250.
53.00	55.00	19.87	1416.	21.11	580.7	12260.
53.00	56.00	20.87	1447.	17.06	714.9	12200.
53.00	57.00	21.87	1478.	14.08	857.6	12070.
53.00	58.00	22.87	1507.	11.79	1007.	11880.
53.00	59.00	23.87	1535.	9.987	1163.	11620.
53.00	60.00	24.87	1562.	8.643	1325.	11450.
53.00	61.00	25.87	1588.	8.126	1489.	12100.
53.00	62.00	26.87	1614.	7.717	1653.	12750.
54.00	43.00	7.895	826.6	36.76	88.25	3244.
54.00	44.00	8.895	894.6	61.63	77.96	4804.
54.00	45.00	9.895	959.3	109.8	58.55	6408.
54.00	46.00	10.89	1023.	301.5	27.09	8168.
54.00	47.00	11.89	1080.	864.7	10.52	9100.
54.00	48.00	12.89	1132.	241.1	38.36	9251.
54.00	49.00	13.89	1178.	91.61	102.3	9369.
54.00	50.00	14.89	1220.	49.08	192.3	9439.
54.00	51.00	15.89	1259.	31.64	299.3	9470.
54.00	52.00	16.89	1295.	22.41	421.4	9438.
54.00	53.00	17.89	1330.	16.84	555.1	9341.
54.00	54.00	18.89	1362.	13.15	697.6	9175.
54.00	55.00	19.89	1393.	10.53	848.6	8940.
54.00	56.00	20.89	1422.	8.933	1006.	8984.
54.00	57.00	21.89	1450.	8.222	1165.	9582.
54.00	58.00	22.89	1478.	7.685	1326.	10190.
54.00	59.00	23.89	1505.	7.266	1489.	10820.
54.00	60.00	24.89	1532.	6.932	1652.	11450.
54.00	61.00	25.89	1558.	6.662	1816.	12100.
54.00	62.00	26.89	1583.	6.439	1982.	12760.
55.00	43.00	7.914	836.9	249.7	19.70	4918.
55.00	44.00	8.913		Disturbing moment < 0		
55.00	45.00	9.913		Disturbing moment < 0		
55.00	46.00	10.91		Disturbing moment < 0		
55.00	47.00	11.91	1081.	155.0	46.52	7211.
55.00	48.00	12.91	1125.	50.58	142.5	7207.
55.00	49.00	13.91	1166.	27.77	257.6	7154.
55.00	50.00	14.91	1203.	18.15	387.7	7035.
55.00	51.00	15.91	1238.	12.93	529.2	6841.
55.00	52.00	16.91	1271.	9.882	679.6	6717.
55.00	53.00	17.91	1303.	8.704	834.2	7262.
55.00	54.00	18.91	1333.	7.898	990.3	7821.
55.00	55.00	19.91	1364.	7.323	1147.	8401.
55.00	56.00	20.91	1393.	6.887	1305.	8990.
55.00	57.00	21.91	1421.	6.547	1465.	9593.
55.00	58.00	22.91	1449.	6.273	1626.	10200.
55.00	59.00	23.91	1474.	6.071	1787.	10850.
55.00	60.00	24.91	1501.	5.884	1950.	11470.
55.00	61.00	25.91	1527.	5.727	2114.	12110.
55.00	62.00	26.91	1551.	5.589	2281.	12750.
56.00	43.00	7.932		Disturbing moment < 0		
56.00	44.00	8.932		Disturbing moment < 0		
56.00	45.00	9.932		Disturbing moment < 0		
56.00	46.00	10.93	1023.	58.12	92.17	5357.
56.00	47.00	11.93	1066.	24.50	213.5	5229.
56.00	48.00	12.93	1105.	14.36	350.5	5034.
56.00	49.00	13.93	1142.	10.37	497.6	5160.
56.00	50.00	14.93	1176.	8.741	647.9	5663.
56.00	51.00	15.93	1210.	7.729	799.9	6182.
56.00	52.00	16.93	1241.	7.074	952.5	6739.
56.00	53.00	17.93	1272.	6.581	1107.	7287.
56.00	54.00	18.93	1303.	6.207	1263.	7839.
56.00	55.00	19.93	1333.	5.918	1420.	8402.
56.00	56.00	20.93	1362.	5.689	1578.	8979.
56.00	57.00	21.93	1390.	5.505	1738.	9567.
56.00	58.00	22.93	1418.	5.355	1899.	10170.
56.00	59.00	23.93	1445.	5.231	2060.	10780.
56.00	60.00	24.93	1471.	5.128	2224.	11400.
56.00	61.00	25.93	1497.	5.040	2388.	12040.
56.00	62.00	26.93	1521.	4.956	2557.	12670.
57.00	43.00	7.951		Disturbing moment < 0		
57.00	44.00	8.951	911.3	105.9	36.62	3878.
57.00	45.00	9.951	957.8	22.79	161.6	3682.
57.00	46.00	10.95	999.7	12.33	302.7	3734.
57.00	47.00	11.95	1038.	9.368	448.4	4200.
57.00	48.00	12.95	1075.	7.853	595.4	4675.

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EPA Export 08-07-2014:23:43:11

57.00	49.00	13.95	1111.	6.938	744.2	5163.
57.00	50.00	14.95	1146.	6.327	894.4	5658.
57.00	51.00	15.95	1180.	5.896	1046.	6167.
57.00	52.00	16.95	1212.	5.579	1199.	6691.
57.00	53.00	17.95	1244.	5.339	1354.	7228.
57.00	54.00	18.95	1274.	5.152	1510.	7777.
57.00	55.00	19.95	1304.	5.004	1667.	8340.
57.00	56.00	20.95	1332.	4.885	1825.	8915.
57.00	57.00	21.95	1360.	4.785	1986.	9501.
57.00	58.00	22.95	1388.	4.697	2149.	10100.
57.00	59.00	23.95	1414.	4.619	2316.	10700.
57.00	60.00	24.95	1439.	4.550	2486.	11310.
57.00	61.00	25.95	1464.	4.488	2658.	11930.
57.00	62.00	26.95	1488.	4.429	2835.	12550.
58.00	43.00	7.970	839.4	26.06	96.73	2520.
58.00	44.00	8.970	885.0	12.10	236.7	2863.
58.00	45.00	9.970	928.7	8.674	378.6	3284.
58.00	46.00	10.97	970.2	7.118	522.3	3717.
58.00	47.00	11.97	1010.	6.236	667.9	4165.
58.00	48.00	12.97	1047.	5.679	815.1	4629.
58.00	49.00	13.97	1083.	5.300	964.0	5109.
58.00	50.00	14.97	1118.	5.028	1114.	5603.
58.00	51.00	15.97	1151.	4.827	1266.	6112.
58.00	52.00	16.97	1183.	4.674	1419.	6634.
58.00	53.00	17.97	1214.	4.553	1575.	7169.
58.00	54.00	18.97	1244.	4.449	1734.	7713.
58.00	55.00	19.97	1273.	4.362	1896.	8272.
58.00	56.00	20.97	1301.	4.284	2062.	8835.
58.00	57.00	21.97	1328.	4.216	2231.	9407.
58.00	58.00	22.97	1354.	4.157	2403.	9988.
58.00	59.00	23.97	1378.	4.122	2577.	10620.
58.00	60.00	24.97	1403.	4.075	2754.	11220.
58.00	61.00	25.97	1427.	4.033	2933.	11830.
58.00	62.00	26.97	1451.	3.996	3115.	12450.
59.00	43.00	7.989	811.4	8.388	289.4	2428.
59.00	44.00	8.989	857.3	6.575	428.9	2820.
59.00	45.00	9.988	900.9	5.663	571.2	3235.
59.00	46.00	10.99	941.9	5.126	715.2	3666.
59.00	47.00	11.99	979.7	4.795	861.2	4130.
59.00	48.00	12.99	1017.	4.560	1008.	4598.
59.00	49.00	13.99	1053.	4.390	1157.	5080.
59.00	50.00	14.99	1087.	4.255	1310.	5574.
59.00	51.00	15.99	1120.	4.144	1467.	6078.
59.00	52.00	16.99	1151.	4.051	1627.	6592.
59.00	53.00	17.99	1181.	3.972	1792.	7115.
59.00	54.00	18.99	1209.	3.904	1959.	7649.
59.00	55.00	19.99	1237.	3.846	2130.	8191.
59.00	56.00	20.99	1264.	3.796	2303.	8743.
59.00	57.00	21.99	1291.	3.753	2479.	9304.
59.00	58.00	22.99	1316.	3.714	2658.	9873.
59.00	59.00	23.99	1341.	3.681	2839.	10450.
59.00	60.00	24.99	1365.	3.652	3023.	11040.
59.00	61.00	25.99	1388.	3.626	3208.	11630.
59.00	62.00	26.99	1411.	3.603	3396.	12230.
60.00	43.00	8.007	782.9	5.245	455.5	2389.
60.00	44.00	9.007	828.5	4.681	595.2	2786.
60.00	45.00	10.01	871.8	4.344	737.4	3203.
60.00	46.00	11.01	912.6	4.127	881.4	3637.
60.00	47.00	12.01	951.0	3.966	1030.	4085.
60.00	48.00	13.01	987.2	3.839	1183.	4544.
60.00	49.00	14.01	1021.	3.737	1341.	5011.
60.00	50.00	15.01	1054.	3.654	1503.	5491.
60.00	51.00	16.01	1086.	3.586	1668.	5980.
60.00	52.00	17.01	1116.	3.528	1837.	6482.
60.00	53.00	18.01	1145.	3.480	2009.	6992.
60.00	54.00	19.01	1173.	3.439	2184.	7512.
60.00	55.00	20.01	1200.	3.405	2362.	8041.
60.00	56.00	21.01	1226.	3.375	2542.	8579.
60.00	57.00	22.00	1251.	3.350	2726.	9125.
60.00	58.00	23.00	1276.	3.328	2909.	9680.
60.00	59.00	24.00	1300.	3.309	3096.	10240.
60.00	60.00	25.00	1323.	3.292	3285.	10810.
60.00	61.00	26.00	1346.	3.278	3476.	11390.
60.00	62.00	27.00	1368.	3.266	3668.	11980.
61.00	43.00	8.026	754.5	3.963	593.9	2354.
61.00	44.00	9.026	799.6	3.741	735.3	2751.
61.00	45.00	10.03	841.4	3.593	884.0	3176.
61.00	46.00	11.03	880.6	3.471	1037.	3601.
61.00	47.00	12.03	917.0	3.375	1195.	4034.
61.00	48.00	13.03	951.9	3.301	1356.	4481.
61.00	49.00	14.03	985.1	3.242	1524.	4940.
61.00	50.00	15.02	1017.	3.191	1694.	5405.
61.00	51.00	16.02	1047.	3.153	1867.	5885.
61.00	52.00	17.02	1076.	3.121	2043.	6374.
61.00	53.00	18.02	1105.	3.079	2221.	6838.
61.00	54.00	19.02	1132.	3.057	2402.	7344.
61.00	55.00	20.02	1158.	3.039	2586.	7858.
61.00	56.00	21.02	1183.	3.024	2772.	8381.
61.00	57.00	22.02	1208.	3.012	2960.	8913.
61.00	58.00	23.02	1232.	3.001	3150.	9453.
61.00	59.00	24.02	1255.	2.993	3341.	10000.
61.00	60.00	25.02	1278.	2.986	3535.	10560.
61.00	61.00	26.02	1300.	2.981	3731.	11120.
61.00	62.00	27.02	1321.	2.977	3928.	11690.
62.00	43.00	8.045	724.3	3.239	717.2	2323.
62.00	44.00	9.045	767.3	3.114	868.5	2705.
62.00	45.00	10.04	807.8	3.023	1026.	3102.
62.00	46.00	11.04	844.9	2.956	1188.	3510.
62.00	47.00	12.04	880.4	2.902	1355.	3932.
62.00	48.00	13.04	914.0	2.862	1525.	4365.
62.00	49.00	14.04	945.9	2.831	1699.	4809.
62.00	50.00	15.04	976.3	2.807	1875.	5264.
62.00	51.00	16.04	1005.	2.788	2054.	5729.
62.00	52.00	17.04	1033.	2.774	2236.	6204.
62.00	53.00	18.04	1060.	2.763	2421.	6688.
62.00	54.00	19.04	1087.	2.754	2607.	7181.
62.00	55.00	20.04	1112.	2.748	2796.	7683.
62.00	56.00	21.04	1136.	2.743	2987.	8195.
62.00	57.00	22.04	1160.	2.740	3180.	8715.
62.00	58.00	23.04	1183.	2.739	3375.	9243.
62.00	59.00	24.04	1206.	2.738	3572.	9780.
62.00	60.00	25.04	1228.	2.738	3770.	10320.
62.00	61.00	26.04	1249.	2.739	3970.	10880.
62.00	62.00	27.04	1270.	2.741	4172.	11440.
63.00	43.00	8.064	689.2	2.726	833.2	2272.
63.00	44.00	9.064	730.5	2.654	995.4	2642.
63.00	45.00	10.06	768.8	2.610	1160.	3028.
63.00	46.00	11.06	804.3	2.575	1330.	3424.
63.00	47.00	12.06	838.4	2.551	1503.	3834.
63.00	48.00	13.06	871.5	2.518	1679.	4229.
63.00	49.00	14.06	902.7	2.504	1861.	4660.
63.00	50.00	15.06	932.1	2.496	2044.	5100.
63.00	51.00	16.06	960.4	2.490	2229.	5550.
63.00	52.00	17.06	987.1	2.489	2414.	6008.

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EPA Export 08-07-2014:23:43:11

63.00	53.00	18.06	1013.	2.487	2604.	6477.
63.00	54.00	19.06	1039.	2.488	2796.	6955.
63.00	55.00	20.06	1063.	2.489	2990.	7443.
63.00	56.00	21.06	1087.	2.492	3186.	7938.
63.00	57.00	22.06	1110.	2.496	3383.	8442.
63.00	58.00	23.06	1133.	2.500	3582.	8955.
63.00	59.00	24.06	1155.	2.505	3782.	9475.
63.00	60.00	25.06	1176.	2.510	3984.	10000.
63.00	61.00	26.06	1197.	2.516	4188.	10540.
63.00	62.00	27.06	1218.	2.523	4392.	11080.
64.00	43.00	8.083	649.5	2.355	937.0	2207.
64.00	44.00	9.082	689.6	2.300	1107.	2546.
64.00	45.00	10.08	726.9	2.277	1280.	2916.
64.00	46.00	11.08	760.9	2.265	1456.	3297.
64.00	47.00	12.08	793.9	2.257	1636.	3692.
64.00	48.00	13.08	825.2	2.253	1819.	4098.
64.00	49.00	14.08	854.9	2.253	2005.	4515.
64.00	50.00	15.08	883.4	2.255	2193.	4943.
64.00	51.00	16.08	910.7	2.258	2383.	5381.
64.00	52.00	17.08	936.5	2.265	2572.	5827.
64.00	53.00	18.08	961.9	2.271	2767.	6284.
64.00	54.00	19.08	986.5	2.278	2963.	6750.
64.00	55.00	20.08	1010.	2.286	3160.	7225.
64.00	56.00	21.08	1033.	2.295	3359.	7708.
64.00	57.00	22.08	1056.	2.303	3560.	8200.
64.00	58.00	23.08	1078.	2.312	3762.	8700.
64.00	59.00	24.08	1100.	2.305	3966.	9141.
64.00	60.00	25.08	1121.	2.314	4171.	9652.
64.00	61.00	26.08	1142.	2.324	4377.	10170.
64.00	62.00	27.08	1162.	2.333	4584.	10700.
65.00	43.00	8.101	605.7	2.071	1022.	2117.
65.00	44.00	9.101	644.4	2.046	1198.	2451.
65.00	45.00	10.10	679.8	2.035	1379.	2807.
65.00	46.00	11.10	712.9	2.034	1561.	3175.
65.00	47.00	12.10	744.7	2.037	1747.	3559.
65.00	48.00	13.10	774.5	2.045	1933.	3954.
65.00	49.00	14.10	803.9	2.035	2123.	4321.
65.00	50.00	15.10	831.5	2.044	2315.	4732.
65.00	51.00	16.10	858.0	2.053	2509.	5153.
65.00	52.00	17.10	883.1	2.065	2703.	5581.
65.00	53.00	18.10	907.8	2.076	2900.	6021.
65.00	54.00	19.10	931.7	2.087	3099.	6469.
65.00	55.00	20.10	955.0	2.099	3300.	6927.
65.00	56.00	21.10	977.5	2.111	3502.	7392.
65.00	57.00	22.10	999.5	2.123	3705.	7866.
65.00	58.00	23.10	1021.	2.135	3910.	8348.
65.00	59.00	24.10	1042.	2.147	4116.	8838.
65.00	60.00	25.10	1062.	2.159	4323.	9336.
65.00	61.00	26.10	1082.	2.172	4532.	9841.
65.00	62.00	27.10	1102.	2.184	4741.	10350.
66.00	43.00	8.120	557.1	1.877	1083.	2033.
66.00	44.00	9.120	594.4	1.861	1264.	2353.
66.00	45.00	10.12	629.1	1.854	1449.	2686.
66.00	46.00	11.12	661.0	1.861	1637.	3047.
66.00	47.00	12.12	691.6	1.847	1827.	3373.
66.00	48.00	13.12	720.9	1.858	2018.	3749.
66.00	49.00	14.12	749.3	1.869	2213.	4138.
66.00	50.00	15.12	776.1	1.883	2409.	4536.
66.00	51.00	16.12	801.5	1.898	2605.	4945.
66.00	52.00	17.12	825.9	1.914	2802.	5361.
66.00	53.00	18.12	850.0	1.928	3002.	5789.
66.00	54.00	19.12	873.3	1.943	3204.	6228.
66.00	55.00	20.12	895.8	1.958	3407.	6673.
66.00	56.00	21.12	918.6	1.953	3612.	7055.
66.00	57.00	22.12	940.1	1.967	3818.	7510.
66.00	58.00	23.12	961.1	1.981	4025.	7974.
66.00	59.00	24.12	981.6	1.995	4233.	8446.
66.00	60.00	25.12	1002.	2.009	4442.	8925.
66.00	61.00	26.12	1021.	2.023	4652.	9412.
66.00	62.00	27.12	1040.	2.037	4864.	9906.
67.00	43.00	8.139	507.7	2.051	1131.	2321.
67.00	44.00	9.139	540.7	1.718	1299.	2233.
67.00	45.00	10.14	574.3	1.711	1488.	2547.
67.00	46.00	11.14	605.9	1.719	1679.	2886.
67.00	47.00	12.14	634.9	1.716	1874.	3215.
67.00	48.00	13.14	663.4	1.722	2069.	3563.
67.00	49.00	14.14	690.6	1.741	2265.	3944.
67.00	50.00	15.14	716.7	1.760	2464.	4337.
67.00	51.00	16.14	742.3	1.752	2664.	4667.
67.00	52.00	17.14	766.6	1.768	2865.	5066.
67.00	53.00	18.14	789.7	1.785	3065.	5472.
67.00	54.00	19.14	812.6	1.802	3269.	5890.
67.00	55.00	20.14	834.7	1.818	3474.	6316.
67.00	56.00	21.14	856.3	1.834	3680.	6751.
67.00	57.00	22.14	877.3	1.851	3888.	7195.
67.00	58.00	23.14	897.8	1.867	4096.	7647.
67.00	59.00	24.14	917.9	1.883	4306.	8107.
67.00	60.00	25.14	937.5	1.898	4517.	8574.
67.00	61.00	26.14	956.7	1.914	4728.	9050.
67.00	62.00	27.14	976.3	1.909	4941.	9430.
68.00	43.00	8.158	443.5	2.569	1088.	2796.
68.00	44.00	9.157	482.5	2.253	1293.	2912.
68.00	45.00	10.16	515.4	1.874	1489.	2789.
68.00	46.00	11.16	545.9	1.605	1682.	2700.
68.00	47.00	12.16	574.9	1.614	1878.	3032.
68.00	48.00	13.16	602.0	1.618	2076.	3359.
68.00	49.00	14.16	628.7	1.635	2275.	3720.
68.00	50.00	15.16	654.4	1.643	2475.	4068.
68.00	51.00	16.16	679.1	1.646	2677.	4406.
68.00	52.00	17.16	702.9	1.666	2880.	4798.
68.00	53.00	18.16	725.9	1.686	3084.	5201.
68.00	54.00	19.16	747.8	1.707	3287.	5612.
68.00	55.00	20.16	769.9	1.700	3494.	5940.
68.00	56.00	21.16	791.2	1.717	3701.	6354.
68.00	57.00	22.16	811.8	1.733	3910.	6777.
68.00	58.00	23.15	832.1	1.750	4119.	7209.
68.00	59.00	24.15	851.8	1.766	4330.	7648.
68.00	60.00	25.15	871.1	1.782	4541.	8095.
68.00	61.00	26.15	890.1	1.799	4754.	8550.
68.00	62.00	27.15	908.6	1.814	4967.	9012.
69.00	43.00	8.176		Not converged (increase iterations?)		
69.00	44.00	9.176		Not converged (increase iterations?)		
69.00	45.00	10.18	450.8	2.473	1425.	3523.
69.00	46.00	11.18	482.7	2.279	1635.	3726.
69.00	47.00	12.18	511.8	1.969	1838.	3620.
69.00	48.00	13.18	543.6	1.847	2079.	3839.
69.00	49.00	14.18	564.7	1.549	2238.	3468.
69.00	50.00	15.18	588.8	1.559	2438.	3802.
69.00	51.00	16.17	612.8	1.568	2641.	4141.
69.00	52.00	17.17	636.2	1.589	2846.	4523.
69.00	53.00	18.17	658.9	1.602	3051.	4898.
69.00	54.00	19.17	681.0	1.608	3257.	5238.

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EPA Export 08-07-2014:23:43:11

69.00	55.00	20.17	702.0	1.615	3462.	5591.
69.00	56.00	21.17	722.9	1.635	3671.	6000.
69.00	57.00	22.17	743.3	1.654	3880.	6418.
69.00	58.00	23.17	763.2	1.674	4090.	6846.
69.00	59.00	24.17	782.6	1.693	4301.	7282.
69.00	60.00	25.17	802.0	1.683	4513.	7596.
69.00	61.00	26.17	820.7	1.699	4726.	8029.
69.00	62.00	27.17	839.0	1.715	4940.	8470.
70.00	43.00	8.195	Not converged (increase iterations?)			
70.00	44.00	9.195	Not converged (increase iterations?)			
70.00	45.00	10.19	Not converged (increase iterations?)			
70.00	46.00	11.19	Not converged (increase iterations?)			
70.00	47.00	12.19	441.6	2.459	1719.	4226.
70.00	48.00	13.19	469.9	2.409	1935.	4660.
70.00	49.00	14.19	496.3	2.141	2144.	4591.
70.00	50.00	15.19	521.6	1.903	2351.	4475.
70.00	51.00	16.19	549.6	1.827	2601.	4751.
70.00	52.00	17.19	567.7	1.518	2760.	4189.
70.00	53.00	18.19	590.0	1.529	2966.	4536.
70.00	54.00	19.19	611.6	1.534	3173.	4867.
70.00	55.00	20.19	632.6	1.555	3381.	5258.
70.00	56.00	21.19	652.8	1.576	3587.	5654.
70.00	57.00	22.19	672.4	1.588	3793.	6024.
70.00	58.00	23.19	692.1	1.594	4004.	6381.
70.00	59.00	24.19	711.4	1.596	4215.	6725.
70.00	60.00	25.19	730.3	1.614	4427.	7146.
70.00	61.00	26.19	748.8	1.633	4640.	7576.
70.00	62.00	27.19	766.9	1.651	4854.	8014.
71.00	43.00	8.214	Weight too small			
71.00	43.00	8.214	213.1	1.765	432.5	763.4
71.00	44.00	9.214	Weight too small			
71.00	44.00	9.214	229.2	1.800	507.5	913.6
71.00	45.00	10.21	Not converged (increase iterations?)			
71.00	46.00	11.21	Not converged (increase iterations?)			
71.00	47.00	12.21	Not converged (increase iterations?)			
71.00	48.00	13.21	Not converged (increase iterations?)			
71.00	49.00	14.21	421.8	2.561	1959.	4977.
71.00	50.00	15.21	448.1	2.439	2180.	5318.
71.00	51.00	16.21	472.6	2.370	2396.	5680.
71.00	52.00	17.21	495.7	2.144	2609.	5595.
71.00	53.00	18.21	517.9	1.939	2819.	5466.
71.00	54.00	19.21	543.9	1.885	3076.	5799.
71.00	55.00	20.21	560.1	1.545	3233.	4995.
71.00	56.00	21.21	580.6	1.515	3442.	5214.
71.00	57.00	22.21	600.4	1.521	3652.	5556.
71.00	58.00	23.21	619.5	1.531	3861.	5912.
71.00	59.00	24.21	638.4	1.552	4072.	6318.
71.00	60.00	25.21	657.1	1.571	4284.	6732.
71.00	61.00	26.21	675.4	1.584	4497.	7124.
71.00	62.00	27.21	693.4	1.590	4711.	7492.
72.00	43.00	8.233	169.8	1.626	387.3	629.8
72.00	44.00	9.232	Weight too small			
72.00	44.00	9.232	185.7	1.647	463.4	763.1
72.00	45.00	10.23	Weight too small			
72.00	45.00	10.23	200.6	1.677	540.2	905.8
72.00	46.00	11.23	Weight too small			
72.00	46.00	11.23	214.6	1.711	617.1	1056.
72.00	47.00	12.23	50.81	10.71	453.2	4852.
72.00	47.00	12.23	228.2	1.747	695.2	1215.
72.00	48.00	13.23	309.8	4.861	1403.	6821.
72.00	49.00	14.23	Not converged (increase iterations?)			
72.00	50.00	15.23	Not converged (increase iterations?)			
72.00	51.00	16.23	393.7	2.701	2133.	5763.
72.00	52.00	17.23	418.6	2.526	2362.	5966.
72.00	53.00	18.23	442.0	2.465	2584.	6369.
72.00	54.00	19.23	463.7	2.432	2801.	6813.
72.00	55.00	20.23	485.2	2.235	3017.	6744.
72.00	56.00	21.23	505.7	2.046	3230.	6609.
72.00	57.00	22.23	525.5	1.872	3441.	6442.
72.00	58.00	23.23	544.6	1.709	3651.	6241.
72.00	59.00	24.23	563.5	1.510	3860.	5830.
72.00	60.00	25.23	581.8	1.518	4070.	6180.
72.00	61.00	26.23	600.0	1.522	4283.	6519.
72.00	62.00	27.23	617.8	1.533	4496.	6891.
73.00	43.00	8.251	123.9	1.606	305.4	490.4
73.00	44.00	9.251	139.3	1.588	381.3	605.4
73.00	45.00	10.25	Slip too small to split into minimum no. of slices			
73.00	46.00	11.25	Weight too small			
73.00	46.00	11.25	167.7	1.612	534.7	861.8
73.00	47.00	12.25	Weight too small			
73.00	47.00	12.25	181.1	1.637	612.9	1003.
73.00	48.00	13.25	Weight too small			
73.00	48.00	13.25	193.8	1.666	691.1	1151.
73.00	49.00	14.25	Weight too small			
73.00	49.00	14.25	206.1	1.697	770.5	1308.
73.00	50.00	15.25	281.4	5.364	1494.	8016.
73.00	51.00	16.25	309.2	5.097	1751.	8924.
73.00	52.00	17.25	335.5	4.406	1999.	8809.
73.00	53.00	18.25	359.5	3.899	2236.	8718.
73.00	54.00	19.25	Not converged (increase iterations?)			
73.00	55.00	20.25	405.7	2.595	2697.	6999.
73.00	56.00	21.25	426.8	2.515	2920.	7343.
73.00	57.00	22.25	447.2	2.533	3141.	7956.
73.00	58.00	23.25	467.3	2.390	3359.	8027.
73.00	59.00	24.25	486.5	2.211	3575.	7903.
73.00	60.00	25.25	505.2	2.041	3790.	7733.
73.00	61.00	26.25	523.2	1.882	4003.	7534.
73.00	62.00	27.25	540.5	1.730	4212.	7287.
74.00	43.00	8.270	78.31	1.742	198.1	345.1
74.00	44.00	9.270	91.37	1.687	260.4	439.4
74.00	45.00	10.27	105.1	1.641	333.0	546.4
74.00	46.00	11.27	118.8	1.614	409.7	661.1
74.00	47.00	12.27	Weight too small			
74.00	47.00	12.27	131.9	1.606	487.2	782.6
74.00	48.00	13.27	Weight too small			
74.00	48.00	13.27	144.4	1.615	564.7	911.9
74.00	49.00	14.27	Weight too small			
74.00	49.00	14.27	156.6	1.631	643.5	1049.
74.00	50.00	15.27	Weight too small			
74.00	50.00	15.27	168.3	1.653	722.3	1194.
74.00	51.00	16.27	Weight too small			
74.00	51.00	16.27	179.9	1.678	802.3	1346.

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EPA Export 08-07-2014:23:43:11

74.00	52.00	17.27	56.88	11.51	630.3	7254.
74.00	52.00	17.27	191.0	1.705	882.8	1505.
74.00	53.00	18.27	71.49	10.87	801.7	8713.
74.00	53.00	18.27	201.9	1.733	963.9	1671.
74.00	54.00	19.27	297.6	5.115	2016.	10310.
74.00	55.00	20.27	321.3	4.530	2260.	10240.
74.00	56.00	21.27	343.3	4.075	2496.	10170.
74.00	57.00	22.27	364.9	2.912	2730.	7949.
74.00	58.00	23.27	385.6	2.735	2959.	8092.
74.00	59.00	24.27	405.5	2.622	3185.	8351.
74.00	60.00	25.27	424.7	2.581	3408.	8798.
74.00	61.00	26.27	443.7	2.573	3630.	9341.
74.00	62.00	27.27	462.0	2.427	3849.	9342.
75.00	43.00	8.289		Weight too small		
75.00	44.00	9.289		Weight too small		
75.00	45.00	10.29	58.93	1.853	190.0	352.1
75.00	46.00	11.29	69.75	1.796	247.3	444.0
75.00	47.00	12.29	81.56	1.740	315.4	548.7
75.00	48.00	13.29	93.97	1.694	392.2	664.5
75.00	49.00	14.29		Weight too small		
75.00	49.00	14.29	106.0	1.669	470.0	784.2
75.00	50.00	15.29		Weight too small		
75.00	50.00	15.29	117.6	1.658	548.1	908.8
75.00	51.00	16.29		Weight too small		
75.00	51.00	16.29	129.0	1.660	627.2	1041.
75.00	52.00	17.29		Weight too small		
75.00	52.00	17.29	140.1	1.670	707.0	1181.
75.00	53.00	18.29		Weight too small		
75.00	53.00	18.29	150.8	1.687	786.8	1327.
75.00	54.00	19.29		Weight too small		
75.00	54.00	19.29	161.3	1.706	867.6	1480.
75.00	55.00	20.29	61.71	11.95	751.2	8974.
75.00	55.00	20.29	171.6	1.728	949.0	1640.
75.00	56.00	21.29		Not converged (increase iterations?)		
75.00	56.00	21.29	181.7	1.751	1031.	1806.
75.00	57.00	22.29	278.3	5.410	2195.	11870.
75.00	58.00	23.29	300.2	4.856	2439.	11840.
75.00	59.00	24.29	320.9	4.404	2677.	11790.
75.00	60.00	25.29	341.2	3.146	2912.	9164.
75.00	61.00	26.29	360.7	2.946	3145.	9264.
75.00	62.00	27.29	379.6	2.804	3373.	9457.
76.00	43.00	8.325		Weight too small		
76.00	44.00	9.322		Weight too small		
76.00	45.00	10.32		Weight too small		
76.00	46.00	11.32		Weight too small		
76.00	47.00	12.32		Weight too small		
76.00	48.00	13.31		Weight too small		
76.00	49.00	14.31	56.94	1.889	259.7	490.5
76.00	50.00	15.31	67.52	1.831	329.9	604.2
76.00	51.00	16.31		Weight too small		
76.00	51.00	16.31	78.69	1.784	407.9	727.6
76.00	52.00	17.31		Weight too small		
76.00	52.00	17.31	89.51	1.754	486.2	852.8
76.00	53.00	18.31		Weight too small		
76.00	53.00	18.31	100.2	1.733	565.6	980.5
76.00	54.00	19.31		Weight too small		
76.00	54.00	19.31	110.5	1.725	645.3	1113.
76.00	55.00	20.31		Weight too small		
76.00	55.00	20.31	120.6	1.727	724.9	1253.
76.00	56.00	21.31		Weight too small		
76.00	56.00	21.31	130.5	1.736	805.2	1394.
76.00	57.00	22.31	52.10	13.23	683.6	9042.
76.00	57.00	22.31	140.2	1.749	886.5	1550.
76.00	58.00	23.31	63.50	12.58	840.2	10570.
76.00	58.00	23.31	149.8	1.765	968.3	1709.
76.00	59.00	24.31	75.07	11.10	1001.	11110.
76.00	59.00	24.31	159.1	1.784	1050.	1873.
76.00	60.00	25.31	86.62	9.984	1161.	11620.
76.00	60.00	25.31	168.3	1.804	1133.	2043.
76.00	61.00	26.31	274.8	5.352	2539.	13590.
76.00	62.00	27.30	294.5	4.876	2780.	13560.
77.00	43.00	8.468		Weight too small		
77.00	44.00	9.450		Weight too small		
77.00	45.00	10.44		Weight too small		
77.00	46.00	11.42		Weight too small		
77.00	47.00	12.41		Weight too small		
77.00	48.00	13.40		Weight too small		
77.00	49.00	14.40		Weight too small		
77.00	50.00	15.39		Weight too small		
77.00	51.00	16.38		Weight too small		
77.00	52.00	17.38		Weight too small		
77.00	53.00	18.37		Weight too small		
77.00	53.00	18.37	57.14	1.897	337.8	640.6
77.00	54.00	19.37		Weight too small		
77.00	54.00	19.37	67.04	1.861	415.6	773.7
77.00	55.00	20.37		Weight too small		
77.00	55.00	20.37	76.77	1.833	494.3	905.8
77.00	56.00	21.36		Weight too small		
77.00	56.00	21.36	86.25	1.812	572.9	1038.
77.00	57.00	22.36		Weight too small		
77.00	57.00	22.36	95.66	1.794	652.8	1171.
77.00	58.00	23.36		Weight too small		
77.00	58.00	23.36	104.9	1.787	732.9	1310.
77.00	59.00	24.36		Weight too small		
77.00	59.00	24.36	113.8	1.790	812.2	1454.
77.00	60.00	25.35	54.24	13.78	768.8	10600.
77.00	60.00	25.35	122.7	1.797	893.3	1605.
77.00	61.00	26.35	64.54	12.75	921.4	11750.
77.00	61.00	26.35	131.4	1.807	974.8	1762.
77.00	62.00	27.35	74.93	11.38	1077.	12260.
77.00	62.00	27.35	140.0	1.820	1056.	1922.
78.00	43.00	8.722		Radius too small		
78.00	44.00	9.680		Weight too small		
78.00	45.00	10.64		Weight too small		
78.00	46.00	11.61		Weight too small		
78.00	47.00	12.59		Weight too small		
78.00	48.00	13.57		Weight too small		
78.00	49.00	14.55		Weight too small		
78.00	50.00	15.53		Weight too small		
78.00	51.00	16.52		Weight too small		
78.00	52.00	17.51		Weight too small		
78.00	53.00	18.49		Weight too small		
78.00	54.00	19.48		Weight too small		
78.00	55.00	20.47		Weight too small		
78.00	55.00	20.47		Weight too small		
78.00	56.00	21.47		Weight too small		
78.00	56.00	21.47		Weight too small		
78.00	57.00	22.46		Weight too small		
78.00	57.00	22.46	58.67	1.901	423.5	805.1
78.00	58.00	23.45		Weight too small		
78.00	58.00	23.45	67.39	1.892	501.9	949.8
78.00	59.00	24.45		Weight too small		
78.00	59.00	24.45	76.00	1.877	580.9	1090.

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EPA Export 08-07-2014:23:43:11

78.00	60.00	25.44	Weight too small		
78.00	60.00	25.44	84.44	1.859	660.0	1227.
78.00	61.00	26.43	Weight too small		
78.00	61.00	26.43	92.78	1.845	739.7	1365.
78.00	62.00	27.43	Weight too small		
78.00	62.00	27.43	101.0	1.841	819.6	1509.
79.00	43.00	9.012	Radius too small		
79.00	44.00	9.969	Radius too small		
79.00	45.00	10.93	Radius too small		
79.00	46.00	11.88	Radius too small		
79.00	47.00	12.84	Weight too small		
79.00	48.00	13.80	Weight too small		
79.00	49.00	14.77	Weight too small		
79.00	50.00	15.74	Weight too small		
79.00	51.00	16.71	Weight too small		
79.00	52.00	17.69	Weight too small		
79.00	53.00	18.67	Weight too small		
79.00	54.00	19.65	Weight too small		
79.00	55.00	20.63	Weight too small		
79.00	56.00	21.61	Weight too small		
79.00	57.00	22.60	Weight too small		
79.00	57.00	22.60	Weight too small		
79.00	58.00	23.59	Weight too small		
79.00	58.00	23.59	Weight too small		
79.00	59.00	24.58	Weight too small		
79.00	59.00	24.58	Weight too small		
79.00	60.00	25.57	Weight too small		
79.00	60.00	25.57	52.31	1.891	431.0	815.2
79.00	61.00	26.55	Weight too small		
79.00	61.00	26.55	60.23	1.913	509.5	974.9
79.00	62.00	27.55	Weight too small		
79.00	62.00	27.55	68.06	1.923	588.4	1132.
80.00	43.00	9.301	Radius too small		
80.00	44.00	10.26	Radius too small		
80.00	45.00	11.22	Radius too small		
80.00	46.00	12.17	Radius too small		
80.00	47.00	13.13	Radius too small		
80.00	48.00	14.09	Radius too small		
80.00	49.00	15.04	Radius too small		
80.00	50.00	16.00	Weight too small		
80.00	51.00	16.96	Weight too small		
80.00	52.00	17.92	Weight too small		
80.00	53.00	18.89	Weight too small		
80.00	54.00	19.86	Weight too small		
80.00	55.00	20.83	Weight too small		
80.00	56.00	21.81	Weight too small		
80.00	57.00	22.79	Weight too small		
80.00	58.00	23.77	Weight too small		
80.00	59.00	24.75	Weight too small		
80.00	59.00	24.75	Weight too small		
80.00	60.00	25.73	Weight too small		
80.00	60.00	25.73	Weight too small		
80.00	61.00	26.71	Weight too small		
80.00	61.00	26.71	Weight too small		
80.00	62.00	27.70	Weight too small		
80.00	62.00	27.70	Weight too small		
81.00	43.00	9.590	Radius too small		
81.00	44.00	10.55	Radius too small		
81.00	45.00	11.50	Radius too small		
81.00	46.00	12.46	Radius too small		
81.00	47.00	13.42	Radius too small		
81.00	48.00	14.38	Radius too small		
81.00	49.00	15.33	Radius too small		
81.00	50.00	16.29	Radius too small		
81.00	51.00	17.25	Radius too small		
81.00	52.00	18.21	Radius too small		
81.00	53.00	19.16	Weight too small		
81.00	54.00	20.12	Weight too small		
81.00	55.00	21.08	Weight too small		
81.00	56.00	22.05	Weight too small		
81.00	57.00	23.01	Weight too small		
81.00	58.00	23.98	Weight too small		
81.00	59.00	24.96	Weight too small		
81.00	60.00	25.93	Slip too small to split into minimum no. of slices		
81.00	61.00	26.91	Weight too small		
81.00	61.00	26.91	Weight too small		
81.00	62.00	27.88	Weight too small		
81.00	62.00	27.88	Weight too small		
82.00	43.00	9.596	Radius too small		
82.00	44.00	10.60	Radius too small		
82.00	45.00	11.60	Radius too small		
82.00	46.00	12.60	Radius too small		
82.00	47.00	13.60	Radius too small		
82.00	48.00	14.60	Radius too small		
82.00	49.00	15.60	Radius too small		
82.00	50.00	16.58	Radius too small		
82.00	51.00	17.54	Radius too small		
82.00	52.00	18.49	Radius too small		
82.00	53.00	19.45	Radius too small		
82.00	54.00	20.41	Radius too small		
82.00	55.00	21.37	Radius too small		
82.00	56.00	22.32	Weight too small		
82.00	57.00	23.28	Weight too small		
82.00	58.00	24.24	Weight too small		
82.00	59.00	25.20	Weight too small		
82.00	60.00	26.17	Weight too small		
82.00	61.00	27.14	Weight too small		
82.00	62.00	28.11	Slip too small to split into minimum no. of slices		
83.00	43.00	9.596	Radius too small		
83.00	44.00	10.60	Radius too small		
83.00	45.00	11.60	Radius too small		
83.00	46.00	12.60	Radius too small		
83.00	47.00	13.60	Radius too small		
83.00	48.00	14.60	Radius too small		
83.00	49.00	15.60	Radius too small		
83.00	50.00	16.60	Radius too small		
83.00	51.00	17.60	Radius too small		
83.00	52.00	18.60	Radius too small		
83.00	53.00	19.74	Fos > 1000		
83.00	54.00	20.70	Disturbing moment < 0		
83.00	55.00	21.66	Fos > 1000		
83.00	56.00	22.61	Disturbing moment < 0		
83.00	57.00	23.57	Radius too small		
83.00	58.00	24.53	Radius too small		
83.00	59.00	25.48	Weight too small		
83.00	60.00	26.44	Weight too small		
83.00	61.00	27.40	Weight too small		
83.00	62.00	28.36	Weight too small		
84.00	43.00	9.596	Radius too small		
84.00	44.00	10.60	Radius too small		
84.00	45.00	11.60	Radius too small		
84.00	46.00	12.60	Radius too small		

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84.00	47.00	13.60	Radius too small
84.00	48.00	14.60	Radius too small
84.00	49.00	15.60	Radius too small
84.00	50.00	16.60	Radius too small
84.00	51.00	17.60	Radius too small
84.00	52.00	18.60	Radius too small
84.00	53.00	19.60	Radius too small
84.00	54.00	20.60	Radius too small
84.00	55.00	21.60	Radius too small
84.00	56.00	22.90	FoS > 1000
84.00	57.00	23.86	FoS > 1000
84.00	58.00	24.82	Disturbing moment < 0
84.00	59.00	25.77	Disturbing moment < 0
84.00	60.00	26.73	FoS > 1000
84.00	61.00	27.69	Disturbing moment < 0
84.00	62.00	28.65	Weight too small
84.00	62.00	28.65	Disturbing moment < 0
85.00	43.00	9.596	Radius too small
85.00	44.00	10.60	Radius too small
85.00	45.00	11.60	Radius too small
85.00	46.00	12.60	Radius too small
85.00	47.00	13.60	Radius too small
85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	FoS > 1000
86.00	43.00	9.596	Radius too small
86.00	44.00	10.60	Radius too small
86.00	45.00	11.60	Radius too small
86.00	46.00	12.60	Radius too small
86.00	47.00	13.60	Radius too small
86.00	48.00	14.60	Radius too small
86.00	49.00	15.60	Radius too small
86.00	50.00	16.60	Radius too small
86.00	51.00	17.60	Radius too small
86.00	52.00	18.60	Radius too small
86.00	53.00	19.60	Radius too small
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86.00	55.00	21.60	Radius too small
86.00	56.00	22.60	Radius too small
86.00	57.00	23.60	Radius too small
86.00	58.00	24.60	Radius too small
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86.00	61.00	27.60	Radius too small
86.00	62.00	28.60	Radius too small
87.00	43.00	9.596	Radius too small
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88.00	51.00	17.60	Radius too small
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88.00	56.00	22.60	Radius too small
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88.00	62.00	28.60	Radius too small
89.00	43.00	9.596	Radius too small
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WORST CASE : WATER CASE 1 OF 1

Centre at (72.00,59.00)
Iterations: 10
Net vertical force [kN]: .0
Net horiz force [kN]: 63.90E-6
Inclination of interslice forces [°]: 16.41

Radius 24.23m
Horiz acceleration (kg): .0
Slip weight [kN] 563.5
Disturbing moment [kN m]: 3860.
Restoring moment [kN m]: 5830.

Factor of Safety: 1.510

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	56.33	40.52	-5.154	.0	.0	.0
2	56.99	39.98	-38.15E-6	0.1979	0.6716	.0
3	58.46	38.91	10.32	2.515	8.541	5.329
4	60.00	37.95	19.50	7.220	24.52	19.00
5	60.62	37.61	7.350	9.054	30.75	2.701
6	60.70	37.57	5.835	9.196	31.23	1.702
7	60.90	37.46	1.877	9.536	32.39	0.1762
8	60.99	37.41	38.15E-6	9.679	32.87	.0
9	61.00	37.41	-0.1104	9.564	32.48	.0
10	61.02	37.40	-0.03235	9.191	31.21	.0
11	61.03	37.40	.0	9.202	31.25	.0
12	61.98	36.94	3.842	10.57	35.88	0.7380
13	62.83	36.57	6.851	11.16	37.89	2.347
14	63.70	36.24	9.519	11.40	38.71	4.531
15	64.00	36.13	10.36	11.49	39.01	5.362
16	65.49	35.66	13.86	12.24	41.57	9.602
17	67.00	35.29	16.37	12.01	40.80	13.40
18	67.37	35.22	16.83	11.77	39.98	14.17
19	68.28	35.06	15.32	10.90	37.03	11.74
20	69.20	34.93	13.44	9.603	32.61	9.037
21	70.63	34.81	9.819	6.932	23.54	4.821
22	72.06	34.77	5.333	3.872	13.15	1.422
23	73.49	34.82	.0	1.061	3.609	.0
24	74.67	34.92	-5.024	.0	63.90E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.4663	.0	1.850	1.704	0.7945
2	.0	0.4663	5.162	16.68	16.24	3.197
3	.0	0.4663	14.91	34.14	33.43	2.947
4	.0	0.4663	13.42	18.04	17.20	3.566
5	.0	0.5774	6.592	2.391	2.213	0.9465
6	.0	0.5774	3.856	7.622	6.991	3.534
7	.0	0.5774	0.9386	4.251	3.877	2.181
8	100.0	1.000	19.07E-6	0.2510	0.1494	0.7719
9	100.0	1.000	.0	0.8224	0.4908	2.525
10	.0	0.5774	.0	0.3424	0.3119	0.1801
11	.0	0.5774	1.921	48.25	44.26	24.38
12	.0	0.6494	5.346	50.98	47.07	27.34

EPA Export 08-07-2014:23:43:11

13	.0	0.6494	8.185	58.90	55.01	30.78
14	.0	0.6494	9.937	15.15	14.28	7.219
15	.0	0.6494	12.11	49.09	46.88	18.20
16	.0	0.6494	15.12	60.61	58.91	22.96
17	.0	0.6494	16.60	15.76	15.52	6.008
18	.0	0.6494	16.08	37.06	36.85	14.26
19	.0	0.6494	14.38	34.24	34.62	13.83
20	.0	0.6494	11.63	45.65	47.36	19.93
21	.0	0.6494	7.576	34.62	37.38	17.23
22	.0	0.6494	2.666	21.11	24.22	13.25
23	.0	0.6494	.0	5.670	7.018	4.557

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0
22	.0	.0	.0	.0
23	.0	.0	.0	.0

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ARUP

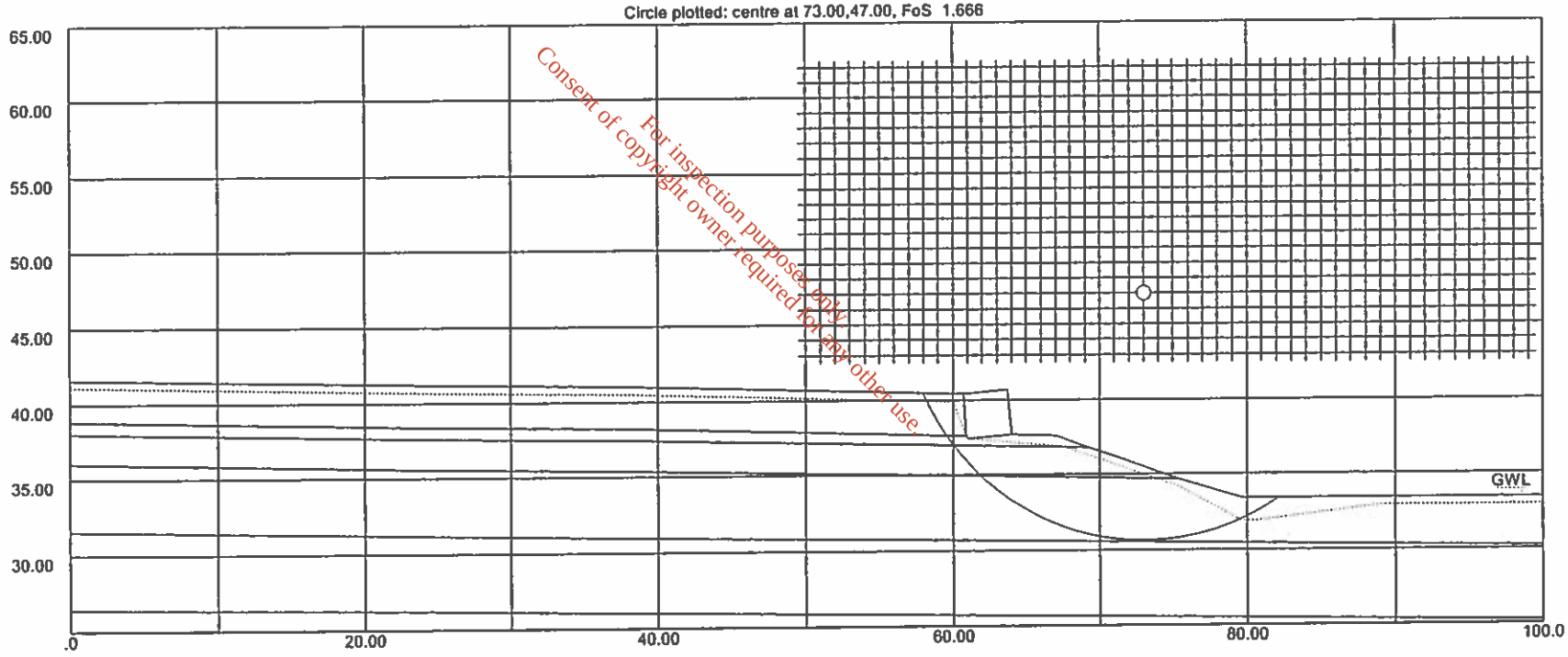
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	A1:Run 9:01.	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No3.sid	



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Notes

Maximum Mineral Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Sand / Non Intact Rock Surface

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight (kN) : 50
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]	Shear Strength Parameters	Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	36.90	.	34.20	31.90

Stratum	Material	X --> 80.60	89.00	100.0
1	1	.	.	33.40
2	2	.	.	33.40
3	3	.	.	33.40

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4	4	.	.	33.40
5	5	.	.	33.40
6	6	.	.	30.20
7	7	.	.	25.20
GWL1	-	31.90	32.90	32.90

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	12.15	2798.	38.98	410.8	16020.
50.00	44.00	13.15	2951.	47.49	391.1	18570.
50.00	45.00	14.15	3100.	57.53	361.1	20770.
50.00	46.00	15.15	3240.	55.50	385.8	21410.
50.00	47.00	16.15	3364.	38.95	549.2	21400.
50.00	48.00	17.15	3476.	26.12	816.6	21330.
50.00	49.00	18.15	3580.	19.22	1147.	22050.
50.00	50.00	19.15	3683.	15.91	1493.	23760.
50.00	51.00	20.15	3776.	13.86	1841.	25500.
50.00	52.00	21.15	3872.	12.43	2195.	27290.
50.00	53.00	22.15	3965.	11.40	2553.	29110.
50.00	54.00	23.15	4054.	10.63	2915.	30980.
50.00	55.00	24.15	4141.	10.03	3280.	32890.
50.00	56.00	25.15	4226.	9.549	3649.	34840.
50.00	57.00	26.15	4303.	9.154	4025.	36850.
50.00	58.00	27.15	4384.	8.798	4416.	38850.
50.00	59.00	28.15	4463.	8.488	4816.	40880.
50.00	60.00	29.15	4543.	8.216	5229.	42960.
50.00	61.00	30.15	4618.	7.968	5654.	45050.
50.00	62.00	31.15	4691.	7.744	6090.	47160.
51.00	43.00	12.16	2808.	62.92	267.4	16820.
51.00	44.00	13.16	2962.	86.07	219.4	18890.
51.00	45.00	14.16		Disturbing moment < 0		
51.00	46.00	15.16	3226.	32.88	551.5	18130.
51.00	47.00	16.16	3339.	21.30	870.7	18720.
51.00	48.00	17.16	3448.	16.61	1224.	20320.
51.00	49.00	18.16	3552.	13.99	1570.	21960.
51.00	50.00	19.16	3652.	12.33	1919.	23650.
51.00	51.00	20.16	3743.	11.19	2269.	25400.
51.00	52.00	21.16	3836.	10.35	2626.	27190.
51.00	53.00	22.16	3928.	9.708	2989.	29020.
51.00	54.00	23.16	4018.	9.200	3357.	30890.
51.00	55.00	24.16	4105.	8.769	3738.	32780.
51.00	56.00	25.16	4190.	8.403	4130.	34710.
51.00	57.00	26.16	4272.	8.093	4535.	36660.
51.00	58.00	27.16	4346.	7.810	4951.	38670.
51.00	59.00	28.16	4424.	7.558	5382.	40680.
51.00	60.00	29.16	4499.	7.334	5823.	42710.
51.00	61.00	30.16	4572.	7.134	6275.	44760.
51.00	62.00	31.16	4643.	6.954	6736.	46840.
52.00	43.00	12.18	2821.	125.9	120.5	16170.
52.00	44.00	13.18	2962.	53.15	291.1	15470.
52.00	45.00	14.18	3082.	26.49	588.2	15580.
52.00	46.00	15.18	3199.	18.44	925.1	17060.
52.00	47.00	16.18	3310.	14.66	1268.	18590.
52.00	48.00	17.18	3411.	12.57	1607.	20200.
52.00	49.00	18.18	3513.	11.16	1958.	21850.
52.00	50.00	19.18	3615.	10.17	2319.	23570.
52.00	51.00	20.17	3711.	9.453	2677.	25300.
52.00	52.00	21.17	3804.	8.899	3044.	27090.

EPA Export 08-07-2014:23:43:11

52.00	53.00	22.17	3895.	8.443	3423.	28900.
52.00	54.00	23.17	3982.	8.057	3815.	30740.
52.00	55.00	24.17	4067.	7.721	4223.	32600.
52.00	56.00	25.17	4149.	7.426	4646.	34500.
52.00	57.00	26.17	4230.	7.169	5081.	36430.
52.00	58.00	27.17	4302.	6.951	5527.	38420.
52.00	59.00	28.17	4377.	6.751	5984.	40400.
52.00	60.00	29.17	4450.	6.573	6451.	42400.
52.00	61.00	30.17	4522.	6.414	6927.	44430.
52.00	62.00	31.17	4592.	6.272	7414.	46490.
53.00	43.00	12.19	2809.	42.81	297.7	12740.
53.00	44.00	13.19	2934.	22.44	624.6	14010.
53.00	45.00	14.19	3053.	16.40	941.3	15430.
53.00	46.00	15.19	3164.	13.23	1280.	16940.
53.00	47.00	16.19	3274.	11.37	1627.	18500.
53.00	48.00	17.19	3381.	10.16	1984.	20110.
53.00	49.00	18.19	3484.	9.328	2333.	21760.
53.00	50.00	19.19	3580.	8.702	2694.	23440.
53.00	51.00	20.19	3676.	8.189	3073.	25160.
53.00	52.00	21.19	3769.	7.752	3473.	26920.
53.00	53.00	22.19	3858.	7.386	3887.	28710.
53.00	54.00	23.19	3943.	7.077	4314.	30530.
53.00	55.00	24.19	4025.	6.813	4752.	32370.
53.00	56.00	25.19	4104.	6.585	5200.	34240.
53.00	57.00	26.19	4180.	6.385	5660.	36140.
53.00	58.00	27.19	4256.	6.210	6130.	38060.
53.00	59.00	28.19	4325.	6.059	6612.	40060.
53.00	60.00	29.19	4398.	5.919	7105.	42050.
53.00	61.00	30.19	4469.	5.793	7607.	44060.
53.00	62.00	31.19	4538.	5.680	8117.	46100.
54.00	43.00	12.20	2780.	19.85	629.0	12490.
54.00	44.00	13.20	2901.	14.47	950.8	13880.
54.00	45.00	14.20	3018.	11.96	1282.	15320.
54.00	46.00	15.20	3132.	10.39	1620.	16830.
54.00	47.00	16.20	3243.	9.368	1964.	18400.
54.00	48.00	17.20	3348.	8.603	2324.	20000.
54.00	49.00	18.20	3449.	8.001	2703.	21630.
54.00	50.00	19.20	3545.	7.503	3103.	23280.
54.00	51.00	20.20	3637.	7.109	3513.	24980.
54.00	52.00	21.20	3725.	6.783	3936.	26700.
54.00	53.00	22.20	3811.	6.501	4378.	28460.
54.00	54.00	23.20	3889.	6.265	4833.	30280.
54.00	55.00	24.20	3971.	6.058	5301.	32110.
54.00	56.00	25.20	4050.	5.879	5778.	33970.
54.00	57.00	26.20	4127.	5.723	6265.	35850.
54.00	58.00	27.20	4201.	5.585	6762.	37760.
54.00	59.00	28.20	4272.	5.463	7267.	39700.
54.00	60.00	29.20	4342.	5.354	7780.	41650.
54.00	61.00	30.20	4410.	5.256	8302.	43640.
54.00	62.00	31.20	4478.	5.167	8834.	45650.
55.00	43.00	12.21	2747.	13.21	935.4	12360.
55.00	44.00	13.21	2872.	10.90	1263.	13770.
55.00	45.00	14.21	2987.	9.580	1589.	15230.
55.00	46.00	15.21	3101.	8.630	1938.	16730.
55.00	47.00	16.21	3209.	7.918	2307.	18270.
55.00	48.00	17.21	3311.	7.353	2698.	19840.
55.00	49.00	18.21	3408.	6.906	3104.	21440.
55.00	50.00	19.21	3498.	6.540	3532.	23100.
55.00	51.00	20.21	3589.	6.228	3979.	24780.
55.00	52.00	21.21	3676.	5.971	4437.	26490.
55.00	53.00	22.21	3761.	5.759	4902.	28230.
55.00	54.00	23.21	3840.	5.579	5375.	29990.
55.00	55.00	24.21	3919.	5.419	5866.	31790.
55.00	56.00	25.21	3996.	5.280	6367.	33610.
55.00	57.00	26.21	4071.	5.155	6882.	35480.
55.00	58.00	27.21	4144.	5.046	7403.	37360.
55.00	59.00	28.21	4215.	4.950	7934.	39270.
55.00	60.00	29.21	4284.	4.864	8472.	41210.
55.00	61.00	30.21	4351.	4.787	9018.	43170.
55.00	62.00	31.21	4417.	4.717	9571.	45150.
56.00	43.00	12.23	2717.	10.09	1216.	12270.
56.00	44.00	13.23	2839.	8.777	1558.	13670.
56.00	45.00	14.23	2957.	7.935	1905.	15110.
56.00	46.00	15.23	3062.	7.277	2282.	16600.
56.00	47.00	16.23	3166.	6.749	2685.	18120.

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56.00	48.00	17.23	3265.	6.334	3106.	19670.
56.00	49.00	18.23	3359.	6.002	3540.	21240.
56.00	50.00	19.23	3452.	5.729	3992.	22870.
56.00	51.00	20.23	3540.	5.499	4459.	24520.
56.00	52.00	21.23	3626.	5.305	4940.	26210.
56.00	53.00	22.23	3707.	5.134	5435.	27910.
56.00	54.00	23.23	3787.	4.990	5941.	29650.
56.00	55.00	24.23	3864.	4.869	6454.	31420.
56.00	56.00	25.23	3939.	4.763	6975.	33220.
56.00	57.00	26.23	4012.	4.668	7508.	35050.
56.00	58.00	27.23	4083.	4.584	8051.	36900.
56.00	59.00	28.23	4152.	4.508	8605.	38790.
56.00	60.00	29.23	4220.	4.440	9167.	40700.
56.00	61.00	30.23	4287.	4.379	9735.	42630.
56.00	62.00	31.23	4351.	4.325	10310.	44580.
57.00	43.00	12.24	2682.	8.146	1495.	12180.
57.00	44.00	13.24	2802.	7.274	1864.	13560.
57.00	45.00	14.24	2914.	6.636	2257.	14980.
57.00	46.00	15.24	3019.	6.187	2655.	16430.
57.00	47.00	16.24	3121.	5.810	3085.	17920.
57.00	48.00	17.24	3218.	5.510	3528.	19440.
57.00	49.00	18.24	3311.	5.263	3991.	21000.
57.00	50.00	19.24	3401.	5.057	4469.	22600.
57.00	51.00	20.24	3487.	4.884	4960.	24220.
57.00	52.00	21.24	3570.	4.737	5464.	25880.
57.00	53.00	22.24	3649.	4.611	5976.	27550.
57.00	54.00	23.24	3727.	4.501	6503.	29270.
57.00	55.00	24.24	3803.	4.402	7047.	31020.
57.00	56.00	25.24	3877.	4.317	7596.	32790.
57.00	57.00	26.24	3948.	4.244	8150.	34590.
57.00	58.00	27.24	4017.	4.180	8710.	36410.
57.00	59.00	28.24	4085.	4.123	9278.	38260.
57.00	60.00	29.24	4151.	4.072	9856.	40130.
57.00	61.00	30.24	4215.	4.025	10440.	42020.
57.00	62.00	31.24	4278.	3.983	11030.	43950.
58.00	43.00	12.25	2643.	6.701	1797.	12040.
58.00	44.00	13.25	2760.	6.100	2197.	13400.
58.00	45.00	14.25	2871.	5.656	2617.	14800.
58.00	46.00	15.25	2975.	5.328	3047.	16230.
58.00	47.00	16.25	3073.	5.060	3497.	17700.
58.00	48.00	17.25	3166.	4.836	3968.	19190.
58.00	49.00	18.25	3257.	4.651	4455.	20720.
58.00	50.00	19.25	3344.	4.498	4957.	22290.
58.00	51.00	20.25	3429.	4.367	5471.	23890.
58.00	52.00	21.25	3510.	4.256	5997.	25520.
58.00	53.00	22.25	3587.	4.160	6530.	27170.
58.00	54.00	23.25	3663.	4.077	7077.	28850.
58.00	55.00	24.25	3737.	4.004	7634.	30570.
58.00	56.00	25.25	3809.	3.940	8200.	32310.
58.00	57.00	26.25	3879.	3.881	8779.	34070.
58.00	58.00	27.25	3947.	3.830	9362.	35860.
58.00	59.00	28.25	4013.	3.787	9950.	37670.
58.00	60.00	29.25	4075.	3.749	10560.	39590.
58.00	61.00	30.25	4138.	3.715	11160.	41460.
58.00	62.00	31.25	4199.	3.683	11770.	43350.
59.00	43.00	12.27	2601.	5.629	2112.	11890.
59.00	44.00	13.27	2715.	5.208	2539.	13220.
59.00	45.00	14.27	2822.	4.885	2988.	14600.
59.00	46.00	15.27	2922.	4.645	3445.	16000.
59.00	47.00	16.27	3018.	4.449	3921.	17440.
59.00	48.00	17.27	3106.	4.284	4420.	18930.
59.00	49.00	18.27	3195.	4.147	4930.	20450.
59.00	50.00	19.27	3280.	4.032	5454.	21990.
59.00	51.00	20.27	3362.	3.934	5988.	23560.
59.00	52.00	21.27	3439.	3.851	6529.	25150.
59.00	53.00	22.27	3516.	3.779	7085.	26780.
59.00	54.00	23.27	3590.	3.717	7649.	28430.
59.00	55.00	24.26	3664.	3.659	8233.	30130.
59.00	56.00	25.26	3734.	3.611	8818.	31840.
59.00	57.00	26.26	3803.	3.568	9411.	33580.
59.00	58.00	27.26	3869.	3.530	10010.	35340.
59.00	59.00	28.26	3935.	3.495	10620.	37130.
59.00	60.00	29.26	3999.	3.464	11240.	38940.
59.00	61.00	30.26	4061.	3.437	11860.	40770.
59.00	62.00	31.26	4121.	3.414	12490.	42630.

EPA Export 08-07-2014:23:43:11

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Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A Rev 9:06	

Drg. Ref.

Made by DAH	Date 08-Dec-2003	Data Stability Max Minerial Cut Slp3.sld	Checked

60.00	43.00	12.28	2551.	4.807	2440.	11730.
60.00	44.00	13.28	2660.	4.504	2895.	13040.
60.00	45.00	14.28	2765.	4.271	3369.	14390.
60.00	46.00	15.28	2864.	4.087	3859.	15770.
60.00	47.00	16.28	2958.	3.945	4357.	17190.
60.00	48.00	17.28	3045.	3.824	4869.	18620.
60.00	49.00	18.28	3131.	3.722	5401.	20100.
60.00	50.00	19.28	3216.	3.635	5948.	21620.
60.00	51.00	20.28	3296.	3.562	6503.	23160.
60.00	52.00	21.28	3372.	3.499	7064.	24720.
60.00	53.00	22.28	3447.	3.445	7639.	26320.
60.00	54.00	23.28	3520.	3.398	8224.	27940.
60.00	55.00	24.28	3590.	3.357	8816.	29590.
60.00	56.00	25.28	3659.	3.321	9417.	31270.
60.00	57.00	26.28	3726.	3.289	10030.	32980.
60.00	58.00	27.28	3791.	3.261	10640.	34710.
60.00	59.00	28.28	3855.	3.236	11270.	36460.
60.00	60.00	29.28	3917.	3.214	11900.	38230.
60.00	61.00	30.28	3978.	3.193	12540.	40030.
60.00	62.00	31.28	4038.	3.175	13180.	41860.
61.00	43.00	12.29	2498.	4.178	2768.	11570.
61.00	44.00	13.29	2604.	3.957	3248.	12850.
61.00	45.00	14.29	2706.	3.784	3746.	14180.
61.00	46.00	15.29	2803.	3.647	4261.	15540.
61.00	47.00	16.29	2895.	3.541	4781.	16930.
61.00	48.00	17.29	2981.	3.446	5323.	18340.
61.00	49.00	18.29	3064.	3.372	5869.	19790.
61.00	50.00	19.29	3145.	3.308	6432.	21270.
61.00	51.00	20.29	3224.	3.253	7005.	22790.
61.00	52.00	21.29	3298.	3.206	7584.	24310.
61.00	53.00	22.29	3371.	3.166	8176.	25880.
61.00	54.00	23.29	3442.	3.131	8776.	27480.
61.00	55.00	24.29	3512.	3.101	9385.	29100.
61.00	56.00	25.29	3579.	3.066	10000.	30670.
61.00	57.00	26.29	3645.	3.043	10630.	32330.
61.00	58.00	27.29	3709.	3.023	11260.	34030.
61.00	59.00	28.29	3771.	3.005	11890.	35740.
61.00	60.00	29.29	3832.	2.990	12540.	37490.
61.00	61.00	30.29	3892.	2.977	13190.	39250.
61.00	62.00	31.29	3950.	2.967	13840.	41060.
62.00	43.00	12.30	2439.	3.658	3090.	11300.
62.00	44.00	13.30	2544.	3.492	3597.	12560.
62.00	45.00	14.30	2643.	3.363	4119.	13850.
62.00	46.00	15.30	2737.	3.261	4654.	15180.
62.00	47.00	16.30	2826.	3.178	5202.	16530.
62.00	48.00	17.30	2910.	3.112	5756.	17910.
62.00	49.00	18.30	2992.	3.055	6326.	19330.
62.00	50.00	19.30	3070.	3.010	6900.	20770.
62.00	51.00	20.30	3147.	2.970	7490.	22250.
62.00	52.00	21.30	3219.	2.935	8086.	23740.
62.00	53.00	22.30	3291.	2.906	8694.	25270.
62.00	54.00	23.30	3361.	2.881	9310.	26820.
62.00	55.00	24.30	3429.	2.860	9933.	28410.
62.00	56.00	25.30	3495.	2.841	10560.	30010.
62.00	57.00	26.30	3559.	2.826	11200.	31650.
62.00	58.00	27.30	3622.	2.814	11840.	33320.
62.00	59.00	28.30	3683.	2.803	12490.	35010.
62.00	60.00	29.30	3744.	2.793	13150.	36720.
62.00	61.00	30.30	3803.	2.784	13810.	38460.
62.00	62.00	31.30	3860.	2.778	14480.	40220.
63.00	43.00	12.32	2373.	3.250	3409.	11080.
63.00	44.00	13.32	2475.	3.126	3938.	12310.
63.00	45.00	14.32	2571.	3.029	4480.	13570.
63.00	46.00	15.32	2662.	2.953	5035.	14870.
63.00	47.00	16.32	2752.	2.889	5607.	16200.
63.00	48.00	17.32	2834.	2.835	6189.	17550.
63.00	49.00	18.32	2914.	2.797	6770.	18930.
63.00	50.00	19.32	2992.	2.762	7368.	20350.
63.00	51.00	20.32	3067.	2.733	7976.	21800.
63.00	52.00	21.32	3136.	2.709	8582.	23250.
63.00	53.00	22.32	3207.	2.689	9206.	24750.
63.00	54.00	23.32	3275.	2.674	9833.	26290.
63.00	55.00	24.32	3341.	2.659	10470.	27850.
63.00	56.00	25.32	3404.	2.650	11100.	29420.
63.00	57.00	26.32	3467.	2.641	11750.	31030.

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ARUP

Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A Rev 9:06	

Drg. Ref.

Made by DAH	Date 08-Dec-2003	Data Stability Max Minerial Cut Slp3.sld	Checked

63.00	58.00	27.32	3529.	2.633	12410.	32660.
63.00	59.00	28.32	3590.	2.626	13070.	34320.
63.00	60.00	29.32	3649.	2.621	13740.	36010.
63.00	61.00	30.32	3707.	2.617	14410.	37710.
63.00	62.00	31.32	3763.	2.615	15090.	39450.
64.00	43.00	12.33	2305.	2.915	3710.	10810.
64.00	44.00	13.33	2404.	2.820	4259.	12010.
64.00	45.00	14.33	2499.	2.746	4822.	13240.
64.00	46.00	15.33	2588.	2.687	5397.	14500.
64.00	47.00	16.33	2674.	2.640	5982.	15790.
64.00	48.00	17.33	2756.	2.602	6578.	17120.
64.00	49.00	18.33	2833.	2.571	7179.	18460.
64.00	50.00	19.33	2909.	2.546	7792.	19840.
64.00	51.00	20.33	2982.	2.528	8411.	21270.
64.00	52.00	21.33	3052.	2.511	9039.	22700.
64.00	53.00	22.33	3121.	2.498	9676.	24170.
64.00	54.00	23.33	3187.	2.488	10310.	25660.
64.00	55.00	24.33	3250.	2.482	10940.	27170.
64.00	56.00	25.33	3314.	2.476	11600.	28720.
64.00	57.00	26.33	3376.	2.471	12260.	30300.
64.00	58.00	27.33	3437.	2.468	12930.	31900.
64.00	59.00	28.33	3496.	2.465	13600.	33530.
64.00	60.00	29.33	3554.	2.464	14280.	35190.
64.00	61.00	30.33	3611.	2.464	14960.	36860.
64.00	62.00	31.33	3667.	2.464	15650.	38560.
65.00	43.00	12.34	2229.	2.645	3989.	10550.
65.00	44.00	13.34	2326.	2.570	4558.	11720.
65.00	45.00	14.34	2420.	2.508	5136.	12880.
65.00	46.00	15.34	2508.	2.463	5727.	14100.
65.00	47.00	16.34	2591.	2.427	6329.	15360.
65.00	48.00	17.34	2671.	2.402	6937.	16660.
65.00	49.00	18.34	2748.	2.377	7561.	17970.
65.00	50.00	19.34	2822.	2.362	8181.	19330.
65.00	51.00	20.34	2894.	2.349	8816.	20710.
65.00	52.00	21.34	2964.	2.339	9458.	22120.
65.00	53.00	22.34	3031.	2.331	10110.	23550.
65.00	54.00	23.34	3097.	2.325	10760.	25020.
65.00	55.00	24.34	3159.	2.324	11400.	26500.
65.00	56.00	25.34	3222.	2.322	12070.	28020.
65.00	57.00	26.34	3281.	2.321	12730.	29560.
65.00	58.00	27.34	3341.	2.321	13410.	31130.
65.00	59.00	28.34	3399.	2.322	14090.	32720.
65.00	60.00	29.34	3456.	2.324	14780.	34340.
65.00	61.00	30.34	3512.	2.326	15470.	35990.
65.00	62.00	31.34	3567.	2.329	16170.	37650.
66.00	43.00	12.36	2152.	2.414	4242.	10240.
66.00	44.00	13.36	2247.	2.354	4828.	11370.
66.00	45.00	14.36	2335.	2.314	5416.	12530.
66.00	46.00	15.36	2421.	2.280	6023.	13730.
66.00	47.00	16.36	2503.	2.254	6640.	14970.
66.00	48.00	17.36	2582.	2.234	7265.	16230.
66.00	49.00	18.36	2658.	2.220	7898.	17530.
66.00	50.00	19.36	2730.	2.206	8543.	18850.
66.00	51.00	20.36	2800.	2.200	9182.	20200.
66.00	52.00	21.36	2869.	2.195	9835.	21590.
66.00	53.00	22.36	2934.	2.191	10490.	22990.
66.00	54.00	23.36	2999.	2.190	11160.	24430.
66.00	55.00	24.36	3062.	2.186	11810.	25810.
66.00	56.00	25.36	3124.	2.187	12480.	27290.
66.00	57.00	26.36	3184.	2.189	13160.	28810.
66.00	58.00	27.36	3243.	2.191	13850.	30350.
66.00	59.00	28.35	3300.	2.195	14540.	31910.
66.00	60.00	29.35	3356.	2.199	15230.	33490.
66.00	61.00	30.35	3409.	2.203	15930.	35090.
66.00	62.00	31.35	3463.	2.208	16630.	36720.
67.00	43.00	12.37	2069.	2.230	4459.	9945.
67.00	44.00	13.37	2162.	2.178	5055.	11010.
67.00	45.00	14.37	2249.	2.145	5660.	12140.
67.00	46.00	15.37	2333.	2.119	6281.	13310.
67.00	47.00	16.37	2414.	2.100	6910.	14510.
67.00	48.00	17.37	2491.	2.087	7547.	15750.
67.00	49.00	18.37	2566.	2.077	8191.	17010.
67.00	50.00	19.37	2638.	2.071	8842.	18310.
67.00	51.00	20.37	2706.	2.065	9504.	19620.
67.00	52.00	21.37	2773.	2.063	10170.	20980.

EPA Export 08-07-2014:23:43:11

67.00	53.00	22.37	2836.	2.064	10830.	22340.
67.00	54.00	23.37	2900.	2.065	11500.	23750.
67.00	55.00	24.37	2959.	2.070	12160.	25170.
67.00	56.00	25.37	3020.	2.073	12850.	26630.
67.00	57.00	26.37	3079.	2.077	13530.	28120.
67.00	58.00	27.37	3136.	2.082	14230.	29620.
67.00	59.00	28.37	3193.	2.088	14930.	31160.
67.00	60.00	29.37	3248.	2.093	15630.	32720.
67.00	61.00	30.37	3302.	2.100	16330.	34300.
67.00	62.00	31.37	3355.	2.107	17040.	35900.
68.00	43.00	12.38	1983.	2.074	4631.	9604.
68.00	44.00	13.38	2071.	2.039	5234.	10670.
68.00	45.00	14.38	2157.	2.011	5859.	11780.
68.00	46.00	15.38	2240.	1.991	6491.	12930.
68.00	47.00	16.38	2318.	1.978	7132.	14100.
68.00	48.00	17.38	2394.	1.969	7780.	15310.
68.00	49.00	18.38	2469.	1.955	8433.	16480.
68.00	50.00	19.38	2539.	1.952	9093.	17750.
68.00	51.00	20.38	2606.	1.948	9765.	19030.
68.00	52.00	21.38	2672.	1.949	10440.	20340.
68.00	53.00	22.38	2737.	1.952	11110.	21690.
68.00	54.00	23.38	2798.	1.954	11800.	23050.
68.00	55.00	24.38	2855.	1.962	12460.	24430.
68.00	56.00	25.38	2915.	1.967	13150.	25860.
68.00	57.00	26.38	2973.	1.973	13840.	27310.
68.00	58.00	27.38	3030.	1.980	14540.	28790.
68.00	59.00	28.38	3086.	1.988	15240.	30300.
68.00	60.00	29.38	3141.	1.997	15940.	31840.
68.00	61.00	30.38	3195.	2.007	16650.	33400.
68.00	62.00	31.38	3248.	2.017	17350.	35000.
69.00	43.00	12.39	1890.	1.958	4754.	9305.
69.00	44.00	13.39	1979.	1.916	5373.	10300.
69.00	45.00	14.39	2062.	1.894	6004.	11370.
69.00	46.00	15.39	2143.	1.877	6647.	12480.
69.00	47.00	16.39	2222.	1.867	7301.	13630.
69.00	48.00	17.39	2296.	1.860	7959.	14800.
69.00	49.00	18.39	2368.	1.857	8623.	16010.
69.00	50.00	19.39	2437.	1.856	9293.	17250.
69.00	51.00	20.39	2504.	1.857	9968.	18510.
69.00	52.00	21.39	2567.	1.858	10660.	19790.
69.00	53.00	22.39	2630.	1.862	11340.	21120.
69.00	54.00	23.39	2694.	1.860	12030.	22370.
69.00	55.00	24.39	2751.	1.869	12690.	23720.
69.00	56.00	25.39	2810.	1.878	13380.	25130.
69.00	57.00	26.39	2868.	1.887	14080.	26560.
69.00	58.00	27.39	2925.	1.898	14770.	28030.
69.00	59.00	28.39	2981.	1.909	15470.	29530.
69.00	60.00	29.39	3036.	1.920	16170.	31050.
69.00	61.00	30.39	3089.	1.932	16870.	32600.
69.00	62.00	31.39	3142.	1.945	17570.	34180.
70.00	43.00	12.41	1795.	1.864	4821.	8988.
70.00	44.00	13.41	1882.	1.826	5453.	9959.
70.00	45.00	14.41	1964.	1.805	6096.	11000.
70.00	46.00	15.41	2043.	1.792	6749.	12100.
70.00	47.00	16.41	2119.	1.785	7409.	13220.
70.00	48.00	17.41	2193.	1.768	8076.	14280.
70.00	49.00	18.41	2264.	1.766	8748.	15450.
70.00	50.00	19.41	2332.	1.768	9423.	16660.
70.00	51.00	20.41	2399.	1.772	10100.	17900.
70.00	52.00	21.41	2463.	1.779	10780.	19180.
70.00	53.00	22.41	2525.	1.785	11470.	20470.
70.00	54.00	23.41	2587.	1.795	12150.	21820.
70.00	55.00	24.41	2643.	1.807	12810.	23160.
70.00	56.00	25.41	2702.	1.819	13500.	24560.
70.00	57.00	26.41	2759.	1.831	14190.	25990.
70.00	58.00	27.41	2816.	1.844	14890.	27450.
70.00	59.00	28.41	2871.	1.858	15580.	28940.
70.00	60.00	29.41	2928.	1.862	16280.	30310.
70.00	61.00	30.41	2982.	1.876	16980.	31840.
70.00	62.00	31.41	3036.	1.892	17670.	33430.
71.00	43.00	12.42	1696.	1.800	4826.	8686.
71.00	44.00	13.42	1779.	1.766	5465.	9654.
71.00	45.00	14.42	1861.	1.734	6124.	10620.
71.00	46.00	15.42	1939.	1.716	6782.	11640.
71.00	47.00	16.42	2014.	1.706	7446.	12700.

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71.00	48.00	17.42	2087.	1.706	8113.	13840.
71.00	49.00	18.42	2157.	1.710	8782.	15020.
71.00	50.00	19.42	2225.	1.717	9454.	16230.
71.00	51.00	20.42	2293.	1.713	10130.	17350.
71.00	52.00	21.42	2357.	1.722	10810.	18610.
71.00	53.00	22.42	2419.	1.731	11490.	19890.
71.00	54.00	23.42	2480.	1.743	12170.	21220.
71.00	55.00	24.42	2536.	1.757	12830.	22540.
71.00	56.00	25.42	2596.	1.772	13520.	23950.
71.00	57.00	26.42	2654.	1.786	14200.	25370.
71.00	58.00	27.42	2711.	1.801	14890.	26820.
71.00	59.00	28.42	2767.	1.816	15580.	28300.
71.00	60.00	29.42	2821.	1.831	16280.	29810.
71.00	61.00	30.42	2875.	1.847	16970.	31340.
71.00	62.00	31.42	2928.	1.862	17670.	32910.
72.00	43.00	12.43	1592.	1.762	4762.	8389.
72.00	44.00	13.43	1675.	1.721	5407.	9306.
72.00	45.00	14.43	1757.	1.692	6064.	10260.
72.00	46.00	15.43	1833.	1.684	6718.	11320.
72.00	47.00	16.43	1909.	1.671	7382.	12330.
72.00	48.00	17.43	1981.	1.670	8046.	13430.
72.00	49.00	18.43	2051.	1.667	8713.	14520.
72.00	50.00	19.43	2121.	1.676	9380.	15720.
72.00	51.00	20.43	2187.	1.687	10050.	16960.
72.00	52.00	21.43	2251.	1.700	10720.	18230.
72.00	53.00	22.43	2314.	1.713	11400.	19530.
72.00	54.00	23.43	2374.	1.726	12080.	20860.
72.00	55.00	24.43	2431.	1.728	12740.	22020.
72.00	56.00	25.43	2491.	1.743	13420.	23400.
72.00	57.00	26.43	2549.	1.758	14110.	24800.
72.00	58.00	27.43	2606.	1.773	14800.	26230.
72.00	59.00	28.43	2662.	1.788	15490.	27690.
72.00	60.00	29.43	2716.	1.804	16180.	29180.
72.00	61.00	30.43	2770.	1.820	16870.	30700.
72.00	62.00	31.43	2823.	1.836	17560.	32240.
73.00	43.00	12.45		Not converged (increase iterations?)		
73.00	44.00	13.45	1570.	1.846	5241.	9677.
73.00	45.00	14.45	1652.	1.693	5898.	9986.
73.00	46.00	15.45	1728.	1.676	6552.	10980.
73.00	47.00	16.45	1803.	1.666	7211.	12020.
73.00	48.00	17.45	1876.	1.670	7870.	13140.
73.00	49.00	18.45	1946.	1.677	8532.	14300.
73.00	50.00	19.45	2015.	1.672	9202.	15390.
73.00	51.00	20.45	2082.	1.678	9871.	16560.
73.00	52.00	21.45	2147.	1.682	10540.	17740.
73.00	53.00	22.45	2210.	1.696	11220.	19020.
73.00	54.00	23.45	2270.	1.708	11900.	20320.
73.00	55.00	24.45	2328.	1.725	12550.	21650.
73.00	56.00	25.45	2385.	1.740	13230.	23020.
73.00	57.00	26.45	2443.	1.755	13910.	24420.
73.00	58.00	27.45	2500.	1.771	14600.	25850.
73.00	59.00	28.45	2557.	1.772	15280.	27090.
73.00	60.00	29.45	2610.	1.785	15970.	28520.
73.00	61.00	30.45	2664.	1.801	16660.	30000.
73.00	62.00	31.44	2717.	1.816	17350.	31510.
74.00	43.00	12.46		Not converged (increase iterations?)		
74.00	44.00	13.46		Not converged (increase iterations?)		
74.00	45.00	14.46	1546.	1.994	5608.	11180.
74.00	46.00	15.46	1625.	1.781	6284.	11190.
74.00	47.00	16.46	1700.	1.697	6937.	11770.
74.00	48.00	17.46	1772.	1.687	7596.	12820.
74.00	49.00	18.46	1842.	1.683	8258.	13900.
74.00	50.00	19.46	1910.	1.689	8921.	15070.
74.00	51.00	20.46	1977.	1.699	9585.	16280.
74.00	52.00	21.46	2041.	1.710	10250.	17520.
74.00	53.00	22.46	2105.	1.706	10930.	18640.
74.00	54.00	23.46	2166.	1.711	11600.	19850.
74.00	55.00	24.46	2221.	1.717	12260.	21050.
74.00	56.00	25.46	2279.	1.730	12930.	22380.
74.00	57.00	26.46	2337.	1.745	13610.	23750.
74.00	58.00	27.46	2393.	1.759	14290.	25150.
74.00	59.00	28.46	2449.	1.774	14980.	26570.

EPA Export 08-07-2014:23:43:11

74.00	60.00	29.46	2505.	1.791	15660.	28040.
74.00	61.00	30.46	2559.	1.806	16350.	29520.
74.00	62.00	31.46	2611.	1.822	17040.	31030.
75.00	43.00	12.47		Not converged (increase iterations?)		
75.00	44.00	13.47		Not converged (increase iterations?)		
75.00	45.00	14.47		Not converged (increase iterations?)		
75.00	46.00	15.47	1517.	2.181	5840.	12740.
75.00	47.00	16.47	1595.	1.964	6547.	12860.
75.00	48.00	17.47	1669.	1.791	7218.	12920.
75.00	49.00	18.47	1739.	1.728	7875.	13610.
75.00	50.00	19.47	1805.	1.719	8537.	14680.
75.00	51.00	20.47	1871.	1.718	9201.	15810.
75.00	52.00	21.47	1937.	1.723	9867.	17000.
75.00	53.00	22.47	2000.	1.732	10530.	18240.
75.00	54.00	23.47	2060.	1.742	11200.	19510.
75.00	55.00	24.47	2118.	1.756	11850.	20810.
75.00	56.00	25.47	2177.	1.751	12530.	21940.
75.00	57.00	26.47	2233.	1.757	13210.	23200.
75.00	58.00	27.47	2290.	1.761	13880.	24450.
75.00	59.00	28.47	2346.	1.774	14560.	25840.
75.00	60.00	29.47	2400.	1.788	15250.	27260.
75.00	61.00	30.47	2454.	1.802	15930.	28710.
75.00	62.00	31.47	2507.	1.816	16620.	30180.
76.00	43.00	12.49	1145.	2.048	3032.	6209.
76.00	44.00	13.49		Weight too small		
76.00	44.00	13.49	1210.	2.041	3436.	7013.
76.00	45.00	14.49		Not converged (increase iterations?)		
76.00	46.00	15.49		Not converged (increase iterations?)		
76.00	47.00	16.48		Not converged (increase iterations?)		
76.00	48.00	17.48	1561.	2.187	6686.	14620.
76.00	49.00	18.48	1633.	1.996	7380.	14730.
76.00	50.00	19.48	1703.	1.840	8050.	14810.
76.00	51.00	20.48	1769.	1.774	8709.	15450.
76.00	52.00	21.48	1833.	1.767	9370.	16560.
76.00	53.00	22.48	1896.	1.767	10040.	17730.
76.00	54.00	23.48	1957.	1.768	10700.	18920.
76.00	55.00	24.48	2014.	1.777	11350.	20170.
76.00	56.00	25.48	2073.	1.786	12020.	21470.
76.00	57.00	26.48	2128.	1.794	12690.	22770.
76.00	58.00	27.48	2183.	1.805	13370.	24120.
76.00	59.00	28.48	2240.	1.800	14050.	25290.
76.00	60.00	29.48	2294.	1.807	14730.	26610.
76.00	61.00	30.48	2348.	1.811	15410.	27900.
76.00	62.00	31.48	2403.	1.821	16090.	29300.
77.00	43.00	12.50	1070.	2.161	2765.	5976.
77.00	44.00	13.50	1135.	2.136	3166.	6764.
77.00	45.00	14.50		Weight too small		
77.00	45.00	14.50	1196.	2.122	3571.	7578.
77.00	46.00	15.50		Not converged (increase iterations?)		
77.00	47.00	16.50		Not converged (increase iterations?)		
77.00	48.00	17.50		Not converged (increase iterations?)		
77.00	49.00	18.50	1522.	2.453	6681.	16390.
77.00	50.00	19.50	1596.	2.241	7412.	16610.
77.00	51.00	20.50	1664.	2.067	8105.	16750.
77.00	52.00	21.50	1730.	1.920	8774.	16850.
77.00	53.00	22.50	1793.	1.831	9437.	17280.
77.00	54.00	23.50	1854.	1.825	10100.	18430.
77.00	55.00	24.50	1911.	1.824	10740.	19600.
77.00	56.00	25.50	1970.	1.822	11410.	20790.
77.00	57.00	26.50	2028.	1.827	12080.	22080.
77.00	58.00	27.50	2083.	1.833	12760.	23380.
77.00	59.00	28.50	2138.	1.841	13430.	24720.
77.00	60.00	29.50	2192.	1.850	14100.	26090.
77.00	61.00	30.50	2244.	1.859	14780.	27480.
77.00	62.00	31.50	2295.	1.866	15460.	28850.
78.00	43.00	12.51	995.8	2.355	2428.	5718.

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78.00	44.00	13.51	1060.	2.299	2823.	6490.
78.00	45.00	14.51	1121.	2.262	3221.	7285.
78.00	46.00	15.51		Weight too small		
78.00	46.00	15.51	1179.	2.239	3618.	8102.
78.00	47.00	16.51		Weight too small		
78.00	47.00	16.51	1237.	2.227	4022.	8958.
78.00	48.00	17.51		Not converged (increase iterations?)		
78.00	49.00	18.51		Not converged (increase iterations?)		
78.00	50.00	19.51	1484.	2.659	6553.	17430.
78.00	51.00	20.51	1555.	2.543	7303.	18570.
78.00	52.00	21.51	1623.	2.336	8026.	18750.
78.00	53.00	22.51	1688.	2.168	8721.	18910.
78.00	54.00	23.51	1750.	2.024	9396.	19020.
78.00	55.00	24.51	1808.	1.907	10050.	19160.
78.00	56.00	25.51	1866.	1.896	10700.	20290.
78.00	57.00	26.51	1921.	1.880	11370.	21370.
78.00	58.00	27.51	1978.	1.879	12040.	22620.
78.00	59.00	28.51	2033.	1.876	12710.	23850.
78.00	60.00	29.51	2088.	1.882	13380.	25190.
78.00	61.00	30.51	2142.	1.889	14060.	26550.
78.00	62.00	31.51	2194.	1.897	14730.	27950.
79.00	43.00	12.52	923.2	2.674	2035.	5441.
79.00	44.00	13.52	985.3	2.568	2409.	6185.
79.00	45.00	14.52	1047.	2.484	2806.	6968.
79.00	46.00	15.52	1106.	2.432	3199.	7778.
79.00	47.00	16.52	1162.	2.393	3595.	8602.
79.00	48.00	17.52		Weight too small		
79.00	48.00	17.52	1217.	2.368	3994.	9456.
79.00	49.00	18.52		Weight too small		
79.00	49.00	18.52	1272.	2.349	4406.	10350.
79.00	50.00	19.52		Not converged (increase iterations?)		
79.00	51.00	20.52	1440.	2.899	6302.	18270.
79.00	52.00	21.52	1510.	2.840	7061.	20050.
79.00	53.00	22.52	1580.	2.665	7808.	20800.
79.00	54.00	23.52	1645.	2.462	8531.	21010.
79.00	55.00	24.52	1707.	2.296	9230.	21190.
79.00	56.00	25.52	1762.	2.149	9894.	21260.
79.00	57.00	26.52	1823.	2.069	10650.	22030.
79.00	58.00	27.52	1875.	1.969	11220.	22090.
79.00	59.00	28.52	1929.	1.952	11880.	23200.
79.00	60.00	29.52	1984.	1.947	12560.	24450.
79.00	61.00	30.52	2038.	1.945	13230.	25730.
79.00	62.00	31.52	2091.	1.944	13910.	27040.
80.00	43.00	12.54	860.3	3.129	1658.	5188.
80.00	44.00	13.54	917.9	2.977	1979.	5890.
80.00	45.00	14.54	975.2	2.850	2327.	6631.
80.00	46.00	15.54	1032.	2.738	2706.	7408.
80.00	47.00	16.54	1089.	2.649	3105.	8225.
80.00	48.00	17.54	1143.	2.589	3497.	9056.
80.00	49.00	18.54		Weight too small		
80.00	49.00	18.54	1196.	2.538	3901.	9900.
80.00	50.00	19.54		Weight too small		
80.00	50.00	19.54	1249.	2.506	4304.	10790.
80.00	51.00	20.54		Weight too small		
80.00	51.00	20.54	1299.	2.486	4706.	11700.
80.00	52.00	21.54	1398.	3.210	5925.	19020.
80.00	53.00	22.54	1467.	3.120	6693.	20880.
80.00	54.00	23.54	1533.	3.043	7451.	22670.
80.00	55.00	24.54	1598.	2.832	8198.	23220.
80.00	56.00	25.54	1656.	2.626	8909.	23400.
80.00	57.00	26.54	1716.	2.455	9615.	23610.
80.00	58.00	27.54	1774.	2.307	10300.	23760.
80.00	59.00	28.54	1829.	2.175	10980.	23870.
80.00	60.00	29.54	1882.	2.059	11630.	23950.
80.00	61.00	30.54	1935.	2.043	12300.	25140.
80.00	62.00	31.54	1987.	2.025	12970.	26260.
81.00	43.00	12.55	804.6	3.802	1301.	4948.
81.00	44.00	13.55	857.3	3.577	1568.	5607.
81.00	45.00	14.55	909.2	3.380	1862.	6295.
81.00	46.00	15.55	963.4	3.212	2190.	7036.
81.00	47.00	16.55	1016.	3.073	2540.	7808.
81.00	48.00	17.55	1071.	2.946	2928.	8628.

EPA Export 08-07-2014:23:43:11

81.00	49.00	18.55	1123.	2.846	3325.	9463.
81.00	50.00	19.55	1175.	2.776	3724.	10340.
81.00	51.00	20.55		Weight too small		
81.00	51.00	20.55	1227.	2.720	4131.	11240.
81.00	52.00	21.55		Weight too small		
81.00	52.00	21.55	1277.	2.679	4537.	12160.
81.00	53.00	22.55		Weight too small		
81.00	53.00	22.55	1325.	2.650	4942.	13100.
81.00	54.00	23.55		Weight too small		
81.00	54.00	23.55	1372.	2.630	5348.	14060.
81.00	55.00	24.55	1405.	3.372	6970.	23500.
81.00	56.00	25.55	1547.	3.270	7734.	25290.
81.00	57.00	26.55	1607.	3.046	8458.	25760.
81.00	58.00	27.55	1668.	2.831	9191.	26020.
81.00	59.00	28.55	1727.	2.652	9904.	26270.
81.00	60.00	29.55	1783.	2.496	10600.	26460.
81.00	61.00	30.55	1837.	2.358	11280.	26610.
81.00	62.00	31.55	1889.	2.235	11950.	26710.
82.00	43.00	12.56	756.3	4.859	971.8	4722.
82.00	44.00	13.56	804.9	4.472	1195.	5344.
82.00	45.00	14.56	854.1	4.172	1440.	6007.
82.00	46.00	15.56	903.4	3.920	1711.	6707.
82.00	47.00	16.56	951.8	3.710	2005.	7439.
82.00	48.00	17.56	1002.	3.518	2336.	8217.
82.00	49.00	18.56	1052.	3.351	2693.	9024.
82.00	50.00	19.56	1103.	3.210	3076.	9877.
82.00	51.00	20.56	1155.	3.093	3479.	10760.
82.00	52.00	21.56		Weight too small		
82.00	52.00	21.56	1204.	3.012	3875.	11670.
82.00	53.00	22.56		Weight too small		
82.00	53.00	22.56	1253.	2.942	4284.	12600.
82.00	54.00	23.56		Weight too small		
82.00	54.00	23.56	1301.	2.889	4693.	13560.
82.00	55.00	24.56		Weight too small		
82.00	55.00	24.56	1347.	2.849	5100.	14530.
82.00	56.00	25.56		Weight too small		
82.00	56.00	25.56	1392.	2.818	5508.	15520.
82.00	57.00	26.56	1495.	3.670	7110.	26090.
82.00	58.00	27.56	1557.	3.551	7879.	27980.
82.00	59.00	28.56	1615.	3.311	8619.	28530.
82.00	60.00	29.56	1674.	3.079	9359.	28820.
82.00	61.00	30.56	1731.	2.886	10080.	29090.
82.00	62.00	31.56	1786.	2.719	10790.	29330.
83.00	43.00	12.58	717.1	6.639	683.5	4537.
83.00	44.00	13.58	761.1	5.983	856.6	5125.
83.00	45.00	14.58	806.1	5.462	1054.	5754.
83.00	46.00	15.58	851.4	5.038	1274.	6419.
83.00	47.00	16.58	896.9	4.686	1519.	7110.
83.00	48.00	17.58	942.8	4.386	1791.	7854.
83.00	49.00	18.58	987.8	4.124	2089.	8615.
83.00	50.00	19.58	1035.	3.901	2416.	9427.
83.00	51.00	20.57	1084.	3.704	2775.	10280.
83.00	52.00	21.57	1132.	3.535	3159.	11170.
83.00	53.00	22.57	1180.	3.399	3553.	12080.
83.00	54.00	23.57		Weight too small		
83.00	54.00	23.57	1226.	3.295	3951.	13020.
83.00	55.00	24.57		Weight too small		
83.00	55.00	24.57	1273.	3.206	4360.	13980.
83.00	56.00	25.57		Weight too small		
83.00	56.00	25.57	1319.	3.136	4771.	14960.
83.00	57.00	26.57		Weight too small		
83.00	57.00	26.57	1364.	3.081	5181.	15960.
83.00	58.00	27.57		Weight too small		
83.00	58.00	27.57	1407.	3.038	5591.	16990.
83.00	59.00	28.57	1504.	4.009	7159.	28700.
83.00	60.00	29.57	1563.	3.870	7923.	30660.
83.00	61.00	30.57	1619.	3.632	8671.	31490.
83.00	62.00	31.57	1676.	3.376	9414.	31780.
84.00	43.00	12.59	686.1	10.05	436.8	4391.
84.00	44.00	13.59	725.4	8.720	567.1	4946.
84.00	45.00	14.59	766.7	7.695	720.3	5543.
84.00	46.00	15.59	808.1	6.906	893.9	6173.
84.00	47.00	16.59	849.7	6.275	1090.	6837.
84.00	48.00	17.59	891.8	5.760	1308.	7535.
84.00	49.00	18.59	931.4	5.336	1545.	8247.

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84.00	50.00	19.59	974.5	4.975	1812.	9014.
84.00	51.00	20.59	1020.	4.671	2104.	9828.
84.00	52.00	21.59	1064.	4.404	2422.	10670.
84.00	53.00	22.59	1109.	4.162	2775.	11550.
84.00	54.00	23.59	1157.	3.943	3165.	12480.
84.00	55.00	24.59	1203.	3.769	3561.	13420.
84.00	56.00	25.59		Weight too small		
84.00	56.00	25.59	1247.	3.637	3958.	14400.
84.00	57.00	26.59		Weight too small		
84.00	57.00	26.59	1292.	3.527	4362.	15380.
84.00	58.00	27.59		Weight too small		
84.00	58.00	27.59	1336.	3.436	4771.	16390.
84.00	59.00	28.59		Weight too small		
84.00	59.00	28.59	1377.	3.356	5183.	17390.
84.00	60.00	29.59		Weight too small		
84.00	60.00	29.59	1419.	3.297	5595.	18440.
84.00	61.00	30.59	52.77	11.27	1109.	12500.
84.00	61.00	30.59	1461.	3.249	6006.	19510.
84.00	62.00	31.59	1568.	4.249	7857.	33390.
85.00	43.00	12.60	664.2	17.40	245.2	4267.
85.00	44.00	13.60	701.1	14.34	336.0	4817.
85.00	45.00	14.60	736.5	12.14	443.0	5376.
85.00	46.00	15.60	774.1	10.46	571.3	5975.
85.00	47.00	16.60	811.6	9.210	716.9	6603.
85.00	48.00	17.60	850.5	8.179	888.6	7268.
85.00	49.00	18.60	889.3	7.379	1079.	7964.
85.00	50.00	19.60	926.0	6.738	1287.	8673.
85.00	51.00	20.60	966.0	6.195	1523.	9436.
85.00	52.00	21.60	1007.	5.740	1783.	10230.
85.00	53.00	22.60	1048.	5.353	2067.	11070.
85.00	54.00	23.60	1089.	5.019	2378.	11930.
85.00	55.00	24.60	1132.	4.724	2718.	12840.
85.00	56.00	25.60	1175.	4.462	3089.	13780.
85.00	57.00	26.60	1219.	4.238	3482.	14760.
85.00	58.00	27.60		Weight too small		
85.00	58.00	27.60	1262.	4.060	3879.	15750.
85.00	59.00	28.60		Weight too small		
85.00	59.00	28.60	1302.	3.913	4278.	16740.
85.00	60.00	29.60		Weight too small		
85.00	60.00	29.60	1344.	3.795	4682.	17770.
85.00	61.00	30.60		Weight too small		
85.00	61.00	30.60	1387.	3.690	5107.	18840.
85.00	62.00	31.60		Weight too small		
85.00	62.00	31.60	1426.	3.617	5502.	19900.
86.00	43.00	12.61	649.3	39.18	103.7	4062.
86.00	44.00	13.61	682.9	28.30	163.3	4621.
86.00	45.00	14.61	714.6	22.29	233.3	5202.
86.00	46.00	15.61	748.0	18.27	317.3	5798.
86.00	47.00	16.61	782.5	15.17	422.8	6415.
86.00	48.00	17.61	816.8	12.96	543.3	7043.
86.00	49.00	18.61	851.0	11.27	683.3	7701.
86.00	50.00	19.61	885.4	9.952	841.6	8375.
86.00	51.00	20.61	920.2	8.950	1016.	9089.
86.00	52.00	21.61	957.8	8.040	1225.	9850.
86.00	53.00	22.61	995.3	7.329	1452.	10640.
86.00	54.00	23.61	1033.	6.738	1701.	11460.
86.00	55.00	24.61	1072.	6.239	1974.	12320.
86.00	56.00	25.61	1111.	5.811	2273.	13210.
86.00	57.00	26.61	1151.	5.442	2598.	14140.
86.00	58.00	27.61	1192.	5.111	2955.	15100.
86.00	59.00	28.61	1232.	4.811	3341.	16070.
86.00	60.00	29.61		Weight too small		
86.00	60.00	29.61	1273.	4.571	3740.	17090.
86.00	61.00	30.61		Weight too small		
86.00	61.00	30.61	1314.	4.381	4139.	18140.
86.00	62.00	31.61		Weight too small		
86.00	62.00	31.61	1354.	4.228	4541.	19200.
87.00	43.00	12.63	643.0	186.4	20.88	3893.
87.00	44.00	13.63	673.5	88.08	50.03	4406.
87.00	45.00	14.63	703.4	55.98	88.40	4949.
87.00	46.00	15.63	733.3	39.96	138.3	5525.
87.00	47.00	16.63	764.2	29.93	205.4	6147.
87.00	48.00	17.63	794.6	24.10	282.2	6799.
87.00	49.00	18.63	825.6	19.96	374.8	7483.
87.00	50.00	19.63	857.7	16.72	480.0	8160.

EPA Export 08-07-2014:23:43:11

87.00	51.00	20.63	888.6	14.29	617.8	8831.
87.00	52.00	21.63	920.4	12.56	759.7	9539.
87.00	53.00	22.63	953.9	11.09	927.1	10280.
87.00	54.00	23.63	988.1	9.906	1117.	11060.
87.00	55.00	24.63	1023.	8.942	1328.	11870.
87.00	56.00	25.63	1060.	8.098	1571.	12730.
87.00	57.00	26.63	1096.	7.432	1831.	13600.
87.00	58.00	27.63	1133.	6.868	2114.	14520.
87.00	59.00	28.63	1170.	6.382	2423.	15470.
87.00	60.00	29.63		Only 1 intersection		
87.00	61.00	30.63		Only 1 intersection		
87.00	62.00	31.63		Weight too small		
87.00	62.00	31.63		Only 1 intersection		
88.00	43.00	12.64		Disturbing moment < 0		
88.00	44.00	13.64	673.0	2763.	1.551	4285.
88.00	45.00	14.64	700.2	415.9	11.50	4784.
88.00	46.00	15.64	726.8	176.9	30.01	5310.
88.00	47.00	16.64	754.7	92.27	63.73	5881.
88.00	48.00	17.64	782.3	61.04	106.2	6480.
88.00	49.00	18.64	808.8	44.30	160.4	7105.
88.00	50.00	19.64	835.2	34.34	226.0	7759.
88.00	51.00	20.64	864.5	27.16	312.1	8475.
88.00	52.00	21.64	893.6	22.49	410.2	9223.
88.00	53.00	22.64	923.4	18.98	526.7	9995.
88.00	54.00	23.64	952.7	16.39	654.8	10730.
88.00	55.00	24.64	983.9	14.22	808.5	11500.
88.00	56.00	25.64		Only 1 intersection		
88.00	57.00	26.64		Only 1 intersection		
88.00	58.00	27.64		Only 1 intersection		
88.00	59.00	28.64		Only 1 intersection		
88.00	60.00	29.64		Only 1 intersection		
88.00	61.00	30.64		Only 1 intersection		
88.00	62.00	31.64		Only 1 intersection		
89.00	43.00	12.65	650.0	172800.	0.02181	3770.
89.00	44.00	13.65	677.1	71820.	0.05091	4231.
89.00	45.00	14.65		Disturbing moment < 0		
89.00	46.00	15.65		Disturbing moment < 0		
89.00	47.00	16.65	752.1	2304.	2.483	5721.
89.00	48.00	17.65	776.9	459.1	13.65	6268.
89.00	49.00	18.65	801.1	205.1	33.35	6840.
89.00	50.00	19.65	826.9	109.4	68.16	7450.
89.00	51.00	20.65	852.4	72.52	111.7	8104.
89.00	52.00	21.65		Only 1 intersection		
89.00	53.00	22.65		Only 1 intersection		
89.00	54.00	23.65		Only 1 intersection		
89.00	55.00	24.65		Only 1 intersection		
89.00	56.00	25.65		Only 1 intersection		
89.00	57.00	26.65		Only 1 intersection		
89.00	58.00	27.65		Only 1 intersection		
89.00	59.00	28.65		Only 1 intersection		
89.00	60.00	29.65		Only 1 intersection		
89.00	61.00	30.65		Only 1 intersection		
89.00	62.00	31.65		Only 1 intersection		
90.00	43.00	12.67		Disturbing moment < 0		
90.00	44.00	13.67		Disturbing moment < 0		
90.00	45.00	14.67		Disturbing moment < 0		
90.00	46.00	15.67		Disturbing moment < 0		
90.00	47.00	16.67		Disturbing moment < 0		
90.00	48.00	17.67		Disturbing moment < 0		
90.00	49.00	18.67		Only 1 intersection		
90.00	50.00	19.67		Only 1 intersection		
90.00	51.00	20.67		Only 1 intersection		
90.00	52.00	21.67		Only 1 intersection		
90.00	53.00	22.67		Only 1 intersection		
90.00	54.00	23.66		Only 1 intersection		
90.00	55.00	24.66		Only 1 intersection		
90.00	56.00	25.66		Only 1 intersection		
90.00	57.00	26.66		Only 1 intersection		
90.00	58.00	27.66		Only 1 intersection		
90.00	59.00	28.66		Only 1 intersection		
90.00	60.00	29.66		Only 1 intersection		
90.00	61.00	30.66		Only 1 intersection		
90.00	62.00	31.66		Only 1 intersection		
91.00	43.00	12.68		Disturbing moment < 0		
91.00	44.00	13.68		Disturbing moment < 0		

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91.00	45.00	14.68	Disturbing moment < 0
91.00	46.00	15.68	Only 1 intersection
91.00	47.00	16.68	Only 1 intersection
91.00	48.00	17.68	Only 1 intersection
91.00	49.00	18.68	Only 1 intersection
91.00	50.00	19.68	Only 1 intersection
91.00	51.00	20.68	Only 1 intersection
91.00	52.00	21.68	Only 1 intersection
91.00	53.00	22.68	Only 1 intersection
91.00	54.00	23.68	Only 1 intersection
91.00	55.00	24.68	Only 1 intersection
91.00	56.00	25.68	Only 1 intersection
91.00	57.00	26.68	Only 1 intersection
91.00	58.00	27.68	Only 1 intersection
91.00	59.00	28.68	Only 1 intersection
91.00	60.00	29.68	Only 1 intersection
91.00	61.00	30.68	Only 1 intersection
91.00	62.00	31.68	Only 1 intersection
92.00	43.00	12.69	Only 1 intersection
92.00	44.00	13.69	Only 1 intersection
92.00	45.00	14.69	Only 1 intersection
92.00	46.00	15.69	Only 1 intersection
92.00	47.00	16.69	Only 1 intersection
92.00	48.00	17.69	Only 1 intersection
92.00	49.00	18.69	Only 1 intersection
92.00	50.00	19.69	Only 1 intersection
92.00	51.00	20.69	Only 1 intersection
92.00	52.00	21.69	Only 1 intersection
92.00	53.00	22.69	Only 1 intersection
92.00	54.00	23.69	Only 1 intersection
92.00	55.00	24.69	Only 1 intersection
92.00	56.00	25.69	Only 1 intersection
92.00	57.00	26.69	Only 1 intersection
92.00	58.00	27.69	Only 1 intersection
92.00	59.00	28.69	Only 1 intersection
92.00	60.00	29.69	Only 1 intersection
92.00	61.00	30.69	Only 1 intersection
92.00	62.00	31.69	Only 1 intersection
93.00	43.00	12.70	Only 1 intersection
93.00	44.00	13.70	Only 1 intersection
93.00	45.00	14.70	Only 1 intersection
93.00	46.00	15.70	Only 1 intersection
93.00	47.00	16.70	Only 1 intersection
93.00	48.00	17.70	Only 1 intersection
93.00	49.00	18.70	Only 1 intersection
93.00	50.00	19.70	Only 1 intersection
93.00	51.00	20.70	Only 1 intersection
93.00	52.00	21.70	Only 1 intersection
93.00	53.00	22.70	Only 1 intersection
93.00	54.00	23.70	Only 1 intersection
93.00	55.00	24.70	Only 1 intersection
93.00	56.00	25.70	Only 1 intersection
93.00	57.00	26.70	Only 1 intersection
93.00	58.00	27.70	Only 1 intersection
93.00	59.00	28.70	Only 1 intersection
93.00	60.00	29.70	Only 1 intersection
93.00	61.00	30.70	Only 1 intersection
93.00	62.00	31.70	Only 1 intersection
94.00	43.00	12.72	Only 1 intersection
94.00	44.00	13.72	Only 1 intersection
94.00	45.00	14.72	Only 1 intersection
94.00	46.00	15.72	Only 1 intersection
94.00	47.00	16.72	Only 1 intersection
94.00	48.00	17.72	Only 1 intersection
94.00	49.00	18.72	Only 1 intersection
94.00	50.00	19.72	Only 1 intersection
94.00	51.00	20.72	Only 1 intersection
94.00	52.00	21.72	Only 1 intersection
94.00	53.00	22.72	Only 1 intersection
94.00	54.00	23.72	Only 1 intersection
94.00	55.00	24.72	Only 1 intersection
94.00	56.00	25.72	Only 1 intersection
94.00	57.00	26.72	Only 1 intersection
94.00	58.00	27.72	Only 1 intersection
94.00	59.00	28.72	Only 1 intersection

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94.00	60.00	29.72	Only 1 intersection
94.00	61.00	30.72	Only 1 intersection
94.00	62.00	31.72	Only 1 intersection
95.00	43.00	12.73	Only 1 intersection
95.00	44.00	13.73	Only 1 intersection
95.00	45.00	14.73	Only 1 intersection
95.00	46.00	15.73	Only 1 intersection
95.00	47.00	16.73	Only 1 intersection
95.00	48.00	17.73	Only 1 intersection
95.00	49.00	18.73	Only 1 intersection
95.00	50.00	19.73	Only 1 intersection
95.00	51.00	20.73	Only 1 intersection
95.00	52.00	21.73	Only 1 intersection
95.00	53.00	22.73	Only 1 intersection
95.00	54.00	23.73	Only 1 intersection
95.00	55.00	24.73	Only 1 intersection
95.00	56.00	25.73	Only 1 intersection
95.00	57.00	26.73	Only 1 intersection
95.00	58.00	27.73	Only 1 intersection
95.00	59.00	28.73	Only 1 intersection
95.00	60.00	29.73	Only 1 intersection
95.00	61.00	30.73	Only 1 intersection
95.00	62.00	31.73	Only 1 intersection
96.00	43.00	12.74	Only 1 intersection
96.00	44.00	13.74	Only 1 intersection
96.00	45.00	14.74	Only 1 intersection
96.00	46.00	15.74	Only 1 intersection
96.00	47.00	16.74	Only 1 intersection
96.00	48.00	17.74	Only 1 intersection
96.00	49.00	18.74	Only 1 intersection
96.00	50.00	19.74	Only 1 intersection
96.00	51.00	20.74	Only 1 intersection
96.00	52.00	21.74	Only 1 intersection
96.00	53.00	22.74	Only 1 intersection
96.00	54.00	23.74	Only 1 intersection
96.00	55.00	24.74	Only 1 intersection
96.00	56.00	25.74	Only 1 intersection
96.00	57.00	26.74	Only 1 intersection
96.00	58.00	27.74	Only 1 intersection
96.00	59.00	28.74	Only 1 intersection
96.00	60.00	29.74	Only 1 intersection
96.00	61.00	30.74	Only 1 intersection
96.00	62.00	31.74	Only 1 intersection
97.00	43.00	12.76	Only 1 intersection
97.00	44.00	13.76	Only 1 intersection
97.00	45.00	14.76	Only 1 intersection
97.00	46.00	15.76	Only 1 intersection
97.00	47.00	16.76	Only 1 intersection
97.00	48.00	17.76	Only 1 intersection
97.00	49.00	18.76	Only 1 intersection
97.00	50.00	19.76	Only 1 intersection
97.00	51.00	20.76	Only 1 intersection
97.00	52.00	21.76	Only 1 intersection
97.00	53.00	22.76	Only 1 intersection
97.00	54.00	23.76	Only 1 intersection
97.00	55.00	24.76	Only 1 intersection
97.00	56.00	25.76	Only 1 intersection
97.00	57.00	26.76	Only 1 intersection
97.00	58.00	27.75	Only 1 intersection
97.00	59.00	28.75	Only 1 intersection
97.00	60.00	29.75	Only 1 intersection
97.00	61.00	30.75	Only 1 intersection
97.00	62.00	31.75	Only 1 intersection
98.00	43.00	12.77	Only 1 intersection
98.00	44.00	13.77	Only 1 intersection
98.00	45.00	14.77	Only 1 intersection
98.00	46.00	15.77	Only 1 intersection
98.00	47.00	16.77	Only 1 intersection
98.00	48.00	17.77	Only 1 intersection
98.00	49.00	18.77	Only 1 intersection
98.00	50.00	19.77	Only 1 intersection
98.00	51.00	20.77	Only 1 intersection
98.00	52.00	21.77	Only 1 intersection
98.00	53.00	22.77	Only 1 intersection
98.00	54.00	23.77	Only 1 intersection

98.00	55.00	24.77	Only 1 intersection
98.00	56.00	25.77	Only 1 intersection
98.00	57.00	26.77	Only 1 intersection
98.00	58.00	27.77	Only 1 intersection
98.00	59.00	28.77	Only 1 intersection
98.00	60.00	29.77	Only 1 intersection
98.00	61.00	30.77	Only 1 intersection
98.00	62.00	31.77	Only 1 intersection
99.00	43.00	12.78	Only 1 intersection
99.00	44.00	13.78	Only 1 intersection
99.00	45.00	14.78	Only 1 intersection
99.00	46.00	15.78	Only 1 intersection
99.00	47.00	16.78	Only 1 intersection
99.00	48.00	17.78	Only 1 intersection
99.00	49.00	18.78	Only 1 intersection
99.00	50.00	19.78	Only 1 intersection
99.00	51.00	20.78	Only 1 intersection
99.00	52.00	21.78	Only 1 intersection
99.00	53.00	22.78	Only 1 intersection
99.00	54.00	23.78	Only 1 intersection
99.00	55.00	24.78	Only 1 intersection
99.00	56.00	25.78	Only 1 intersection
99.00	57.00	26.78	Only 1 intersection
99.00	58.00	27.78	Only 1 intersection
99.00	59.00	28.78	Only 1 intersection
99.00	60.00	29.78	Only 1 intersection
99.00	61.00	30.78	Only 1 intersection
99.00	62.00	31.78	Only 1 intersection

WORST CASE : WATER CASE 1 OF 1

Centre at (73.00,47.00)
Iterations: 10
Net vertical force [kN]: .0
Net horiz force [kN]: 135.4E-6
Inclination of interslice forces [°]: 12.85
Radius 16.45m
Horiz acceleration [kg]: .0
Slip weight [kN] 1803.
Disturbing moment [kN m]: 7211.
Restoring moment [kN m]: 12020.

Factor of Safety: 1.666

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	57.90	40.47	-5.167	.0	.0	.0
2	58.14	39.95	.0	0.1440	0.6314	.0
3	58.76	38.77	11.67	2.172	9.524	6.809
4	59.48	37.64	22.77	6.758	29.63	25.92
5	59.96	36.98	29.23	10.83	47.48	42.73
6	60.70	36.08	20.67	17.50	76.72	21.37
7	60.90	35.86	17.89	19.35	84.82	16.00
8	61.00	35.75	16.46	20.31	89.03	13.55
9	61.80	34.95	23.84	28.34	124.3	28.41
10	63.70	33.44	37.52	47.76	209.4	70.40
11	64.00	33.23	39.30	50.34	220.7	77.21
12	65.46	32.38	46.66	60.68	266.0	108.9
13	67.00	31.69	52.42	69.26	303.7	137.4
14	69.20	31.00	52.78	75.25	329.9	139.3
15	71.22	30.65	49.40	73.65	322.9	122.0
16	73.26	30.56	43.39	65.57	287.5	94.12
17	75.30	30.72	34.85	52.23	229.0	60.71
18	77.47	31.17	18.65	33.81	148.2	17.39
19	79.56	31.92	.0	14.71	64.48	.0
20	79.60	31.94	-0.3617	14.39	63.09	.0
21	80.96	32.61	-6.645	4.357	19.10	.0
22	82.25	33.40	-13.04	.0	135.4E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.4663	.0	0.6742	0.7940	0.3702
2	.0	0.4663	5.835	7.529	10.43	1.225
3	.0	0.4663	17.22	17.64	23.97	0.4384
4	.0	0.5774	26.00	17.60	22.40	0.6731
5	.0	0.6494	24.95	37.51	42.18	8.577
6	.0	0.6494	19.28	13.37	13.74	5.189

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7	.0	0.6494	17.17	7.549	7.566	3.275
8	.0	0.6494	20.15	68.00	67.36	28.90
9	.0	0.6745	30.68	206.7	199.5	84.27
10	.0	0.6745	38.41	31.38	30.22	11.03
11	.0	0.6745	42.98	133.9	129.5	38.38
12	.0	0.6745	49.54	162.4	155.6	48.49
13	.0	0.6745	52.60	244.0	235.0	76.71
14	.0	0.6745	51.09	215.6	212.9	73.06
15	.0	0.6745	46.39	200.0	206.2	75.08
16	.0	0.6745	39.12	171.1	180.5	73.14
17	.0	0.6745	26.75	141.4	173.1	76.70
18	.0	0.6745	9.323	86.62	127.7	72.19
19	.0	0.6745	.0	1.045	1.807	1.219
20	.0	0.6745	.0	29.10	54.57	36.81
21	.0	0.6745	.0	9.718	21.99	14.83

Slice no.	Surface Load (kPa)		Water Pressure on ground surface (kPa)	
	Vert	Horiz	Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0

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ARUP

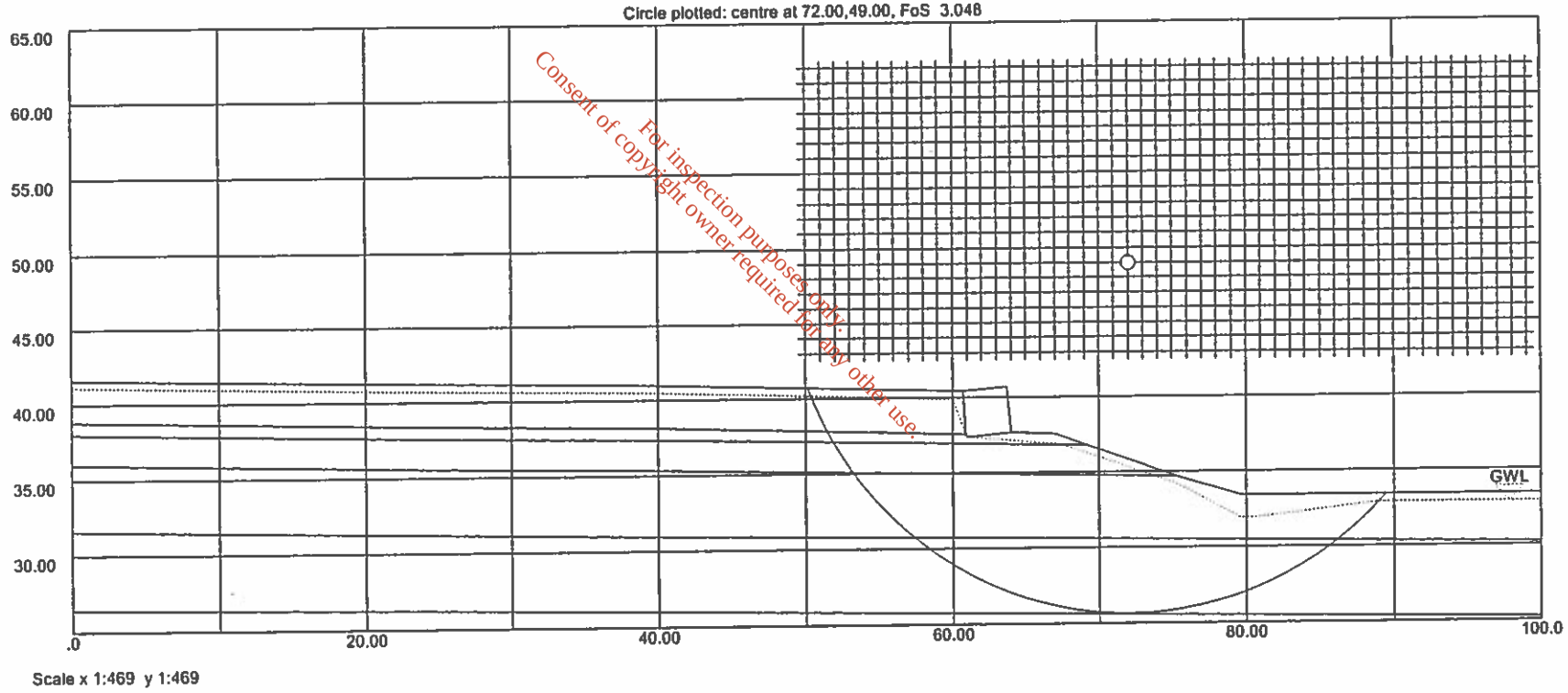
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	FA: Run 10:01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No4.sld	



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Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Drained Analysis (Long Term)
Failure Tangent to Non Intact/ Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Drained - linear strength	45.00	100.0
2	Peat (Drained)	11.00	11.00	Drained - linear strength	25.00	.0
3	Clay (Drained)	18.00	18.00	Drained - linear strength	30.00	.0
4	Upper Sand (Drained	19.00	19.00	Drained - linear strength	33.00	.0
5	Lower Sand (Drained	19.00	19.00	Drained - linear strength	34.00	.0
6	Non Intact Rock (Dr	20.00	20.00	Drained - linear strength	40.00	.0
7	Rock (Drained)	22.00	22.00	Drained - linear strength	45.00	50.00

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	36.90	.	34.20	31.90

Stratum	Material	X --> 80.60	89.00	100.0
1	1	.	.	33.40
2	2	.	.	33.40
3	3	.	.	33.40

4	4	.	.	33.40
5	5	.	.	33.40
6	6	.	.	30.20
7	7	.	.	25.20
GWL1	-	31.90	32.90	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 7

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	17.15	6508.	23.48	2137.	50180.
50.00	44.00	18.15	6738.	19.98	2723.	54400.
50.00	45.00	19.15	6961.	17.74	3312.	58740.
50.00	46.00	20.15	7172.	15.93	3964.	63150.
50.00	47.00	21.15	7365.	14.52	4659.	67650.
50.00	48.00	22.15	7559.	13.41	5390.	72250.
50.00	49.00	23.15	7744.	12.47	6166.	76860.
50.00	50.00	24.15	7927.	11.71	6959.	81570.
50.00	51.00	25.15	8102.	11.06	7809.	86350.
50.00	52.00	26.15	8272.	10.51	8677.	91210.
50.00	53.00	27.15	8431.	10.06	9562.	96220.
50.00	54.00	28.15	8592.	9.654	10490.	101200.
50.00	55.00	29.15	8747.	9.295	11440.	106300.
50.00	56.00	30.15	8899.	8.979	12420.	111500.
50.00	57.00	31.15	9046.	8.694	13430.	116700.
50.00	58.00	32.15	9190.	8.445	14450.	122000.
50.00	59.00	33.15	9329.	8.225	15490.	127400.
50.00	60.00	34.15	9466.	8.023	16560.	132800.
50.00	61.00	35.15	9600.	7.839	17650.	138300.
50.00	62.00	36.15	9738.	7.671	18760.	143900.
51.00	43.00	17.16	6480.	19.44	2582.	50180.
51.00	44.00	18.16	6705.	17.03	3193.	54370.
51.00	45.00	19.16	6919.	15.19	3862.	58660.
51.00	46.00	20.16	7128.	13.78	4571.	63010.
51.00	47.00	21.16	7317.	12.65	5330.	67420.
51.00	48.00	22.16	7511.	11.76	6117.	71930.
51.00	49.00	23.16	7696.	11.02	6945.	76520.
51.00	50.00	24.16	7875.	10.41	7801.	81200.
51.00	51.00	25.16	8048.	9.890	8691.	85950.
51.00	52.00	26.16	8214.	9.444	9612.	90780.
51.00	53.00	27.16	8376.	9.059	10560.	95670.
51.00	54.00	28.16	8523.	8.725	11540.	100700.
51.00	55.00	29.16	8674.	8.431	12540.	105700.
51.00	56.00	30.16	8823.	8.171	13570.	110800.
51.00	57.00	31.16	8967.	7.939	14610.	116000.
51.00	58.00	32.16	9119.	7.745	15670.	121400.
51.00	59.00	33.16	9258.	7.557	16770.	126700.
51.00	60.00	34.16	9394.	7.390	17870.	132100.
51.00	61.00	35.16	9526.	7.240	19000.	137500.
51.00	62.00	36.16	9656.	7.102	20140.	143000.
52.00	43.00	17.18	6446.	16.42	3052.	50120.
52.00	44.00	18.18	6669.	14.51	3737.	54210.
52.00	45.00	19.18	6879.	13.07	4469.	58400.
52.00	46.00	20.17	7074.	11.97	5239.	62700.
52.00	47.00	21.17	7268.	11.09	6050.	67080.
52.00	48.00	22.17	7457.	10.38	6891.	71560.
52.00	49.00	23.17	7639.	9.796	7770.	76120.
52.00	50.00	24.17	7814.	9.301	8682.	80760.
52.00	51.00	25.17	7983.	8.880	9625.	85470.
52.00	52.00	26.17	8147.	8.518	10600.	90260.

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52.00	53.00	27.17	8306.	8.205	11590.	95130.
52.00	54.00	28.17	8451.	7.930	12620.	100100.
52.00	55.00	29.17	8607.	7.696	13660.	105100.
52.00	56.00	30.17	8754.	7.482	14730.	110200.
52.00	57.00	31.17	8897.	7.292	15820.	115400.
52.00	58.00	32.17	9037.	7.121	16930.	120600.
52.00	59.00	33.17	9173.	6.967	18060.	125800.
52.00	60.00	34.17	9307.	6.826	19220.	131200.
52.00	61.00	35.17	9439.	6.697	20390.	136600.
52.00	62.00	36.17	9572.	6.588	21570.	142100.
53.00	43.00	17.19	6405.	13.92	3579.	49820.
53.00	44.00	18.19	6618.	12.46	4328.	53910.
53.00	45.00	19.19	6823.	11.36	5114.	58080.
53.00	46.00	20.19	7022.	10.51	5929.	62340.
53.00	47.00	21.19	7216.	9.795	6810.	66710.
53.00	48.00	22.19	7399.	9.220	7710.	71140.
53.00	49.00	23.19	7575.	8.754	8643.	75660.
53.00	50.00	24.19	7746.	8.354	9607.	80260.
53.00	51.00	25.19	7916.	8.023	10590.	84950.
53.00	52.00	26.19	8079.	7.728	11610.	89710.
53.00	53.00	27.19	8236.	7.472	12650.	94540.
53.00	54.00	28.19	8380.	7.246	13730.	99470.
53.00	55.00	29.19	8529.	7.050	14810.	104400.
53.00	56.00	30.19	8674.	6.874	15920.	109500.
53.00	57.00	31.19	8817.	6.717	17060.	114600.
53.00	58.00	32.19	8956.	6.575	18210.	119700.
53.00	59.00	33.19	9091.	6.447	19380.	125000.
53.00	60.00	34.19	9223.	6.334	20570.	130300.
53.00	61.00	35.19	9353.	6.229	21780.	135600.
53.00	62.00	36.19	9476.	6.135	22990.	141000.
54.00	43.00	17.20	6352.	11.91	4157.	49520.
54.00	44.00	18.20	6566.	10.83	4948.	53570.
54.00	45.00	19.20	6772.	9.952	5800.	57720.
54.00	46.00	20.20	6964.	9.275	6678.	61940.
54.00	47.00	21.20	7153.	8.717	7603.	66270.
54.00	48.00	22.20	7333.	8.260	8556.	70670.
54.00	49.00	23.20	7514.	7.880	9541.	75180.
54.00	50.00	24.20	7683.	7.557	10550.	79750.
54.00	51.00	25.20	7846.	7.280	11590.	84380.
54.00	52.00	26.20	8003.	7.040	12650.	89080.
54.00	53.00	27.20	8157.	6.831	13740.	93860.
54.00	54.00	28.20	8309.	6.647	14850.	98710.
54.00	55.00	29.20	8447.	6.482	15990.	103700.
54.00	56.00	30.20	8591.	6.337	17150.	108700.
54.00	57.00	31.20	8732.	6.208	18320.	113700.
54.00	58.00	32.20	8869.	6.094	19510.	118900.
54.00	59.00	33.20	9003.	5.990	20710.	124100.
54.00	60.00	34.20	9131.	5.897	21930.	129300.
54.00	61.00	35.20	9260.	5.811	23170.	134600.
54.00	62.00	36.20	9386.	5.733	24420.	140000.
55.00	43.00	17.21	6303.	10.36	4750.	49200.
55.00	44.00	18.21	6513.	9.481	5615.	53230.
55.00	45.00	19.21	6714.	8.780	6532.	57360.
55.00	46.00	20.21	6907.	8.262	7448.	61530.
55.00	47.00	21.21	7093.	7.811	8428.	65820.
55.00	48.00	22.21	7268.	7.446	9424.	70170.
55.00	49.00	23.21	7440.	7.136	10460.	74620.
55.00	50.00	24.21	7607.	6.874	11510.	79130.
55.00	51.00	25.21	7768.	6.649	12590.	83720.
55.00	52.00	26.21	7928.	6.444	13720.	88410.
55.00	53.00	27.21	8071.	6.270	14860.	93170.
55.00	54.00	28.21	8219.	6.118	16010.	97980.
55.00	55.00	29.21	8362.	5.987	17180.	102900.
55.00	56.00	30.21	8503.	5.869	18370.	107800.
55.00	57.00	31.21	8638.	5.764	19570.	112800.
55.00	58.00	32.21	8774.	5.670	20800.	117900.
55.00	59.00	33.21	8907.	5.584	22040.	123100.
55.00	60.00	34.21	9037.	5.507	23290.	128300.
55.00	61.00	35.21	9164.	5.438	24560.	133600.
55.00	62.00	36.21	9288.	5.374	25850.	138900.
56.00	43.00	17.23	6248.	9.080	5380.	48850.
56.00	44.00	18.23	6455.	8.307	6301.	52840.
56.00	45.00	19.23	6649.	7.848	7250.	56890.
56.00	46.00	20.23	6838.	7.402	8240.	61050.
56.00	47.00	21.23	7020.	7.045	9269.	65300.

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56.00	48.00	22.23	7189.	6.739	10330.	69650.
56.00	49.00	23.23	7360.	6.486	11420.	74050.
56.00	50.00	24.23	7521.	6.274	12510.	78510.
56.00	51.00	25.23	7681.	6.088	13640.	83060.
56.00	52.00	26.23	7836.	5.927	14790.	87680.
56.00	53.00	27.23	7985.	5.791	15950.	92390.
56.00	54.00	28.23	8134.	5.663	17160.	97170.
56.00	55.00	29.23	8274.	5.554	18360.	102000.
56.00	56.00	30.23	8413.	5.458	19590.	106900.
56.00	57.00	31.23	8548.	5.372	20830.	111900.
56.00	58.00	32.23	8680.	5.295	22080.	116900.
56.00	59.00	33.23	8809.	5.225	23350.	122000.
56.00	60.00	34.23	8936.	5.162	24640.	127200.
56.00	61.00	35.23	9061.	5.106	25940.	132400.
56.00	62.00	36.23	9188.	5.048	27300.	137800.
57.00	43.00	17.24	6185.	8.009	6050.	48450.
57.00	44.00	18.24	6384.	7.475	7007.	52380.
57.00	45.00	19.24	6573.	7.032	8026.	56440.
57.00	46.00	20.24	6760.	6.674	9074.	60560.
57.00	47.00	21.24	6939.	6.389	10140.	64760.
57.00	48.00	22.24	7112.	6.141	11240.	69040.
57.00	49.00	23.24	7279.	5.937	12360.	73380.
57.00	50.00	24.24	7441.	5.763	13500.	77830.
57.00	51.00	25.24	7599.	5.611	14670.	82340.
57.00	52.00	26.24	7748.	5.479	15860.	86910.
57.00	53.00	27.24	7894.	5.366	17060.	91540.
57.00	54.00	28.24	8039.	5.266	18280.	96270.
57.00	55.00	29.24	8179.	5.178	19520.	101100.
57.00	56.00	30.24	8315.	5.100	20770.	105900.
57.00	57.00	31.24	8456.	5.020	22100.	110900.
57.00	58.00	32.24	8587.	4.956	23390.	115900.
57.00	59.00	33.24	8714.	4.899	24700.	121000.
57.00	60.00	34.24	8839.	4.848	26020.	126100.
57.00	61.00	35.24	8961.	4.801	27360.	131300.
57.00	62.00	36.24	9081.	4.758	28700.	136600.
58.00	43.00	17.25	6111.	7.121	6747.	48040.
58.00	44.00	18.25	6308.	6.693	7752.	51880.
58.00	45.00	19.25	6499.	6.353	8802.	55920.
58.00	46.00	20.25	6682.	6.069	9885.	59990.
58.00	47.00	21.25	6859.	5.828	11000.	64130.
58.00	48.00	22.25	7028.	5.636	12130.	68370.
58.00	49.00	23.25	7193.	5.467	13290.	72680.
58.00	50.00	24.25	7350.	5.321	14480.	77060.
58.00	51.00	25.25	7508.	5.195	15700.	81560.
58.00	52.00	26.25	7660.	5.086	16930.	86110.
58.00	53.00	27.25	7807.	4.991	18180.	90740.
58.00	54.00	28.25	7949.	4.908	19440.	95430.
58.00	55.00	29.25	8085.	4.835	20720.	100200.
58.00	56.00	30.25	8220.	4.770	22010.	105000.
58.00	57.00	31.25	8352.	4.712	23320.	109900.
58.00	58.00	32.25	8481.	4.661	24640.	114800.
58.00	59.00	33.25	8606.	4.614	25970.	119900.
58.00	60.00	34.25	8733.	4.570	27350.	125000.
58.00	61.00	35.25	8855.	4.533	28710.	130100.
58.00	62.00	36.25	8975.	4.501	30080.	135400.
59.00	43.00	17.27	6036.	6.400	7428.	47540.
59.00	44.00	18.27	6232.	6.056	8487.	51400.
59.00	45.00	19.27	6419.	5.776	9580.	55330.
59.00	46.00	20.27	6599.	5.550	10700.	59370.
59.00	47.00	21.27	6776.	5.354	11860.	63500.
59.00	48.00	22.27	6942.	5.190	13040.	67690.
59.00	49.00	23.27	7105.	5.051	14250.	71970.
59.00	50.00	24.26	7262.	4.935	15470.	76320.
59.00	51.00	25.26	7415.	4.831	16720.	80760.
59.00	52.00	26.26	7563.	4.742	17980.	85260.
59.00	53.00	27.26	7706.	4.666	19250.	89830.
59.00	54.00	28.26	7847.	4.598	20550.	94480.
59.00	55.00	29.26	7984.	4.537	21860.	99200.
59.00	56.00	30.26	8117.	4.484	23190.	104000.
59.00	57.00	31.26	8245.	4.436	24530.	108800.
59.00	58.00	32.26	8374.	4.394	25890.	113700.
59.00	59.00	33.26	8501.	4.359	27240.	118600.
59.00	60.00	34.26	8625.	4.330	28600.	123800.
59.00	61.00	35.26	8747.	4.305	29970.	129000.
59.00	62.00	36.26	8866.	4.285	31330.	134300.

EPA Export 08-07-2014:23:43:12

ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	AA:Rev10:06	

Drg. Ref.

Made by	Date	Date	Checked
DAH	08-Dec-2003	Stability Max Mineral Cut Rev4.sld	

60.00	43.00	17.28	5960.	5.785	8130.	47030.
60.00	44.00	18.28	6152.	5.511	9229.	50860.
60.00	45.00	19.28	6337.	5.285	10360.	54760.
60.00	46.00	20.28	6513.	5.097	11530.	58750.
60.00	47.00	21.28	6685.	4.941	12710.	62820.
60.00	48.00	22.28	6850.	4.809	13930.	66980.
60.00	49.00	23.28	7010.	4.696	15160.	71220.
60.00	50.00	24.28	7164.	4.597	16430.	75530.
60.00	51.00	25.28	7314.	4.514	17700.	79910.
60.00	52.00	26.28	7459.	4.442	18990.	84370.
60.00	53.00	27.28	7602.	4.377	20310.	88900.
60.00	54.00	28.28	7734.	4.321	21660.	93590.
60.00	55.00	29.28	7869.	4.272	23000.	98270.
60.00	56.00	30.28	8002.	4.231	24350.	103000.
60.00	57.00	31.28	8134.	4.197	25710.	107900.
60.00	58.00	32.28	8262.	4.169	27070.	112800.
60.00	59.00	33.28	8388.	4.146	28430.	117900.
60.00	60.00	34.28	8508.	4.128	29780.	122900.
60.00	61.00	35.28	8631.	4.114	31140.	128100.
60.00	62.00	36.28	8751.	4.103	32500.	133400.
61.00	43.00	17.29	5877.	5.303	8814.	46740.
61.00	44.00	18.29	6065.	5.074	9960.	50540.
61.00	45.00	19.29	6241.	4.886	11150.	54470.
61.00	46.00	20.29	6416.	4.734	12350.	58440.
61.00	47.00	21.29	6583.	4.606	13570.	62490.
61.00	48.00	22.29	6745.	4.497	14810.	66620.
61.00	49.00	23.29	6901.	4.405	16080.	70830.
61.00	50.00	24.29	7054.	4.325	17370.	75120.
61.00	51.00	25.29	7204.	4.255	18680.	79120.
61.00	52.00	26.29	7349.	4.173	20020.	83550.
61.00	53.00	27.29	7490.	4.124	21350.	88060.
61.00	54.00	28.29	7628.	4.083	22700.	92660.
61.00	55.00	29.29	7764.	4.048	24050.	97360.
61.00	56.00	30.29	7897.	4.021	25400.	102100.
61.00	57.00	31.29	8026.	3.999	26750.	107000.
61.00	58.00	32.29	8154.	3.983	28100.	111900.
61.00	59.00	33.29	8281.	3.970	29460.	116900.
61.00	60.00	34.29	8405.	3.960	30810.	122000.
61.00	61.00	35.29	8527.	3.953	32170.	127200.
61.00	62.00	36.29	8642.	3.948	33520.	132300.
62.00	43.00	17.30	5782.	4.835	9509.	45980.
62.00	44.00	18.30	5968.	4.652	10690.	49730.
62.00	45.00	19.30	6146.	4.502	11900.	53560.
62.00	46.00	20.30	6317.	4.378	13130.	57470.
62.00	47.00	21.30	6483.	4.274	14380.	61470.
62.00	48.00	22.30	6644.	4.186	15660.	65550.
62.00	49.00	23.30	6800.	4.110	16960.	69710.
62.00	50.00	24.30	6952.	4.045	18280.	73950.
62.00	51.00	25.30	7099.	3.991	19610.	78290.
62.00	52.00	26.30	7243.	3.948	20950.	82710.
62.00	53.00	27.30	7384.	3.913	22290.	87230.
62.00	54.00	28.30	7522.	3.885	23640.	91830.
62.00	55.00	29.30	7657.	3.865	24970.	96520.
62.00	56.00	30.30	7789.	3.848	26320.	101300.
62.00	57.00	31.30	7920.	3.835	27670.	106100.
62.00	58.00	32.30	8047.	3.826	29020.	111000.
62.00	59.00	33.30	8173.	3.820	30360.	116000.
62.00	60.00	34.30	8295.	3.816	31710.	121000.
62.00	61.00	35.30	8417.	3.814	33060.	126100.
62.00	62.00	36.30	8538.	3.814	34430.	131300.
63.00	43.00	17.32	5691.	4.460	10190.	45440.
63.00	44.00	18.32	5874.	4.310	11400.	49150.
63.00	45.00	19.32	6051.	4.187	12650.	52950.
63.00	46.00	20.32	6218.	4.091	13890.	56800.
63.00	47.00	21.32	6382.	4.004	15180.	60770.
63.00	48.00	22.32	6541.	3.932	16490.	64810.
63.00	49.00	23.32	6695.	3.874	17800.	68960.
63.00	50.00	24.32	6846.	3.828	19120.	73200.
63.00	51.00	25.32	6992.	3.792	20450.	77540.
63.00	52.00	26.32	7136.	3.764	21770.	81960.
63.00	53.00	27.32	7277.	3.742	23100.	86460.
63.00	54.00	28.32	7414.	3.725	24440.	91040.
63.00	55.00	29.32	7549.	3.711	25780.	95690.
63.00	56.00	30.32	7681.	3.702	27120.	100400.
63.00	57.00	31.32	7815.	3.696	28480.	105300.

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ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	AA:Rev10:07	

Drg. Ref.

Made by	Date	Date	Checked
DAH	08-Dec-2003	Stability Max Mineral Cut Rev4.sld	

63.00	58.00	32.32	7939.	3.693	29800.	110100.
63.00	59.00	33.32	8065.	3.691	31160.	115000.
63.00	60.00	34.32	8189.	3.691	32520.	120000.
63.00	61.00	35.32	8311.	3.693	33870.	125100.
63.00	62.00	36.32	8431.	3.696	35220.	130200.
64.00	43.00	17.33	5594.	4.146	10830.	44890.
64.00	44.00	18.33	5776.	4.022	12080.	48560.
64.00	45.00	19.33	5946.	3.925	13320.	52290.
64.00	46.00	20.33	6114.	3.841	14620.	56140.
64.00	47.00	21.33	6277.	3.775	15920.	60090.
64.00	48.00	22.33	6434.	3.724	17220.	64150.
64.00	49.00	23.33	6588.	3.685	18530.	68290.
64.00	50.00	24.33	6738.	3.655	19840.	72520.
64.00	51.00	25.33	6885.	3.631	21160.	76840.
64.00	52.00	26.33	7032.	3.612	22500.	81270.
64.00	53.00	27.33	7173.	3.599	23830.	85740.
64.00	54.00	28.33	7310.	3.589	25160.	90280.
64.00	55.00	29.33	7446.	3.582	26500.	94900.
64.00	56.00	30.33	7578.	3.577	27840.	99590.
64.00	57.00	31.33	7709.	3.575	29190.	104300.
64.00	58.00	32.33	7833.	3.577	30500.	109100.
64.00	59.00	33.33	7958.	3.580	31850.	114000.
64.00	60.00	34.33	8082.	3.584	33200.	119000.
64.00	61.00	35.33	8205.	3.588	34560.	124000.
64.00	62.00	36.33	8325.	3.594	35920.	129100.
65.00	43.00	17.34	5489.	3.877	11450.	44390.
65.00	44.00	18.34	5668.	3.775	12730.	48040.
65.00	45.00	19.34	5836.	3.702	13980.	51760.
65.00	46.00	20.34	6003.	3.642	15270.	55630.
65.00	47.00	21.34	6168.	3.596	16580.	59610.
65.00	48.00	22.34	6326.	3.561	17880.	63660.
65.00	49.00	23.34	6480.	3.534	19180.	67790.
65.00	50.00	24.34	6630.	3.513	20490.	72000.
65.00	51.00	25.34	6776.	3.498	21810.	76280.
65.00	52.00	26.34	6920.	3.487	23130.	80650.
65.00	53.00	27.34	7060.	3.479	24450.	85080.
65.00	54.00	28.34	7198.	3.475	25780.	89590.
65.00	55.00	29.34	7333.	3.473	27110.	94180.
65.00	56.00	30.34	7465.	3.474	28450.	98830.
65.00	57.00	31.34	7591.	3.478	29760.	103500.
65.00	58.00	32.34	7719.	3.481	31110.	108300.
65.00	59.00	33.34	7845.	3.486	32460.	113100.
65.00	60.00	34.34	7969.	3.493	33800.	118100.
65.00	61.00	35.34	8090.	3.501	35150.	123100.
65.00	62.00	36.34	8210.	3.509	36500.	128100.
66.00	43.00	17.36	5387.	3.658	12000.	43890.
66.00	44.00	18.36	5562.	3.588	13240.	47520.
66.00	45.00	19.36	5734.	3.531	14530.	51280.
66.00	46.00	20.36	5901.	3.487	15810.	55130.
66.00	47.00	21.36	6063.	3.453	17100.	59050.
66.00	48.00	22.36	6221.	3.428	18400.	63060.
66.00	49.00	23.36	6375.	3.409	19700.	67160.
66.00	50.00	24.36	6525.	3.395	21010.	71320.
66.00	51.00	25.36	6672.	3.386	22320.	75570.
66.00	52.00	26.36	6815.	3.381	23630.	79890.
66.00	53.00	27.36	6956.	3.378	24950.	84290.
66.00	54.00	28.35	7093.	3.378	26270.	88760.
66.00	55.00	29.35	7228.	3.380	27600.	93290.
66.00	56.00	30.35	7356.	3.386	28900.	97850.
66.00	57.00	31.35	7486.	3.391	30230.	102500.
66.00	58.00	32.35	7614.	3.397	31570.	107300.
66.00	59.00	33.35	7740.	3.405	32920.	112100.
66.00	60.00	34.35	7863.	3.413	34270.	116900.
66.00	61.00	35.35	7985.	3.422	35620.	121900.
66.00	62.00	36.35	8104.	3.432	36970.	126900.
67.00	43.00	17.37	5283.	3.494	12440.	43460.
67.00	44.00	18.37	5457.	3.440	13680.	47060.
67.00	45.00	19.37	5630.	3.396	14950.	50790.
67.00	46.00	20.37	5797.	3.363	16240.	54590.
67.00	47.00	21.37	5959.	3.337	17520.	58480.
67.00	48.00	22.37	6117.	3.319	18820.	62450.
67.00	49.00	23.37	6271.	3.307	20110.	66500.
67.00	50.00	24.37	6421.	3.298	21410.	70630.
67.00	51.00	25.37	6568.	3.294	22720.	74830.
67.00	52.00	26.37	6711.	3.292	24030.	79110.

EPA Export 08-07-2014:23:43:12

67.00	53.00	27.37	6051.	3.293	25340.	83460.
67.00	54.00	28.37	6988.	3.296	26660.	87880.
67.00	55.00	29.37	7123.	3.301	27980.	92370.
67.00	56.00	30.37	7251.	3.309	29270.	96870.
67.00	57.00	31.37	7380.	3.316	30600.	101500.
67.00	58.00	32.37	7508.	3.325	31940.	106200.
67.00	59.00	33.37	7633.	3.334	33280.	110900.
67.00	60.00	34.37	7756.	3.344	34620.	115800.
67.00	61.00	35.37	7877.	3.355	35960.	120600.
67.00	62.00	36.37	7997.	3.365	37320.	125600.
68.00	43.00	17.38	5172.	3.377	12760.	43090.
68.00	44.00	18.38	5350.	3.329	14030.	46700.
68.00	45.00	19.38	5526.	3.289	15290.	50280.
68.00	46.00	20.38	5693.	3.263	16560.	54050.
68.00	47.00	21.38	5855.	3.245	17840.	57890.
68.00	48.00	22.38	6013.	3.232	19130.	61820.
68.00	49.00	23.38	6167.	3.223	20420.	65820.
68.00	50.00	24.38	6317.	3.219	21720.	69900.
68.00	51.00	25.38	6463.	3.218	23020.	74060.
68.00	52.00	26.38	6606.	3.219	24320.	78280.
68.00	53.00	27.38	6745.	3.222	25630.	82580.
68.00	54.00	28.38	6882.	3.227	26940.	86950.
68.00	55.00	29.38	7012.	3.236	28220.	91330.
68.00	56.00	30.38	7144.	3.244	29540.	95840.
68.00	57.00	31.38	7273.	3.253	30870.	100400.
68.00	58.00	32.38	7405.	3.265	32200.	105100.
68.00	59.00	33.38	7530.	3.275	33530.	109800.
68.00	60.00	34.38	7653.	3.286	34860.	114500.
68.00	61.00	35.38	7775.	3.298	36190.	119400.
68.00	62.00	36.38	7896.	3.312	37530.	124300.
69.00	43.00	17.39	5069.	3.282	12990.	42640.
69.00	44.00	18.39	5248.	3.242	14250.	46210.
69.00	45.00	19.39	5420.	3.212	15520.	49850.
69.00	46.00	20.39	5586.	3.191	16790.	53580.
69.00	47.00	21.39	5748.	3.176	18070.	57390.
69.00	48.00	22.39	5905.	3.167	19350.	61280.
69.00	49.00	23.39	6057.	3.161	20640.	65240.
69.00	50.00	24.39	6206.	3.159	21930.	69280.
69.00	51.00	25.39	6352.	3.160	23220.	73400.
69.00	52.00	26.39	6494.	3.164	24520.	77590.
69.00	53.00	27.39	6636.	3.171	25830.	81890.
69.00	54.00	28.39	6779.	3.172	27120.	86020.
69.00	55.00	29.39	6910.	3.183	28390.	90370.
69.00	56.00	30.39	7042.	3.192	29710.	94830.
69.00	57.00	31.39	7170.	3.201	31020.	99300.
69.00	58.00	32.39	7299.	3.213	32340.	103900.
69.00	59.00	33.39	7425.	3.226	33660.	108600.
69.00	60.00	34.39	7549.	3.239	34990.	113300.
69.00	61.00	35.39	7671.	3.252	36320.	118100.
69.00	62.00	36.39	7791.	3.266	37660.	123000.
70.00	43.00	17.41	4966.	3.212	13130.	42170.
70.00	44.00	18.41	5144.	3.176	14380.	45680.
70.00	45.00	19.41	5316.	3.151	15640.	49280.
70.00	46.00	20.41	5482.	3.132	16910.	52960.
70.00	47.00	21.41	5643.	3.120	18180.	56720.
70.00	48.00	22.41	5803.	3.115	19450.	60580.
70.00	49.00	23.41	5956.	3.112	20730.	64500.
70.00	50.00	24.41	6105.	3.112	22020.	68500.
70.00	51.00	25.41	6251.	3.114	23300.	72570.
70.00	52.00	26.41	6393.	3.119	24600.	76720.
70.00	53.00	27.41	6533.	3.125	25900.	80940.
70.00	54.00	28.41	6664.	3.134	27160.	85110.
70.00	55.00	29.41	6799.	3.144	28460.	89480.
70.00	56.00	30.41	6932.	3.155	29760.	93920.
70.00	57.00	31.41	7062.	3.167	31080.	98420.
70.00	58.00	32.41	7189.	3.180	32390.	103000.
70.00	59.00	33.41	7314.	3.193	33710.	107600.
70.00	60.00	34.41	7437.	3.207	35040.	112400.
70.00	61.00	35.41	7558.	3.221	36370.	117100.
70.00	62.00	36.41	7677.	3.236	37700.	122000.
71.00	43.00	17.42	4860.	3.174	13160.	41780.
71.00	44.00	18.42	5039.	3.144	14410.	45290.
71.00	45.00	19.42	5213.	3.110	15660.	48690.
71.00	46.00	20.42	5380.	3.094	16910.	52330.
71.00	47.00	21.42	5542.	3.083	18180.	56040.

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71.00	48.00	22.42	5699.	3.077	19450.	59840.
71.00	49.00	23.42	5852.	3.075	20720.	63710.
71.00	50.00	24.42	6001.	3.075	22000.	67660.
71.00	51.00	25.42	6146.	3.079	23290.	71690.
71.00	52.00	26.42	6288.	3.083	24570.	75720.
71.00	53.00	27.42	6428.	3.091	25850.	79900.
71.00	54.00	28.42	6562.	3.103	27110.	84100.
71.00	55.00	29.42	6696.	3.113	28400.	88420.
71.00	56.00	30.42	6828.	3.124	29710.	92820.
71.00	57.00	31.42	6957.	3.137	31020.	97290.
71.00	58.00	32.42	7084.	3.150	32330.	101800.
71.00	59.00	33.42	7208.	3.163	33650.	106400.
71.00	60.00	34.42	7330.	3.177	34970.	111100.
71.00	61.00	35.42	7451.	3.192	36290.	115800.
71.00	62.00	36.42	7569.	3.207	37620.	120600.
72.00	43.00	17.43	4764.	3.159	13060.	41250.
72.00	44.00	18.43	4936.	3.118	14320.	44660.
72.00	45.00	19.43	5108.	3.095	15570.	48190.
72.00	46.00	20.43	5274.	3.079	16830.	51810.
72.00	47.00	21.43	5434.	3.069	18080.	55510.
72.00	48.00	22.43	5591.	3.064	19350.	59280.
72.00	49.00	23.43	5744.	3.068	20610.	62820.
72.00	50.00	24.43	5895.	3.051	21870.	66730.
72.00	51.00	25.43	6041.	3.055	23140.	70710.
72.00	52.00	26.43	6184.	3.062	24420.	74770.
72.00	53.00	27.43	6323.	3.070	25710.	78910.
72.00	54.00	28.43	6462.	3.084	26960.	83160.
72.00	55.00	29.43	6596.	3.095	28260.	87450.
72.00	56.00	30.43	6728.	3.106	29560.	91820.
72.00	57.00	31.43	6856.	3.118	30870.	96250.
72.00	58.00	32.43	6983.	3.131	32180.	100800.
72.00	59.00	33.43	7108.	3.146	33490.	105300.
72.00	60.00	34.43	7225.	3.158	34790.	109900.
72.00	61.00	35.43	7347.	3.174	36110.	114600.
72.00	62.00	36.43	7467.	3.190	37430.	119400.
73.00	43.00	17.45	4659.	3.170	12080.	40830.
73.00	44.00	18.45	4831.	3.117	14140.	44070.
73.00	45.00	19.45	5003.	3.087	15380.	47470.
73.00	46.00	20.45	5169.	3.070	16630.	51040.
73.00	47.00	21.45	5333.	3.060	17870.	54690.
73.00	48.00	22.45	5491.	3.055	19120.	58420.
73.00	49.00	23.45	5645.	3.054	20380.	62250.
73.00	50.00	24.45	5794.	3.056	21650.	66150.
73.00	51.00	25.45	5939.	3.060	22920.	70140.
73.00	52.00	26.45	6081.	3.066	24200.	74200.
73.00	53.00	27.45	6220.	3.065	25440.	77960.
73.00	54.00	28.45	6356.	3.073	26730.	82140.
73.00	55.00	29.45	6490.	3.084	28020.	86400.
73.00	56.00	30.45	6622.	3.096	29310.	90740.
73.00	57.00	31.44	6753.	3.109	30610.	95160.
73.00	58.00	32.44	6881.	3.123	31910.	99640.
73.00	59.00	33.44	7006.	3.138	33210.	104200.
73.00	60.00	34.44	7123.	3.150	34510.	108700.
73.00	61.00	35.44	7245.	3.166	35820.	113400.
73.00	62.00	36.44	7365.	3.182	37140.	118200.
74.00	43.00	17.46	4561.	3.194	12590.	40220.
74.00	44.00	18.46	4736.	3.153	13820.	43580.
74.00	45.00	19.46	4901.	3.116	15070.	46970.
74.00	46.00	20.46	5068.	3.093	16310.	50430.
74.00	47.00	21.46	5231.	3.070	17550.	53880.
74.00	48.00	22.46	5388.	3.062	18800.	57560.
74.00	49.00	23.46	5541.	3.058	20060.	61350.
74.00	50.00	24.46	5689.	3.058	21320.	65210.
74.00	51.00	25.46	5834.	3.061	22590.	69160.
74.00	52.00	26.46	5977.	3.067	23870.	73190.
74.00	53.00	27.46	6113.	3.077	25110.	77260.
74.00	54.00	28.46	6250.	3.087	26380.	81460.
74.00	55.00	29.46	6385.	3.099	27670.	85730.
74.00	56.00	30.46	6517.	3.111	28960.	90080.
74.00	57.00	31.46	6646.	3.124	30250.	94500.
74.00	58.00	32.46	6776.	3.125	31530.	98550.
74.00	59.00	33.46	6897.	3.136	32820.	102900.
74.00	60.00	34.46	7020.	3.151	34130.	107500.
74.00	61.00	35.46	7142.	3.167	35430.	112200.
74.00	62.00	36.46	7262.	3.183	36740.	116900.

EPA Export 08-07-2014:23:43:12

75.00	43.00	17.47	4454.	3.247	12200.	39610.
75.00	44.00	18.47	4631.	3.204	13410.	42970.
75.00	45.00	19.47	4802.	3.154	14660.	46240.
75.00	46.00	20.47	4966.	3.129	15900.	49740.
75.00	47.00	21.47	5125.	3.111	17140.	53330.
75.00	48.00	22.47	5281.	3.099	18390.	56990.
75.00	49.00	23.47	5435.	3.086	19640.	60620.
75.00	50.00	24.47	5585.	3.076	20900.	64290.
75.00	51.00	25.47	5732.	3.079	22160.	68220.
75.00	52.00	26.47	5875.	3.084	23420.	72220.
75.00	53.00	27.47	6012.	3.093	24660.	76260.
75.00	54.00	28.47	6149.	3.102	25930.	80420.
75.00	55.00	29.47	6284.	3.112	27210.	84660.
75.00	56.00	30.47	6416.	3.123	28490.	88970.
75.00	57.00	31.47	6545.	3.135	29780.	93360.
75.00	58.00	32.47	6672.	3.149	31060.	97820.
75.00	59.00	33.47	6790.	3.160	32350.	102200.
75.00	60.00	34.47	6913.	3.175	33650.	106800.
75.00	61.00	35.47	7034.	3.190	34950.	111500.
75.00	62.00	36.47	7153.	3.206	36250.	116200.
76.00	43.00	17.48	4357.	3.337	11710.	39060.
76.00	44.00	18.48	4529.	3.265	12930.	42210.
76.00	45.00	19.48	4698.	3.223	14150.	45610.
76.00	46.00	20.48	4863.	3.196	15370.	49110.
76.00	47.00	21.48	5025.	3.159	16630.	52540.
76.00	48.00	22.48	5182.	3.145	17870.	56200.
76.00	49.00	23.48	5335.	3.136	19110.	59940.
76.00	50.00	24.48	5483.	3.131	20360.	63770.
76.00	51.00	25.48	5629.	3.128	21620.	67630.
76.00	52.00	26.48	5773.	3.122	22880.	71430.
76.00	53.00	27.48	5909.	3.121	24110.	75260.
76.00	54.00	28.48	6046.	3.120	25380.	79380.
76.00	55.00	29.48	6181.	3.137	26650.	83580.
76.00	56.00	30.48	6313.	3.146	27920.	87860.
76.00	57.00	31.48	6442.	3.157	29200.	92210.
76.00	58.00	32.48	6562.	3.167	30480.	96510.
76.00	59.00	33.48	6687.	3.180	31760.	101000.
76.00	60.00	34.48	6810.	3.193	33060.	105600.
76.00	61.00	35.48	6936.	3.210	34350.	110300.
76.00	62.00	36.48	7056.	3.225	35650.	115000.
77.00	43.00	17.50	4253.	3.474	11110.	38610.
77.00	44.00	18.50	4432.	3.387	12320.	41720.
77.00	45.00	19.50	4600.	3.321	13530.	44950.
77.00	46.00	20.50	4765.	3.275	14750.	48320.
77.00	47.00	21.50	4922.	3.241	16010.	51870.
77.00	48.00	22.50	5080.	3.222	17230.	55530.
77.00	49.00	23.50	5232.	3.210	18470.	59280.
77.00	50.00	24.50	5384.	3.187	19730.	62890.
77.00	51.00	25.50	5529.	3.182	20980.	66760.
77.00	52.00	26.50	5670.	3.181	22230.	70710.
77.00	53.00	27.50	5805.	3.184	23460.	74700.
77.00	54.00	28.50	5942.	3.185	24720.	78740.
77.00	55.00	29.50	6080.	3.185	25990.	82770.
77.00	56.00	30.50	6213.	3.185	27250.	86800.
77.00	57.00	31.50	6343.	3.194	28530.	91120.
77.00	58.00	32.50	6464.	3.201	29800.	95390.
77.00	59.00	33.50	6589.	3.213	31080.	99850.
77.00	60.00	34.50	6713.	3.226	32360.	104400.
77.00	61.00	35.50	6834.	3.239	33650.	109000.
77.00	62.00	36.50	6954.	3.253	34940.	113700.
78.00	43.00	17.51	4156.	3.918	10380.	40660.
78.00	44.00	18.51	4330.	3.560	11600.	41310.
78.00	45.00	19.51	4499.	3.463	12830.	44430.
78.00	46.00	20.51	4664.	3.402	14040.	47770.
78.00	47.00	21.51	4824.	3.347	15270.	51120.
78.00	48.00	22.51	4976.	3.307	16520.	54630.
78.00	49.00	23.51	5130.	3.287	17750.	58340.
78.00	50.00	24.51	5283.	3.276	18980.	62180.
78.00	51.00	25.51	5428.	3.268	20220.	66070.
78.00	52.00	26.51	5573.	3.249	21480.	69790.
78.00	53.00	27.51	5709.	3.248	22710.	73750.
78.00	54.00	28.51	5846.	3.248	23960.	77840.
78.00	55.00	29.51	5979.	3.251	25220.	82000.
78.00	56.00	30.51	6110.	3.256	26490.	86230.
78.00	57.00	31.51	6240.	3.261	27750.	90500.

78.00	58.00	32.51	6361.	3.258	29010.	94540.
78.00	59.00	33.51	6486.	3.258	30290.	98690.
78.00	60.00	34.51	6610.	3.267	31570.	103200.
78.00	61.00	35.51		Only 1 intersection		
78.00	62.00	36.51		Only 1 intersection		
79.00	43.00	17.52	4043.	4.251	9346.	39730.
79.00	44.00	18.52	4220.	4.077	10720.	43690.
79.00	45.00	19.52	4399.	3.700	12000.	44400.
79.00	46.00	20.52	4565.	3.577	13220.	47280.
79.00	47.00	21.52	4728.	3.502	14450.	50600.
79.00	48.00	22.52	4881.	3.450	15690.	54120.
79.00	49.00	23.52	5031.	3.404	16910.	57560.
79.00	50.00	24.52	5180.	3.373	18150.	61220.
79.00	51.00	25.52	5327.	3.356	19390.	65060.
79.00	52.00	26.52	5470.	3.345	20630.	69000.
79.00	53.00	27.52	5605.	3.341	21840.	72970.
79.00	54.00	28.52	5742.	3.338	23090.	77070.
79.00	55.00	29.52	5879.	3.323	24360.	80940.
79.00	56.00	30.52	6010.	3.324	25620.	85140.
79.00	57.00	31.52	6133.	3.324	26870.	89300.
79.00	58.00	32.52		Only 1 intersection		
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79.00	60.00	34.52		Only 1 intersection		
79.00	61.00	35.52		Only 1 intersection		
79.00	62.00	36.52		Only 1 intersection		
80.00	43.00	17.54	3932.	4.706	8188.	38530.
80.00	44.00	18.54	4114.	4.452	9570.	42610.
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80.00	46.00	20.54	4464.	3.944	12290.	48470.
80.00	47.00	21.54	4626.	3.709	13510.	50120.
80.00	48.00	22.54	4783.	3.629	14740.	53480.
80.00	49.00	23.54	4931.	3.569	15970.	57000.
80.00	50.00	24.54	5080.	3.527	17200.	60660.
80.00	51.00	25.54	5226.	3.484	18440.	64240.
80.00	52.00	26.54	5368.	3.456	19680.	68020.
80.00	53.00	27.54	5503.	3.440	20900.	71890.
80.00	54.00	28.54	5640.	3.430	22140.	75940.
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80.00	57.00	31.54		Only 1 intersection		
80.00	58.00	32.54		Only 1 intersection		
80.00	59.00	33.54		Only 1 intersection		
80.00	60.00	34.54		Only 1 intersection		
80.00	61.00	35.53		Only 1 intersection		
80.00	62.00	36.53		Only 1 intersection		
81.00	43.00	17.55		Weight too small		
81.00	43.00	17.55	3818.	4.916	6916.	34000.
81.00	44.00	18.55	4002.	4.987	8291.	41350.
81.00	45.00	19.55	4180.	4.694	9689.	45480.
81.00	46.00	20.55	4354.	4.486	11060.	49630.
81.00	47.00	21.55	4524.	4.237	12450.	52750.
81.00	48.00	22.55	4681.	3.916	13700.	53660.
81.00	49.00	23.55	4831.	3.778	14940.	56440.
81.00	50.00	24.55	4980.	3.708	16170.	59930.
81.00	51.00	25.55	5125.	3.659	17390.	63620.
81.00	52.00	26.55	5267.	3.622	18620.	67430.
81.00	53.00	27.55		Only 1 intersection		
81.00	54.00	28.55		Only 1 intersection		
81.00	55.00	29.55		Only 1 intersection		
81.00	56.00	30.55		Only 1 intersection		
81.00	57.00	31.55		Only 1 intersection		
81.00	58.00	32.55		Only 1 intersection		
81.00	59.00	33.55		Only 1 intersection		
81.00	60.00	34.55		Only 1 intersection		
81.00	61.00	35.55		Only 1 intersection		
81.00	62.00	36.55		Only 1 intersection		
82.00	43.00	17.56	3747.	5.341	6267.	33470.
82.00	44.00	18.56	3897.	5.153	7068.	36430.
82.00	45.00	19.56	4066.	5.341	8268.	44160.
82.00	46.00	20.56	4241.	4.996	9682.	48370.
82.00	47.00	21.56	4415.	4.755	11070.	52640.
82.00	48.00	22.56	4581.	4.570	12450.	56920.
82.00	49.00	23.56	4736.	4.213	13800.	58120.
82.00	50.00	24.56		Only 1 intersection		
82.00	51.00	25.56		Only 1 intersection		

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EPA Export 08-07-2014:23:43:12

82.00	52.00	26.56	Only 1 intersection			
82.00	53.00	27.56	Only 1 intersection			
82.00	54.00	28.56	Only 1 intersection			
82.00	55.00	29.56	Only 1 intersection			
82.00	56.00	30.56	Only 1 intersection			
82.00	57.00	31.56	Only 1 intersection			
82.00	58.00	32.56	Only 1 intersection			
82.00	59.00	33.56	Only 1 intersection			
82.00	60.00	34.56	Only 1 intersection			
82.00	61.00	35.56	Only 1 intersection			
82.00	62.00	36.56	Only 1 intersection			
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83.00	45.00	19.58	3976.	5.458	7136.	38950.
83.00	46.00	20.57	Weight too small			
83.00	46.00	20.57	4119.	5.306	7932.	42080.
83.00	47.00	21.57	4299.	5.383	9530.	51300.
83.00	48.00	22.57	Only 1 intersection			
83.00	49.00	23.57	Only 1 intersection			
83.00	50.00	24.57	Only 1 intersection			
83.00	51.00	25.57	Only 1 intersection			
83.00	52.00	26.57	Only 1 intersection			
83.00	53.00	27.57	Only 1 intersection			
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83.00	55.00	29.57	Only 1 intersection			
83.00	56.00	30.57	Only 1 intersection			
83.00	57.00	31.57	Only 1 intersection			
83.00	58.00	32.57	Only 1 intersection			
83.00	59.00	33.57	Only 1 intersection			
83.00	60.00	34.57	Only 1 intersection			
83.00	61.00	35.57	Only 1 intersection			
83.00	62.00	36.57	Only 1 intersection			
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84.00	45.00	19.59	3905.	6.083	6306.	38360.
84.00	46.00	20.59	Only 1 intersection			
84.00	47.00	21.59	Weight too small			
84.00	47.00	21.59	Only 1 intersection			
84.00	48.00	22.59	Only 1 intersection			
84.00	49.00	23.59	Only 1 intersection			
84.00	50.00	24.59	Only 1 intersection			
84.00	51.00	25.59	Only 1 intersection			
84.00	52.00	26.59	Only 1 intersection			
84.00	53.00	27.59	Only 1 intersection			
84.00	54.00	28.59	Only 1 intersection			
84.00	55.00	29.59	Only 1 intersection			
84.00	56.00	30.59	Only 1 intersection			
84.00	57.00	31.59	Only 1 intersection			
84.00	58.00	32.59	Only 1 intersection			
84.00	59.00	33.59	Only 1 intersection			
84.00	60.00	34.59	Only 1 intersection			
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85.00	44.00	18.60	Only 1 intersection			
85.00	45.00	19.60	Only 1 intersection			
85.00	46.00	20.60	Only 1 intersection			
85.00	47.00	21.60	Only 1 intersection			
85.00	48.00	22.60	Weight too small			
85.00	48.00	22.60	Only 1 intersection			
85.00	49.00	23.60	Weight too small			
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85.00	50.00	24.60	Only 1 intersection			
85.00	51.00	25.60	Only 1 intersection			
85.00	52.00	26.60	Only 1 intersection			
85.00	53.00	27.60	Only 1 intersection			
85.00	54.00	28.60	Only 1 intersection			
85.00	55.00	29.60	Only 1 intersection			
85.00	56.00	30.60	Only 1 intersection			
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85.00	59.00	33.60	Only 1 intersection			
85.00	60.00	34.60	Only 1 intersection			
85.00	61.00	35.60	Only 1 intersection			
85.00	62.00	36.60	Only 1 intersection			

86.00	43.00	17.61	Only 1 intersection
86.00	44.00	18.61	Only 1 intersection
86.00	45.00	19.61	Only 1 intersection
86.00	46.00	20.61	Only 1 intersection
86.00	47.00	21.61	Only 1 intersection
86.00	48.00	22.61	Only 1 intersection
86.00	49.00	23.61	Only 1 intersection
86.00	50.00	24.61	Weight too small
86.00	50.00	24.61	Only 1 intersection
86.00	51.00	25.61	Weight too small
86.00	51.00	25.61	Only 1 intersection
86.00	52.00	26.61	Only 1 intersection
86.00	53.00	27.61	Only 1 intersection
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86.00	55.00	29.61	Only 1 intersection
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86.00	60.00	34.61	Only 1 intersection
86.00	61.00	35.61	Only 1 intersection
86.00	62.00	36.61	Only 1 intersection
87.00	43.00	17.63	Only 1 intersection
87.00	44.00	18.63	Only 1 intersection
87.00	45.00	19.63	Only 1 intersection
87.00	46.00	20.63	Only 1 intersection
87.00	47.00	21.63	Only 1 intersection
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87.00	49.00	23.63	Only 1 intersection
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87.00	51.00	25.63	Weight too small
87.00	51.00	25.63	Only 1 intersection
87.00	52.00	26.63	Weight too small
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87.00	55.00	29.63	Only 1 intersection
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88.00	49.00	23.64	Only 1 intersection
88.00	50.00	24.64	Only 1 intersection
88.00	51.00	25.64	Only 1 intersection
88.00	52.00	26.64	Only 1 intersection
88.00	53.00	27.64	Weight too small
88.00	53.00	27.64	Only 1 intersection
88.00	54.00	28.64	Weight too small
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88.00	56.00	30.64	Only 1 intersection
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88.00	59.00	33.64	Only 1 intersection
88.00	60.00	34.64	Only 1 intersection
88.00	61.00	35.64	Only 1 intersection
88.00	62.00	36.64	Only 1 intersection
89.00	43.00	17.65	Only 1 intersection
89.00	44.00	18.65	Only 1 intersection
89.00	45.00	19.65	Only 1 intersection
89.00	46.00	20.65	Only 1 intersection
89.00	47.00	21.65	Only 1 intersection
89.00	48.00	22.65	Only 1 intersection
89.00	49.00	23.65	Only 1 intersection
89.00	50.00	24.65	Only 1 intersection
89.00	51.00	25.65	Only 1 intersection

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EPA Export 08-07-2014:23:43:12

89.00	52.00	26.65	Only 1 intersection
89.00	53.00	27.65	Only 1 intersection
89.00	54.00	28.65	Weight too small
89.00	54.00	28.65	Only 1 intersection
89.00	55.00	29.65	Weight too small
89.00	55.00	29.65	Only 1 intersection
89.00	56.00	30.65	Weight too small
89.00	56.00	30.65	Only 1 intersection
89.00	57.00	31.65	Only 1 intersection
89.00	58.00	32.65	Only 1 intersection
89.00	59.00	33.65	Only 1 intersection
89.00	60.00	34.65	Only 1 intersection
89.00	61.00	35.65	Only 1 intersection
89.00	62.00	36.65	Only 1 intersection
90.00	43.00	17.67	Only 1 intersection
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90.00	49.00	23.66	Only 1 intersection
90.00	50.00	24.66	Only 1 intersection
90.00	51.00	25.66	Only 1 intersection
90.00	52.00	26.66	Only 1 intersection
90.00	53.00	27.66	Only 1 intersection
90.00	54.00	28.66	Only 1 intersection
90.00	55.00	29.66	Only 1 intersection
90.00	56.00	30.66	Weight too small
90.00	56.00	30.66	Only 1 intersection
90.00	57.00	31.66	Weight too small
90.00	57.00	31.66	Only 1 intersection
90.00	58.00	32.66	Weight too small
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90.00	59.00	33.66	Only 1 intersection
90.00	60.00	34.66	Only 1 intersection
90.00	61.00	35.66	Only 1 intersection
90.00	62.00	36.66	Only 1 intersection
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91.00	47.00	21.68	Only 1 intersection
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91.00	50.00	24.68	Only 1 intersection
91.00	51.00	25.68	Only 1 intersection
91.00	52.00	26.68	Only 1 intersection
91.00	53.00	27.68	Only 1 intersection
91.00	54.00	28.68	Only 1 intersection
91.00	55.00	29.68	Only 1 intersection
91.00	56.00	30.68	Only 1 intersection
91.00	57.00	31.68	Only 1 intersection
91.00	58.00	32.68	Weight too small
91.00	58.00	32.68	Only 1 intersection
91.00	59.00	33.68	Weight too small
91.00	59.00	33.68	Only 1 intersection
91.00	60.00	34.68	Weight too small
91.00	60.00	34.68	Only 1 intersection
91.00	61.00	35.68	Only 1 intersection
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92.00	49.00	23.69	Only 1 intersection
92.00	50.00	24.69	Only 1 intersection
92.00	51.00	25.69	Only 1 intersection
92.00	52.00	26.69	Only 1 intersection
92.00	53.00	27.69	Only 1 intersection
92.00	54.00	28.69	Only 1 intersection
92.00	55.00	29.69	Only 1 intersection
92.00	56.00	30.69	Only 1 intersection
92.00	57.00	31.69	Only 1 intersection

Consent of copyright owner required for any other use.
For inspection purposes only.

92.00	58.00	32.69	Only 1 intersection
92.00	59.00	33.69	Only 1 intersection
92.00	60.00	34.69	Weight too small
92.00	60.00	34.69	Only 1 intersection
92.00	61.00	35.69	Weight too small
92.00	61.00	35.69	Only 1 intersection
92.00	62.00	36.69	Weight too small
92.00	62.00	36.69	Only 1 intersection
93.00	43.00	17.70	Only 1 intersection
93.00	44.00	18.70	Only 1 intersection
93.00	45.00	19.70	Only 1 intersection
93.00	46.00	20.70	Only 1 intersection
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93.00	48.00	22.70	Only 1 intersection
93.00	49.00	23.70	Only 1 intersection
93.00	50.00	24.70	Only 1 intersection
93.00	51.00	25.70	Only 1 intersection
93.00	52.00	26.70	Only 1 intersection
93.00	53.00	27.70	Only 1 intersection
93.00	54.00	28.70	Only 1 intersection
93.00	55.00	29.70	Only 1 intersection
93.00	56.00	30.70	Only 1 intersection
93.00	57.00	31.70	Only 1 intersection
93.00	58.00	32.70	Only 1 intersection
93.00	59.00	33.70	Only 1 intersection
93.00	60.00	34.70	Only 1 intersection
93.00	61.00	35.70	Weight too small
93.00	61.00	35.70	Only 1 intersection
93.00	62.00	36.70	Weight too small
93.00	62.00	36.70	Only 1 intersection
94.00	43.00	17.72	Only 1 intersection
94.00	44.00	18.72	Only 1 intersection
94.00	45.00	19.72	Only 1 intersection
94.00	46.00	20.72	Only 1 intersection
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94.00	48.00	22.72	Only 1 intersection
94.00	49.00	23.72	Only 1 intersection
94.00	50.00	24.72	Only 1 intersection
94.00	51.00	25.72	Only 1 intersection
94.00	52.00	26.72	Only 1 intersection
94.00	53.00	27.72	Only 1 intersection
94.00	54.00	28.72	Only 1 intersection
94.00	55.00	29.72	Only 1 intersection
94.00	56.00	30.72	Only 1 intersection
94.00	57.00	31.72	Only 1 intersection
94.00	58.00	32.72	Only 1 intersection
94.00	59.00	33.72	Only 1 intersection
94.00	60.00	34.72	Only 1 intersection
94.00	61.00	35.72	Only 1 intersection
94.00	62.00	36.72	Only 1 intersection
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95.00	44.00	18.73	Only 1 intersection
95.00	45.00	19.73	Only 1 intersection
95.00	46.00	20.73	Only 1 intersection
95.00	47.00	21.73	Only 1 intersection
95.00	48.00	22.73	Only 1 intersection
95.00	49.00	23.73	Only 1 intersection
95.00	50.00	24.73	Only 1 intersection
95.00	51.00	25.73	Only 1 intersection
95.00	52.00	26.73	Only 1 intersection
95.00	53.00	27.73	Only 1 intersection
95.00	54.00	28.73	Only 1 intersection
95.00	55.00	29.73	Only 1 intersection
95.00	56.00	30.73	Only 1 intersection
95.00	57.00	31.73	Only 1 intersection
95.00	58.00	32.73	Only 1 intersection
95.00	59.00	33.73	Only 1 intersection
95.00	60.00	34.73	Only 1 intersection
95.00	61.00	35.73	Only 1 intersection
95.00	62.00	36.73	Only 1 intersection
96.00	43.00	17.74	Only 1 intersection
96.00	44.00	18.74	Only 1 intersection
96.00	45.00	19.74	Only 1 intersection
96.00	46.00	20.74	Only 1 intersection
96.00	47.00	21.74	Only 1 intersection

EPA Export 08-07-2014:23:43:12

96.00	48.00	22.74	Only 1 intersection
96.00	49.00	23.74	Only 1 intersection
96.00	50.00	24.74	Only 1 intersection
96.00	51.00	25.74	Only 1 intersection
96.00	52.00	26.74	Only 1 intersection
96.00	53.00	27.74	Only 1 intersection
96.00	54.00	28.74	Only 1 intersection
96.00	55.00	29.74	Only 1 intersection
96.00	56.00	30.74	Only 1 intersection
96.00	57.00	31.74	Only 1 intersection
96.00	58.00	32.74	Only 1 intersection
96.00	59.00	33.74	Only 1 intersection
96.00	60.00	34.74	Only 1 intersection
96.00	61.00	35.74	Only 1 intersection
96.00	62.00	36.74	Only 1 intersection
97.00	43.00	17.76	Only 1 intersection
97.00	44.00	18.76	Only 1 intersection
97.00	45.00	19.76	Only 1 intersection
97.00	46.00	20.76	Only 1 intersection
97.00	47.00	21.76	Only 1 intersection
97.00	48.00	22.76	Only 1 intersection
97.00	49.00	23.76	Only 1 intersection
97.00	50.00	24.76	Only 1 intersection
97.00	51.00	25.76	Only 1 intersection
97.00	52.00	26.76	Only 1 intersection
97.00	53.00	27.75	Only 1 intersection
97.00	54.00	28.75	Only 1 intersection
97.00	55.00	29.75	Only 1 intersection
97.00	56.00	30.75	Only 1 intersection
97.00	57.00	31.75	Only 1 intersection
97.00	58.00	32.75	Only 1 intersection
97.00	59.00	33.75	Only 1 intersection
97.00	60.00	34.75	Only 1 intersection
97.00	61.00	35.75	Only 1 intersection
97.00	62.00	36.75	Only 1 intersection
98.00	43.00	17.77	Only 1 intersection
98.00	44.00	18.77	Only 1 intersection
98.00	45.00	19.77	Only 1 intersection
98.00	46.00	20.77	Only 1 intersection
98.00	47.00	21.77	Only 1 intersection
98.00	48.00	22.77	Only 1 intersection
98.00	49.00	23.77	Only 1 intersection
98.00	50.00	24.77	Only 1 intersection
98.00	51.00	25.77	Only 1 intersection
98.00	52.00	26.77	Only 1 intersection
98.00	53.00	27.77	Only 1 intersection
98.00	54.00	28.77	Only 1 intersection
98.00	55.00	29.77	Only 1 intersection
98.00	56.00	30.77	Only 1 intersection
98.00	57.00	31.77	Only 1 intersection
98.00	58.00	32.77	Only 1 intersection
98.00	59.00	33.77	Only 1 intersection
98.00	60.00	34.77	Only 1 intersection
98.00	61.00	35.77	Only 1 intersection
98.00	62.00	36.77	Only 1 intersection
99.00	43.00	17.78	Only 1 intersection
99.00	44.00	18.78	Only 1 intersection
99.00	45.00	19.78	Only 1 intersection
99.00	46.00	20.78	Only 1 intersection
99.00	47.00	21.78	Only 1 intersection
99.00	48.00	22.78	Only 1 intersection
99.00	49.00	23.78	Only 1 intersection
99.00	50.00	24.78	Only 1 intersection
99.00	51.00	25.78	Only 1 intersection
99.00	52.00	26.78	Only 1 intersection
99.00	53.00	27.78	Only 1 intersection
99.00	54.00	28.78	Only 1 intersection
99.00	55.00	29.78	Only 1 intersection
99.00	56.00	30.78	Only 1 intersection
99.00	57.00	31.78	Only 1 intersection
99.00	58.00	32.78	Only 1 intersection
99.00	59.00	33.78	Only 1 intersection
99.00	60.00	34.78	Only 1 intersection
99.00	61.00	35.78	Only 1 intersection
99.00	62.00	36.78	Only 1 intersection

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ARUP
Corrib Gas Terminal
Maximum Minerial Soil Cut Slope Stability
Job No. c1157 Sheet No. AA:Run ID:17 Rev.
Drg. Ref.
Made by DAH Date 08-Dec-2003 Date Stability Max Minerial Cut No4.sld Checked

WORST CASE : WATER CASE 1 OF 1

Centre at (72.00,49.00)
Iterations: 9
Net vertical force [kN]: .0
Net horiz force [kN]: 68.66E-6
Inclination of interslice forces [°]: 7.858
Radius 23.43m
Horiz acceleration [fg]: .0
Slip weight [kN] 5744.
Disturbing moment [kN m]: 20610.
Restoring moment [kN m]: 62820.

Factor of Safety: 3.048

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	50.09	40.68	-5.102	.0	.0	.0
2	50.30	40.16	114.4E-6	0.1093	0.7916	.0
3	51.39	37.85	22.86	4.399	31.86	26.12
4	51.79	37.13	29.89	7.243	52.45	44.67
5	53.12	35.12	49.71	20.59	149.1	123.6
6	55.07	32.80	72.36	46.02	333.3	261.8
7	57.30	30.75	92.23	77.60	562.0	425.3
8	58.95	29.54	103.9	99.48	720.5	539.9
9	60.70	28.47	96.78	120.0	869.2	468.3
10	60.90	28.36	92.87	122.1	884.5	431.2
11	61.00	28.31	90.90	123.2	892.1	413.2
12	63.70	27.09	101.0	147.0	1065.	510.2
13	64.00	26.98	101.9	149.0	1079.	519.1
14	67.00	26.11	108.2	162.2	1175.	585.6
15	69.20	25.74	105.4	164.3	1190.	555.6
16	72.25	25.57	96.69	156.7	1135.	467.5
17	75.30	25.80	83.99	138.4	1002.	352.7
18	77.47	26.22	68.21	119.9	868.2	232.6
19	79.60	26.83	50.66	98.30	711.9	120.3
20	83.05	28.34	38.54	58.07	420.6	74.25
21	86.22	30.38	21.92	20.52	148.6	24.02
22	89.00	32.87	0.2744	0.7579	5.488	0.003763
23	89.03	32.90	.0	0.6825	4.942	.0
24	89.49	33.40	-5.000	.0	68.66E-6	.0

Slice no.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.4663	57.22E-6	0.5694	0.9051	0.4221
2	.0	0.4663	11.43	19.89	34.76	2.561
3	.0	0.5774	26.37	14.95	23.88	1.300
4	.0	0.6494	39.80	82.83	118.9	14.76
5	.0	0.6745	61.04	200.0	253.3	46.19
6	.0	0.6745	82.29	319.1	366.5	79.18
7	.0	0.8391	98.07	286.6	307.1	89.18
8	.0	0.8391	100.3	342.3	352.2	123.0
9	.0	0.8391	94.83	42.54	42.83	17.83
10	.0	0.8391	91.89	21.98	22.03	9.743
11	.0	0.8391	95.96	633.8	626.9	287.4
12	.0	0.8391	101.5	68.40	67.28	29.21
13	.0	0.8391	105.1	643.2	631.7	254.7
14	.0	0.8391	106.8	480.9	474.7	198.3
15	.0	0.8391	101.1	631.1	634.7	273.4
16	.0	0.8391	90.34	567.2	593.9	266.6
17	.0	0.8391	76.10	355.3	392.3	187.8
18	.0	0.8391	59.44	299.0	351.5	184.6
19	.0	0.8391	44.60	391.5	512.1	288.7
20	.0	0.8391	30.23	246.6	386.2	228.5
21	.0	0.6745	11.10	93.63	180.0	93.47
22	.0	0.6745	0.1372	0.2536	0.6228	0.4166
23	.0	0.6745	.0	2.182	5.577	3.762

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0

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Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A:Run ID:18	

Drg. Ref.

Made by	Date	Date	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut Mp4.sld	

6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0
22	.0	.0	.0	.0
23	.0	.0	.0	.0

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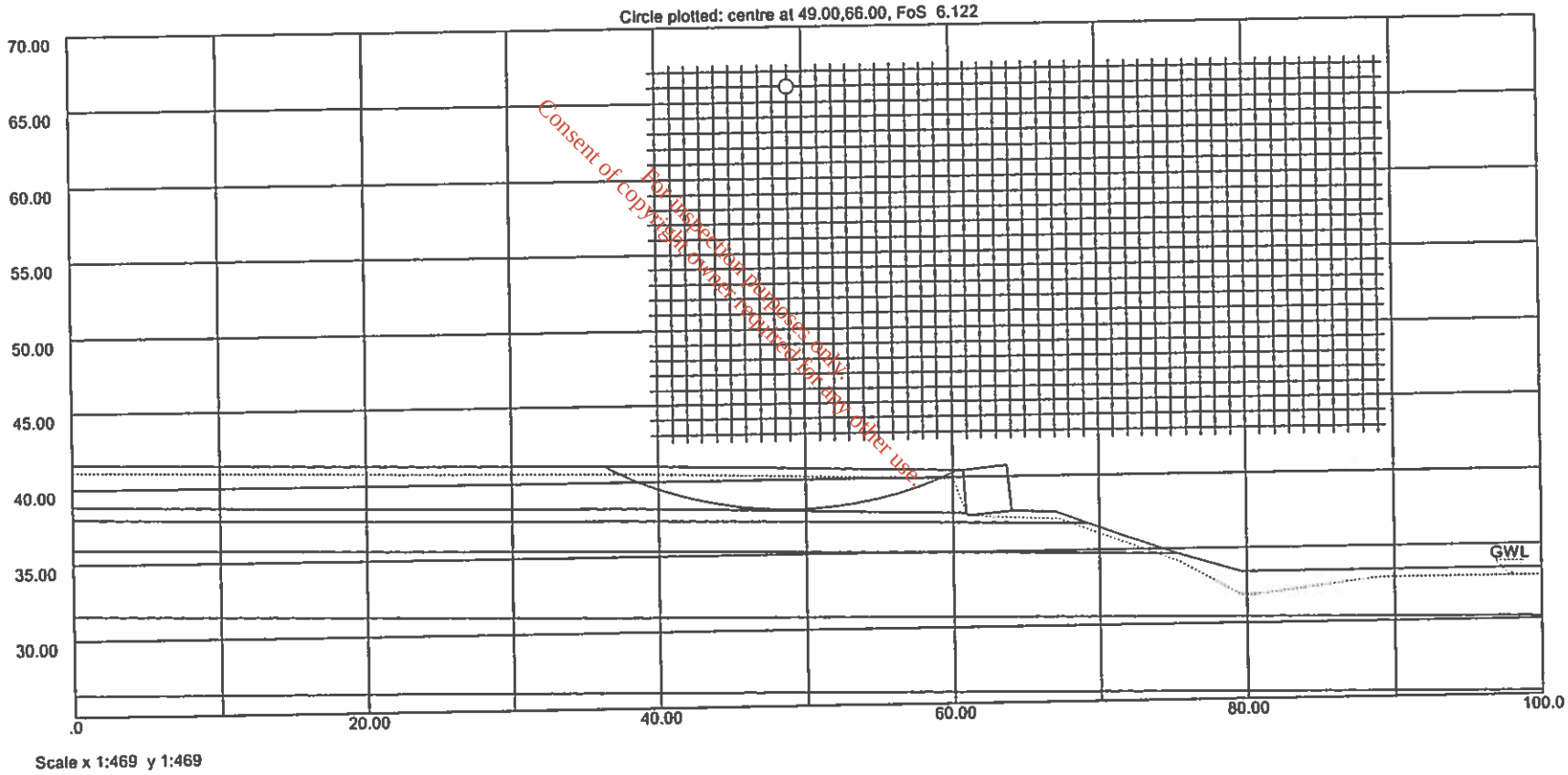
Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A:Runff:01.	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Mineral Cut No5a.sld	



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Slope Stability Analysis

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Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Run 11: 02	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No9a.sld	

Notes

Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Clay Layer

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	Shear Strength Parameters c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Undrained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Undrained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Undrain	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Undrain	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Un	20.00	20.00	Undrained	.0	75.00
7	Rock (Undrained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X --> .0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X --> 63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	37.10	.	34.20	.

Stratum	Material	X --> 79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40
4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

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Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 40.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
25 in y direction at 1.00m spacing
All circles tangent to stratum no. 3

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
40.00	43.00	4.847	192.1	10.70	14.87	159.1
40.00	44.00	5.846	214.4	9.768	21.35	208.5
40.00	45.00	6.846	234.8	9.203	28.50	262.3
40.00	46.00	7.846	253.4	8.825	36.26	320.0
40.00	47.00	8.845	270.8	8.556	44.59	381.5
40.00	48.00	9.845	287.0	8.356	53.43	446.4
40.00	49.00	10.84	301.9	8.216	62.63	514.6
40.00	50.00	11.84	316.5	8.095	72.39	586.0
40.00	51.00	12.84	330.4	7.998	82.57	660.4
40.00	52.00	13.84	343.7	7.919	93.15	737.6
40.00	53.00	14.84	356.5	7.853	104.1	817.7
40.00	54.00	15.84	368.8	7.798	115.5	900.4
40.00	55.00	16.84	380.7	7.751	127.2	985.7
40.00	56.00	17.84	392.2	7.711	139.2	1074.
40.00	57.00	18.84	403.4	7.677	151.6	1164.
40.00	58.00	19.84	414.3	7.647	164.3	1256.
40.00	59.00	20.84	424.8	7.621	177.3	1351.
40.00	60.00	21.84	435.1	7.599	190.6	1449.
40.00	61.00	22.84	445.1	7.579	204.2	1548.
40.00	62.00	23.84	455.5	7.555	218.3	1650.
40.00	63.00	24.84	465.1	7.540	232.5	1753.
40.00	64.00	25.84	474.5	7.526	247.0	1859.
40.00	65.00	26.84	483.7	7.514	261.7	1967.
40.00	66.00	27.84	492.7	7.503	276.7	2076.
40.00	67.00	28.84	501.5	7.493	292.0	2188.
41.00	43.00	4.873	192.9	10.01	16.04	160.5
41.00	44.00	5.873	215.2	9.179	22.89	210.1
41.00	45.00	6.872	235.7	8.685	30.40	264.0
41.00	46.00	7.872	254.4	8.354	38.54	321.9
41.00	47.00	8.872	271.3	8.123	47.21	383.5

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41.00	48.00	9.871	287.6	7.951	56.42	448.6
41.00	49.00	10.87	303.0	7.820	66.11	517.0
41.00	50.00	11.87	317.9	7.704	76.40	588.6
41.00	51.00	12.87	331.9	7.623	86.99	663.1
41.00	52.00	13.87	345.3	7.558	97.99	740.6
41.00	53.00	14.87	358.1	7.504	109.4	820.8
41.00	54.00	15.87	370.5	7.460	121.1	903.7
41.00	55.00	16.87	382.4	7.423	133.3	989.1
41.00	56.00	17.87	394.0	7.391	145.7	1077.
41.00	57.00	18.87	404.6	7.377	158.3	1167.
41.00	58.00	19.87	415.5	7.354	171.4	1260.
41.00	59.00	20.87	426.1	7.335	184.8	1355.
41.00	60.00	21.87	436.4	7.318	198.5	1453.
41.00	61.00	22.87	446.5	7.304	212.5	1552.
41.00	62.00	23.87	456.3	7.291	226.8	1654.
41.00	63.00	24.87	465.9	7.281	241.4	1758.
41.00	64.00	25.87	475.3	7.272	256.3	1864.
41.00	65.00	26.87	484.6	7.264	271.4	1971.
41.00	66.00	27.87	493.6	7.257	286.8	2081.
41.00	67.00	28.86	502.4	7.251	302.4	2193.
42.00	43.00	4.899	193.3	9.725	16.65	161.9
42.00	44.00	5.899	215.9	8.798	24.06	211.7
42.00	45.00	6.898	236.4	8.318	31.96	265.8
42.00	46.00	7.898	254.7	8.006	40.45	323.8
42.00	47.00	8.898	272.2	7.793	49.48	385.6
42.00	48.00	9.897	288.8	7.602	59.31	450.9
42.00	49.00	10.90	304.2	7.485	69.40	519.4
42.00	50.00	11.90	318.9	7.394	79.95	591.2
42.00	51.00	12.90	332.4	7.329	90.84	665.8
42.00	52.00	13.90	345.7	7.273	102.2	743.4
42.00	53.00	14.90	358.6	7.227	114.0	823.7
42.00	54.00	15.90	371.0	7.189	126.1	906.8
42.00	55.00	16.90	383.0	7.158	138.6	992.4
42.00	56.00	17.89	394.6	7.133	151.5	1081.
42.00	57.00	18.89	405.8	7.111	164.7	1171.
42.00	58.00	19.89	416.7	7.094	178.2	1264.
42.00	59.00	20.89	427.8	7.071	192.3	1359.
42.00	60.00	21.89	438.2	7.059	206.4	1457.
42.00	61.00	22.89	448.3	7.048	220.8	1557.
42.00	62.00	23.89	458.2	7.040	235.6	1658.
42.00	63.00	24.89	467.8	7.033	250.6	1762.
42.00	64.00	25.89	477.3	7.027	265.9	1868.
42.00	65.00	26.89	486.5	7.022	281.5	1976.
42.00	66.00	27.89	495.6	7.019	297.3	2086.
42.00	67.00	28.89	503.7	7.028	312.8	2198.
43.00	43.00	4.925	193.8	9.748	16.75	163.2
43.00	44.00	5.925	216.3	8.723	24.45	213.3
43.00	45.00	6.925	236.9	8.130	32.91	267.6
43.00	46.00	7.924	255.4	7.784	41.85	325.8
43.00	47.00	8.924	273.1	7.522	51.54	387.7
43.00	48.00	9.924	289.5	7.362	61.55	453.1
43.00	49.00	10.92	304.5	7.249	71.98	521.8
43.00	50.00	11.92	319.2	7.161	82.90	593.7
43.00	51.00	12.92	333.2	7.094	94.24	668.5
43.00	52.00	13.92	346.6	7.040	106.0	746.3
43.00	53.00	14.92	359.9	6.980	118.5	826.8
43.00	54.00	15.92	372.3	6.946	131.0	910.0
43.00	55.00	16.92	384.4	6.918	143.9	995.8
43.00	56.00	17.92	396.0	6.896	157.2	1084.
43.00	57.00	18.92	406.7	6.886	170.6	1174.
43.00	58.00	19.92	417.7	6.872	184.5	1268.
43.00	59.00	20.92	428.3	6.859	198.7	1363.
43.00	60.00	21.92	438.7	6.850	213.3	1461.
43.00	61.00	22.92	448.8	6.842	228.1	1561.
43.00	62.00	23.92	458.7	6.836	243.3	1663.
43.00	63.00	24.92	468.4	6.831	258.7	1767.
43.00	64.00	25.92	477.9	6.828	274.4	1873.
43.00	65.00	26.92	487.1	6.825	290.3	1981.
43.00	66.00	27.92	496.2	6.823	306.4	2092.
43.00	67.00	28.92	505.1	6.822	322.0	2204.
44.00	43.00	4.952	194.4	9.714	16.93	164.5
44.00	44.00	5.951	216.9	8.732	24.59	214.7
44.00	45.00	6.951	237.2	8.125	33.13	269.2
44.00	46.00	7.950	256.0	7.698	42.57	327.7
44.00	47.00	8.950	273.5	7.421	52.52	389.8
44.00	48.00	9.950	289.6	7.225	63.02	455.3
44.00	49.00	10.95	305.2	7.091	73.92	524.2
44.00	50.00	11.95	319.9	7.000	85.18	596.2
44.00	51.00	12.95	334.2	6.899	97.30	671.3
44.00	52.00	13.95	347.1	6.848	109.4	749.1
44.00	53.00	14.95	360.1	6.804	122.0	829.8
44.00	54.00	15.95	372.6	6.769	134.9	913.2
44.00	55.00	16.95	384.7	6.741	148.2	999.1
44.00	56.00	17.95	396.3	6.719	161.9	1088.
44.00	57.00	18.95	407.6	6.702	175.8	1178.
44.00	58.00	19.95	418.6	6.688	190.2	1272.
44.00	59.00	20.95	429.7	6.665	205.1	1367.
44.00	60.00	21.95	440.2	6.656	220.1	1465.
44.00	61.00	22.95	450.4	6.650	235.4	1565.
44.00	62.00	23.94	460.3	6.644	250.9	1667.
44.00	63.00	24.94	469.3	6.650	266.4	1772.
44.00	64.00	25.94	478.8	6.648	282.5	1878.
44.00	65.00	26.94	488.1	6.646	298.9	1986.
44.00	66.00	27.94	497.2	6.646	315.5	2097.
44.00	67.00	28.94	506.2	6.646	332.4	2209.
45.00	43.00	4.978	195.0	9.681	17.12	165.7
45.00	44.00	5.977	217.4	8.712	24.80	216.0
45.00	45.00	6.977	237.7	8.112	33.37	270.7
45.00	46.00	7.977	256.4	7.705	42.74	329.3
45.00	47.00	8.976	273.8	7.410	52.87	391.7
45.00	48.00	9.976	290.2	7.180	63.74	457.6
45.00	49.00	10.98	305.7	7.018	75.05	526.6
45.00	50.00	11.98	320.0	6.896	86.83	598.7
45.00	51.00	12.97	334.3	6.797	99.16	673.9
45.00	52.00	13.97	347.8	6.727	111.8	752.0
45.00	53.00	14.97	360.8	6.676	124.8	832.8
45.00	54.00	15.97	373.6	6.621	138.4	916.4
45.00	55.00	16.97	385.7	6.588	152.2	1003.
45.00	56.00	17.97	397.5	6.563	166.3	1091.
45.00	57.00	18.97	408.2	6.550	180.5	1182.
45.00	58.00	19.97	419.3	6.534	195.2	1276.
45.00	59.00	20.97	430.0	6.522	210.3	1371.
45.00	60.00	21.97	440.5	6.512	225.6	1469.
45.00	61.00	22.97	450.7	6.505	241.3	1569.
45.00	62.00	23.97	460.6	6.500	257.2	1672.
45.00	63.00	24.97	470.4	6.496	273.4	1776.
45.00	64.00	25.97	479.9	6.493	290.0	1883.
45.00	65.00	26.97	489.2	6.492	306.7	1991.
45.00	66.00	27.97	498.8	6.483	324.2	2102.
45.00	67.00	28.97	507.8	6.483	341.5	2214.
46.00	43.00	5.004	195.6	9.648	17.31	167.0
46.00	44.00	6.004	217.9	8.694	25.01	217.4
46.00	45.00	7.003	238.2	8.100	33.60	272.2
46.00	46.00	8.003	256.8	7.696	43.00	330.9

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EPA Export 08-07-2014:23:43:12

ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Run 11: 04	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No5a.sld	

46.00	47.00	9.003	274.2	7.404	53.14	393.4
46.00	48.00	10.00	290.6	7.182	63.97	459.4
46.00	49.00	11.00	306.1	7.009	75.45	528.8
46.00	50.00	12.00	320.8	6.869	87.54	601.3
46.00	51.00	13.00	334.9	6.749	100.3	676.7
46.00	52.00	14.00	348.4	6.668	113.2	754.9
46.00	53.00	15.00	360.9	6.603	126.6	835.8
46.00	54.00	16.00	373.5	6.544	140.5	919.5
46.00	55.00	17.00	385.8	6.500	154.7	1006.
46.00	56.00	18.00	397.6	6.468	169.2	1095.
46.00	57.00	19.00	409.0	6.443	184.1	1186.
46.00	58.00	20.00	420.0	6.424	199.2	1279.
46.00	59.00	21.00	431.1	6.396	215.0	1375.
46.00	60.00	22.00	441.6	6.383	230.8	1473.
46.00	61.00	23.00	451.1	6.382	246.6	1574.
46.00	62.00	24.00	461.2	6.374	263.0	1676.
46.00	63.00	25.00	471.0	6.369	279.6	1781.
46.00	64.00	26.00	480.6	6.365	296.6	1888.
46.00	65.00	27.00	489.9	6.362	313.8	1996.
46.00	66.00	28.00	499.1	6.361	331.2	2107.
46.00	67.00	29.00	508.1	6.360	349.0	2220.
47.00	43.00	5.030	196.2	9.616	17.50	168.2
47.00	44.00	6.030	218.4	8.675	25.22	218.8
47.00	45.00	7.029	238.7	8.008	33.83	273.6
47.00	46.00	8.029	257.3	7.688	43.25	332.5
47.00	47.00	9.029	274.6	7.398	53.41	395.1
47.00	48.00	10.03	291.0	7.178	64.25	461.2
47.00	49.00	11.03	306.4	7.005	75.75	530.6
47.00	50.00	12.03	321.1	6.866	87.86	603.3
47.00	51.00	13.03	335.2	6.752	100.6	678.9
47.00	52.00	14.03	348.7	6.657	113.8	757.5
47.00	53.00	15.03	361.7	6.574	127.6	838.9
47.00	54.00	16.03	374.3	6.503	141.9	922.8
47.00	55.00	17.03	386.3	6.452	156.4	1009.
47.00	56.00	18.03	398.2	6.405	171.4	1098.
47.00	57.00	19.03	409.0	6.377	186.5	1189.
47.00	58.00	20.02	420.2	6.346	202.2	1283.
47.00	59.00	21.02	431.1	6.322	218.2	1379.
47.00	60.00	22.02	441.7	6.304	234.4	1478.
47.00	61.00	23.02	452.0	6.290	250.9	1578.
47.00	62.00	24.02	462.0	6.280	267.7	1681.
47.00	63.00	25.02	471.8	6.272	284.7	1786.
47.00	64.00	26.02	481.7	6.256	302.5	1892.
47.00	65.00	27.02	491.1	6.251	320.1	2001.
47.00	66.00	28.02	499.6	6.257	337.6	2112.
47.00	67.00	29.02	508.6	6.254	355.7	2225.
48.00	43.00	5.056	196.7	9.584	17.68	169.5
48.00	44.00	6.056	219.0	8.656	25.43	220.2
48.00	45.00	7.056	239.1	8.076	34.07	275.1
48.00	46.00	8.055	257.7	7.679	43.50	334.1
48.00	47.00	9.055	275.0	7.391	53.68	396.7
48.00	48.00	10.05	291.3	7.173	64.54	462.9
48.00	49.00	11.05	306.8	7.001	76.05	532.5
48.00	50.00	12.05	321.5	6.863	88.17	605.2
48.00	51.00	13.05	335.5	6.750	100.9	680.9
48.00	52.00	14.05	349.0	6.655	114.1	759.6
48.00	53.00	15.05	362.0	6.574	127.9	841.1
48.00	54.00	16.05	374.5	6.505	142.3	925.4
48.00	55.00	17.05	386.6	6.444	157.1	1012.
48.00	56.00	18.05	398.4	6.390	172.4	1102.
48.00	57.00	19.05	409.8	6.342	188.1	1193.
48.00	58.00	20.05	420.9	6.305	204.1	1287.
48.00	59.00	21.05	431.7	6.276	220.4	1383.
48.00	60.00	22.05	441.6	6.250	236.8	1482.
48.00	61.00	23.05	452.0	6.234	253.8	1582.
48.00	62.00	24.05	462.2	6.215	271.1	1685.
48.00	63.00	25.05	472.1	6.201	288.7	1790.
48.00	64.00	26.05	481.7	6.189	306.7	1897.
48.00	65.00	27.05	491.2	6.181	325.0	2006.
48.00	66.00	28.05	500.5	6.174	343.9	2117.
48.00	67.00	29.05	509.5	6.170	361.5	2230.
49.00	43.00	5.082	197.3	9.553	17.87	170.8
49.00	44.00	6.082	219.5	8.638	25.65	221.5
49.00	45.00	7.082	239.6	8.064	34.30	276.6
49.00	46.00	8.081	258.2	7.671	43.76	335.6
49.00	47.00	9.081	275.5	7.385	53.95	398.4
49.00	48.00	10.08	291.7	7.168	64.83	464.7
49.00	49.00	11.08	307.1	6.998	76.35	534.3
49.00	50.00	12.08	321.8	6.861	88.49	607.1
49.00	51.00	13.08	335.8	6.748	101.2	682.9
49.00	52.00	14.08	349.3	6.653	114.5	761.7
49.00	53.00	15.08	362.3	6.573	128.3	843.3
49.00	54.00	16.08	374.8	6.503	142.6	927.6
49.00	55.00	17.08	386.9	6.443	157.5	1015.
49.00	56.00	18.08	398.6	6.391	172.8	1104.
49.00	57.00	19.08	410.1	6.344	188.5	1196.
49.00	58.00	20.08	421.2	6.303	204.7	1290.
49.00	59.00	21.08	432.0	6.265	221.4	1387.
49.00	60.00	22.08	442.5	6.229	238.5	1486.
49.00	61.00	23.08	452.8	6.200	255.9	1587.
49.00	62.00	24.08	462.9	6.178	273.5	1690.
49.00	63.00	25.08	472.7	6.159	291.4	1795.
49.00	64.00	26.08	481.6	6.150	309.2	1902.
49.00	65.00	27.07	491.2	6.135	327.8	2011.
49.00	66.00	28.07	500.6	6.122	346.7	2122.
49.00	67.00	29.07	509.8	6.514	365.3	2380.
50.00	43.00	5.109	197.9	9.523	18.06	172.0
50.00	44.00	6.108	220.0	8.620	25.86	222.9
50.00	45.00	7.108	240.1	8.052	34.54	278.1
50.00	46.00	8.108	258.6	7.663	44.01	337.2
50.00	47.00	9.107	275.9	7.379	54.22	400.1
50.00	48.00	10.11	292.1	7.164	65.11	466.5
50.00	49.00	11.11	307.5	6.994	76.65	536.1
50.00	50.00	12.11	322.1	6.858	88.81	609.0
50.00	51.00	13.11	336.2	6.745	101.5	684.9
50.00	52.00	14.11	349.6	6.651	114.8	763.8
50.00	53.00	15.11	362.6	6.571	128.7	845.4
50.00	54.00	16.10	375.1	6.502	143.0	929.8
50.00	55.00	17.10	387.2	6.442	157.8	1017.
50.00	56.00	18.10	398.9	6.390	173.1	1106.
50.00	57.00	19.10	410.3	6.343	188.9	1198.
50.00	58.00	20.10	421.4	6.302	205.2	1293.
50.00	59.00	21.10	432.2	6.265	221.8	1390.
50.00	60.00	22.10	442.7	6.231	238.9	1489.
50.00	61.00	23.10	453.0	6.201	256.5	1590.
50.00	62.00	24.10	463.1	6.174	274.4	1694.
50.00	63.00	25.10	473.1	8.738	291.6	2548.
50.00	64.00	26.10	483.1	11.31	307.0	3470.
50.00	65.00	27.10	492.3	13.88	319.9	4440.
50.00	66.00	28.10	502.2	16.45	331.7	5458.
50.00	67.00	29.10	512.2	19.07	342.0	6523.
51.00	43.00	5.135	198.5	9.493	18.26	173.3
51.00	44.00	6.135	220.6	8.602	26.07	224.3
51.00	45.00	7.134	240.6	8.040	34.77	279.6

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EPA Export 08-07-2014:23:43:12

51.00	46.00	8.134	259.0	7.655	44.26	338.8
51.00	47.00	9.133	276.3	7.373	54.49	401.8
51.00	48.00	10.13	292.5	7.159	65.40	468.2
51.00	49.00	11.13	307.8	6.991	76.96	538.0
51.00	50.00	12.13	322.5	6.855	89.12	610.9
51.00	51.00	13.13	336.5	6.743	101.9	686.9
51.00	52.00	14.13	349.9	6.649	115.2	765.8
51.00	53.00	15.13	362.9	6.570	129.0	847.5
51.00	54.00	16.13	375.3	6.501	143.4	932.0
51.00	55.00	17.13	387.4	6.441	158.2	1019.
51.00	56.00	18.13	399.2	6.389	173.5	1109.
51.00	57.00	19.13	410.5	6.343	189.3	1201.
51.00	58.00	20.13	421.7	7.226	204.8	1480.
51.00	59.00	21.13	432.7	10.43	220.0	2295.
51.00	60.00	22.13	443.0	13.61	232.1	3159.
51.00	61.00	23.13	454.1	16.77	242.8	4072.
51.00	62.00	24.13	465.1	20.00	251.8	5035.
51.00	63.00	25.13	476.0	23.33	259.3	6048.
51.00	64.00	26.13	486.8	26.81	265.3	7111.
51.00	65.00	27.13	497.6	30.47	269.9	8223.
51.00	66.00	28.13	508.3	34.35	273.2	9384.
51.00	67.00	29.13	519.5	38.81	273.0	10600.
52.00	43.00	5.161	199.1	9.463	18.45	174.6
52.00	44.00	6.161	221.1	8.584	26.29	225.7
52.00	45.00	7.160	241.0	8.029	35.01	281.1
52.00	46.00	8.160	259.5	7.646	44.52	340.4
52.00	47.00	9.160	276.7	7.367	54.76	403.4
52.00	48.00	10.16	292.9	7.155	65.69	470.0
52.00	49.00	11.16	308.2	6.987	77.26	539.8
52.00	50.00	12.16	322.8	6.852	89.44	612.9
52.00	51.00	13.16	336.8	6.741	102.2	688.9
52.00	52.00	14.16	350.2	6.647	115.5	767.9
52.00	53.00	15.16	363.1	6.568	129.4	849.7
52.00	54.00	16.16	375.6	6.857	143.5	984.1
52.00	55.00	17.16	388.0	11.00	156.6	1723.
52.00	56.00	18.16	399.7	15.06	166.8	2512.
52.00	57.00	19.16	412.0	19.14	175.1	3352.
52.00	58.00	20.16	424.2	23.38	181.6	4245.
52.00	59.00	21.16	436.2	27.85	186.3	5189.
52.00	60.00	22.16	448.2	32.65	189.4	6185.
52.00	61.00	23.15	460.0	37.85	191.1	7234.
52.00	62.00	24.15	472.3	44.06	189.2	8336.
52.00	63.00	25.15	484.1	50.64	187.3	9487.
52.00	64.00	26.15	495.7	54.23	185.5	10060.
52.00	65.00	27.15	506.8	55.49	187.9	10430.
52.00	66.00	28.15	517.4	55.56	194.4	10800.
52.00	67.00	29.15	527.5	54.66	204.5	11180.
53.00	43.00	5.187	199.7	9.434	18.64	175.8
53.00	44.00	6.187	221.6	8.567	26.50	227.1
53.00	45.00	7.187	241.5	8.017	35.24	282.6
53.00	46.00	8.186	259.9	7.638	44.77	342.0
53.00	47.00	9.186	277.1	7.361	55.03	405.1
53.00	48.00	10.19	293.2	7.150	65.98	471.8
53.00	49.00	11.19	308.6	6.984	77.56	541.7
53.00	50.00	12.18	323.2	6.849	89.76	614.8
53.00	51.00	13.18	337.2	9.187	102.1	938.3
53.00	52.00	14.18	350.7	14.66	111.6	1636.
53.00	53.00	15.18	364.5	20.12	118.6	2386.
53.00	54.00	16.18	378.3	25.87	123.3	3190.
53.00	55.00	17.18	391.8	32.13	126.0	4048.
53.00	56.00	18.18	405.1	39.09	126.9	4960.
53.00	57.00	19.18	418.7	47.64	124.4	5929.
53.00	58.00	20.18	431.9	57.26	121.4	6951.
53.00	59.00	21.18	444.1	69.03	116.3	8028.
53.00	60.00	22.18	456.8	75.27	112.6	9172.
53.00	61.00	23.18	468.9	77.31	114.2	8826.
53.00	62.00	24.18	480.2	76.23	120.5	9188.
53.00	63.00	25.18	491.0	72.91	131.9	9552.
53.00	64.00	26.18	501.3	68.35	145.1	9920.
53.00	65.00	27.18	511.1	63.35	158.5	10290.
53.00	66.00	28.18	520.5	58.39	182.7	10670.
53.00	67.00	29.18	529.5	53.75	205.5	11040.
54.00	43.00	5.213	200.3	9.405	18.83	177.1
54.00	44.00	6.213	222.1	8.550	26.72	228.5
54.00	45.00	7.213	242.0	8.006	35.48	284.1
54.00	46.00	8.212	260.3	7.630	45.03	343.6
54.00	47.00	9.212	277.5	7.355	55.31	406.8
54.00	48.00	10.21	293.8	9.766	65.97	644.3
54.00	49.00	11.21	309.3	17.57	73.34	1288.
54.00	50.00	12.21	325.2	25.56	77.63	1984.
54.00	51.00	13.21	340.6	34.46	79.37	2735.
54.00	52.00	14.21	356.1	45.46	77.96	3544.
54.00	53.00	15.21	371.2	58.88	74.90	4410.
54.00	54.00	16.21	385.3	76.66	69.59	5334.
54.00	55.00	17.21	399.9	100.5	62.84	6317.
54.00	56.00	18.21	414.3	124.7	55.62	6937.
54.00	57.00	19.21	427.7	133.7	54.42	7276.
54.00	58.00	20.21	440.2	128.8	59.18	7622.
54.00	59.00	21.21	451.9	115.6	68.97	7974.
54.00	60.00	22.21	463.0	100.3	83.07	8330.
54.00	61.00	23.21	473.5	86.16	100.9	8691.
54.00	62.00	24.21	483.5	74.28	121.9	9055.
54.00	63.00	25.21	493.0	64.64	145.8	9423.
54.00	64.00	26.21	502.1	56.89	172.2	9793.
54.00	65.00	27.21	510.8	50.64	200.8	10170.
54.00	66.00	28.21	519.3	45.56	231.4	10540.
54.00	67.00	29.21	527.4	41.39	263.9	10920.
55.00	43.00	5.240	200.9	9.377	19.03	178.4
55.00	44.00	6.239	222.6	8.533	26.94	229.8
55.00	45.00	7.239	242.5	7.991	35.73	285.6
55.00	46.00	8.239	261.0	17.49	43.03	752.5
55.00	47.00	9.238	279.5	30.07	45.90	1380.
55.00	48.00	10.24	297.4	45.17	45.61	2060.
55.00	49.00	11.24	315.3	67.43	41.54	2801.
55.00	50.00	12.24	331.9	101.7	35.42	3603.
55.00	51.00	13.24	348.6	162.8	27.44	4467.
55.00	52.00	14.24	365.0	307.5	17.54	5393.
55.00	53.00	15.24	380.8	608.1	9.512	5785.
55.00	54.00	16.24	395.2	623.0	9.808	6110.
55.00	55.00	17.24	408.5	381.5	16.90	6445.
55.00	56.00	18.24	420.8	230.0	29.51	6787.
55.00	57.00	19.23	432.3	152.7	46.71	7135.
55.00	58.00	20.23	443.1	110.5	67.77	7487.
55.00	59.00	21.23	453.3	85.16	92.11	7844.
55.00	60.00	22.23	463.0	68.78	119.3	8205.
55.00	61.00	23.23	472.3	57.53	148.9	8569.
55.00	62.00	24.23	481.1	49.44	180.7	8936.
55.00	63.00	25.23	489.6	43.39	214.5	9306.
55.00	64.00	26.23	497.8	38.73	249.9	9678.
55.00	65.00	27.23	505.7	35.04	286.9	10050.
55.00	66.00	28.23	513.3	32.07	325.2	10430.
55.00	67.00	29.23	520.7	29.63	364.8	10810.
56.00	43.00	5.266	201.6	9.310	19.30	179.7
56.00	44.00	6.265	223.9	27.40	23.86	653.9

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EPA Export 08-07-2014:23:43:12

56.00	45.00	7.265	245.6	54.04	23.16	1252.
56.00	46.00	8.265	266.3	107.4	17.71	1903.
56.00	47.00	9.264	286.5	263.4	9.940	2618.
56.00	48.00	10.26		Disturbing moment < 0		
56.00	49.00	11.26		Disturbing moment < 0		
56.00	50.00	12.26		Disturbing moment < 0		
56.00	51.00	13.26		Disturbing moment < 0		
56.00	52.00	14.26		Disturbing moment < 0		
56.00	53.00	15.26		Disturbing moment < 0		
56.00	54.00	16.26	398.5	315.9	18.89	5967.
56.00	55.00	17.26	409.8	147.8	42.71	6311.
56.00	56.00	18.26	420.4	95.20	69.96	6660.
56.00	57.00	19.26	430.4	70.09	100.1	7013.
56.00	58.00	20.26	439.9	55.58	132.6	7370.
56.00	59.00	21.26	448.9	46.23	167.2	7731.
56.00	60.00	22.26	457.5	39.73	203.7	8095.
56.00	61.00	23.26	465.8	34.99	241.8	8461.
56.00	62.00	24.26	473.7	31.39	281.3	8829.
56.00	63.00	25.26	481.4	28.57	322.0	9200.
56.00	64.00	26.26	488.8	26.30	364.0	9574.
56.00	65.00	27.26	496.0	24.45	406.9	9949.
56.00	66.00	28.26	503.0	22.91	450.8	10330.
56.00	67.00	29.26	509.8	21.60	495.5	10700.
57.00	43.00	5.292	205.4	131.7	7.220	950.7
57.00	44.00	6.292		Disturbing moment < 0		
57.00	45.00	7.291		Disturbing moment < 0		
57.00	46.00	8.291		Disturbing moment < 0		
57.00	47.00	9.291		Disturbing moment < 0		
57.00	48.00	10.29		Disturbing moment < 0		
57.00	49.00	11.29		Disturbing moment < 0		
57.00	50.00	12.29		Disturbing moment < 0		
57.00	51.00	13.29		Disturbing moment < 0		
57.00	52.00	14.29	373.2	227.9	22.65	5162.
57.00	53.00	15.29	384.4	105.2	52.30	5503.
57.00	54.00	16.29	394.9	69.12	84.61	5849.
57.00	55.00	17.29	404.6	51.67	120.0	6199.
57.00	56.00	18.29	413.9	41.71	157.1	6553.
57.00	57.00	19.29	422.7	35.27	195.9	6910.
57.00	58.00	20.29	431.2	30.76	236.3	7270.
57.00	59.00	21.29	439.3	27.46	278.0	7633.
57.00	60.00	22.29	447.0	24.93	320.8	7998.
57.00	61.00	23.29	454.5	22.94	364.7	8365.
57.00	62.00	24.29	461.8	21.33	409.5	8735.
57.00	63.00	25.29	468.8	20.01	455.1	9106.
57.00	64.00	26.28	475.7	18.90	501.4	9479.
57.00	65.00	27.28	482.3	17.97	548.5	9854.
57.00	66.00	28.28	488.8	17.16	596.2	10230.
57.00	67.00	29.28	495.1	16.46	644.5	10610.
58.00	43.00	5.318	214.9	71.97	23.21	1670.
58.00	44.00	6.318	242.0	57.86	40.81	2361.
58.00	45.00	7.318		Disturbing moment < 0		
58.00	46.00	8.317		Disturbing moment < 0		
58.00	47.00	9.317		Disturbing moment < 0		
58.00	48.00	10.32		Disturbing moment < 0		
58.00	49.00	11.32	332.6	937.3	4.316	4045.
58.00	50.00	12.32	344.7	122.3	35.78	4376.
58.00	51.00	13.32	355.8	66.59	70.76	4712.
58.00	52.00	14.32	366.1	46.83	107.9	5055.
58.00	53.00	15.31	375.8	36.71	147.1	5402.
58.00	54.00	16.31	385.0	30.60	188.0	5755.
58.00	55.00	17.31	393.7	26.52	230.3	6106.
58.00	56.00	18.31	402.0	23.61	273.8	6463.
58.00	57.00	19.31	410.0	21.43	318.3	6823.
58.00	58.00	20.31	417.6	19.75	363.7	7184.
58.00	59.00	21.31	425.0	18.41	410.0	7548.
58.00	60.00	22.31	432.2	17.32	457.0	7914.
58.00	61.00	23.31	439.1	16.41	504.6	8281.
58.00	62.00	24.31	445.9	15.65	552.9	8651.
58.00	63.00	25.31	452.4	15.00	601.8	9022.
58.00	64.00	26.31	458.8	14.43	651.0	9395.
58.00	65.00	27.31	465.0	13.94	700.7	9769.
58.00	66.00	28.31	471.1	13.51	751.0	10140.
58.00	67.00	29.31	477.1	13.13	801.6	10520.
59.00	43.00	5.344		Disturbing moment < 0		
59.00	44.00	6.344		Disturbing moment < 0		
59.00	45.00	7.344		Disturbing moment < 0		
59.00	46.00	8.343		Disturbing moment < 0		
59.00	47.00	9.343	300.5	178.5	18.37	3279.
59.00	48.00	10.34	312.8	66.25	54.44	3607.
59.00	49.00	11.34	323.9	42.27	93.23	3941.
59.00	50.00	12.34	334.2	31.93	134.1	4281.
59.00	51.00	13.34	343.9	26.20	176.5	4625.
59.00	52.00	14.34	353.0	22.57	220.3	4972.
59.00	53.00	15.34	361.4	20.06	265.3	5322.
59.00	54.00	16.34	369.6	18.24	311.2	5676.
59.00	55.00	17.34	377.5	16.86	357.8	6031.
59.00	56.00	18.34	385.5	15.77	405.2	6389.
59.00	57.00	19.34	392.8	14.89	453.2	6750.
59.00	58.00	20.34	399.9	14.17	501.7	7112.
59.00	59.00	21.34	406.8	13.57	550.8	7476.
59.00	60.00	22.34	413.5	13.06	600.3	7841.
59.00	61.00	23.34	420.0	12.62	650.2	8208.
59.00	62.00	24.34	426.4	12.24	700.6	8577.
59.00	63.00	25.34	432.6	11.91	751.3	8947.
59.00	64.00	26.34	438.6	11.61	802.4	9319.
59.00	65.00	27.34	444.6	11.35	853.9	9692.
59.00	66.00	28.34	450.4	11.12	905.6	10070.
59.00	67.00	29.34	456.1	10.90	957.7	10440.
60.00	43.00	5.371		Disturbing moment < 0		
60.00	44.00	6.370		Disturbing moment < 0		
60.00	45.00	7.370	264.1	75.39	33.61	2534.
60.00	46.00	8.370	276.8	38.96	73.37	2858.
60.00	47.00	9.369	288.2	27.65	115.4	3190.
60.00	48.00	10.37	298.7	22.19	159.0	3527.
60.00	49.00	11.37	308.5	18.98	203.8	3868.
60.00	50.00	12.37	317.7	16.88	249.6	4213.
60.00	51.00	13.37	326.5	15.39	296.3	4560.
60.00	52.00	14.37	334.8	14.29	343.6	4910.
60.00	53.00	15.37	347.6	14.27	389.4	5555.
60.00	54.00	16.37	355.3	13.54	437.9	5920.
60.00	55.00	17.37	362.4	12.94	487.1	6303.
60.00	56.00	18.37	369.6	12.45	536.6	6680.
60.00	57.00	19.37	376.5	12.04	586.4	7059.
60.00	58.00	20.37	383.2	11.69	636.6	7440.
60.00	59.00	21.37	389.8	11.38	687.2	7822.
60.00	60.00	22.36	396.1	11.12	738.1	8206.
60.00	61.00	23.36	402.6	10.88	789.4	8591.
60.00	62.00	24.36	408.7	10.67	841.0	8977.
60.00	63.00	25.36	414.7	10.49	892.8	9365.
60.00	64.00	26.36	420.5	10.32	944.8	9755.
60.00	65.00	27.36	426.3	10.17	997.2	10150.
60.00	66.00	28.36	431.9	10.04	1050.	10540.
60.00	67.00	29.36	437.4	9.912	1103.	10930.
61.00	43.00	5.397	222.3	40.05	45.30	1814.

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EPA Export 08-07-2014:23:43:12

61.00	44.00	6.396	236.0	24.37	87.66	2136.
61.00	45.00	7.396	248.1	19.13	131.8	2520.
61.00	46.00	8.396	258.9	16.15	177.1	2861.
61.00	47.00	9.395	274.1	14.68	226.2	3320.
61.00	48.00	10.40	283.8	13.47	273.2	3680.
61.00	49.00	11.39	292.8	12.60	320.9	4043.
61.00	50.00	12.39	301.3	11.95	369.0	4409.
61.00	51.00	13.39	309.5	11.44	417.6	4776.
61.00	52.00	14.39	317.3	11.03	466.6	5146.
61.00	53.00	15.39	324.8	10.69	516.1	5517.
61.00	54.00	16.39	332.1	10.41	565.9	5891.
61.00	55.00	17.39	339.1	10.17	616.0	6266.
61.00	56.00	18.39	346.0	9.967	666.4	6642.
61.00	57.00	19.39	352.6	9.789	717.1	7020.
61.00	58.00	20.39	359.9	9.628	768.4	7399.
61.00	59.00	21.39	365.2	9.490	819.7	7780.
61.00	60.00	22.39	371.4	9.368	871.3	8162.
61.00	61.00	23.39	377.5	9.257	923.1	8546.
61.00	62.00	24.39	383.4	9.158	975.2	8931.
61.00	63.00	25.39	389.2	9.067	1028.	9317.
61.00	64.00	26.39	394.9	8.985	1080.	9704.
61.00	65.00	27.39	400.5	8.910	1133.	10090.
61.00	66.00	28.39	406.0	8.840	1186.	10480.
61.00	67.00	29.39	411.7	8.775	1239.	10870.
62.00	43.00	5.507	210.6	9.388	149.4	1403.
62.00	44.00	6.490	221.4	8.786	195.3	1716.
62.00	45.00	7.477	231.4	8.459	241.7	2044.
62.00	46.00	8.468	240.7	8.247	288.6	2380.
62.00	47.00	9.460	249.6	8.070	335.9	2711.
62.00	48.00	10.45	258.0	7.880	383.6	3023.
62.00	49.00	11.45	266.1	7.652	431.7	3303.
62.00	50.00	12.41	274.6	9.213	475.7	4382.
62.00	51.00	13.40	281.3	9.101	521.3	4744.
62.00	52.00	14.40	288.0	9.006	567.2	5108.
62.00	53.00	15.39	294.3	8.924	613.4	5474.
62.00	54.00	16.38	300.5	8.853	659.8	5842.
62.00	55.00	17.41	311.1	8.617	723.0	6230.
62.00	56.00	18.40	317.0	8.133	770.8	6269.
62.00	57.00	19.40	322.8	8.521	818.5	6974.
62.00	58.00	20.39	328.3	8.484	866.1	7348.
62.00	59.00	21.39	333.8	8.451	913.9	7723.
62.00	60.00	22.39	339.2	8.421	961.9	8100.
62.00	61.00	23.38	344.3	8.389	1011.	8478.
62.00	62.00	24.38	349.5	8.363	1059.	8857.
62.00	63.00	25.37	354.6	8.339	1108.	9238.
62.00	64.00	26.37	359.7	8.317	1157.	9620.
62.00	65.00	27.37	364.7	8.296	1206.	10000.
62.00	66.00	28.37	369.6	8.275	1255.	10390.
62.00	67.00	29.36	374.4	8.257	1305.	10770.
63.00	43.00	5.342	165.5	8.935	197.5	1765.
63.00	44.00	6.335	176.1	8.700	239.8	2086.
63.00	45.00	7.359	188.7	8.373	289.5	2424.
63.00	46.00	8.354	197.8	8.265	333.2	2754.
63.00	47.00	9.349	206.2	8.190	376.9	3087.
63.00	48.00	10.34	214.2	8.134	420.7	3422.
63.00	49.00	11.34	221.8	8.088	464.8	3760.
63.00	50.00	12.34	229.1	8.050	509.2	4099.
63.00	51.00	13.33	236.1	8.015	554.1	4441.
63.00	52.00	14.33	242.9	7.987	599.0	4784.
63.00	53.00	15.33	249.5	7.962	644.3	5130.
63.00	54.00	16.33	255.9	7.939	689.8	5476.
63.00	55.00	17.32	262.1	7.919	735.6	5825.
63.00	56.00	18.32	268.2	7.900	781.6	6175.
63.00	57.00	19.32	274.2	7.883	827.9	6527.
63.00	58.00	20.32	280.1	7.867	874.5	6880.
63.00	59.00	21.32	285.8	7.851	921.4	7234.
63.00	60.00	22.32	291.4	7.837	968.4	7590.
63.00	61.00	23.32	296.9	7.824	1016.	7947.
63.00	62.00	24.32	302.2	7.812	1063.	8305.
63.00	63.00	25.32	307.5	7.800	1111.	8664.
63.00	64.00	26.32	312.7	7.788	1159.	9025.
63.00	65.00	27.31	317.9	7.777	1207.	9387.
63.00	66.00	28.31	322.8	7.765	1256.	9750.
63.00	67.00	29.31	327.7	7.755	1304.	10110.
64.00	43.00	5.296	129.0	8.001	230.4	1843.
64.00	44.00	6.296	140.3	7.834	273.5	2143.
64.00	45.00	7.296	150.5	7.759	316.4	2455.
64.00	46.00	8.296	159.9	7.721	359.4	2775.
64.00	47.00	9.296	168.7	7.701	402.5	3100.
64.00	48.00	10.30	177.0	7.688	445.9	3428.
64.00	49.00	11.30	184.9	7.682	489.5	3760.
64.00	50.00	12.30	192.4	7.679	533.3	4095.
64.00	51.00	13.30	199.6	7.677	577.3	4432.
64.00	52.00	14.30	206.6	7.675	621.6	4771.
64.00	53.00	15.30	213.4	7.674	666.2	5112.
64.00	54.00	16.30	219.8	7.670	711.1	5454.
64.00	55.00	17.30	226.1	7.669	756.1	5799.
64.00	56.00	18.30	232.3	7.668	801.4	6145.
64.00	57.00	19.30	238.3	7.666	846.9	6493.
64.00	58.00	20.30	244.2	7.665	892.6	6842.
64.00	59.00	21.30	249.9	7.663	938.6	7192.
64.00	60.00	22.30	255.5	7.661	984.8	7544.
64.00	61.00	23.30	261.1	7.659	1031.	7898.
64.00	62.00	24.30	266.4	7.656	1078.	8252.
64.00	63.00	25.30	271.7	7.654	1125.	8608.
64.00	64.00	26.30	277.1	7.651	1172.	8966.
64.00	65.00	27.30	282.2	7.648	1219.	9324.
64.00	66.00	28.30	287.2	7.645	1267.	9684.
64.00	67.00	29.30	292.2	7.642	1314.	10040.
65.00	43.00	5.326	95.46	8.982	233.7	2099.
65.00	44.00	6.326	108.0	8.210	281.7	2313.
65.00	45.00	7.325	118.9	7.888	327.6	2584.
65.00	46.00	8.325	128.8	7.726	372.6	2879.
65.00	47.00	9.324	137.9	7.636	417.2	3186.
65.00	48.00	10.32	146.4	7.585	461.6	3501.
65.00	49.00	11.32	154.5	7.553	505.9	3821.
65.00	50.00	12.32	162.2	7.535	550.3	4146.
65.00	51.00	13.32	169.5	7.523	594.8	4475.
65.00	52.00	14.32	176.5	7.517	639.4	4806.
65.00	53.00	15.32	183.3	7.514	684.1	5140.
65.00	54.00	16.32	189.9	7.514	728.9	5477.
65.00	55.00	17.32	196.2	7.514	774.0	5816.
65.00	56.00	18.32	202.4	7.516	819.1	6156.
65.00	57.00	19.32	208.3	7.516	864.6	6498.
65.00	58.00	20.32	214.3	7.515	910.5	6842.
65.00	59.00	21.32	219.9	7.520	955.8	7188.
65.00	60.00	22.32	225.5	7.523	1002.	7535.
65.00	61.00	23.32	231.0	7.525	1048.	7884.
65.00	62.00	24.32	236.3	7.528	1094.	8234.
65.00	63.00	25.32	241.6	7.530	1140.	8585.
65.00	64.00	26.31	246.7	7.532	1187.	8938.
65.00	65.00	27.31	251.8	7.534	1233.	9292.
65.00	66.00	28.31	256.8	7.536	1280.	9648.
65.00	67.00	29.31	261.7	7.538	1327.	10000.

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EPA Export 08-07-2014:23:43:12

66.00	43.00	5.360	60.04	10.60	186.3	1974.
66.00	44.00	6.359	74.11	10.72	243.4	2610.
66.00	45.00	7.359	86.35	9.497	297.1	2822.
66.00	46.00	8.358	97.04	8.812	347.0	3058.
66.00	47.00	9.357	106.7	8.428	395.0	3329.
66.00	48.00	10.36	115.7	8.187	442.1	3620.
66.00	49.00	11.36	124.0	8.020	488.5	3922.
66.00	50.00	12.36	132.0	7.915	534.7	4232.
66.00	51.00	13.36	139.5	7.834	580.6	4549.
66.00	52.00	14.35	146.8	7.774	626.5	4870.
66.00	53.00	15.35	153.7	7.727	672.3	5195.
66.00	54.00	16.35	160.4	7.690	718.2	5523.
66.00	55.00	17.35	166.8	7.662	764.1	5855.
66.00	56.00	18.35	173.1	7.639	810.2	6189.
66.00	57.00	19.35	179.3	7.620	856.3	6525.
66.00	58.00	20.35	185.2	7.605	902.5	6863.
66.00	59.00	21.35	191.0	7.592	948.8	7203.
66.00	60.00	22.35	196.7	7.581	995.3	7545.
66.00	61.00	23.35	202.1	7.571	1042.	7889.
66.00	62.00	24.35	207.6	7.563	1089.	8234.
66.00	63.00	25.35	212.9	7.556	1136.	8581.
66.00	64.00	26.35	218.1	7.550	1183.	8930.
66.00	65.00	27.35	223.3	7.545	1230.	9279.
66.00	66.00	28.35	228.3	7.541	1277.	9631.
66.00	67.00	29.35	233.3	7.537	1325.	9983.
67.00	43.00	5.393	Weight too small			
67.00	44.00	6.392	Weight too small			
67.00	45.00	7.392	53.92	11.83	222.2	2628.
67.00	46.00	8.391	65.28	11.85	278.7	3303.
67.00	47.00	9.391	75.64	10.68	333.0	3557.
67.00	48.00	10.39	85.04	9.887	384.4	3801.
67.00	49.00	11.39	93.74	9.375	434.2	4071.
67.00	50.00	12.39	101.9	9.023	483.0	4358.
67.00	51.00	13.39	109.7	8.766	531.2	4656.
67.00	52.00	14.39	117.1	8.573	578.8	4963.
67.00	53.00	15.39	124.1	8.422	626.3	5275.
67.00	54.00	16.39	130.9	8.303	673.6	5593.
67.00	55.00	17.39	137.5	8.206	720.7	5914.
67.00	56.00	18.39	143.9	8.126	767.8	6240.
67.00	57.00	19.39	150.1	8.058	815.0	6568.
67.00	58.00	20.38	156.1	8.002	862.1	6899.
67.00	59.00	21.38	162.0	7.954	909.3	7232.
67.00	60.00	22.38	167.7	7.911	956.6	7568.
67.00	61.00	23.38	173.3	7.875	1004.	7906.
67.00	62.00	24.38	178.8	7.843	1051.	8246.
67.00	63.00	25.38	184.2	7.814	1099.	8588.
67.00	64.00	26.38	189.5	7.789	1147.	8931.
67.00	65.00	27.38	194.6	7.765	1195.	9276.
67.00	66.00	28.38	199.7	7.745	1242.	9622.
67.00	67.00	29.38	204.6	7.727	1290.	9970.
68.00	43.00	5.488	Weight too small			
68.00	44.00	6.474	Weight too small			
68.00	45.00	7.463	Weight too small			
68.00	46.00	8.455	Weight too small			
68.00	47.00	9.449	Weight too small			
68.00	48.00	10.44	56.69	13.14	296.7	3899.
68.00	49.00	11.44	65.52	12.26	350.6	4297.
68.00	50.00	12.44	73.75	11.29	402.4	4543.
68.00	51.00	13.43	81.51	10.63	452.9	4812.
68.00	52.00	14.43	88.88	10.14	502.4	5085.
68.00	53.00	15.43	95.93	9.776	551.3	5360.
68.00	54.00	16.43	102.7	9.490	599.8	5639.
68.00	55.00	17.42	109.3	9.260	648.0	6000.
68.00	56.00	18.42	115.6	9.071	696.0	6314.
68.00	57.00	19.42	121.8	8.914	744.0	6632.
68.00	58.00	20.42	127.8	8.782	791.8	6954.
68.00	59.00	21.42	133.7	8.669	839.7	7279.
68.00	60.00	22.42	139.4	8.570	887.6	7607.
68.00	61.00	23.42	145.0	8.484	935.6	7937.
68.00	62.00	24.42	150.4	8.408	983.6	8270.
68.00	63.00	25.42	155.8	8.342	1032.	8606.
68.00	64.00	26.41	161.1	8.282	1080.	8943.
68.00	65.00	27.41	166.3	8.228	1128.	9282.
68.00	66.00	28.41	171.4	8.179	1177.	9623.
68.00	67.00	29.41	176.4	8.134	1225.	9966.
69.00	43.00	5.754	Radius too small			
69.00	44.00	6.701	Weight too small			
69.00	45.00	7.662	Weight too small			
69.00	46.00	8.631	Weight too small			
69.00	47.00	9.606	Weight too small			
69.00	48.00	10.59	Weight too small			
69.00	49.00	11.57	Weight too small			
69.00	50.00	12.56	51.09	14.22	317.2	4510.
69.00	51.00	13.54	58.64	13.65	370.1	5050.
69.00	52.00	14.53	65.82	12.57	421.6	5298.
69.00	53.00	15.53	72.66	11.79	471.9	5565.
69.00	54.00	16.52	79.23	11.21	521.5	5845.
69.00	55.00	17.51	85.57	10.76	570.4	6135.
69.00	56.00	18.50	91.70	10.39	619.0	6433.
69.00	57.00	19.50	97.67	10.10	667.3	6737.
69.00	58.00	20.49	103.5	9.850	715.4	7047.
69.00	59.00	21.49	109.1	9.642	763.4	7360.
69.00	60.00	22.49	114.6	9.465	811.3	7678.
69.00	61.00	23.48	120.1	9.311	859.1	7999.
69.00	62.00	24.48	125.4	9.178	907.0	8324.
69.00	63.00	25.47	130.6	9.060	954.8	8651.
69.00	64.00	26.47	135.7	8.955	1003.	8981.
69.00	65.00	27.47	140.7	8.862	1051.	9313.
69.00	66.00	28.47	145.6	8.779	1099.	9647.
69.00	67.00	29.46	150.5	8.703	1147.	9983.
70.00	43.00	6.096	Radius too small			
70.00	44.00	7.036	Radius too small			
70.00	45.00	7.976	Weight too small			
70.00	46.00	8.916	Weight too small			
70.00	47.00	9.863	Weight too small			
70.00	48.00	10.82	Weight too small			
70.00	49.00	11.78	Weight too small			
70.00	50.00	12.75	Weight too small			
70.00	51.00	13.73	Weight too small			
70.00	52.00	14.71	Weight too small			
70.00	53.00	15.69	53.81	14.84	391.7	5812.
70.00	54.00	16.67	60.11	13.69	442.8	6062.
70.00	55.00	17.65	66.18	12.84	492.9	6328.
70.00	56.00	18.64	72.06	12.18	542.3	6605.
70.00	57.00	19.63	77.76	11.66	591.2	6891.
70.00	58.00	20.62	83.32	11.23	639.8	7185.
70.00	59.00	21.61	88.73	10.88	688.1	7485.
70.00	60.00	22.60	94.03	10.58	736.1	7791.
70.00	61.00	23.59	99.22	10.33	784.1	8101.
70.00	62.00	24.58	104.3	10.11	831.9	8414.
70.00	63.00	25.57	109.3	9.926	879.7	8732.
70.00	64.00	26.57	114.2	9.760	927.5	9053.
70.00	65.00	27.56	119.0	9.614	975.3	9376.
70.00	66.00	28.55	123.7	9.483	1023.	9702.

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EPA Export 08-07-2014:23:43:12

70.00	67.00	29.55	128.4	9.366	1071.	10030.
71.00	43.00	6.430		Radius too small		
71.00	44.00	7.378		Radius too small		
71.00	45.00	8.317		Radius too small		
71.00	46.00	9.257		Weight too small		
71.00	47.00	10.20		Weight too small		
71.00	48.00	11.14		Weight too small		
71.00	49.00	12.08		Weight too small		
71.00	50.00	13.03		Weight too small		
71.00	51.00	13.98		Weight too small		
71.00	52.00	14.94		Weight too small		
71.00	53.00	15.91		Weight too small		
71.00	54.00	16.88		Weight too small		
71.00	55.00	17.85	50.24	15.72	414.8	6521.
71.00	56.00	18.83	55.84	14.68	465.4	6832.
71.00	57.00	19.80	61.28	13.77	515.2	7096.
71.00	58.00	20.78	66.56	13.06	564.4	7371.
71.00	59.00	21.77	71.71	12.48	613.2	7654.
71.00	60.00	22.75	76.76	12.01	661.7	7945.
71.00	61.00	23.74	81.70	11.61	709.8	8241.
71.00	62.00	24.72	86.54	11.27	757.9	8543.
71.00	63.00	25.71	91.30	10.98	805.7	8849.
71.00	64.00	26.70	95.98	10.73	853.5	9159.
71.00	65.00	27.69	100.6	10.51	901.3	9473.
71.00	66.00	28.68	105.1	10.32	949.0	9791.
71.00	67.00	29.67	109.6	10.14	996.6	10110.
72.00	43.00	6.770		Radius too small		
72.00	44.00	7.715		Radius too small		
72.00	45.00	8.659		Radius too small		
72.00	46.00	9.599		Radius too small		
72.00	47.00	10.54		Weight too small		
72.00	48.00	11.48		Weight too small		
72.00	49.00	12.42		Weight too small		
72.00	50.00	13.36		Weight too small		
72.00	51.00	14.30		Weight too small		
72.00	52.00	15.24		Weight too small		
72.00	53.00	16.19		Weight too small		
72.00	54.00	17.14		Weight too small		
72.00	55.00	18.10		Weight too small		
72.00	56.00	19.06		Weight too small		
72.00	57.00	20.03		Weight too small		
72.00	58.00	21.00	52.54	15.55	489.0	7685.
72.00	59.00	21.97	57.44	14.61	538.5	7869.
72.00	60.00	22.95	62.22	13.86	587.5	8141.
72.00	61.00	23.92	66.91	13.24	636.1	8422.
72.00	62.00	24.90	71.51	12.73	684.4	8710.
72.00	63.00	25.88	76.03	12.29	732.5	9003.
72.00	64.00	26.87	80.47	11.92	780.4	9301.
72.00	65.00	27.85	84.85	11.60	828.2	9604.
72.00	66.00	28.83	89.17	11.32	875.9	9911.
72.00	67.00	29.82	93.43	11.07	923.6	10220.
73.00	43.00	7.095		Radius too small		
73.00	44.00	8.041		Radius too small		
73.00	45.00	8.986		Radius too small		
73.00	46.00	9.932		Radius too small		
73.00	47.00	10.88		Radius too small		
73.00	48.00	11.82		Radius too small		
73.00	49.00	12.76		Weight too small		
73.00	50.00	13.70		Weight too small		
73.00	51.00	14.64		Weight too small		
73.00	52.00	15.58		Weight too small		
73.00	53.00	16.52		Weight too small		
73.00	54.00	17.46		Weight too small		
73.00	55.00	18.40		Weight too small		
73.00	56.00	19.35		Weight too small		
73.00	57.00	20.30		Weight too small		
73.00	58.00	21.26		Weight too small		
73.00	59.00	22.22		Weight too small		
73.00	60.00	23.19		Weight too small		
73.00	61.00	24.15	54.36	15.37	562.5	8644.
73.00	62.00	25.12	58.72	14.58	611.3	8915.
73.00	63.00	26.10	63.01	13.93	659.8	9194.
73.00	64.00	27.07	67.23	13.39	707.9	9479.
73.00	65.00	28.05	71.39	12.92	755.9	9769.
73.00	66.00	29.02	75.49	12.52	803.7	10060.
73.00	67.00	30.00	79.52	12.17	851.4	10360.
74.00	43.00	7.421		Radius too small		
74.00	44.00	8.366		Radius too small		
74.00	45.00	9.312		Radius too small		
74.00	46.00	10.26		Radius too small		
74.00	47.00	11.20		Radius too small		
74.00	48.00	12.15		Radius too small		
74.00	49.00	13.09		Radius too small		
74.00	50.00	14.04		Weight too small		
74.00	51.00	14.98		Weight too small		
74.00	52.00	15.92		Weight too small		
74.00	53.00	16.86		Weight too small		
74.00	54.00	17.80		Weight too small		
74.00	55.00	18.74		Weight too small		
74.00	56.00	19.68		Weight too small		
74.00	57.00	20.62		Weight too small		
74.00	58.00	21.56		Weight too small		
74.00	59.00	22.51		Weight too small		
74.00	60.00	23.46		Weight too small		
74.00	61.00	24.42		Weight too small		
74.00	62.00	25.38		Weight too small		
74.00	63.00	26.34	51.84	16.05	587.1	9422.
74.00	64.00	27.31	55.85	15.25	635.7	9692.
74.00	65.00	28.28	59.79	14.57	683.9	9968.
74.00	66.00	29.25	63.68	14.00	732.0	10250.
74.00	67.00	30.22	67.52	13.51	779.8	10540.
75.00	43.00	7.746		Radius too small		
75.00	44.00	8.692		Radius too small		
75.00	45.00	9.637		Radius too small		
75.00	46.00	10.58		Radius too small		
75.00	47.00	11.53		Radius too small		
75.00	48.00	12.47		Radius too small		
75.00	49.00	13.42		Radius too small		
75.00	50.00	14.37		Radius too small		
75.00	51.00	15.31		Slip too small to split into minimum no. of slices		
75.00	52.00	16.26		Weight too small		
75.00	53.00	17.20		Weight too small		
75.00	54.00	18.14		Weight too small		
75.00	55.00	19.08		Weight too small		
75.00	56.00	20.02		Weight too small		
75.00	57.00	20.96		Weight too small		
75.00	58.00	21.90		Weight too small		
75.00	59.00	22.84		Weight too small		
75.00	60.00	23.78		Weight too small		
75.00	61.00	24.73		Weight too small		
75.00	62.00	25.67		Weight too small		
75.00	63.00	26.63		Weight too small		
75.00	64.00	27.58		Weight too small		

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EPA Export 08-07-2014:23:43:13

75.00	65.00	28.54		Weight too small		
75.00	66.00	29.50	53.44	15.85	660.5	10470.
75.00	67.00	30.47	57.09	15.16	708.6	10740.
76.00	43.00	8.072		Radius too small		
76.00	44.00	9.017		Radius too small		
76.00	45.00	9.963		Radius too small		
76.00	46.00	10.91		Radius too small		
76.00	47.00	11.85		Radius too small		
76.00	48.00	12.80		Radius too small		
76.00	49.00	13.75		Radius too small		
76.00	50.00	14.69		Radius too small		
76.00	51.00	15.64		Radius too small		
76.00	52.00	16.58		Radius too small		
76.00	53.00	17.53		Weight too small		
76.00	54.00	18.47		Weight too small		
76.00	55.00	19.42		Weight too small		
76.00	56.00	20.36		Weight too small		
76.00	57.00	21.30		Weight too small		
76.00	58.00	22.24		Weight too small		
76.00	59.00	23.18		Weight too small		
76.00	60.00	24.12		Weight too small		
76.00	61.00	25.06		Weight too small		
76.00	62.00	26.00		Weight too small		
76.00	63.00	26.94		Weight too small		
76.00	64.00	27.89		Weight too small		
76.00	65.00	28.84		Weight too small		
76.00	66.00	29.79		Weight too small		
76.00	67.00	30.74		Weight too small		
77.00	43.00	8.397		Radius too small		
77.00	44.00	9.343		Radius too small		
77.00	45.00	10.29		Radius too small		
77.00	46.00	11.23		Radius too small		
77.00	47.00	12.18		Radius too small		
77.00	48.00	13.13		Radius too small		
77.00	49.00	14.07		Radius too small		
77.00	50.00	15.02		Radius too small		
77.00	51.00	15.96		Radius too small		
77.00	52.00	16.91		Radius too small		
77.00	53.00	17.85		Radius too small		
77.00	54.00	18.80		Radius too small		
77.00	55.00	19.74		Weight too small		
77.00	56.00	20.69		Weight too small		
77.00	57.00	21.63		Weight too small		
77.00	58.00	22.58		Weight too small		
77.00	59.00	23.53		Weight too small		
77.00	60.00	24.46		Weight too small		
77.00	61.00	25.40		Weight too small		
77.00	62.00	26.34		Weight too small		
77.00	63.00	27.28		Weight too small		
77.00	64.00	28.22		Weight too small		
77.00	65.00	29.16		Weight too small		
77.00	66.00	30.11		Weight too small		
77.00	67.00	31.05		Weight too small		
78.00	43.00	8.722		Radius too small		
78.00	44.00	9.668		Radius too small		
78.00	45.00	10.61		Radius too small		
78.00	46.00	11.56		Radius too small		
78.00	47.00	12.50		Radius too small		
78.00	48.00	13.45		Radius too small		
78.00	49.00	14.40		Radius too small		
78.00	50.00	15.34		Radius too small		
78.00	51.00	16.29		Radius too small		
78.00	52.00	17.23		Radius too small		
78.00	53.00	18.18		Radius too small		
78.00	54.00	19.12		Radius too small		
78.00	55.00	20.07		Radius too small		
78.00	56.00	21.01		Weight too small		
78.00	57.00	21.96		Weight too small		
78.00	58.00	22.91		Weight too small		
78.00	59.00	23.85		Weight too small		
78.00	60.00	24.80		Weight too small		
78.00	61.00	25.74		Weight too small		
78.00	62.00	26.69		Weight too small		
78.00	63.00	27.63		Weight too small		
78.00	64.00	28.57		Weight too small		
78.00	65.00	29.51		Weight too small		
78.00	66.00	30.45		Weight too small		
78.00	67.00	31.39		Weight too small		
79.00	43.00	9.012		Radius too small		
79.00	44.00	9.969		Radius too small		
79.00	45.00	10.93		Radius too small		
79.00	46.00	11.88		Radius too small		
79.00	47.00	12.83		Radius too small		
79.00	48.00	13.78		Radius too small		
79.00	49.00	14.72		Radius too small		
79.00	50.00	15.67		Radius too small		
79.00	51.00	16.61		Radius too small		
79.00	52.00	17.56		Radius too small		
79.00	53.00	18.50		Radius too small		
79.00	54.00	19.45		Radius too small		
79.00	55.00	20.39		Radius too small		
79.00	56.00	21.34		Radius too small		
79.00	57.00	22.29		Radius too small		
79.00	58.00	23.23		Weight too small		
79.00	59.00	24.18		Weight too small		
79.00	60.00	25.12		Weight too small		
79.00	61.00	26.07		Weight too small		
79.00	62.00	27.01		Weight too small		
79.00	63.00	27.96		Weight too small		
79.00	64.00	28.90		Weight too small		
79.00	65.00	29.85		Weight too small		
79.00	66.00	30.79		Weight too small		
79.00	67.00	31.73		Weight too small		
80.00	43.00	9.301		Radius too small		
80.00	44.00	10.26		Radius too small		
80.00	45.00	11.22		Radius too small		
80.00	46.00	12.17		Radius too small		
80.00	47.00	13.13		Radius too small		
80.00	48.00	14.09		Radius too small		
80.00	49.00	15.04		Radius too small		
80.00	50.00	15.99		Radius too small		
80.00	51.00	16.94		Radius too small		
80.00	52.00	17.88		Radius too small		
80.00	53.00	18.83		Radius too small		
80.00	54.00	19.77		Radius too small		
80.00	55.00	20.72		Radius too small		
80.00	56.00	21.67		Radius too small		
80.00	57.00	22.61		Radius too small		
80.00	58.00	23.56		Radius too small		
80.00	59.00	24.50		Radius too small		
80.00	60.00	25.45		Weight too small		
80.00	61.00	26.39		Weight too small		
80.00	62.00	27.34		Weight too small		
80.00	63.00	28.28		Weight too small		

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80.00	64.00	29.23	Weight too small
80.00	65.00	30.18	Weight too small
80.00	66.00	31.12	Weight too small
80.00	67.00	32.07	Weight too small
81.00	43.00	9.590	Radius too small
81.00	44.00	10.55	Radius too small
81.00	45.00	11.50	Radius too small
81.00	46.00	12.46	Radius too small
81.00	47.00	13.42	Radius too small
81.00	48.00	14.38	Radius too small
81.00	49.00	15.33	Radius too small
81.00	50.00	16.29	Radius too small
81.00	51.00	17.25	Radius too small
81.00	52.00	18.21	Radius too small
81.00	53.00	19.15	Radius too small
81.00	54.00	20.10	Radius too small
81.00	55.00	21.05	Radius too small
81.00	56.00	21.99	Radius too small
81.00	57.00	22.94	Radius too small
81.00	58.00	23.88	Radius too small
81.00	59.00	24.83	Radius too small
81.00	60.00	25.77	Radius too small
81.00	61.00	26.72	Weight too small
81.00	62.00	27.66	Weight too small
81.00	63.00	28.61	Weight too small
81.00	64.00	29.56	Weight too small
81.00	65.00	30.50	Weight too small
81.00	66.00	31.45	Weight too small
81.00	67.00	32.39	Weight too small
82.00	43.00	9.596	Radius too small
82.00	44.00	10.60	Radius too small
82.00	45.00	11.60	Radius too small
82.00	46.00	12.60	Radius too small
82.00	47.00	13.60	Radius too small
82.00	48.00	14.60	Radius too small
82.00	49.00	15.60	Radius too small
82.00	50.00	16.58	Radius too small
82.00	51.00	17.54	Radius too small
82.00	52.00	18.49	Radius too small
82.00	53.00	19.45	Radius too small
82.00	54.00	20.41	Radius too small
82.00	55.00	21.37	Radius too small
82.00	56.00	22.32	Radius too small
82.00	57.00	23.26	Radius too small
82.00	58.00	24.21	Radius too small
82.00	59.00	25.15	Radius too small
82.00	60.00	26.10	Radius too small
82.00	61.00	27.04	Radius too small
82.00	62.00	27.99	Radius too small
82.00	63.00	28.94	Weight too small
82.00	64.00	29.88	Weight too small
82.00	65.00	30.83	Weight too small
82.00	66.00	31.77	Weight too small
82.00	67.00	32.72	Weight too small
83.00	43.00	9.596	Radius too small
83.00	44.00	10.60	Radius too small
83.00	45.00	11.60	Radius too small
83.00	46.00	12.60	Radius too small
83.00	47.00	13.60	Radius too small
83.00	48.00	14.60	Radius too small
83.00	49.00	15.60	Radius too small
83.00	50.00	16.60	Radius too small
83.00	51.00	17.60	Radius too small
83.00	52.00	18.60	Radius too small
83.00	53.00	19.74	FoS > 1000
83.00	54.00	20.70	Disturbing moment < 0
83.00	55.00	21.66	FoS > 1000
83.00	56.00	22.61	Disturbing moment < 0
83.00	57.00	23.57	Radius too small
83.00	58.00	24.53	Radius too small
83.00	59.00	25.48	Radius too small
83.00	60.00	26.42	Radius too small
83.00	61.00	27.37	Radius too small
83.00	62.00	28.32	Radius too small
83.00	63.00	29.26	Radius too small
83.00	64.00	30.21	Radius too small
83.00	65.00	31.15	Weight too small
83.00	66.00	32.10	Weight too small
83.00	67.00	33.04	Weight too small
84.00	43.00	9.596	Radius too small
84.00	44.00	10.60	Radius too small
84.00	45.00	11.60	Radius too small
84.00	46.00	12.60	Radius too small
84.00	47.00	13.60	Radius too small
84.00	48.00	14.60	Radius too small
84.00	49.00	15.60	Radius too small
84.00	50.00	16.60	Radius too small
84.00	51.00	17.60	Radius too small
84.00	52.00	18.60	Radius too small
84.00	53.00	19.60	Radius too small
84.00	54.00	20.60	Radius too small
84.00	55.00	21.60	Radius too small
84.00	56.00	22.90	FoS > 1000
84.00	57.00	23.86	FoS > 1000
84.00	58.00	24.82	Disturbing moment < 0
84.00	59.00	25.77	Disturbing moment < 0
84.00	60.00	26.73	FoS > 1000
84.00	61.00	27.69	Disturbing moment < 0
84.00	62.00	28.64	Disturbing moment < 0
84.00	63.00	29.59	Radius too small
84.00	64.00	30.53	Radius too small
84.00	65.00	31.48	Radius too small
84.00	66.00	32.42	Radius too small
84.00	67.00	33.37	Weight too small
85.00	43.00	9.596	Radius too small
85.00	44.00	10.60	Radius too small
85.00	45.00	11.60	Radius too small
85.00	46.00	12.60	Radius too small
85.00	47.00	13.60	Radius too small
85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	FoS > 1000

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```
 85.00   61.00   29.89          FoS > 1000
 85.00   64.00   30.85          FoS > 1000
 85.00   65.00   31.80          Disturbing moment < 0
 85.00   66.00   32.75          FoS > 1000
 85.00   67.00   33.69          Disturbing moment < 0
 86.00   43.00   9.596          Radius too small
 86.00   44.00   10.60          Radius too small
 86.00   45.00   11.60          Radius too small
 86.00   46.00   12.60          Radius too small
 86.00   47.00   13.60          Radius too small
 86.00   48.00   14.60          Radius too small
 86.00   49.00   15.60          Radius too small
 86.00   50.00   16.60          Radius too small
 86.00   51.00   17.60          Radius too small
 86.00   52.00   18.60          Radius too small
 86.00   53.00   19.60          Radius too small
 86.00   54.00   20.60          Radius too small
 86.00   55.00   21.60          Radius too small
 86.00   56.00   22.60          Radius too small
 86.00   57.00   23.60          Radius too small
 86.00   58.00   24.60          Radius too small
 86.00   59.00   25.60          Radius too small
 86.00   60.00   26.60          Radius too small
 86.00   61.00   27.60          Radius too small
 86.00   62.00   28.60          Radius too small
 86.00   63.00   30.18          Disturbing moment < 0
 86.00   64.00   31.14          FoS > 1000
 86.00   65.00   32.10          FoS > 1000
 86.00   66.00   33.05          Disturbing moment < 0
 86.00   67.00   34.01          Disturbing moment < 0
 87.00   43.00   9.596          Radius too small
 87.00   44.00   10.60          Radius too small
 87.00   45.00   11.60          Radius too small
 87.00   46.00   12.60          Radius too small
 87.00   47.00   13.60          Radius too small
 87.00   48.00   14.60          Radius too small
 87.00   49.00   15.60          Radius too small
 87.00   50.00   16.60          Radius too small
 87.00   51.00   17.60          Radius too small
 87.00   52.00   18.60          Radius too small
 87.00   53.00   19.60          Radius too small
 87.00   54.00   20.60          Radius too small
 87.00   55.00   21.60          Radius too small
 87.00   56.00   22.60          Radius too small
 87.00   57.00   23.60          Radius too small
 87.00   58.00   24.60          Radius too small
 87.00   59.00   25.60          Radius too small
 87.00   60.00   26.60          Radius too small
 87.00   61.00   27.60          Radius too small
 87.00   62.00   28.60          Radius too small
 87.00   63.00   29.60          Radius too small
 87.00   64.00   30.60          Radius too small
 87.00   65.00   31.60          Radius too small
 87.00   66.00   33.34  131.1   12.01E+6   0.002152     25860.
 87.00   67.00   34.30          Disturbing moment < 0
 88.00   43.00   9.596          Radius too small
 88.00   44.00   10.60          Radius too small
 88.00   45.00   11.60          Radius too small
 88.00   46.00   12.60          Radius too small
 88.00   47.00   13.60          Radius too small
 88.00   48.00   14.60          Radius too small
 88.00   49.00   15.60          Radius too small
 88.00   50.00   16.60          Radius too small
 88.00   51.00   17.60          Radius too small
 88.00   52.00   18.60          Radius too small
 88.00   53.00   19.60          Radius too small
 88.00   54.00   20.60          Radius too small
 88.00   55.00   21.60          Radius too small
 88.00   56.00   22.60          Radius too small
 88.00   57.00   23.60          Radius too small
 88.00   58.00   24.60          Radius too small
 88.00   59.00   25.60          Radius too small
 88.00   60.00   26.60          Radius too small
 88.00   61.00   27.60          Radius too small
 88.00   62.00   28.60          Radius too small
 88.00   63.00   29.60          Radius too small
 88.00   64.00   30.60          Radius too small
 88.00   65.00   31.60          Radius too small
 88.00   66.00   32.60          Radius too small
 88.00   67.00   33.60          Radius too small
 89.00   43.00   9.596          Radius too small
 89.00   44.00   10.60          Radius too small
 89.00   45.00   11.60          Radius too small
 89.00   46.00   12.60          Radius too small
 89.00   47.00   13.60          Radius too small
 89.00   48.00   14.60          Radius too small
 89.00   49.00   15.60          Radius too small
 89.00   50.00   16.60          Radius too small
 89.00   51.00   17.60          Radius too small
 89.00   52.00   18.60          Radius too small
 89.00   53.00   19.60          Radius too small
 89.00   54.00   20.60          Radius too small
 89.00   55.00   21.60          Radius too small
 89.00   56.00   22.60          Radius too small
 89.00   57.00   23.60          Radius too small
 89.00   58.00   24.60          Radius too small
 89.00   59.00   25.60          Radius too small
 89.00   60.00   26.60          Radius too small
 89.00   61.00   27.60          Radius too small
 89.00   62.00   28.60          Radius too small
 89.00   63.00   29.60          Radius too small
 89.00   64.00   30.60          Radius too small
 89.00   65.00   31.60          Radius too small
 89.00   66.00   32.60          Radius too small
 89.00   67.00   33.60          Radius too small

WORST CASE : WATER CASE  1    OF   1
Centre at (49.00,66.00)        Radius 28.07m
Iterations: 5                  Horiz acceleration (kg): .0
Net vertical force (kN): .0    Slip weight (kN) 500.6
Net horiz force (kN): -4.768E-6  Disturbing moment (kN m): 346.7
Inclination of interslice forces  Restoring moment (kN m): 2122.
(°): 0.9313

                               Factor of Safety: 6.122

Slip surface coordinates       Pore      Interslice forces
                               Pressure  (kN)
Point   x (m)      y (m)       u (kPa)     T          E          E(u)
    1     36.17      41.03      -5.000        .0         .0          .0
    2     37.23      40.51          .0   0.01251    0.7695          .0
    3     38.00      40.17       3.299   0.04547     2.797      0.5440
    4     40.28      39.31       11.24    0.2118     13.03       6.320
```

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5	42.63	38.66	17.16	0.4162	25.60	14.72
6	45.02	38.21	21.00	0.5898	36.28	22.05
7	47.45	37.97	22.74	0.6858	42.19	25.86
8	49.89	37.94	22.36	0.6807	41.87	25.01
9	52.32	38.12	19.88	0.5755	35.40	19.75
10	54.72	38.51	15.29	0.3958	24.35	11.69
11	57.08	39.11	8.651	0.1913	11.77	3.742
12	59.38	39.92	.0	0.03362	2.068	.0
13	60.53	40.40	-18.41	.0	-4.768E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	.0	2.907	2.939	3.527
2	3.000	.0	1.649	5.619	5.928	2.521
3	3.000	.0	7.271	30.82	32.29	7.311
4	3.000	.0	14.20	49.65	51.00	7.311
5	3.000	.0	19.08	63.57	64.28	7.311
6	3.000	.0	21.87	71.87	72.00	7.311
7	3.000	.0	22.55	74.10	74.09	7.311
8	3.000	.0	21.12	70.12	70.51	7.311
9	3.000	.0	17.58	60.10	61.27	7.311
10	3.000	.0	11.97	44.49	46.42	7.311
11	3.000	.0	4.326	24.04	26.04	7.311
12	3.000	.0	.0	3.275	3.854	3.746

Slice No.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0

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ARUP

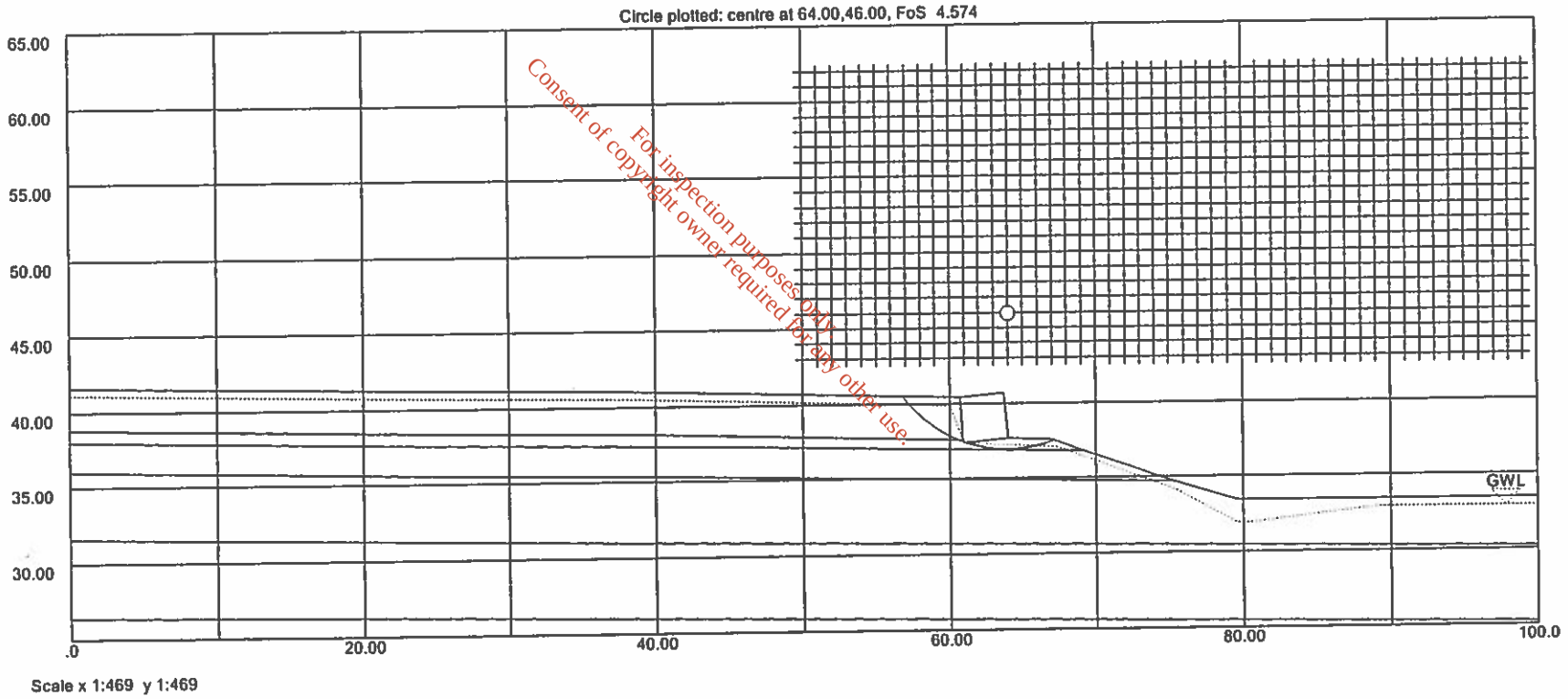
Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A:Lw11A:01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut Mp5.sld	



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ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Rev 11A: 02	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No5.sld	

Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Upper Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Undrained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Undrained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Undrain	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Undrain	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Un	20.00	20.00	Undrained	.0	75.00
7	Rock (Undrained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.60

Stratum	Material	X -->						
		63.70	64.00	67.00	67.37	69.20	75.30	75.90
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	34.70	33.40
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	37.10	.	34.20	.

Stratum	Material	X -->			
		79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40
4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	34.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	5.826	314.2	46.62	31.97	1491.
50.00	44.00	6.826	345.0	42.78	44.07	1885.
50.00	45.00	7.825	373.6	40.15	57.54	2310.
50.00	46.00	8.825	399.5	38.35	72.03	2762.
50.00	47.00	9.825	424.4	36.97	87.69	3242.
50.00	48.00	10.82	447.9	35.90	104.4	3746.
50.00	49.00	11.82	470.3	35.05	122.0	4274.
50.00	50.00	12.82	491.6	34.35	140.4	4825.
50.00	51.00	13.82	512.1	33.78	159.8	5398.
50.00	52.00	14.82	531.8	33.30	180.0	5992.
50.00	53.00	15.82	550.8	32.88	200.9	6606.
50.00	54.00	16.82	569.1	32.52	222.6	7240.
50.00	55.00	17.82	586.9	32.21	245.1	7894.
50.00	56.00	18.82	604.2	31.94	268.2	8566.
50.00	57.00	19.82	621.0	32.96	291.6	9609.
50.00	58.00	20.82	637.9	35.69	312.0	11130.
50.00	59.00	21.82	654.7	38.64	329.4	12730.
50.00	60.00	22.82	671.3	41.85	343.6	14380.
50.00	61.00	23.82	687.8	45.32	355.4	16110.
50.00	62.00	24.82	703.7	49.11	364.4	17900.
51.00	43.00	5.845	313.7	46.45	32.11	1491.
51.00	44.00	6.845	344.3	42.66	44.19	1885.
51.00	45.00	7.845	372.1	40.12	57.53	2308.
51.00	46.00	8.844	398.5	38.27	72.10	2759.
51.00	47.00	9.844	423.3	36.90	87.73	3237.
51.00	48.00	10.84	446.7	35.84	104.3	3740.
51.00	49.00	11.84	469.0	35.00	121.9	4266.
51.00	50.00	12.84	490.3	34.31	140.3	4815.
51.00	51.00	13.84	510.6	33.74	159.6	5386.
51.00	52.00	14.84	530.2	33.25	179.8	5978.

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51.00	53.00	15.84	549.1	32.84	200.6	6590.
51.00	54.00	16.84	567.7	35.09	220.9	7751.
51.00	55.00	17.84	586.1	38.70	237.3	9184.
51.00	56.00	18.84	604.4	42.67	250.4	10680.
51.00	57.00	19.84	621.8	47.08	260.2	12250.
51.00	58.00	20.84	639.8	51.88	267.8	13890.
51.00	59.00	21.84	657.5	57.16	272.9	15600.
51.00	60.00	22.84	674.9	62.98	275.9	17370.
51.00	61.00	23.84	693.0	70.27	273.5	19220.
51.00	62.00	24.84	709.9	75.22	277.3	20860.
52.00	43.00	5.864	313.3	46.28	32.24	1492.
52.00	44.00	6.864	343.6	42.54	44.30	1885.
52.00	45.00	7.864	371.3	40.02	57.63	2306.
52.00	46.00	8.864	397.6	38.19	72.16	2756.
52.00	47.00	9.863	422.3	36.83	87.76	3232.
52.00	48.00	10.86	445.6	35.78	104.3	3733.
52.00	49.00	11.86	467.7	34.94	121.8	4258.
52.00	50.00	12.86	488.9	34.26	140.2	4805.
52.00	51.00	13.86	509.5	33.78	158.1	5816.
52.00	52.00	14.86	529.9	41.62	171.6	7141.
52.00	53.00	15.86	550.0	47.11	181.2	8536.
52.00	54.00	16.86	569.3	53.38	187.4	10000.
52.00	55.00	17.86	588.9	60.43	190.9	11540.
52.00	56.00	18.86	608.7	69.24	189.9	13150.
52.00	57.00	19.86	627.9	79.06	187.6	14830.
52.00	58.00	20.86	646.8	90.66	183.0	16590.
52.00	59.00	21.86	665.4	98.22	179.8	17660.
52.00	60.00	22.86	682.8	100.7	185.1	18640.
52.00	61.00	23.86	699.3	99.31	197.7	19640.
52.00	62.00	24.86	715.0	95.26	216.8	20650.
53.00	43.00	5.883	312.8	46.10	32.37	1492.
53.00	44.00	6.883	343.0	42.41	44.42	1884.
53.00	45.00	7.883	370.5	39.92	57.72	2304.
53.00	46.00	8.883	396.7	38.11	72.23	2753.
53.00	47.00	9.883	421.2	36.76	87.78	3227.
53.00	48.00	10.88	444.6	37.16	104.0	3866.
53.00	49.00	11.88	467.5	43.68	116.2	5074.
53.00	50.00	12.88	489.5	51.46	123.3	6347.
53.00	51.00	13.88	511.7	60.62	126.9	7692.
53.00	52.00	14.88	533.2	71.57	127.3	9112.
53.00	53.00	15.88	555.1	86.72	122.3	10610.
53.00	54.00	16.88	576.2	104.9	116.2	12180.
53.00	55.00	17.88	596.7	125.0	110.0	13750.
53.00	56.00	18.88	616.8	140.9	103.9	14640.
53.00	57.00	19.88	635.3	141.1	110.2	15560.
53.00	58.00	20.88	652.6	132.1	124.9	16500.
53.00	59.00	21.88	668.5	119.4	146.2	17460.
53.00	60.00	22.88	684.0	106.1	173.9	18440.
53.00	61.00	23.88	698.8	94.02	206.8	19440.
53.00	62.00	24.88	712.8	83.78	244.2	20460.
54.00	43.00	5.903	312.3	45.93	32.50	1493.
54.00	44.00	6.902	342.3	42.29	44.51	1883.
54.00	45.00	7.902	369.7	39.84	57.79	2302.
54.00	46.00	8.902	396.2	42.93	71.03	3049.
54.00	47.00	9.902	421.6	53.81	77.94	4194.
54.00	48.00	10.90	446.7	67.49	80.02	5401.
54.00	49.00	11.90	471.6	87.15	76.71	6685.
54.00	50.00	12.90	495.6	114.1	70.54	8048.
54.00	51.00	13.90	519.0	154.8	61.31	9492.
54.00	52.00	14.90	541.9	218.7	50.25	10990.
54.00	53.00	15.90	563.6	279.2	42.29	11820.
54.00	54.00	16.90	583.6	264.4	47.87	12660.
54.00	55.00	17.90	602.2	214.2	63.20	13540.
54.00	56.00	18.90	619.5	166.9	86.51	14440.
54.00	57.00	19.90	635.7	132.0	116.4	15360.
54.00	58.00	20.90	651.0	107.4	151.9	16310.
54.00	59.00	21.90	665.5	89.90	192.2	17280.
54.00	60.00	22.90	679.3	77.20	236.1	18260.
54.00	61.00	23.90	692.5	67.71	283.4	19260.
54.00	62.00	24.90	706.3	60.31	334.3	20280.
55.00	43.00	5.922	311.6	45.58	32.76	1493.
55.00	44.00	6.922	341.5	49.28	43.36	2137.
55.00	45.00	7.921	371.0	68.97	46.58	3213.
55.00	46.00	8.921	399.8	100.4	43.25	4341.
55.00	47.00	9.921	427.5	155.5	35.67	5546.
55.00	48.00	10.92	454.0	282.7	24.18	6837.
55.00	49.00	11.92	479.9	832.9	9.863	8215.
55.00	50.00	12.92		Disturbing moment < 0		
55.00	51.00	13.92		Disturbing moment < 0		
55.00	52.00	14.92	547.8	950.1	11.33	10770.
55.00	53.00	15.92	566.5	333.2	34.82	11600.
55.00	54.00	16.92	583.7	189.0	65.96	12470.
55.00	55.00	17.92	599.9	129.2	103.3	13350.
55.00	56.00	18.92	615.0	97.79	145.8	14260.
55.00	57.00	19.92	630.4	78.65	193.2	15190.
55.00	58.00	20.92	644.1	66.22	243.8	16140.
55.00	59.00	21.92	657.1	57.51	297.5	17110.
55.00	60.00	22.92	669.6	51.11	354.1	18100.
55.00	61.00	23.92	681.7	46.23	413.1	19100.
55.00	62.00	24.92	693.3	42.41	474.4	20120.
56.00	43.00	5.941	313.1	89.12	24.42	2176.
56.00	44.00	6.941	345.9	183.9	17.45	3210.
56.00	45.00	7.941	377.7	744.4	5.801	4318.
56.00	46.00	8.940		Disturbing moment < 0		
56.00	47.00	9.940		Disturbing moment < 0		
56.00	48.00	10.94		Disturbing moment < 0		
56.00	49.00	11.94		Disturbing moment < 0		
56.00	50.00	12.94		Disturbing moment < 0		
56.00	51.00	13.94	527.5	480.9	20.29	9759.
56.00	52.00	14.94	545.0	180.7	58.57	10580.
56.00	53.00	15.94	561.3	111.3	102.7	11430.
56.00	54.00	16.94	576.5	81.16	151.6	12300.
56.00	55.00	17.94	590.9	64.58	204.3	13200.
56.00	56.00	18.94	604.5	54.19	260.3	14110.
56.00	57.00	19.94	617.5	47.13	319.2	15040.
56.00	58.00	20.94	630.8	43.43	376.0	16330.
56.00	59.00	21.94	642.2	38.68	442.0	17100.
56.00	60.00	22.94	653.8	35.16	509.5	17910.
56.00	61.00	23.94	664.9	32.65	576.3	18810.
56.00	62.00	24.94	675.7	30.60	644.7	19730.
57.00	43.00	5.960		Disturbing moment < 0		
57.00	44.00	6.960		Disturbing moment < 0		
57.00	45.00	7.960	389.5	99.44	53.64	5334.
57.00	46.00	8.960		Disturbing moment < 0		
57.00	47.00	9.960		Disturbing moment < 0		
57.00	48.00	10.96		Disturbing moment < 0		
57.00	49.00	11.96	485.8	511.7	15.65	8011.
57.00	50.00	12.96	504.3	155.2	57.66	8951.
57.00	51.00	13.96	520.0	86.91	110.4	9594.
57.00	52.00	14.96	535.7	62.62	165.1	10340.
57.00	53.00	15.96	550.0	49.77	223.1	11100.
57.00	54.00	16.96	563.6	41.84	284.0	11880.
57.00	55.00	17.96	576.4	36.49	347.4	12680.
57.00	56.00	18.96	588.7	32.65	412.9	13480.

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EPA Export 08-07-2014:23:43:13

ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A:Run11A:04	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No5.sld	

57.00	57.00	19.96	600.4	29.96	480.4	14400.
57.00	58.00	20.96	611.7	27.74	549.4	15240.
57.00	59.00	21.96	622.6	25.79	619.4	15970.
57.00	60.00	22.96	632.7	24.22	690.6	16720.
57.00	61.00	23.96	643.0	22.67	763.2	17310.
57.00	62.00	24.96	653.0	21.36	836.8	17870.
58.00	43.00	5.980	333.5	64.07	59.57	3817.
58.00	44.00	6.979		Disturbing moment < 0		
58.00	45.00	7.979		Disturbing moment < 0		
58.00	46.00	8.979		Disturbing moment < 0		
58.00	47.00	9.979	440.6	362.4	17.03	6172.
58.00	48.00	10.98	458.7	101.2	67.92	6871.
58.00	49.00	11.98	475.0	60.52	123.5	7477.
58.00	50.00	12.98	490.0	43.85	183.0	8024.
58.00	51.00	13.98	504.4	34.82	245.5	8549.
58.00	52.00	14.98	518.0	29.20	310.5	9066.
58.00	53.00	15.98	530.9	25.36	377.5	9574.
58.00	54.00	16.98	543.1	22.58	446.1	10070.
58.00	55.00	17.98	554.6	20.44	516.3	10560.
58.00	56.00	18.98	565.9	18.77	587.7	11030.
58.00	57.00	19.98	576.8	17.42	660.1	11500.
58.00	58.00	20.98	587.4	16.29	733.5	11950.
58.00	59.00	21.98	597.5	15.33	807.8	12380.
58.00	60.00	22.98	607.4	14.51	883.0	12810.
58.00	61.00	23.98	617.0	13.79	958.9	13220.
58.00	62.00	24.98	626.4	13.15	1036.	13620.
59.00	43.00	5.999		Disturbing moment < 0		
59.00	44.00	6.999		Disturbing moment < 0		
59.00	45.00	7.998	388.9	197.5	20.82	4112.
59.00	46.00	8.998	408.0	59.32	76.26	4524.
59.00	47.00	9.998	425.1	36.20	136.3	4934.
59.00	48.00	11.00	440.8	26.75	199.6	5339.
59.00	49.00	12.00	455.3	21.61	265.5	5737.
59.00	50.00	13.00	469.0	18.38	333.3	6125.
59.00	51.00	14.00	481.9	16.15	402.7	6504.
59.00	52.00	15.00	494.2	14.51	473.5	6871.
59.00	53.00	16.00	506.0	13.25	545.4	7227.
59.00	54.00	17.00	517.3	12.24	618.4	7571.
59.00	55.00	18.00	528.2	11.42	692.2	7902.
59.00	56.00	19.00	538.8	11.04	766.5	8461.
59.00	57.00	20.00	549.2	10.86	841.3	9134.
59.00	58.00	21.00	559.3	10.72	916.6	9824.
59.00	59.00	22.00	569.1	10.61	992.4	10530.
59.00	60.00	23.00	578.7	10.53	1068.	11250.
59.00	61.00	24.00	588.2	10.47	1145.	11990.
59.00	62.00	25.00	597.7	10.44	1221.	12750.
60.00	43.00	6.018	331.3	116.7	20.57	2401.
60.00	44.00	7.018	351.7	34.04	79.35	2701.
60.00	45.00	8.018	369.9	21.05	142.5	3000.
60.00	46.00	9.017	386.3	15.80	208.5	3294.
60.00	47.00	10.02	401.4	12.94	276.5	3578.
60.00	48.00	11.02	415.6	11.12	346.3	3852.
60.00	49.00	12.02	429.0	10.18	416.9	4245.
60.00	50.00	13.02	441.8	9.795	488.2	4782.
60.00	51.00	14.02	454.1	9.533	560.1	5340.
60.00	52.00	15.02	465.9	9.356	632.5	5918.
60.00	53.00	16.02	477.4	9.236	705.4	6515.
60.00	54.00	17.02	488.5	9.157	778.8	7132.
60.00	55.00	18.02	499.3	9.109	852.6	7766.
60.00	56.00	19.02	509.8	9.083	926.8	8418.
60.00	57.00	20.02	520.0	9.074	1001.	9085.
60.00	58.00	21.02	529.9	9.078	1077.	9773.
60.00	59.00	22.02	539.7	9.093	1152.	10480.
60.00	60.00	23.01	549.2	9.116	1228.	11190.
60.00	61.00	24.01	558.1	9.138	1305.	11930.
60.00	62.00	25.01	567.7	9.180	1381.	12680.
61.00	43.00	6.037	308.9	11.65	136.9	1595.
61.00	44.00	7.037	327.0	9.320	204.1	1902.
61.00	45.00	8.037	343.6	8.509	272.2	2317.
61.00	46.00	9.037	359.0	8.084	341.2	2759.
61.00	47.00	10.04	373.6	7.851	410.8	3225.
61.00	48.00	11.04	387.4	7.725	480.9	3715.
61.00	49.00	12.04	400.6	7.663	551.6	4227.
61.00	50.00	13.04	413.3	7.642	623.0	4761.
61.00	51.00	14.04	425.3	7.648	695.0	5315.
61.00	52.00	15.04	437.1	7.678	767.1	5890.
61.00	53.00	16.04	448.6	7.721	839.7	6484.
61.00	54.00	17.04	459.6	7.773	912.9	7096.
61.00	55.00	18.03	470.4	7.832	986.5	7727.
61.00	56.00	19.03	480.8	7.897	1061.	8375.
61.00	57.00	20.03	491.0	7.965	1135.	9040.
61.00	58.00	21.03	501.0	8.035	1210.	9722.
61.00	59.00	22.03	510.7	8.108	1285.	10420.
61.00	60.00	23.03	520.2	8.182	1361.	11130.
61.00	61.00	24.03	529.5	8.256	1437.	11860.
61.00	62.00	25.03	538.7	8.331	1513.	12610.
62.00	43.00	6.056	281.0	6.159	245.5	1512.
62.00	44.00	7.056	298.6	6.068	312.5	1897.
62.00	45.00	8.056	315.1	6.068	380.6	2309.
62.00	46.00	9.056	330.5	6.117	449.4	2748.
62.00	47.00	10.06	345.1	6.193	518.7	3212.
62.00	48.00	11.06	358.8	6.284	588.7	3699.
62.00	49.00	12.06	372.0	6.385	659.2	4209.
62.00	50.00	13.06	384.6	6.491	730.2	4739.
62.00	51.00	14.05	396.4	6.596	802.1	5290.
62.00	52.00	15.05	408.1	6.705	874.2	5861.
62.00	53.00	16.05	419.4	6.815	946.7	6452.
62.00	54.00	17.05	430.4	6.924	1020.	7060.
62.00	55.00	18.05	441.0	7.033	1093.	7687.
62.00	56.00	19.05	451.4	7.140	1167.	8331.
62.00	57.00	20.05	461.5	7.220	1241.	8961.
62.00	58.00	21.05	471.3	7.283	1316.	9585.
62.00	59.00	22.05	480.7	7.346	1391.	10220.
62.00	60.00	23.05	490.1	7.406	1467.	10870.
62.00	61.00	24.05	499.2	7.465	1544.	11520.
62.00	62.00	25.05	508.2	7.523	1621.	12190.
63.00	43.00	6.076	252.9	4.620	326.5	1508.
63.00	44.00	7.075	270.2	4.802	393.8	1891.
63.00	45.00	8.075	286.7	4.986	461.6	2302.
63.00	46.00	9.075	302.0	5.165	530.2	2738.
63.00	47.00	10.07	316.4	5.338	599.4	3199.
63.00	48.00	11.07	330.0	5.505	669.1	3683.
63.00	49.00	12.07	343.1	5.666	739.5	4190.
63.00	50.00	13.07	355.6	5.778	810.4	4683.
63.00	51.00	14.07	367.2	5.875	882.6	5186.
63.00	52.00	15.07	378.5	5.972	955.0	5703.
63.00	53.00	16.07	389.6	6.063	1028.	6234.
63.00	54.00	17.07	400.4	6.151	1102.	6777.
63.00	55.00	18.07	410.7	6.235	1176.	7334.
63.00	56.00	19.07	420.8	6.317	1251.	7902.
63.00	57.00	20.07	430.9	6.395	1326.	8483.
63.00	58.00	21.07	440.4	6.471	1402.	9075.
63.00	59.00	22.07	449.7	6.545	1479.	9678.
63.00	60.00	23.07	458.8	6.616	1556.	10290.

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EPA Export 08-07-2014:23:43:13

63.00	61.00	24.07	467.6	6.686	1633.	10920.
63.00	62.00	25.07	476.3	6.753	1711.	11550.
64.00	43.00	6.095	224.7	4.803	380.6	1828.
64.00	44.00	7.095	246.9	4.818	464.7	2239.
64.00	45.00	8.095	258.2	4.602	515.6	2373.
64.00	46.00	9.094	273.0	4.574	584.7	2674.
64.00	47.00	10.09	286.9	4.681	654.7	3065.
64.00	48.00	11.09	300.1	4.816	725.6	3494.
64.00	49.00	12.09	312.5	4.942	797.0	3939.
64.00	50.00	13.09	324.5	5.060	869.3	4398.
64.00	51.00	14.09	335.9	5.171	942.2	4872.
64.00	52.00	15.09	347.2	5.276	1016.	5359.
64.00	53.00	16.09	357.6	5.374	1090.	5859.
64.00	54.00	17.09	367.9	5.470	1165.	6372.
64.00	55.00	18.09	378.0	5.561	1240.	6896.
64.00	56.00	19.09	387.7	5.650	1316.	7433.
64.00	57.00	20.09	397.2	5.735	1392.	7981.
64.00	58.00	21.09	406.5	5.817	1468.	8540.
64.00	59.00	22.09	415.5	5.896	1545.	9110.
64.00	60.00	23.09	424.3	5.973	1623.	9691.
64.00	61.00	24.09	433.0	6.047	1700.	10280.
64.00	62.00	25.09	441.5	6.119	1779.	10880.
65.00	43.00	6.114	193.2	6.044	403.2	2437.
65.00	44.00	7.114	210.9	5.661	475.1	2690.
65.00	45.00	8.114	226.8	5.410	546.7	2958.
65.00	46.00	9.114	241.0	5.225	618.2	3230.
65.00	47.00	10.11	254.7	5.077	689.9	3503.
65.00	48.00	11.11	267.4	4.953	762.0	3774.
65.00	49.00	12.11	279.6	4.843	834.6	4042.
65.00	50.00	13.11	291.1	4.823	907.6	4378.
65.00	51.00	14.11	302.2	4.813	981.2	4723.
65.00	52.00	15.11	313.0	4.888	1055.	5156.
65.00	53.00	16.11	323.4	4.836	1130.	5463.
65.00	54.00	17.11	333.2	4.930	1205.	5942.
65.00	55.00	18.11	343.0	5.023	1281.	6434.
65.00	56.00	19.11	352.5	5.113	1357.	6937.
65.00	57.00	20.11	361.8	5.199	1433.	7452.
65.00	58.00	21.11	370.6	5.283	1510.	7977.
65.00	59.00	22.11	379.4	5.363	1587.	8512.
65.00	60.00	23.11	388.3	5.441	1665.	9059.
65.00	61.00	24.11	396.8	5.517	1743.	9615.
65.00	62.00	25.11	405.1	5.591	1821.	10180.
66.00	43.00	6.133	153.9	8.584	382.0	3279.
66.00	44.00	7.133	172.8	7.393	464.0	3430.
66.00	45.00	8.133	189.6	6.794	542.1	3683.
66.00	46.00	9.133	204.6	6.412	618.4	3965.
66.00	47.00	10.13	218.2	6.140	693.6	4258.
66.00	48.00	11.13	231.2	5.927	768.6	4555.
66.00	49.00	12.13	243.4	5.754	843.3	4852.
66.00	50.00	13.13	255.0	5.607	917.9	5147.
66.00	51.00	14.13	266.0	5.480	992.5	5439.
66.00	52.00	15.13	276.8	5.366	1068.	5729.
66.00	53.00	16.13	286.9	5.264	1143.	6015.
66.00	54.00	17.13	301.6	5.336	1245.	6641.
66.00	55.00	18.13	306.3	5.085	1293.	6578.
66.00	56.00	19.13	315.5	5.071	1369.	6944.
66.00	57.00	20.13	324.6	5.062	1446.	7319.
66.00	58.00	21.13	333.4	5.057	1523.	7699.
66.00	59.00	22.13	342.0	5.054	1600.	8085.
66.00	60.00	23.13	350.4	5.052	1677.	8474.
66.00	61.00	24.13	358.7	5.076	1755.	8869.
66.00	62.00	25.13	366.9	5.148	1834.	9270.
67.00	43.00	6.153	106.0	11.93	294.9	3515.
67.00	44.00	7.152	127.1	11.00	392.4	4217.
67.00	45.00	8.152	145.8	9.459	484.4	4502.
67.00	46.00	9.152	162.1	8.461	569.4	4817.
67.00	47.00	10.15	176.7	7.835	651.1	5101.
67.00	48.00	11.15	190.2	7.397	730.8	5405.
67.00	49.00	12.15	202.5	7.063	809.1	5717.
67.00	50.00	13.15	214.4	6.803	886.8	6033.
67.00	51.00	14.15	225.8	6.586	963.9	6349.
67.00	52.00	15.15	236.8	6.401	1041.	6663.
67.00	53.00	16.15	247.2	6.240	1118.	6975.
67.00	54.00	17.15	257.2	6.098	1195.	7284.
67.00	55.00	18.15	266.7	5.969	1272.	7590.
67.00	56.00	19.15	276.2	5.853	1349.	7893.
67.00	57.00	20.15	285.3	5.746	1426.	8192.
67.00	58.00	21.15	294.2	5.648	1503.	8488.
67.00	59.00	22.15	302.8	5.557	1580.	8780.
67.00	60.00	23.15	311.3	5.473	1657.	9070.
67.00	61.00	24.15	324.4	5.566	1767.	9834.
67.00	62.00	25.15	327.3	5.317	1813.	9638.
68.00	43.00	6.172		Weight too small		
68.00	43.00	6.172		Weight too small		
68.00	44.00	7.172		Weight too small		
68.00	44.00	7.172		Weight too small		
68.00	45.00	8.171	61.39	9.954	312.8	3113.
68.00	45.00	8.171		Weight too small		
68.00	46.00	9.171	76.53	9.664	402.5	3890.
68.00	46.00	9.171		Weight too small		
68.00	47.00	10.17	129.2	11.11	547.3	6078.
68.00	48.00	11.17	144.0	10.00	635.0	6351.
68.00	49.00	12.17	157.5	9.250	719.7	6657.
68.00	50.00	13.17	170.0	8.693	802.5	6977.
68.00	51.00	14.17	181.9	8.265	883.8	7304.
68.00	52.00	15.17	193.3	7.918	964.3	7635.
68.00	53.00	16.17	203.9	7.629	1044.	7966.
68.00	54.00	17.17	214.2	7.385	1123.	8296.
68.00	55.00	18.17	224.2	7.172	1202.	8624.
68.00	56.00	19.17	233.8	6.985	1281.	8949.
68.00	57.00	20.17	243.2	6.817	1360.	9272.
68.00	58.00	21.17	252.2	6.668	1438.	9591.
68.00	59.00	22.17	261.0	6.532	1517.	9908.
68.00	60.00	23.17	269.7	6.406	1596.	10220.
68.00	61.00	24.17	278.1	6.289	1675.	10530.
68.00	62.00	25.17	286.3	6.181	1753.	10840.
69.00	43.00	6.191		Weight too small		
69.00	43.00	6.191		Weight too small		
69.00	44.00	7.191		Weight too small		
69.00	44.00	7.191		Weight too small		
69.00	45.00	8.191		Weight too small		
69.00	45.00	8.191		Weight too small		
69.00	46.00	9.190		Weight too small		
69.00	46.00	9.190		Weight too small		
69.00	47.00	10.19	54.21	11.15	330.4	3683.
69.00	47.00	10.19		Weight too small		
69.00	48.00	11.19	66.79	10.79	416.4	4494.
69.00	48.00	11.19		Weight too small		
69.00	49.00	12.19	78.78	9.573	501.5	4801.
69.00	49.00	12.19		Weight too small		
69.00	50.00	13.19	90.02	8.605	583.6	5022.
69.00	50.00	13.19		Weight too small		
69.00	51.00	14.19	100.7	7.945	663.8	5274.
69.00	51.00	14.19		Weight too small		

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EPA Export 08-07-2014:23:43:13

69.00	52.00	15.19	146.0	10.44	828.1	8645.
69.00	53.00	16.19	157.4	9.846	912.6	8985.
69.00	54.00	17.19	168.2	9.374	995.1	9328.
69.00	55.00	18.19	178.7	8.976	1078.	9672.
69.00	56.00	19.19	188.8	8.640	1159.	10020.
69.00	57.00	20.19	198.4	8.350	1240.	10360.
69.00	58.00	21.19	207.6	8.095	1321.	10700.
69.00	59.00	22.19	216.8	7.869	1402.	11030.
69.00	60.00	23.19	225.7	7.668	1483.	11370.
69.00	61.00	24.19	234.3	7.486	1563.	11700.
69.00	62.00	25.19	242.6	7.321	1643.	12030.
70.00	43.00	6.247		Weight too small		
70.00	44.00	7.240		Weight too small		
70.00	44.00	7.240		Weight too small		
70.00	45.00	8.235		Weight too small		
70.00	45.00	8.235		Weight too small		
70.00	46.00	9.231		Weight too small		
70.00	46.00	9.231		Weight too small		
70.00	47.00	10.23		Weight too small		
70.00	47.00	10.23		Weight too small		
70.00	48.00	11.22		Weight too small		
70.00	48.00	11.22		Weight too small		
70.00	49.00	12.22		Weight too small		
70.00	49.00	12.22		Weight too small		
70.00	50.00	13.22	57.16	12.09	411.3	4971.
70.00	50.00	13.22		Weight too small		
70.00	51.00	14.22	67.50	11.20	493.6	5528.
70.00	51.00	14.22		Weight too small		
70.00	52.00	15.22	77.40	10.02	574.4	5756.
70.00	52.00	15.22		Weight too small		
70.00	53.00	16.22	86.91	9.193	653.8	6010.
70.00	53.00	16.22		Weight too small		
70.00	54.00	17.21	96.08	8.579	732.3	6282.
70.00	54.00	17.21		Weight too small		
70.00	55.00	18.21	105.0	8.105	810.2	6567.
70.00	55.00	18.21		Weight too small		
70.00	56.00	19.21	113.6	7.730	887.7	6862.
70.00	56.00	19.21		Weight too small		
70.00	57.00	20.21	152.1	10.73	1066.	11430.
70.00	58.00	21.21	161.7	10.25	1150.	11790.
70.00	59.00	22.21	171.1	9.844	1233.	12140.
70.00	60.00	23.21	180.3	9.493	1316.	12490.
70.00	61.00	24.21	189.1	9.189	1398.	12850.
70.00	62.00	25.21	197.9	8.914	1480.	13190.
71.00	43.00	6.452		Weight too small		
71.00	44.00	7.418		Weight too small		
71.00	45.00	8.391		Weight too small		
71.00	46.00	9.370		Weight too small		
71.00	46.00	9.370		Weight too small		
71.00	47.00	10.35		Weight too small		
71.00	47.00	10.35		Weight too small		
71.00	48.00	11.34		Weight too small		
71.00	48.00	11.34		Weight too small		
71.00	49.00	12.33		Weight too small		
71.00	49.00	12.33		Weight too small		
71.00	50.00	13.32		Weight too small		
71.00	50.00	13.32		Weight too small		
71.00	51.00	14.31		Weight too small		
71.00	51.00	14.31		Weight too small		
71.00	52.00	15.30	50.30	13.28	410.5	5452.
71.00	52.00	15.30		Weight too small		
71.00	53.00	16.30	59.23	12.79	489.8	6266.
71.00	53.00	16.30		Weight too small		
71.00	54.00	17.29	67.95	11.43	568.6	6500.
71.00	54.00	17.29		Weight too small		
71.00	55.00	18.28	76.40	10.45	646.5	6755.
71.00	55.00	18.28		Weight too small		
71.00	56.00	19.28	84.61	9.707	723.7	7025.
71.00	56.00	19.28		Weight too small		
71.00	57.00	20.28	92.64	9.128	800.6	7308.
71.00	57.00	20.28		Weight too small		
71.00	58.00	21.27	100.5	8.664	877.2	7600.
71.00	58.00	21.27		Weight too small		
71.00	59.00	22.27	108.2	8.284	953.6	7900.
71.00	59.00	22.27		Weight too small		
71.00	60.00	23.27	115.7	7.968	1030.	8207.
71.00	60.00	23.27		Weight too small		
71.00	61.00	24.26	123.1	7.700	1106.	8518.
71.00	61.00	24.26		Weight too small		
71.00	62.00	25.26	130.3	7.470	1183.	8835.
71.00	62.00	25.26		Weight too small		
72.00	43.00	6.770		Radius too small		
72.00	44.00	7.715		Radius too small		
72.00	45.00	8.661		Radius too small		
72.00	46.00	9.613		Weight too small		
72.00	47.00	10.57		Weight too small		
72.00	47.00	10.57		Weight too small		
72.00	48.00	11.54		Weight too small		
72.00	48.00	11.54		Weight too small		
72.00	49.00	12.51		Weight too small		
72.00	49.00	12.51		Weight too small		
72.00	50.00	13.49		Weight too small		
72.00	50.00	13.49		Weight too small		
72.00	51.00	14.47		Weight too small		
72.00	51.00	14.47		Weight too small		
72.00	52.00	15.45		Weight too small		
72.00	52.00	15.45		Weight too small		
72.00	53.00	16.44		Weight too small		
72.00	53.00	16.44		Weight too small		
72.00	54.00	17.42		Weight too small		
72.00	54.00	17.42		Weight too small		
72.00	55.00	18.41	53.17	13.92	490.8	6832.
72.00	55.00	18.41		Weight too small		
72.00	56.00	19.40	60.89	12.77	567.7	7251.
72.00	56.00	19.40		Weight too small		
72.00	57.00	20.39	68.44	11.66	644.1	7507.
72.00	57.00	20.39		Weight too small		
72.00	58.00	21.38	75.83	10.80	720.1	7777.
72.00	58.00	21.38		Weight too small		
72.00	59.00	22.37	83.08	10.13	795.8	8058.
72.00	59.00	22.37		Weight too small		
72.00	60.00	23.36	90.21	9.580	871.3	8347.
72.00	60.00	23.36		Weight too small		
72.00	61.00	24.36	97.21	9.130	946.8	8644.
72.00	61.00	24.36		Weight too small		
72.00	62.00	25.35	104.1	8.753	1022.	8948.
72.00	62.00	25.35		Weight too small		
73.00	43.00	7.095		Radius too small		
73.00	44.00	8.041		Radius too small		
73.00	45.00	8.986		Radius too small		
73.00	46.00	9.932		Radius too small		
73.00	47.00	10.88		Radius too small		
73.00	48.00	11.82		Slip too small to split into minimum no. of slices		

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EPA Export 08-07-2014:23:43:13

73.00	49.00	12.77	Weight too small			
73.00	49.00	12.77	Weight too small			
73.00	50.00	13.73	Weight too small			
73.00	50.00	13.73	Weight too small			
73.00	51.00	14.70	Weight too small			
73.00	51.00	14.70	Weight too small			
73.00	52.00	15.66	Weight too small			
73.00	52.00	15.66	Weight too small			
73.00	53.00	16.64	Weight too small			
73.00	53.00	16.64	Weight too small			
73.00	54.00	17.61	Weight too small			
73.00	54.00	17.61	Weight too small			
73.00	55.00	18.59	Weight too small			
73.00	55.00	18.59	Weight too small			
73.00	56.00	19.57	Weight too small			
73.00	56.00	19.57	Weight too small			
73.00	57.00	20.55	Weight too small			
73.00	57.00	20.55	Weight too small			
73.00	58.00	21.53	55.45	14.04	570.4	8008.
73.00	58.00	21.53	Weight too small			
73.00	59.00	22.52	62.24	12.81	645.3	8265.
73.00	59.00	22.52	Weight too small			
73.00	60.00	23.51	68.92	11.85	720.0	8534.
73.00	60.00	23.51	Weight too small			
73.00	61.00	24.49	75.50	11.09	794.5	8813.
73.00	61.00	24.49	Weight too small			
73.00	62.00	25.48	82.00	10.47	869.0	9101.
73.00	62.00	25.48	Weight too small			
74.00	43.00	7.421	Radius too small			
74.00	44.00	8.366	Radius too small			
74.00	45.00	9.312	Radius too small			
74.00	46.00	10.26	Radius too small			
74.00	47.00	11.20	Radius too small			
74.00	48.00	12.15	Radius too small			
74.00	49.00	13.09	Radius too small			
74.00	50.00	14.04	Weight too small			
74.00	51.00	14.99	Weight too small			
74.00	52.00	15.94	Weight too small			
74.00	52.00	15.94	Weight too small			
74.00	53.00	16.89	Weight too small			
74.00	53.00	16.89	Weight too small			
74.00	54.00	17.85	Weight too small			
74.00	54.00	17.85	Weight too small			
74.00	55.00	18.82	Weight too small			
74.00	55.00	18.82	Weight too small			
74.00	56.00	19.79	Weight too small			
74.00	56.00	19.79	Weight too small			
74.00	57.00	20.76	Weight too small			
74.00	57.00	20.76	Weight too small			
74.00	58.00	21.73	Weight too small			
74.00	58.00	21.73	Weight too small			
74.00	59.00	22.71	Weight too small			
74.00	59.00	22.71	Weight too small			
74.00	60.00	23.69	51.14	15.23	575.6	8769.
74.00	60.00	23.69	Weight too small			
74.00	61.00	24.67	57.29	13.91	649.2	9027.
74.00	61.00	24.67	Weight too small			
74.00	62.00	25.65	63.36	12.86	722.6	9296.
74.00	62.00	25.65	Weight too small			
75.00	43.00	7.746	Radius too small			
75.00	44.00	8.692	Radius too small			
75.00	45.00	9.637	Radius too small			
75.00	46.00	10.58	Radius too small			
75.00	47.00	11.53	Radius too small			
75.00	48.00	12.47	Radius too small			
75.00	49.00	13.42	Radius too small			
75.00	50.00	14.37	Radius too small			
75.00	51.00	15.31	Slip too small to split into minimum no. of slices			
75.00	52.00	16.26	Weight too small			
75.00	53.00	17.20	Weight too small			
75.00	54.00	18.15	Weight too small			
75.00	54.00	18.15	Weight too small			
75.00	55.00	19.10	Weight too small			
75.00	55.00	19.10	Weight too small			
75.00	56.00	20.05	Weight too small			
75.00	56.00	20.05	Weight too small			
75.00	57.00	21.01	Weight too small			
75.00	57.00	21.01	Weight too small			
75.00	58.00	21.98	Weight too small			
75.00	58.00	21.98	Weight too small			
75.00	59.00	22.94	Weight too small			
75.00	59.00	22.94	Weight too small			
75.00	60.00	23.91	Weight too small			
75.00	60.00	23.91	Weight too small			
75.00	61.00	24.88	Weight too small			
75.00	61.00	24.88	Weight too small			
75.00	62.00	25.85	Weight too small			
75.00	62.00	25.85	Weight too small			
76.00	43.00	8.072	Radius too small			
76.00	44.00	9.017	Radius too small			
76.00	45.00	9.963	Radius too small			
76.00	46.00	10.91	Radius too small			
76.00	47.00	11.85	Radius too small			
76.00	48.00	12.80	Radius too small			
76.00	49.00	13.75	Radius too small			
76.00	50.00	14.69	Radius too small			
76.00	51.00	15.64	Radius too small			
76.00	52.00	16.58	Radius too small			
76.00	53.00	17.53	Weight too small			
76.00	54.00	18.47	Weight too small			
76.00	55.00	19.42	Weight too small			
76.00	56.00	20.36	Weight too small			
76.00	57.00	21.31	Weight too small			
76.00	57.00	21.31	Weight too small			
76.00	58.00	22.26	Weight too small			
76.00	58.00	22.26	Weight too small			
76.00	59.00	23.21	Weight too small			
76.00	59.00	23.21	Weight too small			
76.00	60.00	24.17	Weight too small			
76.00	60.00	24.17	Weight too small			
76.00	61.00	25.13	Weight too small			
76.00	61.00	25.13	Weight too small			
76.00	62.00	26.10	Weight too small			
76.00	62.00	26.10	Weight too small			
77.00	43.00	8.397	Radius too small			
77.00	44.00	9.343	Radius too small			
77.00	45.00	10.29	Radius too small			
77.00	46.00	11.23	Radius too small			
77.00	47.00	12.18	Radius too small			
77.00	48.00	13.13	Radius too small			
77.00	49.00	14.07	Radius too small			
77.00	50.00	15.02	Radius too small			
77.00	51.00	15.96	Radius too small			

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EPA Export 08-07-2014:23:43:13

77.00	52.00	16.91	Radius too small
77.00	53.00	17.85	Radius too small
77.00	54.00	18.80	Radius too small
77.00	55.00	19.74	Weight too small
77.00	56.00	20.69	Weight too small
77.00	57.00	21.63	Weight too small
77.00	58.00	22.58	Weight too small
77.00	59.00	23.53	Weight too small
77.00	60.00	24.47	Weight too small
77.00	60.00	24.47	Weight too small
77.00	61.00	25.42	Weight too small
77.00	61.00	25.42	Weight too small
77.00	62.00	26.38	Weight too small
77.00	62.00	26.38	Weight too small
78.00	43.00	8.722	Radius too small
78.00	44.00	9.668	Radius too small
78.00	45.00	10.61	Radius too small
78.00	46.00	11.56	Radius too small
78.00	47.00	12.50	Radius too small
78.00	48.00	13.45	Radius too small
78.00	49.00	14.40	Radius too small
78.00	50.00	15.34	Radius too small
78.00	51.00	16.29	Radius too small
78.00	52.00	17.23	Radius too small
78.00	53.00	18.18	Radius too small
78.00	54.00	19.12	Radius too small
78.00	55.00	20.07	Radius too small
78.00	56.00	21.01	Weight too small
78.00	57.00	21.96	Weight too small
78.00	58.00	22.91	Weight too small
78.00	59.00	23.85	Weight too small
78.00	60.00	24.80	Weight too small
78.00	61.00	25.74	Weight too small
78.00	62.00	26.69	Weight too small
79.00	43.00	9.012	Radius too small
79.00	44.00	9.969	Radius too small
79.00	45.00	10.93	Radius too small
79.00	46.00	11.88	Radius too small
79.00	47.00	12.83	Radius too small
79.00	48.00	13.78	Radius too small
79.00	49.00	14.72	Radius too small
79.00	50.00	15.67	Radius too small
79.00	51.00	16.61	Radius too small
79.00	52.00	17.56	Radius too small
79.00	53.00	18.50	Radius too small
79.00	54.00	19.45	Radius too small
79.00	55.00	20.39	Radius too small
79.00	56.00	21.34	Radius too small
79.00	57.00	22.29	Radius too small
79.00	58.00	23.23	Weight too small
79.00	59.00	24.18	Weight too small
79.00	60.00	25.12	Weight too small
79.00	61.00	26.07	Weight too small
79.00	62.00	27.01	Weight too small
80.00	43.00	9.301	Radius too small
80.00	44.00	10.26	Radius too small
80.00	45.00	11.22	Radius too small
80.00	46.00	12.17	Radius too small
80.00	47.00	13.13	Radius too small
80.00	48.00	14.09	Radius too small
80.00	49.00	15.04	Radius too small
80.00	50.00	15.99	Radius too small
80.00	51.00	16.94	Radius too small
80.00	52.00	17.88	Radius too small
80.00	53.00	18.83	Radius too small
80.00	54.00	19.77	Radius too small
80.00	55.00	20.72	Radius too small
80.00	56.00	21.67	Radius too small
80.00	57.00	22.61	Radius too small
80.00	58.00	23.56	Radius too small
80.00	59.00	24.50	Radius too small
80.00	60.00	25.45	Weight too small
80.00	61.00	26.39	Weight too small
80.00	62.00	27.34	Weight too small
81.00	43.00	9.590	Radius too small
81.00	44.00	10.55	Radius too small
81.00	45.00	11.50	Radius too small
81.00	46.00	12.46	Radius too small
81.00	47.00	13.42	Radius too small
81.00	48.00	14.38	Radius too small
81.00	49.00	15.33	Radius too small
81.00	50.00	16.29	Radius too small
81.00	51.00	17.25	Radius too small
81.00	52.00	18.21	Radius too small
81.00	53.00	19.15	Radius too small
81.00	54.00	20.10	Radius too small
81.00	55.00	21.05	Radius too small
81.00	56.00	21.99	Radius too small
81.00	57.00	22.94	Radius too small
81.00	58.00	23.88	Radius too small
81.00	59.00	24.83	Radius too small
81.00	60.00	25.77	Radius too small
81.00	61.00	26.72	Weight too small
81.00	62.00	27.66	Weight too small
82.00	43.00	9.596	Radius too small
82.00	44.00	10.60	Radius too small
82.00	45.00	11.60	Radius too small
82.00	46.00	12.60	Radius too small
82.00	47.00	13.60	Radius too small
82.00	48.00	14.60	Radius too small
82.00	49.00	15.60	Radius too small
82.00	50.00	16.58	Radius too small
82.00	51.00	17.54	Radius too small
82.00	52.00	18.49	Radius too small
82.00	53.00	19.45	Radius too small
82.00	54.00	20.41	Radius too small
82.00	55.00	21.37	Radius too small
82.00	56.00	22.32	Radius too small
82.00	57.00	23.26	Radius too small
82.00	58.00	24.21	Radius too small
82.00	59.00	25.15	Radius too small
82.00	60.00	26.10	Radius too small
82.00	61.00	27.04	Radius too small
82.00	62.00	27.99	Radius too small
83.00	43.00	9.596	Radius too small
83.00	44.00	10.60	Radius too small
83.00	45.00	11.60	Radius too small
83.00	46.00	12.60	Radius too small
83.00	47.00	13.60	Radius too small
83.00	48.00	14.60	Radius too small
83.00	49.00	15.60	Radius too small
83.00	50.00	16.60	Radius too small
83.00	51.00	17.60	Radius too small
83.00	52.00	18.60	Radius too small

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83.00	53.00	19.74	FoS > 1000
83.00	54.00	20.70	Disturbing moment < 0
83.00	55.00	21.66	FoS > 1000
83.00	56.00	22.61	Disturbing moment < 0
83.00	57.00	23.57	Radius too small
83.00	58.00	24.53	Radius too small
83.00	59.00	25.48	Radius too small
83.00	60.00	26.42	Radius too small
83.00	61.00	27.37	Radius too small
83.00	62.00	28.32	Radius too small
84.00	43.00	9.596	Radius too small
84.00	44.00	10.60	Radius too small
84.00	45.00	11.60	Radius too small
84.00	46.00	12.60	Radius too small
84.00	47.00	13.60	Radius too small
84.00	48.00	14.60	Radius too small
84.00	49.00	15.60	Radius too small
84.00	50.00	16.60	Radius too small
84.00	51.00	17.60	Radius too small
84.00	52.00	18.60	Radius too small
84.00	53.00	19.60	Radius too small
84.00	54.00	20.60	Radius too small
84.00	55.00	21.60	Radius too small
84.00	56.00	22.90	FoS > 1000
84.00	57.00	23.86	FoS > 1000
84.00	58.00	24.82	Disturbing moment < 0
84.00	59.00	25.77	Disturbing moment < 0
84.00	60.00	26.73	FoS > 1000
84.00	61.00	27.69	Disturbing moment < 0
84.00	62.00	28.64	Disturbing moment < 0
85.00	43.00	9.596	Radius too small
85.00	44.00	10.60	Radius too small
85.00	45.00	11.60	Radius too small
85.00	46.00	12.60	Radius too small
85.00	47.00	13.60	Radius too small
85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	FoS > 1000
86.00	43.00	9.596	Radius too small
86.00	44.00	10.60	Radius too small
86.00	45.00	11.60	Radius too small
86.00	46.00	12.60	Radius too small
86.00	47.00	13.60	Radius too small
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86.00	49.00	15.60	Radius too small
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86.00	51.00	17.60	Radius too small
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86.00	55.00	21.60	Radius too small
86.00	56.00	22.60	Radius too small
86.00	57.00	23.60	Radius too small
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86.00	60.00	26.60	Radius too small
86.00	61.00	27.60	Radius too small
86.00	62.00	28.60	Radius too small
87.00	43.00	9.596	Radius too small
87.00	44.00	10.60	Radius too small
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87.00	62.00	28.60	Radius too small
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88.00	55.00	21.60	Radius too small
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88.00	60.00	26.60	Radius too small
88.00	61.00	27.60	Radius too small
88.00	62.00	28.60	Radius too small
89.00	43.00	9.596	Radius too small
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89.00	56.00	22.60	Radius too small

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89.00	57.00	23.60	Radius too small
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95.00	61.00	27.60	Radius too small
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WORST CASE : WATER CASE 1 OF 1

Centre at (64.00,46.00)
Iterations: 5
Net vertical force [kN]: .0
Net horiz force [kN]: 0.002806
Inclination of interslice forces [°]: 10.91

Radius 9.094m
Horiz acceleration [kg]: .0
Slip weight [kN] 273.0
Disturbing moment [kN m]: 584.7
Restoring moment [kN m]: 2674.

Factor of Safety: 4.574

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	56.75	40.50	-5.158	.0	.0	.0
2	57.19	39.98	.0	0.1235	0.6409	.0
3	57.81	39.34	6.200	0.9722	4.725	1.922
4	58.49	38.77	11.75	2.413	11.67	6.900
5	59.22	38.26	16.59	4.229	20.43	13.76
6	60.00	37.83	20.67	6.197	29.94	21.37
7	60.49	37.61	10.67	7.365	35.59	5.691
8	60.70	37.53	6.245	7.467	36.08	1.950
9	60.90	37.45	1.997	7.640	36.92	0.1993
10	60.99	37.42	-76.29E-6	7.751	37.46	.0
11	61.00	37.41	-0.1474	7.740	37.41	.0
12	61.03	37.40	-0.04848	7.684	37.14	.0
13	61.05	37.40	.0	7.702	37.23	.0
14	61.92	37.15	2.090	8.471	40.95	0.2185
15	62.80	36.98	3.302	8.622	41.68	0.5451
16	63.70	36.91	3.622	7.885	38.12	0.6560
17	64.00	36.91	3.530	7.381	35.68	0.6232
18	64.72	36.93	2.911	5.991	28.97	0.4238
19	65.43	37.02	1.732	4.431	21.43	0.1500
20	66.13	37.16	.0	2.753	13.32	.0
21	67.00	37.41	-2.973	0.5975	2.894	.0
22	67.25	37.51	-4.022	.0	0.002806	.0

Slice Strength Parameters

Slice No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	.0	1.227	1.195	2.046

EPA Export 08-07-2014:23:43:13

2	3.000	.0	3.100	5.647	6.274	2.669
3	3.000	.0	8.974	10.59	11.47	2.669
4	3.000	.0	14.17	15.60	16.33	2.669
5	3.000	.0	18.63	20.40	20.74	2.669
6	3.000	.0	15.67	14.47	14.45	1.611
7	40.00	.0	8.457	6.639	6.247	9.104
8	40.00	.0	4.121	7.717	7.357	8.547
9	40.00	.0	0.9983	4.200	4.032	3.955
10	100.0	.0	.0	0.3099	0.2850	0.7263
11	100.0	.0	.0	1.495	1.376	3.489
12	40.00	.0	.0	0.7429	0.7142	0.6905
13	40.00	.0	1.045	42.09	40.74	36.05
14	40.00	.0	2.696	47.78	46.98	36.05
15	40.00	.0	3.462	51.78	52.04	36.05
16	40.00	.0	3.576	11.01	11.47	12.00
17	40.00	.0	3.221	9.897	11.54	28.65
18	40.00	.0	2.322	8.810	11.19	28.65
19	40.00	.0	0.8660	6.983	10.68	28.65
20	40.00	.0	.0	5.140	9.941	36.31
21	40.00	.0	.0	0.4232	1.953	10.81

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0

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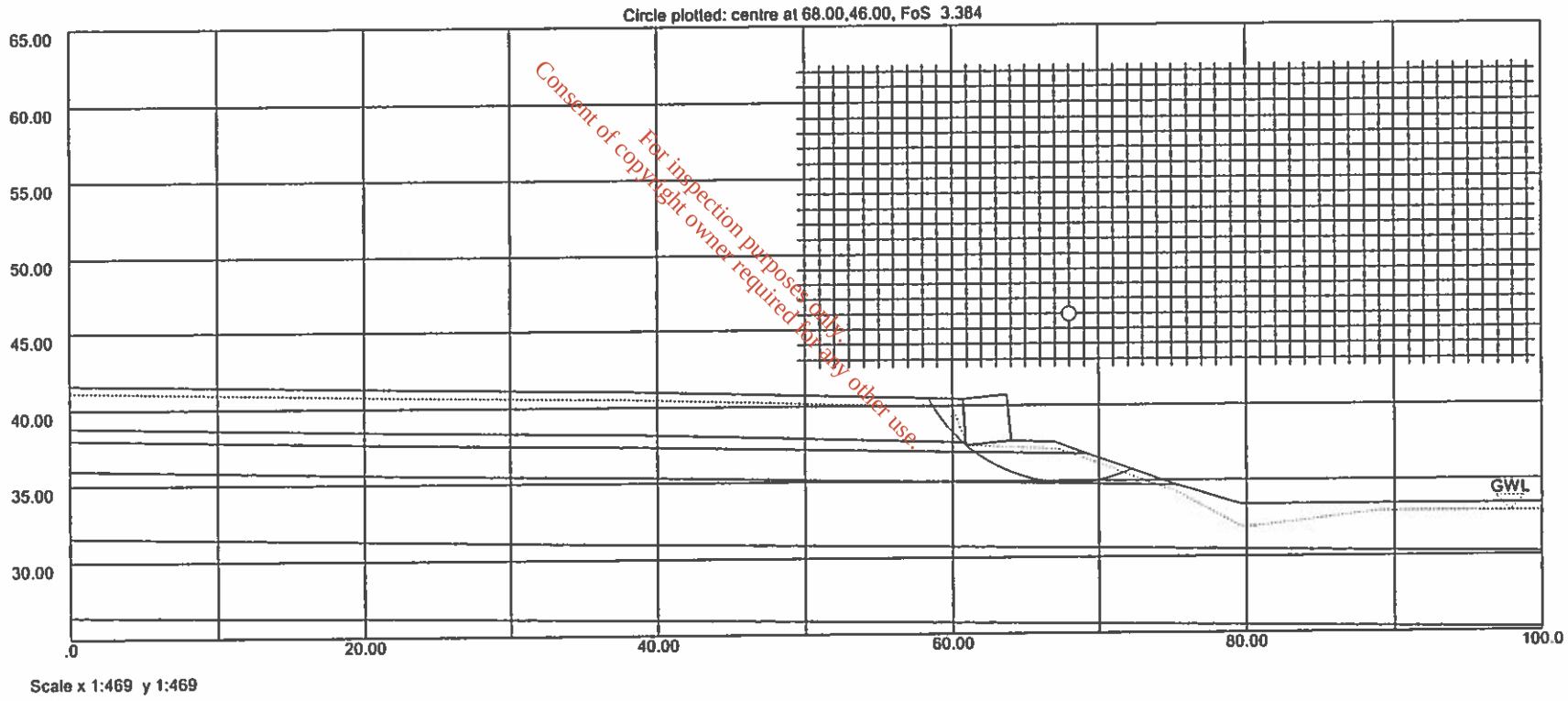
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA:Lun 12:01.	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut Mod.sld	



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Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	4A : Rev 12:02	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No6.sld	

Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Sand / Sand Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop . (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Undrained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Undrained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Undrain	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Undrain	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Un	20.00	20.00	Undrained	.0	75.00
7	Rock (Undrained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	33.40

Stratum	Material	X -->						
		63.70	64.00	67.00	67.37	69.20	75.30	77.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.60
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	37.10	.	34.20	31.90

Stratum	Material	X -->		
		80.60	89.00	100.0
1	1	.	.	33.40
2	2	.	.	33.40
3	3	.	.	33.40
4	4	.	.	33.40
5	5	.	.	33.40
6	6	.	.	30.20
7	7	.	.	25.20
GWL1	-	31.90	32.90	32.90

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Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	7.820	826.1	40.77	106.5	4342.
50.00	44.00	8.820	889.6	37.60	137.8	5180.
50.00	45.00	9.819	948.8	35.34	171.7	6066.
50.00	46.00	10.82	1005.	33.66	207.9	6998.
50.00	47.00	11.82	1057.	32.35	246.5	7974.
50.00	48.00	12.82	1108.	31.31	287.2	8992.
50.00	49.00	13.82	1156.	31.34	328.6	10300.
50.00	50.00	14.82	1203.	34.32	362.6	12440.
50.00	51.00	15.82	1250.	38.00	385.4	14650.
50.00	52.00	16.82	1296.	42.16	401.5	16920.
50.00	53.00	17.82	1340.	46.94	410.8	19290.
50.00	54.00	18.82	1385.	53.59	405.7	21740.
50.00	55.00	19.82	1428.	60.19	402.4	24220.
50.00	56.00	20.82	1470.	63.74	403.1	25700.
50.00	57.00	21.82	1510.	62.96	432.4	27220.
50.00	58.00	22.82	1547.	60.29	477.5	28790.
50.00	59.00	23.82	1582.	56.46	538.5	30400.
50.00	60.00	24.82	1616.	52.30	612.8	32050.
50.00	61.00	25.82	1648.	48.22	699.1	33710.
50.00	62.00	26.82	1678.	43.95	799.5	35140.
51.00	43.00	7.839	825.5	40.70	106.9	4352.
51.00	44.00	8.838	888.7	37.56	138.2	5189.
51.00	45.00	9.838	947.7	35.32	172.0	6075.
51.00	46.00	10.84	1003.	33.64	208.3	7007.
51.00	47.00	11.84	1056.	33.58	245.3	8236.
51.00	48.00	12.84	1107.	37.76	272.7	10300.
51.00	49.00	13.84	1158.	42.96	288.8	12410.
51.00	50.00	14.84	1207.	49.06	297.3	14580.
51.00	51.00	15.84	1256.	57.51	293.0	16850.
51.00	52.00	16.84	1304.	67.21	285.8	19210.

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51.00	53.00	17.84	1350.	76.29	276.5	21090.
51.00	54.00	18.84	1394.	77.27	291.1	22490.
51.00	55.00	19.84	1435.	72.58	329.9	23950.
51.00	56.00	20.84	1473.	65.68	387.4	25450.
51.00	57.00	21.84	1508.	58.43	459.6	26860.
51.00	58.00	22.84	1542.	51.55	548.6	28280.
51.00	59.00	23.84	1574.	45.31	648.3	29370.
51.00	60.00	24.84	1605.	39.73	763.6	30340.
51.00	61.00	25.84	1635.	35.43	883.3	31300.
51.00	62.00	26.84	1663.	31.90	1011.	32250.
52.00	43.00	7.857	824.9	40.63	107.3	4361.
52.00	44.00	8.857	887.8	37.52	138.6	5198.
52.00	45.00	9.857	946.9	35.71	171.3	6118.
52.00	46.00	10.86	1004.	41.61	195.4	8129.
52.00	47.00	11.86	1059.	49.16	206.2	10140.
52.00	48.00	12.86	1113.	59.86	203.9	12210.
52.00	49.00	13.86	1166.	73.45	195.5	14360.
52.00	50.00	14.86	1217.	92.05	180.4	16610.
52.00	51.00	15.86	1267.	106.7	169.7	18110.
52.00	52.00	16.86	1312.	101.8	190.9	19430.
52.00	53.00	17.86	1354.	86.75	238.4	20680.
52.00	54.00	18.86	1393.	71.05	309.1	21960.
52.00	55.00	19.86	1430.	57.57	395.9	22790.
52.00	56.00	20.86	1464.	47.36	499.5	23660.
52.00	57.00	21.85	1497.	39.99	613.3	24530.
52.00	58.00	22.85	1529.	34.44	737.2	25390.
52.00	59.00	23.85	1559.	30.20	869.4	26250.
52.00	60.00	24.85	1587.	26.90	1008.	27100.
52.00	61.00	25.85	1615.	24.23	1154.	27950.
52.00	62.00	26.85	1642.	22.06	1305.	28790.
53.00	43.00	7.876	824.4	40.87	106.9	4370.
53.00	44.00	8.876	888.1	45.23	131.5	5946.
53.00	45.00	9.876	949.8	56.52	139.2	7871.
53.00	46.00	10.88	1010.	74.75	131.4	9823.
53.00	47.00	11.88	1068.	101.7	116.6	11850.
53.00	48.00	12.88	1124.	147.5	94.78	13980.
53.00	49.00	13.88	1177.	188.7	81.00	15290.
53.00	50.00	14.87	1226.	151.3	108.0	16340.
53.00	51.00	15.87	1269.	103.9	164.6	17090.
53.00	52.00	16.87	1309.	72.92	244.8	17850.
53.00	53.00	17.87	1346.	54.06	344.3	18620.
53.00	54.00	18.87	1382.	42.48	456.5	19390.
53.00	55.00	19.87	1416.	34.72	580.7	20160.
53.00	56.00	20.87	1447.	29.28	714.9	20930.
53.00	57.00	21.87	1478.	25.30	857.6	21690.
53.00	58.00	22.87	1507.	22.28	1007.	22450.
53.00	59.00	23.87	1535.	19.94	1163.	23200.
53.00	60.00	24.87	1562.	18.11	1325.	23990.
53.00	61.00	25.87	1588.	17.09	1489.	25440.
53.00	62.00	26.87	1614.	16.28	1653.	26910.
54.00	43.00	7.895	826.6	63.86	88.25	5636.
54.00	44.00	8.895	894.6	95.88	77.96	7474.
54.00	45.00	9.895	959.3	159.9	58.55	9365.
54.00	46.00	10.89	1023.	418.3	27.09	11330.
54.00	47.00	11.89	1080.	1176.	10.52	12380.
54.00	48.00	12.89	1132.	337.6	38.36	12950.
54.00	49.00	13.89	1178.	132.8	102.3	13580.
54.00	50.00	14.89	1220.	74.03	192.3	14240.
54.00	51.00	15.89	1259.	49.82	299.3	14910.
54.00	52.00	16.89	1295.	37.02	421.1	15590.
54.00	53.00	17.89	1330.	29.33	554.6	16270.
54.00	54.00	18.89	1362.	24.29	697.6	16940.
54.00	55.00	19.89	1393.	20.75	848.6	17610.
54.00	56.00	20.89	1422.	18.37	1006.	18280.
54.00	57.00	21.89	1450.	16.99	1165.	18900.
54.00	58.00	22.89	1478.	15.96	1326.	21160.
54.00	59.00	23.89	1505.	15.15	1489.	22550.
54.00	60.00	24.89	1532.	14.51	1652.	23970.
54.00	61.00	25.89	1558.	13.99	1816.	25420.
54.00	62.00	26.89	1583.	13.57	1982.	26890.
55.00	43.00	7.914	836.9	352.8	69.70	6948.
55.00	44.00	8.913		Disturbing moment < 0		
55.00	45.00	9.913		Disturbing moment < 0		
55.00	46.00	10.91		Disturbing moment < 0		
55.00	47.00	11.91	1081.	226.2	46.53	10520.
55.00	48.00	12.91	1125.	77.76	142.5	11080.
55.00	49.00	13.91	1166.	45.25	257.6	11660.
55.00	50.00	14.91	1203.	31.58	387.7	12240.
55.00	51.00	15.91	1238.	24.25	529.2	12830.
55.00	52.00	16.91	1271.	19.83	679.7	13470.
55.00	53.00	17.91	1303.	17.59	834.3	14670.
55.00	54.00	18.91	1333.	16.06	990.5	15900.
55.00	55.00	19.91	1364.	14.97	1147.	17170.
55.00	56.00	20.91	1393.	14.15	1305.	18470.
55.00	57.00	21.91	1421.	13.51	1465.	19790.
55.00	58.00	22.91	1449.	13.01	1626.	21150.
55.00	59.00	23.91	1474.	12.61	1787.	22530.
55.00	60.00	24.91	1501.	12.28	1950.	23950.
55.00	61.00	25.91	1527.	12.01	2114.	25390.
55.00	62.00	26.91	1551.	11.78	2281.	26870.
56.00	43.00	7.932		Disturbing moment < 0		
56.00	44.00	8.932		Disturbing moment < 0		
56.00	45.00	9.932		Disturbing moment < 0		
56.00	46.00	10.93	1023.	90.66	92.17	8356.
56.00	47.00	11.93	1066.	41.41	213.5	8839.
56.00	48.00	12.93	1105.	26.64	350.5	9336.
56.00	49.00	13.93	1142.	20.28	497.6	10090.
56.00	50.00	14.93	1176.	17.25	648.1	11180.
56.00	51.00	15.93	1210.	15.39	799.6	12310.
56.00	52.00	16.93	1241.	14.14	952.5	13470.
56.00	53.00	17.93	1272.	13.25	1107.	14670.
56.00	54.00	18.93	1303.	12.59	1263.	15900.
56.00	55.00	19.93	1333.	12.08	1420.	17160.
56.00	56.00	20.93	1362.	11.69	1578.	18450.
56.00	57.00	21.93	1390.	11.38	1738.	19780.
56.00	58.00	22.93	1418.	11.13	1899.	21130.
56.00	59.00	23.93	1445.	10.93	2060.	22520.
56.00	60.00	24.93	1471.	10.76	2223.	23930.
56.00	61.00	25.93	1497.	10.60	2388.	25300.
56.00	62.00	26.93	1521.	10.43	2557.	26670.
57.00	43.00	7.951		Disturbing moment < 0		
57.00	44.00	8.951	911.3	165.6	36.62	6063.
57.00	45.00	9.951	957.8	39.90	161.6	6448.
57.00	46.00	10.95	999.7	23.32	302.7	7059.
57.00	47.00	11.95	1038.	17.91	448.3	8028.
57.00	48.00	12.95	1075.	15.19	595.3	9040.
57.00	49.00	13.95	1111.	13.56	744.2	10090.
57.00	50.00	14.95	1146.	12.50	894.3	11180.
57.00	51.00	15.95	1180.	11.76	1046.	12310.
57.00	52.00	16.95	1212.	11.23	1199.	13470.
57.00	53.00	17.95	1244.	10.83	1354.	14660.
57.00	54.00	18.95	1274.	10.53	1510.	15890.
57.00	55.00	19.95	1304.	10.29	1667.	17150.
57.00	56.00	20.95	1333.	10.10	1825.	18440.

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57.00	57.00	21.95	1360.	9.908	1986.	19670.
57.00	58.00	22.95	1388.	9.738	2149.	20930.
57.00	59.00	23.95	1414.	9.589	2316.	22210.
57.00	60.00	24.95	1439.	9.458	2486.	23510.
57.00	61.00	25.95	1464.	9.342	2658.	24830.
57.00	62.00	26.95	1489.	9.234	2835.	26170.
58.00	43.00	7.970	839.4	46.22	96.73	4471.
58.00	44.00	8.970	885.0	22.19	236.6	5251.
58.00	45.00	9.970	928.7	16.20	378.6	6134.
58.00	46.00	10.97	970.2	13.52	522.2	7062.
58.00	47.00	11.97	1010.	12.03	667.8	8032.
58.00	48.00	12.97	1047.	11.09	815.0	9042.
58.00	49.00	13.97	1083.	10.47	963.9	10090.
58.00	50.00	14.97	1118.	10.03	1114.	11180.
58.00	51.00	15.97	1151.	9.718	1266.	12300.
58.00	52.00	16.97	1183.	9.486	1419.	13460.
58.00	53.00	17.97	1214.	9.263	1575.	14580.
58.00	54.00	18.97	1244.	9.071	1734.	15730.
58.00	55.00	19.97	1273.	8.908	1896.	16890.
58.00	56.00	20.97	1301.	8.768	2062.	18080.
58.00	57.00	21.97	1328.	8.647	2231.	19290.
58.00	58.00	22.97	1354.	8.543	2403.	20530.
58.00	59.00	23.97	1378.	8.452	2577.	21780.
58.00	60.00	24.97	1403.	8.372	2754.	23060.
58.00	61.00	25.97	1427.	8.302	2933.	24350.
58.00	62.00	26.97	1451.	8.241	3115.	25670.
59.00	43.00	7.989	811.4	15.29	289.3	4423.
59.00	44.00	8.989	857.3	12.26	428.9	5258.
59.00	45.00	9.988	900.9	10.75	571.1	6140.
59.00	46.00	10.99	941.9	9.881	715.1	7066.
59.00	47.00	11.99	979.7	9.329	861.1	8033.
59.00	48.00	12.99	1017.	8.969	1008.	9043.
59.00	49.00	13.99	1053.	8.703	1157.	10070.
59.00	50.00	14.99	1087.	8.463	1310.	11090.
59.00	51.00	15.99	1120.	8.269	1467.	12130.
59.00	52.00	16.99	1151.	8.109	1627.	13200.
59.00	53.00	17.99	1181.	7.977	1792.	14290.
59.00	54.00	18.99	1210.	7.866	1959.	15410.
59.00	55.00	19.99	1237.	7.772	2130.	16550.
59.00	56.00	20.99	1265.	7.693	2303.	17720.
59.00	57.00	21.99	1291.	7.625	2479.	18910.
59.00	58.00	22.99	1316.	7.567	2658.	20110.
59.00	59.00	23.99	1341.	7.518	2839.	21340.
59.00	60.00	24.99	1365.	7.476	3022.	22600.
59.00	61.00	25.99	1388.	7.440	3208.	23870.
59.00	62.00	26.99	1411.	7.409	3395.	25160.
60.00	43.00	8.007	783.0	9.727	455.4	4429.
60.00	44.00	9.007	828.6	8.844	595.1	5263.
60.00	45.00	10.01	871.8	8.333	737.3	6144.
60.00	46.00	11.01	912.6	8.002	881.3	7052.
60.00	47.00	12.01	951.0	7.727	1030.	7957.
60.00	48.00	13.01	987.2	7.516	1183.	8893.
60.00	49.00	14.01	1021.	7.352	1341.	9859.
60.00	50.00	15.01	1054.	7.222	1503.	10850.
60.00	51.00	16.01	1086.	7.118	1668.	11870.
60.00	52.00	17.01	1116.	7.033	1837.	12920.
60.00	53.00	18.01	1145.	6.964	2009.	13990.
60.00	54.00	19.01	1173.	6.908	2184.	15090.
60.00	55.00	20.01	1200.	6.862	2361.	16210.
60.00	56.00	21.01	1226.	6.825	2542.	17350.
60.00	57.00	22.00	1251.	6.795	2724.	18510.
60.00	58.00	23.00	1276.	6.770	2909.	19690.
60.00	59.00	24.00	1300.	6.751	3095.	20900.
60.00	60.00	25.00	1323.	6.736	3284.	22120.
60.00	61.00	26.00	1346.	6.725	3475.	23370.
60.00	62.00	27.00	1368.	6.717	3668.	24640.
61.00	43.00	8.026	754.6	7.471	593.7	4436.
61.00	44.00	9.026	799.6	7.142	735.5	5251.
61.00	45.00	10.03	841.4	6.871	883.	6073.
61.00	46.00	11.03	880.7	6.681	1037.	6930.
61.00	47.00	12.03	917.0	6.541	1195.	7818.
61.00	48.00	13.03	951.9	6.435	1358.	8736.
61.00	49.00	14.03	985.1	6.355	1524.	9684.
61.00	50.00	15.02	1017.	6.267	1694.	10610.
61.00	51.00	16.02	1047.	6.221	1866.	11610.
61.00	52.00	17.02	1076.	6.187	2042.	12630.
61.00	53.00	18.02	1105.	6.162	2221.	13680.
61.00	54.00	19.02	1132.	6.144	2402.	14750.
61.00	55.00	20.02	1158.	6.131	2585.	15850.
61.00	56.00	21.02	1183.	6.124	2771.	16970.
61.00	57.00	22.02	1208.	6.121	2959.	18110.
61.00	58.00	23.02	1232.	6.120	3149.	19270.
61.00	59.00	24.02	1255.	6.122	3341.	20450.
61.00	60.00	25.02	1278.	6.126	3535.	21650.
61.00	61.00	26.02	1300.	6.132	3730.	22870.
61.00	62.00	27.02	1321.	6.139	3928.	24110.
62.00	43.00	8.045	724.3	6.052	717.1	4340.
62.00	44.00	9.045	767.3	5.877	868.5	5104.
62.00	45.00	10.04	807.8	5.753	1026.	5905.
62.00	46.00	11.04	844.8	5.671	1188.	6738.
62.00	47.00	12.04	880.3	5.612	1355.	7602.
62.00	48.00	13.04	913.9	5.572	1525.	8497.
62.00	49.00	14.04	945.8	5.546	1698.	9419.
62.00	50.00	15.04	976.2	5.531	1875.	10370.
62.00	51.00	16.04	1005.	5.524	2054.	11350.
62.00	52.00	17.04	1033.	5.523	2236.	12350.
62.00	53.00	18.04	1060.	5.527	2420.	13370.
62.00	54.00	19.04	1086.	5.533	2607.	14420.
62.00	55.00	20.04	1112.	5.542	2796.	15500.
62.00	56.00	21.04	1136.	5.553	2987.	16590.
62.00	57.00	22.04	1160.	5.567	3180.	17700.
62.00	58.00	23.04	1183.	5.582	3375.	18840.
62.00	59.00	24.04	1206.	5.598	3572.	20000.
62.00	60.00	25.04	1228.	5.615	3770.	21170.
62.00	61.00	26.04	1249.	5.633	3970.	22360.
62.00	62.00	27.04	1270.	5.652	4172.	23580.
63.00	43.00	8.064	689.1	5.082	833.2	4234.
63.00	44.00	9.064	730.3	5.003	995.3	4980.
63.00	45.00	10.06	768.6	4.966	1160.	5761.
63.00	46.00	11.06	804.6	4.942	1330.	6573.
63.00	47.00	12.06	838.7	4.932	1504.	7418.
63.00	48.00	13.06	871.9	4.935	1681.	8294.
63.00	49.00	14.06	902.7	4.942	1861.	9196.
63.00	50.00	15.06	932.2	4.954	2044.	10130.
63.00	51.00	16.06	960.4	4.970	2229.	11080.
63.00	52.00	17.06	987.1	4.994	2414.	12060.
63.00	53.00	18.06	1013.	5.015	2604.	13060.
63.00	54.00	19.06	1039.	5.037	2796.	14080.
63.00	55.00	20.06	1063.	5.061	2990.	15130.
63.00	56.00	21.06	1087.	5.085	3186.	16200.
63.00	57.00	22.06	1110.	5.111	3383.	17290.
63.00	58.00	23.06	1133.	5.137	3582.	18400.
63.00	59.00	24.06	1155.	5.163	3782.	19530.
63.00	60.00	25.06	1176.	5.189	3984.	20680.

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EPA Export 08-07-2014:23:43:13

63.00	61.00	26.06	1197.	5.216	4188.	21840.
63.00	62.00	27.06	1218.	5.243	4392.	23030.
64.00	43.00	8.083	649.5	4.403	936.9	4126.
64.00	44.00	9.082	689.5	4.385	1107.	4854.
64.00	45.00	10.08	726.8	4.387	1280.	5617.
64.00	46.00	11.08	760.9	4.404	1456.	6411.
64.00	47.00	12.08	793.9	4.423	1636.	7235.
64.00	48.00	13.08	825.2	4.446	1819.	8088.
64.00	49.00	14.08	854.9	4.474	2005.	8968.
64.00	50.00	15.08	883.4	4.503	2193.	9873.
64.00	51.00	16.08	910.7	4.534	2383.	10800.
64.00	52.00	17.08	936.5	4.571	2572.	11760.
64.00	53.00	18.08	961.9	4.603	2766.	12730.
64.00	54.00	19.08	986.4	4.636	2962.	13730.
64.00	55.00	20.08	1010.	4.670	3160.	14760.
64.00	56.00	21.08	1033.	4.703	3359.	15800.
64.00	57.00	22.08	1056.	4.736	3560.	16860.
64.00	58.00	23.08	1078.	4.770	3762.	17940.
64.00	59.00	24.08	1100.	4.803	3965.	19050.
64.00	60.00	25.08	1121.	4.836	4170.	20170.
64.00	61.00	26.08	1142.	4.868	4376.	21300.
64.00	62.00	27.08	1162.	4.901	4583.	22460.
65.00	43.00	8.101	605.7	3.932	1022.	4018.
65.00	44.00	9.101	644.4	3.946	1198.	4727.
65.00	45.00	10.10	679.8	3.966	1379.	5469.
65.00	46.00	11.10	712.9	3.998	1561.	6242.
65.00	47.00	12.10	744.7	4.033	1747.	7044.
65.00	48.00	13.10	774.5	4.073	1933.	7874.
65.00	49.00	14.10	803.8	4.113	2123.	8731.
65.00	50.00	15.10	831.4	4.152	2315.	9613.
65.00	51.00	16.10	857.9	4.192	2509.	10520.
65.00	52.00	17.10	883.0	4.237	2702.	11450.
65.00	53.00	18.10	907.7	4.276	2900.	12400.
65.00	54.00	19.10	931.7	4.316	3099.	13370.
65.00	55.00	20.10	954.9	4.355	3299.	14370.
65.00	56.00	21.10	977.4	4.393	3501.	15380.
65.00	57.00	22.10	999.3	4.432	3705.	16420.
65.00	58.00	23.10	1021.	4.469	3909.	17470.
65.00	59.00	24.10	1042.	4.507	4115.	18550.
65.00	60.00	25.10	1062.	4.543	4322.	19640.
65.00	61.00	26.10	1082.	4.580	4531.	20750.
65.00	62.00	27.10	1102.	4.615	4740.	21880.
66.00	43.00	8.120	557.0	3.607	1083.	3905.
66.00	44.00	9.120	594.3	3.634	1264.	4595.
66.00	45.00	10.12	629.3	3.667	1450.	5316.
66.00	46.00	11.12	661.3	3.703	1638.	6067.
66.00	47.00	12.12	691.9	3.746	1828.	6846.
66.00	48.00	13.12	721.3	3.789	2020.	7653.
66.00	49.00	14.12	749.3	3.834	2213.	8485.
66.00	50.00	15.12	776.1	3.878	2409.	9342.
66.00	51.00	16.12	801.5	3.924	2605.	10220.
66.00	52.00	17.12	825.9	3.971	2801.	11130.
66.00	53.00	18.12	849.9	4.014	3002.	12050.
66.00	54.00	19.12	873.2	4.057	3204.	13000.
66.00	55.00	20.12	895.8	4.099	3407.	13970.
66.00	56.00	21.12	918.6	4.140	3612.	14950.
66.00	57.00	22.12	940.1	4.181	3818.	15960.
66.00	58.00	23.12	961.1	4.221	4025.	16990.
66.00	59.00	24.12	981.5	4.260	4233.	18030.
66.00	60.00	25.12	1002.	4.299	4442.	19100.
66.00	61.00	26.12	1021.	4.337	4652.	20180.
66.00	62.00	27.12	1040.	4.374	4864.	21270.
67.00	43.00	8.139	507.7	3.687	1131.	4178.
67.00	44.00	9.139	540.7	3.429	1299.	4698.
67.00	45.00	10.14	574.2	3.464	1488.	5355.
67.00	46.00	11.14	605.8	3.504	1679.	6044.
67.00	47.00	12.14	634.8	3.544	1874.	6639.
67.00	48.00	13.14	663.4	3.588	2068.	7421.
67.00	49.00	14.14	690.6	3.633	2264.	8229.
67.00	50.00	15.14	716.7	3.678	2463.	9060.
67.00	51.00	16.14	742.2	3.723	2663.	9915.
67.00	52.00	17.14	766.6	3.767	2865.	10790.
67.00	53.00	18.14	789.7	3.814	3065.	11690.
67.00	54.00	19.14	812.5	3.857	3269.	12610.
67.00	55.00	20.14	834.7	3.900	3474.	13550.
67.00	56.00	21.14	856.3	3.942	3680.	14510.
67.00	57.00	22.14	877.3	3.983	3888.	15490.
67.00	58.00	23.14	897.8	4.024	4096.	16480.
67.00	59.00	24.14	917.8	4.064	4306.	17500.
67.00	60.00	25.14	937.4	4.103	4516.	18530.
67.00	61.00	26.14	956.6	4.142	4728.	19580.
67.00	62.00	27.14	976.2	4.180	4940.	20650.
68.00	43.00	8.158	445.7	4.045	1069.	5276.
68.00	44.00	9.157	482.4	4.045	1293.	5229.
68.00	45.00	10.16	515.4	3.599	1488.	5356.
68.00	46.00	11.16	545.8	3.384	1682.	5691.
68.00	47.00	12.16	574.8	3.420	1878.	6422.
68.00	48.00	13.16	602.0	3.458	2076.	7179.
68.00	49.00	14.16	628.6	3.500	2275.	7960.
68.00	50.00	15.16	654.3	3.541	2475.	8765.
68.00	51.00	16.16	679.0	3.584	2677.	9593.
68.00	52.00	17.16	702.8	3.626	2880.	10440.
68.00	53.00	18.16	725.8	3.668	3084.	11310.
68.00	54.00	19.16	747.8	3.713	3287.	12200.
68.00	55.00	20.16	769.9	3.754	3493.	13110.
68.00	56.00	21.16	791.1	3.794	3701.	14040.
68.00	57.00	22.16	811.8	3.835	3909.	14990.
68.00	58.00	23.15	832.0	3.874	4119.	15960.
68.00	59.00	24.15	851.8	3.913	4330.	16940.
68.00	60.00	25.15	871.1	3.952	4541.	17950.
68.00	61.00	26.15	890.0	3.990	4753.	18970.
68.00	62.00	27.15	908.6	4.027	4967.	20000.
69.00	43.00	8.176	374.5	6.450	959.3	6187.
69.00	44.00	9.176	415.5	5.711	1202.	6867.
69.00	45.00	10.18	450.8	4.713	1425.	6714.
69.00	46.00	11.18	482.6	4.165	1635.	6808.
69.00	47.00	12.18	511.8	3.798	1838.	6981.
69.00	48.00	13.18	543.6	3.614	2078.	7511.
69.00	49.00	14.18	564.7	3.431	2238.	7679.
69.00	50.00	15.18	589.2	3.465	2441.	8456.
69.00	51.00	16.17	613.2	3.500	2644.	9255.
69.00	52.00	17.17	636.1	3.541	2845.	10070.
69.00	53.00	18.17	658.8	3.579	3050.	10920.
69.00	54.00	19.17	680.9	3.616	3257.	11780.
69.00	55.00	20.17	702.0	3.656	3462.	12660.
69.00	56.00	21.17	722.9	3.694	3670.	13560.
69.00	57.00	22.17	743.2	3.731	3879.	14470.
69.00	58.00	23.17	763.1	3.768	4090.	15410.
69.00	59.00	24.17	782.5	3.805	4301.	16360.
69.00	60.00	25.17	801.9	3.841	4513.	17340.
69.00	61.00	26.17	820.6	3.877	4726.	18320.
69.00	62.00	27.17	839.0	3.913	4939.	19330.
70.00	43.00	8.195	297.5	8.137	748.1	6087.
70.00	44.00	9.195	338.1	7.077	1002.	7091.

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EPA Export 08-07-2014:23:43:13

70.00	45.00	10.19	375.9	6.582	1252.	8142.
70.00	46.00	11.19	418.4	5.612	1493.	8379.
70.00	47.00	12.19	441.6	4.982	1718.	8423.
70.00	48.00	13.19	469.9	4.434	1934.	8577.
70.00	49.00	14.19	496.3	4.094	2144.	8778.
70.00	50.00	15.19	521.6	3.829	2351.	9001.
70.00	51.00	16.19	549.6	3.697	2601.	9614.
70.00	52.00	17.19	567.7	3.511	2760.	9689.
70.00	53.00	18.19	589.9	3.540	2966.	10500.
70.00	54.00	19.19	611.5	3.571	3173.	11330.
70.00	55.00	20.19	632.5	3.602	3381.	12180.
70.00	56.00	21.19	652.7	3.637	3587.	13050.
70.00	57.00	22.19	672.9	3.670	3797.	13930.
70.00	58.00	23.19	692.6	3.702	4008.	14840.
70.00	59.00	24.19	711.3	3.739	4214.	15760.
70.00	60.00	25.19	730.2	3.772	4427.	16700.
70.00	61.00	26.19	748.7	3.804	4640.	17650.
70.00	62.00	27.19	766.8	3.837	4853.	18620.
71.00	43.00	8.214		Weight too small		
71.00	43.00	8.214	213.2	7.495	432.6	3243.
71.00	44.00	9.214		Weight too small		
71.00	44.00	9.214	229.5	7.510	508.2	3817.
71.00	45.00	10.21	294.8	8.142	980.8	7986.
71.00	46.00	11.21	330.1	7.322	1237.	9056.
71.00	47.00	12.21	363.0	6.834	1488.	10170.
71.00	48.00	13.21	393.5	5.898	1729.	10200.
71.00	49.00	14.21	421.7	5.270	1958.	10320.
71.00	50.00	15.21	448.0	4.821	2180.	10510.
71.00	51.00	16.21	472.6	4.478	2396.	10730.
71.00	52.00	17.21	495.6	4.204	2609.	10970.
71.00	53.00	18.21	517.9	3.978	2819.	11210.
71.00	54.00	19.21	543.9	3.865	3076.	11890.
71.00	55.00	20.21	560.1	3.647	3233.	11790.
71.00	56.00	21.21	580.6	3.634	3442.	12510.
71.00	57.00	22.21	600.4	3.659	3652.	13360.
71.00	58.00	23.21	619.5	3.687	3860.	14230.
71.00	59.00	24.21	638.4	3.713	4072.	15120.
71.00	60.00	25.21	657.0	3.741	4284.	16020.
71.00	61.00	26.21	675.4	3.768	4497.	16950.
71.00	62.00	27.21	693.4	3.796	4710.	17880.
72.00	43.00	8.233	169.7	7.949	387.0	3076.
72.00	44.00	9.232		Weight too small		
72.00	44.00	9.232	185.6	7.823	462.9	3622.
72.00	45.00	10.23		Weight too small		
72.00	45.00	10.23	200.5	7.771	539.7	4194.
72.00	46.00	11.23		Weight too small		
72.00	46.00	11.23	214.5	7.768	616.9	4792.
72.00	47.00	12.23	50.81	9.789	453.2	4437.
72.00	47.00	12.23	228.3	7.787	695.4	5414.
72.00	48.00	13.23	309.8	7.884	1403.	11060.
72.00	49.00	14.23	339.9	7.315	1656.	12130.
72.00	50.00	15.23	368.0	6.419	1902.	12210.
72.00	51.00	16.23	393.7	5.800	2133.	12370.
72.00	52.00	17.23	418.6	5.330	2361.	12590.
72.00	53.00	18.23	441.9	4.964	2583.	12820.
72.00	54.00	19.23	463.7	4.667	2801.	13070.
72.00	55.00	20.23	485.2	4.418	3017.	13330.
72.00	56.00	21.23	505.7	4.206	3230.	13580.
72.00	57.00	22.23	525.5	4.021	3441.	13840.
72.00	58.00	23.23	544.5	3.860	3650.	14090.
72.00	59.00	24.23	563.5	3.752	3860.	14400.
72.00	60.00	25.23	581.8	3.763	4070.	15310.
72.00	61.00	26.23	600.0	3.783	4283.	16220.
72.00	62.00	27.23	617.8	3.804	4496.	17150.
73.00	43.00	8.251	123.9	9.462	305.6	2891.
73.00	44.00	9.251	139.3	8.935	381.2	3406.
73.00	45.00	10.25		Slip too small to split into minimum no. of slices		
73.00	46.00	11.25		Weight too small		
73.00	46.00	11.25	167.7	8.442	534.6	4513.
73.00	47.00	12.25		Weight too small		
73.00	47.00	12.25	181.0	8.328	612.7	5102.
73.00	48.00	13.25		Weight too small		
73.00	48.00	13.25	193.7	8.271	690.9	5715.
73.00	49.00	14.25		Weight too small		
73.00	49.00	14.25	206.1	8.243	770.3	6349.
73.00	50.00	15.25	281.4	8.747	1494.	13070.
73.00	51.00	16.25	309.2	8.121	1751.	14220.
73.00	52.00	17.25	335.5	7.183	1999.	14360.
73.00	53.00	18.25	359.9	6.504	2238.	14560.
73.00	54.00	19.25	382.9	5.989	2469.	14780.
73.00	55.00	20.25	405.7	5.574	2697.	15030.
73.00	56.00	21.25	426.7	5.236	2920.	15290.
73.00	57.00	22.25	447.2	4.953	3140.	15550.
73.00	58.00	23.25	467.2	4.709	3359.	15820.
73.00	59.00	24.25	486.5	4.498	3575.	16080.
73.00	60.00	25.25	505.1	4.312	3790.	16340.
73.00	61.00	26.25	523.2	4.146	4003.	16590.
73.00	62.00	27.25	540.4	4.003	4212.	16860.
74.00	43.00	8.270	78.41	12.65	198.4	2510.
74.00	44.00	9.270	91.32	11.84	260.2	3080.
74.00	45.00	10.27	105.1	11.01	333.1	3668.
74.00	46.00	11.27	118.8	10.25	409.7	4199.
74.00	47.00	12.27		Weight too small		
74.00	47.00	12.27	131.9	9.759	487.1	4754.
74.00	48.00	13.27		Weight too small		
74.00	48.00	13.27	144.5	9.431	565.2	5331.
74.00	49.00	14.27		Weight too small		
74.00	49.00	14.27	156.6	9.217	643.3	5929.
74.00	50.00	15.27		Weight too small		
74.00	50.00	15.27	168.3	9.068	722.1	6548.
74.00	51.00	16.27		Weight too small		
74.00	51.00	16.27	179.8	8.962	802.1	7188.
74.00	52.00	17.27	56.88	10.34	630.3	6518.
74.00	52.00	17.27	191.0	8.892	882.6	7848.
74.00	53.00	18.27	71.49	9.610	801.7	7705.
74.00	53.00	18.27	201.8	8.848	963.7	8527.
74.00	54.00	19.27	297.6	8.248	2016.	16630.
74.00	55.00	20.27	321.2	7.451	2260.	16840.
74.00	56.00	21.27	343.2	6.843	2496.	17080.
74.00	57.00	22.27	364.8	6.352	2730.	17340.
74.00	58.00	23.27	385.6	5.950	2959.	17610.
74.00	59.00	24.27	405.5	5.612	3185.	17880.
74.00	60.00	25.27	424.7	5.324	3408.	18150.
74.00	61.00	26.27	443.7	5.074	3630.	18420.
74.00	62.00	27.27	461.9	4.854	3849.	18680.
75.00	43.00	8.289		Weight too small		
75.00	44.00	9.289		Weight too small		
75.00	45.00	10.29	58.91	15.98	190.0	3036.
75.00	46.00	11.29	69.80	14.73	247.5	3645.
75.00	47.00	12.29	81.47	13.68	315.1	4311.
75.00	48.00	13.29	93.92	12.47	392.0	4890.
75.00	49.00	14.29		Weight too small		
75.00	49.00	14.29	106.0	11.59	470.1	5450.

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EPA Export 08-07-2014:23:43:13

75.00	50.00	15.29	Weight too small			
75.00	50.00	15.29	117.7	11.00	548.6	6032.
75.00	51.00	16.29	Weight too small			
75.00	51.00	16.29	128.9	10.58	627.1	6633.
75.00	52.00	17.29	Weight too small			
75.00	52.00	17.29	140.0	10.26	706.8	7255.
75.00	53.00	18.29	Weight too small			
75.00	53.00	18.29	150.7	10.04	786.6	7895.
75.00	54.00	19.29	Weight too small			
75.00	54.00	19.29	161.2	9.862	867.4	8554.
75.00	55.00	20.29	61.71	10.64	751.2	7991.
75.00	55.00	20.29	171.6	9.730	948.9	9232.
75.00	56.00	21.29	74.70	9.511	918.0	8731.
75.00	56.00	21.29	181.6	9.632	1031.	9928.
75.00	57.00	22.29	278.5	8.744	2196.	19200.
75.00	58.00	23.29	300.3	7.973	2440.	19450.
75.00	59.00	24.29	320.9	7.366	2677.	19720.
75.00	60.00	25.29	341.1	6.864	2913.	19990.
75.00	61.00	26.29	360.7	6.446	3144.	20270.
75.00	62.00	27.29	379.6	6.091	3373.	20550.
76.00	43.00	8.325	Weight too small			
76.00	44.00	9.322	Weight too small			
76.00	45.00	10.32	Weight too small			
76.00	46.00	11.32	Weight too small			
76.00	47.00	12.32	Weight too small			
76.00	48.00	13.31	Weight too small			
76.00	49.00	14.31	56.88	18.01	259.5	4673.
76.00	50.00	15.31	67.61	16.43	330.4	5429.
76.00	51.00	16.31	Weight too small			
76.00	51.00	16.31	78.76	14.70	408.3	6003.
76.00	52.00	17.31	Weight too small			
76.00	52.00	17.31	89.49	13.54	486.2	6583.
76.00	53.00	18.31	Weight too small			
76.00	53.00	18.31	100.1	12.71	565.1	7183.
76.00	54.00	19.31	Weight too small			
76.00	54.00	19.31	110.5	12.10	644.8	7802.
76.00	55.00	20.31	Weight too small			
76.00	55.00	20.31	120.6	11.64	725.0	8439.
76.00	56.00	21.31	Weight too small			
76.00	56.00	21.31	130.5	11.29	805.3	9094.
76.00	57.00	22.31	52.10	11.87	683.6	8116.
76.00	57.00	22.31	140.2	11.02	886.4	9766.
76.00	58.00	23.31	63.50	11.15	840.2	9368.
76.00	58.00	23.31	149.7	10.80	968.2	10460.
76.00	59.00	24.31	75.07	9.629	1001.	9640.
76.00	59.00	24.31	159.1	10.63	1051.	11160.
76.00	60.00	25.31	86.62	8.484	1164.	9875.
76.00	60.00	25.31	168.4	10.49	1133.	11890.
76.00	61.00	26.31	274.8	8.722	2539.	22140.
76.00	62.00	27.30	294.5	8.066	2780.	22420.
77.00	43.00	8.468	Weight too small			
77.00	44.00	9.450	Weight too small			
77.00	45.00	10.44	Weight too small			
77.00	46.00	11.42	Weight too small			
77.00	47.00	12.41	Weight too small			
77.00	48.00	13.40	Weight too small			
77.00	49.00	14.40	Weight too small			
77.00	50.00	15.39	Weight too small			
77.00	51.00	16.38	Weight too small			
77.00	52.00	17.38	Weight too small			
77.00	53.00	18.37	Weight too small			
77.00	53.00	18.37	57.15	19.33	337.9	6330.
77.00	54.00	19.37	Weight too small			
77.00	54.00	19.37	67.05	17.09	415.7	7187.
77.00	55.00	20.37	Weight too small			
77.00	55.00	20.37	76.74	15.59	494.1	7701.
77.00	56.00	21.36	Weight too small			
77.00	56.00	21.36	86.26	14.51	573.0	8314.
77.00	57.00	22.36	Weight too small			
77.00	57.00	22.36	95.67	13.70	653.8	8944.
77.00	58.00	23.36	Weight too small			
77.00	58.00	23.36	104.9	13.09	732.9	9592.
77.00	59.00	24.36	Weight too small			
77.00	59.00	24.36	113.8	12.62	812.4	10260.
77.00	60.00	25.35	54.24	12.32	768.8	9469.
77.00	60.00	25.35	122.7	12.24	893.4	10940.
77.00	61.00	26.35	64.54	11.23	921.4	10350.
77.00	61.00	26.35	131.5	11.93	975.0	11630.
77.00	62.00	27.35	74.93	9.834	1077.	10590.
77.00	62.00	27.35	140.0	11.69	1056.	12350.
78.00	43.00	8.722	Radius too small			
78.00	44.00	9.680	Weight too small			
78.00	45.00	10.64	Weight too small			
78.00	46.00	11.61	Weight too small			
78.00	47.00	12.59	Weight too small			
78.00	48.00	13.57	Weight too small			
78.00	49.00	14.55	Weight too small			
78.00	50.00	15.53	Weight too small			
78.00	51.00	16.52	Weight too small			
78.00	52.00	17.51	Weight too small			
78.00	53.00	18.49	Weight too small			
78.00	54.00	19.48	Weight too small			
78.00	55.00	20.47	Weight too small			
78.00	55.00	20.47	Weight too small			
78.00	56.00	21.47	Weight too small			
78.00	56.00	21.47	Weight too small			
78.00	57.00	22.46	Weight too small			
78.00	57.00	22.46	58.70	19.41	423.7	8225.
78.00	58.00	23.45	Weight too small			
78.00	58.00	23.45	67.37	17.60	501.7	8832.
78.00	59.00	24.45	Weight too small			
78.00	59.00	24.45	75.99	16.28	580.8	9455.
78.00	60.00	25.44	Weight too small			
78.00	60.00	25.44	84.45	15.29	660.0	10090.
78.00	61.00	26.43	Weight too small			
78.00	61.00	26.43	92.80	14.52	740.4	10750.
78.00	62.00	27.43	Weight too small			
78.00	62.00	27.43	101.1	13.93	820.2	11420.
79.00	43.00	9.012	Radius too small			
79.00	44.00	9.969	Radius too small			
79.00	45.00	10.93	Radius too small			
79.00	46.00	11.88	Radius too small			
79.00	47.00	12.84	Weight too small			
79.00	48.00	13.80	Weight too small			
79.00	49.00	14.77	Weight too small			
79.00	50.00	15.74	Weight too small			
79.00	51.00	16.71	Weight too small			
79.00	52.00	17.69	Weight too small			
79.00	53.00	18.67	Weight too small			
79.00	54.00	19.65	Weight too small			
79.00	55.00	20.63	Weight too small			
79.00	56.00	21.61	Weight too small			
79.00	57.00	22.60	Weight too small			
79.00	57.00	22.60	Weight too small			

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EPA Export 08-07-2014:23:43:13

79.00	58.00	23.59	Weight too small		
79.00	58.00	23.59	Weight too small		
79.00	59.00	24.58	Weight too small		
79.00	59.00	24.58	Weight too small		
79.00	60.00	25.57	Weight too small		
79.00	60.00	25.57	52.30	21.71	430.9	9353.
79.00	61.00	26.55	Weight too small		
79.00	61.00	26.55	60.23	19.57	509.5	9969.
79.00	62.00	27.55	Weight too small		
79.00	62.00	27.55	68.06	18.02	588.5	10600.
80.00	43.00	9.301	Radius too small		
80.00	44.00	10.26	Radius too small		
80.00	45.00	11.22	Radius too small		
80.00	46.00	12.17	Radius too small		
80.00	47.00	13.13	Radius too small		
80.00	48.00	14.09	Radius too small		
80.00	49.00	15.04	Radius too small		
80.00	50.00	16.00	Weight too small		
80.00	51.00	16.96	Weight too small		
80.00	52.00	17.92	Weight too small		
80.00	53.00	18.89	Weight too small		
80.00	54.00	19.86	Weight too small		
80.00	55.00	20.83	Weight too small		
80.00	56.00	21.81	Weight too small		
80.00	57.00	22.79	Weight too small		
80.00	58.00	23.77	Weight too small		
80.00	59.00	24.75	Weight too small		
80.00	59.00	24.75	Weight too small		
80.00	60.00	25.73	Weight too small		
80.00	60.00	25.73	Weight too small		
80.00	61.00	26.71	Weight too small		
80.00	61.00	26.71	Weight too small		
80.00	62.00	27.70	Weight too small		
80.00	62.00	27.70	Weight too small		
81.00	43.00	9.590	Radius too small		
81.00	44.00	10.55	Radius too small		
81.00	45.00	11.50	Radius too small		
81.00	46.00	12.46	Radius too small		
81.00	47.00	13.42	Radius too small		
81.00	48.00	14.38	Radius too small		
81.00	49.00	15.33	Radius too small		
81.00	50.00	16.29	Radius too small		
81.00	51.00	17.25	Radius too small		
81.00	52.00	18.21	Radius too small		
81.00	53.00	19.16	Weight too small		
81.00	54.00	20.12	Weight too small		
81.00	55.00	21.08	Weight too small		
81.00	56.00	22.05	Weight too small		
81.00	57.00	23.01	Weight too small		
81.00	58.00	23.98	Weight too small		
81.00	59.00	24.96	Weight too small		
81.00	60.00	25.93	Slip too small to split into minimum no. of slices		
81.00	61.00	26.91	Weight too small		
81.00	61.00	26.91	Weight too small		
81.00	62.00	27.88	Weight too small		
81.00	62.00	27.88	Weight too small		
82.00	43.00	9.596	Radius too small		
82.00	44.00	10.60	Radius too small		
82.00	45.00	11.60	Radius too small		
82.00	46.00	12.60	Radius too small		
82.00	47.00	13.60	Radius too small		
82.00	48.00	14.60	Radius too small		
82.00	49.00	15.60	Radius too small		
82.00	50.00	16.58	Radius too small		
82.00	51.00	17.54	Radius too small		
82.00	52.00	18.49	Radius too small		
82.00	53.00	19.45	Radius too small		
82.00	54.00	20.41	Radius too small		
82.00	55.00	21.37	Radius too small		
82.00	56.00	22.32	Weight too small		
82.00	57.00	23.28	Weight too small		
82.00	58.00	24.24	Weight too small		
82.00	59.00	25.20	Weight too small		
82.00	60.00	26.17	Weight too small		
82.00	61.00	27.14	Weight too small		
82.00	62.00	28.11	Slip too small to split into minimum no. of slices		
83.00	43.00	9.596	Radius too small		
83.00	44.00	10.60	Radius too small		
83.00	45.00	11.60	Radius too small		
83.00	46.00	12.60	Radius too small		
83.00	47.00	13.60	Radius too small		
83.00	48.00	14.60	Radius too small		
83.00	49.00	15.60	Radius too small		
83.00	50.00	16.60	Radius too small		
83.00	51.00	17.60	Radius too small		
83.00	52.00	18.60	Radius too small		
83.00	53.00	19.74	FoS > 1000		
83.00	54.00	20.70	Disturbing moment < 0		
83.00	55.00	21.66	FoS > 1000		
83.00	56.00	22.61	Disturbing moment < 0		
83.00	57.00	23.57	Radius too small		
83.00	58.00	24.53	Radius too small		
83.00	59.00	25.48	Weight too small		
83.00	60.00	26.44	Weight too small		
83.00	61.00	27.40	Weight too small		
83.00	62.00	28.36	Weight too small		
84.00	43.00	9.596	Radius too small		
84.00	44.00	10.60	Radius too small		
84.00	45.00	11.60	Radius too small		
84.00	46.00	12.60	Radius too small		
84.00	47.00	13.60	Radius too small		
84.00	48.00	14.60	Radius too small		
84.00	49.00	15.60	Radius too small		
84.00	50.00	16.60	Radius too small		
84.00	51.00	17.60	Radius too small		
84.00	52.00	18.60	Radius too small		
84.00	53.00	19.60	Radius too small		
84.00	54.00	20.60	Radius too small		
84.00	55.00	21.60	Radius too small		
84.00	56.00	22.90	FoS > 1000		
84.00	57.00	23.86	FoS > 1000		
84.00	58.00	24.82	Disturbing moment < 0		
84.00	59.00	25.77	Disturbing moment < 0		
84.00	60.00	26.73	FoS > 1000		
84.00	61.00	27.69	Disturbing moment < 0		
84.00	62.00	28.65	Weight too small		
84.00	62.00	28.65	Disturbing moment < 0		
85.00	43.00	9.596	Radius too small		
85.00	44.00	10.60	Radius too small		
85.00	45.00	11.60	Radius too small		
85.00	46.00	12.60	Radius too small		
85.00	47.00	13.60	Radius too small		

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EPA Export 08-07-2014:23:43:13

85.00	48.00	14.60	Radius too small
85.00	49.00	15.60	Radius too small
85.00	50.00	16.60	Radius too small
85.00	51.00	17.60	Radius too small
85.00	52.00	18.60	Radius too small
85.00	53.00	19.60	Radius too small
85.00	54.00	20.60	Radius too small
85.00	55.00	21.60	Radius too small
85.00	56.00	22.60	Radius too small
85.00	57.00	23.60	Radius too small
85.00	58.00	24.60	Radius too small
85.00	59.00	25.60	Radius too small
85.00	60.00	27.02	Disturbing moment < 0
85.00	61.00	27.98	Disturbing moment < 0
85.00	62.00	28.93	Fos > 1000
86.00	43.00	9.596	Radius too small
86.00	44.00	10.60	Radius too small
86.00	45.00	11.60	Radius too small
86.00	46.00	12.60	Radius too small
86.00	47.00	13.60	Radius too small
86.00	48.00	14.60	Radius too small
86.00	49.00	15.60	Radius too small
86.00	50.00	16.60	Radius too small
86.00	51.00	17.60	Radius too small
86.00	52.00	18.60	Radius too small
86.00	53.00	19.60	Radius too small
86.00	54.00	20.60	Radius too small
86.00	55.00	21.60	Radius too small
86.00	56.00	22.60	Radius too small
86.00	57.00	23.60	Radius too small
86.00	58.00	24.60	Radius too small
86.00	59.00	25.60	Radius too small
86.00	60.00	26.60	Radius too small
86.00	61.00	27.60	Radius too small
86.00	62.00	28.60	Radius too small
87.00	43.00	9.596	Radius too small
87.00	44.00	10.60	Radius too small
87.00	45.00	11.60	Radius too small
87.00	46.00	12.60	Radius too small
87.00	47.00	13.60	Radius too small
87.00	48.00	14.60	Radius too small
87.00	49.00	15.60	Radius too small
87.00	50.00	16.60	Radius too small
87.00	51.00	17.60	Radius too small
87.00	52.00	18.60	Radius too small
87.00	53.00	19.60	Radius too small
87.00	54.00	20.60	Radius too small
87.00	55.00	21.60	Radius too small
87.00	56.00	22.60	Radius too small
87.00	57.00	23.60	Radius too small
87.00	58.00	24.60	Radius too small
87.00	59.00	25.60	Radius too small
87.00	60.00	26.60	Radius too small
87.00	61.00	27.60	Radius too small
87.00	62.00	28.60	Radius too small
88.00	43.00	9.596	Radius too small
88.00	44.00	10.60	Radius too small
88.00	45.00	11.60	Radius too small
88.00	46.00	12.60	Radius too small
88.00	47.00	13.60	Radius too small
88.00	48.00	14.60	Radius too small
88.00	49.00	15.60	Radius too small
88.00	50.00	16.60	Radius too small
88.00	51.00	17.60	Radius too small
88.00	52.00	18.60	Radius too small
88.00	53.00	19.60	Radius too small
88.00	54.00	20.60	Radius too small
88.00	55.00	21.60	Radius too small
88.00	56.00	22.60	Radius too small
88.00	57.00	23.60	Radius too small
88.00	58.00	24.60	Radius too small
88.00	59.00	25.60	Radius too small
88.00	60.00	26.60	Radius too small
88.00	61.00	27.60	Radius too small
88.00	62.00	28.60	Radius too small
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WORST CASE : WATER CASE 1 OF 1

Centre at (60.00,46.00)
Radius 11.16m
Iterations: 5
Horiz acceleration (kg): .0
Net vertical force (kN): .0
Slip weight (kN) 545.8
Net horiz force (kN): 0.02365
Disturbing moment (kN m): 1682.
Inclination of interslice forces (°): 4.690
Restoring moment (kN m): 5691.

Factor of Safety: 3.384

Slip surface coordinates

Point	x (m)	y (m)	Pore Pressure u (kPa)	Interslice forces (kN) T	E	E(u)
1	58.31	40.46	-5.171	.0	.0	.0
2	58.63	39.94	-76.29E-6	0.03229	0.3935	.0
3	59.23	39.10	8.216	1.348	5.540	1.375
4	59.91	38.32	15.82	3.963	15.86	12.52
5	60.65	37.61	6.696	7.577	30.34	2.242
6	60.70	37.56	5.874	7.638	30.60	1.725
7	60.90	37.39	2.564	8.136	32.68	0.3286
8	61.00	37.31	0.8789	8.506	34.20	0.03862
9	61.48	36.95	4.290	10.47	42.21	0.9203
10	62.55	36.26	10.64	15.69	63.47	5.659
11	63.70	35.70	15.68	21.29	86.22	12.29
12	64.00	35.58	16.74	22.00	89.12	14.01
13	64.98	35.26	19.52	22.19	89.91	19.06
14	65.98	35.03	21.38	21.82	88.42	22.86
15	67.00	34.89	22.30	20.54	83.25	24.85
16	67.37	34.86	22.39	19.80	80.26	25.07
17	68.29	34.85	19.18	17.29	70.11	18.40
18	69.20	34.91	15.23	13.96	56.62	11.60
19	70.50	35.13	8.307	8.234	33.43	3.450
20	71.76	35.50	.0	2.391	9.731	.0
21	72.34	35.72	-4.365	.0	0.02365	.0

Slice Strength Parameters / Pore Pressure / Slice Weight / Forces on base [kN]

No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Normal	Shear
1	3.000	.0	.0	0.9109	0.7930	1.847
2	3.000	.0	4.108	6.118	6.980	3.090
3	3.000	.0	12.02	12.75	14.44	3.090
4	3.000	.0	11.26	20.00	21.84	3.090
5	40.00	.0	6.285	1.571	1.314	2.677
6	40.00	.0	4.219	7.752	6.882	10.47
7	40.00	.0	1.721	4.652	4.281	5.161
8	40.00	.0	2.585	24.20	22.55	23.99
9	40.00	.0	7.464	66.60	63.18	51.03
10	40.00	.0	13.16	86.84	83.01	51.03
11	40.00	.0	16.21	18.21	17.32	12.93
12	40.00	.0	18.13	41.21	39.18	41.18
13	40.00	.0	20.45	46.99	45.79	41.18
14	40.00	.0	21.84	50.76	50.86	41.18
15	40.00	.0	22.34	18.43	18.90	14.84
16	40.00	.0	20.79	42.12	44.47	36.64
17	40.00	.0	17.21	36.14	40.28	36.64
18	40.00	.0	11.77	38.43	47.39	52.59
19	40.00	.0	4.154	19.80	31.27	52.59
20	40.00	.0	.0	2.329	7.920	24.81

Slice Surface Load [kPa] / Water Pressure on ground surface [kPa]

Slice no.	Surface Load Vert	Surface Load Horiz	Water Pressure Vert	Water Pressure Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0

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14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0

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ARUP

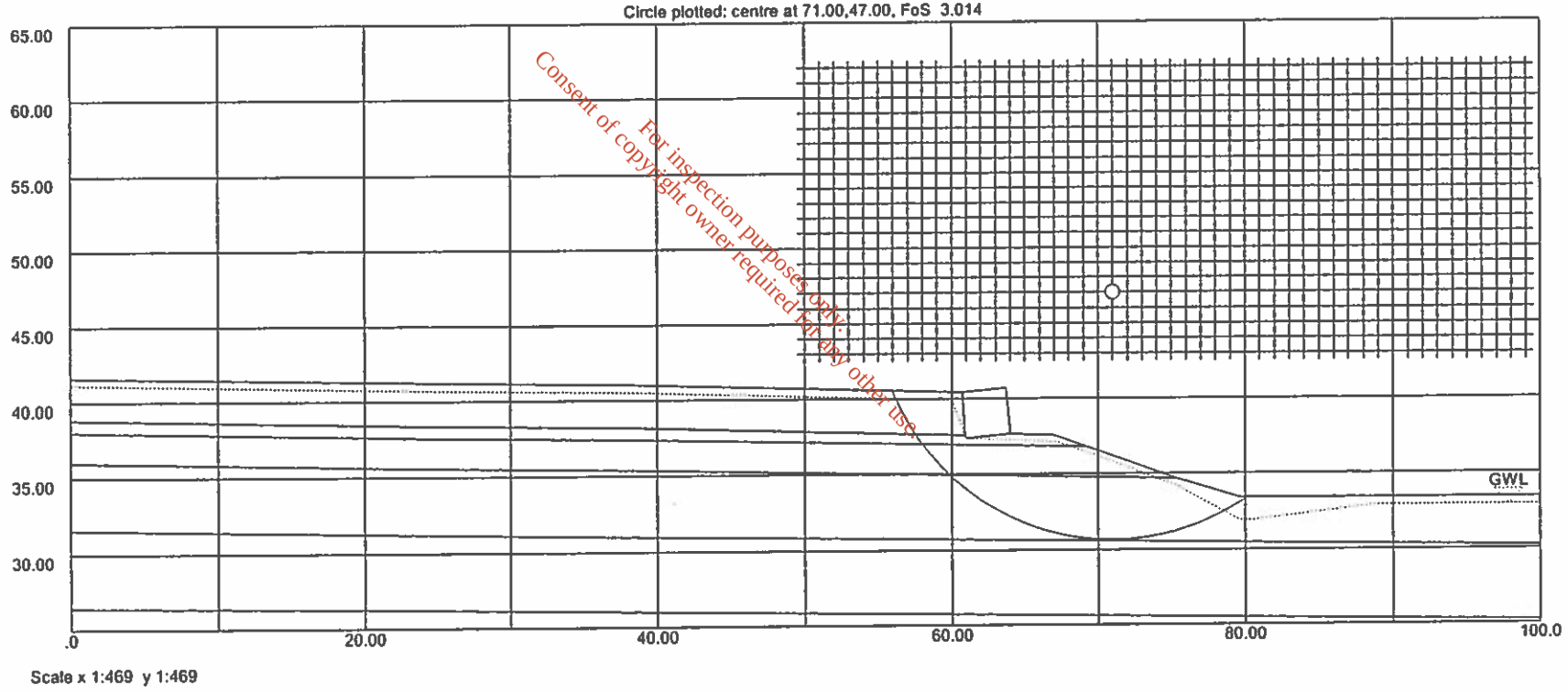
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
C1157.10	AA: Run 13 - 01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut 07.sld	



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Notes

Maximum Mineral Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Sand / Non Intact Rock Surface

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 (°)	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Undrained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Undrained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Undrain	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Undrain	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Un	20.00	20.00	Undrained	.0	75.00
7	Rock (Undrained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X -->						
		63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	37.10	.	34.20	.

Stratum	Material	X -->			
		79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40
4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	12.15	2798.	51.41	410.8	21120.
50.00	44.00	13.15	2951.	61.06	391.1	23880.
50.00	45.00	14.15	3100.	73.57	361.1	26560.
50.00	46.00	15.15	3240.	71.77	385.8	27690.
50.00	47.00	16.15	3364.	51.92	549.2	28520.
50.00	48.00	17.15	3476.	36.21	816.6	29570.
50.00	49.00	18.15	3580.	27.26	1148.	31280.
50.00	50.00	19.15	3683.	22.66	1493.	33840.
50.00	51.00	20.15	3776.	19.80	1841.	36450.
50.00	52.00	21.15	3872.	17.83	2195.	39130.
50.00	53.00	22.15	3965.	16.40	2553.	41880.
50.00	54.00	23.15	4054.	15.33	2915.	44680.
50.00	55.00	24.15	4141.	14.50	3280.	47550.
50.00	56.00	25.15	4226.	13.82	3649.	50420.
50.00	57.00	26.15	4303.	13.23	4025.	53250.
50.00	58.00	27.15	4384.	12.71	4416.	56140.
50.00	59.00	28.15	4463.	12.26	4816.	59070.
50.00	60.00	29.15	4543.	11.87	5229.	62050.
50.00	61.00	30.15	4618.	11.51	5654.	65070.
50.00	62.00	31.15	4691.	11.19	6090.	68130.
51.00	43.00	12.16	2808.	79.92	267.4	21370.
51.00	44.00	13.16	2962.	108.4	219.5	23790.
51.00	45.00	14.16		Disturbing moment < 0		
51.00	46.00	15.16	3226.	45.04	551.5	24840.
51.00	47.00	16.16	3339.	30.04	878.7	26390.
51.00	48.00	17.16	3448.	23.55	1224.	28810.
51.00	49.00	18.16	3552.	19.94	1570.	31300.
51.00	50.00	19.16	3652.	17.64	1919.	33850.
51.00	51.00	20.16	3743.	16.07	2269.	36460.
51.00	52.00	21.16	3836.	14.90	2626.	39140.
51.00	53.00	22.16	3928.	14.01	2989.	41880.
51.00	54.00	23.16	4018.	13.28	3357.	44570.
51.00	55.00	24.16	4105.	12.65	3738.	47300.
51.00	56.00	25.16	4190.	12.13	4130.	50080.
51.00	57.00	26.16	4272.	11.66	4535.	52900.
51.00	58.00	27.16	4346.	11.26	4951.	55760.
51.00	59.00	28.16	4424.	10.90	5382.	58670.
51.00	60.00	29.16	4499.	10.58	5823.	61630.
51.00	61.00	30.16	4572.	10.30	6275.	64630.
51.00	62.00	31.16	4643.	10.05	6736.	67670.
52.00	43.00	12.18	2821.	159.0	128.5	20430.
52.00	44.00	13.18	2962.	71.01	291.1	20670.
52.00	45.00	14.18	3082.	37.04	588.2	21790.
52.00	46.00	15.18	3199.	26.01	925.0	24060.
52.00	47.00	16.18	3310.	20.82	1268.	26400.
52.00	48.00	17.18	3411.	17.93	1607.	28810.
52.00	49.00	18.18	3513.	15.98	1958.	31300.
52.00	50.00	19.18	3615.	14.60	2319.	33850.
52.00	51.00	20.17	3711.	13.61	2677.	36440.
52.00	52.00	21.17	3804.	12.81	3044.	39000.
52.00	53.00	22.17	3895.	12.16	3423.	41610.
52.00	54.00	23.17	3982.	11.60	3815.	44270.
52.00	55.00	24.17	4067.	11.12	4223.	46970.
52.00	56.00	25.17	4149.	10.70	4646.	49730.
52.00	57.00	26.17	4229.	10.34	5081.	52530.
52.00	58.00	27.17	4301.	10.02	5527.	55370.
52.00	59.00	28.17	4377.	9.738	5984.	58270.

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EPA Export 08-07-2014:23:43:14

52.00	60.00	29.17	4450.	9.489	6451.	61210.
52.00	61.00	30.17	4522.	9.267	6927.	64190.
52.00	62.00	31.17	4592.	9.067	7414.	67220.
53.00	43.00	12.19	2809.	58.94	297.7	17550.
53.00	44.00	13.19	2934.	31.39	624.5	19600.
53.00	45.00	14.19	3053.	23.16	941.2	21790.
53.00	46.00	15.19	3164.	18.79	1280.	24060.
53.00	47.00	16.19	3274.	16.23	1627.	26400.
53.00	48.00	17.19	3381.	14.53	1983.	28820.
53.00	49.00	18.19	3484.	13.40	2333.	31260.
53.00	50.00	19.19	3580.	12.51	2694.	33700.
53.00	51.00	20.19	3676.	11.78	3073.	36180.
53.00	52.00	21.19	3769.	11.15	3473.	38720.
53.00	53.00	22.19	3857.	10.63	3886.	41310.
53.00	54.00	23.19	3943.	10.19	4314.	43950.
53.00	55.00	24.19	4025.	9.816	4752.	46640.
53.00	56.00	25.19	4104.	9.495	5200.	49380.
53.00	57.00	26.19	4180.	9.217	5660.	52170.
53.00	58.00	27.19	4256.	8.973	6130.	55000.
53.00	59.00	28.19	4325.	8.753	6612.	57870.
53.00	60.00	29.19	4398.	8.557	7105.	60800.
53.00	61.00	30.19	4469.	8.382	7607.	63760.
53.00	62.00	31.19	4538.	8.226	8117.	66770.
54.00	43.00	12.20	2780.	27.83	628.9	17500.
54.00	44.00	13.20	2901.	20.45	958.7	19600.
54.00	45.00	14.20	3018.	17.01	1281.	21790.
54.00	46.00	15.20	3132.	14.86	1619.	24060.
54.00	47.00	16.20	3243.	13.43	1964.	26370.
54.00	48.00	17.20	3348.	12.33	2324.	28670.
54.00	49.00	18.20	3449.	11.48	2703.	31030.
54.00	50.00	19.20	3545.	10.78	3103.	33440.
54.00	51.00	20.20	3637.	10.22	3513.	35920.
54.00	52.00	21.20	3725.	9.765	3937.	38440.
54.00	53.00	22.20	3811.	9.367	4378.	41010.
54.00	54.00	23.20	3889.	9.027	4833.	43630.
54.00	55.00	24.20	3971.	8.736	5301.	46310.
54.00	56.00	25.20	4050.	8.486	5778.	49030.
54.00	57.00	26.20	4127.	8.268	6265.	51800.
54.00	58.00	27.20	4201.	8.078	6762.	54620.
54.00	59.00	28.20	4272.	7.910	7267.	57480.
54.00	60.00	29.20	4342.	7.761	7780.	60380.
54.00	61.00	30.20	4410.	7.628	8302.	63320.
54.00	62.00	31.20	4478.	7.506	8834.	66310.
55.00	43.00	12.21	2747.	18.72	935.2	17500.
55.00	44.00	13.21	2872.	15.53	1263.	19610.
55.00	45.00	14.21	2987.	13.70	1589.	21780.
55.00	46.00	15.21	3101.	12.35	1938.	23940.
55.00	47.00	16.21	3209.	11.34	2307.	26160.
55.00	48.00	17.21	3311.	10.54	2698.	28450.
55.00	49.00	18.21	3408.	9.917	3104.	30790.
55.00	50.00	19.21	3498.	9.393	3532.	33180.
55.00	51.00	20.21	3589.	8.956	3979.	35640.
55.00	52.00	21.21	3676.	8.599	4437.	38150.
55.00	53.00	22.21	3761.	8.306	4902.	40710.
55.00	54.00	23.21	3840.	8.061	5375.	43320.
55.00	55.00	24.21	3919.	7.839	5866.	45980.
55.00	56.00	25.21	3996.	7.647	6367.	48690.
55.00	57.00	26.21	4071.	7.475	6882.	51440.
55.00	58.00	27.21	4144.	7.325	7403.	54230.
55.00	59.00	28.21	4215.	7.193	7934.	57070.
55.00	60.00	29.21	4284.	7.077	8472.	59960.
55.00	61.00	30.21	4351.	6.973	9018.	62880.
55.00	62.00	31.21	4417.	6.880	9571.	65850.
56.00	43.00	12.23	2717.	14.41	1216.	17510.
56.00	44.00	13.23	2839.	12.54	1558.	19520.
56.00	45.00	14.23	2957.	11.34	1905.	21610.
56.00	46.00	15.23	3062.	10.40	2282.	23740.
56.00	47.00	16.23	3166.	9.664	2685.	25950.
56.00	48.00	17.23	3265.	9.084	3106.	28220.
56.00	49.00	18.23	3359.	8.627	3540.	30540.
56.00	50.00	19.23	3452.	8.249	3992.	32930.
56.00	51.00	20.23	3540.	7.933	4459.	35370.
56.00	52.00	21.23	3626.	7.665	4940.	37860.
56.00	53.00	22.23	3707.	7.434	5436.	40410.
56.00	54.00	23.23	3786.	7.238	5941.	43000.

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56.00	55.00	24.23	3864.	7.072	6454.	45640.
56.00	56.00	25.23	3939.	6.930	6975.	48340.
56.00	57.00	26.23	4012.	6.802	7508.	51070.
56.00	58.00	27.23	4083.	6.688	8051.	53840.
56.00	59.00	28.23	4152.	6.585	8604.	56660.
56.00	60.00	29.23	4220.	6.494	9167.	59530.
56.00	61.00	30.23	4287.	6.413	9735.	62430.
56.00	62.00	31.23	4351.	6.342	10310.	65370.
57.00	43.00	12.24	2682.	11.62	1495.	17370.
57.00	44.00	13.24	2802.	10.39	1864.	19360.
57.00	45.00	14.24	2914.	9.489	2258.	21420.
57.00	46.00	15.24	3019.	8.866	2656.	23550.
57.00	47.00	16.24	3121.	8.346	3085.	25740.
57.00	48.00	17.24	3218.	7.936	3528.	28000.
57.00	49.00	18.24	3311.	7.595	3991.	30310.
57.00	50.00	19.24	3401.	7.312	4469.	32680.
57.00	51.00	20.24	3487.	7.077	4960.	35100.
57.00	52.00	21.24	3570.	6.877	5464.	37570.
57.00	53.00	22.24	3649.	6.710	5976.	40100.
57.00	54.00	23.24	3727.	6.562	6503.	42670.
57.00	55.00	24.24	3803.	6.428	7047.	45300.
57.00	56.00	25.24	3877.	6.315	7595.	47970.
57.00	57.00	26.24	3948.	6.219	8150.	50680.
57.00	58.00	27.24	4017.	6.136	8710.	53450.
57.00	59.00	28.24	4085.	6.063	9278.	56250.
57.00	60.00	29.24	4151.	5.995	9856.	59090.
57.00	61.00	30.24	4215.	5.936	10440.	61970.
57.00	62.00	31.24	4278.	5.882	11030.	64890.
58.00	43.00	12.25	2643.	9.578	1798.	17220.
58.00	44.00	13.25	2760.	8.735	2198.	19200.
58.00	45.00	14.25	2871.	8.122	2617.	21250.
58.00	46.00	15.25	2975.	7.669	3047.	23370.
58.00	47.00	16.25	3073.	7.303	3498.	25540.
58.00	48.00	17.25	3166.	7.000	3968.	27780.
58.00	49.00	18.25	3257.	6.749	4456.	30070.
58.00	50.00	19.25	3344.	6.541	4957.	32420.
58.00	51.00	20.25	3429.	6.365	5471.	34830.
58.00	52.00	21.25	3510.	6.217	5997.	37280.
58.00	53.00	22.25	3587.	6.093	6530.	39780.
58.00	54.00	23.25	3663.	5.983	7077.	42340.
58.00	55.00	24.25	3737.	5.887	7634.	44940.
58.00	56.00	25.25	3809.	5.804	8200.	47590.
58.00	57.00	26.25	3879.	5.728	8779.	50290.
58.00	58.00	27.25	3947.	5.664	9362.	53030.
58.00	59.00	28.25	4013.	5.609	9950.	55810.
58.00	60.00	29.25	4075.	5.553	10560.	58630.
58.00	61.00	30.25	4138.	5.511	11160.	61500.
58.00	62.00	31.25	4199.	5.472	11770.	64410.
59.00	43.00	12.27	2601.	8.088	2111.	17080.
59.00	44.00	13.27	2715.	7.501	2539.	19050.
59.00	45.00	14.27	2822.	7.055	2988.	21080.
59.00	46.00	15.27	2922.	6.727	3446.	23180.
59.00	47.00	16.27	3018.	6.462	3921.	25340.
59.00	48.00	17.27	3106.	6.233	4420.	27550.
59.00	49.00	18.27	3195.	6.049	4931.	29830.
59.00	50.00	19.27	3280.	5.896	5454.	32160.
59.00	51.00	20.27	3362.	5.768	5989.	34540.
59.00	52.00	21.27	3439.	5.663	6529.	36970.
59.00	53.00	22.27	3516.	5.570	7085.	39460.
59.00	54.00	23.27	3590.	5.490	7649.	41990.
59.00	55.00	24.26	3664.	5.415	8233.	44580.
59.00	56.00	25.26	3734.	5.354	8818.	47210.
59.00	57.00	26.26	3803.	5.301	9411.	49880.
59.00	58.00	27.26	3869.	5.254	10010.	52600.
59.00	59.00	28.26	3935.	5.211	10620.	55360.
59.00	60.00	29.26	3999.	5.175	11240.	58170.
59.00	61.00	30.26	4061.	5.144	11860.	61010.
59.00	62.00	31.26	4121.	5.117	12490.	63900.
60.00	43.00	12.28	2550.	6.940	2440.	16930.
60.00	44.00	13.28	2660.	6.524	2895.	18890.
60.00	45.00	14.28	2765.	6.205	3369.	20903.
60.00	46.00	15.28	2864.	5.956	3859.	22990.
60.00	47.00	16.28	2958.	5.767	4357.	25130.
60.00	48.00	17.28	3045.	5.612	4869.	27330.
60.00	49.00	18.28	3131.	5.478	5401.	29580.

EPA Export 08-07-2014:23:43:14

60.00	50.00	19.28	3216.	5.363	5948.	31900.
60.00	51.00	20.28	3296.	5.269	6503.	34260.
60.00	52.00	21.28	3372.	5.192	7064.	36670.
60.00	53.00	22.28	3447.	5.124	7639.	39140.
60.00	54.00	23.28	3520.	5.065	8224.	41650.
60.00	55.00	24.28	3590.	5.015	8816.	44220.
60.00	56.00	25.28	3659.	4.972	9417.	46820.
60.00	57.00	26.28	3726.	4.935	10030.	49480.
60.00	58.00	27.28	3791.	4.902	10640.	52170.
60.00	59.00	28.28	3855.	4.874	11270.	54910.
60.00	60.00	29.28	3917.	4.850	11900.	57690.
60.00	61.00	30.28	3978.	4.827	12540.	60520.
60.00	62.00	31.28	4038.	4.808	13180.	63380.
61.00	43.00	12.29	2498.	6.084	2768.	16840.
61.00	44.00	13.29	2604.	5.783	3248.	18780.
61.00	45.00	14.29	2706.	5.548	3746.	20790.
61.00	46.00	15.29	2803.	5.364	4261.	22860.
61.00	47.00	16.29	2895.	5.226	4781.	24990.
61.00	48.00	17.29	2981.	5.105	5323.	27170.
61.00	49.00	18.29	3064.	5.012	5869.	29410.
61.00	50.00	19.29	3145.	4.930	6432.	31710.
61.00	51.00	20.29	3224.	4.862	7005.	34060.
61.00	52.00	21.29	3298.	4.807	7584.	36450.
61.00	53.00	22.29	3371.	4.758	8176.	38900.
61.00	54.00	23.29	3442.	4.717	8776.	41400.
61.00	55.00	24.29	3512.	4.682	9385.	43940.
61.00	56.00	25.29	3579.	4.643	10000.	46430.
61.00	57.00	26.29	3645.	4.618	10630.	49060.
61.00	58.00	27.29	3709.	4.597	11260.	51740.
61.00	59.00	28.29	3771.	4.577	11890.	54430.
61.00	60.00	29.29	3832.	4.559	12540.	57160.
61.00	61.00	30.29	3892.	4.545	13190.	59920.
61.00	62.00	31.29	3950.	4.533	13840.	62730.
62.00	43.00	12.30	2439.	5.387	3090.	16650.
62.00	44.00	13.30	2544.	5.162	3597.	18570.
62.00	45.00	14.30	2643.	4.990	4119.	20550.
62.00	46.00	15.30	2737.	4.856	4654.	22600.
62.00	47.00	16.30	2826.	4.749	5202.	24710.
62.00	48.00	17.30	2910.	4.668	5756.	26870.
62.00	49.00	18.30	2992.	4.598	6326.	29090.
62.00	50.00	19.30	3070.	4.545	6900.	31360.
62.00	51.00	20.30	3147.	4.497	7490.	33680.
62.00	52.00	21.30	3219.	4.459	8086.	36060.
62.00	53.00	22.30	3291.	4.426	8694.	38480.
62.00	54.00	23.30	3361.	4.399	9310.	40950.
62.00	55.00	24.30	3429.	4.376	9933.	43470.
62.00	56.00	25.30	3495.	4.355	10560.	46000.
62.00	57.00	26.30	3559.	4.337	11200.	48580.
62.00	58.00	27.30	3622.	4.324	11840.	51200.
62.00	59.00	28.30	3683.	4.311	12490.	53850.
62.00	60.00	29.30	3744.	4.301	13150.	56550.
62.00	61.00	30.30	3803.	4.293	13810.	59290.
62.00	62.00	31.30	3860.	4.286	14480.	62060.
63.00	43.00	12.32	2373.	4.839	3409.	16500.
63.00	44.00	13.32	2475.	4.673	3938.	18400.
63.00	45.00	14.32	2571.	4.547	4480.	20370.
63.00	46.00	15.32	2662.	4.449	5035.	22400.
63.00	47.00	16.32	2752.	4.368	5607.	24490.
63.00	48.00	17.32	2834.	4.303	6188.	26630.
63.00	49.00	18.32	2914.	4.259	6770.	28830.
63.00	50.00	19.32	2992.	4.219	7368.	31090.
63.00	51.00	20.32	3067.	4.186	7976.	33390.
63.00	52.00	21.32	3136.	4.163	8582.	35730.
63.00	53.00	22.32	3207.	4.139	9206.	38110.
63.00	54.00	23.32	3275.	4.121	9833.	40530.
63.00	55.00	24.32	3341.	4.106	10470.	42990.
63.00	56.00	25.32	3404.	4.099	11100.	45490.
63.00	57.00	26.32	3467.	4.089	11750.	48040.
63.00	58.00	27.32	3529.	4.081	12410.	50630.
63.00	59.00	28.32	3590.	4.076	13070.	53260.
63.00	60.00	29.32	3649.	4.072	13740.	55930.
63.00	61.00	30.32	3707.	4.069	14410.	58630.
63.00	62.00	31.32	3763.	4.068	15090.	61380.
64.00	43.00	12.33	2305.	4.407	3710.	16350.
64.00	44.00	13.33	2404.	4.282	4259.	18240.

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64.00	45.00	14.33	2499.	4.187	4822.	20190.
64.00	46.00	15.33	2588.	4.114	5397.	22200.
64.00	47.00	16.33	2674.	4.057	5982.	24270.
64.00	48.00	17.33	2756.	4.013	6578.	26400.
64.00	49.00	18.33	2833.	3.979	7179.	28560.
64.00	50.00	19.33	2909.	3.949	7792.	30770.
64.00	51.00	20.33	2982.	3.927	8411.	33030.
64.00	52.00	21.33	3052.	3.909	9039.	35330.
64.00	53.00	22.33	3121.	3.894	9676.	37680.
64.00	54.00	23.33	3187.	3.886	10310.	40070.
64.00	55.00	24.33	3250.	3.884	10940.	42510.
64.00	56.00	25.33	3314.	3.878	11600.	44990.
64.00	57.00	26.33	3376.	3.874	12260.	47510.
64.00	58.00	27.33	3437.	3.872	12930.	50070.
64.00	59.00	28.33	3496.	3.872	13600.	52670.
64.00	60.00	29.33	3554.	3.873	14280.	55300.
64.00	61.00	30.33	3611.	3.875	14960.	57980.
64.00	62.00	31.33	3667.	3.878	15650.	60690.
65.00	43.00	12.34	2229.	4.060	3989.	16200.
65.00	44.00	13.34	2326.	3.964	4558.	18070.
65.00	45.00	14.34	2420.	3.895	5136.	20000.
65.00	46.00	15.34	2508.	3.840	5727.	21990.
65.00	47.00	16.34	2591.	3.796	6329.	24020.
65.00	48.00	17.34	2671.	3.763	6937.	26100.
65.00	49.00	18.34	2748.	3.734	7561.	28240.
65.00	50.00	19.34	2822.	3.718	8181.	30420.
65.00	51.00	20.34	2894.	3.704	8816.	32650.
65.00	52.00	21.34	2964.	3.693	9458.	34930.
65.00	53.00	22.34	3031.	3.686	10110.	37250.
65.00	54.00	23.34	3097.	3.682	10760.	39620.
65.00	55.00	24.34	3159.	3.686	11400.	42020.
65.00	56.00	25.34	3222.	3.685	12070.	44470.
65.00	57.00	26.34	3281.	3.688	12730.	46960.
65.00	58.00	27.34	3341.	3.691	13410.	49490.
65.00	59.00	28.34	3399.	3.694	14090.	52060.
65.00	60.00	29.34	3456.	3.699	14780.	54670.
65.00	61.00	30.34	3512.	3.705	15470.	57310.
65.00	62.00	31.34	3567.	3.711	16170.	59990.
66.00	43.00	12.36	2152.	3.783	4242.	16050.
66.00	44.00	13.36	2247.	3.705	4828.	17890.
66.00	45.00	14.36	2335.	3.652	5416.	19780.
66.00	46.00	15.36	2421.	3.608	6023.	21730.
66.00	47.00	16.36	2503.	3.575	6640.	23740.
66.00	48.00	17.36	2582.	3.550	7265.	25790.
66.00	49.00	18.36	2658.	3.533	7898.	27900.
66.00	50.00	19.36	2730.	3.518	8543.	30060.
66.00	51.00	20.36	2800.	3.514	9182.	32260.
66.00	52.00	21.36	2869.	3.509	9835.	34510.
66.00	53.00	22.36	2934.	3.507	10490.	36810.
66.00	54.00	23.36	2999.	3.508	11160.	39140.
66.00	55.00	24.36	3062.	3.517	11810.	41520.
66.00	56.00	25.36	3124.	3.521	12480.	43950.
66.00	57.00	26.36	3184.	3.526	13160.	46410.
66.00	58.00	27.36	3243.	3.532	13850.	48910.
66.00	59.00	28.35	3300.	3.539	14540.	51450.
66.00	60.00	29.35	3356.	3.546	15230.	54020.
66.00	61.00	30.35	3409.	3.556	15930.	56630.
66.00	62.00	31.35	3463.	3.565	16630.	59280.
67.00	43.00	12.37	2069.	3.556	4459.	15860.
67.00	44.00	13.37	2162.	3.495	5055.	17670.
67.00	45.00	14.37	2249.	3.453	5660.	19540.
67.00	46.00	15.37	2333.	3.418	6281.	21470.
67.00	47.00	16.37	2414.	3.394	6910.	23450.
67.00	48.00	17.37	2491.	3.377	7547.	25480.
67.00	49.00	18.37	2566.	3.365	8191.	27570.
67.00	50.00	19.37	2638.	3.359	8842.	29700.
67.00	51.00	20.37	2706.	3.353	9504.	31870.
67.00	52.00	21.37	2773.	3.353	10170.	34090.
67.00	53.00	22.37	2836.	3.358	10830.	36360.
67.00	54.00	23.37	2900.	3.362	11500.	38670.
67.00	55.00	24.37	2959.	3.373	12160.	41020.
67.00	56.00	25.37	3020.	3.379	12850.	43410.
67.00	57.00	26.37	3079.	3.387	13530.	45840.
67.00	58.00	27.37	3136.	3.395	14230.	48310.
67.00	59.00	28.37	3193.	3.405	14930.	50820.

EPA Export 08-07-2014:23:43:14

67.00	60.00	29.37	3248.	3.414	15630.	53360.
67.00	61.00	30.37	3302.	3.428	16330.	55990.
67.00	62.00	31.37	3355.	3.448	17040.	58770.
68.00	43.00	12.38	1983.	3.382	4631.	15660.
68.00	44.00	13.38	2071.	3.333	5234.	17450.
68.00	45.00	14.38	2157.	3.293	5859.	19300.
68.00	46.00	15.38	2240.	3.266	6491.	21200.
68.00	47.00	16.38	2318.	3.247	7132.	23150.
68.00	48.00	17.38	2394.	3.234	7780.	25160.
68.00	49.00	18.38	2469.	3.228	8433.	27220.
68.00	50.00	19.38	2539.	3.225	9093.	29320.
68.00	51.00	20.38	2606.	3.223	9765.	31470.
68.00	52.00	21.38	2672.	3.226	10440.	33670.
68.00	53.00	22.38	2737.	3.231	11110.	35910.
68.00	54.00	23.38	2798.	3.237	11800.	38180.
68.00	55.00	24.38	2855.	3.252	12460.	40500.
68.00	56.00	25.38	2915.	3.260	13150.	42860.
68.00	57.00	26.38	2973.	3.278	13840.	45380.
68.00	58.00	27.38	3030.	3.299	14540.	47970.
68.00	59.00	28.38	3086.	3.321	15240.	50620.
68.00	60.00	29.38	3141.	3.344	15940.	53310.
68.00	61.00	30.38	3195.	3.367	16650.	56050.
68.00	62.00	31.38	3248.	3.390	17350.	58830.
69.00	43.00	12.39	1890.	3.252	4754.	15460.
69.00	44.00	13.39	1979.	3.206	5373.	17220.
69.00	45.00	14.39	2062.	3.172	6004.	19050.
69.00	46.00	15.39	2143.	3.148	6647.	20930.
69.00	47.00	16.39	2222.	3.131	7301.	22860.
69.00	48.00	17.39	2296.	3.121	7959.	24840.
69.00	49.00	18.39	2368.	3.116	8623.	26870.
69.00	50.00	19.39	2437.	3.115	9293.	28950.
69.00	51.00	20.39	2504.	3.117	9968.	31070.
69.00	52.00	21.39	2567.	3.119	10660.	33230.
69.00	53.00	22.39	2630.	3.135	11340.	35560.
69.00	54.00	23.39	2694.	3.156	12030.	37950.
69.00	55.00	24.39	2751.	3.183	12690.	40390.
69.00	56.00	25.39	2810.	3.205	13380.	42890.
69.00	57.00	26.39	2868.	3.220	14080.	45430.
69.00	58.00	27.39	2925.	3.252	14770.	48030.
69.00	59.00	28.39	2981.	3.276	15470.	50670.
69.00	60.00	29.39	3036.	3.301	16170.	53370.
69.00	61.00	30.39	3089.	3.326	16870.	56110.
69.00	62.00	31.39	3142.	3.351	17570.	58890.
70.00	43.00	12.41	1795.	3.164	4821.	15250.
70.00	44.00	13.41	1882.	3.117	5453.	17000.
70.00	45.00	14.41	1964.	3.083	6096.	18790.
70.00	46.00	15.41	2043.	3.059	6749.	20650.
70.00	47.00	16.41	2119.	3.044	7409.	22550.
70.00	48.00	17.41	2193.	3.035	8076.	24510.
70.00	49.00	18.41	2264.	3.038	8748.	26580.
70.00	50.00	19.41	2332.	3.051	9423.	28750.
70.00	51.00	20.41	2399.	3.067	10100.	30980.
70.00	52.00	21.41	2463.	3.086	10780.	33260.
70.00	53.00	22.41	2525.	3.104	11470.	35600.
70.00	54.00	23.41	2587.	3.126	12150.	37990.
70.00	55.00	24.41	2643.	3.156	12810.	40440.
70.00	56.00	25.41	2702.	3.180	13500.	42930.
70.00	57.00	26.41	2759.	3.204	14190.	45480.
70.00	58.00	27.41	2816.	3.230	14890.	48080.
70.00	59.00	28.41	2871.	3.256	15580.	50720.
70.00	60.00	29.41	2928.	3.282	16280.	53420.
70.00	61.00	30.41	2982.	3.309	16980.	56160.
70.00	62.00	31.41	3036.	3.336	17670.	58950.
71.00	43.00	12.42	1696.	3.117	4826.	15040.
71.00	44.00	13.42	1779.	3.067	5465.	16760.
71.00	45.00	14.42	1861.	3.027	6124.	18540.
71.00	46.00	15.42	1939.	3.016	6782.	20450.
71.00	47.00	16.42	2014.	3.014	7446.	22450.
71.00	48.00	17.42	2087.	3.020	8113.	24500.
71.00	49.00	18.42	2157.	3.030	8782.	26610.
71.00	50.00	19.42	2225.	3.045	9454.	28790.
71.00	51.00	20.42	2293.	3.062	10130.	31020.
71.00	52.00	21.42	2357.	3.082	10810.	33310.
71.00	53.00	22.42	2419.	3.102	11490.	35640.
71.00	54.00	23.42	2480.	3.125	12170.	38040.

71.00	55.00	24.42	2536.	3.155	12830.	40480.
71.00	56.00	25.42	2596.	3.180	13520.	42980.
71.00	57.00	26.42	2654.	3.206	14200.	45530.
71.00	58.00	27.42	2711.	3.232	14890.	48130.
71.00	59.00	28.42	2767.	3.259	15580.	50780.
71.00	60.00	29.42	2821.	3.285	16280.	53480.
71.00	61.00	30.42	2875.	3.312	16970.	56220.
71.00	62.00	31.42	2928.	3.339	17670.	59010.
72.00	43.00	12.43	1592.	3.129	4762.	14900.
72.00	44.00	13.43	1675.	3.087	5407.	16690.
72.00	45.00	14.43	1757.	3.060	6064.	18560.
72.00	46.00	15.43	1833.	3.049	6718.	20490.
72.00	47.00	16.43	1909.	3.045	7382.	22480.
72.00	48.00	17.43	1981.	3.049	8046.	24530.
72.00	49.00	18.43	2051.	3.059	8713.	26650.
72.00	50.00	19.43	2121.	3.073	9380.	28830.
72.00	51.00	20.43	2187.	3.090	10050.	31060.
72.00	52.00	21.43	2251.	3.109	10720.	33350.
72.00	53.00	22.43	2314.	3.130	11400.	35690.
72.00	54.00	23.43	2374.	3.151	12080.	38080.
72.00	55.00	24.43	2431.	3.181	12740.	40530.
72.00	56.00	25.43	2491.	3.205	13420.	43030.
72.00	57.00	26.43	2549.	3.231	14110.	45580.
72.00	58.00	27.43	2606.	3.257	14800.	48180.
72.00	59.00	28.43	2662.	3.283	15490.	50830.
72.00	60.00	29.43	2716.	3.309	16180.	53530.
72.00	61.00	30.43	2770.	3.336	16870.	56280.
72.00	62.00	31.43	2823.	3.363	17560.	59070.
73.00	43.00	12.45	1483.	4.096	4550.	18630.
73.00	44.00	13.45	1570.	3.397	5241.	17810.
73.00	45.00	14.45	1652.	3.151	5898.	18590.
73.00	46.00	15.45	1728.	3.131	6552.	20520.
73.00	47.00	16.45	1803.	3.122	7211.	22510.
73.00	48.00	17.45	1876.	3.122	7870.	24570.
73.00	49.00	18.45	1946.	3.128	8532.	26690.
73.00	50.00	19.45	2015.	3.137	9202.	28860.
73.00	51.00	20.45	2082.	3.151	9871.	31100.
73.00	52.00	21.45	2147.	3.167	10540.	33390.
73.00	53.00	22.45	2210.	3.186	11220.	35730.
73.00	54.00	23.45	2270.	3.205	11900.	38130.
73.00	55.00	24.45	2328.	3.234	12550.	40580.
73.00	56.00	25.45	2385.	3.256	13230.	43080.
73.00	57.00	26.45	2443.	3.280	13910.	45630.
73.00	58.00	27.45	2500.	3.305	14600.	48230.
73.00	59.00	28.45	2557.	3.330	15280.	50890.
73.00	60.00	29.45	2610.	3.355	15970.	53590.
73.00	61.00	30.45	2664.	3.381	16660.	56330.
73.00	62.00	31.44	2717.	3.407	17350.	59130.
74.00	43.00	12.46	1367.	4.535	4129.	18720.
74.00	44.00	13.46	1459.	4.273	4877.	20840.
74.00	45.00	14.46	1546.	3.774	5608.	21160.
74.00	46.00	15.46	1625.	3.365	6284.	21140.
74.00	47.00	16.46	1700.	3.250	6937.	22550.
74.00	48.00	17.46	1772.	3.239	7596.	24600.
74.00	49.00	18.46	1842.	3.236	8258.	26720.
74.00	50.00	19.46	1910.	3.240	8921.	28900.
74.00	51.00	20.46	1977.	3.249	9585.	31140.
74.00	52.00	21.46	2041.	3.261	10250.	33430.
74.00	53.00	22.46	2105.	3.275	10930.	35780.
74.00	54.00	23.46	2166.	3.291	11600.	38180.
74.00	55.00	24.46	2221.	3.315	12260.	40620.
74.00	56.00	25.46	2279.	3.334	12930.	43130.
74.00	57.00	26.46	2337.	3.356	13610.	45680.
74.00	58.00	27.46	2393.	3.378	14290.	48280.
74.00	59.00	28.46	2449.	3.401	14980.	50940.
74.00	60.00	29.46	2505.	3.425	15660.	53640.
74.00	61.00	30.46	2559.	3.450	16350.	56390.
74.00	62.00	31.46	2611.	3.474	17040.	59180.
75.00	43.00	12.47	1250.	5.270	3570.	18820.
75.00	44.00	13.47	1344.	4.826	4338.	20940.
75.00	45.00	14.47	1432.	4.541	5095.	23140.
75.00	46.00	15.47	1517.	4.251	5840.	24830.
75.00	47.00	16.47	1595.	3.768	6547.	24670.
75.00	48.00	17.47	1669.	3.475	7218.	25080.
75.00	49.00	18.47	1739.	3.398	7875.	26760.

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EPA Export 08-07-2014:23:43:14

75.00	50.00	19.47	1805.	3.390	8537.	28940.
75.00	51.00	20.47	1871.	3.388	9201.	31180.
75.00	52.00	21.47	1937.	3.392	9867.	33470.
75.00	53.00	22.47	2000.	3.400	10530.	35820.
75.00	54.00	23.47	2060.	3.412	11200.	38220.
75.00	55.00	24.47	2118.	3.433	11850.	40670.
75.00	56.00	25.47	2177.	3.446	12530.	43180.
75.00	57.00	26.47	2233.	3.463	13210.	45730.
75.00	58.00	27.47	2290.	3.481	13880.	48340.
75.00	59.00	28.47	2346.	3.501	14560.	50990.
75.00	60.00	29.47	2400.	3.522	15250.	53700.
75.00	61.00	30.47	2454.	3.543	15930.	56450.
75.00	62.00	31.47	2507.	3.565	16620.	59240.
76.00	43.00	12.49	1145.	4.947	3032.	15000.
76.00	44.00	13.49		Weight too small		
76.00	44.00	13.49	1210.	4.890	3436.	16800.
76.00	45.00	14.49	1316.	5.250	4426.	23240.
76.00	46.00	15.49	1401.	4.913	5194.	25520.
76.00	47.00	16.48	1485.	4.681	5955.	27880.
76.00	48.00	17.48	1561.	4.261	6686.	28490.
76.00	49.00	18.48	1633.	3.908	7380.	28840.
76.00	50.00	19.48	1703.	3.664	8050.	29490.
76.00	51.00	20.48	1769.	3.584	8709.	31220.
76.00	52.00	21.48	1833.	3.576	9370.	33510.
76.00	53.00	22.48	1896.	3.573	10040.	35860.
76.00	54.00	23.48	1957.	3.575	10700.	38260.
76.00	55.00	24.48	2014.	3.587	11350.	40720.
76.00	56.00	25.48	2073.	3.596	12020.	43220.
76.00	57.00	26.48	2128.	3.607	12690.	45780.
76.00	58.00	27.48	2183.	3.620	13370.	48380.
76.00	59.00	28.48	2240.	3.633	14050.	51040.
76.00	60.00	29.48	2294.	3.649	14730.	53750.
76.00	61.00	30.48	2348.	3.666	15410.	56500.
76.00	62.00	31.48	2403.	3.685	16090.	59300.
77.00	43.00	12.50	1070.	5.433	2765.	15020.
77.00	44.00	13.50	1135.	5.314	3166.	16830.
77.00	45.00	14.50		Weight too small		
77.00	45.00	14.50	1196.	5.236	3571.	18700.
77.00	46.00	15.50	1285.	5.823	4402.	25630.
77.00	47.00	16.50	1368.	5.411	5173.	27990.
77.00	48.00	17.50	1447.	5.126	5935.	30420.
77.00	49.00	18.50	1522.	4.878	6681.	32590.
77.00	50.00	19.50	1596.	4.437	7412.	32880.
77.00	51.00	20.50	1664.	4.135	8105.	33520.
77.00	52.00	21.50	1730.	3.914	8774.	34340.
77.00	53.00	22.50	1793.	3.805	9437.	35910.
77.00	54.00	23.50	1854.	3.793	10100.	38310.
77.00	55.00	24.50	1911.	3.794	10740.	40760.
77.00	56.00	25.50	1970.	3.792	11410.	43270.
77.00	57.00	26.50	2028.	3.793	12080.	45830.
77.00	58.00	27.50	2083.	3.798	12760.	48440.
77.00	59.00	28.50	2138.	3.805	13430.	51100.
77.00	60.00	29.50	2192.	3.815	14100.	53800.
77.00	61.00	30.50	2244.	3.826	14780.	56550.
77.00	62.00	31.50	2295.	3.839	15460.	59350.
78.00	43.00	12.51	995.9	6.197	2428.	15050.
78.00	44.00	13.51	1060.	5.969	2823.	16850.
78.00	45.00	14.51	1121.	5.813	3221.	18720.
78.00	46.00	15.51		Weight too small		
78.00	46.00	15.51	1179.	5.711	3618.	20660.
78.00	47.00	16.51		Weight too small		
78.00	47.00	16.51	1237.	5.636	4022.	22670.
78.00	48.00	17.51	1333.	6.073	5030.	30540.
78.00	49.00	18.51	1409.	5.703	5794.	33050.
78.00	50.00	19.51	1484.	5.433	6553.	35610.
78.00	51.00	20.51	1555.	5.096	7303.	37200.
78.00	52.00	21.51	1623.	4.711	8026.	37810.
78.00	53.00	22.51	1688.	4.430	8721.	38640.
78.00	54.00	23.51	1750.	4.215	9396.	39600.
78.00	55.00	24.51	1808.	4.061	10050.	40810.
78.00	56.00	25.51	1866.	4.047	10700.	43320.
78.00	57.00	26.51	1921.	4.035	11370.	45880.
78.00	58.00	27.51	1978.	4.028	12040.	48490.
78.00	59.00	28.51	2033.	4.024	12710.	51150.
78.00	60.00	29.51	2088.	4.024	13380.	53850.

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78.00	61.00	30.51	2142.	4.027	14060.	56610.
78.00	62.00	31.51	2194.	4.032	14730.	59410.
79.00	43.00	12.52	923.6	7.316	2038.	14910.
79.00	44.00	13.52	985.4	6.995	2409.	16850.
79.00	45.00	14.52	1047.	6.682	2806.	18750.
79.00	46.00	15.52	1106.	6.468	3199.	20690.
79.00	47.00	16.52	1162.	6.313	3595.	22690.
79.00	48.00	17.52		Weight too small		
79.00	48.00	17.52	1217.	6.200	3994.	24760.
79.00	49.00	18.52		Weight too small		
79.00	49.00	18.52	1272.	6.103	4406.	26890.
79.00	50.00	19.52	1367.	6.461	5533.	35750.
79.00	51.00	20.52	1440.	6.091	6302.	38390.
79.00	52.00	21.52	1510.	5.819	7061.	41090.
79.00	53.00	22.52	1580.	5.427	7808.	42380.
79.00	54.00	23.52	1645.	5.064	8531.	43200.
79.00	55.00	24.52	1707.	4.786	9230.	44180.
79.00	56.00	25.52	1762.	4.574	9894.	45260.
79.00	57.00	26.52	1823.	4.426	10650.	47120.
79.00	58.00	27.52	1875.	4.327	11220.	48540.
79.00	59.00	28.52	1929.	4.308	11880.	51200.
79.00	60.00	29.52	1984.	4.293	12560.	53910.
79.00	61.00	30.52	2038.	4.283	13230.	56660.
79.00	62.00	31.52	2091.	4.277	13910.	59470.
80.00	43.00	12.54	860.7	8.851	1661.	14700.
80.00	44.00	13.54	917.9	8.400	1978.	16620.
80.00	45.00	14.54	975.0	8.014	2325.	18630.
80.00	46.00	15.54	1032.	7.655	2706.	20720.
80.00	47.00	16.54	1089.	7.318	3105.	22720.
80.00	48.00	17.54	1143.	7.088	3498.	24790.
80.00	49.00	18.54		Weight too small		
80.00	49.00	18.54	1196.	6.899	3901.	26920.
80.00	50.00	19.54		Weight too small		
80.00	50.00	19.54	1249.	6.763	4304.	29110.
80.00	51.00	20.54		Weight too small		
80.00	51.00	20.54	1299.	6.663	4706.	31350.
80.00	52.00	21.54	1398.	6.961	5925.	41240.
80.00	53.00	22.54	1467.	6.575	6694.	44010.
80.00	54.00	23.54	1533.	6.286	7451.	46840.
80.00	55.00	24.54	1598.	5.858	8198.	48020.
80.00	56.00	25.54	1656.	5.501	8909.	49010.
80.00	57.00	26.54	1716.	5.213	9615.	50120.
80.00	58.00	27.54	1774.	4.981	10300.	51320.
80.00	59.00	28.54	1829.	4.791	10980.	52580.
80.00	60.00	29.54	1882.	4.639	11630.	53960.
80.00	61.00	30.54	1935.	4.611	12300.	56720.
80.00	62.00	31.54	1987.	4.588	12970.	59520.
81.00	43.00	12.55	804.5	11.14	1301.	14490.
81.00	44.00	13.55	857.1	10.45	1567.	16380.
81.00	45.00	14.55	909.7	9.840	1865.	18360.
81.00	46.00	15.55	963.4	9.334	2190.	20440.
81.00	47.00	16.55	1016.	8.905	2539.	22610.
81.00	48.00	17.55	1071.	8.475	2929.	24820.
81.00	49.00	18.55	1123.	8.103	3326.	26950.
81.00	50.00	19.55	1175.	7.823	3725.	29140.
81.00	51.00	20.55		Weight too small		
81.00	51.00	20.55	1227.	7.597	4132.	31390.
81.00	52.00	21.55		Weight too small		
81.00	52.00	21.55	1277.	7.426	4537.	33690.
81.00	53.00	22.55		Weight too small		
81.00	53.00	22.55	1325.	7.294	4942.	36050.
81.00	54.00	23.55		Weight too small		
81.00	54.00	23.55	1372.	7.193	5348.	38460.
81.00	55.00	24.55	1485.	7.159	6970.	49890.
81.00	56.00	25.55	1547.	6.832	7734.	52830.
81.00	57.00	26.55	1607.	6.397	8458.	54110.
81.00	58.00	27.55	1668.	6.010	9191.	55240.
81.00	59.00	28.55	1727.	5.702	9904.	56470.
81.00	60.00	29.55	1783.	5.451	10600.	57780.
81.00	61.00	30.55	1837.	5.242	11280.	59140.
81.00	62.00	31.55	1889.	5.066	11950.	60550.
82.00	43.00	12.56	756.3	14.69	971.8	14270.
82.00	44.00	13.56	804.8	13.50	1195.	16130.
82.00	45.00	14.56	854.0	12.57	1439.	18080.
82.00	46.00	15.56	903.2	11.77	1710.	20130.

EPA Export 08-07-2014:23:43:14

82.00	47.00	16.56	951.4	11.12	2002.	22260.
82.00	48.00	17.56	1002.	10.49	2336.	24500.
82.00	49.00	18.56	1052.	9.964	2692.	26820.
82.00	50.00	19.56	1103.	9.481	3077.	29170.
82.00	51.00	20.56	1155.	9.030	3490.	31420.
82.00	52.00	21.56		Weight too small		
82.00	52.00	21.56	1204.	8.703	3875.	33720.
82.00	53.00	22.56		Weight too small		
82.00	53.00	22.56	1253.	8.422	4285.	36090.
82.00	54.00	23.56		Weight too small		
82.00	54.00	23.56	1301.	8.204	4693.	38500.
82.00	55.00	24.56		Weight too small		
82.00	55.00	24.56	1347.	8.033	5109.	40970.
82.00	56.00	25.56		Weight too small		
82.00	56.00	25.56	1392.	7.896	5500.	43490.
82.00	57.00	26.56	1495.	7.080	7110.	56020.
82.00	58.00	27.56	1557.	7.499	7879.	59090.
82.00	59.00	28.56	1615.	7.032	8619.	60610.
82.00	60.00	29.56	1674.	6.611	9359.	61870.
82.00	61.00	30.56	1731.	6.271	10080.	63210.
82.00	62.00	31.56	1786.	5.992	10790.	64620.
83.00	43.00	12.58	717.1	20.54	603.6	14040.
83.00	44.00	13.58	761.1	18.53	856.8	15870.
83.00	45.00	14.58	806.1	16.89	1054.	17800.
83.00	46.00	15.58	851.3	15.55	1274.	19810.
83.00	47.00	16.58	896.9	14.43	1518.	21920.
83.00	48.00	17.58	942.7	13.47	1790.	24110.
83.00	49.00	18.58	987.5	12.65	2086.	26390.
83.00	50.00	19.58	1035.	11.91	2416.	28770.
83.00	51.00	20.57	1083.	11.26	2774.	31240.
83.00	52.00	21.57	1132.	10.69	3159.	33760.
83.00	53.00	22.57	1180.	10.17	3553.	36120.
83.00	54.00	23.57		Weight too small		
83.00	54.00	23.57	1226.	9.752	3952.	38530.
83.00	55.00	24.57		Weight too small		
83.00	55.00	24.57	1273.	9.403	4361.	41000.
83.00	56.00	25.57		Weight too small		
83.00	56.00	25.57	1319.	9.122	4771.	43520.
83.00	57.00	26.57		Weight too small		
83.00	57.00	26.57	1364.	8.897	5181.	46100.
83.00	58.00	27.57		Weight too small		
83.00	58.00	27.57	1407.	8.714	5591.	48720.
83.00	59.00	28.57	1504.	8.717	7159.	62410.
83.00	60.00	29.57	1563.	8.277	7923.	65580.
83.00	61.00	30.57	1619.	7.788	8671.	67520.
83.00	62.00	31.57	1676.	7.319	9414.	68900.
84.00	43.00	12.59	686.1	31.57	436.7	13790.
84.00	44.00	13.59	725.4	27.51	566.9	15590.
84.00	45.00	14.59	766.7	24.28	720.5	17490.
84.00	46.00	15.59	808.1	21.78	894.1	19480.
84.00	47.00	16.59	849.7	19.78	1090.	21550.
84.00	48.00	17.59	891.8	18.13	1308.	23710.
84.00	49.00	18.59	931.4	16.80	1545.	25960.
84.00	50.00	19.59	974.3	15.62	1811.	28290.
84.00	51.00	20.59	1019.	14.62	2101.	30710.
84.00	52.00	21.59	1064.	13.72	2422.	33240.
84.00	53.00	22.59	1109.	12.92	2774.	35840.
84.00	54.00	23.59	1157.	12.18	3164.	38540.
84.00	55.00	24.59	1203.	11.52	3561.	41040.
84.00	56.00	25.59		Weight too small		
84.00	56.00	25.59	1247.	11.01	3958.	43560.
84.00	57.00	26.59		Weight too small		
84.00	57.00	26.59	1292.	10.58	4362.	46130.
84.00	58.00	27.59		Weight too small		
84.00	58.00	27.59	1336.	10.22	4771.	48760.
84.00	59.00	28.59		Weight too small		
84.00	59.00	28.59	1377.	9.922	5183.	51430.
84.00	60.00	29.59		Weight too small		
84.00	60.00	29.59	1419.	9.678	5595.	54150.
84.00	61.00	30.59	52.77	10.23	1109.	11340.
84.00	61.00	30.59	1461.	9.476	6007.	56920.
84.00	62.00	31.59	1568.	9.203	7857.	72310.
85.00	43.00	12.60	664.2	55.07	245.2	13500.
85.00	44.00	13.60	701.1	45.51	336.0	15290.
85.00	45.00	14.60	736.5	38.73	443.0	17160.

85.00	46.00	15.60	774.1	33.46	571.2	19110.
85.00	47.00	16.60	811.6	29.53	716.6	21160.
85.00	48.00	17.60	850.5	26.20	888.9	23290.
85.00	49.00	18.60	889.4	23.63	1080.	25510.
85.00	50.00	19.60	926.0	21.60	1287.	27800.
85.00	51.00	20.60	966.0	19.82	1523.	30190.
85.00	52.00	21.60	1006.	18.33	1782.	32660.
85.00	53.00	22.60	1047.	17.05	2065.	35210.
85.00	54.00	23.60	1089.	15.95	2374.	37860.
85.00	55.00	24.60	1132.	14.94	2718.	40610.
85.00	56.00	25.60	1175.	14.07	3088.	43430.
85.00	57.00	26.60	1219.	13.26	3482.	46170.
85.00	58.00	27.60		Weight too small		
85.00	58.00	27.60	1262.	12.58	3879.	48790.
85.00	59.00	28.60		Weight too small		
85.00	59.00	28.60	1302.	12.03	4278.	51460.
85.00	60.00	29.60		Weight too small		
85.00	60.00	29.60	1344.	11.57	4682.	54180.
85.00	61.00	30.60		Weight too small		
85.00	61.00	30.60	1387.	11.15	5107.	56950.
85.00	62.00	31.60		Weight too small		
85.00	62.00	31.60	1426.	10.86	5502.	59770.
86.00	43.00	12.61	649.3	126.9	103.7	13160.
86.00	44.00	13.61	682.9	91.36	163.3	14920.
86.00	45.00	14.61	714.6	71.86	233.3	16770.
86.00	46.00	15.61	748.0	58.97	317.3	18710.
86.00	47.00	16.61	782.5	49.02	422.8	20720.
86.00	48.00	17.61	816.8	42.01	543.3	22820.
86.00	49.00	18.61	851.7	36.61	683.1	25010.
86.00	50.00	19.61	885.4	32.39	841.9	27270.
86.00	51.00	20.61	920.2	29.16	1016.	29620.
86.00	52.00	21.61	957.9	26.16	1226.	32060.
86.00	53.00	22.61	995.3	23.82	1452.	34580.
86.00	54.00	23.61	1033.	21.86	1701.	37180.
86.00	55.00	24.61	1072.	20.20	1973.	39860.
86.00	56.00	25.61	1111.	18.78	2270.	42630.
86.00	57.00	26.61	1151.	17.53	2595.	45500.
86.00	58.00	27.61	1192.	16.40	2954.	48460.
86.00	59.00	28.61	1231.	15.42	3340.	51490.
86.00	60.00	29.61		Weight too small		
86.00	60.00	29.61	1273.	14.50	3740.	54220.
86.00	61.00	30.61		Weight too small		
86.00	61.00	30.61	1314.	13.77	4140.	56990.
86.00	62.00	31.61		Weight too small		
86.00	62.00	31.61	1354.	13.17	4541.	59810.
87.00	43.00	12.63	643.0	611.8	20.88	12780.
87.00	44.00	13.63	673.5	289.8	50.03	14500.
87.00	45.00	14.63	703.4	184.5	88.40	16310.
87.00	46.00	15.63	733.3	131.7	138.3	18210.
87.00	47.00	16.63	764.2	98.39	205.4	20210.
87.00	48.00	17.63	794.6	79.02	282.2	22300.
87.00	49.00	18.63	825.6	65.24	374.8	24450.
87.00	50.00	19.63	857.7	54.69	488.0	26690.
87.00	51.00	20.63	888.6	46.95	617.8	29010.
87.00	52.00	21.63	920.4	41.36	759.4	31400.
87.00	53.00	22.63	953.9	36.53	927.6	33890.
87.00	54.00	23.63	988.2	32.62	1117.	36450.
87.00	55.00	24.63	1023.	29.44	1328.	39100.
87.00	56.00	25.63	1060.	26.62	1571.	41830.
87.00	57.00	26.63	1096.	24.39	1830.	44630.
87.00	58.00	27.63	1133.	22.50	2112.	47520.
87.00	59.00	28.63	1170.	20.88	2419.	50510.
87.00	60.00	29.63		Only 1 intersection		
87.00	61.00	30.63		Only 1 intersection		
87.00	62.00	31.63		Weight too small		
87.00	62.00	31.63		Only 1 intersection		
88.00	43.00	12.64		Disturbing moment < 0		
88.00	44.00	13.64	673.0	9047.	1.551	14030.
88.00	45.00	14.64	700.2	1373.	11.50	15800.
88.00	46.00	15.64	726.8	588.4	30.01	17660.
88.00	47.00	16.64	754.7	307.7	63.73	19610.
88.00	48.00	17.64	782.3	204.0	106.2	21650.
88.00	49.00	18.64	808.8	148.3	160.4	23780.
88.00	50.00	19.64	835.2	115.0	226.0	25990.
88.00	51.00	20.64	864.5	90.69	312.1	28300.

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EPA Export 08-07-2014:23:43:14

88.00	52.00	21.64	893.6	74.77	410.2	30670.
88.00	53.00	22.64	923.4	62.88	526.7	33120.
88.00	54.00	23.64	952.7	54.44	654.8	35640.
88.00	55.00	24.64	983.8	47.33	808.3	38260.
88.00	56.00	25.64	Only 1 intersection			
88.00	57.00	26.64	Only 1 intersection			
88.00	58.00	27.64	Only 1 intersection			
88.00	59.00	28.64	Only 1 intersection			
88.00	60.00	29.64	Only 1 intersection			
88.00	61.00	30.64	Only 1 intersection			
88.00	62.00	31.64	Only 1 intersection			
89.00	43.00	12.65	650.0	572500.	0.02181	12490.
89.00	44.00	13.65	677.1	237200.	0.05891	13970.
89.00	45.00	14.65	Disturbing moment < 0			
89.00	46.00	15.65	Disturbing moment < 0			
89.00	47.00	16.65	752.1	7623.	2.483	18930.
89.00	48.00	17.65	776.9	1533.	13.65	20920.
89.00	49.00	18.65	801.1	689.7	33.35	23000.
89.00	50.00	19.65	826.9	369.3	68.16	25170.
89.00	51.00	20.65	852.4	245.5	111.7	27430.
89.00	52.00	21.65	Only 1 intersection			
89.00	53.00	22.65	Only 1 intersection			
89.00	54.00	23.65	Only 1 intersection			
89.00	55.00	24.65	Only 1 intersection			
89.00	56.00	25.65	Only 1 intersection			
89.00	57.00	26.65	Only 1 intersection			
89.00	58.00	27.65	Only 1 intersection			
89.00	59.00	28.65	Only 1 intersection			
89.00	60.00	29.65	Only 1 intersection			
89.00	61.00	30.65	Only 1 intersection			
89.00	62.00	31.65	Only 1 intersection			
90.00	43.00	12.67	Disturbing moment < 0			
90.00	44.00	13.67	Disturbing moment < 0			
90.00	45.00	14.67	Disturbing moment < 0			
90.00	46.00	15.67	Disturbing moment < 0			
90.00	47.00	16.67	Disturbing moment < 0			
90.00	48.00	17.67	Disturbing moment < 0			
90.00	49.00	18.67	Only 1 intersection			
90.00	50.00	19.67	Only 1 intersection			
90.00	51.00	20.67	Only 1 intersection			
90.00	52.00	21.67	Only 1 intersection			
90.00	53.00	22.67	Only 1 intersection			
90.00	54.00	23.66	Only 1 intersection			
90.00	55.00	24.66	Only 1 intersection			
90.00	56.00	25.66	Only 1 intersection			
90.00	57.00	26.66	Only 1 intersection			
90.00	58.00	27.66	Only 1 intersection			
90.00	59.00	28.66	Only 1 intersection			
90.00	60.00	29.66	Only 1 intersection			
90.00	61.00	30.66	Only 1 intersection			
90.00	62.00	31.66	Only 1 intersection			
91.00	43.00	12.68	Disturbing moment < 0			
91.00	44.00	13.68	Disturbing moment < 0			
91.00	45.00	14.68	Disturbing moment < 0			
91.00	46.00	15.68	Only 1 intersection			
91.00	47.00	16.68	Only 1 intersection			
91.00	48.00	17.68	Only 1 intersection			
91.00	49.00	18.68	Only 1 intersection			
91.00	50.00	19.68	Only 1 intersection			
91.00	51.00	20.68	Only 1 intersection			
91.00	52.00	21.68	Only 1 intersection			
91.00	53.00	22.68	Only 1 intersection			
91.00	54.00	23.68	Only 1 intersection			
91.00	55.00	24.68	Only 1 intersection			
91.00	56.00	25.68	Only 1 intersection			
91.00	57.00	26.68	Only 1 intersection			
91.00	58.00	27.68	Only 1 intersection			
91.00	59.00	28.68	Only 1 intersection			
91.00	60.00	29.68	Only 1 intersection			
91.00	61.00	30.68	Only 1 intersection			
91.00	62.00	31.68	Only 1 intersection			
92.00	43.00	12.69	Only 1 intersection			
92.00	44.00	13.69	Only 1 intersection			
92.00	45.00	14.69	Only 1 intersection			
92.00	46.00	15.69	Only 1 intersection			

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92.00	47.00	16.69	Only 1 intersection
92.00	48.00	17.69	Only 1 intersection
92.00	49.00	18.69	Only 1 intersection
92.00	50.00	19.69	Only 1 intersection
92.00	51.00	20.69	Only 1 intersection
92.00	52.00	21.69	Only 1 intersection
92.00	53.00	22.69	Only 1 intersection
92.00	54.00	23.69	Only 1 intersection
92.00	55.00	24.69	Only 1 intersection
92.00	56.00	25.69	Only 1 intersection
92.00	57.00	26.69	Only 1 intersection
92.00	58.00	27.69	Only 1 intersection
92.00	59.00	28.69	Only 1 intersection
92.00	60.00	29.69	Only 1 intersection
92.00	61.00	30.69	Only 1 intersection
92.00	62.00	31.69	Only 1 intersection
93.00	43.00	12.70	Only 1 intersection
93.00	44.00	13.70	Only 1 intersection
93.00	45.00	14.70	Only 1 intersection
93.00	46.00	15.70	Only 1 intersection
93.00	47.00	16.70	Only 1 intersection
93.00	48.00	17.70	Only 1 intersection
93.00	49.00	18.70	Only 1 intersection
93.00	50.00	19.70	Only 1 intersection
93.00	51.00	20.70	Only 1 intersection
93.00	52.00	21.70	Only 1 intersection
93.00	53.00	22.70	Only 1 intersection
93.00	54.00	23.70	Only 1 intersection
93.00	55.00	24.70	Only 1 intersection
93.00	56.00	25.70	Only 1 intersection
93.00	57.00	26.70	Only 1 intersection
93.00	58.00	27.70	Only 1 intersection
93.00	59.00	28.70	Only 1 intersection
93.00	60.00	29.70	Only 1 intersection
93.00	61.00	30.70	Only 1 intersection
93.00	62.00	31.70	Only 1 intersection
94.00	43.00	12.72	Only 1 intersection
94.00	44.00	13.72	Only 1 intersection
94.00	45.00	14.72	Only 1 intersection
94.00	46.00	15.72	Only 1 intersection
94.00	47.00	16.72	Only 1 intersection
94.00	48.00	17.72	Only 1 intersection
94.00	49.00	18.72	Only 1 intersection
94.00	50.00	19.72	Only 1 intersection
94.00	51.00	20.72	Only 1 intersection
94.00	52.00	21.72	Only 1 intersection
94.00	53.00	22.72	Only 1 intersection
94.00	54.00	23.72	Only 1 intersection
94.00	55.00	24.72	Only 1 intersection
94.00	56.00	25.72	Only 1 intersection
94.00	57.00	26.72	Only 1 intersection
94.00	58.00	27.72	Only 1 intersection
94.00	59.00	28.72	Only 1 intersection
94.00	60.00	29.72	Only 1 intersection
94.00	61.00	30.72	Only 1 intersection
94.00	62.00	31.72	Only 1 intersection
95.00	43.00	12.73	Only 1 intersection
95.00	44.00	13.73	Only 1 intersection
95.00	45.00	14.73	Only 1 intersection
95.00	46.00	15.73	Only 1 intersection
95.00	47.00	16.73	Only 1 intersection
95.00	48.00	17.73	Only 1 intersection
95.00	49.00	18.73	Only 1 intersection
95.00	50.00	19.73	Only 1 intersection
95.00	51.00	20.73	Only 1 intersection
95.00	52.00	21.73	Only 1 intersection
95.00	53.00	22.73	Only 1 intersection
95.00	54.00	23.73	Only 1 intersection
95.00	55.00	24.73	Only 1 intersection
95.00	56.00	25.73	Only 1 intersection
95.00	57.00	26.73	Only 1 intersection
95.00	58.00	27.73	Only 1 intersection
95.00	59.00	28.73	Only 1 intersection
95.00	60.00	29.73	Only 1 intersection
95.00	61.00	30.73	Only 1 intersection

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95.00	62.00	31.73	Only 1 intersection
96.00	43.00	12.74	Only 1 intersection
96.00	44.00	13.74	Only 1 intersection
96.00	45.00	14.74	Only 1 intersection
96.00	46.00	15.74	Only 1 intersection
96.00	47.00	16.74	Only 1 intersection
96.00	48.00	17.74	Only 1 intersection
96.00	49.00	18.74	Only 1 intersection
96.00	50.00	19.74	Only 1 intersection
96.00	51.00	20.74	Only 1 intersection
96.00	52.00	21.74	Only 1 intersection
96.00	53.00	22.74	Only 1 intersection
96.00	54.00	23.74	Only 1 intersection
96.00	55.00	24.74	Only 1 intersection
96.00	56.00	25.74	Only 1 intersection
96.00	57.00	26.74	Only 1 intersection
96.00	58.00	27.74	Only 1 intersection
96.00	59.00	28.74	Only 1 intersection
96.00	60.00	29.74	Only 1 intersection
96.00	61.00	30.74	Only 1 intersection
96.00	62.00	31.74	Only 1 intersection
97.00	43.00	12.76	Only 1 intersection
97.00	44.00	13.76	Only 1 intersection
97.00	45.00	14.76	Only 1 intersection
97.00	46.00	15.76	Only 1 intersection
97.00	47.00	16.76	Only 1 intersection
97.00	48.00	17.76	Only 1 intersection
97.00	49.00	18.76	Only 1 intersection
97.00	50.00	19.76	Only 1 intersection
97.00	51.00	20.76	Only 1 intersection
97.00	52.00	21.76	Only 1 intersection
97.00	53.00	22.76	Only 1 intersection
97.00	54.00	23.76	Only 1 intersection
97.00	55.00	24.76	Only 1 intersection
97.00	56.00	25.76	Only 1 intersection
97.00	57.00	26.76	Only 1 intersection
97.00	58.00	27.75	Only 1 intersection
97.00	59.00	28.75	Only 1 intersection
97.00	60.00	29.75	Only 1 intersection
97.00	61.00	30.75	Only 1 intersection
97.00	62.00	31.75	Only 1 intersection
98.00	43.00	12.77	Only 1 intersection
98.00	44.00	13.77	Only 1 intersection
98.00	45.00	14.77	Only 1 intersection
98.00	46.00	15.77	Only 1 intersection
98.00	47.00	16.77	Only 1 intersection
98.00	48.00	17.77	Only 1 intersection
98.00	49.00	18.77	Only 1 intersection
98.00	50.00	19.77	Only 1 intersection
98.00	51.00	20.77	Only 1 intersection
98.00	52.00	21.77	Only 1 intersection
98.00	53.00	22.77	Only 1 intersection
98.00	54.00	23.77	Only 1 intersection
98.00	55.00	24.77	Only 1 intersection
98.00	56.00	25.77	Only 1 intersection
98.00	57.00	26.77	Only 1 intersection
98.00	58.00	27.77	Only 1 intersection
98.00	59.00	28.77	Only 1 intersection
98.00	60.00	29.77	Only 1 intersection
98.00	61.00	30.77	Only 1 intersection
98.00	62.00	31.77	Only 1 intersection
99.00	43.00	12.78	Only 1 intersection
99.00	44.00	13.78	Only 1 intersection
99.00	45.00	14.78	Only 1 intersection
99.00	46.00	15.78	Only 1 intersection
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99.00	49.00	18.78	Only 1 intersection
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99.00	53.00	22.78	Only 1 intersection
99.00	54.00	23.78	Only 1 intersection
99.00	55.00	24.78	Only 1 intersection
99.00	56.00	25.78	Only 1 intersection

99.00	57.00	26.78	Only 1 intersection
99.00	58.00	27.78	Only 1 intersection
99.00	59.00	28.78	Only 1 intersection
99.00	60.00	29.78	Only 1 intersection
99.00	61.00	30.78	Only 1 intersection
99.00	62.00	31.78	Only 1 intersection

WORST CASE : WATER CASE 1 OF 1

Centre at (71.00,47.00) Radius 16.42m
Iterations: 5 Horiz acceleration (kg): .0
Net vertical force [kN]: .0 Slip weight [kN] 2014.
Net horiz force [kN]: 0.02716 Disturbing moment [kN m]: 7446.
Inclination of interslice forces [°]: -14.39 Restoring moment [kN m]: 22450.

Factor of Safety: 3.014

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	55.91	40.53	-5.151	.0	.0	.0
2	56.14	40.01	38.15E-6	-0.05320	0.2097	.0
3	56.76	38.82	11.68	1.575	8.540	6.820
4	57.47	37.69	22.79	5.271	28.03	25.97
5	57.96	37.02	29.39	5.964	33.00	43.20
6	58.84	35.97	39.66	9.787	55.15	78.67
7	59.80	34.99	49.15	16.30	92.06	120.8
8	60.70	34.21	39.38	22.31	126.2	77.55
9	60.90	34.05	35.97	23.89	135.2	64.69
10	61.00	33.98	34.24	24.75	140.1	58.63
11	62.31	33.07	42.70	36.29	205.5	91.18
12	63.70	32.29	49.81	48.18	272.9	124.1
13	64.00	32.15	51.12	50.05	283.5	130.7
14	65.47	31.54	56.52	55.88	316.6	159.7
15	67.00	31.07	60.43	60.04	340.2	182.6
16	69.20	30.68	57.52	61.05	346.0	165.4
17	71.25	30.58	51.00	56.37	319.5	130.1
18	73.29	30.74	41.94	46.90	265.9	87.95
19	75.30	31.15	30.47	34.02	193.0	46.43
20	76.98	31.71	15.94	21.69	123.1	12.70
21	78.59	32.44	-76.29E-6	9.887	56.18	.0
22	79.60	33.01	-11.11	3.370	19.18	.0
23	80.20	33.40	-15.00	.0	0.02716	.0

Slice Strength Parameters

No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	19.07E-6	0.6646	0.4848	1.715
2	3.000	.0	5.040	7.474	10.09	4.009
3	3.000	.0	17.24	17.55	23.08	4.009
4	40.00	.0	26.09	17.96	14.16	33.31
5	40.00	.0	34.53	45.95	43.99	54.74
6	40.00	.0	44.41	68.43	69.76	54.74
7	55.00	.0	44.26	78.55	77.18	65.42
8	55.00	.0	37.68	20.36	20.28	14.04
9	55.00	.0	35.11	10.96	10.98	6.955
10	55.00	.0	38.47	156.9	156.7	87.62
11	55.00	.0	46.26	192.3	190.4	87.62
12	55.00	.0	50.47	37.74	36.91	18.33
13	55.00	.0	53.82	162.2	157.2	87.71
14	55.00	.0	58.48	182.1	177.1	87.71
15	55.00	.0	58.98	263.5	259.4	122.9
16	55.00	.0	54.26	226.4	229.5	112.8
17	55.00	.0	46.47	197.4	210.4	112.8
18	55.00	.0	36.21	156.4	180.5	112.8
19	55.00	.0	23.21	96.30	125.1	97.33
20	55.00	.0	7.970	57.39	90.69	97.33
21	55.00	.0	.0	15.84	37.70	63.76
22	55.00	.0	.0	2.219	15.08	39.38

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0

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2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0
22	.0	.0	.0	.0

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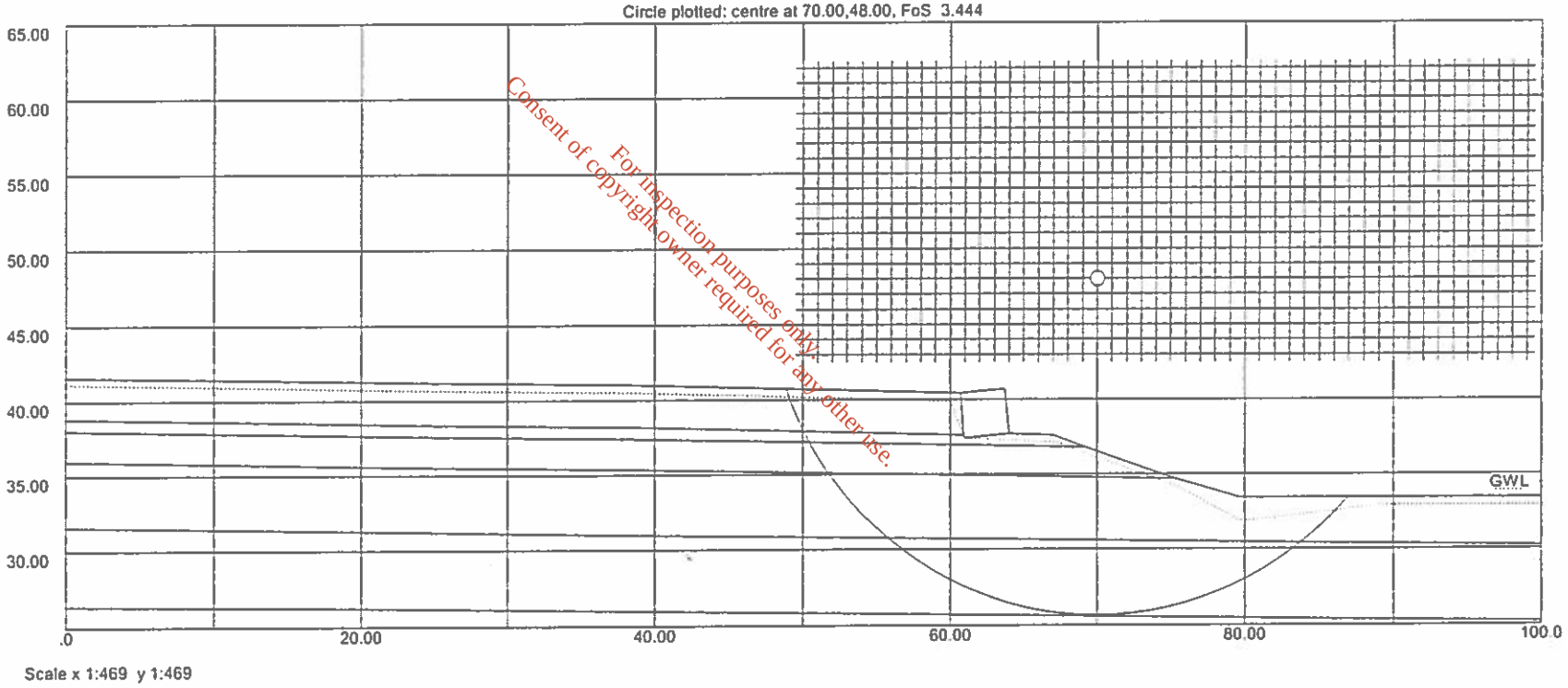
Corrib Gas Terminal

Maximum Minerial Soil Cut Slope Stability

Job No.	Sheet No.	Rev.
c1157	4A: Rev 14:01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	08-Dec-2003	Stability Max Minerial Cut No8.slc	



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Notes
Maximum Minerial Soil Cut height slope stability for Gabion walls
Terminal Fill at 33.4mOD
Undrained Analysis (Short Term)
Failure Tangent to Non Intact / Intact Rock Surface

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 50
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 100

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gabion Fill	15.00	15.00	Undrained	.0	100.0
2	Peat (Undrained)	11.00	11.00	Undrained	.0	3.000
3	Clay (Undrained)	18.00	18.00	Undrained	.0	40.00
4	Upper Sand (Undrain	19.00	19.00	Undrained	.0	40.00
5	Lower Sand (Undrain	19.00	19.00	Undrained	.0	55.00
6	Non Intact Rock (Un	20.00	20.00	Undrained	.0	75.00
7	Rock (Undrained)	22.00	22.00	Undrained	.0	100.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	24.00	38.00	60.00	60.70	60.90	61.00
1	1	41.60	41.20	41.00	.	40.40	.	.
2	2	41.60	41.20	41.00	.	40.40	37.60	37.40
3	3	38.80	38.40	38.20	.	.	37.60	37.40
4	4	38.00	37.60	37.40	.	.	.	.
5	5	36.00	35.60	35.40	.	.	.	.
6	6	31.60	31.20	31.00	.	.	.	.
7	7	26.40	26.20	26.00	.	.	.	.
GWL1	-	41.10	40.70	40.50	39.90	.	.	37.40

Stratum	Material	X -->						
		63.70	64.00	67.00	67.37	69.20	75.30	79.60
1	1	40.70	37.70	37.60	.	36.80	34.70	33.40
2	2	.	37.70	37.60	.	36.80	34.70	33.40
3	3	.	37.70	37.60	.	36.80	34.70	33.40
4	4	.	.	.	.	36.80	34.70	33.40
5	5	.	.	.	.	.	34.70	33.40
6	6	.	.	.	.	.	.	.
7	7	.	.	.	.	.	.	.
GWL1	-	.	.	.	37.10	.	34.20	.

Stratum	Material	X -->			
		79.60	80.60	89.00	100.0
1	1	.	.	.	33.40
2	2	.	.	.	33.40
3	3	.	.	.	33.40
4	4	.	.	.	33.40
5	5	.	.	.	33.40
6	6	.	.	.	30.20
7	7	.	.	.	25.20
GWL1	-	31.90	31.90	32.90	32.90

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Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 50.00 y = 43.00
Centres on grid: 50 in x direction at 1.00m spacing
20 in y direction at 1.00m spacing
All circles tangent to stratum no. 7

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
50.00	43.00	17.15	6508.	22.88	2137.	48880.
50.00	44.00	18.15	6738.	19.47	2723.	53030.
50.00	45.00	19.15	6961.	17.25	3311.	57130.
50.00	46.00	20.15	7172.	15.47	3964.	61320.
50.00	47.00	21.15	7365.	14.07	4661.	65600.
50.00	48.00	22.15	7559.	12.98	5391.	69980.
50.00	49.00	23.15	7744.	12.08	6166.	74460.
50.00	50.00	24.15	7927.	11.34	6969.	79040.
50.00	51.00	25.15	8102.	10.72	7810.	83690.
50.00	52.00	26.15	8272.	10.19	8677.	88440.
50.00	53.00	27.15	8431.	9.752	9562.	93250.
50.00	54.00	28.15	8592.	9.359	10490.	98150.
50.00	55.00	29.15	8747.	9.015	11440.	103100.
50.00	56.00	30.15	8899.	8.713	12420.	108200.
50.00	57.00	31.15	9046.	8.440	13430.	113300.
50.00	58.00	32.15	9190.	8.203	14450.	118500.
50.00	59.00	33.15	9329.	7.993	15490.	123800.
50.00	60.00	34.15	9466.	7.802	16560.	129200.
50.00	61.00	35.15	9600.	7.627	17650.	134600.
50.00	62.00	36.15	9738.	7.468	18760.	140100.
51.00	43.00	17.16	6480.	18.93	2581.	48860.
51.00	44.00	18.16	6705.	16.55	3193.	52840.
51.00	45.00	19.16	6919.	14.73	3863.	56920.
51.00	46.00	20.16	7128.	13.36	4573.	61100.
51.00	47.00	21.16	7317.	12.26	5330.	65370.
51.00	48.00	22.16	7511.	11.40	6118.	69750.
51.00	49.00	23.16	7696.	10.69	6946.	74220.
51.00	50.00	24.16	7875.	10.10	7801.	78780.
51.00	51.00	25.16	8048.	9.599	8691.	83420.
51.00	52.00	26.16	8214.	9.171	9612.	88150.
51.00	53.00	27.16	8376.	8.801	10560.	92960.
51.00	54.00	28.16	8523.	8.478	11540.	97820.
51.00	55.00	29.16	8674.	8.197	12540.	102800.
51.00	56.00	30.16	8823.	7.949	13570.	107800.
51.00	57.00	31.16	8967.	7.729	14610.	112900.
51.00	58.00	32.16	9119.	7.540	15670.	118200.
51.00	59.00	33.16	9258.	7.361	16770.	123400.
51.00	60.00	34.16	9394.	7.203	17870.	128700.
51.00	61.00	35.16	9526.	7.062	19000.	134200.
51.00	62.00	36.16	9656.	6.932	20140.	139600.
52.00	43.00	17.18	6446.	15.94	3054.	48690.
52.00	44.00	18.18	6668.	14.09	3738.	52660.
52.00	45.00	19.18	6879.	12.69	4471.	56720.
52.00	46.00	20.17	7074.	11.62	5239.	60880.
52.00	47.00	21.17	7268.	10.77	6051.	65150.
52.00	48.00	22.17	7457.	10.09	6892.	69520.
52.00	49.00	23.17	7639.	9.520	7770.	73970.
52.00	50.00	24.17	7814.	9.043	8682.	78520.
52.00	51.00	25.17	7983.	8.638	9625.	83140.
52.00	52.00	26.17	8147.	8.291	10600.	87850.
52.00	53.00	27.17	8306.	7.990	11590.	92640.
52.00	54.00	28.17	8451.	7.724	12620.	97500.
52.00	55.00	29.17	8607.	7.500	13660.	102500.
52.00	56.00	30.17	8754.	7.297	14730.	107500.
52.00	57.00	31.17	8897.	7.116	15820.	112600.
52.00	58.00	32.17	9037.	6.955	16930.	117800.
52.00	59.00	33.17	9173.	6.810	18060.	123000.

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Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No. c1157 | Sheet No. AA:Run14:04 | Rev.

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Date Stability Max Mineral Cut Slope | Checked

52.00	60.00	34.17	9307.	6.677	19220.	128300.
52.00	61.00	35.17	9439.	6.556	20390.	133700.
52.00	62.00	36.17	9572.	6.450	21570.	139100.
53.00	43.00	17.19	6405.	13.55	3580.	48510.
53.00	44.00	18.19	6618.	12.12	4328.	52460.
53.00	45.00	19.19	6823.	11.05	5115.	56520.
53.00	46.00	20.19	7022.	10.23	5930.	60680.
53.00	47.00	21.19	7216.	9.535	6811.	64940.
53.00	48.00	22.19	7399.	8.987	7710.	69290.
53.00	49.00	23.19	7575.	8.530	8643.	73720.
53.00	50.00	24.19	7746.	8.145	9607.	78250.
53.00	51.00	25.19	7916.	7.826	10590.	82870.
53.00	52.00	26.19	8079.	7.543	11610.	87560.
53.00	53.00	27.19	8236.	7.298	12650.	92340.
53.00	54.00	28.19	8380.	7.080	13730.	97180.
53.00	55.00	29.19	8529.	6.892	14810.	102100.
53.00	56.00	30.19	8674.	6.727	15920.	107100.
53.00	57.00	31.19	8817.	6.578	17060.	112200.
53.00	58.00	32.19	8956.	6.445	18210.	117400.
53.00	59.00	33.19	9091.	6.323	19380.	122600.
53.00	60.00	34.19	9223.	6.214	20570.	127900.
53.00	61.00	35.19	9353.	6.114	21780.	133100.
53.00	62.00	36.19	9476.	6.026	22990.	138500.
54.00	43.00	17.20	6352.	11.63	4157.	48330.
54.00	44.00	18.20	6566.	10.57	4948.	52280.
54.00	45.00	19.20	6772.	9.712	5800.	56330.
54.00	46.00	20.20	6964.	9.055	6678.	60480.
54.00	47.00	21.20	7153.	8.513	7603.	64720.
54.00	48.00	22.20	7333.	8.071	8556.	69050.
54.00	49.00	23.20	7514.	7.702	9541.	73490.
54.00	50.00	24.20	7683.	7.391	10550.	78000.
54.00	51.00	25.20	7846.	7.126	11590.	82590.
54.00	52.00	26.20	8003.	6.897	12650.	87270.
54.00	53.00	27.20	8157.	6.698	13740.	92020.
54.00	54.00	28.20	8309.	6.522	14850.	96860.
54.00	55.00	29.20	8447.	6.363	15990.	101800.
54.00	56.00	30.20	8591.	6.225	17150.	106700.
54.00	57.00	31.20	8732.	6.101	18320.	111800.
54.00	58.00	32.20	8869.	5.991	19510.	116900.
54.00	59.00	33.20	9003.	5.892	20710.	122000.
54.00	60.00	34.20	9131.	5.804	21930.	127300.
54.00	61.00	35.20	9260.	5.722	23170.	132600.
54.00	62.00	36.20	9386.	5.648	24420.	137900.
55.00	43.00	17.21	6303.	10.14	4750.	48170.
55.00	44.00	18.21	6513.	9.280	5615.	52110.
55.00	45.00	19.21	6714.	8.595	6532.	56150.
55.00	46.00	20.21	6907.	8.094	7448.	60280.
55.00	47.00	21.21	7093.	7.654	8428.	64510.
55.00	48.00	22.21	7268.	7.303	9424.	68820.
55.00	49.00	23.21	7440.	7.004	10460.	73230.
55.00	50.00	24.21	7607.	6.752	11510.	77730.
55.00	51.00	25.21	7768.	6.537	12590.	82310.
55.00	52.00	26.21	7928.	6.340	13720.	86980.
55.00	53.00	27.21	8071.	6.171	14860.	91700.
55.00	54.00	28.21	8219.	6.026	16010.	96500.
55.00	55.00	29.21	8362.	5.899	17180.	101400.
55.00	56.00	30.21	8503.	5.786	18370.	106300.
55.00	57.00	31.21	8638.	5.686	19570.	111300.
55.00	58.00	32.21	8774.	5.595	20800.	116400.
55.00	59.00	33.21	8907.	5.513	22040.	121500.
55.00	60.00	34.21	9037.	5.440	23290.	126700.
55.00	61.00	35.21	9164.	5.373	24560.	132000.
55.00	62.00	36.21	9288.	5.313	25850.	137300.
56.00	43.00	17.23	6248.	8.920	5380.	47990.
56.00	44.00	18.23	6455.	8.241	6301.	51930.
56.00	45.00	19.23	6649.	7.718	7250.	55950.
56.00	46.00	20.23	6838.	7.283	8248.	60070.
56.00	47.00	21.23	7020.	6.936	9269.	64290.
56.00	48.00	22.23	7189.	6.636	10330.	68580.
56.00	49.00	23.23	7360.	6.392	11420.	72980.
56.00	50.00	24.23	7521.	6.189	12510.	77450.
56.00	51.00	25.23	7681.	6.011	13640.	82020.
56.00	52.00	26.23	7836.	5.856	14790.	86630.
56.00	53.00	27.23	7985.	5.724	15950.	91320.
56.00	54.00	28.23	8134.	5.599	17160.	96080.

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ARUP

Corrib Gas Terminal

Maximum Mineral Soil Cut Slope Stability

Job No. c1157 | Sheet No. AA:Run14:05 | Rev.

Drg. Ref.

Made by DAH | Date 08-Dec-2003 | Date Stability Max Mineral Cut Slope | Checked

56.00	55.00	29.23	8274.	5.495	18360.	100900.
56.00	56.00	30.23	8413.	5.403	19590.	105800.
56.00	57.00	31.23	8548.	5.320	20830.	110800.
56.00	58.00	32.23	8680.	5.246	22080.	115800.
56.00	59.00	33.23	8809.	5.179	23350.	121000.
56.00	60.00	34.23	8936.	5.120	24640.	126100.
56.00	61.00	35.23	9061.	5.066	25940.	131400.
56.00	62.00	36.23	9188.	5.009	27300.	136700.
57.00	43.00	17.24	6185.	7.904	6050.	47820.
57.00	44.00	18.24	6384.	7.383	7007.	51730.
57.00	45.00	19.24	6573.	6.944	8026.	55730.
57.00	46.00	20.24	6760.	6.596	9074.	59850.
57.00	47.00	21.24	6939.	6.319	10140.	64050.
57.00	48.00	22.24	7112.	6.080	11240.	68350.
57.00	49.00	23.24	7279.	5.884	12360.	72720.
57.00	50.00	24.24	7441.	5.713	13500.	77150.
57.00	51.00	25.24	7599.	5.565	14670.	81660.
57.00	52.00	26.24	7748.	5.437	15860.	86250.
57.00	53.00	27.24	7894.	5.329	17060.	90910.
57.00	54.00	28.24	8039.	5.232	18280.	95650.
57.00	55.00	29.24	8179.	5.147	19520.	100500.
57.00	56.00	30.24	8315.	5.072	20770.	105400.
57.00	57.00	31.24	8456.	4.992	22100.	110300.
57.00	58.00	32.24	8587.	4.931	23390.	115300.
57.00	59.00	33.24	8714.	4.876	24700.	120400.
57.00	60.00	34.24	8839.	4.827	26020.	125600.
57.00	61.00	35.24	8961.	4.782	27360.	130800.
57.00	62.00	36.24	9081.	4.742	28700.	136100.
58.00	43.00	17.25	6111.	7.060	6747.	47630.
58.00	44.00	18.25	6308.	6.648	7751.	51530.
58.00	45.00	19.25	6499.	6.309	8802.	55530.
58.00	46.00	20.25	6682.	6.033	9885.	59630.
58.00	47.00	21.25	6859.	5.799	11000.	63820.
58.00	48.00	22.25	7028.	5.611	12130.	68070.
58.00	49.00	23.25	7193.	5.446	13290.	72400.
58.00	50.00	24.25	7350.	5.303	14480.	76800.
58.00	51.00	25.25	7508.	5.178	15700.	81300.
58.00	52.00	26.25	7660.	5.072	16930.	85870.
58.00	53.00	27.25	7807.	4.979	18180.	90520.
58.00	54.00	28.25	7949.	4.898	19440.	95240.
58.00	55.00	29.25	8085.	4.828	20720.	100000.
58.00	56.00	30.25	8220.	4.765	22010.	104900.
58.00	57.00	31.25	8352.	4.710	23320.	109800.
58.00	58.00	32.25	8481.	4.660	24640.	114800.
58.00	59.00	33.25	8606.	4.616	25970.	119900.
58.00	60.00	34.25	8733.	4.573	27350.	125000.
58.00	61.00	35.25	8855.	4.544	28710.	130500.
58.00	62.00	36.25	8975.	4.521	30080.	136000.
59.00	43.00	17.27	6036.	6.387	7428.	47450.
59.00	44.00	18.27	6232.	6.048	8488.	51340.
59.00	45.00	19.27	6419.	5.760	9580.	55190.
59.00	46.00	20.27	6599.	5.551	10700.	59380.
59.00	47.00	21.27	6776.	5.357	11860.	63530.
59.00	48.00	22.27	6942.	5.195	13040.	67750.
59.00	49.00	23.27	7105.	5.058	14250.	72070.
59.00	50.00	24.26	7262.	4.944	15470.	76470.
59.00	51.00	25.26	7415.	4.842	16720.	80940.
59.00	52.00	26.26	7563.	4.755	17980.	85480.
59.00	53.00	27.26	7706.	4.680	19250.	90110.
59.00	54.00	28.26	7847.	4.613	20550.	94810.
59.00	55.00	29.26	7984.	4.554	21860.	99580.
59.00	56.00	30.26	8117.	4.502	23190.	104400.
59.00	57.00	31.26	8245.	4.457	24530.	109300.
59.00	58.00	32.26	8374.	4.422	25890.	114500.
59.00	59.00	33.26	8501.	4.396	27240.	119800.
59.00	60.00	34.26	8625.	4.375	28600.	125100.
59.00	61.00	35.26	8747.	4.358	29970.	130600.
59.00	62.00	36.26	8866.	4.344	31330.	136100.
60.00	43.00	17.28	5960.	5.814	8130.	47270.
60.00	44.00	18.28	6152.	5.540	9229.	51120.
60.00	45.00	19.28	6337.	5.315	10360.	55070.
60.00	46.00	20.28	6513.	5.127	11530.	59100.
60.00	47.00	21.28	6685.	4.973	12710.	63220.
60.00	48.00	22.28	6850.	4.842	13930.	67430.
60.00	49.00	23.28	7010.	4.730	15160.	71730.

EPA Export 08-07-2014:23:43:14

60.00	50.00	24.28	7164.	4.632	16430.	76100.
60.00	51.00	25.28	7314.	4.551	17700.	80560.
60.00	52.00	26.28	7459.	4.480	18990.	85090.
60.00	53.00	27.28	7602.	4.416	20310.	89690.
60.00	54.00	28.28	7734.	4.356	21660.	94350.
60.00	55.00	29.28	7869.	4.312	23000.	99190.
60.00	56.00	30.28	8002.	4.280	24350.	104200.
60.00	57.00	31.28	8134.	4.254	25710.	109400.
60.00	58.00	32.28	8262.	4.233	27070.	114600.
60.00	59.00	33.28	8388.	4.216	28430.	119900.
60.00	60.00	34.28	8508.	4.205	29780.	125200.
60.00	61.00	35.28	8631.	4.196	31140.	130700.
60.00	62.00	36.28	8751.	4.191	32500.	136200.
61.00	43.00	17.29	5877.	5.348	8814.	47140.
61.00	44.00	18.29	6065.	5.117	9960.	50970.
61.00	45.00	19.29	6241.	4.923	11150.	54880.
61.00	46.00	20.29	6416.	4.771	12350.	58900.
61.00	47.00	21.29	6583.	4.644	13570.	63010.
61.00	48.00	22.29	6745.	4.536	14810.	67200.
61.00	49.00	23.29	6901.	4.445	16080.	71480.
61.00	50.00	24.29	7054.	4.366	17370.	75840.
61.00	51.00	25.29	7204.	4.291	18680.	80160.
61.00	52.00	26.29	7349.	4.229	20020.	84670.
61.00	53.00	27.29	7490.	4.189	21350.	89460.
61.00	54.00	28.29	7628.	4.156	22700.	94330.
61.00	55.00	29.29	7764.	4.128	24050.	99290.
61.00	56.00	30.29	7897.	4.107	25400.	104300.
61.00	57.00	31.29	8026.	4.092	26750.	109500.
61.00	58.00	32.29	8154.	4.081	28100.	114700.
61.00	59.00	33.29	8281.	4.073	29460.	120000.
61.00	60.00	34.29	8405.	4.068	30810.	125300.
61.00	61.00	35.29	8527.	4.065	32170.	130800.
61.00	62.00	36.29	8642.	4.067	33520.	136300.
62.00	43.00	17.30	5782.	4.922	9509.	46810.
62.00	44.00	18.30	5968.	4.735	10690.	50620.
62.00	45.00	19.30	6146.	4.583	11900.	54520.
62.00	46.00	20.30	6317.	4.458	13130.	58510.
62.00	47.00	21.30	6483.	4.353	14380.	62590.
62.00	48.00	22.30	6644.	4.263	15660.	66770.
62.00	49.00	23.30	6800.	4.187	16960.	71020.
62.00	50.00	24.30	6952.	4.125	18280.	75420.
62.00	51.00	25.30	7099.	4.080	19610.	80030.
62.00	52.00	26.30	7243.	4.045	20950.	84740.
62.00	53.00	27.30	7384.	4.016	22290.	89530.
62.00	54.00	28.30	7522.	3.994	23640.	94410.
62.00	55.00	29.30	7657.	3.980	24970.	99380.
62.00	56.00	30.30	7789.	3.968	26320.	104400.
62.00	57.00	31.30	7920.	3.960	27670.	109600.
62.00	58.00	32.30	8047.	3.955	29020.	114800.
62.00	59.00	33.30	8173.	3.954	30360.	120100.
62.00	60.00	34.30	8295.	3.956	31710.	125400.
62.00	61.00	35.30	8417.	3.959	33060.	130900.
62.00	62.00	36.30	8538.	3.963	34430.	136400.
63.00	43.00	17.32	5691.	4.572	10190.	46580.
63.00	44.00	18.32	5874.	4.417	11400.	50370.
63.00	45.00	19.32	6051.	4.290	12650.	54250.
63.00	46.00	20.32	6218.	4.193	13890.	58220.
63.00	47.00	21.32	6382.	4.104	15180.	62290.
63.00	48.00	22.32	6541.	4.037	16490.	66550.
63.00	49.00	23.32	6695.	3.987	17800.	70970.
63.00	50.00	24.32	6846.	3.948	19120.	75490.
63.00	51.00	25.32	6992.	3.918	20450.	80100.
63.00	52.00	26.32	7136.	3.895	21770.	84810.
63.00	53.00	27.32	7277.	3.878	23100.	89600.
63.00	54.00	28.32	7414.	3.866	24440.	94490.
63.00	55.00	29.32	7549.	3.858	25780.	99460.
63.00	56.00	30.32	7681.	3.854	27120.	104500.
63.00	57.00	31.32	7815.	3.850	28480.	109700.
63.00	58.00	32.32	7939.	3.854	29800.	114900.
63.00	59.00	33.32	8065.	3.857	31160.	120200.
63.00	60.00	34.32	8189.	3.861	32520.	125500.
63.00	61.00	35.32	8311.	3.868	33870.	131000.
63.00	62.00	36.32	8431.	3.876	35220.	136500.
64.00	43.00	17.33	5594.	4.281	10830.	46350.
64.00	44.00	18.33	5776.	4.150	12080.	50120.

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64.00	45.00	19.33	5946.	4.051	13320.	53980.
64.00	46.00	20.33	6114.	3.972	14620.	58060.
64.00	47.00	21.33	6277.	3.913	15920.	62280.
64.00	48.00	22.33	6434.	3.867	17220.	66610.
64.00	49.00	23.33	6588.	3.833	18530.	71040.
64.00	50.00	24.33	6738.	3.807	19840.	75560.
64.00	51.00	25.33	6885.	3.789	21160.	80170.
64.00	52.00	26.33	7032.	3.773	22500.	84880.
64.00	53.00	27.33	7173.	3.764	23830.	89680.
64.00	54.00	28.33	7310.	3.759	25160.	94570.
64.00	55.00	29.33	7446.	3.757	26500.	99540.
64.00	56.00	30.33	7578.	3.757	27840.	104600.
64.00	57.00	31.33	7709.	3.759	29190.	109700.
64.00	58.00	32.33	7833.	3.769	30500.	115000.
64.00	59.00	33.33	7958.	3.776	31850.	120300.
64.00	60.00	34.33	8082.	3.785	33200.	125600.
64.00	61.00	35.33	8205.	3.794	34560.	131100.
64.00	62.00	36.33	8325.	3.805	35920.	136600.
65.00	43.00	17.34	5489.	4.027	11450.	46100.
65.00	44.00	18.34	5668.	3.927	12730.	49970.
65.00	45.00	19.34	5836.	3.861	13980.	53980.
65.00	46.00	20.34	6003.	3.804	15270.	58110.
65.00	47.00	21.34	6168.	3.761	16580.	62340.
65.00	48.00	22.34	6326.	3.729	17880.	66670.
65.00	49.00	23.34	6480.	3.706	19180.	71100.
65.00	50.00	24.34	6630.	3.690	20490.	75620.
65.00	51.00	25.34	6776.	3.679	21810.	80230.
65.00	52.00	26.34	6920.	3.673	23130.	84940.
65.00	53.00	27.34	7060.	3.670	24450.	89740.
65.00	54.00	28.34	7198.	3.670	25780.	94630.
65.00	55.00	29.34	7333.	3.674	27110.	99600.
65.00	56.00	30.34	7465.	3.679	28450.	104700.
65.00	57.00	31.34	7591.	3.690	29760.	109800.
65.00	58.00	32.34	7719.	3.698	31110.	115000.
65.00	59.00	33.34	7845.	3.708	32460.	120300.
65.00	60.00	34.34	7969.	3.720	33800.	125700.
65.00	61.00	35.34	8090.	3.732	35150.	131200.
65.00	62.00	36.34	8210.	3.746	36500.	136700.
66.00	43.00	17.36	5387.	3.844	12000.	46120.
66.00	44.00	18.36	5562.	3.777	13240.	50020.
66.00	45.00	19.36	5734.	3.721	14530.	54050.
66.00	46.00	20.36	5901.	3.679	15810.	58170.
66.00	47.00	21.36	6063.	3.649	17100.	62400.
66.00	48.00	22.36	6221.	3.628	18400.	66740.
66.00	49.00	23.36	6375.	3.613	19700.	71160.
66.00	50.00	24.36	6525.	3.603	21010.	75690.
66.00	51.00	25.36	6672.	3.599	22320.	80310.
66.00	52.00	26.36	6815.	3.598	23630.	85020.
66.00	53.00	27.36	6956.	3.600	24950.	89820.
66.00	54.00	28.35	7093.	3.605	26270.	94710.
66.00	55.00	29.35	7228.	3.612	27600.	99680.
66.00	56.00	30.35	7356.	3.624	28900.	104700.
66.00	57.00	31.35	7486.	3.635	30230.	109900.
66.00	58.00	32.35	7614.	3.646	31570.	115100.
66.00	59.00	33.35	7740.	3.659	32920.	120400.
66.00	60.00	34.35	7863.	3.672	34270.	125800.
66.00	61.00	35.35	7985.	3.686	35620.	131300.
66.00	62.00	36.35	8104.	3.701	36970.	136800.
67.00	43.00	17.37	5283.	3.712	12440.	46170.
67.00	44.00	18.37	5457.	3.661	13680.	50080.
67.00	45.00	19.37	5630.	3.618	14950.	54110.
67.00	46.00	20.37	5797.	3.587	16240.	58240.
67.00	47.00	21.37	5959.	3.565	17520.	62470.
67.00	48.00	22.37	6117.	3.550	18820.	66800.
67.00	49.00	23.37	6271.	3.542	20110.	71230.
67.00	50.00	24.37	6421.	3.538	21410.	75760.
67.00	51.00	25.37	6568.	3.538	22720.	80380.
67.00	52.00	26.37	6711.	3.541	24030.	85090.
67.00	53.00	27.37	6851.	3.547	25340.	89890.
67.00	54.00	28.37	6988.	3.555	26660.	94780.
67.00	55.00	29.37	7123.	3.565	27980.	99760.
67.00	56.00	30.37	7251.	3.581	29270.	104800.
67.00	57.00	31.37	7380.	3.593	30600.	110000.
67.00	58.00	32.37	7508.	3.607	31940.	115200.
67.00	59.00	33.37	7633.	3.621	33280.	120500.

EPA Export 08-07-2014:23:43:14

67.00	60.00	34.37	7756.	3.637	34620.	125900.
67.00	61.00	35.37	7877.	3.653	35960.	131400.
67.00	62.00	36.37	7997.	3.669	37320.	136900.
68.00	43.00	17.38	5172.	3.622	12760.	46210.
68.00	44.00	18.38	5350.	3.574	14030.	50130.
68.00	45.00	19.38	5526.	3.543	15290.	54170.
68.00	46.00	20.38	5693.	3.520	16560.	58300.
68.00	47.00	21.38	5855.	3.504	17840.	62530.
68.00	48.00	22.38	6013.	3.495	19130.	66870.
68.00	49.00	23.38	6167.	3.491	20420.	71300.
68.00	50.00	24.38	6317.	3.492	21720.	75820.
68.00	51.00	25.38	6463.	3.495	23020.	80450.
68.00	52.00	26.38	6606.	3.501	24320.	85160.
68.00	53.00	27.38	6745.	3.510	25630.	89960.
68.00	54.00	28.38	6882.	3.521	26940.	94850.
68.00	55.00	29.38	7012.	3.537	28220.	99820.
68.00	56.00	30.38	7144.	3.550	29540.	104900.
68.00	57.00	31.38	7273.	3.565	30870.	110000.
68.00	58.00	32.38	7405.	3.581	32200.	115300.
68.00	59.00	33.38	7530.	3.597	33530.	120600.
68.00	60.00	34.38	7653.	3.614	34860.	126000.
68.00	61.00	35.38	7775.	3.632	36190.	131500.
68.00	62.00	36.38	7896.	3.651	37530.	137000.
69.00	43.00	17.39	5069.	3.561	12990.	46270.
69.00	44.00	18.39	5248.	3.521	14250.	50190.
69.00	45.00	19.39	5420.	3.493	15520.	54220.
69.00	46.00	20.39	5586.	3.475	16790.	58350.
69.00	47.00	21.39	5748.	3.464	18070.	62590.
69.00	48.00	22.39	5905.	3.458	19350.	66920.
69.00	49.00	23.39	6057.	3.457	20640.	71350.
69.00	50.00	24.39	6206.	3.460	21930.	75880.
69.00	51.00	25.39	6352.	3.466	23220.	80500.
69.00	52.00	26.39	6494.	3.475	24520.	85210.
69.00	53.00	27.39	6636.	3.486	25830.	90020.
69.00	54.00	28.39	6779.	3.501	27120.	94930.
69.00	55.00	29.39	6910.	3.519	28390.	99900.
69.00	56.00	30.39	7042.	3.534	29710.	105000.
69.00	57.00	31.39	7170.	3.550	31020.	110100.
69.00	58.00	32.39	7299.	3.567	32340.	115400.
69.00	59.00	33.39	7425.	3.585	33660.	120700.
69.00	60.00	34.39	7549.	3.603	34990.	126100.
69.00	61.00	35.39	7671.	3.622	36320.	131500.
69.00	62.00	36.39	7791.	3.641	37660.	137100.
70.00	43.00	17.41	4966.	3.529	13130.	46330.
70.00	44.00	18.41	5144.	3.494	14380.	50250.
70.00	45.00	19.41	5316.	3.470	15640.	54280.
70.00	46.00	20.41	5482.	3.455	16910.	58410.
70.00	47.00	21.41	5643.	3.446	18180.	62650.
70.00	48.00	22.41	5803.	3.444	19450.	66990.
70.00	49.00	23.41	5956.	3.445	20730.	71420.
70.00	50.00	24.41	6105.	3.450	22020.	75950.
70.00	51.00	25.41	6251.	3.457	23300.	80580.
70.00	52.00	26.41	6393.	3.467	24600.	85290.
70.00	53.00	27.41	6533.	3.479	25900.	90100.
70.00	54.00	28.41	6664.	3.497	27160.	94980.
70.00	55.00	29.41	6799.	3.513	28460.	99960.
70.00	56.00	30.41	6932.	3.529	29760.	105000.
70.00	57.00	31.41	7062.	3.546	31080.	110200.
70.00	58.00	32.41	7189.	3.563	32390.	115400.
70.00	59.00	33.41	7314.	3.581	33710.	120700.
70.00	60.00	34.41	7437.	3.600	35040.	126100.
70.00	61.00	35.41	7558.	3.619	36370.	131600.
70.00	62.00	36.41	7677.	3.638	37700.	137200.
71.00	43.00	17.42	4860.	3.524	13160.	46370.
71.00	44.00	18.42	5039.	3.491	14410.	50300.
71.00	45.00	19.42	5213.	3.471	15660.	54340.
71.00	46.00	20.42	5380.	3.457	16910.	58470.
71.00	47.00	21.42	5542.	3.450	18180.	62710.
71.00	48.00	22.42	5699.	3.448	19450.	67050.
71.00	49.00	23.42	5852.	3.450	20720.	71490.
71.00	50.00	24.42	6001.	3.455	22000.	76020.
71.00	51.00	25.42	6146.	3.463	23290.	80640.
71.00	52.00	26.42	6288.	3.475	24570.	85360.
71.00	53.00	27.42	6428.	3.488	25850.	90170.
71.00	54.00	28.42	6562.	3.507	27110.	95060.

Consent of copyright owner required for any other use.
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71.00	55.00	29.42	6696.	3.522	28400.	100000.
71.00	56.00	30.42	6828.	3.538	29710.	105100.
71.00	57.00	31.42	6957.	3.555	31020.	110300.
71.00	58.00	32.42	7084.	3.573	32330.	115500.
71.00	59.00	33.42	7208.	3.591	33650.	120800.
71.00	60.00	34.42	7330.	3.609	34970.	126200.
71.00	61.00	35.42	7451.	3.629	36290.	131700.
71.00	62.00	36.42	7569.	3.648	37620.	137200.
72.00	43.00	17.43	4764.	3.556	13060.	46440.
72.00	44.00	18.43	4936.	3.516	14320.	50360.
72.00	45.00	19.43	5108.	3.493	15570.	54390.
72.00	46.00	20.43	5274.	3.478	16830.	58530.
72.00	47.00	21.43	5434.	3.471	18080.	62760.
72.00	48.00	22.43	5591.	3.468	19350.	67100.
72.00	49.00	23.43	5744.	3.471	20610.	71540.
72.00	50.00	24.43	5895.	3.478	21870.	76080.
72.00	51.00	25.43	6041.	3.487	23140.	80700.
72.00	52.00	26.43	6184.	3.498	24420.	85420.
72.00	53.00	27.43	6323.	3.510	25710.	90230.
72.00	54.00	28.43	6462.	3.528	26960.	95140.
72.00	55.00	29.43	6596.	3.543	28260.	100160.
72.00	56.00	30.43	6728.	3.558	29560.	105200.
72.00	57.00	31.43	6856.	3.575	30870.	110300.
72.00	58.00	32.43	6983.	3.592	32180.	115600.
72.00	59.00	33.43	7108.	3.611	33490.	120900.
72.00	60.00	34.43	7225.	3.630	34790.	126300.
72.00	61.00	35.43	7347.	3.649	36110.	131800.
72.00	62.00	36.43	7467.	3.669	37430.	137300.
73.00	43.00	17.45	4659.	3.610	12880.	46490.
73.00	44.00	18.45	4831.	3.565	14140.	50410.
73.00	45.00	19.45	5003.	3.540	15380.	54440.
73.00	46.00	20.45	5169.	3.523	16630.	58580.
73.00	47.00	21.45	5333.	3.515	17870.	62830.
73.00	48.00	22.45	5491.	3.513	19120.	67170.
73.00	49.00	23.45	5645.	3.514	20380.	71610.
73.00	50.00	24.45	5794.	3.518	21650.	76150.
73.00	51.00	25.45	5939.	3.524	22920.	80770.
73.00	52.00	26.45	6081.	3.533	24200.	85490.
73.00	53.00	27.45	6220.	3.550	25440.	90300.
73.00	54.00	28.45	6356.	3.562	26730.	95200.
73.00	55.00	29.45	6490.	3.576	28020.	100200.
73.00	56.00	30.45	6622.	3.591	29310.	105300.
73.00	57.00	31.44	6753.	3.608	30610.	110400.
73.00	58.00	32.44	6881.	3.625	31910.	115700.
73.00	59.00	33.44	7006.	3.643	33210.	121000.
73.00	60.00	34.44	7123.	3.662	34510.	126400.
73.00	61.00	35.44	7245.	3.681	35820.	131900.
73.00	62.00	36.44	7365.	3.701	37140.	137400.
74.00	43.00	17.46	4561.	3.697	12590.	46550.
74.00	44.00	18.46	4736.	3.651	13820.	50470.
74.00	45.00	19.46	4901.	3.615	15070.	54500.
74.00	46.00	20.46	5068.	3.596	16310.	58640.
74.00	47.00	21.46	5231.	3.583	17550.	62890.
74.00	48.00	22.46	5388.	3.576	18800.	67230.
74.00	49.00	23.46	5541.	3.573	20060.	71670.
74.00	50.00	24.46	5689.	3.574	21320.	76210.
74.00	51.00	25.46	5834.	3.578	22590.	80840.
74.00	52.00	26.46	5977.	3.585	23870.	85560.
74.00	53.00	27.46	6113.	3.600	25110.	90370.
74.00	54.00	28.46	6250.	3.611	26380.	95270.
74.00	55.00	29.46	6385.	3.624	27670.	100300.
74.00	56.00	30.46	6517.	3.638	28960.	105300.
74.00	57.00	31.46	6646.	3.653	30250.	110500.
74.00	58.00	32.46	6778.	3.670	31530.	115700.
74.00	59.00	33.46	6897.	3.688	32820.	121100.
74.00	60.00	34.46	7020.	3.706	34130.	126500.
74.00	61.00	35.46	7142.	3.724	35430.	131900.
74.00	62.00	36.46	7262.	3.743	36740.	137500.
75.00	43.00	17.47	4454.	3.819	12200.	46590.
75.00	44.00	18.47	4631.	3.768	13410.	50520.
75.00	45.00	19.47	4802.	3.721	14660.	54560.
75.00	46.00	20.47	4966.	3.692	15900.	58700.
75.00	47.00	21.47	5125.	3.671	17140.	62940.
75.00	48.00	22.47	5281.	3.658	18390.	67280.
75.00	49.00	23.47	5435.	3.651	19640.	71730.

EPA Export 08-07-2014:23:43:14

75.00	50.00	24.47	5585.	3.650	20900.	76270.
75.00	51.00	25.47	5732.	3.651	22160.	80900.
75.00	52.00	26.47	5875.	3.656	23420.	85630.
75.00	53.00	27.47	6012.	3.668	24660.	90440.
75.00	54.00	28.47	6149.	3.677	25930.	95340.
75.00	55.00	29.47	6284.	3.688	27210.	100300.
75.00	56.00	30.47	6416.	3.700	28490.	105400.
75.00	57.00	31.47	6545.	3.714	29780.	110600.
75.00	58.00	32.47	6672.	3.728	31060.	115800.
75.00	59.00	33.47	6790.	3.745	32350.	121100.
75.00	60.00	34.47	6913.	3.761	33650.	126500.
75.00	61.00	35.47	7034.	3.778	34950.	132000.
75.00	62.00	36.47	7153.	3.795	36250.	137600.
76.00	43.00	17.48	4357.	3.985	11710.	46650.
76.00	44.00	18.48	4529.	3.913	12930.	50580.
76.00	45.00	19.48	4698.	3.859	14150.	54610.
76.00	46.00	20.48	4863.	3.823	15370.	58750.
76.00	47.00	21.48	5025.	3.788	16630.	63000.
76.00	48.00	22.48	5182.	3.769	17870.	67350.
76.00	49.00	23.48	5335.	3.756	19110.	71800.
76.00	50.00	24.48	5483.	3.748	20360.	76340.
76.00	51.00	25.48	5629.	3.745	21620.	80970.
76.00	52.00	26.48	5773.	3.746	22880.	85700.
76.00	53.00	27.48	5909.	3.754	24110.	90510.
76.00	54.00	28.48	6046.	3.760	25380.	95410.
76.00	55.00	29.48	6181.	3.768	26650.	100400.
76.00	56.00	30.48	6313.	3.777	27920.	105500.
76.00	57.00	31.48	6442.	3.789	29200.	110600.
76.00	58.00	32.48	6562.	3.802	30480.	115900.
76.00	59.00	33.48	6687.	3.816	31760.	121200.
76.00	60.00	34.48	6810.	3.830	33060.	126600.
76.00	61.00	35.48	6936.	3.846	34350.	132100.
76.00	62.00	36.48	7056.	3.862	35650.	137700.
77.00	43.00	17.50	4253.	4.202	11110.	46700.
77.00	44.00	18.50	4432.	4.110	12320.	50640.
77.00	45.00	19.50	4600.	4.040	13530.	54670.
77.00	46.00	20.50	4765.	3.986	14750.	58820.
77.00	47.00	21.50	4922.	3.940	16010.	63060.
77.00	48.00	22.50	5080.	3.911	17230.	67410.
77.00	49.00	23.50	5232.	3.891	18470.	71860.
77.00	50.00	24.50	5384.	3.872	19730.	76400.
77.00	51.00	25.50	5529.	3.863	20980.	81040.
77.00	52.00	26.50	5670.	3.858	22230.	85760.
77.00	53.00	27.50	5805.	3.861	23460.	90580.
77.00	54.00	28.50	5942.	3.862	24720.	95480.
77.00	55.00	29.50	6080.	3.867	25990.	100500.
77.00	56.00	30.50	6213.	3.873	27250.	105600.
77.00	57.00	31.50	6343.	3.881	28530.	110700.
77.00	58.00	32.50	6464.	3.892	29800.	116000.
77.00	59.00	33.50	6589.	3.903	31080.	121300.
77.00	60.00	34.50	6713.	3.915	32360.	126700.
77.00	61.00	35.50	6834.	3.928	33650.	132200.
77.00	62.00	36.50	6954.	3.942	34940.	137800.
78.00	43.00	17.51	4156.	4.962	10380.	51500.
78.00	44.00	18.51	4330.	4.368	11600.	50690.
78.00	45.00	19.51	4499.	4.266	12830.	54730.
78.00	46.00	20.51	4664.	4.193	14040.	58870.
78.00	47.00	21.51	4824.	4.134	15270.	63130.
78.00	48.00	22.51	4976.	4.085	16520.	67470.
78.00	49.00	23.51	5130.	4.051	17750.	71920.
78.00	50.00	24.51	5283.	4.028	18980.	76470.
78.00	51.00	25.51	5428.	4.011	20220.	81100.
78.00	52.00	26.51	5573.	3.996	21480.	85840.
78.00	53.00	27.51	5709.	3.992	22710.	90650.
78.00	54.00	28.51	5846.	3.988	23960.	95560.
78.00	55.00	29.51	5979.	3.987	25220.	100600.
78.00	56.00	30.51	6110.	3.988	26490.	105600.
78.00	57.00	31.51	6240.	3.992	27750.	110800.
78.00	58.00	32.51	6361.	3.999	29010.	116000.
78.00	59.00	33.51	6486.	4.007	30290.	121400.
78.00	60.00	34.51	6610.	4.016	31570.	126800.
78.00	61.00	35.51		Only 1 intersection		
78.00	62.00	36.51		Only 1 intersection		
79.00	43.00	17.52	4043.	5.561	9346.	51970.
79.00	44.00	18.52	4220.	5.240	10720.	56160.

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79.00	45.00	19.52	4399.	4.603	12000.	55240.
79.00	46.00	20.52	4565.	4.458	13220.	58940.
79.00	47.00	21.52	4728.	4.373	14450.	63190.
79.00	48.00	22.52	4881.	4.306	15690.	67540.
79.00	49.00	23.52	5031.	4.257	16910.	71980.
79.00	50.00	24.52	5180.	4.217	18150.	76530.
79.00	51.00	25.52	5327.	4.187	19390.	81170.
79.00	52.00	26.52	5470.	4.165	20630.	85900.
79.00	53.00	27.52	5605.	4.153	21840.	90720.
79.00	54.00	28.52	5742.	4.142	23090.	95620.
79.00	55.00	29.52	5879.	4.131	24360.	100600.
79.00	56.00	30.52	6010.	4.127	25620.	105700.
79.00	57.00	31.52	6133.	4.126	26870.	110900.
79.00	58.00	32.52		Only 1 intersection		
79.00	59.00	33.52		Only 1 intersection		
79.00	60.00	34.52		Only 1 intersection		
79.00	61.00	35.52		Only 1 intersection		
79.00	62.00	36.52		Only 1 intersection		
80.00	43.00	17.54	3932.	6.365	8188.	52120.
80.00	44.00	18.54	4114.	5.884	9570.	56320.
80.00	45.00	19.54	4292.	5.540	10940.	60630.
80.00	46.00	20.54	4464.	5.002	12290.	61480.
80.00	47.00	21.54	4626.	4.681	13510.	63250.
80.00	48.00	22.54	4783.	4.587	14740.	67600.
80.00	49.00	23.54	4931.	4.511	15970.	72050.
80.00	50.00	24.54	5080.	4.453	17200.	76590.
80.00	51.00	25.54	5226.	4.406	18440.	81230.
80.00	52.00	26.54	5368.	4.369	19680.	85970.
80.00	53.00	27.54	5503.	4.345	20900.	90780.
80.00	54.00	28.54	5640.	4.323	22140.	95690.
80.00	55.00	29.54		Only 1 intersection		
80.00	56.00	30.54		Only 1 intersection		
80.00	57.00	31.54		Only 1 intersection		
80.00	58.00	32.54		Only 1 intersection		
80.00	59.00	33.54		Only 1 intersection		
80.00	60.00	34.54		Only 1 intersection		
80.00	61.00	35.53		Only 1 intersection		
80.00	62.00	36.53		Only 1 intersection		
81.00	43.00	17.55		Weight too small		
81.00	43.00	17.55	3818.	6.781	6917.	46900.
81.00	44.00	18.55	4002.	6.811	8291.	56470.
81.00	45.00	19.55	4180.	6.274	9689.	60790.
81.00	46.00	20.55	4354.	5.895	11060.	65220.
81.00	47.00	21.55	4524.	5.470	12450.	68090.
81.00	48.00	22.55	4681.	4.996	13700.	68470.
81.00	49.00	23.55	4831.	4.827	14940.	72110.
81.00	50.00	24.55	4980.	4.742	16170.	76660.
81.00	51.00	25.55	5125.	4.676	17390.	81300.
81.00	52.00	26.55	5267.	4.621	18620.	86030.
81.00	53.00	27.55		Only 1 intersection		
81.00	54.00	28.55		Only 1 intersection		
81.00	55.00	29.55		Only 1 intersection		
81.00	56.00	30.55		Only 1 intersection		
81.00	57.00	31.55		Only 1 intersection		
81.00	58.00	32.55		Only 1 intersection		
81.00	59.00	33.55		Only 1 intersection		
81.00	60.00	34.55		Only 1 intersection		
81.00	61.00	35.55		Only 1 intersection		
81.00	62.00	36.55		Only 1 intersection		
82.00	43.00	17.56	3747.	7.492	6267.	46950.
82.00	44.00	18.56	3897.	7.199	7068.	50880.
82.00	45.00	19.56	4066.	7.371	8268.	60940.
82.00	46.00	20.56	4241.	6.753	9682.	65380.
82.00	47.00	21.56	4415.	6.317	11070.	69940.
82.00	48.00	22.56	4581.	5.990	12450.	74600.
82.00	49.00	23.56	4736.	5.450	13800.	75190.
82.00	50.00	24.56		Only 1 intersection		
82.00	51.00	25.56		Only 1 intersection		
82.00	52.00	26.56		Only 1 intersection		
82.00	53.00	27.56		Only 1 intersection		
82.00	54.00	28.56		Only 1 intersection		
82.00	55.00	29.56		Only 1 intersection		
82.00	56.00	30.56		Only 1 intersection		
82.00	57.00	31.56		Only 1 intersection		
82.00	58.00	32.56		Only 1 intersection		

EPA Export 08-07-2014:23:43:14

82.00	59.00	33.56		Only 1 intersection		
82.00	60.00	34.56		Only 1 intersection		
82.00	61.00	35.56		Only 1 intersection		
82.00	62.00	36.56		Only 1 intersection		
83.00	43.00	17.58	3674.	8.493	5533.	46990.
83.00	44.00	18.58	3827.	8.050	6327.	50930.
83.00	45.00	19.58	3976.	7.706	7136.	54990.
83.00	46.00	20.57		Weight too small		
83.00	46.00	20.57	4119.	7.456	7932.	59140.
83.00	47.00	21.57	4299.	7.356	9530.	70110.
83.00	48.00	22.57		Only 1 intersection		
83.00	49.00	23.57		Only 1 intersection		
83.00	50.00	24.57		Only 1 intersection		
83.00	51.00	25.57		Only 1 intersection		
83.00	52.00	26.57		Only 1 intersection		
83.00	53.00	27.57		Only 1 intersection		
83.00	54.00	28.57		Only 1 intersection		
83.00	55.00	29.57		Only 1 intersection		
83.00	56.00	30.57		Only 1 intersection		
83.00	57.00	31.57		Only 1 intersection		
83.00	58.00	32.57		Only 1 intersection		
83.00	59.00	33.57		Only 1 intersection		
83.00	60.00	34.57		Only 1 intersection		
83.00	61.00	35.57		Only 1 intersection		
83.00	62.00	36.57		Only 1 intersection		
84.00	43.00	17.59	3604.	9.932	4728.	46960.
84.00	44.00	18.59	3756.	9.251	5511.	50980.
84.00	45.00	19.59	3905.	8.727	6306.	55040.
84.00	46.00	20.59		Only 1 intersection		
84.00	47.00	21.59		Weight too small		
84.00	47.00	21.59		Only 1 intersection		
84.00	48.00	22.59		Only 1 intersection		
84.00	49.00	23.59		Only 1 intersection		
84.00	50.00	24.59		Only 1 intersection		
84.00	51.00	25.59		Only 1 intersection		
84.00	52.00	26.59		Only 1 intersection		
84.00	53.00	27.59		Only 1 intersection		
84.00	54.00	28.59		Only 1 intersection		
84.00	55.00	29.59		Only 1 intersection		
84.00	56.00	30.59		Only 1 intersection		
84.00	57.00	31.59		Only 1 intersection		
84.00	58.00	32.59		Only 1 intersection		
84.00	59.00	33.59		Only 1 intersection		
84.00	60.00	34.59		Only 1 intersection		
84.00	61.00	35.59		Only 1 intersection		
84.00	62.00	36.59		Only 1 intersection		
85.00	43.00	17.60	3542.	11.87	3937.	46730.
85.00	44.00	18.60		Only 1 intersection		
85.00	45.00	19.60		Only 1 intersection		
85.00	46.00	20.60		Only 1 intersection		
85.00	47.00	21.60		Only 1 intersection		
85.00	48.00	22.60		Weight too small		
85.00	48.00	22.60		Only 1 intersection		
85.00	49.00	23.60		Weight too small		
85.00	49.00	23.60		Only 1 intersection		
85.00	50.00	24.60		Only 1 intersection		
85.00	51.00	25.60		Only 1 intersection		
85.00	52.00	26.60		Only 1 intersection		
85.00	53.00	27.60		Only 1 intersection		
85.00	54.00	28.60		Only 1 intersection		
85.00	55.00	29.60		Only 1 intersection		
85.00	56.00	30.60		Only 1 intersection		
85.00	57.00	31.60		Only 1 intersection		
85.00	58.00	32.60		Only 1 intersection		
85.00	59.00	33.60		Only 1 intersection		
85.00	60.00	34.60		Only 1 intersection		
85.00	61.00	35.60		Only 1 intersection		
85.00	62.00	36.60		Only 1 intersection		
86.00	43.00	17.61		Only 1 intersection		
86.00	44.00	18.61		Only 1 intersection		
86.00	45.00	19.61		Only 1 intersection		
86.00	46.00	20.61		Only 1 intersection		
86.00	47.00	21.61		Only 1 intersection		
86.00	48.00	22.61		Only 1 intersection		
86.00	49.00	23.61		Only 1 intersection		

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86.00	50.00	24.61	Weight too small
86.00	50.00	24.61	Only 1 intersection
86.00	51.00	25.61	Weight too small
86.00	51.00	25.61	Only 1 intersection
86.00	52.00	26.61	Only 1 intersection
86.00	53.00	27.61	Only 1 intersection
86.00	54.00	28.61	Only 1 intersection
86.00	55.00	29.61	Only 1 intersection
86.00	56.00	30.61	Only 1 intersection
86.00	57.00	31.61	Only 1 intersection
86.00	58.00	32.61	Only 1 intersection
86.00	59.00	33.61	Only 1 intersection
86.00	60.00	34.61	Only 1 intersection
86.00	61.00	35.61	Only 1 intersection
86.00	62.00	36.61	Only 1 intersection
87.00	43.00	17.63	Only 1 intersection
87.00	44.00	18.63	Only 1 intersection
87.00	45.00	19.63	Only 1 intersection
87.00	46.00	20.63	Only 1 intersection
87.00	47.00	21.63	Only 1 intersection
87.00	48.00	22.63	Only 1 intersection
87.00	49.00	23.63	Only 1 intersection
87.00	50.00	24.63	Only 1 intersection
87.00	51.00	25.63	Weight too small
87.00	51.00	25.63	Only 1 intersection
87.00	52.00	26.63	Weight too small
87.00	52.00	26.63	Only 1 intersection
87.00	53.00	27.63	Only 1 intersection
87.00	54.00	28.63	Only 1 intersection
87.00	55.00	29.63	Only 1 intersection
87.00	56.00	30.63	Only 1 intersection
87.00	57.00	31.63	Only 1 intersection
87.00	58.00	32.63	Only 1 intersection
87.00	59.00	33.63	Only 1 intersection
87.00	60.00	34.63	Only 1 intersection
87.00	61.00	35.63	Only 1 intersection
87.00	62.00	36.63	Only 1 intersection
88.00	43.00	17.64	Only 1 intersection
88.00	44.00	18.64	Only 1 intersection
88.00	45.00	19.64	Only 1 intersection
88.00	46.00	20.64	Only 1 intersection
88.00	47.00	21.64	Only 1 intersection
88.00	48.00	22.64	Only 1 intersection
88.00	49.00	23.64	Only 1 intersection
88.00	50.00	24.64	Only 1 intersection
88.00	51.00	25.64	Only 1 intersection
88.00	52.00	26.64	Only 1 intersection
88.00	53.00	27.64	Weight too small
88.00	53.00	27.64	Only 1 intersection
88.00	54.00	28.64	Weight too small
88.00	54.00	28.64	Only 1 intersection
88.00	55.00	29.64	Only 1 intersection
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88.00	57.00	31.64	Only 1 intersection
88.00	58.00	32.64	Only 1 intersection
88.00	59.00	33.64	Only 1 intersection
88.00	60.00	34.64	Only 1 intersection
88.00	61.00	35.64	Only 1 intersection
88.00	62.00	36.64	Only 1 intersection
89.00	43.00	17.65	Only 1 intersection
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89.00	46.00	20.65	Only 1 intersection
89.00	47.00	21.65	Only 1 intersection
89.00	48.00	22.65	Only 1 intersection
89.00	49.00	23.65	Only 1 intersection
89.00	50.00	24.65	Only 1 intersection
89.00	51.00	25.65	Only 1 intersection
89.00	52.00	26.65	Only 1 intersection
89.00	53.00	27.65	Only 1 intersection
89.00	54.00	28.65	Weight too small
89.00	54.00	28.65	Only 1 intersection
89.00	55.00	29.65	Weight too small
89.00	55.00	29.65	Only 1 intersection
89.00	56.00	30.65	Weight too small

EPA Export 08-07-2014:23:43:14

89.00	56.00	30.65	Only 1 intersection
89.00	57.00	31.65	Only 1 intersection
89.00	58.00	32.65	Only 1 intersection
89.00	59.00	33.65	Only 1 intersection
89.00	60.00	34.65	Only 1 intersection
89.00	61.00	35.65	Only 1 intersection
89.00	62.00	36.65	Only 1 intersection
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90.00	44.00	18.67	Only 1 intersection
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90.00	46.00	20.67	Only 1 intersection
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90.00	48.00	22.67	Only 1 intersection
90.00	49.00	23.66	Only 1 intersection
90.00	50.00	24.66	Only 1 intersection
90.00	51.00	25.66	Only 1 intersection
90.00	52.00	26.66	Only 1 intersection
90.00	53.00	27.66	Only 1 intersection
90.00	54.00	28.66	Only 1 intersection
90.00	55.00	29.66	Only 1 intersection
90.00	56.00	30.66	Weight too small
90.00	56.00	30.66	Only 1 intersection
90.00	57.00	31.66	Weight too small
90.00	57.00	31.66	Only 1 intersection
90.00	58.00	32.66	Weight too small
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90.00	59.00	33.66	Only 1 intersection
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90.00	61.00	35.66	Only 1 intersection
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91.00	43.00	17.68	Only 1 intersection
91.00	44.00	18.68	Only 1 intersection
91.00	45.00	19.68	Only 1 intersection
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91.00	48.00	22.68	Only 1 intersection
91.00	49.00	23.68	Only 1 intersection
91.00	50.00	24.68	Only 1 intersection
91.00	51.00	25.68	Only 1 intersection
91.00	52.00	26.68	Only 1 intersection
91.00	53.00	27.68	Only 1 intersection
91.00	54.00	28.68	Only 1 intersection
91.00	55.00	29.68	Only 1 intersection
91.00	56.00	30.68	Only 1 intersection
91.00	57.00	31.68	Only 1 intersection
91.00	58.00	32.68	Weight too small
91.00	58.00	32.68	Only 1 intersection
91.00	59.00	33.68	Weight too small
91.00	59.00	33.68	Only 1 intersection
91.00	60.00	34.68	Weight too small
91.00	60.00	34.68	Only 1 intersection
91.00	61.00	35.68	Only 1 intersection
91.00	62.00	36.68	Only 1 intersection
92.00	43.00	17.69	Only 1 intersection
92.00	44.00	18.69	Only 1 intersection
92.00	45.00	19.69	Only 1 intersection
92.00	46.00	20.69	Only 1 intersection
92.00	47.00	21.69	Only 1 intersection
92.00	48.00	22.69	Only 1 intersection
92.00	49.00	23.69	Only 1 intersection
92.00	50.00	24.69	Only 1 intersection
92.00	51.00	25.69	Only 1 intersection
92.00	52.00	26.69	Only 1 intersection
92.00	53.00	27.69	Only 1 intersection
92.00	54.00	28.69	Only 1 intersection
92.00	55.00	29.69	Only 1 intersection
92.00	56.00	30.69	Only 1 intersection
92.00	57.00	31.69	Only 1 intersection
92.00	58.00	32.69	Only 1 intersection
92.00	59.00	33.69	Only 1 intersection
92.00	60.00	34.69	Weight too small
92.00	60.00	34.69	Only 1 intersection
92.00	61.00	35.69	Weight too small
92.00	61.00	35.69	Only 1 intersection
92.00	62.00	36.69	Weight too small

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92.00	62.00	36.69	Only 1 intersection
93.00	43.00	17.70	Only 1 intersection
93.00	44.00	18.70	Only 1 intersection
93.00	45.00	19.70	Only 1 intersection
93.00	46.00	20.70	Only 1 intersection
93.00	47.00	21.70	Only 1 intersection
93.00	48.00	22.70	Only 1 intersection
93.00	49.00	23.70	Only 1 intersection
93.00	50.00	24.70	Only 1 intersection
93.00	51.00	25.70	Only 1 intersection
93.00	52.00	26.70	Only 1 intersection
93.00	53.00	27.70	Only 1 intersection
93.00	54.00	28.70	Only 1 intersection
93.00	55.00	29.70	Only 1 intersection
93.00	56.00	30.70	Only 1 intersection
93.00	57.00	31.70	Only 1 intersection
93.00	58.00	32.70	Only 1 intersection
93.00	59.00	33.70	Only 1 intersection
93.00	60.00	34.70	Only 1 intersection
93.00	61.00	35.70	Weight too small
93.00	61.00	35.70	Only 1 intersection
93.00	62.00	36.70	Weight too small
93.00	62.00	36.70	Only 1 intersection
94.00	43.00	17.72	Only 1 intersection
94.00	44.00	18.72	Only 1 intersection
94.00	45.00	19.72	Only 1 intersection
94.00	46.00	20.72	Only 1 intersection
94.00	47.00	21.72	Only 1 intersection
94.00	48.00	22.72	Only 1 intersection
94.00	49.00	23.72	Only 1 intersection
94.00	50.00	24.72	Only 1 intersection
94.00	51.00	25.72	Only 1 intersection
94.00	52.00	26.72	Only 1 intersection
94.00	53.00	27.72	Only 1 intersection
94.00	54.00	28.72	Only 1 intersection
94.00	55.00	29.72	Only 1 intersection
94.00	56.00	30.72	Only 1 intersection
94.00	57.00	31.72	Only 1 intersection
94.00	58.00	32.72	Only 1 intersection
94.00	59.00	33.72	Only 1 intersection
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94.00	62.00	36.72	Only 1 intersection
95.00	43.00	17.73	Only 1 intersection
95.00	44.00	18.73	Only 1 intersection
95.00	45.00	19.73	Only 1 intersection
95.00	46.00	20.73	Only 1 intersection
95.00	47.00	21.73	Only 1 intersection
95.00	48.00	22.73	Only 1 intersection
95.00	49.00	23.73	Only 1 intersection
95.00	50.00	24.73	Only 1 intersection
95.00	51.00	25.73	Only 1 intersection
95.00	52.00	26.73	Only 1 intersection
95.00	53.00	27.73	Only 1 intersection
95.00	54.00	28.73	Only 1 intersection
95.00	55.00	29.73	Only 1 intersection
95.00	56.00	30.73	Only 1 intersection
95.00	57.00	31.73	Only 1 intersection
95.00	58.00	32.73	Only 1 intersection
95.00	59.00	33.73	Only 1 intersection
95.00	60.00	34.73	Only 1 intersection
95.00	61.00	35.73	Only 1 intersection
95.00	62.00	36.73	Only 1 intersection
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96.00	44.00	18.74	Only 1 intersection
96.00	45.00	19.74	Only 1 intersection
96.00	46.00	20.74	Only 1 intersection
96.00	47.00	21.74	Only 1 intersection
96.00	48.00	22.74	Only 1 intersection
96.00	49.00	23.74	Only 1 intersection
96.00	50.00	24.74	Only 1 intersection
96.00	51.00	25.74	Only 1 intersection
96.00	52.00	26.74	Only 1 intersection
96.00	53.00	27.74	Only 1 intersection
96.00	54.00	28.74	Only 1 intersection

EPA Export 08-07-2014:23:43:14

96.00	55.00	29.74	Only 1 intersection
96.00	56.00	30.74	Only 1 intersection
96.00	57.00	31.74	Only 1 intersection
96.00	58.00	32.74	Only 1 intersection
96.00	59.00	33.74	Only 1 intersection
96.00	60.00	34.74	Only 1 intersection
96.00	61.00	35.74	Only 1 intersection
96.00	62.00	36.74	Only 1 intersection
97.00	43.00	17.76	Only 1 intersection
97.00	44.00	18.76	Only 1 intersection
97.00	45.00	19.76	Only 1 intersection
97.00	46.00	20.76	Only 1 intersection
97.00	47.00	21.76	Only 1 intersection
97.00	48.00	22.76	Only 1 intersection
97.00	49.00	23.76	Only 1 intersection
97.00	50.00	24.76	Only 1 intersection
97.00	51.00	25.76	Only 1 intersection
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97.00	55.00	29.75	Only 1 intersection
97.00	56.00	30.75	Only 1 intersection
97.00	57.00	31.75	Only 1 intersection
97.00	58.00	32.75	Only 1 intersection
97.00	59.00	33.75	Only 1 intersection
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97.00	62.00	36.75	Only 1 intersection
98.00	43.00	17.77	Only 1 intersection
98.00	44.00	18.77	Only 1 intersection
98.00	45.00	19.77	Only 1 intersection
98.00	46.00	20.77	Only 1 intersection
98.00	47.00	21.77	Only 1 intersection
98.00	48.00	22.77	Only 1 intersection
98.00	49.00	23.77	Only 1 intersection
98.00	50.00	24.77	Only 1 intersection
98.00	51.00	25.77	Only 1 intersection
98.00	52.00	26.77	Only 1 intersection
98.00	53.00	27.77	Only 1 intersection
98.00	54.00	28.77	Only 1 intersection
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98.00	57.00	31.77	Only 1 intersection
98.00	58.00	32.77	Only 1 intersection
98.00	59.00	33.77	Only 1 intersection
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98.00	61.00	35.77	Only 1 intersection
98.00	62.00	36.77	Only 1 intersection
99.00	43.00	17.78	Only 1 intersection
99.00	44.00	18.78	Only 1 intersection
99.00	45.00	19.78	Only 1 intersection
99.00	46.00	20.78	Only 1 intersection
99.00	47.00	21.78	Only 1 intersection
99.00	48.00	22.78	Only 1 intersection
99.00	49.00	23.78	Only 1 intersection
99.00	50.00	24.78	Only 1 intersection
99.00	51.00	25.78	Only 1 intersection
99.00	52.00	26.78	Only 1 intersection
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99.00	54.00	28.78	Only 1 intersection
99.00	55.00	29.78	Only 1 intersection
99.00	56.00	30.78	Only 1 intersection
99.00	57.00	31.78	Only 1 intersection
99.00	58.00	32.78	Only 1 intersection
99.00	59.00	33.78	Only 1 intersection
99.00	60.00	34.78	Only 1 intersection
99.00	61.00	35.78	Only 1 intersection
99.00	62.00	36.78	Only 1 intersection

WORST CASE : WATER CASE 1 OF 1

Centre at (70.00,48.00) Radius 22.41m
Iterations: 5 Horiz acceleration [fg]: .0
Net vertical force [kN]: .0 Slip weight [kN] 5803.
Net horiz force [kN]: 0.004280 Disturbing moment [kN m]: 19450.

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Inclination of interslice forces [°]: -14.26

Restoring moment [kN m]: 66990.

Factor of Safety: 3.444

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	48.81	40.71	-5.091	.0	.0	.0
2	48.99	40.20	-76.29E-6	-0.02392	0.09414	.0
3	50.01	37.89	22.87	3.032	29.70	26.15
4	50.39	37.16	30.00	3.482	35.43	45.01
5	51.65	35.14	49.84	9.692	99.37	124.2
6	53.51	32.82	72.53	23.93	244.6	263.0
7	55.67	30.77	92.46	44.46	453.8	427.4
8	58.08	29.03	109.3	65.78	671.3	596.9
9	60.70	27.61	105.4	86.46	882.5	555.0
10	60.90	27.52	101.3	87.91	897.2	512.7
11	61.00	27.48	99.20	88.64	904.8	492.0
12	63.70	26.50	107.8	105.5	1077.	580.6
13	64.00	26.41	108.5	106.8	1090.	588.3
14	67.00	25.79	113.2	113.4	1158.	641.0
15	69.20	25.61	108.2	112.8	1152.	585.7
16	72.27	25.71	95.99	104.2	1063.	460.7
17	75.30	26.23	79.71	88.05	898.9	317.7
18	77.49	26.88	61.48	72.76	742.9	189.0
19	79.60	27.75	41.47	56.14	573.4	85.98
20	80.60	28.26	36.41	47.86	488.9	66.29
21	82.29	29.26	28.39	33.31	340.4	40.30
22	83.88	30.41	18.82	19.51	199.5	17.71
23	86.25	32.57	-38.15E-6	3.616	37.07	.0
24	87.00	33.40	-7.384	.0	0.004280	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	3.000	.0	.0	0.5148	0.2700	1.638
2	3.000	.0	11.44	18.39	33.27	7.578
3	40.00	.0	26.44	14.24	11.51	32.75
4	40.00	.0	39.92	78.68	92.61	95.15
5	55.00	.0	61.18	192.1	224.6	163.8
6	55.00	.0	82.50	309.6	353.6	163.8
7	75.00	.0	100.9	431.8	460.0	223.1
8	75.00	.0	107.3	548.8	565.0	223.1
9	75.00	.0	103.3	45.93	46.63	16.45
10	75.00	.0	100.2	23.65	24.00	8.198
11	75.00	.0	103.5	672.1	674.6	215.5
12	75.00	.0	108.1	71.86	71.46	23.40
13	75.00	.0	110.9	669.5	662.9	229.7
14	75.00	.0	110.7	490.6	488.9	165.6
15	75.00	.0	102.1	634.5	645.7	230.5
16	75.00	.0	87.85	546.3	582.2	230.5
17	75.00	.0	70.60	333.6	378.9	171.3
18	75.00	.0	51.47	263.4	323.6	171.3
19	75.00	.0	38.94	104.9	139.2	84.03
20	75.00	.0	32.40	151.5	218.6	147.1
21	75.00	.0	23.61	108.8	181.8	147.1
22	55.00	.0	9.411	86.08	184.8	176.6
23	55.00	.0	.0	5.873	33.87	61.31

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	.0	.0	.0	.0
5	.0	.0	.0	.0
6	.0	.0	.0	.0
7	.0	.0	.0	.0
8	.0	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0

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14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	.0	.0
22	.0	.0	.0	.0
23	.0	.0	.0	.0

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Appendix 4B - Gabion Stability Calculations

Introduction

A significant amount of testing has been carried out on the peat layer on site. The results of the testing indicate the material to be a highly variable material with shear strengths varying from 3kPa in the lower peat to 15kPa and greater in the upper layers.

A conservative approach has been adopted for the retention of the cut peat slopes on site. There will be no freestanding slopes in the peat. The peat will be retained by a series of gabion walls around the site.

The peat thickness at the top of the cut slopes varies from 2.2m to 3m. Two cases are analysed for stability. These are a) the local stability of the peat at the top of the slope and b) the global stability of the peat uphill of the terminal.

Soil Parameters

The following parameters are used for the analyses:

Table 4B.1 Soil Parameters for Local Stability

Parameters	Parameter values	Comment
Peat - Active co-efficient Ka	1.0	Peat is conservatively assumed to have zero shear strength. Using a Ka of 1 and a density of 11kN/m^3 includes the lateral load from the water.
Peat – bulk density - γ	11 kN/m^3	Note the density of the strengthened peat is not used as a Ka value of 1 and a density of 11kN/m^3 yield greater lateral loads than a strengthened C_u of 25kN/m^2 (conservative estimate) and a density of 12kN/m^3.
Co-efficient of friction - μ	0.45	
Gabion – bulk density - γ	15 kN/m^3	
Factor of Safety	1.5	

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Table 4B.2 Soil Parameters for Uphill Stability

Parameters	Parameter values	Comment
Peat - Active co-efficient ka	1.0	Peat is conservatively assumed to have zero shear strength. Using a Ka of 1 and a density of 11kN/m^3 includes the lateral load from the water
Peat – bulk density - γ	11 kN/m^3	Down hill component considered to load gabion wall. Peat will only be strengthened local to the wall but the lower γ value is used as a Ka value of 1 and a density of 11kN/m^3 yield greater lateral loads than a strengthened C_u of 25kN/m^2 (conservative estimate) and a density of 12kN/m^3.
Peat – mineral soil interface	0 kN/m^2	Assuming failure on peat/mineral soil interface
Co-efficient of friction - μ	0.45	For gabion/mineral soil interface
Gabion – bulk density - γ	15 kN/m^3	
Factor of Safety on peat slippage	1.05	Considered a highly improbable event

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Groundwater

The groundwater is taken to be at ground level local to the wall for the design of the gabion retaining structures. This is conservative as the pre-construction drainage to be installed within the peat layer will reduce the groundwater levels within the upper more permeable surface layer. Also the high permeability of the gabions will lead to a reduction in the watertable in the peat local to the wall. The gabions will be constructed on a sloping surface that falls to the west. The face drains, counterfort drains, will be brought up to the gabion retaining wall and will channel the water from the peat, which will flow in very small quantities down the back of the gabions, to the drain at the toe of the slope. These are detailed in RP006 – Site Drainage Planning Report.

Summary of Results

For local stability sufficient mass is provided in the gabion wall to give a FOS of 1.5 on sliding. Overturning moments (FOS in excess of 1.5 achieved) and bearing pressure checks (FOS of 3) are all satisfactory.

Global uphill stability of the peat is only a more onerous design condition than the local stability design condition along the northeast corner of the cut slopes. Elsewhere the ground does not slope directly towards the terminal. As a result there is a much reduced horizontal component acting perpendicular to the gabion walls.

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 48-1	

Member / Location

Drg. Ref. Gabion Wall

Job Title Combs Terrace

Made by JoB Date Oct 03 Chd. EJP

Reference	Calculation	Result

DESIGN OF GABION WALL AROUND FLARE STACK AREA.

Assumptions:

Peat Shear Strength ≃ 0.

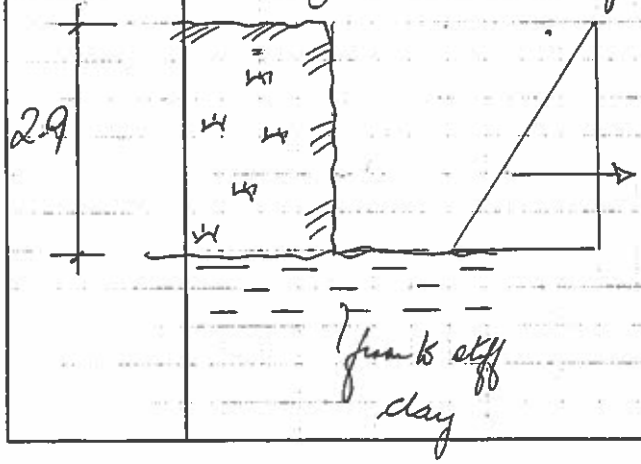
Peat Density ≃ 11kN/m³

Excavation to top of firm in the vicinity of the flare stack was depth of peat taken from boreholes along or adjacent to the cut edge

⇒ Design for peat depth of 2.9m but adjacent to bunds design for excavation depth of 3.6m.

Retaining Peat Only

Horizontal load from Peat:



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G 10
Rev 0

ARUP Calculation Sheet

Job Title: Corrib Terminal

Job No. C11671.0 | Sheet No. App 4-B .2 | Rev.

Member / Location

Drg. Ref. Gabion wall

Made by | Date | Chd. BN

Reference	Calculation	Result

Allowing for gabion weight of 15 kN/m³

Allowing for frictional resistance of $\mu = 0.45$

Required weight of gabions $= \frac{46.3}{0.45} = 102.7$ kN

Required Volume of gabion /m $= \frac{102.7 \text{ kN}}{15} = 6.85 \text{ m}^3$.

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Allowing for a factor of safety of 1.5 on sliding gives

$6.85 \times 1.5 = 10.28 \text{ m}^3/\text{m}$ run of wall

Use 3 deep x 3.5 m wide gabion wall

Overturning: $46.3 \times \frac{2.9}{3} = 45$ kNm/m

FOS on overturning = 6 ⇒ OK

Restoring moment $= 10.5 \times 1.5 \times 3.5/2 = 27.5$ kNm/m

FOS = 27.5 / 45 = 6

Bearing $\frac{P}{A} \pm \frac{My}{I} = \frac{3 \times 1.5}{1 \times 3.5} \pm \frac{45 \times (3.5/2)}{\left(\frac{1 \times 3.5^3}{12}\right)} = 4.5 \pm 22$

$= 67$ kN/m² or 23 kN/m²

⇒ require firm clay; SPT of 10 or greater ⇒ OK

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 4-B-3	

Member / Location

Drg. Ref.

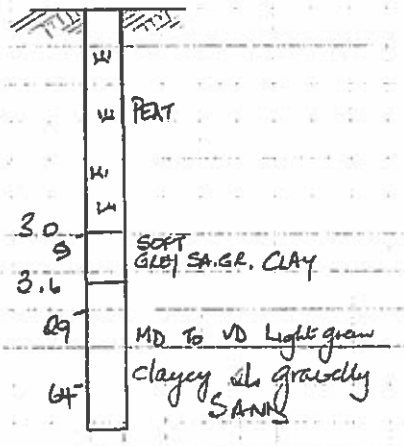
Job Title: Corrib Terminal

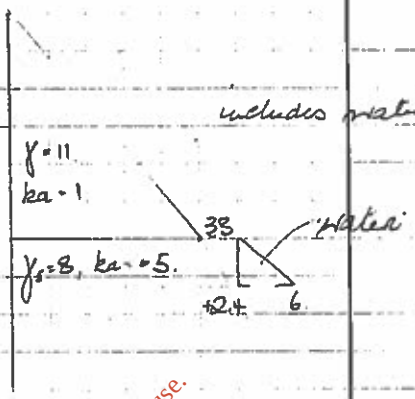
Made by: JG Date: 21 October 2003 Chd: RJP

Reference	Calculation	Result

Gabions in the vicinity of BH A5.

BH A5.





⇒ at 3.6m total horizontal load =

$$\frac{33 \times 3}{2} + \frac{33 + (33 + 24.6)}{2} \times 0.6 = 49.5 + 22.37$$

$$= 71.82 \text{ kN/m}$$

⇒ allowing for a friction value μ of .45 weight of gabion required, allowing for a FOS on sliding of 1.5 =

$$\frac{71.82}{.45} \times 1.5 = 239.4 \text{ kN}$$

Allowing for gabion density of 15kN/m³ volume of gabions required

$$= \frac{239.4}{15} = 15.96 \text{ m}^3/\text{m}$$

⇒ use 4m x 4m gabion wall

Due to fill up 32.5m OD - only retaining 2.7m of peat at D in permanent case ⇒ size for construction FOS ≈ 1.2

$$\frac{71.82 \times 1.2}{.45} = 191 \text{ kN/m}$$

Using 15kN/m³ give 12.7m³/m.

Use 4m HP x 3.5m W. gabion wall

1) Have allowed for water - but gabions should allow for flow
2) Have not taken advantage of 1.0m of fill in front wall in case ground contains rock to be [illegible]

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G 10
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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App A-B-A	

Member / Location

Drg. Ref.

Job Title: Corrib Gas Terminal

Made by: JOB Date: Nov 03 Chd.: EJH

Reference	Calculation	Result

GABION WALL AT TOP OF SLOPE:

1) Overall stability of peat above gabion wall - Extreme event

Top of slope ~ Ground level = 42.4m

Max Ground level = 45m OD

Distance = 110m

Critical is slope of u/s of peat

Take peat at top of slope to be 1.0m thick - from readings from gauge cores

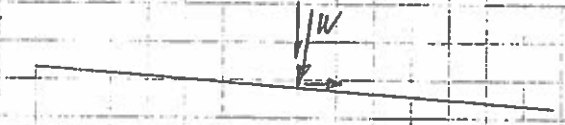
Take peat at top of slope to be 2.2m deep as from GI PI2

⇒ slope angle u/s peat

$$= \frac{(45 - 1.0^*) - (48.0 - 2.6)}{110m} = \frac{3.6}{110} = .0326$$

$$\therefore \quad = 1.87°$$

⇒



Horizontal component = $W \sin 1.87° = .0326\,W$.

⇒ Assuming Zero shear strength along u/s of peat and an average

* BH11 - peat 2.4m but shallower slope, although thicker peat result is smaller downhill component peat avg 2.6m slope 1.145°

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 4-B-5	

Member / Location

Drg. Ref. Gabion Walls

Job Title Corrib Gas Terminal

Made by LB Date Nov. '03 Chd. EJL

Reference	Calculation	Result
	thickness of 1.8m, weight of 11kN/m3.	
	⇒ over 110m the horizontal component =	Allowing for Gabion wall & shelf this reduces to 102m (658kN/m)
	110 × 11 × 1.8 × .0326 69.7kN/m	
	⇒ add this to the later load already on gabions	
	$ka\,\gamma h \times \frac{h}{2}$, γ 11kN/m3, ka = 1	
	h = 2.6	
	= 37.18 kN/m.	
	Allowing for factor of safety of 1.05 on failure up slope - extreme event.	⇒ FOS = 1.05
	⇒ 37.18 + 69.7 = 106.88 kN/m	
	Sliding μ = .045	
	⇒ $\frac{106.8}{.45} \times 1.05$ = 249 kN weight required	
	Gabion density ≈ 15kN/m3.	
	⇒ $\frac{249}{15}$ = 16.6 m3/m.	
	⇒ use 4 × 4.25m Gabion Wall.	
	or 5 × 3.5 m wide gabion wall	
	Check on overturning	
	Note up slope failure considered	

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ARUP

Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 4-B-6	

Member / Location

Drg. Ref.

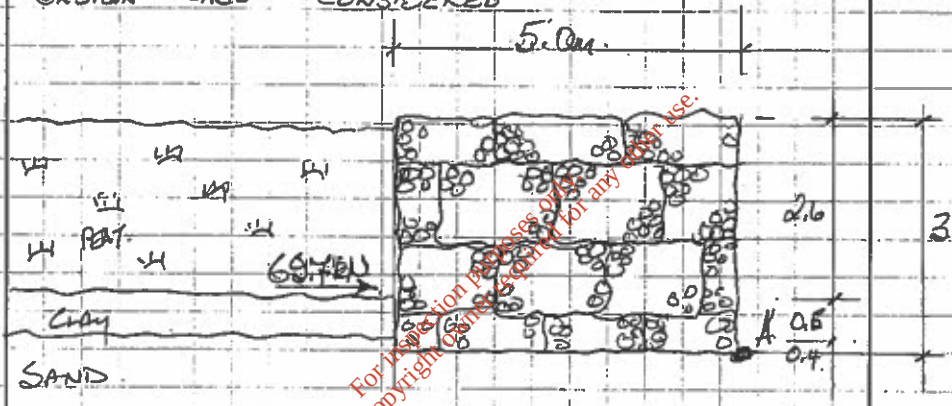
Job Title: Corrib Gas Terminal

Made by: JG Date: Nov '03 Chd.: EJL

Reference	Calculation	Result

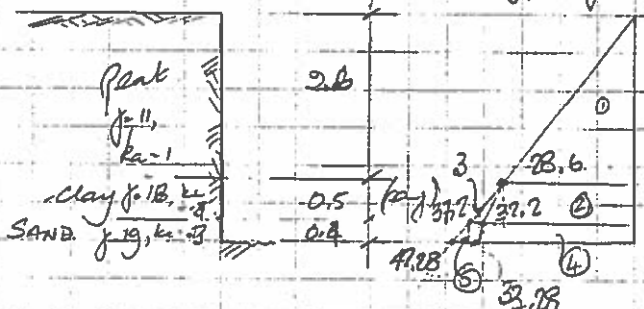
to occur along peat/clay interface
⇒ sliding failure do not contribute to overturning or bearing pressure
cracks unless gabions embedded into the mineral soils ⇒

DESIGN CASE CONSIDERED



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Lateral pressure retained by gabion (assume water table top of peat)



Total load = $\frac{28.6\times2.6}{37.18} + \frac{28.6\times.5}{14.3} + 38.2\times.4 + \frac{(37.2-28.6)\times.5}{2.15} + \frac{(42.28-37.2)\times.4}{1.016} = 69.52$

OT moment about A = $37.18\times(2.6/3+.9)+(4.3\times.65)+12.88\times.2+2.15\times.86+1.016\times.133 = 78.9$ kNm

Total OT_{MBase} = 78.9 + 69.7×.9 = 141 kNm/m

Restoring moment:

Weight of gabion = 5×3.5×15 = 262.5 kN/m

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App A3-7	

Member / Location

Drg. Ref.

Job Title Corrib Gas Terminal

Made by JOB. Date Nov '03 Chd. EJN

Reference	Calculation	Result

Restoring moment: $262.5 kN/m \times \frac{5.0}{2}$

$= 656.25 kN\,m/m$

$\Rightarrow$ FOS on overturning $= \frac{656.25}{142.0} = 1.62$ $\Rightarrow$ OK

For on bearing:

Bearing Pressure $= \frac{P}{A} \pm \frac{My}{I}$

$= \frac{P}{A} = 525 kN/m^2$, $M = 142 kNm$, $y = 2.5$

$I = \frac{5}{12} \times 1 = 10.4 m^4$

$= 52.5 \pm \frac{142 \times 2.5}{10.4} = 52.5 \pm 34.13$

$\Rightarrow 86 kN/m^2$ OK

$19 kN/m^2$

$\Rightarrow$ Adequate bearing capacity for base of form to cast 1st lift layer. ($SPT > 10$ $= 100 kN/m^2$ bearing pressure) Bearing OK

Note:

Need to relook at lateral load & sliding as gabions founded of below u/s of port

Total load $= 67.52 kN + 69.7 kN = 137.2 kN$

FOS of 1.05, $\mu = 0.45$

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C157.10	c App 4-B-8	

Member / Location

Drg. Ref. Gabion Walls

Job Title CORRIB GAS TERMINAL

Made by JOB Date NOV. '03 Chd. EJL

Reference	Calculation	Result

$\Rightarrow \frac{127.2 \times 1.05}{0.45} = 320$ kN/m/m

NOTE Gabion on 6° slope.

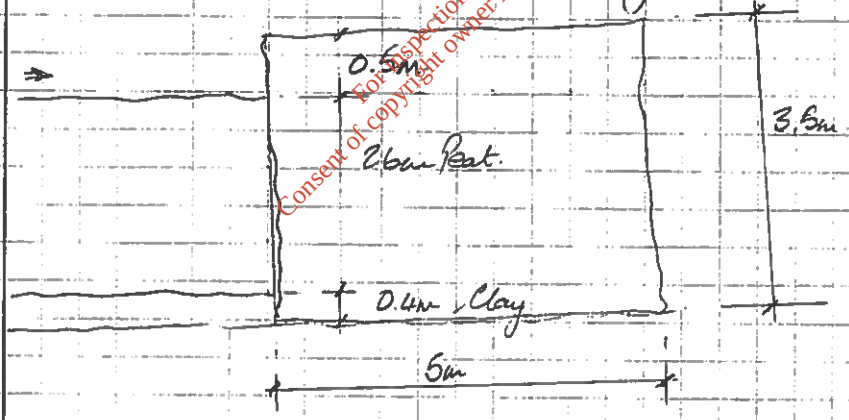
Load into hill $\Rightarrow$ horizontal component resisting sliding

$= 320 \sin 6° = 33$ kN

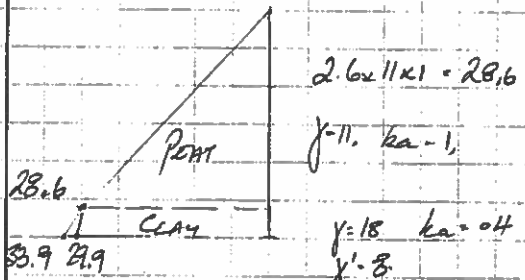
$\Rightarrow \frac{320 - 33}{15} = 19$ m³

$\Rightarrow$ too much increase

$\Rightarrow$ Place Gabions above peat



Horizontal load =



$2.6 \times 11 \times 1 = 28.6$

$\gamma = 11$. $k_a = 1$.

$\gamma = 18$ $k_a = .04$

$\gamma' = 8$.

Total lateral load $= \frac{28.6 \times 2.6}{2} + 28.6 \times .4 + \frac{5.3 \times .4}{2}$

$= 37.18 + 11.44 + 1.06 = 48.62$

Additional loading due to uphill peat

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App 4-B-9	

Member / Location

Drg. Ref. Gabion Walls

Job Title CORRIB GAS TERMINAL

Made by JOB Date Nov'03 Chd. BN

Reference	Calculation	Result

= 69.7 kN/m (equivalent to for head of water)

⇒ 48.62 + 69.7 = 118.32 kN/m

Allowing FOS of 1.05 on global uphill failure & $\mu = 0.45$ gives

$\frac{118.32}{0.45} \times 1.05 = 276$ kN/m

Weight of gabion = 15 kN/m³

So using a 6m × 3.5m gabion wall gives:

15 × 6 × 3.5 = 262.5 kN/m

As the gabion wall is sloped back into the hill of 0.4m over 5m we have horizontal component working back into face. $\tan^{-1} 0.4/5 = 4.6°$.

⇒ 262.5 (Sin 4.6°) = 21 kN

⇒ 276 − 21 = 255 kN/m

Force resisting = 262.5 × Cos 4.6° = 261.65 kN/m

261.65 > 255 kN/m ⇒ OK

for O/A downhill sliding of uphill part.

Note bearing pressures also reduced

OT Moment also reduced

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G 10
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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App A-B-10	

Member / Location

Drg. Ref.

Job Title Corrib Gas Terminal

Made by JOB Date Nov '03 Chd. BM

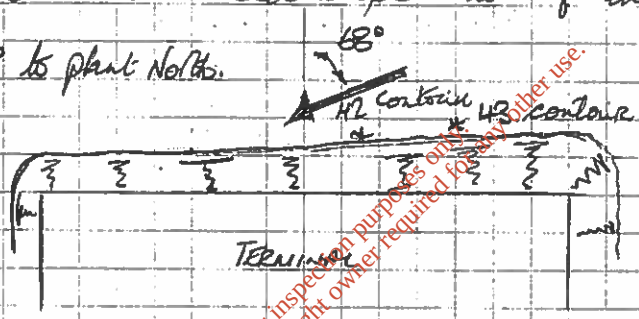
Reference	Calculation	Result

Gabion Details at Contour 42 - N

Stability of Uphill Peat.

From GR 24.11.03 - 001 it can be seen that the 'direct' downhill direction is not at 90° to the cut slope

Angle with cut slope is of the order of 68° to plant North.



Distance to ridge 95m.

Height increase 42 at top of cut slope to 43m AOD top of ridge

Peat thickness increase down slope from top of hill - assume average thickness of 2.6m

Take slope up of peat to be say 1.3m/95m ('say' (2.4 thick top of hill 2.7 thick at cut)

∴ down slope component = $\frac{1.3}{95} = .784$

∴ $2.6 \times 11 \times 95 \times \sin .784^\circ = 37.2 \text{ kN/m}$.

Component 'into' the cut slope =

$37.2 \times \cos 68^\circ = 14 \text{ kN/m}$ at base of peat.

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	App A-B-11	

Member / Location

Drg. Ref.

Job Title: Conib Gas Terminal | Made by: JOB | Date: Nov '03 | Chd.: EN

Reference	Calculation	Result

Note horizontal load from Part

$= \frac{2.7 \times 2.7}{2} \times 11 \times 1 = 40.1$ kN/m

⇒ Need to provide FOS of 1.5 on peak loading on Gabion wall

Need to provide FOS of 1.05 on stability of upslope pad

$(40.1 + 14) \times 1.05 = 56.8$, $1.5(40.1) = 60.15$

⇒ local stability case is the critical design case

⇒ FOS. 1.5, $\phi = 45$

Weight of gabions required = 133.4

at 15 kN/m³ this equates to

$\frac{133.7}{15} = 8.9$ m³/m ⇒ 3m 2m wall

See Spreadsheet on following page for size of gabion wall required

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App A-B-12

Corrib Gas Terminal C1157.10

Gabion Wall Design

Bulk Density of Peat (γ - allowing for water content) = 11 kN/m^3

Active Coefficient (ka - assuming zero shear strength) = 1

Friction co-efficient (μ) 0.45

Factor of Safety = 1.5

Bulk Density of Gabions 15 kN/m^3

Horizontal Force = $\frac{H^2*\gamma*ka}{2}$ kN/m

Peat Thickness (H)	Horizontal Force kN/m	Gabion Weight Reqd. kN/m	Wall area per metre m^2	Gabion Wall Dimensions
2.00	22.00	73.33	4.89	2m * 3m
2.10	24.26	80.85	5.39	2m * 3m
2.20	26.62	88.73	5.92	2.5m * 3m
2.30	29.10	96.98	6.47	2.5m * 3m
2.40	31.68	105.60	7.04	2.5m * 3m
2.50	34.38	114.58	7.64	3m * 3m
2.60	37.18	123.93	8.26	3m * 3m
2.70	40.10	133.65	8.91	3m * 3m
2.80	43.12	143.73	9.58	3m * 3.5m
2.90	46.26	154.18	10.28	3m * 3.5m
3.00	49.50	165.00	11.00	3.5m * 3.5m
3.10	52.86	176.18	11.75	3.5m * 3.5m
3.20	56.32	187.73	12.52	3.5m * 4m
3.30	59.90	199.65	13.31	3.5m * 4m
3.40	63.58	211.93	14.13	4m * 4m
3.50	67.38	224.58	14.97	4m * 4m
3.60	71.28	237.60	15.84	4m * 4m
3.70	75.30	250.98	16.73	4m * 4.5m
3.80	79.42	264.73	17.65	4m * 4.5m
3.90	83.66	278.85	18.59	4m * 5m
4.00	88.00	293.33	19.56	4m * 5m

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App A-B-13

'RIDGE LINE'

CRITICAL SECTION FOR UPHILL SLOPE PEAT STABILITY

BH1 BH 4 BH 3 BH 7 BH 6 BH 5 BH 9

TPR3 TP 1 TP 2 TP 3 TP 4 TPR5 TP 6 TP 7

TE1 TE2 TE3 TE4 TE5 TE6 TE7

BHW1 BHW2 BHW3 BHW4 BHW5 BHW6 BHW7 BHW8 BHW9 BHW10

BHP1 BHP2&IDP2 BHP3 BHP4 BHP5&IDP5 BHP6 BHP7 BHP8 BHP9 BHP10&IDP10 BHP11 BHP12 BHP13&IDP13 BHP14&IDP14 BHP15&IDP15

BHA1 BHA2 BHA3 BHA4 BHA5 BHA6 BHA7 BHA8

3.5m W x 3.5m DP

3m W x 3m DP

3.5m W x 2m DP

1.5m W x 2.5m DP

1.5m W x 4m DP

Reducing as required

Gabion Wall

110m

45m ADD

MEL-BH1-TR1 NTS

MEL-BH2-TR4 NTS

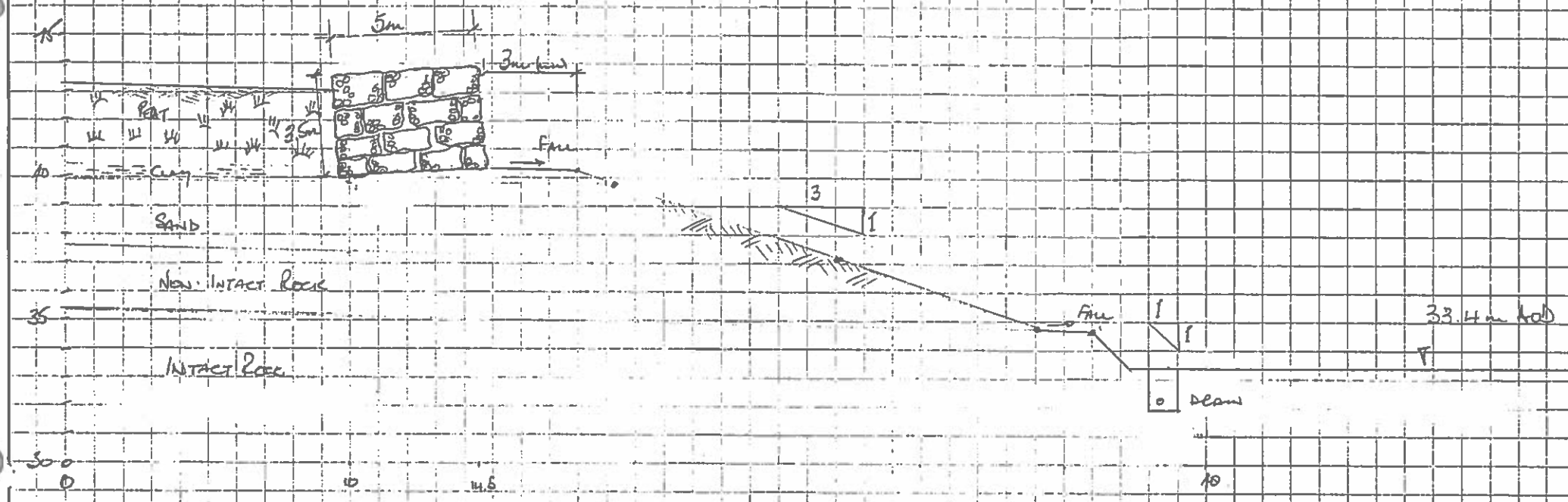
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ARUP Consulting Engineers	15 Oliver Plunkett Street Cork Tel: +353 (0)21 427 7670 Fax: +353 (0)21 427 2345	
Status PLANNING		
Job Title CORRIB GAS TERMINAL		
Drawing Title UPHILL STABILITY OF PEAT		
Scales 1:100	File Ref B.1	
Drn JB Date NOV'03 Chd MD Approved EH		
Job No. C1157.10	Drg No. APP: AB-13	Rev A.

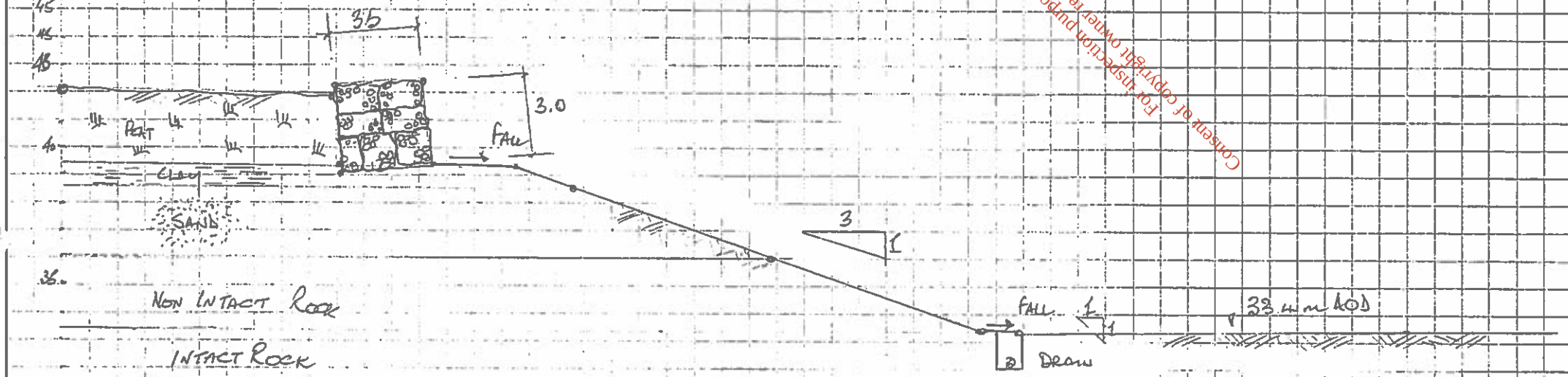
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G 10
Rev 1
A3

GABION DETAIL AT 43.0m CONTOUR M-N



GABION DETAIL AT 42m OD: CONTOUR ~ M-N



A: TERMINAL AT 33.4m AOD

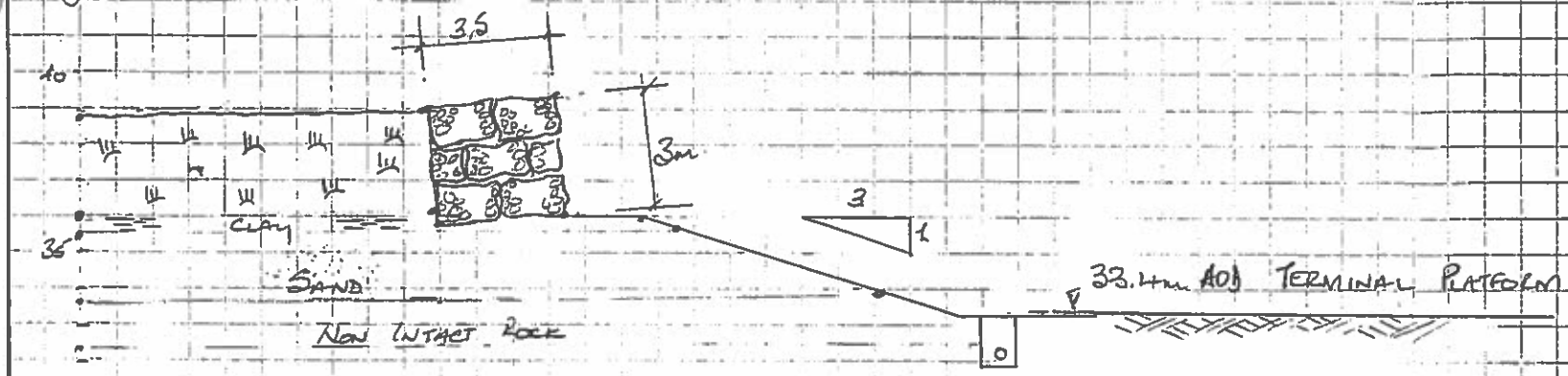
ARUP	Sketch Sheet	
Job Title	Lomb Gas Terminal	
Job No. C1157/10	Sketch No. App4B-14	Rev. 1.
Made by JOKeen	Date Nov '03	Chd. EJL

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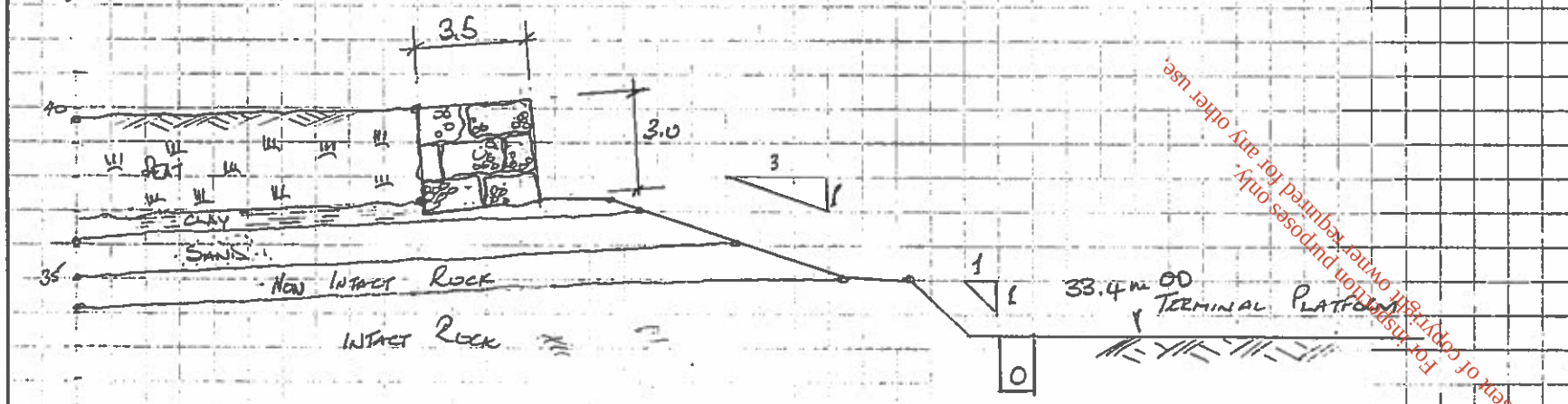
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Rev 1
A3

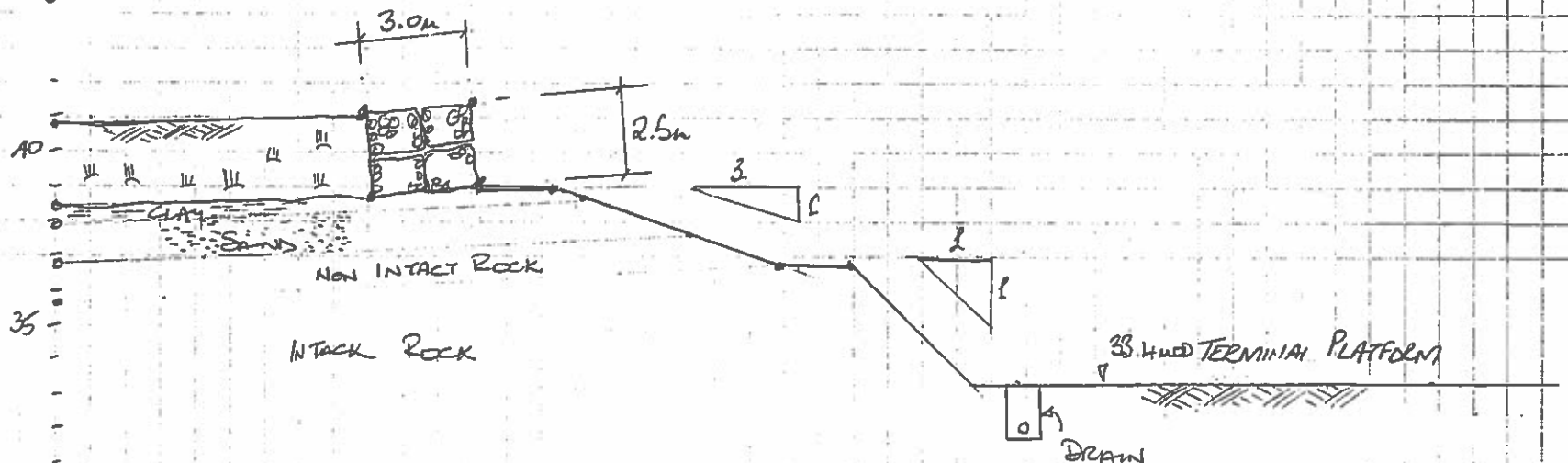
Gabion Detail at 39.0 Contour A-N



Gabion Detail at 40m Contour A-N



Gabion Detail at 41m AOD Contour A-N



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Contour 39m AOD A-N Contour 40m AOD Similar.

Depth of Peat = 2.8m ⇒ H. $\frac{2.8 \times 2.8}{2} \times 11 = 43.12 kN/m$

FOS = 1.5, $\mu = 0.45$ ⇒ Weight of gabions required = $\frac{43.12 \times 1.5}{0.45} = 143 kN/m$

Gabion weight ≈ $15 kN/m^3$

$= 143/15 \simeq 9.6 m^2/m$ required

Use 3m x 3.5m gabion wall

OT Moment : $\frac{43.12 \times 2.8}{3} = 40.25 kNm/m$, Restoring M : $\frac{3 \times 3.5 \times 15 \times 3.5}{2} = 275 kNm/m$

⇒ OK

Bearing : $\frac{P}{A} \pm \frac{My}{I}$, $\frac{P}{A} = 45 kN/m^2$, $M = 40.25$, $y = \frac{3.5}{2}$, $I = \frac{1 \times 3.5^3}{12} = 3.6$

$= 45 + \frac{40.25 \times 1.75}{3.6} = 45 + 19.6 = 65 kN/m^2 / 25 kN/m^2$

⇒ Require firm Clay or better.

Contour 41m AOD A-N

Depth of Peak = 2.3m, $H = \frac{2.3^2}{2} \times 11 = 29.1 kN/m$

FOS on sliding = 1.5, $\mu = 0.45$ ⇒ Gabion weight $(29.1/.45) \times 1.5 = 97 kN/m$

Gabion ≈ $15 kN/m^3$ ⇒ $97/15 = 6.5 m^2/m$ gabion ≈ 3 x 2.5m. Gabion.

NOTE Site falls away from top of slope ⇒ no additional horizontal load to be considered

OT Mom = $29.1 \times 2.3/3 = 22.31 kNm/m$, Restoring Mom = $\frac{3 \times 2.5 \times 15 \times 3}{2} = 169 kNm/m$

⇒ OK

Bearing : $= \frac{P}{A} \pm \frac{My}{I}$ $y = 3/2$, $I = 1 \times 3^3/12 = 2.25$

⇒

$16.25 \pm \frac{22.31 \times 1.5}{2.25} = 37.5 \pm 15 kN/m^2$

$= 52.5 kN/m^2$ or $28 kN/m^2$

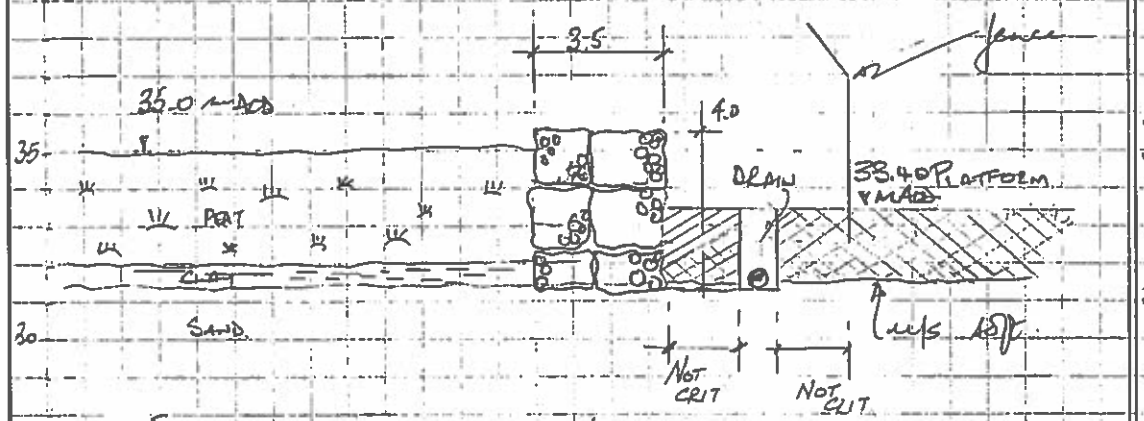
⇒ Require firm Clay or better

ARUP Sketch Sheet		
Job Title CORRIB GAS		
Job No. C1157.10	Sketch No. App 4-B-15	Rev.
Made by JOB	Date 24 Nov '03	Chd. EOL

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G 10
Rev 1
A3

Gabion details: Corner D (soft clay) depth 3.6m



FOS = 1.2 during construction - OK as site slope is away from face of excavation

FOS = 1.5 permanent

3m peat ⇒ horizontal load

$= 11 \times \frac{3^2}{2} = 49.5$ kN/m

⇒ FOS of 1.5, $\mu = .45$

Required wall weight = $\frac{49.5 \times 1.5}{.45} = 165$ kN/m

Gabions ≈ 15kN/m³

⇒ 165/16 ≈ 11m³/m gabion

4 × 3.5 ≈ 14m³ ⇒ OK for permanent case

During Construction

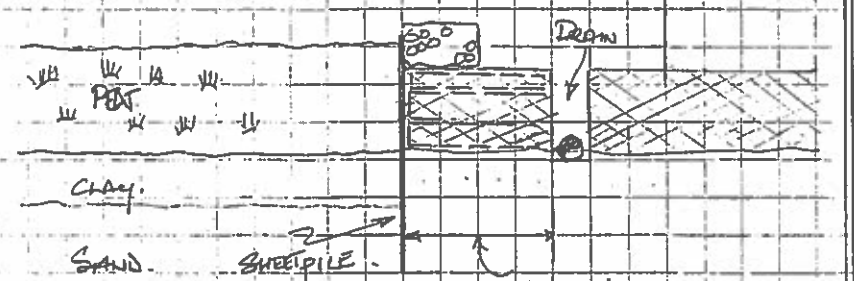
From gabion calculations: H = 72kN/m (page 6)

⇒ FOS = 1.2, $\mu = .45$ ⇒ 192kN/m

⇒ @ 15kN/m³ weight wall required = $\frac{192}{15} = 10.8$m³/m

⇒ Use 1 × 3.5m wall ≈ 14 m³/m run ⇒ OK for construction condt.

Gabion detail at 34m AOD South of Corner D



To pull wrap around geotextile requirements

Sheet pile design for construction stage

Gabion design permanent case assuming Sheetpile

height = 34 − 30.6 = 1.4m

⇒ H $\frac{1.5 \times 1.5 \times 11}{2}$ = 12.4kN/m

⇒ FOS = 1.5, μ = .4 (conflic)

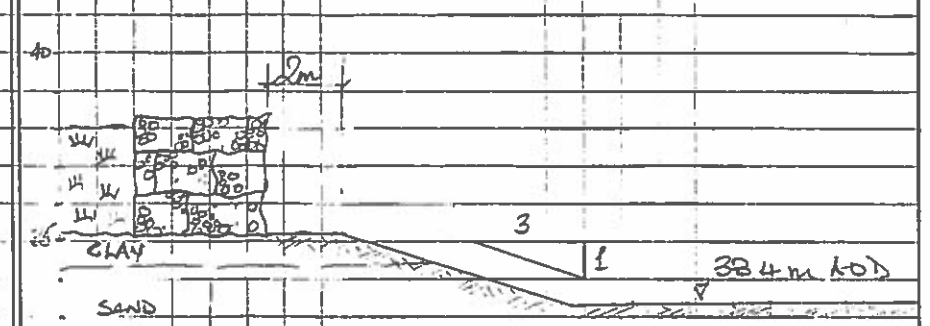
⇒ $\frac{12.4}{.4} \times 1.5 = 46.5$ kN/m

@ 15kN/m³ $\frac{46.5}{15} = 3.1$ m³/m

Provide 2 × 2m Gabion wall

REV:A: TERMINAL PLATFORM AT 38.4m AOD.

Gabion Detail Between A & B



Retaining 2.8m Peat

⇒ H = $\frac{2.8 \times 2.8}{2} \times 11 = 43.12$kN/m.

⇒ FOS = 1.5 μ = .45.

W required from Gabion wall = $\frac{43.12 \times 1.5}{.45} = 143.7$kN/m

Gabion weight ≈ 15kN/m³

⇒ $\frac{14.3}{15} = 9.6$m³/m.

⇒ 2 × 3.5 ≈ 10.5 m³/m ⇒ OK

OT moment = $43.12 \times \frac{2.8}{3} = 40.25$ kNm/m

Restoring = $\frac{3 \times 3.5 \times 15 \times 3.5}{2} = 275$ kNm/m ⇒ OK

Bearing = $\frac{P}{A} \pm \frac{My}{I} = \frac{45\text{kN/m}^2 \pm 40.25 \times 3.5/2}{1 \times \frac{3.5^3}{12}} = 45 \pm 25$kN/m²

= 65kN/m² or 25kN/m²

⇒ From bh's Staff clay OK for bearing

ARUP Sketch Sheet		
Job Title: CORRIB GAS TERMINAL		
Job No.: C1157.10	Sketch No.: App 4-B-16	Rev.: A.
Made by: JOB	Date: 24 NOV '03	Chd.: EJP

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Appendix 4C – Sheet pile Design for Temporary Construction Conditions

Introduction

To the south of the site the ground levels are below the proposed Terminal platform level of 33.4m AOD. It is necessary to remove the soft peat layer and bring levels back to 33.4m AOD. In the temporary construction condition the peat will be retained using sheet piles. These sheet piles are only used to retain the unexcavated peat for a short period of time during the construction of the terminal fill.

The height of retained material varies across the site with a maximum retained height of approximately 3.65m. This is the cross-section that has been analysed as displacements and structural loading of the sheet pile member will be the greatest at this location.

The sheet piling equipment will access the site along a purpose built access track running along the retained edge of the sheet pile. Soil stabilisation will be carried out along this access road and within the peat being retained by the sheet pile wall. This is achieved by the addition of dry powder cement to the peat. The effect of the soil stabilisation is to stiffen the peat resulting in a material with properties similar to a firm to stiff clay.

The length of the sheet pile has been determined by the ground conditions present. Sheet piles will be driven to a depth of 6m below ground level for a retained height of 3.65m. This depth corresponds with the depth at which the underlying firm mineral soil occurs.

Analyses have been carried out to determine the stability and displacements that will occur during the excavation of the peat for the terminal platform. Two analyses have been carried out with soil stabilisation on the retained side of the wall. The first analysis was carried out for a wall in an un-propped condition and the second analysis was carried out with a prop located at the top of the wall. In both cases the stabilised peat has been given properties equivalent to those of firm clay. These are a conservative estimate of the strengths that can be achieved. A 20kN/m^2 surcharge has also been included at the back of the wall in line with guidelines presented in the Ciria guide No.104, Design of Walls Embedded in Stiff Clays, 1984.

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Soil Parameters

The parameters used in the Sheet pile wall analysis are shown in Table 4C.1. Note higher values of density have been used for the mineral soils than in the slope stability calculations as this will generate greater horizontal pressures on the sheet pile.

Groundwater Conditions

Groundwater has been conservatively assumed to be at ground surface on the retained side of the sheet pile wall i.e. at the top of the peat and at excavated surface on the excavated side of the wall as a perimeter drain will be installed at the base of the fill. See PR006 – Site Drainage Planning Report for details of this drain.

Summary of Results

The local stability of the sheet piles under loading is satisfactory in both the propped and un-propped cases. Factored soil parameters have been used. The calculations show that the sheet pile wall to be used to retain the stabilised peat material during construction of the terminal platform can be installed without the requirement for propping. Defections of the will be in the order of 18cm for an un-propped wall and 10cm for the propped wall. This level of deflection is reasonable given the temporary nature of the wall and the long-term backfilling of the terminal platform.

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Table 4C.1 Sheet Pile Wall Design - Soil Properties

Material	Young's Modulus (E)	Unit Weight (kN/m^3)	At rest pressure coefficient (Ko) FOS=1.2 on Tan ϕ	Active pressure coefficient (Ka) FOS=1.2 on Tan ϕ	Passive pressure coefficient (Kp) FOS=1.2 on Tan ϕ	Active pressure coefficient (Cohesion) (Kac)	Passive pressure coefficient (Cohesion) (Kpc)	Ratio Hor Eff Stress to Vert Eff Stress	Cohesion (Co)	Ref Level for E & C	Gradient of Cohesion	Gradient of Youngs Modulus (E/m) FOS= 1.5
Peat (Undrained)	311	11	1	1	1	2	2	1	2	0	0	0
Peat (Drained)	267	11	1	0.37	2.72	1.22	3.3	0.33	3	0	0	0
Peat Stabilised (Undrained)	1667	12	1	1	1	2	2	1	17	0	0	0
Peat Stabilised (Drained)	333	12	1	0.37	2.72	1.22	3.3	0.33	3	0	0	0
Mineral Soil (Undrained)	4800	20	1	1	1	2	2	1	52	-3.5	24	2266
Mineral Soil (Drained)	5010	20	1	0.29	3.41	1.08	3.69	0.33	1	-3.5	0	3300
Schist (Drained / Undrained)	50000	20	1	0.33	3.04	1.15	3.49	0.25	0	0	0	0

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Table 4C.2 Analyses Files

File Name	Analysis Carried Out
App 4C_Sheetpile ULS Unpropped	Sheet Pile wall with Stabilised Peat on Retained Side of wall with no propping
App 4C_Sheetpile ULS Propped	Sheet Pile Wall with Stabilised Peat on Retained Side of wall with propping at top of wall

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	APP-4C-1	/

Member / Location: Sheetpile Wall
Drg. Ref.: South Edge Terminal.
Job Title: CORRIB
Made by: DAH Date: 13/11/03 Chd. SFM

Reference	Calculation	Result

Preliminary Design of Sheet pile Wall on boundary between BHW8 & BHW9.

Borehole Information

BHW8

Peat 0 - 3.7m
Gravelly Clay 3.7m - 5.9m
Clayey Sand 5.9m - 6.8m (Terminates 6.8m)

BHW9.

Peat 0 - 3.6m
Gravelly Clay 3.6 - 5.4m (Terminates 5.4m)

BHP7.

Peat 0 - 2.8m
Gravelly Clay 2.8m - 5m.
Sand 5m - 5.7m

Core records BHP10 indicates solid (intact) rock at a depth of 6.5m

This is similar to the level that the boreholes terminate at.

We shall use a profile as below.

0 - 3.65m Peat
3.65 - 5.70 Gravelly Clay
5.70 - 6.50 Clayey Sand
6.5 → Mod Weak - Mod strong Mica Schist.

Excavation shall be to top of Gravelly Clay.

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	APP-4C-2	/

Member / Location

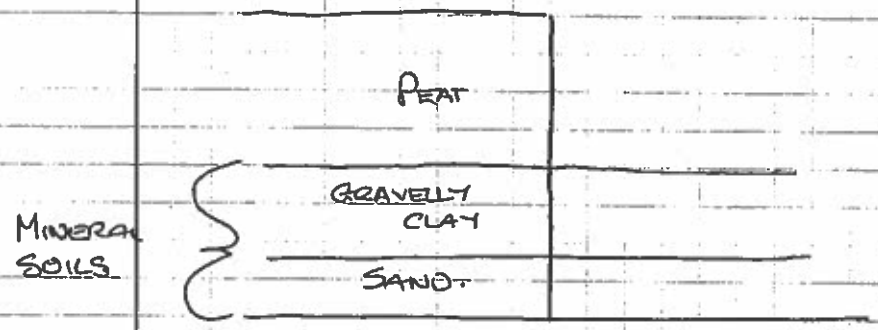
Drg. Ref.

Job Title CORRIB

Made by DAH Date 13/11/03 Chd. SFM

Reference	Calculation	Result

Hence the profile is



MATERIAL PROPERTIES

Peat. $\gamma_b = 11$ kN/m³ AGEC REPORT used 10 kN/m³. 11 more Conservative

UNDRAINED

$K_a = 1$ Active Pressure

$K_p = 1$ Passive Pressure

$K_{ac} = 2$ $2 \times \sqrt{K_a} \Rightarrow 2$ Cohesive Coefficient

$K_{pc} = 2$ $2 \times \sqrt{K_p} \Rightarrow 2$ Cohesive Passive Coeff.

$K_r = 1$ Ratio of horiz to vert

FOS=1.5 Cohesion $C_u = 2. \Rightarrow 3/1.5$ 3kPa from AGEC RPT

FOS=1.5 $E = 466/1.5 = 311$ 466 from AGEC RPT.

DRAINED.

FOS=1.5 $E = 400/1.5 = 267$ 400 from AGEC RPT

FOS=1.2 on ϕ $\frac{1+\sin\phi}{1+\sin\phi} = 0.38$ $K_a = 0.37$.

$\phi = 32$ $\phi_{design} = 26.7$ take 0.37

$K_p = 1/0.37 = 2.72$

$K_{ac} = 2 \times \sqrt{K_a} = 1.22$

$K_{pc} = 2 \times \sqrt{K_p} = 3.3$.

$K_r = 0.33$.

$C' = 3$ kPa.

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G 10
Rev D

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
	APP-4C-3	1

Member / Location

Drg. Ref.

Job Title CORRIB. Made by DAH Date 13/11/03 Chd. SFM

Reference	Calculation	Result

MINERAL SOILS.

$\gamma_b = 20 kN/m^3$

Undrained

$K_a = 1$
$K_p = 1$
$K_{ac} = 2$
$K_{pc} = 2$
$K_r = 1$

CIRIA. SPT Book RPT 143

$C_u \Rightarrow 6.5 \times SPT.$

= SPT top. = 12.
SPT bottom = 29.

Hence C_u top $= (6.5 \times 12)/1.5$
$= 52 kPa$

C_u bottom $= (6.5 \times 29)/1.5$
$= 125 kPa$

$E = 0.6 \times SPT$ (MPa)

$E_{top} = 0.6 \times 12/1.5 = 4800 kPa.$
$E_{bottom} = 0.6 \times 29/1.5 = 11600 kPa.$

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Drained

$K_a = 0.29.$
$K_p = 3.41$
$K_{ac} = 1.08$
$K_{pc} = 3.69.$
$K_r = 0.33.$
$C' = 1 kPa.$

$E = 5010 kPa.$

INTACT ROCK.

Not used in retaining wall calculations as wall does not penetrate rock strata.

$E = 50,000$
$\gamma_b = 20.$
$K_a = 0.33$
$K_p = 3.04$
$K_{ac} = 1.15$
$K_{pc} = 3.49$
$K_r = 0.25$
$C_u = 0.$
$C' = 0.$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
	APP-4E-4	/

Member / Location: SHEET PILE DESIGN.
Drg. Ref.: SOUTH EDGE OF TERMINAL
Job Title: CORRIB.
Made by: DAH Date: 13/11/03 Chd.: SFM

Reference	Calculation	Result

Stabilised Peat.

$\gamma_b = 12\ kN/m^3$ Assumed (Slightly higher due to addition of binder)

Undrained

$E = 1667$ Assumed.
$K_a, K_p = 1$
$K_{ac}, K_{pc} = 2$
$K_r = 1$
$C_u = 17\ kPa$ Very conservative as some mixing can achieve 100 kPa+

Drained

$E = 333\ kPa$ Assumed.

As Per Peat (Drained):
$K_a = 0.37$
$K_p = 2.72$
$K_{ac} = 1.22$
$K_{pc} = 3.3$
$K_r = 0.33$
$C' = 3\ kPa$

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Sheet pile Properties

Assuming an LX16 sheetpile section

Stiffness = E x I

$E = 210{,}000\ N/mm^2$.

$I_{LX16} = 1641\ cm^3$ /m length of wal.

Hence $E \times I = 65486\ kNm^2$/m length of wall.

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APP 4C: -5

REPORT NO. 6984 — GEOTECHNICAL BORING RECORD — IGSL

CONTRACT: Corrib Pipeline - Terminal Site Additional Works

CLIENT: Enterprise Energy Ireland

ENGINEER:

CO-ORDINATES: E 86414.00 N 32848.00

GROUND LEVEL (mOD): ~~32.45~~ 30.779

BOREHOLE DIAMETER (mm): 200

BOREHOLE DEPTH (m): 6.80

CASING DEPTH (m): 6.80

BOREHOLE NO: BHW8

Sheet 1 of 1

DATE STARTED: 01/04/2001

DATE COMPLETED: 01/04/2001

BORED BY: D. Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	DEPTH (m)	FIELD TEST RESULTS
0	Very soft, brown PEAT				4181	DB	1.00-1.45	0/300mm
1								
2					4182	DB	2.00-2.45	0/300mm
3					4183	DB	3.00-3.45	1/300mm
4	Firm, grey, sandy, gravelly CLAY		~~28.74~~ 27.119	3.70	4184	DB	4.00-4.45	16/300mm
5					4185	DB	5.00-5.45	19/300mm
6	Dense, light green, clayey, slightly gravelly SAND (Possible weathered Rock)		~~26.54~~ 24.92	5.90	4186	DB	6.00-6.45	33/300mm
7	End of Borehole at 6.80 m		~~25.64~~ 24.02	6.80				
8								
9								

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
6.60	6.80	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed at	Rise to	Time	Comments

Standpipe Installation Details

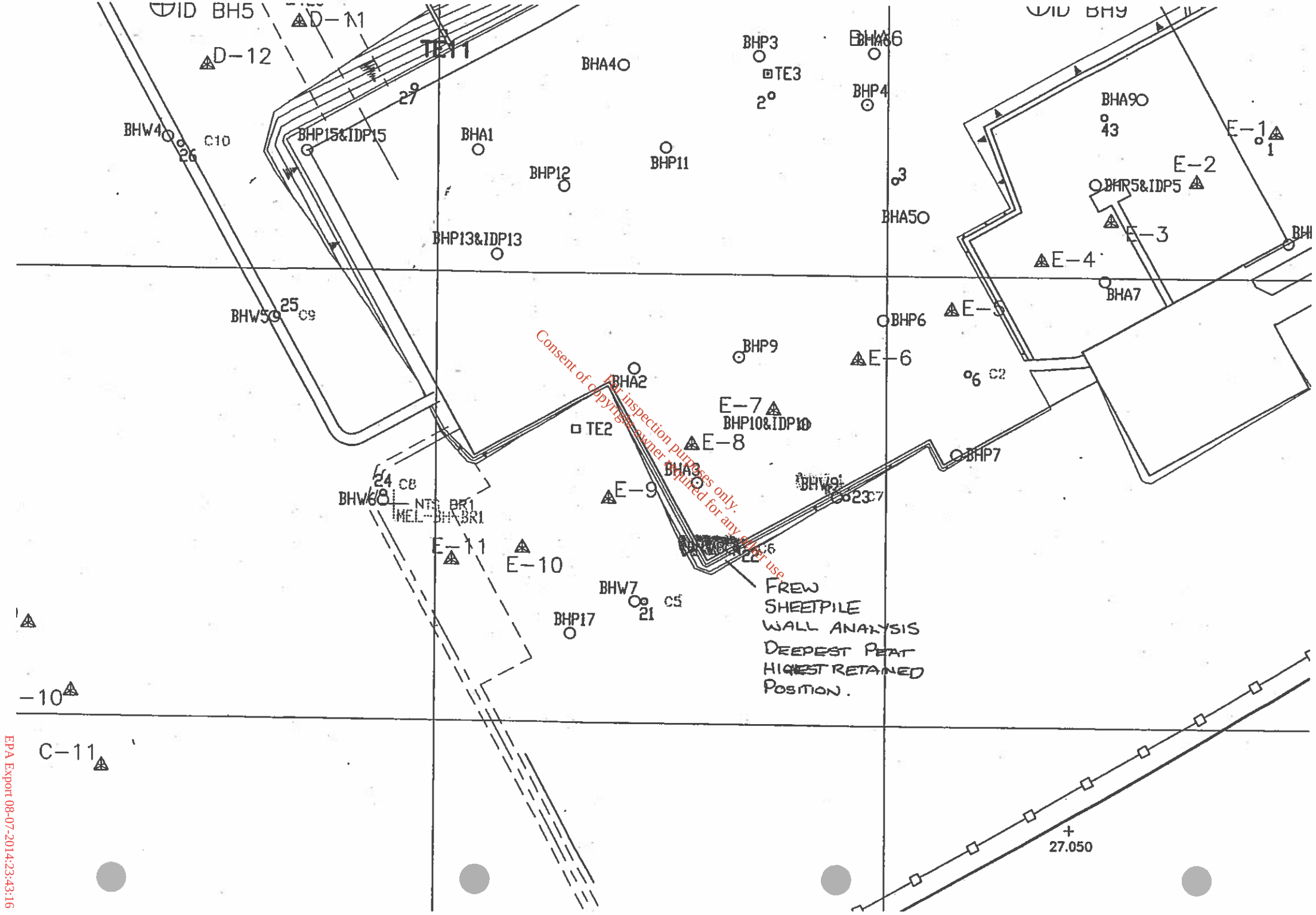
Date	Tip Depth	RZ Top	RZ Base	Type
06/06/2001	6.10	5.10	6.10	

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

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Brief Technical Description

FREW

FREW is a program to analyse the soil structure interaction problem of a flexible retaining wall, for example a sheet pile or diaphragm wall.

The wall is represented as a line of nodal points and three stiffness matrices relating nodal forces to displacements are developed. One represents the wall in bending and the others represent the soil on each side of the wall. The soil behaviour is modelled using one of three methods: -

1. **"SAFE" flexibility method** - the soil is represented as an elastic solid with the soil stiffness matrices being developed from pre-stored stiffness matrices calculated using the "SAFE" finite element program. This method is ideally limited to a soil with linearly increasing stiffness with depth, but empirical modifications are used for other cases.
2. **Mindlin method** - the soil is represented as an elastic solid with the soil stiffness based on the integrated form of the Mindlin Equations. This method can model a wall of limited length in plan but is ideally limited to a soil with constant stiffness with depth but again empirical modifications are used for other cases.
3. **Subgrade reaction method** - the soil is represented as a series of non interactive springs. This method is considered to be unrealistic in most circumstances.

The program analyses the behaviour for each stage of the construction sequence. At each stage it calculates the force imbalance at each node imposed by that stage and calculates displacement and soil stresses using the stiffness matrices. If the soil stresses are outside the active or passive limiting pressures correction forces are applied and the problem solved iteratively until the stresses are acceptable. Allowance can be made for arching within the soil body when calculating the active and passive limiting pressures.

The following input parameters are included in the analysis:

- problem geometry including dig depths, distances to remote boundaries
- wall profile bending stiffness and creep
- soil stratification, strength, density and stiffness
- struts (or anchors) including prestress, stiffness, inclination and a lever arm (to represent rotational fixity).
- surcharges including depth and extent
- groundwater levels and pore pressures each side of wall.

The program gives results for earth pressures, shear forces and bending moments in the wall, strut forces and displacements. These are presented in tabular form and can be plotted diagrammatically. In addition the number of iterations, the displacement error between successive interactions and the maximum earth pressure error are output.

Full details of the assumptions and analysis methods are included in the following paper.

Pappin J W, Simpson B, Felton P J, and Ralson C (1986). "Numerical analysis of flexible retaining walls". Symposium on computer applications in geotechnical engineering. The Midland Geotechnical Society, April.

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INITIAL DATA

Notes
LX16 sheetpile section
Peat Stabilised using soil mixing
Toe of wall at 6.5m bgl
Unpropped
20kN/m2 surcharge

Soil properties

No.	Unit Wt [kN/m³]	KO	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.2900	3.410	1.080	3.690	0.3300	User_Specified
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
9	0.0	1.000	1.000	1.000	1.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	0.0	0.0	333.0	0.0
3	1.000	0.0	0.0	5010.	0.0
4	17.00	0.0	0.0	1667.	0.0
5	52.00	-3.500	24.33	4800.	2266.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0
9	1.000	0.0	0.0	100.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ks
1	2	-	Left	0.0	20.00			

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	2	7	50.00	50.00	65490.	1
2	-0.5000	2	7	50.00	50.00	65490.	2
3	-1.000	2	7	50.00	50.00	65490.	3
4	-1.500	2	7	50.00	50.00	65490.	4
5	-2.000	2	7	50.00	50.00	65490.	5
6	-2.500	2	7	50.00	50.00	65490.	6
7	-3.000	2	7	50.00	50.00	65490.	7
8	-3.400	2	7	50.00	50.00	65490.	8
9	-3.900	3	3	50.00	50.00	65490.	9
10	-4.500	3	3	50.00	50.00	65490.	10
11	-5.000	3	3	50.00	50.00	65490.	11
12	-5.450	3	3	50.00	50.00	65490.	12
13	-5.950	3	3	50.00	50.00	65490.	13
** 14	*-6.500*	*3*	*3*	*50.00*	*50.00*	*0.0*	*14*
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: *-6.50*

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	50.00	50.00

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 27000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 27000. kPa

Iter no.	Ino max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	13.87	4	0.0	0
2	13.90	4	0.0	4	0.0	0
3	13.90	4	0.0	4	0.0	0

Ground level left = 0.00 Ground level right = 0.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	9.640	0.2737	0.2050	0.0	2	7	0.1487	0.2050	0.0	0.0	0.0
2	-0.5000	12.97	1.095	0.8157	4.905	2	7	0.5950	0.8157	4.905	0.0	0.0
3	-1.000	13.67	2.190	1.635	9.810	2	7	1.190	1.635	9.810	0.0	0.0
4	-1.500	13.87	3.285	2.454	14.72	2	7	1.785	2.454	14.72	0.0	0.0
5	-2.000	13.65	4.380	3.272	19.62	2	7	2.380	3.272	19.62	0.0	0.0

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6	-2.500	12.88	5.475	4.092	24.53	2	7	2.975	4.092	24.53	0.0	0.0
7	-3.000	11.66	6.570	4.902	29.43	2	7	3.570	4.902	29.43	0.0	0.0
8	-3.400	9.018	7.446	5.581	33.35	2	7	4.046	5.581	33.35	0.0	0.0
9	-3.900	5.134	10.54	8.639	38.26	3	3	6.891	8.639	38.26	0.0	0.0
10	-4.500	3.105	16.65	14.83	44.15	3	3	13.00	14.83	44.15	0.0	0.0
11	-5.000	2.416	21.75	19.97	49.05	3	3	18.10	18.97	49.05	0.0	0.0
12	-5.450	2.013	26.34	24.56	53.46	3	3	22.69	24.56	53.46	0.0	0.0
13	-5.950	1.582	31.43	29.65	58.37	3	3	27.78	29.65	58.37	0.0	0.0
14	-6.500	1.048	37.03	35.24	63.77	3	3	33.38	35.24	63.77	0.0	0.0
15	-7.000	0.5603	42.13	40.31	68.67	6	6	38.48	40.31	68.67	0.0	0.0
16	-7.500	0.2991	47.22	45.40	73.58	6	6	43.57	45.40	73.58	0.0	0.0
17	-8.000											
	0.1699	52.32	50.54	78.48	6	6	48.67	50.54	78.48	0.0	0.0	
18	-8.500	0.09336	57.41	55.62	83.39	6	6	53.76	55.62	83.39	0.0	0.0
19	-9.000	8.621E-6	62.51	60.69	88.29	6	6	58.86	60.69	88.29	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	4	8	50.00	50.00	65490.	1
2	-0.5000	4	8	50.00	50.00	65490.	2
3	-1.000	4	8	50.00	50.00	65490.	3
4	-1.500	4	8	50.00	50.00	65490.	4
5	-2.000	4	8	50.00	50.00	65490.	5
6	-2.500	4	8	50.00	50.00	65490.	6
7	-3.000	4	8	50.00	50.00	65490.	7
8	-3.400	4	8	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	*-6.500*	*5*	*5*	*50.00*	*50.00*	*0.0*	*14*
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: *-6.50*

RESULTS FOR STAGE 1 : Install Wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 30000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 31000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 0.00 Ground level right = 0.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	0.0	0.2737	0.2050	0.0	4	8	0.1487	0.2050	0.0	0.0	0.0
2	-0.5000	0.0	1.095	0.8157	4.905	4	8	0.5950	0.8157	4.905	0.0	0.0
3	-1.000	0.0	2.190	1.635	9.810	4	8	1.190	1.635	9.810	0.0	0.0
4	-1.500	0.0	3.285	2.454	14.72	4	8	1.785	2.454	14.72	0.0	0.0
5	-2.000	0.0	4.380	3.272	19.62	4	8	2.380	3.272	19.62	0.0	0.0
6	-2.500	0.0	5.475	4.092	24.53	4	8	2.975	4.092	24.53	0.0	0.0
7	-3.000	0.0	6.570	4.902	29.43	4	8	3.570	4.902	29.43	0.0	0.0
8	-3.400	0.0	7.446	5.581	33.35	4	8	4.046	5.581	33.35	0.0	0.0
9	-3.900	0.0	10.54	8.639	38.26	5	5	6.891	8.639	38.26	0.0	0.0
10	-4.500	0.0	16.65	14.83	44.15	5	5	13.00	14.83	44.15	0.0	0.0
11	-5.000	0.0	21.75	19.97	49.05	5	5	18.10	19.97	49.05	0.0	0.0
12	-5.450	0.0	26.34	24.56	53.46	5	5	22.69	24.56	53.46	0.0	0.0
13	-5.950	0.0	31.43	29.65	58.37	5	5	27.78	29.65	58.37	0.0	0.0
** 14	*-6.500*	*0.0*	*37.03*	*35.24*	*63.77*	*5*	*5*	*33.38*	*35.24*	*63.77*	*0.0*	*0.0*
15	-7.000	0.0	42.13	40.31	68.67	6	6	38.48	40.31	68.67	0.0	0.0
16	-7.500	0.0	47.22	45.40	73.58	6	6	43.57	45.40	73.58	0.0	0.0
17	-8.000	0.0	52.32	50.54	78.48	6	6	48.67	50.54	78.48	0.0	0.0
18	-8.500	0.0	57.41	55.62	83.39	6	6	53.76	55.62	83.39	0.0	0.0
19	-9.000	0.0	62.51	60.69	88.29	6	6	58.86	60.69	88.29	0.0	0.0

** Wall toe level: *-6.50*
WARNING - Residual moment > 1% of peak moment in wall
WARNING - Wall base moment > 20% of average wall moment

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : EXCAVATION STAGE 1

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	4	0	50.00	50.00	65490.	1
2	-0.5000	4	0	50.00	50.00	65490.	2
3	-1.000	4	0	50.00	50.00	65490.	3
4	-1.500	4	8	50.00	50.00	65490.	4
5	-2.000	4	8	50.00	50.00	65490.	5
6	-2.500	4	8	50.00	50.00	65490.	6
7	-3.000	4	8	50.00	50.00	65490.	7
8	-3.400	4	8	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	*-6.500*	*5*	*5*	*50.00*	*50.00*	*0.0*	*14*
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

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** Wall toe level: -6.50

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	-1.250	0.0	9.810

RESULTS FOR STAGE 2 : Excavation Stage 1

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 30000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 38000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	93.19	1	0.0	0
2	93.20	1	1.477	1	15.81	10
3	94.70	1	1.108	1	10.27	11
4	95.80	1	0.7992	1	7.100	11
5	96.60	1	0.5561	1	4.160	11
10	98.20	1	0.1345	1	0.6800	12
15	98.70	1	0.04010	1	0.1800	14
20	98.80	1	0.01240	1	0.06000	14
21	98.80	1	0.009900	1	0.04000	14

Ground level left = 0.00 Ground level right = -1.25

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	98.82	20.27	-0.002108	0.0	A 4	0	0.0	0.0	0.0	0.0	0.0
2	-0.5000	98.83	21.10	3.925	4.905	4	0	0.0	0.0	0.0	-0.1530	2.513
3	-1.000	82.84	22.19	0.9943	9.810	4	0	0.0	0.0	0.0	-2.513	7.422
4	-1.500	74.85	23.28	1.170	14.72	4	0	0.2975	3.964	2.455	-7.575	12.52
5	-2.000	66.90	24.38	2.477	19.62	4	0	0.8925	5.327	7.358	-15.03	17.26
6	-2.500	59.01	25.47	4.257	24.53	4	0	1.487	5.485	12.26	-24.84	22.37
7	-3.000	51.22	26.57	10.57	29.43	4	0	2.082	6.085	17.17	-37.40	28.90
8	-3.400	45.08	27.45	10.60	33.35	4	0	2.558	6.563	21.09	-50.47	36.33
9	-3.900	37.59	30.54	-0.003526	38.26	A 5	5	5.403	10.13	26.00	-70.47	32.33
10	-4.500	28.96	36.65	-0.01094	44.15	A 5	5	11.52	20.28	31.88	-85.26	9.221
11	-5.000	22.11	41.75	-0.01993	49.05	A 5	5	16.61	72.31	36.79	-82.15	-20.72
12	-5.450	16.21	46.34	-0.02885	53.46	A 5	5	21.20	65.07	41.20	-66.30	-47.77
13	-5.950	9.877	51.43	28.81	58.37	5	5	26.29	51.34	46.11	-36.14	-63.02
** 14	-6.500	3.068	57.03	112.9	63.77	5	5	31.90	-0.03632	51.50	0.0	0.0
15	-7.000	2.542	62.13	33.38	68.67	6	6	36.99	45.64	56.41	0.0	0.0
16	-7.500	1.652	67.22	42.46	73.58	6	6	42.09	54.72	61.31	0.0	0.0
17	-8.000	1.089	72.32	48.22	78.48	6	6	47.18	60.49	66.22	0.0	0.0
18	-8.500	0.6473	77.41	52.86	83.39	6	6	52.28	65.12	71.12	0.0	0.0
19	-9.000	0.0	82.51	56.92	88.29	6	6	57.37	69.18	76.03	0.0	0.0

** Wall toe level: -6.50

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	98.82	-85.26	0.0	-63.02	36.33

Surcharge 1 present in this stage

STAGE 3 : EXCAVATION STAGE 2

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	4	0	50.00	50.00	65490.	1
2	-0.5000	4	0	50.00	50.00	65490.	2
3	-1.000	4	0	50.00	50.00	65490.	3
4	-1.500	4	0	50.00	50.00	65490.	4
5	-2.000	4	0	50.00	50.00	65490.	5
6	-2.500	4	0	50.00	50.00	65490.	6
7	-3.000	4	0	50.00	50.00	65490.	7
8	-3.400	4	0	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	-6.500	5	5	50.00	50.00	0.0	14
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: -6.50

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	-3.700	0.0	9.810

RESULTS FOR STAGE 3 : Excavation Stage 2

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 30000. kPa
On the RIGHT: E at ground level = 3400. E at bottom node = 53000. kPa

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Iter no.	Ins max displ	Node no.	Disp error	Node no.	Press error	Node no.
	[mm]		[mm]		[kPa]	
1	0.0	0	32.07	1	2.400	14
2	32.10	1	4.384	1	21.90	10
3	36.50	1	4.037	1	19.49	11
4	40.50	1	3.752	1	15.25	12
5	44.20	1	3.523	1	12.31	12
10	59.80	1	2.477	1	6.660	14
15	70.20	1	1.537	1	4.680	14
20	76.40	1	0.8821	1	2.910	14
30	81.90	1	0.2624	1	0.9000	14
40	83.50	1	0.07110	1	0.2500	14
50	83.90	1	0.01840	1	0.06000	14
55	84.00	1	0.009300	1	0.03000	14

Ground level left = 0.00 Ground level right = -3.65

Node	Level	Disp	Va	Pa	U	Soil		Vs	Ps	U	BM	Shear
	[m]	[mm]	[kPa]	[kPa]	[kPa]	Left	Right	[kPa]	[kPa]	[kPa]	[kNm/m]	[kN/m]
1	0.0	182.8	20.27	-0.001946	0.0	A 4	0	0.0	0.0	0.0	0.0	0.0
2	-0.5000	168.3	21.10	-0.002544	4.905	A 4	0	0.0	0.0	0.0	-0.1530	1.532
3	-1.000	153.8	22.19	-0.004025	9.810	A 4	0	0.0	0.0	0.0	-1.532	5.209
4	-1.500	139.2	23.28	-0.004828	14.72	A 4	0	0.0	0.0	0.0	-5.362	11.34
5	-2.000	124.7	24.38	-0.005253	19.62	A 4	0	0.0	0.0	0.0	-12.87	19.92
6	-2.500	110.3	25.47	-0.005574	24.53	A 4	0	0.0	0.0	0.0	-25.28	30.95
7	-3.000	95.94	26.57	-0.005168	29.43	A 4	0	0.0	0.0	0.0	-43.82	43.70
8	-3.400	84.59	27.45	-0.007084	33.35	A 4	0	0.0	0.0	0.0	-63.95	57.83
9	-3.900	70.62	30.54	-0.01080	38.26	A 5	5	2.770	86.24	1.962	-96.62	51.52
10	-4.500	54.35	36.65	-0.01399	44.15	A 5	5	9.152	119.3	7.848	-119.2	14.86
11	-5.000	41.26	41.75	-0.01789	49.05	A 5	5	14.25	122.7	12.75	-115.3	-28.50
12	-5.450	29.86	46.34	-0.01975	53.46	A 5	5	18.83	104.0	17.17	-93.19	-65.10
13	-5.950	17.51	51.43	-0.01649	58.37	A 5	5	23.93	63.82	22.07	-52.60	-98.41
** 14	-6.500	4.141	57.03	145.8	63.77		5	29.53	-0.02847	27.47	0.0	0.0
15	-7.000	5.079	62.13	1.656	68.67	A 6	6	34.63	37.95	32.37	0.0	0.0
16	-7.500	3.133	67.22	16.07	73.58	A 6	6	39.72	52.37	37.28	0.0	0.0
17	-8.000	2.119	72.32	28.50	78.48	6	6	44.82	64.80	42.18	0.0	0.0
18	-8.500	1.259	77.41	33.60	83.39	6	6	49.91	69.90	47.09	0.0	0.0
19	-9.000	0.0	82.51	44.83	88.29	6	6	55.01	81.12	51.99	0.0	0.0

** Wall toe level: -6.50

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	182.8	-119.2	0.0	-98.41	57.83

Surcharge 1 present in this stage

Results Envelope

Node	Level	Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
	[m]	Min	Max	Min	Max	Min	Max
1	.00	0.0	182.8	0.0	0.0	0.0	0.0
2	-0.50	0.0	168.3	-0.1530	0.0	0.0	2.513
3	-1.00	0.0	153.8	-2.513	0.0	0.0	7.492
4	-1.50	0.0	139.2	-7.575	0.0	0.0	13.52
5	-2.00	0.0	124.7	-15.03	0.0	0.0	19.42
6	-2.50	0.0	110.3	-25.28	0.0	0.0	30.95
7	-3.00	0.0	95.94	-43.82	0.0	0.0	43.70
8	-3.40	0.0	84.59	-63.95	0.0	0.0	57.83
9	-3.90	0.0	70.62	-96.62	0.0	0.0	51.52
10	-4.50	0.0	54.35	-119.2	0.0	0.0	14.86
11	-5.00	0.0	41.26	-115.3	0.0	-28.50	0.0
12	-5.45	0.0	29.86	-93.19	0.0	-65.10	0.0
13	-5.95	0.0	17.51	-52.60	0.0	-98.41	0.0
14	-6.50	0.0	4.141	0.0	0.0	0.0	0.0
15	-7.00	0.0	5.079	0.0	0.0	0.0	0.0
16	-7.50	0.0	3.133	0.0	0.0	0.0	0.0
17	-8.00	0.0	2.119	0.0	0.0	0.0	0.0
18	-8.50	0.0	1.259	0.0	0.0	0.0	0.0
19	-9.00	0.0	0.0	0.0	0.0	0.0	0.0

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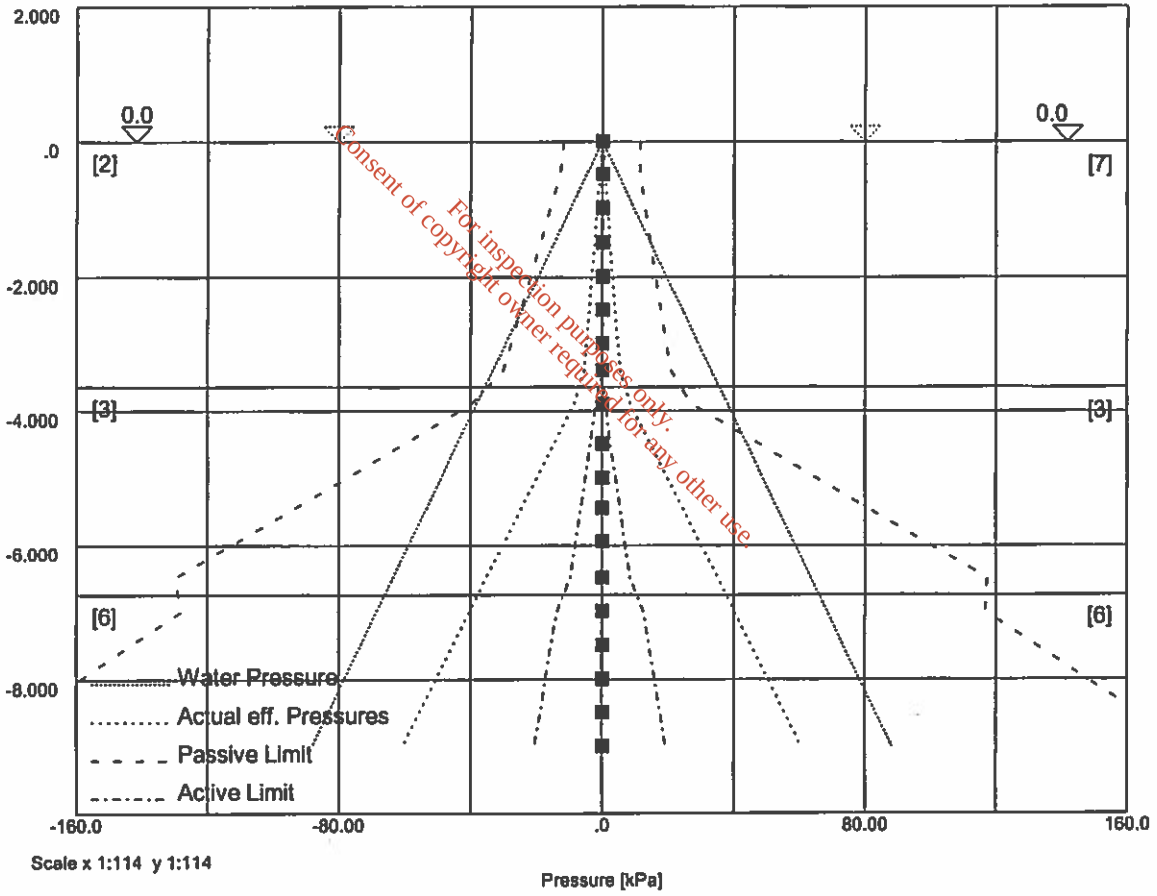
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-11	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Terminal Wall Temp ULS unpropped	



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STAGE 0 : Initial condition

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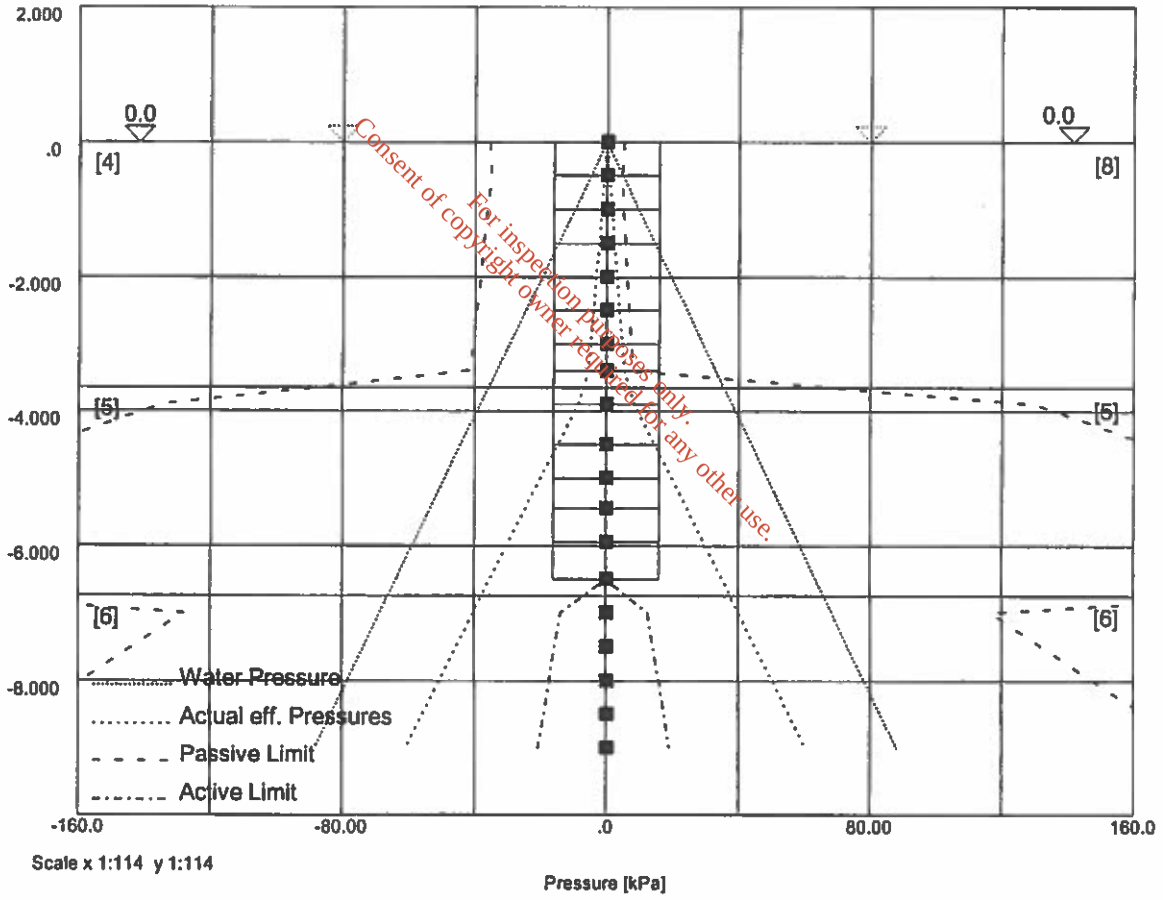
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-12	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Terminal Wall Temp ULS unpropped	



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STAGE 1 : Install Wall

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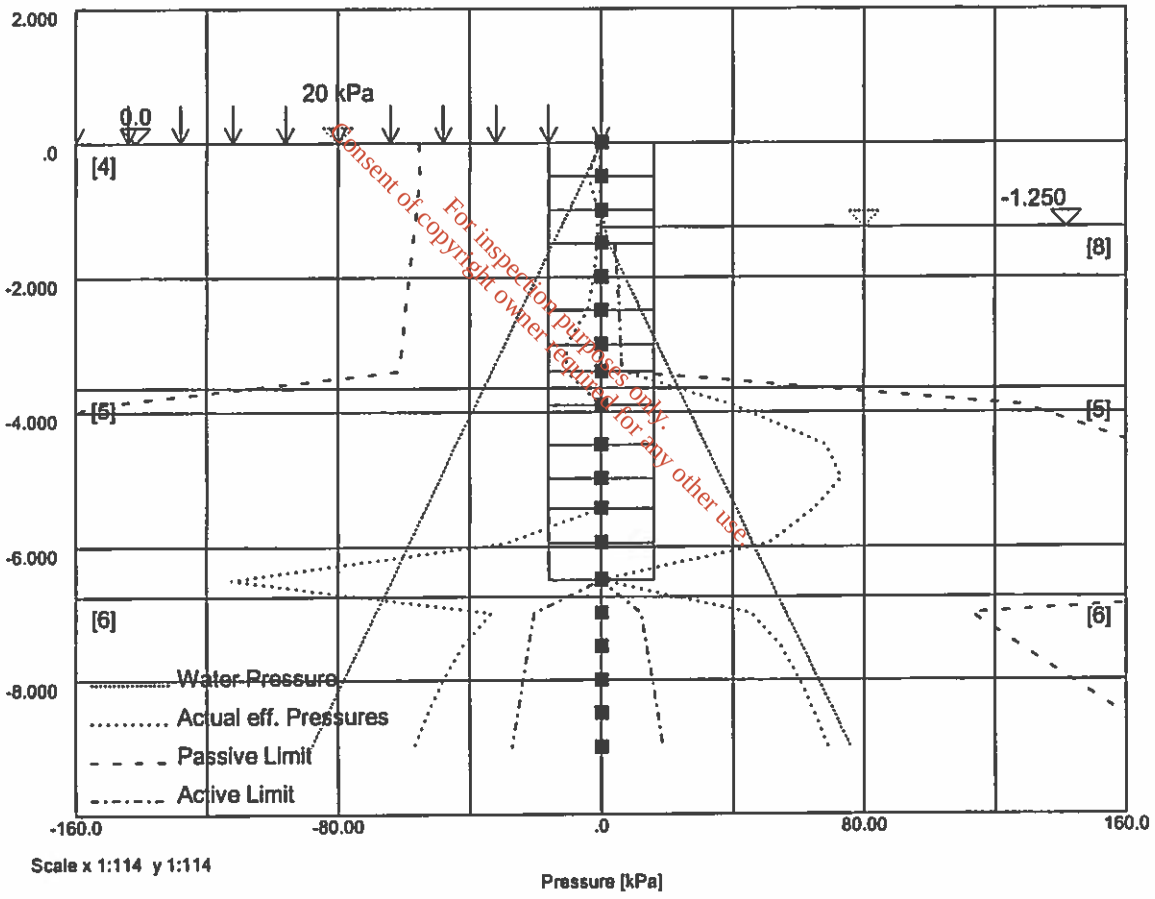
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-13	

Drg. Ref.

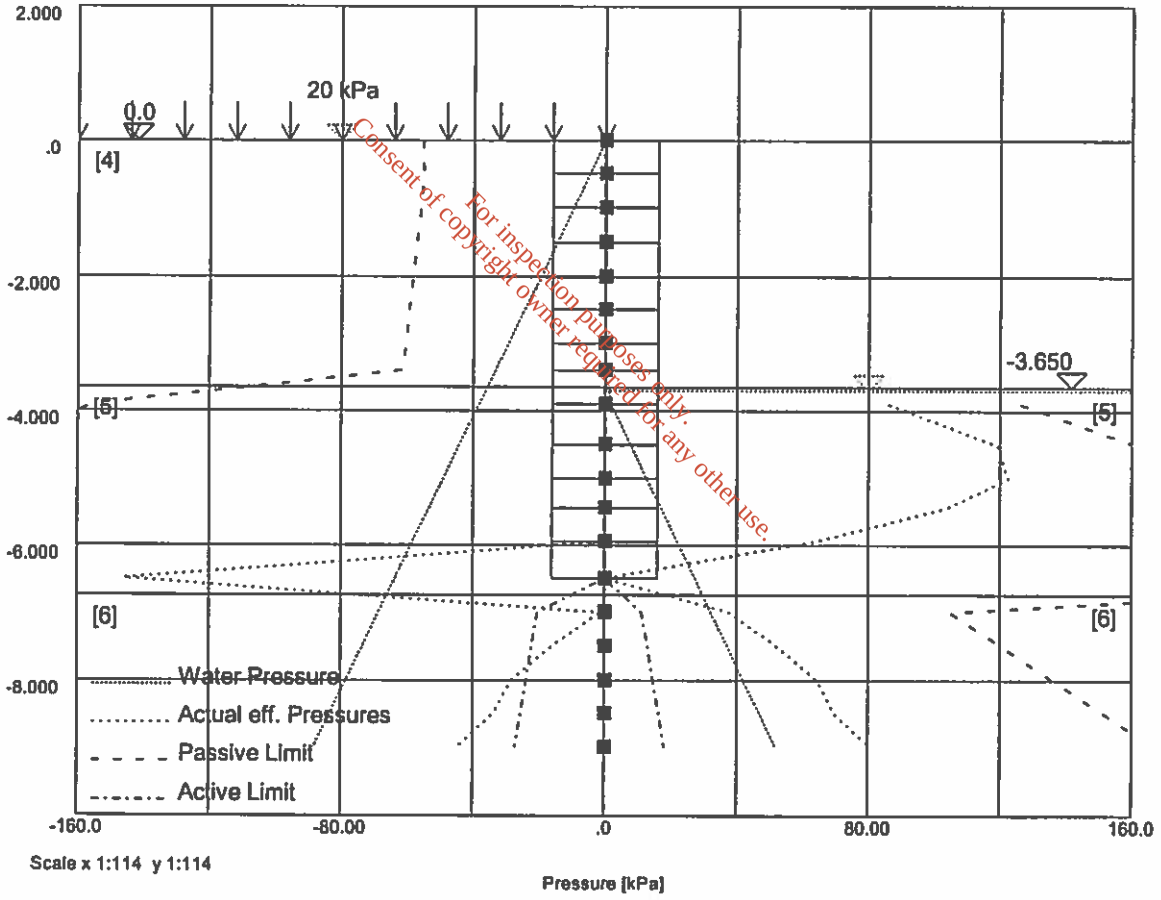
Made by	Date	Data	Checked
DAH	27-Nov-2003	Terminal Wall Temp ULS Unpropped	



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STAGE 2 : Excavation Stage 1

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STAGE 3 : Excavation Stage 2

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INITIAL DATA

Notes
LX16 sheetpile section
Peat Stabilised using soil mixing
Toe of wall at 6.5m bgl
Propped at top of wall
20kN/m2 surcharge

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.2900	3.410	1.080	3.690	0.3300	User_Specified
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
9	0.0	1.000	1.000	1.000	1.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	0.0	0.0	333.0	0.0
3	1.000	0.0	0.0	5010.	0.0
4	17.00	0.0	0.0	1667.	0.0
5	52.00	-3.500	24.33	4800.	2266.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0
9	1.000	0.0	0.0	100.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ks
1	2	-	Left	0.0	20.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	3	-	1	0.0	2.856E+6	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	2	7	50.00	50.00	65490.	1
2	-0.5000	2	7	50.00	50.00	65490.	2
3	-1.000	2	7	50.00	50.00	65490.	3
4	-1.500	2	7	50.00	50.00	65490.	4
5	-2.000	2	7	50.00	50.00	65490.	5
6	-2.500	2	7	50.00	50.00	65490.	6
7	-3.000	2	7	50.00	50.00	65490.	7
8	-3.400	2	7	50.00	50.00	65490.	8
9	-3.900	3	3	50.00	50.00	65490.	9
10	-4.500	3	3	50.00	50.00	65490.	10
11	-5.000	3	3	50.00	50.00	65490.	11
12	-5.450	3	3	50.00	50.00	65490.	12
13	-5.950	3	3	50.00	50.00	65490.	13
** 14	-6.500	3	3	50.00	50.00	0.0	14
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: -6.50

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	50.00	50.00

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 27000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 27000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	13.87	4	0.0	0
2	13.90	4	0.0	4	0.0	0
3	13.90	4	0.0	4	0.0	0

Ground level left = 0.00 Ground level right = 0.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	Bm [kNm/m]	Shear [kN/m]

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1	0.0	9.640	0.2737	0.2050	0.0	2	7	0.1487	0.2050	0.0	0.0	0.0
2	-0.5000	12.97	1.095	0.8157	4.905	2	7	0.5950	0.8157	4.905	0.0	0.0
3	-1.000	13.67	2.190	1.635	9.810	2	7	1.190	1.635	9.810	0.0	0.0
4	-1.500	13.87	3.285	2.454	14.72	2	7	1.785	2.454	14.72	0.0	0.0
5	-2.000	13.65	4.380	3.272	19.62	2	7	2.380	3.272	19.62	0.0	0.0
6	-2.500	12.88	5.475	4.092	24.53	2	7	2.975	4.092	24.53	0.0	0.0
7	-3.000	11.66	6.570	4.902	29.43	2	7	3.570	4.902	29.43	0.0	0.0
8	-3.400	9.018	7.446	5.581	33.35	2	7	4.046	5.581	33.35	0.0	0.0
9	-3.900	5.134	10.54	8.639	38.26	3	3	6.891	8.639	38.26	0.0	0.0
10	-4.500	3.105	16.65	14.83	44.15	3	3	13.00	14.83	44.15	0.0	0.0
11	-5.000	2.416	21.75	19.97	49.05	3	3	18.10	19.97	49.05	0.0	0.0
12	-5.450	2.013	26.34	24.56	53.46	3	3	22.69	24.56	53.46	0.0	0.0
13	-5.950	1.592	31.43	29.65	58.37	3	3	27.78	29.65	58.37	0.0	0.0
14	-6.500	1.048	37.03	35.24	63.77	3	3	33.38	35.24	63.77	0.0	0.0
15	-7.000	0.5603	42.13	40.31	68.67	6	6	38.48	40.31	68.67	0.0	0.0
16	-7.500	0.2991	47.22	45.40	73.58	6	6	43.57	45.40	73.58	0.0	0.0
17	-8.000											
	0.1699	52.32	50.54	78.48	6	6		48.67	50.54	78.48	0.0	0.0
18	-8.500	0.09336	57.41	55.62	83.39	6	6	53.76	55.62	83.39	0.0	0.0
19	-9.000	8.621E-6	62.51	60.69	88.29	6	6	58.86	60.69	88.29	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level	Soil		Boundary		EI below Node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	0.0	4	8	50.00	50.00	65490.	1
2	-0.5000	4	8	50.00	50.00	65490.	2
3	-1.000	4	8	50.00	50.00	65490.	3
4	-1.500	4	8	50.00	50.00	65490.	4
5	-2.000	4	8	50.00	50.00	65490.	5
6	-2.500	4	8	50.00	50.00	65490.	6
7	-3.000	4	8	50.00	50.00	65490.	7
8	-3.400	4	8	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	*-6.500*	*5*	*5*	*50.00*	*50.00*	*0.0*	*14*
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: *-6.50*

RESULTS FOR STAGE 1 : Install Wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 30000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 31000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 0.00 Ground level right = 0.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	0.0	0.2737	0.2050	0.0	4	8	0.1487	0.2050	0.0	0.0	0.0
2	-0.5000	0.0	1.095	0.8157	4.905	4	8	0.5950	0.8157	4.905	0.0	0.0
3	-1.000	0.0	2.190	1.635	9.810	4	8	1.190	1.635	9.810	0.0	0.0
4	-1.500	0.0	3.285	2.454	14.72	4	8	1.785	2.454	14.72	0.0	0.0
5	-2.000	0.0	4.380	3.272	19.62	4	8	2.380	3.272	19.62	0.0	0.0
6	-2.500	0.0	5.475	4.092	24.53	4	8	2.975	4.092	24.53	0.0	0.0
7	-3.000	0.0	6.570	4.902	29.43	4	8	3.570	4.902	29.43	0.0	0.0
8	-3.400	0.0	7.446	5.581	33.35	4	8	4.046	5.581	33.35	0.0	0.0
9	-3.900	0.0	10.54	8.639	38.26	5	5	6.891	8.639	38.26	0.0	0.0
10	-4.500	0.0	16.65	14.83	44.15	5	5	13.00	14.83	44.15	0.0	0.0
11	-5.000	0.0	21.75	19.97	49.05	5	5	18.10	19.97	49.05	0.0	0.0
12	-5.450	0.0	26.34	24.56	53.46	5	5	22.69	24.56	53.46	0.0	0.0
13	-5.950	0.0	31.43	29.65	58.37	5	5	27.78	29.65	58.37	0.0	0.0
** 14	*-6.500*	*0.0*	*37.03*	*35.24*	*63.77*	*5*	*5*	*33.38*	*35.24*	*63.77*	*0.0*	*0.0*
15	-7.000	0.0	42.13	40.31	68.67	6	6	38.48	40.31	68.67	0.0	0.0
16	-7.500	0.0	47.22	45.40	73.58	6	6	43.57	45.40	73.58	0.0	0.0
17	-8.000	0.0	52.32	50.54	78.48	6	6	48.67	50.54	78.48	0.0	0.0
18	-8.500	0.0	57.41	55.62	83.39	6	6	53.76	55.62	83.39	0.0	0.0
19	-9.000	0.0	62.51	60.69	88.29	6	6	58.86	60.69	88.29	0.0	0.0

** Wall toe level: *-6.50*
WARNING - Residual moment > 1% of peak moment in wall
WARNING - Wall base moment > 20% of average wall moment

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : EXCAVATION STAGE 1

Geometry

Node	Level	Soil		Boundary		EI below Node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	0.0	4	0	50.00	50.00	65490.	1
2	-0.5000	4	0	50.00	50.00	65490.	2
3	-1.000	4	0	50.00	50.00	65490.	3
4	-1.500	4	8	50.00	50.00	65490.	4
5	-2.000	4	8	50.00	50.00	65490.	5
6	-2.500	4	8	50.00	50.00	65490.	6
7	-3.000	4	8	50.00	50.00	65490.	7
8	-3.400	4	8	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	*-6.500*	*5*	*5*	*50.00*	*50.00*	*0.0*	*14*

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15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: -6.50

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	-1.250	0.0	9.810

RESULTS FOR STAGE 2 : Excavation Stage 1

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
Z Profiles assumed for calculation (generated):
On the LEFT: Z at ground level = 1000. Z at bottom node = 30000. kPa
On the RIGHT: Z at ground level = 190. Z at bottom node = 38000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	93.19	1	0.0	0
2	93.20	1	1.477	1	15.81	10
3	94.70	1	1.108	1	10.27	11
4	95.80	1	0.7992	1	7.100	11
5	96.60	1	0.5561	1	4.160	11
10	98.20	1	0.1345	1	0.6800	12
15	98.70	1	0.04010	1	0.1800	14
20	98.80	1	0.01240	1	0.06000	14
21	98.80	1	0.009900	1	0.04000	14

Ground level left = 0.00 Ground level right = -1.25

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	98.82	20.27	-0.002108	0.0	A	4	0	0.0	0.0	0.0	0.0
2	-0.5000	90.83	21.10	3.925	4.905		4	0	0.0	0.0	-0.1530	2.513
3	-1.000	82.84	22.19	0.9943	9.810		4	0	0.0	0.0	-2.513	7.422
4	-1.500	74.85	23.28	1.170	14.72		4	8	0.2975	0.866	2.453	-7.575	12.52
5	-2.000	66.90	24.38	2.477	19.62		4	8	0.8925	3.383	7.358	-15.03	17.26
6	-2.500	59.01	25.47	4.257	24.53		4	8	1.487	5.899	12.26	-24.84	22.37
7	-3.000	51.22	26.57	10.57	29.43		4	8	2.082	8.085	17.17	-37.48	28.90
8	-3.400	45.08	27.45	10.60	33.35		4	8	2.558	6.563	21.09	-50.47	36.33
9	-3.900	37.59	30.54	-0.003526	38.26	A	5	5	3.703	40.15	26.00	-70.47	32.33
10	-4.500	28.96	36.65	-0.01094	44.15	A	5	5	11.52	68.38	31.88	-85.26	9.221
11	-5.000	22.11	41.75	-0.01993	49.05	A	5	5	16.47	73.31	36.78	-82.15	-20.72
12	-5.450	16.21	46.34	-0.02885	53.46	A	5	5	20.20	65.07	41.20	-66.30	-47.77
13	-5.950	9.877	51.43	28.81	58.37		5	5	26.29	51.34	46.11	-36.14	-63.02
** 14	-6.500	3.068	57.03	112.9	63.77		5		31.90	-0.03632	51.50	0.0	0.0
15	-7.000	2.542	62.13	33.38	68.67		6	6	36.99	45.64	56.41	0.0	0.0
16	-7.500	1.652	67.22	42.46	73.58		6	6	42.09	54.72	61.31	0.0	0.0
17	-8.000	1.089	72.32	48.22	78.48		6	6	47.18	60.49	66.22	0.0	0.0
18	-8.500	0.6473	77.41	52.86	83.39		6	6	52.28	65.12	71.12	0.0	0.0
19	-9.000	0.0	82.51	56.92	88.29		6	6	57.37	69.18	76.03	0.0	0.0

** Wall toe level: -6.50

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	98.82	-85.26	0.0	-63.02	36.33

Surcharge 1 present in this stage

STAGE 3 : EXCAVATION STAGE 2

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	0.0	4	0	50.00	50.00	65490.	1
2	-0.5000	4	0	50.00	50.00	65490.	2
3	-1.000	4	0	50.00	50.00	65490.	3
4	-1.500	4	0	50.00	50.00	65490.	4
5	-2.000	4	0	50.00	50.00	65490.	5
6	-2.500	4	0	50.00	50.00	65490.	6
7	-3.000	4	0	50.00	50.00	65490.	7
8	-3.400	4	0	50.00	50.00	65490.	8
9	-3.900	5	5	50.00	50.00	65490.	9
10	-4.500	5	5	50.00	50.00	65490.	10
11	-5.000	5	5	50.00	50.00	65490.	11
12	-5.450	5	5	50.00	50.00	65490.	12
13	-5.950	5	5	50.00	50.00	65490.	13
** 14	-6.500	5	5	50.00	50.00	0.0	14
15	-7.000	6	6	50.00	50.00	0.0	15
16	-7.500	6	6	50.00	50.00	0.0	16
17	-8.000	6	6	50.00	50.00	0.0	17
18	-8.500	6	6	50.00	50.00	0.0	18
19	-9.000	6	6	50.00	50.00	0.0	19

** Wall toe level: -6.50

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	0.0	0.0	9.810

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	-3.700	0.0	9.810

RESULTS FOR STAGE 3 : Excavation Stage 2

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Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
Σ Profiles assumed for calculation (generated):
On the LEFT: Σ at ground level = 1000. Σ at bottom node = 30000. kPa
On the RIGHT: Σ at ground level = 3400. Σ at bottom node = 53000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	6.426	9	2.400	14
2	6.400	9	0.2957	9	12.74	12
3	6.700	9	0.2239	9	36.90	14
4	6.900	9	0.1382	9	7.660	12
5	7.100	9	0.09280	9	5.110	12
10	7.400	9	0.01720	8	0.6800	13
15	7.400	9	0.003000	7	0.06000	13

Ground level left = 0.00 Ground level right = -3.65

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	0.0	98.83	20.27	1.255	0.0	4	0	0.0	0.0	0.0	0.0	0.0
	0.0										0.0	-31.95
2	-0.5000	92.34	21.10	5.185	4.905	4	0	0.0	0.0	0.0	15.67	-28.81
3	-1.000	85.79	22.19	2.005	9.810	4	0	0.0	0.0	0.0	28.81	-23.33
4	-1.500	79.13	23.28	1.507	14.72	4	0	0.0	0.0	0.0	39.00	-16.32
5	-2.000	72.32	24.38	1.909	19.62	4	0	0.0	0.0	0.0	45.13	-6.884
6	-2.500	65.34	25.47	2.669	24.53	4	0	0.0	0.0	0.0	45.88	5.296
7	-3.000	58.19	26.57	8.157	29.43	4	0	0.0	0.0	0.0	39.83	20.55
8	-3.400	52.37	27.45	6.690	33.35	4	0	0.0	0.0	0.0	28.23	38.02
9	-3.900	45.00	30.54	0.01223	38.26	A 5	5	2.770	43.20	1.962	4.716	45.06
10	-4.500	36.14	36.65	0.008505	44.15	A 5	5	9.152	75.98	7.848	-21.14	32.18
11	-5.000	28.83	41.75	0.006753	49.05	A 5	5	14.25	84.25	12.75	-31.78	9.883
12	-5.450	22.35	46.34	-0.01618	53.46	A 5	5	18.83	78.29	17.17	-31.10	-11.48
13	-5.950	15.25	51.43	-0.05525	58.37	A 5	5	23.93	65.91	22.07	-20.37	-29.25
** 14	*-6.500*	*7.530*	*57.03*	*70.54*	*63.77*		*5 5*	*29.53*	*36.30*	*27.47*	*0.0*	*0.0*
15	-7.000	4.915	62.13	21.34	68.67		6 6	34.63	57.63	32.37	0.0	0.0
16	-7.500	3.116	67.22	29.25	73.58		6 6	39.72	65.54	37.28	0.0	0.0
17	-8.000	2.064	72.32	33.62	78.48		6 6	44.82	69.92	42.18	0.0	0.0
18	-8.500	1.202	77.41	38.63	83.39		6 6	49.91	74.93	47.08	0.0	0.0
19	-9.000	0.0	82.51	44.83	88.29		6 6	55.01	81.12	51.98	0.0	0.0

** Wall toe Level: *-6.50*

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	98.83	-85.26	45.88	-63.02	45.06

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	1	31.95	31.95	0.0	31.95

Results Envelope

Node	Level [m]	Displacements [mm] Min	Displacements [mm] Max	Moments [kNm/m] Min	Moments [kNm/m] Max	Shears [kN/m] Min	Shears [kN/m] Max
1	.00	0.0	98.83	0.0	0.0	-31.95	0.0
2	-0.50	0.0	92.34	-0.1530	15.67	-28.81	2.513
3	-1.00	0.0	85.79	-2.513	28.81	-23.33	7.422
4	-1.50	0.0	79.13	-7.575	39.00	-16.32	12.52
5	-2.00	0.0	72.32	-15.03	45.13	-6.884	17.26
6	-2.50	0.0	65.34	-24.84	45.88	0.0	22.37
7	-3.00	0.0	58.19	-37.40	39.83	0.0	28.90
8	-3.40	0.0	52.37	-50.47	28.23	0.0	38.02
9	-3.90	0.0	45.00	-70.47	4.716	0.0	45.06
10	-4.50	0.0	36.14	-85.26	0.0	0.0	32.18
11	-5.00	0.0	28.83	-82.15	0.0	-20.72	9.883
12	-5.45	0.0	22.35	-66.30	0.0	-47.77	0.0
13	-5.95	0.0	15.25	-36.14	0.0	-63.02	0.0
14	*-6.50*	*0.0*	*7.530*	*0.0*	*0.0*	*0.0*	*0.0*
15	-7.00	0.0	4.915	0.0	0.0	0.0	0.0
16	-7.50	0.0	3.116	0.0	0.0	0.0	0.0
17	-8.00	0.0	2.064	0.0	0.0	0.0	0.0
18	-8.50	0.0	1.202	0.0	0.0	0.0	0.0
19	-9.00	0.0	0.0	0.0	0.0	0.0	0.0

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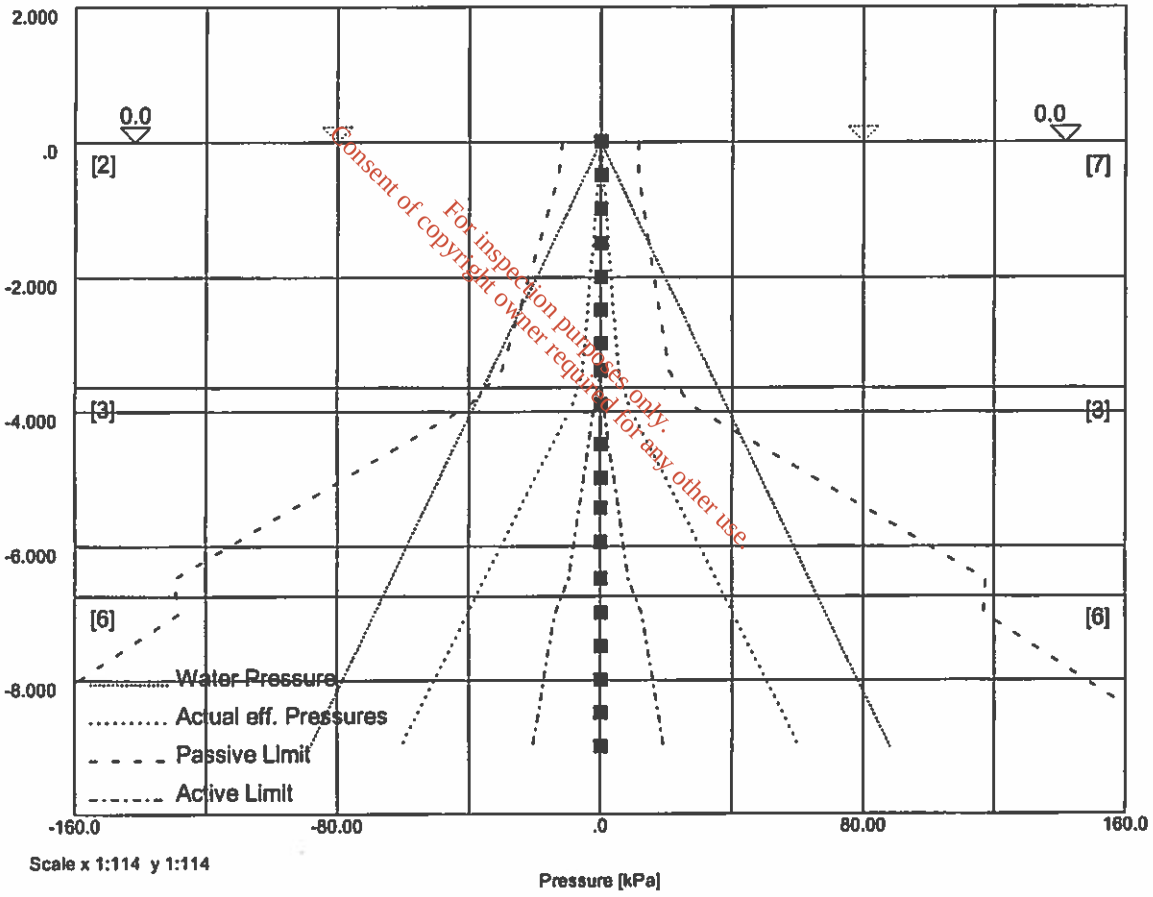
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-18	

Drg. Ref.

Made by	Date	Data	Checked
DAH	26-Nov-2003	Terminal Wall Temp ULS propped	



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STAGE 0 : Initial condition

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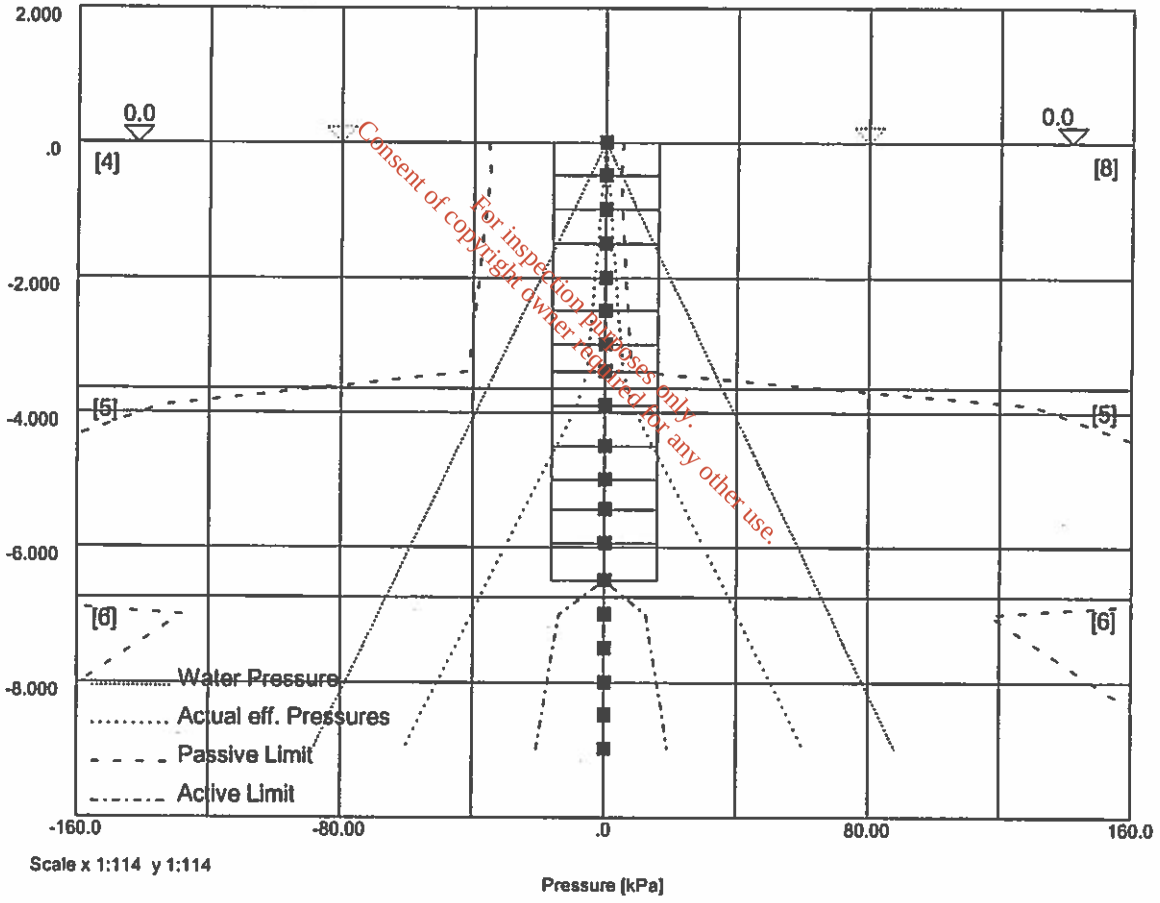
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-19	

Drg. Ref.

Made by	Date	Data	Checked
DAH	26-Nov-2003	Terminal Wall Temp ULS propped	



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STAGE 1 : Install Wall

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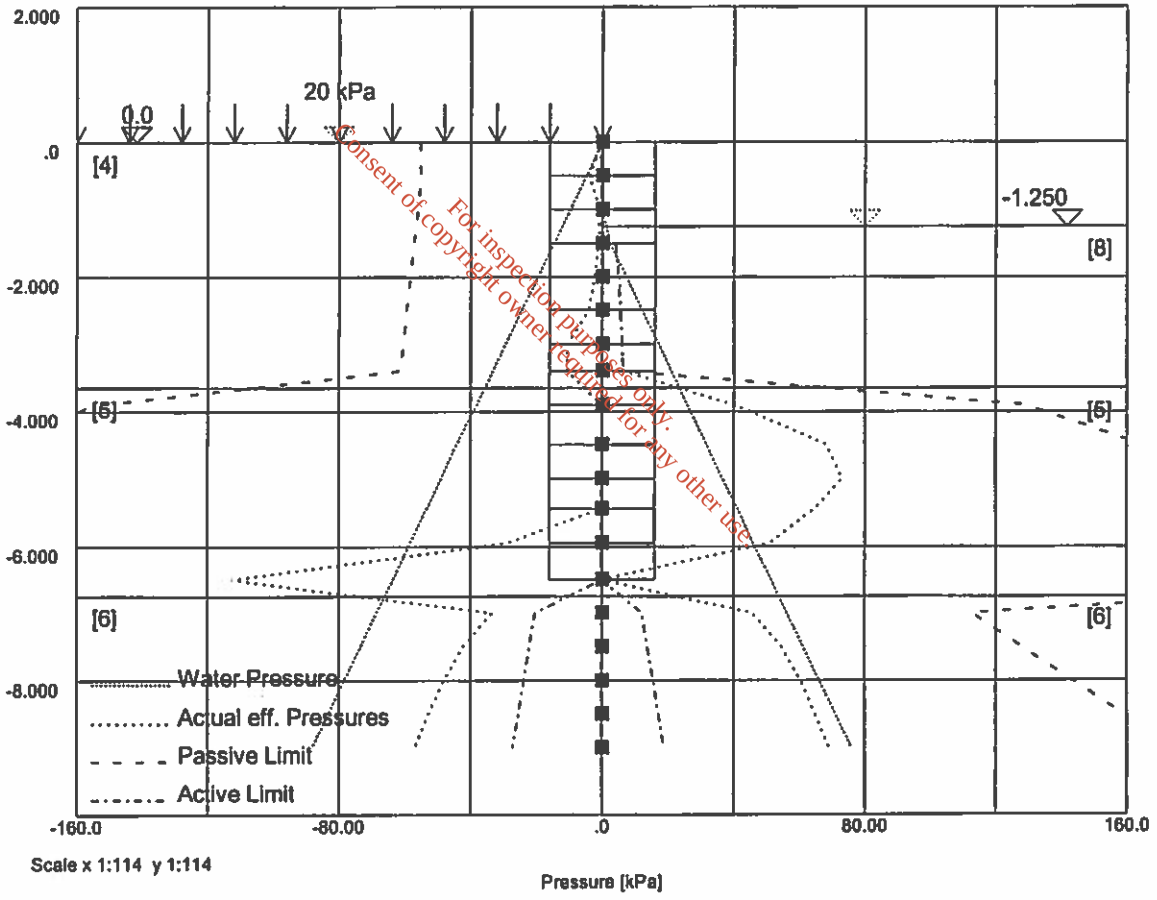
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Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-20	

Drg. Ref.

Made by	Date	Data	Checked
DAH	26-Nov-2003	Terminal Wall Temp ULS propped	



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STAGE 2 : Excavation Stage 1

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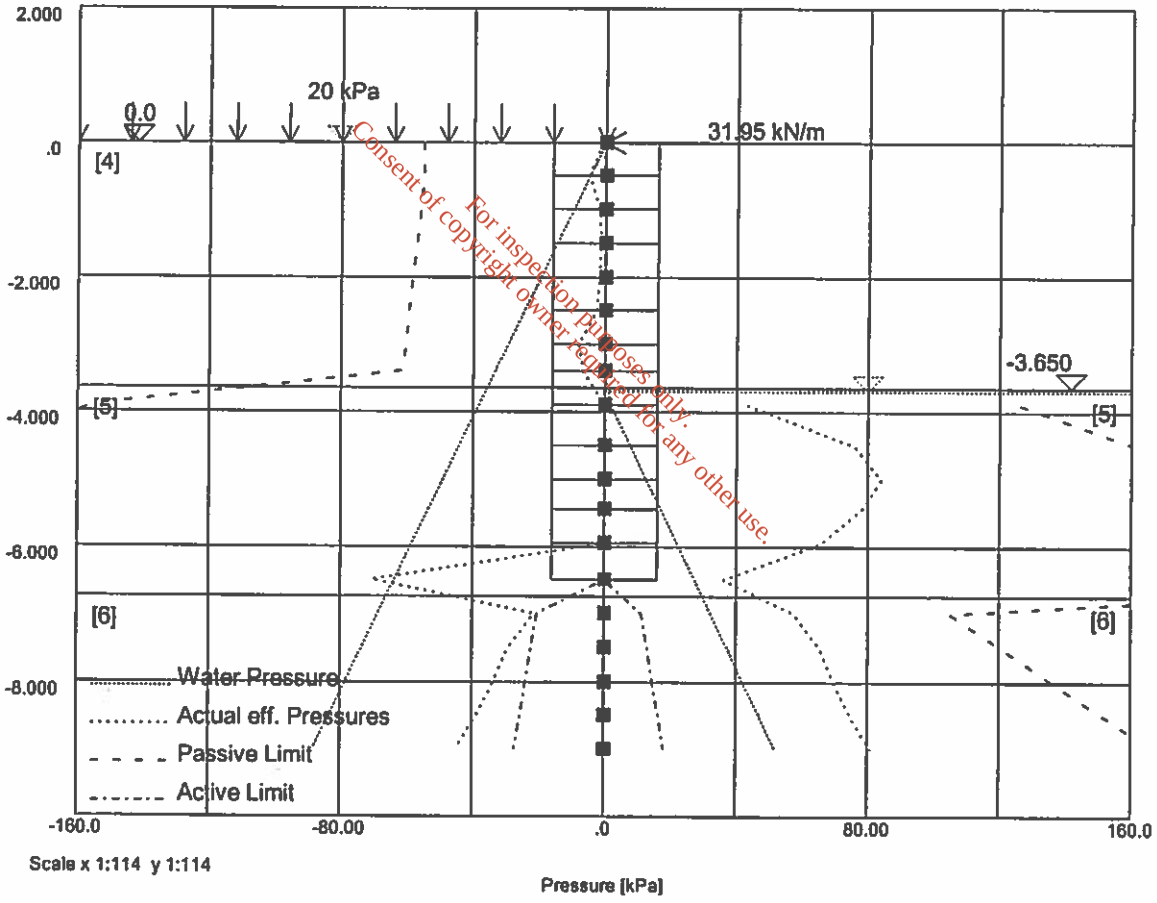
ARUP

Enterprise Terminal
Stability of Sheet pile wall on South edge of Terminal

Job No.	Sheet No.	Rev.
C1157	4C-21.	

Drg. Ref.

Made by	Date	Data	Checked
DAH	26-Nov-2003	Terminal Wall Temp ULS propped	JOB



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STAGE 3 : Excavation Stage 2

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Appendix 4D – Design of Slopes in Fill areas of Terminal

Introduction

As the sheet pile is used as a temporary retaining system for the peat the fill material on site is designed to be self-supporting. This is done by means of incorporating a layered wraparound geotextile system within the fill. The purpose of this is two fold in that it makes the sheet pile redundant once the fill is placed and also stops the fill exerting any downhill lateral load on the in-situ peat.

The geotextile wraparound has been designed in two parts. The slope at the top of the terminal platform has been designed using the two-wedge failure method as specified in BS8006: 1995 (Strengthened /Reinforced Soils and other Fills). The vertical wraparound wall has been designed using the coherent gravity method as specified in BS8006.
Local bearing and sliding capacity checks have been carried out for the reinforced soil block as required by the British Standard. Stability of the reinforced soil block as part of an overall slip failure is considered in Appendix 4E.
The section of wall shown in the calculations is located at the maximum height of wall and maximum slope height. This is the same location at which the sheet pile wall was designed.

Soil Parameters

The soil parameters used in the design are as follows:

Table 4D.1 – Soil Parameters

Parameter	Parameter values	Comment
Fill material– bulk density - γ	20	Compacted General Fill Material
Fill material– friction angle- ϕ	20°	
Slope angle	3Horz to 1Vert	
Surcharge Loading	30 kN/m²	Conservative uniform loading – note the buildings in the fill area of the site will have piled foundations and will exert minimal load on the fill. This allows for construction loading in the short-term and for road and other loadings in the long-term.
Factor of Safety	As per BS8006: 1995	Factors of safety of material and loading parameters

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Groundwater Conditions

Groundwater has been taken to be below the terminal fill materials as a more permeable layer of rockfill won from the site is to be installed at the base of the terminal fill material. This drainage layer will abut the groundwater drain located between the wraparound vertical wall and sheet pile wall – i.e at the perimeter of the terminal platform.

Summary of Results

The design has shown that a wraparound facing consisting of a 'Terram Paragrid' type material is satisfactory to retain and maintain stability of the terminal fill materials. The geogrid-reinforced section of the wall shall extend 3m from the face of the wall into the terminal site.

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1152	APP4D-1	/

Member / Location

Drg. Ref.

Job Title CORRIB.

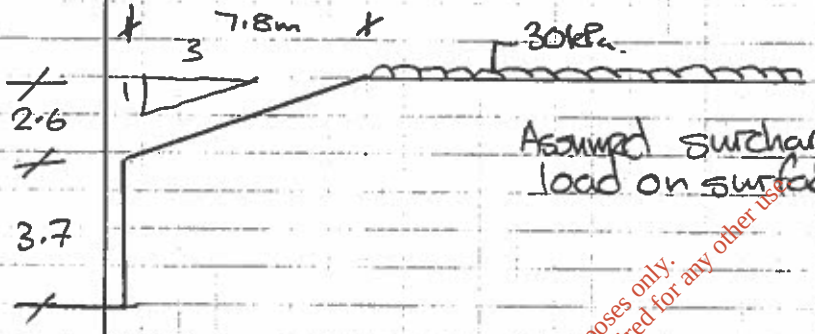
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Reference	Calculation	Result

Terminal Fill

Terminal Fill being constructed of reinforced earth material.

Maximum height = 2.62m Sloping
3.7m Vertical



Assumed surcharge load on surface = 30kPa

Design of reinforcement shall be done in two parts.
- Slope Section
- Vertical Face

Only reinforcement (Internal stability) needs checked for slope section as this sits on top of the other vertical section.

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SLOPE FILL

Height = 2.1 at Location H (BH108)

BS8006 Section 7.4 :- 7.4.4 Two part wedge analysis

Disturbing force $Rh = 0.5 f_s K \gamma H^2$

$H = 2.1m$

f_s = 1.5 or 1.0 (Table 26.)

AGEC RPT. $\gamma = 20 kN/m^3$

$\phi = 30°$

$K = ?$

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Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D - 2.	/

Member / Location

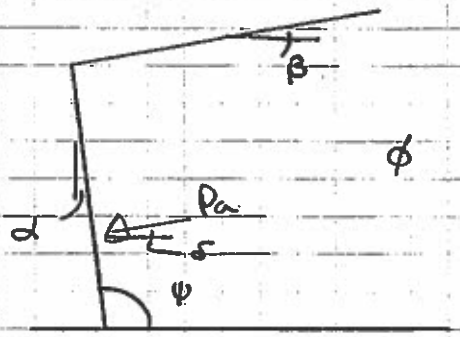
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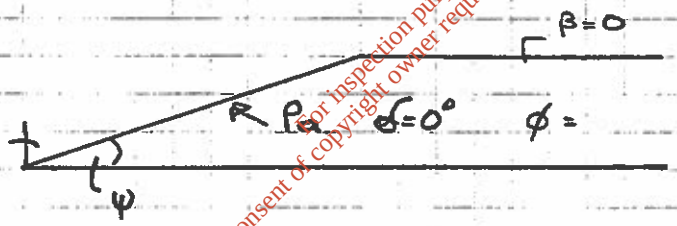
Reference	Calculation	Result

Consider:



$$K_a = \left[\frac{\frac{\sin(\psi - \phi)}{\sin\psi}}{\sqrt{\sin(\psi + \delta)} + \sqrt{\frac{\sin(\phi + \delta)\sin(\phi - \beta)}{\sin(\psi - \beta)}}} \right]^2$$

We have



$\beta = 0 \quad \alpha = 70.5^\circ \left(\cos^{-1}\left(\frac{1}{3}\right)\right) \quad \phi = 30^\circ$

Table 26 f_m relating to $\phi = 1.0$

$\psi = 19.5^\circ$

$$K_a = \left[\frac{\frac{\sin 19.5 - 30}{\sin 19.5}}{\sqrt{\sin 19.5} + \sqrt{\frac{\sin 30 \times \sin 30}{\sin 19.5}}} \right]^2$$

$$= \left[\frac{-0.545}{0.5777 + 0.865} \right]^2$$

$$= 0.142.$$ This is very low.

We shall therefore assume normal Rankine Coefficient. This shall give a more conservative assessment

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-3	/

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DAH Date 24/11/03 Chd. DEG

Reference	Calculation	Result

$$K_a = \frac{1-\sin\phi}{1+\sin\phi} = \frac{1-\sin 30}{1+\sin 30}$$

$= 0.333$ higher than previous, Conservative

$R_h = 0.5 \times 1.5 \times 0.333 \times 20 \times 2.6^2$

$= 33.46$ kN ULS

$= 0.5 \times 1 \times 0.333 \times 20 \times 2.6^2$

$= 22.308$ kN SLS.

SURCHARGE = 30kN = W_s

Horizontal Reaction

$= K f_q W_s$

$f_q = 1.3$ or 1.0

Hence $= 0.333 \times 1.3 \times 30 = 12.99$ kN ULS

$= 0.333 \times 1.0 \times 30 = 9.99$ kN SLS

Totals.

$\Rightarrow 33.46 + 12.99 = 46.45$ kN (ULS)

$\Rightarrow 22.308 + 9.99 = 32.30$ kN (SLS)

For a spacing of 0.3m.

$S_{vj} = 0.3$m.

$$S_{vj} = \frac{T_j}{K(f_{fs}\gamma h_j + f_q W_s)}$$

at bottom of slope

$K(f_{fs}\gamma h_j + f_q W_s) = 40.59$ ULS, 27.31 SLS

Designing using ULS

$S_{vj} \times 40.59 = T_j$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.	4D-4.	/

Member / Location

Drg. Ref.

Job Title

Made by DAM Date 24/11/03 Chd. DEC

Reference	Calculation	Result
	Hence required T_j	
	$0.13 \times 40.59 = 12.17$ kN/m	run of wall
Terram Data Sheet	Partial Factors. Manufacturing = 1.3; Installation = 1.15; Environment = 1.2 } Worst Case Values	
	Hence	
	Capacity = $\frac{12.17 \times 1.3 \times 1.15 \times 1.2}{} = 21.83$	
REF. Terram Data Sheet Pg -18	* If this is the long term capacity it is assumed to be about 60% of short term ultimate.	
	Hence 60% = 21.83 kN/m; 100% = 36.38 kN/m	
	Terram Type Required	
	⇒ TerramGrid 4/4W	
	Actual Tensile Strength = 40kN	
	Pull out Capacity	
	$L_{ej} \geq \frac{f_p f_n T_j}{2\left[(\gamma h_j + w_s)\frac{a \tan\phi_p}{f_{ms_1}} + \frac{a_{pc} C}{f_{ms_2}}\right]}$	0.
	$f_p = 1.3$; $f_n = 1.1$; $a = 0.3$; $a_{pc} = 0.3$; $f_{ms_1} = 1.0$; $f_{ms_2} = 1.6$	$\phi_p = 30°$; $C = 0$ kPa; $T_j = 12.17$ kN/m; $h_j = 2.1$; $\gamma = 20$; $w_s = 30$.

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-5	/

Member / Location

Drg. Ref.

Job Title CORRUS

Made by DAH Date 24/11/03 Chd. DBG

Reference	Calculation	Result

$$\frac{1.1 \times 1.3 \times 12.17}{2\left[(20 \times 2.1 + 30) \times \left(\frac{0.3 \times \tan 30}{1.0} + 0\right)\right]}$$

$$\frac{17.40}{2 \times [72 \times 0.1732]}$$

$$\Rightarrow 17.40 / 24.94$$

$$\Rightarrow 0.698\,m$$

Providing 3m

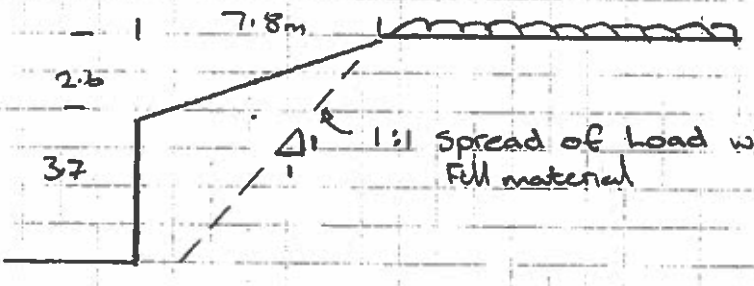
Adherance available

$$\Rightarrow 3 \times 24.94 = 74.8\,kN \text{ ULS.}$$

$$\Rightarrow 74.8 / 1.1 \times 1.3 = 52.32\,kN \text{ SLS.}$$

VERTICAL SECTION

Vertical Section of wall has slope on top of it. See below



By inspection it can be seen that the surcharge is outwith the zone of influence for the vertical wall.

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.	4D-6.	1

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DAH Date 24/11/03 Chd. DFG

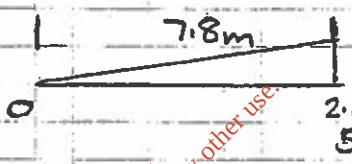
Reference	Calculation	Result

We shall however consider a surcharge on the sloped area for calculations for required tensile strength.

Loading

Two loads => Dead Load.
Live Surcharge (Load)

Unfactored =>



DEAD



LIVE

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Cl 6.5.2 External Stability

Bearing Pressure $q_r = \frac{R_v}{L - 2e}$

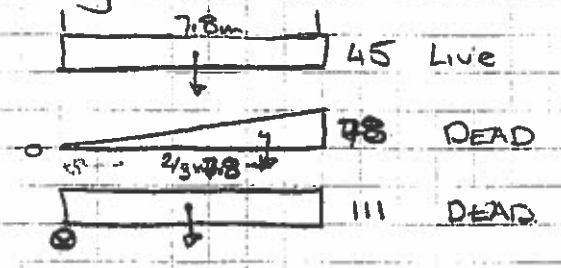
Max Loads = 1.5×52 = 78kN
1.5×30 = 45kN

Loads at base of Block 3.7m thick

= Live - 45kN/m².

Dead = 0 to 78
1 20×1.5×3.7 = 111kN/m²

Excentricity



Moments about ⊗.

$(45 \times 7.8 \times 3.9) + (\frac{1}{2} \times 78 \times 7.8 \times 5.2)$
$+ (111 \times 6.3 \times 3.9) = Y \times (45 \times 7.8 + \frac{1}{2} \times 78 \times 7.8$
$+ 111 \times 7.8)$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-7	/

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DMH Date 24/11/03 Chd. DEG

Reference	Calculation	Result

$1368.9 + 1581.8 + 2727.27 = 1521.4$

$\rho = 3.733m.$

$e = 0.167m$

$R_V = 1521.0\ kN$

$$q_r = \frac{1521.0}{7.8 - 2\times 0.167}$$

$= 203.7\ kN/m^2$

say $205 kN/m^2$

$$q_r = \frac{q_{ULT}}{f_{ms}} + \gamma D_m$$ $D = 0$ No embedment Depth.

f_{ms} Table 16 = 1.35

$$q_{ULT} = \tfrac{1}{2}\gamma B N_\gamma + D N_c + \gamma D N_q$$

$D = 0$ embedment

$\gamma = 20\ kN/m^3$

$B = 6.3m$

$\phi = 30°$ Fill material

AGEC RPT $32°$ Gravelly Clay

$N_q = 22$

$N_\gamma = 20$

$N_c = 0$ No cohesion

$$q_{ULT} = \tfrac{1}{2}\times 0.7 \times 6.3 \times 20 + 0 \times 0 + 20 \times 0 \times 22$$

$1560\ kN/m^2$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D - 8	/

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DAH Date 25/11/03 Chd. DEG

Reference	Calculation	Result

Hence $\frac{q_{ULT}}{f_{ms}} = \frac{1560}{1.35}$

$= 1155\ kN/m^2$

$q_{ULT} > q_E$ No Bearing Failure Bearing OK

C16.5.3 Sliding along base

$$f_s R_h \leq R_v \frac{\tan\phi}{f_{ms}} + \frac{c'}{f_{ms}} l$$

R_v = Vertical load Min Value No Surcharge load factor Comb B Table 1B

$\phi_p = 30°$ As in bearing check above.

$c' = 0$
$f_{ms} = 1.0$ Table 16.
$f_s = 1.2$ Table 16.

R_h = Horizontal load (Disturbing)

Min Vert load

$R_v \Rightarrow ((3.7 \times 20) \times 7.8) + (\frac{1}{2} \times 45 \times 7.8)$
$+ 0$ (surcharge)
$\therefore$ 752.7 kN/m length of wall

Assume a 1m head of water at base. Only possible if drain blocks at toe.

$R_v = 752.7 - 1 \times 9.81 \times 7.8$
$= 676.1\ kN/m$ length of wall.

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D- 9.	/

Member / Location

Drg. Ref.

Job Title CORRIB.

Made by DAH Date 25/11/03 Chd. DEG

Reference	Calculation	Result

Horizontal Load

⇒ Vertical Pressure (Unfactored)

$R_h = K \times R_v$

C16.65.1 K varies with depth

$K = K_o\left(1 - \frac{z}{z_o}\right) + K_a \frac{z}{z_o}$ for $z \leq z_o = 6m$.

$z = 3.7m$

$K_o = 1 - \sin\phi = 1 - \sin 30 = 0.5$

$K_a = \frac{1-\sin\phi}{1+\sin\phi} = \frac{1-\sin 30}{1+\sin 30} = 0.333$

$K_{3.7m} = 0.5\left(1 - \frac{3.7}{6}\right) + \frac{0.333 \times 3.7}{6}$

$= 0.5 \times 0.3833 + 0.2055$

$= 0.397$

R_v = Pressure Behind Block With Surcharge present behind Block.

$R_v = (3.7 \times 20 \times 7.8 \times 1.5) + (\frac{1}{2} \times 52 \times 7.8 \times 1.5) + (30 \times 7.8 \times 1.5)$

$= 865.9 + 304.2 + 351$

$= 1521.1 \text{ kN/m}$

$R_h = 1521.1 \times 0.397 = 603.87 \text{ kN/m}$ length

Using Previous unfactored vertical load the Horiz load is :-

$R_h = 0.397 \times 676.1 = 268.4 \text{ kN}$

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-10	/

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DAH Date 25/11/03 Chd. DEB

Reference	Calculation	Result

Factored Vertical Load = 1521.1 kN with surcharge

Unfactored Vertical Load = 676.1 kN without surcharge

Hence Horizontal Loads

⇒ 603kN factored

⇒ 268kN unfactored

Sliding

$$1.2 \times 603 \leq 1521 \times \frac{\tan 30}{1.0} + \frac{0^{\phi}}{1.0}$$

$$723 \leq 878 \text{ kN} \quad \text{OK.}$$

&

$$1.2 \times 268 \leq 676 \times \frac{\tan 30}{1.0} + \frac{0^{\phi}}{1.0}$$

$$321 \leq 390 \text{ kN} \quad \text{OK.}$$

Both Sliding conditions are OK — Long Term No Sliding

Short Term Sliding (Soil to Soil).

$$fs R_h \leq \frac{C_u}{f_{ms}} L$$

$fs = 1.2$

$R_h = 268$ kN

$C_u = ?$

$f_{ms} = 1.0$

$L = 6.3$

Required C_u ⇒

$$1.2 \times 268 \leq \frac{C_u}{1.0} \times 6.3 \qquad C_u \geq 51 \text{ kN}$$

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ARUP Calculation Sheet

Job No. C1157 Sheet No. 4D-11 Rev. /

Member / Location

Drg. Ref.

Job Title CORRIB. Made by DAH Date 25/11/03 Chd. DEG

Reference	Calculation	Result

AGEC Report notes only soft areas ~~[illegible]~~ have a Cu of 40. These will be treated and over excavated out before wall installation. At terminal site sft in top of mineral soil ⇒ 12-14.

$C_u \Rightarrow \approx 6.5 \times 12 = 78 kPa$

Hence short term sliding will be OK

Short Term No sliding.

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INTERNAL STABILITY

This shall be calculated at the 'top' and bottom of the block

Calculations being carried out.

K value. $K = K_o\left(1 - \frac{z}{z_o}\right) + \left(K_a \frac{z}{z_o}\right)$

$z_o = 6m$

$T_{pj} = K \sigma_{vj} S_{vj}$

$\sigma_{vj} = \frac{R_{vj}}{L - 2e_j}$

e_j = eccentricity of loading at each level.

Hence for upper layer of reinforcement

$h_j = 0.6m$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-12.	/

Member / Location

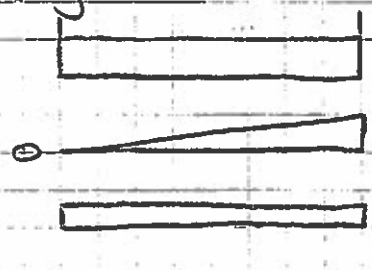
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Job Title CORRIB

Made by DAH Date 25/11/03 Chd. DEG

Reference	Calculation	Result

Loading



$K_o = 1 - \sin\phi = 0.5$

$K_a = \frac{1-\sin\phi}{1+\sin\phi} = 0.333$

$K = 0.5\left(1 - \frac{0.6}{6}\right) + \frac{0.333 \times 0.6}{6}$

$= 0.4833$

$e_j = ?$ $\Rightarrow (30 \times 7.8 \times 3.9) + (12 \times 7.8 \times 3.9) + (\tfrac{1}{2} \times 52 \times 7.8 \times 5.2) = (30 \times 7.8 + 12 \times 7.8 + \tfrac{1}{2} \times 52 \times 7.8) \times e_1$

$\Rightarrow 2332.2 = 503.4 e_1$

$e_1 = 4.63$

$e = 0.73$

$= 0.73m.$

$R_{vj} = 503.4 \times 1.5 = 755.1kN.$

$\sigma_{vj} = \frac{755.1}{7.8 - 2 \times 0.73} = 119.1 kN/m^2$

$T_{pj} = 0.4833 \times 119.1 \times 0.6$

$= 34.53kN.$

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-13	/

Member / Location

Drg. Ref.

Job Title CORRIB

Made by DAH Date 25/11/03 Chd. DEG

Reference	Calculation	Result

No vert load due to strip loads

$T_{sj} = 0$

No load due to horiz loads

$T_{fj} = 0.$

Hence $T_j = 34.5 + 0 + 0$

$= 34.5\,kN$

Cl 6.6.5.2 Points of load.

At face $= a_{(1)} T_{pj}$

At point 1 $= a_1 T_{pj}$

" 2 $= T_{pj}$

At 2 $\Rightarrow$ 34.5 kN

At Face $a_{(1)} = ?$

$z_2 = 1.5\left(\frac{3.7}{2} - 0\right) \quad x = 0.$

$= 2.77$

$h_j \leq z_2$ Hence

$a_{(1)} = 0.85$

$0.85 T_{pj} = 29.32\,kN$ at face.

At Pant 1

$b = 0.$

$d + b/2 = 0$

$\therefore a_1 = a_{(1)}$

$0.85 T_{pj} = 29.32\,kN$ at Pant 1

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ARUP Calculation Sheet

Job No. C1157 | Sheet No. 4D-14 | Rev. /

Member / Location

Drg. Ref.

Job Title CORRIB | Made by DAH | Date 25/11/03 | Chd. DEG

Reference	Calculation	Result
	Hence Required Tensile Capacity at 0.6m = 34.5kN	
	Type of Geogrid	
Terram Data Sheet	⇒ Partial factors: Manufacture 1.3, Environ 1.2, Installation 1.15 } Worst Case	
	$34.5 \times 1.3 \times 1.2 \times 1.15 = 61.89$kN	
	This is long term capacity = 60% of ultimate (Short term)	
	Hence Ultimate = 103.1kN	
	Terram 8/3-W	
	Adherance Capacity $T_j \leq \frac{2B\mu}{f_p f_n} \int_{L-L_{aj}}^{L} f_{fs}\, \sigma_v$	
	B = 1m $\mu = \tan 30 = 0.57$ take 0.5	
	$f_p = 1.3$ $f_n = 1.1$ $f_{fs} = 1.5$	
	$L - L_{aj}$ = Length of reinforcement behind active zone = ?	
	T_j = 34.5kN	Already includes $f_{fs} = 1.5$
	Hence $34.5 = \frac{2 \times 1 \times 0.5}{1.3 \times 1.1} \times (L - L_{aj}) \times \frac{1}{1.5}$	19.1kN
	$L - L_{aj} = 0.414$m	

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G 10
Rev 0

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Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-15	/

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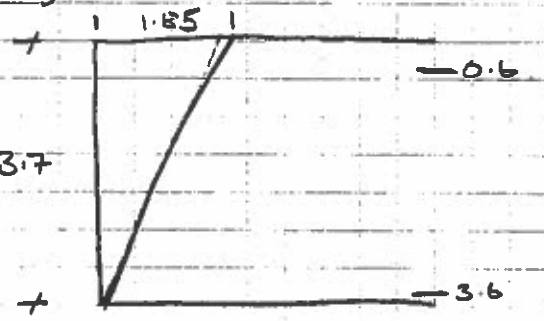
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Reference	Calculation	Result

Laj ⇒



BS8006 Fig 42

3.7 − 0.6 = 3.1 / 2 = 1.55m

Laj = 1.55m

L = 1.55 + 0.414 = 1.964m

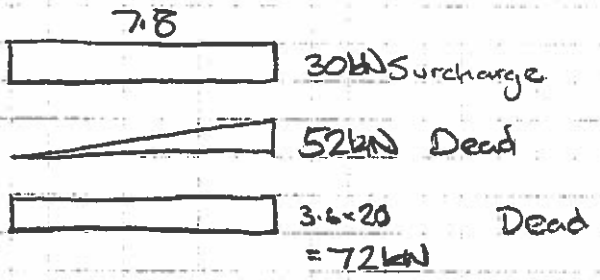
We shall provide min 3m.

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Lowest Reinforcement

h_j = 3.6m.

Loading



$K = 0.5\left(1 - \frac{3.6}{6}\right) + \frac{0.333 \times 3.6}{6}$

= 0.399

e_j = ? ⇒ $\frac{(30 \times 7.8 \times 3.9) + (72 \times 7.8 \times 3.9) + (\frac{1}{2} \times 52 \times 7.8 \times 5.2)}{(30 \times 7.8 + 72 \times 7.8 + \frac{1}{2} \times 52 \times 7.8)}$

4157.4 = 998.47.

Y = 4.16m

e = 0.26m

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1156.	4D-16.	/

Member / Location

Drg. Ref.

Job Title CORRIB | Made by DAM | Date 25/11/03 | Chd. DEG

Reference	Calculation	Result
	$R_{vj} = 998.4 \times 1.5 = 1497.6 kN$	
	$\sigma_{vj} = \frac{1497.6}{7.8 - 2 \times 0.26} = 205.7 kN/m^2$	
	$T_{pj} = 0.399 \times 205.7 \times 0.6 = 49.2 kN$	
	Max load = 49.2 kN	
Terram Data Sheet	Geogrid Required => As before Partial factors & Ultimate load reduction	
	$\frac{49.2 \times 1.3 \times 1.15 \times 1.2}{0.6} = 147.1$	150kN
	Terram Grid 15/3-W Tensile Strength = 150kN.	
	Adherance Capacity	
	$T_j \leq \frac{2\beta y}{f_p f_m} \times L - L_{aj} \times \sigma_v f_{cs}$	
	$49.2 \leq \frac{2 \times 1 \times 0.5}{1.3 \times 1.1} \times (L - L_{aj}) \times 205.7$ ⌐ includes f_{cs}	
	$L - L_{aj} \geq 0.34 m$	
	Provide 3m	

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G 10
Rev 0

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Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	4D-17	/

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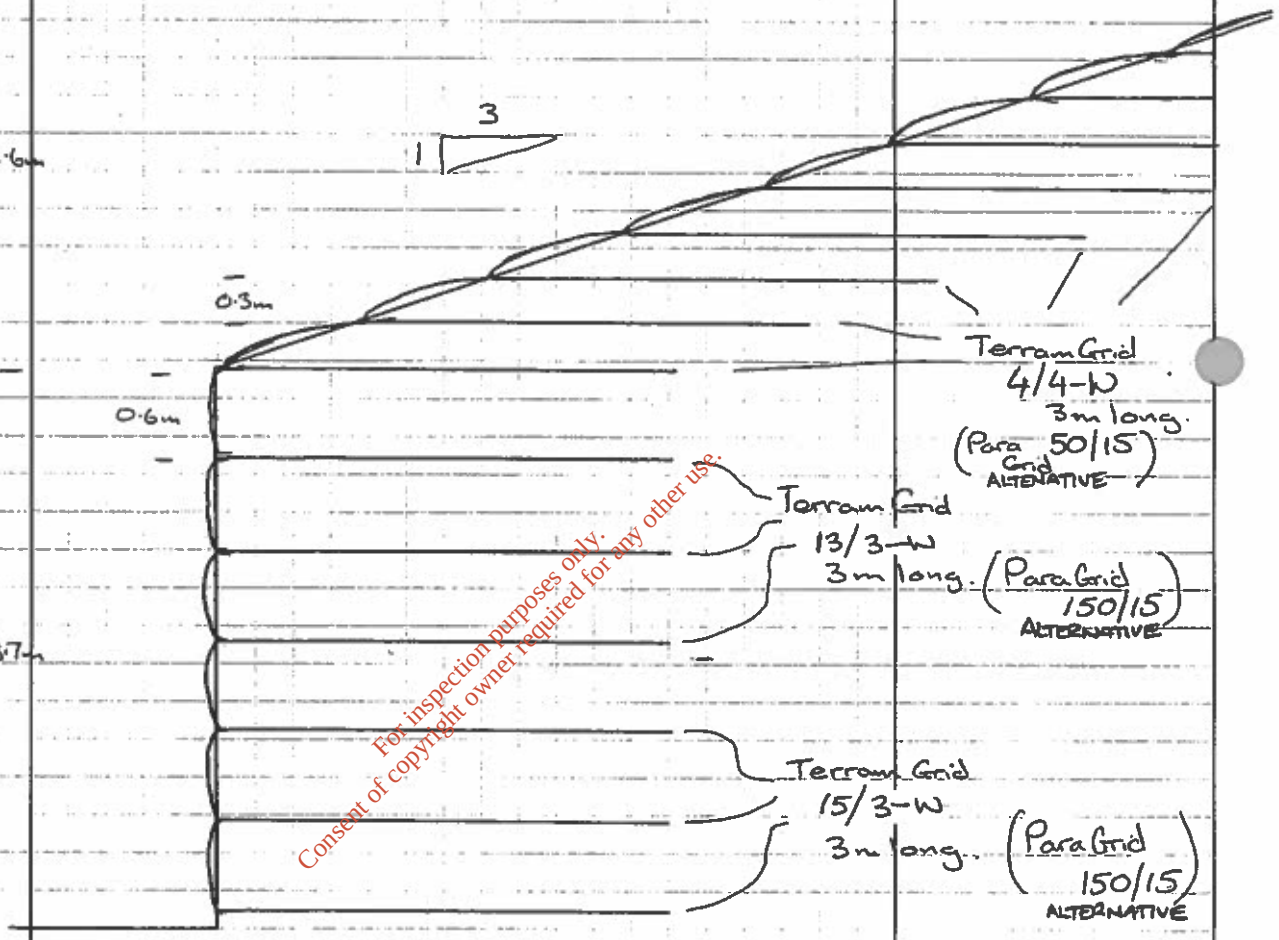
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Job Title CORRIB

Made by DAH Date 25/11/05 Chd. DEG

Reference	Calculation	Result

FINISHED WALL



Grids to be Terram Grid or Paragrid or similar approved geotextile.

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APP-4D-18

Terram Grid-W Woven Geogrid for Soil Reinforcement

TERRAM
Geosynthetics
data

Product Designation		TerramGrid					
Product Composition		Polyester woven grid with PVC coating					
Product Grades		2/2-W	2/3-W	4/2-W	3/3-W	4/4-W	5/5-W
Mechanical Properties							
Characteristic tensile strength, T_{ult} (1)							
EN ISO 10319							
- LD	kN/m	20	20	40	30	40	50
- TD	kN/m	20	30	20	30	40	50
Strain at characteristic tensile strength							
EN ISO 10319							
- LD	%	11	11	12	12	12	13
- TD	%	13	14	14	14	14	15
Physical Properties - typical							
Mass per unit area	g/m²	225	250	260	260	355	410
Roll width	m	5.0	5.0	5.0	5.0	5.0	5.0
Roll length	m	100	100	100	100	50	50
Roll weight (approx)	kg	135	140	150	150	100	120
Aperture width - LD	mm	20	35	15	20	20	30
Aperture width - TD	mm	20	25	15	20	20	30

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(1) The values listed are the characteristic short-term tensile strengths below which not more than 5% of the test results should fall.
(2) The characteristic long-term strength (T_{CR}) can be determined for a given design life and design temperature of 20°C. For a 60 year design life T_{CR} is 64% of T_{ult}. For a 120 year design life T_{CR} is 60% of T_{ult}.
(3) The long-term design strength (T_D) = T_{CR} / partial material safety factors = T_{CR} / (f_{m1} x f_{m2}). Please see reverse side for details regarding partial material safety factors.
(4) LD – Longitudinal direction, TD – Transverse direction.

Terram Ltd
Mamhilad, Pontypool
Gwent NP4 0YR, United Kingdom
Tel: +44 (0) 1495 757 722
Fax: +44 (0) 1495 762 383
Email: info@terram.co.uk
Web: www.terram.com

EN ISO 9002

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APP-40-19

Terram Grid-W Woven Geogrid for Soil Reinforcement

TERRAM
Geosynthetics
data

R4 Data GB
02 April 2001 • 2 of 2

Product Designation	**TerramGrid**
Product Composition	**Polyester woven grid with PVC coating**
Product Grades	**6/3-W 8/3-W 10/3-W 13/3-W 15/3-W 20/3-W**

Mechanical Properties

Characteristic tensile strength, T_{ult} (1)							
EN ISO 10319							
- LD	kN/m	60	80	100	130	150	200
- TD	kN/m	30	30	30	30	30	30
Strain at characteristic tensile strength							
EN ISO 10319							
- LD	%	12	14	13	15	14	13
- TD	%	14	14	14	14	14	13

Physical Properties - typical

Mass per unit area	g/m²	350	400	510	585	640	650
Roll width	m	5.0	5.0	5.0	5.0	5.0	2.1
Roll length	m	50	50	50	50	50	50
Roll weight (approx)	kg	105	120	150	165	180	80
Aperture width - LD	mm	15	20	20	20	20	20
Aperture width - TD	mm	15	20	20	20	20	20

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(1) The values listed are the characteristic short-term tensile strengths below which not more than 5% of the test results should fall.
(2) The characteristic long-term strength (T_{CR}) can be determined for a given design life and design temperature of 20°C. For a 60 year design life T_{CR} is 64% of T_{ult}. For a 120 year design life T_{CR} is 60% of T_{ult}.
(3) The long-term design strength (T_D) = T_{CR} / partial material safety factors = T_{CR} / (f_{m1} x f_{m2}).
(4) LD – Longitudinal direction, TD – Transverse direction.

Partial Material Factors, BS 8006 : 1995 Annex A

f_{m1}: material properties		f_{m2}: construction effects					
f_{m11} Manufacture consistency	f_{m12} Extrapolation of test data	f_{m21} Installation damage		f_{m22} Environment			
		Fill size (mm)		Soil pH level (pH)			
		≤ 2	2 to 60	2.0 to 4.0	4.1 to 8.9	9.0 to 9.5	9.5 to 10
1.3		1.1	1.15	1.1	1.0	1.15	1.2

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APP-4D-20

ParaGrid for Soil Reinforcement

TERRAM
Geosynthetics
data
R1 Data GB 01
August 2001 • 1 of 2

Product Designation		ParaGrid					
Construction		Polyester filament core with polyethylene sheath					
Product Grade		30/15	50/15	80/15	100/15	150/15	200/15*
Mechanical Properties							
Characteristic short term strength							
- length	kN/m	30	50	80	100	150	200
- across	kN/m	15	15	15	15	15	15
Extension at characteristic strength - length	%	12	12	12	12	12	12
Product Dimensions – Nominal							
Weight per m²	g	330	360	430	490	620	760
Thickness of elements	mm	0.8	0.9	1.2	1.3	1.3	1.3
Roll width	m	3.9	3.9	3.9	3.9	3.9	3.9
Standard roll length	m	50	50	50	50	50	50
Roll diameter	m	0.28	0.29	0.32	0.34	0.34	0.38
Roll weight (gross)	kg	73	79	93	103	130	156
Warp element pitch	mm	75	75	75	75	75	75
Weft element pitch	mm	225	225	225	225	225	225
Warp and weft width	mm	24	24	24	24	33/24	33/24

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* Not assessed in BBA Certificate 98/R098

(1) The characteristic short term strength was determined using a modified ISO 10319 test procedure.
(2) For the selection of long term mechanical properties for use in design please refer to BBA Certificate No 98/R098.
(3) ParaLink & ParaGrid are trademarks of Linear Composites Ltd.

Terram Ltd
Mamhilad, Pontypool
Gwent NP4 0YR, United Kingdom
Tel: +44 (0) 1495 757 722
Fax: +44 (0) 1495 762 393
Email: info@terram.co.uk
Web: www.terram.com

BBA BRITISH BOARD OF AGREMENT
ROADS & BRIDGES
CERTIFICATE No 98/R098

BSI REGISTERED
Certificate No: FM 22730

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APP-AU-21

ParaGrid for Soil Reinforcement

TERRAM
Geosynthetics
data
R1 Data GB 01
August 2001 • 2 of 2

Product Designation		ParaGrid			
Construction		Polyester filament core with polyethylene sheath			
Product Grade		50/25	100/25	50/50	100/100
Mechanical Properties					
Characteristic short term strength					
- length	kN/m	50	100	50	100
- across	kN/m	25	25	50	100
Extension at characteristic strength - length	%	12	12	12	12
Product Dimensions – Nominal					
Weight per m²	g	420	550	560	820
Thickness of elements	mm	0.9	1.3	0.9	1.3
Roll width	m	3.9	3.9	3.9	3.9
Standard roll length	m	50	50	50	50
Roll diameter	m	0.30	0.35	0.31	0.36
Roll weight (gross)	kg	90	114	117	164
Warp element pitch	mm	75	75	75	75
Weft element pitch	mm	150	150	75	75
Warp and weft width	mm	24	24	24	24

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(1) The characteristic short term strength was determined using a modified ISO 10319 test procedure.
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Terram Ltd
Mamhilad, Pontypool
Gwent NP4 0YR, United Kingdom
Tel: +44 (0) 1495 757 722
Fax: +44 (0) 1495 762 393
Email: info@terram.co.uk
Web: www.terram.com

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TERMINAL
REINFORCED EARTH
STRUCTURE DESIGN.
HIGHEST SLOPE POSITION
HIGHEST VERTICAL RETAINED
POSITION

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Appendix 4E - Check on Stability of Fill in Terminal (Local & Global)

Introduction

It is necessary to place fill on the excavated surface on the south-western half of the Terminal to bring levels back to 33.4m AOD. These analyses examined the global stability of the fill placed on the terminal at the south of the site.
The face of the fill will be constructed as a geotextile wraparound structure. This will prevent the fill material from applying any lateral load to the peat. This element of the terminal fill has been modelled as a very stiff material with a friction angle of 90 degrees allowing it to stand vertically. The size of the area of this reinforced fill is 3m, the same as that designed in Appendix 4D.

Two cross sections have been analysed. The first one at the location of the maximum height of terminal fill and slope, the same as the section in Appendix 4D. A second section located on the southeast edge of the terminal was analysed. Both analyses were carried out using a slip circle analysis to determine the factor of safety against sliding or rotational failure of the terminal fill against the underlying mineral soils and non-intact rock.
Peat materials on the retained side of the sheet pile wall have not been modelled as a stratum due to program constraints however their effect has been modelled using a uniform load at the surface of the mineral soils on the retained side of the sheet pile.

Soil Parameters

The following soil parameters were used in the analysis of both cross sections. SLOPE calculates the submerged unit weight of soil itself and the data inputted to the program is the bulk density of a unit volume of soil above the water table (γ) and the bulk density of a unit volume of soil below the water table (γ (')). As the soil above the water table is at or near full saturation the values are the same for the analyses. Lower bound values of the density of the mineral soils are used resulting in lower effective pressure being generated in the design. This leads to more conservative design in slope analyses.

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Table 4E.1 – Soil Parameters

Soil Type	γ / γ (') (kN/m^3)	ϕ_u/ ϕ' deg.	C_u/C' (kN/m^3)	Comments
Clay	18/18	-/30°	40/0	
Sand	19/19	-/35°	40/0	
Intact rock	22/22	-/0	100/100	Modelled conservatively as a stiff to hard clay
Engineering Fill	20/20	-/30	50/0	
Engineering Fill Reinforced	20/20	-/90	200/5	Modelled as a stiff clay due to it's vertical stability
Drainage Material	20/20	-/30	40/0	

Groundwater Conditions

The inclusion of a more permeable layer of rockfill at the base of the fill material will limit the groundwater levels within the fill as the layer will abut the perimeter drain. The water level in the design is taken to be at the top of the more permeable rockfill layer.
The lowering of the water table within the terminal to the underside of the fill will also impact on the water levels within the peat down hill of the terminal. The water table has however been conservatively modelled as being at ground surface on the retained side of the sheet pile.

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Summary of Results

The results of the stability analysis show that the factors of safety against sliding and rotational failure of the terminal fill are all above 1.5. Undrained (Short Term) conditions result in larger factors of safety. Details are given in Table 4E.2.

Table 4E.2 Details of Analyses Runs

File Name	Analysis Carried Out	FOS
App 4E_Section 1 No1	Maximum Height Reinforced Wall, Short Term, Failure Plane at Drainage / Clay Interface	2.132
App 4E_Section 1 No2	Maximum Height Reinforced Wall, Short Term, Failure Plane at Clay / Sand Interface	2.087
App 4E_Section 1 No3	Maximum Height Reinforced Wall, Short Term, Failure Plane at Sand / Rock Interface	3.225
App 4E_Section 1 No4	Maximum Height Reinforced Wall, Long Term, Failure Plane at Drainage / Clay Interface	2.535
App 4E_Section 1 No5	Maximum Height Reinforced Wall, Long Term, Failure Plane at Clay / Sand Interface	2.504
App 4E_Section 1 No6	Maximum Height Reinforced Wall, Long Term, Failure Plane at Sand / Rock Interface	3.008
App 4E_Section 2 No1	Second section Reinforced Wall, Short Term, Failure Plane at Drainage / Clay Interface	2.357
App 4E_Section 2 No2	Second section Reinforced Wall, Short Term, Failure Plane at Clay / Sand Interface	2.695
App 4E_Section 2 No3	Second section Reinforced Wall, Short Term, Failure Plane at Sand / Rock Interface	3.356
App 4E_Section 2 No4	Second section Reinforced Wall, Long Term, Failure Plane at Drainage / Clay Interface	4.137
App 4E_Section 2 No5	Second section Reinforced Wall, Long Term, Failure Plane at Clay / Sand Interface	2.545
App 4E_Section 2 No6	Second section Reinforced Wall, Long Term, Failure Plane at Sand / Rock Interface	3.997

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	APP-4E1	/

Member / Location: STABILITY OF
Drg. Ref.: TERMINAL FILL

Job Title: CORRIB

Made by: DAH Date: 24/11/03 Chd.: SFM

Reference	Calculation	Result

Overall Stability Calculation of terminal fill Material.

Parameters used are the same as those used in the slope stability calculations with the inclusion of parameters for the Fill material.

Hence.

Soil	γ/γ'	ϕ/ϕ'	C_u/C'	Comments
GRAVELLY CLAY	18/18	0/30°	40,0	
SAND.	19/19	0/35°	40/0	
ROCK.	22/22	0/45°	100/50	
GENERAL FILL.	20/20	0/30°	50/0	
REINFORCED FILL.	20/20.	0/90°	200/5	Material reinforced with geogrids $\phi = 90°$
DRAINAGE LAYER	19/19.	0/30°	40/0	Same properties as underlying Sand

Parameters for the Reinforced Earth Wraparound structure have been chosen to prevent failure occuring on the reinforced vertical face.

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157	APP-4E-2	/

Member / Location: STABLITY OF TERMINAL FILL

Drg. Ref.:

Job Title: CORRIB

Made by: DAH Date: 24/11/03 Chd.: SFM

Reference	Calculation	Result

Two cross sections have been selected.

One at the point of maximum height of slope & retained peat

And

One at the mid point along the side of the terminal south boundary

The locations of the two cross sections are shown on the attached plans.

Borehole logs from these locations have been used to produce a cross section of the terminal fill. The cross sections were then used to create slope models which were analysed for both undrained & drained parameters.

The cross sections are shown on the attached figures

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APP-4E-3

REPORT NO. 6984 — GEOTECHNICAL BORING RECORD — IGSL

CONTRACT: Corrib Pipeline - Terminal Site Additional Works

CLIENT: Enterprise Energy Ireland

ENGINEER:

CO-ORDINATES: E 86414.00 N 32848.00

GROUND LEVEL (mOD): ~~32.48~~ 30.78

BOREHOLE DIAMETER (mm): 200

BOREHOLE DEPTH (m): 6.80

CASING DEPTH (m): 6.80

BOREHOLE NO: BHW8

Sheet 1 of 1

DATE STARTED: 01/04/2001

DATE COMPLETED: 01/04/2001

BORED BY: D. Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS
0	Very soft, brown PEAT							
1					4181	DB	1.00-1.45	0/300mm
2					4182	DB	2.00-2.45	0/300mm
3					4183	DB	3.00-3.45	1/300mm
4	Firm, grey, sandy, gravelly CLAY		~~28.78~~ 27.12	3.70	4184	DB	4.00-4.45	16/300mm
5					4185	DB	5.00-5.45	19/300mm
6	Dense, light green, clayey, slightly gravelly SAND (Possible weathered Rock)		~~26.54~~ 24.92	5.90	4186	DB	6.00-6.45	33/300mm
7	End of Borehole at 6.80 m		~~25.84~~ 24.02	6.80				
8								
9								

LEVELS CHANGED TO MALIN HEAD DATUM

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
6.60	6.80	2.00	

Water Strike Details

Water Strike	Casing Depth	Seated at	Rise to	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
06/06/2001	6.10	5.10	6.10	

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

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APP. 4E - 4

GEOTECHNICAL BORING RECORD

IGSL

REPORT NO. 6984

CONTRACT: Corrib Pipeline - Terminal Site Additional Works

BOREHOLE NO: BHA3
Sheet 1 of 1

CLIENT: Enterprise Energy Ireland
ENGINEER:
CO-ORDINATES: E 86395.00 N 32584.00

GROUND LEVEL (mOD) ~~32.60~~ 31.38
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 6.00
CASING DEPTH (m) 6.00

DATE STARTED: 27/04/2001
DATE COMPLETED: 27/04/2001
BORED BY: D. Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF NUMBER	SAMPLE TYPE	DEPTH (m)	FIELD TEST RESULTS
0	Very soft, brown PEAT				387	DB	1.00-1.45	0/300mm
1								
2					388	DB	2.00-2.45	0/300mm
3					389	DB	3.00-3.45	3/300mm
	Firm, grey, sandy, gravelly CLAY with boulders		~~29.70~~ 28.08	3.30				
4					390	DB	4.00-4.45	14/300mm
	Medium dense to very dense, light green, clayey, slightly gravelly SAND (Possible weathered Rock)		~~28.78~~ 27.08	4.30				
5					391	DB	5.00-5.45	28/300mm
6								50/60mm
	End of Borehole at 6.00 m		~~27.08~~ 25.38	6.00				
7								
8								
9								

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
5.70	6.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed at	Rise to	Time	Comments
5.40	5.40	0.00	5.20	20	Slow

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks: Standing 10 hrs on 26/04/01. Track broken on Muskee

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APP. 4E-5

REPORT NO. 6984 — GEOTECHNICAL BORING RECORD — IGSL

CONTRACT: Corrib Pipeline - Terminal Site Additional Works

CLIENT: Enterprise Energy Ireland

ENGINEER:

CO-ORDINATES: E 86498.00 N 32975.00

GROUND LEVEL (mOD): ~~35.84~~ 33.72

BOREHOLE DIAMETER (mm): 200

BOREHOLE DEPTH (m): 5.40

CASING DEPTH (m): 5.40

BOREHOLE NO: BHP6

Sheet 1 of 1

DATE STARTED: 03/04/2001

DATE COMPLETED: 03/04/2001

BORED BY: D Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS
0	Very soft, brown PEAT				301	DB	1.00-1.45	0/300mm
1								
2					302	DB	2.00-2.45	0/300mm
3			30.72 ~~32.84~~	3.00	303	DB	3.00-3.45	12/300mm
	Firm, grey, sandy, gravelly CLAY		~~32.84~~	3.30				
4	Very dense, light green, clayey, slightl gravelly SAND (Possible weathered Rock)		30.42		304	DB	4.00-4.45	19/300mm
5					305	DB	5.00-5.45	81/190mm
	End of Borehole at 5.40 m		~~29.84~~ 28.32.	5.40				
6								
7								
8								
9								

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
5.30	5.40	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed at	Rise to	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

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APP. 4E -6

REPORT NO. 6984 — GEOTECHNICAL BORING RECORD — IGSL

CONTRACT: Corrib Pipeline - Terminal Site Additional Works

BOREHOLE NO: BHP7 Sheet 1 of 1

CLIENT: Enterprise Energy Ireland

ENGINEER:

CO-ORDINATES: E 86539.00 N 32900.00

GROUND LEVEL (mOD): ~~33.65~~ 32.03

BOREHOLE DIAMETER (mm): 200

BOREHOLE DEPTH (m): 5.70

CASING DEPTH (m): 5.70

DATE STARTED: 02/04/2001

DATE COMPLETED: 02/04/2001

BORED BY: D. Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS
0	Very soft, brown PEAT				4192	DB	1.00-1.45	0/300mm
2					4193	DB	2.00-2.45	0/300mm
3	Firm, grey, sandy, gravelly CLAY		~~30.85~~ 29.23	2.80	4194	DB	3.00-3.45	12/300mm
4					4195	DB	4.00-4.45	14/300mm
5	Dense, light green, clayey, slightly gravelly SAND (Possible weathered Rock)		~~28.65~~ 27.03	5.00	4196	DB	5.00-5.45	34/300mm
6	End of Borehole at 5.70 m		~~27.93~~ 26.33	5.70	4197	DB	5.70	
7								
8								
9								

Levels changed to Malin Head Datum

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
5.60	5.70	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed at	Rise to	Time	Comments
5.40	5.40	0.00	5.20	20	Slow

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
03/04/2001	5.70	2.70	5.70	

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

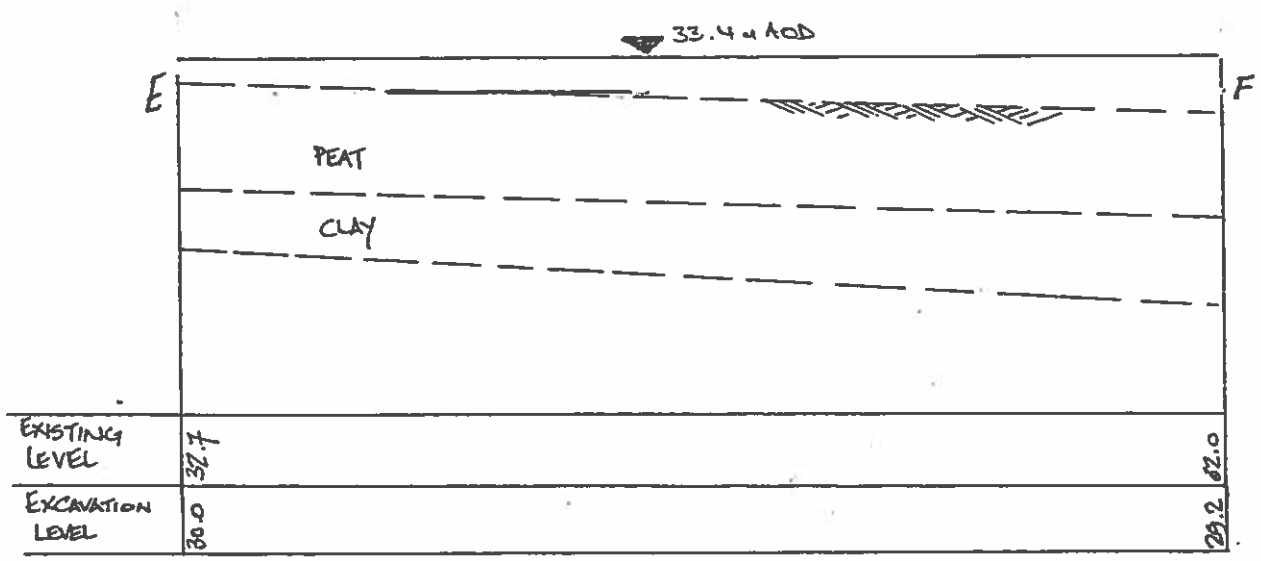
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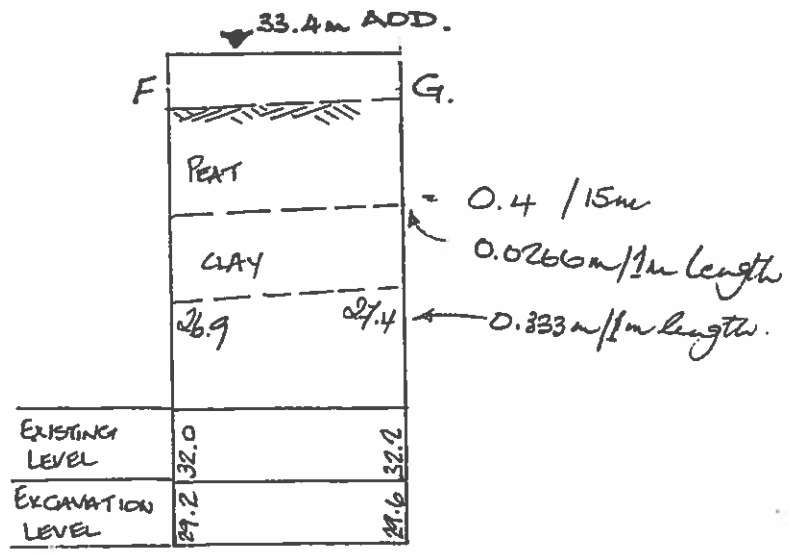
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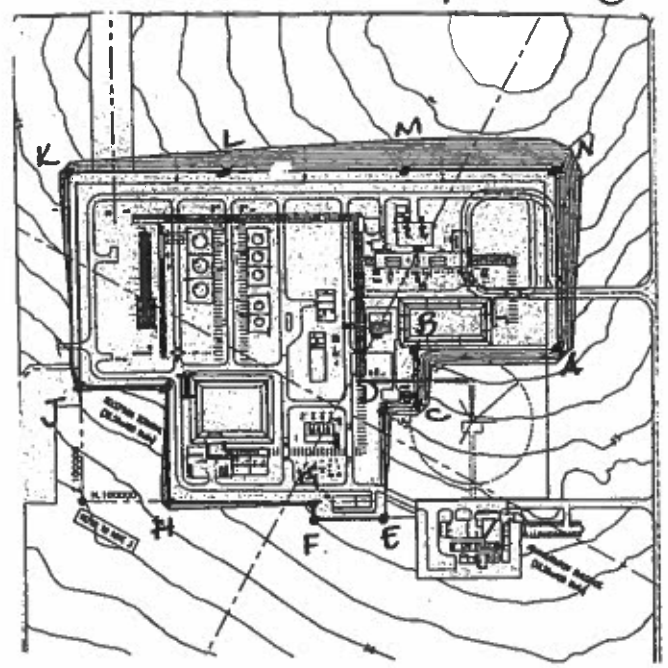
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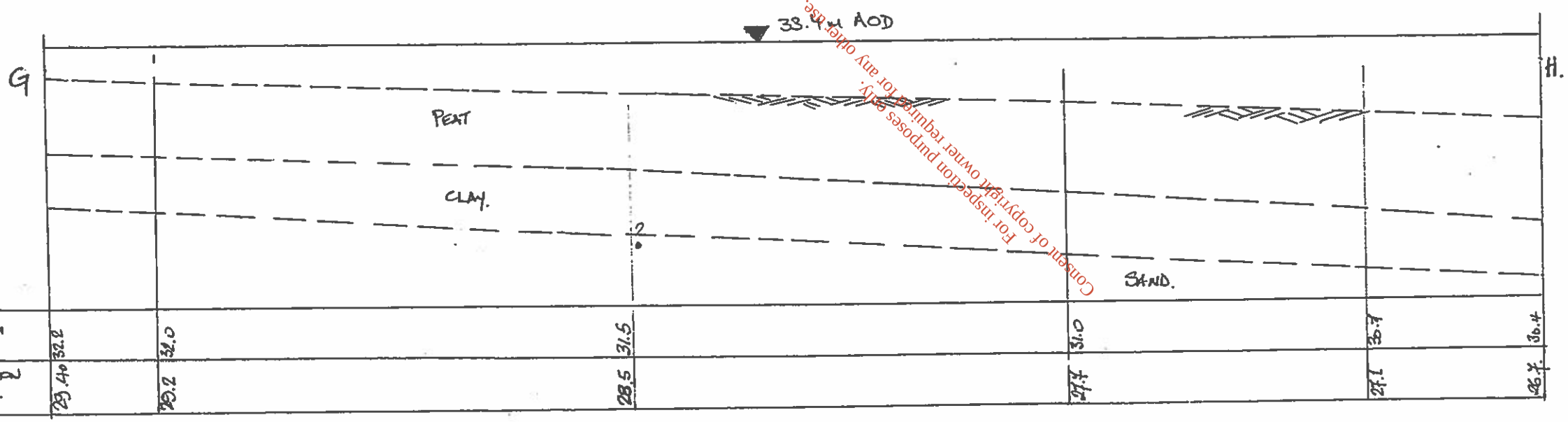
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BHW4 C10 26
BHW5 C9 25
BHW6 C8 24
BHW7 C5 21
BHW8 C6 23
BHW9 C7 23
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BHP2&IDP2
BHP3
BHP4
BHP5&IDP5
BHP6
BHP7
BHP9
BHP10&IDP10
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NTS BR1
MEL-BH-BR1
GLOBAL STABILITY ANALYSIS SECTION 1
25.606
27.050
29.182

APP-4B-8









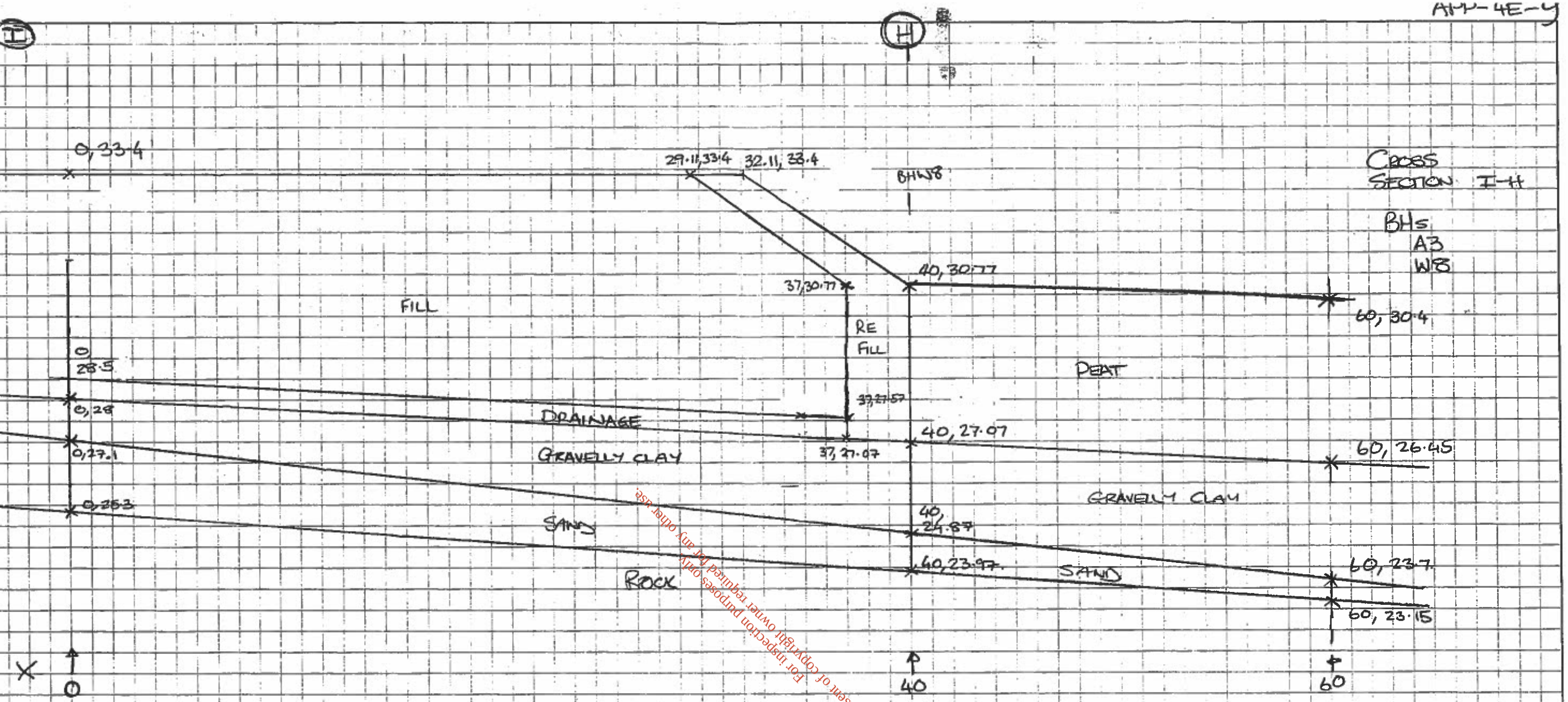
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Rev 1
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I 8 loc



SECTION 1

CROSS SECTION I-H

1:100 VERT
1:200 HORIZ.

ARUP	Sketch Sheet	
Job Title	CORRIB TERMINAL	
Job No. C1157	Sketch No.	Rev. /
Made by DAH	Date 24/11/03	Chd. JB

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D-6 TE5 D-7 D-8 D-9 D-10 D-11 D-12 TE11 TE6 TE4 TE7 TE3 TE2

ID BH16 ID BH8 ID BH7 ID BH10 ID BH5 ID BH9

BHW3 C11 BHW4 C10 BHW5 C9 BHW6 C8 BHW8 C6 BHW9 C7 BHW7 C5

BHP1A BHP1 BHP2&IDP2 BHP3 BHP4 BHP15&IDP15 BHP12 BHP11 BHP13&IDP13 BHP9 BHP10&IDP10 BHP7 BHP17 BHP6 BHP5&IDP5 BHP16&IDP16

BHA1 BHA2 BHA3 BHA4 BHA5 BHA6 BHA7 BHA8 BHA9

E-1 E-2 E-3 E-4 E-5 E-6 E-7 E-8 E-9 E-10 E-11

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MEL-BH\BR1 NTS BR1

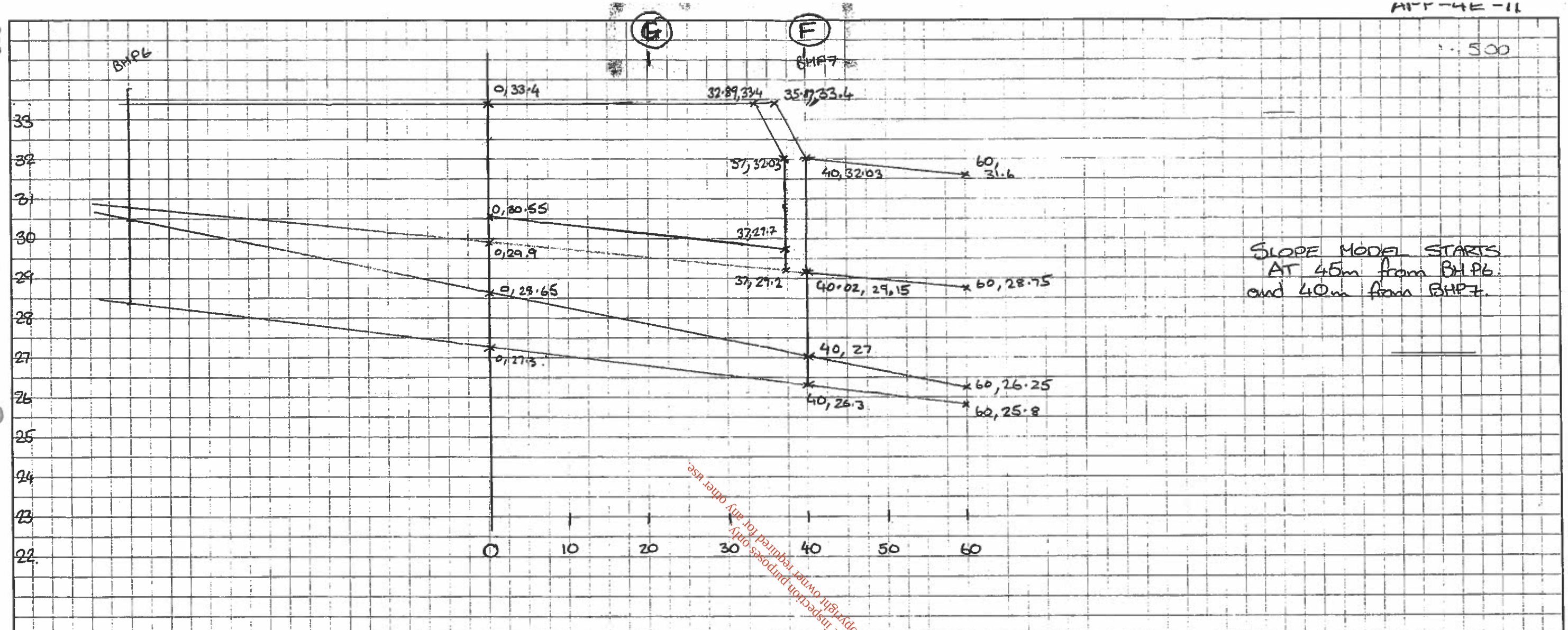
GLOBAL STABILITY ANALYSIS SECTION 2

29.182

27.050

25.606

G 10
Rev 1
A3



SLOPE MODEL STARTS AT 45m from BHP6. and 40m from BHP7.

SECTION 2.

CROSS SECTION G-F

BH's
P6
P7.

VERT 1:100
HORIZ 1:500
NOTE DIFFERENCE IN SCALES FROM PREVIOUS

ARUP	Sketch Sheet	
Job Title	CORRIB TERMINAL	
Job No. C1157	Sketch No.	Rev. /
Made by DAN	Date 24/11/03	Chd.

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ARUP

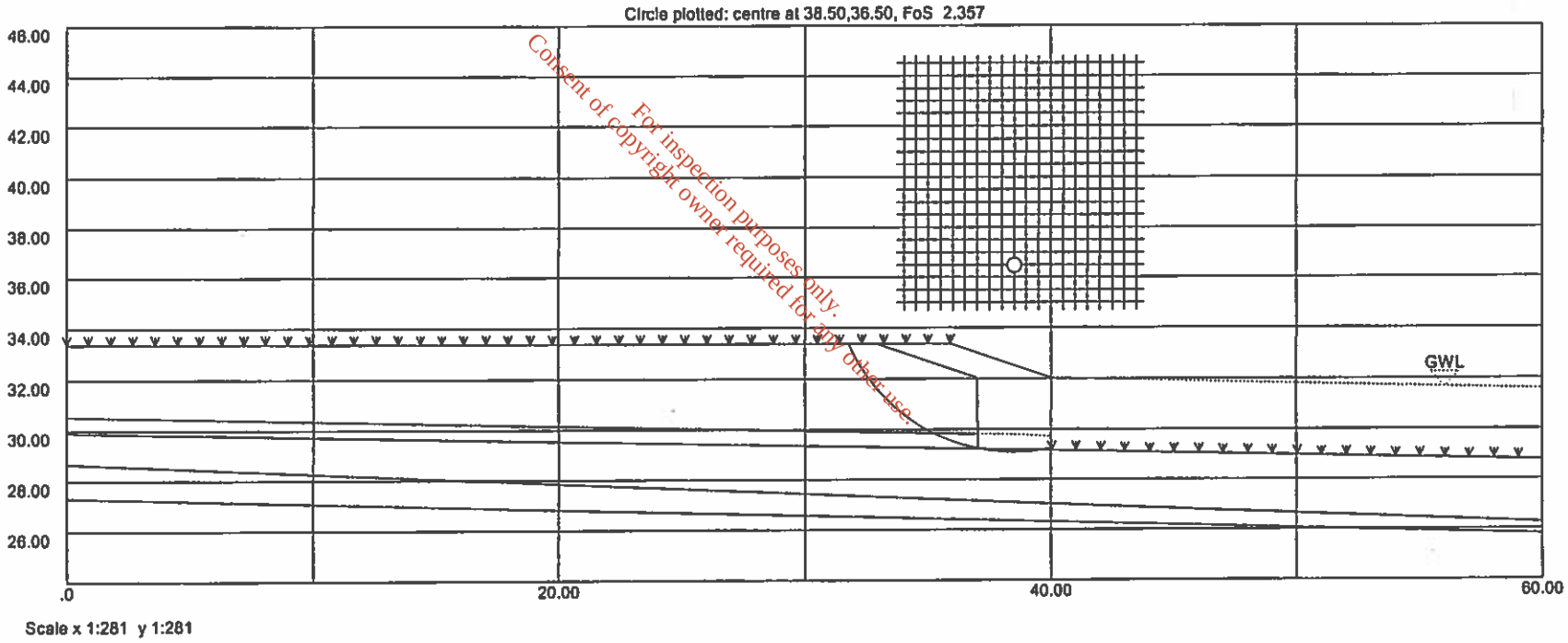
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	4E-S21-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No1 Rev1	



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Notes

A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Undrained Analysis
Slip Circle tangent to Drainage Blanket
Stability at section through BHP6 & P7

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight			Shear Strength Parameters	
		Above GWL	Below GWL		Phi or Phi0	c or c0'
		[kN/m3]	[kN/m3]		[°]	[kPa]
1	Gravelly Clay (undr	18.00	18.00	Undrained	.0	40.00
2	Sand (Weathered Roc	19.00	19.00	Undrained	.0	40.00
3	Intact Rock	22.00	22.00	Undrained	.0	100.0
4	Engineering Fill	20.00	20.00	Undrained	.0	50.00
5	Engineering Fill Re	20.00	20.00	Undrained	.0	200.0
6	Reinforced Drainage	20.00	20.00	Undrained	.0	40.00

Materials with variable cohesion or non-linear strength

No.	Description	y0 OR b	k OR a	cu/p ratio
		[m]	[kPa/m]	
2	Sand (Weathered Rock)	28.00	15.00	-

Coordinates of top of soil strata

Stratum	Material	X -->	.0	32.89	35.89	37.00	37.01	37.02	38.51
1	5		33.40	33.40	33.40	.	.	.	.
2	4		33.40	33.40	.	32.03	29.80	29.20	.
3	6		30.55	.	.	.	29.80	29.20	.
4	1		29.90	.	.	.	.	29.20	.
5	2		28.65	.	.	.	.	.	.
6	3		27.30	.	.	.	.	.	.
GWL1	-		30.55	.	.	.	.	.	29.80

Stratum	Material	X -->	40.00	40.01	40.02	60.00
1	5		32.03	29.70	29.15	28.75
2	4		.	.	29.15	28.75
3	6		.	.	29.15	28.75
4	1		.	.	29.15	28.75
5	2		27.00	.	.	26.25
6	3		26.30	.	.	25.80
GWL1	-		.	29.70	32.03	31.60

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

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Surface Loads

No.	Limits of loaded area X1 [m]	Distributed load X2 [m]	Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 34.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
34.00	35.00	5.738	629.6	11.08	564.4	6256.
34.00	35.50	6.238	658.9	10.62	666.0	7073.
34.00	36.00	6.738	686.3	10.29	769.7	7918.
34.00	36.50	7.238	711.5	10.04	875.2	8789.
34.00	37.00	7.738	735.9	9.857	982.8	9687.
34.00	37.50	8.237	757.6	9.356	1102.	10310.
34.00	38.00	8.737	777.3	8.821	1228.	10840.
34.00	38.50	9.237	795.9	8.404	1358.	11410.
34.00	39.00	9.737	813.7	8.064	1489.	12010.
34.00	39.50	10.24	830.6	7.785	1622.	12630.
34.00	40.00	10.74	843.0	7.471	1774.	13260.
34.00	40.50	11.24	858.4	7.276	1911.	13910.
34.00	41.00	11.74	873.3	7.110	2049.	14570.
34.00	41.50	12.24	901.0	7.217	2112.	15240.
34.00	42.00	12.74	915.4	7.084	2248.	15920.
34.00	42.50	13.24	929.9	6.969	2384.	16610.
34.00	43.00	13.74	943.5	6.868	2521.	17320.
34.00	43.50	14.24	956.6	6.777	2660.	18030.
34.00	44.00	14.74	969.6	6.698	2799.	18740.
34.00	44.50	15.24	981.8	6.626	2938.	19470.
34.50	35.00	5.747	621.2	10.46	629.5	6583.
34.50	35.50	6.247	649.9	10.08	735.6	7417.
34.50	36.00	6.747	676.5	9.827	842.8	8283.
34.50	36.50	7.247	699.2	9.131	964.9	8810.
34.50	37.00	7.747	720.4	8.521	1093.	9316.
34.50	37.50	8.247	740.2	8.052	1225.	9860.
34.50	38.00	8.747	758.8	7.682	1358.	10430.
34.50	38.50	9.247	772.4	7.307	1508.	11020.
34.50	39.00	9.747	789.2	7.068	1646.	11630.
34.50	39.50	10.25	817.6	7.115	1723.	12260.
34.50	40.00	10.75	833.6	6.938	1859.	12900.
34.50	40.50	11.25	849.0	6.786	1996.	13540.
34.50	41.00	11.75	863.8	6.657	2134.	14210.
34.50	41.50	12.25	878.1	6.545	2273.	14880.
34.50	42.00	12.75	891.9	6.448	2413.	15560.
34.50	42.50	13.25	904.7	6.367	2554.	16260.
34.50	43.00	13.75	917.7	6.293	2695.	16960.
34.50	43.50	14.25	930.4	6.229	2836.	17660.
34.50	44.00	14.75	942.7	6.171	2978.	18380.
34.50	44.50	15.25	954.4	6.124	3119.	19100.
35.00	35.00	5.757	611.0	10.04	689.1	6921.
35.00	35.50	6.257	636.2	9.146	810.8	7415.
35.00	36.00	6.757	659.1	8.373	940.5	7875.
35.00	36.50	7.257	680.0	7.817	1073.	8384.
35.00	37.00	7.756	699.8	7.393	1207.	8926.
35.00	37.50	8.256	714.6	6.990	1359.	9497.
35.00	38.00	8.756	743.8	6.975	1446.	10080.
35.00	38.50	9.256	761.2	6.751	1583.	10690.
35.00	39.00	9.756	777.8	6.567	1721.	11300.
35.00	39.50	10.26	794.0	6.408	1862.	11930.
35.00	40.00	10.76	809.2	6.278	2003.	12570.
35.00	40.50	11.26	823.9	6.167	2144.	13220.
35.00	41.00	11.76	838.2	6.073	2286.	13880.

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35.00	41.50	12.26	851.9	5.992	2429.	14550.
35.00	42.00	12.76	865.0	5.923	2571.	15230.
35.00	42.50	13.26	878.0	5.863	2715.	15920.
35.00	43.00	13.76	890.6	5.811	2859.	16610.
35.00	43.50	14.26	902.5	5.764	3003.	17310.
35.00	44.00	14.76	914.2	5.727	3147.	18020.
35.00	44.50	15.26	926.0	5.693	3292.	18740.
35.50	35.00	5.766	593.7	8.510	767.2	6528.
35.50	35.50	6.266	616.5	7.757	902.0	6997.
35.50	36.00	6.766	634.5	7.147	1050.	7505.
35.50	36.50	7.266	664.4	7.004	1149.	8045.
35.50	37.00	7.766	683.6	6.692	1286.	8605.
35.50	37.50	8.266	701.9	6.444	1425.	9184.
35.50	38.00	8.766	719.2	6.242	1566.	9777.
35.50	38.50	9.266	735.8	6.078	1708.	10380.
35.50	39.00	9.766	751.7	5.942	1851.	11000.
35.50	39.50	10.27	766.9	5.830	1995.	11630.
35.50	40.00	10.77	781.3	5.737	2138.	12270.
35.50	40.50	11.27	795.5	5.657	2283.	12910.
35.50	41.00	11.77	809.6	5.591	2427.	13570.
35.50	41.50	12.27	822.9	5.533	2573.	14240.
35.50	42.00	12.76	835.9	5.485	2718.	14910.
35.50	42.50	13.26	848.5	5.443	2864.	15590.
35.50	43.00	13.76	860.8	5.408	3010.	16280.
35.50	43.50	14.26	872.8	5.378	3157.	16980
35.50	44.00	14.76	884.6	5.352	3303.	17680
35.50	44.50	15.26	896.0	5.331	3450.	18390.
36.00	35.00	5.776	576.9	7.454	826.6	6161.
36.00	35.50	6.276	599.2	6.913	964.4	6670.
36.00	36.00	6.776	619.9	6.517	1105.	7204.
36.00	36.50	7.275	639.2	6.218	1247.	7756.
36.00	37.00	7.775	657.4	5.987	1391.	8325.
36.00	37.50	8.275	674.7	5.807	1534.	8907.
36.00	38.00	8.775	691.1	5.662	1678.	9501.
36.00	38.50	9.275	707.1	5.543	1823.	10110.
36.00	39.00	9.775	722.4	5.445	1969.	10720.
36.00	39.50	10.27	737.2	5.365	2115.	11350.
36.00	40.00	10.77	751.4	5.298	2262.	11980.
36.00	40.50	11.27	765.2	5.242	2409.	12630.
36.00	41.00	11.77	778.6	5.195	2556.	13280.
36.00	41.50	12.27	791.6	5.157	2703.	13940.
36.00	42.00	12.77	804.3	5.124	2851.	14610.
36.00	42.50	13.27	816.6	5.097	2998.	15280.
36.00	43.00	13.77	828.6	5.074	3146.	15960.
36.00	43.50	14.27	840.4	5.056	3294.	16650.
36.00	44.00	14.77	851.9	5.041	3442.	17350.
36.00	44.50	15.27	863.4	5.029	3589.	18050.
36.50	35.00	5.785	551.7	6.523	901.9	5883.
36.50	35.50	6.285	572.7	6.124	1047.	6409.
36.50	36.00	6.785	592.2	5.836	1191.	6951.
36.50	36.50	7.285	610.6	5.616	1337.	7509.
36.50	37.00	7.785	628.1	5.446	1484.	8080.
36.50	37.50	8.285	644.8	5.312	1631.	8661.
36.50	38.00	8.785	660.7	5.204	1778.	9253.
36.50	38.50	9.285	675.8	5.120	1925.	9856.
36.50	39.00	9.784	690.6	5.049	2073.	10470.
36.50	39.50	10.28	705.2	4.991	2222.	11090.
36.50	40.00	10.78	719.1	4.944	2370.	11720.
36.50	40.50	11.28	732.6	4.906	2519.	12360.
36.50	41.00	11.78	745.8	4.874	2667.	13000.
36.50	41.50	12.28	758.6	4.848	2816.	13650.
36.50	42.00	12.78	771.1	4.828	2965.	14320.
36.50	42.50	13.28	783.1	4.813	3113.	14980.
36.50	43.00	13.78	795.0	4.802	3261.	15660.
36.50	43.50	14.28	806.7	4.795	3408.	16340.
36.50	44.00	14.78	818.1	4.792	3555.	17030.
36.50	44.50	15.28	829.2	4.791	3701.	17730.
37.00	35.00	5.795	522.3	5.836	969.9	5661.
37.00	35.50	6.294	542.1	5.540	1118.	6192.
37.00	36.00	6.794	561.1	5.325	1265.	6737.
37.00	36.50	7.294	578.9	5.160	1414.	7295.
37.00	37.00	7.794	596.2	5.031	1563.	7863.
37.00	37.50	8.294	612.3	4.931	1712.	8442.
37.00	38.00	8.794	627.9	4.852	1861.	9029.
37.00	38.50	9.294	643.0	4.788	2011.	9626.

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37.00	39.00	9.794	657.3	4.740	2159.	10230.
37.00	39.50	10.29	671.2	4.703	2306.	10850.
37.00	40.00	10.79	684.9	4.675	2453.	11470.
37.00	40.50	11.29	698.1	4.655	2600.	12100.
37.00	41.00	11.79	711.0	4.641	2746.	12740.
37.00	41.50	12.29	724.0	4.631	2891.	13390.
37.00	42.00	12.79	736.3	4.626	3036.	14040.
37.00	42.50	13.29	748.4	4.623	3181.	14700.
37.00	43.00	13.79	760.2	4.624	3325.	15370.
37.00	43.50	14.29	771.8	4.627	3468.	16050.
37.00	44.00	14.79	783.1	4.631	3612.	16730.
37.00	44.50	15.29	794.2	4.638	3756.	17420.
37.50	35.00	5.816	491.8	4.694	1030.	4833.
37.50	35.50	6.314	510.9	4.520	1180.	5331.
37.50	36.00	6.813	529.1	4.402	1328.	5847.
37.50	36.50	7.312	546.2	4.321	1476.	6378.
37.50	37.00	7.811	562.8	4.268	1622.	6925.
37.50	37.50	8.310	578.6	4.235	1768.	7488.
37.50	38.00	8.809	594.1	4.216	1914.	8068.
37.50	38.50	9.308	608.9	4.210	2058.	8665.
37.50	39.00	9.808	623.1	4.215	2202.	9282.
37.50	39.50	10.31	636.8	4.229	2346.	9924.
37.50	40.00	10.81	650.2	4.261	2490.	10610.
37.50	40.50	11.31	663.3	4.504	2632.	11850.
37.50	41.00	11.81	676.0	4.498	2775.	12480.
37.50	41.50	12.31	688.4	4.496	2919.	13120.
37.50	42.00	12.80	700.6	4.497	3061.	13770.
37.50	42.50	13.30	712.8	4.500	3204.	14420.
37.50	43.00	13.80	724.4	4.505	3347.	15080.
37.50	43.50	14.30	735.7	4.427	3556.	15740.
37.50	44.00	14.80	746.9	4.431	3705.	16420.
37.50	44.50	15.30	757.8	4.437	3853.	17090.
38.00	35.00	5.878	466.4	3.497	1076.	3764.
38.00	35.50	6.372	484.6	3.415	1220.	4167.
38.00	36.00	6.866	501.8	3.363	1363.	4585.
38.00	36.50	7.361	518.3	3.267	1535.	5016.
38.00	37.00	7.857	534.2	3.243	1683.	5460.
38.00	37.50	8.354	549.5	3.230	1831.	5916.
38.00	38.00	8.850	564.1	3.225	1980.	6385.
38.00	38.50	9.347	578.3	3.227	2127.	6865.
38.00	39.00	9.845	592.5	3.233	2276.	7358.
38.00	39.50	10.34	605.9	3.244	2424.	7862.
38.00	40.00	10.84	619.0	3.258	2572.	8377.
38.00	40.50	11.34	631.7	3.274	2719.	8903.
38.00	41.00	11.84	644.2	3.293	2867.	9440.
38.00	41.50	12.33	656.1	3.313	3015.	9988.
38.00	42.00	12.83	668.0	3.334	3163.	10550.
38.00	42.50	13.33	679.6	3.357	3311.	11120.
38.00	43.00	13.83	691.0	3.381	3459.	11690.
38.00	43.50	14.33	702.1	3.406	3607.	12280.
38.00	44.00	14.83	713.4	3.432	3754.	12880.
38.00	44.50	15.33	724.4	3.458	3902.	13490.
38.50	35.00	5.982	445.0	2.414	1139.	2750.
38.50	35.50	6.468	462.1	2.380	1287.	3063.
38.50	36.00	6.955	478.4	2.362	1435.	3390.
38.50	36.50	7.445	494.1	2.357	1583.	3730.
38.50	37.00	7.935	509.4	2.360	1730.	4083.
38.50	37.50	8.427	523.9	2.369	1878.	4448.
38.50	38.00	8.920	538.1	2.382	2025.	4825.
38.50	38.50	9.413	551.8	2.399	2173.	5213.
38.50	39.00	9.907	565.2	2.419	2321.	5613.
38.50	39.50	10.40	578.1	2.440	2469.	6024.
38.50	40.00	10.90	591.0	2.463	2617.	6445.
38.50	40.50	11.39	603.4	2.488	2764.	6878.
38.50	41.00	11.89	615.5	2.514	2912.	7321.
38.50	41.50	12.38	627.4	2.541	3060.	7774.
38.50	42.00	12.88	639.0	2.568	3208.	8237.
38.50	42.50	13.38	650.2	2.596	3355.	8710.
38.50	43.00	13.88	661.2	2.625	3503.	9193.
38.50	43.50	14.37	672.1	2.653	3651.	9686.
38.50	44.00	14.87	682.7	2.683	3797.	10190.
38.50	44.50	15.37	693.2	2.712	3945.	10700.
39.00	35.00	5.828	376.7	5.160	1024.	5286.
39.00	35.50	6.328	395.5	4.840	1174.	5681.
39.00	36.00	6.828	413.3	4.647	1323.	6146.

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39.00	36.50	7.328	430.3	4.535	1472.	6675.
39.00	37.00	7.828	446.6	4.451	1621.	7213.
39.00	37.50	8.328	462.5	4.385	1770.	7761.
39.00	38.00	8.828	477.6	4.334	1919.	8318.
39.00	38.50	9.328	492.3	4.295	2068.	8883.
39.00	39.00	9.828	506.7	4.265	2217.	9457.
39.00	39.50	10.33	520.3	4.242	2366.	10040.
39.00	40.00	10.83	533.8	4.225	2515.	10630.
39.00	40.50	11.33	546.9	4.212	2665.	11220.
39.00	41.00	11.83	559.4	4.205	2813.	11830.
39.00	41.50	12.33	571.9	4.200	2962.	12440.
39.00	42.00	12.83	584.2	4.197	3111.	13060.
39.00	42.50	13.33	596.1	4.197	3260.	13680.
39.00	43.00	13.83	607.8	4.199	3409.	14320.
39.00	43.50	14.33	619.2	4.203	3558.	14960.
39.00	44.00	14.83	630.3	4.209	3707.	15600.
39.00	44.50	15.33	641.3	4.215	3856.	16250.
39.50	35.00	5.837	336.4	5.543	972.3	5390.
39.50	35.50	6.336	355.2	5.158	1122.	5786.
39.50	36.00	6.836	373.0	4.855	1271.	6172.
39.50	36.50	7.336	390.1	4.620	1421.	6564.
39.50	37.00	7.836	406.5	4.516	1570.	7090.
39.50	37.50	8.336	422.1	4.434	1720.	7626.
39.50	38.00	8.836	437.3	4.372	1869.	8170.
39.50	38.50	9.336	452.2	4.322	2018.	8724.
39.50	39.00	9.836	466.4	4.288	2168.	9295.
39.50	39.50	10.34	480.1	4.258	2317.	9866.
39.50	40.00	10.84	493.7	4.234	2467.	10440.
39.50	40.50	11.34	506.9	4.217	2616.	11030.
39.50	41.00	11.84	519.7	4.204	2765.	11630.
39.50	41.50	12.34	532.0	4.195	2915.	12230.
39.50	42.00	12.84	544.0	4.190	3064.	12830.
39.50	42.50	13.34	556.0	4.187	3213.	13450.
39.50	43.00	13.84	567.9	4.186	3362.	14070.
39.50	43.50	14.34	579.3	4.187	3512.	14700.
39.50	44.00	14.84	590.6	4.190	3661.	15340.
39.50	44.50	15.34	601.4	4.194	3811.	15980.
40.00	35.00	5.845	295.5	6.128	897.9	5502.
40.00	35.50	6.345	314.3	5.651	1048.	5920.
40.00	36.00	6.845	332.2	5.279	1197.	6322.
40.00	36.50	7.345	349.3	4.973	1347.	6699.
40.00	37.00	7.845	365.7	4.722	1497.	7068.
40.00	37.50	8.345	381.5	4.564	1647.	7516.
40.00	38.00	8.844	396.8	4.480	1797.	8048.
40.00	38.50	9.344	411.4	4.414	1946.	8590.
40.00	39.00	9.844	425.7	4.361	2096.	9141.
40.00	39.50	10.34	439.7	4.319	2246.	9700.
40.00	40.00	10.84	453.1	4.286	2396.	10270.
40.00	40.50	11.34	466.1	4.260	2545.	10840.
40.00	41.00	11.84	479.0	4.239	2695.	11420.
40.00	41.50	12.34	491.6	4.223	2845.	12010.
40.00	42.00	12.84	503.9	4.211	2995.	12610.
40.00	42.50	13.34	515.8	4.207	3144.	13230.
40.00	43.00	13.84	527.4	4.202	3293.	13840.
40.00	43.50	14.34	538.8	4.199	3443.	14460.
40.00	44.00	14.84	550.0	4.198	3593.	15080.
40.00	44.50	15.34	561.3	4.199	3743.	15720.
40.50	35.00	5.854	254.6	7.041	802.1	5647.
40.50	35.50	6.354	273.5	6.357	952.3	6054.
40.50	36.00	6.854	291.5	5.856	1102.	6456.
40.50	36.50	7.354	308.6	5.469	1253.	6851.
40.50	37.00	7.854	325.0	5.158	1403.	7236.
40.50	37.50	8.354	340.8	4.900	1553.	7610.
40.50	38.00	8.854	356.0	4.680	1703.	7971.
40.50	38.50	9.354	370.9	4.576	1853.	8482.
40.50	39.00	9.854	385.2	4.498	2003.	9011.
40.50	39.50	10.35	399.0	4.438	2154.	9558.
40.50	40.00	10.85	412.5	4.390	2304.	10110.
40.50	40.50	11.35	425.8	4.351	2454.	10680.
40.50	41.00	11.85	438.6	4.319	2604.	11250.
40.50	41.50	12.35	451.1	4.294	2754.	11830.
40.50	42.00	12.85	463.3	4.274	2904.	12410.
40.50	42.50	13.35	475.4	4.258	3054.	13010.
40.50	43.00	13.85	487.2	4.246	3204.	13610.
40.50	43.50	14.35	498.7	4.237	3354.	14210.

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EPA Export 08-07-2014:23:43:18

40.50	44.00	14.85	509.9	4.231	3504.	14830.
40.50	44.50	15.35	520.9	4.228	3654.	15450.
41.00	35.00	5.864	213.9	8.514	684.5	5828.
41.00	35.50	6.364	232.8	7.453	835.2	6225.
41.00	36.00	6.864	250.8	6.719	985.8	6624.
41.00	36.50	7.364	268.0	6.176	1136.	7019.
41.00	37.00	7.864	284.5	5.755	1287.	7407.
41.00	37.50	8.364	300.3	5.416	1438.	7786.
41.00	38.00	8.864	315.6	5.133	1588.	8154.
41.00	38.50	9.364	330.3	4.894	1739.	8509.
41.00	39.00	9.864	344.6	4.688	1889.	8859.
41.00	39.50	10.36	358.6	4.609	2040.	9403.
41.00	40.00	10.86	372.1	4.545	2191.	9956.
41.00	40.50	11.36	385.3	4.493	2341.	10520.
41.00	41.00	11.86	398.2	4.443	2492.	11070.
41.00	41.50	12.36	410.9	4.408	2642.	11650.
41.00	42.00	12.86	423.2	4.377	2793.	12220.
41.00	42.50	13.36	435.1	4.351	2944.	12810.
41.00	43.00	13.86	446.9	4.330	3094.	13400.
41.00	43.50	14.36	458.4	4.313	3244.	13990.
41.00	44.00	14.86	469.9	4.299	3395.	14600.
41.00	44.50	15.36	481.0	4.289	3546.	15210.
41.50	35.00	5.874	174.0	11.16	543.5	6065.
41.50	35.50	6.374	192.8	9.267	694.8	6439.
41.50	36.00	6.874	210.7	8.074	846.2	6832.
41.50	36.50	7.374	227.9	7.242	997.4	7223.
41.50	37.00	7.874	244.3	6.625	1149.	7611.
41.50	37.50	8.374	260.2	6.149	1300.	7993.
41.50	38.00	8.874	275.5	5.765	1451.	8366.
41.50	38.50	9.374	290.3	5.448	1602.	8728.
41.50	39.00	9.874	304.5	5.178	1753.	9078.
41.50	39.50	10.37	318.5	4.943	1904.	9414.
41.50	40.00	10.87	332.1	4.750	2056.	9764.
41.50	40.50	11.37	345.3	4.673	2207.	10310.
41.50	41.00	11.87	358.2	4.609	2358.	10870.
41.50	41.50	12.37	370.8	4.557	2509.	11430.
41.50	42.00	12.87	383.1	4.515	2660.	12010.
41.50	42.50	13.37	395.1	4.479	2810.	12590.
41.50	43.00	13.87	407.0	4.450	2962.	13180.
41.50	43.50	14.37	418.4	4.426	3113.	13780.
41.50	44.00	14.87	429.8	4.407	3264.	14380.
41.50	44.50	15.37	440.9	4.384	3415.	14970.
42.00	35.00	5.884	135.8	13.97	444.6	6212.
42.00	35.50	6.384	153.8	12.79	522.9	6689.
42.00	36.00	6.884	171.5	10.40	681.6	7088.
42.00	36.50	7.384	188.5	8.952	833.7	7464.
42.00	37.00	7.884	205.0	7.965	985.9	7853.
42.00	37.50	8.384	220.7	7.237	1138.	8234.
42.00	38.00	8.884	235.9	6.676	1290.	8609.
42.00	38.50	9.384	250.7	6.228	1441.	8977.
42.00	39.00	9.884	265.0	5.858	1593.	9334.
42.00	39.50	10.38	278.9	5.546	1745.	9679.
42.00	40.00	10.88	292.3	5.278	1896.	10010.
42.00	40.50	11.38	305.6	5.042	2048.	10330.
42.00	41.00	11.88	318.5	4.844	2200.	10660.
42.00	41.50	12.38	331.1	4.765	2351.	11210.
42.00	42.00	12.88	343.3	4.699	2503.	11760.
42.00	42.50	13.38	355.3	4.645	2655.	12330.
42.00	43.00	13.88	367.2	4.599	2806.	12910.
42.00	43.50	14.38	378.8	4.561	2958.	13490.
42.00	44.00	14.88	390.2	4.529	3110.	14080.
42.00	44.50	15.38	401.3	4.502	3261.	14680.
42.50	35.00	5.894	100.9	14.88	372.7	5543.
42.50	35.50	6.394	117.3	14.60	448.2	6544.
42.50	36.00	6.894	133.8	13.84	527.4	7301.
42.50	36.50	7.394	150.5	12.31	631.3	7774.
42.50	37.00	7.894	166.7	10.44	779.4	8138.
42.50	37.50	8.394	182.3	9.181	927.0	8510.
42.50	38.00	8.894	197.4	8.271	1074.	8884.
42.50	38.50	9.394	212.1	7.587	1221.	9261.
42.50	39.00	9.894	226.2	6.837	1408.	9624.
42.50	39.50	10.39	240.1	6.393	1560.	9976.
42.50	40.00	10.89	253.5	6.024	1713.	10320.
42.50	40.50	11.39	266.7	5.706	1865.	10640.
42.50	41.00	11.89	279.4	5.430	2018.	10960.

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42.50	41.50	12.39	292.0	5.186	2170.	11250.
42.50	42.00	12.89	304.2	4.966	2322.	11530.
42.50	42.50	13.39	316.3	4.882	2475.	12080.
42.50	43.00	13.89	328.0	4.813	2627.	12640.
42.50	43.50	14.39	339.6	4.754	2779.	13210.
42.50	44.00	14.89	350.9	4.705	2931.	13790.
42.50	44.50	15.39	362.0	4.662	3083.	14370.
43.00	35.00	5.904	70.05	16.84	277.3	4669.
43.00	35.50	6.404	84.57	16.11	347.7	5602.
43.00	36.00	6.904	99.39	15.59	423.7	6605.
43.00	36.50	7.404	114.5	15.20	504.9	7677.
43.00	37.00	7.904	129.8	14.28	591.5	8446.
43.00	37.50	8.404	145.1	12.14	729.1	8851.
43.00	38.00	8.904	160.0	10.47	880.6	9216.
43.00	38.50	9.404	174.5	9.293	1031.	9583.
43.00	39.00	9.904	188.6	8.424	1181.	9945.
43.00	39.50	10.40	202.2	7.750	1329.	10300.
43.00	40.00	10.90	215.6	7.214	1478.	10660.
43.00	40.50	11.40	228.7	6.765	1626.	11000.
43.00	41.00	11.90	241.3	6.386	1773.	11320.
43.00	41.50	12.40	253.8	6.058	1920.	11630.
43.00	42.00	12.90	266.0	5.771	2066.	11920.
43.00	42.50	13.40	277.8	5.515	2213.	12200.
43.00	43.00	13.90	289.5	5.147	2421.	12460.
43.00	43.50	14.40	301.1	5.026	2575.	12940.
43.00	44.00	14.90	312.3	4.951	2728.	13500.
43.00	44.50	15.40	323.4	4.886	2880.	14070.
43.50	35.00	5.914	43.71	20.29	184.6	3746.
43.50	35.50	6.414	56.15	18.82	245.4	4619.
43.50	36.00	6.914	69.06	17.82	311.8	5555.
43.50	36.50	7.414	82.37	17.09	383.9	6560.
43.50	37.00	7.914	96.03	16.54	461.3	7630.
43.50	37.50	8.414	110.0	16.12	544.0	8768.
43.50	38.00	8.914	124.2	15.07	637.7	9611.
43.50	38.50	9.414	138.4	12.57	793.3	9968.
43.50	39.00	9.914	152.2	10.89	948.7	10330.
43.50	39.50	10.41	165.7	9.677	1104.	10680.
43.50	40.00	10.91	178.8	8.773	1258.	11040.
43.50	40.50	11.41	191.6	8.068	1411.	11380.
43.50	41.00	11.91	204.2	7.498	1562.	11710.
43.50	41.50	12.41	216.5	7.025	1713.	12030.
43.50	42.00	12.91	228.6	6.630	1863.	12350.
43.50	42.50	13.41	240.4	6.284	2012.	12640.
43.50	43.00	13.91	252.0	5.979	2161.	12920.
43.50	43.50	14.41	263.4	5.706	2309.	13180.
43.50	44.00	14.91	274.6	5.460	2457.	13420.
43.50	44.50	15.41	285.6	5.290	2605.	13780.

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WORST CASE : WATER CASE 1 OF 1

Centre at (38.50,36.50)
Iterations: 5
Net vertical force [kN]: .0
Net horiz force [kN]: 0.02951
Inclination of interslice forces [°]: 179.2

Radius 7.445m
Horiz acceleration [%g]: .0
Slip weight [kN] 494.1
Disturbing moment [kN m]: 1583.
Restoring moment [kN m]: 3730.

Factor of Safety: 2.357

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	31.73	33.40	-34.68	.0	.0	.0
2	32.06	32.77	-28.40	0.1503	-10.20	.0
3	32.45	32.17	-22.48	0.5552	-9.552	.0
4	32.89	31.61	-16.97	1.772	-1.751	.0
5	33.38	31.09	-11.93	3.786	10.80	.0
6	33.92	30.63	-7.397	6.383	26.14	.0
7	34.50	30.22	-3.408	9.254	42.36	.0
8	35.12	29.87	.0	12.05	57.66	.0
9	35.18	29.84	0.2777	12.29	58.94	0.003855
10	35.89	29.53	3.230	15.41	75.49	0.5217
11	36.44	29.35	4.938	16.07	78.99	1.219
12	37.00	29.21	6.212	16.17	79.51	1.930
13	37.01	29.21	6.231	16.17	79.49	1.941
14	37.02	29.20	6.249	16.16	79.47	1.953

EPA Export 08-07-2014:23:43:18

15	37.04	29.20	6.290	16.15	79.42	1.978
16	37.71	29.10	7.177	15.40	75.63	2.575
17	38.38	29.06	7.461	13.73	67.30	2.783
18	39.05	29.08	6.886	11.15	54.54	2.371
19	39.71	29.16	5.646	7.720	37.70	1.594
20	40.00	29.21	4.925	1.716	8.393	1.213
21	40.01	29.21	4.898	1.512	7.398	1.199
22	40.02	29.21	25.55	.0	0.02951	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	50.00	.0	.0	2.080	-3.653	35.70
2	50.00	.0	.0	7.235	10.56	35.70
3	50.00	.0	.0	13.41	21.93	35.70
4	50.00	.0	.0	20.21	31.90	35.58
5	50.00	.0	.0	27.40	41.08	35.58
6	50.00	.0	.0	34.61	49.54	35.58
7	50.00	.0	.0	41.50	57.30	35.58
8	50.00	.0	0.1388	4.069	5.532	3.210
9	40.00	.0	1.754	52.83	71.74	31.00
10	40.00	.0	4.084	42.49	40.80	23.12
11	40.00	.0	5.575	43.17	41.95	23.12
12	40.00	.0	6.222	0.7641	0.7484	0.4083
13	40.00	.0	6.240	0.7642	0.7488	0.4083
14	40.00	.0	6.269	1.688	1.655	0.9020
15	40.00	.0	6.733	49.80	49.40	26.86
16	40.00	.0	7.319	48.19	49.25	26.86
17	40.00	.0	7.173	45.41	48.33	26.86
18	40.00	.0	6.266	41.56	46.67	26.86
19	200.0	.0	5.286	16.58	27.55	58.22
20	200.0	.0	4.911	0.3311	0.7254	2.042
21	200.0	.0	15.22	0.04346	1.866	1.813

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0
7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	30.00	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	.0	.0
19	.0	.0	.0	.0
20	.0	.0	.0	.0
21	.0	.0	12.77	-702.4

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ARUP

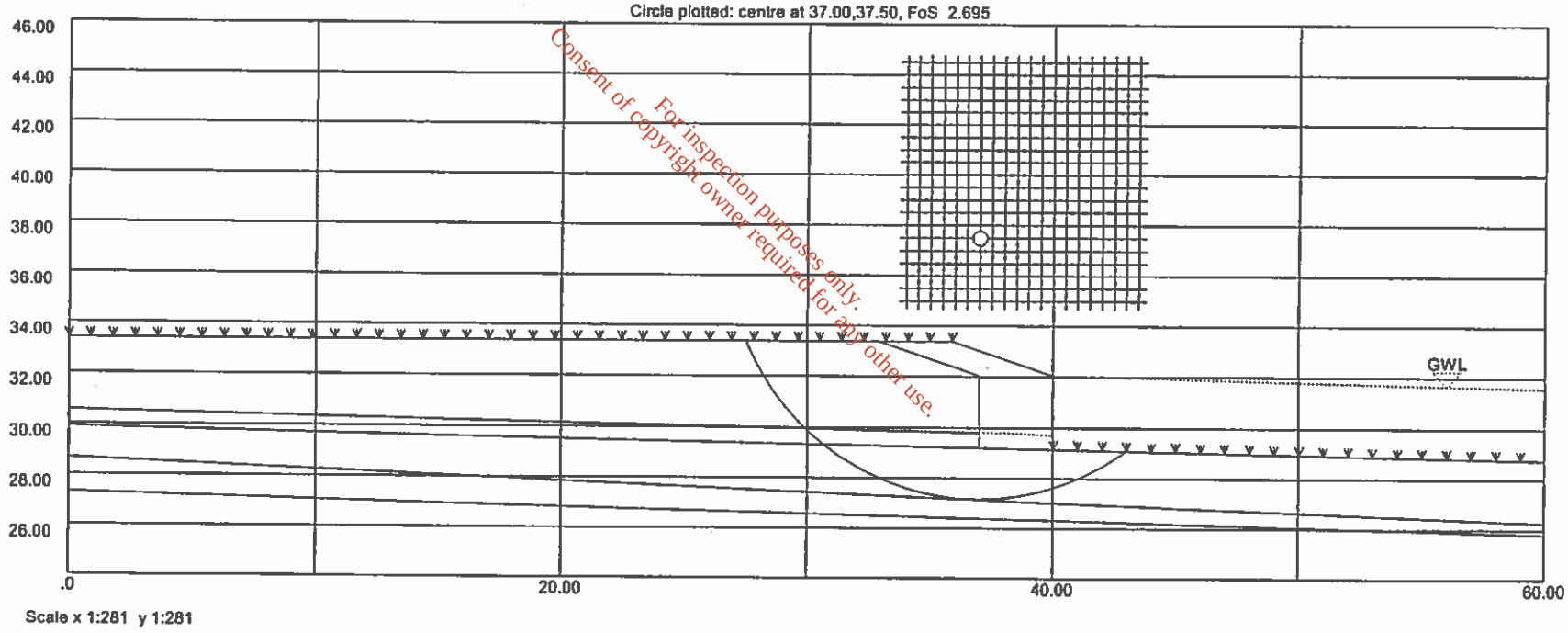
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	4E-S2.2-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No2 Rev1	



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EPA Export 08-07-2014:23:43:18

Notes

A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Undrained Analysis
Slip Circle tangent to Gravelly Clay
Stability at section through BHP6 & P7

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight			Shear Strength Parameters	
		Above GWL [kN/m3]	Below GWL [kN/m3]		Phi or Phi0 [°]	c or c0' [kPa]
1	Gravelly Clay (undr	18.00	18.00	Undrained	.0	40.00
2	Sand (Weathered Roc	19.00	19.00	Undrained	.0	40.00
3	Intact Rock	22.00	22.00	Undrained	.0	100.0
4	Engineering Fill	20.00	20.00	Undrained	.0	50.00
5	Engineering Fill Re	20.00	20.00	Undrained	.0	200.0
6	Reinforced Drainage	20.00	20.00	Undrained	.0	40.00

Materials with variable cohesion or non-linear strength

No.	Description	y0 OR b [m]	c OR a [kPa/m]	cu/p ratio
2	Sand (Weathered Rock)	28.00	15.00	-

Coordinates of top of soil strata

Stratum	Material	X --> .0	32.89	35.89	37.00	37.01	37.02	38.51
1	5	33.40	33.40	33.40	.	.	.	.
2	4	33.40	33.40	.	32.03	29.80	29.20	.
3	6	30.55	.	.	.	29.80	29.20	.
4	1	29.90	.	.	.	.	29.20	.
5	2	28.65	.	.	.	.	.	.
6	3	27.30	.	.	.	.	.	.
GWL1	-	30.55	.	.	.	.	.	29.80

Stratum	Material	X --> 40.00	40.01	40.02	60.00
1	5	32.03	29.70	29.15	28.75
2	4	.	.	29.15	28.75
3	6	.	.	29.15	28.75
4	1	.	.	29.15	28.75
5	2	27.00	.	.	26.25
6	3	26.30	.	.	25.80
GWL1	-	.	29.70	32.03	31.60

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

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EPA Export 08-07-2014:23:43:18

Surface Loads

No.	Limits of loaded area X1 [m]	X2 [m]	Distributed load Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 34.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
34.00	35.00	7.742	1240.	4.983	1471.	7331.
34.00	35.50	8.241	1276.	4.345	1714.	7448.
34.00	36.00	8.741	1309.	3.874	1960.	7592.
34.00	36.50	9.241	1340.	3.547	2186.	7756.
34.00	37.00	9.740	1370.	3.240	2447.	7926.
34.00	37.50	10.24	1399.	3.020	2682.	8100.
34.00	38.00	10.74	1426.	2.906	2902.	8434.
34.00	38.50	11.24	1453.	2.900	3106.	9006.
34.00	39.00	11.74	1478.	2.900	3307.	9591.
34.00	39.50	12.24	1503.	2.902	3510.	10190.
34.00	40.00	12.74	1528.	2.907	3714.	10800.
34.00	40.50	13.24	1552.	2.914	3918.	11420.
34.00	41.00	13.74	1575.	2.923	4122.	12050.
34.00	41.50	14.24	1598.	2.933	4326.	12690.
34.00	42.00	14.74	1621.	2.946	4530.	13340.
34.00	42.50	15.24	1643.	2.959	4734.	14010.
34.00	43.00	15.74	1664.	2.973	4938.	14680.
34.00	43.50	16.23	1686.	2.988	5143.	15370.
34.00	44.00	16.73	1706.	3.004	5347.	16060.
34.00	44.50	17.23	1727.	3.021	5551.	16770.
34.50	35.00	7.763	1211.	3.682	1676.	6171.
34.50	35.50	8.262	1245.	3.270	1926.	6299.
34.50	36.00	8.762	1276.	2.977	2162.	6435.
34.50	36.50	9.261	1307.	2.876	2376.	6833.
34.50	37.00	9.761	1336.	2.856	2580.	7367.
34.50	37.50	10.26	1364.	2.842	2785.	7915.
34.50	38.00	10.76	1391.	2.836	2989.	8476.
34.50	38.50	11.26	1417.	2.837	3190.	9050.
34.50	39.00	11.76	1443.	2.838	3395.	9636.
34.50	39.50	12.26	1469.	2.843	3600.	10230.
34.50	40.00	12.76	1493.	2.851	3804.	10840.
34.50	40.50	13.26	1518.	2.860	4009.	11470.
34.50	41.00	13.76	1541.	2.871	4214.	12100.
34.50	41.50	14.26	1564.	2.884	4419.	12740.
34.50	42.00	14.76	1587.	2.898	4624.	13400.
34.50	42.50	15.26	1609.	2.913	4829.	14070.
34.50	43.00	15.76	1631.	2.928	5035.	14740.
34.50	43.50	16.26	1652.	2.945	5240.	15430.
34.50	44.00	16.75	1673.	2.962	5445.	16130.
34.50	44.50	17.25	1694.	2.979	5650.	16830.
35.00	35.00	7.783	1176.	2.917	1832.	5345.
35.00	35.50	8.283	1209.	2.865	2038.	5838.
35.00	36.00	8.782	1240.	2.830	2243.	6347.
35.00	36.50	9.282	1271.	2.806	2448.	6869.
35.00	37.00	9.781	1300.	2.791	2653.	7406.
35.00	37.50	10.28	1328.	2.782	2859.	7955.
35.00	38.00	10.78	1355.	2.782	3061.	8517.
35.00	38.50	11.28	1382.	2.786	3264.	9093.
35.00	39.00	11.78	1408.	2.790	3470.	9681.
35.00	39.50	12.28	1434.	2.797	3676.	10280.
35.00	40.00	12.78	1459.	2.807	3882.	10890.
35.00	40.50	13.28	1483.	2.818	4087.	11520.
35.00	41.00	13.78	1507.	2.831	4293.	12150.

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EPA Export 08-07-2014:23:43:18

35.00	41.50	14.28	1530.	2.845	4499.	12800.
35.00	42.00	14.78	1553.	2.860	4705.	13460.
35.00	42.50	15.28	1575.	2.876	4911.	14120.
35.00	43.00	15.78	1597.	2.893	5117.	14800.
35.00	43.50	16.28	1618.	2.910	5323.	15490.
35.00	44.00	16.78	1639.	2.928	5529.	16190.
35.00	44.50	17.28	1660.	2.947	5735.	16900.
35.50	35.00	7.804	1140.	2.851	1886.	5377.
35.50	35.50	8.303	1173.	2.807	2092.	5872.
35.50	36.00	8.803	1205.	2.777	2298.	6382.
35.50	36.50	9.302	1235.	2.758	2504.	6906.
35.50	37.00	9.802	1265.	2.746	2711.	7445.
35.50	37.50	10.30	1293.	2.740	2918.	7995.
35.50	38.00	10.80	1320.	2.743	3121.	8559.
35.50	38.50	11.30	1347.	2.746	3327.	9137.
35.50	39.00	11.80	1373.	2.752	3534.	9726.
35.50	39.50	12.30	1399.	2.761	3740.	10330.
35.50	40.00	12.80	1424.	2.772	3947.	10940.
35.50	40.50	13.30	1448.	2.785	4154.	11570.
35.50	41.00	13.80	1472.	2.799	4360.	12200.
35.50	41.50	14.30	1495.	2.814	4567.	12850.
35.50	42.00	14.80	1518.	2.830	4774.	13510.
35.50	42.50	15.30	1540.	2.847	4981.	14180.
35.50	43.00	15.80	1562.	2.864	5188.	14860.
35.50	43.50	16.30	1583.	2.883	5395.	15550.
35.50	44.00	16.80	1604.	2.901	5602.	16250.
35.50	44.50	17.30	1625.	2.920	5809.	16960.
36.00	35.00	7.824	1104.	2.807	1927.	5410.
36.00	35.50	8.324	1137.	2.768	2134.	5907.
36.00	36.00	8.823	1169.	2.742	2341.	6418.
36.00	36.50	9.323	1200.	2.726	2548.	6944.
36.00	37.00	9.823	1229.	2.717	2755.	7483.
36.00	37.50	10.32	1257.	2.715	2960.	8035.
36.00	38.00	10.82	1285.	2.716	3167.	8601.
36.00	38.50	11.32	1312.	2.721	3374.	9180.
36.00	39.00	11.82	1338.	2.728	3582.	9772.
36.00	39.50	12.32	1364.	2.738	3789.	10380.
36.00	40.00	12.82	1389.	2.750	3996.	10990.
36.00	40.50	13.32	1413.	2.764	4204.	11620.
36.00	41.00	13.82	1437.	2.778	4412.	12260.
36.00	41.50	14.32	1460.	2.794	4619.	12910.
36.00	42.00	14.82	1483.	2.811	4827.	13570.
36.00	42.50	15.32	1505.	2.828	5035.	14240.
36.00	43.00	15.82	1527.	2.846	5243.	14920.
36.00	43.50	16.32	1549.	2.864	5451.	15610.
36.00	44.00	16.82	1570.	2.883	5659.	16320.
36.00	44.50	17.32	1591.	2.902	5867.	17030.
36.50	35.00	7.845	1068.	2.783	1955.	5442.
36.50	35.50	8.345	1101.	2.746	2163.	5940.
36.50	36.00	8.844	1133.	2.722	2371.	6453.
36.50	36.50	9.344	1163.	2.707	2579.	6980.
36.50	37.00	9.843	1193.	2.699	2787.	7522.
36.50	37.50	10.34	1221.	2.700	2991.	8076.
36.50	38.00	10.84	1249.	2.702	3199.	8643.
36.50	38.50	11.34	1276.	2.707	3407.	9224.
36.50	39.00	11.84	1303.	2.715	3616.	9817.
36.50	39.50	12.34	1328.	2.726	3824.	10420.
36.50	40.00	12.84	1353.	2.738	4032.	11040.
36.50	40.50	13.34	1379.	2.751	4242.	11670.
36.50	41.00	13.84	1403.	2.766	4450.	12310.
36.50	41.50	14.34	1426.	2.782	4659.	12960.
36.50	42.00	14.84	1449.	2.799	4868.	13620.
36.50	42.50	15.34	1472.	2.816	5077.	14300.
36.50	43.00	15.84	1494.	2.834	5285.	14980.
36.50	43.50	16.34	1516.	2.853	5494.	15670.
36.50	44.00	16.84	1537.	2.872	5703.	16380.
36.50	44.50	17.34	1558.	2.891	5912.	17090.
37.00	35.00	7.866	1031.	2.781	1968.	5474.
37.00	35.50	8.365	1065.	2.744	2177.	5974.
37.00	36.00	8.865	1097.	2.720	2386.	6489.
37.00	36.50	9.364	1128.	2.705	2595.	7018.
37.00	37.00	9.864	1158.	2.697	2804.	7561.
37.00	37.50	10.36	1185.	2.695	3012.	8116.
37.00	38.00	10.86	1213.	2.697	3221.	8686.
37.00	38.50	11.36	1241.	2.702	3430.	9268.

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EPA Export 08-07-2014:23:43:18

37.00	39.00	11.86	1267.	2.710	3639.	9863.
37.00	39.50	12.36	1293.	2.720	3849.	10470.
37.00	40.00	12.86	1318.	2.733	4058.	11090.
37.00	40.50	13.36	1343.	2.746	4268.	11720.
37.00	41.00	13.86	1368.	2.763	4475.	12360.
37.00	41.50	14.36	1391.	2.778	4684.	13020.
37.00	42.00	14.86	1414.	2.795	4894.	13680.
37.00	42.50	15.36	1437.	2.813	5104.	14350.
37.00	43.00	15.86	1459.	2.831	5314.	15040.
37.00	43.50	16.36	1481.	2.849	5523.	15740.
37.00	44.00	16.86	1503.	2.868	5733.	16440.
37.00	44.50	17.36	1524.	2.887	5943.	17160.
37.50	35.00	7.888	995.1	2.798	1970.	5511.
37.50	35.50	8.387	1028.	2.759	2179.	6012.
37.50	36.00	8.886	1061.	2.734	2388.	6528.
37.50	36.50	9.385	1092.	2.718	2597.	7059.
37.50	37.00	9.885	1121.	2.711	2804.	7602.
37.50	37.50	10.38	1150.	2.707	3014.	8160.
37.50	38.00	10.88	1178.	2.707	3226.	8731.
37.50	38.50	11.38	1205.	2.711	3436.	9315.
37.50	39.00	11.88	1232.	2.719	3646.	9912.
37.50	39.50	12.38	1258.	2.728	3856.	10520.
37.50	40.00	12.88	1283.	2.740	4066.	11140.
37.50	40.50	13.38	1308.	2.753	4277.	11770.
37.50	41.00	13.88	1332.	2.767	4487.	12420.
37.50	41.50	14.38	1356.	2.783	4698.	13070.
37.50	42.00	14.88	1379.	2.799	4909.	13740.
37.50	42.50	15.38	1402.	2.816	5119.	14420.
37.50	43.00	15.88	1424.	2.834	5330.	15100.
37.50	43.50	16.38	1446.	2.851	5541.	15800.
37.50	44.00	16.88	1467.	2.869	5752.	16500.
37.50	44.50	17.38	1488.	2.888	5963.	17220.
38.00	35.00	7.934	966.1	2.909	1968.	5723.
38.00	35.50	8.430	999.0	2.860	2177.	6226.
38.00	36.00	8.927	1031.	2.825	2387.	6743.
38.00	36.50	9.424	1061.	2.801	2597.	7274.
38.00	37.00	9.922	1091.	2.786	2807.	7818.
38.00	37.50	10.42	1120.	2.777	3016.	8376.
38.00	38.00	10.92	1147.	2.771	3228.	8945.
38.00	38.50	11.42	1174.	2.771	3438.	9528.
38.00	39.00	11.91	1200.	2.774	3648.	10120.
38.00	39.50	12.41	1226.	2.780	3859.	10730.
38.00	40.00	12.91	1251.	2.788	4069.	11340.
38.00	40.50	13.41	1275.	2.797	4280.	11970.
38.00	41.00	13.91	1299.	2.807	4491.	12610.
38.00	41.50	14.41	1323.	2.819	4702.	13250.
38.00	42.00	14.91	1346.	2.831	4913.	13910.
38.00	42.50	15.40	1368.	2.828	5122.	14490.
38.00	43.00	15.90	1390.	2.845	5334.	15170.
38.00	43.50	16.40	1412.	2.863	5545.	15870.
38.00	44.00	16.90	1434.	2.880	5756.	16580.
38.00	44.50	17.40	1455.	2.899	5968.	17300.
38.50	35.00	8.011	947.2	3.042	1967.	5984.
38.50	35.50	8.503	979.3	2.982	2177.	6492.
38.50	36.00	8.996	1010.	2.939	2387.	7014.
38.50	36.50	9.489	1040.	2.908	2597.	7551.
38.50	37.00	9.983	1069.	2.886	2807.	8101.
38.50	37.50	10.48	1097.	2.871	3018.	8664.
38.50	38.00	10.97	1124.	2.860	3231.	9241.
38.50	38.50	11.47	1150.	2.856	3441.	9829.
38.50	39.00	11.96	1176.	2.856	3652.	10430.
38.50	39.50	12.46	1202.	2.859	3862.	11040.
38.50	40.00	12.96	1226.	2.865	4071.	11660.
38.50	40.50	13.45	1250.	2.872	4282.	12300.
38.50	41.00	13.95	1274.	2.881	4493.	12940.
38.50	41.50	14.45	1297.	2.891	4705.	13600.
38.50	42.00	14.95	1320.	2.902	4916.	14270.
38.50	42.50	15.44	1342.	2.915	5128.	14950.
38.50	43.00	15.94	1364.	2.928	5339.	15630.
38.50	43.50	16.44	1386.	2.942	5551.	16330.
38.50	44.00	16.94	1407.	2.957	5763.	17040.
38.50	44.50	17.44	1428.	2.972	5975.	17760.
39.00	35.00	7.948	884.5	2.971	1886.	5604.
39.00	35.50	8.448	918.5	2.912	2098.	6111.
39.00	36.00	8.947	951.1	2.870	2311.	6632.

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EPA Export 08-07-2014:23:43:18

39.00	36.50	9.447	982.4	2.840	2524.	7167.
39.00	37.00	9.946	1012.	2.822	2734.	7716.
39.00	37.50	10.45	1042.	2.810	2947.	8279.
39.00	38.00	10.95	1070.	2.803	3159.	8856.
39.00	38.50	11.45	1098.	2.799	3374.	9444.
39.00	39.00	12.04	1159.	2.960	3653.	10810.
39.00	39.50	12.53	1184.	2.956	3864.	11420.
39.00	40.00	13.02	1208.	2.957	4076.	12050.
39.00	40.50	13.52	1232.	2.961	4287.	12690.
39.00	41.00	14.01	1255.	2.966	4499.	13350.
39.00	41.50	14.51	1278.	2.975	4710.	14010.
39.00	42.00	15.00	1300.	2.984	4922.	14690.
39.00	42.50	15.50	1322.	2.994	5134.	15370.
39.00	43.00	16.00	1344.	3.005	5346.	16060.
39.00	43.50	16.49	1365.	3.017	5558.	16770.
39.00	44.00	16.99	1386.	3.030	5770.	17480.
39.00	44.50	17.49	1406.	3.043	5983.	18210.
39.50	35.00	7.969	847.7	3.075	1833.	5637.
39.50	35.50	8.468	881.4	3.004	2046.	6145.
39.50	36.00	8.968	913.8	2.952	2259.	6667.
39.50	36.50	9.467	945.3	2.914	2472.	7204.
39.50	37.00	9.967	975.8	2.891	2682.	7755.
39.50	37.50	10.47	1005.	2.873	2896.	8320.
39.50	38.00	10.97	1034.	2.861	3110.	8898.
39.50	38.50	11.47	1062.	2.855	3324.	9489.
39.50	39.00	11.97	1088.	2.851	3540.	10090.
39.50	39.50	12.46	1115.	2.853	3753.	10710.
39.50	40.00	12.96	1141.	2.857	3967.	11330.
39.50	40.50	13.46	1166.	2.864	4181.	11970.
39.50	41.00	13.96	1191.	2.872	4395.	12620.
39.50	41.50	14.46	1215.	2.882	4610.	13290.
39.50	42.00	14.96	1239.	2.894	4824.	13960.
39.50	42.50	15.46	1262.	2.906	5039.	14640.
39.50	43.00	15.96	1285.	2.920	5254.	15340.
39.50	43.50	16.46	1307.	2.934	5468.	16040.
39.50	44.00	16.96	1329.	2.949	5683.	16760.
39.50	44.50	17.46	1351.	2.965	5896.	17490.
40.00	35.00	7.989	811.3	3.215	1764.	5671.
40.00	35.50	8.489	845.5	3.123	1979.	6180.
40.00	36.00	8.988	878.3	3.057	2193.	6705.
40.00	36.50	9.488	909.8	3.010	2407.	7243.
40.00	37.00	9.988	939.6	2.976	2619.	7795.
40.00	37.50	10.49	969.2	2.950	2834.	8361.
40.00	38.00	10.99	998.0	2.932	3049.	8941.
40.00	38.50	11.49	1026.	2.921	3264.	9533.
40.00	39.00	11.99	1053.	2.914	3479.	10140.
40.00	39.50	12.49	1079.	2.912	3693.	10750.
40.00	40.00	12.98	1105.	2.913	3908.	11380.
40.00	40.50	13.48	1130.	2.917	4123.	12020.
40.00	41.00	13.98	1155.	2.923	4338.	12680.
40.00	41.50	14.48	1179.	2.930	4553.	13340.
40.00	42.00	14.98	1203.	2.940	4768.	14020.
40.00	42.50	15.48	1227.	2.950	4984.	14700.
40.00	43.00	15.98	1249.	2.962	5199.	15400.
40.00	43.50	16.48	1272.	2.974	5415.	16110.
40.00	44.00	16.98	1294.	2.988	5630.	16820.
40.00	44.50	17.48	1316.	3.002	5846.	17550.
40.50	35.00	8.009	773.6	3.391	1681.	5702.
40.50	35.50	8.509	808.2	3.277	1896.	6214.
40.50	36.00	9.008	841.2	3.194	2110.	6740.
40.50	36.50	9.508	872.5	3.133	2324.	7281.
40.50	37.00	10.01	903.3	3.085	2541.	7837.
40.50	37.50	10.51	933.0	3.050	2756.	8405.
40.50	38.00	11.01	961.7	3.025	2971.	8986.
40.50	38.50	11.51	989.7	3.007	3187.	9580.
40.50	39.00	12.01	1017.	2.994	3403.	10190.
40.50	39.50	12.51	1044.	2.986	3619.	10810.
40.50	40.00	13.01	1070.	2.982	3835.	11440.
40.50	40.50	13.51	1095.	2.982	4051.	12080.
40.50	41.00	14.00	1120.	2.984	4268.	12740.
40.50	41.50	14.50	1145.	2.989	4484.	13400.
40.50	42.00	15.00	1169.	2.995	4700.	14080.
40.50	42.50	15.50	1192.	3.003	4916.	14770.
40.50	43.00	16.00	1215.	3.013	5133.	15460.
40.50	43.50	16.50	1238.	3.022	5349.	16170.

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EPA Export 08-07-2014:23:43:18

40.50	44.00	17.00	1260.	3.034	5566.	16890.
40.50	44.50	17.50	1282.	3.047	5783.	17620.
41.00	35.00	8.028	736.2	3.692	1581.	5839.
41.00	35.50	8.528	770.0	3.472	1799.	6244.
41.00	36.00	9.027	803.1	3.360	2015.	6771.
41.00	36.50	9.527	835.2	3.277	2232.	7314.
41.00	37.00	10.03	865.3	3.216	2446.	7869.
41.00	37.50	10.53	895.2	3.172	2660.	8438.
41.00	38.00	11.03	924.9	3.133	2879.	9022.
41.00	38.50	11.53	953.1	3.107	3096.	9617.
41.00	39.00	12.03	980.4	3.087	3312.	10230.
41.00	39.50	12.52	1007.	3.074	3528.	10850.
41.00	40.00	13.02	1033.	3.065	3745.	11480.
41.00	40.50	13.52	1059.	3.059	3963.	12120.
41.00	41.00	14.02	1084.	3.057	4180.	12780.
41.00	41.50	14.52	1108.	3.058	4397.	13450.
41.00	42.00	15.02	1132.	3.061	4615.	14120.
41.00	42.50	15.52	1156.	3.065	4833.	14810.
41.00	43.00	16.02	1179.	3.072	5050.	15510.
41.00	43.50	16.52	1202.	3.080	5268.	16230.
41.00	44.00	17.02	1224.	3.090	5485.	16950.
41.00	44.50	17.52	1246.	3.100	5703.	17680.
41.50	35.00	8.047	698.2	4.138	1470.	6084.
41.50	35.50	8.546	732.4	3.814	1687.	6433.
41.50	36.00	9.046	765.8	3.574	1904.	6804.
41.50	36.50	9.546	798.4	3.462	2123.	7348.
41.50	37.00	10.05	829.4	3.378	2340.	7906.
41.50	37.50	10.54	858.0	3.316	2556.	8475.
41.50	38.00	11.04	886.6	3.268	2772.	9059.
41.50	38.50	11.54	914.9	3.231	2989.	9656.
41.50	39.00	12.04	943.1	3.199	3209.	10270.
41.50	39.50	12.54	970.5	3.179	3425.	10890.
41.50	40.00	13.04	996.6	3.163	3643.	11520.
41.50	40.50	13.54	1022.	3.152	3861.	12170.
41.50	41.00	14.04	1047.	3.145	4078.	12830.
41.50	41.50	14.54	1072.	3.141	4297.	13500.
41.50	42.00	15.04	1096.	3.140	4515.	14180.
41.50	42.50	15.54	1120.	3.141	4733.	14870.
41.50	43.00	16.04	1143.	3.144	4952.	15570.
41.50	43.50	16.54	1165.	3.149	5171.	16280.
41.50	44.00	17.04	1188.	3.155	5390.	17000.
41.50	44.50	17.54	1210.	3.163	5608.	17740.
42.00	35.00	8.065	660.0	4.708	1345.	6332.
42.00	35.50	8.565	694.7	4.289	1562.	6700.
42.00	36.00	9.065	727.9	3.968	1780.	7062.
42.00	36.50	9.564	759.9	3.714	1997.	7417.
42.00	37.00	10.06	791.7	3.581	2218.	7941.
42.00	37.50	10.56	820.8	3.499	2433.	8512.
42.00	38.00	11.06	850.8	3.429	2654.	9099.
42.00	38.50	11.56	879.3	3.377	2872.	9698.
42.00	39.00	12.06	906.5	3.337	3089.	10310.
42.00	39.50	12.56	933.6	3.305	3307.	10930.
42.00	40.00	13.06	959.8	3.281	3526.	11570.
42.00	40.50	13.56	985.1	3.260	3746.	12210.
42.00	41.00	14.06	1010.	3.247	3965.	12870.
42.00	41.50	14.56	1035.	3.238	4183.	13540.
42.00	42.00	15.06	1059.	3.232	4402.	14230.
42.00	42.50	15.56	1083.	3.229	4621.	14920.
42.00	43.00	16.06	1106.	3.228	4840.	15620.
42.00	43.50	16.56	1129.	3.229	5060.	16340.
42.00	44.00	17.06	1152.	3.232	5279.	17060.
42.00	44.50	17.56	1174.	3.236	5499.	17790.
42.50	35.00	8.084	622.8	5.458	1207.	6585.
42.50	35.50	8.584	656.7	4.896	1424.	6972.
42.50	36.00	9.083	690.1	4.479	1642.	7353.
42.50	36.50	9.583	722.4	4.154	1860.	7728.
42.50	37.00	10.08	753.5	3.894	2079.	8095.
42.50	37.50	10.58	783.9	3.718	2299.	8550.
42.50	38.00	11.08	813.1	3.627	2519.	9137.
42.50	38.50	11.58	841.2	3.559	2736.	9737.
42.50	39.00	12.08	869.8	3.499	2958.	10350.
42.50	39.50	12.58	897.0	3.455	3177.	10980.
42.50	40.00	13.08	922.9	3.420	3396.	11610.
42.50	40.50	13.58	948.9	3.392	3615.	12260.
42.50	41.00	14.08	974.2	3.370	3834.	12920.

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EPA Export 08-07-2014:23:43:19

42.50	41.50	14.58	998.8	3.353	4054.	13590.
42.50	42.00	15.08	1024.	3.338	4277.	14280.
42.50	42.50	15.58	1048.	3.329	4497.	14970.
42.50	43.00	16.08	1071.	3.323	4718.	15680.
42.50	43.50	16.58	1093.	3.320	4938.	16390.
42.50	44.00	17.08	1115.	3.320	5155.	17120.
42.50	44.50	17.58	1137.	3.321	5376.	17850.
43.00	35.00	8.103	584.7	7.092	1052.	7462.
43.00	35.50	8.602	619.2	5.906	1271.	7504.
43.00	36.00	9.102	653.1	5.130	1492.	7651.
43.00	36.50	9.602	685.4	4.703	1711.	8046.
43.00	37.00	10.10	715.6	4.371	1929.	8432.
43.00	37.50	10.60	746.1	4.100	2149.	8811.
43.00	38.00	11.10	774.8	3.875	2367.	9173.
43.00	38.50	11.60	804.1	3.775	2590.	9777.
43.00	39.00	12.10	831.4	3.699	2809.	10390.
43.00	39.50	12.60	858.9	3.638	3029.	11020.
43.00	40.00	13.10	886.2	3.584	3252.	11660.
43.00	40.50	13.60	912.3	3.544	3472.	12310.
43.00	41.00	14.10	937.8	3.512	3693.	12970.
43.00	41.50	14.60	962.2	3.487	3913.	13640.
43.00	42.00	15.10	986.6	3.467	4133.	14330.
43.00	42.50	15.60	1010.	3.451	4354.	15020.
43.00	43.00	16.10	1034.	3.439	4574.	15730.
43.00	43.50	16.60	1058.	3.427	4799.	16450.
43.00	44.00	17.10	1080.	3.421	5020.	17180.
43.00	44.50	17.60	1102.	3.417	5242.	17910.
43.50	35.00	8.122	545.4	9.869	881.6	8700.
43.50	35.50	8.621	581.0	7.933	1103.	8747.
43.50	36.00	9.121	614.7	6.639	1324.	8788.
43.50	36.50	9.620	647.3	5.722	1544.	8837.
43.50	37.00	10.12	678.4	5.026	1764.	8866.
43.50	37.50	10.62	709.4	4.619	1987.	9177.
43.50	38.00	11.12	738.9	4.335	2207.	9568.
43.50	38.50	11.62	765.9	4.100	2426.	9948.
43.50	39.00	12.12	794.3	3.930	2649.	10430.
43.50	39.50	12.62	822.0	3.852	2871.	11060.
43.50	40.00	13.12	848.1	3.786	3091.	11700.
43.50	40.50	13.62	874.3	3.730	3312.	12350.
43.50	41.00	14.12	900.5	3.681	3536.	13020.
43.50	41.50	14.62	925.7	3.644	3758.	13690.
43.50	42.00	15.12	950.2	3.614	3979.	14380.
43.50	42.50	15.62	973.7	3.589	4200.	15080.
43.50	43.00	16.12	997.4	3.570	4422.	15780.
43.50	43.50	16.62	1021.	3.554	4644.	16500.
43.50	44.00	17.12	1043.	3.542	4865.	17230.
43.50	44.50	17.61	1065.	3.533	5087.	17970.

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WORST CASE : WATER CASE 1 OF 1

Centre at (37.00,37.50) Radius 10.36m
Iterations: 5 Horiz acceleration [%g]: .0
Net vertical force [kN]: .0 Slip weight [kN] 1185.
Net horiz force [kN]: -0.01484 Disturbing moment [kN m]: 3012.
Inclination of interslice forces [°]: 162.7 Restoring moment [kN m]: 8116.

Factor of Safety: 2.695

Slip surface coordinates		Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	27.48	33.40	-33.85	.0	.0	.0
2	28.12	32.15	-21.48	3.107	-9.990	.0
3	28.93	31.00	-10.13	5.629	17.47	.0
4	29.88	29.97	.0	9.750	65.72	.0
5	29.91	29.94	0.2361	9.872	67.09	0.002787
6	30.64	29.32	6.326	13.82	110.6	2.001
7	31.72	28.58	13.50	19.53	170.5	9.115
8	32.89	27.99	19.23	24.79	223.6	18.49
9	34.36	27.48	24.02	29.41	268.9	28.86
10	35.89	27.20	26.55	31.27	286.7	35.24
11	37.00	27.14	26.93	30.27	277.2	36.26
12	37.01	27.14	26.93	30.25	277.0	36.25
13	37.02	27.14	26.92	30.23	276.9	36.25
14	38.53	27.25	25.49	26.51	241.9	32.50

EPA Export 08-07-2014:23:43:19

15	40.00	27.58	21.20	20.55	186.6	22.48
16	40.01	27.58	21.17	20.51	186.3	22.40
17	40.02	27.59	44.44	19.58	177.8	57.26
18	41.08	27.98	40.32	13.80	124.7	39.85
19	42.10	28.48	35.07	7.175	64.46	20.11
20	43.05	29.09	28.75	.0	-0.01484	.0

Slice No.	Strength Parameters		Pore Pressure	Slice Weight	Forces on base [kN]	
	c' [kPa]	Tan phi	[kPa]	[kN]	Normal	Shear
1	50.00	.0	.0	8.018	2.155	70.22
2	50.00	.0	.0	29.37	51.72	70.22
3	50.00	.0	.0	55.58	89.77	70.22
4	50.00	.0	0.1180	1.763	2.694	1.758
5	40.00	.0	3.281	54.91	83.66	38.36
6	40.00	.0	9.914	95.73	135.0	52.49
7	40.00	.0	16.37	117.3	155.2	52.49
8	40.00	.0	21.63	162.2	205.4	62.22
9	40.00	.0	25.29	179.7	223.2	62.22
10	40.00	.0	26.74	129.7	130.0	44.46
11	40.00	.0	26.93	1.137	1.153	0.3999
12	40.00	.0	26.93	1.137	1.153	0.4001
13	40.00	.0	26.21	162.1	167.9	60.42
14	40.00	.0	23.35	138.1	152.7	60.42
15	40.00	.0	21.19	0.6252	0.7414	0.4179
16	40.00	.0	32.80	0.3368	1.517	0.4182
17	40.00	.0	42.38	26.03	106.6	45.33
18	40.00	.0	37.69	16.30	100.5	45.33
19	40.00	.0	31.91	5.413	92.31	45.33

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0
7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	30.00	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	14.40	-791.8
17	30.00	.0	28.79	-0.5764
18	30.00	.0	28.78	-0.5761
19	30.00	.0	28.76	-0.5758

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ARUP

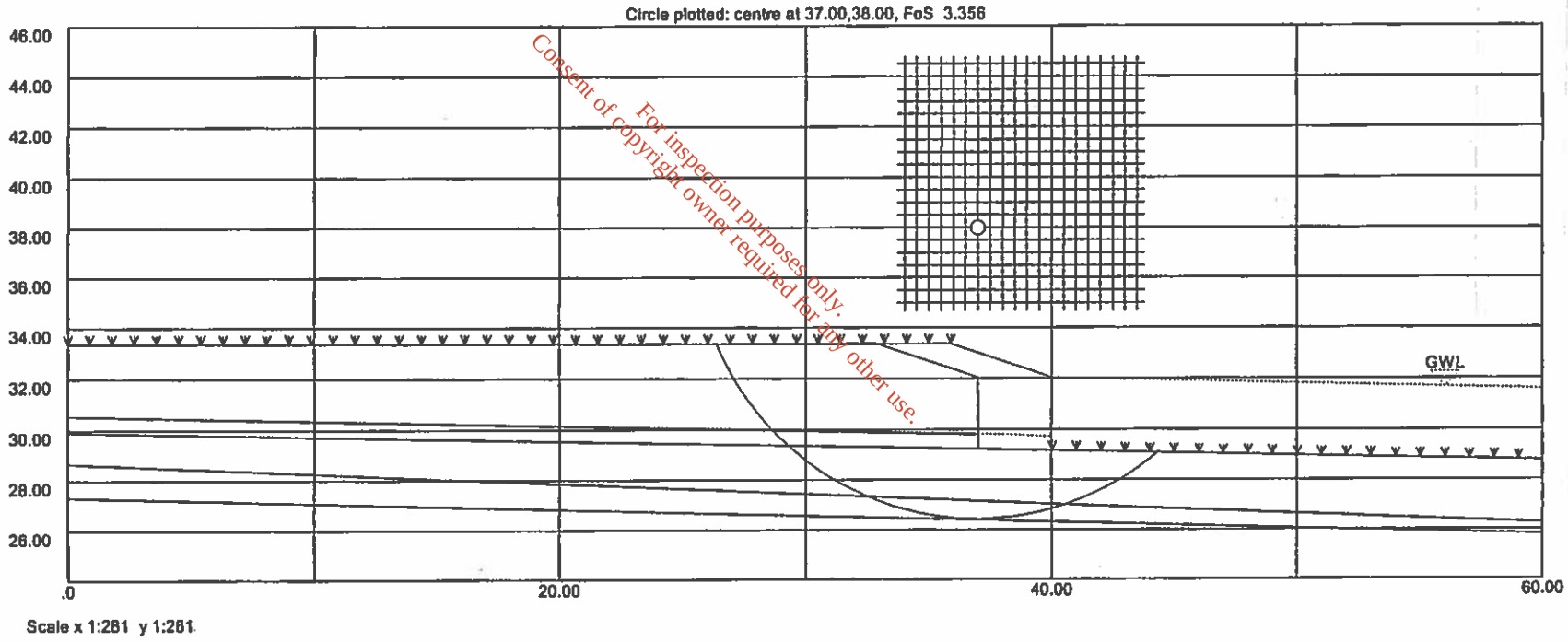
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	AE-S2.3-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No3 Rev1	JB



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EPA Export 08-07-2014:23:43:19

Notes

A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Undrained Analysis
Slip Circle tangent to Sand/Weathered Rock
Stability at section through BHP6 & P7

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight			Shear Strength Parameters	
		Above GWL [kN/m3]	Below GWL [kN/m3]		Phi or Phi0 [°]	c or c0' [kPa]
1	Gravelly Clay (undr	18.00	18.00	Undrained	.0	40.00
2	Sand (Weathered Roc	19.00	19.00	Undrained	.0	40.00
3	Intact Rock	22.00	22.00	Undrained	.0	100.0
4	Engineering Fill	20.00	20.00	Undrained	.0	50.00
5	Engineering Fill Re	20.00	20.00	Undrained	.0	200.0
6	Reinforced Drainage	20.00	20.00	Undrained	.0	40.00

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Materials with variable cohesion or non-linear strength

No.	Description	y0 OR b [m]	k OR a [kPa/m]	cu/p ratio
2	Sand (Weathered Rock)	28.00	15.00	-

Coordinates of top of soil strata

Stratum	Material	X --> .0	32.89	35.89	37.00	37.01	37.02	38.51
1	5	33.40	33.40	33.40	.	.	.	.
2	4	33.40	33.40	.	32.03	29.80	29.20	.
3	6	30.55	.	.	.	29.80	29.20	.
4	1	29.90	.	.	.	.	29.20	.
5	2	28.65	.	.	.	.	.	.
6	3	27.30	.	.	.	.	.	.
GWL1	-	30.55	.	.	.	.	.	29.80

Stratum	Material	X --> 40.00	40.01	40.02	60.00
1	5	32.03	29.70	29.15	28.75
2	4	.	.	29.15	28.75
3	6	.	.	29.15	28.75
4	1	.	.	29.15	28.75
5	2	27.00	.	.	26.25
6	3	26.30	.	.	25.80
GWL1	-	.	29.70	32.03	31.60

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

EPA Export 08-07-2014:23:43:19

Surface Loads

No.	Limits of loaded area X1 [m]	Distributed load X2 [m]	Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 34.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
34.00	35.00	8.543	1511.	3.869	2050.	7932.
34.00	35.50	9.043	1550.	3.777	2277.	8598.
34.00	36.00	9.543	1588.	3.713	2501.	9287.
34.00	36.50	10.04	1625.	3.663	2728.	9995.
34.00	37.00	10.54	1660.	3.627	2956.	10720.
34.00	37.50	11.04	1695.	3.601	3183.	11460.
34.00	38.00	11.54	1728.	3.583	3410.	12220.
34.00	38.50	12.04	1760.	3.569	3641.	12990.
34.00	39.00	12.54	1792.	3.563	3868.	13780.
34.00	39.50	13.04	1823.	3.562	4096.	14590.
34.00	40.00	13.54	1853.	3.564	4324.	15410.
34.00	40.50	14.04	1882.	3.572	4547.	16240.
34.00	41.00	14.54	1911.	3.579	4776.	17090.
34.00	41.50	15.04	1940.	3.588	5004.	17960.
34.00	42.00	15.54	1968.	3.599	5233.	18830.
34.00	42.50	16.04	1995.	3.612	5461.	19720.
34.00	43.00	16.54	2022.	3.626	5690.	20630.
34.00	43.50	17.04	2048.	3.641	5918.	21550.
34.00	44.00	17.54	2074.	3.657	6147.	22480.
34.00	44.50	18.04	2098.	3.676	6370.	23420.
34.50	35.00	8.556	1473.	3.738	2130.	7961.
34.50	35.50	9.056	1512.	3.660	2358.	8628.
34.50	36.00	9.556	1550.	3.605	2585.	9319.
34.50	36.50	10.06	1587.	3.565	2813.	10030.
34.50	37.00	10.56	1622.	3.536	3041.	10750.
34.50	37.50	11.06	1657.	3.517	3269.	11500.
34.50	38.00	11.55	1690.	3.505	3497.	12260.
34.50	38.50	12.05	1722.	3.501	3721.	13030.
34.50	39.00	12.55	1753.	3.496	3953.	13820.
34.50	39.50	13.05	1784.	3.498	4181.	14630.
34.50	40.00	13.55	1815.	3.503	4410.	15450.
34.50	40.50	14.05	1844.	3.511	4638.	16280.
34.50	41.00	14.55	1873.	3.520	4867.	17130.
34.50	41.50	15.05	1902.	3.532	5096.	18000.
34.50	42.00	15.55	1930.	3.545	5325.	18880.
34.50	42.50	16.05	1957.	3.559	5554.	19770.
34.50	43.00	16.55	1984.	3.575	5783.	20670.
34.50	43.50	17.05	2010.	3.592	6012.	21590.
34.50	44.00	17.55	2036.	3.609	6241.	22520.
34.50	44.50	18.05	2060.	3.630	6465.	23470.
35.00	35.00	8.568	1435.	3.640	2196.	7993.
35.00	35.50	9.068	1474.	3.573	2424.	8661.
35.00	36.00	9.568	1512.	3.527	2652.	9354.
35.00	36.50	10.07	1549.	3.494	2880.	10060.
35.00	37.00	10.57	1584.	3.474	3106.	10790.
35.00	37.50	11.07	1618.	3.459	3335.	11540.
35.00	38.00	11.57	1652.	3.451	3563.	12300.
35.00	38.50	12.07	1685.	3.448	3792.	13070.
35.00	39.00	12.57	1717.	3.447	4025.	13870.
35.00	39.50	13.07	1747.	3.449	4256.	14680.
35.00	40.00	13.57	1778.	3.456	4486.	15500.
35.00	40.50	14.07	1807.	3.466	4715.	16340.
35.00	41.00	14.57	1836.	3.478	4944.	17200.

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EPA Export 08-07-2014:23:43:19

35.00	41.50	15.07	1865.	3.491	5174.	18060.
35.00	42.00	15.57	1893.	3.506	5403.	18940.
35.00	42.50	16.07	1920.	3.522	5633.	19840.
35.00	43.00	16.57	1947.	3.538	5863.	20750.
35.00	43.50	17.07	1973.	3.556	6093.	21670.
35.00	44.00	17.57	1999.	3.575	6323.	22600.
35.00	44.50	18.07	2026.	3.593	6555.	23550.
35.50	35.00	8.581	1396.	3.567	2250.	8023.
35.50	35.50	9.081	1435.	3.506	2480.	8693.
35.50	36.00	9.581	1474.	3.469	2707.	9391.
35.50	36.50	10.08	1511.	3.441	2936.	10100.
35.50	37.00	10.58	1546.	3.423	3165.	10830.
35.50	37.50	11.08	1581.	3.412	3394.	11580.
35.50	38.00	11.58	1615.	3.407	3623.	12340.
35.50	38.50	12.08	1647.	3.406	3853.	13120.
35.50	39.00	12.58	1679.	3.409	4082.	13920.
35.50	39.50	13.08	1710.	3.416	4312.	14730.
35.50	40.00	13.58	1741.	3.422	4546.	15550.
35.50	40.50	14.08	1770.	3.433	4776.	16390.
35.50	41.00	14.58	1800.	3.446	5006.	17250.
35.50	41.50	15.08	1828.	3.460	5236.	18120.
35.50	42.00	15.58	1856.	3.476	5466.	19000.
35.50	42.50	16.08	1884.	3.493	5697.	19900.
35.50	43.00	16.58	1910.	3.511	5927.	20810.
35.50	43.50	17.08	1937.	3.529	6158.	21730.
35.50	44.00	17.58	1963.	3.548	6389.	22670.
35.50	44.50	18.08	1989.	3.568	6620.	23620.
36.00	35.00	8.593	1358.	3.521	2288.	8055.
36.00	35.50	9.093	1397.	3.465	2519.	8726.
36.00	36.00	9.593	1436.	3.428	2749.	9422.
36.00	36.50	10.09	1472.	3.403	2978.	10140.
36.00	37.00	10.59	1508.	3.388	3208.	10870.
36.00	37.50	11.09	1543.	3.378	3438.	11620.
36.00	38.00	11.59	1576.	3.375	3668.	12380.
36.00	38.50	12.09	1609.	3.376	3898.	13160.
36.00	39.00	12.59	1641.	3.380	4129.	13960.
36.00	39.50	13.09	1672.	3.388	4359.	14770.
36.00	40.00	13.59	1703.	3.401	4587.	15600.
36.00	40.50	14.09	1732.	3.411	4821.	16440.
36.00	41.00	14.59	1762.	3.424	5052.	17300.
36.00	41.50	15.09	1790.	3.440	5283.	18170.
36.00	42.00	15.59	1818.	3.456	5515.	19060.
36.00	42.50	16.09	1846.	3.473	5746.	19960.
36.00	43.00	16.59	1873.	3.491	5978.	20870.
36.00	43.50	17.09	1900.	3.510	6210.	21800.
36.00	44.00	17.59	1926.	3.530	6442.	22740.
36.00	44.50	18.09	1952.	3.550	6673.	23690.
36.50	35.00	8.606	1319.	3.495	2313.	8083.
36.50	35.50	9.106	1359.	3.446	2542.	8762.
36.50	36.00	9.605	1397.	3.408	2774.	9453.
36.50	36.50	10.11	1434.	3.385	3004.	10170.
36.50	37.00	10.61	1469.	3.371	3234.	10900.
36.50	37.50	11.11	1504.	3.363	3465.	11650.
36.50	38.00	11.60	1538.	3.361	3696.	12420.
36.50	38.50	12.10	1571.	3.362	3927.	13200.
36.50	39.00	12.60	1603.	3.367	4159.	14000.
36.50	39.50	13.10	1635.	3.375	4390.	14820.
36.50	40.00	13.60	1665.	3.386	4622.	15650.
36.50	40.50	14.10	1695.	3.398	4854.	16490.
36.50	41.00	14.60	1724.	3.410	5089.	17350.
36.50	41.50	15.10	1752.	3.425	5321.	18220.
36.50	42.00	15.60	1780.	3.441	5553.	19110.
36.50	42.50	16.10	1808.	3.459	5786.	20010.
36.50	43.00	16.60	1835.	3.477	6018.	20920.
36.50	43.50	17.10	1862.	3.496	6251.	21850.
36.50	44.00	17.60	1888.	3.515	6483.	22790.
36.50	44.50	18.10	1915.	3.539	6714.	23760.
37.00	35.00	8.618	1281.	3.486	2327.	8113.
37.00	35.50	9.118	1320.	3.438	2556.	8787.
37.00	36.00	9.618	1358.	3.403	2788.	9486.
37.00	36.50	10.12	1395.	3.380	3019.	10200.
37.00	37.00	10.62	1431.	3.366	3250.	10940.
37.00	37.50	11.12	1466.	3.359	3482.	11690.
37.00	38.00	11.62	1500.	3.356	3713.	12460.
37.00	38.50	12.12	1533.	3.358	3945.	13250.

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EPA Export 08-07-2014:23:43:19

37.00	39.00	12.62	1565.	3.364	4177.	14050.
37.00	39.50	13.12	1597.	3.372	4409.	14870.
37.00	40.00	13.62	1628.	3.382	4642.	15700.
37.00	40.50	14.12	1658.	3.395	4874.	16550.
37.00	41.00	14.62	1687.	3.409	5107.	17410.
37.00	41.50	15.12	1715.	3.422	5342.	18280.
37.00	42.00	15.62	1743.	3.438	5575.	19170.
37.00	42.50	16.12	1771.	3.456	5808.	20070.
37.00	43.00	16.62	1798.	3.474	6042.	20990.
37.00	43.50	17.12	1825.	3.493	6275.	21920.
37.00	44.00	17.62	1851.	3.513	6508.	22860.
37.00	44.50	18.12	1877.	3.533	6742.	23820.
37.50	35.00	8.635	1243.	3.549	2326.	8255.
37.50	35.50	9.134	1283.	3.459	2557.	8843.
37.50	36.00	9.633	1321.	3.422	2789.	9543.
37.50	36.50	10.13	1358.	3.396	3022.	10260.
37.50	37.00	10.63	1393.	3.379	3254.	11000.
37.50	37.50	11.13	1429.	3.372	3485.	11750.
37.50	38.00	11.63	1462.	3.368	3717.	12520.
37.50	38.50	12.13	1495.	3.368	3950.	13300.
37.50	39.00	12.63	1528.	3.373	4183.	14110.
37.50	39.50	13.13	1559.	3.380	4415.	14930.
37.50	40.00	13.63	1590.	3.390	4648.	15760.
37.50	40.50	14.13	1620.	3.402	4881.	16610.
37.50	41.00	14.63	1649.	3.416	5115.	17470.
37.50	41.50	15.13	1678.	3.431	5348.	18350.
37.50	42.00	15.63	1705.	3.445	5584.	19240.
37.50	42.50	16.13	1733.	3.462	5818.	20140.
37.50	43.00	16.63	1760.	3.480	6052.	21060.
37.50	43.50	17.13	1787.	3.499	6286.	21990.
37.50	44.00	17.63	1813.	3.518	6520.	22940.
37.50	44.50	18.13	1839.	3.538	6754.	23900.
38.00	35.00	8.677	1215.	3.765	2326.	8758.
38.00	35.50	9.174	1254.	3.698	2556.	9451.
38.00	36.00	9.671	1292.	3.647	2788.	10170.
38.00	36.50	10.17	1328.	3.608	3020.	10900.
38.00	37.00	10.67	1364.	3.580	3253.	11650.
38.00	37.50	11.16	1398.	3.560	3486.	12410.
38.00	38.00	11.66	1431.	3.546	3719.	13190.
38.00	38.50	12.16	1464.	3.538	3953.	13980.
38.00	39.00	12.66	1495.	3.534	4186.	14790.
38.00	39.50	13.16	1526.	3.533	4420.	15620.
38.00	40.00	13.66	1557.	3.537	4654.	16460.
38.00	40.50	14.16	1587.	3.544	4885.	17310.
38.00	41.00	14.65	1616.	3.552	5118.	18180.
38.00	41.50	15.15	1646.	3.562	5353.	19070.
38.00	42.00	15.65	1673.	3.571	5590.	19960.
38.00	42.50	16.15	1700.	3.583	5824.	20860.
38.00	43.00	16.65	1727.	3.596	6058.	21780.
38.00	43.50	17.15	1754.	3.609	6292.	22710.
38.00	44.00	17.65	1780.	3.624	6526.	23650.
38.00	44.50	18.15	1806.	3.639	6761.	24600.
38.50	35.00	8.748	1198.	4.001	2326.	9307.
38.50	35.50	9.241	1237.	3.919	2558.	10020.
38.50	36.00	9.735	1274.	3.852	2792.	10760.
38.50	36.50	10.23	1309.	3.805	3025.	11510.
38.50	37.00	10.72	1344.	3.768	3257.	12280.
38.50	37.50	11.22	1378.	3.741	3491.	13060.
38.50	38.00	11.72	1411.	3.721	3724.	13860.
38.50	38.50	12.21	1443.	3.707	3958.	14670.
38.50	39.00	12.71	1474.	3.700	4192.	15510.
38.50	39.50	13.20	1505.	3.695	4426.	16350.
38.50	40.00	13.70	1535.	3.693	4660.	17210.
38.50	40.50	14.20	1564.	3.695	4895.	18090.
38.50	41.00	14.70	1592.	3.699	5130.	18970.
38.50	41.50	15.19	1620.	3.707	5361.	19870.
38.50	42.00	15.69	1647.	3.714	5596.	20780.
38.50	42.50	16.19	1674.	3.723	5831.	21710.
38.50	43.00	16.69	1701.	3.734	6066.	22650.
38.50	43.50	17.19	1727.	3.746	6301.	23600.
38.50	44.00	17.68	1753.	3.758	6536.	24570.
38.50	44.50	18.18	1779.	3.772	6771.	25540.
39.00	35.00	8.668	1126.	3.682	2238.	8240.
39.00	35.50	9.168	1165.	3.613	2469.	8921.
39.00	36.00	9.668	1204.	3.561	2703.	9627.

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EPA Export 08-07-2014:23:43:19

39.00	36.50	10.17	1241.	3.523	2938.	10350.
39.00	37.00	10.67	1277.	3.496	3173.	11090.
39.00	37.50	11.17	1313.	3.479	3406.	11850.
39.00	38.00	11.67	1347.	3.467	3642.	12630.
39.00	38.50	12.17	1380.	3.459	3878.	13420.
39.00	39.00	12.67	1412.	3.458	4114.	14220.
39.00	39.50	13.17	1444.	3.460	4349.	15050.
39.00	40.00	13.67	1475.	3.465	4585.	15880.
39.00	40.50	14.17	1505.	3.472	4821.	16740.
39.00	41.00	14.67	1534.	3.481	5057.	17600.
39.00	41.50	15.17	1564.	3.496	5291.	18490.
39.00	42.00	15.67	1592.	3.508	5527.	19390.
39.00	42.50	16.17	1620.	3.523	5763.	20300.
39.00	43.00	16.67	1647.	3.538	6000.	21230.
39.00	43.50	17.17	1674.	3.554	6237.	22160.
39.00	44.00	17.67	1701.	3.571	6474.	23110.
39.00	44.50	18.17	1727.	3.588	6711.	24080.
39.50	35.00	8.681	1086.	3.794	2179.	8267.
39.50	35.50	9.181	1126.	3.711	2412.	8951.
39.50	36.00	9.680	1164.	3.646	2649.	9658.
39.50	36.50	10.18	1202.	3.601	2883.	10380.
39.50	37.00	10.68	1238.	3.568	3118.	11130.
39.50	37.50	11.18	1274.	3.545	3354.	11890.
39.50	38.00	11.68	1308.	3.528	3589.	12660.
39.50	38.50	12.18	1341.	3.518	3825.	13460.
39.50	39.00	12.68	1374.	3.514	4060.	14270.
39.50	39.50	13.18	1406.	3.513	4296.	15090.
39.50	40.00	13.68	1436.	3.513	4535.	15930.
39.50	40.50	14.18	1466.	3.518	4771.	16790.
39.50	41.00	14.68	1496.	3.526	5008.	17660.
39.50	41.50	15.18	1525.	3.535	5244.	18540.
39.50	42.00	15.68	1554.	3.546	5481.	19440.
39.50	42.50	16.18	1582.	3.558	5718.	20350.
39.50	43.00	16.68	1609.	3.572	5956.	21270.
39.50	43.50	17.18	1636.	3.587	6193.	22210.
39.50	44.00	17.68	1662.	3.602	6431.	23160.
39.50	44.50	18.18	1688.	3.618	6669.	24130.
40.00	35.00	8.693	1048.	3.937	2108.	8302.
40.00	35.50	9.193	1087.	3.835	2343.	8986.
40.00	36.00	9.693	1126.	3.759	2579.	9695.
40.00	36.50	10.19	1164.	3.703	2815.	10420.
40.00	37.00	10.69	1199.	3.657	3053.	11170.
40.00	37.50	11.19	1234.	3.626	3287.	11920.
40.00	38.00	11.69	1268.	3.604	3523.	12700.
40.00	38.50	12.19	1302.	3.589	3760.	13490.
40.00	39.00	12.69	1335.	3.580	3996.	14310.
40.00	39.50	13.19	1366.	3.575	4233.	15130.
40.00	40.00	13.69	1397.	3.573	4470.	15970.
40.00	40.50	14.19	1428.	3.575	4708.	16830.
40.00	41.00	14.69	1458.	3.581	4944.	17700.
40.00	41.50	15.19	1486.	3.586	5184.	18590.
40.00	42.00	15.69	1515.	3.595	5421.	19490.
40.00	42.50	16.19	1543.	3.606	5658.	20400.
40.00	43.00	16.69	1571.	3.617	5896.	21330.
40.00	43.50	17.19	1598.	3.631	6134.	22270.
40.00	44.00	17.69	1624.	3.645	6372.	23220.
40.00	44.50	18.19	1651.	3.660	6611.	24190.
40.50	35.00	8.706	1008.	4.118	2023.	8329.
40.50	35.50	9.206	1048.	3.988	2261.	9016.
40.50	36.00	9.705	1087.	3.896	2497.	9726.
40.50	36.50	10.21	1124.	3.824	2734.	10450.
40.50	37.00	10.71	1160.	3.770	2971.	11200.
40.50	37.50	11.20	1196.	3.732	3206.	11970.
40.50	38.00	11.70	1230.	3.699	3446.	12750.
40.50	38.50	12.20	1263.	3.677	3683.	13540.
40.50	39.00	12.70	1296.	3.662	3920.	14360.
40.50	39.50	13.20	1328.	3.654	4157.	15190.
40.50	40.00	13.70	1359.	3.649	4395.	16040.
40.50	40.50	14.20	1390.	3.648	4632.	16900.
40.50	41.00	14.70	1420.	3.649	4871.	17770.
40.50	41.50	15.20	1449.	3.653	5109.	18660.
40.50	42.00	15.70	1478.	3.658	5347.	19560.
40.50	42.50	16.20	1506.	3.666	5586.	20480.
40.50	43.00	16.70	1534.	3.677	5823.	21410.
40.50	43.50	17.20	1560.	3.686	6065.	22350.

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EPA Export 08-07-2014:23:43:19

40.50	44.00	17.70	1587.	3.698	6303.	23310.
40.50	44.50	18.20	1613.	3.712	6542.	24280.
41.00	35.00	8.718	968.6	4.338	1926.	8353.
41.00	35.50	9.218	1008.	4.186	2161.	9045.
41.00	36.00	9.718	1047.	4.071	2396.	9756.
41.00	36.50	10.22	1085.	3.977	2637.	10490.
41.00	37.00	10.72	1121.	3.909	2874.	11230.
41.00	37.50	11.22	1157.	3.856	3112.	12000.
41.00	38.00	11.72	1191.	3.815	3350.	12780.
41.00	38.50	12.22	1224.	3.784	3589.	13580.
41.00	39.00	12.72	1257.	3.761	3828.	14390.
41.00	39.50	13.22	1289.	3.745	4066.	15230.
41.00	40.00	13.72	1320.	3.734	4304.	16070.
41.00	40.50	14.22	1351.	3.727	4543.	16930.
41.00	41.00	14.72	1381.	3.724	4782.	17810.
41.00	41.50	15.22	1410.	3.724	5021.	18700.
41.00	42.00	15.72	1439.	3.727	5260.	19600.
41.00	42.50	16.22	1467.	3.732	5499.	20520.
41.00	43.00	16.72	1495.	3.738	5738.	21450.
41.00	43.50	17.22	1522.	3.747	5978.	22400.
41.00	44.00	17.72	1549.	3.756	6218.	23360.
41.00	44.50	18.22	1575.	3.767	6458.	24330.
41.50	35.00	8.731	929.3	4.632	1810.	8384.
41.50	35.50	9.231	969.1	4.432	2048.	9076.
41.50	36.00	9.730	1009.	4.278	2288.	9789.
41.50	36.50	10.23	1046.	4.167	2524.	10520.
41.50	37.00	10.73	1082.	4.081	2761.	11270.
41.50	37.50	11.23	1118.	4.007	3003.	12030.
41.50	38.00	11.73	1152.	3.954	3241.	12820.
41.50	38.50	12.23	1185.	3.913	3480.	13620.
41.50	39.00	12.73	1218.	3.880	3719.	14430.
41.50	39.50	13.23	1250.	3.855	3959.	15260.
41.50	40.00	13.73	1281.	3.837	4199.	16110.
41.50	40.50	14.23	1312.	3.824	4439.	16970.
41.50	41.00	14.73	1342.	3.816	4678.	17850.
41.50	41.50	15.23	1371.	3.811	4918.	18740.
41.50	42.00	15.73	1400.	3.809	5158.	19650.
41.50	42.50	16.23	1428.	3.810	5398.	20570.
41.50	43.00	16.73	1456.	3.814	5638.	21500.
41.50	43.50	17.23	1483.	3.819	5878.	22450.
41.50	44.00	17.73	1510.	3.826	6119.	23410.
41.50	44.50	18.23	1536.	3.834	6359.	24380.
42.00	35.00	8.743	890.1	5.145	1684.	8663.
42.00	35.50	9.243	930.2	4.770	1922.	9170.
42.00	36.00	9.743	969.0	4.548	2161.	9829.
42.00	36.50	10.24	1007.	4.395	2403.	10560.
42.00	37.00	10.74	1044.	4.281	2643.	11310.
42.00	37.50	11.24	1079.	4.196	2879.	12080.
42.00	38.00	11.74	1114.	4.127	3117.	12870.
42.00	38.50	12.24	1146.	4.070	3355.	13650.
42.00	39.00	12.74	1179.	4.021	3599.	14470.
42.00	39.50	13.24	1211.	3.987	3838.	15300.
42.00	40.00	13.74	1242.	3.960	4079.	16150.
42.00	40.50	14.24	1273.	3.940	4319.	17010.
42.00	41.00	14.74	1303.	3.924	4560.	17890.
42.00	41.50	15.24	1332.	3.913	4801.	18790.
42.00	42.00	15.74	1361.	3.906	5041.	19690.
42.00	42.50	16.24	1389.	3.903	5282.	20620.
42.00	43.00	16.74	1417.	3.902	5523.	21550.
42.00	43.50	17.24	1445.	3.903	5764.	22500.
42.00	44.00	17.74	1472.	3.907	6006.	23460.
42.00	44.50	18.24	1498.	3.912	6247.	24440.
42.50	35.00	8.756	849.8	5.784	1543.	8924.
42.50	35.50	9.256	890.3	5.303	1782.	9449.
42.50	36.00	9.755	929.4	4.934	2021.	9972.
42.50	36.50	10.26	967.0	4.680	2263.	10590.
42.50	37.00	10.76	1003.	4.535	2501.	11340.
42.50	37.50	11.25	1040.	4.415	2744.	12120.
42.50	38.00	11.75	1074.	4.325	2983.	12900.
42.50	38.50	12.25	1108.	4.252	3224.	13710.
42.50	39.00	12.75	1141.	4.195	3462.	14520.
42.50	39.50	13.25	1173.	4.149	3702.	15360.
42.50	40.00	13.75	1205.	4.107	3947.	16210.
42.50	40.50	14.25	1235.	4.078	4187.	17080.
42.50	41.00	14.75	1265.	4.054	4429.	17960.

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42.50	41.50	15.25	1293.	4.033	4669.	18830.
42.50	42.00	15.75	1322.	4.020	4911.	19740.
42.50	42.50	16.25	1350.	4.010	5153.	20660.
42.50	43.00	16.75	1378.	4.004	5395.	21600.
42.50	43.50	17.25	1405.	4.000	5636.	22550.
42.50	44.00	17.75	1432.	4.000	5878.	23510.
42.50	44.50	18.25	1459.	4.001	6120.	24490.
43.00	35.00	8.768	810.8	6.625	1388.	9198.
43.00	35.50	9.268	850.5	5.980	1628.	9735.
43.00	36.00	9.768	889.6	5.502	1868.	10280.
43.00	36.50	10.27	927.4	5.131	2108.	10820.
43.00	37.00	10.77	964.3	4.843	2349.	11380.
43.00	37.50	11.27	999.8	4.691	2590.	12150.
43.00	38.00	11.77	1035.	4.570	2830.	12940.
43.00	38.50	12.27	1068.	4.469	3074.	13740.
43.00	39.00	12.77	1101.	4.393	3314.	14560.
43.00	39.50	13.27	1133.	4.330	3555.	15390.
43.00	40.00	13.77	1164.	4.279	3796.	16250.
43.00	40.50	14.27	1194.	4.238	4037.	17110.
43.00	41.00	14.77	1225.	4.207	4277.	17990.
43.00	41.50	15.27	1255.	4.176	4523.	18890.
43.00	42.00	15.77	1284.	4.155	4765.	19800.
43.00	42.50	16.27	1313.	4.138	5010.	20730.
43.00	43.00	16.77	1341.	4.126	5253.	21670.
43.00	43.50	17.27	1368.	4.117	5496.	22620.
43.00	44.00	17.77	1395.	4.111	5739.	23590.
43.00	44.50	18.27	1422.	4.107	5982.	24570.
43.50	35.00	8.781	770.9	7.772	1218.	9468.
43.50	35.50	9.281	811.3	6.883	1458.	10030.
43.50	36.00	9.780	850.4	6.231	1700.	10600.
43.50	36.50	10.28	888.5	5.745	1942.	11160.
43.50	37.00	10.78	924.2	5.361	2183.	11700.
43.50	37.50	11.28	959.8	5.054	2424.	12250.
43.50	38.00	11.78	994.2	4.808	2664.	12970.
43.50	38.50	12.28	1029.	4.737	2908.	13780.
43.50	39.00	12.78	1062.	4.635	3149.	14600.
43.50	39.50	13.28	1095.	4.546	3395.	15440.
43.50	40.00	13.78	1125.	4.481	3635.	16290.
43.50	40.50	14.28	1156.	4.424	3878.	17160.
43.50	41.00	14.78	1186.	4.378	4120.	18040.
43.50	41.50	15.28	1215.	4.341	4363.	18940.
43.50	42.00	15.78	1244.	4.310	4605.	19850.
43.50	42.50	16.28	1272.	4.285	4847.	20770.
43.50	43.00	16.78	1302.	4.263	5094.	21720.
43.50	43.50	17.28	1329.	4.247	5337.	22670.
43.50	44.00	17.78	1356.	4.235	5581.	23630.
43.50	44.50	18.28	1382.	4.226	5824.	24610.

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WORST CASE : WATER CASE 1 OF 1

Centre at (37.00,38.00)
Iterations: 5
Net vertical force [kN]: .0
Net horiz force [kN]: 0.01762
Inclination of interslice forces [°]: -11.30

Radius 11.62m
Horiz acceleration [%g]: .0
Slip weight [kN] 1500.
Disturbing moment [kN m]: 3713.
Restoring moment [kN m]: 12460.

Factor of Safety: 3.356

Slip surface coordinates		Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	26.33	33.40	-33.63	.0	.0	.0
2	26.95	32.18	-21.53	-2.066	10.34	.0
3	27.70	31.04	-10.27	2.245	41.96	.0
4	28.58	29.99	19.07E-6	9.732	93.12	.0
5	28.60	29.97	0.2258	9.930	94.49	0.002549
6	29.25	29.35	6.334	16.30	138.8	2.006
7	30.24	28.55	14.08	25.69	205.8	9.913
8	31.31	27.87	20.68	34.76	271.7	21.39
9	32.45	27.31	26.07	42.78	330.8	33.97
10	32.89	27.13	27.76	45.17	348.5	38.52
11	34.37	26.68	31.96	50.65	389.6	51.06
12	35.89	26.44	34.15	52.17	401.0	58.32
13	37.00	26.38	34.47	50.30	386.9	59.40
14	37.01	26.38	34.47	50.27	386.7	59.39

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15	37.02	26.38	34.46	50.25	386.5	59.39
16	38.52	26.48	33.16	44.83	345.4	54.99
17	40.00	26.78	29.24	36.81	284.3	42.75
18	40.01	26.78	29.21	36.76	283.9	42.65
19	40.02	26.78	52.48	35.64	275.3	96.23
20	40.66	26.98	50.41	31.35	242.5	85.62
21	42.00	27.51	44.74	21.85	169.6	58.71
22	43.26	28.21	37.48	11.11	86.64	28.91
23	44.42	29.06	28.73	.0	0.01762	.0

Slice No.	Strength Parameters		Pore Pressure	Slice Weight	Forces on base [kN]	
	c' [kPa]	Tan phi	[kPa]	[kN]	Normal	Shear
1	50.00	.0	.0	7.503	21.82	68.36
2	50.00	.0	.0	27.01	51.36	68.36
3	50.00	.0	9.537E-6	50.90	84.18	68.36
4	50.00	.0	0.1129	1.500	2.344	1.590
5	40.00	.0	3.280	48.19	74.75	35.85
6	40.00	.0	10.21	87.36	125.9	50.77
7	40.00	.0	17.38	108.7	146.6	50.77
8	40.00	.0	23.37	128.4	164.8	50.77
9	51.66	.0	26.91	52.81	65.68	24.60
10	56.36	.0	29.86	185.3	226.3	86.99
11	61.59	.0	33.05	201.2	244.0	95.07
12	63.86	.0	34.31	145.7	146.7	70.97
13	64.26	.0	34.47	1.280	1.305	0.6425
14	64.26	.0	34.46	1.280	1.306	0.6427
15	63.51	.0	33.81	183.3	191.0	95.65
16	60.55	.0	31.20	159.9	176.6	91.20
17	58.33	.0	29.22	0.7720	0.9026	0.6038
18	58.29	.0	40.84	0.4838	1.858	0.6037
19	56.82	.0	51.44	26.28	76.78	38.14
20	40.00	.0	47.58	45.20	150.5	57.61
21	40.00	.0	41.11	27.99	138.5	57.61
22	40.00	.0	33.11	9.137	122.2	57.61

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0
7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	30.00	.0	.0	.0
10	30.00	.0	.0	.0
11	30.00	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0
18	.0	.0	14.40	-791.8
19	30.00	.0	28.80	-0.5765
20	30.00	.0	28.78	-0.5762
21	30.00	.0	28.76	-0.5758
22	30.00	.0	28.74	-0.5754

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ARUP

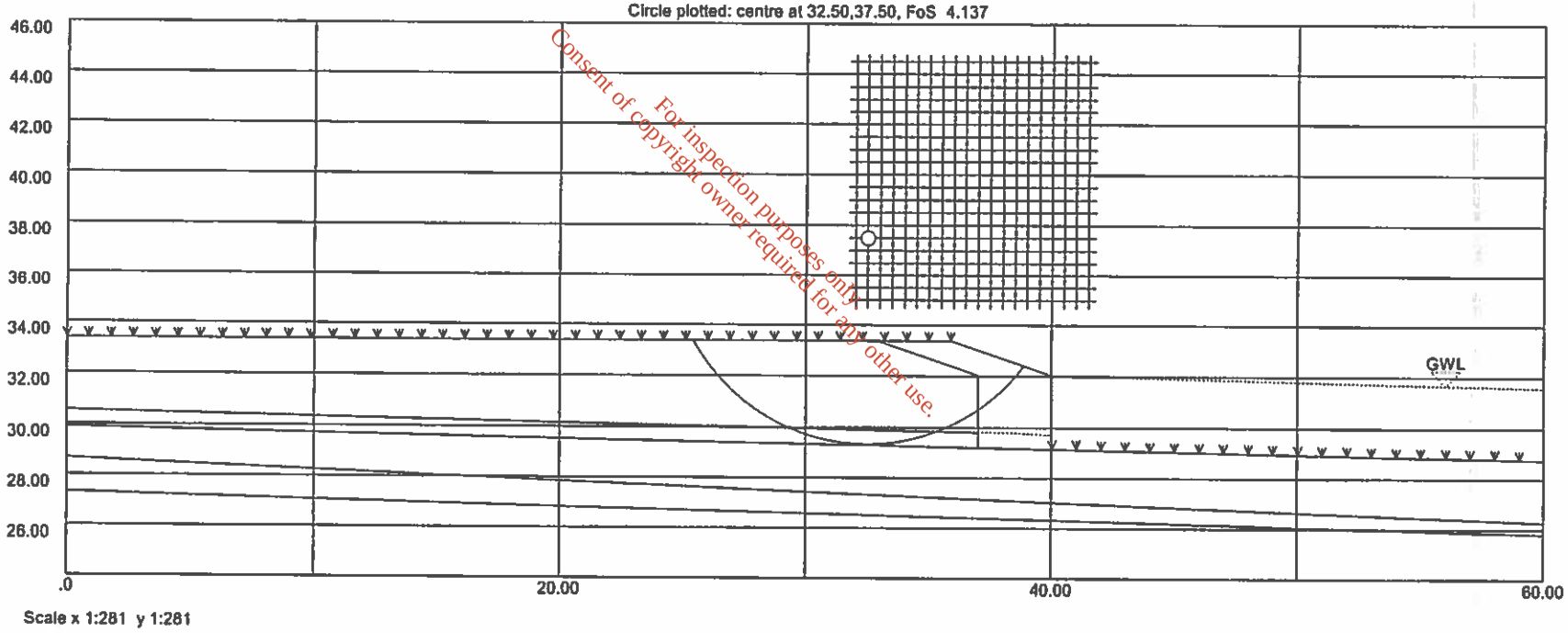
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
c1157	4E-52.4-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No4 Rev1	



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Notes
A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Drained Analysis
Slip Circle tangent to Drainage Layer
Stability at section through BHP6 & P7

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gravelly Clay (undr	18.00	18.00	Drained - linear strength	30.00	.0
2	Sand (Weathered Roc	19.00	19.00	Drained - linear strength	35.00	.0
3	Intact Rock	22.00	22.00	Drained - linear strength	.0	100.0
4	Engineering Fill	20.00	20.00	Drained - linear strength	38.00	.0
5	Engineering Fill Re	20.00	20.00	Drained - linear strength	90.00	10.00
6	Reinforced Drainage	20.00	20.00	Drained - linear strength	30.00	.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	32.09	35.88	37.00	37.01	37.02	38.81
1	5	33.40	33.40	33.40	.	.	.	.
2	4	33.40	33.40	.	32.03	29.80	29.20	.
3	6	30.35	.	.	.	29.80	29.20	
4	1	29.90	.	.	.	.	29.20	
5	2	28.65	.	.	.	.	.	
6	3	27.30	.	.	.	.	.	
GWL1	-	30.55	.	.	.	.	.	29.80

Stratum	Material	X -->			
		40.00	40.01	40.02	60.00
1	5	32.03	29.70	29.15	28.75
2	4	.	.	29.15	28.75
3	6	.	.	29.15	28.75
4	1	.	.	29.15	28.75
5	2	27.00	.	.	26.25
6	3	26.30	.	.	25.80
GWL1	-	.	29.70	32.03	31.60

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Surface Loads

No.	Limits of loaded area X1 [m]	X2 [m]	Distributed load Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 32.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 4

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
32.00	35.00	5.700	650.2	12.28	258.5	3174.
32.00	35.50	6.200	682.0	10.01	340.7	3411.
32.00	36.00	6.700	712.7	8.140	424.7	3457.
32.00	36.50	7.200	740.9	6.924	511.8	3543.
32.00	37.00	7.700	767.9	6.062	602.2	3651.
32.00	37.50	8.200	793.1	5.434	694.0	3772.
32.00	38.00	8.700	817.5	4.945	788.6	3900.
32.00	38.50	9.199		Not converged (increase iterations?)		
32.00	39.00	9.699		Not converged (increase iterations?)		
32.00	39.50	10.20		Not converged (increase iterations?)		
32.00	40.00	10.70		Not converged (increase iterations?)		
32.00	40.50	11.20		Not converged (increase iterations?)		
32.00	41.00	11.70		Not converged (increase iterations?)		
32.00	41.50	12.20		Not converged (increase iterations?)		
32.00	42.00	12.70	979.5	29.35E+6	1603.	47.03E+9
32.00	42.50	13.20		Not converged (increase iterations?)		
32.00	43.00	13.70		Not converged (increase iterations?)		
32.00	43.50	14.20		Not converged (increase		

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			iterations?)				
32.00	44.00	14.70	1040.	27.27E+6	2088.	56.95E+9	
32.00	44.50	15.20		Not converged (increase iterations?)			
32.50	35.00	5.710	646.8	8.048	339.5	2732.	
32.50	35.50	6.209	678.5	6.584	426.8	2810.	
32.50	36.00	6.709	707.4	5.634	516.7	2911.	
32.50	36.50	7.209	735.2	4.966	609.3	3026.	
32.50	37.00	7.709	761.0	4.493	703.3	3160.	
32.50	37.50	8.209	785.9	4.137	808.2	3311.	
32.50	38.00	8.709		Not converged (increase iterations?)			
32.50	38.50	9.209		Not converged (increase iterations?)			
32.50	39.00	9.709		Not converged (increase iterations?)			
32.50	39.50	10.21		Not converged (increase iterations?)			
32.50	40.00	10.71		Not converged (increase iterations?)			
32.50	40.50	11.21		Not converged (increase iterations?)			
32.50	41.00	11.71		Not converged (increase iterations?)			
32.50	41.50	12.21		Not converged (increase iterations?)			
32.50	42.00	12.71	966.7	29.45E+6	1771.	52.14E+9	
32.50	42.50	13.21	979.4	28.37E+6	1906.	54.08E+9	
32.50	43.00	13.71		Not converged (increase iterations?)			
32.50	43.50	14.21		Not converged (increase iterations?)			
32.50	44.00	14.71	1021.	26.54E+6	2300.	61.03E+9	
32.50	44.50	15.21	1034.	26.02E+6	2433.	63.30E+9	
33.00	35.00	5.719		Not converged (increase iterations?)			
33.00	35.50	6.219	674.1	4.596	510.6	2347.	
33.00	36.00	6.719		Not converged (increase iterations?)			
33.00	36.50	7.219		Not converged (increase iterations?)			
33.00	37.00	7.719		Not converged (increase iterations?)			
33.00	37.50	8.219		Not converged (increase iterations?)			
33.00	38.00	8.718		Not converged (increase iterations?)			
33.00	38.50	9.218		Not converged (increase iterations?)			
33.00	39.00	9.718		Not converged (increase iterations?)			
33.00	39.50	10.22		Not converged (increase iterations?)			
33.00	40.00	10.72		Not converged (increase iterations?)			
33.00	40.50	11.22		Not converged (increase iterations?)			
33.00	41.00	11.72	918.0	30.28E+6	1693.	51.28E+9	
33.00	41.50	12.22		Not converged (increase iterations?)			
33.00	42.00	12.72		Not converged (increase iterations?)			
33.00	42.50	13.22	959.0	27.46E+6	2102.	57.73E+9	
33.00	43.00	13.72	972.7	26.83E+6	2237.	60.02E+9	
33.00	43.50	14.22	985.9	26.25E+6	2373.	62.29E+9	
33.00	44.00	14.72	998.7	25.72E+6	2509.	64.55E+9	
33.00	44.50	15.22	1011.	25.25E+6	2646.	66.82E+9	
33.50	35.00	5.728		Not converged (increase iterations?)			
33.50	35.50	6.228		Not converged (increase iterations?)			
33.50	36.00	6.728		Not converged (increase iterations?)			
33.50	36.50	7.228		Not converged (increase iterations?)			
33.50	37.00	7.728		Not converged (increase iterations?)			
33.50	37.50	8.228		Not converged (increase iterations?)			
33.50	38.00	8.728		Not converged (increase iterations?)			
33.50	38.50	9.228		Not converged (increase iterations?)			
33.50	39.00	9.728		Not converged (increase iterations?)			
33.50	39.50	10.23		Not converged (increase iterations?)			
33.50	40.00	10.73	867.3	31.18E+6	1601.	49.90E+9	
33.50	40.50	11.23		Not converged (increase iterations?)			
33.50	41.00	11.73	898.4	29.50E+6	1864.	54.97E+9	
33.50	41.50	12.23	913.5	28.72E+6	1997.	57.34E+9	
33.50	42.00	12.73		Not converged (increase iterations?)			
33.50	42.50	13.23	937.1	26.63E+6	2290.	60.98E+9	
33.50	43.00	13.73	950.7	26.10E+6	2427.	63.35E+9	
33.50	43.50	14.23	978.9	28.39E+6	2476.	70.29E+9	
33.50	44.00	14.73		Not converged (increase iterations?)			
33.50	44.50	15.23	1005.	27.51E+6	2747.	75.59E+9	
34.00	35.00	5.738		Not converged (increase iterations?)			
34.00	35.50	6.238		Not converged (increase iterations?)			
34.00	36.00	6.738		Not converged (increase iterations?)			
34.00	36.50	7.238		Not converged (increase iterations?)			
34.00	37.00	7.738		Not converged (increase iterations?)			
34.00	37.50	8.237		Not converged (increase iterations?)			
34.00	38.00	8.737	777.3	34.78E+6	1228.	42.73E+9	
34.00	38.50	9.237	795.9	33.40E+6	1358.	45.35E+9	
34.00	39.00	9.737	813.7	32.20E+6	1489.	47.95E+9	
34.00	39.50	10.24	830.6	31.15E+6	1622.	50.53E+9	
34.00	40.00	10.74	843.0	29.39E+6	1774.	52.14E+9	
34.00	40.50	11.24		Not converged (increase iterations?)			
34.00	41.00	11.74	873.3	27.83E+6	2049.	57.01E+9	
34.00	41.50	12.24	901.0	29.87E+6	2112.	63.08E+9	
34.00	42.00	12.74	915.4	29.26E+6	2248.	65.77E+9	
34.00	42.50	13.24	929.9	28.71E+6	2384.	68.44E+9	
34.00	43.00	13.74	943.5	28.19E+6	2521.	71.08E+9	

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EPA Export 08-07-2014:23:43:19

34.00	43.50	14.24	956.6	27.71E+6	2660.	73.70E+9
34.00	44.00	14.74	969.4	27.26E+6	2799.	76.29E+9
34.00	44.50	15.24	981.8	26.84E+6	2938.	78.86E+9
34.50	35.00	5.747		Not converged (increase iterations?)		
34.50	35.50	6.247		Not converged (increase iterations?)		
34.50	36.00	6.747		Not converged (increase iterations?)		
34.50	36.50	7.247	699.2	39.01E+6	964.9	37.64E+9
34.50	37.00	7.747		Not converged (increase iterations?)		
34.50	37.50	8.247		Not converged (increase iterations?)		
34.50	38.00	8.747		Not converged (increase iterations?)		
34.50	38.50	9.247	772.4	31.44E+6	1508.	47.43E+9
34.50	39.00	9.747	789.2	30.34E+6	1646.	49.92E+9
34.50	39.50	10.25	817.6	32.02E+6	1723.	55.16E+9
34.50	40.00	10.75	833.6	31.15E+6	1859.	57.90E+9
34.50	40.50	11.25		Not converged (increase iterations?)		
34.50	41.00	11.75	863.8	29.65E+6	2134.	63.27E+9
34.50	41.50	12.25		Not converged (increase iterations?)		
34.50	42.00	12.75	891.9	28.41E+6	2413.	68.54E+9
34.50	42.50	13.25	904.7	27.90E+6	2554.	71.24E+9
34.50	43.00	13.75	917.7	27.40E+6	2695.	73.82E+9
34.50	43.50	14.25	930.4	26.93E+6	2836.	76.39E+9
34.50	44.00	14.75	942.7	26.50E+6	2978.	78.93E+9
34.50	44.50	15.25	954.4	26.09E+6	3119.	81.39E+9
35.00	35.00	5.757		Not converged (increase iterations?)		
35.00	35.50	6.257	636.2	42.62E+6	810.8	34.55E+9
35.00	36.00	6.757		Not converged (increase iterations?)		
35.00	36.50	7.257	680.0	37.19E+6	1073.	39.89E+9
35.00	37.00	7.756		Not converged (increase iterations?)		
35.00	37.50	8.256	714.6	32.83E+6	1359.	44.60E+9
35.00	38.00	8.756	743.8	34.13E+6	1446.	49.35E+9
35.00	38.50	9.256	761.2	32.93E+6	1583.	52.12E+9
35.00	39.00	9.756	777.8	31.87E+6	1721.	54.85E+9
35.00	39.50	10.26	794.0	30.93E+6	1862.	57.58E+9
35.00	40.00	10.76		Not converged (increase iterations?)		
35.00	40.50	11.26	823.9	29.34E+6	2144.	62.90E+9
35.00	41.00	11.76	838.2	28.66E+6	2286.	65.53E+9
35.00	41.50	12.26	851.9	28.05E+6	2429.	68.12E+9
35.00	42.00	12.76	865.0	27.48E+6	2571.	70.65E+9
35.00	42.50	13.26	878.0	26.97E+6	2715.	73.21E+9
35.00	43.00	13.76	890.6	26.50E+6	2859.	75.75E+9
35.00	43.50	14.26	902.5	26.06E+6	3003.	78.28E+9
35.00	44.00	14.76	914.2	25.66E+6	3147.	80.75E+9
35.00	44.50	15.26	926.0	25.29E+6	3292.	83.24E+9
35.50	35.00	5.766		Not converged (increase iterations?)		
35.50	35.50	6.266	616.5	40.17E+6	902.0	36.23E+9
35.50	36.00	6.766	634.5	36.64E+6	1050.	38.47E+9
35.50	36.50	7.266	664.4	37.24E+6	1149.	42.77E+9
35.50	37.00	7.766	683.6	35.46E+6	1286.	45.60E+9
35.50	37.50	8.266	701.9	33.95E+6	1425.	48.39E+9
35.50	38.00	8.766	719.2	32.64E+6	1566.	51.13E+9
35.50	38.50	9.266	735.8	31.52E+6	1708.	53.85E+9
35.50	39.00	9.766	751.7	30.53E+6	1851.	56.52E+9
35.50	39.50	10.27	766.9	29.67E+6	1995.	59.17E+9
35.50	40.00	10.77	781.3	28.88E+6	2138.	61.75E+9
35.50	40.50	11.27	795.5	28.19E+6	2283.	64.35E+9
35.50	41.00	11.77	809.6	27.58E+6	2427.	66.94E+9
35.50	41.50	12.27	822.9	27.01E+6	2572.	69.49E+9
35.50	42.00	12.76	835.9	26.50E+6	2718.	72.03E+9
35.50	42.50	13.26	848.5	26.02E+6	2864.	74.54E+9
35.50	43.00	13.76	860.8	25.59E+6	3010.	77.03E+9
35.50	43.50	14.26	872.8	25.19E+6	3157.	79.51E+9
35.50	44.00	14.76	884.6	24.81E+6	3303.	81.97E+9
35.50	44.50	15.26	896.0	24.47E+6	3450.	84.42E+9
36.00	35.00	5.776		Not converged (increase iterations?)		
36.00	35.50	6.276	598.2	39.66E+6	964.9	38.27E+9
36.00	36.00	6.776	619.9	37.22E+6	1105.	41.14E+9
36.00	36.50	7.275	639.2	35.24E+6	1247.	43.97E+9
36.00	37.00	7.775	657.4	33.61E+6	1391.	46.74E+9
36.00	37.50	8.275	674.7	32.25E+6	1534.	49.47E+9
36.00	38.00	8.775	691.1	31.07E+6	1678.	52.14E+9
36.00	38.50	9.275	707.1	30.06E+6	1823.	54.81E+9
36.00	39.00	9.775	722.4	29.17E+6	1969.	57.44E+9
36.00	39.50	10.27	737.2	28.39E+6	2115.	60.05E+9
36.00	40.00	10.77	751.4	27.69E+6	2262.	62.62E+9
36.00	40.50	11.27	765.2	27.06E+6	2409.	65.18E+9
36.00	41.00	11.77	778.6	26.49E+6	2556.	67.71E+9
36.00	41.50	12.27	791.6	25.98E+6	2703.	70.22E+9
36.00	42.00	12.77	804.3	25.51E+6	2851.	72.71E+9
36.00	42.50	13.27	816.6	25.08E+6	2998.	75.18E+9
36.00	43.00	13.77	828.6	24.68E+6	3146.	77.63E+9
36.00	43.50	14.27	840.4	24.31E+6	3294.	80.08E+9
36.00	44.00	14.77	851.9	23.97E+6	3442.	82.50E+9
36.00	44.50	15.27	863.4	23.66E+6	3589.	84.92E+9
36.50	35.00	5.785	551.7	39.86E+6	981.8	35.95E+9
36.50	35.50	6.285	572.7	37.12E+6	1047.	38.84E+9
36.50	36.00	6.785	592.2	34.97E+6	1191.	41.65E+9
36.50	36.50	7.285	610.6	33.23E+6	1337.	44.44E+9
36.50	37.00	7.785	628.1	31.80E+6	1484.	47.17E+9
36.50	37.50	8.285	644.8	30.58E+6	1631.	49.86E+9
36.50	38.00	8.785	660.7	29.53E+6	1778.	52.51E+9
36.50	38.50	9.285	675.8	28.64E+6	1925.	55.13E+9
36.50	39.00	9.784	690.6	27.84E+6	2073.	57.72E+9
36.50	39.50	10.28	705.2	27.14E+6	2222.	60.30E+9
36.50	40.00	10.78	719.1	26.51E+6	2370.	62.84E+9
36.50	40.50	11.28	732.6	25.95E+6	2519.	65.36E+9
36.50	41.00	11.78	745.8	25.44E+6	2667.	67.85E+9
36.50	41.50	12.28	758.6	24.97E+6	2816.	70.33E+9
36.50	42.00	12.78	771.1	24.55E+6	2965.	72.79E+9
36.50	42.50	13.28	783.1	24.17E+6	3113.	75.24E+9
36.50	43.00	13.78	795.0	23.82E+6	3261.	77.66E+9
36.50	43.50	14.28	806.7	23.49E+6	3408.	80.07E+9
36.50	44.00	14.78	818.1	23.20E+6	3555.	82.46E+9
36.50	44.50	15.28	829.2	22.93E+6	3701.	84.84E+9
37.00	35.00	5.795	522.3	37.01E+6	969.9	35.89E+9
37.00	35.50	6.294	542.1	34.68E+6	1118.	38.76E+9
37.00	36.00	6.794	561.1	32.85E+6	1265.	41.56E+9
37.00	36.50	7.294	578.9	31.34E+6	1414.	44.31E+9
37.00	37.00	7.794	596.2	30.07E+6	1563.	47.00E+9
37.00	37.50	8.294	612.3	29.00E+6	1712.	49.65E+9
37.00	38.00	8.794	627.9	28.08E+6	1861.	52.27E+9

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EPA Export 08-07-2014:23:43:19

37.00	38.50	9.294	643.0	27.28E+6	2011.	54.85E+9	
37.00	39.00	9.794	657.3	26.59E+6	2159.	57.41E+9	
37.00	39.50	10.29	671.2	25.99E+6	2306.	59.93E+9	
37.00	40.00	10.79	684.9	25.45E+6	2453.	62.43E+9	
37.00	40.50	11.29	698.1	24.97E+6	2600.	64.91E+9	
37.00	41.00	11.79	711.0	24.53E+6	2746.	67.36E+9	
37.00	41.50	12.29	724.0	24.14E+6	2891.	69.80E+9	
37.00	42.00	12.79	736.3	23.79E+6	3036.	72.23E+9	
37.00	42.50	13.29	748.4	23.47E+6	3181.	74.63E+9	
37.00	43.00	13.79	760.2	23.17E+6	3325.	77.04E+9	
37.00	43.50	14.29	771.8	22.90E+6	3468.	79.42E+9	
37.00	44.00	14.79	783.1	22.64E+6	3612.	81.80E+9	
37.00	44.50	15.29	794.2	22.41E+6	3756.	84.16E+9	
37.50	35.00	5.816	491.8	29.48E+6	1030.	30.35E+9	
37.50	35.50	6.314	510.9	27.86E+6	1180.	32.86E+9	
37.50	36.00	6.813	529.1	26.62E+6	1328.	35.36E+9	
37.50	36.50	7.312	546.2	25.63E+6	1476.	37.83E+9	
37.50	37.00	7.811	562.8	24.83E+6	1622.	40.29E+9	
37.50	37.50	8.310	578.6	24.19E+6	1768.	42.77E+9	
37.50	38.00	8.809	594.1	23.65E+6	1914.	45.26E+9	
37.50	38.50	9.308	608.9	23.23E+6	2058.	47.81E+9	
37.50	39.00	9.808	623.1	22.89E+6	2202.	50.42E+9	
37.50	39.50	10.31	636.8	22.65E+6	2346.	53.15E+9	
37.50	40.00	10.81	650.2	22.56E+6	2490.	56.18E+9	
37.50	40.50	11.31	663.3	24.23E+6	2632.	63.78E+9	
37.50	41.00	11.81	676.0	23.86E+6	2775.	66.21E+9	
37.50	41.50	12.31	688.4	23.51E+6	2919.	68.62E+9	
37.50	42.00	12.80	700.6	23.20E+6	3061.	71.04E+9	
37.50	42.50	13.30	712.8	22.92E+6	3204.	73.43E+9	
37.50	43.00	13.80	724.4	22.65E+6	3347.	75.81E+9	
37.50	43.50	14.30	735.7	22.13E+6	3556.	78.71E+9	
37.50	44.00	14.80	746.9	21.89E+6	3705.	81.09E+9	
37.50	44.50	15.30	757.8	21.67E+6	3853.	83.48E+9	
38.00	35.00	5.878	466.4	21.13E+6	1076.	22.74E+9	
38.00	35.50	6.372	484.6	20.06E+6	1220.	24.49E+9	
38.00	36.00	6.866	501.8	19.21E+6	1363.	26.18E+9	
38.00	36.50	7.361	518.3	18.35E+6	1535.	28.17E+9	
38.00	37.00	7.857	534.2	17.74E+6	1683.	29.86E+9	
38.00	37.50	8.354	549.5	17.22E+6	1831.	31.54E+9	
38.00	38.00	8.850	564.1	16.77E+6	1980.	33.20E+9	
38.00	38.50	9.347	578.3	16.39E+6	2127.	34.86E+9	
38.00	39.00	9.845	592.5	16.05E+6	2276.	36.53E+9	
38.00	39.50	10.34	605.9	15.76E+6	2424.	38.19E+9	
38.00	40.00	10.84	619.0	15.50E+6	2572.	39.87E+9	
38.00	40.50	11.34	631.7	15.28E+6	2719.	41.55E+9	
38.00	41.00	11.84	644.2	15.08E+6	2867.	43.25E+9	
38.00	41.50	12.33	656.1	14.91E+6	3015.	44.95E+9	
38.00	42.00	12.83	668.0	14.76E+6	3163.	46.67E+9	
38.00	42.50	13.33		Not converged (increase iterations?)			
38.00	43.00	13.83	691.0	14.50E+6	3459.	50.16E+9	
38.00	43.50	14.33	702.1	14.40E+6	3607.	51.94E+9	
38.00	44.00	14.83	713.4	14.31E+6	3754.	53.73E+9	
38.00	44.50	15.33	724.4	14.24E+6	3902.	55.55E+9	
38.50	35.00	5.982		Not converged (increase iterations?)			
38.50	35.50	6.468		Not converged (increase iterations?)			
38.50	36.00	6.955	478.4	12.83E+6	1435.	19.42E+9	
38.50	36.50	7.445	494.1	12.32E+6	1583.	19.50E+9	
38.50	37.00	7.935	509.4	11.88E+6	1730.	20.15E+9	
38.50	37.50	8.427	523.9	11.50E+6	1878.	21.60E+9	
38.50	38.00	8.920	538.1	11.18E+6	2025.	22.62E+9	
38.50	38.50	9.413	551.8	10.91E+6	2173.	23.71E+9	
38.50	39.00	9.907	565.2	10.64E+6	2321.	24.70E+9	
38.50	39.50	10.40	578.1	10.42E+6	2469.	25.74E+9	
38.50	40.00	10.90	591.0	10.21E+6	2617.	26.71E+9	
38.50	40.50	11.39	603.4	10.04E+6	2766.	27.74E+9	
38.50	41.00	11.89	615.5	9.881E+6	2914.	28.77E+9	
38.50	41.50	12.38	627.4	9.741E+6	3060.	29.80E+9	
38.50	42.00	12.88	639.0	9.630E+6	3208.	30.89E+9	
38.50	42.50	13.38	650.2	9.516E+6	3355.	31.93E+9	
38.50	43.00	13.88	661.2	9.403E+6	3503.	32.94E+9	
38.50	43.50	14.37	672.1	9.322E+6	3651.	34.03E+9	
38.50	44.00	14.87	682.7	9.245E+6	3797.	35.10E+9	
38.50	44.50	15.37	693.2	9.181E+6	3945.	36.22E+9	
39.00	35.00	5.828		Not converged (increase iterations?)			
39.00	35.50	6.328		Not converged (increase iterations?)			
39.00	36.00	6.828	413.3	27.45E+6	1323.	36.30E+9	
39.00	36.50	7.328	430.3	26.51E+6	1472.	39.02E+9	
39.00	37.00	7.828	446.6	25.74E+6	1621.	41.72E+9	
39.00	37.50	8.328	462.5	25.07E+6	1770.	44.37E+9	
39.00	38.00	8.828	477.6	24.49E+6	1919.	47.00E+9	
39.00	38.50	9.328	492.3	23.98E+6	2068.	49.60E+9	
39.00	39.00	9.828	506.7	23.54E+6	2217.	52.19E+9	
39.00	39.50	10.33	520.3	23.13E+6	2366.	54.75E+9	
39.00	40.00	10.83	533.8	22.78E+6	2515.	57.29E+9	
39.00	40.50	11.33	546.9	22.44E+6	2665.	59.80E+9	
39.00	41.00	11.83	559.4	22.15E+6	2813.	62.31E+9	
39.00	41.50	12.33	571.9	21.88E+6	2962.	64.80E+9	
39.00	42.00	12.83	584.2	21.64E+6	3111.	67.31E+9	
39.00	42.50	13.33	596.1	21.40E+6	3260.	69.75E+9	
39.00	43.00	13.83	607.8	21.19E+6	3409.	72.22E+9	
39.00	43.50	14.33	619.2	20.98E+6	3558.	74.64E+9	
39.00	44.00	14.83	630.3	20.80E+6	3707.	77.09E+9	
39.00	44.50	15.33	641.3	20.62E+6	3856.	79.51E+9	
39.50	35.00	5.837		Not converged (increase iterations?)			
39.50	35.50	6.336		Not converged (increase iterations?)			
39.50	36.00	6.836	373.0	26.96E+6	1271.	34.27E+9	
39.50	36.50	7.336	390.1	26.01E+6	1421.	36.95E+9	
39.50	37.00	7.836	406.5	25.25E+6	1570.	39.64E+9	
39.50	37.50	8.336	422.1	24.59E+6	1720.	42.28E+9	
39.50	38.00	8.836	437.3	24.04E+6	1869.	44.93E+9	
39.50	38.50	9.336	452.2	23.56E+6	2018.	47.55E+9	
39.50	39.00	9.836	466.4	23.16E+6	2168.	50.19E+9	
39.50	39.50	10.34	480.1	22.76E+6	2317.	52.75E+9	
39.50	40.00	10.84	493.7	22.42E+6	2467.	55.31E+9	
39.50	40.50	11.34	506.9	22.11E+6	2616.	57.84E+9	
39.50	41.00	11.84	519.7	21.83E+6	2765.	60.37E+9	
39.50	41.50	12.34	532.0	21.57E+6	2915.	62.88E+9	
39.50	42.00	12.84	544.0	21.33E+6	3064.	65.35E+9	
39.50	42.50	13.34	556.0	21.12E+6	3213.	67.84E+9	
39.50	43.00	13.84	567.9	20.91E+6	3362.	70.30E+9	
39.50	43.50	14.34	579.3	20.71E+6	3512.	72.74E+9	
39.50	44.00	14.84	590.6	20.53E+6	3661.	75.18E+9	
39.50	44.50	15.34	601.4	20.37E+6	3811.	77.63E+9	
40.00	35.00	5.845		Not converged (increase iterations?)			
40.00	35.50	6.345		Not converged (increase iterations?)			

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40.00	36.00	6.845	332.2	26.91E+6	1197.	32.22E+9
40.00	36.50	7.345	349.3	25.85E+6	1347.	34.83E+9
40.00	37.00	7.845	365.7	25.02E+6	1497.	37.45E+9
40.00	37.50	8.345	381.5	24.34E+6	1647.	40.08E+9
40.00	38.00	8.844	396.8	23.77E+6	1797.	42.70E+9
40.00	38.50	9.344	411.4	23.29E+6	1946.	45.33E+9
40.00	39.00	9.844	425.7	22.86E+6	2096.	47.91E+9
40.00	39.50	10.34	439.7	22.48E+6	2246.	50.49E+9
40.00	40.00	10.84	453.1	22.15E+6	2396.	53.07E+9
40.00	40.50	11.34	466.1	21.84E+6	2545.	55.59E+9
40.00	41.00	11.84	479.0	21.57E+6	2695.	58.13E+9
40.00	41.50	12.34	491.6	21.31E+6	2845.	60.61E+9
40.00	42.00	12.84	503.9	21.07E+6	2995.	63.11E+9
40.00	42.50	13.34	515.8	20.88E+6	3144.	65.66E+9
40.00	43.00	13.84	527.4	20.70E+6	3293.	68.18E+9
40.00	43.50	14.34	538.8	20.51E+6	3443.	70.62E+9
40.00	44.00	14.84	550.0	20.34E+6	3593.	73.08E+9
40.00	44.50	15.34	561.3	20.17E+6	3743.	75.50E+9
40.50	35.00	5.854		Not converged (increase iterations?)		
40.50	35.50	6.354		Not converged (increase iterations?)		
40.50	36.00	6.854		Not converged (increase iterations?)		
40.50	36.50	7.354	308.6	26.04E+6	1253.	32.61E+9
40.50	37.00	7.854	325.0	25.14E+6	1403.	35.27E+9
40.50	37.50	8.354	340.8	24.39E+6	1553.	37.88E+9
40.50	38.00	8.854	356.0	23.73E+6	1703.	40.42E+9
40.50	38.50	9.354	370.9	23.22E+6	1853.	43.04E+9
40.50	39.00	9.854	385.2	22.73E+6	2003.	45.54E+9
40.50	39.50	10.35	399.0	22.35E+6	2154.	48.12E+9
40.50	40.00	10.85	412.5	22.01E+6	2304.	50.69E+9
40.50	40.50	11.35	425.8	21.69E+6	2454.	53.22E+9
40.50	41.00	11.85	438.6	21.42E+6	2604.	55.76E+9
40.50	41.50	12.35	451.1	21.16E+6	2754.	58.27E+9
40.50	42.00	12.85	463.3	20.93E+6	2904.	60.79E+9
40.50	42.50	13.35	475.4	20.71E+6	3054.	63.27E+9
40.50	43.00	13.85	487.2	20.52E+6	3204.	65.75E+9
40.50	43.50	14.35	498.7	20.34E+6	3354.	68.22E+9
40.50	44.00	14.85	509.9	20.16E+6	3504.	70.65E+9
40.50	44.50	15.35	520.9	20.01E+6	3654.	73.11E+9
41.00	35.00	5.864		Not converged (increase iterations?)		
41.00	35.50	6.364		Not converged (increase iterations?)		
41.00	36.00	6.864		Not converged (increase iterations?)		
41.00	36.50	7.364	268.0	26.44E+6	1136.	30.04E+9
41.00	37.00	7.864	284.5	25.45E+6	1287.	32.76E+9
41.00	37.50	8.364	300.3	24.62E+6	1438.	35.40E+9
41.00	38.00	8.864	315.6	23.91E+6	1588.	37.98E+9
41.00	38.50	9.364	330.3	23.29E+6	1739.	40.51E+9
41.00	39.00	9.864	344.6	22.76E+6	1889.	43.00E+9
41.00	39.50	10.36	358.6	22.37E+6	2040.	45.63E+9
41.00	40.00	10.86	372.1	22.01E+6	2191.	48.22E+9
41.00	40.50	11.36	385.3	21.70E+6	2341.	50.80E+9
41.00	41.00	11.86	398.2	21.37E+6	2492.	53.24E+9
41.00	41.50	12.36	410.9	21.10E+6	2642.	55.76E+9
41.00	42.00	12.86	423.2	20.87E+6	2793.	58.28E+9
41.00	42.50	13.36	435.1	20.65E+6	2944.	60.77E+9
41.00	43.00	13.86	446.9	20.45E+6	3094.	63.26E+9
41.00	43.50	14.36	458.4	20.26E+6	3244.	65.73E+9
41.00	44.00	14.86	469.9	20.08E+6	3395.	68.16E+9
41.00	44.50	15.36	481.0	19.93E+6	3546.	70.66E+9
41.50	35.00	5.874		Not converged (increase iterations?)		
41.50	35.50	6.374	192.8	30.63E+6	694.8	21.28E+9
41.50	36.00	6.874		Not converged (increase iterations?)		
41.50	36.50	7.374		Not converged (increase iterations?)		
41.50	37.00	7.874	244.3	26.11E+6	1149.	29.99E+9
41.50	37.50	8.374	260.2	25.14E+6	1300.	32.68E+9
41.50	38.00	8.874	275.5	24.32E+6	1451.	35.29E+9
41.50	38.50	9.374	290.3	23.63E+6	1602.	37.85E+9
41.50	39.00	9.874	304.5	23.03E+6	1753.	40.38E+9
41.50	39.50	10.37	318.5	22.49E+6	1904.	42.84E+9
41.50	40.00	10.87	332.1	22.04E+6	2056.	45.31E+9
41.50	40.50	11.37	345.3	21.72E+6	2207.	47.93E+9
41.50	41.00	11.87	358.2	21.43E+6	2358.	50.53E+9
41.50	41.50	12.37	370.8	21.17E+6	2509.	53.10E+9
41.50	42.00	12.87	383.1	20.93E+6	2660.	55.66E+9
41.50	42.50	13.37	395.1	20.71E+6	2810.	58.20E+9
41.50	43.00	13.87	407.0	20.50E+6	2962.	60.72E+9
41.50	43.50	14.37	418.4	20.31E+6	3113.	63.23E+9
41.50	44.00	14.87	429.8	20.14E+6	3264.	65.72E+9
41.50	44.50	15.37	440.9	19.92E+6	3415.	68.02E+9

WORST CASE : WATER CASE 1 OF 1

Centre at (32.50,37.50)
Iterations: 300
Net vertical force [kN]: .0
Net horiz force [kN]: -28.61E-6
Inclination of interslice forces [°]: 14.24
Radius 8.209m
Horiz acceleration [kg]: .0
Slip weight [kN] 785.9
Disturbing moment [kN m]: 800.2
Restoring moment [kN m]: 3311.

Factor of Safety: 4.137

Slip surface coordinates		Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	25.39	33.40	-33.44	.0	.0	.0
2	26.13	32.33	-22.86	6.519	25.70	.0
3	27.02	31.39	-13.61	15.68	61.81	.0
4	28.06	30.60	-5.929	25.79	101.7	.0
5	29.21	29.98	.0	34.85	137.4	.0
6	29.26	29.96	0.2310	35.21	138.8	0.002667
7	30.43	29.56	4.018	40.95	161.4	0.8072
8	31.65	29.33	5.987	42.52	167.6	1.792
9	32.89	29.30	6.092	38.78	152.8	1.856
10	34.18	29.47	4.193	28.48	112.2	0.8790
11	35.43	29.83	0.2797	11.61	45.77	0.003910
12	35.50	29.86	-19.07E-6	10.47	41.27	.0
13	35.89	30.02	-1.726	3.555	14.01	.0
14	37.00	30.63	-8.048	-11.43	-45.04	.0
15	37.01	30.64	-8.116	-11.29	-44.52	.0
16	37.02	30.65	-8.184	-11.16	-44.00	.0
17	38.04	31.44	-16.34	-2.097	-8.266	.0
18	38.92	32.39	-26.16	.0	-28.61E-6	.0

Slice No.	Strength Parameters c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear

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1	.0	0.5774	.0	7.907	34.49	19.91
2	.0	0.5774	.0	27.71	57.51	33.20
3	.0	0.5774	.0	49.88	80.49	46.47
4	.0	0.5774	.0	71.36	102.1	58.95
5	.0	0.5774	0.1155	3.825	5.278	3.043
6	.0	0.5774	2.125	85.40	116.0	65.43
7	.0	0.5774	5.002	96.42	130.4	71.72
8	.0	0.5774	6.040	101.1	141.5	77.39
9	.0	0.5774	5.143	103.8	156.7	86.63
10	.0	0.5774	2.236	93.74	160.8	91.16
11	.0	0.5774	0.1398	4.687	9.173	5.290
12	.0	0.5774	.0	27.00	52.64	30.39
13	.0	0.5774	.0	64.07	97.73	56.42
14	10.00	21.37E+6	.0	0.4781	.0	-2.600
15	10.00	21.37E+6	.0	0.4763	.0	-2.587
16	10.00	21.37E+6	.0	36.91	-9.376E-6	-187.4
17	10.00	21.37E+6	.0	10.95	-2.951E-6	-50.12

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0
7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	30.00	.0	.0	.0
10	30.00	.0	.0	.0
11	30.00	.0	.0	.0
12	30.00	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	.0	.0
17	.0	.0	.0	.0

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ARUP

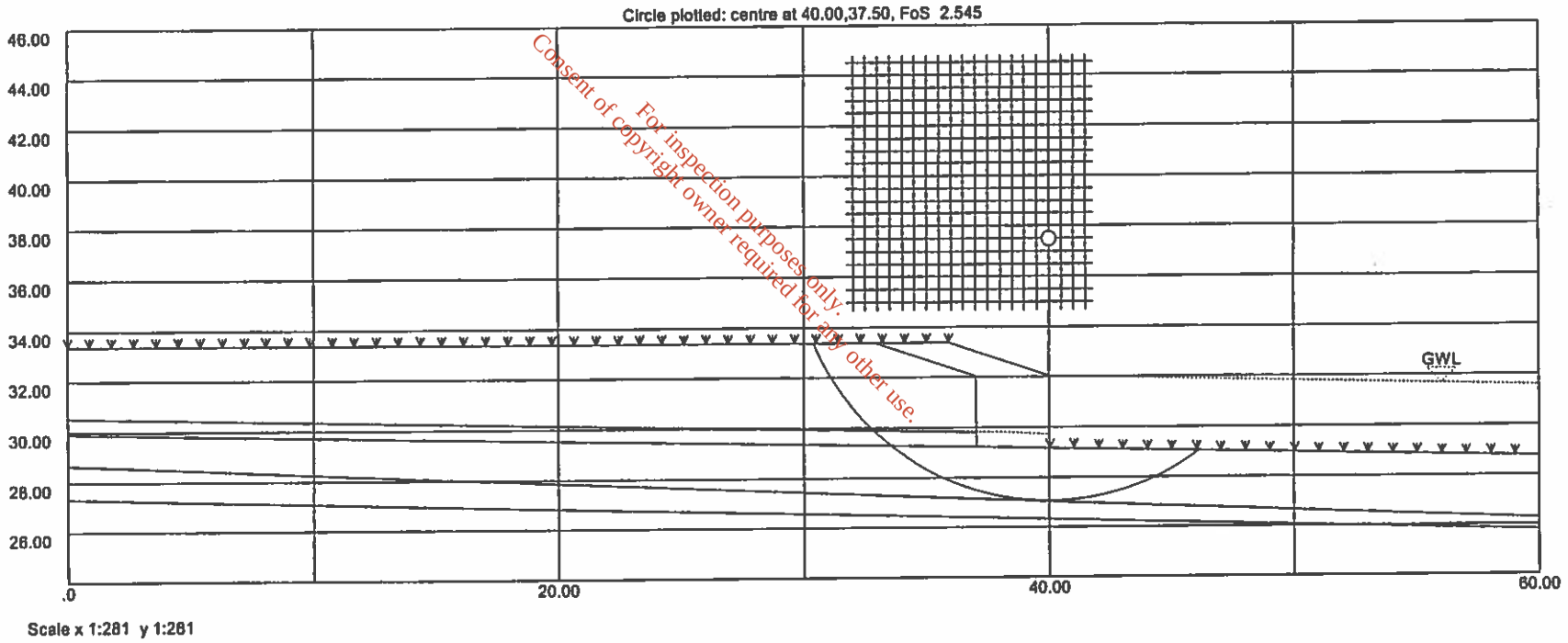
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	4E-525-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No5 Rev1	



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ARUP

Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	4E-32.5-02	
Drg. Ref.		
Made by DAH	Date 27-Nov-2003	Data Stability South Section 2 No5 Rev1

Checked

Notes
A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Drained Analysis
Slip Circle tangent to Gravelly Clay
Stability at section through BHP6 & P7

General Parameters
Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options
Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	c or c0' [kPa]
1	Gravelly Clay (undr	18.00	18.00	Drained - linear strength	30.00	.0
2	Sand (Weathered Roc	19.00	19.00	Drained - linear strength	35.00	.0
3	Intact Rock	22.00	22.00	Drained - linear strength	.0	100.0
4	Engineering Fill	20.00	20.00	Drained - linear strength	30.00	.0
5	Engineering Fill Re	20.00	20.00	Drained - linear strength	90.00	10.00
6	Reinforced Drainage	20.00	20.00	Drained - linear strength	30.00	.0

Coordinates of top of soil strata

Stratum	Material	X -->						
		.0	32.89	35.89	37.00	37.01	37.02	38.51
1	5	33.40	33.40	33.40	.	.	.	
2	4	33.40	33.40	.	32.03	29.80	29.20	
3	6	30.55	.	.	.	29.80	29.20	
4	1	29.90	.	.	.	.	29.20	
5	2	28.65	.	.	.	.	.	
6	3	27.30	.	.	.	.	.	
GWL1	-	30.55	.	.	.	.	.	29.80

Stratum	Material	X -->			
		40.00	40.01	40.02	60.00
1	5	32.03	29.70	29.15	28.75
2	4	.	.	29.15	28.75
3	6	.	.	29.15	28.75
4	1	.	.	29.15	28.75
5	2	27.00	.	.	26.25
6	3	26.30	.	.	25.80
GWL1	-	.	29.70	32.03	31.60

Groundwater
Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Surface Loads

No.	Limits of loaded area X1 [m]	X2 [m]	Distributed load Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification
Circle centre specification: GRID
Bottom left of grid: x = 32.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 5

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
32.00	35.00	7.659		Not converged (increase iterations?)		
32.00	35.50	8.159		Not converged (increase iterations?)		
32.00	36.00	8.659		Not converged (increase iterations?)		
32.00	36.50	9.158		Not converged (increase iterations?)		
32.00	37.00	9.658		Not converged (increase iterations?)		
32.00	37.50	10.16		Not converged (increase iterations?)		
32.00	38.00	10.66		Not converged (increase iterations?)		
32.00	38.50	11.16		Not converged (increase iterations?)		
32.00	39.00	11.66		Not converged (increase iterations?)		
32.00	39.50	12.16	1623.	3.454	2550.	8809.
32.00	40.00	12.66	1651.	3.456	2780.	9607.
32.00	40.50	13.15	1678.	3.468	3015.	10450.
32.00	41.00	13.65	1703.	3.495	3252.	11370.
32.00	41.50	14.15		Not converged (increase iterations?)		
32.00	42.00	14.65	1752.	3.565	3737.	13320.
32.00	42.50	15.15		Not converged (increase iterations?)		

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32.00	43.00	15.65		Not converged (increase iterations?)		
32.00	43.50	16.15		Not converged (increase iterations?)		
32.00	44.00	16.65		Not converged (increase iterations?)		
32.00	44.50	17.15		Not converged (increase iterations?)		
32.50	35.00	7.680		Not converged (increase iterations?)		
32.50	35.50	8.180		Not converged (increase iterations?)		
32.50	36.00	8.679		Not converged (increase iterations?)		
32.50	36.50	9.179		Not converged (increase iterations?)		
32.50	37.00	9.678		Not converged (increase iterations?)		
32.50	37.50	10.18		Not converged (increase iterations?)		
32.50	38.00	10.68		Not converged (increase iterations?)		
32.50	38.50	11.18		Not converged (increase iterations?)		
32.50	39.00	11.68	1572.	3.434	2613.	8974.
32.50	39.50	12.18		Not converged (increase iterations?)		
32.50	40.00	12.68		Not converged (increase iterations?)		
32.50	40.50	13.18		Not converged (increase iterations?)		
32.50	41.00	13.67		Not converged (increase iterations?)		
32.50	41.50	14.17	1700.	3.629	3788.	13750.
32.50	42.00	14.67		Not converged (increase iterations?)		
32.50	42.50	15.17		Not converged (increase iterations?)		
32.50	43.00	15.67		Not converged (increase iterations?)		
32.50	43.50	16.17	1787.	3.969	4757.	18880.
32.50	44.00	16.67	1808.	4.042	4972.	20100.
32.50	44.50	17.17	1828.	4.046	5173.	20930.
33.00	35.00	7.701		Not converged (increase iterations?)		
33.00	35.50	8.200		Not converged (increase iterations?)		
33.00	36.00	8.700		Not converged (increase iterations?)		
33.00	36.50	9.199		Not converged (increase iterations?)		
33.00	37.00	9.699	1427.	3.419	1951.	6669.
33.00	37.50	10.20	1458.	3.412	2186.	7458.
33.00	38.00	10.70		Not converged (increase iterations?)		
33.00	38.50	11.20		Not converged (increase iterations?)		
33.00	39.00	11.70		Not converged (increase iterations?)		
33.00	39.50	12.20		Not converged (increase iterations?)		
33.00	40.00	12.70		Not converged (increase iterations?)		
33.00	40.50	13.20		Not converged (increase iterations?)		
33.00	41.00	13.70		Not converged (increase iterations?)		
33.00	41.50	14.20	1667.	3.822	4094.	15650.
33.00	42.00	14.69	1689.	3.853	4300.	16570.
33.00	42.50	15.19	1711.	3.854	4502.	17350.
33.00	43.00	15.69	1733.	3.857	4705.	18150.
33.00	43.50	16.19	1754.	3.862	4907.	18950.
33.00	44.00	16.69	1775.	3.869	5110.	19770.
33.00	44.50	17.19	1795.	3.878	5312.	20600.
33.50	35.00	7.721	1261.	3.571	1272.	4541.
33.50	35.50	8.221	1300.	3.466	1493.	5175.
33.50	36.00	8.720		Not converged (increase iterations?)		
33.50	36.50	9.220		Not converged (increase iterations?)		
33.50	37.00	9.720	1401.	3.385	2208.	7474.
33.50	37.50	10.22		Not converged (increase iterations?)		
33.50	38.00	10.72		Not converged (increase iterations?)		
33.50	38.50	11.22	1486.	3.487	2936.	10240.
33.50	39.00	11.72	1512.	3.561	3171.	11290.
33.50	39.50	12.22	1538.	3.659	3402.	12450.
33.50	40.00	12.72	1562.	3.678	3611.	13280.
33.50	40.50	13.22	1586.	3.673	3814.	14010.
33.50	41.00	13.72	1609.	3.671	4017.	14750.
33.50	41.50	14.22	1632.	3.673	4220.	15500.
33.50	42.00	14.72	1655.	3.677	4423.	16260.
33.50	42.50	15.21	1677.	3.684	4626.	17040.
33.50	43.00	15.71	1698.	3.692	4830.	17830.
33.50	43.50	16.21	1719.	3.702	5033.	18630.
33.50	44.00	16.71	1740.	3.713	5236.	19440.
33.50	44.50	17.21	1760.	3.725	5440.	20260.
34.00	35.00	7.742	1240.	3.427	1471.	5042.
34.00	35.50	8.241		Not converged (increase iterations?)		
34.00	36.00	8.741		Not converged (increase iterations?)		
34.00	36.50	9.241		Not converged (increase iterations?)		
34.00	37.00	9.740		Not converged (increase iterations?)		
34.00	37.50	10.24		Not converged (increase iterations?)		
34.00	38.00	10.74	1426.	3.536	2902.	10260.
34.00	38.50	11.24	1453.	3.520	3106.	10930.
34.00	39.00	11.74	1478.	3.512	3307.	11610.
34.00	39.50	12.24	1503.	3.506	3510.	12310.
34.00	40.00	12.74	1528.	3.504	3714.	13010.
34.00	40.50	13.24	1552.	3.506	3918.	13740.
34.00	41.00	13.74	1575.	3.510	4122.	14470.
34.00	41.50	14.24	1598.	3.517	4326.	15220.
34.00	42.00	14.74	1621.	3.526	4530.	15970.
34.00	42.50	15.24	1643.	3.537	4734.	16740.
34.00	43.00	15.74	1664.	3.548	4938.	17520.
34.00	43.50	16.23	1686.	3.562	5143.	18320.
34.00	44.00	16.73	1706.	3.576	5347.	19120.
34.00	44.50	17.23	1727.	3.591	5551.	19930.
34.50	35.00	7.763		Not converged (increase		

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EPA Export 08-07-2014:23:43:19

				iterations?)		
34.50	35.50	8.262		Not converged (increase iterations?)		
34.50	36.00	8.762		Not converged (increase iterations?)		
34.50	36.50	9.261	1307.	3.425	2376.	8138.
34.50	37.00	9.761	1336.	3.394	2580.	8756.
34.50	37.50	10.26	1364.	3.371	2785.	9386.
34.50	38.00	10.76	1391.	3.357	2989.	10030.
34.50	38.50	11.26	1417.	3.351	3190.	10690.
34.50	39.00	11.76	1443.	3.348	3395.	11370.
34.50	39.50	12.26	1469.	3.349	3600.	12050.
34.50	40.00	12.76	1493.	3.353	3804.	12760.
34.50	40.50	13.26	1518.	3.360	4009.	13470.
34.50	41.00	13.76	1542.	3.369	4214.	14200.
34.50	41.50	14.26	1564.	3.380	4419.	14930.
34.50	42.00	14.76	1587.	3.392	4624.	15680.
34.50	42.50	15.26	1609.	3.406	4829.	16450.
34.50	43.00	15.76	1631.	3.421	5035.	17220.
34.50	43.50	16.26	1652.	3.437	5240.	18010.
34.50	44.00	16.75	1673.	3.454	5445.	18800.
34.50	44.50	17.25	1694.	3.471	5650.	19610.
35.00	35.00	7.783	1176.	3.377	1832.	6188.
35.00	35.50	8.283	1209.	3.314	2038.	6754.
35.00	36.00	8.782	1240.	3.270	2243.	7334.
35.00	36.50	9.282	1271.	3.240	2448.	7931.
35.00	37.00	9.781	1300.	3.219	2653.	8542.
35.00	37.50	10.28	1328.	3.205	2859.	9164.
35.00	38.00	10.78	1355.	3.202	3061.	9802.
35.00	38.50	11.28	1382.	3.204	3264.	10460.
35.00	39.00	11.78	1408.	3.207	3470.	11130.
35.00	39.50	12.28	1434.	3.212	3676.	11810.
35.00	40.00	12.78	1459.	3.221	3882.	12500.
35.00	40.50	13.28	1483.	3.232	4087.	13210.
35.00	41.00	13.78	1507.	3.244	4293.	13930.
35.00	41.50	14.28	1530.	3.258	4499.	14660.
35.00	42.00	14.78	1553.	3.274	4705.	15400.
35.00	42.50	15.28	1575.	3.290	4911.	16160.
35.00	43.00	15.78	1597.	3.307	5117.	16920.
35.00	43.50	16.28	1618.	3.326	5323.	17700.
35.00	44.00	16.78	1639.	3.344	5529.	18490.
35.00	44.50	17.28	1660.	3.364	5735.	19290.
35.50	35.00	7.804	1140.	3.187	1886.	6011.
35.50	35.50	8.303	1173.	3.140	2092.	6570.
35.50	36.00	8.803	1205.	3.108	2298.	7144.
35.50	36.50	9.302	1235.	3.088	2504.	7733.
35.50	37.00	9.802	1265.	3.076	2711.	8338.
35.50	37.50	10.30	1293.	3.069	2918.	8953.
35.50	38.00	10.80	1320.	3.071	3121.	9584.
35.50	38.50	11.30	1347.	3.074	3327.	10230.
35.50	39.00	11.80	1373.	3.082	3534.	10890.
35.50	39.50	12.30	1399.	3.091	3740.	11560.
35.50	40.00	12.80	1424.	3.103	3947.	12250.
35.50	40.50	13.30	1448.	3.117	4154.	12950.
35.50	41.00	13.80	1472.	3.132	4360.	13660.
35.50	41.50	14.30	1495.	3.149	4567.	14380.
35.50	42.00	14.80	1518.	3.166	4774.	15120.
35.50	42.50	15.30	1540.	3.185	4981.	15860.
35.50	43.00	15.80	1562.	3.204	5188.	16620.
35.50	43.50	16.30	1583.	3.224	5395.	17390.
35.50	44.00	16.80	1604.	3.244	5602.	18170.
35.50	44.50	17.30	1625.	3.264	5809.	18960.
36.00	35.00	7.824	1104.	3.032	1927.	5842.
36.00	35.50	8.324	1137.	2.997	2134.	6394.
36.00	36.00	8.823	1169.	2.974	2341.	6961.
36.00	36.50	9.323	1200.	2.961	2548.	7543.
36.00	37.00	9.823	1229.	2.955	2755.	8139.
36.00	37.50	10.32	1257.	2.954	2962.	8744.
36.00	38.00	10.82	1285.	2.958	3169.	9369.
36.00	38.50	11.32	1312.	2.966	3374.	10010.
36.00	39.00	11.82	1338.	2.976	3582.	10660.
36.00	39.50	12.32	1364.	2.989	3789.	11320.
36.00	40.00	12.82	1389.	3.003	3996.	12000.
36.00	40.50	13.32	1413.	3.019	4204.	12690.
36.00	41.00	13.82	1437.	3.036	4412.	13400.
36.00	41.50	14.32	1460.	3.055	4619.	14110.
36.00	42.00	14.82	1483.	3.074	4827.	14840.
36.00	42.50	15.32	1505.	3.094	5035.	15580.
36.00	43.00	15.82	1527.	3.114	5243.	16330.
36.00	43.50	16.32	1549.	3.135	5451.	17090.
36.00	44.00	16.82	1570.	3.157	5659.	17860.
36.00	44.50	17.32	1591.	3.178	5867.	18650.
36.50	35.00	7.845	1068.	2.905	1955.	5679.
36.50	35.50	8.345	1101.	2.877	2163.	6222.
36.50	36.00	8.844	1133.	2.860	2371.	6781.
36.50	36.50	9.344	1163.	2.852	2579.	7354.
36.50	37.00	9.843	1193.	2.850	2787.	7942.
36.50	37.50	10.34	1221.	2.855	2995.	8541.
36.50	38.00	10.84	1249.	2.862	3199.	9158.
36.50	38.50	11.34	1276.	2.872	3407.	9788.
36.50	39.00	11.84	1303.	2.885	3616.	10430.
36.50	39.50	12.34	1328.	2.900	3824.	11090.
36.50	40.00	12.84	1353.	2.916	4032.	11760.
36.50	40.50	13.34	1379.	2.934	4242.	12440.
36.50	41.00	13.84	1403.	2.952	4450.	13140.
36.50	41.50	14.34	1426.	2.972	4659.	13850.
36.50	42.00	14.84	1449.	2.992	4868.	14570.
36.50	42.50	15.34	1472.	3.013	5077.	15300.
36.50	43.00	15.84	1494.	3.035	5285.	16040.
36.50	43.50	16.34	1516.	3.057	5494.	16800.
36.50	44.00	16.84	1537.	3.079	5703.	17560.
36.50	44.50	17.34	1558.	3.102	5912.	18340.
37.00	35.00	7.866	1031.	2.806	1968.	5521.
37.00	35.50	8.365	1065.	2.783	2177.	6059.
37.00	36.00	8.865	1097.	2.770	2386.	6609.
37.00	36.50	9.364	1128.	2.765	2595.	7174.
37.00	37.00	9.864	1158.	2.766	2804.	7754.
37.00	37.50	10.36	1185.	2.770	3012.	8343.
37.00	38.00	10.86	1213.	2.779	3221.	8951.
37.00	38.50	11.36	1241.	2.791	3430.	9572.
37.00	39.00	11.86	1267.	2.805	3639.	10210.
37.00	39.50	12.36	1293.	2.821	3849.	10860.
37.00	40.00	12.86	1318.	2.838	4058.	11520.
37.00	40.50	13.36	1343.	2.857	4268.	12190.
37.00	41.00	13.86	1368.	2.879	4475.	12880.
37.00	41.50	14.36	1391.	2.899	4684.	13580.
37.00	42.00	14.86	1414.	2.921	4894.	14290.
37.00	42.50	15.36	1437.	2.942	5104.	15020.
37.00	43.00	15.86	1459.	2.964	5314.	15750.
37.00	43.50	16.36	1481.	2.987	5523.	16500.
37.00	44.00	16.86	1503.	3.010	5733.	17260.
37.00	44.50	17.36	1524.	3.033	5943.	18030.
37.50	35.00	7.888	995.1	2.729	1970.	5375.
37.50	35.50	8.387	1028.	2.708	2179.	5901.

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EPA Export 08-07-2014:23:43:19

37.50	36.00	8.886	1061.	2.699	2388.	6443.
37.50	36.50	9.385	1092.	2.695	2587.	7000.
37.50	37.00	9.885	1121.	2.699	2804.	7568.
37.50	37.50	10.38	1150.	2.705	3014.	8153.
37.50	38.00	10.88	1178.	2.712	3226.	8750.
37.50	38.50	11.38	1205.	2.725	3436.	9363.
37.50	39.00	11.88	1232.	2.740	3646.	9990.
37.50	39.50	12.38	1258.	2.757	3856.	10630.
37.50	40.00	12.88	1283.	2.775	4066.	11280.
37.50	40.50	13.38	1308.	2.794	4277.	11950.
37.50	41.00	13.88	1332.	2.814	4487.	12630.
37.50	41.50	14.38	1356.	2.835	4698.	13320.
37.50	42.00	14.88	1379.	2.857	4909.	14020.
37.50	42.50	15.38	1402.	2.879	5119.	14740.
37.50	43.00	15.88	1424.	2.901	5330.	15460.
37.50	43.50	16.38	1446.	2.923	5541.	16200.
37.50	44.00	16.88	1467.	2.946	5752.	16950.
37.50	44.50	17.38	1488.	2.970	5963.	17710.
38.00	35.00	7.934	966.1	2.739	1968.	5389.
38.00	35.50	8.430	999.0	2.713	2177.	5906.
38.00	36.00	8.927	1031.	2.698	2387.	6438.
38.00	36.50	9.424	1061.	2.690	2597.	6984.
38.00	37.00	9.922	1091.	2.688	2807.	7544.
38.00	37.50	10.42	1120.	2.692	3016.	8119.
38.00	38.00	10.92	1147.	2.696	3228.	8704.
38.00	38.50	11.42	1174.	2.707	3438.	9307.
38.00	39.00	11.91	1200.	2.719	3648.	9921.
38.00	39.50	12.41	1226.	2.733	3859.	10550.
38.00	40.00	12.91	1251.	2.749	4069.	11190.
38.00	40.50	13.41	1275.	2.766	4280.	11840.
38.00	41.00	13.91	1299.	2.784	4491.	12500.
38.00	41.50	14.41	1323.	2.802	4702.	13170.
38.00	42.00	14.91	1346.	2.820	4913.	13860.
38.00	42.50	15.40	1368.	2.827	5122.	14480.
38.00	43.00	15.90	1390.	2.849	5334.	15190.
38.00	43.50	16.40	1412.	2.872	5545.	15920.
38.00	44.00	16.90	1434.	2.895	5756.	16660.
38.00	44.50	17.40	1455.	2.918	5968.	17410.
38.50	35.00	8.011	947.2	2.770	1967.	5449.
38.50	35.50	8.503	979.3	2.738	2177.	5961.
38.50	36.00	8.996	1010.	2.718	2387.	6487.
38.50	36.50	9.489	1040.	2.706	2597.	7028.
38.50	37.00	9.983	1069.	2.701	2807.	7583.
38.50	37.50	10.48	1097.	2.701	3018.	8151.
38.50	38.00	10.97	1124.	2.703	3231.	8732.
38.50	38.50	11.47	1150.	2.711	3441.	9328.
38.50	39.00	11.96	1176.	2.721	3652.	9937.
38.50	39.50	12.46	1202.	2.735	3862.	10560.
38.50	40.00	12.96	1226.	2.750	4071.	11200.
38.50	40.50	13.45	1250.	2.766	4282.	11840.
38.50	41.00	13.95	1274.	2.783	4493.	12500.
38.50	41.50	14.45	1297.	2.801	4705.	13180.
38.50	42.00	14.95	1320.	2.819	4916.	13860.
38.50	42.50	15.44	1342.	2.839	5128.	14560.
38.50	43.00	15.94	1364.	2.859	5339.	15260.
38.50	43.50	16.44	1386.	2.879	5551.	15980.
38.50	44.00	16.94	1407.	2.900	5763.	16710.
38.50	44.50	17.44	1428.	2.921	5975.	17450.
39.00	35.00	7.949	884.5	2.616	1886.	4935.
39.00	35.50	8.448	918.5	2.590	2098.	5431.
39.00	36.00	8.947	951.1	2.575	2311.	5950.
39.00	36.50	9.447	982.4	2.568	2524.	6488.
39.00	37.00	9.946	1012.	2.568	2734.	7042.
39.00	37.50	10.45	1042.	2.573	2947.	7612.
39.00	38.00	10.95	1070.	2.581	3159.	8196.
39.00	38.50	11.45	1098.	2.590	3374.	8790.
39.00	39.00	12.04	1139.	2.742	3653.	10010.
39.00	39.50	12.53	1184.	2.750	3864.	10630.
39.00	40.00	13.02	1208.	2.762	4076.	11260.
39.00	40.50	13.52	1232.	2.775	4288.	11900.
39.00	41.00	14.01	1255.	2.790	4499.	12550.
39.00	41.50	14.51	1278.	2.807	4710.	13220.
39.00	42.00	15.00	1300.	2.825	4922.	13900.
39.00	42.50	15.50	1322.	2.843	5134.	14590.
39.00	43.00	16.00	1344.	2.861	5346.	15300.
39.00	43.50	16.49	1365.	2.880	5558.	16010.
39.00	44.00	16.99	1386.	2.900	5770.	16730.
39.00	44.50	17.49	1406.	2.920	5983.	17470.
39.50	35.00	7.969	847.7	2.615	1833.	4793.
39.50	35.50	8.468	881.4	2.583	2046.	5284.
39.50	36.00	8.968	913.8	2.563	2259.	5789.
39.50	36.50	9.467	945.3	2.552	2472.	6310.
39.50	37.00	9.967	975.8	2.552	2682.	6845.
39.50	37.50	10.47	1005.	2.554	2896.	7396.
39.50	38.00	10.97	1034.	2.559	3110.	7960.
39.50	38.50	11.47	1062.	2.569	3324.	8539.
39.50	39.00	11.97	1088.	2.579	3540.	9129.
39.50	39.50	12.46	1115.	2.594	3753.	9735.
39.50	40.00	12.96	1141.	2.610	3967.	10350.
39.50	40.50	13.46	1166.	2.628	4181.	10990.
39.50	41.00	13.96	1191.	2.646	4395.	11630.
39.50	41.50	14.46	1215.	2.666	4610.	12290.
39.50	42.00	14.96	1239.	2.686	4824.	12960.
39.50	42.50	15.46	1262.	2.707	5039.	13640.
39.50	43.00	15.96	1285.	2.728	5254.	14330.
39.50	43.50	16.46	1307.	2.750	5468.	15040.
39.50	44.00	16.96	1329.	2.772	5683.	15760.
39.50	44.50	17.46	1351.	2.796	5896.	16490.
40.00	35.00	7.989	811.3	2.639	1764.	4655.
40.00	35.50	8.489	845.5	2.596	1979.	5138.
40.00	36.00	8.988	878.3	2.570	2193.	5636.
40.00	36.50	9.488	909.8	2.554	2407.	6148.
40.00	37.00	9.988	939.6	2.547	2619.	6671.
40.00	37.50	10.49	969.2	2.545	2834.	7212.
40.00	38.00	10.99	998.0	2.548	3049.	7768.
40.00	38.50	11.49	1026.	2.555	3264.	8338.
40.00	39.00	11.99	1053.	2.564	3479.	8921.
40.00	39.50	12.49	1079.	2.576	3693.	9514.
40.00	40.00	12.98	1105.	2.591	3908.	10120.
40.00	40.50	13.48	1130.	2.607	4123.	10750.
40.00	41.00	13.98	1155.	2.625	4338.	11390.
40.00	41.50	14.48	1179.	2.643	4553.	12030.
40.00	42.00	14.98	1203.	2.663	4768.	12700.
40.00	42.50	15.48	1227.	2.683	4984.	13370.
40.00	43.00	15.98	1249.	2.703	5199.	14060.
40.00	43.50	16.48	1272.	2.724	5415.	14750.
40.00	44.00	16.98	1294.	2.746	5630.	15460.
40.00	44.50	17.48	1316.	2.768	5846.	16180.
40.50	35.00	8.009	773.6	2.683	1681.	4511.
40.50	35.50	8.509	808.2	2.630	1896.	4987.
40.50	36.00	9.008	841.2	2.595	2110.	5477.
40.50	36.50	9.508	872.5	2.574	2324.	5981.
40.50	37.00	10.01	903.3	2.559	2541.	6500.
40.50	37.50	10.51	933.0	2.552	2756.	7033.

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EPA Export 08-07-2014:23:43:19

40.50	38.00	11.01	961.7	2.551	2971.	7580.
40.50	38.50	11.51	989.7	2.555	3187.	8140.
40.50	39.00	12.01	1017.	2.562	3403.	8716.
40.50	39.50	12.51	1044.	2.571	3619.	9305.
40.50	40.00	13.01	1070.	2.583	3835.	9907.
40.50	40.50	13.51	1095.	2.597	4051.	10520.
40.50	41.00	14.00	1120.	2.612	4268.	11150.
40.50	41.50	14.50	1145.	2.629	4484.	11790.
40.50	42.00	15.00	1169.	2.647	4700.	12440.
40.50	42.50	15.50	1192.	2.666	4916.	13110.
40.50	43.00	16.00	1215.	2.686	5133.	13790.
40.50	43.50	16.50	1238.	2.705	5349.	14470.
40.50	44.00	17.00	1260.	2.726	5566.	15170.
40.50	44.50	17.50	1282.	2.747	5783.	15880.
41.00	35.00	8.028	736.2	2.766	1581.	4374.
41.00	35.50	8.528	770.0	2.686	1799.	4831.
41.00	36.00	9.027	803.1	2.636	2015.	5312.
41.00	36.50	9.527	835.2	2.603	2232.	5808.
41.00	37.00	10.03	865.3	2.581	2446.	6315.
41.00	37.50	10.53	895.2	2.571	2660.	6839.
41.00	38.00	11.03	924.9	2.563	2879.	7381.
41.00	38.50	11.53	953.1	2.563	3096.	7933.
41.00	39.00	12.03	980.4	2.566	3312.	8499.
41.00	39.50	12.52	1007.	2.573	3528.	9078.
41.00	40.00	13.02	1033.	2.582	3745.	9671.
41.00	40.50	13.52	1059.	2.594	3963.	10280.
41.00	41.00	14.02	1084.	2.607	4180.	10900.
41.00	41.50	14.52	1108.	2.622	4397.	11530.
41.00	42.00	15.02	1132.	2.638	4615.	12170.
41.00	42.50	15.52	1156.	2.655	4833.	12830.
41.00	43.00	16.02	1179.	2.673	5050.	13500.
41.00	43.50	16.52	1202.	2.692	5268.	14180.
41.00	44.00	17.02	1224.	2.711	5485.	14870.
41.00	44.50	17.52	1246.	2.731	5703.	15580.
41.50	35.00	8.047	698.2	2.888	1470.	4246.
41.50	35.50	8.546	732.4	2.781	1687.	4691.
41.50	36.00	9.046	765.8	2.704	1904.	5149.
41.50	36.50	9.546	798.4	2.657	2123.	5639.
41.50	37.00	10.05	829.4	2.624	2340.	6140.
41.50	37.50	10.54	858.0	2.603	2556.	6651.
41.50	38.00	11.04	886.6	2.590	2772.	7178.
41.50	38.50	11.54	914.9	2.584	2989.	7722.
41.50	39.00	12.04	943.1	2.581	3209.	8283.
41.50	39.50	12.54	970.5	2.585	3425.	8856.
41.50	40.00	13.04	996.6	2.591	3643.	9440.
41.50	40.50	13.54	1022.	2.600	3861.	10040.
41.50	41.00	14.04	1047.	2.610	4078.	10650.
41.50	41.50	14.54	1072.	2.623	4297.	11270.
41.50	42.00	15.04	1096.	2.637	4515.	11910.
41.50	42.50	15.54	1120.	2.652	4733.	12550.
41.50	43.00	16.04	1143.	2.668	4952.	13210.
41.50	43.50	16.54	1165.	2.685	5171.	13880.
41.50	44.00	17.04	1188.	2.703	5390.	14570.
41.50	44.50	17.54	1210.	2.722	5609.	15260.

WORST CASE : WATER CASE 1 OF 1

Centre at (40.00,37.50)
Iterations: 9
Net vertical force [kN]: .0
Net horiz force [kN]: 145.0E-6
Inclination of interslice forces [°]: 10.48

Radius 10.49m
Horiz acceleration [kg]: .0
Slip weight [kN] 969.2
Disturbing moment [kN m]: 2834
Restoring moment [kN m]: 7212

Factor of Safety: 2.545

Slip surface coordinates

Point	x [m]	y [m]	Pore Pressure u [kPa]	Interslice forces [kN] T	E	E(u)
1	30.35	33.40	-34.41	.0	.0	.0
2	30.99	32.13	-21.85	5.010	27.08	.0
3	31.80	30.96	-10.31	12.89	69.66	.0
4	32.76	29.91	-19.07E-6	22.64	122.4	.0
5	32.79	29.89	0.2588	22.92	123.9	0.003350
6	32.89	29.79	1.183	23.92	129.3	0.07000
7	33.50	29.27	6.310	29.90	161.6	1.991
8	34.65	28.48	13.95	39.86	215.5	9.733
9	35.89	27.85	19.99	48.12	260.1	19.98
10	37.00	27.45	23.76	51.86	280.3	28.28
11	37.01	27.45	23.81	51.88	280.4	28.35
12	37.02	27.45	23.84	51.90	280.5	28.41
13	38.49	27.12	26.79	53.27	287.9	35.88
14	40.00	27.01	26.88	50.63	273.6	36.12
15	40.01	27.01	26.87	50.61	273.5	36.10
16	40.02	27.01	50.17	49.07	265.2	84.38
17	41.33	27.10	49.04	44.54	240.7	78.81
18	42.63	27.35	46.27	36.85	199.1	65.67
19	43.88	27.76	41.91	26.36	142.5	46.50
20	45.07	28.32	36.02	13.76	74.35	23.62
21	46.18	29.03	28.71	.0	145.0E-6	.0

Slice Strength Parameters

Slice No.	c' [kPa]	Tan phi	Pore Pressure [kPa]	Slice Weight [kN]	Forces on base [kN] Normal	Shear
1	.0	0.5774	.0	8.166	34.31	19.81
2	.0	0.5774	.0	30.01	61.43	35.47
3	.0	0.5774	.0	56.92	90.18	52.07
4	.0	0.5774	0.1294	1.947	2.844	1.639
5	.0	0.5774	0.7210	7.196	10.44	5.967
6	.0	0.5774	3.747	47.60	66.65	36.73
7	.0	0.5774	10.13	102.8	135.4	70.06
8	.0	0.5774	16.97	127.1	159.3	78.38
9	.0	0.5774	21.89	120.0	116.3	52.21
10	.0	0.5774	23.80	1.081	1.049	0.4624
11	.0	0.5774	23.82	1.081	1.049	0.4624
12	.0	0.5774	25.31	156.4	153.0	66.28
13	.0	0.5774	26.83	150.7	151.9	64.31
14	.0	0.5774	26.87	0.7275	0.7478	0.2766
15	.0	0.5774	38.52	0.4398	2.123	1.003
16	.0	0.5774	49.60	49.22	132.3	38.65
17	.0	0.5774	47.65	43.94	133.0	40.59
18	.0	0.5774	44.09	34.54	130.1	41.59
19	.0	0.5774	38.96	21.92	123.2	41.53
20	.0	0.5774	32.36	7.293	112.3	40.26

Slice no.	Surface Load [kPa] Vert	Horiz	Water Pressure on ground surface [kPa] Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0

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7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	14.40	-791.8
16	30.00	.0	28.79	-0.5764
17	30.00	.0	28.77	-0.5760
18	30.00	.0	28.75	-0.5756
19	30.00	.0	28.73	-0.5752
20	30.00	.0	28.72	-0.5749

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ARUP

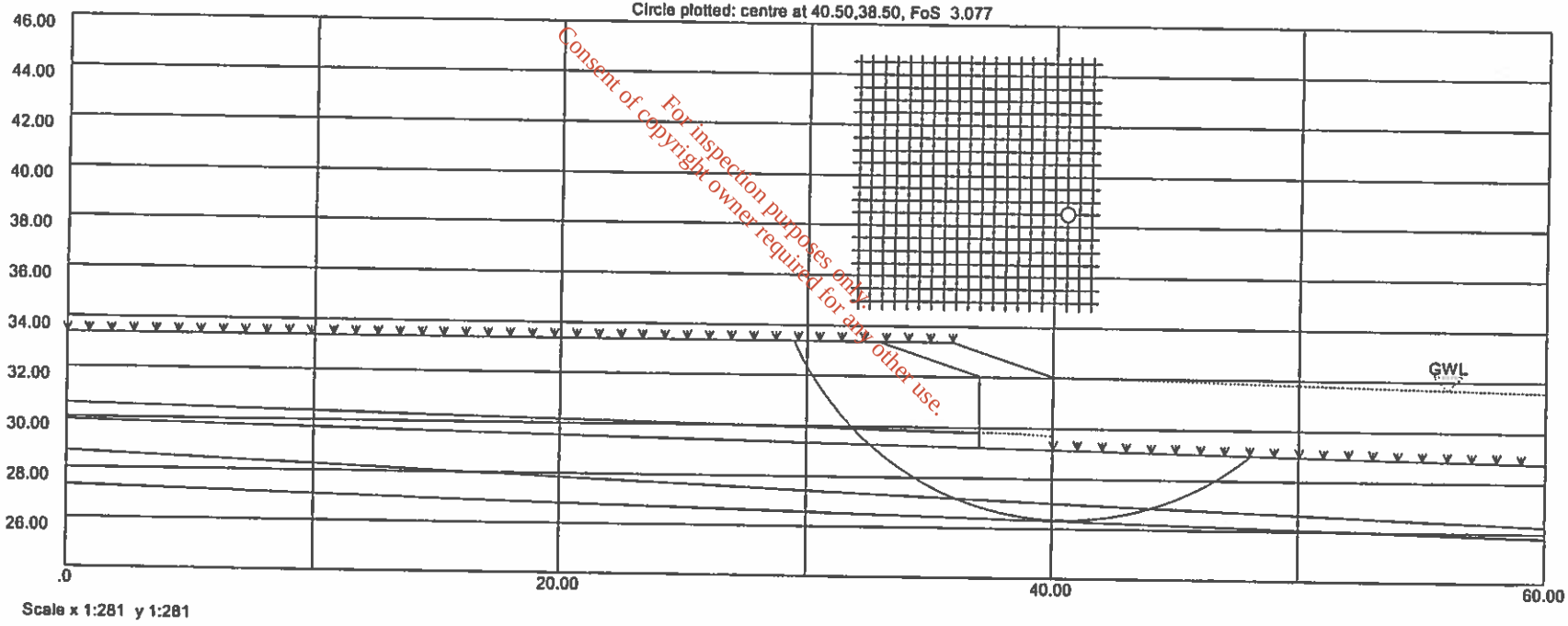
Corrib Gas Terminal

Stability Check of RE Walls at South edge of site

Job No.	Sheet No.	Rev.
C1157.10	4E-52.6-01	

Drg. Ref.

Made by	Date	Data	Checked
DAH	27-Nov-2003	Stability South Section 2 No6 Rev1	



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Notes

A global stability check of the reinforced earth walls
Increased Terminal Fill Level
Drained Analysis
Slip Circle tangent to Sand/Weathered Rock
Stability at section through BHP6 & P7

General Parameters

Direction of slip: DOWNHILL
Minimum slip weight [kN] : 0
Type of analysis : STATIC

Analysis Options

Factor of safety on : SHEAR STRENGTH
Minimum number of slices: 10
Method: Bishop (Parallel inclined interslice forces)
Maximum number of iterations: 400

Material properties

No.	Description	Unit Weight Above GWL [kN/m3]	Unit Weight Below GWL [kN/m3]		Shear Strength Parameters Phi or Phi0 [°]	Shear Strength Parameters c or c0' [kPa]
1	Gravelly Clay (undr	18.00	18.00	Drained - linear strength	30.00	.0
2	Sand (Weathered Roc	19.00	19.00	Drained - linear strength	35.00	.0
3	Intact Rock	22.00	22.00	Drained - linear strength	.0	100.0
4	Engineering Fill	20.00	20.00	Drained - linear strength	30.00	.0
5	Engineering Fill Re	20.00	20.00	Drained - linear strength	90.00	10.00
6	Reinforced Drainage	20.00	20.00	Drained - linear strength	30.00	.0

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Coordinates of top of soil strata

Stratum	Material	X --> .0	32.89	35.89	37.00	37.01	37.02	38.51
1	5	33.40	33.40	33.40	.	.	.	.
2	4	33.40	33.40	.	32.03	29.80	29.20	.
3	6	30.55	.	.	.	29.80	29.20	.
4	1	29.90	.	.	.	.	29.20	.
5	2	28.65	.	.	.	.	.	.
6	3	27.30	.	.	.	.	.	.
GWL1	-	30.55	.	.	.	.	.	29.80

Stratum	Material	X --> 40.00	40.01	40.02	60.00
1	5	32.03	29.70	29.15	28.75
2	4	.	.	29.15	28.75
3	6	.	.	29.15	28.75
4	1	.	.	29.15	28.75
5	2	27.00	.	.	26.25
6	3	26.30	.	.	25.80
GWL1	-	.	29.70	32.03	31.60

Groundwater

Pore pressure distribution type: HYDROSTATIC
Maximum soil suction: .0 [m]
Unit weight of water: 10.00 kN/m³
Number of phreatic surfaces: 1

Surface Loads

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No.	Limits of loaded area X1 [m]	X2 [m]	Distributed load Vert [kPa]	Horiz [kPa]
1	.0	35.89	30.00	.0
2	40.02	60.00	30.00	.0

Slip Surface Specification

Circle centre specification: GRID
Bottom left of grid: x = 32.00 y = 35.00
Centres on grid: 20 in x direction at 0.50m spacing
20 in y direction at 0.50m spacing
Grid extended to find minimum FoS
All circles tangent to stratum no. 6

RESULTS OF ANALYSIS

Slip Centre x [m]	Slip Centre y [m]	Radius [m]	Slip Weight [kN]	Comment/ FoS	Disturbing Moment [kN m]	Restoring Moment [kN m]
32.00	35.00	8.493	1614.	5.481	1223.	6702.
32.00	35.50	8.993		Not converged (increase iterations?)		
32.00	36.00	9.493	1705.	5.130	1732.	8883.
32.00	36.50	9.993	1758.	4.943	1910.	9441.
32.00	37.00	10.49	1798.	4.869	2173.	10580.
32.00	37.50	10.99	1836.	4.830	2449.	11830.
32.00	38.00	11.49	1872.	4.810	2733.	13150.
32.00	38.50	11.99		Not converged (increase iterations?)		
32.00	39.00	12.49	1939.	4.874	3299.	16080.
32.00	39.50	12.99	1971.	4.943	3571.	17650.
32.00	40.00	13.49	2001.	5.061	3837.	19420.
32.00	40.50	13.99	2031.	5.024	4062.	20410.
32.00	41.00	14.49	2060.	4.995	4287.	21410.
32.00	41.50	14.99	2088.	4.972	4512.	22430.
32.00	42.00	15.49	2116.	4.954	4737.	23470.
32.00	42.50	15.99	2143.	4.942	4963.	24520.
32.00	43.00	16.49	2169.	4.933	5188.	25590.
32.00	43.50	16.99	2196.	4.927	5413.	26670.
32.00	44.00	17.49	2220.	4.927	5634.	27760.
32.00	44.50	17.99	2245.	4.926	5860.	28870.
32.50	35.00	8.506		Not converged (increase iterations?)		
32.50	35.50	9.006	1647.	4.977	1650.	8213.
32.50	36.00	9.506		Not converged (increase iterations?)		
32.50	36.50	10.01	1731.	4.789	2198.	10520.
32.50	37.00	10.51	1768.	4.768	2482.	11830.
32.50	37.50	11.01	1804.	4.793	2738.	13120.
32.50	38.00	11.50		Not converged (increase iterations?)		
32.50	38.50	12.00	1871.	4.909	3304.	16220.
32.50	39.00	12.50	1902.	4.860	3529.	17150.
32.50	39.50	13.00	1933.	4.820	3754.	18100.
32.50	40.00	13.50	1963.	4.790	3980.	19060.
32.50	40.50	14.00	1993.	4.766	4205.	20040.
32.50	41.00	14.50	2022.	4.748	4431.	21040.
32.50	41.50	15.00	2050.	4.735	4657.	22050.
32.50	42.00	15.50	2078.	4.727	4883.	23080.
32.50	42.50	16.00	2105.	4.722	5108.	24120.
32.50	43.00	16.50	2132.	4.720	5334.	25180.
32.50	43.50	17.00	2158.	4.720	5561.	26250.
32.50	44.00	17.50	2182.	4.725	5782.	27320.
32.50	44.50	18.00	2207.	4.730	6009.	28420.
33.00	35.00	8.518	1578.	4.904	1631.	7998.
33.00	35.50	9.018	1621.	4.785	1912.	9149.
33.00	36.00	9.518	1661.	4.744	2189.	10390.
33.00	36.50	10.02	1699.	4.736	2478.	11740.
33.00	37.00	10.52	1734.	4.772	2752.	13130.
33.00	37.50	11.02	1769.	4.746	2974.	14110.
33.00	38.00	11.52	1801.	4.684	3202.	15000.
33.00	38.50	12.02	1834.	4.639	3428.	15900.
33.00	39.00	12.52	1866.	4.605	3654.	16820.
33.00	39.50	13.02	1897.	4.578	3880.	17760.

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33.00	40.00	13.52	1927.	4.558	4106.	18720.
33.00	40.50	14.02	1956.	4.544	4333.	19690.
33.00	41.00	14.52	1985.	4.534	4560.	20680.
33.00	41.50	15.02	2014.	4.529	4787.	21680.
33.00	42.00	15.52	2041.	4.527	5014.	22700.
33.00	42.50	16.02	2068.	4.528	5241.	23730.
33.00	43.00	16.52	2095.	4.531	5468.	24780.
33.00	43.50	17.02	2122.	4.537	5695.	25840.
33.00	44.00	17.52	2148.	4.545	5923.	26920.
33.00	44.50	18.02	2172.	4.556	6145.	28000.
33.50	35.00	8.531		Not converged (increase iterations?)		
33.50	35.50	9.031	1588.	4.718	2162.	10200.
33.50	36.00	9.531	1626.	4.691	2408.	11300.
33.50	36.50	10.03	1662.	4.601	2634.	12120.
33.50	37.00	10.53	1697.	4.535	2857.	12960.
33.50	37.50	11.03	1732.	4.480	3084.	13820.
33.50	38.00	11.53	1765.	4.439	3311.	14700.
33.50	38.50	12.03	1797.	4.403	3541.	15590.
33.50	39.00	12.53	1829.	4.380	3768.	16500.
33.50	39.50	13.03	1860.	4.364	3995.	17430.
33.50	40.00	13.53	1890.	4.353	4222.	18380.
33.50	40.50	14.03	1919.	4.347	4449.	19340.
33.50	41.00	14.53	1949.	4.344	4677.	20320.
33.50	41.50	15.03	1977.	4.345	4905.	21310.
33.50	42.00	15.53	2005.	4.349	5132.	22320.
33.50	42.50	16.03	2032.	4.355	5360.	23340.
33.50	43.00	16.53	2059.	4.367	5583.	24380.
33.50	43.50	17.03	2085.	4.376	5811.	25430.
33.50	44.00	17.53	2111.	4.387	6039.	26500.
33.50	44.50	18.03	2135.	4.402	6262.	27560.
34.00	35.00	8.543	1511.	4.616	2050.	9463.
34.00	35.50	9.043	1550.	4.496	2277.	10240.
34.00	36.00	9.543	1588.	4.410	2501.	11030.
34.00	36.50	10.04	1625.	4.341	2728.	11840.
34.00	37.00	10.54	1660.	4.289	2956.	12680.
34.00	37.50	11.04	1695.	4.251	3183.	13530.
34.00	38.00	11.54	1728.	4.222	3410.	14400.
34.00	38.50	12.04	1760.	4.198	3641.	15280.
34.00	39.00	12.54	1792.	4.184	3868.	16190.
34.00	39.50	13.04	1823.	4.176	4096.	17110.
34.00	40.00	13.54	1853.	4.173	4324.	18040.
34.00	40.50	14.04	1882.	4.176	4547.	18990.
34.00	41.00	14.54	1911.	4.179	4776.	19960.
34.00	41.50	15.04	1940.	4.185	5004.	20940.
34.00	42.00	15.54	1968.	4.193	5233.	21940.
34.00	42.50	16.04	1995.	4.202	5461.	22950.
34.00	43.00	16.54	2022.	4.214	5690.	23980.
34.00	43.50	17.04	2048.	4.227	5918.	25020.
34.00	44.00	17.54	2074.	4.242	6147.	26070.
34.00	44.50	18.04	2098.	4.259	6370.	27130.
34.50	35.00	8.556	1473.	4.328	2130.	9218.
34.50	35.50	9.056	1512.	4.234	2358.	9983.
34.50	36.00	9.556	1550.	4.166	2585.	10770.
34.50	36.50	10.06	1587.	4.115	2813.	11580.
34.50	37.00	10.56	1622.	4.078	3041.	12400.
34.50	37.50	11.06	1657.	4.051	3269.	13240.
34.50	38.00	11.55	1690.	4.032	3497.	14100.
34.50	38.50	12.05	1722.	4.024	3721.	14970.
34.50	39.00	12.55	1753.	4.013	3953.	15860.
34.50	39.50	13.05	1784.	4.011	4181.	16770.
34.50	40.00	13.55	1815.	4.013	4410.	17700.
34.50	40.50	14.05	1844.	4.018	4638.	18640.
34.50	41.00	14.55	1873.	4.026	4867.	19590.
34.50	41.50	15.05	1902.	4.035	5096.	20560.
34.50	42.00	15.55	1930.	4.047	5325.	21550.
34.50	42.50	16.05	1957.	4.061	5554.	22550.
34.50	43.00	16.55	1984.	4.076	5783.	23570.
34.50	43.50	17.05	2010.	4.092	6012.	24600.
34.50	44.00	17.55	2036.	4.109	6241.	25640.
34.50	44.50	18.05	2060.	4.128	6465.	26690.
35.00	35.00	8.568	1435.	4.092	2196.	8986.
35.00	35.50	9.068	1474.	4.018	2424.	9741.
35.00	36.00	9.568	1512.	3.966	2652.	10520.
35.00	36.50	10.07	1549.	3.928	2880.	11310.

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35.00	37.00	10.57	1584.	3.904	3106.	12130.
35.00	37.50	11.07	1618.	3.886	3335.	12960.
35.00	38.00	11.57	1652.	3.874	3563.	13810.
35.00	38.50	12.07	1685.	3.869	3792.	14670.
35.00	39.00	12.57	1717.	3.865	4025.	15550.
35.00	39.50	13.07	1747.	3.864	4256.	16450.
35.00	40.00	13.57	1778.	3.871	4486.	17360.
35.00	40.50	14.07	1807.	3.880	4715.	18290.
35.00	41.00	14.57	1836.	3.891	4944.	19240.
35.00	41.50	15.07	1865.	3.904	5174.	20200.
35.00	42.00	15.57	1893.	3.918	5403.	21170.
35.00	42.50	16.07	1920.	3.934	5633.	22160.
35.00	43.00	16.57	1947.	3.951	5863.	23170.
35.00	43.50	17.07	1973.	3.970	6093.	24190.
35.00	44.00	17.57	1999.	3.988	6323.	25220.
35.00	44.50	18.07	2026.	4.008	6555.	26270.
35.50	35.00	8.581	1396.	3.893	2250.	8757.
35.50	35.50	9.081	1435.	3.832	2480.	9502.
35.50	36.00	9.581	1474.	3.795	2707.	10270.
35.50	36.50	10.08	1511.	3.766	2936.	11060.
35.50	37.00	10.58	1546.	3.747	3165.	11860.
35.50	37.50	11.08	1581.	3.736	3394.	12680.
35.50	38.00	11.58	1615.	3.730	3623.	13520.
35.50	38.50	12.08	1647.	3.730	3853.	14370.
35.50	39.00	12.58	1679.	3.734	4082.	15240.
35.50	39.50	13.08	1710.	3.740	4312.	16130.
35.50	40.00	13.58	1741.	3.747	4546.	17030.
35.50	40.50	14.08	1770.	3.759	4776.	17950.
35.50	41.00	14.58	1800.	3.772	5006.	18880.
35.50	41.50	15.08	1828.	3.788	5236.	19830.
35.50	42.00	15.58	1856.	3.805	5466.	20800.
35.50	42.50	16.08	1884.	3.823	5697.	21780.
35.50	43.00	16.58	1910.	3.842	5927.	22770.
35.50	43.50	17.08	1937.	3.861	6158.	23780.
35.50	44.00	17.58	1963.	3.882	6389.	24800.
35.50	44.50	18.08	1989.	3.903	6620.	25830.
36.00	35.00	8.593	1358.	3.731	2288.	8536.
36.00	35.50	9.093	1397.	3.681	2519.	9270.
36.00	36.00	9.593	1436.	3.648	2749.	10030.
36.00	36.50	10.09	1472.	3.627	2978.	10800.
36.00	37.00	10.59	1508.	3.614	3208.	11590.
36.00	37.50	11.09	1543.	3.607	3438.	12400.
36.00	38.00	11.59	1576.	3.606	3668.	13230.
36.00	38.50	12.09	1609.	3.609	3898.	14070.
36.00	39.00	12.59	1641.	3.616	4129.	14930.
36.00	39.50	13.09	1672.	3.625	4359.	15800.
36.00	40.00	13.59	1703.	3.640	4587.	16700.
36.00	40.50	14.09	1732.	3.651	4821.	17600.
36.00	41.00	14.59	1762.	3.666	5052.	18520.
36.00	41.50	15.09	1790.	3.683	5283.	19460.
36.00	42.00	15.59	1818.	3.701	5515.	20410.
36.00	42.50	16.09	1846.	3.719	5746.	21370.
36.00	43.00	16.59	1873.	3.739	5978.	22350.
36.00	43.50	17.09	1900.	3.760	6210.	23350.
36.00	44.00	17.59	1926.	3.781	6442.	24350.
36.00	44.50	18.09	1952.	3.802	6673.	25380.
36.50	35.00	8.606	1319.	3.597	2313.	8318.
36.50	35.50	9.106	1359.	3.558	2542.	9045.
36.50	36.00	9.605	1397.	3.528	2774.	9785.
36.50	36.50	10.11	1434.	3.511	3004.	10550.
36.50	37.00	10.61	1469.	3.503	3234.	11330.
36.50	37.50	11.11	1504.	3.499	3465.	12120.
36.50	38.00	11.60	1538.	3.500	3696.	12930.
36.50	38.50	12.10	1571.	3.505	3927.	13760.
36.50	39.00	12.60	1603.	3.513	4159.	14610.
36.50	39.50	13.10	1635.	3.524	4390.	15470.
36.50	40.00	13.60	1665.	3.537	4622.	16350.
36.50	40.50	14.10	1695.	3.552	4854.	17240.
36.50	41.00	14.60	1724.	3.565	5089.	18140.
36.50	41.50	15.10	1752.	3.583	5321.	19070.
36.50	42.00	15.60	1780.	3.602	5553.	20000.
36.50	42.50	16.10	1808.	3.622	5786.	20960.
36.50	43.00	16.60	1835.	3.643	6018.	21920.
36.50	43.50	17.10	1862.	3.664	6251.	22910.
36.50	44.00	17.60	1888.	3.686	6483.	23900.

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EPA Export 08-07-2014:23:43:20

36.50	44.50	18.10	1915.	3.711	6714.	24920.
37.00	35.00	8.618	1281.	3.480	2327.	8098.
37.00	35.50	9.118	1320.	3.446	2556.	8807.
37.00	36.00	9.618	1358.	3.421	2788.	9536.
37.00	36.50	10.12	1395.	3.407	3019.	10280.
37.00	37.00	10.62	1431.	3.400	3250.	11050.
37.00	37.50	11.12	1466.	3.399	3482.	11830.
37.00	38.00	11.62	1500.	3.402	3713.	12630.
37.00	38.50	12.12	1533.	3.409	3945.	13450.
37.00	39.00	12.62	1565.	3.419	4177.	14280.
37.00	39.50	13.12	1597.	3.432	4409.	15130.
37.00	40.00	13.62	1628.	3.447	4642.	16000.
37.00	40.50	14.12	1658.	3.463	4874.	16880.
37.00	41.00	14.62	1687.	3.481	5107.	17780.
37.00	41.50	15.12	1715.	3.497	5342.	18680.
37.00	42.00	15.62	1743.	3.517	5575.	19610.
37.00	42.50	16.12	1771.	3.538	5808.	20550.
37.00	43.00	16.62	1798.	3.560	6042.	21510.
37.00	43.50	17.12	1825.	3.582	6275.	22480.
37.00	44.00	17.62	1851.	3.604	6508.	23460.
37.00	44.50	18.12	1877.	3.628	6742.	24460.
37.50	35.00	8.635	1243.	3.431	2326.	7978.
37.50	35.50	9.134	1283.	3.360	2557.	8590.
37.50	36.00	9.633	1321.	3.337	2789.	9306.
37.50	36.50	10.13	1358.	3.323	3022.	10040.
37.50	37.00	10.63	1393.	3.316	3254.	10790.
37.50	37.50	11.13	1429.	3.318	3485.	11560.
37.50	38.00	11.63	1462.	3.322	3717.	12350.
37.50	38.50	12.13	1495.	3.330	3950.	13150.
37.50	39.00	12.63	1528.	3.341	4183.	13970.
37.50	39.50	13.13	1559.	3.354	4415.	14810.
37.50	40.00	13.63	1590.	3.370	4648.	15660.
37.50	40.50	14.13	1620.	3.387	4881.	16530.
37.50	41.00	14.63	1649.	3.405	5115.	17420.
37.50	41.50	15.13	1678.	3.425	5348.	18320.
37.50	42.00	15.63	1705.	3.443	5584.	19230.
37.50	42.50	16.13	1733.	3.464	5818.	20150.
37.50	43.00	16.63	1760.	3.486	6052.	21100.
37.50	43.50	17.13	1787.	3.509	6286.	22060.
37.50	44.00	17.63	1813.	3.532	6520.	23030.
37.50	44.50	18.13	1839.	3.555	6754.	24010.
38.00	35.00	8.677	1215.	3.540	2326.	8234.
38.00	35.50	9.174	1254.	3.495	2556.	8933.
38.00	36.00	9.671	1292.	3.462	2788.	9651.
38.00	36.50	10.17	1328.	3.438	3020.	10380.
38.00	37.00	10.67	1364.	3.423	3253.	11140.
38.00	37.50	11.16	1398.	3.414	3486.	11900.
38.00	38.00	11.66	1431.	3.411	3719.	12680.
38.00	38.50	12.16	1464.	3.411	3953.	13480.
38.00	39.00	12.66	1495.	3.415	4186.	14300.
38.00	39.50	13.16	1526.	3.422	4420.	15130.
38.00	40.00	13.66	1557.	3.432	4654.	15970.
38.00	40.50	14.16	1587.	3.447	4885.	16840.
38.00	41.00	14.65	1616.	3.460	5118.	17710.
38.00	41.50	15.15	1646.	3.475	5353.	18600.
38.00	42.00	15.65	1673.	3.488	5590.	19500.
38.00	42.50	16.15	1700.	3.505	5824.	20410.
38.00	43.00	16.65	1727.	3.523	6058.	21340.
38.00	43.50	17.15	1754.	3.541	6292.	22280.
38.00	44.00	17.65	1780.	3.560	6526.	23230.
38.00	44.50	18.15	1806.	3.579	6761.	24200.
38.50	35.00	8.748	1198.	3.687	2326.	8576.
38.50	35.50	9.241	1237.	3.630	2558.	9284.
38.50	36.00	9.735	1274.	3.584	2792.	10010.
38.50	36.50	10.23	1309.	3.554	3025.	10750.
38.50	37.00	10.72	1344.	3.532	3257.	11510.
38.50	37.50	11.22	1378.	3.518	3491.	12280.
38.50	38.00	11.72	1411.	3.510	3724.	13070.
38.50	38.50	12.21	1443.	3.506	3958.	13880.
38.50	39.00	12.71	1474.	3.508	4192.	14700.
38.50	39.50	13.20	1505.	3.511	4426.	15540.
38.50	40.00	13.70	1535.	3.517	4660.	16390.
38.50	40.50	14.20	1564.	3.526	4895.	17260.
38.50	41.00	14.70	1592.	3.536	5130.	18140.
38.50	41.50	15.19	1620.	3.550	5361.	19030.

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EPA Export 08-07-2014:23:43:20

38.50	42.00	15.69	1647.	3.564	5596.	19940.
38.50	42.50	16.19	1674.	3.578	5831.	20860.
38.50	43.00	16.69	1701.	3.594	6066.	21800.
38.50	43.50	17.19	1727.	3.611	6301.	22750.
38.50	44.00	17.68	1753.	3.628	6536.	23710.
38.50	44.50	18.18	1779.	3.646	6771.	24690.
39.00	35.00	8.668	1126.	3.228	2238.	7222.
39.00	35.50	9.168	1165.	3.192	2469.	7883.
39.00	36.00	9.668	1204.	3.168	2703.	8563.
39.00	36.50	10.17	1241.	3.152	2938.	9261.
39.00	37.00	10.67	1277.	3.144	3173.	9976.
39.00	37.50	11.17	1313.	3.144	3406.	10710.
39.00	38.00	11.67	1347.	3.147	3642.	11460.
39.00	38.50	12.17	1380.	3.152	3878.	12230.
39.00	39.00	12.67	1412.	3.163	4114.	13010.
39.00	39.50	13.17	1444.	3.175	4349.	13810.
39.00	40.00	13.67	1475.	3.190	4585.	14630.
39.00	40.50	14.17	1505.	3.206	4821.	15460.
39.00	41.00	14.67	1534.	3.224	5057.	16300.
39.00	41.50	15.17	1564.	3.246	5291.	17170.
39.00	42.00	15.67	1592.	3.266	5527.	18050.
39.00	42.50	16.17	1620.	3.286	5763.	18940.
39.00	43.00	16.67	1647.	3.308	6000.	19850.
39.00	43.50	17.17	1674.	3.330	6237.	20770.
39.00	44.00	17.67	1701.	3.353	6474.	21700.
39.00	44.50	18.17	1727.	3.376	6711.	22650.
39.50	35.00	8.681	1086.	3.217	2179.	7009.
39.50	35.50	9.181	1126.	3.174	2412.	7657.
39.50	36.00	9.680	1164.	3.142	2648.	8323.
39.50	36.50	10.18	1202.	3.125	2883.	9009.
39.50	37.00	10.68	1238.	3.115	3118.	9713.
39.50	37.50	11.18	1274.	3.111	3354.	10430.
39.50	38.00	11.68	1308.	3.113	3589.	11170.
39.50	38.50	12.18	1341.	3.118	3825.	11930.
39.50	39.00	12.68	1374.	3.128	4060.	12700.
39.50	39.50	13.18	1406.	3.139	4296.	13490.
39.50	40.00	13.68	1436.	3.151	4535.	14290.
39.50	40.50	14.18	1466.	3.167	4771.	15110.
39.50	41.00	14.68	1496.	3.184	5008.	15940.
39.50	41.50	15.18	1525.	3.202	5244.	16790.
39.50	42.00	15.68	1554.	3.222	5481.	17660.
39.50	42.50	16.18	1582.	3.242	5718.	18540.
39.50	43.00	16.68	1609.	3.263	5956.	19430.
39.50	43.50	17.18	1636.	3.285	6193.	20340.
39.50	44.00	17.68	1662.	3.307	6431.	21270.
39.50	44.50	18.18	1688.	3.329	6669.	22200.
40.00	35.00	8.693	1048.	3.231	2108.	6811.
40.00	35.50	9.193	1087.	3.177	2343.	7442.
40.00	36.00	9.693	1126.	3.139	2579.	8094.
40.00	36.50	10.19	1164.	3.113	2815.	8764.
40.00	37.00	10.69	1199.	3.096	3053.	9452.
40.00	37.50	11.19	1234.	3.089	3287.	10160.
40.00	38.00	11.69	1268.	3.089	3523.	10880.
40.00	38.50	12.19	1302.	3.092	3760.	11630.
40.00	39.00	12.69	1335.	3.099	3996.	12380.
40.00	39.50	13.19	1366.	3.109	4233.	13160.
40.00	40.00	13.69	1397.	3.121	4470.	13950.
40.00	40.50	14.19	1428.	3.135	4708.	14760.
40.00	41.00	14.69	1458.	3.152	4944.	15580.
40.00	41.50	15.19	1486.	3.167	5184.	16420.
40.00	42.00	15.69	1515.	3.186	5421.	17270.
40.00	42.50	16.19	1543.	3.206	5658.	18140.
40.00	43.00	16.69	1571.	3.227	5896.	19020.
40.00	43.50	17.19	1598.	3.248	6134.	19920.
40.00	44.00	17.69	1624.	3.269	6372.	20830.
40.00	44.50	18.19	1651.	3.291	6611.	21760.
40.50	35.00	8.706	1008.	3.270	2023.	6614.
40.50	35.50	9.206	1048.	3.200	2261.	7235.
40.50	36.00	9.705	1087.	3.154	2497.	7875.
40.50	36.50	10.21	1124.	3.121	2734.	8532.
40.50	37.00	10.71	1160.	3.099	2971.	9207.
40.50	37.50	11.20	1196.	3.088	3206.	9902.
40.50	38.00	11.70	1230.	3.078	3446.	10610.
40.50	38.50	12.20	1263.	3.077	3683.	11330.
40.50	39.00	12.70	1296.	3.081	3920.	12080.

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EPA Export 08-07-2014:23:43:20

40.50	39.50	13.20	1328.	3.089	4157.	12840.
40.50	40.00	13.70	1359.	3.101	4395.	13630.
40.50	40.50	14.20	1390.	3.114	4632.	14420.
40.50	41.00	14.70	1420.	3.128	4871.	15240.
40.50	41.50	15.20	1449.	3.144	5109.	16060.
40.50	42.00	15.70	1478.	3.161	5347.	16900.
40.50	42.50	16.20	1506.	3.179	5586.	17760.
40.50	43.00	16.70	1534.	3.200	5823.	18640.
40.50	43.50	17.20	1560.	3.218	6065.	19520.
40.50	44.00	17.70	1587.	3.239	6303.	20420.
40.50	44.50	18.20	1613.	3.261	6542.	21330.
41.00	35.00	8.718	968.6	3.333	1926.	6418.
41.00	35.50	9.218	1008.	3.253	2161.	7028.
41.00	36.00	9.718	1047.	3.195	2396.	7657.
41.00	36.50	10.22	1085.	3.150	2637.	8305.
41.00	37.00	10.72	1121.	3.120	2874.	8968.
41.00	37.50	11.22	1157.	3.100	3112.	9648.
41.00	38.00	11.72	1191.	3.088	3350.	10350.
41.00	38.50	12.22	1224.	3.081	3589.	11060.
41.00	39.00	12.72	1257.	3.080	3828.	11790.
41.00	39.50	13.22	1289.	3.083	4066.	12540.
41.00	40.00	13.72	1320.	3.090	4304.	13300.
41.00	40.50	14.22	1351.	3.099	4543.	14080.
41.00	41.00	14.72	1381.	3.110	4782.	14870.
41.00	41.50	15.22	1410.	3.123	5021.	15680.
41.00	42.00	15.72	1439.	3.139	5260.	16510.
41.00	42.50	16.22	1467.	3.156	5499.	17350.
41.00	43.00	16.72	1495.	3.174	5738.	18210.
41.00	43.50	17.22	1522.	3.193	5978.	19090.
41.00	44.00	17.72	1549.	3.212	6218.	19970.
41.00	44.50	18.22	1575.	3.232	6458.	20870.
41.50	35.00	8.731	929.3	3.438	1810.	6223.
41.50	35.50	9.231	969.1	3.332	2048.	6823.
41.50	36.00	9.730	1009.	3.254	2288.	7445.
41.50	36.50	10.23	1046.	3.200	2524.	8078.
41.50	37.00	10.73	1082.	3.161	2761.	8730.
41.50	37.50	11.23	1118.	3.130	3003.	9401.
41.50	38.00	11.73	1152.	3.112	3241.	10090.
41.50	38.50	12.23	1185.	3.100	3480.	10790.
41.50	39.00	12.73	1218.	3.093	3719.	11510.
41.50	39.50	13.23	1250.	3.092	3959.	12240.
41.50	40.00	13.73	1281.	3.094	4199.	12990.
41.50	40.50	14.23	1312.	3.100	4439.	13760.
41.50	41.00	14.73	1342.	3.108	4678.	14540.
41.50	41.50	15.23	1371.	3.119	4918.	15340.
41.50	42.00	15.73	1400.	3.131	5158.	16150.
41.50	42.50	16.23	1428.	3.145	5398.	16980.
41.50	43.00	16.73	1456.	3.160	5638.	17820.
41.50	43.50	17.23	1483.	3.176	5878.	18670.
41.50	44.00	17.73	1510.	3.194	6119.	19540.
41.50	44.50	18.23	1536.	3.212	6359.	20430.

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WORST CASE : WATER CASE 1 OF 1

Centre at (40.50,38.50)
Iterations: 9
Net vertical force [kN]: .0
Net horiz force [kN]: 7.629E-6
Inclination of interslice forces [°]: 9.037

Radius 12.20m
Horiz acceleration [%g]: .0
Slip weight [kN] 1263.
Disturbing moment [kN m]: 3683.
Restoring moment [kN m]: 11330.

Factor of Safety: 3.077

Slip surface coordinates			Pore Pressure	Interslice forces [kN]		
Point	x [m]	y [m]	u [kPa]	T	E	E(u)
1	29.41	33.40	-34.23	.0	.0	.0
2	30.08	32.15	-21.89	4.674	29.39	.0
3	30.88	30.99	-10.43	11.94	75.11	.0
4	31.81	29.93	-19.07E-6	21.11	132.8	.0
5	31.84	29.90	0.2513	21.36	134.3	0.003157
6	32.50	29.29	6.316	27.91	175.5	1.994
7	32.89	28.96	9.511	31.73	199.5	4.523
8	34.33	27.97	19.10	44.47	279.6	18.24
9	35.89	27.20	26.52	55.17	346.9	35.15
10	35.97	27.17	26.83	55.55	349.3	36.00

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11	37.00	26.81	30.21	58.79	369.7	45.65
12	37.01	26.80	30.24	58.82	369.8	45.73
13	37.02	26.80	30.27	58.84	370.0	45.82
14	38.49	26.46	33.39	60.63	381.2	55.75
15	40.00	26.31	33.95	59.13	371.8	57.63
16	40.01	26.31	33.95	59.12	371.7	57.62
17	40.02	26.30	57.25	57.82	363.5	122.4
18	41.41	26.33	56.71	54.46	342.4	119.4
19	42.78	26.51	54.61	48.15	302.7	107.7
20	44.12	26.85	50.96	39.14	246.1	88.57
21	45.55	27.39	45.22	27.38	172.2	61.00
22	46.90	28.11	37.75	13.91	87.47	30.08
23	48.15	28.99	28.68	.0	7.629E-6	.0

Slice No.	Strength Parameters		Pore Pressure	Slice Weight	Forces on base [kN]	
	c' [kPa]	Tan phi	[kPa]	[kN]	Normal	Shear
1	.0	0.5774	.0	8.269	36.98	21.35
2	.0	0.5774	.0	29.35	63.86	36.87
3	.0	0.5774	.0	54.76	91.85	53.03
4	.0	0.5774	0.1256	1.765	2.720	1.568
5	.0	0.5774	3.284	50.36	74.62	41.36
6	.0	0.5774	7.913	33.50	47.22	24.93
7	.0	0.5774	14.30	139.5	185.4	92.66
8	.0	0.5774	22.81	176.6	220.6	104.4
9	.0	0.5774	26.67	9.905	9.721	4.241
10	.0	0.7002	28.52	123.3	120.1	62.34
11	.0	0.7002	30.23	1.199	1.169	0.5978
12	.0	0.7002	30.26	1.200	1.170	0.5978
13	.0	0.7002	31.83	174.4	170.7	85.80
14	.0	0.7002	33.67	170.2	169.8	83.21
15	.0	0.7002	33.95	0.8618	0.8713	0.3722
16	.0	0.7002	45.60	0.5742	2.009	1.087
17	.0	0.7002	56.98	71.20	156.3	54.19
18	.0	0.7002	55.66	67.17	158.0	56.61
19	.0	0.7002	52.79	58.91	155.6	57.72
20	.0	0.5774	48.09	49.74	161.8	51.02
21	.0	0.5774	41.48	31.01	148.6	49.19
22	.0	0.5774	33.21	10.17	129.5	45.50

Slice no.	Surface Load [kPa]		Water Pressure on ground surface [kPa]	
	Vert	Horiz	Vert	Horiz
1	30.00	.0	.0	.0
2	30.00	.0	.0	.0
3	30.00	.0	.0	.0
4	30.00	.0	.0	.0
5	30.00	.0	.0	.0
6	30.00	.0	.0	.0
7	30.00	.0	.0	.0
8	30.00	.0	.0	.0
9	.0	.0	.0	.0
10	.0	.0	.0	.0
11	.0	.0	.0	.0
12	.0	.0	.0	.0
13	.0	.0	.0	.0
14	.0	.0	.0	.0
15	.0	.0	.0	.0
16	.0	.0	14.40	-791.8
17	30.00	.0	28.79	-0.5764
18	30.00	.0	28.77	-0.5759
19	30.00	.0	28.75	-0.5756
20	30.00	.0	28.73	-0.5751
21	30.00	.0	28.71	-0.5747
22	30.00	.0	28.69	-0.5743

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5. ACCESS ROADS

5.1 General

5.1.1 Soil Strengthening

Background

Soft soils, including peat, may be strengthened in situ by mixing with a binder such as cement, lime, pulverised fuel ash, gypsum etc. An increase in undrained shear strength by a factor of at least 10 may be achieved.

Dry deep mixing involves feeding a powdered binder agent under compressed air to an auger which mixes it into the soil to a specified depth, relying on the availability of ground water for hydration. Published references have been consulted to make an assessment of the likely improvement that could be achieved in strength and stiffness. Suitable construction methods have been investigated.

The strengthened peat should be surcharged immediately after mixing for a period of time to allow it to consolidate and improve the strength gain. Typically 0.5 to 1.0m of fill would be placed as a surcharge. Strengthening may be carried out in discrete columns or by mass strengthening of a larger zone. Either method may be suitable for the Corrib site. Past experience shows that strengthening with discrete columns achieves more controlled mixing and containment of materials. Mass strengthening may enable a greater production rate to be achieved.

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Case History - Channel Tunnel Rail Link, Kent, UK

Arup are part of RLE, the consortium responsible for engineering design of the Channel Tunnel Rail Link (CTRL). Soil strengthening was successfully used on Contract 440 of the CTRL in Kent. The works were carried out between October 2000 and June 2001.

Hercules Grundläggning were contracted to provide ground improvement to two 100m lengths of trackbed for the CTRL. The alignment passed over a peat and soft clay layer up to 5m thick. Soil stabilization was selected as an alternative to replacing the soft soil with granular fill (between sheet piles) or using precast concrete driven piles to support the track.

Stabilization was achieved with overlapping 800mm diameter, deep mixed columns forming a strengthened block. The binder used was cement at a rate of 200 kg/m³. After mixing a surcharge was placed to increase the strength of the strengthened material.

The undrained shear strength of the strengthened peat 5 days after mixing had increased from around 10 kPa to in excess of 100kPa.

Typical Construction Sequence

A typical construction sequence for soil strengthened areas of peat is as follows

- Lay a geotextile and approximately 0.5m fill over area to be strengthened (working from bog mats/low ground pressure machines if necessary). This provides sufficient overburden for the peat to be strengthened right up to the ground surface. Much of this material will be mixed into the underlying soil during the strengthening process.
- Injection of cement or other binder agent into the peat in a controlled fashion using a low ground pressure crane mounted auger or hydraulic mass mixing tool. Columns of

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strengthened material are created that overlap to form a cellular pattern. With mass mixing, 5m × 5m contiguous blocks of soil are strengthened in each operation. The rig works from its own strengthened soil progressing along/across the area to be strengthened.

- Up to 4 hours after mixing, place a surcharge of about 0.5m fill to compact the mixed soil and enable the maximum strength gain to be achieved. This surcharge could also form the road foundation if a geogrid and suitably compacted stone fill are used.
- The strengthened area may then be used as a platform for drilling or driving piles or construction of road or hard standing areas.

The following design quantities are provisionally recommended for columns to achieve sufficient strengthening for temporary and permanent works. The final mix design would be chosen after laboratory and site mixing trials. If mass mixing is adopted, the mix should be designed to give a comparable overall binder content.

Table 5.1 Preliminary Soil Strengthening Design

Construction	Quantity of binder (cement)	Column layout
Permanent works (roads, settlement ponds)	150-200 kg/m3	800mm diameter columns touching at edges Installed at 800mm centres - 79% coverage
Temporary works (roads, TCF, admin car park)	150-200 kg/m3	800mm diameter columns @ 750mm centres in cellular grid (3m x1.5m) - 59% coverage

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The environmental impact of the soil mixing on the peat bog will be assessed in detail in site trials. As the hydraulic conductivity of the strengthened material is low, it is expected that long term effects on the groundwater chemistry will be minor.

5.1.2 Sheet Piling

Background

Steel sheet piles are proposed to stabilise and isolate the primary roads and hard standing areas of the site, to prevent loads being transferred to the adjacent soft peat. Sheet piles are usually driven using a crane mounted diesel or hydraulic hammer, which has an environmental impact in terms of noise and vibration. As an alternative, sheet piles may be pressed into the ground using a "silent piler". As the silent piler has a limited capacity, pre-augering will be carried out if necessary to ensure the piles can penetrate obstructions in the mineral soil to reach the design depth. It is proposed to use soil strengthening to provide a firm working platform for the piling rig and attendant cranes/ delivery vehicles. The increased stiffness and strength of the strengthened soil needs to be taken into account when assessing pile driveability. Piles should ideally be driven shortly after the completion of soil mixing, before the strengthened material has gained too much strength. Although a light pile section would be adequate to carry the in service loads, an increased section size is recommended to ensure the piles can withstand driving stresses without damage (see below for specific cases).

Design Approach

For each element of construction, sheet piles have been designed using a retaining wall analysis program (*Oasys* FREW). Where tie rods are required, Dywidag high yield steel bars or similar may be used with steel waling beams.

The sheet pile design for the roads and hardstandings has been based on the ground profile and parameters for the settlement ponds, where the peat strength is lowest. These parameters are conservative for the permanent roads and temporary construction facility.

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The drivability of the sheet piles was assessed in strengthened peat, mineral soils and weathered schist following the guidelines given in British Steel Piling Handbook. The assessment concluded that Larssen LX16 sheet piles could be driven at the site.

The extent of corrosion was determined following the procedures outlined in the British Steel Piling Handbook. It was concluded that once driven, the sheet piles will have sufficient section thickness to allow for at least 4mm corrosion from both faces, without losing the minimum moment capacity required to support the roads/cofferdam under ULS soil parameters. For an average corrosion rate of 0.05mm/yr for structures immersed in water, the estimated service life to corrode by 4mm is about 80years.

5.2 Site Investigation Interpretation

Refer to planning drawings for the site road layout. A geological cross-section along the main terminal access road, Section 5 on Figure 5,1, is presented in Figure 5.2. The depth of peat beneath each road alignment varies as follows:

Table 5.2 Site Roads: Measured Peat Thickness

Location	Width	Peat Thickness
Main Site and Terminal Access	15m	1.6 - 5.1m
Access to Temporary Construction Facility	10m	1.4 - 3.4m
Emergency Access road (east of terminal)	8m	1.4 - 2.3m
Emergency Access road (north of terminal)	8m	1.5 - 3.0m
Emergency Access road (west of terminal)	8m	2.6 - 5.3m

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Soil parameters for retaining wall design are based conservatively on those adopted for analysis of the settlement ponds cofferdam, as summarised below:

Table 5.3 Site Roads: Assumed Soil Properties for Analysis of Retaining Walls

Strata	γ(kN/m3)	ϕ′ (deg)	c′ (kPa)	cu (kPa)	Eu (kPa)	E′ (kPa)
Peat	11.0	32.0	3.0	3.0	466	400
Mineral Soil	20.0	32.0	1.0	25 + 16.7z	500cu	300cu
Schist	20.0	35.0	0.0	-	-	75000
Strengthened Peat	12.0	-	-	50 (25 used in wall checks)	100cu	20cu
Engineered Fill	20.0	30.0	0.0	-	-	45000

z = depth below top of layer

Properties assigned to the strengthened peat take account of the fact that the soil mixed columns will not occupy 100% of the soil mass. The average strength of the soil mass will therefore be lower than that of the individual columns. The soil mixing will be designed to achieve an average shear strength of better than 50kPa, and a performance specification will be used to guarantee that this strength is achieved.

For preliminary retaining wall design, the steel section and toe depth have been checked with a characteristic shear strength of 25kPa, to provide a robust design and additional factor of safety.

The strengthened peat is assumed to act in an undrained manner in the short and long term, as it tends to gain strength with time.

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5.3 Stability Calculations

All site roads will be supported on a block of strengthened peat. Strengthening will be carried out beneath and beside the existing roads where these are to be incorporated into the new terminal road layout.

The primary site roads (comprising the permanent access roads to the terminal facility, temporary construction facility and settlement ponds) will also have a row of sheet piles driven along each edge. If obstructions prevent driving sheet piles to the design depth, ties may be installed between the sheet piles in the same way as described in Section 6 for the settlement ponds cofferdam.

Secondary roads for emergency access will be constructed using soil strengthening only, with a road base formed using approximately 0.5m selected granular fill laid over a geogrid. The area of soil strengthening will be extended beyond the edges of the carriageway to ensure the loads are spread down to the mineral soil layer.

Stability analyses of the sheet piles have been carried out for a range of peat depths up to 4.5m. In each case the design sheet pile embedment into the underlying mineral soil of 2.75m provides an adequate factor of safety against passive failure. A surcharge loading of 20kPa, equivalent to 45 units of HB loading, was used for vehicle loading.

The results of the stability analyses for 4.5m peat are tabulated below.

Table 5.4 Site Roads: Results of Retaining Wall Analysis

Wall Type	Pile Section	Peat Depth	ULS Max Bending Moment (kNm/m)	SLS Max Deflection (mm)
Cantilever	LX8	4.5m	68.2	53
Cantilever	LX16	4.5m	84	51

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Full details of the stability calculations are contained in Appendix 5A.

In all cases, a Larssen LX8 sheet pile section will be sufficient to withstand the calculated bending moments. It is recommended that the pile section size is increased to LX16 to withstand stresses during driving, particularly if boulders are encountered within the mineral soil.

5.4 Construction Sequence

The site roads will be constructed progressively working inward from the site access points. This would typically involve the following operations (excluding drainage and services).

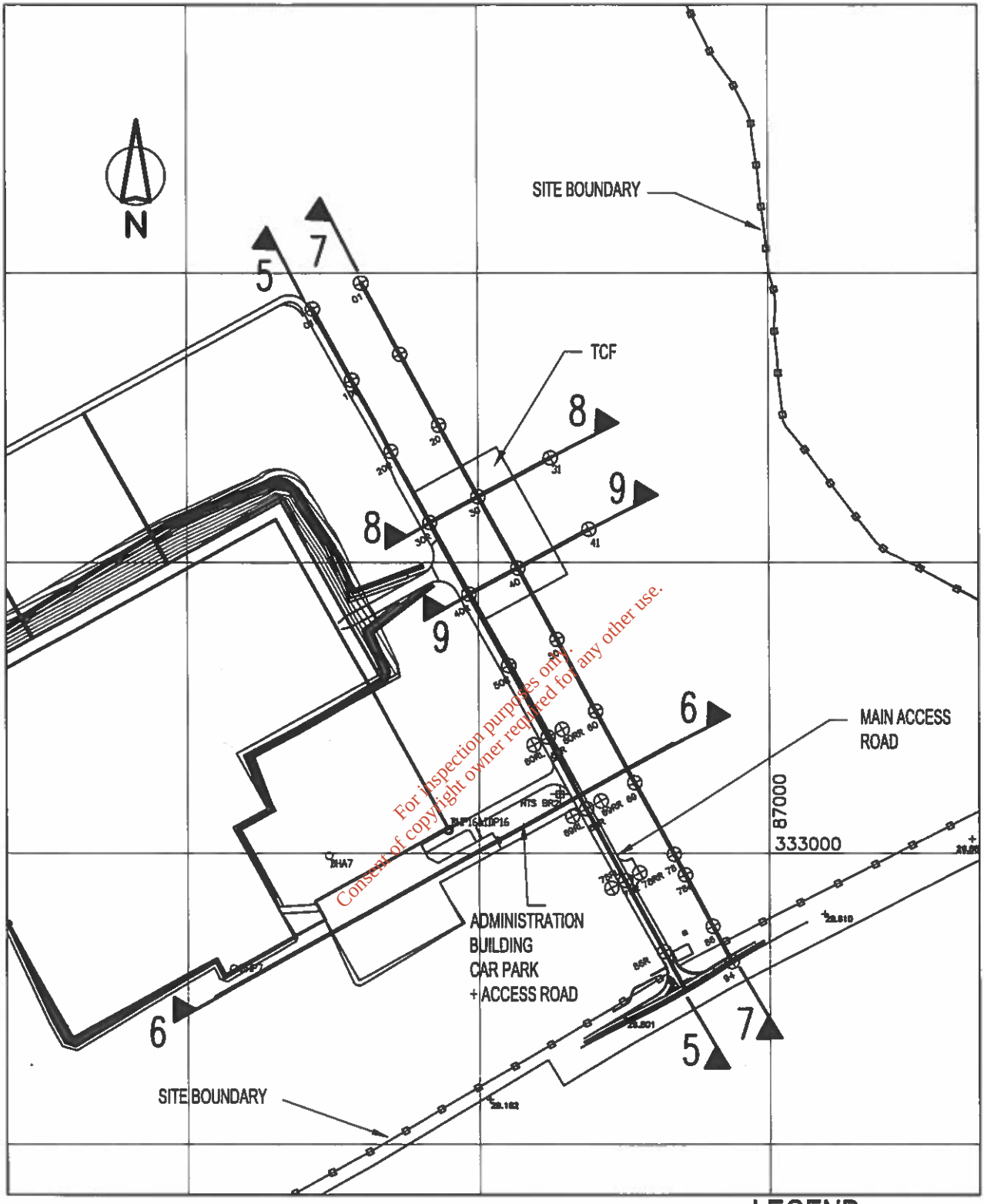
1. Lay geotextile and around 500mm depth of fill to form a working platform.
2. Carry out soil strengthening, working progressively forward from previously strengthened soil.
3. Up to 4 hours after soil mixing, lay a geotextile and approximately 500mm fill to act as a temporary surcharge to compact the strengthened soil, to achieve maximum strength gain. If programme allows, the final roadbase may be laid at this stage instead (step 6).
4. (Permanent roads only) Working from the strengthened road, drive sheet piles along each side to isolate road from adjacent peat
5. Remove temporary surcharge

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6. Lay geogrid and approximately 0.5m selected granular fill to form road base for temporary or permanent road. Follow with permanent wearing course if required.

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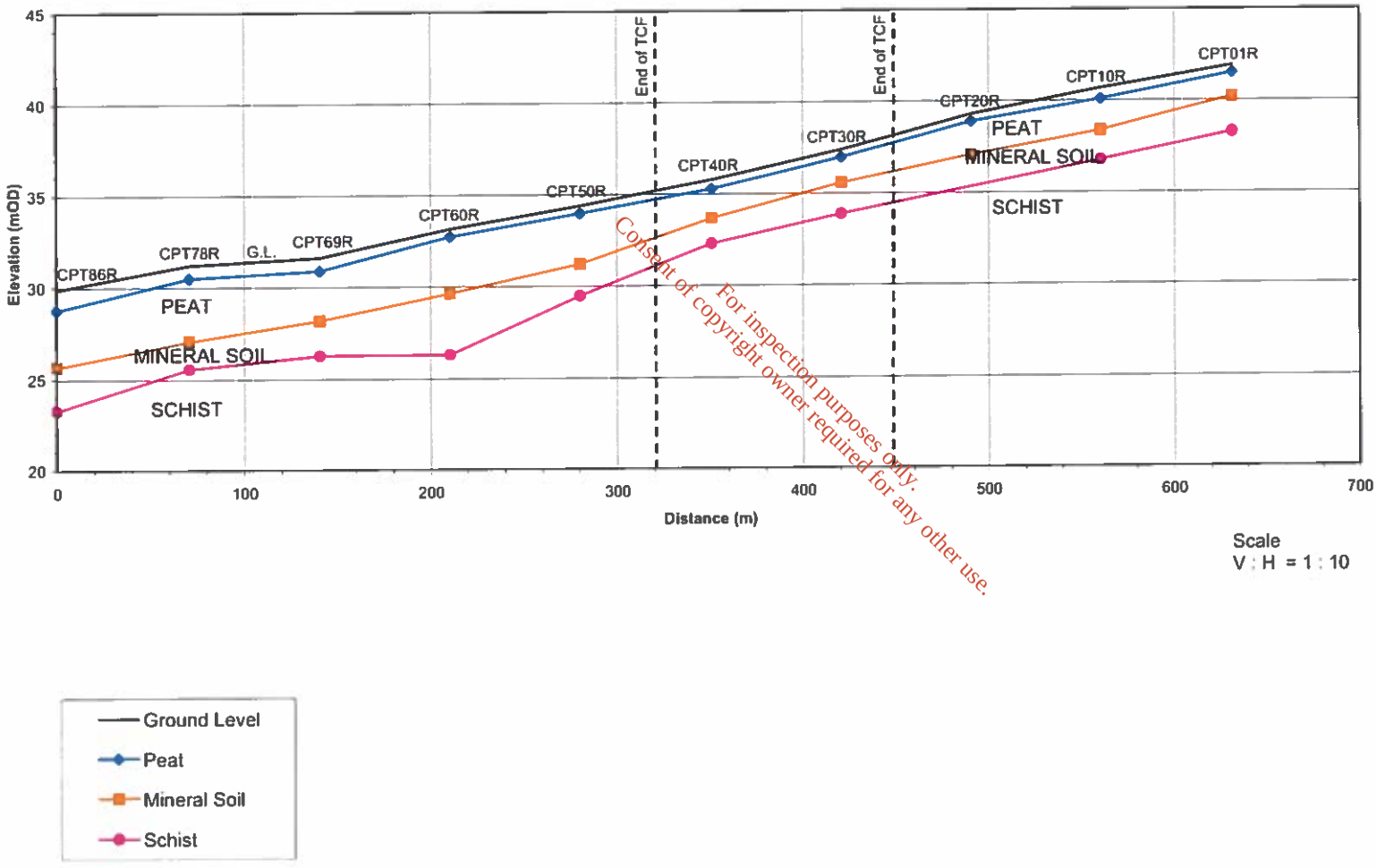
LEGEND

- ○ BOREHOLES (IGSL/IDL2001)
- ⊕ BOREHOLES (MEL2002)
- ⊗ CPT (FUGRO2002)

SITE LAYOUT PLAN FOR ADMINISTRATION BUILDING CAR PARK AND TCF

FIGURE 5.1
SCALE 1:5000

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Figure 5.2 Typical Cross-section along Main Access Road (Cross-section 5)

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Corrib Planning Application

Appendix 5A - Design of Retaining Structures for the Access Roads

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Job title	Corrib Planning Application	Job number
		114662
Document title	Appendix 5A - Design of Retaining Structures for the Access Roads	File reference
Document ref		

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		Signature			
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Appendix 5A - Design of Retaining Structures for the Access Roads

November 2003

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Ove Arup & Partners International Ltd
13 Fitzroy Street, London W1T 4BQ
Tel +44 (0)20 7636 1531 Fax +44 (0)20 7755 2121
www.arup.com

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CONTENTS

		Page
1.	INTRODUCTION	1
2.	DETAILS OF GROUND CONDITIONS	2
3.	SHEET PILE SOLUTION FOR THE RETAINING WALL	3

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1. INTRODUCTION

The design calculations for the earth retaining structures for the access roads are presented in this calculation package. It is proposed to use a sheet pile wall to retain the access roads over stabilized peat. The following sections describe the ground conditions at the site assumed for the design and design calculations to determine the sheet pile section to be used for the retaining wall.

This calculation package is intended to be part of the planning application for the Shell Corrib Field Development.

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2. DETAILS OF GROUND CONDITIONS

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	GC/1	

Member/Location

Job Title: Shell Corrib Terminal Ground conditions

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH.

There is considerable variability in the ground conditions over the footprint of the access roads. The thickness of peat for instance varies from 1.5m to about 4.5m. For the design of sheet pile retaining wall for the access roads, the larger thickness of 4.5m is assumed for the peat layer. The peat layer is underlain by mineral soils of varying thickness, which are overlying weathered schist.

Soil Properties

The soil properties for the design of sheet pile wall for access roads were taken from the "Geotechnical Interpretative and Design Report", AGEC, September 18, 2002. Parameters were assumed where they were not available.

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Soil Parameters

Strata	γ kN/m³	ϕ' (deg)	c' (kPa)	c_u (kPa)	E_u (kPa)	E' (kPa)
Peat	11.0	32°	3.0	3.0	466	400
Mineral Soil	20.0	32°	1.0	25 + 16.72z	500z	300z
Schist	20.0	35°	0.0	—	—	75,000

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	Gc/2	

Member/Location

Job Title: Shell Corrib Terminal Ground Conditions

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH.

The peat along the proposed access road will be stabilized using dry mixing techniques. The stabilization would result in improved properties of peat as follows.

$\gamma = 12\ kN/m^3$ $\phi' = 32°$ $c' = 3\ kPa$

$c_u = 25\ kPa$ lower bound to 50 kPa upper bound

$E_u = 100\ c_u$, $E' = 20\ c_u$

Only the stiffness, undrained strength and unit weight were assumed to have improved due to stabilization.

The road surface will consist of engineered fill overlying stabilized peat. A geogrid will be placed over the stabilized peat prior to laying the road surface, in order to minimize road settlement during service life. Properties of engineered fill are assumed to be as follows.

$\gamma = 20\ kN/m^3$ $\phi' = 30°$ $c' = 0$ $E' = 45{,}000\ kPa$

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3. SHEET PILE SOLUTION FOR THE RETAINING WALL

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/1	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 28/03 Chd. CH.

A sheet pile retaining wall is proposed to retain the access roads throughout the site. The access roads will be constructed on stabilized peat retained by the sheet piles. The construction sequence adopted for the design of the sheet pile wall is as follows.

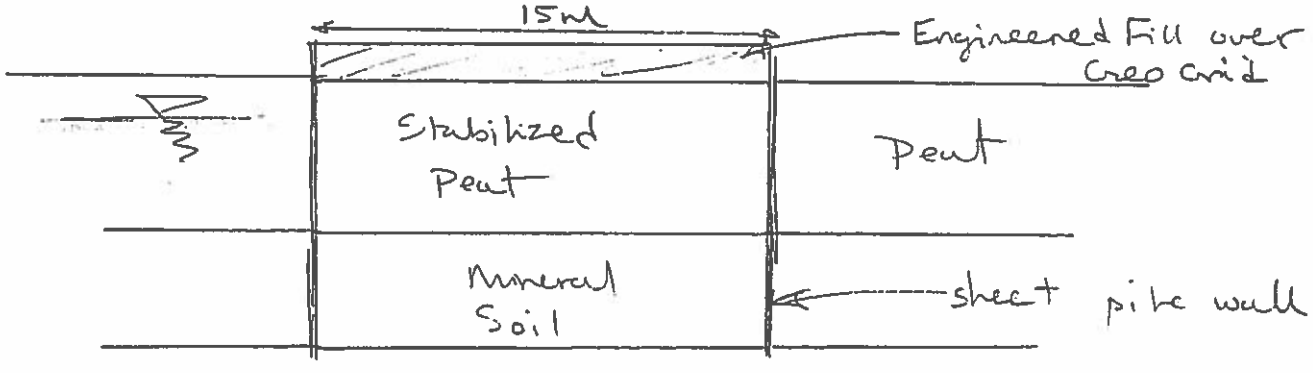
Construction Sequence

Stage 1 — Stabilize the peat along the footprint of the access roads

Stage 2 - Drive sheet piles along the perimeter of the road alignment

Stage 3 - Lay the geogrid and place the engineered fill to form the road surface

Please note the construction of drains is not considered here since they will be dealt with elsewhere.



Typical road section

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/2	

Member/Location

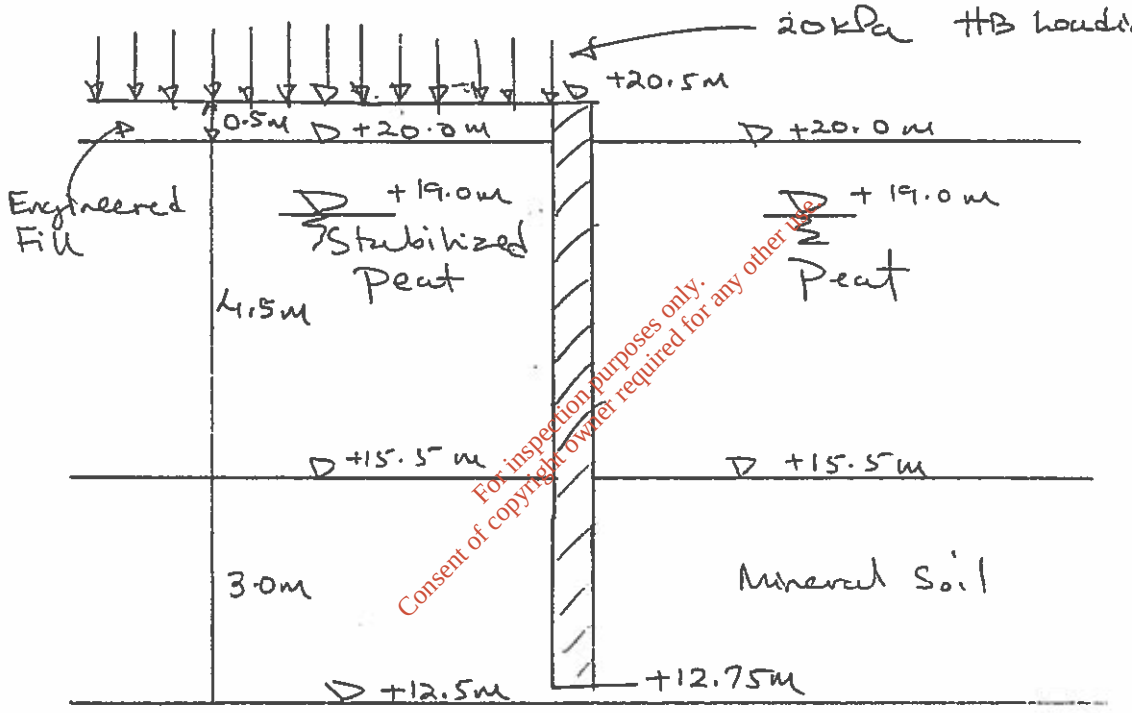
Job Title: Shell Corrib Terminal Sheet Pile solution

Drg. Ref.

Made by NP Date Nov 28/03 Chd. CM.

Design of Sheet Pile Wall

The geotechnical section considered for the design of the sheet pile wall is given below. The design section assumes a 4.5m thick peat layer.



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The sheet pile retaining wall was designed by carrying out stability analyses for ultimate limit state (ULS) soil parameters. The deformation of the wall in service was determined using serviceable limit state (SLS) soil parameters. All analyses were carried out using Oasys FREW retaining wall analysis program.

It was assumed in the above design cross-section that all of the peat below the road will be stabilized.

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Material Properties for FREW

Peat

$\gamma = 11 kN/m^3$ $c' = 3.0 kPa$ $\phi' = 32^\circ$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 32^\circ}{1.2}\right) = 27.5^\circ$

ULS $K_a = \frac{1-\sin\phi'}{1+\sin\phi'} = \frac{1-\sin 27.5^\circ}{1+\sin 27.5^\circ} = 0.368$

$K_p = \frac{1}{0.368} = 2.72$ ignoring interface friction i.e $\delta/\phi' = 0.0$

$K_o = 1.0$ $K_r = \frac{\gamma}{1-\nu} = \frac{0.25}{1-0.25} = 0.33$

SLS $K_a = \frac{1-\sin 32^\circ}{1+\sin 32^\circ} = 0.307$

$K_p = 3.25$

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SLS $E_u = 466 kPa$ $E' = 400 kPa$ $c_u = 3.0 kPa$

ULS $E_u = \frac{466}{1.5} = 311 kPa$ $E' = \frac{400}{1.5} = 267 kPa$

$c_u = \frac{3.0}{1.5} = 2.0 kPa$

Stabilized Peat

$\gamma = 12 kN/m^3$ $c' = 3 kPa$ $\phi' = 32.0^\circ$

ULS $\phi' = 27.5^\circ$

ULS $K_a = 0.368$ $K_p = 2.72$ $K_o = 1.0$

SLS $K_a = 0.307$ $K_p = 3.25$ $K_o = 1.0$

$K_r = 0.33$ $c_u = 25 kPa$ lower bound

50 kPa upper bound

SLS $E_u = 100 c_u = 100 \times 25 = 2500 kPa$ $E' = 20 c_u = 20 \times 25 = 500 kPa$ $c_u = 25 kPa$

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/4	A

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by SLG Date 6/12/03 Chd. BG

ULS $a_u = \frac{25}{1.5} = 16.7$ kPa

$G_u = 16.7 \times 100 = 1670$ kPa

$E' = 16.7 \times 20 = 333$ kPa.

Mineral Soils

$\gamma = 20$ kN/m3 $\quad \phi' = 32°$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 32}{1.2}\right)$

$= 27.5°$

- Assume wall friction in mineral soil only $\delta/\phi' = 0.5$
- Ka, Kp calculated by RKW using EC7 Method

Case	ϕ'_d	δ/ϕ'	Ka	Kp	Ko	Kr
ULS	27.5°	0.5	0.33	3.70	1.0	0.33
SLS	32°	0.5	0.27	4.85	1.0	0.33

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- Shear strength / Stiffness increase with depth

SLS a_u = 25 to 75 kPa over 3m

$= 25 + 16.7z$ kPa

$G_u = 500 a_u = 500(25 + 16.7z) = 12500 + 8350z$ kPa

$E' = 300 a_u = 300(25 + 16.7z) = 7500 + 5010z$ kPa

ULS $a_u = (25 + 16.7z)/1.5 = 16.7 + 11z$ kPa

$G_u = 500(16.7 + 11z) = 8350 + 5500z$ kPa

$E' = 300(16.7 + 11z) = 5010 + 3300z$ kPa

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/5	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date 25/03/03 Chd. CH

Schist

$\gamma = 20 kN/m^3$ $c' = 0.01 kPa$ $\phi' = 35°$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 35°}{1.2}\right) = 30.3°$

ULS $K_a = \frac{1-\sin 30.3°}{1+\sin 30.3} = 0.329$

$K_p = 3.037$ $K_o = 1.0$

SLS $K_a = \frac{1-\sin 35°}{1+\sin 35°} = 0.271$

$K_p = 3.69$ $K_o = 1.0$

$K_r = \frac{0.2}{1-0.2} = 0.25$

SLS $E' = 75{,}000 kPa$

ULS $E' = 50{,}000 kPa$

Engineered Fill

$\gamma = 20 kN/m^3$ $c' = 0$ $\phi' = 30°$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 30°}{1.2}\right) = 25.7°$

ULS $K_a = \frac{1-\sin 25.7°}{1+\sin 25.7°} = 0.395$

$K_p = 1/0.395 = 2.53$ $K_o = 1-\sin 25.7° = 0.566$

SLS $K_a = \frac{1-\sin 30°}{1+\sin 30°} = 0.33$

$K_p = 3.0$ $K_o = 1-\sin 30° = 0.5$

$K_r = 0.33$

SLS $E' = 45{,}000 kPa$

ULS $E' = 30{,}000 kPa$

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	S7/6	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH

Sheet pile properties

It was assumed that the sheet pile sections will be fully interlocked after installation. Hence the sheet pile properties per 1m wall length given in the British steel Piling Handbook were used in the design. Section properties are as follows.

4X8 sheet pile section

I per m = 12861 cm^4/m

Z per m = 830 cm^3/m

Young's modulus E = 210 GPa

$\therefore EI = 210 \times 10^6 \times 12861 \times 10^{-8}$

$= 27{,}008 \cdot kN m^2$ per m

4X16 sheet pile section

I per m = 31175 cm^4/m

Z per m = 1641 cm^3/m

$EI = 210 \times 10^6 \times 31175 \times 10^{-8}$

$= 65468\ kN m^2$ per m

Surcharge loading

HB vehicle loading (for 45units) at 20kPa was considered for SLS analyses in accordance with BD 37/01 (BS 5400-2 : 1978). The partial factor to be used for ULS design is 1.2 hence the surcharge in ULS analyses was 24kPa.

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/7	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH.

Stages in Oasys FREW

The following stages in Oasys FREW were based on the proposed construction sequence given in sheet SP/1

Stage 0 : Initial condition with all soils drained

Stage 1 : Install sheet pile retaining wall, stabilized peat, peat and mineral soils assigned undrained properties,

Stage 2 : Add engineered fill

Stage 3 : Add live load surcharge.

Subsequent stages to long term pore water pressure condition.

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/8	

Member/Location

Job Title: Shell Commtb Terminal Sheet Pile Solution.

Drg. Ref.

Made by NP Date Nov 25/2003 Chd. CH.

HX8 Sheet Pile Wall — Analysis Results

Sheets SP/9 to SP/16 show the results of the ULS analysis wall2-1uls.fwd.

The maximum ULS bending moment is 68.2 kNm per m. This is less than the moment capacity of HX8 section at 132.8 kNm per m. Hence HX8 sheet pile wall section has adequate capacity.

Sheets SP/17 to SP/26 show the results of the SLS analysis wall2-1sls.fwd.

The maximum wall deflection under short and long term ground conditions was predicted to be around 51mm at the top of the wall. This wall deflection could result in a road surface settlement of around 25mm at the perimeter.

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Oasys

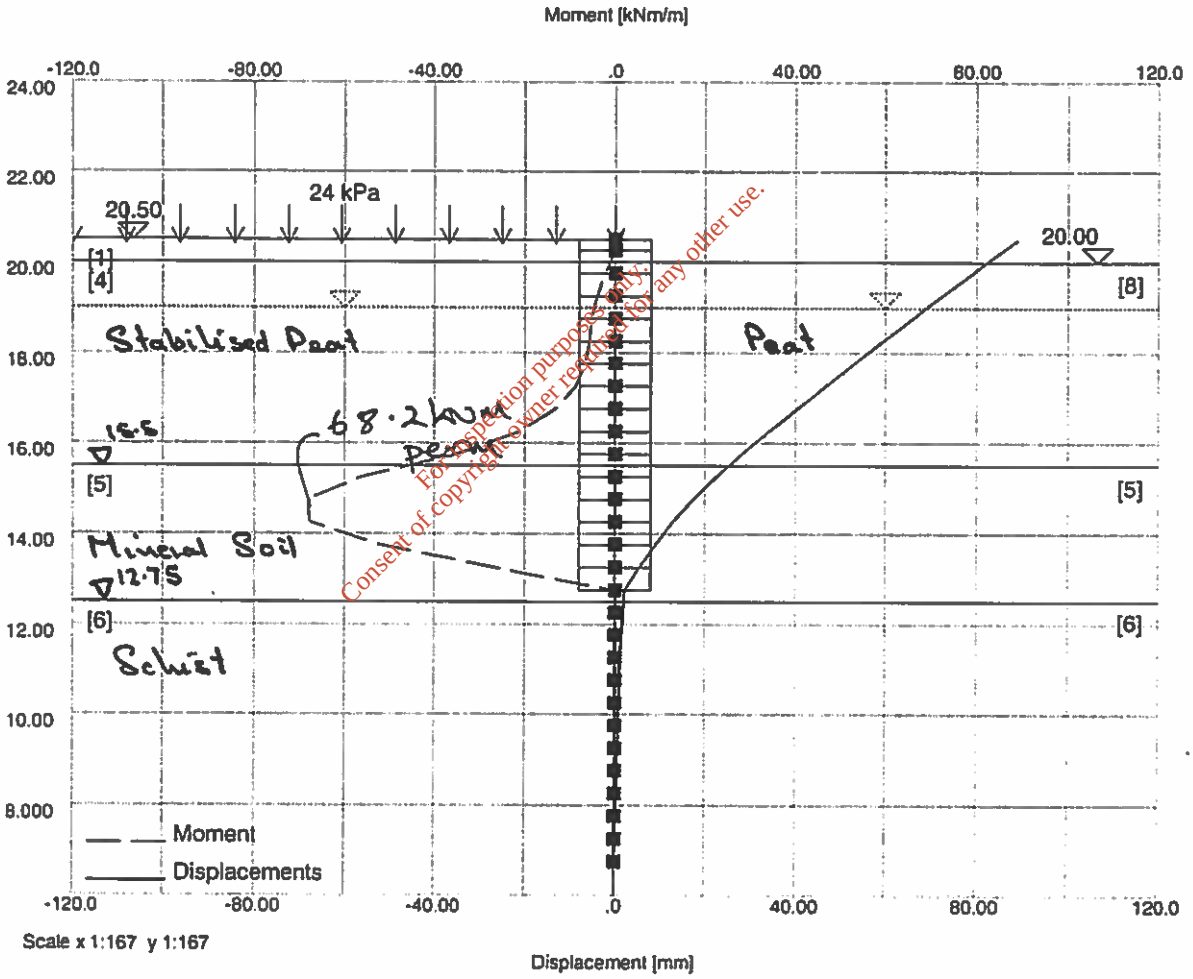
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/9	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 uls.fwd	CH

ULS Wall bending moments and deflection short term conditions



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STAGE 3 : Apply surcharge

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Oasys

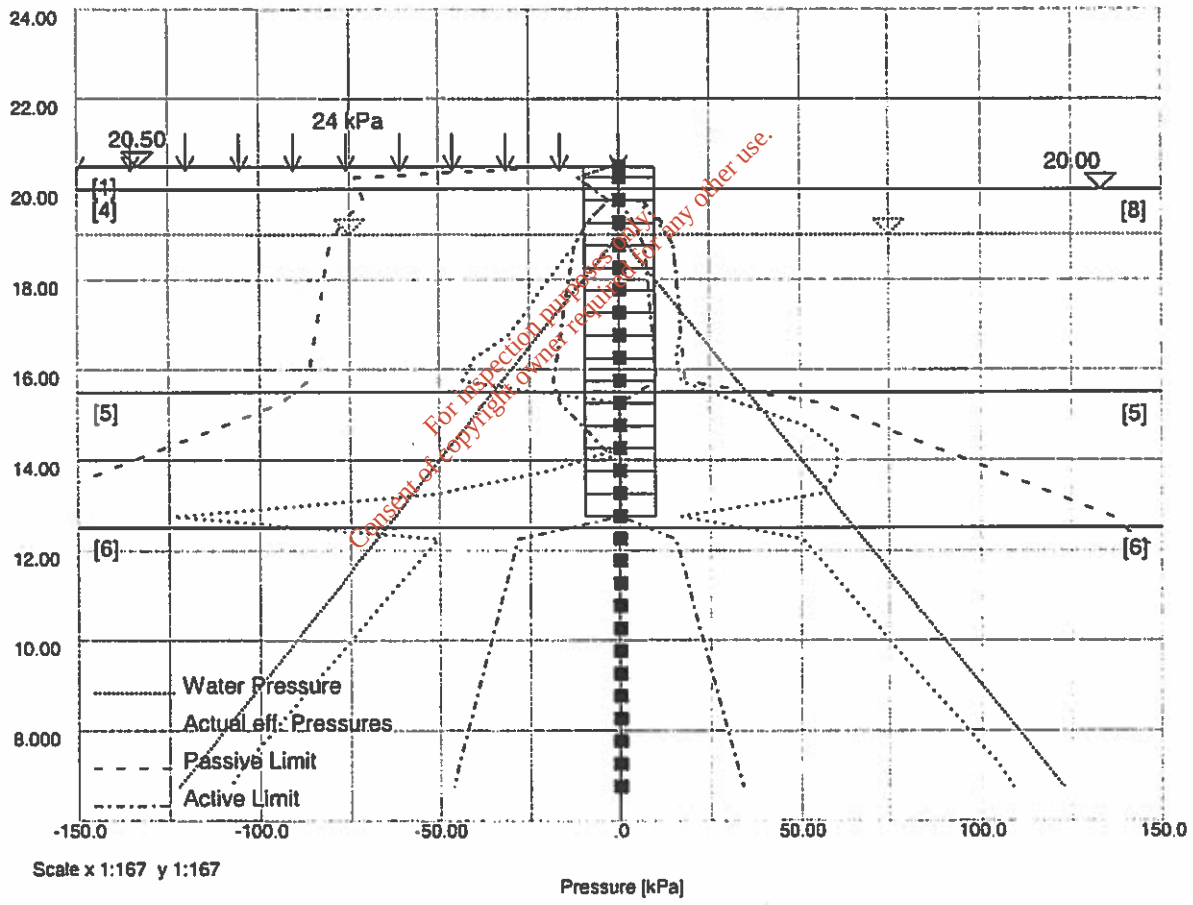
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/10	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 uls.fwd	CH

ULS Earth pressure distributions short term condition



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STAGE 3 : Apply surcharge

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Oasys

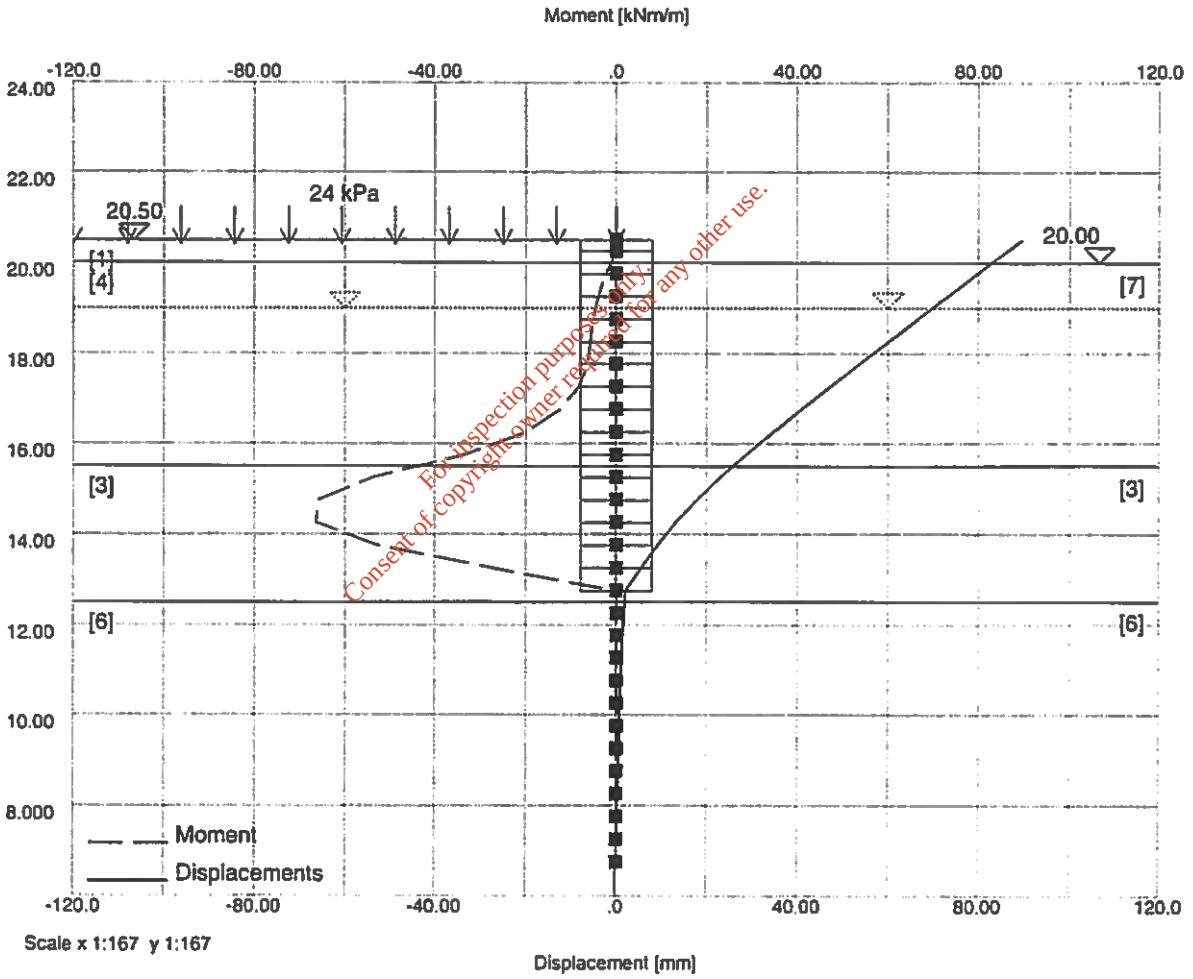
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/11	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 uls.fwd	CH

ULS long term ground conditions



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STAGE 4 : Hydrostatic groundwater

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.150	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	0.0	0.0	333.0	0.0
3	1.000	19.50	0.0	5010.	3300.
4	17.00	0.0	0.0	1667.	0.0
5	16.70	15.50	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
1	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	1	-	Left	20.40	26.00			

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm²/m]	Node
1	20.50	0	0	8.000	32.50	27010.	1
2	20.25	0	0	8.000	32.50	27010.	2
3	19.75	2	7	8.000	32.50	27010.	3
4	19.25	2	7	8.000	32.50	27010.	4
5	18.75	2	7	8.000	32.50	27010.	5
6	18.25	2	7	8.000	32.50	27010.	6
7	17.75	2	7	8.000	32.50	27010.	7
8	17.25	2	7	8.000	32.50	27010.	8
9	16.75	2	7	8.000	32.50	27010.	9
10	16.25	2	7	8.000	32.50	27010.	10
11	15.75	2	7	8.000	32.50	27010.	11
12	15.25	3	3	8.000	32.50	27010.	12
13	14.75	3	3	8.000	32.50	27010.	13
14	14.25	3	3	8.000	32.50	27010.	14
15	13.75	3	3	8.000	32.50	27010.	15
16	13.25	3	3	8.000	32.50	27010.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 55000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 58500. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	6	14.40	7	0.0	6
2	14.40	7	0.0	7	0.0	6
3	14.40	7	0.0	7	0.0	6

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]

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1	20.50	3.547	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	5.098	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	8.823	3.000	2.738	0.0	2	7	2.750	2.738	0.0	0.0	0.0
4	19.25	11.81	9.000	8.418	0.0	2	7	8.250	8.418	0.0	0.0	0.0
5	18.75	13.16	12.50	11.62	2.500	2	7	11.25	11.62	2.500	0.0	0.0
6	18.25	13.98	13.50	12.33	7.500	2	7	11.75	12.33	7.500	0.0	0.0
7	17.75	14.40	14.50	13.05	12.50	2	7	12.25	13.05	12.50	0.0	0.0
8	17.25	14.32	15.50	13.78	17.50	2	7	12.75	13.78	17.50	0.0	0.0
9	16.75	13.71	16.50	14.51	22.50	2	7	13.25	14.51	22.50	0.0	0.0
10	16.25	12.42	17.50	15.24	27.50	2	7	13.75	15.24	27.50	0.0	0.0
11	15.75	9.646	18.50	16.03	32.50	2	7	14.25	16.03	32.50	0.0	0.0
12	15.25	4.385	21.50	18.05	37.50	3	3	17.00	18.05	37.50	0.0	0.0
13	14.75	2.479	26.50	23.37	42.50	3	3	22.00	23.37	42.50	0.0	0.0
14	14.25	1.732	31.50	28.51	47.50	3	3	27.00	28.51	47.50	0.0	0.0
15	13.75	1.327	36.50	33.59	52.50	3	3	32.00	33.59	52.50	0.0	0.0
16	13.25	1.040	41.50	38.66	57.50	3	3	37.00	38.66	57.50	0.0	0.0
17	12.75	0.7860	46.50	43.72	62.50	3	3	42.00	43.72	62.50	0.0	0.0
18	12.25	0.5450	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.4319	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.3693	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.3242	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.2868	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.2532	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0
24	9.250	0.2213	81.50	78.75	97.50	6	6	77.00	78.75	97.50	0.0	0.0
25	8.750	0.1896	86.50	83.84	102.5	6	6	82.00	83.84			
	102.5	0.0	0.0									
26	8.250	0.1572	91.50	88.94	107.5	6	6	87.00	88.94	107.5	0.0	0.0
27	7.750	0.1247	96.50	93.99	112.5	6	6	92.00	93.99	112.5	0.0	0.0
28	7.250	0.08131	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	10.83E-6	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	0	0	8.000	32.50	27010.	1
2	20.25	0	0	8.000	32.50	27010.	2
3	19.75	4	4	8.000	32.50	27010.	3
4	19.25	4	4	8.000	32.50	27010.	4
5	18.75	4	4	8.000	32.50	27010.	5
6	18.25	4	4	8.000	32.50	27010.	6
7	17.75	4	4	8.000	32.50	27010.	7
8	17.25	4	4	8.000	32.50	27010.	8
9	16.75	4	4	8.000	32.50	27010.	9
10	16.25	4	4	8.000	32.50	27010.	10
11	15.75	4	4	8.000	32.50	27010.	11
12	15.25	5	5	8.000	32.50	27010.	12
13	14.75	5	5	8.000	32.50	27010.	13
14	14.25	5	5	8.000	32.50	27010.	14
15	13.75	5	5	8.000	32.50	27010.	15
16	13.25	5	5	8.000	32.50	27010.	16
** 17	12.75	5	5	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 1 : Install wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 61000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 62000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level (m)	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	0.0	3.000	2.738	0.0	4	4	2.750	2.738	0.0	0.0	0.0
4	19.25	0.0	9.000	8.418	0.0	4	4	8.250	8.418	0.0	0.0	0.0
5	18.75	0.0	12.50	11.62	2.500	4	4	11.25	11.62	2.500	0.0	0.0
6	18.25	0.0	13.50	12.33	7.500	4	4	11.75	12.33	7.500	0.0	0.0
7	17.75	0.0	14.50	13.05	12.50	4	4	12.25	13.05	12.50	0.0	0.0
8	17.25	0.0	15.50	13.78	17.50	4	4	12.75	13.78	17.50	0.0	0.0
9	16.75	0.0	16.50	14.51	22.50	4	4	13.25	14.51	22.50	0.0	0.0
10	16.25	0.0	17.50	15.24	27.50	4	4	13.75	15.24	27.50	0.0	0.0
11	15.75	0.0	18.50	16.03	32.50	4	4	14.25	16.03	32.50	0.0	0.0
12	15.25	0.0	21.50	18.05	37.50	5	5	17.00	18.05	37.50	0.0	0.0
13	14.75	0.0	26.50	23.37	42.50	5	5	22.00	23.37	42.50	0.0	0.0
14	14.25	0.0	31.50	28.51	47.50	5	5	27.00	28.51	47.50	0.0	0.0
15	13.75	0.0	36.50	33.59	52.50	5	5	32.00	33.59	52.50	0.0	0.0
16	13.25	0.0	41.50	38.66	57.50	5	5	37.00	38.66	57.50	0.0	0.0
** 17	12.75	0.0	46.50	43.72	62.50	5	5	42.00	43.72	62.50	0.0	0.0
18	12.25	0.0	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.0	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.0	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.0	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.0	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.0	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0
24	9.250	0.0	81.50	78.75	97.50	6	6	77.00	78.75	97.50	0.0	0.0
25	8.750	0.0	86.50	83.84	102.5	6	6	82.00	83.84	102.5	0.0	0.0
26	8.250	0.0	91.50	88.94	107.5	6	6					
	87.00	88.94	107.5	0.0	0.0							
27	7.750	0.0	96.50	93.99	112.5	6	6	92.00	93.99	112.5	0.0	0.0
28	7.250	0.0	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	0.0	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

** Wall toe level: 12.75
MAXIMUS - Residual moment = % of peak moment in wall

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EPA Export 08-07-2014:23:43:21

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : ADD ENGINEERED FILL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	20.25	1	0	8.000	32.50	27010.	2
3	19.75	4	8	8.000	32.50	27010.	3
4	19.25	4	8	8.000	32.50	27010.	4
5	18.75	4	8	8.000	32.50	27010.	5
6	18.25	4	8	8.000	32.50	27010.	6
7	17.75	4	8	8.000	32.50	27010.	7
8	17.25	4	8	8.000	32.50	27010.	8
9	16.75	4	8	8.000	32.50	27010.	9
10	16.25	4	8	8.000	32.50	27010.	10
11	15.75	4	8	8.000	32.50	27010.	11
12	15.25	5	5	8.000	32.50	27010.	12
13	14.75	5	5	8.000	32.50	27010.	13
14	14.25	5	5	8.000	32.50	27010.	14
15	13.75	5	5	8.000	32.50	27010.	15
16	13.25	5	5	8.000	32.50	27010.	16
** 17	12.75	5	5	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 2 : Add engineered fill

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 53000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 62000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	8.756	5	0.0	0
2	8.800	5	4.980	1	32.06	1
3	11.00	1	3.373	1	20.66	1
4	16.60	1	2.276	1	13.99	1
5	18.60	1	1.536	1	9.440	1
10	22.80	1	0.2755	1	1.560	1
15	22.60	1	0.05860	1	0.3300	1
20	23.80	1	0.01250	1	0.07000	1
21	23.80	1	0.009100	1	0.04000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	23.82	1.250	0.4621	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	22.98	5.000	1.961	0.0	A 1	0	0.0	0.0	0.0	+0.01446	0.4258
3	19.75	21.29	13.00	-0.007115	0.0	A 4	8	2.750	3.435	0.0	-0.4113	-0.06682
4	19.25	19.61	19.00	9.130	0.0	4	8	8.250	9.182	0.0	0.05238	-0.9304
5	18.75	17.93	22.50	13.50	2.500	4	8	11.25	12.56	2.500	0.5290	-0.7189
6	18.25	16.25	23.50	14.85	7.500	4	8	11.75	13.29	7.500	0.7713	-0.09561
7	17.75	14.56	24.50	16.26	12.50	4	8	12.25	13.97	12.50	0.6246	0.8664
8	17.25	12.86	25.50	17.79	17.50	4	8	12.75	14.60	17.50	-0.09517	2.236
9	16.75	11.16	26.50	19.56	22.50	4	8	13.25	15.17	22.50	-1.612	4.130
10	16.25	9.487	27.50	22.60	27.50	4	8	13.75	15.38	27.50	-4.225	7.031
11	15.75	7.850	28.50	24.28	32.50	4	8	14.25	16.37	32.50	-8.642	10.81
12	15.25	6.297	31.50	12.59	37.50	5	5	17.00	22.33	37.50	-15.04	10.35
13	14.75	4.880	36.50	13.60	42.50	5	5	22.00	31.14	42.50	-19.00	3.534
14	14.25	3.631	41.50	21.32	47.50	5	5	27.00	37.36	47.50	-18.57	-4.861
15	13.75	2.548	46.50	31.23	52.50	5	5	32.00	41.18	52.50	-14.14	-11.36
16	13.25	1.592	51.50	42.42	57.50	5	5	37.00	43.57	57.50	-7.212	-14.14
** 17	12.75	0.7024	56.50	65.76	62.50	5	5	42.00	36.89	62.50	0.0	0.0
18	12.25	0.5781	61.50	48.69	67.50	6	6	47.00	48.69	67.50	0.0	0.0
19	11.75	0.4693	66.50	53.98	72.50	6	6	52.00	53.98	72.50	0.0	0.0
20	11.25	0.3938	71.50	59.27	77.50	6	6	57.00	59.27	77.50	0.0	0.0
21	10.75	0.3367	76.50	64.48	82.50	6	6	62.00	64.48	82.50	0.0	0.0
22	10.25	0.2902	81.50	69.64	87.50	6	6	67.00	69.64	87.50	0.0	0.0
23	9.750	0.2504	86.50	74.79	92.50	6	6	73.00	74.79	92.50	0.0	0.0
24	9.250	0.2150	91.50	79.95	97.50	6	6	77.00	79.95	97.50	0.0	0.0
25	8.750	0.1822	96.50	85.13	102.5	6	6	82.00	85.13	102.5	0.0	0.0
26	8.250	0.1506	101.5	90.36	107.5	6	6					
	87.00	90.36	107.5	0.0	0.0							
27	7.750	0.1192	106.5	95.46	112.5	6	6	92.00	95.46	112.5	0.0	0.0
28	7.250	0.07872	111.5	100.7	117.5	6	6	97.00	100.7	117.5	0.0	0.0
29	6.750	0.0	116.5	105.5	122.5	6	6	102.0	105.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	23.82	-19.00	0.7713	-14.14	10.81

STAGE 3 : APPLY SURCHARGE

RESULTS FOR STAGE 3 : Apply surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 53000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 62000. kPa

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EPA Export 08-07-2014:23:43:21

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	21.21	5	1.720	2
2	21.20	5	12.46	1	78.99	1
3	32.10	1	8.444	1	51.70	1
4	40.50	1	5.804	1	35.02	1
5	46.30	1	4.295	1	24.07	1
10	59.30	1	1.105	1	5.780	1
15	62.90	1	0.3479	1	1.810	1
20	64.20	1	0.1415	1	0.7000	1
30	64.90	1	0.02370	1	0.1200	1
35	65.00	1	0.009700	1	0.04000	1

Ground level left = 28.50 Ground level right = 28.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	28.50	88.82	6.050	2.380	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	28.25	85.52	28.00	11.56	0.0	A 1	0	0.0	0.0	0.0	-0.07436	2.465
3	19.75	78.92	37.00	2.993	0.0	A 4	8	2.750	5.363	0.0	-2.391	4.040
4	19.25	72.34	43.00	8.991	0.0	A 4	8	8.250	11.29	0.0	-4.115	2.873
5	18.75	65.80	46.50	12.49	2.500	A 4	8	11.25	15.13	2.500	-5.261	1.639
6	18.25	59.31	47.50	17.17	7.500	4	8	11.75	15.87	7.500	-5.753	1.305
7	17.75	52.87	48.50	21.82	12.50	4	8	12.25	16.39	12.50	-6.568	2.986
8	17.25	46.49	49.50	25.93	17.50	4	8	12.75	16.75	17.50	-8.740	6.628
9	16.75	40.28	50.50	30.72	22.50	4	8	13.25	16.86	22.50	-13.21	12.40
10	16.25	34.03	51.50	40.21	27.50	4	8	13.75	15.68	27.50	-21.14	22.00
11	15.75	28.07	52.50	43.46	32.50	4	8	14.25	17.16	32.50	-35.20	34.71
12	15.25	22.45	55.50	-0.003652	37.50	A 5	5	17.00	33.32	37.50	-55.85	32.95
13	14.75	17.33	60.50	-0.006598	42.50	A 5	5	22.00	51.13	42.50	-68.16	11.86
14	14.25	12.82	65.50	-0.008020	47.50	A 5	5	27.00	59.96	47.50	-67.69	-15.94
15	13.75	8.914	70.50	20.04	52.50	5	5	32.00	60.27	52.50	-52.22	-40.99
16	13.25	5.477	75.50	50.75	57.50	5	5	37.00	55.44	57.50	-26.70	-52.22
** 17	12.75	3.285	80.50	123.8	62.50	5	5	42.00	17.00	62.50	0.0	0.0
18	12.25	1.938	85.50	50.35	67.50	6	6	47.00	50.35	67.50	0.0	0.0
19	11.75	1.587	90.50	55.75	72.50	6	6	52.00	55.75	72.50	0.0	0.0
20	11.25	1.336	95.50	61.38	77.50	6	6	57.00	61.38	77.50	0.0	0.0
21	10.75	1.144	100.5	66.83	82.50	6	6	62.00	66.83	82.50	0.0	0.0
22	10.25	0.9871	105.5	72.16	87.50	6	6	67.00	72.16	87.50	0.0	0.0
23	9.750	0.8524	110.5	77.48	92.50	6	6	72.00	77.48	92.50	0.0	0.0
24	9.250	0.7326	115.5	82.82	97.50	6	6	77.00	82.82	97.50	0.0	0.0
25	8.750	0.6209	120.5	88.23	102.5	6	6	82.00	88.23	102.5	0.0	0.0
26	8.250	0.5136	125.5	93.77	107.5	6	6					
	87.00	93.77	107.5	0.0	0.0							
27	7.750	0.4069	130.5	98.97	112.5	6	6	92.00	98.97	112.5	0.0	0.0
28	7.250	0.2698	135.5	104.5	117.5	6	6	97.00	104.5	117.5	0.0	0.0
29	6.750	0.0	140.5	108.5	122.5	6	6	102.0	108.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	88.82	-68.16	0.7713	-52.22	34.71

Surcharge 1 present in this stage

STAGE 4 : HYDROSTATIC GROUNDWATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	28.50	1	0	8.000	32.50	27010.	1
2	28.25	1	0	8.000	32.50	27010.	2
3	19.75	4	7	8.000	32.50	27010.	3
4	19.25	4	7	8.000	32.50	27010.	4
5	18.75	4	7	8.000	32.50	27010.	5
6	18.25	4	7	8.000	32.50	27010.	6
7	17.75	4	7	8.000	32.50	27010.	7
8	17.25	4	7	8.000	32.50	27010.	8
9	16.75	4	7	8.000	32.50	27010.	9
10	16.25	4	7	8.000	32.50	27010.	10
11	15.75	4	7	8.000	32.50	27010.	11
12	15.25	3	3	8.000	32.50	27010.	12
13	14.75	3	3	8.000	32.50	27010.	13
14	14.25	3	3	8.000	32.50	27010.	14
15	13.75	3	3	8.000	32.50	27010.	15
16	13.25	3	3	8.000	32.50	27010.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 4 : Hydrostatic groundwater

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 49080. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 58000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.2071	11	6.280	14
2	0.2080	11	0.1327	10	3.490	14
3	0.3080	10	0.09030	7	2.160	14
4	0.3080	10	0.05340	1	1.150	14
5	0.5080	10	0.07500	1	0.6400	14
10	0.6080	7	0.02520	1	0.2100	1
15	0.8080	1	0.02150	1	0.1000	1
20	0.9080	1	0.009500	1	0.04000	1

Ground level left = 28.50 Ground level right = 28.00

Node	Level	Disp	Va	Pa	U	Soil	Vs	Ps	U	BM	Shear

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EPA Export 08-07-2014:23:43:21

	[m]	[mm]	[kPa]	[kPa]	[kPa]	Left	Right	[kPa]	[kPa]	[kPa]	[kNm/m]	[kN/m]
1	20.50	89.71	6.050	2.381	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	86.39	29.00	11.56	0.0	A	1	0	0.0	0.0	0.0	-0.07439	2.465
3	19.75	79.77	37.00	2.993	0.0	A	4	7	2.750	5.380	0.0	-2.391	4.036
4	19.25	73.18	43.00	8.992	0.0	A	4	7	8.250	11.31	0.0	-4.111	2.860
5	18.75	66.61	46.50	12.49	2.500	A	4	7	11.25	15.15	2.500	-5.251	1.617
6	18.25	60.10	47.50	16.53	7.500		4	7	11.75	15.90	7.500	-5.729	1.111
7	17.75	53.64	48.50	21.45	12.50		4	7	12.25	16.42	12.50	-6.363	2.528
8	17.25	47.24	49.50	25.58	17.50		4	7	12.75	16.78	17.50	-8.256	5.985
9	16.75	40.92	50.50	30.36	22.50		4	7	13.25	16.89	22.50	-12.35	11.55
10	16.25	34.72	51.50	39.89	27.50		4	7	13.75	15.71	27.50	-19.81	20.96
11	15.75	28.71	52.50	43.03	32.50		4	7	14.25	17.22	32.50	-33.31	33.46
12	15.25	23.02	55.50	2.827	37.50	A	3	3	17.00	33.63	37.50	-53.27	32.22
13	14.75	17.81	60.50	4.474	42.50	A	3	3	22.00	51.78	42.50	-65.51	12.69
14	14.25	13.19	65.50	6.122	47.50	A	3	3	27.00	60.78	47.50	-65.96	-12.80
15	13.75	9.162	70.50	11.77	52.50	A	3	3	32.00	60.94	52.50	-52.73	-38.76
16	13.25	5.600	75.50	49.04	57.50		3	3	37.00	55.76	57.50	-27.21	-52.73
** 17	*12.75*	*2.288*	*80.50*	*126.7*	*62.50*		*3*	*3*	*42.00*	*15.89*	*62.50*	*0.0*	*0.0*
18	12.25	1.945	85.50	50.18	67.50		6	6	47.00	50.18	67.50	0.0	0.0
19	11.75	1.592	90.50	55.64	72.50		6	6	52.00	55.64	72.50	0.0	0.0
20	11.25	1.339	95.50	61.30	77.50		6	6	57.00	61.30	77.50	0.0	0.0
21	10.75	1.147	100.5	66.76	82.50		6	6	62.00	66.76	82.50	0.0	0.0
22	10.25	0.9890	105.5	72.11	87.50		6	6	67.00	72.11	87.50	0.0	0.0
23	9.750	0.8539	110.5	77.44	92.50		6	6	72.00	77.44	92.50	0.0	0.0
24	9.250	0.7335	115.5	82.79	97.50		6	6	77.00	82.79	97.50	0.0	0.0
25	8.750	0.6217	120.5	88.20	102.5		6	6	82.00	88.20	102.5	0.0	0.0
26	8.250	0.5142	125.5	93.74	107.5		6	6					
	87.00	93.74	107.5	0.0	0.0								
27	7.750	0.4074	130.5	98.94	112.5		6	6	92.00	98.94	112.5	0.0	0.0
28	7.250	0.2693	135.5	104.5	117.5		6	6	97.00	104.5	117.5	0.0	0.0
29	6.750	0.0	140.5	108.5	122.5		6	6	102.0	108.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	89.71	-68.16	0.7713	-52.73	34.71

Surcharge 1 present in this stage

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	89.71	0.0	0.0	0.0	0.0
2	20.25	0.0	86.39	-0.07439	0.0	0.0	2.465
3	19.75	0.0	79.77	-2.391	0.0	-0.06682	4.040
4	19.25	0.0	73.18	-4.115	0.05238	-0.9404	2.871
5	18.75	0.0	66.61	-5.263	0.5290	-0.7189	1.639
6	18.25	0.0	60.10	-5.753	0.7713	-0.09561	1.305
7	17.75	0.0	53.64	-6.568	0.6246	0.0	2.986
8	17.25	0.0	47.24	-8.740	0.0	0.0	6.638
9	16.75	0.0	40.92	-13.21	0.0	0.0	12.40
10	16.25	0.0	34.72	-21.14	0.0	0.0	22.08
11	15.75	0.0	28.71	-35.20	0.0	0.0	34.71
12	15.25	0.0	23.02	-55.85	0.0	0.0	32.22
13	14.75	0.0	17.81	-68.16	0.0	0.0	12.69
14	14.25	0.0	13.19	-67.69	0.0	-15.94	0.0
15	13.75	0.0	9.162	-52.73	0.0	-40.99	0.0
16	13.25	0.0	5.600	-27.21	0.0	-52.73	0.0
17	*12.75*	*0.0*	*2.288*	*0.0*	*0.0*	*0.0*	*0.0*
18	12.25	0.0	1.945	0.0	0.0	0.0	0.0
19	11.75	0.0	1.592	0.0	0.0	0.0	0.0
20	11.25	0.0	1.339	0.0	0.0	0.0	0.0
21	10.75	0.0	1.147	0.0	0.0	0.0	0.0
22	10.25	0.0	0.9890	0.0	0.0	0.0	0.0
23	9.75	0.0	0.8539	0.0	0.0	0.0	0.0
24	9.25	0.0	0.7335	0.0	0.0	0.0	0.0
25	8.75	0.0	0.6217	0.0	0.0	0.0	0.0
26	8.25	0.0	0.5142	0.0	0.0	0.0	0.0
27	7.75	0.0	0.4074	0.0	0.0	0.0	0.0
28	7.25	0.0	0.2693	0.0	0.0	0.0	0.0
29	6.75	0.0	0.0	0.0	0.0	0.0	0.0

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Oasys

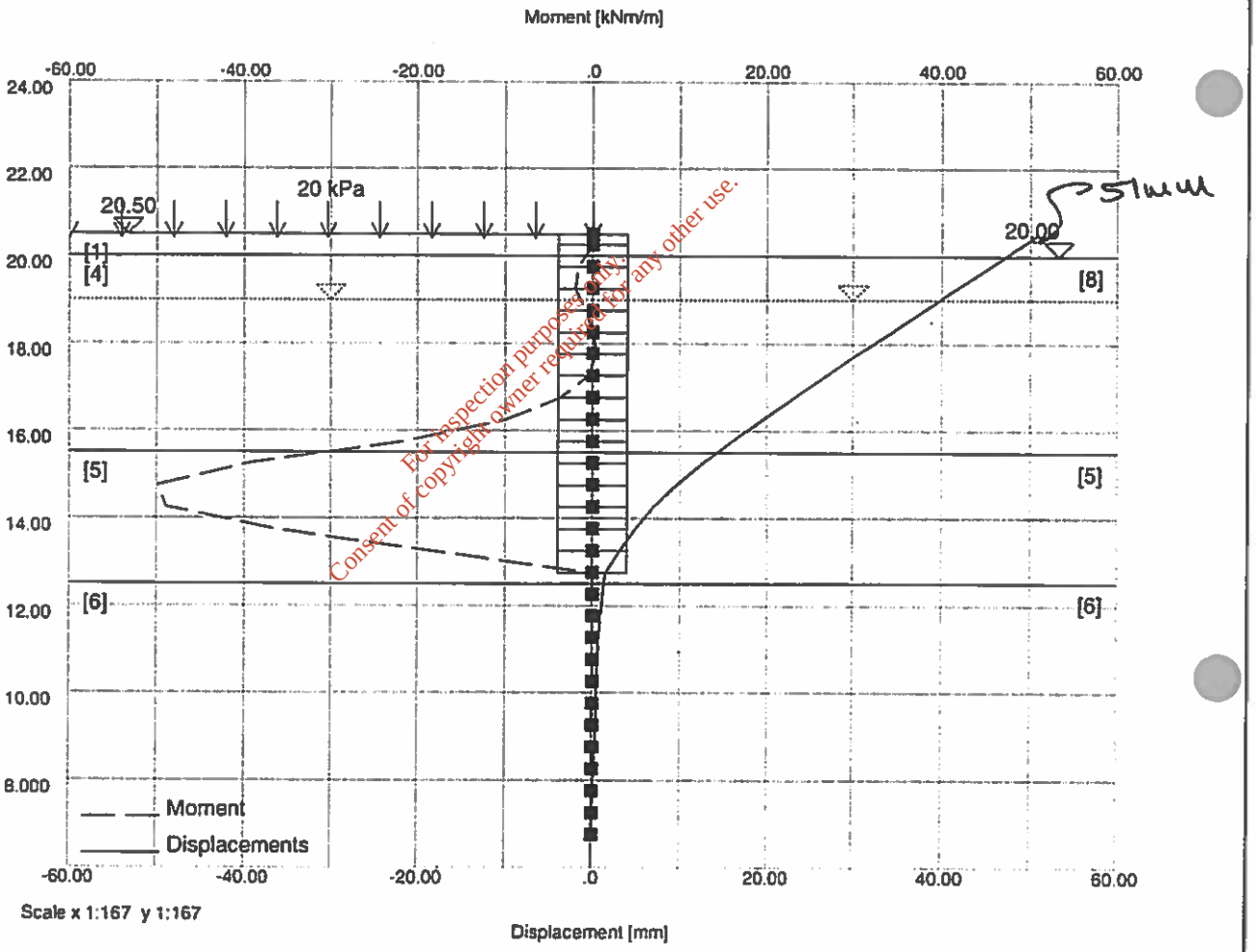
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/17	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 sls.fwd	CH

SLS Wall bending moment and deflection short term condition



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STAGE 3 : Apply surcharge

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Oasys

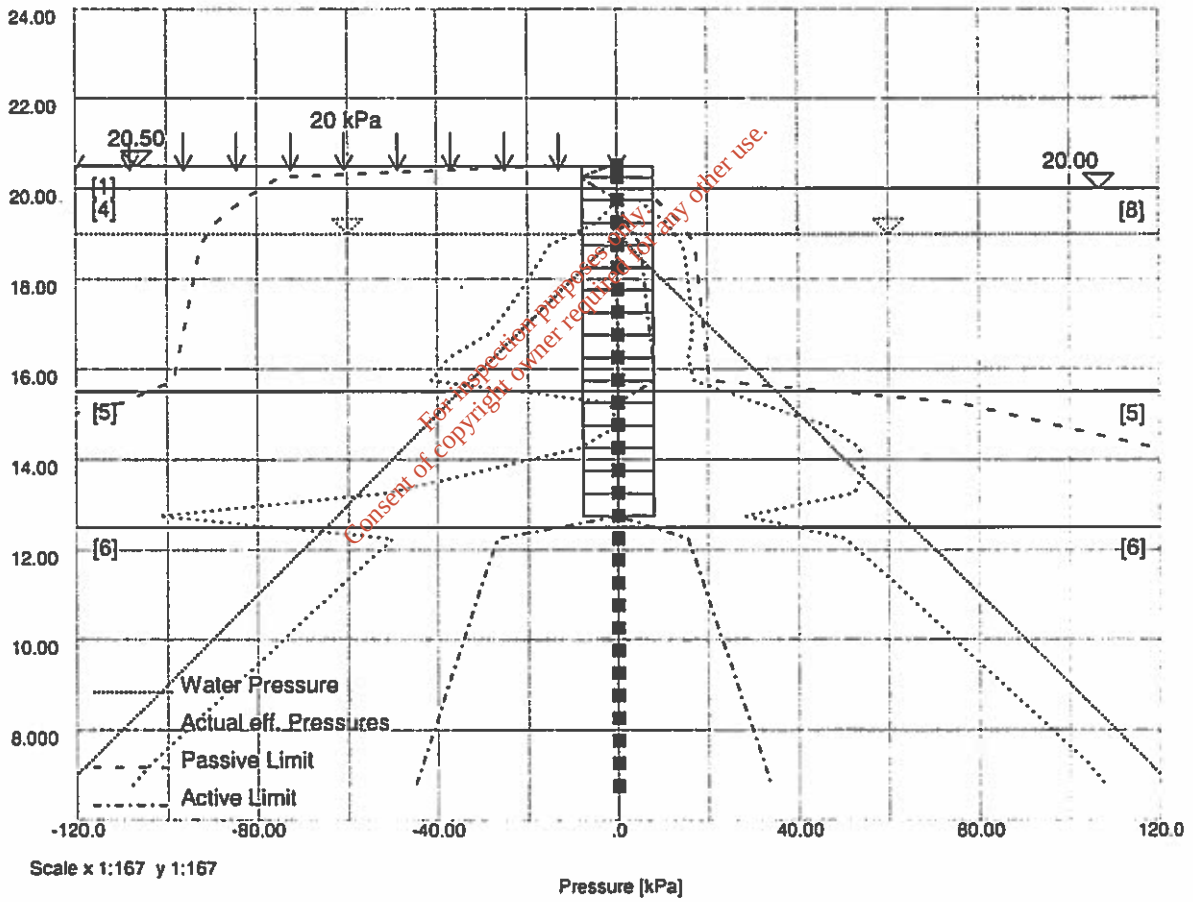
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP118	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 sls.fwd	CM

SLS Earth pressure distribution
Short term condition



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STAGE 3 : Apply surcharge

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Oasys

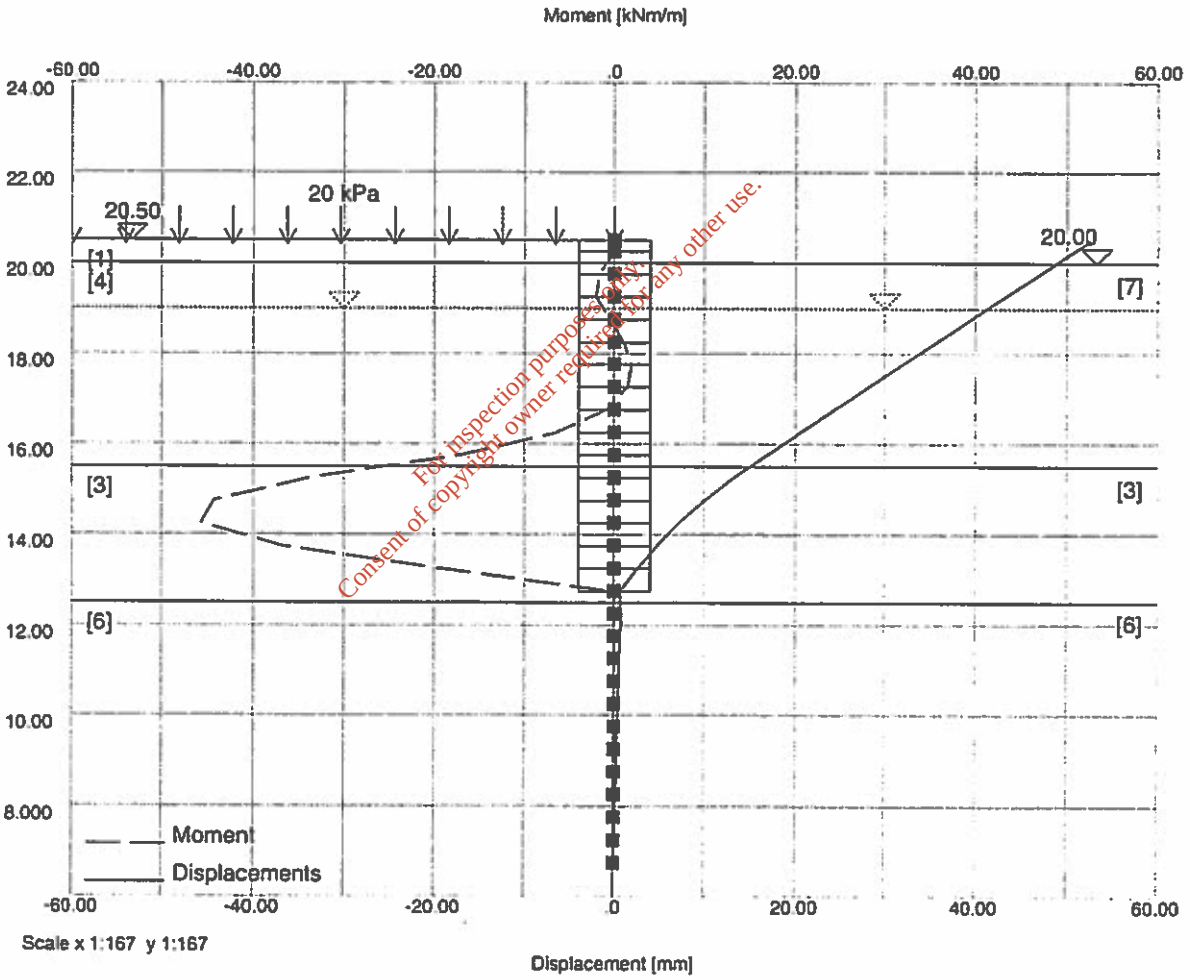
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/19	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1 sls.fwd	CH.

SLS long term ground conditions



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STAGE 6 : Hydrostatic groundwater

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5000	0.3300	3.000	1.150	3.460	0.3300	User_Specified
2	12.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
3	20.00	1.000	0.2700	4.850	1.040	4.400	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.000	1.150	3.460	0.2500	User_Specified
7	11.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	45000.	0.0
2	3.000	0.0	0.0	500.0	0.0
3	1.000	15.50	0.0	7500.	5010.
4	25.00	0.0	0.0	3500.	0.0
5	25.00	15.50	16.70	12500.	8350.
6	0.0	0.0	0.0	75000.	0.0
7	3.000	0.0	0.0	400.0	0.0
8	3.000	0.0	0.0	465.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
1	32.00	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	1	-	Left	20.40	20.00			

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kN=2/m]	Node
1	20.50	0	0	8.000	32.50	27010.	1
2	20.25	0	0	8.000	32.50	27010.	2
3	19.75	2	7	8.000	32.50	27010.	3
4	19.25	2	7	8.000	32.50	27010.	4
5	18.75	2	7	8.000	32.50	27010.	5
6	18.25	2	7	8.000	32.50	27010.	6
7	17.75	2	7	8.000	32.50	27010.	7
8	17.25	2	7	8.000	32.50	27010.	8
9	16.75	2	7	8.000	32.50	27010.	9
10	16.25	2	7	8.000	32.50	27010.	10
11	15.75	2	7	8.000	32.50	27010.	11
12	15.25	3	3	8.000	32.50	27010.	12
13	14.75	3	3	8.000	32.50	27010.	13
14	14.25	3	3	8.000	32.50	27010.	14
15	13.75	3	3	8.000	32.50	27010.	15
16	13.25	3	3	8.000	32.50	27010.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 300. E at bottom node = 57000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 57060. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.596	7	0.0	0
2	9.600	7	0.0	7	0.0	0
3	9.600	7	0.0	7	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kN m]	Shear [kN m]

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1	20.50	2.361	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0	
2	20.25	3.197	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0	
3	19.75	5.879	3.000	2.738	0.0	2	7	2.750	2.738	0.0	0.0	0.0	
4	19.25	7.872	9.000	8.418	0.0	2	7	8.250	8.418	0.0	0.0	0.0	
5	18.75	8.767	12.50	11.62	2.500	2	7	11.25	11.62	2.500	0.0	0.0	
6	18.25	9.317	13.50	12.33	7.500	2	7	11.75	12.33	7.500	0.0	0.0	
7	17.75	9.598	14.50	13.05	12.50	2	7	12.25	13.05	12.50	0.0	0.0	
8	17.25	9.541	15.50	13.77	17.50	2	7	12.75	13.77	17.50	0.0	0.0	
9	16.75	9.134	16.50	14.50	22.50	2	7	13.25	14.50	22.50	0.0	0.0	
10	16.25	8.276	17.50	15.24	27.50	2	7	13.75	15.24	27.50	0.0	0.0	
11	15.75	6.028	18.50	16.03	32.50	2	7	14.25	16.03	32.50	0.0	0.0	
12	15.25	2.922	21.50	18.05	37.50	3	3	17.00	18.05	37.50	0.0	0.0	
13	14.75	1.650	26.50	23.37	42.50	3	3	22.00	23.37	42.50	0.0	0.0	
14	14.25	1.152	31.50	28.51	47.50	3	3	27.00	28.51	47.50	0.0	0.0	
15	13.75	0.8821	36.50	33.58	52.50	3	3	32.00	33.58	52.50	0.0	0.0	
16	13.25	0.6911	41.50	38.65	57.50	3	3	37.00	38.65	57.50	0.0	0.0	
17	12.75	0.5224	46.50	43.72	62.50	3	3	42.00	43.72	62.50	0.0	0.0	
18	12.25	0.3627	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0	
19	11.75	0.2877	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0	
20	11.25	0.2660	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0	
21	10.75	0.2160	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0	
22	10.25	0.1911	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0	
23	9.750	0.1688	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0	
24	9.250	0.1475	81.50	78.76	97.50	6	6	77.00	78.76	97.50	0.0	0.0	
25	8.750	0.1264	86.50	83.84	102.5	6	6	82.00	83.84				
	102.5	0.0	0.0										
26	8.250	0.1048	91.50	88.96	107.5	6	6	87.00	88.96	107.5	0.0	0.0	
27	7.750	0.08312	96.50	94.00	112.5	6	6	92.00	94.00	112.5	0.0	0.0	
28	7.250	0.05420	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0	
29	6.750	7.218E-6	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0	

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level	Soil		Boundary		EI below node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	20.50	0	0	8.000	32.50	27010.	1
2	20.25	0	0	8.000	32.50	27010.	2
3	19.75	4	8	8.000	32.50	27010.	3
4	19.25	4	8	8.000	32.50	27010.	4
5	18.75	4	8	8.000	32.50	27010.	5
6	18.25	4	8	8.000	32.50	27010.	6
7	17.75	4	8	8.000	32.50	27010.	7
8	17.25	4	8	8.000	32.50	27010.	8
9	16.75	4	8	8.000	32.50	27010.	9
10	16.25	4	8	8.000	32.50	27010.	10
11	15.75	4	8	8.000	32.50	27010.	11
12	15.25	5	5	8.000	32.50	27010.	12
13	14.75	5	5	8.000	32.50	27010.	13
14	14.25	5	5	8.000	32.50	27010.	14
15	13.75	5	5	8.000	32.50	27010.	15
16	13.25	5	5	8.000	32.50	27010.	16
** 17	12.75	5	5	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 1 : Install wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 92000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 93000. kPa

Iter no.	Inc max displ	Node no.	Disp error.	Node no.	Press error	Node no.
	[mm]		[mm]		[kPa]	
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level	Disp	Ve	Pe	U	Soil		Ve	Pe	U	BM	Shear
	[m]	[mm]	[kPa]	[kPa]	[kPa]	Left	Right	[kPa]	[kPa]	[kPa]	[kNm/m]	[kN/m]
1	20.50	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	0.0	3.000	2.738	0.0	4	8	2.750	2.738	0.0	0.0	0.0
4	19.25	0.0	9.000	8.418	0.0	4	8	8.250	8.418	0.0	0.0	0.0
5	18.75	0.0	12.50	11.62	2.500	4	8	11.25	11.62	2.500	0.0	0.0
6	18.25	0.0	13.50	12.33	7.500	4	8	11.75	12.33	7.500	0.0	0.0
7	17.75	0.0	14.50	13.05	12.50	4	8	12.25	13.05	12.50	0.0	0.0
8	17.25	0.0	15.50	13.77	17.50	4	8	12.75	13.77	17.50	0.0	0.0
9	16.75	0.0	16.50	14.50	22.50	4	8	13.25	14.50	22.50	0.0	0.0
10	16.25	0.0	17.50	15.24	27.50	4	8	13.75	15.24	27.50	0.0	0.0
11	15.75	0.0	18.50	16.03	32.50	4	8	14.25	16.03	32.50	0.0	0.0
12	15.25	0.0	21.50	18.05	37.50	5	5	17.00	18.05	37.50	0.0	0.0
13	14.75	0.0	26.50	23.37	42.50	5	5	22.00	23.37	42.50	0.0	0.0
14	14.25	0.0	31.50	28.51	47.50	5	5	27.00	28.51	47.50	0.0	0.0
15	13.75	0.0	36.50	33.58	52.50	5	5	32.00	33.58	52.50	0.0	0.0
16	13.25	0.0	41.50	38.65	57.50	5	5	37.00	38.65	57.50	0.0	0.0
** 17	12.75	0.0	46.50	43.72	62.50	5	5	42.00	43.72	62.50	0.0	0.0
18	12.25	0.0	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.0	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.0	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.0	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.0	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.0	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0
24	9.250	0.0	81.50	78.76	97.50	6	6	77.00	78.76	97.50	0.0	0.0
25	8.750	0.0	86.50	83.84	102.5	6	6	82.00	83.84	102.5	0.0	0.0
26	8.250	0.0	91.50	88.96	107.5	6	6					
	87.00	88.96	107.5	0.0	0.0							
27	7.750	0.0	96.50	94.00	112.5	6	6	92.00	94.00	112.5	0.0	0.0
28	7.250	0.0	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	0.0	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

** Wall toe level: 12.75

MARNING - Residual moment = 1% of peak moment in wall

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EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : ADD ENGINEERED FILL

Geometry

Node	Level	Soil		Boundary		EI below node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	20.50	1	0	0.000	32.50	27010.	1
2	20.25	1	0	0.000	32.50	27010.	2
3	19.75	4	8	0.000	32.50	27010.	3
4	19.25	4	8	0.000	32.50	27010.	4
5	18.75	4	8	0.000	32.50	27010.	5
6	18.25	4	8	0.000	32.50	27010.	6
7	17.75	4	8	0.000	32.50	27010.	7
8	17.25	4	8	0.000	32.50	27010.	8
9	16.75	4	8	0.000	32.50	27010.	9
10	16.25	4	8	0.000	32.50	27010.	10
11	15.75	4	8	0.000	32.50	27010.	11
12	15.25	5	5	0.000	32.50	27010.	12
13	14.75	5	5	0.000	32.50	27010.	13
14	14.25	5	5	0.000	32.50	27010.	14
15	13.75	5	5	0.000	32.50	27010.	15
16	13.25	5	5	0.000	32.50	27010.	16
** 17	12.75	5	5	0.000	32.50	0.0	17
18	12.25	6	6	0.000	32.50	0.0	18
19	11.75	6	6	0.000	32.50	0.0	19
20	11.25	6	6	0.000	32.50	0.0	20
21	10.75	6	6	0.000	32.50	0.0	21
22	10.25	6	6	0.000	32.50	0.0	22
23	9.750	6	6	0.000	32.50	0.0	23
24	9.250	6	6	0.000	32.50	0.0	24
25	8.750	6	6	0.000	32.50	0.0	25
26	8.250	6	6	0.000	32.50	0.0	26
27	7.750	6	6	0.000	32.50	0.0	27
28	7.250	6	6	0.000	32.50	0.0	28
29	6.750	6	6	0.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 2 : Add engineered fill

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 80000. kPa
On the RIGHT: E at ground level = 260. E at bottom node = 93000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	6.125	6	0.0	0
2	6.106	6	1.258	1	29.91	1
3	6.306	1	2.274	1	20.30	1
4	10.50	1	1.584	1	14.17	1
5	12.10	1	1.103	1	9.870	1
10	15.20	1	0.2263	1	1.460	1
15	15.90	1	0.03620	1	0.4600	1
20	16.10	1	0.01300	1	0.1100	1
22	16.10	1	0.008000	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	16.14	1.250	0.3627	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	15.57	5.000	1.602	0.0	A 1	0	0.0	0.0	0.0	-0.01131	0.3456
3	19.75	14.43	13.00	-0.009156	0.0	A 4	8	2.750	3.448	0.0	-0.3343	-0.2185
4	19.25	13.30	19.00	8.849	0.0	4	8	8.250	9.196	0.0	0.2071	-1.170
5	18.75	12.16	22.50	13.31	2.500	4	8	11.25	12.59	2.500	0.8355	-1.076
6	18.25	11.02	23.50	14.65	7.500	4	8	11.75	13.32	7.500	1.283	-0.5619
7	17.75	9.865	24.50	16.07	12.50	4	8	12.25	14.00	12.50	1.397	0.2881
8	17.25	8.699	25.50	17.61	17.50	4	8	12.75	14.63	17.50	0.9948	1.551
9	16.75	7.524	26.50	19.63	22.50	4	8	13.25	15.19	22.50	-0.1532	3.356
10	16.25	6.352	27.50	22.60	27.50	4	8	13.75	15.38	27.50	-2.362	6.223
11	15.75	5.205	28.50	24.40	32.50	4	8	14.25	16.35	32.50	-6.376	10.04
12	15.25	4.120	31.50	12.95	37.50	5	5	17.00	22.25	37.50	-12.40	9.727
13	14.75	3.166	36.50	14.52	42.50	5	5	22.00	30.84	42.50	-16.18	3.324
14	14.25	2.315	41.50	22.70	47.50	5	5	27.00	36.73	47.50	-15.73	-4.262
15	13.75	1.624	46.50	32.50	52.50	5	5	32.00	40.46	52.50	-11.84	-9.759
16	13.25	1.040	51.50	42.85	57.50	5	5	37.00	43.22	57.50	-5.967	-11.84
** 17	12.75	0.5204	56.50	47.65	62.50	5	5	42.00	38.79	62.50	0.0	0.0
18	12.25	0.3985	61.50	48.65	67.50	6	6	47.00	48.65	67.50	0.0	0.0
19	11.75	0.3182	66.50	53.96	72.50	6	6	52.00	53.96	72.50	0.0	0.0
20	11.25	0.2654	71.50	59.26	77.50	6	6	57.00	59.26	77.50	0.0	0.0
21	10.75	0.2262	76.50	64.47	82.50	6	6	62.00	64.47	82.50	0.0	0.0
22	10.25	0.1946	81.50	69.64	87.50	6	6	67.00	69.64	87.50	0.0	0.0
23	9.750	0.1676	86.50	74.79	92.50	6	6	72.00	74.79	92.50	0.0	0.0
24	9.250	0.1438	91.50	79.95	97.50	6	6	77.00	79.95	97.50	0.0	0.0
25	8.750	0.1217	96.50	85.13	102.5	6	6	82.00	85.13	102.5	0.0	0.0
26	8.250	0.1005	101.5	90.36	107.5	6	6					
	87.00	90.36	107.5	0.0	0.0							
27	7.750	0.07956	106.5	95.46	112.5	6	6	92.00	95.46	112.5	0.0	0.0
28	7.250	0.05249	111.5	100.7	117.5	6	6	97.00	100.7	117.5	0.0	0.0
29	6.750	0.0	116.5	105.5	122.5	6	6	102.0	105.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	16.14	-16.18	1.397	-11.84	10.04

STAGE 3 : APPLY SURCHARGE

RESULTS FOR STAGE 3 : Apply surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 80000. kPa
On the RIGHT: E at ground level = 260. E at bottom node = 93000. kPa

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Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	6	12.33	6	0.05000	1
2	12.30	6	6.776	1	61.25	1
3	17.00	1	6.726	1	42.21	1
4	21.70	1	3.292	1	29.43	1
5	25.00	1	2.374	1	20.51	1
10	32.40	1	0.5956	1	4.890	1
15	34.20	1	0.1492	1	1.230	1
20	34.70	1	0.03750	1	0.3100	1
25	34.80	1	0.009400	1	0.06000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	50.92	5.250	1.674	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	49.05	25.00	8.193	0.0	A 1	0	0.0	0.0	0.0	-0.05230	1.745
3	19.75	45.32	33.00	-0.01077	0.0	A 4	8	2.750	4.996	0.0	-1.693	2.030
4	19.25	41.60	39.00	4.614	0.0	4	8	8.250	10.89	0.0	-2.082	-0.7909
5	18.75	37.89	42.50	15.20	2.500	4	8	11.25	14.66	2.500	-0.9022	-2.223
6	18.25	34.19	43.50	18.23	7.500	4	8	11.75	15.42	7.500	0.1405	-1.383
7	17.75	30.50	44.50	21.38	12.50	4	8	12.25	15.99	12.50	0.4809	0.6684
8	17.25	26.80	45.50	24.82	17.50	4	8	12.75	16.40	17.50	-0.5279	4.122
9	16.75	23.11	46.50	29.06	22.50	4	8	13.25	16.58	22.50	-3.641	9.340
10	16.25	19.45	47.50	37.41	27.50	4	8	13.75	15.62	27.50	-9.867	17.90
11	15.75	15.90	48.50	41.30	32.50	4	8	14.25	16.95	32.50	-21.56	29.44
12	15.25	12.56	51.50	2.020	37.50	5	5	17.00	30.83	37.50	-39.30	28.32
13	14.75	9.565	56.50	-0.002815	42.50	A 5	5	22.00	46.12	42.50	-69.86	9.587
14	14.25	7.017	61.50	8.637	47.50	5	5	27.00	53.45	47.50	-48.89	-13.15
15	13.75	4.905	66.50	30.05	52.50	5	5	32.00	54.33	52.50	-36.72	-30.42
16	13.25	3.123	71.50	51.37	57.50	5	5	37.00	52.27	57.50	-18.47	-36.72
** 17	12.75	1.512	*76.50*	*101.9*	*62.50*	5	5	*42.00*	*38.04*	*62.50*	*0.0*	*0.0*
18	12.25	1.190	81.50	50.01	67.50	6	6	47.00	50.01	67.50	0.0	0.0
19	11.75	0.9533	86.50	55.44	72.50	6	6	52.00	55.44	72.50	0.0	0.0
20	11.25	0.7960	91.50	61.04	77.50	6	6	57.00	61.04	77.50	0.0	0.0
21	10.75	0.6789	96.50	66.44	82.50	6	6	62.00	66.44	82.50	0.0	0.0
22	10.25	0.5841	101.5	71.75	87.50	6	6	67.00	71.75	87.50	0.0	0.0
23	9.750	0.5035	106.5	77.04	92.50	6	6	72.00	77.04	92.50	0.0	0.0
24	9.250	0.4320	111.5	82.35	97.50	6	6	77.00	82.35	97.50	0.0	0.0
25	8.750	0.3658	116.5	87.73	102.5	6	6	82.00	87.73	102.5	0.0	0.0
26	8.250	0.3022	121.5	93.22	107.5	6	6					
	87.00	93.22	107.5	0.0	0.0							
27	7.750	0.2392	126.5	98.40	112.5	6	6	92.00	98.40	112.5	0.0	0.0
28	7.250	0.1580	131.5	103.9	117.5	6	6	97.00	103.9	117.5	0.0	0.0
29	6.750	0.0	136.5	108.0	122.5	6	6	102.0	108.0	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	50.92	-45.66	1.397	-36.72	29.44

Surcharge 1 present in this stage

STAGE 4 : INTERMEDIATE PORE PRESSURE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	18.25	44.50	10.00
3	17.75	45.80	10.00
4	17.25	52.60	10.00
5	16.75	65.70	10.00
6	16.25	78.90	10.00
7	15.75	106.6	10.00
8	15.25	83.50	10.00
9	14.75	88.60	10.00
10	14.25	93.80	10.00
11	13.75	99.00	10.00
12	13.25	104.1	10.00
13	12.75	109.2	10.00
14	12.25	114.3	10.00
15	11.75	119.4	10.00
16	11.25	124.6	10.00
17	10.75	129.7	10.00
18	10.25	134.9	10.00
19	9.750	139.4	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	18.75	4.000	10.00
3	18.25	9.000	10.00
4	17.75	14.00	10.00
5	17.25	16.80	10.00
6	16.75	23.50	10.00
7	16.25	27.70	10.00
8	15.75	33.00	10.00
9	15.25	43.90	10.00
10	14.75	53.90	10.00
11	14.25	60.00	10.00
12	13.75	62.90	10.00
13	13.25	64.30	10.00
14	12.75	54.70	10.00
15	12.25	68.50	10.00
16	11.75	73.60	10.00
17	11.25	78.80	10.00
18	10.75	84.00	10.00
19	10.25	89.10	10.00
20	9.750	94.20	10.00
21	9.250	99.30	10.00
22	8.750	104.4	10.00
23	8.250	109.6	10.00
24	7.750	114.7	10.00
25	7.250	119.9	10.00
26	6.750	124.4	10.00

RESULTS FOR STAGE 4 : Intermediate pore pressure

Calculation details
E Profiles assumed for calculation (generated)
On the LEFT: E at ground level = 150. E at bottom node = 50000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 93000. kPa

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Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.3581	19	4.980	12
2	0.4000	19	0.05620	9	3.080	13
3	0.4000	19	0.03440	8	1.210	13
4	0.4000	19	0.02800	1	0.7700	14
5	0.4000	19	0.02620	1	0.5200	14
10	0.4000	19	0.01260	1	0.09000	1
12	0.4000	19	0.006800	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	51.17	5.250	1.679	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	49.31	25.00	8.198	0.0	A 1	0	0.0	0.0	0.0	-0.05247	1.747
3	19.75	45.59	33.00	-0.009194	0.0	A 4	8	2.750	4.998	0.0	-1.694	2.032
4	19.25	41.86	39.00	4.440	0.0	4	8	8.250	10.89	0.0	-2.085	-0.8325
5	18.75	38.19	42.03	14.63	2.967	4	8	10.12	13.53	4.000	-0.8620	-2.336
6	18.25	34.51	42.10	16.70	8.900	4	8	10.25	13.92	9.000	0.2519	-1.556
7	17.75	30.83	42.17	18.90	14.83	4	8	10.75	14.50	14.00	0.6964	0.4207
8	17.25	27.14	42.23	21.38	20.77	4	8	11.45	15.12	18.80	-0.1689	3.787
9	16.75	23.46	42.30	24.62	26.70	4	8	12.25	15.60	23.50	-3.091	8.898
10	16.25	19.81	42.37	32.04	32.63	4	8	13.55	15.44	27.70	-9.067	17.36
11	15.75	16.26	42.43	34.92	38.57	4	8	13.75	16.50	33.00	-20.43	28.72
12	15.25	12.90	44.50	-0.009621	44.50	A 5	5	10.60	24.71	43.90	-37.79	28.89
13	14.75	9.883	53.20	-0.02017	45.80	A 5	5	10.60	35.19	53.90	-49.11	11.83
14	14.25	7.304	56.40	-0.02812	52.60	A 5	5	14.50	41.45	60.00	-49.61	-11.22
15	13.75	5.165	53.30	13.88	65.70	5	5	21.60	44.30	62.90	-37.89	-30.35
16	13.25	3.366	50.10	28.51	78.90	5	5	30.28	65.67	64.30	-19.27	-37.89
** 17	12.75	1.748	32.40	59.34	106.6	5	5	49.80	34.26	84.70	0.0	0.0
18	12.25	1.530	65.50	38.41	83.50	6	6	46.00	53.41	68.50	0.0	0.0
19	11.75	1.312	70.40	43.88	86.60	6	6	50.90	58.88	73.60	0.0	0.0
20	11.25	1.152	75.20	49.55	93.80	6	6	55.70	64.55	78.80	0.0	0.0
21	10.75	1.024	80.00	55.06	99.00	6	6	60.50	70.06	84.00	0.0	0.0
22	10.25	0.9124	84.90	60.53	104.1	6	6	65.40	75.53	89.10	0.0	0.0
23	9.750	0.8106	89.80	66.00	109.2	6	6	70.30	81.00	94.20	0.0	0.0
24	9.250	0.7131	94.70	71.48	114.3	6	6	75.20	86.48	99.30	0.0	0.0
25	8.750	0.6157	99.60	77.06	119.4	6	6	80.10	92.06	104.4	0.0	0.0
26	8.250	0.5190	104.4	82.73	124.6	6	6					
	84.90	97.73	109.6	0.0	0.0							
27	7.750	0.4083	109.3	87.85	129.7	6	6	89.80	102.9	114.7	0.0	0.0
28	7.250	0.2660	114.1	93.36	134.9	6	6	94.60	108.4	119.8	0.0	0.0
29	6.750	0.0	119.6	98.16	139.4	6	6	100.1	113.2	124.4	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Sheare [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	51.17	-49.86	1.397	-37.89	25.44

Surcharge 1 present in this stage

STAGE 5 : CHANGE TO DRAINED

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	20.25	1	0	8.000	32.50	27010.	2
3	19.75	4	7	8.000	32.50	27010.	3
4	19.25	4	7	8.000	32.50	27010.	4
5	18.75	4	7	8.000	32.50	27010.	5
6	18.25	4	7	8.000	32.50	27010.	6
7	17.75	4	7	8.000	32.50	27010.	7
8	17.25	4	7	8.000	32.50	27010.	8
9	16.75	4	7	8.000	32.50	27010.	9
10	16.25	4	7	8.000	32.50	27010.	10
11	15.75	4	7	8.000	32.50	27010.	11
12	15.25	3	3	8.000	32.50	27010.	12
13	14.75	3	3	8.000	32.50	27010.	13
14	14.25	3	3	8.000	32.50	27010.	14
15	13.75	3	3	8.000	32.50	27010.	15
16	13.25	3	3	8.000	32.50	27010.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 5 : Change to drained

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 73000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 87000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.1401	11	5.650	13
2	0.1000	11	0.09130	10	3.620	13
3	0.2000	11	0.06030	10	2.210	13
4	0.3000	10	0.04100	8	1.250	13
5	0.3000	10	0.03490	1	0.7600	13
10	0.4000	10	0.01750	1	0.1300	1
13	0.4000	9	0.009800	1	0.06000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	51.49	5.250	1.672	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	49.63	25.00	8.191	0.0	A 1	0	0.0	0.0	0.0	-0.05225	1.745
3	19.75	45.91	33.00	-0.010036	0.0	A 4	8	2.750	4.994	0.0	-1.692	2.027
4	19.25	42.18	39.00	4.437	0.0	4	8	8.250	10.89	0.0	-2.079	-0.8299

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5	18.75	38.57	42.03	14.45	2.947		4	7	10.12	13.54	4.000	-0.7865	-2.522
6	18.25	34.91	42.10	16.50	8.900		4	7	10.25	13.94	9.000	0.4425	-1.841
7	17.75	31.24	42.17	18.67	14.83		4	7	10.75	14.51	14.00	1.055	0.02356
8	17.25	27.57	42.23	21.11	20.77		4	7	11.45	15.14	18.80	0.4189	1.255
9	16.75	23.89	42.30	24.30	26.70		4	7	12.25	15.64	23.50	-2.200	0.205
10	16.25	20.24	42.37	31.70	32.63		4	7	13.55	15.48	27.70	-7.786	16.46
11	15.75	16.67	42.43	34.46	38.57		4	7	13.75	16.57	33.00	-18.66	27.62
12	15.25	13.28	44.50	2.407	44.50	A	3	3	10.60	25.02	43.90	-35.40	27.98
13	14.75	10.21	53.20	4.749	45.80	A	3	3	10.60	35.85	53.90	-46.64	12.67
14	14.25	7.555	54.40	5.605	52.60	A	3	3	14.50	42.30	60.00	-48.08	-8.150
15	13.75	5.329	53.30	5.806	65.70	a	3	3	21.60	44.98	62.90	-38.49	-28.27
16	13.25	3.446	50.10	26.86	78.90		3	3	30.20	45.98	64.30	-19.61	-38.49
** 17	12.75	1.745	32.40	60.35	106.6		3	3	49.80	33.02	56.70	0.0	0.0
18	12.25	1.533	65.50	38.24	83.50		6	6	46.00	53.24	68.50	0.0	0.0
19	11.75	1.315	70.40	43.77	88.60		6	6	50.90	58.77	73.60	0.0	0.0
20	11.25	1.154	75.20	49.47	93.80		6	6	55.70	64.47	78.80	0.0	0.0
21	10.75	1.025	80.00	55.00	99.00		6	6	60.50	70.00	84.00	0.0	0.0
22	10.25	0.9135	84.90	60.49	104.1		6	6	65.40	75.49	89.10	0.0	0.0
23	9.750	0.8115	89.80	65.96	109.2		6	6	70.30	80.96	94.20	0.0	0.0
24	9.250	0.7138	94.70	71.45	114.3		6	6	75.20	86.45	99.30	0.0	0.0
25	8.750	0.6162	99.60	77.03	119.4		6	6	80.10	92.03	104.4	0.0	0.0
26	8.250	0.5153	104.4	82.71	124.6		6	6					
	84.90	97.71	109.6	0.0	0.0								
27	7.750	0.4086	109.3	87.82	129.7		6	6	89.80	102.8	114.7	0.0	0.0
28	7.250	0.2662	114.1	93.32	134.9		6	6	94.60	108.3	119.9	0.0	0.0
29	6.750	0.0	119.6	98.16	139.4		6	6	100.1	113.2	124.4	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	51.49	-49.86	1.397	-38.49	29.44

Surcharge 1 present in this stage

STAGE 6 : HYDROSTATIC GROUNDWATER

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Hydrostatic groundwater

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 73000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 67000. kPa

Iter no.	Inc max displ (mm)	Node no.	Displ error (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	1.051	17	0.06000	1
2	1.100	17	0.2139	1	1.990	1
3	1.100	17	0.1635	1	1.330	1
4	1.100	17	0.1246	1	1.120	1
5	1.100	17	0.09490	1	0.9300	1
10	1.100	1	0.02440	1	0.2000	1
14	1.200	1	0.008200	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level (m)	Displ (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil	Left	Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	52.65	5.250	1.681	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	50.76	25.00	8.200	0.0	A	1	0	0.0	0.0	0.0	-0.05254	1.748
3	19.75	46.97	33.00	-8.009249	0.0	A	4	7	2.750	5.056	0.0	-1.695	2.019
4	19.25	43.19	39.00	2.971	0.0		4	7	5.250	10.95	0.0	-2.072	-1.242
5	18.75	39.43	42.50	14.19	2.500		4	7	11.25	13.99	2.500	-0.6531	-3.186
6	18.25	35.68	43.50	17.21	7.500		4	7	11.75	14.51	7.500	1.115	-2.462
7	17.75	31.91	44.50	20.35	12.50		4	7	12.25	15.09	12.50	2.009	-0.4740
8	17.25	28.13	45.50	23.77	17.50		4	7	12.75	15.66	17.50	1.589	2.867
9	16.75	24.34	46.50	27.95	22.50		4	7	13.25	16.05	22.50	-0.8567	7.670
10	16.25	20.56	47.50	36.46	27.50		4	7	13.75	15.58	27.50	-6.261	16.07
11	15.75	16.85	48.50	40.20	32.50		4	7	14.25	16.81	32.50	-16.92	27.13
12	15.25	13.30	51.50	3.629	37.50	a	3	3	17.00	27.50	37.50	-33.41	27.01
13	14.75	10.05	56.50	4.574	42.50	a	3	3	22.00	40.40	42.50	-43.94	12.09
14	14.25	7.199	61.50	6.918	47.50	a	3	3	27.00	47.16	47.50	-45.50	-6.928
15	13.75	4.750	66.50	11.80	52.50	a	3	3	32.00	48.25	52.50	-37.01	-26.10
16	13.25	2.630	71.50	38.91	57.50		3	3	37.00	46.08	57.50	-19.40	-37.01
** 17	12.75	0.8863	76.50	75.33	62.50		3	3	42.00	27.73	62.50	0.0	0.0
18	12.25	0.8431	81.50	50.70	67.50		6	6	47.00	50.70	67.50	0.0	0.0
19	11.75	0.7420	86.50	55.88	72.50		6	6	52.00	55.88	72.50	0.0	0.0
20	11.25	0.6673	91.50	61.27	77.50		6	6	57.00	61.27	77.50	0.0	0.0
21	10.75	0.5855	96.50	66.56	82.50		6	6	62.00	66.56	82.50	0.0	0.0
22	10.25	0.5145	101.5	71.83	87.50		6	6	67.00	71.83	87.50	0.0	0.0
23	9.750	0.4511	106.5	77.10	92.50		6	6	72.00	77.10	92.50	0.0	0.0
24	9.250	0.3925	111.5	82.35	97.50		6	6	77.00	82.35	97.50	0.0	0.0
25	8.750	0.3365	116.5	87.67	102.5		6	6	82.00	87.67	102.5	0.0	0.0
26	8.250	0.2812	121.5	93.08	107.5		6	6					
	87.00	93.08	107.5	0.0	0.0								
27	7.750	0.2241	126.5	98.30	112.5		6	6	92.00	98.30	112.5	0.0	0.0
28	7.250	0.1484	131.5	103.8	117.5		6	6	97.00	103.8	117.5	0.0	0.0
29	6.750	0.0	136.5	108.0	122.5		6	6	102.0	108.0	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	52.65	-49.86	2.009	-38.49	29.44

Surcharge 1 present in this stage

Results Envelope

Node	Level (m)	Displacements (mm) Min	Max	Moments (kNm/m) Min	Max	Shears (kN/m) Min	Max
1	20.50	0.0	52.65	0.0	0.0	0.0	0.0
2	20.25	0.0	50.76	-0.05254	0.0	0.0	1.748
3	19.75	0.0	46.97	-1.695	0.0	-0.2185	2.019
4	19.25	0.0	43.19	-2.085	0.0000	-1.242	0.0
5	18.75	0.0	39.43	-0.6532	0.0000	-3.186	0.0

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6	18.25	0.0	35.68	0.0	1.283	-2.462	0.0
7	17.75	0.0	31.91	0.0	2.009	-0.4740	0.6684
8	17.25	0.0	28.13	-0.5279	1.589	0.0	4.122
9	16.75	0.0	24.34	-3.641	0.0	0.0	9.340
10	16.25	0.0	20.56	-9.867	0.0	0.0	17.90
11	15.75	0.0	16.85	-21.54	0.0	0.0	29.44
12	15.25	0.0	13.30	-39.30	0.0	0.0	28.69
13	14.75	0.0	10.21	-49.86	0.0	0.0	12.67
14	14.25	0.0	7.555	-49.61	0.0	-13.15	0.0
15	13.75	0.0	5.329	-38.49	0.0	-30.42	0.0
16	13.25	0.0	3.446	-19.81	0.0	-38.69	0.0
17	12.75	0.0	1.745	0.0	0.0	0.0	0.0
18	12.25	0.0	1.533	0.0	0.0	0.0	0.0
19	11.75	0.0	1.315	0.0	0.0	0.0	0.0
20	11.25	0.0	1.154	0.0	0.0	0.0	0.0
21	10.75	0.0	1.025	0.0	0.0	0.0	0.0
22	10.25	0.0	0.9135	0.0	0.0	0.0	0.0
23	9.75	0.0	0.8115	0.0	0.0	0.0	0.0
24	9.25	0.0	0.7138	0.0	0.0	0.0	0.0
25	8.75	0.0	0.6162	0.0	0.0	0.0	0.0
26	8.25	0.0	0.5153	0.0	0.0	0.0	0.0
27	7.75	0.0	0.4086	0.0	0.0	0.0	0.0
28	7.25	0.0	0.2662	0.0	0.0	0.0	0.0
29	6.75	0.0	0.0	0.0	0.0	0.0	0.0

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/27	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH.

LX 16 Sheet Pile Wall – Analysis Results

Sheets SP/28 to SP/35 show the results of the ULS analysis wall 2-1-2 uls.fwd

The maximum ULS bending moment is 84 kNm per m under short term ground conditions when the surcharge was applied. This is less than the moment capacity of LX 16 section at 262.6 kNm per m. (see sheet SP/28). Hence LX16 section has adequate capacity.

Sheets SP/36 to SP/ show the results of the SLS analysis wall 2-1-2 sls.fwd.

The maximum wall deflection under short and long term ground conditions was predicted to be around 50mm at the top of the wall. This wall deflection could result in a road surface settlement of around 25mm at the perimeter.

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Oasys

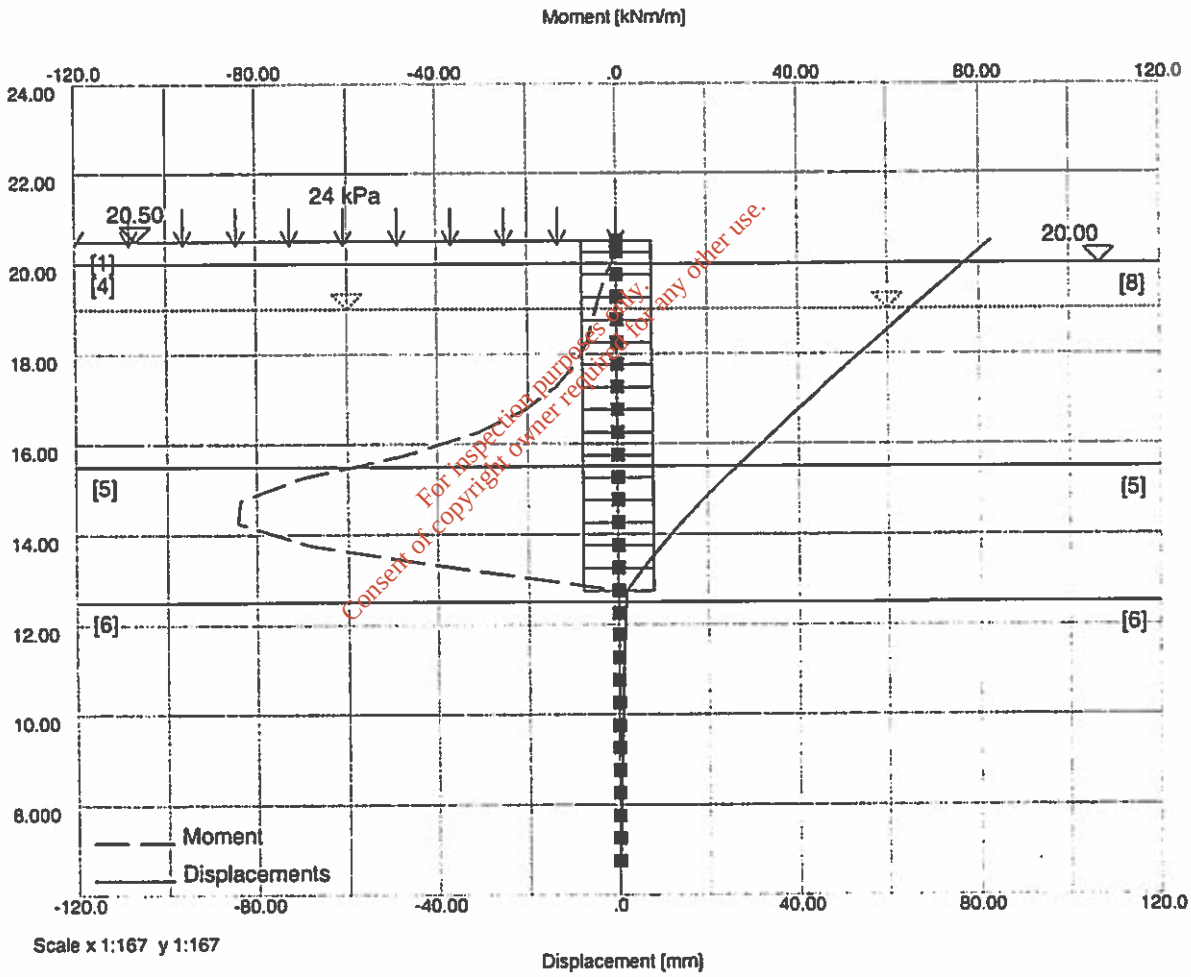
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/28	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 uls.fwd	CH.

ULS Wall bending moment and deflection
Short term condition



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STAGE 3 : Apply surcharge

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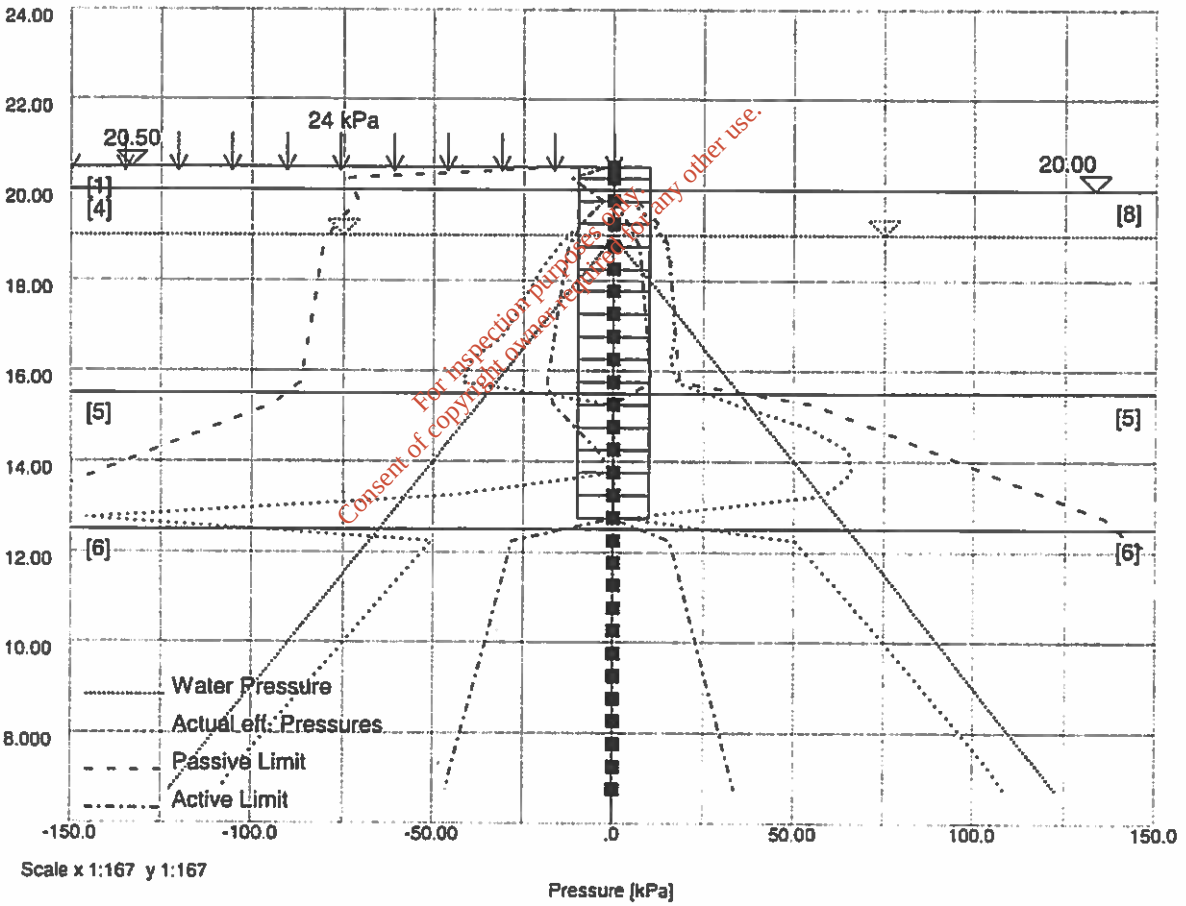
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/29	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 uls.fwd	CH

ULS Earth pressure distribution short term condition



STAGE 3 : Apply surcharge

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Oasys

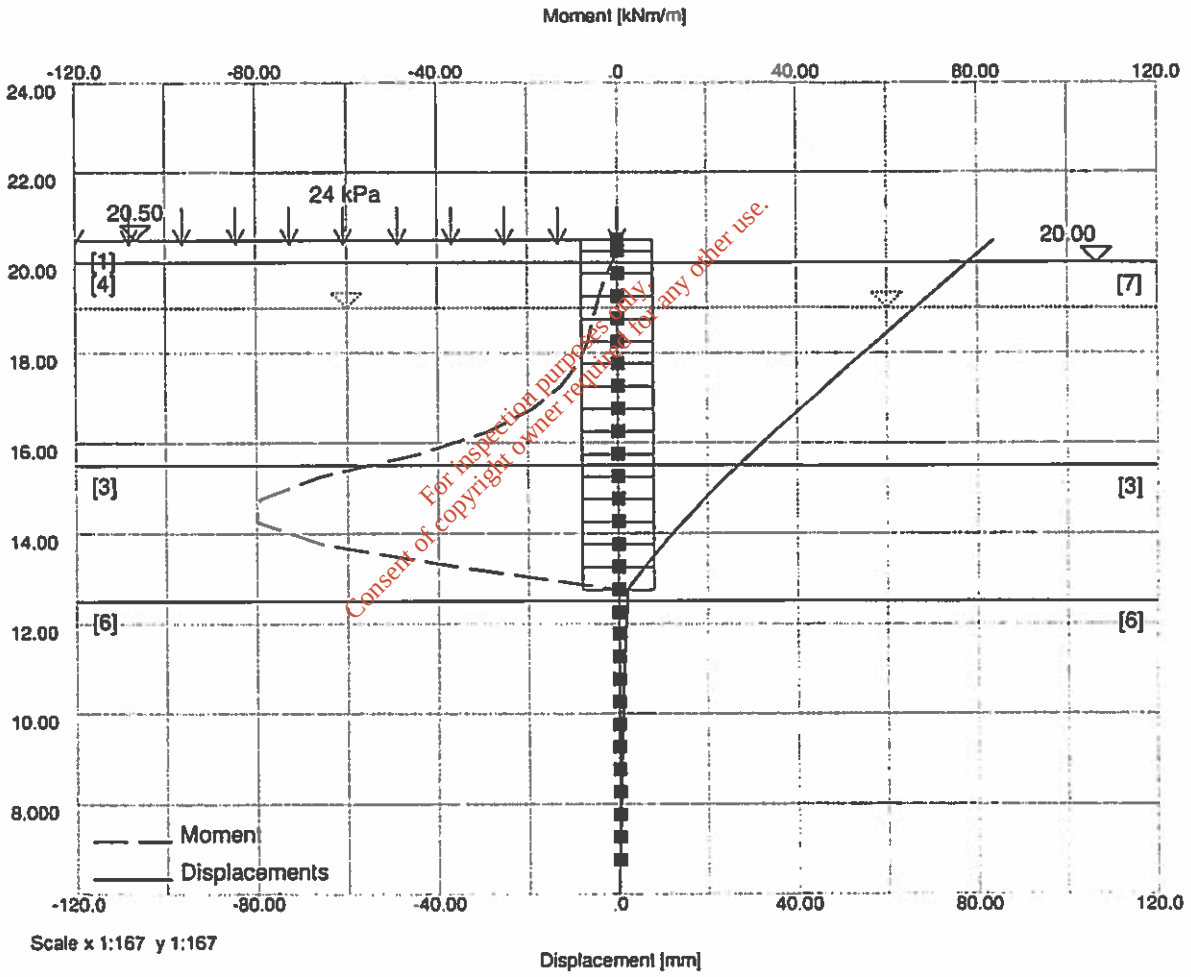
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/30	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 uls.fwd	C.H.

uls long term ground conditions.



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STAGE 4 : Hydrostatic groundwater

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	KD	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.510	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	cB [kPa]	y0	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	0.0	0.0	333.0	0.0
3	1.000	15.50	0.0	5010.	3300.
4	17.00	0.0	0.0	1667.	0.0
5	16.70	15.50	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	3	-	Left	20.40	25.00			

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI Below node [kN=2/m]	Node
1	20.50	0	0	6.000	32.50	65470.	1
2	20.25	0	0	6.000	32.50	65470.	2
3	19.75	2	7	6.000	32.50	65470.	3
4	19.25	2	7	6.000	32.50	65470.	4
5	18.75	2	7	6.000	32.50	65470.	5
6	18.25	2	7	6.000	32.50	65470.	6
7	17.75	2	7	6.000	32.50	65470.	7
8	17.25	2	7	6.000	32.50	65470.	8
9	16.75	2	7	6.000	32.50	65470.	9
10	16.25	2	7	6.000	32.50	65470.	10
11	15.75	2	7	6.000	32.50	65470.	11
12	15.25	3	3	6.000	32.50	65470.	12
13	14.75	3	3	6.000	32.50	65470.	13
14	14.25	3	3	6.000	32.50	65470.	14
15	13.75	3	3	6.000	32.50	65470.	15
16	13.25	3	3	6.000	32.50	65470.	16
** 17	12.75	3	3	6.000	32.50	0.0	17
18	12.25	6	6	6.000	32.50	0.0	18
19	11.75	6	6	6.000	32.50	0.0	19
20	11.25	6	6	6.000	32.50	0.0	20
21	10.75	6	6	6.000	32.50	0.0	21
22	10.25	6	6	6.000	32.50	0.0	22
23	9.750	6	6	6.000	32.50	0.0	23
24	9.250	6	6	6.000	32.50	0.0	24
25	8.750	6	6	6.000	32.50	0.0	25
26	8.250	6	6	6.000	32.50	0.0	26
27	7.750	6	6	6.000	32.50	0.0	27
28	7.250	6	6	6.000	32.50	0.0	28
29	6.750	6	6	6.000	32.50	0.0	29

** Wall toe level: 12.75

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	6.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 55000. kPa
On the RIGHT: E at ground level = 150. E at bottom node = 56000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	14.30	7	0.0	6
2	14.40	7	0.0	7	0.0	0
3	14.30	7	0.0	7	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]

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1	20.50	3.547	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	5.098	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	8.623	3.000	2.738	0.0	2	7	2.750	2.738	0.0	0.0	0.0
4	19.25	11.81	9.000	8.418	0.0	2	7	8.250	8.418	0.0	0.0	0.0
5	18.75	13.16	12.50	11.62	2.500	2	7	11.25	11.62	2.500	0.0	0.0
6	18.25	13.98	13.50	12.33	7.500	2	7	11.75	12.33	7.500	0.0	0.0
7	17.75	14.40	14.50	13.05	12.50	2	7	12.25	13.05	12.50	0.0	0.0
8	17.25	14.32	15.50	13.78	17.50	2	7	12.75	13.78	17.50	0.0	0.0
9	16.75	13.71	16.50	14.51	22.50	2	7	13.25	14.51	22.50	0.0	0.0
10	16.25	12.42	17.50	15.24	27.50	2	7	13.75	15.24	27.50	0.0	0.0
11	15.75	9.846	18.50	16.03	32.50	2	7	14.25	16.03	32.50	0.0	0.0
12	15.25	6.385	21.50	18.05	37.50	3	3	17.00	18.05	37.50	0.0	0.0
13	14.75	2.479	26.50	23.37	42.50	3	3	22.00	23.37	42.50	0.0	0.0
14	14.25	1.732	31.50	28.51	47.50	3	3	27.00	28.51	47.50	0.0	0.0
15	13.75	1.327	36.50	33.59	52.50	3	3	32.00	33.59	52.50	0.0	0.0
16	13.25	1.040	41.50	38.66	57.50	3	3	37.00	38.66	57.50	0.0	0.0
17	12.75	0.7860	46.50	43.72	62.50	3	3	42.00	43.72	62.50	0.0	0.0
18	12.25	0.5450	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.4319	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.3693	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.3242	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.2868	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.2532	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0
24	9.250	0.2213	81.50	78.75	97.50	6	6	77.00	78.75	97.50	0.0	0.0
25	8.750	0.1896	86.50	83.84	102.5	6	6	82.00	83.84			
	102.5	0.0	0.0									
26	8.250	0.1572	91.50	88.94	107.5	6	6	87.00	88.94	107.5	0.0	0.0
27	7.750	0.1247	96.50	93.99	112.5	6	6	92.00	93.99	112.5	0.0	0.0
28	7.250	0.08131	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	10.83E-6	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	0	0	8.000	32.50	65470.	1
2	20.25	0	0	8.000	32.50	65470.	2
3	19.75	4	8	8.000	32.50	65470.	3
4	19.25	4	8	8.000	32.50	65470.	4
5	18.75	4	8	8.000	32.50	65470.	5
6	18.25	4	8	8.000	32.50	65470.	6
7	17.75	4	8	8.000	32.50	65470.	7
8	17.25	4	8	8.000	32.50	65470.	8
9	16.75	4	8	8.000	32.50	65470.	9
10	16.25	4	8	8.000	32.50	65470.	10
11	15.75	4	8	8.000	32.50	65470.	11
12	15.25	5	5	8.000	32.50	65470.	12
13	14.75	5	5	8.000	32.50	65470.	13
14	14.25	5	5	8.000	32.50	65470.	14
15	13.75	5	5	8.000	32.50	65470.	15
16	13.25	5	5	8.000	32.50	65470.	16
** 17	12.75	5	5	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 1 : Install wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 61000. kPa
On the RIGHT: E at ground level = 150. E at bottom node = 62000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	0.0	3.000	2.738	0.0	4	8	2.750	2.738	0.0	0.0	0.0
4	19.25	0.0	9.000	8.418	0.0	4	8	8.250	8.418	0.0	0.0	0.0
5	18.75	0.0	12.50	11.62	2.500	4	8	11.25	11.62	2.500	0.0	0.0
6	18.25	0.0	13.50	12.33	7.500	4	8	11.75	12.33	7.500	0.0	0.0
7	17.75	0.0	14.50	13.05	12.50	4	8	12.25	13.05	12.50	0.0	0.0
8	17.25	0.0	15.50	13.78	17.50	4	8	12.75	13.78	17.50	0.0	0.0
9	16.75	0.0	16.50	14.51	22.50	4	8	13.25	14.51	22.50	0.0	0.0
10	16.25	0.0	17.50	15.24	27.50	4	8	13.75	15.24	27.50	0.0	0.0
11	15.75	0.0	18.50	16.03	32.50	4	8	14.25	16.03	32.50	0.0	0.0
12	15.25	0.0	21.50	18.05	37.50	5	5	17.00	18.05	37.50	0.0	0.0
13	14.75	0.0	26.50	23.37	42.50	5	5	22.00	23.37	42.50	0.0	0.0
14	14.25	0.0	31.50	28.51	47.50	5	5	27.00	28.51	47.50	0.0	0.0
15	13.75	0.0	36.50	33.59	52.50	5	5	32.00	33.59	52.50	0.0	0.0
16	13.25	0.0	41.50	38.66	57.50	5	5	37.00	38.66	57.50	0.0	0.0
** 17	12.75	0.0	46.50	43.72	62.50	5	5	42.00	43.72	62.50	0.0	0.0
18	12.25	0.0	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.0	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.0	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.0	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.0	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.0	76.50	73.67	92.50	6	6	72.00	73.67	92.50	0.0	0.0
24	9.250	0.0	81.50	78.75	97.50	6	6	77.00	78.75	97.50	0.0	0.0
25	8.750	0.0	86.50	83.84	102.5	6	6	82.00	83.84	102.5	0.0	0.0
26	8.250	0.0	91.50	88.94	107.5	6	6					
	87.00	88.94	107.5	0.0	0.0							
27	7.750	0.0	96.50	93.99	112.5	6	6	92.00	93.99	112.5	0.0	0.0
28	7.250	0.0	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	0.0	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

** Wall toe level: 12.75
MAXIMA - Residual moment = 11 at peak moment in wall

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EPA Export 08-07-2014:23:43:22

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : ADD ENGINEERED FILL

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	20.25	1	0	8.000	32.50	65470.	2
3	19.75	4	8	8.000	32.50	65470.	3
4	19.25	4	8	8.000	32.50	65470.	4
5	18.75	4	8	8.000	32.50	65470.	5
6	18.25	4	8	8.000	32.50	65470.	6
7	17.75	4	8	8.000	32.50	65470.	7
8	17.25	4	8	8.000	32.50	65470.	8
9	16.75	4	8	8.000	32.50	65470.	9
10	16.25	4	8	8.000	32.50	65470.	10
11	15.75	4	8	8.000	32.50	65470.	11
12	15.25	5	5	8.000	32.50	65470.	12
13	14.75	5	5	8.000	32.50	65470.	13
14	14.25	5	5	8.000	32.50	65470.	14
15	13.75	5	5	8.000	32.50	65470.	15
16	13.25	5	5	8.000	32.50	65470.	16
** 17	12.75	5	5	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 2 : Add engineered fill

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 53000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 62000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	8.811	1	0.0	0
2	5.800	1	4.980	1	35.46	1
3	13.80	1	3.146	1	20.96	1
4	16.50	1	1.974	1	13.13	1
5	18.90	1	1.240	1	8.250	1
10	22.00	1	0.1509	1	0.9100	1
15	22.40	1	0.02250	1	0.1400	1
16	22.40	1	0.007200	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level (m)	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	22.42	1.250	0.4703	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	21.65	5.000	1.970	0.0	A 1	0	0.0	0.0	0.0	-0.01470	0.4262
3	19.75	20.12	13.00	-0.005829	0.0	A 4	8	2.750	1.385	0.0	-0.4135	-0.05009
4	19.25	18.58	19.00	10.11	0.0	4	8	8.250	9.125	0.0	0.03540	-0.6523
5	18.75	17.05	22.50	14.06	2.500	4	8	11.25	12.49	2.500	0.2388	-0.01419
6	18.25	15.51	23.50	15.34	7.500	4	8	11.75	13.22	7.500	0.04959	0.5085
7	17.75	13.98	24.50	16.67	12.50	4	8	12.25	13.90	12.50	-0.6697	2.132
8	17.25	12.45	25.50	18.10	17.50	4	8	12.75	14.55	17.50	-2.082	3.713
9	16.75	10.92	26.50	19.72	22.50	4	8	13.25	15.14	22.50	-4.383	5.746
10	16.25	9.417	27.50	22.49	27.50	4	8	13.75	15.41	27.50	-7.829	8.661
11	15.75	7.943	28.50	23.90	32.50	4	8	14.25	16.43	32.50	-13.04	12.30
12	15.25	6.519	31.50	11.84	37.50	5	5	17.00	22.50	37.50	-20.13	11.50
13	14.75	5.170	36.50	11.83	42.50	5	5	22.00	31.71	42.50	-24.55	3.869
14	14.25	3.912	41.50	18.70	47.50	5	5	27.00	36.51	47.50	-24.00	-6.052
15	13.75	2.742	46.50	28.83	52.50	5	5	32.00	42.50	52.50	-18.50	-14.42
16	13.25	1.641	51.50	41.59	57.50	5	5	37.00	44.23	57.50	-9.578	-18.50
** 17	12.75	0.5757	56.50	72.60	62.50	5	5	42.00	33.29	62.50	0.0	0.0
18	12.25	0.5382	61.50	48.77	67.50	6	6	47.00	48.77	67.50	0.0	0.0
19	11.75	0.4524	66.50	54.02	72.50	6	6	52.00	54.02	72.50	0.0	0.0
20	11.25	0.3644	71.50	59.29	77.50	6	6	57.00	59.29	77.50	0.0	0.0
21	10.75	0.3309	76.50	64.49	82.50	6	6	62.00	64.49	82.50	0.0	0.0
22	10.25	0.2864	81.50	69.65	87.50	6	6	67.00	69.65	87.50	0.0	0.0
23	9.750	0.2478	86.50	74.80	92.50	6	6	72.00	74.80	92.50	0.0	0.0
24	9.250	0.2133	91.50	79.96	97.50	6	6	77.00	79.96	97.50	0.0	0.0
25	8.750	0.1810	96.50	85.14	102.5	6	6	82.00	85.14	102.5	0.0	0.0
26	8.250	0.1499	101.5	90.36	107.5	6	6					
	87.00	90.36	107.5	0.0	0.0							
27	7.750	0.1188	106.5	95.46	112.5	6	6	92.00	95.46	112.5	0.0	0.0
28	7.250	0.07854	111.5	100.7	117.5	6	6	97.00	100.7	117.5	0.0	0.0
29	6.750	0.0	116.5	105.5	122.5	6	6	102.0	105.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	22.42	-24.55	0.2388	-18.50	12.30

STAGE 3 : APPLY SURCHARGE

RESULTS FOR STAGE 3 : Apply surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 53000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 62000. kPa

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EPA Export 08-07-2014:23:43:22

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	31.48	1	1.710	2
2	21.50	1	12.41	1	87.02	1
3	33.90	1	7.672	1	52.16	2
4	41.80	1	5.152	1	32.85	2
5	46.90	1	3.604	1	21.42	2
10	57.00	1	0.7128	1	3.840	1
15	59.30	1	0.1966	1	1.050	1
20	59.90	1	0.05650	1	0.3000	1
28	60.20	1	0.008500	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	82.59	6.050	2.385	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	79.72	29.00	11.57	0.0	A	1	0	0.0	0.0	0.0	-0.07454	2.467
3	19.75	73.96	37.00	2.994	0.0	A	4	8	2.750	5.130	0.0	-2.392	4.101
4	19.25	68.21	41.00	8.992	0.0	A	4	8	8.250	11.03	0.0	-4.176	3.059
5	18.75	62.48	46.50	15.32	2.500		4	8	11.25	14.82	2.500	-5.491	2.674
6	18.25	56.77	47.50	20.10	7.500		4	8	11.75	15.59	7.500	-6.850	3.924
7	17.75	51.09	48.50	23.43	12.50		4	8	12.25	16.16	12.50	-9.375	6.868
8	17.25	45.44	49.50	26.91	17.50		4	8	12.75	16.59	17.50	-13.72	11.27
9	16.75	39.85	50.50	30.99	22.50		4	8	13.25	16.81	22.50	-20.64	17.39
10	16.25	34.36	51.50	39.34	27.50		4	8	13.75	15.65	27.50	-31.11	26.81
11	15.75	28.95	52.50	41.81	32.50		4	8	14.25	17.49	32.50	-47.45	38.76
12	15.25	23.75	55.50	-0.008335	37.50	A	5	5	17.00	34.32	37.50	-69.87	36.26
13	14.75	18.80	60.50	-0.01295	42.50	A	5	5	22.00	51.91	42.50	-83.71	14.20
14	14.25	14.17	65.50	-0.01848	47.50	A	5	5	27.00	65.11	47.50	-84.07	-15.56
15	13.75	9.853	70.50	-0.02035	52.50	A	5	5	32.00	65.96	52.50	-68.15	-48.34
16	13.25	5.782	75.50	45.11	57.50		5	5	37.00	56.38	57.50	-35.74	-68.15
** 17	12.75	1.843	80.50	145.8	62.50		5	5	42.00	2.857	62.50	0.0	0.0
18	12.25	1.806	85.50	50.41	67.50		6	6	47.00	50.41	67.50	0.0	0.0
19	11.75	1.534	90.50	55.75	72.50		6	6	52.00	55.75	72.50	0.0	0.0
20	11.25	1.308	95.50	61.35	77.50		6	6	57.00	61.35	77.50	0.0	0.0
21	10.75	1.127	100.5	66.79	82.50		6	6	62.00	66.79	82.50	0.0	0.0
22	10.25	0.9764	105.5	72.13	87.50		6	6	67.00	72.13	87.50	0.0	0.0
23	9.750	0.8454	110.5	77.45	92.50		6	6	72.00	77.65	92.50	0.0	0.0
24	9.250	0.7278	115.5	82.79	97.50		6	6	77.00	82.79	97.50	0.0	0.0
25	8.750	0.6180	120.5	88.20	102.5		6	6	82.00	88.20	102.5	0.0	0.0
26	8.250	0.5118	125.5	93.74	107.5		6	6					
	87.00	93.74	107.5	0.0	0.0								
27	7.750	0.4060	130.5	98.93	112.5		6	6	92.00	98.93	112.5	0.0	0.0
28	7.250	0.2686	135.5	104.4	117.5		6	6	97.00	104.4	117.5	0.0	0.0
29	6.750	0.0	140.5	108.5	122.5		6	6	102.0	108.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	82.59	-84.07	0.2388	-68.15	38.76

Surcharge 1 present in this stage

STAGE 4 : HYDROSTATIC GROUNDWATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	20.25	1	0	8.000	32.50	65470.	2
3	19.75	4	7	8.000	32.50	65470.	3
4	19.25	4	7	8.000	32.50	65470.	4
5	18.75	4	7	8.000	32.50	65470.	5
6	18.25	4	7	8.000	32.50	65470.	6
7	17.75	4	7	8.000	32.50	65470.	7
8	17.25	4	7	8.000	32.50	65470.	8
9	16.75	4	7	8.000	32.50	65470.	9
10	16.25	4	7	8.000	32.50	65470.	10
11	15.75	4	7	8.000	32.50	65470.	11
12	15.25	3	3	8.000	32.50	65470.	12
13	14.75	3	3	8.000	32.50	65470.	13
14	14.25	3	3	8.000	32.50	65470.	14
15	13.75	3	3	8.000	32.50	65470.	15
16	13.25	3	3	8.000	32.50	65470.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 4 : Hydrostatic groundwater

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 49000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 58000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.2029	9	7.400	15
2	0.2000	9	0.1660	6	4.110	15
3	0.4000	9	0.1647	1	2.770	15
4	0.5000	7	0.1548	1	1.760	15
5	0.6000	5	0.1382	1	1.050	15
10	1.100	1	0.05860	1	0.2900	1
15	1.300	1	0.02120	1	0.1100	1
19	1.400	1	0.009100	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	83.99	6.050	2.385	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0

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2	20.25	81.08	29.00	11.56	0.0	A	1	0	0.0	0.0	0.0	-0.07445	2.466
3	19.75	75.27	37.00	2.994	0.0	A	4	7	2.750	5.160	0.0	-2.391	4.092
4	19.25	69.46	43.00	8.992	0.0	A	4	7	8.250	11.06	0.0	-4.167	3.034
5	18.75	63.67	46.50	14.39	2.500		4	7	11.25	14.86	2.500	-5.425	2.398
6	18.25	57.91	47.50	19.57	7.500		4	7	11.75	15.64	7.500	-6.566	3.261
7	17.75	52.16	48.50	22.94	12.50		4	7	12.25	16.21	12.50	-8.686	5.927
8	17.25	46.46	49.50	26.45	17.50		4	7	12.75	16.64	17.50	-12.49	10.06
9	16.75	40.80	50.50	30.53	22.50		4	7	13.25	16.85	22.50	-18.75	15.93
10	16.25	35.21	51.50	36.97	27.50		4	7	13.75	15.88	27.50	-28.42	25.12
11	15.75	29.74	52.50	41.36	32.50		4	7	14.25	17.56	32.50	-43.67	36.85
12	15.25	24.44	55.50	2.282	37.50	A	3	3	17.00	24.68	37.50	-65.28	34.71
13	14.75	19.38	60.50	3.928	42.50	A	3	3	22.00	54.67	42.50	-78.58	13.93
14	14.25	14.61	65.50	5.575	47.50	A	3	3	27.00	66.09	47.50	-79.20	-11.89
15	13.75	10.14	70.50	7.223	52.50	A	3	3	32.00	66.83	52.50	-64.70	-41.92
16	13.25	5.906	75.50	35.22	57.50		3	3	37.00	58.73	57.50	-35.29	-64.70
** 17	12.75	1.862	80.50	147.7	62.50		3	3	42.00	6.515	62.50	0.0	0.0
18	12.25	1.846	85.50	47.86	67.50		6	6	47.00	47.86	67.50	0.0	0.0
19	11.75	1.554	90.50	55.22	72.50		6	6	52.00	55.22	72.50	0.0	0.0
20	11.25	1.320	95.50	61.00	77.50		6	6	57.00	61.00	77.50	0.0	0.0
21	10.75	1.136	100.5	66.56	82.50		6	6	62.00	66.56	82.50	0.0	0.0
22	10.25	0.9822	105.5	71.96	87.50		6	6	67.00	71.96	87.50	0.0	0.0
23	9.750	0.8496	110.5	77.32	92.50		6	6	72.00	77.32	92.50	0.0	0.0
24	9.250	0.7309	115.5	82.69	97.50		6	6	77.00	82.69	97.50	0.0	0.0
25	8.750	0.6202	120.5	88.12	102.5		6	6	82.00	88.12	102.5	0.0	0.0
26	8.250	0.5134	125.5	93.66	107.5		6	6					
	87.00	93.66	107.5	0.0	0.0								
27	7.750	0.4071	130.5	98.85	112.5		6	6	92.00	98.85	112.5	0.0	0.0
28	7.250	0.2693	135.5	104.3	117.5		6	6	97.00	104.3	117.5	0.0	0.0
29	6.750	0.0	140.5	108.5	122.5		6	6	102.0	108.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	83.99	-84.07	0.2388	-68.15	38.76

Surcharge 1 present in this stage

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	83.99	0.0	0.0	0.0	0.0
2	20.25	0.0	81.08	-0.07454	0.0	0.0	2.467
3	19.75	0.0	75.27	-2.392	0.0	-0.05009	4.101
4	19.25	0.0	69.46	-6.176	0.03548	-0.6523	3.059
5	18.75	0.0	63.67	-5.451	0.2388	-0.01419	2.574
6	18.25	0.0	57.91	-6.850	0.04959	0.0	3.924
7	17.75	0.0	52.16	-9.375	0.0	0.0	6.868
8	17.25	0.0	46.46	-13.72	0.0	0.0	11.27
9	16.75	0.0	40.80	-20.66	0.0	0.0	17.39
10	16.25	0.0	35.21	-31.11	0.0	0.0	26.61
11	15.75	0.0	29.74	-47.65	0.0	0.0	38.76
12	15.25	0.0	24.44	-69.67	0.0	0.0	36.60
13	14.75	0.0	19.38	-83.71	0.0	0.0	14.20
14	14.25	0.0	14.61	-84.07	0.0	-15.56	0.0
15	13.75	0.0	10.14	-68.15	0.0	-48.34	0.0
16	13.25	0.0	5.906	-35.74	0.0	-68.15	0.0
17	12.75	0.0	1.865	0.0	0.0	0.0	0.0
18	12.25	0.0	1.846	0.0	0.0	0.0	0.0
19	11.75	0.0	1.554	0.0	0.0	0.0	0.0
20	11.25	0.0	1.320	0.0	0.0	0.0	0.0
21	10.75	0.0	1.136	0.0	0.0	0.0	0.0
22	10.25	0.0	0.9822	0.0	0.0	0.0	0.0
23	9.75	0.0	0.8496	0.0	0.0	0.0	0.0
24	9.25	0.0	0.7309	0.0	0.0	0.0	0.0
25	8.75	0.0	0.6202	0.0	0.0	0.0	0.0
26	8.25	0.0	0.5134	0.0	0.0	0.0	0.0
27	7.75	0.0	0.4071	0.0	0.0	0.0	0.0
28	7.25	0.0	0.2693	0.0	0.0	0.0	0.0
29	6.75	0.0	0.0	0.0	0.0	0.0	0.0

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Oasys

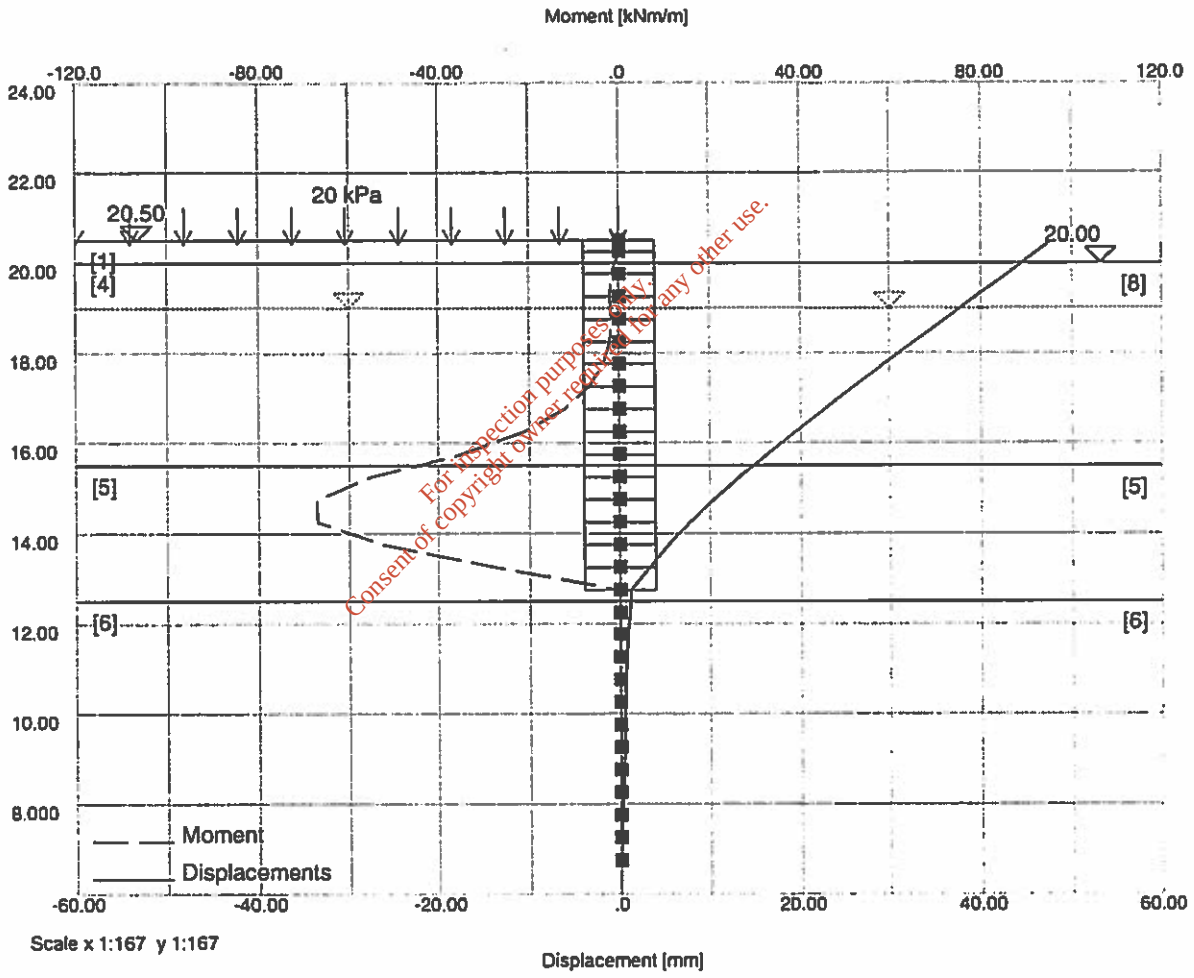
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/36	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 sls.fwd	CH

SLS wall bending moment and deflection short term conditions



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STAGE 3 : Apply surcharge

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Oasys

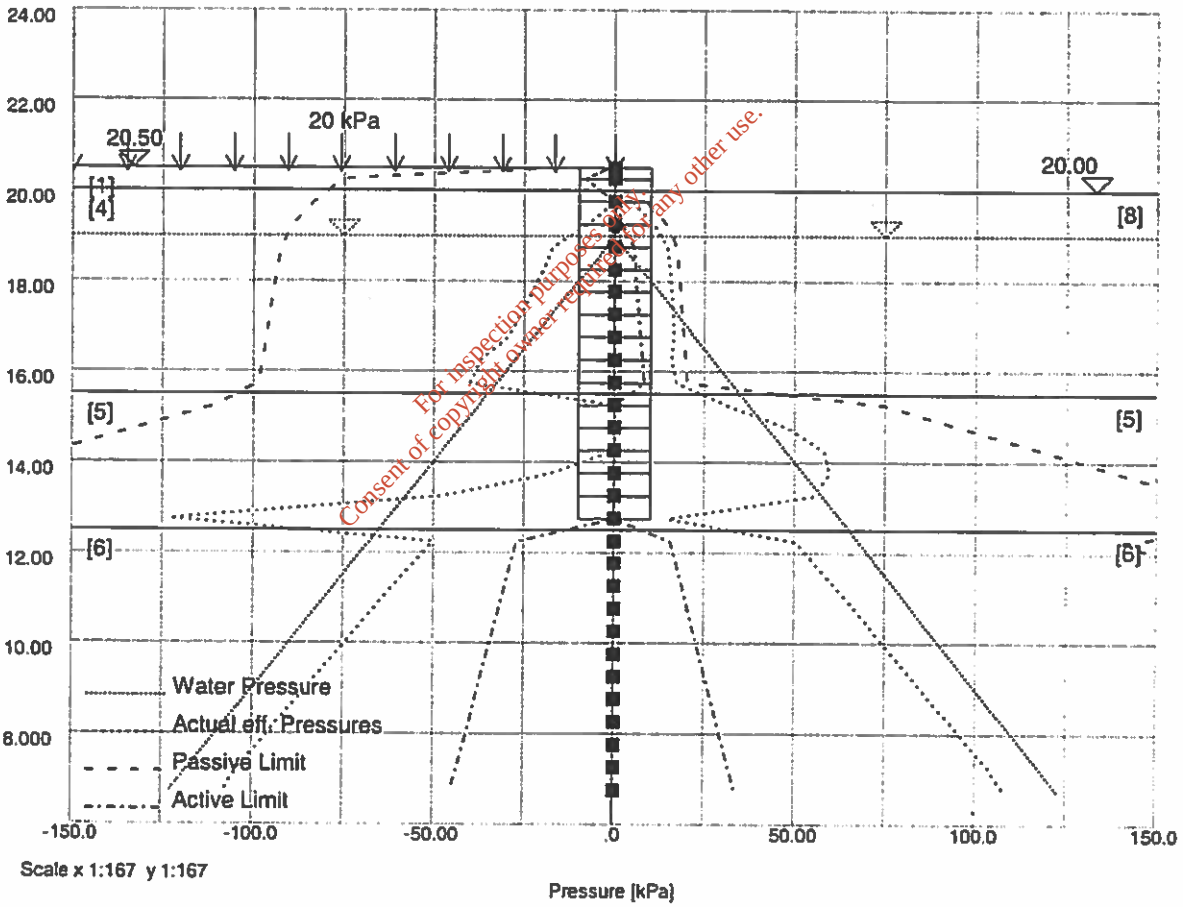
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/37	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 sls.fwd	CH

SLS Earth pressure distribution
Short term conditions.



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STAGE 3 : Apply surcharge

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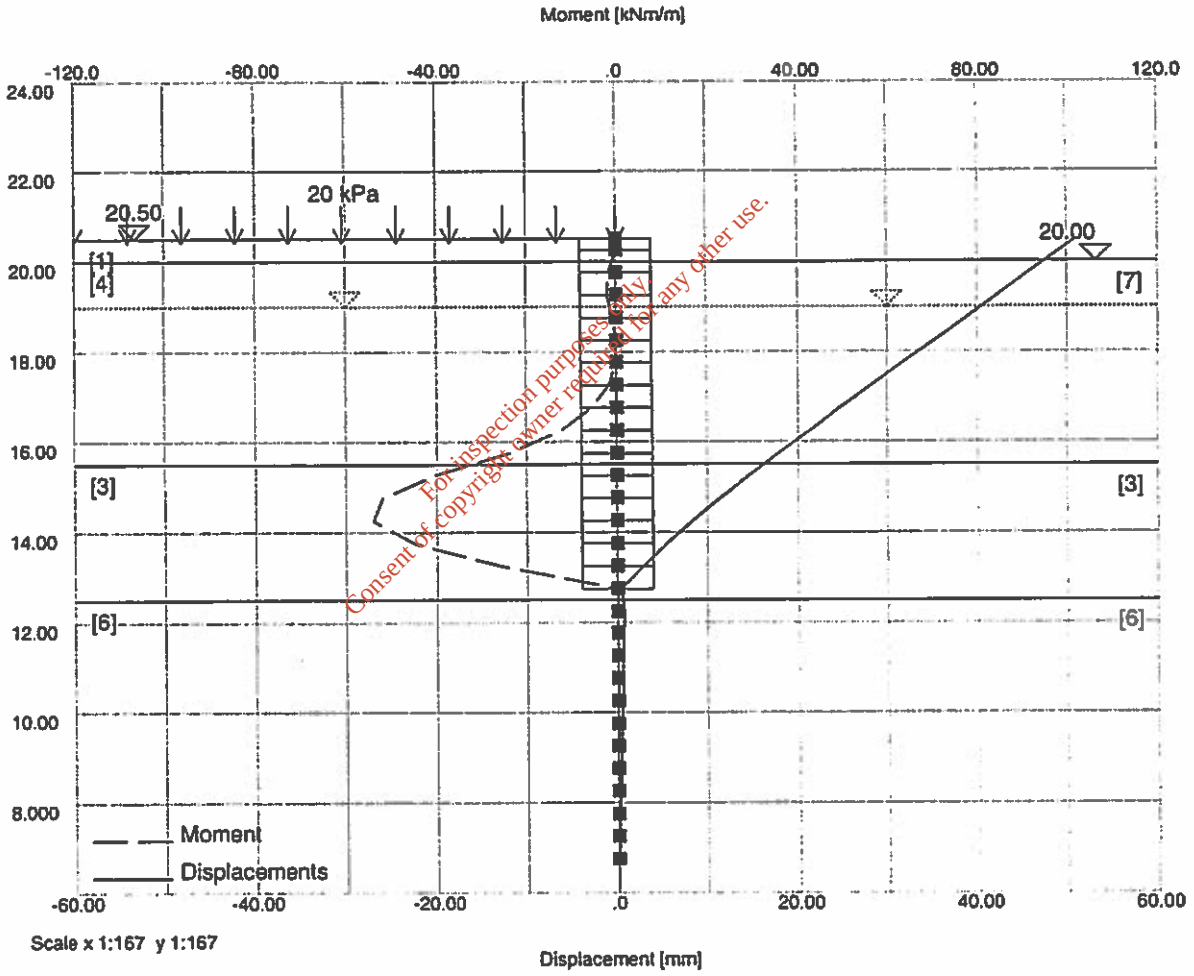
Corrib Field Development
Haul roads 4.5m of peat - no prop

Job No.	Sheet No.	Rev.
114662	SP/38	

Drg. Ref.

Made by	Date	Data	Checked
NP	28-Nov-2003	wall 2-1-2 sls.fwd	CH

SLS Long term ground conditions



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STAGE 6 : Hydrostatic groundwater

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5000	0.3300	3.000	1.150	3.460	0.3300	User_Specified
2	12.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
3	20.00	1.000	0.2700	4.850	1.060	4.400	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.000	1.150	3.460	0.2500	User_Specified
7	11.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	45000.	0.0
2	3.000	0.0	0.0	500.0	0.0
3	1.000	15.50	0.0	7500.	5010.
4	25.00	0.0	0.0	2500.	0.0
5	25.00	15.50	16.70	12500.	8350.
6	0.0	0.0	0.0	75000.	0.0
7	3.000	0.0	0.0	480.0	0.0
8	3.000	0.0	0.0	466.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	32.00	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	3	-	Left	20.40	20.00			

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	0	0	8.000	32.50	65470.	1
2	20.25	0	0	8.000	32.50	65470.	2
3	19.75	2	7	8.000	32.50	65470.	3
4	19.25	2	7	8.000	32.50	65470.	4
5	18.75	2	7	8.000	32.50	65470.	5
6	18.25	2	7	8.000	32.50	65470.	6
7	17.75	2	7	8.000	32.50	65470.	7
8	17.25	2	7	8.000	32.50	65470.	8
9	16.75	2	7	8.000	32.50	65470.	9
10	16.25	2	7	8.000	32.50	65470.	10
11	15.75	2	7	8.000	32.50	65470.	11
12	15.25	3	3	8.000	32.50	65470.	12
13	14.75	3	3	8.000	32.50	65470.	13
14	14.25	3	3	8.000	32.50	65470.	14
15	13.75	3	3	8.000	32.50	65470.	15
16	13.25	3	3	8.000	32.50	65470.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 500
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 300. E at bottom node = 67000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 67000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.598	7	0.0	0
2	9.606	7	0.0	7	0.0	0
3	9.606	7	0.0	7	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	EI [kNm²/m]	Shear [kN/m]

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1	20.50	2.363	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	3.397	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	5.879	3.000	2.738	0.0	2	7	2.750	2.738	0.0	0.0	0.0
4	19.25	7.872	9.000	8.418	0.0	2	7	8.250	8.418	0.0	0.0	0.0
5	18.75	8.767	12.50	11.62	2.500	2	7	11.25	11.62	2.500	0.0	0.0
6	18.25	9.317	13.50	12.33	7.500	2	7	11.75	12.33	7.500	0.0	0.0
7	17.75	9.598	14.50	13.05	12.50	2	7	12.25	13.05	12.50	0.0	0.0
8	17.25	9.941	15.50	13.77	17.50	2	7	12.75	13.77	17.50	0.0	0.0
9	16.75	9.134	16.50	14.50	22.50	2	7	13.25	14.50	22.50	0.0	0.0
10	16.25	8.276	17.50	15.24	27.50	2	7	13.75	15.24	27.50	0.0	0.0
11	15.75	6.028	18.50	16.03	32.50	2	7	14.25	16.03	32.50	0.0	0.0
12	15.25	2.922	21.50	18.05	37.50	3	3	17.00	18.05	37.50	0.0	0.0
13	14.75	1.650	26.50	23.37	42.50	3	3	22.00	23.37	42.50	0.0	0.0
14	14.25	1.152	31.50	28.51	47.50	3	3	27.00	28.51	47.50	0.0	0.0
15	13.75	0.8821	36.50	33.58	52.50	3	3	32.00	33.58	52.50	0.0	0.0
16	13.25	0.6911	41.50	38.65	57.50	3	3	37.00	38.65	57.50	0.0	0.0
17	12.75	0.5224	46.50	43.72	62.50	3	3	42.00	43.72	62.50	0.0	0.0
18	12.25	0.3627	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.2877	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.2460	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.2160	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.1911	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.1688	76.50	73.67	92.50	6	6	72.09	73.67	92.50	0.0	0.0
24	9.250	0.1475	81.50	78.76	97.50	6	6	77.00	78.76	97.50	0.0	0.0
25	8.750	0.1264	86.50	83.84	102.5	6	6	82.00	83.84			
	102.5	0.0	0.0									
26	8.250	0.1048	91.50	88.94	107.5	6	6	87.00	88.94	107.5	0.0	0.0
27	7.750	0.08312	96.50	94.00	112.5	6	6	92.00	94.00	112.5	0.0	0.0
28	7.250	0.05420	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	7.218E-6	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level	Soil		Boundary		EI below node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	20.50	0	0	0.000	32.50	65470.	1
2	20.25	0	0	0.000	32.50	65470.	2
3	19.75	4	8	0.000	32.50	65470.	3
4	19.25	4	8	0.000	32.50	65470.	4
5	18.75	4	8	0.000	32.50	65470.	5
6	18.25	4	8	0.000	32.50	65470.	6
7	17.75	4	8	0.000	32.50	65470.	7
8	17.25	4	8	0.000	32.50	65470.	8
9	16.75	4	8	0.000	32.50	65470.	9
10	16.25	4	8	0.000	32.50	65470.	10
11	15.75	4	8	0.000	32.50	65470.	11
12	15.25	5	5	0.000	32.50	65470.	12
13	14.75	5	5	0.000	32.50	65470.	13
14	14.25	5	5	0.000	32.50	65470.	14
15	13.75	5	5	0.000	32.50	65470.	15
16	13.25	5	5	0.000	32.50	65470.	16
** 17	12.75	5	5	0.000	32.50	0.0	17
18	12.25	6	6	0.000	32.50	0.0	18
19	11.75	6	6	0.000	32.50	0.0	19
20	11.25	6	6	0.000	32.50	0.0	20
21	10.75	6	6	0.000	32.50	0.0	21
22	10.25	6	6	0.000	32.50	0.0	22
23	9.750	6	6	0.000	32.50	0.0	23
24	9.250	6	6	0.000	32.50	0.0	24
25	8.750	6	6	0.000	32.50	0.0	25
26	8.250	6	6	0.000	32.50	0.0	26
27	7.750	6	6	0.000	32.50	0.0	27
28	7.250	6	6	0.000	32.50	0.0	28
29	6.750	6	6	0.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 1 : Install wall

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 92000. kPa
On the RIGHT: E at ground level = 260. E at bottom node = 93000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.00 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
2	20.25	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0
3	19.75	0.0	3.000	2.738	0.0	4	8	2.750	2.738	0.0	0.0	0.0
4	19.25	0.0	9.000	8.418	0.0	4	8	8.250	8.418	0.0	0.0	0.0
5	18.75	0.0	12.50	11.62	2.500	4	8	11.25	11.62	2.500	0.0	0.0
6	18.25	0.0	13.50	12.33	7.500	4	8	11.75	12.33	7.500	0.0	0.0
7	17.75	0.0	14.50	13.05	12.50	4	8	12.25	13.05	12.50	0.0	0.0
8	17.25	0.0	15.50	13.77	17.50	4	8	12.75	13.77	17.50	0.0	0.0
9	16.75	0.0	16.50	14.50	22.50	4	8	13.25	14.50	22.50	0.0	0.0
10	16.25	0.0	17.50	15.24	27.50	4	8	13.75	15.24	27.50	0.0	0.0
11	15.75	0.0	18.50	16.03	32.50	4	8	14.25	16.03	32.50	0.0	0.0
12	15.25	0.0	21.50	18.05	37.50	5	5	17.00	18.05	37.50	0.0	0.0
13	14.75	0.0	26.50	23.37	42.50	5	5	22.00	23.37	42.50	0.0	0.0
14	14.25	0.0	31.50	28.51	47.50	5	5	27.00	28.51	47.50	0.0	0.0
15	13.75	0.0	36.50	33.58	52.50	5	5	32.00	33.58	52.50	0.0	0.0
16	13.25	0.0	41.50	38.65	57.50	5	5	37.00	38.65	57.50	0.0	0.0
** 17	12.75	0.0	46.50	43.72	62.50	5	5	42.00	43.72	62.50	0.0	0.0
18	12.25	0.0	51.50	47.98	67.50	6	6	47.00	47.98	67.50	0.0	0.0
19	11.75	0.0	56.50	53.22	72.50	6	6	52.00	53.22	72.50	0.0	0.0
20	11.25	0.0	61.50	58.37	77.50	6	6	57.00	58.37	77.50	0.0	0.0
21	10.75	0.0	66.50	63.49	82.50	6	6	62.00	63.49	82.50	0.0	0.0
22	10.25	0.0	71.50	68.58	87.50	6	6	67.00	68.58	87.50	0.0	0.0
23	9.750	0.0	76.50	73.67	92.50	6	6	72.09	73.67	92.50	0.0	0.0
24	9.250	0.0	81.50	78.76	97.50	6	6	77.00	78.76	97.50	0.0	0.0
25	8.750	0.0	86.50	83.84	102.5	6	6	82.00	83.84	102.5	0.0	0.0
26	8.250	0.0	91.50	88.94	107.5	6	6					
	87.00	88.94	107.5	0.0	0.0							
27	7.750	0.0	96.50	94.00	112.5	6	6	92.00	94.00	112.5	0.0	0.0
28	7.250	0.0	101.5	99.08	117.5	6	6	97.00	99.08	117.5	0.0	0.0
29	6.750	0.0	106.5	104.3	122.5	6	6	102.0	104.3	122.5	0.0	0.0

** Wall toe level: 12.75

WARNING - Residual moment > 1% of peak moment in wall

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EPA Export 08-07-2014:23:43:22

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STAGE 2 : ADD ENGINEERED FILL

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	20.25	1	0	8.000	32.50	65470.	2
3	19.75	4	8	8.000	32.50	65470.	3
4	19.25	4	8	8.000	32.50	65470.	4
5	18.75	4	8	8.000	32.50	65470.	5
6	18.25	4	8	8.000	32.50	65470.	6
7	17.75	4	8	8.000	32.50	65470.	7
8	17.25	4	8	8.000	32.50	65470.	8
9	16.75	4	8	8.000	32.50	65470.	9
10	16.25	4	8	8.000	32.50	65470.	10
11	15.75	4	8	8.000	32.50	65470.	11
12	15.25	5	5	8.000	32.50	65470.	12
13	14.75	5	5	8.000	32.50	65470.	13
14	14.25	5	5	8.000	32.50	65470.	14
15	13.75	5	5	8.000	32.50	65470.	15
16	13.25	5	5	8.000	32.50	65470.	16
** 17	*12.75*	5	5	*8.000*	*32.50*	*0.0*	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 2 : Add engineered fill

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 80000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 91000. kPa

Iter no.	Inc max displ (mm)	Node no.	Displ error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	5.661	3	0.0	0
2	5.700	3	3.312	1	31.82	1
3	8.900	1	2.160	1	20.73	1
4	11.10	1	1.401	1	13.43	1
5	12.50	1	0.9094	1	8.720	2
10	14.80	1	0.1313	1	1.150	1
15	15.20	1	0.02300	1	0.2000	1
18	15.20	1	0.008100	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil	Left	Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	15.25	1.250	0.3622	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	14.72	5.000	1.600	0.0	A	1	0	0.0	0.0	0.0	-0.01132	0.3453
3	19.75	13.66	13.00	-0.009672	0.0	A	4	8	2.750	1.401	0.0	-0.3340	-0.2075
4	19.25	12.61	19.00	9.785	0.0		4	8	8.250	9.143	0.0	0.1962	-0.8998
5	18.75	11.55	22.50	13.87	2.500		4	8	11.25	12.52	2.500	0.5658	-0.3995
6	18.25	10.49	23.50	15.18	7.500		4	8	11.75	13.25	7.500	0.5957	0.4235
7	17.75	9.428	24.50	16.54	12.50		4	8	12.25	13.92	12.50	0.1423	1.561
8	17.25	8.366	25.50	18.01	17.50		4	8	12.75	14.56	17.50	-0.9654	3.076
9	16.75	7.308	26.50	19.68	22.50		4	8	13.25	15.14	22.50	-2.933	5.071
10	16.25	6.263	27.50	22.56	27.50		4	8	13.75	15.40	27.50	-6.036	7.995
11	15.75	5.241	28.50	24.08	32.50		4	8	14.25	16.40	32.50	-10.93	11.70
12	15.25	4.263	31.50	12.24	37.50		5	5	17.00	22.40	37.50	-17.74	11.08
13	14.75	3.351	36.50	12.62	42.50		5	5	22.00	31.43	42.50	-22.01	3.832
14	14.25	2.519	41.50	19.78	47.50		5	5	27.00	38.00	47.50	-21.57	-5.426
15	13.75	1.768	46.50	29.78	52.50		5	5	32.00	41.94	52.50	-16.56	-13.02
16	13.25	1.077	51.50	41.87	57.50		5	5	37.00	43.96	57.50	-8.552	-16.58
** 17	*12.75*	*0.4182*	*56.50*	*69.06*	*62.50*		*5*	*5*	*42.00*	*34.85*	*62.50*	*0.0*	*0.0*
18	12.25	0.3697	61.50	48.74	67.50		6	6	47.00	48.74	67.50	0.0	0.0
19	11.75	0.3061	66.50	54.00	72.50		6	6	52.00	54.00	72.50	0.0	0.0
20	11.25	0.2587	71.50	59.28	77.50		6	6	57.00	59.28	77.50	0.0	0.0
21	10.75	0.2221	76.50	64.49	82.50		6	6	62.00	64.49	82.50	0.0	0.0
22	10.25	0.1919	81.50	69.65	87.50		6	6	67.00	69.65	87.50	0.0	0.0
23	9.750	0.1658	86.50	74.80	92.50		6	6	72.00	74.80	92.50	0.0	0.0
24	9.250	0.1426	91.50	79.96	97.50		6	6	77.00	79.96	97.50	0.0	0.0
25	8.750	0.1209	96.50	85.14	102.5		6	6	82.00	85.14	102.5	0.0	0.0
26	8.250	0.1000	101.5	90.36	107.5		6	6					
	87.00	90.36	107.5	0.0	0.0								
27	7.750	0.07925	106.5	95.46	112.5		6	6	92.00	95.46	112.5	0.0	0.0
28	7.250	0.05236	111.5	100.7	117.5		6	6	97.00	100.7	117.5	0.0	0.0
29	6.750	0.0	116.5	105.5	122.5		6	6	102.0	105.5	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	15.25	-22.01	0.5957	-16.58	11.70

STAGE 3 : APPLY SURCHARGE

RESULTS FOR STAGE 3 : Apply surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 80000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 91000. kPa

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EPA Export 08-07-2014:23:43:22

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	11.45	3	0.05000	1
2	11.50	3	6.856	1	69.00	1
3	18.20	1	4.476	1	42.85	2
4	22.70	1	2.915	1	27.83	2
5	25.60	1	2.013	1	18.13	2
10	31.40	1	0.3747	1	3.230	1
15	32.40	1	0.07700	1	0.6500	1
20	32.70	1	0.01740	1	0.1400	1
22	32.70	1	0.009800	1	0.06000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil Left	Soil Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	47.96	5.250	1.672	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	46.27	25.00	8.190	0.0	A 1	0	0.0	0.0	0.0	-0.05225	1.745
3	19.75	42.88	33.00	-0.01109	0.0	A 4	8	2.750	4.832	0.0	-1.692	2.069
4	19.25	39.49	39.00	7.709	0.0	4	8	8.250	10.71	0.0	-2.122	0.1092
5	18.75	36.11	42.50	16.85	2.500	4	8	11.25	14.43	2.500	-1.882	-0.01090
6	18.25	32.74	43.50	19.75	7.500	4	8	11.75	15.19	7.500	-2.111	1.757
7	17.75	29.38	44.50	22.66	12.50	4	8	12.25	15.77	12.50	-3.559	4.618
8	17.25	26.04	45.50	25.79	17.50	4	8	12.75	16.23	17.50	-6.729	8.729
9	16.75	22.72	46.50	29.53	22.50	4	8	13.25	16.49	22.50	-12.29	14.38
10	16.25	19.45	47.50	37.00	27.50	4	8	13.75	15.71	27.50	-21.11	22.97
11	15.75	16.26	48.50	39.93	32.50	4	8	14.25	17.17	32.50	-35.25	33.98
12	15.25	13.21	51.50	-0.008582	37.50	A 5	5	17.00	31.56	37.50	-55.09	31.78
13	14.75	10.37	56.50	-0.01805	42.50	A 5	5	22.00	48.43	42.50	-67.03	11.77
14	14.25	7.777	61.50	-0.02612	47.50	A 5	5	27.00	57.96	47.50	-66.86	-14.84
15	13.75	5.429	66.50	17.37	52.50	5	5	32.00	59.37	52.50	-52.19	-39.84
16	13.25	3.274	71.50	47.38	57.50	5	5	37.00	54.79	57.50	-27.02	-52.19
** 17	12.75	1.220	76.50	123.0	62.50	5	5	42.00	34.88	62.50	0.0	0.0
18	12.25	1.100	81.50	50.19	67.50	6	6	47.00	50.19	67.50	0.0	0.0
19	11.75	0.9161	86.50	55.52	72.50	6	6	52.00	55.52	72.50	0.0	0.0
20	11.25	0.7758	91.50	61.07	77.50	6	6	57.00	61.07	77.50	0.0	0.0
21	10.75	0.6666	96.50	66.46	82.50	6	6	62.00	66.46	82.50	0.0	0.0
22	10.25	0.5762	101.5	71.75	87.50	6	6	67.00	71.75	87.50	0.0	0.0
23	9.750	0.4982	106.5	77.04	92.50	6	6	72.00	77.04	92.50	0.0	0.0
24	9.250	0.4285	111.5	82.35	97.50	6	6	77.00	82.35	97.50	0.0	0.0
25	8.750	0.3635	116.5	87.72	102.5	6	6	82.00	87.72	102.5	0.0	0.0
26	8.250	0.3008	121.5	93.21	107.5	6	6					
	87.00	93.21	107.5	0.0	0.0							
27	7.750	0.2386	126.5	98.38	112.5	6	6	92.00	98.38	112.5	0.0	0.0
28	7.250	0.1576	131.5	103.9	117.5	6	6	97.00	103.9	117.5	0.0	0.0
29	6.750	0.0	136.5	108.0	122.5	6	6	102.0	108.0	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	47.96	-67.03	0.5957	-52.19	33.98

Surcharge 1 present in this stage

STAGE 4 : INTERMEDIATE PORE PRESSURE

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00
2	15.25	43.50	10.00
3	14.75	45.80	10.00
4	14.25	48.20	10.00
5	13.75	59.40	10.00
6	13.25	76.90	10.00
7	12.75	117.1	10.00
8	12.25	83.60	10.00
9	11.75	88.70	10.00
10	11.25	93.90	10.00
11	10.75	99.00	10.00
12	10.25	104.1	10.00
13	9.750	109.2	10.00
14	9.250	114.3	10.00
15	8.750	119.4	10.00
16	8.250	124.6	10.00
17	7.750	129.7	10.00
18	7.250	134.9	10.00
19	6.750	139.6	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00
2	18.75	3.900	10.00
3	18.25	8.900	10.00
4	17.75	13.90	10.00
5	17.25	18.70	10.00
6	16.75	23.50	10.00
7	16.25	27.70	10.00
8	15.75	33.10	10.00
9	15.25	44.30	10.00
10	14.75	55.00	10.00
11	14.25	62.20	10.00
12	13.75	65.30	10.00
13	13.25	65.60	10.00
14	12.75	65.10	10.00
15	12.25	68.60	10.00
16	11.75	73.70	10.00
17	11.25	78.90	10.00
18	10.75	84.00	10.00
19	10.25	89.10	10.00
20	9.750	94.20	10.00
21	9.250	99.30	10.00
22	8.750	104.4	10.00
23	8.250	109.6	10.00
24	7.750	114.7	10.00
25	7.250	119.9	10.00
26	6.750	124.4	10.00

RESULTS FOR STAGE 4 : Intermediate pore pressure

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 80000. kPa
On the RIGHT: E at ground level = 200. E at bottom node = 93000. kPa

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EPA Export 08-07-2014:23:43:22

Iter no.	Inc max displ [mm]	Node no.	Displ error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.3584	19	6.010	12
2	0.4000	19	0.07480	9	3.570	13
3	0.4000	19	0.05980	1	2.480	14
4	0.4000	19	0.05680	1	1.350	14
5	0.4000	19	0.05030	1	0.7900	14
10	0.4000	8	0.01880	1	0.1500	1
13	0.5000	7	0.009400	1	0.06000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	48.41	5.250	1.674	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	46.72	25.00	8.193	0.0	A	1	0	0.0	0.0	0.0	-0.05233	1.745
3	19.75	43.33	33.00	-0.01026	0.0	A	4	8	2.750	4.843	0.0	-2.693	3.068
4	19.25	39.94	29.00	7.340	0.0		4	8	8.250	10.72	0.0	-2.121	0.01066
5	18.75	36.57	42.10	16.33	2.980		4	8	10.20	13.40	1.900	-1.704	-0.2631
6	18.25	33.20	42.30	18.32	8.700		4	8	10.35	13.81	8.900	-1.857	1.386
7	17.75	29.84	42.50	20.43	14.50		4	8	10.85	14.39	13.90	-3.089	4.122
8	17.25	26.49	42.70	22.74	20.30		4	8	11.55	15.05	18.70	-5.980	8.102
9	16.75	23.17	42.90	25.66	26.10		4	8	12.25	15.51	23.50	-11.19	13.61
10	16.25	19.89	43.10	32.34	31.90		4	8	13.55	15.53	27.70	-19.59	22.05
11	15.75	16.69	43.30	34.40	37.70		4	8	13.65	16.62	33.10	-33.24	32.90
12	15.25	13.63	45.50	-0.01070	43.50	A	5	5	10.20	25.09	44.30	-52.49	32.02
13	14.75	10.75	53.20	-0.02221	45.80	A	5	5	9.500	36.53	55.00	-65.26	14.10
14	14.25	8.118	60.80	-0.03250	48.20	A	5	5	12.30	44.01	62.20	-66.59	-11.84
15	13.75	5.731	59.60	4.038	59.40		5	5	19.10	47.14	65.40	-53.42	-36.63
16	13.25	3.561	52.10	25.74	76.90		5	5	28.90	47.11	65.60	-27.97	-53.42
** 17	12.75	1.656	22.98	70.25	217.1		5	5	56.40	37.28	48.10	0.0	0.0
18	12.25	1.461	65.40	38.50	83.60		6	6	45.90	53.50	58.60	0.0	0.0
19	11.75	1.276	70.30	43.89	88.70		6	6	50.80	58.89	73.70	0.0	0.0
20	11.25	1.133	75.10	49.53	93.90		6	6	55.60	64.53	78.90	0.0	0.0
21	10.75	1.012	80.00	55.05	99.00		6	6	60.50	70.05	84.00	0.0	0.0
22	10.25	0.9050	84.90	60.52	104.1		6	6	65.40	75.52	89.10	0.0	0.0
23	9.750	0.8057	89.80	65.99	109.2		6	6	70.30	80.99	94.20	0.0	0.0
24	9.250	0.7099	94.70	71.47	114.3		6	6	75.20	86.47	99.30	0.0	0.0
25	8.750	0.6136	99.60	77.04	119.4		6	6	80.10	92.04	104.4	0.0	0.0
26	8.250	0.5137	104.4	82.71	124.6		6	6					
	84.90	97.71	109.6	0.0	0.0								
27	7.750	0.4077	109.3	87.62	129.7		6	6	89.80	102.8	114	0.0	0.0
28	7.250	0.2658	114.1	93.32	134.9		6	6	94.60	108.3	119.9	0.0	0.0
29	6.750	0.0	119.6	98.16	139.4		6	6	100.1	113.2	124.4	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	48.41	-67.03	0.5957	-53.42	33.98

Surcharge 1 present in this stage

STAGE 5 : CHANGE TO DRAINED

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	20.25	1	0	8.000	32.50	65470.	2
3	19.75	4	7	8.000	32.50	65470.	3
4	19.25	4	7	8.000	32.50	65470.	4
5	18.75	4	7	8.000	32.50	65470.	5
6	18.25	4	7	8.000	32.50	65470.	6
7	17.75	4	7	8.000	32.50	65470.	7
8	17.25	4	7	8.000	32.50	65470.	8
9	16.75	4	7	8.000	32.50	65470.	9
10	16.25	4	7	8.000	32.50	65470.	10
11	15.75	4	7	8.000	32.50	65470.	11
12	15.25	3	3	8.000	32.50	65470.	12
13	14.75	3	3	8.000	32.50	65470.	13
14	14.25	3	3	8.000	32.50	65470.	14
15	13.75	3	3	8.000	32.50	65470.	15
16	13.25	3	3	8.000	32.50	65470.	16
** 17	12.75	3	3	8.000	32.50	0.0	17
18	12.25	6	6	8.000	32.50	0.0	18
19	11.75	6	6	8.000	32.50	0.0	19
20	11.25	6	6	8.000	32.50	0.0	20
21	10.75	6	6	8.000	32.50	0.0	21
22	10.25	6	6	8.000	32.50	0.0	22
23	9.750	6	6	8.000	32.50	0.0	23
24	9.250	6	6	8.000	32.50	0.0	24
25	8.750	6	6	8.000	32.50	0.0	25
26	8.250	6	6	8.000	32.50	0.0	26
27	7.750	6	6	8.000	32.50	0.0	27
28	7.250	6	6	8.000	32.50	0.0	28
29	6.750	6	6	8.000	32.50	0.0	29

** Wall toe level: 12.75

RESULTS FOR STAGE 5 : Change to drained

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 73000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 87000. kPa

Iter no.	Inc max displ [mm]	Node no.	Displ error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.2290	10	9.520	14
2	0.2000	10	0.1869	9	6.200	15
3	0.4000	10	0.1465	7	4.690	15
4	0.6000	10	0.1363	1	3.370	15
5	0.7000	9	0.1252	1	2.170	15
10	1.000	8	0.05290	1	0.4000	1
15	1.100	1	0.01730	1	0.1400	1
18	1.200	1	0.008600	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	49.60	5.250	1.650	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	47.90	25.00	8.198	0.0	A	1	0	0.0	0.0	0.0	-0.05249	1.747
3	19.75	44.49	33.00	-0.009237	0.0	A	4	8	2.750	4.876	0.0	-1.695	3.062

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4	19.25	41.10	39.00	6.284	0.0	4	7	8.250	10.75	0.0	-2.115	-0.2747
5	18.75	37.70	42.10	15.69	2.900	4	7	10.20	13.44	3.900	-1.420	-0.9908
6	18.25	34.32	42.30	17.68	8.700	4	7	10.35	13.86	8.900	-1.124	0.3147
7	17.75	30.94	42.50	19.77	14.50	4	7	10.85	14.45	13.90	-1.734	2.700
8	17.25	27.57	42.70	22.06	20.30	4	7	11.55	15.12	18.70	-3.824	6.313
9	16.75	24.21	42.90	24.94	26.10	4	7	12.25	15.59	23.50	-8.048	11.43
10	16.25	20.89	43.10	31.66	31.90	4	7	13.55	15.59	27.70	-15.26	19.49
11	15.75	17.62	43.30	33.58	37.70	4	7	13.65	16.74	33.10	-27.54	29.91
12	15.25	14.47	45.50	5.353	43.50	A	3	10.20	25.75	44.30	-45.17	29.98
13	14.75	11.48	53.20	7.426	45.80	A	3	9.500	37.89	56.00	-57.51	14.76
14	14.25	8.714	60.80	9.472	48.20	A	3	12.30	45.86	62.20	-59.94	-7.745
15	13.75	6.164	59.60	9.142	59.40	A	3	19.10	48.90	65.40	-49.77	-31.78
16	13.25	3.796	52.10	10.73	76.90	a	3	28.90	48.22	65.60	-28.16	-49.77
** 17	12.75	1.533	21.90	69.50	117.1		3	56.40	25.87	48.10	0.8	0.0
18	12.25	1.471	65.40	37.81	83.60		6	45.90	52.81	68.60	0.0	0.0
19	11.75	1.292	70.30	43.49	88.70		6	50.80	58.49	73.70	0.0	0.0
20	11.25	1.142	75.10	49.24	93.90		6	55.60	64.24	78.90	0.0	0.0
21	10.75	1.019	80.00	54.84	99.00		6	60.50	69.84	84.00	0.0	0.0
22	10.25	0.9096	84.90	60.36	104.1		6	65.40	75.36	89.10	0.0	0.0
23	9.750	0.8091	89.80	65.86	109.2		6	70.30	80.86	94.20	0.0	0.0
24	9.250	0.7124	94.70	71.37	114.3		6	75.20	86.37	99.30	0.0	0.0
25	8.750	0.6154	99.60	76.95	119.4		6	80.10	91.95	104.4	0.0	0.0
26	8.250	0.5150	104.4	82.63	124.6		6					
	84.90	97.63	109.6	0.0	0.0							
27	7.750	0.4085	109.3	87.73	129.7		6	88.80	102.7	114.7	0.0	0.0
28	7.250	0.2663	114.1	93.20	134.9		6	94.60	108.2	119.9	0.0	0.0
29	6.750	0.0	119.6	98.16	139.4		6	100.1	113.2	124.4	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	48.60	-67.03	0.5957	-53.42	33.98

Surcharge 1 present in this stage

STAGE 6 : HYDROSTATIC GROUNDWATER

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Hydrostatic groundwater

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 73000. kPa
On the RIGHT: E at ground level = 260. E at bottom node = 87000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	1.062	17	0.05000	1
2	1.100	17	0.3426	1	1.350	1
3	1.100	17	0.2473	1	2.140	2
4	1.100	1	0.1769	1	1.540	1
5	1.300	1	0.1266	1	1.000	1
10	1.700	1	0.02378	1	0.7100	1
13	1.700	1	0.008700	1	0.05000	1

Ground level left = 20.50 Ground level right = 20.00

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil	Left	Right	Vs (kPa)	Ps (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	51.31	5.250	1.678	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	20.25	49.55	25.00	8.196	0.0	A	1	0	0.0	0.0	0.0	-0.05245	1.747
3	19.75	46.02	33.00	-0.01016	0.0	A	4	7	2.750	4.948	0.0	-1.694	2.044
4	19.25	42.49	39.00	4.558	0.0		4	7	8.250	10.83	0.0	-2.096	-0.7632
5	18.75	38.97	42.50	15.07	2.500		4	7	11.25	13.89	2.500	-0.9309	-2.035
6	18.25	35.46	43.50	17.93	7.500		4	7	11.75	14.43	7.500	-0.06094	-0.8644
7	17.75	31.94	44.50	20.89	12.50		4	7	12.25	15.02	12.50	-0.06654	1.479
8	17.25	28.43	45.50	24.05	17.50		4	7	12.75	15.62	17.50	-1.540	5.054
9	16.75	24.92	46.50	27.80	22.50		4	7	13.25	16.02	22.50	-5.120	10.11
10	16.25	21.44	47.50	35.56	27.50		4	7	13.75	15.70	27.50	-11.65	18.02
11	15.75	18.00	48.50	38.35	32.50		4	7	14.25	17.04	32.50	-23.14	28.31
12	15.25	14.66	51.50	5.792	37.50	a	3	3	17.00	28.48	37.50	-39.96	27.97
13	14.75	11.46	56.50	6.668	42.50	a	3	3	22.00	43.06	42.50	-51.11	13.20
14	14.25	8.455	61.50	8.768	47.50	a	3	3	27.00	51.77	47.50	-53.16	-6.647
15	13.75	5.645	66.50	12.61	52.50	a	3	3	32.00	53.32	52.50	-44.47	-27.57
16	13.25	2.998	71.50	22.05	57.50		3	3	37.00	48.90	57.50	-25.59	-44.47
** 17	12.75	0.6447	76.50	109.7	62.50	m	3	3	42.00	7.308	62.50	0.0	0.0
18	12.25	0.7742	81.50	50.32	67.50		6	6	47.00	50.32	67.50	0.0	0.0
19	11.75	0.7373	86.50	55.64	72.50		6	6	52.00	55.64	72.50	0.0	0.0
20	11.25	0.6555	91.50	61.07	77.50		6	6	57.00	61.07	77.50	0.0	0.0
21	10.75	0.5792	96.50	66.41	82.50		6	6	62.00	66.41	82.50	0.0	0.0
22	10.25	0.5111	101.5	71.71	87.50		6	6	67.00	71.71	87.50	0.0	0.0
23	9.750	0.4493	106.5	77.00	92.50		6	6	72.00	77.00	92.50	0.0	0.0
24	9.250	0.3916	111.5	82.26	97.50		6	6	77.00	82.26	97.50	0.0	0.0
25	8.750	0.3363	116.5	87.60	102.5		6	6	82.00	87.60	102.5	0.0	0.0
26	8.250	0.2814	121.5	93.01	107.5		6	6					
	87.00	93.01	107.5	0.0	0.0								
27	7.750	0.2245	126.5	98.22	112.5		6	6	92.00	98.22	112.5	0.0	0.0
28	7.250	0.1429	131.5	103.7	117.5		6	6	97.00	103.7	117.5	0.0	0.0
29	6.750	0.0	136.5	108.0	122.5		6	6	102.0	108.0	122.5	0.0	0.0

** Wall toe level: 12.75

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	51.31	-67.03	0.5957	-53.42	33.98

Surcharge 1 present in this stage

Results Envelope

Node	Level (m)	Displacements (mm) Min	Max	Moments (kNm/m) Min	Max	Shears (kN/m) Min	Max
1	20.50	0.0	51.31	0.0	0.0	0.0	5.0
2	20.25	0.0	49.55	-0.05249	0.0	0.0	1.747
3	19.75	0.0	46.02	-1.695	0.0	-0.2879	2.069
4	19.25	0.0	42.49	-2.122	0.1962	-0.8998	2.209

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5	18.75	0.0	38.97	-1.802	0.5658	-2.035	0.0
6	18.25	0.0	35.46	-2.111	0.5957	-0.8646	1.757
7	17.75	0.0	31.94	-3.559	0.1423	0.0	4.618
8	17.25	0.0	28.43	-6.729	0.0	0.0	8.729
9	16.75	0.0	24.92	-12.29	0.0	0.0	14.36
10	16.25	0.0	21.44	-21.11	0.0	0.0	22.97
11	15.75	0.0	18.00	-35.25	0.0	0.0	33.98
12	15.25	0.0	14.66	-55.09	0.0	0.0	32.02
13	14.75	0.0	11.49	-67.03	0.0	0.0	14.76
14	14.25	0.0	8.714	-66.86	0.0	-14.84	0.0
15	13.75	0.0	6.166	-53.42	0.0	-39.84	0.0
16	13.25	0.0	3.796	-28.16	0.0	-53.42	0.0
17	12.75	0.0	1.533	0.0	0.0	0.0	0.0
18	12.25	0.0	1.471	0.0	0.0	0.0	0.0
19	11.75	0.0	1.292	0.0	0.0	0.0	0.0
20	11.25	0.0	1.142	0.0	0.0	0.0	0.0
21	10.75	0.0	1.019	0.0	0.0	0.0	0.0
22	10.25	0.0	0.9096	0.0	0.0	0.0	0.0
23	9.75	0.0	0.8091	0.0	0.0	0.0	0.0
24	9.25	0.0	0.7126	0.0	0.0	0.0	0.0
25	8.75	0.0	0.6156	0.0	0.0	0.0	0.0
26	8.25	0.0	0.5150	0.0	0.0	0.0	0.0
27	7.75	0.0	0.4085	0.0	0.0	0.0	0.0
28	7.25	0.0	0.2663	0.0	0.0	0.0	0.0
29	6.75	0.0	0.0	0.0	0.0	0.0	0.0

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ArupGeotechnics

Job No. 114662 Sheet 1/1

Made by: CH Chkd: AG
Date: 29/11/2003
Rev: -,-

Corrib Planning Ap[plication
Summary of FREW runs

Filename	Depth of peat	Top of mineral soil	Sheet pile details			Surcharge	Max moment	Max
			Section	Toe level	Penetration	(kPa)	(kNm/m)	displ (mm)
wall 2-1 uls	4.5	15.5	LX8	12.75	2.75	24	68.2	89.7
wall 2-1 sls	4.5	15.5	LX8	12.75	2.75	20	49.9	52.6
wall 2-1-2 uls	4.5	15.5	LX16	12.75	2.75	24	84.1	84
wall 2-1-2 sls	4.5	15.5	LX16	12.75	2.75	20	67	51.3

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6. SETTLEMENT PONDS

6.1 General

For general information on soil strengthening and sheet piling, refer to Section 5.1 (Access Roads).

6.2 Site Investigation

Site investigation of the area around the settlement ponds is currently in progress (November 2003). The properties tabulated below were deduced from the preliminary results of probing and in situ testing carried out near the settlement ponds area at the locations shown on Figure 6.1. This testing indicates 2m to 3m of peat, with a minimum undrained shear strength of 2.5kPa. overlying natural mineral soil. The soil profile and properties derived from data currently available are detailed in Table 6.1.

Table 6.1 Settlement Ponds: Assumed Soil Properties

Top Elevation (mOD)	Thickness (m)	Soil Description	Undrained shear strength s_u (kPa) (Lower Bound)
Varies	3m (assumed minimum)	Peat	2.5
Varies	3m (assumed)	Mineral Soil	-
Varies	>10m (assumed)	Schist	-

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For the purposes of design, a ground profile has been assumed together with geotechnical properties as given in Table 6.2 below. The soil properties were extracted from the "Geotechnical Interpretative and Design Report", AGEC, September 18, 2002. Conservative design values were taken where they were not available in the report.

The ground conditions at the location of the settlement ponds are such that there is typically a 3m thick layer of peat and organic soils overlying mineral soils of clay and sandy soil composition. The mineral soils are assumed to be about 3m in thickness, which are overlying weathered schist. The soil properties are summarised below:

Table 6.2: Settlement Ponds: Assumed Soil Properties for Analysis of Retaining Walls

Strata	γ(kN/m^3)	ϕ' (deg)	c' (kPa)	c_u (kPa)	E_u (kPa)	E' (kPa)
Peat	11.0	32.0	3.0	3.0	466	400
Mineral Soil	20.0	32.0	1.0	25 + 16.7z	$500c_u$	$300c_u$
Schist	20.0	35.0	0.0	-	-	75000
Strengthened Peat	12.0	-	-	50.0 (25 used in wall checks)	$100c_u$	-
Engineered Fill	20.0	30.0	0.0	-	-	45000

z = depth below top of layer

Properties assigned to the strengthened peat take account of the fact that the soil mixed columns will not occupy 100% of the soil mass. The average strength of the soil mass will therefore be lower than that of the individual columns. The soil mixing will be designed to achieve an average shear strength of better than 50kPa, and a performance specification will be used to guarantee that this strength is achieved.

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For preliminary retaining wall design, the steel section and toe depth have been checked with a characteristic shear strength of 25kPa, to provide a robust design and additional factor of safety.

The strengthened peat is assumed to act in an undrained manner in the short and long term, as it tends to gain strength with time.

6.3 Stability Calculations

A sheet pile wall is proposed to form the pond containment walls and to support the perimeter roads of the settlement ponds. The following construction sequence was assumed for retaining wall analysis.

Table 6.3 Settlement Ponds: Construction Stages for Analysis

Stage No.	Task
1	Strengthen the peat along the footprint of the perimeter road
2	Drive sheet piles along the perimeter of the ponds and roads, and install tie bars across the roads
3	Dewater inside the pond
4	Excavate/dredge inside the pond to final formation level
5	Long term (drained) soil properties check with low water level in pond
6	Water levels in the pond rise to operational level.

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The geotechnical section of the proposed perimeter road is such that there is 0.5m of engineered fill overlying the strengthened peat. The pond will be excavated to a level to allow at least 2m of liquid storage above the pond formation level. The design of the sheet piles involved carrying out stability analyses under Ultimate Limit State (ULS) soil parameters and determining the deformation of the wall in service using Serviceable Limit State (SLS) soil parameters. Stability analyses were carried out using *Oasys* FREW for the following geotechnical design sections, in order to assess the suitability of the sheet pile solution for various possible ground conditions:

(i) Pond dredge level is within mineral soil (i.e. all peat removed), piles driven to base of mineral soil.

(ii) 0.5m peat layer remaining in the bottom of the pond below dredge level, piles driven to base of mineral soil

(iii) Check on minimum acceptable pile toe embedment (in case of boulders preventing full penetration of mineral soil)

Details of the design calculations and analyses are presented in the accompanying calculation package (Appendix 6A)

The analyses were carried out for LX8/LX16 sheet pile wall sections and DYWIDAG 900/1030 WR tie rod with nominal diameter of 32mm. The tie rods were taken to be tied to the wall at 5m intervals. It was taken that the sheet piles are fully interlocked so that the full combined section properties could be used in the design. A 20kPa surcharge was considered for the vehicle loading.

The analyses show that the bending moment capacity of LX8 wall section is adequate for stability. However, it is recommended that the pile section size is increased to LX16 to withstand stresses during driving, particularly if boulders are encountered within the mineral soil. Results of the *Oasys* FREW analyses, using LX16 sheet piles, are summarised below.

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Table 6.4 Settlement Ponds: Results of Retaining Wall Analysis

Analysis Description	Pile details		ULS Max. Bending Moment (kNm/m)		ULS Max. Tie Force (kN/m)	
	Total length	Toe in	During const	Perm	During const	Perm
3m of peat. All peat removed to construct ponds. (run pond 8 uls.frw)	6.25	2.75	73.1	50.63	97.3	87.8
3.6m of peat. Dredge level 3m below top of peat so 0.6m of peat remaining below dredge level (run pond 9 uls.frw)	6.25	2.15	101.6	70.93	108	97.19
As pond 9 uls.frw but with reduced toe in. (run pond 10 uls.frw)	5.5	1.4	90.9	30.7	137.5	125.1

Assuming Dywidag steel bar type 900/1030 WR of nominal diameter 32mm, the yield load in the tie is 724kN. For the permanent condition ties are required at 5m centres with a pile toe of a minimum of 2.15m in to the mineral soil. The minimum acceptable toe embedment is calculated to be 1.4m into mineral soils where the pond has a 0.6m thick layer of peat below pond dredge level.

Using LX16 sections, the maximum SLS deflection of the wall is approximately 22mm, hence the maximum expected settlement of the road surface is approximately 10mm behind the sheet pile wall.

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6.4 Construction Sequence

The indicative construction sequence for the settlement ponds is outlined in the following points, excluding construction of the feeder drain and outfalls.

1. The access road to the settlement ponds will be constructed using soil strengthening and sheet piles, starting from the existing gate onto the R314 road (see Section 5 - Roads).
2. A geotextile and 0.5m fill layer will be placed first around the ponds along the line of the cofferdam.
3. Soil strengthening will take place by deep dry mixing to form a "box" around the perimeter and between the two ponds.
4. A temporary surcharge layer of 0.5m fill will be laid over the mixed soil to compact the peat.
5. Steel sheet piles will be driven along the edges of the strengthened area forming a double wall cofferdam.
6. The temporary surcharge will be removed.
7. Tie rods and waling beams will be installed between the rows of sheet piles. This will involve excavating small trenches just outside the sheet piles and along the lines of the trenches. The sheet piles will be drilled to accept the tie rods. The waling beam will be formed of structural steel sections such as two back-to-back rolled steel channels.

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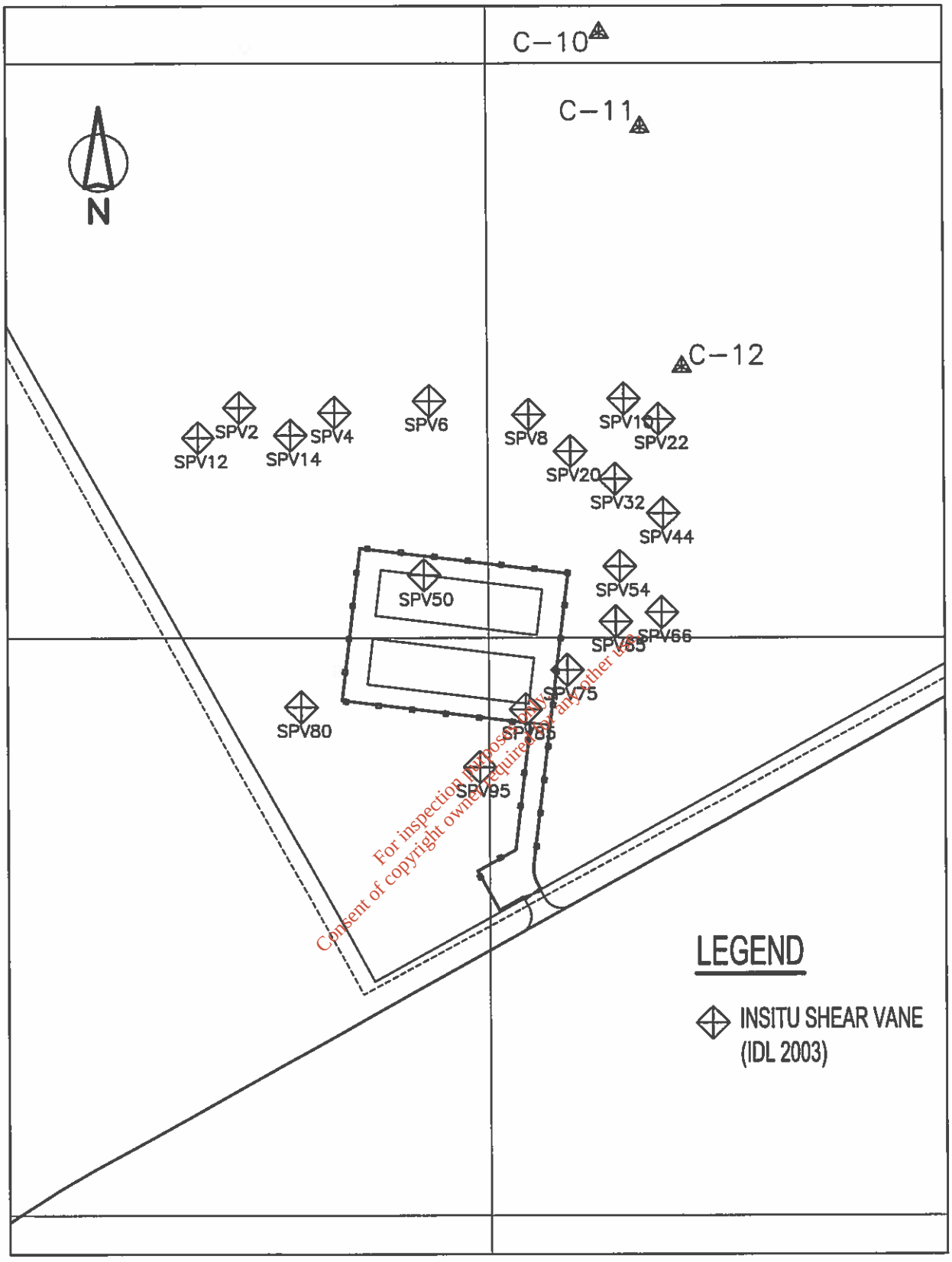
8. A geogrid and 0.5m layer of selected granular fill will be laid to form a perimeter access road around the ponds.
9. The ponds will then be dredged out and the weirs/outfalls completed.

6.5 Piped Drain to Settlement Ponds

A 900mm diameter polyethylene pipe will be installed to connect the terminal surface water and groundwater systems to the settlement ponds. This pipe will run from a manhole at the existing track to the west of the terminal over a distance of approximately 300m down to the ponds. The invert of the pipe will be set at approximately 2m below ground level. The trench for this pipe will be excavated in short sections. Access for the construction of this drain will be effected by strengthening the peat along the route of the pipe and then installing a temporary stone haul road (approximate width 6m) on geotextile/geogrid. The haul road will be used to provide access for the sheet piling rig, ground anchor rig, a tracked excavator and dumpers to remove some of the peat and to bring in stone bedding for the pipe and for the import of the pipe materials themselves. Two rows of sheet piles will be installed and suitably propped so that the trench can be excavated down to the mineral soils. The upper layer of peat will be temporarily stored (in the terminal excavation) and the remainder of the peat will be taken to the windrowing area of the terminal site in preparation for export off-site. A geotextile layer will be installed in the bottom of the trench followed by stone bedding. A slotted pipe drain will also be installed in the lower part of the stone bedding to remove any groundwater, that may accumulate in the trench, down to the settlement ponds. Small ground anchors (such as the Ischebeck Titan system) will then be installed in pairs to straddle the line of the pipe and spaced at 5m centres so as to support and to prevent flotation of the pipe after backfilling with peat. This system has been used successfully for the support of gas pipelines in peat where the pipe is not precoated with concrete to resist any buoyancy effects. The pipe will then be installed in the trench and straps connected from the ground anchors around the pipe. The trench will then be backfilled using the top layers of peat referred to above. The end of the pipe section will be left exposed to allow welding of the next section of pipe. The sheet piles will be removed after completion of appropriate lengths of the backfilling. By adopting this robust approach the trench sides are fully supported during the excavation and the effect of the construction of the trench on the adjacent peat is minimised. The existing land drain system will be reinstated over the pipe drain by re-establishing the channels in the backfilled peat so that the effect on the existing surface water drainage of the area is minimised.

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SITE LAYOUT PLAN FOR SETTLEMENT PONDS

FIGURE 6.1
SCALE 1:2500

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Appendix 6A - Design of Retaining Structures for the Settlement Pond

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Appendix 6A - Design of Retaining Structures for the Settlement Pond

November 2003

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Ove Arup & Partners International Ltd
13 Fitzroy Street, London W1T 4BQ
Tel +44 (0)20 7636 1531 Fax +44 (0)20 7755 2121
www.arup.com

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CONTENTS

		Page
1.	INTRODUCTION	1
2.	DETAILS OF GROUND CONDITIONS	2
3.	SHEET PILE SOLUTION FOR THE RETAINING WALL	3
4.	EFFECT OF PRESENCE OF PEAT IN THE POND	4
5.	CHECK FOR MINIMUM REQUIRED TOE EMBEDMENT	5
6.	DRIVABILTY, CORROSION ALLOWANCE AND SERVICE LIFE	6

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1. INTRODUCTION

The design calculations of the earth retaining structures for the settlement ponds are presented in this calculation package. The retaining structures were designed primarily to retain the perimeter road of the settlement ponds. It iss proposed to use a sheet pile wall to retain the perimeter road around the settlement ponds, similar to the road retaining structures elsewhere in the site, and also to act as the permanent walls to the settlement ponds themselves. The following sections describe the ground conditions at the site, the minimum sheet pile sections to be used, the design calculations considering the variability in the ground conditions and other issues such as drivability, corrosion allowance and typical service life of the sheet pile sections.

This calculation package is intended to be part of the planning application for the Shell Corrib Field Development.

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2. DETAILS OF GROUND CONDITIONS

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Job No.	Sheet No.	Rev.
114662	GC/1	

Member/Location

Job Title: Shell Corib Terminal Ground Conditions

Drg. Ref.

Made by NP Date Nov 25/03 Chd. CH.

Ground Conditions

The ground conditions at the location of the proposed settlement ponds are such that there is typically a 3m thick layer of peat overlying mineral soils, which are overlying weathered schist. The thickness of mineral soils are around 3m. The strata thicknesses mentioned above were based on probing carried out between November 12th and November 14th 2003 near the location of the pond. Sheet GC/2 shows the probing locations in relation to the proposed settlement pond.

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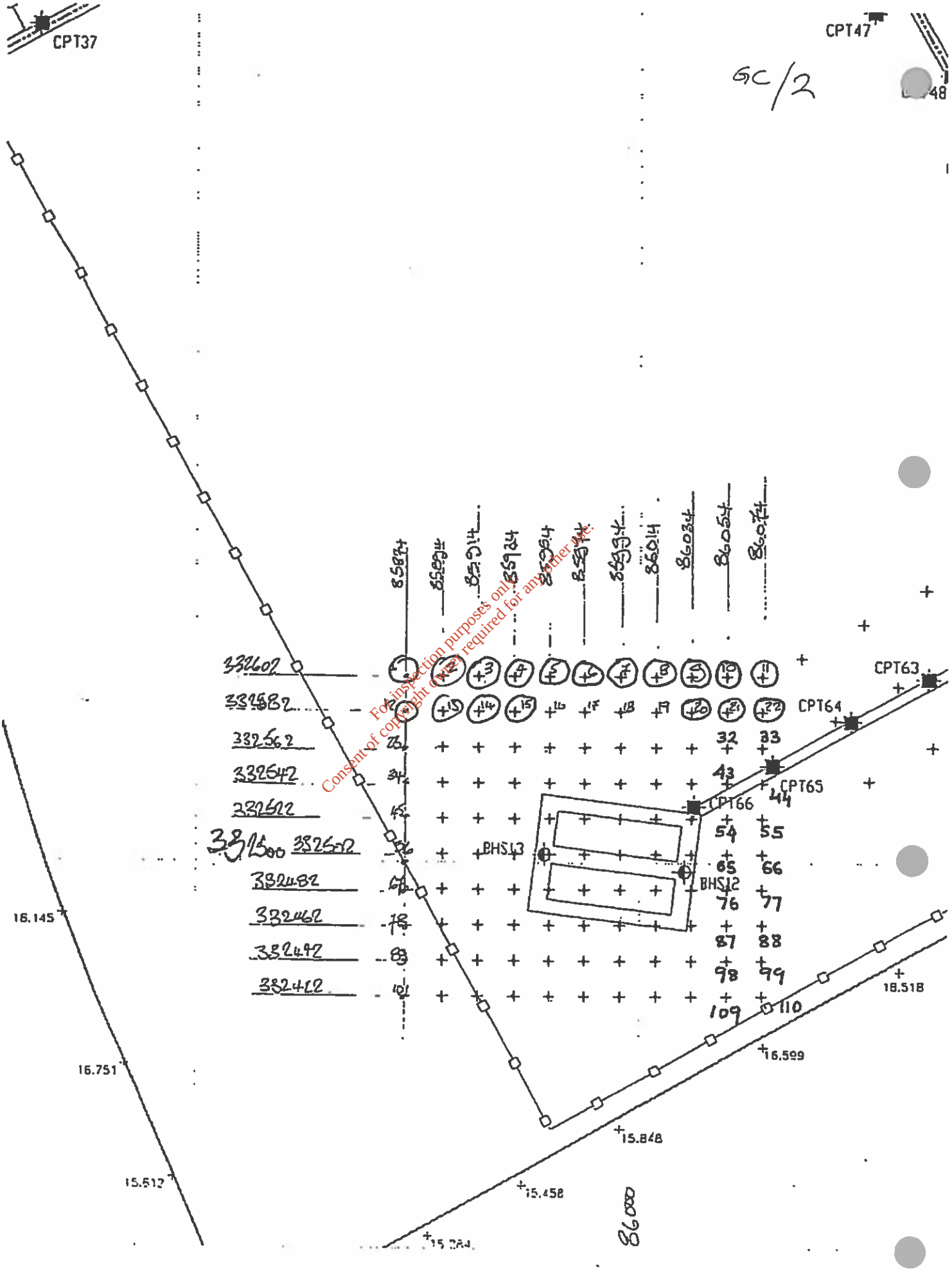
Soil Properties

The soil properties for the site were extracted from the "Geotechnical Interpretative and Design Report", AGEC, September 18, 2002. Parameters were assumed where they are not available.

Soil Parameters

Strata	γ (kN/m³)	ϕ (deg)	c' (kPa)	c_u (kPa)	E_u (kPa)	E' (kPa)
Peat	11.0	32°	3.0	3.0	466	400
Mineral Soil	20.0	32°	1.0	25+16.7z	500c_u	300c_u
Schist	20.0	35°	0.0	—	—	75,000

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114662	GC/3	

Member/Location

Job Title: Shell Corrib Terminal Ground Conditions

Drg. Ref.

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The peat at the location of the ponds will be stabilized using dry mixing techniques. The stabilization would result in improved properties of peat as follows.

$\gamma = 12 kN/m^3$ $\phi' = 32^\circ$ $c' = 3 kPa$ $Cu = 25 kPa$ lower bound, 50 kPa upper bound

$Eu = 100 Cu$ $E' = 20 Cu$

Only the stiffness, undrained strength and unit weight were assumed to have improved due to stabilization.

The road surface will consist of engineered fill overlying the stabilized peat. A geogrid will be placed over the stabilized peat prior to laying the road surface to minimize road settlement during the service life. Properties of engineered fill were assumed to be as follows.

$\gamma = 20 kN/m^3$ $\phi' = 30^\circ$ $c' = 0$ $E' = 45{,}000 kPa$

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3. SHEET PILE SOLUTION FOR THE RETAINING WALL

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Job No.	Sheet No.	Rev.
114662	SP/1	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

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Settlement ponds are proposed to collect the run-off from the site. These ponds will have a road of about 8m wide running along the perimeter. A tied sheet pile solution is proposed to retain the perimeter road instead of cut slopes as this would result in a more stable road and larger settlement pond area.

The construction sequence adopted for the design of the sheet pile wall is as follows.

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Construction Sequence:

Stage 1 – Stabilize the peat along the footprint of the perimeter road

Stage 2 – Drive sheet piles along the perimeter of the pond and roads

Stage 3 – Excavate trenches on stabilized peat to attach anchor rods, to tie the sheet piles together

Stage 4 – Place engineered fill after laying a geogrid over the stabilized peat.

Stage 5 – Dewater and excavate inside the pond to final formation level

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Job No.	Sheet No.	Rev.
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Job Title: Shell Corrib Terminal Sheet Pile Solution

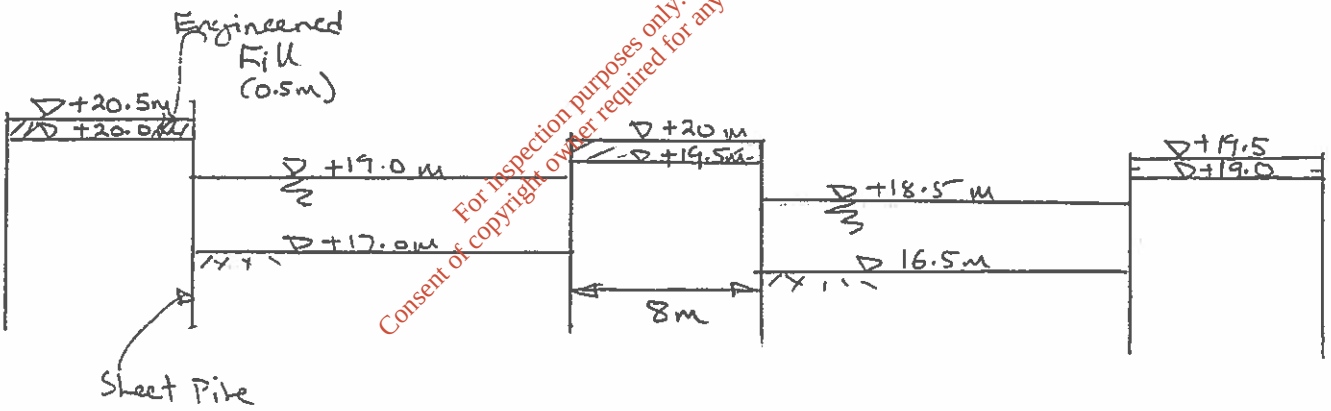
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The perimeter roads are to be retained by steel sheet piles similar to the roads in other parts of the site. The type of sheet piles required and length was determined in the analyses described below.

Typical Pond cross-Section

A typical cross-section through the ponds and the perimeter roads is shown below.



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The proposed alignment for the ponds is such that they follow the downhill direction, Hence there will be an elevation difference in the pond formation and the perimeter roads as indicated above.

The elevations indicated in the above cross-section were used to design the sheet pile walls. Please note that these elevations may vary during construction.

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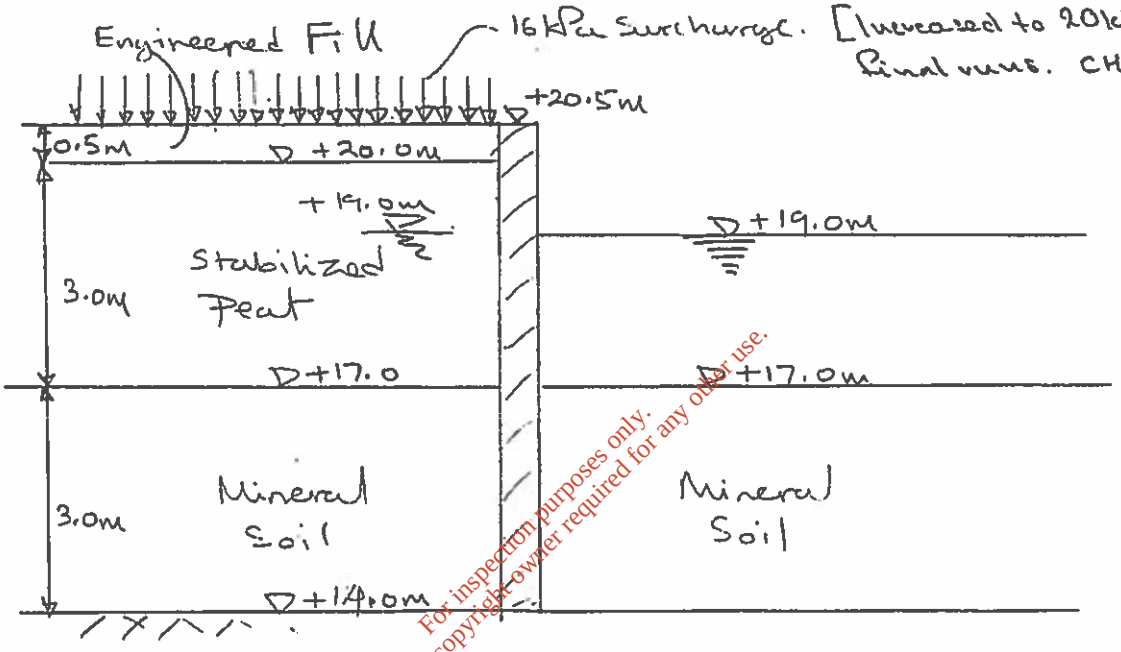
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Design of sheet pile wall

The geotechnical cross-section adopted for the design of the sheet pile wall is given below.



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The sheet pile retaining wall was designed by carrying out stability analyses for ultimate limit state (ULS) soil parameters. The deformation of the wall in service was determined using serviceable limit state (SLS) soil parameters. All analyses were carried out using Oasys FREW retaining wall analysis program. In the above design cross-section, it was assumed that all of the peat below the road will be stabilized and the pond formation extends to mineral soil.

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Job No.	Sheet No.	Rev.
114662	SP/4	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

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Material Properties for FREW

Peat

$\gamma = 11 kN/m^3$ $c' = 3.0 kPa$ $\phi' = 32^\circ$

ULS $\phi = \tan^{-1}\left(\frac{\tan 32^\circ}{1.2}\right) = 27.5^\circ$

ULS $K_a = \frac{1-\sin\phi'}{1+\sin\phi'} = \frac{1-\sin 27.5^\circ}{1+\sin 27.5^\circ} = 0.368$

$K_p = \frac{1}{0.368} = 2.72$ ignoring interface friction i.e. $\delta/\phi' = 0.0$

$K_o = 1.0$ $K_r = \frac{\gamma}{1-\nu} = \frac{0.25}{1-0.25} = 0.33$

SLS $K_a = \frac{1-\sin 32^\circ}{1+\sin 32^\circ} = 0.307$

$K_p = 3.25$

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SLS $E_u = 466 kPa$ $E' = 400 kPa$ $c_u = 3.0 kPa$

ULS $E_u = \frac{466}{1.5} = 311 kPa$ $E' = \frac{400}{1.5} = 267 kPa$

$c_u = \frac{3.0}{1.5} = 2.0 kPa$

Stabilized Peat

$\gamma = 12 kN/m^3$ $c' = 3 kPa$ $\phi' = 32.0^\circ$

ULS $\phi' = 27.5^\circ$

ULS $K_a = 0.368$ $K_p = 2.72$ $K_o = 1.0$ [Undrained strength used Pa both short term + long term conditions CH 4/12/

SLS $K_a = 0.307$ $K_p = 3.25$ $K_o = 1.0$

$K_r = 0.33$ $c_u = 25 kPa$ lower bound

50 kPa upper bound

SLS $E_u = 100 c_u = 100 \times 25 = 2500 kPa$ $E' = 20 c_u = 20 \times 25 = 500 kPa$ $c_u = 25 kPa$

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/5	A

Member/Location

Job Title: Shell Corib Terminal Sheet Pile Solution

Drg. Ref.

Made by SLG Date 06/12/03 Chd. SLG.

ULS $c_u = \frac{25}{1.5} = 16.7$ kPa.

$E_u = 16.7 \times 100 = 1670$ kPa

$E' = 16.7 \times 20 = 333$ kPa

Mineral Soils

$\gamma = 20$kN/m3 $\quad \phi' = 32°$ $\quad c' = 1.0$kPa

ULS $\phi' = \tan^{-1}\left(\frac{\tan 32}{1.2}\right)$

$= 27.5°$

For this soil only assume wall friction $\delta/\phi' = 0.5$.

Case	ϕ'	δ/ϕ'	K_a	K_p	K_o	K_r
ULS	27.5	0.5	0.333	3.7	1.0	0.333
SLS	32	0.5	0.27	4.85	1.0	0.333

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• Variation of undrained shear strength + stiffness

SLS c_u = 25 to 75 kPa over 3M

: $25 + 16.7z$ kPa

$E_u = 500\,c_u = 500(25 + 16.7z) = 12500 + 8350z$ kPa

$E' = 300\,c_u = 300(25 + 16.7z) = 7500 + 5010z$ kPa

ULS $c_u = \frac{25 + 16.7z}{1.5} = 16.7 + 11z$ kPa

$E_u = 500(16.7 + 11z) = 8350 + 5500z$ kPa

$E' = 300(16.7 + 11z) = 5010 + 3300z$ kPa

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/6	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

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Schist

$\gamma = 20 kN/m^3$ $c' = 0.0 kPa$ $\phi' = 35^\circ$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 35^\circ}{1.2}\right) = 30.3^\circ$

ULS $K_a = \frac{1-\sin 30.3^\circ}{1+\sin 30.3} = 0.329$

$K_p = 3.037$ $K_o = 1.0$

SLS $K_a = \frac{1-\sin 35^\circ}{1+\sin 35^\circ} = 0.271$

$K_p = 3.69$ $K_o = 1.0$

$K_w = \frac{0.2}{1-0.2} = 0.25$

SLS $E' = 75{,}000 kPa$

ULS $E' = 50{,}000 kPa$

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Engineered Fill

$\gamma = 20 kN/m^3$ $c' = 0$ $\phi' = 30^\circ$

ULS $\phi' = \tan^{-1}\left(\frac{\tan 30^\circ}{1.2}\right) = 25.7^\circ$

ULS $K_a = \frac{1-\sin 25.7^\circ}{1+\sin 25.7^\circ} = 0.395$

$K_p = 1/0.395 = 2.53$ $K_o = 1-\sin 25.7^\circ = 0.566$

SLS $K_a = \frac{1-\sin 30^\circ}{1+\sin 30^\circ} = 0.33$

$K_p = 3.0$ $K_o = 1-\sin 30^\circ = 0.5$

$K_w = 0.33$

SLS $E' = 45{,}000 kPa$

ULS $E' = 30{,}000 kPa$

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/7	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

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Sheet pile properties

It was assumed the sheet pile sections will be fully interlocked after installation. Hence the sheet pile properties per 1m wall length were used in the design. Section properties are as follows.

Steel sheet pile LX 8 sec^n considered.

I per m = 12861 cm⁴/m
Z per m = 830 cm⁴/m
} from British Steel piling handbook

Young's modulus = 210 GPa

$EI = 210 \times 10^6 \times 12861 \times 10^{-8} = 27{,}008$ kNm²

SLS design also checked for LX16 section.

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Anchor properties

Properties of DYWIDAG anchor 900/1030 WR used

Nominal diameter 32mm

Yield load = 724kN Ultimate load = 828 kN

Allowable load = 0.65 × 724 E = 210 GPa

= 470.6 kN

Anchor bar area $= \frac{\pi D^2}{4} = \frac{\pi \times 0.032^2}{4} = 8.04 \times 10^{-4}$ m²

bar stiffness $= \frac{EA}{L} = \frac{210 \times 10^{36} \times 8.04 \times 10^{-4}}{8.0}$

L = 8.0m = 21,111 kN/m

Anchors placed at 5m centers,

$K = \frac{21{,}111}{5} = 4222$ kN/m in the analyses.

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114662	SP/8	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 25/03 Chd. CH.

Stages in Oasys FREW

The following stages in Oasys FREW were based on the proposed construction sequence for the settlement pond given in sheet SP/1.

Stage 0 : Initial condition with all soils drained

Stage 1 : Install sheet pile retaining wall, Stabilize peat and mineral soil assigned undrained properties. Anchor strut installed.

Stage 2 : Add 16 kPa surcharge to represent plant and traffic loading

Stage 3 : Dewater inside the pond area to +16.8m

Stage 4 : Excavate the pond down to +17m to expose mineralsoil.

Stage 5 : Change to drained (long term) soil parameters with low water level

Stage 6 : Allow water level in pond to rise to operational level

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	S7/9	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile solution

Drg. Ref.

Made by ND Date Nov 25/03 Chd. CH

Assumptions in the FREW analyses

- It was assumed that the peat was stabilized from stage 0 in the analysis.
- The anchor rod was specified at an elevation of +19.5 m, 0.5 m below the top of stabilized peat
- The effects of the presence of a geo grid was not modelled
- It was assumed that the engineered fill was present from stage 0 in the analysis.
- Dewatering and excavation were modelled in two stages to distinguish the effects.

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/10	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 25/03 Chd. CH-

ULS analysis results

Sheets SP/11 to SP/19 shows the results of the analysis with ULS soil parameters. The analysis name is pond 3-2uls.frw. The toe of the sheet pile is at an elevation of +14.25m. Hence the length of sheet pile is 6.25 m with a toe embeddment of 2.75m. relative to the formation of the pond.

Sheet SP/11 shows the bending moment distribution of the sheet pile section. The maximum bending moment occurs when the pond area was excavated after dewatering. The maximum bending moment is 506 kNm per m. The moment capacity of AZ 18 sheet pile wall section is 132.8 kNm per m. Hence the chosen section has adequate capacity.

The force in the anchor rod is 74.5 x 5.0 = 372.5 kN

This is less than the rod's yield load of 724 kN

Once the pond is filled with fluid, the bending moment in the sheet pile wall reduces. This is shown in sheet SP/13.

Max anchor force is 77.5 kN/m for run 5 which assumed drained mineral soil with low water level in the pond. Not a realistic stage so above OK.

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Oasys

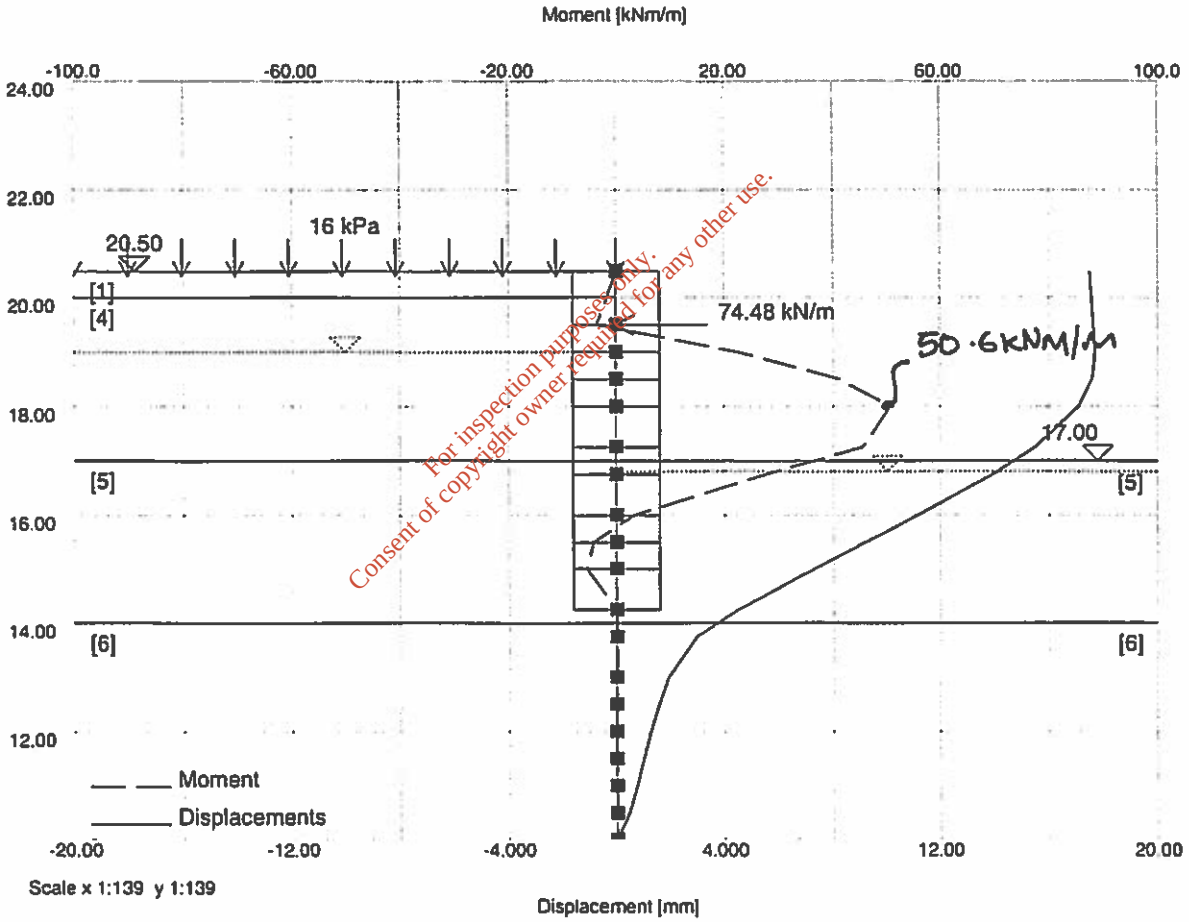
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP/11	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 3_2 uls.fwd	ALS

ULS Bending Moment and Wall deflection



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STAGE 4 : Excavate pond

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Oasys

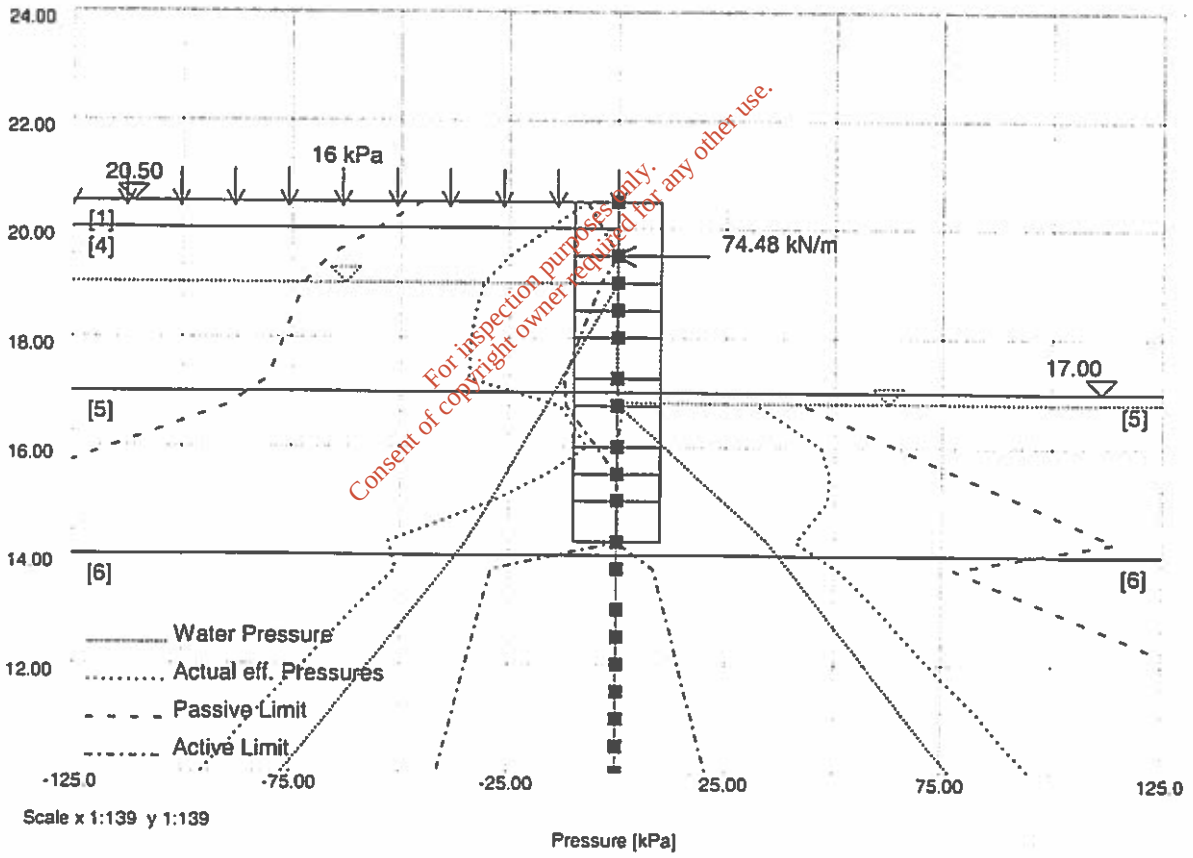
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP/12	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 3_2 uls.fwd	SLS

Earth Pressure Distribution

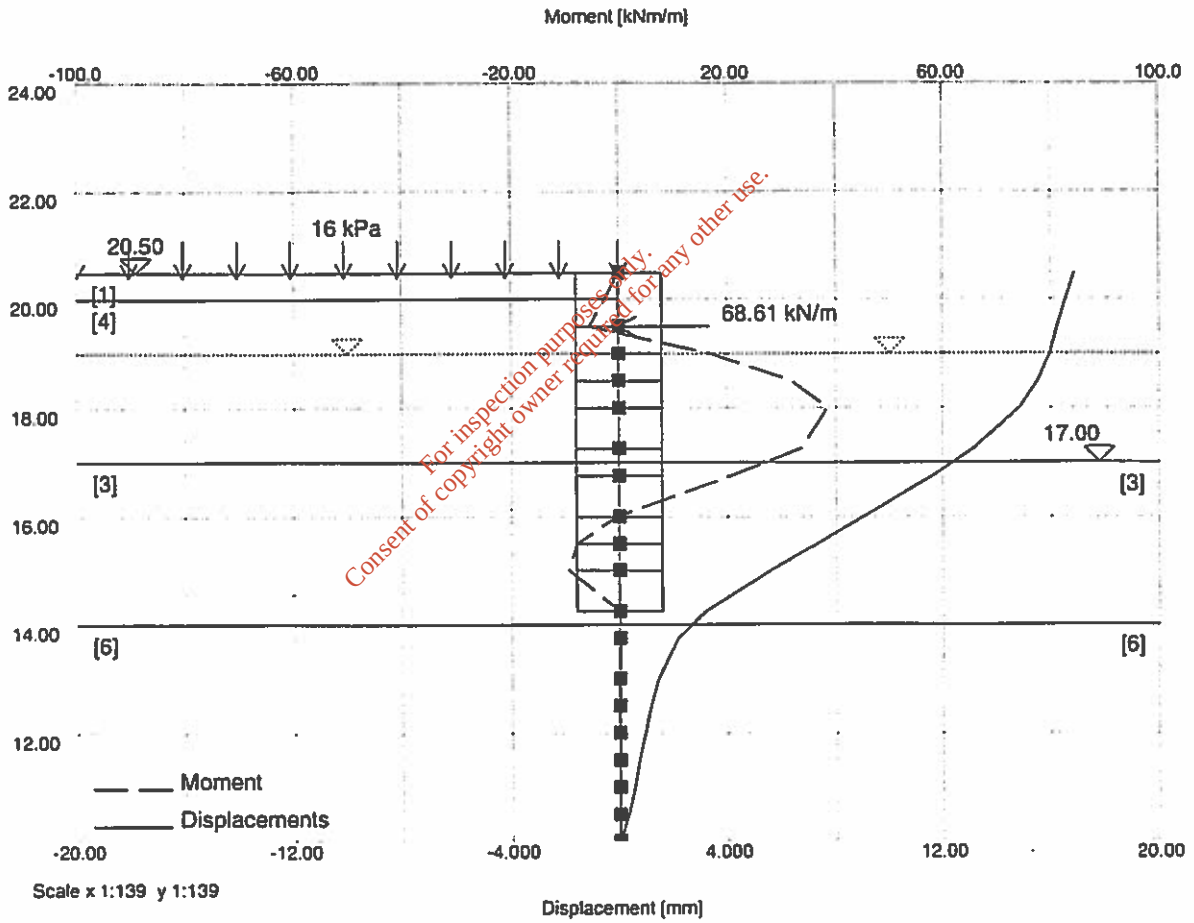


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STAGE 4 : Excavate pond

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ULS long term ground conditions



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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt (kN/m³)	Ko	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.188	0.3300	User_Specified
2	12.00	1.000	0.1700	2.720	1.220	3.308	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified

No.	c0 (kPa)	y0 (m)	Gradient of c (kPa/m)	E0 (kPa)	Gradient of E (kPa/m)
1	0.0	0.0	0.0	30000.	0.0
2	3.000	20.00	0.0	333.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8150.	5500.
6	0.0	0.0	0.0	50000.	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi (°)	Delta/Phi Ratio	Beta (°)	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level (m)	Pressure (kPa)	Offset (m)	Width (m)	Ko
1	2	-	Left	20.40	16.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress (kN/m)	Stiffness (kN/m/m)	Angle (°)	Lever arm (m)
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	2	2	8.000	32.50	27010.	2
3	19.00	2	2	8.000	32.50	27010.	3
4	18.50	2	2	8.000	32.50	27010.	4
5	18.00	2	2	8.000	32.50	27010.	5
6	17.25	2	2	8.000	32.50	27010.	6
7	16.75	3	3	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
10	15.00	3	3	8.000	32.50	27010.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances (m) :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence (mm) : 0.01000
Tolerance for pressure convergence (kPa) : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement (m) : 1.000

RESULTS FOR STAGE 0 : Initial condition

Ground level left = 20.50 Ground level right = 20.50

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil Left	Soil Right	Vs (kPa)	Ps (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	0.0	5.000	2.850	0.0	1	1	5.000	2.850	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	2	2	16.00	16.00	0.0	0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	2	2	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	2	2	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	2	2	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	2	2	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	3	3	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	3	3	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	3	3	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	3	3	46.00	46.00	40.00	0.0	0.0
11	14.25	0.0	53.50	53.50	47.50	3	3	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00											
	0.0	86.50	96.00	90.50	6	6	86.00	86.50	81.50	0.0	0.0	
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0
19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

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NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	4	4	8.000	32.50	27010.	2
3	19.00	4	4	8.000	32.50	27010.	3
4	18.50	4	4	8.000	32.50	27010.	4
5	18.00	4	4	8.000	32.50	27010.	5
6	17.25	4	4	8.000	32.50	27010.	6
7	16.75	5	5	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.850	0.0	1	1	5.000	2.850	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	4	4	16.00	16.00	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	4	4	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	4	4	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	4	4	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	4	4	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	5	5	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	5	5	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	5	5	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	5	5	46.00	46.00	40.00	0.0	0.0
** 11	14.25	0.0	53.50	53.50	47.50	5	5	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00	0.0	86.00	86.00	80.00	6	6	86.00	86.00	80.00	0.0	0.0
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0
19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Displacements [mm] Max	Moments [kNm/m] Min	Moments [kNm/m] Max	Shears [kN/m] Min	Shears [kN/m] Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	4.729	4	0.05000	1
2	4.780	4	1.254	1	14.17	1
3	5.280	3	0.4331	1	4.850	1
4	5.580	1	0.1496	1	1.690	1
5	5.680	1	0.05160	1	0.5800	1
7	5.700	1	0.006280	1	0.02000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	5.700	17.50	7.050	0.0	A	1	1	5.000	2.850	0.0	0.0	0.0

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2	19.50	5.596	32.00	29.47	0.0	4	4	16.00	17.01	0.0	0.6336	4.038
	19.50										0.6336	-19.59
3	19.00	5.523	37.38	35.10	0.0	4	4	21.38	22.70	0.0	8.091	-11.82
4	18.50	5.381	39.00	36.35	5.000	4	4	23.00	24.66	5.000	12.45	-5.769
5	18.00	5.128	40.00	37.23	10.00	4	4	24.00	25.98	10.00	13.86	0.6915
6	17.25	4.521	41.50	37.97	17.50	4	4	25.50	28.19	17.50	10.71	7.261
7	16.75	3.994	44.50	33.70	22.50	5	5	28.50	35.58	22.50	5.548	9.727
8	16.00	3.119	52.00	37.08	30.00	5	5	36.00	46.83	30.00	-1.306	6.094
9	15.50	2.537	57.00	41.27	35.00	5	5	41.00	50.75	35.00	-3.830	1.177
10	15.00	1.978	62.00	50.10	40.00	5	5	46.00	54.29	40.00	-3.483	-2.002
** 11	14.25	1.175	69.50	63.85	47.50	5	5	53.50	57.35	47.50	0.0	0.0
12	13.75	0.7721	74.50	58.68	52.50	6	6	58.50	58.68	52.50	0.0	0.0
13	13.00	0.5032	82.00	66.81	60.00	6	6	66.00	66.81	60.00	0.0	0.0
14	12.50	0.4018	87.00	72.05	65.00	6	6	71.00	72.05	65.00	0.0	0.0
15	12.00	0.3259	92.00	77.23	70.00	6	6	76.00	77.23	70.00	0.0	0.0
16	11.50	0.2590	97.00	82.39	75.00	6	6	81.00	82.39	75.00	0.0	0.0
17	11.00	0.1951	102.0	87.54	80.00	6	6	86.00	87.54	80.00	0.0	0.0
18	10.50	0.1226	107.0	92.70	85.00	6	6	91.00	92.70	85.00	0.0	0.0
19	10.00	0.0	112.0	98.00	90.00	6	6	96.00	98.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	5.704	-2.830	11.86	-19.59	9.727

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	23.62	23.62	0.0	23.62

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	14.25	36.50	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	14.25	36.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000, E at bottom node = 47000 kPa
On the RIGHT: E at ground level = 1000, E at bottom node = 47000 kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.002100	1	0.02000	1
2	0.0	1	700.0E-6	1	0.001000	1
3	0.0	1	300.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	5.707	17.50	7.119	0.0	A 1	1	5.000	6.366	0.0	0.0	0.0
2	19.50	5.598	32.00	29.46	0.0	4	4	16.00	17.01	0.0	0.6237	4.047
	19.50										0.6237	-19.59
3	19.00	5.525	37.55	35.27	0.0	4	4	22.00	23.33	0.0	8.081	-11.82
4	18.50	5.382	40.37	37.82	3.632	4	4	25.00	29.66	0.0	12.44	-5.771
5	18.00	5.128	42.74	39.97	7.263	4	4	26.00	35.98	0.0	13.85	0.6896
6	17.25	4.522	46.29	42.76	12.71	4	4	41.00	45.69	0.0	10.70	7.259
7	16.75	3.994	50.66	39.86	16.34	5	5	49.05	56.13	0.6765	5.543	9.729
8	16.00	3.119	60.21	45.29	21.79	5	5	55.18	66.06	10.82	-1.310	6.091
9	15.50	2.537	66.58	52.85	25.42	5	5	58.41	68.16	17.59	-2.832	1.175
10	15.00	1.978	72.95	61.05	29.05	5	5	61.65	69.93	24.35	-2.484	-2.004
** 11	14.25	1.175	82.50	75.85	34.50	5	5	66.50	70.55	34.50	0.0	0.0
12	13.75	0.7721	87.50	61.93	39.50	6	6	71.50	61.93	39.50	0.0	0.0
13	13.00	0.5032	95.00	70.06	47.00	6	6	79.00	70.06	47.00	0.0	0.0
14	12.50	0.4018	100.0	75.30	52.00	6	6	84.00	75.30	52.00	0.0	0.0
15	12.00	0.3259	105.0	80.48	57.00	6	6	89.00	80.48	57.00	0.0	0.0
16	11.50	0.2590	110.0	85.64	62.00	6	6	94.00	85.64	62.00	0.0	0.0
17	11.00	0.1951	115.0	90.79	67.00	6	6	99.00	90.79	67.00	0.0	0.0
18	10.50	0.1226	120.0	95.95	72.00	6	6	104.0	95.95	72.00	0.0	0.0
19	10.00	0.0	125.0	101.2	77.00	6	6	109.0	101.2	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	5.707	-2.832	11.86	-19.59	9.727

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	23.63	23.63	0.0	23.63

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm² /m]	Node
1	20.50	1	1	5.000	32.00	47000.	1
2	19.50	4	4	5.000	32.00	47000.	2

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3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	5	5	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 5800. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	10.90	5	0.0	1
2	10.90	5	2.736	1	25.81	1
3	11.60	4	1.089	1	10.67	1
4	12.00	4	0.4334	1	4.250	1
5	12.10	4	0.1725	1	1.690	1
9	12.20	4	0.004300	1	0.02000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	17.50	17.80	7.103	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	17.64	32.00	14.56	0.0	4	0	0.0	0.0	0.0	-3.552	12.76
	19.50										-3.552	-61.71
3	19.00	17.71	37.55	30.74	0.0	4	0	0.0	0.0	0.0	22.70	-46.70
4	18.50	17.58	40.37	32.39	3.632	4	0	0.0	0.0	0.0	41.15	-27.90
5	18.00	17.09	42.74	33.57	7.263	4	0	0.0	0.0	0.0	50.60	-6.136
6	17.25	15.50	46.29	34.03	12.71	4	0	0.0	0.0	0.0	45.63	21.23
7	16.75	13.94	50.66	13.17	16.34	5	5	3.045	32.47	0.6765	27.72	34.30
8	16.00	11.15	60.21	6.997	21.79	5	5	9.176	46.07	10.82	3.144	23.76
9	15.50	9.211	66.58	16.34	25.42	5	5	12.61	48.61	17.59	-4.234	8.597
10	15.00	7.100	72.95	28.27	29.05	5	5	15.65	48.51	24.35	-5.452	-2.416
** 11	14.25	4.508	82.50	52.66	34.50	5	5	20.50	61.02	34.50	0.0	0.0
12	13.75	2.917	87.50	50.99	39.50	6	6	25.50	50.99	39.50	0.0	0.0
13	13.00	1.919	95.00	60.52	47.00	6	6	33.00	60.52	47.00	0.0	0.0
14	12.50	1.519	100.0	66.10	52.00	6	6	38.00	66.10	52.00	0.0	0.0
15	12.00	1.246	105.0	71.98	57.00	6	6	43.00	71.98	57.00	0.0	0.0
16	11.50	0.9810	110.0	78.25	62.00	6	6	48.00	78.25	62.00	0.0	0.0
17	11.00	0.7305	115.0	84.26	67.00	6	6	53.00	84.26	67.00	0.0	0.0
18	10.50	0.4564	120.0	89.76	72.00	6	6	58.00	89.76	72.00	0.0	0.0
19	10.00	0.0	125.0	95.56	77.00	6	6	63.00	95.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	17.71	-5.452	50.60	-61.71	34.30

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	74.48	74.48	0.0	74.48

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm²/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	5	5	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 3500. E at bottom node = 71000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.4731	5	17.35	1
2	0.4666	5	0.2640	6	11.51	4

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3	0.7000	6	0.1499	6	10.80	9
4	0.9000	6	0.07230	6	4.940	9
5	1.000	6	0.06340	7	2.390	9
10	1.100	6	0.003000	7	0.2000	10
11	1.100	6	0.001300	7	0.04000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	17.96	17.80	7.118	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	18.36	32.00	24.65	0.0	4	0	0.0	0.0	0.0	-3.559	12.73
	19.50										-3.559	-64.77
3	19.00	18.55	37.55	30.53	0.0	4	0	0.0	0.0	0.0	24.24	-47.86
4	18.50	18.54	40.17	32.03	3.632	4	0	0.0	0.0	0.0	44.30	-31.19
5	18.00	18.12	42.74	32.95	7.263	4	0	0.0	0.0	0.0	55.44	-9.713
6	17.25	16.57	46.29	33.01	12.71	4	0	0.0	0.0	0.0	53.30	17.14
7	16.75	14.94	50.66	10.75	16.34	a 3	3	3.045	15.12	0.6765	37.58	34.56
8	16.00	11.91	60.21	3.801	21.79	a 3	3	9.176	37.80	10.82	9.310	30.49
9	15.50	9.732	66.58	14.03	25.42	a 3	3	12.41	49.74	17.59	-2.338	16.33
10	15.00	7.564	72.95	27.14	29.05	3	3	15.65	61.78	24.35	-7.016	680.6E-6
** 11	14.25	4.400	82.50	57.27	34.50	3	3	20.50	42.20	34.50	0.0	0.0
12	13.75	2.881	87.50	52.14	39.50	6	6	25.50	52.14	39.50	0.0	0.0
13	13.00	1.890	95.00	61.19	47.00	6	6	33.00	61.19	47.00	0.0	0.0
14	12.50	1.518	100.0	66.53	52.00	6	6	38.00	66.53	52.00	0.0	0.0
15	12.00	1.230	105.0	72.33	57.00	6	6	43.00	72.33	57.00	0.0	0.0
16	11.50	0.9676	110.0	78.59	62.00	6	6	48.00	78.59	62.00	0.0	0.0
17	11.00	0.7193	115.0	84.67	67.00	6	6	53.00	84.67	67.00	0.0	0.0
18	10.50	0.4681	120.0	90.34	72.00	6	6	58.00	90.34	72.00	0.0	0.0
19	10.00	0.0	125.0	95.56	77.00	6	6	63.00	95.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	18.55	-7.016	55.44	-64.77	34.56

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	77.50	77.50	0.0	77.50

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	15.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 3500. E at bottom node = 71000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	3.397	6	1.840	7
2	3.400	6	0.001000	5	0.0	7
3	3.400	6	0.05000	6	8.290	8
4	3.400	6	0.0	6	0.0	5

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	16.87	17.80	10.90	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	16.25	32.00	26.46	0.0	4	0	0.0	0.0	0.0	-5.329	14.63
	19.50										-5.329	-53.98
3	19.00	15.97	37.38	30.87	0.0	4	0	0.0	0.0	0.0	16.95	-17.09
4	18.50	15.56	39.00	31.70	5.000	4	0	0.0	0.0	5.000	31.44	-21.45
5	18.00	14.83	40.00	31.99	10.00	4	0	0.0	0.0	10.00	38.48	-3.524
6	17.25	13.13	41.50	31.01	17.50	4	0	0.0	0.0	17.50	33.54	16.16
7	16.75	11.62	44.50	15.11	22.50	3	3	2.500	13.20	22.50	20.62	27.07
8	16.00	9.034	52.00	10.26	30.00	a 3	3	10.00	31.71	30.00	-0.6023	21.59
9	15.50	7.261	57.00	19.50	35.00	3	3	15.00	43.65	35.00	-8.048	8.853
10	15.00	5.594	62.00	31.82	40.00	3	3	20.00	56.49	40.00	-9.455	-4.896
** 11	14.25	3.192	69.50	59.09	47.50	3	3	27.50	38.92	47.50	0.0	0.0
12	13.75	2.150	74.50	52.89	52.50	6	6	32.50	52.89	52.50	0.0	0.0
13	13.00	1.431	82.00	61.55	60.00	6	6	40.00	61.55	60.00	0.0	0.0
14	12.50	1.148	87.00	66.80	65.00	6	6	45.00	66.80	65.00	0.0	0.0
15	12.00	0.9260	92.00	72.44	70.00	6	6	50.00	72.44	70.00	0.0	0.0
16	11.50	0.7228	97.00	78.57	75.00	6	6	55.00	78.57	75.00	0.0	0.0
17	11.00	0.5326	102.0	84.58	80.00	6	6	60.00	84.58	80.00	0.0	0.0
18	10.50	0.3310	107.0	90.09	85.00	6	6	65.00	90.09	85.00	0.0	0.0
19	10.00	0.0	112.0	94.78	90.00	6	6	70.00	94.78	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	18.55	-9.455	55.44	-64.77	34.56

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]

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1	2	68.61	68.61	0.0	77.50

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	17.96	0.0	0.0	0.0	0.0
2	19.50	0.0	18.36	-5.449	0.6336	-64.77	14.63
3	19.00	0.0	18.55	0.0	24.24	-47.86	0.0
4	18.50	0.0	18.54	0.0	44.30	-31.19	0.0
5	18.00	0.0	18.12	0.0	55.44	-9.711	0.6915
6	17.25	0.0	16.57	0.0	53.30	0.0	21.23
7	16.75	0.0	14.94	0.0	37.58	0.0	34.56
8	16.00	0.0	11.91	-1.310	9.310	0.0	30.49
9	15.50	0.0	9.722	-8.048	0.0	0.0	16.33
10	15.00	0.0	7.564	-9.455	0.0	-4.896	680.6E-6
11	14.25	0.0	4.508	0.0	0.0	0.0	0.0
12	13.75	0.0	2.937	0.0	0.0	0.0	0.0
13	13.00	0.0	1.919	0.0	0.0	0.0	0.0
14	12.50	0.0	1.539	0.0	0.0	0.0	0.0
15	12.00	0.0	1.246	0.0	0.0	0.0	0.0
16	11.50	0.0	0.9810	0.0	0.0	0.0	0.0
17	11.00	0.0	0.7305	0.0	0.0	0.0	0.0
18	10.50	0.0	0.4566	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/20	

Member/Location

Job Title: Shell Corrib Terminal Sheet Pile Solution

Drg. Ref.

Made by NP Date Nov 25/03 Chd. CH

SLS analysis results.

Sheets SP/21 to SP/29 shows the results of the analysis with SLS soil parameters. The analysis name is pond 3-2sls.frw. The toe of the sheet pile is at an elevation of +11.25m. The maximum deformation of the sheet pile wall occurs after the pond excavation. The maximum deflection is about 15.5mm at the top of the wall as shown in sheet SP/21. This wall deflection could result in a maximum road settlement of around 8mm behind the wall.

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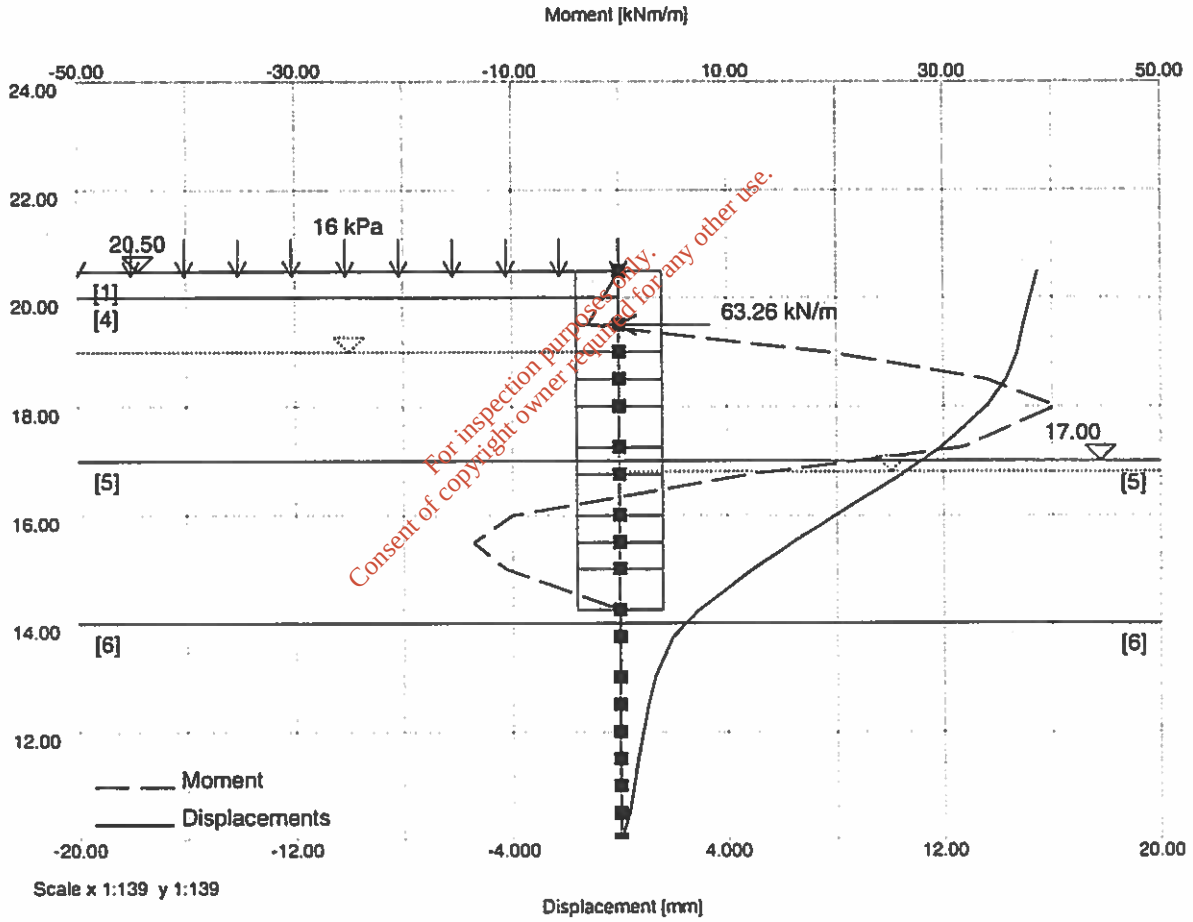
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP121	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 3_2 sls.fwd	DLS

SLS Bending Moment and Wall Deflection.



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STAGE 4 : Excavate pond

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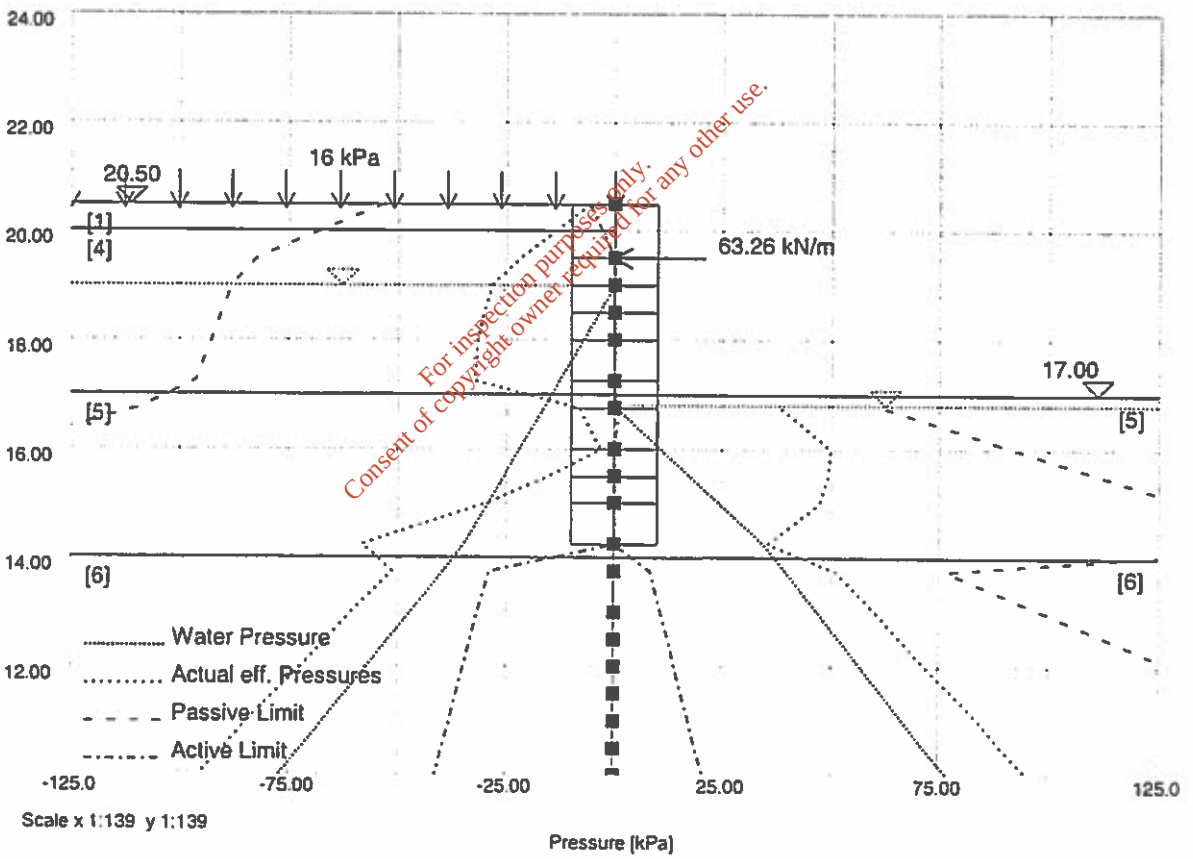
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP/22	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 3_2 sls.fwd	BLS

Earth Pressure Distribution



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STAGE 4 : Excavate pond

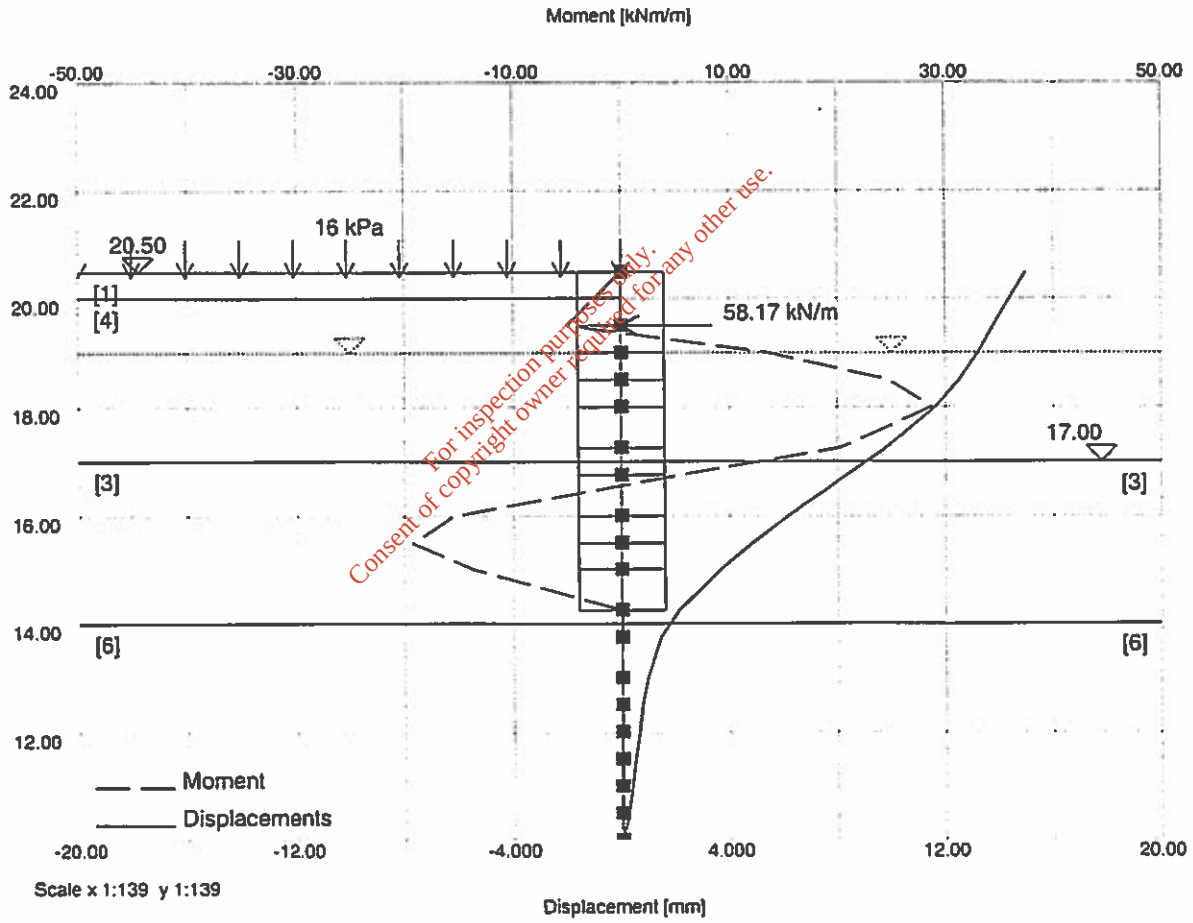
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Oasys

Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP/23	
Drg. Ref.		
Made by NP	Date 06-Dec-2003	Data pond 3_2 sls.fwd
Checked DLS		

SLS Long Term Ground Conditions



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STAGE 6 : Fill the pond

EPA Export 08-07-2014:23:43:24

INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	KO	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5000	0.3300	3.000	1.150	3.460	0.3300	User_Specified
2	12.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
3	20.00	1.000	0.2700	4.850	1.040	4.400	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.000	1.150	3.460	0.2500	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	45000.	0.0
2	3.000	20.00	0.0	500.0	0.0
3	1.000	17.00	0.0	7500.	5010.
4	25.00	20.00	0.0	2500.	0.0
5	25.00	17.00	16.70	12500.	8350.
6	0.0	0.0	0.0	75000.	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	32.00	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	2	-	Left	20.40	16.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm²/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	2	2	8.000	32.50	27010.	2
3	19.00	2	2	8.000	32.50	27010.	3
4	18.50	2	2	8.000	32.50	27010.	4
5	18.00	2	2	8.000	32.50	27010.	5
6	17.25	2	2	8.000	32.50	27010.	6
7	16.75	3	3	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
10	15.00	3	3	8.000	32.50	27010.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe Level: 14.25

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	15.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	15.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 500
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.500	0.0	1	1	5.000	2.500	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	2	2	16.00	16.00	0.0	0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	2	2	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	2	2	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	2	2	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	2	2	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	3	3	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	3	3	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	3	3	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	3	3	46.00	46.00	40.00	0.0	0.0
11	14.25	0.0	53.50	53.50	47.50	3	3	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00	0.0	86.00	86.00	80.00	6	6	86.00	86.00	80.00	0.0	0.0
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0

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19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	4	4	8.000	32.50	27010.	2
3	19.00	4	4	8.000	32.50	27010.	3
4	18.50	4	4	8.000	32.50	27010.	4
5	18.00	4	4	8.000	32.50	27010.	5
6	17.25	4	4	8.000	32.50	27010.	6
7	16.75	5	5	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 71000. kPa
On the RIGHT: E at ground level = 1500. E at bottom node = 71000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.500	0.0	1	1	11.000	2.500	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	4	4	16.00	16.00	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	4	4	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	4	4	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	4	4	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	4	4	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	5	5	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	5	5	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	5	5	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	5	5	46.00	46.00	40.00	0.0	0.0
** 11	14.25	0.0	53.50	53.50	47.50	5	5	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00	0.0	86.00	86.00	80.00	6	6	86.00	86.00	80.00	0.0	0.0
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0
19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 71000. kPa
On the RIGHT: E at ground level = 1500. E at bottom node = 71000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	3.696	4	0.0	0
2	3.700	4	1.056	1	15.17	1
3	4.100	3	0.4311	1	6.190	1
4	4.300	1	0.1759	1	2.530	1
5	4.500	1	0.07180	1	1.030	1
6	4.600	1	0.004900	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]

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1	20.50	4.643	17.80	5.845	0.0	A	1	1	5.000	9.268	0.0	0.0	0.0
2	19.50	4.508	32.00	28.84	0.0		4	4	16.00	17.34	0.0	1.712	2.601
	19.50											1.712	-16.43
3	19.00	4.412	37.36	34.50	0.0		4	4	21.38	23.11	0.0	7.771	-9.271
4	18.50	4.248	39.00	35.83	5.000		4	4	23.00	25.11	5.000	10.58	-3.744
5	18.00	3.589	40.00	36.66	10.00		4	4	24.00	26.42	10.00	11.52	2.135
6	17.25	3.414	41.50	37.46	17.50		4	4	25.50	28.59	17.50	7.514	8.107
7	16.75	2.942	44.50	32.42	22.50		5	5	28.50	36.47	22.50	2.075	9.613
8	16.00	2.208	52.00	36.16	30.00		5	5	36.00	47.47	30.00	-4.185	4.811
9	15.50	1.754	57.00	43.10	35.00		5	5	41.00	50.74	35.00	-4.823	-0.6337
10	15.00	1.341	62.00	50.40	40.00		5	5	46.00	53.90	40.00	-3.552	-3.639
** 11	*14.25*	*0.7748*	*69.50*	*63.99*	*47.50*		*5*	*5*	*53.50*	*56.41*	*47.50*	*0.0*	*0.0*
12	13.75	0.5168	74.50	58.67	52.50		6	6	58.50	58.67	52.50	0.0	0.0
13	13.00	0.3397	82.00	66.80	60.00		6	6	66.00	66.80	60.00	0.0	0.0
14	12.50	0.2718	87.00	72.04	65.00		6	6	71.00	72.04	65.00	0.0	0.0
15	12.00	0.2208	92.00	77.22	70.00		6	6	76.00	77.22	70.00	0.0	0.0
16	11.50	0.1758	97.00	82.38	75.00		6	6	81.00	82.38	75.00	0.0	0.0
17	11.00	0.1327	102.0	87.53	80.00		6	6	86.00	87.53	80.00	0.0	0.0
18	10.50	0.08363	107.0	92.69	85.00		6	6	91.00	92.69	85.00	0.0	0.0
19	10.00	0.0	112.0	98.00	90.00		6	6	96.00	98.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	4.643	-4.823	11.52	-16.43	9.613

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	19.03	19.03	0.0	19.03

STAGE 2 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	14.25	34.50	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.00	0.0	10.00
2	14.25	34.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 75000. kPa
On the RIGHT: E at ground level = 1500. E at bottom node = 71000. kPa

Iter no.	Ino max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.002000	1	0.000000	1
2	0.0	1	800.0E-6	1	0.001000	1
3	0.0	1	300.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	4.646	17.80	5.872	0.0	A 1	1	5.000	9.274	0.0	0.0	0.0
2	19.50	4.509	32.00	28.83	0.0	4	4	16.00	17.34	0.0	1.701	2.610
	19.50										1.701	-16.43
3	19.00	4.414	37.55	34.47	0.0	4	4	22.00	23.74	0.0	7.760	-9.272
4	18.50	4.250	40.37	37.20	3.632	4	4	26.00	30.11	0.0	10.97	-3.746
5	18.00	3.990	42.74	39.40	7.263	4	4	34.00	36.42	0.0	11.51	2.133
6	17.25	3.414	46.29	42.25	12.71	4	4	43.00	46.09	0.0	7.508	8.104
7	16.75	2.943	50.66	38.58	16.34	5	5	49.05	57.01	0.6765	2.069	9.610
8	16.00	2.208	60.21	44.37	21.79	5	5	55.18	66.65	10.82	-4.185	4.809
9	15.50	1.754	66.38	52.68	25.42	5	5	58.41	68.15	17.59	-4.825	-0.6361
10	15.00	1.341	72.95	61.34	29.05	5	5	61.65	69.55	24.35	-3.553	-3.641
** 11	*14.25*	*0.7747*	*82.50*	*76.99*	*34.50*	*5*	*5*	*66.50*	*69.41*	*34.50*	*0.0*	*0.0*
12	13.75	0.5168	87.50	61.92	39.50	6	6	71.50	61.92	39.50	0.0	0.0
13	13.00	0.3397	95.00	70.05	47.00	6	6	79.00	70.05	47.00	0.0	0.0
14	12.50	0.2718	100.0	75.28	52.00	6	6	84.00	75.28	52.00	0.0	0.0
15	12.00	0.2208	105.0	80.47	57.00	6	6	89.00	80.47	57.00	0.0	0.0
16	11.50	0.1758	110.0	85.63	62.00	6	6	94.00	85.63	62.00	0.0	0.0
17	11.00	0.1327	115.0	90.78	67.00	6	6	99.00	90.78	67.00	0.0	0.0
18	10.50	0.08363	120.0	95.94	72.00	6	6	104.0	95.94	72.00	0.0	0.0
19	10.00	0.0	125.0	101.2	77.00	6	6	109.0	101.2	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	4.646	-4.825	11.52	-16.43	9.613

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	19.04	19.04	0.0	19.04

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm²/m]

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1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	5	5	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	*14.25*	*5*	*5*	*8.000*	*32.50*	*0.0*	*11*
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 71000. kPa
On the RIGHT: E at ground level = 8800. E at bottom node = 100000. kPa

Iter no.	Ins max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	8.529	5	0.0	1
2	8.500	5	2.629	1	31.90	1
3	9.300	4	1.270	1	15.40	1
4	9.800	3	0.6129	1	7.430	1
5	10.30	1	0.2959	1	3.590	1
10	10.80	1	0.007800	1	0.05000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	15.47	17.80	5.829	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	14.98	32.00	21.71	0.0	4	0	0.0	0.0	0.0	-2.514	11.06
	19.50										-2.514	-52.21
3	19.00	14.74	37.55	26.36	0.0	4	0	0.0	0.0	0.0	19.12	-36.86
4	18.50	14.32	40.37	30.04	3.632	4	0	0.0	0.0	0.0	33.95	-21.24
5	18.00	13.62	42.74	31.46	7.263	4	0	0.0	0.0	0.0	40.36	-0.7228
6	17.25	11.90	46.29	32.08	12.71	4	0	0.0	0.0	0.0	31.83	25.38
7	16.75	10.39	50.66	8.140	16.34	5	5	3.045	38.37	0.6765	12.14	34.42
8	16.00	7.952	60.21	3.204	21.79	5	5	9.176	39.82	10.82	-9.963	18.33
9	15.50	6.396	66.58	15.46	25.42	5	5	12.81	39.38	17.59	-13.56	0.6710
10	15.00	4.955	72.95	29.31	29.05	5	5	16.45	47.14	24.35	-10.63	-10.01
** 11	*14.25*	*2.949*	*82.50*	*58.08*	*34.50*	*5*	*5*	*20.56*	*55.38*	*34.50*	*0.0*	*0.0*
12	13.75	1.955	87.50	51.03	39.50	6	6	28.50	51.03	39.50	0.0	0.0
13	13.00	1.290	95.00	60.55	47.00	6	6	33.00	60.55	47.00	0.0	0.0
14	12.50	1.037	100.0	66.12	52.00	6	6	38.00	66.12	52.00	0.0	0.0
15	12.00	0.8406	105.0	71.89	57.00	6	6	43.00	71.89	57.00	0.0	0.0
16	11.50	0.6623	110.0	78.33	62.00	6	6	48.00	78.33	62.00	0.0	0.0
17	11.00	0.4942	115.0	84.32	67.00	6	6	53.00	84.32	67.00	0.0	0.0
18	10.50	0.3098	120.0	89.81	72.00	6	6	58.00	89.81	72.00	0.0	0.0
19	10.00	0.0	125.0	95.56	77.00	6	6	63.00	95.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	15.47	-13.56	40.36	-52.21	34.42

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	63.26	63.26	0.0	63.26

STAGE 5 : CHANGE TO DRAINED

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	3	3	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
10	15.00	3	3	8.000	32.50	27010.	10
** 11	*14.25*	*3*	*3*	*8.000*	*32.50*	*0.0*	*11*
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 5 : Change to drained

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 63000. kPa
On the RIGHT: E at ground level = 5300. E at bottom node = 110000. kPa

Iter no.	Ins max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.

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1	0.0	0	0.3364	5	19.20	7
2	0.3000	5	0.1644	6	13.45	8
3	0.5000	5	0.04880	5	3.160	8
4	0.5000	5	0.02560	1	0.8700	8
5	0.6000	5	0.01320	1	0.3500	8
6	0.6000	5	0.006600	1	0.04000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	15.77	17.80	5.835	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	15.41	32.00	21.56	0.0	4	0	0.0	0.0	0.0	-2.917	11.00
	19.50										-2.917	-54.07
3	19.00	15.23	37.55	28.14	0.0	4	0	0.0	0.0	0.0	20.07	-38.83
4	18.50	14.87	40.37	29.69	3.632	4	0	0.0	0.0	0.0	35.92	-23.36
5	18.00	14.15	42.74	30.90	7.263	4	0	0.0	0.0	0.0	43.43	-3.100
6	17.25	12.46	46.29	31.21	12.71	4	0	0.0	0.0	0.0	36.81	22.55
7	16.75	10.86	50.66	6.156	16.34	a 3	3	3.045	19.17	0.6765	18.67	36.70
8	16.00	8.274	60.21	1.693	21.79	A 3	3	9.176	48.53	10.82	-9.172	25.79
9	15.50	6.580	66.58	14.18	25.42	a 3	3	12.41	64.44	17.59	-16.40	3.852
10	15.00	5.021	72.95	29.23	29.05	3	3	15.65	50.51	24.35	-13.02	-12.06
** 11	14.25	2.872	82.50	61.57	34.50	3	3	20.50	33.73	34.50	0.0	0.0
12	13.75	1.924	87.50	51.54	39.50	6	6	25.50	51.54	39.50	0.0	0.0
13	13.00	1.276	95.00	60.85	47.00	6	6	33.00	60.85	47.00	0.0	0.0
14	12.50	1.027	100.0	66.31	52.00	6	6	38.00	66.31	52.00	0.0	0.0
15	12.00	0.8337	105.0	72.15	57.00	6	6	43.00	72.15	57.00	0.0	0.0
16	11.50	0.6569	110.0	78.50	62.00	6	6	48.00	78.50	62.00	0.0	0.0
17	11.00	0.4898	115.0	84.53	67.00	6	6	53.00	84.53	67.00	0.0	0.0
18	10.50	0.3066	120.0	90.15	72.00	6	6	58.00	90.15	72.00	0.0	0.0
19	10.00	0.0	125.0	95.56	77.00	6	6	63.00	95.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	15.77	-16.40	43.43	-54.07	36.70

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	65.07	65.07	0.0	65.07

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 63000. kPa
On the RIGHT: E at ground level = 5300. E at bottom node = 110000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	2.575	6	2.470	7
2	2.600	6	0.002000	5	0.0	7
3	2.600	6	0.06580	6	9.300	8
4	2.600	6	0.0	6	0.0	8

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	14.96	17.80	10.03	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	13.78	32.00	21.60	0.0	4	0	0.0	0.0	0.0	-5.016	13.12
	19.50										-5.016	-45.05
3	19.00	13.21	39.38	28.61	0.0	4	0	0.0	0.0	0.0	13.46	-29.80
4	18.50	12.53	39.00	29.62	5.000	4	0	0.0	0.0	5.000	24.78	-15.24
5	18.00	11.63	40.00	30.35	10.00	4	0	0.0	0.0	10.00	28.70	1.651
6	17.25	9.822	41.50	29.75	17.50	4	0	0.0	0.0	17.50	20.34	20.43
7	16.75	8.384	44.50	11.58	22.50	3	3	2.500	14.42	22.50	5.482	28.84
8	16.00	6.171	52.00	9.249	30.00	A 3	3	10.00	41.88	30.00	-15.48	17.76
9	15.50	4.833	57.00	20.28	35.00	3	3	15.00	57.70	35.00	-19.26	-1.800
10	15.00	3.658	62.00	34.10	40.00	3	3	20.00	45.44	40.00	-13.68	-14.70
** 11	14.25	2.098	69.50	61.64	47.50	3	3	27.50	32.45	47.50	0.0	0.0
12	13.75	1.443	74.50	52.25	52.50	6	6	32.50	52.25	52.50	0.0	0.0
13	13.00	0.9698	82.00	61.19	60.00	6	6	40.00	61.19	60.00	0.0	0.0
14	12.50	0.7709	87.00	66.56	65.00	6	6	45.00	66.56	65.00	0.0	0.0
15	12.00	0.6301	92.00	72.25	70.00	6	6	50.00	72.25	70.00	0.0	0.0
16	11.50	0.4925	97.00	78.47	75.00	6	6	55.00	78.47	75.00	0.0	0.0
17	11.00	0.3643	102.0	84.44	80.00	6	6	60.00	84.44	80.00	0.0	0.0
18	10.50	0.2275	107.0	89.89	85.00	6	6	65.00	89.89	85.00	0.0	0.0
19	10.00	0.0	112.0	94.78	90.00	6	6	70.00	94.78	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	15.77	-19.26	43.43	-54.07	36.70

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force	Horiz force	Moment	Max strut force

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		[kN/m]	[kN/m]	[kNm/m]	[kN/m]
1	2	58.17	58.17	0.0	65.07

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	15.77	0.0	0.0	0.0	0.0
2	19.50	0.0	15.41	-5.016	1.712	-54.07	13.12
3	19.00	0.0	15.23	0.0	20.07	-38.83	0.0
4	18.50	0.0	14.87	0.0	35.92	-23.36	0.0
5	18.00	0.0	14.19	0.0	43.43	-3.100	2.135
6	17.25	0.0	12.46	0.0	36.81	0.0	25.38
7	16.75	0.0	10.85	0.0	28.67	0.0	36.70
8	16.00	0.0	8.294	-15.48	0.0	0.0	25.79
9	15.50	0.0	6.560	-19.26	0.0	-1.800	3.852
10	15.00	0.0	5.021	-13.69	0.0	-14.70	0.0
11	14.25	0.0	2.949	0.0	0.0	0.0	0.0
12	13.75	0.0	1.955	0.0	0.0	0.0	0.0
13	13.00	0.0	1.250	0.0	0.0	0.0	0.0
14	12.50	0.0	1.037	0.0	0.0	0.0	0.0
15	12.00	0.0	0.8406	0.0	0.0	0.0	0.0
16	11.50	0.0	0.6623	0.0	0.0	0.0	0.0
17	11.00	0.0	0.4942	0.0	0.0	0.0	0.0
18	10.50	0.0	0.3098	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/30	

Member/Location

Job Title: Comib Field Development sheet pile solution

Drg. Ref.

Made by NP Date Nov 28/03 Chd. CH.

Alternative sheet pile solution with LX16 sheet pile wall section. Surcharge loading due to HB loading for 45 units of 20kPa was considered in accordance with BD 37/01 (BS 5400-2 : 1978). The load factor for ultimate limit state (ULS) is 1.2 for vertical loads. Hence the ULS design load is $1.2 \times 20 = 24$ kPa

LX16 sheet pile wall section

$I = 31175\ cm^4/m$
$Z = 1604\ cm^3/m$
} from British Steel Piling Handbook

Young's modulus of steel 210 GPa

$\therefore EI = 210 \times 10^6 \times 31175 \times 10^{-8}$

$= 65468\ kNm^2$

Sheets SP/32 to SP/41 show the results of the analysis model pond 8 uls.fnw. The toe of the sheet pile is at an elevation of +14.25m in the adopted geological section.

The maximum ULS bending moment was 64.6 kNm per m. This is less than the moment capacity of 262.6 kNm per m. (see sheet SP/32)

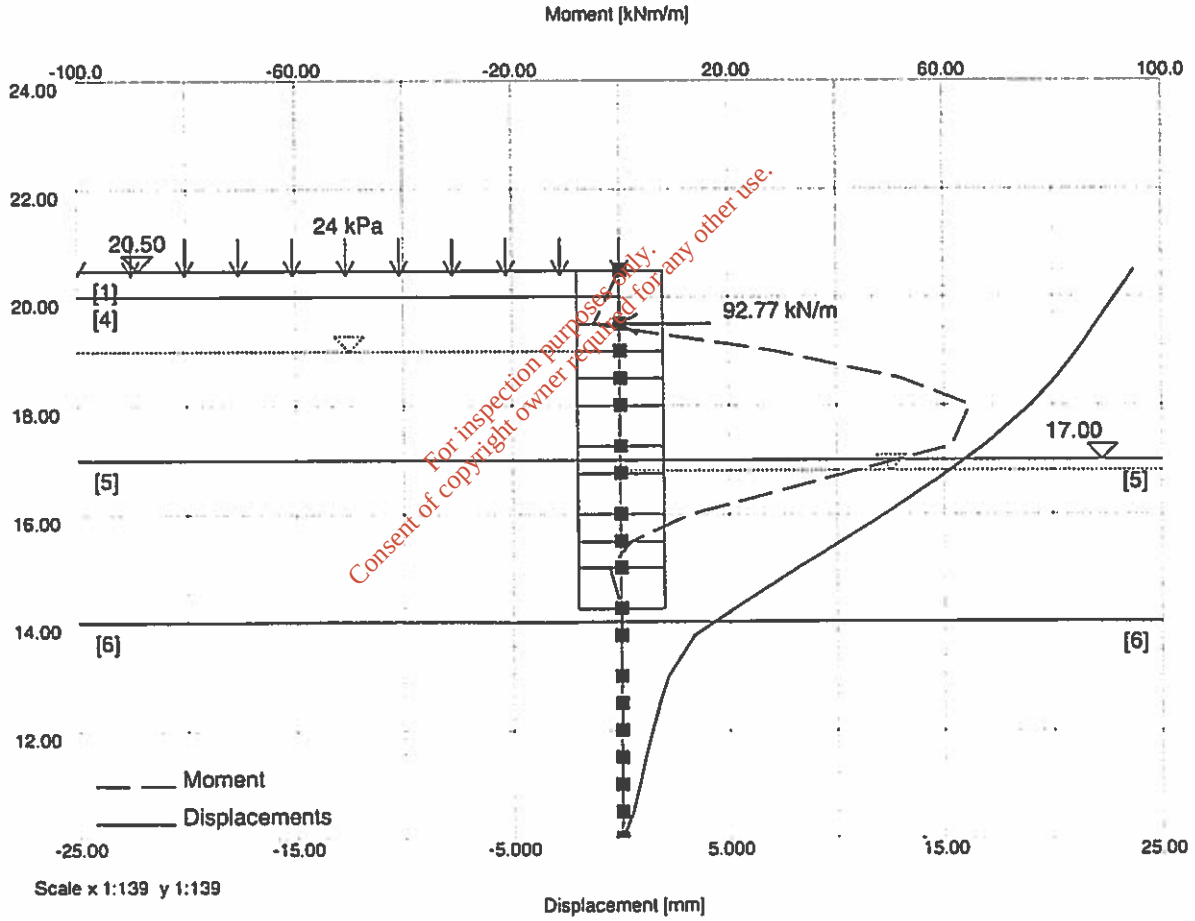
The force in the anchor is $92.8\ kN/m \times 5 = 464\ kN/m$

This is less than the allowable load of 470.6 kN.

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ULS Bending Moment distribution and wall deflection



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STAGE 4 : Excavate pond

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Oasys

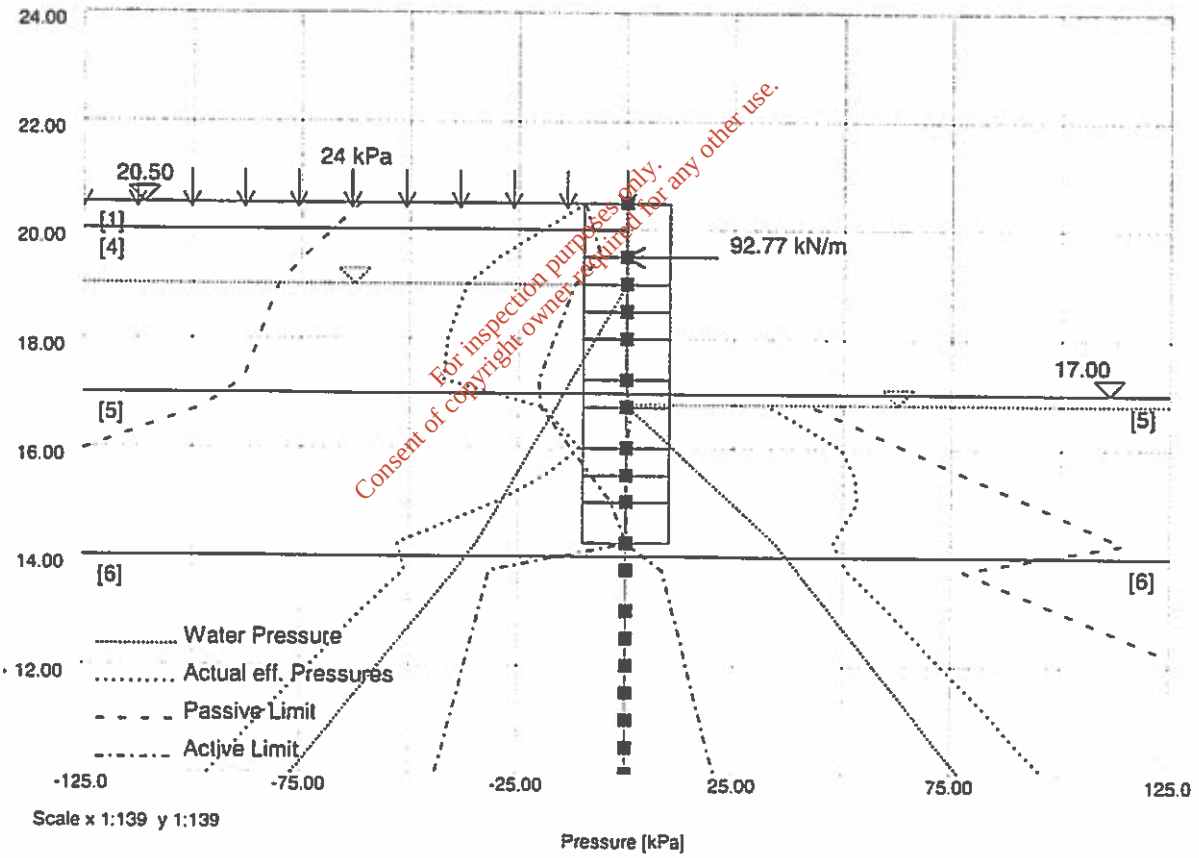
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	SP/32	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 8 uls.fwd	SG

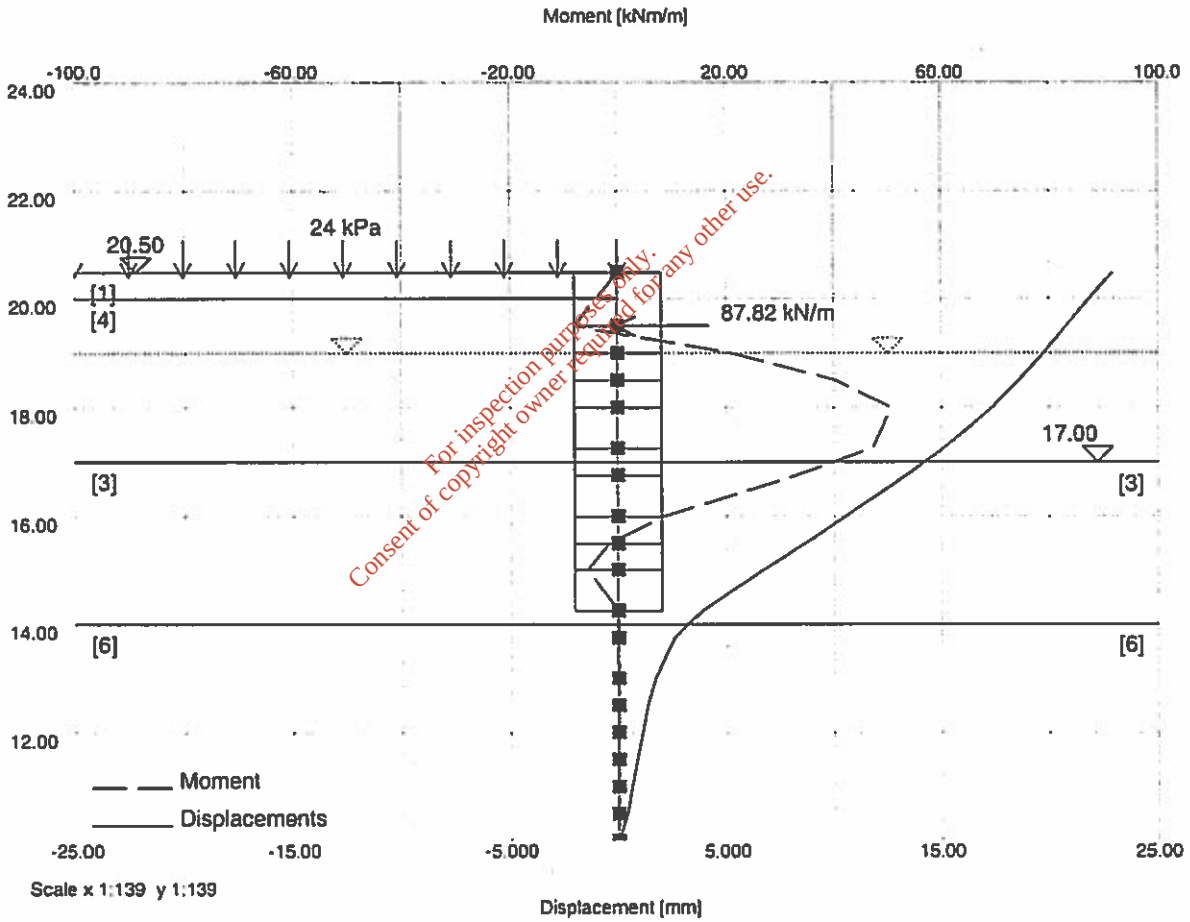
ULS Earth Pressure distribution



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STAGE 4 : Excavate pond

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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	20.00	0.0	333.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ks
1	2	-	Left	20.40	24.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	2	2	8.000	32.50	65470.	2
3	19.00	2	2	8.000	32.50	65470.	3
4	18.50	2	2	8.000	32.50	65470.	4
5	18.00	2	2	8.000	32.50	65470.	5
6	17.25	2	2	8.000	32.50	65470.	6
7	16.75	3	3	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
10	15.00	3	3	8.000	32.50	65470.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.850	0.0	1	1	5.000	2.850	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	2	2	16.00	16.00	0.0	0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	2	2	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	2	2	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	2	2	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	2	2	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	3	3	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	3	3	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	3	3	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	3	3	46.00	46.00	40.00	0.0	0.0
11	14.25	0.0	53.50	53.50	47.50	3	3	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00	0.0	86.00	86.00	80.00	6	6	86.00	86.00	80.00	0.0	0.0
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0
19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

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EPA Export 08-07-2014:23:43:24

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level	Soil		Boundary		EI below node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	4	4	8.000	32.50	65470.	2
3	19.00	4	4	8.000	32.50	65470.	3
4	18.50	4	4	8.000	32.50	65470.	4
5	18.00	4	4	8.000	32.50	65470.	5
6	17.25	4	4	8.000	32.50	65470.	6
7	16.75	5	5	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
10	15.00	5	5	8.000	32.50	65470.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 47000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.850	0.0	1	1	5.000	2.850	0.0	0.0	0.0
2	19.50	0.0	16.00	16.00	0.0	4	4	16.00	16.00	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	21.38	0.0	4	4	21.38	21.38	0.0	0.0	0.0
4	18.50	0.0	23.00	23.00	5.000	4	4	23.00	23.00	5.000	0.0	0.0
5	18.00	0.0	24.00	24.00	10.00	4	4	24.00	24.00	10.00	0.0	0.0
6	17.25	0.0	25.50	25.50	17.50	4	4	25.50	25.50	17.50	0.0	0.0
7	16.75	0.0	28.50	28.50	22.50	5	5	28.50	28.50	22.50	0.0	0.0
8	16.00	0.0	36.00	36.00	30.00	5	5	36.00	36.00	30.00	0.0	0.0
9	15.50	0.0	41.00	41.00	35.00	5	5	41.00	41.00	35.00	0.0	0.0
10	15.00	0.0	46.00	46.00	40.00	5	5	46.00	46.00	40.00	0.0	0.0
** 11	14.25	0.0	53.50	53.50	47.50	5	5	53.50	53.50	47.50	0.0	0.0
12	13.75	0.0	58.50	58.50	52.50	6	6	58.50	58.50	52.50	0.0	0.0
13	13.00	0.0	66.00	66.00	60.00	6	6	66.00	66.00	60.00	0.0	0.0
14	12.50	0.0	71.00	71.00	65.00	6	6	71.00	71.00	65.00	0.0	0.0
15	12.00	0.0	76.00	76.00	70.00	6	6	76.00	76.00	70.00	0.0	0.0
16	11.50	0.0	81.00	81.00	75.00	6	6	81.00	81.00	75.00	0.0	0.0
17	11.00	0.0	86.00	86.00	80.00	6	6	86.00	86.00	80.00	0.0	0.0
18	10.50	0.0	91.00	91.00	85.00	6	6	91.00	91.00	85.00	0.0	0.0
19	10.00	0.0	96.00	96.00	90.00	6	6	96.00	96.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 47000. kPa

Iter no.	Inc max displ (cm)	Node no.	Disp error. (mm)	Node no.	Press error [kPa]	Node no.
1	0.0	0	6.699	2	0.4900	1
2	6.700	2	1.939	1	24.97	1
3	8.500	1	0.5643	1	7.530	1
4	9.100	1	0.1761	1	2.270	1
5	9.300	1	0.05510	1	0.6800	1
7	9.400	1	0.002800	1	0.02000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	9.377	21.20	9.761	0.0	A	1	5.000	17.09	0.0	0.0	0.0

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EPA Export 08-07-2014:23:43:24

2	19.50	8.634	40.00	35.70	0.0	4	4	16.00	17.86	0.0	1.210	5.483
	19.50										1.210	-30.97
3	19.00	8.250	45.37	41.84	0.0	4	4	21.38	23.47	0.0	13.35	-19.69
4	18.50	7.817	47.00	43.36	5.000	4	4	23.00	25.34	5.000	20.90	-10.59
5	18.00	7.308	48.00	44.36	10.00	4	4	24.00	26.53	10.00	23.94	-0.5119
6	17.25	6.380	49.50	44.89	17.50	4	4	25.50	28.89	17.50	20.14	10.06
7	16.75	5.667	52.50	37.56	22.50	5	5	28.50	38.14	22.50	12.61	14.88
8	16.00	4.515	60.00	38.63	30.00	5	5	36.00	51.44	30.00	1.589	10.70
9	15.50	3.732	65.00	44.60	35.00	5	5	41.00	55.54	35.00	-1.758	3.962
10	15.00	2.953	70.00	51.79	40.00	5	5	46.00	58.81	40.00	-2.372	-0.9673
** 11	14.25	1.798	77.50	66.04	47.50	5	5	53.50	68.98	47.50	0.0	0.0
12	13.75	1.168	82.50	58.75	52.50	6	6	58.50	58.75	52.50	0.0	0.0
13	13.00	0.7564	90.00	67.22	60.00	6	6	66.00	67.22	60.00	0.0	0.0
14	12.50	0.6030	95.00	72.58	65.00	6	6	71.00	72.58	65.00	0.0	0.0
15	12.00	0.4885	100.0	77.85	70.00	6	6	76.00	77.85	70.00	0.0	0.0
16	11.50	0.3878	105.0	83.08	75.00	6	6	81.00	83.08	75.00	0.0	0.0
17	11.00	0.2919	110.0	88.30	80.00	6	6	86.00	88.30	80.00	0.0	0.0
18	10.50	0.1832	115.0	93.55	85.00	6	6	91.00	93.55	85.00	0.0	0.0
19	10.00	0.0	120.0	99.00	90.00	6	6	96.00	99.00	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	9.377	-2.372	23.96	-30.97	14.88

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	36.45	36.45	0.0	36.45

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	14.25	34.50	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	14.25	34.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.001500	1	0.01000	1
2	0.0	1	400.0E-6	1	0.01000	1
3	0.0	1	100.0E-6	1	0.0	1

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Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	9.379	24.20	9.679	0.0	A	1	1	9.000	12.08	0.0	0.0	0.0
2	19.50	8.636	40.00	35.70	0.0		4	4	16.00	17.86	0.0	1.202	5.490
	19.50											1.202	-30.97
3	19.00	8.251	45.55	42.01	0.0		4	4	22.00	24.10	0.0	13.34	-19.69
4	18.50	7.818	48.37	44.73	3.632		4	4	24.00	30.34	0.0	20.89	-10.59
5	18.00	7.308	50.76	47.09	7.263		4	4	34.00	36.53	0.0	23.91	-0.5126
6	17.25	6.381	54.29	49.68	12.71		4	4	43.00	46.39	0.0	20.14	10.06
7	16.75	5.667	58.66	43.72	16.34		5	5	49.05	58.69	0.6765	12.61	14.88
8	16.00	4.515	68.21	46.84	21.79		5	5	55.16	70.61	10.82	1.584	10.69
9	15.50	3.732	74.58	54.18	25.42		5	5	58.41	72.95	17.59	-1.762	3.959
10	15.00	2.953	80.95	62.73	29.05		5	5	61.65	74.46	24.35	-2.375	-0.9704
** 11	14.25	1.798	90.50	79.04	34.50		5	5	66.50	73.97	36.50	0.0	0.0
12	13.75	1.166	95.50	62.00	39.50		6	6	71.50	62.00	39.50	0.0	0.0
13	13.00	0.7564	103.0	70.47	47.00		6	6	79.00	70.47	47.00	0.0	0.0
14	12.50	0.6030	108.0	75.63	52.00		6	6	84.00	75.83	52.00	0.0	0.0
15	12.00	0.4885	113.0	81.10	57.00		6	6	89.00	81.10	57.00	0.0	0.0
16	11.50	0.3878	118.0	86.33	62.00		6	6	94.00	86.33	62.00	0.0	0.0
17	11.00	0.2919	123.0	91.55	67.00		6	6	99.00	91.55	67.00	0.0	0.0
18	10.50	0.1832	128.0	96.80	72.00		6	6	104.0	96.80	72.00	0.0	0.0
19	10.00	0.0	133.0	102.2	77.00		6	6	109.0	102.2	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	9.379	-2.375	23.96	-30.97	14.88

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	36.46	36.46	0.0	36.46

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2 m]	Node
1	20.50	1	0	8.000	12.50	65470.	1
2	19.50	4	0	8.000	12.50	65470.	2

EPA Export 08-07-2014:23:43:24

3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	5	5	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
10	15.00	5	5	8.000	32.50	65470.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 5800. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	10.15	4	0.0	1
2	10.20	4	3.167	1	35.76	1
3	12.79	1	1.089	1	12.29	1
4	13.70	1	0.3741	1	4.220	1
5	14.10	1	0.1286	1	1.450	1
8	14.30	1	0.005200	1	0.02000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	23.69	24.20	9.660	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	21.97	40.00	29.34	0.0	4	0	0.0	0.0	0.0	-4.838	15.83
	19.50										-4.838	-76.94
3	19.00	21.12	45.55	36.77	0.0	4	0	0.0	0.0	0.0	28.14	-56.64
4	18.50	20.16	48.37	39.20	3.632	4	0	0.0	0.0	0.0	51.81	-36.62
5	18.00	19.00	50.74	41.36	7.263	4	0	0.0	0.0	0.0	66.77	-10.72
6	17.25	16.83	54.29	42.16	12.71	4	0	0.0	0.0	0.0	61.41	21.62
7	16.75	15.10	58.66	19.19	16.34	A 5	5	3.045	23.31	0.6765	42.03	38.85
8	16.00	12.22	68.21	10.83	21.79	A 5	5	9.176	29.60	10.82	12.83	30.24
9	15.50	10.22	74.58	18.84	25.42	5	5	12.41	32.69	17.59	2.055	15.05
10	15.00	8.209	80.95	30.02	29.05	5	5	15.65	33.13	24.35	-2.218	2.794
** 11	14.25	5.309	90.50	52.60	34.90	5	5	20.50	47.07	34.50	0.0	0.0
12	13.75	3.352	95.50	51.02	39.50	6	6	23.50	51.02	39.50	0.0	0.0
13	13.00	2.176	103.0	60.89	47.00	6	6	33.00	60.89	47.00	0.0	0.0
14	12.50	1.742	108.0	66.59	52.00	6	6	38.00	66.59	52.00	0.0	0.0
15	12.00	1.409	113.0	72.61	57.00	6	6	43.00	72.61	57.00	0.0	0.0
16	11.50	1.109	118.0	78.95	62.00	6	6	48.00	78.95	62.00	0.0	0.0
17	11.00	0.8260	123.0	85.04	67.00	6	6	53.00	85.04	67.00	0.0	0.0
18	10.50	0.5158	128.0	90.61	72.00	6	6	58.00	90.61	72.00	0.0	0.0
19	10.00	0.0	133.0	96.56	77.00	6	6	63.00	96.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	23.69	-4.838	64.77	-76.94	38.85

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	92.77	92.77	0.0	92.77

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	3	3	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
10	15.00	3	3	8.000	32.50	65470.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 1560. E at bottom node = 71000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.4285	5	18.19	7
2	0.4500	5	0.2644	4	14.56	6

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3	0.7000	5	0.1605	4	12.06	9
4	0.9000	5	0.1143	5	6.200	10
5	1.000	5	0.07480	6	4.190	10
10	1.100	5	0.002400	1	0.1600	10
12	1.100	5	500.0E-6	7	0.05000	9

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	24.68	24.20	9.680	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	23.04	40.00	28.94	0.0		4	0	0.0	0.0	0.0	-4.840	15.49
	19.50											-4.840	-81.57
3	19.00	22.21	45.55	36.38	0.0		4	0	0.0	0.0	0.0	30.52	-61.51
4	18.50	21.28	48.37	38.73	3.632		4	0	0.0	0.0	0.0	56.67	-41.71
5	18.00	20.14	50.74	40.74	7.263		4	0	0.0	0.0	0.0	72.23	-16.12
6	17.25	17.92	54.29	41.27	12.71		4	0	0.0	0.0	0.0	73.07	15.75
7	16.75	16.10	58.66	16.99	16.34	A	3	3	3.065	15.12	0.6765	56.77	37.70
8	16.00	13.00	68.21	7.808	21.79	A	3	3	9.176	17.80	10.82	24.68	36.84
9	15.50	10.79	74.58	16.37	25.42	A	3	3	12.41	49.72	17.59	9.234	24.51
10	15.00	8.543	80.95	28.37	29.05		3	3	15.65	61.72	24.35	0.1685	9.178
** 11	14.25	5.166	90.50	55.78	34.50		3	3	20.50	56.14	34.50	0.0	0.0
12	13.75	3.304	95.50	52.75	39.50		6	6	25.50	52.75	39.50	0.0	0.0
13	13.00	2.142	103.0	61.88	47.00		6	6	33.00	61.88	47.00	0.0	0.0
14	12.50	1.715	108.0	67.22	52.00		6	6	38.00	67.22	52.00	0.0	0.0
15	12.00	1.387	113.0	73.11	57.00		6	6	43.00	73.11	57.00	0.0	0.0
16	11.50	1.091	118.0	79.43	62.00		6	6	48.00	79.43	62.00	0.0	0.0
17	11.00	0.8108	123.0	85.60	67.00		6	6	53.00	85.60	67.00	0.0	0.0
18	10.50	0.5045	128.0	91.42	72.00		6	6	58.00	91.42	72.00	0.0	0.0
19	10.00	0.0	133.0	96.56	77.00		6	6	63.00	96.56	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	24.68	-4.840	73.07	-81.57	38.85

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	97.26	97.26	0.0	97.26

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000, E at bottom node = 42000, kPa
On the RIGHT: E at ground level = 1500, E at bottom node = 71000, kPa

Iter no.	Inc max displ [mm]	Node no.	Displ error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	2.795	6	1.840	7
2	2.800	6	0.0	6	0.0	7
3	2.600	6	0.02950	4	2.710	7
4	2.800	6	0.0	4	0.0	7

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	22.94	24.20	16.12	0.0		1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	20.80	40.00	29.30	0.0		4	0	0.0	0.0	0.0	-8.059	19.05
	19.50											-8.059	-68.78
3	19.00	19.75	45.37	36.85	0.0		4	0	0.0	0.0	0.0	20.83	-48.57
4	18.50	18.63	47.00	38.29	5.000		4	0	0.0	0.0	5.000	40.52	-29.79
5	18.00	17.35	48.00	39.35	10.00		4	0	0.0	0.0	10.00	50.63	-7.922
6	17.25	15.09	49.50	38.46	17.50		4	0	0.0	0.0	17.50	47.34	16.39
7	16.75	13.37	52.50	19.78	22.50		3	3	2.500	12.18	22.50	33.14	30.79
8	16.00	10.56	60.00	12.33	30.00	A	3	3	10.00	33.26	30.00	6.264	26.62
9	15.50	8.639	65.00	20.46	35.00		3	3	15.00	44.96	35.00	-1.777	13.96
10	15.00	6.716	70.00	32.37	40.00		3	3	20.00	57.04	40.00	-5.692	0.1204
** 11	14.25	3.860	77.50	61.26	47.50		3	3	27.50	49.31	47.50	0.0	0.0
12	13.75	2.548	82.50	53.58	52.50		6	6	32.50	53.58	52.50	0.0	0.0
13	13.00	1.679	90.00	62.30	60.00		6	6	40.00	62.30	60.00	0.0	0.0
14	12.50	1.344	95.00	67.52	65.00		6	6	45.00	67.52	65.00	0.0	0.0
15	12.00	1.084	100.0	73.24	70.00		6	6	50.00	73.24	70.00	0.0	0.0
16	11.50	0.8469	105.0	79.43	75.00		6	6	55.00	79.43	75.00	0.0	0.0
17	11.00	0.6253	110.0	85.52	80.00		6	6	60.00	85.52	80.00	0.0	0.0
18	10.50	0.3886	115.0	91.16	85.00		6	6	65.00	91.16	85.00	0.0	0.0
19	10.00	0.0	120.0	95.78	90.00		6	6	70.00	95.78	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	24.68	-8.059	73.07	-81.57	38.85

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]

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1	2	87.82	87.82	0.0	97.26

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	24.68	0.0	0.0	0.0	0.0
2	19.50	0.0	23.04	-8.058	1.210	-81.57	19.05
3	19.00	0.0	22.21	0.0	30.52	-61.51	0.0
4	18.50	0.0	21.28	0.0	56.67	-41.71	0.0
5	18.00	0.0	20.14	0.0	72.23	-16.12	0.0
6	17.25	0.0	17.82	0.0	73.07	0.0	21.62
7	16.75	0.0	16.16	0.0	56.77	0.0	38.85
8	16.00	0.0	13.00	0.0	26.68	0.0	36.84
9	15.50	0.0	10.79	-1.777	9.236	0.0	24.51
10	15.00	0.0	8.543	-5.692	0.1685	-0.9704	9.178
11	14.25	0.0	5.308	0.0	0.0	0.0	0.0
12	13.75	0.0	3.352	0.0	0.0	0.0	0.0
13	13.00	0.0	2.176	0.0	0.0	0.0	0.0
14	12.50	0.0	1.742	0.0	0.0	0.0	0.0
15	12.00	0.0	1.409	0.0	0.0	0.0	0.0
16	11.50	0.0	1.109	0.0	0.0	0.0	0.0
17	11.00	0.0	0.8260	0.0	0.0	0.0	0.0
18	10.50	0.0	0.5156	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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4. EFFECT OF PRESENCE OF PEAT IN THE POND

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	PP/1	

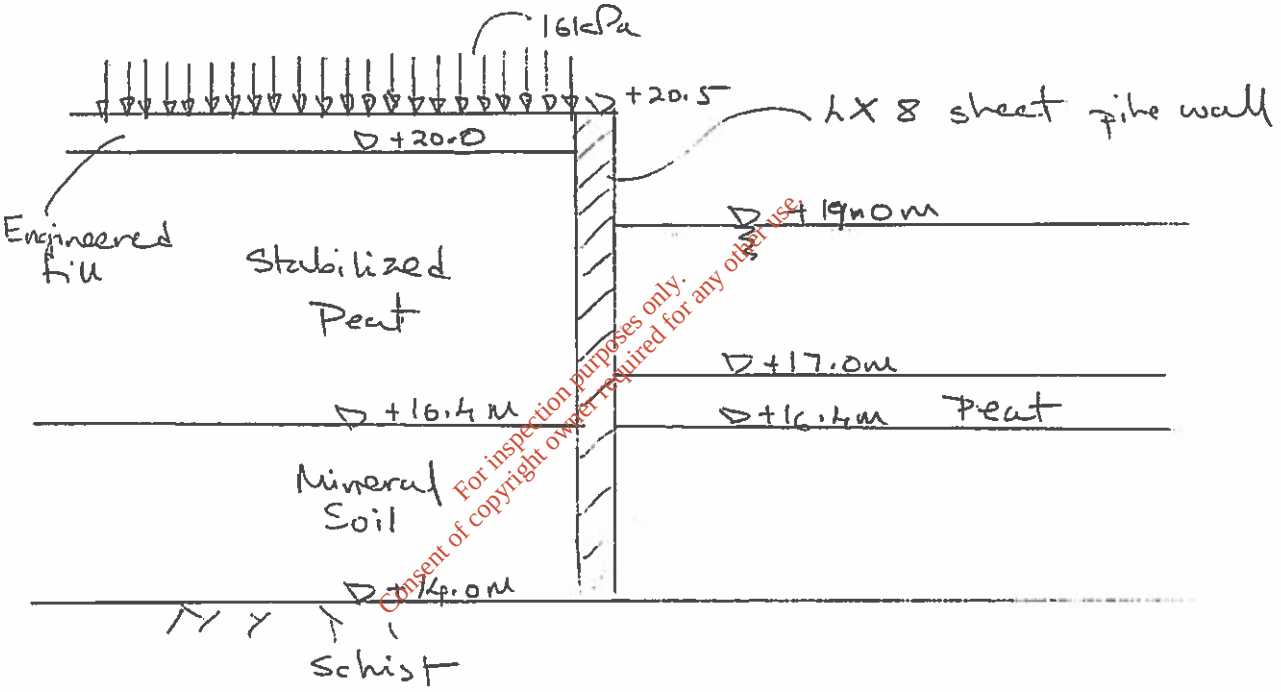
Member/Location

Job Title: Shell Comb Terminal Presence of peat in the pond

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CH.

The effect of the presence of peat in the pond was assessed. The following geotechnical cross-section was used in the Oasys FREW analyses using ULS soil parameters for stability check.



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Sheets PP/2 to PP/10 shows the results of the analysis, named pond4uls.frw. The toe of the LX8 sheet pile wall is at +14.25m.

Sheet PP/2 shows the maximum bending of 70.9kNm which is less than the moment capacity of 132.8 kNm per m for LX8 wall section. The maximum moment has increased from 50.6 kNm per m due to the presence of the peat layer. The anchor force has also increased to 83.94 x 5 = 419.7kN. However this is still less than 470.6 kN allowable load.

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Oasys

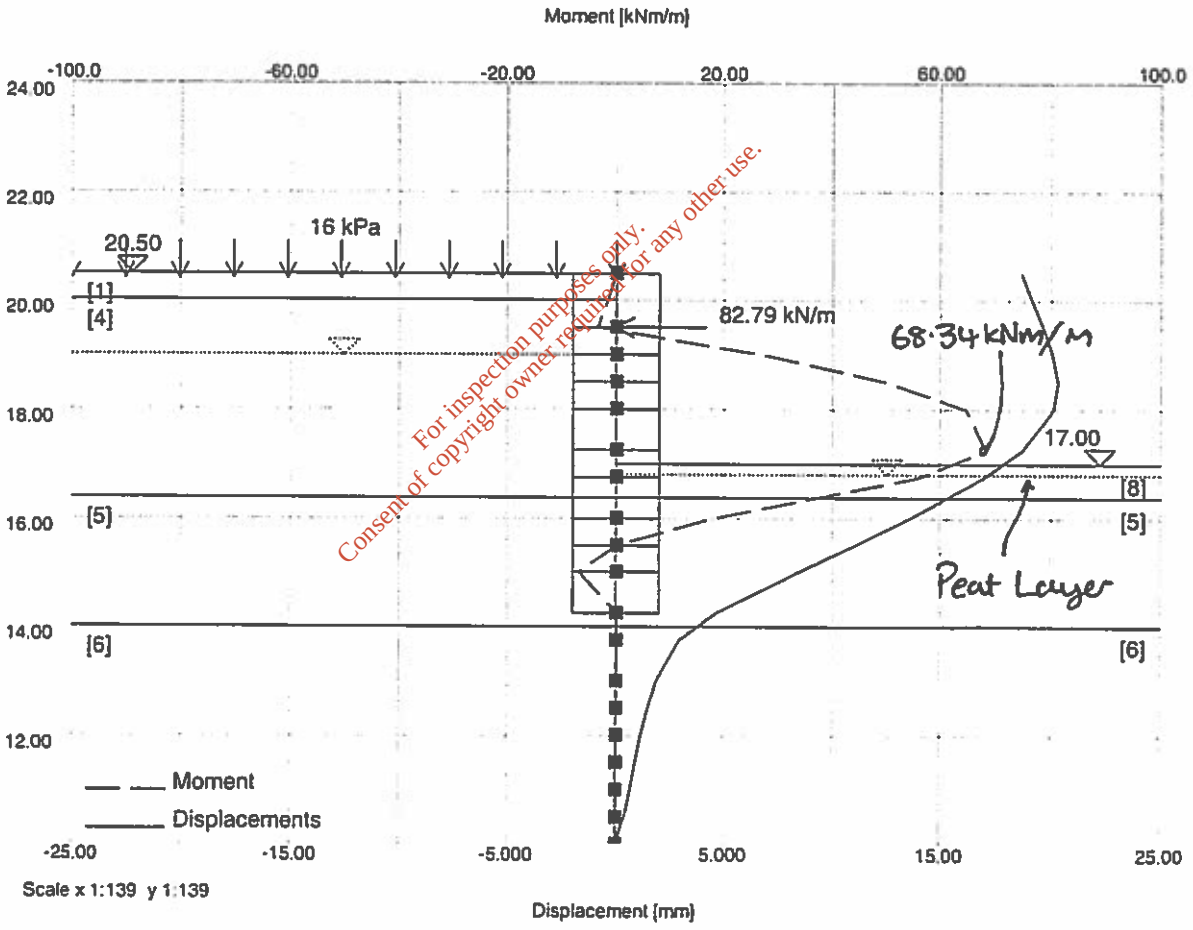
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	PP12	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 4 uls.fwd	JLG

ULS Bending Moment and Wall Deflection



STAGE 4 : Excavate pond

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Oasys

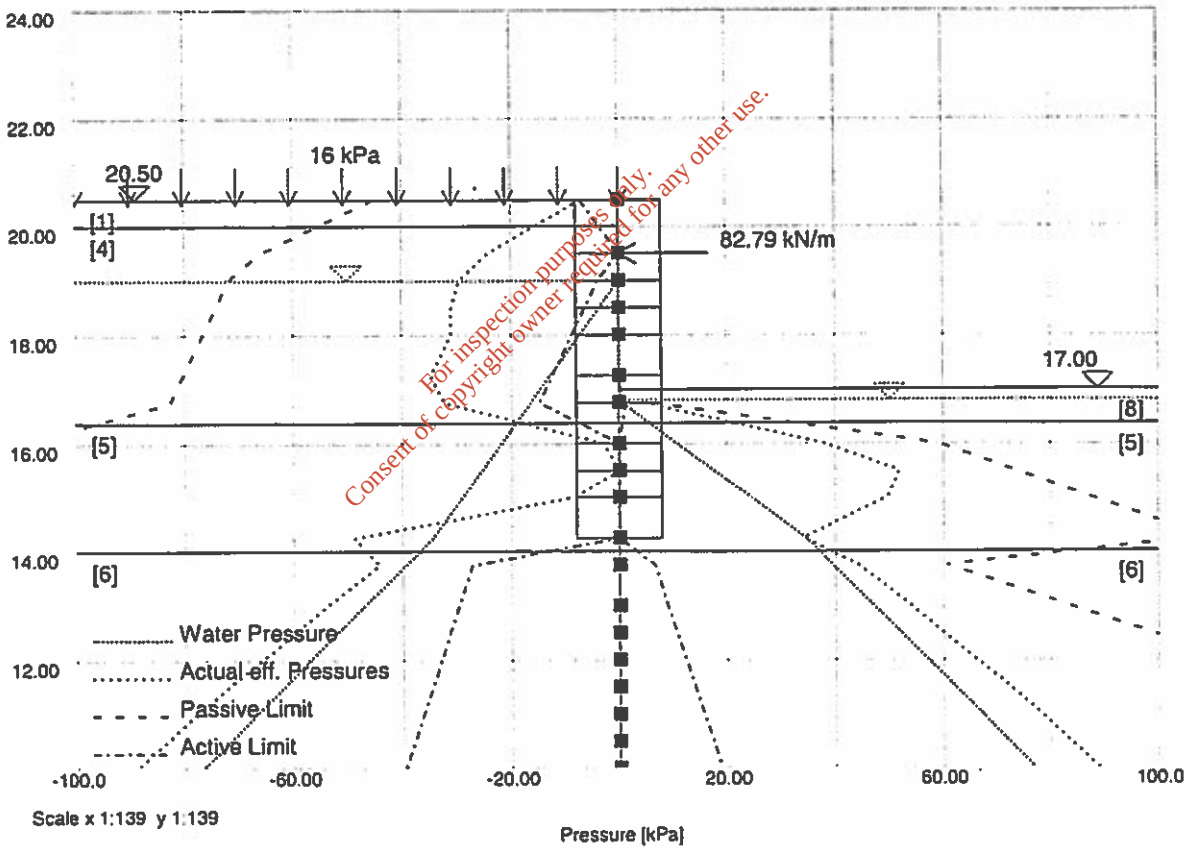
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	PP13	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 4 uls.fwd	SG

Earth Pressure Distribution



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STAGE 4 : Excavate pond

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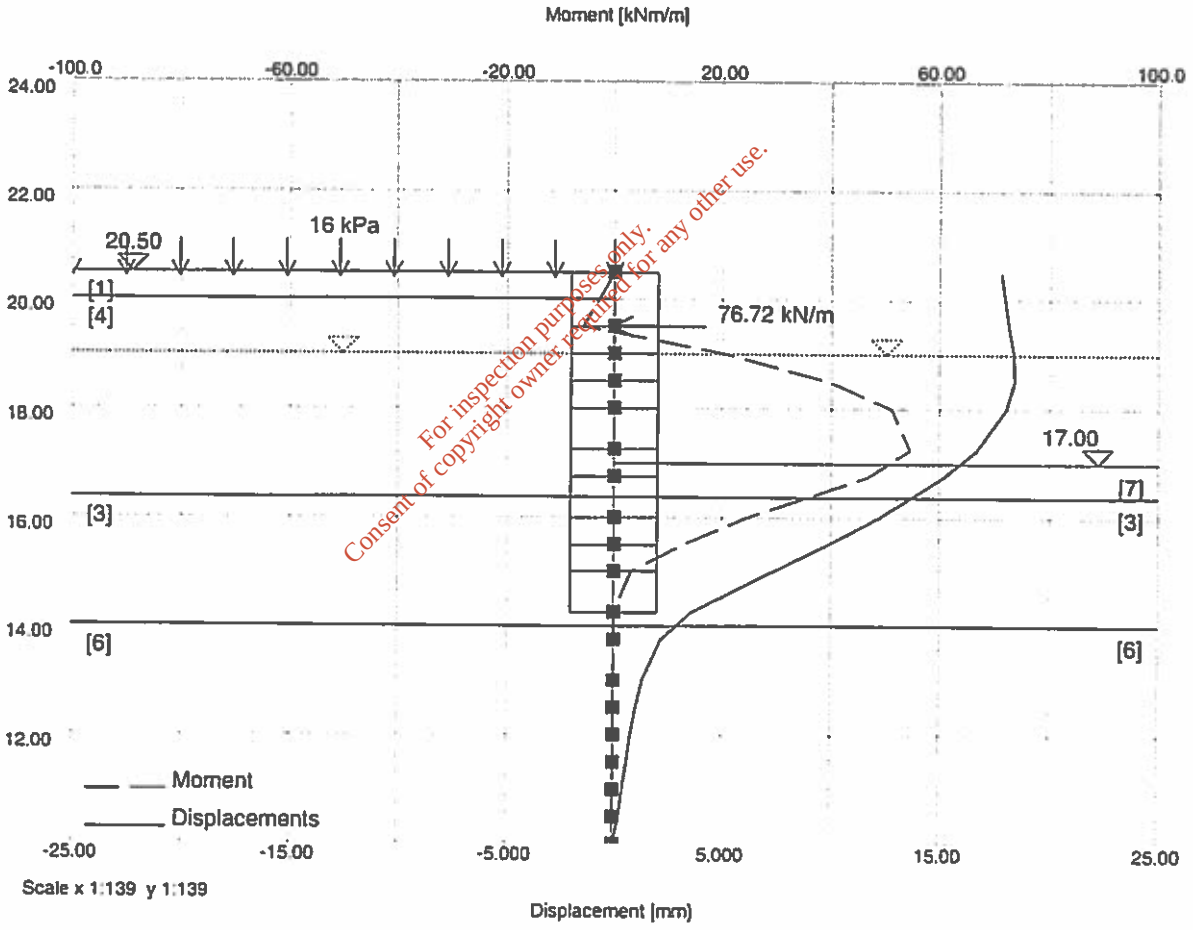
Oasys

Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	PP14	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 4 uls.fwd	



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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	1.180	0.1300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	1.300	0.1300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	1.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	1.300	0.1300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	1.000	20.00	0.0	133.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	1.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ko
1	2	-	Left	20.00	16.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	2	7	8.000	32.50	27010.	2
3	19.00	2	7	8.000	32.50	27010.	3
4	18.50	2	7	8.000	32.50	27010.	4
5	18.00	2	7	8.000	32.50	27010.	5
6	17.25	2	7	8.000	32.50	27010.	6
7	16.75	2	7	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
10	15.00	3	3	8.000	32.50	27010.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 42000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.295	5	0.0	0
2	9.300	5	0.0	5	0.0	0
3	9.300	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vw [kPa]	Pw [kPa]	U [kPa]	Bm [kNm/m]	Shear [kN/m]
1	20.50	0.06400	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	7.585	16.86	19.61	0.0	2	7	15.50	15.61	0.0	0.0	0.0
3	19.00	8.598	21.36	20.70	0.0	2	7	20.36	20.70	0.0	0.0	0.0
4	18.50	9.290	23.93	22.04	5.000	2	7	21.50	22.04	5.000	0.0	0.0

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5	18.00	9.295	24.00	22.76	10.00	2	7	22.00	22.76	10.00	0.0	0.0
6	17.25	8.655	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	8.443	26.50	24.62	22.50	2	7	23.25	24.62	22.50	0.0	0.0
8	16.00	2.356	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	1.355	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.9583	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.5798	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.3853	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.2560	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.2036	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1646	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.1291	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
	0.09583	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0	
18	10.50	0.06204	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	8.633E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	4	8	8.000	32.50	27010.	2
3	19.00	4	8	8.000	32.50	27010.	3
4	18.50	4	8	8.000	32.50	27010.	4
5	18.00	4	8	8.000	32.50	27010.	5
6	17.25	4	8	8.000	32.50	27010.	6
7	16.75	4	8	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	*14.25*	*5*	*5*	*8.000*	*32.50*	*0.0*	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: *14.25*

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	6	0.0	0
2	0.0	6	0.0	6	0.0	0
3	0.0	6	0.0	6	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.38	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.62	22.50	4	8	23.25	24.62	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
10	15.00	0.0	41.00	38.64	40.00	5	5	37.37	38.64	40.00	0.0	0.0
** 11	*14.25*	*0.0*	*48.50*	*46.28*	*47.50*	5	5	*44.87*	*46.28*	*47.50*	*0.0*	*0.0*
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

** Wall toe level: *14.25*
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements [mm] Min	Displacements [mm] Max	Moments [kNm/m] Min	Moments [kNm/m] Max	Shears [kN/m] Min	Shears [kN/m] Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

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EPA Export 08-07-2014:23:43:25

Iter no.	Inc max displ	Node no.	Disp error.	Node no.	Press error	Node no.
	[mm]		[mm]		[kPa]	
1	0.0	0	6.292	5	0.1200	1
2	6.300	5	1.480	1	15.83	1
3	6.700	4	0.5386	1	5.760	1
4	6.900	4	0.1960	1	2.100	1
5	7.000	4	0.07136	1	0.7600	1
6	7.000	4	0.003600	1	0.01000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	6.574	17.80	7.107	0.0	A 1	1	5.000	8.867	0.0	0.0	0.0
2	19.50	6.866	32.00	28.91	0.0	4	8	15.50	15.79	0.0	0.8800	4.038
	19.50										0.8800	-24.95
3	19.00	6.987	37.38	34.01	0.0	4	8	20.38	20.98	0.0	10.90	-16.77
4	18.50	7.012	39.00	35.06	5.000	4	8	21.50	22.38	5.000	17.65	-10.34
5	18.00	6.878	40.00	35.12	10.00	4	8	22.00	23.25	10.00	21.23	-3.456
6	17.25	6.318	41.50	34.56	17.50	4	8	22.75	24.27	17.50	21.06	4.093
7	16.75	5.707	42.50	35.79	22.50	4	8	23.25	25.46	22.50	17.07	11.17
8	16.00	4.523	47.00	27.60	30.00	5	5	27.37	32.62	30.00	6.273	12.83
9	15.50	3.665	52.00	28.13	35.00	5	5	32.37	41.58	35.00	0.6431	7.898
10	15.00	2.755	57.00	36.24	40.00	5	5	37.37	46.97	40.00	-1.625	1.185
** 11	14.25	1.438	64.50	54.71	47.50	5	5	44.87	51.24	47.50	0.0	0.0
12	13.75	0.8661	69.50	51.88	52.50	6	6	49.87	51.88	52.50	0.0	0.0
13	13.00	0.5220	77.00	60.15	60.00	6	6	57.37	60.15	60.00	0.0	0.0
14	12.50	0.3979	82.00	65.62	65.00	6	6	62.37	65.62	65.00	0.0	0.0
15	12.00	0.3112	87.00	70.87	70.00	6	6	67.38	70.87	70.00	0.0	0.0
16	11.50	0.2390	92.00	76.19	75.00	6	6	72.38	76.19	75.00	0.0	0.0
17	11.00	0.1751	97.00	81.52	80.00	6	6	77.38	81.52	80.00	0.0	0.0
18	10.50	0.1107	102.0	86.49	85.00	6	6	82.38	86.49	85.00	0.0	0.0
19	10.00	0.0	107.0	91.19	90.00	6	6	87.38	91.19	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	7.012	-1.625	21.23	-24.95	12.83

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	28.99	28.99	0.0	28.99

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	14.25	34.50	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.50	0.0	10.00
2	14.25	34.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
Σ Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000, E at bottom node = 47000, kPa
On the RIGHT: E at ground level = 190, E at bottom node = 47000, kPa

Iter no.	Inc max displ	Node no.	Disp error.	Node no.	Press error	Node no.
	[mm]		[mm]		[kPa]	
1	0.0	0	0.001300	1	0.01000	1
2	0.0	1	500.0E-6	1	0.0	1
3	0.0	1	200.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	6.576	17.80	7.119	0.0	A 1	1	5.000	8.868	0.0	0.0	0.0
2	19.50	6.867	32.00	28.91	0.0	4	8	15.50	15.79	0.0	0.8745	4.043
	19.50										0.8745	-24.95
3	19.00	6.988	37.55	34.20	0.0	4	8	21.00	21.60	0.0	10.89	-16.77
4	18.50	7.012	40.37	36.43	3.632	4	8	26.50	27.38	0.0	17.64	-10.34
5	18.00	6.879	42.74	37.86	7.263	4	8	32.00	33.25	0.0	21.23	-3.457
6	17.25	6.319	46.29	41.35	12.71	4	8	40.25	41.77	0.0	21.04	4.092
7	16.75	5.708	48.66	41.95	16.34	4	8	43.80	45.99	0.6765	17.07	11.17
8	16.00	4.523	55.21	35.81	21.79	5	5	46.55	51.80	10.82	6.271	12.83
9	15.50	3.665	61.58	37.71	25.42	5	5	49.79	58.99	17.59	0.6416	7.897
10	15.00	2.755	67.95	47.19	29.05	5	5	53.02	62.62	24.35	-1.626	1.184
** 11	14.25	1.438	77.50	69.71	34.50	5	5	57.87	64.20	34.50	0.0	0.0
12	13.75	0.8661	82.50	55.13	39.50	6	6	62.87	55.13	39.50	0.0	0.0
13	13.00	0.5220	90.00	63.40	47.00	6	6	70.38	63.40	47.00	0.0	0.0
14	12.50	0.3979	95.00	68.87	52.00	6	6	75.38	68.87	52.00	0.0	0.0
15	12.00	0.3112	100.0	74.12	57.00	6	6	80.38	74.12	57.00	0.0	0.0
16	11.50	0.2390	105.0	79.44	62.00	6	6	85.38	79.44	62.00	0.0	0.0
17	11.00	0.1751	110.0	84.77	67.00	6	6	90.38	84.77	67.00	0.0	0.0
18	10.50	0.1107	115.0	89.74	72.00	6	6	95.38	89.74	72.00	0.0	0.0
19	10.00	0.0	120.0	94.44	77.00	6	6	100.4	94.44	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	7.012	-1.626	21.23	-24.95	12.83

Surcharge 1 present in this stage

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EPA Export 08-07-2014:23:43:25

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	28.99	28.99	0.0	28.99

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	4	8	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 74000. kPa

Iter no.	Ins max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	11.97	5	0.0	1
2	12.00	5	2.825	1	27.17	1
3	12.70	5	1.139	1	10.99	1
4	13.00	4	0.4597	1	4.430	1
5	13.20	4	0.1857	1	1.790	1
9	13.30	4	0.005100	1	0.02000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil	Left	Right	Vp [kPa]	Pp [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	18.64	17.60	7.100	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	19.61	32.00	24.12	0.0		4	0	0.0	0.0	0.0	-3.550	12.59
	19.50											-3.550	-70.19
3	19.00	20.08	37.55	29.43	0.0		4	0	0.0	0.0	0.0	27.02	-53.67
4	18.50	20.32	40.37	30.97	3.632		4	0	0.0	0.0	0.0	50.12	-37.55
5	18.00	20.11	42.74	30.94	7.263		4	0	0.0	0.0	0.0	64.57	-16.96
6	17.25	18.69	46.29	34.75	12.71		4	0	0.0	0.0	0.0	68.36	9.807
7	16.75	16.98	48.66	32.30	16.34		4	8	0.7950	4.795	0.6765	56.02	37.73
8	16.00	13.55	55.21	2.536	21.79		5	5	3.551	38.01	10.62	17.91	43.29
9	15.50	10.99	61.58	-0.003029	25.42	A	5	5	6.787	51.86	17.59	0.03230	24.74
10	15.00	8.436	67.95	8.435	29.05		5	5	10.02	45.66	24.35	-6.833	2.310
** 11	14.25	6.636	77.50	48.65	34.50		5	5	24.87	34.87	34.50	0.0	0.0
12	13.75	2.926	62.50	44.18	39.50		6	6	19.68	44.18	39.50	0.0	0.0
13	13.00	1.861	90.00	53.84	47.00		6	6	27.36	53.84	47.00	0.0	0.0
14	12.50	1.464	95.00	59.76	52.00		6	6	32.36	59.76	52.00	0.0	0.0
15	12.00	1.167	100.0	65.94	57.00		6	6	37.36	65.94	57.00	0.0	0.0
16	11.50	0.9073	105.0	72.29	62.00		6	6	42.36	72.29	62.00	0.0	0.0
17	11.00	0.6698	110.0	78.27	67.00		6	6	47.36	78.27	67.00	0.0	0.0
18	10.50	0.4180	115.0	83.59	72.00		6	6	52.36	83.59	72.00	0.0	0.0
19	10.00	0.0	120.0	89.13	77.00		6	6	57.36	89.13	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	20.32	-6.833	68.34	-70.19	43.29

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	82.79	82.79	0.0	82.79

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	4	7	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
10	15.00	5	5	8.000	32.50	27010.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16

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EPA Export 08-07-2014:23:43:25

17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	0.5414	7	22.91	9
2	0.5000	7	0.4355	7	17.49	9
3	1.000	7	0.3358	7	12.81	10
4	1.300	7	0.2522	7	8.610	10
5	1.600	7	0.1803	7	5.530	10
10	2.100	7	0.02770	7	0.5300	10
15	2.100	7	0.006700	7	0.06000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil	Left	Right	Vp (kPa)	Pp (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	19.05	17.80	7.114	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	20.63	32.00	24.14	0.0		4	0	0.0	0.0	0.0	-3.557	12.61
	19.50											-3.557	-74.50
3	19.00	21.41	37.55	29.25	0.0		4	0	0.0	0.0	0.0	29.17	-56.02
4	18.50	21.93	40.37	30.55	3.632		4	0	0.0	0.0	0.0	54.46	-42.05
5	18.00	21.96	42.74	30.13	7.263		4	0	0.0	0.0	0.0	71.21	-21.82
6	17.25	20.78	46.29	33.49	12.71		4	0	0.0	0.0	0.0	78.81	4.304
7	16.75	19.12	48.66	30.16	16.34		4	7	0.7950	5.219	0.6765	69.44	31.03
8	16.00	15.50	55.21	1.010	21.79	A	3	3	3.551	23.84	10.82	36.95	39.61
9	15.50	12.62	61.56	1.094	25.62	A	3	3	6.787	26.99	17.59	19.00	31.39
10	15.00	9.552	67.95	5.169	29.05	A	3	3	10.02	40.99	24.35	5.565	17.15
** 11	14.25	4.843	77.50	46.22	34.50		3	3	16.87	58.09	34.50	0.0	0.0
12	13.75	2.837	82.50	46.52	39.50		6	6	19.88	46.52	39.50	0.0	0.0
13	13.00	1.835	90.00	55.15	47.00		6	6	27.38	55.15	47.00	0.0	0.0
14	12.50	1.461	95.00	60.57	52.00		6	6	32.38	60.57	52.00	0.0	0.0
15	12.00	1.166	100.0	66.59	57.00		6	6	37.38	66.59	57.00	0.0	0.0
16	11.50	0.8887	105.0	72.83	62.00		6	6	42.38	72.83	62.00	0.0	0.0
17	11.00	0.6523	110.0	78.97	67.00		6	6	47.38	78.97	67.00	0.0	0.0
18	10.50	0.4041	115.0	84.60	72.00		6	6	52.38	84.60	72.00	0.0	0.0
19	10.00	0.0	120.0	89.13	77.00		6	6	57.38	89.13	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	21.96	-6.833	78.61	-74.50	43.29

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	87.11	87.11	0.0	87.11

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STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	4.013	6	2.090	10
2	4.000	6	0.007300	6	0.0	10
3	4.000	6	0.09040	7	10.45	10
4	4.100	6	0.0	7	0.0	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil	Left	Right	Vp (kPa)	Pp (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	17.81	17.80	11.47	0.0		1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	18.17	32.00	24.25	0.0		4	0	0.0	0.0	0.0	-5.734	14.63
	19.50											-5.734	-61.90
3	19.00	18.37	37.38	29.74	0.0		4	0	0.0	0.0	0.0	20.47	-45.37
4	18.50	18.39	39.00	30.35	5.000		4	0	0.0	0.0	5.000	39.63	-30.34
5	18.00	18.06	40.00	29.34	10.00		4	0	0.0	0.0	10.00	51.01	-13.58
6	17.25	16.69	41.50	31.18	17.50		4	0	0.0	0.0	17.50	54.12	5.328
7	16.75	15.16	42.50	27.61	22.50		4	7	0.2500	4.117	22.50	46.78	22.41
8	16.00	12.13	47.00	7.244	30.00	A	3	3	4.375	16.61	30.00	24.47	36.74
9	15.50	9.766	52.00	10.62	35.00	A	3	3	9.375	21.02	35.00	12.59	31.16
10	15.00	7.324	57.00	11.13	40.00	A	3	3	14.37	33.97	40.00	3.308	11.48
** 11	14.25	3.566	64.50	47.90	47.50		3	3	21.88	54.96	47.50	0.0	0.0
12	13.75	2.169	69.50	47.42	52.50		6	6	26.88	47.42	52.50	0.0	0.0
13	13.00	1.357	77.00	55.67	60.00		6	6	34.38	55.67	60.00	0.0	0.0
14	12.50	1.058	82.00	60.98	65.00		6	6	39.38	60.98	65.00	0.0	0.0
15	12.00	0.8334	87.00	66.82	70.00		6	6	44.38	66.82	70.00	0.0	0.0
16	11.50	0.6379	92.00	72.93	75.00		6	6	49.38	72.93	75.00	0.0	0.0
17	11.00	0.4620	97.00	78.99	80.00		6	6	54.38	78.99	80.00	0.0	0.0

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18	10.50	0.2851	102.0	84.43	85.00	6	6	59.38	84.43	85.00	0.0	0.0
19	10.00	0.0	107.0	88.35	90.00	6	6	64.38	88.35	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	21.96	-6.833	78.81	-74.50	43.29

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	76.72	76.72	0.0	87.11

Results Envelope

Node	Level (m)	Displacements (mm) Min	Displacements (mm) Max	Moments (kNm/m) Min	Moments (kNm/m) Max	Shears (kN/m) Min	Shears (kN/m) Max
1	20.50	0.0	19.05	0.0	0.0	0.0	0.0
2	19.50	0.0	20.63	-5.734	0.8800	-74.50	14.83
3	19.00	0.0	21.41	0.0	29.17	-58.02	0.0
4	18.50	0.0	21.93	0.0	54.46	-42.05	0.0
5	18.00	0.0	21.96	0.0	71.21	-21.82	0.0
6	17.25	0.0	20.78	0.0	78.81	0.0	9.807
7	16.75	0.0	19.12	0.0	69.44	0.0	37.73
8	16.00	0.0	15.50	0.0	36.95	0.0	43.29
9	15.50	0.0	12.42	0.0	19.08	0.0	31.39
10	15.00	0.0	9.552	-6.833	5.565	0.0	17.15
11	14.25	0.0	4.843	0.0	0.0	0.0	0.0
12	13.75	0.0	2.937	0.0	0.0	0.0	0.0
13	13.00	0.0	1.861	0.0	0.0	0.0	0.0
14	12.50	0.0	1.464	0.0	0.0	0.0	0.0
15	12.00	0.0	1.167	0.0	0.0	0.0	0.0
16	11.50	0.0	0.9073	0.0	0.0	0.0	0.0
17	11.00	0.0	0.6698	0.0	0.0	0.0	0.0
18	10.50	0.0	0.4180	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	PP/11	

Member/Location

Job Title: Corrib Field Development
Presence of peat in the pond

Drg. Ref.

Made by NP Date Nov 28/03 Chd. CH.

Alternative sheet pile solution considered with LX 16 sheet pile wall section. Surcharge loading of 20 kPa x 1.2 = 24 kPa considered due to HB loading and in accordance with BD 37/01 (BS 5400-2: 1978).

Sheets PP/12 to PP/20 shows the results of the analysis model pond 9 uls. frw. The toe of the sheet pile wall is at +14.25m.

The maximum uls bending moment was 93 kNm per m. This is less than the moment capacity of 262.6 kNm per m. (see sheet PP/12)

The force in the anchor was 104.6 kN/m x 5 = 523 kN. Although this is greater than the allowable load of 470.6 kN, it is less than the yield load of 724 kN for DYWIDAG 900/1030 WR anchor (see sheet SP/1). The chosen anchor spacing of 5m is still adequate since the maximum anchor force of 523 kN occurs in a temporary condition if the pond area was dewatered.

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Oasys

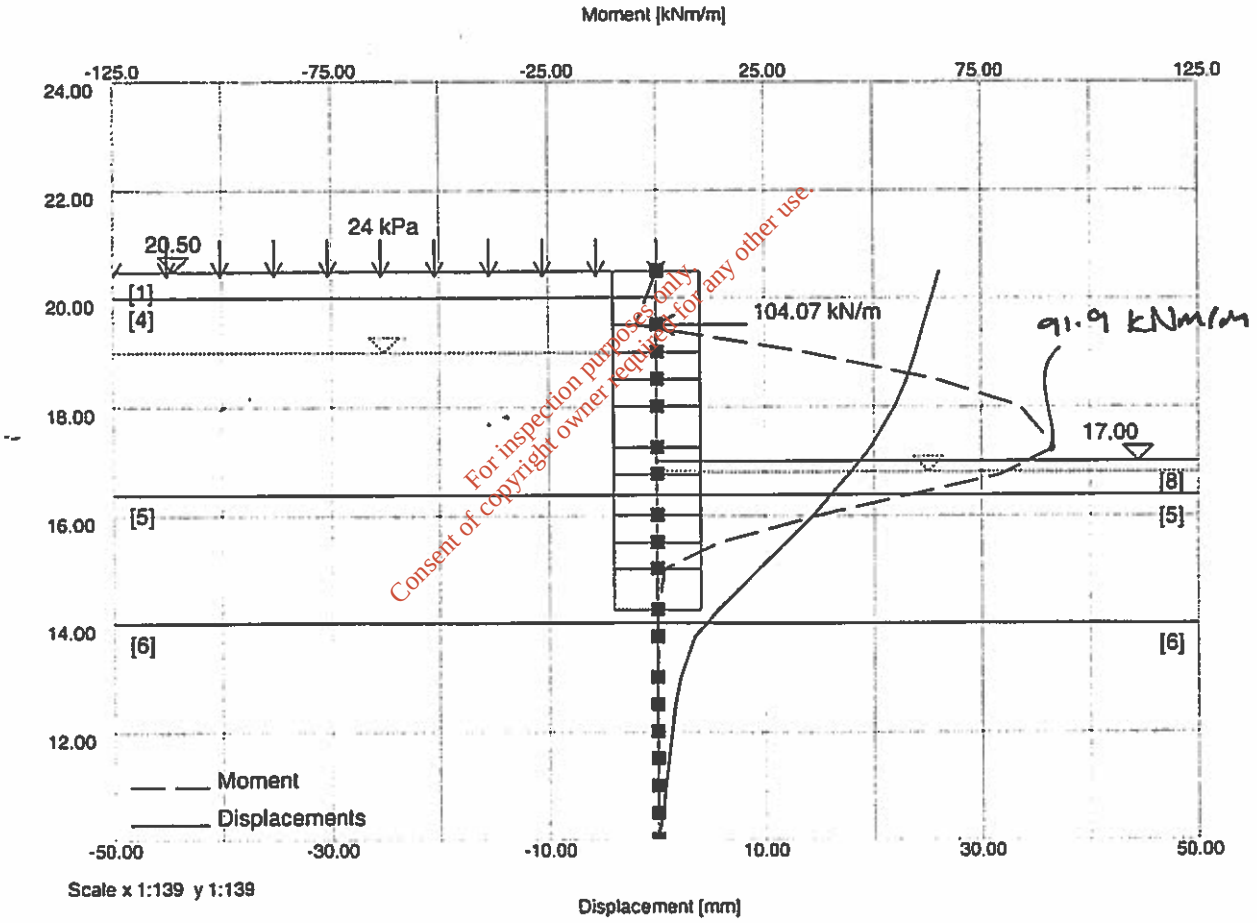
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	PP/12	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 9 uls.fwd	JLS

ULS Bending Moment and wall deflection



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STAGE 4 : Excavate pond

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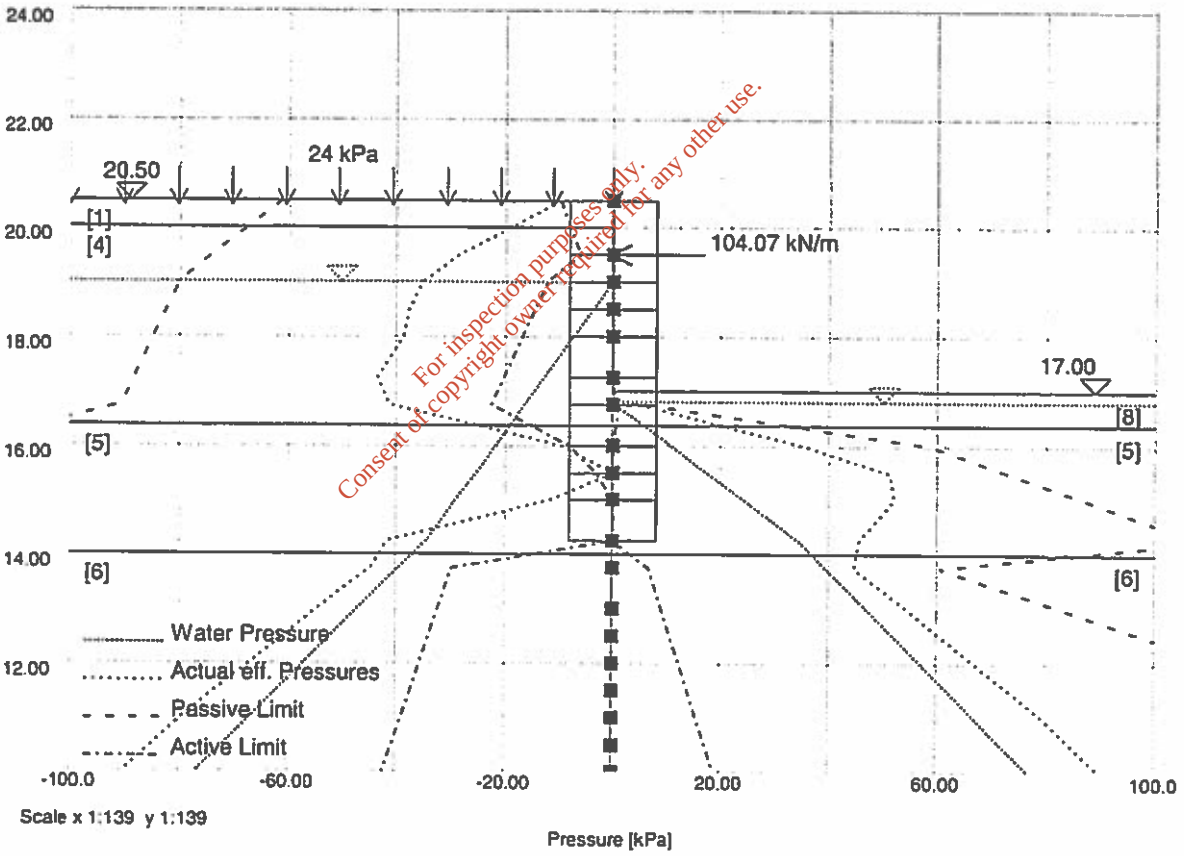
Oasys

Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	PP113	

Drg. Ref.

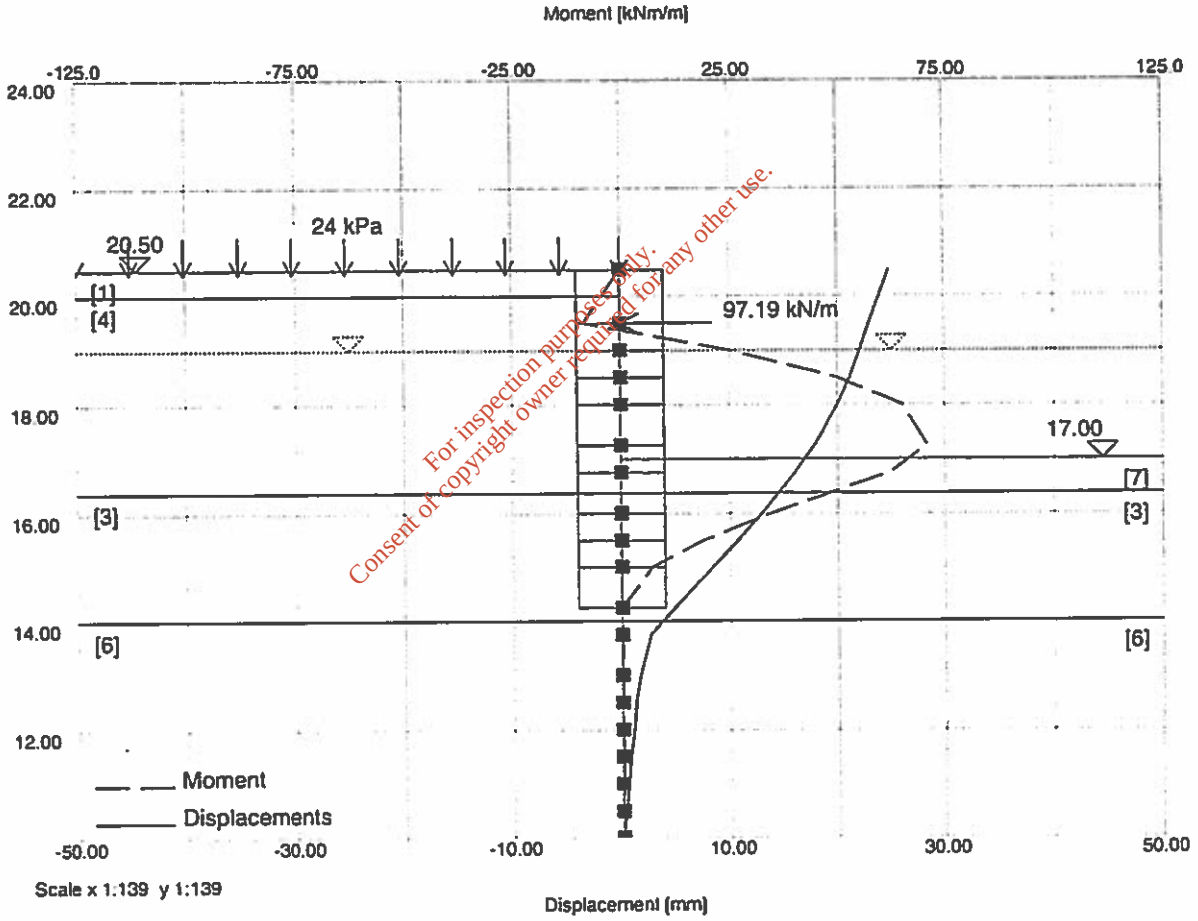
Made by	Date	Data	Checked
NP	06-Dec-2003	pond 9 uls.fwd	AS



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STAGE 4 : Excavate pond

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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	20.00	0.0	333.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ks
1	2	-	Left	20.40	24.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	2	7	8.000	32.50	65470.	2
3	19.00	2	7	8.000	32.50	65470.	3
4	18.50	2	7	8.000	32.50	65470.	4
5	18.00	2	7	8.000	32.50	65470.	5
6	17.25	2	7	8.000	32.50	65470.	6
7	16.75	2	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
10	15.00	3	3	8.000	32.50	65470.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 42000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.295	5	0.0	0
2	9.300	5	0.0	5	0.0	0
3	9.300	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.06400	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	7.585	16.00	15.61	0.0	2	7	15.50	15.61	0.0	0.0	0.0
3	19.00	8.596	21.38	20.76	0.0	2	7	20.38	20.76	0.0	0.0	0.0
4	18.50	9.290	23.00	22.04	5.000	2	7	23.50	22.04	5.000	0.0	0.0

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5	18.00	9.295	24.00	22.76	10.00	2	7	22.00	22.76	10.00	0.0	0.0
6	17.25	8.655	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	6.443	26.50	24.62	22.50	2	7	23.25	24.62	22.50	0.0	0.0
8	16.00	2.356	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	1.355	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.9583	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.5798	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.3853	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.2560	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.2036	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1646	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.1291	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
		0.09583	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.06204	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	8.633E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level	Soil		Boundary		EI below node	Node
	[m]	Left	Right	Left	Right	[kNm2/m]	
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	4	8	8.000	32.50	65470.	2
3	19.00	4	8	8.000	32.50	65470.	3
4	18.50	4	8	8.000	32.50	65470.	4
5	18.00	4	8	8.000	32.50	65470.	5
6	17.25	4	8	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
10	15.00	5	5	8.000	32.50	65470.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	5	0.0	0
2	0.0	5	0.0	5	0.0	0
3	0.0	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	Mt [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.38	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.62	22.50	4	8	23.25	24.62	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
10	15.00	0.0	41.00	38.64	40.00	5	5	37.37	38.64	40.00	0.0	0.0
** 11	14.25	0.0	48.50	46.28	47.50	5	5	44.87	46.28	47.50	0.0	0.0
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

** Wall toe level: 14.25
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

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EPA Export 08-07-2014:23:43:25

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	8.329	4	0.5600	1
2	6.200	6	2.432	1	28.96	1
3	10.10	1	0.7910	1	9.420	1
4	10.90	1	0.2772	1	3.060	1
5	11.20	1	0.1123	1	1.070	1
6	11.30	1	0.007500	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil	Left	Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	11.35	24.20	9.651	0.0	A	1	1	5.000	12.66	0.0	0.0	0.0
2	19.50	10.72	40.00	34.74	0.0		4	8	15.50	16.01	0.0	1.503	5.520
	19.50											1.503	-39.75
3	19.00	10.39	45.37	40.45	0.0		4	8	20.38	21.17	0.0	17.87	-27.91
4	18.50	9.999	47.00	41.75	5.000		4	8	21.50	22.53	5.000	29.41	-18.28
5	18.00	9.695	48.00	42.01	10.00		4	8	22.00	23.39	10.00	36.15	-7.657
6	17.25	8.486	49.50	43.90	17.50		4	8	22.75	24.31	17.50	37.52	4.284
7	16.75	7.638	50.50	42.83	22.50		4	8	23.25	25.58	22.50	32.32	15.79
8	16.00	6.153	55.00	30.27	30.00		5	5	27.37	34.01	30.00	16.44	20.02
9	15.50	5.076	60.00	28.47	35.00		5	5	32.37	44.35	35.00	7.011	14.88
10	15.00	3.969	65.00	36.25	40.00		5	5	37.37	50.39	40.00	1.556	6.493
** 11	14.25	2.294	72.50	53.13	47.50		5	5	44.87	56.44	47.50	0.0	0.0
12	13.75	1.340	77.50	52.33	52.50		6	6	49.87	52.33	52.50	0.0	0.0
13	13.00	0.7928	85.00	60.89	60.00		6	6	57.37	60.89	60.00	0.0	0.0
14	12.50	0.6014	90.00	66.55	65.00		6	6	62.37	66.55	65.00	0.0	0.0
15	12.00	0.4689	95.00	71.88	70.00		6	6	67.38	71.88	70.00	0.0	0.0
16	11.50	0.3591	100.0	77.31	75.00		6	6	72.38	77.31	75.00	0.0	0.0
17	11.00	0.2625	105.0	82.74	80.00		6	6	77.38	82.74	80.00	0.0	0.0
18	10.50	0.1655	110.0	87.66	85.00		6	6	82.38	87.66	85.00	0.0	0.0
19	10.00	0.0	115.0	92.19	90.00		6	6	87.38	92.19	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	11.35	0.0	37.52	-39.75	20.02

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	45.27	45.27	0.0	45.27

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00
2	14.25	34.50	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	16.80	0.0	10.00
2	14.25	34.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47666. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	0.003000	1	0.03000	1
2	0.0	1	0.001200	1	0.01000	1
3	0.0	1	500.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil	Left	Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	11.35	24.20	9.678	0.0	A	1	1	5.000	12.65	0.0	0.0	0.0
2	19.50	10.73	40.00	34.73	0.0		4	8	15.50	16.01	0.0	1.486	5.536
	19.50											1.486	-39.75
3	19.00	10.40	45.55	40.62	0.0		4	8	21.00	21.79	0.0	17.85	-27.91
4	18.50	10.00	48.37	43.12	3.632		4	8	26.50	27.53	0.0	29.39	-18.26
5	18.00	9.697	50.74	44.75	7.263		4	8	32.00	33.39	0.0	36.13	-7.659
6	17.25	8.487	54.29	46.69	12.71		4	8	40.25	41.81	0.0	37.51	4.282
7	16.75	7.639	56.66	48.99	16.34		4	8	41.80	46.13	0.6765	32.31	15.79
8	16.00	6.154	63.21	38.68	21.79		5	5	46.55	53.16	10.62	16.43	20.01
9	15.50	5.076	69.58	38.05	25.42		5	5	49.79	61.76	17.59	7.003	14.87
10	15.00	3.969	75.95	47.20	29.05		5	5	53.02	66.04	24.35	1.551	6.486
** 11	14.25	2.294	83.50	66.23	34.50		5	5	57.87	69.44	34.50	0.0	0.0
12	13.75	1.340	90.50	65.58	39.50		6	6	62.87	65.58	39.50	0.0	0.0
13	13.00	0.7928	98.00	74.14	47.00		6	6	70.38	74.14	47.00	0.0	0.0
14	12.50	0.6014	103.0	69.80	52.00		6	6	75.38	69.80	52.00	0.0	0.0
15	12.00	0.4689	108.0	75.13	57.00		6	6	80.38	75.13	57.00	0.0	0.0
16	11.50	0.3591	113.0	80.56	62.00		6	6	85.38	80.56	62.00	0.0	0.0
17	11.00	0.2625	118.0	85.99	67.00		6	6	90.38	85.99	67.00	0.0	0.0
18	10.50	0.1655	123.0	90.91	72.00		6	6	95.38	90.91	72.00	0.0	0.0
19	10.00	0.0	128.0	95.44	77.00		6	6	100.4	95.44	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	11.35	0.0	37.52	-39.75	20.02

Surcharge 1 present in this stage

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EPA Export 08-07-2014:23:43:25

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	45.28	45.28	0.0	45.28

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
10	15.00	5	5	8.000	32.50	65470.	10
** 11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 74000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	10.60	4	0.0	1
2	10.60	4	3.321	1	36.28	1
3	12.90	1	1.178	1	12.86	1
4	14.10	1	0.4189	1	4.560	1
5	14.50	1	0.1493	1	1.620	1
6	14.70	1	0.006900	1	0.01000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]		Soil Left	Soil Right	Va [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	26.11	24.20	9.653	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	23.65	40.00	28.49	0.0		4	0	0.0	0.0	0.0	-4.827	15.51
	19.50											-4.827	-88.56
3	19.00	23.92	45.55	35.21	0.0		4	0	0.0	0.0	0.0	24.11	-68.96
4	18.50	23.06	48.37	37.63	3.632		4	0	0.0	0.0	0.0	64.13	-49.73
5	18.00	21.96	50.74	38.60	7.263		4	0	0.0	0.0	0.0	83.84	-25.08
6	17.25	19.72	54.29	43.42	12.71		4	0	0.0	0.0	0.0	91.90	6.792
7	16.75	17.81	56.66	41.29	16.34		4	8	0.7950	4.796	0.6765	79.73	40.24
8	16.00	14.42	61.21	9.258	21.79		5	5	3.551	35.52	10.62	37.63	51.37
9	15.50	11.95	69.58	-0.006404	29.42	A	5	5	6.787	51.21	17.59	14.33	35.75
10	15.00	9.419	75.95	11.51	29.05		5	5	20.02	52.06	24.35	1.877	13.70
** 11	14.25	5.603	85.59	41.60	34.50		5	5	34.87	68.61	34.50	0.0	0.0
12	13.75	3.430	90.50	44.62	39.50		6	6	19.86	44.62	39.50	0.0	0.0
13	13.00	2.135	98.00	54.54	47.00		6	6	27.38	54.54	47.00	0.0	0.0
14	12.50	1.667	103.0	60.70	52.00		6	6	32.38	60.70	52.00	0.0	0.0
15	12.00	1.321	108.0	67.03	57.00		6	6	37.38	67.03	57.00	0.0	0.0
16	11.50	1.023	113.0	73.48	62.00		6	6	42.38	73.48	62.00	0.0	0.0
17	11.00	0.7533	118.0	79.56	67.00		6	6	47.38	79.56	67.00	0.0	0.0
18	10.50	0.4699	123.0	84.84	72.00		6	6	52.38	84.84	72.00	0.0	0.0
19	10.00	0.0	128.0	90.13	77.00		6	6	57.38	90.13	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	26.11	-4.827	91.90	-88.56	51.37

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	104.1	104.1	0.0	104.1

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
10	15.00	3	3	8.000	32.50	65470.	10
** 11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16

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EPA Export 08-07-2014:23:43:25

17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
Σ Profiles assumed for calculation (generated):
On the LEFT: Σ at ground level = 1000. Σ at bottom node = 42000. kPa
On the RIGHT: Σ at ground level = 160. Σ at bottom node = 73000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.3947	6	22.25	9
2	0.4000	6	0.3001	6	15.24	9
3	0.7000	6	0.2007	6	11.33	10
4	0.9000	6	0.1361	7	6.950	10
5	1.000	6	0.1064	9	5.030	11
10	1.300	7	0.02650	11	1.300	11
15	1.400	7	0.003000	11	0.1400	11
16	1.400	7	0.001800	11	0.05000	11

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Va [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	26.80	24.20	9.679	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	25.58	40.00	28.30	0.0	4	0	0.0	0.0	0.0	-4.860	15.45
	19.50										-4.860	-92.53
3	19.00	24.96	45.55	34.97	0.0	4	0	0.0	0.0	0.0	36.12	-73.06
4	18.50	24.21	48.37	37.29	3.632	4	0	0.0	0.0	0.0	68.22	-53.98
5	18.00	23.21	50.74	38.10	7.263	4	0	0.0	0.0	0.0	90.10	-29.57
6	17.25	21.07	54.29	42.74	12.71	4	0	0.0	0.0	0.0	101.6	1.933
7	16.75	18.17	56.66	50.20	16.34	4	7	0.7950	4.995	0.6765	92.01	34.76
8	16.00	15.71	63.21	5.908	21.79	A 3	3	3.551	24.06	10.82	54.32	66.01
9	15.50	13.12	69.58	1.615	25.42	A 3	3	6.787	28.95	17.59	31.44	90.89
10	15.00	10.41	75.95	7.247	29.05	A 3	3	10.02	40.91	24.35	13.43	26.96
** 11	14.25	6.252	85.50	30.28	34.50	3	3	14.87	58.94	34.50	0.0	0.0
12	13.75	3.615	90.50	51.14	39.50	6	6	19.88	53.14	39.50	0.0	0.0
13	13.00	2.098	98.00	56.55	47.00	6	6	27.38	56.55	47.00	0.0	0.0
14	12.50	1.636	103.0	61.95	52.00	6	6	32.38	61.95	52.00	0.0	0.0
15	12.00	1.294	108.0	68.02	57.00	6	6	37.38	68.02	57.00	0.0	0.0
16	11.50	0.9985	113.0	74.35	62.00	6	6	42.38	74.35	62.00	0.0	0.0
17	11.00	0.7311	118.0	80.54	67.00	6	6	47.38	80.54	67.00	0.0	0.0
18	10.50	0.4536	123.0	86.08	72.00	6	6	52.38	86.08	72.00	0.0	0.0
19	10.00	0.0	128.0	90.13	77.00	6	6	57.38	90.13	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	26.80	-4.860	101.6	-92.53	51.17

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	108.0	108.0	0.0	108.0

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
Σ Profiles assumed for calculation (generated):
On the LEFT: Σ at ground level = 1000. Σ at bottom node = 42000. kPa
On the RIGHT: Σ at ground level = 160. Σ at bottom node = 73000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	3.220	6	2.060	9
2	3.200	6	0.001300	5	0.0	9
3	3.200	6	0.01820	7	7.510	9
4	3.200	6	0.0	7	0.0	9

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Va [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	24.81	24.20	17.06	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	23.02	40.00	28.76	0.0	4	0	0.0	0.0	0.0	-8.530	19.31
	19.50										-8.530	-77.87
3	19.00	22.14	45.37	35.57	0.0	4	0	0.0	0.0	0.0	25.01	-58.19
4	18.50	21.17	47.00	36.96	5.000	4	0	0.0	0.0	5.000	49.66	-40.06
5	18.00	20.02	48.00	36.82	10.00	4	0	0.0	0.0	10.00	65.08	-19.32
6	17.25	17.83	49.50	39.67	17.50	4	0	0.0	0.0	17.50	70.93	5.587
7	16.75	16.04	50.50	36.51	22.50	4	7	0.2500	4.188	22.50	62.44	27.08
8	16.00	12.95	59.00	10.01	30.00	A 3	3	3.375	19.09	30.00	38.55	54.35
9	15.50	10.70	60.00	7.042	35.00	A 3	3	8.375	23.00	35.00	18.80	77.52
10	15.00	8.384	65.00	12.32	40.00	A 3	3	14.37	34.97	40.00	7.032	16.45
** 11	14.25	4.853	72.50	36.13	47.50	3	3	21.88	52.13	47.50	0.0	0.0
12	13.75	2.619	77.50	54.12	52.50	6	6	26.88	54.12	52.50	0.0	0.0
13	13.00	1.615	85.00	57.13	60.00	6	6	34.38	57.13	60.00	0.0	0.0
14	12.50	1.251	90.00	62.19	65.00	6	6	39.38	62.19	65.00	0.0	0.0
15	12.00	0.9607	95.00	68.28	70.00	6	6	44.38	68.28	70.00	0.0	0.0
16	11.50	0.7352	100.0	74.49	75.00	6	6	49.38	74.49	75.00	0.0	0.0

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17	11.00	0.5421	105.0	80.56	80.00	6	6	54.38	80.56	80.00	0.0	0.0
18	10.50	0.3360	110.0	85.89	85.00	6	6	59.38	85.89	85.00	0.0	0.0
19	10.00	0.0	115.0	89.35	90.00	6	6	64.38	89.35	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	26.88	-8.530	101.6	-92.53	51.37

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	97.19	97.19	0.0	108.0

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	26.88	0.0	0.0	0.0	0.0
2	19.50	0.0	25.58	-8.530	1.503	-92.53	19.31
3	19.00	0.0	24.96	0.0	36.12	-73.06	0.0
4	18.50	0.0	24.21	0.0	68.22	-51.98	0.0
5	18.00	0.0	23.21	0.0	90.10	-29.57	0.0
6	17.25	0.0	21.07	0.0	101.6	0.0	6.792
7	16.75	0.0	19.17	0.0	92.01	0.0	40.24
8	16.00	0.0	15.71	0.0	54.32	0.0	51.37
9	15.50	0.0	13.12	0.0	31.44	0.0	40.89
10	15.00	0.0	10.41	0.0	13.43	0.0	26.96
11	14.25	0.0	6.252	0.0	0.0	0.0	0.0
12	13.75	0.0	3.630	0.0	0.0	0.0	0.0
13	13.00	0.0	2.135	0.0	0.0	0.0	0.0
14	12.50	0.0	1.667	0.0	0.0	0.0	0.0
15	12.00	0.0	1.321	0.0	0.0	0.0	0.0
16	11.50	0.0	1.023	0.0	0.0	0.0	0.0
17	11.00	0.0	0.7533	0.0	0.0	0.0	0.0
18	10.50	0.0	0.4699	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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5. CHECK FOR MINIMUM REQUIRED TOE EMBEDMENT

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	TE/1	

Member/Location

Job Title: Shell Corrib Terminal
Min. Required Toe Embedment

Drg. Ref.

Made by NP Date Nov 25/03 Chd. CH

The recent site investigation revealed the presence of boulders in the mineral soil at the site. It is therefore necessary to determine the minimum toe embedment for stability to allow for the presence of boulders.

Sheets TE/2 to TE/11 show the results of FREW analysis where the minimum toe embeddment for stability was determined for the geotechnical cross-section where peat is present in the pond. The resulting toe elevation was +15.0m. Hence the toe embedment below the pond formation at +17m is 2m or 1.4m into the mineral soils.

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Oasys

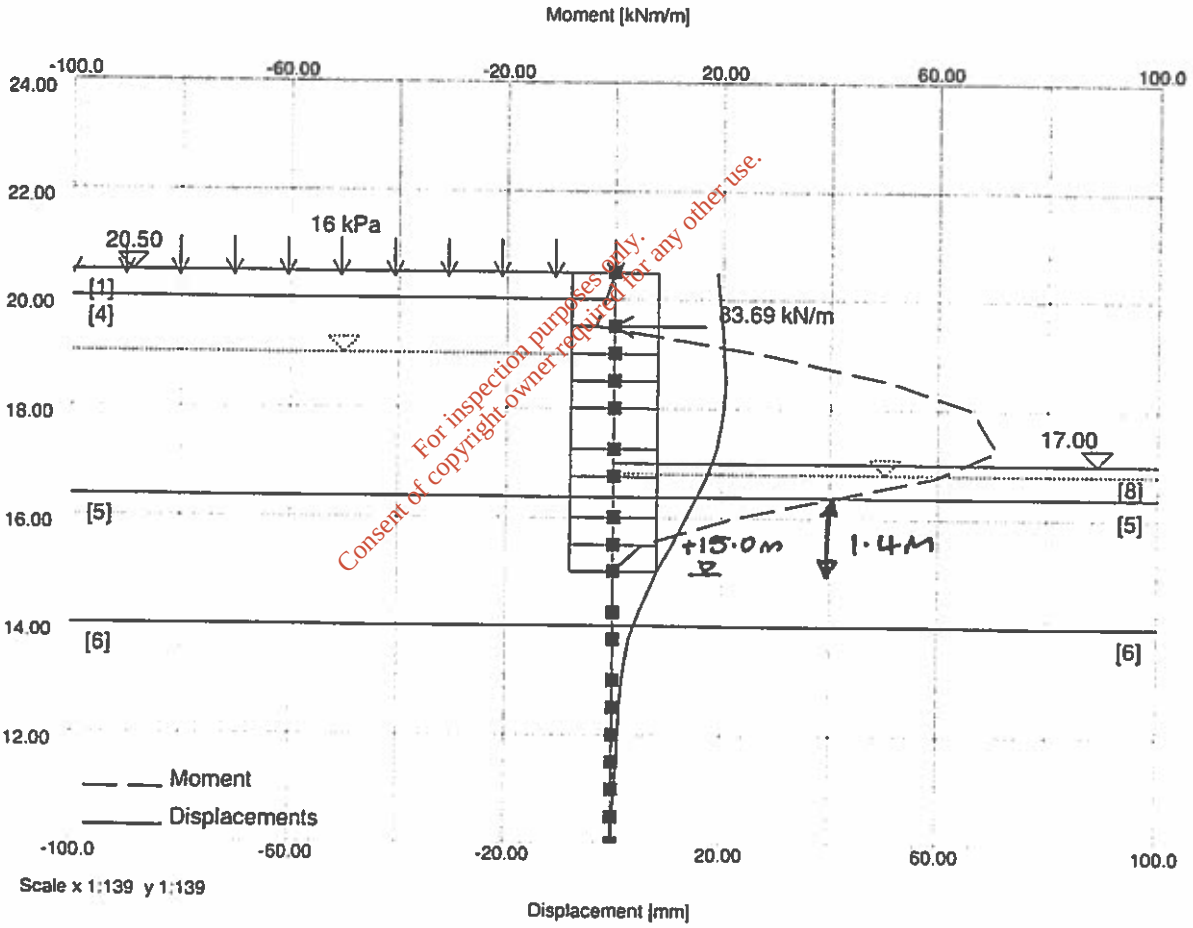
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	TE|2	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 5 uls.fwd	

ULS Bending Moment distribution and max wall deflection

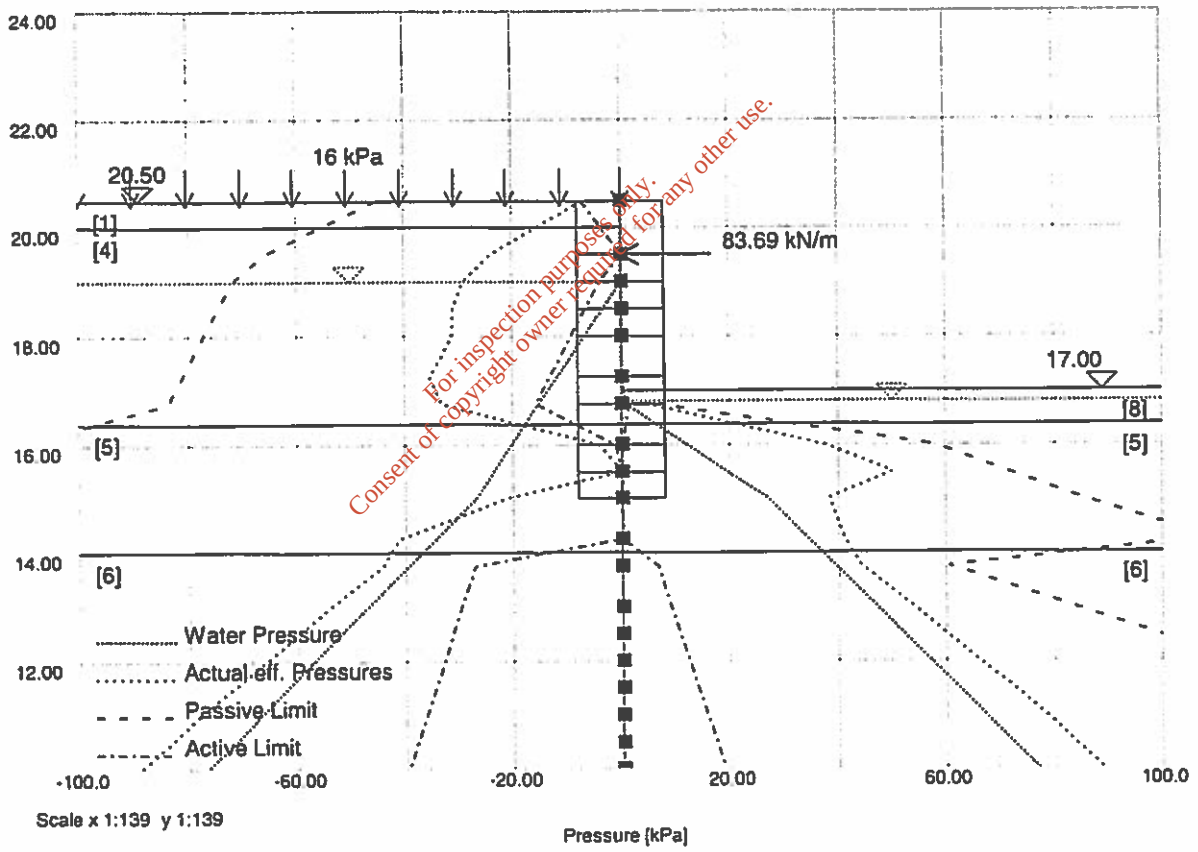


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STAGE 4 : Excavate pond

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Earth Pressure distribution



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STAGE 4 : Excavate pond

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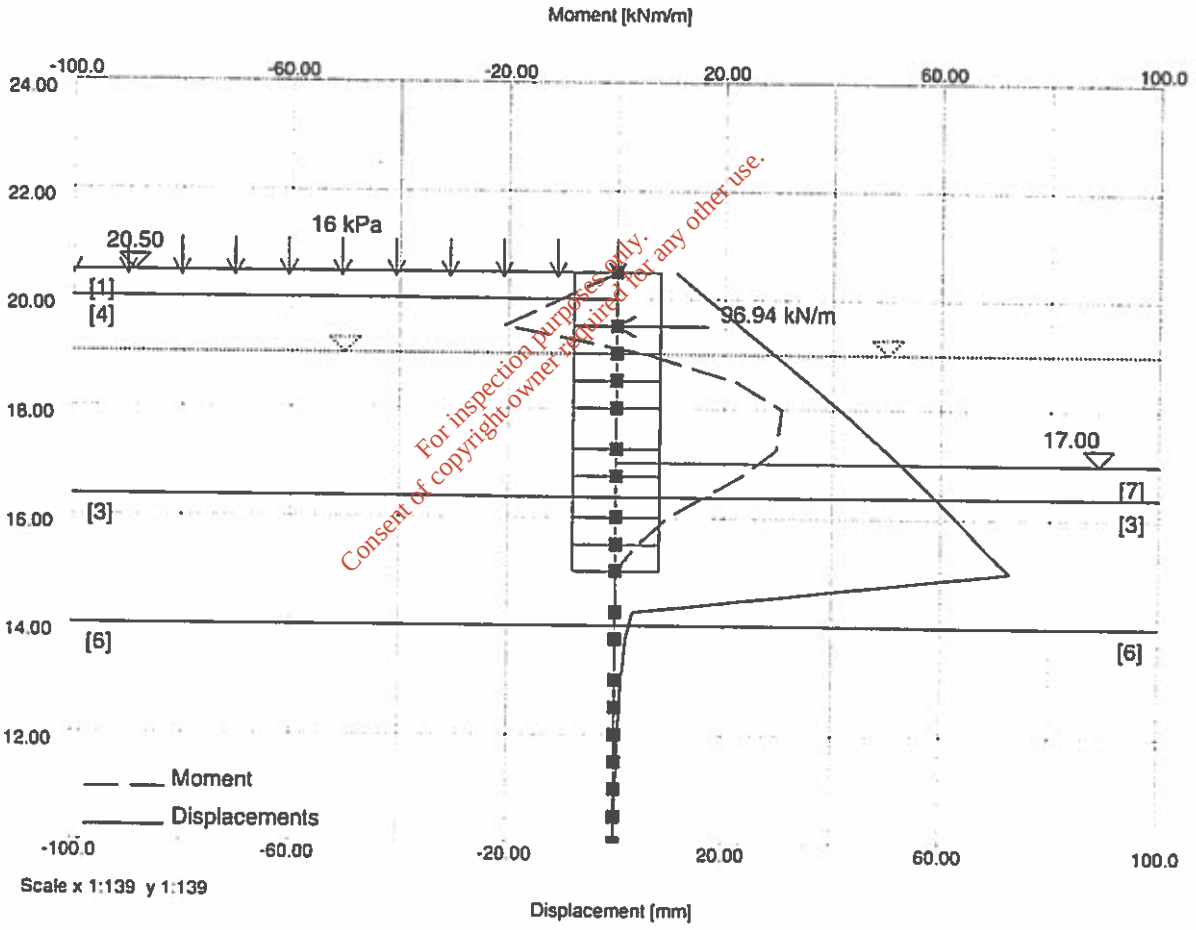
Oasys

Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	TE/4	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 5 uls.fwd	SG



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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	Ko	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	20.00	0.0	333.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	2	-	Left	20.40	16.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	2	7	8.000	32.50	27010.	2
3	19.00	2	7	8.000	32.50	27010.	3
4	18.50	2	7	8.000	32.50	27010.	4
5	18.00	2	7	8.000	32.50	27010.	5
6	17.25	2	7	8.000	32.50	27010.	6
7	16.75	2	7	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
** 10	15.00	3	3	8.000	32.50	0.0	10
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 10000
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 42000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.295	5	0.0	0
2	9.300	5	0.0	5	0.0	0
3	9.300	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vw [kPa]	Pw [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.06100	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	7.585	16.00	15.61	0.0	2	-	15.50	15.61	0.5	0.0	0.0
3	19.00	8.598	21.38	20.76	0.0	2	-	20.38	20.76	0.0	0.0	0.0
4	18.50	9.298	23.00	22.04	5.000	2	-	21.50	22.04	1.500	0.0	0.0

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5	18.00	9.295	24.00	22.76	10.00	2	7	22.00	22.76	10.00	0.0	0.0
6	17.25	8.655	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	6.443	26.50	24.62	22.50	2	7	23.25	24.62	22.50	0.0	0.0
8	16.00	2.356	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	1.355	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.9583	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.5798	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.3853	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.2560	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.2036	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1666	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.1291	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
	0.09583	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0	
18	10.50	0.06204	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	8.631E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	1	8.000	32.50	27010.	1
2	19.50	4	8	8.000	32.50	27010.	2
3	19.00	4	8	8.000	32.50	27010.	3
4	18.50	4	8	8.000	32.50	27010.	4
5	18.00	4	8	8.000	32.50	27010.	5
6	17.25	4	8	8.000	32.50	27010.	6
7	16.75	4	8	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
** 10	15.00	5	5	8.000	32.50	0.0	10
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	0.0	5	0.0	0
2	0.0	6	0.0	5	0.0	0
3	0.0	6	0.0	6	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil Left	Soil Right	Ve (kPa)	Pe (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	0.0	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.26	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.62	22.50	4	8	23.25	24.62	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
** 10	15.00	0.0	41.00	38.64	40.00	5	5	37.37	38.64	40.00	0.0	0.0
11	14.25	0.0	48.50	46.28	47.50	5	5	44.87	46.28	47.50	0.0	0.0
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6					
	87.38	89.19	90.00	0.0	0.0							

** Wall toe level: 15.00
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements (mm) Min	Max	Moments (kNm/m) Min	Max	Shears (kN/m) Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

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EPA Export 08-07-2014:23:43:26

Iter no. Inc max displ Node no. Disp error. Node no. Press error Node no.

	[mm]		[mm]		[kPa]	
1	0.0	0	6.306	5	0.1200	1
2	6.300	5	1.498	1	15.88	1
3	6.700	4	0.5502	1	5.830	1
4	6.900	4	0.2021	1	2.140	1
5	7.000	4	0.07420	1	0.7900	1
6	7.100	4	0.003700	1	0.01000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	6.627	17.80	7.106	0.0	A 1	1	5.000	8.915	0.0	0.0	0.0
2	19.50	6.918	32.00	28.88	0.0	4	8	15.50	15.79	0.0	0.9048	4.002
	19.50										0.9048	-25.21
3	19.00	7.038	37.38	33.99	0.0	4	8	20.38	20.98	0.0	11.05	-17.05
4	18.50	7.061	39.00	35.02	5.000	4	8	21.50	22.38	5.000	17.95	-10.63
5	18.00	6.923	40.00	35.07	10.00	4	8	22.00	23.26	10.00	21.68	-3.781
6	17.25	6.348	41.50	36.52	17.50	4	8	22.75	24.28	17.50	21.75	3.736
7	16.75	5.718	42.50	35.72	23.50	4	8	23.25	25.46	22.50	17.97	10.77
8	16.00	4.490	47.00	27.56	30.00	5	5	27.37	32.64	30.00	7.493	12.39
9	15.50	3.568	52.00	28.32	35.00	5	5	32.37	41.56	35.00	2.092	7.493
** 10	*15.00*	*2.622*	*57.00*	*39.08*	*40.00*	5	5	37.37	*45.78*	*40.00*	0.0	0.0
11	14.25	1.481	64.50	52.36	47.50	5	5	44.87	52.36	47.50	0.0	0.0
12	13.75	0.8783	69.50	51.86	52.50	6	6	49.87	51.86	52.50	0.0	0.0
13	13.00	0.5247	77.00	60.14	60.00	6	6	57.37	60.14	60.00	0.0	0.0
14	12.50	0.3992	82.00	65.62	65.00	6	6	62.37	65.62	65.00	0.0	0.0
15	12.00	0.3119	87.00	70.87	70.00	6	6	67.38	70.87	70.00	0.0	0.0
16	11.50	0.2393	92.00	76.19	75.00	6	6	72.38	76.19	75.00	0.0	0.0
17	11.00	0.1752	97.00	81.52	80.00	6	6	77.38	81.52	80.00	0.0	0.0
18	10.50	0.1107	102.0	86.48	85.00	6	6	82.38	86.48	85.00	0.0	0.0
19	10.00	0.0	107.0	91.19	90.00	6	6					
	87.36	91.19	90.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	7.061	0.0	21.75	-25.21	12.39

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	29.21	29.21	0.0	29.21

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	15.00	27.00	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	15.00	27.00	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no. Inc max displ Node no. Disp error. Node no. Press error Node no.

	[mm]		[mm]		[kPa]	
1	0.0	0	0.001300	1	0.01000	1
2	0.0	1	500.0E-6	1	0.01000	1
3	0.0	1	200.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	6.629	17.80	7.119	0.0	A 1	1	5.000	8.917	0.0	0.0	0.0
2	19.50	6.919	32.00	28.88	0.0	4	8	15.50	15.79	0.0	0.8990	4.007
	19.50										0.8990	-25.21
3	19.00	7.039	37.38	34.20	0.0	4	8	21.00	21.61	0.0	11.05	-17.05
4	18.50	7.062	40.62	36.65	3.375	4	8	26.50	27.38	0.0	17.95	-10.63
5	18.00	6.924	43.25	38.32	6.750	4	8	32.00	33.26	0.0	21.68	-3.782
6	17.25	6.348	47.19	42.20	11.81	4	8	40.25	41.78	0.0	21.75	3.734
7	16.75	5.718	49.81	43.03	15.19	4	8	43.56	45.79	0.7500	17.97	10.77
8	16.00	4.490	56.75	37.31	20.25	5	5	45.36	50.64	12.00	7.491	12.39
9	15.50	3.568	63.37	39.70	23.62	5	5	47.88	57.06	19.50	2.091	7.491
** 10	*15.00*	*2.622*	*70.00*	*52.09*	*27.00*	5	5	*50.38*	*58.78*	*27.00*	0.0	*0.0*
11	14.25	1.481	77.50	65.36	34.50	5	5	57.88	65.36	34.50	0.0	0.0
12	13.75	0.8783	82.50	55.11	39.50	6	6	62.88	55.11	39.50	0.0	0.0
13	13.00	0.5247	90.00	63.39	47.00	6	6	70.38	63.39	47.00	0.0	0.0
14	12.50	0.3992	95.00	68.87	52.00	6	6	75.38	68.87	52.00	0.0	0.0
15	12.00	0.3119	100.0	74.12	57.00	6	6	80.38	74.12	57.00	0.0	0.0
16	11.50	0.2393	105.0	79.44	62.00	6	6	85.38	79.44	62.00	0.0	0.0
17	11.00	0.1752	110.0	84.77	67.00	6	6	90.38	84.77	67.00	0.0	0.0
18	10.50	0.1107	115.0	89.73	72.00	6	6	95.38	89.73	72.00	0.0	0.0
19	10.00	0.0	120.0	94.44	77.00	6	6					
	100.4	94.44	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	7.062	0.0	21.75	-25.21	12.39

Surcharge 1 present in this stage

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EPA Export 08-07-2014:23:43:26

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	29.21	29.21	0.0	29.21

STAGE 4 : EXCAVATE POND

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	4	8	8.000	32.50	27010.	7
8	16.00	5	5	8.000	32.50	27010.	8
9	15.50	5	5	8.000	32.50	27010.	9
** 10	15.00	5	5	8.000	32.50	0.0	10
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 74000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	13.05	5	0.0	1
2	12.00	5	2.875	1	27.40	1
3	12.80	5	1.170	1	11.18	1
4	13.20	4	0.4759	1	4.550	1
5	13.30	4	0.1938	1	1.850	1
9	13.50	4	0.005400	1	0.02000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil Left	Soil Right	Vp (kPa)	Pp (kPa)	U (kPa)	Mom (kNm/m)	Shear (kN/m)
1	20.50	18.06	17.60	7.059	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	19.82	32.00	24.00	0.0	4	0	0.0	0.0	0.0	-3.549	12.55
	19.50										-3.549	-71.14
3	19.00	20.29	37.58	29.34	0.0	4	0	0.0	0.0	0.0	27.52	-54.70
4	18.50	20.52	40.62	31.09	3.375	4	0	0.0	0.0	0.0	51.15	-38.64
5	18.00	20.29	43.25	31.27	6.750	4	0	0.0	0.0	0.0	66.16	-18.14
6	17.25	18.81	47.19	35.50	11.81	4	0	0.0	0.0	0.0	70.85	8.525
7	16.75	17.04	49.81	33.19	15.19	4	8	0.5825	4.563	0.7500	59.20	36.32
8	16.00	13.45	56.75	4.252	20.25	5	5	2.375	17.58	12.00	22.20	41.50
9	15.50	10.74	63.17	-0.001360	23.62	A 5	5	4.875	50.01	19.50	5.366	22.20
** 10	15.00	7.958	70.00	21.26	27.00	5	5	7.375	38.43	27.00	0.0	0.0
11	14.25	4.766	77.50	41.17	34.50	5	5	14.88	41.17	34.50	0.0	0.0
12	13.75	2.984	82.50	44.18	39.50	6	6	19.81	44.18	39.50	0.0	0.0
13	13.00	1.667	90.00	53.81	47.00	6	6	27.38	53.81	47.00	0.0	0.0
14	12.50	1.466	95.00	59.81	52.00	6	6	32.38	59.81	52.00	0.0	0.0
15	12.00	1.167	100.0	66.01	57.00	6	6	37.38	66.01	57.00	0.0	0.0
16	11.50	0.9066	105.0	72.31	62.00	6	6	42.38	72.31	62.00	0.0	0.0
17	11.00	0.6690	110.0	78.28	67.00	6	6	47.38	78.28	67.00	0.0	0.0
18	10.50	0.6173	115.0	83.62	72.00	6	6	52.38	83.62	72.00	0.0	0.0
19	10.00	0.0	120.0	89.13	77.00	6	6					
	57.38	89.13	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements (mm) Min	Max	Moments (kNm/m) Min	Max	Shears (kN/m) Min	Max
0.0	20.52	-3.549	70.85	-71.14	41.50

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	83.69	83.69	0.0	83.69

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	0	8.000	32.50	27010.	1
2	19.50	4	0	8.000	32.50	27010.	2
3	19.00	4	0	8.000	32.50	27010.	3
4	18.50	4	0	8.000	32.50	27010.	4
5	18.00	4	0	8.000	32.50	27010.	5
6	17.25	4	0	8.000	32.50	27010.	6
7	16.75	4	7	8.000	32.50	27010.	7
8	16.00	3	3	8.000	32.50	27010.	8
9	15.50	3	3	8.000	32.50	27010.	9
** 10	15.00	3	3	8.000	32.50	0.0	10
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16

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EPA Export 08-07-2014:23:43:26

17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	0.6447	7	28.13	9
2	0.6000	7	0.5425	8	21.82	9
3	1.200	7	0.5438	10	19.51	10
4	1.600	8	0.4636	10	16.14	10
5	2.000	8	0.5224	10	12.55	10
10	4.500	10	0.5189	10	9.530	10
15	7.000	10	0.4960	10	9.160	10
20	9.400	10	0.4757	10	8.790	10
30	14.00	10	0.4376	10	8.080	10
40	18.20	10	0.4025	10	7.430	10
50	22.10	10	0.3702	10	6.840	10
60	25.70	10	0.3406	10	6.290	10
70	29.00	10	0.3133	10	5.790	10
80	32.00	10	0.2882	10	5.320	10
90	34.80	10	0.2651	10	4.900	10
100	37.30	10	0.2439	10	4.500	10
120	41.80	10	0.2063	10	3.810	10
140	45.60	10	0.1746	10	3.230	10
150	47.30	10	0.1606	10	2.970	10
160	48.90	10	0.1477	10	2.730	10
180	51.60	10	0.1251	10	2.310	10
200	53.90	10	0.1069	10	1.970	10
250	58.40	10	0.07180	10	1.330	10
300	61.30	10	0.04830	10	0.8900	10
350	63.30	10	0.03240	10	0.6000	10
400	64.70	10	0.02180	10	0.4000	10
450	65.60	10	0.01660	10	0.2700	10
500	66.20	10	0.009800	10	0.1800	10
550	66.60	10	0.006600	10	0.1200	10
575	66.70	10	0.005400	10	0.1000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level (m)	Disp (mm)	Ve (kPa)	Pe (kPa)	U (kPa)	Soil Left	Soil Right	Ve (kPa)	Pe (kPa)	U (kPa)	Mom (kNm/m)	Shear (kN/m)
1	20.50	12.12	17.80	37.49	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	25.33	32.00	32.24	0.0	1	0	0.0	0.0	0.0	-18.74	30.84
	19.50										-18.74	-76.10
3	19.00	32.08	37.58	35.60	0.0	1	0	0.0	0.0	0.0	13.25	-55.00
4	18.50	38.73	40.62	33.86	3.375	1	0	0.0	0.0	0.0	36.26	-36.68
5	18.00	45.06	43.25	30.35	6.750	1	0	0.0	0.0	0.0	49.94	-15.78
6	17.25	53.70	47.19	23.40	11.81	1	0	0.0	0.0	0.0	53.09	5.813
7	16.75	58.87	49.81	10.59	15.19	A	1	0.5825	-519.4E-6	0.7500	44.18	25.20
8	16.00	65.92	56.75	1.139	20.25	A	1	2.375	24.11	12.00	19.75	27.97
9	15.50	70.35	63.37	3.309	23.62	A	1	4.875	21.91	19.50	6.065	19.75
** 10	15.00	74.71	70.00	5.430	27.00	A	1	7.375	31.24	27.00	0.0	0.0
11	14.25	2.412	77.50	58.24	34.50		1	14.88	58.24	34.50	0.0	0.0
12	13.75	2.764	82.50	48.68	39.50		6	19.88	48.68	39.50	0.0	0.0
13	13.00	1.759	90.00	56.40	47.00		6	27.38	56.40	47.00	0.0	0.0
14	12.50	1.388	95.00	61.43	52.00		6	32.38	61.43	52.00	0.0	0.0
15	12.00	1.107	100.0	67.30	57.00		6	37.38	67.30	57.00	0.0	0.0
16	11.50	0.8597	105.0	73.40	62.00		6	42.38	73.40	62.00	0.0	0.0
17	11.00	0.6117	110.0	79.50	67.00		6	47.38	79.50	67.00	0.0	0.0
18	10.50	0.3917	115.0	85.18	72.00		6	52.38	85.18	72.00	0.0	0.0
19	10.00	0.0	120.0	89.13	77.00		6					
	57.38	89.13	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	74.71	-18.74	70.85	-76.10	41.50

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	106.9	106.9	0.0	106.9

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level (m)	Pressure (kPa)	Unit wt. (kN/m³)
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	3.780	6	2.510	10
2	3.600	6	0.009800	5	0.5700	-
3	3.600	6	0.1123	8	19.05	10
4	3.900	6	100.0E-6	5	0.0	-

Ground level left = 20.50 Ground level right = 17.00

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EPA Export 08-07-2014:23:43:26

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Va [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	10.91	17.88	41.76	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	22.96	32.00	32.37	0.0	4	0	0.0	0.0	0.0	-20.88	33.02
	19.50										-20.88	-63.93
3	19.00	29.17	37.38	36.05	0.0	4	0				5.015	-42.78
4	18.50	35.35	39.00	33.38	5.000	4	0	0.0	0.0	5.000	21.90	-25.42
5	18.00	41.34	40.00	28.97	10.00	4	0	0.0	0.0	10.00	30.44	-8.023
6	17.25	49.82	41.50	20.07	17.50	4	0	0.0	0.0	17.50	29.66	7.302
7	16.75	55.13	42.50	6.687	22.50	a 4	7	0.2500	-64.04E-6	22.50	22.88	15.66
8	16.00	62.74	47.00	6.305	30.00	a 3	3	4.375	17.20	30.00	9.562	14.35
9	15.50	67.68	52.00	9.539	35.00	a 3	3	9.375	15.05	35.00	4.092	9.562
** 10	15.00	72.38	57.00	12.33	40.00	a 3	3	14.37	26.42	40.00	0.0	0.0
11	14.25	3.293	64.50	57.60	47.50	3	3	21.88	57.60	47.50	0.0	0.0
12	13.75	2.066	69.50	49.41	52.50	6	6	26.88	49.41	52.50	0.0	0.0
13	13.00	1.314	77.00	56.79	60.00	6	6	34.38	56.79	60.00	0.0	0.0
14	12.50	1.028	82.00	61.74	65.00	6	6	39.38	61.74	65.00	0.0	0.0
15	12.00	0.8106	87.00	67.46	70.00	6	6	44.38	67.46	70.00	0.0	0.0
16	11.50	0.6210	92.00	73.44	75.00	6	6	49.38	73.44	75.00	0.0	0.0
17	11.00	0.4698	97.00	79.66	80.00	6	6	54.38	79.66	80.00	0.0	0.0
18	10.50	0.2776	102.0	84.97	85.00	6	6	59.38	84.97	85.00	0.0	0.0
19	10.00	0.0	107.0	88.35	90.00	6	6					
	64.38	88.35	90.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	74.71	-20.88	70.85	-76.10	41.50

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	96.94	96.94	0.0	106.9

Results Envelope

Node	Level [m]	Displacements [mm] Min	Displacements [mm] Max	Moments [kNm/m] Min	Moments [kNm/m] Max	Shears [kN/m] Min	Shears [kN/m] Max
1	20.50	0.0	10.86	0.0	0.0	0.0	0.0
2	19.50	0.0	25.33	-20.88	0.9048	-76.10	33.02
3	19.00	0.0	32.08	0.0	27.52	-55.00	0.0
4	18.50	0.0	38.73	0.0	51.15	-38.64	0.0
5	18.00	0.0	45.06	0.0	66.16	-18.14	0.0
6	17.25	0.0	53.70	0.0	70.85	0.0	8.525
7	16.75	0.0	58.87	0.0	59.20	0.0	16.10
8	16.00	0.0	65.92	0.0	22.28	0.0	41.50
9	15.50	0.0	70.35	0.0	8.065	0.0	32.28
10	15.00	0.0	74.71	0.0	0.0	0.0	0.0
11	14.25	0.0	3.766	0.0	0.0	0.0	0.0
12	13.75	0.0	2.966	0.0	0.0	0.0	0.0
13	13.00	0.0	1.867	0.0	0.0	0.0	0.0
14	12.50	0.0	1.466	0.0	0.0	0.0	0.0
15	12.00	0.0	1.167	0.0	0.0	0.0	0.0
16	11.50	0.0	0.9046	0.0	0.0	0.0	0.0
17	11.00	0.0	0.6690	0.0	0.0	0.0	0.0
18	10.50	0.0	0.4173	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	TE/1.1	

Member/Location

Job Title: Shell Corrib Terminal
Min Required Toe Embedment

Drg. Ref.

Made by NP Date Nov 28/2003 Chd. CH.

The minimum required toe embedment for stability of the alternative sheet pile solution was assessed. Sheets TE/12 to TE/20 show the results of analysis model pond 10 uls · krw. The results show that the toe embedment of 1.4m into mineral soils is sufficient for stability of the LX16 sheet pile wall with HB loading. Since large ground movements for ULS are shown in sheet TE/14 for case where the pond is filled, SLS analysis was carried out to check the likely displacement of the wall during service. The results are given in sheets TE/21 to TE/28. They show that the sheet pile wall is expected to move by about 20mm once the pond has been filled.

Although a toe embedment of 1.4m is sufficient, it is recommended that the sheet piles are driven as far as possible into schist in order minimize the ground movements arising from pond excavation.

The maximum ultimate tie force at Stage 5 (ULS) is 137 kN/m, equivalent to 5x137 = 687 kN/tie rod. This is less than the yield load of 724 kN/rod.

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Oasys

Corrib Field Development
Pond retaining structures

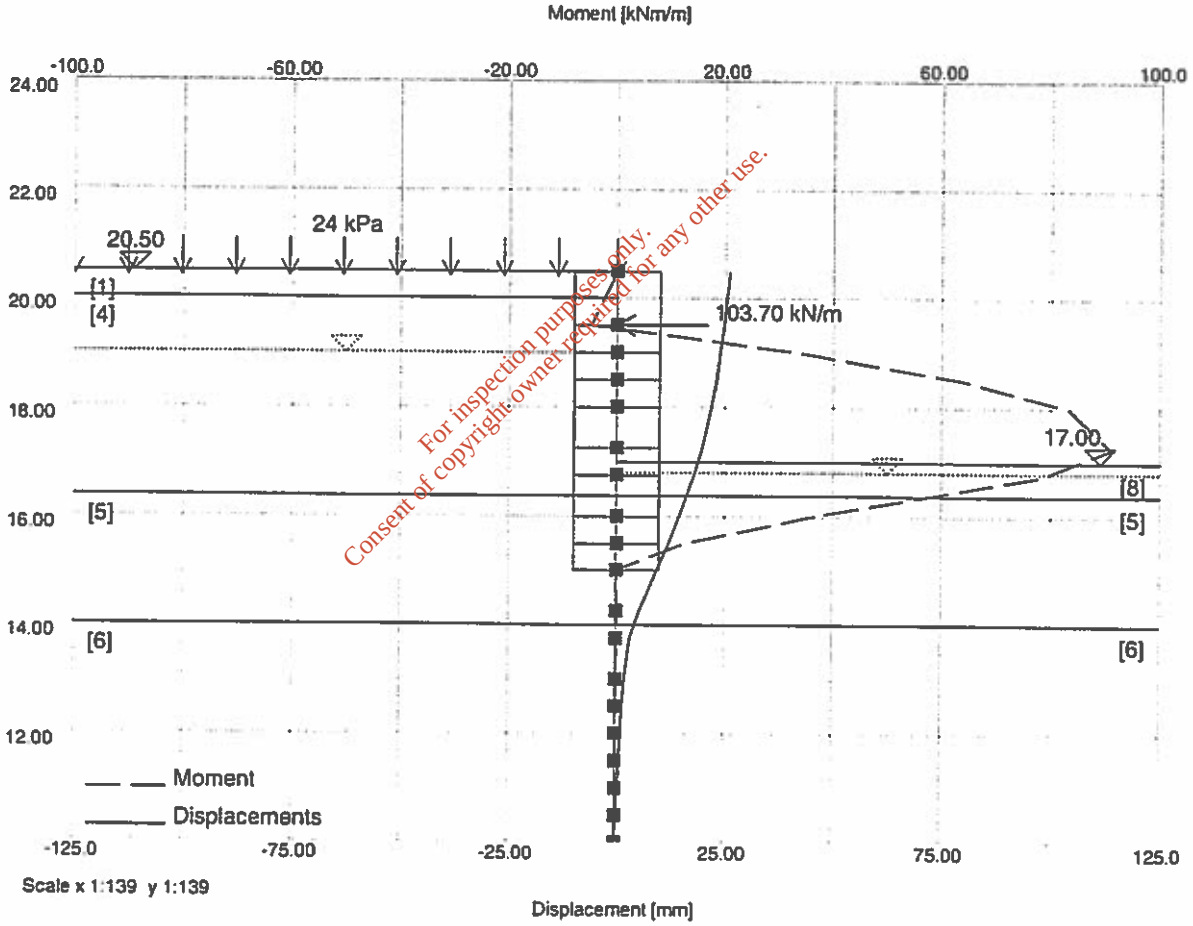
Job No.	Sheet No.	Rev.
114662	TE/12	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 10 uls.fwd	SLG

ULS analysis

LX16 Sheet Pile Wall



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STAGE 4 : Excavate pond

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Oasys

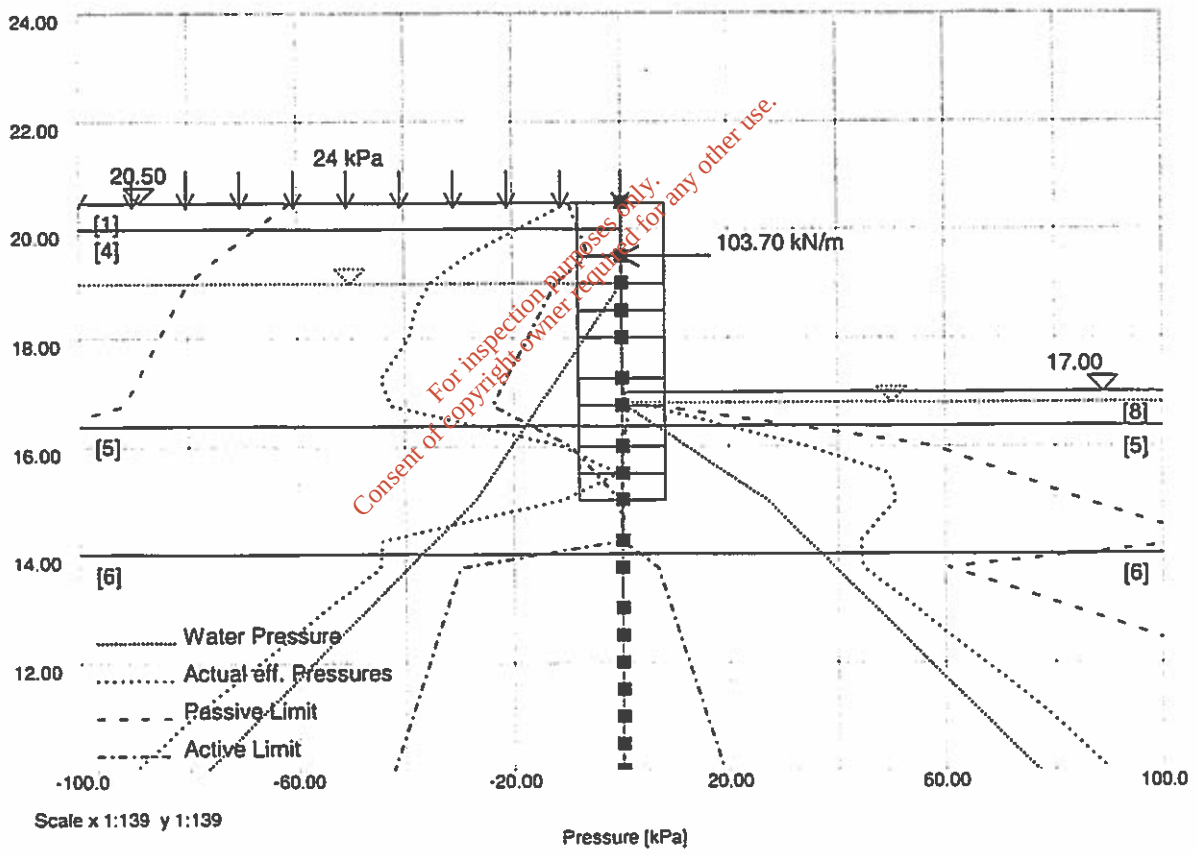
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	TE/13	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 10 uls.fwd	SLS

ULS earth pressure distribution



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STAGE 4 : Excavate pond

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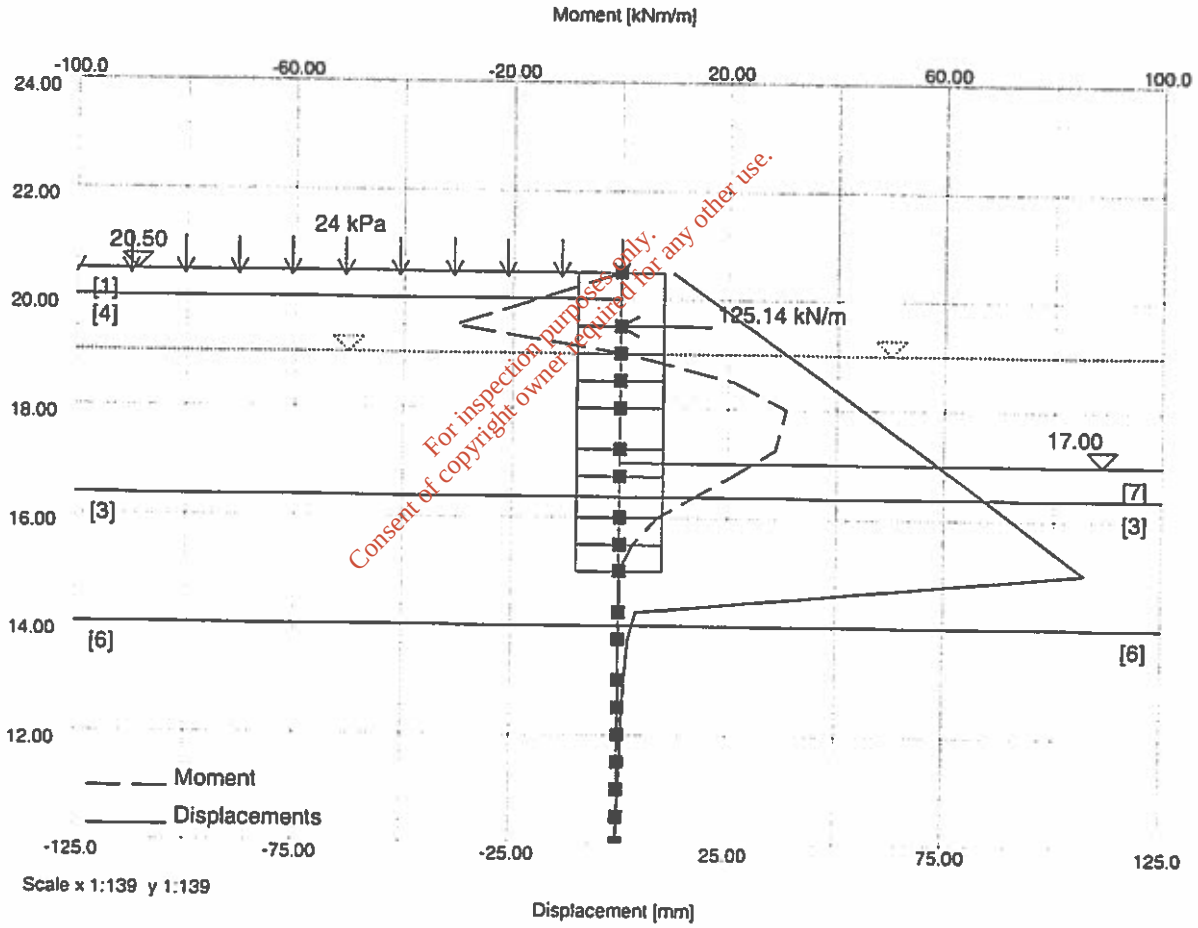
Oasys

Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	TE114	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 10 uls.fwd	SLS



STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5700	0.4000	2.530	1.260	3.180	0.3300	User_Specified
2	12.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
3	20.00	1.000	0.3300	3.700	1.140	3.850	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.040	1.150	3.490	0.2500	User_Specified
7	11.00	1.000	0.3700	2.720	1.220	3.300	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	30000.	0.0
2	3.000	20.00	0.0	333.0	0.0
3	1.000	17.00	0.0	5010.	3300.
4	17.00	20.00	0.0	1667.	0.0
5	16.70	17.00	11.00	8350.	5500.
6	0.0	0.0	0.0	50000.	0.0
7	3.000	0.0	0.0	267.0	0.0
8	2.000	0.0	0.0	311.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	27.50	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	2	-	Left	20.40	24.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	2	7	8.000	32.50	65470.	2
3	19.00	2	7	8.000	32.50	65470.	3
4	18.50	2	7	8.000	32.50	65470.	4
5	18.00	2	7	8.000	32.50	65470.	5
6	17.25	2	7	8.000	32.50	65470.	6
7	16.75	2	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
** 10	15.00	3	3	8.000	32.50	0.0	10
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 200. E at bottom node = 42000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 42000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	9.295	5	0.0	0
2	9.300	5	0.0	5	0.0	0
3	9.300	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.06400	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	7.585	15.00	15.63	0.0	2	7	15.50	15.63	0.0	0.0	0.0
3	19.00	8.596	21.38	20.70	0.0	2	7	20.38	20.70	0.0	0.0	0.0
4	18.50	9.296	23.50	22.04	5.000	2	7	21.50	22.04	5.000	0.0	0.0

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5	18.00	9.295	24.00	22.76	10.00	2	7	22.00	22.76	10.00	0.0	0.0
6	17.25	8.655	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	6.443	26.50	24.62	22.50	2	7	23.25	24.62	22.50	0.0	0.0
8	16.00	2.356	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	1.355	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.9583	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.5798	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.3853	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.2560	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.2026	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1646	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.1291	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
	0.09583	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0	
18	10.50	5.06204	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	8.631E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	4	8	8.000	32.50	65470.	2
3	19.00	4	8	8.000	32.50	65470.	3
4	18.50	4	8	8.000	32.50	65470.	4
5	18.00	4	8	8.000	32.50	65470.	5
6	17.25	4	8	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
** 10	*15.00*	5	5	*8.000*	*32.50*	*0.0*	*10*
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: *15.00*

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	5	0.0	0
2	0.0	5	0.0	5	0.0	0
1	0.0	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.781	0.0	1	1	5.000	2.781	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.38	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.62	22.50	4	8	23.25	24.62	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
** 10	*15.00*	*0.0*	*41.00*	*38.64*	*40.00*	5	5	37.37	38.64	*40.00*	*0.0*	*0.0*
11	14.25	0.0	48.50	46.28	47.50	5	5	44.87	46.28	47.50	0.0	0.0
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6					
	87.38	89.19	90.00	0.0	0.0							

** Wall toe level: 15.00
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

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Iter no. Inc max displ Node no. Disp error. Node no. Press error Node no.

	[mm]		[mm]		[kPa]	
1	0.0	0	8.169	4	0.5600	1
2	8.100	4	2.454	1	28.28	1
3	9.900	1	0.8248	1	9.510	1
4	10.80	1	0.2880	1	3.200	1
5	11.10	1	0.1206	1	1.120	1
6	11.20	1	0.008900	1	0.03000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	11.26	24.20	9.666	0.0	A 1	1	5.000	12.66	0.0	0.0	0.0
2	19.50	10.66	40.00	34.79	0.0	4	8	15.50	16.00	0.0	1.506	5.538
	19.50										1.506	-39.45
3	19.00	10.34	45.37	40.49	0.0	4	8	20.38	21.16	0.0	17.71	-27.58
4	18.50	9.957	47.00	41.79	5.000	4	8	21.50	22.53	5.000	29.08	-17.93
5	18.00	9.467	48.00	42.05	10.00	4	8	22.00	23.38	10.00	35.64	-7.279
6	17.25	8.682	49.50	43.91	17.50	4	8	22.75	24.31	17.50	36.72	4.682
7	16.75	7.654	50.50	42.85	22.50	4	8	23.25	25.58	22.50	31.32	16.21
8	16.00	6.206	55.00	30.18	30.00	5	5	27.37	34.03	10.00	15.12	20.40
9	15.50	5.160	60.00	28.12	35.00	5	5	32.37	44.44	35.00	5.518	15.12
** 10	15.00	4.089	65.00	33.78	40.00	5	5	37.37	52.44	40.00	0.0	0.0
11	14.25	2.251	72.50	55.37	47.50	5	5	44.87	55.37	47.50	0.0	0.0
12	13.75	1.328	77.50	52.35	52.50	6	6	49.87	52.35	52.50	0.0	0.0
13	13.00	0.7900	85.00	60.90	60.00	6	6	57.37	60.90	60.00	0.0	0.0
14	12.50	0.6001	90.00	66.55	65.00	6	6	62.37	66.55	65.00	0.0	0.0
15	12.00	0.4682	95.00	71.88	70.00	6	6	67.38	71.88	70.00	0.0	0.0
16	11.50	0.3588	100.0	77.31	75.00	6	6	72.38	77.31	75.00	0.0	0.0
17	11.00	0.2624	105.0	82.75	80.00	6	6	77.38	82.75	80.00	0.0	0.0
18	10.50	0.1655	110.0	87.66	85.00	6	6	82.38	87.66	85.00	0.0	0.0
19	10.00	0.0	115.0	92.19	90.00	6	6					
	87.38	92.19	90.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	11.26	0.0	36.72	-39.45	20.40

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	44.99	44.99	0.0	44.99

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	15.00	27.00	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	15.00	27.00	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 190. E at bottom node = 47000. kPa

Iter no. Inc max displ Node no. Disp error. Node no. Press error Node no.

	[mm]		[mm]		[kPa]	
1	0.0	0	0.003700	1	0.03000	1
2	0.0	1	0.001600	1	0.01000	1
3	0.0	1	700.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	11.26	24.20	9.677	0.0	A 1	1	5.000	12.65	0.0	0.0	0.0
2	19.50	10.66	40.00	34.78	0.0	4	8	15.50	16.00	0.0	1.467	5.556
	19.50										1.467	-39.45
3	19.00	10.34	45.58	40.69	0.0	4	8	21.00	21.79	0.0	17.69	-27.56
4	18.50	9.960	48.62	43.41	3.375	4	8	26.50	27.53	0.0	29.06	-17.93
5	18.00	9.469	51.25	45.30	6.750	4	8	32.00	33.38	0.0	35.62	-7.283
6	17.25	8.683	55.19	49.60	11.81	4	8	40.25	41.81	0.0	36.71	4.677
7	16.75	7.655	57.81	50.16	15.19	4	8	43.58	45.91	0.7500	31.31	16.20
8	16.00	6.207	64.75	39.92	20.25	5	5	45.38	52.03	12.00	15.11	20.39
9	15.50	5.160	71.38	39.49	23.62	5	5	47.88	59.94	19.50	5.514	15.11
** 10	15.00	4.089	78.00	46.79	27.00	5	5	50.38	64.43	27.00	0.0	0.0
11	14.25	2.251	85.50	68.37	34.50	5	5	57.88	68.37	34.50	0.0	0.0
12	13.75	1.328	90.50	65.60	39.50	6	6	62.88	65.60	39.50	0.0	0.0
13	13.00	0.7900	98.00	64.15	47.00	6	6	70.38	64.15	47.00	0.0	0.0
14	12.50	0.6000	103.0	69.80	52.00	6	6	75.38	69.80	52.00	0.0	0.0
15	12.00	0.4682	108.0	75.13	57.00	6	6	80.38	75.13	57.00	0.0	0.0
16	11.50	0.3588	113.0	80.56	62.00	6	6	85.38	80.56	62.00	0.0	0.0
17	11.00	0.2624	118.0	86.00	67.00	6	6	90.38	86.00	67.00	0.0	0.0
18	10.50	0.1655	123.0	90.91	72.00	6	6	95.38	90.91	72.00	0.0	0.0
19	10.00	0.0	128.0	95.44	77.00	6	6					
	100.4	95.44	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	11.26	0.0	36.72	-39.45	20.40

Surcharge 1 present in this stage

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EPA Export 08-07-2014:23:43:26

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	45.01	45.01	0.0	45.01

STAGE 4 : EXCAVATE POND

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
** 10	15.00	5	5	8.000	32.50	0.0	10
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
Σ Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 47000. kPa
On the RIGHT: E at ground level = 1000. E at bottom node = 74000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	10.47	4	0.0	1
2	10.50	4	3.369	1	35.48	1
3	12.80	1	1.241	1	13.05	1
4	14.00	1	0.4573	1	4.810	1
5	14.50	1	0.1685	1	1.770	1
8	14.70	1	0.008400	1	0.03000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level (m)	Disp (mm)	Va (kPa)	Pa (kPa)	U (kPa)	Soil	Left	Right	Va (kPa)	Pa (kPa)	U (kPa)	BM (kNm/m)	Shear (kN/m)
1	20.50	26.00	24.20	9.647	0.0	A	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	26.56	40.00	26.55	0.0		4	0	0.0	0.0	0.0	-1.624	15.53
	19.50											-1.824	-68.18
3	19.00	23.84	45.58	35.29	0.0		4	0	0.0	0.0	0.0	33.91	-68.54
4	18.50	23.00	48.62	37.93	1.375		4	0	0.0	0.0	0.0	63.72	-49.29
5	18.00	21.92	51.25	39.16	6.750		4	0	0.0	0.0	0.0	83.20	-26.61
6	17.25	19.71	55.19	44.35	11.81		4	0	0.0	0.0	0.0	90.90	7.282
7	16.75	17.62	57.81	42.48	15.19		4	8	0.5825	4.584	0.7500	78.48	40.74
8	16.00	14.47	64.75	10.75	20.25		5	5	2.375	34.31	12.00	35.99	51.87
9	15.50	12.04	71.38	0.8708	23.62	e	5	5	4.875	49.39	19.50	12.45	35.99
** 10	15.00	9.554	78.00	11.00	27.00		5	5	7.375	50.83	27.00	0.0	0.0
11	14.25	5.563	85.50	44.18	34.50		5	5	14.88	44.18	34.50	0.0	0.0
12	13.75	3.416	90.50	44.66	39.50		6	6	19.88	44.66	39.50	0.0	0.0
13	13.00	2.111	98.00	54.55	47.00		6	6	27.38	54.55	47.00	0.0	0.0
14	12.50	1.665	103.0	60.71	52.00		6	6	32.38	60.71	52.00	0.0	0.0
15	12.00	1.321	108.0	67.04	57.00		6	6	37.38	67.04	57.00	0.0	0.0
16	11.50	1.023	113.0	73.48	62.00		6	6	42.38	73.48	62.00	0.0	0.0
17	11.00	0.7533	118.0	79.56	67.00		6	6	47.38	79.56	67.00	0.0	0.0
18	10.50	0.4700	123.0	84.84	72.00		6	6	52.38	84.84	72.00	0.0	0.0
19	10.00	0.0	128.0	90.13	77.00		6	6					
	57.38	90.13	77.00	0.0	0.0								

** Wall toe level: 15.00

EXTREME values so far:-

Displacements (mm) Min	Displacements (mm) Max	Moments (kNm/m) Min	Moments (kNm/m) Max	Shears (kN/m) Min	Shears (kN/m) Max
0.0	26.00	-1.824	90.90	-68.18	51.87

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	103.7	103.7	0.0	103.7

STAGE 5 : HYDROSTATIC GROUND WATER

Geometry

Node	Level (m)	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node (kNm2/m)	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
** 10	15.00	3	3	8.000	32.50	0.0	10
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16

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EPA Export 08-07-2014:23:43:26

17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

Convergence control parameters
Maximum number of iterations : 10000
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 5 : Hydrostatic ground water

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.6239	8	27.50	9
2	0.6000	8	0.7333	10	24.15	10
3	1.300	10	0.9306	10	23.87	10
4	2.300	10	0.9803	10	21.91	10
5	3.200	10	0.9897	10	20.18	10
10	8.000	10	0.9034	10	16.92	10
15	12.60	10	0.8353	10	15.59	10
20	16.50	10	0.7745	10	14.44	10
30	23.70	10	0.6720	10	12.43	10
40	30.20	10	0.6129	10	11.32	10
50	36.00	10	0.5602	10	10.35	10
60	41.40	10	0.5120	10	9.460	10
70	46.30	10	0.4680	10	8.640	10
80	50.80	10	0.4277	10	7.900	10
90	54.90	10	0.3923	10	7.260	10
100	58.70	10	0.3598	10	6.640	10
120	65.40	10	0.3026	10	5.590	10
140	70.90	10	0.2565	10	4.700	10
150	73.40	10	0.2334	10	4.310	10
160	75.60	10	0.2141	10	3.950	10
180	79.60	10	0.1800	10	3.320	10
200	82.90	10	0.1516	10	2.800	10
250	89.10	10	0.09820	10	1.810	10
300	93.10	10	0.06370	10	1.180	10
350	95.70	10	0.04130	10	0.7600	10
400	97.40	10	0.02680	10	0.5000	10
450	98.50	10	0.01740	10	0.3200	10
500	99.20	10	0.01130	10	0.2100	10
550	99.60	10	0.007300	10	0.1400	10
585	99.90	10	0.005400	10	0.1000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Wall Left	Wall Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	14.69	24.20	59.98	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	22.57	40.00	41.24	0.0	1	0	0.0	0.0	0.0	-29.99	45.46
	19.50										-29.99	-92.04
3	19.00	41.61	45.58	44.67	0.0	1	0	0.0	0.0	0.0	8.294	-65.30
4	18.50	50.63	48.62	41.86	3.375	1	0	0.0	0.0	0.0	35.31	-42.72
5	18.00	59.52	51.25	37.26	6.750	1	0	0.0	0.0	0.0	51.61	-17.65
6	17.25	72.51	55.19	25.64	11.81	1	0	0.0	0.0	0.0	53.93	7.805
7	16.75	80.91	57.81	7.867	15.19	1	7	0.5825	-482.6E-6	0.7500	44.18	26.04
8	16.00	93.24	64.75	1.139	20.25	A	3	2.375	24.13	12.00	19.75	37.97
9	15.50	101.3	71.38	3.306	23.62	A	3	4.875	21.91	19.50	8.065	19.75
** 10	15.00	109.4	78.00	5.430	27.00	A	3	7.375	21.24	27.00	0.0	0.0
11	14.25	5.251	85.50	58.89	34.50		3	14.88	58.89	34.50	0.0	0.0
12	13.75	3.131	90.50	52.97	39.50		6	19.88	52.97	39.50	0.0	0.0
13	13.00	1.983	98.00	58.01	47.00		6	27.38	58.01	47.00	0.0	0.0
14	12.50	1.560	103.0	62.89	52.00		6	32.38	62.89	52.00	0.0	0.0
15	12.00	1.240	108.0	68.77	57.00		6	37.38	68.77	57.00	0.0	0.0
16	11.50	0.9606	113.0	74.98	62.00		6	42.38	74.98	62.00	0.0	0.0
17	11.00	0.7048	118.0	81.16	67.00		6	47.38	81.16	67.00	0.0	0.0
18	10.50	0.4380	123.0	86.80	72.00		6	52.38	86.80	72.00	0.0	0.0
19	10.00	0.0	128.0	90.13	77.00		6					
	57.38	90.13	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	109.4	-29.99	90.90	-92.04	51.87

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	137.5	137.5	0.0	137.5

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1000. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 160. E at bottom node = 73000. kPa

Iter no. Inc max displ Node no. Disp error. Node no. Press error Node no.

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EPA Export 08-07-2014:23:43:27

	[mm]		[mm]		[kPa]	
1	0.0	0	3.006	6	2.830	10
2	3.000	6	0.5073	1	5.300	1
3	3.100	6	0.1933	1	12.93	10
4	3.300	5	0.07080	1	0.7600	1
5	3.300	5	0.02630	1	0.2700	1
7	3.300	5	0.003600	1	0.01000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil	Left	Right	Ve [kPa]	Pe [kPa]	U [kPa]	Bt [kNm/m]	Shear [kN/m]
1	20.50	12.12	26.20	61.24	0.0	P	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	29.64	40.00	42.15	0.0		4	0	0.0	0.0	0.0	-30.62	46.43
	19.50											-30.62	-78.72
3	19.00	38.52	45.37	45.41	0.0		4	0	0.0	0.0	0.0	0.8360	-51.56
4	18.50	47.40	47.00	41.38	5.000		4	0	0.0	0.0	5.000	30.94	-29.86
5	18.00	56.21	48.00	35.51	10.00		4	0	0.0	0.0	10.00	30.70	-8.623
6	17.25	69.22	49.50	21.43	17.50		4	0	0.0	0.0	17.50	28.69	9.432
7	16.75	77.75	50.50	2.921	22.50	c	4	7	0.2500	-422.4E-6	22.50	20.60	17.10
8	16.00	90.42	55.00	4.761	30.00	c	3	3	4.375	19.08	30.00	7.087	13.54
9	15.50	98.83	60.00	8.392	35.00	c	3	3	9.375	16.30	35.00	2.555	7.087
** 10	*15.00*	*107.2*	*65.00*	*13.69*	*40.00*	c	3	3	16.37	21.88	40.00	*0.0*	*0.0*
11	14.25	4.127	72.50	58.27	47.50		3	3	21.88	58.27	47.50	0.0	0.0
12	13.75	2.434	77.50	53.72	52.50		6	6	26.88	53.72	52.50	0.0	0.0
13	13.00	1.540	85.00	58.42	60.00		6	6	34.38	58.42	60.00	0.0	0.0
14	12.50	1.201	90.00	63.21	65.00		6	6	39.38	63.21	65.00	0.0	0.0
15	12.00	0.9456	95.00	68.94	70.00		6	6	44.38	68.94	70.00	0.0	0.0
16	11.50	0.7232	100.0	75.03	75.00		6	6	49.38	75.03	75.00	0.0	0.0
17	11.00	0.5241	105.0	81.12	80.00		6	6	54.38	81.12	80.00	0.0	0.0
18	10.50	0.3246	110.0	86.59	85.00		6	6	59.38	86.59	85.00	0.0	0.0
19	10.00	0.0	115.0	89.35	90.00		6	6					
	64.38	89.35	90.00	0.0	0.0								

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	109.4	-30.62	90.90	-92.06	51.87

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	125.1	125.1	0.0	137.5

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	26.00	0.0	0.0	0.0	0.0
2	19.50	0.0	32.57	-30.62	1.506	-92.06	46.43
3	19.00	0.0	41.61	0.0	33.91	-68.45	0.0
4	18.50	0.0	50.63	0.0	61.72	-49.29	0.0
5	18.00	0.0	59.52	0.0	83.20	-24.81	0.0
6	17.25	0.0	72.51	0.0	90.90	0.0	9.432
7	16.75	0.0	80.91	0.0	78.48	0.0	40.74
8	16.00	0.0	93.24	0.0	35.99	0.0	51.87
9	15.50	0.0	101.3	0.0	12.45	0.0	35.99
10	*15.00*	*0.0*	*109.4*	*0.0*	*0.0*	*0.0*	*0.0*
11	14.25	0.0	5.553	0.0	0.0	0.0	0.0
12	13.75	0.0	3.416	0.0	0.0	0.0	0.0
13	13.00	0.0	2.131	0.0	0.0	0.0	0.0
14	12.50	0.0	1.665	0.0	0.0	0.0	0.0
15	12.00	0.0	1.321	0.0	0.0	0.0	0.0
16	11.50	0.0	1.023	0.0	0.0	0.0	0.0
17	11.00	0.0	0.7533	0.0	0.0	0.0	0.0
18	10.50	0.0	0.4700	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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Oasys

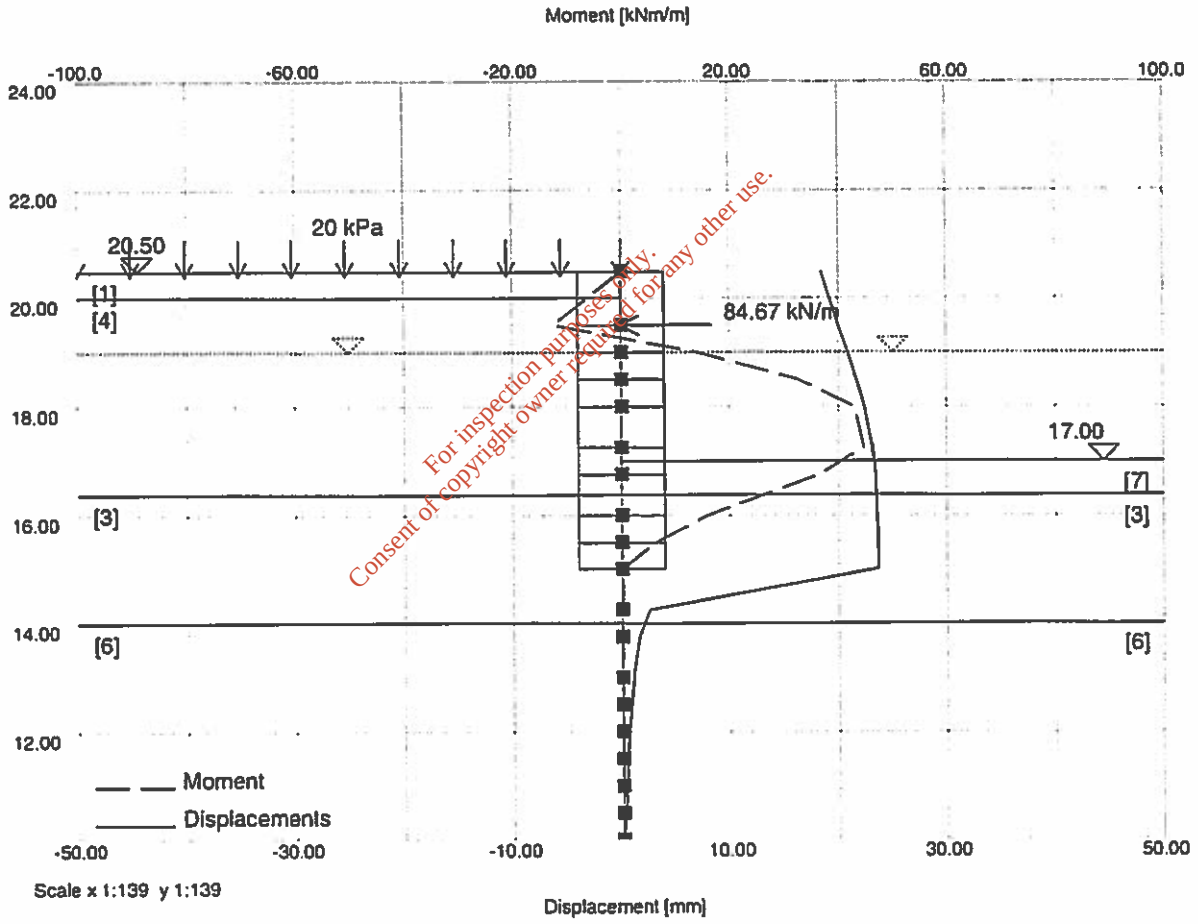
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	TE/21.	

Drg. Ref.

Made by	Date	Data	Checked
NP	06-Dec-2003	pond 10 sls.fwd	SLG

SLS Analysis
LX16 Sheet Pile Wall



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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpo	Kr	Earth pressure coefficients.
1	20.00	0.5000	0.3300	3.000	1.150	3.460	0.3300	User_Specified
2	12.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
3	20.00	1.000	0.2700	4.850	1.040	4.400	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.000	1.150	3.460	0.2500	User_Specified
7	11.00	1.000	0.3100	3.250	1.150	3.460	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	45000.	0.0
2	3.000	20.00	0.0	500.0	0.0
3	1.000	17.00	0.0	7500.	5010.
4	25.00	20.00	0.0	2500.	0.0
5	25.00	17.00	16.70	12500.	8350.
6	0.0	0.0	0.0	75000.	0.0
7	3.000	0.0	0.0	400.0	0.0
8	3.000	0.0	0.0	466.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	32.00	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	2	-	Left	20.40	20.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm²/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	2	7	8.000	32.50	65470.	2
3	19.00	2	7	8.000	32.50	65470.	3
4	18.50	2	7	8.000	32.50	65470.	4
5	18.00	2	7	8.000	32.50	65470.	5
6	17.25	2	7	8.000	32.50	65470.	6
7	16.75	2	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
** 10	*15.00*	*3*	*3*	*8.000*	*32.50*	*0.0*	*10*
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 300. E at bottom node = 63000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 63000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	6.194	5	0.0	0
2	6.200	5	0.0	5	0.0	0
3	6.200	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.04264	5.000	2.431	0.0	1	1	5.000	2.431	0.0	0.0	0.0
2	19.50	5.054	16.00	15.61	0.0	2	7	15.50	15.61	0.0	0.0	0.0
3	19.00	5.730	21.38	20.70	0.0	2	7	20.38	20.70	0.0	0.0	0.0
4	18.50	6.191	23.00	22.04	5.000	2	7	21.50	22.04	5.000	0.0	0.0

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5	18.00	6.194	28.00	22.76	30.00	2	7	22.00	22.76	30.00	0.0	0.0
6	17.25	5.768	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	4.292	26.50	24.61	22.50	2	7	23.25	24.61	22.50	0.0	0.0
8	16.00	1.567	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	0.9005	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.6368	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.3854	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.2564	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.1705	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.1357	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1097	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.08602	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
	0.06387	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0	
18	10.50	0.04135	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	5.755E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	4	8	8.000	32.50	65470.	2
3	19.00	4	8	8.000	32.50	65470.	3
4	18.50	4	8	8.000	32.50	65470.	4
5	18.00	4	8	8.000	32.50	65470.	5
6	17.25	4	8	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
** 10	15.00	5	5	8.000	32.50	0.0	10
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 15.00

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Ino max displ	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
	[mm]					
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	D [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.431	0.0	1	1	5.000	2.431	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.38	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.61	22.50	4	8	23.25	24.61	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
** 10	15.00	0.0	41.00	38.64	40.00	5	5	37.37	38.64	40.00	0.0	0.0
11	14.25	0.0	48.50	46.28	47.50	5	5	44.87	46.28	47.50	0.0	0.0
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6					
	87.38	89.19	90.00	0.0	0.0							

** Wall toe level: 15.00
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa

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On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	5.426	4	0.0	0
2	5.400	4	1.832	1	26.70	1
3	6.700	1	0.7304	1	10.65	1
4	7.400	1	0.2912	1	4.250	1
5	7.700	1	0.1161	1	1.690	1
6	7.900	1	0.002900	1	0.02000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	7.900	21.00	6.913	0.0	A 1	1	5.000	13.43	0.0	0.0	0.0
2	19.50	7.423	36.00	20.46	0.0	4	8	15.50	16.04	0.0	3.261	2.149
	19.50										3.261	-29.15
3	19.00	7.163	41.38	36.15	0.0	4	8	20.38	21.21	0.0	15.15	-20.05
4	18.50	6.848	43.00	37.47	5.000	4	8	21.50	22.58	5.000	23.31	-12.59
5	18.00	6.445	44.00	37.73	10.00	4	8	22.00	23.44	10.00	27.74	-4.405
6	17.25	5.647	45.50	39.81	17.50	4	8	22.75	24.32	17.50	27.70	4.901
7	16.75	4.986	46.50	38.76	22.50	4	8	23.25	25.61	22.50	22.83	13.85
8	16.00	3.846	51.00	27.01	30.00	5	5	27.37	33.85	30.00	9.356	15.83
9	15.50	3.033	56.00	26.47	35.00	5	5	32.37	43.80	35.00	2.512	9.356
** 10	*15.00*	*2.207*	*61.00*	*39.46*	*40.00*	*5*	*5*	*37.37*	*47.50*	*40.00*	*0.0*	*0.0*
11	14.25	1.246	68.50	53.90	47.50	5	5	44.87	53.90	47.50	0.0	0.0
12	13.75	0.7402	73.50	52.15	52.50	6	6	49.87	52.15	52.50	0.0	0.0
13	13.00	0.4426	81.00	60.55	60.00	6	6	57.37	60.55	60.00	0.0	0.0
14	12.50	0.3368	86.00	66.11	65.00	6	6	62.37	66.11	65.00	0.0	0.0
15	12.00	0.2631	91.00	71.41	70.00	6	6	67.38	71.41	70.00	0.0	0.0
16	11.50	0.2019	96.00	76.79	75.00	6	6	72.38	76.79	75.00	0.0	0.0
17	11.00	0.1480	101.0	82.18	80.00	6	6	77.38	82.18	80.00	0.0	0.0
18	10.50	0.09357	106.0	87.13	85.00	6	6	82.38	87.13	85.00	0.0	0.0
19	10.00	0.0	111.0	91.69	90.00	6	6					
	97.38	91.69	90.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	7.900	0.0	27.74	-29.15	15.83

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	31.34	31.34	0.0	31.34

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	15.00	0.0	10.00
2	15.00	27.00	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	15.00	27.00	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.001200	1	0.02000	1
2	0.0	1	500.0E-6	1	0.01000	1
3	0.0	1	200.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	7.901	21.00	6.929	0.0	A 1	1	5.000	13.44	0.0	0.0	0.0
2	19.50	7.425	36.00	20.46	0.0	4	8	15.50	16.04	0.0	3.254	2.155
	19.50										3.254	-29.19
3	19.00	7.164	41.58	36.35	0.0	4	8	21.00	21.84	0.0	15.15	-20.05
4	18.50	6.848	44.63	39.09	3.375	4	8	24.50	27.58	0.0	23.30	-12.59
5	18.00	6.446	47.25	40.98	6.750	4	8	32.00	33.44	0.0	27.74	-4.406
6	17.25	5.648	51.19	45.50	11.81	4	8	40.25	41.82	0.0	27.69	4.899
7	16.75	4.987	53.81	46.87	15.19	4	8	43.58	45.94	0.7500	22.82	13.85
8	16.00	3.846	60.75	36.76	20.25	5	5	45.38	51.85	12.00	9.353	15.82
9	15.50	3.033	67.38	37.84	23.62	5	5	47.88	59.30	19.50	2.510	9.353
** 10	*15.00*	*2.207*	*74.00*	*52.46*	*27.00*	*5*	*5*	*50.38*	*60.49*	*27.00*	*0.0*	*0.0*
11	14.25	1.246	81.50	66.90	34.50	5	5	57.88	66.90	34.50	0.0	0.0
12	13.75	0.7402	86.50	55.40	39.50	6	6	62.88	55.40	39.50	0.0	0.0
13	13.00	0.4426	94.00	63.80	47.00	6	6	70.38	63.80	47.00	0.0	0.0
14	12.50	0.3368	99.00	69.36	52.00	6	6	75.38	69.36	52.00	0.0	0.0
15	12.00	0.2631	104.0	74.66	57.00	6	6	80.38	74.66	57.00	0.0	0.0
16	11.50	0.2019	109.0	80.04	62.00	6	6	85.38	80.04	62.00	0.0	0.0
17	11.00	0.1480	114.0	85.43	67.00	6	6	90.38	85.43	67.00	0.0	0.0
18	10.50	0.09357	119.0	90.38	72.00	6	6	95.38	90.38	72.00	0.0	0.0
19	10.00	0.0	124.0	94.94	77.00	6	6					
	100.4	94.94	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	7.901	0.0	27.74	-29.19	15.83

Surcharge 1 present in this stage

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EPA Export 08-07-2014:23:43:27

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	31.35	31.35	0.0	31.35

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	8	8.000	32.50	65470.	7
8	16.00	5	5	8.000	32.50	65470.	8
9	15.50	5	5	8.000	32.50	65470.	9
** 10	*15.00*	*5*	*5*	*8.000*	*32.50*	*0.0*	*10*
11	14.25	5	5	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: *15.00*

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 1600. E at bottom node = 110000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	8.429	4	0.0	1
2	8.400	4	3.255	1	42.60	1
3	10.80	1	1.449	1	18.91	1
4	12.20	1	0.6472	1	8.420	1
5	12.90	1	0.2895	1	3.760	1
10	13.40	1	0.005400	1	0.03000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	21.30	21.00	6.898	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	19.72	16.00	21.73	0.0	4	0	0.0	0.0	0.0	-3.449	11.60
	19.50										-3.449	-71.67
3	19.00	18.93	41.58	28.85	0.0	4	0	0.0	0.0	0.0	28.31	-56.19
4	18.50	18.03	44.63	31.67	3.375	4	0	0.0	0.0	0.0	52.74	-40.10
5	18.00	16.94	47.25	32.84	6.750	4	0	0.0	0.0	0.0	68.41	-18.97
6	17.25	14.82	51.19	38.98	11.81	4	0	0.0	0.0	0.0	73.36	9.272
7	16.75	13.07	53.81	36.66	15.19	4	8	0.5825	6.584	0.7500	60.79	38.61
8	16.00	10.06	60.75	2.699	20.25	5	5	2.375	39.67	12.00	21.73	43.11
9	15.50	7.914	67.38	-0.005586	23.63	A 5	5	4.875	53.74	19.50	4.661	21.73
** 10	*15.00*	*5.747*	*74.00*	*22.66*	*27.00*	*5*	*5*	*7.375*	*37.57*	*27.00*	*0.0*	*0.0*
11	14.25	3.440	81.50	42.67	34.50	5	5	14.88	42.67	34.50	0.0	0.0
12	13.75	2.137	86.50	44.45	39.50	6	6	19.88	44.45	39.50	0.0	0.0
13	13.00	1.344	94.00	54.22	47.00	6	6	27.38	54.22	47.00	0.0	0.0
14	12.50	1.053	99.00	60.33	52.00	6	6	32.38	60.33	52.00	0.0	0.0
15	12.00	0.8375	104.0	66.57	57.00	6	6	37.38	66.57	57.00	0.0	0.0
16	11.50	0.6508	109.0	72.91	62.00	6	6	42.38	72.91	62.00	0.0	0.0
17	11.00	0.4809	114.0	78.93	67.00	6	6	47.38	78.93	67.00	0.0	0.0
18	10.50	0.3007	119.0	84.29	72.00	6	6	52.38	84.29	72.00	0.0	0.0
19	10.00	0.0	124.0	89.63	77.00	6	6					
	57.38	89.63	77.00	0.0	0.0							

** Wall toe level: *15.00*

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	21.30	-3.449	73.36	-71.67	43.11

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	83.27	83.27	0.0	83.27

STAGE 5 : CHANGE TO DRAINED

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	8.000	32.50	65470.	1
2	19.50	4	0	8.000	32.50	65470.	2
3	19.00	4	0	8.000	32.50	65470.	3
4	18.50	4	0	8.000	32.50	65470.	4
5	18.00	4	0	8.000	32.50	65470.	5
6	17.25	4	0	8.000	32.50	65470.	6
7	16.75	4	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
** 10	*15.00*	*3*	*3*	*8.000*	*32.50*	*0.0*	*10*
11	14.25	3	3	8.000	32.50	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14

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15	12.00	6	6	0.000	32.50	0.0	15
16	11.50	6	6	0.000	32.50	0.0	16
17	11.00	6	6	0.000	32.50	0.0	17
18	10.50	6	6	0.000	32.50	0.0	18
19	10.00	6	6	0.000	32.50	0.0	19

** Wall toe level: 15.00

Convergence control parameters
Maximum number of iterations : 10000
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 5 : Change to drained

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 110000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.3306	6	25.70	9
2	0.3000	6	0.2580	8	19.78	9
3	0.6000	6	0.2728	10	14.77	10
4	0.8000	7	0.2286	10	12.45	10
5	1.000	7	0.1781	10	9.700	10
10	1.600	9	0.1542	10	4.220	10
15	2.400	10	0.1481	10	4.100	10
20	3.100	10	0.1423	10	3.960	10
30	4.500	10	0.1304	10	3.630	10
40	5.700	10	0.1196	10	3.330	10
50	6.900	10	0.1098	10	3.060	10
60	7.900	10	0.1007	10	2.800	10
70	8.900	10	0.09240	10	2.570	10
80	9.800	10	0.08480	10	2.360	10
90	10.60	10	0.07780	10	2.170	10
100	11.30	10	0.07140	10	1.990	10
120	12.70	10	0.06010	10	1.670	10
140	13.80	10	0.05066	10	1.410	10
150	14.30	10	0.04640	10	1.290	10
160	14.70	10	0.04260	10	1.190	10
180	15.50	10	0.03590	10	1.000	10
200	16.20	10	0.03020	10	0.8400	10
250	17.40	10	0.01970	10	0.5500	10
300	18.20	10	0.01280	10	0.3600	10
350	18.70	10	0.008300	10	0.2300	10
400	19.00	10	0.005400	10	0.1500	10
448	19.30	10	0.003600	10	0.1000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [cm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	19.85	21.00	17.27	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	21.96	36.00	25.04	0.0	4	0	0.0	0.0	0.0	-8.637	18.05
	19.50										-8.637	-74.58
3	19.00	23.00	41.50	31.20	0.0	4	0	0.0	0.0	0.0	23.96	-57.39
4	18.50	23.97	44.63	32.40	3.375	4	0	0.0	0.0	0.0	48.65	-40.44
5	18.00	24.77	47.25	31.82	6.750	4	0	0.0	0.0	0.0	64.40	-19.45
6	17.25	25.51	51.19	33.13	11.81	4	0	0.0	0.0	0.0	69.85	6.650
7	16.75	25.68	53.81	26.01	15.19	4	7	0.5625	4.312	0.7500	59.60	31.54
8	16.00	25.54	60.75	0.8230	20.25	3	3	2.375	23.88	12.00	27.80	37.77
9	15.50	25.30	67.38	2.595	23.63	A	3	4.875	28.06	19.50	11.23	27.80
** 10	15.00	25.01	74.00	4.319	27.00	A	3	7.375	49.27	27.00	0.0	0.0
11	14.25	3.318	81.50	55.96	34.50		3	14.88	55.96	34.50	0.0	0.0
12	13.75	2.061	86.50	47.85	39.50		6	19.88	47.85	39.50	0.0	0.0
13	13.00	1.300	94.00	56.16	47.00		6	27.38	56.16	47.00	0.0	0.0
14	12.50	1.021	99.00	61.53	52.00		6	32.38	61.53	52.00	0.0	0.0
15	12.00	0.8126	104.0	67.53	57.00		6	37.38	67.53	57.00	0.0	0.0
16	11.50	0.6309	109.0	73.73	62.00		6	42.38	73.73	62.00	0.0	0.0
17	11.00	0.4645	114.0	79.87	67.00		6	47.38	79.87	67.00	0.0	0.0
18	10.50	0.2891	119.0	85.52	72.00		6	52.38	85.52	72.00	0.0	0.0
19	10.00	0.0	124.0	89.63	77.00		6					
	57.38	89.63	77.00	0.0	0.0							

** Wall toe level: 15.00

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	25.68	-8.637	73.36	-74.58	43.11

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	92.61	92.61	0.0	92.61

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 110000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.

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1	0.0	0	2.356	6	2.850	10
2	2.400	6	0.006208	5	0.0	10
3	2.400	6	0.07620	9	11.06	10
4	2.400	6	0.0	9	0.0	10

Ground level left = 20.50 **Ground level right = 17.00**

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Va [kPa]	Pa [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	18.44	21.00	25.06	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	20.05	36.00	25.53	0.0	4	0	0.0	0.0	0.0	-12.53	22.11
	19.50										-12.53	-62.57
3	19.00	20.90	41.38	31.86	0.0	4	0	0.0	0.0	0.0	13.96	-45.03
4	18.50	21.70	43.00	31.96	5.000	4	0	0.0	0.0	5.000	32.49	-29.07
5	18.00	22.37	44.00	30.28	10.00	4	0	0.0	0.0	10.00	43.03	-11.62
6	17.25	23.09	45.50	29.44	17.50	4	0	0.0	0.0	17.50	44.65	7.045
7	16.75	23.36	46.50	31.53	22.50	4	7	0.2500	3.453	22.50	36.53	21.49
8	16.00	23.53	51.00	9.226	30.00	▲	3	3	4.375	18.52	30.00	15.87	23.39
9	15.50	23.55	56.00	9.370	35.00	▲	3	3	9.375	21.83	35.00	6.252	15.87
** 10	*15.00*	*23.55*	*61.00*	*33.81*	*40.00*	▲	3	3	*14.37*	*33.81*	*40.00*	*0.0*	*0.0*
11	14.25	2.560	68.50	55.36	47.50		3	3	21.88	55.36	47.50	0.0	0.0
12	13.75	1.590	73.50	48.62	52.50		6	6	26.88	48.62	52.50	0.0	0.0
13	13.00	1.001	81.00	56.58	60.00		6	6	34.38	56.58	60.00	0.0	0.0
14	12.50	0.7792	86.00	61.86	65.00		6	6	39.38	61.86	65.00	0.0	0.0
15	12.00	0.6137	91.00	67.70	70.00		6	6	44.38	67.70	70.00	0.0	0.0
16	11.50	0.4708	96.00	73.78	75.00		6	6	49.38	73.78	75.00	0.0	0.0
17	11.00	0.3425	101.0	79.84	80.00		6	6	54.38	79.84	80.00	0.0	0.0
18	10.50	0.2127	106.0	85.32	85.00		6	6	59.38	85.32	85.00	0.0	0.0
19	10.00	0.0	111.0	88.65	90.00		6	6					
	64.38	88.85	98.00	0.0	0.0								

** Wall toe level: 15.00

EXTREME values so far:-

Displacements (mm)		Moments (kNm/m)		Shears (kN/m)	
Min	Max	Min	Max	Min	Max
0.0	25.68	-12.53	73.36	-74.58	43.11

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	84.67	84.67	0.0	92.61

Results Envelope

Node	Level [m]	Displacements (mm) Min	Max	Moments (kNm/m) Min	Max	Shears (kN/m) Min	Max
1	20.50	0.0	21.30	0.0	0.0	0.0	0.0
2	19.50	0.0	21.94	-12.53	3.261	-74.58	22.11
3	19.00	0.0	23.00	0.0	28.31	-57.25	0.0
4	18.50	0.0	23.97	0.0	52.74	-40.44	0.0
5	18.00	0.0	24.77	0.0	68.41	-19.45	0.0
6	17.25	0.0	25.51	0.0	73.36	0.0	9.332
7	16.75	0.0	25.68	0.0	60.75	0.0	18.61
8	16.00	0.0	25.54	0.0	27.80	0.0	33.11
9	15.50	0.0	25.30	0.0	11.23	0.0	27.80
10	*15.00*	*0.0*	*25.01*	*0.0*	*0.0*	*0.0*	*0.0*
11	14.25	0.0	3.440	0.0	0.0	0.0	0.0
12	13.75	0.0	2.137	0.0	0.0	0.0	0.0
13	13.00	0.0	1.344	0.0	0.0	0.0	0.0
14	12.50	0.0	1.053	0.0	0.0	0.0	0.0
15	12.00	0.0	0.8375	0.0	0.0	0.0	0.0
16	11.50	0.0	0.6508	0.0	0.0	0.0	0.0
17	11.00	0.0	0.4909	0.0	0.0	0.0	0.0
18	10.50	0.0	0.3007	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	TE/28	

Member/Location

Job Title: Shell Covib Terminal.

Drg. Ref.

Made by CH Date Nov 29/2003 Chd. CH.

As a final design check model pond 10 ults.fem was re-run for the case with greater toe embedment in the mineral soil to determine the beneficial effect on deeper penetration on the structural design of the sheet piles and tie rods.

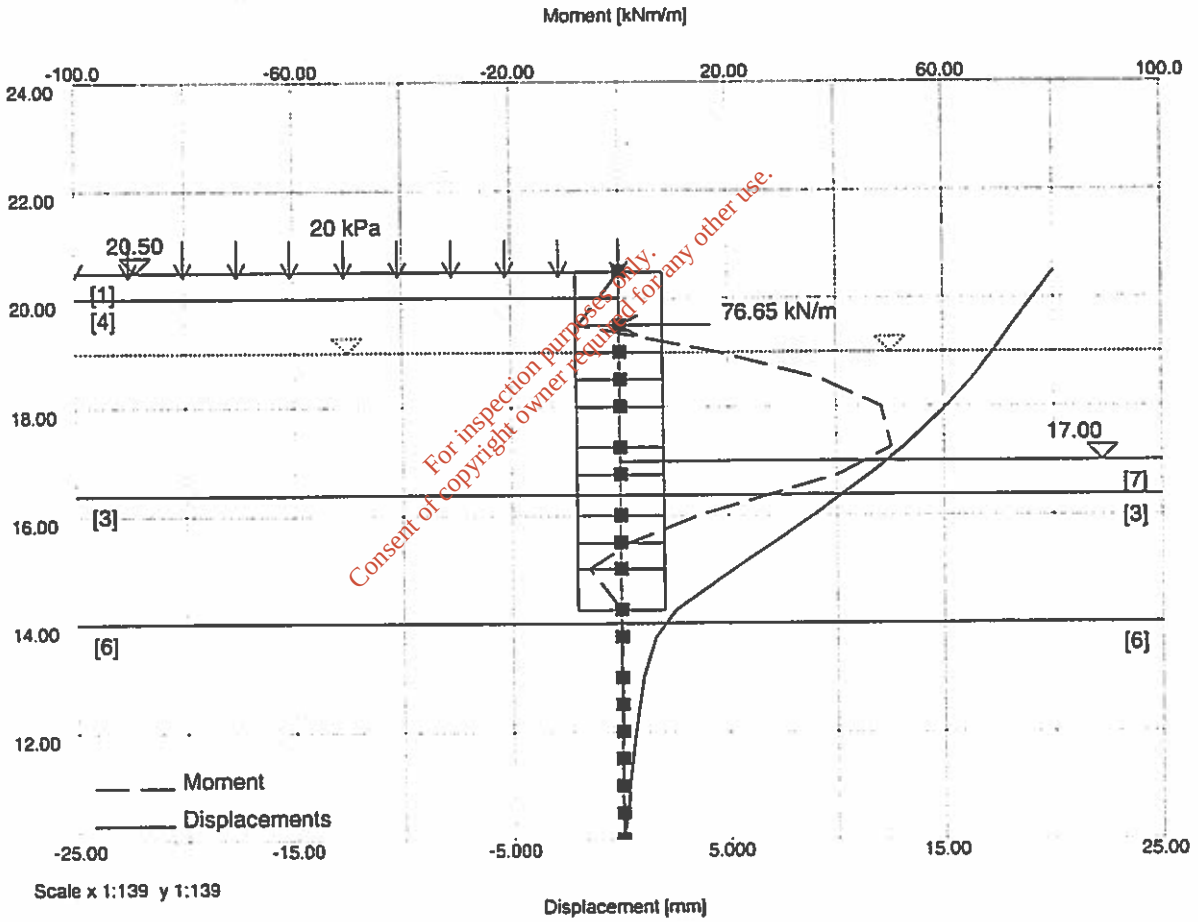
Results of FREW runs pond 11 ults.fem are shown on sheets TE/30 to TE/37. In this analysis the toe embedment is 2.1m into the mineral soil.

There is no significant difference between the results of pond 10 ults and pond 11 ults, so in terms of loading on the sheet piles and tie rods there is no benefit to be gained from driving the sheet piles deeper than that required for stability.

A summary of all the FREW contained in this Appendix is given on Sheet TE/38.

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STAGE 6 : Fill the pond

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INITIAL DATA

Soil properties

No.	Unit Wt [kN/m³]	K0	Ka	Kp	Kac	Kpc	Kr	Earth pressure coefficients.
1	20.00	0.5000	0.3300	3.000	1.150	3.460	0.3300	User_Specified
2	12.00	1.000	0.3100	3.250	1.110	3.610	0.3300	User_Specified
3	20.00	1.000	0.2700	4.850	1.040	4.400	0.3300	Calculated
4	12.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
5	20.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified
6	20.00	1.000	0.3300	3.000	1.150	3.460	0.2500	User_Specified
7	11.00	1.000	0.3100	3.250	1.150	3.460	0.3300	User_Specified
8	11.00	1.000	1.000	1.000	2.000	2.000	1.000	User_Specified

No.	c0 [kPa]	y0 [m]	Gradient of c [kPa/m]	E0 [kPa]	Gradient of E [kPa/m]
1	0.0	0.0	0.0	45000.	0.0
2	3.000	20.00	0.0	500.0	0.0
3	1.000	17.00	0.0	7500.	5010.
4	25.00	20.00	0.0	2500.	0.0
5	25.00	17.00	16.70	12500.	8350.
6	0.0	0.0	0.0	75000.	0.0
7	3.000	0.0	0.0	400.0	0.0
8	3.000	0.0	0.0	466.0	0.0

Parameters used to calculate Earth pressure coefficients

No.	Phi [°]	Delta/Phi Ratio	Beta [°]	Cw/C Ratio
3	32.00	0.5000	0.0	0.0

Surcharge properties

No.	Stage In	Stage Out	Side	Level [m]	Pressure [kPa]	Offset [m]	Width [m]	Ka
1	2	-	Left	20.40	20.00			

Strut properties

No.	Stage In	Stage Out	Node	Prestress [kN/m]	Stiffness [kN/m/m]	Angle [°]	Lever arm [m]
1	1	-	2	0.0	4222.	0.0	0.0

STAGE 0 : INITIAL CONDITION

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	8.000	32.50	65470.	1
2	19.50	2	7	8.000	32.50	65470.	2
3	19.00	2	7	8.000	32.50	65470.	3
4	18.50	2	7	8.000	32.50	65470.	4
5	18.00	2	7	8.000	32.50	65470.	5
6	17.25	2	7	8.000	32.50	65470.	6
7	16.75	2	7	8.000	32.50	65470.	7
8	16.00	3	3	8.000	32.50	65470.	8
9	15.50	3	3	8.000	32.50	65470.	9
10	15.00	3	3	8.000	32.50	65470.	10
** 11	*14.25*	3	3	*8.000*	*32.50*	0.0	11
12	13.75	6	6	8.000	32.50	0.0	12
13	13.00	6	6	8.000	32.50	0.0	13
14	12.50	6	6	8.000	32.50	0.0	14
15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: *14.25*

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Analysis details
SAFE model with redistribution
and without friction at wall/soil interface

	Left	Right
E profile Generated		
Boundary distances [m] :	8.000	32.50

Convergence control parameters
Maximum number of iterations : 900
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 0 : Initial condition

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 300. E at bottom node = 63000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 63000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	6.194	5	0.0	0
2	6.200	5	0.0	5	0.0	0
3	6.200	5	0.0	5	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	0.04264	5.000	2.431	0.0	1	1	5.000	2.431	0.0	0.0	0.0
2	19.50	5.054	16.00	15.61	0.0	2	7	15.50	15.61	0.0	0.0	0.0
3	19.00	5.730	21.38	20.70	0.0	2	7	20.38	20.70	0.0	0.0	0.0
4	18.50	6.191	23.00	22.04	5.000	2	7	21.50	22.04	5.000	0.0	0.0

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5	18.00	6.194	24.00	22.76	10.00	2	7	22.00	22.76	10.00	0.0	0.0
6	17.25	5.768	25.50	23.85	17.50	2	7	22.75	23.85	17.50	0.0	0.0
7	16.75	4.252	26.50	24.61	22.50	2	7	23.25	24.61	22.50	0.0	0.0
8	16.00	1.567	31.00	28.25	30.00	3	3	27.37	28.25	30.00	0.0	0.0
9	15.50	0.5006	36.00	33.54	35.00	3	3	32.37	33.54	35.00	0.0	0.0
10	15.00	0.6368	41.00	38.64	40.00	3	3	37.37	38.64	40.00	0.0	0.0
11	14.25	0.3854	48.50	46.28	47.50	3	3	44.87	46.28	47.50	0.0	0.0
12	13.75	0.2564	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.1705	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.1357	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.1097	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.08602	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00											
	0.06387	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0	
18	10.50	0.04135	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	5.755E-6	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

NOTE: Displacements from STAGE 0 are disregarded in later stages

STAGE 1 : INSTALL WALL

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	1	0.000	32.50	65470.	1
2	19.50	4	8	0.000	32.50	65470.	2
3	19.00	4	8	0.000	32.50	65470.	3
4	18.50	4	8	0.000	32.50	65470.	4
5	18.00	4	8	0.000	32.50	65470.	5
6	17.25	4	8	0.000	32.50	65470.	6
7	16.75	4	8	0.000	32.50	65470.	7
8	16.00	5	5	0.000	32.50	65470.	8
9	15.50	5	5	0.000	32.50	65470.	9
10	15.00	5	5	0.000	32.50	65470.	10
** 11	*14.25*	*5*	*5*	*0.000*	*32.50*	*0.0*	*11*
12	13.75	6	6	0.000	32.50	0.0	12
13	13.00	6	6	0.000	32.50	0.0	13
14	12.50	6	6	0.000	32.50	0.0	14
15	12.00	6	6	0.000	32.50	0.0	15
16	11.50	6	6	0.000	32.50	0.0	16
17	11.00	6	6	0.000	32.50	0.0	17
18	10.50	6	6	0.000	32.50	0.0	18
19	10.00	6	6	0.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 1 : Install wall

Surcharge or strut changes

Strut no 1 inserted at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.0	0	0.0	0
2	0.0	0	0.0	0	0.0	0
3	0.0	0	0.0	0	0.0	0

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	P [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	M [kNm/m]	Shear [kN/m]
1	20.50	0.0	5.000	2.431	0.0	1	1	5.000	2.431	0.0	0.0	0.0
2	19.50	0.0	16.00	15.61	0.0	4	8	15.50	15.61	0.0	0.0	0.0
	19.50										0.0	0.0
3	19.00	0.0	21.38	20.70	0.0	4	8	20.38	20.70	0.0	0.0	0.0
4	18.50	0.0	23.00	22.04	5.000	4	8	21.50	22.04	5.000	0.0	0.0
5	18.00	0.0	24.00	22.76	10.00	4	8	22.00	22.76	10.00	0.0	0.0
6	17.25	0.0	25.50	23.85	17.50	4	8	22.75	23.85	17.50	0.0	0.0
7	16.75	0.0	26.50	24.61	22.50	4	8	23.25	24.61	22.50	0.0	0.0
8	16.00	0.0	31.00	28.25	30.00	5	5	27.37	28.25	30.00	0.0	0.0
9	15.50	0.0	36.00	33.54	35.00	5	5	32.37	33.54	35.00	0.0	0.0
10	15.00	0.0	41.00	38.64	40.00	5	5	37.37	38.64	40.00	0.0	0.0
** 11	*14.25*	*0.0*	*48.50*	*46.28*	*47.50*	*5*	*5*	*44.87*	*46.28*	*47.50*	*0.0*	*0.0*
12	13.75	0.0	53.50	50.78	52.50	6	6	49.87	50.78	52.50	0.0	0.0
13	13.00	0.0	61.00	58.57	60.00	6	6	57.37	58.57	60.00	0.0	0.0
14	12.50	0.0	66.00	63.71	65.00	6	6	62.37	63.71	65.00	0.0	0.0
15	12.00	0.0	71.00	68.81	70.00	6	6	67.38	68.81	70.00	0.0	0.0
16	11.50	0.0	76.00	73.92	75.00	6	6	72.38	73.92	75.00	0.0	0.0
17	11.00	0.0	81.00	79.02	80.00	6	6	77.38	79.02	80.00	0.0	0.0
18	10.50	0.0	86.00	84.07	85.00	6	6	82.38	84.07	85.00	0.0	0.0
19	10.00	0.0	91.00	89.19	90.00	6	6	87.38	89.19	90.00	0.0	0.0

** Wall toe level: 14.25
WARNING - Residual moment > 1% of peak moment in wall

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	0.0	0.0	0.0	0.0	0.0

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	0.0	0.0	0.0	0.0

STAGE 2 : ADD 16KPA SURCHARGE

RESULTS FOR STAGE 2 : Add 16kPa surcharge

Surcharge or strut changes

Surcharge no. 1 applied at this stage

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa

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On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	5.438	4	0.0	0
2	5.400	4	1.792	1	26.80	1
3	6.700	1	0.6964	1	10.42	1
4	7.400	1	0.2707	1	4.050	1
5	7.600	1	0.1052	1	1.570	1
6	7.800	1	0.006200	1	0.04000	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	7.799	21.00	6.894	0.0	A 1	1	5.000	13.25	0.0	0.0	0.0
2	19.50	7.341	36.00	30.55	0.0	4	8	15.50	16.03	0.0	3.155	2.244
	19.50										3.155	-28.75
3	19.00	7.091	41.38	36.23	0.0	4	8	20.38	21.20	0.0	14.85	-19.55
4	18.50	6.786	43.00	37.54	5.000	4	8	21.50	22.57	5.000	22.75	-12.05
5	18.00	6.397	44.00	37.81	10.00	4	8	22.00	23.42	10.00	26.51	-3.815
6	17.25	5.625	45.50	35.86	17.50	4	8	22.75	24.32	17.50	26.40	5.533
7	16.75	4.988	46.50	38.84	22.50	4	8	23.25	25.59	22.50	21.21	14.53
8	16.00	3.894	51.00	26.55	30.00	5	5	27.37	33.85	30.00	7.205	16.51
9	15.50	3.122	56.00	25.99	35.00	5	5	32.37	43.90	35.00	0.02945	9.874
10	15.00	2.347	61.00	35.03	40.00	5	5	37.37	49.36	40.00	-2.669	0.9191
** 11	*14.25*	*1.197*	*68.50*	*57.76*	*47.50*	*5*	*5*	*44.87*	*52.06*	*47.50*	*0.0*	*0.0*
12	13.75	0.7264	73.50	52.19	52.50	6	6	49.87	52.19	52.50	0.0	0.0
13	13.00	0.4394	81.00	60.57	60.00	6	6	57.37	60.57	60.00	0.0	0.0
14	12.50	0.3352	86.00	66.12	65.00	6	6	62.37	66.12	65.00	0.0	0.0
15	12.00	0.2623	91.00	71.41	70.00	6	6	67.38	71.41	70.00	0.0	0.0
16	11.50	0.2015	96.00	76.79	75.00	6	6	72.38	76.79	75.00	0.0	0.0
17	11.00	0.1478	101.0	82.18	80.00	6	6	77.38	82.18	80.00	0.0	0.0
18	10.50	0.09358	106.0	87.14	85.00	6	6	82.38	87.14	85.00	0.0	0.0
19	10.00	0.0	111.0	91.69	90.00	6	6	87.38	91.69	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	7.799	-2.669	26.91	-28.75	16.51

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	31.00	31.00	0.0	31.00

STAGE 3 : DEWATER THE POND SIDE

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00
2	14.25	34.50	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	16.80	0.0	10.00
2	14.25	34.50	10.00

RESULTS FOR STAGE 3 : Dewater the pond side

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 280. E at bottom node = 70000. kPa

Iter no.	Inc max displ [mm]	Node no.	Disp error. [mm]	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.002400	1	0.04000	1
2	0.0	1	900.0E-6	1	0.01000	1
3	0.0	1	400.0E-6	1	0.0	1

Ground level left = 20.50 Ground level right = 20.50

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	7.803	21.00	6.928	0.0	A 1	1	5.000	13.30	0.0	0.0	0.0
2	19.50	7.344	36.00	30.54	0.0	4	8	15.50	16.03	0.0	3.185	2.257
	19.50										3.185	-28.75
3	19.00	7.093	41.55	36.39	0.0	4	8	21.00	21.83	0.0	14.84	-19.55
4	18.50	6.788	44.37	38.90	3.632	4	8	26.50	27.57	0.0	22.74	-12.06
5	18.00	6.398	46.74	40.54	7.263	4	8	32.00	33.42	0.0	26.89	-3.820
6	17.25	5.626	50.28	44.65	12.71	4	8	40.25	41.82	0.0	26.39	5.531
7	16.75	4.988	52.66	44.99	16.34	4	8	43.80	46.14	0.6765	21.20	14.53
8	16.00	3.894	58.21	35.15	21.79	5	5	46.55	53.03	10.82	7.196	16.51
9	15.50	3.122	65.58	35.57	25.42	5	5	49.79	61.32	17.59	0.02247	9.869
10	15.00	2.347	71.95	45.97	29.05	5	5	53.02	65.00	24.35	-2.673	0.9136
** 11	*14.25*	*1.197*	*81.50*	*70.76*	*34.50*	*5*	*5*	*57.87*	*65.06*	*34.50*	*0.0*	*0.0*
12	13.75	0.7264	86.50	55.44	39.50	6	6	62.87	55.44	39.50	0.0	0.0
13	13.00	0.4394	94.00	63.82	47.00	6	6	70.38	63.82	47.00	0.0	0.0
14	12.50	0.3352	99.00	69.37	52.00	6	6	75.38	69.37	52.00	0.0	0.0
15	12.00	0.2623	104.0	74.66	57.00	6	6	80.38	74.66	57.00	0.0	0.0
16	11.50	0.2015	109.0	80.04	62.00	6	6	85.38	80.04	62.00	0.0	0.0
17	11.00	0.1478	114.0	85.43	67.00	6	6	90.38	85.43	67.00	0.0	0.0
18	10.50	0.09358	119.0	90.39	72.00	6	6	95.38	90.39	72.00	0.0	0.0
19	10.00	0.0	124.0	94.94	77.00	6	6	100.4	94.94	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	7.803	-2.673	26.91	-28.75	16.51

Surcharge 1 present in this stage

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STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	31.01	31.01	0.0	31.01

STAGE 4 : EXCAVATE POND

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	0.000	32.50	65470.	1
2	19.50	4	0	0.000	32.50	65470.	2
3	19.00	4	0	0.000	32.50	65470.	3
4	18.50	4	0	0.000	32.50	65470.	4
5	18.00	4	0	0.000	32.50	65470.	5
6	17.25	4	0	0.000	32.50	65470.	6
7	16.75	4	8	0.000	32.50	65470.	7
8	16.00	5	5	0.000	32.50	65470.	8
9	15.50	5	5	0.000	32.50	65470.	9
10	15.00	5	5	0.000	32.50	65470.	10
** 11	14.25	5	5	0.000	32.50	0.0	11
12	13.75	6	6	0.000	32.50	0.0	12
13	13.00	6	6	0.000	32.50	0.0	13
14	12.50	6	6	0.000	32.50	0.0	14
15	12.00	6	6	0.000	32.50	0.0	15
16	11.50	6	6	0.000	32.50	0.0	16
17	11.00	6	6	0.000	32.50	0.0	17
18	10.50	6	6	0.000	32.50	0.0	18
19	10.00	6	6	0.000	32.50	0.0	19

** Wall toe level: 14.25

RESULTS FOR STAGE 4 : Excavate pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 70000. kPa
On the RIGHT: E at ground level = 1600. E at bottom node = 110000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error (mm)	Node no.	Press error (kPa)	Node no.
1	0.0	0	8.407	4	0.0	1
2	8.400	4	3.156	1	42.41	1
3	10.60	1	1.367	1	18.34	1
4	12.00	1	0.5943	1	7.940	1
5	12.60	1	0.2590	1	3.450	1
10	13.10	1	0.004400	1	0.03000	1

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Ve [kPa]	Pe [kPa]	U [kPa]	Soil Left	Soil Right	Ve [kPa]	Pe [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	20.87	21.00	6.904	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	19.37	36.00	22.07	0.0	4	0	0.0	0.0	0.0	-3.452	11.73
	19.50										-3.452	-70.07
3	19.00	18.62	41.55	26.15	0.0	4	0	0.0	0.0	0.0	27.45	-54.40
4	18.50	17.77	44.37	31.69	3.632	4	0	0.0	0.0	0.0	50.95	-38.17
5	18.00	16.73	46.74	32.63	7.263	4	0	0.0	0.0	0.0	65.62	-16.87
6	17.25	14.71	50.29	38.27	12.71	4	0	0.0	0.0	0.0	68.82	11.53
7	16.75	13.04	52.66	35.80	16.34	4	8	0.7950	6.796	0.6765	55.19	41.02
8	16.00	10.20	59.21	1.107	21.79	5	5	3.551	39.52	10.82	14.26	65.88
9	15.50	8.202	65.58	-0.007671	25.42	A 5	5	6.787	56.04	17.54	-4.330	25.12
10	15.00	6.217	71.95	4.400	29.05	5	5	10.02	53.18	24.35	-10.26	-0.7087
** 11	14.25	3.297	81.50	54.62	34.50	5	5	14.87	31.45	34.50	0.0	0.0
12	13.75	2.099	86.50	44.46	39.50	6	6	19.88	44.46	39.50	0.0	0.0
13	13.00	1.336	94.00	54.27	47.00	6	6	27.38	54.27	47.00	0.0	0.0
14	12.50	1.051	99.00	60.25	52.00	6	6	32.38	60.25	52.00	0.0	0.0
15	12.00	0.8377	104.0	66.46	57.00	6	6	37.38	66.46	57.00	0.0	0.0
16	11.50	0.6514	109.0	72.88	62.00	6	6	42.38	72.88	62.00	0.0	0.0
17	11.00	0.4817	114.0	78.90	67.00	6	6	47.38	78.90	67.00	0.0	0.0
18	10.50	0.3015	119.0	84.24	72.00	6	6	52.38	84.24	72.00	0.0	0.0
19	10.00	0.0	124.0	89.63	77.00	6	6	57.38	89.63	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
0.0	20.87	-10.86	68.92	-70.07	65.88

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	81.80	81.80	0.0	81.80

STAGE 5 : CHANGE TO DRAINED

Geometry

Node	Level [m]	Soil Left	Soil Right	Boundary Left	Boundary Right	EI below node [kNm2/m]	Node
1	20.50	1	0	0.000	32.50	65470.	1
2	19.50	4	0	0.000	32.50	65470.	2
3	19.00	4	0	0.000	32.50	65470.	3
4	18.50	4	0	0.000	32.50	65470.	4
5	18.00	4	0	0.000	32.50	65470.	5
6	17.25	4	0	0.000	32.50	65470.	6
7	16.75	4	7	0.000	32.50	65470.	7
8	16.00	3	3	0.000	32.50	65470.	8
9	15.50	3	3	0.000	32.50	65470.	9
10	15.00	3	3	0.000	32.50	65470.	10
** 11	14.25	3	3	0.000	32.50	0.0	11
12	13.75	6	6	0.000	32.50	0.0	12
13	13.00	6	6	0.000	32.50	0.0	13
14	12.50	6	6	0.000	32.50	0.0	14

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15	12.00	6	6	8.000	32.50	0.0	15
16	11.50	6	6	8.000	32.50	0.0	16
17	11.00	6	6	8.000	32.50	0.0	17
18	10.50	6	6	8.000	32.50	0.0	18
19	10.00	6	6	8.000	32.50	0.0	19

** Wall toe level: 14.25

Convergence control parameters
Maximum number of iterations : 10000
Tolerance for displacement convergence [mm] : 0.01000
Tolerance for pressure convergence [kPa] : 0.1000
Damping coefficient : 1.000
Maximum incremental displacement [m] : 1.000

RESULTS FOR STAGE 5 : Change to drained

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 110000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error [kPa]	Node no.
1	0.0	0	0.2199	6	18.73	6
2	0.2000	6	0.2073	6	13.71	6
3	0.4000	6	0.1669	6	9.220	10
4	0.6000	6	0.1223	6	6.300	10
5	0.7800	6	0.08510	6	4.010	10
10	1.800	6	0.01110	5	0.2900	10
13	1.000	6	0.003500	4	0.05000	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	21.52	21.00	6.910	0.0	A 1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	20.16	36.00	21.73	0.0	4	0	0.0	0.0	0.0	-3.455	11.61
	19.50										-3.455	-73.51
3	19.00	19.48	41.55	28.78	0.0	4	0	0.0	0.0	0.0	29.23	-58.06
4	18.50	18.68	44.37	31.22	3.632	4	0	0.0	0.0	0	54.60	-42.04
5	18.00	17.65	46.74	31.96	7.263	4	0	0.0	0.0	0.0	71.26	-21.07
6	17.25	15.65	50.29	37.43	12.71	4	0	0.0	0.0	0.0	77.87	6.860
7	16.75	14.00	52.66	34.48	16.34	4	7	0.7950	7.[illegible]	[illegible]6765	66.60	35.57
8	16.00	11.03	56.21	0.7188	21.75	A 3	3	3.551	20.47	10.82	30.14	43.68
9	15.50	8.888	65.58	2.423	25.42	A 3	3	6.787	27.34	17.59	10.77	31.98
10	15.00	6.697	71.95	4.114	29.05	A 3	3	10.02	33.06	24.35	-1.835	11.38
** 11	14.25	3.409	81.50	51.34	34.50	3	3	14.87	42.43	34.50	0.0	0.0
12	13.75	2.108	86.50	45.92	39.50	6	6	15.38	45.92	39.50	0.0	0.0
13	13.00	1.326	94.00	55.09	47.00	6	6	27.38	55.09	47.00	0.0	0.0
14	12.50	1.041	99.00	60.76	52.00	6	6	32.38	60.76	52.00	0.0	0.0
15	12.00	0.8284	104.0	66.87	57.00	6	6	37.38	66.87	57.00	0.0	0.0
16	11.50	0.6431	109.0	73.22	62.00	6	6	42.38	73.22	62.00	0.0	0.0
17	11.00	0.4736	114.0	79.38	67.00	6	6	47.38	79.38	67.00	0.0	0.0
18	10.50	0.2950	119.0	84.93	72.00	6	6	52.38	84.93	72.00	0.0	0.0
19	10.00	0.0	124.0	89.63	77.00	6	6	57.38	89.63	77.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	21.52	-10.86	77.87	-73.51	43.68

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force [kN/m]	Horiz force [kN/m]	Moment [kNm/m]	Max strut force [kN/m]
1	2	85.12	85.12	0.0	85.12

STAGE 6 : FILL THE POND

Water data on LEFT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

Water data on RIGHT side

No.	Level [m]	Pressure [kPa]	Unit wt. [kN/m³]
1	19.00	0.0	10.00

RESULTS FOR STAGE 6 : Fill the pond

Calculation details
E Profiles assumed for calculation (generated):
On the LEFT: E at ground level = 1500. E at bottom node = 62000. kPa
On the RIGHT: E at ground level = 240. E at bottom node = 110000. kPa

Iter no.	Inc max displ (mm)	Node no.	Disp error. (mm)	Node no.	Press error [kPa]	Node no.
1	0.0	0	2.507	6	2.370	10
2	2.500	6	0.005100	5	0.0	10
3	2.500	6	0.05530	7	9.770	10
4	2.600	6	0.0	7	0.0	10

Ground level left = 20.50 Ground level right = 17.00

Node	Level [m]	Disp [mm]	Va [kPa]	Pa [kPa]	U [kPa]	Soil Left	Soil Right	Vs [kPa]	Ps [kPa]	U [kPa]	BM [kNm/m]	Shear [kN/m]
1	20.50	20.02	21.00	15.27	0.0	1	0	0.0	0.0	0.0	0.0	0.0
2	19.50	18.15	36.00	22.37	0.0	4	0	0.0	0.0	0.0	-7.634	15.98
	19.50										-7.634	-60.66
3	19.00	17.24	41.38	29.55	0.0	4	0	0.0	0.0	0.0	18.52	-44.93
4	18.50	16.26	43.00	31.13	5.000	4	0	0.0	0.0	5.000	37.29	-29.76
5	18.00	15.15	44.00	31.06	10.00	4	0	0.0	0.0	10.00	48.28	-12.27
6	17.25	13.13	45.50	34.78	17.50	4	0	0.0	0.0	17.50	50.20	8.308
7	16.75	11.56	46.50	31.37	22.50	4	7	0.2500	6.119	22.50	40.61	27.07
8	16.00	8.936	51.00	6.070	30.00	a 3	3	4.375	21.22	30.00	14.39	38.22

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9	15.50	7.101	56.00	9.141	35.00	a	3	3	9.375	30.12	35.00	1.650	20.24
10	15.00	5.258	61.00	9.914	40.00	a	3	3	14.37	46.39	40.00	-5.849	3.599
** 11	*14.25*	*2.518*	*68.50*	*54.80*	*47.50*		*3*	*3*	*21.88*	*42.32*	*47.50*	*0.0*	*0.0*
12	13.75	1.585	73.50	46.86	52.50		6	6	26.88	46.86	52.50	0.0	0.0
13	13.00	1.003	81.00	55.64	60.00		6	6	34.38	55.64	60.00	0.0	0.0
14	12.50	0.7836	86.00	61.19	65.00		6	6	39.38	61.19	65.00	0.0	0.0
15	12.00	0.6185	91.00	67.12	70.00		6	6	44.38	67.12	70.00	0.0	0.0
16	11.50	0.4750	96.00	73.35	75.00		6	6	49.38	73.35	75.00	0.0	0.0
17	11.00	0.3464	101.0	79.35	80.00		6	6	54.38	79.35	80.00	0.0	0.0
18	10.50	0.2156	106.0	84.75	85.00		6	6	59.38	84.75	85.00	0.0	0.0
19	10.00	0.0	111.0	88.85	90.00		6	6	64.38	88.85	90.00	0.0	0.0

** Wall toe level: 14.25

EXTREME values so far:-

Displacements [mm]		Moments [kNm/m]		Shears [kN/m]	
Min	Max	Min	Max	Min	Max
0.0	21.52	-10.86	77.87	-73.51	45.88

Surcharge 1 present in this stage

STRUT FORCES

No.	Node no.	Strut force (kN/m)	Horiz force (kN/m)	Moment (kNm/m)	Max strut force (kN/m)
1	2	76.65	76.65	0.0	85.12

Results Envelope

Node	Level [m]	Displacements [mm] Min	Max	Moments [kNm/m] Min	Max	Shears [kN/m] Min	Max
1	20.50	0.0	21.52	0.0	0.0	0.0	0.0
2	19.50	0.0	20.16	-7.634	3.159	-73.51	15.98
3	19.00	0.0	19.48	0.0	29.23	-58.06	0.0
4	18.50	0.0	18.68	0.0	54.60	-42.04	0.0
5	18.00	0.0	17.69	0.0	71.26	-21.07	0.0
6	17.25	0.0	15.69	0.0	77.87	0.0	11.53
7	16.75	0.0	14.00	0.0	66.60	0.0	41.02
8	16.00	0.0	11.03	0.0	30.14	0.0	45.88
9	15.50	0.0	8.888	-4.330	10.77	0.0	31.58
10	15.00	0.0	6.697	-10.86	0.0	-0.7087	11.38
11	*14.25*	*0.0*	*3.409*	*0.0*	*0.0*	*0.0*	*0.0*
12	13.75	0.0	2.108	0.0	0.0	0.0	0.0
13	13.00	0.0	1.336	0.0	0.0	0.0	0.0
14	12.50	0.0	1.051	0.0	0.0	0.0	0.0
15	12.00	0.0	0.8377	0.0	0.0	0.0	0.0
16	11.50	0.0	0.6514	0.0	0.0	0.0	0.0
17	11.00	0.0	0.4817	0.0	0.0	0.0	0.0
18	10.50	0.0	0.3015	0.0	0.0	0.0	0.0
19	10.00	0.0	0.0	0.0	0.0	0.0	0.0

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ArupGeotechnics

Job No. 114662 Sheet 1/1

Made by: CH Chkd: SG
Date: 29/11/2003
Rev: -,-

TE/36

Corrib Planning Ap[plication
Summary of FREW runs

Filename	Depth of peat	Top of mineral soil	Sheet pile details			Surcharge (kPa)	Max moment (kNm/m)	Max tie force (kN/m)	Max displ (mm)
			Section	Toe level	Penetration				
pond 3_2 uls	3	17	LX8	14.25	2.75	16	55.4	77.5	18.6
pond 3_2 sls	3	17	LX8	14.25	2.75	16	43.4	65.1	15.8
pond 8 uls	3	17	LX16	14.25	2.75	24	73.1	97.3	24.7
pond 4 uls	3.625	16.375	LX8	14.25	2.125	16	78.8	87.1	22.0
pond 9 uls	3.625	16.375	LX16	14.25	2.125	24	101.6	108.0	26.8
pond 5 uls	3.625	16.375	LX8	15	1.375	16	70.8	106.9	74.7
pond 10 uls	3.625	16.375	LX16	15	1.375	24	90.9	137.5	109.4
pond 10 sls	3.625	16.375	LX16	15	1.375	20	73.4	92.6	25.7
pond 11 sls	3.625	16.375	LX16	14.25	2.125	20	77.8	85.1	21.5

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6. DRIVABILTY, CORROSION ALLOWANCE AND SERVICE LIFE

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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	Dc/1	

Member/Location

Job Title: Shell Corrib Terminal Drivability and Corrosion allowance

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CH

Drivability

The drivability of LX8 sheet pile sections was assessed using the data from the British Steel Piling Handbook, which are re-produced in Sheet Dc/2. Considerable variability of the soil properties is likely at the site. The strengths of stabilized peat could vary from 25 to 50 kPa. That of mineral soils from 25 to 75 kPa with depth. The mineral soils are composed of clayey and sandy soil layers. Based on the soil descriptions and properties available, the site soils may be described as soft to firm. The stabilized peat may be described as firm. The schist found at depths of 6 to 7m below ground level may be described as stiff or very stiff. However it should be noted that schist is likely to be weathered at the interface with mineral soils.

Based on data for cohesive soils in sheet Dc/2, sheet pile section with minimum well modulus of 600–700 cm^3/m and of steel Grade S270 GP would be sufficient. LX8 sections have section modulus of 830 cm^3/m, hence adequate for driving.

For schist, we have assumed E of 75-1000 kPa

Assuming E = 1000N => N = 75

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	Dc/2	

Member/Location

Job Title: Shell Corrib Terminal Drivability and Corrosion allowance

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CH

Table 8.3.1 Cohesionless Soils

Dominant SPT 'N' Value	Minimum Wall Modulus in cm3/m	
	Grade S270 GP	Grade S355 GP
0-10	450	
11-20		450
21-25	850	
26-30		850
31-35	1,300	
36-40		1,300
41-45	2,300	
46-50		2,300
51-60	3,000	
61-70		3,000
71-80	4,200	
81-140		4,200+

Table 8.3.2.1 Cohesive Soils

Clay Description	Minimum Wall Modulus cm³/m	
	Grade S270GP	Grade S355GP
Soft to Firm	450	
Firm	600-700	450-600
Firm to Stiff	700-1600	600-1300
Stiff	1600-2500	1300-2000
Very Stiff	2500-3000	2000-2500
Hard	Not Recommended	4200-5000

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Table 8.3.2.2 Recommended Maximum Driving Lengths

Larssen Section	Approximate Maximum Lengths Depending Upon Steel Grade and Ground Strata (m)	Frodingham Section	Approximate Maximum Lengths Depending Upon Steel Grade and Ground Strata (m)
LX8	14		
LX12	17		
LX16	20		
LX20	23		
LX25	25	1BXN	14
LX32	28	1N	11
6W	9	2N	14
GSP2	19	3N	18
GSP3	23	3NA	18
GSP4	27	4N	23
6 (122kg/m)	30	5	24
6 (131kg/m)	30+		
6 (138.7kg/m)	30+		

Source: British Steel Piling Handbook, 7th Edition, 1997

EPA Export 08-07-2014:23:43:27

OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	DC/3	

Member/Location

Job Title: Shell Corrib Terminal Drivability and corrosion allowance

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CH.

According to the British Steel Piling Handbook, piles driven to toe hold, the N value of that stratum shall be divided by 4. So this would give an N value of $\frac{75}{4} \approx 19$ ⇒ Grade S270 GP steel section with minimum wall modulus of 850 cm³/m may be used. Hence LX8 section may still be adequate.

The recommended maximum driving length of LX8 sheet pile section is 14m. This is considerably greater than the required driving lengths for the ground conditions interpreted at the site.

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	DC/4	

Member/Location

Job Title: Shell Comlo Terminal Drivability and corrosion allowance.

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CH

Corrosion allowance and service life

A conservative calculation was done to estimate the corrosion allowance and the service life.

Consider the UHS bending moment distribution shown in sheet DC/5 for the design section with peat layer in the pond. The maximum bending moment was 70.9 kNm per m. Let us consider this bending moment even when the water level in the pond has risen to +1.9 m in head with the groundwater level.

Minimum section modulus required is

$$Z_{min} = \frac{70.9 \times 10^3}{180} = 393.9 \text{ cm}^3/\text{m}$$

180 N/mm² is the working stress for steel type S270GP under permanent loading, according to EN 10248 : 1995.

So Z of LX8 would reduce from 830 cm³/m to 393.9 cm³/m. From sheet DC/6, the total thickness loss to reach Z_{min} is 4mm from both faces.

For steel under immersion, typical corrosion rate is about 0.05mm/yr. Hence the service life is $\frac{4}{0.05}$ = 50 years

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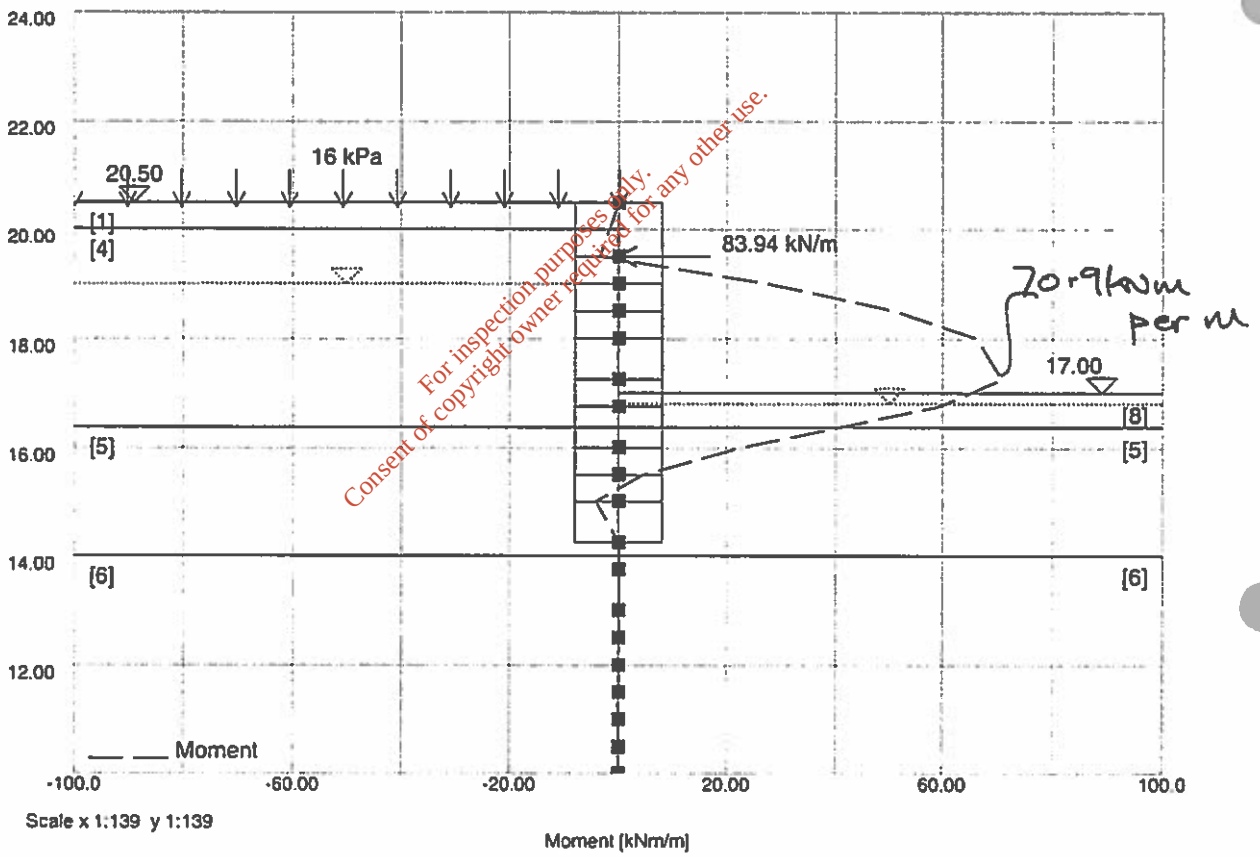
Corrib Field Development
Pond retaining structures

Job No.	Sheet No.	Rev.
114662	DC 15	

Drg. Ref.

Made by	Date	Data	Checked
NP	21-Nov-2003	pond 4 uls.fwd	CM.

ULS Bending Moment distribution.



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STAGE 4 : Excavate pond

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	DC/6	

Member/Location

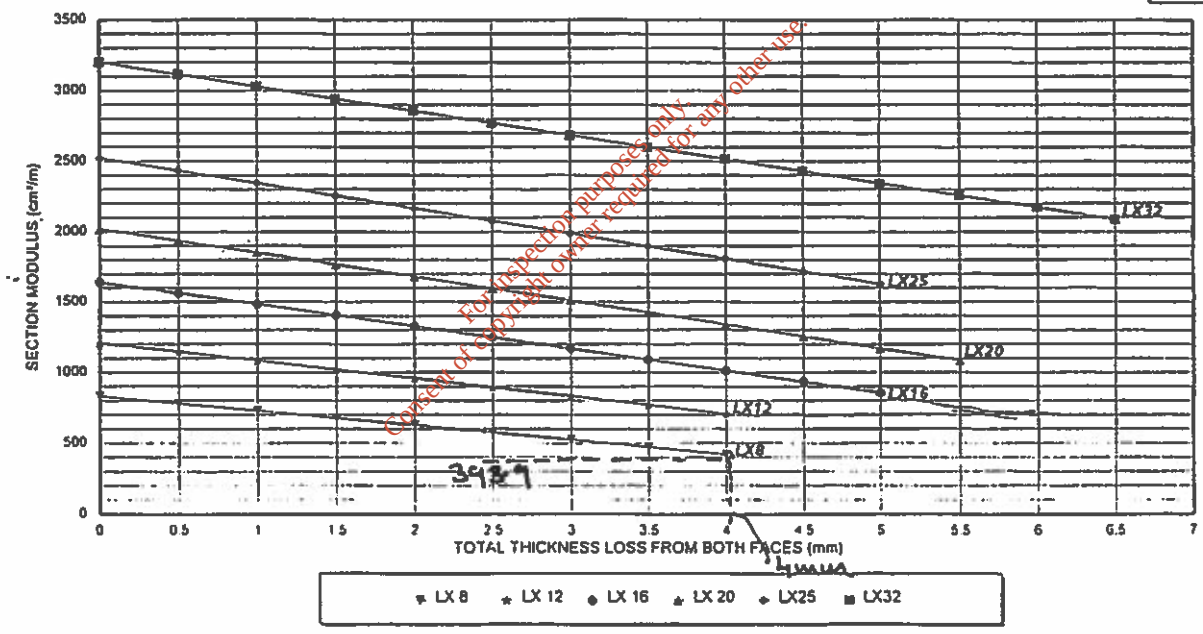
Job Title: Shell Corrib Terminal
Drivability and corrosion allowance

Drg. Ref.

Made by NP Date Nov 26/03 Chd. CM

GRAPH 1

3.2.2.1 Section Modulus against Loss of Thickness – LX Piles



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Source: British Steel Piling Handbook, 7th Edition, 1997

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7. ADMINISTRATION BUILDING / WAREHOUSE CAR PARK

7.1 General

For general information on soil strengthening, refer to Section 5.1 (Access Roads).

7.2 Site Investigation

The results of site investigation in the area of the car park are summarised below. Shear strength test results have been plotted for the peat layer and the range of variation is noted in the table. A geological cross section (Cross-section 6 on Figure 5.1) through the car park is presented in Figure 7.1.

Table 7.1 Admin. Building Car Park: Measured Soil Parameters

Top Elevation (mOD)	Thickness (m)	Soil Description	Undrained shear strength s_u (kPa) (Lower Bound)
34.3 - 33.2	0 - 0.3	Made Ground (Track)	-
34.3 - 32.9	2.8 - 3.3	Peat	3
31.5 - 29.6	2.4 - 3.4	Mineral Soil	-
Top Elevation (mOD)	Thickness (m)	Soil Description	Unconfined compressive strength (MPa)
28.7 - 26.2	>10 (assumed)	Schist	17

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7.3 Slab Design

The reinforced concrete car park slab has been designed to carry a design surcharge of 25kN/m^2. A 300mm thick suspended slab without shear reinforcement is adequate to carry the design loads, assuming piles at no more than 3.5m centres. The heads of the 350mm diameter minipiles should be locally enlarged to 550mm diameter. Slab design calculations are contained in Appendix 7A.

7.4 Pile Design

The piles supporting the car park slab have been designed as rock socketed piles founded in the schist bedrock. For 350mm diameter piles, a design socket length of 2.0m is recommended to carry the ultimate pile load of 661kN. Expected settlements under working load are less than 1mm. Pile design calculations are contained in Appendix 7B.

7.5 Construction Sequence

The envisaged construction sequence for the car park is outlined below (excluding drainage and services).

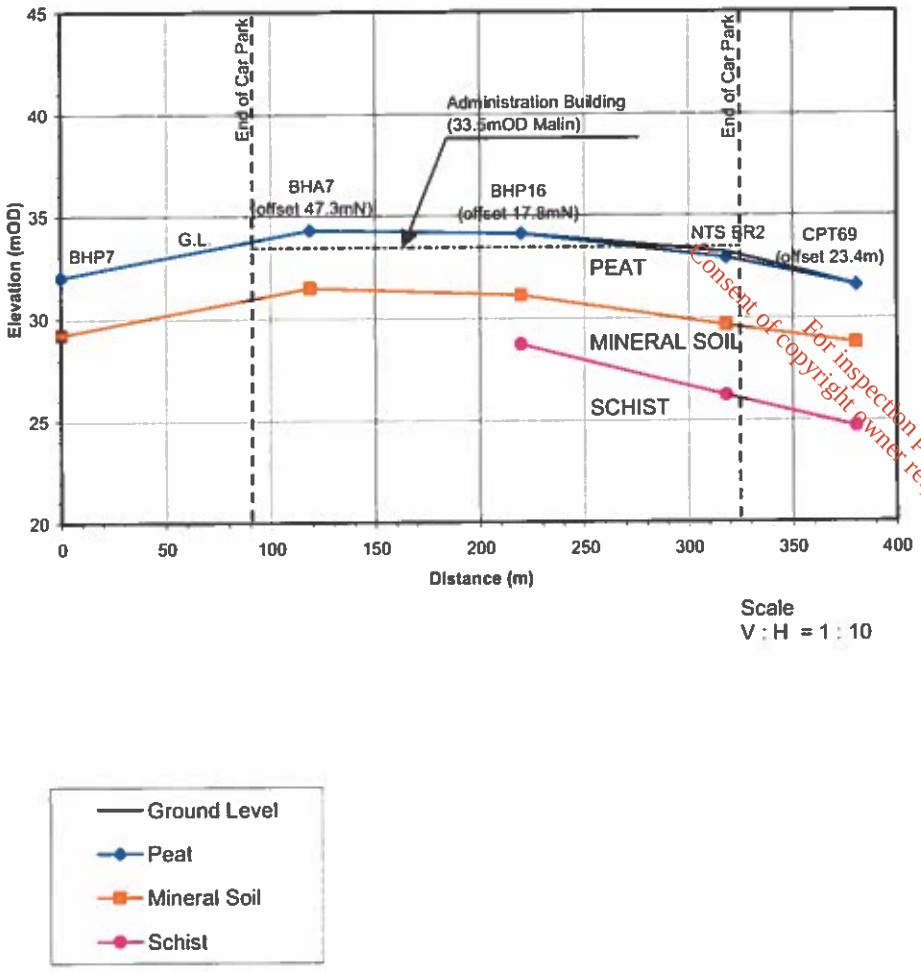
1. The access road to the car park / terminal area will already have been completed
2. A geotextile and 0.5m fill layer will be placed over the car park area.
3. Soil strengthening will take place by deep dry mixing, working across the area from one corner.

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4. A temporary surcharge layer of 0.5m fill will be laid over the mixed soil to compact the peat. This will act as a piling platform.
5. Install piles by ODEX rotary percussive drilling method.
6. Trim piles, lay blinding and cast reinforced concrete slab.

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Figure 7.1 Typical Longitudinal Cross-section along Administration Building Car Park (Cross-section 6)

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Shell

Corrib Planning Application

Appendix 7A - Car Park Slab Design

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157/10	1 of 6	

Member / Location

Drg. Ref. Car Park Slab

Job Title Corrib Gas Terminal

Made by JOB Date Nov '03 Chd. EJH

Reference	Calculation	Result

Car Park Slab Design

Loading:

Live Load - 25 kN/m²

Dead load: assume 300 mm thick

assume average 100mm screed for falls

= 0.4m thick ⇒ 24 × 0.4 = 9.2 kN/m²

say 10 kN/m².

⇒ Design load = 25 × 1.6 + 10 × 1.4

40 + 14 = 54 kN/m².

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For schematic design

BS 8110 3.4.4.4

Moment: = $\frac{wl^2}{9}$ where l = 3m

= M = $\frac{54 \times 3^2}{9}$ = 54 kN m/m

Effective depth (ϕ) noted d: 300 - 50 - 10 = 240

$M/bd^2 f_{cu} = \frac{54 \times 10^6}{10^3 \times 240^2 \times 40} = .023 < 0.95$

$A_s = \frac{M}{.95 f_y z} = \frac{54 \times 10^6}{.95 \times 460 \times .95(240)} = 541 \text{ mm}^2/\text{m}$.

⇒ use T16 @ 200 mm c/c.

Punching Shear

Assume 350 mm diameter pile

Also assume no widening of pile head

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ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C1157.10	2 of 6	

Member / Location

Drg. Ref. Car Park Slab.

Job Title Coach Terminal

Made by LB Date Nov '03 Chd. EN

Reference	Calculation	Result

⇒ at pile spacing of 3m

loading - $3 \times 3 \times 54\ kN/m^2 = 486kN$

⇒ stress around perimeter of pile $= \frac{486\ kN}{\pi \phi \times d}$

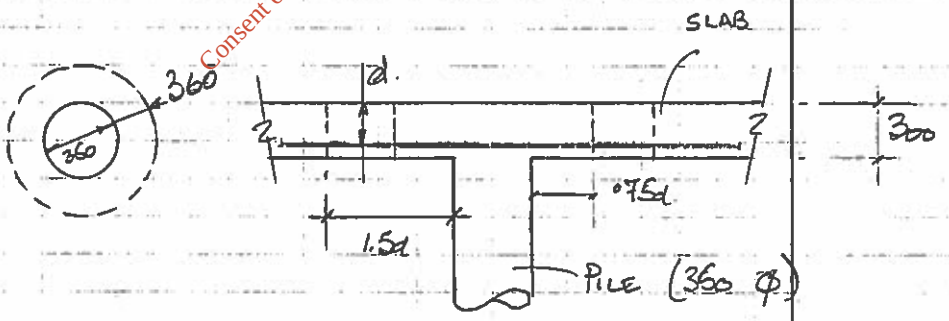
$= \frac{486 \times 10^3}{\pi \times 350 \times 240} = 1.84\ N/mm^2$

BS 8110 3.6.4.6

$1.84 < 5N/mm^2$ or $0.8\sqrt{f_{cu}} (5.06 N/mm^2)$

Check shear stress at 1.5d from face of pile ⇒

$d = 240$, $1.5d = 360$ mm



Shear perimeter $= \pi (350 + 2 \times 360)$

⇒ $\frac{486 \times 10^3}{\pi (1070) \times 240} = .060\ N/mm^2$

BS 8110 Table 3.9

Allowable v_c : $\frac{100 A_s}{bd} = \frac{100 \times 201 \times 5}{1000 \times 240} = .42$

Note 2 Table 3.9

$$v_c = \left\{ \frac{.79 (.42)^{1/3} \left(\frac{400}{240}\right)^{1/4}}{1.25} \right\} \times \left(\frac{40}{25}\right)^{1/3} = .63\ N/mm^2$$

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ARUP Calculation Sheet

Job No. C1157.10 | Sheet No. 3 of 6 | Rev.

Member / Location

Drg. Ref. Car Park Slab

Job Title Corrib Gas Terminal

Made by JOB | Date Nov '03 | Chd. EP

Reference	Calculation	Result

Check - on shear stress at 0.75d from face of pile

$$\frac{486\times10^3}{\pi(350+2\times180)\times2460} = 0.91\ N/mm^2$$

BS8110 3.7.7.4

As distance is less than 1.5d vc can be enhanced

$$av = 0.75d \Rightarrow \frac{1.5d}{0.75d} = 2$$

$$\Rightarrow \text{allowable stress at } .75d = 2(0.68) = 1.26\ N/mm^2$$

$1.26\ N/mm^2 > 0.91\ N/mm^2 \Rightarrow OK.$

Consider different Pile spacing

Say 4.5m: ⇒ MOMENT DESIGN

$$\Rightarrow M = \frac{wl^2}{9} = \frac{54\times4.5^2}{9} = 121.5\ kNm/m$$

⇒ 300 thick slab: d = 240mm

$$\Rightarrow \frac{M}{bd^2f_{cu}} = \frac{121.5\times10^6}{10^3\times240^2\times40} = 0.0527$$

$$z = 0.938$$

$$A_s = \frac{M}{0.95 f_y z} = \frac{121.5\times10^6}{0.95\times460\times0.938\times240} = 1235\ mm^2/m$$

Use T16 @ 150 c/c (1340 mm²/m)

SHEAR DESIGN:

4.5 × 4.5 × 54 = 1095 kN per pile

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Allowable v_c

$$= \frac{.79\left(\frac{100\times 1340}{1000\times 240}\right)^{1/3}\left(\frac{400}{240}\right)^{1/4}\left(\frac{40}{25}\right)^{1/2}}{1.25}$$

$$v_c = \frac{.79 \times .823 \times 1.136 \times 1.17}{1.25} = .69\ N/mm^2$$

Assuming 350 ϕ pile - no head enlargement

⇒ Stress at pile perimeter

$$= \frac{1095\times 10^3}{\pi \times 350 \times 240} = 4.15\ N/mm^2.$$

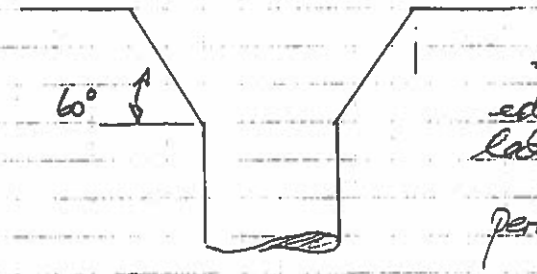
Less than $5\ N/mm^2$ or $0.8\sqrt{f_{cu}}$ ⇒ OK.

Shear at 1.5d from pile

$$\Rightarrow \frac{1095\times 10^3}{\pi(350+2\times 1.5\times 240)\times 240} = 1.357\ N/mm^2$$

Allowable = $.69\ N/mm^2$ ⇒ Shear reinforcement required.

Consider enlarged head to pile



⇒ at 1.5d from edge of enlarged head =

$350 + 2\times 100 = 550$

Perimeter $= \pi(550 + 2\times 1.5\times 240)$

$= \pi 1270$

$= 3990mm$

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ARUP Calculation Sheet

Job No. C1157.10 Sheet No. 5 of 6 Rev.

Member / Location

Drg. Ref. CAK PARK SLAB

Job Title CORRIB GAS TERMINAL

Made by JOB Date Nov '03 Chd. ETL

Reference	Calculation	Result

Shear stress at 1.5d from enlarged head of pile =

$$\frac{1095 \times 10^3}{3990 \times 240} = 1.14 \text{ N/mm}^2.$$

⇒ Shear reinforcement required.

⇒ 4.5m spacing too large

Consider 4 x 4 m spacing

4 x 4 x 5H = 864 kN/pile

Again using enlarged pile head.

$$\frac{864 \times 10^3}{3990 \times 240} = .90 \text{ N/mm}^2.$$

Consider 3.75m spacing

Load = 759 kN/pile

⇒ Shear stress at 1.5d from enlarged head $= \frac{759 \times 10^3}{3990 \times 240} = .79 \text{ N/mm}^2.$

Consider 3.5m spacing

Load = 661 kN

Shear stress at 1.5d from enlarged pile head =

$$\frac{661 \times 10^3}{3990 \times 240} = .69 \text{ N/mm}^2$$

⇒ OK no shear reinforcement reqd.

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G 10
Rev 0

ARUP Calculation Sheet

Job No.	Sheet No.	Rev.
C157/10	6 of 6	

Member / Location

Drg. Ref. Car Park Slab

Job Title Corrib Gas Terminal

Made by JOB Date Nov '03 Chd. ETC

Reference	Calculation	Result

CONCLUSIONS

DESIGN LOADS : 25kN/m² LIVE

10 kN/m² DEAD

PILE DIAMETER: 350 ϕ

1) 300 SLAB PILE SPACING 3m · PILE LOAD · 486kN

NO PILE HEAD ENLARGEMENT REQUIRED

2) 300 SLAB PILE SPACING 3.5m PILE LOAD = 661 kN

PILEHEAD ENLARGEMENT TO 550 mm REQD

NO SHEAR REINFORCEMENT REQD IN SLAB.

3) 300 SLAB PILE SPACING 4.0m PILE LOAD = 864kN

PILE HEAD ENLARGEMENT TO 550 mm REQD

SHEAR REINFORCEMENT IS REQD IN SLAB.

PREFERRED OPTION - 2

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Corrib Planning Application

Appendix 7B - Pile Design for Car Park Slab

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/1	

Member/Location

Job Title: Comb Field Development Socketed Pile Design

Drg. Ref.

Made by NP Date Nov 27/2003 Chd. JB

Design of socketed piles in schist

Design load = 661kN for 3.5m pile spacing with pile head enlargement

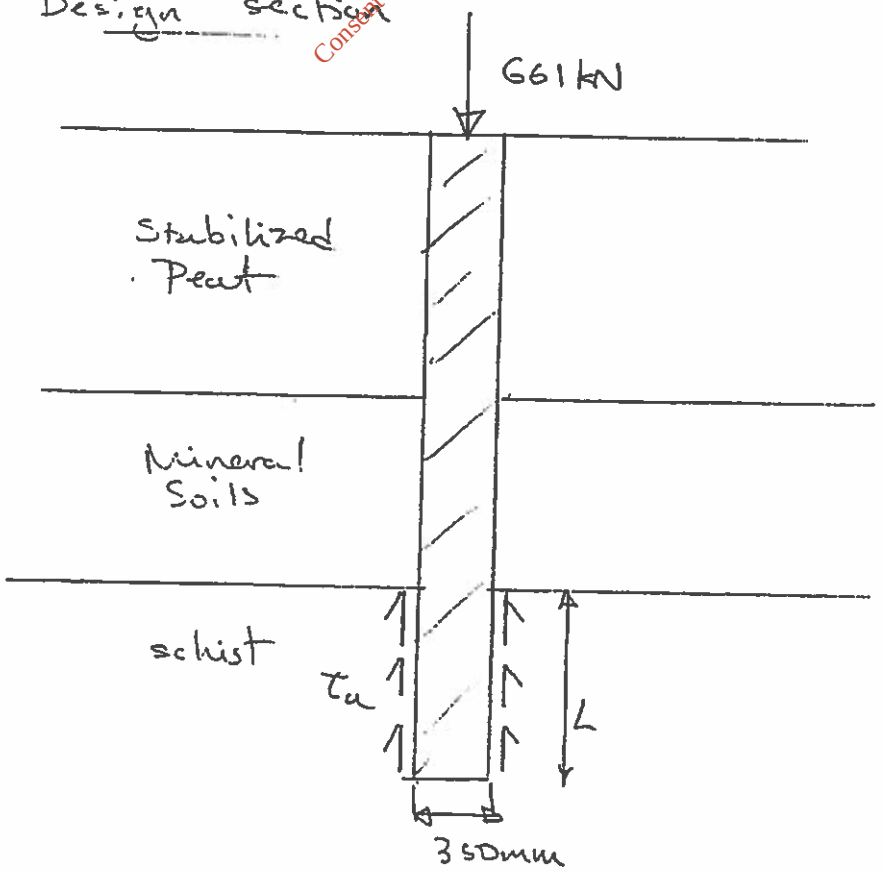
Pile diameter = 350mm

Design assumptions:

- Design loads are resisted by skin friction over the socketed length in schist
- Skin friction contribution from stabilized peat and mineral soils ignored
- End bearing capacity of schist ignored.

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Design section



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OAP20

ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/3	

Member/Location

Job Title: Corrib Field Development Socketed Pile Design

Drg. Ref.

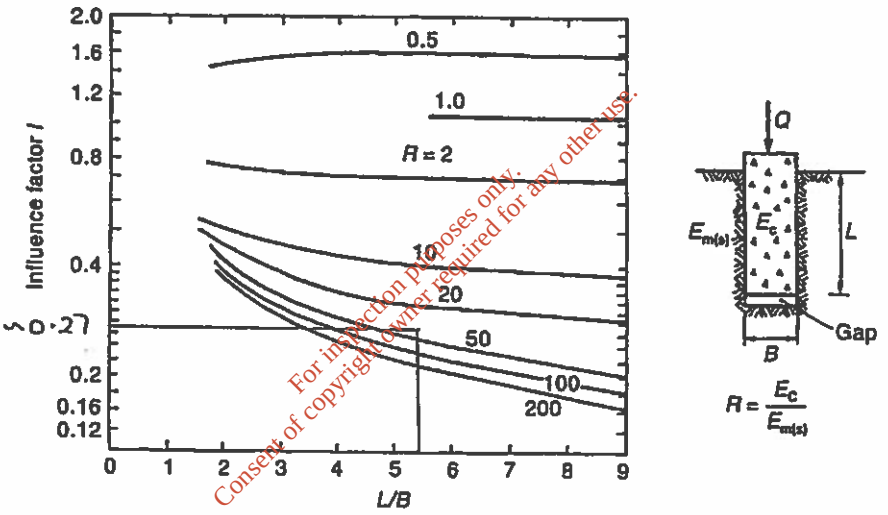
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The settlement of a socketed pile in friction only is given by

$$\delta = \frac{Q I}{\pi E_{m(s)}}$$

I is influence factor from chart below

$E_{m(s)}$ is the rock mass deformation modulus.



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source: "Foundations on Rock", Duncan Wyllie, 1999

$R = \frac{E_c}{E_{m(s)}}$ E_c concrete stiffness, assume 18 GPa

$E_{m(s)} = 110\sqrt{UCS}$

$= 110\sqrt{17} = 453.5$ MPa

$\Rightarrow R = \frac{18\,000}{453.5} = 39.7$

$h = 1.9$m $B = 0.35$ $\Rightarrow h/B = 5.4$

$$\Rightarrow \delta = \frac{661 \times 0.27 \times 10^3}{\pi E \times 453.5 \times 10^3} = 0.1 \text{ mm}$$

Hence pile settlement is negligible.

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ARUP | Calculation sheet

Job No.	Sheet No.	Rev.
114662	SP/2	

Job Title: Corrib Field Development Socketed Pile Design.

Member/Location:

Drg. Ref.:

Made by NP Date Nov 27/2003 Chd.

Allowable capacity $Q_a = \pi D L \times \tau_a$

$$\tau_a = \frac{\tau_{ult}}{FOS} \leftarrow \text{ultimate load}$$

From chapter F.2.2 in BS8081 : 1989 a lower bound estimate of

$$\tau_{ult} = 10\% f_{cu}$$

From borehole P16 near car-park area, the average unconfined compressive strength (UCS) over a depth of 10m is 17MPa, considering lower bound parameters.

So $\tau_{ult} = 0.1 \times 17 = 1.7 MPa$

$$\tau_a = \frac{\tau_{ult}}{3.0} = \frac{1.7}{3} = 0.57 \text{ MPa}.$$

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Table 24 of BS 8081 : 1989 gives rock/grout bond values which have been employed in practice. For schist, the working bond is given as 0.31 MPa

Using this lower value (compared to 0.57MPa) the required socket length is

$$L = \frac{Q_a}{\pi D \tau_a} = \frac{661}{\pi \times 0.35 \times 0.31 \times 1000}$$

$$= 1.9 \text{ m}$$

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8. TEMPORARY CONSTRUCTION FACILITY

8.1 General

For general information on soil strengthening and sheet piling, refer to Section 5.1 (Access Roads).

8.2 Site Investigation

The results of site investigation in the area of the Temporary Construction Facility (TCF) are summarised below. Shear strength test results have been plotted for the peat layer and the range of variation is noted in the table. Geological Cross sections through the TCF (Cross-sections 7, 8 and 9 on Figure 5.1) are presented in Figures 8.1 to 8.3.

Table 8.1 TCF: Measured Soil Parameters

Top Elevation (mOD)	Thickness (m)	Soil Description	Undrained shear strength s_u (kPa) (Lower Bound)
35.1 - 37.4	0 - 0.4	Made Ground (Track)	-
35.1 - 37.8	1.4 - 2.3	Peat	3
32.8 - 35.7	1.5 - 3.2	Mineral Soil	-
29.8 - 33.8	>10 (assumed)	Schist	-

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For the purposes of retaining wall design, the same parameters as assumed for the site access roads and settlement ponds have been used.

8.3 Stability Calculations

The TCF will be constructed on a foundation of reinforced peat. A sheet pile wall will be installed around the perimeter of the strengthened area to avoid transferring load to the adjacent peat soils.

The sheet piled wall has been designed in the same way as the sheet piles along the permanent site roads, assuming a 25kN/m² UDL on the strengthened area. The recommendations for sheet pile size and embedment depth are the same as those contained in Section 5 (Access Roads).

It is recommended that the pile section size is increased to LX16 to withstand stresses during driving, particularly if boulders are encountered within the mineral soil.

8.4 Construction Sequence

The envisaged construction sequence for the TCF is outlined below (excluding drainage and services).

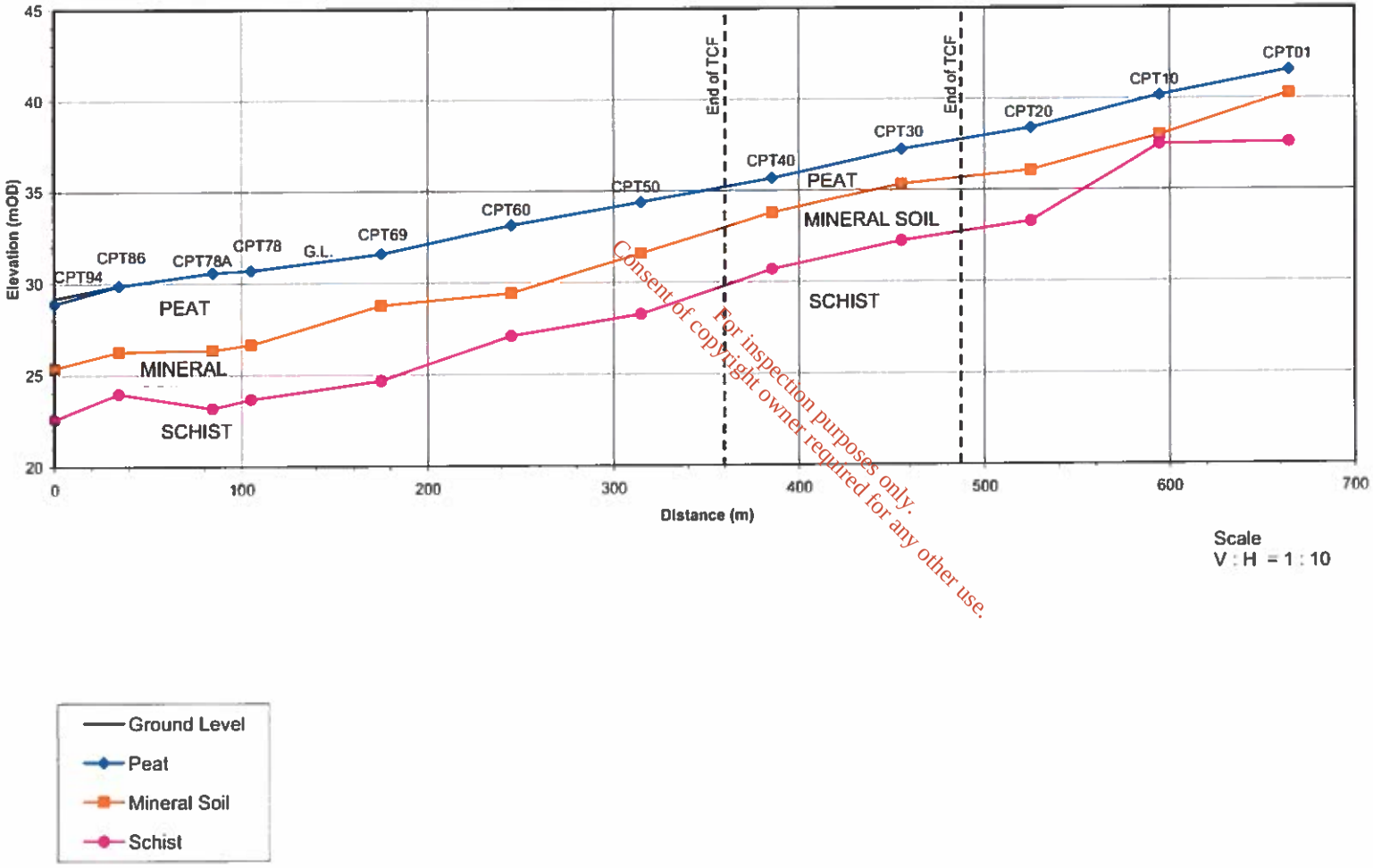
1. The 10/15m wide access road to the TCF area will already have been completed
2. A geotextile and 0.5m fill layer will be placed over the TCF area.
3. Soil strengthening will take place by deep dry mixing, working across the area from one corner. Dry mixed columns will be installed in a cellular layout.
4. A temporary surcharge layer of 0.5m fill will be laid over the mixed soil to compact the peat (within four hours of mixing).

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5. If programme allows, the TCF hard standing base may be laid as the temporary surcharge. In this case a geotextile should be laid, followed by a geogrid and 0.5m of selected granular fill. Otherwise the temporary surcharge should be removed and the hard standing base laid in the same way.
6. Steel sheet piles will be driven all around the perimeter of the TCF.

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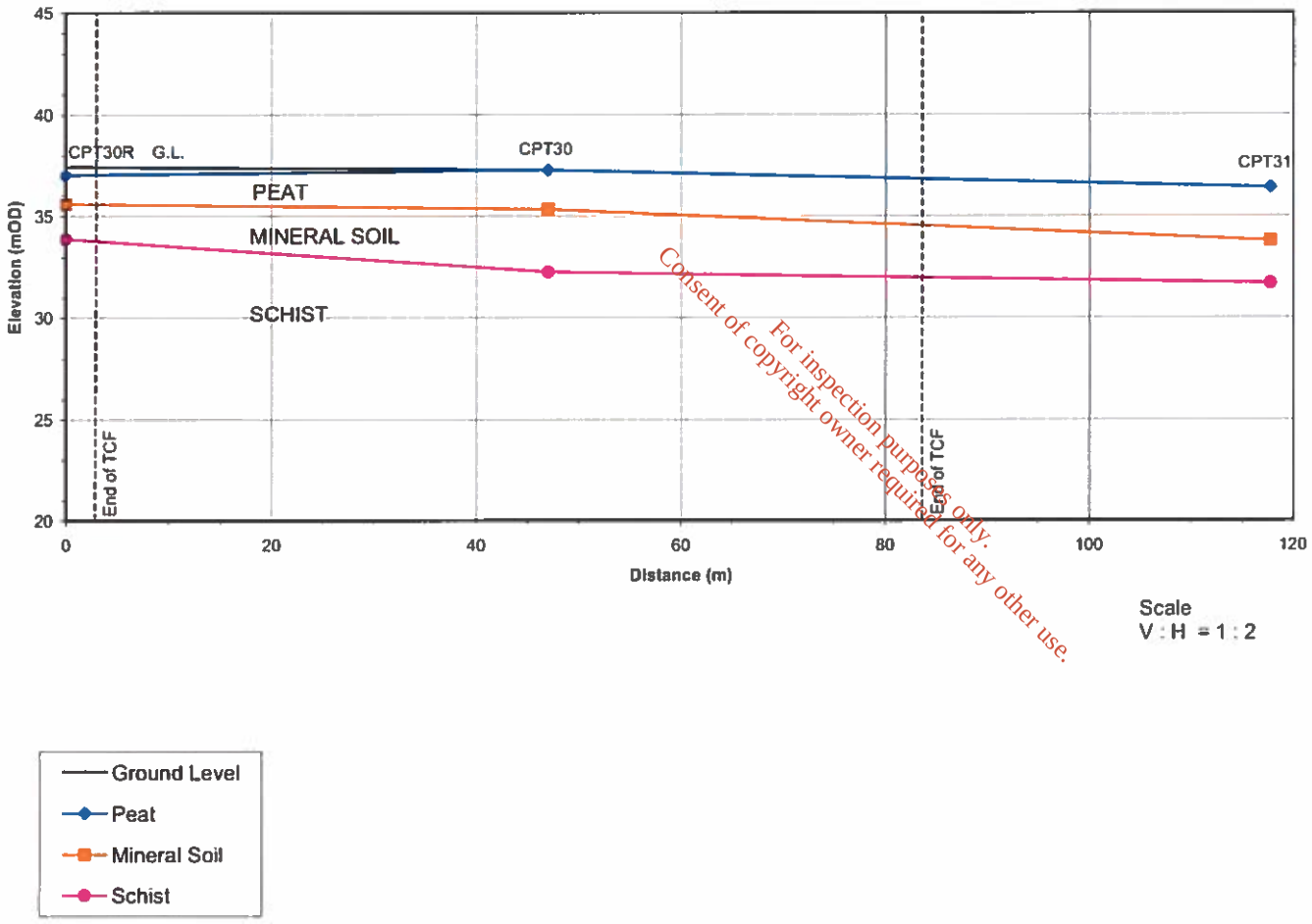
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Figure 8.1 Typical Cross-section of Eastern Area and Temporary Construction Facility (Cross-section 7)

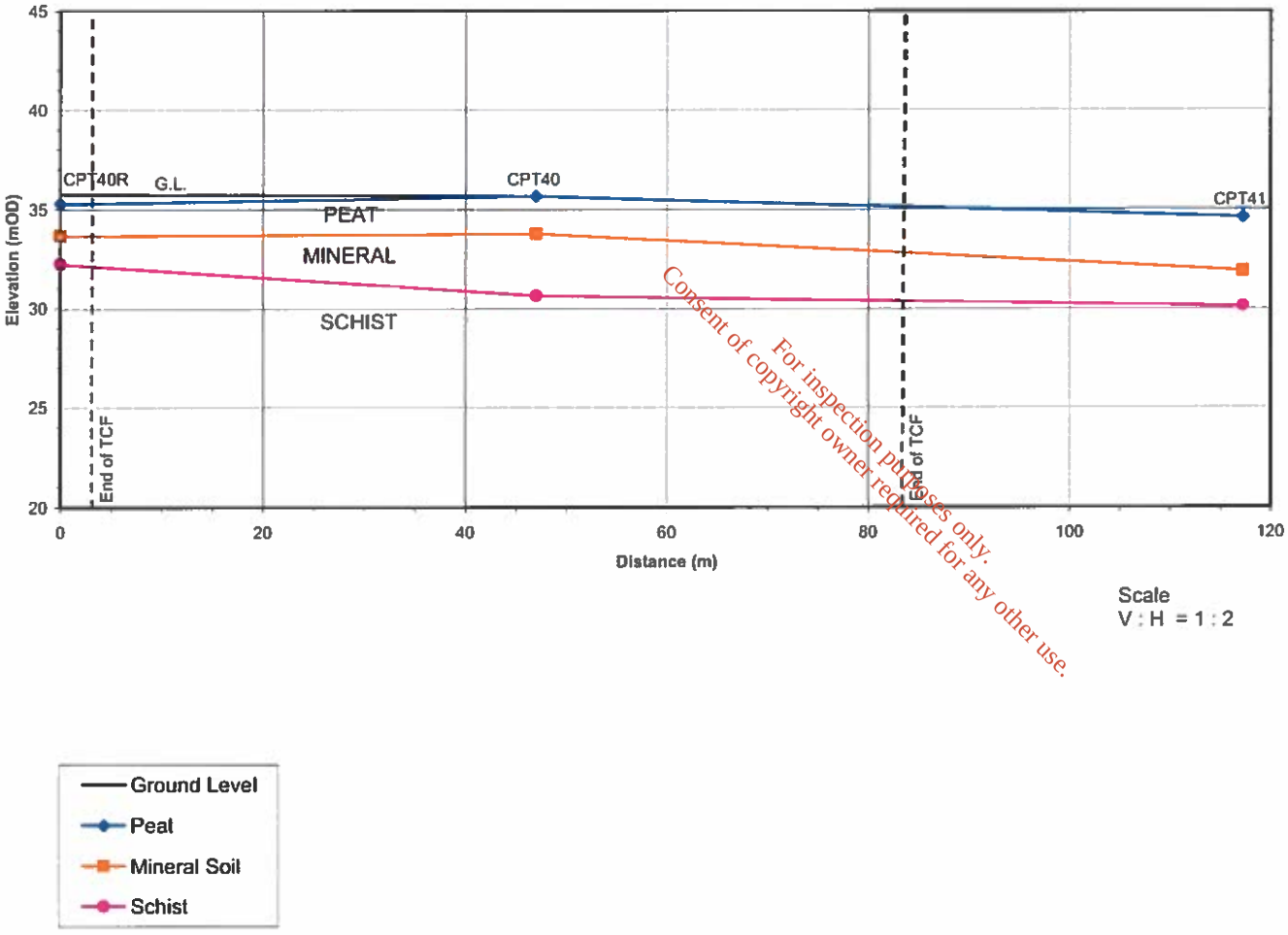
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Figure 8.2 Typical Cross-section of Temporary Construction Facility (Cross-section 8)

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Figure 8.3 Typical Cross-section of Temporary Construction Facility (Cross-section 9)

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9. DIGITAL GROUND MODEL

9.1 General

A Digital Ground Model (DGM) of the Bellanaboy site was developed in order to accurately calculate the volume of the material that would have to be excavated and placed during the earthworks phase of the site development.

The DGM was created using InRoads SelectCAD version 08.00.00.00 (run under Microstation) using information from the topographical survey and site investigation information outlined in Section 2. The model was refined over a period of months to take account of eight different material types in total.

9.2 Description of DGM

The DGM consists of a series of three-dimensional surfaces overlying each other. Each surface represents the interface between two types of material, for example, the interface between peat and clay, or to put it another way, it represents the upper or lower bound of a particular material.

Each surface consists of a three-dimensional triangular mesh defined by a set of three-dimensional data points. The data points are derived by interrogation of site investigation records. The national grid co-ordinates and ground elevation are known for each record used, and the depth below ground level to a particular material type can be obtained. This allows a set of three-dimensional co-ordinates to be built up which define a surface representing the location of the upper or lower bound of a particular type of material.

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Different site investigation techniques were used on the site to determine the depth of particular types of material. For example, shell and auger boreholes provided information on soft materials such as mineral soils, while rotary coreholes provided information on harder material such as bedrock. The variability of site investigation techniques used on the site, and their varying degree of use, has led to a variability in the number of data points available for the definition of some surfaces. Some surfaces may have 200 points whereas others have 20.

The outline of the terminal platform and a partial plan of a typical surface is shown in Figure 9.1.



Figure 9.1: Partial Plan of Typical DGM Surface

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9.3 DGM Material Surfaces

A series of nine surfaces were created in the DGM to model to represent eight different types of material encountered at the site. The surfaces created in the DGM are as follows:

Table 9.1: Digital Ground Model Surfaces

Surface Name	Description
Topographical Surface	Existing Ground Surface
Top of >H_4 Peat	Top of peat with a degree of humification of less than H_4 by the von Post Humification Index
Top of >H_8 Peat	Top of peat with a degree of humification of less than H_8 by the von Post Humification Index
Top of Firm Material	Top of material which is suitable for use as foundation material while in its in-situ condition
Underside of Cohesive	Underside of cohesive material, typically underlain by granular material or heavily weathered rock.
Top of >50% TCR	Top of a zone where the Total Core Recovery in coreholes exceeded 50%
Top of >75% TCR	Top of a zone where the Total Core Recovery in coreholes exceeded 75%
Top of >80% TCR	Top of a zone where the Total Core Recovery in coreholes exceeded 80%
Top of >90% TCR	Top of a zone where the Total Core Recovery in coreholes exceeded 90% (indicating the level below which good rock can be found)

The "Top of Firm" surface effectively defines the underside of peat.

The set of data points that make each of the above surfaces are presented in Table 9.2 below.

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9.4 Terminal Platform Surface

A further surface has been created to represent the completed Terminal Platform. This surface is defined by the outline of the Terminal Platform.

The variation in the angle of cut slopes within the terminal platform for different types of material is also taken into account. Cohesive and granular mineral soil and non-intact rock will be cut to a slope of 1:3, and intact rock will be cut to a slope of 1:1. All exposed fill slopes have been assumed to be at an angle of 1:3. Peat faces will be retained using gabions.

The Terminal Platform surface allows volume calculations to be carried out between the Terminal Platform and any given material surface on the site.

EPA Export 08-07-2014:23:43:28

Table 9.2: Digital Ground Model Data Points

				Depth Below Ground Level (m)							
DGM ID	Easting	Northing	Existing GL	>H4	>H8	Top of Firm	U/S of Cohesive	>50% TCR	>75% TCR	>80% TCR	>90% TCR
IGSL BH1	86183	33262	38.72			2.3	2.5				
IGSL BH2	86390	33739	33.72			2.2	2.8				
IGSL BHA1	86272	33068	36.13			3.1	3.8				
IGSL BHA2	86360	32947	32.74			2.9	3.8				
IGSL BHA3	86395	32883	31.38			3.3	4.3				
IGSL BHA4	86353	33116	37.93			2.8	3.8				
IGSL BHA5	86520	33033	35.65			3.6	3.6				
IGSL BHA6	86492	33124	38.80			2.7	3.3				
IGSL BHA7	86621	32998	34.31			2.8	3.7				
IGSL BHA8	86568	33162	39.59			2.8	3.4				
IGSL BHA9	86641	33100	36.77			2.9	3.7				
IGSL BHP1	86527	33168	40.37			2.6	3.3				
IGSL BHP2	86486	33180	40.91			2.6	3.3				
IGSL BHP3	86428	33121	38.58			2.6	3.4				
IGSL BHP4	86488	33095	37.99			2.8	3.6				
IGSL BHP5	86615	33051	35.95			2.8	3.6				
IGSL BHP6	86498	32975	33.72			3.0	3.3				
IGSL BHP7	86539	32900	32.03			2.8	5.0				
IGSL BHP9	86418	32954	33.51			2.8	3.8				
IGSL BHP10	86455	32917	32.16			3.5					
IGSL BHP11	86376	33070	36.84			2.7	3.4				
IGSL BHP12	86320	33048	35.92			2.8	3.6				
IGSL BHP13	86283	33010	34.91			3.0	3.7				
IGSL BHP14	86576	33287	41.73			2.2	2.4				
IGSL BHP15	86177	33066	35.87			3.6	4.0				
IGSL BHP16	86724	33020	34.14			3.0	4.2				
IGSL BHP17	86325	32799	28.99			3.7	6.2				
IGSL BHP1A	86541	33213	40.96			2.6	3.4				
IGSL BHW1	86445	33407	44.22			2.4	2.4				
IGSL BHW2	86221	33290	40.08			2.7	3.1				
IGSL BHW3	86049	33180	35.02			2.8	3.6				
IGSL BHW4	86100	33073	34.96			2.8	3.7				
IGSL BHW5	86160	32973	32.75			2.9	4.0				
IGSL BHW6	86221	32872	30.47			2.8	3.9				
IGSL BHW7	86361	32818	29.03			3.8	6.0				
IGSL BHW8	86414	32848	30.82			3.7	5.9				
IGSL BHW9	86473	32877	31.77			3.6					

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Table 9.2: Digital Ground Model Data Points (cont'd)

				Depth Below Ground Level (m)							
DGM ID	Easting	Northing	Existing GL	>H4	>H8	Top of Firm	U/S Cohesive	>50% TCR	>75% TCR	>80% TCR	>90% TCR
IGSL TE1	86524	33355	43.95			1.6	1.6				
IGSL TE2	86328	32913	31.82			3.0					
IGSL TE3	86433	33112	38.54			2.9					
IGSL TE4	86546	33204	40.74			1.7	1.8				
IGSL TE5	86358	33240	41.26			2.8	3.7				
IGSL TE7	86630	33210	39.19			2.8	3.1				
ID BH1	86836	33611	39.88					15.0			
ID BH2	86802	33600	39.88					9.0	15.0	20.0	
ID BH3	86547	33390	43.68					3.0	3.0	3.0	4.5
ID BH4	86306	33259	41.08					6.0	7.6	7.6	
ID BH5	86096	33146	35.88					9.0	12.0	12.0	12.0
ID BH6	86486	33238	41.78					9.0	9.0	9.0	10.5
ID BH7	86405	33191	40.38					8.2			
ID BH8	86596	33244	40.38					3.9	4.5	4.5	7.5
ID BH9	86583	33153	39.38					7.5	9.0	9.0	9.0
ID BH10	86638	33180	38.68					6.0	9.0	9.0	9.0
ID BH11	86655	33661	40.18					12.0			
ID BH11A	86655	33662	40.23								
ID BH12	86904	33524	38.23					9.0	18.0	18.0	20.0
ID BH12A	86904	33524	38.23								
ID BHP2	86486	33180	40.91					5.0	12.0	12.0	12.0
ID BHP3	86429	33121	38.58					13.5	13.5	13.5	13.5
ID BHP5	86615	33051	35.95					6.0	6.0	6.0	6.0
ID BHP10	86455	32917	32.16					6.0	6.0	6.0	6.0
ID BHP13	86283	33010	34.91					10.5	10.5	16.5	16.5
ID BHP14	86576	33287	41.73					3.5	3.5	4.5	4.5
ID BHP15	86177	33066	35.87					10.5	13.5	13.5	15.0
ID BHP16	86724	33020	34.14					5.0	6.0	6.0	6.0
ID BH78	86919	32999	30.38				7.4				
ID BH79	86995	33041	29.88								
ID BH80	87070	33083	29.03								
ID BH81	87147	33125	27.38								
ID BH82	87222	33167	26.68				6.2				
ID BH83	87298	33209	28.88				3.5				
ID BH84	87374	33251	29.38				3.2				

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Table 9.2: Digital Ground Model Data Points (cont'd)

				Depth Below Ground Level (m)							
DGM ID	Easting	Northing	Existing GL	>H4	>H8	Top of Firm	U/S Cohesive	>50% TCR	>75% TCR	>80% TCR	>90% TCR
GSIL BH13	86846	33518	38.88			3.0	7.0				
GSIL BH38	87207	33558	36.18			5.2	8.8				
GSIL BH79	86995	33041	29.88			5.0	9.0				
GSIL BH80	87070	33083	29.03			5.8	9.8				
GSIL BH81	87147	33125	27.38			6.7	8.5				
GSIL BH85	87450	33293	29.33			4.0	5.0				
GSIL BH90	87264	33091	24.68			6.0	9.0				
MIN GC1	86707	33078	34.88	1.25	2.08		2.15				
MIN GC2	86435	33100	37.53	0.75	1.75		2.20				
MIN GC3	86504	33053	35.88	0.50	1.00		3.20				
MIN GC4	86356	33259	41.57	1.00	2.35		2.35				
MIN GC5	86399	32636	25.38	0.50	1.25		4.75				
MIN GC6	86545	32946	32.25	0.75	1.75		2.63				
MIN GC7	86526	33369	43.68	1.00	1.25						
MIN GC8	86586	33425	41.63	0.59	0.59		0.59				
MIN GC9	85874	33117	31.67	0.00	0.75						
MIN GC10	85751	33279	27.58	0.00	0.50						
MIN GC11	85635	33499	22.76	0.50	1.50						
MIN GC12	85645	33178	24.12	0.50	2.25						
MIN GC13	86650	33449	40.73	1.50	2.10						
MIN GC14	86835	33588	39.63	1.75	1.80						
MIN GC15	86791	33692	39.73	0.75	1.80						
MIN GC16	86585	33597	41.62	1.25	1.80						
MIN GC17	86831	33356	34.88	1.50	2.75						
MIN GC19	87075	33533	35.48	1.75	3.25						
MIN GC20	87174	33444	33.38	1.25	2.25						
MIN GC21	86366	32818	29.87	0.25	2.25						
MIN GC22	86417	32848	30.84	0.25	3.25						
MIN GC23	86478	32877	31.59	0.25	2.75						
MIN GC24	86221	32876	30.14	1.00	2.85						
MIN GC25	86161	32974	32.81	0.75	2.35						
MIN GC26	86107	33069	34.89	0.75	2.65						
MIN GC27	86050	33176	35.18	0.75	2.50						
MIN GC28	86215	33290	39.92	0.75	2.30						
MIN GC29	86665	33653	40.48	0.25	2.20						
MIN GC30	86300	32540	20.88	0.50	1.50		1.50				
MIN GC31	86240	32575	22.63	0.25	1.25		2.18				
MIN GC32	86180	32550	21.67	0.75	1.75		2.80				

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Table 9.2: Digital Ground Model Data Points (cont'd)

				Depth Below Ground Level (m)							
DGM ID	Easting	Northing	Existing GL	>H4	>H8	Top of Firm	U/S Cohesive	>50% TCR	>75% TCR	>80% TCR	>90% TCR
MIN GC33	86150	32570	22.73	0.50	1.75		3.40				
MIN GC34	86500	33700	36.58	0.75	1.80		1.80				
MIN GC35	86940	33040	29.91	0.75	3.75		4.08				
MIN GC36	87150	33150	27.54	0.75	5.10		5.10				
MIN GC37	87430	33260	26.91	1.25	2.50						
MIN GC38	87260	33280	29.93	0.75	3.15		3.15				
MIN GC39	87250	33350	31.68	0.75	3.25		3.70				
MIN GC40	87320	33250	28.13	0.25	2.75						
MIN GC41	87040	33300	28.73	0.75	0.75						
MIN GC43	86620	33090	36.44	0.50	1.75		2.00				
MIN GC47	86810	33055	32.86	0.75	3.25		3.58				
MIN GC48	86621	33756	38.85	1.80	1.80		1.80				
MIN GC49	86727	33775	38.38	2.11	2.11		2.11				
MIN GC50	86790	33780	37.38	3.00	3.00		3.00				
MIN NTS BH BR1	86227	32870	29.73								
MIN NTS BH BR2	86819	33051	32.82				5.6				
MIN NTS BH BR3	87545	33293	27.11				4.0				
MIN NTS BH BR4	86570	33504	42.55				3.5				
MIN NTS BH OB1	86819	33059	32.58				5.6				
MIN NTS BH OB2	87335	33543	35.20								
MIN NTS BH OB3	87552	33292	26.82								

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9.5 Cut and Fill Volume Calculation Methodology

Using the InRoads software it is possible to calculate cut and fill volumes between any two surfaces. The volumes are calculated in terms of the total cut and fill between the surfaces.

For the present application, we are most interested in the cut and fill volumes between the Terminal Platform surface and the various other material surfaces on the site. The schematic in Figure 9.2 shows a two-dimensional representation of a notional intersection between the Terminal Platform surface and one of the other surfaces modelled in the DGM. It should be noted that the schematic is diagrammatic only and is shown with an exaggerated vertical scale.

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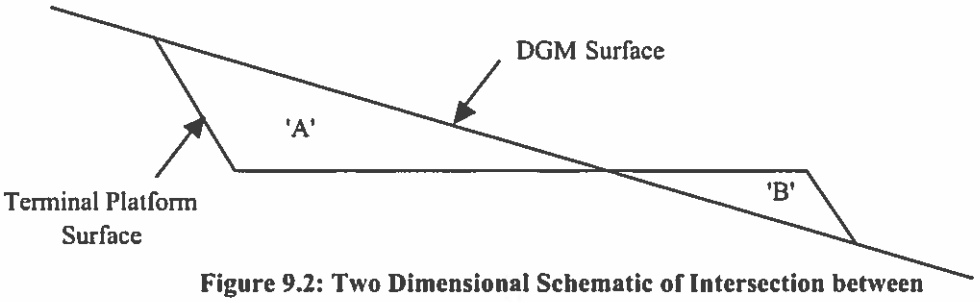
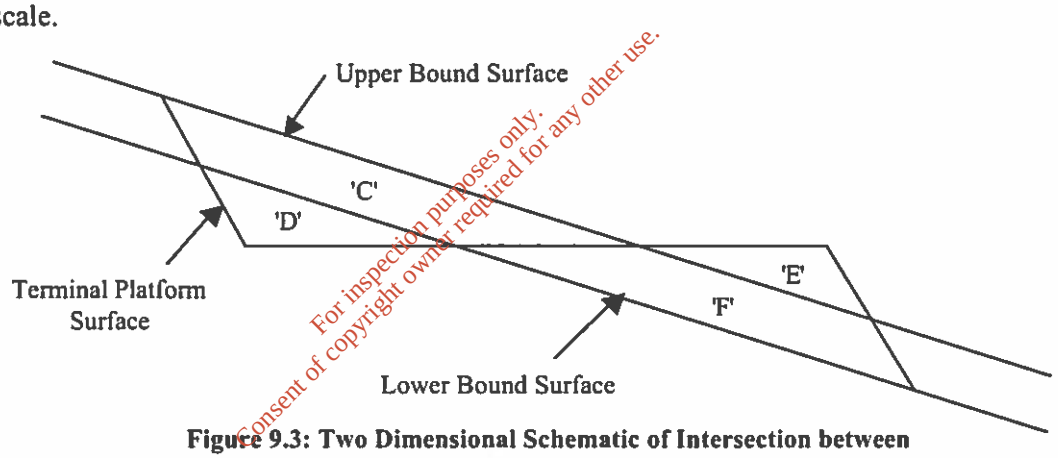


Figure 9.2: Two Dimensional Schematic of Intersection between Terminal Platform surface and other DGM surface

In the Figure 9.2, the volume of cut is represented by area 'A' and the volume of fill is represented by area 'B'.

To calculate the volume of cut and fill of a given type of material over the Terminal Platform area, it is necessary to carry out two cut and fill calculations; one between the Terminal Platform and the upper bound surface of the material and one between the Terminal Platform and the lower bound surface. Figure 9.3 shows a two-dimensional schematic of such a scenario, showing the intersection between the Terminal Platform surface and the upper and lower bound of a band of material. Again, the schematic is shown with an exaggerated vertical scale.



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Figure 9.3: Two Dimensional Schematic of Intersection between Terminal Platform surface and other DGM surface

To obtain the volume of cut for the band of material represented by area 'C', the volume of cut between the Terminal Platform and the lower bound surface (i.e. area 'D') must be subtracted from the volume of cut between the Terminal Platform and the upper bound surface (i.e. area 'D' plus area 'C').

EPA Export 08-07-2014:23:43:29

10. MATERIAL BALANCE

10.1 General

This section present an estimation of the material volumes for cut and fill within the site, the purpose of which is to establish the material balance for the site development, i.e., the volume of material which will be excavated, placed, imported and exported from the site.

For the purpose of presenting the volumes of different types of material on the site, the following material classifications have been used.

Table 10.1: Material Classifications

Material Type	Description
Peat	Peat
Cohesive	Cohesive material, including silts and clays
Granular	Granular material, including sands and gravels. Material with a Total Core Recovery (TCR) of less than 50% from rotary core logs.
Non-Intact Rock	Moderately to heavily weather rock material. Material with a Total Core Recovery (TCR) of between 50% and 90% from rotary core logs.
Intact Rock	Slightly weathered to fresh rock. Material with a Total Core Recovery (TCR) of greater than 90% from rotary core logs.

A series of Terminal Platform elevations were analysed using the DGM in order to optimise the material balance. The level of the Terminal Platform elevation was set at 33.4mAOD on this basis.

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10.2 Description of Material Volumes

10.2.1 General

The following is a description of the earthworks that have been taken into account in preparing the material balance along with an estimate of the material volumes involved.

10.2.2 Terminal Platform

The volumes of cut required for the Terminal Platform at 33.4mAOD are presented in more detail in Table 10.2. The volumes have been rounded to the nearest 1,000m³ for presentation.

Table 10.2: Terminal Platform Cut and Fill

Material	Cut (m³)
Peat	408,000
Cohesive	35,000
Granular	120,000
Non-Intact Rock	24,000
Intact Rock	5,000
Total	**592,000**

Note: 1. All excavated peat will be moved off site.

EPA Export 08-07-2014:23:43:29

In summary, 408,000m³ of peat will have to be excavated from above the site of the Terminal Platform. Following the removal of the peat, approximately 184,000m³ of mineral soils and rock will be excavated. 178,000m³ of this mineral soils and rock will be re-placed as fill to create the Terminal Platform at 33.4mAOD Malin.

10.2.3 Access Roads

10.2.3.1 Main Access Road

The Main Access Road will be upgraded from the existing track to a road capable of carrying significant traffic volumes during the construction phase of the terminal. Thereafter the road will experience less significant operational traffic for the lifetime of the facility.

The road will be 15m wide as far as the turning to the Administration Buildings and 10m from there to the Temporary Construction Facility.

The road construction will utilise peat strengthening, sheet piles, geotextile and imported fill.

Assuming a depth of imported fill of 1m, the estimated volume of imported fill material required for the road is 5,750m³.

10.2.3.2 Eastern Access Road to Terminal Platform

The Eastern Access Road to the Terminal Platform will be constructed by excavating the peat and replacing it with imported fill. The estimate quantity of peat to be removed from the road is approximately 2,500m³. The quantity of imported fill required to raise the road up to foundation level is 750m³.

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10.2.3.3 Administration Building Access Road

The Administration Building Access Road will be constructed by the same method as the Main Access Road and will be 10m wide. The quantity of imported fill required for this road is estimated at 2,750m³.

10.2.3.4 Emergency Access Road

The Emergency Access Roads will be upgraded to 6m wide, principally to facilitate emergency services vehicles. This will be done by strengthening the peat beneath and beside the roads, over which layers of geotextile membrane and fill will be placed..

Assuming a depth of 0.75m of mineral soil and 0.25m of imported fill, the estimated volume of mineral soil required is 8,000m³ and of imported fill is 2,750m³.

10.2.3.5 Settlement Pond Access Road

An access road to the settlement ponds will be installed from the R314. The method of construction of this road will be similar to the Main Access Road. The estimated volume of fill material required for this road is 3600m³.

10.2.4 Administration Building Car Park/Truck Park

The car park and truck park area adjacent to the administration buildings will be constructed as a concrete slab supported by pre-cast concrete piles. The peat beneath this slab will also be strengthened. The strengthening of the peat will require a 0.5m thick platform of imported stone, requiring 2,100m³ of imported fill. Assuming a concrete slab of 300mm thick, this would require approximately 1,250m³ of concrete.

The peat under the administration buildings will also be strengthened, however, the entire area will not be covered by a concrete slab. Therefore, approximately 3,500m³ of imported fill will

EPA Export 08-07-2014:23:43:29

be required during the peat strengthening works, while an allowance of a further 1,250m³of concrete is made for concrete slabs in this area.

10.2.5 Temporary Construction Facilities

The peat in the area of the Temporary Construction Facility (TCF) is to be strengthened and overlain by geotextiles and approximately 1m³ of imported fill, requiring an estimated volume of 10,000m³ of fill.

10.2.6 Gabions

Rock filled gabions will be installed at the edge of the terminal platform close to the flare stack area. The gabions will be filled with imported rock fill material. The estimated volume of imported material required for this purpose is 12,300m³.

10.2.7 Truck Loading Area

The truck loading area is the area where peat is loaded into trucks for export from the site. This area will carry road-going vehicles, typically rigid body tipper trucks. The loading area will measure approximately 100m by 30m to allow for a full turning circle for such vehicles.

The loading area will be surfaced with 0.5m of imported fill, requiring a volume of 1,500m³ fill.

A further allowance of 3,000m³ of imported fill has been made for the provision of access/haul roads within the Terminal Platform during the construction phase.

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10.2.8 Settlement Ponds

Approximately 6,500m³ of peat will be excavated to form the settlement ponds.

10.2.9 Terminal Dressing

It will also be necessary to dress the majority of the Terminal Platform area with imported fill. To maintain the finished level of the Terminal at 33.4mAOD, this will involve replacing approximately 20,000m³ of mineral soil and rock from the site with 20,000m³ of imported fill.

10.2.10 Drainage

An allowance of 10,000m³ of imported stone has been made for drainage within the site. This stone will be used mainly for the permanent drainage associated with Terminal Platform.

10.2.11 Foundation Arisings

An allowance has been made for foundation arisings of 15,000m³. This is the volume of mineral soil and rock that would be replaced by concrete in the form of structural foundations.

10.2.12 Summary of Ancillary Works Volumes

The material volume estimates for the ancillary works on site are presented in Table 10.3.

EPA Export 08-07-2014:23:43:29

Table 10.3: Estimate of Ancillary Site Works Material Volumes

Location	Cut (m³)		Fill (m³)		
	peat	mineral soil/rock	mineral soil/rock	imported fill	imported concrete
Terminal Platform Cut and Fill	408,000	184,000	178,000	0	0
Main Access Road				5,750	
Eastern Access Road to T. P.	2,500			750	
Admin Building Access Road				2,750	
Emergency Access Roads			8,000	2,750	
Settlement Pond Access Roads				3,600	
Administration Building Car Park				2,100	1,250
Administration Buildings				3,500	1,250
Temporary Construction Facilities				10,000	
Gabions				12,300	
Peat Loading Bay and haul roads				4,500	
Settlement Ponds	6,500				
Terminal Platform Dressing		20,000		20,000	
Drainage				10,000	
Foundations		15,000			15,000
Total	**417,000**	**219,000**	**186,000**	**78,000**	**17,500**

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10.2.13 Soil Strengthening Binder

The estimated volume of peat that would require strengthening in the course of the works outlined above is 156,000m³. Based on the strengthening techniques described earlier in this report, it is estimated that this may require the importation of approximately 24,000 tonnes of binder. If it was necessary to strengthen the 178,000m³ of mineral soil/rock fill in the Terminal Platform, this could require a further 12,500 tonnes of binder.

10.3 Summary

From the above, the main conclusions relating to material balance are:

- approximately 417,000m³ of peat will be excavated and removed from the site.
- approximately 219,000m³ of mineral soil and rock is being excavated from the site,
- approximately 186,000m³ of the excavated mineral soils and rock is being used as fill on site,
- approximately 33,000m³ of mineral soil will be removed from site,
- approximately 78,000m³ of fill will be imported onto the site,
- approximately 17,500m³ of concrete will be imported onto the site, and
- approximately 36,500 tonnes of binder could be imported onto the site.

EPA Export 08-07-2014:23:43:29

11. EARTHWORKS CONSTRUCTION SEQUENCE

11.1 General

This section outlines the sequence of construction activities for the earthworks phase of the development of the Bellanaboy site for the period from commencement on site to the completion of the earthworks. In summary, this phase includes:

- Establishing access into the Bellanaboy site,
- Improving drainage on the site and installing settlement ponds,
- Excavation and removal of peat from the Bellanaboy site,
- Creation of the Terminal Platform,
- Provision of temporary construction facilities, and
- Upgrading of emergency access roads.

The peat removal sequence is based on recommendations by Bord na Móna because of their particular expertise in peat handling, and their requirements for peat quality prior to reception at the deposition area at Srahmore. The transportation of the peat from the site and the reception of the peat at Srahmore is not covered here.

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11.2 Seasonal Impacts

For the purpose of examining the seasonal impact on the site development, the earthworks can be divided into two principal activities: the removal of peat from the site and the cut and fill of mineral soils and rock within the site.

The removal of peat from site essentially comprises excavation, windrowing and offloading of the peat. Excavated peat is to be windrowed for 8 days before being offloaded from the site by truck, the purpose of which is to remove as much free-water from the peat as possible. The windrowing, offloading, and reception at the deposition site are weather dependent. This will introduce periods in the peat excavation, removal and receiving activities when Shell and Bord na Móna will agree to suspend the works until the weather improves.

The cut and fill of mineral soils within the site is also likely to be weather dependent. The lower the moisture content of this material, the easier it will be to handle, place and compact. The cut and fill of rock and imported fill, will be less dependent on weather but the scope for this work is likely to be limited over the winter period.

11.3 Upgrade of Public Road Haul Route

The first activity associated with the removal of peat from the site is the upgrading of the R314 and L1204. It is assumed that the earthworks contractor will not carry out this work. These works will impact on the earthworks construction sequence, as they will define the first date that peat can be removed from site.

11.4 Site Works

It is expected that the earthworks will take place over two construction seasons, with little activity over the winter period. In summary the sequence of construction activities is as follows.

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The first activities on site will be the improvement of drainage, the upgrading of the access to the site, and the commencement of the truck parking area. Next, the access to the settlement ponds and administration building platform will be established. The windrowing and removal of peat will commence once the public road haul route has been upgraded. During the early stages of the removal of peat from the site, the settlement ponds will be excavated and the peat arisings will be windrowed. The windrowing of the peat will take place on a mineral soil surface in the north-eastern corner of the terminal platform. Once the removal of peat has commenced, this will expose mineral soils and rock, which can be excavated and used as fill within the site when required. Any surplus or unusable mineral soils will be removed from site. To allow civil and mechanical works to take place in the terminal over the winter period, an area of approximately two hectares in the north-eastern corner of the terminal platform will be excavated to the finished level of 33.4mAOD before the end of the first earthworks season. The removal of the remainder of the peat from the terminal platform in the second earthworks season will then allow the cut and fill works on the site to be completed.

This sequence is explained in more detail below.

11.4.1 Upgrade of Public Road Haul Route

The first activity associated with the removal of peat from the site is the upgrading of the R314 and L1204. These works will impact on the construction sequence, as they will define the first date that peat can be removed from site.

11.4.2 Install Temporary Accommodation

The necessary construction site accommodation and welfare facilities will be installed. Initially these will be relatively small scale for the earthworks crew.

11.4.3 Install monitoring

Before any earthwork activities take place on site, piezometers, inclinometers and settlement plates will be installed to allow constant monitoring of the groundwater levels and ground movement in and around the site, particularly north and south of the terminal.

11.4.4 Install Dewatering Wells

The dewatering wells will be drilled in two main lines across the terminal footprint. This will assist in drawing down the water table and over time reduce the moisture content of the mineral soil that will be excavated, increasing its workability.

11.4.5 Upgrade Existing Drainage and Silt ponds

In parallel to the upgrading of the access to the site, the existing drainage channels on the site will be configured to cater for the construction work and the silt ponds at the western end of the drains will be augmented. An existing drain within the firebreak to the south of the terminal platform and a deep drain to the east of the track on the western edge of the terminal will be upgraded to act as catch drains. Any drains adjacent to areas of the works will be augmented and temporary silt ponds will be installed as required.

11.4.6 Establish Main Access Road to the Site

The first activity at the Bellanaboy site following the granting of planning will be the preparation of adequate and safe access to the site. This will involve the widening of the entrance to the site from the R314 and the upgrading of the main access road between the R314 and the eastern access road to the Terminal Platform. This upgrading will have to be complete prior to the commencement of significant heavy trafficking on the site.

The upgrading of this road will involve the strengthening of the in-situ peat, the installation of sheet piles and the importation of geotextiles and fill. The strengthening of the peat involves

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the mixing of a binder with the peat to form strengthened columns or blocks thereby increasing the compressive strength of the peat. The strengthened areas are then capped with a layer of heavy-duty geotextile and imported stone. The edges of the road will be sheet piled to provide additional containment to the strengthened peat. The geotextile and stone can be placed on the strengthened peat columns almost immediately following the installation of the columns.

It is envisaged that the upgrading works will start at the entrance at the R314 and work northwards. The access road will be 15m wide between the R314 and the Administration Building Access Road and 10m wide from there up to the eastern access road to the Terminal Platform. There will be a period at the start of these works where access to the site from the R314 will be restricted to light vehicular traffic.

11.4.7 Establish Truck Park

In parallel with the upgrading of the Main Access Road, a truck parking area will be established to the west of the main access road. The truck parking area will consist of a concrete slab supported by ODEX piles which will be cast in situ. The piles will be installed through a piling platform created using imported fill on strengthened peat. The peat will be strengthened using a similar technique to that used in the Main Access Road. The peat strengthening will commence at the edge of the existing north-south running track heading west, all the time working from the firm foundation being created.

Once completed, this truck park will provide the necessary area for haulage truck parking, offices, and storage until the Temporary Construction Facility has been constructed. A part of the truck park area will ultimately become the permanent car park for the Administration Buildings.

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11.4.8 Establish Settlement Pond Access

Following the completion of the Main Access Road, a new entrance into the site will be opened from the R314, through an existing entrance if possible, to gain access to the settlement pond location. The same construction methodology will be used here as is used in the Main Access Road except that the road will only be 8m wide.

The access road to the settlement ponds will be continued around the perimeter of the two settlement ponds and extend between the ponds to provide permanent access to the ponds for both the construction and maintenance periods. In this way, the sheet piling at the edge of the access road will also form the edge of the settlement ponds.

A small temporary laydown/turning area may be created adjacent to the settlement pond access.

11.4.9 Establish Administration Building Access Road

Following the completion of the truck park, the Administration Building Access Road will be established, extending from the Main Access Road to the south-eastern corner of the Terminal Platform. This road will be 10m wide and be of similar construction to the Main Access Road. This road will ultimately be the main point of access to the Terminal Platform.

11.4.10 Establish 1ha Temporary Construction Facility

Upon completion of the Administration Building Access Road, similar techniques of peat strengthening and sheet piling will be employed to create the Temporary Construction Facility (TCF). A heavy duty geotextile will be laid over the strengthened peat and overlaid with rock.

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11.4.11 Establish Administration Building Platform

After completing the TCF, the Administration Building Platform will be established. The platform will be established by strengthening the peat, installing sheet piles around the edge of the platform and placing fill on top of the strengthened peat to provide a level platform on which the administration buildings can be built. Any structures built on the Administration Building Platform will be on piled foundations taken through the strengthened peat to the weathered bedrock.

11.4.12 Upgrade Emergency Access Roads

The emergency access roads to the north and west of the site will be upgraded using a combination of peat strengthening and placing of mineral soils available from the excavation in the Terminal Platform. The roads will be completed as excavated material becomes available from the terminal.

11.4.13 Install Gabion Walls

Gabion walls will be installed along the line of the top of the cut slopes of the terminal platform in advance of the excavation of peat. The gabions will be founded on mineral soils and will retain the peat as a permanent feature of the terminal as the site is excavated.

11.4.14 Initial Excavation of peat from NE Terminal Corner

The peat will be removed firstly from an eastern access road to the Terminal Platform and then progressively across the area of the north-eastern corner of the Terminal Platform working in a westerly direction.

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At the early stages of peat excavation there will not be an area of exposed mineral soils available for windrowing the peat. Windrowing consists of excavating peat from the existing peat blanket and placing into linear stockpiles on a mineral soil foundation using excavators. The linear stockpiles, or windrows, could be up to 3.5m in height at the centre. Bord na Móna have indicated that the peat located in the north-eastern quadrant of the site, which is thinner and drier than much of the rest of the peat over the terminal platform, should be of a sufficient quality to be loaded into the haulage trucks for transfer to the Srahmore deposition site without windrowing.

Gradually, this activity will expose the mineral soils providing an area where peat can be windrowed prior to removal and where a truck loading bay can be established.

It is envisaged that offloading of the better peat, without windrowing, is likely to continue for a period of approximately 10 days, by which time a sufficient area will have been cleared of peat to allow some windrowing to take place. There would then be a period of a further week over which some peat would be windrowed and some would be offloaded without windrowing – this is because there would not be a sufficient volume of windrowed peat available at this stage to meet a daily offloading rate of 4,000m³.

11.4.15 Windrow Excavated Peat from Settlement Ponds

Once there is a windrowing area created within the Terminal Platform, the peat from inside the sheet-piled settlement ponds will be excavated, transported to the Terminal Platform, mixed with peat coming from within the terminal, and windrowed.

11.4.16 Excavation of Peat to Windrows

Any further peat being excavated from the site will be windrowed prior to offloading from the site.

The peat will remain in the windrows for a period of 8 days (with the more time available for windrowing the better). Working on the assumption that 4,000m³ of peat will be excavated to

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the windrows in each working day, the windrow area will therefore have to be capable of storing approximately 28,000m³ of peat at any one time. Assuming an average side-slope of 1:2 for the windrows, an area of approximately 16,000m² would be required to store this volume of peat. It may be feasible to achieve a greater side-slope for the windrowed peat but the potential area saved by this may be offset against providing limited access between the windrows.

An area for a truck loading bay is also required. It is assumed that the truck loading bay will measure the equivalent of 100m by 30m. This implies that a total area required at any one time to facilitate the peat removal operations will be of the order of two hectares.

The windrowing area would gradually move across the site (as would the truck loading bay) as the peat excavation front moves west.

The orientation of the windrows should be such that natural drainage is achieved between them. Free drainage from the windrows will be maintained at all times.

11.4.17 Excavate Mineral Soils from the Terminal

Once a sufficient area of the Terminal Platform has been stripped of peat to allow the peat removal activities to proceed unhindered (i.e. an area greater than 2 ha) it will become possible to commence the excavation of mineral soils from the north-eastern corner of the Terminal Platform.

The excavated mineral soil will be used for upgrading internal access roads and other facilities. Any surplus or unusable mineral soils will be removed from site as required.

Prior to the cessation of works before the first winter season, it is intended that an area of approximately two to three hectares will be excavated down to the finished terminal level of 33.4mAOD. This will require the excavation of approximately 120,000m³ of mineral soils. A further volume of rock beneath the mineral soil will also be excavated. This excavated mineral soil and rock will be used as fill to create the Terminal Platform as it becomes available.

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11.4.18 Install Southern Perimeter Sheet Piles

Starting from the Administration Building Access Road, a line of sheet piles will be installed along the southern edge of the Terminal Platform in advance of the fill of the platform. The sheet pile wall will provide temporary restraint to allow the peat to be excavated and replaced with fill material. It will also allow a groundwater drain to be installed along the southern perimeter of the platform.

11.4.19 Excavate Rock from Terminal and Commence Fill of Platform

Prior to the cessation of works before the first winter season, it is intended that an area of approximately two to three hectares will be excavated down to the finished terminal level of 33.4mAOD. This will require the excavation of approximately 30,000m³ of non-intact and intact rock. Blasting will not be required to excavate this rock.

This rock has been allocated for use in the fill of the Terminal Platform. Since some of the fill of the Terminal Platform will not take place until the second season, a portion of this rock will be stockpiled over the winter period. It is estimated that an area of approximately one hectare within the Terminal Platform will be required for this stockpile.

11.4.20 Early Civil Works

To provide space for civil and mechanical works to take place within the terminal over the first winter season, prior to the cessation of earthworks before the winter, a sufficient area of peat would have to be cleared to allow for the civil works area, an area for storage of rock material, and an area for windrowing and offloading peat at the beginning of the second

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season. This would require an area of approximately six hectares of peat to be removed, the equivalent of approximately 200,000m³ of peat.

The area of excavated peat will also have to be left in such a condition that it will be fully drained over the winter period.

It is intended that civil and mechanical works will commence during the winter period when earthworks activities in the Terminal Platform have been halted.

11.4.21 Second Season

After the cessation of earthworks over the winter period, once the weather permits, the offloading of peat will recommence. The windrowing of peat will take place in advance to build up a stock of windrowed peat for offloading.

11.4.22 Completion of Offloading of Peat

The peat will be excavated, windrowed and offloaded in the same manner as before until all peat has been cleared from the Terminal Platform area. Civil and mechanical works will still be taking place at this time. The earthworks contractor will utilise the Administration Building Access Road for the offloading of peat instead of the eastern access road to the Terminal Platform for this period.

11.4.23 Completion of Terminal Platform

As the peat is being removed from levels below the finished level of the Terminal Platform, it is replaced immediately with rock and mineral soil fill. The sheet pile wall installed previously will provide temporary support to facilitate excavation of the peat. The southern edge of the fill area will be reinforced with geotextile.

In parallel with the completion of the fill of the Terminal Platform, the permanent surface and groundwater drainage for the terminal will be completed and tied into the settlement ponds.

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10cm - SCALE WITH CAUTION AS DISTORTION CAN OCCUR

A3

10cm

N

AGHOOS Td.

TRUCK LOADING BAY

Upgrade Existing Track for Temporary Access Initially

WINDROWS

BELLAGELLY SOUTH Td.

LINE OF DEWATERING WELLS

TEMPORARY CONSTRUCTION FACILITY

EXISTING DRAINS

SILT PONDS

ADMIN BUILDING AREA

Construction Compound for Use for Purposes only Compatible with Permitted Use any other use

LINE OF DEWATERING WELLS

MAIN ACCESS ROAD

BELLANABOY Td.

SETTLEMENT PONDS

Rev.	Date	By	Description	Chd By
P4	08.12.03	MD	Issued for Planning	EL
P3	28.11.03	MD	Issued for Planning	MD
P2	20.11.03	MD	Re-issued for information	MD
P1	18.11.03	MD	Issued for Information	MD

- Existing Drain
- Permanent New or Upgraded Drain
- Temporary New Drain
- Outline of Facility

Job Title
CORRIB TERMINAL:
BELLANABOY BRIDGE

Drawing Title
PEAT REMOVAL SCHEMATIC:
INITIAL STAGE (1 of 4)

Drawing Status
PLANNING

ARUP Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
Email cork@arup.com
DUBLIN CORK LIMERICK

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Scales 1:7500 @ A3
Originator M Daly
Checked E Lynch
Approved E Lynch
Date 18.11.03

Job No. C1157.10
Drawing No. C771
Rev. P4

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A3

10cm – SCALE WITH CAUTION AS DISTORTION CAN OCCUR

10cm

AGHOOS Td.

BELLAGELLY SOUTH Td.

BELLANABOY Td.

EMERGENCY ACCESS ROADS

EARLY CIVIL WORKS

WINDROWS

EXISTING DRAINS

SILT PONDS

LINE OF DEWATERING WELLS

SETTLEMENT PONDS

TEMPORARY CONSTRUCTION FACILITY

TRUCK LOADING BAY

MAIN ACCESS ROAD

ADMIN BUILDING AREA

FILLED PLATFORM

Construction Exclusion Zone - Not to be used for any other purposes unless required for Construction Purposes

Rev.	Date	By	Description	Chd By
P4	08.12.03	MD	Issued for Planning	EL
P3	28.11.03	MD	Issued for Planning	MD
P2	20.11.03	MD	Re-issued for information	MD
P1	18.11.03	MD	Issued for Information	MD

Existing Drain

Permanent New or Upgraded Drain

Temporary New Drain

Outline of Facility

Job Title
CORRIB TERMINAL:
BELLANABOY BRIDGE

Drawing Title
PEAT REMOVAL SCHEMATIC:
INTERMEDIATE STAGE (2 of 4)

Drawing Status
PLANNING

ARUP Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
EMail cork@arup.com
DUBLIN CORK LIMERICK

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Job No. C1157.10 Drawing No. C772 Rev. P4

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10cm – SCALE WITH CAUTION AS DISTORTION CAN OCCUR

A3

10cm

ACHOOS Td.

EMERGENCY ACCESS ROADS

EARLY CIVIL WORKS

WINDROWS

EXISTING DRAINS

SILT PONDS

BELLAGELLY SOUTH Td.

TEMPORARY CONSTRUCTION FACILITY

MAIN ACCESS ROAD

TRUCK LOADING BAY

LINE OF DEWATERING WELLS

ADMIN BUILDING AREA

BELLANABOY Td.

FILLED PLATFORM

SETTLEMENT PONDS

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Rev.	Date	By	Description	Chd By
P4	08.12.03	MD	Issued for Planning	EL
P3	28.11.03	MD	Issued for Planning	MD
P2	20.11.03	MD	Re-issued for information	MD
P1	18.11.03	MD	Issued for Information	MD

Existing Drain

Permanent New or Upgraded Drain

Temporary New Drain

Outline of Facility

Job Title
CORRIB TERMINAL:
BELLANABOY BRIDGE

Drawing Title
PEAT REMOVAL SCHEMATIC:
LATTER STAGE (3 of 4)

Drawing Status
PLANNING

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Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
EMail cork@arup.com
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Job No. C1157.10
Drawing No. C773
Rev. P4

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A3

10cm – SCALE WITH CAUTION AS DISTORTION CAN OCCUR

10cm

AGHOOS Td.

EMERGENCY ACCESS ROADS

PERMANENT DRAINAGE

EXISTING DRAINS

SILT PONDS

BELLAGELLY SOUTH Td.

TEMPORARY CONSTRUCTION FACILITY

MAIN ACCESS ROAD

ADMIN BUILDING AREA

FILLED PLATFORM

BELLANABOY Td.

SETTLEMENT PONDS

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Rev.	Date	By	Description	Chd By
P4	08.12.03	MD	Issued for Planning	EL
P3	28.11.03	MD	Issued for Planning	MD
P2	20.11.03	MD	Re-issued for information	MD
P1	18.11.03	MD	Issued for Information	MD

Existing Drain

Permanent New or Upgraded Drain

Temporary New Drain

Outline of Facility

Job Title
CORRIB TERMINAL:
BELLANABOY BRIDGE

Drawing Title
PEAT REMOVAL SCHEMATIC:
COMPLETED STAGE (4 of 4)

Drawing Status
PLANNING

ARUP
Consulting Engineers
15 Oliver Plunkett Street, Cork
Tel 021-4277670 Fax 021-4272345
Email cork@arup.com
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Checked E Lynch
Approved E Lynch
Date 18.11.03

Job No. C1157.10
Drawing No. C774
Rev. P4

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APPENDIX A
Earthworks and Roads Drawings

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NOTES:

1. USE FIGURE DIMENSIONS ONLY. DO NOT SCALE.

2. ALL LEVELS REFER TO CD MALIN HEAD.

FINAL ROAD SPECIFICATION TYPE 2
50mm JUNISTONE FINES BLINDING ON
300mm MIN CAT2 80% BROKEN LIMESTONE ON
POLYBRANE GEOTEXTILE MEMBRANE

FINAL ROAD SPECIFICATION TYPE 1
PRECOATED CHIPPINGS (20mm AGG.) TO CL 902 ON
40mm ROLLED ASPHALT WEARING COURSE CL 905 ON
50mm DENSE BITUMEN MACADAM BASE COURSE
(76mm AGG.) TO CLAUSE 804 ON
50mm LIMESTONE FINES BLINDING ON
300mm MIN. CLAUSE 804 "BROKEN LIMESTONE ON
POLYBRANE GEOTEXTILE MEMBRANE.

TEMPORARY CONSTRUCTION FACILITY

TERMINAL PLATFORM (33.4m OD MALIN)

REFER TO DRAWING COR-AR-RL-002

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AN BORD PLEANÁLA
TIME ____ BY ____
30 JUN 2014
LTR DATED ____ FROM ____
PL ____

Corrib Field Development

Bellanaboy Bridge Gas Terminal

Shell E&P Ireland Limited

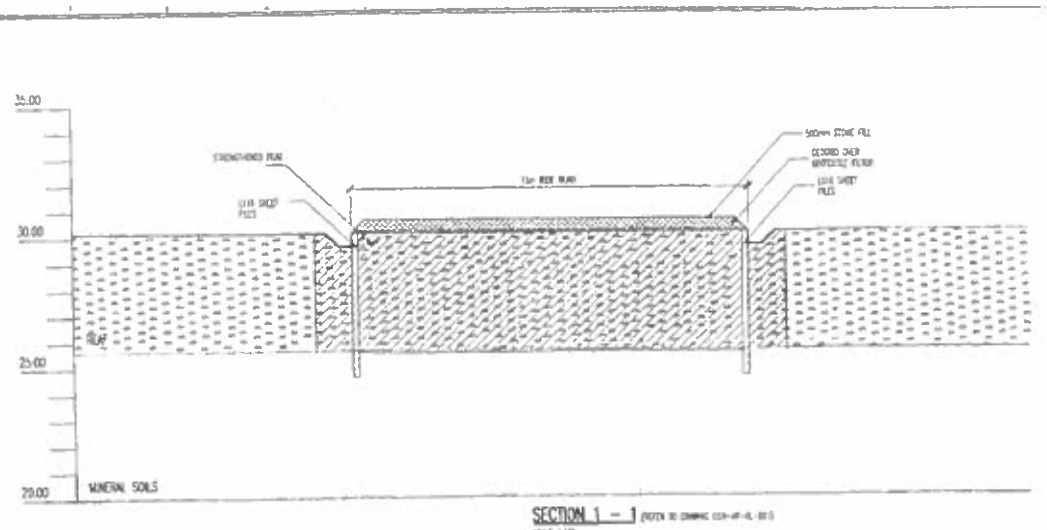
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ARUP Consulting Engineers

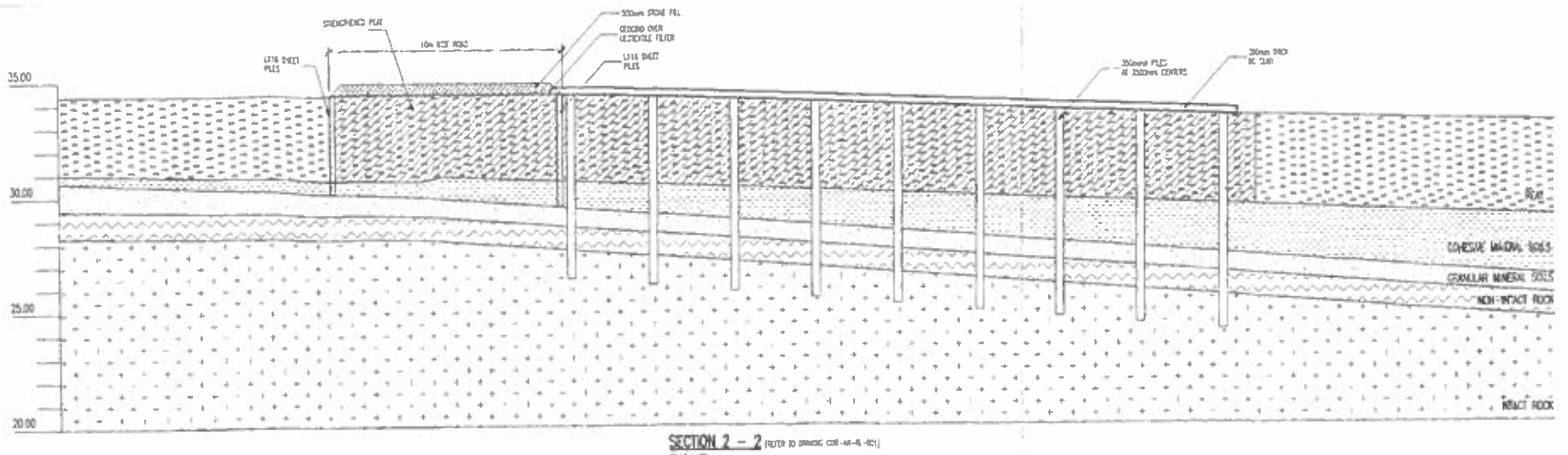
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SITE ROADS LAYOUT PLAN

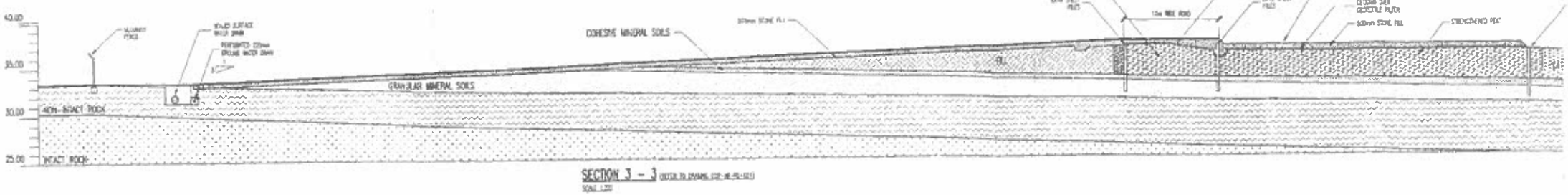
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Size A0	Scale (at full size) 1:2500
Drawn by B.MURPHY	
Checked J. O'BRIEN	Approved E LYNCH
Date NOVEMBER 2003	
Issue For Planning Application	Shell Drawing No COR-AR-RL-001



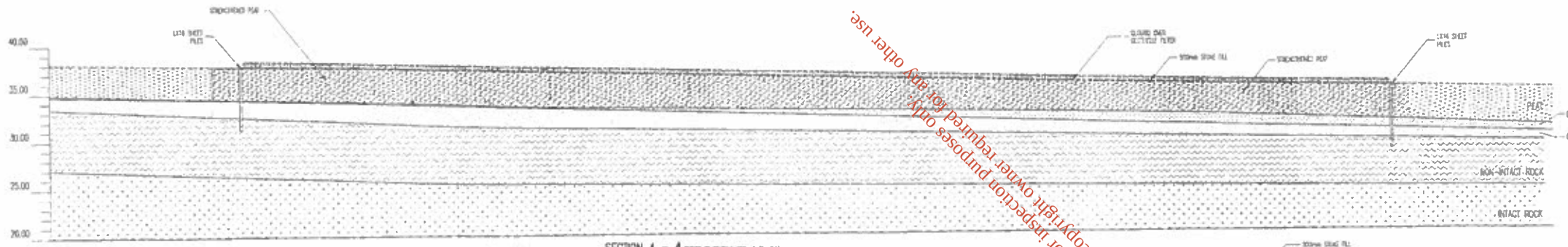
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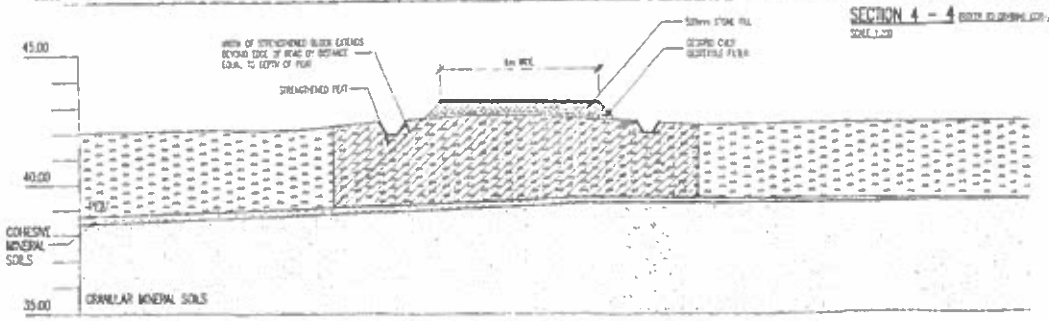
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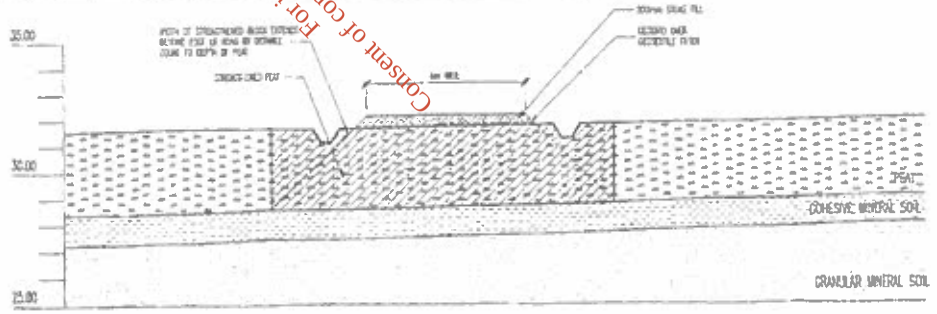
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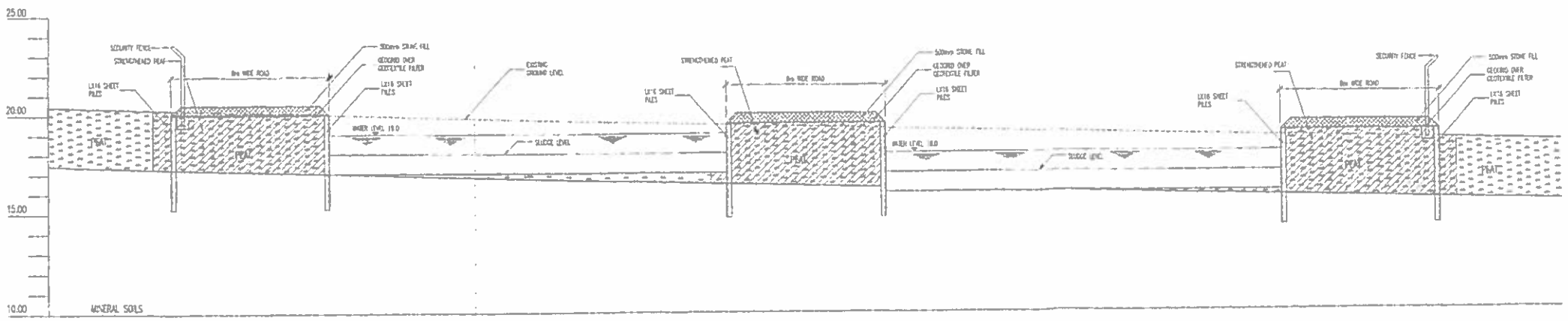
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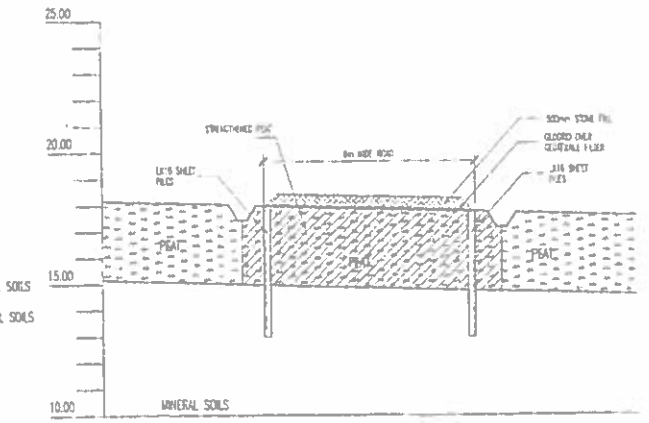
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SECTION 6 – 6 (REFER TO DRAWING COR-AR-RL-001)
SCALE 1:100



SECTION 7 – 7 (REFER TO DRAWING COR-AR-RL-001)
SCALE 1:100



SECTION 8 – 8 (REFER TO DRAWING COR-AR-RL-001)
SCALE 1:100

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1. USE FIGURE DIMENSIONS ONLY DO NOT SCALE.
2. LEVELS REFER TO CD WATER HOD

Corrib Field Development

Bellanaboy Bridge Gas Terminal

Shell E&P Ireland Limited

CORRIB DEVELOPMENTS

ARUP Consulting Engineers

Drawing Title: TERMINAL ROAD SECTIONS

A-U3 Drawing No. C-051	Sheet No. 1 OF 1
Size A0	Scale (at full size) 1:100, 1:200
Drawn by B.MURPHY	
Checked J. O'BRIEN	Approved E.LYNCH
Date NOVEMBER 2003	
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1. USE FIGURE DIMENSIONS ONLY DO NOT SCALE.

2. THE SITE TOPOGRAPHY IS REFERENCED TO ORDNANCE DATUM AT MALIN HEAD USING THE ORDNANCE BENCHMARKS AT BELLANABOY BRIDGE WHICH IS +3.193m ABOVE THE DATUM AT MALIN HEAD.

EMERGENCY ESCAPE PATH

EMERGENCY ESCAPE PATH

EMERGENCY ESCAPE PATH

GABIONS

TEMPORARY CONSTRUCTION FACILITY

TERMINAL PLATFORM (33.4m OD MALIN)

SECURITY FENCE

ADMINISTRATION BUILDINGS AREA

1 REFER TO DRAWING COR-AR-EW-002

2 REFER TO DRAWING COR-AR-EW-002

3 REFER TO DRAWING COR-AR-EW-002

4 REFER TO DRAWING COR-AR-EW-002

5 REFER TO DRAWING COR-AR-EW-002

6 REFER TO DRAWING COR-AR-EW-002

7 REFER TO DRAWING COR-AR-EW-002

8 REFER TO DRAWING COR-AR-EW-003

9 REFER TO DRAWING COR-AR-EW-003

10 REFER TO DRAWING COR-AR-EW-003

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18 JUN 2004
LTR DATED FROM

Corrib Field Development

Bellanaboy Bridge Gas Terminal

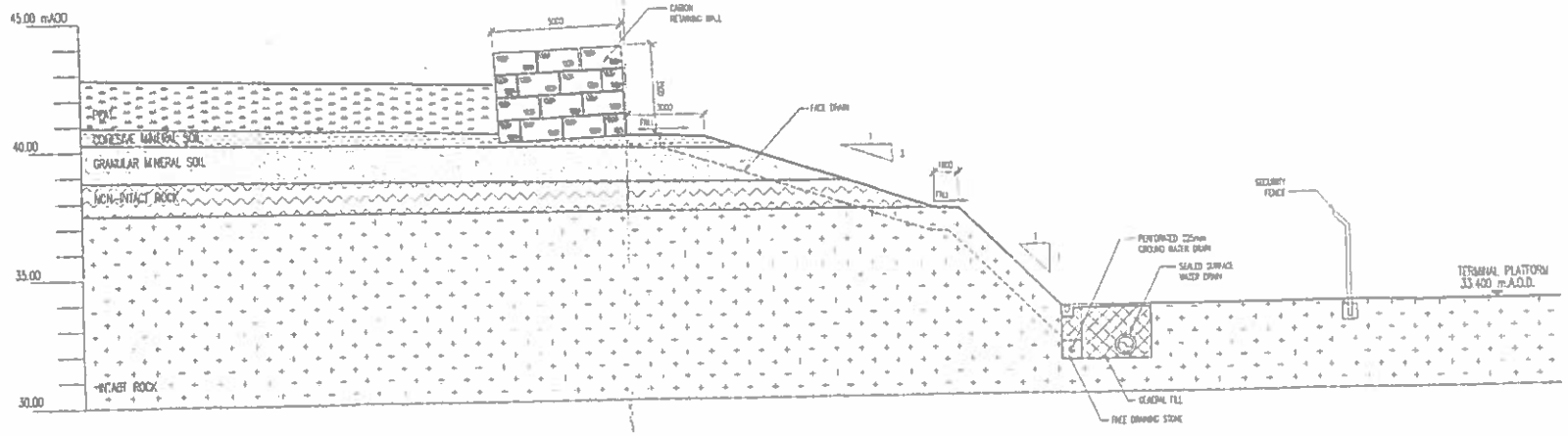
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Corrib natural gas

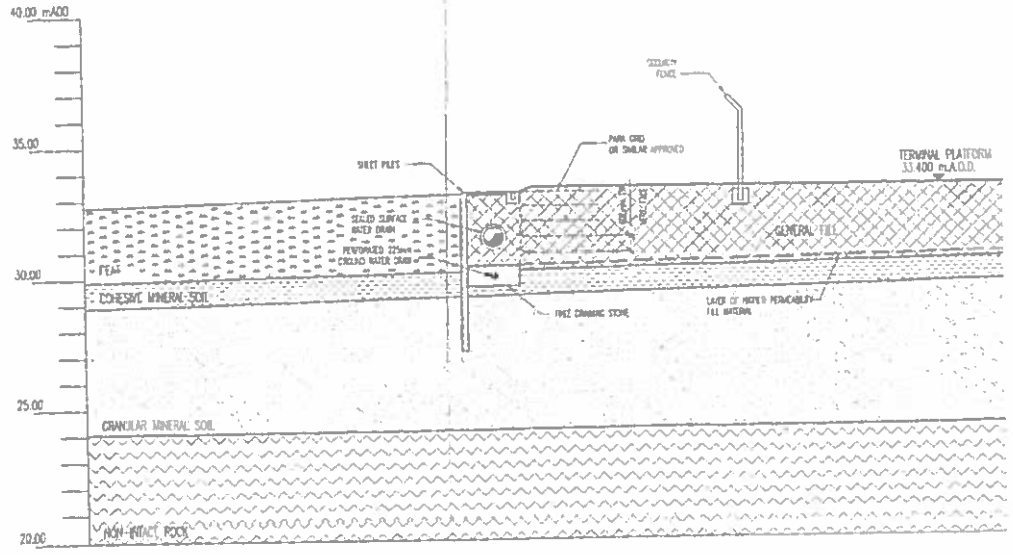
ARUP Consulting Engineers

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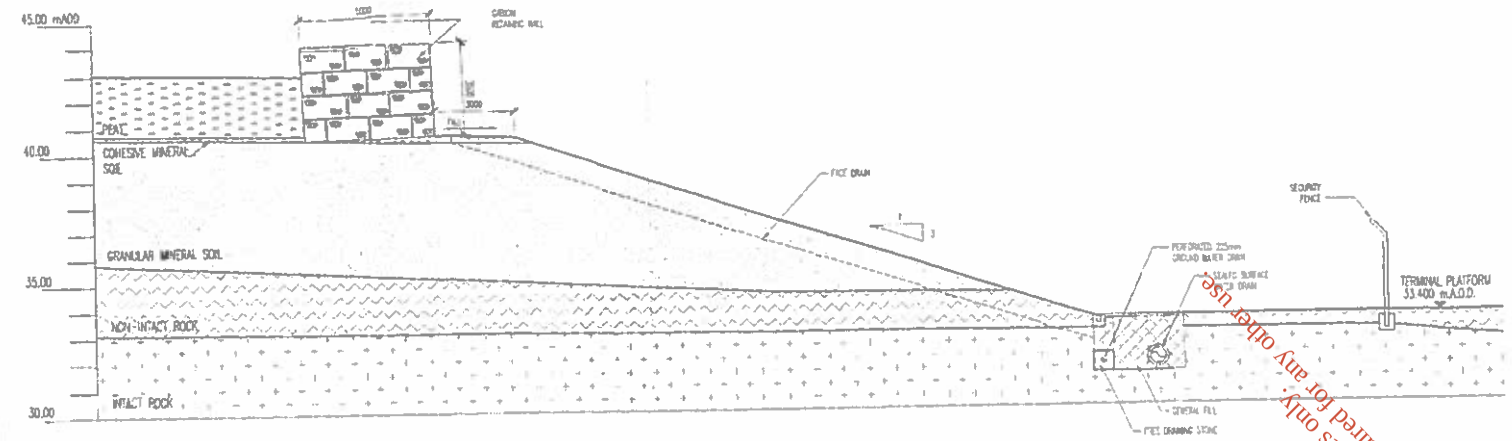
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Checked: J. O'BRIEN	Approved: E.LYNCH	Date: NOVEMBER 2003	
Issue: For Planning Application		Sheet Drawing No: COR-AR-EW-001	



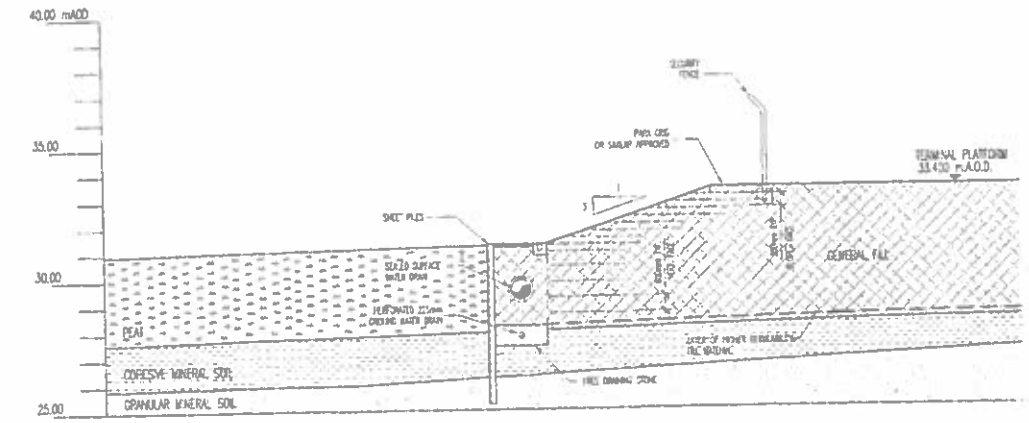
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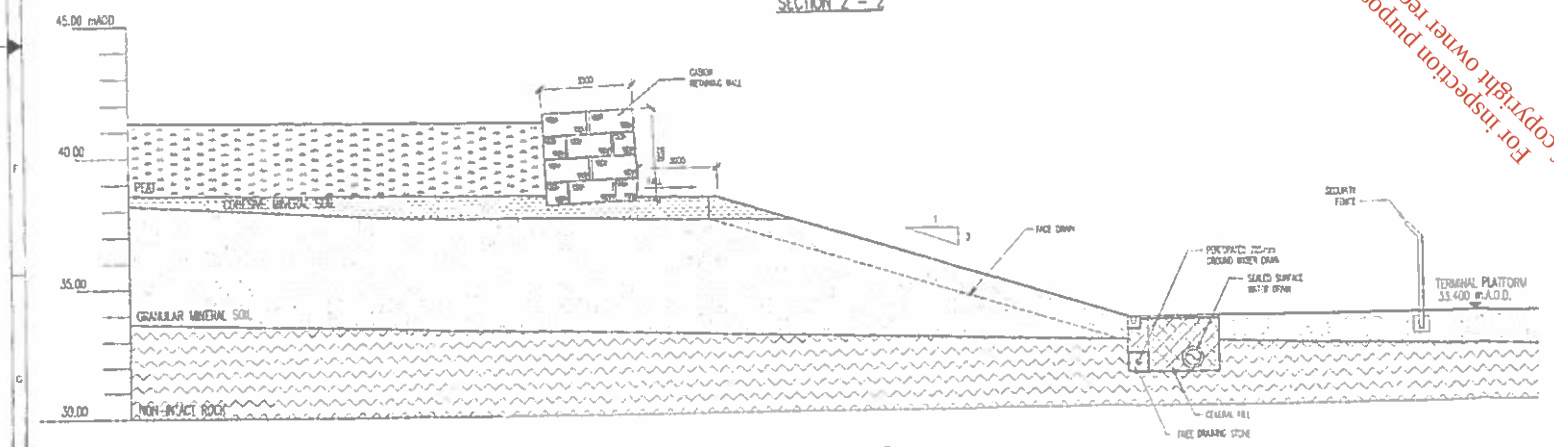
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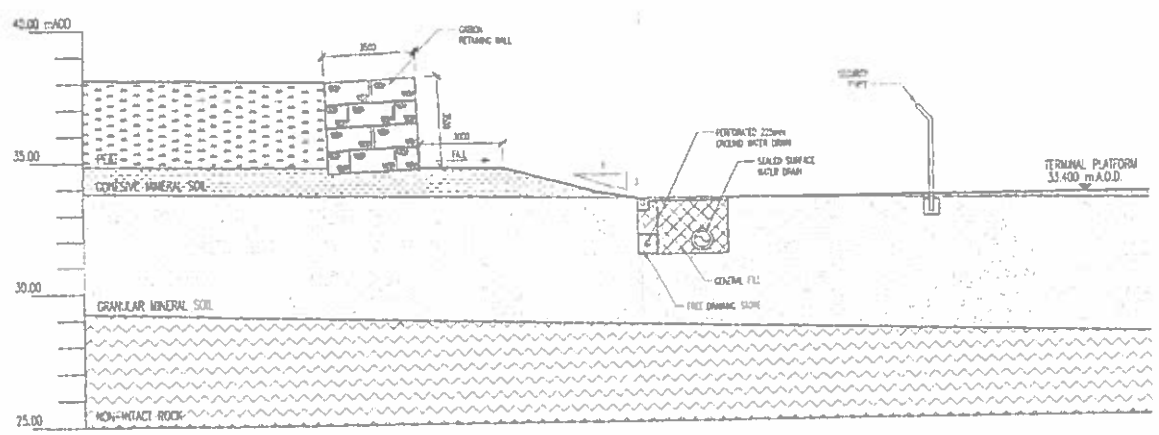
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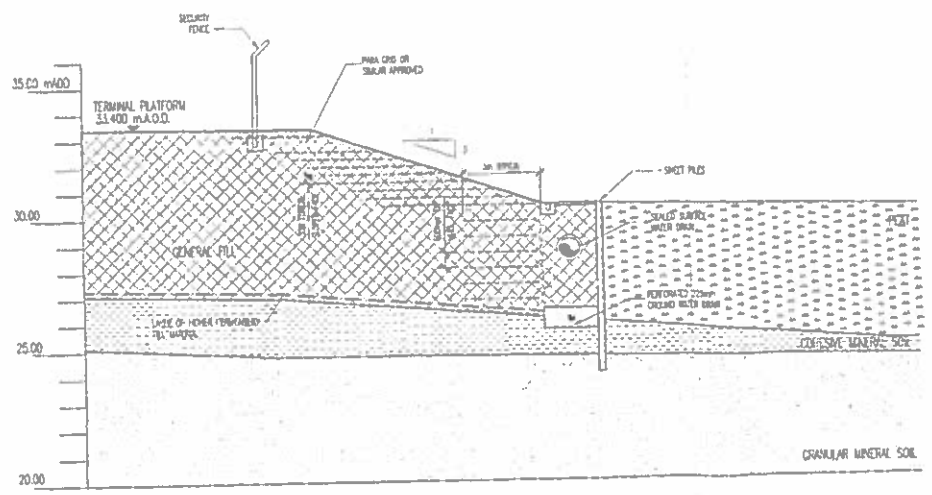
SECTION 6 - 6



SECTION 3 - 3



SECTION 4 - 4



SECTION 7-7

NOTES:
1. USE FIGURED DIMENSIONS ONLY, DO NOT SCALE.
2. ALL LEVELS REFER TO OD MALIN HEAD.

Corrib Field Development

Bellanaboy Bridge Gas Terminal

Shell E&P Ireland Limited

Corrib

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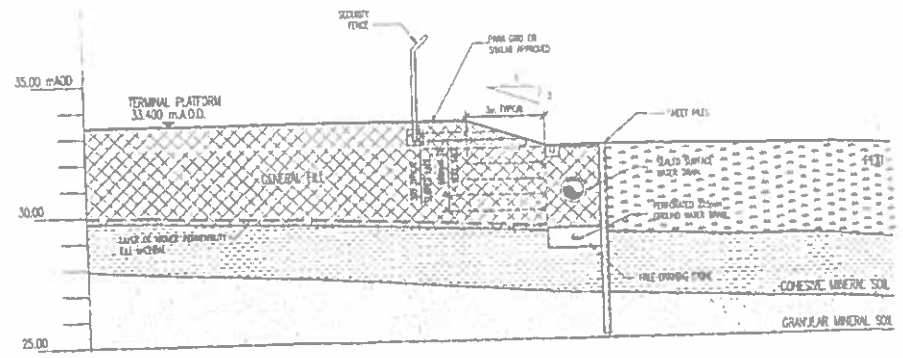
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SHEET 1

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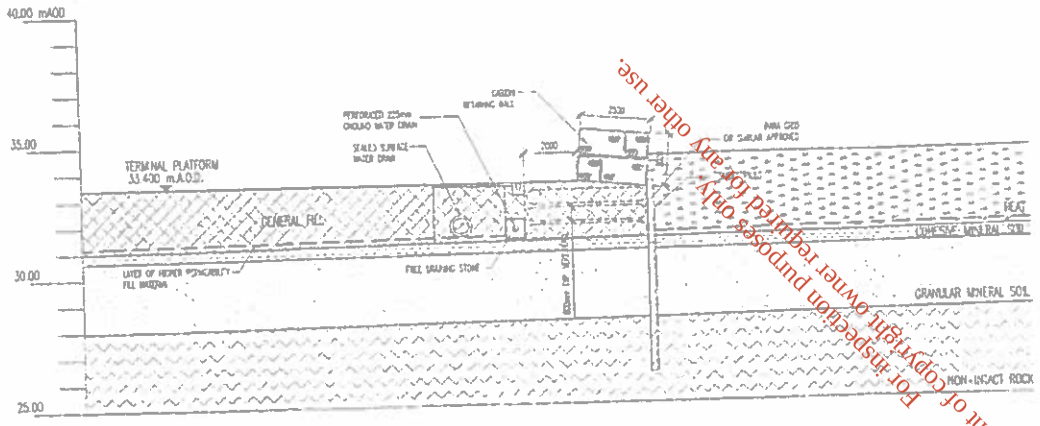
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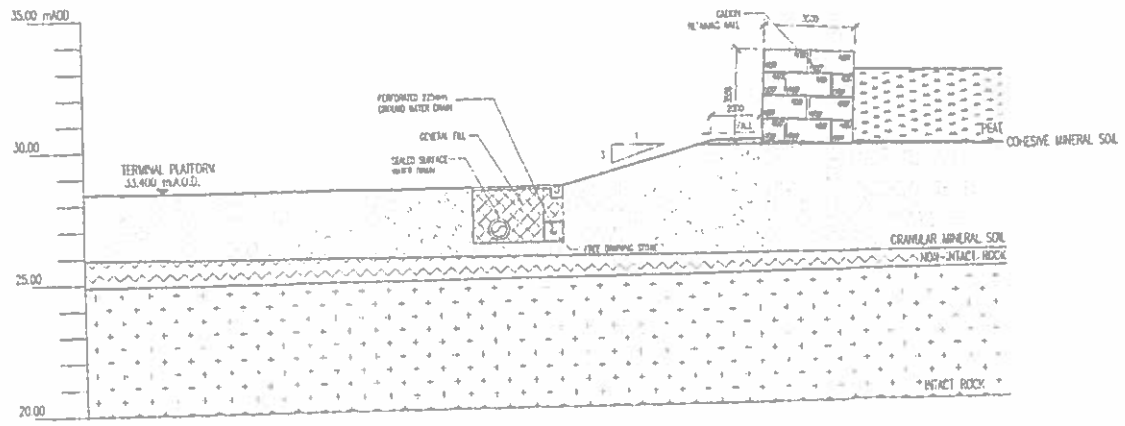
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SECTION 8-8



SECTION 9 - 9



SECTION 10 - 10

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Bellanaboy Bridge Gas Terminal

Shell E&P Ireland Limited

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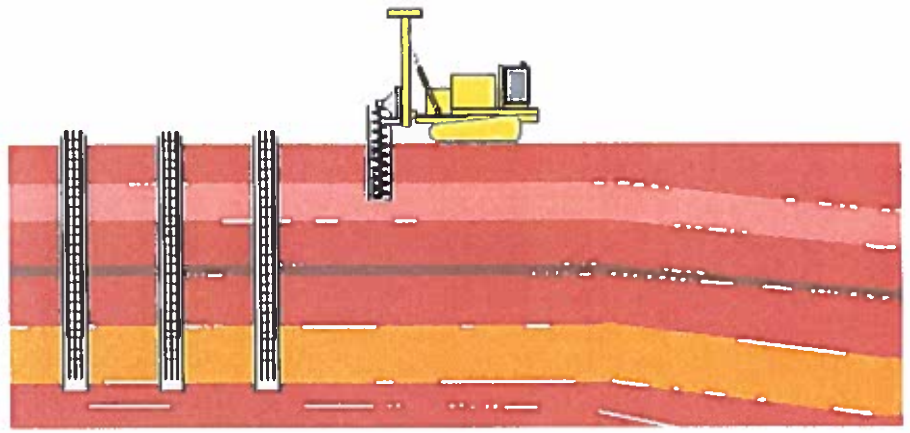
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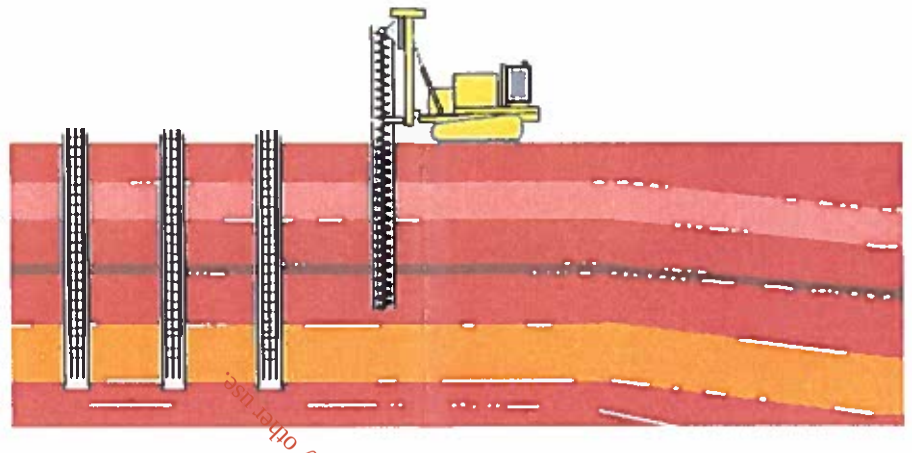
TERMINAL EARTHWORKS SECTIONS SHEET 2

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Checked: J. O'BRIEN	Approved: E.LYNCH
Date: NOVEMBER 2	
Issue: For Planning Application	Shell Drawing No: COR-AR-EW-003

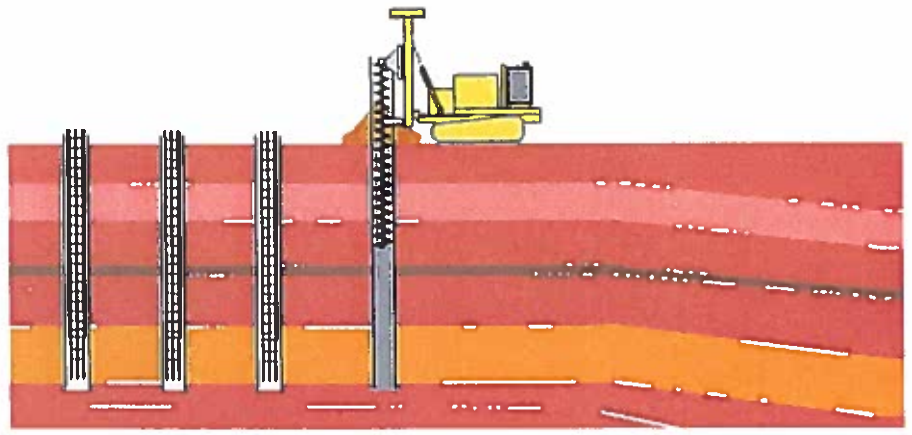
10. APPENDIX B ROTARY PILE INSTALLATION.



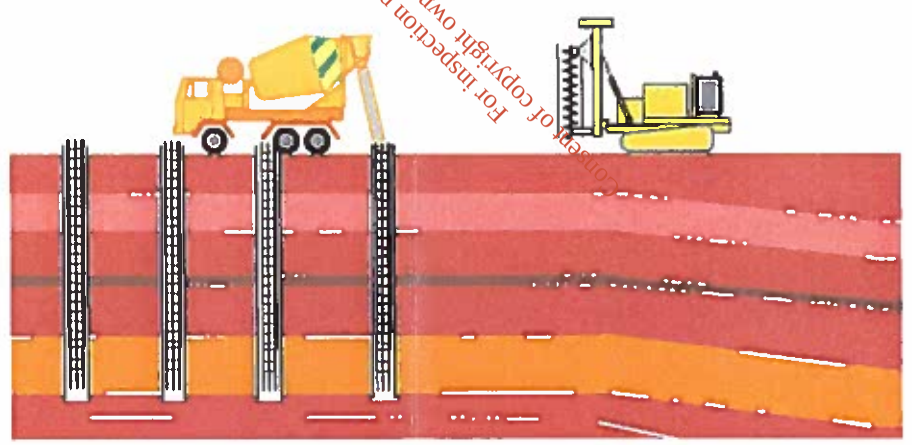
PILE INSTALLED IN SECTIONS



SUBSEQUENT SLEEVES CONNECTED TO PREVIOUS SLEEVE



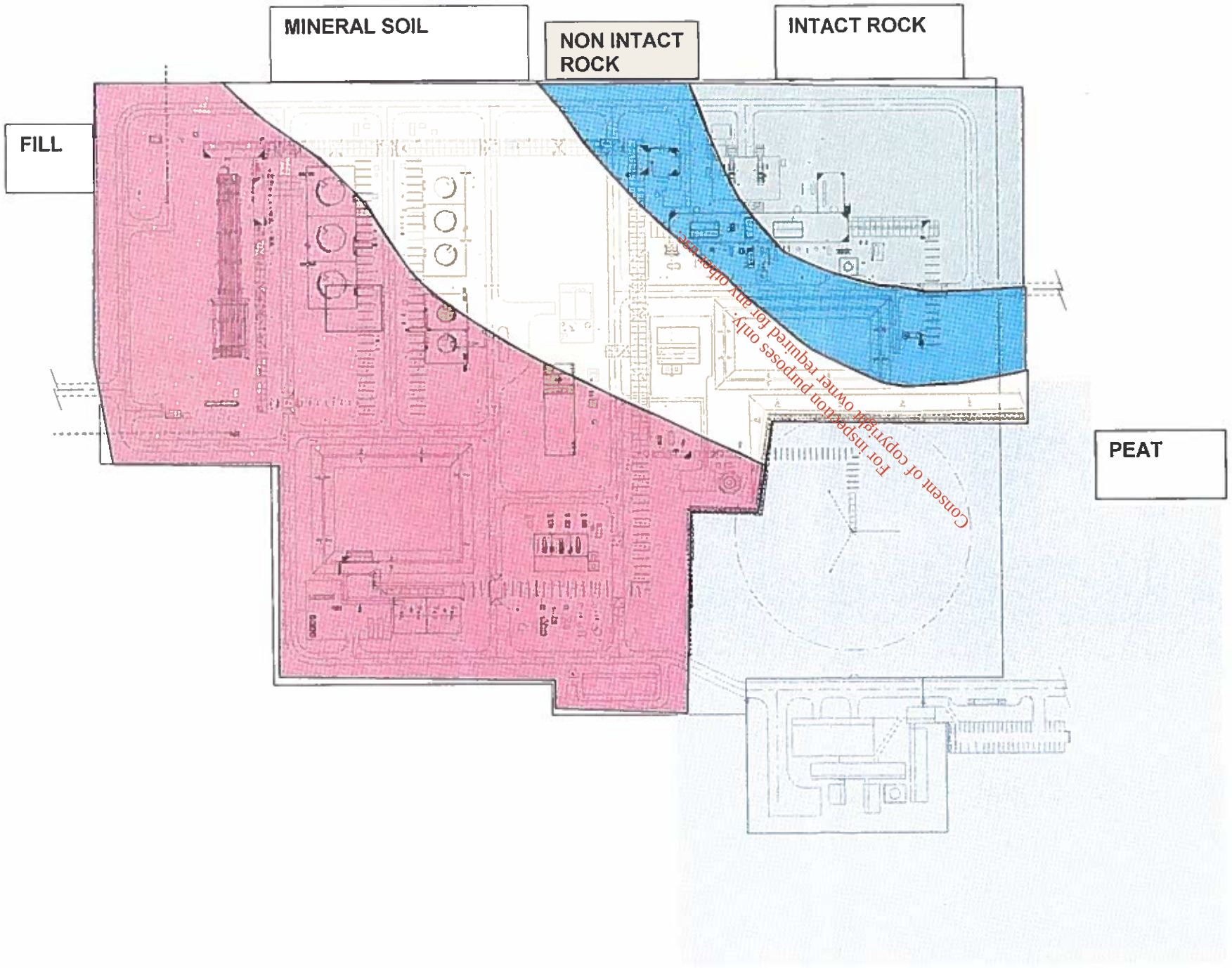
AUGER WITHDRAWN



SLEEVE RETAINED IN GROUND, REINFORCING CAGE INSTALLED, CONCRETE POURED

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DOCUMENT No.	L3882-030-110-0389	P1	NOV'03	10 of 12



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APPENDIX B

AMEC Civils Design Philosophy Document L3882-030-0389

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	amec	Corrib natural gas
Corrib Project L3882	Shell E+P Contract No. 101.24.15	

CORRIB FIELD DEVELOPMENT: BELLANABOY BRIDGE GAS TERMINAL

DOCUMENT TITLE: CIVILS DESIGN PHILOSOPHY DOCUMENT

DOCUMENT NUMBER: L3882-030-110-0389

SHEET NO.: 1 of 12

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CONTENTS

1. INTRODUCTION 3
2. PREAMBLE 3
3. EARTHWORKS AND GROUND PREPARATION 3
   3.1 FLARE AREA RETAINING WALL 3
   3.2 FLARE STERILE AREA RADIATION PROTECTION 3
   3.3 ADMINISTRATION BUILDING AND CAR PARK PLATFORM. 3
4. TERMINAL GEOTECHNICAL CONDITIONS 4
5. FOUNDATION DESIGN 4
   5.1 STRUCTURES FOUNDED ON INTACT ROCK, NON INTACT ROCK AND MINERAL SOILS. 4
   5.2 STRUCTURES. FOUNDED ON NON-ENGINEERING FILL MATERIAL AND MINERAL SOILS 4
   5.3 STRUCTURES FOUNDED ON NON-ENGINEERING FILL MATERIAL. 5
   5.4 STRUCTURES IN PEAT AREAS 5
6. PILING REVIEW 6
   6.1 OVERVIEW AND RECOMMENDATION 6
   6.2 ODEX PILING SYSTEM -SUMMARY 6
   6.3 FLARE STACK AND GUY CABLES. 6
   6.4 CONTROL BUILDING. 7
   6.5 PILING CONSTRUCTION ISSUES 7
7. SITE DRAINAGE 7
8. ACCESS ROADS 7
   8.1 FLARE AREA 8
   8.2 TERMINAL ACCESS ROAD 8
9. APPENDIX A GEOTECHNICAL CONDITIONS OF TERMINAL 9
10. APPENDIX B ROTARY PILE INSTALLATION. 11
11. APPENDIX C AREA DESIGNATIONS 12

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1. INTRODUCTION

Shell E+P Ireland Limited (SEIPL) are submitting a new Planning Application for the Corrib Natural Gas Terminal at Bellanaboy Bridge.

2. PREAMBLE

AMEC (Oil and Gas) has assessed the civil and structural design within the terminal security fence area. The purpose of this document is to set out the civil design philosophy.

Arup Consulting Engineers have carried out the engineering and design of the site preparation and earthworks which includes all enabling works, peat removal, cut and fill operations and all works required to establish a stable and level platform for the Corrib Terminal at a level of 33.4m AOD Malin, including the composite drawing for the earthworks for the site and surrounding area, and the perimeter drainage of the terminal platform and the surrounding area. AMEC have prepared the drainage design for the terminal site.

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3. EARTHWORKS AND GROUND PREPARATION

In order to minimise the removal of peat from the terminal site the flare area has been retained as natural ground. The administration buildings are also founded at an elevation corresponding to the natural ground level.

Arup investigated the ground preparation approach for the in situ peat (in the flare area, administration building area and car park) as part of the earthworks for the terminal site. This is summarised below, but is detailed fully in Arup's documentation.

3.1 FLARE AREA RETAINING WALL

The natural ground forming the flare area is higher than the adjacent terminal ground level. A retaining wall will be required for the transition from the natural ground level to the terminal level, and will be constructed from gabions. Construction details and sections through the gabion wall are shown on drawing COR-AP-RP-001 / 002.

3.2 FLARE STERILE AREA RADIATION PROTECTION

The peat surface forming the flare terrace will be protected from flare heat radiation by incorporating a geotextile and 100mm of graded engineering fill with a 25mm top layer of reflective stone.

3.3 ADMINISTRATION BUILDING AND CAR PARK PLATFORM.

For the ground around the administration, warehouse building and car park, a platform will be constructed. The in situ peat is stable and will be modified to increase its strength. This will require soil stabilisation of the in situ peat,

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and the construction of a cast reinforced concrete slab supported on Odex piles. This will enable the construction of the buildings, roads and car parks and provide a permanent area around the buildings, which will not be subject to settlement. This is detailed on drawing numbers COR-AP-RP-001 to 002.

4. TERMINAL GEOTECHNICAL CONDITIONS

The cut and fill balance and the final geotechnical conditions across the terminal site were investigated by Arup, and are summarised in Appendix A.

The ground conditions fall into 5 categories: -

1. Intact rock.
2. Non Intact rock (weathered rock)
3. Mineral soil
4. Non engineering fill
5. Peat

The foundation requirements for each of these categories is detailed in section 5.0

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5. FOUNDATION DESIGN

The foundation type for each of the structures is dependent upon the ground conditions, as described in section 4.0 above, and appendix A.

5.1 STRUCTURES FOUNDED ON INTACT ROCK, NON INTACT ROCK AND MINERAL SOILS.

The foundation design for structures founded on the intact rock, non-intact rock and mineral soils will be "pad and pier" ground bearing foundations. All of the structures in the process area (area 4) will be of pad and pier construction.

5.2 STRUCTURES. FOUNDED ON NON-ENGINEERING FILL MATERIAL AND MINERAL SOILS

Where structures are founded partially on the non-engineering fill the structure will be piled. Alternatively and where suitable, the ground level will be raised to the same formation level as the firm mineral soils using lean mix concrete and "pad and pier" foundations as in 5.1 above will be used.

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5.3 STRUCTURES FOUNDED ON NON-ENGINEERING FILL MATERIAL.

Structures founded on non-engineering fill will be piled, refer to appendix A for the extent of non-engineering fill. The structures affected are summarised below, refer to appendix C for area designations.

- Area 1 Pig launcher.
- Area 1 Pig receiver and piping anchor block.
- Area 1 Major pipe supports to pig launcher.
- Area 1 Slug catcher
- Area 2 Product methanol storage tanks and bund.
- Area 2 Raw methanol storage tanks and bund.
- Area 3 Open drain sump
- Area 6 Firewater pump house building.
- Area 6 Firewater pumps and pipe support frame
- Area 6 Pipe rack between firewater pump house and firewater pond.
- Area 6 Major pipe supports
- Area 7 Power generation building
- Area 7 Power generators
- Area 7 Major equipment
- Area 7 Major pipe supports
- Area 7 Telecommunications mast.
- Area 7 Control building.
- Area 8 Maintenance Flare
- Area 8 Flare pipe rack
- Area 9 Export pipe rack.
- Area 9 Sleeper ways adjacent to storage tanks and flare

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5.4 STRUCTURES IN PEAT AREAS

Foundations which are supporting structures and buildings located on peat cannot be ground bearing due to the very low bearing and shear capacity of the peat and these will be piled, refer to appendix A for the extent of the peat area.

The structures affected are summarised below.

- Area 8 Flare stack and Guy cables
- Area 8 Flare pipe rack supporting the flare piping and utilities on the flare plateau.
- Area 8 Reinforced concrete sleepers supporting the firewater ring main on the flare plateau.
- Area 10 Administration buildings and car park.
- Area 10 Weighbridge.
- Access road to terminal.

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6. PILING REVIEW

6.1 OVERVIEW AND RECOMMENDATION

AMEC has reviewed the layout and the potential piling options for the foundations that will now be constructed on the peat and non-engineering fill. The Odex piling system is recommended for piling in peat and non-engineering fill for the following reasons:-

- Minimal vibration during pile installation.
- Mini piling rig which is more suitable for operating on peat.
- Steel sleeve retains wet concrete during curing.
- Pile installation method allows pile to be installed into the rock, providing a higher level of confidence in pile stability.

6.2 ODEX PILING SYSTEM -SUMMARY

Odex piles are installed using a mini piling rig, which has an operating weight of 15-25t, and is suitable for operating on soft soils. The drill bit supports the pile sleeve, which is installed in 2m sections, subsequent sleeves are connected to the previous sleeve as piling operation progresses. A rotary pile installation diagram is shown in Appendix B.

As the peat may not provide sufficient lateral support to maintain the integrity of the pile whilst the concrete is wet, the pile sleeve is retained. The sleeve also protects the wet concrete from the acidic peat.

As this is an augured piling system the pile can be installed in a rock socket, providing better stability at the toe of the pile.

This piling system will have minimal vibrations and is suitable for operating on soft soils such as the peat and non-engineering fill.

6.3 FLARE STACK AND GUY CABLES.

The flare stack foundation will be piled. The guy cables will be restrained with reinforced concrete anchor blocks and a combination of ground anchors and piles. The rock anchors drilled and grouted into the bedrock will resist the tension from the guy cables.

The ground anchors used to hold the guy ropes from the flare stack will be approximately 150mm diameter and will extend approximately 5m into the good quality rock. There is sufficient borehole information to assess the depth of anchor, however confirmatory drilling as part of the anchor installation is recommended to confirm the depth of sound rock in the particular areas required.

The anchors will require corrosion protection to the current standards, i.e. double encapsulation. A mobile grout batching plant will be used on site to

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produce the grout required to fill the bores. Samples of the grout will be taken for testing to prove the grout quality.

6.4 CONTROL BUILDING.

The complete control building is to be blast resistant, with a design overpressure of 0.2bar. The building structure will be of reinforced concrete construction.

Special consideration will be required for the foundation design, as the control building is founded on non-engineering fill and therefore piling will be required. The piling design will have to take into account the horizontal shears and overturning moment resulting from the applied blast over pressure. Rock anchors will be used to provide the lateral constraint required for the blast overpressure design case.

6.5 PILING CONSTRUCTION ISSUES

A platform will be required to support the piling machines and equipment. The design of the piling mat will be undertaken once the final details of the piling equipment are known. As the Odex piling rig is suitable for soft ground conditions the thickness of the piling platform will not be more onerous than the requirements for the temporary haul roads or the platforms for cranes normally used during construction.

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7. SITE DRAINAGE

The overall terminal rainwater discharge to the settlement ponds has been assessed by Arup as part of the overall rainwater / settlement pond calculations.

The drainage philosophy for areas within the terminal boundary is described in document number L3882-030-110-0390 and detailed on drawing COR-AM-TD-001. For the perimeter surface water and ground water drainage layout refer to drawing number COR-AR-SD-001.

8. ACCESS ROADS

The construction of the terminal roads located on the intact rock, non-intact rock, mineral soils and non-engineering fill will consist of a sub base layer of imported, crushed and graded rock. This will be laid at depths between circa 150mm and 500mm, depending on the nature of the underlying materials and the bearing capacities achieved in the underlying cut / fill materials. The sub base materials will be overlain by a reinforced concrete pavement or flexible bituminous pavement depending on the local duty requirements of the paved / road area. The use of geo textiles in fill areas is envisaged.

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The roads located on the peat will require a different construction to allow for the settlement of the peat. The access roads affected are summarised below.

8.1 FLARE AREA

A construction road will be provided on the flare plateau for the installation of the flare pipe rack, flare guy cables, flare stack, and fire main sleepers. (E.g. piling rig and crane access for the rack and flare installation).

Road construction In the flare area will be similar to the terminal access road.

8.2 TERMINAL ACCESS ROAD

The main terminal access road will be constructed on modified peat, in accordance with the Arup construction details in the Arup "Earthworks Planning Report" document reference C1157.10-RP005.

The road includes a piped drain system and the design of the road will be developed to ensure that differential settlement of the road and drainage system cannot occur.

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9. APPENDIX A GEOTECHNICAL CONDITIONS OF TERMINAL

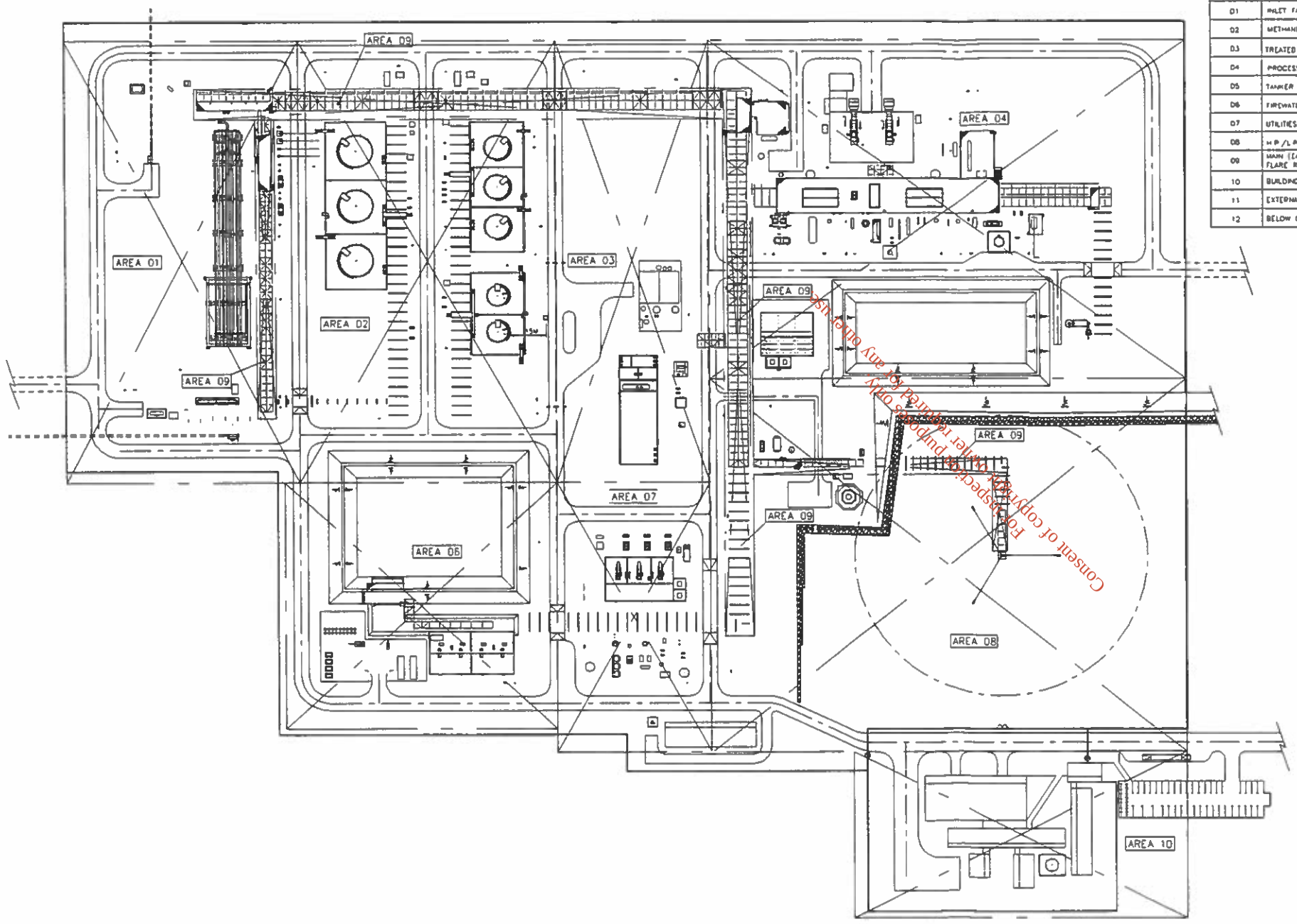
REFER TO ARUP DRAWINGS FOR SECTIONS THROUGH TERMINAL GROUND.

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DOCUMENT No.	L3882-030-110-0389	P1	NOV'03	12 of 12

11. APPENDIX C AREA DESIGNATIONS



CONSTRUCTION AREAS DESIGNATION LIST

AREA No	AREA DESCRIPTION
01	INLET FACILITIES/SALES GAS METERING AREA
02	METHANOL/CONDENSATE STORAGE AREAS
03	TREATED WATER/DRAINS SUMPS AREA
04	PROCESS AREA
05	TANKER LOADING/UNLOADING AREA
06	FIREWATER EQUIPMENT AREA
07	UTILITIES/POWER GENERATION AREA
08	H P/L P FLARES AREA
09	MAIN (EAST-WEST) (NORTH-SOUTH) PIPE RACKS/SLEEPERS FLARE RACK AND EXPORT RACK
10	BUILDINGS
11	EXTERNAL AREAS TO PERIMETER FENCE
12	BELOW GROUND

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