Energy, Environment & Safety

Newmarket Co-Operative Creameries Ltd.

Scarteen Lower, Newmarket, Co. Cork

Volume I: Environmental Impact Statement
Newmarket Co-Operative Creameries Ltd
Scarteen Lower, Newmarket, Co. Cork

November 2016

ENVIRONMENT ISO 14001:2004 NSAI Certified
HEALTH & SAFETY OHSAS 18001:2007 NSAI Certified
QUALITY ISO 9001:2008 NSAI Certified

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Control Sheet

Document Title:	Volume I: Environmental Impact Statement Scarteen Lower, Newmarket, Co. Cork	**Document No.**	R3_1160__31

Rev	**Description**	**Originator**	**Reviewer**	**Change**	**Date**
04	Final	DH	POL	DH	November 2016

Newmarket Co-Operative Creameries Ltd
Scarteen Lower, Newmarket, Co. Cork

Volume I: Environmental Impact Statement

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Request for Further Information 21st October 2016

This Environmental Impact Statement (EIS) was originally submitted to Cork County Council (CCC) in support of planning application 16/04895 on 20th April 2016. CCC issued a letter dated 14th June 2016 requesting the submission of further information to inform the deliberation process of the planning application. An amended EIS was submitted to CCC on 30th August 2016 to address the issues raised, as summarised below in Table 1.2.

CCC subsequently issued a further request for Further Information (FI) in a letter dated 21st October 2016, the details of which are provided in Table 1.1 below with a response and where applicable, a description of the location where each point has been addressed in this amended EIS. A copy of the letter issued by CCC is provided in EIS Volume II: **Appendix 1.3**. To differentiate the amendments and additions made to the EIS to reflect the 7 points raised by CCC in their letter dated 21st Oct 2016 from earlier amendments and revisions, only the changes/revisions made to reflect the 21st October 2016 FI request have been inserted in a **red colour**. All other original EIS text or previous amendments to reflect the June 2016 FI request are in a black colour.

Table 1.1: Further information request issues raised by CCC in the letter dated 21 October 2016 and summary of where these have been addressed

FI Point Number	FI Point	Addressed in EIS Section
1	Confirm that the calculations of the impact of the proposed discharge on the assimilative capacity of the Dalua are based on the remaining assimilative capacity **after** the impact of upstream discharges including the discharge from the public wastewater treatment plant. *You are advised to contact the Waste Water Section of Cork County Council prior to the submission of the required clarification, as detailed in points 1 and 2 above.*	The calculations of the impact of the proposed discharge on the assimilative capacity of the River Dalua are based on the remaining assimilative capacity **after** the impact of upstream discharges including the public wastewater treatment plant as discussed in Sections 4.2 and 4.6 of the amended EIS **Appendix 5.3.6.** The Waste Water Section of CCC has been consulted to address the FI Points 1-3 noted in this table. Representatives of OES Consulting and Newmarket Co-Operative Creameries Ltd attended a meeting with representatives of the waste water section of CCC on 9th November 2016 in County Hall to clarify the issues raised in the FI dated 21st October 2016.

FI Point Number	FI Point	Addressed in EIS Section
2	Submit full details of all calculations of the increased impact of the proposed development on the assimilative capacity of the River Dalua relative to the impact of current activities. (Including an assessment of the impact of your current operations on the assimilative capacity of the River Dalua). You are advised to contact the Waste Water Section of Cork County Council prior to the submission of the required clarification, as detailed in points 1 and 2 above.	A comparative set of calculations has been provided in the amended **Appendix 5.3.6** to explain the impact of the current discharge on the assimilative capacity of the River Dalua in relation to that being proposed as part of this planning application. As mentioned above, representatives of OES Consulting and Newmarket Co-Operative Creameries Ltd attended a meeting with representatives of the waste water section of CCC on 9th November 2016 in County Hall to clarify the issues raised in the FI dated 21st October 2016.
3	Section 5.3.3.8 of the EIS is noted which details that the cumulative discharge from the Newmarket Co-Op and Kanturk urban WWTP can be accommodated without utilising all of the available assimilative capacity in the river system at the point of discharge. The details outlined in appendix 5.3.6 are also noted. No reference has been made to the **Kanturk North Cork Co-Op WWTP** in relation to assimilative capacity calculations. Accordingly, clarify whether the WWTP serving the North Cork Co-op has been included in the relevant calculations, and the relevant assessments, including the EIS and NIS should be revised to address this, where applicable. The revised and updated EIS and NTS and NIS should be redacted / colour coded to enable a full	**Appendix 5.3.6** has been amended to clarify that the WWTP serving the Kanturk North Cork Co-Op has been included in the assimilative capacity calculations which inform the impact assessment of the proposed discharge on the river system. The impact assessment concluded that significant residual assimilative capacity remains within the downstream river system after the proposed mass emissions from Newmarket Co-Op, Kanturk urban public WWTP, Newmarket urban public WWTP and Kanturk North Co Op WWTP have been taken into account. Based on this assessment, there is significant residual assimilative capacity to allow for other discharges to be made, while maintaining compliance with the water quality Standards' Good status values the parameters of which are covered under the Surface Water Quality Regulations 2009. The impact assessment provided in the amended Appendix 5.3.6 demonstrates that the discharges from Newmarket, can be accommodated within the catchment without impacting adversely

FI Point Number	FI Point	Addressed in EIS Section
	assessment of the relevant revised documentation.	on the future developments within Newmarket and Kanturk settlements.
4	The Planning Authority considers that parts of the Construction and Environmental Management Plan (CEMP) submitted appear to be generic and non specific to this particular project - providing for example	The purpose of the CEMP document at this early stage is to **outline** to the **proposed** Contractor their approach to environmental management throughout the Construction phase with the primary goal of reducing any adverse impacts from construction on the local area. This is a "Live" Document and once a **Contractor has been appointed** they are responsible for **updating the report to include their proposed Construction Methodology.** This is then issued to the relevant bodies for approval.
	( ) details of proposed approach to development of water crossings including undertaking to time instream works to only take place outside the fish spawning season, when elsewhere in the documentation it is stated that no instream works are required;	No instream works will take place as part of the proposed development and no development is proposed along river banks or within corridors of riparian habitat. This point has been clarified throughout the revised CEMP provided in **Appendix 2.2** and the amended EIS.
	(i) references to proposed leave strips which are to be protected along riparian zones, whereas elsewhere in the documentation it is stated that there will be no works in riparian zones (also locations of proposed leave strips not identified);	No development is proposed on river banks or within riparian habitats. Development will be confined to the R576 road corridor and the WWTP site boundary and will not require access to or a requirement to develop outside of the road corridor. No impacts are proposed on either the Rampart Stream or the Dalua River. However, to follow best practice procedures and to clearly outline where no development will be occurring, **development buffer zones will be implemented during the construction phase at the locations shown on Appendix 5.2.7** which was previously submitted to Cork County Council on 30th August 2016. No development will be located within these areas. Please see section 4.4.4 of the amended CEMP for more information on this point.

FI Point Number	FI Point	Addressed in EIS Section
	(ii) commitments that the EcOW will be completing daily water quality monitoring programme when elsewhere in the document it is stated that the EcOW they are to be present primarily for weekly monitoring visits;	Section 4.4.4 of the amended CEMP has been revised to clarify this point. The EcOW will be the liaison for the purposes of consulting with environmental bodies including the NPWS and IFI, and will also be responsible for carrying out site weekly inspections and audits of the Contractor's Construction Method Statement (CMS) on behalf of the proposed developer. The EcOW will maintain a register indicating whether all mitigation measures have been carried out satisfactorily to ensure the daily monitoring undertaken by the contractor's project manager is consistent with the CMS. The contractor's project manager will be responsible for undertaking and reporting on **daily** monitoring requirements and the performance of site mitigation measures including: • Inspection of surface water treatment measures (silt fencing, ponds, sandbags, etc.) • Visual inspection of the watercourses, wheel wash facilities and stockpiles • Daily Inspection of control measures and attenuation ponds, their release systems and other attenuation features • Visual inspection by Contractor's Project Manager for oil sheen/ suspended solids • Concrete operations shall be supervised and designated chute washing out facilities shall be inspected on a daily basis by the contractor's project manager and inspected weekly by the EcOW; As stated in section 4.4.4 of the revised CEMP, the Contractor's project manager will be responsible for **daily** water quality monitoring and recording at the development site. The EcOW will undertake **weekly** water quality monitoring as part of the weekly audit of the monitoring records and CMS being maintained by the contractor's project manager.

FI Point Number	FI Point	Addressed in EIS Section
	(iii)reference to establishment of settlement ponds, silt traps, fences and mini dams without identifying where these are required.	Appendix C of the amended CEMP provided in **Appendix 2.2** has been provided to show the location of the Settlement ponds/tanks to be located at the WWTP. If ground water is encountered during the excavation necessary precautions will be made to prevent silt laden/ turbid waters entering the watercourse. If ground water is encountered a sump will be formed to keep the water level below the work/ excavation area and minimise interference with water flow. Once the sump is formed a suitable sized submersible pump c/w stone and steel mesh shroud will be used to pump water to the prefabricated settling tanks, as shown in Appendix C of **Appendix 2.2**. The size of the settling tanks will be determined at construction stage to provide adequate retention time to ensure waters are adequately settled prior to discharge. No SUDS measures are required along the proposed pipeline route as the pipe is being installed along road carriageways which contain pre-existing surface water control measures. Existing surface water crossings have been noted on a drawing and will be maintained during the works. Sections 4.8 and 4.9.1 of the amended CEMP provided in **Appendix 2.2** contain more information on SUDS measures.
	Accordingly, a CEMP is required, which is tailored to the specifics of the proposed development, and which identifies locations on a drawing of proposed surface water protection infrastructure (leave strips, settlement ponds, silt traps) to be deployed, as referenced in the CEMP and elsewhere in submitted documentation (as per original FI request 11(h)(i) and (j)).	An amended CEMP has been provided in EIS Volume II **Appendix 2.2** to address these site specific points. The location of the proposed best practice leave strips/buffer zones is provided in **Appendix 5.2.7.**

FI Point Number	FI Point	Addressed in EIS Section
5	The details outlined in response to 1. WATER / HYDROLOGY AND DISCHARGE items e) and f) are noted. The response outlined in relation to 3. WASTES items a)-c) are also noted. Given it is estimated 5,000 tonnes of dairy sludge will be produced at the Co-Op following completion of the proposed development, and the additional throughput and operational hours proposed, you are required to clarify **what additional water usage and power** requirement will be required to accommodate the existing and proposed development. Provide clarification on the following: a) Details submitted outline that ground water monitoring is carried out onsite. Similarly, details outline that to date, no influence to groundwater from activities onsite have been identified. However **details of water usage and power requirements** have not been clearly outlined. The EIS and hydrological assessments submitted should be revised to address this and should clearly **outline what volume(s) of water will be required to accommodate the proposed development**, from that which is currently required. b) The EIS and hydrological assessments should be revised to outline if the additional water volume requirement will result in increased water abstraction and what impacts / potential impacts this will have on any existing ground water resource. The extent of any dewatering impacts should be fully addressed. In addressing the above	The proposed development will produce an additional 1,000 tonnes of dairy sludge per annum, in addition to the current annual level of 4,000 tonnes. The increase in sludge production is not a result of increased levels of water usage, rather it is a result of the proposed increase in milk processing volumes at the site. The increased quantity of dairy sludge arises directly from small, unavoidable losses of product during the manufacturing process. There is no direct relationship between volumes of water abstracted and volumes of sludge produced in the WWTP. An increased abstraction of water above the current 2015 level of 201,224 m^3 per annum will not be required as a result of the proposed development. The only other water source utilised at the site is from the public supply with the Newmarket Co-Op facility utilising 15,003 m^3 of water in 2015. The proposed development will not require an increase from this source of water. As mentioned above, an increased abstraction of water above the current levels will not be required as a result of the proposed development. During 2015 the Newmarket Co-Op facility used 6,766 MWHrs of electricity. The proposed WWTP upgrade and increased levels of processing will require a 6% increase in electricity usage or 436MWHrs. The proposed development will not require additional water or any change to existing water usage and extraction levels discussed above. As a result, no impacts will occur on the existing ground water resource. No additional water abstraction is proposed as part of the development which will ensure dewatering impacts do not occur. As there will be no change to current water level usage and requirements on site, it has not been necessary to amend the EIS and hydrological

FI Point Number	FI Point	Addressed in EIS Section
	you are advised to consult the EPA Advice Notes 2003 and Project Type 24.	assessments.
6	The submitted bridge reports are considered to be almost 4 years old and it is considered that the bridges should be re-examined and the reports updated. Accordingly, up to date bridge reports are required.	A revised summary report on the 4 No. bridges has been carried out by Malachy Walsh and Partners and has been included as **Appendix 2.3.**
7	Clarify details of the SuDS measures which are to be incorporated into the proposed scheme and demonstrate that these measures have sufficient capacity to provide appropriate attenuation function at the site.	As mentioned above in response to FI Point 4 (iii), Sections 4.8 and 4.9.1 of the amended CEMP provided in **Appendix 2.2** have been revised to provide further details on the SuDS measures to be utilised for the proposed development. A location plan of the measures is provided in Appendix C of the CEMP. If ground water is encountered during the excavation necessary precautions will be made to prevent silt laden/ turbid waters entering the watercourse. If ground water is encountered a sump will be formed to keep the water level below the work/ excavation area and minimise interference with water flow. Once the sump is formed a suitable sized submersible pump c/w stone and steel mesh shroud will be used to pump water to the prefabricated settling tanks, as shown in Appendix C of **Appendix 2.2.** The size of the settling tanks will be determined at construction stage to provide adequate retention time to ensure waters are adequately settled prior to discharge. No SUDS measures are required along the proposed pipeline route as the pipe is being installed along road carriageways which contain pre-existing surface water control measures. Existing surface water crossings have been noted on Drawing 16547 SK09 provided in Appendix B of the CEMP and will be maintained during the works. Sections 4.8 and 4.9.1 of the amended CEMP provided in **Appendix 2.2** contain more information on SUDS measures.

Previous Request for Further Information 14th June 2016

~~This Environmental Impact Statement (EIS) was originally submitted to Cork County Council (CCC) in support of planning application 16/04895 on 20th April 2016~~. CCC issued a letter dated 14th June 2016 requesting the submission of further information to inform the deliberation process of the planning application. The points of Further Information (FI) requested by CCC were detailed in table 1.2 below with a response and where applicable, a description of the location where each point was addressed in an amended EIS submitted on 30th August 2016 to CCC. A copy of the letter issued by CCC is provided **in EIS Volume II: Appendices, Appendix 1.1**. As requested by Point 14 (d), changes to the EIS were ~~have been~~ inserted in a red colour and any deletions were ~~have also been~~ shown. For the purposes of this latest response to the additional request for further information requested by CCC in their letter dated **21st October 2016**, the previous amendments and changes made to reflect the FI request made by CCC in June 2016 have been provided in a black colour along with the original EIS text submitted as part of the original submission in April 2016 to differentiate the specific text inserted and amendments made to reflect the 21st October 2016 FI request, which have been provided in red.

Table 1.2: Further information request issues raised by CCC in the letter dated 14th June 2016 and summary of where these have been addressed

FI Point Number	FI Point	Answer / Addressed in EIS Section
1 a	Details submitted in relation to the impact assessment of treated WWTP discharge to the River Dalua are noted. To enable the full assessment of the proposed development the EIS and NIS should be revised to address the following: (i) Provide details of the predicted impact(s) of the proposed discharge on water quality and ecological receptors in the River Allow.	An assessment of the predicted impacts on the River Allow is provided below in Section 5.2.5.3. The assessment concluded that there will be no potential water quality mediated impacts from the proposed discharge at the proposed Emission Limit Values. The additional water quality assessment completed in **Appendix 5.3.6** also assessed potential impacts on water quality in the River Allow. The assessment concluded that the maximum discharge from the Newmarket Co-Op facility represents less than 8% of the 95%ile flow and therefore is considered to have an insignificant impact on the River Allow.

FI Point Number	FI Point	Answer / Addressed in EIS Section
	(ii) Demonstrate that the increased discharge from the proposed development to the River Dalua will not significantly impact on any future development in nearby settlements by utilising a significant proportion of the available assimilative capacity in the River Dalua, having regard to the Cork County Development Plan 2014 and the Kanturk Electoral Area Local Area Plan 2011, taking account of water quality standards required to be maintained to ensure compliance with the Water Framework Directive and the Habitats Directive.	Section 5.2.5.3 assesses the impact of the proposed development on the assimilative capacity in the River Dalua and surrounding rivers as a result of the proposed development from a biological and ecological perspective. Based on a study of the available EPA biological data, the assessment concluded that there is surplus chemical assimilation capacity downstream of the proposed discharge, and that there is a considerable assimilative capacity in the Dalua River and in the Allow at the confluence of the Allow and Dalua. Section 5.3.3.8 and **Appendix 5.3.6** include an assessment of the proposed discharge in relation to assimilative capacities in the Dalua and the cumulative impact of the development with other existing and proposed developments. **Appendix 5.3.6** concluded that there is sufficient Assimilative Capacity within the River Dalua to accept discharges from Newmarket under the proposed amendment and discharges can be made in full compliance with the Surface Water Regulations (S.I. 272 of 2009). When evaluated in the context of other sources, the (cumulative) assessment shows that the cumulative discharge from Newmarket Co-Op and the Kanturk urban WWTP can be accommodated without utilising all of the available Assimilative Capacity in the river system at the point of discharge. Based on a conservative assessment, there is significant residual assimilative capacity to allow for other discharges to be made, while maintaining compliance with the water quality standards "Good status" values covered under the

FI Point Number	FI Point	Answer / Addressed in EIS Section
		Surface Water Quality Regulations 2009. The assessment demonstrates that the discharges from Newmarket, can be accommodated within the catchment without impacting adversely on the future developments within Newmarket and Kanturk settlements.
1 b	Details should be revised to include a full cumulative assessment of the proposed development along with other developments (i.e. WWTPs and other permitted developments) in the catchment.	Section 5.2.8 below assesses the cumulative impact of the proposed development in the catchment. The assessment determined that in the context of the requirement for the Dalua, Blackwater and the Allow (downstream of Kanturk) to achieve Good status, and the requirement for the Allow upstream of Kanturk to achieve High Status, only two sites failed to achieve the standard required in 2012; i.e. Site 18A02-0020 at the top of the Allow which achieved Q4 rather than the Q4-5 required, and Site 18B02-2700 which is the lowest site on the Blackwater (2km downstream of Lismore Bridge) which achieved a Q3-4 rather than the Q4 required. These results indicate that the cumulative impact of all pressures on these rivers is within the carrying capacity of these rivers. The proposed discharge to the Dalua will not compromise the Good status of the Dalua River and will therefore not compromise the Good status of the Allow or Blackwater Rivers. The cumulative impact of the proposed development and all other existing pressures in the catchment will therefore be compatible with the maintenance of Good status. As discussed above, Section 5.3.3.8 and **Appendix 5.3.6** include an assessment of the proposed discharge in relation to assimilative capacities in the Dalua and the cumulative impact of the development with other existing and proposed developments.

FI Point Number	FI Point	Answer / Addressed in EIS Section
1 c	Details submitted outline that the proposed development seeks to extend the current peak season to accommodate increased milk intake and increased processing. The duration of the existing and proposed peak seasons should be outlined.	The existing operational period at the Newmarket Co-Op Creamery is from February to late November. The proposed development seeks to extend the peak production period on a weekly basis from 6 to 7 days per week rather than on a monthly basis and will not increase the number of months the plant is operational throughout the year.
1 d	Details submitted outline that soil excavations for the WWTP upgrade will be shallow and therefore will not encounter groundwater. Details should be provided in relation to the construction process, should ground water be encountered onsite.	These details are provided in Section 4.9.3 of the revised CEMP, **Appendix 2.2**.
1 e	Details submitted outline that ground water monitoring is carried out onsite. Similarly, details outline that to date, no influence to groundwater from activities onsite have been identified. However details of water usage and power requirements have not been clearly outlined. The EIS and hydrological assessments submitted should be revised to address this and should clearly outline what volume(s) of water will be required to accommodate the proposed development, from that which is currently required.	The proposed development will not require additional water usage to the levels currently used at Newmarket Co-Op. Water supply and usage is discussed below in section 2.4.10 and no change is proposed to the existing water levels requirements. No additional power requirements will be necessary as part of the proposed development. As no change is proposed to existing water usage and power levels, no changes have been made to the EIS and hydrological assessments.
1 f	The EIS and hydrological assessments should be revised to outline if the additional water volume requirement will result in increased water abstraction and what impacts / potential impacts this will have on any existing ground water resource. The extent of any dewatering impacts should be fully addressed. In addressing the above you are advised to consult the EPA Advice Notes 2003 and Project Type 24.	The proposed development will not require additional water or any change to existing water usage and extraction levels at the Newmarket Co-Op site. As a result, no impacts will occur on the existing ground water resource. No additional water abstraction is proposed as part of the development which will ensure dewatering impacts do not occur. As there will be no change to current water level usage and requirements on site, it has not been necessary to amend

FI Point Number	FI Point	Answer / Addressed in EIS Section
		the EIS and hydrological assessments.
2a	Having regard to the EIA Directives (Article 3), the Planning and Development Act 2000, as amended, Schedule 6 of the Planning and Development Regulations 2001, as amended, EPA's Advice Notices and Current Practice (in the preparation of Environmental Impact Statements) 2003, and in order to enable the Planning Authority carry out a full assessment of the direct and indirect effects of the proposed development, including a cumulative assessment of the existing and proposed development, the EIS, Non Technical Summary (NTS) and Outline CEMP should be revised to take the following into account: Details submitted outline that a site investigation has been carried out and site baseline report (IEL Reg. No. P0793-03) is noted. Details also outline that the objective of the baseline report is to establish soil and groundwater characteristics at the facility and to allow a quantified comparison with the condition of the site at some future date (e.g. upon definitive cessation of activities). While the contents of the report and the ground characteristics onsite are noted, **a clear assessment of the stability of the proposed WWTP plant site has not been outlined**. Details should be submitted to address this, and the EIS and section on vibration impacts in the EIS should be revised, where applicable. Having regard to the above, relevant advice notes and the EIA Regulations, an assessment taking into account the following, should be outlined for the site of the proposed W	Site stability has been assessed through the completion of a Geotechnical Site Investigation Report, (**Appendix 2.9**). The Report indicated no signs of significant rock deposits. The Geotechnical Site Investigation Report recommended plate loading tests at a depth 1.0m, to detail settlements under the tanks and verify the design bearing pressure. However it suggests that this be undertaken at Construction stage Excavations for the development of the WWTP tanks are described below in section 2.3.1.1

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	WTP. A soil stability assessment which should include for details on: • Methods of excavations at WWTP • Volume of earth/topsoil/subsoil to be removed/ stockpiled and treatments of same • Depth of excavations, sections etc. • Stockpiling locations I compound locations • Details of potential impacts on water table /ground water The EIS, CEMP and NTS should be revised also to address the above	Impacts on soils are discussed in Section 5.3 of the EIS below. The volume of earth to be stockpiled from the WWTP excavations prior to subsequent grading of spoils over the adjacent land is 1,620m^3. Stockpiling and site compound and laydown area locations are shown on EIS **Figure 2.9** The depth of excavation will be approximately 0.80m at the WWTP as shown on **Figure 2.10**. Pipeline excavation volumes along the extent of the 4km pipeline installation will total 5,500m^3. Treatment of stockpiles is discussed in section 5.2.6 below and within the CEMP, **Appendix 2.2**. There is no potential impact on the water table due to the excavation depths below ground level. This has been confirmed by the Ground Investigation Report, **Appendix 2.9**. Groundwater control may only be required for excavations to depths below 2.5m below ground level. If required, a simple sump and pump system shall suffice to control groundwater. This ground water can be recycled through the wastewater treatment. Pipeline excavation volumes covering the 4km pipeline length will be 5,500m^3. Trenches will be excavated to approximately 700mm depth and to a maximum of 700mm width. Design specifications for the pipeline can be seen in drawing 16547-2016 of the Rising Main Design Report (provided in **EIS Volume II, Appendix 2.1**. As it is expected that soil excavations for trench construction associated with the upgrade works to the WWTP will be shallow, it is not

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		anticipated that groundwater will be encountered. All excavated materials during the pipeline route construction works will be used as backfill, reinstating all roads and grass margins back to their original condition. Any excess materials will be disposed of to a licensed disposal facility.
3 a	The volume of sludge arising from existing and proposed operations has not been outlined. In order to fully assess the proposed development and any effects of any land-spreading of wastes, details of the volume of sludge and land spreading arising from both the existing and proposed operations should be outlined.	Details of the existing and proposed levels of sludge arising from the current and proposed development are outlined below in section 2.5.2.
	The EIS, NTS and OCEMP should be revised for an assessment of any effects of land¬ spreading of wastes, and relevant documentation should be outlined to address this, including mitigation details for existing and proposed land spreading.	The EIS, NTS have been revised to include an assessment of the effects of land spreading of sludge and the constraints based mitigation measures implemented to avoid and minimise any associated impacts. Section 2.5.2 below provides details on the proposed land spreading of sludge and the mitigation measures implemented before sites are chosen for spreading and also the good practice measures implemented to reduce the impact of this activity. Further information on the constraints based approach to sludge landspreading is detailed in **Appendix 2.4.**
	Details of the outlined and agreed Nutrient Management Plan (NMP) should be outlined, and clarification on whose agreement has been met in relation to the NMP should be outlined.	Nutrient management plans and clarification of land owner agreements for all areas to be landspread are provided in **Appendix 2.5.**
4 a	Taking into account the details submitted and the level of additional traffic which will access the site through Emmett Place in a 24 hour period, the Planning Authority has concerns in relation to the potential noise impacts that the	The feasibility of an alternative entrance is discussed in section **5.7.4.4** below.

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	proposed development may have on the amenity of residents at this location. Accordingly you should outline if the site can be accessed from the alternative southern access I exit point by Heavy Vehicles from the R576, or from the Freemount road (see also traffic items below).	
4 b	Outline if the above alternative access point is not an option, if traffic movements to the site can be curtailed /staggered on Sundays and at night time. You should provide a reasoned justification for existing and proposed levels of night-time supplier traffic to the facility.	Section 5.7.4.4 below explains that from a site operational and feasibility standpoint in relation to third party land ownership and internal traffic movements within the Newmarket Co-Op site, an access from Freemount Road would not be a suitable alternative option. Existing traffic movements and deliveries to the Co-Op site are supply driven with the Co-Op under obligation to transport and process milk as soon as possible due to the perishable nature of the product. This results in milk deliveries throughout both the day and night to keep up with supply. The lack of refrigerated storage infrastructure on individual farms prevents the possibility of delayed deliveries and the staggering of milk truck movements to certain periods in order to avoid Sundays or specific night-time periods. Proposed levels of supplier traffic to the facility are discussed in sections 5.4 and 5.7 below.
4 c	It is noted that at the Noise Sensitive Location 2 night time noise was recorded at 46dB and attributed to three trucks. Having regard to proposed increases in production and volumes, it is likely that traffic volumes will increase, accordingly, it is considered that the noise monitoring frequency be increased. The Planning Authority notes that following the 2010 review of noise monitoring, frequency of such monitoring was reduced from bi-annual to annual monitoring. Even on a temporary basis subject to review, it is	To address this point raised by Cork County Council, Newmarket Co-Op, in addition to the proposed mitigation of measure of completing a noise survey on completion of the WWTP discussed in Section 5.4.8 below, will increase noise monitoring at the site from the annual level to twice per year to ensure the existing noise situation is accurately reported on at different times of the year.

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	considered that increasing monitoring frequency should be carried out to ensure non-exceedence of the night time level of 45 db. Mitigation measures should be revised to address the above.	
5 a	The EIS should be revised to address dust emissions and potential impact(s) of same, which may arise during the construction phase.	The Air Quality and Odour assessment has been amended to include an assessment of dust emissions and potential impacts of same during the construction phase. Sections 5.5.5.5 and 5.5.5.6 below contain the amended assessment information and proposed mitigation measures in relation to air quality and dust.
5 b	The details submitted in Appendix 5.5.1 Air Quality impacts from boiler stacks are noted. The mapping figures should be revised to clearly outline both the existing emission concentrations and the proposed emissions concentrations arising from the proposed development. This is required to enable a cumulative assessment of the existing and proposed development.	To enable a cumulative assessment of both the existing emission concentrations and the proposed emissions concentrations arising from the proposed development, sections 5.5.5.1 and 5.5.5.2 have been added to the Air quality and Odour assessment below. **Appendix 5.5.1** has also been amended to assess both the existing boiler stack emissions and those related to the proposed development and **EIS figures 5.5.1 to 5.5.10** have been altered to reflect this re-assessment.
5 c	The location, size and height of vent points along the pipeline should be outlined.	Vent stacks will not be required. Grated manhole covers will be provided to allow air escape from the 3 No. DAV contained within manhole chambers. A description of the proposed manhole covers is provided in **Appendix 2.7**. Drawing **16547-2015-B** provided in EIS **Appendix 2.1** has been updated to provide further information on proposed pipeline scour valve chambers and double air valves.
6 a	An analysis of the HGV numbers should be submitted	A drawing is provided within **Appendix 5.7.1** which details

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	detailing what direction they currently approach the town / Co-Op site from. The feasibility of an entrance being created from the Freemount road should be explored in order to reduce the traffic impact on the town. You are advised that any additional entrance would require a new planning application.	the existing daily heavy vehicle traffic volumes and direction of approach to the Kerry Newmarket Co-op site. The feasibility of an alternative entrance is discussed in section **5.7.4.4** below.
6 b	A structural report on all the bridges should be submitted. Submit details of how you intend to attach the pipeline to these bridges are also required	Structural reports on all of the bridges relevant to the proposed development is provided in **Appendix 2.3.** Construction details of pipeline works at each bridge are provided in **Appendix 2.1: Effluent Rising Main Design Report.** Drawings **16547-2017-C** and **16547-2019-E** provided in EIS **Appendix 2.1** have been amended to provide further information on pipeline attachment details for both Bridge A and Allen's Bridge to address Point 6 b.
6 c	A site layout plan should be submitted showing the locations of all the surface water crossings that the proposed pipeline will intersect	A site investigation was completed along the route of the proposed pipeline and several surface water crossings and road drains were mapped on the drawing provided in **Appendix 2.11**. The Contractor is required to contact Cork County Council (in Newmarket) and to carry out their own site investigation to ensure that all crossings have been accounted for. During excavation of the pipeline the Contractor may intercept gully connections which will be reinstated as per their original state.
6 d	A draft Traffic Management Plan should be outlined for the construction stage.	Extracts from the Traffic Report which was issued with the EIS report have been included within the CEMP (**Appendix 2.2**, Section 4.14.2). A complete TMP will be submitted by the Contractor to the Council for approval prior to Construction.

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6 e	Section 5.7.3.2 details mitigation measures for the operation stage will include continuing to operate with existing access arrangements. Details of the operation stage mitigation measures should be clearly outlined and details of the existing arrangements and any proposed alterations to same should also be outlined, if / where applicable. Mapping detailing the existing traffic circulation patterns and traffic flows onsite should be clearly outlined.	Section 5.7.5 of the submitted EIS details the recommended mitigation measures. Paragraph 5.7.5.2 states that Newmarket Co-Operative Creameries will continue to operate their existing access arrangements with the proposed development in place. Access to the existing Newmarket Co-Operative Creameries site is provided via an existing access on Emmett Place and existing exit on the R576 Pound Hill Road. Emmett Place provides for inbound heavy vehicles only. Cars and light vehicles may exit via Emmett Place. Emmett Place forms a priority controlled T-junction with Church Street, and has a typical carriageway width of 6.0 metres at its junction with Church Street. It is not considered that mitigation would be required, as a result of the proposal. There would be no change to existing Newmarket Co-Operative Creameries Monday to Saturday operations with the proposed development in place. Milk intake, whey imports and product exports would increase on Sundays to existing Monday to Saturday levels, with the proposed development in place. Staff working on Sundays would increase to just less than existing Monday to Saturday levels, with the proposed development in place. Accordingly, as outlined in Paragraph 5.7.6.2 of the EIS, there are no operational residual impacts predicted as a result of the proposed development. Details of the existing heavy vehicle traffic circulation patterns and flows onsite have been provided in **Appendix 5.7.2**. Private vehicles are permitted to access and egress via Emmett Place, and park adjacent to the access located

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		at Emmett place, and to the north of the site, adjacent to the Dry Goods Store. Access to the car park adjacent to the Dry Goods Store is via the ancillary internal route, as shown in **Appendix 5.7.2**.
7 a	Section 1.7.3 of the EIS is noted. A landscape and visual assessment has not been submitted. Having regard to the EIA Directives (Article 3), Planning and Development Act 2000, as amended, Planning and Development Regulations 2001, as amended (Schedule 6), EPA advice notes, and in order to carry out an assessment of the direct and indirect effects of the proposed development and a cumulative assessment of the existing and proposed development, the EIS, NTS and CEMP should be revised to include a visual assessment of the development and to address the above. Any assessment should also include details in relation to mitigation measures, including for the design of visible facilities, siting alternatives, landscaping etc.	A detailed Landscape and Visual Impact Assessment has been completed and is included as EIS Section 5.9 below. The assessment included a number of photomontages and concluded that the proposed development will not incur any significant impacts in respect of local landscape character or visual receptors in the environs of the site, i.e. surrounding residents and businesses or town centre users including visitors to the town. The assessment concluded that the absence of impacts reflects the capacity of the site to accommodate change of this nature with minimal alteration to the setting. This is due to a combination of variations in topography, existing tree and hedgerow cover and the built fabric of Newmarket town including existing buildings and infrastructure on the proposed development site which combine to restrict views of the proposed WWTP development. As a result of no impacts occurring, mitigation measures in the form of landscaping have not been deemed necessary. An assessment of alternative site locations and development designs is provided below in **Chapter 4: Alternatives** below.
8 a	The section on socio economics does not include mitigation measures in relation to traffic impact, noise impact, odour impact, air and dust emissions, water impacts / ELV etc. which may arise at various receptors (Elms / Emmett Place /	Section 5.8: Socio Economics below has been amended to include mitigation measures in relation to traffic impact, noise impact, odour impact, air and dust emissions, water impacts where applicable.

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	along R576). To enable a full cumulative evaluation of the proposed development and the existing developments onsite and adjacent, these should be outlined.	
8 b	This section should also be revised to address sterilisation of natural resources and supplier and product traffic (see Advice Notes re Material Assets).	Section 5.8: Socio Economics has been amended to address impacts relating to the sterilisation of resources and material assets as discussed in section 5.8 below.
9 a	The details outlined in Chapter 6 in relation to Inter - Relationships are noted, however, this chapter should be revised to take into account and assess all of the issues as highlighted in this further information request. A fully comprehensive assessment of the Inter - Relationships of all the foregoing should be outlined in order to enable the Planning Authority to carry out a comprehensive assessment of the proposed development and the EIS.	**Chapter 6: Inter Relationships** has been amended to include a comprehensive assessment of all of the potential impact relationships related to the proposed development and has also sought to address the points raised in the FI issued by Cork County Council.
10 a	Details of any decommissioning, where applicable, have not been located / identified in the EIS i.e. Alternative uses / reuse of buildings. Taking into account the nature of the existing and proposed development onsite, and having regard to the relevant EPA Advice Notes for project type 24; it is recommended that plant decommissioning provisions be addressed.	Information on elements of the existing development to be demolished and the methods to be used to complete this work is discussed below in section 2.3.1.3. **EIS Figure 2.9** shows the location of the existing structures to be demolished and the proposed infrastructure at the WWTP.
11 a	The location of the proposed effluent pumping station is situated on the site of an existing vehicular access path within the WWTP site. The build out of this development may compromise the existing access arrangements onsite. Given the above, you should provide clarification on the location of this infrastructure.	The proposed pumping station is underground and is shown on **EIS Figure 2.4** as the Proposed Effluent Pumping Station. The construction of this infrastructure will not impact on the operational traffic flows of the creamery as it will be underground and will not form an obstacle to onsite traffic. Existing traffic flows on the site avoid the proposed location of the effluent pumping station as shown in **Appendix 5.7.2**:

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		Traffic Flows. Existing traffic flows will not change as a result of the proposed development.
11 b	The site layout plan should be revised to clearly detail the existing and proposed development intended at the WWTP site. Any tanks which are intended to be filled in / disused as a result of the proposed development or are currently decommissioned should be clearly outlined.	The proposal for the upgrade of the waste water treatment plant involves the retention of the majority of the existing facility. Doing this allows for a multi stream treatment plant. The existing Biotower will be decommissioned and removed from site. Also being decommissioned is the existing DAF but this will be stored on site. Some below ground tanks that have been redundant for a number of years, will be filled in to match the existing concrete pad. The site layout plan provided as **EIS Figure 2.9** differentiates between the existing, new plant and plant to be decommissioned/demolished.
11 c	Clarify details of the SuDS measures (drainage scheme) which are to be incorporated into the proposed scheme and demonstrate that these measures have sufficient capacity to provide appropriate attenuation function at the site. Details of the proposed SuDS scheme should be shown on suitably scaled map(s).	There is no surface water interconnection between the wastewater treatment plant and the adjacent watercourse. The areas that are adjacent to the new plant are constructed from graded hardcore and due to the drainage capacity of this material, increased levels of runoff from the proposed WWTP are not envisaged. Petrol/oil and grit interceptors will be located at outfalls to watercourses. Design of those interceptors will conform to the recommendations of CIRIA Report No. 142 (Luker & Montague 1994). As virtually all treatment options require proper maintenance in order to function properly, and as some such as oil interceptors can become a source of pollution if not properly maintained, a programme of regular cleaning, maintenance and inspection of the runoff treatment system will be put in place to ensure it functions correctly.

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		Fuels, lubricants and hydraulic fluids for equipment used at the facility, as well as any solvents, oils, chemicals and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and stored in appropriately bunded areas.
11 d	A surface water drainage inspection chamber is located on the site of the upgrade site, and it would appear that the proposed development will require a relocation of this drainage infrastructure. Accordingly, you should clarify the above. Plans should be revised where applicable.	The surface water inspection chamber, GW4, is to be relocated in a northerly direction within the planning application redline boundary to avoid the proposed new waste water treatment plant development. **Appendix 2.8** shows the existing and future position for this chamber.
11 e	The site layout plans should clearly outline the extent of the existing and proposed levels sought onsite. Details of the extent of excavations and volumes of material to be excavated at the site of the proposed WWTP upgrade and the pipeline route should be clearly outlined.	Please refer to the answer provided to Point 2a above on this issue. The volume of earth to be stockpiled as a result of the WWTP excavations prior to subsequent grading of spoils over the adjacent land is 1,620m^3 with stockpile locations shown on **Figure 2.9**, **EIS Volume III: Figures**. The depth of excavation will be approximately 0.80m at the WWTP as shown on **Figure 2.10**. Pipeline excavation volumes along the extent of the 4km pipeline installation will total 5,500m^3. Treatment of stockpiles is discussed in section 5.2.6 below and within the CEMP, **Appendix 2.2**. The construction phase of the underground pipeline route will involve a series of trench excavation works. Trenches will be excavated to approximately 700mm depth and to a maximum of 700mm width.
11 f	Clarify if the onsite waste water storage facilities will be of	The WWTP has three balance tanks. The purpose of these

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	adequate capacity in the event of pipeline / wastewater treatment plant failure.	tanks is to balance the flow and to provide protection in case of a plant failure. At the production plant's design flowrate this arrangement allows a volume of more than 30 hours to provide for an occurrence of pipeline or waste water treatment plant. If a failure is not corrected within a 24 hour period, this arrangement allows for the controlled shutdown of the manufacturing operations.
11 g	Clarify if adequate in-line and wastewater treatment plants alarm monitoring procedures are included / addressed to mitigate wastewater and avoid waste water emissions into groundwater /surface water or the environment.	The monitoring at the waste water treatment plant is in line with the site IPC license. A PLC system will be installed to control the operation of all equipment on-site. A SCADA system is incorporated to allow operator/management interface with the PLC and to monitor and manipulate the system for optimum control of the waste water treatment plant. A monitoring system will also be installed, which will automatically notify staff of alarms on-site. These alarms will be established at the commissioning stage of the process, to suit the day-to-day operation of the plant but will include those that mitigate the discharge of wastewater into groundwater.
11 h	Submit information relating to the environmental measures / procedures which will be implemented at the WWTP site during the construction phase of the proposed development to prevent the release of sediments, effluents, nutrients or other contaminants to the adjacent watercourse. Submit information on how surface water will be dealt with, and a site layout identifying the locations for	Section 4.8 & 4.9 of the construction environmental management Plan (CEMP) provided in **Appendix 2.2** provides details on the environmental measures to be implemented onsite during the construction phase to prevent the release of sediments, effluents, nutrients or other contaminants to the adjacent watercourse.

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	stockpiling of materials, silt fences etc. shall also be submitted.	The construction compound, stockpile locations and proposed laydown area are shown on **Figure 2.9**.
11 i	There is a need for good site practices with regard to the protection of fisheries resource from pollution / habitat loss arising from construction activity. During the construction phase, the discharge of silt-laden waters to fisheries streams due to insufficient silt control measure can clog salmonid spawning beds and also precipitate further riverbank erosion downstream. This can lead to loss or degradation of valuable habitat. It is important to incorporate best practices to minimise discharge of silt / solids to waters. Silt traps should be constructed at locations that will intercept run off from the site, where appropriate. Details of the sediment and runoff control measures during the construction period should be outlined. This should include the number and location of settlement ponds or sediment traps	No construction works will be carried out in watercourses. Fixing of the pipe to the bridges will be carried out from the roadway side of the bridge. No water course embankments will be excavated as all works will be carried out through and along the parapets walls of the bridges. Details of the mitigation measures to be implemented to ensure sediment and runoff control are provided in the CEMP, **Appendix 2.2.**
11 j	Plans should highlight areas where the 10m protection for water courses will have to be removed. Where works are proposed within 10 m of any watercourse, you should provide details of these works and the measures to be implemented to protect water quality and riparian vegetation in these areas. You should also verify the findings of the Otter survey for all of these areas (not just Allen's Bridge). Details should be outlined on the number and location of the 20m wide riparian strips which are required where work	No construction works will be carried out in watercourses. Fixing of the pipe to the bridges will be carried out from the roadway side of the bridge. No water course embankments will be excavated or interfered with during construction as all works will be carried out through and along the parapets walls of the bridges. Section 5.1: Terrestrial Ecology has been updated to provide further details of the otter surveys completed as part of this EIS. Sections 5.1.6.3, 5.1.9.2, 5.1.12 and 5.1.14.3 provide the assessment information on otters. No development is proposed on river banks or within riparian habitats. Development will be confined to the R576 road

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	takes place close to streams or rivers.	corridor and the WWTP site boundary and will not require access to or a requirement to develop outside of these areas. No impacts are proposed on either the Rampart Stream or the Dalua River. However, to follow best practice procedures and to clearly show where development will not be occurring, development buffer zones will be implemented during the construction phase at the locations shown on **Appendix 5.2.7.**
11 k	As the footprint area of the proposed development is bounding a watercourse, the design and completion of any required riparian landscaping or new crossing structure should be cognisant of the need to preserve both the ecological quality and connectivity of the riparian corridor in order to satisfy the existing fisheries resource. You should therefore provide designs in line with achieving same, and "Planning for Watercourses in the Urban Environment" should be used as a reference document. All relevant plans and method statements should be revised to address the above.	Construction of the proposed development including all aspects of the WWTP and underground pipeline, including attachment to Allen's Bridge will happen outside of riparian habitats. No development on the river bank is proposed and no new crossing structures for bridges or watercourses is included within the scope of the proposed development. As no works will take place on river banks or within riparian habitats, riparian landscaping is not proposed as part of the proposed development. The proposed pipeline will traverse watercourses in 3 different locations as discussed further in **Appendix 2.1**: Effluent Rising Main Design Report. The pipeline has been designed to not interfere with the natural water courses of either the Rampart Stream or the Dalua River. Stoneville Bridge road surface has sufficient cover over the arches so that any works will not have any adverse affect on the watercourse. At the second watercourse crossing (Park Bridge) again this small stream crossing will not be affected by the construction works as the pipe will be laid in the road. The crossing at Bridge A will not have any effect on the watercourse. The pipeline will be

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		attached to Allen's Bridge using a road based crane, ensuring no access or works on the river bank is necessary. No impacts will occur on watercourses and riparian landscaping or new crossing structures are not required.
11 l	Clarify the extent of survey works which has been completed for alien invasive species along the pipeline route, and the findings of any such surveys, identifying locations (if any) of any infestations should be provided. A draft method statement prescribing the methods (including timing of treatment relative to timing of construction works) to be used to manage any such infestations should be submitted in the event that Japanese Knotweed or any other invasive alien species is identified along the route. Methods to be used should accord with best practise guidance as prescribed by Invasive Species Ireland. Timing of treatment of invasive species relative to the timing of the proposed works will be critical to ensuring that works do not cause the spread of invasive species.	Terrestrial ecology surveys of the WWTP site and the pipeline route included an assessment of problematic invasive species as discussed in Section 5.1.11.3 below. No problematic invasive alien species were recorded during the field survey at the site of the proposed WWTP or along and in the vicinity of the proposed pipeline route. Indian Balsam (Impatiens grandiflora) is known to occur along the riverbanks of both the Rampart Stream and the River Dalua (IRD Duhallow Life Project). It is possible that this species occurs at or close-by the discharge point, however due to high water levels at the time of survey could not be confirmed. The confirmed absence of Japanese knotweed (Fallopia japonica) from the study area implies the there is no risk of spread of this species and possible introduction can be prevented by use of appropriate controls. Detailed statements prescribing the methods (including timing of treatment relative to timing of construction works) to be used to manage any such infestations for Japanese Knotweed and Indian Balsalm have been provided in EIS **Appendix 5.1.3**: Invasive Species Draft Methdology Statements. Best Practice Guidance supplied by Invasive Species Ireland and the National Roads Authority have been utilised to draw up these method statements.
11 m	Submit a detailed landscaping plan outlining proposals for planting at the WWTP site and detailed boundary	A detailed Landscape and Visual Impact Assessment has been completed and is included as EIS Section 5.9 below.

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	treatments, and a timetable for its implementation accompanied by an associated scaled site layout drawing at 1:500. The number, type and location of each tree/planting proposed should be identified on the plan.	The assessment included a number of photomontages and concluded that the proposed development will not incur any significant impacts in respect of local landscape character or visual receptors in the environs of the site, i.e. surrounding residents and businesses or town centre users including visitors to the town. As a result of no impacts occurring, mitigation measures in the form of landscaping have not been deemed necessary and as such no plans have been submitted for such measures.
11 n	Having regard to the path of the proposed pipeline, you are advised to consult with the OPW in relation to any requirements of the Arterial Drainage Act, 1945	A scoping document describing the proposed development and accompanied by explanatory drawing was provided to the OPW as part of the pre-application consultation exercise undertaken in November 2015 to acquire the views of the relevant bodies in relation to the proposed development, as discussed in Chapter 1, Section 1.6 below. No responses have been received from the OPW to date.
12 a	You are required to engage the services of a suitably qualified archaeologist (licensed under the National Monuments Acts 1930-2004) to carry out archaeological testing in SAP 1 and AAP 1 (as identified in the Chapter 5 of EIS) to establish no subsurface archaeology impacted by the proposed. In addition the testing in SAP 1 shall establish the nature and date of the potential archaeological site. No sub-surface work shall be undertaken in the absence of the archaeologist without his/her express consent. The appointed archaeologist shall liaise with the Local Authority Archaeologist four weeks in advance of the commencement of the works. In the event that archaeological material is found during the	Irish Archaeological Consultancy (IAC) completed the Cultural Heritage assessment to inform the EIS and were subsequently appointed to manage and undertake the requested archaeological testing of SAP 1. Archaeological testing at the site identified as an Area of Archaeological Potential (AAP 1) in the EIS was not carried out as the discharge outfall is not at this location, being proposed at Allen's Bridge instead. This location does not form part of the proposed development and no works of any kind, including groundworks are proposed at this location. As such testing was not carried out at this location. IAC liaised with the Cork County Council archaeologist prior

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	course of testing, the archaeologist shall stop the testing at the upper archaeological levels and notify the Local Authority Archaeologist and National Monuments Service Department of Arts Heritage and the Gaeltacht (DAHG). No further surface clearance shall take place, pending a decision as to how best to deal with the archaeology. You shall be prepared to be advised by the Local Authority Archaeologist and National Monuments Service (DAHG) in regard to any necessary mitigating action (e.g. preservation in situ, or excavation). Having completed the work, the archaeologist shall submit a written report to the Planning Authority and to the National Monuments Service (DHAG) for consideration.	to applying to the Department for Arts Heritage, Regional, Rural and Gaeltacht Affairs for a licence to excavate for the purposes of the requested trial testing. The Cork County Council archaeologist was provided with more than 4 weeks notice of the intended archaeological testing. The report states that a total of eight test trenches were excavated across the proposed WWTP site. No features of archaeological potential were identified during testing of the proposed WWTP site The license was received on 22nd July 2016 and the Archaeological testing was completed by IAC on 3rd August 2016. A detailed report on the investigations is provided in **EIS Appendix 5.6.9** and has been issued to the National Monument Service.
13 a	A draft Environment Operating Plan should be provided. This should include a monitoring programme for the facility, including for existing and proposed monitoring, as outlined in Section 5.2.6.3 of EIS.	Section 5.2.6.3 of the EIS states the following: *"To monitor the proposed development during* ***construction,*** *a biological and chemical monitoring system will be put in place on potentially affected streams/rivers at the locations discussed below and shown on the maps provided in* ***Appendix 5.2.8 Construction Phase Water Quality Monitoring Plan.*** *The monitoring regime will be undertaken by the project aquatic ecologist, Conservation Services Ltd and the appointed construction phase Ecological Clerk of Works.* *As a minimum the monitoring system will measure Q-values, suspended solids, molybdate reactive phosphorus & pH on the Rampart Stream and the Dalua River upstream and downstream of the following elements of the proposed*

FI Point Number	FI Point	Answer / Addressed in EIS Section
		development: ➢ *Potential impact of construction/expansion of WWTP on Rampart Stream and Dalua River;* ➢ *Potential impact of pipe laying on Rampart Stream and Dalua River;* ➢ *Potential impact of construction of outfall to the Dalua River.* Section 5.2.6.3 focuses on the implementation of a monitoring plan during the construction phase which has been provided in **Appendix 5.2.8.** In relation to the operational stage of the development, section 2.5.6.1 and 2.5.6.2 provide more information on this in addition to **Appendix 2.10**. Operational discharges will be subject to agreement by the EPA as part of the IE Licence review process which will outline the monitoring that will be required for the proposed discharge.
13 b	Provide a revised CEMP which incorporates details requested in item 11 (items c, j, and k) above. The draft CEMP should also include details of ecological and water quality monitoring to be completed during the construction and post construction phases. The CEMP should also be revised to include a summary of all mitigation measures.	The CEMP contains elements for the Construction Phase of the works only and is not intended to be carried forward as operational manual. Refer to Clause 4.4.4 of the CEMP for Ecological Monitoring and 4.4.4 for Monitoring of Water Quality. Further detail on water quality monitoring is provided in EIS **Appendix 5.2.8**.
13 c	The CEMP outlines that a monitoring system will be set up to monitor the Q values and suspended solids of the Rampart Stream and the Dalua River. Submit clarification on who will	The CEMP states the following: *To monitor the proposed development during construction,*

FI Point Number	FI Point	Answer / Addressed in EIS Section
	carry this out and where the monitoring points are to be located.	*a biological and chemical monitoring system will be put in place on potentially affected streams/rivers.* *As a minimum the monitoring system will measure Q-values, suspended solids, molybdate reactive phosphorus & pH on the Rampart Stream and the Dalua River upstream and downstream of the following elements of the proposed development:* *1. Potential impact of construction/expansion of WWTP on Rampart Stream and Dalua River* *2. Potential impact of pipe laying on Rampart Stream and Dalua River* A construction phase water quality monitoring plan is provided in **Appendix 5.2.8**. The requested monitoring is also discussed below in Section 5.2.6.3.
13 d	No details have been located in relation to the introduction or existence of predators and vermin arising from the existing and proposed development, and relevant controls in place. Plans should be revised to address this.	Pest and vermin control measures currently in operation at the site are discussed in section 2.5.5 with more information provided in **Appendix 2.6.** The existing measures will be expanded to cover the proposed WWTP.
14 a	Chapter 4 Alternatives should be revised to provide a more detailed assessment of alternative options	**Chapter 4: Alternatives** has been amended to include a comprehensive assessment of alternatives.
14 b	The EIS should be revised to detail a summary of mitigation measures for both the construction and operation phase of the proposed developments.	A mitigation matrix providing a summary of all proposed construction and operational mitigation measures is provided in **EIS Appendix 1.2.**
14 c	Mitigation measures (see Section 5.5.15 in EIS) should be revised to omit reference to actions which 'should ' be carried out, and replaced with measures /actions which 'shall ' be carried out. The EIS, CEMP should be revised, where	Proposals for mitigation measures have been reworded to address this request where applicable.

FI Point Number	FI Point	Answer / Addressed in EIS Section
	relevant.	
14 d	The EIS and NTS should be revised to take into account all of the above. The revised and updated EIS, NTS and OCEMP should be redacted / colour coded to enable a full assessment of the relevant revised documentation.	The EIS, NTS and CEMP have been subject to appropriate amendments to address the issues raised in the FI request. Changes have been made in a red colour.
15 a	Landowner consent for outfall to be provided	The outfall discharge is not located on third party lands as it is attached to the public road section of Allen's Bridge. The construction process for the discharge outfall will be completed from the public road and will not involve access or use of third party lands. No development is proposed on river banks or within riparian habitats. The attachment of the pipeline to Allen's Bridge is shown on Drawing 16547-2019 C which is provided in **EIS Volume II, Appendx 2.1.**

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Chapter One - Introduction

1.1 Introduction

OES Consulting has been retained by Newmarket Co-Operative Creameries Ltd. (Newmarket Co-Op) to prepare a Planning Application, Environmental Impact Statement (EIS) and Appropriate Assessment Natura Impact Statement (AA NIS) for their creamery facility at Scarteen Lower, Newmarket, Co. Cork, the location of which is shown on **EIS Volume III Figure 1.1 Site Location** (provided in EIS Volume III) for the following proposed development:

- An upgrade to the existing operational waste water treatment plant (WWTP) onsite and an increase in the total discharge of waste water from the facility from 2,000 metres cubed (m^3) to 2,700m^3 per day;

- The installation of an underground pipeline to convey treated water from the facility to a discharge point on the River Dalua, approximately 4 kilometres (km) to the south east of the facility. It is noted that the River Dalua is considered to be the receiving water in the facility's current industrial emissions license; and

- An increase in the duration of peak milk processing at the creamery throughout the year (80 million gallons of milk equivalent per year) from six to seven days per week and an increase in the duration of the current peak milk processing period. As part of the planning application, an EIS has been prepared on the overall facility as this has not been completed to date on the site.

1.2 Background

Newmarket Co-Op was acquired by the Kerry Group in 2010. Newmarket Co-Op has operated dairy processing facilities in and around Newmarket since 1944.

The primary activity at the facility is the production of cheddar cheese from fresh milk in a modern processing facility. The facility received an Integrated Pollution Prevention and Control (IPPC) Licence from the Environmental Protection Agency (EPA) on 30th September 2009 for the processes undertaken at the site. This licence was reviewed by the applicant and a revised licence (P0793-02) was issued on 01st May 2012 with a Technical Amendment, updating the licence in line with the Industrial Emissions Directive, issued on 16th December 2013. The facility currently operates to the controls and requirements of the Industrial Emissions Licence (IEL) reference number P0793-02, which is available for view on the Agency website (http://www.epa.ie/licensing).

The facility is one of the main employers in the town with 53 staff employed at the installation. Existing operating hours at the installation are normally 24 hours per day, six days per week.

Newmarket Co-Op operates an Environmental Management System (EMS) accredited to the International Standard ISO14001, which sets out a framework for

environmental management at the site. Newmarket Co-Op are an accredited ISO 14001 facility and are audited on an annual basis by an external body.

1.3 Planning and Consents History

The Newmarket Co-Operative was set up in 1944. The Newmarket Co-Operative Creamery was officially opened in 1955 as a modern general purpose creamery. Over the years, Newmarket Co-Op increasingly specialised in cheese production with butter production ceasing at the installation in 2005. The location of the site is best described as being in a built up area, effectively marking the boundary of the greater Newmarket town area and the agricultural hinterland. A summary of the planning permissions sought and granted at the facility are provided in Table 1.3.1.

Due to the long-established nature of the facility and its organic growth over nearly half a century, there is an extensive planning history associated with the subject site. Table 1.3.1 below provides a comprehensive overview of the creamery-related planning applications relating to the site.

Table 1.3.1: Planning Permissions Newmarket Co-Op

Planning Reference	Application Date	Grant Date	Development Description
10/5656	05/07/10	27/09/10	Retention of a single storey extension to the existing salt room
09/4533	23/02/09	21/05/09	Single storey storage building to rear of existing feed store & associated site works
07/7166	19/04/07	12/07/07	Construction of a single storey structure over the existing loading yard, single storey chill building incorporating a plant room, single storey desalination building including switchroom, single storey sludge handling building and associated works and retention of covered truck wash area
98/0907	11/03/98	10/06/98	Extension to offices
95/3031	29/08/95	21/11/95	Extension to existing laboratory
95/2194	19/06/95	20/09/95	Alterations to Cheddaring Room by increasing the roof height of the building to facilitate the installation of new process equipment
94/3004	27/09/94	03/01/95	448 cubic metres water storage tank
2323/90	16/07/90	15/10/90	Blockformer housing to roof of existing cheese factory and remodelled entrance
4845/79	03/12/79	25/02/80	Office building (Administration)
1505/79	09/04/79	10/07/79	New Dry Goods Store (Change of Layout)
171/79	17/01/79	19/04/79	Construction of new Cheese Starter Room
169/79	17/01/79	19/04/79	Erection of Bio Tower and associated pump sumps
168/79	17/01/79	19/04/79	Retention of Boiler House extension
166/79	17/01/79	19/04/79	Erection of New Dry Goods Store
1678/76	03/06/76	31/08/76	Erection of building for housing refrigeration plant
970/75	18/04/75	18/07/75	Erection of 10Kv Substation
800/75	03/04/75	01/07/75	Erection of Cheese Store
168/75	23/01/75	15/04/75	Extension to existing factory

Planning Reference	Application Date	Grant Date	Development Description
3499/73	17/12/73	02/05/74	Construction of effluent treatment works

In addition to the planning history set out in Table 1.3.1 above, there are a number of further non-creamery permissions relating to the Newmarket Co-Operative Creameries Ltd. site (e.g. DIY and farm supplies stores). These permissions are not relevant to the issue at hand, but are set out in Table 1.3.2 below in the interests of completeness.

Table 1.3.2: Non Creamery Planning Permissions

Planning Reference	Application Date	Grant Date	Development Description
14/6384	10/11/2014	05/02/2015	Demolition of an existing Feed Store and reinstatement of the area to match the existing yard slab
13/4693	17/04/13	16/07/13	Demolition of existing house and reinstatement of site to match existing levels, and construction of a new stone boundary wall and gate to match existing wall along Church Street
12/5586	19/07/12	06/11/12	Construction of an agricultural entrance to serve lands to rear of site, alterations to south western face of existing DIY & Hardware retail building and construction of an over ground diesel tank and dispensing pump and all associated site works
11/5929	08/09/11	01/12/11	Construction of a concrete yard (total area=2,500sqm) for storage and distribution of fertilisers and farm supplies, new entrance, boundary fence and all associated site works
07/5215	20/02/07	28/06/07	Change of use of existing Top Car garage/workshop to hardware store to include all internal alterations and provision of new front entrance, demolition of existing car wash and construction of store extension, construction of outdoor garden/leisure display area to side of hardware store, new signage and associated works
94/4008	23/12/94	20/03/95	Alterations and extension to farm shop and associated site works

The facility made an application to the EPA in 2006 for an IPPC Licence. This application was granted with conditions to Newmarket Co-Operative Creameries Limited on the 30th of September 2009 under Section 90(2) of the Environmental Protection Agency Acts 1992 and 1997, to carry on the following activity:

Class 7.2.1: Treatment and processing of milk, the quantity of milk received being greater than 200 tonnes per day (average value on an annual basis).

Under the amendment of licence P0793-02 to an IEL, the activity on site was amended to:

Class 7.2.1: Treatment and processing of milk, the quantity of milk received being greater than 200 tonnes per day (average value on a yearly basis).

The facility has maintained an excellent environmental performance since operations commenced with high levels of compliance on an annual basis. As envisaged in the original assessments undertaken, the existing facility has been shown to have no significant impact on the environment.

1.4 Site and Surrounding Lands Description

The facility is situated on the outskirts of the town of Newmarket and can be accessed directly from Church Street (Regional Road R576, Newmarket to Kanturk Road) and also via Emmet Place as shown of **Figure 1.1: Site Location** (**EIS Volume III: Figures**). Newmarket Town is located in North Cork; the town of Kanturk is located approximately 7 kilometres (km) to the south east of Newmarket and houses the Kanturk and District Council. The site is bound by agricultural lands to the north and east and domestic and commercial properties to the south and west.

The topography surrounding the site is classified as rolling hills with Scarteen Upper to the north at an elevation of 265 metres (m) AOD and Ballyduane East to the East at an elevation of 244m AOD. Land use in the surrounding area of Newmarket is predominantly dairy and beef farming.

Newmarket is located within the catchment of the River Dalua, which rises in Meentiny East approximately 10km to the north west of Newmarket Town. A portion of this river is diverted through the Newmarket Co-Op facility above the town via a man-made weir and channel constructed to form a mill race. The mill race discharges to the Rampart Stream 60m downstream of the Newmarket Co-Op facility and converges with the River Dalua approximately 4km south of Newmarket. The River Dalua flows into the River Allow in Kanturk, Co Cork approximately 8km downstream of the facility.

1.5 Regulatory Requirement for an EIS

The existing development and processes at the Newmarket facility fall below the stated limits of milk production at a development which would require an EIS to accompany a planning application. Schedule 5, Part 2, Class 7(c) of the Planning and Development Regulations 2001-2015, specifies that an EIA must be undertaken for the following class of development:

"Food Industry – Installation for manufacture of dairy products, where the processing capacity would exceed 50 million gallons of milk equivalent per annum."

The proposed development involves an increase in the duration of peak milk processing at the site, which will increase levels of annual milk processing above the 50 million gallon threshold and will therefore require an EIS under Class 13 of Part II of Schedule 5 of the Planning and Development Regulations 2001-2015 which deals with changes, extensions, development and testing. Under this class, an EIS is required where:

(a) *Any change or extension to a development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would:*

(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of Schedule 5 , and

(ii) result in an increase in size greater than –
- *25 per cent, or*
- *An amount equal to 50 per cent of the appropriate threshold, whichever is the greater.*

The proposed increase in the peak duration and subsequent levels of milk processing results in the plant falling under class 7(c) listed in Part II and therefore the requirements of Class 13 do apply.

1.6 Consultation and Scoping for the EIS

Consultation is a practice that is carried out to ensure that all relevant issues are addressed in the EIS. The consultation process for the current facility involved the distribution of a formal Scoping Consultation Document to a number of Consultees asking them for a written opinion on the proposed content of the EIS. The following bodies were consulted on 11th November 2015:

- Cork County Council;
- Department of Agriculture, Food and the Marine;
- Inland Fisheries Ireland;
- The Heritage Council;
- National Roads Authority;
- Geological Survey of Ireland;
- An Taisce;
- Development Applications Unit – Department of Arts, Heritage and the Gaeltacht;
- Irish Farmers Association;
- Environmental Protection Agency;
- Office of Public Works; and
- National Parks and Wildlife Service.

Meetings were also held on the following dates with a number of statutory bodies prior to submission of this planning application and supporting EIS to Cork County

Council to inform the project design and development process, ensuring all relevant environmental constraints had been addressed:

- 2nd September 2015: Meeting with Cork County Council ecologist Sharon Casey;
- 24th September 2015: Meeting with Jervis Good and Declan O'Donnell of National Parks and Wildlife Service;
- 4th November 2015: Meeting with Andrew Gillespie of Inland Fisheries Ireland and,
- 19th November 2015: Meeting with Ronnie Barry and Noel Sheridan of Cork County Council Planning Department.

Additional meetings have taken place to address issues raised in the Further information Requests issued by CCC on the following dates:

- 7th July 2016: Meeting with Ronnie Barry and David Ryan of Cork County Council Planning Department.
- 9th November 2016: Meeting with Billy O Sullivan and Kevin Morey of Cork County Council Water Services Department.

1.7 The Environmental Impact Statement

The EIS is a legal document and has been developed in line with the requirements of national legislation. This section outlines the primary sections of this document.

1.7.1 General Guidance

This EIS has been prepared in accordance with requirements of the *Planning and Development Act 2000 and the Planning and Development Regulations 2001-2015 as amended.*

The EIS has been prepared in accordance with the following EPA documents and relevant best practice guidelines:

- "Advice notes on current practice in the preparation of Environmental Impact Statements" (2003); and
- "Guidelines on the information to be contained in Environmental Impact Statements" (2002).
- Revised guidelines on the information to be contained in Environmental Impact Statements draft (September 2015).
- "Guidelines for Planning Authorities and An Bord Pleanala Carrying out Environmental Impact Assessment" Department of the Environment, Community and Local Government (2013).

Where a specialist chapter incorporates additional best practice or guidance documents these are outlined within the relevant section's methodology.

1.7.2 Structure of the EIS

This EIS is accompanied by an NIS, Planning Application and a Non-Technical Summary (NTS) of the EIS. These documents are separate from this EIS but form part of the overall development application. The structure of this EIS adopts a sequence as follows:

- General Description of the EIS and how it relates to the development;
- Description of the Development;
- Planning Context and Need for the Development;
- Alternatives considered;
- Impacts – incorporating baseline data and specialist findings;
- Interactions.

In the description of the impacts of the activity the following attributes of the receiving environment and their interactions are described:

- Terrestrial Ecology;
- Aquatic Ecology;
- Hydrology, Hydrogeology and Geology;
- Noise and Vibration;
- Air Quality and Odour;
- Cultural Heritage;
- Traffic and Transport;~~and~~
- Socio economics, and
- Landscape and Visual Impact Assessment

The EIS is provided in the following format:

- Volume I: EIS Main Text
- Volume II: EIS Appendices
- Volume III: EIS Figures

- Volume IV: Non-Technical Summary

~~1.7.3 Issues Scoped out of the EIS~~

~~This section discusses the technical assessment that were not included within the EIS and the reasons for their exclusion.~~

~~1.7.3.1 Landscape and Visual Impact~~

~~The scoping document discussed above listed the different technical assessments to be carried out as part of the EIS. Due to the location and limited scale of the development (within the existing facility and the underground pipeline), it was concluded that potential landscape and visual impacts would be less than negligible and would not require assessment within the EIS.~~

~~The Newmarket Co-Op site sits on a lower elevation than the surrounding roads and town buildings. Occasional and limited views are currently all that is achieved of the site due to its elevation and the presence of local hedging along most roads.~~

~~Due to the local topography, views from buildings further within the town, or along the local and regional roads accessing the town have either no, or very restricted/narrow viewpoints of the Newmarket Co-Op site. There are also no views from the scenic route (S17 designated in the Cork County Development Plan 2014) located to the west of Newmarket alongside the River Dalua.~~

~~There are no other identified areas of scenic or visual amenity near the facility. The landscape of the site is industrial, composed of the existing industrial buildings. The surrounding landscape is urban to the south and west, and agricultural to the east and north. These landscapes are not identified as sensitive to change.~~

~~It is viewed that the proposed development will not result in a change to the local visual or landscape characteristics within and surrounding the Newmarket Co-Op site and along the route of the R576. The level and scale of physical development being proposed at the facility is limited to the WWTP upgrade works which will blend into an existing background of larger industrial and processing buildings, whilst the pipeline will be installed underground and result in no change to the existing visual environment.~~

~~As the local site landscape sensitivity is low, it is concluded by Newmarket Co-Op that the proposed development will not result in any variation that will impact upon either visual or landscape amenity that is not currently occurring. As a result of the minimal impact of the proposed development, it was not deemed necessary to include a landscape and visual impact assessment within the EIS being undertaken.~~

1.8 Methodology

1.8.1 Assessment of the Effects – Evaluation Criteria

The assessment of effects has been undertaken in accordance with best practice, legislation and guidance notes. The significance criteria as set out in the EPA Guidelines (2002, 2003 and 2015 (Draft)) and listed in Table 1.8.1 below have been

followed throughout this EIS unless otherwise stated in the methodology for each chapter and/or specialist reports.

Table 1.8.1: EIS Assessment Criteria

Significance Level	Criteria
Profound	An impact which obliterates sensitive characteristics
Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Slight	An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An impact capable of measurement but without noticeable consequences.

As per the EPA Guidelines, impacts are considered as being negative, neutral or positive in nature. Impacts are also considered as being direct, indirect and/or cumulative, as appropriate. Duration of impact is considered as being:

- Temporary (up to one year);
- Short-term (from 1 to 7 years);
- Medium-term (7 to 15 years);
- Long-term (from 15 to 60 years); or
- Permanent (in excess of 60 years).

1.9 Project Team

This EIS has been prepared by an OES EIA Project Manager assisted by a team of qualified and experienced environmental specialists including terrestrial and aquatic ecologists, an acoustician and hydro geologist.

The EIS has been prepared utilising both desk-based information including the Annual Environmental Reports (AERs) undertaken as required by the EPA under the IEL and IPPC licencing regime for the facility, and also site based assessments to fully understand the existing baseline situation at the Newmarket facility and surrounds.

1.10 Guide to the Document

The document has been structured to facilitate a clear presentation of the proposed development, the potential impacts on the environment and the measures to mitigate these. Accordingly, the remainder of the document is set out as follows:

Chapter Two - Description of the Development

Describes the existing processes on the site and the proposed changes and improvements needed to increase production on a per annum basis, upgrade the WWTP and install the underground pipeline.

Chapter Three – Planning Context and Need for the Development

The chapter identifies how the proposed development complies with national, county and local policies and explains the need for the proposed increase in milk processing at the Newmarket Co-Op site, taking account of economic and where appropriate, environmental imperatives.

Chapter Four – Alternatives Considered

It is a statutory requirement that a detailed evaluation of alternatives is undertaken within the EIA process. This chapter looks at potential alternative processes, movement of the development elsewhere and a do-nothing scenario.

Chapter Five – Impacts on the Environment

Chapter Five comprises a number of sub-sections on the assessment of environmental impacts on specific environmental topics, together with an evaluation of their significance and a description of any ameliorative measures, existing or proposed to minimise impacts. It also takes into account the interactions between the various attributes.

Chapter Six – Inter-Relationships

Chapter Six assesses the inter-relationships between the aspects of the environment likely to be significantly affected by the proposed development.

Chapter Two – Description of the Development

2.1 Introduction

This chapter describes the existing environment at the Newmarket Co-Op site and provides detailed information on the proposed developments being put forward as part of the planning application to Cork County Council. An overview of the existing processing activities on the site is provided with descriptions of both inputs and outputs involved in this process.

2.2 Existing Development

The Newmarket Co-Op facility is a modern cheese manufacturing facility, located within the outskirts of Newmarket Town, northwest Cork County.

The facility is situated on a 10 ha site as shown on **EIS Volume III Figure 2.1: Existing Site Layout**, with:

- Milk delivery & milk truck wash down area;
- Whey production building;
- Cheese Production building and laboratory;
- Boiler house;
- Air Compressor & Refrigeration buildings;
- Cheese Stores;
- Dispatch Area; and
- WWTP.

2.3 Proposed Development

Newmarket Co-Op proposes the following developments at the Newmarket facility which are discussed further below, with an overview shown on **EIS Volume III Figure 2.2: Proposed Site Layout:**

- An upgrade and extension to the existing operational WWTP onsite and an increase in the total discharge of waste water from the facility from 2,000m^3 to 2,700m^3 per day to further improve the treatment abilities of the waste water treatment plant technologies, process controls and existing technologies and enable the facility to operate more efficiently within the additional milk processing parameters.

- Installation of an underground pipeline to convey treated water from the facility to a discharge point on the River Dalua, approximately 4 km to the south east of the facility. It is noted that the River Dalua is considered to be the receiving water in the facility's current industrial emissions license.

- Increase the duration of peak milk processing at the creamery throughout the year from 6 to 7 days per week (80 million gallons of milk equivalent per year) and extend the current peak season to accommodate processing of an increased milk pool.

2.3.1 Waste Water Treatment Plant Upgrade

Newmarket Co-Op proposes to upgrade the existing operational WWTP at the Newmarket facility, the layout of which is shown on **EIS Volume II Figure 2.3: Existing WWTP Site Layout**. The proposed WWTP development includes an extended aeration activated sludge plant complete with anaerobic zone and anoxic zones for biological phosphorous and nitrogen removal and aeration zone for Biochemical Oxygen Demand (BOD) removal.

The proposed development includes the installation of the following facilities, shown on **EIS Volume III Figure 2.4: Proposed WWTP Site Layout** to be located directly north east of the existing WWTP:

- 3 new forward feed pumps (D/D/S) to Dissolved Air Flotation (DAF) Unit;
- New DAF system complete with recycling pumps, poly dosing system and compressor;
- pH Correction Systems complete with bunded storage tanks;
- 2 additional forward feed pumps (D/S) to Biological treatment;
- New biological treatment stream based on anaerobic, anoxic and aeration tanks;
- New aeration system complete with 3 No. New Air blowers;
- 2 No. Additional iRAS pumps;
- 1 new final settlement tank;
- New tertiary treatment based on Disc filtration;
- 2 new filter backwash pumps;
- Phosphorous polishing removal based on chemical precipitation, incorporating dosing pumps and chemical storage;
- Upgrade of control panel and SCADA system; and
- Instrumentation required for the process.

As shown on **EIS Volume III Figure 2.4: Proposed WWTP Site Layout**, the footprint of the proposed WWTP upgrade incorporating all listed elements and upgrades above will be approximately 2,838m^2 (0.28 ha). A detailed description of the proposed WWTP infrastructure and associated footprint is provided in Table 2.1 below. The WWTP

upgrade works will add to the footprint of the existing WWTP which is approximately 7,100 m² (0.710 ha). The scale of proposed development is not significant in comparison with the footprint for the overall Newmarket Co-Op facility site which is approximately 10 ha as can be seen on **Figure 2.4: Proposed WWTP Site Layout**.

Table 2.3.1: Proposed WWTP Infrastructure and Footprint

Development/structure	Gross Foot Print
New DAF Plant on concrete plinth	33 m²
Control and Electrical Panel Rooms	37.5 m²
Proposed Tertiary filter	23 m²
Proposed Balance Tank	385 m²
Proposed Anoxic Tank	144 m²
Proposed Anaerobic Tank	24 m²
Proposed Aeration Tank number 1	345 m²
Proposed Aeration Tank number 2	345 m²
Proposed Clarifier	49 m²
Concreted area additional to concrete plinths under proposed tanks	1,397 m²
Two Proposed culverts linking existing and proposed WWTPs	36m²
Underground Effluent Pumping Station	20 m²
Total	**2,838 m²**

The heights and elevations of the existing WWTP are shown on **EIS Volume III Figure 2.5** whilst the proposed WWTP elevations information is shown on **EIS Volume III Figure 2.6.**

2.3.1.1 WWTP Upgrade Construction Overview

Upon completion and acceptance of the process and structural designs required to construct the wastewater treatment upgrade at the facility in Newmarket Co-Op, on site work will commence.

Following a period for site mobilisation and setup, it is proposed to split the work site into 2 areas. The existing area will be focused on works within the current waste water plant while the new area will concentrate on works in the new greenfield area of the site. This will mean that work can progress in parallel paths with the complete works merging together during the electrical installation and commissioning periods.

Works within the existing WWTP area will proceed on the following basis:

- Demolition of the existing biotower;
- Installation of new DAF unit, pumps and pipework;;
- Construction of tertiary filter plinth;
- Installation of tertiary filter and feed pumps;
- Installation of interconnecting and outfall pipework;

- Excavate and form foundation for new control building;
- Install underground pipework and pour floor;
- Installation of site ducting;
- Construct building walls and roof;
- Install windows, doors and complete building finishes;
- Provide electrical fit-out of complete building;
- Install and wire new Machine Control Centre (MCC) to provide power to plant, and
- Install SCADA computer to provide complete control to plant.

Works within new upgrade WWTP area will proceed on the following basis:

- Excavate area for new process tank foundation;
- Placement of steel and concrete for tank base;
- Placement of steel and concrete for tank walls;
- Placement of concrete roof and walkways;
- Placement and/or construction of stairs and plinths local to tank;
- Installation of process tank pipework;
- Installation of process tank pumps;
- Installation of process tank mixers;
- Installation of aeration system;
- Installation of chemical dosing;
- Excavate area for new clarifier tank foundation;
- Placement of steel and concrete for tank base;
- Standing of precast walls;
- Fit-out of clarifier including bridge, scrapers and decant system;
- Construction of services culverts, and
- Installation of site ducting.

Excavations for the development of the WWTP tanks will be as follows:

- The tank and plinth positions will be marked out by the site engineer and a CAT scan will be carried out.
- Any underground services will be clearly marked and signed ahead of the excavation.
- The top soil will be stripped off and stored on site for use on completion of the ground works.
- The excavator will dig within the line for the extent of the excavation.
- The site engineer will mark the top and bottom of the batter to show the outline of the excavation. The base of the tanks is approximately 400mm below ground level.
- Additional area will be allowed around the perimeter of the tanks for working room.
- The excavator will firstly dig the footprint of the tank to just above formation level.
- The excavator will then form the batter to the line set out by the site engineer.
- A ramped access will be provided for operatives to the formation level.
- The excavator will excavate down to approximately 400mm below the tank base level
- The arising, approximately 1,620m^3, will be loaded into a dumper and deposited around the perimeter of the site for later graded off to a safe batter. These arising will be spread in the adjacent field at a suitable time of the year. Stockpiling locations are shown on EIS **Figure 2.9**
- A sloped access to and from the excavation will be maintained for site plant and operatives.
- A post and rail barrier will be erected back from the edge of the excavation to prevent operatives accessing the top of the batter.
- When the excavator approaches formation level, a grading bucket will be used to trim the formation to level. Sections of the formation will be trimmed and the blinding will be placed in stages.

2.3.1.2 Electrical Installation and Commissioning

Once the civil and mechanical works have been substantially completed the complete plant will be fully wired and connected back to the MCC in the new control building. This will then allow the full commissioning of the plant. All equipment will be "dry tested" first to check for the correct operation. Once compliance with

same is achieved the plant can be "wet tested" on standard water. This it ensure that all equipment will operate as designed under wet conditions. Once compliance with this test is achieved the plant can take wastewater flows. The plant will be operated for a set period to prove that it operates as designed and achieves the required standards for which it was designed. This period is known as process proving. On successful completion of these tests the plant will handed over to Newmarket Co-Op for operation and the works will be deemed complete.

2.3.1.3 Decommissioning

There are three elements of the existing site layout which require decommissioning as part of the proposed development (Shown on **Figure 2.9, EIS Volume III: Figures**) and this will undertaken as follows:

1. Biotower:

All elements of the biotower will be washed in situ. The resultant waste water from the washing process will be processed by the WWTP. The Biotower will then be disassembled and the structural steelwork and media will be sent to approved recycling sites for recycling in line with the Waste Management Act. Given that the effluent which the tower had been treating is non-hazardous and the milk is pasteurized during processing, it is not envisaged that the components will need any special treatment. However this will be further evaluated at the time of decommissioning.

2. Existing Dissolved Air Flotation Unit:

The machine will be cleaned fully by flushing through with water/final effluent. The resulting solution will then be processed fully by the WWTP. After the washing procedure the DAF will be dismantled and stored on site. No material will leave site.

3. Redundant Tanks:

These tanks will be decommissioned through the following procedure:

- Clean out and wash down of the tanks and dispose of contents in accordance with the Waste Management Act.
- Seal and grout pipe openings.
- Breakout the Re-enforced Concrete structure to 300mm below Ground level.
- Fill in with CL804 stone aggregate & compact in layers.

In line with the IPC license the EPA will be informed of the plans to make the above equipment redundant and get approval for the methodology being applied.

2.3.2 Underground Wastewater Pipeline

Newmarket Co-Op propose to install an underground pipeline to convey treated water from the WWTP at the creamery facility to a discharge point on the River

Dalua, approximately 4 km to the south east of the facility shown on **EIS Volume III Figure 2.7: Underground Pipeline Route**. The River Dalua is considered to be the receiving water in the facility's current industrial emissions license covering the existing wastewater discharge from the creamery facility. This proposed discharge location amendment will result in a cessation to the current discharge of treated waste water into the Rampart Stream via the Mill Race.

The pipeline will run along the route of the R576 to minimise development impacts on the local area and private property and will avoid any sites designated for ecological, cultural heritage or other conservation purposes. A detailed description and construction methodology for the proposed pipeline including pipeline locations, design and construction designs is provided in **EIS Volume II Appendix 2.1: Newmarket Co-Operative Creameries Ltd. Effluent Rising Main Design Report.** The Construction Environmental Management Plan (CEMP) provided in **EIS Volume II Appendix 2.2** details the protection measures that will be implemented before and during construction of the underground pipeline to ensure the surrounding environment including river water quality, ecological habitats and other sensitive receptors will not be negatively impacted by the proposed development. The proposed pipeline will run across three road bridges before reaching Allen's Bridge at the River Dalua discharge location where it will be attached to the side of the bridge. The construction of the pipeline at these bridges is discussed further in **Appendix 2.1** mentioned above whilst structural reports for all four bridges are provided in **EIS Volume II, Appendix 2.3:** Cork County Bridges Inventory, and the revised and updated **Appendix 2.3.**

2.3.3 Increase in Peak Processing Period Duration

Currently, under the seasonality of milk supply, the Newmarket Co-Op facility utilises less than 50 million gallons of milk equivalent per annum. However, with changing milk quota regulations being implemented in Ireland, Newmarket Co-Op propose to extend the peak season to accommodate processing of an increased milk pool.

The increase in milk processing will be facilitated by increasing the duration of peak time milk processing at the facility and increasing processing timing from six to seven days a week, rather than increasing the existing daily processing levels, which will remain unchanged as part of the proposed development. Existing milk processing infrastructure currently utilised at the Newmarket Co-Op facility will not require amending as part of the proposed development.

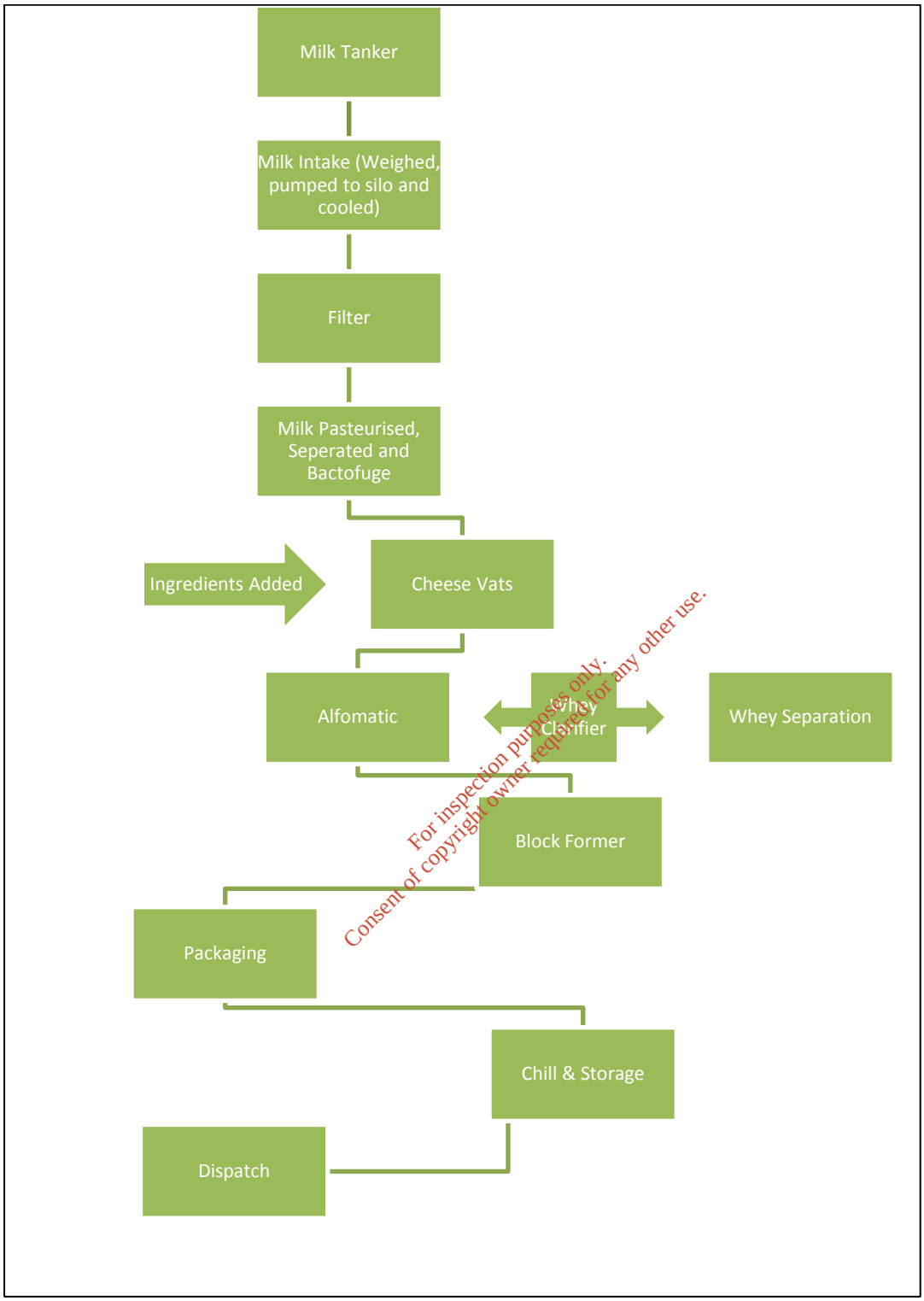
2.4 Manufacturing Process Overview

Milk is collected for processing by hauliers in stainless steel bulk tankers from Kerry Group milk suppliers in the region. On arrival at the facility milk is weighed, sampled, cooled and pumped to milk silos. There are 7 insulated milk silos at the site and 2 insulated cream silos.

From the silos, milk is pumped through filters to the pasteuriser and if required through the bactofuges and standardising system. Milk is then pumped to the cheese vat where ingredients are added and curds and whey are formed. From the cheese vat the curds and whey are pumped to a cheddaring machine to allow the curds and whey to be separated.

The curd is cheddared, milled and salted and is transported to the block formers where 20 kilo blocks of cheese are formed. After the block formers the cheese is vacuum sealed, passed through a metal detector, boxed and conveyed to the rapid chill area of the plant before being placed in cold storage to allow the cheese to mature before being dispatched off site. A schematic of the process is provided in Diagram 2.4.1 below.

Diagram 2.4.1: Diagrammatic of Production Process



2.4.1 Description of Raw Materials, Product and Key Elements of the Process

The raw materials for the facility are predominately milk, which is supplied by dedicated road milk tankers. These tankers collect milk from farmer suppliers, and deliver to the Newmarket Co-Op facility on a daily basis during peak production. Additionally, the site requires:

- Small volumes of chemicals for clean in place (CIP) within the production and pipework on site;
- Packaging and pallets for the final products;
- Heat which is supplied by the onsite boilers; and
- Refrigeration.

Waste arising from the development is predominately liquids, which are directed to the WWTP for treatment prior to release. Solids collected from this process are land spread in accordance with Nutrient Management Plans and in compliance with restrictions with the EPA.

2.4.2 Input Raw Materials

Fresh milk is the primary substance used at the facility and is delivered to the facility by road tanker. At Newmarket Co-Op the milk is unloaded and stored in stainless steel silos before further processing. The milk intake area and milk silos are all remotely bunded to the WWTP so that in the unlikely event of loss or failure of the storage facilities, the milk will be collected and routed to the WWTP for safe storage and either treatment or collection and appropriate disposal as required.

All incoming dry goods for packaging products are stored in the dry goods warehouse area of the facility. These include:

- Cardboard;
- Plastics and
- Dry ingredients.

Steam, required for the process at the site, is generated from onsite Medium Fuel Oil (MFO) fired boilers. MFO is delivered to the site in road tankers and is stored in bunded oil tanks at the east of the product storage buildings. Bulk chemicals (caustic and nitric acid) are used for cleaning processing equipment and these liquids are stored in stainless steel tanks which are located inside concrete bunds.

Water treatment chemicals for boilers and the chilling system are stored locally in plastic bunds at the boiler house.

Operations at the Newmarket Co-Op facility are dependent on the volume of milk available for processing and the demand for cheddar cheese on the domestic and export markets. On this basis, the hours of operation across the year are analogous with milk supply and market demand.

Processing occurs on a 24 hour per day, 6 days per week timescale during the current production period, which the proposed development aims to extend to 7 days per week.

Processing operations at Newmarket Co-Op are supported by:

- Operational personnel;
- Warehouse and packaging personnel;
- Maintenance personnel;
- Laboratory personnel;
- Administration personnel; and
- Management.

Operational and production personnel operate on a shift basis. During peak season, shifts consist of three 8 hour shifts in a 24 hour period.

Maintenance personnel work from 8.00am to 4.30pm, with staff also on duty on a rota basis during all other production periods.

Administration and management personnel work from 9.00am to 5.30pm Monday to Friday. Management are on call 24 hours per day based on a rota basis to ensure all aspects of site operation operate efficiently and quality and environmental issues are addressed immediately as they arise.

The proposed extension to the existing peak processing season involving an equivalent increase of 30 million gallons of milk per annum will require 24 hour operation of the site, 7 days per week during the proposed peak period.

2.4.3 Bulk Storage

There will be no increase in the number of bulk milk storage tanks present onsite as a result of the proposed development. The increased production capacity will be accommodated by increasing the delivery and dispatch rates respectively for raw materials and finished product.

2.4.4 Steam Boilers

There are two steam raising boilers at the site which supply steam for the process. The boiler units are run on medium fuel oil and operate on a lead/standby basis, with one boiler being sufficient to meet the steam demand at the site. No additional steam generating capacity is required for the proposed development.

2.4.5 Refrigeration System

Refrigeration is a critical utility at the site as much of the product produced at the site needs to be maintained at low temperatures to prevent spoiling. Refrigeration is provided in centralised plants in the utilities building and cheese factory services area. Refrigeration centres at the site consist of a number of compressors in succession, expansion vessel, cooling towers and condensers.

2.4.6 Compressors

Compressed air is used extensively at the site for the operation of valves, filling and packing machines and numerous other activities such as local cleaning of equipment.

2.4.7 Drainage Infrastructure

Surface water drainage is located on all clean areas of the site, including roof drainage. These areas are drained directly to the Mill Race and thereby to the local stream course. The proposed development proposes to continue the drainage of surface water from clean areas of the site to the Mill Race.

Surface water emissions are monitored in accordance with the IEL licence (Ref: P0793-02).

2.4.8 Foul and Process Wastewater

Waste water emissions from the existing facility comprise process waste water and domestic sewage. All process wastewater from the site is currently treated on-site at the WWTP; the main discharge from the Newmarket Co-Op facility arises from treated process effluent which is currently discharged to the Rampart Stream, a tributary of the River Dalua.

A connection to the town sewer exists for the sanitary waste waters associated with the office block. This connection was made in 2010 as part of the programme to decommission the septic tank. Emissions to sewer are solely associated with the sanitary requirements of the office buildings on site, and do not include process water emissions.

2.4.9 Process Waste Water Treatment

All process waters arising at the site are treated at the onsite wastewater treatment plant.

The purpose of the WWTP at the facility is to biologically treat waste water to a standard suitable for discharge to the River Dalua. The treatment methods comprise of activated sludge (biological treatment) and solid removal through clarification.

The treatment plant comprises the following items as shown **EIS Figure 2.3** (**EIS Volume III: Figures**):

- Balancing Tank;
- Dissolved Air Flotation (DAF) unit;
- Biotower;
- Aeration ditch;
- Anoxic Tank;

- Clarifier;
- Sand Filtration Tertiary System;
- Sludge holding tank;
- Sludge dewatering, and
- Measurement and sampling station.

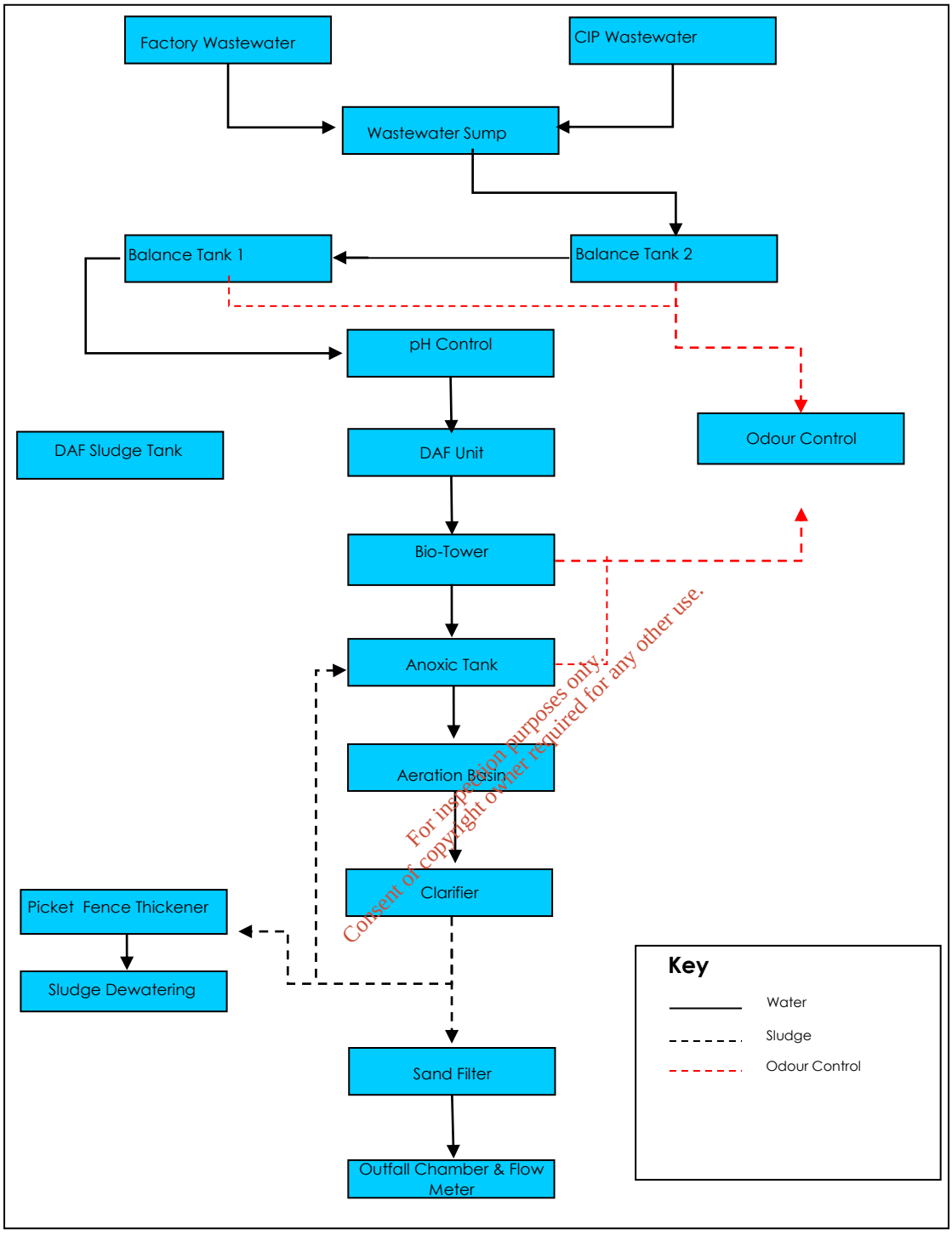
Process waste waters from processing areas of the site are collected centrally and conveyed to an underground sump from where they are pumped forward to two combined balance tanks. The WWTP balance tanks allow waste streams from the various sections of the plant to be mixed so that a consistent quality of effluent is pumped forward in the treatment system.

Waste water is pumped from the balance tank to a DAF unit via a forward feed pump. After the DAF unit, the effluent is pumped to the Biotower for further BOD reduction. Chemical agents to reduce orthophosphate are added at this stage. From the biotower water is pumped to an anoxic zone, where the water is exposed to an anaerobic environment, in this zone the nitrate is broken down to nitrite.

Further organic removal occurs in the oxidation ditch, wastewater is then pumped from the oxidation ditch to a clarifier for removal of solids. Solids removed are de-watered for re-use. The water is passed through a sand filter before final discharge. A description of the WWTP system is provided in Diagram 2.4.2 below.

The balance tanks, bio-tower and anoxic tank are under negative pressure to force the air inside the units to an odour treatment system to remove odours from the air before release. In addition, the decanter is located within an enclosed building. The building is under negative pressure and all air from the building is forced through an odour treatment system prior to release to atmosphere.

Diagram 2.4.2 Existing Waste Water Treatment Plant



All discharges to the WWTP are monitored as per licence conditions.

Newmarket Co-Op discharge surface water runoff and treated process effluent to surface water. All of the discharge points from the site are included in the facilities IEL licence. Emission point reference SW-1 relates to the discharge of treated effluent and discharge point SW-2 is a discharge of water and surface water. Both of these emission points, shown **EIS Volume III Figure 2.8,** are subject to continuous monitoring in respect of volume and quality.

Selected emission points such as SW1 are monitored for chemical parameters and temperature. The current IE Licence Limit values assigned to emission point SW-1 are presented in Table 2.4.1 below.

Table 2.4.1: Annual Average Results for Surface Water Emission Point SW1

Parameter	ELV	Unit	2009*	2010	2011	2012	2013	2014
Temperature	25	˚C	17.6	17.6	18.4	14.3	15.86	16.14
pH	6-9	Unit	7.62	7.22	7.74	7.69	7.72	7.63
BOD	10	mg/l	2.5	2.5	1.77	1.80	2.66	2.01
COD	50	mg/l	14.08	17.02	8.71	20.06	16.74	15.12
Suspended Solids	20	mg/l	11.0	11.27	8.69	7.02	8.47	8.68
Total Nitrogen	15	mg/l	10.65	10.65	4.12	3.55	5.08	2.88
Ammonia	0.5	mg/l	0.07	0.06	0.18	0.18	0.24	0.16
Oils, Fats and Grease	10	mg/l	8	8	4.84	4.22	<5	<5
Reactive Phosphate	0.5	mg/l	0.45	0.29	0.22	0.17	0.21	0.21
Total Phosphorous	1	mg/l	0.56	0.69	0.45	0.50	0.68	0.60

*Licence monitoring only commenced in October 2009, these results therefore only cover the period October to December 2009.

A review of the history of the monitoring results from emission point SW1 shows a general improvement over the previous 6 years.

The remaining discharges (SW3-12 shown on **EIS Volume III Figure 2.8**) from the site are associated with roof and yard areas arising as a result of rainfall. In Agreement with the EPA, these discharge points are not monitored directly due to their inaccessibility.

It is noted that the surface water from the carpark area of the site passes through a Class 1 bypass separator prior to discharge to a surface water (Mill Race).

2.4.10 Water Supply

Water is pumped from a number of deep wells on site to 2 reservoirs, from where it is treated and supplied for use across the site. In addition to the onsite wells the facility maintains a supply from the local authority potable water main. All water is chlorinated via a dosing station prior to storage in the reservoirs.

Newmarket Co-Op use approximately 7.33 m^3 of water per tonne of cheese produced at the creamery which will not change as a result of the proposed development. Coolant Water is not required at the facility. Industrial Emissions Licence (IEL) reference number P0793-02 requires the temperature of water being discharged from the creamery to be below 25 degrees Celsius. The average annual temperatures of the waste water discharge from the creamery into the Rampart Stream at surface Emission Point SW1 are provided above in Table 2.4.1.

An increased abstraction of water above the current 2015 level of 201,224 m^3 per annum will not be required as a result of the proposed development. The only other water source utilised at the site is from the public supply with the Newmarket Co-Op facility utilising 15,003 m^3 of water in 2015. The proposed development will not require an increase from this source of water. The proposed development will not require

additional water or any change to existing water usage and extraction levels discussed above. As a result, no impacts will occur on the existing ground water resource.

2.4.11 Roads and Access

The facility is currently accessed via Emmett Place by all site traffic, which connects the site to Church Street within Newmarket Town as shown on **EIS Figure 2.2** (**EIS Volume III: Figures**). Newmarket Co-Op operate a one way system for HGV deliveries to the site facility in which Emmet Place is utilised as the site access for inbound deliveries. HGV traffic then continues in a south east direction through the site and exits onto Church Street to the south.

The proposed development does not include any variations to the ingress/egress routes to the Newmarket Co-Op facility. **Chapter 5 Section 5.7** below assesses the potential impacts and mitigation measures proposed from this application regarding traffic management.

As the proposed development is seeking an increase in annual production levels of cheese on site, additional supplies of milk will be required with a resulting increase in the movement of block cheese product from the facility.

The elongation of the peak production period will require seasonal staff to work for a longer period of the year, with the associated traffic for current peak production proposed to occur for approximately half of the year. Approximately 13 additional staff will be employed on site as a result of operating at maximum capacity.

The possible impacts and proposed mitigation measures concerning traffic are assessed in **Chapter 5 Section 5.7.**

2.5 Environmental Management and Emissions

The current facility is operated in accordance with the requirements of the EPA licence for the site. The activities carried out on site fall within the scope of the Industrial Emissions Directive and therefore the existing licence was amended in December 2013 by the Agency under the European Union (Industrial Emissions) Regulations, 2013. The emissions arising as a result of the facility operating to maximum capacity will be licensed by the Agency through emission limit values (ELVs), and stipulated licence conditions.

Newmarket Co-Op operates an Environmental Management System (EMS) on site covering the following:

- Identification of key environmental impacts of the operational activities;
- The setting of objectives and targets and a programme of improvements;
- Regular monitoring of environmental performance;
- Regular auditing both by internal and external groups;

- Establishment of operational controls to prevent and minimise significant impacts;
- Regular reporting of environmental performance;
- Monitoring and control systems reviewed and amended;
- Environmental procedures including incident reporting, complaints, and emergency procedures established;
- Provision of environmental awareness training and,
- Operation of preventative maintenance programmes.

The Newmarket Co-Op Environmental Management System is accredited to the International Standard ISO14001, which sets out a framework for environmental management at the site. Newmarket Co-Op are an accredited ISO 14001 facility and are audited on an annual basis by an external body (SGS Ireland).

The following sections look at the licenced emission points from the facility.

2.5.1 Process Waste

The predominant waste, by volume, produced at the facility is waste water. Waste water arises from washing activities at the site. This waste is treated in the onsite WWTP with the treated liquid being discharged to surface water and the solid fraction transported off site for re-use in composting or land spreading. Wastewater currently generated and proposed in relation to the developments being put forward at the Newmarket Co-Op site are discussed in **Chapter 5 Section 5.3**.

Sludge from the WWTP is moved to an enclosed building (where air is extracted and ducted to the odour control unit) and decanted to approximately 17% solid content. The solids are prepared for off-site removal and transported within covered trucks for land-spreading or composting.

The WWTP has a comprehensive, state of the art, odour treatment control system in place. The system is the Anua Mónashell® product. The system manages odours on site. The system collects the air from the covered balance tanks, bio-tower and anoxic tanks within the WWTP. The system also collects air from the enclosure used to decant the WWTP sludge.

Other wastes collected at the site is segregated, labelled and accompanied by the appropriate documentation on transport for authorised recycling or other treatment.

Cardboard and plastics are compacted, stored for short duration on site prior to collection by licensed hauliers and sent to authorised facilities for recovery. Non-hazardous wastes not suitable for recovery are collected by licensed hauliers and disposed of at authorised facilities.

Hazardous waste arisings, normally generated in small quantities, are associated with maintenance activities (waste oils etc.) on site.

2.5.2 Sludge Management and Landspreading

All sludge land spreading is carried out in accordance with the agreed Nutrient Management Plans (NMPs) provided in **EIS Volume II, Appendix 2.5**. The method of application is dependent on the solids content of the sludge, land parcel and associated crop type, and therefore sludge is either applied via rear discharge spreader or vacuum tanker with or without trailing shoe applicator. The application rates for land spreading are in accordance with those set out in the NMP for each area of land.

It is forecasted that approximately 4,000 tonnes of dairy sludge will be produced by Newmarket Co-Op in 2016. All of this sludge will be recovered as a valuable organic fertiliser on productive agricultural land, which will offset imported and chemical fertiliser use on the landbank in question. An estimated total maximum of 5,000 tonnes of dairy sludge will be produced at Newmarket Co-Op following completion of the proposed development works.

The increase in sludge production of 1,000 tonnes per annum is not a result of increased levels of water usage, rather it is a result of the proposed increase in milk processing volumes at the site. The increased quantity of dairy sludge arises directly from small, unavoidable losses of product during the manufacturing process. There is no direct relationship between volumes of water abstracted and volumes of sludge produced in the WWTP. An increased abstraction of water above the current 2015 level of 201,224 m^3 per annum will not be required as a result of the proposed development. The only other water source utilised at the site is from the public supply with the Newmarket Co-Op facility utilising 15,003 m^3 of water in 2015. The proposed development will not require an increase from this source of water.

The existing landbank assigned to dairy sludge from Newmarket Co-Op possesses more than enough capacity to enable the spreading of the additional predicted 1,000 tonnes of sludge required to meet output. Enva Ireland Ltd. currently manage the landspreading process on behalf of Newmarket Co-Op.

All landspreading operations are carried out as per Enva's Protocol for the Landspreading of Organic Sludge/Biosolid. A copy of this and an EPA approved, field specific Nutrient Management Plan will be provided to all individuals carrying out spreading operations. All NMPs are fully compliant with SI 31 of 2014, and adhere to the recommendations of the "Code of Good Practice for use of Biosolids in Agriculture".

The following areas are automatically buffered out of spreadlands when a landbank is being assessed for suitability as a recovery destination for dairy sludge:

- Areas of increased groundwater vulnerability (as per GSI):
- Areas of increased groundwater quality sensitivity (source protection areas):
- Areas in close proximity to surface water (drains, streams, rivers, lakes, sea):
- Areas near sensitive receptors (odour nuisance to schools, churches, hospitals: nutrient input to SPA, SAC and NHAs etc.), and
- Areas of high soil fertility (P index 4).

In addition to this, 10m buffer zones are applied to public roads and 100m buffer zones to dwelling houses.

Detailed information on the implementation of buffer zones to protect environmental and hydrological constraints at each of the six land banks that are used for land spreading of sludge from the Newmarket Co-Op site are provided in **EIS Volume II, Appendix 2.4.** It is proposed to utilise the same six landbanks for the purposes of land spreading the additional 1,000 tonnes of sludge that will be produced as a result of the proposed development. The landbanks contain more than the required areas of land needed to accommodate the additional volumes of sludge as discussed in **Appendix 2.4**.

The *Code of Good Practice for the use of Biosolids in Agriculture - Guidelines for Farmers* (DELG) and the Teagasc *Code of Practice for Safe Land Applications of Fertilisers and Animal Manures* are used by Enva in the drafting of all Nutrient Management Plans. The 6 existing NMPs for the re-use of Newmarket Co-Op WWTP sludge as an agricultural fertiliser are provided in **EIS Volume II, Appendix 2.5**. Each NMP details the exclusion zones implemented on each landbank to avoid impacts on environmental constraints and discusses the hydrological, soil and other assessments completed to inform each individual NMP.

2.5.3 Emissions to Atmosphere

Air emissions at the facility arise from heat generation systems and minor emissions from the odour treatment system. Other air emissions include pressure relief valves which are infrequent (PRV's) and air vents from storage areas. These sources are negligible in relation to environmental effect and are therefore not deemed necessary for monitoring by the EPA. An assessment of potential air quality and odour impacts arising from the proposed development are addressed in **Chapter 5 Section 5.5- Air Quality and Odour.**

2.5.4 Noise

Due to the nature of the activity at the site, processing of milk occurs indoors. The building fabric attenuates much of the noise within the building to the external environment. Regular inspections and preventative maintenance is carried out on external equipment to ensure that it operates as designed and is not causing noise in excess of the design. Maintenance personnel are present on site at all times and can respond immediately to any equipment which malfunctions causing noise emissions during service.

Newmarket Co-Op undertook two noise surveys per annum in accordance with IPPC Licence Reg. No. P0793-01. After years of compliance and no complaints, this frequency of monitoring has been reduced to an annual monitoring requirement in IEL Licence Reg. No.P0793-02. Noise measurements were undertaken at noise sensitive receptors in all surveys, as recommended in Agency Guidance Documents on Noise (NG2 prior to April 2012, NG4 post April 2012). To date, no complaints regarding noise have been received by Newmarket Co-Op.

An assessment of noise emissions on site, the control of noise on site and a detailed assessment of noise emissions in relation to the proposed development is provided in

Chapter 5 Section 5.4 Noise and Vibration.

2.5.5 Pest Control

Rentokil Pest Control provide monitoring, implementation and training of pest control measures at the Newmarket Co-Op site. Rentokil undertake monthly site visits to monitor and control the following pests and vermin on site:

- Rats;
- Mice;
- Flying Insects;
- Cockroach;
- Stored Product Insects (SPI), and
- Garden ants and crawling insects.

During each monthly site visit inspections for the above pests are undertaken and any further pests found on site are recorded with a report issued to Newmarket Co-Op on addressing any additional pests on site. Remains of pests are removed if discovered during routine site visits if not already removed by staff onsite. Further information on the issues covered in each monthly site visit and the record of visits for 2016 by Rentokil are provided in **Appendix 2.6 Pest Control Service Delivery Methodology.**

In addition to the monthly site visits and inspections, a field biologist carries out in depth inspections of the Newmarket site at least four times per year to monitor ongoing pest control management at the site, effectiveness of the monthly inspections and propose any additional issues which need to be addressed by Newmarket Co-Op.

The current area covered by the current suite of pest control measures and inspections on site will be increased to include the area of the new WWTP at Newmarket Co-Op to ensure all pests are controlled.

Predators have not been identified on the Newmarket site.

2.5.6 Operational Monitoring

2.5.6.1 Existing Monitoring

The installation is controlled, operated and maintained, and emissions take place as set out in the IE license PO 793-02, dated 16/12/13. The existing discharges to the River Dalua via the Rampart are discussed in section 5.3.3.4 below with the discharge points shown on EIS **Figure 5.3.3**.

The monitoring of the Rampart Stream is carried out at two specific locations SW1, N107348:E132157, and SW2, N107325:E132151 shown on **Figure 5.3.3**. These two point cover upstream and down stream of the current discharge point.

At these locations the following is the monitoring plan:

Table 2.5.6: Monitoring Points

Inspection type	Frequency
Visual	Daily
Smell	Daily
COD	Monthly
ORP	Monthly
Ammonia	Monthly
Suspended Solids	Monthly

This work is undertaken by onsite personnel/laboratory or by an approved external laboratory.

2.5.6.2 Proposed Operational Monitoring

The proposed development will be controlled, operated and maintained, and emissions will take place as set out in the revised IE license application which Newmarket Co-Op are applying for to the EPA. Included in this will be the requirement for the licensee to:

- Maintain an Environmental Management System (EMS). The EMS will be updated on an annual basis.
- Establish procedures to ensure that corrective action is taken should the specified requirements of this licence not be fulfilled.
- Maintain a Public Awareness and Communications Programme to ensure that members of the public are informed, and can obtain information at the installation, at all reasonable times, concerning the environmental performance of the installation.

Table 5.3.6 below details the proposed emission limit values (ELVs) that Newmarket Co-Op are applying for at the new discharge point at Allen's Bridge.

The site is currently licensed by the EPA and final ELVs to be adopted will be subject to their assessment and agreement. A monitoring programme of the proposed discharge will also be required by the EPA as part of the Licence review application and this will be agreed with the EPA at the Licence deliberation stage. Newmarket Co-Op will monitor the treatment system performance internally to ensure that it is working effectively and will also monitor the quality of the final discharge on a continuous basis. The monitoring will either be completed by in house personnel/laboratory or by a suitably approved external laboratory. On agreement of Licensed ELVs from the EPA, Newmarket Co-Op will be required to monitor discharges to water on a regular basis and compile this information for submission to the EPA in the form of an Annual Environmental Report (AER). The existing Environmental Management Programme for the site is provided in **Appendix 2.10** which sets out the environmental objectives and targets specified to address the requirements of the existing IE Licence. This will be updated upon approval of the licence review application by the EPA.

Chapter Three - Planning Context and Need for the Development

3.1 Introduction

This Chapter reviews the National, Regional and Local planning policies, objectives and targets for rural agri-business development within Ireland and north-west Cork County and discusses the compliance of the proposed development with such policies. In particular, information regarding the expansion of existing dairy industry businesses is reviewed. This chapter has assessed the following policy documents:

- National Level: National Spatial Strategy, Capital Investment Plan, Food Harvest 2020: A Vision for Irish Agri-Food and Fisheries;
- Regional: Regional Planning Guidelines for the Southwest Region 2010-2022; and
- Local: Cork County Council Development Plan 2014, Kanturk Local Area Plan 2011.

3.2 National Policy

3.2.1 National Spatial Strategy

The Strategy, published in 2002, is a twenty year planning framework designed to deliver more balanced social, economic and physical development between regions, setting out how all areas of the country will have the opportunity to develop to their potential.

The Strategy states that traditional rural based sectors of employment in agriculture, forestry and fishing will continue to have key roles as a base for strong and diversified rural economies. The Strategy places importance on the necessity to secure agriculture, where it has the capacity to remain strong and viable, by maintaining the maximum possible number of family farms, while at the same time ensuring that smaller farmers have the opportunity to supplement their farm income through off-farm work.

The Strategy continues to state that while agriculture has traditionally been the most important contributor to rural economies, it must adapt to the challenges posed by modernisation, restructuring, market development and the increasing importance of environmental issues. An economically efficient agricultural and food sector, together with forestry, fishing and aquaculture are essential components of the development of the rural economy.

Compliance of the Proposed Development

The proposed development complies with the aims of the Strategy as it seeks to secure the continuing presence of a well-established agri-food producer which provides employment within the rural town of Newmarket.

3.2.2 Food Harvest 2020: A Vision for Irish Agri-Food and Fisheries, (2010), Department of Agriculture, Fisheries and Food.

The Department of Agriculture, Fisheries and Food published this report in July 2010 to set out the strategy for the development of the agri food industry in Ireland. The report sets out the industry visualisation for the sector and sets striving targets for development over the next decade. It contains recommendations aimed at reaching sustainable growth, increasing efficiency, higher productivity and competitiveness in primary agriculture, as well as in food and drink production. The growth targets for the industry are supported by substantial production increases in the milk, beef, sheep, pigment, poultry and aquaculture sectors.

Food Harvest 2020 identifies the expansion of the Irish milk production sector and the need for the expansion in dairy manufacturers within Ireland to create value added products from this milk.

Agriculture, already a significant constituent of the Irish economy, has potential to contribute to economic recovery through growth in input to a non-quota environment. Food Harvest 2020 envisages the agri-food and fisheries industry expanding from its baseline output of €24 billion per annum by increasing the value of primary production by 33%, increasing value-added outputs by 40%, and increasing exports by 42% by 2020.

Food Harvest 2020 included specific sector growth targets to be achieved between referenced years passed 2007 to 2009 and 2020. These targets included 50% volume increase in milk production, a 20% increase in value of beef output, a 50% increase in value of pig meat, a 20% increase in the value of sheep meat production, and a 10% increase in the value of poultry production. (Harvest 2020)

Compliance of the Proposed Development

The Newmarket Co-Op facility is an existing exemplary milk manufacturing facility and the increase in production will support the aims of Food Harvest 2020 to increase the output of the agri-food business in Ireland towards 2020.

3.3 Regional Policy/Guidelines

3.3.1 Regional Planning Guidelines for the Southwest Region 2010-2022

The regional planning guidelines for the southwest region cover the period of 2010 to 2022. Within this region the document notes that '*The primary production employment sector (agriculture, forestry, fishing) accounted for 12% of the workforce in the region in 1998 but this has declined to 7% in 2007, a decline of 13.5% marginally lower than the national average.*'

Regarding industry in the rural areas of the southwest region, the guidelines state that a '*...general trend is that these areas continue to rely on the traditional economic sectors of agriculture/fishing, tourism and construction.*'

The Guidelines recognise the high quality of both raw agricultural enterprises (farming) and the renowned agri-businesses in the southwest:

'Agriculture in the South West continues to be a very important aspect of the regional economy for many people. Food produce from the South West is acclaimed internationally and the region has a very large internationally known food production sector. While the relative importance of agriculture to the regional economy has changed in terms of employment and value, the region has many areas of high quality productive capacity which have the potential to contribute to growth in the development of new food products with international demand resulting in the creation of new employment opportunities within the region.'

As such the Guidelines outline that *'Policies for the towns and villages should provide sustainable opportunities for local employment, supporting the needs of agriculture, local services and tourism, improving public transport access to higher order settlements as well as providing a range of housing to meet local needs.'*

Policy RES-04, on primary resource based sectors notes *'It is an objective to encourage the protection and sustainable further development of the primary resource based sectors through:*

1. *Protecting the quality of the productive environment (water, land and air) for the production of high quality food and high value food processing industries in the region;*

2. *Promoting the further development of food products to the level of high quality final shelf products; and*

3. *Supporting initiatives which address the promotion of a local food culture in the Region, including appropriately located farmers markets.'*

Compliance of the Proposed Development

The Newmarket Co-Op application will offer additional capacity for local dairy farmers, provide increased employment in the town of Newmarket and produce higher volumes of quality local cheese per annum whilst protecting the local productive environment (water, land and air, as discussed further below in Chapter 5). The proposed development, including the WWTP upgrade, supports the aims of the regional guidelines to further develop the local agri-food industry whilst protecting the environment.

3.4 Local Planning Policy

3.4.1 Cork County Development Plan 2014

The Cork County Development Plan 2014 has been prepared in accordance with the steps set out in the Planning and Development Acts. It was adopted by the Members of Cork County Council on the 8th December 2014 and came into effect on 15th January 2015. It is expected to remain in force (subject to any interim variations that the Council may make) until late 2020.

It is a six year development plan for the county that attempts to set out, as concisely as possible Cork County Council's current thinking on planning policy looking towards the horizon year of 2022. The plan also sets out the overall planning and

sustainable development strategy for the county which must be consistent with the National Spatial Strategy 2002-2020 and the South West Regional Planning Guidelines 2010-2022.

This Development Plan is the county's principle strategic planning policy document. Detailed land-use zoning maps for the main settlements of the county are contained in the Electoral Area Local Area Plans and the Special Local Area Plans. The Development Plan online mapping tool states that whilst the Newmarket Co-Op site is located within the development boundaries of Newmarket town, a section of both the proposed WWTP and underground pipeline are located within an area designated by County Development Plan Objective RCI 4-2 as Rural Housing Policy Area Type Town Greenbelt. The southern section of the underground pipeline is also located within an area of Rural Housing Policy Area Type Structurally Weaker Rural (County Development Plan Objective RCI 4-6: Structurally Weaker Rural Area). Both of these policies seek to manage housing development within the local area and are not deemed relevant to the proposed Newmarket Co-Op development.

County plan objectives of particular relevance to the proposed development are listed below in Table 3.4.1. A description of other relevant policies and a statement of compliance of the proposed development with these objectives are provided in **EIS Volume II**, **Appendix 3.1.**

Table 3.4.1: Cork County Development Plan Objectives relevant to the Proposed Development

County Plan Objective	Summary of Policy Text	Compliance of Proposed Development
County Development Plan Objective EE 9-1: Business Development in Rural Areas	The development of appropriate new businesses in rural areas will normally be encouraged where the scale and nature of the proposed new business are appropriate to the rural area, and are in areas of low environmental sensitivity. Developments should enhance the strength and not adversely affect the character and appearance of the landscape or result in negative impacts on the existing or planned local road network.	The proposed development is compliant with this objective as it will provide increased employment in the town of Newmarket, strengthening the local economy. The Newmarket Co-Op facility is not within in an environmentally sensitive location, designated ecological or landscape interest site and will not result in adverse impacts on local views, blending into the background of the existing milk processing facility, with the proposed pipeline being installed underground in an existing road corridor. As mentioned below in **Chapter 5 Section 5.7**, the proposed development will not result in negative impacts on the surrounding road network.
County Development Plan Objective **WS 5-2: River Channel Protection**	Ensure that where practical development is kept at 10m or other appropriate distances from streams and river banks and adequate protection measures are put in place.	The proposed development will not be located on riverbanks or within river habitats. The proposed discharge outfall will be attached to Allen's Bridge with all construction works being completed from the road. Access to the river bank or river corridor will not be required and no impacts will occur on the river bank as a result of the proposed development.
County Development Plan Objective **WS 5-3: Surface Water Management**	Manage surface water catchments and the use and development of lands adjoining streams, watercourses and rivers in such a way as to minimise damage to property by instances of flooding and with regard to any conservation objectives of European sites within the relevant catchments and floodplains.	The proposed development is compliant with this policy as The Flood Risk assessment completed for the proposed development provided in **EIS Volume II Appendix 5.3.1**, concluded that the overall risk posed to the new development site by flooding is estimated to be low and that the proposed development is appropriate from a flood risk perspective. The proposed development does not occupy ground in the river flood plain, and therefore will not contribute to loss of storage or downstream flooding The proposed discharge pipeline to the River Dalua, which will be underground, will not have any potential to exasperate local flooding. In further compliance with the aims of this policy, the Appropriate Assessment

County Plan Objective	Summary of Policy Text	Compliance of Proposed Development
		Natura Impact Statement (NIS) included within this EIS **(EIS volume II, Appendix 5.2.5)** assessed potential impacts of the proposed development on the conservation objectives of European sites. The NIS concluded that with the implementation of the mitigation measures specified in the NIS, the residual negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant. The NIS states that it is expected that the proposed development will have a significant positive ex situ impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.
County Development Plan Objective WS 6-1: Flood Risks – Overall Approach	To reduce the risk of new development being affected by possible future flooding, development in areas at risk of flooding should be avoided and where development in floodplains cannot be avoided, a sequential approach to flood risk management based on avoidance, reduction and mitigation of risk should be utilised.	The proposed development is compliant with Policy WS 6 - 1 as The Flood Risk assessment completed for the proposed development provided in **EIS Volume II Appendix 5.3.1** concludes that the risk posed to the new development site by flooding is estimated to be low which relates to the probability of being impacted by a 1000-year flood and therefore Flood Zone C is relevant for the proposed development site. The proposed development does not occupy ground in the river flood plain, and therefore will not contribute to loss of storage or downstream flooding The proposed discharge pipeline to the River Dalua, which will be underground, will not have any potential to exasperate local flooding.
County Development Plan Objective WS 6-2: Development in Flood Risk Areas	Proposals for development identified as being at risk from flooding will need to be supported by a site specific flood risk assessment	A detailed Stage 2 Flood Risk assessment has been carried out to assess the proposed development and is discussed below in section 5.3 of Chapter 5 and provided in **EIS Volume II Appendix 5.3.1**
County Development Plan Objective **HE 2-1: Site Designated for Nature Conservation**	Protection should be provided to all natural heritage sites designated or proposed for designation under National and European legislation and International Agreements, and to	The proposed development is not located within a designated heritage site with the nearest being the Blackwater River SAC located over 1km to the west of the Newmarket Co-Op site. The Natura Impact Statement **(EIS Volume II, Appendix 5.2.5)** assessed potential impacts of the proposed development on the conservation objectives of European sites. The NIS concluded that with the implementation of the mitigation measures specified in the NIS, the residual

County Plan Objective	Summary of Policy Text	Compliance of Proposed Development
	maintain or develop linkages between these.	negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant. The NIS states that it is expected that the proposed development will have a significant positive ex situ impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.

3.5 Kanturk Electoral Area Local Area Plan 2015 2nd Edition

Newmarket is located within the jurisdiction of the Kanturk electoral area and forms part of this Local Area Plan. The Plan was updated in December 2014 concerning housing density policies.

The Kanturk Local Plan designates part of the Newmarket Co-Op facility site within an existing built up area which is susceptible to flooding. The existing WWTP on the northern boundary of the Newmarket facility is adjacent to an area designated as Green Belt. A small area of the upgraded WWTP will encroach on this area of Green Belt which is used as arable farming lands and under the ownership of Newmarket Co-Op. The underground pipeline route will travel alongside the route of the R576 running in a south easterly direction out of Newmarket Town through areas designated as Green Belt and existing built up area and will run past a number of areas designated for open space/sports recreation and residential.

The Local Area Plan makes general objectives for development within Newmarket. Objectives that are particularly relevant to the proposed development are outlined in Table 3.5.1 below. A description of other relevant policies and a statement of compliance of the proposed development are provided in **EIS Volume II, Appendix 3.2.**

Table 3.5.1: Kanturk Electoral Area Local Area Plan objectives and policies relevant to the Proposed Development

Objective	Summary of Policy Text	Compliance of Proposed Development
LAS 1 Water & Waste Water Infrastructure Objective	Developments will only take place where appropriate and sustainable water and waste water infrastructure is in place which will secure the objectives of the relevant River Basin Management Plan and the protection of the Blackwater River Special Area of Conservation.	The Newmarket Co-Op facility operates an existing waste water treatment plant which is licensed by the EPA. The proposed development will ensure efficient and appropriate upgraded waste water infrastructure will be in place to accompany the increased processing levels at the creamery site which have been designed to reflect the objectives of the relevant River Basin Management Plan and the protection of the Blackwater River Special Area of Conservation. The Appropriate Assessment NIS **(EIS volume II, Appendix 5.2.5)** has assessed the impacts of the proposed development on the conservation objectives of the Blackwater SAC. The NIS states that with the implementation of the mitigation measures specified in the NIS, the residual negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant. The NIS states that it is expected that the proposed development will have a significant positive ex situ impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.
	Waste water infrastructure must be capable of treating discharges to ensure that water quality in the receiving river does not fall below legally required levels and that there is no net increase in Phosphates within the freshwater system.	A water quality assessment was completed as part of **Chapter 5 Section 5.3** provided below which concluded that the proposed Emission Limit Values (ELV's) for Ammonia, Orthophosphate and BOD will use only 5.41%, 7.24% and 3.88% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition respectively and therefore emphasising that the proposed discharge from the Newmarket Co-Op facility will have an insignificant impact on the River Blackwater. The predicted orthophosphate concentration in the River Dalua downstream of the Newmarket Co-Op pipeline discharge will not result in an exceedance of the 95%ile concentration target value at the 95%ile flow condition. It is noted that the proposed ELV for orthophosphate will use 66% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition. In compliance with Objective LAS 1, the proposed orthophosphate ELV can therefore be accommodated whilst remaining compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009, and accordingly will not cause a significant environmental impact.

Objective	Summary of Policy Text	Compliance of Proposed Development
LAS 4 Environmental Objectives	It is an objective to provide protection to all proposed and designated natural heritage sites and species within this planning area.	The proposed development is not located within a designated natural heritage site with the nearest being the Blackwater River SAC located over 1km to the west of the Newmarket Co-Op site. As discussed above, the Appropriate Assessment NIS has found that with the implementation of mitigation measures, the residual negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant. In support of Objective LAS4, The terrestrial ecology assessment provided in **Chapter 5 Section 5.1** below states that although potential disturbance to resident fauna of conservation concern during the construction phase has been identified as the main impact associated with the proposed works, Newmarket Co-Op will implement controls and measures outlined throughout **Chapter 5 Sections 5.1 and 5.2, and also outlined in the CEMP, Appendix 2.2** aimed at mitigating the identified potential impacts. Assuming the full implementation of mitigation measures, it is predicted that the residual adverse impacts of the proposed development on ecological receptors identified within the study area will not be significant.
GB 1-1 Green Belts Around the Ring and County towns	It is an objective to retain the identity of towns, to prevent sprawl, and to ensure a distinction in character between built up areas and the open countryside by maintaining a Greenbelt around all individual towns.	Part of the proposed WWTP upgrade infrastructure will encroach on a small area of Green Belt lands adjacent to the existing WWTP to the north of the Newmarket site. A section of the underground pipeline following the route the R576 is also located within a designated Green Belt area. Due to the negligible scale of this encroachment and the minimal landscape and visual impacts of the proposed WWTP and underground pipeline, the impacts of the proposed development on the Green Belt are minor and will not lead to urban based sprawl, or a reduction in the maintenance of the Green Belt surrounding Newmarket.
FD 1-1 Flood Risks Overall approach	It is an objective of this plan to avoid development in areas at risk of flooding; and where development in floodplains cannot be avoided, to take a sequential approach to flood risk management	The proposed development is compliant with Policy FD 1 - 1 as The Flood Risk assessment completed for the proposed development provided in **EIS Volume II Appendix 5.3.1** states that the proposed development does not occupy ground in the river flood plain, and therefore will not contribute to loss of storage or downstream flooding The proposed discharge pipeline to the River Dalua, which will be underground, will not have any potential to exasperate local flooding. The Flood Risk assessment concluded that the risk posed to the new development site by flooding is estimated to be low which relates to the probability of being impacted by a 1000-year flood and therefore Flood Zone C is relevant for the proposed development site.

Objective	Summary of Policy Text	Compliance of Proposed Development
	based on avoidance, reduction and mitigation of risk.	
Newmarket Development Boundary Objectives of Relevance		
Objective DB-07	The Dalua River runs adjacent to the town and forms part of the Blackwater River Candidate Special Area of Conservation, a designated Natura 2000 site. This plan will protect the favourable conservation status of these sites, and all new development shall be designated to ensure the protection and enhancement of biodiversity generally.	The proposed development supports Objective DB-07 as with the implementation of the mitigation measures specified in the Appropriate Assessment NIS **(EIS Volume II, Appendix 5.2.5)**, the residual negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant. Newmarket Co-Op have sought to protect surrounding biodiversity throughout the design of the proposed development and the terrestrial ecology assessment completed in **Chapter 5, Section 5.1** below states that assuming the full implementation of mitigation measures, it is predicted that the residual adverse impacts of the proposed development on ecological receptors identified within the study area will not be significant.
Objective DB-08	All proposals for development within the areas identified as being at risk of flooding will need to comply with Objectives FD1-1 to FD1-6 detailed in Section 1 of this Plan.	As mentioned above, the proposed development is compliant with Policy FD 1 - 1 and the other local plan policies relating to development and flooding, as explained further in **Appendix 3.2**. The Flood Risk Assessment completed for the proposed development provided in **EIS Volume II Appendix 5.3.1** states that the proposed development does not occupy ground in the river flood plain, and therefore will not contribute to loss of storage or downstream flooding. The proposed discharge pipeline to the River Dalua, which will be underground, will not have any potential to exasperate local flooding. The Flood Risk assessment concluded that the risk posed to the new development site by flooding is estimated to be low which relates to the probability of being impacted by a 1000-year flood and therefore Flood Zone C is relevant for the proposed development site.

3.6 Need for the Development

The need for the proposed increase in milk processing is clear in terms of a number of factors. The Irish agricultural sector income is projected by 2020 to be approximately 16% higher than during base period 2007-2009. This growth in sector income is due largely to increased Irish dairy sector output following the abolition of milk quotas in April 2015 by the European Union. The projected increase in Irish agricultural output is in line with the current global growth in demand for dairy products. The elimination of milk quotas frees up dairy farmers and processors from previous restrictions on milk production, enabling milk producers to maximise annual production through forward planning of dairy herds and staggered milk production, resulting in longer peak supply of farm milk. Newmarket Co-Op, as the core processor of milk in the Newmarket locality, intend to meet this increase in supply of local Irish milk, and demand for milk products by extending the peak processing period at the facility.

The increase in world population will require a 50% increase in food production by 2030 (70% increase by 2050). The dairy industry in Ireland has been constrained by the milk quota system which was introduced in 1984. Milk quota constraint, rather than a land constraint, was the main determinant on the size of the dairy enterprise on farms. Many dairy farmers have a beef enterprise on their farms as a result of milk quota constraints concerning milk production volume. The expected growth on many dairy farms post milk quota abolition will come from a decline in their beef enterprise. This will be replaced by growth in dairy cow numbers, in turn increasing the volume of milk. A target of a 50% increase in milk production volumes is targeted for Ireland according to Food Harvest [1]2020. The proposed development will allow Newmarket Co-Op to treat increased levels of waste water and operate for longer at peak processing levels.

3.7 References

National Spatial Strategy, Department of the Environment, Heritage and Local Government, 2002

Building on Recovery: Infrastructure and Capital Investment 2016-2021, Department of Public Expenditure and Reform, 2015

Food Harvest 2020: A Vision for Irish Agri-Food and Fisheries, Department of Agriculture, Fisheries and Food, 2010

Regional Planning Guidelines for the Southwest Region 2010-2022, South West Regional Authority, 2010

Cork County Development Plan 2014, Cork County Council, 2014

Kanturk Electoral Area Local Area Plan 2015 2nd Edition, Cork County Council Planning Policy Unit, 2014

[1] Food Harvest 2020: A Vision for Irish Agri-Food and Fisheries, (2010), Department of Agriculture, Fisheries and Food.

Chapter Four – Alternatives

4.1 Introduction

The Planning and Development Regulations 2001-2015 as amended, specifies the information to be contained within an EIS. Schedule 6 1(d) specifies that an EIS shall include *"An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice taking into account the effects on the environment."* This chapter will review the potential options assessed and highlight the preferential options.

4.2 Guidance on Assessing Alternatives

Guidance documents produced by the Agency[23] and at EC[4] level provide direction in interpreting the requirements for the evaluation of alternatives. The EU EIA Guidelines on scoping refer to three components in the consideration of alternatives and these include:

- ~~Alternative location;~~
- ~~Design and Layout;~~
- ~~Processes on site.~~

Alternative Locations
Some locations have more inherent environmental problems than others. Such sites can usually be avoided in favour of sites which have fewer constraints and more capacity to sustainably assimilate the project. It can be useful to ensure that a range of options that may reasonably be expected to be considered are included in the evaluation.

Alternative Layouts
Alternative layouts can often be devised to consider how different elements of a proposal can be arranged on a site, typically with different environmental, as well as design, implications.

Alternative Designs
Most problems will be capable of being resolved by a number of design solutions by varying key aspects such as the shape of buildings or the location of facilities. Where designers are briefed at an early stage on environmental factors, these can usually be considered during the design development process, along with other design parameters.

Alternative Processes
Within each design solution there can be a number of different options as to how the processes or activities of the project can be carried out. These can include such

[2] Guidelines on the Information to be Contained in Environmental Impact Statements, Environmental Protection Agency, 2002
[3] Revised Guidelines on the Information to be contained in Environmental Impact Statements, Environmental Protection Agency, Draft 2015
[4] Guidance on EIA Scoping, European Commission, 2001

aspects as management of process that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources.

The Guidelines also state that alternatives are essentially different ways in which the developer, or in this case the operator of an existing activity, can feasibly meet the project objectives. Generally the EU Guidelines seem to envisage that alternatives are identified and reviewed at the outset of the project while mitigation measures can also play a role in the process in terms of alternatives considered.

The draft EPA guidelines produced in 2015 state *that the presentation and consideration of the various reasonable alternatives investigated by the applicant is an important requirement of the EIA process.* Such considerations will indicate the primary reasons for selecting the project that is being submitted for consent.

The EPA 2002 Guidelines on EIA state that "*the consideration of alternative routes, sites, alignments, layouts, processes, designs or strategies, is the single most effective means of avoiding environmental impacts.*" However they also note that it is important from the outset to acknowledge the existence of difficulties and limitations when considering alternatives. The EPA continues to discuss these difficulties and limitations at some length and these are summarised below:

- The EPA is only concerned with projects. Many projects arise on account of plans, strategies and policies which have previously been decided upon in some instances. Neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority.

- It is important to acknowledge that other non-environmental factors may have equal or overriding importance to the developer, e.g. project economics, land availability, engineering feasibility, planning considerations.

- The consideration of alternatives also needs to be set within the parameters of the availability of land or the need for the project to accommodate demands or opportunities which are site specific. Such considerations should be on the basis of alternatives within a site, e.g. design, layout.

The EPA Guidelines note that alternatives often arise as a result of consultation processes.

4.3 Alternatives Assessed

There are four ~~three~~ main alternatives and a ~~the~~ preferential option that are therefore reviewed in this Chapter to comply with the EPA Guidance produced in 2002 and 2015:

- Do Nothing Scenario – where the facility does not seek the necessary permissions to enable increased production;

- Alternative Location ~~Facility~~ – where the facility develops ~~a brown or green field facility within the locality of Newmarket to supplement the operations at the existing facility;~~ another site

- Alternative Layout and Design-
- Alternative processes – Changing the processing methods on site;
- Preferential Option: Planning and EIS for the Existing facility.

A review of each of these alternatives is discussed below.

4.3.1 Do Nothing Scenario

The Do-Nothing Scenario would result in no upgrades and modernisation of the existing WWTP on the site, a continued discharge of waste water into the Dalua River via the smaller Rampart Stream and no increase in the duration of peak production on site.

To do nothing at the site would prevent a modernisation and upgrade of the WWTP and enable a direct discharge into the Dalua River, allowing a cessation of discharge into the Rampart stream. To do nothing would prevent, as stated in the Natura Impact Statement provided in **Appendix 5.2.5**, a significant positive ex situ impact occurring on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.

The Rampart Stream is a non-SAC tributary stream but is treated as a potential location for ex situ impacts on the SAC. Of the three potentially anadromous migratory qualifying interest species, one i.e. Atlantic Salmon is known to occur in the Rampart Stream at significant densities. On the basis of the fish survey data and habitat assessment data provided in the Natura Impact Statement in **EIS Volume II, Appendix 5.2.5**, and applying the precautionary principle as is required by the Habitats Directive, it is concluded that the Rampart Stream is a significant spawning and nursery area for salmon running into the stream from the Dalua River and the Blackwater River. The present investigation indicates that the present ecological status of the Rampart Stream downstream of Newmarket is "poor". The proposed total cessation of WWTP discharges to the Rampart Stream from the Newmarket Co-Op facility is likely to result in improved ecological status in the Rampart Stream, with a likely beneficial ex situ effect on Salmon within the SAC. The relocation of the discharge to the Dalua will remove this impact on the Rampart Stream and will not result in an exceedance of any of the target concentrations set out in the Surface Water regulations (S.I. 272 of 2009) for achievement of a 'good status' for the River Dalua as discussed further below in Section 5.3.

As discussed further in section 5.3, the proposed volumes and Emission Limit Values for the proposed discharge at Allan's Bridge have been shown, using approved methodology, to be compliant with S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 for attaining Good status in the River Dalua. In addition, the impact of the nitrate and suspended solids emissions has been demonstrated as not causing an impact on the receiving water.

As a production facility, the Newmarket Co-Op facility services the primary producers in the locality (dairy farmers). The proposed development will enable the

processing capacity of the Co-Op to expand in a sustainable manner, with fewer constraints to processing increased yields The inability of the Newmarket Co-Op facility to accommodate increased yields by the primary producers in the area would adversely impact on the viability of the industry with an oversupply in the local market in line with the projected increase in milk production following the abolition of milk quotas in April 2015. This inability would place additional pressure on other milk processing facilities within the region to accept the additional milk which the proposed development would enable at Newmarket Co-Op, and would place additional pressure on the operating capacities, limits and licensed outputs and emissions of these facilities. The transport of milk to other processing facilities would result in the development of new milk processing facilities or expansion to those already in operation due to the resultant pressure on milk processing capacities which would bring additional environmental impacts at these locations.

The transport of milk to processing facilities further afield than Newmarket ~~is~~ would have knock on impacts on the local agricultural community and economy including the transport of milk outside of the locality with the resultant environmental impacts that this would cause in relation to road traffic levels, noise and air quality along the additional milk delivery routes.~~The potential over-supply of milk may result in the development of competitor developments, though the application for planning and relevant environmental permits may delay these for several years~~ A do nothing scenario for Newmarket Co-Op would see the facility continue to operate but without increased capacity to accept milk from local dairy farmers, hindering farm business growth and also reducing the need for increased seasonal staff and downstream jobs in Newmarket arising from the development and service suppliers. A do nothing scenario would place pressure on other milk processing facilities to accept additional milk quantities and would place pressure on such sites to grow in capacity with the resultant environmental impacts at other locations within Cork that would accompany such expansion. For these reasons, along with the proposed improvements to water quality in the Rampart Stream, a do-nothing scenario is not a feasible option if Newmarket Co-Op is to grow and operate in a sustainable manner whilst minimising environmental impacts as much as possible both on a local and regional level.

4.3.2 Alternative Location~~Facility~~

To comply with the EIA regulations and EPA Guidelines, Newmarket considered the option of alternative sites for the proposed developments, but due to the scope of the proposals involving an upgrade and modernisation of existing on site infrastructure and the development of a pipeline to enable this upgrade to operate in an efficient and sustainable manner, an alternative site would not be a feasible option. During the project design process it was concluded that for a number of reasons discussed below, the existing Newmarket Co-Op facility presented the most favourable option for the proposed development in terms of environmental impacts and constraints.

~~The search for an alternative facility is not a serious contender.~~ The existing site is a long established development, currently noted within the ~~Local~~ Kanturk Area Plan for Newmarket as one of the main employers within the town. As the proposed development involves a small footprint additional to the existing built environment on the site to allow the Co-Op to operate more efficiently, an alternative location for

such a site specific development is not a feasible option as it would result in the development of an entirely new site. Development of a WWTP upgrade off site would not be a feasible operating option for the Co-Op.

As an offsite WWTP is not a feasible, the option of developing an alternative creamery was investigated. The existing site is an established milk processing land use ideally located to ensure minimal distances to ~~In the process of relocation, a site would need to be found locally to ensure distances~~ to the primary milk producers ~~are maintained,~~ and ~~where the~~ available resources (water, electricity, drainage, wastewater, skilled workers) ~~could be found~~. An alternative site would need to be located in close proximity to the existing site or within the town of Newmarket to ensure such resources are closeby and ensure financial feasibility for the site as a result of such easy access. The proposed development involves the construction of a small part of the WWTP within the designated green belt surrounding the town of Newmarket, however the development of an alternative facility within necessary proximity to the town would involve the development of a much larger part of the green belt or the annexation of lands designated for other uses within the Kanturk Area Local Plan such as residential, open space/sports recreation or business, rather than the established industrial use of the Newmarket Co-Op site.

The development of an alternative site would require an industrially zoned site large enough for feasible operation in terms of deliveries, storage, milk processing and waste water treatment which would not be currently available within the settlement boundary of Newmarket town. As a result, a greenfield site within the green belt would be the alternative option which would involve a significantly higher level of direct development footprint, environmental and landscape impacts in comparison with the proposed development at the existing Newmarket Co-Op site.

It was concluded by Newmarket Co-Op that to comply with the EPA draft guidelines produced in 2015, the existing Co-Op facility was selected as the most practical development option which also minimised environmental constraints in comparison to an alternative site. The Newmarket Co-Op site ensures the proposed development will "sustainably assimilate the project" whilst resulting in far less "inherent environmental problems than others[5]".

The design and route of the proposed pipeline was investigated with a number of alternative routes and discharge points assessed. Alternative route options for the 4km pipeline would have involved development within third party owned agricultural lands to the south of Newmarket Town. A number of routes were assessed, however the selected route of the R576 road corridor provided the most feasible option in relation to minimising environmental impacts as the road corridor, which is already an established transport land use and the installation of the pipeline within this corridor will avoid impacts on any sites designated for ecological, cultural heritage or other conservation purposes.

Alternative pipeline discharge outfall locations were also assessed and a number of option sites were identified slightly downstream of Allen's Bridge. Other locations would involve development on the river bank and within riparian habitats which

[5] Revised Guidelines on the Information to be contained in Environmental Impact Statements, Environmental Protection Agency, Draft 2015, pg. 26.

Newmarket Co-Op wanted to avoid. Alternative development options on the river bank would require the construction of an outfall point using rockwall and other hard physical structures which would be developed into the river bank to ensure stability. Such development on the riverbank would result in direct impacts on habitats at these locations and potential impacts on water quality during the construction phase. In contrast to the riverbank discharge construction option, the proposed development at Allen's Bridge will not require any development or construction access onto the river bank or within riparian habitats. The proposed outfall design can be attached to the bridge using road based cranes and will avoid any direct and indirect impacts on the river and river bank below. Newmarket Co-Op selected the Allens's Bridge outfall location and design option as it will result in the least amount of impacts on the surrounding environment when compared to other possible development locations and designs.

The planning, outline and development of a new site would ~~enable the development of a sub-threshold facility in regards to~~ also lead to increased environmental impacts, ~~but this would be off-set by the requirements to~~ resulting from splitting management resources and potentially adversely impact on economies of scale. The existing site is designed to accept and process the proposed quantities of milk without any changes or upgrades to processing infrastructure onsite (the proposed development involves an upgrade to the WWTP plant rather than the processing plant), and it is therefore preferential to the development of an alternative site.

4.3.3 Alternative Layout and Design

The layout and design of the proposed development has been informed by the identification and assessment of onsite and surrounding environmental constraints. In determining the final layout of the WWTP upgrade, Newmarket Co-Op sought to minimise additional land take within the designated Green belt to the north of the existing WWTP whilst also avoiding a location close to the Rampart Stream to the east and the residential receptors to the south, west and north west of the Co-Op facility.

Whilst alternative locations for the WWTP upgrade were investigated, from a feasibility and operational perspective, it was necessary to locate the WWTP upgrade in close proximity to the existing WWTP plant to utilise existing treatment, drainage and processing infrastructure and avoid the construction of a larger development footprint. To address this need of proximity, alternative sites for the WWTP were assessed and discounted. A location further east would locate the WWTP closer to the Rampart Stream which would increase possible construction related impacts on this waterbody and a location closer to residential housing. Locating the WWTP further west or north of the existing WWTP would increase the levels of development within the designated Newmarket Green belt, which from a visual and land use constraints based approach, was not the favoured option.

Following an assessment of the alternative options for the layout of the site and location of the proposed WWTP upgrade, it was concluded that the proposed location directly north of the existing WWTP presented the least amount of environmental constraints and maximised existing infrastructure onsite.

The design of the WWTP upgrade mirrors the existing building heights and external facades of the operational WWTP and wider processing site to ensure it assimilates easily into the existing visual background.

A constraints based approach was also adopted for the location, layout and design of the proposed underground pipeline from the Co-Op site to the discharge point at Allen's Bridge, 4km to the south east. The design process for the layout of the finalised pipeline selected the route with the least environmental constraints, utilising the existing route corridor of the R576 and avoiding private lands and any sites designated for ecological or other conservation purposes. In general the R576 is wider than usual with good grass margins on both sides to allow development take place without significant impacts.

Alternative routes for the pipeline diverging form the R576 route corridor were discounted to avoid impacts on watercourses and private lands, however the proposed pipe will transverse watercourses in 3 different locations. To address this, the pipeline has been designed so as not to interfere with the natural water courses of either the Rampart Stream or the Dalua River. Further information on this is provided in **EIS Volume II Appendix 2.1.**

The proposed pipeline has been designed to minimise impacts on local water courses as mentioned above and also on the integrity and structure of the road bridges along the route. At Stoneville the pipe will be laid in the newer section of road carriageway. There is ample cover available over the upstream side of Stoneville Bridge to allow the effluent line pass over it so that the proposed pipe shall have no impact on the bridge. Stoneville bridge road surface has sufficient cover over the arches so that any works will not have an adverse effect on the watercourse below.

Following the constraints based approach to project design, a number of designs were put forward to address the potential impact of the pipeline on the historically recorded Bridge A and Allen's Bridge whilst also minimising development on the river bank itself and protecting the surrounding riparian habitat. As mentioned in **EIS Volume II Appendix 2.1**, it was concluded that to protect the integrity of the structure, the pipeline will be diverted from the roadway and carried across the bridge by tying it to the parapet of the downstream side. To protect Allen's Bridge, a recorded monument, it was concluded that the design with the least impact would be to turn the ductile iron pipe through the bridge wall and then vertically downwards to discharge into the Dalua at the eastern arch. The pipe will be anchored to the side of the bridge allowing the effluent to discharge directly into the river, reducing construction on the river bank itself.

The final design being put forward has followed a constraints based approach looking at all possible alternative options for site location, layout and design and has as much as practicable avoided environmental constraints and potential impacts on waterbodies, local roads, residential receptors and recorded and scheduled monuments. As a result it has been concluded that the best possible option is being proposed by Newmarket Co-Op.

4.3.4 Alternative Process

Currently there are no alternative processes identified for the processing of milk into cheese. The existing manufacturing process has been refined and modernised over many decades and is operated to develop award winning cheddar cheese.

This application seeks to increase production by increasing the duration of the peak processing period on site. Processing alternatives on site will not vary the requirement for an EIS and planning, where milk intake approaches or exceeds the threshold value of 50 million gallons of milk per annum.

4.3.5 Planning & EIS for increased Production

The proposed development ~~This~~ is the preferred option for the Newmarket Co-Op facility. Maintaining production and processing at the current facility ensures the commitment to the historic nature of the existing facility, while ensuring that the modernisation of the processing plant and WWTP on site are used to their full potential.

This EIS, with accompanying planning application and NIS are the preferential option to achieving a growth to 80 million gallons of milk per annum at the Newmarket Co-Op facility and upgrading the existing WWTP.

4.3.6 Summary

The adoption of proposed alternatives such as the development of other locations would not be ~~most sustainable~~ a practical option as the proposed development is an upgrade to existing plant and is site specific to the Newmarket Co-Op site. The development of an alternative site ~~as~~ would move milk processing away from an established creamery facility with installed capacity, equipment and an experienced workforce and result in a larger development footprint than what is being proposed as part of this EIS and planning application. The proposal to upgrade the existing WWTP at Newmarket will be an addition to a well-established facility which possesses an excellent track record in relation to environmental performance and is an established land use as noted within the Kanturk Area Local Plan.

Chapter Five – Impacts

Introduction

This chapter of the EIS consists of technical assessments of the proposed development in relation to the following technical areas:

- 5.1 Terrestrial Ecology;
- 5.2 Aquatic Ecology;
- 5.3 Soils, Geology and Hydrology;
- 5.4 Noise and Vibration;
- 5.5 Air Quality and Odour;
- 5.6 Cultural Heritage;
- 5.7 Traffic and Transport; and
- 5.8 Socio economics.
- 5.9 Landscape and Visual Impact Assessment

Chapter 5 – Section 5.1 Terrestrial Ecology

5.1.1 Introduction

This section presents the factual terrestrial ecology information gathered during the desk study and field study as a description of the existing environment. The potential impacts (direct, indirect and cumulative) of the proposed development on terrestrial ecology present within the site and surroundings are qualitatively assessed in this section. Mitigation measures to be implemented in the construction and operational phases are proposed to minimise identified impacts on terrestrial ecology. Figures referred to in the text are embedded within the section while Appendices that are referred to are presented at the rear of the EIS.

The potential impacts of the proposed development on the Natura 2000 network of sites (European sites known as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are assessed in a standalone Natura Impact Statement which accompanies the application as **EIS Volume II Appendix 5.2.5**

This section of the EIS was prepared by Dr Patrick Crushell and Mr. Brendan Kirwan, Ecologists with Wetland Surveys Ireland Ltd. Dr. Crushell (BSc Applied Ecology; MSc Environmental Resource Management, PhD Environmental Sciences, MCIEEM) received an honours degree in Applied Ecology from UCC, a Masters degree in Environmental Resource Management from UCD and defended his PhD at Wageningen University, the Netherlands. He is a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Dr Crushell has been working in the area of nature conservation and ecological impact assessment for the past fifteen years. Projects that he has been involved in include wetland inventory surveys; evaluation of proposed designated sites; restoration and management of peatland habitats; baseline ecological surveys and impact assessments of various development proposals including road, quarries, wind-farms, waste facilities, arterial drainage schemes, and residential developments; during and post-construction ecological monitoring.

Brendan Kirwan (BSc Wildlife Biology, ACIEEM) received an honours degree in Wildlife Biology from IT Tralee. He is an Associate Member of the Chartered Institute of Ecology and Environmental Management (ACIEEM). He has experience in the field of ecological assessment and environmental management since graduating in 2012. Since joining Wetland Surveys Ireland in 2013, he has undertaken a wide range of baseline ecology surveys and contributed to impact assessments of various development proposals, in particular within the wind energy and electrical infrastructure sectors.

5.1.2 Objectives of Terrestrial Ecology Assessment

The objectives of the assessment were:

- To carry out a desktop study in order to determine the previously recorded terrestrial biodiversity of the area;
- To carry out a baseline terrestrial flora and fauna survey of the development site and surroundings;

- Evaluate the biodiversity value of the development site and surroundings;

- To predict and assess the potential direct, indirect, and cumulative impacts of the proposed development on terrestrial flora and fauna; and

- To propose mitigation measures in the construction and operation phase of the development so as to minimise potential impacts on terrestrial flora and fauna.

5.1.3 Project Description

A detailed description of the proposed project including site layouts is presented in Chapter 2 of the EIS. In summary, Newmarket Co-operative creameries Ltd. (Newmarket Co-op) propose the following development at their creamery site at Newmarket, County Cork:

- An upgrade to the existing operational waste water treatment plant (WWTP) onsite and an increase in the total discharge of waste water from the facility from 2,000 cubic meters (m3) to 2,700m3 per day;

- The installation of an underground pipeline to convey treated water from the facility to a discharge point on the River Dalua, approximately 4 kilometres (km) to the south east of the facility. It is noted that the River Dalua is considered to be the receiving water in the facility's current industrial emissions license; and

- Increase in the duration of peak volume milk processing at the creamery throughout the year (80 million gallons of milk equivalent per year).

The main infrastructural elements that require consideration in this assessment include the WWTP upgrade at the Newmarket Co-Op facility and the installation of the underground pipeline from here to the River Dalua along the public roads for ca 4km. In this section, where reference is made to 'proposed development' or the 'proposed development site' this refers to both the Newmarket Co-Op facility and the Pipeline Route together unless otherwise stated.

5.1.4 Study Area

The proposed upgrade to the existing operational WWTP will take place within and adjoining the existing Newmarket Co-op facility which adjoins residential, commercial, and agricultural lands. The proposed development is located outside and removed from any site designated for nature conservation.

The route of the proposed underground pipeline follows existing public road infrastructure throughout its length until it discharges to the River Dalua at Allen's Bridge 4km south-east of the Newmarket Co-op facility. The River Dalua is within the Blackwater River (Cork/Waterford) Special Area of Conservation (NPWS site code 002170), which is designated for a range of both aquatic and terrestrial habitats and species. The Blackwater River SAC constitutes the main ecological constraint relevant to the project.

5.1.5 Consultation

Meetings were held with representatives of Cork County Council and the National Parks and Wildlife Service during September 2015 to discuss, amongst other things, the approach to the ecological assessments.

Following these meetings a scoping document was prepared during November 2015 by OES consulting and circulated to a wide range of bodies including key stakeholders with an interest in ecology including:

- Cork County Council;
- Environmental Protection Agency;
- Development Applications Unit, Department of Arts, Heritage and the Gaeltacht;
- Inland Fisheries Ireland;
- The Heritage Council;
- National Parks and Wildlife Service; and
- An Taisce – the National Trust of Ireland.

A formal written response to scoping was received from the National Parks and Wildlife Service via the Development Applications Unit, Department of Arts, Heritage and the Gaeltacht during December 2015. In this letter, provided in **EIS Volume II, Appendix 5.2.5,** the Department highlighted the need to consider the following features relevant to terrestrial ecology in the NIS and EIS of the proposed development:

- Effects on otter habitat, in particular breeding habitat and resting places (note that a Regulation 54 derogation licence will be required if breeding sites or resting places of otter are damaged or if there is deliberate disturbance of otters during periods of breeding or rearing);
- Effects on alluvial forest habitat (91E0), if this occurs downstream of the discharge point;
- Effects of potential introduction of invasive aquatic and riverbank plants during construction;
- Effects on badgers which may have breeding sites or resting places (setts) along the route of the pipeline);
- Effects on breeding kingfisher, a Birds Directive Annex 1 species; and
- Effects on breeding river birds (e.g. grey wagtail, an amber listed species).

5.1.6 Methodology

Data required to carry out the assessment was collected through a combination of a desktop review and field surveys as described further below.

5.1.6.1 Statutory Context

This appraisal has consideration to the following legislation:

- Consolidated EIA Directive 2011/92/EU;
- Wildlife Acts 1976-2012;
- The Habitats Directive 92/43/EEC;
- The Birds Directive 2009/147/EC;
- The European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 411 of 2011];
- European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011 [S.I. No. 456 of 2011];
- European Union (Environmental Impact Assessment and Habitats) Regulations 2011 [S.I. No. 473 of 2011];
- European Union (Environmental Impact Assessment and Habitats) Regulations 2012 [S.I. No. 246 of 2012]; and
- Flora (Protection) Order, 2015.

In addition, in considering the ecological impacts of the proposed development regard was made to the following guidance and information documents:

- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. (Chartered Institute of Ecology and Environmental Management);
- DAHG (2011). Irelands National Biodiversity Plan: Actions for Biodiversity 2011 – 2016;
- EPA (2002). Guidelines on the information to be contained in Environmental Impact Statements;
- EPA (2003). Advice notes on current practice (in the preparation of Environmental Impact Statements);
- Fossitt (2000). A Guide to Habitats in Ireland;
- Smith et al. (2011). Best Practice Guidance for Habitat Survey and Mapping in Ireland.

- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2).

5.1.6.2 Desktop Review

A desktop review was carried out to identify features of ecological importance within the development site and surrounding region. Literature sources consulted are included in the text and listed in the references section of the report. A review of designated sites was carried out as part of the desktop study using data available from the National Parks and Wildlife Service (NPWS).

5.1.6.3 Field Survey

A multidisciplinary walkover survey of the site (creamery and pipeline route) was undertaken on the 3rd December 2015 to assess the habitats, vegetation, birds, and mammals within the site as described in the following paragraphs.

Target notes were taken relating to habitats, species, and landuse encountered during the survey including notes on dominant vegetation, qualitative assessment of plant species diversity, vegetation structure, topography, drainage, disturbance, and management. The habitats encountered on site were classified in accordance with Fossitt (2000). The methods that were followed during the habitat survey and subsequent mapping followed best practice guidance as outlined by Smith *et al*. (2011).

The surveys included recording any problematic invasive species within the WWTP site or along and in the vicinity of the pipeline route (including roadside verges and watercourse crossings), and river banks at discharge points.

Bird species encountered (seen and heard) during the survey were recorded in a field note book. The abundance of each species and behaviour was also noted. An assessment was made of the sites potential to support bird species of conservation importance that may not have been recorded due to seasonal constraints.

All mammals recorded during site visit were noted. The site was also assessed for any evidence of mammal activity. Signs and tracks of mammals are the best way of assessing a site without conducting night surveys. All signs and tracks (Bang and Dahlstrom 2004) were assessed as they were encountered in the field. Suitable mammal habitat within and surrounding the site was also noted. Otter surveys were undertaken during late 2015 in areas of potential suitable habitat such as along riverbanks upstream and downstream at all watercourse crossings along the proposed pipeline route.

5.1.7 Evaluation of Ecological Significance

The impact significance is a combined function of the value of the affected feature (its ecological importance), the type of impact and the magnitude of the impact. It is necessary to identify the value of ecological features within the study area in order to evaluate the magnitude and significance of possible impacts.

The method of evaluating ecological significance used in this study is based on guidelines issued by IEEM (2016) and the NRA (2009). The results of the habitat and fauna surveys were evaluated to determine the significance of identified ecological features located in the study area on an importance scale ranging from international - national - county - local. The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local importance scale, this is sub-divided into local importance (high value) and local importance (low value). The criteria presented in **EIS Volume II Appendix 5.1.1** have been used in assessing ecological value. In addition to these criteria, the evaluation also considers other factors such as potential ecological value, secondary supporting values where habitats may perform a secondary ecological function, and social values of an ecological feature such as educational, recreational, and economic value.

5.1.8 Assessment of Impacts and Impact Significance

The assessment of impacts is based on guidance offered by the Chartered Institute of Environmental and Ecological Management (CIEEM 2016) with reference to national guidance in NRA (2009), the EPA (2002), and Gittings (1998). Impacts are discussed and assessed in relation to impact type (positive, neutral or negative), character and sensitivity of the affected feature, magnitude, duration, timing and frequency. Criteria for assessing impact type and magnitude are presented in **EIS Volume II Appendix 5.1.1**. In assessing the magnitude and significance of impacts it is important to consider the value of the affected feature.

5.1.8.1 Survey Constraints and Limitations

The field survey was undertaken during the sub-optimal winter season. However, considering the character of the receiving environment of the WWTP site and pipeline route (improved grassland and industrial site in sub-urban setting and existing road infrastructure) and the nature of the project it is felt that the survey is adequate to provide the necessary baseline information to present a comprehensive assessment of impacts on terrestrial ecology.

The river levels were extremely high during the field survey making it difficult to survey riverside habitats at the discharge point at the River Dalua.

5.1.9 Baseline Description of Existing Conditions

5.1.9.1 Designated Sites

The proposed development site does not lie within any sites designated or under consideration for designation for nature conservation. There is a single designated site (Blackwater River SAC) located within 2km of the proposed development as described and illustrated in Table 5.1.1 and **EIS Volume III Figure 5.1.1**. This is also the only site located downstream of the proposed development. Considering the nature of the proposed project it is considered that there is no potential for impacts on terrestrial features of designated sites beyond 2km (or downstream).

The Blackwater River is designated as a candidate Special Area of Conservation (cSAC). Candidate Special Areas of Conservation (cSACs) are sites of international

importance due to the presence of listed habitats or species that are of European importance. The site is extensive and includes the main channel of the Munster Blackwater and its tributaries. In places the site extends into terrestrial habitats that are associated with the river. The site is selected for a range of terrestrial and aquatic habitats and species as listed in Table 5.1.1. The potential effects of the proposed development on aquatic features of the cSAC are addressed in the Aquatic Ecology section of the EIS (Section 5.2) and in the accompanying NIS (**EIS Volume II Appendix 5.2.5**).

As illustrated in **EIS Volume III Figure 5.1.1** there are no other designated sites within proximity to the proposed development that could be potentially impacted.

Protection of candidate SACs in Ireland is required by the EU Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC; commonly known as the 'Habitats Directive') which has been transposed into Irish Law through the enacted European Communities (Birds and Natural Habitats) Regulations 2011 (SI 411/11). A Natura Impact Statement was separately prepared in order to assess the potential for significant effects on European sites (cSACs and SPAs) in the surroundings.

Table 5.1.1: Designated Sites within 2km of the Proposed Development.

Name	Site description	Location in Relation to Proposed Development Site
Blackwater River SAC (NPWS Site Code: 2170)	The Blackwater River is one of the largest rivers in the country, draining a major part of Co. Cork and five mountain ranges. The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of the directive, as well as important numbers of wintering wildfowl including some species listed on Annex I of the EU Birds Directive. The ecological interest of the site includes both aquatic and terrestrial habitats associated with the river. The occurrence of a number of Red Data Book plant and animal species adds further importance to the Blackwater River site. The site is selected for the following Annex I habitats and Annex II species: Annex I Habitats[6]: Atlantic salt meadows [1330] Estuaries [1130] Floating river vegetation [3260] Mediterranean salt meadows [1410] Old oak woodlands [91A0] Perennial vegetation of stony banks [1220] Residual alluvial forests* [91E0] Annex II Species: Atlantic Salmon [1006] Brook Lamprey [1096] Freshwater Pearl Mussel [1029] Killarney Fern [1421] Otter [1355] River Lamprey [1099] Sea Lamprey [1095] Twaite Shad [1103] White-Clawed Crayfish [1092]	Located 4km downstream of the Newmarket Co-op facility. The pipeline route terminates at the site. It is proposed that treated waste water will discharge into the Dalua River at this location.

[6] Priority habitats which are in danger of disappearing within EU territory, are indicated by an asterisk EU habitat and species names follow the abbreviated versions published by NPWS (2013)

	Salicornia mud [1310] Taxus baccata woods* [91J0] Tidal mudflats [1140]	

5.1.9.2 Description of SAC at Discharge Point

The pipeline deviates southwards from the main R576 road following a public road for approximately 0.5km where it crosses the Rampart Stream (at Bridge A) before terminating at Allen's Bridge which crosses the River Dalua approximately 0.3km upstream of the confluence with the Rampart Stream (see **Figure 5.1.2**). It is not possible to lay the pipe within the roadway at Bridge A. In this instance the pipe will be diverted from the roadway and carried across the bridge by tying it to the parapet of the downstream side. It will follow the line of the arch to ensure it does not affect the existing flows through the stream. It will then be re-diverted back to the roadway until it reaches Allen's Bridge.

The bank side vegetation of the River Dalua at Allen's Bridge comprises mature alder, ash, and willow, which is continuous on the northern side of the river bank (see Plate 5.1.1). No evidence of otter or badger was recorded within the area surrounding the pipeline route, although conditions at the time of survey were not suitable for identifying otter signs. An artificial otter holt has been sited along the River Dalua on the right hand bank downstream of the Allen's Bridge and otter presence in the area has been confirmed in the past (K Murphy pers. comm. January 2016). Improved agricultural grassland occurs on either side of the River Dalua at this location. At Allen's Bridge the pipe will be of a ductile iron type. The pipe will be turned through the bridge wall and then vertically downwards to discharge into the Dalua at the eastern arch. The pipe will be anchored to the side of the bridge allowing the effluent to discharge directly into the river. Riparian habitat at this location will not be impacted by the proposed pipe construction.

Plate 5.1.1: The Proposed Pipeline Discharge Point at Allen's Bridge (downstream view)

5.1.10 Habitats and Vegetation

Habitats that occur within and surrounding the existing WWTP and along the proposed pipeline route are described in the following paragraphs. Habitats are classified according to Fossitt (2000).

5.1.11 WWTP Site Location

A map showing the extent of different habitats in the vicinity of the existing WWTP is presented in **EIS Volume III Figure 5.1.3**. The proposed WWTP development site occurs immediately north-east of the existing facility.

The proposed upgrade of the existing WWTP will involve expanding the facility to the east into an area of dry improved agricultural grassland (GA1) as shown on **EIS Volume III Figure 5.1.3**. The grassland in this area slopes south-westwards and has been managed intensively for agriculture and is of low ecological value. A narrow margin of rank grassy verge vegetation (GS3) occurs along the boundary between the existing WWTP and the agricultural grassland to the east (see Plate 5.1.2). Species recorded within the grassland area of the site include the following common and widespread species: Yorkshire Fog (*Holcus lanatus*), Rye grass (*Lolium perenne*), Creeping Bent (*Agrostis stolonifera*), Cocksfoot (*Dactylis glomerata*), White Clover (*Trifolium repens*), Daisy (*Bellis perenne*) and Dock (*Rumex* spp.). The improved pasture surrounds the proposed WWTP development site to the north and east. Two individual ash (*Fraxinus excelsior*) trees occur amongst the grassland habitat that surrounds the site. In places where drainage is impeded wet grassland vegetation (GS4) is locally dominant with Soft Rush (*Juncus effusus*), Sedge (*Carex* spp.), Cuckooflower (*Cardamine pratensis*), Great Willow-herb (*Epilobium hirsutum*), and Iris (*Iris pseudacorus*). The large agricultural field that surrounds the site to the east is bordered by hedgerows (WL1) dominated by Willow (*Salix* spp.), Hawthorn (*Crataegus monogyna*) and Gorse (*Ulex europaeus*) to the north and east. A natural watercourse (Rampart Stream) flowing southwards occurs along the eastern boundary of the site.

Buildings and artificial surfaces (BL3) surround the site to the west and south.

Plate 5.1.2: Proposed Development Site. (a) View North across Site. (b) View West across Site.

5.1.11.1 Proposed Pipeline Route

The proposed underground pipeline follows an existing public road (R576) in a south-east direction from the Newmarket Co-op facility for approximately 3.75km before diverting to the south along a public road as described further in Section 5.1.9.2 above.

The public road from Newmarket southwards is typically surrounded by residential properties and managed agricultural farmland (see **EIS Volume III Figure 5.1.4**). Habitats that occur most commonly either side of the road includes improved grassland (GA1), buildings and artificial surfaces (BL3), grassy verges (GS2), hedgerows (WL1), and treelines (WL2). There are two watercourse crossings along this section of the route. The first crossing occurs at the northern end of the proposed line route where the road crosses the Rampart Stream in a built up environment (at Stoneville Bridge). The pipe will be laid within the newer section of road carriageway and therefore there will no impact on the bridge or riparian habitats.

The second crossing, over the Garraunawarrigg Upper stream at Glenlahan, occurs ca 3km south-east of the Newmarket Co-op facility (at Park Bridge). The Garraunawarrigg Upper stream flows from the north-east under the road bridge to the Rampart Stream to the southwest. The habitats that surround the stream in proximity to the road include wet woodland dominated by willow and sycamore on the eastern side of the road, with a small area of mixed conifer woodland (WD3) occurring on the western side. The pipe will be constructed within the new section of bridge and therefore there will no impact on the watercourse or adjacent semi-natural habitats.

5.1.11.2 Plant Species

Common plant species recorded during the field survey are included in the habitat descriptions above and listed in **EIS Volume II Appendix 5.1.2**.

During the field survey, habitats were also assessed as to their potential suitability for rare or protected plant species with reference to; Preston *et al*. (2002), the Flora Protection Order 2015, Annex II of the EU Habitats Directive, NPWS rare plant database, and the Irish Red Data Book (Curtis and McGough 1988).

Searches of the NPWS Rare Plant Database, The New Atlas of the British & Irish Flora (Preston *et al*. 2002) and the National Biodiversity Data Centre Biodiversity Maps (NBDC 2016) were conducted for any previous records of rare and protected plant species within the 10km square (R30) of the study area. The results of this search are presented in Table 5.1.2.

Two rare and / or protected plant species have been reported from the 10km square (R30) in which the proposed development site occurs. No rare or protected plant species were recorded during the field survey.

Table 5.1.2: Rare and protected plant species within the 10km squares (R30) of the proposed development site

Common Name	Latin Name	Conservation Status	Likely to occur onsite
Common Corncockle	*Agrostemma githago*	DD	No, only occurs on a handful of sites nationally, occurring on arable crops.
Cornflower	*Centaurea cyanus*	Ex	No, found on wastelands and roads, though thought to be extinct from the region in which the proposed development occurs

5.1.11.3 Invasive Alien Species

No problematic invasive alien species were recorded during the field survey at the site of the proposed WWTP or along and in the vicinity of the proposed pipeline route. Indian Balsam (*Impatiens grandiflora*) is known to occur along the riverbanks of both the Rampart Stream and the River Dalua (IRD Duhallow Life Project). It is possible that this species occurs at or close-by the discharge point, however due to high water levels at the time of survey could not be confirmed.

5.1.11.4 Birds

Bird species recorded during the site visit are presented in Table 5.1.3. All of these species are common and widespread in the area.

A review of species distribution based on winter and summer atlas records (Balmer *et al*. 2013) for the 10km squares (R30) that the proposed development site (WWTP site and pipeline route) is situated within was undertaken to further inform the assessment. BirdWatch Ireland and the RSPB Northern Ireland have agreed a red list of priority Bird species of Conservation Concern in Ireland (BoCCI) (Colhoun & Cummins 2013). An assessment of whether species of conservation concern are likely to occur within or interact with the proposed development site was carried out taking into consideration the habitat preferences of individual species and those habitats present within and surrounding the proposed development.

The only part of the proposed development site that comprises habitats with potential to support species of high conservation concern is the riparian habitats at the proposed discharge point. Species of concern that are likely to occur at this location include Kingfisher (Annex I Birds Directive, Amber listed on BoCCI) and Grey Wagtail (Red listed on BoCCI). These species are both likely to occur along the River Dalua although there is an absence of suitable breeding sites for Kingfisher. More suitable Kingfisher nesting habitat occurs along the Allow River which occurs ca 2km east of the proposed discharge point, though no Kingfisher were recorded along the Allow River during the assessment of the distribution and abundance of Kingfisher within the Blackwater River SAC (Cummins *et al*. 2010). Kingfisher nest boxes have been installed in proximity to the confluence of the Rampart Stream and River Dalua, however to date these nest boxes have not been used by Kingfisher (K Murphy, pers. comm. January 2016).

Table 5.1.3: Conservation Status and Abundance of Bird Species recorded during Field Visit.

Common Name	Latin Name	BoCCI / Annex I	Number observed
Blackbird*	*Turdus merula*	Green	3
Goldcrest	*Regulus regulus*	Amber	1
Mistle Thrush	*Turdus viscivorus*	Amber	1
Pied Wagtail*	*Motacilla alba yarrellii*	Green	1
Robin*	*Erithacus rubecula*	Amber	2
Rook	*Corvus frugilegus*	Green	15
Starling	*Sturnus vulgaris*	Amber	14
Wood pigeon	*Columba palumbus*	Green	10

*Bird species recorded within the proposed WWTP development site

5.1.12 Mammals

This section reviews the value of the WWTP site and pipeline route for terrestrial mammal species. During the field survey rabbits were the only mammals observed (amongst improved grasslands surrounding the pipeline route).

Mammal species of conservation concern (rare or protected) that have been recorded from the 10km grid squares (R30) of the proposed development based on records held by the National Biodiversity Data Centre (NBDC 2016) and the National Parks and Wildlife Service (NPWS) are presented in Table 5.1.4 below. These species are likely to be recorded from suitable habitat in the vicinity of the development site.

No suitable badger habitat occurs within or in close proximity to the proposed development. Otter (listed on Annex II and IV of the EU Habitats Directive) are likely to occur along the Rampart Stream and River Dalua in proximity to the proposed pipeline route. Following the site visit it is confirmed that no breeding sites for otter occur in proximity to the proposed discharge point. Previous targeted otter surveys have confirmed otter activity in proximity to Allen's Bridge (Igoe and Murphy 2015). An artificial otter holt has been sited on the eastern (downstream) side of Allen's Bridge (right hand bank – opposite bank to the discharge point) as part of the IRD Duhallow Life Project (K Murphy, pers. comm., January 2016). No evidence of otter was recorded at all other watercourse crossings along the pipeline route despite surveys being undertaken of banks in proximity to each crossing.

Bat species are likely to occur amongst suitable habitat throughout the wider study area (hedgerows, treelines, woodlands, and watercourses). All bat species are given strict protection under the Wildlife (amendment) Act 2000 and are listed on Annex IV of the Habitats Directive. Daubenton's Bat (*Myotis daubentonii*) is likely to occur along the River Dalua and the Rampart Stream in proximity to the pipeline route. This species is known to roost in bridges and may roost at bridges along the proposed pipeline route. Other species that may roost at bridges include Whiskered Bats (*Myotis mystacinus*) and Natterer's Bat (*Myotis nattereri*), however neither of these species have previously been reported from the study area.

Table 5.1.4: Mammals of Conservation Concern Present in the 10km Square (R30) of the Proposed Development Site. (Source: National Biodiversity Data Centre 2016)

Species	Protected Status	Potential occurrence within proximity to proposed development
Sika Deer	Invasive species Wildlife Act	Unlikely, typically associated habitats.
Fallow Deer	Invasive species Wildlife Act	Unlikely, typically associated habitats.
West European Hedgehog	Wildlife Act	Probable, likely to occur amongst suitable habitat in proximity to the proposed development.
Irish Hare	Wildlife Act HD Annex V	Probable, likely to occur amongst suitable habitat in proximity to the proposed development.
European Otter	HD Annex II and IV Wildlife Act	Probable, likely to occur amongst suitable habitat (watercourses and adjacent riparian areas) in proximity to the proposed development. Confirmed presence at Allen's Bridge.
Eurasian Badger	Wildlife Act	Unlikely, no suitable badger habitat was recorded in close proximity to development.
Irish Stoat	Wildlife Act	Probable, likely to occur amongst suitable habitat in proximity to the proposed development.
American Mink	Invasive species	Probable, this species is mostly associated with watercourse and coastal habitats, potentially occurs along the River Dalua and Rampart Stream.
Bank Vole	Invasive species	Probable, likely to occur amongst suitable habitat in proximity to the proposed development.
Daubenton's Bat	HD Annex IV Wildlife Act	Probable known to roost in crevices under bridges and in trees in proximity to watercourses. Forages and commutes over watercourses.
Leisler's Bat	HD Annex IV Wildlife Act	Possible, likely to occur amongst suitable habitat in the surroundings.
European Rabbit	Wildlife Act	Confirmed in proximity to pipeline route.
Pipistrelle Bat species	HD Annex IV Wildlife Act	Possible, associated with a wide range of habitats, including those that occur in proximity to proposed development.
Soprano Pipistrelle	HD Annex IV Wildlife Act	Possible, associated with a wide range of habitats, including those that occur in proximity to proposed development.
Eurasian Red Squirrel	Wildlife Act	Unlikely, as the species is restricted to woodland areas.
Red Fox	Wildlife Act	Likely to utilise the habitats within and surrounding the proposed development.

5.1.13 Results of Assessment (Evaluation of receiving environment)

5.1.13.1 Designated Sites

The main ecological constraint to the project is the internationally important Blackwater River SAC which includes the River Dalua and adjoining bank-side habitat. The potential impacts on the conservation interest of the SAC are assessed in the standalone Natura Impact Statement prepared for the project and provided in Appendix 5.2.5.

Terrestrial features for which the SAC is designated are listed in Table 5.1.5 below and their occurrence in relation to the proposed development is also presented.

No semi-natural terrestrial habitats occur at the discharge point as the proposed pipeline is to be attached to the bridge structure at Allen's Bridge.

Table 5.1.5: Terrestrial Qualifying Interests of the Blackwater River (Cork/Waterford) SAC and their Occurrence in relation to the Proposed Development.

Name	Location in relation to proposed development site
Taxus baccata woods* [91J0]	Not located in proximity to proposed development, the nearest known location of this habitat occurs ca 75km east of the proposed discharge point.
Atlantic salt meadows [1330]	Coastal habitat. Not located in proximity to proposed development.
Old oak woodlands [91A0]	Not located in proximity to proposed development, the nearest known location of this habitat type occurs ca 2.5km west of the proposed discharge point.
Floating river vegetation [3260]	Likely to occur downstream of the proposed discharge point.
Residual alluvial forests* [91E0]	Not located in proximity to the proposed development. This habitat occurs ca 2.5km west and upstream of the proposed discharge points. The nearest mapped downstream residual alluvial forest occurs approximately 36km downstream of the proposed discharge point (NPWS 2012).
Perennial vegetation of stony banks [1220]	Coastal habitat. Not located in proximity to proposed development.
Mediterranean salt meadows [1410]	Coastal habitat. Not located in proximity to proposed development.
Killarney Fern [1421]	Not known to occur in proximity to proposed development. Absence of suitable habitat. The nearest known location of this species occurs ca 70km east of the proposed discharge point.
Otter [1355]	Although no evidence of otter was recorded during field survey, it is probable that otter use stretches of the River Dalua for commuting and foraging. Otter are known to have used an artificial otter holt on the eastern (downstream) side of Allen's Bridge (right hand side), and habitats downstream in close proximity to the bridge.

5.1.13.2 Habitats and Flora

The habitats within and adjacent to the WWTP at the Newmarket Co-op facility comprise buildings and artificial surfaces and improved grassland. These habitats are of low ecological value.

The proposed pipeline route mainly occurs within the public road infrastructure and therefore the habitat likely to be impacted is of no ecological importance.

No plant species of conservation concern are likely to occur in proximity to the proposed development. The invasive species, Indian Balsam, is known to occur on the riverbanks of both the Rampart Stream and the River Dalua in proximity to the proposed discharge point.

5.1.13.3 Fauna

Based on the habitats present and the built up surroundings it is considered that the WWTP and adjacent habitats are of no significant value to fauna species of conservation concern.

Based on the type and distribution of habitats throughout the proposed Pipeline Route, bird and mammal species of conservation concern are likely to only occur in areas associated with the River Dalua and Rampart Stream.

Kingfisher (Birds Directive Annex I) and Grey Wagtail (Red listed on BoCCI) are likely to occur within the river corridor.

Otter (Habitats Directive Annex II and IV) occur along both the Rampart Stream and River Dalua. Their presence at Allen's Bridge has been confirmed as part of the IRD Duhallow Life Project and an artificial holt has been installed on the eastern (downstream) side of Allen's Bridge (opposite bank to proposed discharge point).

Bat species (Wildlife Act and Habitats Directive Annex II and IV), in particular Daubenton's Bat, are likely to occur along the Rampart Stream and River Dalua. The species is known to commonly roost within crevices beneath bridges.

5.1.14 Assessment of Impacts (Construction and Operational)

5.1.14.1 Designated Sites

Minor habitat loss disturbance within the SAC is likely to occur at Allen's Bridge due to the installation of the pipeline. The habitat at this location comprises a narrow treeline along the river bank. The effects of this habitat disturbance is minor and is not expected to result in any impact of significance on the conservation status of the SAC.

In the absence of appropriate mitigation and controls, the introduction or spread of invasive species could have detrimental effects on downstream habitats of conservation value within the SAC.

The potential adverse impacts on each of the terrestrial qualifying interests of the Blackwater River (Cork/Waterford) are presented in Table 5.1.6 below.

Table 5.1.6: Potential Impacts on Relevant Terrestrial Qualifying Interests of SAC as Identified Above.

Name	Potential impacts
Taxus baccata woods* [91J0]	Not located in proximity to proposed development. No adverse impacts on this habitat are foreseen.
Atlantic salt meadows [1330]	Not located in proximity to proposed development. No adverse impacts on this habitat are foreseen.
Old oak woodlands [91A0]	Not located in proximity to proposed development. No adverse impacts on this habitat are foreseen.
Floating river vegetation [3260]	Likely to occur downstream of the proposed discharge point. Any significant alteration in downstream water quality could potentially result in indirect adverse effects on this habitat.

Name	Potential impacts
	However, considering the conclusion of the assessment in relation to water quality (see Section 5.3 of the EIS), no such impacts are foreseen.
Residual alluvial forests* [91E0]	Not located in proximity to proposed development. No adverse impacts on this habitat are foreseen. Any spread of invasive species could adversely affect the conservation status of this habitat downstream of the development. Any significant alteration in downstream water quality could potentially result in indirect adverse effects on this habitat to alteration of tropic status. However, considering the conclusion of the assessment in relation to water quality (see Sections 5.2 and 5.3 of EIS) and the distribution of this habitat in relation to the proposed development, no such impacts are foreseen.
Perennial vegetation of stony banks [1220]	This coastal habitat is removed from the proposed development and therefore adverse impacts are not foreseen.
Mediterranean salt meadows [1410]	Occurs in coastal part of the SAC. Not located in proximity to proposed development.
Killarney Fern [1421]	Not known to occur in proximity to proposed development. Absence of suitable habitat.
Otter [1355]	Otter are known to occur along the river at the proposed discharge points. Direct disturbance to otter breeding sites is not foreseen. However, there is potential for disturbance of resident otters during the construction phase. Any significant alteration in downstream water quality could potentially result in indirect adverse effects on otter, due to effects on prey density etc. However, considering the conclusion of the assessment in relation to water quality and aquatic ecology (see Sections 5.2 and 5.3 of EIS), no such impacts are foreseen.

5.1.14.2 Habitats and Flora

The proposed WWTP extension occurs on habitats as described in Section 5.1.10.1 above. The footprint of the proposed WWTP development will cause the direct loss of habitat where new WWTP buildings and associated infrastructure are to be developed. The affected habitats are of low ecological value (improved grassland and buildings and artificial surfaces). The loss of improved grassland will result in an imperceptible adverse impact.

The installation of the proposed pipeline is confined to the existing road corridor and therefore no direct ecological impacts on semi-natural habitats are foreseen.

A potential impact associated with the construction of the proposed development, in the absence of suitable controls, is the introduction or spread of invasive species such as Japanese knotweed (*Fallopia japonica*), and Indian balsam (known to occur in the proximity of the proposed discharge point). The confirmed absence of Japanese knotweed (*Fallopia japonica*) from the study area implies the there is no risk of spread of this species and possible introduction can be prevented by use of appropriate controls. Should such species become established then it could have a detrimental effect on native flora and fauna within habitats downstream of the proposed development.

Impacts as a result of the landspreading of sludge within the agricultural landbanks discussed in **Appendices 2.4 and 2.5** are deemed as negligible due to the identification and avoidance of ecological constraints prior to spreading.

5.1.14.3 Fauna

It is considered that those habitats directly impacted by the footprint of the proposed development at the WWTP do not support fauna species of conservation concern and therefore impacts on fauna due to works at this location are not foreseen.

However, as outlined above habitats that occur in proximity to the proposed discharge point are likely to support faunal species of conservation concern including riparian birds (kingfisher and grey wagtail), otter, and bat species.

Riparian Birds

There is an absence of suitable breeding sites at the location of the discharge point and therefore direct impacts on breeding sites are not foreseen. However, suitable breeding sites are likely to occur in the surroundings and therefore potential disturbance is possible should construction works overlap with the breeding season.

Otter

There is an absence of suitable breeding sites at the location of the discharge point and therefore direct impacts on breeding sites are not foreseen. However, suitable breeding sites occur in the surroundings and therefore potential disturbance to the resident otter population is possible. No works are proposed at any other watercourse crossings that could cause disturbance of otter.

Disturbance to Bats

The only potential bat roost site that may be impacted by the development would be at Allen's Bridge and Bridge A. These bridges provide suitable roost habitat for bat species. There is potential for direct disturbance to bats should they be roosting at these locations when construction works are being undertaken. The proposal will involve securing the pipeline to the exterior of these two bridges. Dense ivy grows across the bridges at these locations and crevices in the brickwork could provide suitable roosting opportunities for bats. The underneath of the bridges will not be impacted by the proposed development and therefore any roost sites that may occur beneath the bridges will be safeguarded.

Considering the characteristics of the proposed development and the ecological sensitivity of the study area operational phase impacts on terrestrial ecological receptors are not foreseen.

5.1.15 Proposed Mitigation and Enhancement Measures

This section sets out the mitigation which will be implemented to mitigate the potential biodiversity impacts of the proposed development as identified above. The following measures are proposed in order to avoid, minimise or remedy potential

adverse impacts associated with the construction phase of the proposed development.

The key approach for minimising risks such as disturbance to wildlife is the appointment of an appropriately experienced Ecological Clerk of Works (ECoW) on site during construction to advise on the detailed implementation of the design approach and ecological mitigation as detailed in the EIS and as will be detailed in the Construction Environmental Management Plan (CEMP).

The role of the ECoW will include:

- Supervision of construction works and ensure compliance with legislation;
- Monitoring habitats and species during the course of construction works and effectiveness of mitigation;
- Provision of advice regarding the avoidance and minimisation of potential disturbance to wildlife;
- Provide recommendations on appropriate responses / actions to site specific issues (e.g. identification of previously unrecorded breeding sites during construction works); and
- Liaison with NPWS, IFI and other prescribed authorities, when required.

Specific mitigation measures relating to the potential impacts identified include:

- A detailed Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of construction. All mitigation measures relating to ecology will be incorporated into the construction phase CEMP. An outline CEMP is provided in EIS Volume II Appendix 2.2;
- Hedgerows / treelines and other semi-natural habitats that occur in close proximity to proposed works will be protected from accidental damage;
- During construction, all site works (including machinery movements, storage of excavated material etc.) will be confined to the development footprint;
- The spread and introduction of invasive species and noxious weeds will be avoided by adopting appropriate mitigation measures as per guidance issued by the NRA (2010) and Invasive Species Ireland. These measures will be detailed in the CEMP and are discussed further in the draft Invasive Species Method statement provided in **EIS Volume II, Appendix 5.1.3**. In advance of construction a baseline confirmatory survey of invasive species (targeting in particular Indian (or Himilayan) Balsam, which is known to occur along watercourses in the study area) will be undertaken by the EcoW. This survey will inform a risk assessment to be undertaken and the development of an appropriate construction management plan. It will be important that any bankside areas along water courses that may disturbed by the proposed development are not re-colonised by Indian Balsam following reinstatement. Follow up checks will need to be undertaken annually and

control measures undertaken should the plant be recorded. In the case of Indian Balsam, mechanical controls are recommended such as hand pulling or mowing and cutting. It is important that this is done prior to flowering in June and regular follow ups will be required to deal with any seedlings.

~~The spread and introduction of invasive species and noxious weeds will be avoided by adopting appropriate mitigation measures as per guidance issued by the NRA (2010). These measures will be detailed in the CEMP. Any invasive plant material noted on site will be removed off site and disposed of at appropriate licensed waste disposal facility. Any invasive species found to occur within 15m of working areas will require a specialist method statement for its eradication to avoid the spread of invasive species, this will ensure compliance with the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477 of 2011]. The presence of non-native species and requirement for actions will be confirmed by the Ecological Clerk of Works.~~

- All woody vegetation clearance required shall take place outside of the bird breeding season (March to August, inclusive) in order to protect nesting birds. In the event that clearance is required during the breeding season, a survey for nesting birds will be undertaken prior to clearance taking place to ensure that no nesting birds are impacted;

- ~~Where possible,~~ No construction works are proposed along river banks or within riparian zones, however development outside of these areas in proximity to the River Dalua such as that at Allen's Bridge shall ~~should~~ be confined to periods outside the bird breeding season to avoid potential adverse impacts on breeding birds;

- Prior to commencement of works pre-construction surveys for the presence of otter in proximity to the discharge point will be undertaken. Should the presence of otters be confirmed then appropriate measures in accordance with best practice (NRA 2008) will be followed to ensure that potential disturbance is minimised. In the case of a breeding site being confirmed in proximity, this may require timing of works to be scheduled outside of the breeding season (otter breeding season is variable). In the event of unavoidable disturbance impacts on otter then a license from NPWS will be sought and work will be undertaken in compliance with any conditions attached;

- Prior to commencement of works pre-construction surveys for the presence of bats at bridge sites will be undertaken. Should the presence of bats be confirmed then appropriate measures will be followed to ensure that no harm to individual bats will occur. In the event of a bat roost being identified during pre-construction surveys then appropriate measures will be taken to ensure its protection with reference to BCI (2010) and NRA (2005). In the event that direct damage to the roost is unavoidable, then a derogation license from NPWS will be sought and work will be undertaken in compliance with any conditions attached;

- Smooth newt, frogs, or viviparous lizard species are fully protected under the Irish Wildlife Acts 1976 - 2012 and if found on site works will stop immediately to allow proper assessment and management.

Specific Mitigation Measures related to the landspreading of sludge include:

- Landspreading of Biosolids/Organic sludge shall be carried out as early as practicable in the growing season so as to maximise the uptake of nutrients by crops and minimise pollution risks.

- A general practice is that sludge applications to land shall be avoided throughout the non – growing season which varies throughout the country, depending on local climatic conditions, between the months of October and February. However, exceptions to this general rule are permitted where the Nutrient Management Plan establishes that landspreading of certain sludges/effluents can be carried out during this period in accordance with the Code of Good Practice without risk of causing water pollution or where exceptional weather conditions arise.

- Organic Sludge shall not be spread on ground without an active crop cover, although it may be spread on fallow land prior to sowing, provided the biosolids are immediately incorporated into the soil.

- In general, organic sludges shall not be applied to land which has:

  i) a shallow depth to the underlying bedrock,

  ii) has gravel or cracked soil overlying pipe or mole drains,

  iii) has a surface gradient of greater than 11%,

  iv) or is prone to flooding.

- Spreading in unsuitable weather conditions can cause loss of nutrients to both surface and ground water, so therefore the spreading of organic wastes shall be avoided if heavy rain is forecast within 48 hours.

- All organic fertilisers shall be aimed to have been applied by early to mid-September, maintaining a balance of nutrients in the soil.

- Pollution of surface waters and wells shall be avoided by leaving a buffer strip between the water source and the land on which organic materials are applied. The table below sets out general guidance on widths that may be appropriate for buffer strips. (Code of Good Farming Practice, DELG)

Table 5.1.7 Buffer Strip Observations when Landspreading Biosolids

Receptor	Buffer Zone (m)
Sensitive buildings (hospitals, schools and churches)	200
Dwelling houses	100
Karst features	30

Lakes & main river channels	20
Small watercourses	10
Public roads	10
Domestic wells	50
Public water supplies	50-300

- Biosolid application during extended drought periods, or when the soil is frozen or snow covered shall be avoided.

- Spreading equipment shall be maintained in prime condition and calibrated for even application regularly.

- The minimisation of slurry odours and nutrient losses to the air will be reduced by adopting a common sense approach such as availing of suitable weather conditions.

- When applying liquid sludges to crops, splash plates or trailing shoe technology will be used at all times to ensure proper and even distribution across the field. Similarly, when applying sludge cake to crops, the volume of sludge released from the muck spreader will be spread equally throughout the field.

- The tank/muck spreader spreading the sludge will not stop during the spread and the tractor pulling the tanker/muck spreader will travel at the same speed for the full spread to ensure there is an even distribution of the sludge over the field and that too much sludge is not spread in the one area.

5.1.16 Residual Impacts

Assuming the full implementation of mitigation measures outlined above the following residual impacts will apply.

Considering the small scale nature of the proposed development and the low ecological value of those habitats directly impacted it is predicted that the proposed development will have a minor negative impact on the biodiversity value of the proposed development site. The inevitable loss of habitat within the footprint of the proposed WWTP development and minor habitat disturbance along the pipeline route is deemed to be of minor significance. The off-site impacts on flora, terrestrial habitats, birds and mammals will be imperceptible, short term, and are not considered significant. Considering the nature and scale of the proposed development, no impacts of significance are foreseen during the operational phase of the proposed development.

5.1.17 Cumulative Impacts

Considering the scale and characteristics of the proposed development and the potential impacts on terrestrial ecology; it is considered that the potential for cumulative impacts is negligible and no significant cumulative impacts on biodiversity are foreseen.

5.1.18 Summary and Conclusions

The potential impacts on terrestrial ecology associated with the proposed upgrade and extension to an existing WWTP at the Newmarket Co-op facility and the development of a waste water pipeline to the River Dalua were assessed.

The site of the WWTP is located within a sub-urban environment and is surrounded by habitats of low ecological value and sensitivity. The proposed pipeline route follows the existing road infrastructure throughout its length only deviating from this at its southern end at the proposed discharge to the River Dalua. The River Dalua is designated as part of the larger River Blackwater Special Area of Conservation. Habitats surrounding the proposed discharge location support a number of species of conservation concern including otter, bats, and breeding bird species.

The proposed development is not located within areas of riparian habitat. A buffer zone will be implemented as a best practice measure only (discussed further in Sections 5.2.6.2 below at the location of the proposed WWTP upgrade works at the Co-Op site to ensure no impacts occur on the Rampart Stream or the habitats lining its banks. Development at the four bridges along the pipeline route will avoid impacts on the surrounding rivers and will not result in any impacts on the riparian habitats at the river crossing locations. The proposed discharge point will be connected to Allen's Bridge and treated water will discharge directly into the Dalua River, negating the need for infrastructure development on the river bank or in lands surrounding the bridge, ensuring no development will occur on riparian habitats at this location.

Potential disturbance to resident fauna of conservation concern during construction has been identified as the main impact associated with the proposed work. Various controls and measures are outlined in the report aimed at mitigating the identified potential impacts.

Assuming the full implementation of mitigation measures it is predicted that the residual adverse impacts of the proposed development on ecological receptors identified within the study area will not be significant.

5.1.19 References

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Chapter 5 – Section 5.2 Aquatic Ecology

5.2.1 Introduction

OES Consulting commissioned Conservation Services – Ecological & Environmental Consultants to prepare an Aquatic Ecological Report as part of the Environmental Impact Statement for the following proposed developments at Newmarket Co-Operative Creameries Ltd, County Cork:

1. Wastewater treatment plant upgrade;
2. Installation of underground wastewater pipeline to the Dalua River;
3. Discontinuation of the existing discharge of treated waste water to the Rampart Stream (a tributary of the Dalua River) and commencement of discharge of treated wastewater directly to the Dalua River;
4. An increase in the levels of milk processing at the Newmarket Co-Operative Creameries Ltd facility.

The aims of the assessment are:

- To assess the present fishery value, invertebrate fauna, aquatic flora, water quality, habitat value and general ecological condition of streams and rivers potentially affected by the proposed development and provide baseline data against which future changes can be assessed;
- To assess the general status of the streams and rivers from an ecological and fisheries perspective in the context of their wider catchment based on survey data, published sources, EPA data, and on consultation with Inland Fisheries Ireland and NPWS;
- To assess the potential impact of the proposed development on water quality and aquatic flora and fauna and in particular to assess the potential impact of the proposed development on the qualifying interests of the Blackwater (Cork/Waterford) River Special Area of Conservation (Site Code 002170);
- To recommend mitigation measures where negative impacts are predicted.

Assessment of potential impact on aquatic mammals, amphibians and birds is included in the terrestrial ecology section of the EIS.

The following were invited to submit information and comments:

- National Parks & Wildlife Service (Development Applications Unit);
- Inland Fisheries Ireland.

Table 5.2.1 below outlines the main legal constraints on the proposed development in relation to aquatic flora, fauna, habitats and fisheries.

Table 5.2.1: Legal Constraints on Proposed Development

Legislation	Constraints on Proposed Development
The Local Government (Water Pollution) Act, 1977 (and associated regulations)	Prohibits the entry of unlicensed polluting matter into waters.
European Communities Environmental Objectives (Surface Waters) Regulations 2009	The Regulations give legal status to the criteria and standards to be used for classifying surface waters in accordance with the ecological objectives approach of the Water Framework Directive. The classification of waters is a key step in the river basin management planning process and is central to the setting of objectives and the development of programmes of measures. Waters classified as 'high' or 'good' must not be allowed deteriorate. Waters classified as less than good must be restored to at least good status within a prescribed timeframe. The environmental targets or goals and the programmes of measures to be included in river basin management plans must therefore reflect these requirements.
The Fisheries (Consolidation) Act, 1959 as amended by the Fisheries (Amendment) Act, 1962	Prohibits: 1. The entry of deleterious matter into waters. (Deleterious matter is defined as any substance that is liable to injure fish, their spawning grounds or their food, or to injure fish in their value as human food.) 2. Obstructing the passage of salmon, trout or eels or their smolts and fry 3. Injury or disturbance of the spawn or fry of salmon, trout or eels or to their spawning or nursery areas
Fisheries (Amendment) Act 1999	Requires the regional fisheries board to have regard for the need for the conservation of fish and other species of fauna & flora habitat and biodiversity of inland fisheries and ecosystems. Under this Act the Regional Fisheries Board has the responsibility to protect and conserve all freshwater fisheries within its area of jurisdiction. It is the stated policy of the Regional Fisheries Boards that "*every river, stream, canal, lake, pond and reservoir must be regarded as constituting and/or supporting a Fishery under the meaning of the Fisheries Acts unless otherwise regarded by the Boards*."
The Freshwater Fish Directive 78/659/EEC as transposed into Irish law under E.C. (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988)	Lays down standards for the quality of designated waters and requirements for monitoring.

Legislation	Constraints on Proposed Development
The Wildlife Act 1976	Prohibits damage to protected species which includes certain freshwater aquatic species.
The Habitats Directive (92/43/EEC) as transposed into Irish law under the E.C. (Natural Habitats Regulations 1997 (S.I. No. 94 of 1997)	Lists certain species (Annex II) and habitats (Annex I) which require to be protected within SACs. Annex II species include crayfish, salmon, and all three Irish species of Lamprey.
Water Framework Directive (2000/60/EC)	The Water Framework Directive requires the maintenance of good ecological quality in all surface waters, which in the Irish context is generally taken to mean achieving salmonid water quality standards regardless of whether the watercourse is designated under the Salmonid Regulations.
Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage	The Environmental Liability Directive specifies that Member States should, inter alia, establish a civil liability regime whereby operators of specified activities which cause environmental damage are financially liable for remedying this damage. The Directive also aims to hold those responsible for certain activities which have caused an imminent threat of environmental damage liable for taking preventive actions.

5.2.2 Consultation

Meetings were held with representatives of Cork County Council and the National Parks and Wildlife Service during September 2015 to discuss, amongst other things, the approach to the aquatic ecological assessments.

Following these meetings a scoping document was prepared during November 2015 by OES consulting and circulated to a wide range of bodies including key stakeholders with an interest in ecology including:

- Cork County Council;
- Environmental Protection Agency;
- Development Applications Unit, Department of Arts, Heritage and the Gaeltacht;
- Inland Fisheries Ireland;
- The Heritage Council;
- National Parks and Wildlife Service;
- An Taisce – the National Trust of Ireland.

A formal written response to scoping was received from the National Parks and Wildlife Service via the Development Applications Unit, Department of Arts, Heritage and the Gaeltacht during December 2015 (see Appendix 5.2.1). In this letter the

Department highlighted the need to consider the following features relevant to aquatic ecology in the NIS and EIS of the proposed development:

- Effects on Lamprey;
- Effects on Salmon;
- Effects on Freshwater Pearl Mussel;
- Effects on Water crowfoot/ Starwort vegetation;
- Potential impacts of construction generated pollution;
- Potential impacts of sediment;
- Potential impacts of nutrient enrichment;
- Potential impacts of scouring.

5.2.3 Methodology

5.2.3.1 Selection of Waterbodies and Sites for Assessment

All watercourses were assessed which are marked on EPA mapping of streams (http://maps.epa.ie/internetmapviewer/mapviewer.aspx) and which are within 0.5km down gradient from any part of the proposed development site where works will be carried out. As O.S. 1:50,000 maps generally include streams/drains which are too small to be useful salmonid habitat, and as general guidelines are presented for procedures at any watercourse crossing, the survey is adequate to ensure that all measures necessary to prevent significant impacts are identified.

The potentially affected watercourses are the Dalua River and its tributary the Rampart Stream, and the Rivers Allow and Blackwater River to which the Dalua River drains (See Figure 5.2.1). The location of the proposed development in relation to the Blackwater (Cork/Waterford) River SAC is shown on Map 5.2.2.

5.2.3.2 Habitat Assessment

Habitat assessment was carried out on 13th October 2014 and 3rd February 2016.

Field Procedure

A general assessment of salmonid and lamprey habitat quality was carried out for c. 10km downstream of the proposed WWTP extension on watercourses shown on the EPA on-line mapping of streams & rivers (http://gis.epa.ie/Envision). This included the c.5 km of the Rampart Stream from Newmarket to the confluence with the Dalua River and c.5km of the Dalua River downstream of the Rampart Stream confluence. A small tributary of the Rampart Stream which flows under the R576 at Park Bridge will be crossed by the proposed pipeline. The habitat of the lowest c.250m of this tributary was also assessed.

Assessment consisted of walking and/or wading the entire channel length. All stream/river channels were demarcated into habitat sections based on:

1. Stream width and depth;
2. Substrate type, i.e. relative dominance of large rocks, cobble, gravel, sand, mud etc.;
3. Flow type, i.e. relative dominance of riffle, glide and pool in the sampling area;
4. Dominant bank-side vegetation;
5. In-stream vegetation;
6. Degree of shade by bank-side vegetation.

Salmonid and Lamprey habitat quality was assessed, taking into account the environmental features 1-6 listed above. Based on these observations and more detailed criteria outlined in the following section, the value of each river section for salmonid and lamprey spawning, as a nursery area for juvenile salmonids and lamprey larvae, and as an area for adult salmonids was estimated on a scale of None/ Poor/ Fair/ Good/ Very Good/ Excellent.

Table 5.2.2: Habitat Quality

Scale	Assessment
None	The ecologist carrying out the assessment regards it as impossible that the stream could support the species in the relevant life stage
Poor	Unlikely but possible that the stream could support the species in the relevant life stage
Fair	Species life stage likely to be present at low density
Good	Species life stage likely to be present at moderate density
Very Good	Species life stage likely to be present at high density
Excellent	Conditions ideal for the species life stage

This rating assesses the physical suitability of the habitat; the presence/absence/density of salmonids and/or lamprey at the location will also depend on present and historical water quality and accessibility of the site to the species in question.

Locations for identification of habitat sections were recorded as Irish Grid References using a GPS. Photographs were taken to illustrate the habitat quality.

Criteria Used for Assessment of Salmonid and Lamprey Habitat Quality

Habitat quality for in-stream invertebrate and plant communities, and for fish, and riparian birds and mammals, is primarily a function of 'naturalness' and diversity. The more diverse the stream habitat in terms of substrate, flow rate, depth, riparian vegetation, light conditions etc., the richer the biological community is likely to be, and the more suitable it is likely to be for salmonid fish (trout and salmon).

Assessment of the quality of salmonid spawning habitat, nursery habitat and adult habitat is based on personal expertise developed over a period of 20 years of electrofishing and on published information such as the following:

1. Favourable locations for salmon spawning are likely to occur where the gradient of a river is 3% or less (Mills 1989);

2. Preferred current velocity for spawning is within the range 25–90 cm s-1, with a water depth in the range 17–76 cm (Hendry & Cragg-Hine 1997);

3. Typical spawning sites are the transitional areas between pool and riffle where flow is accelerating and depth decreasing, where gravel of suitable coarseness is present and interstices are kept clean by up-welling flow (Peterson 1978, Bjorn & Reiser 1991);

4. Salmon fry and parr occupy shallow, fast-flowing water with a moderately coarse substrate with cover (Symons & Heland 1978, Baglinière & Champigneulle 1986);

5. Deep or slow-moving water, particularly when associated with a sand or silt substrate, does not support resident juvenile salmonids (Wankowski & Thorpe 1979, Baglinière & Champigneulle 1986);

6. Suitable cover for juveniles includes areas of deep water, surface turbulence, loose substrate, large rocks and other submerged obstructions, undercut banks, overhanging vegetation, woody debris lodged in the channel, and aquatic vegetation (Heggenes 1990; Bjorn & Reiser 1991; Haury et al. 1995);

7. The juxtaposition of habitat types is also important. The proximity of juvenile habitat to spawning gravels may be significant to their utilisation. In addition, adults require holding pools immediately downstream of spawning gravels in which they can congregate prior to spawning. Cover for adult salmon waiting to migrate or spawn can be provided by overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water and surface turbulence (Bjorn & Reiser 1991);

8. Bjorn & Reiser (1991) suggest that proximity of cover to spawning areas may be a factor in the selection of spawning sites by some salmonid species.

Lamprey habitat preferences change with the stages of their life cycle. They show a preference for gravel-dominated substratum for spawning. After hatching the larvae swim or are washed downstream by the current to areas of sandy silt in still or slow flowing water where they burrow and spend the next few years in tunnels. Lampreys therefore require mainly silt and sand dominated substratum for nursery habitat. Other important environmental characteristics for optimal ammocoete habitat are shallow waters with low water velocity, and the presence of organic detritus and/or plant material. Sub-optimal habitat supporting only a few individuals may consist of a few square centimetres of suitable silt in an open, comparatively high-velocity, boulder-strewn streambed. Spate rivers, with high flow velocities, tend to support

fewer ammocoetes because they contain smaller areas of stable sediment (Maitland 2003).

5.2.3.3 Biological Water Quality Assessment

Biological Sampling Sites

Biological water quality assessment was carried out at 9 locations (see Figures 5.2.3 & 5.2.4):

Table 5.2.3: Locations of Water Quality Monitoring

Site Code	Grid Reference	Sampling Date	Location
M1	R31774 07488	21/10/14	Mill Stream immediately upstream of Newmarket Co-Operative Creameries Ltd facility
M2	R32108 07409	13/10/14	Mill Stream immediately downstream of Newmarket Co-Operative Creameries Ltd facility
R1	R32216 07513	28/07/15	Rampart Stream immediately upstream of Newmarket Co-Operative Creameries Ltd facility and confluence with Mill Stream
R2	R32130 07268	28/07/15	Rampart Stream immediately downstream of Newmarket Co-Operative Creameries Ltd facility and confluence with Mill Stream
R3	R32396 06858	03/09/15	c.750m downstream of Newmarket Co-Operative Creameries Ltd facility
R4	R33406 05553	04/09/15	c.2.5km downstream of Newmarket Co-Operative Creameries Ltd facility
R5	R34264 04598	04/09/15	c.3.8km downstream of Newmarket Co-Operative Creameries Ltd facility
D1	R34263 04536	21/10/14	Dalua River downstream of proposed discharge location and immediately upstream of confluence with Rampart Stream
D2	R34353 04490	21/10/14	Dalua River immediately downstream of confluence with Rampart Stream
D3	R35171 04436	05/11/15	Dalua River c. 2km downstream of confluence with Rampart Stream and proposed discharge location

Biological Sampling & Analysis

Invertebrates were sampled using the standard kick sampling method. After field sampling the sample was thoroughly sieved and live sorted for 30 minutes under laboratory conditions. Invertebrates were preserved in 70% alcohol, examined microscopically and identified to the taxonomic level required to calculate Q-ratings by the EPA methodology (McGarrigle et al 2002). The preserved samples were archived for future examination or verification. Based on the relative abundance of indicator species, a biotic index (Q-rating) was determined in accordance with the biological assessment procedure used by the Environmental Protection Agency (McGarrigle et al 2002 & S.I. No. 258 of 1998) and more detailed unpublished methodology (McGarrigle, Clabby and Lucey pers. comm.)

Table 5.2.4: Biotic Index and Water Quality Status

Biotic Index	Water Framework Directive Ecological Quality	Quality Status
Q5	High	Unpolluted Waters
Q4-5	High	
Q4	Good	
Q3-4	Moderate	Slightly Polluted Waters
Q3	Poor	Moderately Polluted Waters
Q2-3	Poor	
Q2	Bad	Seriously Polluted Waters
Q1-2	Bad	
Q1	Bad	

Submerged and emergent aquatic plants were assessed at each site by means of direct observation and recorded as % cover of the substratum.

5.2.3.4 Fish Assessment

- Timed electrofishing was carried out at six sites on the Rampart Stream (Sites A-F, see Figure 5.2.5) on 3/9/15 and 4/9/15 to assess the species of fish present and the qualitative abundance (catch per unit effort/minimum density estimate) and age composition of juvenile and adult salmonids;
- The area electrofished at each site was estimated based on the length and average width of the channel fished;
- At each site a representative stream reach was selected and measured such that all primary physical habitat characteristics (i.e. riffle/glide/pool, if present) of the stream were included within the reach;
- Grid references for the upstream and downstream extremities of the surveyed sections were recorded and representative photographs of each survey site were taken;
- Fish were captured using a Safari Research Surveyor pulsed direct current backpack electrofisher;
- All fish were identified, and fork length of salmonids was measured to the nearest mm;
- Scales were taken from a representative sample of captured trout. Trout age was determined by length frequency distribution combined with scale reading using a high power binocular microscope. Trout were classified according to age as less than 1 year old (0+), 1 year old (1+), and 2 year old (2+);
- Age of juvenile salmon was determined using length frequency distribution;
- All fish captured were carefully handled and returned alive where possible to the water from which they were taken, following the gathering of data;

- Suitable lamprey nursery substrate was identified at three sites (Sites A, D & F) and electrofished for juvenile lamprey using the qualitative method described by O'Connor (2004) following procedure of Harvey & Cowx (2003);

- IFI Biosecurity Protocol for Field Survey Work (December 2010) was followed at all times.

5.2.3.5 Assessment of Significance of Potential Impacts

Impacts are defined on the basis of severity of impact on aquatic species and/or habitats. Species protected under national and European legislation are given special consideration. Because of their amenity, commercial and legal status, salmonid fish (trout and salmon) are given special consideration. Assessment of the importance of a potential impact takes into account not only the ecological considerations in the immediate vicinity of the potential impact, but also geographical and wider catchment considerations. If spawning and nursery habitat of a species are limiting factors in short supply in a particular river system, then impacts on them will have an importance out of proportion with their apparent 'face value'.

If an aspect of a proposed development is judged likely to have a measurable negative effect on salmonid fish populations or any rare or protected species, it would be classified as a significant potential impact. The criteria for assessing the significance of impacts on flora, fauna and fisheries are as follows. (For details of water-body categories see Section 5.2.3.6)

Table 5.2.5: Criteria for Assessing the Significance of Impacts

A Sites				
	Temporary	**Short-term**	**Medium-term**	**Long-term**
Extensive	MAJOR	SEVERE	SEVERE	SEVERE
Localised	MAJOR	MAJOR	SEVERE	SEVERE
B Sites				
	Temporary	**Short-term**	**Medium-term**	**Long-term**
Extensive	MAJOR	MAJOR	SEVERE	SEVERE
Localised	MODERATE	MODERATE	MAJOR	MAJOR
C Sites				
	Temporary	**Short-term**	**Medium-term**	**Long-term**
Extensive	MODERATE	MODERATE	MAJOR	MAJOR
Localised	MINOR	MODERATE	MODERATE	MODERATE
D Sites				
	Temporary	**Short-term**	**Medium-term**	**Long-term**
Extensive	MINOR	MINOR	MODERATE	MODERATE
Localised	NOT SIGNIFICANT	MINOR	MINOR	MINOR
E Sites				
	Temporary	**Short-term**	**Medium-term**	**Long-term**
Extensive	NOT SIGNIFICANT	NOT SIGNIFICANT	MINOR	MINOR
Localised	NOT SIGNIFICANT	NOT SIGNIFICANT	NOT SIGNIFICANT	NOT SIGNIFICANT

NRA (2006)

In line with the EPA guidelines (EPA 2002) the following terms are defined when quantifying duration:

- Temporary: Up to 1 year;
- Short-term: From 1 to 7 years;
- Medium-term: 7 to 15 years;
- Long-term: 15 – 60 years;
- Permanent: over 60 years.

For the purposes of this report 'localised' impacts on rivers are loosely defined as impacts measurable no more than 250 metres from the impact source. 'Extensive' impacts on rivers are defined as impacts measurable more than 250m from the impact source. Any impact on salmonid spawning habitat or nursery habitat where it is in short supply, would be regarded as an extensive impact as it is likely to have an impact on the salmonid population beyond the immediate vicinity of the impact source.

5.2.3.6 Guidelines Used for Classification of Importance of Freshwaters

Table 5.2.6: Guidelines Used for Classification of Importance of Freshwaters

Rating	
A	**Internationally Important** Habitats designated as SACs for Annex II species under the EU Habitats Directive. Major Salmon river fisheries. Major salmonid lake fisheries.
B	**Nationally or Regionally Important** Other major salmonid waters and waters with major amenity fishery value. Commercially important coarse fisheries. Waters with important populations of species protected under the Wildlife Act and/or important populations of Annex II species under the EU Habitats Directive. Waters designated or proposed as Natural Heritage Areas by NPWS.
C	**High Value, locally important** Small water bodies with known salmonid populations or with good potential salmonid habitat, or any population of species protected under the Wildlife Act and/or listed Annex II species under the EU Habitats Directive. Large water bodies with some fisheries value.
D	**Moderate value, locally important** Small water bodies with some coarse fisheries value or some potential salmonid habitat. Any stream with an unpolluted Q-value rating.
E	**Low value** Water bodies with no current fisheries value and no significant potential fisheries value. Habitat diversity low and degraded.

NRA (2006)

5.2.3.7 Limitations Encountered

No significant limitations were encountered.

5.2.4 Existing Environment

5.2.4.1 General Catchment Information

Rampart Stream

The Rampart Stream rises c.4km north of Newmarket and flows for c.8km via Newmarket to the confluence with the Dalua River. Little published information on the Rampart Stream was available for this report. However the Rampart Stream is known to have a population of Salmon. www.duhallowlife.com/content/ird-duhallows-work-biodiversity-recognised

Brook Lamprey have been observed in the Rampart Stream (Dr F. Igoe pers. comm.) Brook Lamprey and Atlantic Salmon are qualifying interests of the Blackwater (Cork/Waterford) River SAC.

As a nursery stream for salmon and brown trout and having a population of brook lamprey, the Rampart Stream is classified as of high local value.

Dalua River

The River Dalua rises in north-west Co. Cork, approximately 10km north of Newmarket. It flows in a south-easterly direction towards Kanturk, where it joins the River Allow. The River Allow then continues for approximately 5km before joining the Munster Blackwater. The River Dalua, along with most of the major tributaries of the River Blackwater, is located within the Blackwater River (Cork/Waterford) SAC. The Site Synopsis for the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/synopsis/SY002170.pdf and the Conservation Objectives of the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002170.pdf.

Fishery Value

A fish survey was carried out by IFI on the Dalua River in 2010 (IFI 2010). The survey site was located approximately 3km south of Newmarket. A total of five fish species were recorded in the River Dalua site. Salmon was the most abundant species, followed by brown trout, minnow, eel and lamprey. A total juvenile salmon minimum density of 0.629 per m² was recorded at the site. Salmon ranged in length from 2.4cm to 16.9cm. Three age classes (0+, 1+ and 2+) were present, accounting for approximately 71%, 27% and 2% of the total salmon catch respectively.

Ecological Value

River and Brook Lamprey are present in the Dalua River (King& Linnane 2004). Mapping in NPWS (2012) shows Sea Lamprey as present in the Dalua River.

The main channel of the Dalua River is not classified as suitable Freshwater Pearl Mussel habitat in the SAC Conservation Objectives NPWS (2012). NPWS in its letter of 4/12/15 states: "*It is currently a conservation target to maintain the distribution of the freshwater pearl mussel within the downstream Rivers Allow and Blackwater … Note that this conservation target does not apply to the River Dalua. Therefore, effects in the River Dalua should be assessed for salmonid water quality, with salmon habitat as the target*." (See **Appendix 5.2.1**)

As an SAC channel with populations of Atlantic Salmon, Sea Lamprey, River Lamprey and Brook Lamprey, all of which are qualifying interest Annex II species of the SAC, the Dalua River is classified as of international importance.

Water Quality

In 2012 EPA described the water quality in the Dalua River as "Continuing satisfactory with Good and High ecological quality" (see EPA biological water quality data in Appendix 5.2.2)

Allow River

The River Allow rises on the eastern flanks of the Mullaghareirk Mountains, flowing in an easterly direction for twelve kilometres before turning south at Freemount, and continuing for a further 12 kilometres to Kanturk town. Five kilometres downstream of Kanturk the Allow flows into the Blackwater River. The Allow catchment is 323.46km^2(NS-2 2010). The Allow forms part of the Blackwater River SAC. The Site Synopsis for the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/synopsis/SY002170.pdf and the Conservation Objectives of the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002170.pdf

Fishery Value

The River Allow has been the training ground for the Trout Anglers Federation of Ireland international teams, both adult and youths, in preparation for world and European fly fishing championships for the past 20 years, and has hosted all Ireland senior and youth championships in the past few years. Limited electrofishing carried out for the Allow Sub-basin Management Plan (NS-2 2010) recorded juvenile salmon at higher density than brown trout. It is evident that the River Allow is an important nursery and spawning area for both brown trout and salmon within the River Blackwater system as well as being a significant brown trout angling water in its own right.

Ecological Value

Sea Lamprey, River lamprey and Brook lamprey (King & Linnane 2004) salmon and Freshwater Pearl Mussel (NS-2 2010) are present in the River Allow and all are qualifying interests of the SAC.

The Freshwater Pearl Mussel Second Draft Allow Sub-Basin Management Plan (NS-2 2010) states that on the basis of the available survey information: "*the population of Margaritifera in the Allow River was found to be in unfavourable condition in the areas surveyed during 3 visits made between September 2008 and September 2009. …The population is failing in its habitat quality (through evidence of heavy siltation and strong macrophyte growth), and in its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. The future of the Allow Catchment population is not hopeful, as there is intensive catchment management that would be slow to recover even with stringent measures being*

undertaken. … If it took 20 years to implement the measures needed for the catchment, it is likely that half the remaining population would be lost."

Freshwater Pearl Mussel are not found in the Allow downstream of the Dalua confluence (NS-2 2010), therefore the closest known population of FPM downstream of the proposed discharge location is in the main channel of the Blackwater River immediately downstream of the River Allow confluence (c.10km downstream of the proposed discharge location) (NPWS (2012). NPWS in its letter of 4/12/15 states that the conservation target to maintain the distribution of freshwater pearl mussel, and to restore suitable habitat for this species, does not apply to the stretch of the Allow between the confluence of the Dalua and the confluence of the Allow with the Blackwater. NPWS notes "*the draft Allow River sub-basin management plan refers to a comprehensive survey of this section of the river (which) found no mussels and recorded very poor habitat conditions*".

~~*The conservation target to maintain the distribution of freshwater pearl mussel, and to restore suitable habitat for this species, applies to the population downstream in the main channel of the River Blackwater, not to the stretch of the River Allow between the confluence of the Dalua and the confluence of the Allow with the Blackwater. … the draft Allow River sub-basin management plan refers to a comprehensive survey of this section of the river found no mussels and recorded very poor habitat conditions.*"~~

As an SAC channel with populations of Atlantic Salmon, Sea Lamprey, River Lamprey, Brook Lamprey and Freshwater Pearl Mussel, all of which are qualifying interest Annex II species of the SAC, the Allow River is classified as of international importance.

Water Quality

In 2012 EPA described the water quality in the Allow River as "*Continuing satisfactory with High and Good ecological quality.*" (see EPA biological water quality data in **Appendix 5.2.2**)

Blackwater (Munster)

The River Blackwater is one of Ireland's largest rivers, extending some 160km from source to sea and draining in excess of 3,000km^2. The river rises in the mountains of east Co. Kerry, traversing much of Co. Cork and west Co. Waterford, before entering the Celtic Sea at Youghal Bay, Co. Cork.

From County Kerry to its tidal reaches the Blackwater is a Special Area of Conservation. The Site Synopsis for the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/synopsis/SY002170.pdf. and the Conservation Objectives of the SAC can be viewed at www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002170.pdf

Fishery Value

The population of salmon in the River Blackwater was classified as above the conservation limit in 2015 (Standing Scientific Committee for Salmon 2015. The

Blackwater is one of the country's most important game fisheries, and the main channel is a designated salmonid river under the European Communities (Quality of Salmonid Waters) Regulations of 1988 (S.I. No. 293, 1988, implementing the Freshwater Fish Directive (78/659/EEC). O'Reilly (2002) stated: "*The river is noted for its enormous run of salmon over the years. The average size of the brown trout is small and it is not a noted seatrout fishery*."

"*Salmon are mostly fished on the main channel, while brown trout are fished there and in the larger tributaries. Sea trout (which spawn in the nearby Owenashad River) are important on the River Bride, especially around Tallow Bridge and on the main channel upstream as far as Lismore. … While the Blackwater is very much the domain of the salmon angler, having 20 salmon and trout clubs, "coarse fishing" has always been well organised on the river, especially for tourist anglers. Roach and dace are the two main cyprinids in the Blackwater.*" (O'Halloran *et al* 1998)

Ecological Value

The sections of the National Parks & Wildlife Service site synopsis dealing with aquatic features of the SAC are as follows, though it should be noted that many of the features described apply to areas of the SAC remote from the study area. "*Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. Common Reed (Phragmites australis) is ubiquitous and is harvested for thatching. There is also much Marsh Marigold (Caltha palustris) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (Carex riparia and C. acutiformis). Hemlock Water-dropwort (Oenanthe crocata), Wild Angelica (Angelica sylvestris), Reed Canary-grass (Phalaris arundinacea), Meadowsweet (Filipendula ulmaria), Nettle (Urtica dioica), Purple Loosestrife (Lythrum salicaria), Marsh Valerian (Valeriana officinalis), Water Mint (Mentha aquatica) and Water Forget-me-not (Myosotis scorpioides).*

Floating river vegetation is found all along the freshwater stretches within the site. The species list is quite extensive and includes Pond Water-crowfoot (Ranunculus peltatus), Water-crowfoot (Ranunculus spp.), Canadian Pondweed (Elodea canadensis), Broad-leaved Pondweed (Potamogeton natans), Pondweed (Potamogeton spp.), Water Milfoil (Myriophyllum spp.), Common Club-rush (Scirpus lacustris), Water-starwort (Callitriche spp.), Hemlock Water-dropwort, Fine-leaved Water-dropwort (O. aquatica), Common Duckweed (Lemna minor), Yellow Water-lily (Nuphar lutea), Unbranched Bur-reed (Sparganium emersum) and the moss Fontinalis antipyretica. The site is also important for the presence of several Habitats Directive Annex II animal species, including Sea Lamprey (Petromyzon marinus), Brook Lamprey (Lampetra planeri), River Lamprey (L. fluviatilis), Twaite Shad (Alosa fallax fallax), Freshwater Pearl-mussel (Margaritifera margaritifera), Otter (Lutra lutra) and Salmon (Salmo salar). The Awbeg supports a population of White-clawed Crayfish (Austropotamobius pallipes). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers." www.npws.ie/sites/default/files/protected-sites/synopsis/SY002170.pdf

Qualifying Interests of Blackwater (Cork / Waterford) River SAC

Table 5.2.7: Qualifying Interests of Blackwater (Cork / Waterford River SAC

Qualifying Interests	Freshwater Aquatic Habitats/Species
Freshwater Pearl Mussel *Margaritifera margaritifera*	✓
White-clawed Crayfish *Austropotamobius pallipes*	✓
Sea Lamprey *Petromyzon marinus*	✓
Brook Lamprey *Lampetra planeri*	✓
River Lamprey *Lampetra fluviatilis*	✓
Twaite Shad *Alosa fallax*	✓
Atlantic Salmon *Salmo salar* (only in fresh water)	✓
Estuaries	X
Mudflats and sandflats not covered by seawater at low tide	X
Perennial vegetation of stony banks	X
Salicornia and other annuals colonizing mud and sand	X
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	X
Otter *Lutra lutra*	X
Mediterranean salt meadows (Juncetalia maritimi)	X
Killarney Fern *Trichomanes speciosum*	X
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	✓
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	X
*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	X
**Taxus baccata* woods of the British Isles	X

* indicates a priority habitat under the Habitats Directive

Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The Freshwater Pearl Mussel Second Draft Munster Blackwater Sub-Basin Management Plan (NS-2 2009) states that the available survey information "*suggests that whilst pearl mussels still may be relatively widespread in the Blackwater, and there are still small localised areas with moderately high densities, the numbers have declined, and the population is composed entirely of aged adults with no evidence of recruitment for at least 20 years*." Maps in the Draft Sub-Basin Management Plan show Freshwater Pearl Mussel present in the Blackwater upstream and downstream of Allow confluence. It appears that the most recent records at these sites are from pre 1992 (John Lucey EPA unpublished notes).

NPWS in it's letter of letter of 8/2/16 stated: "The conservation objective relating to freshwater pearl mussel in the Blackwater River (Cork/Waterford) candidate Special Area of Conservation (cSAC) (2170) will be changed, and will no longer relate to the main channel of the Munster Blackwater River…."

White-clawed Crayfish (*Austropotamobius pallipes*)

The NPWS Conservation Objectives for the Blackwater River (Cork/Waterford) SAC maps the distribution of Crayfish in the SAC and outlines the "*area of interest*" for the species in the SAC. The "*area of interest*" is c.16km downstream of the proposed development. (See Map 9 in www.npws.ie/sites/default/files/protected-sites/synopsis/SY002170.pdf) The nearest crayfish records shown on the National Biodiversity Data Centre online mapping are c.56km downstream of the proposed development. Given the nature of the development and the distance from crayfish

populations or areas of significant potential for crayfish, there is deemed to be no significant risk to crayfish.

Twaite Shad (*Alosa fallax*)
Twaite shad (*Alosa fallax*) is listed in Annex II of the Habitats Directive. In the first half of the 20th Century commercial shad catches of greater than 100 metric tonnes were recorded in the North and Baltic seas (Doherty *et al*., 2004). But twaite shad populations have declined throughout Europe and most fisheries have collapsed (Maitland & Hatton-Ellis, 2003).

Four Special Areas of Conservation (SACs) have been designated in the Republic of Ireland for the protection of this species; these are the estuarine reaches of the Munster Blackwater, Suir, Barrow–Nore and Slaney. "*These designations are based on recent historical information on spawning activity. The spawning status of some of these populations is considered to have declined substantially in recent years*." (King & Roche 2008).

The normal habitat of this species is the sea – especially coastal waters off the south-west coast of northern Europe. At maturity, the adult fish stop feeding and gather in early summer in the estuaries of slow-flowing unpolluted rivers where there is easy access from the sea, thereafter moving upstream to spawn in mid-June in the stretches above the influence of high tides. Spawning takes place in flowing water over stones and gravel. The eggs take about 4-6 days to hatch, and the young drop quickly downstream in the current to the quieter waters of the upper estuary where they start to feed and grow. (Maitland & Campbell 1992).

In a survey of Shad in the Munster Blackwater in 2003/2004, the furthest upstream that the species was recorded was in the Careysville fishery near Fermoy c.25km upstream of the top of the tide. The report states this fish "*is likely to have been impeded by the weir at this location*". (King & Linnane 2004) As Fermoy is c.65km downstream of the proposed development, it is concluded that there is no significant possibility of shad occurring in the waters potentially affected by the proposed development.

Sea Lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*) & Brook Lamprey (*Lampetra planeri*)
All the three Irish lamprey species, Sea Lamprey, River Lamprey & Brook Lamprey, are qualifying interests of the Blackwater River SAC. NPWS (2012) classifies both Brook and River Lamprey as being at favourable conservation status in the SAC but classifies Sea Lamprey at being at unfavourable conservation status.

Surveys for lamprey were carried out by the Central Fisheries Board in 2003/2004. The report on this survey (King & Linnane 2004) states: "*A total of 88 sites were electric fished for juvenile lamprey over 29 channels .. 26 sites yielded no juvenile lamprey. Of the 18 sites fished on the main River Blackwater two, only, contained no juvenile lamprey. Among the 70 sites fished in the tributary channels 34% contained no juvenile lamprey. The majority of juvenile lamprey taken were identified as river / brook lamprey. Juvenile sea lamprey were recorded in many of the channels, including the main Blackwater channel and made up approximately one-sixth of the overall recorded population across the catchment*."

King & Linnane (2004) further stated: "*It is apparent that sea lamprey can, at least in some years, ascend the weirs and other physical obstructions on the Blackwater in sufficient numbers to permit upstream dispersal prior to spawning. The possibility that such escapement is not annual, or that annual escapement is insufficient to adequately populate the potential habitats for this species, is indicated in absences and gaps in age classes evident in the length frequency distribution for this species in the Blackwater. The pattern of sea lamprey redd concentration in the area immediately downstream of weirs, as witnessed at Clohamon and Fermoy in the present study, has been observed in the main channel of several other large Irish catchments. The findings from the present study and from earlier CFB studies point to small breeding populations of sea lamprey, in the year examined, but extended studies would be required to identify trends or fluctuations. The redd counts only provide a 'minimum estimate' of spawning effort as they do not indicate the number of sea lamprey involved. In addition, redds can become levelled in summer floods and may be obscured to observation. ….The widespread distribution of juvenile sea lamprey in the Munster Blackwater in the present study supports the Lamprey and shad in the Slaney and Blackwater accumulated anecdotal records in Kurz and Costello (1999) who reported spawning activity of sea lamprey up to the headwaters of the system at Ballydesmond.*"

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

Watercourses characterised by submerged or floating-leaved vegetation ("Ranunculion fluitantis and Callitricho-Batrachion vegetation") are listed in Annex II of the Habitats Directive and this habitat is a qualifying interest of the Blackwater River SAC. The definition of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion communities is very wide, in practice covering the majority of rivers and streams with aquatic plant communities of note (Hatton-Ellis & Grieve 2003). Species characteristic of the habitat type include *Callitriche* sp., and *Potamogeton* sp. (European Environment Agency www.eunis.eea.europa.eu/habitats-factsheet.jsp). NPWS (2012) states that in the River Blackwater "*the dominant floating leaved species appears to be the common and widespread stream water-crowfoot (Ranunculus penicillatus subsp. penicillatus) (Green, 2008, O'Mahony, 2009). No high conservation value subtypes are known to occur in the SAC and further survey is required to determine whether any such are present. Only one rare/threatened vascular plant species is known to occur in the SAC, the protected opposite-leaved pondweed (Groenlandia densa), which is abundant in the tidal stretches around Cappoquin (Green, 2008).*

Water quality

In 2012 EPA described the water quality in the Blackwater River as "*Satisfactory throughout, with High and Good ecological quality, following improvement at Mallow and Fermoy*". (See EPA biological water quality data in **Appendix 5.2.2**)

5.2.4.2 Assessment of Potentially Affected Waters

Habitat Assessment

Habitat sections are shown on Figure 5.2.6.

Habitat Section 1 – Rampart Stream

Location	R32216 07513 to R32146 07303
Length	c.150
Description	Mostly glide on mud and sand in uniform canalised stream. Some short gravel and cobble riffles. Shade by garden trees c.40%.
Salmonid Adult Habitat	Fair
Salmonid Nursery Habitat	Fair
Salmonid/Lamprey Spawning Habitat	Poor - Fair
Lamprey Nursery Habitat	Fair

Short section of riffle on cobble, gravel & sand

Slow muddy glide

Stream flowing through landscaped garden

Canalised stream with uniform glide habitat

Habitat Section 1A – Rampart Stream Tributary

Location	R33365 06054 to R33247 05875
Length	c.250
Description	Stream 1.5 – 2.5m wide. Mostly riffle over cobble, large rocks and gravel, with some glide on silty gravel and sand. Mostly well shaded by ash, willow, alder and hawthorn. The twin pipe culvert under the N576 at Park Bridge is likely to constitute a major obstacle to upstream movement of fish. A 1m fall a short distance downstream from the bridge is likely to constitute an obstacle to upstream fish movement except at high flows.
Salmonid Adult Habitat	Fair
Salmonid Nursery Habitat	Good
Salmonid/Lamprey Spawning Habitat	Good
Lamprey Nursery Habitat	Poor - Fair

Riffle on cobble and gravel upstream of road

Twin culvert at Park Bridge

Riffle over cobble and large rocks

Cobble riffle just upstream of Rampart confluence

Habitat Section 2 – Rampart Stream

Location	R3145 07303 to R32495 06830
Length	c.600m
Description	Stream 1 - 2m wide with mixture of riffle over cobble and glide over mud and cobble.
Salmonid Adult Habitat	Fair
Salmonid Nursery Habitat	Fair - Good
Salmonid/Lamprey Spawning Habitat	Fair
Lamprey Nursery Habitat	Fair - Good

Stream at downstream end of triple culvert under R576

Riffle over cobble and mud

Riffle & glide through forestry plantation

Section of canalised stream with riffle and glide through forestry

Section of channel after habitat enhancement diversification works

Section of channel after habitat enhancement diversification works

Slow shallow glide over sand and mud substrate

Habitat Section 3 – Rampart Stream

Location	R32495 06830 to R33329 05739
Length	c.1.9km
Description	Stream 4-5m wide with good mix of riffle, glide and pool. Mostly shaded with native deciduous tree mixed with laurel and conifers.
Salmonid Adult Habitat	Fair - Good
Salmonid Nursery Habitat	Good
Salmonid/Lamprey Spawning Habitat	Fair
Lamprey Nursery Habitat	Fair

Diverse stream habitat with woodland riparian vegetation

Shallow glide on sandy mud

Diverse mix of riffle, glide and run

Moderately shaded section of riffle and glide

Riffle over cobble & gravel

Glide over sand, gravel & cobble

Habitat Section 4 – Rampart Stream

Location	R33329 05739 R34272 04562
Length	c.2km
Description	Stream 4-5 m wide. Good mix of riffle, glide & pools. Mostly heavily shaded by alder, willow, ash and sycamore. Significant areas of silt suitable as lamprey nursery
Salmonid Adult Habitat	Good
Salmonid Nursery Habitat	Good
Salmonid/Lamprey Spawning Habitat	Fair
Lamprey Nursery Habitat	Fair - Good

Shallow riffle & run

Diverse mix of riffle, run & glide over cobble

Large deep pool

Shallow riffle & glide

Riffle & glide with eroded bank on bend

Shallow riffle & glide over silt cobble & gravel

Shallow riffle and glide over sand, silt and gravel

Slow glide close to Dalua confluence

Habitat Section 5 – Dalua River

Location	R34035 04432 to R35155 04442
Length	c.2km
Description	River 15 – 18m wide. Good mix of riffles over cobble, large rocks and gravel with moderate siltation, and glides ranging from fast shallow glides to deep slow glides. Good bankside cover of mature ash, alder and willow along much of the section, with sections with pasture extending to the river bank. Some sections of significantly eroding river bank.
Salmonid Adult Habitat	Good
Salmonid Nursery Habitat	Good
Salmonid/Lamprey Spawning Habitat	Fair
Lamprey Nursery Habitat	Poor – Fair

Shallow riffle & glide over cobble & gravel

Well developed bankside cover of mature ash, alder and willow

Shallow Glide

Deep Glide

Section of reinforced bank

Riffle & Glide

Shallow glide

Severely eroding river bank

Habitat Section 6 – Dalua River

Location	R35155 04442 to R37194 03821
Length	c.3km
Description	River in spate and turbid, visibility of substrates poor at time of assessment. Mostly rapid run and riffle with some fast glide. Cobble and larger rock substrate dominant where substrates visible. Bank cover of alder, willow and ash scattered in lower part of section, but good cover on both banks in upper part of section
Salmonid Adult Habitat	Good – Very Good*
Salmonid Nursery Habitat	Good*
Salmonid/Lamprey Spawning Habitat	Good*
Lamprey Nursery Habitat	Fair*

*Rating tentative due to poor visibility of substrates

Cascade possibly over bedrock

Spate run over large rocks

Deep glide

Riffle over cobble

Turbid run in spate

Riffle & glide

Biological Water Quality

Locations of biological water quality assessment sites are shown on Figures 5.2.3 & 5.2.4.

SITE M1 - Mill Stream upstream of Newmarket Co-Operative Creameries Ltd Facility

The invertebrate community at this site merits a Q-rating of Q3-4 indicating slightly polluted conditions and moderate ecological quality.

Table 5.2.8: Biological Water Quality at M1 – Mill Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Protonemura sp.*	1
	Ecdyonurus sp.	5
	Heptagenia sp.	2
	Rhithrogena sp.	8
	Heptageniidae (small/damaged)	1
Group B - Moderately Pollution Sensitive	*Agapetus sp.*	2
Group C - Moderately Pollution Tolerant	*Ancylus sp.*	3
	Potamopyrgus antipodarum	c.1000
	Gammarus duebeni	c.500
	Baetis rhodani	1
	Hydropsyche sp.	8
	Dytiscidae	1
	Elmidae	14
	Chironomidae	1
	Pediciidae	4
	Simuliidae	1
Group D - Very Pollution Tolerant	Erpobdellidae	16
	Glossiphonia sp.	5
	Lymnaea peregra	1
	Physa sp.	2
	Asellus aquaticus	2
Group E - Most Pollution Tolerant	Tubificidae	4
Not assigned to an indicator group	Lumbricidae	2
	Lumbriculidae	3

SITE M2 - Mill Stream downstream of Newmarket Co-Operative Creameries Ltd Facility

The invertebrate community at this site merits a Q-rating of Q2-3 indicating moderately polluted conditions and poor ecological quality.

Table 5.2.9: Biological Water Quality at M2 – Mill Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	None recorded	
Group B - Moderately Pollution Sensitive	*Agapetus sp.*	1
	Sericostoma sp.	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	1
	Potamopyrgus antipodarum	c.5000
	Gammarus duebeni	8
	Hydropsyche sp.	6
	Dytiscidae	1
	Chironomidae	6
Group D - Very Pollution Tolerant	Erpobdellidae	8
	Lymnaea peregra	25
	Asellus aquaticus	c.2000
Group E - Most Pollution Tolerant	*Chironomus sp.*	19
	Tubificidae	17

SITE R1 - Rampart Stream Upstream of Mill Stream Confluence

The invertebrate community at this site merits a Q-rating of Q4 indicating unpolluted conditions and good ecological quality, with no significant change since October 2014.

Table 5.2.10: Biological Water Quality at R1 – Rampart Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Isoperla grammatica*	2
	Ecdyonurus sp.	11
	Rhithrogena sp.	44
	Heptageniidae (small/damaged)	1
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	24
	Baetis muticus	6
	Glossosoma sp.	4
	Limnephilidae	3
	Odontocerum albicorne	1
	Sericostoma personatum	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	4
	Potamopyrgus antipodarum	4
	Gammarus duebeni	30
	Baetis rhodani	35
	Serratella ignita	84
	Hydropsyche sp.	25
	Rhectrocnemia sp.	1
	Polycentropus sp.	9
	Rhyacophila sp.	9
	Velia sp.	1
	Dytiscidae	1
	Elmidae	30
	Hydraena sp.	1
	Chironomidae	27
	Pediciidae	1
	Simuliidae	14
Group D - Very Pollution Tolerant	Erpobdellidae	9
	Lymnaea peregra	1
Group E - Most Pollution Tolerant	Tubificidae	1

SITE R2 - Rampart Stream Downstream of Mill Stream Confluence

The invertebrate community at this site merits a Q-rating of Q3 indicating moderately polluted conditions and poor ecological quality, an improvement compared with Q2-3 in October 2014.

Table 5.2.11: Biological Water Quality at R2 – Rampart Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Rhithrogena sp.*	1
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	3
	Limnephilidae	3
	Odontocerum albicorne	1
	Sericostoma personatum	1
Group C - Moderately Pollution Tolerant	*Potamopyrgus antipodarum*	1
	Gammarus duebeni	16
	Serratella ignita	12
	Hydropsyche sp.	3
	Polycentropus sp.	2
	Rhyacophila sp.	59
	Velia sp.	1
	Dytiscidae	1
	Elmidae	8
	Hydraena sp.	1
	Ceratopogonidae	4
	Chironomidae	77
	Pediciidae	1
	Simuliidae	38
Group D - Very Pollution Tolerant	Erpobdellidae	4
	Helobdella stagnalis	1
	Lymnaea peregra	1
	Asellus aquaticus	9
Group E - Most Pollution Tolerant	Tubificidae	3
Not assigned to an indicator group	Enchytraeidae	1
	Lumbricidae	1
	Naididae	1

SITE R3 - Rampart Stream

The invertebrate community at this site merits a Q-rating of Q3 indicating moderately polluted conditions and poor ecological quality.

Table 5.2.12: Biological Water Quality at R3 – Rampart Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	None recorded	
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	4
	Sericostoma sp.	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	1
	Potamopyrgus antipodarum	5
	Gammarus duebeni	2
	Baetis rhodani	8
	Serratella ignita	1
	Hydropsyche sp.	68
	Polycentropus sp.	7
	Rhyacophila sp.	38
	Tinodes waeneri	1
	Ceratopogonidae	2
	Chironomidae	103
	Simuliidae	65
	Dytiscidae	1
	Elmidae	1
Group D - Very Pollution Tolerant	Erpobdellidae	5
	Glossiphonia complanata	3
	Lymnaea peregra	6
	Asellus aquaticus	34
Group E - Most Pollution Tolerant	None recorded	
Not assigned to an indicator group	Enchytraeidae	1
	Lumbriculidae	1

SITE R4 - Rampart Stream

The invertebrate community at this site merits a Q-rating of Q3 indicating moderately polluted conditions and poor ecological quality.

Table 5.2.13: Biological Water Quality at R4 – Rampart Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Protonemura sp.*	1
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	6
	Limnephilidae	1
	Sericostoma sp.	1
	Silo sp.	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	5
	Potamopyrgus antipodarum	c.400
	Gammarus duebeni	4
	Serratella ignita	2
	Hydropsyche sp.	2
	Polycentropus sp.	5
	Rhyacophila sp.	9
	Ceratopogonidae	2
	Chironomidae	99
	Dixidae	1
	Dytiscidae	2
	Elmidae	28
Group D - Very Pollution Tolerant	Erpobdellidae	10
Group E - Most Pollution Tolerant	Tubificidae	6
Not assigned to an indicator group	Naididae	1

SITE R5 - Rampart Stream

The invertebrate community at this site merits a Q-rating of Q3 indicating moderately polluted conditions and poor ecological quality.

Table 5.2.14: Biological Water Quality at R5 – Rampart Stream

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	None recorded	
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	23
	Glossosomatidae	2
	Limnephilidae	2
	Sericostoma sp.	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	1
	Potamopyrgus antipodarum	c.800
	Gammarus duebeni	46
	Hydracarina	2
	Serratella ignita	6
	Hydropsyche sp.	3
	Polycentropus sp.	33
	Rhyacophila sp.	3
	Ceratopogonidae	4
	Chironomidae	14
	Pediciidae	9
	Simuliidae	1
	Dytiscidae	6
	Elmidae	14
Group D - Very Pollution Tolerant	*Glossiphonia complanata*	8
Group E - Most Pollution Tolerant	Tubificidae	13

SITE D1 - Dalua River Upstream of Rampart Stream Confluence

The invertebrate community at this site merits a Q-rating of Q4 indicating unpolluted conditions and good ecological quality.

Table 5.2.15: Biological Water Quality at D1 – Dalua River

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Perla bipunctata*	17
	Ecdyonurus sp.	9
Group B - Moderately Pollution Sensitive	*Sericostoma sp.*	2
Group C - Moderately Pollution Tolerant	*Ancylus fluviatilis*	1
	Gammarus duebeni	10
	Hydracarina	1
	Hydropsyche sp.	168
	Polycentropus sp.	1
	Rhyacophila sp.	13
	Chironomidae	3
Group D - Very Pollution Tolerant	*Asellus aquaticus*	1
Group E - Most Pollution Tolerant	None recorded	
Not assigned to an indicator group	Naididae	1

SITE D2 - Dalua River Downstream of Rampart Stream Confluence

The invertebrate community at this site merits a Q-rating of Q4 indicating unpolluted conditions and good ecological quality.

Table 5.2.16: Biological Water Quality at D2 – Dalua River

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Perla bipunctata*	17
	Protonemura sp.	3
	Ecdyonurus sp.	7
Group B - Moderately Pollution Sensitive	Goeridae	1
	Sericostoma sp.	1
Group C - Moderately Pollution Tolerant	*Potamopyrgus antipodarum*	1
	Gammarus duebeni	18
	Baetis rhodani	10
	Hydropsyche sp.	103
	Polycentropus sp.	6
	Rhyacophila sp.	19
	Elmidae	8
	Hydraena sp.	1
	Chironomidae	5
	Pediciidae	1
Group D - Very Pollution Tolerant	Erpobdellidae	3
Group E - Most Pollution Tolerant	None recorded	
Not assigned to an indicator group	Ceratopogonidae	1

SITE D3 - Dalua River

The invertebrate community at this site merits a Q-rating of Q4-5 indicating unpolluted conditions and high ecological quality.

Table 5.2.17: Biological Water Quality at D3 – Dalua River

Indicator Group	Taxon	Numbers
Group A - Very Pollution Sensitive	*Perla bipunctata*	4
	Protonemura sp.	1
	Ecdyonurus sp.	24
	Heptagenia sp.	1
	Heptageniidae (small/damaged)	11
	Rhithrogena sp.	25
Group B - Moderately Pollution Sensitive	*Leuctra sp.*	3
	Glossosoma sp.	6
	Limnephilidae	1
	Sericostoma personatum	1
Group C - Moderately Pollution Tolerant	*Potamopyrgus antipodarum*	1
	Baetis rhodani	28
	Hydropsyche sp.	14
	Rhyacophila sp.	3
	Chironomidae	4
	Pediciidae	2
	Elmidae	11
	Hydraena sp.	1
Group D - Very Pollution Tolerant	Erpobdellidae	3
Group E - Most Pollution Tolerant	None recorded	

Summary of Biological Water Quality Data 2014 & 2015

Table 5.2.18: Summary of Biological Water Quality Data 2014 & 2015

	Site	October 2014	July 2015	September 2015	November 2015
Mill Race upstream of Newmarket Co-Operative Creameries Ltd	**M1**	Q3-4 (Fair)	-	-	-
Mill Race downstream of Newmarket Co-Operative Creameries Ltd	**M2**	Q2-3 (Poor)	-	-	-
Rampart Stream upstream of Newmarket	**R1**	Q4 (Good)	Q4 (Good)	-	-
Rampart Stream downstream of Newmarket	**R2**	Q2-3 (Poor)	Q3 (Poor)	-	-
	R3	-	-	Q3 (Poor)	-
	R4	-	-	Q3 (Poor)	-
	R5	-	-	Q3 (Poor)	-
Dalua River proposed discharge location	**D1**	-	-	Q4 (Good)	-
Dalua River downstream of proposed discharge location	**D2**	-	-	Q4 (Good)	-
Dalua River c.2km downstream of proposed discharge location	**D3**	-	-	-	Q4-5 (High)

Fish Survey

Full fish assessment data are presented in Appendix 5.2.3 and salmonid catch per unit effort, minimum density and length frequency distribution graphs are presented in Appendix 5.2.4.

Table 5.2.19: Summary of Fish Catch at Sites on the Rampart Stream

Site	0+ Trout	1+ Trout	2+ Trout	0+ Salmon	1+ Salmon	Eel	Stone Loach	3-Spined Stickleback
A	73	1	0	2	1	1	0	0
B	42	7	0	5	1	1	0	1
C	37	8	2	6	1	1	0	0
D	10	15	1	14	5	0	0	0
E	25	11	4	24	2	0	0	0
F	18	8	3	32	4	0	1	0

Table 5.2.20 Summary of Salmonid Catch per Unit Effort at Sites on the Rampart Stream

Site	0+ Trout	1+ Trout	2+ Trout	0+ Salmon	1+ Salmon
A	19.2	0.3	0.0	0.5	0.3
B	9.5	1.6	0.0	1.1	0.2
C	8.4	1.8	0.5	1.4	0.2
D	2.8	4.2	0.3	3.9	1.4
E	5.0	2.2	0.8	4.8	0.4
F	4.5	2.0	0.8	8.0	1.0

To calculate catch per unit effort, the catch figures and fishing time are combined to calculate the theoretical catch per 5 minutes fishing.

Table 5.2.21 Summary of Minimum Density of Fish Species at Sites on the Rampart Stream

Site	Juvenile Trout	Adult Trout	Juvenile Salmon	Eel	Stone Loach	3-Spined Stickleback
A	0.123	0.000	0.005	0.002	0.000	0.000
B	0.251	0.000	0.031	0.005	0.000	0.005
C	0.129	0.006	0.020	0.003	0.000	0.000
D	0.078	0.003	0.059	0.000	0.000	0.000
E	0.096	0.011	0.069	0.000	0.000	0.000
F	0.052	0.006	0.072	0.000	0.002	0.000

Minimum density/m², based on a single electrofishing pass; actual densities may be more than double these figures.

Summary of baseline assessment findings of particular relevance to the Blackwater River (Cork / Waterford) SAC

1. Juvenile salmon were recorded at all of the six sites assessed on the Rampart Stream, including the site immediately upstream of Newmarket. The density of juvenile salmon progressively increased between Newmarket and the Dalua confluence. (Salmon are a qualifying interest of the Blackwater River SAC into which the Rampart Stream flows);

2. The results of the surveys indicate that the Rampart Stream is a significant spawning and nursery area for both trout and salmon in the context of the Dalua/Allow system. If measures were taken to improve the water quality of the Rampart Stream downstream of Newmarket, and to reduce the silt load to the river, the quality of the stream as a salmonid nursery and spawning area would be likely to significantly increase;

3. In 2014 & 2015 biological water quality in the Rampart Stream was found to be good immediately upstream of Newmarket and poor downstream of the town;

4. In 2015 poor biological water quality was recorded in the Rampart Stream from Newmarket as far downstream as the confluence with the Dalua River;

5. The poor water quality recorded (Q3) indicates that the water quality of the Rampart Stream downstream of Newmarket is likely to be borderline for the survival of salmonid fish (trout & salmon);

6. The Dalua River has good ecological status upstream and downstream of its confluence with the Rampart Stream. The biological water quality status of the river was found to be high c.2km downstream of the proposed discharge location in November 2015;

7. The 2km section of the Dalua downstream of the Rampart Stream confluence was found to have good adult and nursery habitat for salmon and fair salmonid and lamprey spawning habitat. Lamprey nursery habitat was classified as poor-fair. Lamprey and salmon are Annex II qualifying interests of the Blackwater SAC of which the Dalua River forms a part.

5.2.5 Potential Impacts

5.2.5.1 Description of Proposed Development

Waste Water Treatment Plant Upgrade

The proposed WWTP development includes an Extended Aeration Activated Sludge Plant complete with anaerobic zone and anoxic zones for biological phosphorous and nitrogen removal and aeration zone for Biochemical Oxygen Demand (BOD) removal. The footprint of the proposed WWTP upgrade incorporating all elements and upgrades will be approximately 2,838 m²(0. 28ha).This will add to the footprint of the existing WWTP which is approximately 7,100 m² (0.710 ha). The scale of proposed development is small in comparison with the footprint for the overall Newmarket Co-op facility site which is approximately 10 ha.

The proposed development aims to improve the efficiency of the treatment of waste water before it leaves the site via the proposed underground pipeline. Newmarket Co-op propose to upgrade the existing operational WWTP at the Newmarket facility to further improve the treatment abilities of the waste water treatment plant technologies, process controls and existing technologies.

Underground Wastewater Pipeline

Newmarket Co-op propose to install an underground pipeline to convey treated water from the WWTP at the creamery facility to a discharge point on the River Dalua, approximately 4km to the south east of the facility. The pipeline will run along the route of the R576 to minimise development impacts on the local area and private property and will avoid any sites designated for ecological, cultural heritage or other conservation purposes. The pipeline will cross the Rampart Stream at Stoneville Bridge in Newmarket and at Bridge A a short distance upstream of the confluence with the Dalua River. The pipeline will also cross a small tributary of the Rampart Stream at Park Bridge which is located on the R576 approximately 3km from Stoneville Bridge.

The Malachy Walsh & Partners Newmarket Co-op Creameries Ltd. Effluent Rising Main Design Report (**EIS Volume III Appendix 2.1**) states that at Stoneville Bridge "*the pipe will be laid in the newer section of road carriageway. There is ample cover available over the upstream side of Stoneville Bridge to allow the effluent line pass over it so that the proposed route should have no impact on the bridge*". The report also indicates that at Park Bridge the embankment and roadway were widened in the past and a new section of culvert installed. The pipeline will be constructed in the new section of bridge and will not affect the existing bridge or watercourse. At Bridge A "*the pipe will be diverted from the roadway and carried across the bridge by tying it to the parapet of the downstream side. It will follow the line of the arch to ensure it does not affect the existing flows through the stream. It will then be re-diverted back to the roadway…*"

The proposed discharge outfall is at Allen's Bridge. Malachy Walsh & Partners Newmarket Co-op Creameries Ltd. Effluent Rising Main Design Report (**EIS Volume III Appendix 2.1**) states: "*The ductile iron pipe will be turned through the bridge wall and then vertically downwards to discharge into the Dalua at the eastern arch. The*

pipe will be anchored to the side of the bridge allowing the effluent to discharge directly into the river."

Increase in the Milk Processing at the Facility

Newmarket Co-op intends to apply for planning permission to increase its annual production up to its maximum installed processing of 35,000 tonnes of cheese per annum, which is a milk equivalent of approximately 75-80 million gallons. It is proposed to increase processing on site from 6 to 7 days per week.

5.2.5.2 An Assessment of the Potential Aquatic Environmental Impact of the Proposed Development during the Period of Construction

Pollution of Streams/Rivers with Suspended Solids

In the absence of adequate mitigation any element of the proposed construction which involves excavation or placement of excavated materials has potential for suspended solids contamination of surface waters.

- Suspended sediment due to runoff of soil from construction areas~~, or due to disturbance of fine sub-surface sediments in the course of instream construction and excavation,~~ can have severe negative impacts on invertebrate and plant life and on all life stages of salmonid fish;

- Suspended sediment can settle on spawning areas, infill the intragravel voids and smother the eggs and alevins (newly hatched fish) in the gravel;

- Bed Load (coarse material transported along the bottom of the stream) and settled sediments can infill pools and riffles, reducing the availability and quality of rearing habitat for fish;

- Suspended sediment can reduce water clarity and visibility in the stream, impairing the ability of fish to find food items;

- Settled sediments can smother and displace aquatic organisms such as macroinvertebrates, reducing the amount of food items available to fish;

- Increased levels of sediment can displace fish out of prime habitat into less suitable areas (Chilibeck et al 1992);

- Suspended solids can abrade or clog the gills of salmonid fish. It takes a high concentration of solid wastes to clog a fish gill and cause asphyxiation, but only a little to cause abrasions and thus permit the possibility of infections (Solbe 1988);

- Silt has been identified in the scientific literature as a serious threat to Margaritifera; the I.U.C.N. Red Data Book states that in the U.K. Margaritifera is 'threatened by siltation' and in North America 'accelerated siltation from land development could endanger them in future' (Wells et al 1983); Valovirta (1989) cites increase in the silt load of rivers as a reason for the decline of Margaritifera in Finland. Hendelberg (1960) and Young and Williams (1983) also implicate silt in damaging or eliminating Margaritifera

populations. As juvenile Margaritifera are fully buried in the sand and gravel of the river bed they are more vulnerable to siltation. 'Any siltation of the river bed results in a rapid decrease in the oxygen content of the interstitial water and death of the juveniles living there.' (Buddensiek et al 1993).

Pollution of Watercourses with Nutrients due to Ground Disturbance during Construction

The main potential sources of nutrient inputs to freshwater due to ground disturbance are nutrients adsorbed or chemically bound to eroded suspended solids.

Several studies in the United States have found increases in both nitrogen and phosphorus export into streams following ground disturbance, particularly in association with organic particles (Golladay & Webster 1988; Likens et al 1970). Busman *et al* (2002) found that "*phosphorus in soils is almost entirely associated with soil particles. When soil particles are carried to a river or lake, phosphorus will be contained in this sediment. … Phosphate in soils is associated more with fine particles than coarse particles. When soil erosion occurs, more fine particles are removed than coarse particles, causing sediment leaving a soil through erosion to be enriched in phosphorus*". It is therefore concluded that in the context of the proposed development the main potential source of nutrient enrichment of surface waters due to soil disturbance will be nutrients associated with eroded soil particles.

Pollution of Streams/Rivers with Other Substances Associated with the Construction Process

The potential exists for a range of serious pollutants to enter watercourses during construction. For example any of the following will have deleterious effects on fish, plants and invertebrates if allowed to enter watercourses:

- Raw or uncured concrete and grouts;
- Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks;
- Fuels, lubricants and hydraulic fluids from equipment used on the development site and the pipeline laying route.

Introduction or Spread of Invasive Non-Native Aquatic Species during Construction

The potential exists for invasive non-native species to be brought onto the construction site on machinery, tools and soil, or for invasive species already present on site to be transported to new locations. When a non-native species displays invasive qualities and is not managed it can potentially:

- Out-compete native vegetation, affecting plant community structure and habitat for wildlife;
- Cause damage to infrastructure including road carriageways, footpaths, walls and foundations;

- Result in soil erosion and collapse of river banks through exposure of the soil during winter when plants die back;

- Have an adverse effect on landscape quality through a loss of naturalness, aesthetics and regional identity.

(NRA 2010)

Permanent Loss of Habitat due to Bank/Stream Alteration

Loss of natural riparian vegetation, particularly native trees has a significant negative impact on the ecological quality of rivers by:

- Decreasing plant, invertebrate and bird biodiversity;

- Removing an important breeding area for insects, resulting in a reduction in insects which are an important food source for fish;

- Removing vital habitat for many species of wildfowl and mammals such as otters;

- Reducing the protective function of natural riparian habitat which intercepts nutrient and suspended solids runoff from surrounding land, and anchors the bankside soils, protecting them from erosion, particularly during high winter water levels;

- Any removal of riparian habitat may result in significant pollution with suspended solids as a result of machinery activity and earth movement.

5.2.5.3 An Assessment of the Potential Operational Aquatic Environmental Impact of the Proposed Development

Pollution of Streams/Rivers with Surface Runoff from Completed Development

The main pollutants of concern are petrochemicals, which includes petrol, fuel oils, and lubricating oils which may be stored or leaked from vehicles. In unmodified form these are liquid, virtually insoluble and lighter than water. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence (Luker & Montague 1994).

EIFAC (Svobodova *et al* 1993) states that "*a sensory assessment is preferred to toxicological analysis in determining the highest admissible amounts of oil and oil products that can be present in water; on this basis the highest admissible concentrations are in the range of 0.002 to 0.025 mg per litre*".
Harmful effects include:

- The prevention of gaseous exchange at the water surface, leading to reduced dissolved oxygen in the underlying water (Solbe 1988);

- In the case of turbulent waters the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically

contaminated and their respiratory capacity reduced (Svobodova et al 1993);

- Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate into the fish and can have a direct toxic effect. It is generally agreed that the lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars) reduced. (Svobodova et al 1993).

Organic Pollution

The organic components of the wastewater from dairy processing operations can be classified as proteins, lactose and fat. These will affect the environment in different ways depending on their biodegradability and their solubility. Most of the organic components in dairy processing wastewater are highly biodegradable. In waterways, bacteria will consume the organic components of the waste (http://nzic.org.nz/ChemProcesses/dairy/3J.pdf). Following the introduction of untreated or poorly treated dairy effluent to a river, conditions of existence for many organisms become substantially degraded. Increased turbidity in the water will reduce light penetration, which in turn will reduce the volume of water capable of supporting photosynthesizing plants. Particulate matter in settling will flocculate small floating plants and animals from the water. Within the zone of active decomposition the breakdown of organic products by bacteria may consume all available dissolved oxygen, resulting in the river becoming uninhabitable by fish and many other aquatic species. When organic materials are decomposed, a seemingly inexhaustible food supply is liberated for those particular organisms that are adapted to use this food source, and to surviving in the associated low oxygen and high ammonia conditions. Thus, highly pollution tolerant invertebrate groups may be present at extremely high densities.

Low molecular weight organic compounds promote the growth of certain filamentous slimes in waterways. These bacterial colonies are collectively known as sewage fungus. The most common bacterial species in this category is *Sphaerotilus natans*. One of the major constituents of dairy factory wastewaters is lactose, a low molecular weight sugar that is known to promote sewage fungus growth.

Nitrogen is a very important component of dairy factory wastewaters. Some protein will be lost to the waste streams. Bacteria convert the nitrogen in proteins to inorganic forms including ammonia, and ammonium, nitrite and nitrate ions. Each of these inorganic forms of nitrogen have different environmental effects.

Eutrophication: Phosphorus

The most serious threat to water quality of lakes and rivers in Ireland is eutrophication, defined as the enrichment of waters, beyond natural levels, principally by the nutrient phosphorus. This enrichment commonly results in excessive production of cyanobacteria (formerly referred to as blue-green algae), planktonic algae and rooted plants in such waters. Eutrophication of aquatic ecosystems also results in loss of biodiversity and degradation of aquatic habitats of high ecological quality (EPA 1997).

Standards for Phosphorus, Dissolved Oxygen, Biochemical Oxygen Demand, and biological water quality are laid down in the European Communities Environmental Objectives (Surface Waters) Regulations 2009.

Potential pre-mitigation impacts on freshwater aquatic qualifying interests of Natura 2000 site

The freshwater aquatic qualifying interests of the Natura 2000 site considered to be within the potential zone of influence of the proposed development are Brook Lamprey, River Lamprey, Sea Lamprey and Atlantic Salmon. European Commission Guidance states that '*The decision as to whether it (the European Site) is adversely affected should focus on and be limited to the site's conservation objectives*'. The potential pre-mitigation effects of the proposed development on each of the conservation objectives for each of the potentially affected qualifying interests are addressed below.

Atlantic Salmon

The assimilative capacity of the Dalua River has been calculated based on (1) background chemical and biological monitoring data for the Dalua River in the vicinity of the proposed discharge and (2) the requirement for good biological and chemical status as set out in the SAC's Conservation Objectives and in the Environmental Objectives (Surface Waters) Regulations (2009).

At the proposed Emission Limit Values (ELVs) the proposed discharge will utilise 33%, 47%, 66% and 71% respectively of the available assimilative capacity for BOD, Ammonia, Orthophosphate and Nitrate at 95%ile low flow conditions in the Dalua River. It is noted that the predicted contribution of suspended solids from the discharge is 0.24mg/l which represents less than 5% of the 25mg/l standard as set out in the Quality of Salmonid Regulations (OES Consulting, 2015).

The predicted downstream concentrations in the Dalua River are based on a worst case scenario, as it is unlikely that the facility's discharge emission quality and volumetric emission would be at the maximum proposed values whilst the River Dalua is at its 95%ile flow condition.

The conservation objectives of the Blackwater (Cork/Waterford) River SAC (i.e. the Dalua River, the River Allow and the Munster Blackwater) include 6 specific targets which must be achieved for salmon to achieve/retain favourable conservation status. The impact of the proposed development on each of these targets is addressed in the Natura Impact Statement (**See Appendix 5.2.5 of Volume II of the EIS**).

It is concluded that there will be no potential water quality mediated impacts from the proposed discharge at the proposed Emission Limit Values. This conclusion is based on the following:

- Favourable water quality conditions for these species equates to the biological and chemical standards which define "good" status in the Surface Water Regulations (2009).

- Biological water quality in the Dalua 2km downstream of the proposed discharge location was "high" (Q4-5) in November 2015, indicating biological water quality significantly better than those required under the regulations.

- At the proposed Emission Limit Values (ELVs) the proposed discharge will utilise 33%, 47%, 66% and 71% respectively of the available assimilative capacity for BOD, Ammonia, Orthophosphate and Nitrate at 95%ile low flow conditions in the Dalua River. It is noted that the predicted contribution of suspended solids from the discharge is 0.24mg/l which represents less than 5% of the 25mg/l standard as set out in the Quality of Salmonid Regulations (OES Consulting, 2015). The predicted downstream concentrations in the Dalua River are based on a worst case scenario, as it is unlikely that the facility's discharge emission quality and volumetric emission would be at the maximum proposed values whilst the River Dalua is at its 95%ile flow condition.

- EPA biological monitoring of the Allow upstream of Kanturk consistently records high biological status (in compliance with the standard set in the Freshwater Pearl Mussel Regulations (2009) which apply to the River Allow upstream of Kanturk). As the standard required in both the River Allow downstream of Kanturk and the main channel of the river Blackwater is Good rather than High, an additional assimilative capacity is thereby made available at Kanturk as a result of the lower standard which applies downstream of the town. The biological data, and the surplus chemical assimilation capacity which will exist downstream of the proposed discharge, indicate a considerable assimilative capacity in the Dalua River and in the Allow at the confluence of the Allow and Dalua. Using the Freshwater Pearl Mussel Regulations (2009) as the standard to be achieved, at the proposed Emission Limit Values for Ammonia, Orthophosphate and BOD the proposed discharge will use only 5.41%, 7.24% and 3.88% of the available assimilative capacity in the River Blackwater at the 95%ile flow condition respectively (OES Consulting 2015). (The percentage of the assimilative capacity utilised will be considerably less based on the Good status which now applies, rather than High standard which previously applied in the main channel of the Blackwater.)

Salmon are anadromous migratory fish. Adult fish migrate from the sea to river/stream spawning areas, where the young fish live out their juvenile life stages before migrating as adults to the sea. As part of the present assessment, juvenile salmon were recorded at all six sites assessed on the Rampart Stream. Whereas the Rampart Stream is not within the SAC, the salmon population in this stream is an integral part of the SAC salmon population, and salmon spawned in the Rampart Stream spend parts of their life cycle within the SAC. Any impact on salmon in the Rampart Stream is therefore treated as an *ex situ* impact on the Salmon which are a qualifying interest of the SAC.

At the proposed Emission Limit Values (ELVs) the proposed discharge will have no adverse impact on salmon in the Dalua River or further downstream.

The proposed development could have a potential adverse pre-mitigation impact on salmon in the Rampart Stream and in the Dalua River mediated largely by construction generated pollution impacts on spawning success and survival of juvenile salmon.

An important finding of the EIS/NIS is that the c.4.75km of the Rampart Stream between Newmarket and the Dalua confluence is a significant spawning and nursery area for both trout and salmon in the context of the Dalua/Allow system. Juvenile salmon were recorded at all of the six sites assessed on the Rampart Stream, including the site immediately upstream of Newmarket. The density of juvenile salmon progressively increased between Newmarket and the Dalua confluence. The poor water quality recorded (Q3) in this section of the Rampart Stream indicates that the water quality of the Rampart Stream downstream of Newmarket is likely to be borderline for the survival of salmonid fish (trout & salmon). It is expected that the proposed development will have a significant positive *ex situ* impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream, which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.

~~The conservation objectives of the Blackwater (Cork/Waterford) River SAC include 6 specific targets which must be achieved for salmon to achieve/retain favourable conservation status. The impact of the proposed development on each of these targets is addressed in the Natura Impact Statement (**See Appendix 5.2.5 of Volume II of the EIS**).~~

Brook Lamprey, River Lamprey & Sea Lamprey

As at the proposed Emission Limit Values (ELVs) the proposed discharge will not compromise the continued achievement in the receiving waters of the standards set out in the Environmental Objectives (Surface Waters) Regulations (2009), there will be no adverse impact on any of the three lamprey species.

The proposed development could have a potential adverse pre-mitigation impact primarily via siltation of spawning areas due to construction related suspended solids.

The conservation objectives of the Blackwater (Cork/Waterford) River SAC include 5 specific targets which must be achieved for each of the qualifying interest lamprey species to achieve/retain favourable conservation status. The impact of the proposed development on each of these targets is addressed in the Natura Impact Statement (See **Appendix 5.2.5**, **Volume II: Appendices** of the EIS).

<u>Potential pre-mitigation impacts on Freshwater Habitats Directive Annex II species which are not qualifying interests of a Natura 2000 site</u>

Freshwater Pearl Mussel

The Department of Arts, Heritage and the Gaeltacht letter of 8 February 2016 (See **Appendix 5.2.6, EIS Volume II: Appendices**) indicates that the Conservation Objectives regarding Freshwater Pearl Mussel no longer apply to the main channel of the Blackwater River. Nevertheless as Freshwater Pearl Mussel occur in the main channel of the River Blackwater downstream of the proposed development, the

assimilative capacity of the River Blackwater at its confluence with the Allow River has been calculated based on (1) background chemical and biological monitoring data for the Blackwater River in the vicinity of its confluence with the Allow River and (2) the standards set out in the Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009). Whereas these standards apparently do not now legally apply to the main channel of the River Blackwater, freshwater pearl mussel are a protected species under the Wildlife Act, 1976 (Protection of Wild Animals) Regulations, 1990. The freshwater pearl mussel is also on the IUCN Red Data List as Endangered (IUCN 1996) and Red Data (Ireland) as Critically Endangered (Byrne et al. 2009).

Using the Freshwater Pearl Mussel Regulations (2009) as the standard to be achieved, at the proposed Emission Limit Values for Ammonia, Orthophosphate and BOD the proposed discharge will use only 5.41%, 7.24% and 3.88% of the available assimilative capacity in the River Blackwater at the 95%ile flow condition respectively (OES Consulting 2015).

The predicted downstream concentrations in the Blackwater are based on a worst case scenario, as it is unlikely that the facility's discharge emission quality and volumetric emission would be at the maximum proposed values whilst the River Dalua is at its 95%ile low flow condition.

At the proposed Emission Limit Values (ELVs) the standards set out in the Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009) will continue to be achieved in the River Blackwater downstream of the proposed discharge.

With the implementation of best practice mitigation to prevent construction generated pollution (see Section 5.2.6.1 below) there will be no significant potential impact on freshwater pearl mussels in the Blackwater >12km downstream.

Predicted Impacts of the Proposed Discharge on Water Quality and Ecological Receptors in the River Allow

Ecological & Fishery value of the River Allow is described in section 5.2.4.1 above.

It is noted that the following qualifying interest Annex II species are present in the River Allow:

- Sea lamprey;
- River lamprey;
- Brook Lamprey ;
- Atlantic Salmon, and
- Freshwater Pearl Mussel

It is however noted that Freshwater Pearl Mussels are not found in the River Allow downstream of the Dalua confluence. The letter from NPWS of 4/12/15 states that the conservation target to maintain the distribution of freshwater pearl mussel, and to restore suitable habitat for this species, does not apply to the stretch of the Allow between the confluence of the Dalua and the confluence of the Allow with the Blackwater. NPWS notes "*the draft Allow River sub-basin management plan refers to a comprehensive survey of this section of the river (which) found no mussels and recorded very poor habitat conditions*."

Subsequent to the letter of 4/12/15, the NPWS letter of 8/2/16 stated: "*The conservation objective relating to freshwater pearl mussel in the Blackwater River (Cork/Waterford) candidate Special Area of Conservation (cSAC) (2170) will be changed, and will no longer relate to the main channel of the Munster Blackwater River. … As a consequence, the advice in the Department's letter of 4 December 2015, concerning the main channel of the Munster Blackwater under the heading 'Effects on freshwater pearl mussel', no longer applies.*"

It is therefore evident that the Freshwater Pearl Mussel Regulations (2009) will not in future apply to any waters downstream of the proposed discharge.

The aquatic qualifying interest Annex II species present in the section of the River Allow potentially affected by the propose discharge are:

- Sea lamprey;
- River lamprey;
- Brook Lamprey, and
- Atlantic Salmon.

In the NIS the potential impact of the proposed discharge on the qualifying interest Annex II species (i.e. Atlantic Salmon and the three species of Lamprey) in the River Allow are examined in detail in Sections 3.2.3.1, 3.2.3.3, 3.2.3.4 & 3.2.3.5. It is concluded that there will be no potential water quality mediated impacts from the proposed discharge at the proposed Emission Limit Values. This conclusion is based on the following:

- Favourable water quality conditions for these species equates to the biological and chemical standards which define "good" status in the Surface Water Regulations (2009).

- Biological water quality in the Dalua 2km downstream of the proposed discharge location was "high" (Q4-5) in November 2015, indicating biological water quality significantly better than required under the regulations.

- At the proposed Emission Limit Values (ELVs) the proposed discharge will utilise 33%, 47%, 66% and 71% respectively of the available assimilative capacity for BOD, Ammonia, Orthophosphate and Nitrate at 95%ile low flow conditions in the Dalua River. It is noted that the predicted contribution of suspended solids from the discharge is 0.24mg/l which represents less than 5% of the 25mg/l standard as set out in the Quality of Salmonid Waters Regulations (OES Consulting, 2015). The predicted downstream concentrations in the Dalua River are based on a worst case scenario, as it is unlikely that the facility's discharge emission quality and volumetric emission would be at the maximum proposed values whilst the River Dalua is at its 95%ile flow condition.

- As the Dalua downstream of the proposed discharge will remain well within the limits of the Surface Water Regulations (2009) it follows that the Dalua could not and will not cause a breach of these limits in the Allow River

downstream of the Dalua/ Allow confluence. For example it is not possible for a river with a mean orthophosphate concentration of less than 0.035mg/l (i.e. Good status) to elevate the orthophosphate concentration in the receiving river to a mean concentration of greater than 0.035mg/l.

- EPA biological monitoring of the Allow upstream of Kanturk consistently records high biological status (in compliance with the standard set in the Freshwater Pearl Mussel Regulations (2009) which apply to the River Allow upstream of Kanturk). As the standard required in both the River Allow downstream of Kanturk is Good rather than High, an additional assimilative capacity is thereby made available at Kanturk as a result of the lower standard which applies downstream of the town. The biological data, and the surplus chemical assimilation capacity which will exist downstream of the proposed discharge, indicate a considerable assimilative capacity in the Dalua River and in the Allow at the confluence of the Allow and Dalua.

5.2.6 Mitigation Measures

5.2.6.1 Mitigation of the Potential Aquatic Impact of the Proposed Development during the Period of Construction

Reduction and Prevention of Suspended Solids Pollution

- Before earthworks commence on the proposed WWTP extension (i.e. before they are needed) erosion control and sediment control measures must be in place and functioning;

- At the proposed WWTP extension works earth moving and construction activities will be avoided in the area within 10m of the bank of the Rampart Stream and the Mill Race as no development is proposed within this river corridor. This area will be fenced off prior to the commencement of works and left undisturbed for the duration of the construction process;

- Release of suspended solids to streams will be kept to a minimum by minimising erosion and preventing runoff from excavated areas. Suspended solids in runoff from construction areas to the Rampart Stream and/or the Mill Stream and/or the Park Bridge tributary of the Rampart Stream will not exceed 25mg/l. The key factors in erosion and sediment control are to intercept and manage off- and on-site runoff. This limits the potential for soils to be eroded and enter surface waters in runoff. Runoff and surface erosion control is more effective and less expensive than sediment control with sediment control ponds only. Eroded sediments will be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors will be placed towards the end of drainage channels but sufficiently well back from the receiving streams to avoid any possibility of inundation by these streams in flood conditions. Further details on drainage mitigation measures are provided in the Construction environmental Management Plan (CEMP) in Appendix 2.2;

- Temporary fills or stockpiles which are likely to erode into nearby watercourses will be covered with polyethylene sheeting;

- Runoff will be diverted away from denuded areas;

- Runoff velocities and erosive energy will be minimised by maximising the lengths of flow paths for precipitation runoff, constructing interceptor ditches and channels with low gradients to minimise secondary erosion and transport, and lining unavoidably steep interceptors or conveyance ditches with filter fabric, rock or polyethylene lining to prevent channel erosion;

- Any dewatering of open trenches etc. will be discharged to a settlement pond to remove suspended solids before being released to surface waters;

- At locations where excavated materials are stored, drains will surround and intercept surface runoff from materials mounds and distribute this water to the controlled drainage system in place;

- Works with a significant risk of suspended solids contamination of streams/rivers will not be carried out between the end of September and the end of April unless otherwise agreed with Inland Fisheries Ireland.

Reduction and Prevention of Other Construction Generated Pollution

- Raw or uncured waste concrete will be disposed of by removal from the site;

- Before release to the environment, wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks will be treated to a level which will ensure that total suspended solids in discharges to surface waters (including drains) will not exceed 25mg/l. Furthermore wash out water will not be released to the environment until it has reached a neutral pH;

- Only the chute of the concrete delivery truck will be cleaned on site, using the smallest volume of water necessary. Concrete trucks will be directed back to their batching plant for washout;

- Clearly visible signs will be placed in prominent locations close to concrete pour areas, stating that washout of concrete lorries is not permitted on the site;

- The arrangements for concrete deliveries to the site will be discussed with suppliers before commencement of work, agreeing routes, prohibiting on-site washout and discussing emergency procedures;

- So as to avoid spillage, concrete will not be transported around the site in open trailers or dumpers. All concrete used will be pumped directly into the shuttered formwork from the delivery truck;

- Concrete pours will be avoided where prolonged periods of heavy rain are forecast and covers will be available for freshly placed concrete to avoid the surface washing away in heavy rain;

- Fuels, lubricants and hydraulic fluids for equipment used on the construction site, as well as any solvents, oils, and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to codes of practice (Enterprise Ireland BPGCS005);

- Fuelling and lubrication of equipment will be carried out in a specially bunded area;

- Oil booms and oil soakage pads will be kept on site to deal with any accidental spillage;

- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the site and properly disposed of;

- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling;

- Sites for use as storage areas, machinery depots, site offices, or the disposal of spoil will be located as far as is practicable from watercourses. In general any site which is at least 50m from the nearest watercourse may be chosen. Disposal of spoil or storage of soils will not be carried out in any location where runoff can occur into watercourses.

Mitigation of Pollution of Watercourses with Nutrients due to Ground Disturbance

As much of the potential nutrient input to streams during ground disturbance is associated with suspended soil particles, the measures outlined in the above section apply equally to prevention of nutrient inputs to streams.

Mitigation of Potential Impact of Pipe Laying

In addition to the mitigation measures outlined in the above sections, the following mitigation measures will also be implemented during the pipe laying process.

- Pipe-laying activities with a high risk of suspended solids contamination of surface waters, such as laying under or close to the watercourses, will not take place between the end of September and the end of April to prevent damage to spawning and early juvenile trout;

- Operation of machinery in the immediate vicinity of watercourses will not occur as no development is proposed in such locations including river banks;

- Contamination of water with fuels, lubricants and other pollutants will be avoided;

- ~~Disturbance of bankside soils and instream sediments will be kept to the minimum required for the pipe laying process;~~

- Top infilling over the pipe at or close to watercourse crossings will be with coarse silt-free material;

- If pumping is required from excavations, the water will be directed first to a suitably constructed settlement pond or other equivalent silt removal facility before discharge to surface waters including drains, to prevent suspended solids contamination. It is important that sufficient area is available to allow for suitably sized silt removal facilities. Suspended solids in discharges to surface waters will not exceed 25mg/l;

- ~~To protect stream side hedgerows and trees from damage where the pipe is to cross or be laid in close proximity to streams, prior to construction a leave strip will be marked delimiting areas where construction activity is not necessary and which are to remain off limits and undisturbed.~~

Mitigation of Potential Impact of Outfall Construction

The proposed discharge outfall is at Allen's Bridge. Malachy Walsh & Partners Newmarket Co-op Creameries Ltd. Effluent Rising Main Design Report (EIS Volume III, Appendix 2.1) states: "*The ductile iron pipe will be turned through the bridge wall and then vertically downwards to discharge into the Dalua at the eastern arch. The pipe will be anchored to the side of the bridge allowing the effluent to discharge directly into the river*."

In addition to the mitigation measures outlined in the above sections, the following mitigation measures will also be implemented during the construction of the proposed outfall to the Dalua River.

- Works will not take place between the end of September and the end of April;

- No instream works will be carried out;

- Any necessary machinery work at Allen's Bridge will be carried out from the bank/bridge. Entry of machinery into the Dalua River will not occur;

- Care will be taken to ensure that no material is allowed to enter the river during the construction of the outfall including old masonry or stone, rubble, soil, concrete/grouts, wash-down concrete etc.

Method Statement / Environmental Operating Plan

The appointed contractor will draw up a Construction Method Statement (CMS) which includes detailed mitigation measures as outlined in the EIS. This method statement will be strictly adhered to by the contractor involved in the works. The method statement will detail how these mitigation measures will be monitored for effectiveness by the appointed contractor. There will be on-going consultation with IFI throughout all phases of the works. A mechanism for reporting of pollution

incidents will be agreed in advance between the contractor(s) and the developer. The contractor's project manager will be required to prepare a CMS which will incorporate all of the avoidance and mitigation measures and explain how each of these will be implemented. In addition, the Contractor will consult with the NPWS and IFI in relation to the final detail of the Plan and shall include their requirements in this regard.

Before earthworks commence on site, and before they are needed - erosion control and sediment control measures must be in place and functioning and must be inspected and approved by the Ecological Clerk of Works (EcOW).

Ecological Clerk of Works

An Ecological Clerk of Works (EcOW) will be employed who will make at least weekly site visits for the duration of the construction works and more frequently at start-up and during critical construction events such as concrete pours as outlined below;

- The EcOW will also be the liaison for the purposes of consulting environmental bodies including the NPWS and IFI. The EcOW will be responsible for carrying out regular audits of the Contractor's CMS on behalf of the proposed developer. In addition, the EcOW will be the primary person involved in the developer's monitoring role. The EcOW will be delegated sufficient powers under the construction contract so that he/she will be able to instruct the contractor to stop works and to direct the carrying out of emergency mitigation/clean-up operations;

- The EcOW will maintain a register indicating whether all mitigation measures have been carried out satisfactorily. This register will be signed off by the contractor's site foreman.

Separate from the on-going daily monitoring carried out by the contractor's project manager as part of the CMS, the EcOW shall carry out weekly inspections of the monitoring regime described below on behalf of the employer. The results will be stored in the EcOW's monitoring file and will be available for inspection/ audit by the Client, NPWS or IFI staff. The main elements of the inspection/ monitoring regime are as follows:

- Inspection of surface water treatment measures by the EcOW (silt fencing, ponds, sandbags, etc.) to ensure monitoring undertaken by the contractor on a daily basis is consistent with the CMS and onsite conditions;

- Visual inspection of the watercourses by the EcOW in proximity to the works to ensure daily inspections undertaken by the contractor are in line with site conditions;

- Wheel wash facilities shall be inspected on a weekly basis by the EcOW;

- Stockpiles shall be monitored by the contractor's project manager on a daily basis while being filled or emptied and otherwise on a weekly basis;

- Control measures for works at or near water bodies shall be inspected on a daily basis by the contractor's project manager and by the EcOW when necessary;

- Concrete operations at or near watercourses shall be supervised and designated chute washing out facilities shall be inspected on a daily basis by the contractor's project manager and inspected weekly by the EcOW;

- Weekly Inspection of attenuation ponds, their release systems and other attenuation features such as silt traps etc by the EcOW.

- The Contractor's CMS monitoring results shall be audited on a frequent basis by the EcOW (weekly at a minimum).

~~Before works commence on site, the contractor will be required to prepare an Environmental Operating Plan (EOP) which will incorporate all of the avoidance and mitigation measures. In addition, the Contractor will consult with the NPWS and IFI in relation to the final detail of the Plan and shall include their requirements in this regard.~~

~~Before earthworks commence on site, and before they are needed - erosion control and sediment control measures must be in place and functioning and must be inspected and approved by the Ecological Clerk of Works (EcOW).~~

~~Ecological Clerk of Works~~

- ~~An Ecological Clerk of Works (EcOW) will be employed who will make at least weekly site visits for the duration of the construction works and more frequently at start-up and during critical construction events such as concrete pours as outlined below;~~

- ~~The EcOW will also be the liaison for the purposes of consulting environmental bodies including the NPWS and IFI. The EcOW will be responsible for carrying out regular audits of the Contractor's EOP on behalf of the proposed developer. In addition, the EcOW will be the primary person involved in the developer's monitoring role. The EcOW will be delegated sufficient powers under the construction contract so that he/she will be able to instruct the contractor to stop works and to direct the carrying out of emergency mitigation/clean-up operations;~~

- ~~The EcOW will maintain a register indicating whether all mitigation measures have been carried out satisfactorily. This register will be signed off by the contractor's site foreman.~~

~~Separate from the on-going monitoring carried out by the contractor as part of the EOP, the EcOW shall carry out the inspection/ monitoring regime described below on behalf of the employer. The results will be stored in the EcOW's monitoring file and will be available for inspection/ audit by the Client, NPWS or IFI staff. The main elements of the inspection/ monitoring regime are as follows:~~

- ~~Inspect surface water treatment measures (silt fencing, ponds, tanks, mini-dams, sandbags, etc.) on a daily basis;~~
- ~~Daily visual inspection of the watercourses in proximity to the works;~~
- ~~Wheel wash facilities shall be inspected on a weekly basis;~~
- ~~Stockpiles shall be monitored on a daily basis while being filled or emptied and otherwise on a weekly basis;~~
- ~~Control measures for works at or near water bodies shall be inspected on a daily basis;~~
- ~~Concrete operations at or near watercourses shall be supervised and designated chute washing out facilities shall be inspected on a daily basis;~~
- ~~Inspection of attenuation ponds, their release systems and other attenuation features such as silt traps etc.;~~
- ~~The Contractor's EOP monitoring results shall be audited on a frequent basis (weekly at a minimum).~~

Where the EcOW has carried out an investigation of a release of sediment to a watercourse causing a plume, the following procedure shall be followed:

- The relevant NPWS and IFI staff shall be notified immediately;
- The discharge generating the sediment discharge shall be stopped immediately;
- The contractor will be required to take immediate action and to implement measures to ensure that such discharges do not re-occur;
- Works shall not recommence until appropriate corrective measures to avoid any repetition are put in place. Such measures shall be agreed with the EcOW following consultation with the NPWS and IFI and shall be in accordance with the requirements of these control measures;
- Where the discharge is from one of the control measures associated with the works, the controlled discharge shall not recommence until written consent is received from the EcOW;
- Where the EcOW considers that the risk of a sediment release is high, he/ she shall inform the contractor and request protective action to be taken. Where the contractor does not take immediate action the EcOW shall instruct the contractor to take action and same shall be reported to the Contract Manager and the Client;
- The EcOW will be delegated powers under the contract sufficient for these instructions to be issued and for an instruction to stop works or carry out emergency works.

Procedure for Contractors

Contractors will establish contact with Inland Fisheries Ireland and National Parks & Wildlife Service before works commence, and there will be ongoing liaison with these bodies throughout the construction process. Contractors will be in possession of, and familiar with the contents of "Control of water pollution from construction sites - Guidance for consultants and contractors" published by the Construction Industry Research and Information Association (CIRIA 2001) (e-mail enquiries@ciria.org.uk).

5.2.6.2 Mitigation of Potential Long-Term Aquatic Impact of the Existence of the Proposed Development

Mitigation of Impact of Waste Water Discharge

In November 2015 the macroinvertebrate status recorded for the present report was indicative of high ecological quality (Q4-5) downstream of the proposed effluent discharge.

The waste water discharge from the proposed development will be treated to a standard which will ensure that (1) the requirements of the Environmental Objectives (Surface Water) Regulations (2009) can continue to be achieved in the section of the Dalua River downstream of the proposed discharge and (2) the requirements of the Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009), can continue to be achieved in the section of the River Blackwater downstream of the confluence with the Allow River.

Mitigation of Pollution of Watercourses with Contaminated Water Draining Paved and Roofed Areas

~~A sustainable drainage system will be installed for all surface waters draining from hard areas of the proposed development including access roads, car parks, storage areas, roofs etc. The system installed will have a proven capability of achieving and sustaining at least the following pollution reduction in runoff:~~

- ~~Total Suspended Solids maximum 25mg/l~~
- ~~Heavy Metals 50 – 80% reduction~~
- ~~Chemical Oxygen Demand 50% reduction~~
- ~~Hydrocarbons 90% reduction~~

~~Best management practices for treatment of runoff would include:~~

- ~~Constructed Wetlands;~~
- ~~Vegetated lagoons;~~
- ~~Swales;~~

- ~~Filter strips;~~
- ~~Filter drains;~~
- ~~Infiltration devices;~~
- ~~Oil/grit separators.~~

There is no surface water interconnection between the wastewater treatment plant and the adjacent watercourse. The areas that are adjacent to the new plant are constructed from graded hardcore and due to the drainage capacity of this material, increased levels of runoff form the proposed WWTP are not envisaged. Further details on surface water management measures to be implemented at the WWTP are discussed in the CEMP, EIS Volume II, Appendix 2.2.

~~In a major EPA funded study of the impact of road runoff on water quality in Ireland (Bruen et al 2006) it is concluded that "Each of the Best Management Practices outlined have individual advantages in the removal of pollutants from highway runoff. Therefore, a combination of these systems will be used for enhanced and more uniform overall pollutant removal performance. In fact a combination of runoff management and control measures is recommended whenever it is feasible." This is also the conclusion of the CIRIA Report C608 on SUDS (Wilson et al 2004) which concludes that the more techniques used in a runoff treatment and attenuation system, the better the performance is likely to be.~~

Petrol/oil and grit interceptors will be located at outfalls to watercourses. Design of those interceptors will conform to the recommendations of CIRIA Report No. 142 (Luker & Montague 1994).

As virtually all treatment options require proper maintenance in order to function properly, and as some such as oil interceptors can become a source of pollution if not properly maintained, a programme of regular cleaning, maintenance and inspection of the runoff treatment system will be put in place to ensure it functions correctly.

Fuels, lubricants and hydraulic fluids for equipment used at the facility, as well as any solvents, oils, chemicals and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and stored in appropriately bunded areas.

~~The sustainable drainage system will be designed with a cut-off system to enable any serious spillage of pollutants to be contained within the drainage system and prevented from being released to the Rampart Stream and/or the Mill Race.~~

~~Mitigation of Hydrological Impacts~~

~~The sustainable drainage system for runoff from all paved and roofed areas will be designed with sufficient attenuation capacity to ensure that no significant increase in peak stream/river flows is caused by the proposed development.~~

~~Water abstraction from watercourses for any purpose will only take place at locations, in a manner and during a time period agreed with Inland Fisheries Ireland.~~

Mitigation of Habitat Loss

One of the most effective methods of minimising loss of stream and riparian habitat during developments is the establishment of Leave Strips. Leave strips are the areas of land and vegetation adjacent to watercourses that are to remain in an undisturbed state, throughout and after the development process (Chilibeck et al 1992). Leave strips are valuable not only because riparian vegetation is a vital component of a healthy stream ecosystem, but because this vegetation acts as an effective screen/barrier between the stream and the development area, intercepting runoff and acting as an effective filter for sediment and pollutants from the development area. Where development is to take place close to rivers/streams, a riparian leave strip at least 20m wide will be clearly marked and its significance explained to machinery operators. No development is proposed on river banks or within riparian habitats. Development will be confined to the R576 road corridor and the WWTP site boundary and will not require access to or a requirement to develop outside of the road corridor. No impacts are proposed on either the Rampart Stream or the Dalua River. However, to follow best practice procedures and to clearly outline where no development will be occurring in response to the previous FI Point 11(j) raised in June 2016, development buffer zones will be implemented during the construction phase at the locations shown on **Appendix 5.2.7**. No development will be located within these areas.

Prevention of Spread of Invasive Non-Native Aquatic Species during Construction and/or Operation of the Proposed Development

The introduction of Alien Invasive Species (AIS) through spoil on machinery must be avoided. To prevent the instruction of AIS, hot power washing of machinery will be carried out before it is introduced to the sites and after site works have been completed before machinery is moved to another site. Further information on the invasive species methodology to be implemented during the construction phase is provided in **EIS Volume II, Appendix 5.1.3.**

5.2.6.3 Monitoring

To monitor the proposed development during construction, a biological and chemical monitoring system will be put in place on potentially affected streams/rivers at the locations discussed below and shown on the maps provided in **Appendix 5.2.8 Construction Phase Water Quality Monitoring Plan.** The monitoring regime will be undertaken by the project aquatic ecologist, Conservation Services Ltd and the appointed construction phase Ecological Clerk of Works, with the assistance of the Contractor's project manager.

As a minimum the monitoring system will measure Q-values, suspended solids, molybdate reactive phosphorus & pH on the Rampart Stream and the Dalua River upstream and downstream of the following elements of the proposed development:

- Potential impact of construction/expansion of WWTP on Rampart Stream and Dalua River;

- Potential impact of pipe laying on Rampart Stream and Dalua River;
- Potential impact of construction of outfall to the Dalua River.

Table 5.2.22: Recommended Monitoring during Construction

(For location of proposed monitoring sites except Site D1A see Maps 5.2.3 & 5.2.4. Exact locations are also provided in **Appendix 5.2.8)**

Watercourse	Site	Location	Biological Water Quality Assessment before commencement and after completion of construction phase	Suspended solids, turbidity, molybdate reactive phosphorus & pH at intervals to be agreed with IFI & NPWS	Fish Assessment before commencement and after completion of construction phase
Mill Race	M1	Upstream of proposed WWTP works	✓	✓	
	M2	Downstream of proposed WWTP works	✓	✓	
Rampart Stream	R1	Upstream of proposed WWTP works	✓	✓	✓
	R2	Downstream of proposed WWTP works	✓	✓	
	R3	Downstream of proposed WWTP works	✓	✓	✓
	R4	Downstream of proposed WWTP works & pipe laying	✓	✓	✓
	R5	Downstream of proposed WWTP works & pipe laying	✓	✓	✓
Dalua River	D1A	Upstream of Allen's Bridge discharge location	✓	✓	
	D1	Downstream of Allen's Bridge discharge and upstream of Rampart Stream confluence	✓	✓	
	D2	Downstream of Rampart Stream confluence and all elements of the proposed development	✓	✓	
	D3	c.2km downstream of proposed pipeline and outfall construction	✓	✓	

5.2.7 Residual Impact

If the mitigation measures specified in this EIS are implemented in full, the residual negative impact of the proposed development on the qualifying interests of Natura 2000 sites will be insignificant.

It is expected that the proposed development will have a significant positive *ex situ* impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream, which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.

5.2.8 Cumulative Impacts

There is a range of major land use activities within the catchment of the River Blackwater which may be affecting, or have the potential to affect, the conservation objectives of the Blackwater River SAC. ~~Despite the potential for pollution from a wide range of sources, in 2012 EPA described the water quality in the Dalua River as "*Continuing satisfactory with Good and High ecological quality*" (www.epa.ie/qvalue/webusers/) (See Appendix 5.2.2), and in the present survey biological water quality in the Dalua River was found to be Good (Q4) at sites in the Dalua upstream and downstream of the proposed discharge location in 2014 and High (Q4-5) on the Dalua River c.2km downstream of the proposed discharge in November 2015 (See Tables 5.2.16 and 5.2.17).~~

Nevertheless, based on EPA catchment wide biological water quality data for 2012, all sites monitored on the Dalua, Allow and Blackwater Rivers achieved Good or High Status. EPA described the water quality in the Dalua River as "*Continuing satisfactory with Good and High ecological quality*" (www.epa.ie/qvalue/webusers/) (See **Appendix 5.2.2**) Also in the assessment carried out for this EIS, biological water quality in the Dalua River was found to be Good (Q4) at sites in the Dalua upstream and downstream of the proposed discharge location in 2014, and High (Q4-5) on the Dalua River c.2km downstream of the proposed discharge in November 2015 (See Tables 5.2.16 and 5.2.17).

In the context of the requirement for the Dalua, Blackwater and the Allow (downstream of Kanturk) to achieve Good status, and the requirement for the Allow upstream of Kanturk to achieve High Status, only two sites failed to achieve the standard required in 2012; i.e. Site 18A02-0020 at the top of the Allow which achieved Q4 rather than the Q4-5 required, and Site 18B02-2700 which is the lowest site on the Blackwater (2km downstream of Lismore Bridge) which achieved a Q3-4 rather than the Q4 required. These results indicate that the cumulative impact of all pressures on these rivers is within the carrying capacity of these rivers. As has been demonstrated above and in the EIS and NIS, the proposed discharge to the Dalua will not compromise the Good status of the Dalua River and will therefore not compromise the Good status of the Allow or Blackwater Rivers. The cumulative impact of the proposed development and all other existing pressures in the catchment will therefore be compatible with the maintenance of Good status.

~~The EPA monitoring and the present assessment establish that at present the sum of potential impacts upstream of the proposed discharge location are not preventing the Dalua River from achieving Good Ecological status as required by the Environmental Objectives (Surface water) Regulations (2009) and as required by the Conservation Objectives of the SAC. The assessment of the assimilative capacity of the Dalua River at the location of the proposed discharge (OES Consulting 2015) establishes that at the proposed Emission Limit Values the proposed discharge will not compromise the good ecological status of the Dalua River. As the proposed discharge will not result in loss of Good status immediately downstream of the discharge location, it follows that it cannot cause a loss of Good status in sections of the Dalua River and Allow River further downstream (where Good status is also required under the Surface Waters Regulations (2009) and the SAC Conservation Objectives).~~

Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009) and the Conservation Objectives of the SAC require High Ecological Status in the Blackwater River downstream of its confluence with the River Allow. It is theoretically possible that a discharge which will not cause a breach of Good ecological quality in the receiving water could cause a breach of a High ecological quality standard further downstream. The River Blackwater is c.12km downstream of the proposed discharge and it has been established that at the proposed Emission Limit Values the proposed discharge will not prevent the present High Ecological status from being maintained, even in the worst case and unlikely scenario of prolonged low river flow conditions corresponding with prolonged discharges at maximum emission limit values. (OES Consulting 2015)

Taking all the above into account, it is concluded that there will not be any significant in-combination contribution by the project to possible adverse impacts on the Blackwater River SAC.

5.2.9 References

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Chapter 5 – Section 5.3 Soils, Geology and Hydrology

5.3.1 Introduction

The impact of the proposed upgrade works to the WWTP and the relocation of the discharge point with respect to soils, geology and hydrogeology will be assessed in this section.

5.3.2 Study Assessment and Methodology

A desk based study of the proposed development areas was conducted which involved reviewing available geotechnical information held by the Geological Survey of Ireland (GSI) on the site and surrounding lands.

The following sources were reviewed:

- Geological Survey Ireland (GSI) public mapping system – www.gsi.ie
- Environmental Protection Agency (EPA) Envision public viewer – www.epa.ie
- Effluent Rising Main Design Report(16547-6002-Design Report) – Malachy Walsh and Partners – **EIS Volume II Appendix 2.1**
- Flood Risk Assessment Report(P1300) – Hydro-Environmental Services – **EIS Volume II Appendix 5.3.1**
- Baseline Report for IEL Application (R1_1160_36) – OES Consulting **– EIS Volume II Appendix 5.3.2**
- Report on Hydrogeological Investigation (R1_116002_09) – OES Consulting – **EIS Volume II Appendix 5.3.3**
- River Dalua and River Blackwater Hydrochemical data provided by the EPA – **EIS Volume II Appendix 5.3.4**
- EPA Hydrotool Report - Environmental Protection Agency (EPA) – **EIS Volume II Appendix 5.3.5**
- Additional Information – Cumulative Assessment - OES Consulting – **EIS Volume II, Appendix 5.3.6**

5.3.2.1 Baseline Description of Existing Conditions

The receiving environment is sub-divided into relevant sections concerning geology, soils, hydrogeology, and hydrology, as the characteristics, though linked, have different risks from development. It is noted that hydrology is discussed in Section 5.2.

5.3.2.2 Geology

The Geological Survey of Ireland (GSI) Sheet 21 "Geology of Kerry-Cork" (Scale 1:100,000) indicates that the bedrock underlying the site and proposed pipeline route is Namurian undifferentiated siltstones and sandstones. Namurian bedrock aquifers are predominantly siliciclastic. (Rocks, usually sedimentary, made up of fragments of non-carbonate rock fragments). They have been reported to comprise of sandstones, mudrocks, shales, clayey, fine sandstones and sometimes coal seams. It has also been reported that thin carbonate beds exist in older parts of the bedrock succession in southwest Co. Cork. Porosity is primary intergranular and secondary. The secondary porosity arises from dissolution of secondary carbonate. The mapping also indicates that the bedrock underlying the outfall of the proposed pipeline route along the river bed comprises undifferentiated alluvium of unconsolidated gravels, sands, silts and clays.

5.3.2.3 Soils

The predominant soils in the area are described as Deep Poorly Drained Mineral (AminPD) derived mainly from non-calcareous parent material. They are in the great soil groups of surface water Gleys and groundwater Gleys. These are followed by pockets of deep well drained soils (AminDW) which may potentially be encountered during trench excavation works along the proposed pipeline route. The subsoil in the area has been described as made ground and till derived from shale and sandstone (TNSSs) which underlie the soils. The permeability of this subsoil type is typically moderate to low. The majority of the pipeline route will be constructed on made ground along the roadside edge during trench excavations for the pipeline route, particularly at watercourse crossings Stonemill Bridge, Park Bridge and Bridge A discussed in detail in **EIS Volume II, Appendix 2.1. Effluent Rising Main Design Report**. It is also expected to encounter some made ground during foundation excavations at the Newmarket Co-Op site.

A site investigation, to assess the baseline conditions of the underlying ground was conducted in 2014 and is provided in **EIS Volume II, Appendix 5.3.2.** As part of this assessment, 3 boreholes were drilled on site and logs identifying the varying soil horizons noted by a qualified hydrogeologist. The underlying ground across the site was identified as consisting of overlying concrete and made ground followed by clays for the remaining depth. A point of note from the site investigation was the presence of leaf litter and other organic matter at 2.3m deep in BH03. Given the defined soil horizons above this material it is considered that this is the remnants of a swamp or marsh.

In addition to the 2014 intrusive investigation, eight monitoring wells on site were drilled between 1997 and 2005. It is noted that monitoring well 4 is located within the confines of the proposed waste water treatment plant boundary. From discussion with the driller (TJ Cross & Co Ireland Ltd) it is understood that the rock encountered was black shale and sandstone. Difficulties encountered when drilling suggested that the wells were installed in an unconsolidated fracture zone (*fault breccia*) which is also in line with the

findings of the Rathmore Groundwater Body Description provided in **EIS Volume II, Appendix 5.3.2**.

5.3.2.4 Hydrogeology

The baseline assessment for the facility, carried out in 2014 (**EIS Volume II, Appendix 5.3.2)**, suggested that perched groundwater is present underneath the site. On account that the site was found to be underlain by a stiff clay, groundwater was found to be confined above this layer.

The primary underlying aquifer has been classified as an Ll (locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones) and the GSI Classification for this bedrock aquifer unit indicates it is capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes). Groundwater flow occurs predominantly through fractures, fissures and joints.

Newmarket Co-Operative Creameries Ltd is located within the Rathmore Groundwater body. An abstract from the "Rathmore Groundwater Body Report" **EIS Volume II, Appendix 5.3.2** states that:

"*These rocks have no intergranular permeability; groundwater flow occurs in fractures and faults. Permeability is highest in the upper few metres but generally decreases rapidly with depth. In general, groundwater flow is concentrated in the upper 15 m of the aquifer, although deeper inflows from along fault zones or connected fractures can be encountered. Significant yields can be obtained where boreholes are drilled into known fault zones.*"

However, yields are not necessarily sustainable, as the fracture networks are generally not extensive or well-connected but primarily concentrated in the vicinity of the fault zones. Springs occur in some instances on fault zones. Groundwater levels are about 1.5-15 m below ground level, and will generally follow the topography. Close to the rivers and streams, water levels will be near ground level. Surface water features are considered to be in hydraulic continuity with the water table.

Groundwater flow will be local. Groundwater flow paths are generally short, typically 30-300 m, with groundwater discharging to small springs, or to the streams and rivers that traverse the aquifer. Flow directions are expected to approximately follow the local surface water catchments. Groundwater is generally unconfined".

Currently there are eight abstraction wells at Newmarket Creamery, seven of which are currently in use. Well 4 is not in use due to continued siltation of the well.

It is noted in the Hydraulic Investigation Report that in wells 4, 5, 6, 7 and 8, the water table when left to recover is within a few centimetres of the ground level and wells 5, 6 and 7 are artesian. The water table at these locations is within a few centimetres of the ground level and confirm the *Rathmore*

groundwater body description that surface water features are considered to be in hydraulic continuity with the water table. The report concludes that the groundwater from the site would contribute to the Rampart Stream and Millstream.

The groundwater flow direction was also triangulated from the water levels within the recovered wells. The natural groundwater flow direction is predominantly to the south east, flowing towards the Rampart Stream and Millstream. The direction of groundwater flow reaffirms that groundwater contributes to the flow of surface watercourses in the area.

The groundwater onsite is tested biannually from three wells (GW2, GW3 and Spring (GW4) as part of compliance monitoring under IEL P0793-02 for the existing facility. Samples taken from the three wells on site are tested for the following parameters.

- Water level, Conductivity, pH;
- Nitrate;
- Total Ammonia;
- Phosphorus, and
- Major Anions and Major Cations.

Groundwater monitoring has shown good quality results to-date and results are compared to the Groundwater Threshold Values as per Statutory Instrument 09/2010. To date, no influences to groundwater from activities on site have been identified.

A GSI well search was undertaken to investigate if there was any domestic or public drinking groundwater sources in the vicinity of the site and is discussed further in **EIS Volume II Appendix 5.3.3**. The search yielded results on two wells in the area as noted in Table 5.3.1.

Table 5.3.1: Summary of Well Details Provided by GSI

Townland	Depth to rock (m)	Depth (m)	NGR (E,N)	Location Accuracy	Usage	Yield m3/d
Meenatariff	8.8	36.6	E29420 N07420	1km	Agri & domestic	28
Gardeen	13.1	30.5	E36080 N07340	50m	Agri & domestic	28

The nearest groundwater well to the site is approximately 2km directly west of the facility. The only other well which was available from the GSI records is located approximately 4km directly east of the facility. Both wells are located in the same geological unit as the wells at Newmarket Co-Op (Namurian Undifferentiated). The depth of overburden in these wells was 8.8m and 13.1m, indicating that there is a deep soil cover in this area.

5.3.2.5 Flood Risk

The Flood Risk Assessment (FRA) completed for the proposed development provided in **EIS Volume II Appendix 5.3.1** reports that there is no history of fluvial or pluvial flooding at the existing WWTP plant or proposed extension area. The overall increase in hardstanding area from the existing plant is relatively small and no downstream flooding from storm water runoff is anticipated.

The FRA states that the peak flood events that occurred during 2015 (including Storm Desmond) did not cause the Rampart Stream to flood in the area of the proposed development site and this was based on accurate surface water flow measurements at an adjacent weir.

Hydraulic modelling of the Rampart Stream in the area of the proposed site indicate that 100-year and 1000-year flood flows can pass down the stream channel without impacting on the proposed site. In the event of the downstream R576 culverts being exceeded during peak flood events, no significant stream back up is anticipated due to flood storage on the land upstream of the R576 road/bridge. Peak flood volumes over the culvert capacity are anticipated to pass quickly thereby preventing significant back up.

The FRA concludes that the risk posed to the new development site by flooding is estimated to be low which relates to the probability of being impacted by a 1000-year flood and therefore Flood Zone C is relevant for the proposed development site. The proposed development does not occupy ground in the river flood plain, and therefore will not contribute to loss of storage or downstream flooding. The proposed discharge pipeline to the River Dalua, which will be underground, will not have any potential to exasperate local flooding.

5.3.2.6 Assessment of Impacts of the Proposed Development

<u>Construction Phase</u>

Phase 1 (WWTP)

The construction phase of the upgrade of the site WWTP will involve the excavation of soils for foundation construction to provide a base for new tank infrastructure. It is expected that soil excavations for foundation construction associated with the upgrade works to the WWTP will be shallow and therefore will not encounter groundwater. All excavated materials during foundation construction will be used for reinstatement works surround the WWTP infrastructure. Any excess materials will be disposed of to a licensed disposal facility. It is therefore considered that the proposed upgrade works will have negligible or no variation to the surrounding environment.

Phase 2 (Underground Pipeline)

The proposed pipeline route requires the laying of a new 225mm Ø PE80 SDR17 pipe from a point adjacent to the existing WWTP. The pipe will continue through the facilities exit gate where it will then follow the R576 South towards Kanturk for approximately 3.5km before it diverts westward. The pipeline will then divert along the Public Lower Road southwards before discharging to a point adjacent to Allen's Bridge. The construction phase of the underground pipeline route will involve a series of trench excavation works. Trenches will be excavated to approximately 700mm depth and to a maximum of 700mm width. Design specifications can be seen in drawing 16547-2016 of the Rising Main Design Report **(provided in EIS Volume II, Appendix 2.1).**
As it is expected that soil excavations for trench construction associated with the upgrade works to the WWTP will be shallow, it is not anticipated that groundwater will be encountered. All excavated materials during the pipeline route construction works will be used as backfill, reinstating all roads and grass margins back to their original condition. Any excess materials will be disposed of to a licensed disposal facility. It is therefore considered that the proposed upgrade works will have negligible or no variation to soils, geology or hydrogeology.

The majority of the pipeline route will be constructed on made ground (within Newmarket Co-Op site and along public road) with potential to encounter the underlying shale and sandstone till. A 300mm Ø AC Regional public water main also runs along the R576. It is considered that this pipe is over 30 years old and as a result may be quite brittle. The route has been designed to avoid this water main where possible however there exist a number of areas along the route where crossings may be necessary. Final detail as to the exact location of the water main is to be identified prior to construction however particular care may be required between chainage 140 to 420, 540 to 620, 3380 to 3420 and finally 3544 to 3620 illustrated in **EIS Volume II, Appendix 2.1**.

The main impacts associated with the construction phase of the development will be to the potential degradation to surface water quality on nearby watercourses. This is discussed in section 5.3.2.7 below.

Operational Phase

It is also considered that the continued operation of the development will have negligible or no variation to the hydrogeology, soils or geology of the site. Upon installation of the proposed pipeline route, the pipe will undergo testing to ensure that there are no leaks in seals or joints and ensure the pipe is operating a maximum efficiency. Flow meters will also be installed along the pipeline route and may be used as an indicator of any leaks imposed on the system prior to and during the operational phase of the WWTP. The main impacts associated with the operational phase of the development will be the discharge of treated effluent to surface waters including the relocation of the outfall point for treated effluent discharged from the Newmarket Co-Op site to the River Dalua. This is discussed in section 5.3.3 below.

5.3.2.7 Mitigation Measures and/or Factors

The mitigation factors and measures for the control of pollution and general protection of soils and groundwater are described below.

The proposed upgrade works will involve a limited amount of alterations to the physical landscape and it is not considered that such works will introduce significant new pressures that impact upon soils, geology or groundwater.

The excavation of foundations for the WWTP and trench excavations for the proposed pipeline route will result in surplus spoil material being generated. It will be necessary to store surplus material until such time as it can be used for landscaping or reinstatement. It is noted that topsoils and subsoils must be stored separately. Excavated material may be temporarily stored adjacent to works but must be stored in an environmentally safe manner and located at least 50m from existing watercourses. Any excess materials will be disposed of to a licensed disposal facility.

~~Where possible, any landscaping that is required in areas around WWTP infrastructure will use topsoil removed from the site during the construction phase. This will be allowed to re-vegetate naturally on completion of the backfilling or if required by re-seeding with an appropriate seed mix.~~

For pipeline works, where possible, excavated material from the construction works will be used predominantly for trench backfill and/or landscaping.

To minimise impacts from disturbance, pipelines will be laid in a trench along the edge of the existing road as far as possible.

The trenches will be dug during drier periods, if possible, and any spoil material will be temporarily placed on the uphill slope to reduce the likelihood of runoff entering the excavations.

The pipe will be quickly placed within the trenches and soils replaced to minimise the ingress of water into the trenches.

Although anticipated to be used in small quantities, all oils and fuel required for the project must be stored in a bunded area with provisions of adequate spill retention capacity (a minimum of 110% tank capacity).

The issue of accidental spillage of hydrocarbons such as diesel and lubrication oil during refuelling of plant machinery is a potential risk during the construction phase. A purpose designed, removable, drip tray will be provided beneath connection points to catch any residual oil during filling and disconnection of the flexible tanker hose. The drip tray will be regularly emptied and disposed of off-site by a specialist licensed contractor.

It is noted that a 300mm Ø AC Regional public water main also runs along a sizeable portion of the proposed pipeline route. The route has been designed so as to avoid the public water main however it remains inevitable that crossings may exist on occasion. Prior to construction works the contractor will be required to locate the exact location of the pipeline using CAT and GPR scans.

5.3.2.8 Soils, Geology and Hydrogeology Summary and Conclusion

It is considered that impacts on the geological and hydrogeological environs during both the construction and operational phases of the development will be insignificant. Mitigation measures are proposed to ensure minimal disturbance to the surrounding landscape and to prevent any degradation to groundwater underlying the site.

The main impacts associated with the construction phase of the development will be to the potential degradation to surface water quality on nearby watercourses. The main impacts associated with operational phase of the development will be discharge of treated effluent to surface waters including the relocation of the outfall point for treated effluent discharged from the site to the River Dalua. These are discussed in section 5.3.3 below.

Operational Impacts as a result of the landspreading of sludge within the agricultural landbanks is deemed as negligible subject to the identification and avoidance of ecological constraints prior to spreading and the implementation of the proposed mitigation measures outlined in Section 5.1.15 above.

5.3.3 Impact Assessment of Treated WWTP Discharge to the River Dalua

5.3.3.1 Introduction

Newmarket Co-Op engaged OES Consulting to undertake an impact assessment on proposed development which includes an upgrade to the Waste Water Treatment Plant (WWTP) and relocation of the outfall point for treated effluent discharged from the site. Newmarket Co-Op has already applied to the Environmental Protection Agency for an amendment of the emission limit values associated with the discharge of treated effluent in the site Industrial Emissions Licence (P0793-02).

The purpose of the onsite Waste Water Treatment Plant (WWTP) is to treat process waste waters generated from the milk processing activity on the site. Currently the treated effluent from the WWTP is discharged from emission point SW-1 to the River Dalua via the Rampart stream. The proposed relocation of the outfall will be facilitated by the installation of an underground pipeline and will ensure that the physical location of the outfall is consistent with the location referred to in the current IE Licence.

The impact of the proposed amendments to the discharge emission limit values at SW-1, upgrade works to the WWTP and the relocation of the discharge point will be assessed.

5.3.3.2 Background to Assessment

The facility has been licensed by the Environmental Protection Agency (EPA) since September 2009 (IPPC Licence Reg. No. P0793-01) and in June 2011 the EPA initiated a review of the facilities licence to ensure compliance with the

EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. 272 of 2009. A revised licence was issued by the EPA in May 2012(IPPC Licence Reg. No. P0793-02).

Due to proposed amendments to milk processing operations on the site which will see milk being processed over 7 days ~~and a broadening of the peak processing period across the year,~~ the facility is proposing to modernise the WWTP and ensure efficient treatment of wastewaters.

The development works at the WWTP will involve the construction of concrete tanks to provide treatment based on the existing treatment concept (Extended Aeration Activated Sludge Plant complete with anaerobic zone and anoxic zones for biological phosphorous and nitrogen removal and aeration zone for BOD removal). A plan of the proposed upgrades is provided in **EIS Volume III, Figure 5.3.1**.

The development works will also include the installation of an underground pipeline to convey treated wastewater from the facility to a discharge point on the River Dalua, approximately 4 kilometres (km) to the south east of the facility. It is noted that the River Dalua is considered the receiving water in the facility's current industrial emissions license. A plan of the proposed pipeline route is included in **EIS Volume III, Figure 5.3.2**.

In order to establish the ability of the water course to accept a discharge of treated effluent, the assimilative capacity at the point of discharge has been established. Background water quality data was obtained from EPA datasets and additional information was provided by Cork County Council. The flow conditions in the watercourses were obtained from nearby hydrometric stations and using the EPA Hydrotool for estimation of flow in ungauged catchments.

5.3.3.3 Statutory Requirements

The assessment has taken due regard to the water quality requirements of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) to ensure that the receiving water quality is not impaired by the discharge from Newmarket Co-Op.

5.3.3.4 Current Discharges to Water

Newmarket Co-Op discharge surface water runoff and treated process effluent to surface water. All of the discharge points from the site are included in the facility's IE licence.

Emission point reference SW-1 relates to the discharge of treated effluent and discharge point SW-2 is a discharge of water and surface water. Both of these emission points are subject to continuous monitoring in respect of volume and quality. The remaining discharges (SW3-12) from the site are associated with roof and yard areas arising as a result of rainfall. These discharge points are not monitored directly due to their inaccessibility and with agreement of the

Agency, monitoring of surface water quality is based on samples taken upstream and downstream of the facility.

The waste water treatment plant currently consists of balance tanks, dissolved air floatation (DAF) unit, bio- tower, an anoxic tank, oxidation ditch, phosphate reduction dosing, clarifier and sand filters.

It is noted that the surface water from the carpark area of the site passes through a Class 1 bypass separator prior to discharge to a surface water (Mill Race). The current IE Licence Limit values assigned to emission point SW-1 are presented in Table 5.3.2. The location of the current emission point can be seen in **EIS Volume III Figure 5.3.3.**

Table 5.3.2: Emission Limit Values (SW-1)

Emission Point Reference No.: SW-1
Name of Receiving Water: River Dalua (via Rampart Stream)
Monitoring Location: 132082E 107452N
Volume to be emitted: Maximum in any one day: 2000m^3
Maximum rate per hour: 100m^3

Parameter	Emission Limit Value	
Temperature	25 °C(Max)	
pH	6-9	
Toxicity	5 TU	
	mg/l	Kg/day
BOD	10	10
COD	50	50
Suspended Solids	15	15
Total Nitrogen (as N)	20	20
Nitrates (as N)	15	15
Ammonia (as N)	0.5	0.5
Molybdate Reactive Phosphate	0.5	0.5
Total Phosphorous (as P)	1	1
Oils, Fats and Greases	10	10

5.3.3.5 Methodology

Impact Assessment Methodology

The impact assessment methodology is based on a determination of the available assimilative capacity in the River Dalua for the pollutants of concern which are discharged from the site. In addition, an assessment (mass balance) was undertaken to establish the maximum downstream concentration of pollutants of concern and specifically those specified in S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009

The methodology used to determine the assimilative capacity is based on the following:

Assimilative capacity = (Cmax – Cback) x F95 x 86.4 kg/day

Where:
Cmax = maximum permissible concentration (EQS – 95%ile value) (mg/l)
Cback = background upstream concentration (mg/l mean value)
F95 = the 95%ile flow in the river (m3/s)

Note: (60x60x24)/1000 = 86.4

The output of the calculation of assimilative capacity is the total mass of the pollutant which can be discharged to a watercourse.

In order to work out a mass balance for the discharge, a mixing model is used, this based on the following calculation:

$$\textbf{C final} = \frac{(\text{C back} * \text{F river}) + (\text{C discharge} * \text{F discharge})}{(\text{F river} + \text{F discharge})}$$

Where:

C final = Resultant concentration after discharge (mg/l)
C back = Background (u/s) concentration in river (mg/l)
F river = Flow in River (m^3/s)
C discharge = Maximum concentration in discharge (mg/l)
F discharge = Flow of discharge (m^3/s)

The output of this assessment for each parameter (C final) can be compared against the target values set out in the regulations (S.I. 272 of 2009).

The input parameters required for the assessment are set out below.

Model Assessment Input Criteria

In order to carry out the impact assessment, background water quality and flow in the receiving water are required. In assessing discharges to waters the EPA has specified the following requirements:

C back, the background concentration of the emission to be assessed in the receiving water is to be taken as the mean river from records at a point upstream of the discharge point.

F river, the flow of the receiving water is to be taken as the 95%ile flow in receiving water.

C discharge and F discharge is to be taken as the maximum discharge volume and concentration from the assessed discharge point.

Assessment Standards

In assessing the impact of the discharge against BOD, Ammonia and Orthophosphate requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009, the target level to be achieved is the 95%ile concentration value, whilst the model is set up as outlined in the methodology section discussed above.

The 95%ile BOD, Orthophosphate and Ammonia target concentrations are provided in Table 5.3.3.

Table 5.3.3: 95%ile BOD, Ammonia and Orthophosphate for 'Good' Status River

Parameter	95%ile (mg/l)
BOD	2.6
Ammonia (as N)	0.140
Ortho P	0.075

Nitrate and Suspended Solids have also been included in the impact assessment of the wastewater treatment plant discharge. Nitrate, a nutrient in surface water systems, is used to assess the ecological status of a water body. Although no target concentration has been identified for nitrate in SI 272 of 2009, a criteria used to assess nitrate target concentration has been derived for high and good status surface waters (source 2012 EPA Integrated Water Quality Report –Monaghan Louth 2011). Mean and 95%ile nitrate target standard of for good status waters has been developed as 1.8mg/l and 2.7mg/l NO_3- (as N) respectively.

In the case of suspended solids, the River Dalua does not fall within the scope (not listed in Schedule I) of the European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. 293 of 1988). However, the River Blackwater is included in the Regulations. The Quality of Salmonid Waters Regulations set the only legislative benchmark for which suspended solids can be assessed against.

Irrespective of the non-inclusion of the River Dalua within Schedule I, given that the Dalua is a tributary of the Blackwater the target concentration for suspended solids set out in the Quality of Salmonid Waters is used in this assessment.

5.3.3.6 Baseline Description of Existing Conditions

A summary of the receiving environment including river morphology, designations, quality and targets are provided in the following sections.

Receiving Water Body (Morphology)

The receiving water body for the discharge from SW-1 is the River Dalua as stated in the current IE license. Currently, the discharge is conveyed to the Dalua through a short stretch (60m) of a man made channel (historical mill race) and then into the Rampart Stream which meets the River Dalua approximately 3.5 kilometres south of Newmarket. The proposed development will see the installation of an underground pipeline which will convey the treated water directly to the River Dalua.

The River Dalua flows into the River Allow in Kanturk, Co Cork approximately 11 kilometres downstream of the Newmarket Co-Op facility. The River Allow then converges with the River Blackwater, at a point approximately 2 Kilometres North of Banteer, County Cork.

River Basin Management Requirements

The Newmarket Co-Op facility is located in the South Western River basin and as a result falls under the South Western River Basin Management Plan. This plan was developed by the South Western Regional Fisheries Board, which is coordinated by Cork County Council. The river basin management plan sets out a framework for achieving the targets set out under the Water Framework Directive through Water Unit Action Plans. The current plan runs from 2009 to 2015 and is currently under review, the revised plans are not due to be published until 2017, and will run from 2017 to 2021.

A target of 'Good Ecological Status' has been assigned to the River Dalua in the Water Unit Action Plan (WMU). Due to the presence of Freshwater Pearl Mussel populations in the River Allow and Blackwater, a sub region Management Plan has been established for the catchment in which the Newmarket Co-Op facility is located. The management plan currently available is the Freshwater Pearl Mussel Second Draft Allow Sub-Basin Management Plan (March 2010).

Ecological Designations

The Blackwater River is a designated Special Area of Conservation (SAC) (assigned Site Code 002170), draining a large proportion of County Cork including five ranges of mountains. The SAC encompasses the River Dalua. The Blackwater SAC commences in the River Dalua 5 kilometres north of the facility and west of the village of Meelin and extends over the entire watercourse.

The site is assigned SAC status on the basis of the presence of alluvial wet woodlands, and Yew wood, both priority habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats, Salicornia mudflats, Atlantic salt meadows, Mediterranean salt meadows, perennial vegetation of stony banks and old Oak woodlands, all habitats listed on Annex I of the E.U. Habitats Directive.

The site is also selected for the following species listed in Annex II of the Directive-Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the Killarney Fern.

The SAC is noted as supporting a number of protected bird species including wintering waterfowl and other bird species such as Heron, Cormorant, Mute Swan and Long-eared Owl.

Maintaining the nutrient balance within watercourses discharging to the SAC form an integral part of ensuring species diversity is not impacted.

It is noted that in the context of the review of the discharge licence undertaken by the Agency in 2011, the current discharge from Newmarket Co-Op was not considered to have a significant impact on the Blackwater SAC.

River Water Quality

Historically, water quality monitoring has been undertaken by Cork County Council in the River Dalua as part of routine monitoring and also in the implementation of SI No. 258/1998-Local Government (Water Pollution) Act, 1977 (Water Quality for Phosphorous) Regulations, 1998. However, these Regulations have now been revoked by S.I. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations which drive the implementation of the Water Framework Directive.

The Water Framework Directive (environmental legislation which requires watercourses to achieve at least 'Good' status by 2015) has been established to ensure that all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats are protected. The Surface Water Regulations (S.I. 272 of 2009) set out the biological and chemical criteria to be achieved to ensure the watercourses achieve the objectives set by the Water Framework Directive (WFD).

In order to monitor the status of surface watercourses with regard to the requirements of the (WFD) water quality surveillance sites have been established and are routinely monitored by the EPA for biological and chemical elements (Cork County Council undertake some chemical sampling and analysis and results are provided to the EPA for review and compilation to the WFD compliance file).

It is noted that the objective for the River Dalua is to achieve 'Good Ecological Status' by 2021. Surveillance monitoring is typically undertaken every two years by the Agency and the most recent data (2012 monitoring) determined water quality to be at Good Ecological Status (Q4). Furthermore, biological water quality monitoring undertaken by Conservation Services on behalf of Newmarket Co-Op in November 2015 determined that biological water quality was to be at High Ecological Status (Q4-5) in the River Dalua, 2km downstream of the confluence with the Rampart Stream and the proposed discharge location.

A map showing the location of EPA biological water quality surveillance sites and their accompanying status is illustrated on **EIS Volume III, Figure 5.3.4**.

Physiochemical monitoring is also undertaken in the River Dalua by the EPA and Cork County Council. The mean of BOD, ammonia and orthophosphate results from records obtained from the EPA are presented in Table 5.3.4 below (record period January 2010 to December 2014).

Table 5.3.4: Physiochemical Water Quality Results River Dalua (Location Reference Point 18D01_0200) (Footbridge South West of Lisconghill)

Parameter	Mean (mg/l)	Mean Surface Water Targets S.I. 272 of 2009
BOD	1.2800	2.6
Ammonia (as N)	0.0295	0.065
Orthophosphate	0.0214	0.045

5.3.3.7 Assimilative Capacity Assessment

The assimilative capacity assessment and results are presented in the following sections. The assessment is focussed on the oxygenation, nutrients and suspended solids associated with the discharge.

Background Data

The background conditions used for water quality have been obtained from monitoring results generated at an EPA surveillance site in the River Dalua upstream of the discharge from Newmarket Co-Op. The reference for the monitoring point is 18D01_0200.

Mean quality data for orthophosphate, BOD and ammonia is provided in Table 5.3.5 below. The mean results have been developed from records provided by the EPA from January 2014 to October 2014. The records obtained are provided in **EIS Volume II, Appendix 5.3.4**.

Table 5.3.5: Mean BOD, Ammonia & Orthophosphate Reference Point 18D01_0200) (Footbridge Southwest Lisconghill)

Parameter	Mean (mg/l)
BOD	1.280
Ammonia (as N)	0.0295
Orthophosphate	0.0214

Nitrate analysis records were not available on the sampling dates used to derive the mean BOD, Ammonia, and Orthophosphate concentrations in Table 5.3.4. However, nitrate analysis undertaken at the monitoring point between August 2008 and September 2011 has been reviewed to provide a background concentration. Using this data, the background nitrate concentration was found to be 0.9mg/l nitrate (as N).

With respect to suspended solids, neither Cork County Council nor the EPA undertake suspended solids analysis in the River Dalua. However a past sampling and analysis campaign undertaken by Newmarket Co-Op found suspended solids to be 2mg/l or <2mg/l. Due to the limited nature of this dataset and likely fluctuation of suspended solids concentration during flood events this data may not be representative of background conditions. A conservative approach has been adopted in identifying a background value for suspended solids where half the mean (25mg/l target value) as set out in the European Communities (Quality of Salmonid Waters) Regulations, 1988 (SI.293 of 1988) is assumed.

The EPA hydrotool was used to determine the 95%ile flow in the receiving water. Using the tool, it was estimated that the 95%ile flow rate is 0.268m^3/s. A copy of the report is presented in **EIS Volume II Appendix 5.3.5**.

Impact of Existing Discharge on the River Dalua

To assess the impact of the current discharge into the River Dalua, the current downstream concentration of BOD, Ammonia and Orthophosphate from the Newmarket Co-Op facility was determined using the method described above, with full details provided in the amended **Appendix 5.3.6**.

It is noted that the assessment was based on the current discharge being emitted at the maximum proposed emission limit values and during maximum flows. The assessment was based on the current ELV's as shown in table 5.3.2 above.

The ELV's identified in table 5.3.2 above, are presented as both concentration levels and mass emissions of BOD, Ammonia, Orthophosphate, Nitrate and Suspended Solids representing 17%, 19%, 40%, 36% and 5% respectively of the available assimilative capacity in the receiving watercourse. Further information on this issue is provided in the amended **Appendix 5.3.6**.

The assimilative capacity used up by the Newmarket Co-Op discharge is based on an extreme worst case scenario where the site is discharging at its limit -both in terms of ELV's and flow - during low river flow, in practice this is unlikely to occur.

Notwithstanding the extreme worst case basis for the assessment, all discharges are accommodated whilst remaining compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface waters) Regulations 2009, and accordingly do not cause a significant environmental impact.

Assimilative Capacity –R. Dalua

The assimilative capacity of the River Dalua at the proposed discharge point was calculated using the method described in the methodology section 5.3.3.5 above.

The available assimilative capacity for Ammonia, BOD and Orthophosphate has been calculated as 2.56kg, 59.71kg and 1.25kg respectively. Although based on assumed background levels, the assimilative capacity of suspended solids and nitrate has been calculated as 289.4 kg and 41.7kg respectively.

Proposed Amendments to Discharge Characteristics

The proposed emission limit values associated with the discharge volume to the River Dalua is presented in Table 5.3.6. The location of the proposed emission point can be seen in **EIS Volume III, Figure 5.3.2**.

Table 5.3.6: Requested Emission Limit Values at New Emission Point

Parameter	Requested ELV	
Volume	120 m^3/hr	
	2700 m^3/day	
Parameter/Units	mg/l	Kg/d
BOD	10	20
COD	75	202.5
Suspended Solids	15	40
Total Nitrogen (as N)	20	40
Nitrates (as N)	15	30
Ammonia (as N)	0.75	1.22
Molybdate Reactive Phosphate	0.5	0.86
Total Phosphorous (as P)	1	2
Oils, Fats and Greases	10	20

The ELV's identified in the table above, are presented as both concentration levels and mass emissions of BOD, Ammonia, Orthophosphate, Nitrate and Suspended Solids representing 33%, 47%, 66%, 71% and 14% respectively of the available assimilative capacity in the receiving watercourse. It is noted that the assimilative capacity used up by the Newmarket Co-Op discharge is based on an extreme worst case scenario where the site is discharging at its limit during low river flow, in practice this is unlikely to occur.

The assessment of impact on the receiving environment is based on a series of Emission Limit Values (ELV'S) for each parameter, which in terms of the operation of the WWTP, are established as absolute limit values. The WWTP aims to operate at lower levels where possible to reflect the typical fluctuations in inlet loadings to the waste water treatment plant from the various waste water sources within the plant throughout daily and weekly production cycles.

In the case of Newmarket, a review of the AER data for 2015 submitted to the EPA shows that actual emissions are significantly lower than permitted. Table 5.3.7 shows current WWTP performance against permitted ELV's in terms of average and maximum discharged concentrations, therefore showing the upper range for each parameter.

Table 5.3.7 Summary of Current Plant Performance

Parameter	Current ELV (mg/l)	Current Performance (Average)	Mean % of ELV	Current Performance (Max)	% of ELV
Flow	2000	943	47%	1830	91%
BOD	10	1.9	19%	2.0	20%
COD	50	11.4	23%	21.0	42%
SS	15	8.0	54%	13.0	87%
Ammonia	0.5	0.1	28%	0.5	96%
Nitrates	15	6.1	41%	8.9	59%
Total Nitrogen	20	3.3	16%	4.9	25%
Total OP	1	0.6	58%	0.8	79%

Ortho P	0.5	0.2	47%	0.4	70%
OFG	10	4.1	41%	5.0	50%

In order to achieve compliance with ELV's therefore, the plant aims to operate at lower target levels where possible to ensure that the upper end of the concentration range for each parameter remains well within ELV. For example, although the mean Ortho P value is 47% of ELV, due to natural variations in influent concentration, levels of ortho P in the final discharge range up to 70% of ELV.

Therefore, Newmarket aim to operate the treatment plant to lower value levels where possible in order to ensure that the upper end of the range of concentrations remains within ELV and therefore fully compliant.

Furthermore, it is noted that the wastewater treatment plant flows will typically range at lower levels than ELV – in 2015 the mean flow was 47% of ELV and the maximum flow was 91%. The variation in flows, together with concentrations of each parameter being lower than ELV, further reduces the loading on the receiving environment in actual plant performance terms.

It is noted that final ELV's will be provided by the Agency once they have undertaken their own assessment on the discharge.

Predicted Impact

The predicted downstream concentration of BOD, Ammonia and Orthophosphate from the Newmarket Co-Op facility was determined using the method described in section 5.3.3.5, the results are presented in Table 5.3.8. Predicted nitrate and suspended concentrations are also included in the assessment. It is noted that the assessment is based on the discharge being emitted at the maximum proposed emission limit values. In practice, emissions from the facility are considerably lower than the Emission Limit Values (ELV's) proposed as discussed above. This is due to operational requirements as Newmarket aim to run the wastewater treatment according to a range of lower levels where possible which are aimed at ensuring that normal fluctuations in loading and performance can be accommodated within the limit value.

In addition, flow rates vary throughout the year and are not sustained at maximum values for extended periods of time. Therefore, depending on the variability in particular parameter, the actual concentrations can range up to 50% lower than ELV. A review of Newmarket Annual Environmental Report (AER) data 2013 – 2015 submitted to the EPA shows that actual discharges of BOD, Ammonia and Ortho-P ranged between 60% and 80% below the permitted levels which reflects high levels of plant performance and lower than maximum flow rates.

Table 5.3.8: Predicted Maximum Downstream Concentration

Parameter	Predicted Concentration @ 95%ile flow	*95%ile Target Concentration (mg/l)	Compliant
BOD	1.68	<2.6	Yes
Ammonia(as N)	0.07	<0.140	Yes
Orthophosphate	0.05	<0.075	Yes
Nitrate	1.97	<2.7	Yes[1]
Suspended Solids	12.74	25	Yes[2]

1. Nitrate target concentration has been derived for high and good status surface waters (*source 2012 EPA Integrated Water Quality Report –Monaghan Louth 2011*). Mean and 95%ile nitrate target standard of for good status waters has been developed as 1.8mg/l and 2.7mg/l NO3 (as N) respectively.
2. European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. 293 of 1988)

Again, it is noted that the predicted downstream concentrations are based on an extreme worst case scenario, as it is unlikely that the facilities discharge quality emission limits and volumetric emission limits would be at the maximum proposed values for any duration whilst the River Dalua is at its 95%ile flow condition.

Predicted Impact – Blackwater

The River Dalua joins the Allow River approximately 4km downstream of the proposed discharge point. The River Allow then in turn joins the Blackwater below Banteer, approximately 15km downstream of Newmarket Co-Op. It is noted that the Blackwater is known to support populations of freshwater pearl mussels downstream of the site and therefore the potential impact on this watercourse from the Newmarket Co-OP site has been considered.

In order to quantify the impact of the discharge from the site, a comparison was made to the 95%ile flow rate in the Blackwater. It was determined from the EPA Hydrotool that the flow rate in the Blackwater where it converges with the River Allow is 2.31m3/s. The maximum discharge from the Newmarket Co-Op facility represents 1.35% of the 95%ile flow and therefore is considered to have an insignificant impact on the River Blackwater, given that at maximum discharge from the site, approximately 100 dilutions are available.

In addition, the assimilative capacity of the River Blackwater where it converges with the River Allow was calculated to assess the impact of the discharge using the method described in Section 5.3.3.5.

Physiochemical monitoring is undertaken in the River Blackwater by the EPA and Cork County Council. Mean quality data for orthophosphate, BOD and ammonia (Location Reference Point 18B02_1000) is provided in Table 5.3.9 below. The mean results have been developed from records provided by the EPA from February 2013 to October 2014. The records obtained are appended as **EIS Volume II Appendix 5.3.4.**

Table 5.3.9: Mean Physiochemical Water Quality Results River Blackwater (Location Reference Point 18B02_1000) (Ballymaquirk Bridge)

Parameter	Mean (mg/l)
BOD	1.525
Ammonia (as N)	0.0274
Orthophosphate	0.017

The available assimilative capacity for Ammonia, BOD and Orthophosphate has been calculated as 22.44kg, 514.86kg and 11.56kg respectively. The predicted downstream concentrations of BOD, Ammonia and Orthophosphate are presented in Table 5.3.10.

Table 5.3.10: Predicted Maximum Concentration in the River Blackwater

Parameter	Predicted Concentration @ 95%ile flow	*95%ile Target Concentration (mg/l)	Compliant
BOD	1.60	<2.6	Yes
Ammonia(as N)	0.03	<0.140	Yes
Orthophosphate	0.02	<0.075	Yes

Again, it is noted that the predicted downstream concentrations are based on an extreme worst case scenario, as it is unlikely that the facilities discharge quality emission limits and volumetric emission limits would be at the maximum proposed values for any duration whilst the River Blackwater is at its 95%ile flow condition.

The proposed ELV's for Ammonia, Orthophosphate and BOD will use only 5.41%, 7.24% and 3.88% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition respectively and therefore emphasising the above consideration that the discharge from the Newmarket Co-Op facility will have an insignificant impact on the River Blackwater, and furthermore, will not compromise the ability of the Allow/Blackwater system accommodate significant additional discharges in the future, over and above those minor additional inputs envisaged through projected increases in population to 2022.

5.3.3.8 Assessment of Impacts (Construction and Operational)

Construction Phase

Phase 1 (WWTP)

The construction phase of the upgrade of the site WWTP will involve the excavation of soils for foundation construction to provide a base for new tank infrastructure.

It is anticipated that soil clearance for foundation construction will be shallow and therefore will not encounter groundwater.

One of the main potential impacts which could arise with this project is an impact on the water quality in nearby water courses (Rampart Stream). This would occur with washing out of fines (suspended solids) as a result of breaking out existing ground, foundation excavations, concrete washout or spoil storage.

There could also be potential degradation of surface water quality resulting from a spill of hydrocarbon associated with plant and machinery used in the construction works. In this regard, it is noted that there are no significant water features in the immediate vicinity of the proposed works. However, the Rampart Stream which is a tributary of the River Dalua flows along the south eastern boundary of the site.

Phase 2 (Underground Pipeline)

The proposed pipeline route travels along the R576 South towards Kanturk for approximately 3.5km before it diverts westward along the Public Lower Road southwards before discharging to a point adjacent to Allen's Bridge. The majority of the pipeline route will be constructed on made ground (within Newmarket Co-Op site and along public road).

The route does not traverse any designated site however it is located in close proximity to the Black Water SAC 00120.

The proposed pipe will traverse watercourses in 3 different locations (**refer to drawing no. 16547-0002 of Appendix 2.1 (EIS Volume II)** for the locations of each). The pipeline has been designed so as not to interfere with the natural water courses of either the Rampart Stream or the Dalua River. Stoneville bridge road surface has sufficient cover over the arches so that any works will not have any adverse effect on the Rampart Stream. At the second watercourse crossing over a tributary of the Rampart (at Park Bridge), the stream will not be affected by the construction works as the pipe will be laid in the road. The final crossing of the Rampart Stream at Bridge A will not have any effect on the watercourse. Care will also be taken during construction to ensure that these water courses are not adversely affected by the contractor. ~~All works in the vicinity of the watercourses crossing will require particular care and the implementation of mitigation measures to avoid water pollution.~~ No development works are proposed within riparian corridors or along river banks. A Construction Environmental Management Plan (CEMP) will be prepared in advance of undertaking the works which will outline the work methods, control measures to be adopted, monitoring and inspection requirements together with roles and responsibilities of those involved.

Agreement will be sought from Cork County Council with respect to the location of trenches on roads to ensure no damage is caused to storm-water drains, water-mains or other services. All drain and culverts affected by the works are to be re-instated to the satisfaction of Cork Co. Council.

Public road sections and road crossings will be fully reinstated in accordance with Cork County Council road opening licence conditions. Where trenches are to be excavated in blacktop roads, trench edges are to be cut and

milled prior to excavating the trench to avoid unnecessary damage to the existing road.

Surface water courses could be affected during the civil works for installation of the pipeline along the public road and at the outfall location. Contamination of surface watercourses could occur from wash out fines (suspended solids) as a result of trench excavation works, concrete spill or spills of hydrocarbons during refuelling of plant and machinery.

~~It is noted that works will be undertaken off the bank of the River Dalua at the outfall location. When these works are being undertaken there is a risk that these works could result in suspended solids being released to the River.~~

Operational Phase

The predicted ELV's associated with the treated effluent discharged to the River Dalua are described below.

BOD

The predicted BOD concentration in the River Dalua downstream of the Newmarket Co-Op discharge has been calculated as 1.68mg/l, which is significantly below the 95%ile concentration target value for BOD – 2.6mg/l.

The proposed BOD ELV will require an increase of only 16% on existing utilisation levels of assimilative capacity in the River Dalua at the 95%ile flow condition. This has been calculated at the 95%ile flow condition in the river and therefore is a conservative assessment and represents worst case. Flows greater than the 95%ile together with normal discharges from the site, which are significantly lower than limit values used in the calculations, will significantly reduce the resultant BOD levels in the river even further.

However, to place this addition into the context of the River Dalua, the resultant downstream BOD concentration from the proposed discharge represents only a **14%** increase in the utilisation of capacity in the river, when compared to the target quality value, over current licensed discharges.

In conclusion, the proposed BOD ELV can be accommodated in the River Dalua whilst remaining fully compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 and accordingly not cause a significant environmental impact.

~~The predicted BOD concentration in the River Dalua downstream of the Newmarket Co-Op discharge will not result in an exceedance of the 95%ile concentration target value for BOD at the 95%ile flow condition.~~

~~It is noted that the proposed BOD ELV will use only 33% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition.~~

~~The proposed BOD ELV can therefore be accommodated whilst remaining compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009, and accordingly not cause a significant environmental impact.~~

Orthophosphate

The predicted orthophosphate concentration in the River Dalua downstream of the Newmarket Co-Op discharge has been calculated as 0.052mg/l, which is significantly below the 95%ile concentration target value for Ortho-P – 0.075mg/l.

The proposed ELV for orthophosphate will require an increase of only 26% on existing utilisation levels of assimilative capacity in the River Dalua at the 95%ile flow condition. This has been calculated at the 95%ile flow condition in the river and therefore is a conservative assessment and represents proposed worst case levels which are unlikely, as discussed above. Flows greater than the 95%ile together with normal discharges from the site, which are significantly lower than limit values used in the calculations, will significantly reduce the resultant Ortho-P levels in the river even further.

To place this addition into the context of the River Dalua, the resultant downstream Ortho P concentration from the proposed discharge represents a **17%** increase in the utilisation of capacity in the river, when compared to the target quality value, over current licensed discharges.

In conclusion, the proposed Ortho P ELV can be accommodated in the River Dalua whilst remaining fully compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 and accordingly not cause a significant environmental impact.

~~The predicted orthophosphate concentration in the River Dalua downstream of the Newmarket Co-Op discharge will not result in an exceedance of the 95%ile concentration target value at the 95%ile flow condition.~~

~~It is noted that the proposed ELV for orthophosphate will use 66% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition.~~

~~The proposed orthophosphate ELV can therefore be accommodated whilst remaining compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009, and accordingly not cause a significant environmental impact.~~

Ammonia

The predicted ammonia concentration in the River Dalua downstream of the Newmarket Co-Op discharge has been calculated as 0.07mg/l, which is

significantly below the 95%ile concentration target value for ammonia – 0.14 mg/l.

The proposed ELV for ammonia will require an increase of only 28% on existing utilisation levels of assimilative capacity in the River Dalua. This increase has been calculated at the 95%ile flow condition in the river and therefore is a conservative assessment and represents worst case levels, which are unlikely to occur as discussed above. Flows greater than the 95%ile together with normal discharges from the site, which are significantly lower than limit values used in the calculations, will significantly reduce the resultant ammonia levels in the river even further.

Again, to consider this addition in the context of the River Dalua, the resultant downstream ammonia concentration from the proposed discharge represents a **19%** increase in the utilisation of capacity in the river, when compared to the target quality value, over current licensed discharges.

In conclusion, the proposed ammonia ELV can be accommodated in the River Dalua whilst remaining fully compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 and accordingly not cause a significant environmental impact.

~~The predicted ammonia concentration in the River Dalua downstream of the Newmarket Co-Op discharge has demonstrated that the ammonia load from the proposed discharge point will not result in an exceedance of the 95%ile concentration target value at the 95%ile flow condition.~~

~~It is noted that the proposed ELV for ammonia will use 47% of the available assimilative capacity in the receiving watercourse at the 95%ile flow condition.~~

~~The proposed ammonia ELV can therefore be accommodated whilst remaining compliant with the requirements of S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009, and accordingly not cause a significant environmental impact.~~

Nitrate

The predicted nitrate concentration in the River Dalua downstream of the Newmarket Co-Op discharge has been calculated as 1.97 mg/l, which is significantly below the 95%ile concentration target value for ammonia – 2.7 mg/l.

The proposed ELV for Nitrate will require an increase of 35% on existing utilisation levels of assimilative capacity in the River Dalua. This increase has been calculated at the 95%ile flow condition in the river and therefore is a conservative assessment and represents worst case, which is most unlikely as the WWTP will be operating to achieve lower emission levels than the required ELVs to ensure compliance in all scenarios as discussed above. Flows greater than the 95%ile together with normal discharges from the site, which are

significantly lower than limit values used in the calculations, will significantly reduce the resultant nitrate levels in the river even further.

Again, to consider this addition in the context of the River Dalua, the resultant downstream nitrate concentration from the proposed discharge represents a **20%** increase in the utilisation of capacity in the river, when compared to the target quality value, over current licensed discharges.

In conclusion, the proposed ammonia ELV can be accommodated in the River Dalua whilst remaining fully compliant with water quality objectives for that parameter and accordingly not cause a significant environmental impact.

~~The predicted concentration of nitrate in the River Dalua downstream of the Newmarket Co-Op discharge has been demonstrated to be below the calculated concentration 95%ile target value of 2.7mg/l at 2.06mg/l and therefore the impact of the discharge is not considered to cause a significant impact on water quality within the River Dalua.~~

Suspended Solids

The predicted suspended solids (SS) concentration in the River Dalua downstream of the Newmarket Co-Op discharge has been calculated as 12.74mg/l, which is significantly below the 95%ile concentration target value for SS – 25 mg/l.

The proposed ELV for suspended solids will require a 9% increase on existing utilisation levels of assimilative capacity in the River Dalua. This has been calculated at the 95%ile flow condition in the river and therefore is a conservative assessment and represents worst case. Flows greater than the 95%ile together with normal discharges from the site, which are significantly lower than limit values used in the calculations, will significantly reduce the resultant SS levels in the river even further.

To consider this addition in the context of the River Dalua, the resultant downstream suspended solids concentration from the proposed discharge represents a **3%** increase in the utilisation of capacity in the river, when compared to the target quality value, over current licensed discharges.

In conclusion, the proposed SS ELV can be accommodated in the River Dalua whilst remaining fully compliant with the requirements of the EC (Quality of Salmonid Waters) Regulations 1989 and accordingly not cause a significant environmental impact. It is noted that the predicted contribution from the discharge is 0.14mg/l which represents less than 1% of the 25mg/l standard as set out in the Regulations.

~~The predicted concentration of suspended solids downstream of the Newmarket Co-Op facility has been found to have a negligible increase on the assumed background concentration of 12.5mg/l, and therefore the discharge from the wastewater plant is not considered to be of significance. It is noted that the predicted contribution from the discharge is 0.24mg/l~~

~~which represents less than 5% of the 25mg/l standard as set out in the Quality of Salmonid Regulations.~~

~~On the basis of the predicted emission values outlined in Table 5.3.7, it appears feasible to discharge directly to the River Dalua without causing an impact on water quality.~~

Cumulative Impacts and Assimilative Capacity

The amended **Appendix 5.3.6** has assessed the proposed development in the context of the available assimilative capacity in the River Dalua system and takes account of the cumulative impacts of other sources including Newmarket and Kanturk public urban WWTP's and the Kanturk North Cork Co-OP WWTP. The assimilative capacity assessment has been calculated based on water quality data which takes account of current discharges from the Newmarket urban WWTP upstream i.e. is based on the remaining assimilative capacity **after** the impact of upstream discharges including the public wastewater treatment plant. The findings of the assessment confirm:

- There is sufficient Assimilative Capacity within the River Dalua to accept discharges from Newmarket under the proposed amendment.

- Discharges can be made in full compliance with the Surface Water Regulations (S.I. 272 of 2009).

When evaluated in the context of other sources, the (cumulative) assessment shows that:

- As set out in the amended **Appendix 5.3.6**, significant residual assimilative capacity remains within the downstream river system after the proposed mass emissions from Newmarket Co-Op, Newmarket and Kanturk urban public WWTPs and Kanturk North Co Op WWTP have been taken into account.

- Based on the assessment provided in the amended **Appendix 5.3.6**, there is significant residual assimilative capacity to allow for other discharges to be made, while maintaining compliance with the water quality standards Good status values the parameters of which are covered under the Surface Water Quality Regulations 2009.

- The assessment demonstrates that the discharges from Newmarket, can be accommodated within the catchment without impacting adversely on the future developments within Newmarket and Kanturk settlements or those planned for future development within the Cork County Development Plan, Kanturk Area Local Plan and the Mallow Kanturk Municipal District Local Area Plan.

- Point discharges represent a minor influence on water quality in the overall catchment. Other improvement measures within the wider catchment (further implementation of the Nitrates Directive and actions for achievement of Water Framework Directive commitments) should lead to further improvement in water quality across the Blackwater river system.

- The discharges amount to less than 8% of the 95%-ile flow in the Allow and < 1.5% in the Blackwater and therefore can have only limited influence on the overall water quality within the larger Blackwater river system.

- Overall discharges from both Newmarket and Kanturk lead to utilisation of less than 10% of the Blackwater assimilative capacity which is not significant and thereby ensures that ample capacity exists to facilitate additional population growth and developments within the catchment.

5.3.3.9 Proposed Mitigation and Enhancement Measures

Construction Phase

The mitigation factors and measures for the control of pollution and general protection of surface water are described below.

Control of both erosion and sediment entrainment in runoff will be a key undertaking during the construction phase of the project. It will be necessary to ensure that the risk of potential washout of fines to surface water is minimised. Contamination of watercourses with silt will be prevented by managing materials which have potential to give rise to siltation at source.

The proposed route will involve the crossing of watercourses at three different locations. Stoneville bridge road surface has sufficient cover over the arches so that any works will not have any adverse effect on the watercourse. At the second watercourse crossing (Park Bridge) and final watercourse crossing (Bridge A) the pipeline will be laid within current bridge infrastructure, thereby avoiding in-stream works.

Given the nature of the works being undertaken as part of the installation, it is noted that risks to water quality for the most part are not considered significant; however measures will need to be adopted where works are being undertaken in the vicinity of water crossings.

Stockpiling of excavated material may occur on site subject to appropriate management. Any stockpiled materials will be stored in low mounds at the Newmarket Co-Op facility and they will be located as far as possible from any existing water bodies. There will be no materials stored within 50m of nearby watercourses.

For pipeline works, where possible, excavated material from the construction works will be used predominantly for trench backfill and/or landscaping. Any excess materials will be disposed of to a licensed disposal facility.

To minimise impacts from disturbance, pipelines will be laid in small trenches along the edge of existing road and track infrastructure as far as possible.

Excavation of trenches will be carried out over short distances, with frequent backfilling of trenches in order to minimise opportunity for the ingress of water into open trenches.

The reinstatement of trenches on public roads will be carried out in accordance with the DOE publication, "Guidelines for Opening, Backfilling and Reinstatement of Trenches in Public Roads".

All oils and fuel required for the project must be stored in a bunded area with provisions of adequate spill retention capacity (a minimum of 110% tank capacity).

The issue of accidental spillage of hydrocarbons such as diesel and lubrication oil during refuelling of plant machinery is a potential risk during the construction phase. A purpose designed, removable, drip tray will be provided beneath connection points to catch any residual oil during filling and disconnection of the flexible tanker hose. The drip tray will be regularly emptied and disposed of off-site by a specialist licensed contractor.

Vehicle refuelling will not occur within 50 m of any watercourse and all machinery will be maintained in good working order, free from leakage of fuel or hydraulic fluid. Oil booms and oil soakage pads will be maintained on-site and on all operated machinery to enable a rapid and effective response to any accidental spillage or discharge.

Where required, wet concrete will be manufactured at an offsite batching plant and where necessary transported to the required route area by Ready Mix Trucks during pipeline installation works. The pouring of concrete will be controlled to ensure quality control, safe working operation and no impact on the environment.

The transport of concrete in Ready Mix Trucks will be strictly controlled to ensure the safe passage of the material while on route, with particular attention given to spillage. All transport deliveries shall be carried out strictly within the permitted truck carrying capacity and no allowance will be permitted for exceeding the carrying specification of the lorry.

Any spillages will be cleaned up and disposed of correctly. Surplus concrete will be returned to batch plant after completion of a pour.

When constructing the final outfall to the River Dalua the appointed Civil Contractors will adhere to the following measures at a minimum:

- An Environmental Scientist / ECoW is to be present for this element of the works to ensure that all necessary control measures are put in place and to monitor water quality downstream of the works area;

- Visual inspection of the Dalua upstream and downstream of the works area. Field hydrochemistry samples to be collected before, during and after the works. Turbidity monitoring to form part of field monitoring;

- Collection of water samples for suspended solids, ammonia and orthophosphate analysis prior to, during and after works have been completed.

Operational Phase

The site is currently licensed by the Environmental Protection Agency and final ELV's to be adopted will be subject to their assessment and agreement. Newmarket Co-Op will monitor the treatment system performance internally to ensure that it is working effectively and will also monitor the quality of the final discharge on a continuous basis.

Summary and Conclusion

Mitigation measures have been proposed to ensure protection of surface waters during both the constructional and operational stage.

Both erosion and sediment entrainment in runoff produced during excavation works is considered the most significant risk to surface water during the construction stage. The proposed mitigation measures will ensure that this risk is kept to a minimum. It is noted that additional care will be required when working at water crossings and during concrete pours.

The impact assessment of the discharge from the proposed emission point downstream of Allen's Bridge will not result in an exceedance of any of the target concentrations set out in the Surface Water regulations (S.I. 272 of 2009) for achievement of a 'good status' watercourse.

The proposed ELV's for volume and associated mass emission of BOD, Ammonia and Orthophosphate have been shown, using approved methodology, to be compliant with S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 for attaining Good status in the River Dalua. In addition, the impact of the nitrate and suspended solids emissions has been demonstrated as not causing an impact on the receiving water. Compliance is assured under a worst case assessment basis as resultant concentrations for the parameters assessed are well below the relevant target values and leave significant reserve capacity in the river to assimilate potential discharges from other sources in the catchment.

There is sufficient Assimilative Capacity within the River Dalua after discharges from the Newmarket urban WWTP are taken into account to accept discharges from Newmarket under the proposed amendment.

When evaluated in the context of other sources, the cumulative assessment shows that:

- The assessment demonstrates that there is significant residual assimilative capacity to allow for other discharges to be made into the River Dalua, while maintaining compliance with the water quality standards "Good" status values, the parameters of which are covered under the Surface Water Quality Regulations 2009. The proposed discharge will not impact on the capacity of future planned residential and industrial developments within Newmarket and Kanturk, and those planned and zoned within the Cork County Development Plan, Kanturk Area Local Plan and the Mallow Kanturk Municipal District Local Area Plan to utilise the river quality resource as part of their developments.

- Overall discharges from both Newmarket and Kanturk lead to utilisation of less than 10% of the Blackwater assimilative capacity which is not significant and thereby ensures that ample capacity exists to facilitate additional population growth and developments within the catchment.

Chapter 5 – Section 5.4 Noise and Vibration

5.4.1 Introduction

This chapter presents the noise and vibration impact assessment of the Proposed Development at Newmarket Co-Op comprising:

- Construction of a new 4km wastewater pipeline;
- Upgrade of the existing WWTP and construction and operation of additional wastewater treatment facilities, and,
- Extension of current milk processing peak operating times

Key issues to be addressed in this chapter include potential construction noise impacts arising from the installation of the pipeline along the R576 and construction/upgrade of the WWTP, additional traffic and change in traffic patterns on the local road network and entrance to the facility resulting in additional traffic noise impact and assessment of the potential noise impact arising from the increase in operational hours to include Sunday and extension of the peak season.

The assessment has been prepared by Siobhan Maher, of Redkite Environmental Ltd. Qualifications include M.Tech. Environmental Management, B.Sc. Analytical Science, Dip. Acoustics and Noise Control Engineering, MIOA.[7]

5.4.2 Consultation

Newmarket Co-Op has not received noise complaints as a result of existing operations. Past noise surveys show that the facility is compliant with the noise conditions set out in the IEL licence. Therefore separate consultation was not conducted by the noise and vibration specialist as part of this assessment.

5.4.3 Methodology

Characterisation of the Receiving Environment

The receiving ambient noise environment has been characterised by a desk-based review of past monitoring data compiled by OES Consulting. Past monitoring is deemed sufficient to complete the assessment. No significant difficulties were encountered as a result.

Ambient noise monitoring is regularly conducted at a number of Noise Sensitive Locations (NSLs) in the immediate vicinity of the facility since 2010.

Noise monitoring was initially conducted as part of the IPPC licence application; reference P0793-01, in October 2006. Following the granting of the licence, monitoring was conducted bi-annually. A licence review (P0793-

[7] MIOA – Member of Institute of Acoustics

02) was granted in 2010 and the frequency of noise monitoring was reduced, based upon the compliance history of the facility with noise limits. The revised licence stipulated annual noise monitoring and a revision of the monitoring locations to remove boundary monitoring locations.

Accordingly, the latest annual noise survey for 2015, prepared in compliance with existing license conditions, was reviewed in order to characterise the receiving environment and the existing noise impact of the facility at NSLs. Historical monitoring data is included in the 2015 survey report including data for past licence boundary monitoring locations (N4 and N6 close to the WWTP) which were last monitored in 2010 and 2011. The 2015 survey was conducted in June 2015 during peak season and in accordance with the EPA Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), 2012.

A number of additional spot noise source measurements were also previously undertaken during the June 2014 annual survey by OES Consulting to provide additional information for this chapter of the EIS.

Prediction of Construction Phase Impacts

Prediction of construction noise associated with the installation of the pipeline and construction at the WWTP has been conducted as described in British Standard 5228: Part 1: 2009, Noise and Vibration Control on Construction and Open Sites. According to this standard, a number of factors such as site location, existing ambient noise levels, duration of site operations, hours of work and attitude of the site operator are likely to affect considerations of acceptability of site noise. Details of the duration of the works and typical activities envisaged were provided by the engineering design team. The equipment likely to be used was selected from sources in BS5228 however the exact equipment used will be determined by the successful contractor taking account of measures recommended in this EIS. A worst case scenario in terms of noise impact was assumed for the purposes of this assessment.

Prediction of Operational Phase Impacts

WWTP Sources

Noise levels at the nearest NSLs are normally predicted in accordance with the guidance set out in ISO 9613.-2 - Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. However as the design is at an early stage, the assessment considers applicable limits and conditions to ensure that there is no significant effect on NSLs.

Traffic Related Impacts

The potential noise impact of expected changes in traffic patterns and flows has been assessed through a review of existing roadside traffic noise data and flows compared against expected future flow changes and corresponding likely changes in traffic noise levels. Standard noise calculations for vehicle pass-by were also used where necessary. BS4142:2014

Methods for Rating and Assessing Industrial and Commercial Sound was also used as guidance. The traffic impact assessment provided in Section 5.7 below informed the traffic noise impact assessment.

Criteria for Assessment of Noise Impact and Determination of Significance

The following criteria have been used to assess noise impacts and effects described in this chapter:

Table 5.4.1: Criteria for Noise Impact Assessment

Criteria for Extent of Noise Impact (dB)	Noise Impact Magnitude	Magnitude Rating
>10	Severe	Very high
5 to 10	Substantial	High
3 to 5	Moderate	Medium
1 to 3	Slight	Low
<1	No impact	Very Low

The above table describes the noise impact i.e. the change in noise levels before and after implementation of a proposal. The table does not however describe whether the change in noise levels is significant. Relying solely on change in noise level is not appropriate because it risks ignoring the context of the noise change. The actual effect on receptors and hence significance takes account of other relevant factors such as time of day, averaging periods, nature of source, frequency spectra, frequency of occurrence and absolute level. The linking of magnitude of impact to effects and significance is described in Table 5.4.2 below.

Table 5.4.2 Significance of Effects

Impact Magnitude	Receptor Perception	Significance
Negligible	No discernible effect	Not significant
Slight	Non-intrusive	Less likely to be significant ↓
Moderate	Intrusive	
Substantial	Disruptive	More likely to be significant
Severe	Physically harmful (e.g. sleep disturbance, cardio-vascular effects)	Always significant

The above assessment procedure is in line with recently published methodologies set out in BS4142:2014 and IEMA Guidelines for Environmental Noise Impact Assessment, 2014.

5.4.4 Baseline Description of Existing Conditions

Surrounding Area

The Newmarket Co-Op facility is located in Newmarket town, a small rural town in northeast Cork with a population of approximately 2,500 people. Agri-businesses and businesses related to those employed within the agricultural sector, such as Newmarket Co-Op predominate in the town. The facility is surrounded by a mix of commercial and residential development.

The local topography is gently undulating, with residential dwellings and commercial enterprises within Newmarket generally located upon a higher elevation than the facility and hence overlooking the facility from the north, northwest and east. The boundaries of private residential properties are located along the facility boundary to the northwest, west, south and southwest of the facility. The Elms, a detached dwelling, is located to the east/southeast and approximately 63m from the R576. It is the nearest NSL in this direction. A number of NSLs are located on the entrance road to the south of the facility at Emmett Place. Palm Grove, another detached dwelling, is located on the Charleville Road (R578) and approx. 58m from the northwest boundary of the facility. Agricultural lands bound the facility to the north, northeast and east. The nearest NSLs are identified on **Figure 5.4.1, EIS Volume III**. The R576 is the main route from Newmarket to Kanturk to the east. The route is characterised by detached ribbon development mainly set back from the road.

On-site Sources

The core activity on site is the processing of milk into cheese. Processing of milk occurs indoors. All processing equipment is located within a building which, by the nature of the building fabric, provides attenuation of noise to the external environment. External noise sources are present. These mainly include:

- Roof mounted air conditioning systems & fans;
- Pumps and mixers in the milk intake area;
- Vehicles delivering milk to the site and transporting products off site;
- WWTP pumps and motors, and,
- Forklift manoeuvring within the facility boundary.

Monitoring Results

Based on a review of the 2015 noise survey report, the ambient noise environment in the vicinity of the facility can be described as predominantly influenced by regular traffic on the local road network. Noise monitoring is completed at three locations in the vicinity of the facility as described in Table 5.4.3 below and as indicated on **Figure 5.4.1, EIS Volume III**.

Table 5.4.3: Noise Monitoring Locations

Location	ITM Co-ordinates Easting; Northing	Description of Location
NSL2	531859; 607535	Located on the approach road (Emmett Place) to the facility, outside the plant main gate at a dwelling house (<10m from facility IEL boundary).
NSL3	531853; 607722	Located off the Charleville Road close to the boundary of an adjoining property. The meter is located within the facility lands and

		approximately 15m set back from the roadside.
NSL4	532257; 607395	Located on R576 road southeast of the facility, approximately 66m south of The Elms dwelling.

Constant steady plant noise arising from the facility is audible at all three locations to varying degrees. The 2015 report describes steady noise from air handling and refrigerator plant as audible at NSL2 and faint to very faint at NSL3 and NSL4 respectively. The steady plant noise becomes more clearly audible at night time as the masking effect of traffic subsides during the night time period as traffic reduces. No tones were noted, either subjectively or objectively[8] in association with the constant steady noise sources.

Additional facility noise sources audible during the day include intermittent forklift activity and trucks manoeuvring inside the facility boundary. Noise from the existing WWTP was not specifically noted as audible during the survey. This is to be expected and is due to either intervening distance and/or screening by existing facility buildings afforded to monitoring locations.

Additional external noise sources impacting the monitoring locations include other commercial premises (refrigeration systems, chillers, etc.), people (talking, opening/closing doors, etc.), dogs barking and normal domestic activities (gardening, lawnmowers, hedge trimmers etc.).

The $L_{A90,30minute}$ parameter was used in the 2015 survey to establish compliance with the IEL licence and describe facility noise in accordance with guidance set out in EPA Guidance Note NG4. This parameter can be used if the noise emissions on site are relatively steady and where extraneous noise may unduly influence the measured L_{Aeq}. The results ranged from $L_{A90,30minute}$ 39 – 49 dB(A) during the day and from 39 – 46 dB(A) during the night time period.

The results for 2015, when compared with historic data summarised in Table 5.4.4 below, were in line with historic data for each monitoring location. The historic data is included in **Appendix 5.4.1, EIS Volume II**.

Table 5.4.4: Historical Results Summary for NSLs (2010 – 2015)

Noise Sensitive Location	Night-time $L_{A90\ (30\ minutes)}$	Day-time $L_{A90\ (30minute)}$
NSL2	43-46	44-47
NSL3	38-43	39-45
NSL4	36-40	44-51

The historic reports also noted that noise arising from the facility is either faint or not audible at NSLs during monitoring events. Typical noise audible at NSLs is attributed to:

- Traffic on the local road network;
- Wind induced noise through hedging; and

[8] Tones were assessed objectively in accordance with the simplified method set out in Annex D of ISO 1996-2:2007(E) Acoustics – Description, Measurement and Assessment of Environmental Noise, Part 2: Determination of Environmental Noise Levels.

- Other business activities closer to the monitoring location.

The proposed development will involve an element of upgrade of the existing WWTP and construction of a new extension directly north. The existing WWTP is not audible at the monitoring locations listed in Table 5.4.3. As the plant was not fully operational at the time of writing this report, past data for "boundary" monitoring completed in 2010 and 2011 was reviewed to establish noise levels associated with the existing WWTP. Locations N4 and N6 as illustrated in **EIS Volume III Figure 5.4.1**, were both located close to the existing WWTP. Both the L_{A90} and L_{Aeq} values are similar for each location and also do not vary significantly from day to night indicating that facility sources (most likely from the WWTP) were predominant at these locations. The levels ranged from 48 – 51 dB(A).

In June 2014 measurements were undertaken by OES Consulting at selected areas on site to assess source noise levels. Monitoring was conducted at the east, north-east and southeast of the WWTP as indicated below.

Table 5.4.5: 2014 Noise Monitoring at WWTP

ID and Location	Duration (mins)	L_{Aeq}	L_{AFMax}	L_{A10}	L_{A90}
S.E. WWTP	00:02:00	63	65	63	62
East of WWTP aeration tanks	00:02:00	53	57	54	53
N.E. of WWTP	00:02:00	55	58	56	53

It is likely that the measurement taken at the southeast was close to a blower or similar type source at the WWTP while the other measurements were at the boundary of the existing WWTP.

5.4.5 Results of Assessment of Existing Impact

The IED license (P0793-02) sets out the requirements for noise impact in relation to the facility.

Condition 4.5 of the IE license (P0793-02) states the following:

"Noise from the installation shall not give rise to sound pressure levels ($L_{eq,T}$) measured at noise sensitive locations of the installation which exceed the limit value(s). "

The limit values are set out in Schedule B.4 of the IED license which states that *"noise from the installation shall not give rise to sound pressure levels ($L_{Aeq,\ 30\ minutes}$) which exceed the limit value of 55 dB(A) by day and 45 dB(A) by night. In addition, there shall be no clearly audible tonal or implusive noise component in the noise emission from the activity at any noise sensitive location."*

Monitoring conducted in 2015 during peak operations demonstrates that the facility is in compliance with license conditions in relation to noise at the nearest NSLs during the daytime. One reading at NSL2 (Emmett Place) was above the night time limit due to three trucks passing the noise meter during

the reading. Truck movements outside of the license red-line boundary and on public roads are not assessed for the purposes of compliance with license limits. Accordingly, the night time limit was also complied with. However it is acknowledged that the noise from the trucks is associated with the facility and has the potential to temporarily elevate ambient noise levels at Emmett Place as demonstrated during the survey.

Overall, the facility has an excellent compliance history regarding noise arising from site activities. No complaints have been logged directly with Newmarket Co-Op or with the EPA regarding the facility during its many years of operation.

5.4.6 Assessment of Impacts

5.4.6.1 Construction Phase

There are two elements to the Proposed Development that will involve construction works; - installation of the pipeline along the R576 to the River Dalua and works on-site associated with the upgrading of the existing WWTP and construction of the new WWTP extension.

Prediction of construction noise to the nearest NSLs has been conducted as described in BS 5228: Part 1: 2009, Noise and Vibration Control on Construction and Open Sites. As the construction of the Proposed Development will be subject to a tendering process, the prediction of construction noise can only be an outline of likely sources used. Also, BS5228, from which the noise data is sourced, refers to different power ratings for equipment. During the actual construction, these ratings may vary and therefore the noise levels will vary. Accordingly, there is a degree of uncertainty in the predictions undertaken.

5.4.6.2 Pipeline Installation

The installation of 4km of pipeline along the R576 is expected to take place over a 2-3 month period with up to 100m installed per day. A total 4.0 metres wide working width along the R576 would be required for the underground construction works. The machinery likely to be used to install the pipeline includes a maximum size 20 tonne excavator to dig out existing soil and subsoil, JCB or bobcat for backfilling and a dump truck for removal of surplus spoil. Gravel delivery trucks will also be used. It is anticipated that a total of 22 Heavy Goods Vehicles (HGV) will travel both to and from the pipeline construction point every day. This equates to 44 truck movements per day. Table 5.4.6 overleaf details the noise sources and levels that may be experienced temporarily at NSLs in the vicinity of the pipeline route.

Table 5.4.6: Likely Noise Levels Arising from the Installation of the Pipeline at Receptors on the R576

No.	Activity	Source	Activity equivalent continuous sound pressure level L_{Aeq} @ 10m
1	Tracked excavator (22T)	BS5228:1- 2009 Table C2#3	78
2	Bobcat (mini tracked excavator 2.8T)	BS5228:1- 2009 Table C3#20	68
3	Dump truck for removal of spoil	n/a	Engine off while being filled.
4	Dump truck for removal of spoil moving on the R576*	BS5228:1- 2009 Table C3#31	87
5	Tipper lorry/tipping gravel fill	BS5228:1- 2009 Table C2, #30	79

Drive by maximum sound pressure level in L_{Amax}

The vast majority of houses along the R576 are set back off the road by at least 15m. Existing traffic noise levels directly along the roadside are likely to be similar to those recorded at NSL4 during the annual noise surveys. The daytime $L_{Aeq,\ 30\ mins}$ values at this location ranged from 65 – 70 dB since 2010. Accordingly existing traffic noise levels at the front façade of houses on the R576 are likely to be in the range of 53 – 58 dB(A).

Not all of the sources will be in operation together at any given time during the installation of the pipeline. Source 1 is likely to be used the most during a typical working day from 08.00 – 18.00 hrs. Approximately 4.5 trucks movements will occur per hour involved in either tipping or removal of excavated material (Sources 4 and 5). Overall, it is predicted that the $L_{Aeq,\ 1hr}$ for an NSL set back a minimum of 10m from the roadside is likely to be dominated by the noise of the excavator taking duration into account. The predicted $L_{Aeq,\ 1hr}$ for NSLs set back at an average distance of 15m is 75dB(A). Accordingly, the installation of the pipeline will result in a potentially very high magnitude of change in overall ambient noise levels at existing receptors along the R576. This calculation is based on a worst case scenario with the excavator in continuous full operation. However, each day, the works will move 100m further away from individual NSLs. Therefore the noise levels are expected to reduce back to within the range of normal levels after each day of localised construction. The effect is not deemed to be significant due to the very short duration of elevated noise levels at each NSL due to the pipeline installation.

Based on the equipment proposed for use it is envisaged that there will be no vibration impacts on structures or occupants in the vicinity of the pipeline installation works.

5.4.6.3 WWTP Construction

The construction phase for the proposed extension is expected to last over a 43 week period. The upgrade of the existing WWTP will run concurrently or in

parallel with the construction of the extension in order to minimise construction time and avoid unnecessary delays for future operations. Chapter 2 of this EIS details the proposed upgrade and construction details. The works will generally include activities such as demolition, excavation/earthworks to provide level sites for structures, construction of a control room, plinths and culverts, placement of steel, installation of pre-formed structures including tanks and dosing units etc. and final electrical fit-out. A broad overview of typical activities is described below.

Typically, site preparation will involve the operation of heavy equipment, such as excavators within the proposed site, and the movement of HGVs onto and off site, all involved in excavation and filling works to provide level sites. Some hardcore is likely to be unloaded and leveling will occur using rollers.

It is anticipated that demolition of the biotower will be done using a tracked excavator.

Piling, rock breaking and ripping will not be required.

Construction will involve activities such as pouring of concrete for plinths and the control room floor slab, installation of tanks and equipment, roofing and cladding of the control room followed by mechanical and electrical services installation and commissioning. The above would typically involve concreting operations, dismantling and loading scaffold poles and clips, the use of diggers, dumpers poker vibrators, cranes, hoists, compressors and rollers etc.

Table 5.4.7 overleaf details typical noise sources that may be in operation at different times and predicted noise levels at the nearest NSLs.

Table 5.4.7: Likely Noise Levels Arising from the Construction Phase for the WWTP Predicted at The Elms and Palm Grove NSLs

Activity	Source	Activity equivalent continuous sound pressure level L_{Aeq} @ 10m	Predicted $L_{Aeq,t}$ at The Elms	Predicted $L_{Aeq,t}$ at Palm Grove
Demolition			**Group Total (dB(A)**	
Likely equipment to be used for demolition of steel biotower			**58****	**56**
Tracked Excavator (breaking and cutting steel) 14T	BS5228:1- 2009 Table C1, #17	83	57	54
Gas Cutter	BS5228:1- 2009 Table C2, #18	79	53	50
Dump Truck for Removal of Steel*	BS5228:1- 2009 Table C2, #34	80	40	37
Site Preparation for New WWTP			**Group Total (dB(A)**	

Activity	Source	Activity equivalent continuous sound pressure level L_{Aeq} @ 10m	Predicted $L_{Aeq,t}$ at The Elms	Predicted $L_{Aeq,t}$ at Palm Grove
Likely equipment to be used for clearing, ground excavation & preparation			**63**	**60**
Tracked Excavator 22T	BS5228:1- 2009 Table C2, #03	78	55	52
Tipper lorry/Placing of rock fill*	BS5228:1- 2009 Table C2, #34	80	43	40
Tracked loader	BS5228:1- 2009 Table C2, #03	78	55	52
Likely equipment to be used for trenching				
Tracked Excavator and Lorry	BS5228:1- 2009 Table C2, #3	78	55	52
Likely equipment to be used for tipping/spreading and leveling of ground				
Dump Truck*	BS5228:1- 2009 Table C2, #30	79	42	39
Wheeled Excavator/loader	BS5228:1- 2009 Table C2, #26	79	56	53
Dozer	BS5228:1- 2009 Table C2, #12	81	58	55
Roller*	BS5228:1- 2009 Table C2, #38	73	36	33
Construction/Installation of Structures			**Group Total (dB(A)**	
Likely Equipment to be used for Construction and Installation			**65**	**62**
Truck mixer (discharging)	BS5228:1- 2009 Table C4, #18	75	52	49
Pumping concrete - truck mixer	BS5228:1- 2009 Table C4, #20	80	57	54
Placing concrete and compaction – (combined truck mixer, tracked crane, poker vibrator)	BS5228:1- 2009 Table C4, #29	80	57	54
Poker Vibrator	BS5228:1- 2009 Table C4, #33	78	55	52
Ancillary Plant likely to be used during Construction and Installation				

Activity	Source	Activity equivalent continuous sound pressure level L_{Aeq} @ 10m	Predicted $L_{Aeq,t}$ at The Elms	Predicted $L_{Aeq,t}$ at Palm Grove
Diesel Driven Generator	BS5228:1- 2009 Table C4, #76	61	38	35
Compressor	BS5228:1- 2009 Table C.5, #05	65	42	39
Poker vibrators (max likely)	BS5228:1- 2009 Table C4, #33	78	55	52
Electric percussion drills	BS5228:1- 2009 Table D6, #52	78	55	52
Hand-held circular saw	BS5228:1- 2009 Table C4, #72	79	56	53
Scaffold Poles and Clips (dismantling)	BS5228:1- 2009 Table D7, #01	80	57	54
Lifting Platform	BS5228:1- 2009 Table C4, #57	67	44	41
Site Fork Lift Trucks (idling)	BS5228:1- 2009 Table D7, #96	77	54	51
Diesel Hoist	Historic	76	53	50
Dumper* 7tonne	BS5228:1- 2009 Table C4, #03	76	39	36
Tracked Crane	BS5228:1- 2009 Table C4, #50	71	48	45
Lorry, 4Axle*	BS5228:1- 2009 Table C2, #34	80	43	40
Paving Works/Landscaping			**Group Total (dB(A)**	
Likely equipment to be used for Landscaping			**50**	**47**
Tipper lorry*	BS5228:1- 2009 Table C8, #20	79	42	39
Roller*	BS5228:1- 2009 Table C2, #37	79	42	39
Grader*	BS5228:1- 2009 Table C6, #31	86	49	46

Drive by maximum sound pressure level in L_{Amax} (overall level)

***** Ignores screening of demolition works by existing structures.***

The highest combined prediction for a number of sources is 65 dB(A) at The Elms during the construction/installation stage. The cumulative impact at this NSL of both site preparation and demolition operating concurrently have also been assessed and found to be less than the overall impact of the construction/Installation stage. Baseline noise levels have not been measured at this house, however based on background levels recorded at NSL 2, 3 and

4, it is likely that existing ambient noise levels at the rear of the house are in the vicinity of 45-50 dB(A) during the daytime. The predictions set out in Table 5.4.7 above take account of distance attenuation from the nearest construction point and with little screening provided (as the NSLs are at a higher elevation). They do not take account of the duration of sources which may be intermittent. Therefore the magnitude of change in ambient noise levels may not be as high as predicted above however it is likely to be elevated by 10 decibels at least above existing ambient noise levels thus the magnitude rating of the impact is considered to be very high. As noted previously the context defines the actual effect and significance of the impact. Construction works are temporary in nature however they can be disturbing and annoying. Accordingly, it is considered that the effect on The Elms and Palm Grove is likely to be temporarily significantly adverse. Other receptors in the area to the west are likely to be screened from the works by existing facility buildings. Section 5.4.8 details mitigation measures and acceptable limits for the construction phase of development.

5.4.6.4 Operational Phase

Extension of Peak Processing Season

It is proposed to extend the peak season beyond the current period to accommodate processing of an increased milk pool. It should be noted that currently there are no differences between peak and non-peak months in the number or noise level of operational noise sources. Accordingly, there will be no perceptible difference in noise levels from Monday to Saturday as a result of the extended peak season. The increased production will however mean that operations will extend to include Sundays. As with most plants, the main non-mobile noise sources such as AHUs, refrigerators and cooling towers are operational on a Sunday for storage etc. Accordingly, it is not considered that there will be an increase in noise emissions from these sources on a Sunday. However, the Proposed Development will result in increased HGV movements on the local road network, particularly at Emmett Place and increased staff arrivals and departures on a Sunday compared to the existing scenario. These issues are dealt with under Traffic Noise Impact below.

5.4.6.5 WWTP Additional Noise Sources

Chapter 2 of this EIS details the new equipment associated with the proposed extension to the WWTP. There will be a number of new pumps and blowers associated with the Proposed Development. Sound power values are not available at this early stage in the design process as not all equipment has been fully specified. The designers of the WWTP upgrade have provided an approximation of sound pressure levels (SPL) of 75 – 80 dB(A) at 1m from the potential units. The blowers will be fitted with acoustic hoods. Based on distance attenuation alone, the blowers are unlikely to result in elevation of ambient noise levels above existing background at the nearest NSLs. However, blowers at WWTPs are generally tonal in nature and may include some low frequency tones which will need special consideration during the design stage including screening behind structures etc.

The facility is licensed by the EPA, therefore the limits set out in the current license will apply at a minimum. However the license will be reviewed as a result of the Proposed Development and therefore the limits and current conditions are subject to change. The facility is not located in a quiet area or an area of low background noise as defined in NG4 therefore the following typical limits are likely to apply:

- Daytime (07.00 to 19.00 hrs) – $55L_{Ar,T}$[9]
- Evening (19.00 to 23.00 hrs) – $50L_{Ar,T}$
- Night time (23.00 to 07.00 hrs) $45L_{Aeq,T}$

The following conditions are likely to apply:

> *During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and implusive noise at all sensitive locations. A penalty of 5 dB for tonal and/or implusive elements is to be applied to the daytime and evening measured L_{Aeq} values to determine the appropriate rating level ($L_{Ar,T}$).*
>
> *During the night time period no tonal or implusive noise from the facility should be clearly audible or measurable at any NSL.*
>
> *In addition to the foregoing recommended license limit values, the noise from the licensed facility shall not be so loud, so continuous, so repeated, of such duration or pitch and it should not occur at such times as to give reasonable grounds for annoyance.*

Based on current operations and the overall SPL provided by the WWTP designer, it is envisaged that the above limits will be complied with. Where both the limits and conditions are complied with, it is considered that there will be no significant effect on existing NSLs.

5.4.7 Traffic Noise Impact

The traffic impact assessment provided in Section 5.7 below was reviewed in order to inform this section of the noise impact assessment. The following is stated:

> *There would be no change to existing peak season traffic volumes on Mondays to Saturdays, with the proposed development in place.*
>
> *Predicted peak season Sunday daily traffic volumes would increase by 80 vehicles on Church Street, during the Sunday 24 hours operations period; and by 50 vehicles on the R576 during the Sunday 24 hours operations period.*

[9] The rated noise level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and/or implusiveness of sound.

Predicted peak season typical Sunday peak traffic hour volumes would increase by 15 vehicles on Church Street; and by nine vehicles on Pound Hill Road and Main Street.

For context, these predicted increases in Sunday traffic volumes equate to daily increases of up to 2.3% and typical peak hour increases of up to 4.2%, on the basis of the predicted 2017 typical daily and peak hour traffic volumes, factored from the recorded weekday on-site traffic counts. It is envisaged that future background traffic volumes on the local road network would typically be lower on Sundays, compared to Mondays to Saturdays.

A doubling of traffic volumes would be required in order for a perceptible increase in traffic related noise to occur. Accordingly, the traffic noise effect is considered to be negligible and insignificant for residents on the roads assessed.

5.4.7.1 Emmett Place

Currently, approximately 35 tankers and five employees access the facility on a Sunday through Emmett Place. This amounts to a total of 45 vehicles each Sunday.

Following the implementation of the Proposed Development, the number of vehicles accessing the facility on a Sunday via Emmett Place will increase by 134 vehicles. This represents a 3 fold increase on existing flows and is due to an increase in HGV numbers by 48 and the employment of 43 additional staff working revolving shift patterns. Shift hours are 06.00 hrs to 14.00 hrs, 14.00 hrs to 22.00 hrs and 22.00 hrs to 06.00 hrs. This equates to 28 car movements on Emmett Place at each shift change on a Sunday.

A total of 83 HGVs will access the facility on a Sunday compared to 35 at present in a 24 hour period.

Broken down over a 24 hour period, it is estimated that the number of HGVs entering the facility per hour will increase from 1.5 to 3.5 on a Sunday. For convenience the numbers are rounded to 2 and 4.

If the L_{Amax} associated with each HGV pass-by is 82 dB(A) and each pass-by lasts approximately 5 seconds then the change in the ambient noise environment over a one hour period can be calculated assuming typical background levels for night time as 46 dB(A) at NSL2. The predicted $L_{Aeq,1hr}$ for the existing scenario is 57 dB[10] compared to an $L_{Aeq,1hr}$ of 60 dB for the future proposed scenario. A 3 decibel increase has a low to moderate magnitude rating as it is perceptible. The context of the change must be taken into account in order to rate the effect. HGVs currently access the facility on a Sunday during night time hours via Emmett Place. No complaints have been received from the residents. However, the absolute values both for existing and proposed scenarios are considered to be relatively high for the night time

[10] This predicted value correlates well to measured values at NSL2 during the night time period in 2015.

period. The frequency of trucks arriving will increase. Therefore taking these factors into account, the effect on the residents of Emmett Place is deemed to be of moderate to low significance during the Sunday night time period.

Additional shift changes will occur on a Sunday at 06.00, 14.00 and 22.00 hrs that currently do not occur during the peak and non-peak season. Shift changes generally occur fairly rapidly over a 5 -10 minute period as employees enter and leave.

If the L_{Amax} associated with each car pass-by is approximately 73 dB(A) and each pass-by lasts approximately 5 seconds with 28 pass-bys then the change in the ambient noise environment over a one hour period can be calculated assuming typical background levels for daytime as 46 dB(A) at NSL2. The predicted $L_{Aeq,1hr}$ for each shift change is 61dB. This value is similar to current $L_{Aeq,t}$ values recorded during a typical peak day during the daytime. However, it is likely to exceed ambient noise levels on a typical Sunday compared to the current scenario. Shift changes are short in duration and frequency. Car noise is not particularly intrusive or disturbing. Therefore overall, it is considered that the introduction of shift changes during the daytime on a Sunday will result in an effect on local residents of negligible to low significance.

It is also noted, that a shift change will also occur at 06.00 hrs which is officially classified as night time. However the facility is located in a town centre where it would be expected that activities have commenced at this time of the day. Furthermore the EPA NG4 document specifies night time monitoring for licensed facilities preferably between the hours of 23.00 – 04.00 hrs. This time includes the sensitive period when residents will be going to sleep. 06.00 hrs is not deemed to be a particularly sensitive time period relative to the early hours of the morning. The shift change is short in duration. Therefore the effect is deemed to be of low significance.

5.4.8 Proposed Mitigation and Enhancement Measures (if applicable)

5.4.8.1 Construction Phase

There is no published Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. BS5228:2009 lists applicable noise level thresholds, depending upon existing ambient levels, as described in Table 5.4.8 below. This table is based upon chapter E3.2, Table E.1 of BS5228:2009 Part 1.

Table 5.4.8: Threshold of Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A	Category B	Category C
Night-time (23:00-07:00)	45	50	55
Evening and Weekends	55	60	65
Daytime (07:00-19:00) and Saturday 07:00-13:00)	65	70	75
NOTE 1: A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to			

the ambient noise level. NOTE 2: If the ambient noise level exceeds the threshold values given, in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3dB due to construction activity. NOTE 3 Applied to residential receptors only.
A) Cat A: Threshold values to use when ambient noise levels (rounded to nearest 5dB) are less than these values B) Cat B: Threshold values to use when ambient noise levels (rounded to the nearest 5dB) are the same as Cat A values C) Cat C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Cat A values D) 19:00-23:00 weekdays, 13:00-23:00 Saturday and 07:00-23:00 Sunday is deemed 'evening and weekend' period.

Category A threshold values can be applied based on the ambient noise levels recorded during the surveys at NSL2 and NSL3 (NSL4 is disregarded as it represents a roadside location). The predicted on-site construction work is predicted to be less than 65dB(A) at the Elms and therefore it is unlikely that the guidance in BS5228:2009 will be exceeded.

However, the following mitigation measures will be implemented as good practice to ensure that the Category A threshold values are complied with:

- During the construction phase all equipment will be required to comply with noise limits set out in EC Directive 2000/14/EC and the 2005/88/EC amendment on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors. The directive covers equipment such as compressors, welding generators, excavators, dozers, loaders and dump trucks.

- Account will also be taken of mitigation measures set out in Section 8 of BS5228: Part 1: 2009 - Noise Control on Construction and Open Sites. This section identifies measures such as substitution, modification, use of enclosures and siting of equipment in order to minimise impact.

- Construction work will be limited to hours agreed with the Planning Authority.

- During the construction phase any complaints received will be thoroughly investigated with suitable mitigation measures taken at the time such as restricting the use of noisy equipment during the early hours and late in the evening. With these measures, noise impact from the construction phase will be kept to a minimum and within acceptable levels to noise sensitive receptors.

- A detailed Construction Environment Management Plan will be developed by the contractor. This will include for construction noise minimisation.

5.4.8.2 Operational Phase

General

At a minimum, the limit values and conditions specified by the EPA in the latest IED license will be complied with for noise sources within the site boundary. The limits and conditions as set out in Section 5.4.6.2 of this chapter will form part of the specification of works for the WWTP designer.

Newmarket Co-Op has undertaken acoustic abatement measures already on site to minimise facility noise. These measures have been undertaken on a phased basis as part of the improvement and development of the facility.

Noise mitigation measures include:

- Installation of deflector hoods lined with acoustic absorbing material external to the vent openings on the vertical walls of the Whey Building;
- Upgrade, in 2009, of the facility wastewater treatment plant with inherent improvements in new plant, and,
- Installation of acoustic panels to the internal walls of the chilled water plant.

Preventative maintenance is conducted regularly to ensure that source noise levels are minimised and that tonal noise is not introduced. All personnel at the facility are conscious of keeping doors closed at building access, preventing noise emission from production processes.

Overall there is an existing environmental performance driven culture on site which will ensure that measures are taken where necessary. Noise sources, both existing and new, will be regularly evaluated and reviewed internally to ensure noise is prevented and minimised where possible and in line with BAT requirements. Acoustic hoods etc. will be implemented on blowers at the WWTP where necessary to ensure compliance with the limits and conditions of the licence.

A Noise Survey will be commissioned on completion of the WWTP works. This will be undertaken by a competent person and will include monitoring locations at the north-western and eastern boundaries with The Elms and Palm Grove and close to the façades of the NSLs where possible with the consent of owners.

Point 4 (c) of the request for Further Information letter issued to Newmarket Co-Op dated 14 June 2016 stated the following:

"It is noted that at the Noise Sensitive Location 2 night time noise was recorded at 46dB and attributed to three trucks. Having regard to proposed increases in production and volumes, it is likely that traffic volumes will increase, accordingly, it is considered that the noise monitoring frequency be

increased. The Planning Authority notes that following the 2010 review of noise monitoring, frequency of such monitoring was reduced from bi-annual to annual monitoring. Even on a temporary basis subject to review, it is considered that increasing monitoring frequency should be carried out to ensure non-exceedence of the night time level of 45 db."

To address this point raised by Cork County Council, Newmarket Co-Op, in addition to the proposed mitigation of measure of completing a noise survey on completion of the WWTP discussed above will increase noise monitoring at the site form the annual level to twice per year to ensure the existing noise situation is accurately reported on at different times of the year.

Traffic

Staff and truck drivers will be made aware of the need to access the facility via Emmett Place as quietly as possible by reducing speed and avoiding the unnecessary use of horns and hard braking etc.

Trucks and contract trucks will be maintained in accordance with legislative requirements to minimise noise impact.

5.4.9 Residual Impacts

In terms of truck deliveries at night time, the residual effect on dwellings along Emmett Place is expected to be of low significance on a Sunday as a result of implementation of the stated mitigation measures.

For all other scenarios assessed, the residual impacts and effects are as described under Section 5.4.6.

5.4.10 Cumulative Impacts

Cumulative impacts and effects have been considered in the assessments undertaken.

5.4.11 Summary & Conclusions

The noise impact assessment for the Proposed Development has been completed through desk-based review of past monitoring conducted for the existing facility and assessment of noise impacts and effects in accordance with recognised standards and guidance.

The ambient noise environment in the vicinity of the existing plant is characterised by traffic on the local road network. Steady continuous sources at the facility are audible to varying degrees ranging from clear to very faint at existing monitoring locations close to nearby NSLs. Delivery trucks accessing the facility via Emmett Place have the potential to elevate ambient noise levels at this location during the night time. The facility is in compliance with the noise limits and conditions set out in IED Licence P0793-02 and noise complaints have never been received.

Both the construction and operational phases of the Proposed Development have been assessed.

The construction phase will result in an elevation of ambient noise levels at NSLs along the pipeline route on the R576 and those overlooking the WWTP site from the east and northwest. The effect along the pipeline route is not deemed to be significant. The effect of construction noise on the Elms is deemed to be temporarily significantly adverse. However the levels are not anticipated to be above Guidance limits for construction noise set out in BSI British Standards BS5228:2009. Furthermore additional mitigation measures will be implemented to minimise construction noise impact and hence potential effect on this NSL.

Extension of the WWTP will result in new sources becoming operational on site. However, the limits and conditions of the revised license will be complied with at a minimum. The facility is not located in a quiet area or area of low background noise levels. Therefore the effect is not deemed to be significant.

Extension of the peak season to include Sunday has been assessed. A potential impact on the ambient noise environment at NSLs arising from truck movements on Emmett Place was identified. However the effect is deemed to be of low significance based on proposed mitigation measures and where the context of the impact is considered.

Traffic arising on the local road network as a result of the proposed increase in peak season is considered to be negligible and insignificant in terms of noise impact and effect.

Overall, it can be concluded that the Proposed Development will not give rise to significant adverse noise related effects on nearby NSLs provided the limits and conditions of the IED license are complied with and the mitigation measures relating to deliveries are adhered to.

5.4.12 References

BS4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound

BS 5228: Part 1: 2009, Noise and Vibration Control on Construction and Open Sites.

'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)' as published by the Environmental Protection Agency in April 2012.

IS0 1996:-2 2007 Acoustics -- Description, Measurement and Assessment of Environmental Noise – Part 2: Determination of Environmental Noise Levels

IEMA, Guidelines for Environmental Noise Impact Assessment, 2014

Kerry EMEA, Newmarket, Annual Environmental Noise Monitoring Survey, 2015, OES Consulting

Chapter 5 – Section 5.5 Air Quality and Odour

5.5.1 Introduction

This chapter describes the potential impacts to the ambient air quality as a result of the proposed development. It is projected that the intensification of milk processing will be increased to an annual throughput of 80 million gallons with the facility operating at peak production 7 days per week during an extended peak processing period.

In terms of potential impact on air quality the operation of the 2 boilers at the Newmarket Co-Op facility will change to meet the steam demand during the peak cheese production period which will be extended from 6 to 7 days per week and for a longer peak processing period throughout the year. Newmarket Co-Op also plan to expand the existing wastewater treatment plant (WWTP) to provide sufficient effluent treatment capacity during the peak manufacturing period that could result in an increase in odorous emissions from certain parts of the treatment plant.

The objective of this Section is to examine the operational scenarios for the boilers and WWTP to identify the likely change in air quality due to the planned intensification programme, compared to the existing operations at the facility. The following sections provide details of the assessment methodology, existing air emissions, air quality and odour impacts along with mitigation measures.

5.5.2 Methodology

5.5.2.1 Data Sources

The assessment of impacts involved a desk study and a site visit to identify the activities associated with the proposed development that could significantly affect local air quality and a scoping of possible key pollutants associated with the boilers and WWTP. Information from the client was obtained to calculate emission parameters, boiler load, site characteristics and operational scenarios for these sources of air emissions to evaluate air quality impacts.

The predicted impacts resulting from the modelling study for the 2 boilers was assessed with regard to the 2011 National Air Quality Standards[1] A detailed report of this dispersion modelling study, undertaken by Envirocon in 2011[2] is included in **EIS Volume II Appendix 5.5.1**. Details on the existing WWTP and planned extension were obtained from drawings and operating details from the client. Emission data for the odour control units at the WWTP were obtained from the monitoring report carried out in 2014 by Bord Na Mona.

5.5.2.2 Air Quality and Odour Modelling Assessment

The ADMS (Atmospheric Dispersion Modelling System)[3] air quality dispersion model was used to predict the local air quality impact of emissions from the boiler stacks and odour concentrations due to emissions from the WWTP. This

advanced prediction model has been developed by CERC (Cambridge Environmental Research Consultants) in the UK and is widely used for air quality impact assessments for industrial facilities and wastewater treatment plants in Ireland and the UK. The model is approved by the Environmental Protection Agency for Licence applications.

Two air quality studies were carried out, the first was for assessing the potential impact of SO_2, NO_x and PM_{10} emissions from the boiler plant at the facility (**Volume II Appendix 5.5.1**). The second modelling study was to model the potential short-term impact of odorous emissions from the WWTP resulting from the proposed intensification development at the facility, with this report included in Appendix 5.5.2.

5.5.2.3 Assessment Criteria

Ambient concentrations of SO_2, NO_2 and PM_{10}

Table 5.5.1: National Air Quality Standards (SI No 180 of 2011)

Pollutant	Criteria	(µg/m³)	Compliance Date
SO_2	Hourly – 99.7% (not to be exceeded more than 24 times per year)	350	1 Jan 2005
	Daily – 99.2% (not to be exceeded more than 3 times per year)	125	1 Jan 2005
NO_2	Hourly – 99.8% (not to be exceeded more than 18 times per year)	200	1 Jan 2010
	Annual average	40	1 Jan 2010
Particulates (as PM_{10})	Daily – 90.4% (not to be exceeded more than 35 times per year)	50	1 Jan 2005
	Annual Average	40	1 Jan 2005

Source: Air Quality Standards Regulations 2011 (SI No 180 of 2011)

The assessment of the impact due to emissions from the boiler stacks was undertaken using the National Air Quality Standards (NAQS) for Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Particulates (PM_{10}) specified in the 2011 Regulations (Table 5.5.1). These Standards provide a short-term (hourly/daily) and long-term (annual) criteria for the protection of community health.

Odours

The perception of odour at some point downwind of an emission source depends on the character of the odour compound emitted and the air concentration of the odorous gas. The measure used to quantify odour nuisance potential is the odour concentration, expressed in European odour units per cubic metre (ouE/m³). An odour concentration of 1 ouE/m³ is the level at which there is a 50% probability that, under laboratory conditions using a panel of qualified observers, an odour may be detected. At levels

below 1 ouE/m^3 the concentration of the gaseous compound causing the odour in the air will be less than the odour detection level and so although the odorous gas is still present in the air no odour will be experienced.

The intensity of an odour ranges from 1 ouE/m^3 = odour detection, 2= faint odour with the intensity increasing up to 5 ouE/m^3 where the odour is easily identifiable, with higher levels of 10-20 ouE/m^3 likely to result in nuisance complaints by the local community. The length of time the odour can be detected is an important factor in the likelihood of the odour causing a nuisance. If the odour is recognisable but very infrequent over the year, then again complaints are unlikely. The level at which the strength of the odour causes a community nuisance also depends on the locality. This is especially the case for rural environments where the community generally has a higher tolerance of odours than those living in an urban area.

Ambient odour limits recommended in a report by the EPA [4] for pig production units give a limit value of 3 ouE/m^3 as a 98 percentile of predicted hourly concentrations, with a target value of 1.5 ouE/m^3. A predicted odour concentration of 1.5 ouE/m^3, expressed as a 98 percentile of hourly values, is recommended by the Environment Agency in the U.K.[5]for sources with a potential for highly offensive odours associated with WWTP's, and 3 ouE/m^3 for moderately offensive odours.

5.5.3 Existing Environment

5.5.3.1 Ambient Air Quality

There is no ambient monitoring available in Newmarket to provide information on existing air quality. EU Legislation on Air Quality [6] require Member States to divide their country into 4 zones (A-D), for the purpose of air quality monitoring, reporting, assessment and management. Outside of the Dublin and Conurbation and towns with populations greater than 15,000 the remainder of the country is within Zone D. Newmarket is within the Zone D (small town/rural) air quality zone classification. Representative air quality data for Zone D locations in Ireland for 2014 published by the EPA[7](Table 5.5.2).

Table 5.5.2: Air Quality in Zone D (non-urban) Regions of Ireland in 2014 (µg/m^3)

Pollutant	Annual average concentration
Sulphur Dioxide (SO_2)	4
Nitrogen Dioxide (NO_2)	3-13
PM_{10}	9-22

Source: Air Quality in Ireland 2014, EPA 2015

5.5.3.2 Odours

There have been no reports within the surrounding community of odours arising from the activities within the Newmarket Co-Op facility in recent years.

5.5.3.3 EPA Licence Requirements

The Newmarket Co-Op milk processing facility is currently operating under IEL Licence (P0793-02) issued by the Environmental Protection Agency in May 2012. Schedule B of the Licence specifies air emission limit values for the 2 boiler exhaust stacks (A1-1 and A1-2). These emission limits relate to boiler exhaust concentrations for sulphur dioxide (SO_2), Nitrogen Oxides (as NO_2) and Particulates (PM) and limits on the exhaust volume flow from each of the 2 boilers.

There are no other licenced exhaust stacks at the facility. However, Condition 5.3 of the Licence also specifies that:

"No emissions, including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the installation boundary or any other legitimate uses of the environment beyond the installation boundary".

This condition covers all activities on-site including the operation of the WWTP.

5.5.4 Characteristics of Emissions

5.5.4.1 Boiler Emissions

There are 2 oil-fired boilers used for generating process steam at the Newmarket Co-Op facility. The emissions from these boilers are exhausted to atmosphere from two 24m stacks that are licenced by the EPA with emission limits for both exhaust flows and emission concentrations of SO_2, NO_2 and PM specified in Licence P0793-02. The oil grade burnt in the boilers is Medium Fuel Oil (MFO) (BS 2869, Class F) with a maximum permitted sulphur content of 1%.

The maximum firing rate of Boiler No 1 is 418 kg/h and for Boiler No 2 it is 423kg/h. The steam requirements for the facility is achieved with one of the boilers operating at full load and the other one running at 60% load even during peak production. Normally the boilers may run at a lower average daily load due to the variation in steam demand over 24 hours. Recent boiler demand values indicate that the daily average requirement is typically 60-80% of the hourly load during peak production periods.

Table 5.5.3: Emission characteristics of the boiler stacks at maximum operating load scenario

Stack (IPPC Licence Designation)	Stack Ht (m)	Diameter (m)	Ref (i) Exhaust Volume (Nm^3/h)	Actual Exhaust Volume (Nm^3/h)	Exit T. (^oC)	Exit Vel (m/s)
A1-1 Oil Boiler No 1	25.0	0.58	6,010	7,450	215	14.0
A1-2 Oil Boiler No 2	25.0	0.58	3,420	4,250	270	9.0

Note: (i) Schedule B Reference Conditions of Dry/ 3% O_2 exhaust flows (as Nm^3/h). Actual exhaust volume flows are based on O_2/moisture conditions in the flue gas of 6% O_2 and 3% moisture.

Table 5.5.4: SO_2, NOx and PM emission estimates from the boilers at maximum operating load scenario (g/s)

Stack (IPPC Licence Designation)	Hourly SO_2	Daily SO_2	Hourly NO_x	Daily PM
A1-1 Oil Boiler No 1	2.32	1.86	1.50	0.46
A1-2 Oil Boiler No 2	1.41	1.12	0.86	0.27

The emission characteristics of the 2 boiler stacks (A1-1 and A1-2) are given in Table 5.4.3, based on a peak production load of boiler No 1 operating at 100% load with boiler No 2 at 60% load. The hourly and daily average emission rates for boiler operating scenario are given in Table 5.5.4 for SO_2, NO_x and PM. The SO_2 emission rates for each stack are based on the hourly MFO consumption rate for 2 boilers running at 100% and 60% load respectively and a sulphur content of 1%. The corresponding daily average SO_2 emission rates will be less than the emission rate based on the two boilers operating continuously and was calculated based on 80% of the maximum hourly load for Boiler No 1, with emissions from Boiler No 2 based on 48% (80% x 60%) of the hourly load.

The rate of NO_x emissions from the boilers depends on the oil grade burnt and combustion conditions within the flame zone of the boiler. Over 95% of the total nitrogen oxides (NO_x) in the exhaust gas from industrial boilers burning fuel oil is typically emitted as nitric oxide (NO) with the remainder (< 5%) emitted as nitrogen dioxide (NO_2). The NO_x forms in the zone downstream of the burner where the combustion air is mixed. The NO_x emission rates for the boilers were calculated from the hourly exhaust flow from each stack and a maximum emission concentration of 900 mg/Nm^3. Emission rates for PM given in Table 5.5.4 are based on an emission concentration of 350 mg/Nm^3. It is assumed that all the PM is emitted as PM_{10} (particulates with a mean aerodynamic diameter of <10µm) when the MFO is burnt. However, depending on the fuel quality and combustion efficiency, the actual PM_{10} emission rate can be substantially lower. The fraction of particles that can be larger than 10µm in the exhaust from a boiler fired on fuel oil is dependent on a number of factors including combustion efficiency, load and age.

5.5.4.2 Wastewater Treatment Plant

Odour Emissions from Wastewater Treatment Plants

The rate of emissions of malodorous compounds from within a WWTP treating effluent from a dairy production facility depend on the freshness of the process water influent, type and extent of uncovered tanks, sludge storage and de-watering procedures and type of odour control systems installed. Pungent odours such as hydrogen sulphide, ammonia, Dimeythlsulphide and other mercaptans (organosulphur compounds) may occasionally result in strong odours detected beyond the plant boundary, especially at old plants that exceed the design capacity in terms of biological loading.

Secondary treatment processes have advanced significantly within the past decade with diffused aeration commonly used to oxygenate the influent in

the tanks, replacing surface aeration systems that generated substantial emissions of odours and aerosols. Dissolved Air Flotation (DAF) units have also largely replaced bio-towers, which were a major source of pungent odours, as an efficient process to remove sludge from the process influent. Modern process control systems are also used to effectively control and reduce odours from a treatment plant by continuous monitoring of the condition of the influent being treated.

Process waste-water arriving at a well-designed and managed treatment plant will have a slight odour characteristic of milk and cheese products. It is important that the influent is properly mixed in the balance tanks and the sludge flocculation process is efficient. Reducing the organic load (BOD) using diffused aeration in secondary treatment further reduces the potential for odours forming by maintaining an adequate level of dissolved oxygen to prevent anaerobic conditions taking place.

Sulphide compounds, especially hydrogen sulphide and mercaptans, have very low levels of odour detection and these gases are a major component of the malodours generated. Hydrogen sulphide has an odour detection threshold of about 0.5-2 µg/m^3, with the characteristic smell of rotten eggs occurring at concentrations about 3-4 times higher and local community nuisance complaints likely at higher levels.

Existing WWTP

The existing wastewater treatment plant at the Newmarket Co-Op facility comprises:-

- 2 Balance tanks - Covered circular tanks
- Dissolved Air Flotation Plant (DAF)
- Oxidation Ditch
- Bio-Tower – Covered
- Anoxic Tank - Covered
- Final Clarifier
- Covered Sludge Thickening Tank
- Sludge De-watering Building
- 3 Odour Control Units: Covered tanks head-space air, Bio-tower air extraction and Sludge thickening tank and de-watering building.

Balance Tanks

Incoming process water from the underground pumping station is stored in the 2 covered circular tanks at the northern end of the WWTP. The balance

tanks are covered and the headspace air extracted under negative pressure to an odour control unit (OCU 1).

DAF Plant

The DAF Plant was installed in 2008. Micro-fine bubbles generated in the DAF vessel attach to the floc particles and cause the sludge to rise to the surface of the DAF tank, where it is removed by a scraper system. The scraper mechanism consists of rubber scrapers on a roller chain drive mechanism that deposits the sludge into a collection hopper. The sludge removed from the DAF tank surface is transferred by pipe to the covered sludge thickening tank. This effluent is then transferred to the oxidation ditch for secondary treatment of BOD loading.

Bio-Tower

A Bio-Tower is currently in operation to treat the effluent from the DAF unit by removal of organic loading (BOD). The process involves the effluent flowing downwards over plastic media that provides an extensive surface for a bio-film to grow. As the bio-film layer thickens it flows downwards to the base of the bio-tower forming secondary sludge which is subsequently removed from the liquor in the oxidation aeration ditch. Bio-towers can be a major source of malodours at treatment plants due to the problem of clogging and anaerobic conditions occurring within the tower.

The Bio-Tower was covered in 2008, with the foul air extracted under negative pressure to the odour control unit (OCU 1) before being vented to atmosphere. The BOD removal efficiency improved with covering the Bio-tower and there have been no reports of malodours from the plant since the tower was covered.

Oxidation Ditch

The oxidation ditch system, located near the centre of the WWTP site provides secondary treatment of the organic load present in the liquor from the DAF unit using diffused aeration. The ditch is a closed oval ring-shaped with the liquor from the DAF unit introduced upstream of the rotor that assists the flow around the oval channel. The aerobic process is relatively slow, with a typical retention time of 16-24 hours depending on influent BOD load. To achieve a high degree of biological treatment, the liquor needs to flow at a relatively constant rate around the tank with uniform mixing with the suspended solids and the oxygen taking place to encourage microbial growth.

This process of secondary treatment significantly reduces anaerobic activity within the liquor and so the formation of odorous gases is low. The flow of the liquor around much of the tank is laminar at a speed of less than 1 m/s. This type of flow will produce little turbulence at the surface and so atmospheric emissions are mainly restricted to the part of the tank where the mixers are located. In addition, the dissolved oxygen concentration is automatically controlled to ensure adequate levels are maintained in the ditch.

Final Clarifier

Odours from secondary treatment clarifiers are not normally detected beyond a few metres from the tank, due to the low BOD of the final effluent from the treatment process. Secondary sludge is generally well-oxidised and has a low BOD and so will not generate significant malodours.

Sludge Treatment

Sludge removed from the DAF unit and also 'wasted' secondary sludge is transferred to a sludge thickening tank before being dewatered by centrifuge in the dewatering building. The sludge tank is enclosed with the headspace air extracted to a small odour control unit (OCU 2). This unit also takes the air from the headspace of the anoxic tank.

The sludge is dewatered using high efficiency centrifuges that produce a sludge with 17% solids content. The sludge is then transferred into a proprietary covered trailor with separate air extraction over the trailor. The sludge de-watering building is located near the southern end of the WWTP site and air from this building is treated in a high efficiency odour control unit (OCU 3).

Odour Control Units

There are 3 Odour Control Units (OCU's) installed to treat foul air from covered tanks and sludge handling at the WWTP. The headspace from the existing balance tanks and covered Bio-tower is treated in OCU 1 before being vented to the atmosphere. This odour abatement unit is located near the northern boundary of the treatment plant site. The air from the sludge de-watering building and from the dewatering centrifuge is exhausted to the air from OCU 3. This unit, which is the largest of the three in terms of volume of treated air, is located next to the dewatering building.

The units OCU 1 and 2 were installed by Bord Na Mona (MonaShell filter units) in 2008 and OCU 3 was installed in 2010. These units use a biofilter bed of shells as a highly effective filter media for removing hydrogen sulphide, ammonia, mercaptans and other organic compounds from the contaminated air extracted from covered tanks and Bio-tower. All units have a very high removal efficiency rate, with a design odour abatement in excess of 98%.

Proposed Development - WWTP

The proposed extension of the existing treatment works at the Newmarket Co-Op facility is designed to provide sufficient waste water treatment capacity for the planned intensification programme. This will increase the process influent capacity during peak production periods from the current rate of 2,000 m^3/day up to 2,700 m^3/day.

In order to provide an efficient effluent treatment process the design of the extended plant will include the following new components: -

- New DAF plant and Pipe Flocculation system;

- Extended Aeration Plant – Covered Balance tank, Anoxic and Anaerobic tanks and 2 diffused aeration tanks;
- Final Clarifier; and
- The Bio-tower will also be removed as part of the WWTP to increase treatment efficiency.

DAF Plant

The new DAF Plant will be installed on the site of the redundant Bio-tower and will replace the existing DAF unit. The top of the unit will be covered and headspace air will be exhausted under negative pressure to one of the existing OCU's. A Pipe Flocculation system will be incorporated into the unit, which provides effective solids removal of the particles of fats or other suspended solids in the process influent. Correction of the acidity (pH) of the influent will also occur within this system to prevent the process liquor becoming acidic, which can result in strong odours from the effluent. A coagulation and floc agent is added to the influent to effectively treat the various sized-particles in the liquor to improve the sludge floc.

The acidity and oxygen conditions in the pipe flocculator and DAF tank will be monitored to ensure that the coagulation and flocculation of the sludge particles is effective with a consistency that allows the sludge at the surface of the DAF tank to be removed effectively. This shall ~~ould~~ ensure that the sludge floc is fresh with no strong malodours released.

The sludge removed from the tank surface will be transferred by pipe to the existing covered sludge thickening tank, with the effluent transferred for secondary aeration treatment.

Extended Aeration Plant

The proposed new secondary treatment plant process will comprise covered balance tanks in which the effluent is stored before treatment in the DAF unit and then moving to covered anoxic tanks where denitrification of the liquor occurs. The anoxic tank also provides mixing and good settling characteristics of the fine sludge particles. The liquor is then pumped to the adjacent aeration tanks.

The liquor in the aeration tanks will be oxygenated via a fine bubble diffused aeration system located near the floor of the tanks. The air supply is controlled by a dissolved oxygen monitoring system to ensure efficient oxidation of the tank liquor. This reduces the potential for pungent odours to be released from the surface of these tanks. Odorous emissions from secondary aeration tanks are normally low due to the diffused aeration process and the odour tends not to be as objectionable as those from primary sludge treatment processes.

Final Clarifier

The effluent from the aeration tanks will be clarified in a two circular settlement tanks. Due to the low BOD, the potential for further decay of the secondary sludge and resulting odorous emissions from these tanks is very low. Odours from the final clarifier will be negligible, due to the low organic content (BOD) of this final effluent from the treatment process.

Sludge Treatment

The sludge collected from the DAF plant and secondary treatment plant will be stored in the existing sludge thickening tank and treated in the sludge de-watering building centrifuges.

Odour Control Units

The three existing OCU's installed at the WWTP have sufficient inlet air capacity for treating the odours from the proposed extended plant. The odorous air from the new DAF unit covered tanks of the additional secondary treatment plant will be treated in the existing OCU 1 unit that currently treats odorous air from the Bio-tower. The Bio-tower will cease operation with the installation of the new DAF unit and so spare odour treatment capacity will be available at the OCU 1 unit. No increase in the exhaust flows from the other 2 OCUs that treat odours extracted from the sludge thickening and de-watering activities are also expected.

5.5.5 Impact of Emissions

5.5.5.1 Existing Boiler Emissions

The results of the air quality modelling study are given in Tables 5.5.5 and 5.5.6 with full details contained in Appendix 5.5.1. The operational scenario modelled represents 'worst-case' emissions with the 2 boilers operating continuously throughout the year with an hourly steam generating rate at full load on one boiler and 60% load for the other boiler. A daily load factor of 80% of the hourly rate was used to calculate daily concentrations. Therefore, this scenario over-estimates the current annual boiler emissions from the facility. Tables 5.5.5 and 5.5.6 provide a summary of the highest predicted concentrations due to emissions from the two boiler exhaust stacks or Process contribution (PC) and the Predicted Environmental Concentration (PEC), which is the cumulative impact of the PC and the background value.

Table 5.5.5 Summary of maximum predicted PC and PEC concentrations beyond the site boundary

Pollutant	Modelled Period	NAQS[(i)] (µg/m³)	Predicted Max Conc. (µg/m³)	Max Conc. as a % of NAQS
SO_2	Hourly	99.73%- 350	177 (183)	51 (52)
	Daily	99.2% - 125	95 (103)	79 (84)
NO_2	Hourly	99.8% - 200	36 (49)	18 (24)
	Annual	Average - 40	6 (19)	15 (47)

PM_{10}	Daily Annual	90.4% - 50 Average - 40	14 (29) 4.2 (19)	28 (58) 11 (48)

Note: (i) Air Quality Standards Regulations (SI: No 180 of 2011). PC Process Contribution; Predicted Environmental Concentration (PEC) in ()

Table 5.5.6 Summary of maximum predicted PC and PEC concentrations at the nearest house or sensitive receptor

Pollutant	Modelled Period	NAQS[(i)] (µg/m³)	Predicted Max Conc. (µg/m³)	Max Conc. as a % of NAQS
SO_2	Hourly	99.73%- 350	150 (158)	43 (45)
	Daily	99.2% - 125	60 (68)	48 (54)
NO_2	Hourly	99.8% - 200	30 (43)	15 (22)
	Annual	Average - 40	6 (19)	15 (47)
PM_{10}	Daily	90.4% - 50	7 (22)	14 (48)
	Annual	Average - 40	2 (17)	5 (42)

Note: (i) Air Quality Standards Regulations (SI: No 180 of 2011). Process Contribution (PC); Predicted Environmental Concentration (PEC) in ()

Concentration contour plots for the predicted 99.7 percentile of hourly and 99.2 percentile of daily SO_2 concentrations are given in **Figures 5.5.1 and 5.5.2**. The concentrations are the Process Contribution (PC). The predicted hourly PC concentration for SO_2 due to emissions from the two boiler stacks is 177 µg/m³, or 51% of the NAQS. This value occurs close to the south east corner of the facility with levels decreasing to 46% at the nearest house. The maximum predicted daily PEC SO_2 concentration is 84% of the daily NAQS. However, this occurs within a small zone on lands owned by Newmarket Co-Op and not in an area of where the community are exposed. At the nearest house the predicted daily 99.2 percentile PEC concentration is 68 µg/m³ or 54% of the daily NAQS.

The predicted 99.8 percentile of hourly PC NO_2 ground level concentrations due to the emissions of NO_x from the 2 boiler stacks is shown in **Figure 5.5.3.** The highest 99.8 percentile of hourly NO_2 concentrations beyond the facility boundary is 30 µg/m³, or 15% of the NAQS and this maximum level occurs within 100m of the NW boundary of the creamery facility. The predicted annual concentrations are 15% of the annual NAQS of 40 µg/m³.

The predicted daily particulate concentrations are shown in **Figure 5.5.4,** expressed as the 90.4 percentile of daily values. Predicted levels are calculated on the assumption that all of the PM emissions from the two boiler stacks are emitted as PM_{10} size material. The results indicate that predicted daily PC concentrations are substantially below the daily NAQS value of 50 µg/m³ even where this conservative modelling approach has been applied. The maximum 90.4 percentile daily concentration beyond the facility boundary is 14 µg/m³, which is equivalent to 28% of the daily NAQS. This maximum predicted level occurs within the lands owned by the Newmarket Co-Op, about 75m to the SE of Newmarket Co-Op.

The predicted PC annual average PM_{10} concentrations are shown in **Figure 5.5.5**. The maximum annual average PM_{10} concentration beyond the boundary is 4 µg/m³, or 11% of the NAQS value of 40 µg/m³. The area where the highest levels are predicted to occur is approximately 100m to the south east of the boundary.

Concentration contours for the PEC (PC + background concentration) of SO_2, NO_2 and PM_{10} are shown in **Figures 5.5.6-5.5.10**. The results indicate that the short-term and long-term values are below the NAQS beyond the boundary. The maximum concentrations occur outside the Newmarket Co-Op boundary but within lands owned by the company. At the nearest houses, predicted hourly and daily SO_2 levels are 158 µg/m³ and 68 µg/m³, which is well below the NAQS. For predicted hourly NO_2 concentrations, the highest level at the nearest house is 43 µg/m³ and an annual value of 19 µg/m³. The highest predicted daily PEC PM_{10} concentration at the nearest house is 22 µg/m³, or 44% of the daily NAQS, with a predicted annual average PEC level below 45% of the NAQS value.

~~The results of the air quality modelling study are given in Tables 5.5.5 and 5.5.6. Full details are given in **EIS Volume II Appendix 5.5.1**. These tables provide a summary of the highest predicted concentrations obtained from the two exhaust stacks combined with background levels and percentage compliance with the NAQS at the location of maximum impact and at the nearest house (sensitive receptor).~~

~~The operational scenario modelled represents 'worst-case' emissions with the 2 boilers operating continuously throughout the year with an hourly steam generating rate at full load on one boiler and 60% load for the other boiler. A daily load factor of 80% of the hourly rate was used to calculate daily concentrations. Therefore, this scenario over-estimates the current annual emissions from the facility and also resulting from the planned intensification with the increase in the number of hours of peak dairy production.~~

~~Table 5.5.5: Summary of maximum SO_2, NO_2 and PM_{10} predicted concentrations beyond the site boundary~~

~~Pollutant~~	~~Modelled Period~~	~~NAQS[(i)] (µg/m³)~~	~~Predicted Max Conc. (µg/m³)~~	~~Max Conc. as a % of NAQS~~
~~SO_2~~	~~Hourly~~	~~99.73% - 350~~	~~183~~	~~52~~
	~~Daily~~	~~99.2% - 125~~	~~105~~	~~84~~
~~NO_2~~	~~Hourly~~	~~99.8% - 200~~	~~48~~	~~24~~
	~~Annual~~	~~Average - 40~~	~~18~~	~~45~~
~~PM_{10}~~	~~Daily~~	~~90.4% - 50~~	~~29~~	~~58~~
	~~Annual~~	~~Average - 40~~	~~17~~	~~42~~

~~*Note: (i) Air Quality Standards Regulations (SI: No 180 of 2011)*~~

Table 5.5.6: Summary of maximum SO_2, NO_2 and PM_{10} predicted concentrations at the nearest house or sensitive receptor

Pollutant	Modelled Period	NAQS(i) (µg/m³)	Predicted Max Conc. (µg/m³)	Max Conc. as a % of NAQS
SO_2	Hourly	99.73% - 350	160	46
	Daily	99.2% - 125	88	70
NO_2	Hourly	99.8% - 200	45	22
	Annual	Average - 40	18	45
PM_{10}	Daily	90.4% - 50	23	46
	Annual	Average - 40	15	38

Note: (i) Air Quality Standards Regulations (SI: No 180 of 2011)

Concentration contour plots for the predicted 99.7 percentile of hourly and 99.2 percentile of daily SO_2 concentrations are given in **EIS Volume III Figures 5.5.1 and 5.5.2**. The concentrations are the Predicted Environmental Concentration (PEC), (Process Contribution + Background Concentration). The predicted hourly PEC concentration for SO_2 due to emissions from the two boiler stacks is 183 µg/m³, or 52% of the NAQS. This value occurs close to the south east corner of the facility with levels decreasing to 46% at the nearest house. The maximum predicted daily PEC SO_2 concentration is 84% of the daily NAQS. However, this occurs within a small zone on lands owned by the company and not in an area of where the community are exposed. At the nearest house the predicted daily 99.2 percentile PEC concentration is 88 µg/m³ or 70% of the daily NAQS.

The predicted 99.8 percentile of hourly PEC NO_2 ground level concentrations due to the combined emissions of NO_x from the 2 boiler stacks is shown in **EIS Volume III Figure 5.5.3.** The highest 99.8 percentile of hourly NO_2 concentrations beyond the boundary is 48µg/m³ , or 25% of the NAQS and this maximum level occurs within 100m of the NW boundary of the facility. The predicted annual concentrations are 45% of the annual NAQS of 40 µg/m³.

The predicted daily particulate concentrations are shown in **EIS Volume III Figure 5.5.4**, expressed as the 90.4 percentile of daily values. The predicted levels are calculated on the assumption that all of the PM emissions from the two boiler stacks are emitted as PM_{10} size material. The results indicate that the predicted PEC concentrations (including background level of 13 µg/m³) are substantially below the daily NAQS value of 50 µg/m³ even where this conservative modelling approach has been applied. The maximum 90.4 percentile daily concentration beyond the facility boundary is 29 µg/m³, which is equivalent to 58% of the daily NAQS. This maximum predicted level occurs within the lands owned by the Newmarket Co-Op, about 75m to the SE of the facility.

The predicted PEC annual average PM_{10} concentrations are shown in **EIS Volume III Figure 5.5.5**. The maximum annual average PM_{10} concentration beyond the boundary is 17 µg/m³, or 42% of the NAQS value of 40 µg/m³. The area where the highest levels are predicted to occur is approximately 100m to the south east of the boundary.

5.5.5.2 Proposed Development - Boiler Emissions

The proposed intensification of the milk-intake and cheese production at the Newmarket Co-Op facility will result in the extension of the peak production period during the summer months. However, there will be no change in maximum hourly or daily steam demand. Therefore, the predicted impacts on local air quality in terms of SO_2, NO_2 and PM_{10} based on the modelled 'worst-case' emissions scenario described above remain unchanged with the extension of the peak production period. The predicted short-term and annual average ground level concentrations due to emissions from the boilers (PC) and the corresponding PEC values due to boiler emissions and background concentrations for the peak manufacturing period are below the corresponding NAQS beyond the creamery facility boundary.

~~The proposed intensification of the milk-intake and cheese production at the Newmarket Co-Op facility will result in the extension of the peak production period during the summer months.~~

~~However, there will be no change in maximum hourly or daily emissions from the 2 boiler stacks based on the steam requirements for the processing plant. Therefore, the predicted impacts on local air quality in terms of SO_2, NO_2 and PM_{10} based on the modelled 'worst-case' emissions scenario described in Section 5.5.6.1 will remain unchanged. The predicted short-term and annual average PEC values due to emissions from the boilers combined with the background concentrations will be below the corresponding NAQS beyond the facility boundary.~~

5.5.5.3 Existing Wastewater Treatment Plant

Odour Emission Rates

To assess the potential impact of odours from the OCU vents and uncovered tanks estimates of emissions were calculated. In the case of the oxidation ditch, the emission rates were calculated in terms of the odour emission rate per unit area per second (ouE/m^2.s). For emissions from the OCU vents, the emission rates were calculated in ouE/s, based on the design exhaust flow from the unit.

A tank surface height of 2m for the tanks and an emission plume temperature near to ambient conditions was used in the odour model. The vertical exit velocities from the surface of the tanks are very low with rates typically below 0.01 m/s reported in the literature and so the emission rate from the oxidation ditch are due primarily to the rate of evaporation from the water surfaces.

The total surface area of the oxidation ditch is approximately 610 m^2, resulting in an emission rate per tank of 305 ouE/s, based on an estimated emission rate per square metre of tank surface of 0.5 ouE/s. However, odour emissions from the surface of the liquor will only be significant in the zone where sub-surface aeration and the mixers are operating. This zone is less than 20% of the

total oval path of the liquor as it moves around the oxidation ditch and so the emission rate from the whole surface of the oxidation ditch is likely to be substantially lower.

Table 5.5.7: Emission characteristics of the Odour Control Units

Source	Height (m)	Stack Diam (m)	Exhaust Flow (m^3/h)	Temp (°C)	Exit Velocity (m/s)	Odour Conc (ouE/m^3)	Odour Emission Rate (ouE/s)
OCU 1	3	0.4	5120	15	11.3	1000	1440
OCU 2	2.5	0.1	400	15	21.9	1000	110
OCU 3	3.5	0.5	6025	15	8.5	1000	1680

The emission characteristics of the OCU's are given in Table 5.5.7. The odour concentrations were based on a maximum odour emission concentration of 1000 ouE/m^3, with no diurnal or seasonal variation in emissions from the odour abatement units. The exit velocities calculated for each of the OCU's are based on the design exhaust flows given in column 6 of Table 5.5.7.

At a lower odour removal efficiency of 90% instead of a design abatement rate of 98%, this concentration in the exhaust air would be equivalent to a concentration in the inlet air stream of 10,000 ouE/m^3. The equivalent Hydrogen Sulphide level present in the inlet air stream, based on an odour detection level of 0.5 ppb, would be 5ppm. For mercaptans such as Dimethylsulphide, which has an odour detection level about 100 times lower, the equivalent concentration in the inlet air would be 0.05ppm.

Results

The results of the odour modelling are shown as odour concentration plots in **EIS Volume III Figure 5.5.6**, which give the maximum short-term ground level odour concentrations within 0.5km of the WWTP that are predicted as the 98 percentile, or to be exceeded for 2% of the year or 175 hours over a year. The pattern of predicted odour concentration around the plant reflects the annual incidence of certain wind speeds and directions coupled with the different types of atmospheric stability near to the ground. The pattern of odour levels indicates that the maximum level at the nearest house to the West of the Newmarket Co-Op boundary will be about 0.5 ouE/m^3. At the houses to the North of the facility boundary, the predicted 98 percentile odour concentration is less than 0.25 ouE/m^3 and to the south the predicted level will also be below 0.25 ouE/m^3. In other words, the odour prediction model predicts that odour levels will be less than the odour detection level for 98 percent of the time at the nearest houses to the facility.

5.5.5.4 Proposed Development - WWTP Extension

Odour Emission Rates

A new secondary aeration plant will be installed that will run in parallel with the existing oxidation ditch. The total surface area of the proposed 2 new aeration tanks is approximately 685 m^2, resulting in an emission rate per tank

of 342 ouE/s, based on an emission rate per square metre of exposed tank surface of 0.5 ouE/s.

The total odour emission rates from the 3 odour control units are expected to be comparable to the levels emitted from the existing odour abatement requirements with removal efficiencies of over 98%. The OCU's were modelled with the same emission characteristics as for the 'Existing WWTP' scenario to represent maximum odour emissions from these units.

Results

The results of the odour modelling based on the planned extension of the WWTP are presented in **EIS Volume III Figure 5.5.7** as the 98 percentile of short-term odour concentrations. Compared to the results based on the existing plant there is no significant change in the predicted odour levels beyond the facility boundary. At the nearest houses the maximum 98 percentile odour concentration is predicted to be between 0.5-0.7 ouE/m^3.

5.5.5.5 Construction

The construction phase involves the construction of the extended WWTP and the construction of the planned underground pipeline from the site to the River Dalua discharge point.

WWTP

The site for the extended WWTP will be regraded slightly with removal of soil and overburden during levelling the ground and excavation of the tank foundations. The footprint of the existing WWTP site is 0.71 ha and the extended area will add a further 0.28 ha to the final site area. It is expected that the duration of the WWTP upgrade programme will last 9-10 months with the regrading and excavation work taking only a few weeks.

The peak daily vehicle two-way movement at the construction site is estimated to be approximately 40-50 truck per day and a similar number of cars and vans. The planned access road to the site will be from the southern entrance onto the R576 that runs along the southern boundary of the Newmarket Co-Op boundary.

The depth of excavation is relatively shallow, with no rock breaking or ripping required and much of the excavated material will be retained on site for re-grading the boundary area. Any surplus waste material will be removed off-site for disposal at a licenced waste facility. Upgrading the existing WWTP part of the site will involve demolition of the biotower and construction of the new control building, with the remaining works being the installation of a new DAF unit, installation of underground pipework and fitting out the new control building. For the extension area of the WWTP, works will include regrading, excavation of tank foundations, placement of steel and concrete tank walls and floor, services culverts and pipework.

The potential for emissions of dust and PM10 having a significant impact on air quality beyond the boundary is largely related to the rate of emissions, on-site control measures, local wind conditions (speed and direction), coupled with the frequency and duration of rainfall. The latter is a major factor since even small amounts of rain can be sufficient to suppress dust emissions from road surfaces and construction areas.

The construction of the extended WWTP will have a temporary impact on air quality in the immediate vicinity due to dust and PM10 emissions generated from the use of excavators and trucks during stripping of overburden and digging the foundations of tanks and the control building. A temporary haul route will also be constructed along with temporary stockpiling of soil and overburden and so there is a potential for local dust-blow from these surfaces during dry windy weather conditions.

Exhaust emissions from the general operation of on-site construction equipment and machinery will occur. Air emissions from trucks and other diesel-engines used in other construction plant comprise mainly of nitrogen oxides, hydrocarbons and particulate emissions. The departure and arrival of trucks transporting the waste material off-site or delivering concrete and other building materials can generate significant dust and PM_{10} emissions from the access road surface near the site entrance onto the R576. The number of HGV's and other commercial vehicles delivering materials to the site will vary depending on the phase of the construction. Due to the small scale of the proposed works, the rate of vehicle emissions will be low, especially once the regrading and excavating foundations is completed. During the construction of the treatment tanks and other ancillary works the impact will be minor or insignificant. The volume of truck movements associated will be low with an estimated maximum additional 40 movements per day when the concrete is being delivered as ready-mix. Therefore, the impact of the exhaust-pipe emissions during the main construction phase will have an imperceptible or slight impact on the ambient air quality beyond the Newmarket Co-Op boundary.

The overall impact on the surrounding air quality near the WWTP boundary close to the construction activities is predicted to be a minor or slight negative impact as a result of dust and PM10 emissions generated from truck movements, excavators and other machinery. These impacts will be short-term in nature. There is likely to be a minor or slight impact near the site entrance on the R576. Dust control measures recommended in Section 5.5.6 will form an integral part of the Construction Environmental Management Programme (CEMP). With the implementation of these measures no significant adverse impact, in terms of a dust or PM10 nuisance is predicted during this phase of the development.

Discharge Pipeline

An underground pipeline will be constructed from the Newmarket Co-Op site to the River Dalua discharge point. This route will follow the R576 and will be a total length of 4km. It is expected that the construction of this pipeline will take 3-months to complete, with 100m sections completed per day. The

operation will comprise digging a trench, laying the pipe sections and backfilling with 22 trucks transferring material off-site.

There is a potential for significant dust emissions from excavating the trench and the movement of trucks causing the re-suspension of silt from the road near the pipe-laying location, especially during dry, windy weather conditions. This phase of construction will be included in the CEMP to control and reduce fugitive dust emissions from near the pipe-laying so that emissions do not result in a local nuisance, especially for road-users.

5.5.6 Mitigation Measures

5.5.6.1 Construction Phase

- A temporary wheel-wash through which all trucks departing from the site will pass before accessing the R576.
- Unpaved internal haul roads shall be sprayed during dry windy weather conditions.
- Regular maintenance of the public road surface near the entrance will be undertaken. A mechanical vacuum road sweeper shall be used if necessary.
- Loose, fine aggregates and other similar sized building materials that can be easily re-suspended by the wind will be stored in covered stockpiles in designated areas of the WWTP site.
- Vehicle speeds shall be controlled to 20 km/h along the temporary unpaved routes within the construction areas to prevent high levels of dust being re-suspended from the internal road surfaces.
- Mud or silt deposited on the public road near the discharge pipe-laying section as a result of drag-out by the tyres of vehicles shall be promptly removed.
- Loose aggregates that can be easily re-suspended by the wind shall be stored in covered stockpiles along the discharge pipeline route
- Diesel engines in the trucks, excavators and other pipe-laying plant shall be regularly maintained to prevent excessive exhaust emissions of particulates and other pollutants during their operation.
- Truck speeds shall be controlled along the haul road section adjacent to the pipe-laying operation to prevent high levels of dust being re-suspended from the surface of the public road.

5.5.6.2 Operational Phase

Boiler Emissions

The emission control measures planned for the 2 oil-fired boilers are a continuation of current activities to maintain high boiler efficiency, particulate

removal with water injection and regular maintenance to prevent abnormal emissions. In addition, with the likely ongoing reduction in the sulphur content in the fuel oil available in Ireland to less than the current maximum permitted of 1% by weight of fuel, SO_2 emissions from the boilers will decrease per kg of oil burnt.

~~With regard to the proposed extension of~~ The ~~WWTP, the~~ following measures to control and reduce potential sources of malodours are planned:-

- The existing DAF unit will be replaced with a new DAF plant that will be covered.
- The new DAF and Pipe Flocculator system will provide effective formation of sludge floc with a dosing agent used to maintain the correct level of pH in the liquor to prevent acid conditions forming in the sludge.
- The existing Bio-tower will be demolished.
- The balance and anoxic tanks at the new extended aeration plant will be covered and headspace air extracted to the odour control unit (OCU 1) used for treating the air from the existing covered balance tanks.
- The high efficiency OCUs currently operating at the WWTP site will ensure that no malodours occur beyond the site boundary, with removal rates of H2S and other pungent sulphurous compounds above 98%. Bi-annual maintenance and emission monitoring will continue to ensure optimum operation of these abatement units.

5.5.7 Residual Impacts

The planned intensification of production at the Newmarket Co-Op facility will result in an increase in atmospheric emissions from the boilers as a result of the extension during the peak production period. The total volume of emissions over these months are likely to increase as a result of the number of days when full production takes place at the facility. However, the increase in emissions per month will be minor.

The proposed operation of the WWTP, arising from the increased treatment capacity will result in residual odour emissions from the odour abatement units that are currently in operation and also from the surface of the planned new aeration tanks. However, due to the improved BOD removal efficiency of the new extended aeration system and also very high odour abatement efficiencies of the odour abatement units, the residual effect will be minor or not significant.

5.5.8 Summary and Conclusion

The planned intensification programme at the Newmarket Co-Op facility will increase production throughout the year and will increase the number of

days with the facility running at maximum output when peak cheese production takes place. This will result in an increase in steam demand from the boilers and also the daily volume of process water treated at the on-site WWTP during peak production.

An air quality impact study of the emissions from the 2 boilers was undertaken to predict ground level concentrations in the locality and assess percentage compliance with National Air Quality Standards values. Emission rates for SO_2, NO_x and PM from the boilers were for a 'worst-case' emission scenario based on providing the hourly maximum steam demand for the production process during peak production. This steam requirement can be achieved with one boiler operating at 100% load and the other firing at only 60% boiler load. Daily steam demand was estimated at 80% of the hourly demand for each boiler. Continuous daily operation at these boiler load conditions was assumed in the modelling study, with no monthly or seasonal variation in output and so this over-estimates the existing emissions from the facility.

The results of the modelling study demonstrate that the predicted ambient concentrations within the locality comply with the Air Quality Standards for both short-term and annual average limit values specified in the 2011 Regulations. Since the air quality model was based on stack emissions during full hourly plant production, the planned intensification programme will not result in a change in these short-term emission rates. Furthermore, the model excluded monthly or seasonal variations in steam demand and so the predicted long-term concentrations are also applicable to the future intensification programme. Any change in future seasonal emission rates compared to current emissions will be minor or insignificant and less than the modelled values.

Potential emissions of odours from the existing WWTP were estimated based on an examination of the type of plant installed, number and size of uncovered treatment tanks and type of odour abatement systems installed at the site. There are 3 odour control units at the site for treating odorous air collected from covered balance tanks, bio-tower, sludge storage and the sludge de-watering building. Estimates of odour emissions from the uncovered oxidation ditch and odour control units were made to predict odour concentrations within the locality using an air quality model.

The planned intensification programme will result in a higher wastewater throughput with increased BOD and sludge treatment requirements to meet effluent quality standards. The extension to the WWTP comprises an upgrade to the process of sludge removal from the process influent with a new DAF unit, additional balance tank and 2 diffused aeration tanks. Odorous emissions from the new tanks and DAF unit will be treated in the existing odour control units, with the sludge stored and de-watered using existing facilities at the plant. The results of the odour impact modelling study indicates that based on current and the future planned operation of the WWTP, the change in emissions will be small or not significant and odours will not be detected beyond the site boundary.

Overall, the assessment of air quality impacts due to the planned intensification programme at Newmarket Co-Op demonstrates that no significant impact on the health of the local community or surrounding environment is predicted. The impact of emissions from the boilers will comply with National Air Quality Standards values and emissions of odours from the extended WWTP will be well below levels likely to cause a potential odour nuisance beyond the Newmarket Co-Op boundary.

5.5.9 References

(1) Stationary Office, 2011, Air Quality Standards Regulations 2011 (SI No. 180 of 2011); Dublin
(2) Envirocon Ltd, 2011, Air Quality Impact of SO2, NOx and PM Emissions from the Boiler Stacks, (IPPC P0793-01 Technical Amendment)
(3) CERC, 2015, ADMS5 Atmospheric Dispersion Modelling System User Guide; Cambridge
(4) Environmental Protection Agency, 2001, Odour Impact and Odour Emission Control Measures for Intensive Agriculture ER No 14; EPA Wexford
(5) Environment Agency, 2009, Technical Guidance Note, H4 – Odour Management, Draft; EA UK.
(6) CEU, 2008, Directive 2008/50/EC of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe, OJ L152.,
(7) Environmental Protection Agency, 2015, Air Quality in Ireland, EPA Wexford

Chapter 5 – Section 5.6 Cultural Heritage

5.6.1 Introduction

Irish Archaeological Consultancy Ltd has prepared this report for Newmarket Co-Op, to assess the impact, if any, on the cultural heritage resource by the proposed development at Newmarket Co-operative, Newmarket, County Cork (**EIS Volume III, Figure 5.6.1)**.

This study determines, as far as reasonably possible from existing records, the nature of the cultural heritage resource within the area of proposed development using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (IFA 2012). In order to compile a complete baseline, a site inspection is carried out to complement the results of the desk-based assessment. This leads to the following:

- Determining the presence of known archaeological/ architectural heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Suggested mitigation measures based upon the results of the above research.

The study involved detailed interrogation of the archaeological and historical background of the Newmarket Co-operative site and pipeline route. This assessment focused on the areas of actual proposed development footprint outlined in the redline boundary shown on **Figures 5.6.1 to 5.6.6 (provided in EIS Volume III)** which encapsulates the proposed upgrade works to the Waste Water Treatment Plant (WWTP) and underground pipeline, (known hereafter for the specific purposes of this assessment as the proposed development site).

This included information from the Record of Monuments and Places of Cork, the County Development Plan, the topographical files of the National Museum of Ireland, and cartographic and documentary records. Aerial photographs of the study area held by the Ordnance Survey were also consulted. Field inspection was undertaken on 18 November 2015 and on 5 January 2016 in an attempt to identify any known cultural heritage sites and previously unrecorded features, structures and portable finds within the proposed development area.

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential adverse impacts that

the proposed development may have on the cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts. The definitions of the degree of impact on the potential archaeological resource are described in **EIS Volume II, Appendix 5.6.4**.

5.6.2 Consultation

Following the initial research a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the existing and receiving environment and study area, as follows –

- Department of Arts, Heritage and the Gaeltacht – the Heritage Service, National Monuments and Historic Properties Section: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database; Preservation Orders; Register of Historic Monuments and the database of current licences (2014–2015);
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- National Inventory of Architectural Heritage: County Cork;
- Cork County Council: Planning Section;
- Trinity College Dublin, Map Library: Historical and Ordnance Survey Maps;
- Mary Sleeman, Cork County Archaeologist (20 November 2015).

5.6.3 Methodology

Research has been undertaken in two phases. The first phase comprised a desktop assessment of all available archaeological, historical and cartographic sources. The second phase involved a field inspection of the proposed development area.

5.6.3.1 Desktop Assessment

This is a document search. The following sources were examined and lists of areas of archaeological heritage potential were compiled –

- Record of Monuments and Places for County Cork;
- Sites and Monuments Record for County Cork;
- Monuments in State Care Database;
- Preservation Orders;
- Topographical files of the National Museum of Ireland;

- Cartographic and written sources relating to the study area;
- Cork County Development Plan 2014–2020;
- National Inventory of Architectural Heritage;
- Place name analysis;
- Aerial photographs, and
- Excavations Bulletin (1970–2015).

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to the lack of locational information. As a result these are omitted from the Record of Monuments and Places. SMR sites are also listed on the recently launched website created by the DoAHG – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the Department of Arts, Heritage and the Gaeltacht may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Topographical files of the National Museum of Ireland is the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

The following maps were reviewed:

- Sir William Petty, Down Survey Map, 1654–56, Barony of Duhallow;
- Grand Jury Map of County Cork, 1811, and
- Ordnance Survey maps of County Cork (1842, 1903 and 1926–37).

Documentary sources were consulted to gain background information on the archaeological and cultural heritage landscape of the proposed development site and pipeline development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The County Cork Development Plan (2014–2020) was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed route.

The *National Inventory of Architectural Heritage* is a government based organisation tasked with making a nationwide record of significant local, regional, national and international structures, which in turn provides county councils with a guide as to what structures to list within the Record of Protected Structures. The architectural survey for County Cork was completed by 2011. The National Inventory of Architectural Heritage (NIAH) have also carried out a nationwide desk based survey of historic gardens, including demesnes that surround large houses. This has also been

completed for County Cork and was examined in relation to the surviving demesnes within the surrounding area of the proposed development.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2015.

5.6.3.2 Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information. The archaeological field walking inspection entailed -

- Walking the proposed development area and its immediate environs;
- Noting and recording the terrain type and land usage;
- Noting and recording the presence of features of archaeological or cultural heritage significance;
- Verifying the extent and condition of recorded sites;
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

5.6.3.3 Definitions

In order to assess, distil and present the findings of this study, the following definitions apply:

'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of cultural heritage features, where –

- The term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places);
- The term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany are archaeological or architectural designation.

Table 5.6.1: Impact Definitions

Imperceptible	An effect capable of measurement but without noticeable consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

Impacts as defined by the Draft EPA 2015 Guidelines (pg. 42).

5.6.4 Baseline Description of Existing Conditions

5.6.4.1 Archaeological and Historical Background

The proposed development is located within the townlands of Scarteen Lower, Newmarket, Garraunawarrig Upper, Garraunawarrig Lower and Liscongill **(EIS Volume III, Figure 5.6.1)**. It is located within the Parish of Clonfert and Barony of Duhallow. The surrounding topography follows a gentle valley along the Rampart Stream where it runs north-northwest–south-southeast to discharge into the River Dalua.

There are only 14 Recorded Monuments located within a 500m radius of the proposed development site **(EIS Volume III Figures 5.6.2–3)**. The proposed pipeline route traverses the eastern limits of the zone of potential for the historic town CO022-279, although the nearest recorded site comprises of the former Church of Ireland Parish Church of Clonfert *c*. 50m west. At its southern limit the proposed route abuts Allens Bridge (CO022-271). To the north of the proposed development site several *fulachta fiadh* are recorded 70m (CO014-093) and 200m north (CO014-092).

Records for two stone finds found in a circular earthwork in the townland of Gortknockaneroe were present in the NMI Topographical Files however no further detail was included (NMI 1932:7152–7153).

Prehistoric Period

The earliest evidence we have for prehistoric activity in this area dates to the Bronze Age (c. 2500–800 BC) in the form of burnt mounds. Within a 500m radius of the proposed development site, three sites are recorded in the SMR and a further site was identified and excavated in advance of development. The nearest of these comprise of a cluster of three sites (CO014-092–093 and site 12E0135) in Scarteen Lower townland c. 70–200m north of the proposed development site. The two Recorded Monuments in Scarteen Lower are shown on the third edition OS map (1936) as circular mounds. Site CO014-092 is currently below a concrete surface while site CO014-093 is an oval mound

(12m north–south; 14m east–west; height 0.9m) located in rough pasture, immediately west of a deep drain with stream. A fourth burnt mound is recorded in Garraunawarrig Lower townland c. 250m north of the proposed pipeline route.

An unusually high density of these sites are recorded in North Cork, particularly in the Barony of Duhallow, where Bowman recorded 852 sites on a thesis on the area (Power and Lane et al. 2000, 43). Burnt mounds are scattered throughout the country with over 7000 examples recorded in the SMR and excavation databases (Walsh 2012). In spite of this no clear understanding of the precise function of these sites has been forthcoming. They are typically located in areas where there is a readily available water source, often in proximity to a river or stream or in places with a high water table. In the field burnt mounds may be identified as charcoal-rich mounds or spreads of heat shattered stones, however, in many cases the sites have been disturbed by later agricultural activity and are no longer visible on the field surface. Nevertheless even disturbed spreads of burnt mound material often preserve the underlying associated features, such as troughs, pits and gullies, intact.

Burnt mound sites are principally Bronze Age monuments and reach their pinnacle of use in the middle/late Bronze Age (Brindley et al. 1989−90; Corlett 1997). Earlier sites, such as Enniscoffey Co. Westmeath (Grogan et al. 2007, 96), have been dated to the Neolithic and later sites, such as Peter Street, Co. Waterford (Walsh 1990, 47), have been dated to the medieval period. Thus although burnt mound sites generally form a component of the Bronze Age landscape, the use of pyrolithic technology has a long history in Ireland.

Ó Néill (2003–2004, 82) has aptly identified these sites as the apparatus and by-product of pyrolithic technology. This technology involved the heating or boiling of water by placing fire-heated stones into troughs of water. Small shallow round-bottomed pits, generally referred to as pot boiler pits or roasting pits, are often associated with burnt mound sites. The purpose of these pits remains unclear. Occasionally large pits are also identified and may have acted as wells or cisterns. Linear gullies may extend across the site, often linked to troughs and pits, and demonstrate a concern with onsite water management. Post and stakeholes are often found on burnt mound sites and these may represent the remains of small structures or wind breakers.

Although there is a general consensus that burnt mound sites are the result of pyrolithic technology for the heating or boiling of water, the precise function of these sites has, to date, not been agreed upon. Several theories have been proposed but no single theory has received unanimous support. These include use in cooking (O'Kelly 1954 and Lawless 1990), bathing or saunas (Lucas 1965, Barfield and Hodder 1987, O' Drisceoil 1988), textile production (Jeffrey 1991) and brewing (Quinn and Moore 2007).

Early Medieval Period (AD 400–1100)

The early medieval period is depicted in the surviving sources as entirely rural characterised by the basic territorial unit known as *túath*. Byrne (1973) estimates that there were probably at least 150 kings in Ireland at any given

time during this period, each ruling over his own *túath*. In 1837 Lewis notes that 'Newmarket was formerly called *Ahatrasne*, or "the place of the ford," from its situation near an ancient ford now superseded by a neat bridge at the entrance of the town'.

During this sometimes violent period, roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. The ringfort or rath is considered to be the most common indicator of settlement during this period. In a study of the ringfort, Stout (1997) suggested that there is more than 45,119 potential ringforts or enclosure sites throughout Ireland, with c. 882 recorded in North Cork alone (Power and Lane *et al*. 2000, 217). Ringforts were often constructed to protect rural farmsteads and are usually defined as a broadly circular enclosure delimited by a bank and ditch.

A substantial ringfort and souterrain (CO023-058001–2) is recorded 290m east of the proposed pipeline route in Garraunawarrig Lower townland. This ringfort is marked on the historic OS maps as a large enclosure and it is visible in the landscape today, although surrounded by a copse of trees. Souterrains are often linked with early medieval sites such as cashels and ringforts but c. 30% of the recorded sites in North Cork are found in isolation (*ibid.,* 367).
A large sub-oval enclosure lined with five trees was illustrated on the first edition OS map partially within the eastern half of the proposed WWTP upgrade location. While the enclosure was removed by the later maps it was thereafter named Fairy Hill. This may only represent a tree-circle, which is a post medieval designed landscape feature. However, it also has the potential to indicate the presence of an earlier enclosure, now levelled.

Medieval Period (AD 1100–1600)

There are no archaeological sites recorded in the SMR within proximity to the proposed development site dating to the medieval period. While the fertile nature of the land would have been attractive to settlement at this time it was not located near any of the main route ways or towns.

A castle site (CO022-060) is recorded within the southern limits of the town, 240m west of the proposed development site. While there is no visible surface trace of the site local information states that a castle of the McAuliffes was located here (www.archaeology.ie). Lewis (1837) noted that there was formerly a castle on 'The Mount near Mr Aldworth's Lodge' (CO022-061). The castle and lands surrounding Scarteen to the north were forfeited as part of McAuliffe estate after Desmond Rebellions of the late 16th century (www.archaeology.ie.).

Post-Medieval Period (AD 1600–1900)

The receiving environment of the proposed development site is characterised by a rural landscape on the periphery of a market town. Following a grant of land from King James I in 1621, Sir Richard Aldworth established a market and market house at Newmarket between 1620 and 1622 (www.archaeology.ie). In 1641 c. 25 households were present and in 1750 the town contained 'one regular street' with 'some well looking houses' (*ibid*.). The town was attacked

by a band of Catholic men during the 1641 Rebellion in an attempt to overthrow Protestant strongholds (Canny 1993, 276) and the loss of life and destruction of property at this and other towns, such as Mallow and Mitchelstown, was notable. Apart from Kanturk, Macroom and Newmarket, there were few notable settlements so distant from the foci of the Rivers Blackwater and Bandon.

The proposed pipeline passes through the eastern limit of the zone of archaeological potential for the historic Newmarket town (CO022-279). The substantial demesne associated with Newmarket House (CO022-061) leads south from the town. By the mid-18th century North County Cork was a centre for a series of small woollen driven settlements with links to linen production. O'Flanagan (1993) noted that Newmarket was one of the towns that had 'clothiers who bought up wool, employed combers in their houses to spin it into worsted, which was then exported from Cork to Bristol and Norwich'.

Smyth (1993) noted on the distinct linear development of the 'frontier drover towns', including Newmarket, during the early and mid-18th century in order to facilitate the movement of cattle from the north and west of the county to Cork City. In 1837 Lewis records that the town contained about 246 houses, of which several are well built. A former Church of Ireland parish church of Clonfert (CO022-171) is located c. 50m west of the proposed development site. The church was built in 1830 on the site of an earlier church, which was present in 1629 (www.archaeology.ie). It was used during the 1970s as a school and also functioned as a welding workshop (*ibid*.). The graveyard to the south of this church has headstones dating from mid-18th century to the present day. A further church (CO022-278) is located *c*. 280m southwest which was built in 1834 on site donated by Richard Aldworth, replacing 18th-century church in Scarteen to north (*ibid*.).

The site of a church and burial ground (CO022-220001–2) are recorded 360m east of the proposed development site. While there is no sign of any structural remains local information notes that executions were carried out here during penal times.

The railway came to Newmarket in 1889; built by Robert Worthington for the Kanturk and Newmarket Railway Company. It functioned as an independent company, funded by the local land gentry and Cork businessmen, for three and a half years until it was purchased by the Great Southern and Western Railway in 1893. The line was closed in 1963 and dismantled.

5.6.4.2 Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2015) and the available resource has shown that four programmes of archaeological investigation have been carried out within 1km of the proposed development site.

Monitoring in advance of a proposed concrete yard, associated with the Newmarket Cooperative Creamery identified three mid–late Bronze Age burnt mounds (Harte 2012; Licence Ref.: 12E0135). Subsequent excavation revealed that one of the mounds was associated with two troughs and two

pits (Walsh 2013; Licence Ref.: 12E0135). Numerous post-medieval ditches and drains traversed the site which was located 160m north of the proposed development site (*ibid*.).

Monitoring of groundworks associated with the Charleville to Newmarket 110kV line in 2003 did not identify any features of archaeological significance within the vicinity of the proposed development site (Lyttleton 2003; Licence Ref.: 03E0250).

Further to the west, 860m from the proposed development site, testing of a recorded *fulacht fiadh* site CO014-086, in advance of a residential development, failed to identify any archaeological remains (Kiely 2007; Licence Ref.: 07E0813).

5.6.4.3 Cartographic Analysis

Sir William Petty, Down Survey Map, Barony of Duhallow, 1654–6 **(EIS Volume III Figure 5.6.4)**

Newmarket is annotated on this map to the west of the River Dalua. There are no structures or features shown at the site of the current town. A tower house labelled 'Castle McAlive' is shown to the southwest at the bend in the river. This likely represents the castle recorded in the SMR CO022-057 at Castlemacauliffe *c*. 2.79km west of the proposed development. The townland is annotated as 'Aghascartane', with 'Scarten' marked to the north.

Grand Jury Map of County Cork, 1811 **(EIS Volume III Figure 5.6.4)**
This maps shows the region in more detail with main route ways and topographical features included. The townland is now annotated as 'Skarteen' and Newmarket town is shown as a well-developed settlement along two main axes. The Rampart Stream is shown flowing through the south of the proposed development site, passing through Newmarket Demesne. Newmarket House is illustrated as a large manor house. The road leading south-southeast from the town borders the tree-lined eastern extent of the demesne. Smaller houses, such as Spring Lodge in the south and Killowan in the north are illustrated.

First Edition Ordnance Survey Map, 1842, Scale 1:10560 **(EIS Volume III Figure 5.6.5–6)**

This is the first accurate historic mapping coverage of the area containing the proposed development site. The proposed WWTP upgrade part of the proposed development site is located within undeveloped greenfield to the immediate northeast of the town. A large sub-oval enclosure, measuring *c*. 70m by 60m, is shown partially within the proposed development site. A ring of trees are illustrated within the enclosure. The Rampart Stream is shown flowing south to underpass the road and meander through the substantial demesne of Newmarket House. A mil (in ruins) is shown adjacent to a mill race within the southwest corner of the current creamery complex. The mill race flows southeast from the River Dalua, curving around the northern limit of the town to access the mill and connect with the Rampart Stream to underpass the

road. At this point the road (now the R576) is bordered by thickets of trees and scrub. The town, to the west is well developed and the Church (CO022-171) is shown c. 50m west.

Several small farmhouses are dotted in the landscape including the vernacular house recorded in the NIAH c. 120m south of the proposed development site in Scarteen. The pipeline route runs along the roadway, which borders the demesne lands. A gate lodge is shown mid-way along the eastern demesne perimeter. The pipeline leads south from this road in advance of Rivers View House; to the north of which the substantial ringfort (CO023-058) is illustrated. The pipeline route runs southeast along undeveloped pasture before turning south along a road. The route traverses a ford crossing the Rampart Stream before continuing south to reach Allen's Bridge (CO022-271) At this point the pipeline turns east and then south to discharge into the River Dalua. The riverbank is shown as marshy scrubby land.

Ordnance Survey Map, 1903, Scale 1:2500

The main change in the landscape since the earlier mapping is the arrival of the railway. The line of the Great Southern and Western Railway – Kanturk and Newmarket Branch runs from the east through Rossacon and Garraunawarrig Lower townlands to the north of the River Dalua. It curves northwards at Rivers View House, briefly passing through Lisconigil townland, before running alongside the Rampart River at the base of the valley in Newmarket Demesne. It terminates in the northeast corner of the demesne with numerous goods stores, engine sheds and a cattle pen shown. Stoneville Bridge is annotated for the first time to the northwest of the terminus, through which the mill race and Rampart Stream flow.

There is no indication of the enclosure shown on the first edition OS map at the proposed development site; however the area is now annotated as 'Fairy Hill'. Several field drains are shown running northwest to southeast and a further drain follows the course of the stream to the south. The mill is no longer present and the mill race has been diverted northeast to facilitate a new creamery. This new mill race continues northeast for a short stretch before turning south to join with the Rampart Stream.

There is no reference to 'Park Bridge' however a stream is shown under-passing the road at this location to join with the Rampart Stream. Further south Bridge 'A' (NIAH Ref.: 20902203) has been constructed at the location of a ford shown on the first edition OS map however it is not annotated. The cut waters and parapets are shown in basic detail on Allen's Bridge (CO022-271) to the south.

Third Edition Ordnance Survey Map, 1926–1937, Scale 1:10560 (Figure 5.6.2–3)

There are no major changes to note within the footprint of the proposed development site. Three *fulachta fiadh* (CO014-092–93, CO023-059) are recorded to the north of the proposed WWTP upgrade location for the first time. Newmarket House is now known as St. Joseph's Convent. Allensbridge Creamery is shown on the banks of the Rampart Stream to the south of the

railway line and to the immediate northeast of Bridge 'A' (NIAH Ref.: 20902203).

5.6.4.4 County Development Plan

The Cork County Development Plan aims to protect, conserve and manage the archaeological and architectural heritage of the county and to encourage sensitive sustainable development so as to ensure its survival and maintenance for future generations. It is an objective of the plan to protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places.

There are 14 Recorded Monuments located within a 500m radius of the proposed development site (Table 5.6.2 and **EIS Volume II Appendix 5.6.1**). The proposed pipeline route traverses the eastern limits of the zone of potential for the historic town CO022-279, although the nearest recorded site comprises of the former Church of Ireland Parish Church of Clonfert *c*. 50m west. To the north of the proposed WWTP upgrade several *fulachta fiadh* are recorded 90m (CO014-093) and 240m north (CO014-092).

There are eight Protected Structures recorded within 500m radius of the proposed development site (Table 5.6.2 and **EIS Volume II Appendix 5.6.3**). The nearest structure comprises of the former Church of Ireland Parish Church of Clonfert (RPS 00161) located c. 50m to the west, which is also listed as a Recorded Monument and in the NIAH Survey (see below). The only other Protected Structure within the immediate vicinity (<250m) of the proposed development site is the former gate lodge on Main Street, *c*. 100m west of the pipeline route. The remaining structures include Newmarket House, St. Mary's Church, Market House and three vernacular houses.

There are no Architectural Conservation Areas designated within proximity to the proposed development site.

Table 5.6.2: Recorded Cultural Heritage sites within 500m of proposed development site

SMR No. RPS/NIAH No.	Classification	Townland	Distance to site
CO022-271 NIAH 20902204	Allen's bridge	Cloontycommade, Liscongill	Pipeline traverses northern limit
NIAH 20902203	Bridge 'A' "Allensbridge"	Liscongill	Pipeline traverses bridge
CO022-279	Historic Town	Newmarket	Pipeline passes through ZAP
CO022-171 RPS 00161 NIAH 20819002	Former Church of Ireland parish church of Clonfert	Newmarket	50m west
CO014-093	*Fulacht Fiadh*	Scarteen Lower	70m north
RPS 01214	Former Gate Lodge	Newmarket	100m west
NIAH 20819014	Vernacular house	Garraunawarrig Lower	120m southeast

SMR No. RPS/NIAH No.	Classification	Townland	Distance to site
CO014-092	*Fulacht Fiadh*	Scarteen Lower	200m north
CO022-060	Castle, unidentified	Newmarket	240m west
CO022-062	Designed landscape feature	Garraunawarrig Upper	250m east
CO023-059	*Fulacht fiadh*	Garraunawarrig Lower	250m north
RPS 01212 NIAH 20819006	Market House	Newmarket	260m west
RPS 01213 NIAH 20819007	House	Newmarket	260m west
CO022-278 RPS 00160 NIAH 20819008	St. Mary's Church	Newmarket	260m west
CO023-058001–2	Ringfort and Souterrain	Garraunawarrig Lower	280m west
NIAH 20819005	Houses	Newmarket	120m northwest
NIAH 20819004	Houses	Newmarket	90m northwest
RPS 01216 NIAH 20819011	Vernacular Houses	Newmarket	310m west
RPS 01215 NIAH 20819012	Vernacular Houses	Newmarket	310m west
CO022-061 RPS 00162 NIAH 20819009	James O'Keeffe Memorial Centre (Newmarket House)	Demesne	350m west
CO022-220001–2	Church and burial ground	Garraunawarrig Upper	360m east
NIAH 20819003	House	Newmarket	390m west

5.6.4.5 National Inventory of Architectural Heritage

A review of both the architectural survey and garden survey was undertaken as part of this assessment. An area up to 500m that surrounds the proposed development site was examined in order to identify any buildings or areas of architectural significance. As shown in Table 5.6.2, 13 buildings are included in the survey within this area. These include seven houses, two churches, a country house, two bridges and a market house. Six of these buildings are also recorded as Protected Structures and three are also listed as Recorded Monuments.

The garden survey lists three parklands located within 1km of the proposed development site, the largest and nearest of which is associated with Newmarket House (NIAH: CO-72-R-322068). Although the boundary is defined the survey records that the main features are unrecognisable but some peripheral features are visible. The parkland surrounding Liscongill House (NIAH: CO-72-R-330047) is recorded in a similar state although the principal building is present. Two much smaller parklands are also recorded associated with Spring Lodge (NIAH: CO-72-R-334072) and Killowan Cottage (NIAH: CO-72-R-329079).

5.6.4.6 Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development site held by the Ordnance Survey (1995, 2000 and 2005) and Google Earth (March 2012) failed to reveal any definitive features of archaeological potential. The images from 2005 suggest that the western part of the proposed WWTP upgrade location has been subject to some minor previous disturbance.

5.6.4.7 Townlands

The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word *baile* refers to a place. It is possible that the word is derived from the Old English *tun* land and meant 'the land forming an estate or manor' (Culleton 1999, 174).

Gaelic land ownership required a clear definition of the territories held by each sept and a need for strong, permanent fences around their territories. It is possible that boundaries following ridge tops, streams or bog are more likely to be older in date than those composed of straight lines (*ibid*. 179). The vast majority of townlands are referred to in the 17th century, when land documentation records begin. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch. Therefore most are in the context of pre-17th century landscape organisation (McErlean 1983, 315).

In the 19th century, some demesnes, deer parks or large farms were given townland status during the Ordnance Survey and some imprecise townland boundaries in areas such as bogs or lakes, were given more precise definition (ibid.). Larger tracks of land were divided into a number of townlands, and named Upper, Middle or Lower, as well as Beg and More (small and large) and north, east, south and west (Culleton 1999, 179). By the time the first Ordnance Survey had been completed a total of 62,000 townlands were recorded in Ireland.

The proposed development site lies within the townlands of Scarteen Lower, Newmarket, Garraunawarrig Upper, Garraunawarrig Lower and Liscongill. The townland boundaries within the vicinity of the proposed development site are formed by roadway, with the exception of the River Dalua and Rampart Stream which also function as boundaries. The first edition OS 6-inch OS map shows the townland boundary differently to the current layout, following the original line of the mill race. When the course of the mill race was changed in the late 19th century the townland boundary was moved west to Church Street.

5.6.4.8 Place Name Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long forgotten site, and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main reference used for the place name analysis is Irish Local Names Explained by P.W Joyce (1870) and the online resource of Logainm.ie.

The townland name Scarteen Lower is derived from '*Scairt*' meaning a little thicket or cluster. The townland has been divided into Upper and Lower portions. This area is located in the Parish of Clonfert and Barony of Duhallow. Explanations for surrounding townland names are included in Table 5.6.3.

Table 5.6.3: Placename Analysis

Placename	Derivation	Possible Meaning
Scarteen Lower	*Scairt* – 'een'	A little thicket or cluster, lower refers to division of the larger townland.
Newmarket		The new market
Clonfert	*Cluain-ferta*	The meadow of the grave
Duhallow	*Dúthaigh-Ealla*	The district of the Allo
Demesne	-	Land associated with a country house
Garraunawarrig Upper and Lower	*Garraun a carraig*	Stony shrubbery
Cloontycommade	*Cluainte commaun*	Meadow in the little hollow
Gortknockaneroe	*Gort cnoc an rua*	Field of the red little hill
Liscongill	*Lios Congbhail*	Fort of the habitation/ church

5.6.4.9 Field Inspection

The field inspection sought to assess the proposed development site, its previous and current land use, the topography and whether any areas or sites of archaeological potential were present. During the course of the field investigation the proposed development site and its surrounding environs were inspected for known or previously unknown archaeological sites. A field inspection was carried out on 18 November 2015 and 5 January 2016 in wet overcast conditions.

The proposed development site is located adjacent to an existing waste water treatment plant in Scarteen Lower townland in relatively flat pasture (**EIS Volume II Appendix 5.6.8** Plates 5.6.1 and 5.6.2). There is no obvious above ground indication of an enclosure illustrated on the first edition OS

map (**EIS Volume II Appendix 5.6.8** Plate 5.6.3); however a very slight curved rise in the ground was noted (**EIS Volume II Appendix 5.6.8** Plate 5.6.2). For the purpose of this report the area has been identified as a Site of Archaeological Potential (SAP 1) as shown on **EIS Volume III Figure 5.6.2.** To the southeast a patch of rough scrubby ground was noted and a wooded area lies to the south. The lands to the immediate south and southwest have been subject to varying levels of disturbance associated with the existing plant.

The route of the proposed discharge pipeline leads southwest from the plant via a concreted yard and exits the complex at the junction of Main Street and the R576. It traverses the line of a mill race as shown on the 25-inch OS maps (**EIS Volume II Appendix 5.6.8** Plate 5.6.5). A section of the mill race, at the crossing of the pipeline, has been culverted and concreted over (**EIS Volume II Appendix 5.6.8** Plate 5.6.6). There was no above ground evidence for the earlier course of the mill race and mill building marked 'in ruin' on the first edition OS map **(EIS Volume III Figure 5.6.5)**. For the purpose of this report the remains of the mill race are designated as a site of Cultural Heritage (CH 1).

This section of the pipeline lies within the zone of potential for the historic town of Newmarket (CO022-279) and the nearest recorded monument within this area is the church (CO022-171), *c*. 50m to the west. Two modern monuments are located at the southern and western side of the road junction.

Leading east along the R576 the pipeline passes over a road bridge (**EIS Volume II Appendix 5.6.8** Plate 5.6.7) and along the northern limit of the Newmarket Demesne. A low stone wall lines the southern perimeter of the road and this is supported by large buttresses on the lower ground to the south (**EIS Volume II Appendix 5.6.8** Plate 5.6.8). An entrance door is located in the western limit of the wall which may have provided access to the demesne or the later railway station. There is no remaining evidence for the main railway buildings located to the southwest of the pipeline route.

Continuing south, the pipeline runs along the roadway which is bound by linear residential development and mature tree lines. A modern grotto is located at the junction of the R576 and Pond Hill. The land falls to the west of the road towards the Rampart Stream. Approximately 1km south of the town the pipeline route passes a gate lodge on the eastern boundary of Newmarket Demesne. This two storey house has been modified with an extension to the rear and it retains the original concave entranceway.

Approximately 700m to the south a road bridge, Park Bridge, channels water to the Rampart Stream (**EIS Volume II Appendix 5.6.8** Plate 5.6.9). This bridge appears to have been modified and concrete brickwork was visible in its fabric.

Near the southern limit of the proposed pipeline route it leaves the roadway heading south over the level crossing for the dismantled railway line (**EIS Volume II Appendix 5.6.8** Plate 5.6.10). An old post box was noted within the green verge at the level crossing. A large house and outbuildings, shown on

the OS maps as Riverview, are located to the north of the road. The ringfort CO023-058 is not visible from the pipeline route. The pipeline travels along the narrow road, parallel to the railway line. At this point the remains of the railway line comprise of a low embankment flanked by trees and hedgerows which currently functions as a farm access/ right of way east of the pipeline route (**EIS Volume II Appendix 5.6.8** Plate 5.6.11). No railway furniture or features were identified *in situ*. For the purpose of this report the remains of the railway are designated as a site of Cultural Heritage (CH 2).

The route continues south to cross Bridge 'A' (NIAH 20902203), a 20th century stone single arch road bridge (**EIS Volume II Appendix 5.6.8** Plate 5.6.12). The eastern façade (or downstream façade) of this bridge was heavily overgrown at the time of inspection and as such it was difficult to accurately inspect the fabric (**EIS Volume II Appendix 5.6.8** Plate 5.6.13). An existing pipeline already runs through the eye of the bridge along the roadway.

Further to the south the proposed route abuts the northern limit of the 19th century Allen's Bridge (DU026-271, NIAH 20902204) (**EIS Volume II Appendix 5.6.8** Plate 5.6.14). This triple-arched slightly hump-backed bridge crosses a fast flowing section of the River Dalua (Plate 5.6.15). The bridge is partially overgrown and is in very good condition. The northeast façade of the bridge and parapet are covered with thick ivy and vegetation (**EIS Volume II Appendix 5.6.8** Plate 5.6.16) and a sloped rampart is visible leading to the roadway (**EIS Volume II Appendix 5.6.8** Plate 5.6.17) at the point of the proposed outflow. The proposed pipeline will be inserted through the base of the parapet wall at this location to discharge into the river.

The riverbank is sloped to the riverbed and covered in low vegetation. No previously unidentified features of archaeological interest were noted on the river bank. Riversides have always provided a focus for human activity and settlement and act as natural boundaries. While there are no obvious indicators of substantive archaeological activity there is the potential to identify transient archaeological activity such as Bronze Age burnt mound sites. These sites are generally uncovered in or near riverine and waterlogged environments which provide the ideal circumstances for the construction and preservation of burnt mounds (*fulachta fiadh*). For the purpose of this report the riverside has been designated as an Area of Archaeological Potential (AAP 1).

5.6.4.10 Results of Assessment

The proposed development site is located within the townlands of Scarteen Lower, Newmarket, Garraunawarrig Upper, Garraunawarrig Lower and Liscongill. It is located within the Parish of Clonfert and Barony of Duhallow. The surrounding topography follows a gentle valley along the Rampart Stream where it runs north-northwest–south-southeast to discharge into the River Dalua.

There are 14 Recorded Monuments located within a 500m radius of the proposed development site. The proposed pipeline route traverses the eastern limits of the zone of potential for the historic town CO022-279,

although the nearest recorded site comprises of the former Church of Ireland Parish Church of Clonfert *c*. 50m west. To the north of the proposed development site several *fulachta fiadh* are recorded 70m (CO014-093) and 200m north (CO014-092). At the southern end of the proposed scheme the pipeline traverses Allen's Bridge (CO022-271).

A review of the Excavations Bulletin (1970–2015) and the available resource has shown that no programmes of intrusive archaeological investigation have been carried out within the proposed development site. Within the wider area four programmes of investigation have been undertaken two of which led to the identification and excavation of a burnt mound *c*. 160m north of the proposed development site.

The first edition OS map of 1842 shows the proposed WWTP upgrade location within greenfields, including the western extent of a large tree-lined enclosure (later annotated as Fairy Hill). A ruined mill is shown to the southwest and the mill race running southeast from this crosses the proposed pipeline route. The later 25-inch mapping (1904) shows a rerouted mill race passing further north along the proposed pipeline route. The majority of the proposed pipeline runs along roadway which has been in existence since at least the turn of the 19th century. The later mapping also shows the extent of the railway line which terminates in Newmarket Demesne. The proposed pipeline runs along a short section of this line at the southern extent of the proposed development site.

A review of the Record of Protected Structures and NIAH Survey for County Cork revealed 13 structures of architectural merit located within 500m of the proposed development site. Of these two structures, Bridge 'A' and Allen's Bridge are located within the path of the proposed scheme.

Inspection of the aerial photographic coverage of the proposed development site failed to reveal any definitive features of archaeological potential. The images from 2005 suggest that the western part of the WWTP upgrade location has been subject to some minor previous disturbance.

During field inspection a slight rise was noted within the footprint of the proposed development which has potential to represent the enclosure identified on the first edition OS map (SAP 1). The pipeline route crosses a culverted section of mill race (CH 1) and a possible back-filled section of mill race before exiting the Newmarket Co-Op Creamery facility. It runs along a short section of the dismantled railway (CH 2), which survives as a low embankment currently in use as an access track.

The proposed discharge location is within a wider riverside area has been designated as an Area of Archaeological Potential (AAP 1). Riversides have always provided a focus for human activity and settlement and act as natural boundaries. While there are no obvious indicators of substantive archaeological activity there is the potential to identify transient archaeological activity such as Bronze Age burnt mound sites.

5.6.5 Assessment of Impacts (Construction and Operational)

5.6.5.1 Construction Phase

- There will be a direct moderate negative impact on the 19th century road bridge, known as Allen's Bridge (CO022-0271, NIAH 20902204). This will be caused by the insertion of the pipeline through the parapet wall from the road (at a below ground level) and strapping the outfall pipe to the eastern façade to discharge into the river.

- There may be a significant direct negative impact on previously unrecorded archaeological feature or deposits, such as the enclosure SAP 1 or further burnt mound remains that have the potential to survive beneath the current ground level within the footprint of the proposed WWTP upgrade (0.429 ha). This will be caused by ground disturbances associated with the proposed development.

- The proposed riverside discharge location has been designated as an Area of Archaeological Potential (AAP 1). ~~While~~ No obvious indicators of substantive archaeological activity were identified ~~there may be a significant direct negative impact on any previously unrecorded archaeological features or remains, such as burnt mound sites, that have the potential to survive on the river banks or bed.~~

- The proposed pipeline will be strapped to the external eastern façade of Bridge 'A', a 20th century single arch road bridge. As such there will be a direct negative moderate impact on this bridge.

- The proposed pipeline traverses Stoneville Bridge, 18th/19th century Road Bridge under the R576. However, Malachy Walsh and Partners state in their Effluent Rising Main Design Report (provided in **EIS Volume III Appendix 2.1**) that the pipeline will be laid in the newer section of road carriageway and that there is ample cover available over the upstream side of Stoneville Bridge to allow the effluent line pass over it so that the proposed route shall ~~ould~~ have no impact on the bridge.

- The proposed pipeline traverses Park Bridge, a previously modified 19th century Road Bridge under the R576. There may be a slight direct negative impact on the fabric of the road bridge caused by ground disturbances associated with the proposed development.

- The proposed pipeline crosses two sections of the mill race (CH 1, shown on **EIS Volume III Figure 5.6.2)**, as shown on the 1842 and 1904 OS maps, one of which is possibly culverted. There may be a direct moderate negative impact on these remains caused by ground disturbance associated with the proposed pipeline installation.

- The proposed pipeline crosses the level crossing for the dismantled railway, CH 2. It is probable that all railway features have been

removed when the railway was dismantled and as such there is no predicted impacted on CH 2 by the proposed development.

5.6.5.2 Operational Phase

There is no predicted impact on the Cultural Heritage resource during the operational phase of the proposed development.

5.6.6 Proposed Mitigation and Enhancement Measures (if applicable)

- It is recommended that following vegetation clearance from the northeast façade of Allen's Bridge (CO022-271) that a written and photographic record be carried out of the section to be impacted by the proposed development.

It is further recommended that all ground works associated with development be monitored by a suitable qualified archaeologist. Should the proposed designs change further built heritage assessment may be required.

- Prior to construction it is recommended that a programme of archaeological test trenching is carried out to assess the potential for previously unrecorded archaeological remains such as SAP 1 within the footprint of the proposed WWTP upgrade location. Testing shall ~~ould~~ be carried out by a licenced archaeologist in consultation with the National Monuments Service and the National Museum of Ireland. Full provision shall be made for the resolution of any archaeological features/deposits that may be discovered, should that be deemed the appropriate manner in which to proceed. Archaeological testing of the SAP 1 area was completed on 3rd August 2016 and a report on the findings of this work is provided in **Appendix 5.6.9**. The request for further information issued by Cork County Council on 14th June 2016 also asked for testing on the riverbank, which was identified as an Area of Archaeological Potential (AAP 1). This riverbank location is not part of the proposed development and no development including groundworks is proposed at this location. As such testing was not carried out at this location, at this time.

- It is recommended that all ground disturbances associated with the proposed development, within proximity to AAP 1 and CH 1, such as topsoil stripping or site investigations, be monitored by a suitably qualified archaeologist. Full provision shall ~~ould~~ be made for the resolution of any archaeological features/deposits that may be discovered, should that be deemed the appropriate manner in which to proceed.

- It is recommended that a full written and photographic record be made of the eastern façade of Bridge 'A' prior to construction but following vegetation clearance.

- Due to the previously modified nature of Park Bridge no mitigation is recommended during construction works.

5.6.7 Residual Impacts

There will be no residual impact on the archaeological resource by the proposed development should all of the above mitigation measures be undertaken.

5.6.8 Cumulative Impacts

No cumulative impact upon the Cultural Heritage resource has been identified as a result of the proposed development going ahead.

5.6.9 Summary and Conclusions

The proposed development comprises of the upgrade of an existing WWTP, installation of c. 4km of an underground discharge pipeline and an increase in the duration of the weekly and annual milk processing period. The proposed development lies on the periphery of a rural market town and associated demesne which has been evolved from the late 17th century. Recorded Monuments in the area comprise of churches and castles 50–300m west in the town, three prehistoric burnt mounds c. 70–200m north and a 19th century road bridge within the pipeline route.

There will be a direct moderate negative impact on Allen's Bridge (CO022-271) caused by ground works associated with the proposed development. It is recommended that a full written and photographic record be maintained of the bridge section to be impacted following vegetation clearance. It is also recommended that all groundworks be monitored by an archaeologist. Should any of the design details change further built heritage assessment may be required.

The proposed WWTP upgrade location currently comprises undeveloped greenfield and a possible enclosure (SAP 1) has been identified partially in this area on the early 19th century mapping. There is the potential for ground disturbance associated with the proposed WWTP to have a significant negative impact on any previously unrecorded archaeological features, such as SAP 1 or further burnt mounds, which have the potential to survive beneath the current ground level. Archaeological testing of the SAP 1 area was completed on 3rd August 2016 and a report on the findings of this work is provided in **Appendix 5.6.9**.

In addition to Allen's Bridge three smaller road bridges are traversed by the scheme. The proposed pipeline will traverse Bridge 'A' by being strapped to the external eastern façade. It was recommended that a full written and photographic record of the façade be carried out prior to construction, and following vegetation clearance.

Due to the previously modified nature of Park Bridge no mitigation was deemed necessary during the construction stage of the proposed development.

The proposed ~~riverside~~ discharge location is within an area designated as an Area of Archaeological Potential (AAP 1) due to the presence of a river. Riversides have always provided a focus for human activity and settlement and act as natural boundaries. However ~~While~~ no obvious indicators of substantive archaeological activity were identified within this area and the riverbank location is not part of the proposed development, with no development including groundworks proposed at this location. ~~there may be a significant direct negative impact on any previously unrecorded archaeological features or remains, such as burnt mound sites, that have the potential to survive on the river banks or bed.~~

Furthermore the proposed pipeline traverses two sites of cultural heritage; mill race CH 1 and dismantled railway CH 2. It was recommended that any groundworks, including site investigations and topsoil stripping, undertaken within the vicinity of CH1 be subject to archaeological monitoring. No mitigation was deemed necessary for works in the vicinity of CH2 as all features had been removed from the level crossing area during the 20th century.

All archaeological investigations, including testing and monitoring, shall ~~ould~~ be carried out by a qualified archaeologist under licence to the National Monuments Service and in consultation with the National Museum of Ireland. Full provision shall ~~ould~~ be made for the resolution of any archaeological features/deposits that may be discovered, should that be deemed the appropriate manner in which to proceed.

Once all recommended mitigation measures are undertaken there will be no impact on the archaeological resource during the operational phase of the proposed development.

No cumulative or residual impacts upon the Cultural Heritage resource were identified as a result of the proposed development going ahead.

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Chapter 5 – Section 5.7 Traffic and Transport

5.7.1 Introduction

In November 2015, Newmarket Co-Op appointed Malachy Walsh and Partners to prepare a Traffic and Transport chapter to inform this EIS. In this Traffic and Transport chapter, the effect of traffic on the local road network due to the proposed development is assessed to establish what impact the construction and operational generated traffic may have on the surrounding road network.

5.7.2 Methodology

This Traffic and Transport chapter has been prepared in the context of the following:

- The National Roads Authority (NRA) Traffic and Transport Assessment Guidelines May 2014. The NRA is now part of Transport Infrastructure Ireland (TII);
- The NRA (TII) Project Appraisal Guidelines Unit 16.1 Estimating Annual Average Daily Traffic (AADT) on National Roads and Unit 5.5 Link-Based Traffic Growth Forecasting 2011;
- The NRA (TII) Design Manual for Roads and Bridges (DMRB) TA79/99 Traffic Capacity of Urban Roads (1999);
- The NRA (TII) DMRB TD 9/12 Road Link Design;
- Cork County Council's Cork County Development Plan 2014; and
- The Central Statistics Office (CSO) Census 2011 (Profile 10 Door to Door December 2012).

Existing traffic volumes on the local road network have been established on the basis of on-site traffic counts carried out by Malachy Walsh and Partners and the existing Newmarket Co-op operating characteristics. On-site inspections, road network inventories and traffic counts were carried out by Malachy Walsh and Partners in November 2015.

5.7.3 Receiving Environment

5.7.3.1 Existing Road Network

The existing Newmarket Co-op site is located in Newmarket, County Cork, on the north east side of Church Street, off Emmett Place, as shown on **Figure 5.7.1** below.

Church Street is part of the R576 Regional Road, which extends from the N72 National Secondary Road in the south east, to the N21 National Primary Road

in the north west, via Kanturk and Newmarket. South of the site, the R576 extends along Pound Hill Road.

Access to the existing Newmarket Co-Operative Creameries site is provided via an existing access on Emmett Place and existing exit on the R576. Emmett Place forms a priority controlled T-junction with Church Street. On-street parking is prohibited locally on the east side of Church Street at its Emmett Place junction.

Emmett Place has a typical carriageway width of 6.0 metres at its junction with Church Street. North west of the junction with Emmett Place, Church Street has a variable carriageway width, ranging from circa. 10.0 metres with permitted on-street parking, to circa. 6.1 metres with prohibited parking at its north west end, with footways on both sides. Church Street has a typical carriageway width of 6.5 metres with prohibited on-street parking, south east of Emmett Place. Approximately 200 metres north west of its Emmett Place junction, Church Street forms a priority controlled crossroads junction with High Street, New Street and Scarteen Street. The R576 extends from Church Street along New Street.

Scarteen Street is part of the R578 Regional Road that extends north east from Newmarket, to the R515 on the west side of Charleville and the N20 National Primary Road. North west of Newmarket, the R578 extends west to Ballydesmond. At the south east end of Church Street, the R576 includes a priority controlled T-junction with Main Street, approximately 200 metres from the junction with Emmett Place. At the junction, Main Street has a total carriageway width of circa. 14.0 metres, with dedicated left and right-turn lanes on the Main Street junction approach. The Newmarket Co-op site and its access junctions are located within Newmarket town centre and its 50 km/hour urban speed limit zone.

A Bus Éireann bus stop is located on the north side of the R576 Pound Hill Road, approximately 80 metres east of the Newmarket Co-op exit junction. The Newmarket town 50 km/hour urban speed limit zone extends approximately 0.8 kms along the R576 from the Newmarket Co-op exit junction, to its 80 km/hour rural speed limit zone. South east of Newmarket town, the R576 has a typical road carriageway width of 7.0 metres with variable width hard shoulders and intermittent grass verges.

Approximately 3.3 kms south east of the Newmarket Co-op exit junction on the R576, the L1021 Local Road forms a priority controlled T-junction on the west side of the R576, north of the River Dalua, as shown on **Figure 5.7.2** below. The L1021 has a typical road carriageway width of 5.0 metres, with a circa. 7.0 metres width locally at its R576 junction tie-in. The R576 has a priority controlled T-junction on its east side with the L5044 Local Road, approximately 100 metres north of its L1021 junction.

5.7.3.2 Work Travel Mode Share (Census 2011)

Details of the Government of Ireland Central Statistics Office (CSO) existing means of travel mode shares, for a usual residence location in the Cork

County areas excluding Cork City, in the latest population census, Census 2011, are summarised in Table 5.7.1 (Reference: Central Statistics Office Profile 10 Door to Door December 2012). The mode shares have been rebased to exclude persons that mainly work at, or from home, and persons that did not state a travel mode.

Table 5.7.1: Cork County Area Resident Persons' Travel to Work Mode (Census 2011)

Travel to Work Mode	Travel Mode Share
Car/Van Driver	84.3%
On Foot	6.8%
Car Passenger	4.3%
Bus	1.7%
Cycle	0.8%
Train/Dart/	0.5%
Motorcycle/Scooter	0.4%
Other	1.1%

5.7.3.3 Traffic Volumes

Existing 2015 (estimated full year) Annual Average Daily Traffic (AADT) volumes and typical weekday peak hour link traffic volumes on the R576 have been established on the basis of on-site traffic counts carried out by Malachy Walsh and Partners and the existing Newmarket Co-op operating characteristics. The existing 2015 traffic volumes are provided in Table 5.7.2 below. The AADT heavy goods vehicles (HGV's) percentage proportions are also provided. The Newmarket Co-Op AADT volumes are peak daily operational traffic volumes during peak season.

Table 5.7.2: Existing (2015) Two-Way Link Traffic Volumes

Road	Location	Total Vehicles	% HGV's	Typical Weekday Peak Hour Vehicles
		AADT:		
R576	Church Street	3,500	4.8%	348
	Pound Hill Road	3,550	4.8%	351
Main Street	At R576 Junction	2,100	2.3%	209
		Peak Day:		
Newmarket Co-Operative Creameries Site	Emmett Place Access Road	189	43.9%	30
	R576 Exit Road	83	100%	5

5.7.3.4 Road Traffic Capacities

On the basis of the NRA (TII) Design Manual for Roads and Bridges (DMRB) document NRA TA 79/99 Traffic Capacity of Urban Roads, the R576 Church Road at Newmarket has an urban road link capacity of 750 vehicles in each direction (1,500 vehicles/hour two-way) for an NRA (TII) urban all-purpose road classification UAP4. Accordingly, Church Street is currently operating well within its link capacity during the peak hour, at 23.2% of its urban road link

capacity. The R576, south of Newmarket, has a rural road link capacity of 8,600 vehicles AADT, on the basis pf the NRA (TII) document TD 9/12 Road Link Design. The R576 is currently operating well within its link capacity, at 41.3% of its rural road AADT link capacity.

During the on-site inspection and traffic counts, no significant traffic queuing and delays were observed at the existing Main Street/Church Street priority controlled junction. There are dedicated left and right-turn lanes on the Main Street junction approach.
During the on-site inspection and traffic counts, some short period traffic delays were observed on Church Street due to parking by vehicles in prohibited on-street areas.

Figure 5.7.1 - Site Location Map

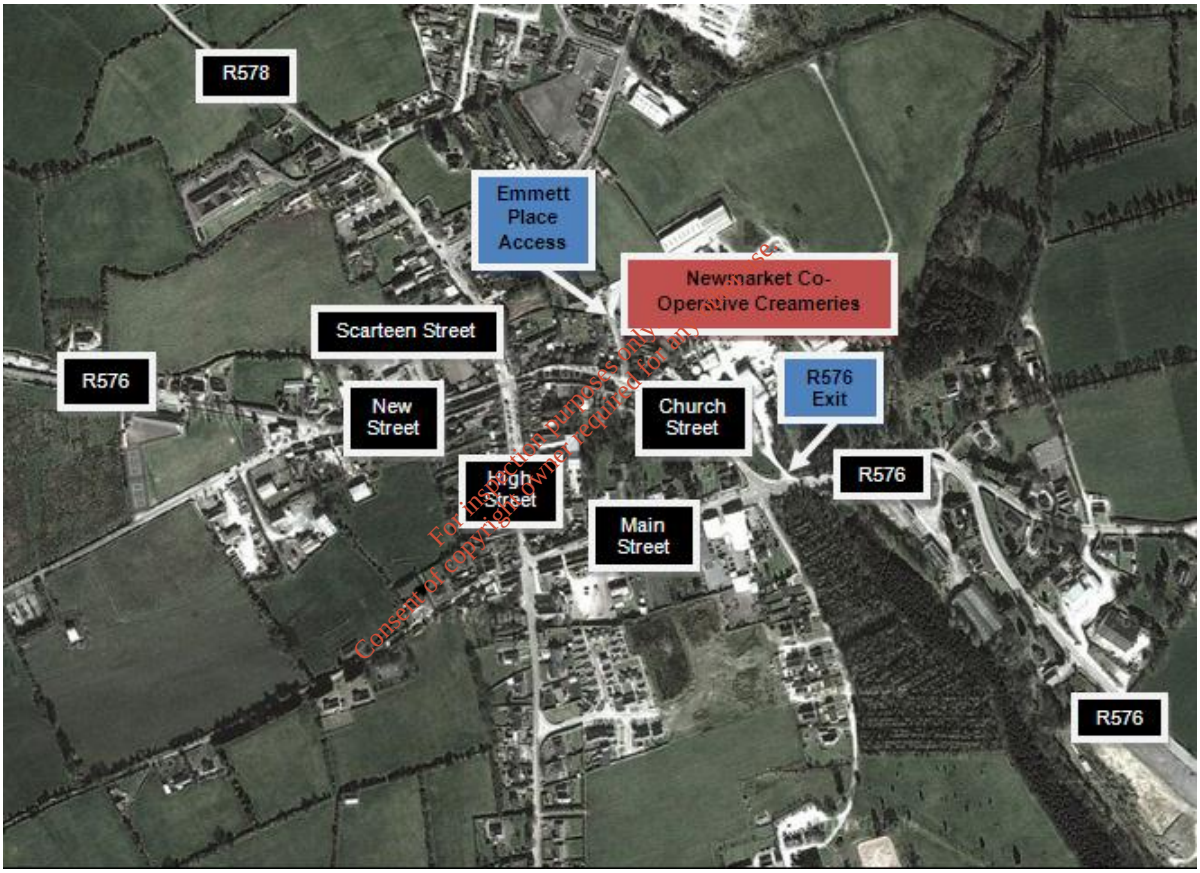
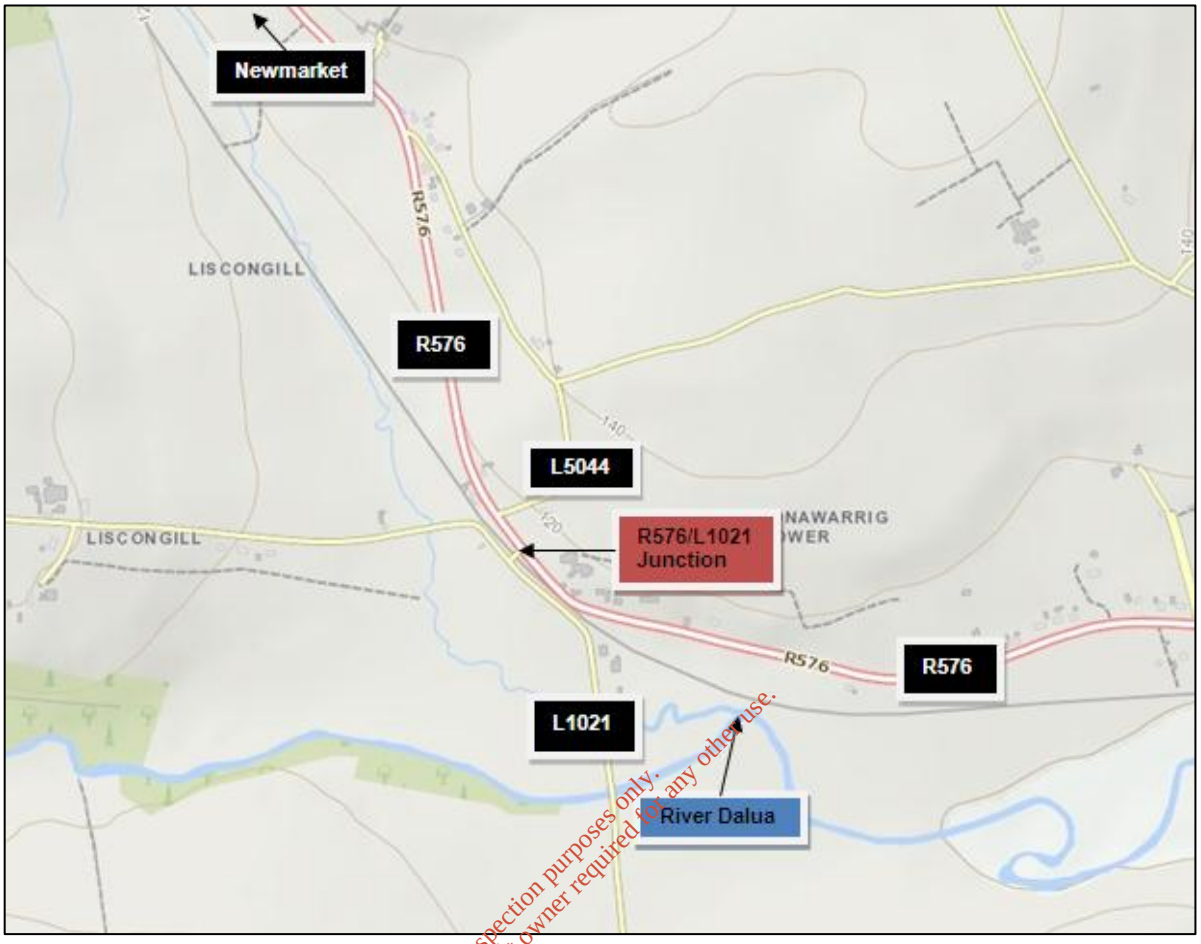


Figure 5.7.2 – R576/L1021 Junction and River Dalua Location Map



5.7.3.5 Existing Newmarket Co-Operative Creameries Operations

Newmarket Co-Op currently operates 24 hours a day, six days per week during peak production. Milk intake is received seven days per week.

Newmarket Co-Op has a total of 53 staff during peak season, including day staff and staff working revolving shift patterns. Shift hours are 6.00 a.m. to 2.00 p.m., 2.00 p.m. to 10.00 p.m. and 10.00 p.m. to 6.00 a.m. During peak season, all 53 staff work during each day (24 hours period), Monday to Friday; 48 staff work during Saturday; and five staff work during Sunday.

During peak production, daily imported materials include 60 milk tankers, Monday to Saturday, and 30 milk tankers on Sundays. The typical daily profile times of milk tankers are continuous through the 24 daily hours, and mostly during off-peak traffic periods on the local road network, as follows:

- 30% of arrivals and 28% of departures are between midnight and 7.00 a.m.;
- 13% of arrivals and departures are between 7.00 a.m. and 10.00 a.m.;
- 28% of arrivals and 24% of departures are between 10.00 a.m. and 4.00 p.m.;

- 9% of arrivals and 13% of departures are between 4.00 p.m. and 7.00 p.m.; and,

- 20% of arrivals and 22% of departures are between 7.00 p.m. and midnight.

During peak production, daily exported materials include 13 whey tankers, Monday to Saturday, and five whey tankers on Sundays; and 10 trucks daily moving finished product, Monday to Saturday.

The typical daily profile times of exported materials and finished products are continuous from early morning to evening, with typically up to two arrivals and two departures during the peak traffic hour. All vehicles enter the Newmarket Co-op site via the Emmett Place access. All heavy vehicles exit the site via the R576 exit. The majority of light vehicles exit the site via the Emmett Place access. Light vehicle traffic may also exit via the R576 exit.

The majority of milk tankers travel between the Newmarket Co-op site and Charleville Road, via the R576 (west) and R578, respectively. The whey tankers travel between Newmarket and Listowel via the R576 (west). Trucks moving finished product are typically distributed in all directions, including travel between Cork, Mallow, Castleisland and Listowel.

5.7.4 Impact Assessment

5.7.4.1 Do Nothing Impact

Cork County Council, in association with the NRA (TII), propose to provide a new and upgraded N20 route. The Cork County Development Plan 2014 Objectives for the National Road Network include the provision of the M20 (Blarney – Mallow – Limerick) project.

An Bord Pleanála, Cork County Council and the NRA (TII) have approved the proposed upgrading of the N20/N72 Annabella Roundabout junction, on the west side of Mallow, as part of the permitted Dairygold Dryer Facility expansion, currently under construction, at Dairygold's existing site facility at West End, Mallow.

The Cork County Development Plan National Road Network Objectives, in association with the NRA (TII), include the provision of the N72 Mallow Northern Relief Road and N72 Mallow to Fermoy projects.

The foregoing proposed upgraded national roads would benefit existing and future users, including Newmarket Co-op users. The NRA (TII), in their Project Appraisal Guidelines Unit 5.5 Link-Based Traffic Growth Forecasting, envisages that light vehicle traffic would increase by an annual growth factor of up to 1.013, during the period up to 2025, based on their medium growth scenario for Cork County and City. Thereafter, the NRA envisages that light vehicle traffic would increase by an annual average factor of up to 1.011, to 2040, for their medium growth scenario. The equivalent annual growth factors,

envisaged by the NRA for heavy vehicle traffic, are 1.009 and 1.001, respectively.

Subject to planning permission, it is envisaged that the proposed development will be fully complete and operational in 2017. The NRA (TII) Traffic and Transport Assessment Guidelines identify the opening year and future years, five and 15 years after the opening year, for considering the impact of a proposed development. In this case, the operational opening year is 2017, and the future years are 2022 and 2032.

Accordingly, the existing (2015) traffic volumes have been factored to 2017 and 2027 levels on the basis of the foregoing NRA growth factors, to determine the future predicted traffic volumes, without the proposed development in place. There are no significant existing proposed permitted developments in the vicinity of the existing Newmarket Co-Op site that will be significant in terms of potential additional traffic generation.

The predicted 2016, 2017 and 2027 AADT and typical weekday peak hour link traffic volumes, on the local road network, without the proposed development in place, are provided in Table 5.7.3. The Newmarket Co-op AADT volumes are peak daily operational traffic volumes during peak season.

Table 5.7.3: Predicted Two-Way Link Traffic Volumes Without Proposal

Road	Location	Year	Total Vehicles	% HGV's	Typical Weekday Peak Hour Vehicles
			AADT:		
R576	Church Street	2017	3,590	4.8%	357
		2022	3,828	4.7%	381
		2032	4,283	4.3%	426
	Pound Hill Road	2017	3,620	4.8%	360
		2022	3,860	4.7%	384
		2032	4,320	4.3%	430
Main Street	At R576 Junction	2017	2,154	2.3%	214
		2022	2,298	2.2%	229
		2032	2,577	2.1%	256
			Peak Day:		
Newmarket Co-Operative Creameries Site	Emmett Place Access Road	2017	189	43.9%	30
		2022	189	43.9%	30
		2032	189	43.9%	30
	R576 Exit Road	2017	83	100%	5
		2022	83	100%	5
		2032	83	100%	5

Church Street would continue to operate well within its link capacity during the peak hour, at up to 28.4% of its urban road link capacity, in 2032, on the basis of its NRA (TII) DMRB document NRA TA 79/99 Traffic Capacity of Urban Roads urban road link capacity of 750 vehicles in each direction (1,500 vehicles/hour two-way), for an NRA (TII) urban all-purpose road classification UAP4.

The R576, south of Newmarket, would also continue to operate well within its link capacity, at up to 50.2% of its rural road AADT link capacity of 8,600 vehicles AADT, in 2032, on the basis of the NRA (TII) document TD 9/12 Road Link Design.

5.7.4.2 Construction Phase

The construction phase impacts will be temporary impacts.

WWTP Upgrade

Subject to planning permission, on-site construction for the WWTP Upgrade is scheduled for 43 weeks, from the second quarter of 2016. Construction site access will be via the existing site access arrangements. Peak on-site construction employment is expected to be up to 20 personnel. Peak site personnel will generate up to approximately 40 daily car and van trips two-way. This will include arrivals for the proposed start time, departures after the proposed finish time and 50% of personnel leaving and returning to site once a day, during either the mid-morning or lunchtime work breaks, at an average vehicle occupancy of 1.5 personnel per vehicle.

Peak daily construction deliveries will be approximately 20 concrete trucks, both in and out of the site. This will occur on up to three daily occasions during peak construction. There will be no abnormal loads delivered during construction. The WWTP Upgrade construction works will not have a significant adverse traffic impact on the existing local road network.

Underground Pipeline

Subject to planning permission, on-site construction for the proposed underground pipeline is scheduled for up to three months, during the second quarter of 2016. The underground pipeline would extend for approximately four kms, from the Newmarket Co-Operative Creameries site to a discharge point on the River Dalua, along the R576 road.

A total 4.0 metres wide total working width along the R576 would be required for the underground construction works. This would require the temporary closure of one traffic lane, locally, on the existing two-lane R576 road, on a moving basis as the works proceed. An alternating stop/go traffic management layout would be provided at the works, in accordance with the Department of Transport Traffic Signs Manual (2010) Chapter 8 Temporary Traffic Measures and Signs for Roadworks, and the requirements of Cork County Council. The length of the temporary traffic management layout at the works would be of the order of 300 metres.

The pipeline works would proceed at an average rate of 100 metres length of pipeline per day. A total of 112 m^3 of material would be excavated per day, and replaced with pipeline, backfill materials and road pavement materials. This would generate 22 heavy vehicles per day, both to and from the pipeline works. A total of six construction staff would be on-site for the pipeline works.

The proposed pipeline construction works would increase daily traffic volumes on the R576, south of Newmarket, by up to 56 vehicles per day. This equates to 1.6% of the existing AADT volume on the R576.

The temporary stop/go traffic management measures for the underground pipeline works would result in short delays for vehicles on the R576, south of Newmarket. The construction compound for the underground pipeline works would be located within the Newmarket Co-op site. The pipeline construction works would not have a significant adverse traffic impact on the existing local road network.

Cumulative Construction Phases

The peak construction phase for the proposed 43 weeks WWTP Upgrade will not coincide with the proposed underground pipeline construction works which will last up to three months.

5.7.4.3 Operational Phase

Subject to planning permission, the proposed development will be fully complete and operational in 2017. There would be no change to existing Monday to Saturday operations with the proposed development in place.

Milk intake, whey imports and product exports would increase on Sundays to existing Monday to Saturday levels, with the proposed development in place. Staff working on Sundays would increase to just less than existing Monday to Saturday levels, with the proposed development in place.

Total staff employed by Newmarket Co-op during peak season would increase from 53 to 66 staff, with the proposed development in place, in order to facilitate increased staff working on Sundays. A summary of Newmarket Co-op existing and proposed operations is provided in Table 5.7.4.

Table 5.7.4: Summary of Existing and Proposed Newmarket Co-Operative Creameries Operations

Operations	Total Staff	Day	Hours	Peak Season Daily Working Staff	Peak Season Daily Heavy Vehicles
Existing	53	Monday to Saturday	24 Hours	53 (48 on Saturday)	60 Milk Tankers 13 Whey Tankers 10 Product Trucks
		Sunday	Tanker Intake Only	5	30 Milk Tankers 5 Whey Tankers
Proposed	66	Monday to Saturday	24 Hours	53 (48 on Saturday)	60 Milk Tankers 13 Whey Tankers 10 Product Trucks
		Sunday	24 Hours	48	60 Milk Tankers 13 Whey Tankers 10 Product Trucks

Operations	Total Staff	Day	Hours	Peak Season Daily Working Staff	Peak Season Daily Heavy Vehicles
Change	**+13**	**Monday to Saturday**	**No Change**	**No Change**	**No Change**
		Sunday	**24 Hours**	**+43**	**+30 Milk Tankers +8 Whey Tankers +10 Product Trucks**

There would be no change to existing Newmarket Co-Op vehicle trip distributions and access arrangements, with the proposed development in place. The predicted peak season changes in two-way daily and typical peak hour traffic volumes, with the proposed development in place, are provided in Table 5.7.5.

Table 5.7.5: Predicted Peak Season Changes in Two-Way Link Traffic Volumes With Proposal

Road	Location	Day	Peak Season Change (% in 2017)	
			Daily Traffic Volumes	Typical Peak Hour Traffic Volumes
R576	Church Street	Monday to Saturday	No Change	No Change
		Sunday	+80 (+2.2%)	+15 (4.2%)
	Pound Hill Road	Monday to Saturday	No Change	No Change
		Sunday	+50 (+1.4%)	+9 (+2.5%)
Main Street	At R576 Junction	Monday to Saturday	No Change	No Change
		Sunday	+50 (+2.3%)	+9 (+4.2%)
Newmarket Co-Operative Creameries Site	Emmett Place Access Road	Monday to Saturday	No Change	No Change
		Sunday	+134	+25
	R576 Exit Road	Monday to Saturday	No Change	No Change
		Sunday	+48	+3

There would be no change to existing peak season traffic volumes on Mondays to Saturdays, with the proposed development in place. Predicted peak season Sunday daily traffic volumes would increase by 80 vehicles on Church Street, during the Sunday 24 hours operations period; and by 50 vehicles on the R576 during the Sunday 24 hours operations period.

Predicted peak season typical Sunday peak traffic hour volumes would increase by 15 vehicles on Church Street; and by nine vehicles on Pound Hill Road and Main Street.

For context, these predicted increases in Sunday traffic volumes equate to daily increases of up to 2.3% and typical peak hour increases of up to 4.2%, on the basis of the predicted 2017 typical daily and peak hour traffic volumes, factored from the recorded weekday on-site traffic counts. It is envisaged that future background traffic volumes on the local road network would typically be lower on Sundays, compared to Mondays to Saturdays.

Accordingly, typical peak traffic hour volumes on Sundays, with the proposed development in place, would be of the order of Monday to Saturday peak hour traffic volumes, or less, with existing Newmarket Co-Op operations. Church Street would continue to operate well within its peak hour link capacity, at up to 28.4% of its urban road link capacity, in 2032, on the basis of its NRA (TII) DMRB document NRA TA 79/99 Traffic Capacity of Urban Roads urban road link capacity of 750 vehicles in each direction (1,500 vehicles/hour two-way), for an NRA (TII) urban all-purpose road classification UAP4.

Predicted AADT volumes on Church Street, Pound Hill Road and Main Street would increase by up to 0.3%.

The predicted 2017, 2022 and 2032 AADT volumes, on the local road network, with the proposed development in place, are provided in Table 5.7.6. The Newmarket Co-Op site predicted peak season daily operational traffic volumes, provided in Table 5.7.6 for existing operations would remain unchanged with the proposed development in place.

Table 5.7.6: Predicted AADT Volumes With Proposal

Road	Location	Year	Total Vehicles (% Change)	% HGV's
R576	Church Street	2017	3,601 (+0.3%)	4.9%
		2022	3,839 (+0.3%)	4.9%
		2032	4,294 (+0.3%)	4.5%
	Pound Hill Road	2017	3,627 (+0.2%)	4.8%
		2022	3,867 (+0.2%)	4.7%
		2032	4,327 (+0.2%)	4.4%
Main Street	At R576 Junction	2017	2,161 (+0.3%)	2.4%
		2022	2,305 (+0.3%)	2.3%
		2032	2,584 (+0.3%)	2.2%

The proposed development would increase predicted future AADT volumes on the local road network by up to 0.3%. The R576, south of Newmarket, would continue to operate well within its link capacity, with the proposed development in place, at up to 50.3% of its rural road AADT link capacity of 8,600 vehicles AADT, in 2032, on the basis of the NRA (TII) document TD 9/12 Road Link Design.

The predicted increases in traffic volumes generated by the proposed development operational phase would not have any significant impact on the capacity of the existing local road network.

5.7.4.4 HGV Access and Feasibility of an Alternative Site Entrance

Point 6a of the request for further information made by Cork County Council on 14 June 2016 requested the following information:

"An analysis of the HGV numbers should be submitted detailing what direction they currently approach the town / Co-op site from."

Appendix 5.7.1 has been produced to address this point and details the existing daily heavy vehicle traffic volumes and direction of approach to the Newmarket Co-op site.

Point 6a also requested the following:

"The feasibility of an entrance being created from the Freemount road should be explored in order to reduce the traffic impact on the town. You are advised that any additional entrance would require a new planning application."

The feasibility of an entrance being created from the Freemount Road was assessed and the drawing in **Appendix 5.7.2** details the following:

- land ownership boundaries to the west of the Newmarket Co-op Site;
- Existing access and egress locations for heavy vehicles to the public Road network;
- Enhanced width routes for heavy vehicle through the site; and
- Reduced width ancillary internal routes.

Appendix 5.7.2 shows the one-way system through the site for heavy vehicles from the existing access via Emmett Place. This includes the Weighbridge, immediately north of Emmett Place, to the Milk Intake area and outbound to the R576 Regional Road to the east of the site. The site routing and buildings have been developed to facilitate this process and movement. Ancillary requirements, such as the truck wash, are located appropriately with respect to this route through the site. The geometry of the ancillary routes typically facilitates lower volumes and types of vehicles, such as the two-way route to the north of the site. Accordingly, it is a requirement to access the site to the south west of the site. Access from the north west of the site would not be facilitated by the current site layout.

The site boundary to the west is shown on **Appendix 5.7.2**. The land to the west of the weighbridge, south of the existing warehouse/ cheese store is within third party ownership. The land within Newmarket Co-op ownership, north of the weighbridge area is bounded by the existing warehouse/ cheese store buildings. As demonstrated in **Appendix 5.7.2**, access to the site to the north of these buildings would require a circuitous route via an unsuitable internal road network to access the established heavy vehicle route. Furthermore, significant additional on-site turning movements would be required for heavy vehicles.

With the exception of Emmet Place, the relocation of the access would be unlikely to result in a significant positive impact for the Newmarket road network, and would also include some negative impacts such as possible increased heavy vehicle turning movements at the Church Street/ Scarteen Street/ New Street/ High Street junction.

Therefore, it is not considered to be feasible to construct an entrance from the Freemount Road in order to reduce the traffic impact on the town.

5.7.5 Mitigation Measures

5.7.5.1 Construction Phase

All construction parking and compounds will be provided within the site confines. Construction wheel wash facilities will be provided on-site. A specialist road washing and cleaning vehicle will be used regularly each day to maintain public roads. All necessary construction signage and other measures required by Cork County will be provided. A detailed Construction Traffic Management Plan would be submitted to Cork County Council, for their approval, prior to the commencement of construction.

5.7.5.2 Operational Phase

Newmarket Co-op will continue to operate their existing access arrangements with the proposed development in place.

5.7.6 Residual Impacts

5.7.6.1 Construction Phase

There are no construction residual impacts predicted as a result of the proposed development.

5.7.6.2 Operational Phase

There are no operational residual impacts predicted as a result of the proposed development.

5.7.7 References

Central Statistics Office (2012), Census 2011 Profile 10 Door to Door

Cork County Council (2014), Cork County Development Plan 2014

Department of Transport (2013), Design Manual for Urban Roads and Streets

Department of Transport (2010), Traffic Signs Manual

National Roads Authority (Transport Infrastructure Ireland) (2012), Design Manual for Roads and Bridges Volume 6 Section 1 Part 1 NRA TD 9/12 Road Link Design

National Roads Authority (Transport Infrastructure Ireland) (2014), Traffic and Transport Assessment Guidelines

National Roads Authority (Transport Infrastructure Ireland) (2011), Project Appraisal Guidelines Unit 5.5 Link-Based Traffic Growth Forecasting

National Roads Authority (Transport Infrastructure Ireland) (2012), Project Appraisal Guidelines Unit 16.1 Estimating AADT on National Roads

National Roads Authority (Transport Infrastructure Ireland) Design Manual for Urban Roads and Streets (2012), TD 9/12 Road Link Design

UK Highways Agency (1999), Design Manual for Roads and Bridges Volume 5 Section 2 Part 2 TA 79/99 Traffic Capacity of Urban Roads

Chapter 5 – Section 5.8 Socio Economic

5.8.1 Introduction

Human beings comprise one of the most important elements in the environment. In carrying out any development, one of the principal concerns is that human beings should experience no reduction in the quality of life as a consequence of the construction and occupational phases of a development.

5.8.2 Study Assessment and Methodology

A ~~desk based~~ study was undertaken to assess information regarding:

- Population;
- Age structure;
- Economic activity;
- Employment; and
- Unemployment.

The aim of the study was to assess the positive and negative impacts of the proposed development on the socio-economic environment including material assets. Publications and other data sources that guided the preparation of this chapter are listed hereunder:

- The Central Statistics Office – data from the 2011 Census.
- Cork County Development Plan, 2014.

5.8.3 Receiving Environment

5.8.3.1 Population and Settlement Structure

The results of Census 2011 indicate that the population of County Cork has grown to 519,032 persons. Excluding the city, the population of Cork County was 399,802, an increase of just fewer than 37,737 persons compared with the Census 2006 population figures. There was a modest decline in the population of the city over the same period.

The population of County Cork is spread across an extensive range of settlements comprising:

- 26 'main towns';
- 275 villages and smaller settlements; and
- The rural areas.

The main towns and city environs (urbanised areas) together account for 46% of the population of the county in 2011. Table 5.8.1 describes population levels within Newmarket and compares this to County Cork and Kanturk.

Table 5.8.1: Population Levels within Local and County Areas 1996-2011

Town	Population				
	1996	2002	2006	2011	% change between 2006 & 2011
Cork County	420,510	447,829	481,295	519,032	7.8
Kanturk	1,666	1,551	1,915	2,263	18.1
Newmarket	1,150	1,055	949	988	4.1

Kanturk, as the provincial town, has seen the stronger growth post the 'Celtic Tiger' boom years of the two towns. The longer term view of population within Newmarket, based on the CSO data, is a gradual decline, though the latest Local Area Plan for Kanturk and Newmarket is dedicated to develop a positive settlement pattern over the next decade. Cork as a county is showing positive growth patterns, in line with the county's strong economy and development of agricultural, industry and pharmaceutical employment.

5.8.3.2 Age Profile

The age profile for Newmarket in the year 2011 is shown in Table 5.8.2, as abstracted from the CSO.

Table 5.8.2: Persons Classified by Age Group, Newmarket, Co. Cork, 2011

Area	Total	Age Group (Years)				
		0-14	15-24	25-44	45-64	65+
Newmarket	988	134	111	223	272	248
Newmarket % Total		**13.5%**	**11.2%**	**22.6%**	**27.5%**	**25.1%**
County Cork	399,802	92,006	45,495	125,300	92,571	44,430
County Cork % Total		**23%**	**11.4%**	**31.3%**	**23.2%**	**11.1%**
Cork City	119,230	17,497	20,007	36,507	27,269	17,950
Cork City % Total		**14.7%**	**16.8%**	**30.6%**	**22.8%**	**15.1%**

Source: 2011 Census

The age profile for Cork County is strong, with a large percentage of eligible workforce (25-64 year age groups = 54.5% of population), while maintaining a strong youth population for the support of this group in later years (0-24 year age groups =34.4%).

Newmarket does not exhibit the strong youth group as displayed within the County statistics. The high level of over 65s (25%) is over double the county average, while the under 25s grouping, as a percentage, is significantly smaller than the county average.

Reviewing the figures for the working age group (24-64) Newmarket has an eligible workforce of approximately 495 persons in 2011. The current employment at Newmarket Co-Op is 53 with additional seasonal staff during

peak production. This accounts for just under 10.7% of the available eligible working persons in the town.

5.8.3.3 Local Economy and Employment

Table 5.8.3 describes the breakdown of primary employment classes for County Cork.

Table 5.8.3 Total Persons aged 15 years and over at work classified by broad industrial group - County Cork

Industrial Group	Cork City and County
Agriculture, forestry and fishing	12,529
Manufacturing	28,969
Construction	10,786
Wholesale and Retail	30,131
Transportation and Storage	7,856
Accommodation and Food Service	11,613
Information and communication	6,526
Financial and insurance	6,364
Professional, Scientific and Technical	10,433
Administrative	7,287
Public Administration	10,980
Education	18,949
Human Health and social work	22,734
Arts and entertainment	3,059
Industry not stated	10,900
Total	**199,116**

[11]

In the census, unemployment is measured on a Principal Economic Status basis and the results in Ireland Part 2 showed an overall unemployment rate of 19%. However, there were over 82,000 people aged 15-24 out of work in April 2011 up from 47,122 in 2006, resulting in an unemployment rate for this age group of 39%. Among males in this group the numbers rose from 26,448 to 50,440 over the five years giving an unemployment rate of 45%. For females, the numbers out of work increased from 20,674 to 31,713 giving an unemployment rate of 32%.

Nationally Limerick City and Donegal had the highest levels of youth unemployment with rates of 50% and 49% in 2011 respectively, in effect half of all young people in the labour force. The lowest rate was 27% in Dún Laoghaire-Rathdown. Fingal Cork County and Galway City were also at the lower end of the youth unemployment spectrum. Overall, according to the 2011 Census the unemployment rate for Newmarket and its environs was 23.5%.

[11] *Source: Census 2011 Profile 3 At Work - Employment, Occupations and Industry*

5.8.4 Characteristics and Impacts of the Proposed Development Local Economy and Employment

The Newmarket Co-Op facility is a long term and steady employer within Newmarket and is referenced within the Kanturk Local Area Plan as one of the prime employers in the locality. As discussed above, Newmarket Co-Op is a direct employer of nearly 10.7% of the available workforce in the town. The proposed development will require staff numbers to increase from 53 to 66 staff, an increase of 24%. Additional downstream employment will also be required through truck drivers, external maintenance contractors (painters, decorators), mechanics and the service industry, both for the company and from additional staff accessing local fuel stations and food suppliers.

Seasonal workers have been a long established requirement for the Newmarket Co-Op facility, arriving during the peak summer months to work on one of three 8 hour shifts. This seasonal work force will, under the grant of this application, be required for an extended period of the summer. The proposed increase in the duration of peak processing and the proposed increase of processing to 7 days per week will require additional seasonal staff.

5.8.5 Impacts on Human Beings

5.8.5.1 Noise

As discussed above in Chapter 5 Section 5.5.4, the construction phase will result in an elevation of ambient noise levels at noise sensitive locations along the pipeline route on the R576 and those overlooking the WWTP site from the east and northwest. The effect along the pipeline route is not deemed to be significant. The effect of construction noise on the residential property known as the Elms is deemed to be temporarily significantly adverse.

Extension of the WWTP will result in new sources becoming operational on site. However, the limits and conditions of the revised license will be complied with at a minimum. The facility is not located in a quiet area or area of low background noise levels. Therefore the effect is not deemed to be significant.

Extension of the peak season to include Sunday has been assessed. A potential impact on the ambient noise environment arising from truck movements on Emmett Place was identified. However the effect is deemed to be of low significance based on proposed mitigation measures and where the context of the impact is considered.

Traffic arising on the local road network as a result of the proposed increase in peak season is considered to be negligible and insignificant in terms of noise impact and effect. Overall, it can be concluded that the Proposed Development will not give rise to significant adverse noise related effects on nearby residential dwellings.

5.8.5.2 Air Quality, Odour and Dust

The air quality assessment provided in section 5.5 above concluded that no significant impact on the health of the local community or surrounding environment is predicted as a result of the planned intensification programme at Newmarket Co-Op. The impact of emissions from the boilers will comply with National Air Quality Standards values and emissions of odours from the extended WWTP will be well below levels likely to cause a potential odour nuisance beyond the facility boundary.

Construction operations such as the excavation and deposition of materials, vehicle movements around site and site cutting works may result in dust arising during the works, causing an impact on the amenity of local residents such as the enjoyment of open spaces and gardens close to roads and local air quality. The potential issue of dust creation during the works will be weather and season dependant. A number of construction related dust mitigation measures are discussed below and expanded on in the CEMP provided in **EIS Volume II, Appendix 2.2**. It is not envisioned that dust will be an impact during the operational phase of the development as milk processing occurs indoors within controlled hygienic environments. Air quality and odour impacts of the proposed development are discussed above in Section 5.5.

5.8.5.3 Traffic

The Traffic and Transport assessment discussed above in section 5.7 states that the predicted increases in traffic volumes generated by the proposed development operational phase would not have any significant impact on the capacity of the existing local road network. Newmarket Co-Op will continue to operate their existing access arrangements with the proposed development in place.

Traffic related impacts on local residents as a result of the proposed development will not be significant. There will be no change to existing Monday to Saturday operations with the proposed development in place whilst milk intake, whey imports and product exports will increase on Sundays to existing Monday to Saturday levels. Staff working on Sundays will increase to just less than existing Monday to Saturday levels as a result of the proposed development, however, there will be no change to existing Newmarket Co-Op vehicle trip distributions and access arrangements.

For context, the predicted increases in Sunday traffic volumes equate to daily increases of up to 2.3% and typical peak hour increases of up to 4.2%, on the basis of the predicted 2017 typical daily and peak hour traffic volumes, factored from the recorded weekday on-site traffic counts. It is envisaged that future background traffic volumes on the local road network would typically be lower on Sundays, compared to Mondays to Saturdays

The traffic and transport assessment ~~included in Chapter 5 section 5.7 above concludes that there will be no change to existing peak season traffic volumes on Mondays to Saturdays, and the predicted increases in traffic volumes generated by the proposed development operational phase will not have any significant impact on the capacity of the existing local road network. The assessment~~ concluded that there are no construction and

operational residual impacts predicted as a result of the proposed development in relation to traffic.

5.8.5.4 Amenity

Developments have the potential to impact on the amenity of local residents due to adverse impacts on local views and visual amenity. The LVIA undertaken for Section 5.9 below concluded that the proposed development will not incur any significant impacts in respect of local landscape character landscape or visual receptors in the environs of the site, i.e. surrounding residents and businesses or town centre users including visitors to the town.

The assessment determined that the absence of visual and landscape impacts as a result of the proposed development at Newmarket Co-Op due to a combination of variations in topography, existing tree and hedgerow cover and the built fabric of Newmarket town reflects the capacity of the development site to accommodate the proposed development with minimal alteration to the setting. Therefore it is concluded that the proposed development will not result in adverse impacts on the on the visual amenity of local residents

5.8.5.5 Water impacts/ ELV

An assessment has been completed (**Appendix 5.3.6**) to provide more information on the assimilative capacity of the River Dalua to assess whether the proposed development and increased levels of discharge will hinder future developments within Kanturk and Newmarket from utilising local water quality resources.

Based on a conservative assessment, there is significant residual assimilative capacity to allow for other discharges to be made. The assessment demonstrated that the discharges from Newmarket Co-Op can be accommodated within the catchment without impacting adversely on the future developments within Newmarket and Kanturk settlements. Further information on this issue is provided in section 5.3 above and within **Appendix 5.3.6.**

5.8.6 Mitigation Measures and/or Factors

The supply of longer seasonal working hours and an increase to full time staff on site is seen as a positive impact on human beings under social and economic terms.

5.8.6.1 Noise

To minimise noise impacts on surrounding local residents, a number of mitigation measures will be implemented by Newmarket Co-Op during both the construction and operational phases of the proposed development.

During the construction phase all equipment such as compressors, welding generators, excavators, dozers, loaders and dump trucks will be required to

comply with noise limits set out in EC Directive 2000/14/EC. Construction work will be strictly limited to hours agreed with the Planning Authority and will not be exceeded. During the construction phase any complaints received will be thoroughly investigated with suitable mitigation measures taken at the time such as restricting the use of noisy equipment during the early hours and late in the evening. With these measures, noise impact from the construction phase will be kept to a minimum and within acceptable levels to noise sensitive receptors.

Following construction of the WWTP, a noise survey will be commissioned and will include monitoring locations at the north-western and eastern boundaries with The Elms and Palm Grove and close to the façades of the NSLs where possible with the consent of owners. In addition to this, bi-annual noise monitoring is proposed to accurately report on the operation of the creamery at different times of the year.

During the operational phase, preventative maintenance will be conducted regularly to ensure that source noise levels are minimised and that tonal noise is not introduced. All personnel at the facility are conscious of keeping doors closed at building access, preventing noise emission from production processes.

To minimise traffic related nose impacts on local residents, staff and truck drivers will be made aware of the need to access the facility via Emmett Place as quietly as possible by reducing speed and avoiding the unnecessary use of horns and hard braking etc. Trucks and contract trucks will be maintained in accordance with legislative requirements to minimise noise impact.

Traffic arising on the local road network as a result of the proposed increase in peak season is considered to be negligible and insignificant in terms of noise impact and effect on local residents subsequent to the implementation of the proposed mitigation measures listed in Section 5.4 above.

The noise assessment concluded that the proposed WWTP extension, additional milk processing on Sundays and resulting traffic will not result in significant impacts on local residents, with the implementation of the listed mitigation measures ensuring noise impacts will be minimised during both the construction and operational stages.

5.8.6.2 Air Quality, Odour and Dust

As discussed above, the assessment of air quality and odour impacts provided in section 5.5 above demonstrates that no significant impact on the health of the local community or surrounding environment is predicted as a result of the proposed development. A number of mitigation measures have been proposed as part of the proposed development which will be implemented by Newmarket Co-Op to ensure local air quality and odour levels are not impacted by the proposed development including:

- Replacement and covering of the existing DAF unit within the WWTP;

- Demolition of the existing Bio-tower;

- The balance and anoxic tanks at the new extended aeration plant will be covered and headspace air extracted to the odour control unit used for treating the air from the existing covered balance tanks.

- The high efficiency Odour Control Units currently operating at the WWTP site will ensure that no malodours occur beyond the site boundary, with removal rates of H2S and other pungent sulphurous compounds above 98%. Bi-annual maintenance and emission monitoring will continue to ensure optimum operation of these abatement units.

Dust management will be carried out at all times in accordance with industry best practice measures to ensure that any local sensitive receptors are not affected by nuisance levels of dust from the construction works. The following methods of dust suppression will be implemented, where appropriate and depending on conditions, during the construction.

- Road sweeper to be used to remove loose material from highways during construction;
- Cleaning vehicles including wheel washing facilities;
- The implementation of soil erosion control measures discussed further in the CEMP provided in appendix 2.2 (EIS Volume II);
- Speed limits to be put in place to ensure low vehicle speeds;
- Damping of dry excavations and cutting activities which generate dust;
- Programming of works to minimise the time that soils are exposed, and
- Detailed dust management methods will be included in contractor working method statements provided prior to construction phase.

Public and site Roads shall be brushed or scraped as required to minimise dust and mud deposits, especially at site entrances and any watercourse crossings. If necessary during dry weather, dust suppression may be achieved by spraying water onto the site tracks to dampen down the airborne dust particulate.

5.8.6.3 Traffic

The Traffic and transport assessment provided in Section 5.7 above concludes that traffic related impacts on local residents as a result of the proposed development will not be significant. However, to address the potential impacts of construction traffic on the local road network, a draft Traffic Management Proposal has been prepared and is included within the CEMP EIS Volume II, Appendix 2.2. The appointed Contractor will develop the draft plan into a detailed Construction Traffic Management Plan (CTMP) prior to the commencement of construction following discussion with the Clients Representative and Cork County Council.

The traffic management plan will be developed to minimise traffic delays, ensure road safety risk is not increased on local roads during the construction phase and will outline the suitable methods of traffic management such as a Stop - Go system along the pipeline construction route. The CMTP will make reference to the following:-

- The Department of Transport Guidance for the Control and Management of Traffic at Road Works; and
- The Department of Transport, Tourism and Sport's Traffic Signs Manual 2010;

The Contractor will be required to attend a weekly Traffic Management Meeting held by Cork County Council to discuss vehicular movement. An Garda Síochána will be informed of the CMTP, and will retain responsibility for enforcement of road traffic legislation.

5.8.6.4 Visual Amenity

The Landscape and Visual Impact Assessment provided below in Section 5.9 determined that the proposed development will not incur any significant impacts in respect of local landscape character landscape or visual receptors in the environs of the site, i.e. surrounding residents and businesses or town centre users including visitors to the town.

The assessment concluded that the absence of impacts reflects the capacity of the site to accommodate change of this nature with minimal alteration to the setting. As a result of the absence of impacts, no mitigation or enhancement measures are proposed.

5.8.6.5 Water impacts/ ELV

The water quality assessment discussed in section 5.3 above concluded that the discharge from the proposed emission point downstream of Allen's Bridge will not result in an exceedance of any of the target concentrations set out in the Surface Water regulations (S.I. 272 of 2009) for achievement of a 'good status' watercourse.

The proposed ELV's for volume and associated mass emission of BOD, Ammonia and Orthophosphate have been shown, using approved methodology, to be compliant with S.I. No. 272 of 2009 European Communities Environmental objectives (Surface waters) Regulations 2009 for attaining Good status in the River Dalua. In addition, the impact of the nitrate and suspended solids emissions has been demonstrated as not causing an impact on the receiving water.

Mitigation measures have been proposed in Section 5.3 above to ensure protection of surface waters during both the constructional and operational stage. Measures include upstream and downstream monitoring during the construction period to ensure water quality in the Rampart Stream and River Dalua is monitored to prevent significant impacts on this resource. The

operational discharge will be subject to EPA Licence agreement and will be subject to regular monitoring to ensure compliance with the EPA Licence limits and protection of existing water quality in these watercourses.

5.8.7 Material Assets

The Draft Advice Notes for Preparing Environmental Impact Statements produced by the EPA in September 2015 state that "*Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin*".

The objective of the assessment of such assets is to ensure that they are used in a sustainable manner, so ensure continued availability for future generations after the development of the project.

Some examples of material assets relevant to the proposed development include:

- Assimilative capacity of air and water and sterilisation of resource
- Minerals, soils, oil, gas);
- Transportation infrastructure (roads, railways, canals, airports etc), and
- Major utilities (water supplies, sewage, power systems, telecommunication systems)

5.8.7.1 Assimilative Capacity of Air and Water and Sterilisation of Resource

Air

As discussed above in the Air Quality and odour assessment completed as part of Section 5.5 and in section 5.8.5.2 the proposed development will not result in significant impacts on air quality levels within Newmarket Town and the surrounding Area. The impact of emissions from the boilers within the Creamery plant will comply with National Air Quality Standards values and emissions of odours from the extended WWTP will be well below levels likely to cause a potential odour nuisance beyond the facility boundary. It is concluded that as a result of this assessment, the asset of local air quality will not be impacted by the proposed development.

Water

As mentioned above in section 5.3 and **Appendix 5.3.6**, an assessment has been completed to provide more information on the assimilative capacity of the River Dalua to assess whether the proposed development and increased levels of discharge will hinder future developments within Kanturk and Newmarket from utilising local water quality resources.

The assessment concluded that there will be no potential water quality mediated impacts from the proposed discharge at the proposed Emission Limit Values. The assessment determined that based on a study of the available EPA biological data, there is surplus chemical assimilation capacity downstream of the proposed discharge, and that there is a considerable

assimilative capacity in the Dalua River and in the Allow at the confluence of the Allow and Dalua.

Based on a conservative assessment, there is significant residual assimilative capacity to allow for other discharges to be made. The assessment demonstrated that the discharges from Newmarket Co-Op can be accommodated within the catchment without impacting adversely on the future developments within Newmarket and Kanturk settlements.

5.8.7.2 Minerals and soils

Agricultural Lands and Soils

The proposed development will utilise a small proportion of the greenfield site adjacent to the existing WWTP in lands owned by Newmarket Co-Op. As discussed in Chapter 2 above, the footprint of the proposed WWTP upgrade incorporating all listed elements and upgrades above will be approximately 2,838m^2 (0.28 ha). The scale of proposed development is not significant in comparison with the much larger greenfield site and the footprint for the overall Newmarket Co-Op facility site which is approximately 10 ha as can be seen on **Figure 2.4: Proposed WWTP Site Layout**. At present the greenfield site is maintained in grass by Newmarket Co-Op, a practice which will not change as a result of the proposed development. Due to the small scale of the WWTP development at this location within Newmarket Co-Op owned lands, annexation of agricultural lands and suitable soils has been assessed as negligible.

The proposed underground pipeline will run along the route of the R576 corridor to minimise development impacts on the local area and private property. The pipeline will not result in adverse impacts on local soils or agricultural lands.

The proposed development will have no impact on local mineral resources.

5.8.7.3 Transportation Infrastructure (roads, railways, canals, airports)

Bridges

There are four bridges located along the proposed pipeline route as discussed in detail in **EIS Volume II, Appendix 2.1**. Structural reports for each bridge are provided in **Appendix 2.3: Cork County Bridges Inventory**, with an updated assessment provided in **Appendix 2.3**. The first bridge the proposed pipeline will meet after leaving the Co-Op site is Stoneville Bridge (over the Rampart Stream) at Newmarket which the pipeline development will have no impact on. The second bridge along the pipeline route is Park Bridge on the R576 located approximately 3km from the Co-Op. The embankment and roadway at Park Bridge were widened previously and a new section of tunnel was completed. The pipeline will be constructed in the new section of bridge and will not affect the existing bridge or watercourse.

The proposed pipeline will traverse Bridge 'A', the third bridge on the proposed pipeline route by being strapped to the external eastern façade. There will also be a direct moderate negative impact on Allen's Bridge, the fourth and final bridge on the proposed pipeline route. The Cultural Heritage Assessment discussed above in section 5.6 recommends that prior to construction at both Bridge A and Allen's Bridge, a full written and photographic record of each façade be carried out following vegetation clearance at both bridge sections. The assessment concludes that once all recommended mitigation measures are undertaken there will be no impact on the archaeological resource of these bridges.

It is therefore concluded that the proposed development will not result in significant adverse impacts on the structural integrity and cultural significance of local bridges.

Roads

As discussed above and in section 5.7, the Traffic and Transport assessment concluded that the predicted increases in traffic volumes generated by the proposed development operational phase would not have any significant impact on the capacity of the existing local road network. Mitigation measures listed above will minimise construction related impacts on both local road capacities and local road users.

Canals and Airports

The proposed development will result in no impacts on canals and airports.

Major utilities (water supplies, sewage, power systems, telecommunication systems etc)

A detailed assessment of existing site services along the route of the proposed development, including the WWTP and the pipeline route and discharge location was completed to inform the project design described in detail in EIS Volume II, **Appendix 2.1**. A detailed topographical survey was completed for the entire route along the R576. In addition the existing services were identified and are shown the on Drawing No. 16547-2002, provided in **EIS Volume II**, **Appendix 2.1.**

A 300mm Ø AC Regional public watermain runs for a considerable length along the R576. This pipe is over 30 years old and may be quite brittle. Drawing No. 16547-2002 provided in **Appendix 2.1** shows an approximate location of this pipe. The proposed route has been designed to avoid this main where possible. However crossings are unavoidable. The Contractor will be required to locate the exact position of the watermain prior to construction. All works in the vicinity of the water main will be agreed with Irish Water.

Eircom have confirmed that they have services in the area and Drawing No. 16547-2002 provided in **Appendix 2.1** shows the approximate location of these. The cable appears to run along the opposite side of the road to the

pipeline for the initial section of the route until it reaches the first bend on the R576, where it changes to the same side of the road as the proposed route. Based on observation from the ground and the services drawings it appears that the cable is located in the grass margins and very close to the ditch along the route. The new pipe will be laid so as to avoid this. Again all works in the vicinity of the cable will be agreed with Eircom.

Bord Gais, Enet and Virgin Media (formerly known as UPC) have stated that they do not have any services along the proposed route.

ESB Street lighting poles are also visible along the same side as the proposed pipeline route. The pipeline will be laid so as to avoid interfering with these. There are several manholes located on the road at the top of the R576 near the Newmarket Co-Op site. These appear from the CCC drawings to be surface water manholes. The only location that may be affected by this is the road crossing at the northern part of the route. Where the proposed pipe crosses existing services, silt trenches will be carried out to ascertain the location and crowns of the pipes. At construction stage silt trenches, CAT and GPR scans will be carried along the route to locate the exact position of services. This will be done in accordance with good practice and the HSA Code of Practice For Avoiding Danger From Underground Services.

Existing underground services will be identified in the Project Health and Safety Plan, which will include procedures for the control of risks including the use of permitting systems where necessary. Assessment of the hazards for underground services shall include an assessment of the potential environmental impact of damage during site works.

Due to the detailed level of investigation to date in locating existing services, the design steps taken to avoid these and the proposed mitigation measures that will be implemented to ensure existing cables, pipes and other infrastructure are safeguarded during the construction phase, it is not envisioned that the proposed development will impact on local underground services.

5.8.8 Residual Impact/Conclusions

~~Not relevant.~~ The increase in annual production will be a positive impact upon the local social and economic baseline within Newmarket, ensuring that a regionally important employer can continue to operate and grow in a sustainable manner at it's current location. ~~aspects.~~

Chapter 5 Section 5.9 Landscape and Visual Impact Assessment

5.9.1 Introduction

This chapter deals with landscape and visual impact assessment (LVIA) examining potential effects of the proposed development on the landscape setting as well as on visual receptors in the landscape such as residents, visitors, people pursuing recreational activities etc. The assessment indicates the level of anticipated impact and outlines measures by which impacts can be mitigated. The assessment focuses on the waste water treatment plant (WWTP) itself, excluding the proposed pipeline which will be underground and thus will not generate any landscape and visual impacts post construction.

Tables and maps referred to in the text are embedded within the section.

This section of the EIS was prepared by Cunnane Stratton Reynolds, landscape architects. It has been informed by a detailed survey of the site and the surrounding receiving environment carried out by a senior and experienced landscape architect who is a full member of the Irish Landscape Institute (I.L.I.). and a chartered member of the Landscape Institute (U.K.).

5.9.2 Consultation

No consultation other than with the design team was required in the preparation of this report.

5.9.3 Methodology

5.9.3.1 Desk Based Assessment

A desk top review of planning policy affecting the site was undertaken and the following documents were reviewed:-

- Cork County Council Development Plan 2014
- Kanturk Electoral Area Local Area Plan, Second Edition, January 2015

A summary of relevant policies contained in the above plans is as follows:-

Kanturk Electoral Area Local Area Plan, Second Edition, January 2015

Section 4.1.1 states that:

Newmarket is one of six towns located within the North Strategic Planning Area and the smallest town located within the Kanturk Electoral Area. The objective for Newmarket, as set out in the County Development Plan 2009, is to strengthen the role of the town as an important centre of population, a district employment centre and a services centre serving a wide rural hinterland.

Section 4.1.2 continues to state that the North and West Cork Strategic Plan seeks:

To promote a stronger tourism and leisure economy through the protection of the area's natural and built heritage assets.

Section 4.1.3 of the plan reports that:

Newmarket is located in an undulating landscape at the foothills of the Mullaghareirk Mountains. It is concentrated around a long and relatively narrow main street with an abundance of traditional style buildings. Town centre activity is mainly concentrated on residential and retail usage although there are also some civic activities present including a Garda Station and library. In terms of other uses there is an existing centrally located creamery with two small industrial estates on the Scarteen and Kanturk roads.

Section 4.2.24 of the Plan states that:

The 2009 Draft Landscape Strategy describes Newmarket as being located within a Landscape Character Type known as Broad Marginal Middle Ground valley. The draft Landscape Strategy deems the landscape to be of high value given its picturesque nature and natural and cultural heritage of county or national importance. It is also considered to be of high sensitivity given that it is a landscape which is highly sensitive to certain types of changes and with the ability to accommodate limited development, and of local importance. In particular the town is located on the upper reaches of the Dalua River and is bordered by several hills leading down to this valley.

5.9.3.2 Site Based Assessment

The proposed development site and environs were visited as part of the landscape and visual impact assessment during July 2016. The purpose of the site visit was to gain a thorough understanding of the character of the site and locality and to determine the location of visual receptors in the area who could be potentially affected by the proposed development.
The nature of potential mitigation measures appropriate to the setting was also be informed by the site visit.

5.9.3.3 LVIA Guidelines – Values and Significance Criteria

This Landscape and Visual Impact Assessment (LVIA) is in accordance with the EPA's *Guidelines on the Information to be contained in Environmental Impact Statements,* 2002, and the Landscape Institute (UK) *Guidelines for Landscape and Visual Impact Assessment,* Second Edition 2002, (the Guidelines) from which the methodology is derived.

The following sources were also consulted:

- Department of the Environment and Local Government's Draft Landscape and Landscape Assessment Guidelines.
- Cork County Development Plan 2014 – 2020

The EPA guidelines suggest that impacts should be assessed by reference to an existing acknowledged standard requiring clarity and a systematic approach to the description of impacts - Character (Positive, Neutral or Negative), Magnitude, Significance, Duration.

The Guidelines (Landscape Institute) prescribe that landscape and visual impacts be assessed by separate, although linked procedures. Landscape assessment considers the effects deriving from alterations to the elements and characteristics of the landscape, which may give rise to changes in its character, how it is experienced and hence the ascribed value of the landscape. The landscape is often described as "townscape". Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity. Visual change is the alteration to a view, visual impact is the assessment of the significance of that change.

5.9.4 Landscape Impacts

The potential landscape impact assessment is based on:

The sensitivity of the landscape resource, which is a function of its land use, landscape / townscape patterns and scale, visual enclosure and distribution of visual receptors, and the value placed on the landscape.

The landscape sensitivity is classified as:

- high (exhibits a very strong positive character with valued elements and characteristics that combine to give an experience of unity, richness and harmony; therefore particularly sensitive to change in general),
- medium (exhibits positive character but has evidence of alteration to / degradation / erosion of elements and characteristics resulting in an area of mixed character, therefore potentially sensitive to change in general, or
- low (exhibits generally negative character with few valued elements or characteristics), and;

The scale or magnitude of landscape effects or the quantity of change to be imposed on the landscape by the development:

The magnitude of change to the landscape is classified as:

- high (total loss of or major alteration to the key elements or characteristics of the landscape/townscape, and / or introduction of elements considered totally uncharacteristic in the context of the receiving environment's landscape/townscape character),
- medium (partial loss of or alteration to one or more key elements or features, and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic in the context of the receiving environment),

- low (minor loss of or alteration to one or more key elements or characteristics, and / or introduction of elements that may not be uncharacteristic in the context), or
- negligible (very minor loss, alteration or introduction of elements of the landscape).

5.9.5 Visual Impacts

The potential visual impact assessment describes the changes in the character of the available views and the changes in the visual amenity of the visual receptors for a number of places / viewpoints selected to represent the receiving environment and its users. The potential visual impact on each viewpoint is assessed based on:

The sensitivity of the visual receptors, which is a function of the location and context of the viewpoint, the expectations and occupation or activity of the receptor, and the importance of the view.

Viewpoint sensitivity is classified as:

- high (e.g. users of outdoor recreation facilities or centres of activity focused on the landscape, and occupiers of residential properties with views affected by the development),
- medium (e.g. people travelling through or past the affected landscape in cars or on public transport, i.e. viewing but not focused on the landscape), or
- low (e.g. people at their place of work or engaged in similar activities such as shopping, etc. whose attention will be focused on these activities).

The scale or magnitude of visual effects or the degree / quantity of change to the field of view (towards the site) resulting from the development. This takes into account the extent of the view that would be occupied by the intrusion, e.g. full, partial, glimpse, etc. including the distance of the viewpoint from the development and its effect on the importance of the development in the field of view, the proportion of the development or particular features that would be visible, and whether the view of the development would be static, or a sequence or transient (as seen from a moving vehicle).

The magnitude of change to each view is classified as:

- high (total loss of or major alteration to the key elements or characteristics of the view, and / or introduction of elements considered totally uncharacteristic in the context of the view),
- medium (partial loss of or alteration to one or more key elements or features, and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic in the context of the view),
- low (minor loss of or alteration to one or more key elements or characteristics, and / or introduction of elements that may not be uncharacteristic in the context), or

- negligible (very minor loss, alteration or introduction of elements of the view).

The significance of the impacts (both landscape and visual) is determined based on the measurement of the magnitude of change against the sensitivity to change:

Assessment / Grading of Impact Significance

Magnitude \ Sensitivity	High	Medium	Low
High			
Medium			
Low			
Negligible			

	High Significance
	Medium Significance
	Low Significance

The predicted impacts are also classified as beneficial, neutral or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However the methodology applied is designed to provide robust justification for the conclusions drawn.

These qualitative impacts are defined as:

Adverse – Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape (townscape)/view to be diminished.

Neutral – Scheme complements the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality.

Beneficial – improves landscape (townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Impacts are also categorised according to their longevity or timescale:

- Temporary – Lasting for one year or less
- Short Term – Lasting one to seven years
- Medium Term – Lasting seven to fifteen years
- Long Term – Lasting fifteen years to sixty years

- Permanent – Lasting over sixty years

A statement is made as to the appropriateness of the proposed development based on the combined assessment of the predicted landscape and visual impacts.

This methodology, in accordance with the various guidelines for LVIA, results in a conclusion as to the appropriateness of the proposed development based on objective assessment of its likely landscape and visual impacts

5.9.6 Baseline Description of Existing Conditions

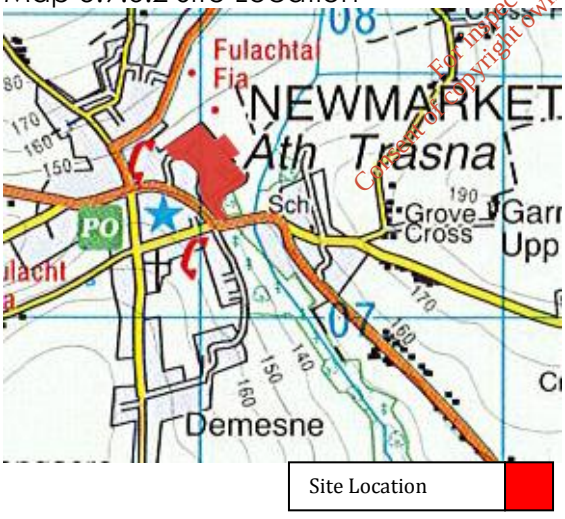
5.9.6.1 Planning Policy

There are no designations directly affecting the proposed development site. The Special Area of Conservation associated with the Dalua River to the west, the Mullaghareirk Special Protection Area to the north-west and the Priory Wood Proposed NHA to the east are all located outside the town boundary.

Scenic Route S17 to the west terminates approximately 0.5km from the town boundary. There are no designated views or prospects in the town. Nonetheless vantage points associated with elevated locations around the town are noted.

5.9.6.2 Newmarket Town Context

Map 5.9.6.2 Site Location



Newmarket is located in an attractive undulating agricultural landscape characterised by hedge-bound fields and significant tree cover. Views across the landscape vary according to local topography and the extent of screening provided by roadside hedgerow and tree cover. The town centre is built between the +130 and 140m O.D. contours and nestles among a series of surrounding ridges which vary in height from +219m O.D to the south, +244m O.D. to the west, +265m O.D. to the north west and +214m O.D. to the north east.

The landscape is drained by the Dulua River located approximately 1km to the west of the town and the Rampart Stream located immediately to east of the town.

The proposed development site is located in the heart of Newmarket town, situated on low ground to the north-east of the town. Existing site buildings and infrastructure are visible as one approaches and moves around the town (Ref. photos 4, 5 and 8 below). Views of the site, however, are generally limited due to a combination of tree cover and the built fabric of the town centre.

Photograph 1 View towards Newmarket from R578 approach road (Charleville-Newmarket Regional Road)

Photograph 2 View towards site from R578 approaching town centre

Photograph 3 Approach to Newmarket from R576 Kanturk to Newmarket Regional Road showing significant tree screen at eastern end of town

Photograph 4 View of existing Co-Operative processing plant on R576 approach to town centre

Photograph 5 View towards proposed development site from Clanaulie Close located to north-west of the site

Photograph 6 View towards Newmarket from elevated location to the south-west of the town

Photograph 7 View along Church Street

Photograph 8 View along Church Street in which views of proposed development site are restricted

Photograph 8 View of existing site apparatus from approach route to site just off Church Street.

5.9.6.3 Proposed Development Site Description

The proposed development site is located at the north-eastern extremity of the Co-Operative processing plant adjacent to an existing waste water treatment plant. The proposed development footprint is 101.20m x 42.40m in size and is part of a large field which is currently devoted to pasture. The field is bound by mature hedgerows and trees which restrict views into and out of the site. There is one section of the R578 Charleville Road which is visible from the processing plant as shown in photograph 12 below.

The pasture has been managed intensively for agriculture and is of low ecological value. The surrounding hedgerows are dominated by Willow (Salix spp.), Hawthorn (Crataegus monogyna) and Gorse (Ulex europaeus). There is an area of woodland located to the east of the Rampart Stream which contains Beech (Fagus sylvatica), Sycamore (Acer pseudoplatanus), Alder (Alnus spp.), Oak (Quercus spp.), Pine (Pinus spp.), Holly (Ilex spp.), Mountain Ash (Sorbus aucuparia), Ash (Fraxinus excelsior), Spruce (Picea spp.), Willow (Salix spp.), Hawthorn (Crataegus monogyna) and Gorse (Ulex europaeus).

Photograph 9 Location of proposed development adjacent to existing waste water treatment facility

Photograph 10 View north-eastwards from existing waste water treatment facility

Photograph 11 Existing waste water treatment facility

Photograph 12 View from Co-Operative site towards the R578 Charleville Road

Photograph 13 View towards town centre from existing waste water treatment facility

5.9.6.4 Landscape Characteristics and Values

The above descriptions identify an extensive range of characteristics and values of the receiving environment that might be affected by the proposed development. Landscape values can be described as the environmental or cultural benefits, including services and functions that are derived from various landscape attributes. These attributes will, in many instances, be the components and image of the landscape as already established in the assessment of landscape character". (Department of Environment, Heritage and Local Government, Landscape and Landscape Assessment Consultation Draft of Guidelines for Planning Authorities, 2000)

The Guidelines differentiate between enhancement values (values of a socio-economic nature pertaining to development and thus environmental change), and cultural, social or ecological conservation values (concerned with natural landscape integrity and the inclination towards constraint in terms of environmental change).

Enhancement values reflect where policy, inevitable change or degraded features provide the scope to restore, or the opportunity to alter, or create, a new characteristic. The enhancement values reflect change that is already occurring, as well as potential capacity of parts of the receiving environment.

The conservation values indicate those aspects of the receiving environment which are sensitive and could potentially be negatively impacted on by the proposed development. These values form the landscape and visual constraints to the proposed development.

Conservation Values

- Potential loss of greenfield buffer along town edge
- Potential impact on sensitive receptors such as adjacent residents and visitors to the town
- Potential impact on mature hedgerows along the perimeter on the site
- Potential impact on views and vistas

Enhancement Values

- Opportunity to enhance Newmarket's recognised role as a district employment centre
- Opportunity for innovative and sensitive design to meet the demand for business expansion while avoiding significant adverse landscape and visual impacts
- Potential to enhance the landscape infrastructure of the site

5.9.7 Results of Assessment

5.9.7.1 Landscape Impact

On balance, there will be a predicted **Medium and Neutral Significance** of impact on Landscape Character reflecting minor loss of pasture land on the one hand but the capacity of the site on the other hand to accommodate development without incurring significant landscape impacts on the town centre and environs.

5.9.7.2 Visual Impact

There will be no visual impacts associated with the proposed development. The visual impact assessment finds that of the five viewpoints assessed:-

1. The short term impact will be

- No change for all five of the viewpoints.

2. The medium to long term impact will be (i.e. after completion and development of any mitigating landscape treatment that may be required):

- No change for all five of the viewpoints.

5.9.8 Assessment of Impacts

5.9.8.1 Landscape Impact

The proposed development will constitute an extension to the existing development footprint of the site. This will incur an equivalent loss of agriculture pasture land and will in essence appear as an extension to the existing WWTP facility.

The loss of the agricultural pasture land is of low significance as it is of low ecological value and the footprint of the proposed development is small relative to the size of the field.
The image and perception of the town will not be significantly affected by the proposed development either given the manner in which it will be accommodated on the lower part of the site thus remaining screened from view as one approaches the town and moves through it. While elements of the existing processing plant will be visible from various locations described in Section 4, the proposed development will be low key given the combination

of topography, vegetation and existing buildings that prevail on and adjacent to the site.

The sensitivity of the landscape resource is a function of its land use, landscape patterns and scale, visual enclosure and distribution of visual receptors and the value placed on the landscape (Refer to 1.1). The landscape sensitivity of the proposed development's receiving environment is classified as Medium: It exhibits positive character in respect of its natural boundary screening to the north and east but has a significant existing industrial function of mixed character. The wider landscape/townscape settings potentially sensitive to change on the site but the site can generally accommodate alteration that extends its function as an industrial/commercial centre.

The scale or magnitude of landscape effects (or the quantity of change) to be imposed on the landscape by the development is classified as Low. There would be minor alteration to the agricultural pasture and the introduction of elements that would be prominent, but not uncharacteristic in the context of the receiving environment, the adjacent existing WWTP and the established industrial/commercial function of the site as a processing plant.

On balance, there will be a predicted **Medium and Neutral Significance** of impact on Landscape Character reflecting minor loss of pasture land on the one hand but the capacity of the site on the other hand to accommodate development without incurring significant landscape impacts on the town centre and surrounding residential areas.

Construction Phase
The landscape impact in the construction phase would be – **Low and Neutral.** This would be **Temporary.**

5.9.8.2 Visual Impact

Based on the assessment of the landscape characteristics, values and sensitivities, 5 viewpoints were selected for assessment of visual amenity impact. These are divided into two categories, namely *Immediate Views (Micro Landscape)* and *More Distant Views (Macro Landscape)*.

Table 5.9.8.2 Viewpoints for Visual Impact Assessment

No	***Location***	***Direction***	***Viewpoint Type***	***Distance to site***
1	R576/Main Street Junction	North	Public Road	0.25km
2	R578 Charleville Road	North-East	Residential	0.25km
3	Church Street	South East	Town Street	0.25km
4	Clanaulie Close	North	Residential	0.35km
5	R576 Kanturk Road	North-West	Public Road	0.25km

Distances from the site are from the viewpoint to the nearest boundary of the proposed development site. Figure 5.9.8.2 below illustrates the locations of the above viewpoints.

For each viewpoint that would be affected by the proposed development, the field of view towards the application site is briefly described, and illustrated with a wide-angle photograph.

The potential visual impact on each viewpoint is assessed below, based on the degree / quantity of change to the field of view (towards the site) which would result from the proposed development and the sensitivity of the visual receptors at that location. The significance of the visual impact is scored and the quality of that impact.

Finally, a conclusion is made as to the predicted visual amenity impact in the operational phase and timescale. The Construction stage is also commented on.

Fig 5.9.8.2 Photo Viewpoints

Viewpoint 1 R576/Main Street Junction

Site as currently exists

Photomontage view showing outline of proposed development

Description of View

The selected viewpoint is located to the south of the proposed development site at the R576 Kanturk Road and Main Street junction.

Existing View

The view towards the proposed development site from this location reveals the relationship between the Co-Operative site and the town centre, i.e. a significant processing facility with large scale infrastructure and built elements which are apparent in intermittent views but otherwise significantly screened by tree cover, town centre buildings and the natural variations in local topography.

Proposed View and Mitigation

The proposed development will not be visible from this location given the screening effect of existing mature vegetation and the significant level differences between the proposed development site and the photoview location.

VIA Result

- The viewpoint sensitivity is considered medium given the relatively high profile of this approach route into the town centre but where the emphasis is on travel to and from the town.
- The degree of change from this viewpoint would be no change in the short to medium term and no change in the long term given the manner in which the site is screened from view.
- The significance of the visual impact will be no change in the short to medium term and no change in the long term as there will be no visual impacts experienced.

During the construction phase there will be no visual impacts evident from this location.

Viewpoint 2 R578 Charleville Road

Site as currently exists

Photomontage view showing outline of proposed development

Description of View

The selected viewpoint is located on the R578 Charleville Road adjacent to a number of residential properties which are positioned along the western side of the road.

Existing View

This view reveals the undulating nature of the local landscape and the low-lying nature of the Co-Operative processing relative to the R578. A gap in the roadside vegetation provides a view onto the site in which the buildings, tanks and chimney stacks are prominent. The significant tree cover in the view softens the visual impact of the built elements.

Proposed View and Mitigation

The proposed development will not incur any visual impact from this location as it will be screened from view by existing built elements on the site as well as by existing roadside vegetation.

VIA Result

- The viewpoint sensitivity is considered high reflecting the residential nature of the location on a main approach route to the town.
- The degree of change from this viewpoint would be no change in the short to medium term and no change in the long term given the manner in which the site is screened from view.
- The significance of the visual impact will be no change in the short to medium term and no change in the long term as there will be no visual impacts experienced.

During the construction phase there will be no visual impacts evident from this location.

Viewpoint 3 Church Street/Emmet Place Junction

Site as currently exists

Description of View

The selected viewpoint is located just off Church Street on the approach road to the Co-Operative site.

Existing View

The view shows upper parts of the Co-Operative plant infrastructure which extend above adjacent town centre properties. This typifies the relationship between the Co-Operative site and the main streets of the town in which parts of the processing plant are revealed as one moves around the town.

Proposed View and Mitigation

The proposed development will not incur any visual impact from this location as it will be screened from view by existing built elements on the site.

VIA Result

- The viewpoint sensitivity is considered medium given the nature of this access road to the site and residential properties where the main focus is on travel to and from the area.
- The degree of change from this viewpoint would be no change in the short to medium term and no change in the long term given the manner in which the site is screened from view.
- The significance of the visual impact will be no change in the short to medium term and no change in the long term as there will be no visual impacts experienced.

During the construction phase there will be no visual impacts evident from this location.

Viewpoint 4 Clanaulie Close Residential Estate

Site as currently exists

Description of View
The selected viewpoint is located in a residential development on elevated ground to the north west of the proposed development site.

Existing View
This view shows the rural setting of the town with residential, commercial and industrial elements set against the backdrop of tree-lined fields, areas of woodland and distant hills. This makes for a relatively harmonised view although buildings on higher ground inevitably stand out and dominate the view.

Proposed View and Mitigation
The proposed development will not incur any visual impact from this location as it will be screened from view by existing houses in the foreground.

VIA Result

- The viewpoint sensitivity is considered medium given the nature of this access road to the site and residential properties where the main focus is on travel to and from the area.
- The degree of change from this viewpoint would be no change in the short to medium term and no change in the long term given the manner in which the site is screened from view.
- The significance of the visual impact will be no change in the short to medium term and no change in the long term as there will be no visual impacts experienced.
-

During the construction phase there will be no visual impacts evident from this location.

Viewpoint 5 R576 Kanturk Road

Site as currently exists

Description of View
The selected viewpoint is located to the south-east of the proposed development site on the R576 Kanturk Road.

Existing View
This view shows the R567 approach road to Newmarket and a significant area of tree cover to the right which screens the Co-Operative processing plant from view.

Proposed View and Mitigation
The proposed development will not be visible from this location given the effect of existing mature roadside vegetation which fully screens the Co-Operative processing plant site.

VIA Result

- The viewpoint sensitivity is considered medium given the relatively high profile of this approach route into the town centre but where the emphasis is on travel to and from the town.
- The degree of change from this viewpoint would be no change in the short to medium term and no change in the long term given the manner in which the site is screened from view.
- The significance of the visual impact will be no change in the short to medium term and no change in the long term as there will be no visual impacts experienced.

During the construction phase there will be no visual impacts evident from this location.

Table 5.9.8.3 Results of Visual Impact Assessment

No.		Location / Description	Viewpoint Sensitivity	Degree of Change	Predicted Impact				
					Temporary (construction)	Short Term	Medium Term	Long Term	Permanent
		Macro (Wider) Landscape Viewpoints							
1		R576/Main Street Junction	Medium	No Change	No Change	No Change			
2		R578 Charleville Road	Medium	No Change	No Change	No Change			
3		Church Street/Emmet Place Junction	Medium	No Change	No Change	No Change			
4		Clanaulie Close	Medium	No Change	No Change	No Change			
5		R576 Kanturk Road	Medium	No Change	No Change	No Change			

Beneficial			Neutral	Adverse		
High	Medium	Low	L, M, H	Low	Medium	High

5.9.9 Proposed Mitigation and Enhancement Measures

There are no mitigation or enhancement measures proposed as the absence of landscape or visual impacts means that there is no requirement for same.

5.9.10 Residual Impacts

There are no residual impacts associated with the proposed development which demonstrates the capacity of the site to accommodate development of this nature i.e. the proposed WWTP will be fully screened from view by existing site building and infrastructure and existing vegetation in the vicinity of the site.

5.9.11 Cumulative Impacts

There are no cumulative visual impacts associated with the proposed development as the WWTP will be fully screened from view all viewpoints.

The loss of pasture land to accommodate the WWTP constitutes negligible landscape impact as the grassland in question is of no special ecological value.

5.9.12 Summary and Conclusions

This assessment finds that the proposed development of a WWTP facility adjacent to an existing site WWTP facility will not incur any significant impacts in respect of local landscape character or visual receptors in the environs of the site, i.e. surrounding residents and businesses or town centre users including visitors to the town.

The absence of impacts reflects the capacity of the site to accommodate change of this nature with minimal alteration to the setting. This is due to a combination of variations in topography, existing tree and hedgerow cover and the built fabric of Newmarket town including existing buildings and infrastructure on the proposed development site which combine to restrict views of the proposed WWTP development. The loss of part of the green field in which the WWTP is to be located constitutes negligible landscape impact as the pasture in question is of no special ecological value.

Chapter 6 – Inter-Relationships

6.1 Introduction

The Planning and Development Regulations 2001 to 2015 Schedule 6 Part 2 (b) require an Environmental Statement to include:

A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

- *Human beings, fauna and flora,*
- *Soil, water, air, climatic factors and the landscape,*
- *Material assets, including the architectural and archaeological heritage, and the cultural heritage;*
- ***The inter-relationship between the above factors;***

This chapter describes and assesses the inter relationships between the different potential impacts of the proposed development. The identified technical inter-relationships are provided below.

6.2 Noise and People

Section 5.4 above has assessed the potential noise impact of the proposed development on local residents during both the construction and operation phases. Noise has the potential to impact on the amenity of local residents in relation to background noise levels both inside and outside of dwellings. Noise levels at the existing Co-Op are regulated by the EPA through the noise limits and conditions set out in IED Licence P0793-02 which includes annual monitoring of noise at selected locations. Newmarket Co-Op has received no noise complaints from local residents as a result of the existing operations. Past noise surveys undertaken show that the facility is compliant with the noise conditions set out in the IED licence.

All elements of the proposed development including construction noise, additional traffic, extension of the peak season to include Sunday and operational noise of the new WWTP infrastructure have been assessed to determine their impact on the surrounding population. The assessment identified a potential impact on the ambient noise environment at NSLs arising from truck movements on Emmett Place however the effect is deemed to be of low significance based on proposed mitigation measures and where the context of the impact is considered.

Overall, section 5.4 concluded that the Proposed Development will not give rise to significant adverse noise related effects on local residents and properties provided the limits and conditions of the IED license are complied with and the mitigation measures relating to deliveries are adhered to.

6.3 Air Quality, People and Ecology

Decreases in air quality and the production of odours from manufacturing and industrial facilities can impact on the amenity and enjoyment of outdoor spaces for local residents such as back gardens and local parks. Such impacts were assessed in detail within this EIS (Chapter 5 section 5.5 above).

An air quality impact study of the emissions from the 2 boilers was undertaken to predict ground level concentrations in the locality and assess compliance with National Air Quality Standards values. Emission rates for Sulphur Dioxide (SO2), Nitrogen Oxide (NOx) and Particulate Matter from the boilers were for a 'worst-case' emission scenario based on providing the hourly maximum steam demand for the production process during peak production. Potential emissions of odours from the existing WWTP were also estimated based on an examination of the type of plant installed, number and size of uncovered treatment tanks and type of odour abatement systems installed at the site. As discussed in chapter 5, section 5.5, the assessment of air quality impacts due to the planned intensification programme at Newmarket Co-Op demonstrated that no significant impact on the health of the local community or surrounding environment is predicted. The impact of emissions from the boilers will comply with National Air Quality Standards values and emissions of odours from the extended WWTP will be well below levels likely to cause a potential odour nuisance beyond the facility boundary.

As no significant air quality impacts on the health of the local community or surrounding environment are predicted and emissions of odours from the extended WWTP will be well below levels likely to cause a potential odour nuisance beyond the facility boundary, it is also concluded for similar reasons that local ecological receptors will not be impacted by the proposed development.

6.4 Noise and Ecology

Noise impacts resulting from the construction and operation of machinery and plant have the potential to disturb local fauna such as breeding birds and land mammals. The construction phase of developments may have some adverse impact on the most sensitive species using the site, arising from noise and disturbance. However, considering the small scale nature of the proposed development and the low ecological value of those habitats directly impacted, it is predicted that the proposed development will have a minor negative impact on the biodiversity value of the proposed development site. The inevitable loss of habitat within the footprint of the proposed WWTP development and minor habitat disturbance along the pipeline route is deemed to be of minor significance whilst noise impacts will not be significant.

Noise impacts during both the construction and operational phase will be negligible as there is an absence of suitable breeding sites at the location of the proposed development and therefore direct impacts on breeding sites are not foreseen. However, where possible, construction works in proximity to the River Dalua will be confined to periods outside the bird breeding season to avoid potential adverse impacts on breeding birds.

Noise impacts on otters are not deemed to be significant. Section 5.1 states that following the terrestrial ecology site visit, it was confirmed that no breeding sites for otter occur in proximity to the proposed discharge point and there was an absence of evidence of otter at all other watercourse crossings along the pipeline route despite surveys being undertaken of banks in proximity to each crossing. However, suitable breeding sites occur in the surroundings and therefore potential disturbance to the resident otter population is possible. To mitigate against any potential impacts on otters, pre-construction surveys for the presence of otter in proximity to the discharge point will be undertaken prior to construction. Should the presence of otters be confirmed then appropriate measures in accordance with best practice (NRA 2008) will be followed to ensure that potential disturbance is minimised. Due to the lack of otter evidence within the area surrounding the proposed discharge route and other river crossings and the proposed mitigation measures should otter be identified in the pre-construction surveys, noise related disturbance of otter is not deemed significant.

As stated in section 5.1.12, no suitable badger habitat occurs within or in close proximity to the proposed development and as result, noise impacts on this species are not foreseen.

The only potential bat roost site that may be impacted by the development would be at Allen's Bridge and Bridge A. These bridges provide suitable roost habitat for bat species. There is potential for direct noise disturbance to bats should they be roosting at these locations when construction works are being undertaken. Prior to commencement of works pre-construction surveys for the presence of bats at bridge sites will be undertaken. Should the presence of bats be confirmed then appropriate measures will be followed to ensure that no harm to individual bats will occur. In the event of a bat roost being identified during pre-construction surveys then appropriate measures will be taken to ensure its protection with reference to BCI (2010) and NRA (2005). In the event that direct damage to the roost is unavoidable, then a derogation license from NPWS will be sought and work will be undertaken in compliance with any conditions attached. In light of the proposed mitigation measures to protect bats should they be identified at Allen's Bridge and Bridge A, significant noise impacts as a result of the project construction phase are not deemed significant.

The off-site noise impacts on flora, terrestrial habitats, birds and mammals will be imperceptible, short term, and are not considered significant. Considering the nature and scale of the proposed development, no noise impacts of significance are foreseen during the operational phase of the proposed development.

6.5 Landscape and Visual and People

Developments have the potential to cause adverse impacts on the local and regional visual landscape and as a result can reduce visual amenity for local residents. Negative impacts on views from windows and outdoor spaces such as back gardens can reduce the enjoyment of a specific views valued by local residents. The LVIA completed as part of section 5.9 assessed the impact of the proposed development on local views, selecting five key viewpoints throughout Newmarket Town. The assessment concluded none of the viewpoints assessed would experience change due to a combination of variations in topography,

existing tree and hedgerow cover and the built fabric of Newmarket town including existing buildings and infrastructure on the proposed development site which combine to restrict views of the proposed WWTP development. It is therefore determined that the proposed development will not impact on the visual amenity and enjoyment of views throughout Newmarket town by local residents.

6.6 Water Quality and Ecology

Section 5.2 provides a detailed assessment of the impact of the proposed development on water quality and aquatic ecology. The aquatic ecology assessment also included an Appropriate Assessment to determine the impacts of the proposed development on the Blackwater Special Area of Conservation.

The assimilative capacity of the Dalua River has been calculated based on (1) background chemical and biological monitoring data for the Dalua River in the vicinity of the proposed discharge and (2) the requirement for good biological and chemical status as set out in the SAC's Conservation Objectives and in the Environmental Objectives (Surface Waters) Regulations (2009).

The aquatic ecology assessment concluded that the proposed discharge to the Dalua will not compromise the Good status of the Dalua River water quality and will therefore not compromise the Good status of the Allow or Blackwater Rivers.

At the proposed Emission Limit Values (ELVs) the proposed discharge will have no adverse impact on salmon in the Dalua River or further downstream. The proposed Emission Limit Values (ELVs) of the proposed discharge will also not compromise the continued achievement in the receiving waters of the standards set out in the Environmental Objectives (Surface Waters) Regulations (2009), and there will be no adverse impact on any of the three lamprey species.

At the proposed Emission Limit Values (ELVs) the standards set out in the Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009) will continue to be achieved in the River Blackwater downstream of the proposed discharge.

It is expected that the proposed development will have a significant positive *ex situ* impact on the Blackwater (Cork/Waterford) River SAC by improving water quality in the Rampart Stream, which is a significant nursery and spawning stream for salmon which are a qualifying interest of the SAC.

As outlined above in Section 5.2, riparian habitat zones will also be avoided by the proposed development thereby obviating the need for riparian landscaping, and avoiding impacts on the ecological quality and connectivity of the riparian corridor. No instream works will be carried out, and all pipeline crossings will be via existing bridge structures.

It is concluded that the proposed development will not compromise the existing water quality of the Dalua and surrounding rivers, improving quality in the Rampart stream. No changes to water quality and impacts on aquatic ecology are predicted as a result of the proposed development.

6.7 Water Quality and People

An assessment has been completed (**Appendix 5.3.6**) to provide more information on the assimilative capacity of the River Dalua to assess whether the proposed development and increased levels of discharge will hinder future developments within Kanturk and Newmarket from utilising local water quality resources.

The assessment concluded that there will be no potential water quality mediated impacts from the proposed discharge at the proposed Emission Limit Values. The assessment determined that based on a study of the available EPA biological data, there is surplus chemical assimilation capacity downstream of the proposed discharge, and that there is a considerable assimilative capacity in the Dalua River and in the Allow at the confluence of the Allow and Dalua.

Section 5.3.3.8 above and **Appendix 5.3.6** include an assessment of the proposed discharge in relation to assimilative capacities in the Dalua and the cumulative impact of the development with other existing and proposed developments.

Appendix 5.3.6 concluded that there is sufficient Assimilative Capacity within the River Dalua to accept discharges from Newmarket Co-Op under the proposed amendment and discharges can be made in full compliance with the Surface Water Regulations (S.I. 272 of 2009). When evaluated in the context of other sources, the (cumulative) assessment shows that the cumulative discharge from Newmarket Co-Op and the Kanturk urban WWTP can be accommodated without utilising all of the available Assimilative Capacity in the river system at the point of discharge.

Based on a conservative assessment, there is significant residual assimilative capacity to allow for other discharges to be made. The assessment demonstrated that the discharges from Newmarket Co-Op can be accommodated within the catchment without impacting adversely on the future developments within Newmarket and Kanturk settlements.