11.4.4 Remedial or Reductive Measures

11.4.4.1 Construction Phase

Construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speed and wind direction. In order to ensure that no dust nuisance occurs, a series of measures will be implemented. Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development. Any un-surfaced roads shall be restricted to essential site traffic only. Furthermore, any road in the vicinity of the development that has the potential to give rise to dust may be regularly watered, as appropriate, during extended dry and/or windy conditions.

A full traffic management plan and dust management plan will be implemented into the Construction Environmental Management Plan (CEMP) in order to minimise such emission as a result of the construction phase of the development. This will be generated specifically for the development when detailed design is completed.

Vehicles using site roads shall have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road and on hard surfaced roads that site management dictates speed shall be restricted to 20 km per hour.

Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

In relation to the completion of the proposed development, the hard standing surface, and all roads will be tarmacadamed/concreted. In periods of dry weather when dust emission would be greatest, a road sweeper, which would also dampen the road, may be employed in order to prevent the generation of dust.

11.4.4.2 Operation Phase

It is not anticipated that dust will be a significant problem during the operation of the development. All sources generating dust will operate dust management equipment as required.

Emissions of pollutants from road traffic can be controlled by either controlling the number of road users or by controlling the flow of traffic. For the majority of vehicle-generated pollutants, emissions rise as speed drops. Emissions are also higher under stop-start conditions when compared with steady speed driving. Since the development will generate only small volumes of traffic, emissions from such activities were predicted to be minimal.

It is envisaged that the proposed development will not have a significant impact on the surrounding air quality. However, as discussed previously a number of mitigation measures have been suggested. Moreover, dust monitoring could be carried out during the construction phase of the development if deemed necessary by the planning authority. If the level of dust is found to exceed 350 mg/m^2/day in the vicinity of the site, further mitigation measures will be incorporated into the construction and operation of the proposed development. Odour control techniques for the proposed development are discussed in more detail in *Section 12*.

11.4.4.3 Climate

Road traffic and power usage would be expected to be the dominant sources of greenhouse gas emissions as a result of the proposed development. Vehicles and power used to operate the plant will give rise to CO_2 and N_2O emissions as a result of the proposed development. It

is expected that the number of vehicles accessing the site when operational will be a weekly maximum of 12 vehicles for truck movements and approximately 60 vehicle movements per week for small vehicles such as passenger cars. This will lead to the emission of 139 tonnes of CO_2 per annum, which is equivalent to 0.00000175% of the National Emissions in Ireland in 2008 to 2012 assuming a driving radius of 30 Km from the facility and a payload of 13 tonnes.

With reference to relevant evaluation criteria such as the Kyoto Protocol, which has set objectives to be achieved by 2008 – 2012, GHG emissions as a result of this proposal will be imperceptible.

11.5. Predicted Residual Impacts of the development

11.5.1.1 Construction Phase

The effect of construction of the facility on air quality will not be significant following the implementation of the proposed mitigation measures. The main environmental nuisance associated with construction activities is dust. However, it is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated will be minimal and are unlikely to cause an environmental nuisance. A series of such good working practices and mitigation measures are outlined earlier in this chapter (*see Section 11.4.4.1*).

11.5.1.2 Operation Phase

Traffic

The predicted increases in traffic volumes as a result of the development along the existing road network are expected to be very low. The information on traffic provided in the traffic section of the Statement has been used to identify whether any significant impact on sensitive receptors will occur. The traffic information has been input into the Design Manual for Roads and Bridges (DMRB), Volume 11 (February 2003) model. This model was prepared by the United Kingdom Department of Transport, the Scottish Office of Industrial Development, the Welsh Office and the Department of Environment for Northern Ireland as a screening tool to assess worst-case air quality impact associated with roads developments.

The screening model uses a worst-case scenario in calculating emissions. The emission factors used for each pollutant are intentionally biased to overestimate the actual emission rate. Also, wind speeds are assumed to be 2 m s^{-1} (approximately 3.9 knots compared to a mean wind speed of between 4 to 5 m s^{-1} from nearest Met stations (Cork met station). In addition to this, the background concentrations incorporated into the model are worst-case scenario concentrations. For these reasons, it can be assumed with confidence that a project will not produce air pollution from traffic if this model identifies none.

Traffic figures have been assessed using the Annual Average Daily Traffic (AADT) figures. The overall predicted increase in air pollutants as a result of the development was assessed utilising the predicted traffic generation figures for the facility when in operation. The predicted impact of traffic on air quality during the construction phase of the development are more difficult to predict since this is only a specimen design and the actual DBO plant could be a little different. The overall emissions as a result of traffic during the construction phase of the project will be short term. In terms of emissions, as the average speed of vehicles has a significant effect on the generation of pollutants, calculations are carried out for two different traffic speed scenarios. The speeds are 20 km hr^{-1}, to represent gridlock conditions and 50 km hr^{-1}, to represent free-flowing traffic conditions in the area. The growth rate per annum assumed for the area is based on NRA future traffic forecasts for non-national roads.

The DMRB only assesses the potential impacts from traffic up to and including the year 2023. Even though the development design period goes beyond this date, this is not considered significant since impacts are expected to be even lower beyond this date due to improvements in engine technology etc. The impacts associated with the proposed development are well within the ground level impact concentrations in year 2023 (as predicted by the model). Using the model, concentrations of Carbon Monoxide, Benzene, Oxides of Nitrogen and PM_{10} (particulate matter with an average 10 µm aerodynamic diameter), have been determined for a receptor point road along the road L2490 (Fernhill Rd). The results of these calculations are presented in *Tables 11.5.1* (J1). It is assumed that a total of 4 ADDT movements per day for HGV's and a maximum 12 ADDT movements per day for LGV/cars (i.e. to and from the site).

Table 11.5.1. Screening Air Quality Assessment, Cork Harbour Main Drainage Scheme WWTP operation phase for WWTP traffic.

Scenarios	Traffic Speed Km hr^{-1}	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Oxides of Nitrogen ($\mu g/m^3$)	Particulates (PM_{10}) ($\mu g/m^3$)
	-	**Annual Average-Traffic component**	**Annual Average-Traffic component**	**Annual Average NO_2-Traffic component**	**Annual Average-Traffic component**
2010 "Do something Scenario"	20	0.01	0.01	0.08	0.01
	50	0.01	0.01	0.06	0.01
2023 "Do Something" Scenario	20	0.01	0.01	0.05	0.01
	50	0.01	0.01	0.03	0.01
Irish and EU Standards	-	-	**5**	**40**	**40**

For carbon monoxide (CO) under all traffic scenarios at both speeds, the predictions indicate that even under worst-case scenario conditions the maximum CO level combined with the baseline figures will not breach the EU limit as a result of traffic movements to and from the WWTP during operation.

The predicted results for benzene at the two speed scenarios indicate that the concentrations are below the relevant Irish and EU limit at both locations. Again, the predicted levels drop with increases in speed. As with the CO results, the predicted levels actual remain relative equal over the development years. When added to baseline the overall ambient air concentrations of Benzene are well within the Irish and EU limit values during the operation phase of the development.

The predicted levels of nitrogen dioxide (NO_2) at the two speed scenarios for the operation phase of the development will cause negligible increases NO_2 on the surrounding area. There is a general overall improvement in the NO_2 levels as the development proceeds from 2010 to 2023 due to improvements in engine technology. When added to baseline the overall ambient air concentrations of NO_2 are well within the Irish and EU limit values for the operation phase of the development.

For particulate matter (PM_{10}) the predictions indicate that even under worst-case scenario conditions the annual average will not breach the Irish and EU limit as a result of traffic movement during the operation phase of the WWTP. The predictions show a variation with speed resulting in lower levels of particulates produced under normal traffic conditions (50 km/hr). There is no significant difference on air quality impact whether the development proceeds or not.

The computer model predictions indicate the following findings:

- Ambient concentrations will, in general, decrease due to legislation driven improvements in engine technology and fuel content. Any increases will be slight.
- There will be negligible increases in NO_2 and PM_{10} concentrations as the development phase is implemented.
- The net impact of the proposed development will be a slight negative for NO_2 and PM_{10} but will remain well within the Irish and EU legislative limit values.

11.5.1.3 Climate

The effect of the proposed WWTP is not considered to be significant in term of air quality impact from traffic emissions.

All space heating and energy requirements for the proposed development should be designed in accordance with best practice. The Building Regulations 2002 "Technical Guidance Document Part L – Conservation of Fuel an Energy Dwellings" should be used as a reference for best practice in order to reduce the impact of the proposed development on greenhouse gas emissions.

11.5.1.4 "Worst Case" Scenario

For traffic-derived pollutants, the "worst-case" scenario consists of gridlock conditions with large volumes of traffic on the road, simultaneously. This has been accounted for within the model whereby it is predicted that traffic movements will occur simultaneously on the road network. In addition gridlock is also assessed.

The DMRB predictive model employed is a screening model that is used to generate worst-case scenario predictions for air quality. If this model indicates that pollutant levels will not breach the Irish and EU limits, then it can be assumed with some confidence that a project will not produce air pollution problems if none are identified by this method. There are no predicted breaches of Irish and EU legislation for design year and 2023. As a result of these

model predictions it may be concluded that the worst-case impact of the traffic alterations associated with the proposed development are predicted to be a slight negative.

11.5.2 Monitoring

11.5.2.1 Construction Phase

It is envisaged that the proposed development will not have a significant impact on the surrounding air quality. However, as discussed previously a number of dust mitigation measures have been suggested. Moreover, dust monitoring could be carried out during the construction phase of the development if deemed necessary by the planning authority. If the level of dust is found to exceed 350mg/m^{2}day in the vicinity of the site (using Bergerhoff gauges), further mitigation measures will be incorporated into the construction of the proposed site.

11.5.2.2 Operational phase

In terms of odours, the exhaust emission point of the odour control systems will be monitored for odours using both onsite subjective assessment and biannual monitoring, if this is deemed necessary. Greater detail on the assessment of odours can be found in *Section 12*.

Process equipment responsible for dust generation will be fitted with dust abatement equipment and monitored continuously in accordance with EN14181.

Depositional dust monitoring will be carried out during the operation phase of the development if deemed necessary by the regulatory authority. If the level of dust is found to exceed 350mg/m^{2}day in the vicinity of the site, further mitigation measures will be incorporated into the operation of the proposed site.

11.5.3 Reinstatement

Not Applicable

11.6. Non-Technical Summary

A baseline ambient air quality survey was carried out in the vicinity of the proposed Cork Lower Harbour. Currently the air quality is average to good with levels of criteria and baseline odour pollutants for traffic, industrial and residential derived pollution (BTEX, NO_2, NO, CO, PM_{10}, H_2S and Speciated VOC's) below the relevant Irish and European Union limits. The main source of air pollution in the area is from motor vehicle exhausts, construction and industrial activities, and associated suburban emissions. There is the risk that emissions from dust could result in air quality impacts in the vicinity of the proposed WWTP site location. Since focused dust extraction and abatement will be applied to the dust generation equipment as necessary, then it is anticipated that no associated impacts will occur with the proposed development.

11.7. Appendix I-Monitoring and predictive traffic emission modelling location

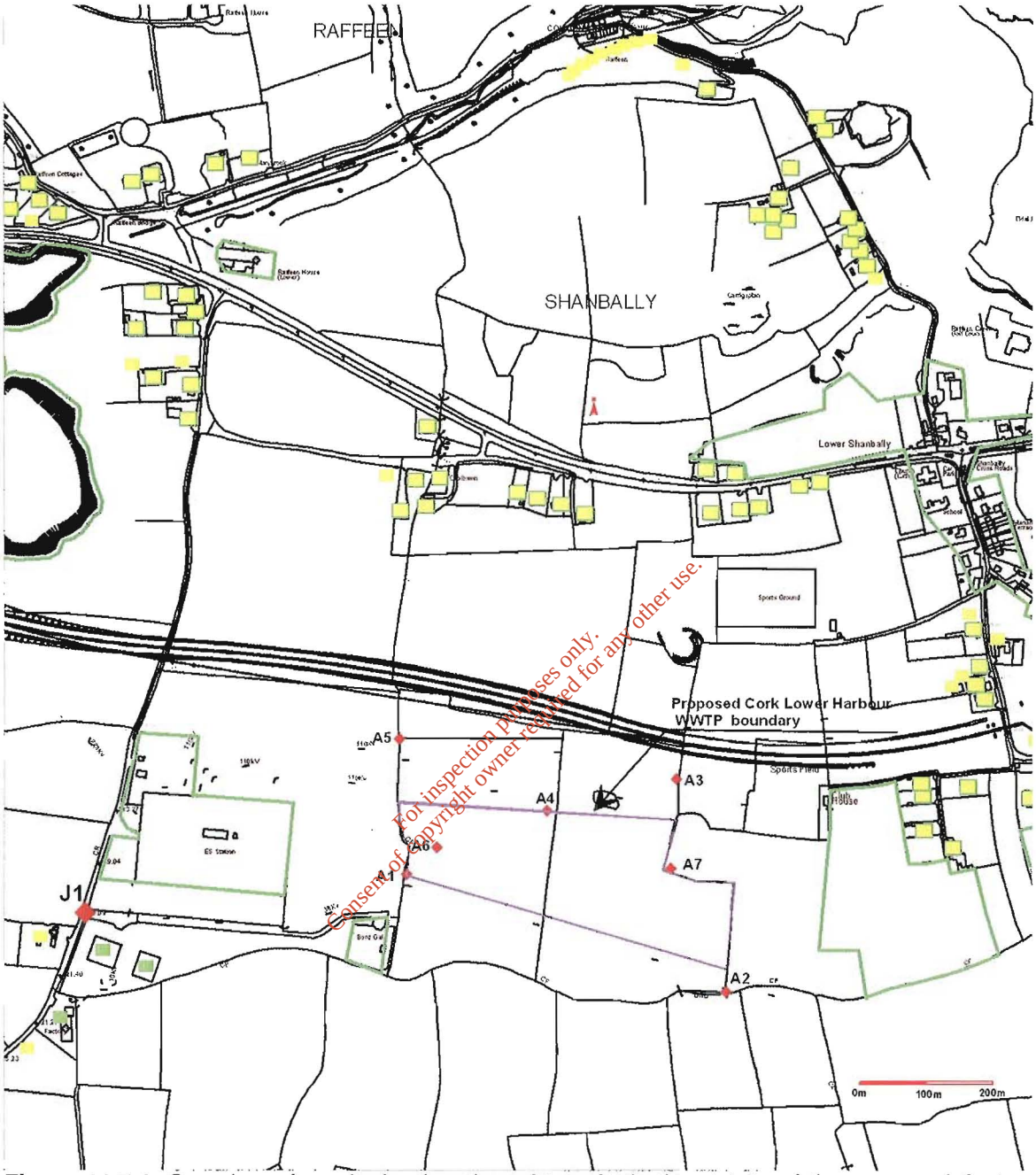

Figure 11.7.1. Overview of monitoring locations A1 to A7 in the vicinity of the proposed Cork Harbour Main Drainage Scheme WWTP and receptor location J1 (used for assessing the maximum predicted emissions associated with traffic generation as a result of the WWTP operation phase).

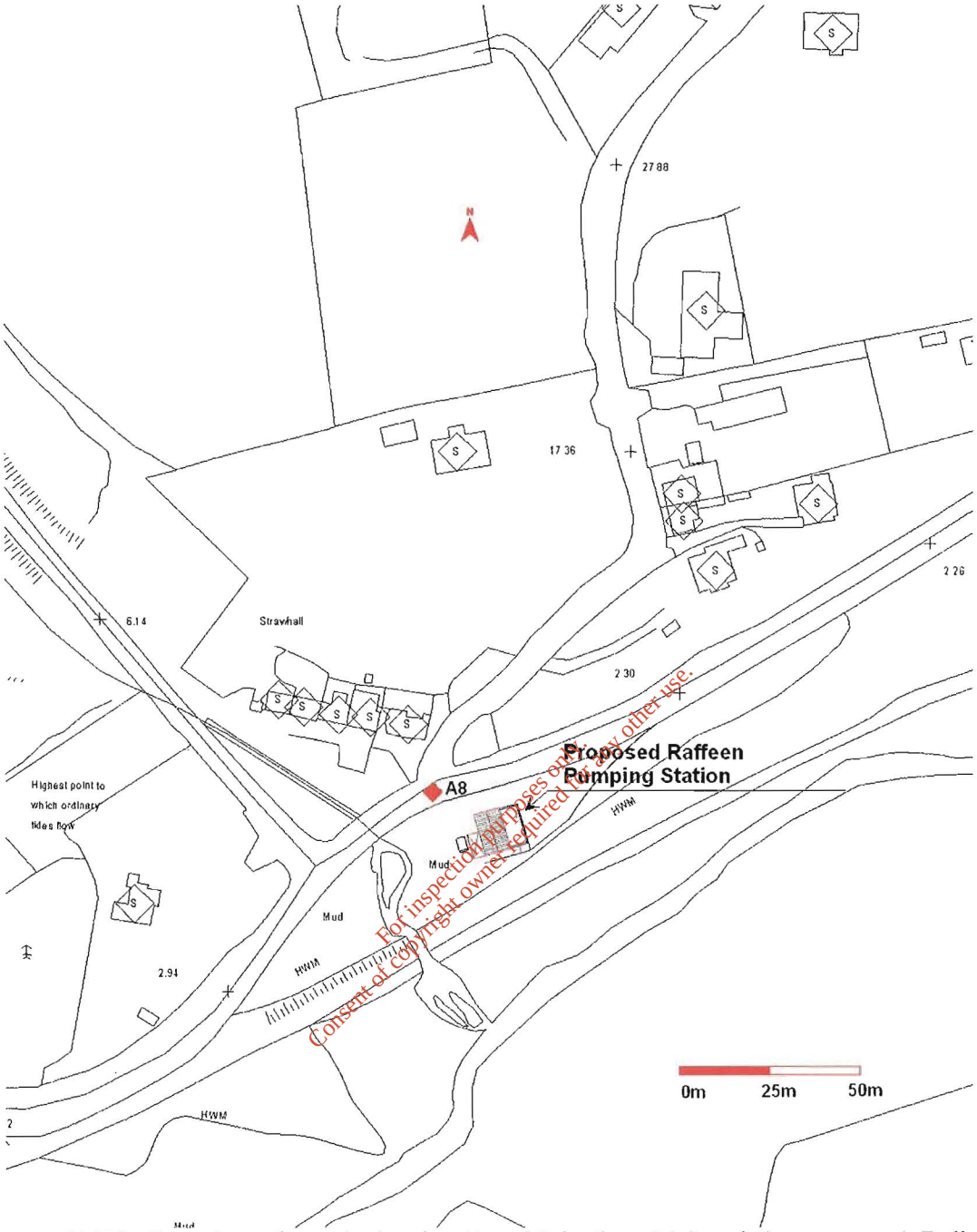

Figure 11.7.2. Overview of monitoring location A8 in the vicinity of the proposed Raffeen Pumping Station.

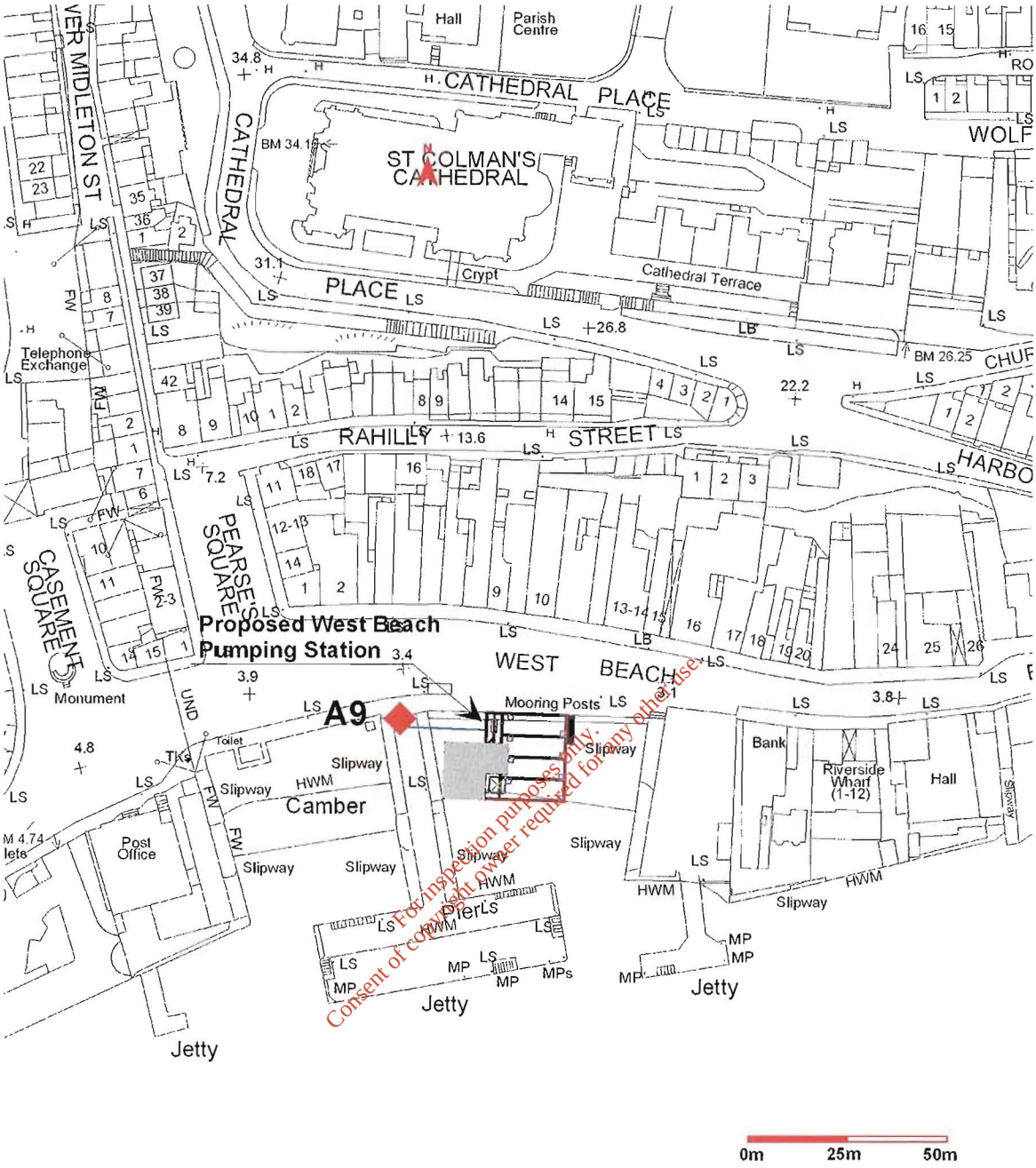

Figure 11.7.3. Overview of monitoring location A9 in the vicinity of the proposed West beach Pumping Station.

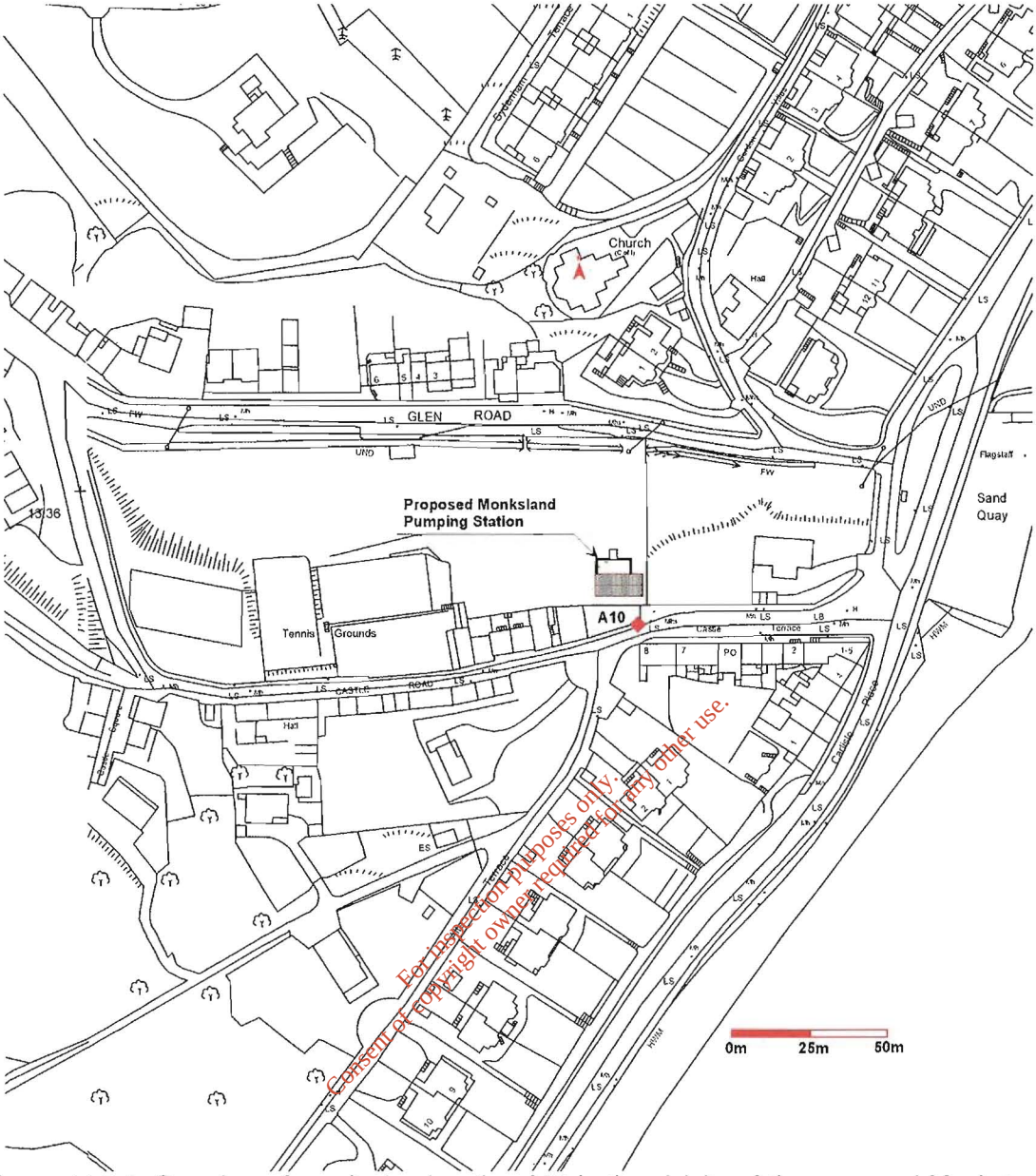

Figure 11.7.4. Overview of monitoring location A10 in the vicinity of the proposed Monkstown Pumping Station.

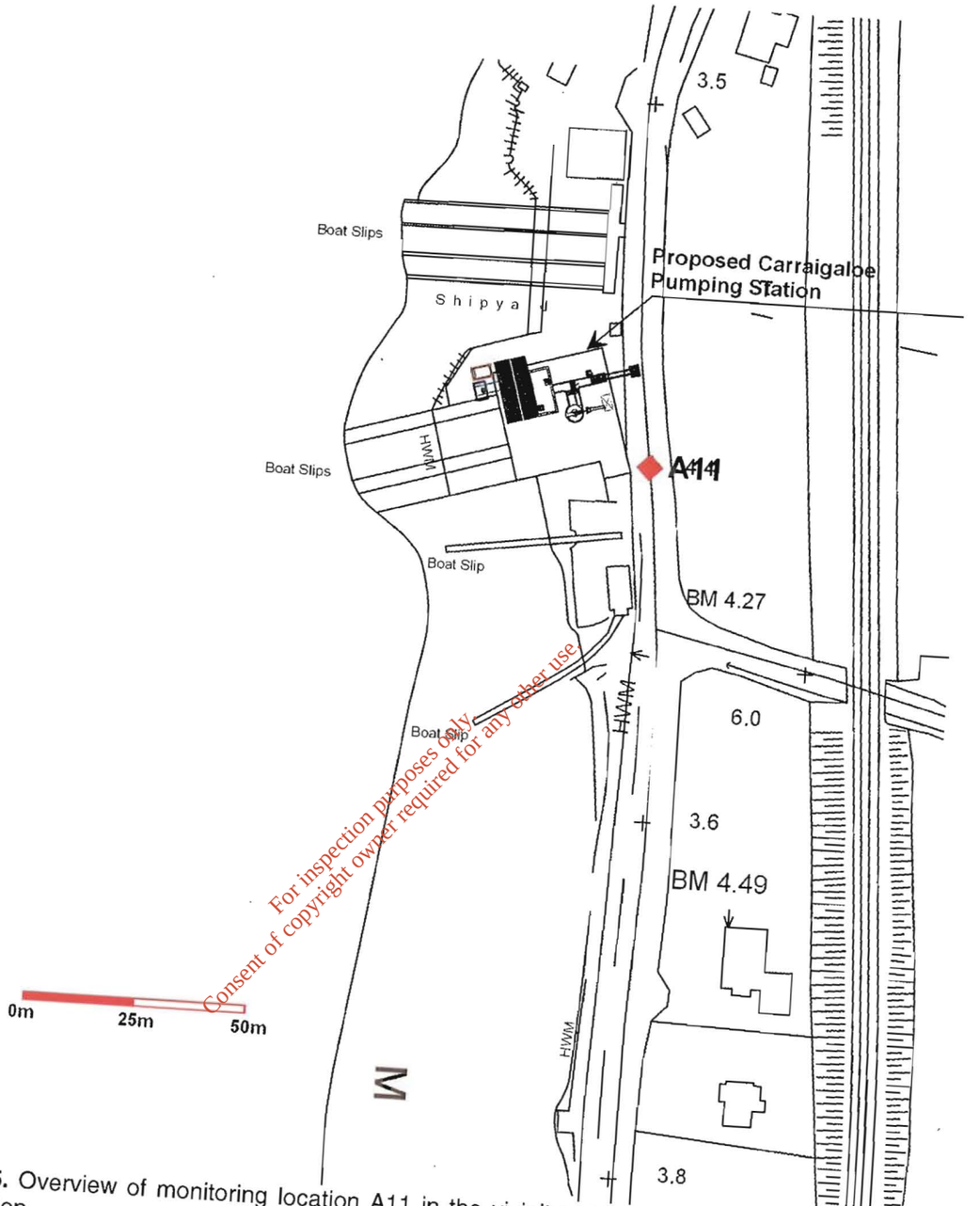

Figure 11.7.5. Overview of monitoring location A11 in the vicinity of the proposed Carrigaloe Pumping Station.

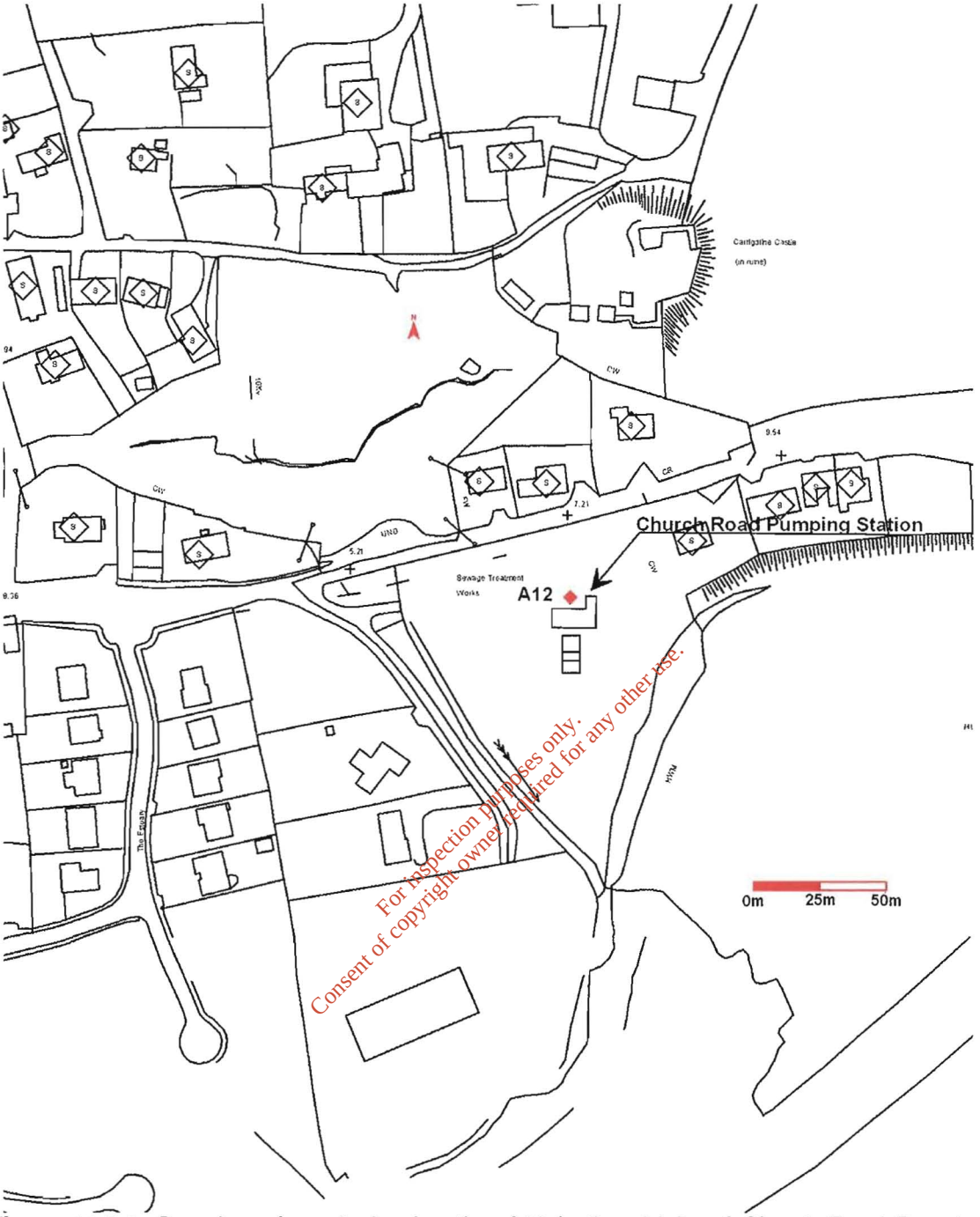

Figure 11.7.6. Overview of monitoring location A12 in the vicinity of Church Road Pumping Station.

12. Appendix II-References

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