reassessed and stated to be in compliance with the AQS. Nitrogen deposition rates also remain in compliance with the lower boundary of the critical load limit values.

Mitigation Measures – Air Quality

11.11.27. Proposed **construction phase mitigation measures** are set out in Section 16.6.2.1 of the EIAR. The measures generally comprise good practise construction methods for controlling/suppressing dust and are derived from the TII Guidelines, the BRE publication 'Controlling particles, vapour and noise pollution from construction sites' and the Institute of Air Quality Management publication 'Guidance on the assessment of dust from demolition and construction'. Examples of mitigation measures include:

- Spraying of exposed earthwork activities and site haul roads during dry weather.
- Provision of wheel washes at exit points.
- Control of vehicle speeds and speed restrictions.
- Sweeping of hard surface roads.
- A public communication strategy and complaints register and employee training (as set out in Appendix A.7.5, CEMP).
- Control of exhaust emissions through regular servicing of machinery.
- Areas where materials will be handled and stockpiled will be positioned away from main site access roads. These areas will also be designed to minimise their exposure to wind, with stockpiles kept to the minimum practicable height with gentle slopes.
- No long-term stockpiling on site and minimising of storage time.
- Minimising material drop heights from plant to plant or from plant to stockpile.
- Water suppression during the demolition of buildings.
- Crushing and concrete batching plant will be located as far from sensitive receptors as is reasonably practicable.

11.11.28. Dust screens are proposed at locations where sensitive receptors are located within 100m of the works and in areas of overlap of the PRD and the Lough Corrib

SAC, and the area of the PRD adjacent to Moycullen Bogs NHA. Dust deposition monitoring will also be conducted at a number of locations in the vicinity of the PRD. The EIAR states that, at a minimum, monitoring will be carried out at the two nearest sensitive receptors at locations where works of a 'major' scale is proposed while works are taking place in proximity. However, as noted above, all sections of the road development are stated as entailing works of a 'major' scale. Where dust deposition exceeds TA Luft limits, or where complaints are received in relation to dust levels, it is proposed to implement additional mitigation measures, for example more regular spraying of water. In order to establish a baseline, at least one month of dust deposition monitoring will be carried out in advance of the commencement of works.

11.11.29. With regard to particulate matter, it is proposed to carry out PM_{10} and $PM_{2.5}$ monitoring at the nearest sensitive receptors upwind and downwind of the construction works where sensitive receptors have been identified within 25m of the works. This monitoring programme will take place when works likely to generate dust are being carried out and will allow direct comparison with the PM_{10} and $PM_{2.5}$ air quality standards on a daily basis.

11.11.30. Protocols for proactively addressing potential dust nuisance situations are also set out in the EIAR, which may entail alternative mitigation measures and/or modification of the construction works taking place.

11.11.31. No specific mitigation measures are proposed during the **operational phase**, on the basis that all air quality standards for the protection of human health and vegetation will be complied with. The EIAR also notes that improvements in air quality are likely at a National/European level over the next few years as a result of the on-going comprehensive vehicle inspection and maintenance program, fiscal measures to encourage the use of alternatively fuelled vehicles and the introduction of cleaner fuels.

Residual and Cumulative Impacts – Air Quality

11.11.32. No significant residual impacts on air quality are predicted during either the construction or operational phases.

11.11.33. With regard to potential cumulative impacts, the EIAR notes that the traffic data utilised considers identified development proposed for the Galway area and

incorporates the cumulative impacts of these projects into the 'Do-Minimum' traffic data. This includes the projects listed in the Galway Transport Strategy. No major construction works are envisaged to take place in such proximity to the PRD which would significantly impact on dust levels. No negative significant cumulative impacts on air quality are predicted.

Climate

11.11.34. During the **construction phase** of the PRD, the EIAR estimated that 150,000 tonnes per year of CO_2 will be generated, assuming a 36-month construction programme. The predicted total construction phase emissions constitute 0.39% of Ireland's 2020 CO_2 limit under the EU Climate Change and Renewable Energy Package.

11.11.35. The applicant's air quality and climate specialist, Sinead Whyte of Arup, presented revised and reduced figures for construction phase carbon emissions at the oral hearing on 20th February 2020. The reduction was stated to result from a re-evaluation utilising a 2019 update to the 'Inventory of Carbon and Energy Database' and the 'Civil Engineering Standard Method of Measurement Carbon and Price Book 2013'. The figures submitted in the EIAR and at the oral hearing are compared in the Table below. The reduction of c. 123,000 CO_{2e} tonnes is stated to primarily relate to the use of concrete with a lower emission factor and I note that a commitment to use low-emission concrete (<0.0949 $kgCO_{2e}/kg$) has been added to the revised Schedule of Environmental Commitments submitted at the oral hearing.

Scenario	**EIAR** **Carbon Emissions (CO_{2e} tonnes)**	**Oral Hearing** **Carbon Emissions (CO_{2e} tonnes)**
Year 1	150,000 worst case year	38,420
Year 2		52,254
Year 3		61,393
Total	**275,000**	**152,067**
Ireland's non-ETS CO_2 Commitment for 2020	38,000,000	38,000,000

Increase relative to CO_2 commitment per year	**0.39%**	**0.16%** (worst case year)

Table 11.11.1: Carbon Emissions for the construction phase of the PRD: EIAR and Oral Hearing versions.

Source: Data from EIAR Table 16.38 and S. Whyte submission to Oral Hearing, Table 4.

11.11.36. The EIAR predicts CO_2 produced as a result of the **operation** of the PRD for both Opening Year (2024) and Design Year (2039), based on traffic data for the PRD and the design speed for each existing and proposed road. The predicted changes in levels of CO_2 due to the PRD are compared to Ireland's non-ETS commitments under the EU Climate Change and Renewable Energy Package. The projected increase of CO_2 in 2039 is 0.094% of Ireland's non-ETS commitment.

11.11.37. As noted above, the applicant, in responding to the Board's Request for Further Information, reassessed air quality and climate impacts during the operational phase on the basis of the higher traffic forecasts for the NTA/GCC NPF Scenarios. This is set out in Appendix A.8.3 to the RFI Response, and in Section 8.2.2.5 of the RFI Response document.

11.11.38. Under this revised NTA/GCC NPF N6 GCRR 2039 Scenario, the predicted increase of CO_2 would be 55,783 tonnes per annum, representing 0.15% of Ireland's non-ETS commitment under the EU Climate Change and Renewable Energy Package, with a marginal reduction to 54,402 tonnes per annum (0.14%) when the other Galway Transport Strategy measures are incorporated.

11.11.39. Subsequently, in Ms Whyte's submission at the oral hearing, the applicant provided further revised figures for operational phase carbon emissions. These revised figures are stated to take account of the adoption of electric vehicles, noting that the Climate Action Plan 2019 proposes: a ban on the sale of new fossil fuel cars from 2030; to stop the granting of NCT certificates for fossil fuel cars from 2045; and includes a target of 840,000 electric vehicles (EV) on Irish roads by 2030. The revised figures assume 70% of the EV target is achieved, and that 83.5% of the electricity utilised to power EVs in 2039 would be from renewable sources and generate zero carbon (in line with the Eirgrid Group Strategy 2020 – 2025 and Climate Action Plan).

11.11.40. The applicant also noted that CO_{2e} emissions will be offset, to an extent, through the proposed planting of trees as part of the proposed development, which will sequester c. 94 tonnes of CO_{2e} per year, and that carbon emissions from cars are being continuously reduced at European level, with all new cars needing to achieve 95g of CO_2 per km by 2021, compared with 130g in 2015.

11.11.41. Table 11.11.2 below compares the three sets of carbon emission figures submitted by the applicant at EIAR, RFI (two scenarios) and oral hearing stages, respectively.

Scenario	EIAR DM – DS	RFI Response NTA NPF N6 GCRR (DM – DS)	RFI Response NTA NPF N6 GCRR + GTS (DM – DS)	Oral Hearing NPF + EVs
Total CO_2 as a result of scheme 2039 (tonnes/yr)	35,776	55,783	54,402	33,435 – 37,124[20]
Ireland's non-ETS CO_2 Commitment limit for 2020 (tonnes/yr)	38,000,000	38,000,000	38,000,000	38,000,000
Change relative to Ireland's CO_2 commitment	**0.094%**	**0.15%**	**0.14%**	**0.09% - 0.1%**

Table 11.11.2: Total CO_2 produced as a result of the operation of the PRD: EIAR, RFI and Oral Hearing versions.

Source: Data from EIAR Table 16.39; RFI Response, Appendix A.8.3, Table 5; and S. Whyte submission to Oral Hearing, Table 6

Mitigation Measures – Climate

11.11.42. The proposed mitigation measures to minimise CO_2 emissions during the **construction phase** include:

[20] The range depends on whether 22% or 32% of vehicles are EVs by 2030, i.e. whether the CAP target of 840,000 EVs by 2030 is fully achieved, or if 70% of the target is achieved.

- Local sourcing of construction materials where possible (e.g. crushing and re-use of rock).
- Implementation of CTMP to minimise congestion, encourage car sharing and the use of public transport.
- Efficient materials handling to minimise the waiting time for loading and unloading, thereby reducing potential emissions.
- Engines will be turned off when machinery is not in use and regular maintenance of plant and equipment will be carried out.
- Materials with a reduced environmental impact will be used where available, such as recycled steel and use of Ground Granulated Blast Furnace Slag and Pulverised Fly Ash as replacements for Portland cements[21].
- Implementation of an Energy Management System to include: thermostatic heating controls in site buildings; insulated temporary building structures; low energy equipment and power saving functions on all computer systems; low flow tap fittings and showers; and solar/thermal power to heat water for the on-site welfare facilities.

11.11.43. The EIAR refers to the TIIs 'Environmental Impact Assessment of National Road Schemes – A Practical Guide' (2008) which states that climate change issues are largely outside the scope of an EIAR for individual road schemes as the issues and mitigation measures are the subject of specific policies and strategies set out by government.

11.11.44. In terms of mitigation, the EIAR contends that transferring existing and future traffic from the existing road network to the new road infrastructure will improve traffic congestion, benefit public transport and private vehicle users and allow for the reallocation of space for cyclists/pedestrians and reconfiguration and improvement of the public transport network resulting in a modal shift which will help to reduce carbon emissions, albeit that the reduction is difficult to quantify.

11.11.45. It is also contended that the provision of improved public transport, traffic management measures, cycling and walking facilities and the introduction of the

[21] As noted above, the applicant added an additional Environmental Commitment at the oral hearing to use low-emission concrete with a specified emission factor.

'Cross-City Link' by the GTS will encourage a modal shift in line with the Smarter Travel Policy which has the potential to reduce greenhouse gas emissions associated with the PRD in the future. The EIAR also refers to EU legislation requiring reductions in CO_2 emissions for the average new car fleet and to measures set out in the National Mitigation Plan (which has since been quashed by the Supreme Court).

Residual and Cumulative Impacts – Climate

11.11.46. The EIAR concluded that potential carbon emissions generated by the PRD can be offset by measures outlined in the Galway Transport Strategy, removing congestion in Galway City and measures outlined in the National Mitigation Plan (since quashed). It states that no significant residual climate impacts are envisaged.

11.11.47. Subsequently, due to changes in policy and environmental commitments, Ms Whyte, the applicant's air and climate specialist, stated in her submission to the oral hearing on 20th February 2020 that the proposed development would be likely to have a significant adverse impact on carbon emissions and climate.

11.11.48. The cumulative impact of the proposed development and other projects on climate, as opposed to air quality, was not explicitly addressed in the EIAR. However, in the 'EIAR – Cumulative Impact Assessment Update Addendum Report' submitted at the oral hearing (Issue 3, 3rd November 2020), the applicant states that the PRD and the various identified projects are likely to have significant cumulative impacts on climate.

11.11.49. **Assessment**

11.11.50. I consider that the potential significant impacts are as follows:

- Construction phase air pollution.
- Operational phase air pollution.
- Climate change.
- Paris Agreement and the Heathrow Runway decision.
- Parkmore Link Road proposed modification.

Construction Phase Air Pollution

11.11.51. A considerable number of observers/objectors raised concerns in relation to air pollution during the construction phase, including from construction traffic, dust generation and inadequate mitigation and monitoring measures.

11.11.52. Emissions to air during earthmoving and demolition/construction will occur, although the prevailing weather, the size of the site and its distance from sensitive receptors is predicted to assist in facilitating the management of any effects and the applicant has, therefore, focused their control procedures on reducing the generation of airborne material at source.

11.11.53. During movement of materials both on and off-site, it is proposed to cover trucks with tarpaulin at all times to minimise windblow effects. Before entrance onto public roads, trucks will be inspected to reduce the potential for dust emissions. It is also intended to provide wheelwashes and to sweep roads. Therefore, I consider that no significant air quality impacts are likely due to the hauling of construction material.

11.11.54. With regard to dust generation, I note that the applicant's assessment was undertaken in accordance with standard TII methodology with a programme of mitigation measures, as I have outlined above. This includes the provision of dust screens where sensitive receptors are located within 100m of the works and at the locations of the overlap of the PRD and the Lough Corrib SAC and the area of the PRD adjacent to Moycullen Bogs NHA. Water suppression will also be utilised during demolition works, and on roads and stockpiles during dry periods.

11.11.55. The applicant's assessment predicts that increases in pollutant concentrations during the construction phase due to the PRD will be negligible at worst-case receptors, with all projected pollutant concentrations within air quality standards.

11.11.56. Michael O'Donnell BL, accompanied by Professor Michael Kerin, Dr Annette Kerin, Dr Imelda Shanahan (TMS Environment Ltd.), Julian Keenan (Traffic Wise) and Karl Searson (Searson Associates) made submissions at the oral hearing on 30th October 2020 regarding various environmental topics on behalf of the Kerin family, who are residents of Ard an Locha, on the south side of the N59 Moycullen Road. The applicant subsequently submitted a document entitled 'Response to submission on behalf of Prof. Michael and Dr Annette Kerin' at the oral hearing on 3rd November 2020 (Ref. 103). The Kerins' and their consultants subsequently made

further submissions responding to the applicant's response, at the oral hearing on 4th November 2020 (Ref. 98+).

11.11.57. In relation to air quality, Dr Shanahan noted the proximity of the Kerins' property to the PRD mainline, and listed the various structures located within 900m of the property. I note, however, that TII guidance considers that potential dust deposition impacts can occur within 100m of construction works and that the UK DMRB concurs with this approach, stating that the risk from construction dust is low beyond 100m from the works. I would note that Dr Shanahan also states at Section 5.6.1 of her submission that air quality impacts are at their highest within 100m of the source of emissions. Having regard to this, I consider that the primary source of construction phase dust that has the potential to impact the Kerins' property is associated with the construction of the mainline, its associated embankments and retaining structure, the N59 underbridge (i.e. carrying the mainline over the N59) and construction traffic. Dr Shanahan contends that the Kerins family would be uniquely affected by the construction process. However, there are numerous dwellings in close proximity to major proposed structures and to the PRD mainline and MDAs and as such I do not consider that that they are uniquely affected. They are, however, representative of the sensitive receptors close to the PRD who have the greatest potential to be negatively affected by it (with the possible exception of those whose houses are to be acquired).

11.11.58. Dr Shanahan contended that the use of EPA Zone C data is not appropriate in this location, and that it results in a 50% overstatement of NO_2 and PM_{10} concentrations. Referring to the property as a peaceful and tranquil location and as a rural location, Dr Shanahan contended that Zone D (rural/small town) should be applied. I note, however, that the Kerins' property is immediately adjacent to the N59 Moycullen Road, one of the main radial routes serving the City. The applicant's response was that EPA maps clearly demonstrate that the full extent of the PRD is included in Zone C and that the use of Zone C data allows a worst-case baseline to be accounted for, ensuring a robust comparison with air quality standards. I would concur with the applicant that their approach is suitably conservative and, if it overstates the baseline concentrations of NO_2 and PM_{10}, then this is of benefit in ensuring that air quality standards are not exceeded.

11.11.59. Further to this point, and with regard to the more problematic $PM_{2.5}$, I note the applicant's response to Professor Kerin that the measured level of $PM_{2.5}$ at Ard an Locha over a period of 3 months was 5.4µg/m^3, which is well below the WHO guideline of 10 µg/m^3. The maximum increase in $PM_{2.5}$ calculated at the nearest modelled receptor to the Kerin property is 1.9 µg/m^3. This results in a total concentration of 7.3 µg/m^3 which remains in comfortable compliance with the WHO guideline and well below the AQS.

11.11.60. The applicant also draws the Board's attention to the EPA Air Quality in Ireland 2019 report, which states that residential use of solid fuel such as coal, peat and wood is still the largest problem for air quality and health in Ireland and that the continued use of solid fuel burning for home heating remains the leading contributor to $PM_{2.5}$ pollution across Ireland.

11.11.61. With regard to dust deposition, Dr Shanahan contended that the application of the TA Luft guidance over an annual averaging period is inappropriate and that it would not afford the required protection for sensitive receptors by ignoring overwhelmingly negative adverse impacts which may arise over shorter time periods. Section 16.2.2.1 of the EIAR refers to the TA Luft dust deposition limit of 350mg/m^2/day and I note that this applies over an annual period and not over 28-30 days as stated in Section 5.3.6 of Dr Shanahan's submission. Notwithstanding this, the applicant proposes to apply the dust deposition limit as a 30-day average, in accordance with the EPA's Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2006, and as outlined in the EIAR and Schedule of Environmental Commitments.

11.11.62. Noting the 'semi-quantitative' assessment of construction dust contained in the EIAR, Dr Shanahan calculated that the total amount of dust generated from general construction activities across the section of the mainline construction within 100m of the Kerin property is c. 0.25 tonne/day or c. 42 tonnes total dust across a 6 month construction period, of which approximately 12 tonnes is PM_{10}. This is based on the methodology outlined in the US Environmental Protection Agency (US EPA) Guidance AP-42. The applicant, in response, noted that TII guidance states that "it is very difficult to accurately quantify dust emissions arising from construction activities. It is thus not possible to easily predict changes to dust soiling rates or PM_{10} concentrations". The applicant contended that the assumptions underpinning the US

EPA guidance make it not applicable to Irish circumstances noting, by way of example, references to a "semiarid climate", which would not include locations such as Galway. I would agree with the applicant that the use of US guidance is questionable in an Irish context, particularly when dust and air quality emissions associated with road construction are well understood and a suite of best practice monitoring and mitigation measures have been developed.

11.11.63. Dr Shanahan also contended that construction traffic would result in significant levels of dust, particulate matter and NO_x emissions that would impact on her Clients. I note that the assessment undertaken by the applicant utilised TII methodology, which considers both construction works and HGV movements. Dr Shanahan, Professor Kerin and Dr Kerin also raised health issues in relation to air emissions, particularly with regard to $PM_{2.5}$ emissions. These health issues are addressed in Section 11.6 of this report.

11.11.64. Similar issues with regard to construction phase air quality impacts were also raised by Dr Shanahan in relation to Caiseal Geal Teoranta (Castlegar Nursing Home) at the oral hearing on 19th and 30th October 2020. The Nursing Home is located on School Road in Castlegar, to the south of the PRD mainline (approx. Ch. 13+250), which is in a deep cutting in this area and will pass under a new overbridge carrying School Road. The Nursing Home caters for residents with a medium to high dependency, as well as providing respite and palliative care and it is clearly a very sensitive receptor. It was contended that insufficient consideration had been given to the Nursing Home and what was stated to be its unique sensitivity. Dr Shanahan noted that the closest receptor to the Nursing Home for predicting air quality impacts was at R16, c. 300m away. She contended that this was not a comparable location, given the different topography, distance to the site boundary and the much greater need for removal of material in the vicinity of the Nursing Home. Dr Shanahan's submission made similar points as she had been in relation to the Kerin property and contended that a terrace area to the north of the building, and rooms opening onto this area, would not be usable during the summer period due to dust and particulate matter and the risk of airborne bacteria and fungi, including aspergillus. Dr Shanahan also raised issues with regard to construction traffic, particularly that associated with rock removal, and associated dust and particulate emissions. She contended that the cumulative effect on the Nursing Home was such that it may be uninhabitable for

the duration of the construction phase. Mr O'Donnell reiterated these points, noting that the Nursing Home was required to comply with various HIQA requirements and may have to close if they cannot be complied with. Mr O'Donnell contended that the Board was obliged to refuse permission due to the failure to properly assess the impacts on the Nursing Home.

11.11.65. The applicant responded to these submissions at the oral hearing on 21st October 2020, outlining various sections of the EIAR where the Nursing Home had been considered. The applicant accepted the sensitivity of the Nursing Home and contended that the mitigation measures for dust control, including spraying of spoil, covering of trucks, dust screens etc. and air emission controls were suitable for reducing impacts on the Nursing Home. With regard to Receptor R16, Sinead Whyte, on behalf of the applicant, stated that it was included for the purposes of the operational assessment, not the construction phase assessment. Mr O'Donnell subsequently asked a number of questions of the applicant's team. Ms McCarthy, responding to a question, advised that construction traffic will use the PRD mainline, not School Road, for haulage of excavated materials with no rock processing at that location.

11.11.66. Having considered the issues raised in the written and oral submissions, I conclude that dust and air quality emissions will arise during the construction phase and that this has the potential to impact upon sensitive receptors. However, I consider that the applicant has proposed a comprehensive and robust suite of mitigation measures, the majority of which are relatively standard for proposed road developments and are derived from TII guidance as well as the BRE and IAQM guidance referenced above. I consider that these proposed mitigation measures will adequately address construction phase air pollution. However, I also consider that their success will be dependent on adequate monitoring and a pro-active communications/complaints system.

11.11.67. The applicant has outlined their dust deposition and particulate (PM_{10} and $PM_{2.5}$) monitoring proposals in the Construction Environmental Management Plan (CEMP) and the Schedule of Environmental Commitments. At a minimum, monitoring will be carried out at the two nearest sensitive receptors at locations where works of a 'major' scale are proposed while works are taking place in their proximity. In addition, particulate monitoring will be carried out at the nearest

sensitive receptors upwind and downwind of the construction works where sensitive receptors have been identified within 25m of the works. The monitoring will allow direct comparison with the PM_{10} and $PM_{2.5}$ air quality standards on a daily basis, which I consider to be appropriate given the health implications of exposure to these forms of particulate matter. The applicant has also outlined the procedures to be followed in the event of limit values approaching an exceedance, or in the event of a complaint due to elevated dust, and has incorporated this procedure into the Schedule of Environmental Commitments.

11.11.68. While I consider the construction phase mitigation and monitoring proposals to be generally acceptable, having regard to the particular potential vulnerability of the residents of Castlegar Nursing Home and the proximity of the construction site, I consider it appropriate that a specific dust monitoring location be installed at or adjacent to this receptor for the duration of the construction phase. Should any issues with regard to dust emissions be identified, then in accordance with the CEMP, any identified issues can be addressed through additional mitigation or changes to work practices.

Operational Phase Air Pollution

11.11.69. A number of objections and submissions, both written and at the oral hearing, contend that the PRD will result in air pollution or negative impacts on air quality during the operational phase.

11.11.70. I consider that the assessment undertaken by the applicant, as outlined in the EIAR, RFI response and at the oral hearing, was robust, suitably conservative and in accordance with best practice for road development proposals. The assessment predicts the changes in air quality due to the PRD in the opening and design year and compares them to the relevant air quality standards (S.I. No. 180 of 2011). The DMRB spreadsheet methodology was utilised to predict future levels of pollution due to the PRD and validated using the ADMS model. Predicted concentrations are all well below air quality standards, although there are some exceedances of WHO $PM_{2.5}$ guideline levels, which is stated to be due to high background concentrations. The greatest predicted impacts using the ADMS Model were at three locations (Castlegar (R16), Upper Dangan (R17) and Letteragh (R20)) where a slight adverse impact is predicted, with a negligible impact predicted at all other locations.

11.11.71. Dr Imelda Shanahan, in her separate submissions to the oral hearing representing the Kerin family and Castlegar Nursing Home, stated that "while it is unlikely based on the information provided in the EIAR that an exceedance of Air Quality Standards would occur, in my opinion there would be a noticeable impact on air quality during the operational phase".

11.11.72. The applicant notes that pollution emissions from the national vehicle fleet are regulated as a result of European-led controls and that emissions of NO_x and PM_{10} are reducing over time as more stringent standards are introduced. As noted by Mr Ciaran Ferrie at the oral hearing, however, PM_{10} emissions also arise from tyre and brake pad wear, in addition to combustion emissions, and this element of air pollution will not reduce with the move to electric vehicles. Notwithstanding this, I consider that there is likely to be continuing improvement of air quality in future years. Rather than incorporating these likely improvements, I note that the applicant has applied the existing baseline air quality to future assessment years, which I consider to be an appropriately conservative assessment approach.

11.11.73. In the 2039 Design Year, I note that the highest concentration of pollutants at the worst-case receptor (R17, Upper Dangan) is predicted to be 37% of the AQS for NO_2 (of which the PRD contributes 14%), 48% of the AQS for PM_{10} (of which the PRD contributes 5.7%) 54% of the proposed AQS for $PM_{2.5}$ (of which the PRD contributes 6.4%). As no significant impacts are predicted to occur, no mitigation measures are required during the operational phase of the PRD.

11.11.74. The potential air quality impacts at Bushypark National School were raised in a written objection and by Mr Gerard Lawless at the oral hearing on 20th October 2020. Ms Whyte, in her submission to the oral hearing, provided a table setting out air quality predictions at the school. Air quality monitoring was carried out in the grounds of the School in 2017 with measured levels of NO_2 less than 10µg/m^3, which is well below the annual limit of 40 µg/m^3. For all pollutants, the PRD is predicted to result in a negligible impact on air quality at the School.

11.11.75. Galway City Harriers also contended that dust and other emissions to air would impact on people utilising the NUIG Sporting Campus. However, again I note that no exceedances of air quality standards are predicted.

11.11.76. While no significant negative impacts on air quality are predicted during the operational phase, I note that the changes to traffic flows as a result of the PRD will result in traffic reduction on parts of the local road network with associated air quality improvements. These areas are detailed in Table 16.28 of the EIAR and I note that on some routes, traffic volumes are predicted to decrease by over 70%. These areas are generally in close proximity to existing housing and this will result in localised air quality improvements.

Climate Change

11.11.77. A number of observers/objectors (e.g. An Taisce, Ciaran Ferrie, Brendan Mulligan, Catherine Connolly TD, Senator O'Reilly), contend that the PRD would undermine, or be contrary to, Ireland's climate obligations due to its carbon emissions.

11.11.78. Since the submission of the EIAR and RFI Response, there have been further changes to the climate legislation and policy framework, including the Climate Action Plan 2019, the publication of the Draft General Scheme of the Climate Action (Amendment) Bill 2019 and subsequently the Climate Action and Low Carbon Development (Amendment) Bill 2021, Ireland's declaration of a climate and biodiversity emergency in May 2019 and the European Parliament's approval of a resolution declaring a climate and environment emergency in Europe.

11.11.79. In December 2020, after the oral hearing concluded, the EU submitted an updated and enhanced Nationally Determined Contribution (NDC) under the Paris Agreement (see below), with the target to reduce emissions by at least 55% by 2030 from 1990 levels. The previous NDC was to reduce greenhouse gas emissions by at least 40% by 2030 compared to 1990. As before, Europe aims to become climate-neutral by 2050. The current EU Effort Sharing Regulation 2018/842 (ESR), which was referenced by the applicant at the oral hearing, sets out binding annual GHG emission targets for individual Member States for the period 2021–2030 inclusive. Ireland's target is a 30% reduction in emissions (compared to 2005 levels) by 2030. It should be noted that the ESR relates to the overall EU objective to reduce its emissions by 40% by 2030 compared to 1990 levels. However, as noted above, the EU has now committed to a more ambitious 55% reduction in its updated NDC. I note that the Commission is proposing to revise the ESR, however this had not

occurred at the time of writing. Other European level initiatives include the European Green Deal, 2030 Climate Target Plan and proposed European Climate Law.

11.11.80. While climate policy and legislation at national and European level is rapidly developing and evolving, it is clear that the ultimate end goal of achieving climate neutrality or net zero emissions by 2050 remains consistent.

11.11.81. In an Irish context, I also note the recent 'Programme for Government – Our Shared Future' ('PfG'), agreed in 2020. In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policies consistent with the National Development Plan and Climate Action Plan include the significant decarbonisation of road transport in addition to policies to ensure an "unprecedented modal shift in all areas by a reorientation of investment to walking, cycling and public transport". In this regard, the PfG states that "the Government is committed to a 2:1 ratio of expenditure between new public transport infrastructure and new roads over its lifetime". It also states that "we will develop and implement the existing strategies for our cities, such as...the Galway Transport Strategy...and other projects progressing through planning". Finally, I note the statement that "we will continue to invest in new roads infrastructure to ensure that all parts of Ireland are connected to each other".

11.11.82. In light of the developments in climate policy and the increased sensitivity of the baseline, the applicant, at the oral hearing, concluded that the proposed development is likely to have a significant adverse impact on carbon emissions and climate both individually and cumulatively with other projects, notwithstanding the predicted reduction in carbon emissions during both the construction and operational phases, compared to what was set out in the EIAR.

11.11.83. The applicant contends that applying the same methodology (i.e. EPA guidance on classification of impacts) to any significant construction project will result in a significant adverse impact on carbon emissions and climate, and that their conclusion must therefore be considered in context, and that it will create an environment conducive to the investment in more sustainable modes of transport, as set out in the GTS.

11.11.84. Having regard to the applicant's revised conclusion, i.e. that the proposed development is likely to have a significant adverse impact on carbon emissions and climate, it could be considered that there is consensus on this issue between the applicant and the objectors/observers who raised climate issues in their written and oral submissions. Where the parties differ is on the issue of whether the identified significant adverse impact is acceptable or not.

11.11.85. Mr Brendan Mulligan noted the need for drastic reductions in greenhouse gases and stated at the oral hearing on the 24th February 2020 that it is utterly unsustainable to undertake any project during the next decade which increases Ireland's greenhouse gas emissions. Hands Across the Corrib, noting the declared Climate emergency, quoted Greta Thunberg in their submission of 3rd March 2020: "*I want you to act as you would in a crisis. I want you to act as if our house is on fire. Because it is".*

11.11.86. Mr Ciaran Ferrie in his submission of 4th March 2020 noted that Ireland has been missing its targets to switch energy sources and to reduce emissions. He also noted that the Climate Action Plan seeks to make growth less transport intensive through better planning, remote and home-working and modal shift to public transport.

11.11.87. The applicant, in Section 7.5 of their 'Response to Queries raised in Module 2' document (Ref. 78) submitted at the oral hearing, provide a response to various goals of the CAP. They contend that the PRD, when considered in the wider context of the GTS, will reduce congestion, thereby reducing emissions, and facilitate planned improvements in public transport and active transport modes. They also contend that it will improve the city centre environment by attracting traffic and allow the city to densify in accordance with NPF forecasts. In response to queries from Mr Mulligan, the applicant also stated that the Cost Benefit Analysis for the scheme had been updated to reflect the carbon emissions and increased carbon tax rates as per the CAP. The results of this 'Cost of Carbon Sensitivity Test' are set out in Table 16 of the 'Response to Queries raised in Module 2' document.

11.11.88. Chapter 10 of the CAP, entitled 'Transport', notes that transport accounted for c. 20% of Ireland's greenhouse gases in 2017. However, the applicant, in their response document referenced above, draw attention to the EPA's July 2020 update

to Ireland's greenhouse gas emissions projections to 2040, which projects a 37.8% decrease in transport emissions over the period 2019 to 2030 in the 'with additional measures' scenario. This scenario assumes that the CAP measures are implemented and the EPA conclude that Ireland will meet its 2030 target under the ESR, as long as there is early and full implementation of the CAP measures (although, as noted above, a revised and more ambitious ESR may be forthcoming).

11.11.89. Having reviewed all relevant policy, I do not consider that there is an inherent contradiction in investing in new road infrastructure while at the same time seeking to work towards net zero emissions/climate neutrality by 2050. This can be seen in the TEN-T Policy, the CAP, the NPF, the NDP, the Programme for Government, and the proposed measures contained in the Climate Action and Low Carbon Development (Amendment) Bill 2021 which – while not yet enacted – include adoption of sectoral emissions ceilings, carbon budgets, Local Authority Climate Action Plans and strengthening of the role of the Climate Change Advisory Council. The NDP also, for example, has detailed both a continuation of the upgrading of the road network and a range of detailed measures to improve road transport GHG emissions. Thus, the NDP perceives that upgrading of the road network can be achieved in tandem with carbon reduction measures which suggests that improvements in road infrastructure are not necessarily a barrier to the 2050 target.

11.11.90. While I consider that the proposed development will have a significant adverse impact on climate, I also consider that this must be seen in the context of providing a piece of strategic infrastructure that will benefit the City, County, Region, State and European Union. The population of Galway is forecast to grow significantly, as set out in the NPF and, as detailed in Section 10.4, I consider that the current road network is under-developed. The development of a more integrated and higher quality road network, together with improvements to public transport and active travel modes as detailed in the GTS will assist in achieving more compact growth, facilitating the development of a denser, more efficient and more sustainable City. This is not to deny the clear need for a significant modal shift towards public transport, walking and cycling in Galway, but given the inter-relationship between the PRD and the other GTS measures, I consider that the modal share will be improved by the proposed development and the densification of the city, while the operational

phase carbon emissions from private car use will reduce over time as the national vehicle fleet becomes increasingly decarbonised.

11.11.91. In conclusion, while I concur that the PRD is likely to have a significant adverse impact on carbon emissions and climate, I do not consider that it would undermine, or be contrary to Ireland's climate obligations, given that climate action requires a broad sectoral and economy-wide approach. Ireland has committed to becoming climate neutral / zero emission by 2050, and carbon emissions associated with necessary infrastructural projects such as the PRD, which I note equates to c. 0.1% of Ireland's 2030 obligations, can be mitigated through reductions in other areas as mechanisms such as carbon tax and carbon budgets are developed.

Paris Agreement and Heathrow Airport

11.11.92. A number of objectors/observers (e.g. An Taisce, Mr Ciaran Ferrie, Mr Brendan Mulligan, Mr Frank McDonald) contended at the oral hearing that the proposed development is inconsistent with, or contrary to, Ireland's obligations under the Paris Agreement. In support of this position, a number of parties made reference to the February 2020 judgement of the UK Court of Appeal in the case of R (Friends of the Earth) v Secretary of State for Transport and Others, which related to a proposed third runway at Heathrow Airport.

11.11.93. The Paris Agreement is a legally binding international treaty on climate change which entered into force on 4th November 2016. Its goal is to limit global warming to below 2°C, and preferably to 1.5°C, above pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

11.11.94. Mr Declan McGrath SC, on behalf of the applicant, submitted a summary of the UK Court's judgement in respect of Heathrow Airport at the oral hearing on 4th March 2020 (Ref. 51). He noted that it did not relate to a challenge to a consent, but instead related to a challenge to a policy document.

11.11.95. Having considered the matter, I would concur with the position put forward by the applicant. It is clear to me that the judgement was a narrow one, relating to a failure to take the Paris Agreement into account in the preparation of the UK's Airports National Policy Statement and to explain how it was taken into account, as

was required by law. The judgement does not relate to the acceptability or otherwise of a new runway from a climate change/Paris Agreement perspective. I note that the Justices would appear to have been aware of the potential for their judgement to be misinterpreted, as they state at paragraph 13 of their summary that:

> "*Our decision should be properly understood. We have not decided, and could not decide, that there will be no third runway at Heathrow. We have not found that a national policy statement supporting this project is necessarily incompatible with the United Kingdom's commitment to reducing carbon emissions and mitigating climate change under the Paris Agreement, or with any other policy the Government may adopt or international obligation it may undertake.*"

11.11.96. By way of comparison, Ms Sinead Whyte, on behalf of the applicant, noted at the oral hearing on 4th March 2020 that the Heathrow Airport expansion was predicted to generate 20 million tonnes of CO_{2e} per annum during the operation phase, equating to 7.5% of total UK emissions. In contrast, Ms Whyte stated that the PRD is predicted to c. 0.1% of Ireland's non-ETS 2030 obligations.

11.11.97. The Paris Agreement seeks to limit global warming and achieve a climate neutral world by mid-century, however, it does not seek to prevent development from occurring. Europe and Ireland have adopted climate action legislation and policies which aim to fulfil their obligations under the Paris Agreement and, in particular, the achievement of climate neutrality or net zero emissions by 2050. The PRD will result in additional carbon emissions during both construction and operation and the applicant has accepted that this will have a significant adverse impact on climate. I do not consider that this, in itself, is evidence of the PRD being contrary to, or undermining the Paris Agreement obligations, as such obligations are set on a national level, which will require broader sectoral adaptation and I note in this regard the proposed implementation of economy-wide carbon budgets as envisioned in the Climate Action and Low Carbon Development (Amendment) Bill 2021 and proposed increases in carbon tax.

Parkmore Link Road Proposed Modification

11.11.98. Having reviewed the information submitted by the applicant and having inspected the site, I do not consider that the proposed Parkmore Link Road

modification would result in any additional or increased impacts on air quality and climate.

Conclusion on Air Quality and Climate

11.11.99. I have considered all of the written and oral submissions made in relation to air quality and climate matters, in addition to those specifically identified in this section of the report. I am satisfied that potential air quality impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. However, I consider that the PRD, individually and cumulatively with other identified projects, is likely to result in a significant negative impact on carbon emissions and climate that will not be fully mitigated. Notwithstanding the conclusion reached in respect of climate, it is considered that the residual impacts following mitigation would not justify a refusal, having regard to the overall benefits of the PRD including its identified strategic importance at European, National, Regional and local level, its role in alleviating congestion and underpinning the sustainable transport measures of the Galway Transport Strategy and its role in facilitating Galway to grow in a more compact manner, as identified in the National Planning Framework.

11.12. Land, Soil, Water, Air and Climate – Noise and Vibration

11.12.1. Noise and vibration are addressed in Chapter 17 of the EIAR. The series of Figures 17.1.01-17.1.15 contained in Volume 3 of the EIAR indicate the noise monitoring and mitigation locations. Volume 4 of the EIAR includes a number of associated Appendices: A.17.1 provides the baseline noise survey results; A.17.2 relates to construction noise & vibration mitigation; and A.17.3 sets out the calculated road traffic noise levels for the opening year (2024) and design year (2039) in the 'do-minimum' and 'do-something' scenarios. The Schedule of Environmental Commitments, which was updated at numerous stages over the course of the oral hearing, also sets out commitments in relation to noise management and mitigation. A Corrigendum, correcting various errors and omissions in the EIAR, was also submitted at the oral hearing on 21st February 2020.

11.12.2. The changes to traffic forecasts as a result of the consideration of the National Transport Authority/Galway City and County Councils National Planning Framework

scenarios for Galway ('NPF Scenarios'), as requested by the Board (see section 4.7), has potential implications for noise. These potential implications are addressed in Section 8.2.2.5 of the RFI response report, and the associated Appendix A.8.2 'NPF Traffic Forecast – Noise Sensitivity Analysis'.

11.12.3. A submission responding to the noise and vibration-related written submissions/objections, was given at the oral hearing on 20th February 2020 by Jennifer Harmon of AWN Consulting on behalf of the applicant. A number of parties subsequently made further noise and vibration-related submissions over the course of the oral hearing, including questioning of, and further submissions by, Ms Harmon. These matters are addressed, where necessary, below. The potential impacts of noise on human and animal health are addressed separately in Sections 11.6 and 11.16, respectively.

Relevant Guidance

11.12.4. The applicant considers that the key relevant guidance documents are the 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes' (TII; 2004) and the 'Good Practice Guidelines for the Treatment of Noise during the Planning of National Road Schemes (TII; 2014). The chapter is also stated to have utilised information gathered during the earlier constraints and route selection studies.

11.12.5. Noise and vibration limits, in line with TII guidance, are set out in Section 17.2.2.1 of the EIAR. For the construction phase, this comprises maximum permissible noise levels at the façade of dwellings of **70dB $L_{Aeq,1hr}$** Monday to Friday 07:00 to 19:00, reducing to **60dB $L_{Aeq,1hr}$** during the hours 19:00 to 22:00, with **65dB $L_{Aeq,1hr}$** Saturdays 08:00 to 16:30 and **60dB $L_{Aeq,1hr}$** Sundays and Bank Holidays 08:00 to 16:30. A higher L_{ASmax} figure for each period is also provided. Night-time construction noise limit values are not included in the TII Guidance, and the applicant has therefore taken guidance from '*British Standard BS5228-1: 2009 + A1 2014 Code of practice for noise and vibration control on construction and open sites – Noise'*. This Standard provides guidance on setting appropriate limit values for construction based on existing ambient noise levels in the absence of construction noise. The noise thresholds under the Standard range from **45dB to 55dB**, depending on the ambient noise levels. Construction vibration limits, based on TII guidance, are set

out in Table 17.3. For blasting, air overpressure and Peak Particle Velocity (PPV) are considered. The frequency of blasting will be no greater than one blast per day in any one site, so the applicant proposes a PPV limit value of **12mm/s** in line with TII Guidelines and the EPA's guidance on Environmental Management in the extraction industry (2006). The potential need for site-specific vibration limits for particularly sensitive receptors is also addressed below.

11.12.6. With regard to operational phase noise, the applicant states that there are no statutory guidelines relating to noise from road schemes in Ireland. The TII 2004 and 2014 noise guidance documents both specify that an absolute noise design criterion for new national road schemes of **60dB L_{den}** is appropriate. This is a 24-hour noise rating level, which includes penalties for evening and night-time noise. Under the TII guidance there are 3 No. conditions that must be met for noise mitigation to be provided:

1. The combined expected maximum traffic noise level, i.e. the relevant noise level, from the PRD together with other traffic in the vicinity is greater than the design goal of 60dB L_{den}.
2. The relevant noise level is at least 1dB more than the expected traffic noise level without the PRD in place.
3. The contribution to the increase in the relevant noise level from the PRD is at least 1dB.

11.12.7. The Galway City Council and Galway County Council Noise Action Plans 2019 – 2023 (NAPs) relate to the management of environmental noise in accordance with the Environmental Noise Directive ('END'; 2002/49/EC) and supersede the 2013 – 2018 NAPs referenced in the EIAR. The purpose of the NAPs is to manage and reduce, where necessary, environmental noise through the adoption of the action plans. This process is informed by a strategic noise mapping exercise. Both NAPs state that there are no statutory limits in relation to environmental noise exposures at EU or national level and that the EPA recommends that the proposed onset levels for assessment of noise mitigation measures should be **70dB L_{den}** and **57dB L_{night}**. Both NAPs contain a series of proposed mitigation measures to manage noise. The Galway City Ring Road is specifically identified as one of a number of 'key strategic

projects' in the County Council NAP, while implementation of the GTS and the development of a 'strategic relief road' is referenced in the City Council NAP.

Baseline Noise and Vibration

11.12.8. Noise-sensitive locations within a study area of c. 300m from the centreline of the PRD were identified for the baseline noise study, with a mix of unattended and attended measurements undertaken. This surveying programme encompassed attended surveys at 73 locations and unattended surveys at 33 locations. Where access was not possible, proxy locations were utilised. The baseline noise monitoring locations are illustrated in Figures 17.1.01 to 17.1.15, with survey results set out in Appendix A.17.1. A calibration and validation exercise comparing measured baseline noise against modelled predictions found a strong correlation, with a variation of ± 1dB L_{den}.

11.12.9. The results of the baseline noise survey indicate that the noise environment varies across the PRD depending on the surrounding noise sources. In general, properties facing directly onto existing roads are dominated by road traffic and experience noise levels in excess of 60dB L_{den}. Properties in more rural settings set back from road traffic experience noise levels typically in the range of 42 to 50dB L_{den} depending on local sources in the vicinity. These noise sources included animal noises, construction and gardening work and voices. The EIAR identifies a total of 270 noise sensitive buildings, resulting in a total of 299 modelled receiver locations (a number of properties have two or more receiver locations to assess noise levels at different facades). It should be noted that the applicant has also utilised single receiver locations to represent clusters of properties in many cases. These noise receiver locations are identified on Figures 17.1.01 to 17.1.15.

11.12.10. No baseline vibration survey was undertaken, on the basis that the applicant considers that traffic on existing roads would not be expected to result in vibration of a level to cause nuisance or damage to property.

Potential Impacts

11.12.11. The **construction phase** for the proposed development is expected to last 36 months, which will include up to 10 weeks of night-time working, primarily to facilitate bridge works over existing roads. The general direction of construction is envisaged

as east to west, either in two concurrent phases or a single overall contract. If two phases are utilised, these will be:

- **Phase 1:** N6 Coolagh to N59 Letteragh Junction (Incl. N59 Link Road North and South): 9.9km.
- **Phase 2:** N59 Letteragh Junction to R336 Coast Road: 7.5km.

11.12.12. Noise and vibration generating activities will include ground breaking, earthworks, earth haulage, drainage works, construction of ponds, bridges, overpasses and tunnels, surfacing works and movement of plant and materials. Blasting of bedrock will be required, and I note that 'proposed blasting' and 'possible blasting' locations are identified on Figures 7.201 and 7.202 of Volume 3 of the EIAR.

11.12.13. The EIAR notes that road building works, by their nature, are transient as the works progress along the length of the route. For the purposes of the EIAR, the applicant has assumed 15 No. individual construction sections, which may be combined or completed simultaneously. 12 No. site compound locations have also been identified and are listed in Table 17.10 of the EIAR.

11.12.14. The EIAR, referencing the TII Guidelines, notes that there is limited information available on specific construction methods, numbers and types of plant before the appointment of a Contractor, which will normally happen after a scheme has been approved. The TII Guidelines note that it is more appropriate to address the way in which potential construction impacts will be assessed and how they will be managed, including forms of mitigation and codes of practices that will be applied. In this regard, the TII Guidelines state that in the absence of an Irish or international standard relevant to construction noise, reference can be made to '*BS 5228-:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise and Part 2 Vibration*'. This standard sets out sound power levels for a range of plant items encountered on construction sites and includes recommended methodologies for calculating construction noise levels as well as setting out a range of best practice mitigation and management measures for the control of noise and vibration from construction sites.

11.12.15. The highest noise levels are anticipated to be associated with rock extraction and processing (i.e. breaking, drilling and crushing). For these activities a total

construction noise level of 93dB L_{Aeq} at 10m is used for calculations. For other higher noise activities, such as excavation, fills, bridge works etc. a construction noise level of 85dB L_{Aeq} at 10m is used. For construction compounds and activities with lower noise levels (e.g. landscaping, concreting), a total construction noise level of 78dB L_{Aeq} at 10m is used.

11.12.16. Table 17.9 of the EIAR sets out the calculated attenuation of the abovementioned construction noise levels with distance, in the absence of any other form of mitigation. This indicates that for construction activities with the highest noise levels, the daytime noise limit value (70dB $L_{Aeq,1hr}$) would be exceeded at distances of up to 100m from the works boundary while evening and weekend noise limit values (60dB $L_{Aeq,1hr}$/65dB $L_{Aeq,1hr}$) would be exceeded at distances of up to 250m.

11.12.17. TII Guidelines recommend that areas of major earthworks, blasting and piling should be identified. Relevant areas in this regard, and the construction section ('CS') they are contained within, are: below the Aille Road L5384 (CS: S2); Letteragh Junction and approach roads (CS: S3 and S4); N59 Link Road North (CS: S5); N59 Letteragh Junction (CS: S6); embankment leading to Menlough Viaduct and cutting approaching Lackagh Tunnel (both CS: S10); Lackagh Tunnel construction (CS: S11); cutting on the eastern side of Lackagh Quarry and N84 Headford Road Junction construction (CS: S12); cutting east of School Road, N83 Junction construction and cutting approaching Racecourse Tunnel portal (all CS: S13); Racecourse Tunnel (CS: S14); excavation works east of Tunnel portal and Coolagh Junction construction (CS: S15). Potential noise impacts are also identified at a number of construction compounds.

11.12.18. The potential for noise impacts from construction traffic along public roads is also addressed. A total of 16 public roads are identified as haul routes and, whilst the overall construction period is forecast as three years, construction traffic movements are split over a 12 month period along haul roads accessing specific work zones and a two-year period for national and regional roads serving multiple work zones. This is stated to be for the purposes of allowing a robust assessment to be made. Other conservative assumptions include concentrated construction periods at working areas and that no delivery of materials will occur along the corridor of the PRD. In fact, as noted elsewhere, it is proposed to use the PRD corridor for construction delivery vehicles.

11.12.19. Noise levels associated with passing event such as road traffic are expressed in terms of its Sound Exposure Level (LAX). Table 17.11 of the EIAR presents a summary of the construction traffic noise assessment, including a comparison of the base (Do-Minimum) scenario and the Do-Something (i.e. base plus construction) scenario. This indicates that the increase in noise level along the majority of the haul routes is negligible (<1dB) due to the existing volume of traffic along these roads and the relatively low additional HGV and LGV traffic per day forecast. The greatest increase in noise levels is calculated along the Bearna to Moycullen Road (L1321) in Zone 1 (3dB increase), the Cappagh Road in Zone 2 (8dB increase) and along Bóthar Nua in Zone 4 (7dB increase). Having regard to the assumed 12-month duration, and the existing traffic volumes and noise environments, the increase along the Bearna to Moycullen Road (L1321) and the Cappagh Road are deemed to be moderate short-term impacts. The increase along Bóthar Nua is deemed to be a major short-term impact.

11.12.20. Construction phase vibration is stated to be typically associated with excavation works, rock-breaking and blasting operations. There is also potential for some vibration relating to piling operations, demolition works and lorry movements on uneven road surfaces.

11.12.21. With regard to piling, the applicant undertakes to utilise low vibration methods (bored or augured piles) rather than percussive type piling, where ground conditions permit. However, for the purposes of the assessment, vibration levels associated with driven piles are assumed. Referencing British Standard '*BS5228-2 2009+A1:2014: Vibration*', the applicant states that the vibration magnitudes associated with sheet steel piling at distances beyond 20m are well below those associated with any form of cosmetic damage to buildings.

11.12.22. With regard to rock breaking, no data is provided in the BS 5228-2 standard, however it is stated that the applicant's noise and vibration consultant, AWN Consulting, has previously conducted vibration measurements under controlled conditions on a sample site where concrete slab breaking was carried out. Peak vibration levels recorded using a 3 tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities, while a 6 tonne Breaker, result in between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m

respectively. Vibration impacts due to demolition and construction works are deemed to be not significant and short term.

11.12.23. With regard to blasting, the applicant states that for the majority of identified locations a relatively shallow blast depth is required. However, there are a number of locations along the route of the PRD where a cut depth of greater than 10m will be required. This will result in intermittent high noise levels albeit of a significantly shorter time period compared to other extraction methods. It is stated that the use of drill and blast will enable extraction works to be undertaken at a significantly faster rate compared to traditional rock breaking techniques.

11.12.24. Potential blasting impacts relate to both air overpressure (AOP) and ground vibration. The applicant states that the intensity of AOP levels at a receiver location is highly dependent on meteorological conditions including temperature, cloud cover, humidity, wind speed and direction etc. Due to the large variability in these conditions, it is not possible to reliably calculate AOP and the control of its intensity is therefore undertaken at source through careful blast design. The applicant, again referencing BS 5228-2, notes that there is no known evidence of structural damage to structures from excessive air overpressure levels from quarry blasting in the UK.

11.12.25. With regard to ground vibration, the level of vibration at a receiver location depends predominately on the distance from the blast, the maximum instantaneous charge (MIC), sequencing of charges and ground conditions between the blast area and the receiver location. The applicant states that the most accurate methodology for determining vibration levels is through controlled trial blasts at specific sites and undertaking scaled distance regression analysis to determine maximum charge values in order to comply with set criteria. The closest sensitive properties to the identified likely blast sites are at distances of 30m to 50m and the potential blasting impacts are stated to be significant, momentary and localised.

11.12.26. During the **operational phase**, noise levels will be increased at the majority of noise sensitive locations along the length of the PRD. Table 17.13 of the EIAR sets out predicted noise levels for the Opening Year (2024) and Design Year (2039) for 299 receiver locations and compares these against the three TII conditions for determining if noise mitigation is required (as set out above). In the Opening Year, 92 of the 299 modelled locations satisfy the TII conditions for noise mitigation,

increasing to 106 in the Design Year. The number of properties determined to require noise mitigation excludes those that it is proposed to demolish but includes those that it is proposed to acquire.

Mitigation Measures

11.12.27. **Construction phase** noise and vibration mitigation measures are set out in Section 17.6.2 of the EIAR and in the associated Appendix A.17.2.

11.12.28. With regard to noise, it is stated that the contractor will be obliged to take specific noise abatement measures and comply with the recommendations of '*BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise'* and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001. The mitigation measures are generally standard for large construction projects, and include:

- Liaison with neighbours.
- Noise control audits.
- Controls on hours of work and scheduling of activities.
- Selection of quiet plant and regular maintenance.
- Control of noise sources.
- Screening of noisy plant.
- Best-practice controls for high-noise activities (e.g. piling, breaking, demolition and excavation).

11.12.29. Construction phase noise monitoring is also proposed at the nearest sensitive locations in accordance with the International Standard ISO 1996: Acoustics – Description, measurement and assessment of environmental noise Part 1 (2016) and Part 2 (2017). Noise control audits will be conducted at regular intervals throughout the construction programme in conjunction with noise monitoring to ensure that all appropriate steps are being taken to control construction noise emissions and to identify opportunities for improvement, where required.

11.12.30. Air overpressure from blasting will be controlled through blast design at source in accordance with the recommendations contained within BS 5228-2 in addition to experienced blast control techniques used by the contractor. These

techniques include restriction of hours within which blasting can be conducted, trial blasts, use of a sufficient amount of stemming and primer cord is used, and profiling after each blast in order to ensure the geometry of the rock face can be established. It is also stated that blasting within 150m of any existing structure shall require special considerations, including the use of pre and post-condition structural surveys. Ground vibration and AOP will be recorded simultaneously for each blast at the most sensitive locations. When blasting moves into a new area, an initial low level blast will be carried out and monitoring will be carried out simultaneously at a number of sensitive properties in different directions in order to generate specific scaled distance graphs. This will be used to determine the optimum charge for subsequent blasts area in order to control vibration and AOP.

11.12.31. A Public Communications Strategy will also be implemented by the contractor prior to the commencement of any blast works. This will include prior notification of blasting, firing of blasts at similar times to reduce the 'startle' effect, circulars to inform people of the progress of the blasting works, implementation of an onsite documented complaints procedure and use of independent monitoring for verification of results.

11.12.32. With regard to non-blasting related vibration, the EIAR concludes that the likely vibration levels associated with construction activities are not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to buildings. In the case of vibration levels giving rise to human discomfort, a number of measures are proposed, including a clear communication programme, use of alternative less intensive working methods and/or plant items, where feasible, vibration isolation, and monitoring at identified sensitive buildings, where proposed works have the potential to exceed the vibration limit values.

11.12.33. It is also proposed to offer pre and post-property condition surveys for all buildings within 50m of the proposed development boundary and, as noted above, those within 150m of proposed blasting works.

11.12.34. The EIAR notes that potentially vibration sensitive activities have been identified for a number of manufacturing facilities within the Parkmore and Racecourse Business Parks, close to where blasting will take place as part of the

proposed Racecourse Tunnel. It is proposed to mitigate this through on-going consultation, including baseline vibration monitoring and the use of trial blasts with simultaneous vibration measurements undertaken at the building. This information will be used to set agreed limits values at the facility in question, which will be monitored during subsequent blasts or other excavation methodologies. Where no safe limit is determined, the timing and scheduling of blasts will be undertaken in consultation with the facility when no sensitive operations are taking place.

11.12.35. The results of the EIAR modelling exercise during the **operation phase** identified that noise mitigation is required for 106 properties along the proposed route of the PRD for the 2039 Design Year. Mitigation measures include the use of a Low Noise Road Surface (LNRS) to reduce noise generated at source and the use of noise barriers to reduce noise levels along the propagation path between the source (PRD) and the specific receivers (houses, schools, churches etc.). As part of the assessment, therefore, the use of a LNRS providing a mean reduction in traffic noise level of -2.5dB compared to Hot Rolled Asphalt was modelled along the length of the PRD mainline and the main junction slip roads accessing the N59 Moycullen Road, N84 Headford Road, N83 Tuam Road and existing N6 in addition to the N59 Link Road North and South. Table 17.14 of the EIAR summarises the locations, extent and type of noise barriers proposed along the PRD and they are illustrated on Figures 17.1.01 to 17.1.15.

Residual Impacts

12.36. Once the mitigation measures are put in place and the limit values complied with, noise impacts associated with the **construction phase** are predicted to be of moderate to major, short term impact, with the highest noise impacts occurring during periods of excavation, particularly where hard rock is to be excavated. The EIAR considers that the use of standard construction activities can operate comfortably within the recommended vibration limits for standard residential and other light-framed buildings and that potential vibration impacts at the most sensitive premises can be adequately mitigated to within acceptable levels.

11.12.37. The residual noise levels during **operation phase** for the locations requiring noise mitigation are set out in Table 17.15 of the EIAR which indicates that noise levels at or below 60dB L_{den}, or that 'Do-Something' noise levels reduced to the

equivalent 'Do-Nothing' noise levels, can be achieved in the majority of cases. There are, however, a number of instances where a residual noise level of 1 to 2dB above the design goal remains. These locations are stated to primarily relate to properties which: are to be acquired; remain dominated by traffic along the local road network outside the PRD boundary; or where access onto the local road restricts physical additional mitigation. In relation to these locations, the applicant makes reference to the 2004 TII noise guidance document which states that "the Authority accepts that it may not always be sustainable to provide adequate mitigation in order to achieve the design goal. Therefore, a structured approach should be taken in order to ameliorate as far as practicable". Similarly, the 2014 TII noise guidance document notes that "in some cases the attainment of the design goal may not be possible by sustainable means". It goes on to note that caution should be exercised specifying substantial screening where small benefits (<3dB) are only achieved, given a change of 3dB(A) is the smallest change that would give a reliable difference in public response.

11.12.38. Table 17.16 summarises the number of properties categorised within each magnitude rating based on DMRB assessment tables. During the Opening Year (2024) 134 of the modelled receptors will experience a 'Major' short-term noise impact, with a further 31 locations experiencing a 'Moderate' noise impact. During the Design Year (2039), this reduces to 53 of the modelled receptors experiencing a 'Major' long-term noise impact and 90 locations experiencing a 'Moderate' noise impact. At the remaining locations, the impacts are categorised as 'No Change/Reduction' to 'Minor'.

11.12.39. Further analysis of properties assigned a 'Moderate' and 'Major' change in noise levels is also provided with regard to likely levels of annoyance, based on the EEA exposure-response studies for the Opening and Design Years, in Tables 17.17 – 17.20. The absolute noise levels associated with both 'Moderate' and 'Major' changes in noise levels are in the range of 48 to 62dB L_{den}. The percentage of the population typically 'highly annoyed' by road traffic noise in this range is 3 to 12% respectively. This is stated to represent a low percentage of the population likely to experience high levels of annoyance when exposed to the range of noise levels under consideration.

11.12.40. Whilst a higher number of locations are determined to experience a 'Major' change in noise levels during the opening year, the applicant contends that the

absolute noise level under consideration are below a level that would pose high levels of annoyance to the typical population in accordance with published data. During the Design Year, the number of properties determined to experience a 'Major' change in noise levels is significantly reduced due to the threshold values for impact ratings in the long-term period. The EIAR concludes that residual noise impacts across the full extent of the PRD are determined to be imperceptible to significant, with the majority of properties overall, experiencing an imperceptible to moderate impact

11.12.41. The EIAR also contends that that there will be a positive moderate to major noise impact on an extensive number of noise sensitive properties along a large portion of the existing road network due to the PRD reducing traffic volumes on the existing road network. These locations are identified in Table 17.21 of the EIAR.

11.12.42. The Noise Sensitivity Analysis submitted with the RFI response, which was based on the updated NPF Scenarios, included a noise assessment undertaken at the same locations as assessed within the EIAR, but with the traffic flows associated with the NPF Scenarios modelled, and with the EIAR mitigation measures provided where necessary. The results of this assessment are stated as indicating a negligible change in noise levels between those associated with the TII Central Case growth figures (i.e. as per the EIAR) and those associated with the NPF Scenarios. It is noted that 94% of the changes in noise levels as a result of the higher forecasts in the NPF Scenarios were 1dB(A) or less. A number of the remaining locations have a calculated increase of between 1.1 and 2.6dB, compared to the EIAR. These locations are mostly along the local road network outside of the PRD boundary, and a number of these locations experience an overall noise level reduction compared to the 'Do Minimum' scenario. Since a change of 3dB(A) is generally considered to be the smallest change in noise that is perceptible to the human ear, the applicant contends that it is reasonable to conclude that the difference between the traffic noise levels assessed under the EIAR and the NPF Scenarios for all assessment locations can be considered negligible.

11.12.43. There are 13 locations along the N6 GCRR where the operational noise level is increased above the design goal (i.e. 60dB L_{den}) by 1 dB L_{den} or increased by 1dB above the EIAR residual noise level. The applicant considers this calculated change to be negligible when compared to those assessed in the EIAR, and significant noise

mitigation measures, including barriers, are already proposed at these locations. The applicant does not consider it practicable to further increase barrier heights at these locations to achieve an imperceptible change in noise level, due to other engineering and environmental considerations, such as visual intrusion.

11.12.44. With regard to operational vibration, no significant residual impacts are anticipated, on the basis that ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties near to well-maintained and smooth road surfaces.

11.12.45. Finally, with regard to cumulative impacts, the traffic data used as part of the noise impact assessment is stated as having taken account of other committed and proposed road developments, which are listed in the EIAR and the cumulative road traffic noise impacts are stated to be incorporated into the calculated operational noise levels set out in the EIAR

11.12.46. In relation to cumulative construction impacts, other committed or proposed construction projects are stated as having been reviewed in the vicinity of Galway City and County. As a result of the separation distances from the PRD, no cumulative noise and vibration impacts are predicted.

11.12.47. **Assessment**

11.12.48. I consider that the potential significant impacts can be assessed under the following headings:

- Applicability of WHO Environmental Noise Guidelines 2018
- Construction phase noise and vibration.
- Blasting during construction.
- Operational phase noise.
- Additional/altered noise barriers.
- Parkmore Link Road proposed modification.

Applicability of WHO Environmental Noise Guidelines 2018

11.12.49. A number of parties, in their written submissions and at the oral hearing (e.g. Prof. and Dr Kerin, Mr Kevin Gill, Aughnacurra Residents Association, Galway City

Harriers, Ronan McDonagh), made reference to the World Health Organisation's Environmental Noise Guidelines for the European Region, published in 2018 and contended that they should be utilised in assessing the PRD. The Guidelines were also the subject of much discussion and questioning at the oral hearing, in relation to noise and human health.

11.12.50. These WHO Guidelines were published after the submission of the EIAR, and thus are not addressed in the EIAR. I note that Section 2.6.3 of the Guidelines states that they supersede the earlier WHO Community Noise Guidelines 1999, which are referred to in Chapter 18 of the EIAR. Given that the TII Guidance dates from 2004 and 2014, I consider that it is important to consider the 2018 WHO Guidelines in the context of developments in scientific knowledge and understanding.

11.12.51. The main purpose of the WHO Guidelines is stated to be the provision of recommendations for protecting human health from exposure to environmental noise originating from various sources, including transportation (road traffic, railway and aircraft) noise. The Guidelines are stated to provide robust public health advice underpinned by evidence, which is essential to drive policy action that will protect communities from the adverse effects of noise. They set out a series of specific recommendations for various noise sources and each recommendation is rated as either 'strong' or 'conditional'. In relation to 'strong' recommendations, the Guidelines state that these "can be adopted as policy in most situations. The guideline is based on the confidence that the desirable effects of adherence to the recommendation outweigh the undesirable consequences. The quality of evidence for a net benefit – combined with information about the values, preferences and resources – inform this recommendation, which should be implemented in most circumstances."

11.12.52. In relation to Road Traffic Noise, the following recommendations and strength ratings are set out in the Guidelines:

Recommendation	**Strength**
For **average noise exposure**, the Guideline Development Group ('GDG') strongly recommends reducing noise levels produced by road traffic below **53 dB L_{den}**, as road traffic noise above this level is associated with adverse health effects.	Strong

For **night noise exposure**, the GDG strongly recommends reducing noise levels produced by road traffic during night time below **45 dB L_{night}**, as night-time road traffic noise above this level is associated with adverse effects on sleep.	Strong
To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.	Strong

11.12.53. The applicant's noise consultant, Ms Jennifer Harmon, addressed the WHO Guidelines in Section 4.3 of her statement at the oral hearing on 20th February 2020. She noted that the WHO's recommended traffic noise level of 53dB L_{den} is based on a level at which 10% of the population are estimated to be 'highly annoyed' by road traffic noise. This level is 6dB below the noise level determined for increased risks relating to incidence of Ischaemic Heart Disease, i.e. 59dB L_{den}, which she notes is only 1dB below the TII noise design goal of 60dB L_{den}. Dr Martin Hogan, the applicant's human health consultant, also addressed the WHO Guidelines in his submission to the hearing, with similar conclusions to Ms Harmon. Human health issues are addressed in Section 11.6 of this report.

11.12.54. Ms Harmon's conclusion was that the WHO guidelines have not been adopted in any form in Ireland to date and that, whilst they provide a valuable peer review of potential health-based indicators, it is not appropriate to design or operate a new national road network to comply with the noise levels included within its recommendations. She stated that the recommendations are made primarily in the context of strategic policy-making, as opposed to EIA, and that the TII guidance remains the current best practice standard for road traffic noise in Ireland.

11.12.55. In support of this position, she noted that the Guidelines state, with regard to implementation, that:

"The WHO guideline values are evidence-based public health-oriented recommendations. As such, they are recommended to serve as the basis for a policy-making process in which policy options are considered. In the policy decisions on reference values, such as noise limits for a possible standard or legislation, additional considerations – such as feasibility, costs, preferences and so on – feature in and can influence the ultimate value chosen as a noise limit. WHO acknowledges that implementing the guideline recommendations will require coordinated effort from ministries, public and private sectors and nongovernmental organizations, as well as possible input from international development and finance organizations." [emphasis added.]

11.12.56. The Aughnacurra Residents Association, on the 4th March 2020, queried compliance with WHO night-time noise levels, rather than L_{den} levels, stating that composite values were like average depth when crossing a river, they mean nothing as it's the deepest point that matters. Ms Harmon accepted that night-time levels were above the WHO Guidelines, but that this related to self-reported sleep disturbance for 3% of the population. She contended that the EIAR figures relate to 3% – 6% being sleep disturbed, which is a low percentage of the population.

11.12.57. The applicant was also asked by the Inspectors at the oral hearing, on the 21st October 2020, to comment on the applicability of the 2018 WHO Guidelines, with the Inspectors noting by way of comparison that the Draft Wind Energy Development Guidelines for Planning Authorities are stated to be consistent with the WHO Guidelines. Jarlath Fitzsimons SC stated that the applicant's position was that the Board should consider the WHO Guidelines, and all other relevant guidelines, but within their correct context. Ms Harmon reiterated statements made in her submission, regarding the purpose of the WHO Guidelines which used a range of population studies from around the world and which seek to prevent the majority of the population being highly annoyed and to prevent increased risk of heart disease. She contended that they align closely with TII guidelines but that it would take a further 80% reduction in traffic volumes on the mainline to achieve the values from WHO Guidelines. She contended that the criteria from the TII guidelines protect the majority of people from being highly annoyed and protect populations that may be exposed to more significant health effects. Dr Hogan outlined the methodology

underpinning the WHO Guidelines, broadly reiterating the position set out in his oral hearing submission of 20th February 2020.

11.12.58. The Inspectors also asked Mr Fitzsimons to comment on the implications or otherwise of favouring the 2004 TII Guidelines over 2018 WHO Guidelines, particularly in light of the Supreme Court judgement in the case of Balz v An Bord Pleanála. Mr Fitzsimons, noting that he had been involved in that case, responded that it is important for the Board to consider every submission made, and every material aspect or issue raised in those submissions. He stated that the WHO Guidelines are a relevant consideration for the Board, and it is a matter for the Board what weight to ascribe them, noting that Dr Hogan and Ms Harmon had offered a view as to the appropriate context within which they are to be considered, i.e. at the population level.

11.12.59. I note that the Environmental Noise Directive does not set noise limit values or target values. However, the European Commission's Environmental Noise website[22] states that "Annex III will describe the methods for calculating the burden of disease caused by exposure to specific noise levels. The methods will include dose-effect relations for a set of health endpoints such as cardiovascular disease, annoyance and sleep disturbance". It goes on to state that "a revised Annex III is currently under development following the latest scientific review of the health effects of noise that is being performed by the WHO". It appears, therefore, that the WHO Guidelines will inform forthcoming European-level noise limit values or targets in relation to environmental noise. However, at this stage it is not clear whether the WHO recommendations will be adopted verbatim or whether other considerations will also influence any such limit value, as the WHO Guidelines themself note.

11.12.60. The noise level recommendations set out in the WHO Guidelines are substantially lower than those set out in the TII Guidelines and in the Galway County and Galway City Noise Action Plans 2019-2023, which I note were adopted after the publication of the WHO Guidelines. It can be seen from the applicant's baseline noise survey that the WHO Guidelines recommendations would be difficult to achieve, with a considerable number of the baseline survey locations already exceeding the recommended noise levels. In a real-world scenario, where it is

[22] https://ec.europa.eu/environment/noise/policy_dev_en.htm

proposed to retrofit a major road into the existing urban fabric, it is difficult to see how the WHO noise levels could be achieved without very extensive and intrusive noise screening measures (which, even if possible, may result in other issues around visual impact, severance, residential amenity issues etc.) or by very significant reductions in traffic volumes, as noted by Ms Harmon which would render the project effectively pointless. I would, therefore, concur with the applicant that the WHO Guidelines, while useful in understanding the relationship between noise and health issues, are primarily of benefit at a macro or population scale, i.e. at a strategic and land use planning policy level, rather than in the case of specific road projects. I note, in this regard, that the TII Guidelines have been used in the assessment of all new national road projects in Ireland since their publication, and that they are tried and tested in an Irish environment. The health implications of noise are addressed separately in Section 11.6 of this report, but I also consider it relevant that the TII design goal is comparable to that associated with the prevention of the more significant health effects of environmental noise such as cardiovascular effects as set out in the WHO guidelines. Finally, I also consider it to be relevance that the adopted NAPs for Galway City and County, which post-date the publication of the WHO Guidelines, did not incorporate its recommendations. In conclusion, I consider that the TII Guidelines are the appropriate guidelines to utilise in this instance.

Construction Phase Noise and Vibration

11.12.61. A common issue raised in many of the written objections and observations and raised by many parties at the oral hearing was construction phase noise and vibration impacts, related to both construction activity and construction traffic.

11.12.62. Having regard to the scale and nature of the PRD, and the receiving environment, it is clear that high levels of construction noise will be generated during the construction phase, and this has been accepted by the applicant. The greatest noise impacts will arise during excavation works, particularly where sections of hard rock have to be excavated through drill and blast methods, or conventional rock-breaking. However, given the generally linear nature of the works, the noise emissions associated with the construction phase will be of short-term impact at any one area as the works progress along the length of the PRD.

11.12.63. As detailed above, the EIAR has assessed construction phase noise assuming a range of typical plant items and has considered the potential for noise impacts associated with major earthworks, structures and site compounds. The locations and distances from construction works where noise mitigation is required has also been identified.

11.12.64. Notwithstanding the applicant's assessment, I consider that there is an inherent uncertainty with regard to construction phase noise due to the scale of the PRD, the range of activities and plant types, variable ground conditions etc. and, in this regard, I consider that the applicant has adopted an appropriate approach of setting limit values in accordance with TII Guidance and implementing a broad suite of mitigation measures and best-practice noise control/abatement measures in accordance with British Standard BS 5228-1:2009+A1:2014. These measures are incorporated into the Schedule of Environment Commitments and/or the CEMP. Monitoring, noise control audits and public liaison (including prior notification of noisy activities and complaints procedures) will also be implemented during the construction phase to ensure compliance with TII and BS guidance.

11.12.65. With regard to noise impacts associated with construction traffic and increased HGVs movements, I note the assessment contained in Section 17.5.3.2 of the EIAR. A total of 16 public roads have been identified as haul routes and are illustrated in Figures 7.001 and 7.002 of the EIAR. The mainline of the PRD will also be utilised as a haul route during the construction phase, although this was not included in the assessment undertaken, which is suitably conservative in my opinion.

11.12.66. Traffic noise levels at a distance of 10m from the haul roads was calculated and compared for the 'Do-Minimum' (base) and the 'Do-Something' (base + construction) scenarios. This assessment determined that the increase in noise level along the majority of the haul routes is negligible (<1dB), which is stated to be due to the existing volume of traffic along these roads and the relatively low additional HGV and LGV traffic per day forecast. Greater increases in noise levels were, however, calculated along the L1321 Bearna to Moycullen Road (+3.4dB), the Cappagh Road (+8.4dB) and along Bóthar Nua (+6.8dB). The overall impact along the Bearna to Moycullen Road and Cappagh Road is determined to be moderate short-term, given that the overall noise level remains low to moderate, while the impact on Bóthar Nua is considered to be major short-term. I note, however, that Bóthar Nua is a sparsely

populated road with a low number of sensitive receptors. Given the various 'worst case' conservative assumptions made by the applicant in their assessment, and in particular the assumption that the PRD mainline will not be used as a haul route which results in a worst-case construction traffic impact on public roads, I am satisfied that noise associated with construction traffic will not result in significant adverse impacts on sensitive receptors along the haul routes.

11.12.67. Given the linear, transient and highly variable nature of the construction activities, I consider the values utilised by the applicant to be suitably robust for assessing potential construction phase impacts.

11.12.68. With regard to construction phase vibration, I consider that the greatest potential for significant impacts is associated with the use of drill and blast techniques for rock excavation and I have addressed this issue separately below.

11.12.69. Michael O'Donnell BL, accompanied by Professor Michael Kerin, Dr Annette Kerin, Dr Imelda Shanahan (TMS Environment Ltd.), Julian Keenan (Traffic Wise) and Karl Searson (Searson Associates) made submissions at the oral hearing on 30th October 2020 regarding various environmental topics on behalf of the Kerin family, who are residents of Ard an Locha, on the south side of the N59 Moycullen Road (Ref. 98A - 98E). The applicant subsequently submitted a document entitled 'Response to submission on behalf of Prof. Michael and Dr Annette Kerin' at the oral hearing on 3rd November 2020 (Ref. 103). The Kerins' and their consultants subsequently made further submissions responding to the applicant's response, at the oral hearing on 4th November 2020 (Ref. 98F).

11.12.70. Baseline noise surveys undertaken by both the applicant and by Searson Associates indicate that the existing noise environment at the Kerins' property is dominated by the existing N59 Moycullen Road, which is adjacent to their property. Having regard to the particular circumstances of the family and the proximity to a number of major construction work areas, Dr Shanahan stated that they are a very sensitive receptor and contended that, due to the nature and duration of the works in the vicinity of the Kerins' property, lower noise limits should apply in line with EPA guidance for the extractive industry or those set out in Annex E.5 of BS 5228-1 (2009 + A1 2014). In support of this position, she noted the submission made to the oral

hearing by her colleague Mr Keenan, likening the construction works in this area to the operation of a large commercial quarry.

11.12.71. The applicant disagreed with the application of limit values associated with long-term operational activities associated with a quarry or surface mineral extraction to a temporary road construction project. The applicant noted that the construction noise limits values in the TII guidelines are set for the control of noise from national road project, which would often extend over a 9 month period. The applicant contended that the lower limit values proposed by Dr Shanahan of 55dB L_{Aeq} during daytime periods are not realistic as they would not permit any road construction, or other infrastructure project to be built. I concur with the applicant's position that the construction of the PRD is not directly comparable to an operational quarry, notwithstanding the similarities in rock excavation etc. due to the limited timeframe for the works and the transient nature of particular activities and construction processes. I consider the use of TII noise limits to be appropriate for the construction phase, noting that the higher level of noise allowed is not a permanent noise source, and that a balance is required between speed of construction (thus reducing duration of impacts) and control of noise. The TII limits have been applied to road construction projects across the Country, are achievable and once appropriate monitoring is in place, I consider that they will control noise emissions to a suitable level.

11.12.72. With regard to vibration limit values, Dr Shanahan contends that there are anomalies in the EIAR and that the TII limit values only deal with the potential for structural or cosmetic damage and not the significant nuisance effect on human occupants. I do not consider the human perception threshold to a be a suitable vibration limit, as recommended by Dr Shanahan, given that perceiving that something is happening is not necessarily the same as being negatively affected by it. With regard to the anomaly referred to by Dr Shanahan, the applicant clarified that this relates to a specific section of the Lackagh Tunnel construction, while the limit values relating to blasting for all residential dwellings and other light framed structures is 12mm/s, as identified in the EIAR. The applicant confirmed that no piling works are proposed in the vicinity of the Kerins' home and, thus, I do not consider that piling-related vibration will be a significant issue in this location.

11.12.73. In terms of construction phase noise impacts, Dr Shanahan contended that there was a lack of detail on the construction programme and that noise levels associated with the various activities were lower than she would expect. She outlined the results of her calculations for construction noise levels at the Kerin property for the various construction activities, which were greater than predicted in the EIAR, and stated that the noise levels would be intolerable for the Kerin family and render their house uninhabitable during the construction phase. With regard to blasting-related vibration associated with attenuation pond construction, N59 Letteragh Junction and other sites, she contended that the blast noise and vibration would be perceptible at the Kerins' property, adding to disturbance and adverse impacts.

11.12.74. The applicant responded that the construction activities which will be undertaken closest to the Kerins' property will involve works to the access road at Ard an Locha, the construction of the earth embankment and the construction of the N59 underbridge. No piling is proposed in the vicinity and the construction of the earth embankment would involve earth moving and rolling equipment over a duration of 3 to 6 months which would not generate significant levels of noise due to the nature of the works involved. The applicant contended that the range of noise levels presented in the calculations were artificially high having regard to the nature of the works in the vicinity.

11.12.75. Mr Searson reiterated points made by Dr Shanahan and noted his clients' need for quiet indoor noise environment, both in the daytime and the night-time. Both Dr Shanahan and Mr Searson's submissions referred to an assessment of construction traffic and excavation quantities undertaken by Mr Keenan. This is addressed in Section 11.13. Dr Shanahan, Professor Kerin and Dr Kerin also raised health issues in relation to noise emissions, which are addressed in Section 11.6 of this report.

11.12.76. Having regard to the nature, extent and duration of the construction works in the vicinity of the Kerins' property, I have no reason to conclude that noise during the construction phase would not be capable of complying with the TII construction noise limits, following implementation of the identified mitigation measures. Comprehensive noise monitoring and management measures are proposed as part of the PRD and I am satisfied that this would provide an appropriate control

mechanism during the construction phase to ensure that the construction noise limits are not exceeded.

11.12.77. Finally, in relation to this property, I note that the applicant made a commitment at the oral hearing to pay for similar alternative accommodation for the Kerins' family to be rehoused during the 9 month duration of earthworks at the N59 (Item 1.33 in the Final Schedule of Environmental Commitments refers).

11.12.78. Similar issues with regard to noise impacts were also raised by Dr Shanahan in relation to Caiseal Geal Teoranta (Castlegar Nursing Home) at the oral hearing on 19th and 30th October 2020. The Nursing Home is located on School Road in Castlegar, to the south of the PRD mainline (approx. Ch. 13+250), which is in a deep cutting in this area and will pass under a new overbridge carrying School Road. The Nursing Home caters for residents with a medium to high dependency, as well as providing respite and palliative care and it is clearly a very sensitive receptor. It was contended that insufficient consideration had been given to the Nursing Home and what was stated to be its unique sensitivity. Dr Shanahan, again referring to an assessment of construction traffic and excavation quantities undertaken by Mr Keenan, contended that construction phase noise levels had been underestimated. She outlined the results of modelling she had undertaken, considering the impacts of activities such as rock breaking and processing. She contended that the level of noise was so high that it would not be possible to adequately mitigate it and that the nursing home would be unable to operate during the construction phase. Both she, and subsequently Mr O'Donnell, raised concerns regarding vibration from blasting, with Mr O'Donnell stating that the nursing home had a basement built directly on bedrock. Mr O'Donnell reiterated the points made by Dr Shanahan, noting that the Nursing Home was required to comply with various HIQA requirements and may have to close if they cannot be complied with. Mr O'Donnell contended that the Board was obliged to refuse permission due to the failure to properly assess the impacts on the Nursing Home.

11.12.79. The applicant responded to these submissions at the oral hearing on 21st October 2020, outlining various sections of the EIAR where the Nursing Home had been considered. The applicant accepted the sensitivity of the Nursing Home and contended that the mitigation measures for dust control, including spraying of spoil, covering of trucks, dust screens etc. and air emission controls were suitable for

reducing impacts on the Nursing Home. Mr O'Donnell subsequently asked a number of questions of the applicant's team. Ms McCarthy, responding to a question, advised that construction traffic will use the PRD mainline, not School Road, for haulage of excavated materials, while Ms Harmon stated that no rock processing would be undertaken in the vicinity of the nursing home.

11.12.80. Having considered the issues raised in the written and oral submissions, I conclude that noise and vibration emissions will arise during the construction phase and that this has the potential to impact upon sensitive residential receptors. However, I consider that the applicant has proposed a comprehensive and robust suite of mitigation measures, the majority of which are relatively standard for proposed road developments. I consider that these proposed mitigation measures will adequately address construction phase noise and vibration. However, I also consider that their success will be dependent on adequate monitoring and a pro-active communications/complaints system as outlined in the EIAR, CEMP and the SoEC.

11.12.81. In addition to residential receptors, a number of commercial receptors raised noise issues. M&M Qualtech Ltd. which is located in Parkmore Business Park provides design and manufacturing services in various sectors including medical devices, automotive etc. and expressed concerns in their written submission and at the oral hearing on 4th March 2020 in relation to noise and vibration impacts on their operations and particularly on the very sensitive equipment they use in their operation.

11.12.82. While the applicant had already acknowledged the location of potentially vibration-sensitive activities in manufacturing facilities within the Parkmore and Racecourse Business Parks, they updated their Schedule of Environmental Commitments at the oral hearing to explicitly clarify that a property condition survey would be undertaken at this premises and that "M&M Qualtech will be included in the list of property owners to be consulted with as the design and construction of the PRD progresses, in particular in respect of the dates of rock breaking and blasting and the detailed traffic management plan for their area. Vibration monitoring will be undertaken at their property in Parkmore".

11.12.83. Subject to compliance with the CEMP, SoEC and appropriate monitoring, I do not consider that M&M Qualtech or other industrial/commercial enterprises are likely to experience significant noise or vibration-related impacts during the construction phase.

Blasting during Construction

11.12.84. A number of submissions and objections, both written and at the oral hearing, raised issues regarding construction phase blasting and the potential impacts on properties, including structural damage.

11.12.85. Blasting will be required at numerous locations along the route of the PRD, as identified in Figures 7.3.1 and 7.3.2 in Volume 3 of the EIAR. The extent of proposed blasting will vary, depending on rock type, depth below surface and the depth of the cutting involved. The applicant states that for the majority of identified locations, a relatively shallow blast depth is required, although there are a number of locations where a cut depth of greater than 10m will be required.

11.12.86. The applicant contends that the proposed use of drill and blast techniques will enable extraction works to be undertaken at a significantly faster rate compared to traditional rock breaking techniques, with noise and ground vibration levels being of momentary duration. In order to control any potential impacts to structures in proximity to blasting, the applicant undertakes to utilise specific blast control techniques in line with those prescribed within the relevant British Standard Code of Practice and best practice control measures as outlined above in order to ensure the relevant limit values for Air Over Pressure and Peak Particle Velocity are not exceeded.

11.12.87. The blast control measures include restricted hours, trial blasts in less sensitive areas, pre- and post-condition structural surveys, use of initial low-level blasts and monitoring in order to generate specific scaled distance graphs to control impacts on sensitive receptors, and a Public Communications Strategy to include prior notification of residents, complaints register, circulars etc.

11.12.88. The pre- and post-construction property condition surveys would be offered to all buildings within 50m of the proposed development boundary and those within 150m of proposed blasting works. While several observers located at greater distances have requested structural surveys, I consider that the 150m distance is

sufficient to ensure that controls are sufficient and that the blast design is appropriate.

11.12.89. While blasting will result in noise and vibration impacts, the impacts associated with each blasting event will be short in duration. I consider that the use of appropriately controlled blasting in accordance with a blasting programme that is communicated to local residents is preferable to extended periods of conventional rock breaking that would otherwise be required to achieve the cuttings in rock that are required to construct the PRD. I also note the linear nature of the development, and the construction phasing proposals, which will limit the duration during which sensitive receptors are close to blasting areas.

11.12.90. Finally, I note that the applicant made an additional commitment at the oral hearing to liaise with the operator for the nearby Twomileditch Quarry in relation to their respective blasting schedules to ensure that blasting between the School Road and N84 does not take place concurrently with blasting in Twomileditch Quarry. This measure has been added to the Schedule of Environmental Commitments and is appropriate in my opinion.

Operational Phase Noise

11.12.91. With regard to operational phase noise, I refer the Board to Appendix A.8.2 of the applicant's RFI Response, which compares the predicted noise levels under the EIAR growth scenario (i.e. TII Central Case) and the RFI growth scenario (i.e. NTA/GCC NPF) for the 2039 Design Year. It can be seen that, for the majority of receptors, there is a negligible difference between the two scenarios in terms of residual noise levels.

11.12.92. Unlike the construction phase noise impacts, the operational phase noise impacts are long-term and will result in a variety of changes to the noise environment, depending on the nature of the receiving environment. In rural and semi-rural areas, which are not currently exposed to high levels of traffic noise, properties close to the PRD will experience an increase in the noise environment, while in areas where the noise environment is already dominated by traffic noise, the effect will be less pronounced. It should also be noted that some areas would experience a reduction in noise levels, due to the diversion of traffic flows.

11.12.93. It can be seen from Appendix A.8.2 of the RFI Response that residual noise levels at a relatively small number of locations will remain above the TII 60dB L_{den} design goal by 1 to 2dB. The HSE submission sought that mitigation measures be applied to ensure compliance with the design goal for these properties. The applicant, in response, made reference to the 2004 TII Guidelines, which state that "the Authority accepts that it may not always be sustainable to provide adequate mitigation in order to achieve the design goal. Therefore, a structured approach should be taken in order to ameliorate as far as practicable." The 2014 TII Guidelines were also referenced by the applicant, which note that caution should be exercised specifying substantial screening where small benefits (<3dB) are only achieved, given that a change of 3dB(A) is the smallest change that would give a reliable difference in public response.

11.12.94. The applicant's approach to noise mitigation is based, to a significant degree, on the use of noise barriers. There is no evidence in the EIAR that other forms of interventions to noise pathways between the source and receptor were considered, such as a noise insulation scheme to provide triple glazing, acoustic vents, sound insulation etc. to relevant affected receptors. The Inspectors queried the proposed noise mitigation approach and asked the applicant if noise mitigation at receptor had been considered where noise mitigation at source or on the pathway was not possible or not effective. Ms Harmon stated that where noise mitigation at source or on the pathway was not feasible, noise mitigation at the receptor was not considered. She also noted that the 60 dB Lden noise criterion is a free field façade criterion and is not applicable to internal rooms.

11.12.95. I note that the Galway County Council Noise Action Plan states that Galway County Council will consider requiring a higher standard of façade and window insulation for all new multiple residential developments located beside major roads, potentially with a pre-completion sound insulation test required prior to habitation to ensure that recommended internal noise levels in line with BS 8233:2014 have been achieved. Galway County Council will consider requiring a higher standard of façade and window insulation for single one-off housing applications beside major roads in order to achieve the recommended internal noise levels within BS 8233:2014. It could be argued that the reverse should also apply and that, where a new major road is proposed close to existing houses, then sound insulation of the houses should be

provided. Notwithstanding this, there are substantial mitigation measures built into the PRD proposal, namely the noise attenuating barriers and the use of a Low-Noise Road Surface on the mainline and certain other links.

11.12.96. Given the need to balance the provision and scale of noise barriers against other considerations such as visual impact, I consider that the TII guidance on minor exceedances of the design goal should be followed in this instance.

11.12.97. The operational phase noise impacts on the NUIG Sporting Campus at Dangan was raised by a number of parties. Ms Michelle Van Kampen, on behalf of the Galway City Harriers, queried the potential noise impacts on sports, particularly with regard to interference with communications. She noted that other sports grounds identified in Table 4.7.2 of Ms Harmon's submission to the oral hearing are adjacent to existing roads, unlike the NUIG Sporting Campus.

11.12.98. Ms Harmon noted that the Section identified by Ms Van Kampen was a direct response to the acoustic report submitted with the NUIG objection (since withdrawn). She stated that the WHO Guidelines for Community Noise do not infer that speech communication would be interfered with at higher levels. Similarly, the purpose of the table was to demonstrate that there are high levels of noise at many other sports facilities in Galway that require speech communication and that speech communication would not be interfered with. Table 4.7.1 of Ms Harmon's submission to the oral hearing sets out the calculated noise levels at various locations within the Sporting Campus. It can be seen that the PRD, which is elevated in this area and includes noise mitigation measures including a 2m high noise barrier, achieves a residual noise level that is in compliance with the TII Design Goal. While there will be an increase in noise levels at the Sporting Campus, which has been accepted by the applicant, the noise levels will be relatively typical of a suburban environment, and I do not consider that the PRD will significantly impact on the sports and amenity activities at this location or result in any significant interference with speech communication during sporting activities.

11.12.99. Dr Shanahan, in her separate submissions to the oral hearing representing the Kerin family and Castlegar Nursing Home, stated that "operational phase noise impacts are likely to be noticeable on completion of the Scheme. The existing noise climate is relatively quiet and the change associated with the proposal is likely to be

noticeable. It is unlikely based on the information provided in the Scheme that the currently permissible noise levels will be exceeded during the operation phase but the change in noise levels would be noticeable at the home/nursing home". Operational phase noise impacts associated with a proposed electricity substation in the vicinity of the Kerin property were also raised by Mr Searson. Such substations are of a type typically found in urban and suburban locations and, once appropriately housed, are unlikely to be a major source of noise emissions, in my opinion. I note the proposed provision of 2m high walls and gate at this location and that this is not a low noise environment, with the noise environment both currently and post-construction of the PRD dominated by road traffic noise.

11.12.100. The applicant contended that baseline noise surveys and future calculated traffic noise levels at the Kerin property, in the absence of the proposed road development, are well in excess of the L_{den} and L_{night} values discussed within the 2018 WHO European noise guidance document, and that with the inclusion of the proposed noise mitigation measures, the residual noise impact from the operation of the PRD at the Kerins' property is negligible. This is due to the minor contribution of road traffic noise from the proposed road development when added to the prevailing noise levels associated with the N59 Moycullen Road which bounds the property. Having considered the issues raised by the noise specialists on both sides, I would concur with the applicant that the residual noise impact on the Kerins' property arising from the PRD would not be significant.

Additional/Altered Noise Barriers

11.12.101. A number of parties queried the type and extent of noise barriers proposed and/or sought additional noise barriers or alterations to noise barrier types.

11.12.102. Having regard to the results of the noise assessment, I consider the extent of noise barrier treatments, as proposed, to be broadly acceptable. There are potential visual and other impacts associated with excessive barriers and there is clearly a balance to be struck.

11.12.103. I note that the applicant has proposed extending noise barrier NB12/05 west to Chainage 12+550 to reduce noise levels at assessment location R188 below the TII design goal, on the basis of the RFI sensitivity analysis. This commitment has

been included in the final Schedule of Environmental Commitments submitted at the oral hearing.

11.12.104. A number of parties who consider that their lands may be suitable for future development have sought that noise barriers be provided. Any such development will require planning permission and it is uncertain when and if such development will take place and the requirement for noise barriers may depend on the form and layout of development proposed. I would, therefore, agree with the applicant that the appropriate time for considering noise mitigation of new development is during the planning process for said development. I do not consider that the presence of the PRD would preclude new development on adjacent suitably zoned lands.

11.12.105. Dermot Flanagan SC, on behalf of Connolly Motor Group, questioned the applicant at the oral hearing regarding the extent and type of noise barrier proposed adjacent to his client's car dealership (approx. Ch. 15+700). The barrier in question is identified as Noise Barrier NB 15/01, and is located on the northern side of the proposed mainline. Ms Harmon noted that it would be a reflective wooden barrier of specified height and length, which would have to comply with TII standards. Mr Flanagan sought that the portion of barrier in the vicinity of his client's lands be changed to a transparent noise barrier, rather than a solid barrier, in the interests of benefiting the retained lands and creating a more open environment.

11.12.106. Mr Thomas Burns, the applicant's landscape consultant, noted that there were also residential properties in the area, and that the barrier on this section of elevated road was providing visual screening in addition to noise mitigation. He contended that visibility of the Connolly Motors lands from the proposed GCRR would be limited, as the solid central median would block views for vehicles travelling west, while coming from the east, there would only be fleeting views due to vehicle speed, landscaping on the embankment and the c. 1m high embankment safety barrier.

11.12.107. Given that cars will be travelling at speed through this area, and that only fleeting glimpses of Connolly Motors will be available, I do not consider it necessary or appropriate to provide a transparent barrier at this location, which could also have the potential for distracting drivers. The purpose of the noise barrier is to attenuate noise, and to provide visual screening, and I consider the extent and type of barrier proposed at this location to be adequate.

11.12.108. Mr James Elwood on behalf of M&M Qualtech also sought additional noise barriers in the vicinity of their premises at the oral hearing. Ms Harmon responded that the PRD is in a retained cut in this area and, as a result is screened and would not require a noise barrier. I would concur with this assessment.

Parkmore Link Road Proposed Modification

11.12.109. Section 3.11 of Ms Jennifer Hamon's submission at the oral hearing relates to noise implications of the proposed modification of the Parkmore Link Road as it passes through Boston Scientific's lands. It states that "noise levels will be reduced at noise sensitive properties along Bóthar na Gréine with the proposed modification. The link road incorporates earth berms and noise barriers along the full extent of its eastern boundary. Noise levels calculated at Galway Racecourse with the proposed screening in place are below 60dB L_{den} and are comparable to those in the EIAR associated with the original design. The overall impact is neutral to positive".

11.12.110. Having reviewed the information submitted by the applicant and having inspected the site, I do not consider that the proposed Parkmore Link Road modification would result in any additional or increased impacts on noise and vibration.

Conclusion on Noise and Vibration

11.12.111. I have considered all of the written and oral submissions made in relation to noise and vibration matters, in addition to those specifically identified in this section of the report. I consider that noise and vibration impacts will arise during the construction phase, including from blasting operations, and that this has the potential to impact upon residential and other sensitive receptors. However, I am satisfied that these potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation and monitoring measures, through suitable conditions and noting the relatively short-term duration of the construction phase and the linear nature of the proposed development.

11.12.112. During the operational phase, the majority of noise sensitive receptors will be in compliance with the design goal set out in the TII Guidelines – which I consider to be the appropriate guidelines to utilise in this instance – once noise mitigation measures are incorporated, such as noise barriers and the low noise road surface. There will also be positive impacts on a large number of receptors on the existing

road network, due to reductions in traffic volumes on existing roads. A limited number of properties will, however, experience a residual noise impact marginally in excess of the TII Design Goal. Noting the provisions of the TII Guidelines for such a scenario, and also noting the need to balance the provision and scale of noise barriers against other consideration, such as visual impact, I am satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative noise and vibration impacts.

11.13. Material Assets – Traffic and Transportation

11.13.1. Chapter 6 of the EIAR is entitled 'Traffic Assessment and Route Cross-Section' and addresses the potential traffic and transport impacts that may arise from the PRD. Appendix A.6.1, included in Volume 4 of the EIAR, comprises the associated Traffic Modelling Report and also includes a series of sub-Appendices, including various modelling and calibration reports, a copy of the Galway Transport Strategy (GTS) and a junction strategy report. Chapter 5, entitled 'Description of Proposed Road Development' is also of relevance to the traffic assessment, as it addresses, inter alia, design standards, road type, cross-section and functionality.

11.13.2. The changes to traffic forecasts as a result of the consideration of the National Transport Authority/Galway City and County Councils National Planning Framework scenarios for Galway ('NPF Scenarios'), as requested by the Board (see Section 4.7) are addressed in Section 8 of the RFI response report, and the associated Appendix A.8.1 'NPF Traffic Sensitivity Test'. The RFI response also included copies of the Route Selection Report (Appendix A.2.1) and the Design Report (Appendix A.10.1).

11.13.3. An initial submission responding to the traffic-related written submissions/objections, was made at the oral hearing on 18th February 2020 by Mr Andrew Archer and Mr David Conlon of SYSTRA Ltd. on behalf of the applicant. The submission made by Ms Eileen McCarthy (applicant's Project Lead) on the same date entitled 'Responses to Engineering, Need for the Project, Alternatives Considered and Material Assets Non-Agriculture' is also of relevance. A number of parties subsequently made traffic and transportation-related submissions over the course of the oral hearing, including questioning of the applicant's team. Further traffic-related submissions were subsequently made by members of the applicant's team at the oral hearing on the 19th October 2020 and the 3rd November 2020, entitled 'Response to Queries raised

in Module 2 of the N6 Galway City Ring Road in respect of Traffic and Climate' and 'Response to Submission on behalf of Prof. Michael and Dr Annette Kerin', respectively.

Relevant Guidance

11.13.4. The applicant considers that the relevant guidance documents for the traffic and transportation assessment are the TII Project Appraisal Guidelines for National Roads 2016 (TII PAG), Spatial Planning and National Roads Guidelines for Planning Authorities (2012), NRA Traffic and Transport Assessment Guidelines (2007) and the various EPA guidance documents relating to EIA.

Baseline and Model Development

11.13.5. A baseline review of existing traffic conditions in Galway City and the surrounding area was undertaken, including consultation with Galway City and County Councils, TII, NTA etc. as well as site visits, traffic surveys and review of demographic and Census data. A traffic model was developed, based on the NTA's West Regional Model (WRM), which is one of a number of Regional models in the NTA's transport modelling system for Ireland. The WRM was adapted/refined in order to align with the TII PAG model criteria, and to provide models for each of the following time periods:

- AM Morning peak period: 07:00 – 10:00.
- Average morning Inter-peak period (IP1): 10:00 – 13:00.
- Average afternoon Inter-peak period (IP2): 13:00 – 16:00.
- PM Evening peak: 16:00 – 19:00.

11.13.6. These models are referred to as the 'N6 GCRR Model' and the stated objective for the model was to develop a traffic model that accurately reflects existing traffic conditions in the study area at a sufficient level of detail to allow for an accurate traffic assessment. The SATURN suite of modelling programs was used for the highway assignment element of the model.

11.13.7. The future year 'Do-Minimum' network include the 2012 (Base Year) network plus all schemes (road and public transport) that are already built, are committed to be built or likely to be built by 2024 (Opening Year) and 2039 (Design Year). The future year

'Do-Something' network includes the 'Do-Minimum' schemes plus the PRD. The GTS proposals are also included in a 2039 assessment as a sensitivity test. The forecast scenarios utilised in the EIAR included a Low Growth Scenario, Medium Growth Scenario and High Growth Scenario.

11.13.8. The existing road network, travel patterns and alternative modes of transport are described in Section 6.3 of the EIAR. Plate 6.3 illustrates the base year morning peak hour travel patterns.

Potential Impacts

11.13.9. **Construction** traffic impacts, and associated mitigation measures, are primarily considered in Chapter 7 of the EIAR (Construction Activities) and are addressed in Section 10.10 above.

11.13.10. It is stated that existing traffic movements on the local and regional road network will generally not be restricted and that existing cyclist and pedestrian movements will be facilitated throughout the construction period.

11.13.11. Three Key Performance Indicators (KPIs) were identified for assessing and evaluating the impact of the PRD during **operation phase** on peak period traffic. These KPIs and their purpose are as follows:

- Journey Times on Key Routes (to determine the traffic impact of the PRD on the strategic road network). The key routes are illustrated on Plate 6.7.
- Ratio of Flow to Capacity (RFC) at Key Junctions (to take account of local traffic impacts). The key junctions are illustrated on Plate 6.8.
- Network Statistics (to give an overall, general, assessment of the performance of the entire model network). These statistics include average speed, average delay, total network travel time and total vehicle distance travelled.

11.13.12. The predicted changes in journey times on the key routes for 2024 (Opening Year) and 2039 (Design Year) across the different time periods are set out in Tables 6.7-6.10 and 6.11-6.14, respectively. The GTS sensitivity test results for 2039 are set out in Tables 6.15-6.18.

11.13.13. It is stated that the PRD has a significant positive impact on the majority of journey time routes and that it is hugely beneficial for reducing traffic congestion and reducing journey times in the AM and PM peaks. The 2039 results show a similar

pattern to the 2024 results. A small number of routes show negligible or minor impacts with increases in some journey times of less than 120 seconds. These increases are stated to be caused by the addition of new signalised junctions (e.g. at the N59 Link Road junctions). The GTS sensitivity test also shows a similar pattern, with a positive impact for the majority of routes, although more negative impacts on journey times are identified under this scenario. The reason for this is stated to be GTS measures to increase active and public transport in the city centre, which limits vehicular capacity in those areas, adding delays to certain sections of the network.

11.13.14. The Network Statistics for 2024 and 2039 Scenarios for the various time periods are set out in Tables 6.19 to 6.22. The tables demonstrate that the Do-Something option (i.e. with the PRD) reduces the network delay considerably relative to the Do-Minimum and provides a higher average speed in all time periods. Analysis of the GTS scenario provided indicates an increased level of delay and slightly lower average speeds compared to the Do-Something scenario of the same year. Again, this increase is stated to be caused by the implementation of a number of active mode and public transport priority proposals under the GTS. It is, however, stated that the level of network delay is much lower than in the Do-Minimum scenario.

11.13.15. An evaluation of the RFCs for the key junctions is provided in Tables 6.23 to 6.26 for 2024 and 2039. It is stated that there is a large decrease in the number of links in the network which have an RFC of over 90%. In the PM peak period the number of over-capacity links, at key junctions along the N6/ R338 Corridor, reduces by over 70% in both 2024 and 2039. Similarly, the number of over-capacity links on the entire city network is reduced by 55% and 48% in 2024 and 2039, respectively, in the Do-Something scenario. Similar results are shown in GTS sensitivity test.

11.13.16. It is concluded that, in both 2024 and 2039, the PRD does not result in any traffic impacts of major negative significance. In terms of the three KPIs used, the impact of the PRD is rated as having a positive impact.

11.13.17. The impact of the PRD on forecast traffic flows is addressed in Section 6.8.3 of the EIAR, where it is stated that traffic in the city centre will be reduced as a result of the PRD, as evidenced by a 29% reduction in AADT on Quincentenary Bridge. The issue of induced traffic is also addressed in this section, and it is stated that the modelling takes account of induced travel demand to varying degrees. It is stated

that the models indicate that the proposed road will lead to an increase on the crossings of the River Corrib of c.19,000 AADT in 2039, which is stated to be primarily due to the redistribution of trips and the release of overcapacity demand caused by existing congestion. This reduces to 13,000 AADT in the GTS scenario. The mode share for the Base, Opening and Design Years and the GTS scenario is also addressed in this Section, where it is stated that the impact of the PRD on mode share is minimal, with Car Mode increasing by c. 1% in both 2024 and 2039 while the GTS test increases Public Transport Mode to 5%.

Mitigation Measures

11.13.18. It is stated that the Construction Environmental Management Plan will ensure that **construction** traffic impacts are minimised through the control of site access/egress routes and site access locations.

11.13.19. The traffic modelling indicates no traffic impacts of major significance in the **operation** or Opening or Design Years and, therefore, no mitigation measures are proposed.

11.13.20. However, as the PRD is a TEN-T route, it is stated that it will be important to protect its operating capacity and that demand management measures, such as the integration of transport and land use planning, are considered within the development of the GTS.

Cumulative and Residual Impacts

11.13.21. The Do-Minimum and Do-Something modelling scenarios are stated to have taken into account committed transport schemes for Galway City and its environs and those likely to be completed for the various years assessed. The GTS sensitivity test further analyses the cumulative impacts with the proposals contained within the GTS. The assessment also uses three different travel demand scenarios to allow for traffic growth in Galway over time resulting from increases in population and economic activity.

11.13.22. No significant residual negative traffic impacts are anticipated during either the construction or operational phases.

RFI Response

11.13.23. In response to the RFI, the applicant submitted a justification for the use of 2012 as the base year for the traffic assessment, addressed population and economic changes since 2012, and addressed the question of whether more recent traffic survey data was available. A summary of the applicant's response is as follows:

- **2012 Base year**: Traffic modelling began in 2013. At that time the Western Regional Model (WRM) was under development with a base year of 2012. The WRM is the most appropriate model for the appraisal of the road. The fact that 2012 is the base year is irrelevant to the forecast traffic flows as the forecast flows are determined based on land use, population forecasts and economic assumptions, as opposed to applying a growth factor to the base year flows as previously done.
- **Population and Economic Changes**: All population and economic changes which have occurred between 2012 and May 2019 have been accounted for in the forecasting undertaken.
- **Recent Traffic Survey Data**: Recent (2018) traffic survey data has been collated for Galway City. However, its incorporation into the WRM would not alter the future year demand forecasts which are determined using planning data/land use assumptions combined with the various calibrated travel behaviour parameters.

11.13.24. The implications of the NPF population growth forecasts on traffic forecasts used in the EIAR is also addressed in the RFI response, with a 'NPF Traffic Sensitivity Test' included as Appendix A.8.1 of RFI Response. Tables 8.4 and 8.5 of the RFI response compare population and employment forecasts under the TII Central Case Scenario (i.e. as per the EIAR) and the NPF Scenario. City population forecasts are significantly higher in the NPF scenario (55% NPF vs. 14% TII Central Growth). Similarly, the total jobs growth for the city and county in the NPF forecast is 51%, which is more than double the TII Central Forecast of 24%.

11.13.25. The NPF forecasts were inputted into the National Demand Forecasting Model and the WRM to determine the resultant traffic flows in the Design Year of 2039 with the PRD in place (the 2039 Do-Something NPF scenario) and this is compared against the TII Central Case presented in the EIAR. Both scenarios have

the same infrastructure assumed (PRD only) but differ in their planning and land use assumption.

11.13.26. The results show some increases in delay and congestion as a result of the differing demographic assumptions but these increases are stated to be relatively minor in the context of the increases in population and employment assumed to take place under the NPF assumptions.

11.13.27. A sensitivity test comparing the NPF with the PRD and the Galway Transport Strategy (GTS) measures with the TII Central case with the PRD and the GTS measures was carried out (i.e. the NPF + GTS Vs. TII + GTS). The results indicate that the GTS measures have a greater impact when combined with the NPF growth assumptions. Both vehicle distance and total network travel time show a reduction and average speed improves as a result of the GTS measures in the NPF scenario. Comparison of journey times indicates that the introduction of the GTS measures has a minimal impact on journey times under the NPF scenario whereas they result in further delays using the TII Central case.

11.13.28. The ratio of flow to capacity (RFC) at key junctions has been analysed including the GTS measures. It is stated that in the EIAR scenario there are minor benefits along key junctions but an increase in links experiencing an RFC >90% on a network wide basis. Under NPF assumptions, network performance improves at both key junctions and on a network wide basis because of the introduction of the GTS measures.

11.13.29. **Assessment**

11.13.30. I consider that the key issues in respect of traffic and transport are as follows:

- Existing traffic and need for a road-based solution.
- Modelling approach.
- Traffic Assessment.
- Mode share implications.
- Smarter Travel Policy.
- Pedestrian and cyclist infrastructure.

- Induced traffic.
- Demand management.
- Impact on local roads.
- Rosán Glas / Bothar Diarmuida area.
- Gort na Bró junction.
- Implementation of the Galway Transport Strategy.
- Proposed Parkmore Link Road modification.

Existing Traffic and Need for a Road-Based Solution

11.13.31. Existing traffic congestion in Galway is detailed in the EIAR, and to aid in understanding existing traffic patterns in Galway, I refer the Board to Plate 6.3 contained in the EIAR, which illustrates travel patterns in the morning peak hour in the base year. In particular, I note that, of the 35% of car trips that cross the River Corrib, only 3% of total trips are by-passing the city. This was highlighted by a number of parties, who contend that Galway does not need a bypass and instead needs localised road improvements and improvements to public transport and active travel infrastructure. In support of that argument, it can be noted from Plate 6.3 that 40% of trips are commencing in the City and are not crossing the River, while a further 20% are short cross-City journeys. The applicant accepts that both of these forms of trips are clear targets for a shift to public transport if an efficient system is available.

11.13.32. A number of observers/objectors also contend that Galway has a peak hour problem not a general traffic problem, with An Taisce contending that morning congestion is primarily due to school-related traffic. This is also addressed in Evaluation of Alternatives. I note that this peak hour problem, both in terms of congestion and unreliability of journey times, is acknowledged in the GTS.

11.13.33. Currently, most arrivals to Galway arrive at the N6 Coolagh Roundabout, which experiences significant congestion due to both the volume of traffic arriving at the junction and the lack of grade separation which hampers its dispersal to other routes. The existing congestion at this Roundabout and other key junctions such as the Briarhill Junction and the Deane Roundabout can be seen in the extracts from

drone footage of the AM Peak Period, which are included as Figures 2 – 5 in the applicant's 'Response to Queries raised in Module 2' document submitted at the oral hearing. These images demonstrate how buses get held up in congestion due to the lack of dedicated bus lanes, resulting in unreliable journey times which reduces their attractiveness for commuters. In my view the applicant's aerial images also, however, demonstrate the existing car dependency of the City, with very long lines of mostly single occupant vehicles impeding the movement of more efficient bus services. The Galway Transport Strategy (GTS) includes bus priority measures to address the efficiency of the bus network, such as the proposed Cross-City Link. However, the key junctions along the existing east-west spines, which are all at-grade junctions, are currently operating beyond capacity. These junctions include: Briarhill, Ballybane, Tuam Road, Kirwan Junction, Bodkin Junction, junctions from Martin Roundabout to Monenageisha Junction to Wolf Tone Bridge on the southern edge of the city, Newcastle Road, Browne Roundabout, Deane Roundabout and Kingston Road Junction.

11.13.34. The applicant undertook additional analysis of the impact of existing traffic congestion on bus services and included this in their 'Response to Queries raised in Module 2' document. This included surveys to compare scheduled journey times against recorded journey times, which demonstrates a significant variance and unreliability in bus journey times, which reduces the attractiveness of the bus mode and is indicative, in my opinion, of the need to reduce congestion and/or reallocate road space to prioritise public transport. Microsimulation of the area encompassing the N84 Headford Road to the N83 Tuam Road to Parkmore Road to the N6/M6 and onto the Martin Roundabout was also undertaken for the 2039 Design Year with the NPF traffic forecasts, but without the PRD in place (i.e. the Do-Minimum Scenario). Screenshots from the model were submitted at the oral hearing, and show extensive congestion in the AM peak hour, with queues of up to 5km at key junctions. Total congestion in the Galway City Administrative Boundary area during this AM peak hour is 135% higher in the 'Do-Minimum' scenario than the base year, and compared to the GTS scenario (i.e. incl. the PRD) would result in c. 2,000 hours of additional delay/queuing on the network.

11.13.35. A number of parties supporting the PRD, including some elected representatives, the Parkmore Traffic Action Group, IBEC and Galway Chamber of

Commerce raised issues regarding the impact of current traffic congestion on economic development in Galway. The Chamber of Commerce, in their submission at the oral hearing, outlined the results of a survey of their members, in which 80% of businesses considered that traffic congestion has a somewhat negative or very negative impact on business. They stated that the future development of the City requires additional road network capacity as well as significant improvement in sustainable transport infrastructure, and that the PRD is not just about the City Centre, but also the County and Region.

11.13.36. A number of parties contend that there are more suitable and more sustainable alternatives for resolving traffic and transport issues in Galway, such as improved public transport, light rail system, active travel improvements and/or localised improvements to roads. The issues of alternatives is primarily addressed in Section 10.6 and 11.3 of this report, where it is concluded that the PRD does not prohibit future development of light rail, for example, and that the GTS identifies the road as being a key component in addressing the transport issues.

11.13.37. While there was much discussion at the oral hearing regarding the need for improved public transport, active travel, and localised improvements in the City Centre, it should be noted that there are a number of strands to the stated purpose and functionality of the PRD, and that it has a wider County, Regional and National level function. Firstly, it will provide a key link on the European TEN-T Network and will connect a series of National Roads, serving a strategic role in developing the national road network and keeping bypassable trips out of the City Centre. Secondly, it will add a substantial new east-west spine to the road network, with interconnection to all of the key radial routes that converge on the City. This is an important consideration having regard to the very substantial population and economic growth forecast for Galway under the NPF and the currently underdeveloped road network that serves the City. The provision of additional road links and improved connectivity and permeability will assist in the compact and sustainable growth of the City. Thirdly, the additional road capacity will attract traffic from existing roads in the City Centre area, thereby improving journey times and reducing congestion, which will make public transport and active travel modes more reliable and attractive and will facilitate the reallocation of road space, as envisaged in the GTS.

11.13.38. These issues are addressed in more detail in the following Sections. However, I consider that the applicant has adequately demonstrated the existing traffic congestion issues in the City and the need for improvements to the structure of the road network to improve Regional accessibility and to address the challenges that face Galway in growing in a compact manner as required by the NPF. This is also addressed in section 10.4 above.

Modelling Approach

11.13.39. The traffic and transport implications of the PRD were primarily assessed using a refined version of the NTA's West Regional Model (WRM). This is one of 5 No. Regional Models developed by the NTA for Ireland, and it comprises a strategic multi-modal transport model for Counties Galway, Mayo, Roscommon, Sligo, Leitrim and Donegal, with a focus on Galway City. Details of the model development, structure, methodology, calibration and validation are set out in Appendix A.6.1 of the EIAR, and were further elaborated upon by Mr Andrew Archer, the applicant's Traffic Consultant, in his Brief of Evidence at the oral hearing.

11.13.40. As noted above, the traffic modelling and assessment undertaken for the EIAR utilised 2012 as the base year, with relatively modest population and economic growth based on TII forecasts. The subsequent publication of the NPF had significant implications for Galway's future population and the applicant was asked by the Board to address these issues in the RFI.

11.13.41. The justification for the use of 2012 as a basis for forecasting future traffic was addressed in the RFI response and by Mr Archer in his Traffic submission at the oral hearing. The applicant's contention is that the base year is irrelevant to the forecast traffic flows. This is because, unlike traditional 'Incremental Highway Models' which apply growth factors to a calibrated base year traffic demand matrix (thus linking the forecast travel demand to the base year traffic flows), the WRM is an 'Absolute Model', in which the travel demand for each forecast year is based on the forecast land use assumptions (population, employment, etc.) combined with the base year calibrated travel behaviour parameters and trip rates contained in the WRM. This form of model generates and distributes demand based on future land use information, and because travel behaviour is relatively constant over the short to medium term, the base year traffic flows do not play an important part in forecasting

future year traffic flows. Instead, the key drivers of demand for the forecast years are the population, employment and other socio-economic factors assumed to be in place for the opening year (2024) and Design Year (2039). Since the values used for these key drivers are the up to date population, land use and economic forecasts, the actual growth which has occurred from 2012 to present is captured in the model, in addition to the anticipated growth up to the future assessment years. Changes to highway, public transport and active travel networks since 2012 are also captured in the model scenarios.

11.13.42. I note that the applicant's RFI response included results of a test to compare 2016 model outputs against observed 2016 traffic count data at a number of key locations. The results of this test are set out in Table 8.1 of the RFI Response, and it demonstrates a reasonably good match between modelled and observed traffic flows, particularly on the existing N6 and other national roads. A small number of locations, including the Salmon Weir Bridge and O'Brien's Bridge showed more of a discrepancy, with the modelled traffic flows being substantially greater than observed flows. The absolute volume of traffic in these areas, however, is relatively low compared to the national roads.

11.13.43. Having reviewed and considered the information submitted and the validation test undertaken, I am satisfied that the use of 2012 as a base year does not undermine or invalidate the model underpinning the traffic assessment.

11.13.44. The applicant's RFI Response and associated NPF Traffic Sensitivity Test outline how the NPF forecasts were incorporated into the model and the implications thereof. The results of this are assessed below.

11.13.45. With regard to the use of the model to forecast mode shares, further information regarding the model and the factors within it that influence mode choice was submitted at the oral hearing, in the applicant's 'Response to Queries raised in Module 2' document, in response to a query from an observer (Mr Brendan Mulligan). I have addressed the issue of mode share separately below, however I note that the model utilises a number of conservative modelling assumptions, including car availability not reducing in line with recent trends, the number of parking spaces at origins and destinations remaining the same, and no account is taken of likely behavioural changes regarding attitudes to carbon emissions and

sustainable travel. Mr Mulligan queried whether additional car parking provision at new development sites in the City had been incorporated into the model, and the applicant confirmed that they had.

11.13.46. The WRM splits the region into 15 No. sectors. A number of parties contended, and I would agree with them, that the 'City Centre' area utilised by the applicant for the mode share analysis set out in the EIAR is not fully representative of the actual City Centre. I note that, contrary to what was stated by the applicant, this sector is actually identified as 'Galway City Centre – East' in the WRM Zone System Development Report, not as 'Galway City Centre'. Other relevant sectors include 'Galway City Centre West', 'East of Galway Centre', 'North of Galway Centre' etc. The applicant, in their 'Response to Queries raised in Module 2' document, provided mode share results for the broader Galway City Council Administrative Area, which I consider to be a more appropriate zone, as addressed in the Mode Share assessment below.

11.13.47. Having considered the information submitted by the applicant regarding the modelling approach utilised and the WRM, including details of its development, methodology and calibration, I consider that it is a robust, well-considered and suitably conservative model, once the NPF forecasts are incorporated. Given the particular physical characteristics of the Western Region, with Lakes, mountains and the sea combining to create a funnel effect that forces traffic through Galway City, and the position of Galway at the economic heart of the region, I consider that the broad Regional nature of the model is beneficial in ensuring that the assessment is robust. The use of a common modelling framework for the country, underpinned by a National Demand Forecasting Model, is eminently suitable to the assessment of strategic projects such as the N6 GCRR, which in addition to seeking to address local traffic issues also have a wider regional impact.

Traffic Assessment

11.13.48. As noted above, the applicant identified 3 No. KPIs for assessing and evaluating the impact of the PRD on peak period traffic.

- Ratio of Flow to Capacity (RFC) at Key Junctions.
- Journey Times on Key Routes.

- Network Statistics.

11.13.49. I consider that these KPIs are suitable for a general assessment of the impact of the PRD on traffic flows and congestion. Other traffic-related issues, such as mode share and localised impacts, are addressed separately below.

11.13.50. In assessing the impact of the PRD on traffic under these KPIs, I refer the Board primarily to the applicant's RFI response, including the NPF Traffic Sensitivity Test, and the 'Response to Module 2 Queries' document submitted at the oral hearing, both of which take account of the population and employment growth forecasts for Galway under the NPF which are significantly greater than those forecast in the TII Scenarios utilised in the EIAR. Figures 2-1 and 2-2 within the NPF Traffic Sensitivity Test show the locations of this growth, and it can be seen that population growth is concentrated in Ardaun, the City Centre and in the west of the city, while employment growth is concentrated in the City Centre and the Parkmore/Ballybrit area.

RFC at Key Junctions

11.13.51. The applicant has identified a number of 'Key Junctions' on the existing N6/R338 corridor and assesses the impacts of the PRD on both these junctions and those across the entire network under the various scenarios. The measurement for congestion at junctions is the Ratio of Flow to Capacity, with congestion considered to occur when traffic flows are over 85% of the capacity of a priority junction or 90% of the capacity of a signalised junction.

11.13.52. The applicant has produced a considerable number of Tables at various stages of the planning process regarding this KPI and the Table below draws together this information to allow a comparison of the impacts in the AM peak in the 2039 Design Year. This includes the EIAR (TII Central Growth Case), RFI (NPF Scenarios) and the result of a sensitivity test presented at the oral hearing, under which the level of car ownership (as a proxy for car parking availability at trip origins) is reduced by 50% for all new developments within Galway City, in alignment with National Policy. In comparing the number of junctions operating at capacity, it should be noted that the NPF scenarios include population growth forecasts of 55% for Galway City, compared to 22% for the County area. This contrasts to a figure of 14% population growth under the TII Central Growth forecast used in the EIAR.

RFC >90%	TII Central Case (EIAR)	TII Central Case + GTS (EIAR)	NTA/GCC NPF 'Do Minimum' (RFI)	NTA/GCC NPF 'Do Something' N6 GCRR (RFI)	NTA/GCC NPF 'Do Something' N6 GCRR + GTS[23] (RFI)	NTA/GCC NPF 'Do Something' N6 GCRR + GTS + Parking Management (Oral Hearing)
Key Junctions (N6/R338)	12	8	22	14	8	5
Entire Network	115	131	281	185	129	Not Stated

Table 11.13.1: Number of Junctions at or over capacity in the AM Peak

Source: EIAR, NPF Traffic Sensitivity Test, 'Response to Issues Raised in Module 2' document.

11.13.53. It can be seen that with the PRD in place, but without the other GTS measures, there is a substantial reduction in both the number of key junctions and the total number of junctions that are operating with an RFC > 90% when compared to the 'Do-Minimum' scenario. There is a further substantial reduction once the other GTS measures are implemented. However, it can be seen that there will still be 8 key junctions and 129 junctions across the network operating above 90% capacity in the AM Peak. This is still a notably high figure which demonstrates both the level of car dependency in the city, and that the PRD will not solve all traffic congestion in the city. However, given that the RFC figures relate to AM Peak only, I note that it would not be unusual for numerous junctions in any city to be operating at or close to capacity during this period. It can be seen from the EIAR that the number of junctions at capacity in the Inter Peak periods are substantially lower (albeit that the EIAR is based on the lower TII growth case). There is a balance to be struck between alleviating congestion and facilitating the freeflow of traffic and the appropriate design of the road network in a built-up area. The number of junctions that remain congested is indicative of the wider need to improve the mode share for active travel and public transport modes, in my view.

[23] There is a discrepancy between Table 4-7 and Table 7-5 in the NPF Traffic Sensitivity Test in respect of the number of junctions at capacity under the DS N6 GCRR + GTS scenario. Table 7-5 appears to have erroneously copied the figures from the PM peak table, so I have used the Table 4-7 figures. This would also be consistent with Table 9 of the 'Response to queries raised in Module 2' document.

11.13.54. In light of the NPF growth forecasts, the applicant also analysed the performance of the busiest junctions on the PRD using LINSIG software. The results of this analysis are set out in Appendix A of the NPF Traffic Sensitivity Test, submitted in response to the RFI, and I note that it demonstrates that the proposed junctions will continue to operate successfully in the 2039 design year, with some minor changes to signal timings and flare lane lengths.

11.13.55. In conclusion, given the large population and employment growth forecast for Galway under the NPF, I consider that the PRD will have a significant positive impact on junction congestion when compared to the 'Do Minimum' scenario.

Journey Times on Key Routes

11.13.56. The analysis of journey times on the key routes serving Galway is utilised as a means of quantifying the strategic traffic impact of the PRD. These routes are shown in Plate 6.7 of the EIAR and I am satisfied that the chosen routes are representative of the strategic routes in/out and through the City.

11.13.57. Tables 4-3 and 4-4 in the applicant's NPF Traffic Sensitivity Test compares the journey times for the various routes in the AM and PM peaks under the 'Do-Minimum' (i.e. no PRD) and the 'Do-Something' Scenarios for the 2039 Design Year. This takes account of NPF forecasts and, therefore, can be considered to supersede the EIAR assessment of journey times. It can be seen that the PRD has a significant positive effect on journey times on the majority of the routes.

11.13.58. When the other GTS measures are included in the assessment, the journey times show a similar pattern, with positive effects on the majority of routes. These are set out in Tables 4-5 and 4-6 of the NPF Traffic Sensitivity Test. I note, however, that Route 3 Outbound and Route 8 Outbound show a negative impact on journey times of 64% and 9% in the AM peak, respectively. The reason for this is stated to be the public transport priority measures and active mode measures in the city centre, which add delay and hence increased journey lengths in certain sections of the network.

11.13.59. Tables 6-3 and 6-4 provide a useful comparison of the TII Central Case (i.e. EIAR) and NPF (i.e. RFI response) scenarios in the absence of the other GTS measures. It can be seen that the NPF growth results in a negative impact on journey times across the city, with an average increase of 5.8% in the AM peak and

4.5% in the PM peak. Given the considerable increase in population under the NPF Scenario (an increase of 41% on the EIAR assumptions), I would concur with the applicant that this increase is not significant. Once the GTS measures are incorporated, the situation changes again. The GTS measures result in an average journey time increase of 5% for the EIAR Scenario in the AM peak, but no increase for the NPF Scenario. The reason for this is stated to be the reduction in vehicular capacity in the city centre due to reallocation of road space and the mode shift to more sustainable modes facilitated by more compact growth in areas more easily served by public transport under the NPF scenario.

11.13.60. The Table below, replicating Table 8 from Appendix A of the applicant's 'Response to Issues Raised in Module 2' document, compares the average journey times in the AM peak period across all of the routes for each scenario.

Scenario	Average Journey Time (Seconds)
Base Year (2012)	1,428
2039 -TII EIAR 'Do-Something' N6 GCRR + GTS	1,418
2039 -NPF 'Do-Something' N6 GCRR + GTS	1,430
2039 - NPF 'Do-Something' N6 GCRR + GTS + Parking Management	1,399

Table 11.13.2: Average Journey Times across All Routes

Source: Table 8 of applicant's 'Response to Issues Raised in Module 2' document.

11.13.61. While the applicant states in Section 2.3.4 of the 'Response to Issues Raised in Module 2' document, that the full implementation of the GTS will result in a reduction in the average journey times on the network, when compared to the base year, it can be seen from the Table above that this is not the case. The PRD in conjunction with the implementation of all other GTS measures will, in fact, result in a negligible increase in average journey times in the NPF Scenario, although the implementation of parking management measures will then slightly reduce average times below the base year level. However, while there will be little difference in average journey times compared to the base year, I would note that the network in the 2039 NPF Scenario will cater for significantly more trips and a c. 50% increase in the Galway City population compared to the base year.

In conclusion, I am satisfied that the PRD will result in improvements in journey times on the key routes into the City when compared to the 'Do Minimum' scenario, both alone and in combination with the other GTS measures. The implementation of demand management in the form of parking management measures in the city would further benefit average journey times.

Network Statistics

11.13.62. Table 4-1, included in the NPF Traffic Sensitivity Test submitted with the RFI response, compares the network statistics under the 'Do Minimum' scenario and the NPF (PRD) and NPF (PRD + GTS) scenarios. I have replicated the Table below for the Board's ease of reference.

Scenario	Total Vehicle Distance (pcu.Kms)	Total Network Travel Time (pcu.Hrs)	Total Network Delay (pcu.Hrs)	Average Vehicle Speed (kph)
2039 Do-Minimum	277,745	10,879	4,256	25.5
2039 Do-Something N6 GCRR	339,630	9,300	2,440	36.5
2039 Do-Something N6 GCRR + GTS	325,157	8,707	2,082	37.3

Table 11.13.3: Network Performance Indicators AM Peak Comparison

Source: Table 4-1 of NPF Traffic Sensitivity Test

11.13.63. A comparison of the scenarios indicates that the PRD will significantly reduce total network delay and increase average vehicle speeds when compared to the 'Do Minimum' scenario. When the other GTS measures are implemented, there is a further substantial reduction in delay and a marginal increase in vehicle speed. These two factors are indicative of the linking of land use and transport through the NPF and the GTS encouraging a shift towards more sustainable travel modes in the city centre where the majority of delay occurs.

11.13.64. When the PRD is compared to the EIAR scenarios (i.e. TII Central Case), there is a slight reduction of average vehicle speed (from 38.7 to 36.5 kph) and a more substantial increase in total network delay (from 1,738 to 2,440 pcu.Hrs). Once

the other GTS measures are implemented, there is less divergence between the scenarios, which is notable given the considerable population increased under the NPF scenarios, compared to the EIAR scenarios.

11.13.65. In conclusion, I am satisfied that the applicant has demonstrated that the PRD, both alone and together with the other GTS measures, will have positive impacts on the three KPIs when compared with the 'Do Minimum' scenario for the 2039 Design Year. While the PRD will not solve all traffic congestion issues in the city, it will lead to a significant reduction in the number of junctions at capacity and in delays experienced on the network. It will also add additional links on what is an underdeveloped road network, providing alternative routes and improved accessibility, which must be considered within the scenario of significant population and employment growth forecasts for the city.

Mode Share Implications

11.13.66. The implications of the PRD for the transport modal split for Galway was the subject of much discussion at the oral hearing, particularly with respect to the targets contained in the policy document 'Smarter Travel – A Sustainable Transport Future: A New Transport Policy for Ireland 2009-2020' and the low mode share for public transport. The Galway Cycling Campaign noted that Census data showed that most trips in Galway were less than 4km and that the growth of e-bikes was stretching ease of commuting distances.

11.13.67. Various mode share tables have been submitted by the applicant throughout the planning process to date, reflecting various scenarios and forecasts, and with errors which were corrected in the Corrigendum submitted at the oral hearing. This has resulted in a somewhat confusing situation and in order to provide clarity on the applicant's position, I refer the Board to Section 6 of the document entitled 'Response to Queries raised in Module 2 of the N6 Galway City Ring Road in respect of Traffic and Climate', and its associated Appendix A, which was presented by the applicant at the oral hearing on 19th October 2020.

11.13.68. Mr Brendan Mulligan, in his submission at the oral hearing, queried the definition of 'City Centre' used in the applicant's Mode Share tables. Figure 16 in the applicant's 'Response to Queries raised in Module 2' document illustrates the 'City Centre' sector, which comprises one of five sectors that Galway City was split into

during preparation of the NTA WRM Model. Hands Across the Corrib contended that this boundary was not reflective of the actual functional city centre. I would agree with the observers that the boundary appears to be somewhat arbitrary, and note that it doesn't include any areas west of the River Corrib, east of the N83 Tuam Road, and that while a large expanse of rural land to the north of Bothar na dTreabh is included in the city centre boundary, the large employment centres at Parkmore and Ballybrit Business Parks are excluded. While the 'City Centre' area may provide a useful basis for comparing mode share changes over time for different scenarios, it may not reflect the actual overall mode share for the city.

11.13.69. In response to the queries regarding the 'City Centre' zone, the applicant submitted mode share tables for the broader Galway City Administrative Boundary area in Appendix A to their 'Response to Queries raised in Module 2' document.

11.13.70. The table below compares the various mode share tables submitted by the applicant for the 'City Centre' as well as the results of a sensitivity test presented at the oral hearing, under which the level of car ownership (as a proxy for car parking availability at trip origins) is reduced by 50% for all new developments within Galway City, in alignment with National Policy. In comparing the mode shares under the various scenarios, I note that the NPF scenarios include population growth forecasts of 55% for Galway City, compared to 22% for the County area. This contrasts to a figure of 14% population growth under the TII Central Growth forecast used in the EIAR.

11.13.71. It can be seen that the car mode share in the 'City Centre' in the base year is 66.7%, with public transport only having a very low c. 4% mode share. In the Design Year (2039), with population growth in line with the NPF and with the PRD and other GTS measures in place, the car mode share drops to 56%, with corresponding increases in sustainable transport modes, including a 100% increase in the mode share for cycling. The sensitivity test for parking demand management shows a further reduction in the car mode share to 44.9%.

11.13.72. The final portion of the Table below shows the mode share for the broader Galway City administrative boundary area (i.e. incorporating suburban and rural areas on the outer fringes of the City). This indicates a car mode share of 65.6% in the Design Year, with the PRD and GTS measures in place. With the implementation

of parking demand management measures, the car mode share drops to c. 55%, with walking being the primary beneficiary of modal shift.

11.13.73. I have considered the Smarter Travel Policy separately below. However, I consider that these mode share results are illustrative of the interconnections between the provision of an adequate road network, provision of sustainable transport alternatives, implementation of demand management measures, and land use and density changes as envisaged by the NPF.

11.13.74. The Galway Cycling Campaign noted the low mode share for cycling. The applicant's response was that the mode shares were forecasts, not targets, and that they could be improved in future.

11.13.75. Galway has developed over a prolonged period into a linear city with a low population density and a large hinterland from which people commute to the city area for work and other purposes. As such, I would not expect the construction of a Ring Road, in itself, to improve mode share for public transport and active modes in such a receiving environment and, indeed, as Mr Brendan Mulligan noted in his submission, achieving a modal shift is not listed among the Project Objectives set out in the EIAR. As can be seen from the Table below, the PRD, when considered alone, would increase the car mode share, likely as a result of induced traffic. However, I do not consider that this is a reasonable conclusion to draw, as the PRD will facilitate the full implementation of the GTS measures to increase sustainable travel mode share. Ultimately, I consider that a holistic approach to addressing Galway's transport issues is required, and I consider that the GTS, the City and County Development Plans and national policy are the appropriate mechanisms for balancing the compact growth of Galway with a significant shift to more sustainable modes of transport.

11.13.76. I conclude that the PRD will have a positive impact on sustainable transport mode share when considered together with the other GTS measures that it will support.

Option	% Car	% Public Transport	% Walk	% Cycle
2012 Base Year	66.7%	3.9%	26.3%	3.1%

TII Central Growth Forecast (EIAR)				
2039 Do-Minimum	67.4%	4.3%	25.2%	3.1%
2039 Do-Something N6 GCRR	68.6%	4.1%	24.5%	2.8%
2039 Do-Something N6 GCRR + GTS	67.3%	5.0%	24.9%	2.8%
NTA/GCC NPF Scenario (RFI, corrected by Corrigendum)				
2039 Do-Minimum	61.2%	5.4%	29.3%	4.1%
2039 Do-Something N6 GCRR	64.1%	5.0%	27.6%	3.3%
2039 Do-Something N6 GCRR + GTS	56%	6.8%	31.2%	6.0%
NTA/GCC NPF Scenario with Demand Management (Oral Hearing) 'City Centre' Zone				
2039 Do-Something N6 GCRR + GTS + Parking Management	44.9%	8.1%	41.6%	5.4%
NTA/GCC NPF Scenario with Demand Management (Oral Hearing) Galway City Administrative Boundary Area				
2039 Do-Something N6 GCRR + GTS	65.6%	7.0%	22.6%	4.8%
2039 Do-Something N6 GCRR + GTS + Parking Management	54.9%	8.4%	32.0%	4.7%

Table 11.13.4: Comparison of Mode Share tables submitted by applicant.

Smarter Travel Policy

11.13.77. A number of parties contend that the PRD is inconsistent with, or contrary to the mode share targets set out in Smarter Travel – A Sustainable Transport Future: A New Transport Policy for Ireland 2009-2020. I note that while this Policy document relates to the period 2009-2020, it had not been superseded by a new Policy at the

time of writing. Among the targets set out in the Smarter Travel Policy are the following:

- Work-related commuting by car will be reduced from a current modal share of 65% to 45%, which will mean that between 500,000 and 600,000 commuters will be encouraged to take means of transport other than car driver (of these 200,000 would be existing car drivers). Change in personal behaviour will also be necessary for other travel purposes as most travel relates to non-commuting.
- Car drivers will be accommodated on other modes such as walking, cycling, public transport and car sharing (to the extent that commuting by these modes will rise to 55% by 2020) or through other measures such as e-working.
- The total kilometres travelled by the car fleet in 2020 will not increase significantly from current total car kilometres.

11.13.78. The implications of the PRD for mode share generally are addressed above. As the applicant noted at the oral hearing, the mode share figures in the Smarter Travel policy are for 'work-related commuting', whereas the mode share figures above are over a 24-hour period. The mode share results for the AM Peak Period (i.e. the busiest commuter period) are provided in Appendix A to the applicant's 'Response to Queries raised in Module 2' document submitted at the oral hearing.

11.13.79. The mode share tables for the AM Peak Period contained in that document show that the N6 GCRR + GTS + parking demand management measures (as discussed above) results in a mode share for sustainable travel of 57.4% for the city centre and 47.9% for the broader Galway City Administrative Boundary area. The mode share for car is 42.6% and 52.1%, respectively.

11.13.80. While the PRD will not, by itself, shift commuters to more sustainable modes of transport, it forms a key part of the GTS, which seeks to do exactly this. As addressed above, the PRD will facilitate the implementation of the wide-ranging measures outlined in the GTS and as such will contribute to a shift to sustainable modes. As the city develops in line with the NPF targets in a more compact form, with reduced car parking provision in new developments, the modal shift will accelerate, as detailed in the mode share analysis undertaken by the applicant.

11.13.81. I note in this regard the applicant's response to Mr Mulligan's query regarding the forecast low sustainable transport mode share in 2039. They stated that currently 42% of all trips destined for Galway City originate within Galway County and that whilst future population growth will be more concentrated and easily served by public transport, the trips from the county area cannot be completed by walking or cycling due to distance, and cannot be viably served by public transport due to their dispersed nature.

11.13.82. Considering Galway's starting point as a low density, car-dependant city, I would concur with the applicant that the mode share results for the AM Peak Period are in broad alignment with the Smarter Travel Policy targets.

Pedestrian and Cyclist Infrastructure

11.13.83. A number of parties contended that the proposed provision of pedestrian and cycle facilities is inadequate. The HSE, noting community severance impacts, also recommended that pedestrian and cycle access be maintained or provided between any communities potentially divided.

11.13.84. With regard to the mainline of the PRD, pedestrian and cycle use is not prohibited on the portion of the road designated as a Protected Road (primarily single carriageway), but is prohibited on the Motorway designated section. No specific provision is made for pedestrian and cycle use of the Protected Road section (i.e. footpaths or cycle lanes). Given the generally rural nature of this section of the PRD and noting the strategic function of the road and the high traffic speeds, I consider that this is acceptable, noting that more direct routes are available which will, in many cases, see reductions in traffic as a result of the PRD and thus become more attractive alternative options. As noted elsewhere, the GTS also includes extensive proposals for improving cycle infrastructure throughout the City, which will precede the construction of the PRD, if approved.

11.13.85. The locations and details of all proposed pedestrian and cyclist crossing facilities within the PRD are described in Section 5.5.4.2 of the EIAR and illustrated on Figures 1.10.01 – 1.10.22 of Appendix A.1.13 of the RFI Response. As I have addressed above, it is proposed to provide dedicated pedestrian facilities at the junction locations where the PRD interfaces with the existing road network, with

cycle lanes also provided in some locations. Where overbridges/underbridges are proposed, they also include footpaths.

11.13.86. Along the proposed Link Roads (N59 Link Road North and South, Parkmore Link Road and City North Business Park Link Road) it is proposed to provide footpaths with a minimum width of 1.8m which will tie-in to existing footpaths. In the more built-up areas, such as the southern portion of the N59 Link Road South and the Parkmore Link Road, it is also proposed to provide cycle lanes.

11.13.87. I note that there are six houses located on the western side of the N83 Tuam Road, immediately north of the PRD mainline (Ch. 14+000). These houses are currently individually accessed from the Tuam Road, but it is proposed to provide an access road AR 13/06 parallel to the Tuam Road to serve these houses, which will include a footpath. A shared footpath/cycle lane and an inbound bus lane is proposed along the opposite (eastern) side of the Tuam Road. However, a concrete barrier is also proposed between Access Road AR 13/06 and the Tuam Road, which it appears will interfere with access from these houses to the crossing point at the signalised junction of the PRD diverge arm and the Tuam Road. In the interests of pedestrian and cyclist safety, I recommend, should the Board be minded to approve the PRD, that the applicant be required to provide pedestrian access from Access Road AR 13/06 to said crossing point.

11.13.88. The proposed Parkmore Link Road and City North Business Park Link will connect a number of the major industrial areas/employment centres of the city with new urban streets featuring dedicated cycleways and footpaths along their length. This will provide a more direct route for pedestrians and cyclists to access the industrial estates and will also facilitate improvements to public transport between the Ballybrit and Parkmore industrial estates, as per the GTS. I consider that these proposals in the Parkmore/Ballybrit area will have positive impacts on public transport and active travel access to this key employment centre, supporting a modal shift to more sustainable transport measures, particularly when other GTS measures are implemented.

11.13.89. Pedestrian and cycle infrastructure improvement are also proposed in the vicinity of the Gort na Bró junction and this issue is considered separately below.

11.13.90. A number of parties living in the vicinity of Lackagh Quarry, such as Ms Linda Rabbitte and Mr Patrick McDonagh expressed concern about pedestrian safety in the area and access to a local greenway/boithrín, due to construction traffic accessing Lackagh Quarry, and over-size vehicles using the access road in the operational phase. The applicant made an undertaking at the oral hearing to provide a pedestrian crossing at the entrance to Lackagh Quarry prior to the commencement of construction and to restrict speed on the access road to the site compound to 15km/hr. This is included as Item 18.15 in the final version of the Schedule of Environmental Commitments submitted at the oral hearing and I consider that it will improve pedestrian safety at what will be a busy access road during the construction phase.

11.13.91. Subject to the provision of access to the N83 pedestrian crossing as identified above, I consider that the PRD, including its interactions with the existing road network, makes adequate provision for pedestrian and cycle traffic, insofar as such movements would not conflict with the strategic function of the PRD to cater for vehicular traffic and noting the Motorway designation of part of the road which prohibits pedestrian/cycle access. As outlined elsewhere in this section, the PRD will remove vehicular traffic from City Centre streets, facilitating the reallocation of road space, and this, together with the measures incorporated within the PRD and the wider measures proposed in the GTS, will assist in significantly improving pedestrian and cyclist infrastructure in the City.

Induced Traffic

11.13.92. A number of parties at the oral hearing raised the issue of induced traffic or induced demand, with many contending that, rather than reducing congestion, the construction of the PDR would result in additional traffic, increasing congestion and encouraging urban sprawl and unsustainable travel patterns. Reference was made to the history of Dublin's M50 Motorway in this regard. Mr Frank McDonald, quoting Lewis Mumford, stated that "adding car lanes to deal with traffic congestion is like loosening your belt to cure obesity". Similarly, Mr Ciaran Ferrie referred to a fundamental law of highway congestion put forward in the 1960s by Anthony Downs, which states that "on urban commuter expressways, peak-hour traffic congestion rises to meet maximum capacity". The Galway Cycling Campaign contended that the

additional traffic crossing the River Corrib in the Do-Something scenario is an indication of induced traffic.

11.13.93. I note that induced traffic was addressed briefly in the EIAR in Section 6.8.3.2, entitled 'Trip Redistribution and Overcapacity Demand' and the applicant also responded to this issue in more detail at the oral hearing, primarily in the Traffic submission made by Mr Andrew Archer, but also in the 'Response to Queries raised in Module 2' document.

11.13.94. The applicant has accepted that the PRD will generate induced traffic and provided an outline of the various behavioural responses of users to new transport facilities/services which result in induced traffic. These include change to users' routes (Diverted Traffic), change to mode of travel, change of destination to one easily reachable using the new system, change of trip origin to one that results in a longer trip (urban sprawl), change of trip making frequency, and change of time of travel.

11.13.95. The applicant contended that the traffic model, as a variable demand model, has accounted for the majority of these types of generated traffic. I note that a number of aspects of induced traffic were not included in the model appraisal: additional trip making at peak hour, trip frequency increase and origin changes due to different land use patterns.

11.13.96. With regard to origin changes, this issue was raised by various parties, who contend that the PRD will lead to further urban sprawl, and development pressures along the route. In response to this, I would concur with the applicant that land use changes are governed by the relevant Development Plans, which must be consistent with the broader framework for compact growth set out in the NPF. While many earlier road projects frequently resulted in development pressures in peripheral areas, there is now a clear planning policy framework in place with a consistent hierarchy of plans in effect from national to local level and oversight by the Office of the Planning Regulator to ensure consistency in Plan-making. As set out in the Planning submission made on behalf of the applicant at the oral hearing, the projected growth in Galway City and suburbs will primarily be through consolidation of existing residential areas at Knocknacarra, Rahoon, Castlegar and Roscam, through development at Ardaun and in brownfield lands within the City. Given the

planning policy framework in place, and the sustainable transport measures outlined in the GTS for serving this growth, I do not believe that origin changes will result in significant induced demand.

11.13.97. With regard to trip frequency changes, the applicant contends that if all modes of travel (including walking and cycling) are included in a model then it is not necessary to include a trip frequency response because any increase in trips by one mode is usually the result of mode shift from alternative modes. While I consider this statement to be debatable, given the nature of the development, I would agree with the applicant's subsequent statement that peak hour trip frequency is insensitive to changes in the generalised cost of travel, as demand for travel is largely derived by activity at the end destination (e.g. trips to school or place of work) as opposed to the capacity of the transport network. The applicant contends that increased inter-peak trips for purposes such as tourism, leisure and business would have considerable economic benefits for the city and region. I consider this to be an important point, as while induced traffic is a recognised phenomenon with negative connotations, one of the elements that makes up induced traffic is the release of suppressed demand or what the EIAR refers to as overcapacity demand (the difference between desired trips and actual trips). While induced traffic is generally seen as a negative impact, the provision of new road links and lessened congestion can release suppressed demand and enable people to make trips that they would wish to take, but which are difficult or inconvenient in the current scenario, and which would become more difficult under the 'Do Minimum' scenario, due to increased congestion. There is an important socio-economic aspect to this, in my view, as the suppression of desired trips can limit people's access to employment opportunities, healthcare services, education, family/friends etc. Ideally the additional trips resulting from the release of suppressed demand would be public transport or active travel trips, rather than private car trips. The issue of mode share is addressed above, however I would note that the PRD will remove traffic from City Centre streets, facilitating shorter and more reliable journey times and enabling the effective implementation of other GTS measures.

11.13.98. With regard to time of travel changes, these would result in people who currently defer trips in the peak period due to congestion, thereby spreading the peak, instead making their trips at peak hour following the removal of congestion.

That is to say, these would not be new trips, but trips that are moved from one time period to another. While such changes would not alter the AADT forecasts for the PRD, which relate to 24-hour periods, they have the potential to cause peak hour traffic impacts.

11.13.99. The applicant stated that they undertook an analysis of historical traffic trends on Dublin's M50 Motorway, before and after it was widened, to determine the likely shift in traffic from outside the peak to the peak hour. This found a 20%-30% increase in the proportion of traffic travelling during the peak hour immediately following the upgrade of the M50. A sensitivity test for the PRD in the 2039 Design Year, with a similar change in peak hour factor, results in a c. 20% increase in total delay experienced on the network and a 3% increase in the average journey time through the city. This demonstrates a negative impact of induced demand. However, it is still a considerable improvement on the Do-Minimum Scenario and as noted above, results from reduced levels of congestion.

11.13.100. Related to this issue of induced and suppressed traffic was a discussion at the oral hearing regarding whether vehicular traffic flows behaved more like a liquid or a gas. The applicant contended that traffic flows would divert to alternative routes like a liquid, while Mr Ferrie contended that traffic behaves more like a gas, noting the phenomenon of traffic evaporation whereby – when vehicular traffic capacity is removed – a portion of the traffic doesn't divert and instead 'evaporates', either through a trip not being made or a modal shift occurring.

13.101. In my opinion traffic can behave somewhat like a gas, in that it may expand to fill all available road space and, conversely, may evaporate when road space is taken away. What is proposed in this instance, however, is not the addition of car lanes to an existing road as with the M50, but instead the construction of a new strategic road link. As outlined elsewhere in this report, the population of Galway is forecast to grow significantly, and it currently has an underdeveloped road network, particularly with regard to east-west connections, river crossings and transfer between the radial National Roads that lead into the City Centre.

11.13.102. The results of the 'Do Minimum' forecast demonstrate that failure to provide the PRD will result in a severe level of congestion for all transport modes, not just

private cars. This will suppress travel movements with resultant socio-economic and environmental consequences.

11.13.103. In conclusion, the principle of induced traffic is well-established and understood and I consider that the PRD will result in the generation of a level of induced traffic. However, I also consider that the applicant has appropriately considered and addressed this issue within their traffic model and assessment. Given that a portion of the induced traffic will result from the release of suppressed demand, and from a variety of other factors, I consider that there are both positive and negative impacts associated with this induced traffic. The PRD forms a key element of the GTS, which contains various measures to improve public transport and active travel infrastructure, and ultimately this form of holistic approach is required to reduce Galway's car dependency and reduce the private car mode share. Given the significant population growth forecast for Galway and the dual functionality of the PRD, which improves the structure of the underdeveloped road network, with a new east-west spine and linkages to the radial routes, and which provides additional road capacity which will remove trips from the City Centre, I do not consider that the generation of induced traffic would be a reasonable reason for refusing permission for the project.

Demand Management

11.13.104. A number of parties noted that Demand Management Studies for Galway and other cities had been commissioned by the Department of Transport (DoT) and contended that the PRD was premature pending the preparation of the Study.

11.13.105. An Taisce also compared the PRD to Dublin's M50 and the Limerick City Bypass and contended that the benefit of those projects has been undermined by failure to implement demand management measures and failure to implement investments in public transport.

11.13.106. Since the oral hearing concluded, the Department of Transport published the 'Five Cities Demand Management Study Recommendations Report' in March 2021. The Study was prepared on behalf of the Department by Systra, who also undertook the traffic assessment for the PRD in association with Arup. The Report constitutes Phase 1 of the Demand Management Study and examines various demand

management measures for each city, including parking prices, Slow Zones, car clubs, flexible working, School Streets, and variable speed limits.

11.13.107. The Department's website states that the Phase 2 Report, which will quantify and predict the impacts of a number of demand management measures, is expected to follow in Q2 2021 but is currently experiencing some unexpected delays due to issues with the quantitative analysis and regional transport models[24].

11.13.108. The existing congestion in Galway is referenced in the report, where it is stated that:

> "Increased congestion also exacerbates emissions and air quality problems. A reduction in speeds due to congestion results in longer travel times and resultant increase in emissions per kilometre travelled. Congestion can also lead to a disruptive driving style. Driving with more accelerations, decelerations, stops and starts increases exhaust emissions and contributes to wear on brakes and tyres, which in turn produces more particulate emissions.
>
> In some cases, providing additional road infrastructure in response to congestion is unlikely to solve the issue. There is limited space to provide significant extra road capacity, particularly in historic medieval cities such as Galway and Waterford. More importantly, there is the likelihood that additional road capacity will induce additional car-based travel, ultimately resulting in a further increase in emissions and a return to the congested road conditions, but with even greater environmental damage, due to the increased volume of road traffic.
>
> To accommodate the future sustainable growth of the cities, it is vital that congestion is carefully managed and that growth in travel demand is as far as possible catered for sustainably, through increased public transport usage, walking and cycling." (Five Cities Demand Management Study Recommendations Report, Page 9.)

11.13.109. The Report has regard to, and frequently references, the provisions of the Galway Transport Strategy with regard to demand management measures such as

[24] https://www.gov.ie/en/publication/63517-publication-of-five-cities-demand-management-study-phase-1-report-and-toolkits/

implementing restrictions to vehicular traffic, reducing car parking provision, park-and-ride facilities etc. With regard to congestion charging, it states that opportunities may arise in Galway with the delivery of improved public transport and park and ride facilities as envisaged in the Galway Transport Strategy. However, congestion charging does not form part of the Study's recommendations.

11.13.110. With regard to the potential for ramp metering (i.e. an 'intelligent transport system' entailing traffic signals on Motorway ramps which control the flow of vehicles onto the main carriageway to improve flow and average speed), it is stated that "ramp metering is not part of the proposed Galway City Ring Road due to the road configuration". I note that the Report concludes that Ramp Metering should not form a key recommendation of the Study, due to its limited application outside the strategic road network and uncertain ease of delivery.

11.13.111. I note that Galway has been recommended in the Study as a pilot city for further examination and research with regard to a potential workplace parking levy.

11.13.112. While Phase 2 of the Demand Management Study had not been published at the time of writing this report, I do not consider that the PRD is premature pending its completion. There is an identified traffic congestion issue and a deficit in the structure of the road network that will hinder the compact growth of the city in line with NPF forecasts, and which will be addressed by the PRD. Construction of the PRD will not prevent demand management measures being introduced in the future, if such measures are considered appropriate following completion of Phase 2 of the Demand Management Study. Any such measures would be of benefit in protecting the strategic function of the PRD as a TEN-T route serving the city and wider region.

11.13.113. Also, as noted by the applicant in Section 6.4 of the 'Response to Queries raised in Module 2' document, the GTS already contains a number of demand management measures, including concentrating future development on brownfield sites (in line with the subsequent NPF), controlling the availability and cost of parking in the city centre, restricting traffic in certain areas, removing on-street car parking etc. As outlined below, the implementation of the GTS is underway, albeit slowly. The provisions of the GTS with regard to demand management are referenced in the Department's Phase 1 Report, as noted above, and I do not consider that any conflict between the two Strategies/Studies arises.

11.13.114. Also relevant to the issue of demand management is car parking provision at new development sites in the city, which was the subject of discussion at the oral hearing. A number of parties, including Mr Brendan Mulligan, Mr Frank McDonald and Galway N6 Action Group noted the extensive existing level of car parking provision in Galway, with Mr Mulligan quoting a figure of 13,000 spaces, which would increase to 15,000 with the development of Bonham Quay, Céannt Station and Crown Square.

11.13.115. Mr Uinseann Finn, on behalf of Galway City Council, stated that car parking provision at these new development sites was significantly below Development Plan ratios. By way of example, Table 7 contained in the 'Response to Module 2 Queries' document demonstrates that permitted car parking provision at two of the larger development sites, Bonham Quay and Céannt Station redevelopment, are 80% and 68%, respectively, below Development Plan ratios. Reference was also made by the applicant to the 'Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities', which sets out criteria for minimising or eliminating car parking provision in certain locations.

11.13.116. In conclusion, I consider that the need for the PRD has been justified and I do not consider that the PRD is premature pending the completion of Phase 2 of the Department of Transport's Five Cities Demand Management Study. In my opinion, any forthcoming demand management measures, such as a workplace parking levy, would have the potential to work in concert with the PRD and other GTS measures to improve the mode share for public transport and active travel modes and protect the strategic function of the PRD.

Impact on Local Roads

11.13.117. A number of parties (e.g. Galway Cycling Campaign, Mr Kevin Gill, Damien and Katherine Kelly) raised issues regarding the impact of the PRD on local roads, many of which are contended to be unsuited to large volumes of traffic. The roads identified included L5387 (in Troscaigh), Aille Road, Cappagh Road, Letteragh Road, N59 Moycullen Road, Circular Road, N83 Tuam Road and Parkmore Road. These roads are illustrated in Figure 6 of the applicant's Traffic submission at the oral hearing.

11.13.118. Table 1 in the applicant's Traffic submission compares average annual daily traffic (AADT) levels at the abovementioned roads in the 2039 Design Year under the 'Do-Minimum' (i.e. without PRD) and 'Do-Something' (i.e. with PRD) scenarios. The table also details the forecast peak hour two-way traffic flow at these locations with the PRD in place.

11.13.119. In the majority of cases, the PRD results in either a decrease or a small increase in traffic volumes on these roads. However, in the case of the Letteragh Road, east of the N59 Link Road Junction, and the Cappagh Road, south of the PRD, the introduction of junctions with the PRD will result in a substantial increase on what are currently local roads. In the case of the Cappagh Road, the AADT increases from 539 to 6,857, while the Letteragh Road increases from 2,109 to 10,656. Both roads are within the urban street network, and the applicant contends that as per TA79/99 of the UK DMRB, these roads would be classified as "Urban All Purpose (UAP) 3; variable standard road carrying mixed traffic" with a capacity of 900 vehicles per hour in the busiest direction and a two-way capacity of 1,500 vehicles per hour. There appears to be no equivalent Irish guidance on this issue, however I consider the UK guidance to be of use in understanding road capacity.

11.13.120. The Letteragh Road east of the N59 Link Road has a forecast peak hour, two-way flow of approximately 1,050, while that for the Cappagh Road South of the PRD is 750. Both of these forecasts are comfortably within the guidance capacity and I do not consider that any capacity issues are likely to arise in respect of these local roads. Residential amenity issues with respect to changes to traffic volumes on the local road network are addressed elsewhere in this report.

11.13.121. In addition to these particular roads, Mr Ciaran Ferrie, noting Figure 7 of the applicant's Traffic submission at the oral hearing, which shows colour-coded flow differences on the road network, queried the increases in traffic on a large number of roads, including city centre roads. Similarly, Galway Cycling Campaign noted the traffic increases on some local roads with children, etc.

11.13.122. I note Section 7.6 of Appendix A.6.1 of the EIAR, where changes in traffic patterns are addressed. It would appear that these increases in traffic flows on some roads are due to the removal of bottlenecks (i.e. congestion at critical junctions) which improves accessibility, particularly from the east of the city, releasing

suppressed traffic but also inducing additional traffic due to this improved accessibility. I have addressed the issues of induced and suppressed traffic above. Having regard to the KPIs utilised to assess the impact of the PRD on the road network, it is clear that the PRD will improve traffic flows, reduce congestion and reduce the number of junctions with capacity issues across the network. While there may be localised increases in traffic on some roads, this is related to the removal of bottlenecks and the effect of the PRD on the network as a whole is positive.

Rosán Glas / Bothar Diarmuida Area

11.13.123. Rosán Glas is a housing estate to the north of the Rahoon Road, in Rahoon. Bóthar Diarmuida is a cul de sac road which runs along the west side of the estate and connects to Rahoon Road at its southern end. The proposed N59 Link Road South would run parallel to Bóthar Diarmuida in this area and connect to the Rahoon Road at the upgraded Rahoon Road Junction. Bóthar Diarmuida would be truncated by the PRD, with traffic from Rosán Glas instead joining the N59 Link Road South at the proposed Bóthar Diarmuida junction.

11.13.124. A number of residents of the Rosán Glas estate made submissions regarding the proposed closure of the junction of Bóthar Diarmuida/Rahoon Road which they contend will elongate journey times/distances for residents. They also contend that the signalised junction will impede traffic movements and that traffic from other areas will "rat-run" through residential roads to access the N59 Link Road.

11.13.125. This issue was addressed by the applicant in their Traffic submission at the oral hearing, and as illustrated in Figure 11 of the submission, the maximum increase in distance to reach the Rahoon Road would be c. 450m for vehicular traffic which I do not consider to be significant, while pedestrian and cyclist accessibility would be enhanced by the design of the proposed N59 Link Road South and the nearby Gort na Bró Link Road.

11.13.126. The results of the traffic modelling of the area indicate that both the N59 Link Road/Bóthar Diarmuida junction and the N59 Link road/Rahoon Road will operate within capacity in the 2039 peak period. I would, therefore, concur with the applicant that the closure of the Bóthar Diarmuida/Rahoon Road junction is not likely to lead to any traffic problems or congestion issues in the area.

11.13.127. The applicant also states that strategic modelling undertaken as part of the EIAR indicates that no traffic will use the Rosán Glas area as a rat-run and only traffic originating or destined for the estate will use its internal road network. Having visited the area and reviewed all available information and mapping, I do not consider that there will be a significant impact on Rosán Glas in terms of traffic and transportation and I do not consider that the PRD is likely to attract 'rat-running' traffic through Rosán Glas, once operational.

Gort na Bró Junction

11.13.128. Galway Cycle Bus made a submission at the oral hearing in which they outlined their successful initiative to encourage cycle travel to Gaelscoil Mhic Amhlaigh and Knocknacarra National School, with 10% of school children travelling by bicycle to the Gaelscoil, compared to a city-wide 2% figure. They queried the proposed road design in the vicinity of the Gort na Bró junction and the Western Distributor Road and the measures proposed to provide safe cyclist routes to the Gaelscoil.

11.13.129. The Galway Cycle Bus representative also contended that improvements to permeability between housing estates was required to facilitate active travel modes and enhance safety. Similar points were made by the Galway Cycling Campaign. While increased permeability for cycling/pedestrians is generally desirable, I consider that this is primarily a matter for the Local Authorities. The GTS contains measures to improve cycling and pedestrian infrastructure and the PRD would not prevent or hinder these or other permeability improvements.

11.13.130. The existing Gort na Bró junction is a roundabout with five arms, which is a sub-optimal arrangement for child cyclists, in my opinion. It is proposed to convert this to a signalised junction, with a new link road and entrance to the Gateway Retail Park to be constructed to replace the fifth arm of the existing roundabout. Localised widening of the Western Distributor Road is also proposed to allow for two-way bus lanes on approach to the junction, to allow for future public transport improvements. I consider that the reconfiguration of this junction and particularly removing the direct access to the Gateway Retail Park from the junction, will enhance safety and access provision at this location.

11.13.131. At the oral hearing, the applicant submitted a revised drawing for this area, indicating improved pedestrian and cycle facilities from the Gort na Bró junction to Gael Scoil Mhic Amhlaigh. This includes a segregated cycle track from the reconfigured Gort no Bró junction to the school and a two-way segregated cycle track on the eastern verge of Gort Na Bró Road from the junction, past the school, to Rahoon Road. Segregated cycle lanes are also proposed on the Western Distributor Road in the vicinity of the junction, tying into the existing on-road cycle paths at either side. These measures are included in the final version of the Schedule of Environmental Commitments submitted at the oral hearing (Items 1.23 and 1.24 and Appendix A.21.1 of the SoEC refer). I also note that both Gort na Bró Road and the Western Distributor Road are anticipated to have a reduction in vehicular traffic in the 2039 Design Year, which again will benefit pedestrians and cyclists.

11.13.132. I consider that these revised proposals represent a considerable improvement to the original proposal and will significantly enhance cyclist and pedestrian accessibility both to the school and the local area, more generally.

Implementation of the Galway Transport Strategy

11.13.133. Many of the submissions, particularly at the oral hearing, addressed the Galway Transport Strategy (GTS), particularly with regard to the adequacy of the measures contained therein and the speed at which it is being implemented, with a number of parties contending that there had been a lack of progress since its preparation in 2016. It was also contended that the GTS is being used as a crutch by the PRD, while another objector stated that the applicant has created a 'chicken and egg' situation, whereby the GTS measures to improve public transport can't progress until the ring road is delivered.

11.13.134. Compelling arguments were put forward by a number of parties, including An Taisce, Mr Brendan Mulligan, Galway Cycling Campaign, Mr Ciaran Ferrie and Galway Cycle Bus, regarding the need to improve public transport provision and active travel infrastructure in Galway. This included detailed critiques of the GTS measures and options for dedicated bus lanes etc. Ultimately, I consider that such critiques are better directed to the planning and transport policy arenas, as the GTS has been prepared by Galway City Council and Galway County Council and, as noted above in section 10, it is not before the Board for approval. I consider that the

GTS provides a coherent and holistic strategy for addressing transport issues in Galway and it includes the PRD as a key element of delivering upon its objectives. Whether the GTS objectives and measures are suitably ambitious in light of the NPF growth scenario for the city, which post-date its publication, is not a matter for the Board to determine within the context of this application, in my opinion, given that the need for the PRD has been satisfactorily established.

11.13.135. An Taisce, in their submission at the oral hearing, identified a number of roads where bus lanes could be provided. As noted under Evaluation of Alternatives, section 10.6 above, I do not consider that the PRD would prevent such bus lanes from being provided in the future, should they be deemed appropriate, and the removal of traffic from the existing City Centre road network, as identified by the applicant, will likely be of assistance in any such reallocation of road space to more sustainable modes. Likewise, buses will be able to use the PRD, should services be expanded in the future. These are ultimately matters for the Planning Authority, NTA and the bus operators.

11.13.136. The applicant, at the oral hearing, and in Section 4 of their 'Response to Module 2 Queries' document, outlined the current status of the various GTS measures, and identified those GTS projects that are included in Galway City Council's approved and budgeted Annual Service Delivery Plan. These projects include the Salmon Weir cycling and pedestrian bridge, Galway Cross-City Link, replacement of roundabouts with signalised junctions and remodelling of the bus service (Bus Connects). It is clear to me that progress, albeit slow progress, is being made on implementation of the GTS and indeed a number of the projects are currently with the Board (e.g. Salmon Weir pedestrian bridge).

11.13.137. The applicant, in responding to An Taisce on this issue, noted that the PRD is part of the medium/long term measures included in the GTS, whereas the other measures identified, including the various public transport measures, are identified as short/medium term measures and will be implemented in advance of the PRD.

11.13.138. As I have stated above, many of the valid points raised by observers regarding the GTS and the need for measures to improve public transport and active travel infrastructure within the city would be more appropriately directed at a policy level, rather than to the PRD that is before the Board. Fundamentally, I do not

consider that Galway faces an 'either/or' situation with regard to the PRD and improved public transport/active transport. The existing road network in Galway is underdeveloped, particularly on the western side of the City, and the ecological and geographical constraints of the city have resulted in an elongated linear city, with low density residential development and ribbon development which makes it difficult to serve efficiently by public transport. The population of Galway is forecast to grow significantly over the coming decades, in line with the NPF, and it is necessary for the City to have an adequate road network to facilitate this expansion within a more compact footprint than would otherwise be the case.

11.13.139. Providing a new ring road will not prevent improved public transport from being delivered and will not prevent enhanced pedestrian and cyclist infrastructure from being provided. In this regard I note that the PRD itself includes measures to improve walking and cycling infrastructure within the development boundary. The current underdeveloped road network and limited number of River crossings results in vehicles having to travel into city centre areas in order to traverse the city, resulting in congestion. Removing this traffic will assist in reassigning road capacity for improvements to public transport and active travel, as envisaged by the GTS.

Proposed Parkmore Link Road Modification

11.13.140. As noted above, the applicant proposed a modification to the proposed Parkmore Link Road at the oral hearing. Section 3.2.11 of Andrew Archer's traffic submission at the oral hearing addresses the proposed modification and states that:

> "A modification to the Parkmore Link Road has been assessed using the micro-simulation model to test its impact. The detailed assessment found that the proposed modification will result in a similar network performance to the previous design and, in summary, there will be no operational issues on the mainline of the PRD or any of its associated junctions."

No further details of the assessment were provided. However, I note that the modified Parkmore Link Road would still serve the same function in connecting the N6 GCRR via Parkmore Business Park and City North Business Park to Bóthar na dTreabh. The proposed modified alignment retains the cycle paths and footpaths of the original proposal and would run via a route to the east of the Boston Scientific campus, rather than to the west.

Having compared the two alignments for this portion for the proposed Parkmore Link road, I do not consider that any significant additional impacts on traffic are likely to arise as a result of the proposed modification.

Conclusion on Material Assets – Traffic and Transportation

11.13.141. In conclusion, I am satisfied that the PRD will remove a significant amount of traffic from city centre streets and thereby alleviate congestion, freeing up road space for reallocation and the implementation of the public transport and active travel measures set out in the GTS. It will also provide a missing element of strategic infrastructure, providing an additional river crossing and linking the various radial routes feeding into the city. It will support the significant growth and population increase that is forecast for the city and will fulfil a strategic function as a TEN-T route. However, it will not be a panacea for all of Galway's transport ills, as can be seen, for example, in the number of junctions that remain near or at capacity in the 2039 Design Year. Ultimately, in my opinion, the private car is not the solution to all of Galway's traffic issues and a large and sustained modal shift to more sustainable travel modes will be required. I consider that the PRD will provide a key piece of infrastructure that will assist in developing a denser, more compact city, in line with NPF targets, and that this increased density together with the removal of traffic from city centre areas will assist in facilitating this modal shift to more sustainable modes, as outlined in the GTS. I do not consider that the PRD and public transport/active travel modes are mutually exclusive, and instead consider that a holistic approach is required, as set out in the GTS.

11.13.142. I have considered all of the written and oral submissions made in relation to traffic matters, in addition to those specifically identified in this section of the report. I am satisfied that potential significant negative impacts would generally be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions.

11.14. Material Assets – Landscape and Visual

11.14.1. Landscape and visual aspects are addressed in Chapter 12 of the EIAR. The series of Figures 12.1.01-12.1.15, 12.2.01-12.2.02 and 12.3.01-12.3.02 contained in Volume 3 of the EIAR indicate potential impacts and mitigation measures, landscape

character, and landscape planning context, respectively. Appendices A.12.1 to A.12.3 contained in Volume 4 of the EIAR provides a Visual Impact Schedule and photomontages. The Schedule of Environmental Commitments, which was updated at numerous stages over the course of the oral hearing, also sets out commitments in relation to landscape and visual aspects.

11.14.2. A submission responding to the landscape and visual related written submissions/objections, was given at the Oral Hearing on 21st February 2020 by Mr Thomas Burns of Brady Shipman Martin on behalf of the applicant. A number of parties subsequently made further landscape and visual related submissions over the course of the Oral Hearing, including questioning of Mr Burns. Mr Burns also made further submissions. These matters are addressed, where necessary, below.

11.14.3. The EIAR notes that the landscape setting for the PRD covers a wide corridor comprising a part rural, part peri-urban and part suburban landscape. The baseline data collection involved reviewing statutory planning documents, landscape character assessments and other landscape and visual related publications/sources augmented by a series of survey visits, undertaken at different times during the year. This allowed for the identification of likely significant and sensitive landscape and visual receptors.

11.14.4. It is stated that views from properties are all considered on an equal basis without varying degrees of significance or sensitivity. All properties located within 200m of the centreline are considered, together with any property outside of 200m which for reasons of openness or otherwise, are considered to have potential for significant impact. Impact from other properties, such as schools and recreational amenities, are also included. The potential impacts are assessed at three stages: Construction, Pre-establishment (i.e. initial operation phase, when new landscape measures are unlikely to provide effective mitigation) and Post-establishment (i.e. after planting has established and is providing effective mitigation).

11.14.5. It is noted that the Landscape Character Assessment for County Galway (2003) sub-divides the county into 25 large landscape character areas (LCAs). Landscape values and sensitivity ratings have also been applied. Five of the LCAs pertain to the route of the PRD. The Lough Corrib LCA (11) is the most sensitive, with a sensitivity

rating of 'unique'. Table 12.2 identifies the Landscape Character Areas (LCAs) and Local Landscape Character Units (LLCUs) within each LCA.

11.14.6. The main landscape features in the receiving environment along the PRD include the diversity of ecological/landscape and cultural areas, the mosaic of open grassland, limestone pavement, marsh, wetland, river corridor/lake edge, scrub/and occasional tree plantings; the presence of significant recreational and sports grounds (including Galway Racecourse and NUIG Sports Campus) and other open spaces; and the overall high quality of the landscape – especially along the River Corrib corridor and east through to Ballindooley. These features are stated to add to overall diversity and interest of the landscape as well as to its sensitivity and significance.

11.14.7. The two Development Plans as well as the Ardaun LAP and the Bearna LAP and the Gaeltacht LAP are detailed along with green networks and protected views detailed therein. The main features of significance and sensitivity in the receiving landscape are detailed as well as the main features of visual significance and sensitivity.

11.14.8. The main characteristics of the construction phase of the PRD with the potential for landscape and visual impacts are listed in Section 12.4.1, and include: removal of properties, boundaries and amenities; significant earthworks; construction of the new road, link roads, noise barriers, lighting etc.; construction of new structures and demolition and modification of part of the NUIG Sports Pavilion and provision of sports pitches. During the operational phase, the main characteristics that have potential for landscape and visual impacts are the presence of traffic, prominence of embankments/cuttings, elevated structures and features such as noise barriers, roadside lighting etc.

Potential Impacts

11.14.9. With regard to potential **construction phase** impacts, potentially impacted features and landscape and visual impacts are described on a section-by-section basis, under the headings of properties, vegetation, landscape features, embankments, cuttings, visual impacts, landscape planning and landscape character. An assessment of the overall construction stage visual impact is also provided and is set out in detail in Appendix A.12.1 and summarised in Table 12.5 of the EIAR. It is

stated that some 407[25] No. locations have been assessed, of which 54 No. residential properties will be acquired. The remaining 353 properties and landscape locations have been assessed for visual impact during construction with the results summarised in the aforementioned Table 12.5. Of the 353 No. locations, 105 No. locations (c.30%) will have significant or very significant short-term visual impacts and 43 No. locations (c.11%) will experience profound temporary or short-term negative visual impacts.

11.14.10. The potential impact for the **operational phase** has also been described on a section-by-section basis, with an overall assessment of the operational phase. The details are set out in Appendix A.12.1 and in Table 12.6 of the EIAR. The applicant contends that, as landscape measures establish and mature, the level of visual impact will gradually recede so that in the post-establishment stage, some 33[26] will have significant or very significant medium-term visual impact (reduced from 86 at pre-establishment stage) and 23 will continue to experience profound medium and longer-term negative visual impact (reduced from 30 at pre-establishment stage).

11.14.11. A series of Photomontages[27] have been prepared of the River Corrib bridge and for other areas along the route and are included in Appendices A.12.2 and A.12.3 of the EIAR. A mixture of summer-time and/or winter-time views have been prepared. It is stated that the greatest impact is at the existing sports grounds of NUIG on the west bank of the River Corrib, where users of the sports facilities and the river-side amenities gain direct access to the underside of the proposed bridge.

14.12. Other construction related impacts, such as site compounds, construction traffic, and diversions of overhead lines will give rise to slight to moderate localised temporary impacts. Operational impact such as gantries, signs, lighting, noise and safety barriers will give rise to slight localised and short-term impacts. Taller noise barriers (>2.5m) on elevated sections of embankment near the N59 Moycullen Road crossing will further accentuate already significant visual impact for residential properties.

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[25] The Corrigendum submitted at the oral hearing identified that one residential property at Ch. 2+850 (Property reference 195) had been omitted in error from the Visual Impact Schedule and EIAR Tables. This property is identified as having a potential profound impact at construction phase.

[26] Again, this figure was corrected in the Corrigendum submitted at the oral hearing.

[27] A number of the submitted photomontages contained errors, and corrected photomontages were submitted with the Corrigendum at the oral hearing.

Mitigation Measures

11.14.13. It is stated that although consideration was given to avoidance of significant landscape and visual impacts during the route corridor selection and design process, all road construction projects give rise to some degree of unavoidable landscape and visual impacts.

11.14.14. During the construction stage the CEMP, and the mitigation and monitoring measures contained therein, will be adhered to. Other specific measures include, inter alia:

- Storage areas located so as to avoid impacting further on existing residential and other property, woodlands, trees, hedgerows, drainage patterns, etc.
- Provision of solid site hoarding of min. 2.0m in height alongside construction works adjoining residential property or recreational amenities and along any side of proposed construction compounds, where they are located within 100m of residential properties.
- Decommissioning and reinstatement of construction compounds at the end of the construction contract.
- Seeding/planting at the earliest possible opportunity. Due to construction programming and seasonal restrictions, it is stated that it is likely that significant planting works will not be undertaken until the end of the major construction phase.

11.14.15. During the operational phase, both project-wide measures to be applied over the entire PRD (depending on the nature of the particular road section) and specific measures for particular areas are proposed. These are described in Tables 12.7 and 12.8, respectively and identified on Figures 12.1.01 to 12.1.15[28]. The measures are stated to take account of the specific protection and mitigation measures detailed in the Biodiversity Chapter of the EIAR (Chapter 8).

Residual and Cumulative Impacts

11.14.16. The proposed mitigation measures are stated to have limited effect during the construction stage and, therefore, it is considered that the potential negative

[28] The Board should note that these Figures are incorrectly referenced throughout this chapter of the EIAR. See clarification contained in RFI Response, Section 9.3.

landscape and visual impacts will continue to arise, even with mitigation, during the construction phase.

11.14.17. During the initial operation stage, it is stated that landscape and visual impacts will continue to arise as the PRD will be a significant and prominent new element in the landscape, at least until such stage as landscape mitigation proposals establish and become increasingly effective. The significance and severity of landscape and visual impacts will gradually abate over time, although negative visual impacts will also continue to arise for residential and other properties located close to or adjoining the boundary of the PRD at post-establishment stage.

11.14.18. Significant residual visual impacts will also continue to arise for a number of properties, as set out in Appendix A.12.1 and identified in Figures 12.1.01 to 12.1.15. Significant residual landscape impacts will also continue to arise at a number of locations, which are again illustrated in Figures 12.1.01 to 12.1.15.

11.14.19. With regard to potential cumulative impacts, a number of planned or potential projects are identified. However, it is contended that there is limited potential for any significant cumulative impacts and that these will not further increase the adverse or negative impacts associated with the PRD.

11.14.20. **Assessment**

11.14.21. I consider the potential significant impacts are as follows:

- Impact on landscape character.
- Visual impacts on properties.
- Design of bridge and impact on River Corrib, NUIG Sports Campus and Menlo Castle.
- Landscaping proposals.
- Boundary treatments, including stone walls.
- Road lighting impacts.
- Proposed Parkmore Link Road Modification.

Impact on Landscape Character

11.14.22. The PRD will pass through a complex landscape, comprising a mix of rural, semi-rural/peri-urban and suburban areas, with the landscape characteristics, value and sensitivity varying significantly along the road. The 5 No. landscape character areas (LCAs) through which the PRD passes, together with their sensitivity, are illustrated in Plate 12.1 of the EIAR. The Lough Corrib LCA (11), which covers the central section of the PRD, is the most sensitive LCA, being described as "wide dramatic expanse of water including many islands supporting deciduous woodland. The land ...surrounding the southern section is flat, open grassland. The landscape of the Lough and its surrounds is highly scenic and includes many facilities for visitors". Given the variation within LCAs, the applicant has further sub-divided them into Local Landscape Character Units (LLCUs), as illustrated in Figures 12.2.01 and 12.2.02 of the EIAR. I consider this to be a useful tool for understanding the distinctive landscape characteristics and sensitivity on a scale that is more appropriate to the PRD. These LLCUs and their characteristics are set out in Table 12.2. I also refer the Board to Figures 12.3.01 and 12.3.02, entitled 'Landscape Planning Aspect', which identify the various amenity, environmental management zones and scenic/protected views in the area.

11.14.23. The road and its associated engineering structures will be seen as a prominent new feature in the receiving environment and I would agree with the applicant that the impacts on landscape character will be most pronounced at construction and early operation stage. The applicant acknowledges, in Section 12.7.2 of the EIAR that the proposed mitigation measures will have limited effect during the construction stage. This stage is, however, temporary and relatively short-term in nature and the significance and severity of the landscape impacts will generally abate over time, as the proposed mitigation planting becomes established and begins to either screen views of the PRD and its structures within the landscape or provide a natural context which will serve to embed the PRD into the receiving landscape.

11.14.24. The landscaping proposals are addressed separately below, however, it can be seen by comparing the pre- and post-establishment photomontages included in Appendices A.12.2 and A.12.3 of the EIAR, which I consider to be suitably comprehensive and representative, that the extensive landscaping measures proposed form a very important role in mitigating the landscape impacts of the PRD.

11.14.25. Notwithstanding the mitigating effects of the proposed landscaping measures, significant residual landscape impacts are predicted in the following areas:

- Along the edge of Sruthán Na Libeirtí, Bearna.
- On the open elevated landscapes of Ballagh, Rahoon, Letteragh, Barnacranny and Dangan Upper.
- On the recreation sports and amenity landscape of NUIG Sports Campus.
- On the lowland landscape valley of the River Corrib, and the setting of Menlo Castle.
- On the limestone landscape of Menlough and Coolough.
- On the rolling landscape through Castlegar, south of Ballindooley Lough.

11.14.26. These areas are illustrated as 'Areas of Notable Landscape Impact' on Figures 12.1.01 – 12.1.15 of the EIAR, and it can be seen that the areas generally incorporate the proposed grade-separated junctions and the major structures (e.g. River Corrib Bridge and NUIG viaduct, Menlough Viaduct, etc.) or are open or rolling landscape types, where wide views are available.

11.14.27. The impacts on the River Corrib valley and the adjacent NUIG Sports Campus and Menlo Castle are addressed separately below. With regard to the other areas where significant residual landscape impacts are predicted, having inspected the area on a number of occasions, having reviewed the information submitted by the applicant, including the photomontages contained in Appendices A.12.2 and A.12.3, and having reviewed the Development Plan designations, including the Landscape Character Areas, I would concur with the applicant's assessment of areas which will experience a significant residual landscape impact, as set out above.

Visual impacts on properties

11.14.28. The visual impact of the PRD on properties was raised in a considerable number of written and oral submissions. Potential visual issues associated with boundary treatments and road lighting are addressed separately below.

11.14.29. I note that a Visual Impact Schedule (VIS) was included in Appendix 12.1 of the EIAR. The VIS, which should be reviewed with reference to Figures 12.1.01 – 12.1.16, assesses the potential visual impact at each property or group of properties

along the length of the PRD during the construction stage, at pre-establishment stage (i.e. at opening, when planting is not mature), and at post-establishment stage, (i.e. when planting has matured). It can be seen from the VIS that the applicant considers that the effectiveness of the mitigation measures will be enhanced as planting matures in height and density, resulting in the significance of visual impact reducing over time in many cases. The applicant contends that this will require a period of 5 to 7 years.

11.14.30. The scale of the PRD and the nature of the receiving environment, including the number and distribution of dwellings along local and national roads in the area, is such that significant visual impacts on residential receptors would be difficult to avoid. The applicant has accepted this and, notwithstanding the extensive mitigation planting proposed (see below in relation to landscaping), the VIS identifies that in the post-establishment stage, some 33 will have significant or very significant medium-term visual impact (reduced from 86 at pre-establishment stage) and 23 will continue to experience profound medium and longer-term negative visual impact (reduced from 30 at pre-establishment stage).

11.14.31. The main visual impacts associated with the PRD relate both to the road itself, and its associated structures, including embankments, over and underbridges, viaducts, retaining walls, etc. Other visual impacts will be associated with the loss of mature trees and planting and in many cases the change in the visual amenities of the area, particularly in more rural areas or where extensive demolition is proposed.

11.14.32. Mr Burns, in his submission to the oral hearing, provided a response to each submission/objection that raised the issue of visual impacts on properties.

11.14.33. A number of submissions were received from residents of Rosán Glas and Árd Na Gaoithe, two suburban estates. Having regard to the characteristics and context of these estates, and their proximity to elements of the PRD, I do not consider that the PRD will give rise to significant visual impacts at these locations. I note, however, that the proposed screen planting will act as a visual separation and buffer between existing development and the PRD.

11.14.34. Mr Damien Kelly, a resident of Na Foraí Maola Thiar, raised issues in his submission at the oral hearing on 14th October 2020, regarding the visual impacts of the PRD on his property due to its elevation in this area. Mr Kelly's property is close

to the northern boundary of the PRD mainline (approx. Ch.1+050) which is on an embankment in this area. Mr Kelly, noting that the final design of the road had been dropped in other areas, queried why the road could not be dropped in this area to mitigate the visual impacts (see photographs included in submission). Mr Kelly's house would be c. 35m from the fenceline and 50m from the road edge. While the height of the road would be elevated c. 2.5m in this area, the extensive roadside planting proposed would be effective in substantially mitigating the visual impact at this distance. View 1 in Appendix A.12.3.1 is taken from a rear garden immediately east of Mr Kelly's house, but substantially closer to the PRD, and indicates the mitigating effects of the boundary planting. A moderate residual visual impact is predicted at this property, and I would concur with this assessment.

Aughnacurra and Ard an Locha

11.14.35. A number of submissions and objections were made by residents of the Aughnacurra estate, which is located on the eastern side of the N59 Moycullen Road, in the Dangan area. The estate comprises 14 No. detached houses arranged on large sites in an oval shape, with ornamental entrance gate, tree-lined avenue and extensive mature planting. It is proposed to acquire 6 No. houses within the estate (and to demolish 5 of these) to accommodate the PRD mainline, which will be elevated in this area, with a mix of retaining wall and embankment. It is also proposed to acquire the internal estate road.

11.14.36. The photomontages contained in Appendix A.12.3.3 of the EIAR provide four views of the PRD in the vicinity of Aughnacurra and are representative of the potential impacts in my opinion.

11.14.37. In addition to the submissions made by individual residents of Aughnacurra, I refer the Board to the submission made by Aughnacurra Residents Association at the oral hearing on 4th March 2020 (Ref. 48) which includes a number of useful photographs of the existing visual amenities of the estate, and requests various mitigation measures.

11.14.38. In response to the submissions by Aughnacurra residents, a number of additional commitments were made at the oral hearing and are included in the final SoEC (items 12.41 to 12.43 and 15.14 refer). These include:

- A grass verge with birch tree planting will be established to either side of the new entrance avenue into Aughnacurra Estate to match the character of the existing entrance.
- Except where the existing wall is retained, a new stone wall will be constructed to the front of properties 539 and 540 (west of proposed road development) along the side of the existing / realigned avenue within Aughnacurra Estate to match the character of existing stone walls within the estate.
- Ground levels within the residual lands at properties 539 and 540 shall be raised back towards the proposed road development and planted with 1000 no. trees of between 1.0 and 2.0m in height in accordance with the details set out on Figure GCRR-SK-OH-652 in Appendix A.21.2 [of SoEC]. The soil grading and planting shall not interfere with the proposed Bat Roost Structure in property 540.
- The existing decorative historic gates at the entrance to the Aughnacurra Estate will be removed, stored and erected at the front entrance upon completion, noting that they currently do not close and that they will not close and span the new entrance width.

11.14.39. These additional commitments are reflected in a revised planting plan for the Aughnacurra estate, which was submitted at the oral hearing and included as Appendix A.21.2 of the final SoEC.

11.14.40. Notwithstanding that these additional commitments generally provide the mitigation that they sought, the Aughnacurra Residents Association reiterated their resolute opposition to the PRD and the associated CPO prior to the close of the oral hearing.

11.14.41. These remaining residents of Aughnacurra will experience significant or profound residual visual impacts, arising from the PRD (depending on distance), due to the loss of visual amenity, visual character and the presence of the elevated mainline passing through the estate. I consider that the additional measures committed to by the applicant at the oral hearing will be of benefit in ameliorating the impacts associated with the insertion of the PRD into this mature residential setting and represent welcome additional mitigation. However, I do not consider that the

measures would reduce the significance or magnitude of the visual impacts, which will remain significant or profound. I note the submission made by Mr Michael Murphy, a resident of Aughnacurra at the oral hearing on 28th October 2020, in which he stated that the proposed planting would take 10 years to reach maturity, against which he noted the number of older people living in the estate, which he considered would increase the significance of the impacts. Given the design and alignment of the PRD, I do not consider that any additional mitigation imposed by the Board would feasibly reduce the significant/profound residual impacts on the remaining properties in Aughnacurra.

11.14.42. On the opposite side of the N59 Moycullen Road from Aughnacurra is the estate known as Ard an Locha. Again, this estate comprises detached houses with sizable grounds in some instances and a high level of residential amenity. It is proposed to acquire 3 No. houses within the estate, as well as undeveloped sites. The PRD will also be elevated on a sizable embankment and retaining structure as it passes through Ard an Locha, with an overbridge over the N59. The visual impacts associated with the PRD in this area were raised by a number of parties, including Galway N6 Action Group and Professor and Dr Kerin, who are residents of Ard an Locha.

11.14.43. Michael O'Donnell BL, accompanied by Professor Kerin, Dr Kerin and a number of technical experts made submissions at the oral hearing on 30th October 2020 regarding various environmental topics, including visual impacts (Ref. 98A – 98E). The applicant subsequently submitted a document entitled 'Response to submission on behalf of Prof. Michael and Dr Annette Kerin' at the oral hearing on 3rd November 2020 (Ref. 103). The Kerins' and their consultants subsequently made further submissions responding to the applicant's response, at the oral hearing on 4th November 2020 (Ref. 98F).

11.14.44. While Dr Kerin's submission contended that a moderate to significant negative visual impact represented a gross underestimation and misinterpretation of the impact on their family and property, the applicant clarified that, as per the EIAR, they acknowledge that there will a profound visual impact on the Kerins property at all stages, including post-establishment of the mitigation planting.

11.14.45. The visual amenities and character of Ard an Locha will be profoundly altered by the visual intrusion of the PRD, similar to the nearby Aughnacurra estate. The property will face a sizable embankment and overbridge with a noise barrier atop, and an electricity substation. View 4 in Appendix A.12.3.3 gives an indication of the visual impact. Mitigation measures in respect of this property include the provision of solid screen hoarding during construction, planting (12m depth) of the embankment, planting (6m depth) along the southern boundary of the access road to Ard an Locha, and planting to the front of retaining structure R08/02. The existing boundary walls, planting and gardens will be retained. Additional commitments were made at the oral hearing to locate the substation behind a 2m high limestone-faced boundary wall, with access via the gate proposed to the south of the Kerin property in order to ensure that the substation does not have a negative visual impact on the Kerin property. A further commitment was made to provide alternative accommodation for a 9 month period during construction.

11.14.46. Notwithstanding the proposed and additional mitigation, I consider that a profound negative residual visual impact will remain for this property.

11.14.47. With regard to other properties in the vicinity of the PRD, I generally concur with the assessment of the applicant as outlined in the VIS. While the PRD includes a suite of appropriate and comprehensive mitigation measures to avoid or reduce visual impacts, significant or profound residual visual impacts will continue to arise at post-establishment stage for a number of residential properties located close to the PRD.

Design of Bridge and Impact on River Corrib, NUIG Sports Campus and Menlo Castle

11.14.48. A number of parties raised issues regarding the visual impact of the PRD arising from the proposed River Corrib Bridge and on Menlo Castle and on views along the River Corrib. While the NUIG's objection was withdrawn, a number of other parties also contended that the PRD would have a negative impact on the visual amenities and character of the NUIG Sporting Campus and amenity walkways in the Dangan area.

11.14.49. With regard to Menlo Castle, the potential impact on the setting of the Castle and its demesne was raised at the oral hearing by various parties, including Mr

Stephen Dowds on behalf of the Galway N6 Action Group on the 20th October 2020 and Mr Ciaran Ferrie on 4th March 2020 and 21st October 2020. The Castle, which dates from c. 1550 and is in a ruinous state, is located on the eastern bank of the River Corrib, in a mixed agricultural and wooded landscape, which was formerly part of its demesne lands. Views of the Castle on its secluded riverside setting were referred to as one of the iconic views in Galway. The NUIG Sporting Campus is located on the opposite side of the River Corrib and there are currently unobstructed views of the Castle from the riverside walk within the NUIG lands. The NUIG Sporting Campus is a large publicly accessible amenity area, with numerous pitches, open areas, walks and a pavilion structure.

11.14.50. The proposed River Corrib Bridge will be located c. 140m to the south of Menlo Castle. The overall length of the proposed eight span bridge is c. 650m. The bridge crosses the River Corrib with a single span of c. 153m (i.e. there are no supports within the River), with one further short span to the east carrying the PRD onto a retained embankment, and the remaining spans to the west run through the NUIG Sporting Campus as a viaduct structure. The cross-section of the proposed bridge is T-shaped, with a single concrete box with variable depth (generally 3m, increasing to 7m at the main River span supports) and projecting 'wings' supported on inclined ribs at 4m centres. The superstructure will be supported on reinforced concrete piers, while 2m high transparent noise barriers are proposed on the bridge.

11.14.51. Detailed drawings of the bridge/viaduct structure were submitted in response to the RFI (Appendix A.1.1 and A.1.2 refer). Appendix A.12.2 of the EIAR also provides photomontages of the proposed bridge from a total of 22 viewpoints which I consider to be reflective of all main views from the surrounding area. I also note that a range of summer and winter photomontages are provided, which allows for a more comprehensive understanding of potential impacts.

11.14.52. Due to the scale of the bridge and viaduct structure it will, without doubt, impact on the fabric and structure of the landscape and visual amenities of the immediate area. Of particular assistance in understanding these localised impacts of the bridge and viaduct on Menlo Castle and the NUIG Sporting Campus are Views 5, 6, 7, 17 - 21.

11.14.53. From a design perspective, the proposed bridge is a relatively bland and functional structure, with its visual interest primarily arising from its scale and its positioning within the River Corrib valley. It could be argued that a more architecturally interesting or innovative bridge design should have been considered given the scale of the river crossing and the position close to Menlo Castle. The Inspectors queried this design approach at the oral hearing on 21st October 2020, and asked whether alternative architectural treatments had been considered. Mr Burns responded that consideration had been given to alternative designs, but it had been decided to keep the bridge as simple as possible, so that it would not detract from views when travelling north from the city along the River. Other approaches involving tied arches and suspension elements etc., had been considered but the applicant's view was that this resulted in visual clutter or dominance within the landscape. Having considered the design approach, I am of the view that the approach adopted by the applicant, comprising a visually simple and streamlined bridge, is the correct approach given the sensitivity of the landscape and visual amenity in this area and the natural and cultural heritage character of Menlo Castle and its demesne. While the structure does form a visual barrier across the river, separating Menlo Castle from the city, this is mitigated to an extent by the height of the bridge, the lack of a support within the river and the gentle arch of the soffit of the main span, which allows relatively open views from the riverside amenity areas through the bridge towards Menlo Castle, as can be seen in the photomontages. In this regard, the landmark prominence and visibility of Menlo Castle on the edge of the river bank will be retained to a considerable degree.

11.14.54. Notwithstanding this, from a landscape and visual impact perspective, I consider that the PRD will have a significant negative residual impact on Menlo Castle and its former demesne. The potential impact of the bridge structure on the architectural and cultural heritage of Menlo Castle and demesne is considered separately in Section 11.15.

11.14.55. The NUIG Sporting Campus is a valuable amenity and sporting facility, with an open expansive character belying its proximity to the city centre. The routing of the PRD through the campus on an elevated concrete viaduct will be visually intrusive and will have a negative impact on the visual and landscape character of the campus. While the viaduct structure will be visually intrusive, its raised nature will

avoid any significant visual or physical severance of the campus, and will allow for the continued use of the campus and access within and through the campus, including to the riverside amenity walkways. The proposed use of transparent noise barriers will assist in reducing noise levels and will slightly reduce the massing and apparent depth of the structure. However, it will remain a very substantial engineering structure with an appearance that is at odds with the existing character of this amenity area. The applicant considers that there will be a significant negative residual impact on the NUIG Sporting Campus and I would concur with this assessment. However, while there will be changes and negative impacts on the amenity of the area, the use of the facility will not be prohibited by the PRD and, having regard to its location in an increasingly urban area, I do not consider this a reason to refuse permission.

11.14.56. In terms of the impact on the wider area, the photomontages demonstrate that the undulating landscape, with the River Corrib being in a shallow valley, and the mature vegetation in the area are reasonably effective in reducing the impact of this very sizable structure on the visual amenities and landscape character of the area. The extensive additional landscaping proposals as part of the PRD will assist in further mitigating the impacts as planting becomes established. The nearest existing bridge on the River Corrib is the Quincentenary Bridge, c. 1.5km to the south, and View 1 demonstrates that the new bridge will be almost imperceptible from this existing bridge. Similarly, the photomontages from an elevated position on Coolagh Road (View 4, to the east of the bridge) and a similarly elevated position at Bushypark House (View 9, to the west of the bridge) illustrate the extent to which topography and vegetation mitigates the visual impact of the bridge/viaduct structure from the wider area. The bridge is somewhat more visible from elevated areas to the south west, as illustrated in the view from Circular Road (View 13). However, the location of the bridge within the River Corrib valley means that the bridge does not break the skyline, and I do not consider it to be unduly intrusive when seen from this area.

Landscaping Proposals

11.14.57. A considerable number of objections/submissions queried the landscaping proposals, with many contending either that the measures were inadequate or that insufficient detail had been provided by the applicant.

11.14.58. In response to this issue, I would refer the Board in the first instance to Section 12.6 of the EIAR, where details of the landscape mitigation measures and landscape proposals are set out, and the associated Figures 12.1.01 – 12.1.15. Additional landscaping commitments were also made at the oral hearing and are included in the final version of the Schedule of Environmental Commitments (SoEC) submitted at the hearing.

11.14.59. During the main construction phase, no significant landscaping-based screening is proposed, with the screening of construction works achieved through hoardings in the vicinity of dwellings and careful storage of materials. It is stated that side slopes and other landscape areas along the PRD will be prepared for soiling, and either seeded and/or planted at the earliest possible opportunity. This commitment is reflected in the SoEC, however I note that there is an inherent contradiction within Items 12.7 of the SoEC, and that Items 12.7 and 12.8 of the SoEC would also appear to contradict each other somewhat.

11.14.60. Item 12.7 states that: "Side slopes and other landscape areas along the proposed road development shall be prepared for soiling, and either seeded and/or planted at the earliest possible opportunity. As such, some scope may exist for undertaking significant areas of seeding and planting prior to the end of the construction works. **However, due to construction programming and seasonal restrictions, it is also likely that significant planting works will not be undertaken until the end of the major construction phase**" [emphasis added].

11.14.61. Item 12.8, however, states that: "All mitigation planting will take place at the earliest opportunity feasible during the construction stage so as to maximise establishment prior to road opening".

11.14.62. It can be seen by comparing the pre- and post-establishment photomontages included in Appendices 12.2 and 12.3 of the EIAR that the landscaping forms a very important role in mitigating the visual and landscape impacts of the PRD, and as such, it would be appropriate to front-load seeding and planting works prior to the end of the construction works, where possible. The construction phase is predicted to last three years, with works occurring simultaneously on different sections, and while I understand why the applicant would wish to defer planting until the end of the construction phase, I do not accept their statement that construction programming or

seasonal restrictions would prevent such planting works from being undertaken. Should the Board decide to approve the PRD, I recommend that Item 12.7 of the SoEC be amended to omit the final sentence and clarify that early planting be undertaken where possible.

11.14.63. During the operational phase, both project-wide landscape measures and specific landscape measures are proposed, as detailed in Tables 12.7 and 12.8 of the EIAR, respectively. The measures are also identified, as appropriate, on Figures 12.1.01 to 12.1.15 of the EIAR. Mr Burns, in Section 4.2 of his submission to the oral hearing, also set out the landscaping measures and proposals in respect of each of the properties where objectors had contended that inadequate or insufficient detail had been provided. This is addressed in the CPO section of this report for each objector. However, I consider that full and clear details of landscaping proposals have been provided by the applicant and I do not consider that any uncertainty remains.

11.14.64. A dense network of deciduous and evergreen native planting is proposed to provide screening of the PRD and traffic utilising it and to assist it in assimilating into its wider landscape setting. The applicant accepts that the exposed nature of the landscape in certain areas (i.e. in Western areas) will have the effect of restricting the overall growth and height of proposed planting. Such restricted growth would be typical of planting in this area and contributes to the open character and views of the area. I consider that it will remain relatively effective in screening the road, which is a single carriageway in this area, with at grade junctions, and as such will be intrinsically less intrusive. The exposed nature of the area may, however, result in failure of planting in some instances and I note that Item 12.14 in the SoEC commits to replacing failed, dead or defective plants. This will be an important element of the maintenance and aftercare programme of the PRD, in my opinion.

11.14.65. In general, new hedgerow planting is proposed along the full extent of the fenceline boundary of the PRD and around attenuation ponds. The exception to this is at structure locations, such as bridges, tunnels etc. This hedgerow will comprise a double staggered hedgerow with tree planting, where locally appropriate, and will be a mix of blackthorn (in the western areas), hazel (in the eastern areas), hawthorn and holly, interspersed with elder, willow and other trees found in the local environment. In total, the applicant notes that this will result in the planting of over

68km of new hedgerow with c.275,000 hedgerow trees and shrubs, which includes over 2,700 half-standard sized trees.

11.14.66. Additional screen planting is proposed in many areas, where sufficient land is available within the development boundary, in planting belts that are a minimum of 3m or 6m wide, depending on location, as illustrated in Figures 12.1.01 to 12.1.15 of the EIAR. This depth of planting increases up to c. 18m on some of the embankments. This screening planting includes various quick growing native tree and shrub species, with a total of over 300,000 sq m of screen planting.

11.14.67. In total, the proposed landscaping measures will result in the establishment of over 500,000 sq m of new planting using approximately one million trees and shrubs.

11.14.68. While the construction of the PRD will require the removal of a large amount of existing hedgerows and planting and the insertion of civil engineering works within a rural or semi-rural area, the proposed landscaping works are extensive and comprehensive, and I consider that they will generally be successful in mitigating the landscape and visual impacts associated with the PRD to a considerable extent. This mitigating effect will increase over time as the planting becomes established, and the series of photomontages included in Appendix A.12.3 of the EIAR demonstrate the effectiveness of this planting, particularly in the post-establishment phase, in screening the PRD and embedding it within the receiving landscape.

11.14.69. In conclusion on this issue, I consider the proposed landscaping proposals to be unambiguous and sufficiently detailed and I further consider them to be of high quality and comprehensive, noting in particular the use of layers of native planting and the broad mix of species and deciduous/evergreen species. Notwithstanding this, while the landscaping will be generally successful in mitigating the landscape and visual impacts of the PRD to a considerable extent, there will remain adverse impacts, including significant and profound adverse impacts, for a number of receptors as outlined above.

Boundary Treatments, including Stone Walls

11.14.70. A number of parties contended that inadequate details of the proposed boundary treatments had been provided by the applicant or objected to the proposed removal of existing stone walls and the proposed use of timber fencing rather than replacement stone walls in various areas.

11.14.71. The applicant's approach to proposed boundary treatments is set out in Section 5.5.4.3 of the EIAR and was clarified in their RFI Response, Appendix A.1.9 of which includes boundary treatment detail drawings and Figures 1.6.01 to 1.6.30, which identify the locations of the various boundary treatments. An updated version of these boundary treatment drawings was included as an Appendix to the final SoEC submitted before the close of the oral hearing, to address additional commitments made in the course of the hearing.

11.14.72. The issues of stone walls were addressed in Section 4.4 of Mr Burns submission at the oral hearing. He noted that Chapter 11 of the Galway City Development Plan includes references to retention of stone walls "where possible" (section 11.2.8, pages 176-180); and "where feasible" (section 11.3.1 (a), page 185), and that the Galway County Development Plan contains similar references to retention and incorporation of features such as stone walls into development, "wherever possible" or "wherever feasible" (e.g. Objective NHB 11, page 162 and DM Standard 41, page 239).

11.14.73. Mr Burns contended that the existing stone wall field boundaries are often dilapidated and overgrown with scrub, and as such they are not – and never were – of a character or quality of the stone wall landscape of east Galway. He contended that, in most places these original field boundary features are fading into the background landscape, with their original prominence continually declining. The applicant's position is that these features are retained along the PRD, wherever possible, as illustrated in Figures 12.1.01-12.1.15 of the EIAR, and that existing stone walls along local roads and around residential properties will be retained or replaced where possible.

11.14.74. Mr Burns contended that it would be impractical and inappropriate to build new stone walls along the mainline of the PRD as, given the varied and understated nature of indigenous stone walls in the landscape, newly constructed stone walls along the mainline would in themselves be overbearing, out of character and visually incongruous in this landscape.

11.14.75. I note that Section 2.6 of the RFI response notes the ecological, cultural heritage, aesthetic, natural heritage and amenity value of dry-stone walling. However, the 'Typical Stone Wall' detail drawing (GCRR-SK-C-001) contained in

Appendix A1.9 of the RFI response shows a mortared wall. The Inspectors asked the applicant at the oral hearing on 21st October 2020 why dry stone walls were not being proposed instead of this more engineered approach. The applicant's response was that the proposed design was more resilient and robust. I consider this response to be acceptable, noting the need for secure boundaries in the interests of road safety and ease of maintenance.

11.14.76. The removal of large extents of stone walls is regrettable. However, stone walls are relatively common in the vicinity of the PRD, and I do not consider that constructing stone walls along the mainline boundary of the PRD would be an effective mitigation measure. The existing stone walls that it is proposed to remove are generally dry stone walls, and are extremely heterogenous with variations in height, construction and alignment. They typically bound small irregularly shaped fields. Any replacement walls along the PRD mainline would, by necessity, be homogenous, with more uniform structure and alignment and each section would be of considerable length. I would agree with the applicant's assertion that such walls would be visually incongruous and in my opinion would be relatively alien within the receiving environment, creating their own visual and landscape impacts. I consider that the proposed approach of timber fencing with dense boundary planting is a more appropriate solution along the PRD mainline from a landscape and visual perspective. With regard to local roads and boundaries to dwellings, I consider it appropriate to construct high quality stone walls as proposed, where there will be impacts on existing walls. I also note that the applicant has undertaken to make the dismantled stone from walls available to landowners, should they wish to re-erect walls on their side of the PRD boundary. This would be at the landowners' expense, and, therefore, may have limited uptake. However, it may be of interest to landowners who view stone walls as an important feature of their landholding.

11.14.77. Section 4.11 of the applicant's Main Brief of Evidence provides individual responses to the CPO objections which raised boundary treatment issues and these are addressed in the CPO Section of this report.

11.14.78. The proposed 1.3m high post and rail timber fencing, which is the main boundary treatment proposed, is a typical fencing design in accordance with TII Standards and is found on road schemes across the country. It is rendered mammal resistant with infill mesh along the majority of the mainline and, once reinforced with

native planting as is proposed, I consider that it strikes an appropriate balance between road safety and minimising visual impacts on the receiving environment. Where fencing is proposed along the boundaries of equine enterprises, a slightly different stud fencing is proposed, which does not result in any additional visual impacts.

11.14.79. A number of submissions also queried the boundary treatments around attenuation ponds or contended that the ponds would be unsightly. Mr Burns stated at the oral hearing that paladin security fencing is proposed, with landscaping planting around the ponds. This is also indicated on the boundary treatment drawings. I note, however, that the detail fencing drawing submitted by the applicant in Appendix A.1.9 (amended version included as an appendix to the final SoEC) is of a palisade fence, not a paladin fence. Palisade fences are a more visually intrusive and less transparent form of fence due to the heavy vertical bars, and in the interests of clarity I recommend that the Schedule of Environmental Commitments be amended to require all security fencing to be paladin type fencing. I consider a c. 2.4m high metal paladin fence to be appropriate around these ponds in the interests of health and safety, and I consider that the proposed planting will soften the visual impact of the metal fencing as it becomes established.

11.14.80. In conclusion, I consider that the proposed boundary treatments and the removal of stone walls is acceptable from a landscape and visual impact perspective, and that the mitigation measures proposed, including very substantial landscaping proposals, will assist in mitigating the impacts associated with the boundary treatments.

Road Lighting Impacts

11.14.81. A number of parties, primarily objectors/observers living close to the PRD, raised the issue of road lighting, particularly with regard to the impact of light spill, light pollution and associated impacts on residential amenity.

11.14.82. The proposed lighting column locations and lighting isolines are shown on Figures 5.4.01 to 5.4.15 of Volume 3 of the EIAR. I note that the full extent of the PRD mainline will not be lit, with road lighting generally limited to junctions and tunnel portals and their immediate approaches. The extent of the PRD mainline from the eastern portal of Lackagh Tunnel (Ch. 11+420) as far as the N83 Tuam Road

Junction (Ch. 14+000) would, however, be lit. Road lighting is also proposed along the proposed N59 Link Roads North and South, City North Business Park Link and Parkmore Link Road. It is also proposed on the extents of the N83 Tuam Road, N84 Headford Road, School Road, Racecourse Avenue, Ballybrit Crescent Junction, Briarhill Link and proposed Coolagh Junction where there are tie-ins to the existing road network, with road lighting generally already present through most of this area.

11.14.83. A variety of lantern types are proposed of various heights and light emissions, and all will be LED. Section 5.5.4.4 of the EIAR states that lighting will comply with TII Standards and DMRB requirements and that the use of LED fittings with well-defined, controlled light beam distribution will significantly reduce light spill compared to traditional discharge lamps. Lanterns will include cut-off fittings, which prevents light emission to the sky and minimises light spill off the PRD.

11.14.84. It can be seen from the lighting isolines on Figures 5.4.01 to 5.4.15 that the lighting design approach will ensure that lanterns are generally effective in limiting light spill beyond the PRD boundary. This is assisted in some instances by the location of the PRD in cutting, which shields nearby properties from light spill. I consider the extent of lighting to be reasonable and appropriate to the receiving environment, with that proposed in the more rural areas west of the N59 limited to junctions and their approaches, which will meet the required road safety function of lighting, while minimising the visual impact associated with the introduction of this new feature in the landscape. More extensive lighting is proposed east of the N59. This section of the PRD is Motorway, with associated large-scale grade-separated junctions, which must be lit. The receiving environment in this area is generally more built-up and suburban in nature, and many of the roads in the vicinity of the PRD are already lit. I, therefore, consider that lighting is an existing feature of the landscape in this area and the impact of the additional lighting will not be as significant.

11.14.85. The landscape planting measures proposed along the mainline, as outlined above, as well as the noise barriers in certain locations, will also be of benefit in mitigating the landscape and visual impact of lighting, both from the lanterns but more particularly from vehicles using the PRD.

11.14.86. In conclusion, I consider that the nature and extent of road lighting proposed is sensitive to the receiving environment, and I do not consider that it is excessive,

with lighting generally only provided where required for road safety reasons, or where urban roads are being provided. While some rural areas currently removed from public roads will be exposed to additional light emissions, I do not consider that the levels of light spill or light pollution that will arise from the PRD will significantly impact on the landscape or visual amenities of the area.

Proposed Parkmore Link Road Modification

11.14.87. Mr Burns addressed the potential landscape and visual impacts of the proposed modification of the Parkmore Link Road in Section 3.1.10 of his Brief of Evidence to the oral hearing. The modification includes for berms and associated 3m wide screen planting to mitigate any potential visual impact on Galway Racecourse and the applicant contends that the proposed modification will not have any significant landscape or visual impact either locally or in the wider setting and does not alter the EIAR assessment.

11.14.88. The location of the modified extent of the Parkmore Link Road is a marginal piece of land to the rear of the Boston Scientific industrial site, close to the boundary with Galway Racecourse. Having inspected the site I do not consider that this area is sensitive from a landscape or visual impact perspective, and I would concur with the applicant that no significant additional landscape or visual impacts are likely to occur as a result of the proposed modification.

Conclusion on Landscape and Visual Impact

11.14.89. I have considered all of the written and oral submissions made in relation to landscape and visual impact matters, in addition to those specifically identified in this section of the report. It is considered that the assessment of the landscape and visual impact conducted by the applicant together with the information provided during the course of the application, including at the oral hearing, is adequate to enable a full and comprehensive assessment of the issues.

11.14.90. The construction phase of the PRD will result in a range of landscape and visual impacts on certain landscapes and receptors, including significant and profound impacts. The mitigation measures proposed during this phase will have limited effect due to the scale and nature of the development, and it is considered that the negative landscape and visual impacts will continue during the construction

phase. Having regard to the limited duration of construction, and the linear nature of the development, I do not consider that these impacts would be unacceptable.

11.14.91. During the initial operation stage, landscape and visual impacts will continue, but the significance and severity of these impacts will generally abate over time as the proposed landscape mitigation proposals become established and increasingly effective at screening the PRD and/or incorporating it into the landscape. However, significant and profound negative residual visual impacts will continue to arise for numerous residential properties located close to or adjoining the boundary of the PRD, and particularly in the vicinity of major engineering structures at post-establishment stage. Significant residual impacts on landscape character will also continue to arise at a number of locations. The proposed mitigation measures, and particularly the extensive and comprehensive landscaping planting proposals, will not fully mitigate significant or profound impacts. However, they will ameliorate the impacts to a certain extent and this will increase over time as planting matures.

11.14.92. Significant residual visual impacts will also occur in the River Corrib valley at Menlo Castle and the NUIG Sporting Campus, primarily due to the visual intrusion associated with the proposed River Corrib Bridge and associated viaduct. These structures do not result in significant visual impacts in the wider area, due to topography and existing/proposed vegetation.

11.14.93. With regard to potential cumulative impacts, I do not consider that significant cumulative visual and landscape impacts beyond those associated with the PRD are likely to occur.

11.15. Material Assets – Archaeological, Architectural and Cultural Heritage

11.15.1. Archaeological, Architecture and Cultural Heritage is addressed in Chapter 13 of the EIAR. The series of Figures 13.1.01 to 13.1.15, contained in Volume 3 of the EIAR identify the relevant features, sites and areas described below, while the series of Appendices A.13.1 to A.13.12 contain supporting information on the receiving environment, the legislative framework, impact assessment methodology and mitigation measures. A submission responding to the heritage-related written submissions/objections, was given at the oral hearing on 20th February 2020 by Faith Bailey of IAC Archaeology on behalf of the applicant. The Schedule of

Environmental Commitments, which was updated at numerous stages over the course of the oral hearing, also sets out commitments in relation to archaeological, architectural and cultural heritage.

11.15.2. The assessment undertaken for the purposes of the EIAR included desk and field-based research, as well as information gathered during the constraints and route selection studies.

Receiving Environment

11.15.3. The receiving environment is defined in the EIAR as an area measuring c.250m from the edge of the PRD. Having regard to the linear nature of the proposed development and the construction methodology outlined in the EIAR, I consider this to be a suitably conservative definition. I also note that it is significantly wider than the recommended 50m from centreline measurement recommended in the *Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes* published by the then National Roads Authority in 2005.

11.15.4. A total of 41 No. Archaeological Heritage Sites (AH sites) are recorded within the receiving environment, however, the EIAR notes that 17 No. of these AH sites are due to be removed from the records by the Department of Culture, Heritage and the Gaeltacht for various reasons (e.g. non-archaeological, removed by quarrying/modern development etc.). Seven of the AH sites are recorded within the footprint of the road development, of which 6 No. are dismissed for reasons including already removed by quarrying etc. No trace of the seventh, which is a bullaun stone (Ref. AH2), has been found.

11.15.5. A total of 27 No. Protected Structures (BH sites) are recorded within the receiving environment, 9 No. of which are also AH sites. 1 No. Protected Structure is located within the footprint of the road – a single storey thatched cottage within the townland of An Caislean Gearr (Ref. BH12).13 No. structures included in the National Inventory of Architectural Heritage (NIAH) are located within the receiving environment, and in a number of cases these again overlap with Protected Structures and recorded monuments.

11.15.6. There are no Architectural Conservation Areas located within the receiving environment, with the closest being Bearna village, which is c. 940m to the south-east of the road. A total of 9 No. designed landscapes (DL sites) have been identified

within the receiving environment, 4 No. of which are associated with a Protected Structure (Bearna House, Rahoon House, Bushypark House, Menlo Castle).

11.15.7. 72 No. previously unrecorded sites and structures of archaeological and architectural heritage merit (CH sites) have been identified during the course of the appraisal and are described in Table 13.9 of the EIAR. In addition, 12 No. areas of archaeological potential (AAP sites) have been identified and are described in Table 13.10 of the EIAR. I also note that the PRD traverses 33 No. townlands.

Potential Impacts

11.15.8. With respect to potential impacts, the EIAR notes that ground disturbances associated with the **construction** of the road have the potential to directly and negatively impact on a number of sites. These are listed in Tables 13.3 to 13.16, and I note the following sites that may experience significant or profound direct impacts:

- **Profound impacts:**
  - AH2: Bullaun stone.
  - BH12: Thatched cottage.
- **Significant impacts:**
  - DL8: Menlo Castle Demesne.
  - CH2: Site of vernacular buildings.
  - CH18: Vernacular cottage.
  - CH26: Vernacular cottage.
  - CH29: Site of vernacular buildings.
  - CH34: Site of vernacular building.
  - CH38: Possible square enclosure.
  - CH49: Possible prehistoric tomb.
  - CH52: Site of vernacular buildings.
  - CH55: Site of vernacular buildings.
  - CH56: Site of vernacular buildings.

- CH57: Possible mass path.
- CH58: Site of vernacular buildings.

11.15.9. The EIAR also notes the potential for moderate to profound negative impacts to occur on as yet undiscovered subsurface archaeological features, deposits or artefacts that have the potential to survive beneath designated AAPs or in places where there is no surface expression. Potential negative impacts on townland boundaries are also identified.

11.15.10. No indirect impacts arising from vibration or dust associated with the construction activities are anticipated.

11.15.11. During the **operational phase**, the proposed development has the potential to indirectly and negatively impact on a number of sites. These are listed in Tables 13.17 to 13.20, and I note the following sites that may experience significant indirect impacts:

- **Significant impacts:**
  - AH15: Summer house.
  - AH16: Menlo Castle.
  - BH9: Summer house.
  - BH10: Menlo Castle.
  - DL8: Menlo Castle demesne.
  - CH20: Vernacular buildings.
  - CH23: Vernacular cottage.

Mitigation Measures

11.15.12. Mitigation measures are described in Section 13.6 and in Appendix A.13.11 of the EIAR. The proposed construction phase mitigation measures include:

- Test trenching within the footprint of the PRD prior to construction. Provision for excavation where appropriate.
- Full measured, written and photographic survey of the thatched cottage (BH12) prior to demolition.

- Excavation of all previously recorded archaeological sites, where these fall, in whole or in part, within the footprint of the development.
- Detailed photographic and written record of the demesne landscape associated with Menlo Castle (DL8), at Dangan Lower (DL7) and at Bushypark House (DL4) prior to the construction of the PRD.
- Detailed written and photographic survey (to include test trenching where appropriate) of all Cultural Heritage (CH) sites listed in Table 13.17 of the EIAR that include built heritage remains. Provision for excavation where appropriate.
- Archaeological wade or underwater assessments will be carried out at any natural water courses (AAPs) to be impacted upon by the PRD by disturbance to their banks or beds. Provision for excavation where appropriate.
- Detailed written and photographic survey (to include test trenching where appropriate) of any section of Townland Boundary to be impacted upon. Provision for excavation where appropriate.

11.15.13. The proposed operational phase mitigation measures to address indirect impacts are to undertake a detailed photographic and written landscape record of the following sites to preserve their current setting prior to the construction and operation of the PRD (i.e. these mitigation measures will be carried out during or prior to the construction phase):

- AH 15, 16, 29, 11, 12, 23 and 26.
- BH 1, 7, 9, 10 and 17.
- CH 20, 23, 8, 25, 30, 35, 42 and 54.

Residual and Cumulative Impacts

11.15.14. The EIAR predicts no residual impacts during the construction phase, once the recommended mitigation measures have been applied.

11.15.15. During the operational phase, it is stated that the proposed mitigation measures will not fully remove the residual impact of the PRD on the setting of Menlo Castle (AH 16/ BH 10) and the Summer House at Dangan Lower (AH 15/ BH

9)[29] and that an indirect moderate negative impact on the castle and Summer House will remain.

11.15.16. Potential cumulative impacts are addressed with a range of projects and plans listed in Section 13.7.4 of the EIAR, and in the various iterations of the Cumulative Impact Assessment Update Addendum Report that deals with approved and pending applications since publication of the EIAR. No proposed developments are identified that will result in a significant negative cumulative impact upon the archaeological, architectural and cultural heritage resource.

11.15.17. Tables 13.21 to 13.26 of the EIAR provide a comprehensive summary of the sites, the potential impacts and the proposed mitigation measures.

..15.18. **Assessment**

11.15.19. I consider that the potential significant impacts are as follows:

- Recorded Monument and Protected Structure to be demolished.
- Menlo Castle.
- Archaeological features in Coolagh/Menlo area.
- Stone walls.
- Impact on Gaeltacht cultural heritage.
- Parkmore Link Road Proposed Modification.

Recorded Monument and Protected Structure to be Demolished

11.15.20. As noted above, potential profound direct impacts have been identified for 1 No. recorded monument and 1 No. protected structure. The recorded monument is listed as a Bullaun Stone (AH2). However, it was not found during a site inspection by the applicant, or during an earlier survey by the Archaeological Survey of Ireland. It would appear, therefore, that the feature is either no longer extant or that it has been moved.

11.15.21. The protected structure that it is proposed to demolish is located along the proposed PRD mainline at approx. chainage 12+875, in the townland of An Caislean

[29] Section 13.7.3 of the EIAR, dealing with residual operational impacts, uses incorrect reference numbers for these two structures.

Gearr/Castlegar. The structure in question is a single storey thatched cottage (Ref. BH12) and is identified in the National Inventory of Architectural Heritage (NIAH) as being of 'Regional' interest, under the 'architectural' and 'technical' categories. It is described as follows:

> *"Detached four-bay single-storey thatched house, built c.1800. Pitched reed thatched roof having smooth rendered low chimneystack. Painted smooth rendered walls. Square-headed window and door openings having painted render surrounds, painted sills, replacement timber windows and replacement timber panelled door. Smooth rendered wall and hedgerow to boundary."*

11.15.22. The NIAH Appraisal states that "the low elevation, thick walls, and small openings are typical of the vernacular tradition in Ireland. Once common throughout the countryside and small villages, thatched buildings have become increasingly rare. This example retains its original form and notable features such as its low chimneystack, and is pleasantly presented with painted details".

11.15.23. While this is an application under the Roads Act 1993, as amended, I note that under section 57(10)(b) of the Planning and Development Act 2000, as amended, a planning authority, or the Board on appeal, shall not grant permission for the demolition of a protected structure or proposed protected structure, save in exceptional circumstances.

11.15.24. The proposed mitigation measure is a full measured, written and photographic survey of the structure, prior to demolition. While the EIAR considers that no residual impacts remain I do not accept that the creation of a 'record of the past' (as it is described in the NRA 'Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes') will mitigate the profound impact arising from the demolition and removal of a protected structure. I consider that there will be a profound direct residual impact on the protected structure.

11.15.25. Notwithstanding this, I consider that there are exceptional circumstances associated with the need and purpose of the PRD and the positive impacts it will have in other areas which, when balanced against the demolition of the thatched cottage, would support its demolition. While the pre-demolition survey would not fully alter the magnitude of the predicted impact, it is a reasonable compromise in my opinion.

Menlo Castle

11.15.26. The potential impact on the setting of Menlo Castle and its demesne was raised in a number of submissions, and raised at the oral hearing by a number of parties, including Mr Stephen Dowds on behalf of the Galway N6 Action Group on the 20th October 2020 and Mr Ciaran Ferrie on 4th March 2020 and 21st October 2020.

11.15.27. Menlo Castle which dates from c. 1550, is currently in a roofless and ruinous state and covered in ivy, having been gutted by fire in 1910. It is included within the Record of Monuments and Places, is a Protected Structure (AH 16/ BH 10) and is included on the NIAH. However, it is not a National Monument. It is located on the eastern bank of the River Corrib, in a mixed agricultural and wooded landscape, which was formerly part of its demesne lands. The NUIG sports campus at Dangan is located on the opposite side of the River Corrib, and there are unobstructed views of the Castle from the riverside walk within the NUIG lands. A small ruined stone structure, identified as a Summer House (AH 15/ BH 9) is located on the western bank of the River Corrib and appears to have been historically associated with the Castle (described as a possible tea house for residents of Menlo Castle).

11.15.28. Menlo Castle is located c. 140m northwest of the proposed River Corrib Bridge and the bridge will run between the Castle and the Summer House. The applicant considers that there is the potential for an indirect significant negative impact upon both the Castle and Summer House as archaeological and built heritage sites, which they propose to mitigate with a detailed photographic and written record of the current setting, resulting in an indirect moderate negative residual impact on both structures during the operational phase

11.15.29. With regards to the post-medieval demesne landscape (DL 8) associated with the 18th and 19th century use of the Castle, the predicted impact is a direct, significant negative impact, again to be mitigated with a detailed record. Ms Bailey, in her submission at the oral hearing, stated that the former demesne now exists in a denuded state and that sections have been subject to modern development. She stated that, considering the poor state of preservation of the designed landscape, it cannot be considered as representing the full curtilage associated with the protected structure.

11.15.30. Mr Ciaran Ferrie, in his oral hearing submissions, contended that the proposed development would significantly impact the curtilage and attendant grounds of Menlo Castle, and damage its unique character and setting, isolated on the banks of the River Corrib. He also contended that there was a contradiction between Ms Bailey's evidence at the hearing that there would be a significant impact on setting and Mr Burns' evidence that this would not be the case. I note, however, that Ms Bailey and Mr Burns were addressing cultural heritage and landscape and visual impacts, respectively, and while there is obviously an interconnection between the two disciplines in respect of Menlo Castle, I do not consider that there was any substantive contradiction in the submissions made.

11.15.31. In order to understand the nature and magnitude of the indirect impact on Menlo Castle and the Summer House, I refer the Board to the photomontages included in Appendix A.12.2 of the EIAR. These show the proposed River Corrib Bridge from a wide variety of viewpoints, and viewpoints 5, 6, 7, 19, 20, 21, 22 are instructive in this regard. I consider that the existing planting to be retained, combined with the simple open design of the proposed bridge, which crosses the River Corrib with a single span (i.e no pier within the River) and the separation distances involved, are sufficient to mitigate the residual impact on the Castle and Summer House to an acceptable level, noting also that a detailed photographic and written record of the existing structures and their setting is to be made prior to construction.

11.15.32. From a cultural heritage perspective, I would concur with the applicant that the PRD will have an indirect moderate negative residual impact on Menlo Castle and the Summer House. The potential landscape and visual impacts on Menlo Castle and its setting are also addressed in Section 11.14 of this report.

Archaeological Features in Coolagh /Menlo Area

11.15.33. A number of parties, including Ms Linda Rabbitte (Ob_584; oral submission 3rd March 2020) and James and Cathleen Barrett/Menlo-Ballindooley Residents (S_074; oral submission by Patrick McDonagh on 6th March 2020) raised concerns in their written and oral submissions regarding the potential impacts on architectural archaeological heritage features in the Coolough and Menlo area. These include a famine village settlement, thatched cottage (Protected Structure), Menlo castle and

its associated gate lodge, burial ground, Sean Bothar, which is stated to have been the route used by Oliver Cromwell's Army to enter Galway, and various unrecorded features which were not identified in the EIAR.

11.15.34. Ms Bailey responded to the issues in her initial submission to the hearing, and in responding to the oral submissions made and questions asked of her. In response to Ms Rabbitte, she confirmed that as per the EIAR, the entirety of the development would be subject to archaeological testing and mitigation, in consultation with the National Monuments Service. The thatched cottage at Coolough is identified as BH11, and is located 63m north west of the existing access to Lackagh Quarry. The PRD will be c. 314m north of the cottage. The EIAR considers the impact on BH11 to be neutral, and given the separation distances I would concur with this assessment.

11.15.35. In relation to Ms Rabbitte's queries regarding the impacts on construction traffic on Menlo castle gate lodge, Ms McCarthy, on behalf of the applicant, noted that the proposed haul route terminates on Bothar Nua at the crossing of the new road, and that construction traffic will not pass Menlo National School (Scoil Brighde) or access the site via the gate lodge.

11.15.36. With regard to the additional unrecorded archaeological features referenced by Mr McDonagh at the oral hearing on the 6th March 2020, the applicant noted their difficulty responding to the issues raised without knowing the location of the features in question. Mr McDonagh agreed to attend a joint archaeological field inspection with Ms Bailey where he would identify the locations of the features. This field inspection was undertaken on the 29th September 2020, and I note that a representative of TII also took part in the inspection. The results of this field inspection were submitted at the oral hearing on 14th October 2020 ('Archaeological Field Inspection, Coolagh Townland, Galway'; Ref. 79). It states that all of the 5 No. sites identified by Mr McDonagh are located outside of the footprint of the proposed N6 GCRR and that none of the sites are visible within historic mapping or have previously been recorded as archaeological or architectural sites. Ms Bailey contends that the sites may relate to animal husbandry use, and are likely to be post-medieval or relatively modern in date.

11.15.37. Mr McDonagh did not re-appear at the oral hearing following the submission of Ms Bailey's field inspection report, so it is uncertain whether or not he accepts Ms

Bailey's conclusions. Notwithstanding this, having reviewed the field inspection report, including mapping and photographs of the features, I am satisfied that there will be no direct impact on these features and that no significant indirect impacts are likely to occur that would warrant additional mitigation measures, given the nature of the features and the significant distances from the PRD.

Stone Walls

11.15.38. A number of parties raised the issue of the proposed removal of stone walls to facilitate construction of the PRD. While the potential impacts of removing such walls is generally a landscape and visual (and potentially biodiversity) impact, and as such are addressed elsewhere in this report, some of the walls have cultural heritage value. Section 4.2.3 of Ms Bailey's submission to the oral hearing referred to Mr Burns submission to the hearing on landscape and visual matters, but also noted that a number of stone walls that will be impacted upon were included in her assessment, as laid out in Table 13.9 of the EIAR (including CH 8, 33, 36, 48, 71 and 72). The sections of these walls to be removed will be subject to a full written and photographic record prior to the commencement of construction works. I consider this to be an adequate mitigation measure, noting that there is no specific protection afforded to these walls, although the Development Plans generally seek that stone walls be retained where feasible.

Impact on Gaeltacht Cultural Heritage

11.15.39. Part of the PRD will be located within a designated Gaeltacht area and, therefore, I consider it appropriate to consider the potential impacts on the cultural heritage of the Gaeltacht, and more particularly the Irish language. This issue was not addressed in Chapter 13 of the EIAR and was instead addressed in Chapter 18, 'Human Beings, Population and Human Health', and in the submission made by Mr John Cronin of John Cronin & Associates on behalf of the applicant at the oral hearing on 20th February 2020 (Ref. 20). This issue is also assessed in Section 11.6 of this report.

11.15.40. Mr Cronin stated that the PRD will not have any significant impact on the use of Irish into the future. However, he also noted that an improved road network will facilitate Irish speakers to commute more easily, lessening the need to re-locate for economic reasons. With regard to the potential for migration to Gaeltacht areas, and

associated 'dilution' of the Gaeltacht, Mr Cronin stated that it will be the responsibility of Galway County Council, Galway City Council and Údarás na Gaeltachta among others to ensure that the use of the Irish language is promoted and encouraged among new residents.

11.15.41. I note that Údarás na Gaeltachta is supportive of the PRD and considers that it will bring economic development benefits to the Gaeltacht area which will enable Irish-speakers to remain in the area.

11.15.42. The applicant considers that the PRD will have a Moderate Positive Impact on the status of Irish as a community language within the Gaeltacht area, and I consider that it will, likewise, have a moderate positive impact on the cultural heritage of the Gaeltacht area by improving access and facilitating economic development which can help sustain the Irish-speaking community.

Parkmore Link Road Proposed Modification

11.15.43. Having reviewed the information submitted by the applicant and having inspected the site, I do not consider that the proposed Parkmore Link Road modification would result in any additional or increased impacts on known features of architectural, archaeological or cultural heritage.

Conclusion on Archaeological, Architectural and Cultural Heritage

11.15.44. I have considered all of the written and oral submissions made in relation to archaeological, architectural and cultural heritage matters, in addition to those specifically identified in this section of the report. I am satisfied that potential significant impacts would generally be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. These proposed measures will, however, fail to fully mitigate the impact of the PRD on a protected structure (Ref. BH12) which it is proposed to demolish. Nevertheless, it is considered that the residual impacts following mitigation, would not justify a refusal, having regard to the overall benefits of the PRD. I am, therefore, satisfied that the proposed road development would not have any unacceptable direct, indirect or cumulative effects on archaeological, architectural and cultural heritage matters.

11.16. **Material Assets – Agriculture**

11.16.1. The issue of material assets – agriculture is addressed in Chapter 14 of the EIAR. The series of Figures 14.1.01 to 14.1.15, contained in Volume 3 of the EIAR identify the plots of land affected by the proposed development, and indicate the location of proposed field entrances to retained lands. Appendix A.14.1, contained in Volume 4 of the EIAR, contains a summary of individual farm impacts. A submission responding to the agriculture-related written submissions/objections, was given at the oral hearing on 19th February 2020 by Mr Con Curtin of Curtin Agricultural Consultants Ltd. on behalf of the applicant. A submission by Mr Michael Sadlier on the same date, which responded to equine-related written submissions/objections, is also of relevance to this section.

Methodology

11.16.2. The assessment undertaken for the purposes of the EIAR is stated as having utilised information gathered during the constraints and route selection studies. It is stated that the author was able to engage directly with landowners in relation to 145 (74%) of the 195 No. agricultural land holdings directly affected by the road development. Where landowners could not be reached, roadside vantage points, aerial photography and other desk information sources were used. The applicant considers that the available data was sufficient for the agricultural impact appraisal.

11.16.3. The study area comprises 195 No. agricultural land parcels that are directly affected by the PRD (a total area of 1,096 ha). These are illustrated in Figures 14.1.01 – 14.1.15 of the EIAR. It is stated that proximity to an expanding city has resulted in many smaller, fragmented holdings and that this, combined with poor land quality (particularly west of the Corrib), means that the sensitivity of agriculture is low (48% of land parcels are considered to be low or very low sensitivity).

11.16.4. The methodology utilised to assess the agricultural impacts included evaluation of the baseline environment (i.e. types of farms and their sensitivity) and evaluation of the nature and magnitude of the effects on each farm and the effects on farming collectively along the entire route and within County Galway. Having considered the sensitivity of the baseline and the magnitude of effects, the impact significance is predicted for each land parcel affected, agriculture collectively along the PRD and agriculture within County Galway.

11.16.5. The Census of Agriculture 2010 statistics show that the average size of farms in County Galway is 25.8 ha compared to the national average size of 32.7 ha. In contrast, the average size of land parcels along the route is c. 6 ha. Approximately 21% of land parcels are less than 1 ha in size and accordingly have limited agricultural use. Beef farming is the main enterprise along the route and compared to the national average the number of small equine enterprises is high. However, as noted below, it is stated that these horses are mainly kept for leisure purposes.

11.16.6. It is stated that while the sensitivity of the beef and sheep farm enterprises range from very low to medium, there is one high sensitivity beef enterprise (cattle trader – PRO4 701) and two high sensitivity dairy enterprises (PRO 239 & PRO 241). The Galway Racecourse (MO6 691) is classified as very high sensitivity due to the equine enterprise and regional importance. There are two very high sensitivity equine land parcels (MO 751 & MO 760) and the remaining equine enterprises are medium, low or very low sensitivity enterprises where horses and donkeys are kept mainly for leisure purposes.

Potential Impacts

11.16.7. **Construction phase** impacts arising from noise, vibration and dust are not considered to be significant. Activities such as rock breaking/blasting and piling may result in a flight response in livestock but the applicant contends that this rarely causes a significant impact. The landtake will result in the acquisition of farm buildings on 17 No. land parcels, which is considered to result in temporary impacts because these facilities can be replaced with new buildings on the retained lands. Potential impacts arising from temporary disruption to power and water supplies and land drainage are also identified.

11.16.8. The reduction in land area once boundary fencing is erected is a permanent impact and the range of impact due to loss of land ranges from not significant to profound. The PRD will cross 62 No. land parcels causing separation of part of the farm, separating approximately 163 ha of land and creating 87 No. new land parcels. This land separation will also be a permanent impact and the range of impact is not significant to significant adverse.

11.16.9. With regard to potential **operational impacts**, the land loss impact which commences with the fencing off of the acquired land during the construction phase is

a permanent residual impact that continues in the operational phase. This impact cannot be mitigated except through compensation. Similarly, the separation/severance of parts of farms is a permanent impact but can be mitigated to an extent by providing access roads to the separated land parcel. This will result in additional travel distances and additional fixed costs on a farm and the range of impact is considered to be not significant to significant adverse. Impacts on drainage and the permanent disturbance impact caused by traffic, noise, air emissions and lighting are generally considered to be not significant.

11.16.10. The potential pre-mitigation impacts on land parcels are summarised in Table 14.6 of the EIAR. 68 No. land parcels are predicted to have a pre-mitigation impact which is significant adverse or greater (35% of all affected land parcels). These are broken down as follows:

- 13 profound impacts.
- 7 very significant adverse.
- 48 significant adverse.

Mitigation Measures

11.16.11. Mitigation of potential impacts takes place under two headings:

- General mitigation measures for the construction and operational phases.
- Compensation under the Compulsory Purchase System.

11.16.12. The general mitigation measures during the construction phase include: maintenance of access to separated lands; provision of alternative water or electricity supplies where interruption occurs; provision of boundary fencing; communication via a key contact person; and prior notification of noisy activities such as rock breaking/blasting; repair of land drains where required; and implementation of water quality and dust control mitigation measures detailed elsewhere in the EIAR.

11.16.13. With regard to the operational phase, the EIAR notes that the loss of agricultural land due to the construction of the PRD is a permanent loss which cannot be mitigated except through financial compensation. Similarly, landowners who lose buildings to the PRD will be compensated. It is stated that all separated land parcels will be accessible either via the local road network or via

accommodation access roads and tracks. Where existing water and electricity supplies to fields or farm yards are severed, the supply will be reinstated by provision of ducting where possible with compensation payments to enable farmers to replace these power and water supplies, or the provision of a permanent alternative water source or electricity supply. Any required re-organisation of fields, additional farm facilities required on separated lands, or other disruption and injury impacts will again be addressed in the compensation settlements. Finally, it is stated that landscaping along the PRD will minimise the visual impact on farms along the route and improve shelter in affected farms over time.

Residual and Cumulative Impacts

11.16.14. The residual impacts during the construction phase generally result from noise, dust and disturbance from construction traffic and construction activities. No significant residual impacts during this phase are anticipated. Operational phase residual impacts such as the loss of land and the separation/severance of land are permanent and, therefore, more significant than the temporary impacts that occur during the construction phase. No significant residual impacts on the drainage of affected farms is anticipated. Table 14.7 in the EIAR identifies the number of land parcels that will experience residual impacts, and identifies the nature of these farms i.e. dairy, beef/sheep and hay/silage, other (incl. equine) and not farmed.

11.16.15. 51 No. land parcels are predicted to have a residual impact which is significant adverse or greater (26% of all affected land parcels). These are broken down as follows:

- 4 profound impacts (2% of land parcels along the route of the PRD).
- 9 very significant adverse (5% of land parcels along the route of the PRD).
- 38 significant adverse (19% of land parcels along the route of the PRD).

11.16.16. With regard to the wider agricultural study area, which consists of the area of all land parcels directly affected (i.e. c.1,096 ha), c. 219 ha will be acquired which represents c. 20% of the study area. Land separation will affect 62 land parcels and 172 ha of land will be separated. However, this will be mitigated through the provision of access to the separated lands. The overall residual impact on agriculture along the PRD is considered to be moderate adverse.

11.16.17. The cumulative impact on regional agriculture is appraised by assessing the impact on agriculture in County Galway due to the landtake for the PRD in combination with other recently constructed and planned roads. Combined, these projects will require <1% of the agricultural area of County Galway which is not considered to be significant.

11.16.18. **Assessment**

11.16.19. I consider that the potential significant impacts are as follows:

- Impacts on retained lands and farm viability.
- Access during construction and operation.
- Noise, vibration, dust and air emissions.
- Impacts on services.
- Impact on land drainage and flood risk.
- Farm security and privacy issues.
- Boundary treatments and landscaping.
- Impacts on equine enterprises.
- Parkmore Link Road Proposed Modification

Impact on Retained Lands and Farm Viability

11.16.20. The PRD will result in the permanent loss of a substantial amount of farmland and the severance of numerous farm enterprises. Approximately 219 ha will be acquired (slightly reduced on foot of modifications to the CPO), representing c. 20% of the study area. Land separation will affect 62 land parcels and 172 ha of land will be separated/severed. The overall residual impact on agriculture along the PRD is considered by the applicant to be moderate adverse. In terms of the study area, I would agree with this assessment.

11.16.21. With regard to individual landholdings, I note that 51 No. land parcels are predicted to have a residual impact which is significant adverse or greater (26% of all affected land parcels). The loss of land cannot be mitigated other than through compensation as part of the CPO process. With regard to severance, the applicant has undertaken to provide alternative access arrangements and provision of

services, as detailed below. The agricultural enterprises that are significantly or profoundly adversely affected are likely to require major changes to their operations, management and scale and this is ultimately a compensation matter.

Access During Construction and Operation

11.16.22. A considerable number of submissions/objections raised concerns regarding access to retained lands during both the construction and operational phases.

11.16.23. During the construction phase, the landholdings which are severed by the PRD are the most likely to experience temporary severance or interruption of access. Section 14.6.2 of the EIAR states that adequate access across the PRD will be maintained for these land parcels during construction by providing temporary crossing points for livestock and machinery until the permanent access accommodation works are in place, and that where temporary disruptions to access occurs landowners will be notified in advance. A key contact person will also be appointed to liaise with landowners and ensure that access requirements are communicated to the contractor and facilitated. These commitments are included as Item 14.1 of the SoEC. Landholdings which are not severed by the PRD may potentially experience temporary disruption due to construction activity and traffic. It is again proposed to address this through liaison and communications.

11.16.24. Having regard to the commitment to provide access and to liaise with affected parties and the limited duration of the construction phase, I would concur with the applicant that impacts associated with access during the construction phase are not likely to be significant.

11.16.25. During the operational phase, access will be provided to all retained lands via new access roads and/or access gates to standard TII design. Mr Curtin addressed access arrangements to each objector's lands individually in his submission, and these are assessed in detail in the CPO section of this report. It should be noted that the proposed agricultural access arrangements for Plots 504 and 506 run through a residential estate known as The Heath, and the majority of the residents are strongly opposed to this proposal. This is again addressed in the CPO section. Noting that all separated land parcels will be accessible either via the local road network or via new access roads, I do not consider that access arrangements in the operational phase are likely to result in significant impacts.

Noise, Vibration, Dust and Air Emissions

11.16.26. The issues of noise, vibration, dust and air emissions are addressed comprehensively in Sections 11.11 and 11.12 of this report. However, I consider it appropriate to address the potential impacts of these issues on livestock health and welfare.

11.16.27. Section 14.5.3 of the EIAR states that general construction noise and vibration will have no significant impacts on livestock. Mr Curtin, in his submission to the oral hearing, stated that this was because livestock very quickly adapt to construction machinery noises, vibrations and movements and will graze land adjoining new roads during the construction and operational phases. However, during the construction phase, livestock may react in an unpredictable manner where there are sudden changes in the grazing environment due to activities such as rock breaking or blasting, there is the potential for injury due to the flight response.

11.16.28. With regard to blasting, Mr Curtin noted the instantaneous nature of blasts, and stated that while blasts are accompanied with air and ground vibrations there is no visual stimuli which is usually required to cause a sustained flight response in livestock. He stated that it was recommended to temporarily remove livestock from the direct vicinity of blasting or rock breaking sites, and to reintroduce the livestock as they become accustomed to blasting / breaking. I consider this to be a reasonable and proportionate approach which will minimise the risk to livestock health and wellbeing. I also consider that good communications and liaison with affected landowners will be an important mitigation measure. I note in this regard the following commitments included in the SoEC:

- 14.4: A key contact person will be appointed during the construction phase to facilitate communications between affected landowners and to facilitate the re-organisation of farm enterprises by farmers during critical times.
- 14.5: Landowners with lands adjoining sites where either rock breaking, blasting or piling takes place will be notified in advance of these activities.

11.16.29. In conclusion, I do not consider that noise and vibration is likely to result in significant impact on agricultural practices or on livestock,

11.16.30. With regard to potential dust impacts on livestock, Mr Curtin stated, in his submission to the oral hearing, that dust will not have a significant impact on grazing livestock, due to their high tolerance to elevated clay/soil content in grass and their lack of sensitivity to air dust particles in outdoor situations. He stated that dust from construction sites does not cause eye irritation or respiratory problems for grazing livestock in the vicinity. Mr Curtin noted that there are no statutory regulations or quality guidance documents in relation to meat or milk produced from farms beside motorways, which he contended was because there are no known significant effects. As identified in Chapter 16 of the EIAR, the predicted maximum annual Nitrogen deposition rate is 1.27 kgs/ha/yr on land adjoining the PRD, and it is not considered that this will significantly affect grass growth or quality.

16.31. Dust will principally be a temporary impact during the construction phase, and as noted in Section 11.11 of this report, I consider that a comprehensive range of mitigation measures has been included in the EIAR and the CEMP to control dust emissions and a dust monitoring regime is proposed during the construction phase. On this basis, and having regard to the limited Nitrogen deposition rate, I do not consider that dust or air emissions are likely to result in significant impacts on agricultural practices or on livestock.

Impacts on Services

11.16.32. Arising from the severing of landholdings, several objectors contended that the PRD would impact on services including electrical supplies, wells or the provision of a water supply to severed portions of land. The EIAR states that there may be temporary disruption to water supplies and commits to monitoring of all wells within 150m of the proposed development boundary (or 50m from the calculated drawdown ZoI if greater) on a monthly basis for 12 months before construction, during construction, and for 12 months after construction. If the monitoring indicates that the PRD has impacted on the well, then the applicant states that mitigation will be applied, comprising either an alternative water source or supply.

11.16.33. Where existing water and electricity supplies to fields or farm yards are severed, it is stated that the supply will be reinstated by provision of ducting where possible. Alternatively, where ducting is not feasible a permanent alternative water

source or electricity supply will be made available, and compensation payments will enable farmers to replace power and water supplies.

11.16.34. Given that services can generally be reinstated or alternative services provided, I do not consider it likely that significant residual impacts will arise as a result of this issue.

Impact on Land Drainage and Flood Risk

11.16.35. Many landowners raised the issues of drainage of retained lands and flood risk arising from the PRD. Drainage proposals and flood risk issues are addressed in Section 11.10 of this report, however the potential agriculture impacts will be addressed in this section.

11.16.36. The potential impact on land drainage is acknowledged in Section 14.5.3 of the EIAR, and mitigation measures are proposed in Section 14.6.2, and more comprehensively in Section 11.6.2 of the EIAR, to address the potential impacts.

11.16.37. Mr Curtin, in his submission at the oral hearing, stated that, during construction, where drainage outfalls are temporarily altered or land drains blocked or damaged, an adequate drainage outfall will be maintained and land drains will be repaired. During both the construction and operational phases of the PRD the surface water run-off will be diverted to a series of treatment ponds before discharging and he stated that the drainage design is adequate to maintain the existing land drainage. With the implementation of these mitigation measures, he contended that the residual impact is not significant.

11.16.38. As I have concluded in Section 11.10, the proposed drainage design is considered to be suitably designed and adequate to drain the PRD without significantly impacting on the drainage of adjacent agricultural lands or increasing flood risk to such lands. Existing agricultural drainage outfalls will generally be retained or reinstated and, following the implementation of the mitigation measures, I do not consider the PRD will result in any significant adverse residual impacts on land drainage or flood risk.

Farm Security and Privacy Issues

11.16.39. Concerns were expressed by a number of parties that the PRD would encourage: trespass on farmlands; anti-social behaviour due to increased

accessibility; and illegal dumping, particularly on proposed access roads. A loss of privacy was also raised by a number of agricultural landowners.

11.16.40. Mr Curtin, in his submission to the oral hearing, contended that incidents of disturbance to livestock due to stray dogs or human trespass are most likely to occur near urban centres where agricultural land adjoins housing estates and as such is an impact that pre-exists the PRD. He contended that there are no significant effects from increased security risk adjoining new road developments and that the theft of machinery and livestock generally occurs in more rurally isolated areas where there is direct access to land from the public road network. As there will be no direct access from the PRD to adjacent lands, he considered that the potential impact from increased security risk is not significant. I would agree with this in respect of the mainline, but note that the PRD also includes link roads, access roads and works to existing roads. Notwithstanding this, appropriate agricultural boundary treatments, landscaping and gates are proposed and I do not consider that any significant impacts associated with trespass or anti-social behaviour are likely to arise.

11.16.41. Mr Curtin, referring to Section 14.6.3 of the EIAR, noted that this potential disturbance impact had been considered in respect of each affected land parcel, as outlined in Appendix A.14.1 of the EIAR, with the conclusion that because it will not have a significant impact on agricultural productivity, the impact is not deemed significant.

11.16.42. With regard to loss of privacy, it is accepted by the applicant that this will occur in respect of certain land parcels, but they contend that it will not have a significant impact on agricultural productivity. In the majority of situations, as the landscape mitigation along the PRD boundary becomes established, privacy will be restored to affected lands and I do not consider that any residual loss of privacy would be unacceptable.

Boundary Treatments and Landscaping

11.16.43. A considerable number of parties, including many agricultural landowners, queried the proposed boundary treatment and landscaping measures. This issue is addressed in detail in the Material Assets – Landscape and Visual section of this report (Section 11.14) and is addressed with regard to the landholding of each specific CPO objector in the CPO Section of the report.

11.16.44. It was contended in a number of submissions that inadequate details of the proposed boundary treatments had been provided by the applicant. Having reviewed the drawings submitted by the applicant, and in particular the series of Boundary Treatment Details Plan Layouts and the detail drawings (refer to versions included in Final Schedule of Environmental Commitments) I consider that there is no ambiguity or lack of detail regarding proposed boundary treatments. The general post and rail timber fence proposed for agricultural lands bounding the PRD are of a standard TII detail, are preservative treated, and are utilised on National Road schemes across the country. I consider that they are a suitable agricultural boundary treatment, and that they will provide adequate security to prevent livestock accessing the PRD. In many areas the post and rail fencing is made mammal-resistant with mesh infill. The accompanying landscaping planting will improve screening of agricultural lands and provide shelter as it matures. Standard agricultural steel or timber gates are proposed at field entrances.

11.16.45. Where equine enterprises are located adjacent to, or are severed by the PRD, it is proposed to provide stud fencing, as addressed in the equine section below.

11.16.46. A number of landowners have sought that stone boundary walls be provided, or have objected to the removal of drystone walls. This is again addressed in Section 11.14 of this report, and in the CPO section where relevant, but I would concur with the applicant's Agricultural consultant that stock-proof fencing is more appropriate where the PRD interfaces with agricultural lands. Drystone walling requires more upkeep and maintenance, as can be seen from the tumble-down appearance of many existing field boundaries, and given the high speed of traffic on the PRD mainline, I consider that the provision of secure and easily maintained stock-proof fencing is preferable from a human and animal welfare perspective.

Impacts on Equine Enterprises

11.16.47. A number of submissions contended that the PRD would impact on equine enterprises.

11.16.48. Mr Michael Sadlier, a veterinary and equine consultant, made a submission at the oral hearing on behalf of the applicant on 19th February 2020. Mr Sadlier noted that equine enterprise is present in 46 land parcels or 24% of land parcels along the PRD, with it being the main enterprise in roughly two thirds of these parcels. Mr

Sadlier contended that the high number of equine enterprises is primarily due to many of the small land parcels being used only to keep ponies and horses for leisure purposes.

11.16.49. Mr Sadlier stated that the only very high sensitivity equine enterprise is Galway Racecourse (Plot 691), while two equine enterprises, comprising typical stud farms, were considered to be of high sensitivity (Plots 751 and 760). The remaining equine enterprises were considered to be of medium or low sensitivity.

11.16.50. Mr Sadlier noted that construction of the PRD has the potential to create a significant amount of abnormal noise and visual stimuli that may be quite intrusive to horses in the immediate vicinity. He stated that when horses are confronted with an exposure to unfamiliar stimuli such as noise, movement, sights etc. a 'fight or flight' reaction can occur which may result in horses running away blindly from the stimuli (potentially injuring themselves or people) or remaining unperturbed. During the operational phase, he stated that horses are normally very adaptive to environmental changes and become very quickly receptive to the aural and visual stimuli associated with normal traffic flow. While Mr Sadlier's assessment is based on his own professional experience, rather than any stated guidance or published research, I note that it is not uncommon to see horses grazing adjacent to busy roads without any apparent distress or disturbance.

11.16.51. The results of the equine assessments, as per Appendix A.14.1 of the EIAR, are that 1 No. holding is profoundly affected, 1 No. holding very significantly affected and 9 No. holdings significantly affected, with the remainder being affected to a lesser extent or not at all. The impacts are generally related to the percentage loss and separation of land, and loss of water supplies. Mr Sadlier contended that these impacts are typical of other major road infrastructural projects and are acceptable when the wider societal benefits are taken into account. The profoundly affected holding (Plot 751) is due to the level of loss and separation/severance of the holding.

11.16.52. A submission was made at the oral hearing on 13th October 2020 on behalf of Mr Tom Burke, the owner of Plot 751, by Mr Kevin Miller. Mr Miller stated that Mr Burke operated an Irish draught horse breeding enterprise. He expressed concern that horses would chew timber fences, and that the wire mesh would be dangerous for horses. He considered that the existing stone wall was important to stop stock

straying, and also raised concerns regarding noise impacts on horses, seeking that a noise barrier be provided.

11.16.53. Mr Sadlier acknowledged that some horses chew fences, but said it was relatively uncommon. Ms McCarthy outlined two fencing options. The first was a double layer of fencing and 2m of planting (with the planting and fence on the landowners side). The alternative option is a tensioned post and mesh fencing. Mr Miller, noting the extent of acquisition contended that the planting and second fence should be located on the road-side, not the field-side. Mr Fitzsimons responding, stated that this is an accommodation works discussion to occur outside of the planning/CPO process.

11.16.54. I consider the proposed timber stud fencing proposal to be suitable for a stud farm enterprise and, should the objector ultimately prefer the double-fence option, I consider that this is a matter for discussion/agreement between the parties as part of the accommodation works. With regard to the request for a replacement stone wall, I have addressed this above and do not consider that it is justified. I do not consider that noise barriers are necessary at this location, noting that horses will adapt to the new noise environment during the operational phase.

11.16.55. The potential impact of the PRD on Galway Racecourse is addressed in various sections of this report, where appropriate, including Sections 10.7 and 10.8. However, purely with regard to equine matters, it is noted that the existing stables would be removed to facilitate construction of the Racecourse Tunnel and replaced with temporary stables, with permanent stables to be constructed, as detailed in Appendix A.15.2 of the EIAR. Having reviewed the replacement stables proposals, it is clear that they are of a very high standard both in terms of design and materials and in terms of equine welfare. The sequencing of construction works will ensure that there is no impact on race meetings.

11.16.56. The SoEC was updated in the course of the oral hearing to include the following items:

- 14.14: The design and construction of the temporary stables and permanent stables proposed for Galway Racecourse will be carried out in consultation with the Irish Horseracing Regulatory Board (Horse Racing Ireland HRI). The

British Horse Racing Association guidelines will be used as a benchmark in the design in the absence of any future specific HRI guidelines.

- 14.15: Galway County Council will continue to liaise with Galway Race Committee in relation to the implementation of any approval granted in so far as it relates to Galway Racecourse.

11.16.57. Mr Dermot Flanagan SC, who represented the Racecourse at the oral hearing, made a number of submissions focussing on the need for certainty and clarity with regard to construction works, phasing, mitigation and monitoring. While the racecourse will be negatively affected through the loss of land, the loss of existing stable, and the routing of a tunnel through its lands, I consider that the high-quality replacement stables will significantly benefit the racecourse and that the commitment made by the applicant to liaise with the Racecourse and ensure that there is no disruption of race meetings will be sufficient to mitigate the impact on the racecourse to an acceptable level. The developer will be bound by the conditions attached to any grant by the Board, and Mr Jarlath Fitzsimons, representing the applicant, provided a response to Mr Flanagan outlining how they would be bound by the commitments made.

11.16.58. Given the level of equine enterprises across the PRD area, the applicant also made an additional commitment at the oral hearing to employ an equine expert or veterinary practitioner for the duration of the construction contract (item 14.13 in final SoEC). Given the percentage of land parcels with an equine enterprise element, I consider that this additional construction phase oversight and monitoring role will be beneficial given the extent of the PRD, and to also address potential impacts in relation to Galway Racecourse.

11.16.59. Having reviewed the equine assessment, I would concur with the applicant's assessment that there will be profound or significant residual effects on a number of equine enterprises due primarily to land loss and land severance which cannot be mitigated, and which will instead be addressed through the compensation process.

Parkmore Link Road Proposed Modification

11.16.60. Having reviewed the information submitted by the applicant and having inspected the site, I do not consider that the proposed Parkmore Link Road

modification would result in any additional or increased impacts with regard to Material Assets - Agriculture.

11.16.61. More particularly, with regard to the potential impact of the modification on the adjacent Galway Racecourse, I would concur with Mr Sadlier's assessment that the proposed noise barrier and the continuous bunding will provide adequate visual and auditory shielding for the racing horses and is not likely to impact on animal health, welfare or performance.

Conclusion on Material Assets – Agriculture

11.16.62. I have considered all of the written and oral submissions made in relation to Material Assets – Agriculture matters, in addition to those specifically identified in this section of the report. Significant or profound residual impacts on retained lands and farm viability will arise in respect of 51 No. land parcels. The loss of land will not be avoided, mitigated or otherwise addressed by means of condition. There is no mitigation for this impact within the EIA process. Impacts due to land severance are mitigated to a degree through the proposed provision of alternative access arrangements and services. However, the agricultural enterprises that are significantly or profoundly adversely affected are likely to require major changes to their operations, management and scale and there is no mitigation for this impact within the EIA process.

11.16.63. There will also be significant to profound negative residual impacts on a number of equine enterprises due to land loss and severance which will not be avoided, mitigated or otherwise addressed by means of condition.

11.16.64. With regard to the other potential impacts assessed under this environmental heading, I am satisfied that significant potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions.

11.17. Material Assets – Non-Agriculture

11.17.1. Material Assets – Non-Agriculture is addressed in **Chapter 15**. Volume 3 of the EIAR contains the figures: Figures 15.1.1 to 15.1.15 illustrate the electrical utilities; Figures 15.2.1 to 15.2.5 illustrate the gas network; Figures 15.3.1 to 15.3.15 illustrate the Demolitions and Acquisitions; and Figures 15.4.01 and 15.4.02 illustrate the Land

Use zonings. Volume 4 of the EIAR contains the Appendices: A.15.1 NUIG Sports Facilities Mitigation Proposals; A.15.2 Galway Racecourse Stables Mitigation Proposals; and, A.15.3 110kV Diversion Details. It is stated that this chapter addresses: Land Use and ownership (non-agricultural properties including residential, commercial and industrial properties); Utilities; and, Land use zonings and planning permissions.

11.17.2. At the oral hearing the applicant made a submission responding to the Material Assets – Non-agriculture related written submissions/objections. This was presented by the Project Lead Ms Eileen McCarthy on the 18th February 2020. Corrigendum to the EIAR presented to the hearing included an amendment to chapter 15 relating to the description of land-take. A number of parties made further Material Asset – Non-agriculture related submissions over the course of the hearing, including questioning of the applicant's consultants. The Schedule of Additional Environmental Commitments was updated during the hearing and included additional commitments relevant to this chapter which were included in the final Chapter 21 Schedule of Environmental Commitments issued on the 4th November 2020. These matters are addressed in the assessment section below.

Methodology and Receiving Environment

11.17.3. The **methodology** and assessment are based on a desk study and on information gathered during consultations. A number of site walkovers and visits were also conducted. The extent of the study area is defined as the lands within the proposed development boundary. There are 313 non-agricultural properties including dwellings, industrial and commercial properties, NUIG Sporting Campus, Galway Racecourse and zoned lands that are directly affected. A total area of 184Ha including agricultural land zoned for future development will be included within the development boundary.

11.17.4. The **receiving environment** is described by chainage from west to east. The land use and zoning, as well as the density of dwellings and where planning permissions exist are described. The existing services are described including the power lines and underground circuits, telecommunications, water and waste, and gas supply. Table 15.3 identifies locations where the PRD traverses existing 110kV and 38kV lines.

Potential Impacts

11.17.5. The evaluation of **potential impacts** states that the road has been designed to avoid as many properties as possible, but given the built environment and the linear development of the city with housing along every road radiating out of the city, there will be a number of property acquisitions and demolitions. Section 15.5.2.1 – 15.5.2.6 details the direct impacts on non-agricultural properties including the demolition of 44 residential properties, 2 industrial properties (one property includes four buildings) and two commercial buildings. In addition, 10 residential properties, one commercial property and one landholding that has a full residential planning permission require full acquisition. Table 15.4 lists the residential, commercial or industrial properties to be fully acquired or demolished.

11.17.6. Table 15.5 identifies the partial land acquisitions. This involves the partial acquisition of lands such as gardens and paved areas and roadbed areas outside of dwelling boundaries or land holdings zoned for residential development. There are 76 such acquisitions. There are 58 residential properties where roadbed only acquisitions are required. Table 15.6 lists partial land acquisition from 12 commercial or industrial enterprises and partial land take from 5 landholdings zoned for commercial or industrial development. The remaining 107 landholdings are made up of the acquisition of isolated road beds from 24 properties, the acquisition of river bed from two properties and the partial acquisition of land from Galway County Council, NUIG Sporting Campus, Castlegar National School, Church at Bushypark, Church at Coolagh, Galway racecourse and disused railway tracks. There is also acquisition of 74 parcels of zoned land. It is noted that NUIG Sporting Campus will be severely affected during construction. The proposal will require the acquisition of lands from five properties upon which there is full planning permission for residential or commercial development. Electricity services, gas services, telecommunication services, water supply and foul water services will each be affected by the proposed road development as detailed in Tables 15.9, 15.10, and 15.11.

11.17.7. During the operational phase it is stated that all properties with the exception of NUIG Sports Pavilion will have access and utilities, and will operate and function to a level of service as is the current situation. The NUIG Sports Pavilion will have restricted access to its western perimeter due to the presence of the road. Through traffic on the Parkmore Link Road will introduce a delay to the movement of product

and people within the Boston Scientific campus. At the start of the oral hearing the road was modified as detailed throughout this report.

Mitigation Measures

11.17.8. **Mitigation measures** during construction are detailed in individual accommodation works agreements such as boundary treatment, domestic entrances, property condition surveys, provision of ducting to facilitate services, maintenance of access etc. which will remove impacts relating to partial land-take. Compensatory measures for the loss of land, buildings and other injurious issues will form part of the process and are dealt with outside of the EIA process. Temporary stables will be provided for Galway Racecourse during the construction of the proposed road development until such time as the Galway Racecourse Tunnel is complete and the permanent stables are constructed. Each of the utility diversions associated with the proposed road development have been planned with ongoing and detailed engagement with relevant utility providers during the preparation of the EIAR. This engagement will continue prior to and during the construction phases. Each diversion has been assessed from both a construction point of view, but also from an operational point of view. Public water supply and foul water systems affected will be reconnected. All necessary diversions will be carried out in accordance with the local authority and Irish Water's requirements. Where private potable water supplies are impacted, a new well or alternative water supply or financial compensation for the loss of the well will be provided.

11.17.9. During the operation phase, the proposed development will result in a 20% reduction of the NUIG Sporting Campus due to encumbrance caused by the viaduct support structures. This will result in the removal of two grass based GAA sized playing pitches. The sporting campus will require a new Sporting Campus Plan and Strategy.

11.17.10. The current cul-de-sac road which provides access to Hewlett Packard and Boston Scientific will no longer become a through road as per the revised plan presented at the oral hearing. The stable yard and associated facilities for the Galway Racecourse will be relocated. Noise barriers where required will be provided across the length of the proposed road development to mitigate potential increase in noise.

Residual Impacts

11.17.11. In terms of the **residual impacts**, it is stated that the very significant/significant impacts on the 54 residential properties, 8 commercial properties, and 1 planning permission will remain as there are **no mitigation options**. The residual impact post compensation cannot be assessed as the compensation to be agreed as part of the land acquisition are outside the scope of the EIA process. Mitigation measures as detailed in individual accommodation works agreements will remove the residual impacts related to the properties with partial landtake. There are no residual impacts on dwellings from which part of the road bed will be acquired. The residual landscape and visual impacts of diverting existing overhead powerlines are considered in **Landscape and Visual** chapter. There will be no residual impacts on services or services infrastructure. The residual impacts on NUIG Sporting Campus remain as very significant in the absence of a new University Sports Masterplan. It is considered that with an appropriate level of masterplanning and implementation, the residual impact would be reduced to moderate. It is considered that there will be a positive residual impact on Galway Racecourse once the mitigation measures have been constructed with the provision of enhanced access to the premises and new stable yard.

11.17.12. **Cumulative Impacts** are assessed with the list of projects previously referred to as well as the SHD developments which were introduced at the oral hearing. It is considered that there will not be a significant cumulative impact as a result of the proposal.

11.17.13. **Assessment**

11.17.14. I consider the potential significant impacts in terms of **Material Assets - Non-agriculture** are:

- Demolition/Acquisition of dwellings
- Demolition/Acquisition of commercial/industrial properties
- Public facilities – churches, schools etc.
- Planning applications
- Impacts on utilities

11.17.15. There is substantial overlap between this topic, **Alternatives** and **Population and Human Health** having particular regard to the level of demolition/acquisition of residential properties. While I address commercial/industrial demolitions below, there is no doubt that the substantial numbers of dwellings to be demolished is a significant impact on the families therein, and on the rest of the community left behind. This is particularly the case where clusters of dwellings are being demolished or acquired, such as Aughnacurra, Ard an Locha, Castlegar and the cluster on the N84. Table 15.4 of the EIAR distinguishes between properties being demolished as a 'significant' or 'very significant' impact, and properties being acquired as a 'moderate' impact. Where families have to unwillingly move out of their homes, I consider this to be a very significant impact for all concerned.

17.16. Other acquisitions in respect of parts of gardens, roadbed and riverbed are in my opinion of moderate, slight to imperceptible impact. I am satisfied that Table 15.5 of the EIAR has adequately assessed these impacts. The specific details are dealt with in the CPO section 13 of this Report whereby further commitments were made and are detailed.

Loss of Dwellings

11.17.17. This subject is addressed throughout this report in section 10.6, 10.8, 11.3, and 11.6. The applicant acknowledges that there are minimal mitigation options for those residents that will lose their homes. The applicant has sought to make funds available within a short period of time to the owners of dwellings, if the proposal is approved by the Board. However, as made very clear by affected parties who spoke at the oral hearing, many consider that this in no way mitigates their losses. Many of the residents made very articulate submissions to the hearing about the effect of losing their home and their community. Other submissions were made by members of the community 'left behind'. In my opinion the demolition/acquisition of dwellings is one of the most significant negative permanent impacts arising from the construction of this road.

11.17.18. I am of the view that the Board must be satisfied that the 'need' for this road and the 'greater good' this road will serve outweighs the impact on the immediately affected residents and the communities left behind. Notwithstanding this, it is considered that the residual impacts following mitigation would not justify a refusal,

having regard to the overall benefits of the PRD including its identified strategic importance at European, National, Regional and local level, its role in alleviating congestion and underpinning the sustainable transport measures of the Galway Transport Strategy and its role in facilitating Galway to grow in a more compact manner, as identified in the National Planning Framework.

Commercial and Industrial properties

11.17.19. With respect to commercial and industrial properties, the EIAR identifies that the proposal will require the partial acquisition of lands such as green open spaces or paved surfaces for car parking. Land take from other non-agricultural properties and the impact therein are listed in Tables 15.6 and 15.7 which I consider gives a fair and accurate assessment of the impact. The proposal will also require the acquisition of lands from five properties upon which there is currently full planning permission for residential or commercial development. At the oral hearing a number of issues relating to such properties were resolved between parties. These are set out in detail in section 13 below.

11.17.20. As stated above in the Planning Assessment, the Parkmore Link Road was re-routed to avoid severance of Boston Scientific lands. The original proposal to effectively sever, interfere and hamper large scale manufacturing operations was not acceptable, in my opinion, where there was an obvious alternative. As noted earlier this was revised at the hearing and discussed therein. I am satisfied that this proposed re-routing will mitigate the impact satisfactorily and recommend that should the Board consider approving the proposal that this amendment is included as a condition.

11.17.21. The loss of NUIG lands has been addressed in section 10.8 and 11.6 under the heading of amenities. As previously noted, NUIG withdrew their objection to the project and are proceeding with their own redevelopment of sports pitches. Thus, I am satisfied that the impact on the amenities is addressed elsewhere in this report.

11.17.22. At the hearing the loss of Brooks Timber and Building Supplies Ltd (Brooks) was discussed. This was subject of much debate and no resolution was forthcoming at the hearing. Brooks are the tenants and while the landowner withdrew their objection the tenant did not. Brooks were of the opinion that the CPO of land to serve a non-road related development for a third party was contrary to law. They were of

the opinion that lands for purposes other than for road related purposes and for the replacement stables for Galway Racecourse was not in accordance with the law. The applicant responded stating that the construction of the Galway Racecourse tunnel resulted in the need to demolish their building regardless of the stables and that the placement of the stables was simply an opportunity following the tunnel construction. As noted in section 10.2 the legal team on behalf of Brooks advised the Board to seek their own legal advice on this matter. However, following lengthy arguments at the hearing, I am persuaded that the buildings occupied by Brooks will need to be demolished for purposes of building the tunnel and that this is the reason for the demolition. I am satisfied that the applicant made use of the fact that this land had to be cleared and, following construction of the tunnel, could be used for purposes such as replacement stables. This is dealt with further in Section 13.

11.17.23. At the hearing the impact on Connolly's Car Dealership was discussed. The extent and purpose of the land to be acquired was discussed and concerns addressed. A request to install transparent noise barriers where the road crosses near the dealership was made as the dealership is a focal point in the area. However, having regard to the likely speed of cars at this point, I do not consider that transparent noise barriers are warranted. It is unlikely that the business will be visible to passers-by at this point.

11.17.24. While there are other demolitions and acquisitions of commercial developments, issues were either resolved before the application was lodged or before the end of the oral hearing with the exception of Brooks discussed above. No other businesses subject to the CPO process raised concerns about the project not addressed above or in section 13 below.

11.17.25. Galway Racecourse will be getting new stables as a result of the road. I am of the opinion that the mitigation measures for the Racecourse will more than adequately address the temporary impacts during construction. In addition, there will be enhanced access and egress from the racecourse. I am satisfied that there will be a positive impact on the racecourse as a result of the proposal.

11.17.26. Between the lodgement of the planning application and the oral hearing the ownership of the quarry changed hands. Dermot Flanagan represented McHugh Properties at the oral hearing and this is dealt with in detail in section 10.10, and

11.8. There was no objection in principle to the CPO of the lands and changes were made to temporarily acquire part of the quarry lands.

Public and Community Facilities

11.17.27. Public facilities such as St. James' National School in Bushypark, Bushypark and Coolagh Churches, Castlegar school, Castlegar Nursing Home and a disused railway track will be affected by partial acquisition of lands or roadbeds. As noted above land take from other non-agricultural properties and the impact therein are listed in Tables 15.6 and 15.7 which I consider gives a fair and accurate assessment of the impact. I am satisfied that there will not be a significant impact on these public facilities (with the exception of NUIG lands which are addressed separately in this Report).

11.17.28. At the hearing, the owner and operator of the aforementioned Nursing Home expressed significant concerns about the impact of construction activities on the operation of his nursing home facility. In particular, discussions were held about the rerouting of the foul sewer and gas main that runs along the road in front of the facility (School Road), and the distance the rear garden areas would be from the road during operation stage.

11.17.29. As noted in Section 10.2 the Nursing Home's legal representative Mr Michael O'Donnell contended that the Nursing Home was omitted from assessment within the EIAR and stated that the EIAR was, therefore, deficient and did not comply with the EIA Directive. The applicant totally refuted this claim and at the hearing provided a list of locations within the EIAR whereby the impact on the Nursing Home was assessed. Having regard to the information in the EIAR and the specific locations of that information as identified by the applicant, I am satisfied that the Nursing Home was considered and the Board can carry out an adequate EIA.

11.17.30. In terms of the impact during construction the Nursing Home was represented by the aforementioned Mr Michael O'Donnell as well as by Air and Noise specialists at the hearing. There was much debate between the various specialists and neither side concurred with the other. This is addressed in section 11.6, 11.11 and 11.12 above. However, in terms of the material asset, to gain an understanding of the proximity of the works to the Nursing Home and to understand the partial landtake which is discussed further in Section 13, I draw the Board's attention to the Deposit