

IN THE MATTER OF AN APPLICATION TO
AN BORD PLEANÁLA

FOR APPROVAL OF (I) THE N6 GALWAY CITY RING
ROAD PURSUANT TO SECTION 51 OF THE ROADS ACT
1993 (AS AMENDED); (II) THE N6 GALWAY CITY RING
ROAD MOTORWAY SCHEME 2018; and (III) THE N6
GALWAY CITY RING ROAD PROTECTED ROAD SCHEME
2018

ABP Ref. ABP-302848-18 and ABP-302885-18

Response to Submission on behalf of Prof. Michael and Dr.
Annette Kerin to
Oral Hearing

by

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Contents

	Page	
1	Introduction	1
2	Engineering & Traffic	1
3	Landscape and visual	9
4	Air Quality response to TMS Submission	11
	4.1 Response to TMS Submission	11
	4.2 Response to Prof. Kerin submission	14
5	Noise & Vibration	15
	5.1 Baseline Noise Environment	15
	5.2 Construction Phase Noise and Vibration Impacts	15
6	Population & Human Health	19

1 Introduction

- 1.1.1 The purpose of this document is to provide a response to certain issues raised in the various submissions presented on behalf of Prof. Michael and Dr. Annette Kerin to the N6 Galway City Ring Road (GCRR) oral hearing on 30 October 2020.
- 1.1.2 Submissions were received from the following parties on behalf of Michael and Annette Kerin:
- Julian Keenan, Trafficwise Ltd.
 - Dr Imelda Shanahan, TMS Environment Ltd.
 - Karl Searson, Searson Associates
 - Dr. Annette Kerin
 - Prof. Michael Kerin
- 1.1.3 Each submission has been reviewed by the relevant experts engaged on behalf of Galway County Council in respect of the N6 GCRR and any discrepancies or inaccuracies in the data presented is outlined in this document.

2 Engineering & Traffic

- 2.1.1 The location as set out in Figure 3 in the Statement of Evidence of Julian Keenan identifies the distances from the front boundary of the retained lands incorporating the Kerin home to various elements of the proposed road development. The Kerin house is set back a further 21m from this front boundary with the distances to various elements of the proposed road development reflecting this further setback provided on Figure 4 in the Statement of Evidence of Julian Keenan.
- 2.1.2 Paragraph 5.4 of Mr Keenan's statement states that access and egress to the site in the vicinity of the Kerin home "*is left over for post consent decision making*". This is factually incorrect. As noted within Chapter 7 of the EIAR, the existing road network and the lands made available for the works will be utilised as haulage routes. Such haulage routes include HR08/01 (N59) and HR04/01 (lands made available for the works) per Table 7.4 of Chapter 7 of the EIAR and Figures 7.106. Necessarily, the interface of HR08/01 and HR04/01 serve as a site access. As outlined within Chapter 6 and Chapter 7 of the EIAR, construction traffic impacts are minimised through the control of site access/ egress routes and site access locations.

- 2.1.3 Furthermore, Paragraph 5.5 of Mr Keenan’s statement correctly references Chapter 7 of the EIAR and acknowledges “*that access to the proposed road development will be provided directly from the N59 Moycullen Road (HR08/01) through the acquired Kerin lands*”.
- 2.1.4 Paragraph 5.8 asserts that there is no information in the EIAR on the three material deposition areas (MDAs) DA17, DA18 and DA19. However, the locations and capacity of these deposition areas is clearly outlined, for example, on Figure 7.301 of the EIAR and in Table 5.1 of Annex 2 of A1.11 of the RFI Response. As regards DA20 and DA21, which are located approximately 250m west of the Kerin property, as illustrated in Figure 7.301 of the EIAR and in Table 5.1 of Annex 2 of A1.11 of the RFI Response, their respective capacities are 1,500m³ and 900m³. Combined, those 2 no. MDAs (2,400m³) account for less than 1% of the total placement volume (597,200m³) for MDAs across the proposed road development and will accept material arising close to them from excavations on the mainline, N59 Link Road North and N59 Link Road South. Therefore, the use of these MDAs has been assessed as having no impact to the Kerin home.
- 2.1.5 Section 5.11 of Mr Keenan’s statement sets out the earthwork volumes between N59 Letteragh Junction to River Corrib with Paragraph 5.11.7 noting that the depth of construction quoted in Section 10 of the EIAR exceeds that quoted in Section 9 of the EIAR by 2.5m. However, it should be noted that Table 10.17 in Chapter 10 of the EIAR provides the hydrogeological assessment. Immediately prior to Table 10.17, on page 877 of the EIAR, the statement is made that ‘*the excavation depths for foundations and drainage have a maximum cut depth elevation of 3m below the finished road elevation, which is applied to the full length of the proposed road development. This is an over estimation on the maximum potential cut depth for drainage and foundations.*’ This 3m dimension is discussed in the context of a hydrogeological assessment only and is not reflective of the depth of the cut at this rock excavation EW 11.
- 2.1.6 The volumetric calculations which are relevant to the assessments to be carried out by the Board are based on the earthworks areas of cut and fill presented in Figure 9.8.001 to Figure 9.8.012 and in Table 9.16 of the EIAR. The embankment height (average and maximum), cut height (average and maximum) and the soils and geology at each earthwork area are clearly presented in Table 9.16. As appears from Table 9.16, the maximum depth of cut in EW 11 is 14.9m below ground level. Indeed, this maximum depth accounts for an “overdig” of 0.5m as a conservative allowance in good quality rock for pavement construction.

- 2.1.7 The overall earthwork volumes are presented in Table 7.3 of the EIAR, and based on our analysis of the quantities that will be generated from the cutting between Ch. 7+450 and Ch. 8+300, we estimate that the quantities indicated by Mr. Keenan on this section constitute an overestimation by approximately 150,000m³ of rock, and the quantities stated by Mr. Keenan are incorrect due to the cut level from Table 10.17 of the EIAR being applied across the cutting as opposed to the levels from Table 9.16 of the EIAR and the consideration of the topographical profile and ground conditions as indicated on Fig. 9.8.006 of the EIAR. The subsequent calculation of the tonnage of rock is also factually incorrect and constitutes a significant overestimation.
- 2.1.8 It is important to emphasise that the earthworks in this area are not equivalent to a commercial quarry. By way of example, in relation to the works in respect of the construction of the proposed road development, standard highway rock cutting construction practices will be used and the works will be completed within 9 months, after which point no further rock extraction will occur. It may assist the Board to observe that this cutting (i.e., EW 11) is similar in depth and scale to other rock cuttings in previous schemes such as the M17/M18 Gort to Tuam PPP Scheme and N25 New Ross Bypass and will require blasting and rock extraction to create cuttings at either side of the carriageway. This is standard practice in road construction.
- 2.1.9 As noted in the EIAR, an expedited construction programme has been proposed for this area to minimise disruption. Whilst, as is set out above, the applicant does not agree with the volume of rock Mr Keenan has suggested will be excavated in this area, it is clear from the application documentation that a substantial volume will be excavated over a relatively short period of time, as is presented in Table 7.1 and Section 7.4.7.6 of the EIAR. In this context, it has also been stated in the application documentation that the construction phase in this vicinity will involve regular rock blasting (no more than one instantaneous blast per day as presented in Section 17.2.2.1 of the EIAR) and, in keeping with standard construction of rock cuttings, will require the preparation of cut faces on both sides of the alignment.
- 2.1.10 However, it is very important to note that the works in the immediate vicinity of the Kerin property will consist of ‘soft’ construction methods. In this context, fill material will be deposited from the cutting to the west and rolled in layers. Both the mechanically-stabilised earth wall and the steepened slope wall to be constructed in the vicinity of the Kerin lands will consist of rolled material with intermittent straps that will be laid down between material layers. This construction process is clearly shown in Figure 1 and 2 of Appendix A.7.8, BD02 Other Structures of the Design Report. This addresses the incorrect

statement in Paragraph 6.6.2 of Mr. Keenan's statement which asserts that there is no reference to these retaining structures.

- 2.1.11 Contrary to the impression created in certain submissions made on behalf of Prof. & Dr. Kerin, no piling will be conducted in this area. In this context, it is important to emphasise that the abutment bank seats for the N59 Moycullen Road Underbridge (Structure S08/02) will be formed on top of the fill that has been brought up to the correct level. Indeed, this method of construction is clearly shown on Drawing GCOB-1700-D-GEN-004 of Appendix A.7.2 BD02 Standard Underbridges of the Design Report. For the sake of completeness, it should be confirmed that the nearest location of piling is approximately 500m east of the Kerin lands at the River Corrib Bridge construction.
- 2.1.12 Once the underbridge is in place, haulage will continue along the mainline directly over the N59 Moycullen Road. Moreover, haulage of material for the construction of the River Corrib Bridge will be along the designated haul routes.
- 2.1.13 Furthermore, the excavation works on the mainline to the west of the Kerin lands will constantly be moving further away from the Kerin lands with the cut commencing at zero depth approximately 200m south of the Kerin home and increasing thereafter to the south. It is unlikely that blasting will take place in the shallower parts of the rock cutting, however, a conservative assessment entailing consideration of the blasting of the entire cutting has been assessed (and is shown in Figure 7.201 of the EIAR).
- 2.1.14 Section 5.12 of Mr Keenan's statement purports to describe the works associated with the attenuation ponds and access road AR 08/01. However, both paragraphs 5.12.2 and paragraph 6.3.1 are factually incorrect. Firstly, AR 08/01 will provide access to the three existing retained properties in the Ard an Locha estate, to the property acquired under plot reference 518, to two additional serviced sites and to the attenuation ponds. Works on this access road comprise a resurfacing post completion of the diversion of services plus an extension to provide access to the home acquired and the attenuation ponds. Secondly, the earthwork quantities provided in the statement of evidence from Mr. Keenan in respect to the excavation in the area of the attenuation ponds in Ard an Locha is incorrect. As identified in Figure 7.201 of the EIAR, blasting is identified as possible in this location and has been assessed for possible blasting. However, in accordance with the ground investigation provided in Appendix A.9.1b of the EIAR, which is summarised on Figure 9.8.006 of the EIAR, rock is approximately at 3m below ground level at this location. Given that the lowest invert level of the pond is 35mOD, in accordance with Drawing No. GCOB-500-D-111 of the

Design Report, the orientation of the pond and the depth to rock, it is very unlikely that blasting will be required at these attenuation ponds.

- 2.1.15 In respect of the separate ponds located to the east of the N59 Moycullen Road, the available ground investigation indicates that rock is anticipated at greater than 4m below ground level. Based on Figure 9.8.006 of the EIAR, the ground level at the location of the ponds is approximately 24mOD. According to Drawing No. GCOB-500-D-111 of the Design Report, the invert level of both ponds is 22.1mOD. This equates to a dig of circa. 2m. Therefore, rock will not be encountered based on available information, and no blasting will be required at these ponds either.
- 2.1.16 Section 5.13 incorrectly implies that there will be night-time works associated with the earthworks associated with the N59 underbridge, structure reference S08/02. However, it has been clearly stated that night-time works are required where overbridges are to be constructed as noted in Section 7.4.5 of the EIAR. It is estimated that the bridge beams will be placed for this structure over a two-week period with a road closure and night-time works on four nights within that two-week period. In the Engineering Statement of Evidence delivered to the oral hearing on 18 February 2020, at paragraph 4.13.7, the applicant has already committed to ensuring that timely notification to the residents of Ard an Locha will be provided in advance of the limited night-time road closures associated with the construction of the overbridge, in order to minimise disruption. Indeed, in relation to the Kerin family, as stated in commitment 15.13 of Schedule of Environmental Commitments *“Galway County Council will notify Ob_521_O_517.14_02 of any upcoming day or night-time closures near their property”*.
- 2.1.17 Paragraph 6.4 of Mr. Keenan’s statement of evidence is factually incorrect in respect of culvert C08/01, in respect of which it is suggested that there is no reference made in the EIAR. For the avoidance of doubt, C08/01 is detailed in Table 11.20 of the EIAR as a 1.2m diameter pipe. C08/01 is also referred in Table 11.19 in the EIAR in terms of its contributing area and C08/01 hydrological impact is assessed in Table 11.28 of the EIAR.
- 2.1.18 Paragraph 6.5.1 is also factually incorrect in respect of the works on the N59 Moycullen Road. Table 3.24 of the Design Report and Table 5.2 of the EIAR provide details of the N59 Moycullen Road realignment at Ch 8+500 as 2 x 3.5m wide lanes for approximately 350m *“Redesign of N59 Moycullen Road at Dangan to accommodate proposed mainline overbridge.”* The works are shown on Figures 5.1.06 of EIAR on plan and the profile (MCS0) is provided on Figure 5.3.08 of the EIAR.

- 2.1.19 As can be seen from the profile, there is a maximum 50mm regrading in the vicinity of Ard an Locha, with no proposal to lower the road. The resurfacing has been designed to keep it at grade with a minimal realignment at the centreline so as to tie into the existing edges and kerbs.
- 2.1.20 Section 6.6 of Mr Keenan's statement appears to confuse the nature of the works in this area. The location of each retaining structure is clearly stated in Table 5.7 of the EIAR, and the retaining wall structure type is set out in Table 6 of Section 3.1 of Appendix A.7.8 of the Design Report, together with detailed graphics showing the construction methodology for such structures. Again, it should be noted that minimal excavation works are required for footings for the mechanically stabilised earth walls and the strengthened slopes, both of which are to be used in the vicinity of the Kerin property, on either side of the mainline. Accordingly, there is no reinforced concrete retaining wall proposed in this area of the Kerin property.
- 2.1.21 In terms of traffic during the operational phase, Prof. Michael Kerin's statement questions the sustainability of the N6 GCRR. As has been observed on many occasions throughout the application process, the N6 GCRR forms an integral part of a sustainable transport strategy for Galway City (Galway Transport Strategy – GTS). The implementation of the GTS will include reduced speed limits in the city centre, increased services and priority for public transport, improved priority and infrastructure for active modes and the implementation of demand management measures such as parking restrictions. A planning application in respect of the Cross-City Link, which is currently at non-statutory public consultation, is due to go to An Bord Pleanála by 2021 and, subject to approval, is estimated to be completed within a 12 to 18-month period. It is the case that progress is being made in implementing those elements of the GTS which will reduce speeds in the city centre and improve priority for public transport and active modes.
- 2.1.22 With respect to parking management, the Galway Transport Strategy outlines a number of Demand Management measures aimed at shifting the focus of travel within the city centre to walking, cycling and public transport including:
- Controlling the availability and cost of parking in the city centre
 - Reduced parking standards for new developments that are located close to public transport corridors
 - Removing a large proportion of on-street parking in the city centre to provide more priority for pedestrians, cyclists and public transport
- 2.1.23 Indeed, as set out in the Planning & Policy and Traffic Statements of Evidence presented at the oral hearing, recent large-scale proposed

developments in the city centre, such as large scale Office/Retail development at Bonham Quay and the redevelopment of Céannt Station as a large mixed-use development, are aligned with these sustainable development principles and will deliver substantially lower levels of parking than currently exist in Galway City Council's maximum parking standards. The table below outlines the amount of parking spaces permitted at these developments and the level of parking permissible under existing parking ratios for the city.

Development	Parking Spaces Provided	Parking Spaces Permitted based on Development Plan Ratios	% below existing permitted ratios
Bonham Quay	131	687	80%
Céannt Station Redevelopment	572	1772	68%

2.1.24 Again, it is clear that progress is being made in implementing the sustainable planning principles of the GTS and NPF.

2.1.25 As set out in Appendix A - Mode Share Results of the traffic note presented to An Bord Pleanála on 19 October 2020, the full implementation of the GTS, with parking management measures, will result in a significant reduction in car travel and a corresponding increase in travel by sustainable modes. For ease of reference, this information is detailed in the table below which shows forecast, 24-hour, mode share for the entire Galway City Administrative Area.

Scenario	Car (%)	PT (%)	Active (%)
NPF Do-Minimum	66.4%	6.1%	27.5%
NPF Do-Something N6 GCRR + GTS + Parking Management	54.9%	8.4%	36.7%

2.1.26 When compared to the Do-Minimum, the GTS scenario will result in a 11.5% drop in the mode share for car use, which equates to approximately 50,000 less car trips on the road network over an average 24-hour period and a corresponding increase in trips made by more sustainable modes. This reduction in car use will have considerable

health benefits through reduced collisions and also reduced air and noise pollution across the city.

2.1.27 Prof. Kerin also draws similarities between Galway and Cambridge. Whilst a degree of caution should be exercised in comparing Galway with other European cities (as each city will have different geographic considerations, demographics, economies and travel patterns), it is worth noting that Cambridge is served by two grade-separated radial corridors, the M11 and A14. These roads, similar the proposed N6 GCRR, cater for strategic traffic and remove non-essential traffic from the city centre. This, in turn, creates a more pedestrian and cycle friendly environment in Cambridge city centre. Additionally, the GTS proposals for Galway include a reconfigured bus network to better serve existing and future demand and a considerable improvement in Bus frequencies and priority throughout the city.

2.1.28 The GTS contains a specific section relating to “intelligent Systems” which, like SMART Cambridge, includes recommendations on how data and new technology can be used to deliver transport services in a more efficient manner. Some of the proposed Smarter mobility and ITS projects for Galway as part of the Galway Transport Strategy include:

- Removing non-essential private cars from the city core;
- Expanding and integrating Galway Cities Urban Traffic Management Centre;
- Provide an integrated ticketing system;
- Creating and operating a Smart Parking System for Galway City;
- Provide Smart parking facilities for cyclists;
- Provide Smart priority routes for pedestrians and cyclists

3 Landscape and visual

- 3.1.1 Paragraph 3.10 of Dr. Annette Kerin's submission notes that the *'impact on our amenity due to visual intrusion in the long term is considered moderate to significant negative (EIAR Chapter 18) which I feel is a gross underestimation and misinterpretation.'*
- 3.1.2 The assessment of the impact on the landscape setting and visual characteristics of the Kerin and surrounding properties is fully addressed in Chapter 12 Landscape and Visual of the EIAR. Specifically, construction stage landscape and visual impacts are detailed at Section 12.5.3.3 of Chapter 12 and operation stage impacts are detailed at Section 12.5.4.3 of Chapter 12.
- 3.1.3 The Kerin house is specifically identified as Property Ref.: P008-026 on Figure 12.1.06 of the EIAR. The impact on the property is specifically assessed during construction; at the end of construction (pre-establishment); and with establishment of mitigation (post-establishment) in the Visual Impact Schedule in Appendix A.12.1 of the EIAR. For the avoidance of doubt, the impact on the Kerin house during these phases is described in the EIAR as follows:
- Construction: Profound
 - Pre-establishment: Profound
 - Post-establishment: Profound
- 3.1.4 Accordingly, the significant impact of the proposed road development on the landscape and visual setting of the property is fully recognised in the assessment, and substantial measures are specifically proposed to mitigate this impact. These measures are outlined on Figure 12.1.06 of the EIAR and detailed in Section 12.6 and Tables 12.7 and 12.8 of the EIAR.
- 3.1.5 For ease of reference, these measures (refer to Figure 12.1.06) include:
- No direct impact on the boundary walls, plantings and gardens of the property
 - Retention of existing mature garden boundary planting along the northern and western boundary of the adjoining acquired property (ref.: P008-025 on Figure 12.1.06)
 - Retention of existing planting on the boundary of the landtake area for the attenuation ponds to the south
 - Provision of solid screen hoarding along the land-take / works boundary during construction
 - Planting (12m depth) of the embankment for the proposed road development directly east of the Kerin property

- Planting (6m depth) along the southern boundary of the access road to Ard an Locha
- Planting to the front of retaining structure R08/02

3.1.6 Following lodgement of the Response to the An Bord Pleanála Request for Further Information (RFI, August 2019), the submission on behalf of the Kerin Family (Paula Murphy, Oct 2019) raised the visual impact of the proposed ESB sub-station located opposite the property entrance. Therefore, in mitigating this impact, it is proposed to locate the sub-station behind a 2m high limestone-faced boundary wall, with access to sub-station provided via the gate proposed to the south of the Kerin property (refer to updated Figure 4.1.11 of Appendix A.9.1 Landowner Accommodation Works Details of the RFI Response appended to the Additional Schedule of Environmental Commitments submitted to ABP the 20 October 2020). This will ensure that the sub-station does not have a negative visual impact on the Kerin property or its entrance.

3.1.7 While the Kerin property will be subject to significant visual impact, it is not unique in this regard. Over 20 no. properties (excluding those acquired) will experience similarly significant levels of impact. Together with the Kerin property, 8 of these properties are located to either side of the N59 at Dangan / Bushy Park (refer to Figure 12.1.06 of the EIAR). In contrast to the Kerin property, 3 of these properties (i.e. P008-014; P008-023; & P008-054) also have direct impacts on (including acquisition of) private garden areas immediately adjoining the house and are located closer to similarly elevated sections of proposed road development. Therefore, and notwithstanding the significant impact on the Kerin property, the nature of the visual impact is neither particularly exceptional nor unique in the context of the proposed road development.

4 Air Quality response to TMS Submission

4.1 Response to TMS Submission

Section 5.1 - the sensitivity of the Kerin Family home

- 4.1.1 In accordance with TII air quality guidelines, sensitive receptor locations include residential housing, schools, hospitals, places of worship, sports centres and shopping areas (refer to Section 16.2.5.1 of the EIAR). Indeed, it is noted that Statement of Evidence of Dr. Imelda Shanahan (at section 5.1.2) that the EIAR does indeed acknowledge that the EIAR “recognises the importance of considering receptor sensitivity when assessing impacts and defines highly sensitive receptors in several locations”. Moreover, it should be noted that all residential receptors located within 100m of the proposed N6 GCRR construction have been assessed as part of the air quality impact assessment (refer to Section 16.5.3.1 of the EIAR) including the Kerin home.

Section 5.2 - Baseline air quality

- 4.1.2 The TMS statement of evidence acknowledges the completion of air quality monitoring survey at Bushypark school. In addition it should be noted that air quality monitoring (nitrogen dioxide and particulate matter) was also carried out at Ard na Locha for a period of 3 months. The TMS statement suggests that the use of EPA Zone C data is not appropriate in this location and that Zone D data (rural Ireland) should be applied. However, EPA maps (<https://gis.epa.ie/EPAMaps/>) clearly demonstrate that the full extent of the proposed N6 GCRR included in Zone C. Moreover, as outlined previously, the use of Zone C data allows a worst-case baseline to be accounted for, ensuring a robust comparison with air quality standards. Indeed, it is accepted by the applicant (as acknowledged by Dr. Shanahan in section 5.2.2 of her statement) that concentrations of NO₂ and PM₁₀ concentrations are overstated in the EIAR. This overstatement was deliberate, so as to ensure that a worst-case assessment was carried out.

Section 5.3 - Air quality impact assessment criteria

- 4.1.3 The TMS statement asserts (at section 5.3.5) that “*there are no air quality standards in the EIAR against which the construction phase impacts may be assessed*”. However, Table 16.7 of the EIAR outlines the assessment criteria for the impact of dust emissions from construction activities. The table refers to emissions of PM₁₀ and footnotes the air quality standards for PM₁₀.
- 4.1.4 Reference is also made in Section 16.2.2.1 of the EIAR to the T.A. Luft¹ dust deposition limit of 350mg/m²/day which, as stated in the EIAR,

¹ https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Luft/taluft_engl.pdf.

applies over an annual period and not over 28-30 days as stated in the TMS statement of evidence.

4.1.5 As outlined in Section 16.2.2.1 of the EIAR, “*the Environmental Protection Agency (EPA) concurs that this guideline may be applied, although applied as a 30-day average, in its document Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)*”. This dust deposition limit will be applied on a monthly basis to the dust deposition monitoring, in accordance with the EPA guidance and as outlined in Section 16.2.2.1 of the EIAR. It should be noted that this limit is referenced as it is the only dust deposition limit prescribed in Ireland, and is not referenced for the purposes of comparison between the proposed construction works to quarrying activities.

4.1.6 The TMS statement of evidence also states that the assessment of construction impacts in accordance with TII guidance is ‘at best semi-quantitative’. However, the TII Guidelines for the Treatment of Air Quality during the planning and construction of National Road Schemes, state that “*a semiquantitative approach is recommended to determine the likelihood of a significant impact, which should be combined with an assessment of the proposed mitigation measures*”. Indeed, this semi-quantitative approach is consistent with other relevant guidance including the 2019 DMRB Air Quality Guidance² and the Institute of Air Quality Management Guidance on the assessment of dust from demolition and construction (2014)³ and is entirely appropriate for the assessment of construction dust. Finally, in this respect, and contrary to the assertions in the TMS statement, the proximity of sensitive receptors is considered in the assessment of construction impacts, in accordance with TII guidance.

Section 5.4 - Construction phase air quality assessment

4.1.7 Section 5.4 of the TMS statement discusses the potential air quality impacts due to works taking place within 900m of the Kerin home. In this context, it should be noted, firstly, that TII guidance considers that potential dust deposition impacts can occur within 100m of construction works. The UK DMRB (2019), concurs with this approach and states that the risk on the receiving environment sensitivity to construction dust is low beyond 100m from the works. This is also consistent with the Institute of Air Quality Management air quality guidance.

4.1.8 Section 5.4.9 of the TMS statement suggests that an assessment of “*the amount of dust that will be generated is not difficult and can be achieved using the methodology outlined in the US Environmental*

² UK DMRB LA 105 - Air quality November 2019

³ Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction (2014)

Protection Agency (EPA) Guidance AP-42...”. However, contrary to the position adopted by Dr. Shanahan, 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 PM₁₀ concentrations.”

- 4.1.9 TMS uses USEPA AP-42 methodology to predict dust levels at the Kerin property due to construction works. The calculations rely on the 1995 Heavy Construction Operations (Chapter 13.2.3) to estimate construction dust levels. However, only the amount of dust (in tonnes) is estimated with no indication over the area over which the dust may be deposited. Therefore, based on the information provided, it is impossible to state if the estimation of dust is likely to result in compliance with the dust deposition limit values.
- 4.1.10 It is clear from an examination of the USEPA methodology AP-42 that many of its calculation assumptions are simply not applicable to the N6GCRR, or any road development in Ireland. By way of example, section 13.2.3 of the USEPA AP-42 document (which is applied in the TMS assessment) provides emission factors to be used for heavy construction operations. USEPA AP_42 that “*the emission factors are most useful for developing estimates of overall emissions from construction scattered throughout a geographical area. The value is most applicable to construction operations with (1) medium activity level, (2) moderate silt contents and (3) semiarid climate*”. It is also clear that a “semiarid climate” experiences annual precipitation of between 250 mm and 500 mm. Unsurprisingly, Galway does not have a semiarid climate, with the annual rainfall in Galway averaged at 1,173mm per annum (www.met.ie Claremorris data 1971-2000).
- 4.1.11 Moreover, it is unclear from the calculations set out in section 5.4.11 of the TMS statements whether control measures have been included in accordance with AP-42, which provides a rating adjustment for various dust-generating activities. Indeed, it should be noted that AP-42 recommends a number of the control measures recommended for general construction and are referenced in the EIAR, including:
- Wind speed reduction (Section 16.6.2.1 of the EIAR)
 - Wet suppression (Section 16.6.2.1 of the EIAR)
- 4.1.12 Moreover, the EIAR describes a large number of mitigation measures for the minimisation of construction dust, over and above those described in the AP42 1995 document. These EIAR measures have been developed having regard to TII guidance, the British Research Establishment (BRE) document ‘Controlling particles, vapour and noise pollution from construction sites’ and IAQM ‘Guidance on the assessment of dust from demolition and construction’, 2014. These are the most appropriate guidance documents for assessing potential dust impacts in Ireland.

- 4.1.13 The TMS statement contends that the HGV traffic accessing the haul route along the mainline of the proposed N6 GCRR during the construction phase will “lead to significant levels of fine particulate matter emitted and also nitrogen oxides from the diesel engines and it will have a measurable impact on air quality in the immediate vicinity of the Kerin property”. However, the assessment of the construction phase impacts was completed in accordance with TII guidance. The EIAR assessment is based on the assumption that the works are major in scale which is described as “large construction sites, with high use of haul routes”. Therefore, the TII methodology considers both construction works and HGV movements. It is also noted that the construction phase HGV traffic volumes along the mainline, HR 04/01, are less than the operational phase HGV traffic volumes which have been fully assessed in the EIAR (Section 16.5.4.1).

Section 5.6 Assessment of construction air quality impacts

- 4.1.14 The TMS statement confirms that construction air quality impacts are at their highest within 100m of the source of emissions. As outlined above, TII guidelines and other relevant guidance confirms that there is low risk from dust impacts at a distance of greater than 100m from the source. It is contended by Dr. Shanahan that the measures proposed in the EIAR are not sufficient to mitigate the impacts identified. However, mitigation measures have been developed in accordance with recent Irish and UK guidelines and are considered robust and comprehensive for the mitigation of construction dust. As outlined in Section 16.6.2.1 of the EIAR, dust deposition monitoring, PM₁₀ and PM_{2.5} monitoring will be carried out to ensure compliance with limit values.

4.2 Response to Prof. Kerin submission

- 4.2.1 The predicted levels of PM_{2.5} calculated for the operational phase are based on the inclusion of worst-case background concentrations which is likely to be an over-statement of total concentrations, as outlined in the TMS statement of evidence.
- 4.2.2 It is important to note that concentrations of PM_{2.5} at Ard an Locha over a period of 3 months were measured at 5.4µg/m³, which is well below the WHO guideline of 10 µg/m³. The maximum increase in PM_{2.5} calculated at the nearest modelled receptor to the Kerin property is 1.9 µg/m³. This results in a total concentration of 7.3 µg/m³ which remains in comfortable compliance with the WHO guideline.
- 4.2.3 In relation to European Environment Agency reporting, the Board should note that the EPA Air Quality in Ireland 2019 report states the following in Section 7:

“The European Environment Agency estimates that there were 1,300 premature deaths in Ireland due to fine dust particles (PM_{2.5})

air pollution in 2017 alone... Residential use of solid fuel such as coal, peat and wood is still the largest problem for air quality and health in Ireland. The continued use of solid fuel burning for home heating remains the leading contributor to fine particulate matter (PM_{2.5}) pollution across Ireland.”

5 Noise & Vibration

5.1 Baseline Noise Environment

5.1.1 The baseline noise environment in the vicinity of the Kerin’s home is described within the EIAR. Baseline noise surveys have been undertaken in proximity to the front of the property and also at nearby properties adjacent to the Kerin’s home which characterise the noise environment in the area. Indeed, as part of the submission made on behalf of Prof. & Dr. Kerin to the Board, Searson Associates have also furnished results of baseline noise surveys undertaken within and external to the property. It is clear, from the results of surveys recorded within the EIAR and undertaken as part of the Kerin’s submission, that the prevailing noise environment is dominated by the existing N59 Moycullen Road, which is the national primary route located immediately adjacent to the Kerin’s home.

5.2 Construction Phase Noise and Vibration Impacts

5.2.1 The submissions by Dr Imelda Shanahan, Mr Karl Searson, Dr. Annette and Prof. Michael Kerin refer to the noise and vibration impacts associated with the construction of the proposed road development at the Kerin’s property. The applicant’s responses to these issues are summarised below.

5.2.2 Construction Noise Limits

- Construction works are limited to and bound by the construction noise limits included within the EIAR (Section 17.2.2.1)
- Dr. Imelda Shanahan has indicated (at section 6.2.10 in her statement) that, due to the nature and duration of the works in the vicinity of the Kerin’s property, lower limits should apply in line with those set out in Annex E.5 of BS 5228 – 1 (2008 + A1 2014).
- However, the applicant does not agree that limit values associated with ongoing, long-term, operational activities associated with a quarry or surface mineral extraction are appropriate for a temporary road construction project. The construction noise limits values in the TII guidelines are set for the control of noise from road construction projects which, for a new national road, would extend well in excess of a 6 month duration. Works associated with earth moving activities

over periods extending up to 9 months is not an unusual scenario for a road construction project and would not automatically trigger lower noise limits to be applied. Reference to the major road construction projects in Section 2.1.8, which involved similar elements of works to the N6 GCRR, did not apply any alternative lower construction noise limits. The lower limit values proposed of 55dB L_{Aeq} during daytime periods are not realistic, are not possible to achieve and would not permit any road construction, or other infrastructure project to be built.

5.2.3 Construction Vibration Limits

- Construction vibration limits are set for the avoidance of any cosmetic damage to buildings and structures from construction activities and those associated with blasting are included in Section 17.2.2.1 of the EIAR.
- It is incorrect to suggest (as Dr. Shanahan does at section 6.2.5 of her statement) that the higher limit values of 20 to 25mm/s – relating to a specific section of the construction of the Lackagh Tunnel in Section 9.4.1.1 of the EIAR – are applicable to residential dwellings. Rather, the appropriate limit values relating to blasting for all residential dwellings and other light framed structures are 12mm/s, as clearly set out in Section 17.2.2.1 of the EIAR.
- The TII Guidelines set limit values with respect to the avoidance of cosmetic or structural damage to buildings which are quoted within the EIAR (Table 17.3.) Reference is made within the TII 2004 and 2014 Guidelines to suggested tolerances of vibration for blasting and piling for people within buildings, i.e., human response to vibration. It should be noted that these are suggested tolerances rather than limit values and relate to a discussion on human perception to vibration-generating activities.
- Vibration impacts associated with the most significant potential vibration-generating piling works (i.e., sheet piling) are considered in Section 17.5.3.3 and Table 17.12 of the EIAR. The information contained within this section is provided to compare against limit values for structures. The likely responses to people within buildings can also be determined based on the information contained in this section.
- It is critical to note that there are no piling works associated with any of the works (embankment, bridge works or retaining structures) in the vicinity of the Kerin's home.
- Moreover, blasting will occur during the excavation of the Letteragh Cutting. The limit values associated with blasting for the prevention of any form of cosmetic damage to buildings or adverse human response is 12mm/s. This limit value is clearly set out in Section 17.5.3.3 of the EIAR.

5.2.4 Construction Noise Impacts

The submissions on behalf of Prof. & Dr. Kerin include a range of suggested noise impacts that will be experienced at the Kerin property during the construction phase of the proposed road development.

- It should be noted that construction works are limited to, and bound by, the construction noise limits included within the EIAR (Section 17.2.2.1).
- As described above, the construction activities which will be undertaken closest to the Kerin 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.
- There will be no piling activities associated with the works described above in the vicinity of the Kerin's property.
- The construction of the earth embankment to the south of the Kerin's property, will involve earth moving and rolling equipment which will deposit and compact the fill material on a layered basis over a duration of 3 to 6 months. The use of vibratory rolling equipment, hammering of material etc. is not required and will not be undertaken as part of these works. The earth embankment construction activities will not generate significant levels of noise due to the nature of the works involved for this type of activity.
- It should be noted that all activities associated with the cutting at Letteragh will be undertaken at distances between 300 to 1km away from the Kerin home and will not occur in the vicinity of the Kerin home.
- Drill and blast techniques will be undertaken at the Letteragh cutting to expediate the works, however, the duration of a blast is extremely limited (a number of seconds, once per day) and is a highly controlled activity.
- It is noted that a number of construction calculations are included in the submissions made by Dr Imelda Shanahan and Karl Searson. The range of noise levels calculated indicate significant levels of high noise-generating activities occurring immediately in the vicinity of the Kerin's property. However, the construction works in the vicinity of the Kerin's property will not involve significant levels of high noise-generating activities or equipment. Accordingly, the range of noise levels that are presented in the calculations made in submissions made on behalf of Prof. & Dr. Kerin are artificially high. For the avoidance of doubt, the applicant does not accept that the works cannot be sufficiently controlled to take place within the relevant limit values.

5.2.5 The Board is referred to Table 17.9 of the EIAR, which presents the range of construction noise calculations based on plant items at varying distances from the works. Taking account of the activities and distances

involved, it is clear the construction works undertaken at the Kerin's property are capable of compliance with the construction noise limits within the EIAR.

5.2.6 In any event, construction works are limited to, and bound by, the construction noise limits included within the EIAR. The basic principles of noise control mitigation and management will be employed as described in Section 17.6.2 and Appendix A.17.2 of the EIAR.

5.2.7 **Operational Noise Impacts**

The submissions received on behalf of the Kerin family refer to the potential noise impact of the proposed road development once operational. The submissions also refer to the 2018 WHO Noise Guidelines for Europe. The Board is requested to note the following points in response:

- Discussion of the 2018 WHO European noise guidelines has occurred over the course of the oral hearing and are addressed in detail in Section 4.3 of Noise & Vibration Statement of Evidence and are also addressed in detail by Dr Martin Hogan in the Human Health Statement of Evidence.
- It is important, however, to draw attention to the current noise environment at the Kerin's home, which has been surveyed as part of the EIAR and also surveyed by Mr. Searson as part of his submission to An Bord Pleanála.
- The results of both the baseline noise surveys and future calculated traffic noise levels, in the absence of the proposed road development, are well in excess of the Lden and Lnight values discussed within the 2018 WHO European noise guidance document at the Kerin property.
- Once operational, the proposed road development will be located on an embankment above the height of the property in question. An extensive suite of noise barriers is incorporated along the length of the proposed road alignment to the edge of the embankment extending over a continual length of 900m east and 400m west of the N59 Underbridge. A low noise road surface will also form the surface for the road.
- With the inclusion of the extensive noise mitigation measures, the residual noise impact from the operation of the proposed road development at the Kerin's 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. Indeed, the outcome of the assessment results is similar noise levels

calculated to arise from the N59, with or without the proposed road development in place.

- It is noted throughout the submissions on behalf of Prof. & Dr. Kerin that the noise environment in which the property currently sits is a relatively quiet area and is enjoyed by the family for home life, work and study.
- It is important to note, therefore, that current traffic noise levels up to and exceeding 60dB Lden are experienced at this property on all façades. Once the proposed road development is operational, this scenario will remain.
- The use of bedrooms, studies and living space will, consequently, experience the same conditions that presently exist at the Kerin home in its current setting.

6 Population & Human Health

6.1.1 It was stated on a number of occasions in the statements of evidence made by and on behalf of Prof. & Dr. Kerin that the Kerin household was “uniquely” sensitive and so should be regarded differently from other homes and households. It is agreed, and expressly stated in the EIAR, that all residences should be regarded as highly sensitive receptors. However, it is not accepted that the Kerin household is uniquely sensitive. As detailed previously, the health assessment completed to inform the EIAR assumes that there are sensitive individuals everywhere. It is not the case that certain medical conditions referenced in [Dr. Annette Kerin’s statement are rare. Indeed, and unfortunately, there are many households with similar (or even more severe) sensitivity, both in the vicinity of the proposed N6 GCRR and indeed along the existing road network. This point is made in no way to diminish the real issues within the Kerin household but rather to underscore the fact that all homes are assessed in a similar way. The health status of individuals within households across the proposed road development are not static and are may change during the course of the project development and all residential properties are treated the same, namely, as being highly sensitive receptors.

6.1.2 Prof. Kerin in his submission suggested the health assessment reported upon in the EIAR did not use evidenced-based methods. However, this contention is entirely incorrect. Evidence-based medicine is fundamental to modern science and, indeed, to the health impact assessment carried out in respect of the proposed road development. Section 18.5.2.7 of the EIAR details an extensive literature review of peer-reviewed journals and other evidence based sources used to inform the methodology for the health assessment undertaken to inform the EIAR.

- 6.1.3 The submissions made on behalf of the Kerin household refer to the WHO Environmental Noise Guidelines for the European Region. As outlined by Jennifer Harmon, the noise levels at the Kerin home exceeds WHO levels in the ‘Do-nothing’ scenario, i.e. the existing situation without the development of the N6 GCRR, due to the close proximity of the Kerin home to the existing N59. Moreover, as has been confirmed, it is predicted that there will be negligible changes in noise levels from the current scenario compared with the operational phase of the proposed N6 GCRR.
- 6.1.4 I should confirm that the WHO noise guidelines are evidence based. Indeed, one of the aspects of truly evidence-based studies is that the evidence is ranked in relation to its quality, which was done in the WHO guidelines. It is of note that the WHO ranked the evidence on which the 53 dBL_{den}, annoyance level, is based as “moderate” quality which was downgraded because of inconsistent reports in the literature. The only evidence that was rated as “high” quality was the level of 59.3 dBL_{den} in relation to ischaemic heart disease. Nevertheless, it is accepted that the WHO made strong recommendations whilst also noting that, as reiterated on a number of occasions, these guidelines are for populations rather than individual households. Finally in this context, the Board should note that the WHO issued a third **strong** recommendation in relation to environmental noise. In many ways it is the most important one of all. It stated:
- “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**.”* [Emphasis added]
- 6.1.5 To put this in perspective, it is worthwhile considering the manner in which Ireland has performed in dealing with environmental noise. Prof. Kerin quoted from the European Environmental Agency [EEA] 2020 report on environmental noise, which gives the most recent number of people exposed to greater 55 dB L_{den} and 50 dBL_{night}.
- 6.1.6 It should be noted, firstly, that both these figures are higher than the WHO guidelines. Secondly, it is worth putting these in context.
- 6.1.7 The report gives figures for the numbers exposed to these levels due to road noise in Ireland. In 2017, the year where most recent figures are available, the number exposed to road noise greater than 55 dB L_{den} was 914,700. However, of note, in 2007 the number exposed was 1,190,100. Similarly, for night-time noise the number exposed to road noise greater than 50 dB L_{night} was 570,300 down from 977,600 in 2007, a dramatic

improvement. This is in spite of increased traffic and a greater population.

- 6.1.8 In the same time similar figures in Portugal showed large increases. Even in Germany, often seen as a leader in this regard, numbers exposed also increased by in the order of 20%. Most European countries showed an increase in numbers. This was largely explained by higher levels of traffic.
- 6.1.9 A very significant reason why the Irish numbers fell over the ten-year period was that it corresponded with the time when motorways and other roads infrastructure opened taking large volumes of traffic away from heavily populated areas. This is precisely what the proposed N6 GCRR would do. Prof. Kerin described the WHO guidelines as prescriptive. We do not agree with that statement, they are guidelines and are not prescriptive, but nevertheless very important. When viewed in terms of the population, projects such as the proposed N6 GCRR go some distance to achieving the aims of the WHO guidelines.
- 6.1.10 Prof. Kerin quoted an article by Cohen in the Lancet in 2017. This essentially outlined the role of air pollution and specifically PM_{2.5} on mortality. It is important, however, to put this analysis in perspective. Firstly, as outlined in the Cohen article, excess mortality is not evenly distributed around the globe. It is disproportionately present in low and middle income countries with poor air quality. Secondly, the article refers to improving air quality in high-income countries. However, in this respect, home heating is a significant contributor (and, in particular, coal and other solid fuel). The ban on smoking coal may be expected to have a positive effect in this regard. Thirdly, and most importantly, in the assessment of the proposed N6 GCRR, it is predicted that the proposed road development will have negligible effects on PM_{2.5} levels. Essentially, the Do-Nothing and Do-Something scenarios are the same.
- 6.1.11 Overall, therefore, the health assessment detailed in the EIAR and subsequent Statements of Evidence during the course of the oral hearing for the proposed N6 GCRR, in population terms, is positive.