21 SUMMARY OF CUMULATIVE IMPACT & INTERACTIONS

21.1 Introduction

This chapter of the EIAR identifies the principle interactions between the potential impacts of the environmental factors identified in Chapter 5 to 17 inclusive.

The principal interactions are summarised below, under Table 21.1, and further discussed in Section 21.2 of this Chapter.

The predicted impacts identified in Chapters 5 – 19 have taken into account the principal interactions listed below and associated mitigation measures.

The cumulative impacts arising from the interaction of impacts identified below, is also outlined in this Chapter.

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Where there is an interaction = ✓ No Interaction = **x**

	Population & Human Health	Biodiversity	Land, Soils , Geology & Hydrogeology	Water	Climate (Air Quality & Climate Change)	Climate (Sunlight & Daylight)	Air (Noise & Vibration)	Landscape & Visual Impact	Material Assets (Transportation)	Material Assets (Waste)	Material Assets (Utilities)	Cultural Heritage (Archaeological & Architectural)
Population & Human Health		**x**	**x**	**x**	✓	**x**	✓	✓	✓	**x**	**x**	**x**
Biodiversity	x		✓	✓	**x**	**x**	**x**	✓	**x**	**x**	**x**	**x**
Land, Soils , Geology & Hydrogeology	✓	✓		✓	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Water	x	✓	✓		**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Climate (Air Quality & Climate Change)	x	x	x	x		**x**	**x**	**x**	✓	**x**	**x**	**x**
Climate (Sunlight & Daylight)	x	x	x	x	x		**x**	**x**	**x**	**x**	**x**	**x**
Air (Noise & Vibration)	✓	x	x	x	✓	x		**x**	✓	**x**	**x**	**x**
Landscape & Visual Impact	x	✓	x	x	x	x	x		**x**	**x**	**x**	**x**
Material Assets (Transportation)	x	x	x	x	✓	x	✓	x		**x**	**x**	**x**
Material Assets (Waste)	✓	x	✓	x	x	x	x	x	✓		**x**	**x**
Material Assets (Utilities)	✓	x	✓	x	x	x	x	x	x	x		**x**
Cultural Heritage (Archaeological & Architectural)	x	✓	✓	x	x	x	x	✓	✓	✓	✓	

Table 21.1: Matrix of Interactions between Environmental Factors (During Construction and Operational Phases)

21.2 Interactions

21.2.1 Population & Human Health (Chapter 5)

Climate (Air Quality & Climate Change)

Increases in emissions and dust can lead to an increase in the level of poor respiratory health in the area. Implementing the suggested mitigation measures will reduce the potential for such effects.

Air (Noise &Vibration)

An increase in noise emissions can result in physical health effects relating to hearing loss and headaches and mental health effects such as stress and anxiety. Implementing the suggested mitigation measures will reduce the potential for such effects.

Landscape & Visual Impact Assessment

The introduction buildings on undeveloped land can cause visual disturbance for nearby residents leading to effects on mental health and wellbeing. As the buildings are in keeping with the existing surrounding developments and give increased access to open space and the links through the site, the effects should be limited.

Material Assets (Transportation)

An increase in the number of vehicle movements in the area has the potential to give rise to a risk of more traffic accidents and increased levels of poor air quality.

21.2.2 Biodiversity (Chapter 6)

At the Proposed Development site, the main interactions of importance to biodiversity relate to Chapter 12: Landscape & Visual Impact Assessment, Chapter 8: Water and Chapter 7: Land, Soils, Geology & Hydrogeology. The mitigation measures for the Proposed Development have been designed to minimise the potential impact that the construction and operational phases may have on the receiving environment, including on the retained hedgerow / tree lines.

The landscape design for the Proposed Development takes into account the requirements to maximise the benefits to biodiversity, both locally and within the wider landscape.

As noted in Chapter 19: Summary of Cumulative Impacts & Interactions the potential significant impacts of biodiversity have been considered within the relevant discipline, particularly Water and Landscape, and mitigation measures outlined, where required. With mitigation measures in place, no significant residual negative impacts are predicted.

21.2.3 Land, Soils, Geology & Hydrogeology (Chapter 7)

Human Health

Potential groundwater contamination could impact human health if contamination affects groundwater abstraction or the groundwater quality in the underlying aquifer. This has been assessed as negligible in magnitude and imperceptible in significance before mitigation measures are applied. Nevertheless, good construction practices will be employed on site.

Biodiversity

Potential impacts on the underlying soils, geology and hydrogeology could also impact on biodiversity conditions present, particularly with respect to control of excavations and contamination as described above. This has been assessed as negligible in magnitude and imperceptible in significance before mitigation measures are applied. Nevertheless, good construction practices will be employed on site.

Water

Potential impacts on the underlying soils, geology and hydrogeology could also impact on surface water, particularly with respect to control of excavations and contamination as described above. This has been assessed as negligible in magnitude and imperceptible in significance before mitigation measures are applied. Nevertheless, good construction practices will be employed on site.

21.2.4 Water (Chapter 8)

Biodiversity

Potential impacts on the surrounding hydrological features could also impact on biodiversity conditions present, particularly with respect to potential for increased siltation in runoff arising from excavations and potential contamination from accidental spills and / or leaks (concreting / oils, fuels and chemicals / emergency foul overflows). This has been assessed as negligible in magnitude and imperceptible to slight in significance before mitigation measures are applied. Taking account of proposed construction mitigation measures this risk is considered imperceptible.

Land, Soils, Geology and Hydrogeology

Potential surface water contamination (as described above) could negatively impact soils and underlying aquifers. This has been assessed as negligible in magnitude and imperceptible in significance before mitigation measures are applied. Nevertheless, good construction practices will be employed on site.

21.2.5 Climate (Air Quality & Climate Change) (Chapter 9)

Material Assets (Transportation)

Briefly, there are interactions between the noise and vibration assessment and traffic assessment. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the Proposed Development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the low level changes in traffic flows associated with the Proposed Development.

21.2.6 Climate (Sunlight) (Chapter 10)

No potential impacts from other chapters of this EIAR were considered to have the potential to have associated sunlight impacts.

21.2.7 Air (Noise & Vibration) (Chapter 11)

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the demolition, construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is short-term and imperceptible with regard to the construction phase and long term and imperceptible with respect to the operational phase.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality and climate have been identified.

21.2.8 Landscape & Visual Impact (Chapter 12)

The principle interaction for landscape is with biodiversity. Hedgerows and treelines on site are of landscape, visual and biodiversity value. However, removal of such features for the Proposed Development is very limited – mainly involving narrow road and services crossings and for sightlines at the junction on Moyne Road. In addition to the limited removal of vegetation, the landscape scheme for the Proposed Development sets out a network of connected spaces and linear parks, with additional planting and measures for enhancement of biodiversity. These measures will have a locally positive effect on landscape character, visual quality and biodiversity value.

Interaction between landscape and surface water will see the provision of local surface water attenuation / detention measures, which will be appropriately graded, landscaped and planted for treatment of surface water, and for local biodiversity and landscape value.

No other significant interactions are likely to arise with landscape and visual factors.

21.2.9 Material Assets (Transport) (Chapter 13)

Climate (Air Quality & Climate Change)

Any increase in vehicle trips generated on the receiving transportation network has the potential to impact air quality and climate change, however this development has been designed in accordance with DMURS and parking provision in accordance with Fingal County Council's Development Plan, that is with the emphasis on promoting the use of public transport and active travel. The proximity of Portmarnock DART Station as well as significant footpath / cyclepath linkages throughout this and earlier phases of the development will mitigate against the above.

Air (Noise and Vibration)

Any increase in vehicle trips generated on the receiving transportation network has the potential to impact noise, however this development has been designed in accordance with DMURS and parking provision in accordance with Fingal County Council's Development Plan, that is with the emphasis on promoting the use of public transport and active travel. The proximity of Portmarnock DART Station as well as significant footpath / cyclepath linkages throughout this and earlier phases of the development will mitigate against the above.

21.2.10 Material Assets (Waste) (Chapter 14)

Land, Soils, Geology & Hydrogeology

During the construction phase, excavated soil, stone and clay (c. 24,000 m^3) will be generated from the excavations required to facilitate site levelling, construction of new foundations and underground services. It is envisaged that there will be limited opportunity for reuse on site It is estimated that most, if not all, of the excavated material will need to be removed off-site. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 18: Summary of Mitigation Measures and the requirements of the C&D WMP (Appendix 14.1), will ensure the effect is long-term, imperceptible and neutral.

Material Assets (Transportation)

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the Site during the construction and operational phases of the proposed development. The increase in vehicle movements as a result of waste generated during the Construction Phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the Operational Phase but these movement will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the Construction and Operational phases are addressed in Chapter 13: Material Assets (Transportation). Provided the mitigation measures detailed in Chapter 18: Summary of Mitigation Measures and the requirements of the OWMP (included as Appendix 14.2) are adhered to, the predicted effects are short to long-term, imperceptible and neutral.

Population & Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific C&D WMP and OWMP (Appendices 14.1 and 14.2, respectively), will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be long-term, imperceptible and neutral.

21.2.11 Material Assets (Utilities) (Chapter 15)

Human Health

Potential contamination of water supply infrastructure could impact human health. The proposed mitigation measures of ensuring all watermains to be constructed are pressure tested, cleaned and sterilised before being connected to existing operational water infrastructure in accordance with Section 4 of Irish Water's Code of Practice for Water Infrastructure July 2020, will mitigate against potential risk here.

Land, Soils, Geology and Hydrogeology

The digging of trenches for water services and utilities has the potential to impact soils and underlying aquifers, this has been assessed in Chapter 7: Land, Soils, Geology & Hydrogeology as negligible in magnitude and imperceptible in significance before mitigation measures are applied. Nevertheless, good construction practices will be employed on site.

21.2.12 Cultural Heritage (Archaeological & Architectural) (Chapter 16)

Design team meetings have been held throughout the lifetime of the project and consultation has taken place with the other disciplines preparing the EIAR and designing the scheme. Interactive effects have been considered for this project and include interactions with the following disciplines: -

- Landscape & Visual Impact.
- Biodiversity.
- Land, Soil, Geology & Hydrogeology.
- Material Assets.

The investigation of the townland boundaries took place in consultation with the landscape and visual consultants and the biodiversity specialists to ensure that work was co-ordinated, and that the extent of work required, minimised, in order to protect the townland boundaries. As a result of this, two 10m sections were investigated and the rest of the townland boundaries were left intact and undisturbed. These treeline and scrub boundaries are being incorporated into the proposed development enhancing the natural character of the area.

All archaeological site investigations have been coordinated with other specialists allowing the archaeological work to take place in a timely manner for the EIAR programme. Our results have been shared with other consultants on the team.

21.3 Cumulative Impacts

Where cumulative impacts were considered to arise, these have been outlined in the relevant chapters of this EIAR. The below sections outline the cumulative impacts as raised in each relevant chapter.

21.3.1 Population &Human Health (Chapter 5)

The cumulative effect of the Proposed Development alongside other development due to take place in the area will be long term, significant and positive.

21.3.2 Biodiversity (Chapter 6)

Neither the development proposed nor any other developments will give rise to any significant impacts on biodiversity and there are no predicted cumulative impacts in relation to biodiversity, for example in terms of habitat loss or disturbance to protected species, as a result of the Proposed Development in combination with existing / proposed plans or projects.

21.3.3 Land, Soils, Geology & Hydrogeology (Chapter 7)

The potential impacts for both the Construction Phase and the Operational Phase of the Proposed Development, equally apply for future phases.

21.3.4 Water (Chapter 8)

The potential impacts for both the Construction Phase and the Operational Phase of the Proposed Development, equally apply for future phases, and whilst it is envisaged that the proposed Irish Water Portmarnock Bridge Pumping Station with rising main direct to North Fringe Sewer will be operational within their likely development timelines, however the proposed upgrades to the interim foul pumping station serving this and future developments, will enable it to continue to function until such time as this is the case.

21.3.5 Climate (Air Quality & Climate Change) (Chapter 9)

Construction Phase

According to the IAQM guidance (2014) should the Construction Phase of the Proposed Development coincide with the Construction Phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. There is the potential for the Construction Phase of the Proposed Development to overlap with other phases of the Portmarnock SHD. However, provided the mitigation measures outlined in Section 9.7 and Appendix 9.2 are implemented throughout the Construction Phase of the Proposed Development significant cumulative dust impacts are not predicted.

Due to the short-term duration of the Construction Phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered imperceptible.

There are no significant cumulative impacts to air quality or climate predicted for the Construction Phase.

Operational Phase

The traffic data used to assess the Operational Phase impacts to air quality and climate included the cumulative traffic associated with the Proposed Development as well as other existing and permitted developments in the local area where such information was available. Therefore, the cumulative impact is included within the Operational Phase impact for the Proposed Development. The impact is predicted to be long-term, neutral and imperceptible with regards to air quality and climate.

Do-Nothing Impact

As per Section 9.5.1.3.

21.3.6 Climate (Sunlight & Daylight) (Chapter 10)

As illustrated by the Site Shading Diagrams presented in Section 4.0 of IN2 Document Portmarnock South Phase 1D Sunlight Analysis, it is the finding of IN2's analysis the Proposed Development will have no undue adverse impact on sunlight access within buildings in the Cumulative Development. The potential impact of the Proposed Development on sunlight access within the Cumulative Development surrounding the application site is, therefore, likely to be imperceptible.

21.3.7 Air (Noise & Vibration) (Chapter 11)

Construction Phase

If construction of the proposed development were to concur with that of other phases, there is potential for cumulative construction noise impacts. As noted in Section 11.5.1.1, significant construction noise levels are only expected when works are being carried out at short distances from a given noise-sensitive location. However, it is not likely that there will be simultaneous construction activity from other proposed developments at such distances from noise-sensitive locations.

Operational Phase

In respect of cumulative impact, assessment of the impact of additional vehicular traffic on surrounding roads presented in above takes into account both traffic flows due to the Proposed Development and flows generated by other phases of the Portmarnock Framework Plan, namely the 'entire development' as it is described in Chapter 14: Material Assets Traffic and Transport.

21.3.8 Landscape & Visual Impact Assessment (Chapter 12)

Construction Phase

Potential cumulative landscape and visual impacts from the Construction Phase are associated with: -

- Wider site-based landscape disturbance, earthworks, stockpiling of soils and materials on the subject Site and other sites in the vicinity of the Site.
- Removal of trees / hedgerows on other sites in cumulation with the subject Site.
- More intensive construction activity, traffic from a number of sites / sources.
- Wider inconvenience and / or visual effects from dust, dirt, noise.

Operational Phase

Potential cumulative landscape and visual impacts from the Operational Phase are associated with: -

- Design, character and quality of a wider range of buildings, developments.
- Design, amenity and quality of open spaces within and around the Site.
- Overall quality of finish and management of subject and surrounding developments.

Do-Noting Impact

The lands at Portmarnock South are zoned for residential and associated open space development in the Portmarnock South LAP. Therefore, should this and other subject developments not proceed (do-nothing), it is envisaged that some development of a broadly similar nature will proceed on these LAP lands at some stage.

21.3.9 Material Assets (Transportation) (Chapter 13)

Introduction

In order to produce a robust assessment, this section will analyse the traffic impact of the entire Portmarnock Local Area Plan lands (hereafter the 'Entire Development') which will accommodate c. 1,100no. residential units and a small Local Centre (See Framework Plan, prepared by Burke Kennedy Doyle Architects). The Entire Development will be served by three new priority controlled junctions providing direct access from the external road network. Two of these junctions are on Station Road and one on Moyne Road. It is estimated that the Entire Development will be complete by the 15 year design horizon of 2038. Therefore, this will be used as the comparison year, "without" and "with" the Entire Development scenarios.

Trip Generation: Entire Development

The Trip Rate Information Computer System (TRICS) database was interrogated to derive the potential residential development trip generation rates. As the development includes 3 / 4 bedroom houses and 1 / 2 / 3 bedroom duplex / apartments, the trip rates were calculated "per bedroom" in order to get a more accurate result. The TRICS database was also interrogated to derive the potential trip generation rates for the permitted Local Centre (retail / café / restaurant units and medical / community unit).

Modal Split: Entire Development

When estimating trip generation for a residential development using TRICS the trip rate for car drivers accounts for a 65 – 70% modal split. This is in line with the national average modal split as well as the modal split at a location with a Public Transport Accessibility Level (PTAL) of 1 (see South Fingal Transport Study 2012: Section 5). As the Portmarnock South development has a PTAL of 4[1] (see South Fingal Transport Study 2012: Section 5), we propose to use the PTAL 4 modal split of 41% for car drivers. The South Fingal Transport Study 2019 does not reference "Public Transport Accessibility Level"; therefore the 2012 study is referenced.

The majority of trips generated by the Local Centre will likely come from within the St. Marnock's Bay development and neighbouring developments without passing through Junctions 1 to 5. The trips will most likely form part of the residential trips (i.e. the people using the Local Centre will live within the St. Marnock's Bay, rather than the surrounding Portmarnock / Clongriffin / Malahide area). However, to produce a robust, conservative scenario, it will be assumed that half of the trips generated by the local centre will be generated from outside the area immediately adjacent the development.

Utilising data supplied by the TRICS database including trip attenuation principles, Table 13.17 following details the estimated trip generation for the Entire Development and Local Centre during the morning and evening peak hours being considered for this study. The full TRICS output files are contained in Appendix 13.2.

	Time	Factor	TRICS Arrival Rate	TRICS Departure Rate	Hourly Trips *(PTAL area of 1)*		Attenuated Hourly Trips *(PTAL area of 4)*	
					Trips In	Trips Out	Trips In	Trips Out
Residential Units	Morning Peak Hour	c. 3,500 Bedrooms	0.040 *(per bedroom)*	0.118 *(per bedroom)*	140	413	**88**	**260**
	Evening Peak Hour		0.103 *(per bedroom)*	0.055 *(per bedroom)*	360	192	**227**	**121**
Local Centre: Retail and Café	Morning Peak Hour	443.8m^2	4.661 *(per 100m^2)*	4.318 *(per 100m^2)*	21	19	**11**	**10**
	Evening Peak Hour		6.874 *(per 100m^2)*	7.345 *(per 100m^2)*	31	33	**16**	**17**
Medical / Community Unit	Morning Peak Hour	86.9m^2	3.062 *(per 100m^2)*	1.533 *(per 100m^2)*	3	1	**2**	**1**
	Evening Peak Hour		1.257 *(per 100m^2)*	2.129 *(per 100m^2)*	1	2	**1**	**1**
TOTAL	Morning Peak Hour	-	-	-	-	-	**101**	**271**
	Evening Peak Hour		-	-	-	-	**244**	**139**

Table 21.1: TRICS Trip Generation Entire Residential Housing Development and Local Centre.

[1] A Public Transport Accessibility Level (PTAL) is defined as a numerical value which determines the quality of access to public transport from a particular location. The value is based on the proximity to a service, the frequency of the service, and the nature of the service. Portmarnock South has a PTAL of 4 due to the proximity of the DART and Bus.

Trip Distribution Entire Development

When the Entire Development is complete, residents will be able to use the primary access road onto Moyne Road as well as the existing access points on Station Rd. The access going south onto Moyne Road is likely to attract more of the trips generated within the Entire Development, with at least 60% likely to travel south (Moyne Rd) and 40% likely to travel north (Station Rd). The 60% / 40% for the Entire Development is an estimate derived from the existing traffic flows traveling north and south at each junction and the location of each phase within the overall development itself.

In reality, due to the existing congested nature of Junction 1 and Junction 2 along Station Road, the traffic generated from the Proposed Development will likely pre-sort within the development itself to avoid locations of congestion or travel before / after the peak times thus reducing the amount of traffic on Station Rd.

It was assumed for the purposes of this study that the future development traffic will mirror existing travel flows when exiting and entering the development. The existing traffic from the Phase 1A development was analysed for the morning and evening peak hours. Currently of the traffic from the existing Phase 1A leaving the development, during the morning and evening peak, 60% will travel east towards the Coast Road/Strand Road junction, while the remaining 40% will travel west towards the Drumnigh Road R124 junction. Currently the traffic on Moyne Road, during the morning peak, 50% will travel west towards the Balgriffin junction (Hole in Wall Road realignment junction), while the other 50% will travel east towards the Coast Road junction.

It has been assumed that the future development traffic distribution at the surrounding junctions will also mirror existing traffic patterns i.e. development generated flows will be split through the junction proportionally to existing flows.

Trip Assessment Years Entire Development

It is likely that the Entire Development will be fully operational well in advance of the 15 Year Design Horizon – 2038 used in the Phase 1D traffic analysis. Therefore, the traffic analysis associated with the Entire Development will focus on the 15 Year Design Horizon – 2038. The analysis will compare the 2038 "without" development scenario with a 2038 "with" Entire Development scenario. This will serve as a stress test scenario for the surrounding junctions when the Entire Development is complete.

Figures 13.17 and 13.18 illustrate the 2038 Design Year stress test for the "without" and "with" development scenarios for the morning and evening peak hours.

The Hole in the Wall Road realignment project, as noted earlier is substantially complete. The project replaced Junction 5: Balgriffin Park / Balgriffin Cottages / Moyne Road and Junction 4: Drumnigh Road / Moyne Road).

Additionally, Junction 1) Station Road/Drumnigh Rd (R124) and Junction 2) Strand Road/Coast Road/Station Road upgrades should be complete in March 2022.

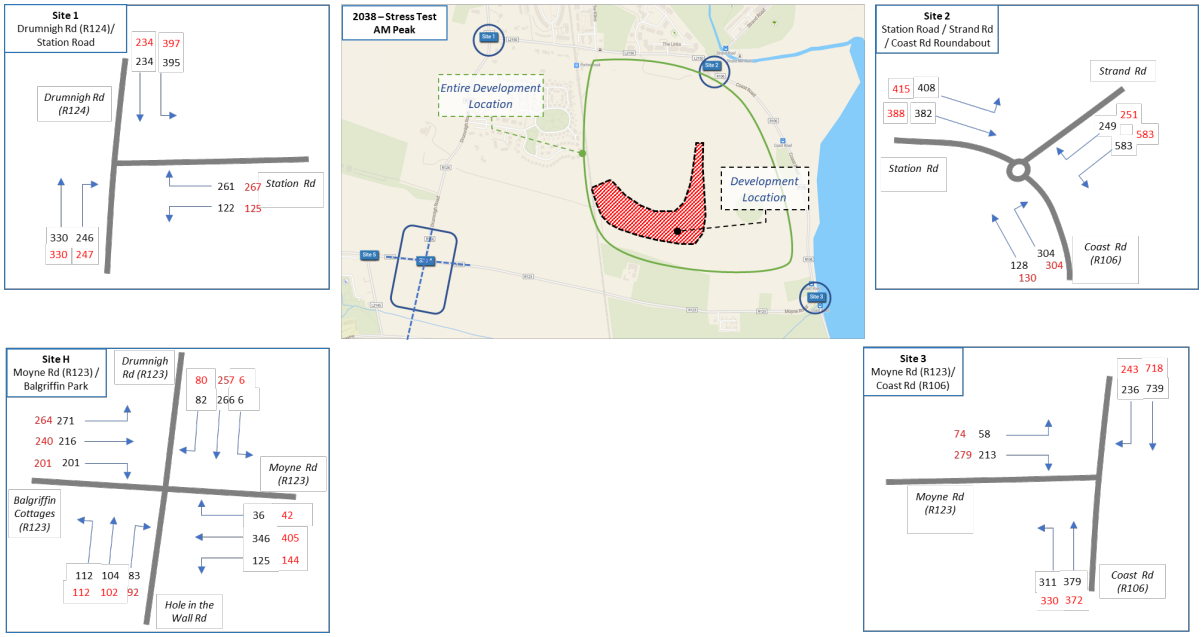

Figure 13.17: 2038 Morning Peak Hour Entire Development (Stress Test).

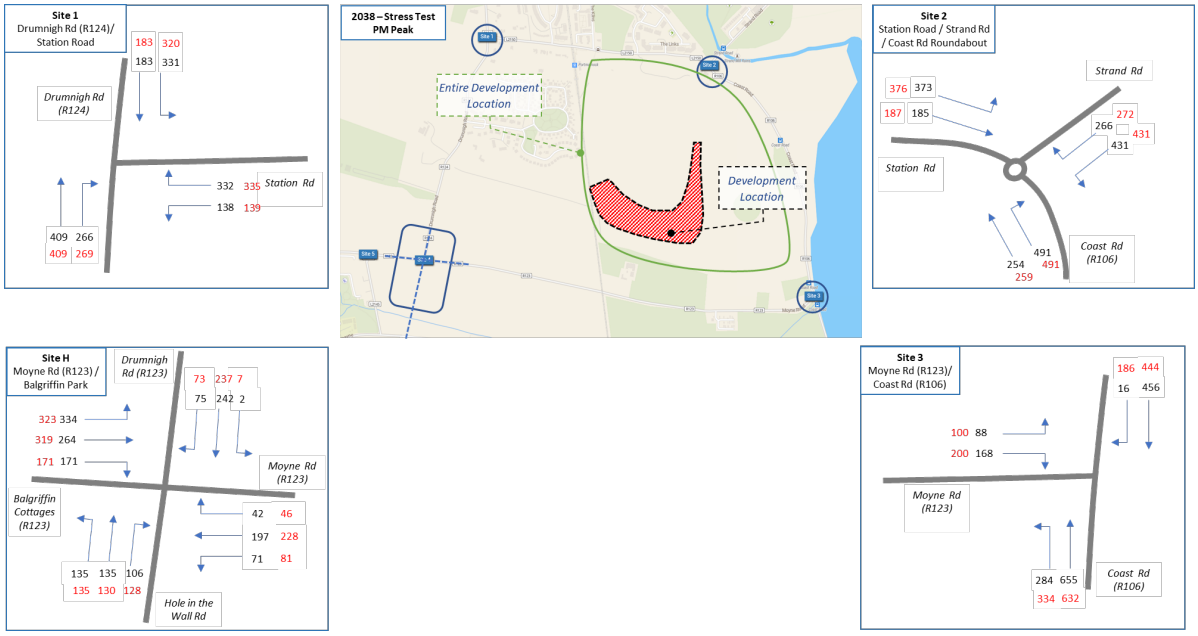

Figure 13.1: 2038 Evening Peak Hour Entire Development (Stress Test).

Traffic Modelling Entire Development

In order to assess the future traffic impact of the Proposed Development, capacity assessments were undertaken using TRL's PICADY and OSCADY software on the following junctions: -

- Junction 1: Station Road / Drumnigh Road R124 (to the north / west).
- Junction 2: Strand Road / Coast Road / Station Road (to the north / east).
- Junction 3: Moyne Road / Coast Road (to the south / east).
- Junction H: Hole in the Wall Road Upgrade (to the south / west).

The junctions were modelled for the 2038 (15-Year) Design Year Horizon for the morning and evening peak hour periods using the flow diagrams shown in Figures 13.17 & 13.18.

To demonstrate the direct traffic impact associated with the Entire Development on the key junctions being considered, the traffic modelling exercise was carried out for the "without" development and "with" development scenarios.

2038 Design Year Entire Development

A summary of the results for Junction 1: Station Road / Drumnigh Road R124, 2038 Entire Development "without" and "with" the development, morning and evening peak hours is shown in Table 13.18. The proposed Junction 1 upgrade will have little effect on traffic movements but improve road safety.

Junction 1) Station Road / Drumnigh Road R124 2038 Design Year Entire Development						
	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
Approach Arm	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Drumnigh Road R124 North	0 0	0 0	0 0	0 0	0 0	0 0
Station Road	1.37 1.35	1.66 1.65	68 62	142 140	653 587	1310 1282
Drumnigh Road R124 South	0.76 0.75	0.80 0.82	5 5	8 7	23 22	31 25

Table 21.2: Junction 1) Station Road / Drumnigh Road R124.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. Table 13.18 demonstrates that Junction 1: Station Road/ Drumnigh Road R124 will exceed the normal design threshold during the morning and evening peak hours considered. This is the case both "without" and "with" the development scenarios. Once a junction is at capacity any slight increase, whether it is background traffic growth or a new residential development, will have a noticeable increase in queues /delays.

However, it is clear from the analysis that the Entire Development will help the performance of Junction 1. During the "with" Entire Development scenario, the new primary access road onto Moyne Road will have been constructed as part of the Proposed Development (Phase 1D). This new access road going south onto Moyne Road will cater for a proportion of trips generated from all phases of the development. A high percentage of these trips will likely travel south avoiding Junction 1 entirely.

The capacity analysis indicates that the junction will not operate efficiently during the "without" and "with" the development scenarios. Any future traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. Nevertheless, the Entire Development will have a slight positive effect on the junction.

The analysis concurs with the observations made in the South Fingal Transport Study (2012) referenced in the Portmarnock South LAP. The study concludes that this junction will undergo capacity issues in the future and recommends that an upgrade of the junction is explored.

A summary of the results for Junction 2: Strand Road / Coast Road / Station Road, 2038 Entire Development Design Year "without" and "with" the development, morning and evening peak hours

is shown in Table 13.19. The proposed Junction 2 upgrade will have a minor effect on traffic movements but improve road safety and provide a safer environment for pedestrians and cyclists.

Junction 2: Strand Road / Coast Road / Station Road 2038 Design Year Entire Development						
	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Strand Road	1.06 1.03	0.94 0.95	65 59	32 32	157 140	87 89
Coast Road	0.44 0.45	0.73 0.72	13 13	16 15	28 29	27 26
Station Road	1.02 1.03	0.81 0.80	54 54	19 18	141 146	53 53

Table 21.3: Junction 2: Strand Road / Coast Road / Station Road.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. Table 13.19 demonstrates that the Junction 2: Strand Road / Coast Road / Station Road will operate above the normal design threshold during the morning and evening peak hour considered. This is the case both "without" and "with" the development scenarios with queues and delays evident.

However, it is clear from the analysis that the Entire Development will slightly help the performance of Junction 2. During the "with" Entire Development scenario, the new primary access road onto Moyne Road will have been constructed as part of the Proposed Development (Phase 1D). This new access road going south onto Moyne Road will cater for a proportion of trips generated from the Entire Development. A high percentage of these trips will likely travel south avoiding Junction 2 entirely. Due to the existing congested nature of Junction 2, the traffic generated from the Proposed Development will likely take an alternative route via Moyne Road or travel before / after the peak times thus reducing the impact on the junction. The Entire Development will have a slight positive effect on the junction.

A summary of the results for Junction 3: Moyne Road/Coast Road, 2038 Entire Development design year "without" and "with" the development, morning and evening peak hours is shown in Table 13.20.

Junction 3: R123 Moyne Road / R106 Coast Road 2038 Design Year Entire Development						
	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Coast Road South	0 0	0 0	0 0	0 0	0 0	0 0
Moyne Road	1.10 1.41	0.92 1.09	20 60	8 22	227 572	105 230
Coast Road North	0.96 0.96	0.57 0.64	22 20	3 3	62 58	11 14

Table 21.4: Junction 3: R123 Moyne Road / R106 Coast Road.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. Table 13.20 demonstrates that Junction 3: Moyne Road/Coast Road will operate above the normal design threshold during the morning and evening peak hours considered. This is the case both "without" and "with" the development scenarios.

It is clear that the traffic generated by the Entire Development will have a minor effect on the Moyne Road junction. However, Junction 3 will still exceed the design threshold without any additional residential development at St. Marnock's Bay. Additionally, the new southern development access onto Moyne Road does relieve pressure on Junction 1 and Junction 2, while having a minor effect on Moyne Road and Junction 3.

A summary of the results of the analysis of Junction H: Hole in the Wall Road, 2038 Entire Development design year "without" and "with" the development, morning and evening peak hours is shown in Table 13.21.

Junction H: Hole in the Wall Road Upgrade 2038 Design Year Entire Development						
	Max. RFC		**Max. Queue (PCU)**		**Average Delay (Seconds)**	
Approach Arm	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Moyne Road East	0.55 0.58	0.33 0.37	7 8	4 4	17 17	15 15
Hole in the Wall Road	0.55 0.59	0.64 0.64	5 6	6 6	32 42	34 39
Moyne Road West	0.74 0.80	0.76 0.78	7 7	9 11	29 37	24 24
Drumnigh Road	0.67 0.68	0.55 0.56	6 7	5 5	35 40	31 32

Table 21.5: Junction H: Hole in the Wall Road Upgrade.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. Table 13.21 demonstrates that Junction H) Hole in the Wall Road Upgrade will operate within the normal design threshold during the morning and evening peak hours considered. This is the case both "without" and "with" the development scenarios. It is clear that the traffic generated by the Entire Development will have a negligible effect on the upgraded Hole in the Wall junction.

Summary

It is noted that the junction analysis for the Entire Development is a robust and conservative analysis. The Entire Development 2038 Stress Test assumes that little additional transport interventions have been applied to the road network in the Fingal area and presents a "worst-case" situation where the full impact of population growth and employment distribution is assigned to the existing road network. Several committed road schemes and junction upgrades in the Fingal / North Dublin City area are to be implemented in the coming years.

It is difficult to quantify the exact impact these upgrades will have on the surrounding road network, but it is clear it will be positive. These road / junction upgrades will likely take traffic away from the smaller junctions around the Portmarnock Local Area Plan lands and wider local area.

The analysis does not consider that by 2038 further sustainable transport improvements in the Fingal area such as improved DART services, BusConnects, cycle schemes and additional government initiatives will all have a positive effect on the modal split, reducing the impact of surrounding junctions.

21.3.10 Material Assets (Waste) (Chapter 14)

Construction Phase

Multiple permissions remain in place for both residential and commercial developments within the vicinity of the development and it is likely more will occur in the Portmarnock area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the Construction Phases. Due to the high number of waste contractors in the Fingal region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise / mitigate any potential cumulative effects associated with waste generation and waste management. As such the effect will be short-term, not significant and negative.

Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place and the potential for more future development in the Portmarnock area. All of the current and potential developments will generate similar waste types during their Operational Phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise / mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a long-term, imperceptible and neutral.

Do-Noting Impact

As per Section 14.5.1.3.

21.3.11 Material Assets (Utilities) (Chapter 15)

No significant cumulative impacts on the water environment are anticipated during the Construction or Operation Phases.

There are no predicted cumulative impacts arising from the Construction or Operation Phases related to the provision of water, power and telecommunication / broadband services.

21.3.12 Cultural Heritage (Archaeological & Architectural) (Chapter 16)

Other developments that contribute to the cumulative development include: -

- Portmarnock South Phase 1C – this considers of 153no. residential units, the 'Local Centre' consisting of 3no. retail / café / restaurant units and public open space, all located adjacent to the north of the application site (permitted under ABP Ref. ABP-305619-19 and currently under construction).

- Envisaged Future Development of the Remaining Portmarnock South LAP Lands – Approximately 507no. residential units, provision of public open space, integration of the recorded monument and provision of road and drainage infrastructure.

Construction Phase

All archaeological and cultural heritage work within Phase 1D is being carried out with the knowledge of the findings from previous development stages of the Portmarnock lands. If any archaeological findings are revealed as a result of the development of Phase 1D, the findings will contribute to our understanding of the wider archaeological landscape and add to the knowledge base of the overall lands.

The development of the above-mentioned schemes and phasing of the remaining Portmarnock South LAP lands will not result in a negative, likely significant, direct, indirect or cumulative effect when assessed in relation to the proposed works necessary for the construction and operational phases of the residential development from an archaeological, architectural heritage and cultural heritage perspective. This is due to the nature of the Proposed Developments and the approach to protect insitu two recorded monuments (DU015-014; a Mound and DU015-055, an enclosure) within the LAP lands in Portmarnock and Maynetown townland and to provide signage as to the development of archaeological and historical landscape.

The remaining lands will be archaeologically assessed and where below ground remains are revealed, they are mitigated and excavated in accordance with the requirements of the DHLGH and Fingal County Council. The retention of the townland boundaries will assist in the protection of the cultural heritage of the area across all phases of development.

Operational Phase

Following the implementation of the mitigation measures, there will not be a significant cumulative effect whether the schemes and phasing of permitted and Proposed Developments are undertaken concurrently or consecutively. No significant cumulative effects will occur.

21.3.13 Risk Management (Major Accidents and Disasters)

As outlined in sections 17.5.1.6 and 17.5.1.7 above, no likely risks of a major accident / disaster occurring are identified during the Construction Phase. A medium risk of major accident / disaster in respect of the Proposed Development during the Operational Phase. No cumulative effects are identified.

Construction Phase

The potential risk during the Construction Phase of the Proposed Development is the same as described under 17.5.1.6.

Operational Phase

The potential risk during the Operational Phase of the Proposed Development is the same as described under 17.5.1.6.

Do-Nothing Impact

The 'do-noting' impact of the Proposed Development will be the same as described under 17.5.1.5.