

## **8.0 MATERIAL ASSETS**

### **8.1 Traffic**

The purpose of this section is to provide a statement addressing the effects of the anticipated traffic generated by the proposed development. It is prepared following the approach set out in the Guidelines published by the Institution of Highway & Transportation in 1994 and guidelines published by the Department of Regional Development Roads Service in 2006.

The proposal is for an underground gas storage facility, however due to the nature of the development, which when opened will employ a small number of skeleton staff; this transport section will mostly deal with the traffic associated with the construction activities at the site. A site location plan is included in Appendix 8.1

The proposed site is in the vicinity of the existing Ballylumford Power Station. The road network on Islandmagee has already facilitated the construction, operation and maintenance of the existing power station. The proposed development will make use of these existing facilities during the construction phases.

This assessment takes into account and considers the impact of the proposed development on the road network at Islandmagee. Existing facilities and services are considered along with the capacity of the surrounding highway network. The method of calculating and estimation of the levels of construction traffic associated with each phase of the construction process will be outlined later in this report.

RPS commissioned traffic surveys to be undertaken during September 2009 to assess the existing traffic conditions at strategic points on the local highway network. The National Road Traffic Forecast (NRTF) central growth rates have been applied to counted traffic data, in order to forecast flows for the relevant assessment years.

To assess any required mitigation measures for the proposed development it is first necessary to understand the baseline or existing conditions with respect to levels of traffic using the local highway network and the accessibility of the application site, before potential impact of the proposed development can be determined. An assessment of the residual impacts of the proposed development on the local highway network and public transport network has also been undertaken.

#### **8.1.1 Baseline Conditions**

##### **8.1.1.1 Existing Road Network**

The roads infrastructure on Islandmagee serves the power station at Ballylumford and the power inter-connectors. During the recent past a new power station (station C) was constructed at Ballylumford. All the construction traffic used the local road network. The ongoing operation of the power station also requires large vehicles to access the site, with continued use of the existing road network. The possibility of delivering equipment and

materials by ship directly to Islandmagee was considered, however the quays at the power station are not designed for unloading of heavy cargo and there are no other docking facilities on Islandmagee which are capable of berthing large vessels. Therefore, the modules for the gas plant facility and leaching plant and any other equipment not able to be sourced from Northern Ireland will be transported via the ports of Larne or Belfast.

The existing routes will be used by heavy goods vehicles carrying drilling, pumping and test plant in and out of the site and by HGVs removing waste products.

Road network baseline conditions have been broken down into four sections;

1 – B90 - A2 Larne Road to Four Corners

2 – B90 Millbay Road – B90 Low Road to Ballylumford Road/ Hollow Road Junction

3 – Hollow Road/Ballylumford Road – Four Corners to Site at Ballydown

4 – B90 Brown's Bay Road/Ferris Bay Road/Ballylumford Road to Site at Ballydown.

In addition site accesses have been considered for the Gas Plant Site at Ballylumford and the Well Pad Site at Ballydown, both linking to the adjacent Ballylumford Road.

The location of the routes sections and site accesses are shown on Figure 8.1.

### **Section 1 – B90 – A2 Larne Road to Four Corners**

This section of road from the A2 Larne Road, the main road linking Larne with Carrickfergus and on to Belfast, is the primary access on to Islandmagee, penetrating northwards towards Ballylumford before linking to the three optional approaches to the sites. This assessment covers a 4.5 mile (7.2km) length of single carriageway road, ending at the Four Corners.

This section of road is graded 'B' Class and is not subject to any traffic width or weight restrictions. Speed restrictions apply from the A2 junction, across the railway line and through Ballystrudder Village. On exiting the village the national speed limit applies. Although there are no further speed restrictions on this section, 'Slow' warning signs and markings have been placed at a bend to the north of St John's Church.

The junction of A2 Larne Road/B90 Island Road Lower has no traffic islands or other obstructions within the kerbed carriageway. The A2 has a right turn pocket and together with the lack of obstruction heavy, long or wide loads should have unobstructed access. (See Photo 1, Appendix 8.9) The B90 is 6m wide at this point.

The route progresses eastwards over the railway bridge where a 30mph maximum speed is advised, where there are no pedestrian footways and where traffic signs advise drivers that the road narrows and there may be 'oncoming vehicles in middle of road'.

The road crosses a causeway at North Channel which is at least 6m wide. No restrictions are signed.



Figure 8.1 – Road Network Assessment Sections

A gentle uphill grade on Lough Road approaches Ballystrudder Village where the route turns 90° northwards at the junction of Low Road, Lough Road, Reid's Road and Ballystrudder Road. The junction in the form of a crossroads is regulated as a mini-roundabout so there are no obstructions within the kerbed carriageway of the junction. The exit arm of the junction is 7.5 m. Approximately 70m from the junction there is a pedestrian island where the carriageway splits reducing to traffic lanes of approximately 3.5m on each side. (See Photos 2 & 3, Appendix 8.9)

Leaving the village the B90 become rural in nature and is unkerbed except where reconstructed. (See Photo 4, Appendix 8.9) The width is generally around 5.8 to 6.0m except in the vicinity of the bend at St John's Church where it narrows to around 5.5m. In a couple of locations where reconstruction/re-alignment has been undertaken the width increases to 7.0m or more.

The general state of maintenance on this section is good. The surface appears to be bitumen macadam (which may have been surface dressed in places). Only in a few locations is there evidence of edge deterioration (e.g. to the inside of the long bend to the east of Four Corners). In places where patching has taken place, the reinstatement has been completed with asphalt.

Estimated speeds of observed traffic between Ballystrudder and Four Corners were quite high, between 40 and 60 mph. While visibility is generally good along all sections of road any slow moving or wide load may be at risk or create a risk at the following locations:

- the bend at the railway bridge and the west end of the causeway
  - the bend at the east end of the causeway
  - the bend in the vicinity of St John's Church
- the bend to the south of the disused Kilcoan Quarries.

## **Section 2 – B90 Millbay Road – B90 Low Road to Ballylumford Road/ Hollow Road Junction**

The B90 Millbay Road runs from the B90 (Low Road/ Brown's Bay Road) just North of the disused Kilcoan Quarries, through the village of Millbay to its junction with Ballylumford Road and Hollow Road. This assessment covers a 1.9 mile (3.1km) length of single carriageway road.

Millbay Road has limited access with a weight restriction of 7.5t signed at both ends (See Photos 5 & 6, Appendix 8.9). The road width varies between around 4.5 to 5.0m. It is largely unkerbed except through the village where a length of road has recently been resurfaced and finished with kerbing. In many places there is evidence of edge weakness with edge patching and strengthening. Horizontal and vertical alignments are the major physical restrictions. Leaving the B90 Low Road a driver is immediately faced with a downhill gradient and a series of hairpin bends. Further sharp bends adjacent to Kilcoan House, adjacent to St John's Cottage and at the south of Millbay Village make this road totally

unsuitable as a haul or access route to the proposed site although it is classified as a 'B' route.

### **Section 3 – Hollow Road/Ballylumford Road – Four Corners to Site at Ballydown**

This section comprises Hollow Road and the southern length of Ballylumford Road as far as the proposed Well Pad Site at Ballydown. Hollow Road from Four Corners to its junction with Ballylumford Road/Millbay Road is unclassified but is signposted as part of the Brown's Bay Scenic Route. Ballylumford Road is designated as the B90. This assessment covers a 1.3 mile (2.1km) length of single carriageway road.

From Four Corners, proceeding west, Hollow Road runs fairly straight for about 1 km (0.6 mile) before a left hand bend at the bottom of the quite steep decline where the road crosses a stream. About halfway along the decline there is a levelling off before the decline continues – this creates a dip/crest in the vertical alignment which may impede visibility. After the stream the road gradient raises fairly sharply before a gentle right hand bend on the approach to the junction with Ballylumford Road/Millbay Road.

Hollow Road varies in width from around 5.4m down to around 4.5m. The bitmac surface is in generally good condition although it is totally unkerbed and the unsupported edges are probably liable to damage if overrun by haul vehicles.

Traffic speeds along the straight section of road downhill were estimated to be upwards of 40mph on occasions.

The Ballylumford Road/Hollow Road junction has been improved to give a wide swept bend. (See Photo 7, Appendix 8.9)

From the junction with Hollow Road/ Millbay Road, Ballylumford Road extends north towards the proposed well pad site access at Ballydown. Width varied from around 5.5 down to around 5.0m. The route rises steadily before rising steeply towards the location of the proposed site access. Horizontal alignment has moderate bends with reasonable visibility.

Speed of some observed traffic proceeding southwards downhill away from the site was estimated to exceed 50mph.

### **Section 4, B90 Brown's Bay Road/Ferris Bay Road/Ballylumford Road to Site at Ballydown.**

This section of the B90 extends from the Four Corners along Brown's Bay Road, through Brown's Bay and along the northern length of Ballylumford Road past the proposed Gas Plant Site as far as the proposed Well Pad Site at Ballydown. It is signed as part of the Brown's Bay Scenic Route. Ballylumford Power Station is situated adjacent to the junction of Ferris Bay Road and Ballylumford Road. This assessment covers a 4.3 mile (6.9km) length of single carriageway road.



Gradients along this route are gentle with the steepest section probably on the approaches to Brown's Bay.

Four Corners is a slightly staggered crossroads. Traffic on Brown's Bay Road approaching from Ballystrudder (on Section 1 above) is required to make a sharp turn through approximately 120°. The tightness of this corner may limit the size of load that can be taken over this section of the route and may require traffic control. The width of carriageway is around 5.2m at this location. (See Photos 8, Appendix 8.9)

Proceeding north the road bends past some farm buildings on to a reconstructed section at Portmuck Road. While this reconstructed section extends north at 7.5m wide and provides a right turn pocket at the Portmuck Road junction, the bends to the south have restricted visibility and are appropriately signed to warn of the bend and to reduce speed. (See Photos 9 & 10)

From Portmuck Road to Brown's Bay significant lengths of carriageway have been constructed with 7 to 7.5m width. Vertical and horizontal alignments are gentle offering good visibility. In the town land of Drumgurland there is a large lay-by (48m useable length, 6 to 6.5m width) which may have strategic use.

This length of the route passes the proposed access to the sea water intake pumping station site at Dundressan.

Through Brown's Bay a 30mph speed limit applies. Continuing through the village the carriageway narrows to around 5.5m and this length is subject to 'No waiting at any time' restrictions.

Exiting Brown's Bay the carriageway remains at a width of 5.5 – 6m without waiting restrictions and after a series of slight bends turns through a 90° bend to cross the headland to Ferris Bay. There is a continuous pedestrian footway from Browns Bay to Ballylumford Road.

The junction of Ballylumford Road and Ferris Bay Road has been improved to accommodate left turn movements into Ballylumford Road by provision of a 6m wide slip lane. (See Photo 11, Appendix 8.9)

Ballylumford Road starts around 6m wide but reduces to around 5m after the accesses to the power station and Moyle Inter-connector sites. A 40mph speed limit applies through Ballylumford village where the road width narrows locally to 4.5 to 4.8m. Vertical visibility is restricted. (See Photo 12, Appendix 8.9) Exiting the village there are some edge defects and fatting up of the surface.

The proposed Gas plant Site access at Ballylumford is on the stretch of road approaching the 40mph speed restriction, applying to the section of road passing the main group of residential properties at the top of the hill. Similarly the proposed well pad site access at Ballydown lies just beyond the limit of the 40mph speed restriction.

### **8.1.1.2 Site Accesses**

#### **Well Pad Site Access at Ballydown**

The proposed Well Pad Access Site access point is shown on drawing no. IBE0096/P\_011, Rev A, Appendix 8.7. This is situated at the end of route sections 3 and 4. This is a downhill section of Ballylumford Road just outside the 40mph speed limit. Sightlines of 2.4m x 90m (LHS and RHS) are proposed.

#### **Gas Plant Site Access at Ballylumford**

The proposed Gas Plant Site access point is shown on drawing no. IBE0096/P\_010, Rev A, Appendix 8.7. This is a downhill section of Ballylumford Road and is on location on a section just before entering the 40mph speed limit. Sightlines of 4.5m x 88m (LHS) and 4.5m x 105m (RHS) are proposed.

### **8.1.1.3 Existing Vehicle Movements**

To obtain relevant information on vehicle movements around the application site, traffic surveys were commissioned by RPS. The traffic surveys were undertaken by Count Us In on Tuesday 22nd September 2009. Table 8.1 outlines the locations, date and time of the traffic surveys.

**Table 8.1 – Traffic Survey Details**

<b>Junction</b>	<b>Date</b>	<b>Time</b>	<b>Peak Hour</b>
Lough Road/ Ballystrudder Road/ Low Road Mini Roundabout	Tuesday 22 <sup>nd</sup> September 2009	0700-0930	0730-0830
		1600-1830	1630-1730
Browns Bay Road/ Low Road at Four Corners	Tuesday 22 <sup>nd</sup> September 2009	0700-0930	0730-0830
		1600-1830	1645-1745

During the traffic surveys no queuing or delay was noted at the junction.

### **8.1.1.4 Collision Statistics**

Collision Statistics were requested from the Police Service of Northern Ireland's (PSNI) Central Statistics Units for the junction at Lough Road/ Ballystrudder Road/ Low Road mini roundabout. Table 8.2 below tabulates these statistics.

**Table 8.2 PSNI Collision Statistics for Lough Road/Ballystrudder Road/Low Road Mini Roundabout**

(1 April 2006 – 31 March 2009)

Fatal Collisions	Serious Collisions	Slight Collisions	All Collisions
0	0	3	3
Killed	Seriously Injured	Slightly Injured	All Casualties
0	0	5	5

Since the nature and cause of the collisions are not know, it is difficult to comment as to weather there are safety concerns relating to the layout of the junction. The statistics are gathered from a period of approximately 3 years and since there is a minor level of slight collisions it could be deemed that there are no accident trends at this junction.

### 8.1.2 Proposed Development

The proposed development is for an underground gas storage facility to be located at Ballylumford, Islandmagee. The above ground facilities for the proposed development are primarily located adjacent to the existing power station at Ballylumford. A site location plan is included in Appendix 8.1

The proposed development works comprise the following main construction elements

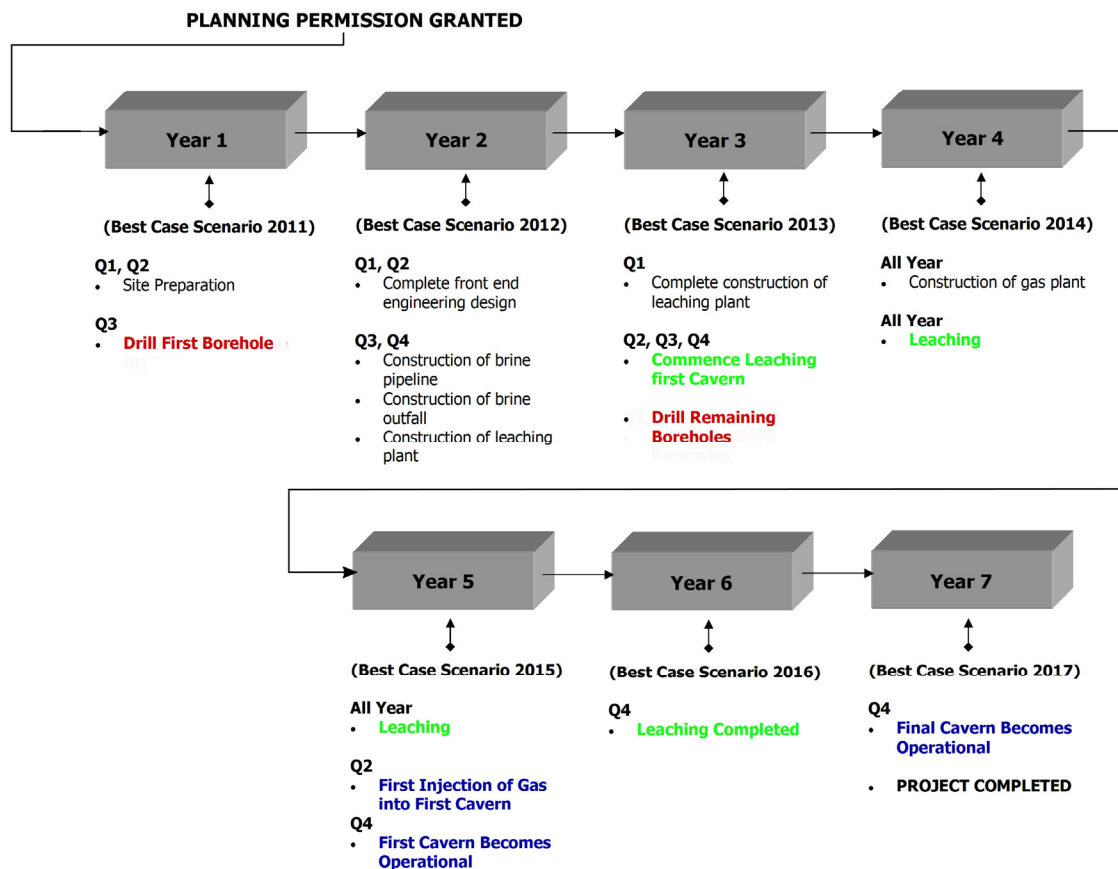
- Gas Plant Facility
- Sea Water and Brine Pumping Facilities (Leaching Plant)
- Wellpad
- Sea Water Intake Pumping Station
- Connecting Pipelines
- Temporary Set Down and Storage Compound

Prior to works commencing the existing fences and, where necessary, hedgerows will be removed as required for the new entrance lane. Hedgerows and verges along the B90 will be cut back to accommodate sight lines as required. The existing wall adjacent to the lane entrance will also be removed. Waste materials from these activities will be removed from the site and transported by a licensed contractor for disposal in an approved landfill or green waste recycling centre.

The construction will be phased, with construction of the wellpad, taking place first, followed by the sea water intake, leaching plant, and outfall and connecting pipelines. Leaching cannot commence until all these elements are completed and the first well has been drilled. It is anticipated that construction of the leaching infrastructure and wellpad and the subsequent



reinstatement will take approximately two years. Figure 8.2 below shows a flowchart outlining the construction phases associated with the proposed development.



**Figure 8.2 Gas Storage Facility Construction Phases**

Since the construction activities will follow a specific sequence based on yearly quarter time scales the traffic impact assessment will be carried out on a yearly basis using the largest predicted level of hourly traffic for the whole year.

Proposed construction traffic will be assessed for the following years:

- 2011 (Year 1)
- 2012 (Year 2)
- 2013 (Year 3)
- 2014 (Year 4)

Construction activities are expected to last approximately 7 years, however levels of construction traffic expected will be assessed for the first 4 years of construction (2011-2014) as any activities taking place after this time will be sub-surface.

### 8.1.3 Base Traffic

Traffic recorded during the surveys was converted into PCUs (i.e. each recorded HGV/ bus was converted to car units by using a factor of 2.0). Traffic network diagrams showing junction turning counts and two-way flows are included in Appendix 8.2.

A National Road Traffic Forecast (NRTF) Central Growth factor was subsequently applied to the traffic to predict likely traffic levels in future years of assessment. Table 8.3 below outlines the traffic growth factor applied to the surveys. Given the limited development on Islandmagee, this traffic uplift factor is considered very robust.

**Table 8.3 NRTF Central Growth Factors applied to traffic surveys (2009)**

Year	Central Growth
2011	3.1%
2012	4.6%
2013	6.2%
2014	7.7%

Future year base traffic flow diagrams are included in Appendix 8.3.

### 8.1.4 Generated Traffic

Generated traffic will be calculated on the basis of quarterly construction activities. The activities were estimated on an hourly basis based on 6 working days per week and 10 hours per day. The most onerous activity was used to assess the peak hour impact for the corresponding year.

The following is a break down of the construction activities involved in each of the years of assessment

#### 8.1.4.1 Year 1

##### Q1 (4 weeks = 240 hours) – Wellpad construction (4 week period)

Tarmac and Aggregate Required for Wellpad construction during the 4 weeks period = 10,000 Tonnes

16T/8 m<sup>3</sup> Lorry trips  $10000/16 = 625$  loads

Typical hourly loads  $625/240 = 2.6$

Movements at Site (in and out) = 5 (2\*number of hourly trips)

For robustness of assessment say 10 movements in the peak hour

**Total No of PCU movements at site**                      **20**                      **(HGV = 2.0 PCUs)**

### **8.1.4.2 Year 2**

#### **Q1 and Q2 (6 months = 1560 hours) Construction of Brine Leaching Plant**

Note: Loads required for delivery of pipe is calculated assuming flatbed loader (11.8m assumed length) with 10 pipes of 450mm diameter per load. For the 1000mm carrier sleeve this has been reduced to 5 pipes per load.

Length of 406/450mm Pipeline required	8175m =	69 loads
Length of 500mm sleeve pipe required	595m =	5 loads
Length of 1000mm sleeve pipe required	725m =	13 loads

Note: The number of loads required for access road construction was based on a road length of 222m, 6m wide and a 1.0m make up depth

Access Road Construction (1332m <sup>3</sup> )	167 loads
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Note: Given the likely ground conditions it is assumed that 25% of the conventionally trenched pipeline route (5405m<sup>3</sup>/4) requires sand to bed the pipelines. For the purposes of assessment 60 number 20 tonne lorry loads will be required

Backfilling	60 loads
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Note: Brine Leaching Facilities are 2197m<sup>2</sup> at a concrete depth of 200mm (440m<sup>3</sup>)

Leaching plant construction* 295/8	37 loads
(*assuming 2/3 of leaching plant to be complete this quarter)	

Total Loads	351 loads
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Movements at Site	702 movements
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Total movements per hour	702/1560	0.45
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Say 10 HGV movements for robustness

<b>Total No of PCU movements at site</b>	<b>20</b>	<b>(HGV = 2.0 PCUs)</b>
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### **8.1.4.3 Year 3**

#### **Q1 (3 months = 780 hours) - Completion of Brine Leaching Facilities**

Leaching plant construction\* 148/8                      19 loads  
(\*assuming 1/3 of leaching plant to be complete this quarter)

Movements at Site    38 movements                      (2\*number of hourly trips)

Total movements per hour                      38/780                      0.05

For robustness of assessment say 4 movements in the peak hour

**Total No of PCU movements at site                      8                      (HGV = 2.0 PCUs)**

The transfer of 21,100m<sup>3</sup> of fill material from the leaching plant site to the gas facilities site (adjacent site on the opposite side of the road) takes place at this point, however this does not involve vehicle movement along the Ballylumford Road. The other 12,000m<sup>3</sup> of fill needed will be recycled from previously disposed rock and rubble from the power station within the site itself and will be transported to the site without using the public road network

### **8.1.4.4 Year 4**

#### **Q1, Q2, Q3 & Q4 (12 months = 3120 hours) Construction of Gas Plant**

Note: Figures below based on Gas Pant Construction, 9462m<sup>2</sup> area at 500mm depth (4726m<sup>3</sup>)

Gas plant construction		
Main Platform and Metering	4726/8	592 loads
Compressor Pad	600/8	75 loads
Access Road Construction	7758/8	970 loads
<b>Total Loads</b>		<b>1637 loads</b>

Movements at Site    3274                      (2\*number of hourly trips)

Peak Hour Movements                      3274/3120                      1.05 movements in peak hour

For robustness of assessment say 5 movements in the peak hour

**Total No of PCU movements at site                      10                      (HGV = 2.0 PCUs)**

Generated traffic flow diagrams for design years 2011, 2012 and 2013 are provided in Appendix 8.4.

#### **8.1.5 Assignment and Distribution**

Generated traffic was assigned to the network based on the likely routes in and out of the site for HGV traffic arriving and departing via the B90 junction at Ballystrudder crossroads. It was noted in section 1 that traffic leaving the site would prefer to turn left to take advantage of better visibility; therefore departures from the site are distributed left along the Ballylumford Road and Brown's Bay Road to the junction at the Four Corners. Large traffic arriving at the site will travel along Low Road from the junction of B90/ Ballystrudder Crossroads, along Low Road and Hollow Road to left turn into the site.

#### **8.1.6 Proposed Traffic**

Proposed traffic was determined by the addition of the likely assessed levels of construction traffic to the base network traffic (existing traffic from surveys with NRTF Central Growth Factor applied)

Proposed Traffic flow diagrams for design years 2011, 2012 ,2013 and 2014 are included in Appendix 8.5

#### **8.1.7 Percentage Impact**

Percentage Impact Diagrams for each of the 3 years of construction are included in Appendix 8.6.

#### **8.1.8 Junction Analysis**

The Departmental approved software package PICADY was used to assess the operation of the junction at Ballystrudder Road/ Lough Road and the junction at the Four Corners.

The Departmental approved software package ARCADY was used to assess the operation of the Ballystrudder crossroads as it is set out as a mini roundabout.

The ARCADY modelling package was used to model the Ballystrudder mini roundabout for proposed (PCU) traffic flows in design year 2012. Parameters used for the models are shown on Drawing IBT0496/004 included in Appendix 8.7. The resulting Ratio of Flow to Capacity (RFC) determines the level of queuing and delay that the junction is likely to experience. Optimum RFC is less than 0.85 indicates when minimal queuing can be expected at the junction. When the RFC is between 0.85 and 1.00 the junction will begin to experience queuing on minor arms and opposed movements.

The ARCADY results for the mini-roundabout layout are shown in Tables 8.4 and 8.5 below;

**Table 8.4 ARCADY results of junction at Ballystrudder Rd/ Lough Road/ Low Road  
(PROPOSED TRAFFIC FLOWS AM 2012)**

ARM	RFC	Q
ARM A	0.143	0.2
ARM B	0.237	0.3
ARM C	0.281	0.4
ARM D	0.181	0.2

ARM A – Ballystrudder Road

ARM B – Lough Road (west)

ARM C – Low Road

ARM D – Lough Road (east)

**Table 8.5 ARCADY results of junction at Ballystrudder Rd/ Lough Road/ Low Road  
(PROPOSED TRAFFIC FLOWS PM 2012)**

ARM	RFC	Q
ARM A	0.273	0.4
ARM B	0.357	0.6
ARM C	0.294	0.4
ARM D	0.165	0.2

ARM A – Ballystrudder Road

ARM B – Lough Road (west)

ARM C – Low Road

ARM D – Lough Road (east)

The modelling output indicates that the junction will operate well within capacity during the most onerous construction phase of the proposed development. The highest modelled RFC is 0.357 which is significantly less than the optimum maximum threshold of 0.85.

The PICADY results for the slightly staggered crossroads at the Four Corners are shown in Tables 8.6 and 8.7 below; Junction parameters are shown on drawing IBT0496/004 included in Appendix 8.8.



**Table 8.6 PICADY results of junction at Four Corners (PROPOSED TRAFFIC FLOWS AM 2012)**

<b>Movement</b>	<b>RFC</b>	<b>Q</b>
B-ACD	0.015	0.0
A-BCD	0.049	0.1
D-ABC	0.072	0.1
C-ABD	0.000	0.0

ARM A – Low Road  
ARM B – Ballytober Road  
ARM C - Hollow Road  
ARM D – Browns Bay Road

**Table 8.7 PICADY results of junction at Four Corners (PROPOSED TRAFFIC FLOWS PM 2012)**

<b>Movements</b>	<b>RFC</b>	<b>Q</b>
B-ACD	0.007	0.0
A-BCD	0.065	0.1
D-ABC	0.066	0.1
C-ABD	0.000	0.0

ARM A – Low Road  
ARM B – Ballytober Road  
ARM C - Hollow Road  
ARM D – Browns Bay Road

The modelling output indicates the junction at the Four Corners works within capacity with virtually no queuing or delay predicted for the addition of construction traffic in design year 2012. The highest RFC is 0.074 which is significantly less than the optimum maximum threshold value of 0.85.

Therefore it is anticipated that the proposed development will not have detrimental impacts on the surrounding highway network. An electronic copy of PICADY and ARCADY outputs is included in Appendix 8.8.

### **8.1.9 Mitigating the Impacts**

The most significant highway impact of the proposed development is during the construction phase.

Tables 8.4 to 8.7 recorded the potential impact and as noted all junctions are predicted to operate within capacity.

As noted in paragraph 8.1.1.4 (page 8-7) there are no recorded accident trends with the existing road network. On this basis no off-site road network improvements are required to mitigate against construction impacts.

As discussed in 8.1.1.2 (page 8-6) minor improvements to create adequate construction visibilities will be provided.

Throughout the construction phase appropriate traffic management procedures will be put in place, which will be agreed with DRD Roads service to minimise the impact on the local road network and adjacent residents.

#### **8.1.10 Residual Impact**

The operational traffic generations associated with the proposed development will be minimal and there will be no ongoing residual impacts.

## **8.2 Infrastructure**

### **8.2.1 Water Supply**

Mains water infrastructure extends along the Ballylumford Road to supply domestic residences and the power station. The power station also sources water for its steam cycle and plant requirements from an on-site desalination plant which abstracts water from Larne Lough and stores the treated water in tanks on site. During the detailed design phase of the scheme, a detailed breakdown of water requirements for the construction phase will be prepared. This will be submitted to Northern Ireland Water as a Pre-Development Enquiry to determine whether the average and peak flow requirements for the construction phase, such as supplying the on site offices and accommodation as well as water requirements for concrete production can be achieved, although it is likely that temporary storage tanks may be required. There do not appear to be any constraints to providing a connection to the mains water supply for the main gas plant facility for the operational phase of the project and there are no significant impacts predicted on the mains water supply network arising from the proposed development.

### **8.2.2 Waste Water**

At present, there is no sewerage infrastructure across most of the northern portion of Islandmagee. Domestic foul waste is handled by individual or shared septic tanks at properties. There is therefore no mechanism for foul and surface water arising from the proposed gas storage facilities to be discharged into a municipal treatment system. Provision for appropriate treatment of foul waste by septic tank or domestic treatment plant will be incorporated within the detailed design of the main gas plant facilities. During the operational phase, the leaching plant, sea water intake and wellpad sites do not have any foul waste disposal requirements.

Provision for surface and storm water collection and, where appropriate, treatment to remove silt and/or oils prior to controlled discharge via soakaways during the construction and operational phases of the gas storage facility and other associated above ground facilities has been considered in the outline design (refer to section 12.3, "Drainage").

During construction, temporary portable toilets will be provided at the construction hubs along the working width of the pipeline routes, at each of the above ground facility construction sites and at the site offices within the temporary construction set down area. These will be emptied regularly by a specialist contractor and disposed off-site in accordance with The Environmental Protection (Duty of Care) Regulation (NI) 2002.

There are no significant impacts predicted to arise from waste water management at the proposed gas storage facility.

### 8.2.3 Electricity

The proposed gas storage facility will have a significant power demand during both the construction (during leaching) and operational phases. The sea water and brine pumping equipment is estimated to have a peak power demand of approximately 10MW and during operation, the gas compression and heating/cooling plant may require up to 30MW. Consequently, it is likely that the Islandmagee gas storage facility will be one of the biggest power consumers in Northern Ireland when running at peak operations.

Consultation meetings were held with Northern Ireland Electricity (NIE) who own the electricity transmission network in Northern Ireland and Systems Operator Northern Ireland (SONI) who operate the network on 4<sup>th</sup> June 2009 and 25<sup>th</sup> August 2009 to identify the potential connection points to the transmission network and assess the feasibility of distributing power to the various component sites of the scheme.

It has been confirmed by NIE and SONI that there is an available bay within the 110kv sub-station adjacent to the proposed main gas plant facility site to which a connection for the main gas plant facility and leaching plant may be made. However, the sub-station is scheduled to be upgraded and a new sub station is to be built on a site adjacent to the existing sub-station. The upgrade is currently scheduled for the period 2013-2018. Islandmagee Storage Limited will liaise closely with NIE and SONI regarding phasing and timescale of both the gas storage project and the transformer replacement to ensure that both proposed schemes are integrated efficiently to reduce overall costs and/or unnecessary works for both parties.

NIE/SONI will require an operating profile of load demand over project life, including leaching phase which will be provided by Islandmagee Storage Limited during the detailed design phase. All of the pumping equipment will be frequency controlled and will be capable of “soft starting” to gradually build up the load on the electricity network.

110kv to 33kv and, where required, 33kv to 11kv step down transformers are included within the scheme design.

Cabling will be required from the grid connection point to the intake site and the wellpad site as the local distribution network will not be capable of taking the additional load. It is currently suggested that power cables are tunnelled/buried within the same trench or conduit as the sea water, brine and gas pipelines. Further study will be required during the detailed design phase to ensure that this does not cause any conflict with control cables which will also have to be routed to the two remote sites.

From the outline consultations with NIE and SONI, there do not appear to be any significant issues with the upstream supply and the proposed scheme is not expected to cause any overloading of the transmission system. However, harmonic analysis will be required to make sure that any harmonic currents spilled into the transmission network do not cause resonance.

### 8.2.4 Gas

The Scotland to Northern Ireland natural gas transmission Pipeline (SNIP) extends 135km to Ballylumford from Twynholm in Scotland and was completed in 1996. The 24 inch diameter sub-sea pipeline makes landfall at Castle Robin Bay on the eastern shore of Islandmagee and crosses the peninsula, terminating at the Ballylumford Pressure Reduction Station (PRS), adjacent to the Power Station (please refer to Figure 3.8 on page 3-15 of this EIS).

The Belfast Gas Transmission Pipeline (BGTP), completed in 1998, also originates from the Ballylumford PRS and runs for 26km to a pressure reduction station at Tory Town on the northern shore of Belfast Lough where it then travels 9km across Belfast Lough to Knocknagoney pressure reduction station. A 3km spur, known as the Larne Crossing Pipeline, also travels from the PRS at Ballylumford to a Pressure Reduction Station at Curran Point in Larne.

The Ballylumford PRS neighbours the proposed gas plant facilities on their northern side and it is proposed that the connection to the mains gas network and all gas sourcing requirements will take place through the PRS.

The cathodic protection for the Larne Lough Crossing Pipeline, a 28m groundbed, is known to be located close to the shore below the main gas plant facilities and is connected to a transformer rectifier and subsequently to the pipeline within the Ballylumford PRS compound. Mapping showing the location of the buried cabling and the groundbed itself (shown in Appendix 3.4) is not sufficiently detailed to identify the precise location of the protection. This area will therefore also require to be surveyed by GPR or similar prior to construction to ensure that damage to the protection can be avoided or appropriately mitigated.

Provided that the mitigation outlined above is undertaken to safeguard the Larne Crossing Pipeline's cathodic protection, the proposed scheme will have no negative residual impacts on the local or regional gas infrastructure. Rather, the proposed scheme will serve to enhance the efficient use of the SNIP and will help to balance and provide swing to the gas network.

### 8.2.5 HFO Pipeline

A 12" pipeline which was commissioned to transfer heavy fuel oil (HFO) between Ballylumford Power Station and Kilroot Power Station in the 1980s runs through the vicinity of the proposed site. The oil pipeline is now redundant and was decommissioned following the power station's conversion to gas in 1997. To avoid causing damage to the HFO pipeline, as with the other sub-surface infrastructure, sub surface imaging will be undertaken prior to construction and the precise location of the pipeline will be identified. Its location will be clearly marked on the site and reinforcing slabs will be cast and placed over the pipeline where plant machinery is required to cross it.

There are not predicted to be any residual impacts from the proposed construction on the HFO pipeline.

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