Attachment 4 - Supporting Information

1.0 Project construction methodology and area of disturbance

1.1 Construction Methodology

All Project components will be designed, constructed an operated in accordance with the *Australian Standard (AS) 2885* and the Australian Pipeline and Gas Association *Code of Environmental Practice 2017*.

1.1.1 Transmission and storage pipelines

Construction of both the transmission and storage pipelines will use typical methods for modern gas pipelines. Given the larger diameter pipe required for the storage pipeline, there will be some differences in construction methodology relative to the transmission pipeline. Notably construction equipment will be larger, the construction rate will be slower and welding and weld testing methods appropriate for the increased wall thickness will be implemented. The construction footprint for the storage pipeline will also be cleared and reinstated incrementally to match construction progress, and to minimise the area of exposed ground during construction.

The construction sequence is shown in **Figure 1**, and will involve the following key steps:

- Preliminary survey works (including geotechnical surveys, installation of temporary gates in fences)
- Clearing of vegetation and grading the ROW
- Stripping and stockpiling of topsoil
- Delivery of pipe segments to the ROW and welding into 'strings'
- Non-destructive testing (NDT) and coating of welds
- Excavating a trench and any necessary bell holes in which to lay the pipe
- Lowering the pipeline strings into the trench and welding strings together
- Backfilling the trench with excavated material
- Crossing watercourses and roads by open cut trench, horizontal boring or HDD methods
- Installing pipeline markers at fences, road crossings and other locations as required by AS 2885
- Testing the structural integrity of the pipeline by hydrostatic testing
- Installing permanent gates in fences, where required
- Rehabilitating the construction footprint.

A typical layout for the construction ROW of the transmission pipeline is shown in **Figure 2.**

Figure 1. **Typical construction sequence**

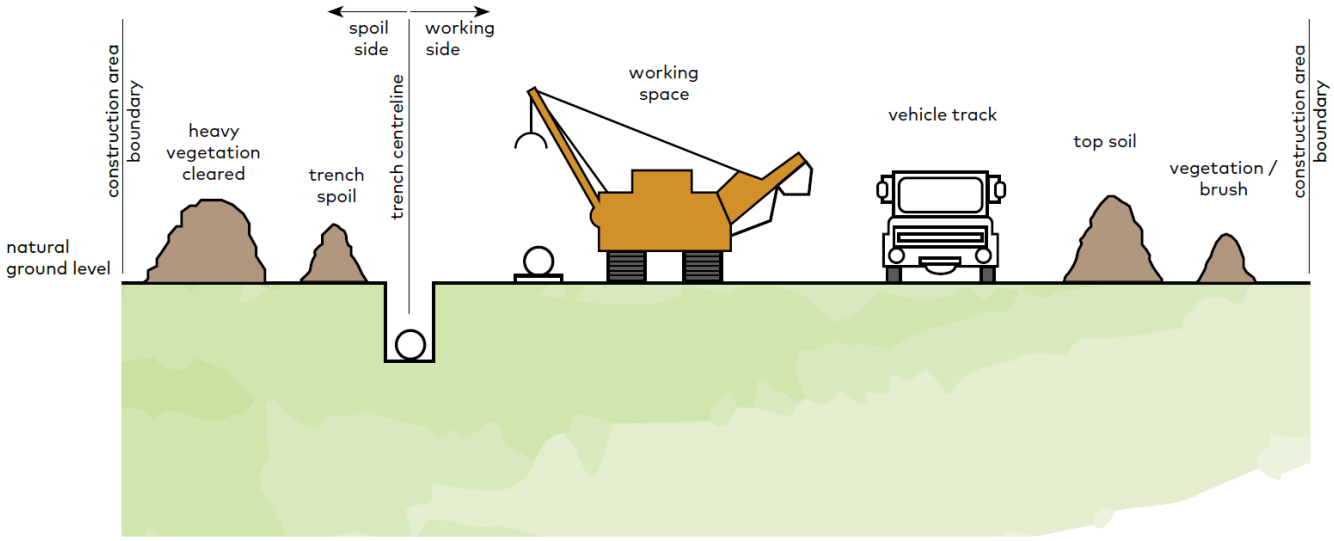

Figure 2. **Typical layout for the construction Right of Way**

1.1.2 Associated surface facilities

Construction of the JGN offtake facility, compressor station and delivery station will be undertaken by specialist crews across several stages of works. These stages broadly comprise site set up, earthworks and civil construction, mechanical, electrical and instrumentation works and testing and commissioning.

Site set up within the construction footprint of each associated surface facility is required to provide a safe and efficient area for construction activities. This includes constructing temporary access to the construction sites, clearing vegetation, installation of temporary fencing and site offices, set up of lay down areas, and relocating existing services if required.

Earthworks will then be undertaken to modify existing ground levels to the required design levels. The topsoil may be required to be replaced with engineered fill or pilings installed to minimise ground settlement. Steel reinforced concrete foundations and piled steel footings will then be installed for fixing surface facility equipment and supports on to.

Following installation of foundations and footings, work to install structural, mechanical, piping, electrical and instrumentation (SMPEI) components can be undertaken. Specialist crews will install structural supports, mechanical equipment, piping spools, electrical equipment, cabinets and panels, cabling, instrumentation, buildings, and walkways.

The majority of major equipment and SMPEI components will be manufactured outside of Australia, although fabrication of skids and installation of equipment will be undertaken within Australia where equipment is shipped as separate components. The major equipment and SMPEI components will be transported to the Port of Newcastle by ship, then transported by semi-trailer to the relevant associated surface facility site for installation.

Testing and commissioning of the associated surface facilities may involve hydrostatic testing of pipework, as well as testing of mechanical and electrical equipment to make sure they have been installed correctly and are ready for commissioning. Commissioning involves fine tuning of equipment and instrumentation by running the facilities through various operating ranges. Once each facility passes all checks following a commissioning plan, it is ready to commence operations.

1.2 Environmental impacts of construction activities

The previously described construction activities associated with the Project would result in potential direct and indirect impacts on the environment. These potential impacts would broadly occur through, but not limited to:

- Vegetation clearing for permanent and temporary infrastructure;
- Removal of fauna habitat/features and displacement of resident fauna;
- Soil disturbance and excavation for ROW construction, pipeline trenches and site set up of associated surface facilities;
- Generation of dust, noise and vibration by construction equipment and traffic;
- Changes to local landscape character.

These construction impacts are not anticipated to have a significant impact on any MNES.

1.3 Environmental impacts of operational activities

Environmental impacts during operation of the project will be limited to minor noise and air emission from the JGN offtake facility, compressor station and delivery station. Minor fragmentation of habitat due to construction of the transmission pipeline would ameliorate over time as vegetation regenerates.

These operational impacts are not anticipated to have a significant impact on any MNES.

1.4 Land Requirements

Construction of the Project would disturb an estimated maximum of 96 ha of land. Of this, approximately 43 ha is required for construction of the transmission pipeline ROW, approximately 34 ha for construction of the storage pipeline, approximately 5 ha for associated surface facilities, and approximately 8 ha for access tracks.

During operations the Project would require an estimated 2.3 ha of land.

The estimated land disturbance area for construction and operational phases of the Project are outlined in **Table 1**.

Table 1 Estimated Maximum Disturbance Area

Infrastructure	Number	Maximum Disturbance Area (ha)	
		Construction	Operations
Transmission pipeline ROW	1	43	0
Mainline valve	1	0.1[1]	0.01
Vegetation stockpiles	6	1.5	0
Truck turnarounds	12	0.9[2]	0
Access tracks (constructed or upgraded)	12	8.17	0[3]
Turkeys nest storage	1	1.2	0
Additional workspaces – watercourses	12	0.3	0
HDD entry and exit points	12	1.2	0
Pipe laydown areas	3	3.99	0
Storage pipeline construction footprint	1	33.64	0
JGN Offtake facility	1	0.4	0.1
Compressor station and delivery station	1	2.2	2.2
Total		**95.6**	**2.31**

[1] MLV footprint contained within disturbance footprint of the transmission pipeline ROW
[2] Truck turnaround areas are contained within the access track areas
[3] Access easements over temporary access tracks for permanent operational access may be sought following consultation and negotiation with landholders. Final operational footprint dependent on outcomes of negotiations

1.5 Potential Impacts on Ramsar listed Hunter Estuary Wetland

The Shortland section of Hunter Estuary Wetlands is located approximately 5.9 km south-east of the JGN Offtake Facility at KP0. This is the closest distance between any Project component and the Hunter Estuary Wetlands.

The area between the Project and the Shortland section of Hunter Estuary Wetlands encompasses cleared grazing land and the densely vegetated Hexham Swamp. Given the nature of the proposed action and distance from the closest point of the Hunter Estuary Wetlands, it is unlikely that any aspect of the Project will directly or indirectly impact the ecological character of the Hunter Estuary Wetland. No direct or indirect impacts to the ecological character of the Hunter Estuary Wetland are expected to occur during the lifetime of the Project.

An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:

- *areas of the wetland being destroyed or substantially modified*

The Shortland section of Hunter Estuary Wetlands is approximately 5.9km south east of the JGN Offtake Facility at KP0. This is closest distance between any Project component and the Hunter Estuary Wetlands. Because of this spatial separation there is no real chance or possibility that the Project will result in areas of a Ramsar wetland being destroyed or substantially modified.

- *a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland*

The hydrological regime of the Hunter Estuary Wetlands is primarily controlled by the Hunter River and tidal influences, and constructed drainage and flood mitigation systems. The Project is approximately 5.9km distant from the Hunter Estuary Wetlands at its closest point and consists of shallow buried pipelines and small surface facilities that are unlikely to cause substantial hydrological change for the hydrological regime of any wetland. There is no real chance or possibility that the Project will cause a measurable change for any component of the hydrological regime of the Hunter Estuary Wetlands.

- *the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected*

The Project footprint almost entirely impacts terrestrial communities, including the cleared floodplains of Wallis Creek and Swamp Creek. There is no real chance or possibility that the Project will result in the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected.

- *a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or*

The Project is located approximately 5.9km distant from the Hunter Estuary Wetlands at its closest point. Standard management techniques in line with the APGA *Code of Environmental Practice Onshore Pipelines 2017* will be applied during construction and operation of the Project to manage erosion and sediment risks and handling of fuel and chemicals. Given the location of the Project and the appropriateness of the controls, there is no real chance or possibility that the Project will cause a substantial and measurable change in the water quality of the Hunter Estuary Wetlands.

- *an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.*

The Project is located approximately 5.9km distant from the Hunter Estuary Wetlands at its closest point and does not entail the introduction of any wetland plants or animals into the local area. Standard management techniques in line with the APGA Code of Environmental Practice Onshore Pipelines 2017 will be applied during construction of the Project to minimise and mitigate any potential biosecurity issues including the possible introduction of invasive species. There is no real chance or possibility that the Project will result in an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

Reference

APGA 2017. *Code of Environmental Practice Onshore Pipelines, Revision 4*. Australian Pipelines and Gas Association Ltd. September 2017.