

5. PROJECT DESCRIPTION: FEED GAS PIPELINE

A single, nominal 48" (1,219 mm) internal diameter, high-pressure gas pipeline is proposed to deliver feed gas to the LNG plant at a nominal pressure of 7.3 MPa from the Arrow Surat Pipeline on the mainland. The 9.45-km-long pipeline will be installed using a combination of conventional pipe-laying techniques, and the excavation of a tunnel beneath Port Curtis using a tunnel boring machine (TBM). Ancillary pipeline infrastructure required will include metering, isolation valves, an integrated scraper or pig receiving station (which will be located near the gas inlet station at the LNG plant), telecommunications (via fibre optic cable), and supervisory control and data acquisition (SCADA) systems. Above ground facilities will be enclosed within a security fence. If required, the pipeline will be depressurised through the LNG plant flare system.

A detailed description of the feed gas pipeline, pipeline control systems, and construction and operation activities for the pipeline was presented in Chapter 7 of the Arrow LNG Plant EIS (Coffey Environments, 2012). This chapter describes changes to the feed gas pipeline and tunnel design that have occurred since the publication of the EIS, as part of ongoing engineering investigations and design (Figure 5.1). These changes relate to the alignment of the tunnel and the location of the reception shaft on Curtis Island, pipeline alignment on Curtis Island, tunnel launch site layout and access arrangements, and tunnel drainage design.

5.1 Feed Gas Pipeline (and Tunnel) Alignment

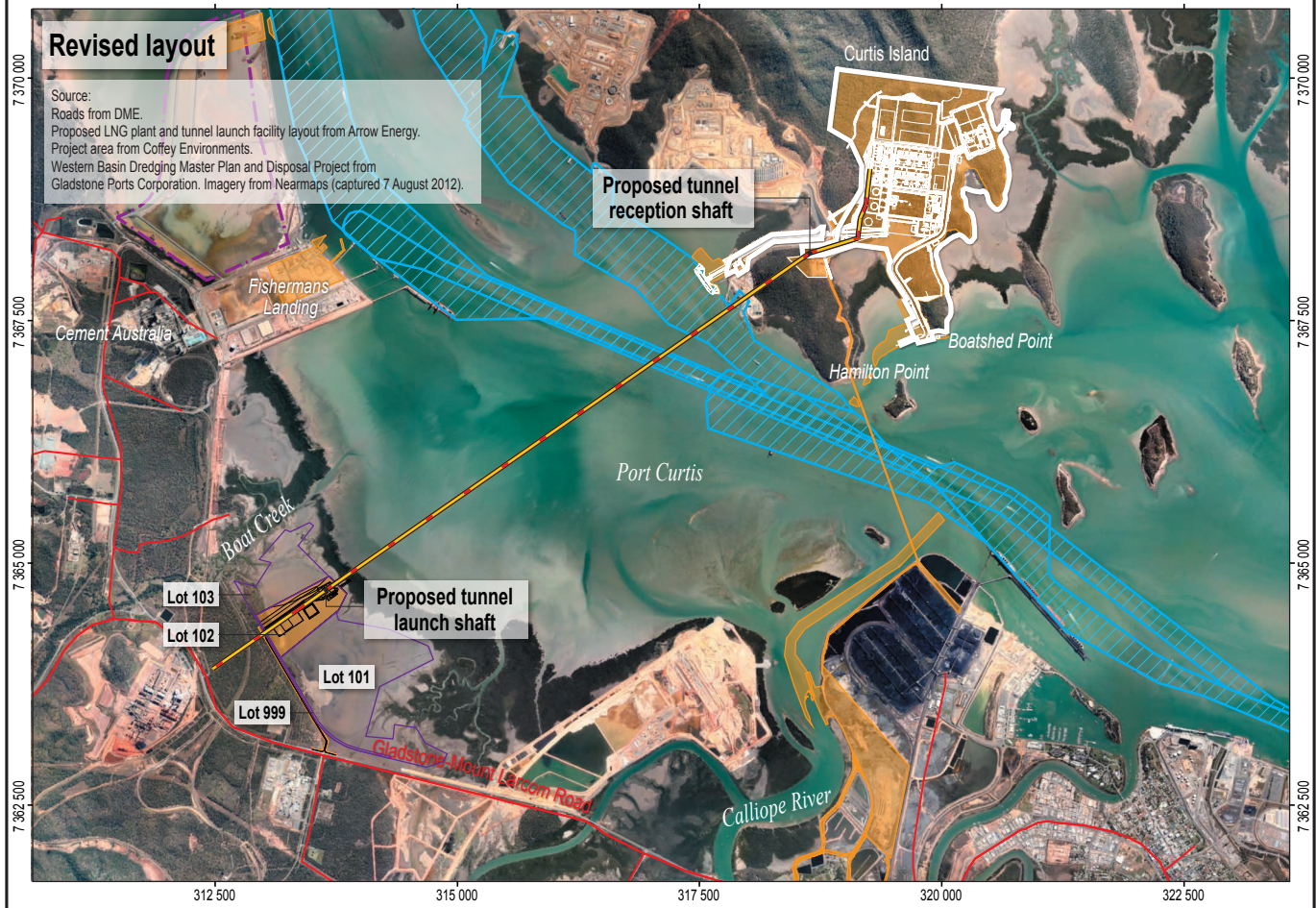
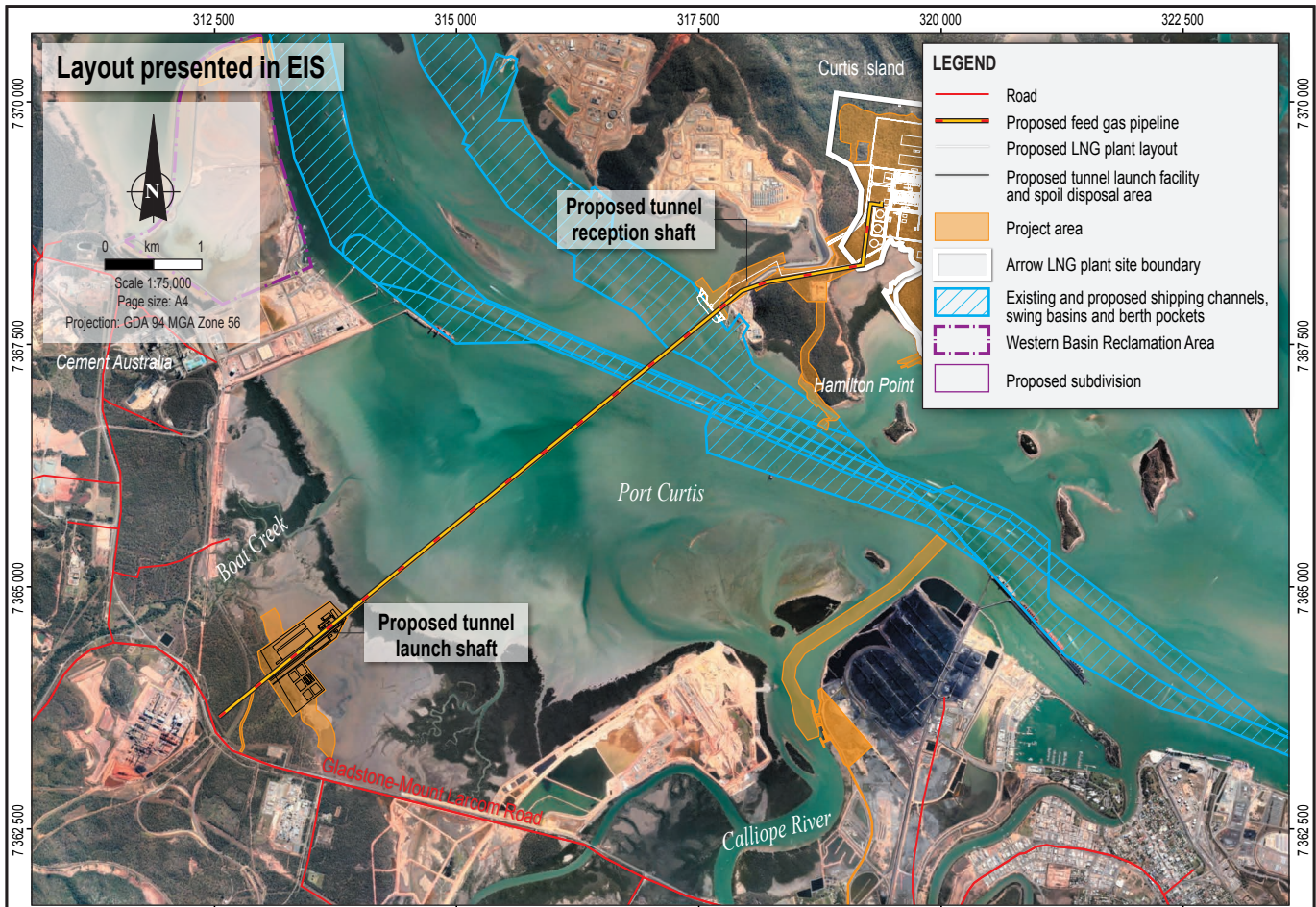
The tunnel reception shaft site on Curtis Island presented in the EIS was located north of the Gladstone LNG Project (GLNG) materials offloading facility (MOF) at the northwest corner of Hamilton Point. On exiting the tunnel, the feed gas pipeline crossed the GLNG haul road to run south of the haul road adjacent to the LNG loading lines to the LNG plant site.

The tunnel has been extended and realigned, since the EIS was finalised and exhibited, to avoid the GLNG MOF and haul road. The tunnel reception shaft is now located approximately 700 m east of the original site, south of the GLNG haul road and on the eastern side of the low hills of Hamilton Point. The feed gas pipeline now runs south of the haul road to the LNG plant site, crossing the LNG loading lines inside the LNG plant site. West of the LNG plant site, the tunnel reception shaft and feed gas pipeline are located in the Curtis Island Corridor Sub-Precinct of the Gladstone State Development Area (see Figure 4.1).

The revised tunnel and feed gas pipeline alignments avoid crossing of the haul road, congestion at the GLNG MOF and improve separation to the Arrow Energy LNG loading lines, which now run north of the GLNG haul road from the LNG jetty to near the LNG plant site boundary where they cross the haul road.

5.2 Tunnel Launch Site Layout and Access

The mainland tunnel launch site, located on the intertidal mudflats south of Boat Creek, was originally proposed as an irregular-shaped, 50-ha site, approximately 900 m long by 700 m wide at the edge of the mudflats, narrowing to 350 m near the tunnel launch shaft to encompass the tunnel launch shaft pad and tunnel spoil disposal areas.



A 35-ha site, approximately 900 m long by 450 m wide at the edge of the mudflats, narrowing to 300 m wide near the tunnel launch shaft, is now proposed. It avoids essential habitat for coastal sheathtail bat and koala, and land use conflict with the Yarwun Coal Terminal Project proposed by Tenement to Terminal Limited (Figure 5.2). The tunnel launch site is located on proposed Lot 102 of the proposed subdivision of Lot 101 SP235026. Lot 102 is adjacent to proposed Lot 101 the site for the proposed Yarwun Coal Terminal Project.

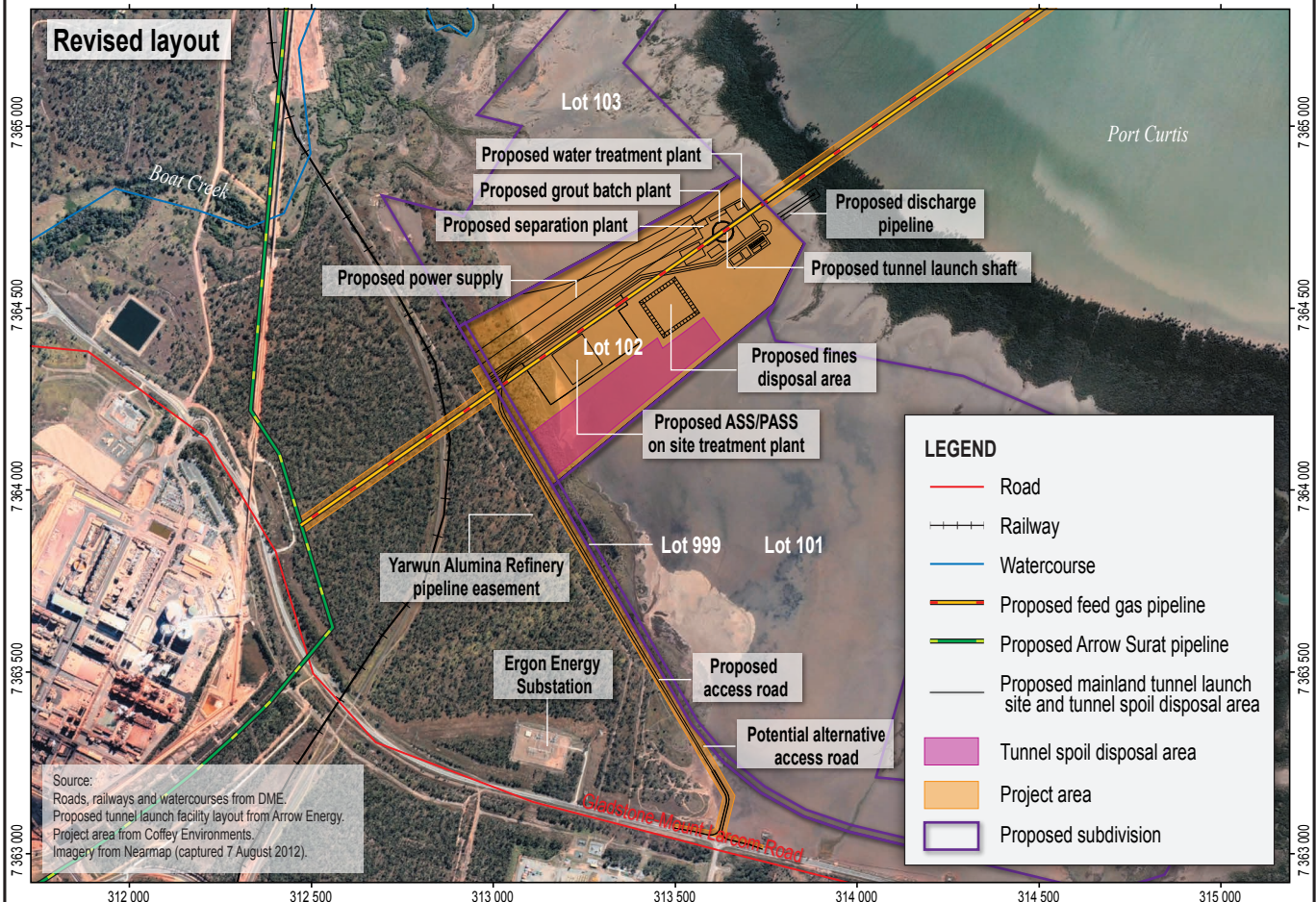
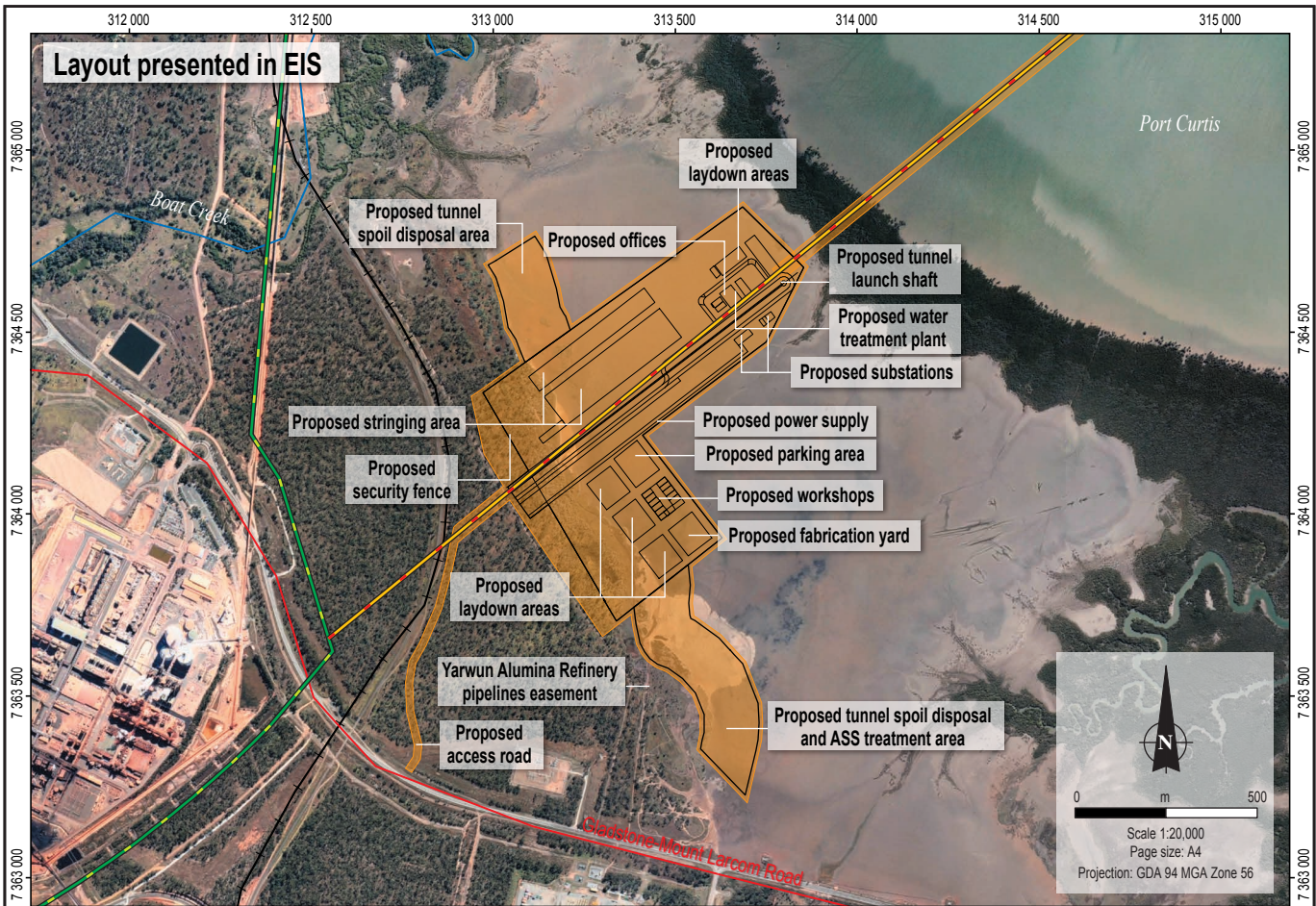
The tunnel launch site pad will be constructed from imported fill and suitable tunnel spoil, which will be contained within an engineered structure. The pad will be shaped to direct stormwater runoff to retention ponds from where, if necessary, it will be pumped to a water treatment plant to be treated before discharge to the intertidal mudflats or directly to Port Curtis. This will ensure an adequate separation distance of discharge points from Boat Creek and its associated estuarine ecosystem. Water for tunnel construction and hydrostatic testing of the pipeline, will be supplied to the tunnel launch site from a tapping on the Gladstone Area Water Board (GAWB) water main which runs along Gladstone–Mount Larcom Road. Figure 5.3 shows conceptual water management during construction of the tunnel launch shaft and tunnel. During construction, power for the tunnelling operation will be supplied through a temporary Ergon connection. After completion of tunnel and pipeline construction the electrical infrastructure will be removed. During the first few months of construction and initial establishment of the tunnel launch site, small scale diesel engine generators will be used.

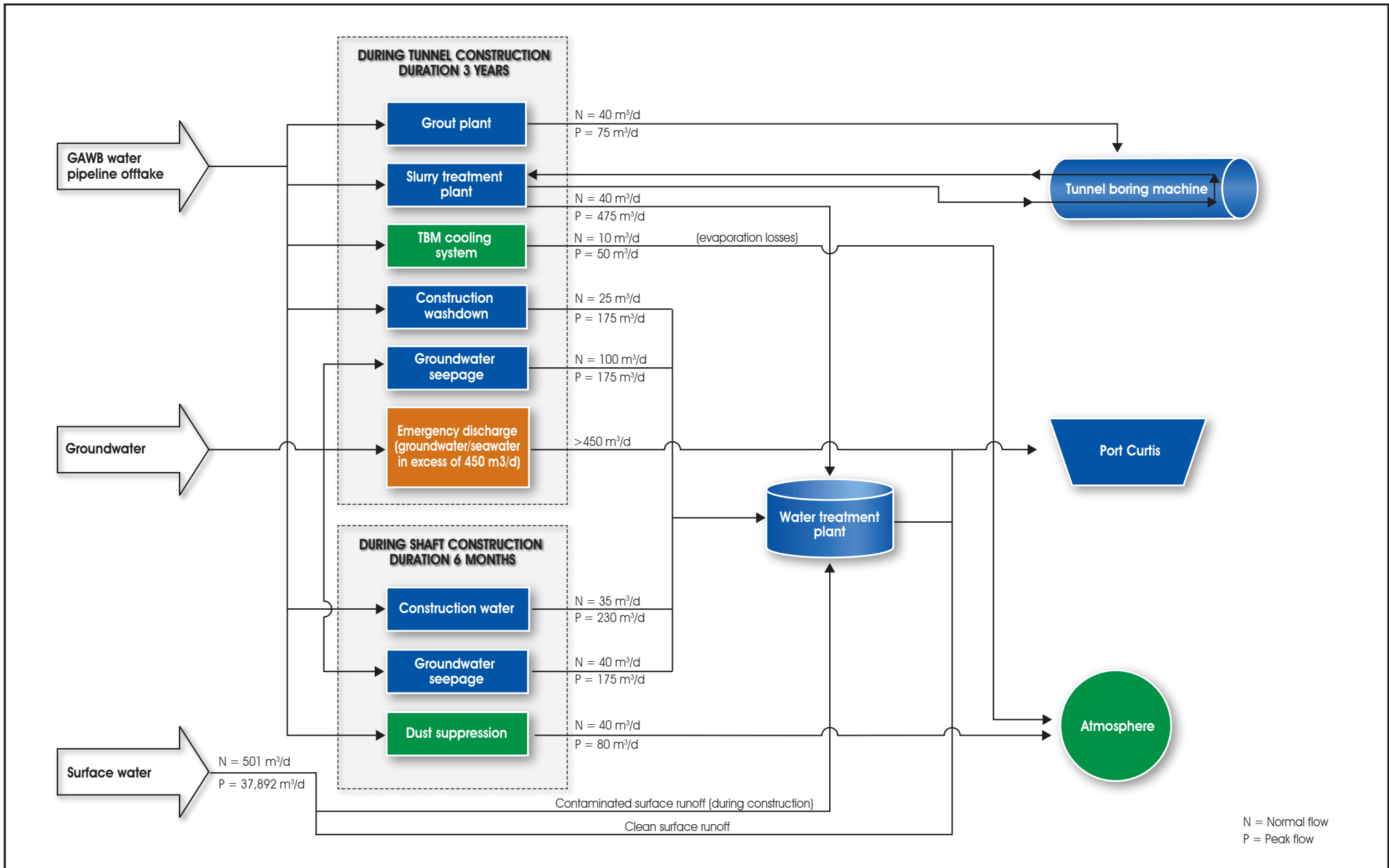
Seawater inundation, drainage, stabilisation and management of spoil material including acid sulfate soils, and the properties of intertidal mudflat sediments will be considered in design of the tunnel spoil disposal area, which will be informed by ongoing geotechnical investigations and geochemical analysis.

An acid sulfate soil treatment pad will be located adjacent to the tunnel spoil disposal area to treat acid sulfate soil material exposed or excavated during construction of the site formation and launch shaft. Acid sulfate soil material will be treated then disposed in the adjacent tunnel spoil disposal area in accordance with relevant guidelines. It is estimated that up to 450 m³ of acid sulfate soil material will require treatment and disposal. The tunnel spoil disposal areas have been sized to accept this volume of material and the estimated 223,000 m³ of weathered and competent rock to be excavated by the TBM. The launch site pad and spoil disposal areas will remain as permanent features after construction.

Access to the tunnel launch site was proposed via an upgrade to the Orica Australia pipeline access track from Gladstone–Mount Larcom Road, or alternatively a new 900-m-long access track from Gladstone–Mount Larcom Road. The proposed access track was to connect to Gladstone–Mount Larcom Road approximately 150 m east of the Ergon Energy substation access road.

The proposed tunnel launch site access road has been revised following discussion with the Department of Transport and Main Roads to connect to the Gladstone–Mount Larcom Road (Port Curtis Way) at the existing Reid Road intersection to provide a common access point for property owners east of Port Curtis Way. The intersection will require upgrading as a result of construction of the proposed Yarwun Coal Terminal Project. An additional turning lane and other treatments will be required to the already upgraded intersection to provide safe access to and from the mainland tunnel launch site.





Source: Coffey Environments and Arrow Energy



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Arrow Energy
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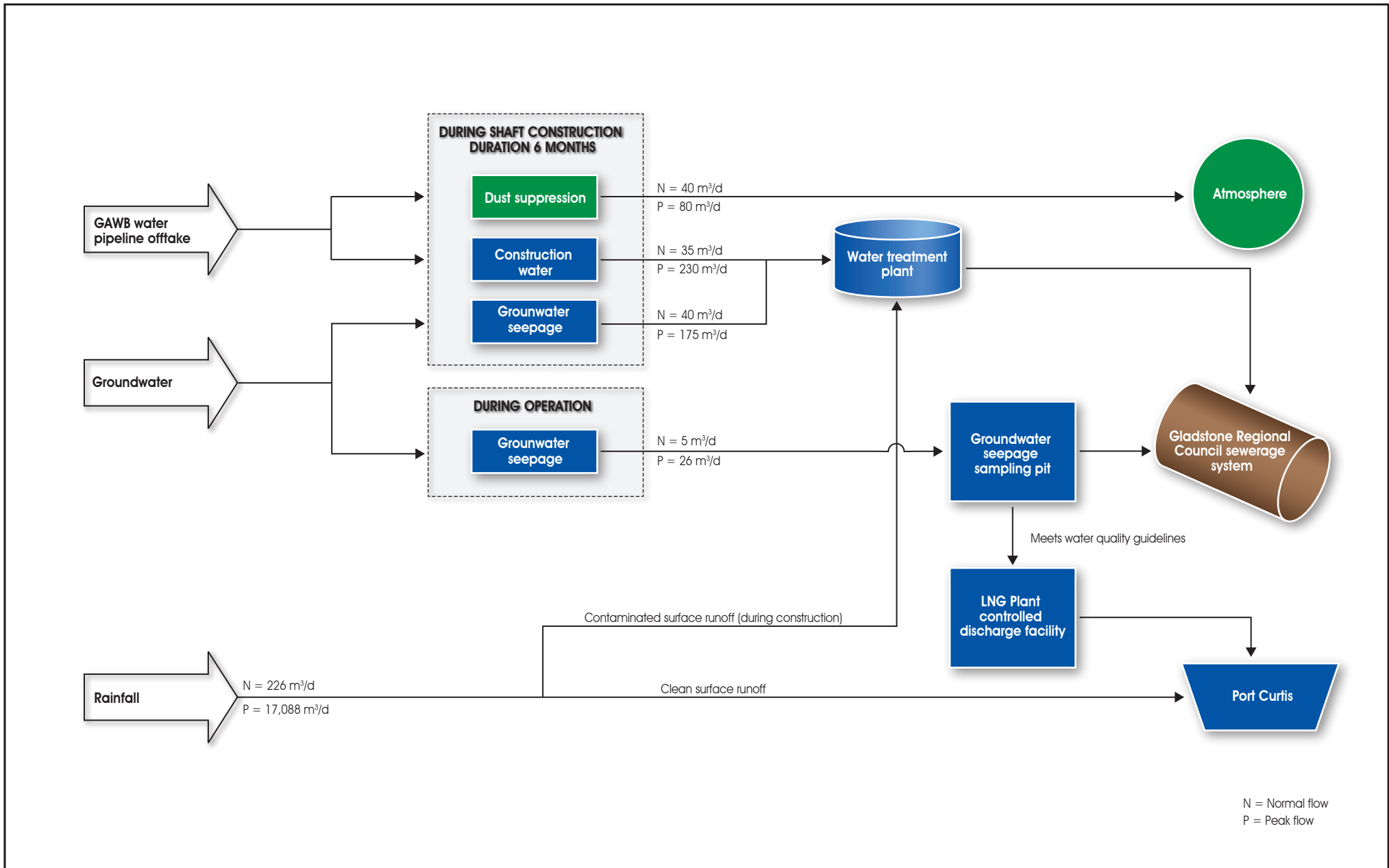


Conceptual water management -
tunnel launch site

Figure No:
5.3

5.3 Tunnel Drainage Design

The tunnel design presented in the Arrow LNG Plant EIS showed the tunnel inclining upward from the mainland to Curtis Island at a grade of 1 in 1,000 to provide gravity drainage to a sump in the base of the launch shaft. The tunnel has been redesigned to incline downward from the mainland to Curtis Island at the same 1 in 1,000 grade, to provide gravity drainage to a sump in the base of the reception shaft. This design change enables seepage water collecting in the reception shaft sump to be pumped from the tunnel to a sampling pit adjacent to the Gladstone Regional Council (GRC) sewer mains on Curtis Island. Water quality sampling will determine whether the collected water is discharged to the GRC category B (trade waste) sewer main or to the controlled discharge facility at the LNG plant or another licenced discharge point for discharge to Port Curtis. Figure 5.4 shows conceptual water management during construction of the tunnel reception shaft, and during operation of the tunnel.



Source: Coffey Environments and Arrow Energy



Job No:
07.12.2012
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Arrow Energy
Arrow LNG Plant



Conceptual water management -
Curtis Island tunnel reception site

Figure No:
5.4

Supplementary Report to the Arrow LNG Plant EIS
Arrow LNG Plant