

Gas Import Jetty and Pipeline Project

Environment Effects Statement

July 2020



EES Technical Report C

Surface water impact assessment



Surface water impact assessment

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Executive summary

This report assesses the potential impacts to surface water associated with the construction and operation of the Gas Import Jetty and Pipeline Project (the Project).

The Project would establish a gas import jetty and pipeline in Victoria comprising:

- a floating storage and regasification unit (FSRU) at Crib Point Jetty – the Gas Import Jetty Works
- a gas pipeline between Crib Point and Pakenham to connect to the Victorian Transmission System (VTS) east of Pakenham – the Pipeline Works.

The Project would provide an additional supply of natural gas into the south-eastern Australian gas market for industrial, commercial and residential customers.

Potential supply gaps in Victoria's gas market are predicted from 2024. The Project would improve energy security for industrial, commercial and domestic customers and would increase competition in the market.

This report does not assess potential direct impacts on marine waters in Western Port from the floating storage and regasification unit (FSRU) or Jetty Infrastructure. Potential impacts to the marine environment are assessed in the EES Technical Report A: *Marine biodiversity impact assessment*.

Methodology

The assessment of existing conditions for surface water was based on previous investigations undertaken by APA, a review of publicly available water quality data, studies and management strategies. A visual inspection of waterway and drainage line crossings was also carried out in December 2018, February 2019 and September 2019.

Potential impacts to surface water have been identified by considering the proposed construction methods and identifying risks that may impact beneficial users or downstream watercourses or receiving waters, in particular the Western Port Ramsar listed wetland. Methods to mitigate the risks have been developed based on existing construction guidelines and practices to manage environments surrounding large construction sites.

Detailed flood modelling has not been undertaken as part of this assessment as the Pipeline Works would not permanently alter surface levels or substantially impede flows at waterways.

Existing conditions

The Project is located within the Western Port catchment. The catchment includes hilly regions near the Bunyip State Park and Strzelecki Ranges some distance from Western Port, flat undulating terrain of the former Koo Wee Rup swamp and Wetlands of International Importance (Western Port Ramsar site).

The Pipeline Works pass through low lying flat areas which are subject to flooding and also pass a number of waterways where flooding occurs during rainfall events such as large storms.

Many of the waterways along the pipeline alignment have been significantly modified, including excavation to increase capacity or the construction of levees to reduce flooding. Water quality has been impacted due to changes in land use within the catchment, which has resulted in increased nutrients in waterways and increased potential for erosion of waterways and sediment transportation.

Maintaining low sediment volumes is important in sustaining the Western Port Ramsar site, as increased sedimentation can result in reduced light penetration and siltation which can impact sea grass growth. Recent investigations indicate that when the wetlands were listed in 1982, total sediment loads were 40,000 tons per year. However, this had increased to 62,000 tons per year in 2010 with finer sediment deposited in Cardinia and Bunyip Creeks (Department of Sustainability, Environment, Water, Population and Communities, 2010).

Impact assessment

The construction phase of the Pipeline Works is likely to have the greatest risk of impact on the surrounding surface water environment. Trenching, stockpiling of material, creation of disturbed areas and trenching across waterways all increase the risk of sediment discharge to nearby waterways and the Western Port Ramsar site. Dewatering of the trench following rain events also has the potential to result in turbid water entering waterways.

Furthermore, the Pipeline Works construction methodology would require long lengths of spoil material to be temporarily placed along the excavated trench while the trench and pipeline are being prepared. In some locations, significant lengths of spoil material would be placed within existing floodplains which creates the potential to increase flood water levels in the event of a flood and thus impact neighbouring properties. This potential is most significant in the Koo Wee Rup Flood Protection District. Spills of fuels and chemicals during construction also have the potential to impact nearby waterways if not properly managed.

The potential for impacts on surface water is minimal during the operational phase of the Project. The Pipeline Works are predominantly underground and the pipeline would not result in permanent change to the existing topography which could redirect surface water flows or increase flood levels. There would also be no obstruction of existing waterways or changes to flow conveyance. The Pakenham Delivery Facility is not located within existing flood plains and an assessment of existing topography at this site indicates local surface flows can be managed with standard building and drainage design. The Crib Point Receiving Facility is subject to local coastal flooding on the eastern boundary and the design of the facility would be required to prevent increases in flood levels on neighbouring properties.

Potential environmental impacts would be managed at some waterway crossings by using horizontal directional drilling techniques which do not disturb the surface at the waterway as the pipeline is installed using a trenchless methodology below the watercourse bed. At other waterway crossings, open trenching is proposed. All pipeline construction activities are required to be undertaken in accordance with the Australian Pipelines and Gas Association *Code of Environmental Practice (Onshore Pipelines)* and the International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control Appendix P (2008)*.

Potential surface water impacts away from waterways can predominantly be managed by applying the EPA Victoria (1996) *Best Practice Environmental Management: Environmental Guidelines for Major Construction Sites* (EPA Publication 480) and EPA Victoria (1991) *Construction Techniques for Sediment Pollution Control* (EPA Publication 275) using key techniques such as:

- minimising the time materials are stockpiled at the surface and disturbed areas are exposed
- reinstating and vegetating disturbed surfaces as quickly as possible
- preventing flow from external catchments from flowing over spoil material by providing breaks in excavated trench material or providing a flow diversion bank or silt fence around stockpiled material and disturbed areas
- monitoring weather forecasts and avoiding having open trenches when high rainfall events are predicted.

Specific methods and procedures to be used during construction to achieve the above outcomes are provided in the recommended mitigation measures.

Consideration of the placement of stockpiled material and the provision of gaps to allow water to flow when material is placed within a floodplain can reduce the potential for increased flood waters in the event of a flood during construction. Discussions relating to the temporary placement of material within the floodplain have been undertaken with Melbourne Water. Further consultation prior to construction would be undertaken to ensure potential flooding risks are appropriately mitigated.

The facilities at Crib Point and Pakenham would have reduced permeability and should be designed to ensure that existing overland flow paths are adequately managed using standard design procedures. This would minimise impacts on existing stormwater runoff flow paths and discharge on nearby properties. An assessment of the sites indicates that there are no significant floods that needs to be accounted for. Design of the Crib Point Receiving Facility should account for potential impacts of

climate hazards on the facility, including increased storm events creating coastal flooding, as well as a possible rise in sea level of 0.61-1.10 metres by 2090 in accordance with IPCC's Representative Concentration Pathway (RCP) 8.5 (2019). It is noted that the operational timeframe of the Project is approximately 20 years, and therefore additional design measures are not required at this point in time to cater for 0.61-1.10 metre sea level rise.

This study has concluded that the combined use of trenchless construction methodologies for traversing sensitive watercourses and industry-standard surface water management controls during the Pipeline Works construction would mean that the Project would be consistent with the draft evaluation objectives for surface water through the minimisation and management of adverse impacts. In particular, implementation of the recommended mitigation measures means that there should be no substantial or ongoing increase in sedimentation of the Western Port Ramsar site.

Recommended mitigation measures

The following surface water mitigation measures have been recommended for the Project.

Table 1 Recommended mitigation measures

Mitigation measure ID	Mitigation measure	Works area	Phase
MM-SW01	<p>Discharge water Water collected from within excavated trenches/hydrostatic testing should be collected and treated if turbidity exceeds EPA requirements prior to discharging. The relevant suggested measures outlined in EPA publication 480 (Section 4.4 Dewatering work sites) and in EPA publication 275 (Section 16 Water treatment) should be incorporated into the Pipeline Works Construction Environmental Management Plan (CEMP).</p> <ul style="list-style-type: none"> a. Non-contaminated groundwater and surface runoff that enters the open trenches and bell holes should be managed in accordance with SEPP (Waters). b. A description of the post-test (for hydrostatic testing) or post-extraction (for groundwater) treatment of the water should be included in the Pipeline Works CEMP as per direction from EPA Victoria. c. Discharge of water to land should avoid soil erosion or sedimentation of land or water. Sediment control devices to remove suspended solids and dissipate flow should be used where required. d. Water should not be discharged to waterways or into stormwater drains without approval from relevant authorities. e. Water should be tested for pH and salinity prior to discharge to land. pH should be between 4 and 9, and salinity should not exceed 6,000µS/cm. f. Water that cannot be treated to meet the relevant discharge criteria should be disposed to an EPA Victoria licensed facility. 	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
	<ul style="list-style-type: none"> g. Relevant landholder(s) and water authorities should be consulted, and permission obtained prior to discharge to land. h. Discharge to land should not occur within 50 metres of watercourses. i. Discharge should be to low gradient, stable, grassed areas and be undertaken in accordance with landholder requirements and through “irrigation type” systems to prevent scour or erosion. Visual monitoring during land discharge should be undertaken to ensure water does not enter existing waterways. j. Contaminated water should be managed in accordance with mitigation measures described in EES Technical Report E: <i>Contamination and acid sulfate soils impact assessment</i> (MM-C04). 		
MM-SW02	Managing runoff <ul style="list-style-type: none"> a. Flow diversion banks should be placed upstream of the spoil material if required. b. An overflow spillway should be constructed to allow runoff from external catchments to pass over the spoil material at a controlled location without causing erosion. 	Gas Import Jetty Works and Pipeline Works	Construction
MM-SW03	Watercourse trenching during no flow conditions Where practicable, all trenched watercourse crossings should be constructed during no flow conditions and reinstated as soon as possible.	Pipeline Works	Construction
MM-SW04	Watercourse trenching Where trenching is undertaken over a watercourse the following mitigation measures should be undertaken: <ul style="list-style-type: none"> a. Weather forecasts should be monitored to avoid having open trenches at the waterway when high rainfall events are expected. b. Where watercourses are trenched, all obstructions to flow should be removed as soon as practicable after the pipe has been laid and backfilled. c. Trenching on both sides of the waterway should be fully excavated and prepared prior to undertaking the final section of trenching over the waterway. d. The pipeline should be assembled and prepared so that it can be immediately installed once the trenching over the watercourse has been undertaken. 	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
	<ul style="list-style-type: none"> e. Waterway reinstatement should be carried out in consultation with the relevant authority(s). f. The exposed trench within the watercourse and riparian zones should be reinstated immediately following the installation and commissioning of the pipeline, including providing suitable compaction and revegetation. g. Waterway reinstatement should be designed to avoid future erosion over the pipeline alignment. This may include the use of riprap made of stones to stabilise the waterway. h. If necessary, a geofabric should be provided to prevent erosion and scour until the vegetation has established. i. Visual monitoring should be undertaken downstream of the trench during flow events if the trench has not been reinstated. j. Temporary diversions should be provided if there is permanent or tidal flow in the waterway in accordance with International Erosion Control Association (IECA) <i>Best Practice Erosion and Sediment Control Appendix P: Land-based Pipeline Construction</i> (2008). 		
MM-SW05	<p>Watercourse trenchless crossing</p> <p>The following watercourses should be crossed by trenchless construction techniques: Kings Creek (KP7), Warringine Park Swamp (KP4.8), Watson Creek (KP 18.9), Vowell Drive Wetlands (KP22.9), Cardinia Creek (KP40.1), Toomuc Creek (KP41.1), Lower Gum Scrub Creek (KP41.0), Deep Creek (KP41.2), Langwarrin Creek (KP20.9).</p> <p>For watercourses managed by Melbourne Water, the HDD profile design should meet or exceed Melbourne Water's minimum design requirements.</p>	Pipeline Works	Construction
MM-SW06	<p>Fuel and chemical storage</p> <p>The following measures should be implemented to ensure that fuel and chemical storage is safe and spilt liquids do not cause environmental harm:</p> <ul style="list-style-type: none"> a. Fuels and chemicals stored on site should be minimised. b. Fuels should not be stored close to waterways. c. Bunds should be installed around stored liquids. d. Dangerous goods should be stored and handled, and storage facilities monitored as per EES Technical Report K: <i>Safety, hazard</i> 	Gas Import Jetty Works and Pipeline Works	Construction and operation

Mitigation measure ID	Mitigation measure	Works area	Phase
	<i>and risk assessments</i> (MM-HR05, MM-HR06).		
MM-SW07	Spills <ol style="list-style-type: none"> Spill kits should be available at locations where machinery/plant are operating, refuelling points and fuel and chemical storage locations. Spills of hazardous materials should be rendered safe, and where required, collected and transported by licenced contractors for disposal at appropriately licenced facilities, including cleaning materials, absorbents and contaminated soils. Staff training should include spills management procedures. Emergency response plans for spills should be developed as per EES Technical Report K: <i>Safety, hazard and risk assessments</i> (MM-HR07). 	Gas Import Jetty Works and Pipeline Works	Construction and operation
MM-SW08	Refuelling of vehicles and mobile machinery Refuelling of vehicles and machinery (excluding hand held machines) on the ROW should: <ol style="list-style-type: none"> be undertaken in a designated refuelling area with appropriate measures to contain spills utilise auto shut off valves not occur within 50m of a watercourse. 	Gas Import Jetty Works and Pipeline Works	Construction
MM-SW09	Discharge from trenchless drilling sites Specific construction techniques to prevent discharge of hazardous material from the trenchless drilling sites include: <ol style="list-style-type: none"> Earth bunds/or and drainage channels should be placed around the upper edges of drill sites and work areas to divert natural runoff around and away from the site and prevent mixing with drilling compound runoff. Sump pits should be constructed at the bottom of the drill site. The sump pit should be positioned to capture runoff from the drilling compound. An earth bund should be placed around the sump pit to contain any spillage. All facilities utilised in the surface mud handling (mixing, cleaning and pumping) during the HDD activities should be bunded. 	Pipeline Works	Construction
MM-SW10	Stockpiling To minimise the impacts to upstream flood levels and allow flow to be conveyed across the ROW, the following measures should be adopted: <ol style="list-style-type: none"> Avoid the creation of a continuous row of stockpiled materials that can cause water to pond on the upstream side. 	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
	<ul style="list-style-type: none"> b. Provide regular gaps to allow flood water to pass through or constructing overflow spillways in the spoil material. c. Avoid stockpiling material near waterways. Material should be located away from the top of banks so that there is no restriction to the flow conveyance area. 		
MM-SW11	Facilities design Permanent surface structures, including the facilities at Pakenham and Crib Point should be designed to maintain existing overland flow paths and not result in increased flood levels upstream of the sites.	Gas Import Jetty Works and Pipeline Works	Design
MM-SW12	Water Sensitive Urban Design treatments WSUD treatments should be incorporated into the site design for the Crib Point Receiving Facility and the Pakenham Delivery Facility to capture surface runoff and reduce pollutants in accordance with the <i>Best Practice Environmental Management Guidelines</i> (CSIRO 1999).	Gas Import Jetty Works and Pipeline Works	Design

Abbreviations

Abbreviation	Definition
AECOM	AECOM Australia Pty Ltd
AGL	AGL Wholesale Gas Limited
AHD	Australian Height Datum
APA	APA Transmission Pty Limited
CEMP	Construction Environmental Management Plan
EES	Environment Effects Statement
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EPA	Environment Protection Authority
ESV	Energy Save Victoria
FSRU	Floating storage and regasification unit
Ha	Hectare
HAT	Highest astronomical tide
HDD	Horizontal directional drilling
IECA	International Erosion Control Association
LNG	Liquefied natural gas
LSIO	Land Subject to Inundation Overlay
MLV	Mainline valve
NTU	Nephelometric turbidity units
PoHDA	Port of Hastings Development Authority
SBO	Special Building Overlay
RCP	Representative Concentration Pathway
ROW	Right of way
SEPP	State Environment Protection Policy
TSS	Total suspended solids
VTs	Victorian Transmission System
WQI	Water quality index
WSUD	Water Sensitive Urban Design

Glossary of terms

Term	Definition
Ephemeral waterway	A waterway which flows only after rain and has no baseflow component
Land Subject to Inundation Overlay (LSIO)	Identification under state planning schemes of land in a flood storage or flood fringe area affected by the 1 in 100 year flood
Nephelometric turbidity units (NTU)	Unit of measurement for turbidity
Sheet flow	An overland flow or downslope movement of water occurring in a thin layer, of low volume, velocity and energy.
Special Building Overlay (SBO)	Identification under state planning schemes of land in urban areas liable to inundation by overland flows from the urban drainage system.
Swale	A linear, depressed channel that collects and carries stormwater. They can be lined with grass or more densely vegetated and landscaped.

1.0 Introduction

This report assesses the potential surface water impacts associated with the construction and operation of the Gas Import Jetty and Pipeline Project (the Project).

The Project would provide an additional supply of natural gas into the south-eastern Australian gas market for industrial, commercial and residential customers.

The Australian Energy Market Operator has predicted potential supply gaps in Victoria's gas market from 2024 (AEMO, 2019). The Project would improve energy security for industrial, commercial and domestic customers and would increase competition in the market.

The joint proponents of the Project are AGL Wholesale Gas Limited (AGL) and APA Transmission Pty Limited (APA).

The Project would establish a gas import jetty and pipeline comprising:

- a floating storage and regasification unit (FSRU) at Crib Point Jetty – the Gas Import Jetty Works
- a gas pipeline between Crib Point and Pakenham to connect to the Victorian Transmission System (VTS) east of Pakenham – the Pipeline Works.

The Project was referred by AGL and APA to the Victorian Government under the *Environment Effects Act 1978* (Vic) on 13 September 2018 as two separate projects consisting of the Gas Import Jetty Works and Pipeline Works.

On 8 October 2018 the Minister for Planning issued a decision determining that an Environment Effects Statement (EES) was required for the Project due to the potential for a range of significant environmental effects.

The Gas Import Jetty Works and the Pipeline Works were also referred to the Commonwealth Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as separate projects.

Each project was designated as a controlled action requiring impact assessment under the EPBC Act. The EES process is the accredited environmental assessment for the controlled action decisions under the EPBC Act in accordance with the bilateral agreement between the Commonwealth and Victorian governments.

1.1 Purpose

This report provides a surface water impact assessment for the EES and sets out mitigation measures for potential impacts of the Project. This report will inform the development of an Environmental Management Framework (EMF) for the Project. The mitigation measures listed in the EMF would be implemented in the approvals and management plans for the Project.

1.1.1 Why understanding surface water is important

Western Port is designated as a wetland of international importance under the Ramsar Convention on Wetlands of International Importance. Sedimentation of waterways as a result of previous land use changes in the catchment has the potential to smother seagrass beds, which are an important ecological feature of the wetlands and a critical component of the Ramsar values of the site. Adverse impacts on seagrass beds have the potential to have flow on impacts affecting fish, waterbirds, and invertebrates, including threatened species.

Construction of infrastructure has the potential to alter flow characteristics and impact water quality within waterways and receiving waters.

Understanding the condition of existing waterways and the environmental values that require protection enables construction methods to be developed to minimise or prevent impacts to waterways and the Western Port Ramsar site.

1.2 Project description

The Project comprises two sets of works: the Gas Import Jetty Works and the Pipeline Works.

AGL would undertake the Gas Import Jetty Works. APA would undertake the Pipeline Works.

1.2.1 Gas Import Jetty Works

The Gas Import Jetty Works would consist of a liquefied natural gas (LNG) import facility comprising:

- continuous mooring of an FSRU at Berth 2 of the existing Crib Point Jetty to store LNG and regasify LNG into natural gas
- Jetty Infrastructure on the Crib Point Jetty including marine loading arms (MLAs) and gas piping to transfer the gas from the FSRU to the Crib Point Receiving Facility
- Crib Point Receiving Facility, including metering, odorant injection and nitrogen injection, which would be located on land adjacent to the Crib Point Jetty.

The FSRU vessel for the Project would be approximately 300 metres long and 50 metres wide. It would have capacity to store 170,000 cubic metres (m³) of LNG. Visiting vessels carrying LNG (LNG carriers) would berth alongside the FSRU to transfer their LNG to the FSRU, which could take up to 36 hours.

The FSRU would store the LNG as a liquid and when required, return LNG back into a gaseous state by heating the LNG using either seawater or gas-fired boilers (a process known as regasification).

Following regasification, the natural gas would be transferred through gas piping along the jetty from the FSRU to the Crib Point Receiving Facility.

The Crib Point Receiving Facility would include treatment facilities to inject odorant and nitrogen (as required) into the natural gas to meet VTS gas quality specifications.

1.2.2 Pipeline Works

The Pipeline Works would comprise a bi-directional gas transmission pipeline to transport gas from the Crib Point Receiving Facility to the VTS east of Pakenham.

The pipeline would be approximately 57 kilometres long with a nominal diameter of 600 millimetres. The pipeline would be buried at a depth of generally 1.2 metres below ground (to the top of the pipe).

The Pipeline Works would also comprise the following facilities:

- the pigging facility at the Crib Point Receiving Facility to enable in-line inspections of the pipeline with a pipeline inspection gauge (pig)
- the above-ground Pakenham Delivery Facility situated adjacent to the Pakenham East rail depot to monitor and regulate the gas
- the below-ground End of Line Scraper Station (EOLSS) located at the connection point to the VTS, north of the Princes Highway in Pakenham
- two above-ground mainline valves (MLVs) located at different points along the pipeline alignment to enable isolation of the pipeline in an emergency.

1.2.3 Construction

The key construction activities for the Gas Import Jetty Works would include:

- establishment of construction sites including laydown areas
- installation of Jetty Infrastructure on the Crib Point Jetty, including MLAs, gas piping mounted to the jetty, electrical and instrumentation equipment and a firefighting system
- construction of the Crib Point Receiving Facility.

Construction for the Gas Import Jetty Works would take approximately 18 to 27 months, depending on weather conditions.

The key construction activities for the Pipeline Works would include:

- establishment of laydown areas
- construction of the pigging facility at Crib Point Receiving Facility, Pakenham Delivery Facility, two MLVs and the EOLSS
- pipeline construction using construction techniques such as trenching, horizontal directional drilling (HDD) or boring, typically within a 30-metre-wide pipeline construction right of way (ROW).

Construction for the Pipeline Works would take approximately 18 to 24 months, depending on weather conditions. Pipeline construction would progress in a linear manner.

Subject to the staging of the works outlined above, construction for the entire Project is expected to take approximately 18 to 27 months.

1.2.4 Operation and maintenance

When commissioned, the FSRU would be operated by an experienced third-party operator. The Crib Point Receiving Facility and associated Jetty Infrastructure would be owned and operated by AGL or an experienced third-party operator. The Pipeline Works would be owned and operated by APA.

The FSRU may leave Western Port during the Project lifetime for activities such as scheduled maintenance and extreme weather events.

The gas import jetty would initially receive approximately 12 LNG carriers per year with capacity to increase to approximately 40 LNG carriers per year. The number and frequency of LNG carriers arriving each year would depend on their storage capacity and gas demand.

The Crib Point Receiving Facility is designed to be automated and may be operated unmanned under normal operating conditions.

An operational easement of generally 15 metres wide would apply to the pipeline alignment. The pipeline easement would be routinely inspected for any operational or maintenance issues in accordance with APA procedures.

The pipeline would also be designed and constructed so that pigging could be undertaken to inspect the integrity of the pipeline as required. Pigging would be undertaken around 10 years after construction and then at a frequency determined by the first inspection.

The Pakenham Delivery Facility is also designed to be automated and operate unmanned under normal operating conditions.

The EOLSS would be buried with valves contained within concrete pits. The connection to the VTS would operate unmanned. Excavation of the site to access the EOLSS would be required for the pigging activities

1.2.5 Decommissioning

The FSRU is proposed to operate for 20 years, although this may be shortened or extended to address security and stability of gas supply to south-eastern Australia. When the Project was no longer required, the FSRU would leave Western Port.

The Jetty Infrastructure installed on the Crib Point Jetty and the Crib Point Receiving Facility would be decommissioned and removed when no longer required. The Crib Point Jetty would remain as an operational jetty under the management of the Port of Hastings Development Authority (PoHDA).

The pipeline would have a design life of 60 years. If the Pipeline Works were no longer required, they would be decommissioned in accordance with Australian Standard AS2885 *Pipelines – gas and liquid petroleum* and relevant legislative and approval requirements at the time of decommissioning.

1.2.6 Surface water considerations in the design

The construction phase of the Project has the potential to have the greatest impact on surface water and associated beneficial uses. The Pipeline Works design has considered where open trenching across waterways may be appropriate and where trenchless methods under the waterway is required. While this investigation indicates that the Crib Point Receiving Facility and the Pakenham Delivery Facility do not need to address significant flooding issues due to their location and level relative to

flood inundation maps, the design of the facilities would need to include standard design criteria to manage local surface flows and runoff water quality.

Trenchless crossings avoid surface disturbance to the relevant feature, however introduce other technical and environmental risks which must be managed. Geotechnical constraints (fissures and cracks, unconsolidated substrata and subsurface scour potential) may also impose design constraints on the use of trenchless crossings, or prevent this method being suitable in some areas. The benefits of trenchless crossings also need to be considered against additional cost and schedule implications. The criteria used to inform the selection of trenchless crossing locations for the alignment are listed and discussed listed in Table 1-1 below.

Table 1-1 Trenchless crossing criteria

Trenchless crossing criterion	Reasoning
1. Sealed public roads	Sealed public roads typically convey significant volumes of traffic. Trenchless crossings of sealed roads enable interruption of such traffic flows to be avoided or significantly minimised relative to open trenching.
2. Rail lines, including disused and non-operational rail lines	Open trenching of rail lines and associated corridors would require significant disturbance to rail infrastructure, rendering the rail line inoperable until subsequent major rectification work was completed. Use of trenchless crossings avoids such disturbance and disruption to rail infrastructure and services.
3. Wetlands listed under the Ramsar convention	Wetlands listed under the Ramsar convention are identified as wetlands of international importance. Use of trenchless crossings avoids direct disturbance to such wetlands.
4. Major watercourses	Major watercourses typically convey significant volumes of water, either intermittently or continuously, and as such have an elevated risk of sedimentation and bank instability if open trenching were used. Use of trenchless crossings typically eliminates these risks.
5. Main drains with levee banks within the Koo Wee Rup flood protection district	The main drains within the Koo Wee Rup Flood Protection District are bordered by embankments which provide flood protection to the surrounding area. Crossing these main drains by trenchless techniques enables this flood protection to be maintained at all times.
6. Highly sensitive biodiversity areas	A highly sensitive biodiversity areas support the known or assumed presence of threatened species or ecological communities listed FFG Act or EPBC Act. Trenchless crossing techniques would be employed in such areas when other mitigation measures are unable to reduce the residual risk to biodiversity a level of 'moderate' or lower, as assessed by the terrestrial and freshwater biodiversity technical specialists.
7. Residential, commercial or agricultural infrastructure	Residential, commercial or agricultural infrastructure identified by a landholder and agreed by APA as likely to be significantly impacted or disrupted by open trenching, and where mitigation measures to reasonably mitigate impacts cannot be implemented, would be crossed by trenchless methods.
8. Major services (water, gas, electricity, optic fibre)	Interruption of major services (water, gas, electricity, optic fibre) by open trenching would cause significant service provision and cost implications to business providing such services and their customers. Trenchless crossings would allow operation of such services to continue uninterrupted.
9. Highly sensitive historical heritage sites or Aboriginal cultural heritage places	A highly sensitive historical heritage is defined as a site listed on Victorian or Commonwealth heritage lists (Victorian Heritage Register, National Heritage List, Commonwealth Heritage List, World Heritage sites). A highly sensitive Aboriginal cultural heritage site would be determined by the archaeologist completing Cultural Heritage

Trenchless crossing criterion	Reasoning
	Management Plans for the pipeline in consultation with the Registered Aboriginal Parties. Trenchless crossing techniques would be employed in such areas when other mitigation measures are unable to reduce the residual risk to heritage values below a level of 'high', as assessed by the cultural heritage technical specialists.
10. Other	Trenchless crossings may be employed in other situations to those described above on as needed basis. Such situations may include insufficient space for safe construction by open trenching, presence of structures which preclude open trenching, schedule optimisation or interfaces with other construction projects.

Plans of the pipeline alignment indicating each waterway that the Pipeline Works would directly interface with and the proposed construction method at each waterway are provided in Appendix A. Design alignments of trenchless construction methodologies indicating clearances from waterways are provided in Appendix C.

Three methods would be used to construct the pipeline through or below waterways. These are:

- horizontal directional drilling (HDD)
- horizontal boring
- open trench.

Horizontal directional drilling

HDD is a trenchless method used for the crossing of major watercourses where standard open cut methods are less desirable from an environmental viewpoint in order to minimise surface impacts. HDD may also be used for road or railway crossings as an alternative to shallow horizontal boring.

The installation of a pipeline by HDD involves drilling a pilot hole, at a shallow angle beneath the surface, from an entry point on one side of the crossing to an exit point on the other side of the crossing. Typically, the entry and exit pits are approximately five metres wide, five metres long and two and a half metres deep. A schematic indicating the HDD profile is provided in Figure 1-1. The hole is enlarged to allow for the welded pipe string to be pulled back through the drill hole from the exit point to the entry point without damaging the coating.

The pipeline string is then welded to adjoining sections of the pipeline. Once the pipe string is installed and tied into the main section of the pipeline, the entry and exit points are remediated.

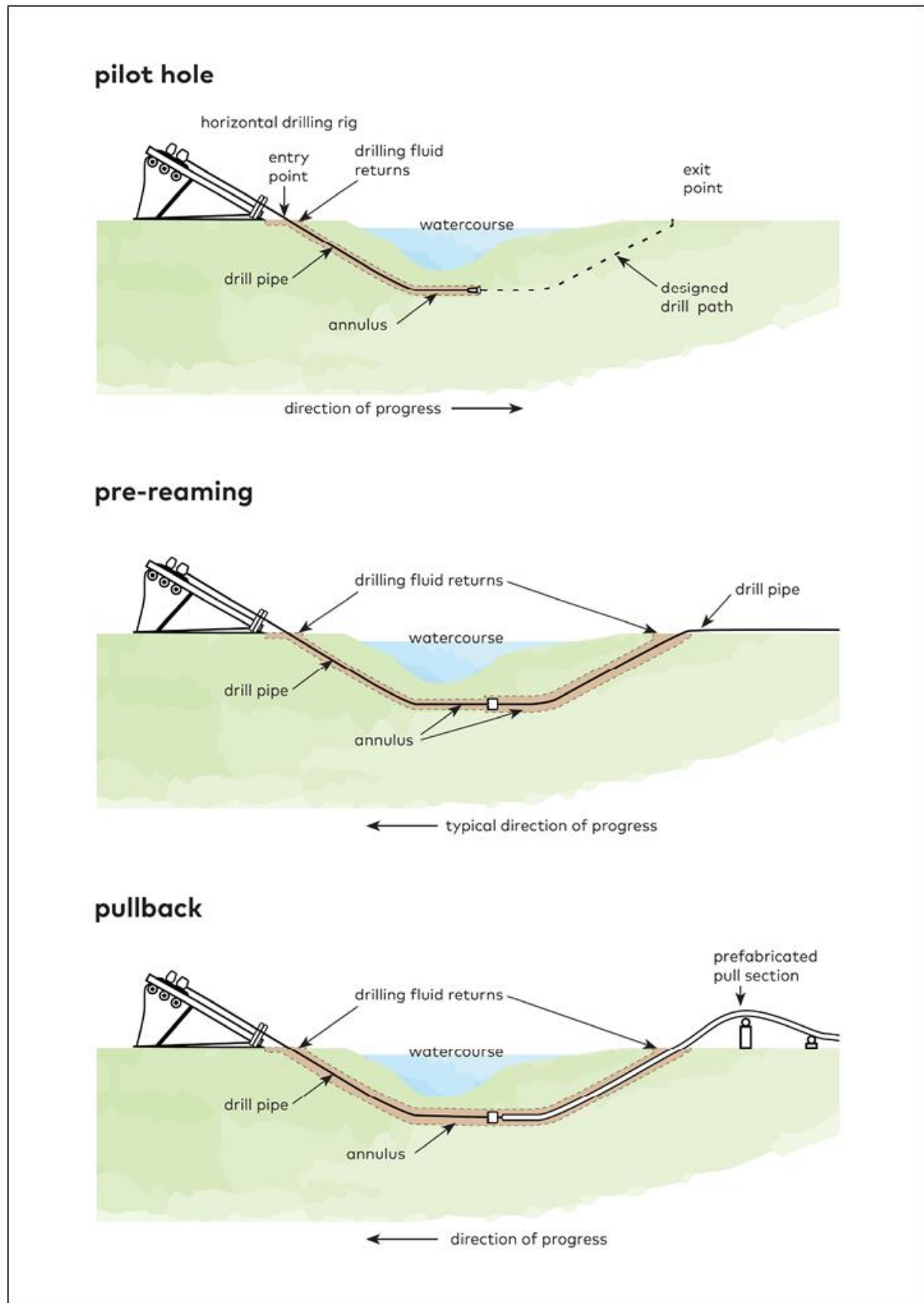


Figure 1-1 HDD schematic

Drilling mud (typically bentonite) is used to hydraulically drive the drilling head, as a coolant, to wash in-situ material (cuttings) from the drilled hole and to seal and line the hole to facilitate insertion of the pipe. Cuttings are screened, removed at the HDD rig and the drilling mud is recycled.

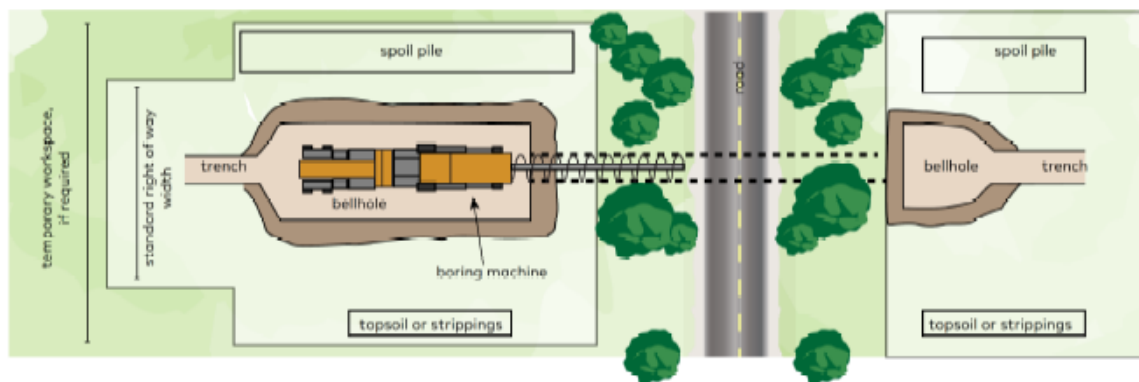
HDD avoids surface disturbance but requires management of other environmental risks including geotechnical constraints (fissures and cracks, unconsolidated substrata and subsurface scour potential), which may prevent HDD being a suitable construction methodology. Where HDD presents unacceptable environmental risks an alternate construction methodology would be used such as shallow horizontal boring or open trenching.

Horizontal boring

The methodology for shallow horizontal boring (referred to as thrust boring or micro-tunnelling) involves construction of a horizontal bore hole for installation of a pipeline beneath surface features rather than using a trench. Bell holes are excavated on both sides of the sensitive feature to the depth of the adjacent trench and graded to match the proposed slope of the pipeline. A bell hole is an enlarged hole allowing a boring machine wider than the width of the trench to operate within it to tunnel under the relevant features. A typical horizontal boring set up is shown below in Figure 1-2.

Plan View

(not to scale)



Profile

(not to scale)

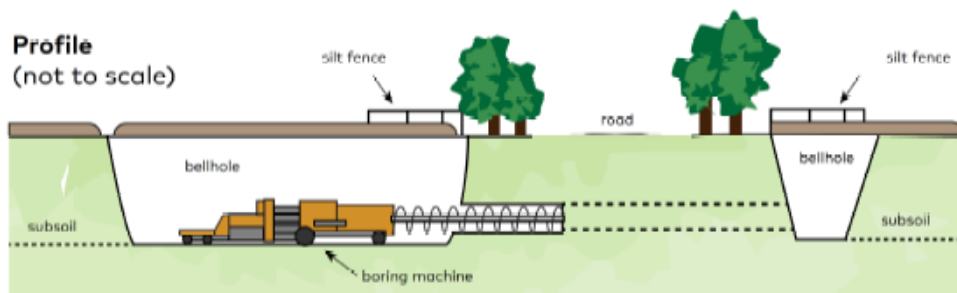


Figure 1-2 Typical horizontal boring set up

Open trench

Excavators or backhoes are generally used for this technique, enabling trench spoil to be stockpiled away from the streambed. The prefabricated pipe is placed across the waterway, lowered in and the trench backfilled immediately. This method is often applied in dry or shallow, low flow watercourses, but may also be applied in watercourses with environmental value where rapid construction is considered the best means of minimising impacts.

1.3 Project Area

The Project Area is situated between Crib Point and Pakenham East in Victoria within the local government areas of Mornington Peninsula Shire, the City of Casey and Cardinia Shire.

The Project Area includes the construction and operation footprints for the Gas Import Jetty Works and the Pipeline Works.

The Project Area is detailed in EES Attachment VII *Map book*. An overview of the Project Area showing the proposed pipeline alignment and current options is shown in Figure 1-3.

The Gas Import Jetty Works would be located at the existing Crib Point Jetty (Berth 2) and on land immediately adjacent. The Crib Point Jetty is located within the Port of Hastings and within an area designated as a wetland of international significance under the Ramsar Convention on Wetlands of International Importance (the Western Port Ramsar site).

The Pipeline Works would be located on land between the Crib Point Receiving Facility and a connection point to the VTS east of Pakenham.

The pipeline alignment was selected to minimise impacts on sensitive land uses and where possible follows existing pipeline easements.

The pipeline would be located on land used for various purposes including rural residential living, road corridors, industry, conservation reserves, hobby farming, horse studs and agriculture. The pipeline would generally follow the Stony Point rail reserve through Hastings.

Towards Pakenham, the pipeline would cross the Gippsland rail line before reaching the proposed Pakenham Delivery Facility adjacent to the Pakenham East rail depot and connecting to the VTS north of the Princes Highway.

The pipeline crosses seven main watercourses, as follows:

- Warringine Creek
- Rutherford Creek
- Watson Creek
- Cardinia Creek
- Lower Gum Scrub Creek
- Toomuc Creek
- Deep Creek.

In addition to the above waterways, the pipeline alignment would also cross another 57 other watercourses and surface drains.

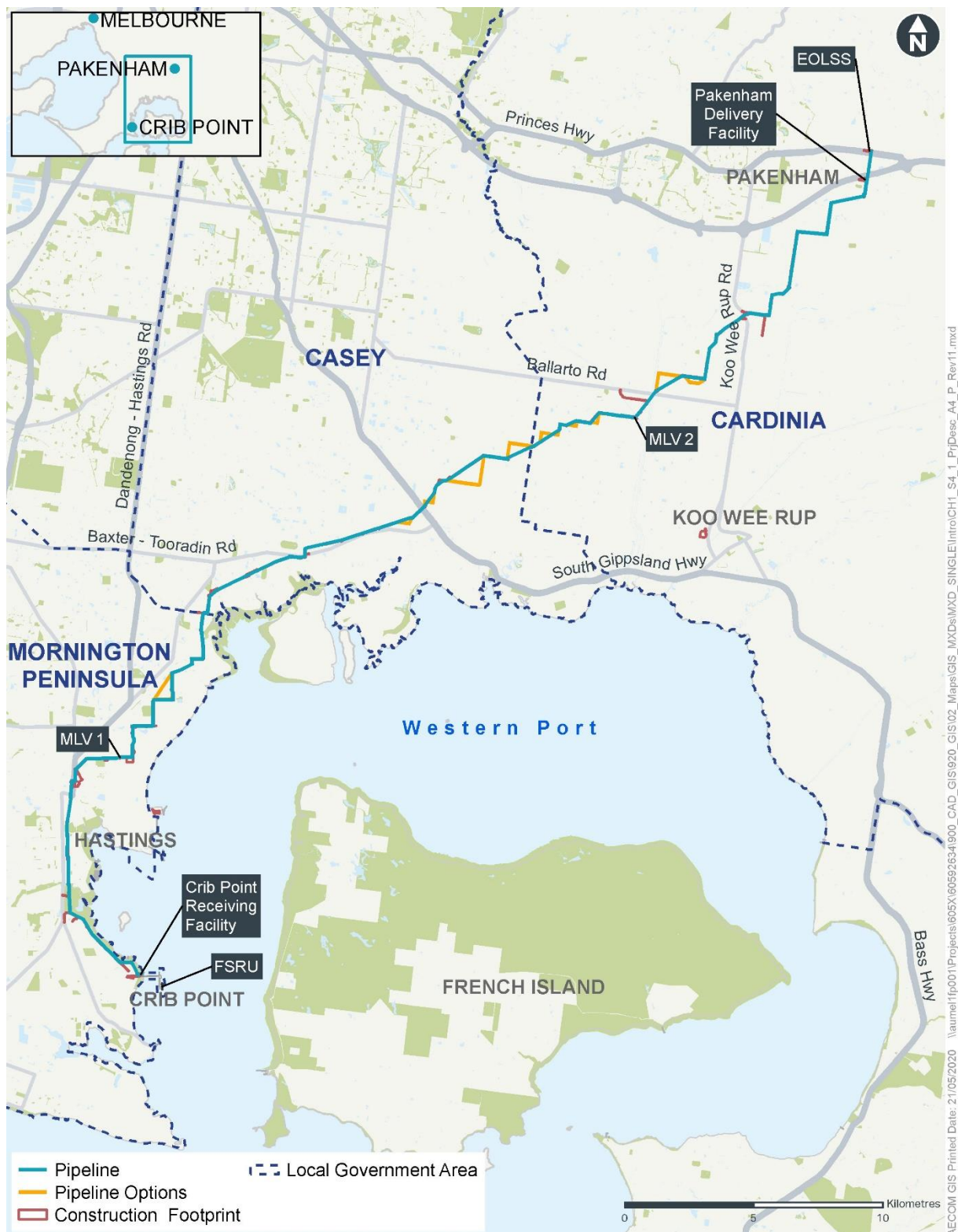


Figure 1-3 Project Area overview

2.0 Scoping requirements

The EES scoping requirements for the Project were issued by the Victorian Minister for Planning in February 2019, and augment the key matters listed in the Minister's decision to require an EES.

The scoping requirements set out the specific matters to be investigated and documented in the EES in the context of the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978*.

The EES is an accredited assessment process for the purposes of the assessment of the Project under the EPBC Act, and the EES scoping requirements also include matters to be assessed under the EPBC Act.

2.1 EES evaluation objectives

The following draft evaluation objective is relevant to surface water and identifies the desired outcomes in the context of potential Project effects.

The draft evaluation objectives, as set out in the final scoping requirements, provide a framework to guide integrated assessment of the environmental effects of the Project. These draft evaluation objectives are to be used in the context of the relevant legislative requirements set out in Section 3.0.

Draft evaluation objectives for surface water

Water and catchment values – To minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement particularly as they might affect the ecological character of the Western Port Ramsar site.

Waste - To minimise generation of wastes by or resulting from the project during construction and operation, including accounting for direct and indirect greenhouse gas emissions.

2.2 Assessment of specific environmental effects

The following extracts from the scoping requirements, issued by the Minister for Planning, are relevant to the draft evaluation objectives listed above.

Table 2-1 Scoping requirements for surface water impact assessment

Aspect	Scoping requirement	Refer
Key issues	<p>The potential for adverse effects on the functions, values and beneficial uses of surface water environments, especially the Western Port Ramsar site, such as interception or diversion of flows or changed water quality or flow regimes during construction and operation.</p> <p>The potential for adverse impacts on water-related values due to spills or other incidents during construction or operation.</p> <p>The potential for adverse effects on nearby and downstream water environments due to changed flow regimes, floodplain storage, run-off rates, water quality changes, or other waterway conditions during construction and operation, in the context of relevant climate change projections.</p>	<p>Section 7.0 (Impact assessment)</p> <p>EES Technical Report A: <i>Marine biodiversity impact assessment</i></p>

Aspect	Scoping requirement	Refer
	The potential for adverse effects on biodiversity values of the Western Port Ramsar site.	
Priorities for characterising the existing environment	Describe marine, estuarine, intertidal and freshwater waters and their beneficial uses that could be affected from changed water quality or water movement, due to the project. Detail and evaluate the hydrological/hydro-geological modelling techniques utilised.	Section 5.0 (Existing conditions) EES Technical Report A: <i>Marine biodiversity impact assessment</i>
Design and mitigation measures	Identify and evaluate aspects of project works and operations, and proposed design refinement options or measures, that could avoid or minimise significant effects on water, waterway or wetland environments. Describe further potential and proposed design options and measures that could avoid or minimise significant effects on beneficial uses of surface water, groundwater and downstream water environments during the project's construction and operation, including response measures for environmental incidents. Describe measures to minimise the risk of spills including of water from vessels which might contain contaminants or exotic organisms.	Section 6.0 (Risk assessment) Section 7.0 (Impact assessment) Section 8.0 (Mitigation measures) EES Technical Report A: <i>Marine biodiversity impact assessment</i> EES Technical Report D: <i>Groundwater impact assessment</i> EES Technical Report E: <i>Contamination and acid sulfate soils impact assessment</i>
Assessment of likely effects	Identify and evaluate effects of the project and alternatives on groundwater, surface water, waterways and wetlands near the project works, including the likely extent, magnitude and duration (short and long term) of changes to water quality, water level, temperature or flow paths during construction and operation, considering appropriate climate change scenarios and possible cumulative effects resulting in combination with other existing or proposed projects of actions.	Section 7.0 (Impact assessment) EES Technical Report A: <i>Marine biodiversity impact assessment</i> EES Technical Report D: <i>Groundwater impact assessment</i>
Approach to manage performance	Describe any further methods that are proposed to manage risks of effects as a result of nearby projects impacting on water inflow to water environments and catchment values, as well as water quality. Describe any further methods that are proposed to manage risks of effects on groundwater and surface water and catchment values, as well as water quality, to form part of the EMF.	Section 5.4 (Water quality) Section 8.0 (Mitigation measures) EES Technical Report A: <i>Marine biodiversity impact assessment</i>

Aspect	Scoping requirement	Refer
	<p>Describe and evaluate the approach to monitoring and the proposed contingency measures to be implemented in the event of adverse residual effects on water quality and catchment values requiring further management.</p> <p>Describe measures for emergency and spill response.</p>	<p>EES Technical Report D: <i>Groundwater impact assessment</i></p> <p>EES Technical Report E: <i>Contamination and acid sulfate soils impact assessment</i></p>

In the context of this report, 'effects' includes all potential direct, indirect, on-site and off-site environmental impacts resulting from the Project.

The description and assessment of effects is not confined to the immediate area of the Project – it also considers the potential of the Project to impact on adjacent or other areas that could be affected, in the context of a systems-based approach.

3.0 Legislation, policy and guidelines

Table 3-1 summarises the relevant legislation that applies to the Project in the context of this surface water impact assessment, as well as the implications and required approvals.

Table 3-1 Primary legislation and associated information

Document	Description	Implications for the Project	Works area
Commonwealth			
Policy / guidelines / standards			
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Revised 2018) (ANZECC Guidelines)	The ANZECC Guidelines set the water quality objectives required to sustain current environmental values for natural or semi-natural water resources in Australia and New Zealand. The document identifies limits to acceptable change in water quality that would continue to protect the associated environmental value.	Regulatory authorities would have regard for these guidelines when assessing the Project's impacts on fresh and marine water quality.	Gas Import Jetty Works and Pipeline Works
State			
Legislation			
<i>Environment Effects Act 1978</i> (Environment Effects Act)	<p>The Environment Effects Act provides a regime where projects with potentially significant environmental impacts may require the preparation of an EES for assessment by the Minister for Planning. An EES may be required for declared 'public works' or works determined by the Minister for Planning to require an EES following referral. Where an EES is required, the Minister for Planning will issue scoping requirements to guide preparation of the EES.</p> <p>Once the EES is prepared it is placed on exhibition for public comment (typically for 20 to 30 days).</p> <p>The Minister for Planning may appoint an inquiry to assess the impacts of the project, taking into account the EES studies and any public submissions. This can involve a formal hearing.</p>	On 8 October 2018, the Victorian Minister for Planning determined that an EES was required for the Gas Import Jetty Works and Pipeline Works (as a single joint project). In February 2019, the Minister for Planning issued the scoping requirements for the Project. The EES has been prepared in accordance with these scoping requirements, which require the assessment of a range of specific environmental effects. The EES would be placed on public exhibition and an inquiry would be appointed to consider the environmental effects of the projects. At the conclusion of the EES assessment process the Minister for Planning's Assessment Report would be provided to the relevant statutory decision-makers to inform their decisions whether to grant approvals for the projects.	Gas Import Jetty Works and Pipeline Works

Document	Description	Implications for the Project	Works area
	The Minister for Planning subsequently provides an assessment (typically within 25 business days of the inquiry report being received), having considered the proponent's response, public submissions, EES documents and the inquiry report. The relevant statutory decision-makers must consider the Minister for Planning's Assessment when deciding whether to approve the project and, if so, on what conditions.		
<i>Water Act 1989</i> (Water Act)	The Water Act provides the legal framework for the integrated management of Victoria's water resources. The main purpose of the Water Act is to promote the efficient and equitable use of water resources and ensure water resources are conserved and appropriately managed for sustainable use. The Water Act provides a formal means of protecting and enhancing waterway flow, water quality and catchment conditions. The Water Act also governs the entitlements of water authorities. Melbourne Water is the authority responsible for managing Melbourne's waterways and major drainage systems.	Under the Water Act, Melbourne Water have been given the power to implement by-laws which apply within a specific area under their responsibility. By-law No. 2: Waterways, Land and Works Protection and Management prohibits certain activities without authorisation from Melbourne Water. Approval from Melbourne Water would be required for any works on, over or under a designated waterway, or for the Gas Import Jetty Works on the land which is subject to the Land Subject to Inundation Overlay (LSIO). Approval is required before the construction works start. Consent for minor waterway work would be required for each crossing of a waterway by the Pipeline Works.	Pipeline Works
<i>Environment Protection Act 1970</i> (Environment Protection Act)	The Environment Protection Act provides a legal framework to protect the environment in Victoria, including the protection of air, land and water from pollution. The Environment Protection Act is outcome oriented, with a basic philosophy of preventing pollution and environmental damage by setting environmental quality objectives and establishing programs to meet them.	The Environment Protection Act regulates discharges to land, surface water or groundwater by a system of licences and works approvals. Any discharge into a waterway or groundwater during the construction or operation of the Project must be in accordance with the proposed EPA Licence. The FSRU component of the Gas Import Jetty Works would require a Works Approval and licence under the Environment Protection Act.	Gas Import Jetty Works and Pipeline Works

Document	Description	Implications for the Project	Works area
	The Act establishes the EPA Victoria to administer the Act and any regulations and orders made under the Act, including orders declaring SEPPs.		
<i>Pipelines Act 2005</i> (Pipelines Act)	The Pipelines Act is the primary Act governing the construction and operation of pipelines in Victoria. The Pipelines Act covers 'high transmission' pipelines for the conveyance of gas, oil and other substances. DELWP and Energy Safe Victoria are responsible for administering the Pipelines Act and the Pipelines Regulations 2017.	The Project requires a pipeline licence under the Pipelines Act for the construction and operation of the Pipeline Works. Mitigation measures to minimise impacts on surface water for the construction of the pipeline would be included in the Pipeline Works Construction Environmental Management Plan (CEMP).	Pipeline Works
Policy / guidelines / standards			
Victorian Waterway Management Strategy (2013)	The Victorian Waterway Management Strategy provides a detailed policy for managing Victoria's waterways over an eight-year period. The strategy aims to maintain and improve the condition of wetlands, rivers and estuaries so they can continue to provide environmental, social, cultural and economic value for all Victorians.	Regulatory authorities would have regard to the strategy when assessing the Project's impacts on fresh and marine water quality through the approvals required under the Water Act and the CaLP Act.	Gas Import Jetty Works and Pipeline Works
Healthy Waterways Strategy (2018 to 2028)	The Healthy Waterways Strategy is a shared strategy across Melbourne Water, state and local government, water corporations and the community. The strategy provides direction towards a regional vision for the health of rivers, estuaries and wetlands in the Port Phillip and Westernport region.	Regulatory authorities would have regard to the strategy when assessing the Project's impacts on waterways through the approvals required under the Water Act and the CaLP Act.	Gas Import Jetty Works and Pipeline Works
Victorian Coastal Strategy (2014)	The Victorian Coastal Strategy is established under the <i>Coastal Management Act 1995</i> and is the Victorian Government's policy commitment for coastal, estuarine and marine environments in Victoria. The strategy establishes sea level rise planning benchmarks.	The strategy would inform regulatory approvals required under the Marine and Coastal Act for the Project. It provides guidance on allowances to be made for potential sea level rise when designing facilities near coastal environments (this could have implications for the Gas Import Jetty Works). The	Gas Import Jetty Works and Pipeline Works

Document	Description	Implications for the Project	Works area
		Project should consider implications of projected sea level rise on the facilities and set design criteria accordingly.	
Marine and Coastal Policy (March 2020) (Note this policy replaces the 'policy for decision making' parts of the Victorian Coastal Strategy (2014))	The Marine and Coastal Policy guides the planning, management and sustainable use of the marine and coastal environment in Victoria and informs consents issued under the Marine and Coastal Act.	The Project would need to align with the strategic directions and provisions of the Marine and Coastal Policy. The preparation of the Marine and Coastal Act consent applications for the Project would consider the policy.	Gas Import Jetty Works and Pipeline Works
SEPP (Waters) (2018)	SEPPs are subordinate to the Environment Protection Act. SEPP (Waters) provides a framework for the protection and management of water resources in Victoria, covering surface waters, estuarine and marine waters and groundwater across the State. SEPP (Waters) aims to protect the beneficial uses of water resources, set water quality indicators and objectives, and establish rules and obligations to achieve these objectives.	Compliance with SEPP (Waters) is required under the Environment Protection Act. The SEPP (Waters) requires the Project to minimise the potential for adverse impacts on surface water quality so that existing beneficial uses are protected, with priority given to maintaining beneficial uses of areas of high conservation value (Ramsar sites). The SEPP would be taken into account in setting conditions on the Works Approval and ultimately the EPA licence. The Project must meet environmental quality objectives for biological indicators and the pollutant target loads for Western Port must be maintained. Inputs of nutrients and sediments into Western Port must be at levels that support the maintenance or improvement of the current cover, extent and condition of seagrasses, within the bounds of natural variations.	Gas Import Jetty Works and Pipeline Works

4.0 Methodology

A systematic risk-based approach has been applied to understand the existing environment, the potential impacts of the Project and how to avoid, minimise or manage the risk of impact.

The following sections outline the method for the surface water impact assessment.

4.1 Existing conditions assessment

The assessment of existing conditions was based on previous investigations undertaken by APA, a review of publicly available water quality data, studies and management strategies. These included:

- a preliminary waterway crossing assessment. Alluvium, 2018
- Melbourne Water, 2018. *Understanding the Western Port Environment*, 2018
- Department of Sustainability, Environment, Water, Population and Communities, 2010. *Western Port Ramsar Wetland Ecological Character Description* and 2017 addendum
- Department of Environment, Land, Water and Planning, 2017. *Western Port Ramsar Site Management Plan*
- Yarra and Bay water quality monitoring website, Western Port catchment.

A visual inspection of waterway and drainage line crossings was carried out in December 2018, February 2019 and September 2019. The majority of major waterways were inspected; however, some of the smaller waterways and drainage lines could not be visually assessed due to property access restrictions. These were assessed using aerial photography and the Alluvium (2018) Waterway Crossing Assessment.

4.2 Risk assessment method

The EES scoping requirements for the Project require that a risk-based approach is adopted for assessment of the potential impacts of the Project. A risk assessment was carried out using an approach that is consistent with Australian/New Zealand Standard AS/NZS ISO 31000:2018 *Risk Management Process*.

The risk assessment process provides a method for:

- facilitating a consistent approach to risk assessment across the various specialist studies in the EES
- identifying key Project risks to inform where detailed investigations are required
- ensuring the level of investigation is proportionate to the relative environmental risk
- assessing the effectiveness of proposed mitigation measures and whether additional measures may be required.

Risk can be defined as a combination of:

- the magnitude of potential consequences of an event
- the likelihood of the event occurring.

The risk assessment process developed for the Project involved the assignment of consequence and likelihood ratings which were combined to give an overall risk level for each identified risk.

The initial findings of the impact assessment were used to identify and describe cause-and-effect pathways for the Project to determine links between Project activities and their subsequent environmental consequences (known as risk pathways). These risk pathways were identified considering the assets, values and uses requiring protection identified during the existing conditions assessment.

Assigning consequence of risks

In this risk assessment, the consequences of a risk occurring were assigned using a consequence guide. Specific consequence categories were developed considering existing conditions in the study area. The consequence rating criteria used in the risk assessment specifically for risks relating to surface water is shown in Table 4-1. It should be noted that the consequence ratings for water quality standards outlined in Table 4-1 also have some relevance to water quality in Western Port although more localised impacts at the lower end of the rating scale are unlikely to have discernible effects in Western Port.

Table 4-1 Surface water consequence rating criteria

Level	Qualitative description
Negligible	Applicable water quality standards met across the region. Negligible or very minor change to waterway and flow regime.
Minor	Isolated, minor and temporary exceedance of applicable water quality standards that is short lived. Some change to waterway or flow regime with minor implications.
Moderate	Localised exceedance of applicable water quality standards. Changes to waterway or floodplain function with moderate implications.
Major	Major exceedance of water quality standards in a local area. Waterway, floodplain levels where river health is significantly compromised.
Severe	Regional and prolonged exceedance of applicable water quality standards. Extensive impact to waterway, floodplain function or flow regime with irreversible disturbance to river health or flood levels.

Assigning likelihood of risks

A likelihood rating for each identified risk pathway was assigned using the guide in Table 4-2.

The likelihood criteria in the risk assessment range across a scale from 'almost certain' where 'the event is expected to occur in most circumstances or is planned to occur' to 'rare' where 'the event may occur only in exceptional circumstances.'

Table 4-2 Likelihood guide

Level	Description
Rare	The event may occur only in exceptional circumstances
Unlikely	The event could occur but is not expected
Possible	The event could occur
Likely	The event will probably occur in most circumstances
Almost certain	The event is expected to occur in most circumstances or is planned to occur

Risk assessment matrix and risk rating

The consequence and likelihood were combined to arrive at a risk rating, using the matrix shown in Table 4-3.

Table 4-3 Risk assessment matrix

		Consequence ratings				
		Negligible	Minor	Moderate	Major	Severe
Likelihood rating	Rare	Very low	Very low	Low	Medium	Medium
	Unlikely	Very low	Low	Low	Medium	High
	Possible	Low	Low	Medium	High	High
	Likely	Low	Medium	Medium	High	Very high
	Almost certain	Low	Medium	High	Very high	Very high

Further information about the risk assessment process and the risk register for the Project is detailed in EES Attachment III *Environmental risk report*.

Application of mitigation measures

An initial set of mitigation measures have been developed as part of this impact assessment. These mitigation measures are based on compliance with legislation and standard requirements that are typically incorporated into the delivery of infrastructure projects of similar type, scale and complexity.

As the Pipeline Works design, construction methodology and operation strategies were well progressed at the commencement of this impact assessment, mitigating measures that were already incorporated in the Pipeline Works design were included as initial mitigation measures.

Initial risk ratings were applied to each identified risk pathway assuming that these initial mitigation measures were in place.

Additional mitigation measures were developed where the initial risk ratings were categorised as medium or higher.

The initial and additional mitigation measures have been incorporated into the Project description and design (where relevant) by AGL and APA and included in the EMF to effectively manage the environmental performance of the Project during construction and operation. See Chapter 25 *Environmental Management Framework* for further detail on how the mitigation measures are proposed to be implemented.

The risk and impact assessment process is iterative. Potential impacts were reassessed after the risk assessment and after mitigation measures were refined. The level of residual risk was reassessed using the same methodology to confirm the mitigation measure is effective in mitigating or managing potential impacts so the Project is able to satisfy the draft evaluation objectives set out in the EES scoping requirements.

4.3 Impact assessment method

Surface water impact assessments often undertake hydrological and hydraulic analysis to determine a baseline condition and then quantify likely impacts, such as increases in water levels, which may result from the works. Infrastructure is then designed to mitigate the impact or reduce to a level that is within statutory requirements or guidelines and acceptable to the responsible authorities.

This surface water impact assessment focuses on the Pipeline Works and the land-based aspects of the Gas Import Jetty Works. This study does not assess potential direct impacts on marine waters in

Western Port from the FSRU or Jetty Infrastructure. Potential impacts to the marine environment are assessed in the EES Technical Report A: *Marine biodiversity impact assessment*.

4.3.1 Construction

Potential impacts to surface water have been identified by considering the Pipeline Works construction methods and identifying risks that may impact beneficial uses or downstream water courses or receiving waters including the Western Port Ramsar site. Methods to mitigate potential impacts have been developed based on existing construction guidelines and practices. The APA construction team has been consulted relating to construction techniques and specific mitigation measures.

The primary considerations in determining the construction method proposed for each waterway crossing of the pipeline included:

- ability of the waterway bed and banks to be adequately reinstated to avoid future erosion
- ability to undertake the works while minimising the amount of sediment entering the downstream waterway
- ability to undertake the works without significantly interrupting flows during a storm event, to minimise changes to floodplain characteristics.

There are a variety of construction techniques and controls that can be implemented to minimise impacts on waterways and receiving waters. For waterway crossings the least intrusive method is HDD where there is a negligible impact on the waterway and minimal ground disturbance. Trenching across waterways would create a greater disturbance but sediment deposition in the downstream waterway can still be minimised if controls are implemented, such as undertaking the works in dry periods and immediately reinstating the affected area. For trench works outside of the waterway, controls such as methods to dewater to disperse flows would be required to manage risks.

HDD has been adopted for waterway crossings where risks such as sedimentation of downstream waterways or damage to riparian zones or levees cannot be adequately mitigated by controls if trenching was adopted. Trenching has been proposed for other waterways and drainage lines where construction risks can be managed and other impacts, such as dewatering and reinstating bell holes required to accommodate boring machines, can be avoided.

In assessing the suitability of the proposed construction method for crossing each waterway, the following factors were considered:

- Whether the waterway was natural or had been significantly modified from its original form (constructed).
- Whether vegetation was intact or cleared including extent of vegetation and ability to re-establish.
- A combination of upstream catchment area and channel width, which provides an indication of whether the trench could be excavated and reinstated with certainty before rain is forecast so that sediment accumulating in the downstream waterway could be prevented. Waterway size also provides an indication of how easily the channel can be reinstated to match its existing form.
- Whether the waterway was ephemeral.

In situations where open trenching is the proposed construction method, the assessment has considered other issues including the ingress of rainwater and surface runoff into the trench and proposed measures for management of dewatering in accordance with regulatory requirements. There are numerous strategies that can be applied to manage stormwater during construction. Management of stormwater during the construction phase would be based on the mitigation techniques listed in the *Best Practice Environmental Management: Environmental Guidelines for Major Construction Sites* (EPA Publication 480) and EPA Victoria (1991) *Construction Techniques for Sediment Pollution Control* (EPA Publication 275). These guidelines have been used to identify potential impacts from the construction method and identify suitable mitigation measures. The International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control Appendix P (2008)* documents how many of the strategies for managing sediment on construction sites can be implemented.

4.3.2 Operation

As the pipeline would be underground once constructed, the Project would generally not result in any permanent change to the existing surface landform or create a permanent obstruction to overland flow or flow within waterways. The Project would not permanently modify the existing cross section of waterways or alter existing levees or flood controls. Furthermore, while there would be minor roads and the use of some crushed rock and concrete at the facilities, there would be no material change to the existing proportion of impervious surfaces associated with the pipeline.

As a result, no modelling to quantify and mitigate potential impacts on flood levels associated with the pipeline or facilities has been undertaken as part of this assessment. Surface water issues should be readily managed through standard design measures to address stormwater runoff and runoff quality.

Impacts on the marine environment during operation of the Gas Import Jetty Works have been assessed in EES Technical Report A: *Marine biodiversity impact assessment*.

4.4 Assumptions and limitations

Assumptions and limitations relating to this impact assessment are provided below:

- Hydrological modelling has not been carried out as the Pipeline Works would not permanently alter surface levels or substantially impede flows at waterways.
- The assessment focuses on the impact of the Pipeline Works on waterways. The Gas Import Jetty Works have only been included in this assessment in relation to land-based spills and land-based infrastructure which may affect waterways. Potential impacts on marine waters from the FSRU and the works proposed on the Crib Point Jetty are addressed in EES Technical Report A: *Marine biodiversity impact assessment*.
- Works at the Pakenham Delivery Facility are not located within a floodplain and as a result no modelling has been undertaken to assess flood impacts. The Crib Point Receiving Facility site has been identified as located within an area subject to partial inundation by coastal flooding and would need to consider this in the development of the site, however no additional modelling has been undertaken for this impact assessment.
- Waterway crossings would be undertaken using construction methods outlined in Section 1.2 and Chapter 4 *Project Description* of the EES.

4.5 Stakeholder engagement

A program of stakeholder and community engagement was undertaken to assist with Project development as described in Chapter 26 *Stakeholder engagement*.

Specific stakeholder engagement undertaken as part of the surface water impact assessment is summarised in Table 4-4. In addition, consultation with the community has identified the following concerns relating to surface water:

- contaminated water spilling into the Ramsar wetlands at Tyabb and affecting marine life and birds
- potential for an odorant spill when transporting mercaptan to the facility and the chemical spill causing impact to soil, waterways and groundwater.

Table 4-4 Stakeholder engagement undertaken as part of the surface water impact assessment

Activity	When	Key issues discussed	Engagement outcome
Melbourne Water	20 th December 2018	Construction methodology and impacts on waterways	Correspondence provided by Melbourne Water providing criteria for pipeline design.
Environment Protection Authority	19 th August 2019	Discharge of water to the environment and approvals required	EPA concurs that non-contaminated groundwater or hydrostatic testing water can be discharged to land or stormwater

Activity	When	Key issues discussed	Engagement outcome
			<p>where prior agreement with landowners is obtained.</p> <p>For those waterways where the crossing would be via open cut trenching, it was suggested to contact the water authorities to request long-term data which may be adequate to establish background levels. It was also noted that monitoring during construction is needed to ensure background levels remain unaffected by construction.</p>

4.6 Linkage to other EES technical reports

The surface water impact assessment should be read in conjunction with other relevant technical reports of the EES. Other impacts relating to groundwater, marine water quality (particularly regarding the FSRU) and contamination have been considered in detail in other technical reports:

- EES Technical Report A: *Marine biodiversity impact assessment*
- EES Technical Report D: *Groundwater impact assessment*
- EES Technical Report E: *Contamination and acid sulfate soils impact assessment*.

EES Technical Report D: *Groundwater impact assessment* details the interaction between groundwater and surface water, such as groundwater dependent ecosystems. Mitigation measures recommended in the surface water impact assessment have been adopted where applicable for the marine and contamination assessments.

The outcomes of the surface water impact assessment also relate to surface water impacts on terrestrial and freshwater biodiversity, as detailed in:

- EES Technical Report B: *Terrestrial and freshwater biodiversity impact assessment*.

5.0 Existing conditions

This section of the surface water impact assessment describes the existing conditions of the catchment and local waterways which the pipeline would intersect. It also addresses Western Port, which is the primary receiving water for surface water flows and is a Wetland of International Importance (Western Port Ramsar site).

The existing conditions assessment considers the following elements:

- catchment overview
- flood characteristics
- waterway condition
- water quality
- Western Port Ramsar site.

5.1 Catchment overview

The Project is located within the Western Port catchment. The catchment covers an area of 3,721 square kilometres (km²) and includes 2,232 kilometres of rivers and creeks. The topography of this catchment includes hilly regions near the Bunyip State Park and Strzelecki Ranges, flat, undulating terrain of the former Koo Wee Rup swamp and the marine environment of Western Port. Significant features of the catchment include surface and groundwater springs which support many streams and wetlands.

The marine ecosystem within Western Port is also of regional, national and international importance and supports mangrove, saltmarsh, seagrass, reef and soft seabed habitats. The Western Port catchment is divided into five sub-catchments. The pipeline would pass through three of these sub-catchments: the Lower Bunyip, Lang Lang and Bass system, Cardinia system and Mornington Peninsula system. Several of the rivers and creeks within these sub-catchments flow into Western Port creating estuaries that provide habitat for estuary-dependent species. The Western Port catchment extent and the associated sub-catchments are indicated in Figure 5-1.

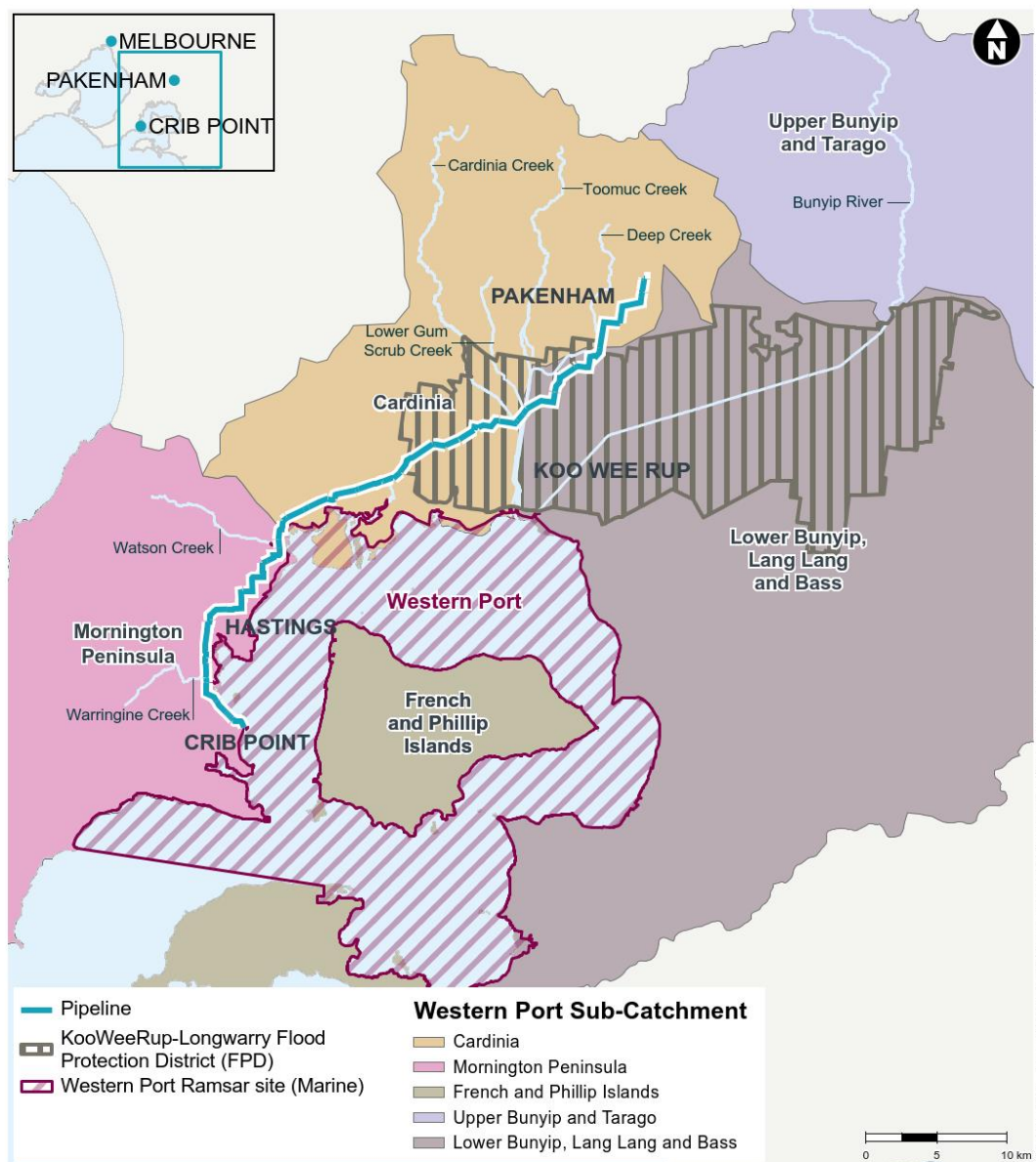


Figure 5-1 Western Port catchment extent

A large portion of the Western Port catchment where the Pipeline Works would be located has been substantially cleared of native vegetation and is now predominantly used for farming. The pipeline would traverse coastal floodplains adjoining Western Port. The local hydrology of part of the catchment was substantially altered in the 1800s when creeks were modified to drain the Koo Wee Rup Swamp. Large open drains were excavated and creeks increased in size to drain the swamp. Today, these assets convey high volumes of water following storms, however they do not have the capacity to cater for 1 in 100 year events and a large proportion of the previous swamp area is therefore inundated by floodwater after such events. Flooding also occurs through ponding in the flat areas before the water makes its way to the open drains.

The pipeline alignment is contained within the Western Port catchment which includes a number of significant waterways that discharge to Western Port. A previous study (Alluvium 2018) assessed scour potential from the Project Area and indicates that under the original pipeline alignment there

were a total of 66 waterway crossings comprising 22 named waterways that were crossed by the pipeline and an additional 44 minor swales and surface drains. Revision of the pipeline alignment since this assessment was undertaken has reduced the number of waterway crossings to 64. The location of each waterway crossing is indicated on pipeline alignment plans provided in Appendix A and photographs of the crossings where trenching is proposed are provided in Appendix B.

5.2 Flood characteristics

The Pipeline Works traverse low-lying, flat areas which are subject to flooding. The pipeline would also traverse a number of waterways where flooding occurs during rainfall events such as large storms. Flood overlays, including Land Subject to Inundation Overlays (LSIO) and Special Building Overlays (SBO) in the Mornington Peninsula, Casey and Cardinia Planning Schemes have been used to identify existing floodplains that would need to be considered in the construction methodology for the pipeline. The overlays in the relevant Planning Schemes do not have statutory effect for the Project as planning approvals are not required for the pipeline due to it being assessed under the *Pipelines Act 2005*.

The site proposed for the Pakenham Delivery Facility is not subject to flooding, however, local catchment runoff would need to be considered in the design of stormwater protection for the buildings. Recent flood modelling by Mornington Peninsula Shire indicates that the Crib Point Receiving Facility site is subject to minor coastal inundation on the eastern boundary.

Existing floodplains or waterways that require consideration with respect to the pipeline construction include:

- Warringine Creek
- Kings Creek
- Olivers Creek
- Floodplain east of McKirdys Road
- Watson Creek
- Langwarrin Creek
- between Fisheries Road and Adeneys Road
- Koo Wee Rup floodplain which extends from the South Gippsland Highway to Deep Creek
- floodplain at Bald Hills Road
- floodplain at Oakview Road.

A significant section of the Pipeline Works would be located within the Koo Wee Rup Flood Protection District which is a large area of sunken land that feeds into Western Port (as shown in Figure 5-1). The area is a former swamp that was drained through the mid-late 1800s and used for farming. Drains were cut through the land to help manage flooding that was, and remains, an issue in the area. Assets within the area vary from small catch drains to large, leveed open drains. Flooding is widespread across the area and approximately 19 kilometres of the pipeline would be located within the Flood Protection District.

The locations of floodplains along the pipeline alignment from the relevant Planning Schemes outlined above are shown on the alignment plans in Appendix A.

5.3 Waterway condition

Many of the waterways along the pipeline alignment have been significantly modified over time or are constructed waterways. These modifications include excavation or the construction of levees to increase capacity or reduce flooding.

The lower section of the pipeline alignment from Crib Point to Pearcedale is dominated by waterways with largely intact physical form and vegetation, including meandering stream systems and wetlands. This section can be expected to be relatively stable with lower likelihood of major channel changes in the absence of alterations to catchment and stream conditions.

The section from Pearcedale to Pakenham traverses multiple waterways that have been subject to significant clearing and drainage works. This section of the Pipeline Works crosses waterways that were included in the Koo Wee Rup wetland drainage program. These waterways, including Cardinia, Toomuc, Deep and Lower Gum Scrub Creeks, are predominantly constructed waterways and are more prone to ongoing instabilities.

Melbourne Water's river health monitoring indicates that the waterways and associated riparian vegetation in the sub-catchments of Cardinia and Mornington Peninsula support a variety of uses including flood mitigation and recreational use and support threatened fauna including Dwarf Galaxias, Growling Grass Frog and Southern Brown Bandicoot. They also support populations of numerous non-threatened fish and frog species.

Figure 5-2 and Figure 5-3 are indicative of the types of waterway located along the pipeline alignment. Figure 5-2 shows a shallow ephemeral drainage line located towards the Crib Point end of the Project which is indicative of a number of similar waterways elsewhere in the catchment. Figure 5-3 shows Cardinia Creek which is a more substantial waterway with constructed flood protection levees.



Figure 5-2 Unnamed waterway towards southern end of the pipeline alignment



Figure 5-3 Cardinia Creek

5.4 Water quality

Water quality has been impacted by changes in land use within the catchment and removal of riparian and aquatic vegetation. Historically, clearing of land and agricultural land use has contributed to increases in sediment and nutrient loads within the waterways of the Western Port catchment and changes in volumetric runoff have increased the potential for bed and bank erosion.

Water quality data are not widely available for waterways within the study area.

Yarra and Bay is a public website with historical water quality data and is supported by Melbourne Water, DELWP and the EPA (Victorian Government, 2018). The website publishes the results of annual water quality assessments that monitor water quality in some of the waterways that discharge to Western Port. The assessment measures six water quality parameters including water clarity, metals, pH, nutrients, dissolved oxygen and salinity. The parameters are then used to determine an overall water quality index (shown as WQI on the figures below). The scores are calculated based on the level of attainment of the relevant indicators against the environmental water quality objectives in the State Environment Protection Policy (Waters of Victoria) (SEPP (WoV)) and its Schedule F6 (Waters of Port Phillip Bay), which is now superseded by SEPP (Waters).

At each site, the individual water quality indicators are calculated from annual monitoring data using the relevant statistic that applies to each indicator in the State Environment Protection Policy (Waters of Victoria [SEPP WoV]). The SEPP (WoV) has now been superseded by SEPP (Waters) 2018 but the SEPP (WoV) was the relevant policy document for evaluation of water quality data collected prior to 2018. These results are then compared with the SEPP (WoV) environmental quality objectives and its Schedule F6 (Waters of Port Phillip Bay) that apply at each site.

Data from the Yarra and Bay website shows clearly that water quality in the Western Port catchment has consistently been rated as poor since 2000 when the monitoring program commenced.

Figures 5-4 to 5-7 indicate the results of 2017 water quality monitoring for waterways crossed by the pipeline alignment, where water quality data is available.

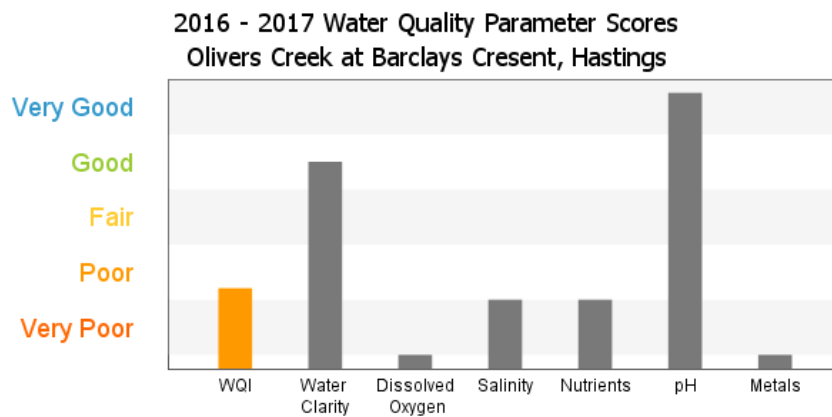


Figure 5-4 Water Quality Summary, Oliver Creek (Yarra and Bay water quality website)

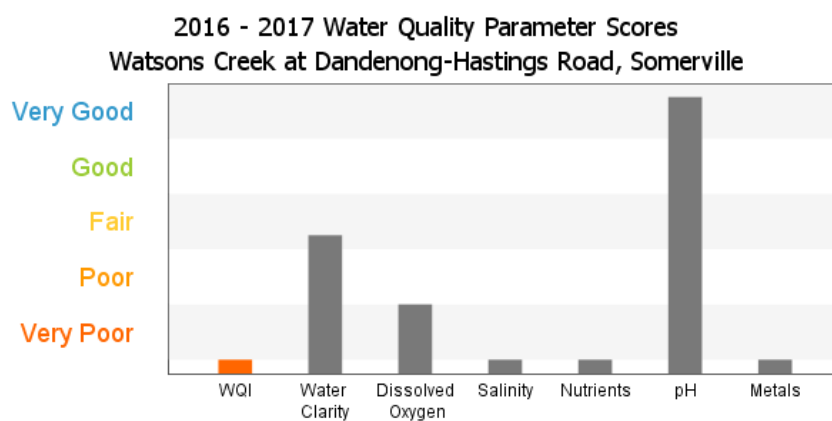


Figure 5-5 Water Quality Summary, Watson Creek (Yarra and Bay water quality website)

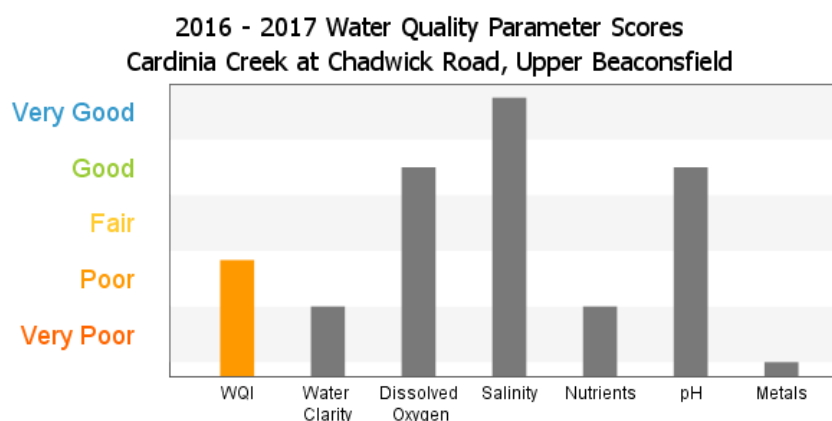


Figure 5-6 Water Quality Summary, Cardinia Creek (Yarra and Bay water quality website)

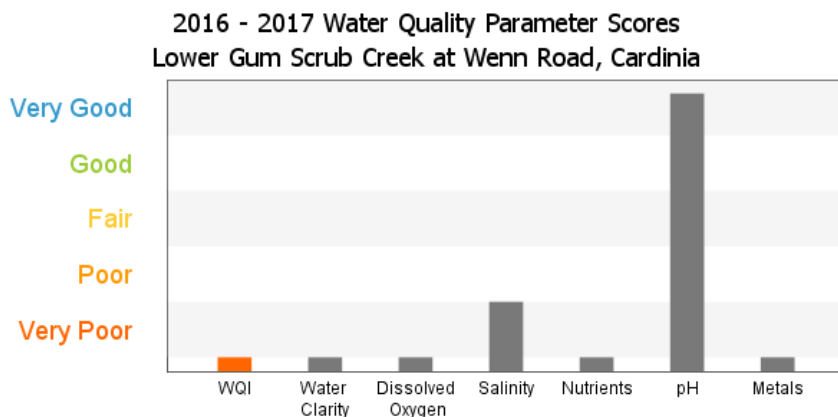


Figure 5-7 Water Quality Summary, Lower Gum Scrub Creek (Yarra and Bay water quality website)

The water quality data outlined in Figure 5-4 to Figure 5-7 indicate that waterways in the catchment for the Pipeline Works, including more substantial waterways such as Cardinia Creek, are in poor condition and under considerable stress, while other waterways in the lower catchment are under severe stress.

The cumulative water quality index for each waterway shown is typically in the range of Poor to Very Poor with nutrients, metals and water clarity generally in these categories in all waterways. The poor water quality is the result of significant changes to land use over time including the removal of native vegetation, introduction of agriculture and the channelisation of waterways. These practices are considered to have resulted in increased runoff volumes and frequency which contributes to erosion and scour of waterways leading to elevated sediment loads.

On this basis, it is evident that changes in land use or projects in the Western Port catchment which have the potential to generate adverse water quality impacts require appropriate design and mitigation measures to ensure that they do not contribute to a further degradation in water quality.

The potential impacts of land use change and development on water quality in the Western Port catchment are of particular importance due to the discharge of waterways in the catchment into Western Port which is a Ramsar listed wetland supporting significant ecological communities.

The main potential impact of the Pipeline Works on water quality relates to sedimentation resulting from construction activities entering waterways and ultimately being discharged into Western Port. Sedimentation in Western Port is an issue of particular note due to the susceptibility of seagrass beds to smothering as a result of excessive sediment loads. This issue is discussed more fully in Section 5.6 of this report.

The potential impacts of the Pipeline Works on water quality parameters would require management during the construction phase of the Project on the basis that the pipeline would be fully underground for the operational phase.

It is important that the construction phase of the Pipeline Works does not contribute to further degradation of the already poor water quality in the waterways discharging into Western Port.

Potential surface water impacts and proposed mitigation measures are found in Sections 7 and 8 of this report.

5.5 Waterway crossing assessment

The Pipeline Works involve a combination of open trench construction, horizontal boring and HDD for each of the waterways traversed by the pipeline as shown in Appendix A. Trenchless construction methodologies are generally proposed for the crossing of major watercourses where standard open cut methods are less desirable from an environmental viewpoint, or used for road or railway crossings as an alternative to shallow horizontal boring. Major waterways have been assessed as waterways or creeks that may convey flow for extended periods after a storm event and are well defined and would have a catchment area exceeding 10 hectares. Minor waterways predominantly consist of surface

drains and swales and roadside swales. Examples of a major and minor waterway are depicted in Figure 5-8 and Figure 5-9.



Figure 5-8 Christies Drain – Example of a major waterway



Figure 5-9 Unnamed waterway – Example of a minor waterway

As part of this study, a visual inspection of waterways traversed by the Pipeline Works was undertaken to assess the suitability of the construction method proposed for crossing each waterway and the ability to manage sediment during the construction process. Not all waterway crossing locations were inspected due to land access restrictions.

Table 5-1 below summarises the key waterway characteristics and the proposed construction method. The assessment concluded that the construction method proposed for each waterway (HDD, horizontal boring or open trench) as indicated in Table 6-1 would allow sediment to be managed so that sediment does not enter waterways and waterways reinstated so that there are no future detrimental impacts.

In addition to managing surface water impacts at major waterways, trenchless construction methods have been proposed to minimise vegetation clearing at locations that are known habitat areas for Southern Brown Bandicoot. Narrow strips of native and exotic vegetation along drainage channels and roadsides in the former Dalmore and Koo Wee Rup swamps have been identified as core habitat for this species. Trenchless construction methods have also been proposed at waterways that may be suitable habitat for Dwarf Galaxias and Australian Grayling. Further information is provided in EES Technical Report B: *Terrestrial and freshwater biodiversity impact assessment*. Waterways along the pipeline alignment are shown in Appendix A.

Access to the pipe crossing location at Langwarrin Creek was granted by the land owner and the location inspected on Wednesday 25th September 2019. At the time of the inspection water was observed to be flowing in the invert of the waterway. While Langwarrin Creek is ephemeral during summer, flow is more frequent during winter. Langwarrin Creek is also tidal at this location with water flowing upstream during high tides.

A pipeline was recently constructed through Langwarrin Creek using an open cut trench. During the site visit it was observed that the waterway had been re-established and the banks appeared to be stable with no indication of erosion. Planting of the overbanks had also been undertaken.



Figure 5-10 Langwarrin Creek

Table 5-1 Waterway assessment summary and proposed construction method

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation	Construction Method	Ephemeral	Reasoning for construction method
1	3.8		1.3	<1	Natural	Intact	Trench	Yes	Narrow waterway, works can be reinstated quickly
2	4.8	Warringine Creek	20	4	Natural	Intact	HDD	Yes	Substantial vegetation, larger upstream catchment and within LSIO
3	7.0	Kings Creek	13.9	2	Natural	Intact	HDD	Yes	Substantial vegetation, larger upstream catchment and within LSIO
4	7.2	Kings Creek	<0.1	<1	Natural	Intact	HDD	Yes	Substantial vegetation, and within Kings Creek LSIO
5	8.8		<0.1	<1	Constructed	Narrow	Trench	Yes	Narrow and constructed waterway
6	9.6	Olivers Creek	35.3	3	Natural	Cleared	Trench	Yes	Cleared and narrow waterway and can be reinstated quickly
7	13.4		11.1	2	Natural	Intact	HDD	Yes	Substantial vegetation and within LSIO
8	14.3		0.6	<1	Natural	Intact	Trench	Yes	Narrow waterway, works can be reinstated quickly
9	15.0		0.6	<1	Natural	Intact	Trench	Yes	Narrow waterway, works can be reinstated quickly
10	18.9	Watson Creek	36.9	3	Natural	Intact	HDD	No	Substantial vegetation and large upstream catchment

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation ¹	Construction Method	Ephemeral	Reasoning for construction method
11	19.3	Watson Creek	1.6	3	Natural	Intact	HDD	Yes	Combined with Watson Creek
12	20.9	Langwarrin Creek	31.4	2	Natural	Intact	HDD	Yes (long duration flows in winter and tidal influence)	Narrow waterway, with tidal flows. Waterway recently reinstated.
13	21.4		0.4	<1	Constructed	Cleared	Trench	Yes	No defined watercourse. Can reinstate quickly
14	21.5		0.4	<1	Constructed	Cleared	Trench	Yes	No defined watercourse. Can reinstate quickly
15	22.9	Vowell Drive Wetlands	9.3	3	Natural	Cleared	HDD	Yes	Highly sensitive environmental features
16	23.2		0.8	3	Constructed	Cleared	Trench	Yes	Small watercourse and can be reinstated quickly
17	24.0		1.5	<1	Natural	Cleared	Trench	Yes	Small watercourse and can be reinstated quickly
18	24.6		<0.1	2.5	Constructed	Cleared	Trench	Yes	Small watercourse and can be reinstated quickly
19	24.8		0.5	3	Constructed	Cleared	Trench	Yes	Small watercourse and can be reinstated quickly. Minimal vegetation
20	25.0		0.5	<1	Constructed	Cleared	Horizontal boring	Yes	Boring as part of road crossing

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation	Construction Method	Ephemeral	Reasoning for construction method
21	25.3		0.4	<1	Constructed	Cleared	Trench	Yes	Poorly defined channel, can be reinstated quickly
22	25.6	Quail Inlet Drain	2.3	3	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
23	25.6		0.3	2	Constructed	Cleared	Trench	Yes	Poorly defined channel, can be reinstated quickly
24	26.8	Drain at Fisheries Road	6.9	2	Constructed	Cleared	HDD	Yes	Boring as part of road crossing.
25	27.7	Christies Drain	9.8	2	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
26	27.8		4	2	Constructed	Cleared	Trench	Yes	Small waterway that can be reinstated quickly
27	28.7		0.8	<1	Constructed	Cleared	Horizontal boring	Yes	Boring as part of road crossing
28	29.6	Rutherford Creek	21.3	2	Constructed	Cleared	HDD	Yes	HDD viable due to proximity to South Gippsland Highway
29	31.5	Western Outfall Drain	22	11	Constructed	Cleared	Trench	Yes	No vegetation, can be reinstated quickly
30	33.4	Muddy Gates Drain	27.5	3	Constructed	Cleared	HDD	Yes	HDD due to proximity to road
31	34.0	Manks Rd Drain	0.4	<1	Constructed	Narrow	Trench	Yes	Minor drain and can be reinstated quickly.
32	34.2		0.1	<1	Constructed	Narrow	Trench	Yes	Minor drain and can be reinstated quickly

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation	Construction Method	Ephemeral	Reasoning for construction method
33	34.9		1.4	2	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
34	35.1		1.4	2	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
35	35.4	Tooradin Road Drain	50.9	2	Constructed	Cleared	Horizontal boring	Yes	Boring due to proximity to road and Southern Brown Bandicoot habitat
36	35.8		0.1	<1	Constructed	Cleared	Trench	Yes	Minor drain, very small catchment and can be reinstated quickly
37	36.1		1.9	<1	Constructed	Cleared	Trench	Yes	Minor drain, poorly defined and can be reinstated quickly
38	37.2	Tooradin Inlet Drain	1	6	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
39	37.6	Ridgeways Drain	<0.1	2	Constructed	Cleared	Trench	Yes	Very small drain catchment and can be reinstated quickly
40	38.1		0.1	<1	Constructed	Cleared	Trench	Yes	Very small drain catchment and can be reinstated quickly
41	38.3		0.1	2	Constructed	Cleared	Trench	Yes	Very small drain catchment and can be reinstated quickly
42	38.8	Dalmore Rd Drain	0.4	4	Constructed	Cleared	Horizontal boring	Yes	Boring due to proximity to road
43	39.2		0.1	2	Constructed	Narrow	Trench	Yes	Gravel road drain and can be reinstated quickly

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation	Construction Method	Ephemeral	Reasoning for construction method
44	39.3		<0.1	<1	Constructed	Cleared	Trench	Yes	Poorly defined drainage channel and can be reinstated quickly
45	40.1	Cardinia Creek	0.4	3	Constructed	Cleared	HDD	Yes	HDD due to proximity to Cardinia Creek
46	40.1	Cardinia Creek	70.2	10	Constructed	Cleared	HDD	No	Large catchment and waterway cannot be obstructed. Identified Southern Brown Bandicoot habitat
47	40.4		0.3	2	Constructed	Cleared	Trench	Yes	Very small drain catchment and can be reinstated quickly
48	40.7		<0.1	2	Constructed	Cleared	Trench	Yes	Poorly defined drainage and can be reinstated quickly
49	41.0	Lower Gum Scrub Creek	39	5	Constructed	Cleared	HDD	Yes	Large catchment and waterway cannot be obstructed. Identified Southern Brown Bandicoot habitat
50	41.1	Toomuc Creek	62	7	Constructed	Cleared	HDD	Yes	Large catchment and waterway cannot be obstructed
51	41.2	Deep Creek	56.2	12	Constructed	Cleared	HDD	Yes	Large catchment and waterway cannot be obstructed. Identified Southern Brown Bandicoot habitat
52	41.4		3.9	12	Constructed	Cleared	Trench	Yes	Poor vegetation and can be reinstated quickly

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation	Construction Method	Ephemeral	Reasoning for construction method
53	42.7		0.5	2	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
54	44.1	Soldiers Road West Drain	<0.1	<1	Constructed	Cleared	Horizontal boring	Yes	Horizontal boring due to proximity to road
55	45.2	Hagelthorn es	1.3	2	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly
56	46.5	McGregors Drain	2.8	2	Constructed	Cleared	HDD	Yes	HDD due to proximity to road and Southern Brown Bandicoot habitat
57	47.2	Fogartys Drain	0.2	3	Constructed	Cleared	Trench	Yes	Poorly defined channel and can be reinstated quickly
58	47.3		0.1	<1	Constructed	Cleared	Trench	Yes	Poorly defined channel and can be reinstated quickly
59	49.2	Deep Creek (lower)	22.5	5	Constructed	Cleared	HDD	Yes	Large catchment and waterway cannot be obstructed
60	51.5		<0.1	<1	Constructed	Cleared	Trench	Yes	Poorly defined drainage channel and can be reinstated quickly
61	51.8		1.9	2	Constructed	Cleared	Trench	Yes	Poorly defined drainage channel and can be reinstated quickly
62	52.2		0.1	<1	Constructed	Cleared	Trench	Yes	Small waterway and can be reinstated quickly
63	54.2		4	<1	Constructed	Cleared	Trench	Yes	No vegetation and can be reinstated quickly

Crossing ID	Pipeline chainage (KP)	Name	Catchment Area (km ²)	Channel Width (m)	Natural or Constructed	Existing vegetation ¹	Construction Method	Ephemeral	Reasoning for construction method
64	54.7		10.8	2	Constructed	Cleared	Trench	Yes	Large catchment, downstream of railway culvert

Notes:

1. Where vegetation exists and the construction method requires removal, flora and habitat for sensitive fauna species have been assessed (see EES Technical Report B: *Terrestrial and freshwater biodiversity impact assessment*).
2. KP: Kilometre point, starting from Crib Point Receiving Facility (KP0)

5.6 Western Port Ramsar site

In 1982, a large portion of Western Port was designated as a wetland of international importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). The site occupies approximately 60,000 hectares (ha) and consists of large shallow intertidal areas dissected by deeper channels and a narrow strip of adjacent coastal land in some areas. The extent of the Ramsar wetlands is indicated in Figure 5-1.

The 'Western Port Ramsar Site Ecological Character Description' (Kellogg Brown and Root, 2010) which had an addendum issued in 2017 (Hale, 2017) identified components, processes and services that are critical to the ecological character of the Ramsar site: wetland bathymetry, geomorphology and sedimentation; seagrass, saltmarsh, mangroves, waterbirds, invertebrates, fish and threatened species. This report has established baseline values for the Western Port wetlands against which potential impacts can be assessed.

The surface water risk assessment conducted as part of this study and outlined in Section 4.2 (Risk assessment method) and Section 6.0 (Risk assessment) identified the potential for stormwater runoff containing sediments generated by the Pipeline Works construction as the highest risk to water quality in both waterways and Western Port.

Western Port is characterised by high sediment loads from its catchment which are deposited in the river mouths and intertidal areas of the bay. The primary concern in relation to sediments entering Western Port is the potential for smothering of seagrass beds which have an important ecological function and are a critical component of the Ramsar values of the site. Adverse impacts on seagrass beds have the potential to have flow on impacts affecting fish, waterbirds, and invertebrates including threatened species.

Seagrass growth is sensitive to light limitation and sediment smothering (Collier et al. 2012). Recent modelling also indicates that the concentration of suspended sediment within Western Port is likely to be a key driver of seagrass distribution (Holland et al. 2013). Resuspension of sediments by wind and wave action in the predominantly shallow embayment is also a key driver of the light climate in Western Port, which affects seagrass condition and extent. Sediments mobilised by the channelisation of rivers through the Koo Wee Rup swamp prior to the 1950s have been suggested as a possible primary cause of historical seagrass degradation in Western Port (Wilk et al. 1979; Roberts 1985). While seagrass extent has increased since 1999 in the north and west (Holland et al. 2013), the seagrass in the north-east has not recovered and loss has been associated with increased erosion and turbidity.

Recent investigations indicate that when the wetlands were listed in 1982, total sediment loads were 40,000 tons per year. However, this had increased to 62,000 tons per year in 2010 with finer sediment deposited in Cardinia and Bunyip Creeks (Department of Sustainability, Environment, Water, Population and Communities, 2010).

Modelling data (EPA Victoria 2011) estimates that additional suspended sediments entering Western Port from greenfield and infill developments between 1996-2030 could be 60 tonnes per year if urban development is not adequately managed.

The study 'Understanding the Western Port Environment' (Melbourne Water, 2018) also investigated sediment accumulation in Western Port. The study found that the primary sources of sediment inputs are rivers and coastal erosion and run-off. This is due primarily to land use change in the catchments with sources of sediment input including agriculture, coastal development and unsealed roads. The contributions of each sub-catchment to the total river TSS load over this period were Cardinia 12 per cent, Bunyip 31 per cent, Lang Lang 41 per cent and Bass 16 per cent.

The Western Port Ramsar Site Management Plan (Department of Environment, Land, Water and Planning 2017) identified sediment and nutrient inputs to Western Port as high priority threats to the wetlands. One of the primary strategies identified is to reduce nutrient and sediment inflow through supporting the implementation of riparian, in-stream and catchment works identified in the Healthy Waterways Strategy (Melbourne Water Corporation, 2018).

The Western Port Ramsar Site Management Plan continues to develop strategies to reduce sediment input to protect Ramsar values which include:

- reduce sediment loads through improved riparian, in stream and catchment works
- develop best practice guidelines for urban and rural runoff
- develop appropriate approach for pollution reduction
- investigate the sources, potential impact and mitigation strategies for toxicants entering Western Port.

The data outlined in this section clearly indicates that potential sedimentation impacts in Western Port associated with activities in the catchment have historically had adverse impacts on the ecology and Ramsar values of the bay.

Sediment input and resuspension is a key threatening process for the Western Port environment. Although construction of the Project is unlikely to result in noticeable increases in sediment input or resuspension in Western Port compared with existing annual loads, careful management during construction is required in accordance with an Environmental Management Plan (EMP) for the Gas Import Jetty Works and a CEMP for the Pipeline Works, given the sensitivity of the Western Port receiving environment.

The risk assessment addressing this issue is found in Section 6.0 of this report with impact assessment and mitigation measures found in Section 7.0 and Section 8.0 respectively.

5.7 Stormwater drainage at Crib Point and Pakenham

5.7.1 Crib Point Receiving Facility

The external catchment upstream of the proposed site for the Crib Point Receiving Facility is approximately seven hectares and stormwater runoff is directed towards the proposed site via overland sheet flow and natural drainage channels. A culvert under The Esplanade directs upstream stormwater flow towards the existing facility at the southern side of the Crib Point Jetty. A small stormwater swale is located at the northern edge of the proposed site that diverts stormwater flows from the existing site towards the shoreline. The remainder of the site experiences overland sheet flows that run off into Western Port.

5.7.2 Pakenham Delivery Facility

The proposed site for the Pakenham Delivery Facility is situated in an open grassed paddock with well-maintained grass cover. The proposed site generally grades from east to west with an average grade of around two per cent. A short section of steeper grade on the eastern edge up to seven per cent then flattens to 2.5 per cent through the central section of the site, flattening further to around one per cent at the western edge of the site.

The contributing external stormwater catchment extends approximately 160 metres to the east across Oakview Lane to the top of a small knoll in the adjacent property. The knoll falls away in all directions and therefore forms the high point of the catchment.

5.8 Beneficial uses

The SEPP (Waters) aims to provide a coordinated approach for the protection and, where necessary, rehabilitation of the health of Victoria's water environments. This SEPP identifies 'beneficial uses' of waterways and establishes environmental quality objectives at levels that would ensure the protection of these beneficial uses. In addition to general provisions, Schedule 5 to the SEPP (Waters) provides for Areas of High Conservation Values, which includes Ramsar wetlands, and has relevance to the Project. SEPPs are legally enforceable statutory instruments and provide the cornerstone for a wide range of environmental protection and management activities in Victoria. Table 5-2 summarises the beneficial uses relevant to the Project.

Table 5-2 Beneficial uses

Segment	Beneficial uses
Estuaries and Inlets	<p>Marine and estuarine waters – aquatic ecosystems:</p> <ul style="list-style-type: none"> • Slightly to moderately modified. <p>Water suitable for:</p> <ul style="list-style-type: none"> • Primary contact recreation • Secondary contact recreation • Aesthetic enjoyment • Traditional Owner cultural values • Cultural and spiritual values • Aquaculture • Industrial and commercial use • Human consumption of aquatic foods.
Western Port	<p>Marine and estuarine waters – aquatic ecosystems:</p> <ul style="list-style-type: none"> • Largely unmodified (Entrances and North Arm) • Slightly to moderately modified (East Arm) <p>Water suitable for:</p> <ul style="list-style-type: none"> • Human consumption of aquatic foods • Aquaculture • Industrial and commercial • Primary contact recreation • Secondary contact recreation • Aesthetic enjoyment • Traditional Owner cultural values • Cultural and spiritual values • Navigation and shipping (Entrances and North Arm sub-segment).
Rivers and Streams – Central Foothills and Coastal Plains	<p>Aquatic ecosystems:</p> <ul style="list-style-type: none"> • Slightly to moderately modified. <p>Water suitable for:</p> <ul style="list-style-type: none"> • Primary contact recreation • Secondary contact recreation • Aesthetic enjoyment • Traditional Owner cultural values • Cultural and spiritual values • Agriculture and irrigation • Aquaculture • Industrial and commercial use • Human consumption of aquatic foods.

6.0 Risk assessment

The risk assessment identified the risks associated with surface water as a result of the Project during its construction and operation in accordance with the method described in Section 4.2 of this report. The initial and residual surface water risks associated with the Project are summarised in Table 6-1.

The initial risk ratings presented below consider an initial set of mitigation measures (where relevant), which are based on compliance with legislation and standard requirements that are typically incorporated into the delivery of infrastructure projects of similar type, scale and complexity. As the Pipeline Works design was well progressed at the commencement of this impact assessment, mitigating measures identified early on in the design such as HDD for major watercourses, were also included as initial mitigation measures. Risk ratings were applied to each of the identified risk pathways assuming that these mitigation measures were in place.

Where the initial risk ratings were categorised as medium or higher, additional mitigation measures were developed. These mitigation measures were then incorporated into the Project description or Project design.

Assessment of the risks and effectiveness of proposed mitigation measures was undertaken by specialists with technical expertise in this area and individuals with pipeline construction experience.

Table 6-1 Surface water risks

Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk		Additional mitigation measure	Residual Risk	
Construction									
HD1	Pipeline Works	Site dewatering (runoff quality)	Dewatering of the trenches following a storm event results in water discharged from site above EPA water quality limits ultimately enters receiving water bodies.	MM-SW01 Discharge water i. Discharge should be to low gradient, stable, grassed areas as agreed with the landholder. c. Sediment control devices to remove suspended solids and dissipate flow should be used. f. Water that cannot be treated to meet the relevant discharge criteria should be disposed to an EPA Victoria licensed facility. j. Contaminated water should be managed in accordance with EES Technical Report E: <i>Contamination and acid sulfate soils impact assessment.</i>	Moderate	Unlikely	MM-SW01 Discharge water h. Trench water should not be discharged into or within 50m of watercourses.	Moderate	Unlikely
						Low			Low

HD2	Gas Import Jetty Works and Pipeline Works	Stormwater runoff	Stormwater runoff (from trench intercepting surface waterway and excavated material from the ROW or construction sites) is above EPA water quality limits for sediments and enters waterways and the Western Port Ramsar site.	<p>MM-SW02 Managing runoff</p> <ol style="list-style-type: none"> Flow diversion banks should be placed upstream. An overflow spillway can be constructed to allow runoff to pass. <p>MM-SW03 Trenched watercourse crossings should be constructed during no flow conditions.</p> <p>MM-SW04 Watercourse trenching</p> <ol style="list-style-type: none"> Weather forecasts should be monitored. Obstructions to flow should be removed and waterways reinstated as soon as practicable. Trenching on both sides of the waterway should be fully excavated and prepared. The pipeline should be assembled so that it can be installed as soon as practicable. <p>MM-SW05 Watercourse trenchless crossing The following watercourses should be crossed by trenchless techniques: Kings Creek, Warrigine Park Swamp, Watson Creek, Vowell Drive</p>	Moderate	Unlikely	Low	No additional mitigation measures identified	Moderate	Unlikely	Low
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Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk			Additional mitigation measure	Residual Risk		
					C	L	Risk		C	L	Risk
				Wetlands, Cardinia Creek, Toomuc Creek, Lower Gum Scrub Creek and Deep Creek.							
HD3	Pipeline Works	Stormwater runoff from Langwarrin Creek	Stormwater and tidal flow within waterways need to be temporary diverted during trenching of Langwarrin Creek and results in downstream erosion and flow that is above EPA water quality limits for sediments.	MM-SW04 Watercourse trenching a. Weather forecasts should be monitored to avoid having open trenches when high rainfall events are expected. b. Obstructions to flow should be removed and waterways reinstated as soon as practicable. j. Temporary diversions should be provided to allow flow around the trench to be maintained.	Moderate	Possible	Medium	MM-SW05 Watercourse trenchless crossing The following watercourses should be crossed by trenchless construction techniques: Langwarrin Creek.	Moderate	Unlikely	Low

Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk			Additional mitigation measure	Residual Risk		
					C	L	Risk		C	L	Risk
HD4	Pipeline Works	Runoff from disturbed surfaces at HDD drilling sites	Sediment laden runoff from disturbed surfaces at HDD drilling sites flow into local waterways.	<p>MM-SW02 Managing runoff</p> <p>a. Flow diversion banks should be placed upstream of the spoil material if required.</p> <p>b. An overflow spillway can be constructed to allow runoff to pass.</p> <p>MM-SW05 Watercourse trenchless crossing</p> <p>The HDD profile design, the work method statement should be submitted to Melbourne Water and approved.</p> <p>MM-SW09 Discharge from trenchless drill sites</p> <p>a. Earth bunds and drainage channels should be placed around the upper edges of drill sites and work areas.</p> <p>b. Sump pits should be constructed at the bottom of the drill site. An earth bund should be placed around the sump pit to contain any spillage.</p>	Minor	Possible	Low	No additional mitigation measures identified	Minor	Possible	Low

Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk			Additional mitigation measure	Residual Risk		
					C	L	Risk		C	L	Risk
HD5	Pipeline Works and Gas Import Jetty Works	Spill to water (construction)	A spill of hazardous materials during construction results in contaminated discharge to surface water.	<p>MM-SW06 Fuel and chemical storage Fuels and chemicals stored on site should be minimised. Dangerous goods should be stored and handled in accordance with relevant Australian Standards. Chemical and fuel storage should be monitored as per EES Technical Report K: <i>Safety, hazard and risk assessments</i>.</p> <p>MM-SW07 Spills a. Spill kits should be available. d. Emergency response plans.</p> <p>MM-SW08 Refuelling of vehicles and machinery Refuelling of machinery should utilise auto shut off valves and not occur within 50m of a watercourse.</p> <p>MM-SW09 Discharge from trenchless drill sites Hazardous fluids to be prevented from discharge from drill sites.</p>	Minor	Possible	Low	No additional mitigation measures identified	Minor	Possible	Low

Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk			Additional mitigation measure	Residual Risk		
					C	L	Risk		C	L	Risk
HD6	Pipeline Works	Waterway or floodplain function (construction)	Temporary excavated material results in obstruction of waterways or floodplain function (construction).	MM-SW10 Stockpiling Avoid stockpiling material near waterways. Material should be located away from the top of banks. MM-SW03 Trenched watercourse crossings should be constructed during no flow conditions. MM-SW04 Watercourse trenching Weather forecasts should be monitored to avoid having open trenches when high rainfall events are expected Obstructions to flow should be removed and waterways reinstated as soon as practicable.	Minor	Unlikely	Low	MM-SW10 Stockpiling Avoid the creation of a continuous row of stockpiled materials.	Negligible	Unlikely	Very low
Operation											
HD7	Gas Import Jetty Works and Pipeline Works	Waterway or floodplain function (operation)	Permanent infrastructure results in changes to waterway or floodplain function (operation).	MM-SW11 Facilities design Permanent surface structures, including the facilities at Pakenham and Crib Point should be designed to maintain existing overland flow paths and not result in increased flood levels upstream of the sites.	Negligible	Unlikely	Very low	No additional mitigation measures identified	Negligible	Unlikely	Very low

Risk ID	Works area	Risk name	Risk pathway	Initial mitigation measure	Initial Risk			Additional mitigation measure	Residual Risk		
					C	L	Risk		C	L	Risk
HD8	Gas Import Jetty Works and Pipeline Works	Spill to water (operation)	A spill of hazardous materials at the operational facilities results in contaminated discharge to the surface water environment.	MM-SW06 Fuel and chemical storage MM-SW07 Spills MM-SW08 Refuelling of vehicles and mobile machinery	Minor	Possible	Low	No additional mitigation measures identified	Minor	Possible	Low
HD9	Gas Import Jetty Works and Pipeline Works	Runoff water quality	Reduced water quality discharged from the facilities sites.	MM-SW12 Water Sensitive Urban Design treatments WSUD treatments should be incorporated into the site design for the Crib Point Receiving Facility and the Pakenham Delivery Facility to capture surface runoff and reduce pollutants in accordance with the <i>Best Practice Environmental Management Guidelines</i> (CSIRO 1999).	Minor	Unlikely	Low	No additional mitigation measures identified	Minor	Unlikely	Low

C: Consequence
L: Likelihood

While there is potential for localised and temporary impacts on waterways traversed by the pipeline, a significant number of the waterways to be crossed are considered low risk due to their characteristics. Many are minor waterways or drains, often with limited or no vegetation cover and dry for periods of time meaning trenching and reinstatement can be undertaken quickly with minimal impact to the environment. To reduce the risk of stormwater runoff from Pipeline Works construction depositing unacceptable levels of sediments into waterways and into the Western Port Ramsar site (Risk ID HD2), APA has elected to traverse significant waterways by using trenchless construction methods such as horizontal directional drilling (HDD) or horizontal boring. These trenchless methods avoid risk of disturbance to waterways maintaining bank stability and minimising vegetation removal.

As discussed in Section 5.0 of this report, potential seagrass degradation associated with sediment deposits into Western Port continues to be an environmental issue of concern.

Trenchless construction method is proposed for specific waterways as they may have a more significant impact on the character of Western Port Ramsar site due to the potential for high flow during the construction period.

HDD represents a significant commitment to minimising potential environmental impacts associated with disturbance to waterways where an increased risk of sediment transport was identified.

It is considered that construction of the Pipeline Works is unlikely to generate sediment loads in waterways and Western Port that would have a material impact on overall sediment loads entering the bay as there is no potential to generate sediment in sufficient volumes from the proposed works, particularly with HDD being used at the main waterways. It is possible that some localised temporary impacts from sedimentation could occur in waterways if construction works are not properly managed. Management of runoff from the Crib Point Receiving Facility and the Pakenham Delivery Facility during construction would be governed by the Gas Import Jetty Works EMP and the Pipeline Works CEMP, respectively, as well as the use of temporary sediment basins.

As indicated in Table 6-1, other potential risks associated with spills of hazardous materials during construction and operation and the potential for temporary or permanent stockpiles and infrastructure to create localised flooding issues were rated as low risk with industry standard mitigation measures applied from the outset of construction.

On the basis of the risk assessment, it is considered that the overall surface water risks associated the Project are low with appropriate mitigation measures in place. The potential impacts and mitigation measures proposed are discussed more fully in the following sections.

7.0 Impact assessment

This section of the report provides more detail on the potential surface water impacts associated with the Project which were identified in the risk assessment outlined in Section 6.0.

Section 8.0 then provides details on the mitigation measures outlined in the risk assessment which should be implemented to manage potential impacts.

7.1 Construction assessment

This section provides an assessment of impacts to surface water quality during construction, including site dewatering from trenches leading to increased sediments being discharged back to the environment, runoff from disturbed areas and potential for spills impacting surface water quality. Excavation of the pipeline trench may also result in increases to flood levels due to soil stockpiling in areas used for overland water storage.

The highest risk to the beneficial uses outlined in Table 5-2 are from potential surface water impacts from Pipeline Works construction activities. In particular, potential impacts resulting from stormwater runoff containing sediments, and to a lesser degree, contaminants from spills entering waterways and being deposited in Western Port requires consideration.

7.1.1 Site dewatering (Risk ID HD1)

After a rain event during pipeline construction activities, it may be necessary to pump surface water out of open trenches which has resulted from direct rainfall ingress or from surface runoff which may contain sediments and other pollutants. There is a risk that stormwater with high sediment content is discharged to a nearby waterway having localised impacts on the waterway or deposited in the Western Port Ramsar site. As outlined earlier in this report, the primary concern with this potential impact is the possibility of sediment loads contributing to seagrass degradation in the Western Port Ramsar site.

Water collected from within excavated trenches should be collected and treated if turbidity exceeds EPA requirements, prior to discharging. Water in trenches which may contain other contaminants should be tested and discharged or disposed of in accordance with protocols outlined in EES Technical Report E: *Contamination and acid sulfate soils impact assessment*. Hydrotest water, trench or bell-hole water should not be discharged into or within 50 metres of watercourses. Discharge of collected water should be to low gradient and grassed areas to avoid soil erosion or sedimentation of land or water. Sediment control devices to remove suspended soils and dissipate flow should be used where required.

Pollutants associated with contaminated soils and groundwater are discussed in EES Technical Report D: *Groundwater impact assessment* and EES Technical Report E: *Contamination and acid sulfate soils impact assessment*.

7.1.2 Runoff from disturbed areas (Risk ID HD2, HD3, HD4)

Runoff from disturbed areas such as along the pipeline alignment and at the Crib Point and Pakenham facility sites has the potential to impact water quality in receiving waters, as the runoff may contain sediment or other pollutants. Runoff from laydown areas, HDD sites and haulage routes, stripped surfaces and stockpiled material have the potential to increase sediment loads and turbidity in receiving water bodies. There is also the potential for these sediments to contain pollutants including contaminated sediments, oils and/or chemicals.

Open trenching is proposed for the less significant waterways and there is increased potential for sediment associated with trenching across the watercourse to be transported downstream if there is a rain event that causes flow to occur.

HDD and horizontal boring are proposed at a number of waterways to avoid interaction with the waterway or riparian zone. This is to reduce the risk of depositing sediment into the waterway and to the Western Port Ramsar wetlands in waterways that are likely to convey substantial volumes of water following significant rain.

Subject to further detailed geotechnical investigations confirming suitability, the following watercourses would be crossed by HDD: Kings Creek, Warringine Park Swamp, Watson Creek, Vowell Drive Wetlands, Cardinia Creek, Toomuc Creek, Lower Gum Scrub Creek, Deep Creek and Langwarrin Creek.

While HDD is less intrusive to surface features, the technique has other environmental constraints associated with managing drilling muds and runoff from the drilling sites.

The HDD profiles provided in Appendix C indicate that there is considerable horizontal and vertical clearance from the waterways.

Initial construction design involved open cut trenching through Langwarrin Creek, which would require additional works involving temporary diversions around the trench to maintain waterway flow. These additional works would introduce further complexities at Langwarrin Creek and increase the risk of erosion and reducing water quality. Further assessment throughout the EES process has resulted in the adoption of HDD as the construction method for the crossing of Langwarrin Creek. This mitigates the potential risks of erosion and potential water quality impacts associated with the open trenching method at this creek crossing.

For the remaining watercourses and drainage lines, it is proposed to use standard 'open cut' trenching, which involves in-stream excavation of a trench. The reasons for selecting open trenching as the preferred construction methodology for waterway crossings at these locations are set out in Table 5-1. Primarily, open trenching would be used for waterways that are heavily degraded and/or do not have the potential to convey significant volumes of water during rainfall events, meaning the risk of sediment mobilisation from construction areas during these events is low.

As outlined earlier in this report, the primary concern with this potential impact is the possibility of sediment loads contributing to seagrass degradation in the Western Port Ramsar site.

As indicated in the risk assessment, the Pipeline Works are considered to have a low risk of sedimentation impacts due to the use of widely accepted and effective sediment control measures during construction supplemented by HDD at major waterways draining into Western Port. Additionally, the pipeline construction activities are temporary and progressively move along the alignment, with completed sections being rehabilitated as construction progresses.

7.1.3 Spills (Risk ID HD5)

There is potential for spills of fuels or other liquid pollutants to flow into local waterways or drainage lines during construction of the Project. Potential spills are most likely to be associated with refuelling and liquids used in the drilling process. The primary concern with this potential impact is the possibility of hazardous materials entering waterways and the Western Port Ramsar site.

As indicated in the risk assessment, impacts associated with spills of fuels during construction of the Project are considered a low risk with application of industry standard mitigation measures during construction and operation. In addition to good practice such as minimal storage of chemicals at the work site, bunding of areas where storage is required and storing chemicals away from waterways a potential spill would be localised and contained at the active work site rather than being widespread. Additionally, the volume of hazardous materials located at the active work site at any one time is not significant.

On this basis, it is considered that potential spills of hazardous materials would not have unacceptable impacts on waterways and Western Port as a result of the Gas Import Jetty Works and Pipeline Works construction activities.

It should be noted that potential spills associated with the FSRU moored at Crib Point are not addressed in this report. These issues are addressed in EES Technical Report A: *Marine biodiversity impact assessment*.

7.1.4 Increase in flood levels (Risk ID HD6)

Excavation of the pipeline trench would include temporary placement of stockpiled material along the pipeline alignment during the construction phase. This could potentially result in obstruction of waterways or floodplain function and an increase in flood levels within flood prone areas. In the event of a major rainfall event this may cause flooding impacts on neighbouring properties.

A large portion of the pipeline alignment where works would be undertaken is within the Koo Wee Rup Flood Protection District. The floodplain in this Flood Protection District performs a flood storage function. In these areas, flow velocities tend to be slower. This means that increased flooding in these locations is typically less severe than in areas where flooding is caused as a result of a waterway's inability to convey flows during a flood event, as the slower flow velocities result in reduced increases in water levels. Notwithstanding, the Project would implement measures to ensure that spoil material placed along the trench during construction does not completely impede the flow of flood waters. Other measures such as avoiding placement of the small stockpiles of soil associated with boring and HDD sites in flood prone areas and providing up-slope diversions to convey flow through or around the ROW should be implemented where required.

Overall, the potential impact on flood levels is likely to be small and can be further minimised by implementation of industry standard mitigation measures.

In the event that a stockpile had to be located in an area which may have flooding concerns, it is possible to conduct flood modelling to quantify potential impacts, propose mitigation measures or confirm that another location is required.

7.2 Operation

This section provides an assessment of impacts to surface water during Project operation. An increase in impervious areas at the above ground facilities may increase flood levels as well as pose a risk to runoff water quality. The potential for spills to water during operation of the Crib Point and Pakenham facilities are also assessed.

7.2.1 Increase in flood levels (Risk ID HD7)

Two above ground facilities would be constructed at Pakenham and at Crib Point. These are not located within floodplains, although Crib Point is subject to some minor flooding at the eastern end of the site, and the local topography indicates that local catchment runoff upstream of the site can be managed in the design phase.

There is very minimal risk that the pipeline, the Pakenham Delivery Facility or the Crib Point Receiving Facility would increase flood levels.

The pipeline would be fully covered once constructed and there would be negligible change to the surface topography or obstruction to waterways.

The Pakenham Delivery Facility and the Crib Point Receiving Facility would result in a small increase in impervious area at their respective locations which would increase local runoff. However, this runoff is not expected to be detrimental to the receiving waterways and can be managed by standard design practices. Existing overland flow paths and the risk of localised flooding would need to be managed through ensuring appropriate siting and drainage provisions are made. Refer to Section 7.2.3 for further discussion on runoff quality.

As an initial mitigation measure for managing flood levels during operation of the Project, the Crib Point and Pakenham facilities should be designed to limit impacts to surface water conveyance. Existing overland flows that cause minor flooding on the northern boundary of the Crib Point Receiving Facility should be considered in the development of flood management and drainage requirements for this facility.

For stormwater sizing purposes it is estimated that the proposed Crib Point Receiving Facility would encounter half of the flow from the culvert (which is considered to be conservative) and the remainder is anticipated to flow towards Western Port. It is expected there would be a negligible change to the natural course of flows along the southern boundary of the site. The site is free from flooding except for an existing swale along the northern boundary. Detailed design of the stormwater drainage system at the Crib Point Receiving Facility should be undertaken in accordance with the recommended mitigation measures (or similar) outlined in this report.

Due to the proximity of Western Port, tidal influence is a key consideration in the design of the facility. Tidal data obtained from the Australian Bureau of Meteorology states the Highest Astronomical Tide (HAT) for Western Port (Stony Point) is 1.62 metres Australian Height Datum (AHD).

During design of the Crib Point Receiving Facility, consideration of high tide levels plus storm surge would need to be given to the proposed floor level and a further allowance of 0.61-1.10 metres should be provided to account for sea level rise as a result of 2090 climate change projections in accordance with Representative Concentration Pathway (RCP) 8.5 (IPCC, 2019). It is noted that the operational timeframe of the Project would be 20 years.

Overall, the likelihood of adverse impacts from flooding as a result of the operation of the Project and the potential consequence associated with any flood impacts are considered to be negligible and the risk very low.

7.2.2 Spills (Risk ID HD8)

There is potential for spills of fuels or other hazardous substances, which may flow into local waterways or directly to Western Port, to occur during the operation of the Pakenham Delivery Facility or the Crib Point Receiving Facility. Potential spills are most likely to be associated with refuelling and liquids used in processing. The potential impacts of a spill at these facilities are considered to be minor as the facilities would be designed in accordance with regulatory requirements for storage of chemicals and fuels. Additionally, any spill would be localised and manageable within site boundaries. The sites can be designed so that areas used to store chemicals are located outside of overland flow paths so the risks of a spill entering a waterway or Western Port are minimal.

7.2.3 Runoff water quality (Risk ID HD9)

The increase in impervious surfaces associated with the development of the Pakenham Delivery Facility and the Crib Point Receiving Facility have the potential to result in increased sediment and nutrients in stormwater runoff. The potential impact has been rated minor as it is intended that both sites would be designed to meet the pollutant reduction targets specified in the *Best Practice Environmental Management Guidelines* (CSIRO 1999). Water Sensitive Urban Design (WSUD) can be used to remove pollutants from stormwater runoff, retain water on site and reduce the frequency of runoff discharging from the site during storm events. Achieving the best practice performance objectives for nutrients and sediment would result in compliance with the SEPP receiving water objectives.

8.0 Recommended mitigation measures

This section outlines the recommended mitigation measures for surface water identified as a result of the risk and impact assessment.

The recommended mitigation measures are applicable to the construction and operation components of the Project and, when implemented, would ensure the Project minimises adverse effects on water quality within the Project Area and downstream waterways and therefore would not have a significant or ongoing effect on the Western Port Ramsar site.

An EMP for the Gas Import Jetty Works and a CEMP for the Pipeline Works, which should include the following recommended mitigation measures, would be developed prior to construction commencing and developed in accordance with the *Best Practice Environmental Management: Environmental Guidelines for Major Construction Sites* (EPA Publication 480) and EPA Victoria (1991) *Construction Techniques for Sediment Pollution Control* (EPA Publication 275), in order to meet the SEPP requirements. Methods to implement the plan can be informed by the International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control Appendix P* (2008).

The recommended mitigation measures listed in Table 8-1 combine the initial and additional mitigation measures applied during the risk assessment to arrive at recommended mitigation measures for the design, construction and operation of the Gas Import Jetty Works and the Pipeline Works.

In the course of finalising this technical report, consultation was undertaken with AGL and APA and other members of the team (designers, contractors and other specialists) so that recommended mitigation measures would be achievable and compatible with those proposed by other specialists.

The recommended mitigation measures have been refined as a result of these discussions and, where adopted by the Project proponent, would be incorporated into the EMP for the Gas Import Jetty Works and the CEMP for the Pipeline Works. All mitigation measures adopted by the Project proponent are outlined in EES Chapter 25 *Environmental Management Framework*.

In addition to the surface water mitigation measures recommended in Table 8-1, mitigation measures to avoid, minimise and mitigate impacts to surface water are also recommended as per:

- EES Technical Report E: *Contamination and acid sulfate soils impact assessment*
- EES Technical Report K: *Safety, hazard and risk assessments*.

Table 8-1 Recommended mitigation measures

Mitigation measure ID	Mitigation measure	Works area	Phase
MM-SW01	<p>Discharge water Water collected from within excavated trenches/hydrostatic testing should be collected and treated if turbidity exceeds EPA requirements prior to discharging. The relevant suggested measures outlined in EPA publication 480 (Section 4.4 Dewatering work sites) and in EPA publication 275 (Section 16 Water treatment) should be incorporated into the Pipeline Works CEMP.</p> <p>a. Non-contaminated groundwater and surface runoff that enters the open trenches and bell holes should be managed in accordance with SEPP (Waters).</p>	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
	<ul style="list-style-type: none"> b. A description of the post-test (for hydrostatic testing) or post-extraction (for groundwater) treatment of the water should be included in the Pipeline Works CEMP as per direction from EPA Victoria. c. Discharge of water to land should avoid soil erosion or sedimentation of land or water. Sediment control devices to remove suspended solids and dissipate flow should be used where required. d. Water should not be discharged to waterways or into stormwater drains without approval from relevant authorities. e. Water should be tested for pH and salinity prior to discharge to land. pH should be between 4 and 9, and salinity should not exceed 6,000µS/cm. f. Water that cannot be treated to meet the relevant discharge criteria should be disposed to an EPA Victoria licensed facility. g. Relevant landholder(s) and water authorities should be consulted, and permission obtained prior to discharge to land. h. Discharge to land should not occur within 50 metres of watercourses. i. Discharge should be to low gradient, stable, grassed areas and be undertaken in accordance with landholder requirements and through "irrigation type" systems to prevent scour or erosion. Visual monitoring during land discharge should be undertaken to ensure water does not enter existing waterways. j. Contaminated water should be managed in accordance with mitigation measures described in EES Technical Report E: <i>Contamination and acid sulfate soils impact assessment</i> (MM-C04). 		
MM-SW02	Managing runoff <ul style="list-style-type: none"> a. Flow diversion banks should be placed upstream of the spoil material if required. b. An overflow spillway should be constructed to allow runoff from external catchments to pass over the spoil material at a controlled location without causing erosion. 	Gas Import Jetty Works and Pipeline Works	Construction
MM-SW03	Watercourse trenching during no flow conditions Where practicable, all trenched watercourse crossings should be constructed during no flow conditions and reinstated as soon as possible.	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
MM-SW04	<p>Watercourse trenching</p> <p>Where trenching is undertaken over a watercourse the following mitigation measures should be undertaken:</p> <ol style="list-style-type: none"> Weather forecasts should be monitored to avoid having open trenches at the waterway when high rainfall events are expected. Where watercourses are trenched, all obstructions to flow should be removed as soon as practicable after the pipe has been laid and backfilled. Trenching on both sides of the waterway should be fully excavated and prepared prior to undertaking the final section of trenching over the waterway. The pipeline should be assembled and prepared so that it can be immediately installed once the trenching over the watercourse has been undertaken. Waterway reinstatement should be carried out in consultation with the relevant authority(s). The exposed trench within the watercourse and riparian zones should be reinstated immediately following the installation and commissioning of the pipeline, including providing suitable compaction and revegetation. Waterway reinstatement should be designed to avoid future erosion over the pipeline alignment. This may include the use of riprap made of stones to stabilise the waterway. If necessary, a geofabric should be provided to prevent erosion and scour until the vegetation has established. Visual monitoring should be undertaken downstream of the trench during flow events if the trench has not been reinstated. Temporary diversions should be provided if there is permanent or tidal flow in the waterway in accordance with International Erosion Control Association (IECA) <i>Best Practice Erosion and Sediment Control Appendix P: Land-based Pipeline Construction</i> (2008). 	Pipeline Works	Construction
MM-SW05	<p>Watercourse trenchless crossing</p> <p>The following watercourses should be crossed by trenchless construction techniques: Kings Creek (KP7), Warringine Park Swamp (KP4.8), Watson Creek (KP 18.9), Vowell Drive Wetlands (KP22.9), Cardinia Creek (KP40.1), Toomuc Creek (KP41.1), Lower Gum Scrub Creek (KP41.0), Deep Creek (KP41.2), Langwarrin Creek (KP20.9). For watercourses managed by Melbourne Water, the HDD profile design should meet or exceed Melbourne Water's minimum design requirements.</p>	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
MM-SW06	<p>Fuel and chemical storage</p> <p>The following measures should be implemented to ensure that fuel and chemical storage is safe and spilt liquids do not cause environmental harm:</p> <ol style="list-style-type: none"> Fuels and chemicals stored on site should be minimised. Fuels should not be stored close to waterways. Bunds should be installed around stored liquids. Dangerous goods should be stored and handled, and storage facilities monitored as per EES Technical Report K: <i>Safety, hazard and risk assessments</i> (MM-HR05, MM-HR06). 	Gas Import Jetty Works and Pipeline Works	Construction and operation
MM-SW07	<p>Spills</p> <ol style="list-style-type: none"> Spill kits should be available at locations where machinery/plant are operating, refuelling points and fuel and chemical storage locations. Spills of hazardous materials should be rendered safe, and where required, collected and transported by licenced contractors for disposal at appropriately licenced facilities, including cleaning materials, absorbents and contaminated soils. Staff training should include spills management procedures. Emergency response plans for spills should be developed as per EES Technical Report K: <i>Safety, hazard and risk assessments</i> (MM-HR07). 	Gas Import Jetty Works and Pipeline Works	Construction and operation
MM-SW08	<p>Refuelling of vehicles and mobile machinery</p> <p>Refuelling of vehicles and machinery (excluding hand held machines) on the ROW should:</p> <ol style="list-style-type: none"> be undertaken in a designated refuelling area with appropriate measures to contain spills utilise auto shut off valves not occur within 50m of a watercourse. 	Gas Import Jetty Works and Pipeline Works	Construction
MM-SW09	<p>Discharge from trenchless drilling sites</p> <p>Specific construction techniques to prevent discharge of hazardous material from the trenchless drilling sites include:</p> <ol style="list-style-type: none"> Earth bunds/or and drainage channels should be placed around the upper edges of drill sites and work areas to divert natural runoff around and away from the site and prevent mixing with drilling compound runoff. Sump pits should be constructed at the bottom of the drill site. The sump pit should be positioned to capture runoff from the drilling compound. An earth bund should be placed around the sump pit to contain any spillage. 	Pipeline Works	Construction

Mitigation measure ID	Mitigation measure	Works area	Phase
	c. All facilities utilised in the surface mud handling (mixing, cleaning and pumping) during the HDD activities should be bunded.		
MM-SW10	Stockpiling To minimise the impacts to upstream flood levels and allow flow to be conveyed across the ROW, the following measures should be adopted: <ul style="list-style-type: none"> a. Avoid the creation of a continuous row of stockpiled materials that can cause water to pond on the upstream side. b. Provide regular gaps to allow flood water to pass through or constructing overflow spillways in the spoil material. c. Avoid stockpiling material near waterways. Material should be located away from the top of banks so that there is no restriction to the flow conveyance area. 	Pipeline Works	Construction
MM-SW11	Facilities design Permanent surface structures, including the facilities at Pakenham and Crib Point should be designed to maintain existing overland flow paths and not result in increased flood levels upstream of the sites.	Gas Import Jetty Works and Pipeline Works	Design
MM-SW12	Water Sensitive Urban Design treatments WSUD treatments should be incorporated into the site design for the Crib Point Receiving Facility and the Pakenham Delivery Facility to capture surface runoff and reduce pollutants in accordance with the <i>Best Practice Environmental Management Guidelines</i> (CSIRO 1999).	Gas Import Jetty Works and Pipeline Works	Design

9.0 Conclusion

A surface water impact assessment has been undertaken to determine the potential impacts of the Project on surface water movement and quality (including waterways and wetlands) and to identify recommended mitigation measures where appropriate to reduce potential risks of the Project. This report does not assess potential direct impacts of the FSRU and Jetty Infrastructure on marine waters in Western Port. Potential impacts to the marine environment are assessed in the EES Technical Report A: *Marine biodiversity impact assessment*.

Surface water considerations are important in assessment of potential impacts of the Project given that the Pipeline Works traverse waterways which drain into Western Port. It was identified that runoff from disturbed areas containing sediment is a key risk which could impact nearby waterways and the Western Port Ramsar site.

The study concluded that the construction phase of the Pipeline Works is likely to have the greatest potential to impact the surrounding surface water environment. In relation to the Pipeline Works, trenching, stockpiling of material, creation of disturbed areas and trenching across waterways all increase the potential for sediment to discharge to nearby waterways and ultimately deposit in the Western Port Ramsar site. Dewatering of the trench following rain events may also result in turbid water entering waterways. The construction methodology also requires long lengths of spoil material to be temporarily placed along the excavated trench while the trench and pipeline are being prepared. In some locations, significant lengths of stockpiled material would be placed within existing floodplains which creates the potential to increase flood water levels and impact neighbouring properties. This is most pronounced in the Koo Wee Rup Flood Protection District.

Spills of hazardous materials from construction practices were also identified as having the potential to impact nearby waterways.

APA has conducted a thorough assessment of the pipeline alignment and all waterway crossings and has adopted waterway crossing construction methods to suit each crossing. In particular, HDD has been adopted as the construction method for waterways where there was the risk for sediment to enter the waterways and drain into Western Port. Measures to further manage sediment based on the International Erosion Control Association described in the mitigation measures should be incorporated into the Pipeline Works CEMP. The study has concluded that it is unlikely that Project construction activities, with appropriate mitigation measures in place, would cause potentially unacceptable environmental impacts on surface water.

The study also found that the potential for impacts on surface water is minimal during the operational phase of the Project. The pipeline would be fully underground and there would be no permanent change to existing topography which could redirect flows or increase flood levels. There would also be no obstruction of existing waterways or changes to flow conveyance. The Pakenham Delivery Facility is not located within an existing floodplain and an assessment of existing topography indicates local surface flows as a result of stormwater can be managed with standard building design. The Crib Point Receiving Facility is subject to some coastal inundation on the eastern boundary and the design of this site would be required to prevent increases in flood levels on neighbouring properties.

The study has concluded that the Project is consistent with the draft evaluation objectives relevant to surface water with appropriate mitigation measures in place.

10.0 References

- AEMO, 2019. Gas Statement of Opportunities: For eastern and south-eastern Australia, March 2019.
- Alluvium, 2018. AGL Gas Pipeline – Crib Point to Pakenham – Waterway Crossing Assessment.
- Australian Pipelines and Gas Association, 2017. Code of Environmental Practice. (Onshore Pipelines) Revision 4.
- Collier, C.J., Waycott, M. and McKenzie, L.J., 2012. Light thresholds derived from seagrass loss in the coastal zone of the northern Great Barrier Reef, Australia, *Ecological Indicators* 23, 211–219.
- Department of Environment and Primary Industries, 2013. Western Port Ramsar Site Boundary Description.
- Department of Environment, Land, Water and Planning, 2017. Western Port Ramsar Site Management Plan. Department of Environment, Land, Water and Planning, East Melbourne.
- EPA Victoria, 2011. Western Port Condition Report. EPA Victoria, Melbourne, Australia.
- EPA Victoria, 1996. Best Practice Environmental Management: Environmental Guidelines for Major Construction Sites. EPA Publication 480.
- EPA Victoria, 1991. *Construction Techniques for Sediment Pollution Control* (EPA Publication 275).
- Hale, J., 2016. Ecological Character Description Addendum - Western Port Ramsar Site. Department of Environment, Land, Water and Planning. East Melbourne.
- Holland, D., Cook, P., Mac Nally, R., Thomson, J., Womersley, B., Ball, D., Longmore, A., Keough, M.J., Lee, R., Martinez, G., and Greer, D. 2013. Preliminary assessment of water quality requirements of seagrasses in Western Port. Water Studies Centre, Monash University, Clayton, Victoria.
- IPCC, 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, M. Nicolai, A. Okem, J. Petzold, B. Rama, N. Weyer (eds.)]. In press.
- Kellogg Brown & Root, 2010. Western Port Ramsar Wetland Ecological Character Description. Report for Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- Melbourne Water, 2018. Understanding the Western Port Environment: a summary of research findings from the Western Port Environment Research Program 2011-2017 and priorities for future research. Coleman R, Bathgate R and Keough MJK (eds). Melbourne Water, Victoria.
- Melbourne Water, 2007. Guidelines for Development in Flood-prone Areas, Melbourne Water Corporation, 2007.
- Victorian Government, 2018. Western Port Catchment: Report Card for July 2016 – June 2017 <https://yarraandbay.vic.gov.au/report-card/report-card-2017/western-port-and-catchment/western-port-catchment#top_of_report> accessed February 2019.

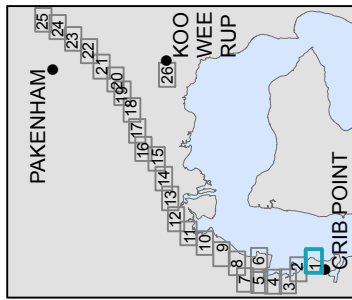
Appendix A

Pipeline Alignment

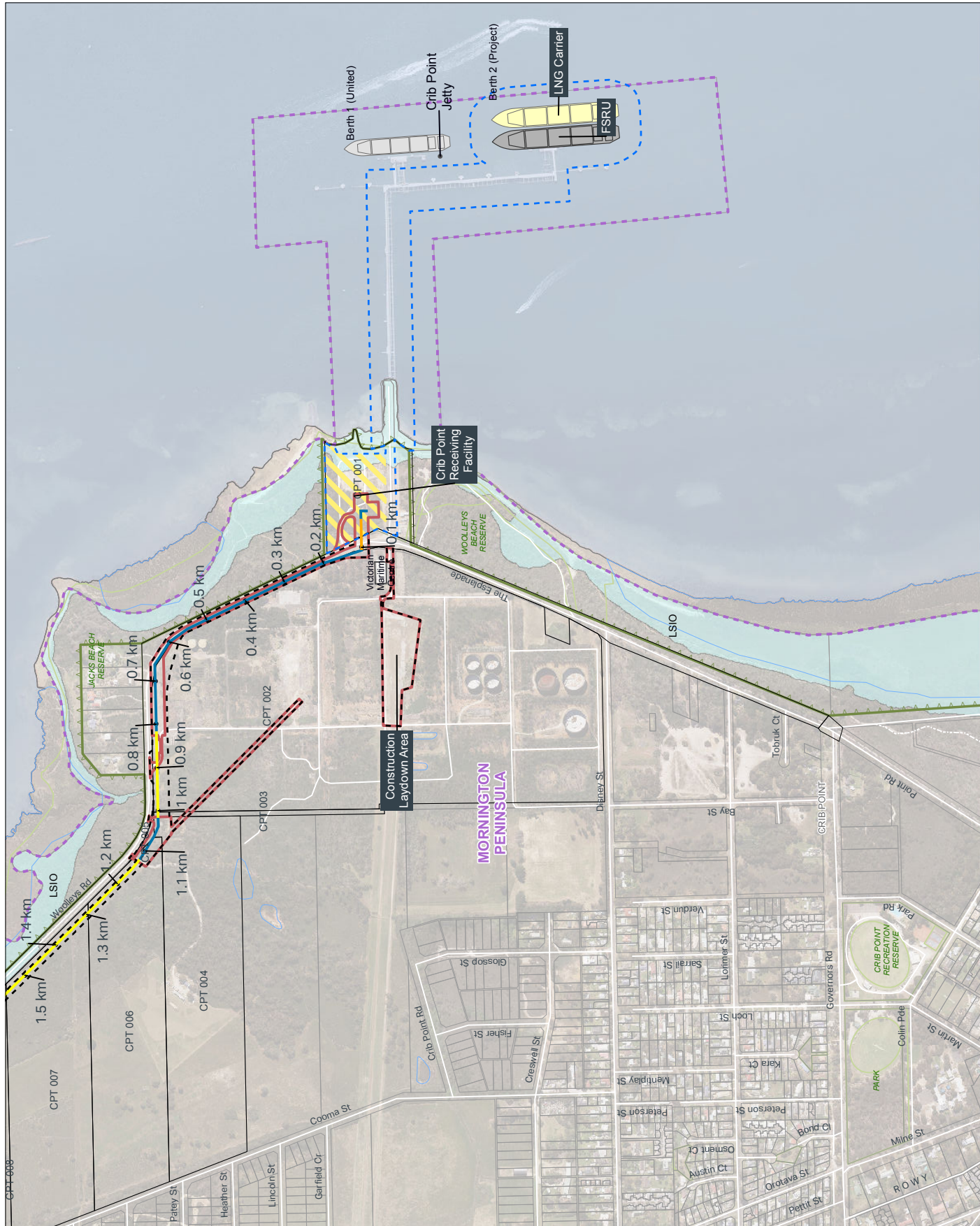


Gas Import Jetty and Pipeline Project

Mapsheet 1 (of 26)



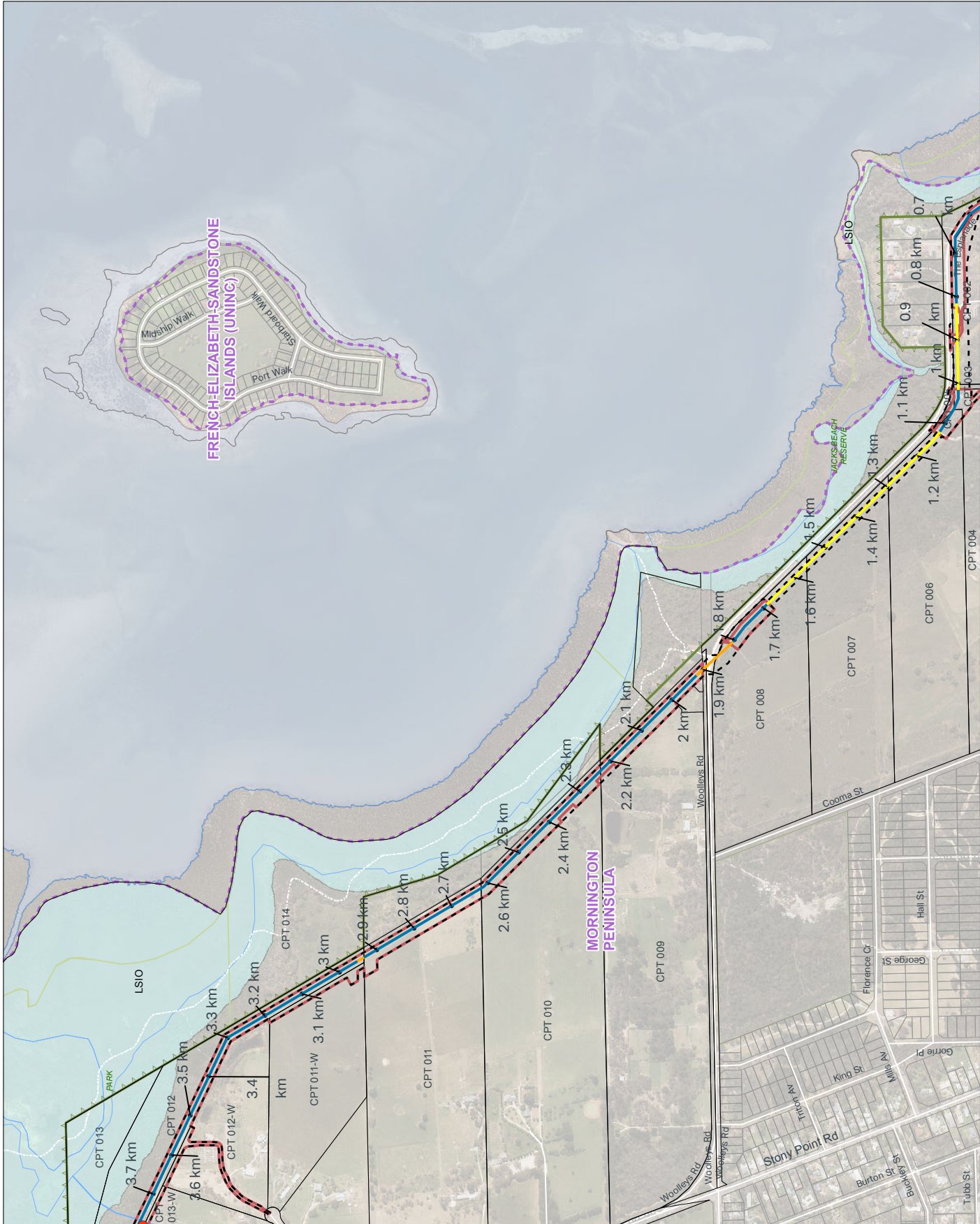
- Pipeline Works Area
 - Kilometre point
 - Gas Import Jetty Works area
 - Open - Cut
 - Trenchless: Bore
 - Trenchless: HDD
 - Construction Footprint
 - Crib Point Receiving Facility
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - CPT
 - Waterbody
- ## Planning Overlays - Flood
- Land Subject to Inundation Overlay



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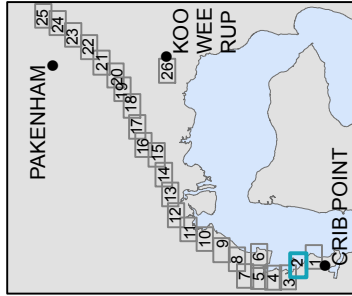
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Gas Import Jetty and Pipeline Project

Pipeline Project

Mapsheet 2 (of 26)



- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, Bore
 - Trenchless, HDD
 - Construction Footprint
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - CPT
 - Watercourse
 - Waterbody
- ### Planning Overlays - Flood
- Land Subject to Inundation Overlay

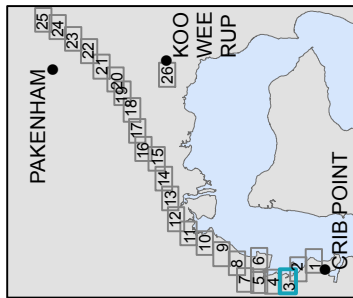


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Gas Import Jetty and Pipeline Project

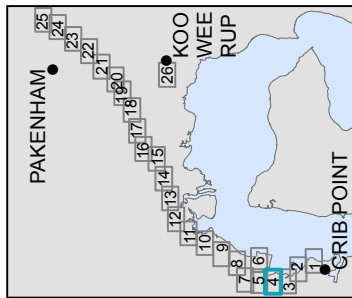
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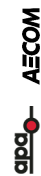
- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, Bore
 - Trenchless, HDD
 - Construction Footprint
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - Rail
 - Watercourse
 - Waterbody
- ## Planning Overlays - Flood
- Land Subject to Inundation Overlay

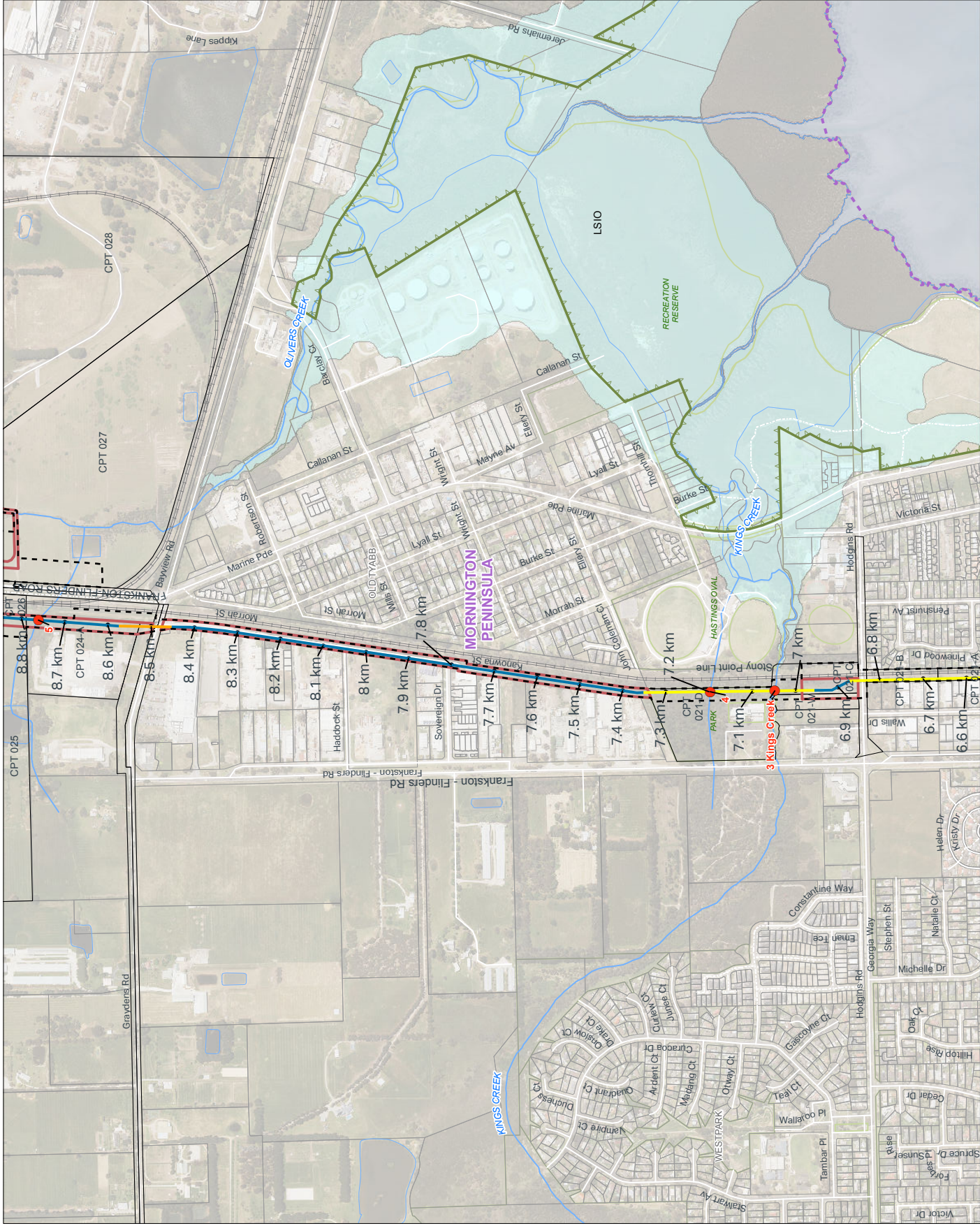


Mapsheet 4 (of 26)



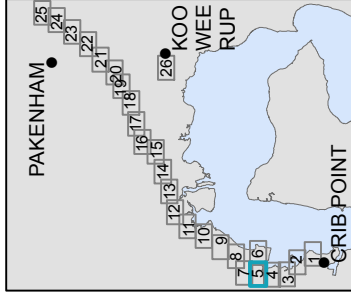
-
- Planning Overlays - Flood**
- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, HDD
 - Construction Footprint
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - Rail
 - Watercourse
 - Waterbody
 - Land Subject to Inundation Overlay





Gas Import Jetty and Pipeline Project

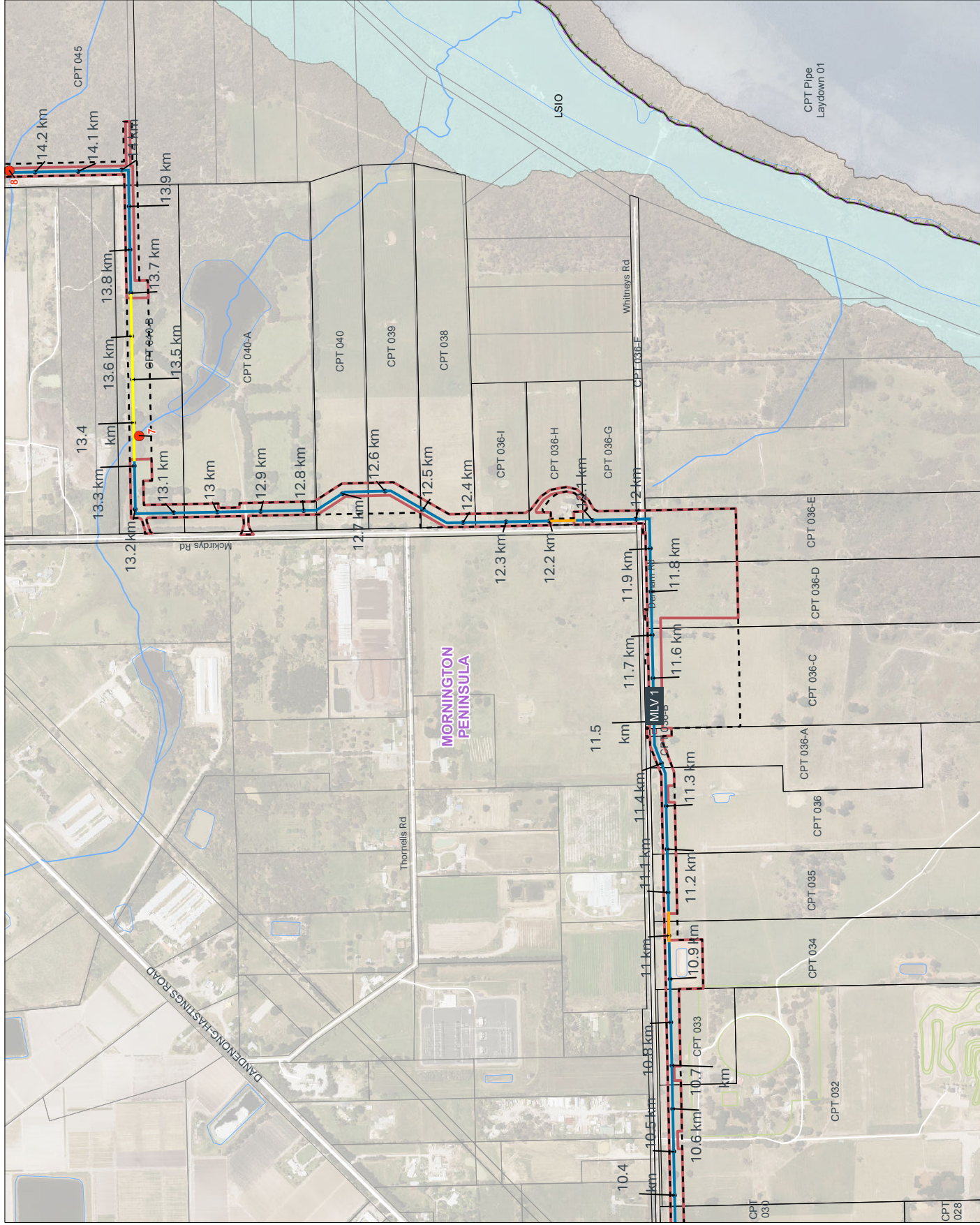
Mapsheet 5 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, Bore
- Trenchless, HDD
- Construction Footprint
- Local Government Area
- Western Port Ramsar site boundary
- Affected landholdings
- Rail
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Land Subject to Inundation Overlay



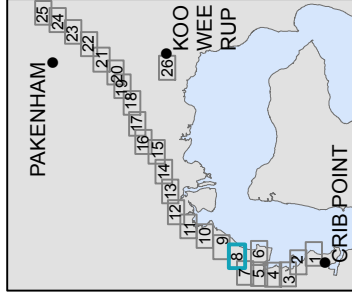
Source: Vicmap 2019 (a), Imagery - Naamap 2019 (c)



Gas Import Jetty and Pipeline Project

Pipeline Project

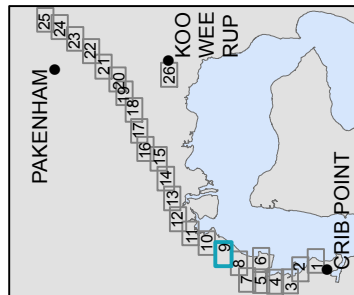
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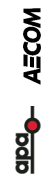
- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, Bore
 - Trenchless, HDD
 - Construction Footprint
 - MLV 1
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - Watercourse
 - Waterbody
- ### Planning Overlays - Flood
- Land Subject to Inundation Overlay



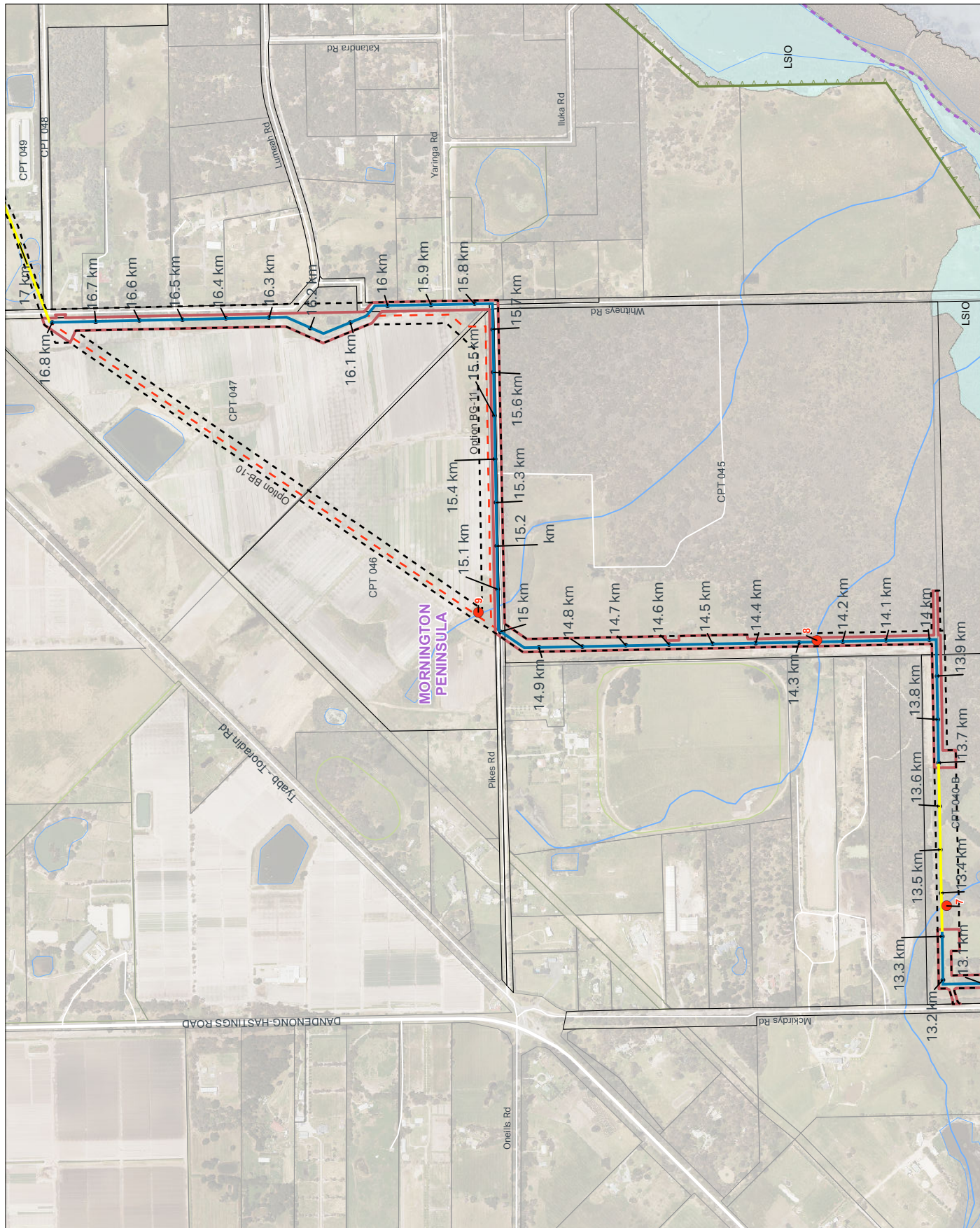
Mapsheet 9 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, HDD
- Alignment Options
- Construction Footprint
- Local Government Area
- Western Port Ramsar site boundary
- Affected landholdings
- Watercourse
- Waterbody



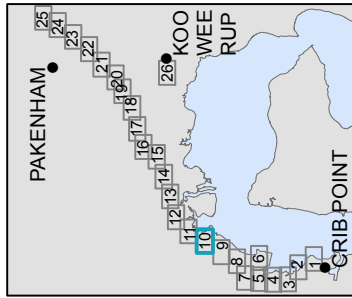
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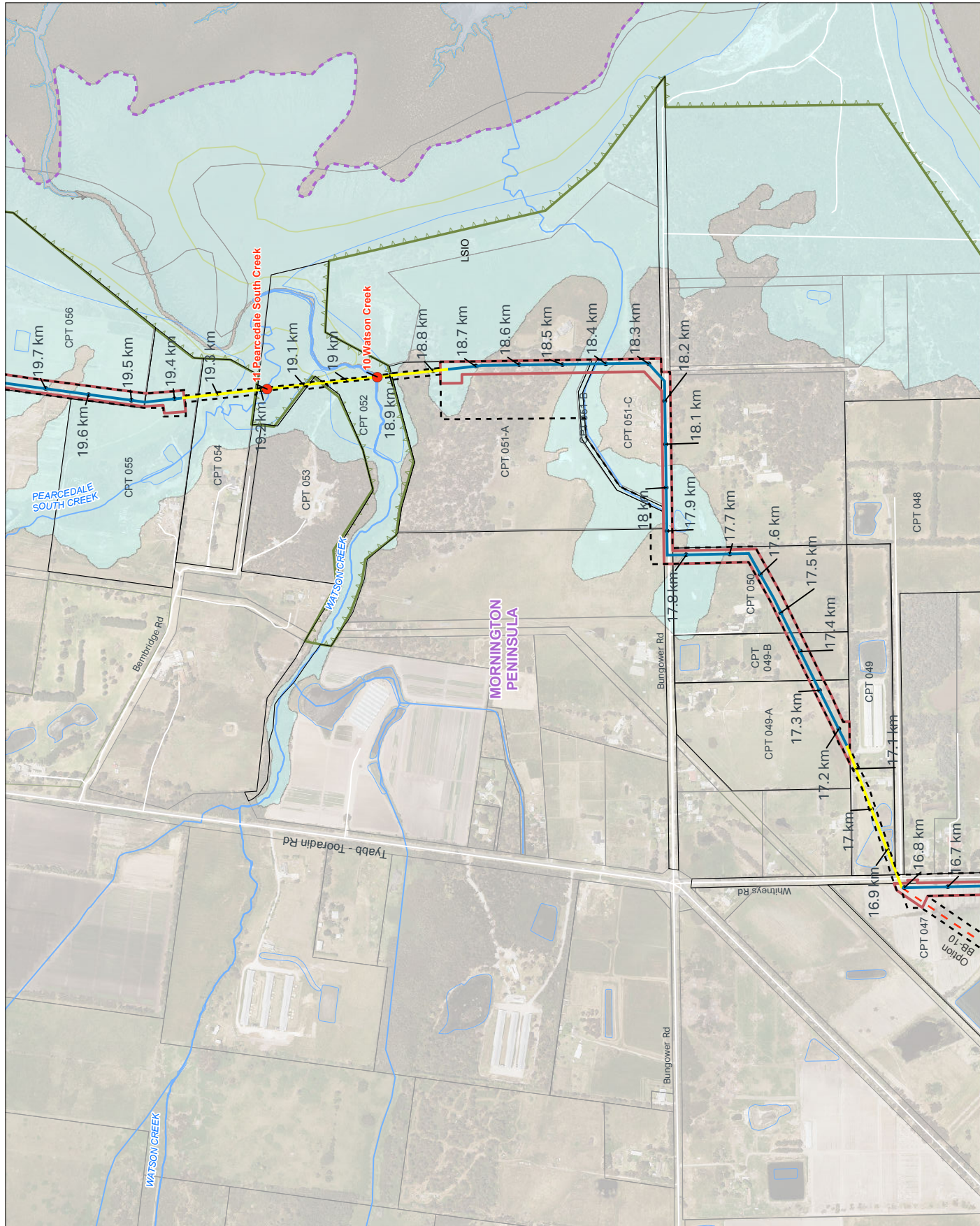


Gas Import Jetty and Pipeline Project

Mapsheet 10 (of 26)



- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, HDD
 - Alignment Options
 - Construction Footprint
 - Local Government Area
 - Western Port Ramsar site boundary
 - Affected landholdings
 - CPT
 - Watercourse
 - Waterbody
- ## Planning Overlays - Flood
- Land Subject to Inundation Overlay

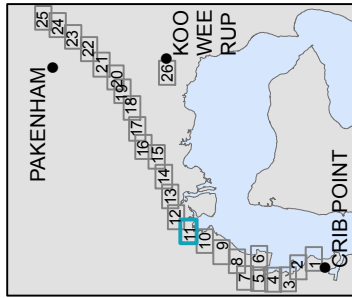


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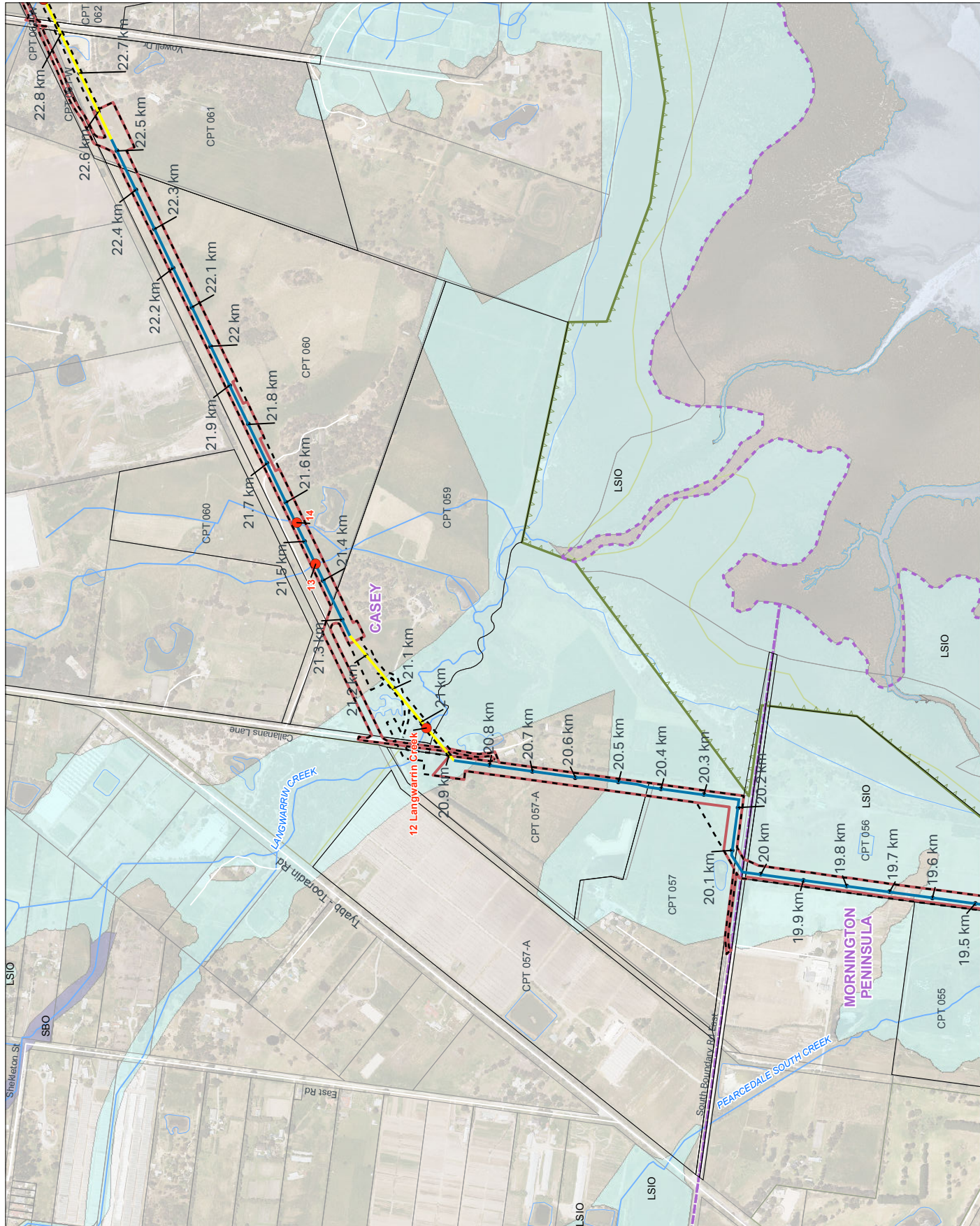


Gas Import Jetty and Pipeline Project

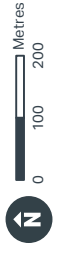
Mapsheet 11 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless - HDD
- Construction Footprint
- Local Government Area
- Western Port Ramsar site boundary
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Land Subject to Inundation Overlay
- Special Building Overlay

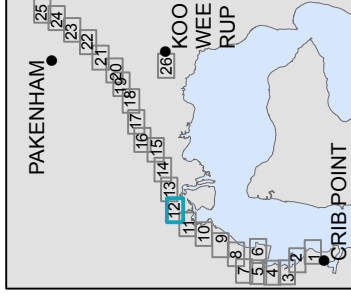


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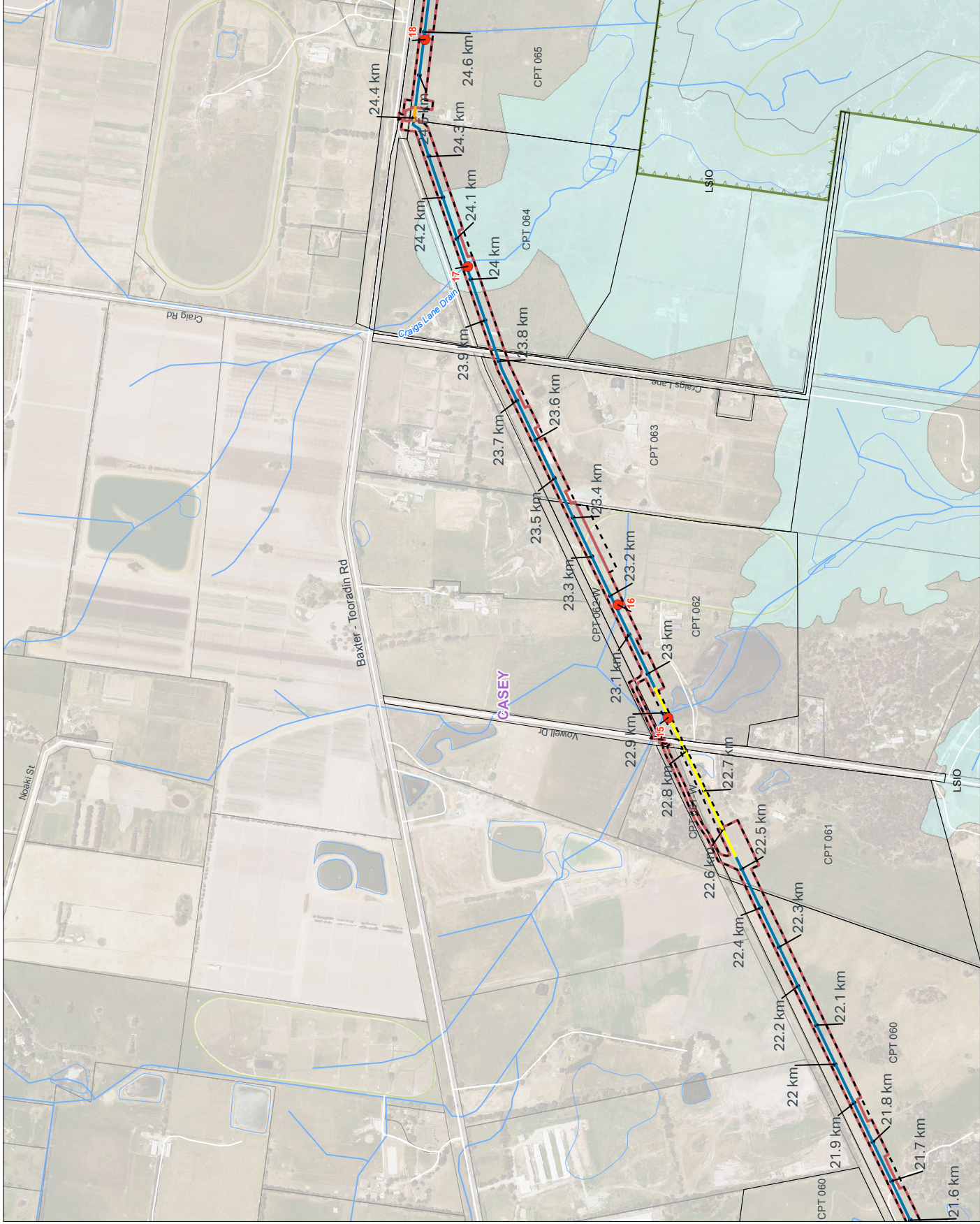


Gas Import Jetty and Pipeline Project

Mapsheet 12 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, Bore
- Trenchless, HDD
- Construction Footprint
- Local Government Area
- Western Port Ramsar site boundary
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Land Subject to Inundation Overlay



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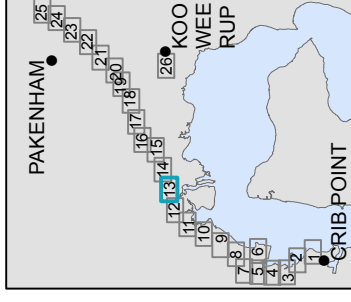


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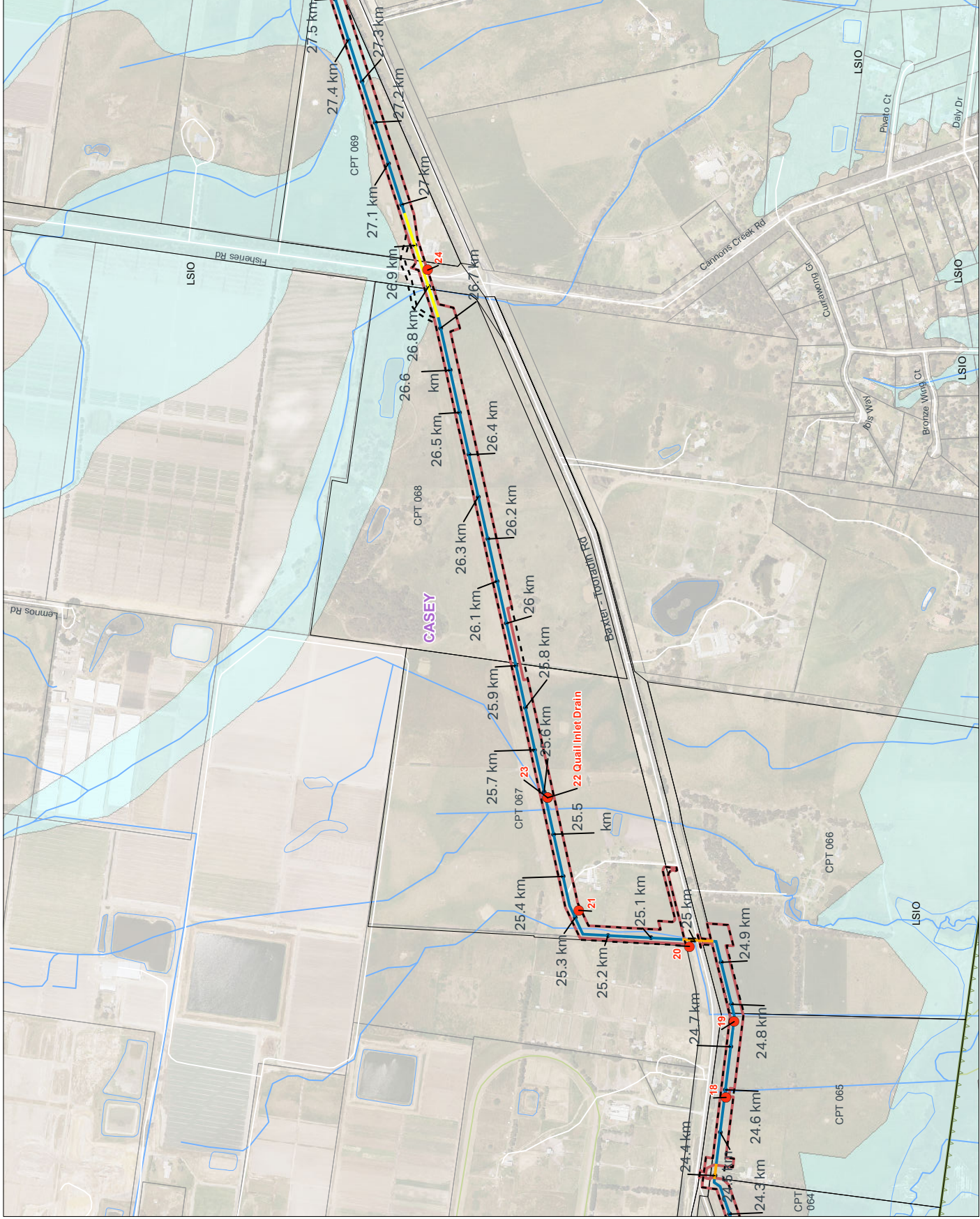
Gas Import Jetty and Pipeline Project

Mapsheet 13 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, Bore
- Trenchless, HDD
- Construction Footprint
- Local Government Area
- Western Port Ramsar site boundary
- Affected landholdings
- CPT
- Watercourse
- Waterbody
- Land Subject to Inundation Overlay

Planning Overlays - Flood

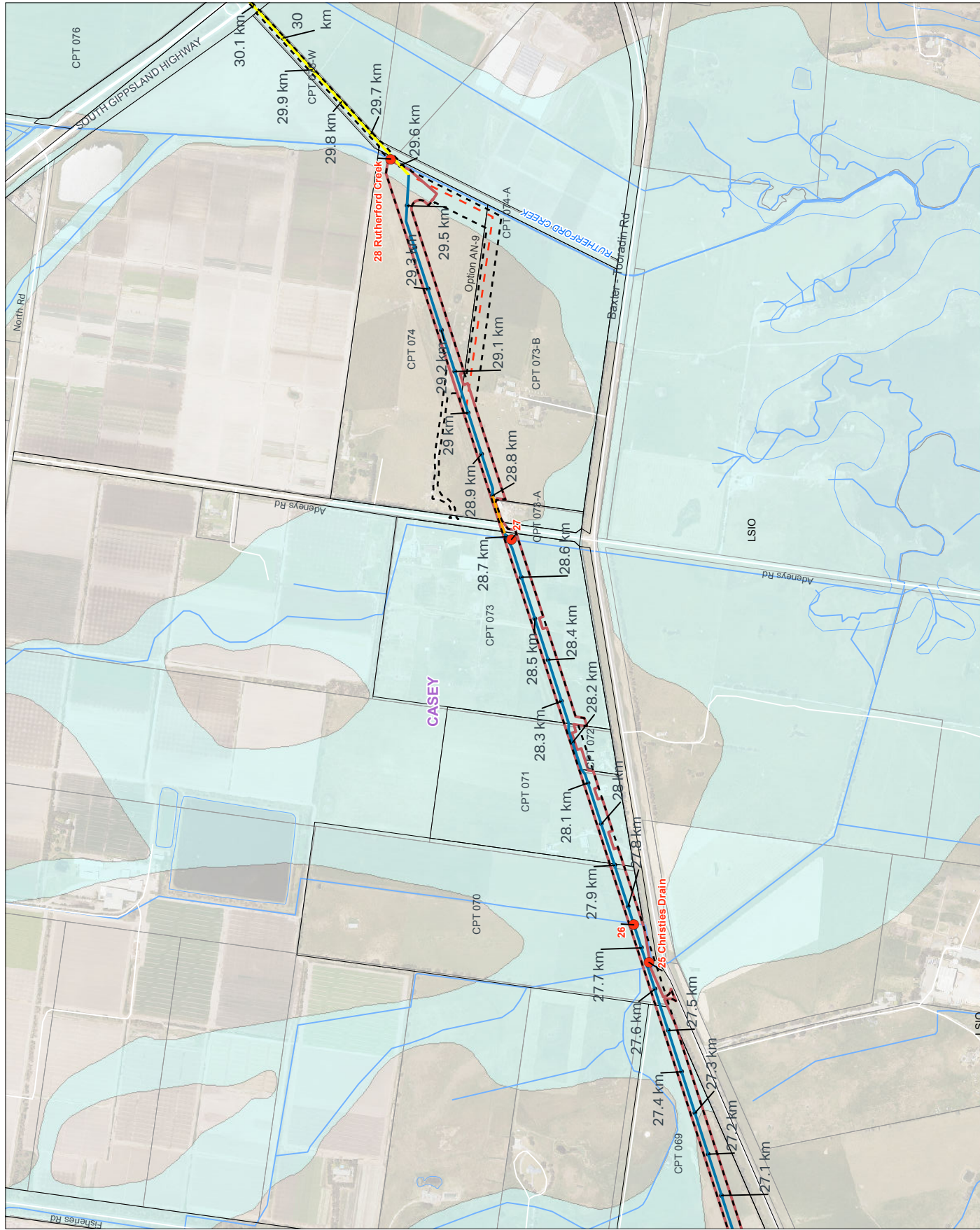
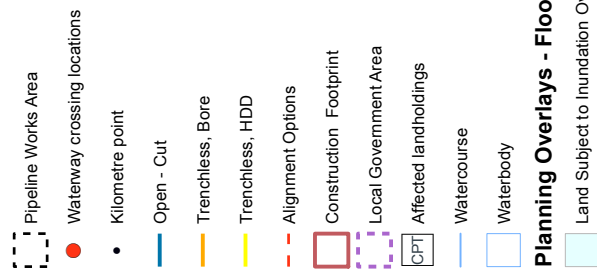
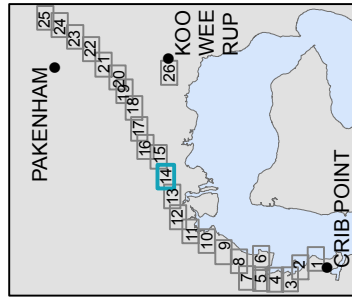


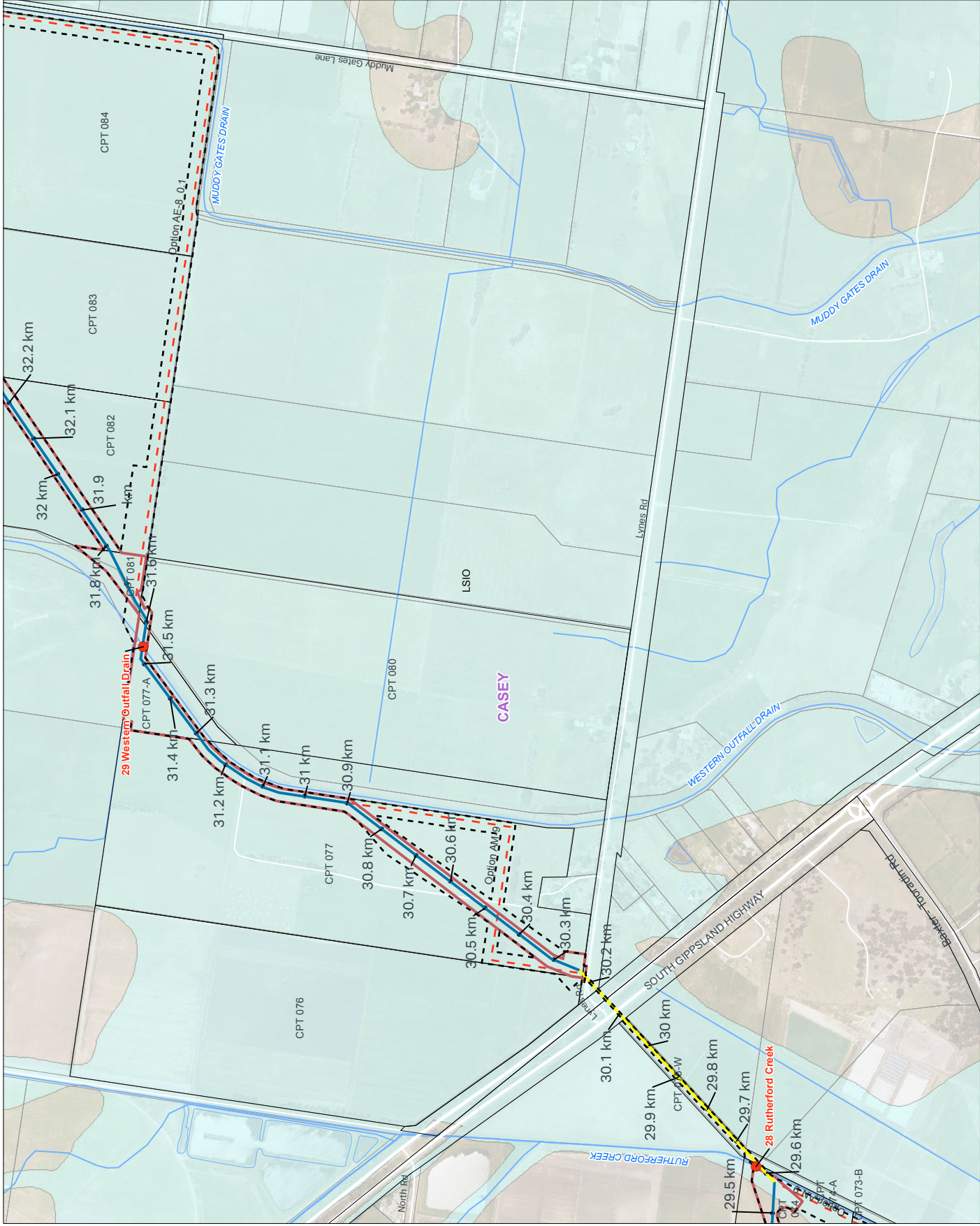
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Gas Import Jetty and Pipeline Project

Mapsheet 14 (of 26)



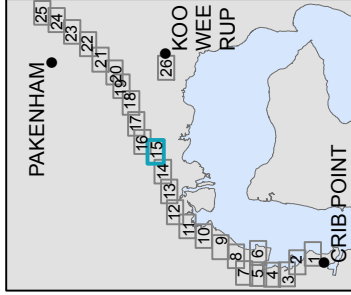


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Gas Import Jetty and Pipeline Project

Mapsheet 15 (of 26)



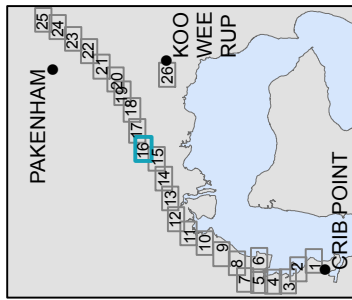
- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless - HDD
 - Alignment Options
 - Construction Footprint
 - Local Government Area
 - Affected landholdings
 - CPT
 - Watercourse
 - Waterbody
- ### Planning Overlays - Flood
- Land Subject to Inundation Overlay



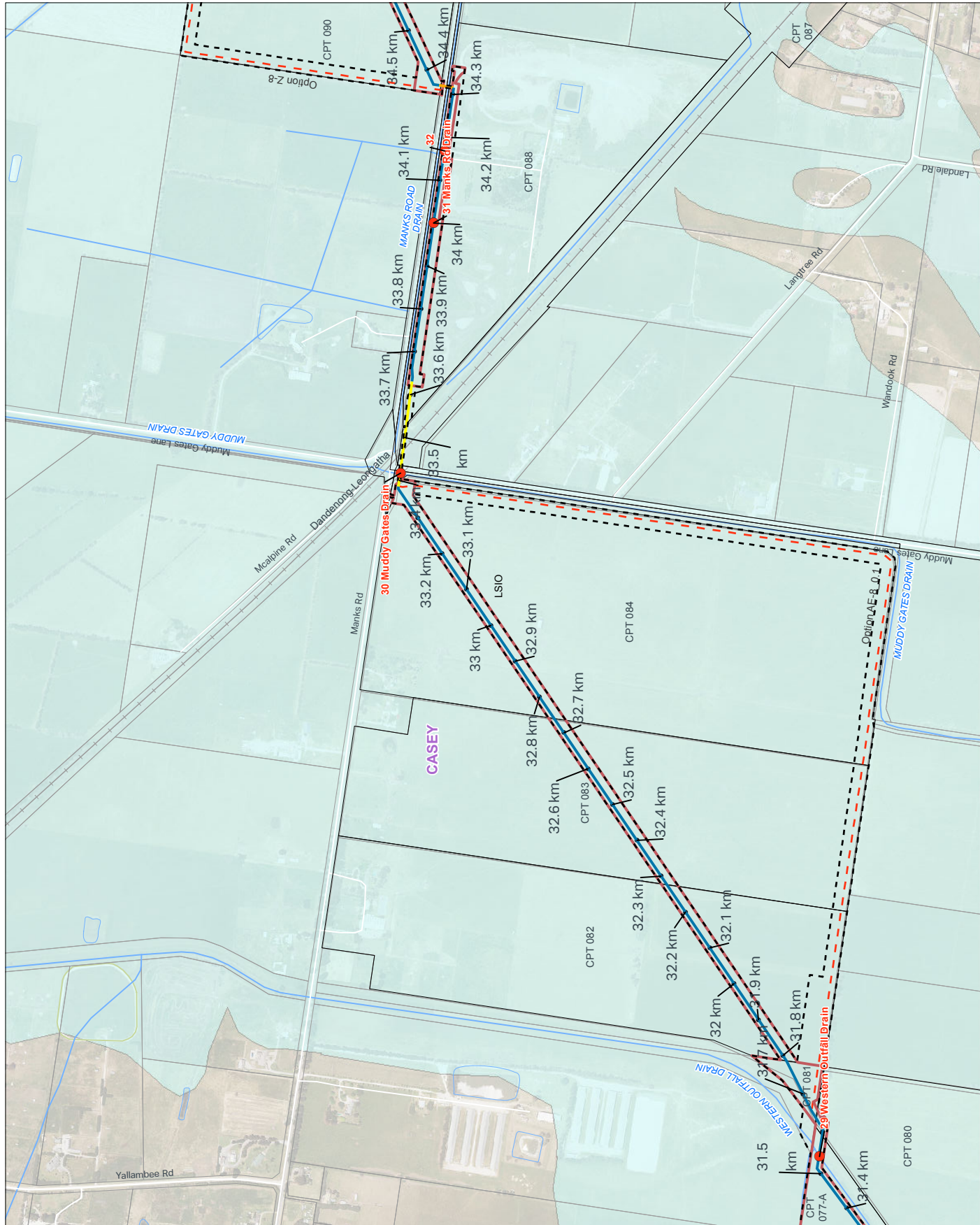


Gas Import Jetty and Pipeline Project

Mapsheet 16 (of 26)



- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, Bore
 - Trenchless, HDD
 - Alignment Options
 - Construction Footprint
 - Local Government Area
 - Affected landholdings
 - CPT
 - Rail disused/ dismantled/ rail trail
 - Watercourse
 - Waterbody
- ## Planning Overlays - Flood
- Land Subject to Inundation Overlay



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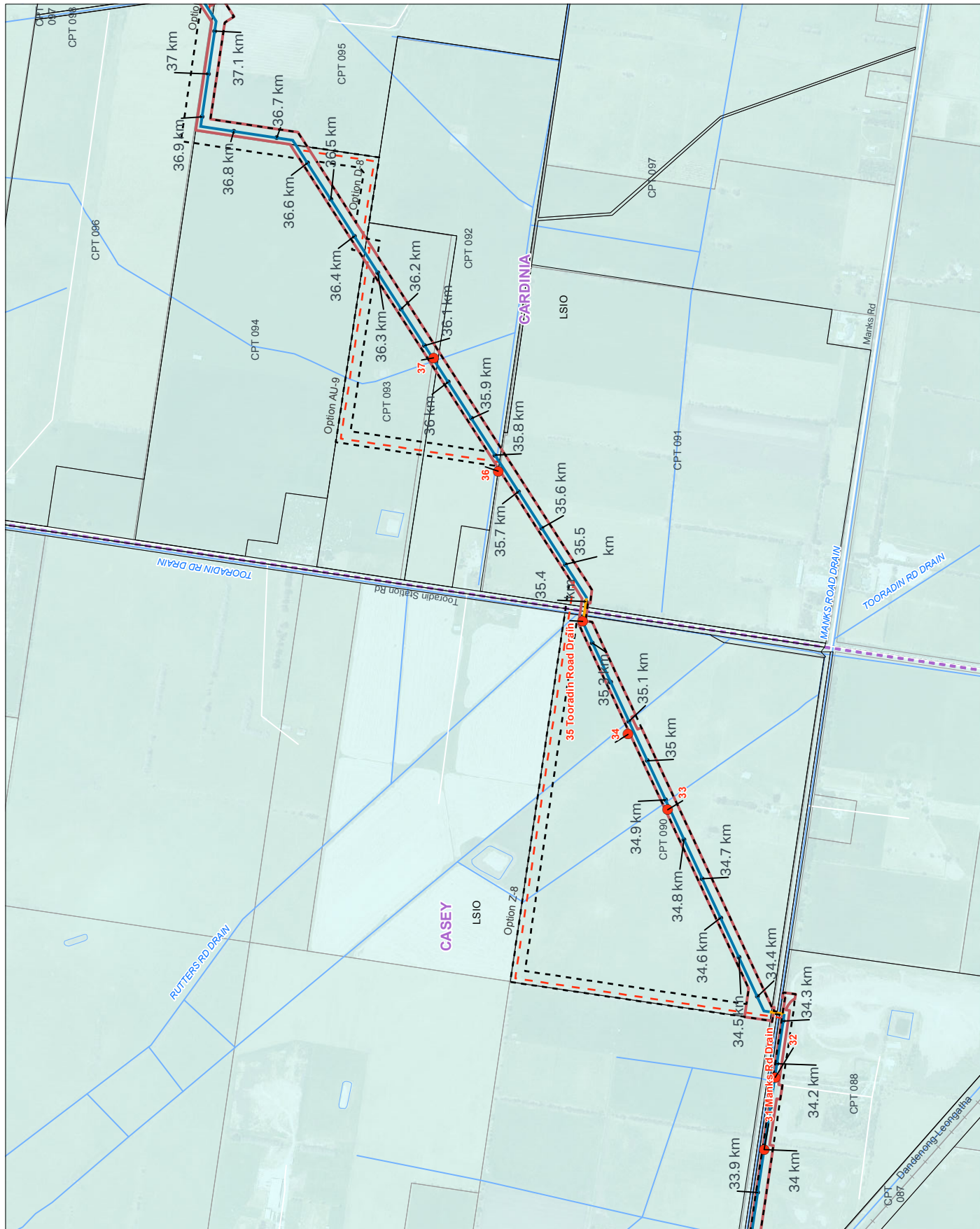
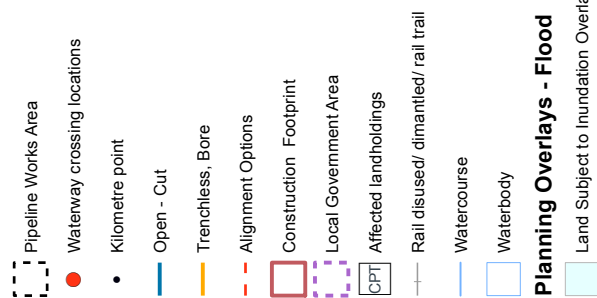
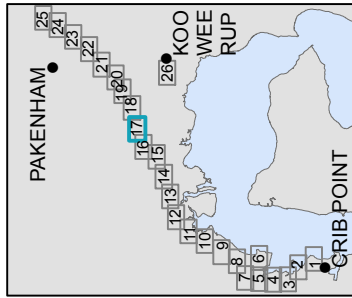


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Gas Import Jetty and Pipeline Project

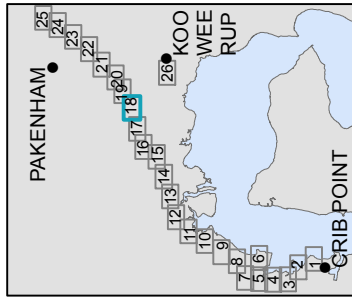
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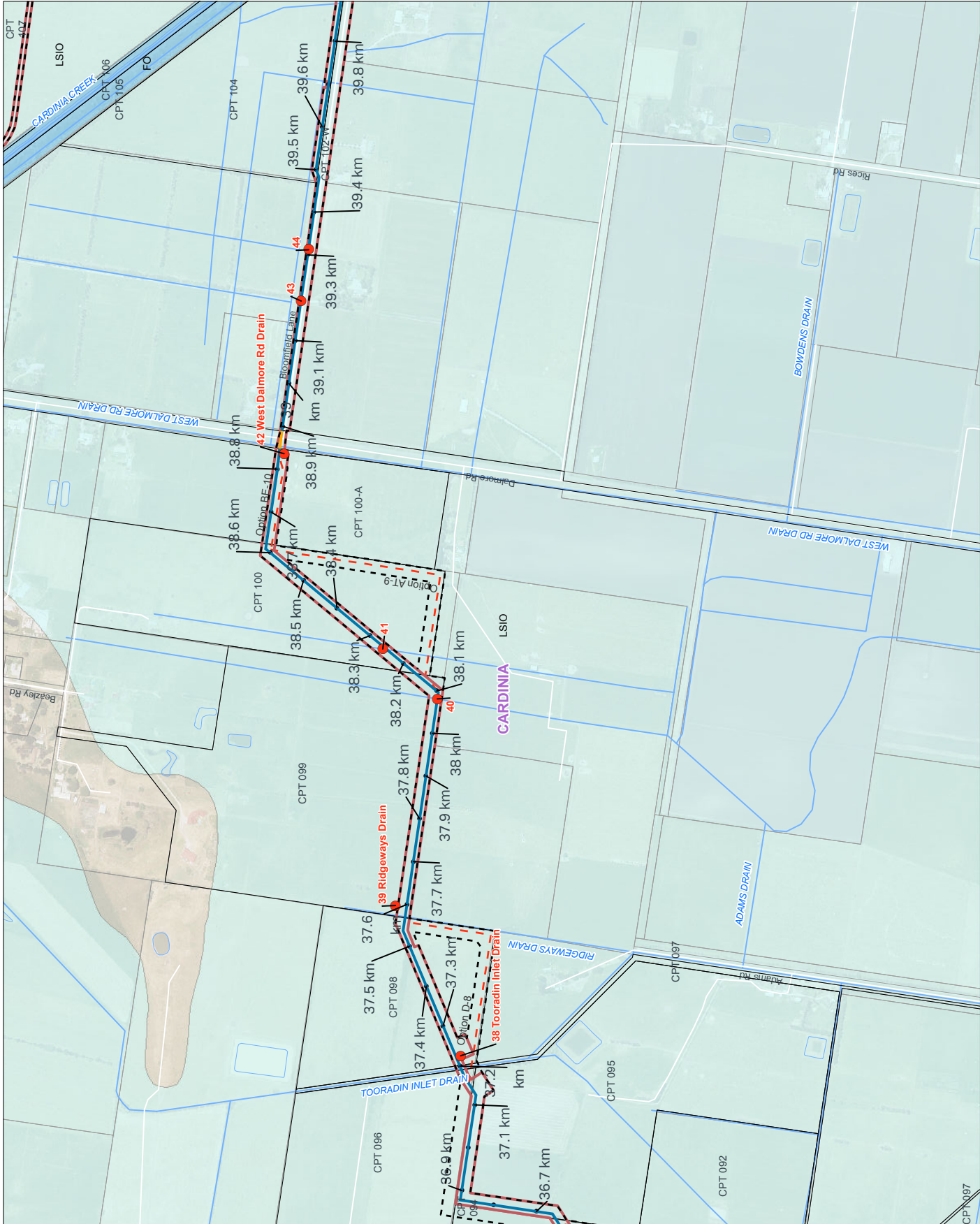


Gas Import Jetty and Pipeline Project

Mapsheet 18 (of 26)



- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless Bore
 - Alignment Options
 - Construction Footprint
 - Local Government Area
 - Affected landholdings
 - Watercourse
 - Waterbody
- ### Planning Overlays - Flood
- Flood Overlay
 - Land Subject to Inundation Overlay

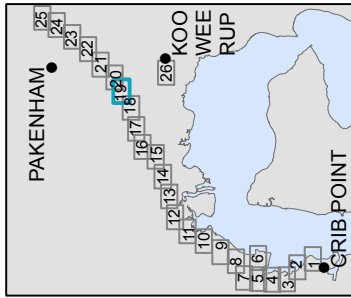


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Gas Import Jetty and Pipeline Project

Mapsheet 19 (of 26)



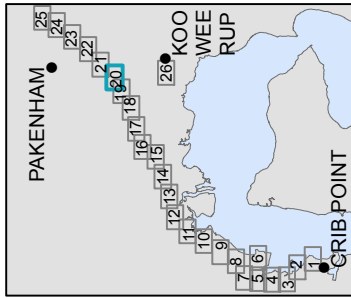
- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless - HDD
- Alignment Options
- Construction Footprint
- MLV 2
- MLV 2 - Land area
- Local Government Area
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Flood Overlay
- Land Subject to Inundation Overlay





Gas Import Jetty and Pipeline Project

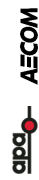
Mapsheet 20 (of 26)



- Pipeline Works Area
 - Waterway crossing locations
 - Kilometre point
 - Open - Cut
 - Trenchless, Bore
 - Trenchless, HDD
 - Alignment Options
 - Construction Footprint
 - Local Government Area
 - Affected landholdings
 - CPT
 - Watercourse
 - Waterbody
- ## Planning Overlays - Flood
- Flood Overlay
 - Land Subject to Inundation Overlay



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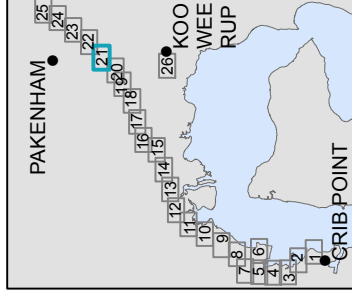


Source: Vicmap 2019 (s. Imagery - Neumap 2019 (c).



Gas Import Jetty and Pipeline Project

Mapsheet 21 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, Bore
- Trenchless, HDD
- Construction Footprint
- Local Government Area
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Flood Overlay
- Land Subject to Inundation Overlay



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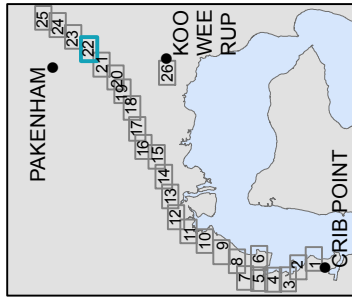


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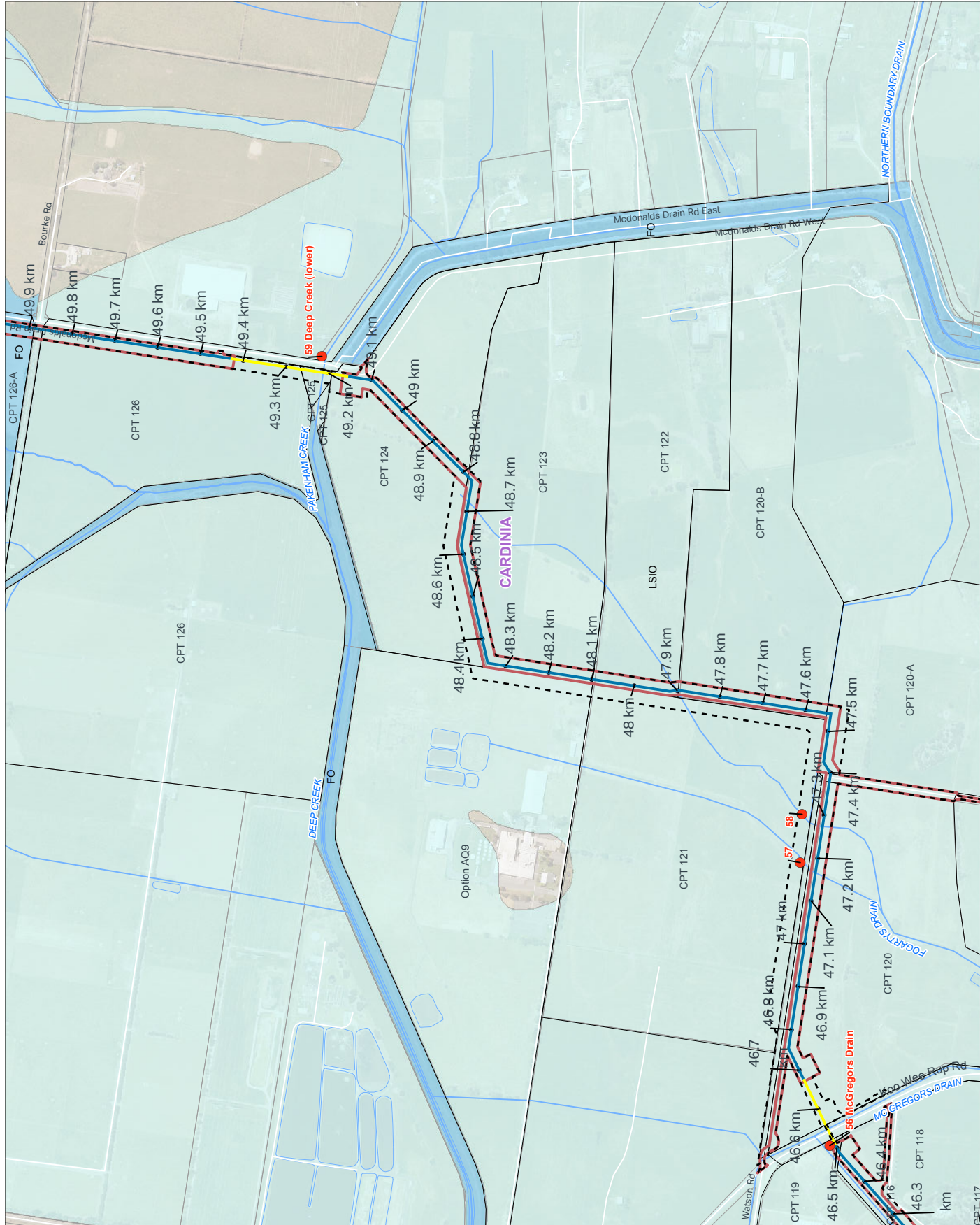


Gas Import Jetty and Pipeline Project

Mapsheet 22 (of 26)



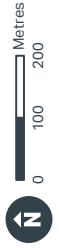
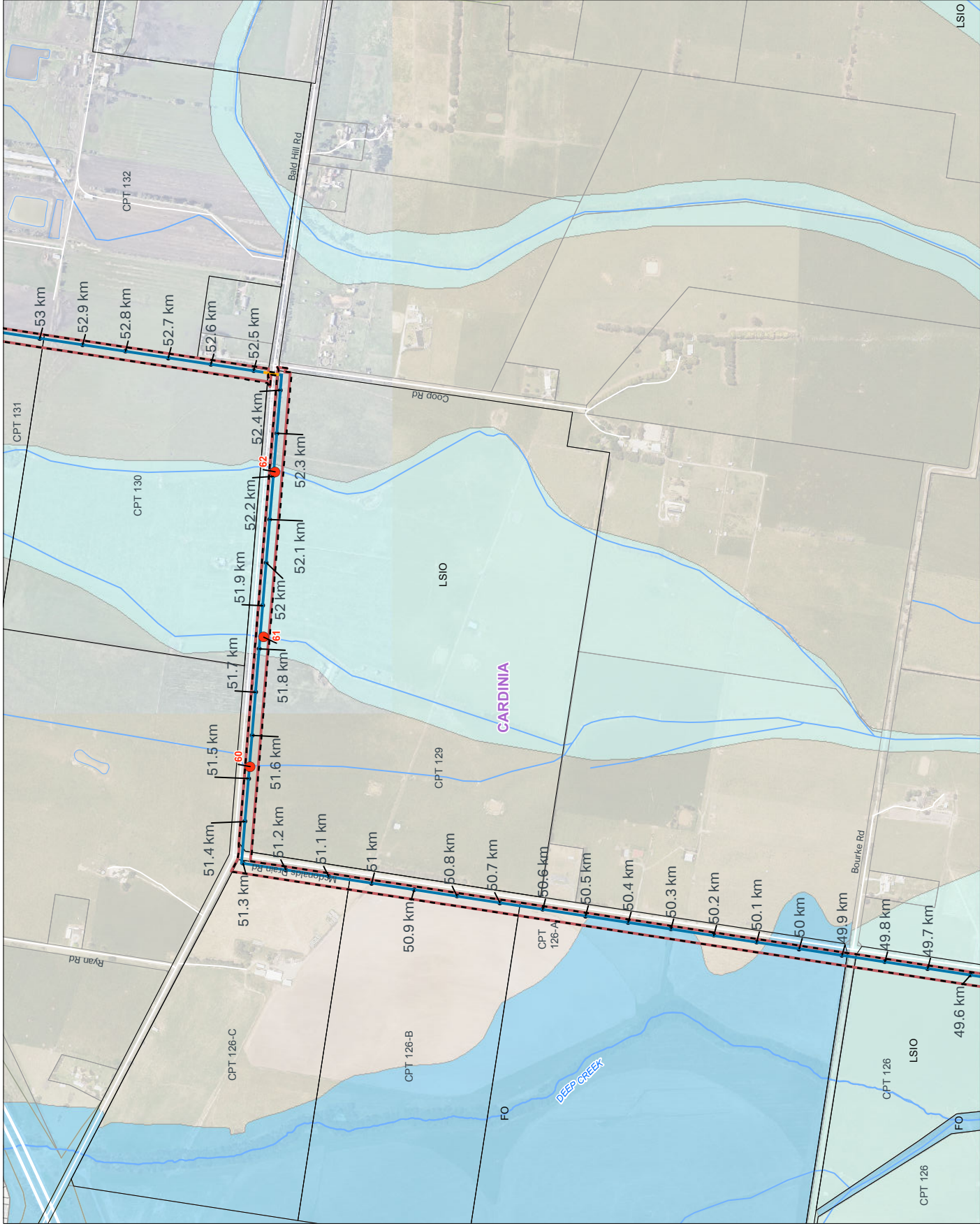
- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, HDD
- Construction Footprint
- Local Government Area
- Affected landholdings
- CPT
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Flood Overlay
- Land Subject to Inundation Overlay



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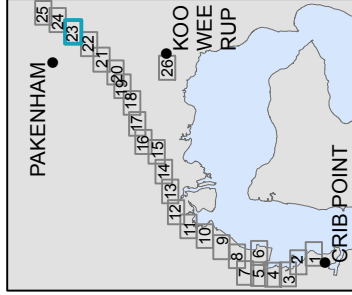


Source: Vicmap 2019 (g Imagery - Neumap 2019 (c)



Gas Import Jetty and Pipeline Project

Mapsheet 23 (of 26)



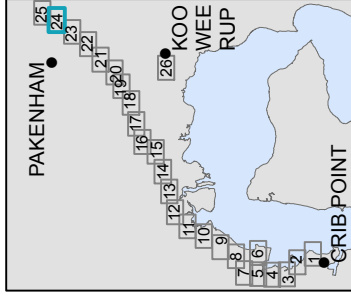
- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless, Bore
- Construction Footprint
- Local Government Area
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Flood Overlay
- Land Subject to Inundation Overlay



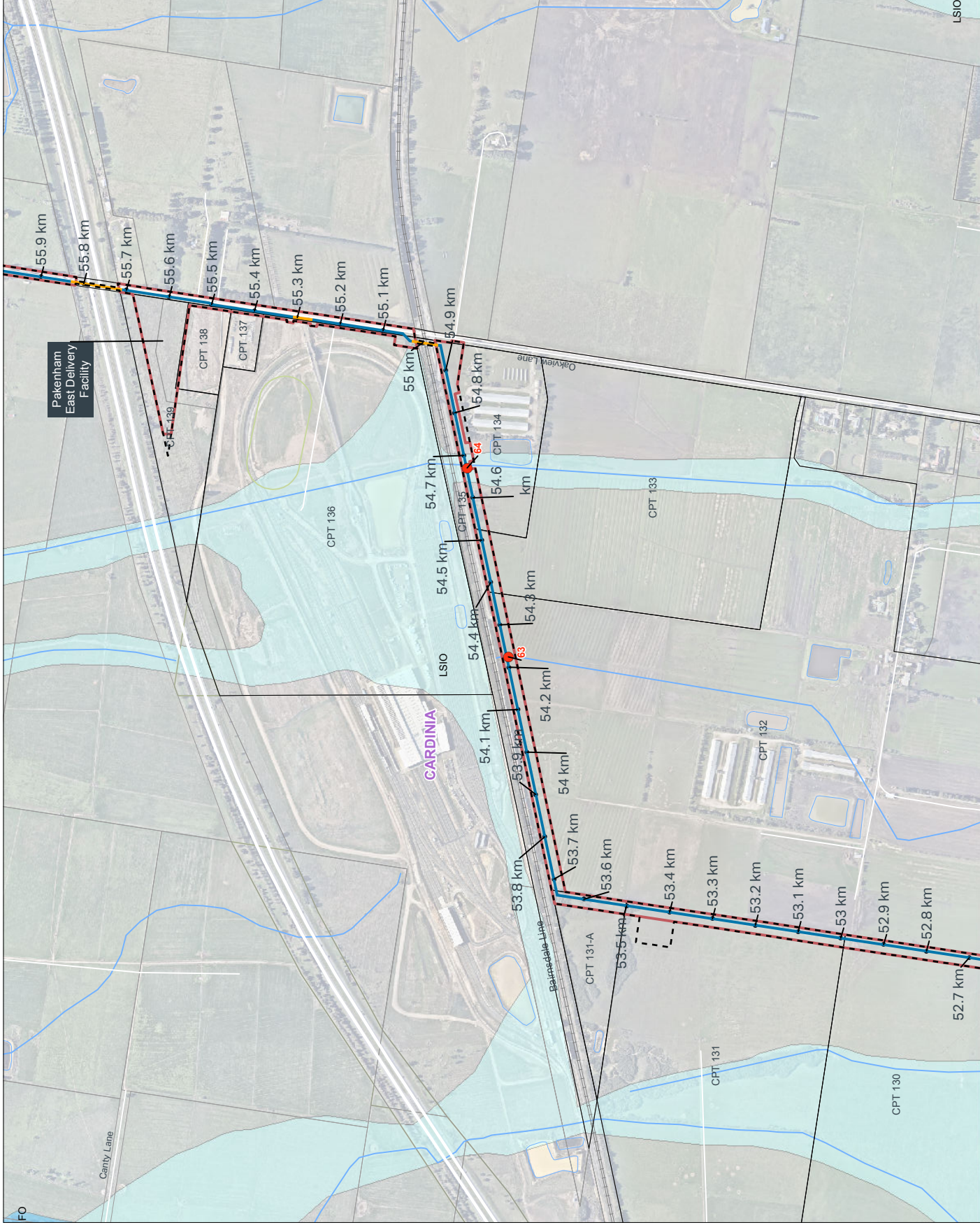


Gas Import Jetty and Pipeline Project

Mapsheet 24 (of 26)



- Pipeline Works Area
- Waterway crossing locations
- Kilometre point
- Open - Cut
- Trenchless Bore
- Construction Footprint
- Local Government Area
- Affected landholdings
- Rail
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Flood Overlay
- Land Subject to Inundation Overlay

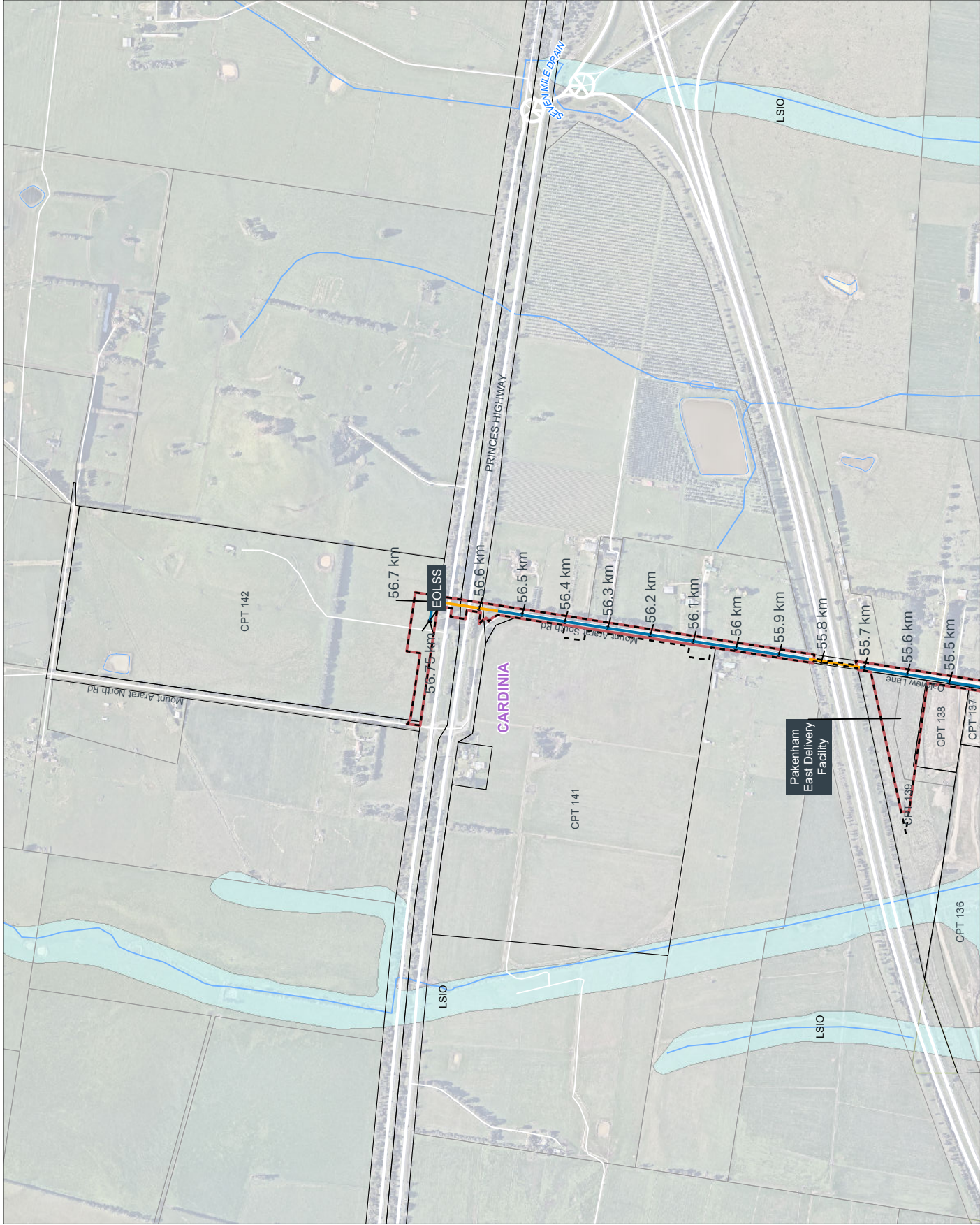


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Mapsheet 24 (of 26) Pakenham Gas Import Jetty and Pipeline Project - Final Design - 2019-01-24

Source: Vicmap 2019 (s Imagery - Newmap 2019 (c)

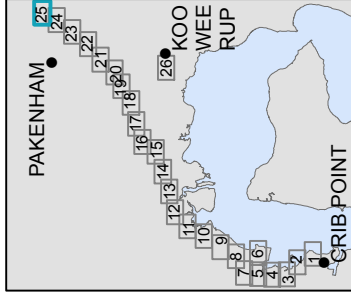


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Gas Import Jetty and Pipeline Project

Mapsheet 25 (of 26)



- Pipeline Works Area
- Kilometre point
- Open - Cut
- Trenchless Bore
- Construction Footprint
- Local Government Area
- Affected landholdings
- Watercourse
- Waterbody
- Planning Overlays - Flood
- Land Subject to Inundation Overlay

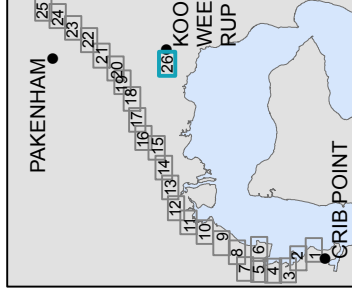


Source: Vicmap 2019 (s Imagery - Neumap 2019 (c)



Gas Import Jetty and Pipeline Project

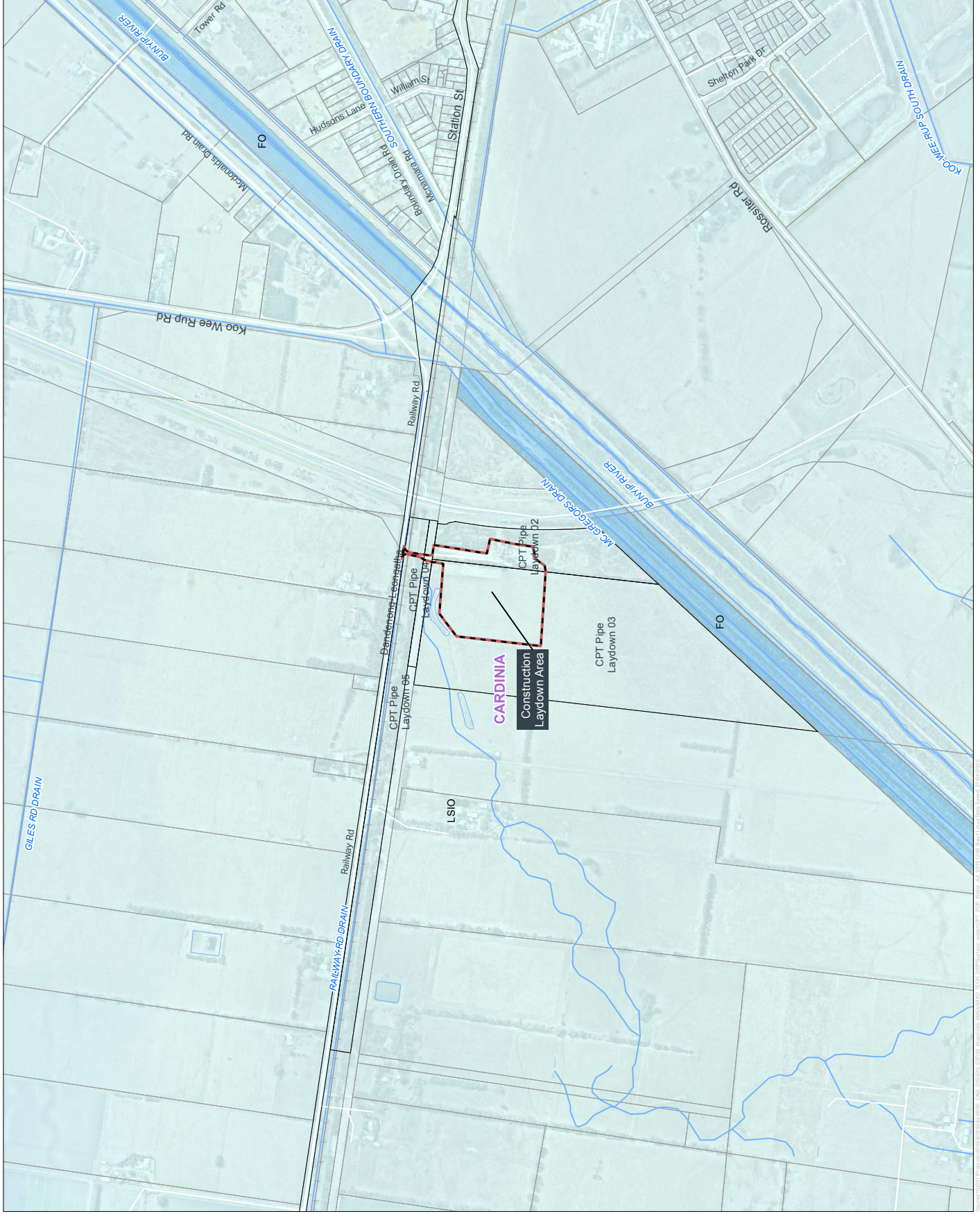
Mapsheet 26 (of 26)



- Pipeline Works Area
- Construction Footprint
- Local Government Area
- Affected landholdings
- Rail disused/ dismantled/ rail trail
- Watercourse
- Waterbody

Planning Overlays - Flood

- Flood Overlay
- Land Subject to Inundation Overlay



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Source: Vicmap 2019 (s Imagery - Neumap 2019 (c)

Appendix B

Field Inspection Templates



Waterway crossing 1



Waterway crossing 5



Waterway crossing 6



Waterway crossing 9



Waterway crossing 16



Waterway crossing 18



Waterway crossing 19



Waterway crossing 25 – Christies Drain



Waterway crossing 28



Waterway crossing 29



Waterway crossing 44



Waterway crossing 47



Waterway crossing 48



Waterway crossing 59



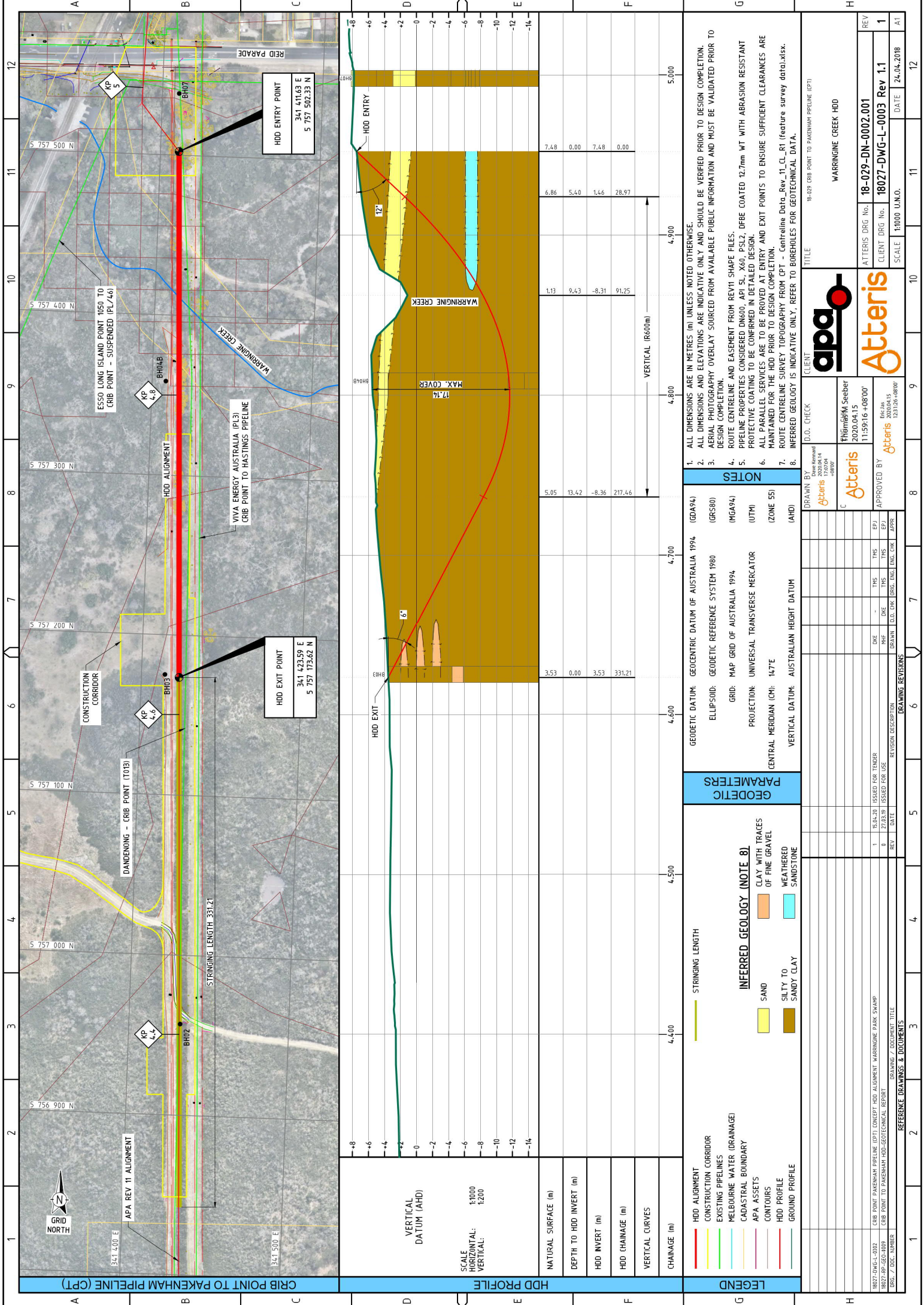
Waterway crossing 60



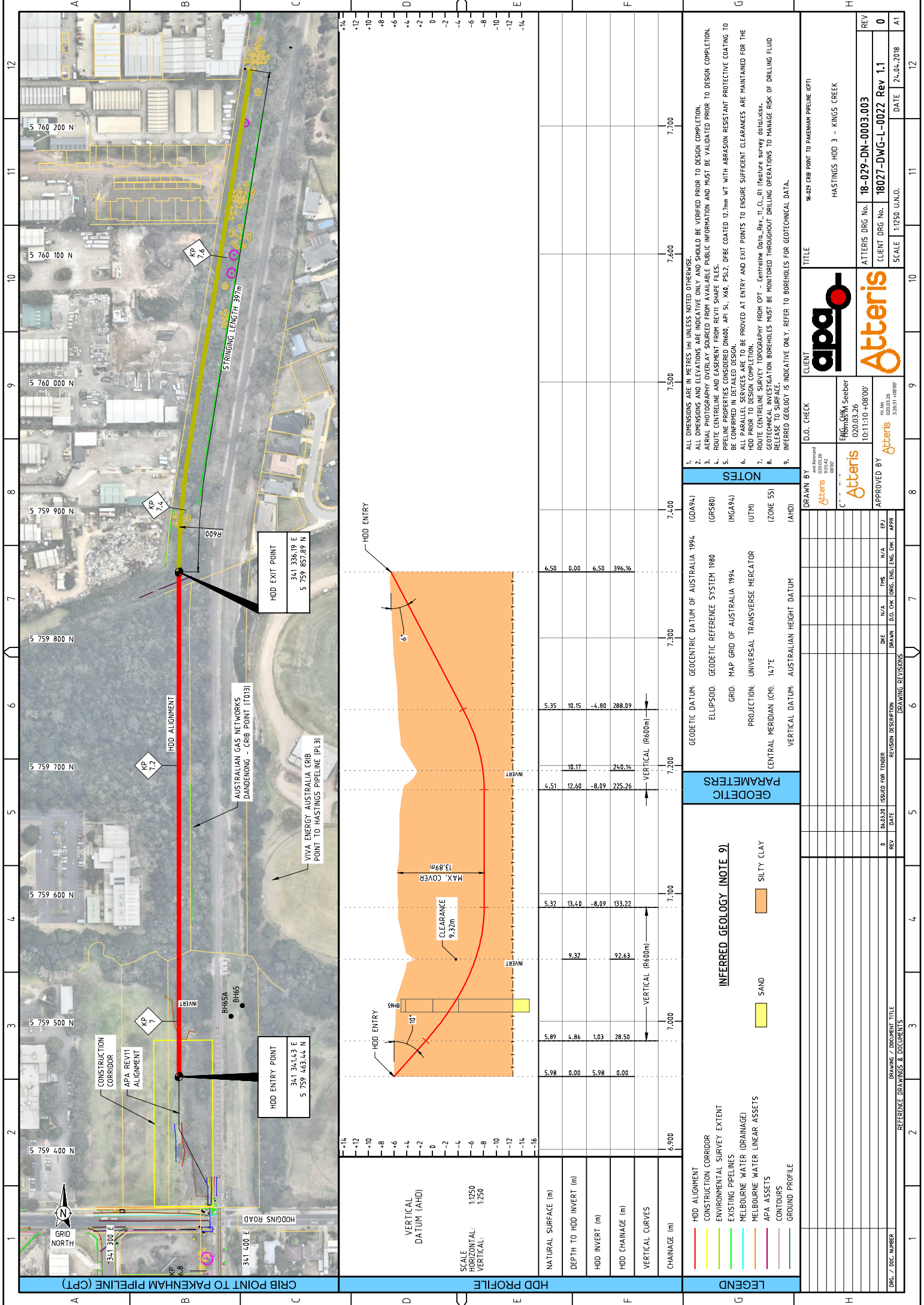
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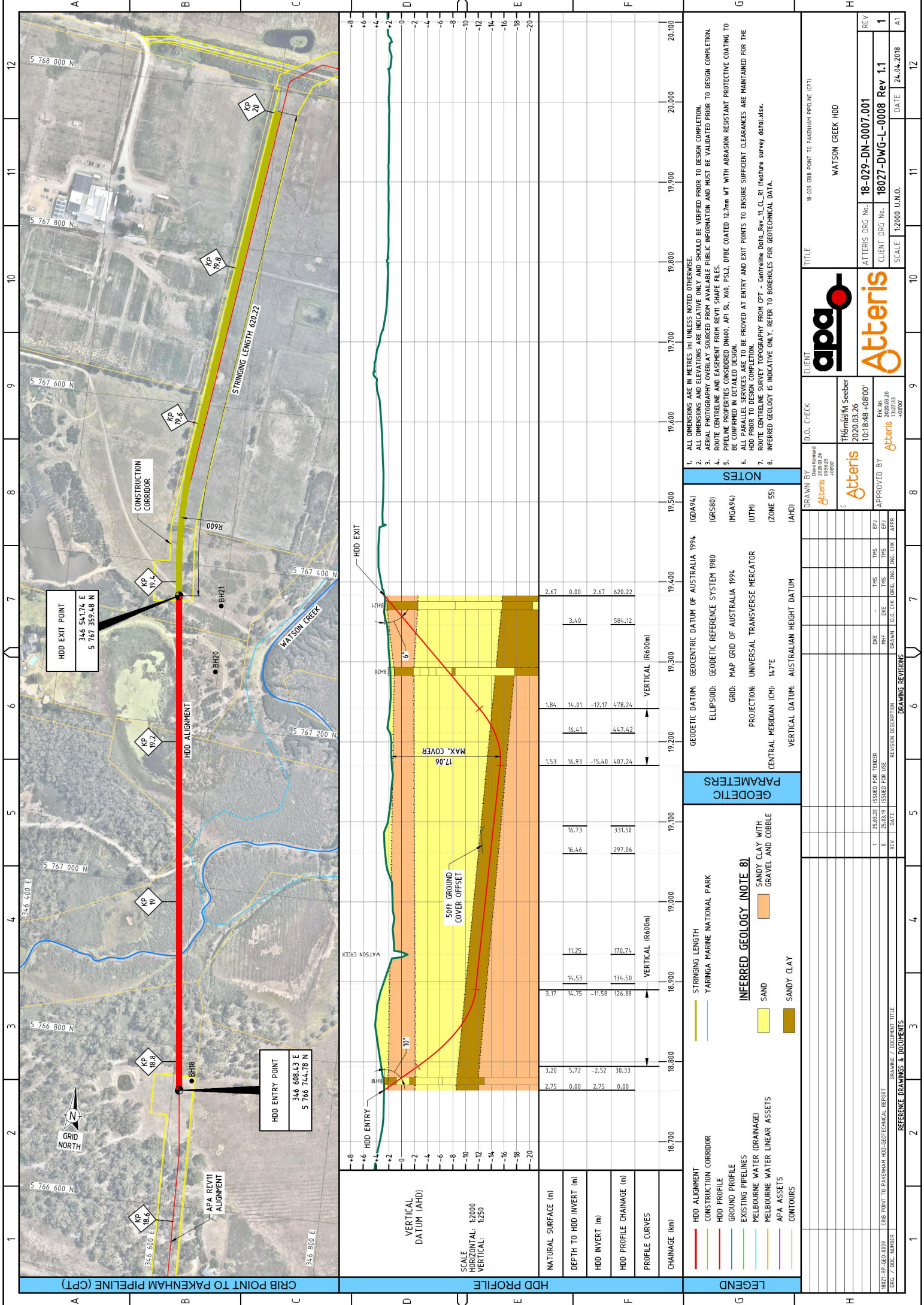
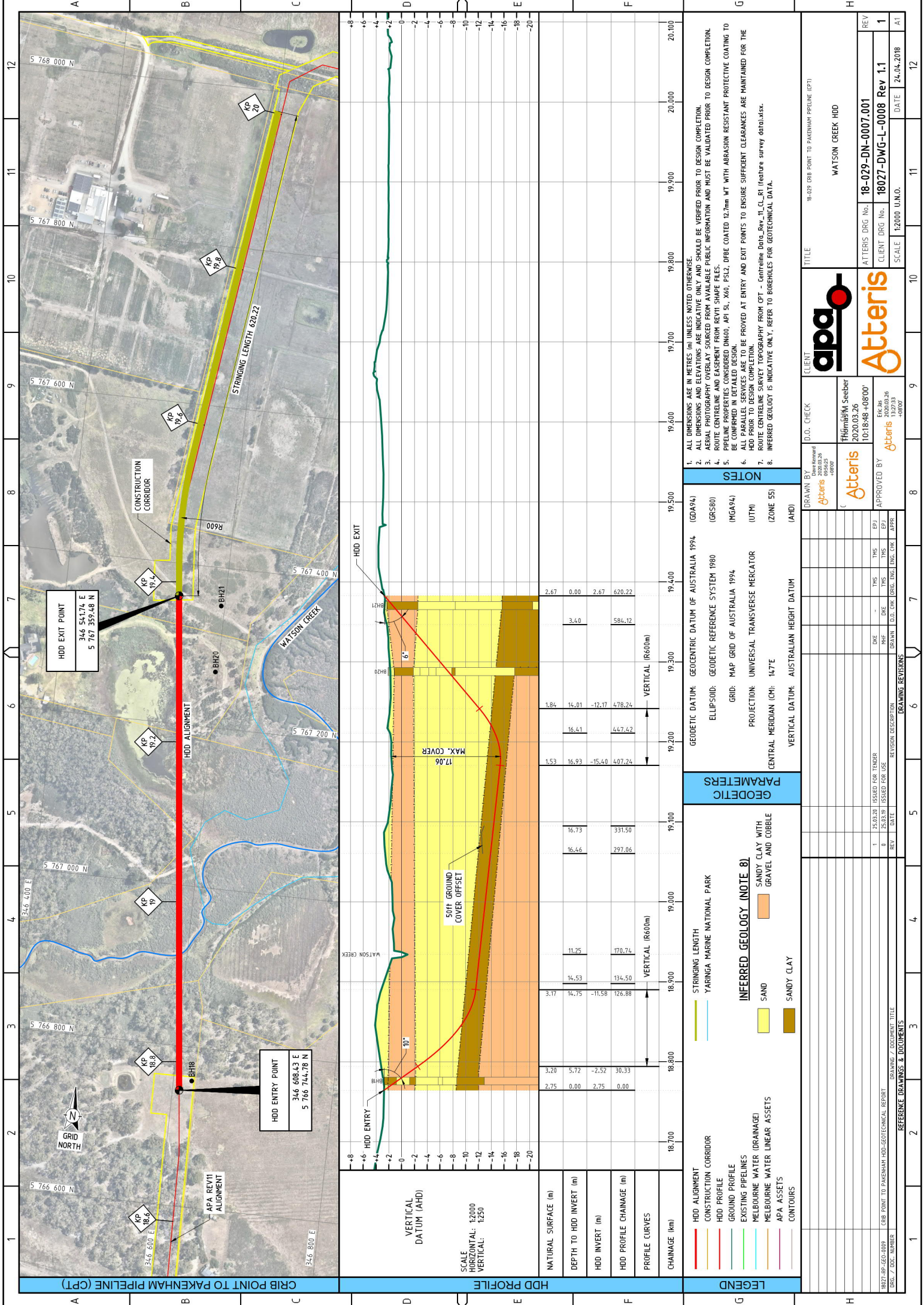
Appendix C

Horizontal Directional Drilling Profiles

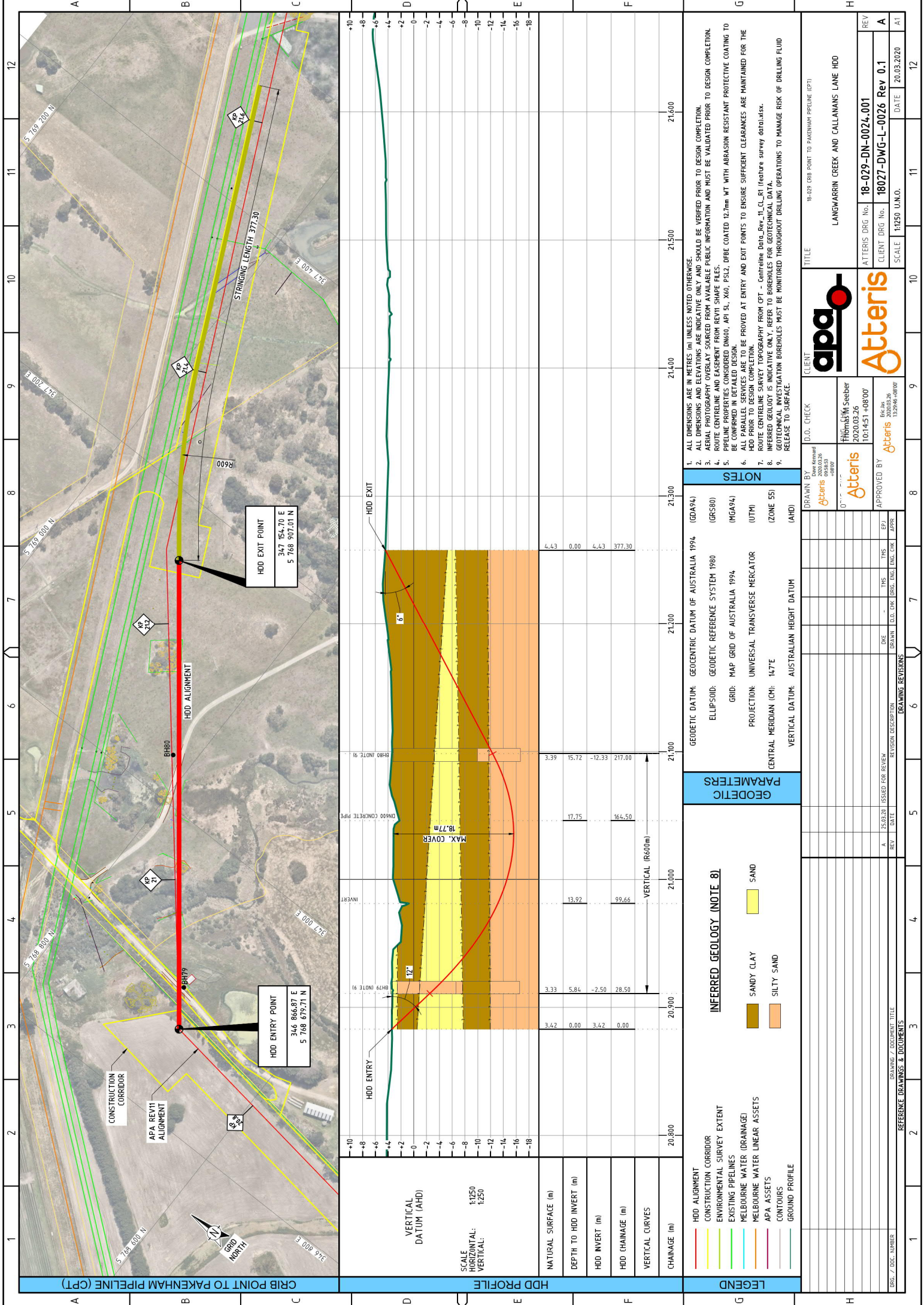


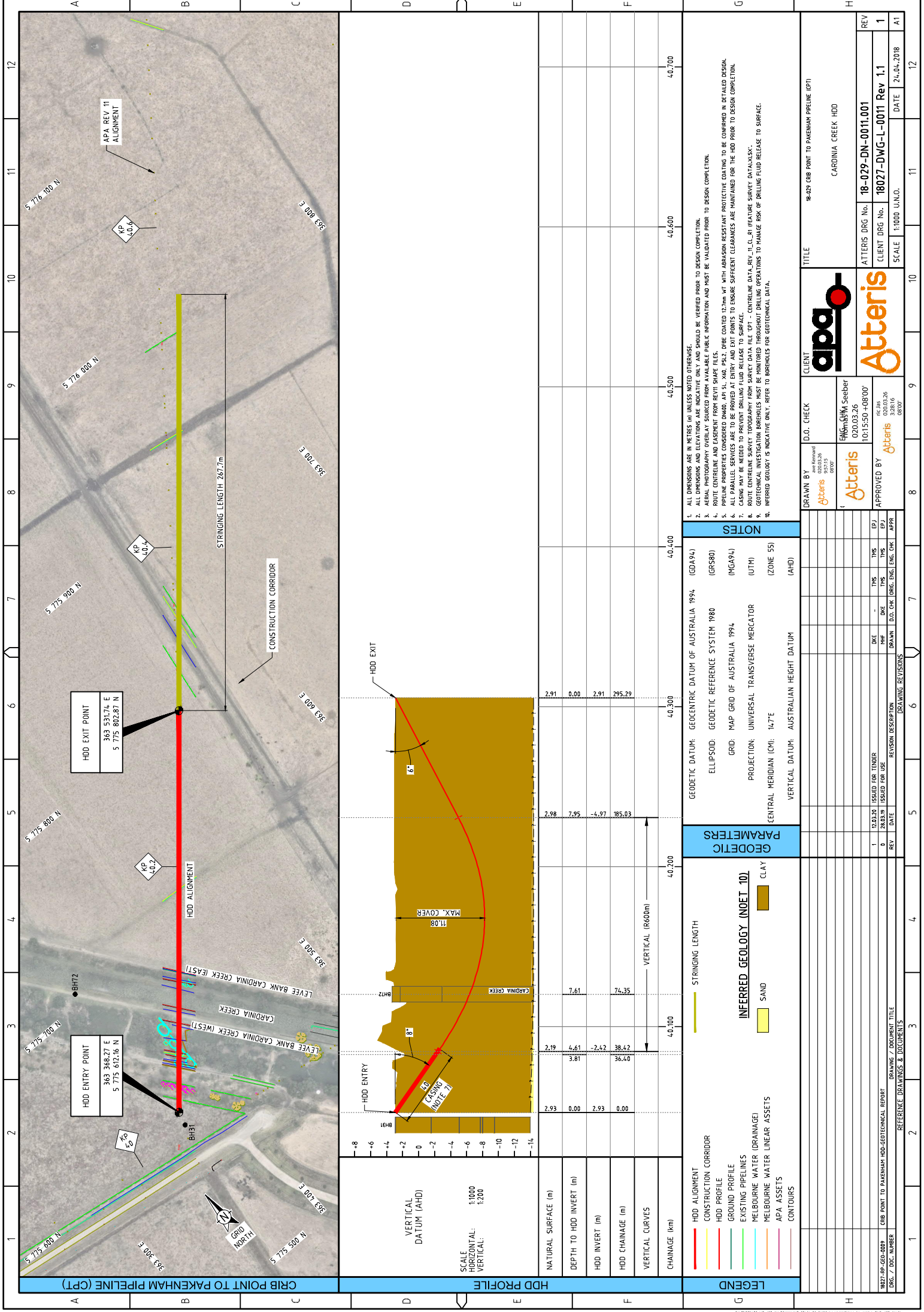
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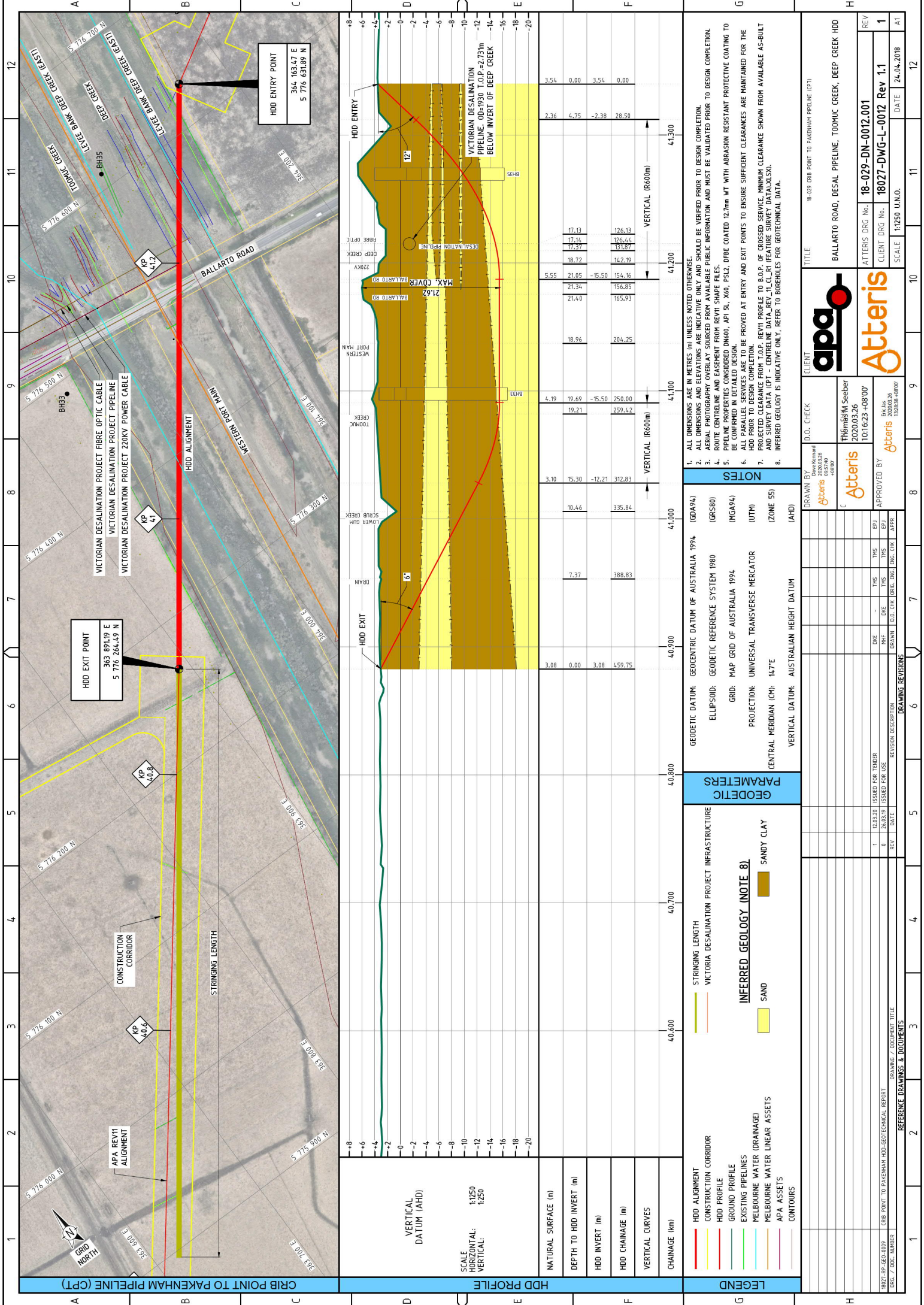




CRIB POINT TO PAKENHAM PIPELINE (CPT)		HDD PROFILE		LEGEND		GEODETIC PARAMETERS		NOTES		DRAWING REVISIONS		DRAWING / DOCUMENT TITLE		REFERENCE DRAWINGS & DOCUMENTS	
VERTICAL DATUM (AHD)		NATURAL SURFACE (m)		HDD ALIGNMENT		STRINGING LENGTH		GEODETIC DATUM: GEOCENTRIC DATUM OF AUSTRALIA 1994		DRAINED BY		D.O. CHECK		CLIENT	
SCALE: HORIZONTAL: 1:2000 VERTICAL: 1:250		DEPTH TO HDD INVERT (m)		CONSTRUCTION CORRIDOR		YARINCA MARINE NATIONAL PARK		ELLIPSOID: GEODETIC REFERENCE SYSTEM 1980		DRAWN BY		D.O. CHECK		CLIENT	
		HDD INVERT (m)		HDD PROFILE				GRID: MAP GRID OF AUSTRALIA 1994		DRAINED BY		D.O. CHECK		CLIENT	
		HDD PROFILE CHAINAGE (m)		GROUND PROFILE				PROJECTION: UNIVERSAL TRANSVERSE MERCATOR		DRAINED BY		D.O. CHECK		CLIENT	
		PROFILE CURVES		EXISTING PIPELINES				CENTRAL MERIDIAN (CM): 147°E		DRAINED BY		D.O. CHECK		CLIENT	
		CHAINAGE (km)		MELBOURNE WATER (DRAINAGE)				VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM		DRAINED BY		D.O. CHECK		CLIENT	
				MELBOURNE WATER LINEAR ASSETS						DRAINED BY		D.O. CHECK		CLIENT	
				APA ASSETS						DRAINED BY		D.O. CHECK		CLIENT	
				CONTOURS						DRAINED BY		D.O. CHECK		CLIENT	
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