PMaxP Part V Works Approval Submission

Berth 1 and 6 Construction
Attachment 8

Table of Contents

1 Introduction

1.1 APPLICATION TYPE

This document provides supporting information to the application for a Works Approval under Part V, Division 3 of the *Environmental Protection Act 1986* (WA) (the EP Act) for the construction of a new berth (Berth 1) and extension of the existing Berth 6 within the Port of Geraldton (the port) as part of the Port Maximisation Project (PMaxP).

1.2 PMAXP PROJECT BACKGROUND

The PMaxP is a significant amendment to the existing *'Geraldton Port Enhancement Project and Preparatory Works for the Town Beach Foreshore Redevelopment'* (the approved proposal) authorised under MS 600, to upgrade marine infrastructure at the port. The PMaxP includes dredging of approximately 258,000 cubic metres (m^3), land reclamation, piling, and installation of the following marine infrastructure:

- new wharf decks related to berth 1 (relocated) and berth 8/9
- extension of the existing berth 6
- new tug harbour, including the construction of a new breakwater extending north into Champion Bay.

The PMaxP was also referred to the Department of Climate Change Energy the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act) in April 2025 and in August 2025 it was determined to be 'Not a Controlled Action if taken in a Particular Manner' (EPBC 2025/10165).

Figure 1 Model depiction of PMaxP (Agilitus 2024)

1.3 SCOPE OF THIS APPLICATION

This application for a Works Approval is required to allow construction of the new Berth 1 wharf deck and the extension of the existing Berth 6 wharf deck, as construction of this infrastructure has been determined to meet the threshold of *'to become, or to become capable of being, prescribed premises'* under s. 52 of the EP Act.

1.3.1 Berth 1 wharf construction

Berth 1 will be constructed to replace the aged infrastructure of existing Berths 1 and 2 (Berth1/2). The replacement Berth 1 will be a new structure sited in a north-south orientation, which has been optimised to maximise operability and berth utilisation based on reduced long period wave impacts (surge mitigation). Wharf construction will include vibratory and impact piling of ~120 tubular piles of up to 1,050 mm diameter to a maximum depth of ~40 m, to support a new 293 x 22 m concrete wharf deck. The primary intent for the new Berth 1 is to support ongoing trade, assist with predicted future Berth 6 bottlenecks and provide a dedicated and safe disembarkation point for cruise ships which currently berth at berths 3 and 6 impacting scheduling of incoming vessels for export of products via these berths.

1.3.1.1 Berth and material information

Operationally the new Berth 1 wharf will not increase the overall tonnage of the Port; berth tonnages will be redistributed once Berth 1 is online and the total maximum throughput will remain within the existing Environmental Licence production capacity of 23 million tonnes per annum (Mtpa). Berth 1 will provide additional flexibility in the operation of the existing Berth 6 by creating an additional berth for unregulated break bulk cargo and passenger vessels. A limited range of regulated bulk granular materials are also proposed to be handled over Berth 1. Importantly, potentially hazardous metal concentrate products such as copper, lead sulphide, zinc, nickel and iron concentrates are not proposed for handling at Berth 1 due to the proximity of potentially sensitive receptors at the Town Beaches east of the port. Table 1 summarises the proposed bulk materials and potential emissions at Berth 1.

Table 1: Berth 1 bulk materials and potential emissions summary

Bulk Materials	Handling	Potential Emissions	
		Construction	Operation
Import: • Heavy mineral concentrate (HMC) • Fertiliser (urea, soda ash, pot ash, phosphates) Note: export and import of containerised cargo will also be undertaken but is not regulated under Category 58 or 58A.	• Self-discharging vessel to hopper for HMC • Grab bucket and hopper for fertiliser	**Noise** – piling works, construction works, trucks, mobile plant	**Noise** - trucks, mobile plant
		Dust – wheel generated dust on unsealed surfaces.	**Dust** – handling of granular bulk materials: • HMC • Fertiliser
		Electromagnetic radiation – nil.	**Electromagnetic radiation** – handling of Naturally Occurring Radioactive Material (NORMS) present in HMC.
		Stormwater – overland flow and infiltration via retention swale with 1 in 10-year storm event overtopping to material disposal pond.	**Stormwater** –as per construction phase until land reclamation completed.

Figure 2 presents a render of the proposed new Berth 1, showing the new Berth 1 wharf highlighted in yellow.

Figure 2: Berth 1 render (Agilitus 2024) new wharf highlighted yellow

1.3.2 Berth 6 wharf extension

Berth 6 is an existing operational berth that requires an upgrade and extension to accommodate Panamax size vessels, to eliminate existing impacts to the utilisation of the adjacent Berth 5. The extension of Berth 6 will allow for substantial improvements in stormwater management through the provision of a sealed and graded berth draining to a network of gross pollutant traps and discharging treated water to the commercial harbour via three new stormwater discharge points under the berth. There will be no change to the regulated bulk granular products handled or the handling methods of those products imported or exported over Berth 6.

The wharf upgrade works will include a combination of vibratory and impact piling of ~100 tubular piles of up to 914 mm diameter to a depth of ~20 m and extension of the wharf deck to a new length of ~290 m (existing wharf deck length is 244 m) and width of 23 m.

Figure 3 presents a render of Berth 6 with the proposed extension highlighted in yellow.

1.3.2.1 Berth and material information

Operationally the extension of Berth 6 will not increase the overall throughput of the Port. Berth tonnages will be redistributed once Berth 6 is online and the total maximum throughput will remain within the existing Environmental Licence throughput limit of 23 Mtpa. Importantly, the extension of Berth 6 will allow for the import of fuel deliveries and break-bulk cargo without impacting the operational capacity of Berth 5. Table 2 summarises the proposed bulk materials and potential emissions at Berth 6.

Figure 3: Berth 6 Render (Agilitus 2024) wharf extension highlighted yellow

Table 2: Berth 6 bulk materials and potential emissions summary

Bulk Materials	Handling	Potential Emissions	
		Construction	Operation
No changes to regulated products from those approved by existing Environmental Licence (L4275/1982/15) **Export:** • Metal concentrates (copper, lead sulphide, zinc, nickel, iron), • mineral sand concentrate • Clean fill **Import:** • Heavy mineral concentrate, • coal, • fertiliser (urea, soda ash, pot ash, phosphates)	• Crane and rotating lifting frame for export of metal concentrates via Rotainers • Self-discharging vessel to hopper for import of HMC • Grab bucket and hopper for import of fertiliser and coal	**Noise** – piling works, construction works, trucks, mobile plant **Dust** – wheel generated dust on unsealed surfaces. **Electromagnetic radiation** – nil. **Stormwater** – discharge via existing licenced stormwater discharge points SW14 and SW15 (refer Figure 8.) Construction of 3x new stormwater discharge points.	**Noise** – no change from existing port operations **Dust** – no change from existing port operations **Electromagnetic radiation** – handling of NORMS present in HMC (no change from existing port operations) **Stormwater** –significant improvement in stormwater management on Berth

1.3.3 Exclusions

During scoping meetings held with the Department of Water and Environment Regulation (DWER) Industry Regulation – Resource Industries team in May and September 2025 it was agreed that the dredging and land reclamation activities, construction of the new tug harbour and breakwater extension, and the removal of the existing Berth 2 wharf did not meet the prescribed premises threshold criteria under s. 52 of the EP Act and are therefore excluded from this Works Approval application.

The concrete crushing and screening associated with the removal and recycling of concrete from Berth 2 was considered to meet the threshold, becoming a Category 13 prescribed premises. However, at the time of writing the project scope for concrete recycling has not been defined and insufficient data is currently available to support an application for this activity. MWPA has therefore committed to demolition and transport off site for all building materials to be recycled as part of the Berth 2 wharf deck removal.

A separate Works Approval application for the mobile crushing and screening plant will be submitted in relation to the offsite premises by the contractor prior to any prescribed activity being undertaken.

The construction of future Berth 8/9 meets the threshold under s. 52, however, the construction of this berth is currently unfunded and is not included in the current PMaxP construction schedule. No construction of the Berth 8/9 wharf is included in this Works Approval application, and a future works approval application will therefore be submitted for the Berth 8/9 wharf deck construction once detailed design has been undertaken.

2 Applicant details (Part 2)

2.1 PROOF OF OCCUPIER STATUS (ATTACHMENT 1A)

Mid West Ports Authority (MWPA) is responsible for the control and management of the Port and operates the Port as a Government Trading Enterprise (GTE) appointed under the *Port Authorities Act 1999*.

The Port is defined in the *Port Authorities (Description of Port of Geraldton) Order 2017*, published in Government Gazette No.34 (WA Gov, 2017) and forms part of Lot 503 on Deposit Plan 57801. Deposit Plan 410027 shows all the land and waters managed by MWPA as part of Reserve 25300 (extract provided below, Figure 4).

CONTACTS:

Entity Name	Mid West Ports Authority
Australian Business Number (ABN)	73 384 989 178
Address	298 Marine Terrace, Geraldton Western Australia
Authorised Representative	[redacted]
Email	[redacted]
DWER Enquiries related to this application should be directed to: [redacted]	

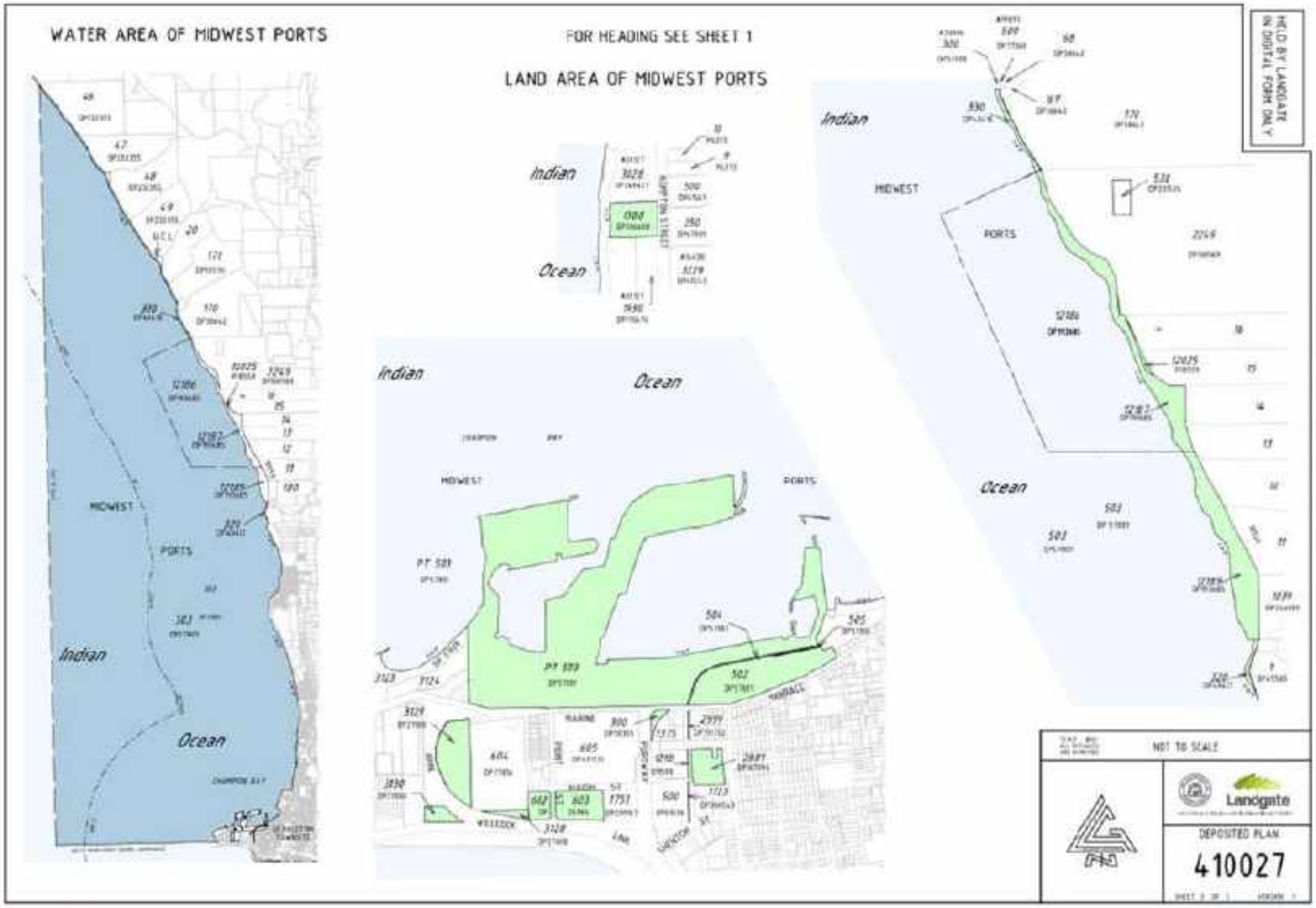


Figure 4: Port of Geraldton Reserve 25300

2.2 ASIC COMPANY EXTRACT (ATTACHMENT 1B)

ASIC
Australian Securities & Investments Commission

Business Name Details

Extracted from ASIC's database at AEST 11:05:17 on 16/04/2025

Business name:	Mid West Ports	
Status:	Registered	
Registration date:	25/10/2014	
Renewal date:	25/10/2026	
Address for service of documents:	298 Marine Tce Geraldton WA 6530	
Principal place of business:	298 Marine Tce Geraldton WA 6530	
Holder(s) details:	Holder name:	MID WEST PORTS AUTHORITY
	Holder type:	Other Unincorporated Entity
	ABN:	73 384 989 178
Organisational Representative Details:	Name:	Peter James Klein
	Start date:	22/10/2014
	Name:	Damian Tully
	Start date:	29/04/2024
Debtor representative(s):	not applicable	
Notified successor(s):	not applicable	
Regulator:	Australian Securities and Investments Commission	

Figure 5: MWPA ASIC Company Extract

3 Premises Details (Part 3, including Attachment 2)

The Port of Geraldton is located approximately 430 km north of Perth, on the northern shores of Point Moore within the south-eastern corner of Champion Bay (refer Figure 4). Operating from its current location since 1924, the port has evolved into one of Western Australia's most diverse port operations supporting exports including grain, iron ore, minerals, and livestock, and imports including fuel, fertiliser, and general cargo. The port also accommodates cruise vessels, oil rig tenders, and other specialist marine craft.

3.1 EXISTING PRESCRIBED PREMISES

Figure 6 presents the existing prescribed premises boundary for the Port as defined in Schedule 1 of Licence L4275/1982/15. The most recent licence amendment was granted in July 2025 to authorise the relocation of the solid waste drying and storage area to the western side of the Berth 7 material disposal area. Figure 7 includes the current layout of the bulk handling facilities and existing berths at the port, which are used to export iron ore and minerals including spodumene concentrate and lithium direct shipping ore (added to Licence L4275/1982/15 in January 2024 for export via the Berth 4 only, and not associated with this Works Approval application).

3.2 EXISTING DISCHARGE POINTS

Figure 8 presents the existing stormwater drainage network and licenced stormwater discharge points. Of note is the location of DPW1, the discharge point for the tail water return pipes that connect the existing Berth 7 material disposal area with the port commercial harbour.

During the assessment of the 23 Mtpa Licence Amendment, DPW1 was excluded from the licenced discharge points due to the ongoing use of the Berth 7 reclamation area for the disposal of dredge material, which is regulated under Part IV of the EP Act (refer Section 2.3.6 of Licence L4275/1982/15 Amendment Report, File Number 2011/000451-4~4, dated 18 November 2024).

Figure 6: Existing boundary of the prescribed premises

Figure 7 Port of Geraldton Bulk Handing Facilities L4275/1982/15 (last amended: 22/07/2025)

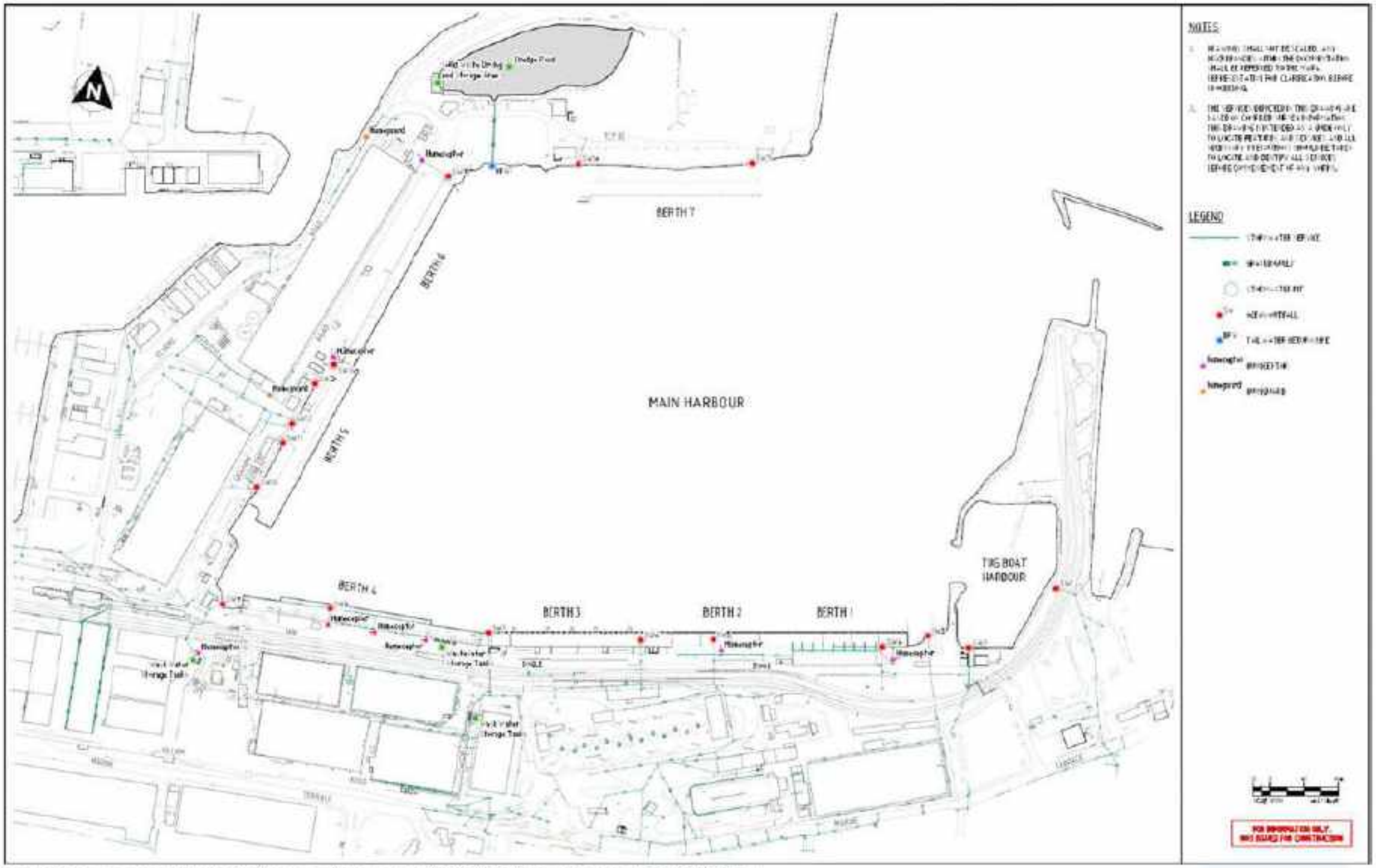


Figure 8: Existing drainage network and discharge points L4275/1982/15 (last amended: 22/07/2025)

3.3 PROPOSED PRESCRIBED PREMISES BOUNDARY AND EMISSION AND DISCHARGE POINTS

As discussed in Section 4.1.1.4 below, the stormwater at the Berth 1 land reclamation will be managed in the construction phase through a temporary infiltration swale and weir, only overtopping into the Berth 1 (OTH) material disposal area during a greater than 1 in 10 year average recurrence interval (ARI) rain event. To manage risks associated with ongoing land reclamation activities, ongoing monitoring of return water quality (including throughout the PMaxP operations phase) at the discharge locations related to both the Berth 7 and Berth 1 material disposal areas is a requirement of the Draft PMaxP Ministerial Statement (as published in EPA Report 1792, September 2025) under conditions B2-1 and C2-1. Return water quality associated with the OTH material disposal area is managed under the DEMMP and will be conditioned under the updated Ministerial Statement if the PMaxP significant amendment is approved by the Minister.

Figure 9 presents an extract of the PMaxP DEMMP including the location of the Low Ecological Protection Areas (LEPAs) and their relevant sampling points, shown as B7D (corresponding to DPW1 in Figure 8) and OTHD (anticipated to be designated as DPW2 in a future licence amendment).

Figure 10 depicts the proposed prescribed premises boundary and emission and discharge points relevant to this application. The boundary has been extended from the existing Licence boundary to incorporate the new Berth 1, and excludes the proposed new tug harbour reclamation and material disposal areas as these are not considered part of the prescribed premises (refer Section 1.3 above and Section 4.1.1 below for further details).

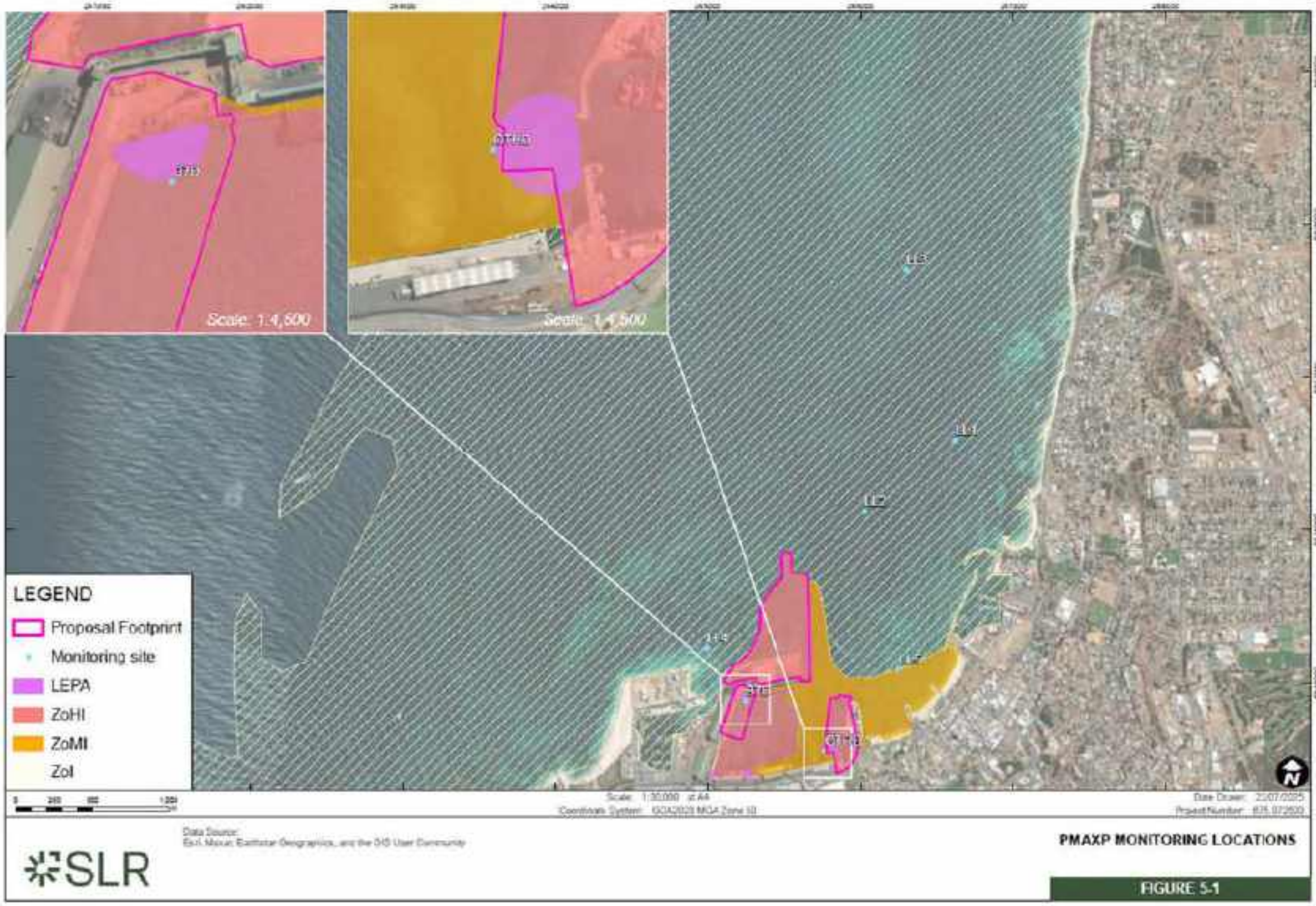


Figure 9: PMaxP DEMMP Low Ecological Protection Areas (LEPA) and associated water quality monitoring points (SLR 2025)

Figure 10: Proposed prescribed premises boundary and emission and discharge points

4 Proposed Activities (Part 4 and Attachment 3B)

4.1 CONSTRUCTION

PMaxP encompasses construction of a number of work scopes as listed in the table below. The majority of these scopes are considered enablers to the construction of the infrastructure that will facilitate the prescribed premises activities i.e. construction of Berth 1 and the extension to Berth 6.

Any scope of work identified as "N" in the table below has been considered as infrastructure that does not directly facilitate the prescribed premises activity and is considered "preparatory works" in line with Section 3 of *Guideline: Industry Regulation Guide to Licensing* (DWER 2019). These preparatory works are not included as a component of this Work Approval.

Limited further detail is provided for context on the preparatory works; it is considered that these can be undertaken outside the scope of the Part V Works Approval. For the avoidance of doubt, construction associated with impermeable hardstands and stormwater drainage infrastructure associated with Berth 1 and Berth 6 will not commence until the works approval has been granted.

It is noted that all work scopes listed below and their associated impacts are included in the detailed EIA submitted for the PMaxP Part IV (see Section 1.2 above) and where applicable are managed via the Part IV Ministerial Conditions (see sections 1.3.3, 3.2 aboveand 4.1.1 below).

Construction Work Scopes	Prescribed Activity Infrastructure (Y or N)
New Tug Harbour and breakwater, floating jetties & reclaim pond	N
Berth 1 dredging	N
Berth 1 rock revetment, causeway & OTH pond	N
Berth 1 – Piling and deck construction	Y
Berth 6 dredging	N
Berth 6 rock revetment	N
Berth 6 berth extension – piling and deck construction	Y
Berth 2 Demolition	N

4.1.1 Preparatory Works

4.1.1.1 New Tug Harbour and Breakwater

A new (replacement) Tug Harbour will be constructed to replace the existing Tug Harbour located near the new Berth 1 location. The new Tug Harbour has a dual purpose in that it provides a more accessible and operable hub for the Port tug fleet and affords protection from long period waves (surge) within the main harbour via the new western breakwater (seawall). The replacement tug harbour will involve:

- construction of a new breakwater extending north ~450 m into Champion Bay;
- vibratory and impact piling of ~10 tubular piles of 914 mm diameter to a depth of ~20 m;
- construction of a floating jetty within the harbour (~100 x 6 m in dimension);
- land reclamation along the southern boundary (north of the existing northern reclamation area); and
- capital dredging using a trailing suction hopper dredge of ~31,000 m³ to a design depth of -7.0 m chart datum (CD).

The new tug harbour reclamation area will include a new HDPE-lined pond and is intended for use as a dredge spoil disposal pond for future dredging campaigns, including the new tug harbour capital dredge. The new tug harbour reclaim pond will be hydraulically connected to the existing B7 material disposal area by pipework and will ultimately discharge to the Port harbour via existing tailwater return pipes (labelled as DPW1, see Figure 8). It is noted that during assessment of the recent 23 Mtpa licence amendment, DPW1 was excluded from consideration as a regulated discharge point as it is associated with dredging and land reclamation works that are regulated under Part IV of the *Environmental Protection Act 1986* (EP Act) (refer Section 2.3.6 of Licence L4275/1982/15 Amendment Report, File Number 2011/000451-4~4, dated 18 November 2024). The ongoing monitoring of return water quality, including throughout the PMaxP operations phase, is a requirement of the PMaxP Ministerial Statement under conditions B2-1 and C2-1, to manage risks associated with ongoing land reclamation activities. As such, there is no proposed change related to the new tug harbour reclaim pond and the construction of the new tug harbour and associated breakwater is outside the scope of this application.

4.1.1.2 Berth 1 Dredging

The construction of Berth 1 will initially require the maintenance dredging of ~18,000 m^3 of sediment from within an area that was capital dredged to design depth as part of the Port Enhancement Project (PEP; MS600) in 2002. A capital dredge campaign will also be required to remove ~25,000 m^3 of sediment and rock to deepen the berth pocket to -13.4 mCD using a hydro-hammer and long arm excavator to remove material. The impacts related to dredging have been addressed as part of the environmental impact assessment (EIA) under Part IV of the EP Act and hence are not covered in this application.

4.1.1.3 Berth 6 Dredging

The Berth 6 upgrade will include capital dredging of ~98,000 m^3 to a design depth of -13.4 mCD using the same method as Berth 1 (hydro-hammer and excavator) along with some land-based soil removal.

As per Berth 1, dredging and its related impacts have been addressed in the Part IV EP Act EIA and hence are not considered as part of this application.

4.1.1.4 Berth 1 Reclamation and Berth 1 and 6 Revetments

A new Berth 1 reclamation area will be created and bordered by a rock revetment supplemented by geotechnically suitable imported fill to create the land-backed wharf and causeway that will enclose the old tug harbour and provide access to the new Berth 1 wharf. The newly enclosed old tug harbour (OTH) area would be used for the disposal of Port-derived materials. New pipes will be installed at the southwest end of the enclosed OTH discharging to the main harbour. As for DPW1 at Berth 7, monitoring of the tailwater return is a requirement of the PMaxP Ministerial Statement under condition B2-1 and C2-1.

The Berth 1 revetment design requires land reclamation to extend the land area behind the new Berth 1. The first component of these works is removing the rock armour from the existing revetment wall to tie in the new construction. Existing armour material will be stockpiled on site until required for re-use.

For both Berth 1 and Berth 6, additional rock armour will be imported to construct the revetment wall; this material will be imported from commercial quarries. A front-end loader will be used to push core material out which will be later trimmed to profile using a long-reach excavator fitted with a GPS. The core material is protected with outer layers of filter then primary and secondary armour as per the design drawings. The GPS fitted machine will be able to accurately construct the wall to the design profile.

The impacts related to the reclamation, revetments and material re-use have also been covered by the Part IV EIA and are managed through the implementation of ministerial conditions. These aspects are therefore not further considered as part of this application.

4.1.1.5 Berth 2 Demolition

Berth 2 will be demolished as part of PMaxP, the berth's concrete deck will be cut using concrete saws and removed in sections using an excavator / mobile crane. The concrete piles will be cut off 500 mm above the seabed.

The concrete deck and piles will be collected and transported off-site for storage, testing and waste characterisation and finally crushing for re-use. All required approvals for the concrete crushing will be sourced by the Contractor engaged to complete the Demolition Works. It is envisaged that all the crushed material meeting the Port Site Re-use criteria *"Contaminated Soil and Operational Waste Management Procedure"* will be utilised as a capping layer for temporary pavements at the new Berth 1. There is expected to be approximately 30 000 tonnes of concrete from the Berth 2 demolition to crush.

Any material, e.g. steel, that is recyclable will be separated and transported offsite for re-use, and all residual waste will be collected and transported offsite to an appropriate licenced waste facility.

A contractor holding a Demolition Licence issued through the Department of Local Government, Industry Regulation and Safety (LGIRS) will be required for the removal of the wharf deck panels.

The concrete crushing process and considerations are NOT included in this Works Approval application.

4.1.2 Berth 1 & 6 Pile Installation

Piles may be installed from land or floating plant (subject to contractor's methodology). The Berth 1 and 6 designs assume installation using a land-based pile installation method. Shorter land-based piles (located at the rear of the wharf) will be supported during driving using a fixed piling gate. Land-based piles will be spliced and non-destructive tested prior to being driven to final embedment. The outer berth side piles (located at the front of the wharf) will be pitched and driven in single lengths. They will be supported during driving by a cantilevered piling frame resting on the previously driven rear piles. All piles will be initially driven with a vibratory hammer followed by an impact hammer until piles reach design set. Piling will commence from the southern end of the berth moving to the north.

- Berth 1 – up to 120 piles (910 and 1050 diameter)
- Berth 6 – up to 100 tubular piles (762 & 914 diameter).

4.1.3 Berth 1 & 6 – Deck Install

The primary precast concrete elements are trough beams and wharf deck panels. The trough beams are located directly on the driven piles, running between these beams are precast concrete planks. The precast will be installed from cranes located behind the wharf abutment (land based) and precast will be delivered to site in stages to avoid building up and storage on site.

In-situ concrete will be poured to integrate the piles and precast elements; there are three main in-situ pours. The first two pours will integrate the piles and the precast troughs. The third concrete pour is the topping slab that ties the precast deck panels into the rest of the structure. Concrete will be supplied from a commercial batch plant located in Geraldton and will be poured within the confines of the formwork using conventional land-based plant and equipment.

4.1.4 Construction Staging

Berth 1 earthworks are planned for early Q2 (April) 2026 with the berth piling scheduled to commence from Q3 2026 (July), the deck installation from Q2 2027 and the overall completion of Berth 1 in late 2027.

The Berth 6 construction will not commence until Berth 1 construction is completed and the berth operational. Berth 1 will be required to facilitate handling of fertilisers and HMC while Berth 6 construction is underway.

								2026				2027				2028				2029
PMaxP Construction Schedule								Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
(June 2025 forecast - subject to change)					Q4				Stage 1							Stage 2				
Activity	**Duration (weeks)**							Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Construction Phase																				
Berth 1 Construction	71	B1							B1	B1	B1	B1	B1	B1						
B1 - Piling & revetment	19	B1								B1	B1	B1								
B1-Deck completed	26	B1											B1	B1						
Berth 6 Construction	49	B6															B6	B6	B6	B6

Figure 11: PMaxP Construction schedule – subject to change

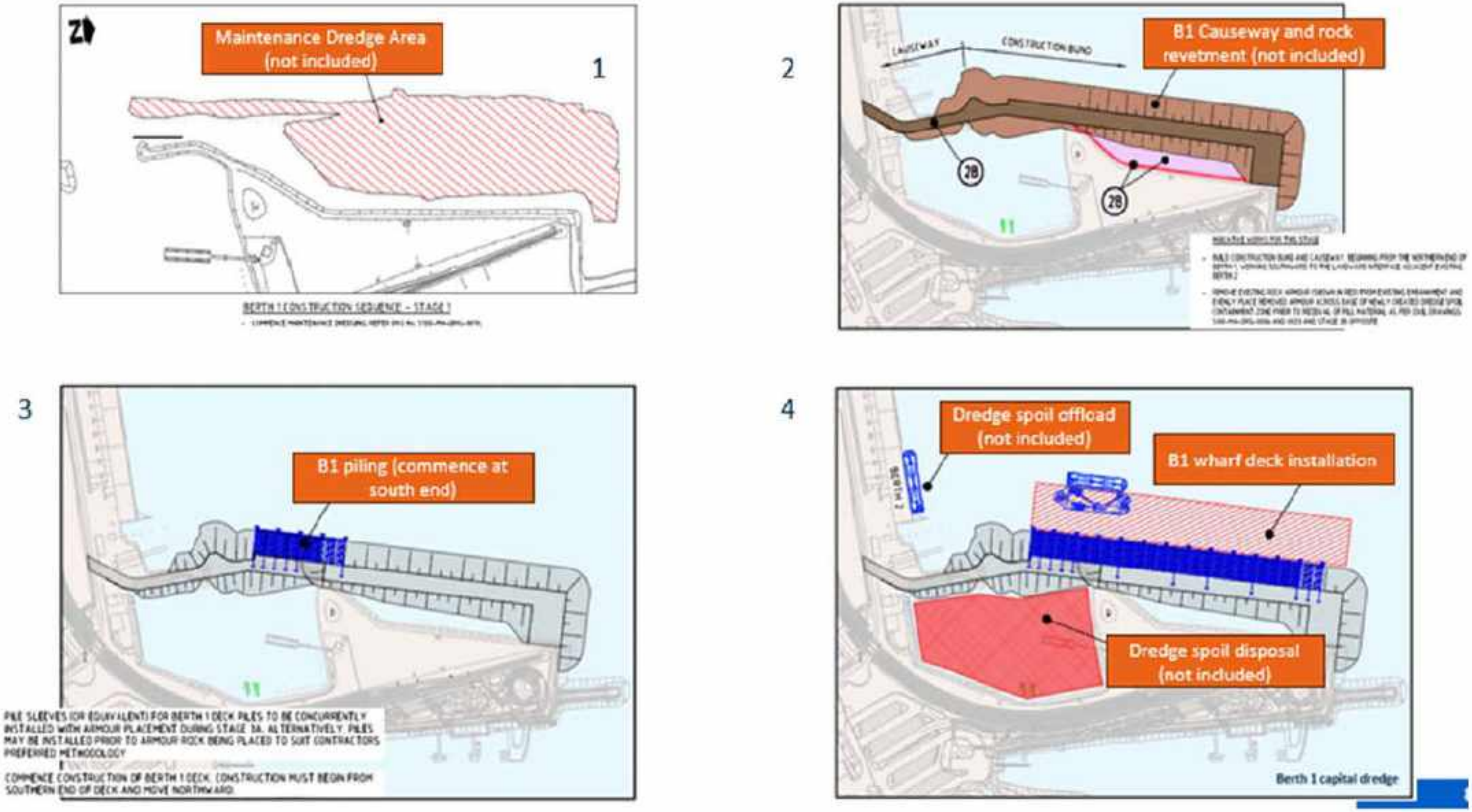


Figure 12: Berth 1 construction staging (Ref: P100184-0000-MA-SKT-DRG-0360 - Subject to Change)

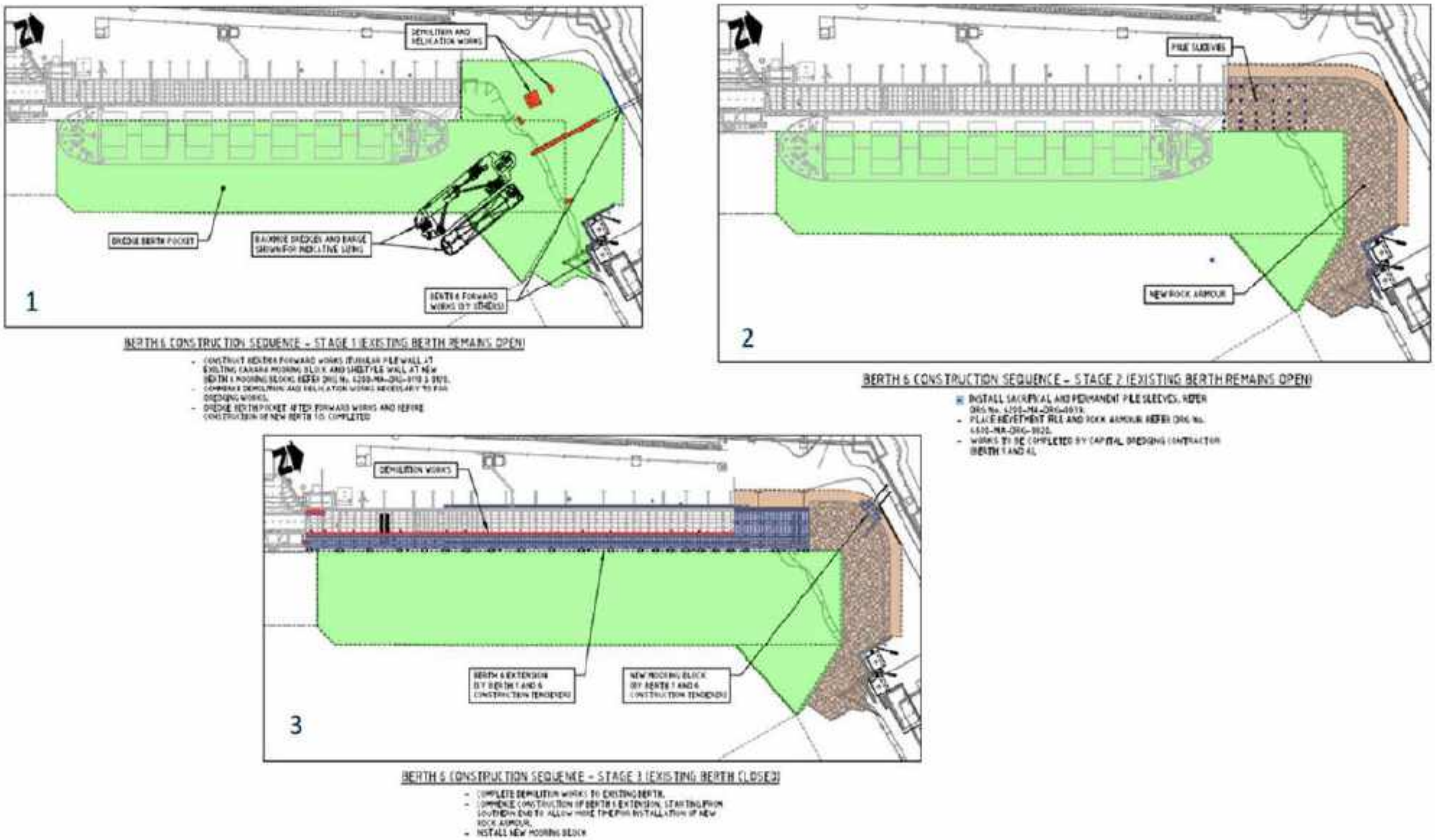


Figure 13: Berth 6 construction staging (Ref: P100184-0000-MA-SKT-DRG-0361- Subject to Change)

4.2 OPERATIONS

All future Berth operations will be undertaken in accordance with MWPA's existing operational controls and procedures, including but not limited to the following:

- *MWPA Dust Management Plan (DMP)*
- *Managing Dust from Port Operations Procedure*
- *Unloading Fertiliser Using Hoppers Procedure*
- *Berth Operator Custody and Handover Procedure*
- *Berth Operator Custody and Handover Checklist*

Relevant sections of these procedures have been referenced below.

4.2.1 Berth 1

The new berth will primarily cater to break bulk cargo, fertiliser unloading, and import of HMC products and will also be a dedicated berth for incoming cruise ships which currently impact vessel schedules on other berths. Berth 1 will also assist MWPA with scheduling of products to alternative berths while the Berth 6 extension is underway. Berth 1 will be serviced via mobile cranes; there is no permanent ship loader planned for this berth. The unloading methods proposed for regulated bulk granular materials during Berth 1 operations are described below.

4.2.1.1 Mobile crane and grab with hopper for fertiliser imports

The DMP identifies fertiliser as permitted for unloading and import via vessel crane and grab to a hopper on the berth, or via a self-discharging vessel equipped with a conveyor and capable of unloading product directly to the hopper. The current DMP states that this loading must occur via Berth 6; however, MWPA require the option to undertake these operations at the new Berth 1 during the Time Limited Operations (TLO) phase of the Works Approval, and then be incorporated into the Licence.

If the Works Approval is granted the DMP will be updated to clarify that fertiliser unloading is permitted from Berth 1, in accordance with the following existing operational requirements:

4.2.1.1.1 Berth Operator Custody and Handover Procedure

Specifies routine procedures for required cleaning and berth hygiene. Before any activities begin on the berth, the Berth Operator's representative and the MWPA Duty Wharf Supervisor must take time to complete the Berth Operator Custody and Handover Checklist. They should ensure that all applicable items on the list are checked off and non-applicable items dismissed. No equipment is to be moved onto the berth, until handover has been completed or the Wharf Supervisor has provided approval. Section 3 of the *Berth Operator Custody and Handover Checklist* (the checklist) relates specifically to fertiliser discharge and is shown in Figure 14.

Section 3. Fertiliser Discharge			
	Item to Check	Handover ✓ / ✗	Hand Back ✓ / ✗
3.1	Unloading fertiliser using Hoppers Procedure has been read and understood by Berth Operator.		
3.2	Hoppers positioned in accordance with MWPA Unloading Fertiliser Using Hoppers Procedure and MWPA Wharf Specification Book.		
3.3	Berth wet swept on completion of discharge.		
3.4	Spill plates in position.		
3.5	Dry sweeper available for recovery of spilt fertiliser.		

Figure 14: Handover requirements for fertiliser discharge

Upon completion of the activity at the berth, the Berth Operator's representative and the MWPA Duty Wharf Supervisor must ensure that the site is handed back in the original condition that it was received. Once the berth is vacated, the MWPA Duty Wharf Supervisor will conduct an inspection of the site using the Berth Operator Custody and Handover Checklist. Any identified non-compliances must be recorded on the Checklist and reported immediately to the Berth Operator for rectification.

4.2.1.1.2 Unloading Fertiliser Using Hoppers Procedure

Specifies the operational controls required to ensure the safe and environmentally sound unloading of vessels via grab. The procedure includes the following environmental requirements:

- The vessel must be prepared for discharge. All scuppers from which fertiliser could enter the harbour must be blocked before discharge commences. In the event that scuppers cannot be reasonably blocked, extra precaution and attention must be focused on maintaining the vessel deck clean of any spilt product.
- Spill plates must be used in all areas where falling product is likely to access the marine environment. These are provided by the Port.
- To avoid spillage, hoppers should not be overloaded. The maximum level to which hoppers should be filled depends on the bulk density of the product being unloaded.
- Grabs should not be overloaded, as far as practicable. Ideal load level is up to the height of the grizzly and with no 'ice cream cones'.
- When changing over crane drivers, place the grab in the hold or on the deck of the ship and not on the hopper to prevent spillage of product out of the hopper.
- Non-impact grabs whether empty, partially laden or fully laden, are not permitted to be landed on the hopper at any time.
- Non-impact grabs are not permitted to discharge until they have been lowered to a position as close as possible to the hopper.
- When a grab of any type is faulty (for example, excessive leakage) it must be replaced by a different grab and/or repaired to prevent spillage.
- Routine mechanical and manual sweeping is to be carried out to reduce spilt material entering marine environment. Stevedores are to maintain a clean, swept area around the hopper and where the truck drivers alight to prevent persons slipping on the product, prevent tracking of fertiliser along the berth by truck movement and prevent contaminated stormwater entering the harbour during a rain event.
- Spilt product should be removed along kerbs, around bollards, on top of fenders, and berth face water outlet lids using vacuum truck or swept back onto the berth to be picked up by road sweeper. At no time are materials to be swept or washed into the marine environment.
- Trucks should not be overloaded and any spillage of product onto the truck body external to the trailer should be cleaned up immediately and prior to the truck leaving the hopper area.
- Once loaded, trucks must immediately be tarped.
- Tracks on the excavator need to be 'run off' upon completion of work to minimise fertiliser being spread on the berth.
- Machinery such as excavators and bobcats which are used in the hold of a ship and are bought out onto the Berth must be cleaned down before being moved to a storage location. All material cleaned down from machinery must be swept up and disposed of by an approved method (for example, off-site disposal via skip bins).
- On completion of discharge hoppers are to be cleaned down by sweeping and vacuuming up product that has been 'hung up' in the hopper bin or structure.
- If after vacuuming, there is still product 'hang-up', then the hopper bin can be washed down provided that the washdown water and material are captured using the purpose-built funnel / sock to ensure that no contaminated water enters the marine environment. This washdown water and material is to be disposed of by the Fertiliser company in an approved manner (offsite). Under no circumstances can the hoppers or contaminated equipment be washed down on the Berth without the use of the washdown funnel / sock.

These requirements will apply to future fertiliser operations at Berth 1. Further discussion of the potential emissions and discharges related to future Berth 1 operations is provided in Section 6.2.

4.2.1.2 Self-discharging vessel with hopper for HMC imports

The DMP identifies HMC imports via a self-discharging vessel to a hopper as permitted at Berth 6, this is further confirmed in Table 2 of the current Licence L4275/1982/15 which states:

- Product must be unloaded at Berth 6, via grab bucket or self-discharging vessel, and hopper.
- Any wastewater generated from post-handling washdown activities must be collected and disposed offsite.

MWPA require the option to undertake these operations at the new Berth 1 during the Time Limited Operations (TLO) phase of the Works Approval. If the Works Approval is granted the DMP will be updated to clarify that HMC unloading is permitted from Berth 1, in accordance with the licence requirements above and the following existing operational requirements:

4.2.1.2.1 Berth Handover Procedure

Specifies routine procedures requiring cleaning and berth hygiene. Before any activities begin on the berth, and the requirements for hand back of berth upon completion of the activities. Section 2 of the checklist specifies the requirement for the discharge of HMC products and is shown in Figure 15:

Section 2. HMC Discharge			
	Item to Check	✓ / ✗	N/A
2.1	Hopper positioned on bitumen; wind shields in place.		
2.2	Hopper positioned on wharf in accordance with MWPA Wharf Specifications booklet (if discharging via grab).		
2.3	Spill plates in position (if discharging via grab).		
2.4	Berth swept on completion.		

Figure 15: Handover requirements for HMC discharge

These activities are all currently undertaken at Berth 6 under the existing Environmental Licence (refer to Table 2 of L4275/1982/15 [last amended: 22/07/2025]). If The Works Approval is granted, the same requirements will be applied to HMC Discharge at Berth 1.

4.2.2 Berth 6

Once the extension is completed, Berth 6 will continue to operate as a multi-user facility for various purposes, including; the export of metal concentrates using a wharf-based crane and rotating lifting frame, the import of fuel via bunkering operations, discharge of mineral sand concentrate, fertilisers, using trucks loaded via hoppers; and other general (break bulk) cargo with the added capacity to cater to larger vessels without impact to Berth 5.

There are no changes to the bulk products or handling methods proposed as part of the wharf extension at Berth 6 and MWPA consider the current operational requirements outlined in Table 2 of L4275/1982/15 would still apply to the Berth 6 operations post-extension. The primary difference to the existing operational condition for Berth 6 is an improved stormwater management system with three new Humeceptors and stormwater discharge points to be incorporated into a revised Licence, once installed. Further discussion of the potential emissions and discharges related to future Berth 6 operations is provided in Section 6.2.

5 Other Approvals and Consultation (Attachment 5)

5.1 OTHER APPROVALS

5.1.1 State

The PMaxP is a significant amendment to the PEP (subject of Ministerial Statement 600, dated 2002). The PMaxP was referred under Part IV of the EP Act in August 2024 and is currently in the final assessment stages. All marine infrastructure construction aspects of PMaxP have been included and assessed in the Part IV submission. Section 1.2 summarises the PMaxP referral and the current status of the significant amendment.

Section 1.3.3 above and Section 4.1.1 above summarise the interaction of the PMaxP Part IV project scope with Part V of the EP Act, as discussed and agreed with DWER during the Part V scoping meetings listed in Table 3.

5.1.2 Commonwealth

The PMaxP was also referred under section 68 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and was determined by DCCEEW on 11 August 2025 to be 'Not a Controlled Action if taken in a Particular Manner'.

5.2 CONSULTATION

In alignment with the organisation's strategic objective to: "*Engage Customers, Community, and Stakeholders*", MWPA consults with its stakeholders through a range of mediums to allow the organisation to provide and obtain information relevant to its operations. As part of MWPA communication and consultation processes, regular (approximately quarterly) consultation sessions are held with key stakeholder groups.

Community and stakeholder consultation and engagement has been ongoing for PMaxP since 2022 with a register maintained of all activities. Table 3 is a concise summary of the most recent engagement directly related to PMaxP.

Table 3: PMaxP Stakeholder and Community Engagement Summary

Sector	Details	Date	Main Themes specific to Berth 1 and 6
MWPA Employees	Various Forums • Town Halls • Weekly News • Leadership Weekly Meet • Employee Consultative Committee	July 2024 onwards	Construction schedule Port Interface impacts
Local Community / Local Businesses	Community Information Sessions	19/09/2024 09/10/2024	Australian Sea Lion Management A general desire to see an increase in Tourism (Cruise Ships) Procurement of construction to local entities

Sector	Details	Date	Main Themes specific to Berth 1 and 6
	Community Environmental Interest Groups	Sept / Oct 2024	Australian Sea Lion management during construction. "Design" for nature
	Website Updates	As changes / updates arise	
	Letter Drop – adjacent suburbs	10 & 11th Sept 2024	
	Newspaper Adverts	30/08/24 & 04/09/2024	
	Port Tours	Ongoing late 2024 onwards	Generally positive feedback for PMaxP
	Community Consultation Committee	May, Aug, Nov 2024 Quarterly 2025	Env Approvals & Construction schedule
	Yamatji Southern Regional Corporation (YSRC)	Ongoing	Engagement / involvement of YSRC in marine fauna monitoring and management during construction
Port Users & Stakeholders	Fishing Boat Harbour (FBH)	Quarterly meetings	Construction Schedule and interface impacts
	Berth User Meetings	Aug & Nov 2024 Feb, May, Aug 2025	Construction Schedule and interface impacts
Regulatory	DWER Part V	05/05/25 Site Visit 28/05/25 Scoping Meeting 11/09/25 Scope confirmation	Emissions, discharges & waste
	EPAS Part IV	August 2024 onwards EPA Board Meeting 21/08/25	Key Factors – impacts to sensitive receptors
	DCCEEW (EPBC)	June – July 2025 (Not Controlled Action with PM)	Australian Sea Lion management during construction.
	DBCA	19/09 & 20/11 2024 June / July 2025 with DCCEEW	Australian Sea Lion management – operations & construction.

6 Emissions, Discharges and Waste (Attachment 6A)

6.1 CONSTRUCTION

6.1.1 Noise

Construction works have the potential to generate noise emissions during the following activities:

- Piling
- Construction of Berth 1 deck and Berth 6 extension.

Construction works will primarily be conducted during daylight hours from 0700 to 1900 hours as prescribed in the *Environmental Protection (Noise) Regulations 1997* (WA) (the EP Noise Regs).

Noise modelling of construction activities has been completed for construction seven (7) days a week during day shifts. The modelling indicates minor exceedances at receptors during construction phases but with low occurrence percentages.

The construction site is bounded on the West and South side by permanent Port infrastructure including storage sheds and grain silos.

A PMaxP Construction Noise Management Plan (CNMP) has been developed (Appendix B) to manage construction noise during the construction phase including out of hours work; the CNMP will be submitted to CGG (City of Greater Geraldton) for approval under regulation 13 of the *Environmental Protection (Noise) Regulations 1997* (WA).

6.1.2 Dust

Construction works have the potential to generate fugitive dust emissions due to wheel generated dust associated with construction vehicles and mobile plant on unsealed surfaces. Dust generation will be kept to a minimum through the wetting of soils prior to and during works. A water cart will be available for use throughout construction and wetting will be applied based on observed site conditions and any visible dust generation at the work front.

Dust management measures will be in accordance with the MWPA DMP and will be included in the Contractor's Construction Environmental Management Plan. The Port of Geraldton operates an extensive dust monitoring network to monitor and mitigate dust emissions. This network will be in use throughout the construction phase, and the details of the existing dust monitoring regime are provided in Section 6.3.

6.1.3 Stormwater

Stormwater within the Berth 1 construction site will be managed via a series of sumps with silt traps, or via infiltration, to prevent discharge of material-laden stormwater into the existing adjoining drainage network or marine environment.

Stormwater at the Berth 6 construction site will be managed via the existing drainage system along with drainage diversion and collection where required.

6.1.4 Waste (General)

All waste will be segregated into major and minor recyclables, putrescible waste and other non-recyclable waste. Major and minor recyclables will be diverted to recycling facilities in the City of Geraldton, whilst putrescible and non-recyclable waste will be disposed of to the Geraldton municipal landfill facility.

Temporary ablutions will be supplied by a licensed contractor, who will be responsible for disposal of the black and grey waste to an appropriate offsite facility. All temporary ablutions mobilised to site, must include a system shut down when the waste tank reaches maximum capacity, which includes a 10% freeboard.

6.2 OPERATIONS

6.2.1 Noise

Operational noise will be managed subject to the EP Noise Regs. An Environmental Noise Impact Assessment (ENIA) was completed by Acoustic Engineering Solutions (AES 2025) in support of the PMaxP and is included in Appendix A. The operational aspects considered in the noise assessment are summarised below.

Individual 'worst-case' operation of Berth 1 was modelled in Scenario 9 of the ENIA (Appendix A). The ENIA found that exceedance of the noise target of 5 dB below the assigned noise level would occur in 7.2% of weather conditions at receptor R10 during daytime conditions (see Figure 24 for R10 location) increasing to exceedance 10% of the time during evenings and 12.2% of the time during the night. Exceedances of the 5dB below target were also modelled at R7 on Sundays (2.4%) evenings (11.3%) and during the night (18.1%) and at R2 during the night-time only (12.9% of the time). The ENIA identifies noises from mobile cranes, forklifts, vacuum trucks and prime movers as the most common sources of noise exceedances.

However, it is noted in the ENIA that exceedances of the assigned noise threshold for receptors under Scenario 11 (Berth 1 'worst-case' operational noise plus the current worst-case Geraldton Port Operation noise) was compliant as it did not exceed for more than 1.7% of the time and therefore met the 98% operational compliance target under the EP Noise Regs. The ENIA also notes that high background noises from sources including road traffic, sea-waves, commercial premises and other exempt noise such as rail noise and shipping noise in the Port, occur at the site and that these noises result in significant masking of noise under most conditions.

In support of the recent 23Mtpa licence amendment (approved on 18 November 2024) a noise validation assessment was completed, including attended noise validation monitoring in March and April 2025. The key outcome of the noise model validation was that the Port achieved full compliance with the EP Noise Regs, and the model output was found to be ~5dB higher than the actual noise measured during the validation study (i.e. the model over-predicts Port-derived noise). The noise validation assessment report *20250516 AES Report Geraldton Port Noise Validation Monitoring Rev 0* has been submitted to DWER (June 2025) and is awaiting final review by the DWER IR team.

The validation report further confirmed that significant masking of port derived noise occurs due to high winds and other noise sources which are exempt from the EP Noise Regs, and this finding is expected to be replicated in the operations phase of the new Berth 1.

MWPA therefore propose to undertake a second round of attended noise validation monitoring to commence during the TLO phase for the new Berth 1. If the attended noise model validation monitoring identifies exceedances of the EP Noise Regs associated with the new Berth 1 operations MWPA will commit to the development of an operational noise management plan as recommended in the ENIA to ensure ongoing compliance with the EP Noise Regs.

6.2.2 Dust

Operational dust will be managed under the existing Licence (L4275/1982/15) and the MWPA Dust Management Plan (DMP) and procedures as outlined in section 4.2, these include management controls such as spill deflector plates, sweeping / vacuuming during handling to recover spillage and ensure the avoidance of bulk product entering the harbour during rain events. The MWPA DMP will be updated for location specific requirements and applied to both Berth 1 and Berth 6. MWPA consider the newly relocated Environmental Licence compliance monitoring station at Berth 1 (see Figure 16) to be sufficient to effectively monitor the ambient dust dispersal from the new Berth 1 location. Note the monitoring location was approved to be moved to a new location further east of the Port Boundary during the recent 23 Mtpa licence amendment, on the basis that PMaxP works would disturb the previous site and make monitoring there impossible; further details of the existing ambient air monitoring program are outlined in Section 6.3.

Figure 16: Relocated TEOM Licence compliance monitoring station for Berth 1 (extracted from Schedule 1 of L4275/1982/15)

6.2.2.1 Naturally Occurring Radioactive Materials (NORM)

There is no change to the currently approved regulated bulk products listed in Schedule 3 of Environmental Licence (L4275/1982/15) proposed for the Port. MWPA are confident that the existing controls applied at Berth 6 are also sufficient to prevent the release of NORM into the environment during HMC Discharge when applied at Berth 1. The primary method for controlling any release of dust (including NORM) during HMC Discharge is compliance with the berth handover and hygiene procedures outlined in Section 4.2.

Compliance with the ambient air monitoring requirements outlined in Section 6.3 also allows MWPA to demonstrate that the risks associated with the emission pathway are low and acceptable. MWPA Wharf Supervisors take an active role in the assessment and sign-off of handover documents for all shipments from Berth 6 and the same processes, which are successful in controlling the NORM risk at Berth 6 will be applied to activities at Berth1.

6.2.3 Stormwater management

6.2.3.1 Berth 1

Berth 1 will incorporate drainage via overland flow to the back of the berth, that will include overland flow across sealed (bituminised) hardstand. The overland flow will continue onto the graded but unsealed hardstand before entering the graded earthworks and finally the retention and infiltration swale. The swale will be lined with 300 mm blue metal and will include a sediment fence designed for the removal of on average 80% of solids and gross pollutants (see Figure 17 and Figure 18).

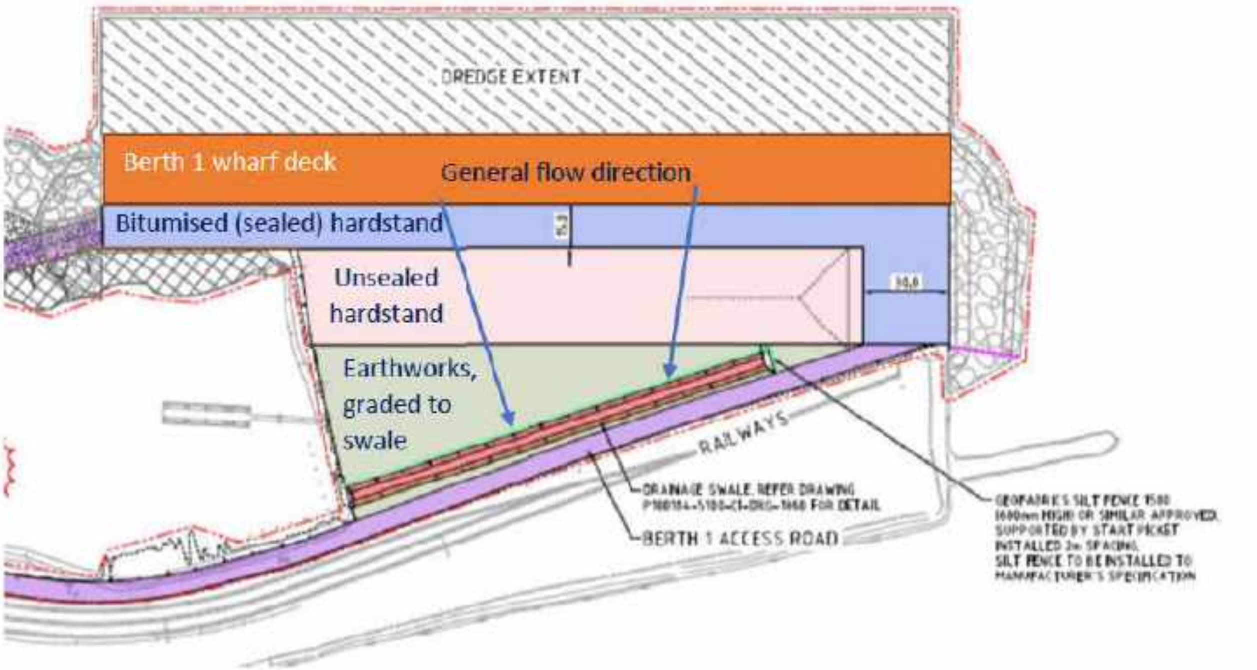


Figure 17: Berth 1 wharf deck layout

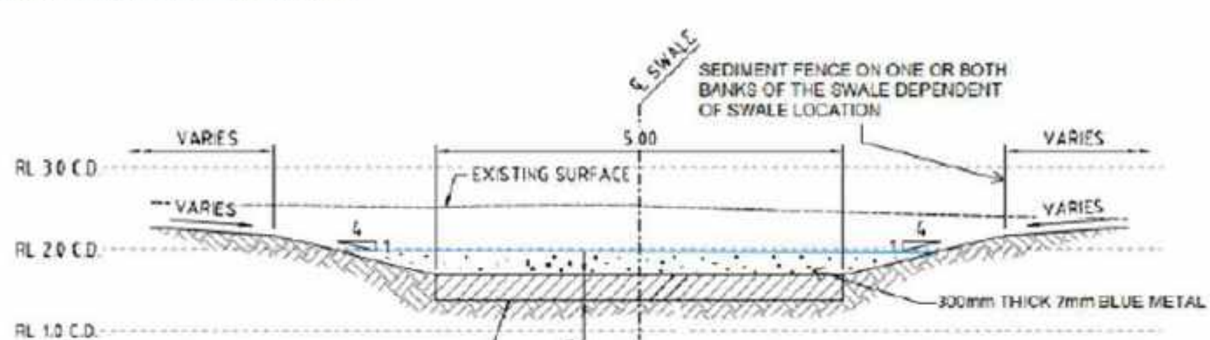


Figure 18 Arrangement of drainage retention swale at Berth 1, (Ref: P100184-5100-CI-1060 Rev B)

The Berth 1 drainage / stormwater system has been designed to contain a one (1) in ten (10) year ARI event based on the local region. The swale will house a weir overflow at the south end, that will discharge to the newly enclosed old tug harbour material disposal area only during a greater than 1 in 10 yr ARI event.

It is noted that existing overland flow and infiltration at Berth 7 has been included in the risk assessment for the current Environmental Licence, but that DPW1 (the existing Berth 7 material disposal area return water outflow, see Figure 8) is excluded from the licenced discharge points as it is associated with dredging and land reclamation regulated under Part IV of the EP Act (refer Section 2.3.6 of Licence L4275/1982/15 Amendment Report, File Number 2011/000451-4~4, dated 18 November 2024). It is therefore expected that a similar approach will be adopted at Berth 1 and monitoring the OTHD return water pipes will remain regulated under conditions B2-1 and C2-1 of the PMaxP Ministerial Statement only (i.e. excluded from the Works Approval and shown but not regulated in a future Environmental Licence amendment for Berth 1). This will avoid duplication with existing regulatory requirements under the PMaxP Ministerial Statement.

During loading / unloading of products, or in the event of a spill, procedural hygiene controls including the use of blue metal filled sediment socks along the perimeter of the sealed hard stand area (where it meets the unsealed hard stand) will be installed to minimise the risk of entry of product to the drainage system. The sediment socks can then be removed upon completion of loading and once the berth has been cleared of all residual product. The existing pre and post loading Berth handover and hopper loading procedures outlined in Section 4.2 will also be implemented.

6.2.3.2 Berth 6

Post construction stormwater management at Berth 6 will be improved through the design of the new berth extension. The stormwater will be captured and treated via an increased number of new drainage inlets (downpipes), with fines / sediment sump incorporated, before being directed to a Humeceptor (six new Humeceptors in total, see Figure 19 and Figure 20, below) prior to discharge via new drainage outfall points (three new outfalls, see Figure 10, Figure 19 and Appendix C).

The Berth 6 drainage / stormwater system has been designed to contain a 1 in 10-year ARI storm event based on the local region, with all captured stormwater flowing back away from the harbour towards the landside infrastructure. As is current operational hygiene practice at Berth 4, once constructed the drains on Berth 6 will be able to be isolated during product loading and unloading, to minimise the risk of product entry into the drainage system. The requirement to isolate and then clean and deisolate Humeceptors are currently included in the following MWPA procedures:

- *Berth 4 Washdown Sands Circuit Shiploader Safe Work Instruction*
- *Bulk Handling Facility (BHF) Pre Loading Checklist*
- *BHF Post Loading Checklist*

Drains are opened once the berth has been cleared of all residual product. *The Berth Operator Custody and Handover Procedure and Berth Operator Custody and Handover Checklist* and (as outlined in Section 4.2) will be updated to include the requirement to isolate the Humeceptors and recover any waste post loading via vacuum truck. With the improved drainage and filtration system on Berth 6, it is proposed that stormwater (Humeceptor) monitoring during loading / unloading of materials is no longer required at the Port.

To confirm that stormwater discharge is not impacting the marine (receiving) environment, MWPA will continue to implement the Marine Environmental Monitoring and Management Plan (MEMMP) at the Port following the completion of PMaxP.

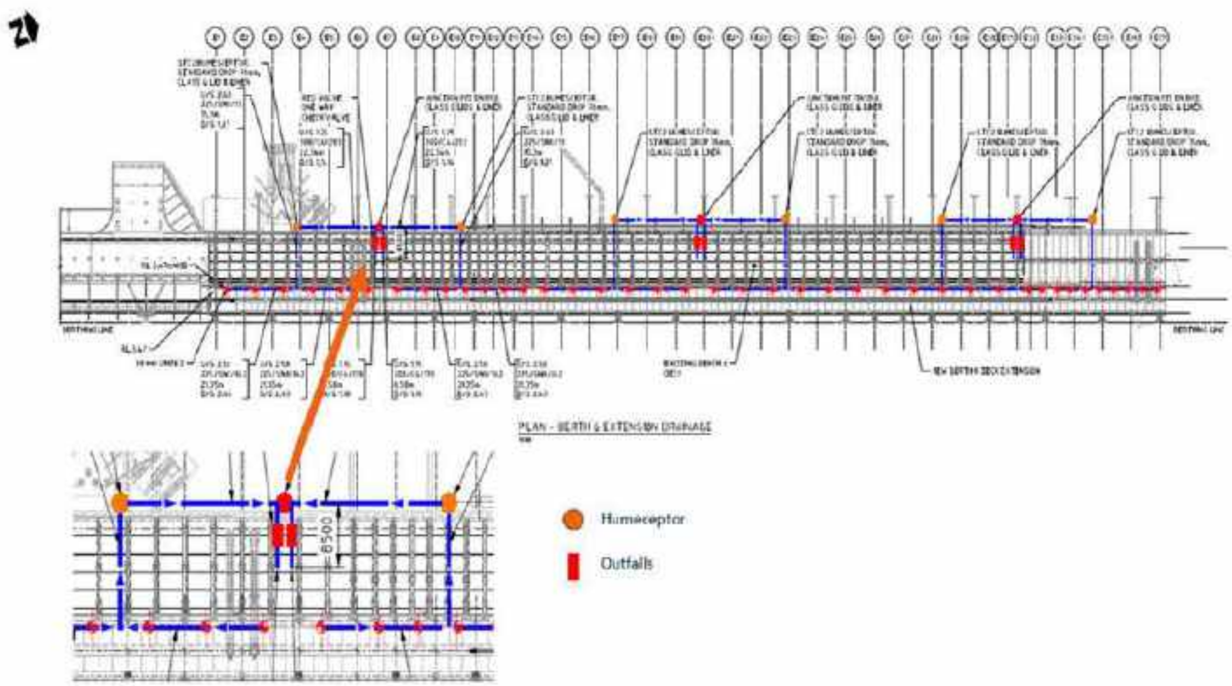


Figure 19: Berth 6 Drainage system and new outfalls (Refer Appendix C P100184-4200-CI-DRG-0001))

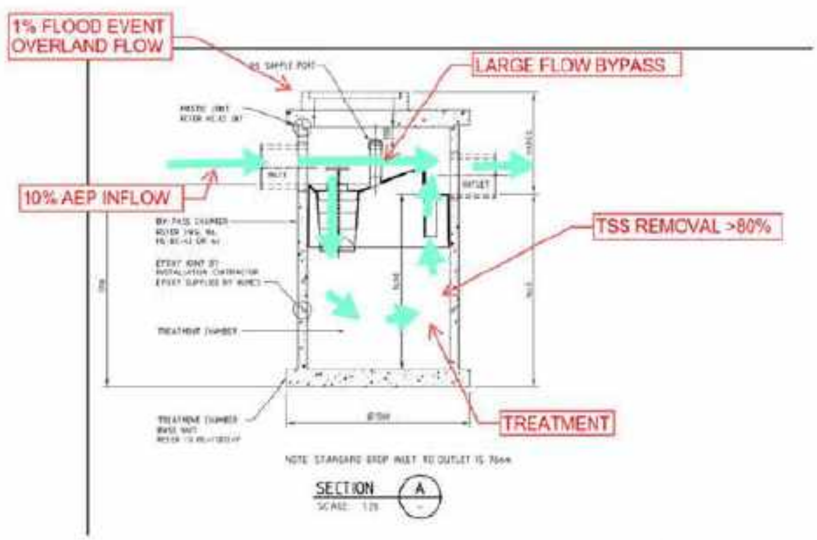


Figure 20 Humes HC-STC2-B STC-2 Humeceptor (Refer Appendix D)

6.2.4 Drainage and stormwater infrastructure management

All pollution control equipment, including Humeceptors, are listed within the Port Asset management system (IFS). A preventative maintenance schedule, assigned in accordance with the manufacturer's recommendation is included in the MWPA *Maintenance Services Management Plan* (MSMP). Humeceptor inspection and cleaning via a vacuum truck is scheduled as a 6 monthly planned maintenance task and is assigned to the Port Plumber (see Figure 21).

6M Clean Filter Fresh Water Trolley	6 Months	Maint
6M Inspect Non-Return Valves	6 Months	Plumb
6M (BUSCH) Inspect Vacuum Pumps	6 Months	Maint
6M Fire Extinguishers / Hose Reels Inspect	6 Months	Maint
6M Air Conditioner Servicing	6 Months	Maint
6M Inspect Storm Water Drains	6 Months	Plumb
6M Inspect Line Marking Sitewide	6 Months	Maint
6M Clean All Road Safety and Info Signs	6 Months	Maint
6M Inspect Vacuum Tank Internally	6 Months	Miant

Figure 21: Extract from Section 11.1.14 of the MWPA MSMP

The new retention swale at Berth 1 will be added to the six-monthly planned maintenance task highlighted in Figure 21 above, and maintenance undertaken as required.

6.3 EXISTING ENVIRONMENTAL MONITORING

6.3.1 Air quality monitoring

MWPA undertake a range of environmental monitoring programs as part of the Environmental Licence compliance program. These include Tapered Element Oscillating Microbalance (TEOM) continuous real time air monitoring at five locations (four compliance monitoring sites and one background site) as shown in Figure 16. The TEOM monitors measure particulate matter finer than 10 microns in diameter (PM10) at ten-minute intervals. Metals speciation monitoring is conducted using High Volume Air Samplers (HiVol) that can measure metals as PM10. The TEOM and HiVol units are collocated in air quality monitoring stations distributed around the port's perimeter (see Figure 16). An example station is shown in Figure 22.

Figure 22 Existing Connell Road monitoring station

In accordance with Table 5 of Environmental Licence L4275/1982/15, HiVol sampling for metals speciation is only required on a per campaign basis during the loading of metal concentrates. As such, it is expected that the existing monitoring requirements will continue to apply to activities undertaken at the extended Berth 6 and that the TEOM continuous monitoring only, would apply to activities at the new Berth 1 (no metal concentrates will be loaded at Berth 1).

As discussed in Section 6.2.2, MWPA consider the existing (relocated) Berth 1 monitoring station to be sufficient for the ongoing continuous monitoring of PM_{10} associated with the proposed bulk unloading activities at the new Berth 1.

6.3.2 Ambient sediment quality monitoring

In accordance with Table 6 of Environmental Licence L4275/1982/15, MWPA undertake annual ambient sediment quality compliance monitoring at 18 sites as shown in Figure 23. This includes two reference sites within Champion Bay, four sites within and adjacent to the fishing boat harbour, one site at town beach, one site within the existing tug harbour (YM1) and ten sites within the commercial harbour.

As part of the preparatory works outlined in Section 4.1.1.4, the existing tug harbour will be closed off to create the OTH material disposal area. The area will be subject to land reclamation with dredge spoil sourced from PMaxP works that are beyond the scope of this application. YM1 was historically associated with the Geraldton Yacht Club Marina, which became the tug harbour during the Port Enhancement Project in the early 2000s. Activities in the tug harbour which resulted in the continuation of sampling in this location included port related support vessels (tugs, pilot boats and work boats) and associated maintenance activities. As these activities will cease upon the closure of the tug harbour and the commencement of dredge material disposal, no further sampling is expected to be required at YM1.

The location of the existing sediment sampling sites is driven by a risk-based approach with sampling only occurring at berths where metal concentrates are loaded (e.g. no sediment sampling is undertaken at Berth 7, where only magnetite and hematite are loaded). As no metal concentrate loading will occur at the new Berth 1, additional sediment sampling within the new Berth 1 pocket is not considered necessary.

MWPA therefore propose to continue to implement the existing *Port of Geraldton Sediment Sampling and Analysis Plan (SAP)*, minus the YM1 site.

6.3.3 Stormwater discharge sampling

In accordance with Table 9 of Environmental Licence L4275/1982/15, grab sampling for total nitrogen, nitrate and ammonia is currently required at SW14 or the associated Humeceptor at Berth 6. This sampling is currently undertaken in accordance with the *MWPA Fertiliser Handling – Monitoring Guideline*. MWPA is required to take a grab sample daily during fertiliser loading and again four days after loading.

It is standard practice that the Humeceptor is pumped out using a vacuum truck prior to commencement of fertiliser handling. As reported in Table 12 of the *MWPA Annual Environmental Report* (AER), only four instances of sampling occurred out of 26 fertiliser handling events within the 2024-2025 reporting period, as no storm water was available to be sampled in 22 of those events. Once the isolation of Humeceptors on Berth can be implemented it is expected that no occurrence of stormwater discharge during fertiliser loading will occur at Berth 6 and the sampling required by Condition 33 (Table 9) will be obsolete.

Similarly, at Berth 1 the retention swale is designed to overtop only during a greater than 1 in 10 ARI storm event. MWPA consider it unsafe to deploy staff for stormwater sampling during these major storm events and therefore propose reliance on Condition 5 of the licence, including the berth hygiene and handover practices discussed in Sections 4.2.1 and 6.2.3 to prevent contamination of the stormwater. MWPA consider the requirement for stormwater grab sampling at Berth 1 to be unnecessary and unsafe to implement, and therefore no sampling of stormwater is proposed at Berth 1.

Figure 23: Annual ambient sediment quality sampling sites

6.4 WASTE (ATTACHMENT 6B)

6.4.1 Soil & Sludge (Stormwater Management Systems)

Waste generated from the Berth 1 and Berth 6 stormwater management systems will be managed in accordance with the existing Environmental Licence (L4275/1982/15). Soil and sludge that accumulates in the drainage and Humeceptor system is collected and temporarily stored on a concrete drying pad at the Berth 7 reclamation area. Once dried, the product is sampled in accordance with the MWPA *Contaminated Soil and Operational Waste Management Procedure* and disposed of at the Meru Landfill, typically as a Class II waste.

As per the existing Environmental Licence (L4275/1982/15), spills of products are recovered and returned to product owners. Leaks from waste, chemical or hydrocarbons storage areas are cleaned up, tested and disposed of offsite at an approved landfill facility, including any potentially contaminated soil / sludge recovered from retention swales, drainage sumps and Humeceptor systems.

7 Siting and Location

7.1 CLIMATE

Throughout the year, Geraldton displays typical Mediterranean climatic characteristics - a warm summer, mild winter and relatively even distribution of rainfall across months. The highest temperatures occur between December and February, with temperatures ranging from 28.1°C to 30.5°C. The coolest months are from June to August as temperatures drop to recorded lows between 12.7°C to 12.9°C.

Geraldton records the highest relative humidity from July to September, peaking at 70% in August. Rainfall appears most abundant in June, contributing to an average of 43 mm of precipitation, in November rainfall dips to its lowest, averaging 6 mm.

7.2 TOPOGRAPHY

The site is relatively flat, low lying coastal land approximately 5 mAHD above sea level.

7.3 GEOLOGY AND SOILS

The quaternary aged Tamala Limestone is covered by a thin layer of recent calcareous beach and dune sands along the coastal fringe, and recent alluvium and colluviums to the east. The Quaternary system is underlain by the Jurassic aged Yarragadee Formation. The areas of the Port that are the subject of this application are either existing hard stand or harbour waters that will be reclaimed to form a land-backed wharf.

7.4 HYDROLOGY

The site falls within a Right in Water and Irrigation (RIWI) Act groundwater area. Regional groundwater flow direction is inferred to be north and west towards the Indian Ocean, indicating the Geraldton Port harbours and Pages Beach are the receiving environment.

7.5 SENSITIVE RECEPTORS

Table 4: Sensitive Receptor distances from Source

Receptor	Distance from Berth 1 (m)	Distance from Berth 6 (m)
Fishing Boat Harbour (R11)	1195	650
Residential premises (R1, R3, R4, R7)	• R1 – 1860 • R3 – 615 • R4 – 500 • R7 - 555	• R1 – 1530 • R3 – 930 • R4 – 995 • R7 - 1215
Caravan Park (R2)	1900	1430
Retirement Village (R5)	445	1015
Geraldton Residency (R6)	350	1010
Commercial premises (R8)	345	1060
Overnight caravan parking (R10) (overnight caravan park)	175	915
Foreshore playground (R9)	375	1070

Figure 24 Siting and Location Figure (Attachment 7) - Receptors

8 Fee (Attachment 10)

The Works Approval fee [redacted], which was calculated using Schedule 3 of the *Environmental Protection Regulations 1987*; [redacted] The general breakdown of construction costs is provided below.

Part IV Berth 1 & 6	[redacted]
Berth 1 structure	
Berth 6 structure	
EPCM Management	

Appendix A: Project PMaxP Noise Assessment

ENIVRONMENTAL NOISE IMPACT ASSESSMENT

OF

PMAXP MARINE INFRASTRUCTURE

7 February 2025

AES-890384-R01-1-07022025

Acoustic Engineering Solutions
www.acousticengsolutions.com.au

DOCUMENT CONTROL

Prepared for:	**Mid West Ports Authority**
	298 Marine Terrace
	Geraldton WA 6530
Contact:	Fleur Hole
Prepared by:	Dr Roy Ming
	Acoustic Engineering Solutions
	[redacted]
Revision:	1
Date:	7 February 2025
Doc NO:	AES-890384-R01-1-07022025

Acoustic Engineering Solutions

ABN: 64 451 362 914

EXECUTIVE SUMMARY

MWPA is proposing through the Port Maximisation Project (PMaxP) to construct and upgrade marine based infrastructure in the Geraldton Port. Acoustic Engineering Solutions (AES) has been commissioned by Mid West Ports Authority (MWPA) to undertake environmental noise impact assessments of the proposed constructions and operations of PMaxP marine based infrastructure. The aims of assessments are to determine whether or not the proposed constructions and operations would comply with the Environmental Protection (Noise) Regulations 1997 (the Regulations).

An acoustic model has been developed and twelve worst-case construction and operational scenarios are modelled:

Scenario 1 to 7:	represent the worst-case daytime construction activities for different stages.
Scenario 8:	represents the worst-case day and night-time dredging operations.
Scenarios 9 & 10:	represent the individual operations of new berth 1 and 8.
Scenarios 11 & 12:	represent the worst-case Geraldton Port operations including one of the newly constructed berths 1 and 8/9.

Scenarios 9 to 12 are operational scenarios and can happen at any time of a day (during the day, the evening and the night). Scenarios 1 to 8 are construction scenarios and not covered by the Regulations, however MWPA has assessed the potential construction noise impacts on the surrounding community.

Eleven closest noise-sensitive and commercial receivers are selected for the detailed assessments of noise impact. Noise levels are predicted for calm and "worst-case" winds in 8 cardinal directions. The predicted noise levels are adjusted to account for their dominant characteristics and then assessed against the criteria set by the Regulations.

Wind directions have significant impact on the noise propagation. Risk analysis is undertaken to determine the percentages of different wind speeds under 8 cardinal directions in the Geraldton Port and surrounding area. Then the analysis results are used in the compliance assessments to determine the percentage occurrence of noise exceedance during the construction and operations.

The compliance assessments conclude that:

- For the daytime constructions on Monday to Saturday, exceedance is predicted with occurrence percentage of ≤16.2% at:
  - R2 and R7 (two noise-sensitive receivers) and most of the commercial receivers for scenario 1.
  - R7 (one noise-sensitive receiver) and most of the commercial receivers for scenarios 2, 4, 5 and 8.
  - R1, R2 and R7 (three noise-sensitive receivers) and most of the commercial receivers for scenario 3.

  - R8 to R10 (three commercial receivers) for scenario 6.
  - R10 (marginal exceedance at one commercial receiver) for scenario 7.
- For the daytime constructions on Sunday and Public holidays, exceedance is predicted at most receivers except for R2, R5 and R11. The exceedance occurrence percentage is ≤16.2%.
- For the worst-case evening and night-time dredging operations (scenario 8), exceedance is predicted at:
  - R1, R2 and R6 to R10 for the evening with the occurrence percentage of ≤16.4.
  - R1, R2 and R4 to R10 for the night with the occurrence percentage of ≤19.4.
- For the operations of berth 1 and 8 (scenarios 9 and 10), exceedance is predicted at:
  - R10 (a commercial receiver) during the day on Monday to Saturday (for scenario 9 only);
  - R7 (a noise-sensitive receiver) and R10 (a commercial receiver) during the operations of Sunday, public holiday and evening; but
  - R2, R4, R7 (three noise-sensitive receivers) and R10 (a commercial receiver) for the night-time operations.

When the operation of berth 1 or 8/9 is included, the (current) "worst-case" port operation (for scenario 11 or 12) does not comply with the Regulations at:

- R10 (a commercial receiver) during the day on Monday to Saturday.
- R2, R7 (two noise-sensitive receivers) and R10 (a commercial receiver) for the Sunday and public holidays.
- R1 to R4, R7 (five noise-sensitive receivers) and R10 (a commercial receiver) during the evening.
- R1 to R5, R7 (all of the closest noise-sensitive receivers) and R10 (a commercial receiver) during the night.

The annual occurrence percentage of exceedance is less than 1.7% for the "worst-case" port operation.

Most items of construction equipment/plant generate high level noises. To reduce construction noises, the following noise control measures are recommended:

- Piling noise is to be managed through restricting the activity to dayshift construction hours and where feasible managing the activity away from community peak periods (example mid-day breaks). Piling should also be managed according to weather and Port operational noise conditions.
- Enclose noisy fixed plant such as diesel generators and compressors.
- In consultation with the local Council (LGA), signage will be placed in Community areas and construction site interfaces to communicate the noise hazard associated with the area.
- Implement where reasonably practicable "other" best practice" construction noise controls as outlined in the construction noise management plan (CNMP).

Where reasonably practicable, temporary and mobile barriers are recommended at locations close to noisy sources for reducing construction noise propagation towards the noise-sensitive premises.

The major noise sources in the shiploading of berth 1 or 8/9 are mobile cranes, forklifts, vacuum truck and prime movers. Management of Berth 1 and Berth 8/9 will be via the existing MWPA Operational Noise Management Plan.

In Summary

The Geraldton Port is located close to the Geraldton city centre and surrounded by commercial premises. Noises from road traffic, sea-waves, wind, commercial premises, other industries and street activities are present during the days and the night. Background noises vary and are normally high in the port and surrounding area. The noise emitted from the port operations may therefore be masked and inaudible due to high level background noises in many scenarios.

While construction and vessel noise within the Port are exempt, where managed within the applicable regulations, the impacts from construction and operational noise from the Port that is related to PMaxP will be managed via:

- Construction Noise Management Plan; and
- The existing MWPA Operational Noise Management Plan.

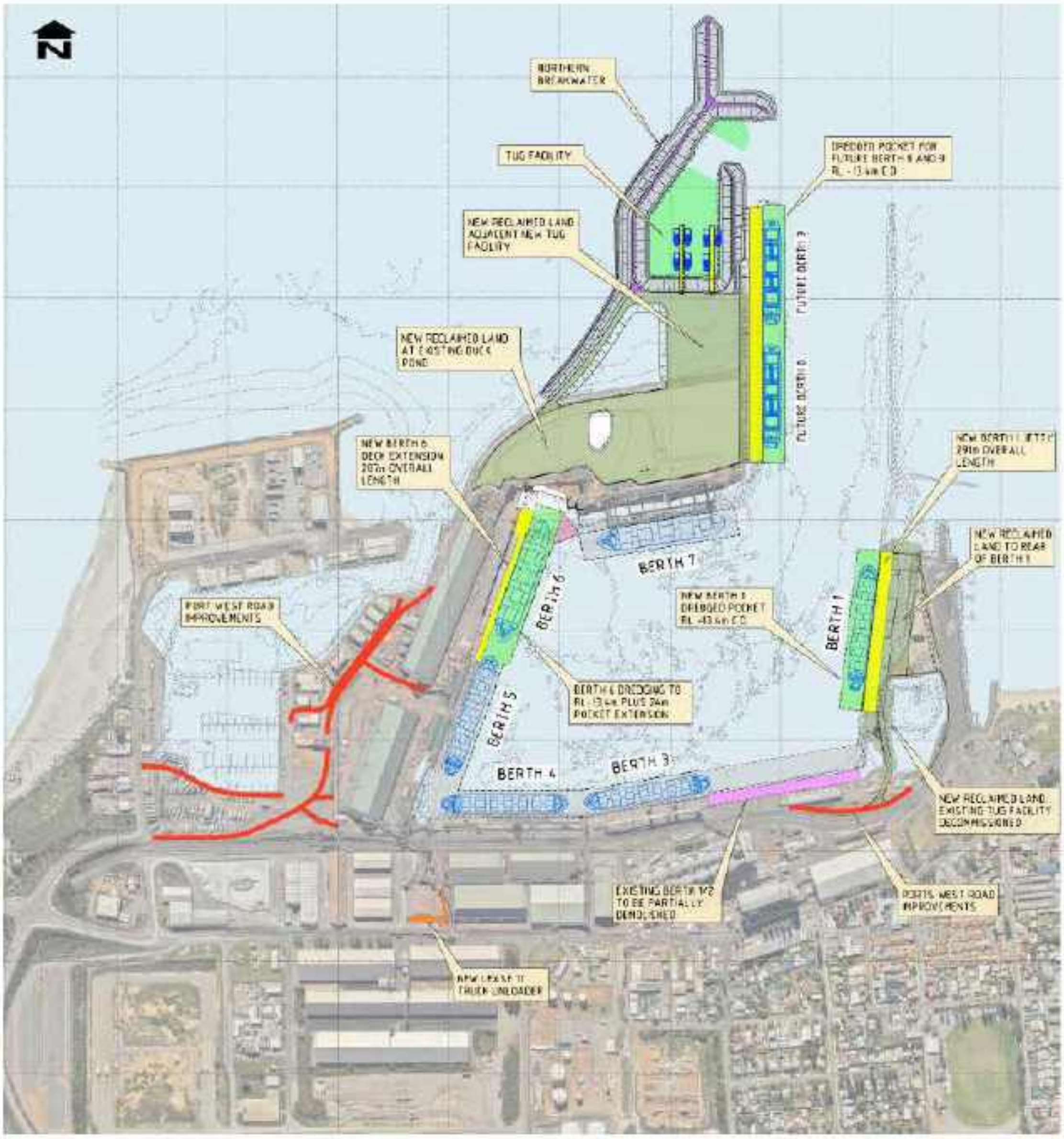


Figure 1: Upgraded Geraldton Port Layout.

Figure 2: cations of selected noise-sensitive receivers.

TABLE OF CONTENTS

1.0 INTRODUCTION

The Geraldton Port is operated by Mid West Ports Authority (MWPA) and located close to the city centre of Geraldton. The Geraldton Port is a multi-user port consisting of a multiple-berth inner harbour, port related infrastructure and storage sheds/tanks.

MWPA plans to upgrade the Port to facilitate increased utilisation, efficiency and infrastructure improvements. The Port Maximisation Project (PMaxP) will upgrade the marine based infrastructure at the Geraldton Port including:

- Capital Dredging at Berth 1 and Berth 6.
- Maintenance Dredging at Berth 1 and Tug Harbour.
- Construction of a New Berth 1 including an access causeway.
- Upgrade to Berth 6 – widening and lengthening of the existing berth.
- Construction of a New Tug Harbour.
- Capital Dredging at Berth 8/9 and Construction of New Berth 8/9.

Acoustic Engineering Solutions (AES) has been commissioned by MWPA to undertake environmental noise impact assessments of the proposed constructions and operations of PMaxP marine based infrastructure. The objectives of assessments are to determine whether or not the proposed constructions and operations would comply with the Environmental Protection (Noise) Regulations 1997 (the Regulations).

To achieve the objectives, the following activities are undertaken:

- Review provided information including the site layouts, construction phases and schedules, equipment model/list and utilisation;
- Develop an acoustic model;
- Predict the worst-case noise emissions at the closest noise sensitive receivers;
- Generate noise contours for the port and surrounding area under the 8 "worst-case" cardinal wind conditions;
- Undertake risk assessments based on the past 5-year weather conditions;
- Undertake compliance assessments of the worst-case noise emissions from:
  - the construction activities at different phases.
  - the individual operations of new berth 1 or 8.
- Recommend noise control options if required.

Figure 1 in APPENDIX A presents the upgraded Geraldton Port layout and its surrounding area including the proposed new berths and Tug harbour. Figure 2 in APPENDIX A presents the closest residential/commercial receivers selected for the detailed assessments of noise impact.

2.0 NOISE CRITERIA

Environmental noise management in Western Australia is implemented through the Environmental Protection (Noise) Regulations 1997 (the Regulations). The Regulations set noise limits which are the highest noise levels that can be received at noise-sensitive (residential), commercial and industrial premises. These noise limits are defined as 'assigned noise levels' at receiver locations. Regulation 7 requires that "noise emitted from any premises or public place when received at other premises must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind".

Table 2-1 presents the assigned noise levels at various premises.

Table 2-1: Assigned noise levels in dB(A)

Type of Premises Receiving Noise	Time of Day	Assigned Noise Levels in dB(A)[1]		
		$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	45 + Influencing factor	55 + Influencing factor	65 + Influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + Influencing factor	50 + Influencing factor	65 + Influencing factor
	1900 to 2200 hours all days	40 + Influencing factor	50 + Influencing factor	55 + Influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + Influencing factor	45 + Influencing factor	55 + Influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises other than those in the Kwinana Industrial Area	All hours	65	80	90

[1] Assigned level L_{A1} is the A-weighted noise level not to be exceeded for 1% of a delegated assessment period.
Assigned level L_{A10} is the A-weighted noise level not to be exceeded for 10% of a delegated assessment period.
Assigned level L_{Amax} is the A-weighted noise level not to be exceeded at any time.

For highly noise sensitive premises, an "influencing factor" is incorporated into the assigned noise levels. The influencing factor depends on road classification and land use zonings within circles of 100 metres and 450 metres radius from the noise receiver locations.

2.1 CORRECTIONS FOR CHARACTERISTICS OF NOISE

Regulation 7 requires that that "noise emitted from any premises or public place when received at other premises must be free of:

(i) tonality;
(ii) impulsiveness; and
(iii) modulation.

when assessed under Regulation 9".

If the noise exhibits intrusive or dominant characteristics, i.e. if the noise is impulsive, tonal, or modulating, noise levels at noise-sensitive premises must be adjusted. Table 2-2 presents the adjustments incurred for noise exhibiting dominant characteristics. That is, if the noise is assessed as having tonal, modulating or impulsive characteristics, the measured or predicted noise levels have to be adjusted by the amounts given in Table 2-2. Then the adjusted noise levels must comply with the assigned noise levels. Regulation 9 sets out objective tests to assess whether the noise is taken to be free of these characteristics.

Table 2-2: Adjustments for dominant noise characteristics

Adjustment where noise emission is not music. These adjustments are cumulative to a maximum of 15 dB.			Adjustment where noise emission is music	
Where tonality is present	Where Modulation is present	Where Impulsiveness is present	Where Impulsiveness is not present	Where Impulsiveness is present
+5 dB	+5 dB	+10 dB	+10 dB	+15 dB

2.2 CUMULATIVE NOISE

Regulation 7(2) states that "for the purposes of subregulation (1)(a), a noise emission is taken to ***significantly contribute to*** a level of noise if the noise emission as determined under subregulation (3) exceeds a value which is 5 dB below the assigned level at the point of reception".

The Guideline for the Assessment of Environmental Noise Emissions[2] (the Guideline) states that "*for an application for new industry or expansion of an existing one which is part of a large industrial estate, the department would require the applicant to achieve noise targets*

[2] Guideline: Assessment of Environmental Noise Emissions, Draft for Consultation, May 2021.

set below the '5 dB below' level in order to contain cumulative noise and meet the EPA's objectives".

2.3 CONSTRUCTION NOISE

Noise associated with the construction activities in WA is managed through Regulation 13, which presents the definitions of construction site and construction work, and provides management procedures for the construction noise.

2.3.1 Normal Construction Hours

Regulation 13(2) states that *Regulation 7 does not apply to noise emitted from a construction site as a result of construction work carried out between 0700 hours and 1900 hours on any day which is not a Sunday or public holiday if the occupier of the premises or public place, shows that —*

(a) the construction work was carried out in accordance with control of environmental noise practices set out in section 4 of AS 2436-2010 Guide to noise and vibration control on construction, maintenance and demolition sites; and
(b) the equipment used on the premises was the quietest reasonably available; and
(c) if the occupier was required to prepare a noise management plan under subregulation (4) in respect of the construction site —
  (i) the noise management plan was prepared and given in accordance with the requirement, and approved by the CEO; and
  (ii) the construction work was carried out in accordance with the noise management plan, excluding any ancillary measure.

2.3.2 Out-of-Hours Construction

Regulation 13(3) states that *Regulation 7 does not apply to noise emitted from a construction site as a result of construction work carried out other than between the hours specified in subregulation (2) if the occupier of the construction site shows that —*

(a) the construction work was carried out in accordance with control of environmental noise practices set out in section 4 of AS 2436-2010 Guide to noise and vibration control on construction, maintenance and demolition sites; and
(b) the equipment used on the premises was the quietest reasonably available; and
(c) the construction work was carried out in accordance with a noise management plan, excluding any ancillary measure, in respect of the construction site —
  (i) prepared and given to the CEO not later than 7 days before the construction work commenced; and
  (ii) approved by the CEO;

  and
(d) at least 24 hours before the construction work commenced, the occupier of the construction site gave written notice of the proposed construction work to the

occupiers of all premises at which noise emissions received were likely to fail to comply with the standard prescribed under regulation 7; and

(e) it was reasonably necessary for the construction work to be carried out at that time.

2.4 EXEMPTIONS UNDER THE REGULATIONS

Regulation 3(1) states that *nothing in these regulations applies to the following noise emissions —*

(a) Noise emissions from the propulsion and braking systems of motor vehicles operating on a road;

(c) Noise emissions from trains or aircraft (other than model aircraft and trains operating on railways with a gauge of less than 70 cm);

(d) Noise emissions from a safety warning device fitted to a train or vessel;

(f) Noise emissions from the propulsion system or the movement through the water of a vessel operating in water other than water on private premises;

(g) Noise emissions —

(iv) for the purpose of giving a warning required under the *Mines Safety and Inspection Regulations 1995* regulation 8.26,

If every reasonable and practicable measure has been taken to reduce the effect of the noise emission consistent with providing an audible warning to people;

(h) Noise emissions from —

(i) a reversing alarm fitted to a motor vehicle, mobile plant, or mining or earthmoving equipment; or

(ii) a startup or movement alarm fitted to plant,

If —

(iii) it is a requirement under another written law that such an alarm be fitted; and

(iv) it is not practicable to fit an alarm that complies with the written law under which it is required to be fitted and emits noise that complies with these regulations;

(i) Noise emissions from an engine, equipment, machinery or plant on a vessel while the vessel is in a port.

All of the roads inside the Port including the access roads (such as Gillam Road) are managed and used by the Port only and not open to public. The Guideline[2] states that Regulation 3(1)(a) *does not apply to vehicles operating within any premises as the vehicles are not on a "road that is open to or used by the public".*

2.5 INFLUENCING FACTORS

Eleven receivers surrounding the Geraldton Port are selected, as shown in Figure 2 in APPENDIX A, by consulting with the MWPA representative for detailed assessments of noise impact. Five of them (R6 and R8 to R11) are commercial receivers and the others represent noise-sensitive premises.

Influencing factor varies from residence to residence depending on the surrounding land use. No roads in the vicinity of the selected noise sensitive locations are sufficient to be classified as either the major or secondary roads and therefore no transport factors apply.

Table 2-3 presents the calculated assigned noise levels for the selected receivers.

Table 2-3: Calculated assigned noise levels in dB(A).

Closest Residents	Influencing Factor in dB	Assigned Noise levels in dB(A)			
		Day[3] Monday to Saturday	Day[4] for Sunday & Public Holiday	Evening[5]	Night[6]
L_{A10}					
R1	3	48	43	43	38
R2	2	47	42	42	37
R3	12	57	52	52	47
R4	7	52	47	47	42
R5	8	53	48	48	43
R6	N/A	60	60	60	60
R7	2	47	42	42	37
R8	N/A	60	60	60	60
R9	N/A	60	60	60	60
R10	N/A	60	60	60	60
R11	N/A	60	60	60	60
L_{AMax}					
R1	3	68	68	58	58
R2	2	67	67	57	57
R3	12	77	77	67	67
R4	7	72	72	62	62
R5	8	73	73	63	63

[3] 0700 to 1900 hours for Monday to Saturday.
[4] 0900 to 1900 hours for Sunday and public holidays.
[5] 1900 to 2200 hours for all days.
[6] 2200 to 0700 hours for Monday to Saturday and to 0900 hours for Sunday and public holidays.

Closest Residents	Influencing Factor in dB	Assigned Noise levels in dB(A)			
		Day[3] Monday to Saturday	Day[4] for Sunday & Public Holiday	Evening[5]	Night[6]
R6	N/A	80	80	80	80
R7	2	67	67	57	57
R8	N/A	80	80	80	80
R9	N/A	80	80	80	80
R10	N/A	80	80	80	80
R11	N/A	80	80	80	80

3.0 THE PORT MAXIMISATION PROJECT

The Port Maximisation Project is to construct and upgrade marine based infrastructure at the Geraldton Port including:

- Capital Dredging at Berth 1 and Berth 6.
- Maintenance Dredging at Berth 1 and Tug Harbour.
- Construction of a New Berth 1 including an access causeway.
- Upgrade to Berth 6 – widening and lengthening of the existing berth.
- Construction of a New Tug Harbour.
- Capital Dredging at Berth 8/9 and Construction of New Berth 8/9.

3.1 PROPOSED CONSTRUCTION HOURS

The construction activities take place 7 days a week over a two-year period.

Most of the construction activities are planned during the day (between 7am and 7pm) only, but a 24/7 operation is proposed for the dredging operations due to the significant costs associated with starting and stopping the dredge operation on a daily basis. The capital dredging occurs at:

- Berth 1 for 3 weeks in April 2026.
- Berth 6 for 6 weeks in May and June 2026.
- Berth 8/9 for 6 weeks in June to August 2026.

3.2 PROPOSED CONSTRUCTION ACTIVITIES

Broadly the construction scope is divided into Dredging, Tug Harbour construction, Civil Works, Piling and Structural Works. Piling will be intermittent during the day with expected 1 to 3 piles per day at berths B1, B6 or B8 and 4 piles per day at Tug Harbour. The pile driving time is about 20 to 40 minutes per pile.

Table A1 in APPENDIX A presents the construction schedule and plant utilisation. The main construction activities are detailed in the followings.

3.2.1 Dredging

Dredging activities include:

- Berth 1 Maintenance dredge pocket – 3 week period.
- Berth 1 Capital dredge pocket – 6 week period.
- Berth 6 Capital dredge pocket – 3 week period.
- Tug Harbour (Maintenance dredge) – 3 week period.
- Berth 8 Capital dredge pocket – 6 week period.

The equipment used during the maintenance dredging work is:

- 1 X Trailer Suction Hopper Dredge.

The equipment used for the daytime capital dredging works includes:

- 1 X BHD (Backhoe dredge (2000kW) or similar) with Excavator (Komatsu PC5500 or equivalent);
- 2 X Split Hopper Barge (650m3);
- 2 X 14T Bollard Pull tugs;
- 1 X Survey Vessel Class 1C;
- 2 X Articulated Dump Truck;
- 1 X 45T Excavator (CAT 350);
- 1 X WA 500 Front End Loader (CAT 980); and
- 1 X D10 Bulldozer.

The evening/night-time capital dredging will operate the following equipment:

- 1 X Conditioning Seabed Hyrdro Hammer; OR
- 1 X Trailer Suction Hopper Dredge.

3.2.2 Tug Harbor Seawall & Reclamation

The equipment used during this stage includes:

- 3 X Articulated Dump Truck (ADT);
- 1 X 140T Excavator;
- 2 X 45T Excavator (CAT 350);
- 1 X 30T Excavator with rock breaker;
- 1 X WA 500 Front End Loader (CAT 980);
- 1 X D10 Bulldozer;
- 1 X Grader;
- 1 X 20T Telehandler/Franna Crane;
- 1 X 600cfm Compressor;
- 1 X 150kva Generator (silenced);
- 1 X 5T Roller/Compactor; and
- 1 X 8-Wheel Dump Truck.

3.2.3 Civil/Earthworks at Berth 1, 6 or 8

The equipment used during this stage includes:

- 3 X Articulated Dump Truck (ADT);
- 1 X 140T Excavator;
- 1 X 100T Excavator (Landside "dredge") - Berth 6 ONLY;
- 1 X 45T Excavator (CAT 350);
- 1 X 30T Excavator with Rock Bbreaker;
- 1 X WA 500 Front End Loader (CAT 980);
- 1 X D10 Bulldozer;
- 1 X Grader;
- 1 X 5T Roller/Compactor; and
- 1 X Plate Compactor.

3.2.4 Piling (Tug and Berth 1, 6, 8 and 9)

The equipment used during the piling includes:

- 1 X 200T Mobile Crane;
- 1 X IHC S200 Piling Hammer;
- 1 X ABI 13/16 Sheet Piling Rig;
- 2 X 600cfm Compressor; and
- 2 X 150kva Generator (silenced).

3.2.5 B2 Berth Deck Removal and Pile Cutoff

The equipment used during B2 berth removal includes:

- 2 X Construction Saws (1500mm (60inch) Diesel 74HP);
- 1 X 30T Excavator with rock breaker;
- 2 X 200T Mobile Crane; and
- 2 X 8 Wheel Dump Trucks.

3.2.6 Structural Works at Berth 1, 6 or 8

The equipment used during the structural works includes:

- 1 X Concrete Delivery Truck;
- 1 X Concrete Pump (Putzmeister M56-5);
- 1 X 20T Front End Loader (FEL CAT 972);
- 1 X 200T Mobile Crane;
- 1 X 300T Mobile Crane (Manitwoc Crawler);
- 1 X 20T Telehandler;
- 1 x 40T Franna Crane;
- 3 X Elevated Work Platforms;
- 1 X Plate Compactor;
- 4 X Lincoln Welding Generator;
- 2 X 600cfm Compressor; and
- 2 X 150kva Generator (silenced).

3.2.7 All Construction Stages

For all of the above construction stages, the following mobile equipment and hand tools will operates intermittently:

- 2 X Forklifts;
- 2 X 20T Telehandler/Franna Crane;
- 2 X Bobcat loaders;
- 2 X Delivery Trucks;
- 2 X Service Trucks;
- 1 X Fuel Delivery Truck;
- 2 X Watercarts;

- 4 X Angle Grinders;
- 4 X Circular Saws;
- 4 X Impact Drivers; and
- 4 X Hammer Drill.

3.3 NEW BERTH OPERATONS

For new berths 1 and 8/9, no ship Loader and conveyor systems will be constructed. Un/loading in these berths is undertaken using mobile harbour cranes.

3.3.1 Berth 1

The equipment operated during the un/loading operation at new berth 1 includes:

- One mobile harbour Crane (Liebherr LHM 550 or similar).
- Four road trains/trucks: two driving inside the port, one idling on the new berth (1 or 8/9) being un/loaded and one idling waiting for un/loading on the new berth.
- Mobile equipment including one EWP, one forklift and one vacuum truck. The utilisation time is 30% for EWP, 100% for forklift and 15% for vacuum truck.

3.3.2 Berths 8 and 9

Berths 8 and 9 are designed for wind farm un/loading. The equipment operated at new berths 8 and 9 includes:

- 2 X Liebehrr 280 Mobile Harbour Cranes.
- 1 X 15T Forklift (eg Hyster/Hyundai).
- 1 X 3T Forklift.
- 2 X Sany SC1500A-5 Creeper Cranes.
- 2 X Snorkel A46JRT 35ft EWPs.
- 1 X Panoramic P25.6 Telehandler.
- 2 X Prime Movers with power packs, typically Kenworth K104; Volvo Fh16; Mercedes-Benz Actros 2660.

All of them are assumed to have utilisation of 100%.

4.0 NOISE MODELLING

4.1 METHODOLOGY

An acoustic model has been developed using SoundPlan v8.0 program, and the CONCAWE[7,8] prediction algorithms are selected for this study. The acoustic model is used to predict noise levels at the selected receivers and generate noise contours for the area surrounding the Geraldton Port.

The acoustic model does not include noise emissions from any sources other than from the construction and operations of PMaxP Marine Infrastructure. Therefore, noise emissions from nearby road traffic, aircraft, neighbouring industrial and commercial premises, sea waves, etc are excluded from the modelling.

4.2 INPUT DATA

4.2.1 Topography

Topographical data for the Geraldton Port and surrounding area was provided by MWPA in Auto-CAD dxf format. A reflective surface is assumed for (sea) water and port area while averaged absorptive coefficient of 0.6 is assumed for the other area.

The existing buildings and sheds in the port and surrounding area of interest are considered in the acoustic model.

4.2.2 Noise Sensitive Premises

In consultation with the MWPA representatives, eleven (11) closest noise-sensitive and commercial receivers are selected for the detailed assessment of noise impacts, as shown in Figure 2 in APPENDIX A.

Receivers R1 to R5 and R7 represent the noise-sensitive premises while the others (R6, R8 to R11) represent the commercial receivers.

4.2.3 Source Sound Power Levels

Table 4-1 presents the source sound power levels. Some of the source sound power levels are calculated from the information provided by MWPA while some of them are obtained from the measurements for the previous AES projects[910] in the Geraldton Port. Some (overall levels) of the construction equipment and hand tools are suggested by the Australian

[7] CONCAWE (Conservation of Clean Air and Water in Europe) was established in 1963 by a group of oil companies to carry out research on environmental issues relevant to the oil industry.
[8] The propagation of noise from petroleum and petrochemical complexes to neighbouring communities, CONCAWE Report 4/81, 1981.
[9] Occupational noise survey of the Geraldton Port operations, AES Report (AES-890351-R01-A-11072024), 11 July 2024.
[10] Environmental noise impact assessment of Geraldton Port. AES Report (AES-890312-R02-0-21112023), 21 November 2023.

Standard 2436:2010[11] and their spectra are fitted from the AES database for similar equipment.

Table 4-1: Source sound power levels.

Noise Sources	Overall Sound Power Levels in dB(A)
Trailer Suction Hopper Dredge	112
BHD (Backhoe dredge (2000kW) or similar)	116
Split Hopper Barge	112
14T Bollard Pull Tugs	103
Survey Vessel Class 1C	106
45T Excavator (CAT 350)	107
WA 500 Front End Loader (CAT980 FEL)	103
D10 Bulldozer	113
Service Truck	97
Fuel Delivery Truck	97
Water Cart	107
Articulated Dump Truck (ADT)	97
140T Excavator	113
100T Excavator (Landside "dredge")	111
30T Excavator with Rock Breaker	118
Grader	104
200T Mobile Crane	106
300T Mobile Crane (Manitwoc Crawler)	106
IHC S200 Piling Hammer L_{Amax}	137
ABI 13/16 Sheet Piling Rig	111
20T Telehandler	94

11 AS2436-2010, Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites, Standards Australia.

Noise Sources	Overall Sound Power Levels in dB(A)
600cfm Compressor	101
150kva Generator (silenced)	97
5T Roller / compactor	109
Plate Compactor	109
Bobcat loader	102
8-Wheel Dump Truck	107
Construction Saws	108
Concrete Delivery Truck	108
Concrete Pump (Putzmeister M56-5)	98
20T Front End Loader (FEL CAT 972)	109
40T Franna Crane	104
Elevated Work Platform (EWP)	100
Hyundai Forklift 35DT-7	102
Lincoln Welding Generator	100
Liebherr LHM 550 Crane	109
Driving Road Train	98
Idling Road Train	91
Vacuum Truck	109
Liebehrr 280 Mobile Harbour Crane	106
Sany SC1500A-5 Creeper Crane	106
3T Forklift	91
Prime Movers with power pack	102
Angle Grinder	108
Circular Saw	107
Impact Driver	102

Noise Sources	Overall Sound Power Levels in dB(A)
Hammer Drill	110

4.3 METEOROLOGY

SoundPlan calculates noise levels for defined meteorological conditions. In particular, temperature, relative humidity, wind speed and direction data are required as input to the model. For this study the default "worst-case" meteorological conditions[12] are assumed, as shown in Table 4-2. Since the evening and night have the same worst-case meteorological conditions, their predicted noise levels will be the same if the noise sources are the same.

Table 4-2: Worst-case meteorological conditions.

Time of day	Temperature Celsius	Relative Humidity	Wind speed	Pasquill Stability Category
Evening (0700 --- 1900)	20 Celsius	50%	4m/s	E
Evening (1900 --- 2200)	15 Celsius	50%	3m/s	F
Night (2200 --- 0700)	15 Celsius	50%	3m/s	F

4.4 OPERATIONAL SCENARIOS

By consulting with the MWPA representative and based on the provided information and construction schedule shown in Table A1 in APPENDIX A, twelve (12) construction and operational scenarios are modelled as followings:

Scenario 1: Represents the following daytime construction activities in April 2026:

- Berth 1 Capital Dredge;
- Tug Harbour Seawalls and Reclamation; and
- Berth 1 Civil/Earthworks.

Scenario 2: Represents the following daytime construction activities in July & August 2026:

- Berth 8/9 Capital Dredge;
- Tug Harbour Seawalls and Reclamation;
- Berth 6 Civil/Earthworks;
- Berth 1 Piling; and

[12] Guideline: Assessment of Environmental Noise Emissions, Draft for Consultation, May 2021.

- Berth 1 Structural (Deck Install).

Scenario 3: Represents the Piling Hammer operation for Berth 1 Piling. Piling Hammer generates high impact noise L_{AMax}.

Scenario 4: Represents the following daytime construction activities in October to December 2026:

- Tug Harbour Seawalls and Reclamation;
- Tug Harbour Piling; and
- Berth 1 Structural (Deck Install).

Scenario 5: Represents the following daytime construction activities in May 2027:

- Maintenance Dredging Works at Tug Harbour;
- Berth 6 Piling; and
- Berth 6 Structural (Deck Install).

Scenario 6: Represents the following daytime construction activities in August 2027:

- Berth 8 Civil/Earthworks;
- Berth 2 Berth Demolition;
- Berth 8 Piling; and
- Berth 6 Structural.

Scenario 7: Represents the following daytime construction activities in November 2027 to March 2028:

- Berth 8 Structural.

Scenario 8: Represents the worst-case day and evening/night-time dredging operations in April 2026:

- Berth 1 Capital Dredge.

Scenario 9: Represents the worst-case operation of new berth 1.

Scenario 10: Represents the worst-case operation of new berth 8.

Scenario 11: Scenario 9 plus the current worst-case Geraldton Port Operation[13].

Scenario 12: Scenario 10 plus the current worst-case Geraldton Port Operation[13].

Scenarios 1 to 7 represent the construction activities occurring during the day only (between 7am and 7pm) while scenario 8 represents the construction activities occurring during the day, the evening and the night (24 hours a day). Scenarios 9 to 12 are the operational scenarios.

The number and utilisation percentages of equipment operating in each of the construction scenarios are listed in Table A1 in APPENDIX A. For all of the daytime construction scenarios (1, 2 and 4 to 7), the following mobile equipment and hand tools are considered:

Mobile equipment: 2 X Forklifts;
2 X 20T Telehandlers/Franna Cranes;
2 X Bobcat loaders;

[13] Worst-case operational scenarios 1 (for the day) and 1A (for the night) in the acoustic report of "Environmental Noise Assessment of the Geraldton Port" AES report (NO: AES-890312-R02-0-21112023).

2 X Delivery Trucks;
2 X Service Trucks; and
1 X Fuel Delivery Trucks.

Hand tools: 4 X Angle Grinders;
4 X Circular Saws;
4 X Impact Drivers; and
4 X Hammer Drills.

Scenario 3 considers the Piling Hammer impact noise in isolation for its maximum noise L_{AMax} emission during Berth 1 piling, which is the worst-case piling location to R3 to R10.

The noises from capital/maintaince dredge operations are exempted from the Regulations because the dredging equipment operates on vessels in the water of the port (see section 2.4). They are included in the construction scenarios because MWPA wants to assess their noise impacts on the surrounding community.

Scenarios 9 and 10 represent the individual shiploading operations at New Berth 1 and 8. As stated in section 3.3, shiploading in new berths 1 and 8/9 is undertaken using mobile harbour crane (not via conveyor system). The shiploading equipment is listed in section 3.3.

5.0 MODELLING RESULTS

5.1 POINT CALCULATIONS

Noise levels for the 12 operational scenarios are predicted at the 11 noise-sensitive and commercial receivers for calm and worst-case winds in 8 cardinal directions. The full point prediction results for different wind conditions are presented in Table B1 to Table B17 in APPENDIX B. Those tables indicate that wind direction has a big impact on the noise levels received at the selected receivers.

Table 5-1 and Table 5-2 summarise the predicted worst-case noise levels in dB(A) at the selected receivers. For construction scenarios 1 to 7, the predicted noise levels are the daytime A-weighting noise levels. For scenario 3, the predicted noise levels are the daytime A-weighting maximum noise levels L_{AMax}. For construction scenario 8 and operational scenarios 9 to 12, the day and night-time A-weighting noise levels are predicted.

Table 5-1: Predicted worst-case daytime construction noise levels in dB(A).

Receivers	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
	Day	Day	Day	Day	Day	Day	Day
R1	41.5	37.7	56.6	36.6	32.5	39.2	28.3
R2	42.2	40.4	56.0	38.4	31.9	39.1	33.5
R3	36.9	37.7	50.9	32.1	32.3	40.2	29.0
R4	43.0	46.6	56.9	39.8	39.2	45.3	41.3
R5	41.6	40.6	55.9	36.5	35.9	38.4	32.5
R6	59.9	55.8	74.5	54.6	49.7	47.5	47.0
R7	50.8	48.0	66.7	45.9	43.6	40.1	40.1
R8	56.8	54.4	75.9	52.2	52.7	51.0	46.4
R9	57.8	55.7	74.2	52.1	51.0	51.3	49.0
R10	65.4	61.6	82.1	60.2	57.7	59.6	50.8
R11	49.6	47.8	63.5	45.8	39.7	46.3	40.2

Table 5-2: Predicted worst-case noise levels in dB(A).

Receivers	Scenario 8		Scenario 9		Scenario 10		Scenario 11		Scenario 12	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
R1	38.3	38.8	31.9	32.4	28.2	28.6	42.5	42.8	42.3	42.5
R2	38.5	38.9	32.0	32.3	33.8	34.2	44.7	44.4	44.8	44.6
R3	33.9	33.9	28.4	28.5	28.8	28.9	49.1	48.8	49.2	48.8
R4	38.9	39.0	33.9	34.0	38.9	39.0	45.1	44.9	45.8	45.6
R5	38.4	38.5	32.6	32.6	32.2	32.3	41.5	41.3	41.5	41.3
R6	56.2	56.3	49.8	49.9	46.2	46.4	51.5	51.5	49.4	49.5
R7	48.0	48.1	41.9	42.0	39.4	39.7	44.0	44.1	42.7	42.8
R8	55.4	55.5	45.5	45.6	46.7	46.9	52.7	52.6	52.9	52.9
R9	55.0	55.0	49.8	49.8	47.6	47.7	53.9	53.8	53.2	53.1
R10	62.6	62.6	56.4	56.5	50.0	50.1	59.4	59.4	57.4	57.2
R11	46.0	46.3	39.9	40.2	39.9	40.1	52.6	51.7	52.6	51.7

Comparison between scenarios 9 and 11 (or 10 and 12) indicates that the operational noise in berth 1 (or 8/9) is much below the noise radiated from the current worst-case Geraldton Port Operation at most of the representative receivers.

5.2 NOISE CONTOURS

Noise contours are generated for the default "worst-case" meteorological conditions of 8 cardinal wind directions and presented in Figure 3 to Figure 138 in APPENDIX C. These noise contours represent the noise propagation envelops at 1.5m above the ground.

Figure 3 to Figure 138 show that wind direction has a big impact on the noise propagation. North-easterly to south-easterly winds enhance the noise propagations towards R1, R2 and R11 while westerly to northerly winds increase the noise levels at R3 to R10.

6.0 RISK ASSESSMENT

The noise modelling results presented in Table B1 to Table B17 in APPENDIX B show that the predicted noise levels at any given receiving location vary significantly depending on the prevailing weather conditions. In order to assess the actual noise impact on the receiving locations, 4.5 year (mid-2018 to 2022) meteorological data are analysed to determine the frequency of occurrence of specific weather conditions.

6.1 REVIEW OF METEOROLOGICAL CONDITIONS

Wind speed and direction data provided by MWPA are analysed to determine the percentage occurrence that exceedance could occur at the selected receiving locations. Historical data dating back over 4.5 years was used in the analysis. Table 6-1 to Table 6-3 present the percentage occurrence of worst-case wind speeds (4m/s for day time and 3m/s for evening/night time) for 8 cardinal wind directions.

Detailed percentage occurrence for different wind speeds and directions is presented in Table E1 and Table E2 in APPENDIX D.

Table 6-1: Percentage occurrence of wind-speeds from 3.5m/s to 4.5m/s during the day (7am to 7pm).

Month	Percentage Occurrence for Windspeed of 4m/s During the Day								Total
	N	NE	E	SE	S	SW	W	NW	
Jan	0.1%	0.3%	0.9%	0.8%	3.4%	4.8%	0.2%	0.0%	10.5%
Feb	0.2%	0.2%	1.6%	1.0%	4.6%	6.0%	1.1%	0.0%	14.7%
Mar	0.3%	0.9%	2.8%	1.3%	4.6%	5.3%	1.1%	0.0%	16.2%
Apr	0.2%	0.3%	3.7%	2.2%	3.9%	5.2%	0.9%	0.0%	16.2%
May	0.6%	1.8%	4.3%	1.7%	3.1%	2.8%	0.9%	0.0%	15.4%
Jun	0.9%	2.0%	6.1%	1.5%	2.1%	2.2%	1.1%	0.0%	15.9%
Jul	0.7%	1.6%	4.2%	0.9%	2.7%	3.1%	1.0%	0.0%	14.2%
Aug	0.8%	1.2%	4.9%	2.3%	2.4%	2.5%	1.4%	0.0%	15.6%

Month	Percentage Occurrence for Windspeed of 4m/s During the Day								Total
	N	NE	E	SE	S	SW	W	NW	
Sep	0.9%	0.8%	2.9%	1.5%	2.8%	6.0%	1.4%	0.0%	16.2%
Oct	0.2%	0.2%	0.7%	1.5%	3.1%	6.9%	1.7%	0.0%	14.4%
Nov	0.3%	0.2%	0.7%	1.0%	2.7%	6.2%	1.6%	0.1%	12.7%
Dec	0.3%	0.3%	1.0%	1.0%	2.9%	6.4%	1.2%	0.0%	13.0%
Annum	0.5%	0.8%	2.8%	1.4%	3.2%	4.8%	1.1%	0.0%	14.6%

Table 6-2: Percentage occurrence of wind-speeds from 2.5m/s to 3.5m/s during the evening (7pm to 10pm).

Month	Percentage Occurrence for Windspeed of 3m/s During the Evening								Total
	N	NE	E	SE	S	SW	W	NW	
Jan	0.1%	0.0%	0.2%	0.5%	2.6%	3.1%	0.2%	0.0%	6.8%
Feb	0.4%	0.5%	0.6%	1.1%	5.0%	3.1%	0.1%	0.0%	10.7%
Mar	0.0%	0.1%	1.0%	3.2%	5.0%	2.8%	0.1%	0.0%	12.2%
Apr	0.2%	0.0%	2.1%	4.8%	4.3%	4.5%	0.6%	0.0%	16.4%
May	0.4%	0.9%	5.5%	9.7%	1.6%	0.8%	0.5%	0.0%	19.5%
Jun	1.0%	1.1%	11.4%	8.3%	0.9%	1.6%	0.8%	0.0%	25.2%
Jul	0.3%	1.1%	5.2%	6.7%	1.6%	1.4%	0.4%	0.1%	16.8%
Aug	0.4%	0.2%	5.1%	8.1%	2.3%	2.9%	1.1%	0.1%	20.2%
Sep	0.9%	0.3%	0.9%	5.7%	4.1%	4.1%	0.6%	0.0%	16.6%

Month	Percentage Occurrence for Windspeed of 3m/s During the Evening								Total
	N	NE	E	SE	S	SW	W	NW	
Oct	0.4%	0.2%	0.0%	0.5%	3.2%	4.2%	1.9%	0.0%	10.4%
Nov	0.0%	0.0%	0.0%	1.1%	2.6%	3.9%	0.2%	0.0%	7.9%
Dec	0.4%	0.1%	0.3%	0.7%	2.8%	2.9%	0.6%	0.1%	8.0%
Annum	0.4%	0.4%	2.7%	4.2%	3.0%	2.9%	0.6%	0.0%	14.2%

Table 6-3: Percentage occurrence of wind-speeds from 2.5m/s to 3.5m/s during the night (10pm to 7am).

Month	Percentage Occurrence for Windspeed of 3m/s During the Night								Total
	N	NE	E	SE	S	SW	W	NW	
Jan	0.2%	0.2%	0.7%	4.4%	5.2%	2.4%	0.4%	0.0%	13.5%
Feb	0.7%	0.4%	2.3%	5.4%	4.3%	1.9%	0.2%	0.0%	15.2%
Mar	0.4%	0.7%	3.6%	6.2%	4.8%	2.0%	0.4%	0.0%	18.0%
Apr	0.2%	0.2%	6.8%	8.9%	1.7%	1.1%	0.5%	0.0%	19.4%
May	0.7%	2.2%	8.4%	6.7%	0.3%	0.4%	0.4%	0.0%	19.0%
Jun	0.4%	1.6%	14.9%	3.1%	0.6%	0.7%	0.4%	0.0%	21.8%
Jul	0.2%	2.2%	9.4%	3.4%	0.5%	0.7%	0.5%	0.0%	17.0%
Aug	0.5%	0.8%	10.5%	4.5%	0.9%	1.3%	0.9%	0.1%	19.4%
Sep	0.5%	1.1%	6.0%	7.8%	1.9%	2.2%	1.1%	0.0%	20.6%
Oct	0.1%	0.2%	3.2%	8.2%	3.4%	2.8%	1.6%	0.1%	19.6%

Month	Percentage Occurrence for Windspeed of 3m/s During the Night								Total
	N	NE	E	SE	S	SW	W	NW	
Nov	0.1%	0.0%	2.0%	6.8%	4.8%	3.2%	1.0%	0.1%	18.1%
Dec	0.5%	0.3%	1.7%	5.6%	4.6%	3.0%	0.3%	0.0%	15.9%
Annum	0.4%	0.8%	5.8%	5.9%	2.7%	1.8%	0.6%	0.0%	18.1%

6.2 WIND INDUCED NOISES

The Regulations assess the noise impact only for wind speeds of:

- 4m/s for daytime operations; and
- 3m/s for evening/night-time operations.

The Guideline indicates that the wind speeds exceeding the above speed values may elevate background noise levels from local vegetation and can dominate the noise emissions. Therefore, for wind speeds above 4m/s during the days or 3m/s during the evening or the night, it is possible that the port noise emissions may exceed the assigned levels; however it is unlikely that the port noises would be audible above wind induced noises.

7.0 COMPLIANCE ASSESSMENT

As indicated in section 2.3, construction noise is not required to comply with the assigned noise levels. But MWPA wants to assess the construction noises for determining if a construction noise management plan is required.

New berths 1 and 8/9 are "expansion of an existing one which is part of a large industrial estate" (the Geraldton Port). As indicated in section 2.2, the Guideline requires that *"the applicant to achieve noise targets set below the '5 dB below' level in order to contain cumulative noise and meet the EPA's objectives*". The construction activities represented by scenarios 1 to 8 are for the new expansion and occur within the Geraldton Port. Therefore, for all of the construction scenarios (1 to 8) and for operational scenarios 9 to 10, the compliance assessments are undertaken based on the noise limits, which is 5 dB below the assigned noise levels shown in Table 2-3.

Scenarios 11 and 12 consider the worst-case operations of whole Geraldton Port and they are assessed against the assigned noise levels L_{A10}.

7.1 TONALITY ADJUSTMENT

According to Table 2-2, before the compliance assessment the predicted noise levels shown in Table 5-1 and Table 5-2 should be adjusted by:

- 5 dB if the noise received exhibits tonality; or
- 10 dB if the noise received exhibits impulsiveness.

Mechanical plant may radiate tonal noise components while piling hammer noise exhibits impulsiveness. High background noises are present in the Geraldton Port and surround area. When the overall noise received at a receiver is much below background levels, its tonality or impact characteristics will be masked and inaudible. Therefore, the above adjustments will not apply.

Both the the 2015[14] and 2023[15] measurement results indicate that the night-time background noise levels are above 45 dB(A) at the selected receivers. The daytime background levels are expected to be 10 dB(A) higher. It is expected that tonality will be masked at the receiver when the predicted mechanical noise level is below 50 dB(A) for the day and below 40 dB(A) for the evening and the night.

Scenario 3 considers piling noise only and a 10dB impact adjustment applies while the other scenarios consider mechanical noises and a 5dB tonality adjustment applies to the noise levels above 50 dB(A) for the day and 40 dB(A) for the evening and the night.

Table 7-1 and Table 7-2 present the adjusted worst-case A-weighted noise levels. The adjusted noise levels for different wind conditions are presented in Table B1 to Table B17 in APPENDIX B. The adjusted levels are expressed in ***italic bold***.

[14] Environmental noise impact assessment of Geraldton Port operations. SVT Report (Rpt01-1370822-Rev1-12 February 2015), 12 February 2015.
[15] Environmental Noise Assessment of the Geraldton Port, AES report (NO: AES-890312-R02-0-21112023), 21 Nov. 2023.

Table 7-1: Adjusted construction noise levels in dB(A).

Receivers	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
	Day	Day	Day	Day	Day	Day	Day
R1	41.5	37.7	***66.6***	36.6	32.5	39.2	28.3
R2	42.2	40.4	***66.0***	38.4	31.9	39.1	33.5
R3	36.9	37.7	***60.9***	32.1	32.3	40.2	29.0
R4	43.0	46.6	***66.9***	39.8	39.2	45.3	41.3
R5	41.6	40.6	***65.9***	36.5	35.9	38.4	32.5
R6	***64.9***	***60.8***	***84.5***	***59.6***	49.7	47.5	47.0
R7	***55.8***	48.0	***76.7***	45.9	43.6	40.1	40.1
R8	***61.8***	***59.4***	***85.9***	***57.2***	***57.7***	***56.0***	46.4
R9	***62.8***	***60.7***	***84.2***	***57.1***	***56.0***	***56.3***	49.0
R10	***70.4***	***66.6***	***92.1***	***65.2***	***62.7***	***64.6***	***55.8***
R11	49.6	47.8	***73.5***	45.8	39.7	46.3	40.2

Table 7-2: Adjusted operational noise levels in dB(A).

Receivers	Scenario 8		Scenario 9		Scenario 10		Scenario 11		Scenario 12	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
R1	38.3	38.8	31.9	32.4	28.2	28.6	42.5	***47.8***	42.3	***47.5***
R2	38.5	38.9	32.0	32.3	33.8	34.2	44.7	***49.4***	44.8	***49.6***
R3	33.9	33.9	28.4	28.5	28.8	28.9	49.1	***53.8***	49.2	***53.8***
R4	38.9	39.0	33.9	34.0	38.9	39.0	45.1	***49.9***	45.8	***50.6***
R5	38.4	38.5	32.6	32.6	32.2	32.3	41.5	***46.3***	41.5	***46.3***
R6	***61.2***	***61.3***	49.8	***54.9***	46.2	***51.4***	***56.5***	***56.5***	49.4	***54.5***
R7	48.0	***53.1***	41.9	***47.0***	39.4	39.7	44.0	***49.1***	42.7	***47.8***

Receivers	Scenario 8		Scenario 9		Scenario 10		Scenario 11		Scenario 12	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
R8	***60.4***	***60.5***	45.5	***50.6***	46.7	***51.9***	***57.7***	***57.6***	***57.9***	***57.9***
R9	***60.0***	***60.0***	49.8	***54.8***	47.6	***52.7***	***58.9***	***58.8***	***58.2***	***58.1***
R10	***67.6***	***67.6***	***61.4***	***61.5***	***55.0***	***55.1***	***64.4***	***64.4***	***62.4***	***62.2***
R11	46.0	***51.3***	39.9	***45.2***	39.9	***45.1***	***57.6***	***56.7***	***57.6***	***56.7***

7.2 COMPLIANCE ASSESSMENT

In the following sections, the occurrence percentage of exceedance is calculated based on the following two factors:

- For all of the construction and operational scenarios, the annual percentage occurrence for the worst-case wind-speeds (4m/s during the day and 3m/s during the evening and the night) in different wind directions shown in Table 6-1 to Table 6-3.
- For operational scenarios 11 and 12, the (additional) annual percentage of worst-case operation of Geraldton Port of 9.4%[15].

In the following tables (Table 7-3 to Table 7-11):

- Blank cell represents the adjusted noise levels are below the noise limits for scenarios 1 to 10 (or assigned noise levels for scenarios 11 and 12).
- N represents "worst-case" northerly wind.
- NE represents "worst-case" north-easterly wind.
- E represents "worst-case" easterly wind.
- SE represents "worst-case" south-easterly wind.
- S represents "worst-case" southerly wind.
- SW represents "worst-case" south-westerly wind.
- W represents "worst-case" westerly wind.
- NW represents "worst-case" north-westerly wind.
- ALL represents all of the 8 "worst-case" cardinal winds.

7.2.1 Construction Noises

Construction scenarios 1 to 7 occur during the day only. Therefore only the daytime assessment is undertaken for scenarios 1 to 7. Scenario 8 represents the 24-hours construction activities of Berth 1 Capital Dredge and its noise emissions are assessed against the day and evening/night-time limits.

Scenario 3 represents piling hammer impact noise L_{Amax} and its predicted noise levels are assessed against the noise limits L_{Amax}. For the other construction scenarios (1, 2, and 4 to

8), noise limits L_{A10} apply.

Monday to Saturday

Table 7-3 and Table 7-4 present the day-time compliance assessments on Monday to Saturday excluding public holidays. It is shown that exceedance is predicted for every construction scenario. For the daytime constructions, exceedance is predicted at:

- R2 and R7 (two noise-sensitive receivers) and most of the commercial receivers for scenario **1.**
- R7 (one noise-sensitive receiver) and most of the commercial receivers for scenarios 2, 4, 5 and 8.
- R1, R2 and R7 (three noise-sensitive receivers) and most of the commercial receivers for scenario 3.
- R8 to R10 (three commercial receivers) for scenario 6.
- R10 (marginal exceedance at one commercial receiver) for scenario 7.

The daytime exceedance occurrence percentage is ≤16.2%.

Table 7-3: Daytime compliance assessment on Monday to Saturday.

Receivers	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 1	Scenario 2	Scenario 4	Scenario 5	Scenario 6
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	43					
R2	42	0.2 (NE – E) 4.0%				
R3	52					
R4	47					
R5	48					
R6	55	1.0 — 9.9 ALL 16.2%	3.8 — 5.8 (W – NE) 3.4%	2.3 — 4.6 (W – NE) 2.0%		
R7	42	0.6 — 13.8 (SW – NE) 10.2%	5.0 — 6.0 (W – NE) 3.4%	3.3 — 3.9 (W – NE) 2.0%	0.4 — 1.6 (W – NE) 3.4%	

Receivers	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 1	Scenario 2	Scenario 4	Scenario 5	Scenario 6
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R8	55	0.4 — 6.8 ALL 16.2%	0.6 — 4.4 (W – NE) 3.4%	1.9 — 2.2 (W – N) 1.8%	2.5 — 2.7 (W – N) 1.5%	1.0 (W – NW) 1.5%
R9	55	0.9 — 7.8 (S – NE) 10.3%	3.5 — 5.7 (SW – N) 4.8%	0.6 — 2.1 (SW – N) 8.3%	0.6 — 1.0 (SW – NW) 3.7%	0.9 — 1.3 (SW – NW) 4.0%
R10	55	9.3 — 15.4 ALL 16.2%	2.0 — 11.6 ALL 14.9%	1.2 — 10.2 ALL 13.4%	1.9 — 7.7 ALL 15.4%	0.1 — 9.6 (SE – N) 9.5%
R11	55					

Table 7-4: Daytime compliance assessment Monday to Saturday.

Receivers	5dB Below Daytime Assigned Noise Levels L_{Amax} in dB(A)	Scenario 3	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 7	Scenario 8
		Exceedance (Non-compl Wind Direction) Occurrence Percentage		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	63	3.2 — 3.6 (N – SE) 7.6%	43		
R2	62	3.5 — 4.0 (N – SE) 7.6%	42		
R3	72		52		
R4	67		47		
R5	68		48		

Receivers	5dB Below Daytime Assigned Noise Levels L_{Amax} in dB(A)	Scenario 3 Exceedance (Non-compl Wind Direction) Occurrence Percentage	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 7 Exceedance (Non-compl Wind Direction) Occurrence Percentage	Scenario 8 Exceedance (Non-compl Wind Direction) Occurrence Percentage
R6	75	2.9 — 9.5 ALL 15.4%	55		1.2 — 6.2 (W – E) 5.0%
R7	62	6.5 — 14.7 ALL 15.4%	42		5.5 — 6.0 (W – NE) 1.3%
R8	75	4.8 — 10.9 ALL 15.4%	55		0.1 — 5.4 (SW – E) 10.2%
R9	75	2.9 — 9.2 ALL 15.4%	55		3.9 — 5.0 (SW – N) 6.2%
R10	75	12.8 — 17.1 ALL 15.4%	55	0.4 — 0.8 (W – N) 1.3%	8.1 — 12.6 ALL 16.2%
R11	75		55		

Sunday and Public Holidays

Table 7-5 and Table 7-6 present the day-time compliance assessments for Sunday and public holidays. It is shown that exceedance is predicted for every scenario at most receivers except for R2, R5 and R11. The daytime exceedance occurrence percentage is ≤16.2%.

Table 7-5: Daytime compliance assessment on Sunday.

Receivers	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 1	Scenario 2	Scenario 4	Scenario 5	Scenario 6
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	38	3.1 — 3.5 (N – SE) 6.3%				0.8 — 1.2 (N – SE) 9.2%
R2	37	4.5 — 5.2 (N – SE) 6.3%	1.8 — 3.4 (N – SE) 8.3%	1.0 — 1.4 (N – E) 1.3%		1.8 — 2.1 (NE – SE) 8.4%
R3	47					
R4	42	0.6 — 1.0 (NW – NE) 0.4%	3.0 — 4.6 (W – NE) 3.4%			1.3 — 3.3 (W – NE) 3.5%
R5	43					
R6	55	1.0 — 9.9 ALL 16.2%	3.8 — 5.8 (W – NE) 3.4%	2.3 — 4.6 (W – NE) 2.0%		
R7	37	4.2 — 18.8 ALL 16.2%	0.8 — 11.0 (SW – E) 10.8%	8.3 — 8.9 (W – NE) 2.0%	5.4 — 6.6 (W – NE) 3.4%	2.9 — 3.1 (W – N) 2.3%
R8	55	0.4 — 6.8 ALL 16.2%	0.6 — 4.4 (W – NE) 3.4%	1.9 — 2.2 (W – N) 1.8%	2.5 — 2.7 (W – N) 1.5%	1.0 (W – NW) 1.5%
R9	55	0.9 — 7.8 (S – NE) 10.3%	3.5 — 5.7 (SW – N) 4.8%	0.6 — 2.1 (SW – N) 8.3%	0.6 — 1.0 (SW – NW) 3.7%	0.9 — 1.3 (SW – NW) 4.0%
R10	55	9.3 — 15.4 ALL 16.2%	2.0 — 11.6 ALL 14.9%	1.2 — 10.2 ALL 13.4%	1.9 — 7.7 ALL 15.4%	0.1 — 9.6 (SE – N) 9.5%
R11	55					

Table 7-6: Daytime compliance assessment on Sunday.

Receivers	5dB Below Daytime Assigned Noise Levels L_{Amax} in dB(A)	Scenario 3	5dB Below Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 7	Scenario 8
		Exceedance (Non-compl Wind Direction) Occurrence Percentage		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	63	3.2 — 3.6 (N – SE) 7.6%	38		0.1 — 0.3 (N – E) 4.1%
R2	62	3.5 — 4.0 (N – SE) 7.6%	37		1.0 — 1.5 (N – SE) 6.3%
R3	72		47		
R4	67		42		
R5	68		43		
R6	75	2.9 — 9.5 ALL 15.4%	55		1.2 — 6.2 (W – E) 5.0%
R7	62	6.5 — 14.7 ALL 15.4%	37	2.6 — 3.1 (W – NE) 1.6%	2.9 — 11 ALL 16.2%
R8	75	4.8 — 10.9 ALL 15.4%	55		0.1 — 5.4 (SW – E) 10.2%
R9	75	2.9 — 9.2 ALL 15.4%	55		3.9 — 5.0 (SW – N) 6.2%
R10	75	12.8 — 17.1 ALL 15.4%	55	0.4 — 0.8 (W – N) 1.3%	8.1 — 12.6 ALL 16.2%
R11	75		55		

The Evening and The Night

As indicated in section 4.4, scenario 8 happens during the day, the evening and the night. Table 7-7 presents the evening and night-time compliance assessments for scenario 8. Exceedance is predicted at:

- R1, R2 and R6 to R10 for the evening with the occurrence percentage of ≤16.4.
- R1, R2 and R4 to R10 for the night with the occurrence percentage of ≤19.4.

Table 7-7: Compliance assessment for scenario 8.

Receivers	5dB Below Evening Assigned Levels L_{A10} in dB(A)	Exceedance (Non-compl Wind Direction) Occurrence Percentage	5dB Below Night-time Assigned Levels L_{A10} in dB(A)	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	38	0.8 (N – SE) 7.1%	33	0.2 — 5.8 (NW – S) 17.8%
R2	37	1.8 — 1.9 (N – SE) 7.1%	32	1.2 — 6.9 (NW – S) 17.8%
R3	47		42	
R4	42		37	1.5 — 2.0 (NW – E) 7.2%
R5	43		38	0.5 (NW – NE) 0.4%
R6	55	0.6 — 6.3 ALL 16.4%	55	0.6 — 6.3 ALL 19.4%
R7	37	10.1 — 16.1 ALL 16.4%	32	15.1 — 21.1 ALL 19.4%
R8	55	0.7 — 5.5 ALL 16.4%	55	0.7 — 5.5 ALL 19.4%

Receivers	5dB Below Evening Assigned Levels L_{A10} in dB(A)	Exceedance (Non-compl Wind Direction) Occurrence Percentage	5dB Below Night-time Assigned Levels L_{A10} in dB(A)	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R9	55	0.1 — 5.0 ALL 16.4%	55	0.1 — 5.0 ALL 19.4%
R10	55	8.4 — 12.6 ALL 16.4%	55	8.4 — 12.6 ALL 19.4%
R11	55		55	

7.2.2 Operation Noises

Scenarios 9 to 12 are operational scenarios. Scenarios 9 and 10 consider individual new berth operations and they are assessed against the noise limits L_{A10} (5dB below the assigned noise levels L_{A10}). Scenarios 11 and 12 consider the worst-case operations of the whole Geraldton Port and they are assessed against the assigned noise levels L_{A10}.

Table 7-8 to Table 7-11 presents the compliance assessments. For scenarios 9 and 10, exceedance is predicted at:

- R10 during the day on Monday to Saturday (for scenario 9 only);
- R7 and R10 during the operations of Sunday, public holiday and evening; but
- R2, R4, R7 and R10 for the night-time operations.

The annual percentage of operation of berth 1 or 8/9 is unknown. If only the weather condition is considered, the predicted exceedance occurrence percentage for scenario 9 or 10 is less than:

- 7.2% during the daytime operation;
- 11.3% during the evening-time operation; and
- 18.1% during the night-time operation.

Without including the operation of new berth 1 or 8/9, the worst-case port operation does not comply with the Regulations[15] at:

- R10 during the day on Monday to Saturday;
- R2 and R10 during Sunday and public holidays;
- R2 to R4 and R10 during the evening; and
- R1 to R4, R7 and R10 during night.

By including the operation of new berth 1 or 8/9, the worst-case port operations (scenarios 11 and 12) not only increase the exceedance levels at the above receiver locations but also do not comply at the following additional receivers:

- R7 during Sunday and public holidays;
- R1 and R7 during the evening; and
- R5 during the night.

The annual percentage of the "worst-case" port operation is 9.4%. The predicted exceedance occurrence percentage of scenarios 11 and 12 is less than:

- 0.7% for the "worst-case" daytime port operation;
- 1% for "worst-case" evening-time port operation; and
- 1.7% for "worst-case" night-time port operation.

Table 7-8: Daytime compliance assessment for Monday to Saturday.

Receivers	5dB Below daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 9	Scenario 10	Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 11	Scenario 12
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	43			48		
R2	42			47		
R3	52			57		
R4	47			52		
R5	48			53		
R6	55			60		
R7	42			47		
R8	55			60		
R9	55			60		
R10	55	0.1 — 6.4 (SW – NE) 7.2%		60	0.9 — 4.4 (SW – NE) 0.7%	1.4 — 2.4 (SW – NW) 0.6%
R11	55			60		

Table 7-9: Daytime compliance assessment for Sunday.

Receivers	5dB Below daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 9	Scenario 10	Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 11	Scenario 12
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	38			43		
R2	37			42	0.6 — 2.7 (N – SE) 0.5%	0.8 — 2.8 (N – SE) 0.5%
R3	47			52		
R4	42			47		
R5	43			48		
R6	55			60		
R7	37	4.3 — 4.9 (W – NE) 2.4%	1.9 — 2.4 (W – NE) 2.4%	42	0.3 — 2.0 (W – NE) 0.2%	0.5 — 0.7 (W – N) 0.1%
R8	55			60		
R9	55			60		
R10	55	0.1 — 6.4 (SW – NE) 7.2%		60	0.9 — 4.4 (SW – NE) 0.7%	1.4 — 2.4 (SW – NW) 0.6%
R11	55			60		

Table 7-10: Evening-time compliance assessment.

Receivers	5dB Below daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 9 Exceedance (Non-compl Wind Direction) Occurrence Percentage	Scenario 10 Exceedance (Non-compl Wind Direction) Occurrence Percentage	Daytime Assigned Noise Levels L_{A10} in dB(A)	Scenario 11 Exceedance (Non-compl Wind Direction) Occurrence Percentage	Scenario 12 Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	38			43	0.4 — 4.8 (NW – SE) 0.7%	0.4 — 4.5 (NW – SE) 0.7%
R2	37			42	1.5 — 7.4 (NW – S) 1.0%	1.9 — 7.6 (NW – S) 1.0%
R3	47			52	1.3 — 1.8 (SW – N) 0.4%	1.3 — 1.8 (SW – N) 0.4%
R4	42			47	0.2 — 2.9 (SW – NE) 0.4%	1.5 — 3.6 (SW – NE) 0.4%
R5	43			48		
R6	55			60		
R7	37	0.7 — 1.0 (W – S) 11.3%	2.6 — 2.7 (W – NE) 1.4%	42	2.0 — 7.1 (SW – E) 0.7%	3.3 — 5.8 (SW – NE) 0.4%
R8	55			60		
R9	55			60		
R10	55	0.4 — 6.5 (S – E) 10.0%	0.1 (W – N) 1.0%	60	1.1 — 4.4 (S – NE) 0.7%	0.6 — 2.2 (SW – N) 0.4%
R11	55			60		

Table 7-11: Night-time compliance assessment.

Receivers	5dB Below Night-time Assigned Levels L_{A10} in dB(A)	Scenario 9	Scenario 10	Night-time Assigned Noise Levels L_{A10} in dB(A)	Scenario 11	Scenario 12
		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage		Exceedance (Non-compl Wind Direction) Occurrence Percentage	Exceedance (Non-compl Wind Direction) Occurrence Percentage
R1	33			38	1.3 — 9.8 ALL 1.7%	1.2 — 9.5 ALL 1.7%
R2	32	0.3 (N – SE) 12.9%	2.0 — 2.2 (N – SE) 12.9%	37	3.8 — 12.4 ALL 1.7%	3.9 — 12.6 ALL 1.7%
R3	42			47	0.5 — 6.8 ALL 1.7%	0.5 — 6.8 ALL 1.7%
R4	37		1.6 — 2.0 (W – NE) 1.9%	42	0.8 — 7.9 ALL 1.7%	1.3 — 8.6 ALL 1.7%
R5	38			43	1.0 — 3.3 (SW – NE) 0.3%	1.0 — 3.3 (SW – NE) 0.3%
R6	55			60		
R7	32	5.7 — 15.0 ALL 18.1%	1.9 — 7.7 (SW – E) 9.5%	37	3.5 — 12.1 ALL 1.7%	2.0 — 10.8 ALL 1.7%
R8	55			60		
R9	55			60		
R10	55	0.4 — 6.5 (S – E) 12.2%	0.1 (W – N) 1.0%	60	1.1 — 4.4 (S – NE) 0.6%	0.6 — 2.2 (SW – N) 0.3%
R11	55			60		

8.0 DISCUSSIONS AND RECOMMENDATIONS

8.1 MODEL LIMITATIONS

Noise emissions from either the construction activities or the port operations vary on a day to day basis depending on the activities being undertaken. The acoustic model does not model real-time port operations; it models snapshots of the assumed worst-case construction activities/operations and also considers the utilisation (occurrence percentage) of operating equipment/plant. The predicted noise levels represent averaged noise levels for the assumed construction/operational conditions.

8.2 HIGH LEVEL BACKGROUND NOISES

The Geraldton Port is located close to the Geraldton city centre and surrounded by commercial premises. Noises from road traffic, sea-waves, commercial premises, other industries and street activities are present during the days and the night. Background noises vary and are normally high in the port and surrounding area.

The assigned noise levels do not consider the effect of local background noises. At some noise sensitive premises, background noises are higher than the assigned noise levels. For example, at R1 and R2 the measured background noise was above 45 dB(A) during nights, which are higher than the night-time assigned noise levels. The noise emitted from the port operations may be masked and inaudible due to high level background noises.

8.3 NOISE CONTROLS

The compliance assessments in section 7.2 show none of the construction or operational scenarios achieves compliance with the Regulations.

8.3.1 Construction Noises

Most items of construction equipment/plant generate high level noises. To reduce construction noises, the following noise control measures are recommended:

- Enclose noisy fixed plant such as diesel generators and compressors.
- Piling noise is to be managed through restricting the activity to dayshift construction hours and where feasible managing the activity away from community peak periods (example mid-day breaks). Piling should also be managed according to weather and Port operational noise conditions.
- Signage, in consultation with the Local Council (LGA), will be placed in Community areas and construction site interfaces to communicate the noise hazard associated with the area.
- Implement where reasonably practicable "other" "best practice" construction noise controls as outlined in the CNMP.

Where reasonably practicable, temporary or mobile fences are recommended at locations close to noisy sources for reducing construction noise propagations towards the noise-sensitive premises.

8.3.2 Operational Noises

The major noise sources in the shiploading of new berth 1 or 8/9 are mobile cranes, forklifts, vacuum truck and prime movers. Management of Berth 1 and Berth 8/9 noise will be via the existing MWPA Operational Noise Management Plan.

APPENDIX A AERIAL VIEW

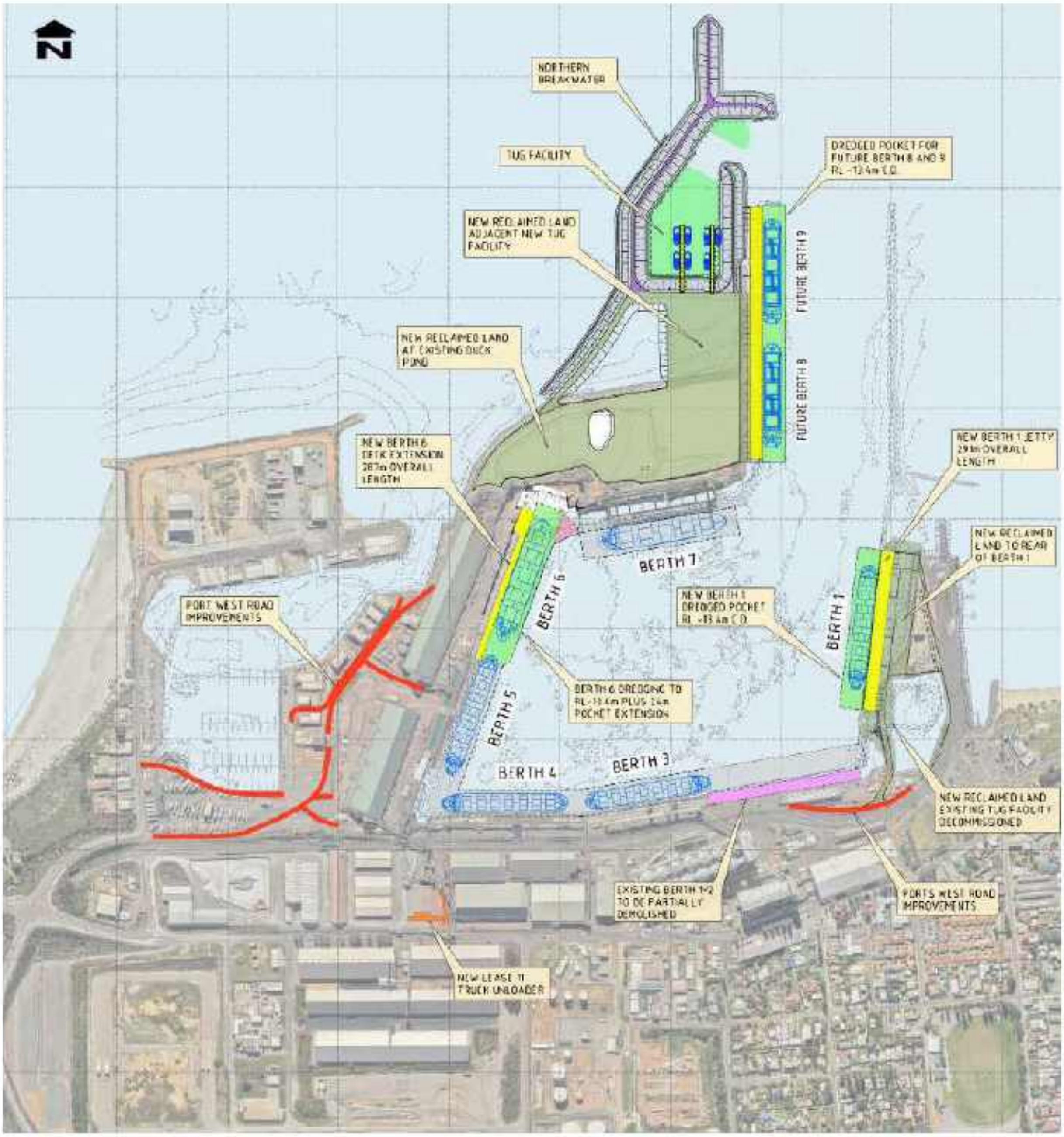


Figure 1: Upgraded Geraldton Port Layout.

Figure 2: Locations of selected noise-sensitive receivers.

Table A1: Construction schedule and plant utilisation.

PMaxP - Marine Construction - Plant Utilisation [illegible]

PHASE	INDICATIVE EQUIPMENT LIST (or similar)	ESTIMATED NUMBER OF Plant	Notes	Jan-26	Feb-26	Mar-26	Apr-26	[illegible]	May-26	[illegible]	Jun-26	[illegible]	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28
Summary schedule																																				
Dredge																																				
Berth 1 Main Dredge Pocket																																				
Berth 1 Capital Dredge																																				
Berth 2 Marine																																				
B2 Land side "dredge"																																				
Berth 5 [illegible]																																				
Tug Harbour (Not Port Maint Dredge)																																				
Construction																																				
Tug Harbour Seawalls / Breakwater																																				
Tug Harbour Piling (40 Piles)																																				
B1 Causeway & Revetment																																				
B1 Piling (H 22 piles)																																				
B1 Structural (Deck Works)																																				
B2 Piling - H 25 [illegible]																																				
B2 Structural																																				
B2 Berth Demolition																																				
B5 Piling																																				
B5 Structural																																				
Maintenance Dredging Works																																				
[illegible] TSHD	Trailer Suction Hopper Dredge	1			B1 North - [illegible]		weeks																													
Capital Dredging Works	BHD - Backhoe / Excavator [illegible] or similar - [illegible]	1					40%																													
(~ Berth 1, 4, 5)	Conditioning Seabed - Hydro Hammer	1	[illegible]					30%																												
	CSD (Cutter Suction Dredge) [illegible]	2					60%																													
	40T Bollard Pull tugs	2					10%																													
	Survey Vessel Class [illegible]	1					10%																													
	Articulated Dump Truck	2				40%																														
	40 Excavator (CAT 352)	1				30%																														
	WA 600 Front End Loader (CAT 980)	1				40%																														
	D10 Bulldozer	1					30%																													
Berth 1																																				
Berth 2																																				
Berth 3 / 4																																				
Tug Harbour																																				
Tug Harbour Seawall & Reclamation																																				
	Articulated Dump Truck (ADT)	2			80%																															
	140T Excavator	1			90%																															
	45 Excavator (CAT 350)	2			80%																															
	30t Excavator with rock breaker	1			70%																															
	WA 500 Front End Loader (CAT 980)	1			20%																															
	D10 Bulldozer	1			10%																															
	Grader	1			5%																															
	22T Telehandler / Franna Crane	1			20%																															
	600cfm Compressor	1			10%																															
	100kva Generator (silenced)	1			30%																															
	[illegible] Roller / compactor	1			20%																															
	6 Wheel Dump Truck	1			10%																															
Civil Earthworks Berth 1, 2, 5																																				
	Articulated Dump Truck (ADT)	2			70%									50%												10%		10%								
	140T Excavator	1			80%									30%																						
	120T Excavator (... "dredge") - Berth [illegible] ONLY	1												50%																						
	42 Excavator (CAT 352)	1			30%									40%												20%		20%								
	35 Excavator with rock breaker	1			10%									20%																						
	WA 500 Front End Loader (CAT 980)	1			30%									30%																						
	D10 Bulldozer	1			20%																															
	Grader	1			20%																															
	D Roller / compactor	1			20%									5%														5%								
	Plate Compactor	1			5%									5%												5%		5%								
Piles (1, 2, Tug, B5)	200T Mobile Crane	1									50%		50%																							
	IHC S200 Piling Hammer	1									25%		50%																							
	ABI [illegible] Down piling rig	1									25%		25%																							
	600cfm Compressor	2									10%		10%																							

	110kva Generator (silenced)	2								70%		70%																							
Berth 2																																			
[illegible]	Construction Case (1100mm (60mt) Diesel 7/4-P)	2																							60%	30%										
	35T Excavator with rock breaker	1																							60%	30%										
	100T Mobile Crane	1																							10%	20%	30%									
	6 Wheel Dump Truck	2																							50%	30%										
[illegible]																																			
	Concrete Delivery Truck 6m3	1										10%	10%	20%	20%						10%	10%	20%	20%			10%	20%							
	Concrete Pump (Putzmeister M56-5)	1										10%	10%	20%							10%	10%	20%				10%	20%							
	35T Front End Loader (FEL CAT 972)	1										20%									20%						30%								
	200T Mobile Crane	1										50%									50%						50%								
	500T Mobile Crane (Kumbach Crawler)	1										30%									30%						30%								
	25T Telehandler	1										20%									20%						20%								
	40T Franna Crane	1										20%									20%						20%								
	Elevated Work Platform	2										20%									20%						20%								
	Plate Compactor	1										5%									5%						5%								
	Lincoln Welding Generator	4										20%									20%						20%								
	900cfm Compressor	2										60%									60%						60%								
	110kva Generator (silenced)	2										80%									80%						80%								
Across 2 years	Forklift	2	20%									20%																							
	25T Telehandler / Franna Crane	2	40%									40%																							
	Bobcat loader	2	20%									20%																							
	Delivery Trucks	2	20%									20%																							
	Service Truck	2	10%									20%									10%														
	Fuel Delivery Truck	1	10%									20%									10%														
	Water Cart	2	10%									10%									10%														
Hand Tools (Across Project)																																			
	Angle Grinder	4		25%								25%									25%						25%								
	Circular Saw	4		10%								10%									10%						10%								
	Impact Driver	4		10%								20%									20%						20%								
	Hammer Drill	4		10%								10%									10%						10%								

APPENDIX B POINT MODELLING RESULTS

Table B1: *Predicted worst-case daytime noise levels in dB(A) for scenario 1.*

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 1								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	41.3	41.5	41.5	41.1	31.0	29.2	29.2	32.1	36.0
R2	41.7	42.2	42.2	41.5	32.6	30.5	30.5	32.7	36.4
R3	36.9	36.9	36.0	29.0	27.8	27.8	29.1	36.0	31.9
R4	43.0	42.9	40.3	34.3	33.8	33.8	36.9	42.6	38.2
R5	41.6	41.5	37.6	33.6	33.4	33.5	36.8	41.4	37.0
R6	***64.9***	***64.6***	***59.0***	***56.0***	***56.0***	***56.5***	***62.3***	***64.9***	***60.3***
R7	***55.8***	***55.3***	42.9	41.2	41.2	42.6	***55.1***	***55.8***	46.4
R8	***61.8***	***59.3***	***55.7***	***55.4***	***55.5***	***56.9***	***61.5***	***61.8***	***57.7***
R9	***62.0***	***55.9***	49.5	49.5	***56.1***	***62.0***	***62.8***	***62.8***	***58.8***
R10	***70.4***	***68.8***	***64.8***	***64.4***	***64.3***	***66.0***	***70.1***	***70.4***	***66.6***
R11	46.6	49.6	49.6	48.9	41.9	38.1	38.1	39.7	43.7

Table B2: *Predicted worst-case daytime noise levels in dB(A) for scenario 2.*

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 2								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	37.5	37.7	37.7	36.6	26.5	25.0	25.1	29.0	32.0
R2	40.1	40.4	40.4	38.8	30.1	28.6	28.7	32.0	34.8
R3	37.7	37.5	34.1	28.3	27.6	28.0	33.0	37.4	32.3

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 2								
	N	NE	E	SE	S	SW	W	NW	Calm
R4	46.6	45.2	38.9	34.3	34.1	36.9	45.0	46.5	40.9
R5	40.6	39.4	33.9	30.0	29.9	31.9	38.4	40.5	35.2
R6	***60.8***	***60.3***	47.8	43.9	44.0	45.1	***58.8***	***60.8***	***55.7***
R7	47.9	47.0	37.8	35.7	35.8	38.9	47.4	48.0	42.8
R8	***59.2***	***55.6***	43.1	42.5	42.9	49.8	***59.1***	***59.4***	49.3
R9	***60.0***	48.2	44.1	44.0	45.9	***58.5***	***60.6***	***60.7***	***55.3***
R10	***66.4***	***63.8***	***57.6***	***57.0***	***57.6***	***62.7***	***66.3***	***66.6***	***62.5***
R11	46.5	47.8	47.8	46.5	39.1	36.4	36.4	39.2	42.3

Table B3: ***Predicted worst-case daytime noise levels in dB(A) for scenario 3.***

Closest Residences	Worst-case Daytime Noise Levels L_{AMax} in dB(A) for Scenario 3								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	***66.3***	***66.6***	***66.6***	***66.2***	46.5	44.5	44.5	47.4	***61.4***
R2	***65.5***	***66.0***	***66.0***	***65.7***	47.1	44.5	44.5	46.1	***60.6***
R3	***60.9***	***60.9***	***60.1***	43.3	42.1	42.1	43.3	***60.1***	45.9
R4	***66.9***	***66.9***	***64.1***	49.2	48.7	48.7	***61.2***	***66.6***	***62.4***
R5	***65.9***	***65.9***	***61.7***	48.6	48.5	48.6	***61.6***	***65.8***	***61.6***
R6	***84.5***	***84.0***	***79.1***	***77.9***	***77.9***	***78.3***	***82.5***	***84.5***	***80.2***
R7	***76.7***	***76.2***	***70.0***	***68.5***	***68.5***	***69.9***	***76.1***	***76.7***	***72.8***

Closest Residences	Worst-case Daytime Noise Levels L_{AMax} in dB(A) for Scenario 3								
	N	NE	E	SE	S	SW	W	NW	Calm
R8	***85.9***	***83.3***	***80.0***	***79.8***	***79.8***	***80.9***	***85.4***	***85.9***	***81.6***
R9	***83.2***	***78.6***	***77.9***	***77.9***	***79.0***	***83.5***	***84.2***	***84.2***	***80.9***
R10	***92.1***	***88.9***	***87.8***	***87.8***	***87.8***	***87.8***	***91.9***	***92.1***	***87.8***
R11	***69.5***	***73.5***	***73.5***	***73.2***	***66.5***	***62.2***	***62.2***	***62.8***	***67.7***

Table B4: ***Predicted worst-case daytime noise levels in dB(A) for scenario 4.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 4								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	36.4	36.6	36.6	35.8	25.1	23.3	23.4	27.4	30.8
R2	38.0	38.4	38.4	36.7	27.5	25.7	25.7	29.5	32.4
R3	32.1	32.1	30.9	22.7	21.0	21.1	23.6	31.4	26.9
R4	39.8	39.7	36.4	28.8	28.1	28.3	34.0	39.5	34.6
R5	36.5	36.4	31.7	26.1	25.8	26.0	31.9	36.3	31.4
R6	***59.6***	***59.2***	46.7	42.2	42.2	43.3	***57.3***	***59.6***	49.6
R7	45.9	45.4	35.4	32.9	32.9	35.0	45.3	45.9	40.8
R8	***57.2***	49.2	41.5	40.9	41.0	46.2	***56.9***	***57.2***	47.5
R9	***56.0***	43.8	39.4	39.3	42.5	***55.6***	***57.0***	***57.1***	46.9
R10	***65.0***	***62.5***	***56.7***	***56.2***	***56.8***	***61.5***	***64.9***	***65.2***	***61.5***
R11	44.0	45.8	45.8	44.2	37.0	33.3	33.3	37.0	39.9

Table B5: ***Predicted worst-case daytime noise levels in dB(A) for scenario 5.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 5								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	32.4	32.5	32.5	32.2	22.0	19.9	19.9	23.1	27.5
R2	31.5	31.9	31.9	31.6	22.7	20.1	20.1	21.8	26.6
R3	32.3	31.4	27.2	22.5	21.9	23.5	30.7	32.2	27.2
R4	39.2	37.4	31.8	27.7	27.4	30.9	38.1	39.2	34.0
R5	35.9	33.1	28.2	25.8	25.7	29.3	34.8	35.9	30.7
R6	49.7	49.3	43.7	41.5	41.6	42.4	47.9	49.7	45.3
R7	43.5	42.4	35.0	33.3	33.4	37.0	43.3	43.6	39.2
R8	***57.5***	49.0	44.4	44.0	44.3	49.4	***57.5***	***57.7***	48.0
R9	49.9	42.8	41.7	41.7	43.9	***55.6***	***56.0***	***56.0***	46.8
R10	***62.5***	***59.1***	***57.0***	***56.9***	***57.0***	***59.3***	***62.6***	***62.7***	***58.3***
R11	36.6	39.7	39.7	39.5	32.6	28.2	28.2	29.0	34.3

Table B6: ***Predicted worst-case daytime noise levels in dB(A) for scenario 6.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 6								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	38.8	39.2	39.2	38.8	28.6	26.0	26.0	28.3	33.4
R2	36.5	39.1	39.1	38.8	30.4	26.1	26.1	27.4	33.0
R3	40.2	40.1	37.6	30.4	29.5	29.9	34.8	39.8	35.6

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 6								
	N	NE	E	SE	S	SW	W	NW	Calm
R4	45.3	44.6	37.4	33.8	33.8	35.2	43.3	45.3	40.6
R5	38.4	36.3	28.8	27.4	27.4	31.1	37.8	38.4	33.6
R6	47.5	45.0	38.8	38.1	38.2	41.8	47.1	47.5	43.2
R7	39.9	36.3	28.3	27.6	28.0	34.8	39.9	40.1	34.7
R8	***55.0***	42.8	38.9	38.7	41.2	49.9	***56.0***	***56.0***	45.7
R9	47.2	40.0	38.7	39.4	47.1	***55.9***	***56.3***	***56.1***	45.9
R10	***58.5***	49.8	48.9	***55.1***	***63.1***	***64.4***	***64.6***	***64.1***	***59.9***
R11	39.7	46.1	46.3	46.3	42.4	34.3	33.6	33.9	40.3

Table B7: ***Predicted worst-case daytime noise levels in dB(A) for scenario 7.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 7								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	28.2	28.3	28.2	24.0	16.2	15.7	15.7	21.2	22.4
R2	33.3	33.5	33.5	32.3	22.0	20.7	20.7	24.2	27.7
R3	29.0	29.0	24.2	18.5	18.2	18.3	23.0	28.9	23.5
R4	41.3	41.1	34.1	28.4	28.4	29.2	38.2	41.3	36.2
R5	32.5	32.0	24.0	21.2	21.2	22.1	30.5	32.5	27.0
R6	47.0	46.4	36.6	34.3	34.3	36.2	46.3	47.0	41.4
R7	40.1	39.6	29.0	26.7	26.7	29.5	39.7	40.1	34.9

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 7								
	N	NE	E	SE	S	SW	W	NW	Calm
R8	46.4	44.6	35.0	33.8	33.8	37.5	46.0	46.4	40.9
R9	48.8	41.5	35.8	35.8	36.6	45.5	49.0	49.0	43.5
R10	***55.8***	48.8	39.3	38.2	38.2	42.0	***55.4***	***55.8***	45.4
R11	39.8	40.2	40.2	39.5	29.3	27.6	27.6	30.3	34.7

Table B8: ***Predicted worst-case Day-time noise levels in dB(A) for scenario 8.***

Closest Residences	Worst-case Day-time Noise Levels in dB(A) for Scenario 8								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	38.1	38.3	38.3	38.0	28.5	26.9	26.9	29.3	33.1
R2	38.0	38.5	38.5	38.3	30.0	28.0	28.0	29.2	33.2
R3	33.9	33.9	33.1	27.0	26.1	26.1	27.0	33.0	29.1
R4	38.9	38.9	36.2	32.2	31.8	31.8	33.8	38.6	34.7
R5	38.4	38.3	34.7	32.0	31.9	32.0	34.3	38.3	34.5
R6	***61.2***	***60.9***	***56.2***	49.5	49.5	49.9	***59.4***	***61.2***	***57.1***
R7	48.0	47.5	41.3	39.9	39.9	41.3	47.5	48.0	44.2
R8	***60.4***	***57.7***	***55.1***	49.9	***55.0***	***56.1***	***60.2***	***60.4***	***56.6***
R9	***58.9***	49.2	48.4	48.4	49.8	***59.4***	***60.0***	***60.0***	***56.6***
R10	***67.5***	***65.4***	***63.3***	***63.1***	***63.1***	***64.4***	***67.3***	***67.6***	***63.8***
R11	42.2	46.0	46.0	45.8	39.1	35.5	35.5	36.0	40.3

Table B9: ***Predicted worst-case night-time noise levels in dB(A) for scenario 8.***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 8								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	38.8	38.8	38.8	38.8	33.2	30.3	30.6	34.2	38.5
R2	38.8	38.9	38.9	38.9	34.5	31.0	30.7	33.2	38.5
R3	33.9	33.9	33.9	29.3	27.6	27.6	29.1	33.8	32.9
R4	39.0	39.0	38.5	34.2	33.1	33.6	36.5	39.0	38.2
R5	38.5	38.5	37.4	33.7	33.0	33.7	37.3	38.5	37.5
R6	***61.3***	***61.3***	***58.5***	***56.0***	***55.6***	***56.6***	***60.9***	***61.3***	***60.4***
R7	***53.1***	***53.1***	***49.4***	***47.1***	***47.1***	***49.2***	***53.1***	***53.1***	***52.6***
R8	***60.5***	***59.7***	***56.3***	***55.7***	***56.0***	***58.4***	***60.5***	***60.5***	***59.6***
R9	***59.9***	***56.5***	***54.9***	***55.1***	***57.1***	***60.0***	***60.0***	***60.0***	***59.2***
R10	***67.6***	***66.6***	***63.8***	***63.4***	***63.4***	***66.0***	***67.6***	***67.6***	***66.9***
R11	***50.8***	***51.3***	***51.3***	***51.3***	***49.0***	38.7	37.7	39.3	***50.5***

Table B10: ***Predicted worst-case daytime noise levels in dB(A) for scenario 9.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 9								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	31.8	31.9	31.9	31.7	20.3	18.4	18.4	21.4	26.3
R2	31.7	32.0	32.0	31.8	21.6	19.3	19.3	20.8	26.0
R3	28.4	27.9	27.2	18.9	17.2	19.7	21.9	27.6	23.3

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 9								
	N	NE	E	SE	S	SW	W	NW	Calm
R4	33.9	33.8	31.8	23.3	22.4	22.7	26.2	33.5	28.9
R5	32.6	32.5	28.1	22.3	22.0	22.5	27.7	32.4	27.7
R6	49.8	49.5	42.9	37.8	37.8	38.8	46.7	49.8	44.9
R7	41.9	41.5	32.1	29.2	29.2	31.1	41.3	41.9	37.0
R8	45.4	44.2	35.8	34.6	35.0	38.1	45.1	45.5	40.9
R9	49.1	39.9	37.8	37.8	40.4	49.2	49.8	49.8	45.0
R10	***61.3***	***60.4***	48.0	47.0	48.3	***55.1***	***61.0***	***61.4***	***57.3***
R11	36.2	39.9	39.9	39.8	32.9	27.5	27.4	28.0	34.0

Table B11: ***Predicted worst-case night-time noise levels in dB(A) for scenario 9.***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 9								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	32.4	32.4	32.4	32.4	26.2	22.5	22.9	27.6	32.2
R2	32.3	32.3	32.3	32.3	27.4	22.9	22.5	25.8	32.1
R3	28.5	28.2	28.0	23.4	20.3	22.1	24.2	28.4	27.6
R4	34.0	34.0	33.6	27.7	25.0	26.1	30.9	34.0	33.2
R5	32.6	32.6	31.6	25.8	24.1	25.8	31.1	32.6	31.7
R6	***54.9***	***54.8***	***52.6***	***47.0***	***45.7***	***48.3***	***54.3***	***54.9***	***54.1***
R7	***47.0***	***47.0***	37.8	33.2	32.7	36.4	***46.9***	***47.0***	***46.4***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 9								
	N	NE	E	SE	S	SW	W	NW	Calm
R8	*50.6*	*50.2*	*45.0*	37.3	38.3	*47.2*	*50.6*	*50.6*	*49.8*
R9	*54.8*	*50.0*	*46.1*	*46.1*	*50.1*	*54.8*	*54.8*	*54.8*	*54.0*
R10	*61.3*	*61.1*	*56.6*	*54.6*	*55.4*	*58.3*	*61.5*	*61.5*	*60.7*
R11	39.6	*45.2*	*45.2*	*45.2*	37.9	31.6	30.1	32.5	39.6

Table B12: ***Predicted worst-case daytime noise levels in dB(A) for scenario 10.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 10								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	28.1	28.2	28.2	24.2	16.2	15.7	15.7	21.1	22.5
R2	33.6	33.8	33.8	32.8	22.4	21.2	21.2	24.3	28.1
R3	28.8	28.8	24.0	18.3	18.0	18.1	23.1	28.7	23.5
R4	38.9	38.6	31.5	26.6	26.6	27.4	35.7	38.9	33.6
R5	32.2	31.7	23.7	21.2	21.2	22.1	30.5	32.2	26.9
R6	46.2	45.6	35.9	33.9	33.9	35.9	45.6	46.2	40.8
R7	39.4	38.9	28.2	26.2	26.2	29.2	39.1	39.4	34.2
R8	46.7	44.5	35.0	34.0	34.0	38.1	46.4	46.7	41.2
R9	47.3	39.4	34.6	34.6	35.6	44.9	47.6	47.6	42.1
R10	*55.0*	47.4	38.4	37.5	37.5	41.9	49.6	*55.0*	44.6
R11	39.4	39.9	39.9	39.3	29.0	27.1	27.1	29.5	34.3

Table B13: ***Predicted worst-case night-time noise levels in dB(A) for scenario 10.***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 10								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	28.6	28.6	28.6	28.4	21.0	18.6	20.2	27.0	28.3
R2	34.2	34.2	34.2	34.0	27.5	24.4	25.1	30.3	33.8
R3	28.9	28.9	28.1	21.7	20.0	21.5	27.6	28.9	28.1
R4	39.0	39.0	36.7	30.8	29.4	32.1	38.6	39.0	38.3
R5	32.3	32.3	28.5	24.1	23.4	26.1	31.9	32.3	31.3
R6	***51.4***	***51.4***	***45.9***	37.1	37.1	***45.8***	***51.4***	***51.4***	***50.6***
R7	39.7	39.6	33.9	30.1	30.4	35.1	39.7	39.7	39.3
R8	***51.9***	***51.5***	39.9	36.9	38.0	***48.6***	***51.9***	***51.9***	***51.1***
R9	***52.7***	***49.9***	39.0	37.7	***45.7***	***52.3***	***52.7***	***52.7***	***52.0***
R10	***55.1***	***54.6***	***48.2***	***45.3***	***46.5***	***52.1***	***55.1***	***55.1***	***54.2***
R11	***45.1***	***45.1***	***45.1***	***45.0***	34.1	30.5	30.8	35.0	39.5

Table B14: ***Predicted worst-case daytime noise levels in dB(A) for scenario 11.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 11								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	42.1	42.5	42.5	41.9	32.8	31.0	31.0	33.6	37.6
R2	42.6	44.7	44.7	44.4	37.2	33.1	33.1	34.2	39.6
R3	48.7	43.8	41.1	40.9	41.7	47.4	49.1	49.1	45.0

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 11								
	N	NE	E	SE	S	SW	W	NW	Calm
R4	44.3	40.5	37.0	35.3	37.0	43.2	44.7	45.1	40.6
R5	40.3	37.6	32.9	31.3	33.6	39.1	40.9	41.5	36.6
R6	***56.4***	***55.3***	43.9	40.3	40.8	43.6	49.5	***56.5***	46.5
R7	43.9	42.3	34.0	32.3	32.8	37.6	43.6	44.0	39.0
R8	***56.1***	46.5	41.9	41.8	45.3	***56.0***	***57.6***	***57.7***	47.6
R9	***56.4***	43.5	42.3	42.7	48.5	***58.6***	***58.9***	***58.8***	48.8
R10	***62.8***	***60.9***	***55.1***	49.8	***59.8***	***62.2***	***64.4***	***64.4***	***59.8***
R11	46.6	***56.1***	***57.6***	***57.5***	***56.0***	47.3	42.4	42.0	47.8

Table B15: ***Predicted worst-case night-time noise levels in dB(A) for scenario 11.***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 11								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	***47.8***	***47.8***	***47.8***	***47.7***	37.5	34.3	34.6	38.4	***47.2***
R2	***49.1***	***49.4***	***49.4***	***49.4***	***46.5***	36.6	35.8	38.5	***48.8***
R3	***53.7***	***50.8***	***48.0***	***47.5***	***49.3***	***53.3***	***53.7***	***53.8***	***53.0***
R4	***49.8***	***47.2***	39.4	37.8	***45.3***	***48.8***	***49.7***	***49.9***	***49.0***
R5	***46.1***	39.0	35.8	34.0	37.1	39.8	***46.2***	***46.3***	***45.4***
R6	***56.5***	***56.2***	***53.3***	***48.7***	***48.7***	***52.0***	***56.2***	***56.5***	***55.7***
R7	***49.1***	***48.5***	39.0	35.5	36.3	***45.7***	***49.0***	***49.1***	***48.4***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 11								
	N	NE	E	SE	S	SW	W	NW	Calm
R8	*57.4*	*54.2*	*50.1*	*49.8*	*54.2*	*56.9*	*57.6*	*57.6*	*56.9*
R9	*57.9*	*52.8*	*50.1*	*51.1*	*56.2*	*58.8*	*58.8*	*58.8*	*58.0*
R10	*63.4*	*62.1*	*58.2*	*57.5*	*61.1*	*63.0*	*64.4*	*64.4*	*63.5*
R11	*53.9*	*56.6*	*56.7*	*56.7*	*55.7*	*51.5*	*48.5*	*49.3*	*55.9*

Table B16: ***Predicted worst-case daytime noise levels in dB(A) for scenario 12.***

Closest Residences	Worst-case Daytime Noise Levels in dB(A) for Scenario 12								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	41.9	42.3	42.3	41.6	32.7	30.9	30.9	33.6	37.4
R2	42.8	44.8	44.8	44.5	37.2	33.2	33.2	34.4	39.7
R3	48.7	43.8	41.0	40.9	41.7	47.4	49.1	49.2	45.0
R4	45.1	42.1	36.9	35.6	37.3	43.3	45.1	45.8	41.1
R5	40.3	37.4	31.9	31.2	33.5	39.1	41.1	41.5	36.5
R6	49.3	47.4	39.6	38.6	39.3	42.8	49.0	49.4	44.1
R7	42.5	40.3	32.0	31.0	31.7	37.3	42.5	42.7	37.5
R8	*56.5*	46.7	41.8	41.7	45.3	*56.0*	*57.9*	*57.9*	47.7
R9	*55.5*	43.3	41.4	41.9	48.1	*57.4*	*58.2*	*58.1*	47.8
R10	*59.3*	*55.1*	46.5	47.0	*58.8*	*61.4*	*62.4*	*62.2*	*57.0*
R11	47.0	*56.1*	*57.6*	*57.5*	*56.0*	47.3	42.4	42.1	47.8

Table B17: ***Predicted worst-case night-time noise levels in dB(A) for scenario 12.***

Closest Residences	Worst-case Night-time Noise Levels in dB(A) for Scenario 12								
	N	NE	E	SE	S	SW	W	NW	Calm
R1	*47.5*	*47.5*	*47.5*	*47.5*	37.3	34.2	34.5	38.4	*47.0*
R2	*49.3*	*49.6*	*49.6*	*49.5*	*46.5*	36.7	35.9	38.9	*49.0*
R3	*53.7*	*50.8*	*48.0*	*47.5*	*49.3*	*53.3*	*53.8*	*53.8*	*53.0*
R4	*50.5*	*48.5*	*45.4*	38.3	*45.6*	*49.1*	*50.5*	*50.6*	*49.8*
R5	*46.1*	39.0	34.9	33.7	37.0	39.8	*46.2*	*46.3*	*45.4*
R6	*54.5*	*54.0*	*48.5*	*46.0*	*47.2*	*51.1*	*54.5*	*54.5*	*53.6*
R7	*47.8*	*46.9*	36.4	34.0	35.5	*45.3*	*47.8*	*47.8*	*47.2*
R8	*57.7*	*54.7*	*50.1*	*49.7*	*54.1*	*57.1*	*57.9*	*57.9*	*57.1*
R9	*57.0*	*52.8*	*49.4*	*50.3*	*55.5*	*58.0*	*58.1*	*58.1*	*57.3*
R10	*60.6*	*57.8*	*54.2*	*54.9*	*59.9*	*61.7*	*62.2*	*62.2*	*61.3*
R11	*54.0*	*56.6*	*56.7*	*56.7*	*55.6*	*51.5*	*48.6*	*49.6*	*55.9*

APPENDIX C NOISE CONTOURS

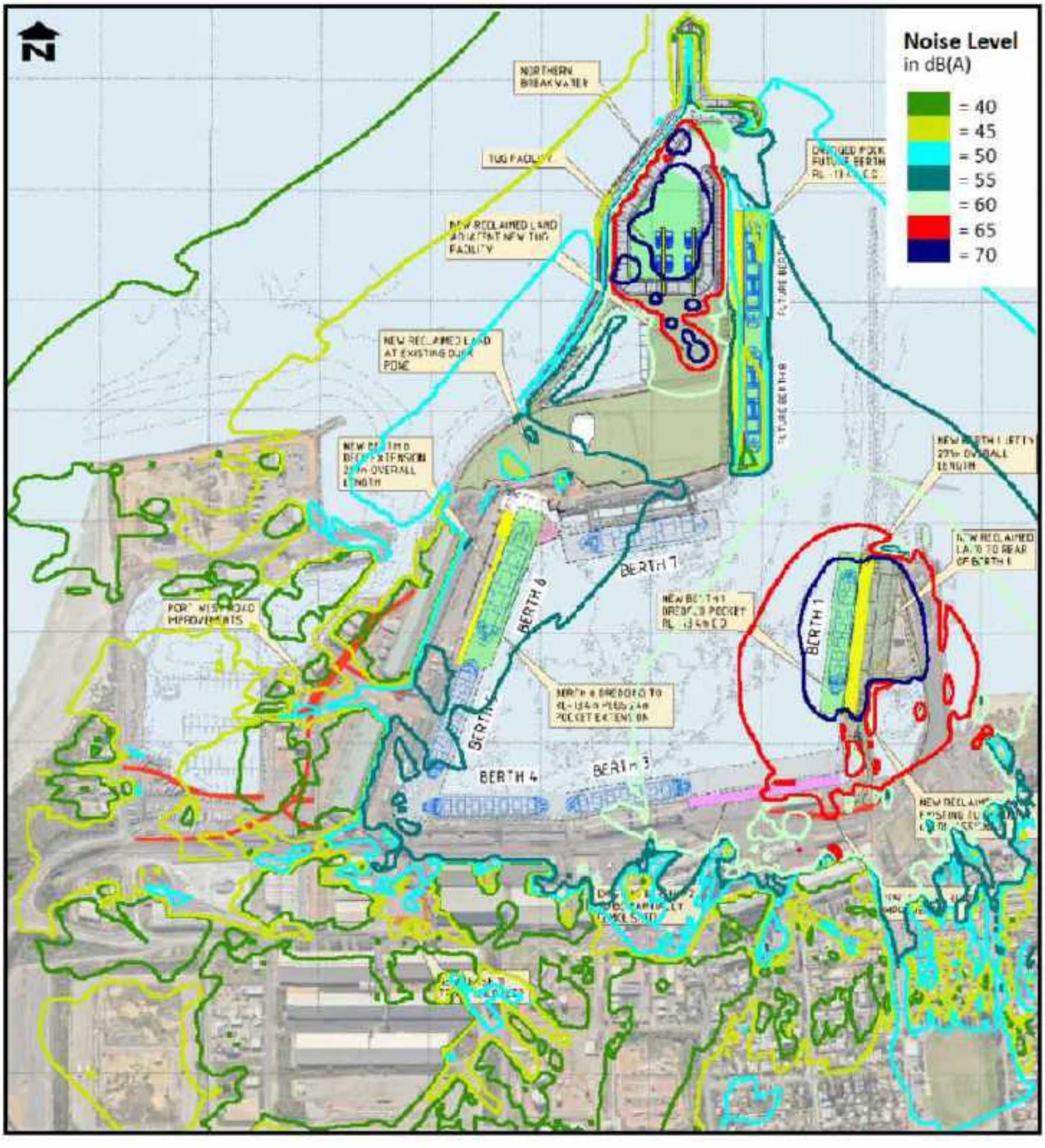


Figure 3: **e noise contours for scenario 1 under northerly wind.**

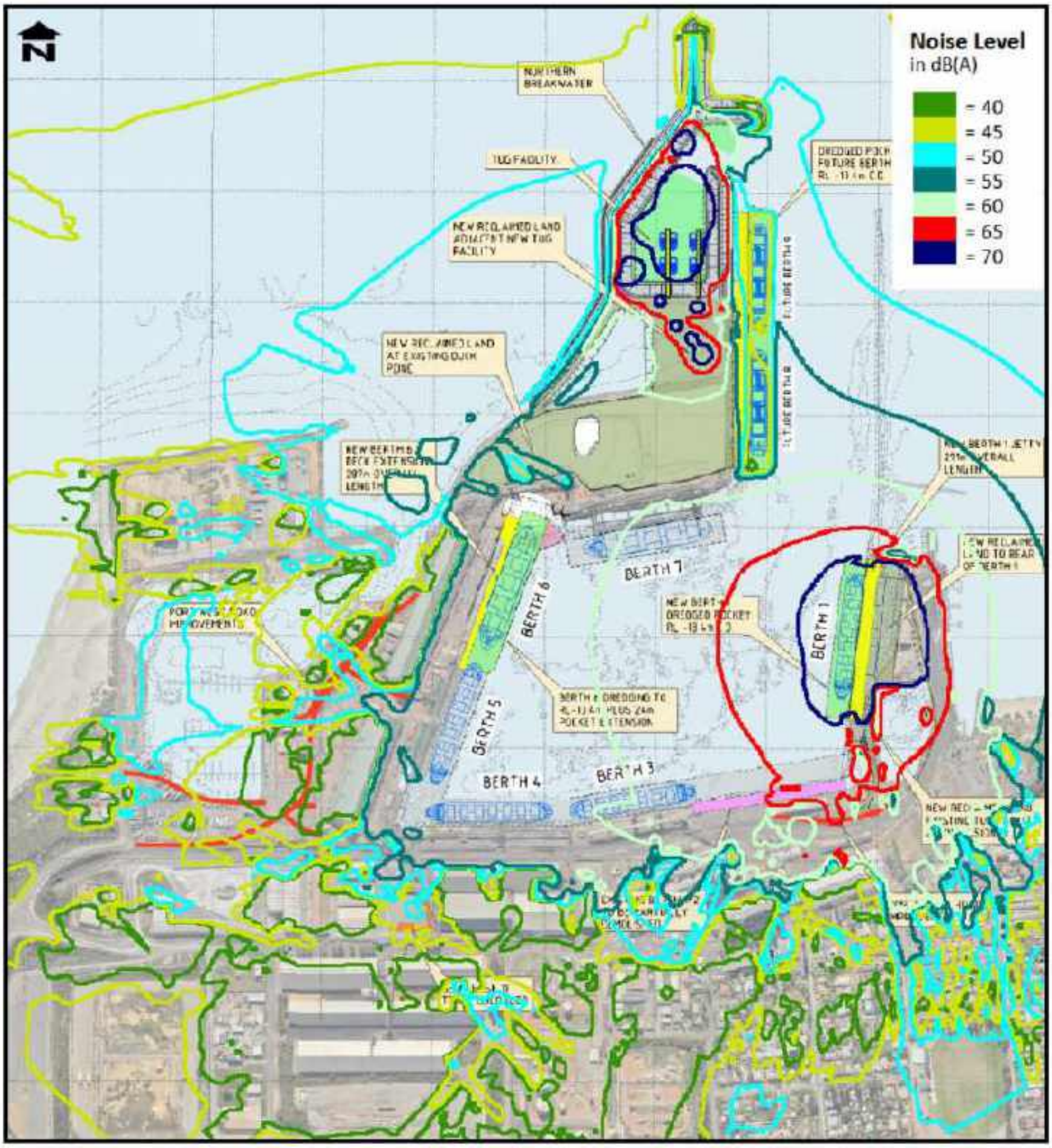


Figure 4: Daytime oise contours for scenario 1 under north-easterly wind.

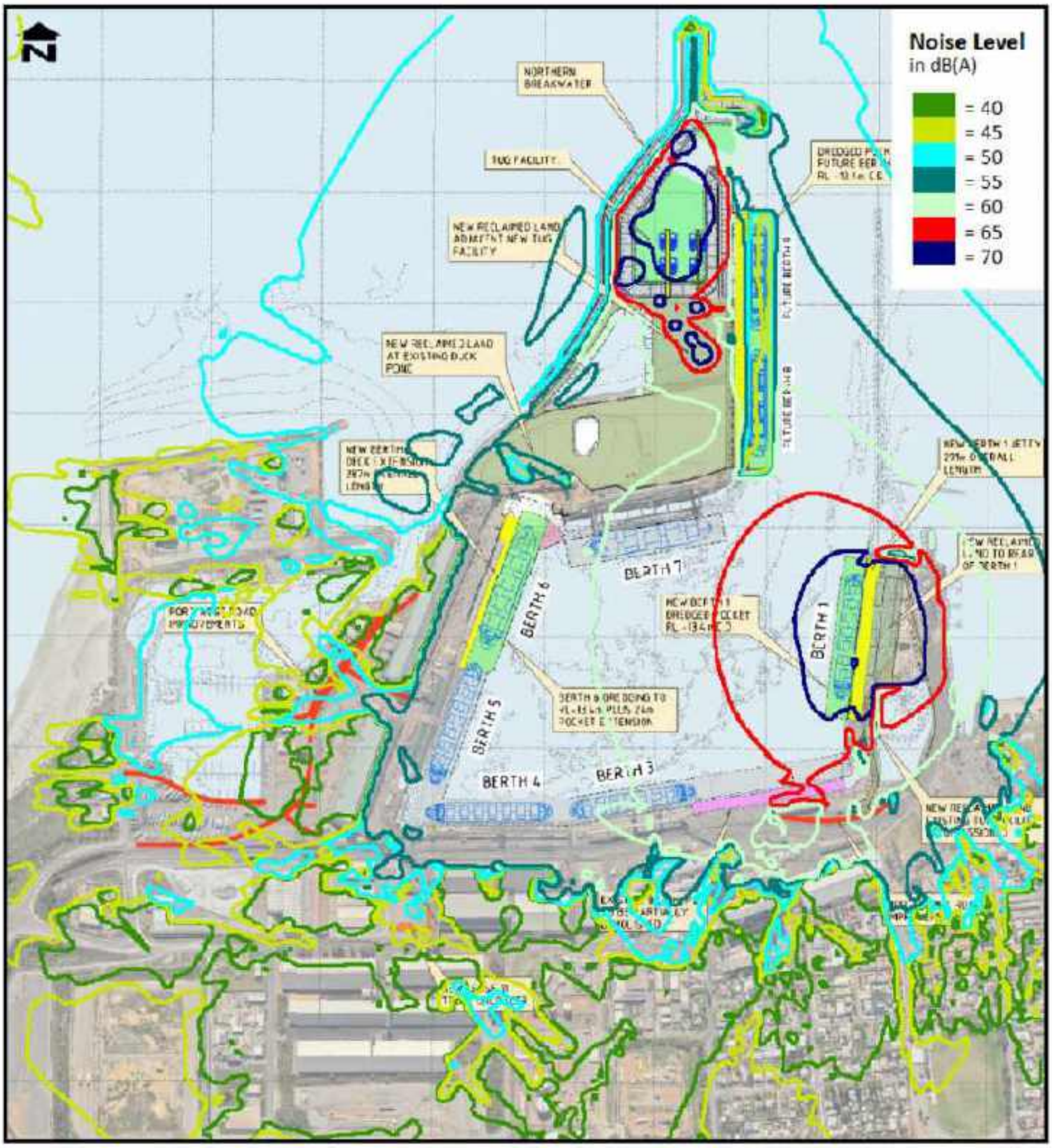


Figure 5: a e noise contours for scenario 1 under easterly wind.

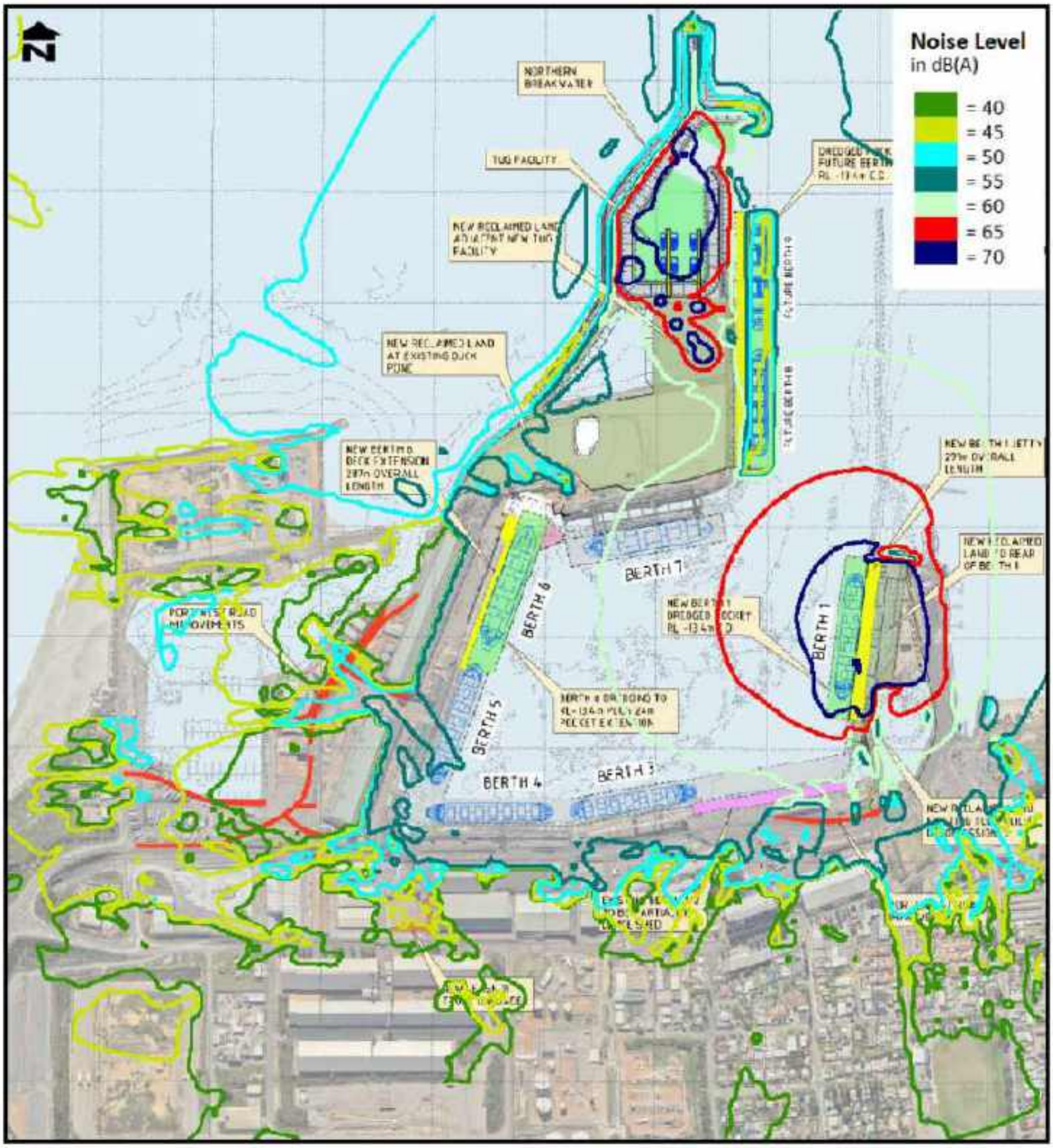


Figure 6: **Daytime oise contours for scenario 1 under south-easterly wind.**

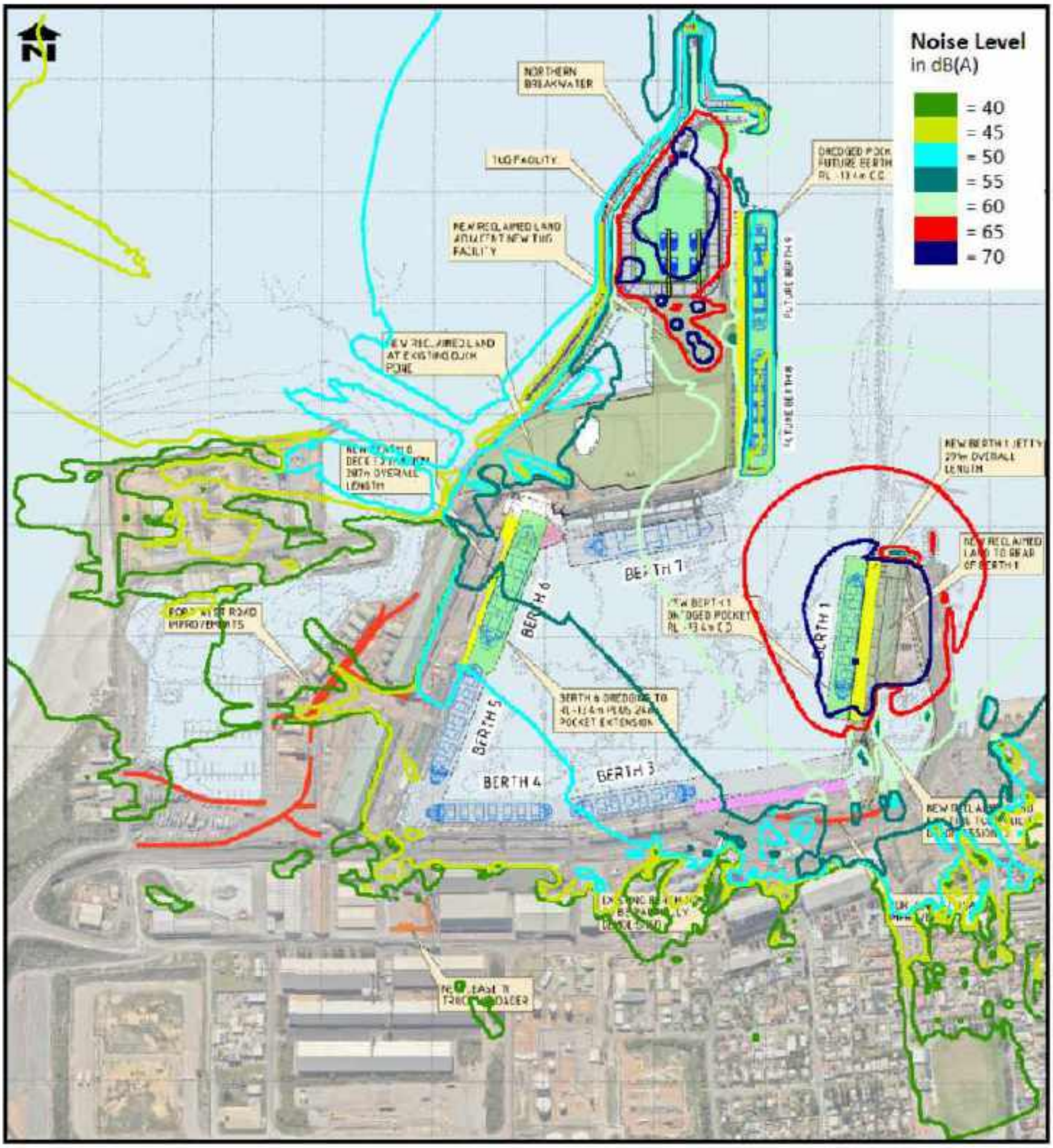


Figure 7: D yti e noise contours for scenario 1 under southerly wind.

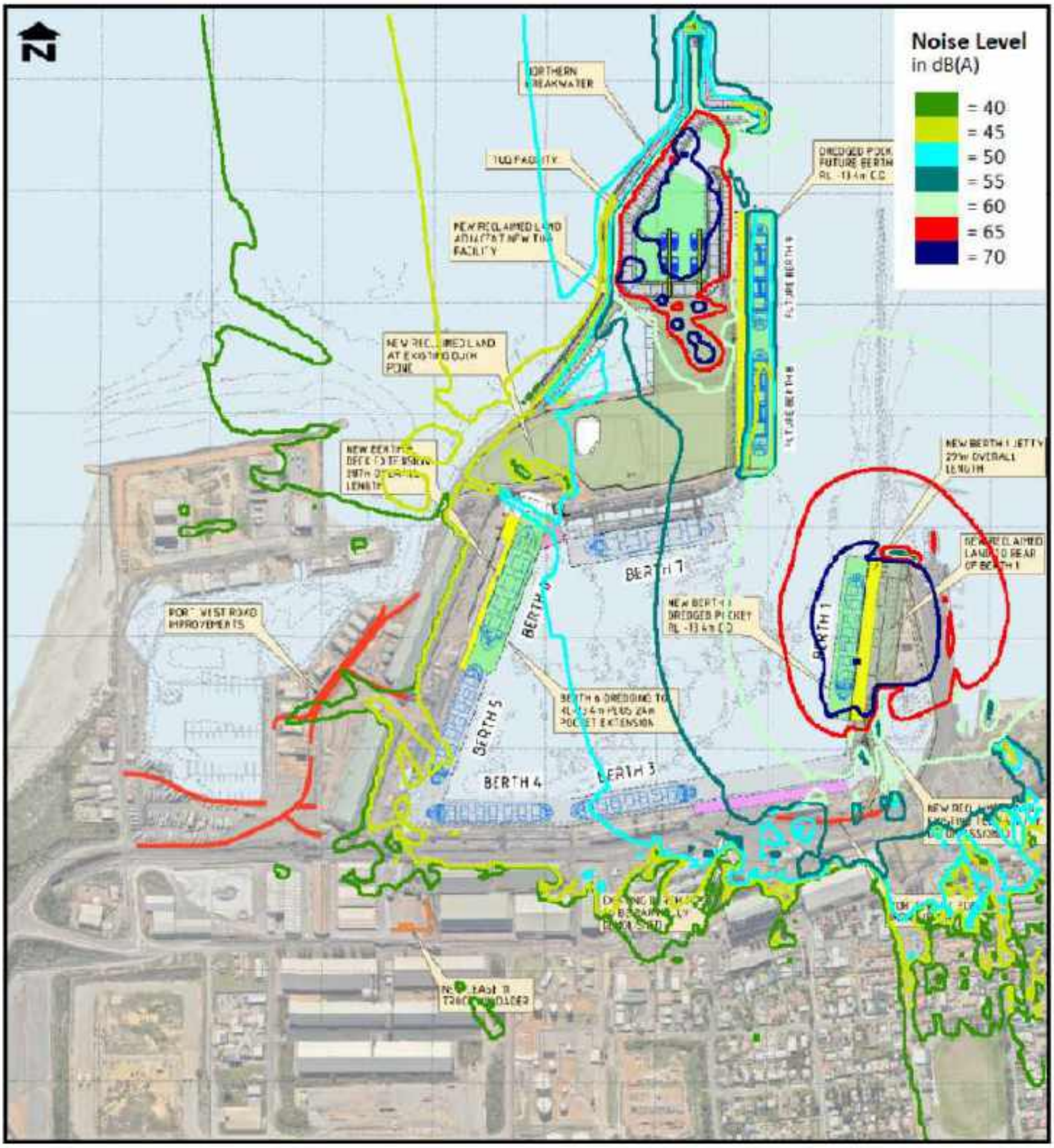


Figure 8: Daytime ɔise contours for scenario 1 under south-westerly wind.

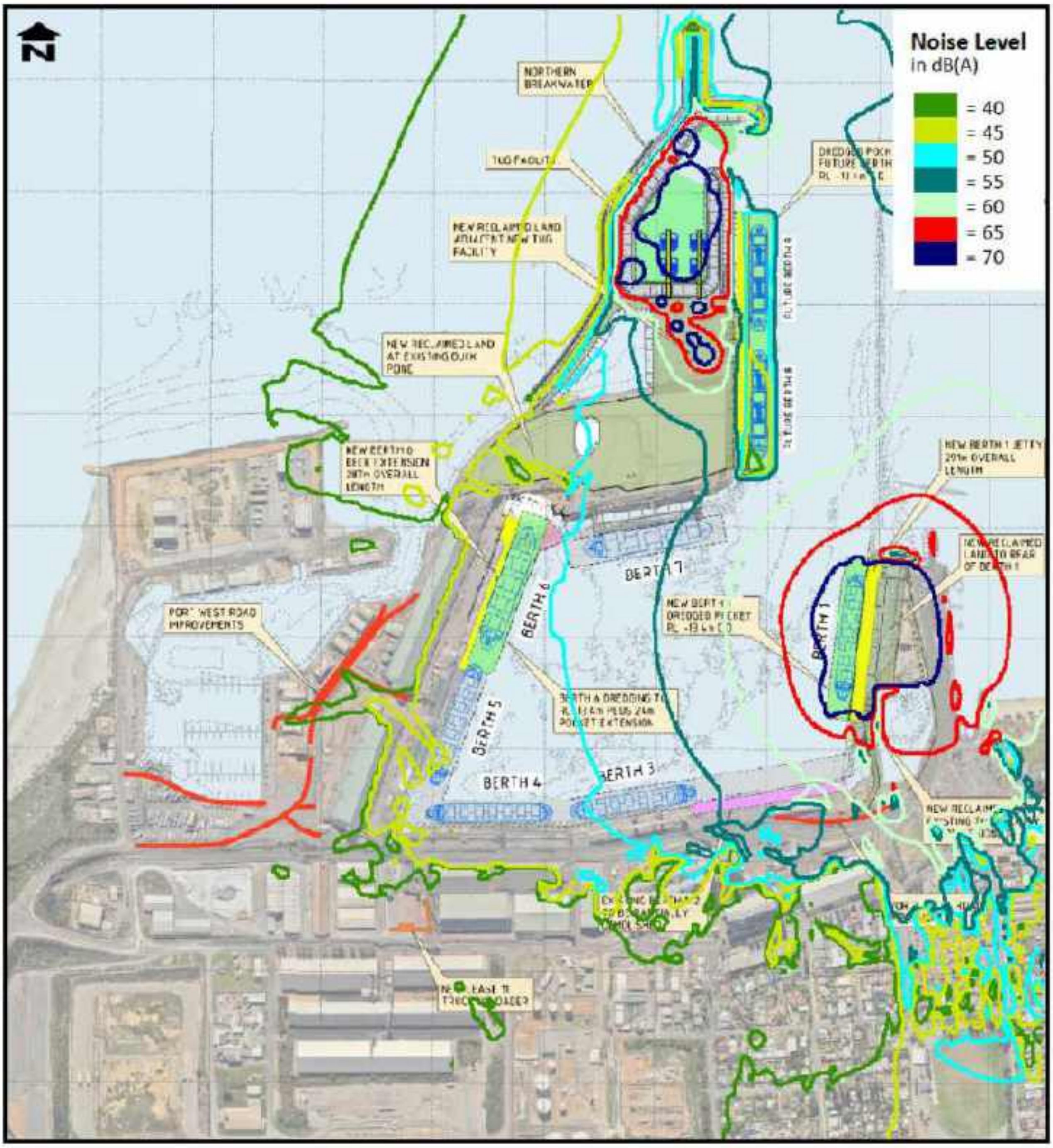


Figure 9: D yti e noise contours for scenario 1 under westerly wind.

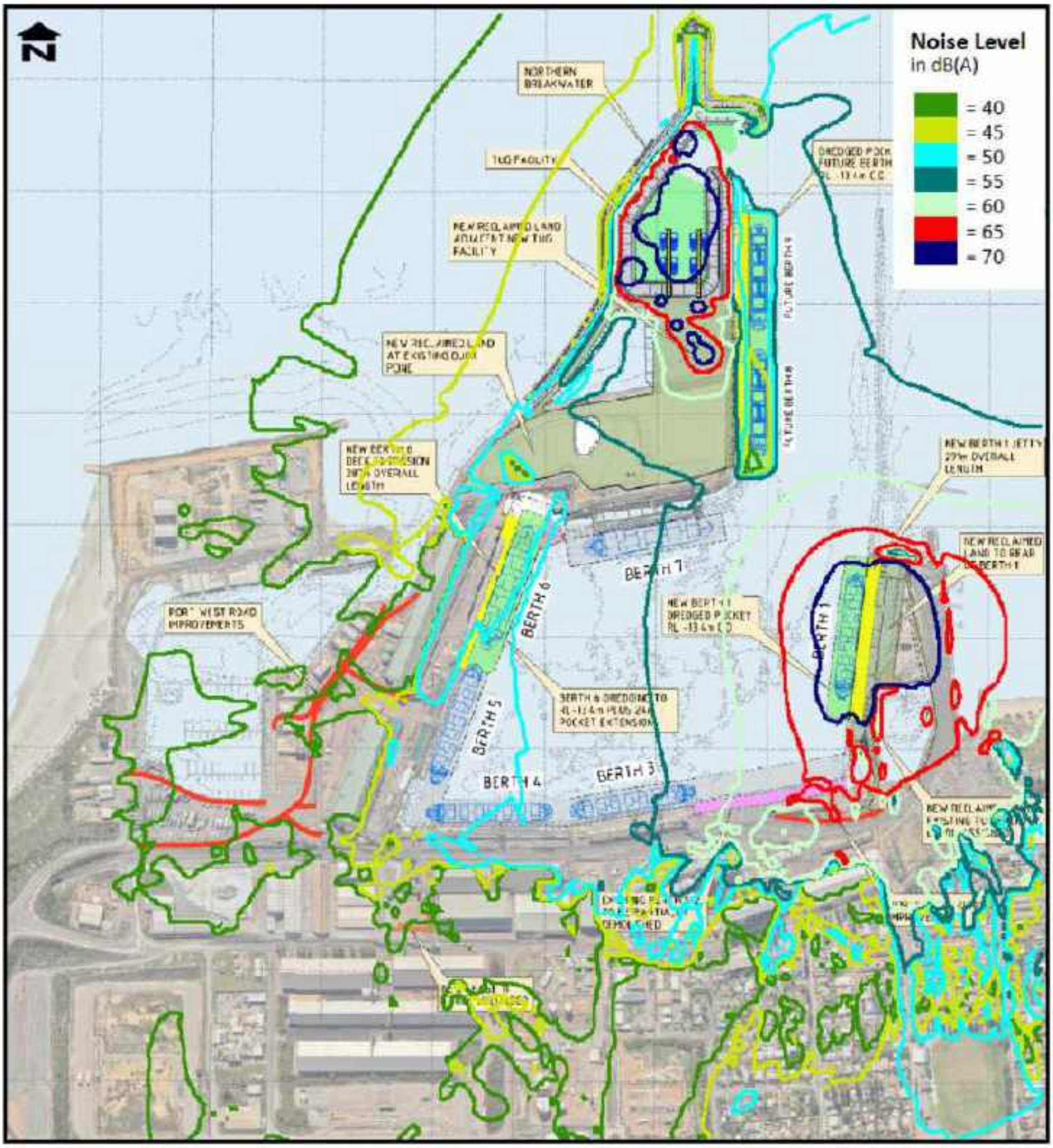


Figure 10: Daytime oise contours for scenario 1 under north-westerly wind.

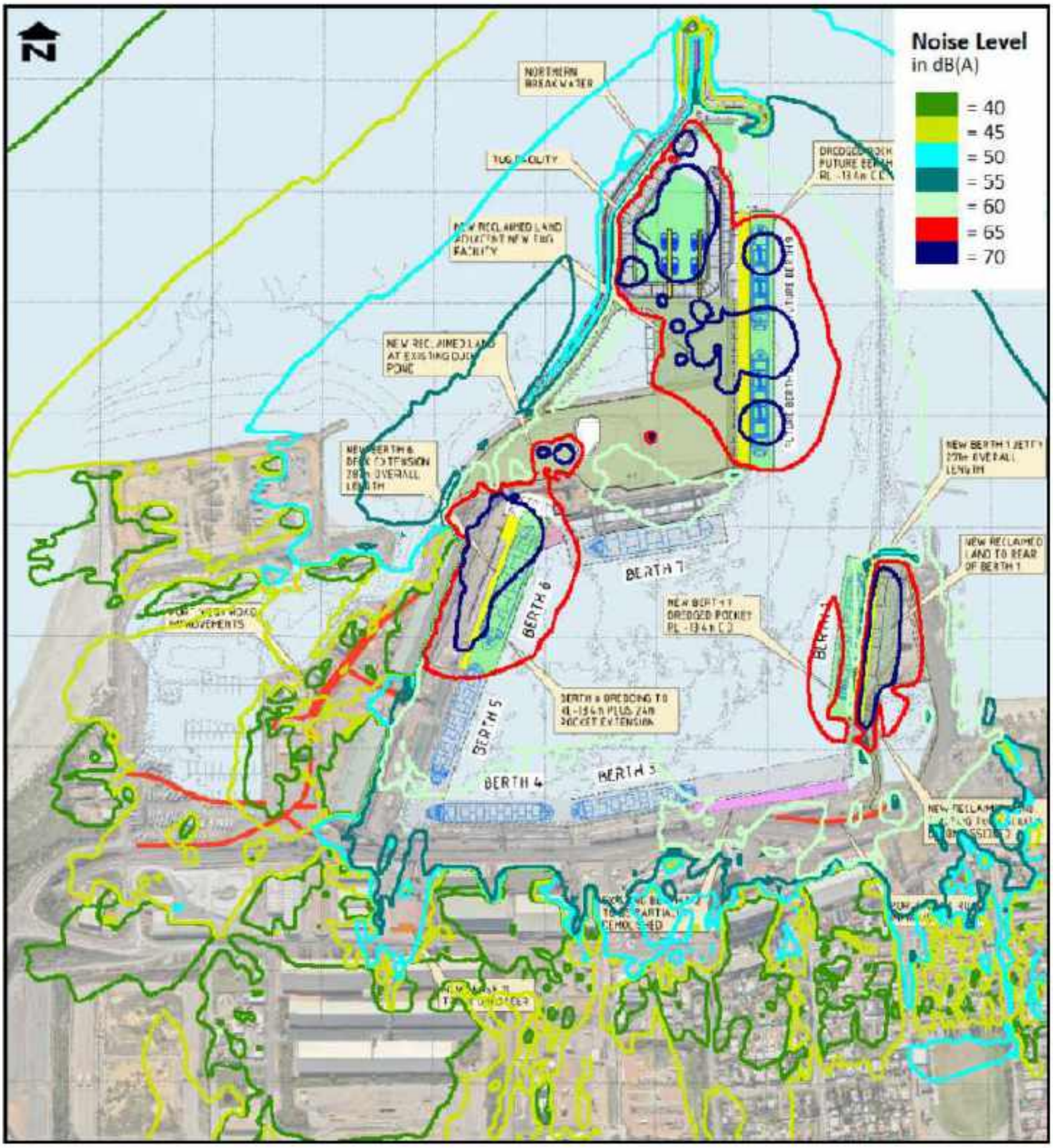


Figure 11: e noise contours for scenario 2 under northerly wind.

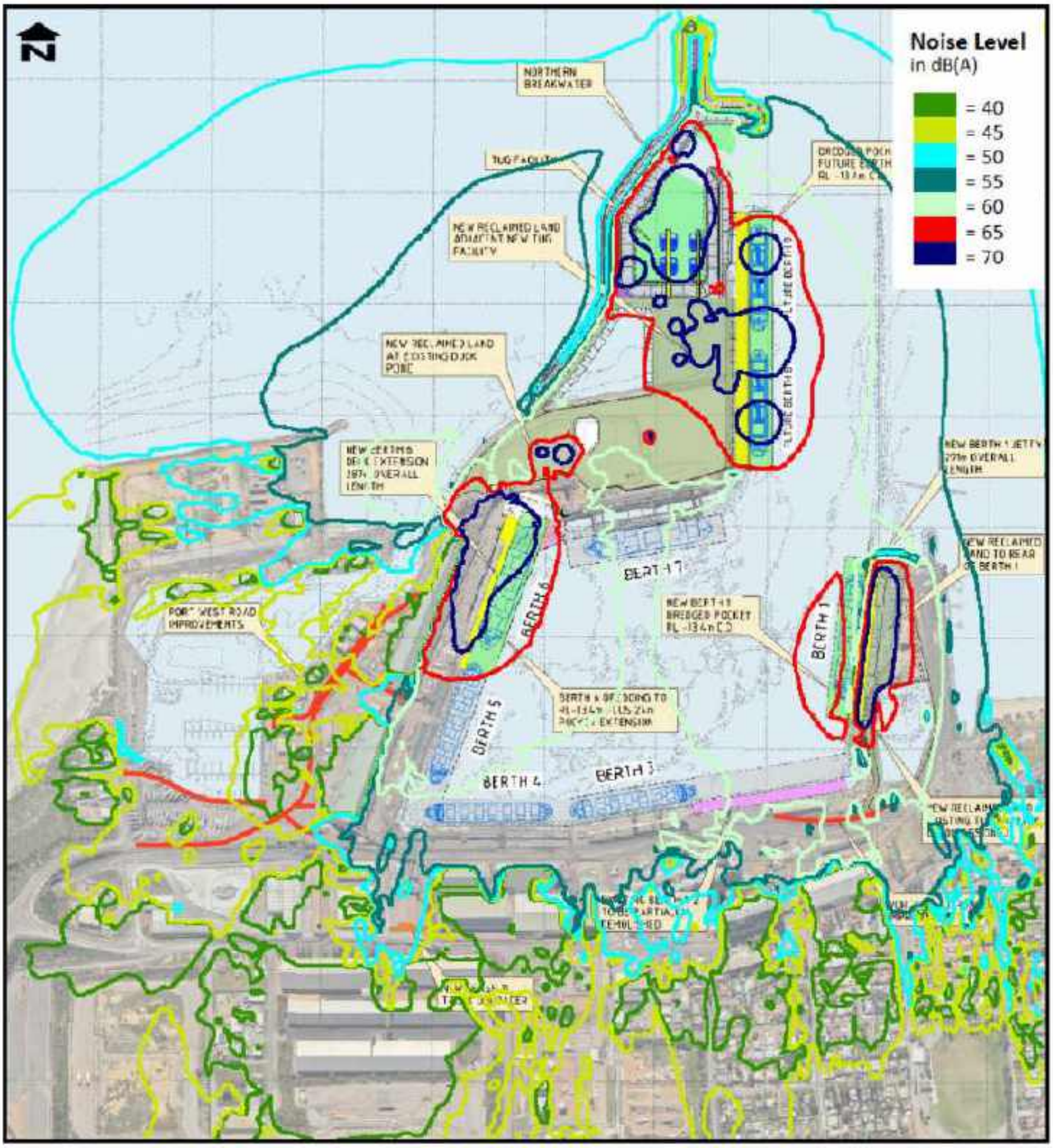


Figure 12: Daytime oise contours for scenario 2 under north-easterly wind.

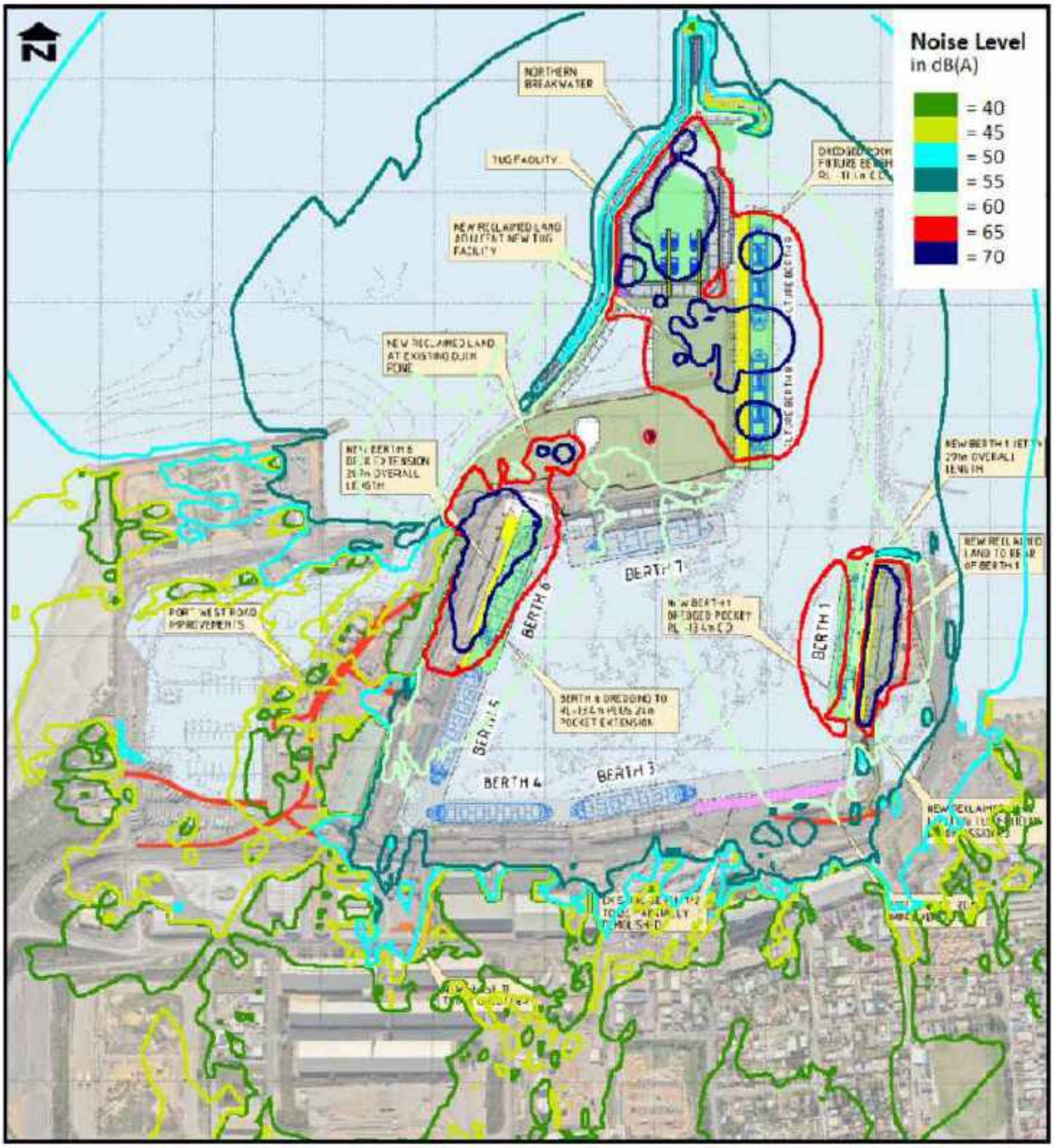


Figure 13: a e noise contours for scenario 2 under easterly wind.

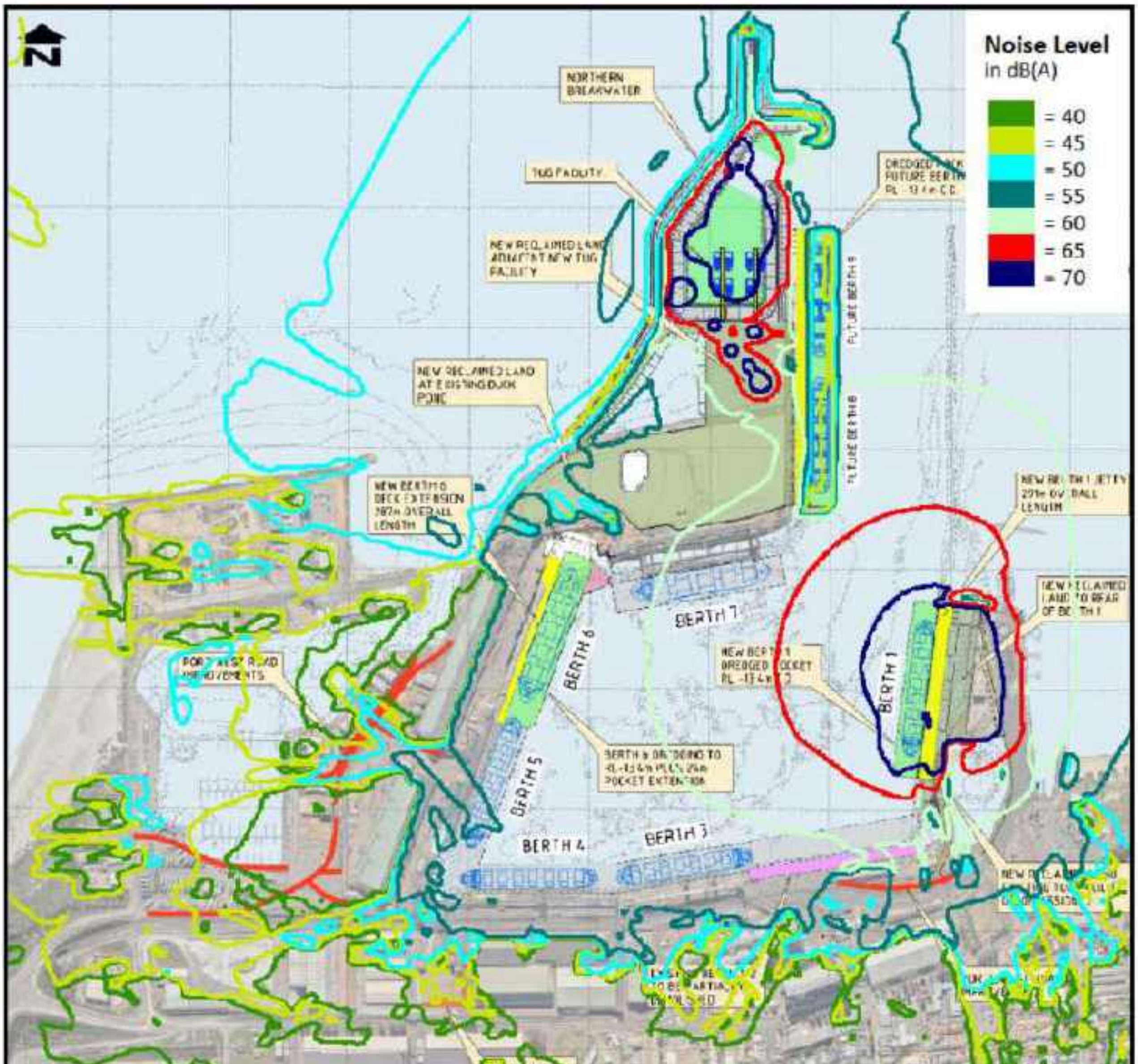


Figure 14: Daytime oise contours for scenario 2 under south-easterly wind.

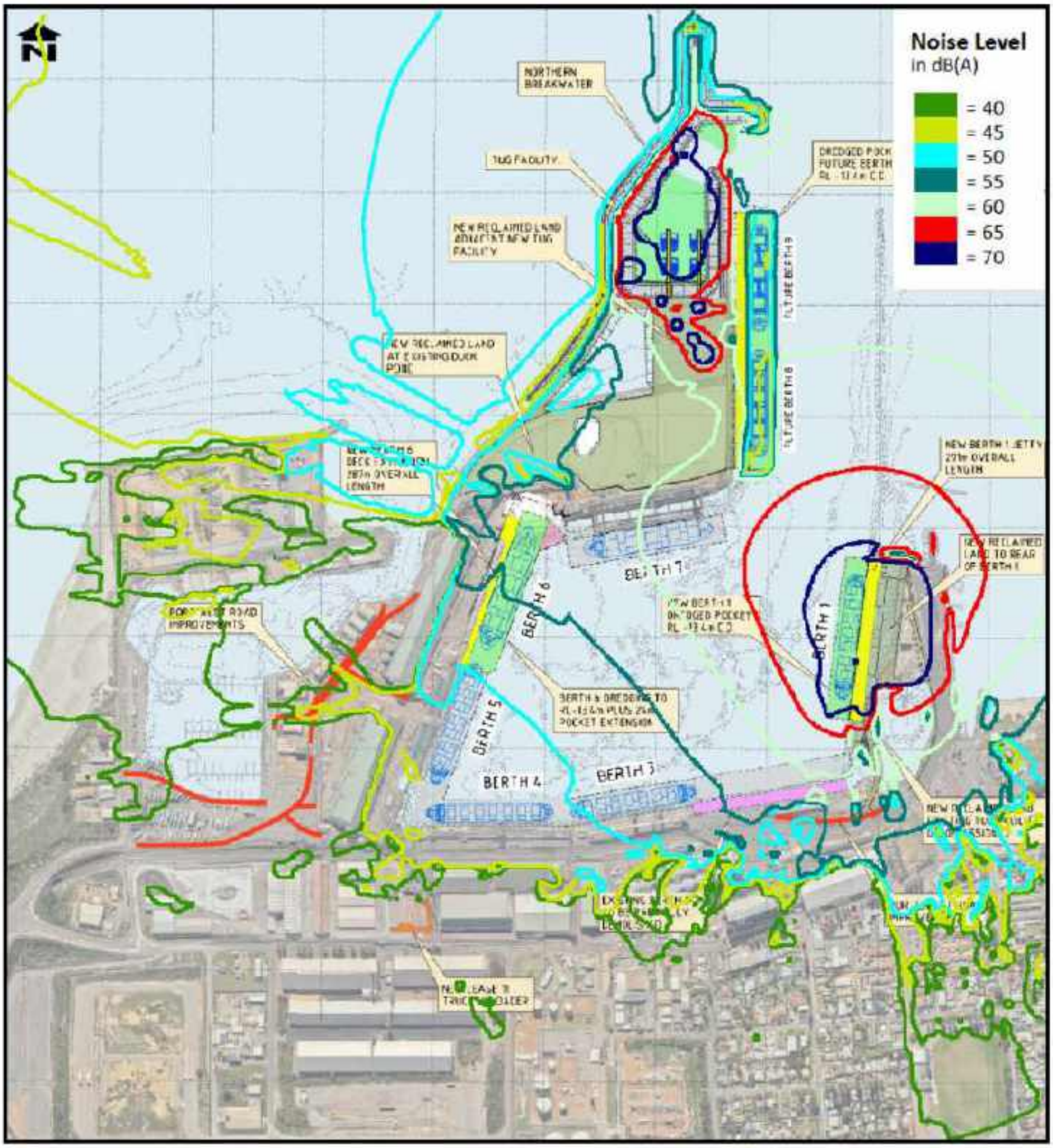


Figure 15: D yti e noise contours for scenario 2 under southerly wind.

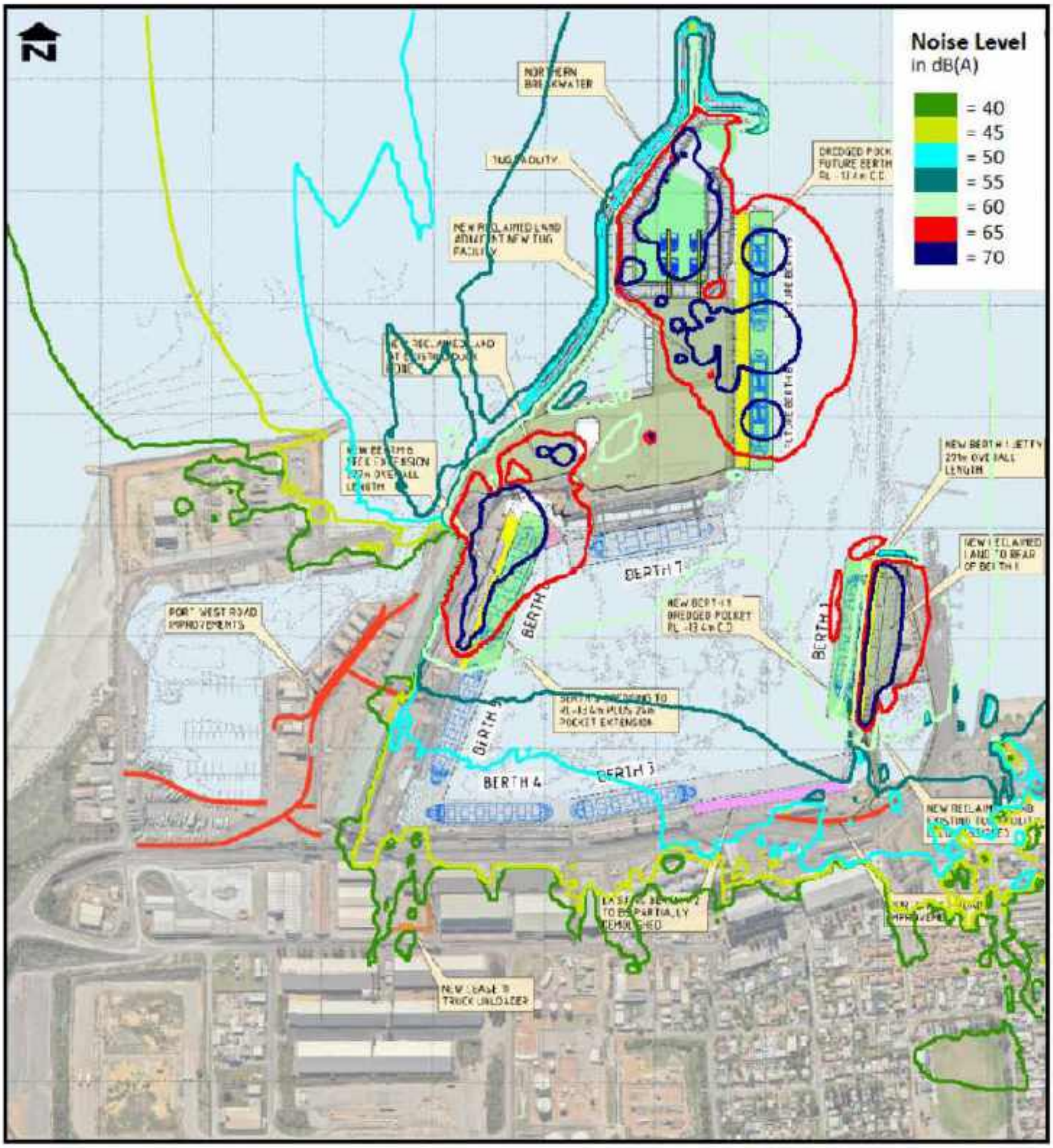


Figure 16: Daytime oise contours for scenario 2 under south-westerly wind.

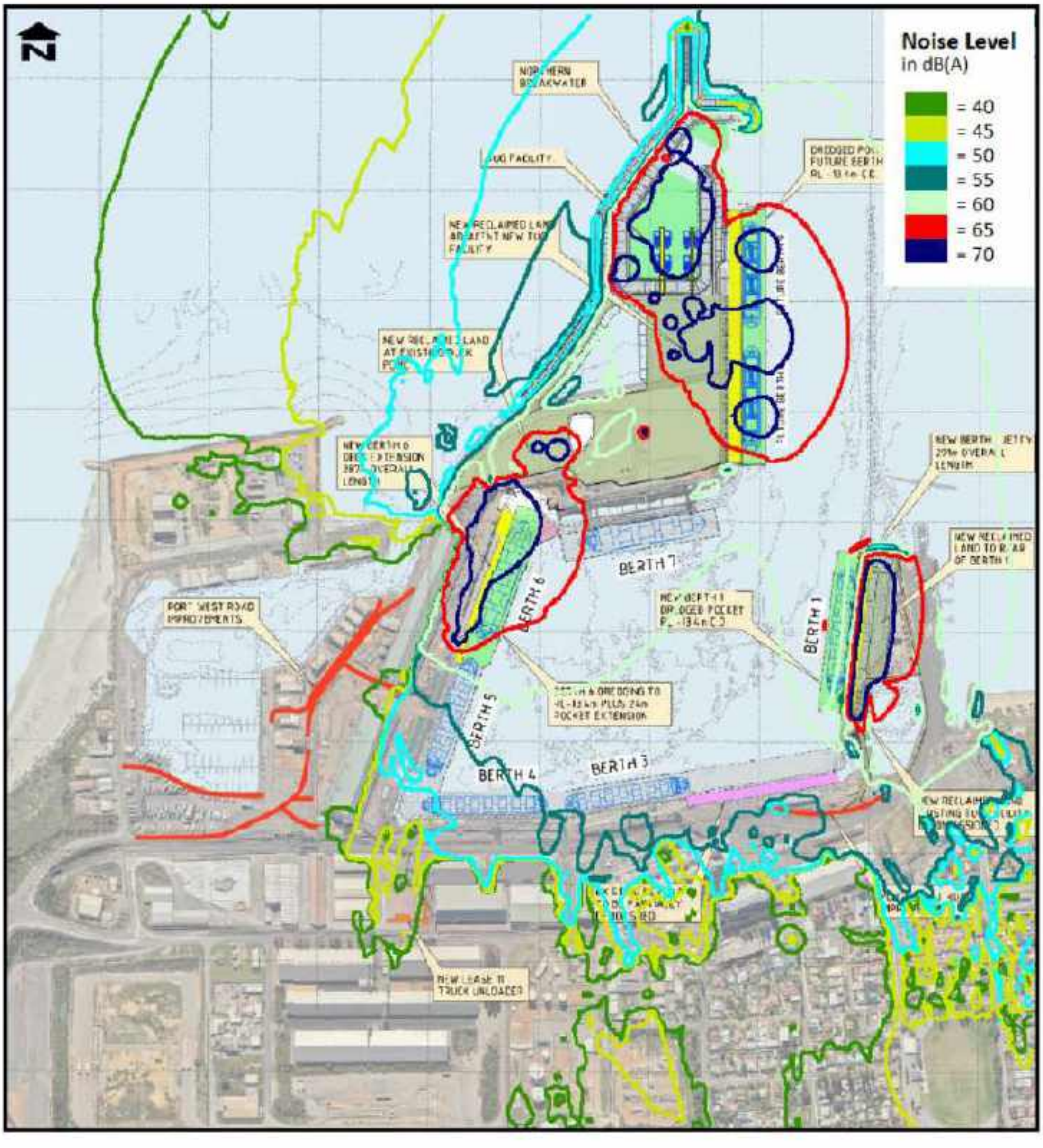


Figure 17: D yti e noise contours for scenario 2 under westerly wind.

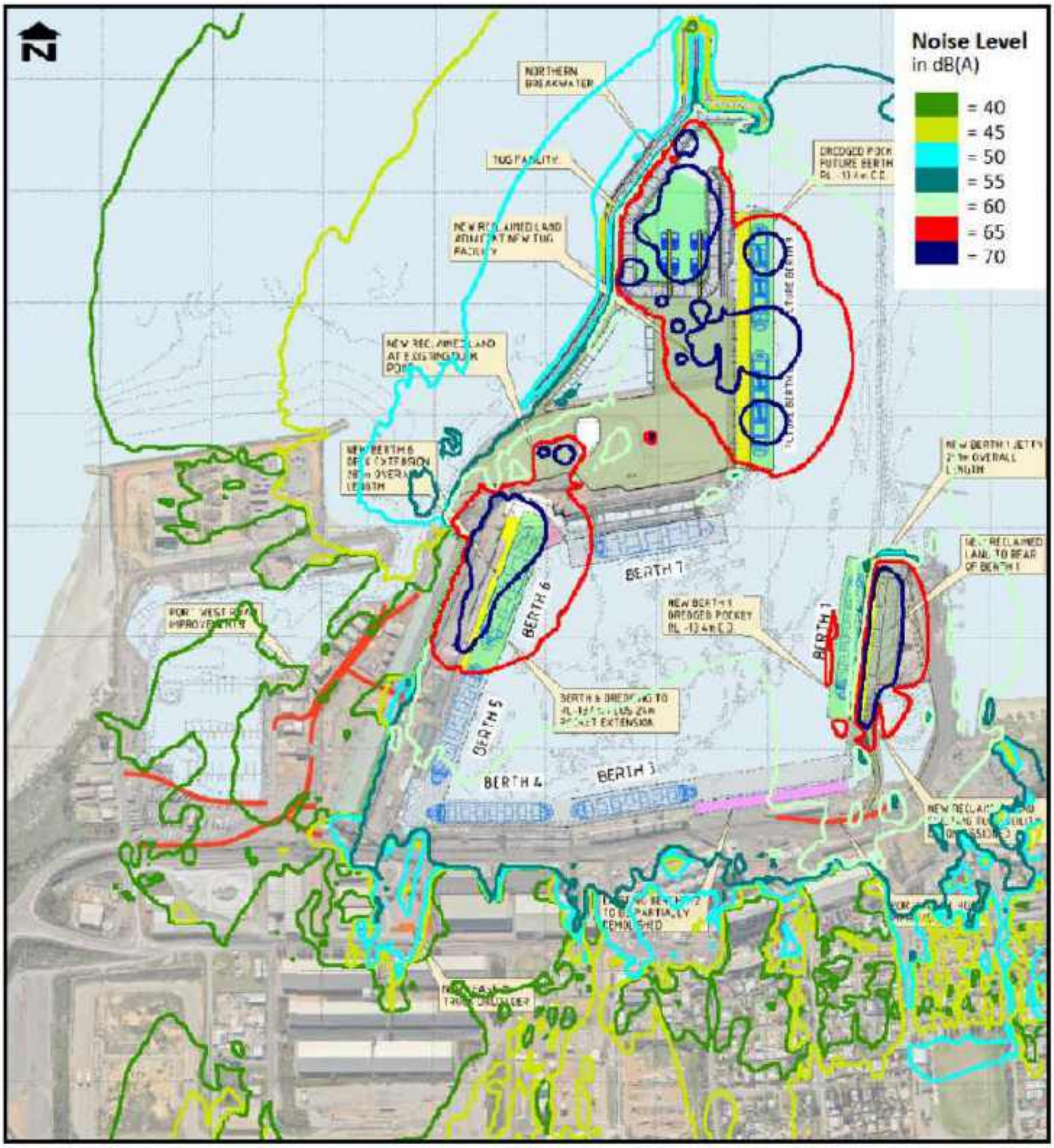


Figure 18: Daytime oise contours for scenario 2 under north-westerly wind.

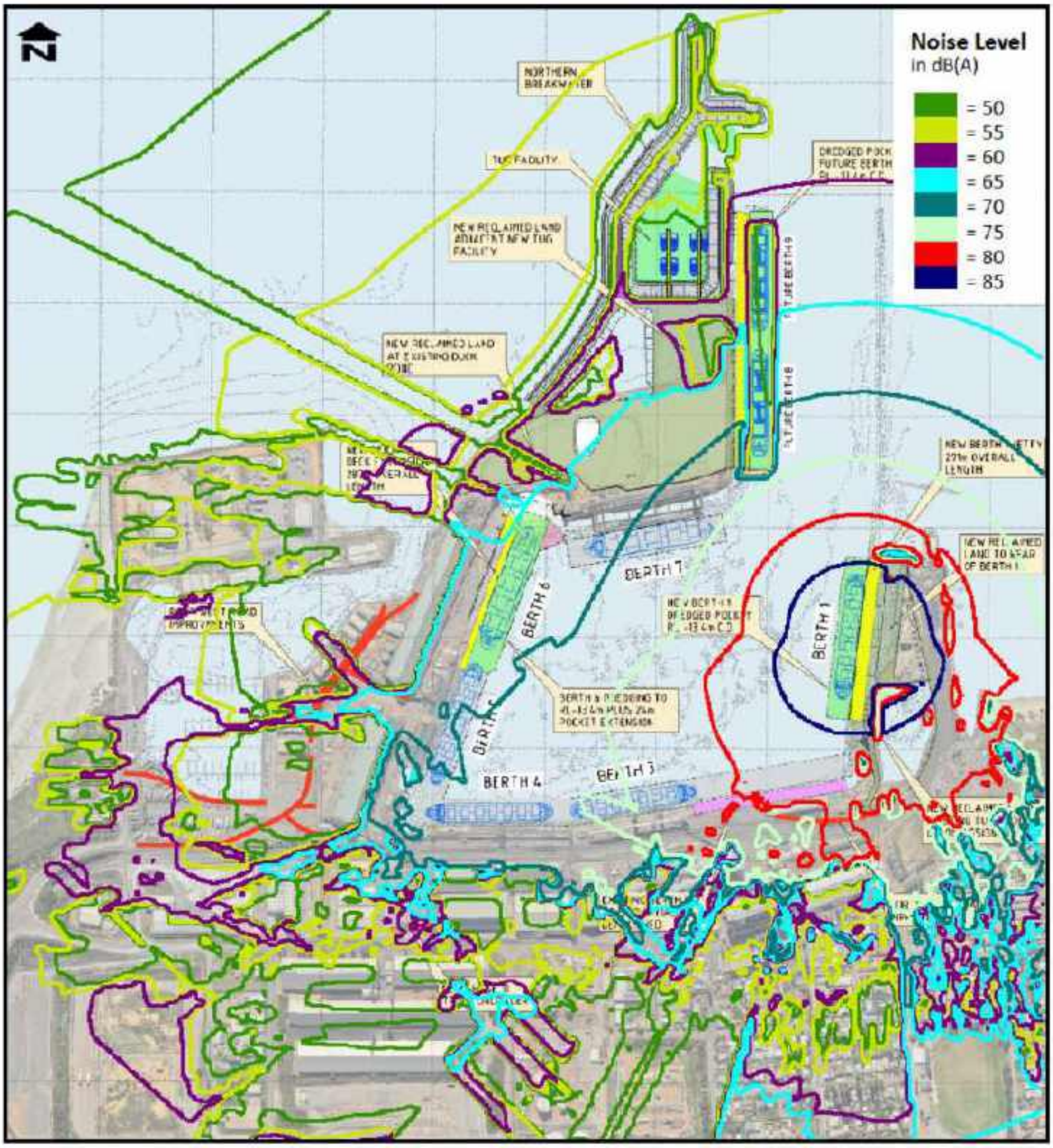


Figure 19: Daytime oise L_{AMax} contours for scenario 3 under northerly wind.

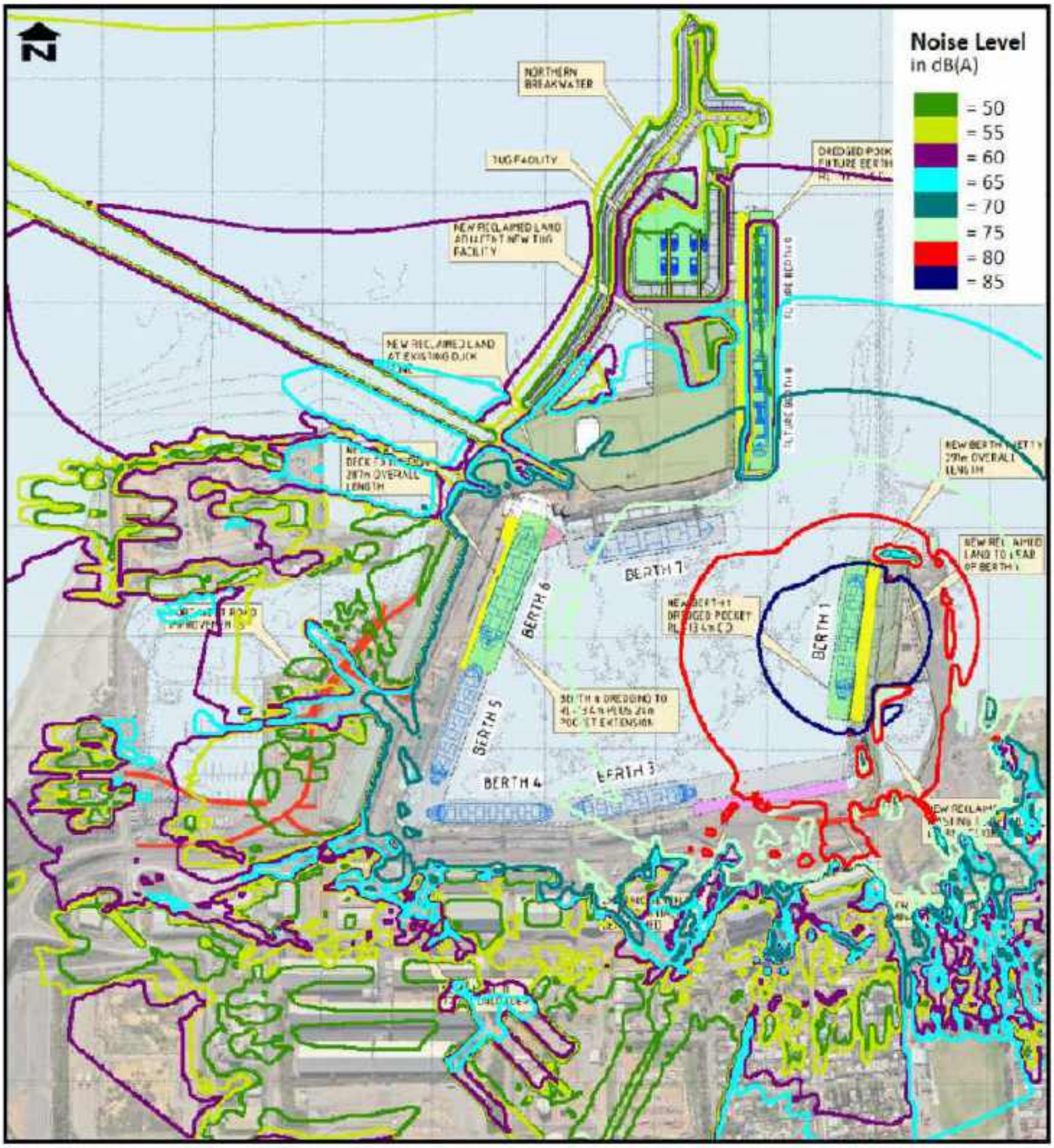


Figure 20: Daytime ıoise L_{AMax} contours for scenario 3 under north-easterly wind.

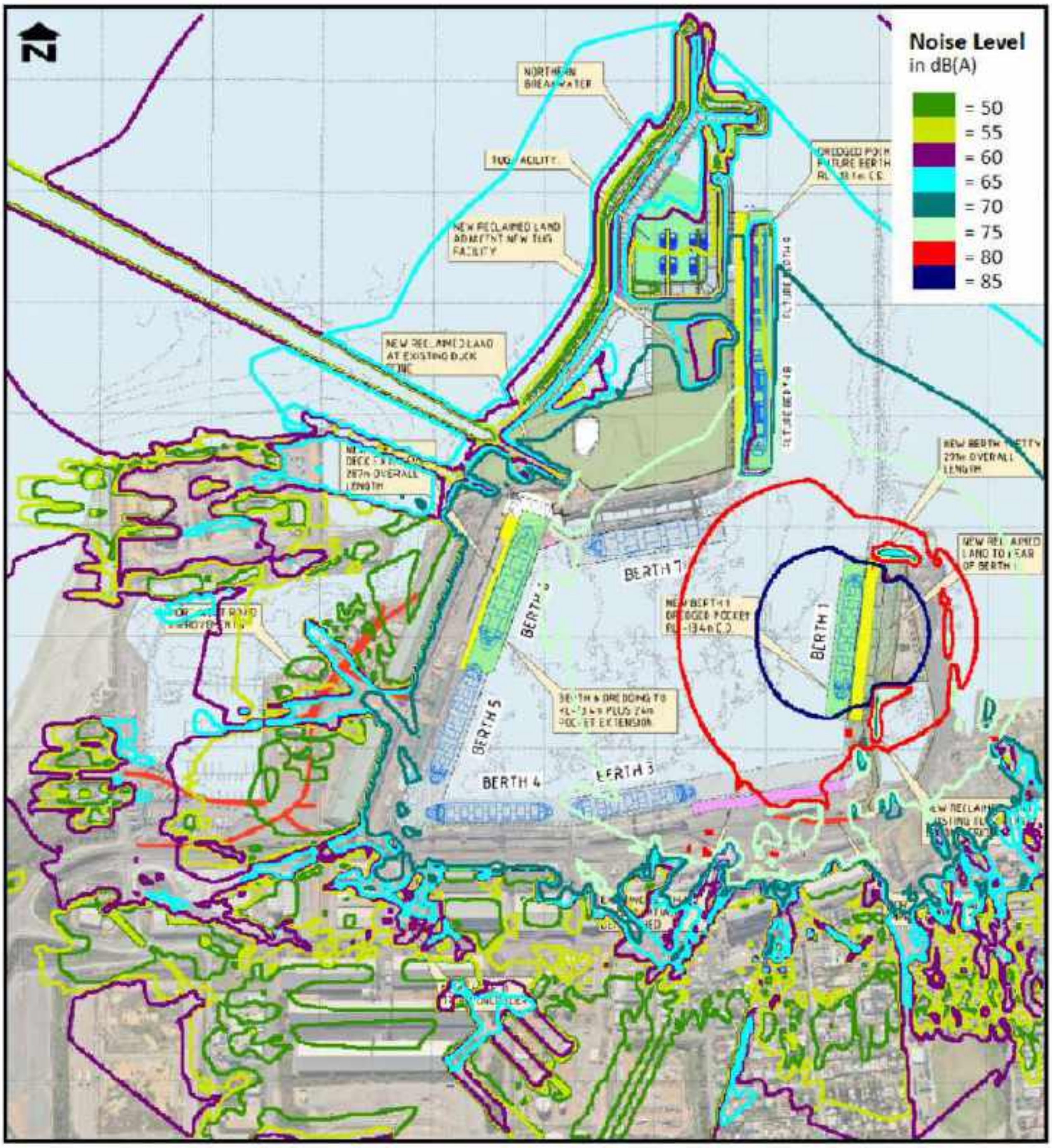


Figure 21: Daytime noise L_{AMax} contours for scenario 3 under easterly wind.

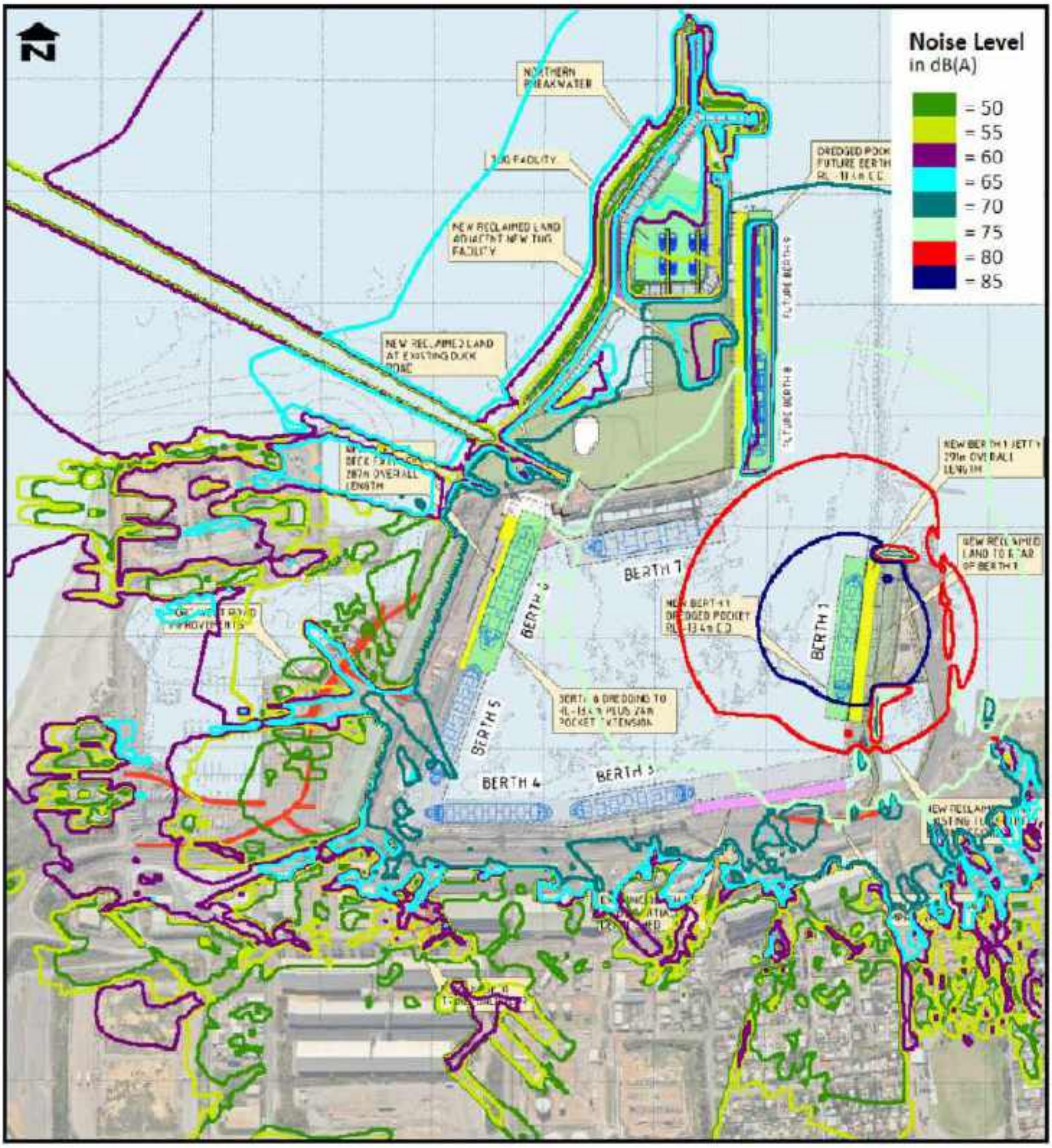


Figure 22: Daytime oise L_{AMax} contours for scenario 3 under south-easterly wind.

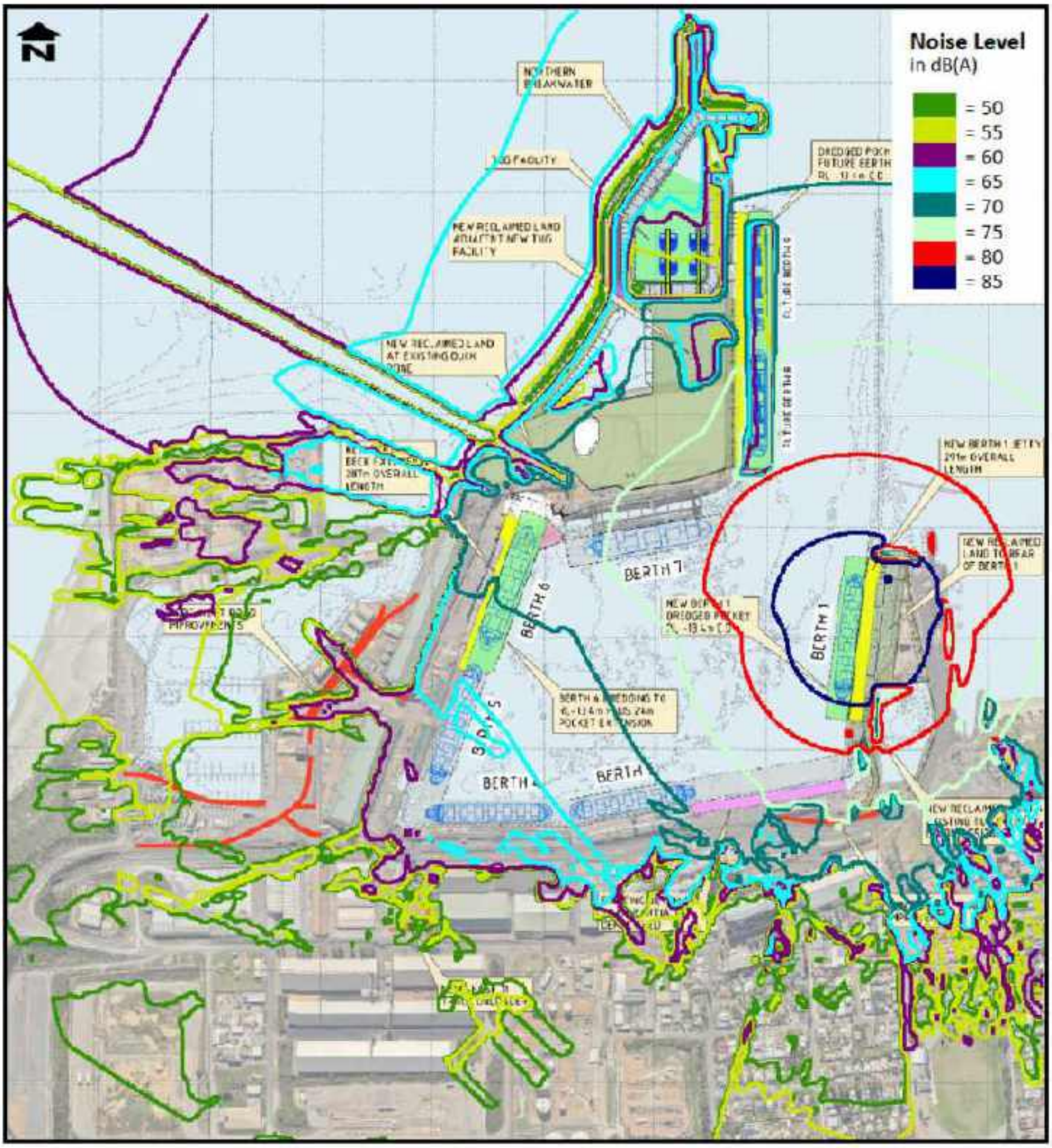


Figure 23: Daytime noise L_{AMax} contours for scenario 3 under southerly wind.

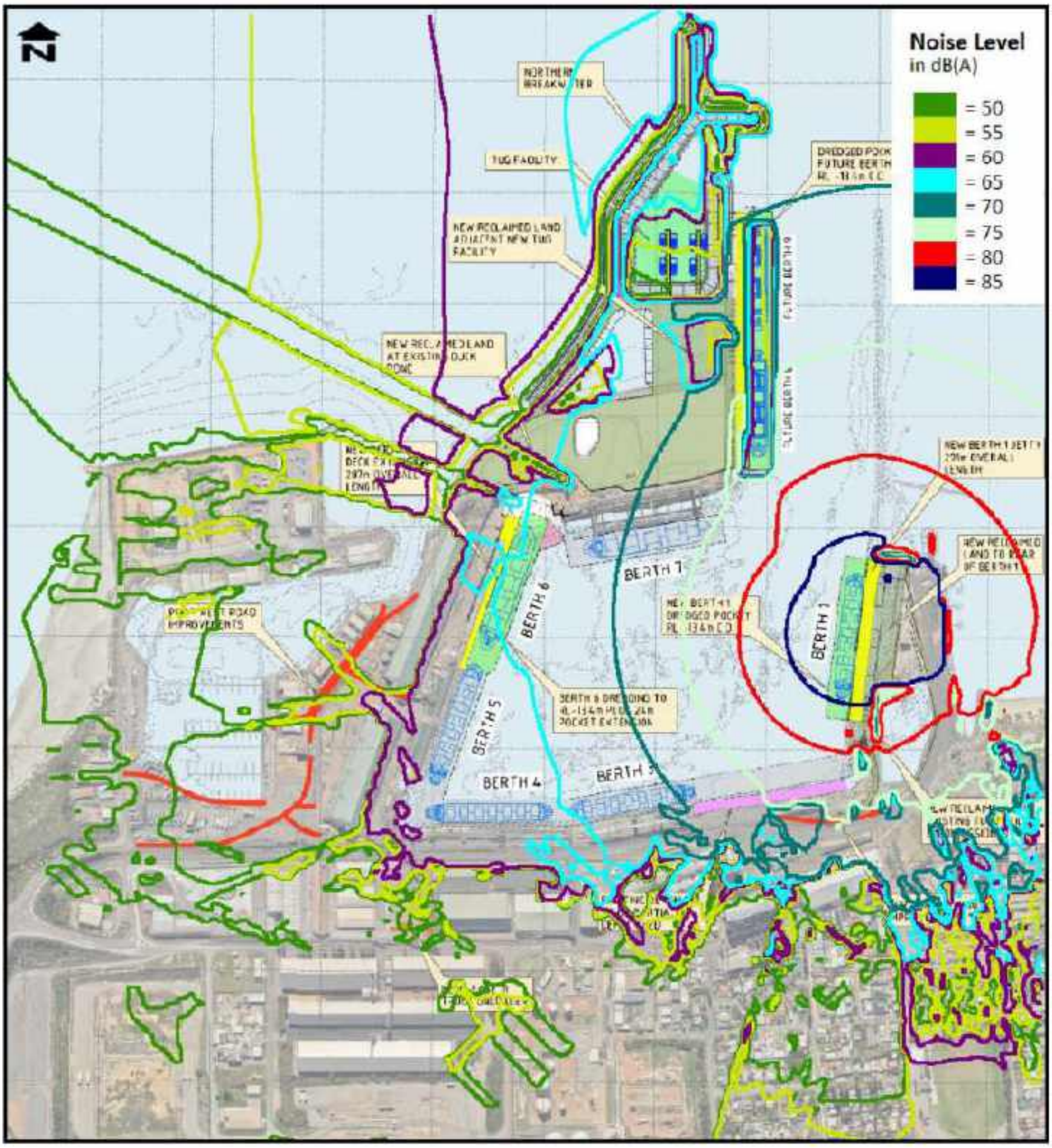


Figure 24: Daytime oise L_{AMax} contours for scenario 3 under south-westerly wind.

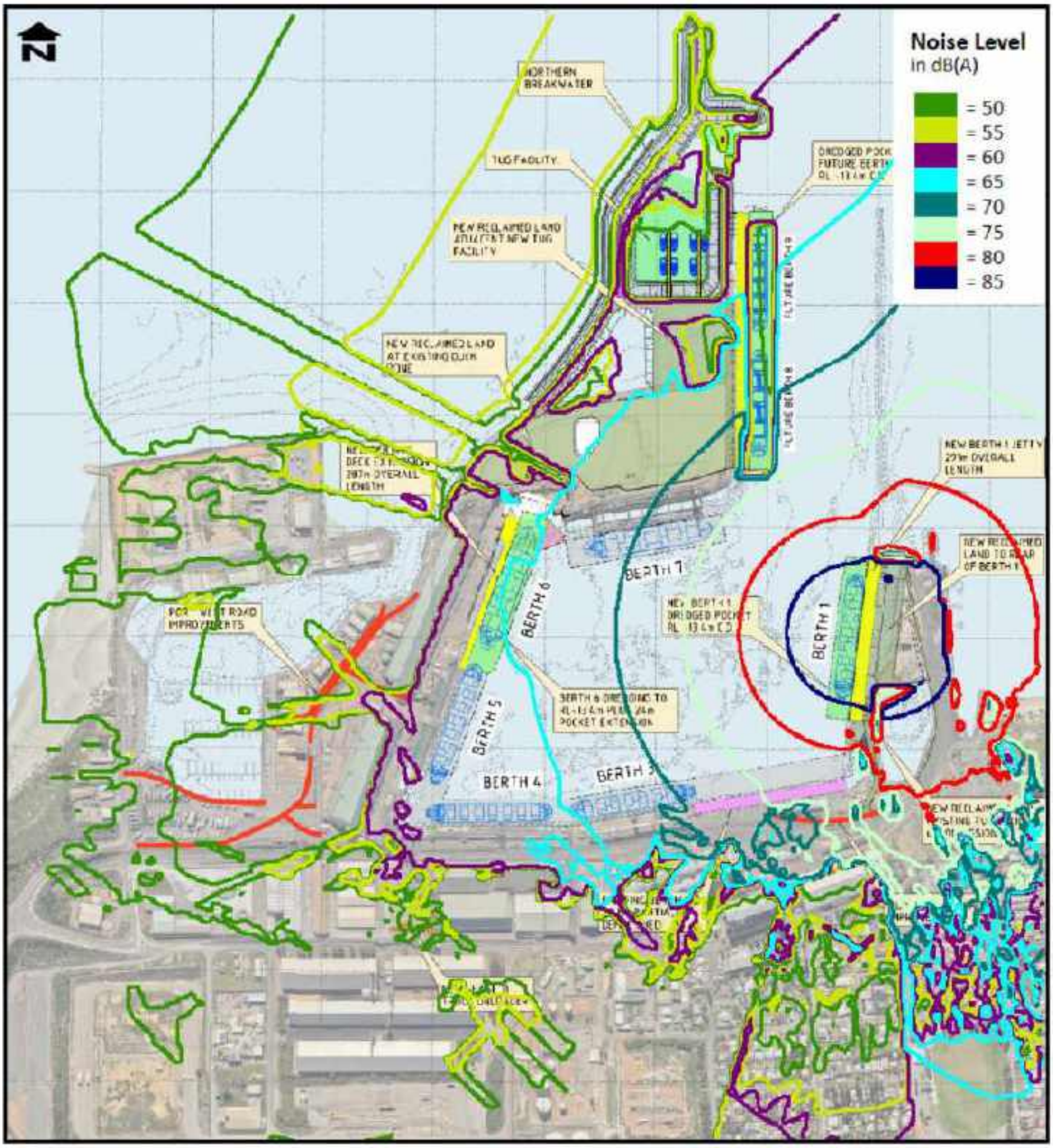


Figure 25: Daytime noise L_{AMax} contours for scenario 3 under westerly wind.

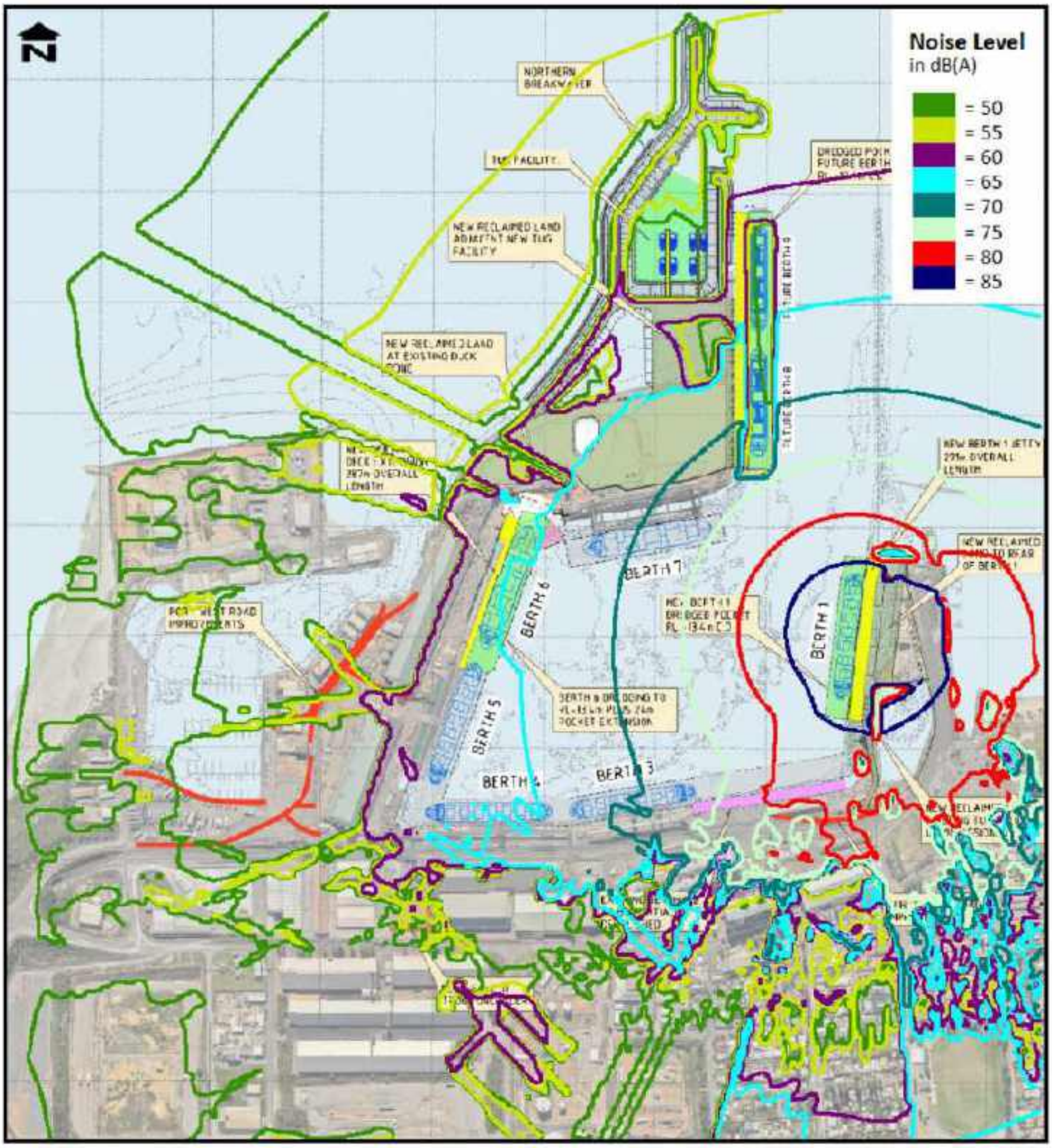


Figure 26: Daytime oise L_{AMax} contours for scenario 3 under north-westerly wind.

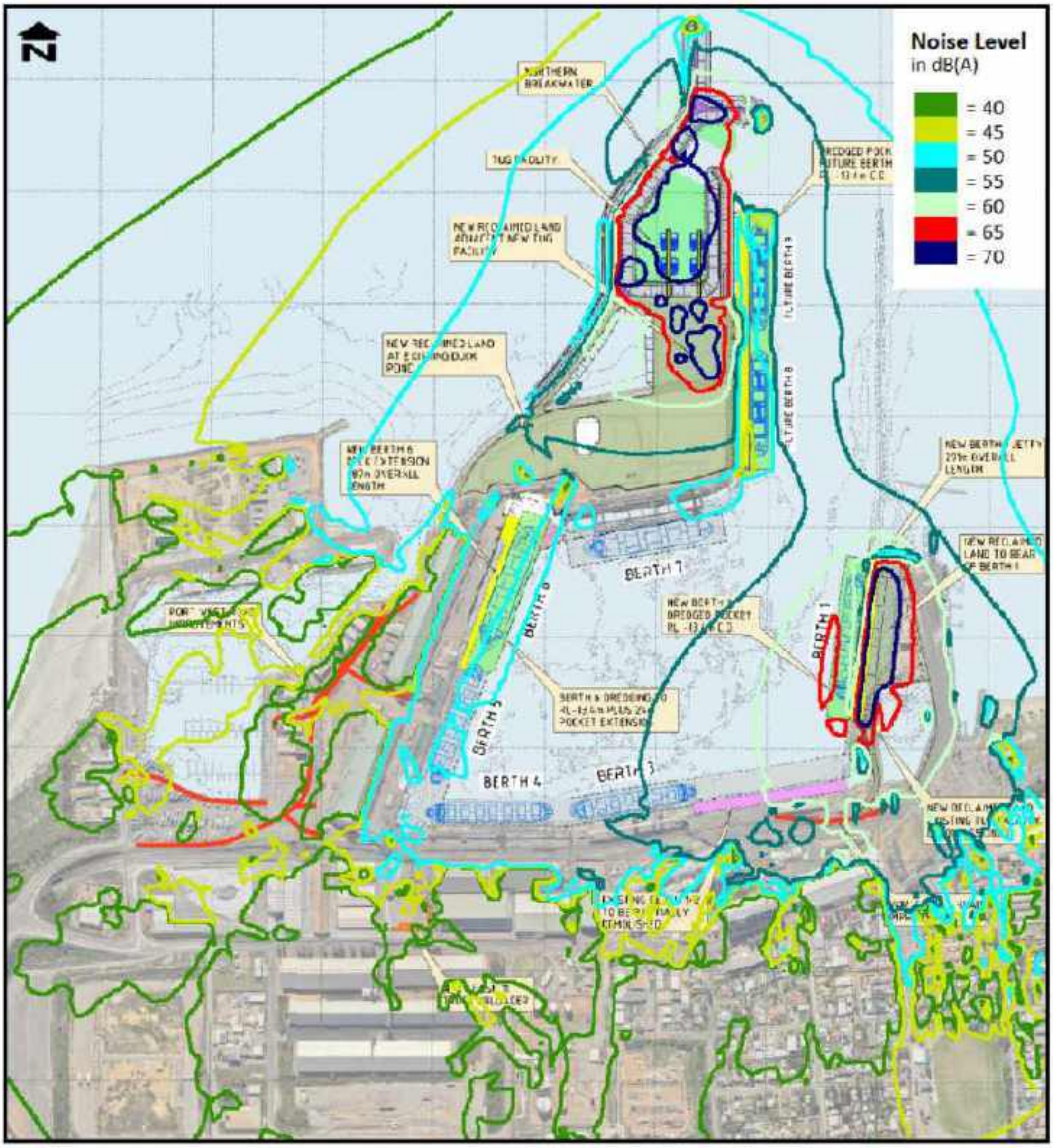


Figure 27: e noise contours for scenario 4 under northerly wind.

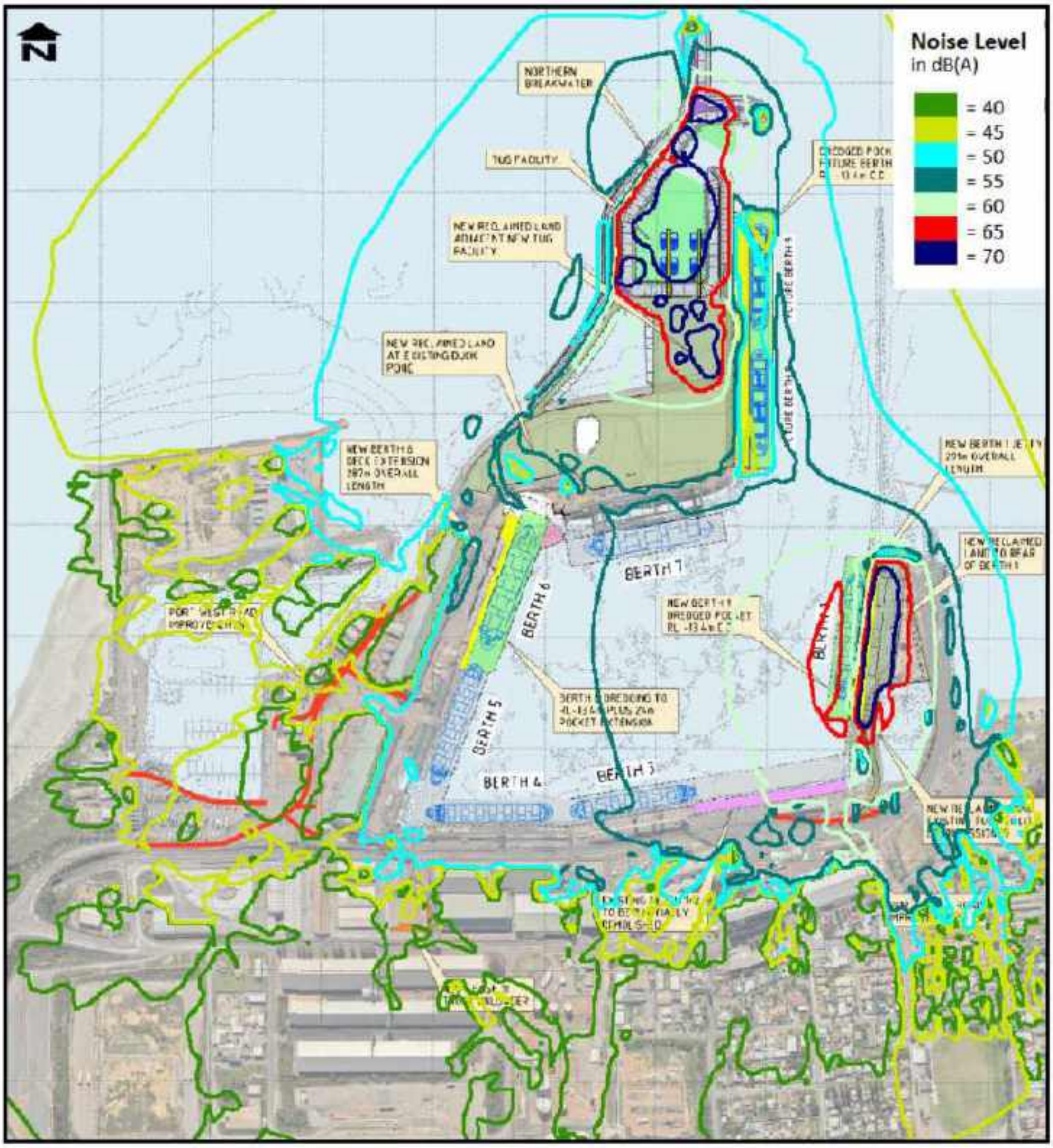


Figure 28: Daytime oise contours for scenario 4 under north-easterly wind.

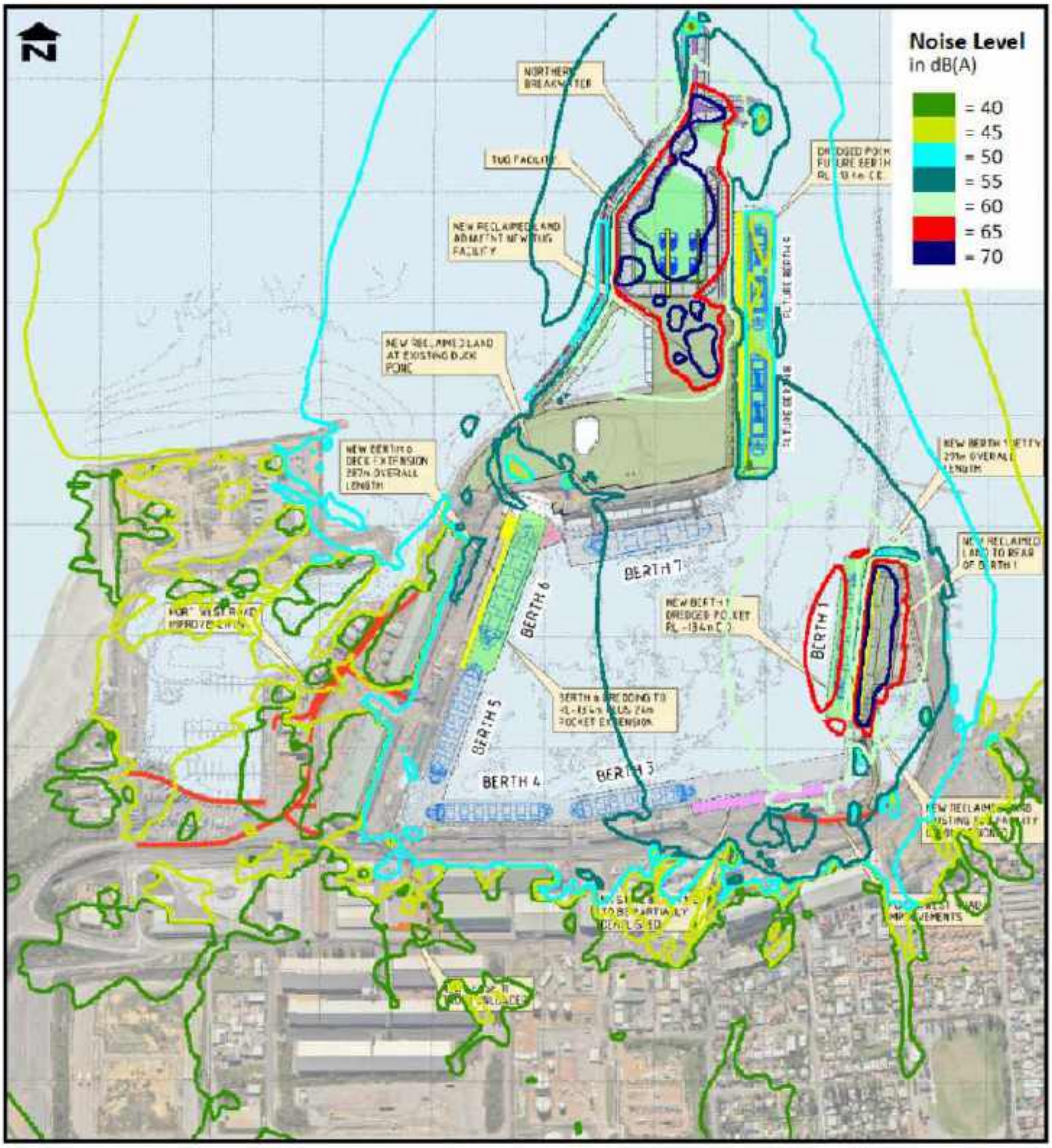


Figure 29: a e noise contours for scenario 4 under easterly wind.

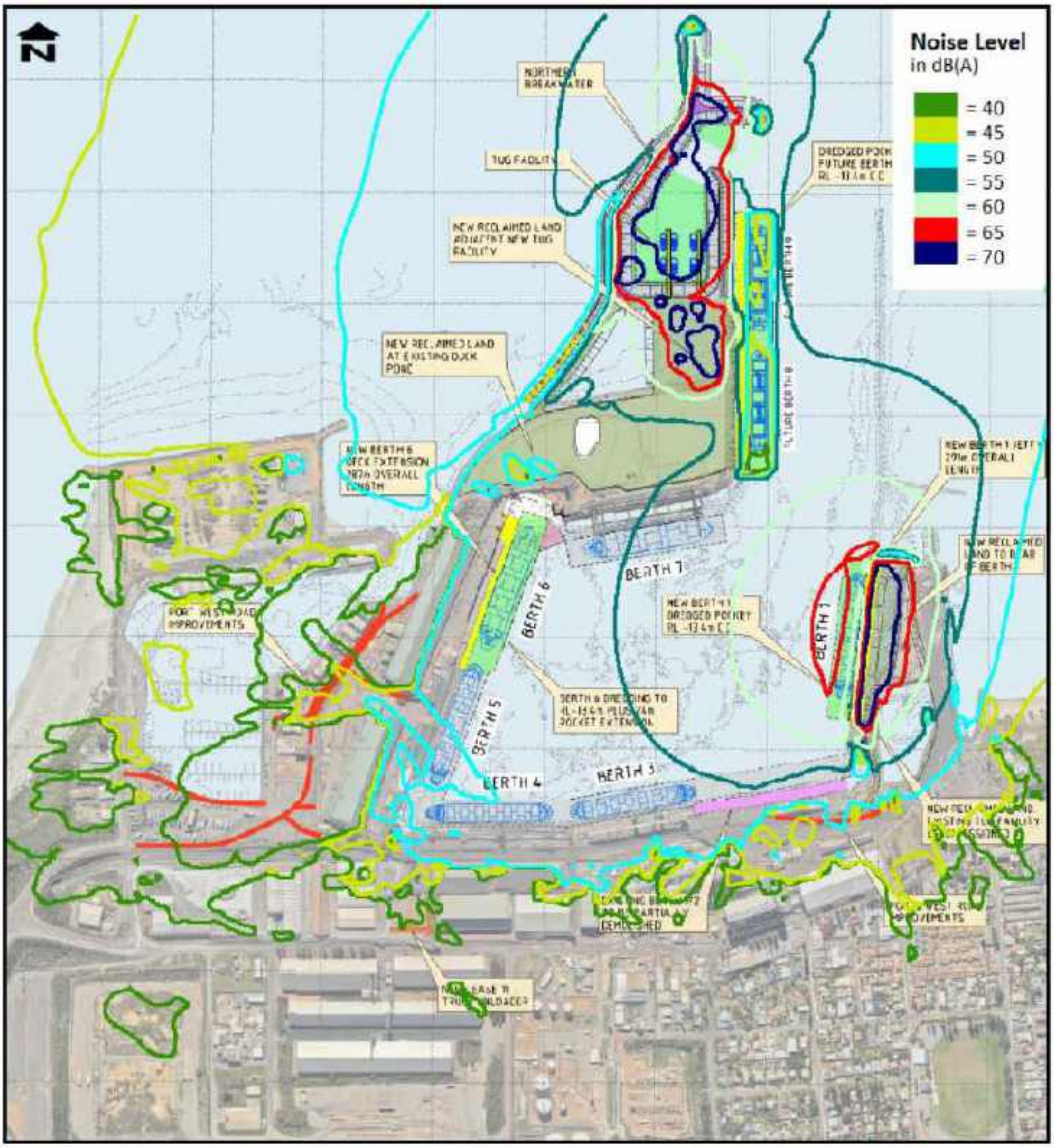


Figure 30: Daytime oise contours for scenario 4 under south-easterly wind.

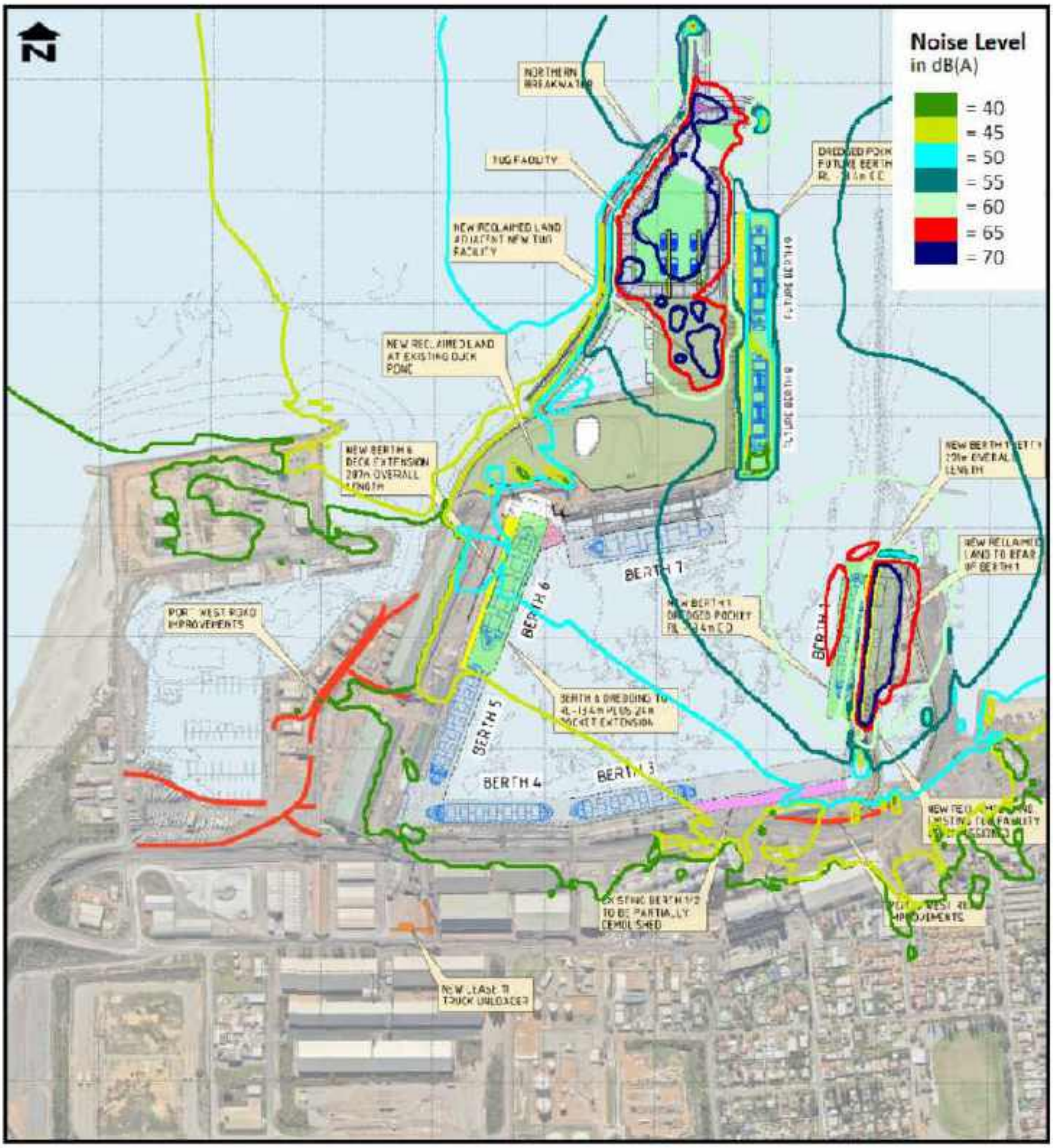


Figure 31: D yti e noise contours for scenario 4 under southerly wind.

Figure 32: Daytime ›oise contours for scenario 4 under south-westerly wind.

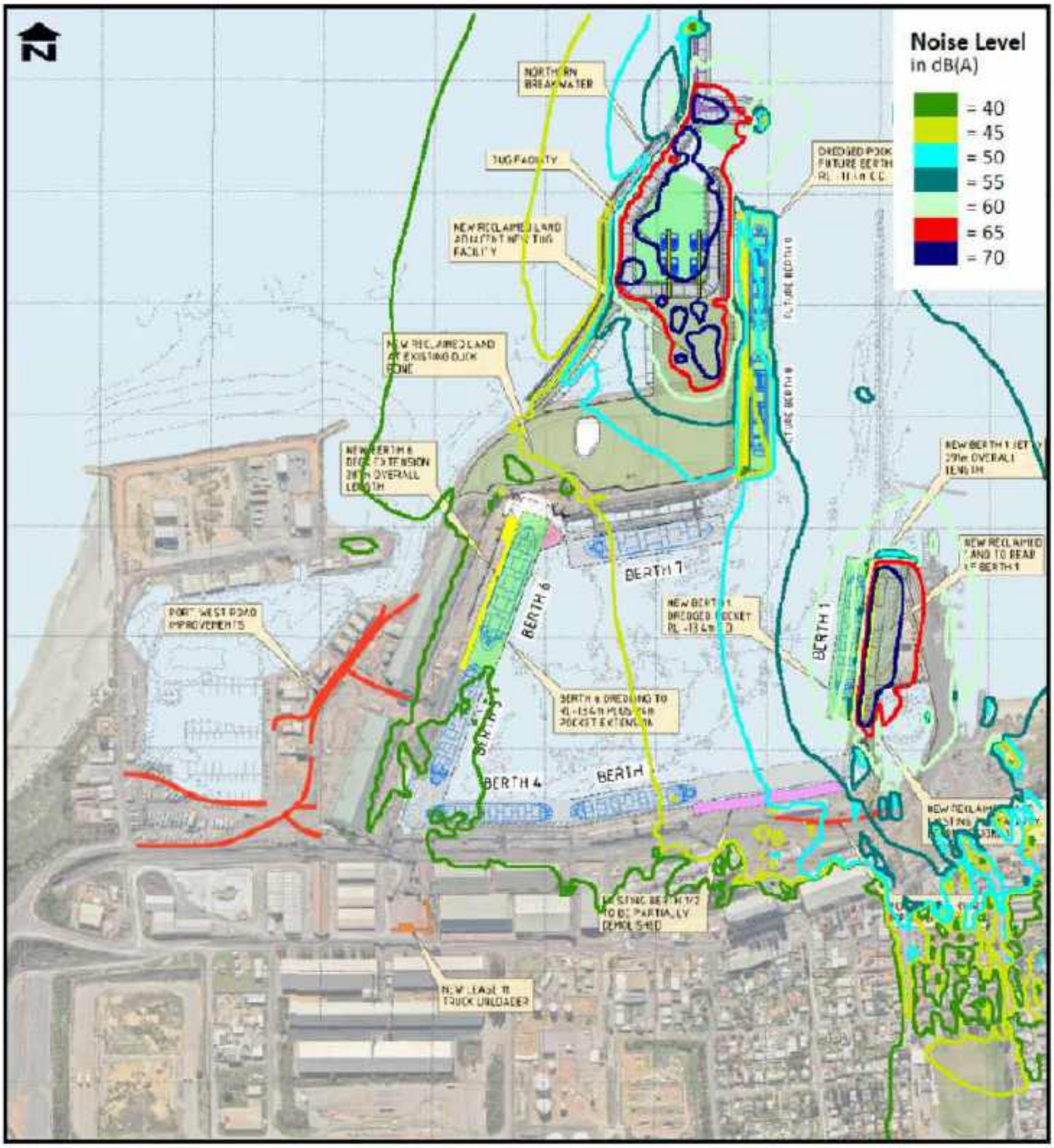


Figure 33: D yti e noise contours for scenario 4 under westerly wind.

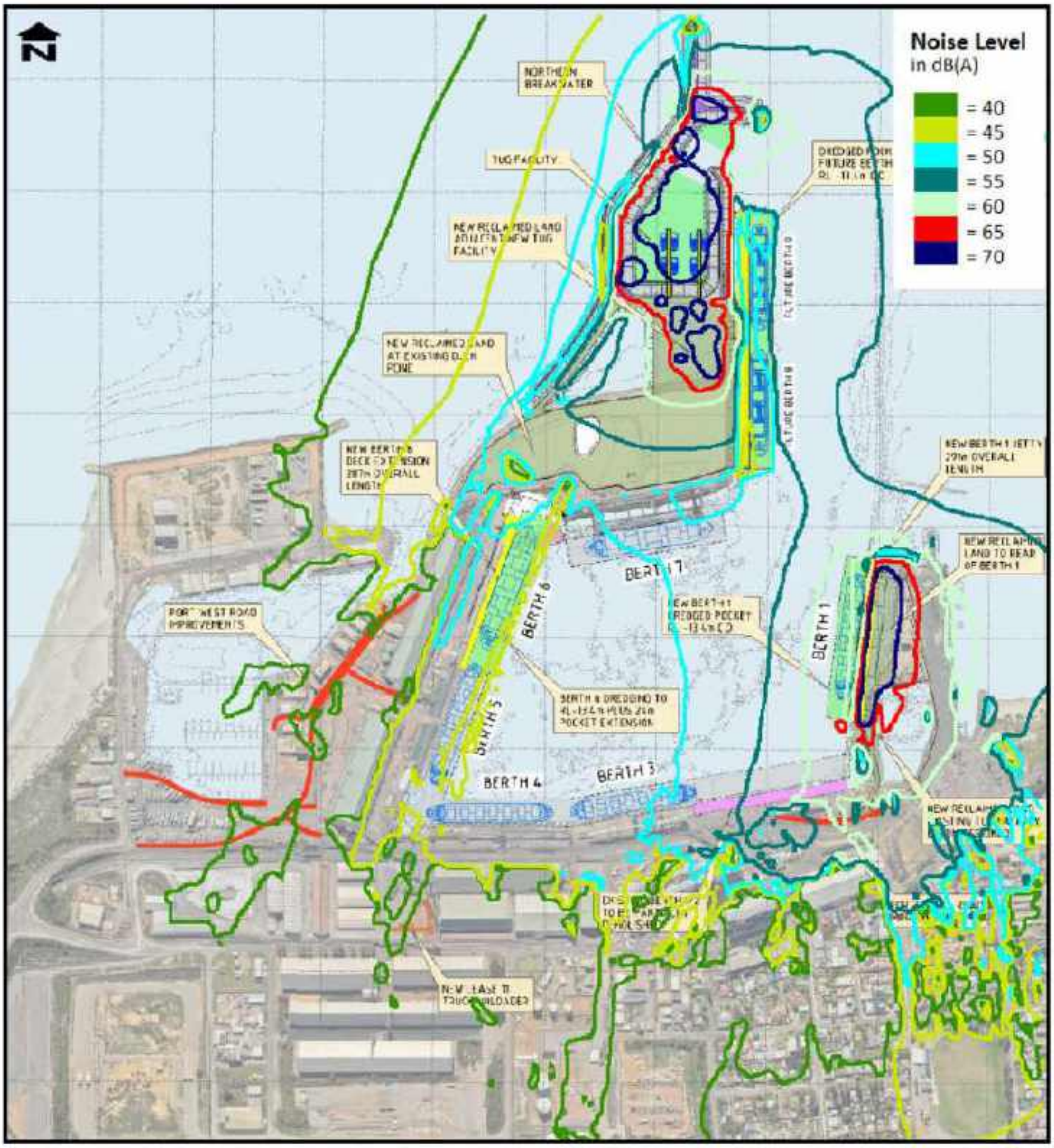


Figure 34: Daytime oise contours for scenario 4 under north-westerly wind.

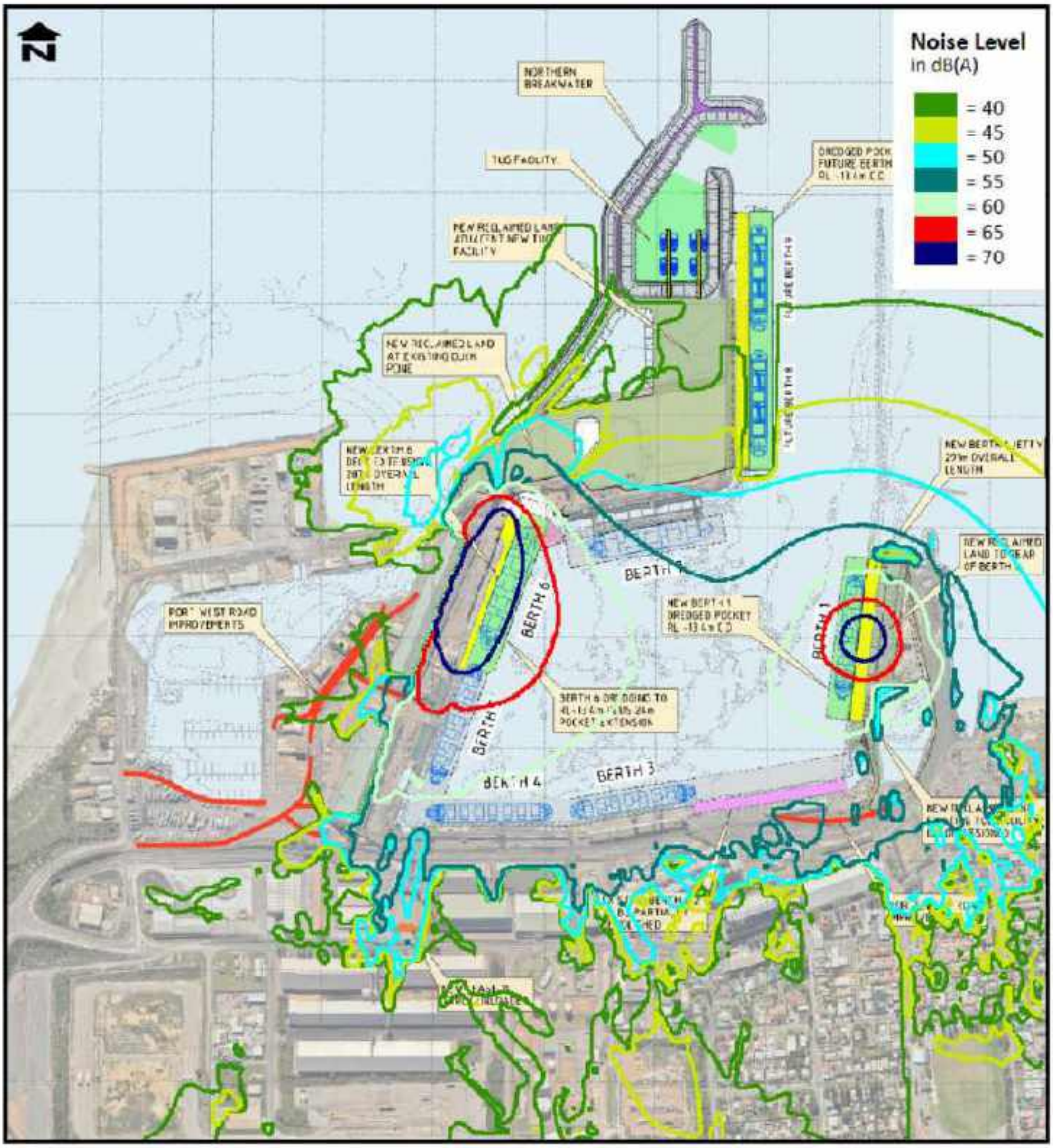


Figure 35: **e noise contours for scenario 5 under northerly wind.**

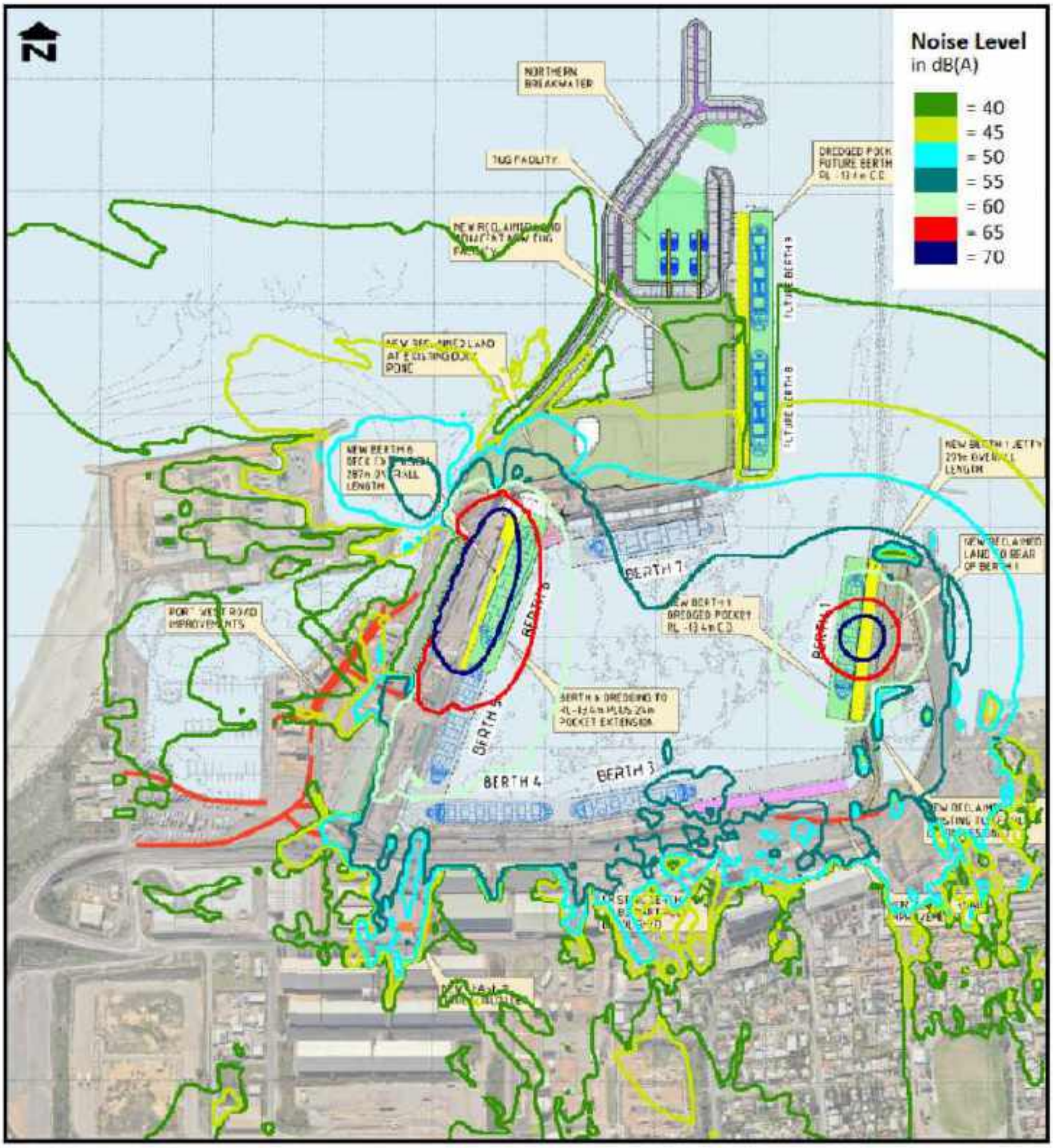


Figure 36: Daytime oise contours for scenario 5 under north-easterly wind.

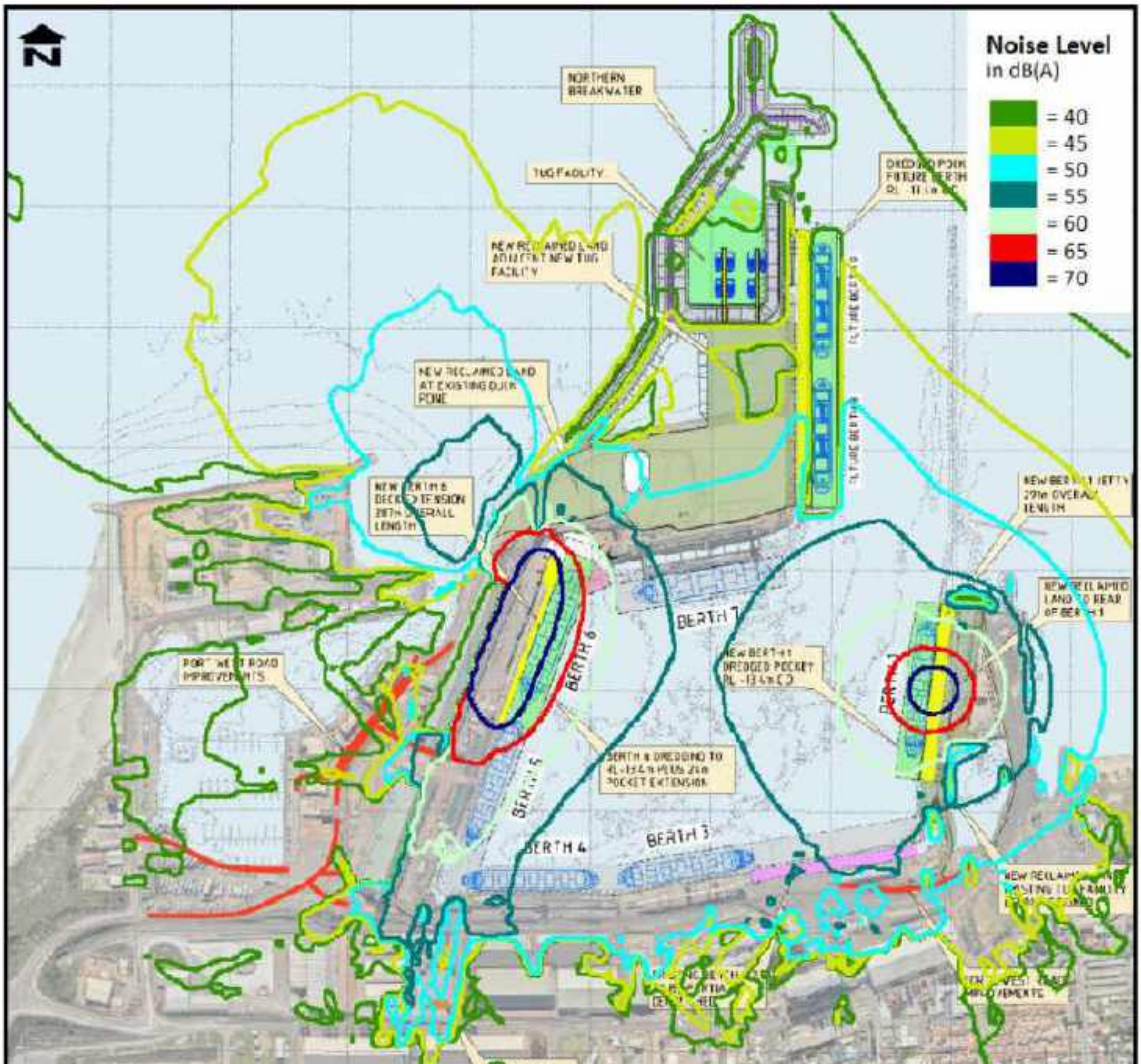


Figure 37: a e noise contours for scenario 5 under easterly wind.

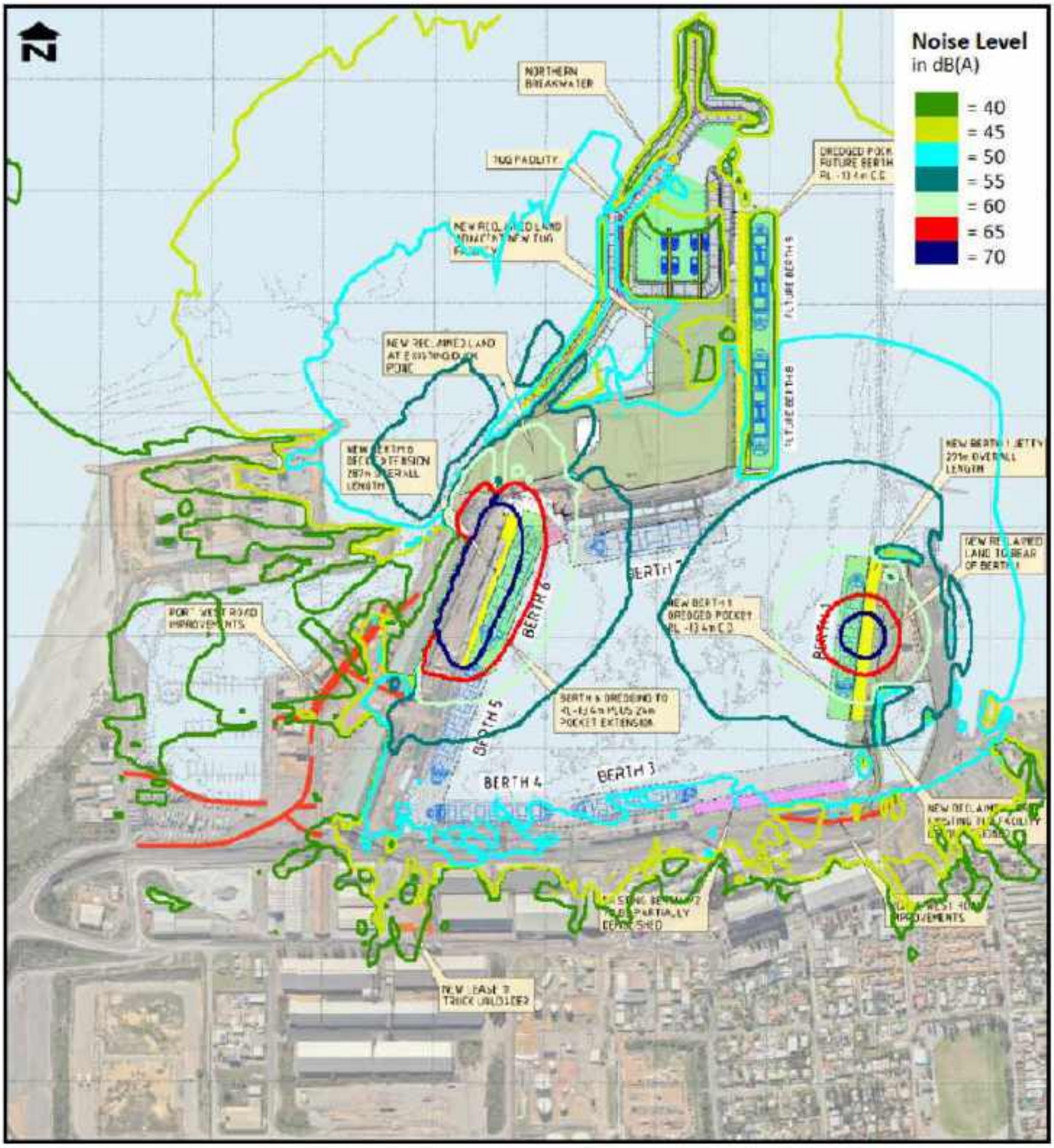


Figure 38: Daytime oise contours for scenario 5 under south-easterly wind.

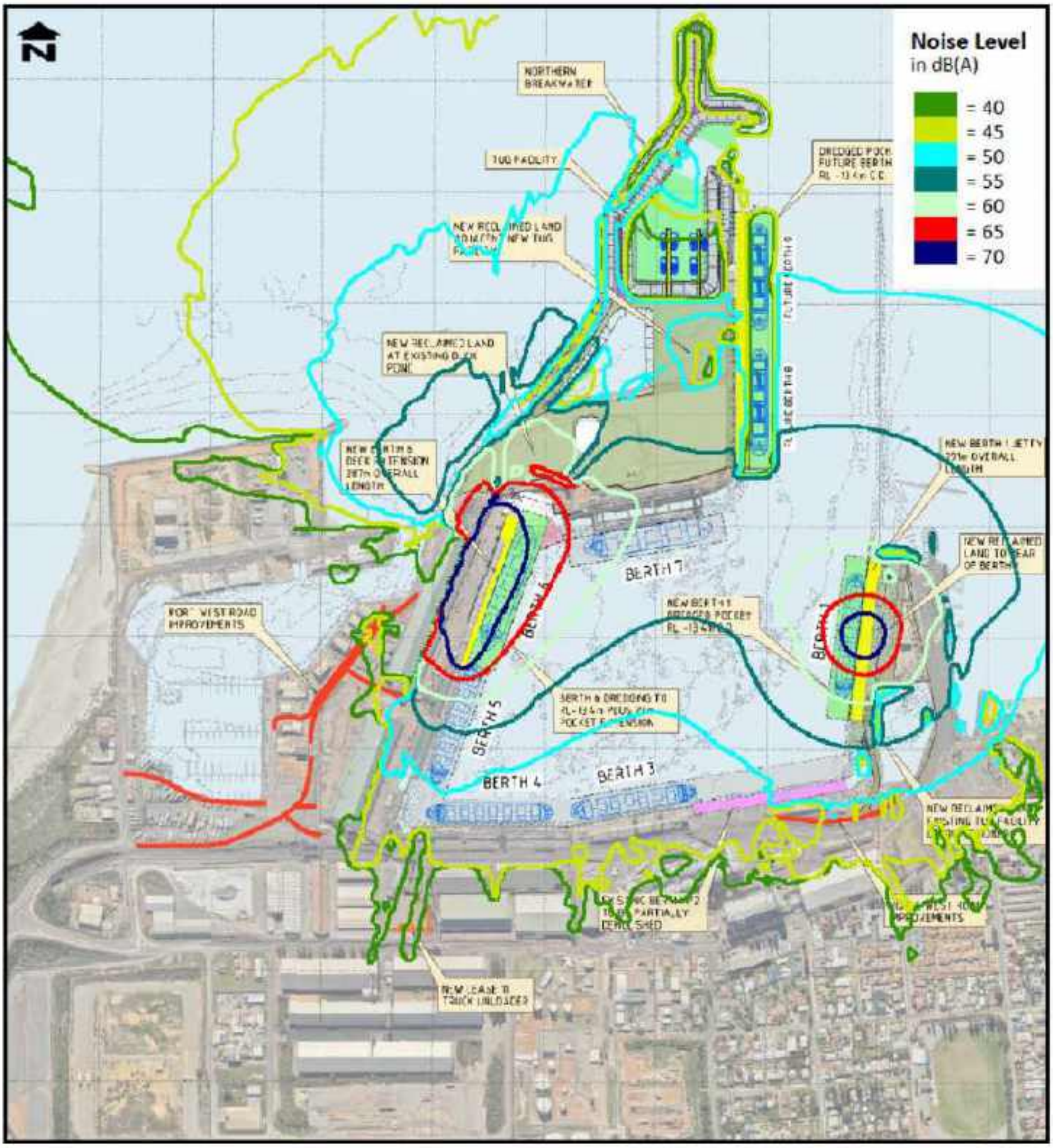


Figure 39: D yti e noise contours for scenario 5 under southerly wind.

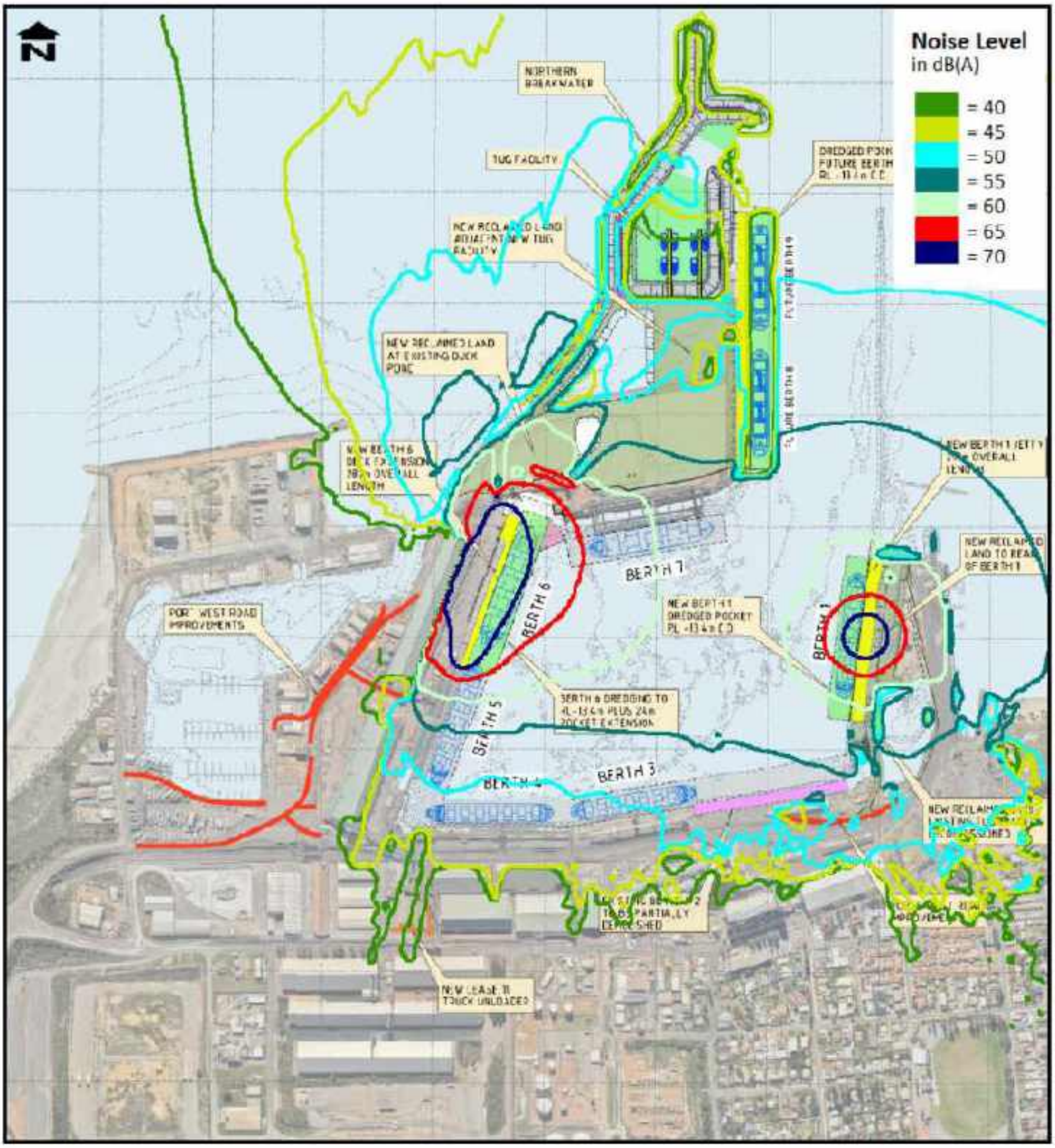


Figure 40: Daytime oise contours for scenario 5 under south-westerly wind.

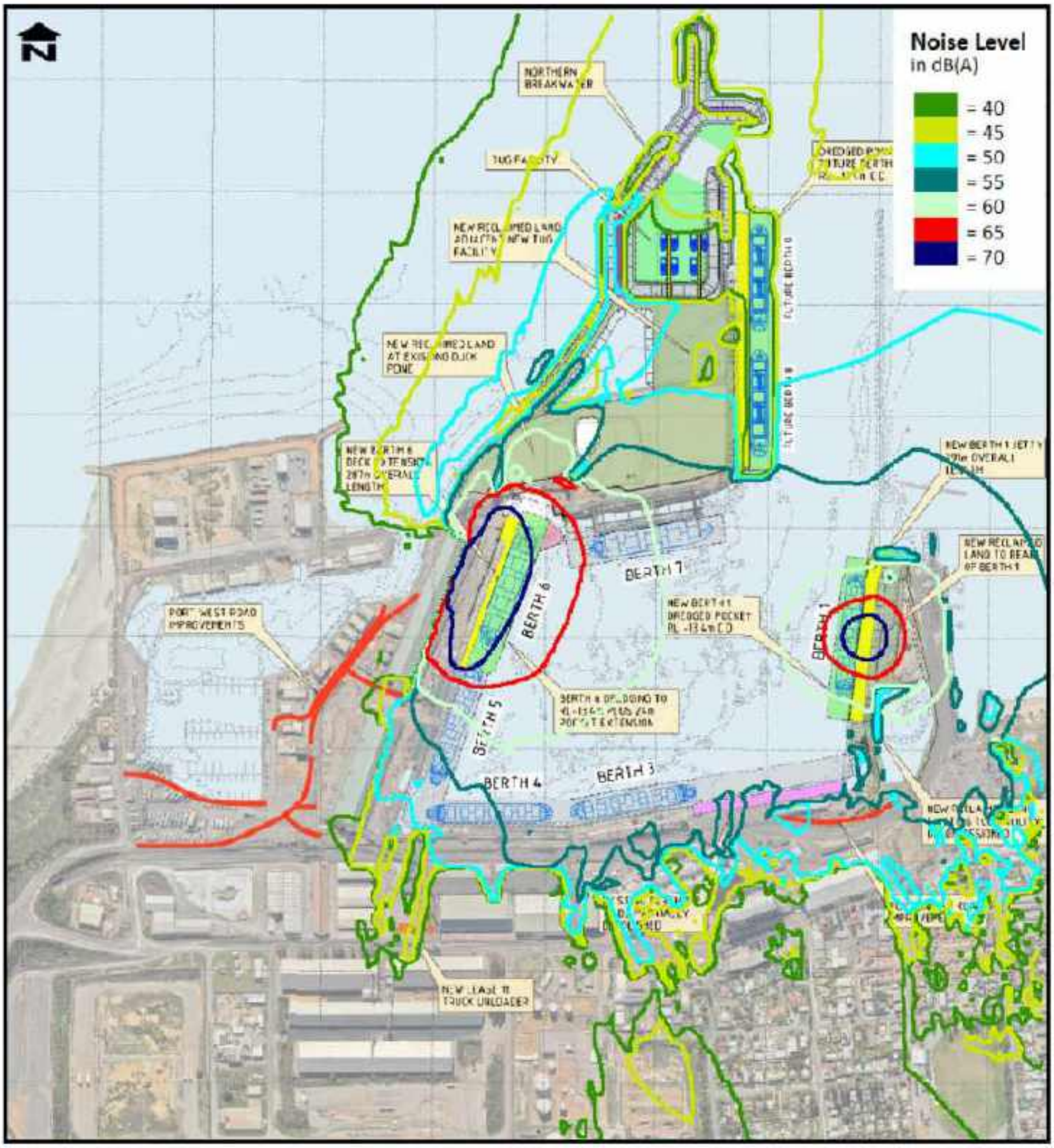


Figure 41: D yti e noise contours for scenario 5 under westerly wind.

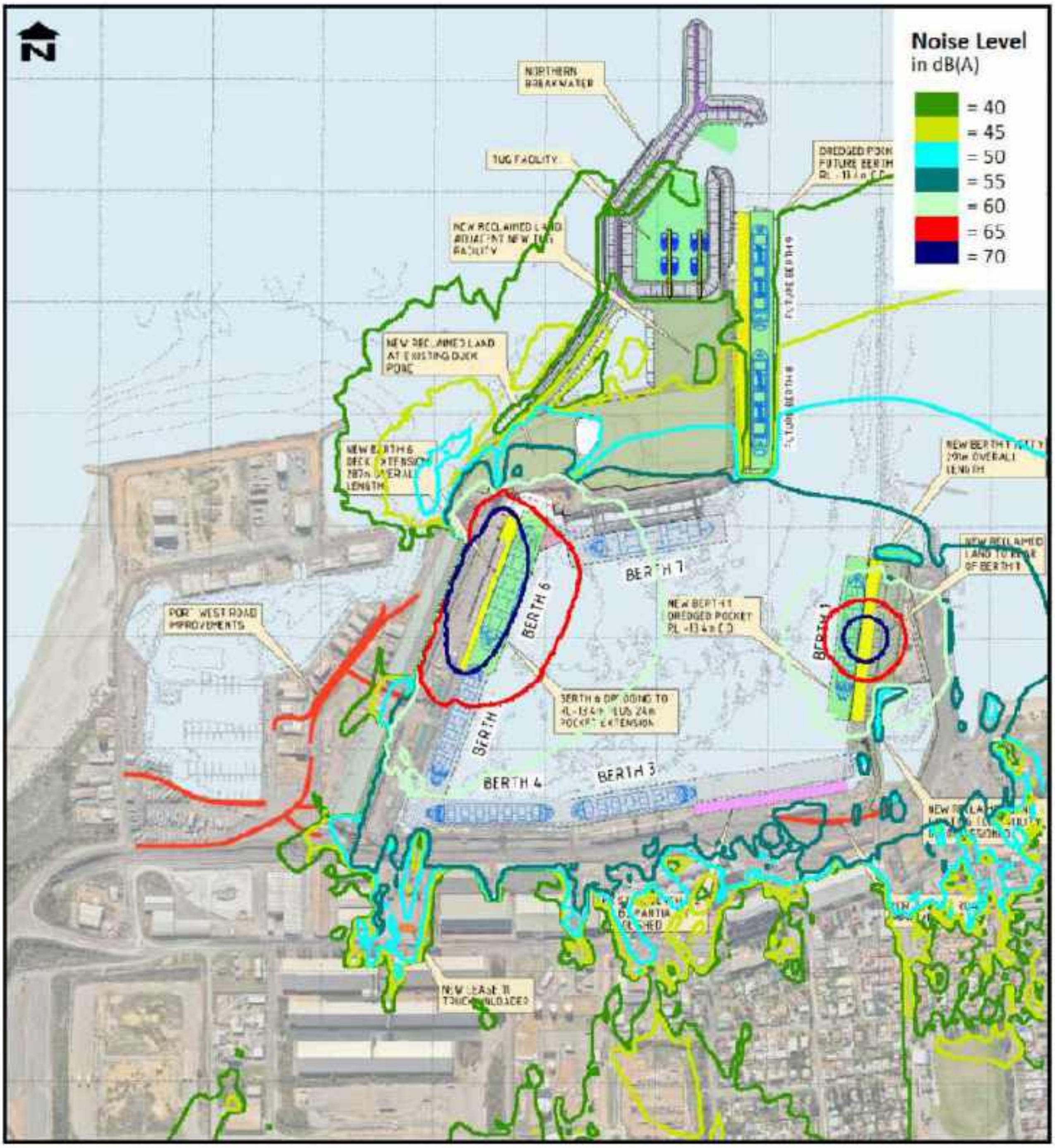


Figure 42: Daytime oise contours for scenario 5 under north-westerly wind.

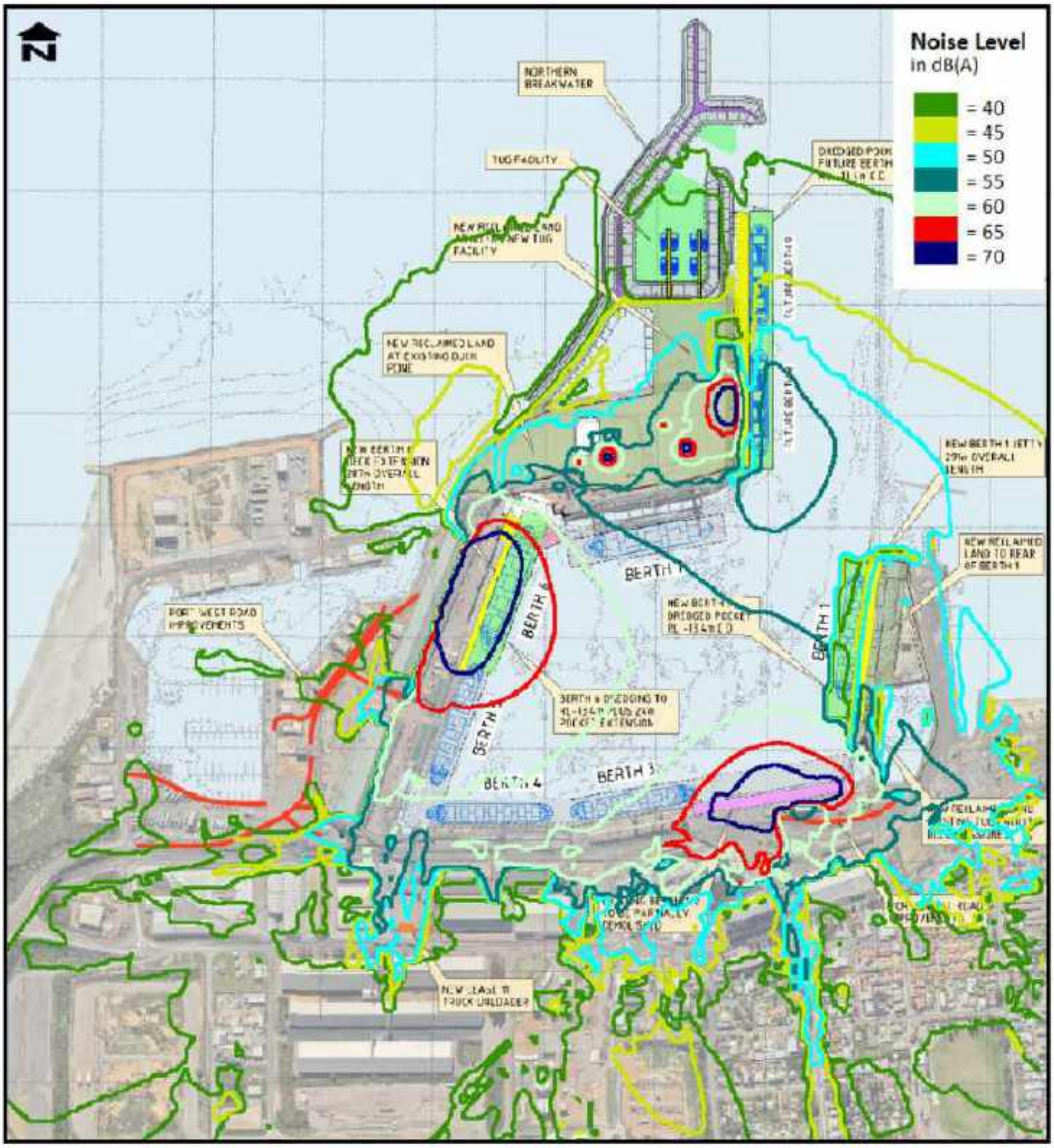


Figure 43: e noise contours for scenario 6 under northerly wind.

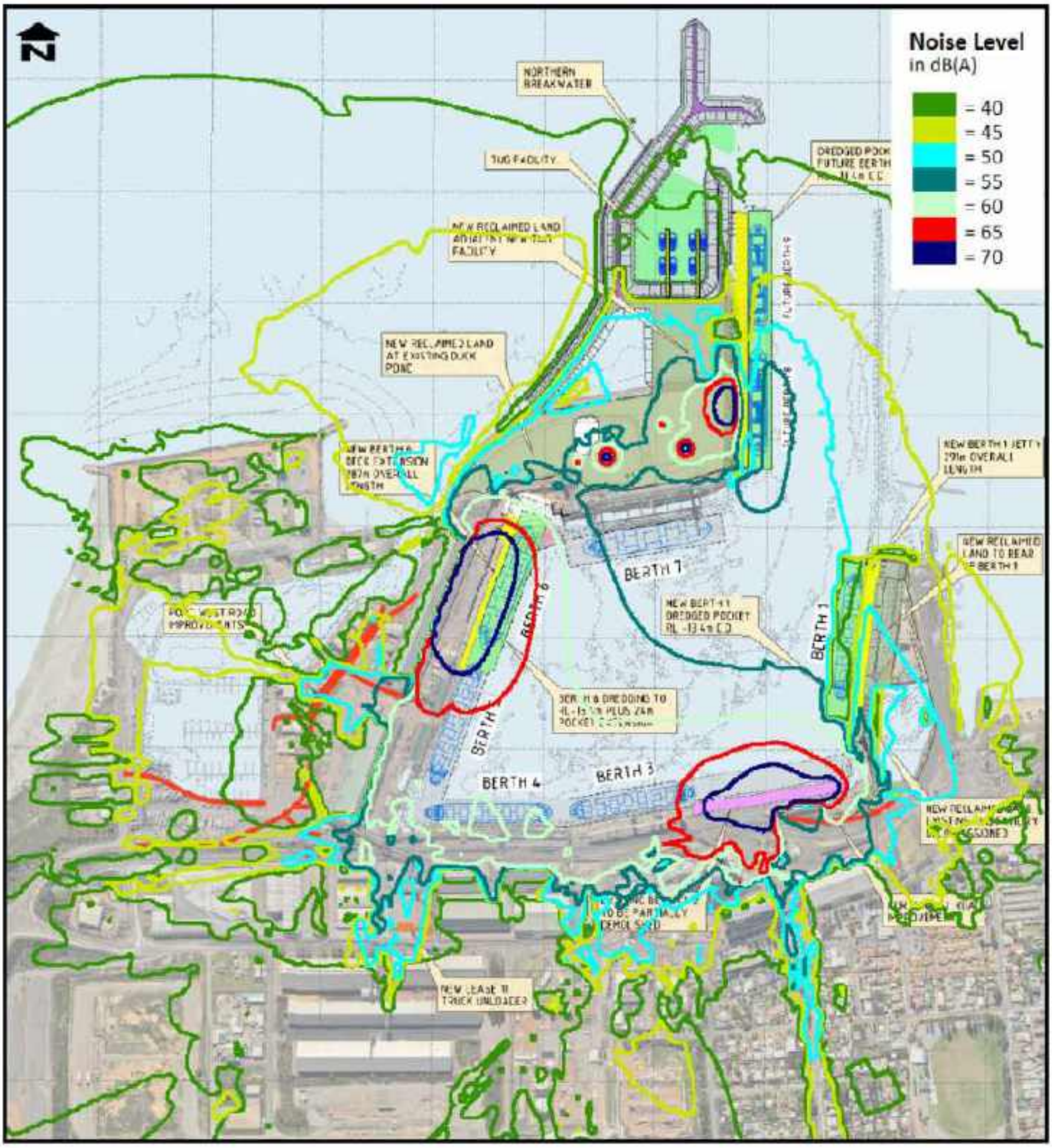


Figure 44: Daytime oise contours for scenario 6 under north-easterly wind.

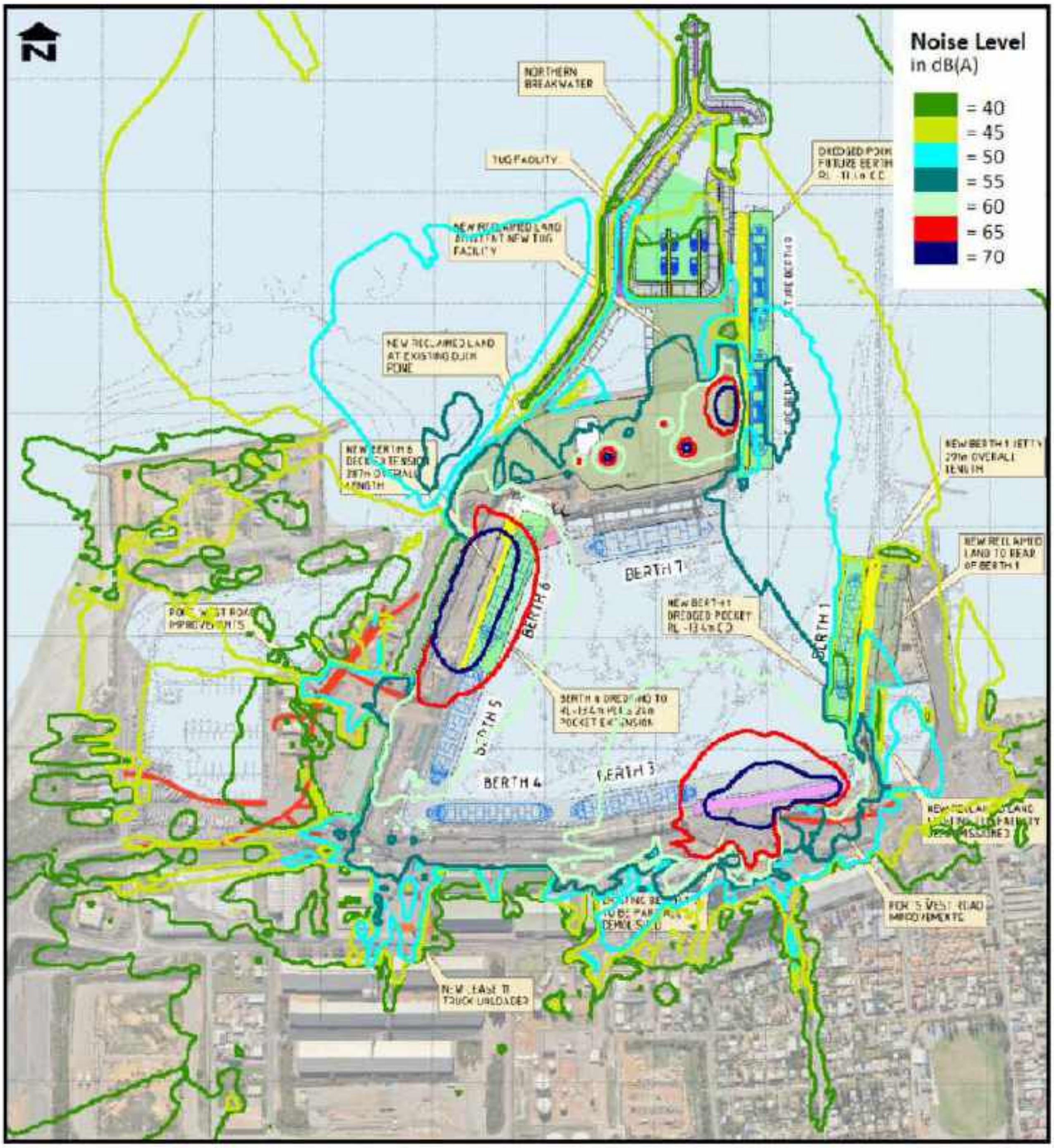


Figure 45: a e noise contours for scenario 6 under easterly wind.

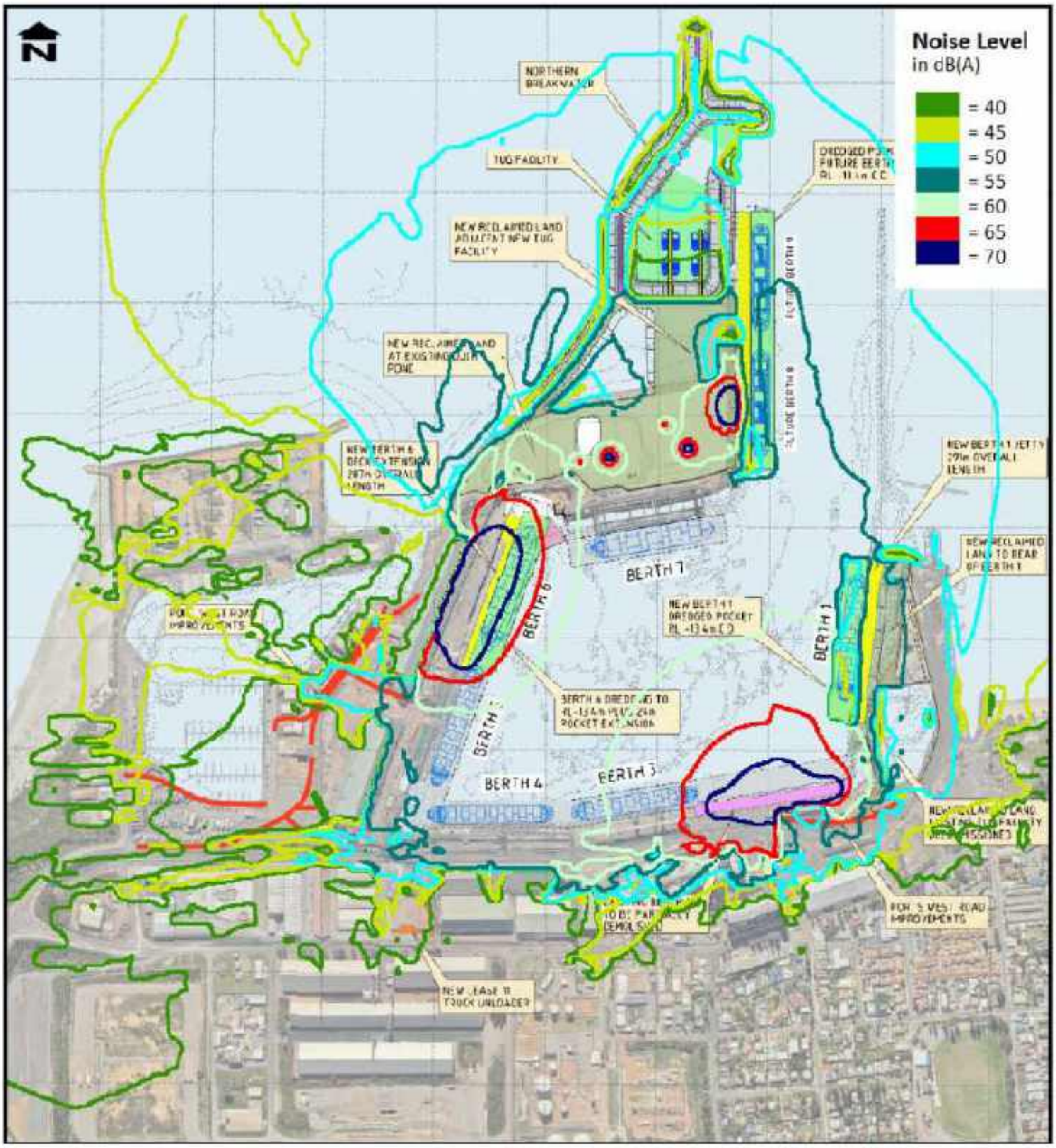


Figure 46: Daytime oise contours for scenario 6 under south-easterly wind.

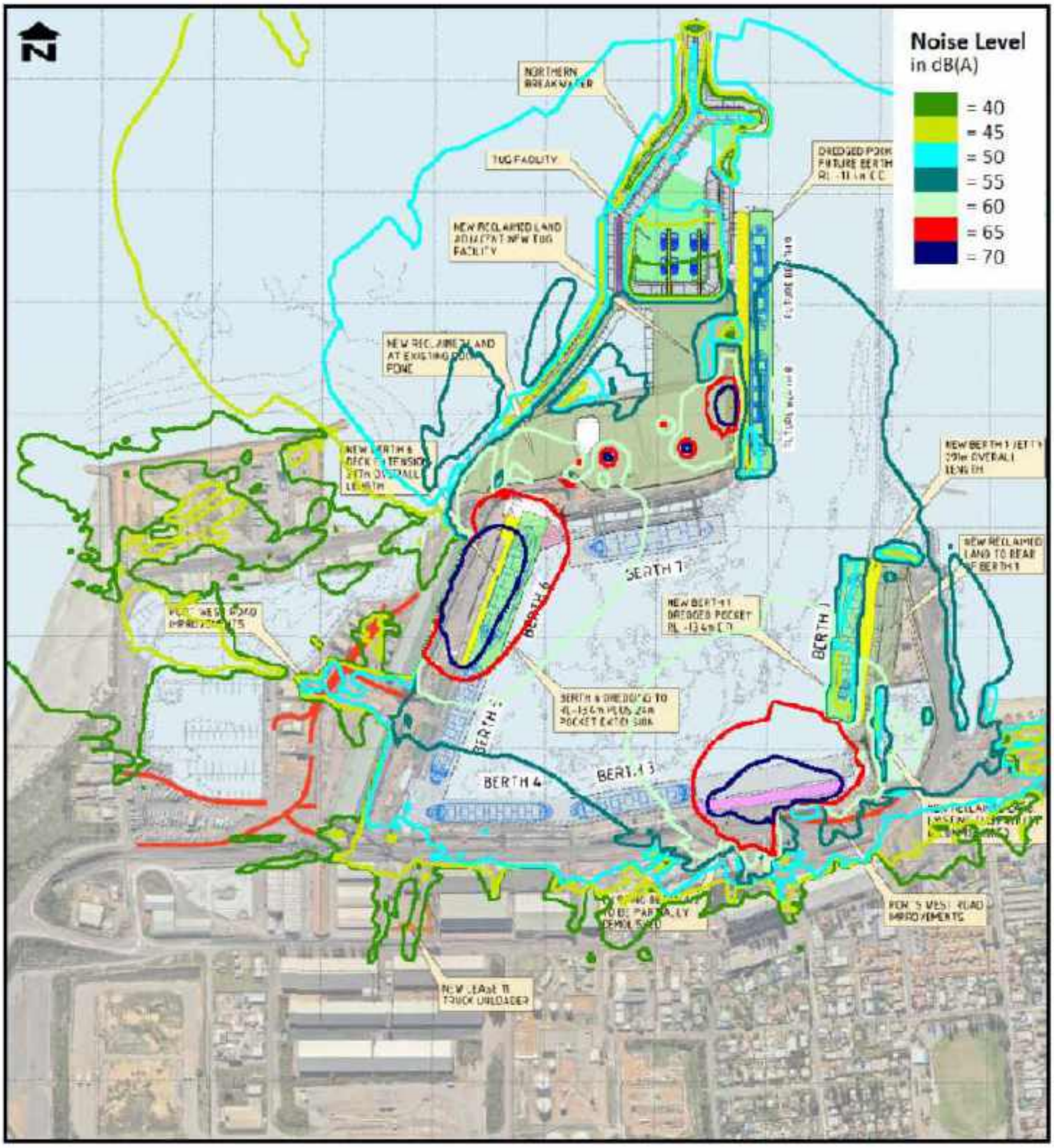


Figure 47: D yti e noise contours for scenario 6 under southerly wind.

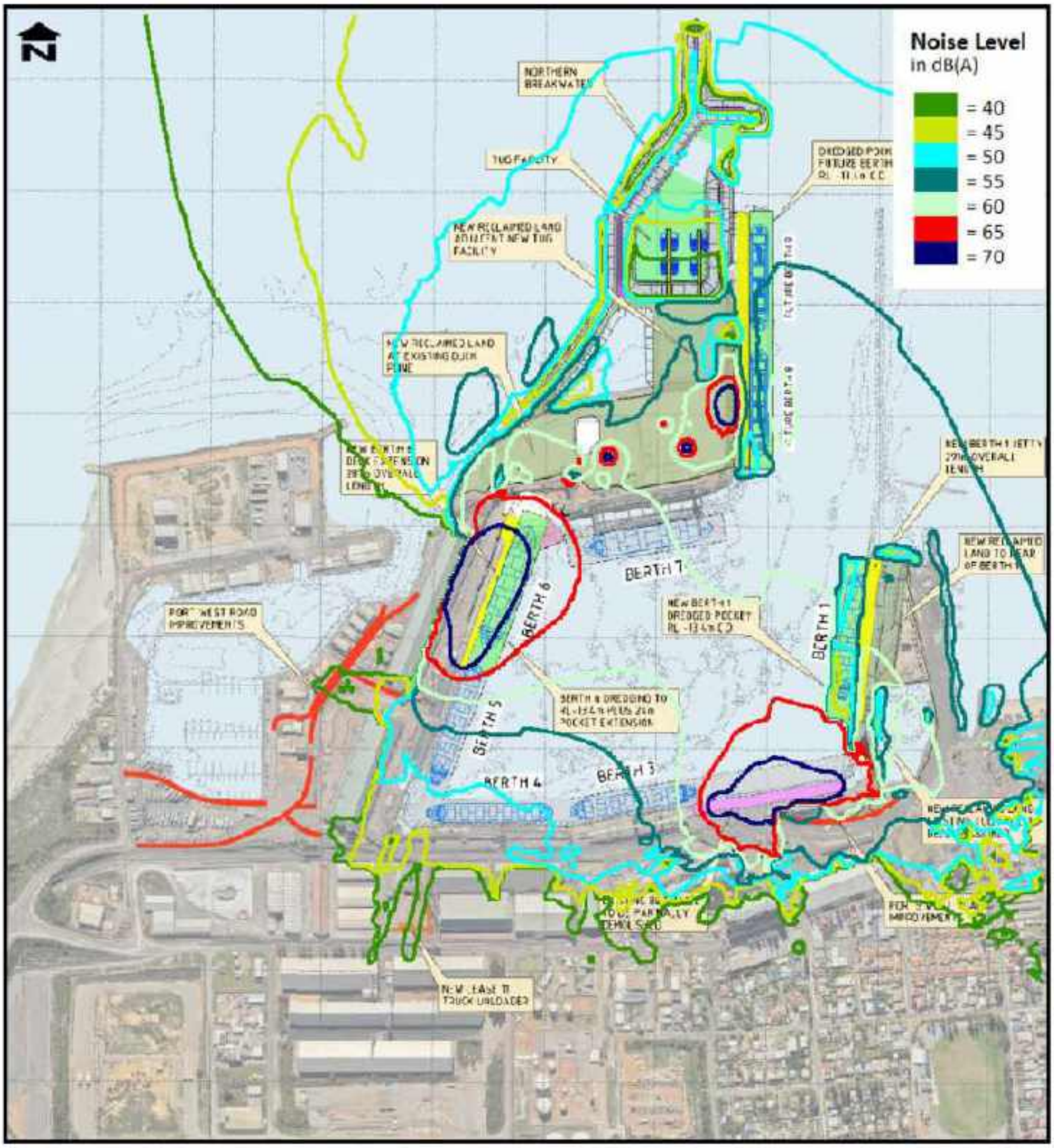


Figure 48: Daytime oise contours for scenario 6 under south-westerly wind.

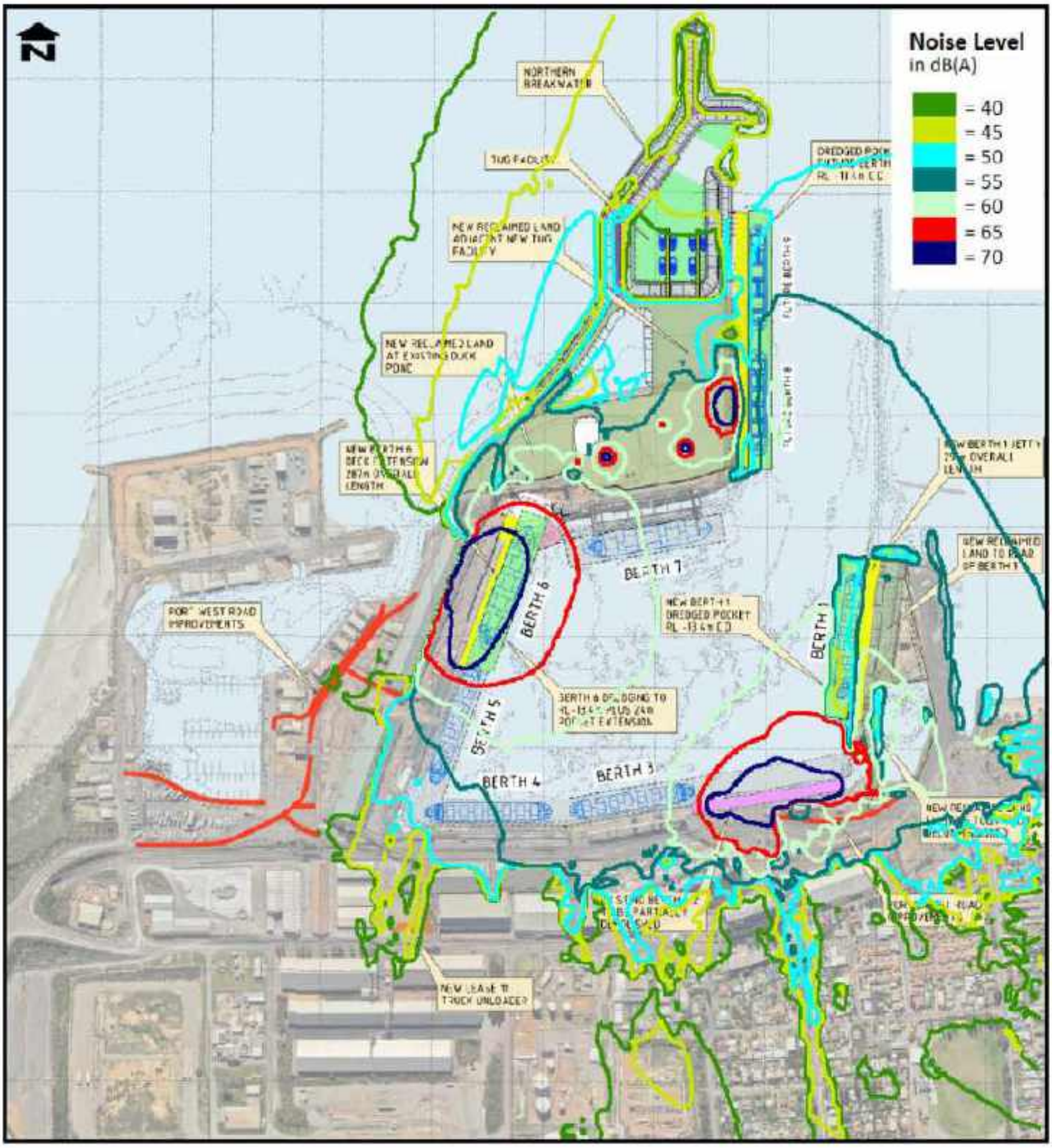


Figure 49: D yti e noise contours for scenario 6 under westerly wind.

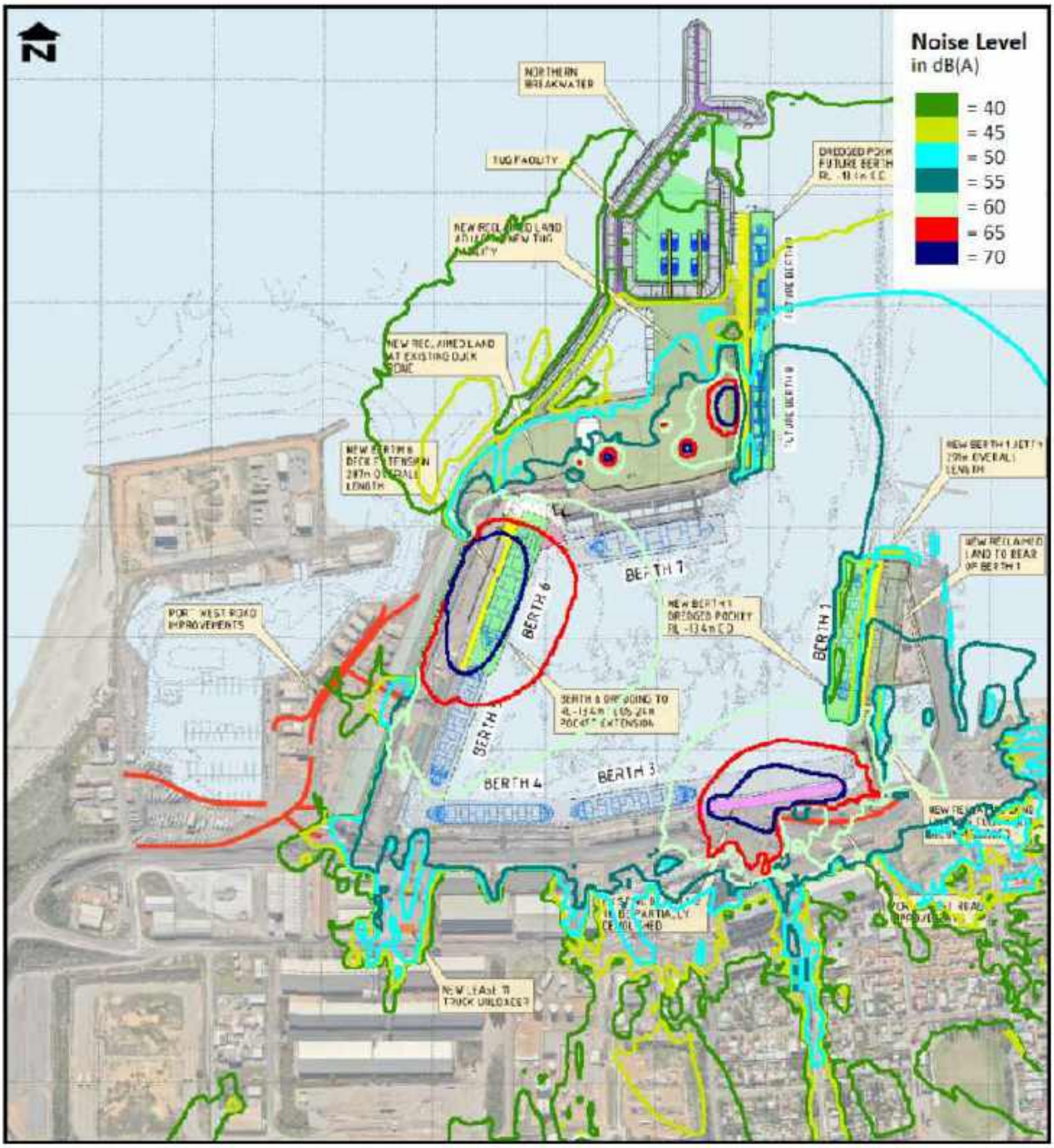


Figure 50: Daytime oise contours for scenario 6 under north-westerly wind.

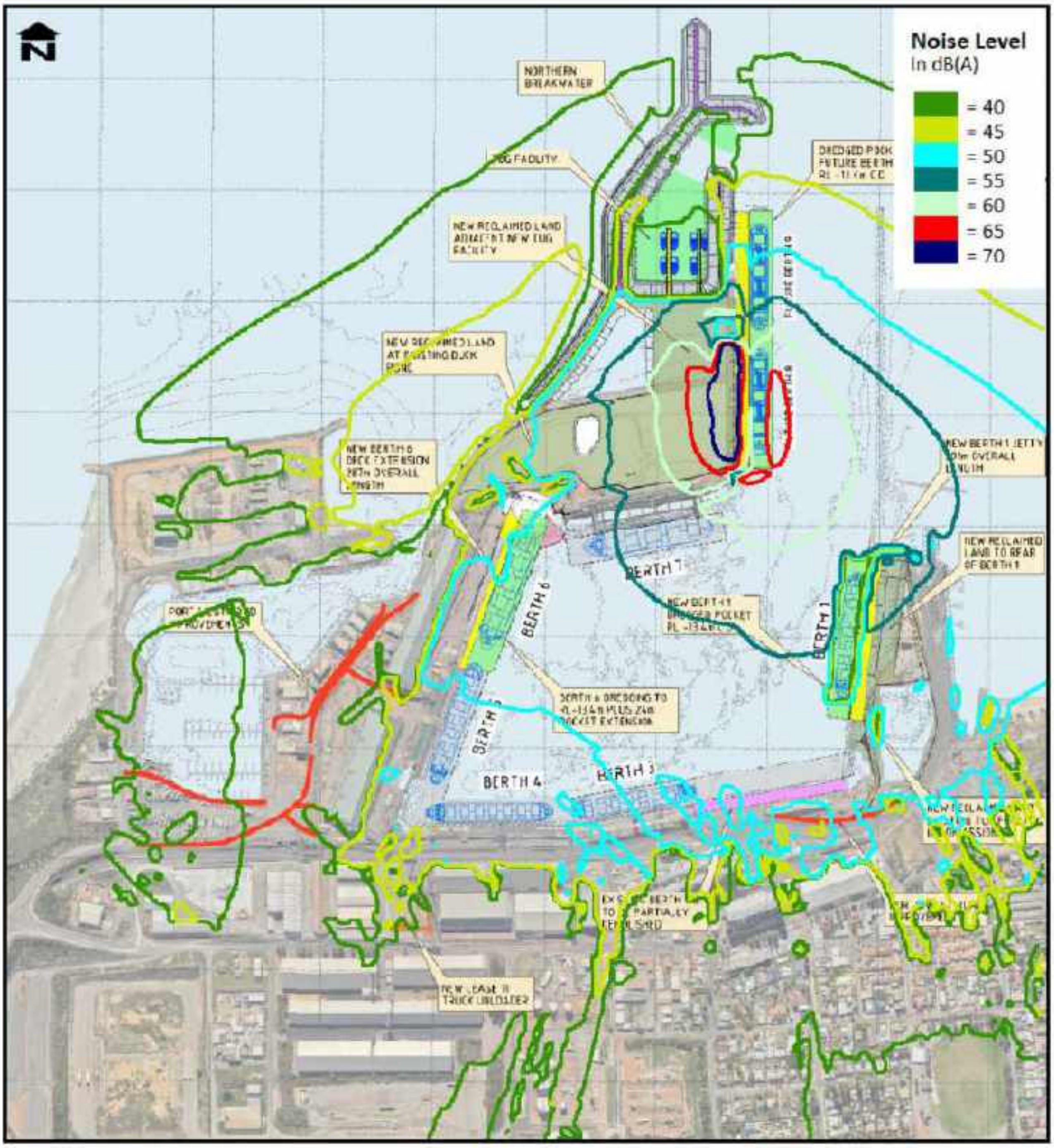


Figure 51: e noise contours for scenario 7 under northerly wind.

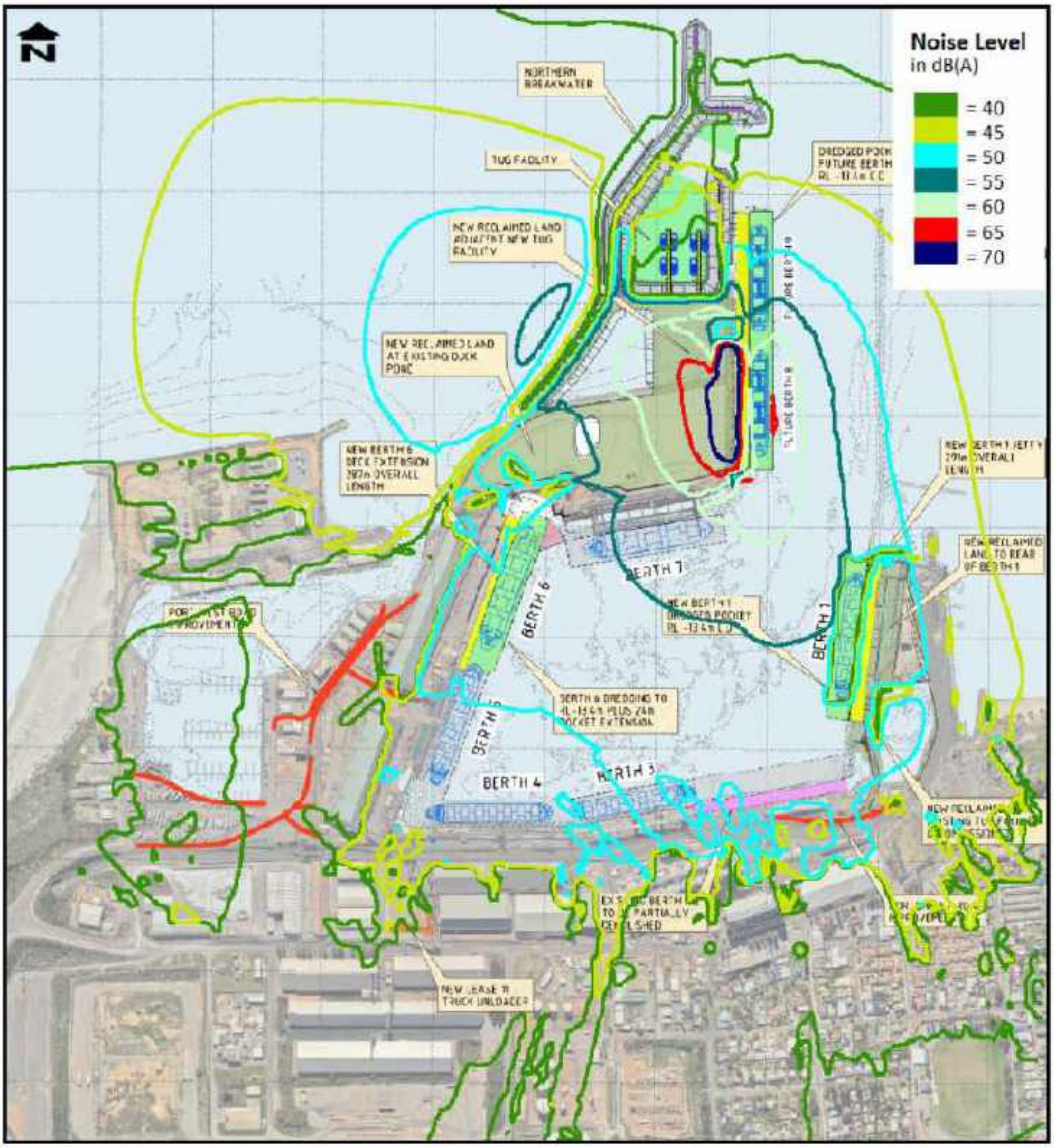


Figure 52: Daytime oise contours for scenario 7 under north-easterly wind.

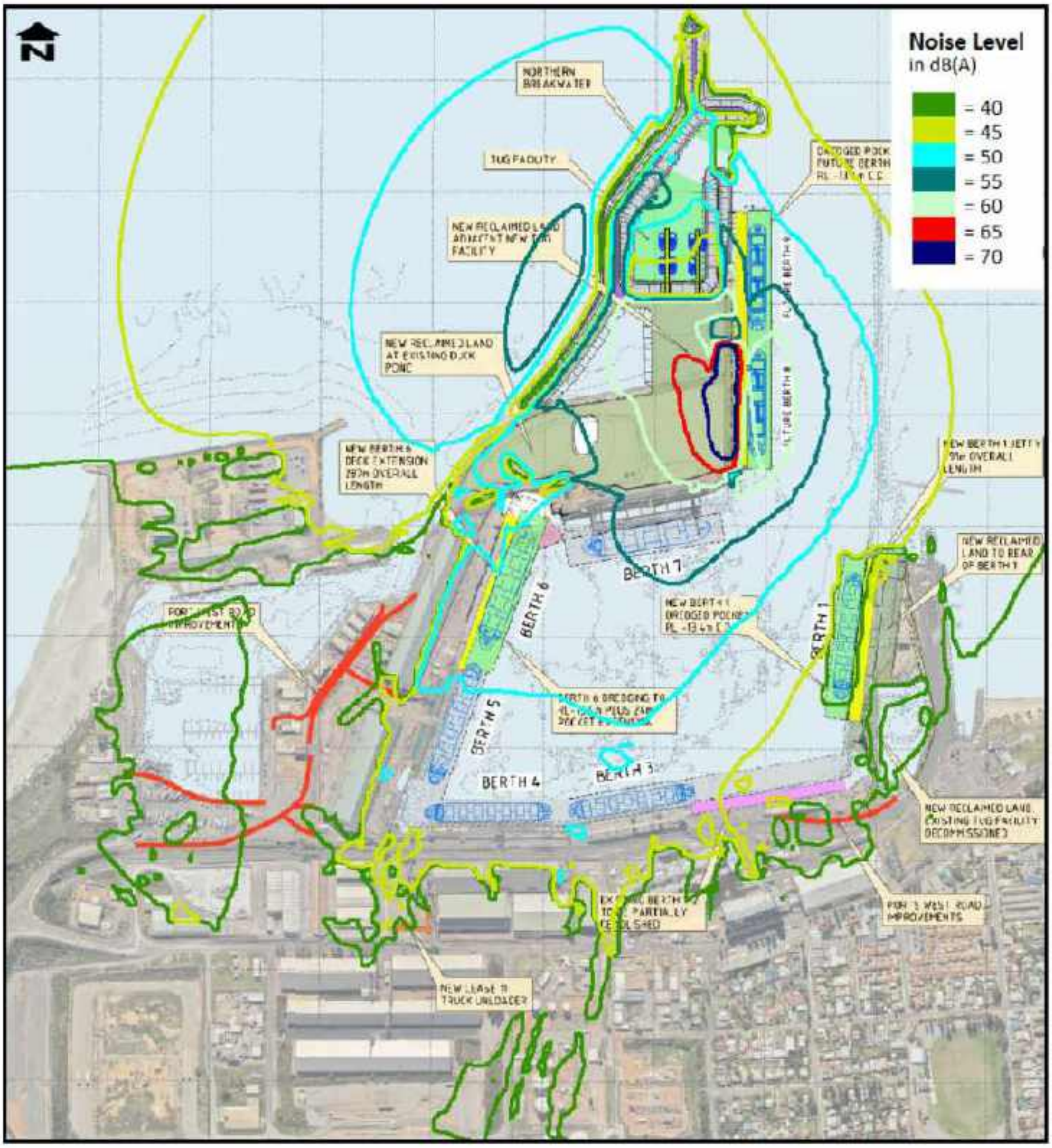


Figure 53: a e noise contours for scenario 7 under easterly wind.

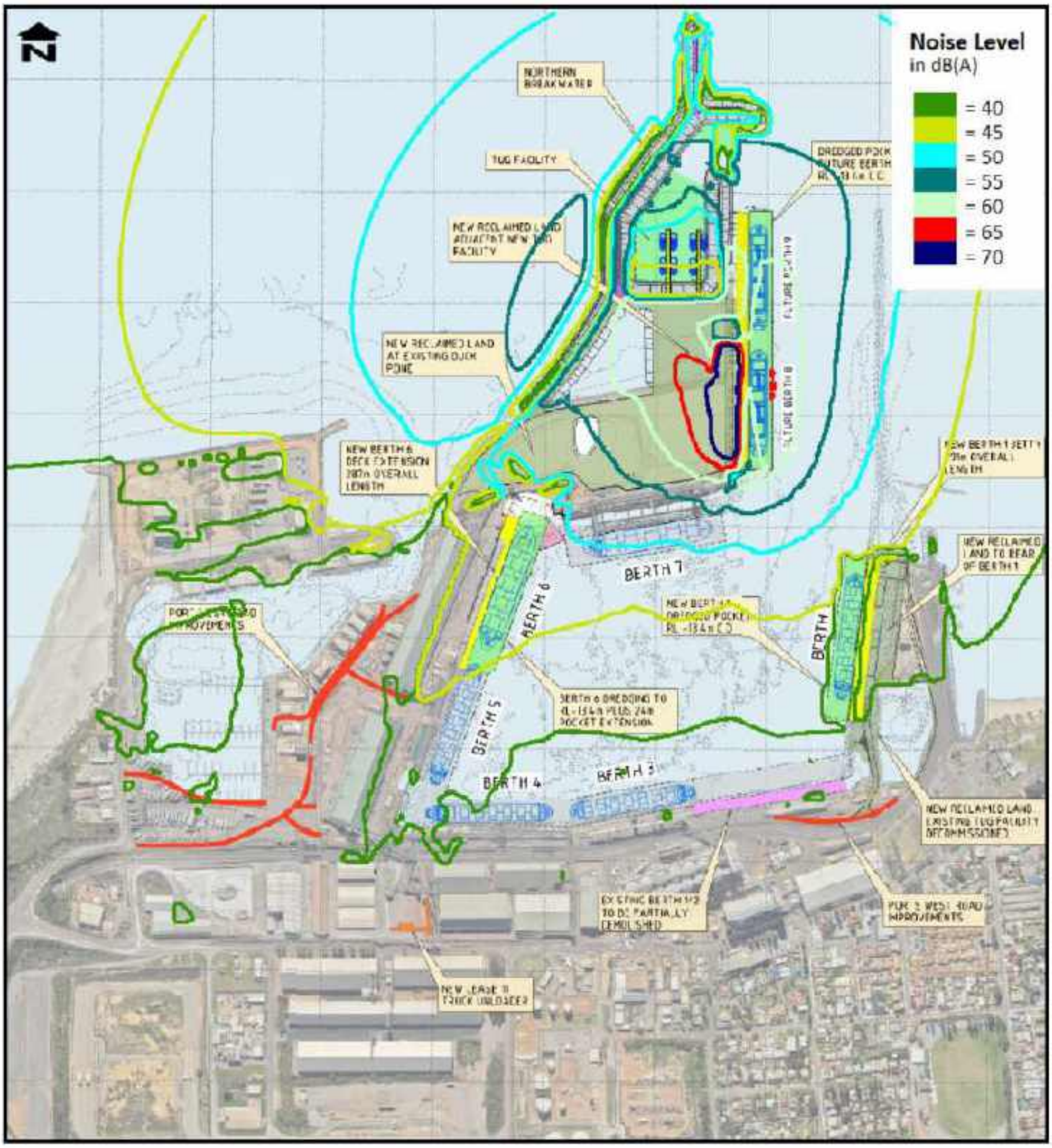


Figure 54: Daytime oise contours for scenario 7 under south-easterly wind.

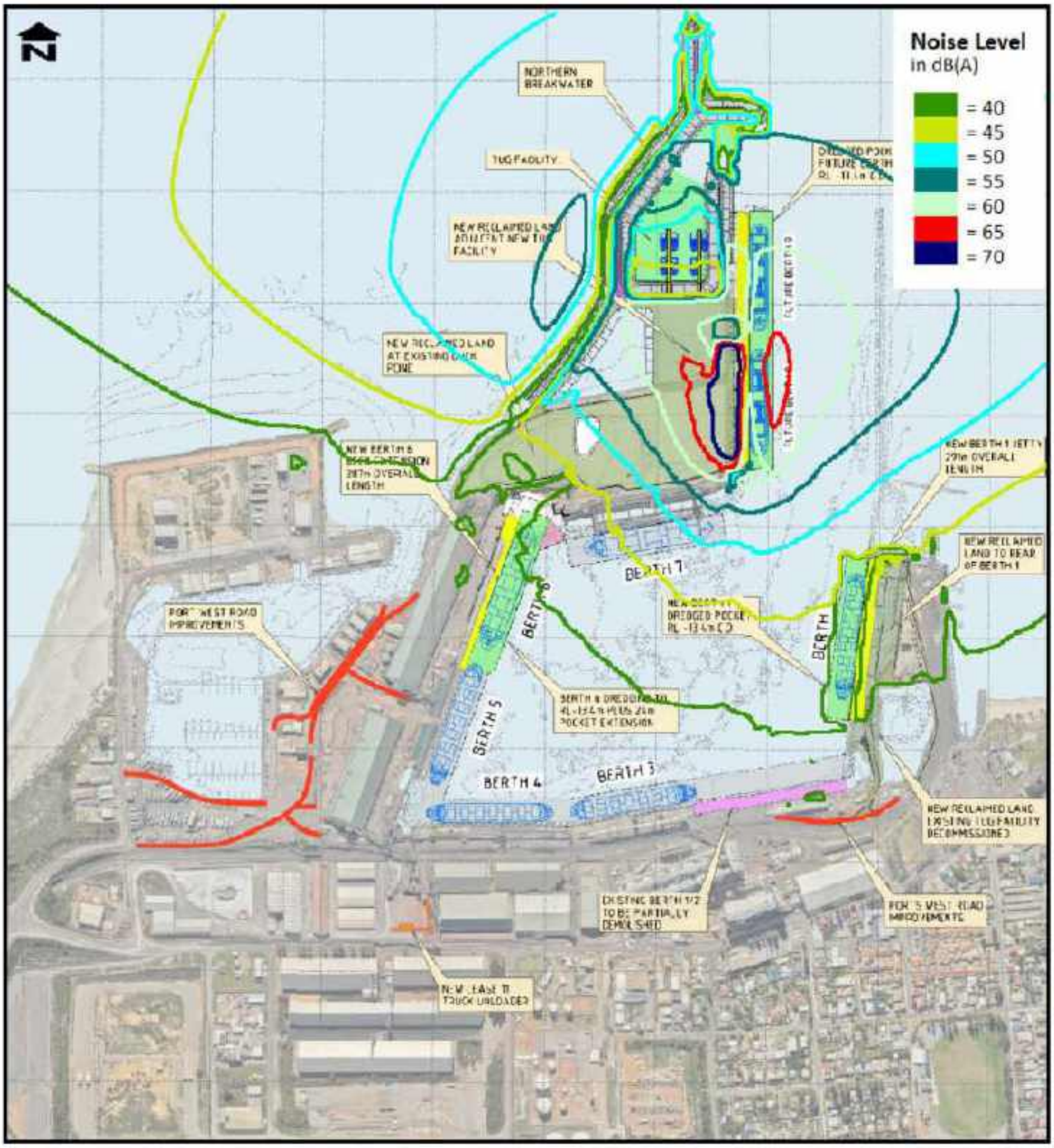


Figure 55: D yti e noise contours for scenario 7 under southerly wind.

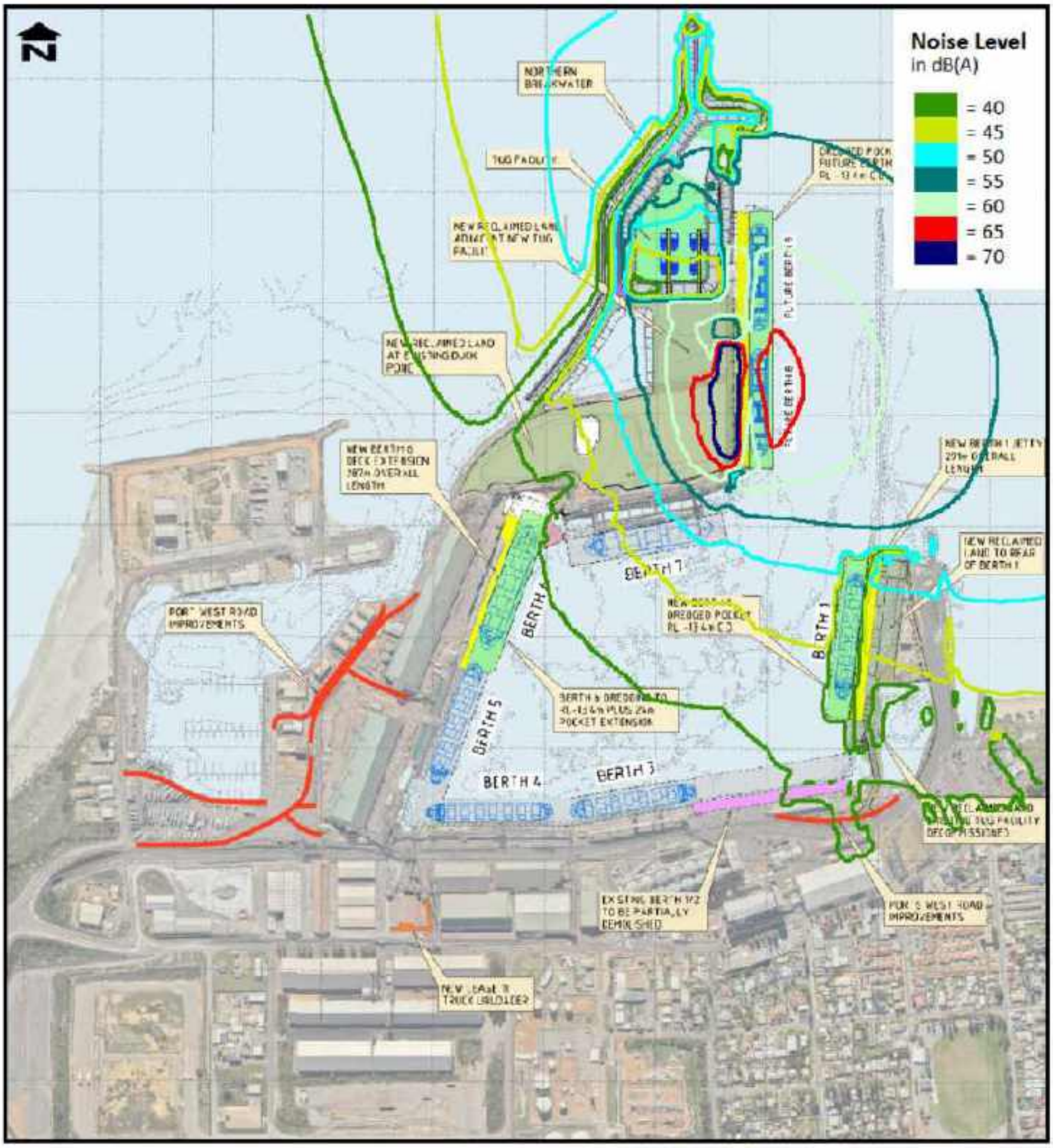


Figure 56: Daytime oise contours for scenario 7 under south-westerly wind.

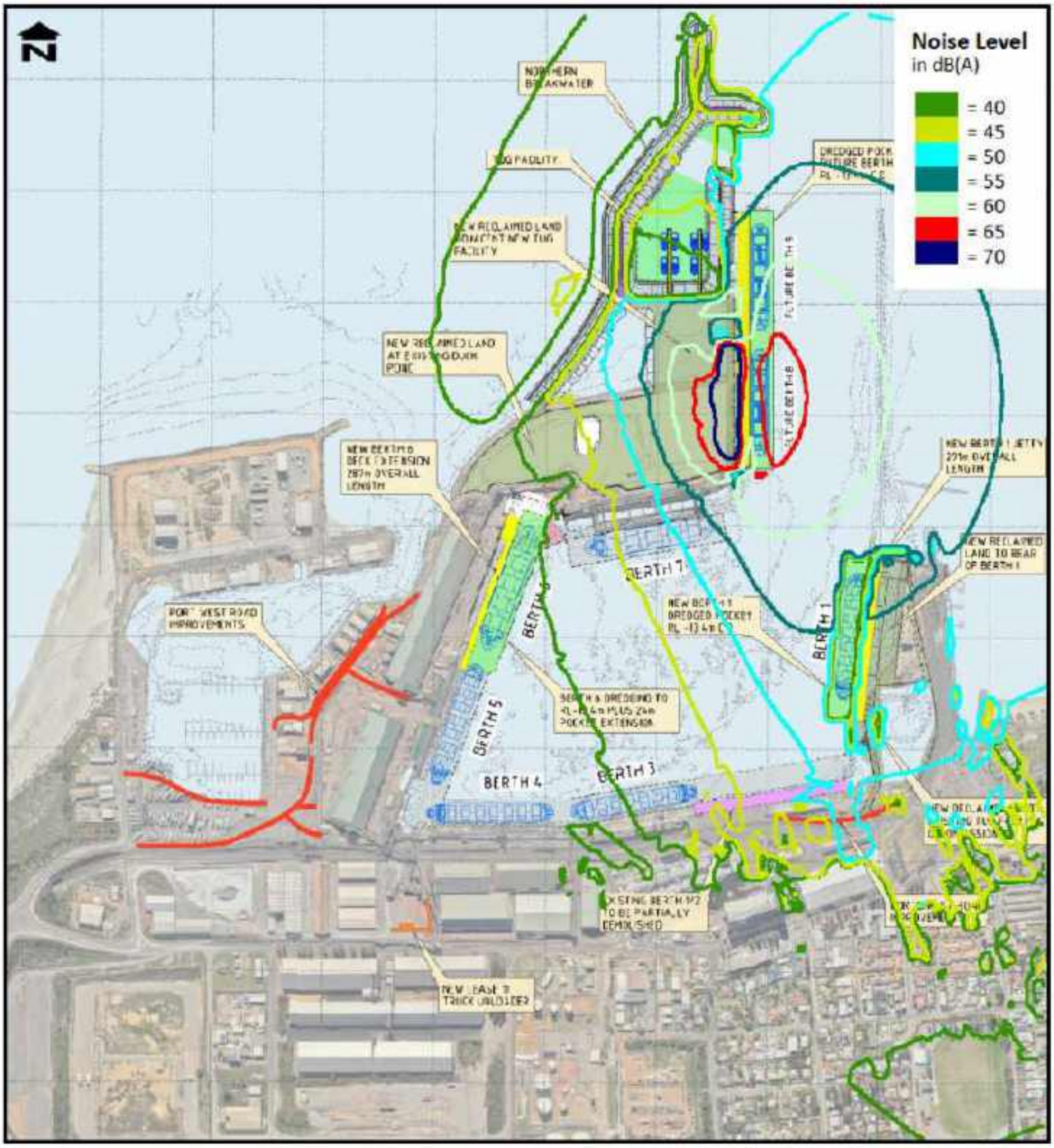


Figure 57: D yti e noise contours for scenario 7 under westerly wind.

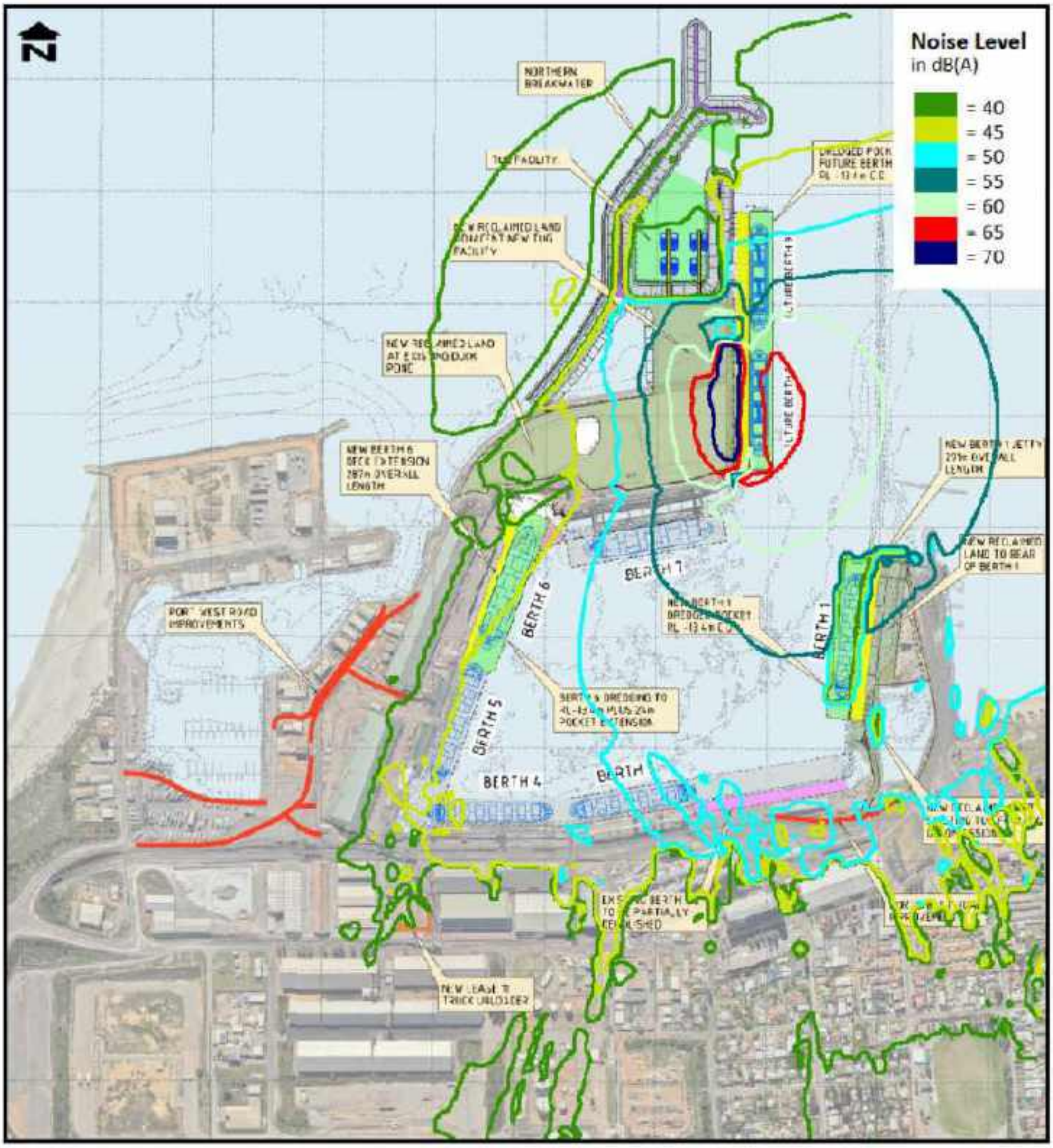


Figure 58: Daytime oise contours for scenario 7 under north-westerly wind.

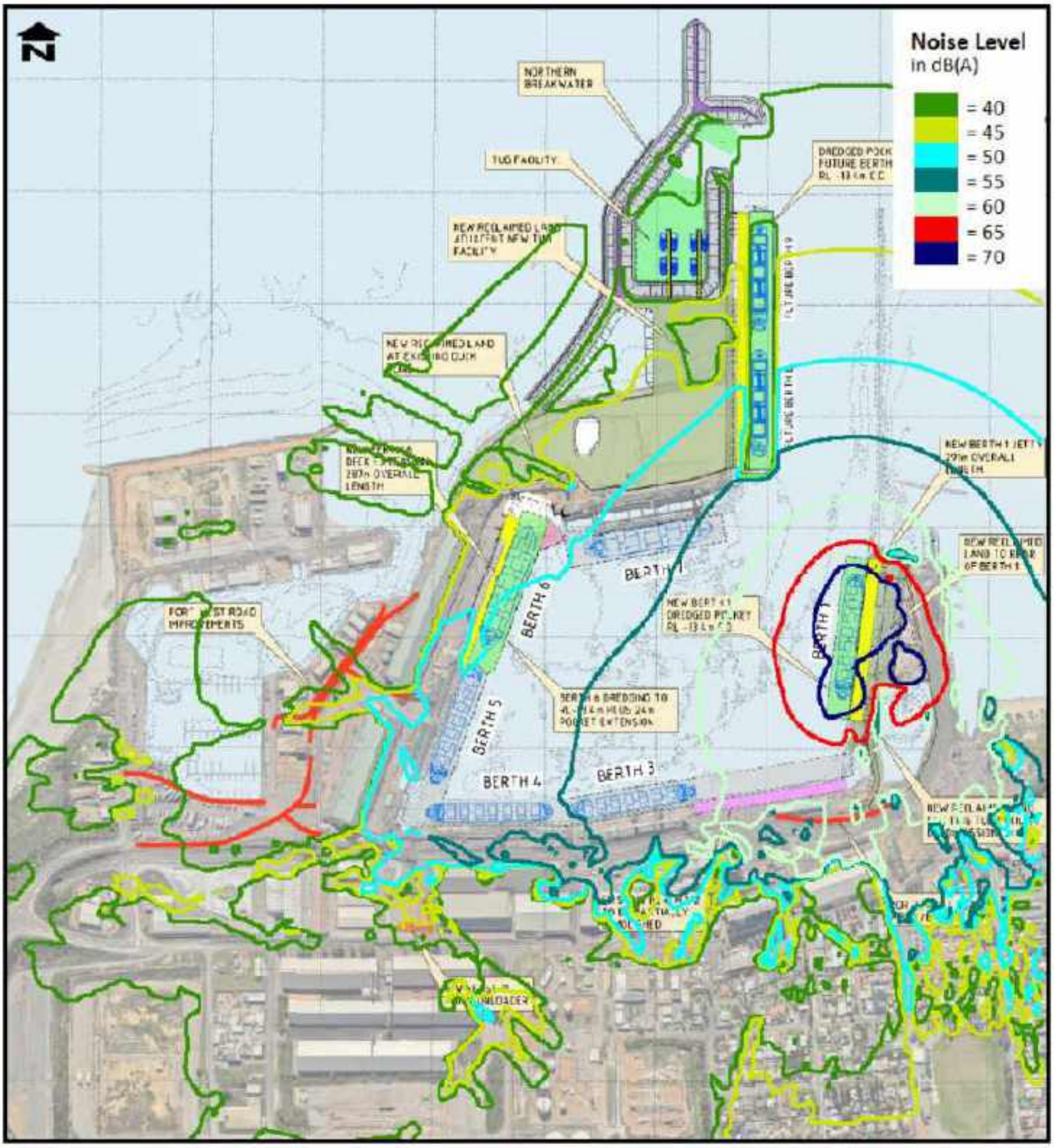


Figure 59: Day-ti e noise contours for scenario 8 under northerly wind.

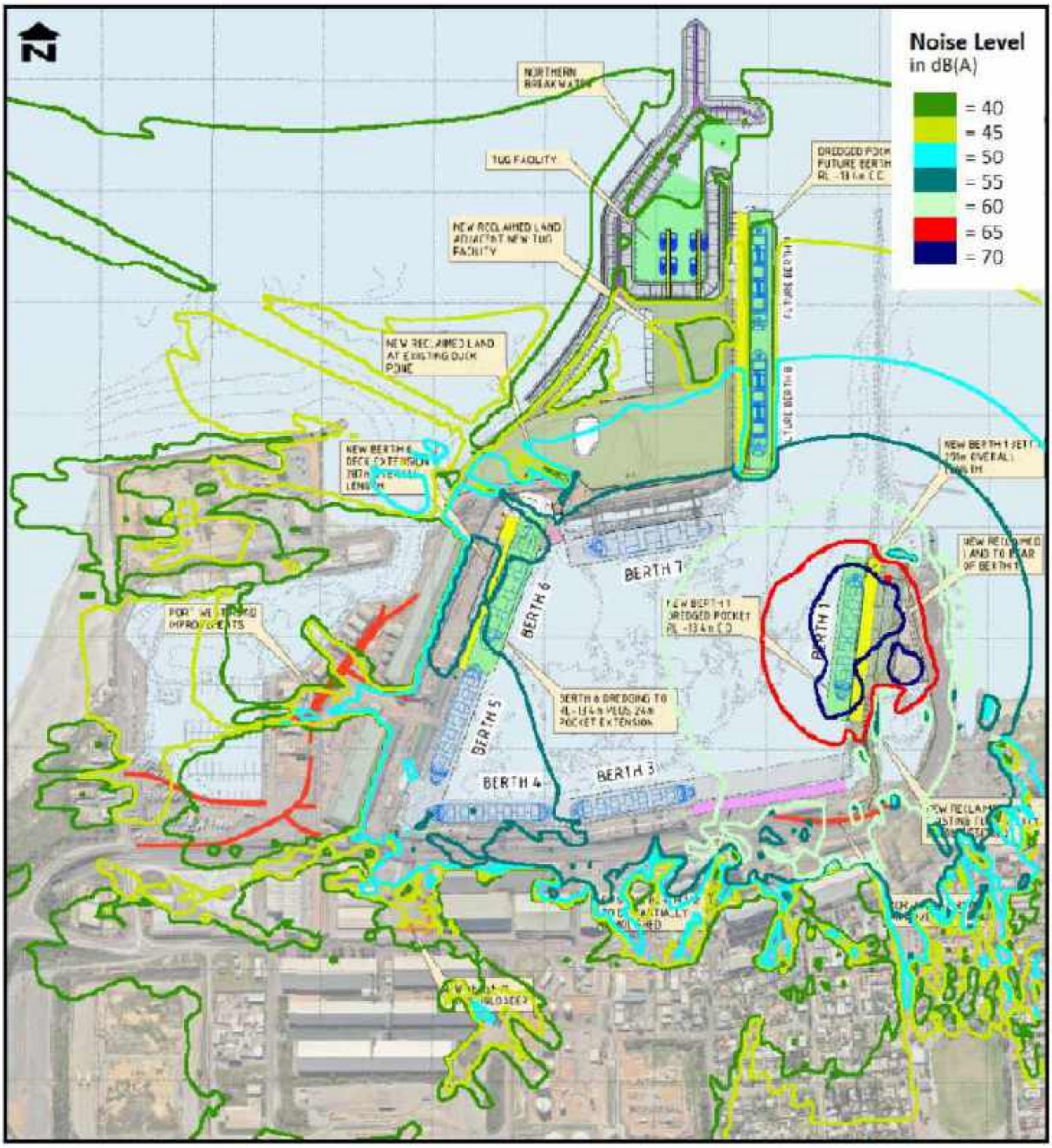


Figure 60: Day-ti e noise contours for scenario 8 under north-easterly wind.

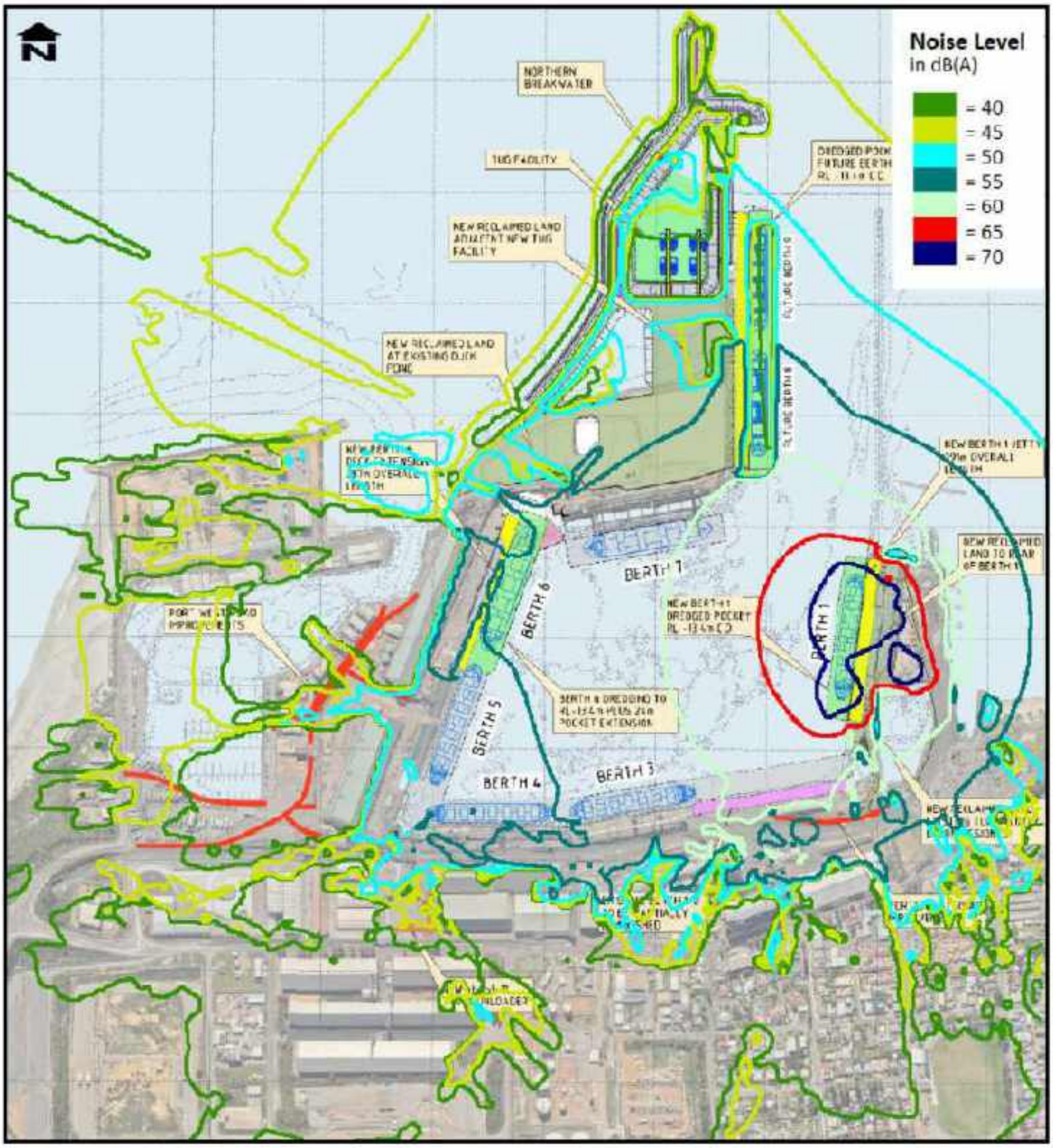


Figure 61: Day- ıe noise contours for scenario 8 under easterly wind.

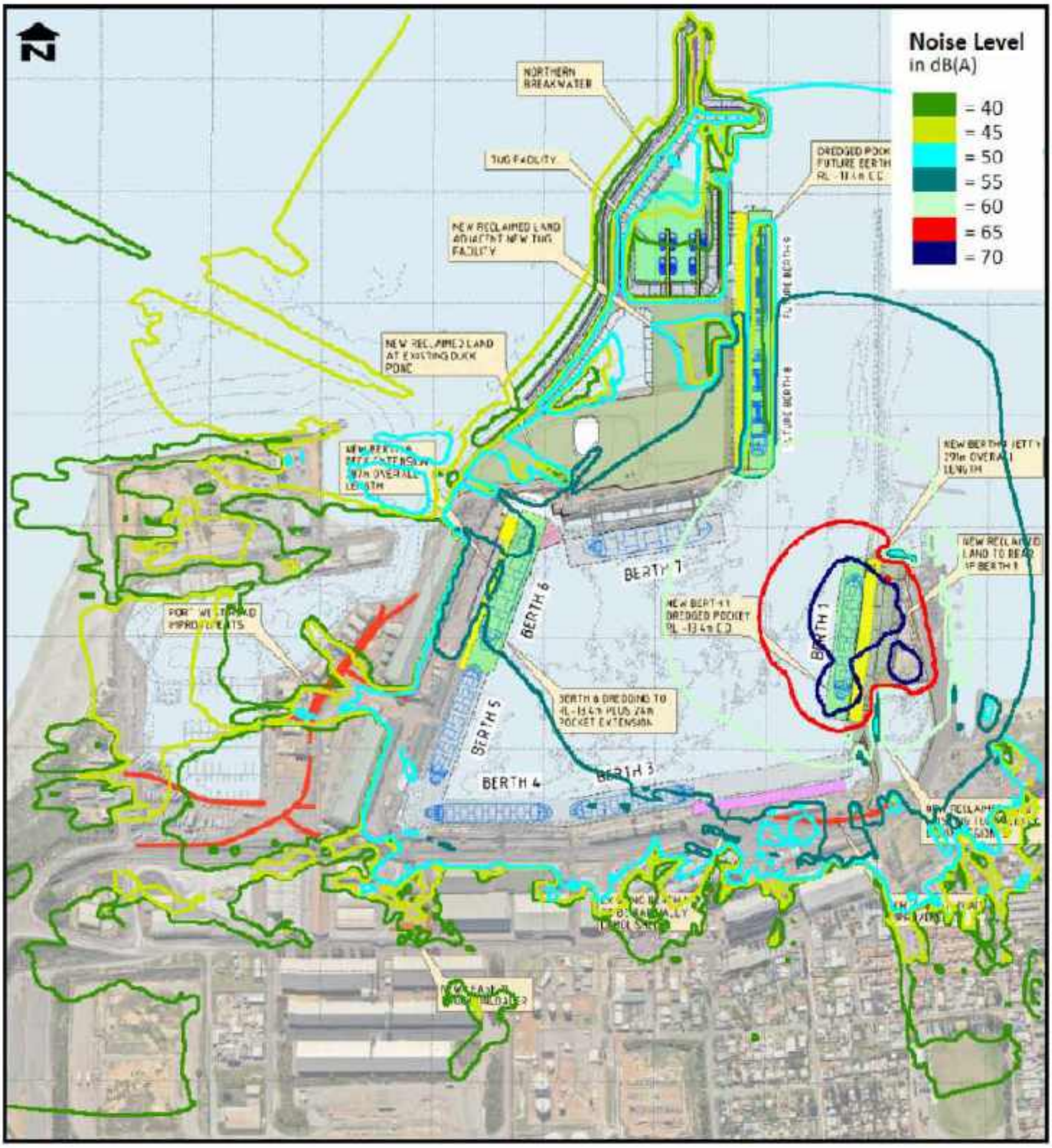


Figure 62: Day-ti e noise contours for scenario 8 under south-easterly wind.

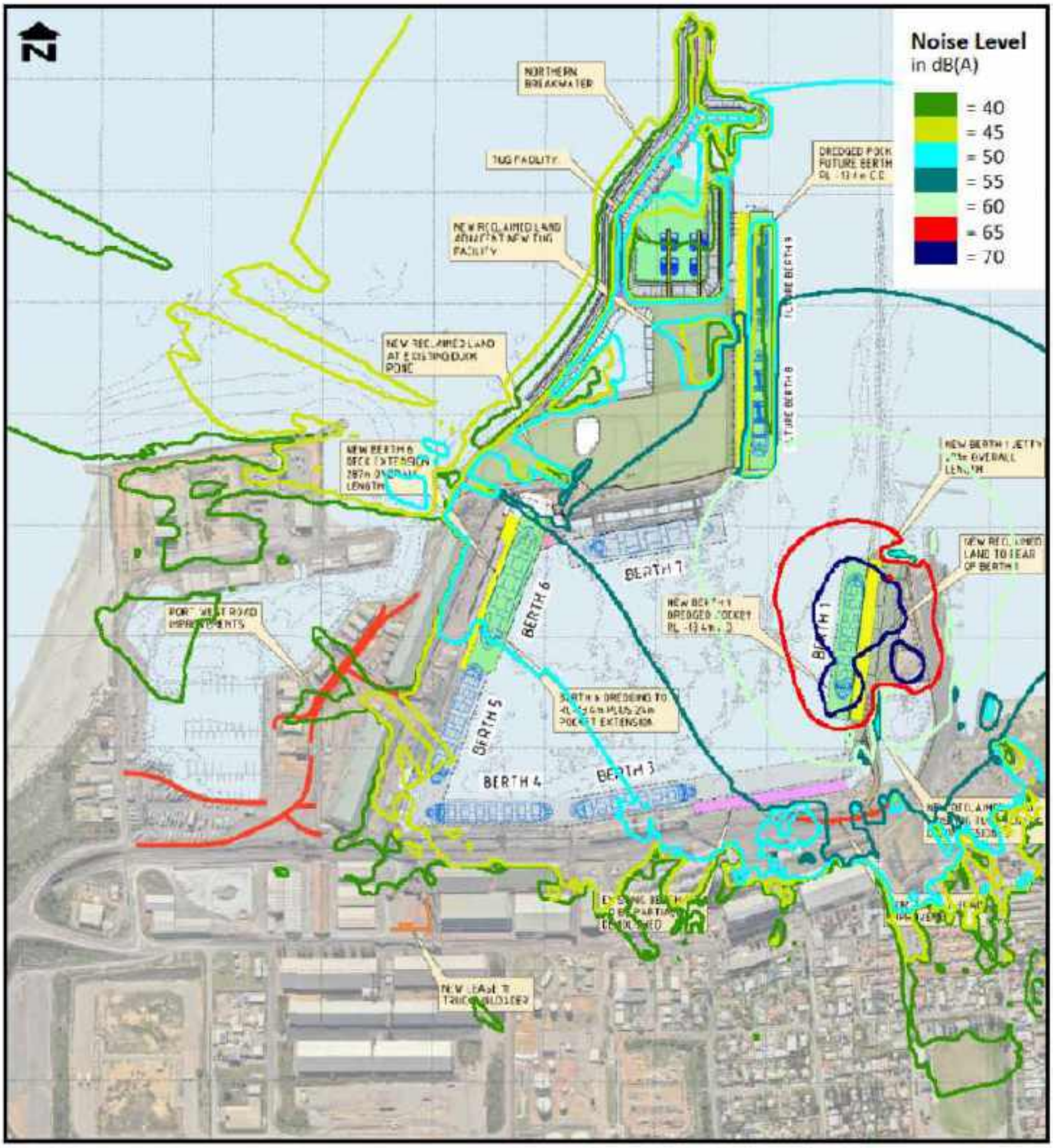


Figure 63: Day-ti e noise contours for scenario 8 under southerly wind.

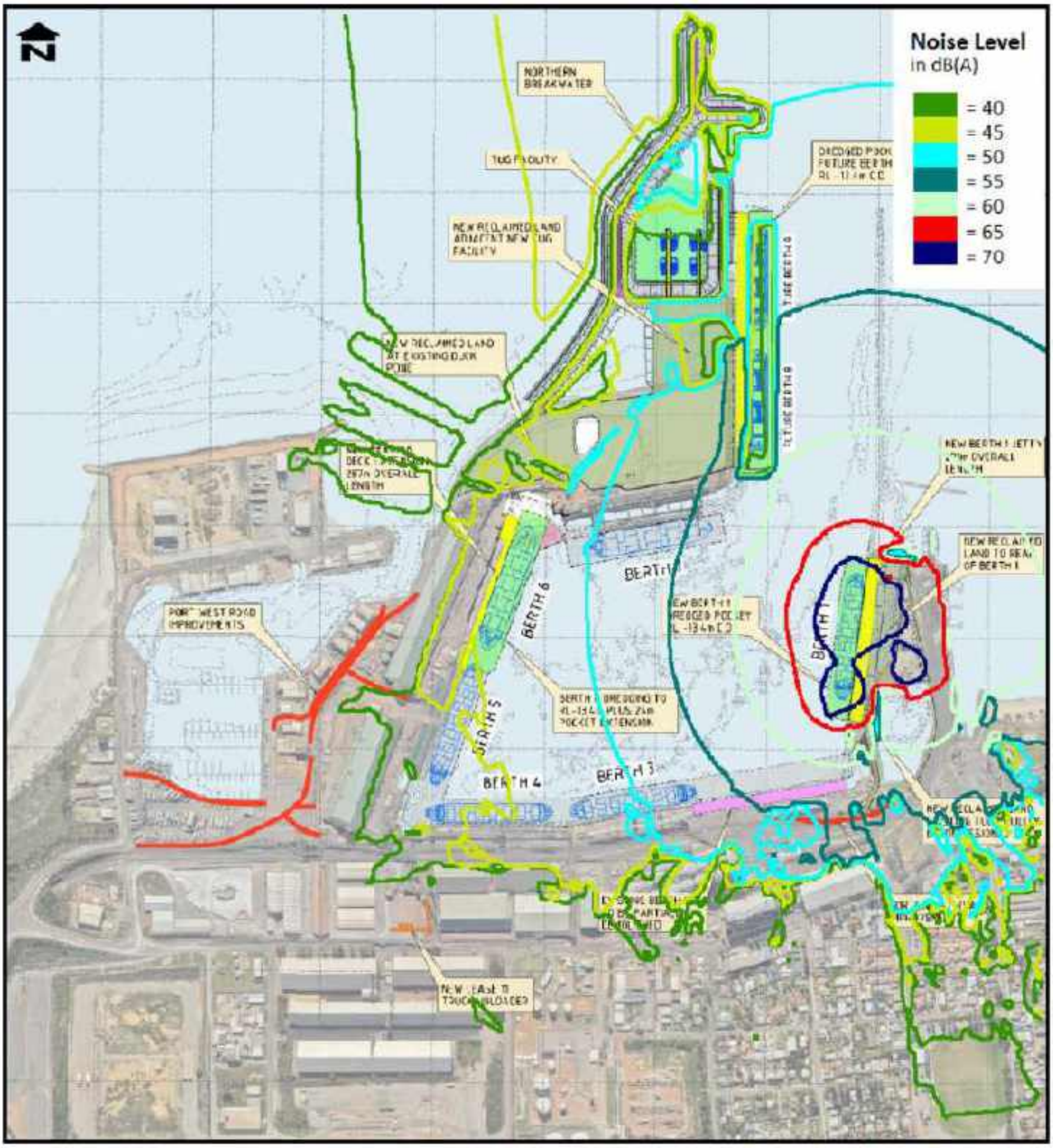


Figure 64: Day- m oise contours for scenario 8 under south-westerly wind.

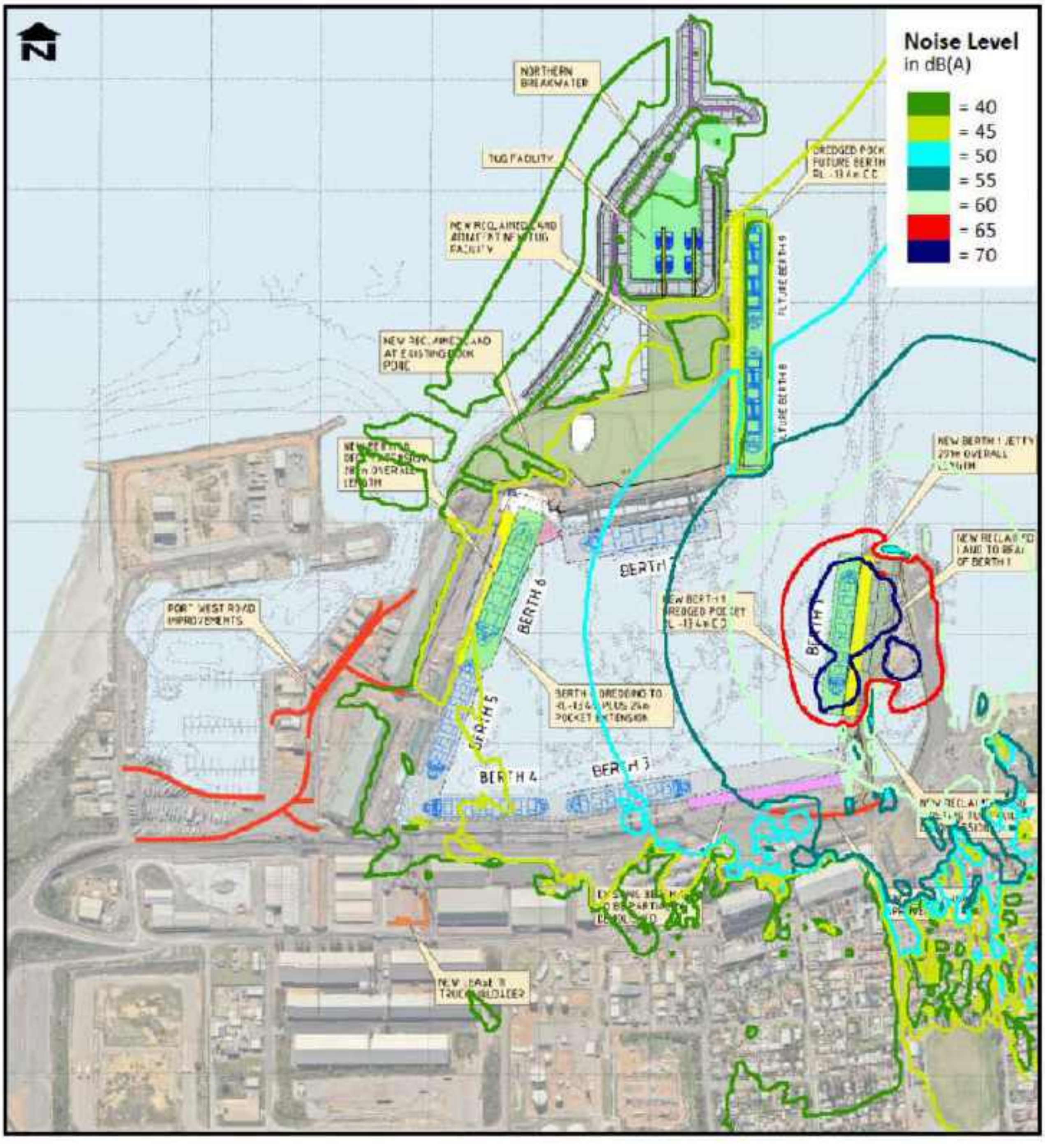


Figure 65: Day-ti ıe noise contours for scenario 8 under westerly wind.

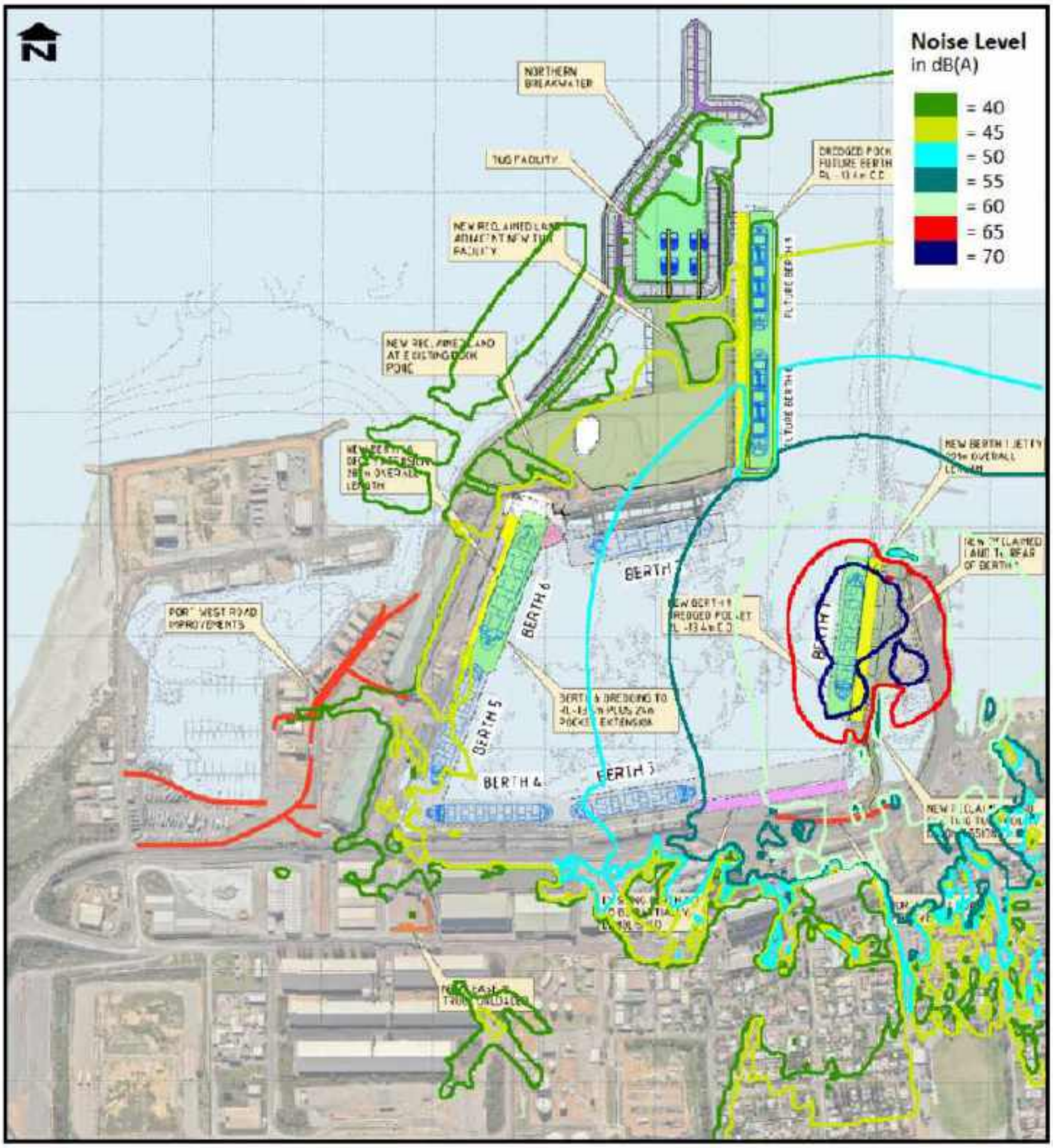


Figure 66: Day- m ıoise contours for scenario 8 under north-westerly wind.

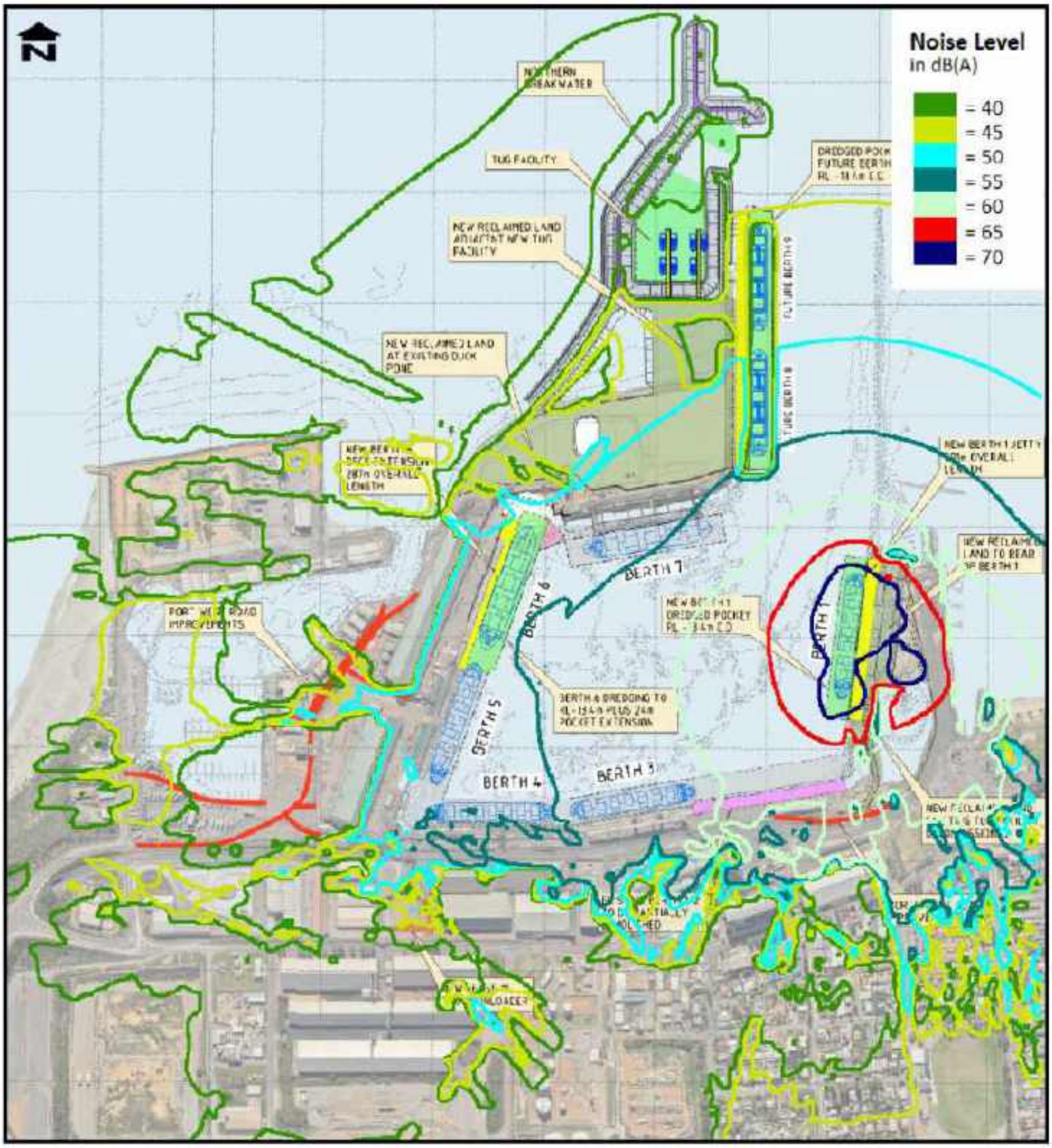


Figure 67: Night- ıe noise contours for scenario 8 under northerly wind.

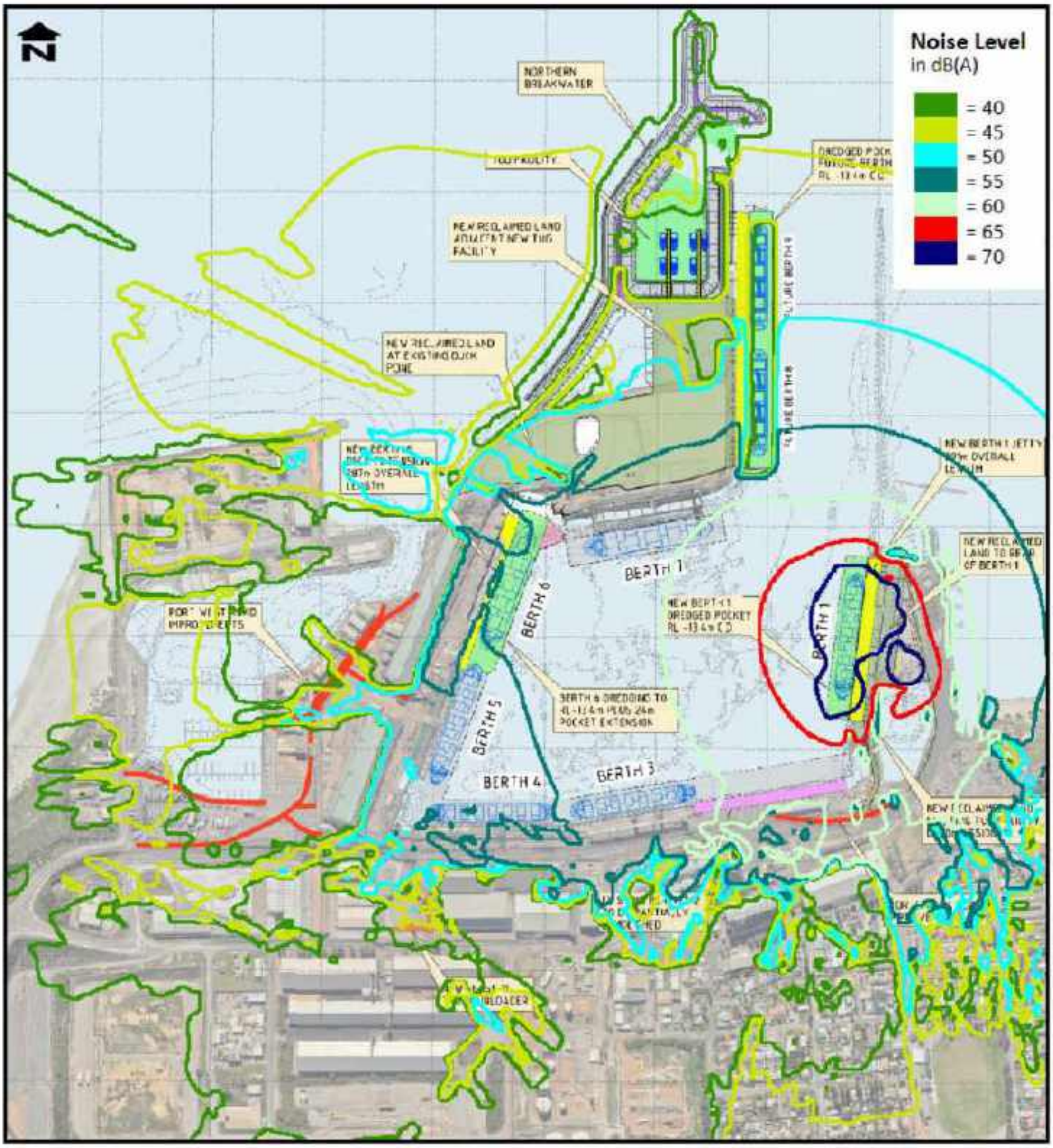


Figure 68: Night-time noise contours for scenario 8 under north-easterly wind.

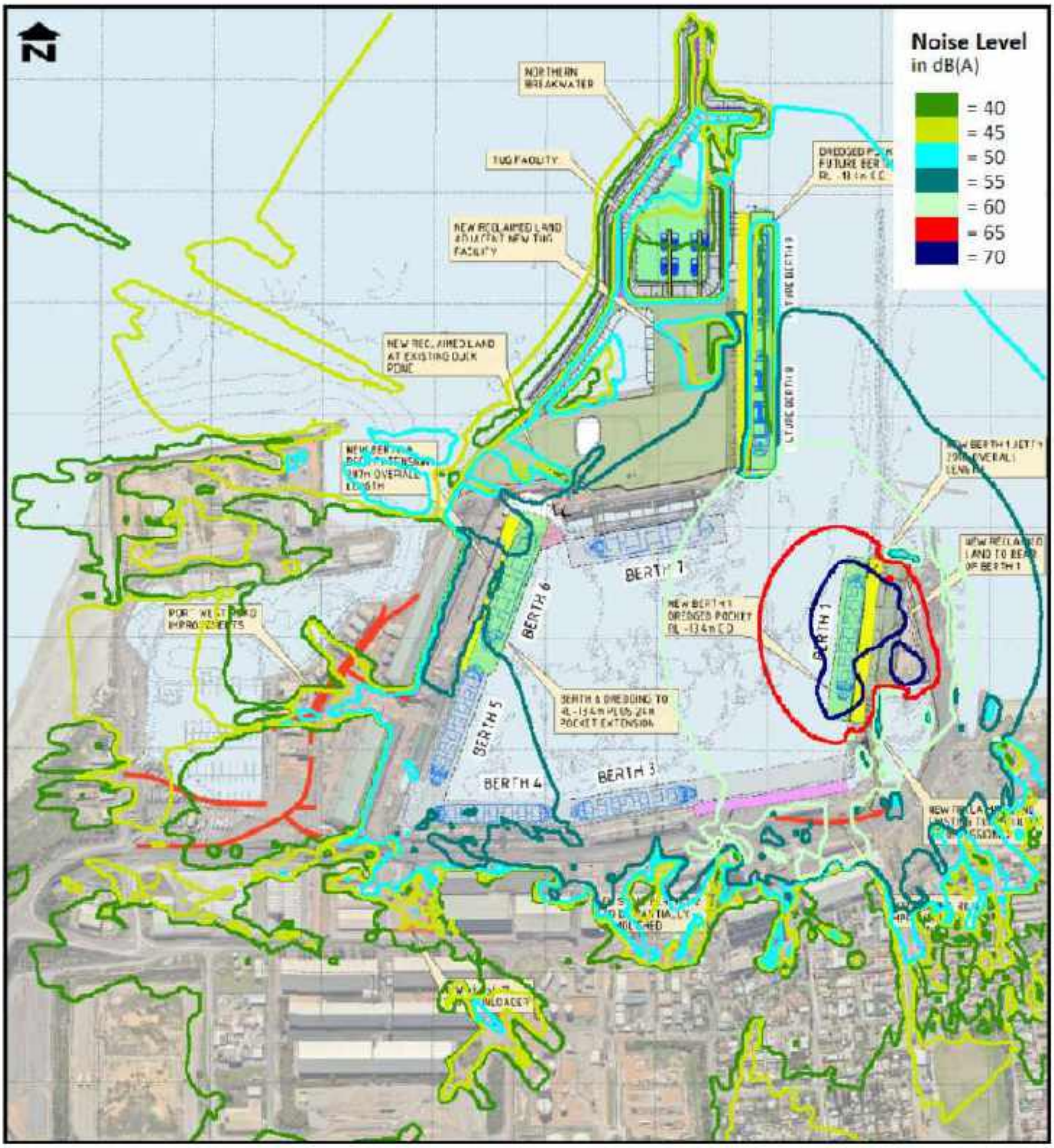


Figure 69: Night- me noise contours for scenario 8 under easterly wind.

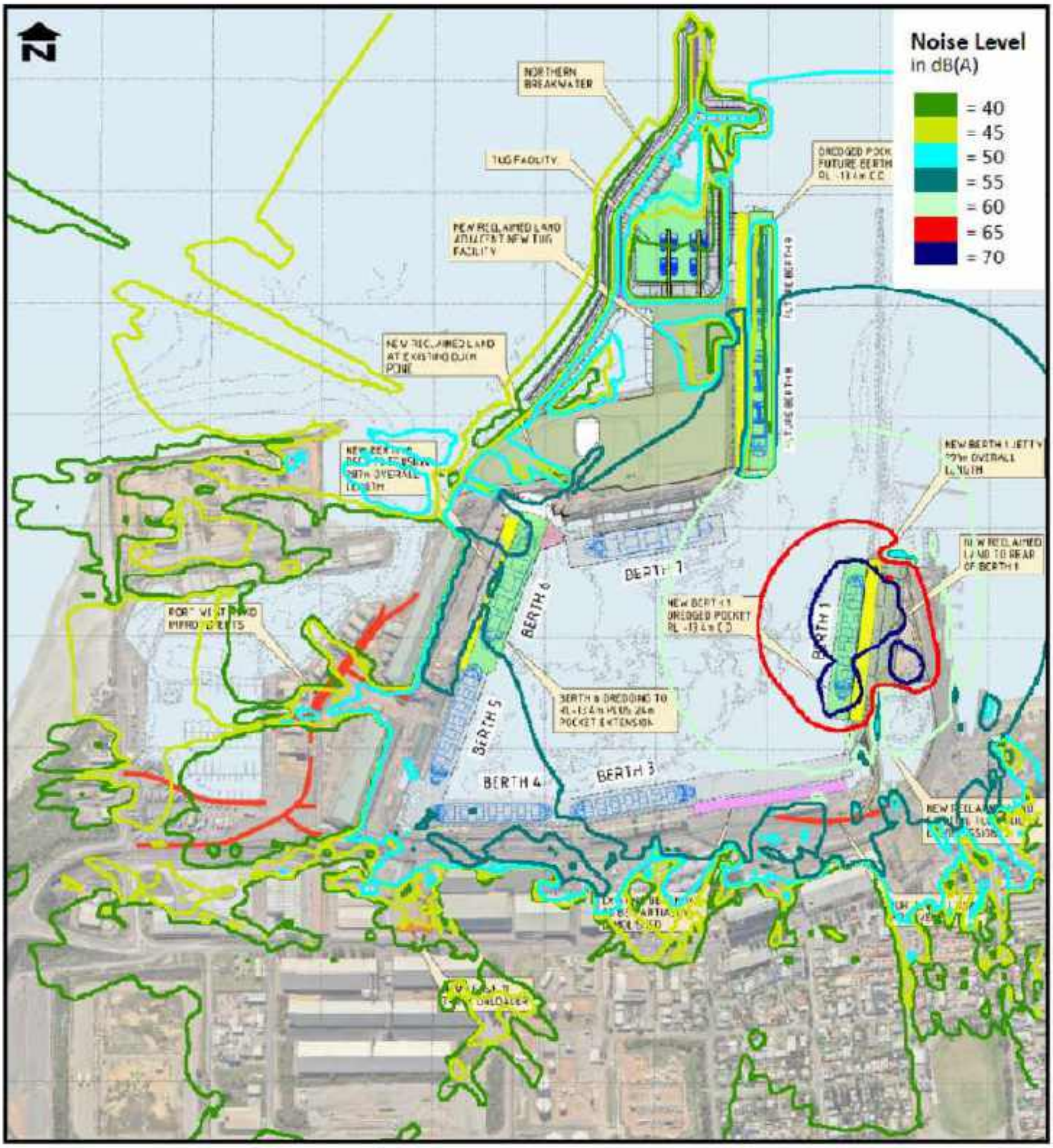


Figure 70: Night-time noise contours for scenario 8 under south-easterly wind.

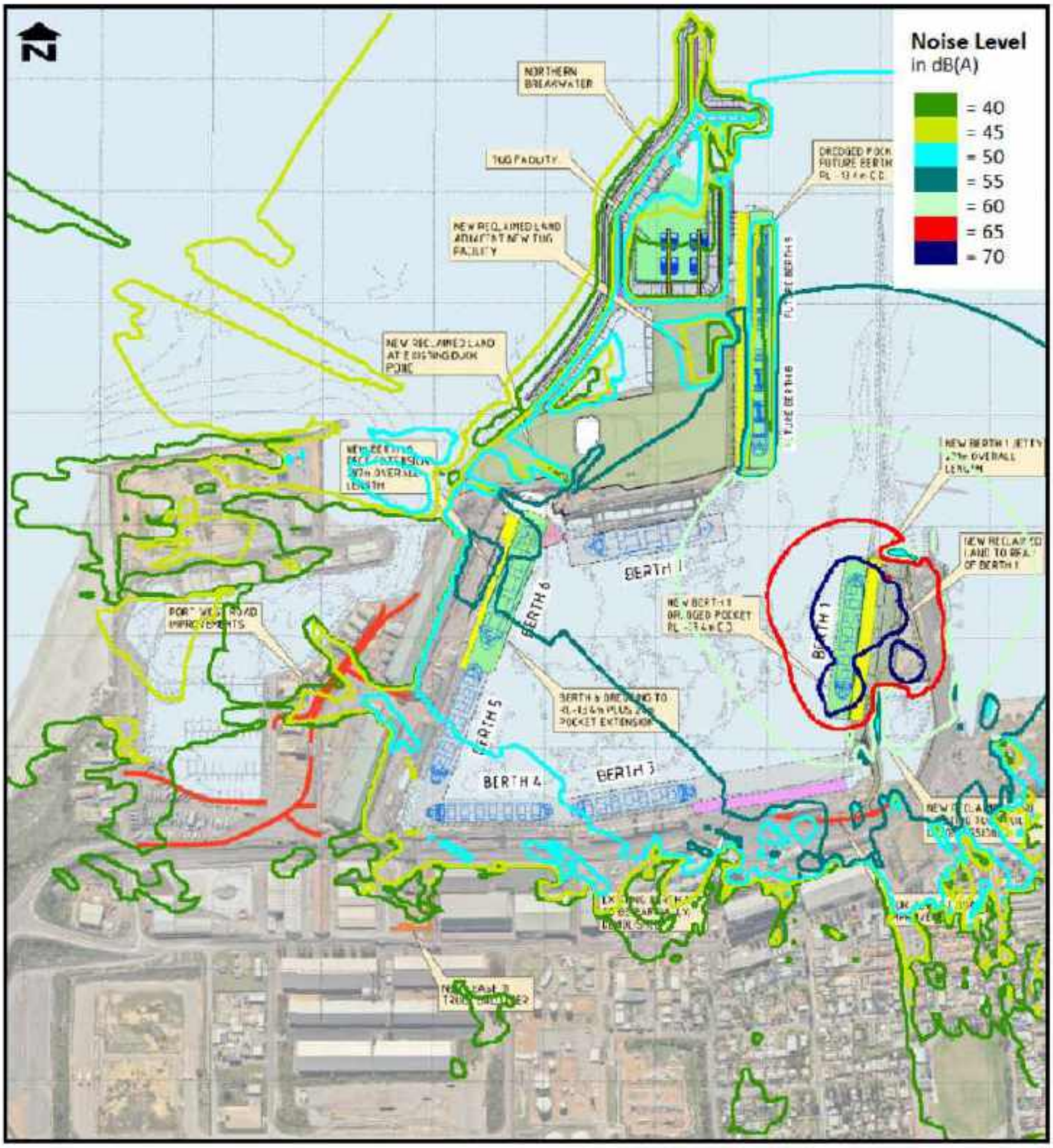


Figure 71: Night- ıe noise contours for scenario 8 under southerly wind.

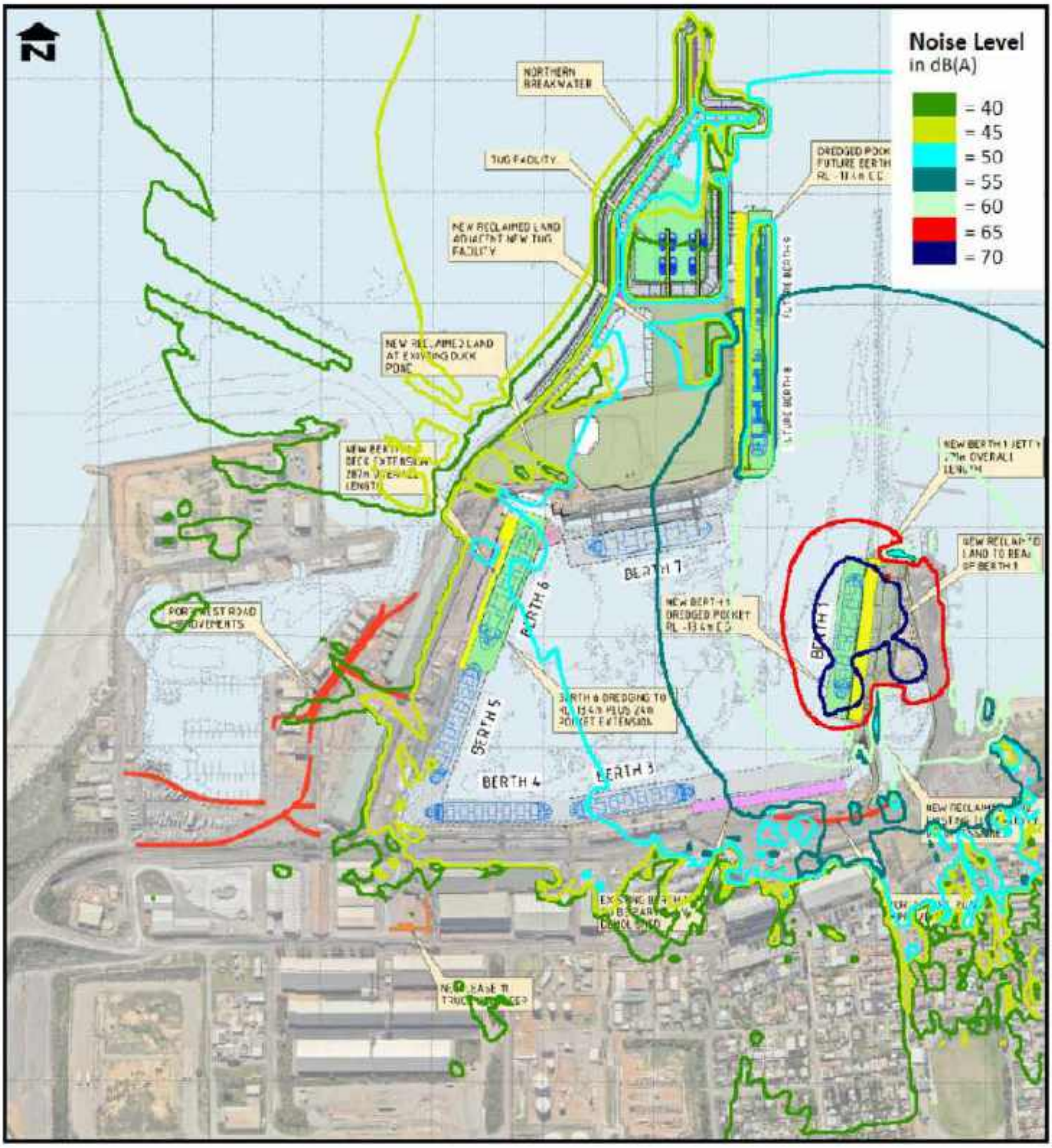


Figure 72: Night-time ıoise contours for scenario 8 under south-westerly wind.

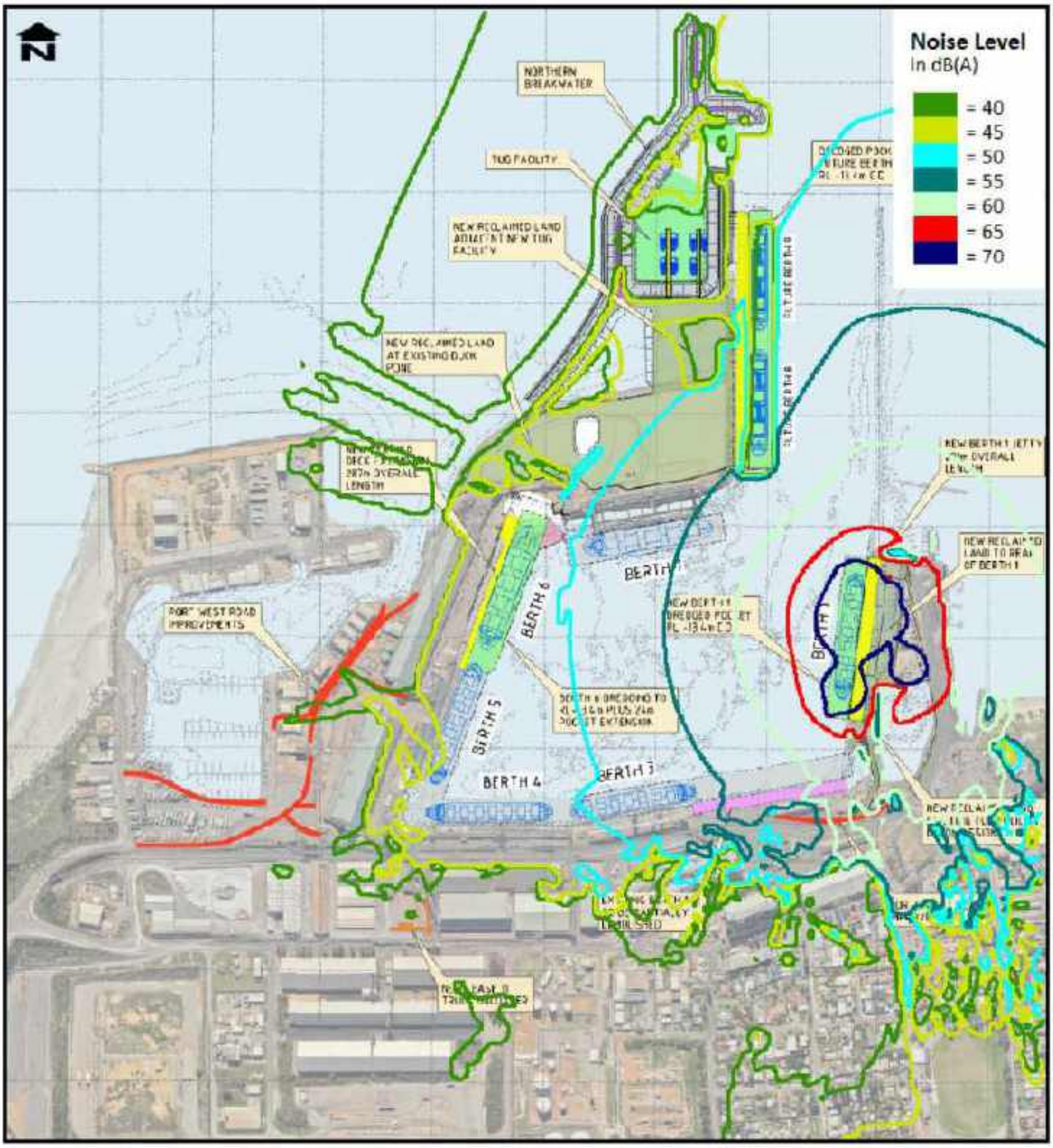


Figure 73: Night- ne noise contours for scenario 8 under westerly wind.

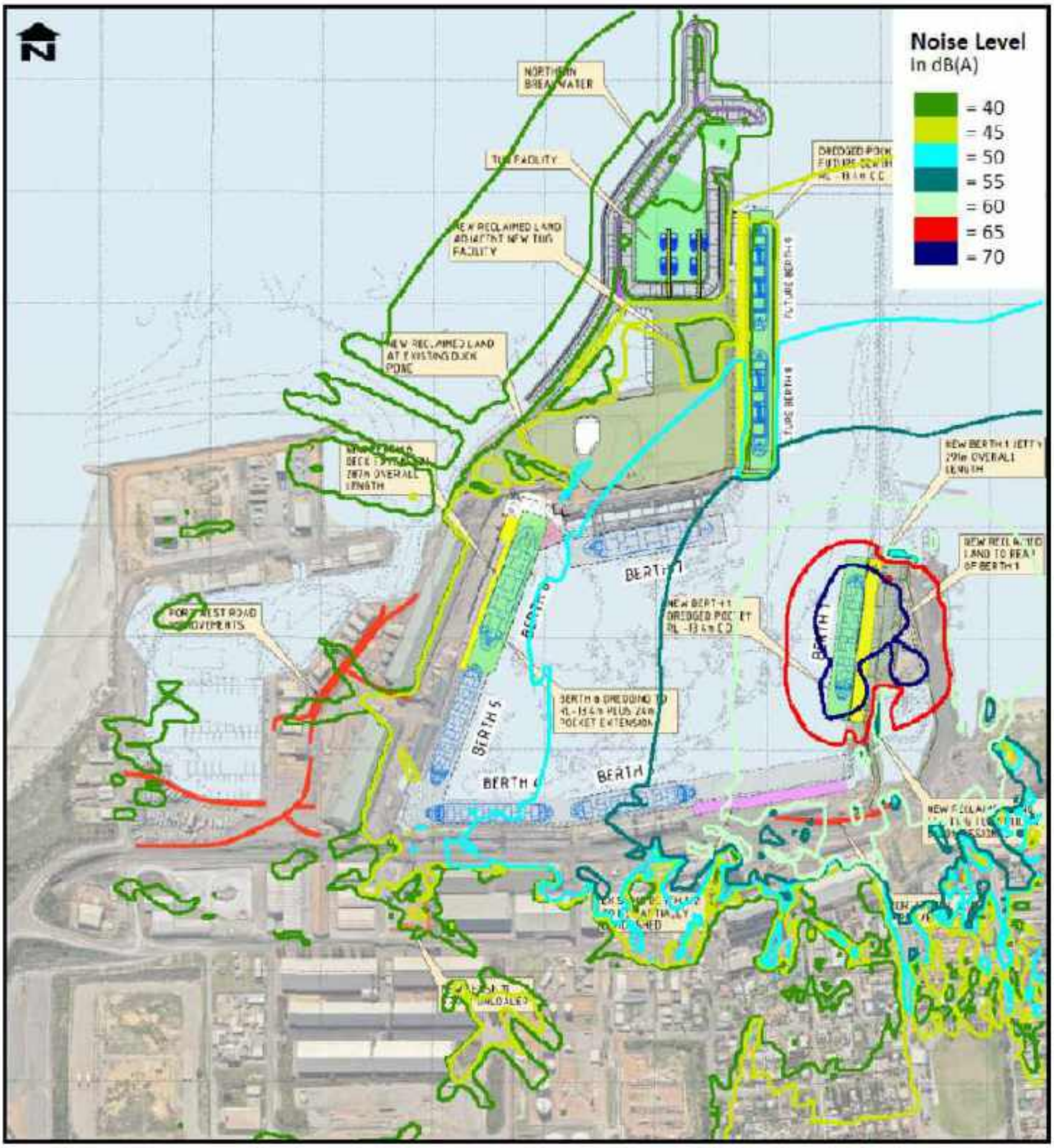


Figure 74: Night-time noise contours for scenario 8 under north-westerly wind.

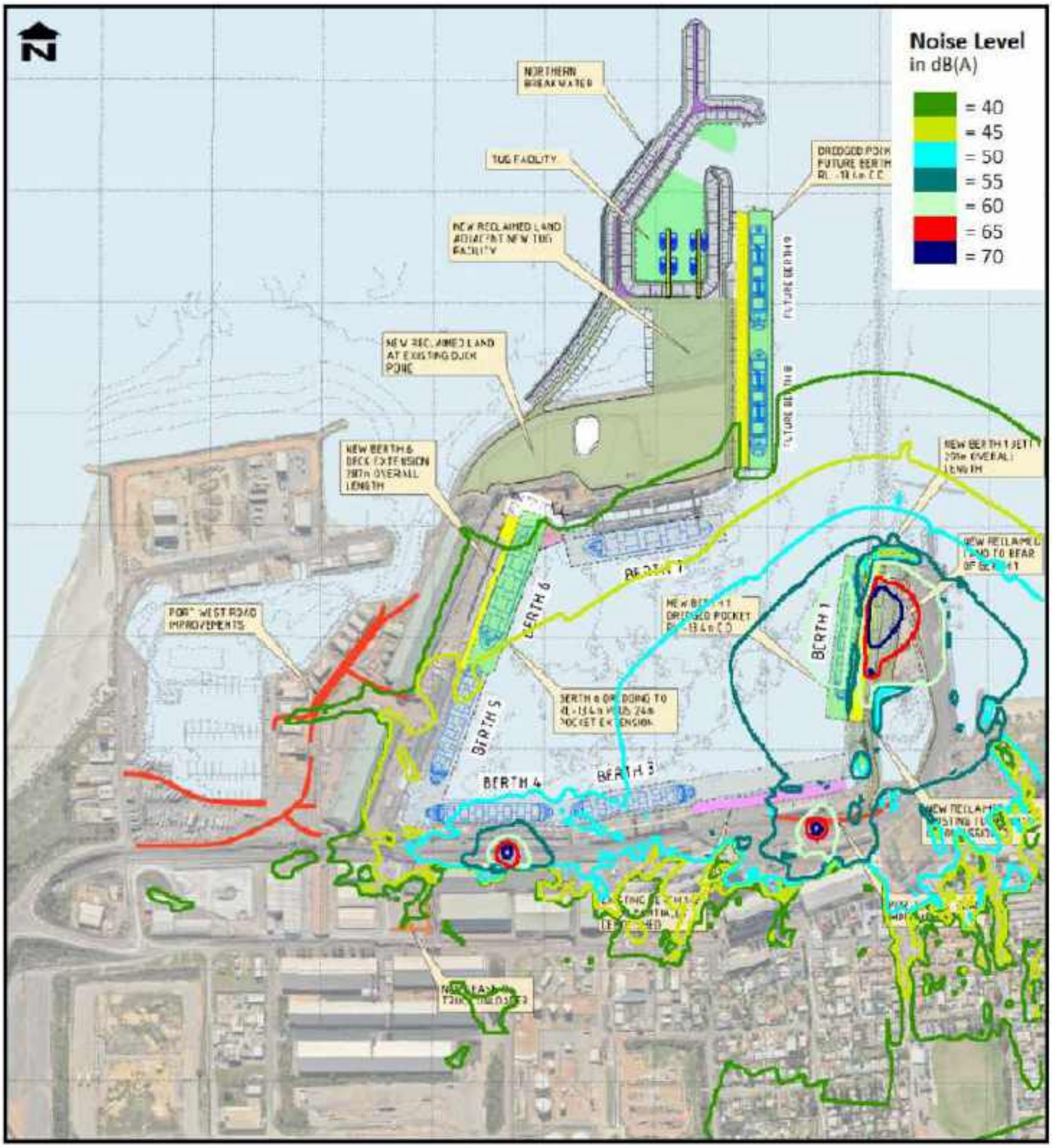


Figure 75: e noise contours for scenario 9 under northerly wind.

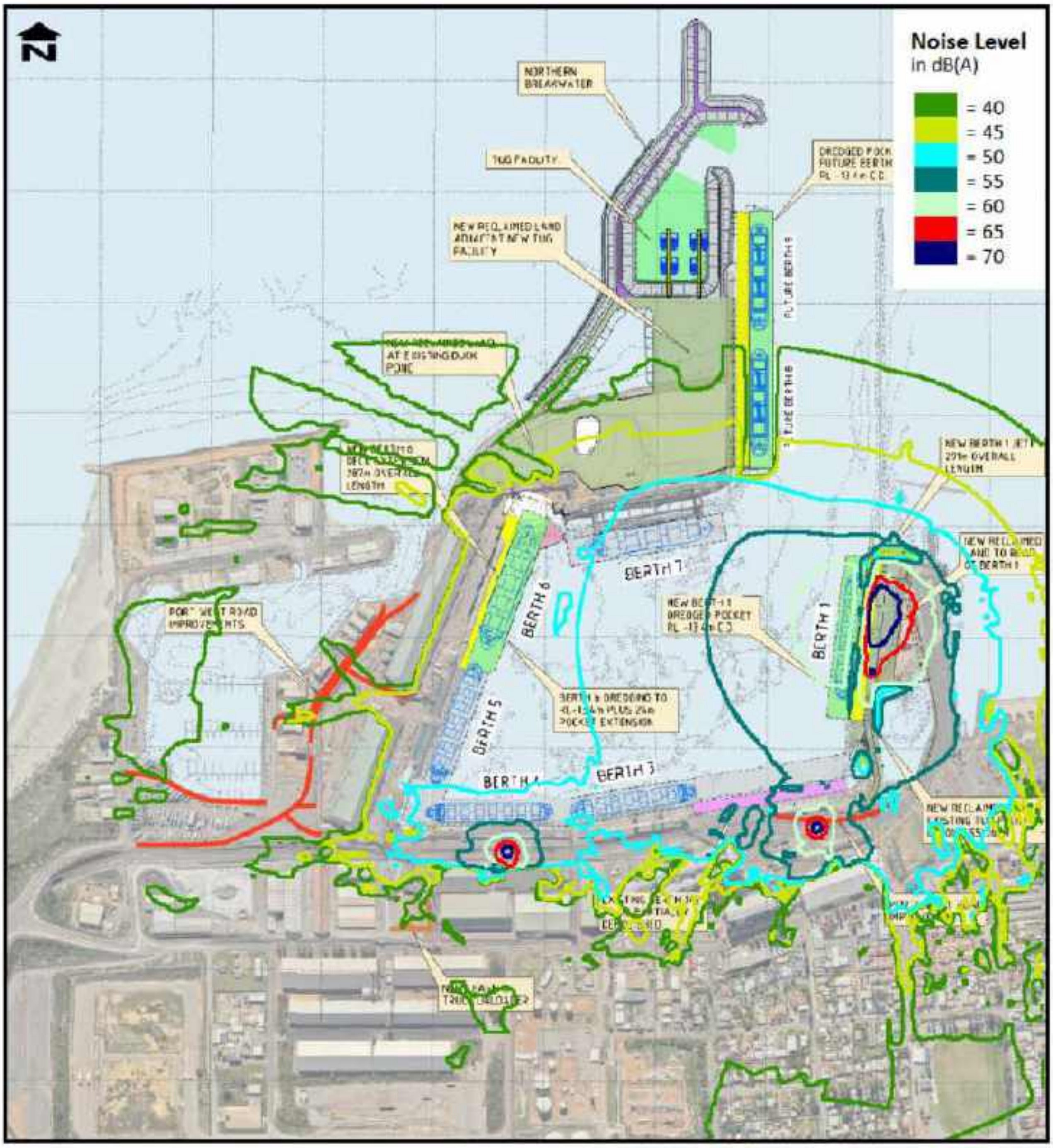


Figure 76: Daytime oise contours for scenario 9 under north-easterly wind.

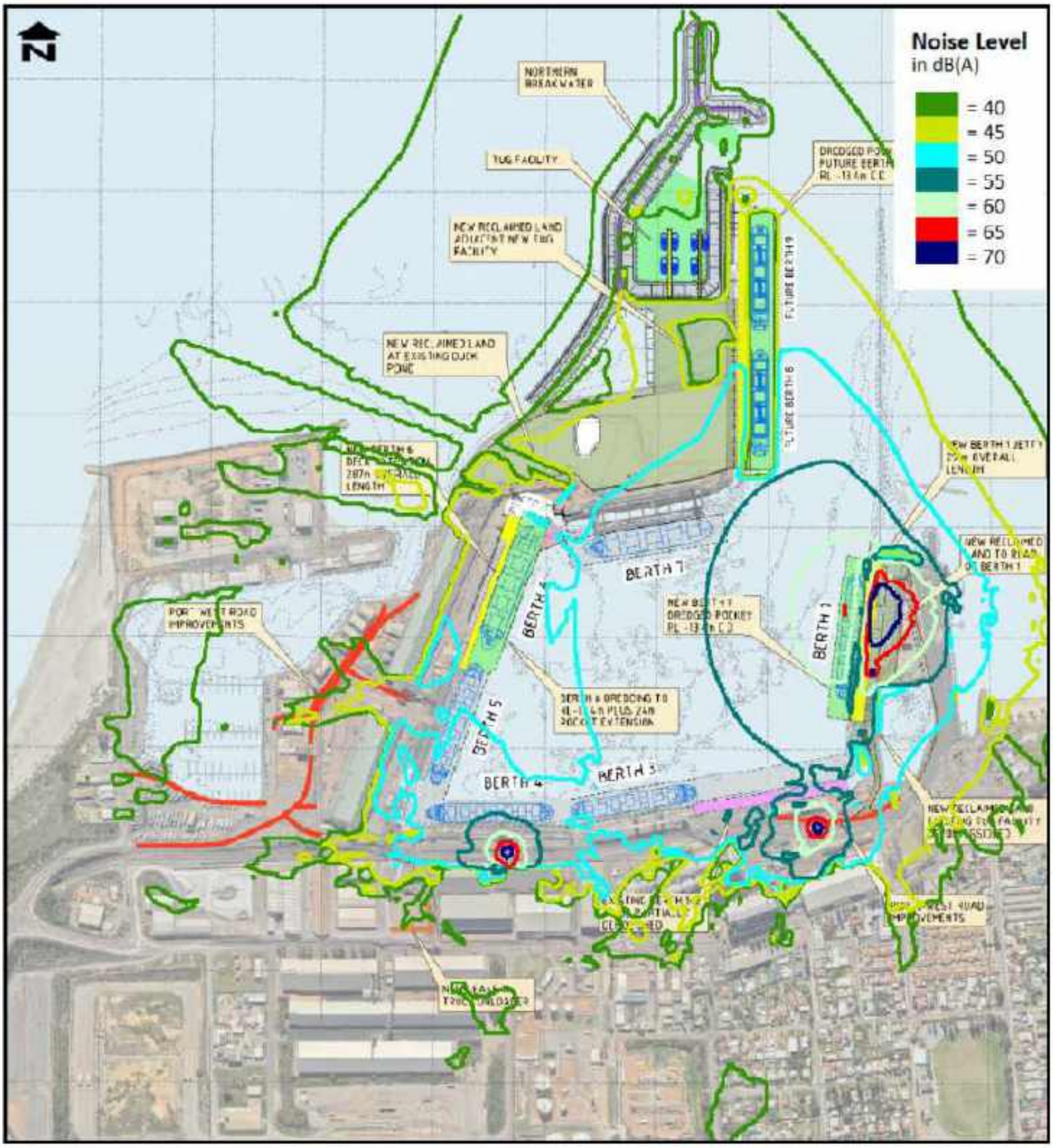


Figure 77: a e noise contours for scenario 9 under easterly wind.

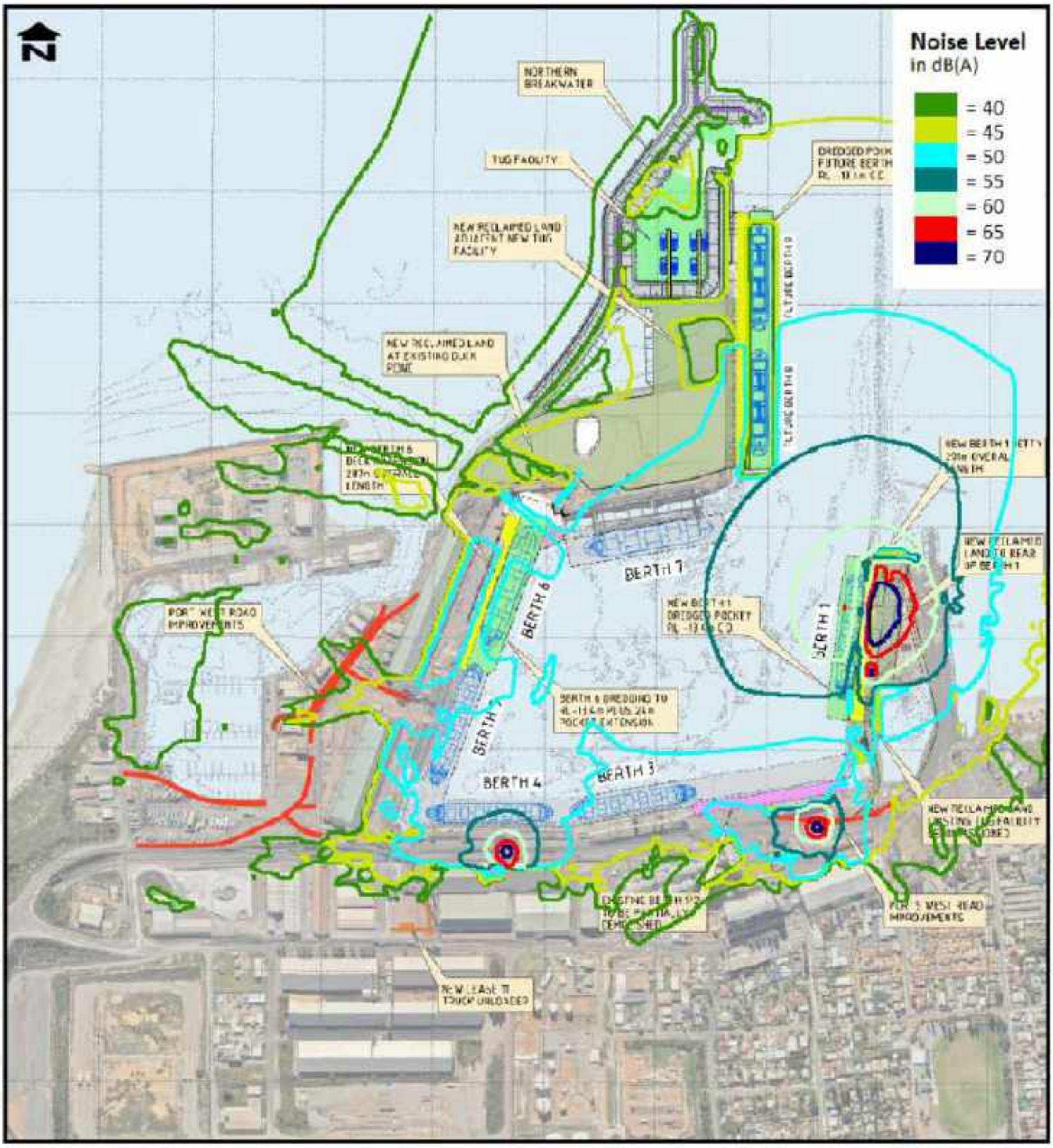


Figure 78: Daytime oise contours for scenario 9 under south-easterly wind.

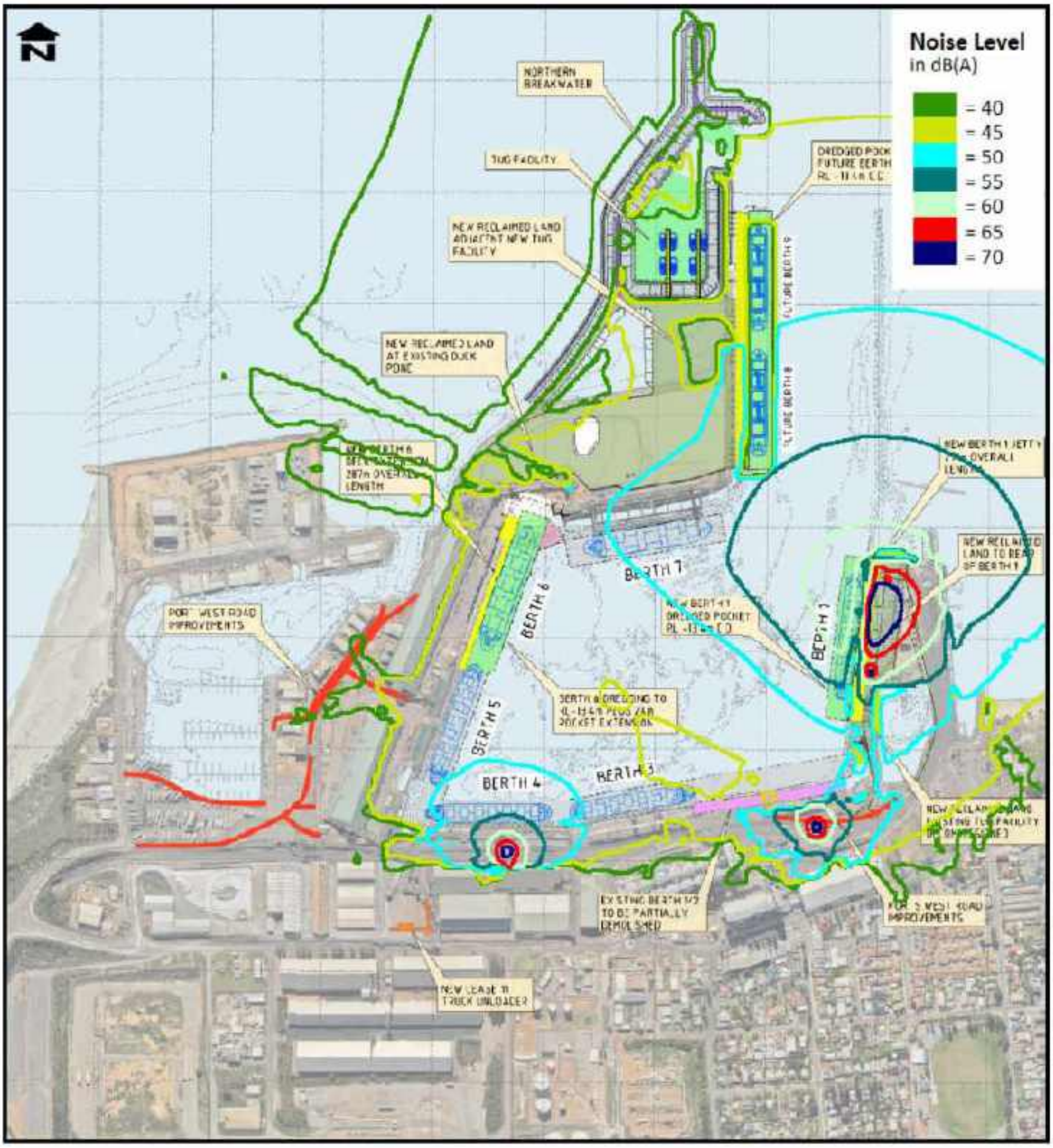


Figure 79: D yti e noise contours for scenario 9 under southerly wind.

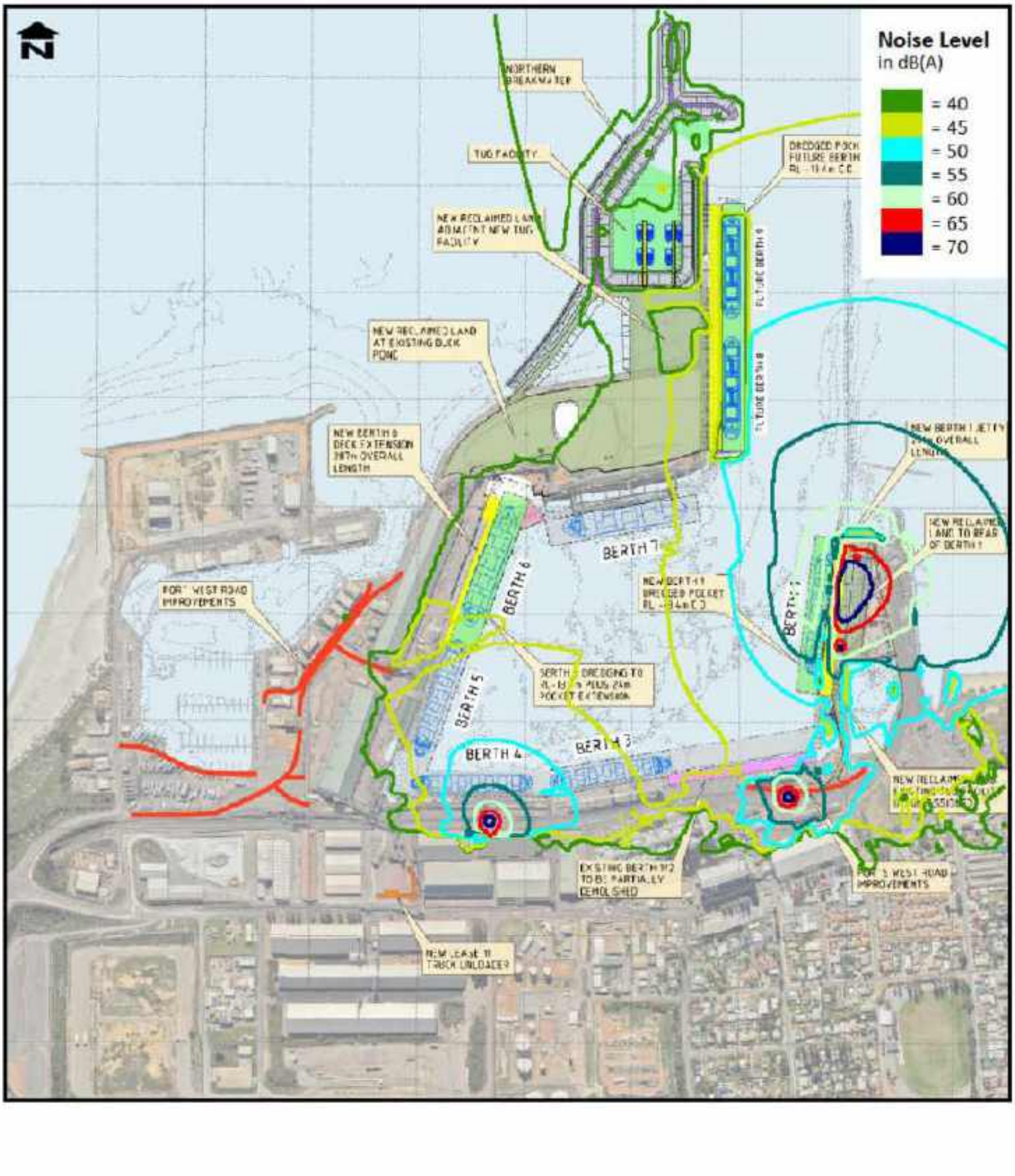


Figure 80: Daytime ɔise contours for scenario 9 under south-westerly wind.

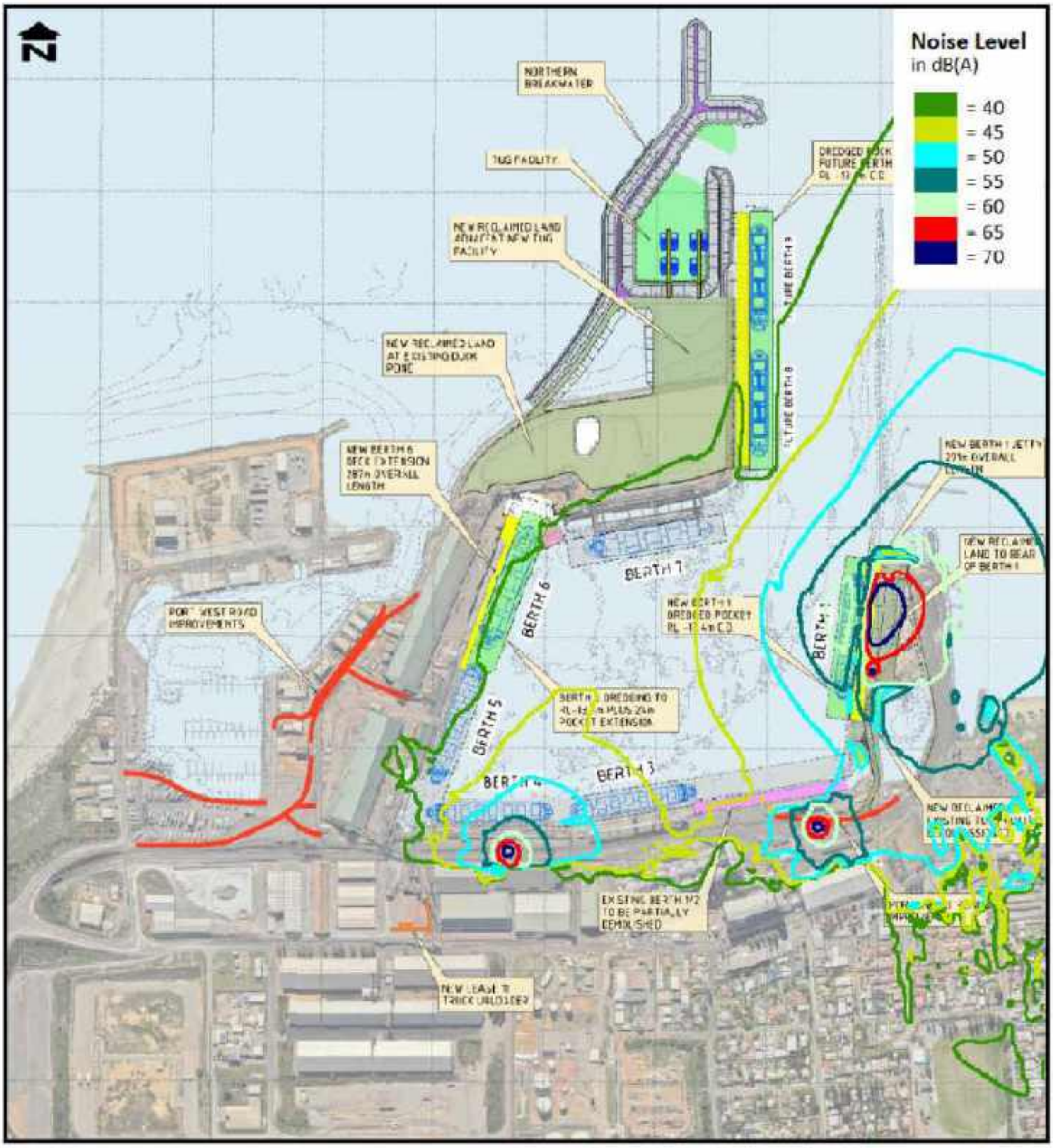


Figure 81: D yti e noise contours for scenario 9 under westerly wind.

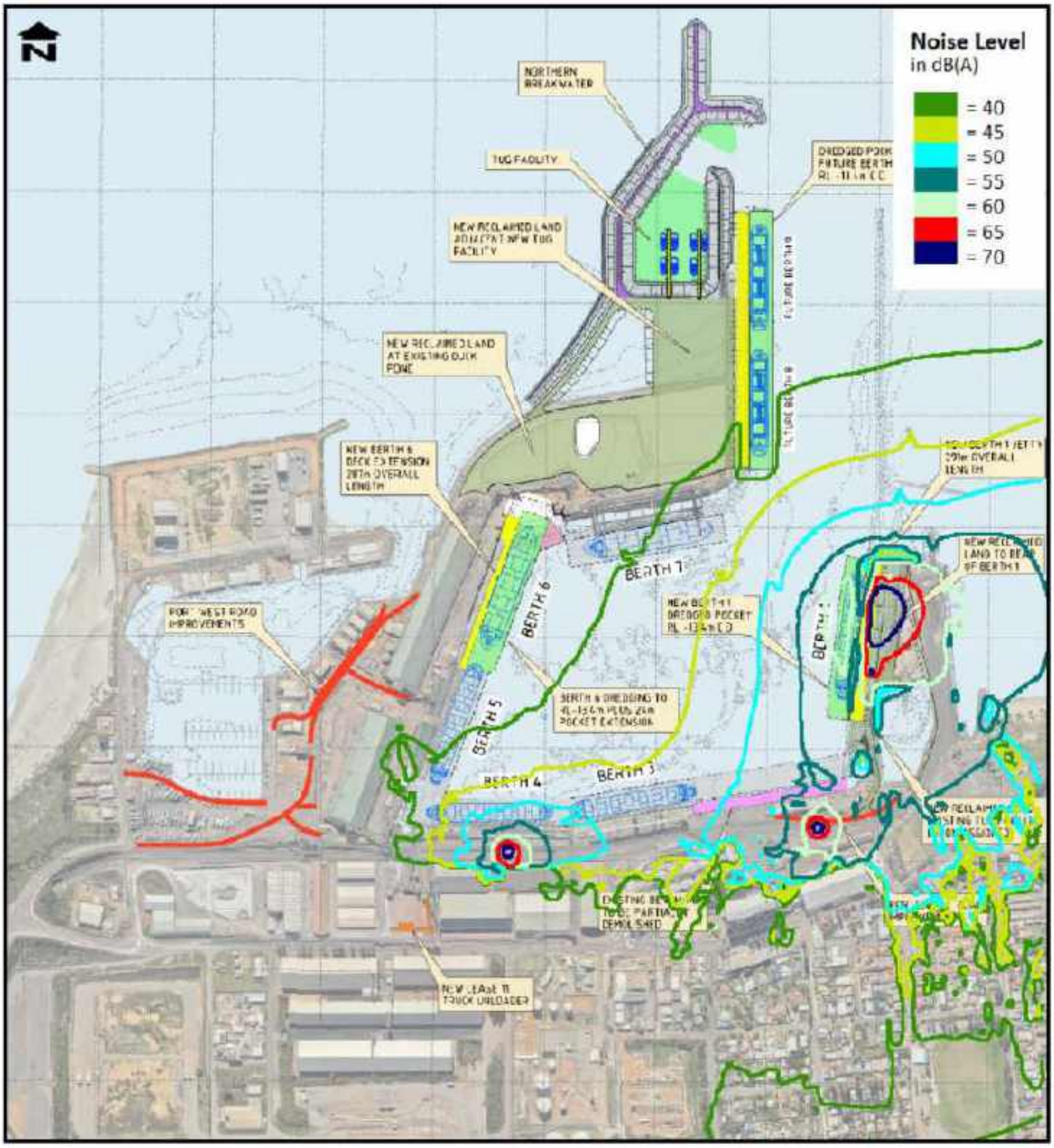


Figure 82: Daytime oise contours for scenario 9 under north-westerly wind.

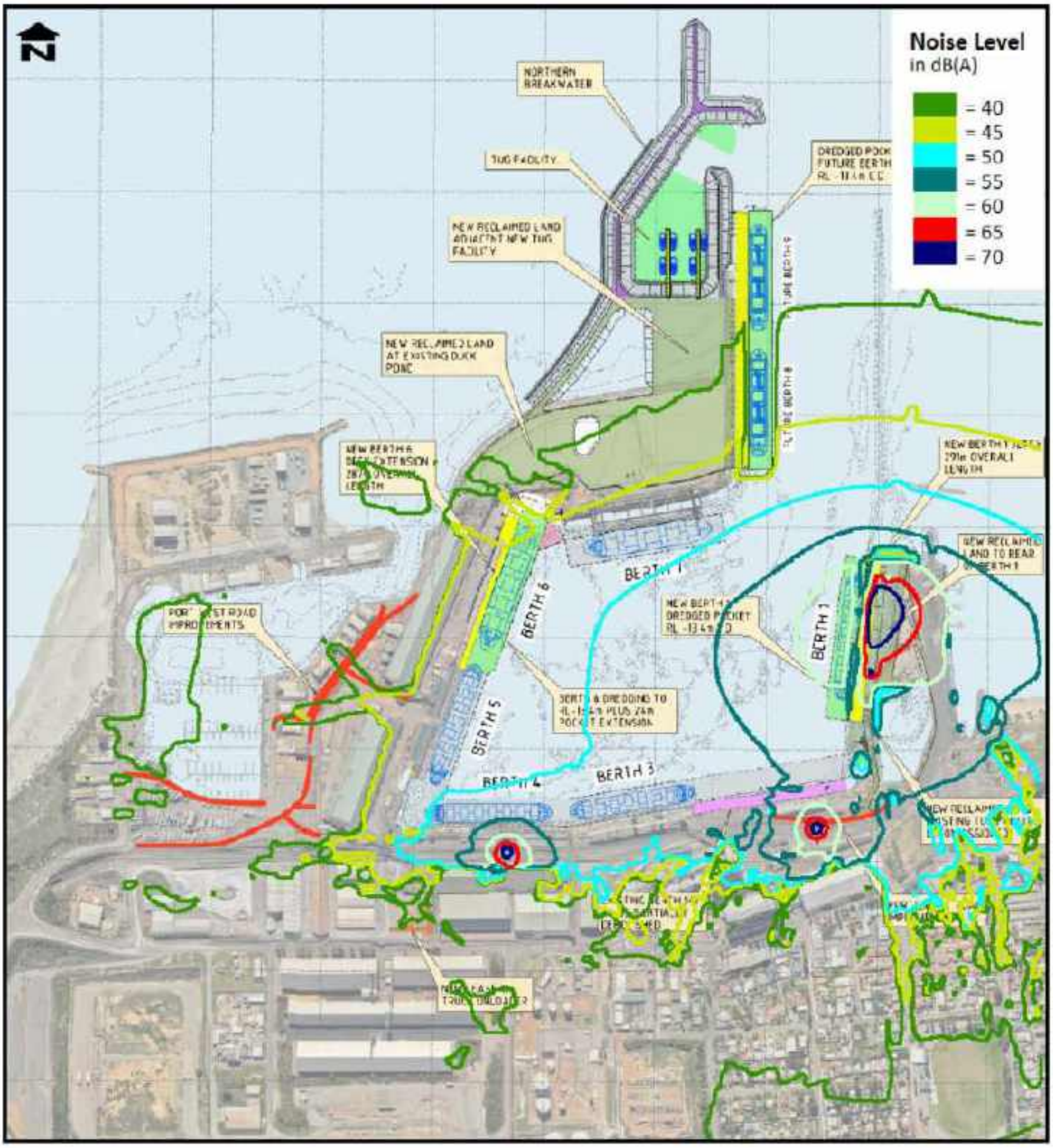


Figure 83: Night- ıe noise contours for scenario 9 under northerly wind.

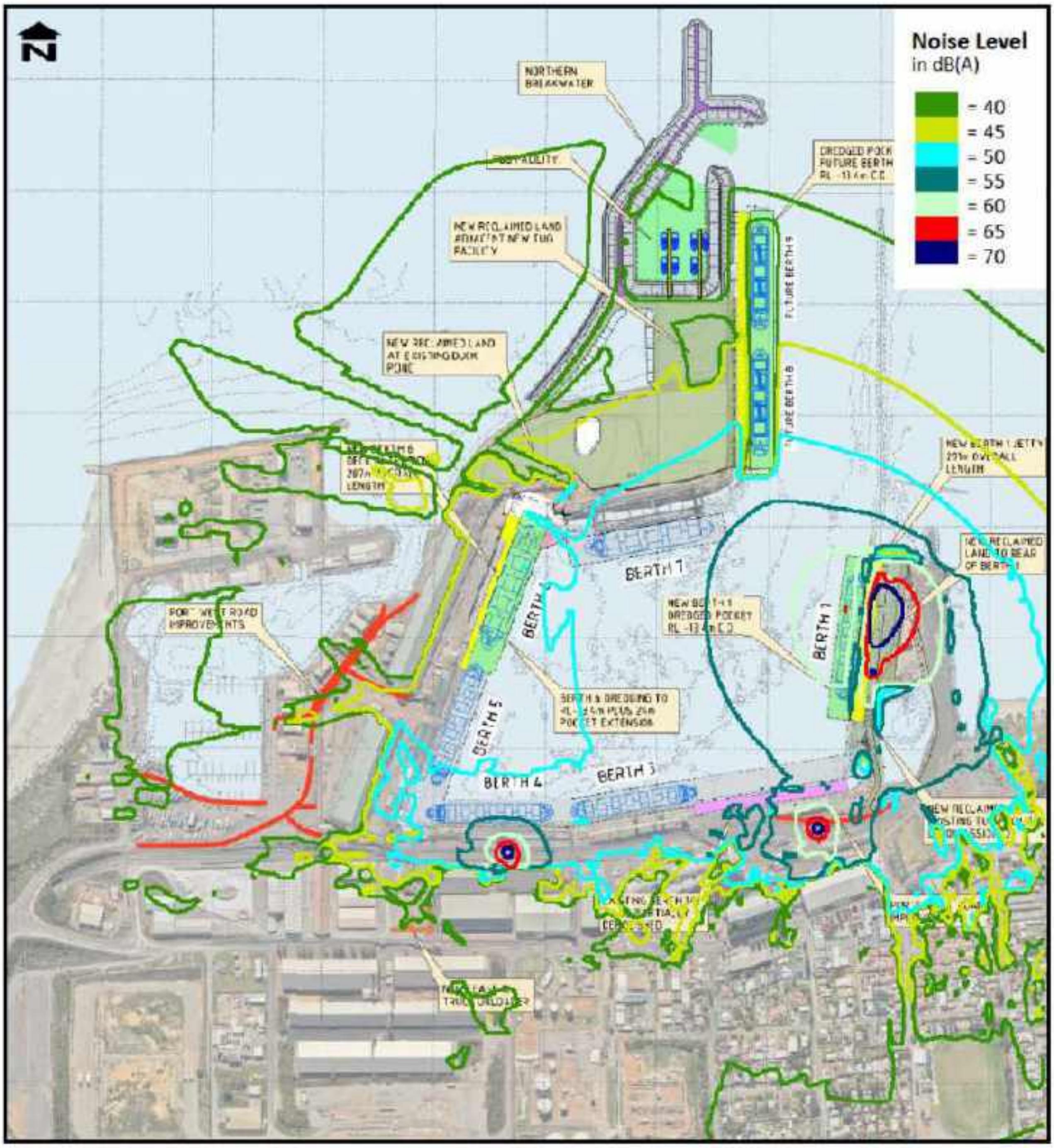


Figure 84: Night- noise contours for scenario 9 under north-easterly wind.

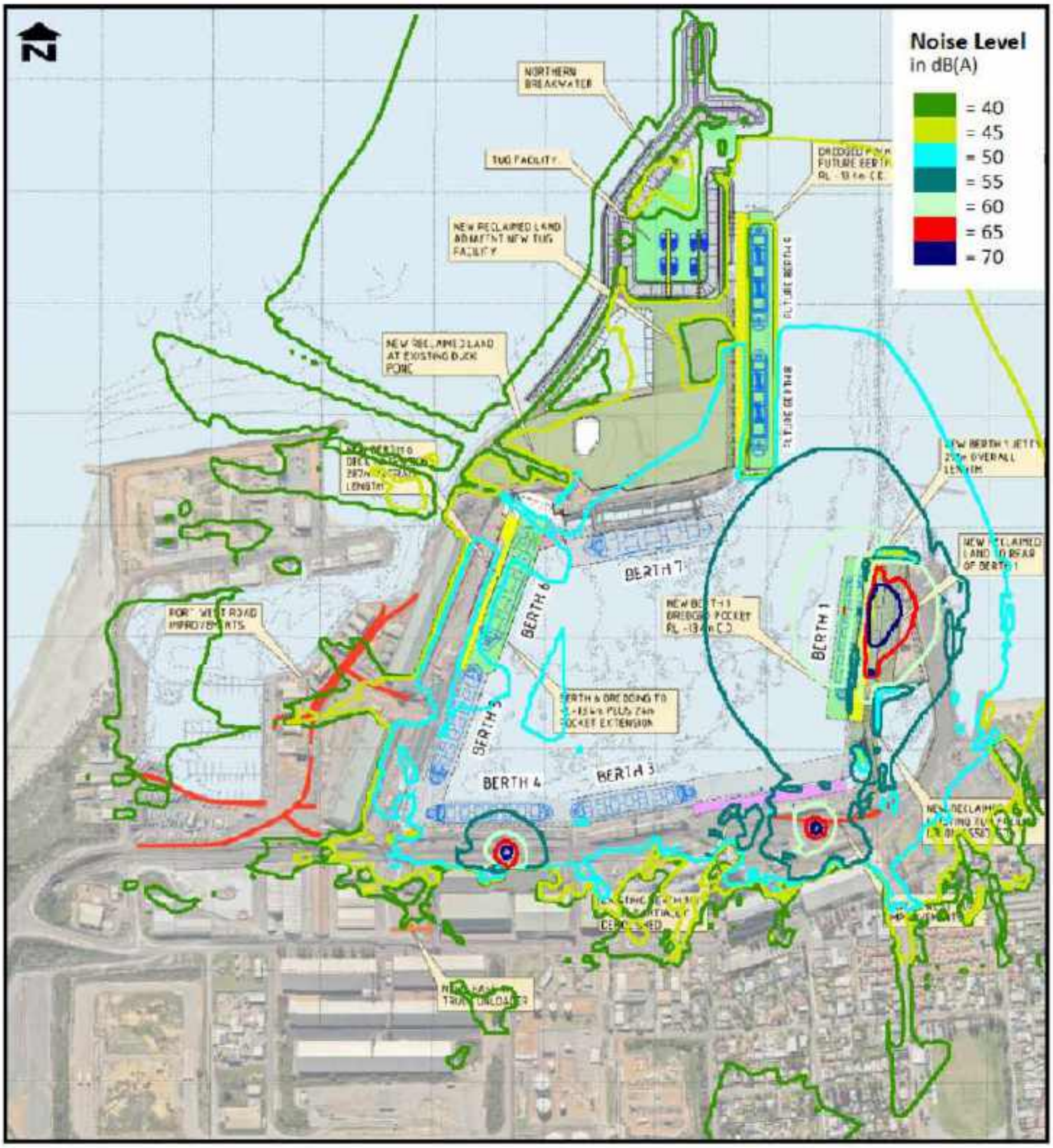


Figure 85: Night- me noise contours for scenario 9 under easterly wind.

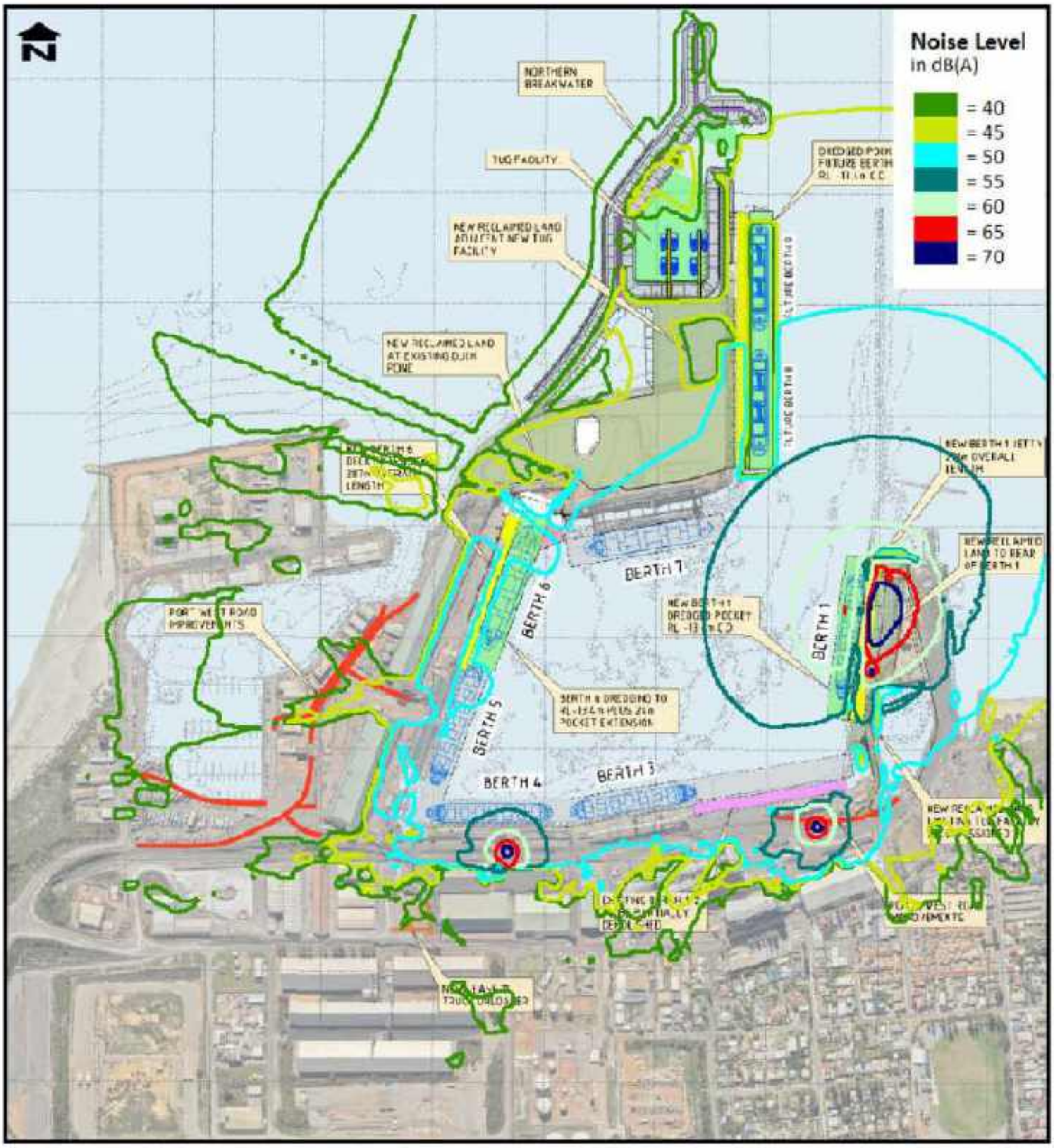


Figure 86: Night- noise contours for scenario 9 under south-easterly wind.

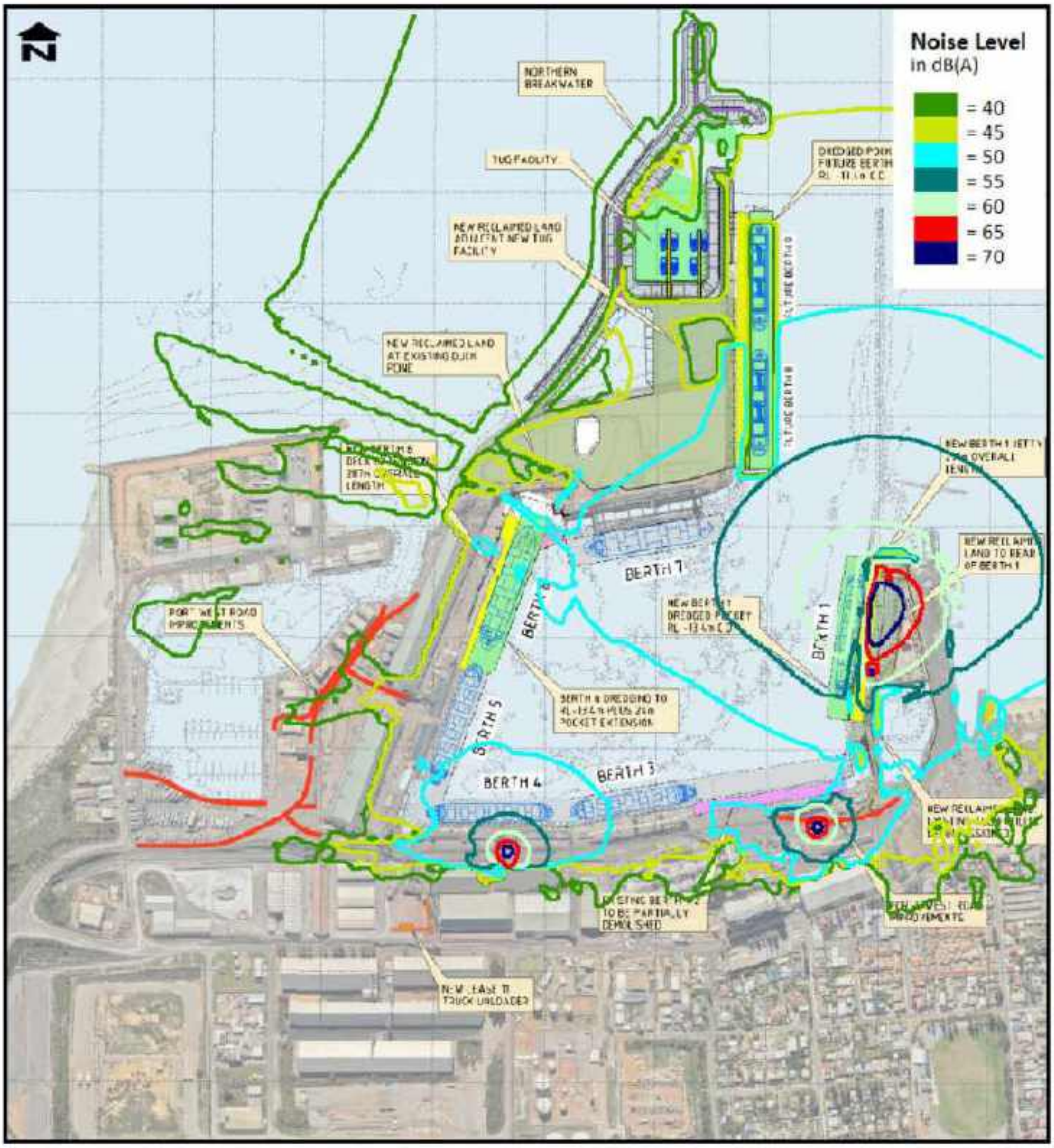


Figure 87: Night- ıe noise contours for scenario 9 under southerly wind.

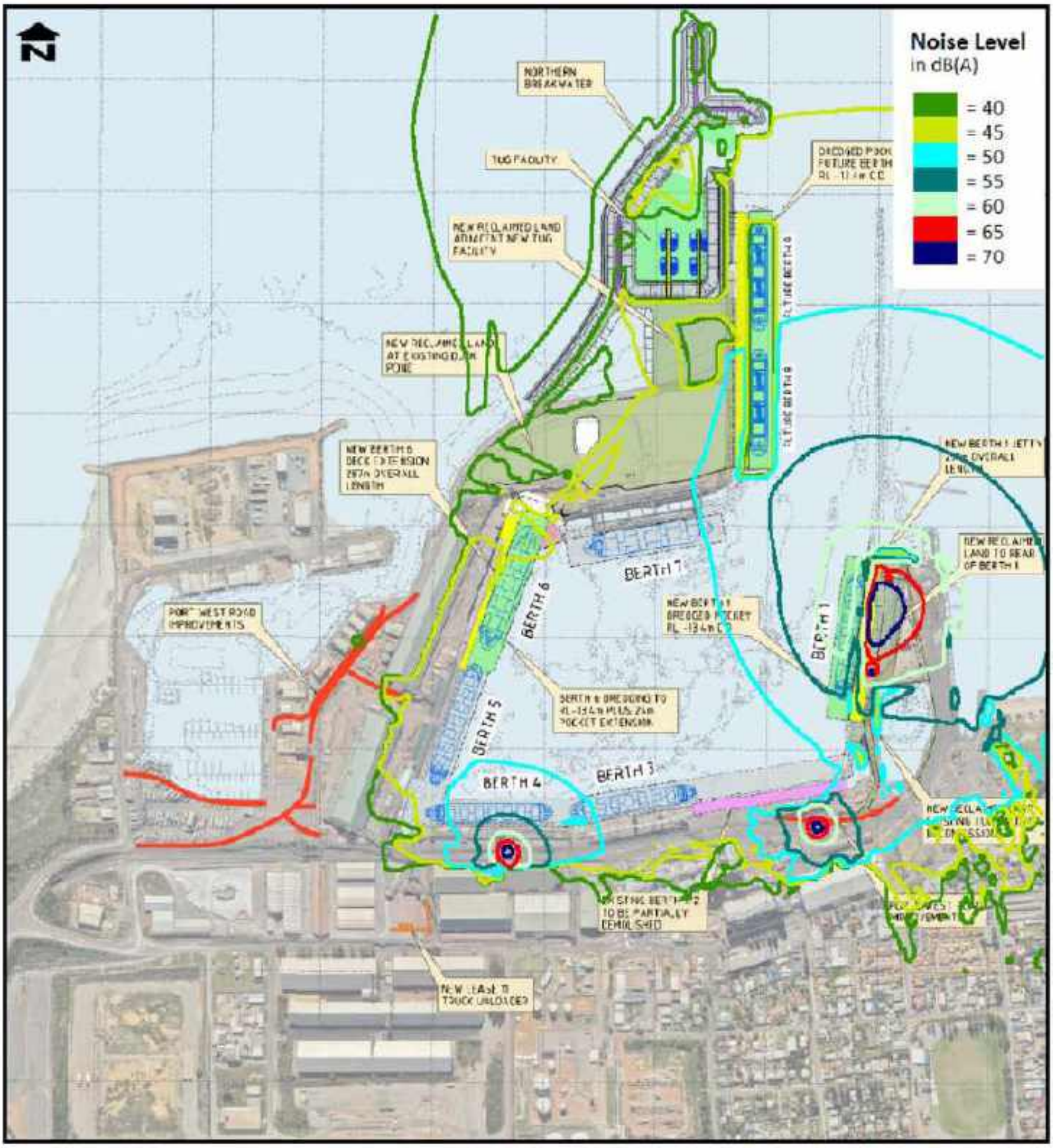


Figure 88: Night-ti e noise contours for scenario 9 under south-westerly wind.

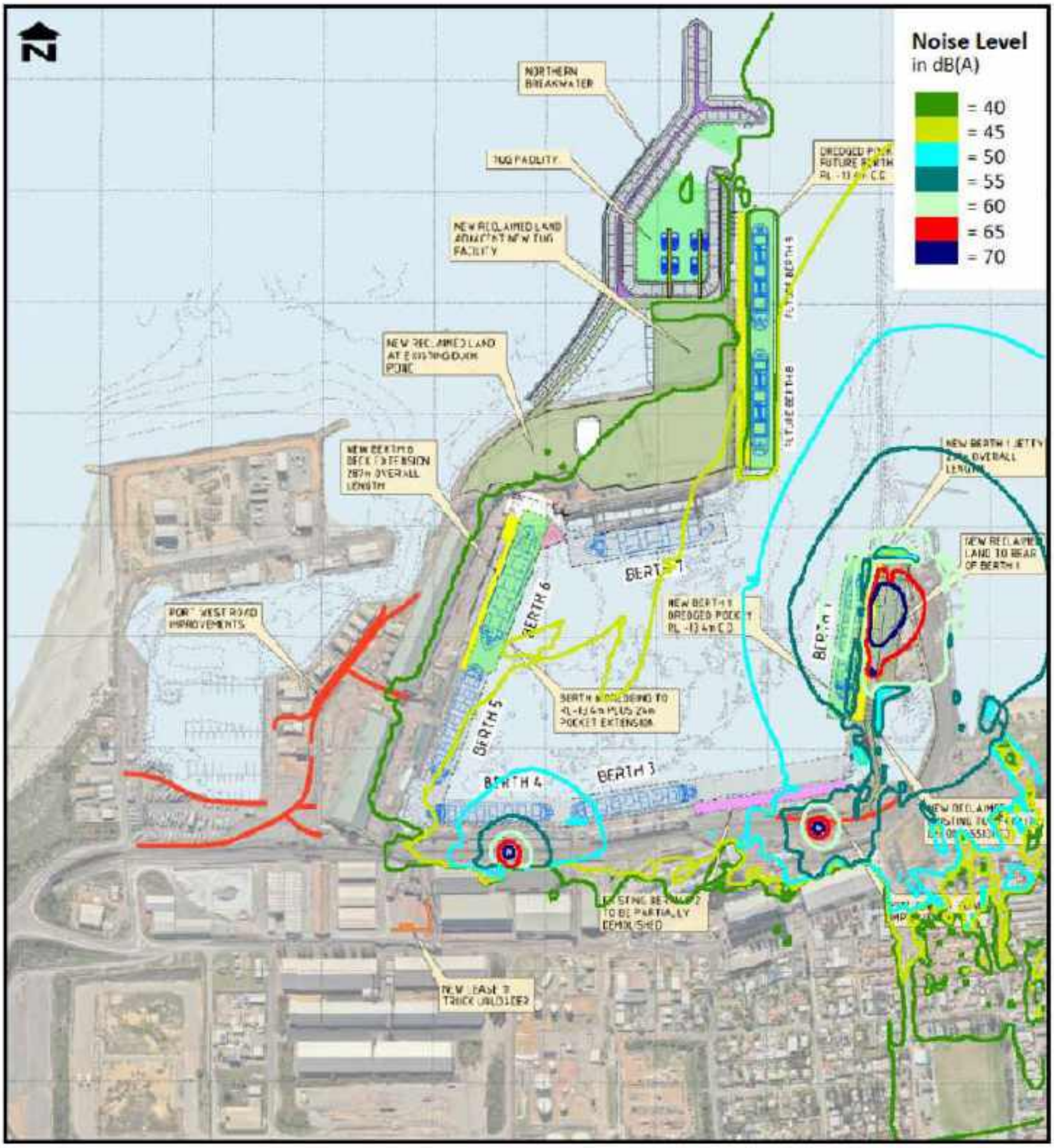


Figure 89: Night- ne noise contours for scenario 9 under westerly wind.

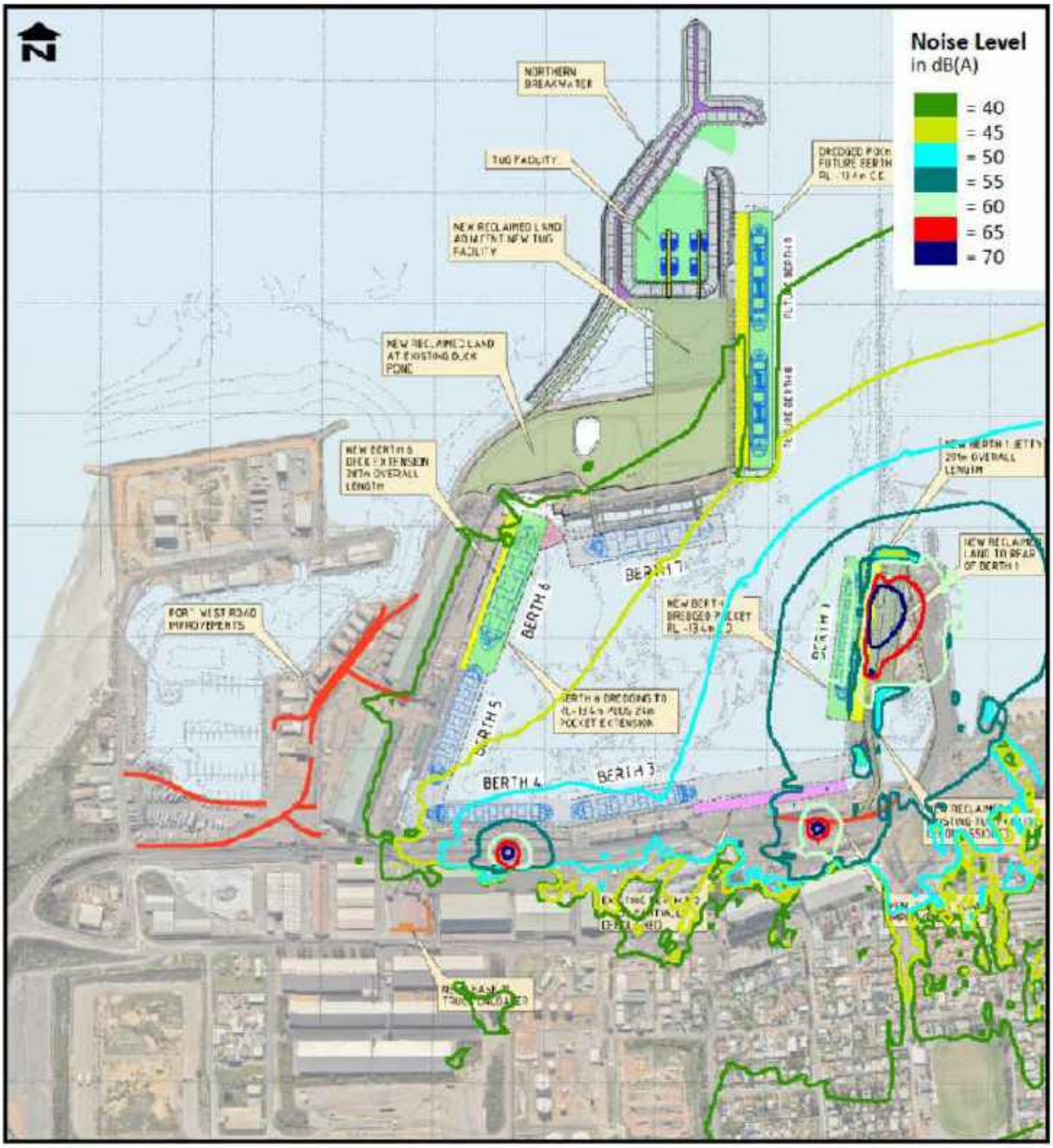


Figure 90: Night-ti e noise contours for scenario 9 under north-westerly wind.

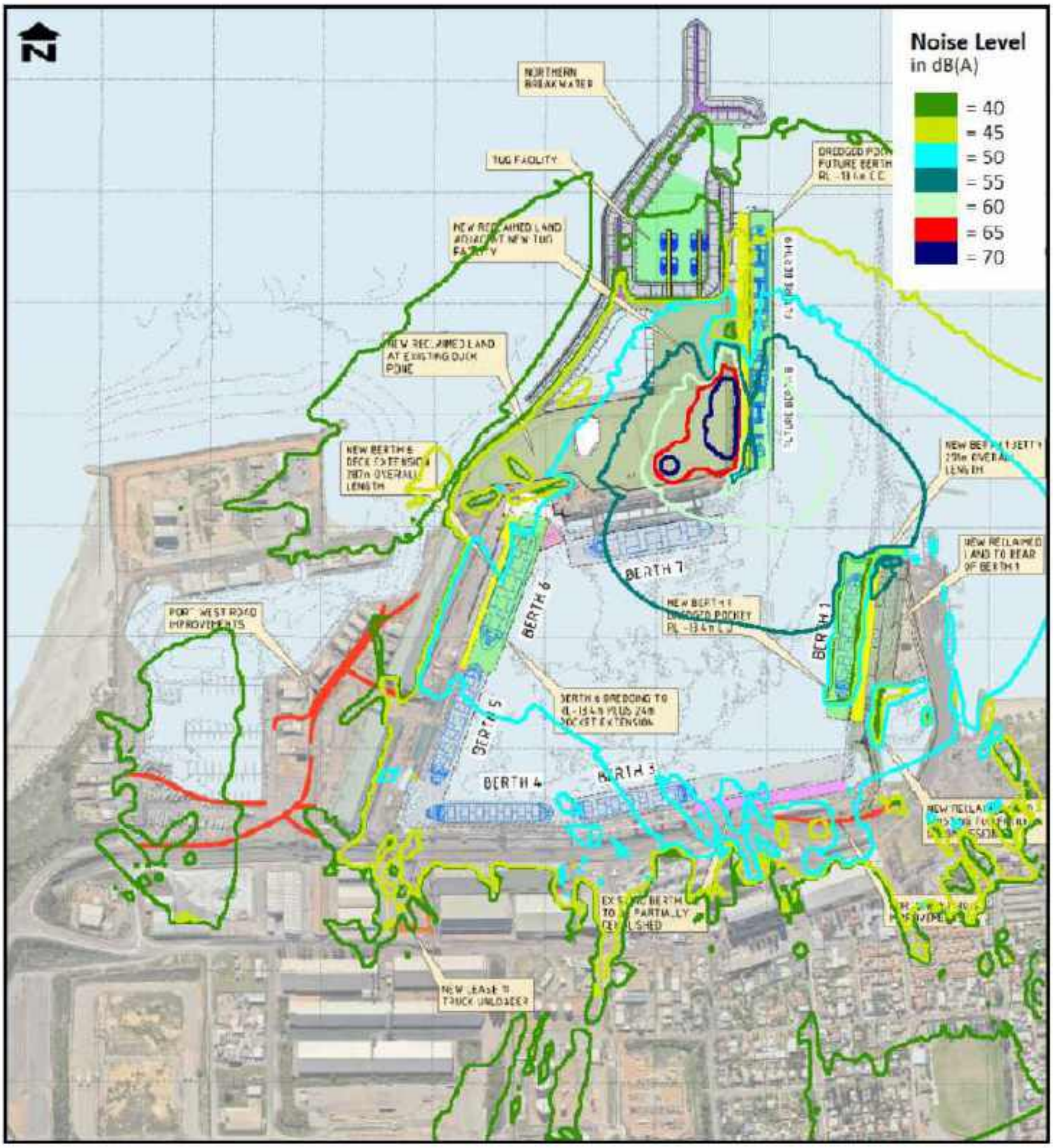


Figure 91: m noise contours for scenario 10 under northerly wind.

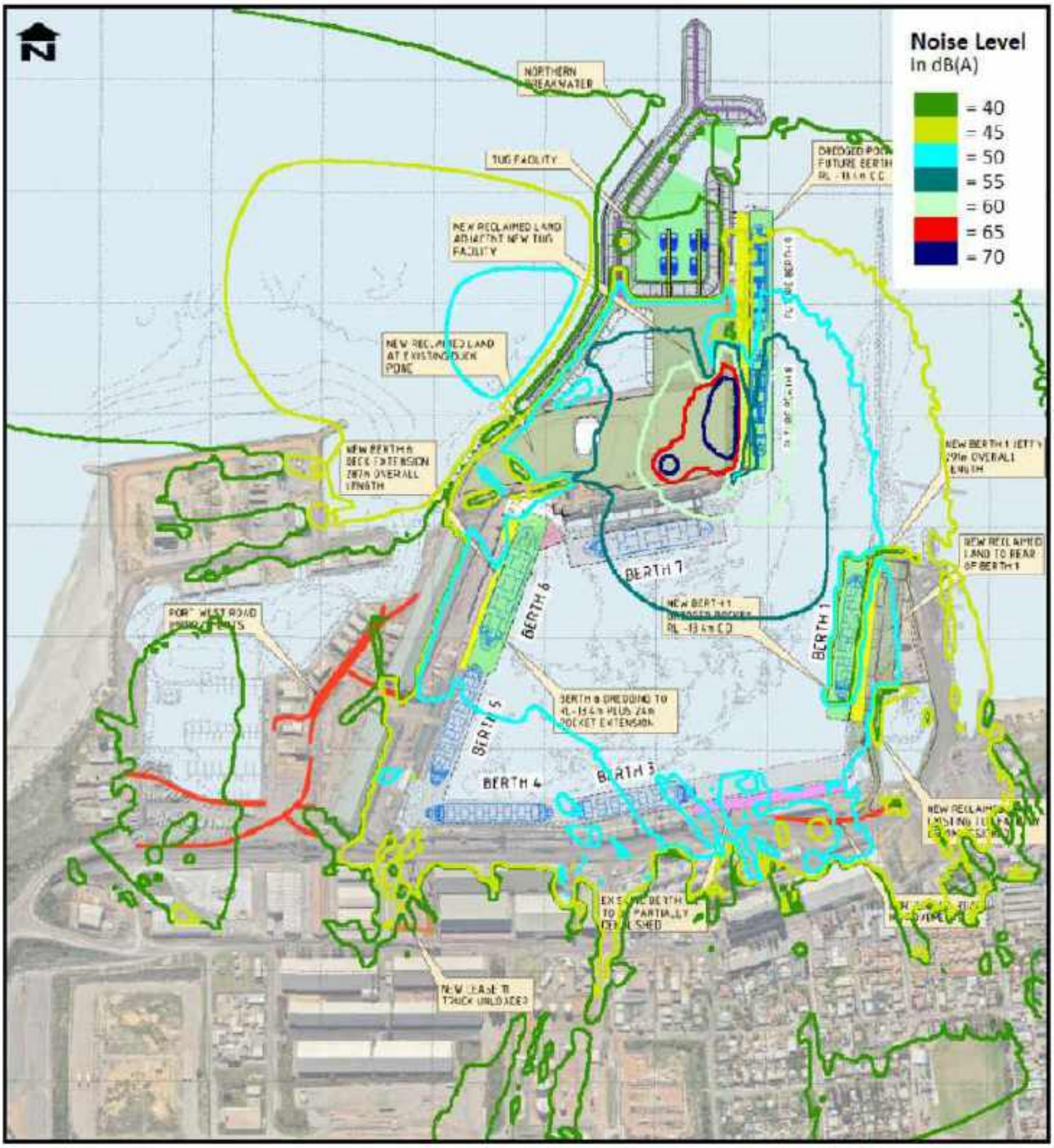


Figure 92: Daytime ›ise contours for scenario 10 under north-easterly wind.

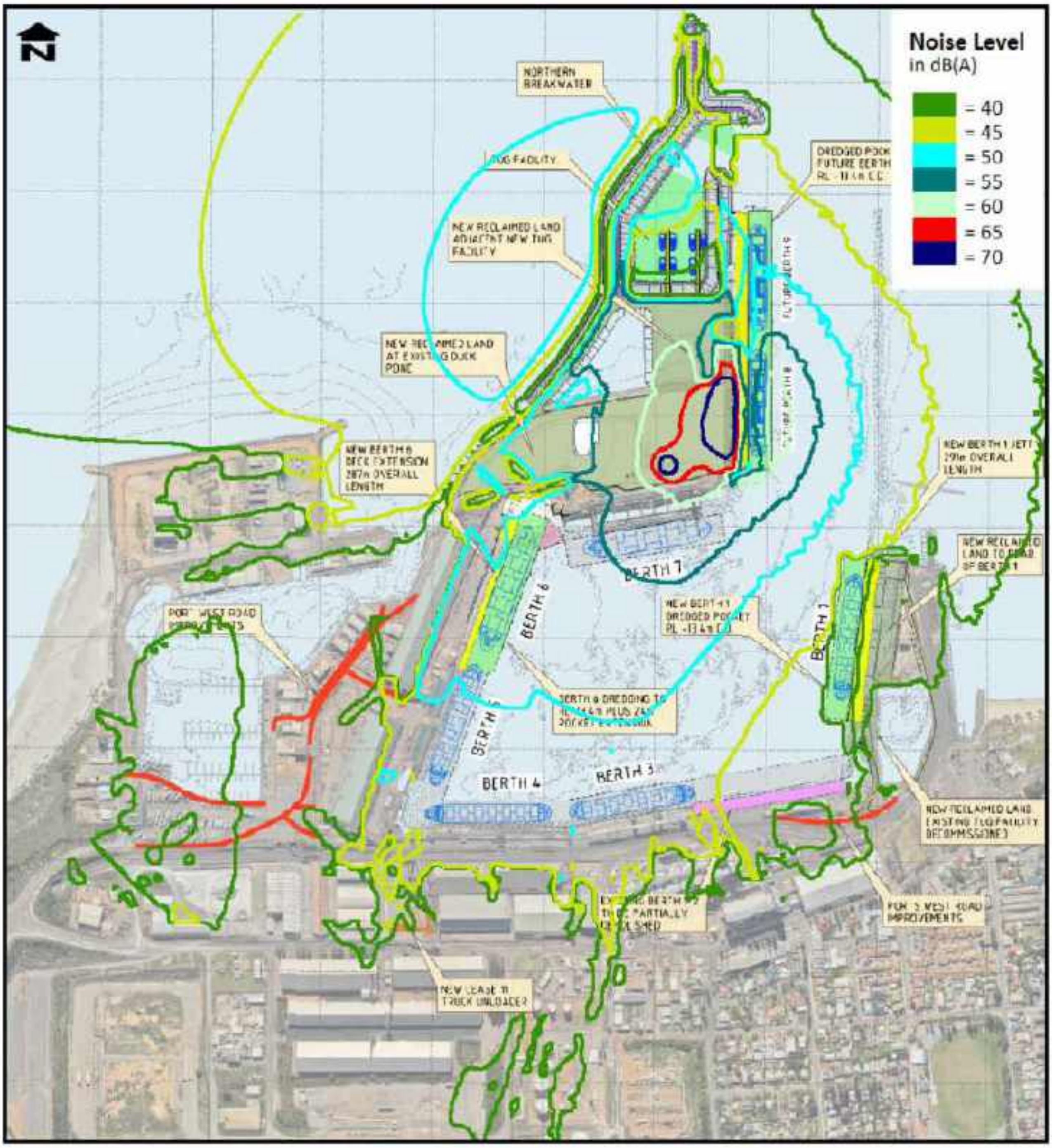


Figure 93: D yti ɘ noise contours for scenario 10 under easterly wind.

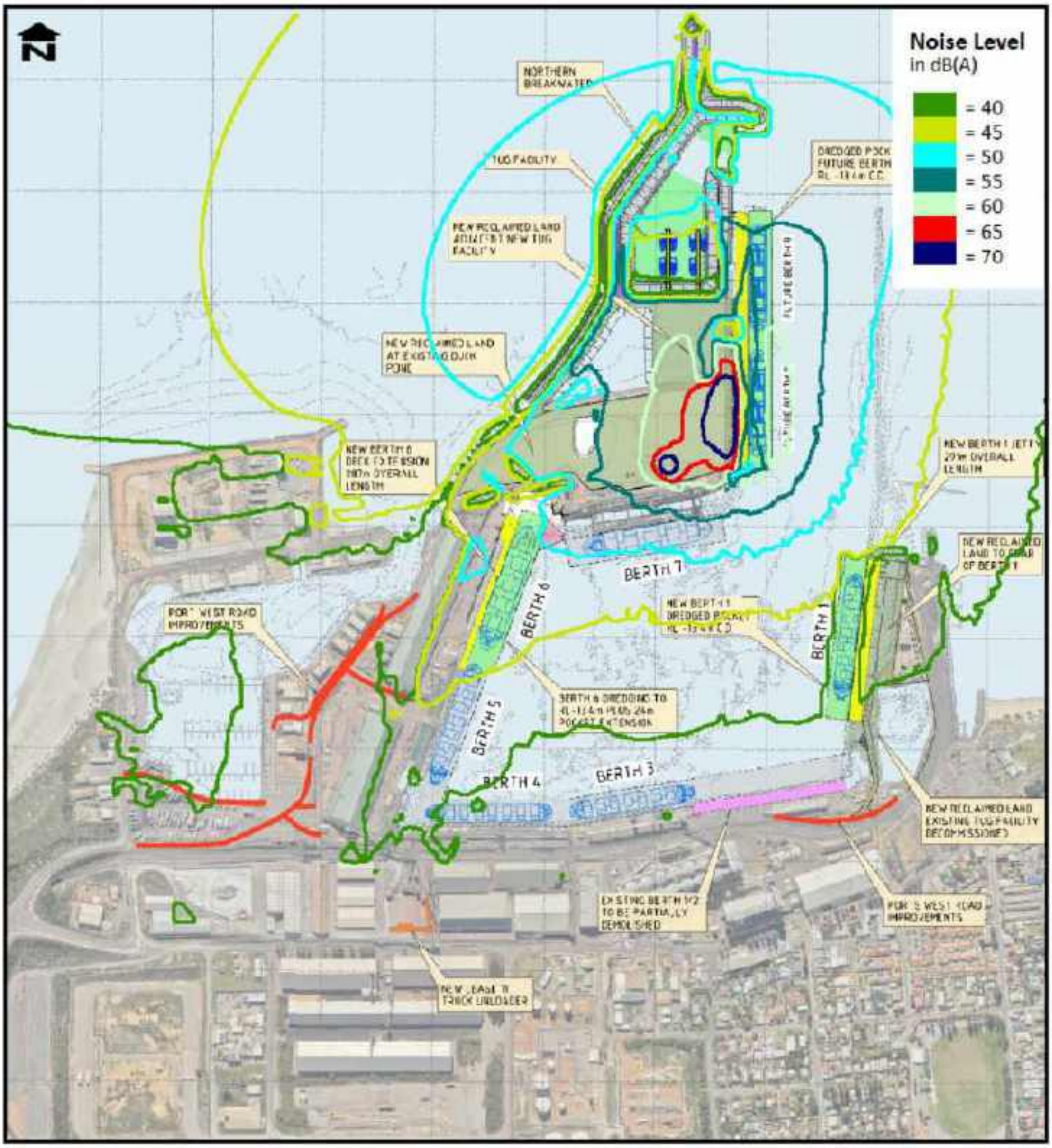


Figure 94: Daytime oise contours for scenario 10 under south-easterly wind.

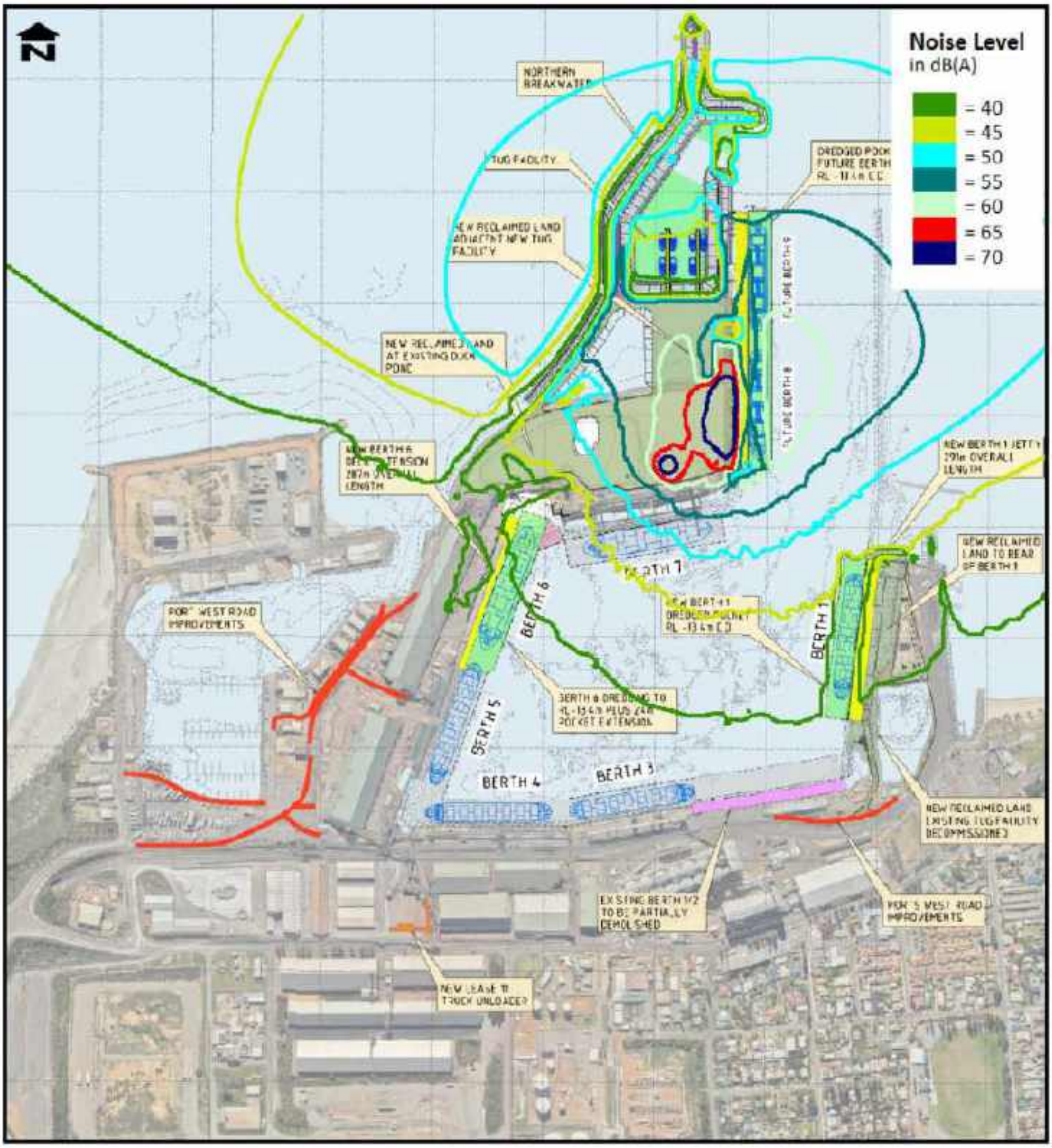


Figure 95: Daytime noise contours for scenario 10 under southerly wind.

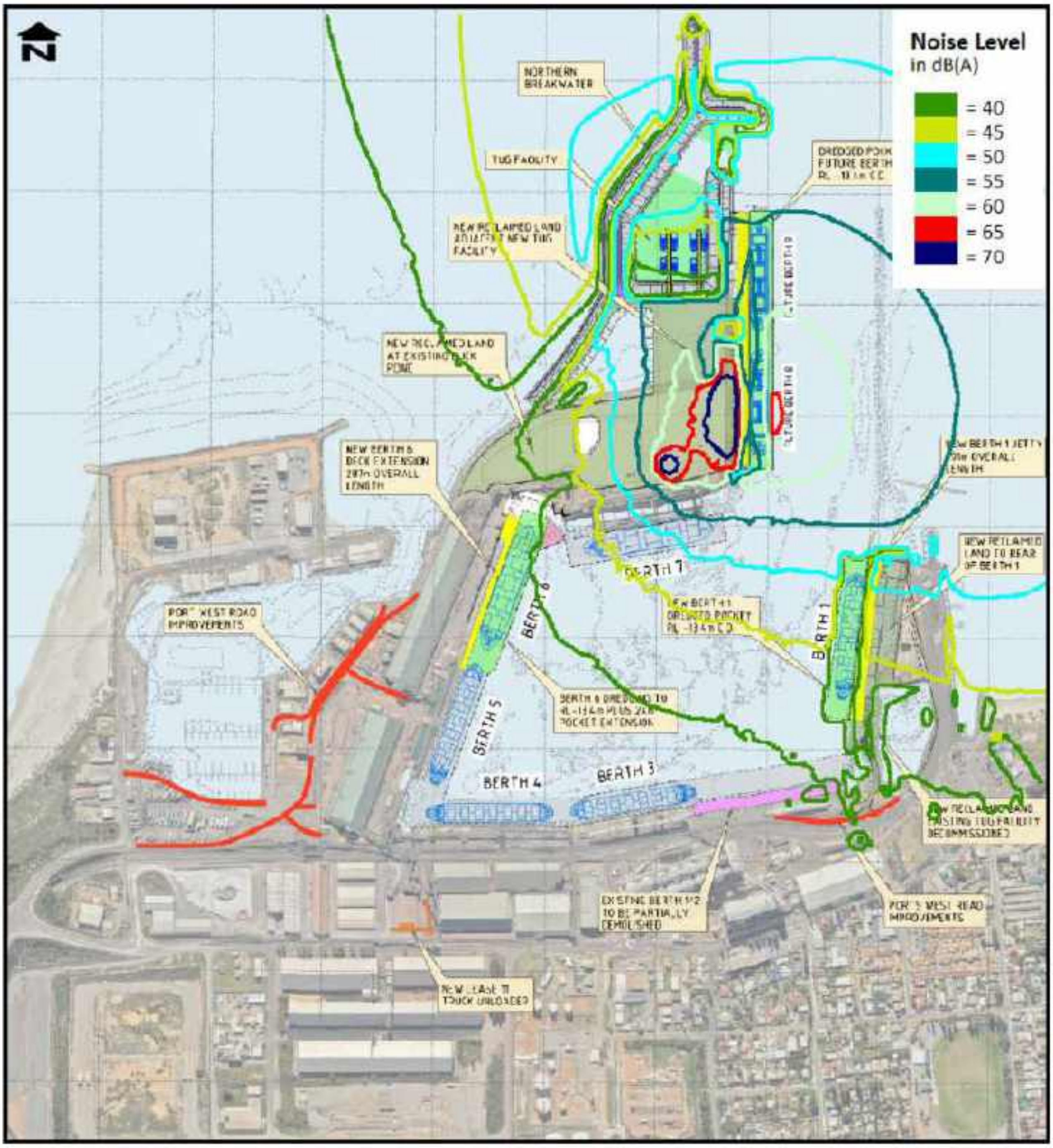


Figure 96: Daytime ›ise contours for scenario 10 under south-westerly wind.

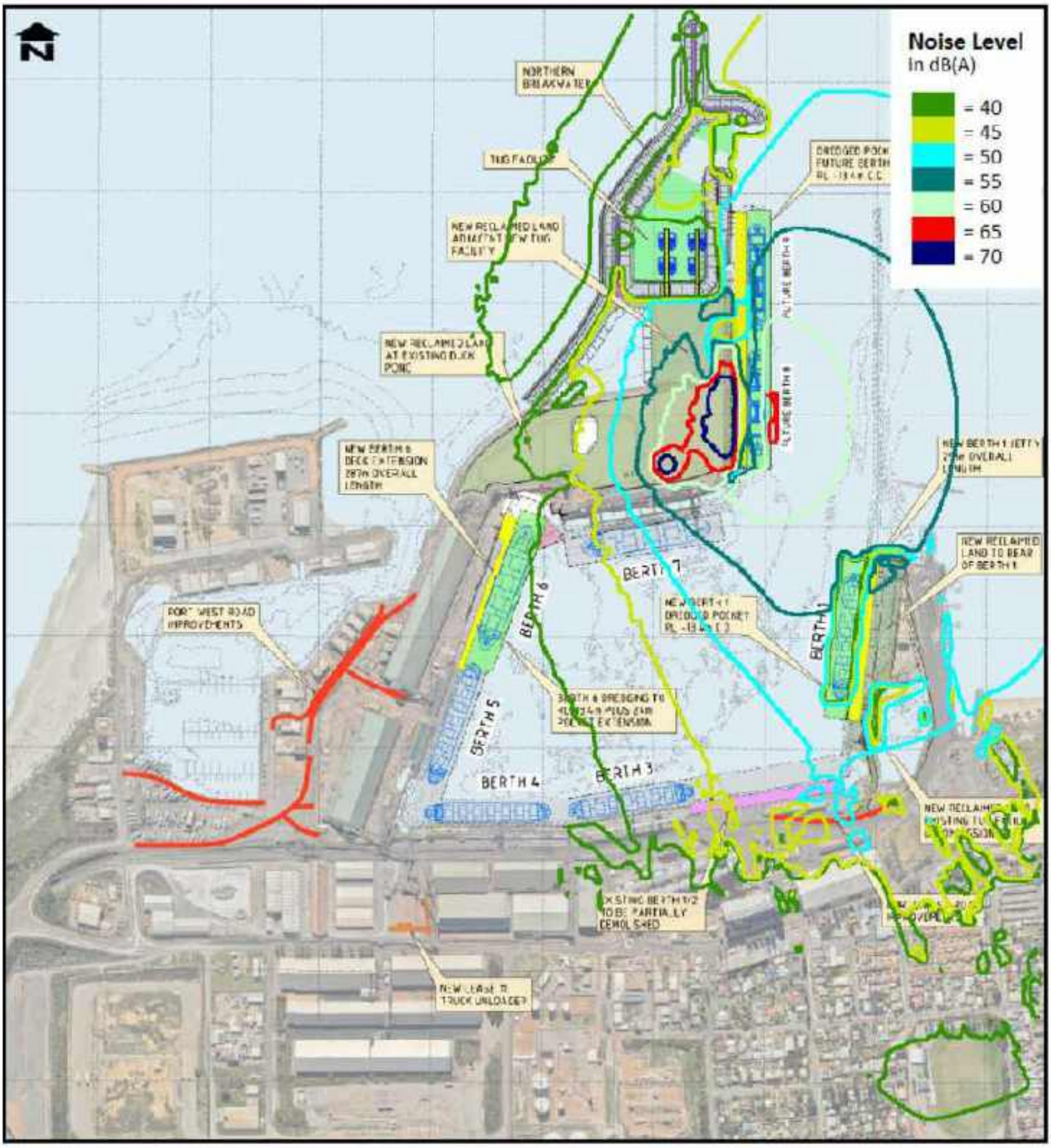


Figure 97: › noise contours for scenario 10 under westerly wind.

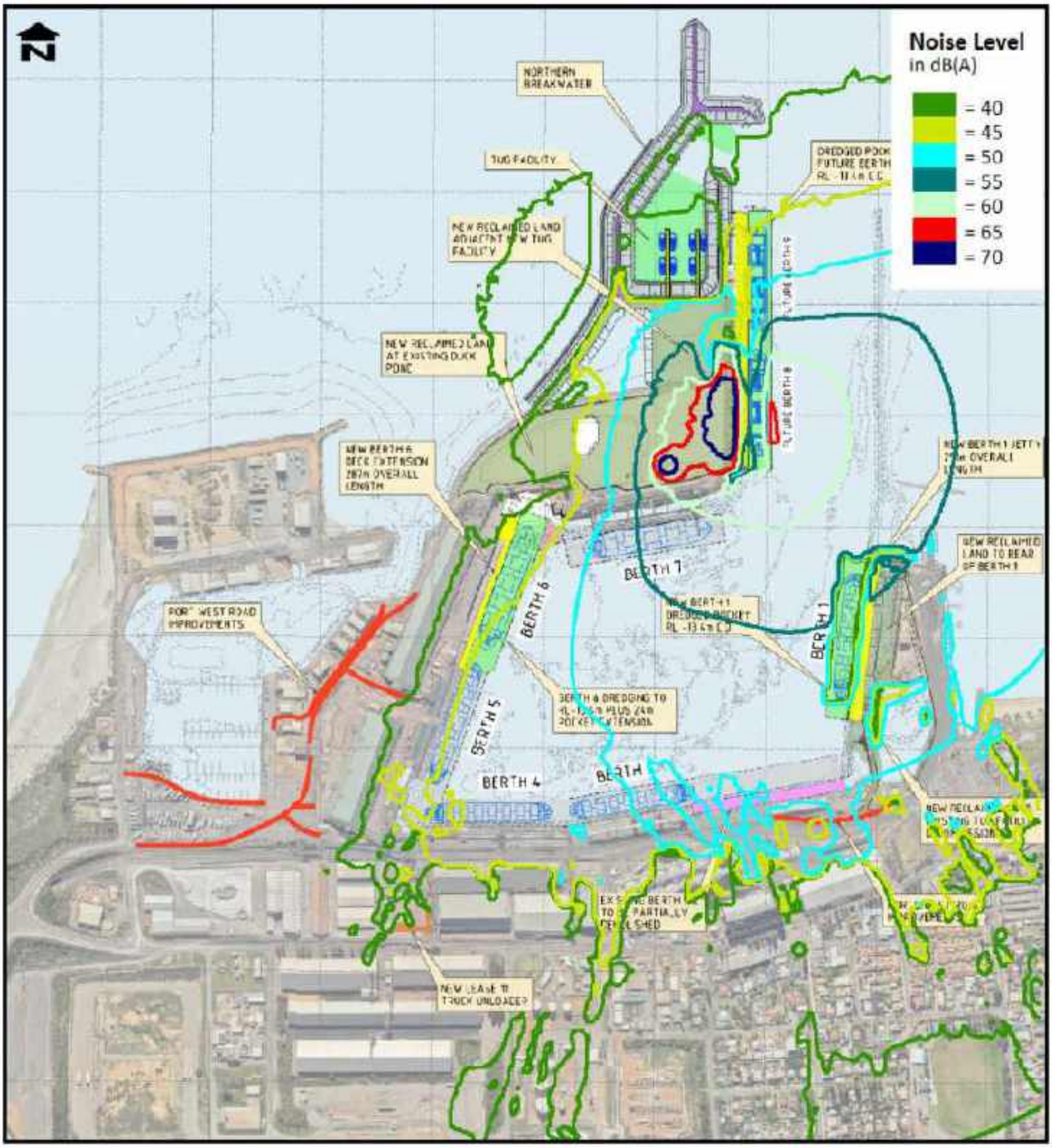


Figure 98: Daytime n ›ise contours for scenario 10 under north-westerly wind.

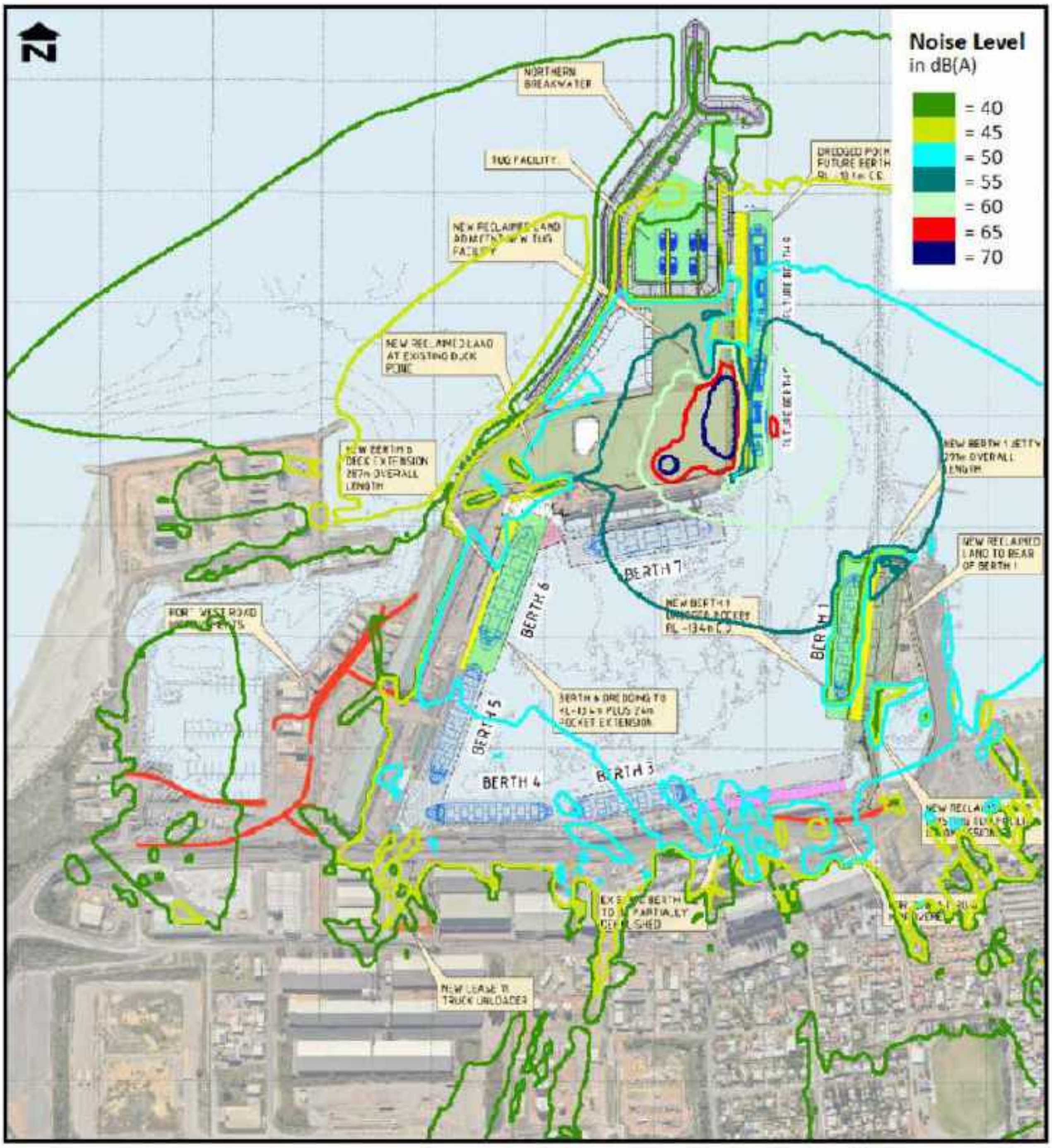


Figure 99: Night-ti e noise contours for scenario 10 under northerly wind.

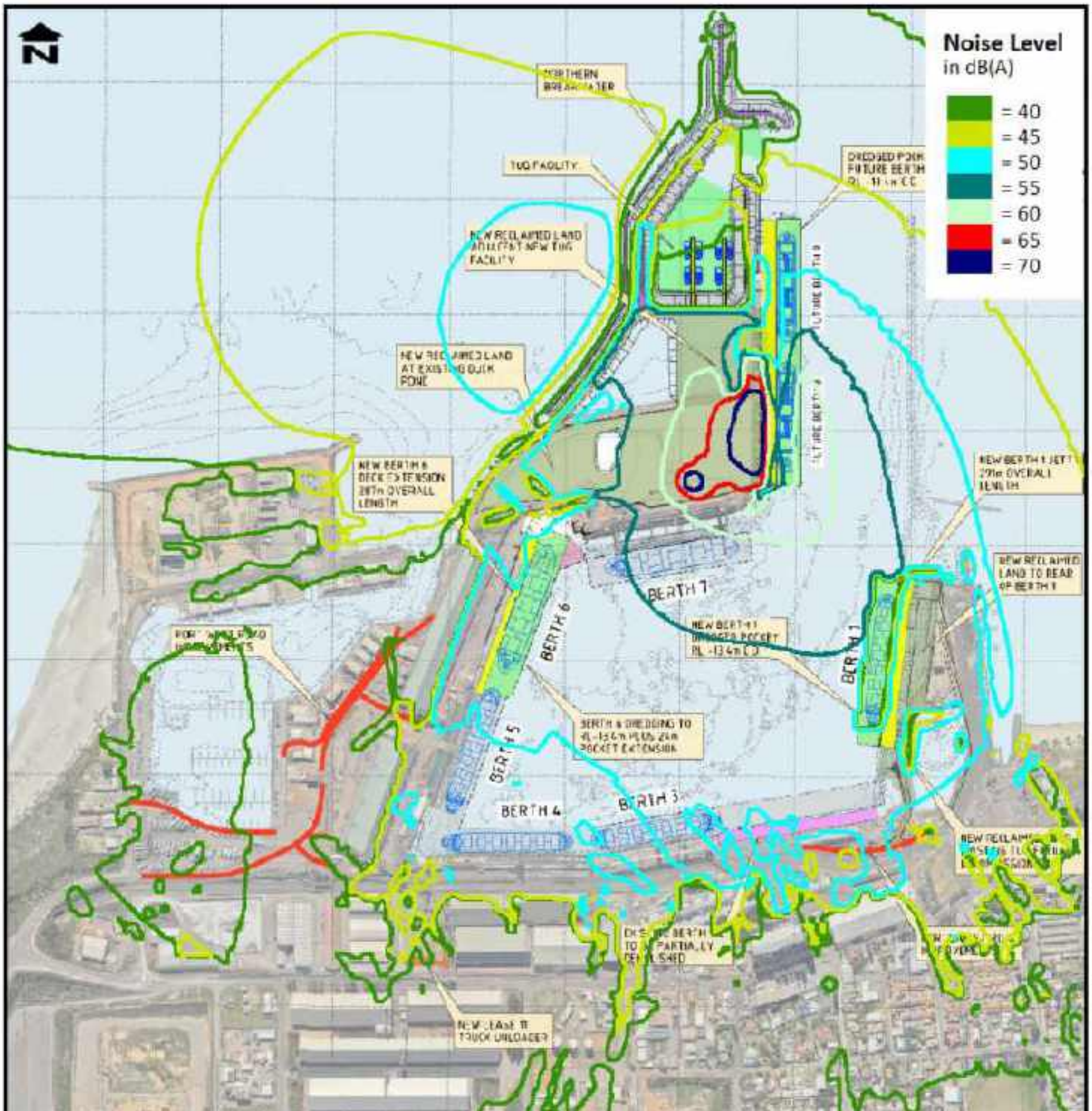


Figure 100: Night- ıoise contours for scenario 10 under north-easterly wind.

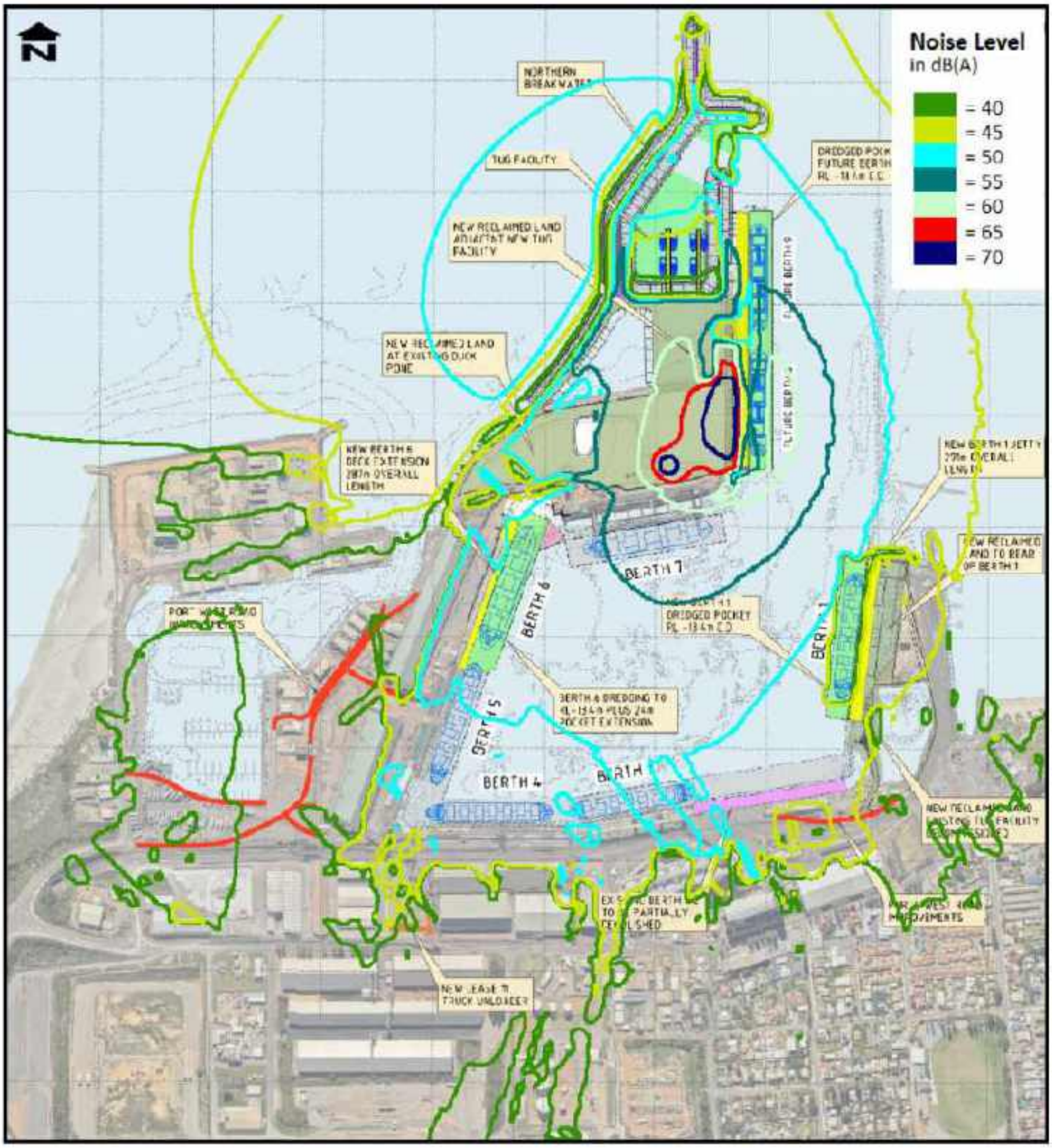


Figure 101: Night- ıe noise contours for scenario 10 under easterly wind.

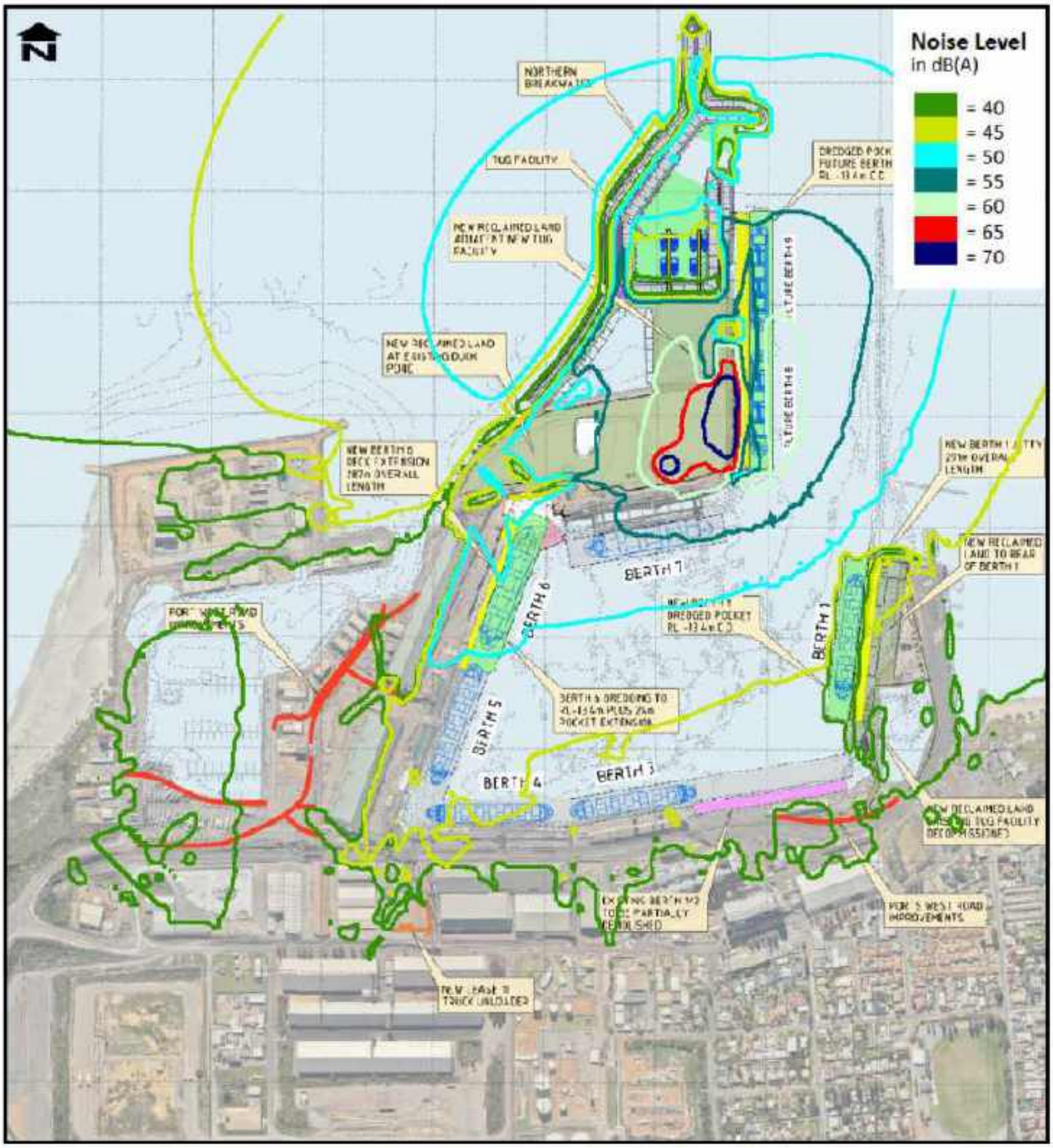


Figure 102: Night-ti e noise contours for scenario 10 under south-easterly wind.

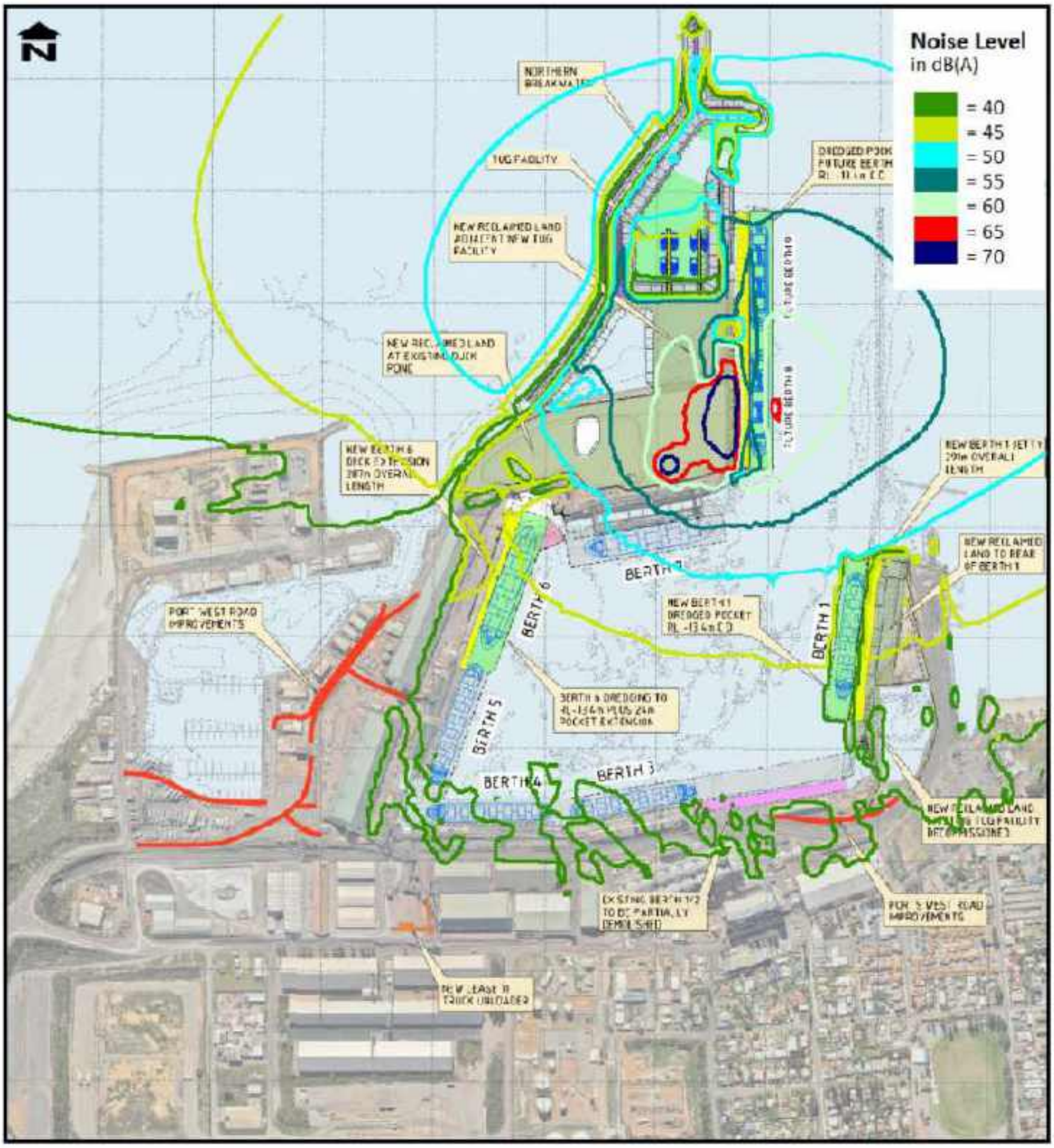


Figure 103: Night-ti e noise contours for scenario 10 under southerly wind.

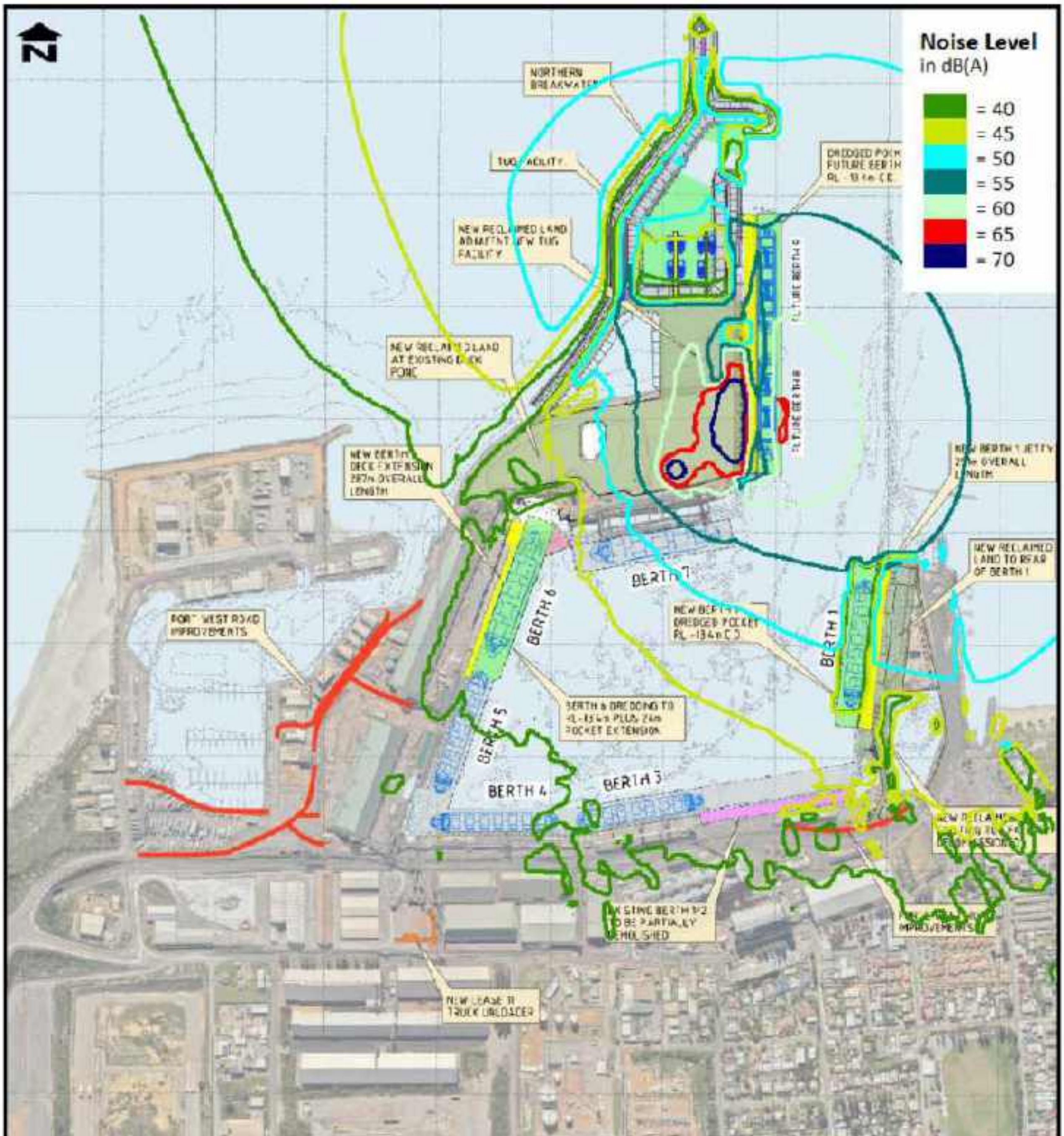


Figure 104: Night- m oise contours for scenario 10 under south-westerly wind.

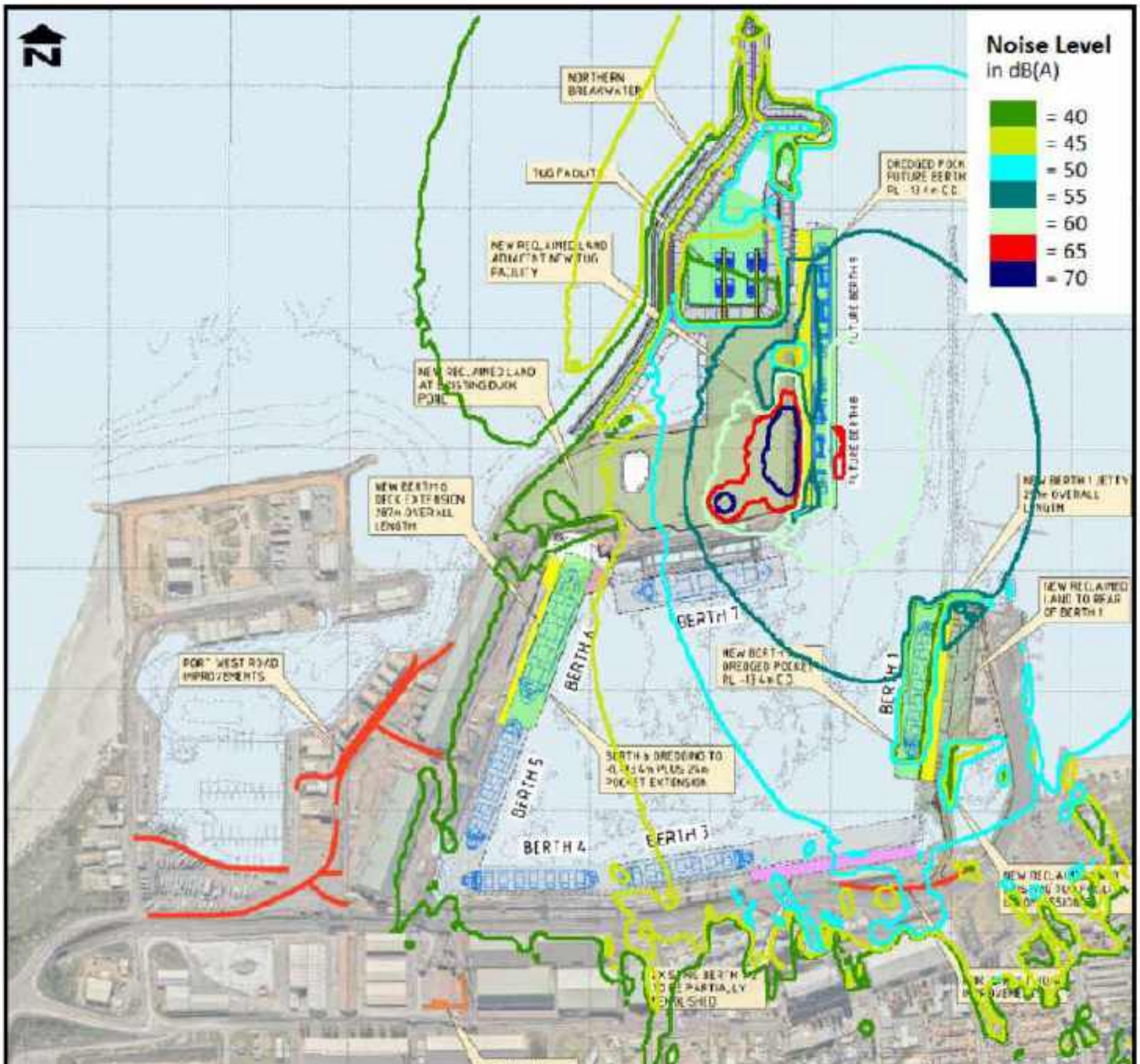


Figure 105: Night-ti ıe noise contours for scenario 10 under westerly wind.

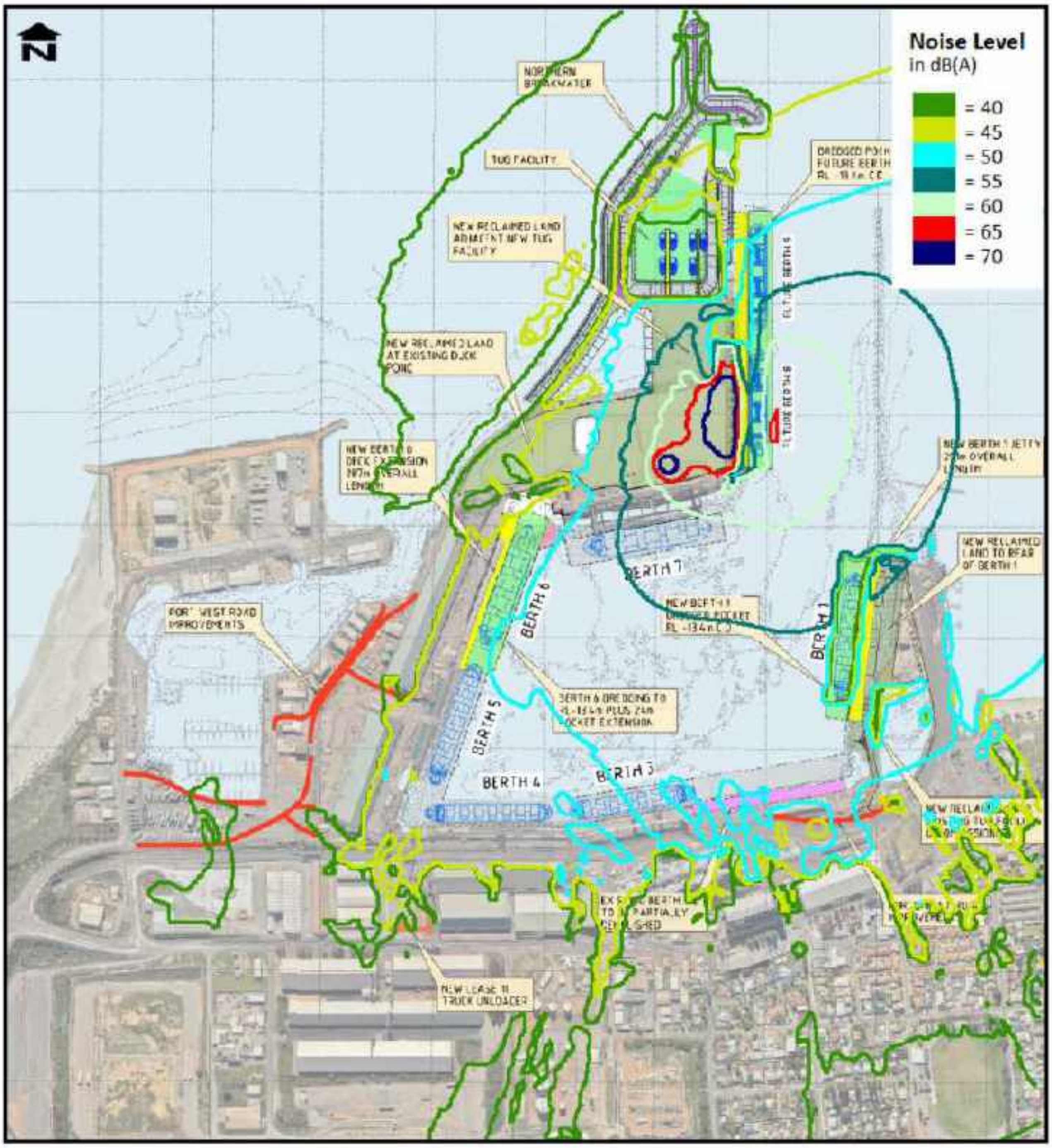


Figure 106: Night- m ıoise contours for scenario 10 under north-westerly wind.

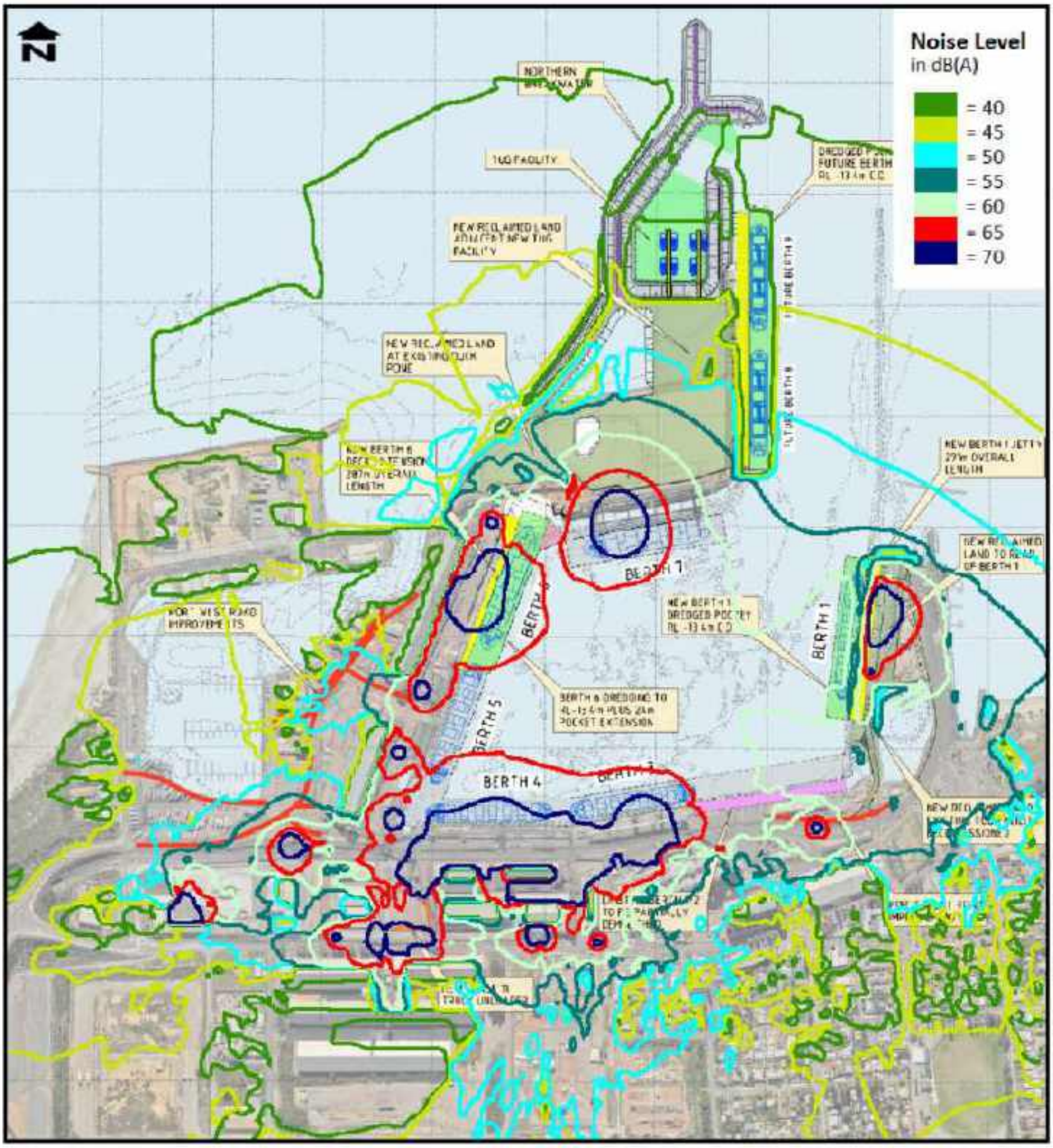


Figure 107: m noise contours for scenario 11 under northerly wind.

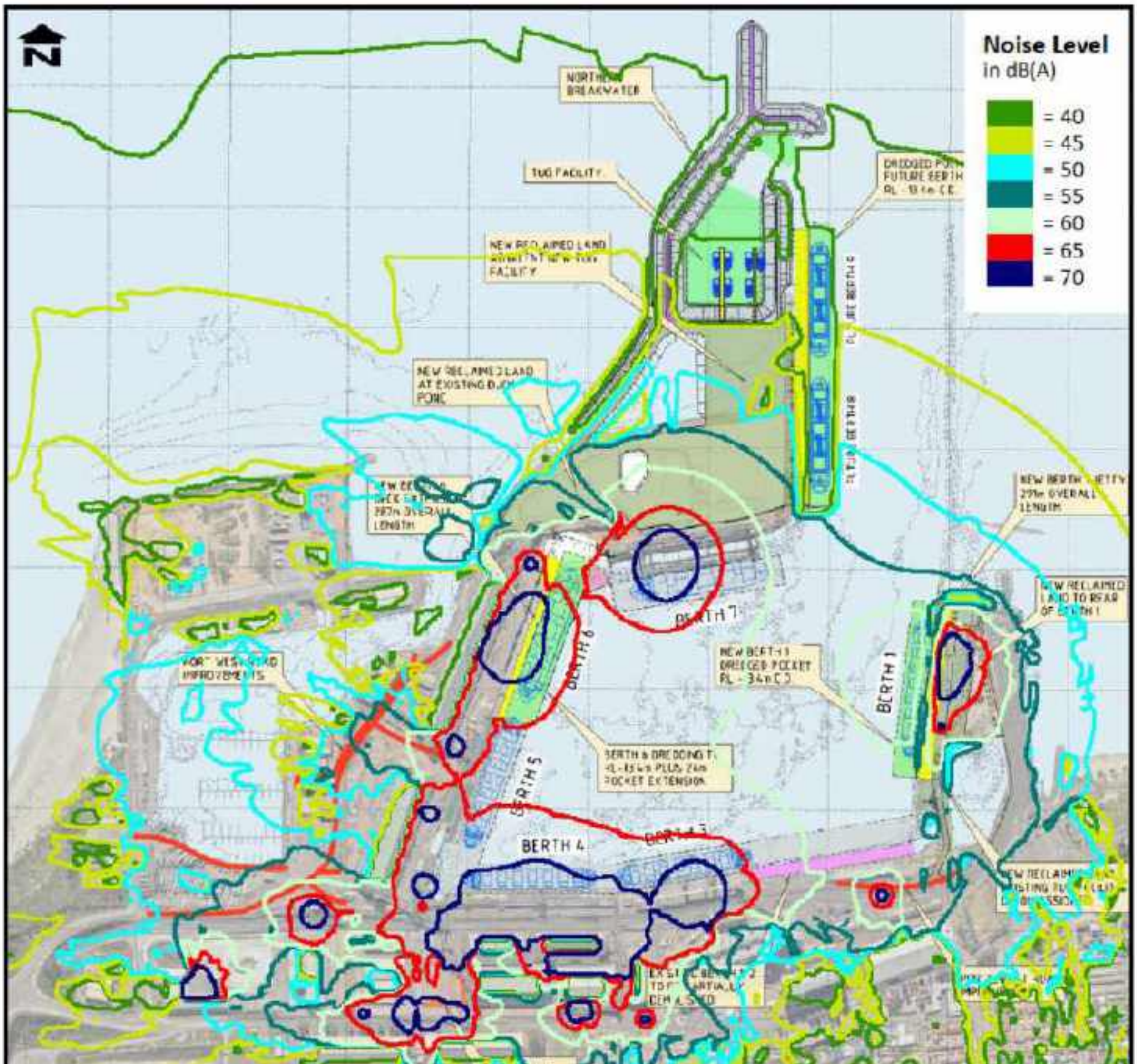


Figure 108: Daytime ›ise contours for scenario 11 under north-easterly wind.

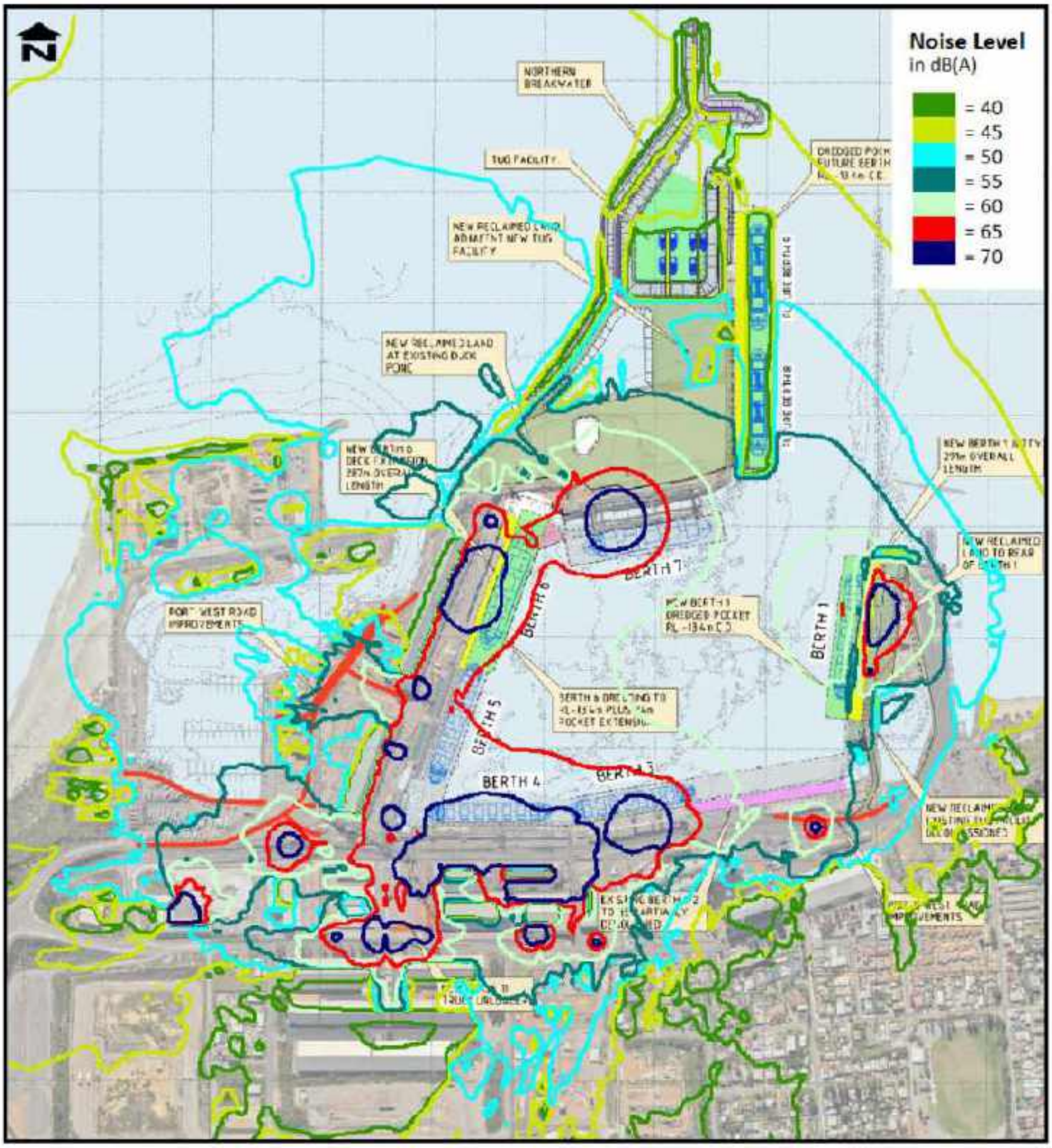


Figure 109: D yti ɜ noise contours for scenario 11 under easterly wind.

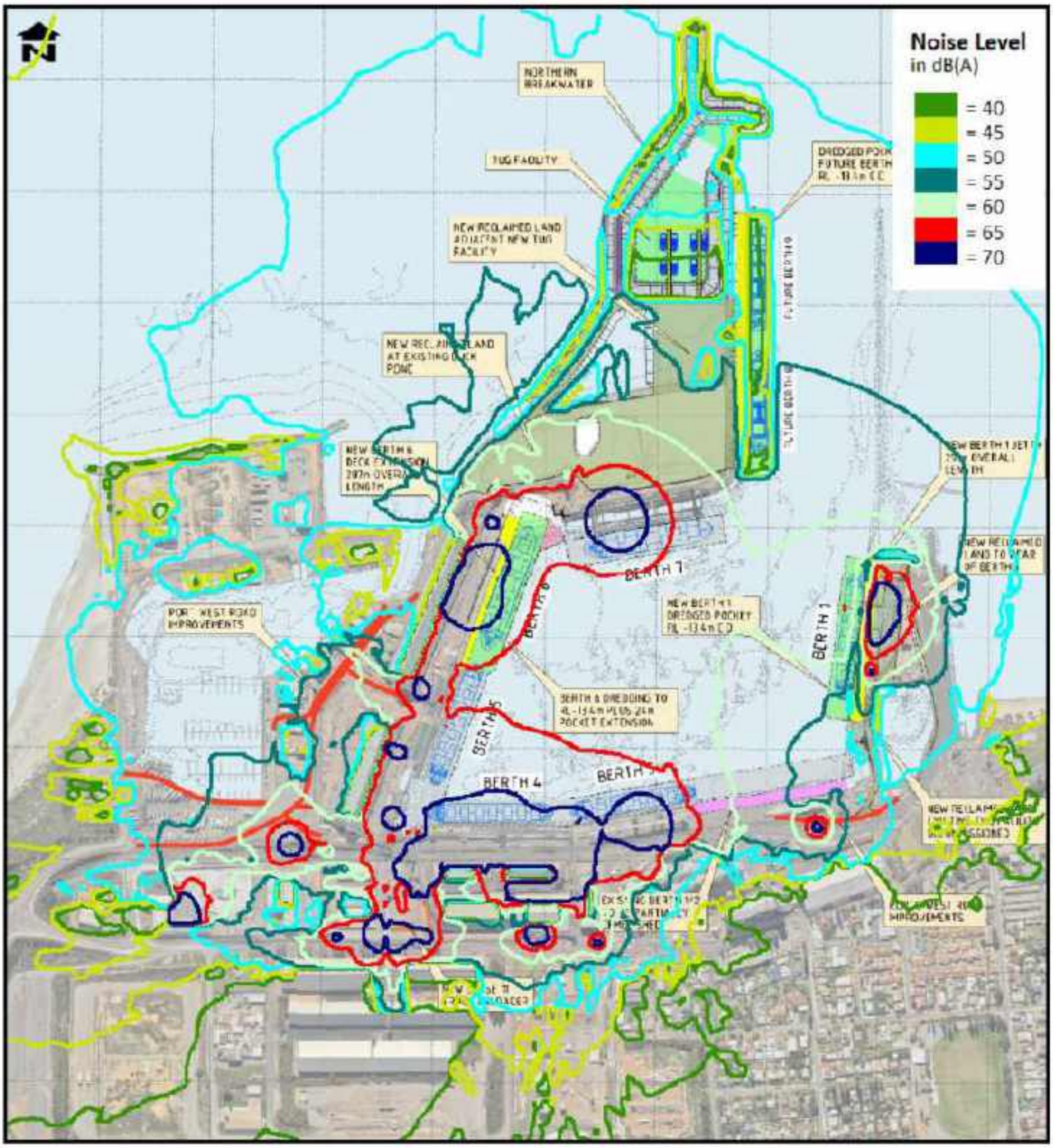


Figure 110: Daytime oise contours for scenario 11 under south-easterly wind.

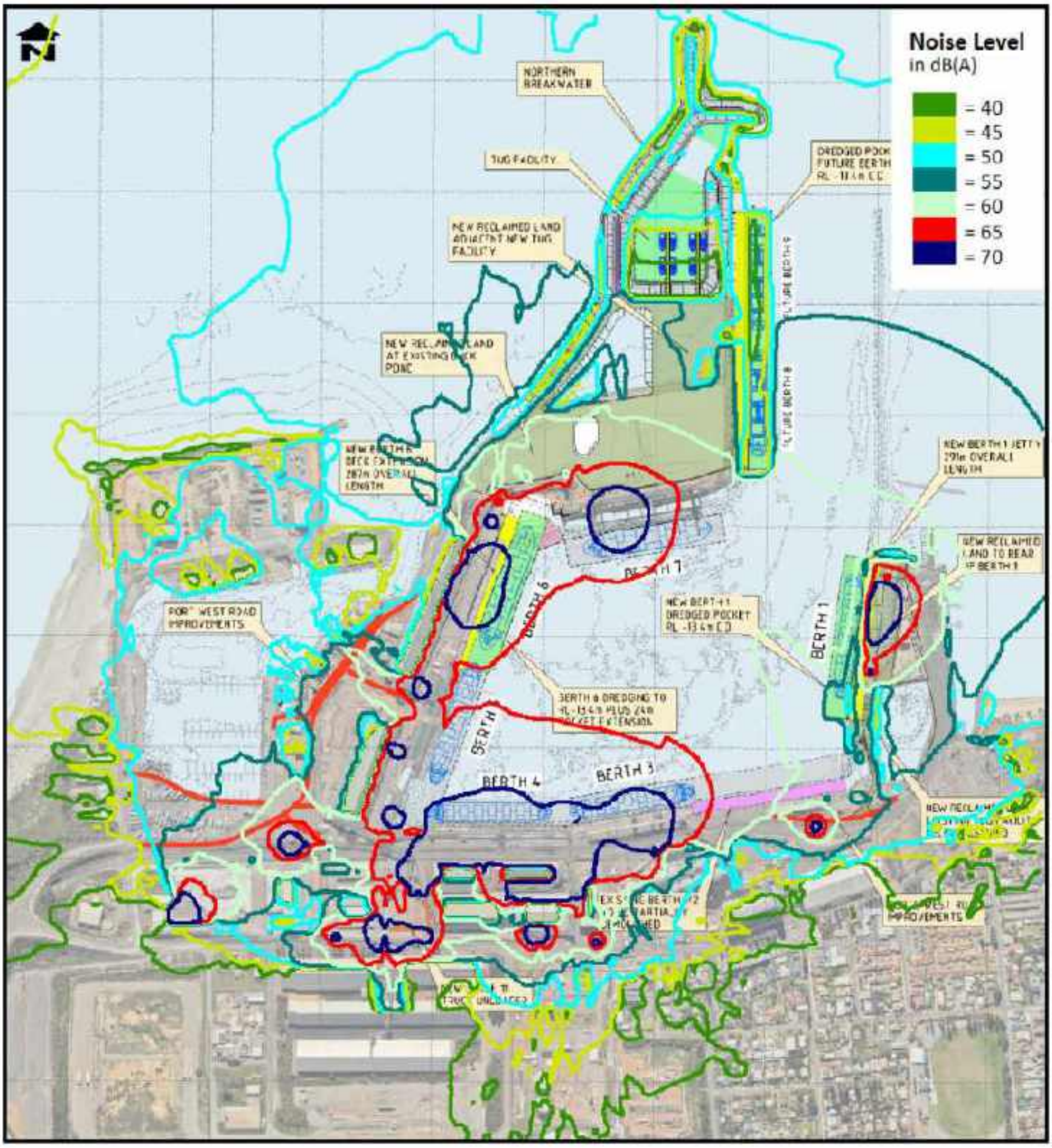


Figure 111: Daytime noise contours for scenario 11 under southerly wind.

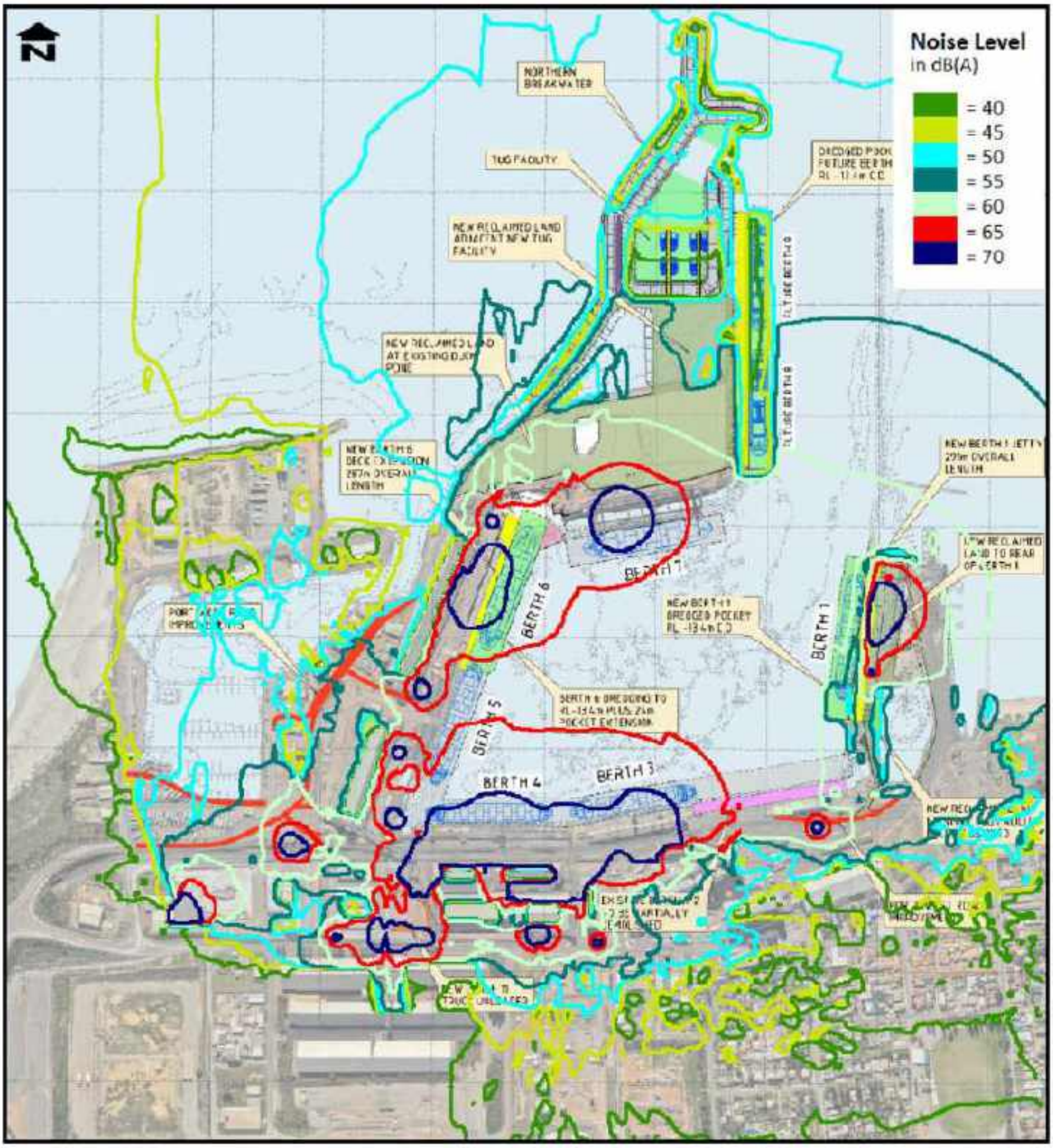


Figure 112: Daytime ›ise contours for scenario 11 under south-westerly wind.

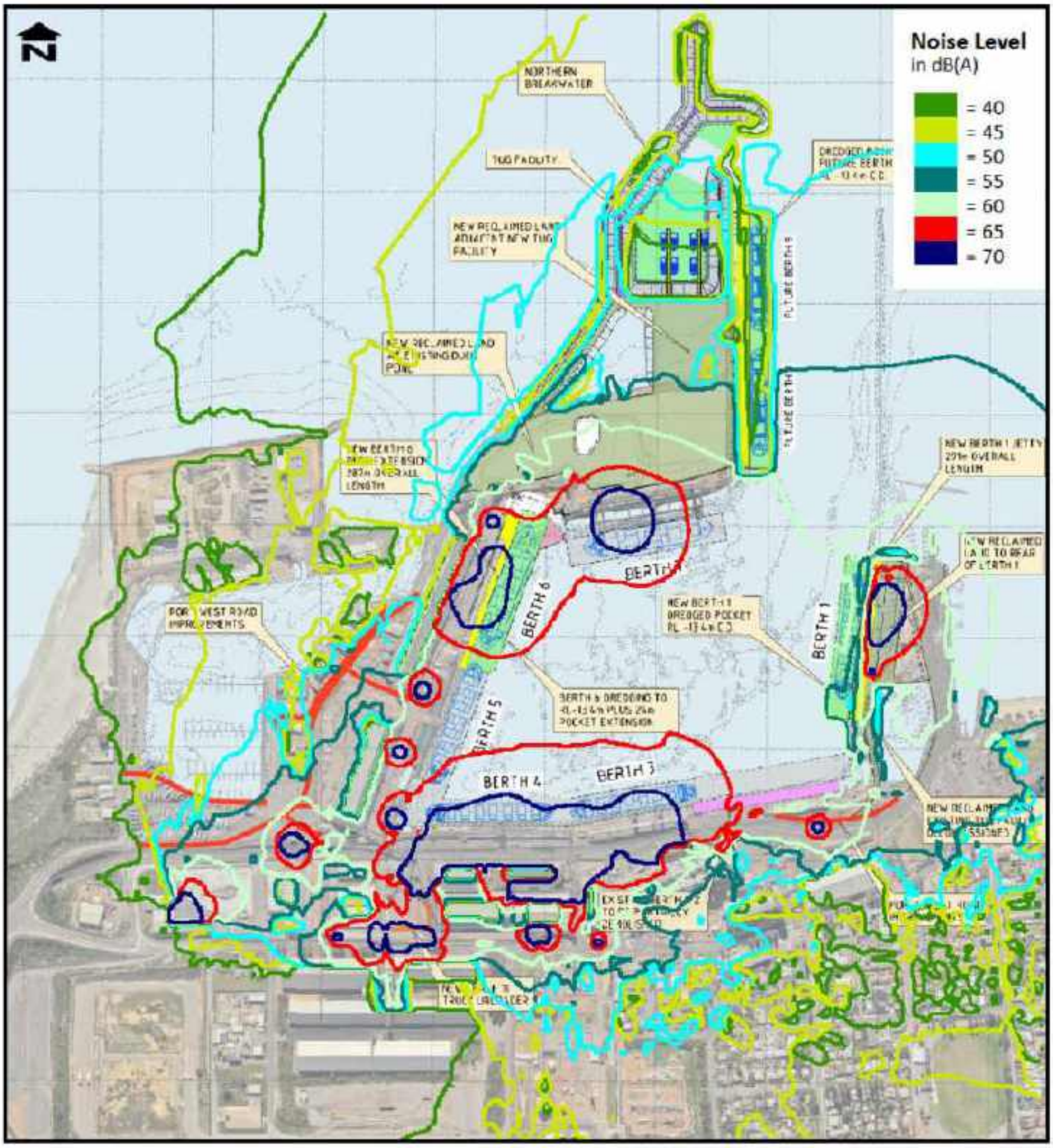


Figure 113: ꞉ noise contours for scenario 11 under westerly wind.

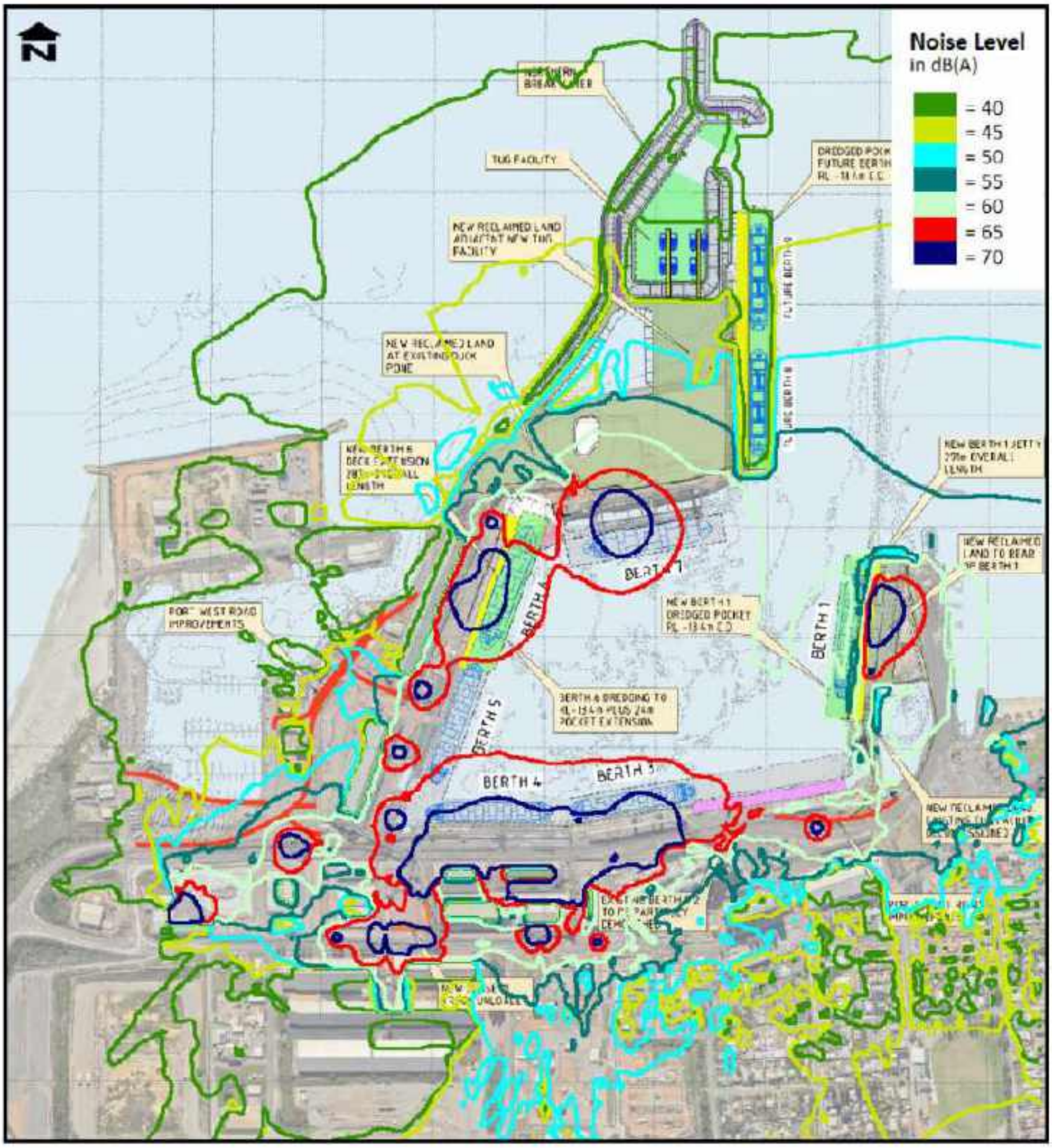


Figure 114: Daytime n ›ise contours for scenario 11 under north-westerly wind.

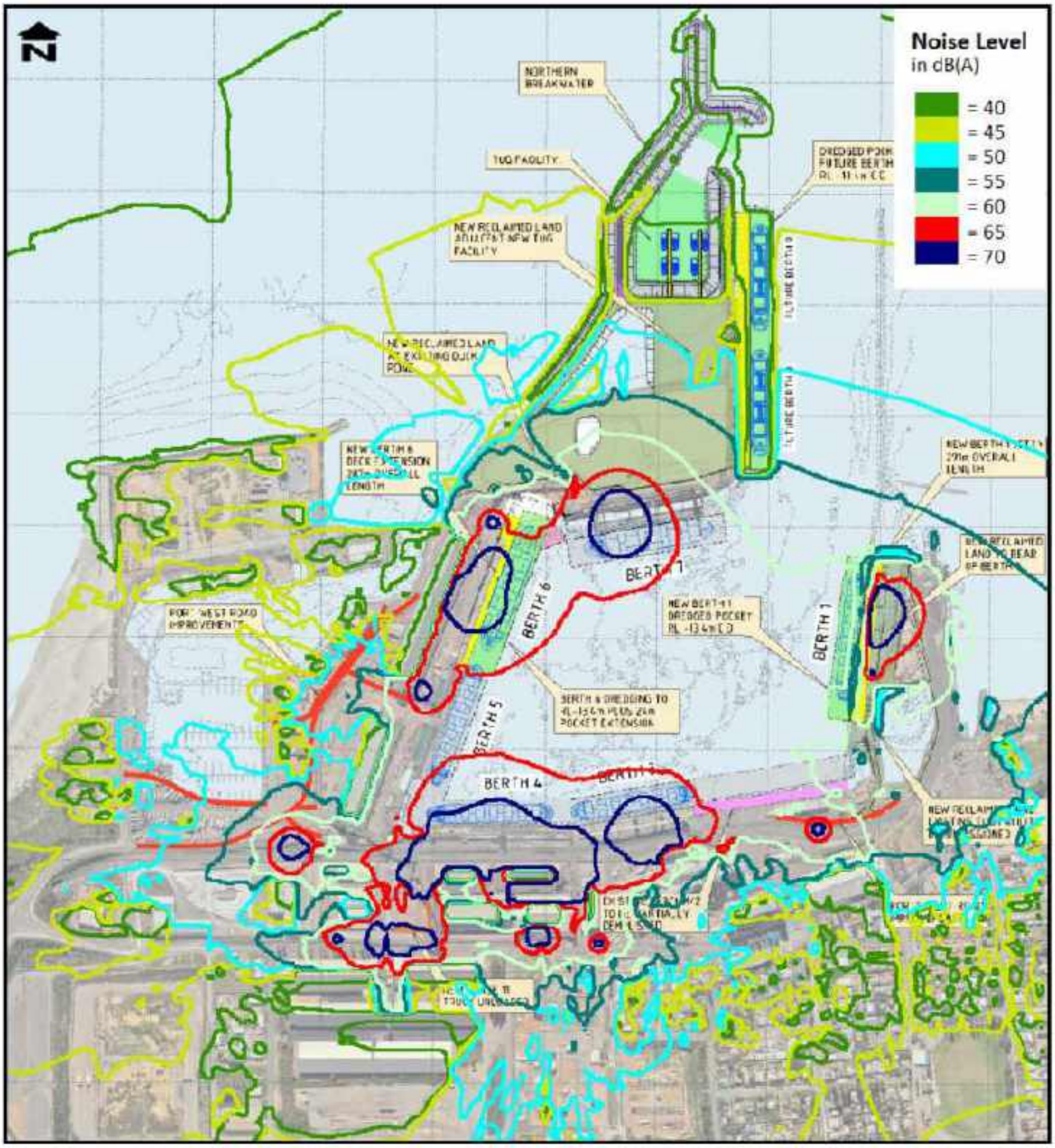


Figure 115: Night-ti e noise contours for scenario 11 under northerly wind.

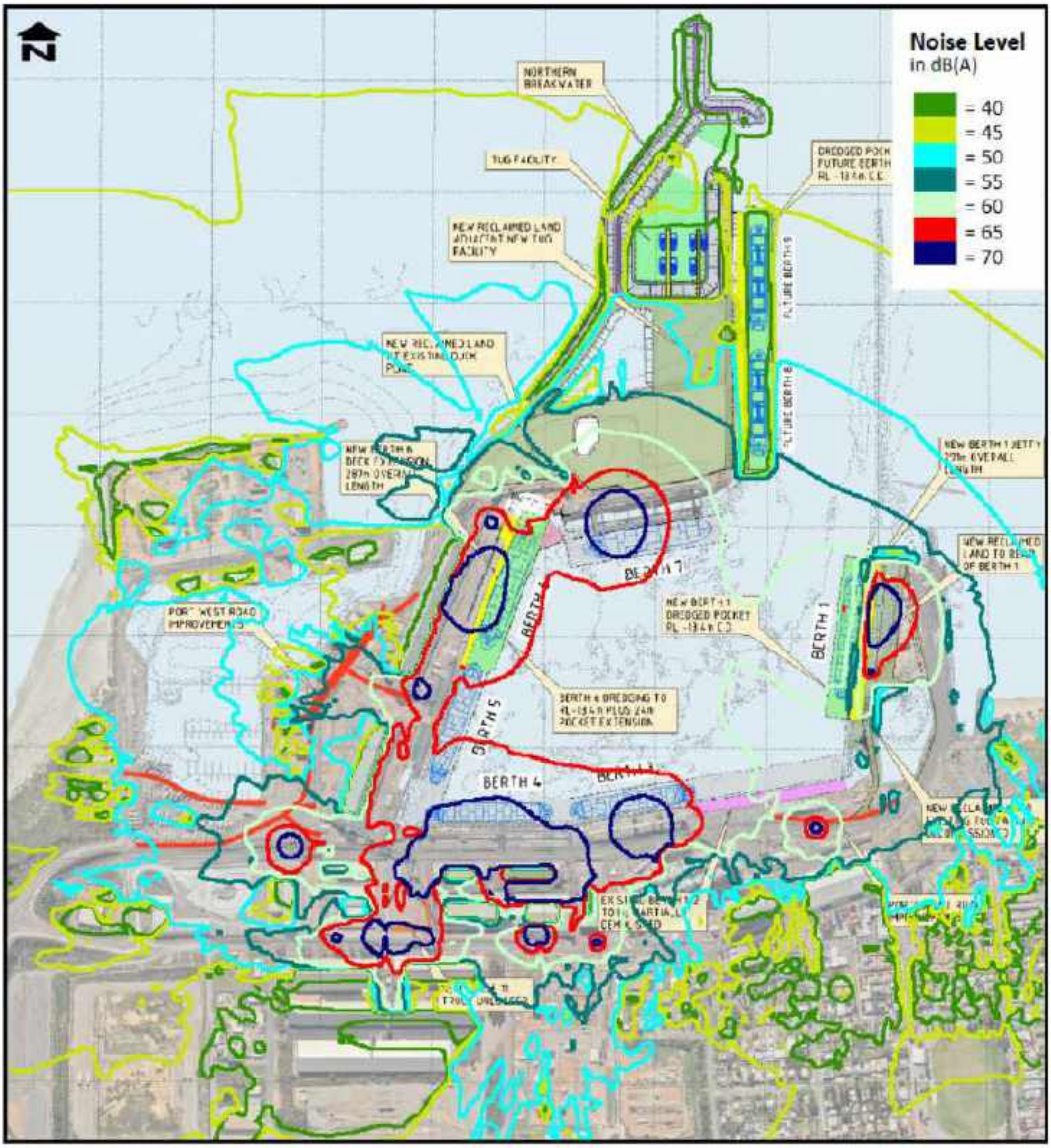


Figure 116: Night- ıoise contours for scenario 11 under north-easterly wind.

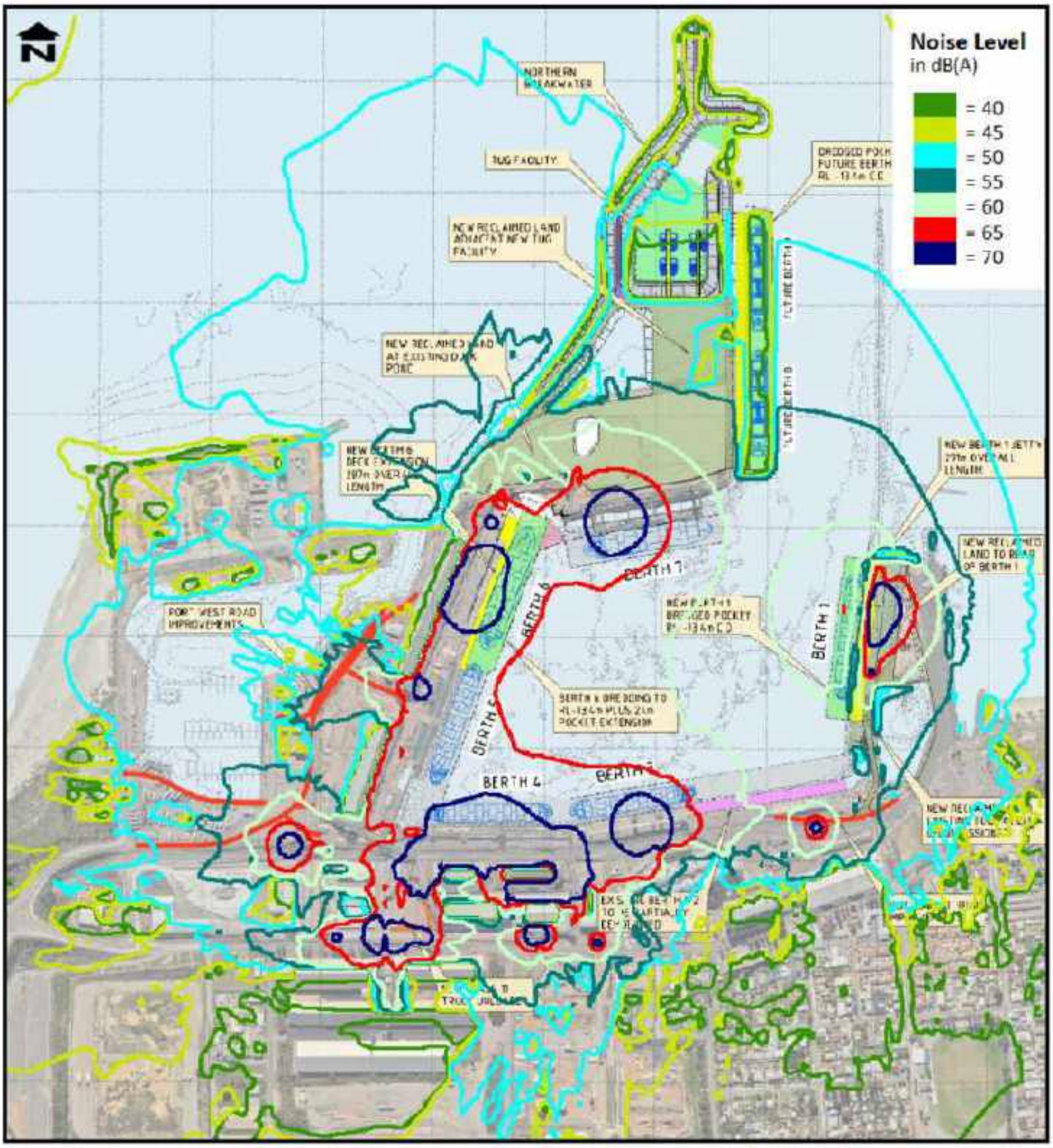


Figure 117: Night- ıe noise contours for scenario 11 under easterly wind.

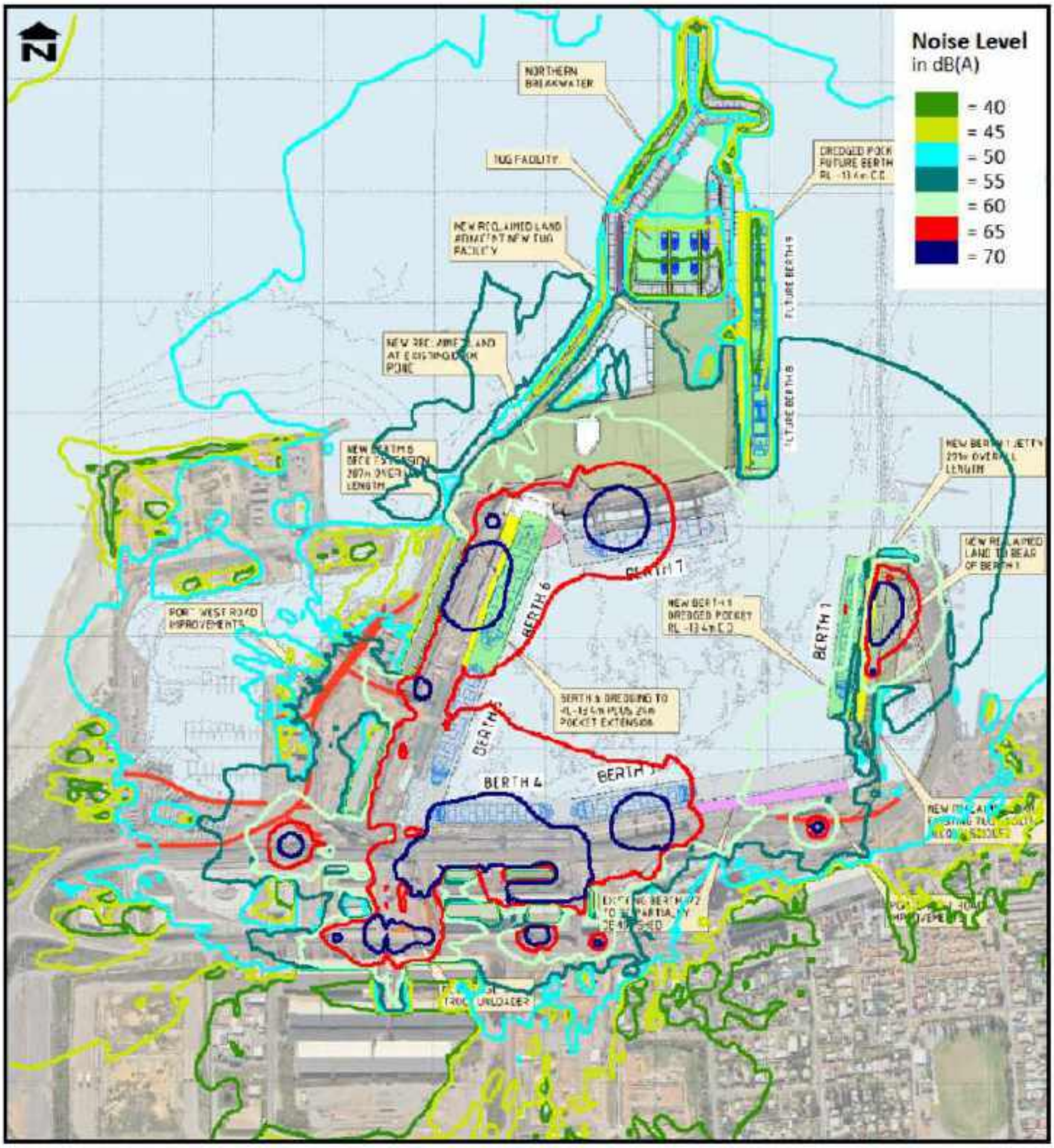


Figure 118: Night-ti e noise contours for scenario 11 under south-easterly wind.

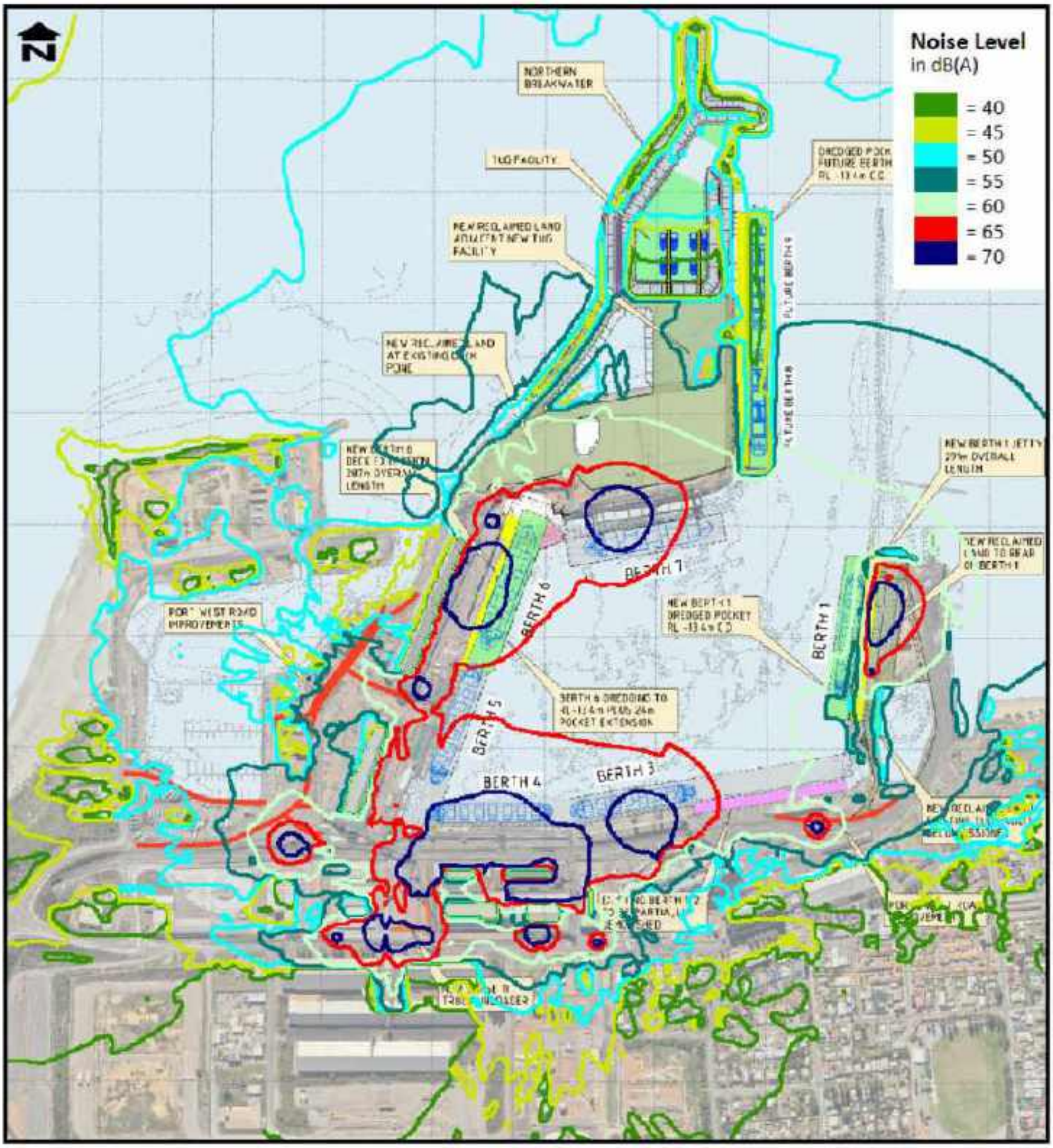


Figure 119: Night-ti e noise contours for scenario 11 under southerly wind.

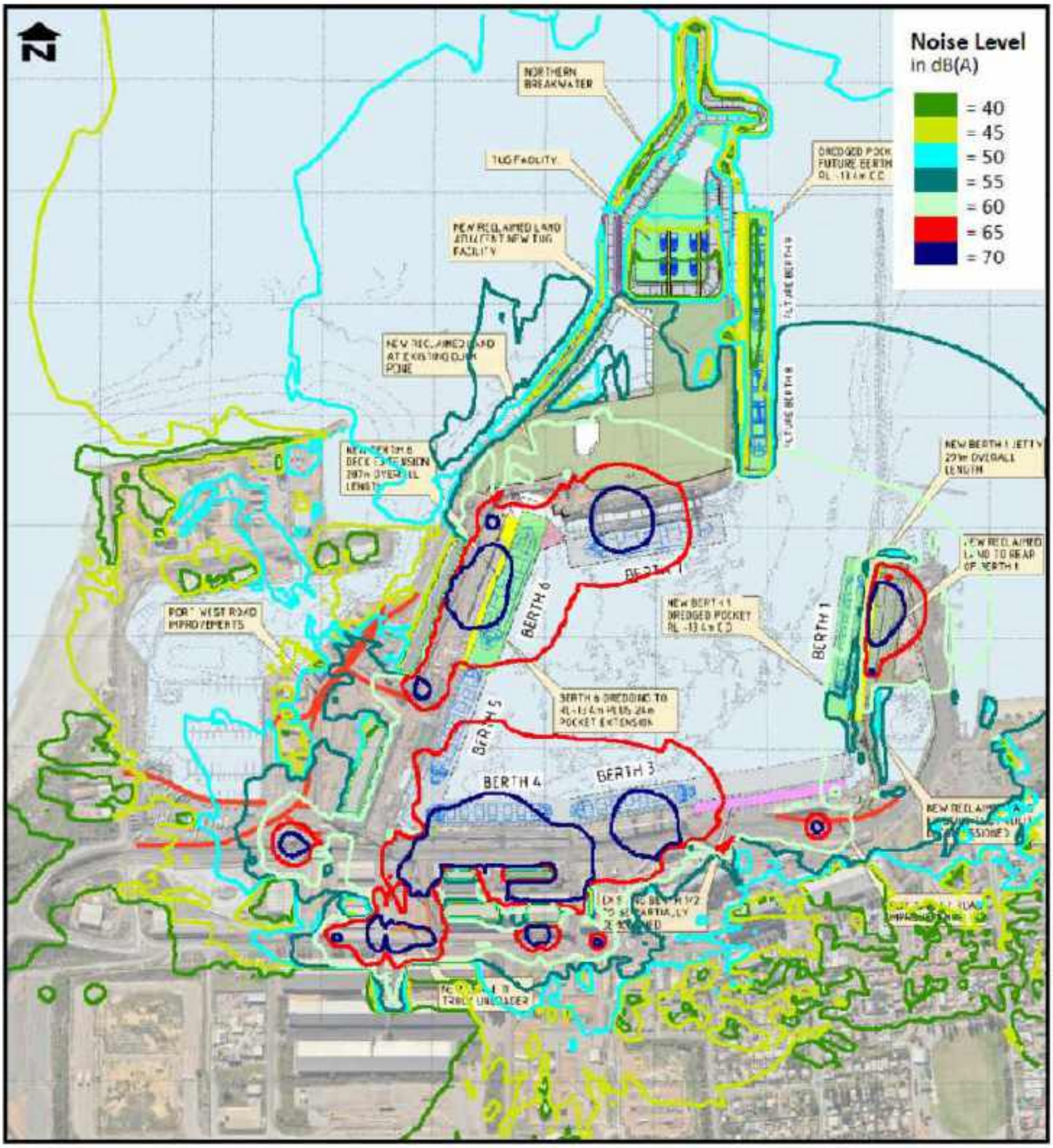


Figure 120: Night- m ɪoise contours for scenario 11 under south-westerly wind.

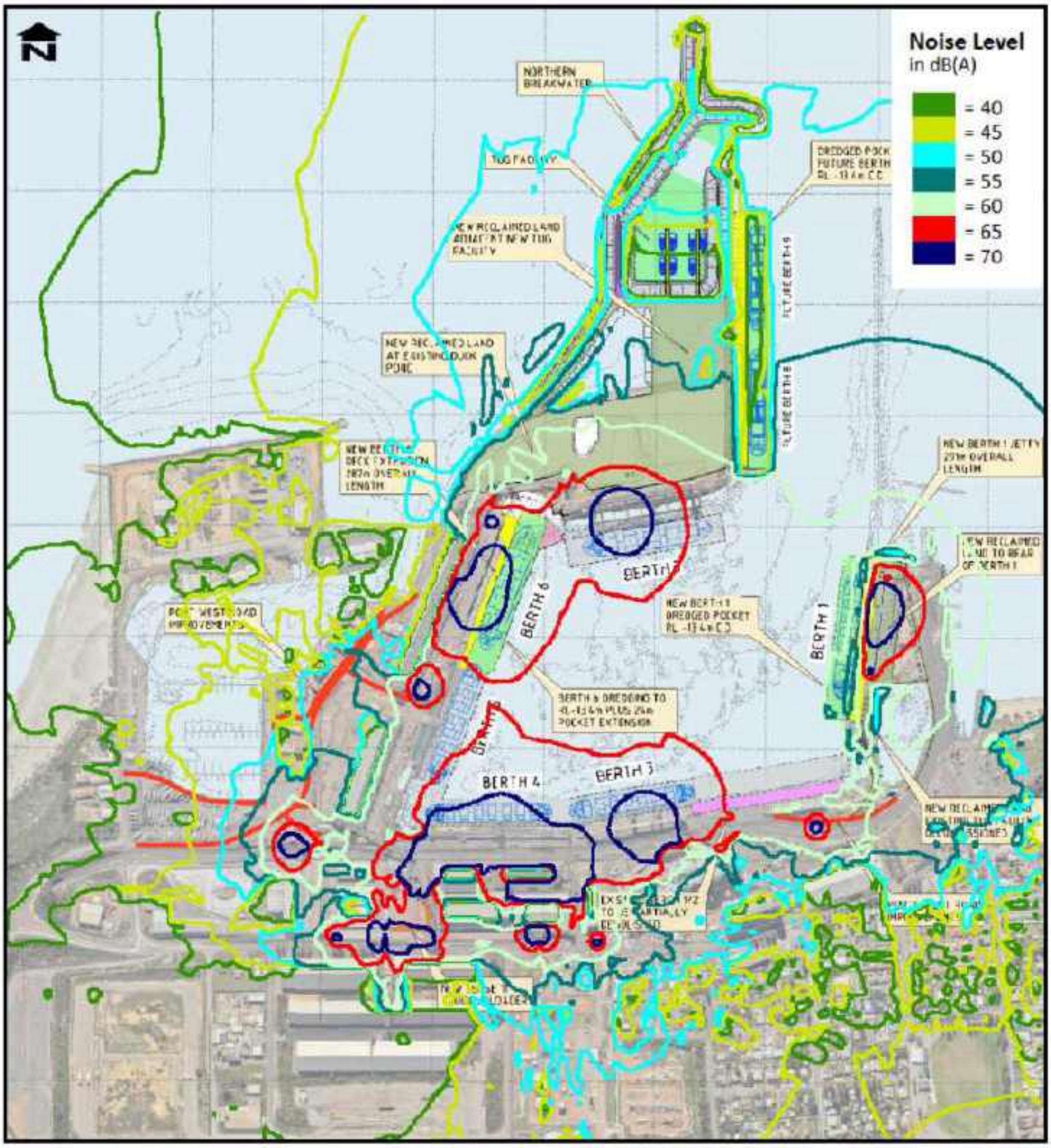


Figure 121: Night-ti ıe noise contours for scenario 11 under westerly wind.

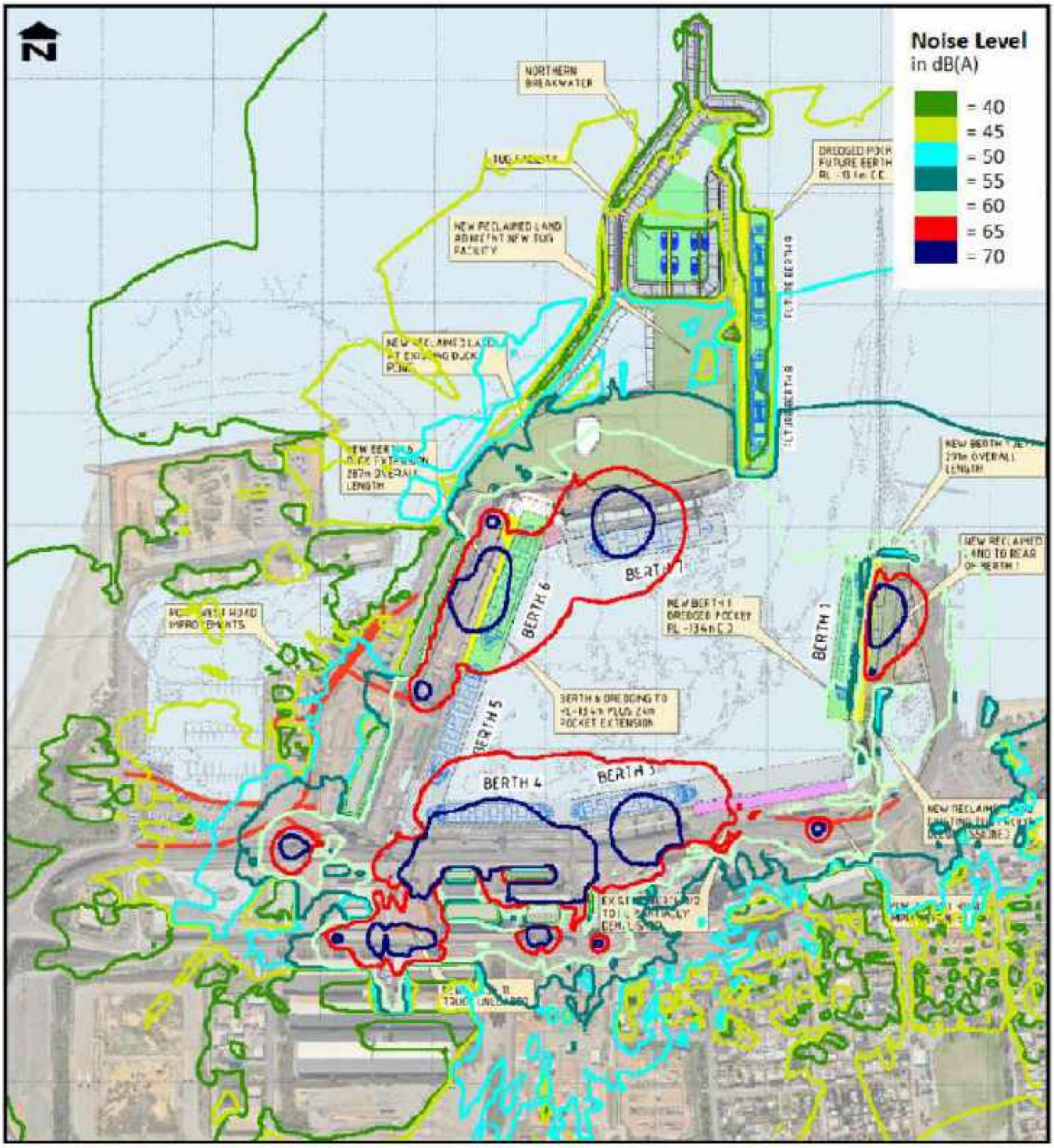


Figure 122: Night- m ıoise contours for scenario 11 under north-westerly wind.

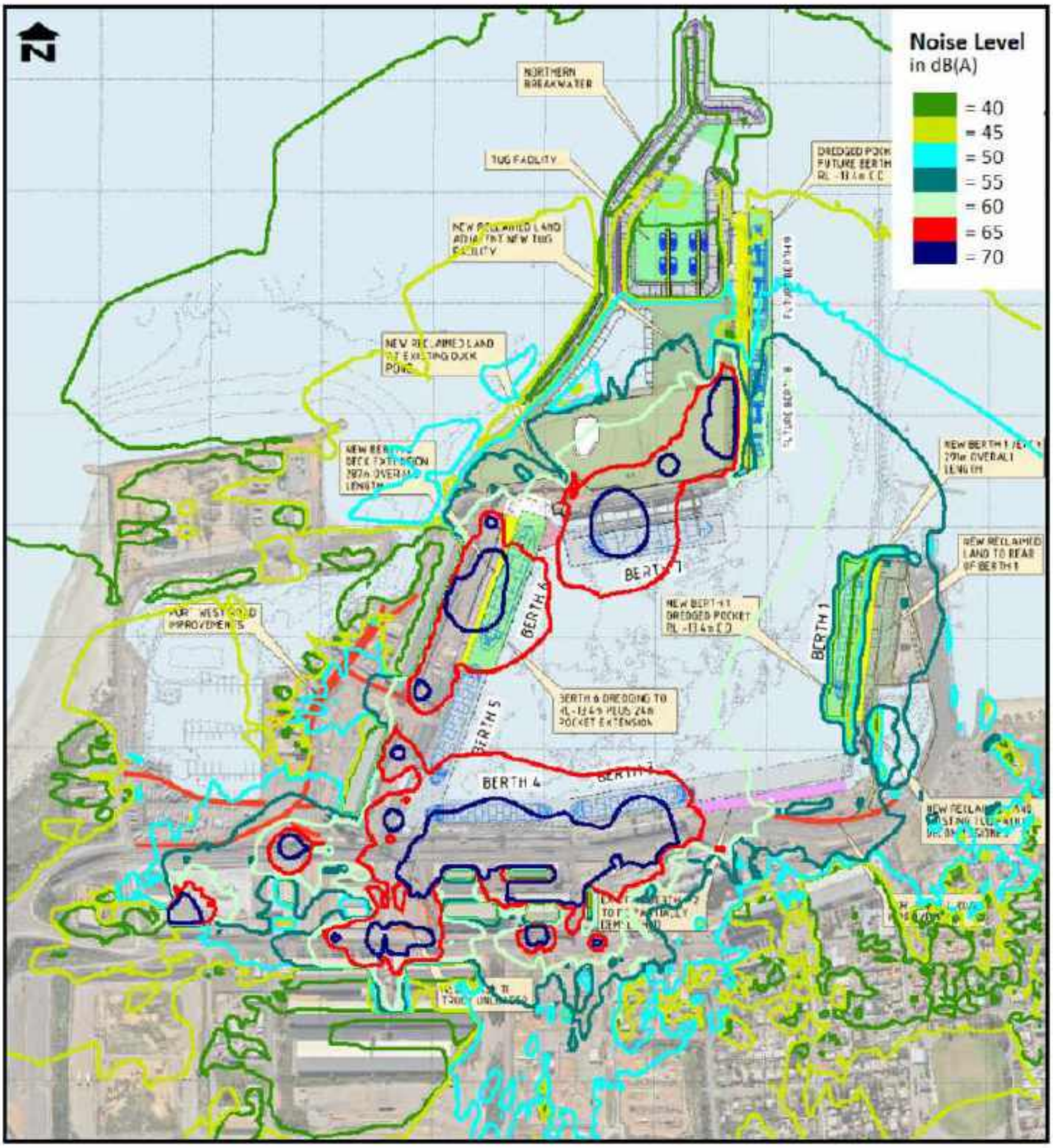


Figure 123: m noise contours for scenario 12 under northerly wind.

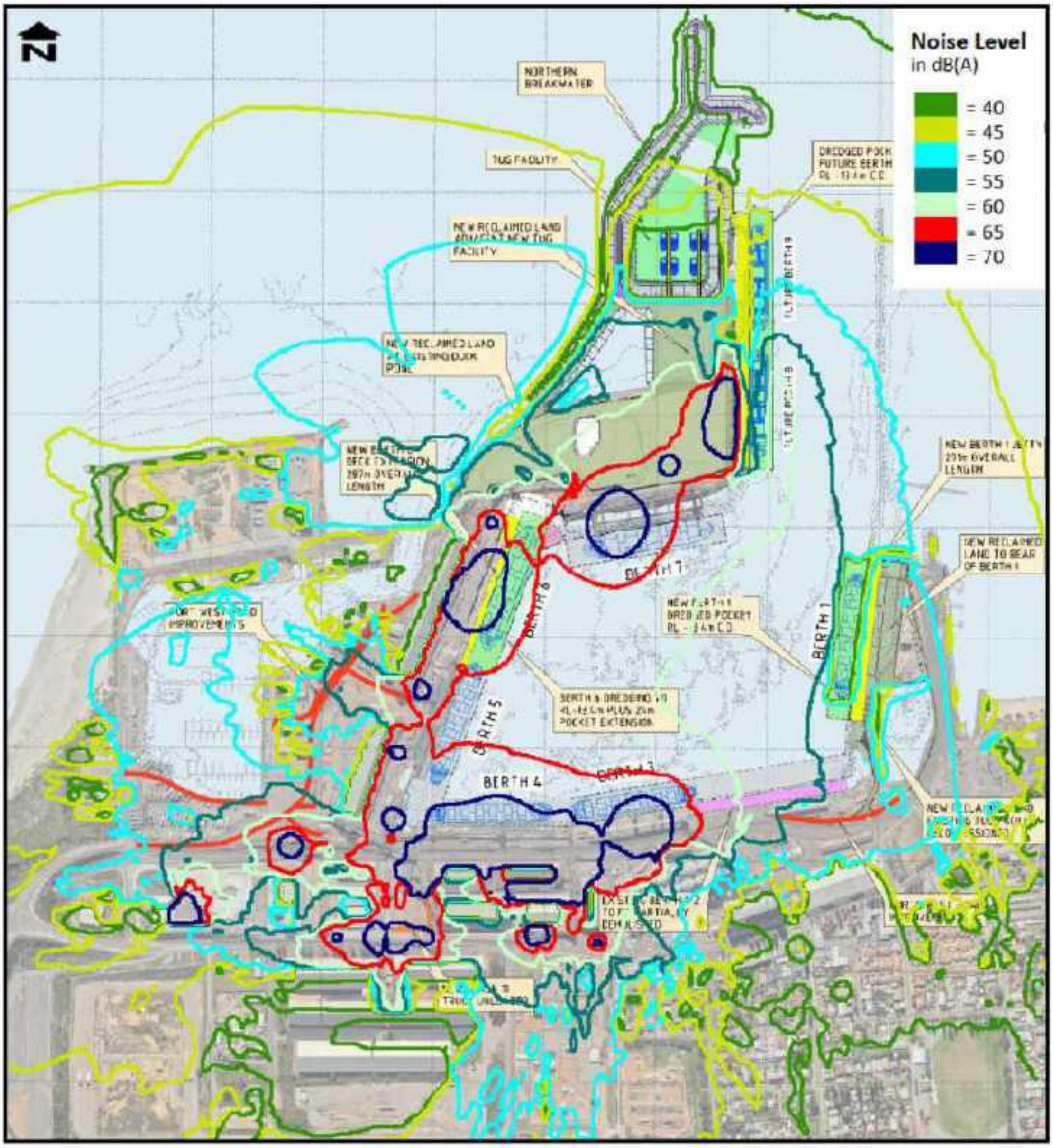


Figure 124: Daytime ›ise contours for scenario 12 under north-easterly wind.

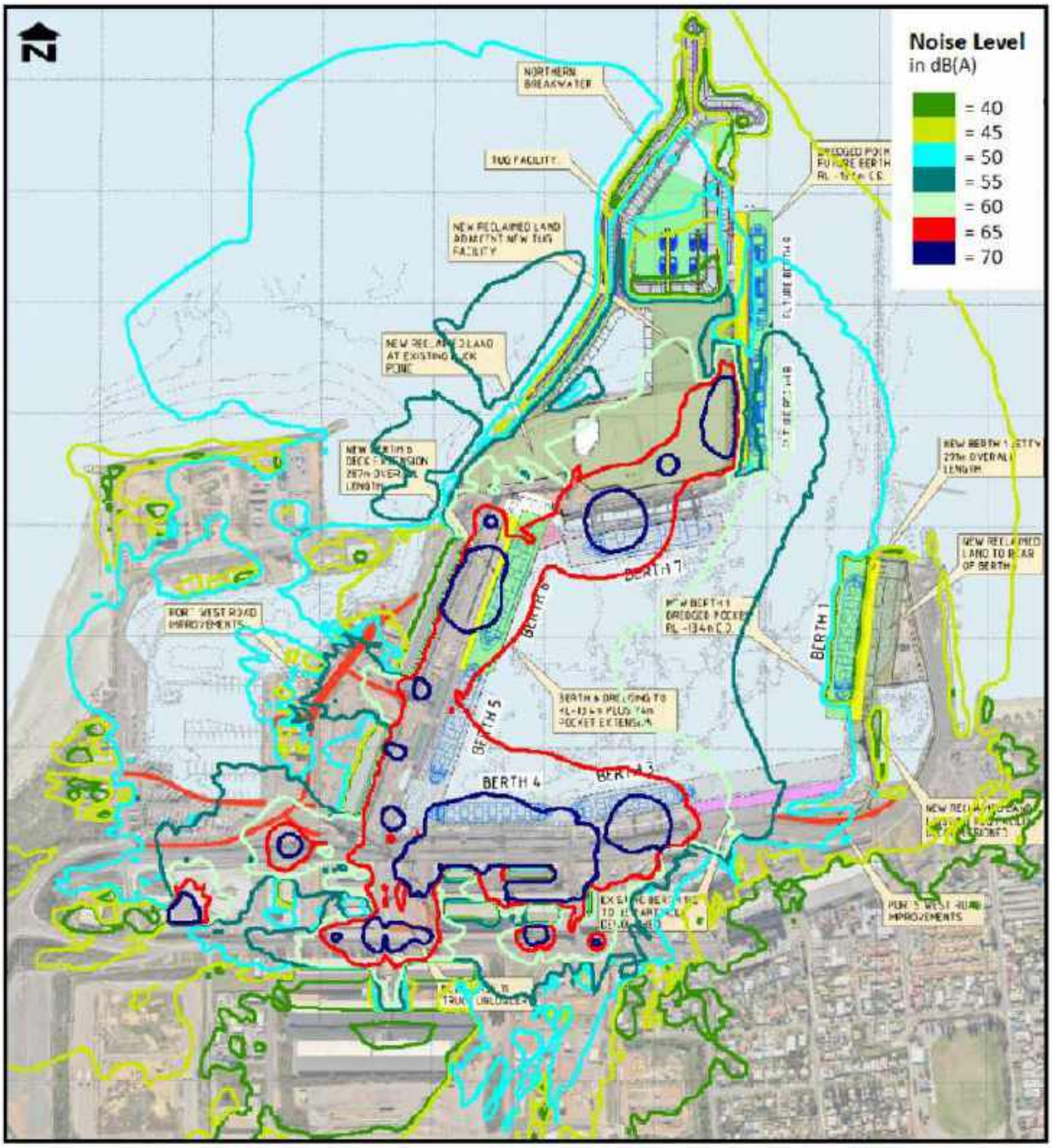


Figure 125: D yti : noise contours for scenario 12 under easterly wind.

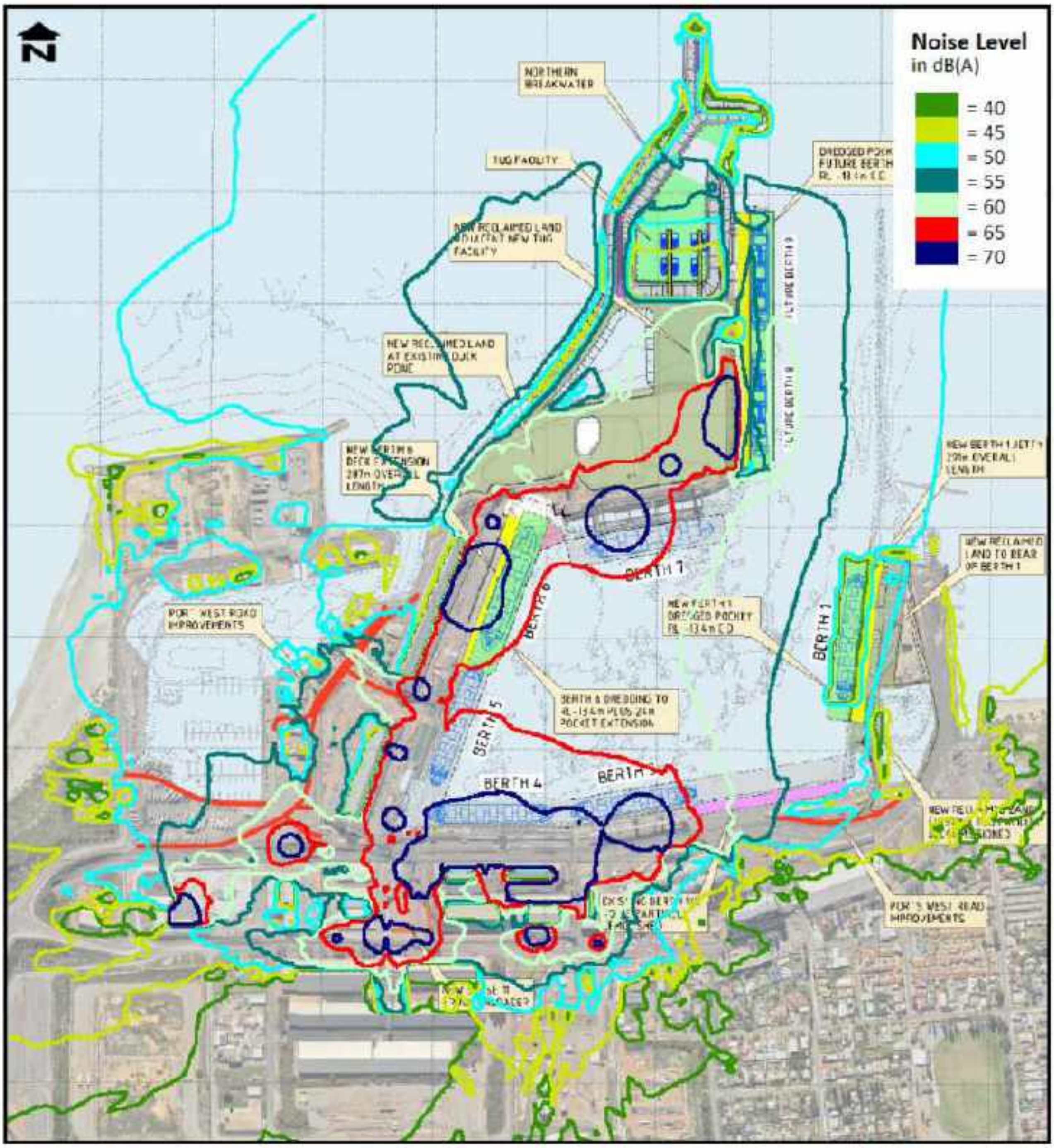


Figure 126: Daytime oise contours for scenario 12 under south-easterly wind.

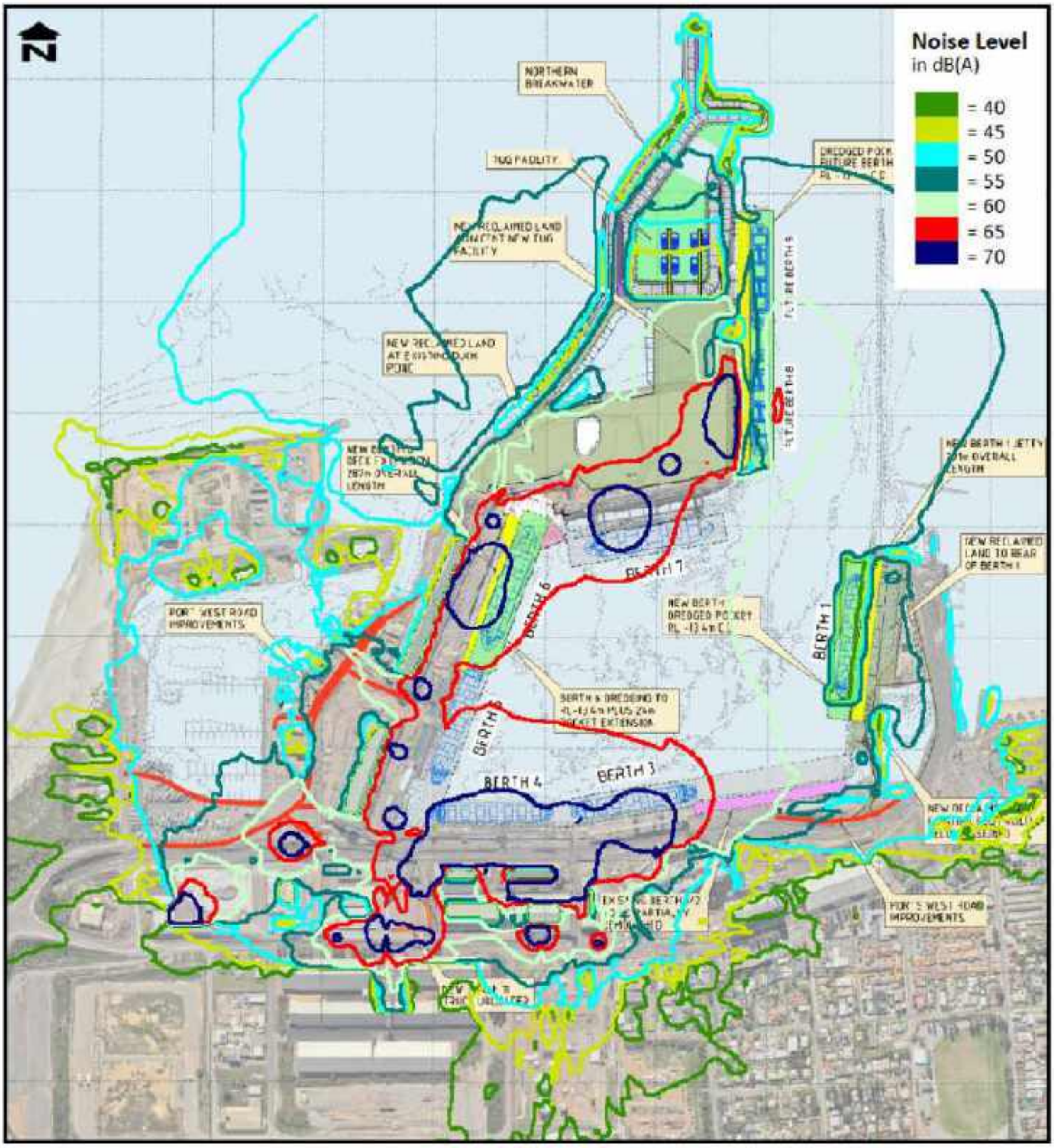


Figure 127: Daytime noise contours for scenario 12 under southerly wind.

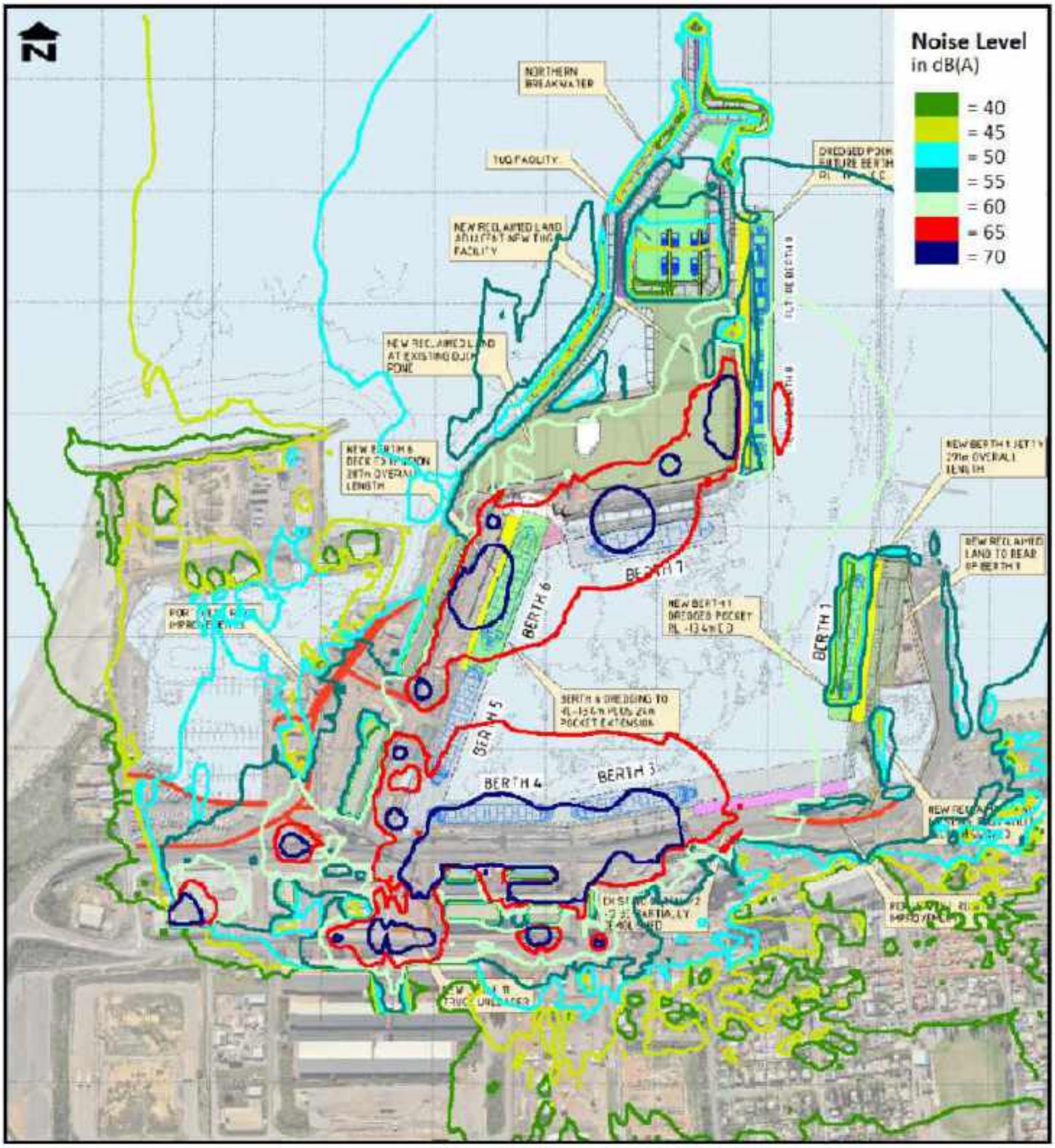


Figure 128: Daytime ›ise contours for scenario 12 under south-westerly wind.

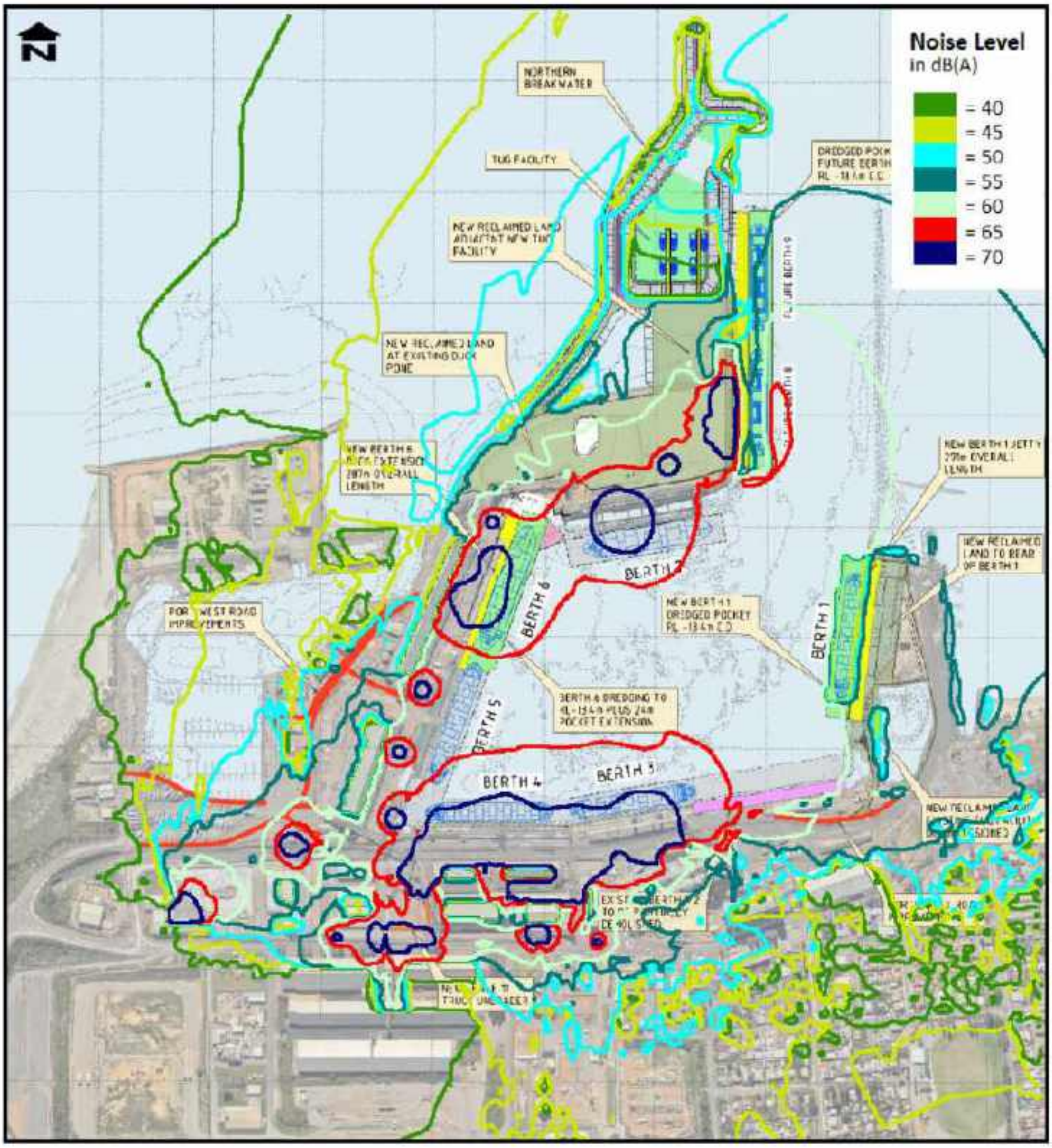


Figure 129: : noise contours for scenario 12 under westerly wind.

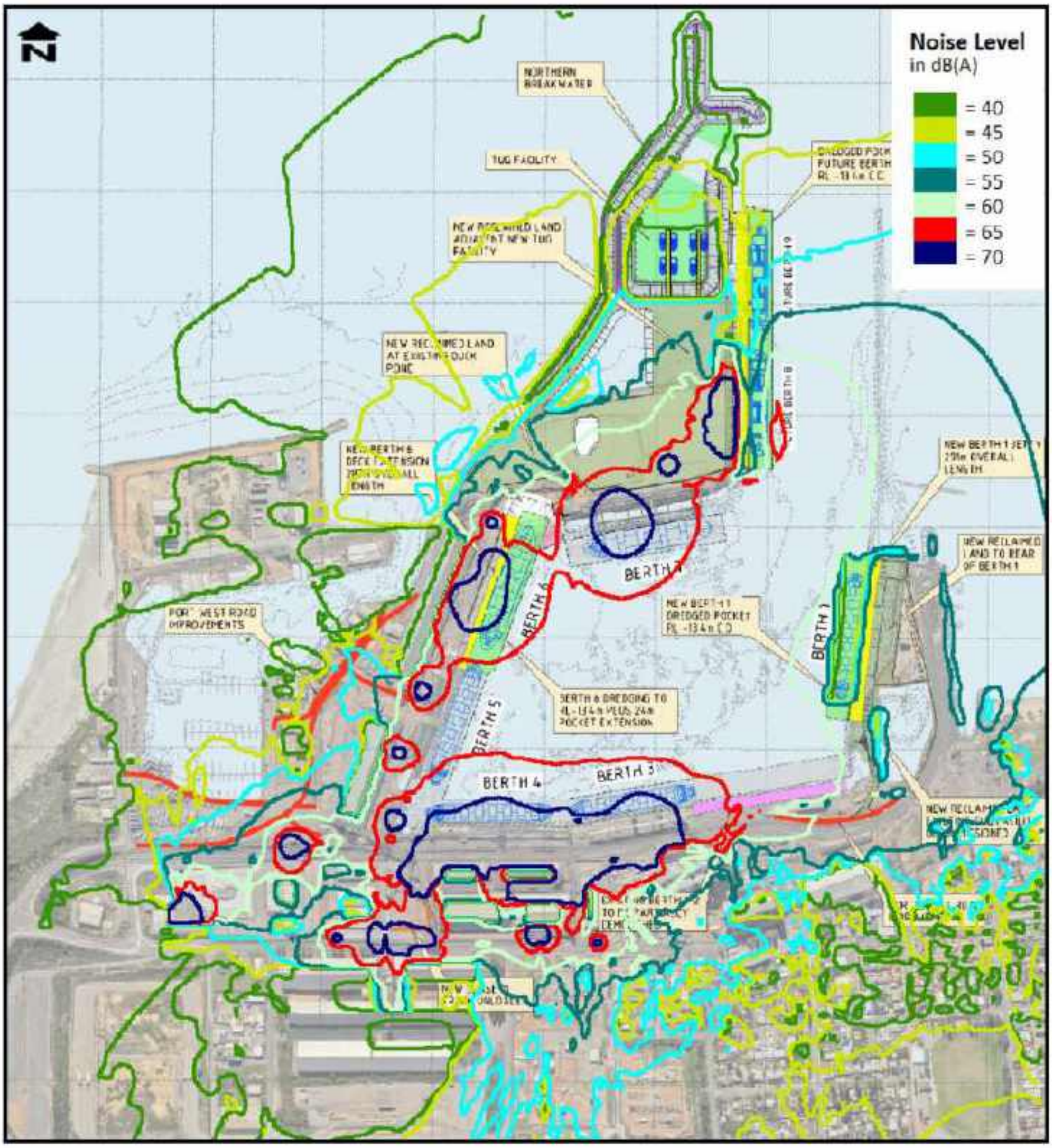


Figure 130: Daytime n ›ise contours for scenario 12 under north-westerly wind.

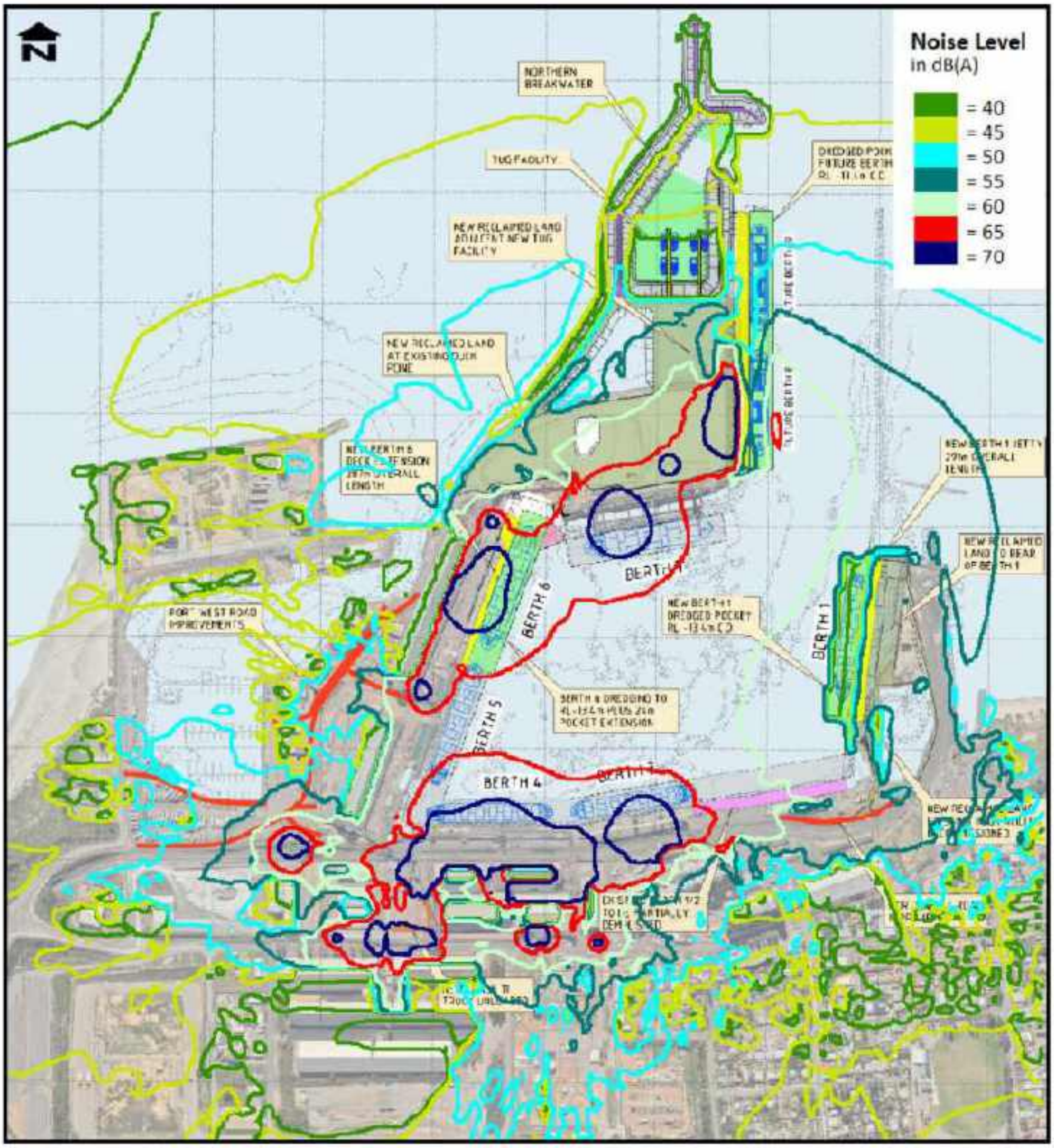


Figure 131: Night-ti e noise contours for scenario 12 under northerly wind.

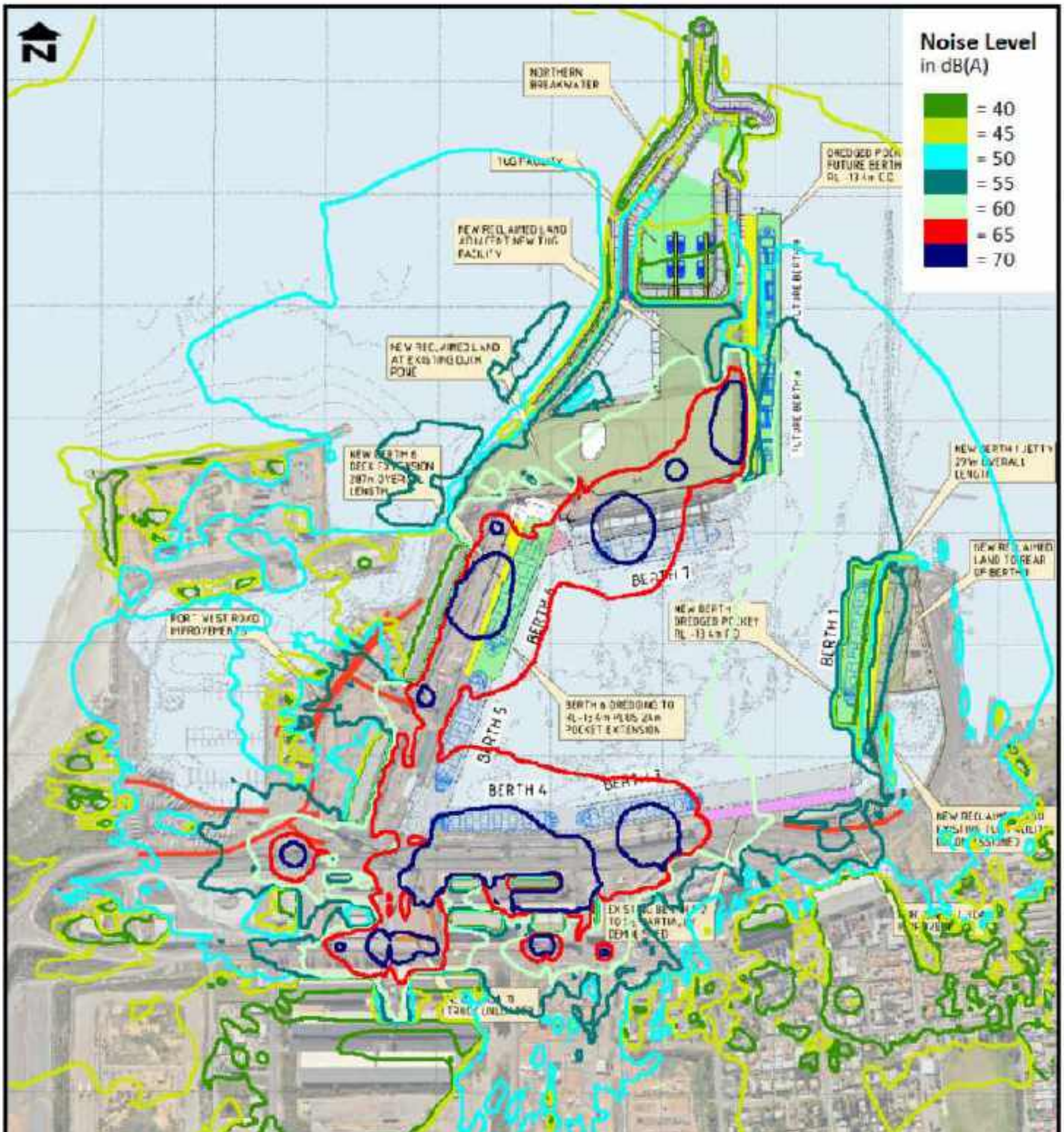


Figure 132: Night- ıoise contours for scenario 12 under north-easterly wind.

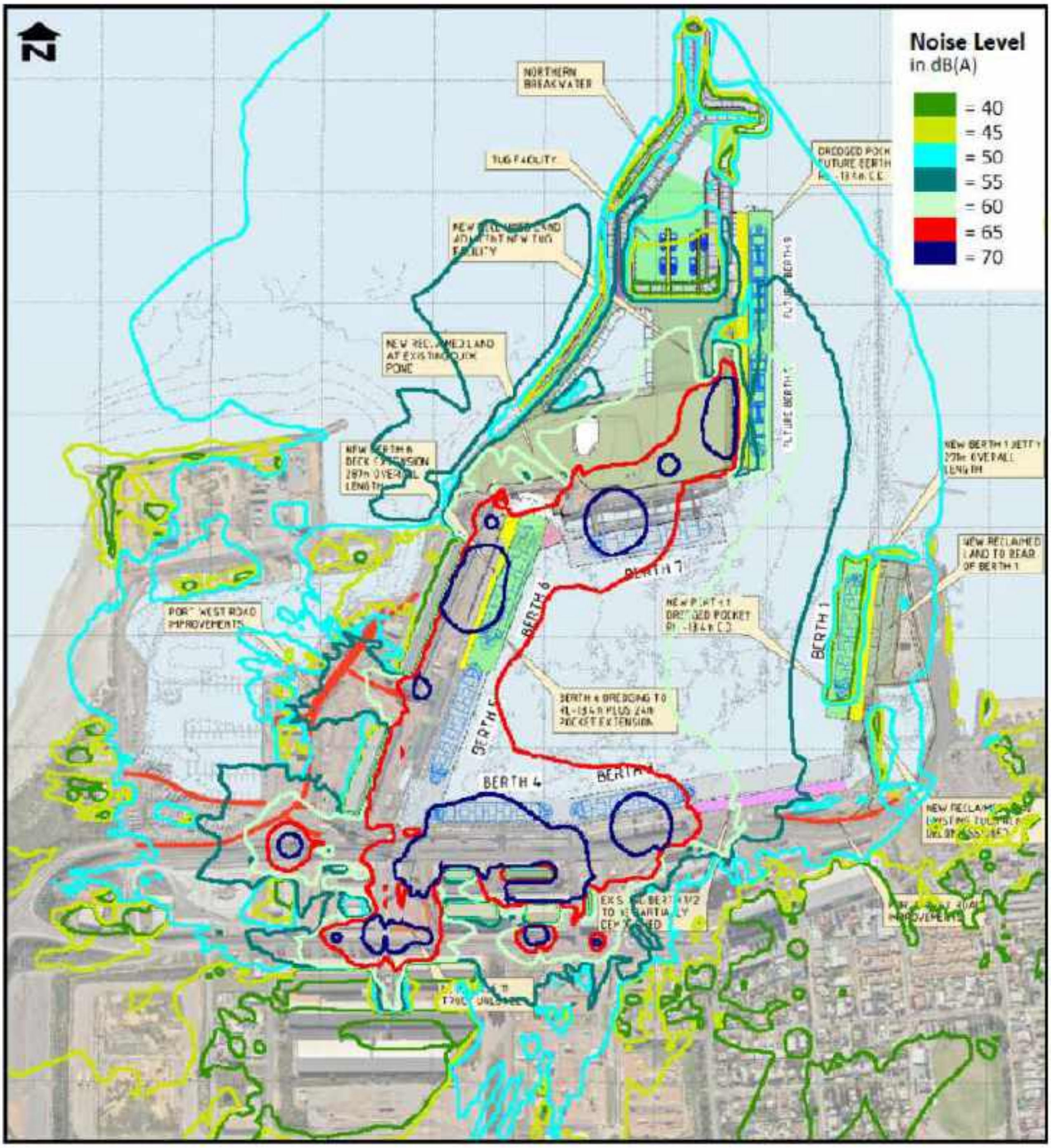


Figure 133: Night- ıe noise contours for scenario 12 under easterly wind.

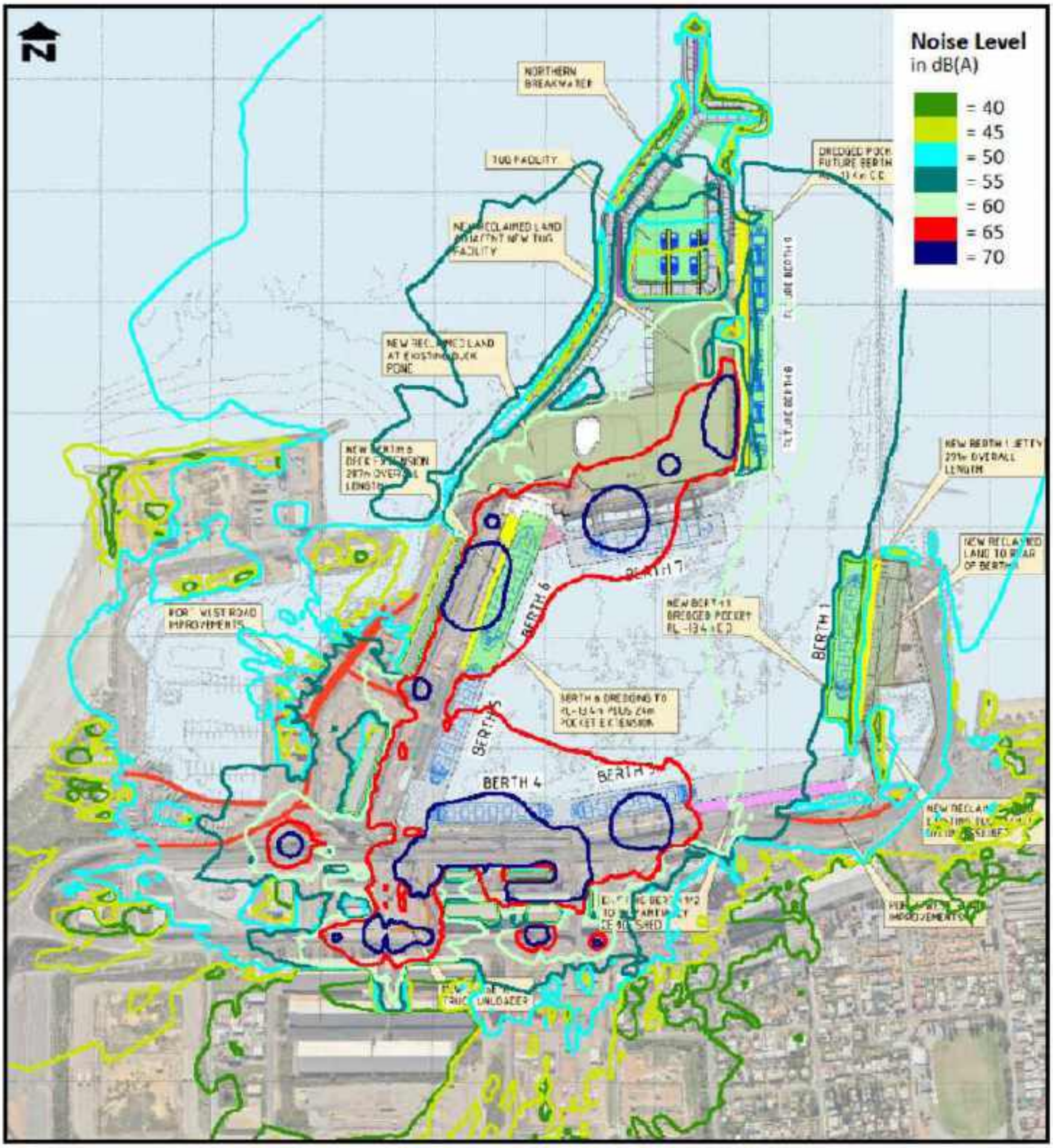


Figure 134: Night-ti e noise contours for scenario 12 under south-easterly wind.

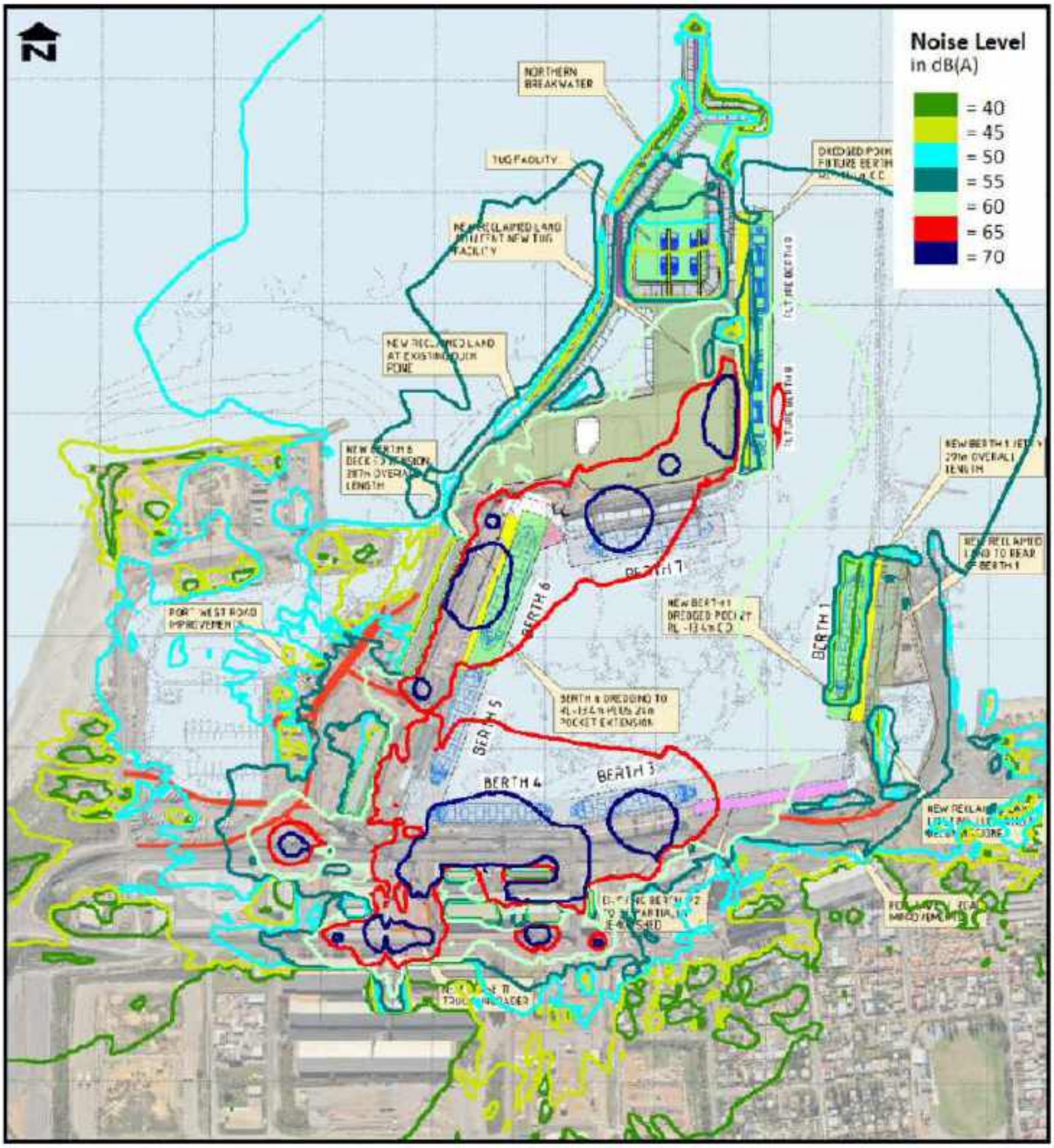


Figure 135: Night-ti e noise contours for scenario 12 under southerly wind.

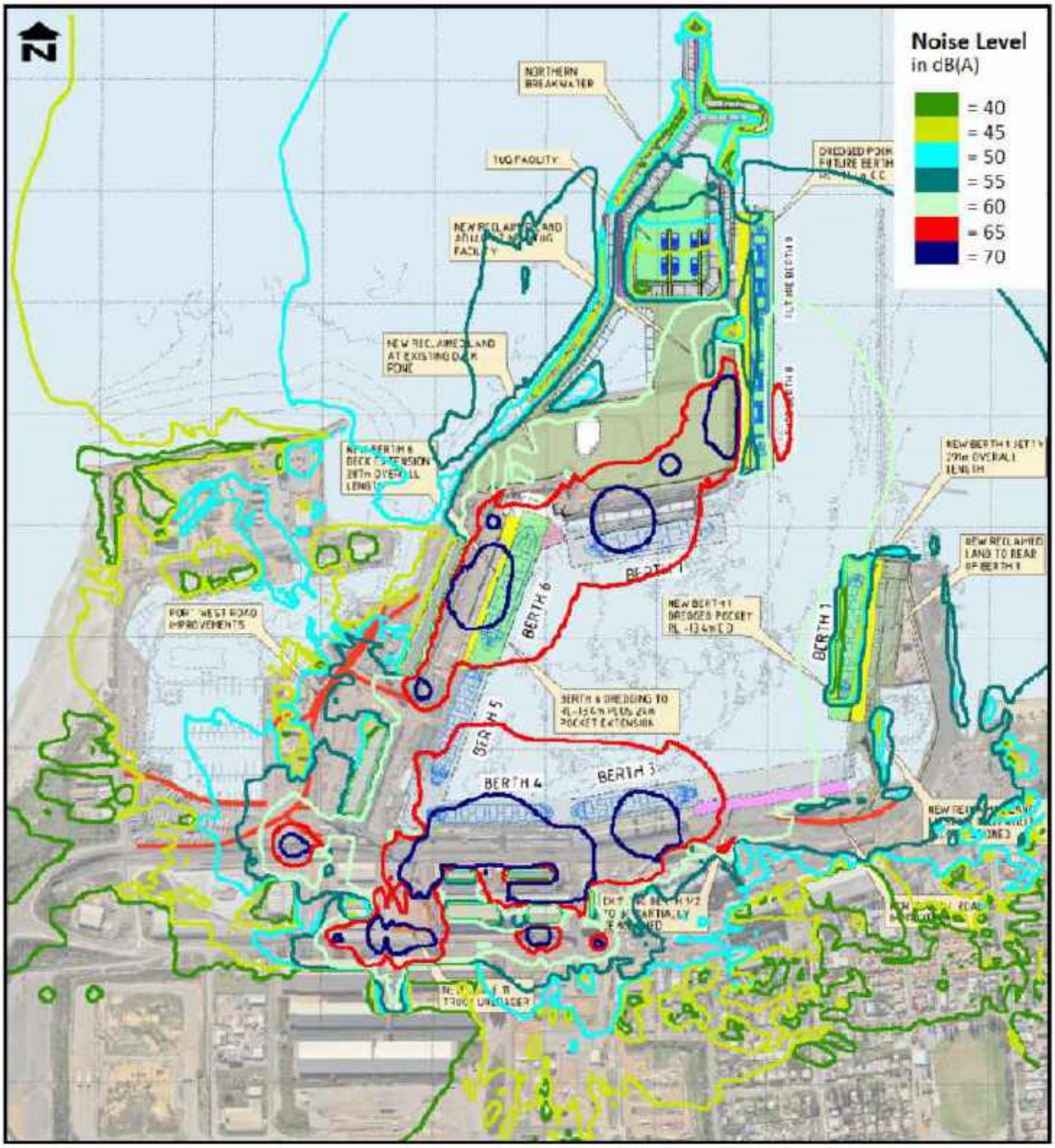


Figure 136: Night- m ıoise contours for scenario 12 under south-westerly wind.

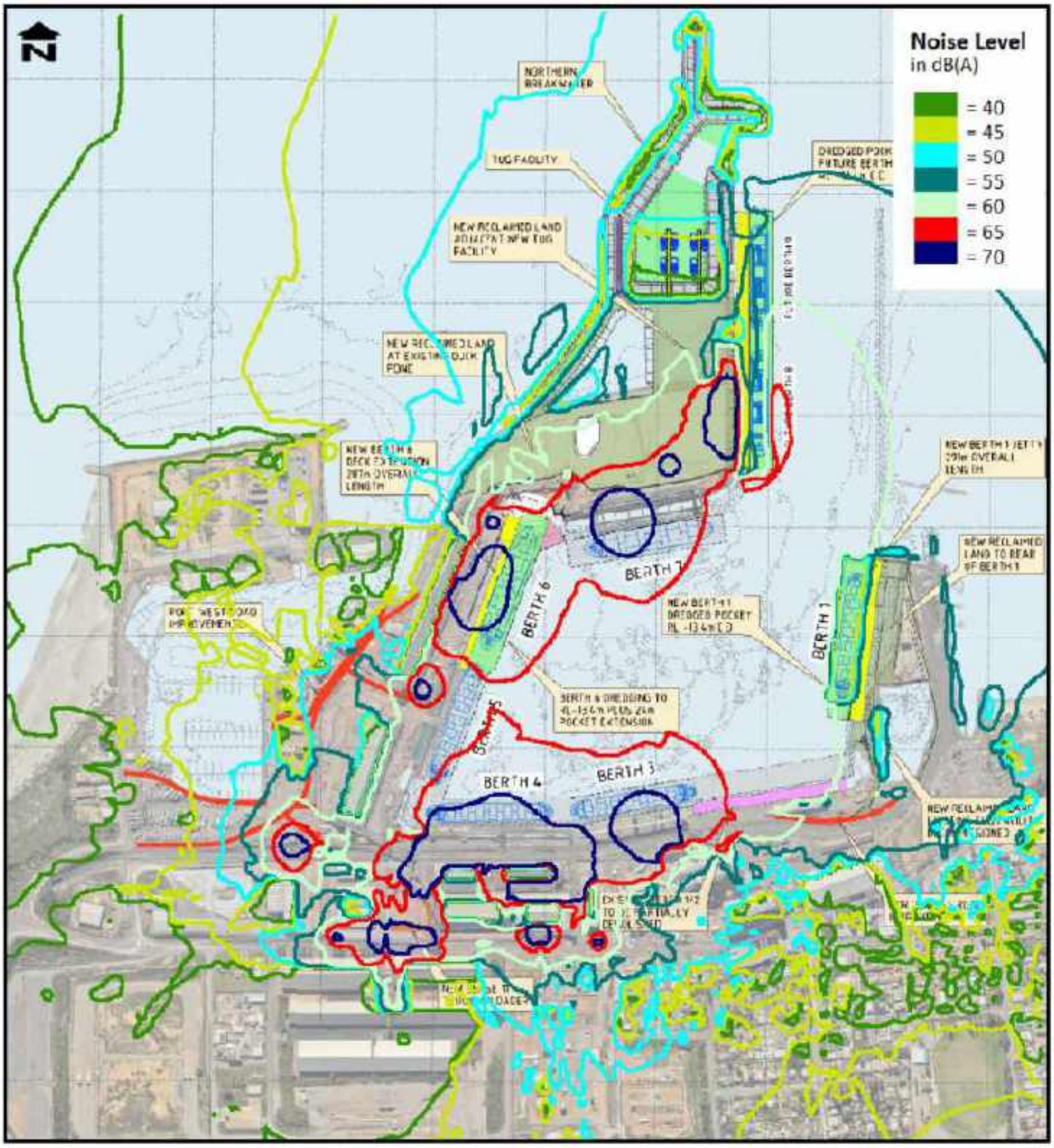


Figure 137: Night-ti ıe noise contours for scenario 12 under westerly wind.

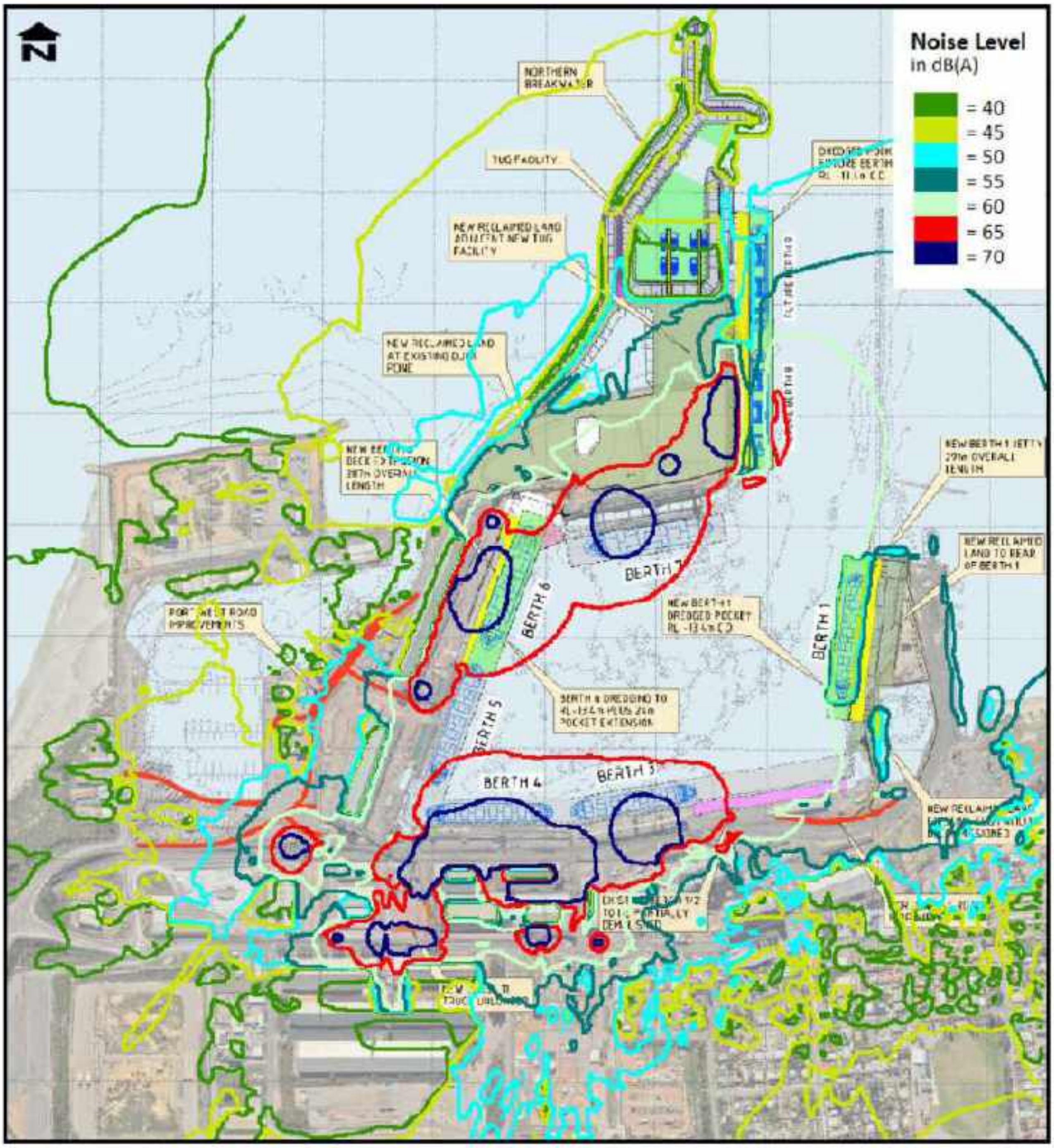


Figure 138: Night- m ıoise contours for scenario 12 under north-westerly wind.

APPENDIX D WEATHER DATA ANALYSIS

Table E1: **Percentage occurrence for different wind speeds and directions.**

Month	Period	Wind Speeds	Percentage Occurrence of Winds from different Directions								
			Calm	N	NE	E	SE	S	SW	W	NW
January	Day	Calm	0.0%								
		1 m/s		0.1%	0.2%	0.1%	0.2%	0.4%	0.3%	0.2%	0.1%
		2 m/s		0.1%	0.2%	0.3%	0.5%	1.0%	0.6%	0.4%	0.0%
		3 m/s		0.1%	0.3%	0.8%	0.6%	1.6%	2.6%	0.3%	0.0%
		4 m/s		0.1%	0.3%	0.9%	0.8%	3.4%	4.8%	0.2%	0.0%
		≥5 m/s		0.1%	1.2%	4.1%	1.7%	45.4%	24.8%	0.9%	0.1%
	Evening	Calm	0.0%								
		1 m/s		0.1%	0.0%	0.1%	0.3%	0.3%	0.2%	0.0%	0.0%
		2 m/s		0.1%	0.0%	0.1%	1.5%	1.8%	1.0%	0.1%	0.0%
		3 m/s		0.1%	0.0%	0.2%	0.5%	2.6%	3.1%	0.2%	0.0%
		≥4 m/s		0.2%	0.8%	1.6%	1.5%	61.1%	21.9%	0.5%	0.0%
	Night	Calm	0.3%								
		1 m/s		0.2%	0.3%	0.6%	2.4%	3.2%	0.7%	0.2%	0.1%
		2 m/s		0.3%	0.2%	0.4%	4.0%	5.2%	1.2%	0.4%	0.0%
		3 m/s		0.2%	0.2%	0.7%	4.4%	5.2%	2.4%	0.4%	0.0%
		≥4 m/s		0.2%	0.3%	5.2%	7.1%	39.5%	13.7%	0.7%	0.0%
February	Day	Calm	0.1%								
		1 m/s		0.4%	0.2%	0.3%	0.6%	1.0%	0.7%	0.4%	0.2%
		2 m/s		0.8%	0.5%	0.7%	1.1%	1.3%	0.8%	0.9%	0.1%
		3 m/s		0.6%	0.4%	1.0%	1.0%	2.8%	3.3%	0.8%	0.0%
		4 m/s		0.2%	0.2%	1.6%	1.0%	4.6%	6.0%	1.1%	0.0%
		≥5 m/s		0.1%	1.7%	5.5%	4.5%	34.9%	16.7%	2.1%	0.0%
	Evening	Calm	0.2%								
		1 m/s		0.3%	0.4%	0.1%	1.0%	0.9%	0.8%	0.6%	0.3%
		2 m/s		0.5%	0.3%	0.3%	1.9%	3.0%	1.5%	0.6%	0.1%
		3 m/s		0.4%	0.5%	0.6%	1.1%	5.0%	3.1%	0.1%	0.0%
		≥4 m/s		0.7%	1.1%	2.3%	5.7%	56.8%	8.8%	0.9%	0.0%
	Night	Calm	0.7%								
		1 m/s		0.7%	0.6%	1.4%	3.6%	3.6%	1.5%	0.7%	0.2%
		2 m/s		0.6%	0.7%	1.8%	6.5%	4.4%	1.5%	0.5%	0.0%
		3 m/s		0.7%	0.4%	2.3%	5.4%	4.3%	1.9%	0.2%	0.0%
		≥4 m/s		0.5%	1.1%	7.8%	11.2%	29.4%	5.2%	0.5%	0.0%
March	Day	Calm	0.1%								
		1 m/s		0.2%	0.4%	0.7%	0.8%	0.7%	0.5%	0.4%	0.1%
		2 m/s		0.5%	0.7%	1.2%	1.5%	1.9%	1.3%	0.9%	0.1%
		3 m/s		0.4%	0.6%	1.9%	1.4%	2.8%	3.4%	1.1%	0.0%
		4 m/s		0.3%	0.9%	2.8%	1.3%	4.6%	5.3%	1.1%	0.0%
		≥5 m/s		0.4%	2.9%	5.4%	2.5%	34.9%	13.3%	0.8%	0.0%
	Evening	Calm	0.7%								
		1 m/s		0.4%	1.1%	1.1%	2.8%	3.0%	0.8%	0.5%	0.3%
		2 m/s		0.0%	0.3%	1.1%	4.6%	6.0%	2.0%	0.3%	0.0%

Month	Period	Wind Speeds	Percentage Occurrence of Winds from different Directions								
			Calm	N	NE	E	SE	S	SW	W	NW
		3 m/s		0.0%	0.1%	1.0%	3.2%	5.0%	2.8%	0.1%	0.0%
		≥4 m/s		0.0%	0.6%	3.2%	4.5%	47.7%	6.4%	0.2%	0.0%
	Night	Calm	1.2%								
		1 m/s		0.7%	1.2%	2.4%	4.0%	3.5%	0.9%	0.3%	0.2%
		2 m/s		0.3%	0.7%	2.5%	6.8%	5.3%	1.6%	0.1%	0.0%
		3 m/s		0.4%	0.7%	3.6%	6.2%	4.8%	2.0%	0.4%	0.0%
		≥4 m/s		0.5%	1.6%	11.8%	10.3%	20.2%	5.3%	0.5%	0.0%
April	Day	Calm	0.4%								
		1 m/s		0.7%	1.3%	1.1%	0.9%	1.0%	0.5%	0.5%	0.2%
		2 m/s		0.7%	0.7%	1.5%	2.0%	2.3%	1.5%	1.1%	0.0%
		3 m/s		0.4%	0.4%	3.1%	2.2%	3.1%	4.0%	1.6%	0.0%
		4 m/s		0.2%	0.3%	3.7%	2.2%	3.9%	5.2%	0.9%	0.0%
		≥5 m/s		0.2%	1.4%	7.7%	5.8%	24.6%	12.6%	0.2%	0.0%
	Evening	Calm	0.2%								
		1 m/s		0.0%	0.1%	1.4%	3.3%	2.5%	1.0%	0.1%	0.0%
		2 m/s		0.1%	0.1%	2.0%	5.1%	3.7%	2.7%	0.5%	0.0%
		3 m/s		0.2%	0.0%	2.1%	4.8%	4.3%	4.5%	0.6%	0.0%
		≥4 m/s		0.9%	0.1%	6.2%	11.0%	32.4%	10.0%	0.2%	0.0%
	Night	Calm	1.5%								
		1 m/s		1.0%	2.2%	4.2%	4.2%	2.5%	0.6%	0.3%	0.2%
		2 m/s		0.3%	0.6%	6.4%	8.3%	2.7%	1.2%	0.5%	0.0%
		3 m/s		0.2%	0.2%	6.8%	8.9%	1.7%	1.1%	0.5%	0.0%
		≥4 m/s		0.4%	0.6%	13.5%	14.9%	8.3%	4.2%	1.9%	0.0%
May	Day	Calm	1.4%								
		1 m/s		0.8%	1.2%	1.4%	1.2%	1.6%	1.0%	0.9%	0.3%
		2 m/s		1.1%	1.7%	3.6%	2.0%	4.0%	2.0%	1.3%	0.1%
		3 m/s		0.9%	1.9%	4.8%	2.1%	3.0%	2.7%	0.9%	0.0%
		4 m/s		0.6%	1.8%	4.3%	1.7%	3.1%	2.8%	0.9%	0.0%
		≥5 m/s		1.7%	6.0%	8.2%	3.4%	15.4%	5.9%	2.4%	0.0%
	Evening	Calm	1.5%								
		1 m/s		0.6%	2.5%	3.4%	4.3%	2.4%	0.8%	0.7%	0.2%
		2 m/s		0.3%	1.3%	2.7%	8.7%	3.9%	0.5%	0.4%	0.0%
		3 m/s		0.4%	0.9%	5.5%	9.7%	1.6%	0.8%	0.5%	0.0%
		≥4 m/s		1.2%	2.9%	9.8%	15.6%	8.5%	4.3%	4.1%	0.0%
	Night	Calm	0.9%								
		1 m/s		0.3%	3.7%	4.3%	2.0%	1.0%	0.4%	0.1%	0.0%
		2 m/s		0.3%	3.3%	7.3%	5.0%	3.2%	0.3%	0.3%	0.0%
		3 m/s		0.7%	2.2%	8.4%	6.7%	0.3%	0.4%	0.4%	0.0%
		≥4 m/s		1.2%	5.4%	22.3%	11.7%	0.6%	4.6%	2.5%	0.0%
June	Day	Calm	0.5%								
		1 m/s		1.4%	1.4%	1.4%	1.2%	1.2%	0.9%	0.8%	0.5%
		2 m/s		1.2%	1.9%	6.1%	2.2%	2.2%	2.3%	1.2%	0.1%
		3 m/s		0.9%	2.0%	9.3%	2.4%	2.4%	2.3%	1.1%	0.0%

Month	Period	Wind Speeds	Percentage Occurrence of Winds from different Directions								
			Calm	N	NE	E	SE	S	SW	W	NW
		4 m/s		0.9%	2.0%	6.1%	1.5%	2.1%	2.2%	1.1%	0.0%
		≥5 m/s		4.8%	7.6%	5.0%	3.1%	3.3%	7.7%	5.4%	0.0%
	Evening	Calm	0.8%								
		1 m/s		0.6%	2.0%	4.1%	1.8%	1.3%	0.6%	0.5%	0.1%
		2 m/s		0.5%	1.6%	8.9%	6.3%	0.9%	1.1%	0.6%	0.0%
		3 m/s		1.0%	1.1%	11.4%	8.3%	0.9%	1.6%	0.8%	0.0%
		≥4 m/s		3.8%	5.1%	9.4%	7.3%	1.8%	8.5%	7.3%	0.0%
	Night	Calm	0.5%								
		1 m/s		0.5%	2.6%	3.4%	0.9%	0.3%	0.1%	0.1%	0.1%
		2 m/s		0.3%	2.8%	10.2%	2.5%	0.9%	0.3%	0.2%	0.0%
		3 m/s		0.4%	1.6%	14.9%	3.1%	0.6%	0.7%	0.4%	0.0%
		≥4 m/s		4.3%	7.9%	20.4%	3.2%	0.7%	8.5%	7.4%	0.0%
July	Day	Calm	1.0%								
		1 m/s		0.7%	1.4%	1.5%	1.0%	1.2%	0.9%	0.7%	0.2%
		2 m/s		1.1%	2.6%	4.3%	1.7%	1.8%	2.3%	1.2%	0.1%
		3 m/s		1.0%	2.1%	6.1%	1.4%	2.4%	3.1%	1.0%	0.1%
		4 m/s		0.7%	1.6%	4.2%	0.9%	2.7%	3.1%	1.0%	0.0%
		≥5 m/s		5.2%	3.2%	3.6%	3.8%	10.0%	12.2%	6.9%	0.0%
	Evening	Calm	1.6%								
		1 m/s		0.2%	1.6%	4.2%	2.7%	0.9%	0.7%	0.4%	0.0%
		2 m/s		0.1%	0.8%	6.3%	7.2%	1.7%	1.1%	0.4%	0.0%
		3 m/s		0.3%	1.1%	5.2%	6.7%	1.6%	1.4%	0.4%	0.1%
		≥4 m/s		1.7%	2.0%	5.7%	7.3%	13.7%	14.6%	8.2%	0.0%
	Night	Calm	0.9%								
		1 m/s		0.1%	3.8%	4.8%	1.1%	0.5%	0.1%	0.1%	0.1%
		2 m/s		0.1%	2.9%	8.9%	3.7%	0.8%	0.3%	0.3%	0.0%
		3 m/s		0.2%	2.2%	9.4%	3.4%	0.5%	0.7%	0.5%	0.0%
		≥4 m/s		2.4%	4.6%	13.7%	4.5%	7.1%	13.1%	9.2%	0.0%
August	Day	Calm	0.3%								
		1 m/s		0.6%	0.8%	0.7%	0.7%	1.0%	0.7%	0.5%	0.2%
		2 m/s		0.8%	1.1%	3.2%	1.9%	1.7%	1.9%	1.0%	0.1%
		3 m/s		0.9%	1.1%	5.4%	2.6%	2.4%	2.9%	1.6%	0.1%
		4 m/s		0.8%	1.2%	4.9%	2.3%	2.4%	2.5%	1.4%	0.0%
		≥5 m/s		2.1%	5.1%	5.7%	4.3%	11.6%	15.0%	5.3%	1.0%
	Evening	Calm	1.3%								
		1 m/s		0.3%	1.6%	1.8%	2.1%	2.1%	1.5%	0.5%	0.5%
		2 m/s		0.2%	0.6%	3.0%	6.2%	2.4%	2.9%	0.6%	0.1%
		3 m/s		0.4%	0.2%	5.1%	8.1%	2.3%	2.9%	1.1%	0.1%
		≥4 m/s		2.7%	1.1%	4.1%	11.2%	10.5%	14.6%	7.5%	0.4%
	Night	Calm	0.5%								
		1 m/s		0.5%	3.0%	2.5%	1.1%	0.8%	0.3%	0.2%	0.1%
		2 m/s		0.4%	2.1%	7.3%	3.6%	1.5%	0.8%	0.3%	0.0%
		3 m/s		0.5%	0.8%	10.5%	4.5%	0.9%	1.3%	0.9%	0.1%

Month	Period	Wind Speeds	Percentage Occurrence of Winds from different Directions								
			Calm	N	NE	E	SE	S	SW	W	NW
		≥4 m/s		1.8%	3.2%	16.7%	8.7%	3.4%	13.1%	8.3%	0.6%
September	Day	Calm	0.1%								
		1 m/s		0.3%	0.7%	1.0%	0.7%	1.1%	0.6%	0.4%	0.2%
		2 m/s		1.0%	0.9%	2.2%	2.0%	2.0%	1.8%	1.0%	0.3%
		3 m/s		1.0%	0.7%	2.7%	1.8%	2.2%	4.0%	1.5%	0.2%
		4 m/s		0.9%	0.8%	2.9%	1.5%	2.8%	6.0%	1.4%	0.0%
		≥5 m/s		1.1%	1.4%	4.7%	3.0%	18.4%	20.1%	4.5%	0.3%
	Evening	Calm	0.3%								
		1 m/s		0.2%	0.8%	1.2%	2.6%	2.5%	0.9%	0.8%	0.1%
		2 m/s		0.5%	0.4%	0.9%	7.0%	4.3%	2.9%	1.0%	0.1%
		3 m/s		0.9%	0.3%	0.9%	5.7%	4.1%	4.1%	0.6%	0.0%
		≥4 m/s		1.7%	0.7%	1.5%	8.6%	22.2%	18.5%	3.8%	0.0%
	Night	Calm	0.5%								
		1 m/s		0.3%	2.4%	4.2%	2.3%	1.3%	0.5%	0.3%	0.1%
		2 m/s		0.5%	2.3%	6.0%	7.0%	2.6%	1.5%	0.6%	0.0%
		3 m/s		0.5%	1.1%	6.0%	7.8%	1.9%	2.2%	1.1%	0.0%
		≥4 m/s		0.8%	1.0%	11.4%	13.5%	3.8%	12.1%	3.9%	0.6%
October	Day	Calm	0.1%								
		1 m/s		0.1%	0.2%	0.4%	0.4%	0.5%	0.3%	0.2%	0.1%
		2 m/s		0.3%	0.4%	1.1%	1.1%	1.5%	1.4%	0.7%	0.1%
		3 m/s		0.3%	0.4%	1.1%	1.6%	2.2%	3.7%	0.9%	0.0%
		4 m/s		0.2%	0.2%	0.7%	1.5%	3.1%	6.9%	1.7%	0.0%
		≥5 m/s		0.2%	0.2%	1.1%	2.5%	27.2%	29.2%	6.0%	0.1%
	Evening	Calm	0.2%								
		1 m/s		0.1%	0.1%	0.1%	0.4%	0.5%	0.3%	0.4%	0.1%
		2 m/s		0.4%	0.2%	0.1%	0.9%	1.9%	1.8%	0.8%	0.1%
		3 m/s		0.4%	0.2%	0.0%	0.5%	3.2%	4.2%	1.9%	0.0%
		≥4 m/s		0.7%	0.1%	0.1%	1.8%	46.7%	25.8%	6.0%	0.0%
	Night	Calm	0.2%								
		1 m/s		0.1%	0.5%	2.1%	1.6%	1.3%	0.6%	0.3%	0.1%
		2 m/s		0.1%	0.2%	3.7%	4.9%	2.7%	1.3%	0.6%	0.1%
		3 m/s		0.1%	0.2%	3.2%	8.2%	3.4%	2.8%	1.6%	0.1%
		≥4 m/s		0.9%	0.4%	3.4%	16.6%	18.6%	14.4%	5.3%	0.3%
November	Day	Calm	0.0%								
		1 m/s		0.2%	0.2%	0.1%	0.2%	0.3%	0.3%	0.2%	0.1%
		2 m/s		0.3%	0.2%	0.4%	0.9%	1.0%	0.9%	0.6%	0.1%
		3 m/s		0.2%	0.1%	0.9%	1.0%	1.5%	2.8%	1.2%	0.1%
		4 m/s		0.3%	0.2%	0.7%	1.0%	2.7%	6.2%	1.6%	0.1%
		≥5 m/s		0.5%	0.5%	2.5%	1.9%	33.6%	30.2%	4.0%	0.0%
	Evening	Calm	0.0%								
		1 m/s		0.3%	0.1%	0.1%	0.3%	0.4%	0.2%	0.6%	0.3%
		2 m/s		0.1%	0.0%	0.1%	1.4%	1.7%	1.7%	0.7%	0.1%
		3 m/s		0.0%	0.0%	0.0%	1.1%	2.6%	3.9%	0.2%	0.0%

Month	Period	Wind Speeds	Percentage Occurrence of Winds from different Directions								
			Calm	N	NE	E	SE	S	SW	W	NW
		≥4 m/s		0.1%	0.6%	0.1%	2.6%	53.4%	25.1%	2.2%	0.0%
	Night	Calm	0.3%								
		1 m/s		0.3%	0.2%	0.6%	1.8%	1.5%	0.5%	0.3%	0.2%
		2 m/s		0.2%	0.1%	1.3%	5.1%	3.8%	1.6%	0.6%	0.1%
		3 m/s		0.1%	0.0%	2.0%	6.8%	4.8%	3.2%	1.0%	0.1%
		≥4 m/s		0.5%	0.6%	3.3%	15.0%	23.5%	17.6%	2.9%	0.1%
December	Day	Calm	0.0%								
		1 m/s		0.2%	0.1%	0.2%	0.3%	0.6%	0.4%	0.3%	0.2%
		2 m/s		0.4%	0.3%	0.3%	0.7%	1.2%	1.0%	0.8%	0.2%
		3 m/s		0.4%	0.3%	0.8%	0.9%	1.8%	2.9%	0.8%	0.1%
		4 m/s		0.3%	0.3%	1.0%	1.0%	2.9%	6.4%	1.2%	0.0%
		≥5 m/s		0.3%	1.0%	2.2%	1.7%	37.6%	27.5%	1.5%	0.0%
	Evening	Calm	0.3%								
		1 m/s		0.2%	0.2%	0.2%	0.6%	0.9%	0.3%	0.4%	0.1%
		2 m/s		0.4%	0.3%	0.1%	1.6%	2.4%	1.2%	0.6%	0.1%
		3 m/s		0.4%	0.1%	0.3%	0.7%	2.8%	2.9%	0.6%	0.1%
		≥4 m/s		0.3%	0.1%	1.0%	1.6%	53.9%	25.1%	0.1%	0.1%
	Night	Calm	0.4%								
		1 m/s		0.5%	0.6%	0.8%	2.0%	2.6%	1.3%	0.5%	0.2%
		2 m/s		0.6%	0.5%	1.0%	4.6%	5.1%	2.3%	0.5%	0.1%
		3 m/s		0.5%	0.3%	1.7%	5.6%	4.6%	3.0%	0.3%	0.0%
		≥4 m/s		0.3%	0.6%	4.2%	7.7%	33.3%	13.6%	0.8%	0.0%

Table E2: **Annual percentage occurrence for different wind speeds and directions.**

Period	Wind Speeds	Annaul Percentage Occurrence of Winds from different Directions								
		Calm	N	NE	E	SE	S	SW	W	NW
Day	Calm	0.3%								
	1 m/s		0.5%	0.7%	0.7%	0.7%	0.9%	0.6%	0.5%	0.2%
	2 m/s		0.7%	0.9%	2.1%	1.5%	1.8%	1.5%	0.9%	0.1%
	3 m/s		0.6%	0.9%	3.2%	1.6%	2.4%	3.1%	1.1%	0.1%
	4 m/s		0.5%	0.8%	2.8%	1.4%	3.2%	4.8%	1.1%	0.0%
	≥5 m/s		1.4%	2.7%	4.6%	3.2%	24.7%	17.9%	3.3%	0.1%
Evening	Calm	0.6%								
	1 m/s		0.3%	0.9%	1.5%	1.9%	1.5%	0.7%	0.5%	0.2%
	2 m/s		0.3%	0.5%	2.1%	4.4%	2.8%	1.7%	0.6%	0.1%
	3 m/s		0.4%	0.4%	2.7%	4.2%	3.0%	2.9%	0.6%	0.0%
	≥4 m/s		1.2%	1.3%	3.8%	6.6%	34.1%	15.3%	3.4%	0.0%
Night	Calm	0.7%								
	1 m/s		0.4%	1.8%	2.6%	2.3%	1.8%	0.6%	0.3%	0.1%

Period	Wind Speeds	Annaul Percentage Occurrence of Winds from different Directions								
		Calm	N	NE	E	SE	S	SW	W	NW
	2 m/s		0.3%	1.4%	4.7%	5.2%	3.2%	1.2%	0.4%	0.0%
	3 m/s		0.4%	0.8%	5.8%	5.9%	2.8%	1.8%	0.6%	0.0%
	≥4 m/s		1.2%	2.3%	11.1%	10.4%	15.7%	10.5%	3.7%	0.1%

Appendix B: Project PMaxP Construction Noise Management Plan

NOISE MANAGEMENT PLAN

FOR

THE PORT MAXIMISATION PROJECT

7 February 2025

AES-890384-R02-1-07022025

Acoustic Engineering Solutions
www.acousticengsolutions.com.au

DOCUMENT CONTROL

Prepared for:	**Mid West Ports Authority**
	298 Marine Terrace
	Geraldton WA 6530
Contact:	Fleur Hole
Prepared by:	Dr Roy Ming
	Acoustic Engineering Solutions
	[redacted]
	[redacted]
Revision:	1
Date:	7 February 2025
Doc NO:	AES-890384-R02-1-07022025

Acoustic Engineering Solutions

ABN: 64 451 362 914

EXECUTIVE SUMMARY

Acoustic Engineering Solutions (AES) has been commissioned by Mid West Ports Authority (MWPA) to prepare a noise management plan for the construction of marine based infrastructure at the Geraldton Port. The aim of this construction noise management plan (CNMP) is to manage and minimise the construction noise emissions and comply with Regulation 13 of the Environmental Protection (Noise) Regulations 1997.

The construction is expected to take place 7 days a week over a two-year period and it can be divided into different stages: Dredging, Civil Works, Piling and Structural Works. Different types of plant/equipment will operate at different stages. The mechanical plant and equipment used are selected to be the quietest reasonably available.

Most of the construction activities are planned during the day (between 7am and 7pm) but a 24/7 operation is proposed for the dredging operations due to the significant costs associated with starting and stopping the dredge operation on a daily basis.

An acoustic model has been developed to predict noise emissions from the proposed construction activities at different stages. The "worst-case" construction noise levels are predicted at the closest noise-sensitive and commercial premises and the "worst-case" noise contours are generated for the construction sites and surrounding area. It is shown that the construction noise varies depending on the construction activities. The highest construction noise level will be received at closest commercial receiver R10.

Detailed noise controls and community consultation including complaint management are presented in sections 5 and 7 of this CNMP. The protocol of noise monitoring is also outlined in section 6. To ensure the compliance with Regulation 13, this CNMP will be implemented accordingly during the construction stages.

TABLE OF CONTENTS

1.0 INTRODUCTION

The Geraldton Port is a multi-user port operated by Mid West Ports Authority (MWPA). MWPA plans to upgrade the Port to facilitate increased utilisation, efficiency and infrastructure improvements. The Port Maximisation Project (PMaxP) will be executed to construct and upgrade marine based infrastructure at the Geraldton Port including:

- Capital Dredging at Berth 1 and Berth 6.
- Maintenance Dredging at Berth 1 and Tug Harbour.
- Construction of a New Berth 1 including an access causeway.
- Upgrade to Berth 6 – widening and lengthening of the existing berth.
- Construction of a New Tug Harbour.
- Capital Dredging at Berth 8/9 and Construction of New Berth 8/9.

Acoustic Engineering Solutions (AES) has been commissioned by MWPA to prepare a noise management plan (NMP) for the construction of marine based infrastructure at the Geraldton Port. This construction noise management plan (CNMP) is developed to:

- Manage and minimise the construction noise emissions;
- Provide a protocol for noise monitoring;
- Undertake active community consultation and outline complaint management procedure; and
- Comply with the relevant WA Regulations.

1.1 ROLE AND RESPONSIBILITY

The PMaxP Construction Site Manager has the overall responsibility for this CNMP implementation, and provides the necessary resources as required. The PMaxP Construction Site Manager is responsible for:

- Implementing, managing and meeting the CNMP requirements.
- Communicating CNMP information to all personnel, contractors and visitors to site.
- Ensuring all construction personnel, contractors and visitors:
  - Are inducted and aware of their obligation under this CNMP; and
  - Understand and meet the requirements of this CNMP.
- Liaising with relevant authorities and organizations as necessary.

The PMaxP Construction Site Supervisors are responsible for responding to adverse site noise emissions, and adjusting construction works as appropriate to minimise impact on the closest noise sensitive premises.

PMaxP site construction personnel including contractors are responsible for following mitigation measures when undertaking site works, and informing the supervisor of any noise management issues.

2.0 LEGISLATION AND REGULATIONS

2.1 RELEVANT LEGISLATION

Environmental noise management in Western Australia (WA) is implemented through:

- Environmental Protection Act 1986 (the Act); and
- Environmental Protection (Noise) Regulations 1997 (the Regulations).

2.2 CONSTRUCTION NOISE CRITERIA

Noise associated with construction activities in WA is managed through Regulation 13.

The Regulations create a number of special cases where noise emissions may not be required to meet the assigned noise levels set in Regulations 7 and 8. Construction noise is one of the special cases.

Regulation 13 presents the definitions of construction site and construction works, and provides management procedures for construction noise.

2.2.1 Normal Construction Hours

If construction work is carried out between 7am and 7pm (daytime) on Monday to Saturday ("normal" working hours), excluding public holidays, the assigned noise levels set in Regulations 7 and 8 do not apply, provided:

- The construction work is carried out in accordance with the control of environmental noise practices in section 4 of AS 2436-2010 *Guide to noise and vibration control on construction, demolition and maintenance sites*; and
- The equipment used is the quietest reasonably available; and
- If a NMP is required, then:
  - The NMP is prepared and given in accordance with the requirement and approved by the Chief Executive Officer (CEO) of the local Government Authority (LGA); and
  - The construction work is carried out in accordance with the NMP.

2.2.2 Out-of-Hours Construction

If construction work is carried out outside the above 'daytime' hours, such as weekday evenings, Sunday and public holidays, the assigned noise levels set in Regulations 7 and 8 do not apply if the occupier of the construction site shows that:

- The construction work is carried out in accordance with the control of environmental noise practices in section 4 of AS 2436-2010 *Guide to noise and vibration control on construction, demolition and maintenance sites*; and

- The equipment used is the quietest reasonably available; and
- The construction work is carried out in accordance with a NMP in respect of the construction site:
  - prepared and given to the Chief Executive Officer (LGA) not later than 7 days before the construction work commenced; and
  - approved by the CEO (LGA).
- At least 24 hours before construction work commences, the occupier of the construction site gives written notice of the proposed construction work to the occupiers of all premises at which noise emissions received were likely to fail to comply with the standard prescribed under Regulation 7; and
- It is reasonably necessary for the construction work to be carried out at that time.

2.2.3 Noise Management Plan

Under Regulation 13(6), a NMP shall be prepared to include but not to be limited to:

- details of, and reasons for, construction work on the construction site; and
- details of, and the duration of, activities on the construction site likely to result in noise emissions that fail to comply with the standard prescribed under regulation 7; and
- predictions of noise emissions on the construction site; and
- details of measures to be implemented to control noise emissions; and
- procedures to be adopted for monitoring noise emissions; and
- complaint response procedures to be adopted.

2.3 GUILDELINES AND STANDARDS

This CNMP has been prepared in accordance with following guidelines and standards:

- Guideline: Assessment of Environmental Noise Emissions, Draft for Consultation, May 2021.
- AS 2436:2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites, Standards Australia.
- AS 1055:2018 Acoustics – Description and measurement of environmental noise, Standards Australia.

2.4 EXEMPTIONS UNDER THE REGULATIONS

Regulation 3(1) states that *nothing in these regulations applies to the following noise emissions —*

(a) Noise emissions from the propulsion and braking systems of motor vehicles operating on a road;

(c) Noise emissions from trains or aircraft (other than model aircraft and trains operating on railways with a gauge of less than 70^{0}cm);

(d) Noise emissions from a safety warning device fitted to a train or vessel;

(f) Noise emissions from the propulsion system or the movement through the water of a vessel operating in water other than water on private premises;

(g) Noise emissions —

(iv) for the purpose of giving a warning required under the *Mines Safety and Inspection Regulations 1995* regulation 8.26,

If every reasonable and practicable measure has been taken to reduce the effect of the noise emission consistent with providing an audible warning to people;

(h) Noise emissions from —

(i) a reversing alarm fitted to a motor vehicle, mobile plant, or mining or earthmoving equipment; or

(ii) a startup or movement alarm fitted to plant,

If —

(iii) it is a requirement under another written law that such an alarm be fitted; and

(iv) it is not practicable to fit an alarm that complies with the written law under which it is required to be fitted and emits noise that complies with these regulations;

(i) Noise emissions from an engine, equipment, machinery or plant on a vessel while the vessel is in a port.

All of the roads inside the Port including the access roads (such as Gillam Road) are managed and used by the Port only and not open to public. The Guideline[1] states that Regulation 3(1)(a) *does not apply to vehicles operating within any premises as the vehicles are not on a "road that is open to or used by the public"*.

[1] Guideline: Assessment of Environmental Noise Emissions, Draft for Consultation, May 2021.

3.0 PROJECT DESCRIPTION

The Port Maximisation Project is a major infrastructure endeavour to upgrade the Port to facilitate increased utilisation, efficiency and infrastructure improvements. Figure 1 in APPENDIX A presents the expanded Geraldton Port layout and its surrounding area including the proposed new berths and Tug harbour.

3.1 PROPOSED HOURS

Construction is expected to take place 7 days a week over a two-year period. Most of the construction activities happen during the day (between 7am and 7pm) but a 24/7 operation is proposed for the dredging operations because engaging the dredging company is a major cost to the project and the startup and shutdown of dredging equipment is time consuming. The most efficient process is to work the dredge operation around the clock in each location. Therefore, 24/7 construction is proposed including Sunday and public holidays for the Capital Dredge at:

- Berth 1 for 3 weeks in April 2026.
- Berth 6 for 6 weeks in May and June 2026.
- Berth 8/9 for 6 weeks in June to August 2026.

3.2 PROPOSED CONSTRUCTION ACTIVITIES

The construction is divided into different stages: Dredging, Tug Harbour Construction, Civil Works, Piling and Structural Works. Piling will be intermittent during the day with expected 1 to 3 piles per day at berths B1, B6 or B8 and 4 piles per day at Tug Harbour. The pile driving time is about 20 to 40 minutes per pile.

Table A1 in APPENDIX A presents the construction schedule and plant utilisation. The main construction activities are detailed in the followings.

3.2.1 Dredging

Dredging activities include:

- Berth 1 Maintenance dredge pocket – 3 week period.
- Berth 1 Capital dredge pocket – 6 week period.
- Berth 6 Capital dredge pocket – 3 week period.
- Tug Harbour (Maintenance dredge) – 3 week period.
- Berth 8 Capital dredge pocket – 6 week period.

The equipment used during the maintenance dredging work is:

- 1 X Trailer Suction Hopper Dredge.

The equipment used for the daytime capital dredging works includes:

- 1 X BHD (Backhoe dredge (2000kW) or similar) with Excavator (Komatsu PC5500 or equivalent);
- 2 X Split Hopper Barge (650m3);
- 2 X 14T Bollard Pull tugs;
- 1 X Survey Vessel Class 1C;
- 2 X Articulated Dump Truck;
- 1 X 45T Excavator (CAT 350);
- 1 X WA 500 Front End Loader (CAT 980); and
- 1 X D10 Bulldozer.

The equipment used for the evening/night-time capital dredging includes:

- 1 X Conditioning Seabed Hydro Hammer; or
- BHD (Backhoe dredge (2000kW) or similar) with Excavator (Komatsu PC5500 or equivalent).

3.2.2 Tug Harbour Seawall & Reclamation

The equipment used during this stage includes:

- 3 X Articulated Dump Truck (ADT);
- 1 X 140T Excavator;
- 2 X 45T Excavator (CAT 350);
- 1 X 30T Excavator with rock breaker;
- 1 X WA 500 Front End Loader (CAT 980);
- 1 X D10 Bulldozer;
- 1 X Grader;
- 1 X 20T Telehandler/Franna Crane;
- 1 X 600cfm Compressor;
- 1 X 150kva Generator (silenced);
- 1 X 5T Roller/Compactor; and
- 1 X 8-Wheel Dump Truck.

3.2.3 Civil/Earthworks at Berth 1, 6 or 8

The equipment used during this stage includes:

- 3 X Articulated Dump Truck (ADT);
- 1 X 140T Excavator;
- 1 X 100T Excavator (Landside "dredge") - Berth 6 ONLY;
- 1 X 45T Excavator (CAT 350);
- 1 X 30T Excavator with rock breaker;
- 1 X WA 500 Front End Loader (CAT 980);
- 1 X D10 Bulldozer;
- 1 X Grader;
- 1 X 5T Roller/Compactor; and
- 1 X Plate Compactor.

3.2.4 Piling (Tug and Berth 1, 6, 8 and 9)

The equipment used during piling includes:

- 1 X 200T Mobile Crane;
- 1 X IHC S200 Piling Hammer;
- 1 X ABI 13/16 Sheet Piling Rig;
- 2 X 600cfm Compressor; and
- 2 X 150kva Generator (silenced).

3.2.5 B2 Berth Deck Removal and Pile Cut-off

The equipment used during B2 berth removal includes:

- 2 X Construction Saws (1500mm (60inch) Diesel 74HP);
- 1 X 30T Excavator with Rock Breaker;
- 2 X 200T Mobile Crane; and
- 2 X 8 Wheel Dump Trucks.

3.2.6 Structural Works at Berth 1, 6 or 8

The equipment used during the structural works includes:

- 1 X Concrete Delivery Truck;
- 1 X Concrete Pump (Putzmeister M56-5);
- 1 X 20T Front End Loader (FEL CAT 972);
- 1 X 200T Mobile Crane;
- 1 X 300T Mobile Crane (Manitwoc Crawler);
- 1 X 20T Telehandler;
- 1 x 40T Franna Crane;
- 3 X Elevated Work Platforms;
- 1 X Plate Compactor;
- 4 X Lincoln Welding Generator;
- 2 X 600cfm Compressor; and
- 2 X 150kva Generator (silenced).

3.2.7 All Construction Stages

For all of the above construction stages, the following mobile equipment and hand tools will operates intermittently:

- 2 X Forklifts;
- 2 X 20T Telehandler/Franna Crane;
- 2 X Bobcat loaders;
- 2 X Delivery Trucks;
- 2 X Service Trucks;
- 1 X Fuel Delivery Truck;

- 2 X Watercarts;
- 4 X Angle Grinders;
- 4 X Circular Saws;
- 4 X Impact Drivers; and
- 4 X Hammer Drill.

4.0 NOISE MODELLING

An acoustic model has been developed using SoundPlan v8.0 program, and the CONCAWE[2,3] prediction algorithms are selected for this study. The acoustic model does not include noise emissions from any source other than the construction activities. Therefore, noise emissions from the port operations, road traffic, sea waves, neighbouring premises, etc are excluded from the modelling.

4.1 INPUT DATA

4.1.1 Topography

Topographical data for the Geraldton Port and surrounding area was provided by MWPA in Auto-CAD dxf format. A reflective surface is assumed for water and port area while averaged absorptive coefficient of 0.6 is assumed for the other area.

The existing buildings and sheds in the Geraldton Port and surrounding area are considered in the acoustic model.

4.1.2 Potentially Affected Properties

Eleven (11) representative noise-sensitive and commercial receivers are selected for the detailed assessments of noise impact, as shown in Figure 2 in APPENDIX A. Receivers R1 to R5 and R7 represent the closest noise-sensitive premises while the others (R6, R8 to R11) represent the closest commercial premises. All of the selected receivers are the ground receivers (at 1.5m above the ground).

4.1.3 Source Sound Power Levels

Table 4-1 presents the source sound power levels. Some of the source sound power levels are calculated from the information provided by MWPA while some of them are obtained from the measurements for the previous AES projects[45] in the Geraldton Port. Some (overall levels) of the construction equipment and hand tools are suggested by the Australian Standard 2436:2010[6] and their spectra are fitted from the AES database for similar equipment.

---

[2] CONCAWE (Conservation of Clean Air and Water in Europe) was established in 1963 by a group of oil companies to carry out research on environmental issues relevant to the oil industry.

[3] The propagation of noise from petroleum and petrochemical complexes to neighbouring communities, CONCAWE Report 4/81, 1981.

[4] Occupational noise survey of the Geraldton Port operations, AES Report (AES-890351-R01-A-11072024), 11 July 2024.

[5] Environmental noise impact assessment of Geraldton Port. AES Report (AES-890312-R02-0-21112023), 21 November 2023.

[6] AS2436-2010, Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites, Standards Australia.

Table 4-1: Source sound power levels.

Noise Sources	Overall Sound Power Levels in dB(A)
Trailer Suction Hopper Dredge	112
BHD (Backhoe dredge (2000kW) or similar)	116
Split Hopper Barge	112
14T Bollard Pull Tugs	103
Survey Vessel Class 1C	106
45T Excavator (CAT 350)	107
WA 500 Front End Loader (CAT980 FEL)	103
D10 Bulldozer	113
Service Truck	97
Fuel Delivery Truck	97
Water Cart	107
Articulated Dump Truck (ADT)	97
140T Excavator	113
100T Excavator (Landside "dredge")	111
30T Excavator with Rock Breaker	118
Grader	104
200T Mobile Crane	106
300T Mobile Crane (Manitwoc Crawler)	106
IHC S200 Piling Hammer L_{Amax}	137
ABI 13/16 Sheet Piling Rig	111
20T Telehandler	94
600cfm Compressor	101
150kva Generator (silenced)	97
5T Roller / Compactor	109
Plate Compactor	109

Noise Sources	Overall Sound Power Levels in dB(A)
Bobcat loader	102
8-Wheel Dump Truck	107
Construction Saws	108
Concrete Delivery Truck	108
Concrete Pump (Putzmeister M56-5)	98
20T Front End Loader (FEL CAT 972)	109
40T Franna Crane	104
Elevated Work Platforms	100
Hyundai Forklift 35DT-7	102
Lincoln Welding Generator	100
Angle Grinder	108
Circular Saw	107
Impact Driver	102
Hammer Drill	110

4.1.4 METEOROLOGY

SoundPlan calculates noise levels for defined meteorological conditions. In particular, temperature, relative humidity, wind speed and direction data are required as input to the model. For this study the default "worst-case" meteorological conditions[7] are assumed, as shown in Table 4-2. Since the evening and night have the same worst-case meteorological conditions, their predicted noise levels will be the same if the noise sources are the same.

Table 4-2: Worst-case meteorological conditions.

Time of day	Temperature Celsius	Relative Humidity	Wind speed	Pasquill Stability Category
Evening (0700 --- 1900)	20 Celsius	50%	4m/s	E

[7] Guideline: Assessment of Environmental Noise Emissions, Draft for Consultation, May 2021.

Time of day	Temperature Celsius	Relative Humidity	Wind speed	Pasquill Stability Category
Evening (1900 --- 2200)	15 Celsius	50%	3m/s	F
Night (2200 --- 0700)	15 Celsius	50%	3m/s	F

4.2 NOISE MODELLING SCENARIOS

MWPA advised:

- The construction will be progressed as planned and scheduled.
- The plant and equipment used in the construction are selected to be the quietest reasonably available.
- No solid fences are proposed within the construction site.

Based on the provided information, eight (8) construction scenarios are modelled in accordance with the schedule and plant usage shown in Table A1 in APPENDIX A:

Scenario 1: Represents the following daytime construction activities in April 2026:

- Berth 1 Capital Dredge;
- Tug Harbour Seawalls and Reclamation; and
- Berth 1 Civil/Earthworks.

Scenario 2: Represents the following daytime construction activities in July & August 2026:

- Berth 8/9 Capital Dredge;
- Tug Harbour Seawalls and Reclamation;
- Berth 6 Civil/Earthworks;
- Berth 1 Piling; and
- Berth 1 Structural (Deck Install).

Scenario 3: Represents the Piling Hammer operation for Berth 1 Piling. Piling Hammer generates high impact noise L_{AMax}.

Scenario 4: Represents the following daytime construction activities in October to December 2026:

- Tug Harbour Seawalls and Reclamation;
- Tug Harbour Piling; and
- Berth 1 Structural (Deck Install).

Scenario 5: Represents the following daytime construction activities in May 2027:

- Maintenance Dredging Works at Tug Harbour;
- Berth 6 Piling; and
- Berth 6 Structural (Deck Install).

Scenario 6: Represents the following daytime construction activities in August 2027:

- Berth 8 Civil/Earthworks;
- Berth 2 Berth Demolition;
- Berth 8 Piling; and
- Berth 6 Structural.

Scenario 7: Represents the following daytime construction activities in November 2027 to March 2028:

- Berth 8 Structural.

Scenario 8: Represents the worst-case day and evening/night-time dredging operations in April 2026:

- Berth 1 Capital Dredge.

Scenarios 1 to 7 happen during the day only while scenario 8 occurs during the day, evening and night. The number and utilisation percentages of equipment operating in each of the construction scenarios are listed in Table A1 in APPENDIX A. For the daytime construction scenarios (1, 2 and 4 to 7), the following mobile equipment and hand tools are also considered:

Mobile equipment: 2 X Forklifts;
2 X 20T Telehandlers / Franna Cranes;
2 X Bobcat loaders;
2 X Delivery Trucks;
2 X Service Trucks; and
1 X Fuel Delivery Trucks.

Hand tools: 4 X Angle Grinders;
4 X Circular Saws;
4 X Impact Drivers; and
4 X Hammer Drills.

Scenario 3 considers the Piling Hammer impact noise in isolation for its maximum noise L_{AMax} emission during Berth 1 piling, which is the worst-case piling location to R3 to R10.

4.3 PREDICTED NOISE LEVELS

Table 4-3 presents the predicted worst-case noise levels in dB(A). For scenario 3, the predicted noise levels are L_{Amax}. For scenario 8, the predicted day and night-time noise levels are at similar levels. The highest noise levels are predicted at R10 for all of the scenarios.

Table 4-3: Predicted worst-case noise levels in dB(A).

Receivers	S1	S2	S3	S4	S5	S6	S7	S8	
	Day	Day	Day	Day	Day	Day	Day	Day	Night
R1	41.5	37.7	56.6	36.6	32.5	39.2	28.3	38.3	38.8
R2	42.2	40.4	56.0	38.4	31.9	39.1	33.5	38.5	38.9
R3	36.9	37.7	50.9	32.1	32.3	40.2	29.0	33.9	33.9
R4	43.0	46.6	56.9	39.8	39.2	45.3	41.3	38.9	39.0
R5	41.6	40.6	55.9	36.5	35.9	38.4	32.5	38.4	38.5
R6	59.9	55.8	74.5	54.6	49.7	47.5	47.0	56.2	56.3
R7	50.8	48.0	66.7	45.9	43.6	40.1	40.1	48.0	48.1
R8	56.8	54.4	75.9	52.2	52.7	51.0	46.4	55.4	55.5
R9	57.8	55.7	74.2	52.1	51.0	51.3	49.0	55.0	55.0
R10	65.4	61.6	82.1	60.2	57.7	59.6	50.8	62.6	62.6
R11	49.6	47.8	63.5	45.8	39.7	46.3	40.2	46.0	46.3

4.4 NOISE CONTOURS

Noise contours at 1.5m above the ground are presented in Figure 3 to Figure 10 in APPENDIX B for the default "worst-case" meteorological conditions. These noise contours represent the "worst-case" noise propagation envelopes, i.e., worst-case propagation in all directions simultaneously. Because the predicted worst-case day and night-time noise levels are at similar levels, the noise contours in Figure 10 represents the worst-case day, evening and night-time noise propagation envelopes for scenario 8.

Figure 5 shows the noise level L_{Amax} contours.

5.0 NOISE CONTROLS

The primary objective of this CNMP is to manage and minimise construction noise impact on the surrounding community. The PMaxP Construction Site Manager must ensure that:

- the construction work is carried out in accordance with the control of environmental noise practices in section 4 of AS 2436-2010;
- the equipment used is the quietest reasonably available; and
- the construction activities for scenarios 1 to 7 take place during the day only.

Further descriptions of noise mitigation and management measures are provided in the following sections.

5.1 EQUIPMENT PERFORMANCE

All items of the equipment operating in the construction site will be regularly inspected and maintained, and an equipment maintenance program will be developed to ensure all machines are operating as designed (the manufacturer's specifications).

5.2 ENGINEERING NOISE CONTROLS

The construction site is located within the Geraldton Port. The following engineering noise control measures, where reasonable practicable, are proposed to minimise the construction noise emissions:

- Install high performance silencers for all pneumatic tools and mechanical plant to reduce exhaust noise emissions.
- Install suitable mufflers to all internal combustion engines.
- Fit silenced damped bits to pneumatic tools.
- Enclose high level fixed plant such as diesel pumps, generators and compressors.
- Design on-site roads to minimise the need for vehicles to reverse.
- Install broadband-noise reversing alarms as an alternative to common 'beeper' alarms for on-site vehicles and vehicles that regularly visit the site.

Site office/storage sheds may be placed in locations to act as barriers for reducing construction noise propagations towards the closest noise-sensitive premises where reasonably practicable.

5.3 SELECT QUIET POLICY

When purchasing and/or selecting new construction equipment/plant, noise is an important factor to be considered and the "Select Quiet Policy" is committed. Construction equipment and plant are selected to have low noise emissions as practicably available.

5.4 BEST MANAGEMENT WORK PRACTISES

Best management work practices are the adoption of particular operational procedures that minimise noise while retaining productive efficiency. The majority of proposed noise mitigation recommendations will be adopted from the Australian Standard AS2436:2010, including:

- Where reasonably practicable, quieter equipment should be used. Consideration should be given to use of the most suitable equipment. Select equipment that can achieve a similar outcome with less noise radiation, or modification of existing equipment to reduce noise emissions. Where practicable utilise/size plant for the work activity to minimise noise output (i.e. where possible don't utilise equipment that is larger than required).
- Change machine speed if possible if this assists with lowering noise & vibration output.
- Implement corrective measures prior to the recommencements of construction activities.
- Unless involved in emergency repair or for safety reasons, all of the works should be conducted within the hours proposed in section 3.1.
- If routine work is planned outside the hours specified section 3.1, all affected premises in the residential area must be notified of the intended work, its duration and times of occurrence.
- Organize noisy activities so as not to occur in the same period if possible.
- Consider respite periods if noise is continuous for 3 hours or more.
- Reduce the amount of machines or tools operating simultaneously near the noise-sensitive receiver locations.
- Equipment and vehicles should not be left running when not in use.
- No shouting or swearing on site. Either walk over and talk to somebody or use a radio/phone.
- Be careful with tools and equipment. Place them down and do not drop them.
- Do not drag materials on the ground. Place them down when you arrive at the work area.
- Manage activities according to weather and background noise conditions. Where practical, schedule noisy activities (such as piling) to occur when background noises, including local road traffic, wind and sea-wave induced noises, are high to provide masking of construction noise.
- When unavoidable noisy works are necessary, careful consideration must be given to scheduling of works, and residents must be notified prior to the works taking place. Where practical, noisy activities (such as piling) occur when most people are at work. The noise levels of unavoidable work activity should be predicted to assist in determining the appropriate noise management required for the activity.
- When loading trucks try not to drop material from a height. Load softer material at the bottom.
- All vehicular movements to and from the site occur during the scheduled working hours, unless approval has been granted by the relevant authority.

- Site access roads should be kept even and well graded so as to mitigate the potential for noises from driving trucks.
- Delivery of all plant and equipment to the site occurs during the “normal” working hours.
- Deliveries and access to the site should occur quietly. For example, minimize reversing around the site and do not use compression brakes. Truck drivers should be kept informed of designated vehicle routes, parking locations and acceptable delivery hours.
- Signage, in consultation with the Local Council (LGA), will be placed in Community areas and construction site interfaces to communicate the noise hazard associated with the area.

5.5 TRAINING

All employees and subcontractors are required to complete a Construction Site Induction that includes a section specific to noise management requirements. The induction will provide necessary awareness of noise management and the procedures and work practices to minimise and report noise generation. The induction should include but not be limited to the followings:

- Existence and requirements of this CNMP;
- Worker’s responsibilities and obligations;
- Relevant WA noise legislations;
- Relevant project specific and standard noise mitigation measures;
- Hearing loss and personal hearing protection devices;
- Locations of potential affected noise-sensitive premises for this project;
- Designated loading/unloading areas and procedures;
- General noise mitigation measures;
- Best noise management work practices; and
- Site noise complaint and reporting procedures.

Regular toolbox meetings will include noise management talks to reinforce a positive attitude towards noise management and to highlight any noise issues that arise during the course of construction. A record of all trainings will be maintained.

6.0 NOISE MONITORING

6.1 OVERVIEW

If deemed necessary, noise monitoring will be conducted in accordance with the procedures outlined in the Regulations and AS 1055:2018[8].

Noise monitoring is undertaken to:

- Quantify the ambient noise levels;
- Verify noise prediction during the construction;
- Assess the effectiveness of noise mitigation measure if it is implemented;
- Response to complaints where it is appropriate; and
- Evaluate construction noise emissions and impacts.

6.2 MONITORING LOCATION AND PERIOD

Noise monitoring is recommended to perform at the most affected (or closest) residential premises or the complainant premise or representative boundary locations.

At each location, noise monitoring should be undertaken for a minimum of 15 minutes during worst-case operations or for continuous seven days.

Monitoring locations and recording time periods are described in details in the measurement notes including:

- Marks in an aerial photograph; and
- Photos showing the noise logger locations; and
- Geographic Information System (GIS) coordinates.

6.3 NOISE MONITORING PROCEDURE

6.3.1 Personnel

Noise monitoring should be conducted by a suitably qualified acoustic specialist.

6.3.2 Noise Monitoring Equipment

Noise monitoring equipment must comply with Schedule 4 of the Regulations.

Type 1 Sound Level Meter (SLM) is recommended and it should comply with the requirements of Schedule 4 of the Regulations. The SLM should be able to record the 'Slow' time weighted and 'A' frequency-weighted noise levels of L_{A1}, L_{A10}, L_{A90}, L_{Amax} and L_{Aeq}.

[8] Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise.

The SLM microphone should be placed towards the site at 1.5m above the ground and at least 3m away from any reflective objects.

The SLM should be calibrated immediately before and after the monitoring.

6.3.3 Meteorological Conditions

Noise monitoring should be undertaken during the periods with light winds (<5 m/s) and without rains. Wind speeds/directions and temperature are recorded. Rain and heavy winds produce false (high) noise readings.

6.3.4 Noise Environment

For attended noise monitoring, noise environment (activities and time) should be recorded/ written in details, including:

- Any activities or audible noises from neighboring premises;
- Local traffic, especially motorcycles if monitoring location is close to roads;
- Aircraft noise if present;
- Any mechanical plant operating nearby;
- Animal noises (Bird noises, Dog barks, etc);
- People walking and talking passing the noise logger;
- Any audible noise if present; and/or
- Any other activities, which make noises.

6.4 BACKGROUND NOISE MONITORING

Before the construction, background noise monitoring is recommended to establish a baseline for the future assessment of construction noises.

6.5 NOISE MONITORING

Noise monitoring is recommended during the worst-case construction activities to verify the prediction. If monitored noise level consistently exceeds the predicted levels shown in sections 4.3 and 4.4, then investigation is made to check if the exceedance results from the construction, and/or if so acoustic model should be updated.

If a complaint is received, noise monitoring may be undertaken to:

- quantify the noise level at complainant location;
- correlate the noise level between the construction and receiver; and
- identify other potential noise sources and their relative contributions.

If a noise mitigation measure is implemented, noise monitoring is undertaken to verify the effectiveness of noise mitigation measures.

6.6 REPORTING ON NOISE MONITORING

Following each noise monitoring, a report is prepared to present monitoring results and findings. The following information is included in the reports when applicable:

- Monitoring times/periods and dates.
- Noise monitoring location indicated in the site layout and/or by a photo.
- Sound measurement equipment including models and series numbers.
- Field calibration results (before and after measurements).
- Meteorological conditions during the monitoring.
- Description of the construction activities during the monitoring.
- Description of the noise environment including activities in the neighbouring premises during the monitoring.
- A table of monitoring results, which are the 15-minute L_{A1}, L_{A10}, L_{A90}, L_{Aeq} and L_{Amax} noise levels. The noise levels shall be taken to the nearest 0.1dB.
- Time histories of monitoring results for unattended noise monitoring.
- A summary of any exceedance if present, and description of the construction or other sources causing the exceedance.
- Details of any corrective & preventive actions taken and status of their implementation.

7.0 COMPLAINT MANAGEMENT

7.1 RESPONSIBILITIES

The PMaxP Construction Site Manager will ensure that all actions of this NMP are undertaken to a satisfactory standard. A dedicated MWPA contact (MWPA PMaxP representative) is appointed to communicate with the community and deal with construction noise issues. The contact details are prominently displayed at the entrance gates to the Geraldton Port so that they are clearly visible to the public.

7.2 COMMUNITY CONSULTATION

The MWPA PMaxP representative will ensure that the local community is informed of the construction activities. Any works that are anticipated to generate community awareness or concern will be appropriately communicated. The following practices are recommended:

- A range of media is used to notify the community before and during the construction, for example, the MWPA website, community meetings, individual contact and/or letterbox drops. The content of notification includes:
  - Brief description of the works and reasons of construction.
  - Construction hours and days.
  - Contact details of site contact person.
  - How to lodge a complaint.
- The most affected residents (if any) will be informed, at least 2 days in advance, of scheduled noisy works including piling and excavation, the nature of the works, construction duration, and the measures being taken to minimize noise from the construction.
- The MWPA PMaxP representative is responsible for all contact with external Commonwealth and State Environmental Agencies, the media, elected representatives and the public.
- Dedicated website is designed to update the progress of construction works.
- Dedicated telephone complaint line and/or email address are established and made available to public especially the closest residents.

7.3 COMPLAINT MANAGEMENT

In the event of a noise complaint from the community, the MWPA Construction Site Manager will inform the MWPA PMaxP representative as soon as practicable. A response will be provided to the complainant within 24 hours. Corrective actions may involve noise monitoring to identify sources of the complaint, and/or may involve modification of construction or operational techniques to avoid any recurrence or minimise impacts. Complaints will be managed on an individual basis. Corrective actions which do not adversely impact the construction programme will be implemented as a priority.

A complaint log will be maintained throughout the construction, detailing addresses of complaints, times and actions.

When a complaint is made, the MWPA Construction Site Manager will complete a Noise Compliant Report Form or MWPA equivalent (example shown in APPENDIX C), which includes:

- Date and time of the complaint.
- Compliant methods (telephone, email, in person).
- Location and contact details of the complainant.
- Nature of the complaint.
- Meteorological conditions at the time of the incident.
- The action taken in relation to the complaint:
  If a verbal response is given, what is it and is the complainant satisfied.
  If the site contact discusses with the complainant, what is resolved at this point.
- Name of staff who had taken the complaint.

The noise complaint report form will be kept for management purposes, and available to the City of Geraldton upon request.

After a complaint is received, actions will be taken as soon as practicable, including:

- Investigation of noise sources that is the subject of complaint.
- Identification of construction-related activities and source locations that could have or are known to have contributed to the complaint.
- If known, identification of non-construction related noise activities and locations at time of incident.
- Attended or unattended noise monitoring at the complainant location.
- Undertaking noise modelling of the construction activities with the field measured data.
- Development and implementation of noise control measures to reduce the noise emission from the construction.

If the noise from the construction is above the predicted levels shown in sections 4.3 and 4.4, investigation should be made to check if the construction equipment/plant operates normally or additional equipment/plant temporarily operate onsite.

APPENDIX A SITE LAYOUTS

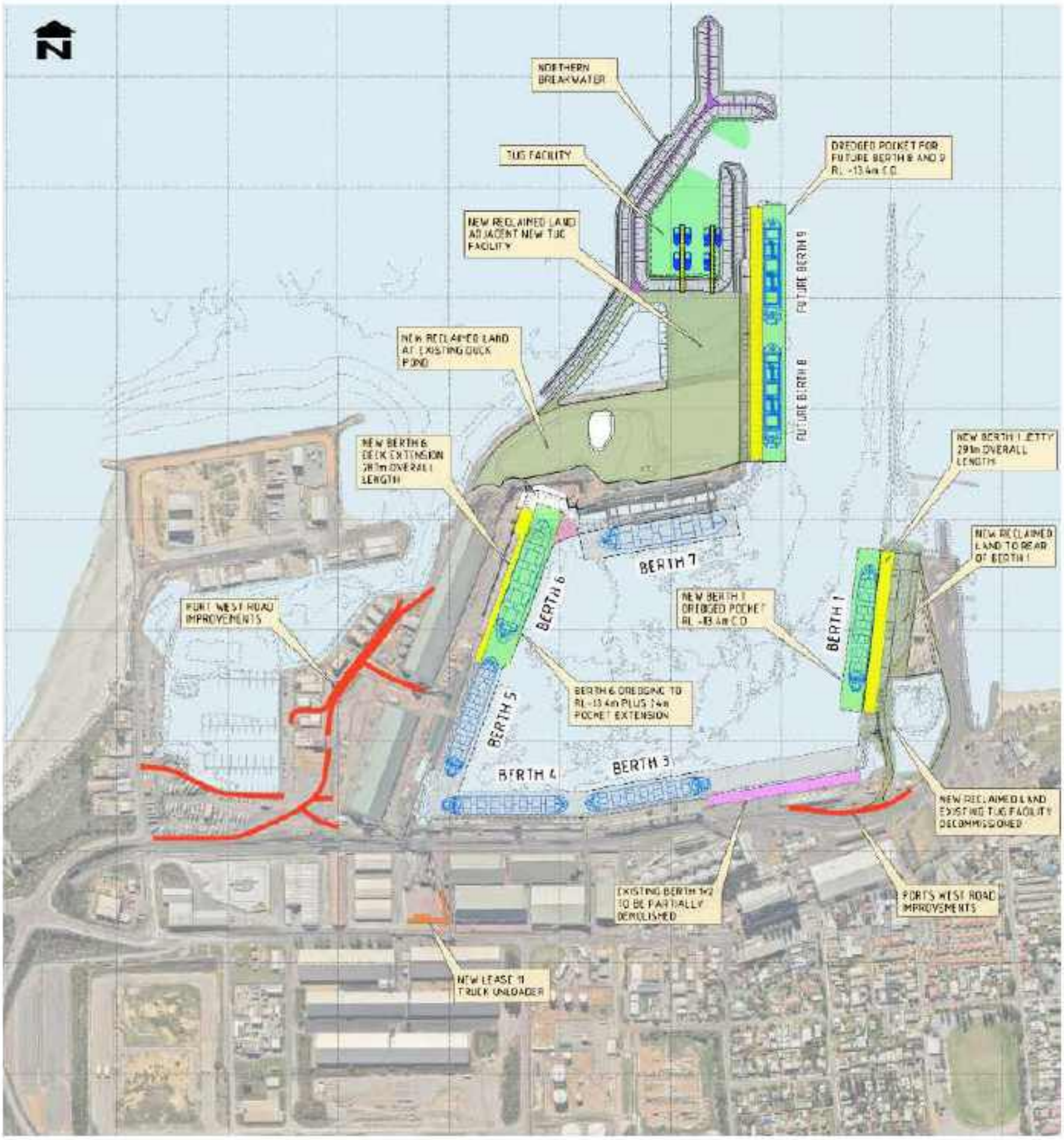
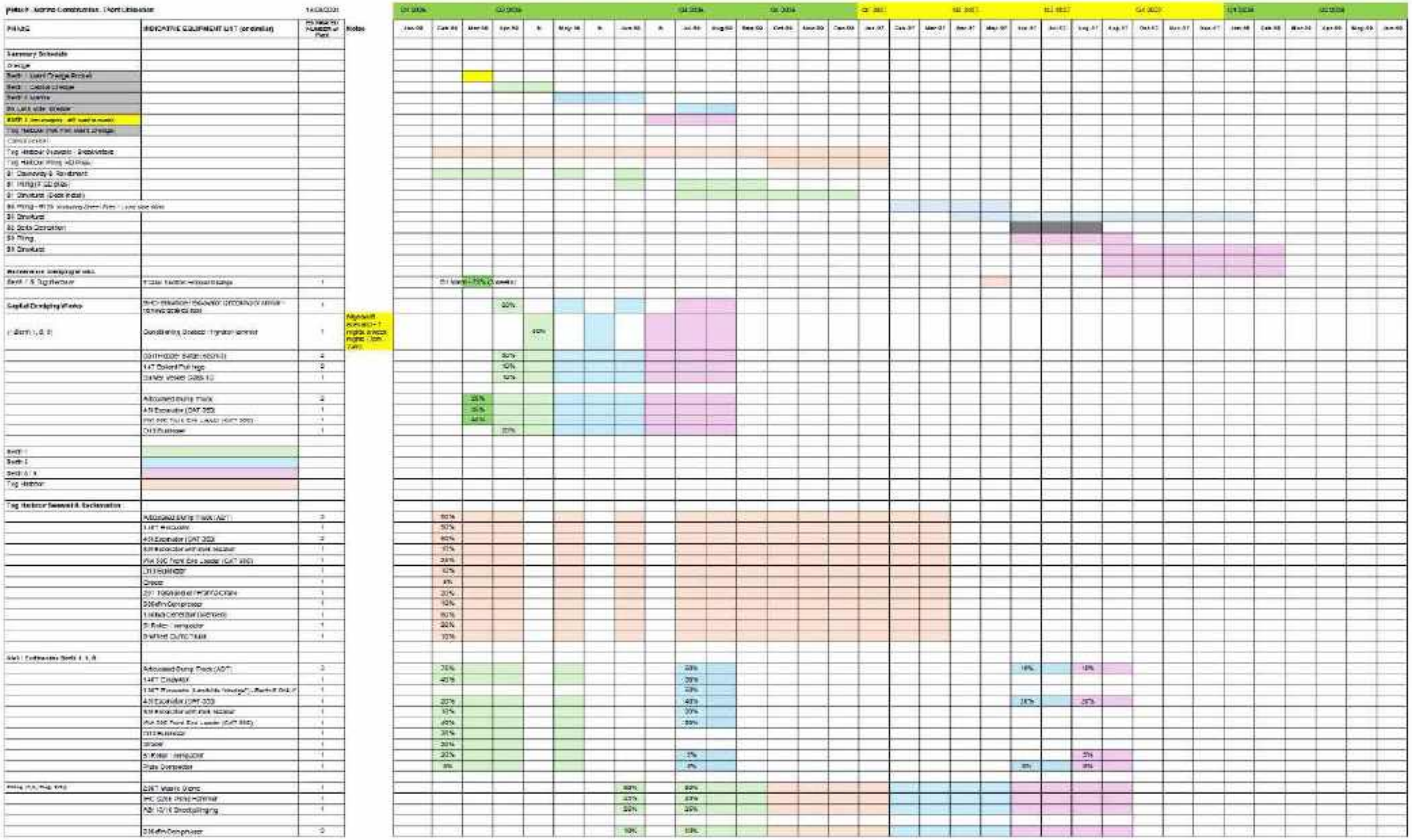


Figure 1: Upgraded Geraldton Port Layout.

Figure 2: Locations of selected noise-sensitive receivers.

Table A1: Construction schedule and plant utilisation.



	150kva Generator (silenced)	2								75%		10%																						
Berth 1																																		
Berth Deck Removal / Pile cutoff	Construction Auger (1500mm (60inch) Diesel 124HP)	2																						50%	50%											
	30T Excavator with rock breaker	1																						50%	30%											
	200T Mobile Crane	1																						10%	25%	30%										
	8 Wheel Dump Truck	2																						50%	30%											
Structural Works Berth 1, 2 and 3																																		
	Concrete Delivery Truck 6m3	1										10%	10%	20%	20%						10%	10%	20%	25%			10%	25%							
	Concrete Pump (Putzmeister M56-5)	1										10%	10%	20%							10%	10%	20%				10%	25%							
	20T Front End Loader (FEL CAT 972)	1										20%									20%						20%								
	250T Mobile Crane	1										50%									50%						50%								
	300T Mobile Crane (Manitowoc Crawler)	1										30%									30%						30%								
	20T Telehandler	1										20%									20%						20%								
	40T Franna Crane	1										20%									20%						20%								
	Elevated Work Platforms	3										30%									30%						30%								
	Plate Compactor	1										5%									5%						5%								
	Lincoln Welding Generator	4										10%									20%						20%								
	850cfm Compressor	2										50%									50%						50%								
	150kva Generator (silenced)	2										50%									50%						50%								
Across 3 years	Forklift	2	30%									10%																							
	20T Telehandler / Franna Crane	2	20%									10%																							
	Bobcat loader	2	20%									20%																							
	Delivery Trucks	3	20%									10%																							
	Service Truck	2	10%									10%									10%														
	Fuel Delivery Truck	1	10%									10%									10%														
	Water Cart	2	20%									20%									10%														
Handtools (Across Project)																																		
	Angle Grinder	4		20%								20%									20%						20%								
	Circular Saw	4		10%								10%									10%						10%								
	Impact Driver	4		10%								20%									20%						20%								
	Hammer Drill	4		10%								10%									10%						10%								

APPENDIX B NOISE CONTOURS

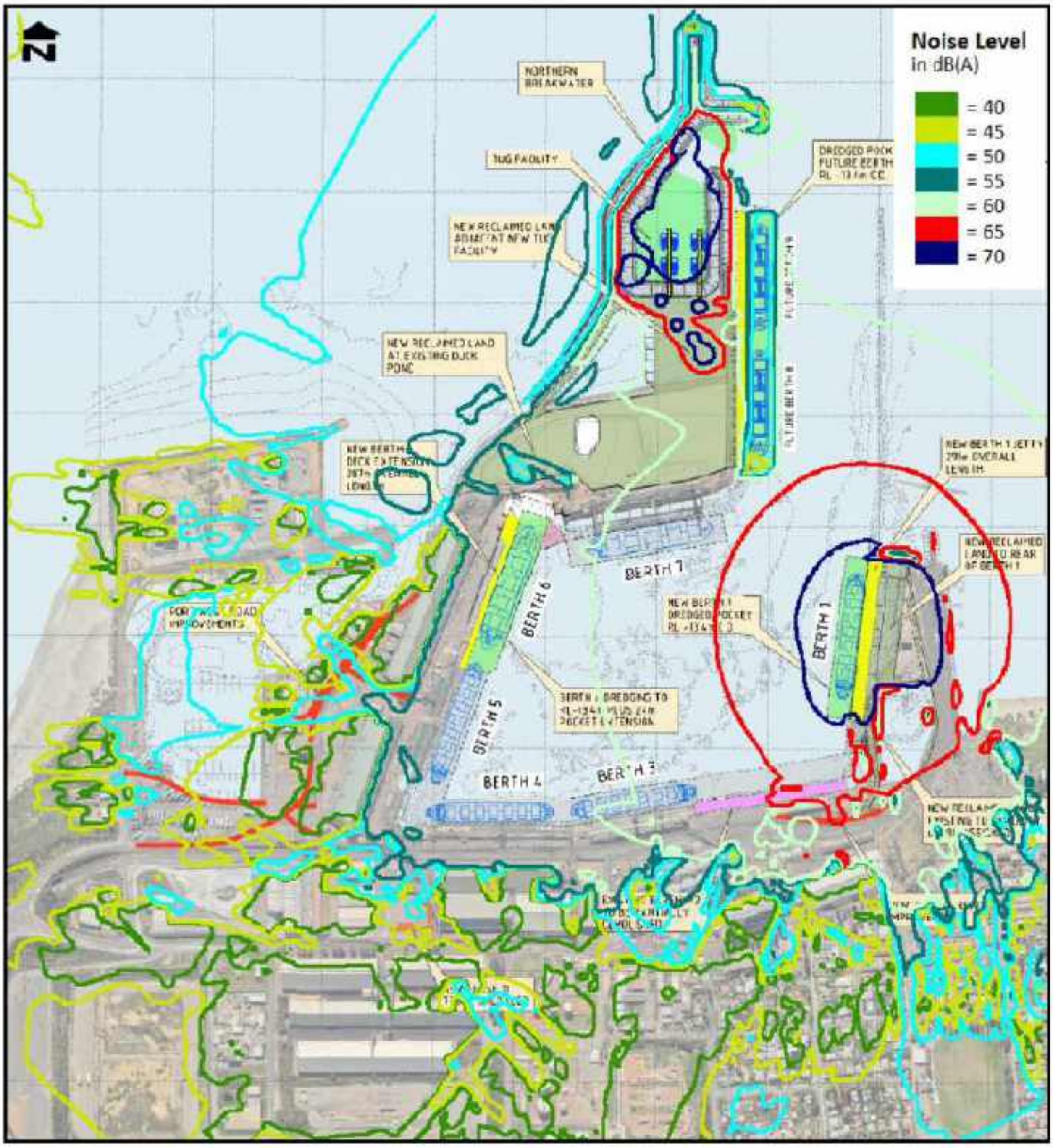


Figure 3: r t-case daytime noise contours for scenario 1.

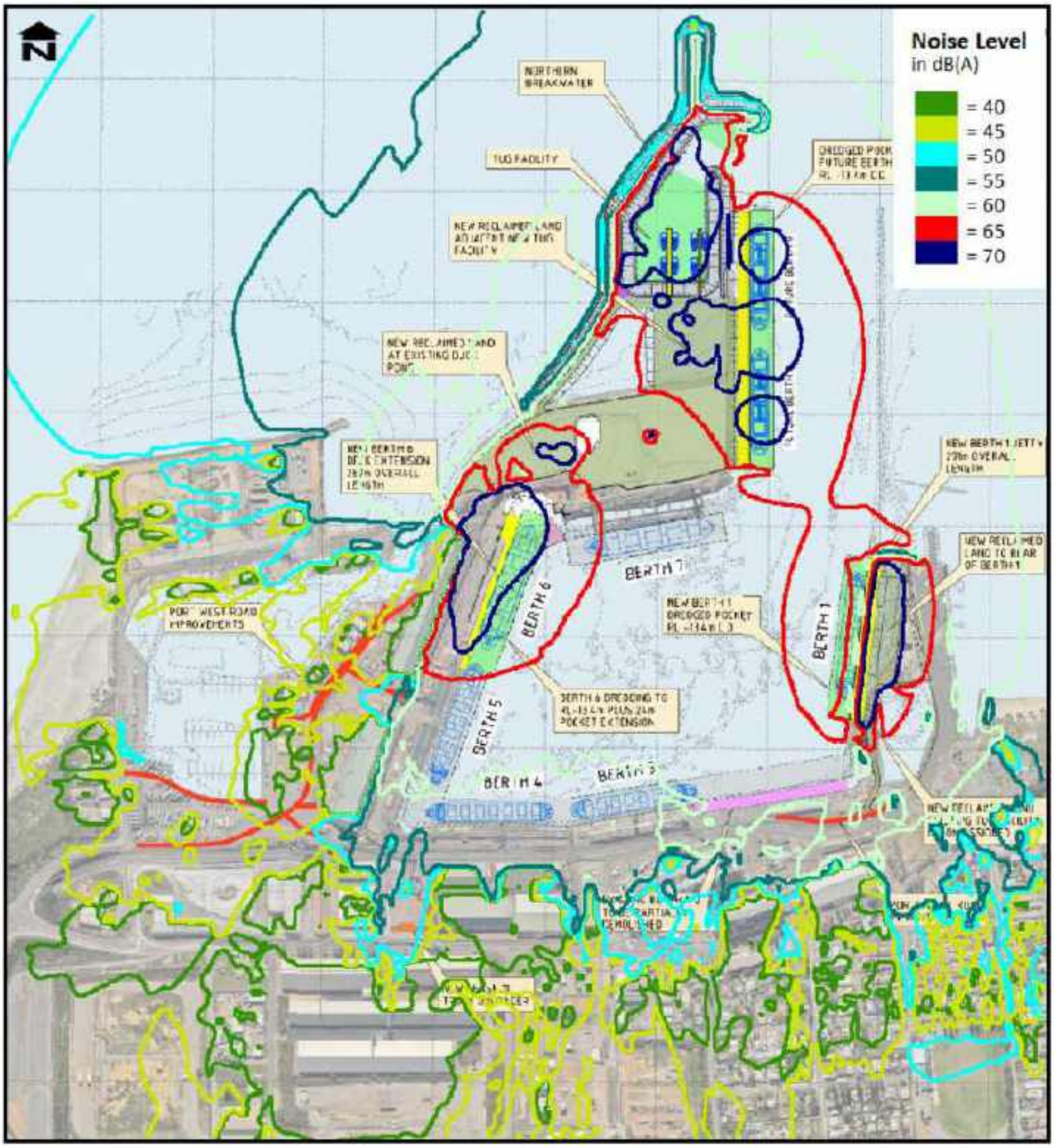


Figure 4 **t-case daytime noise contours for scenario 2.**

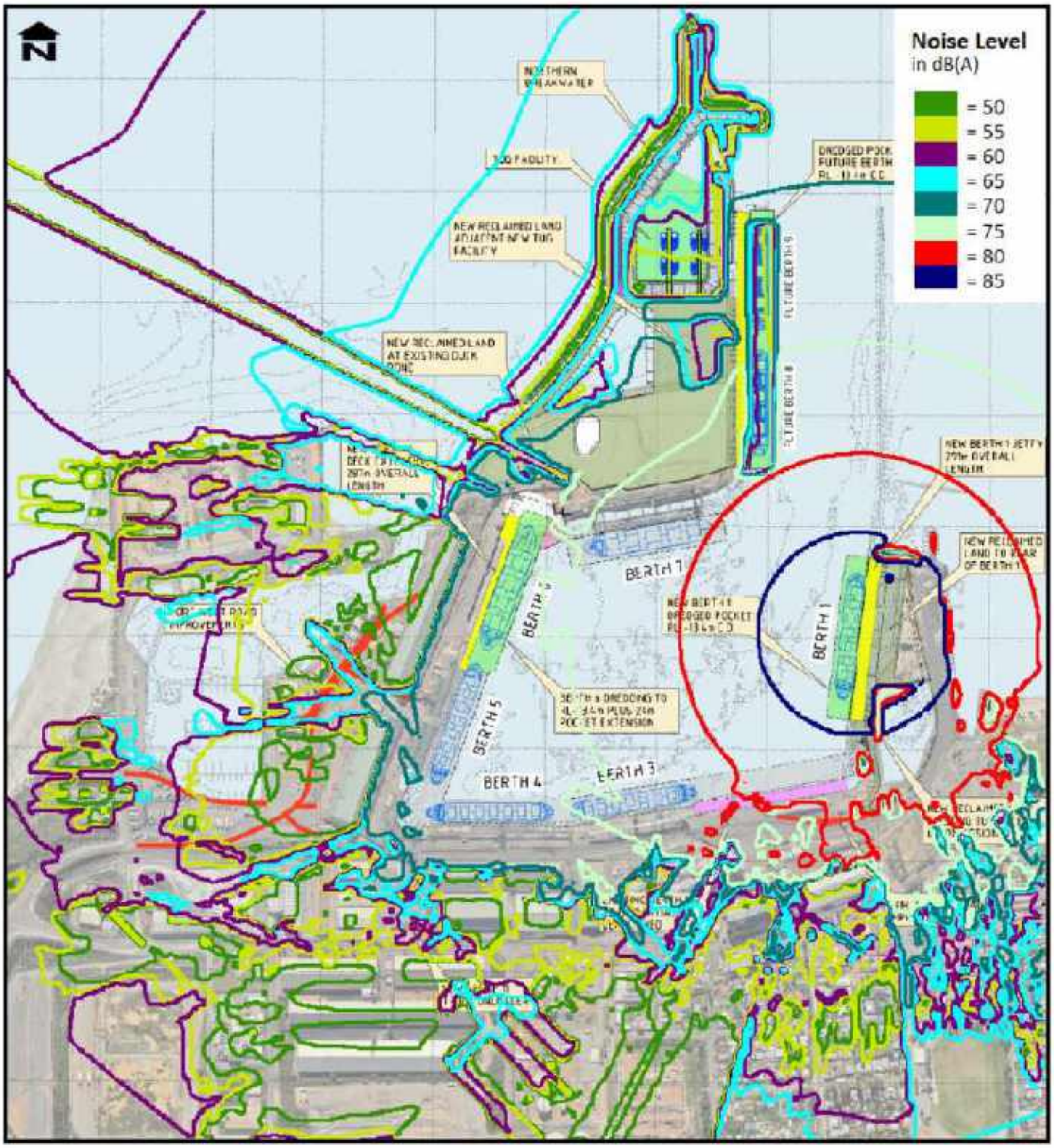


Figure 5: Worst- a › daytime noise level L_{Amax} contours for scenario 3.

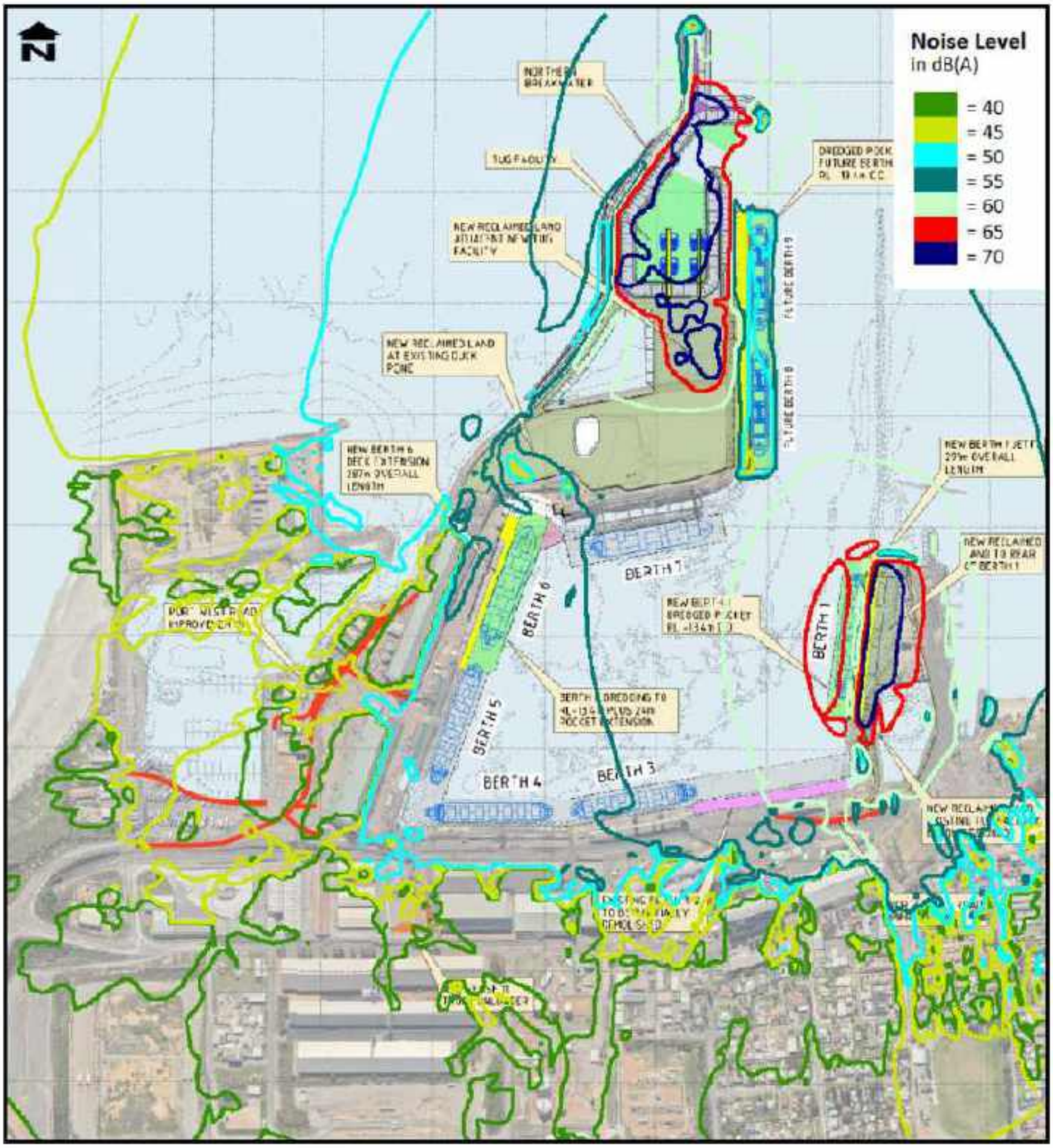


Figure 6: r t-case daytime noise contours for scenario 4.

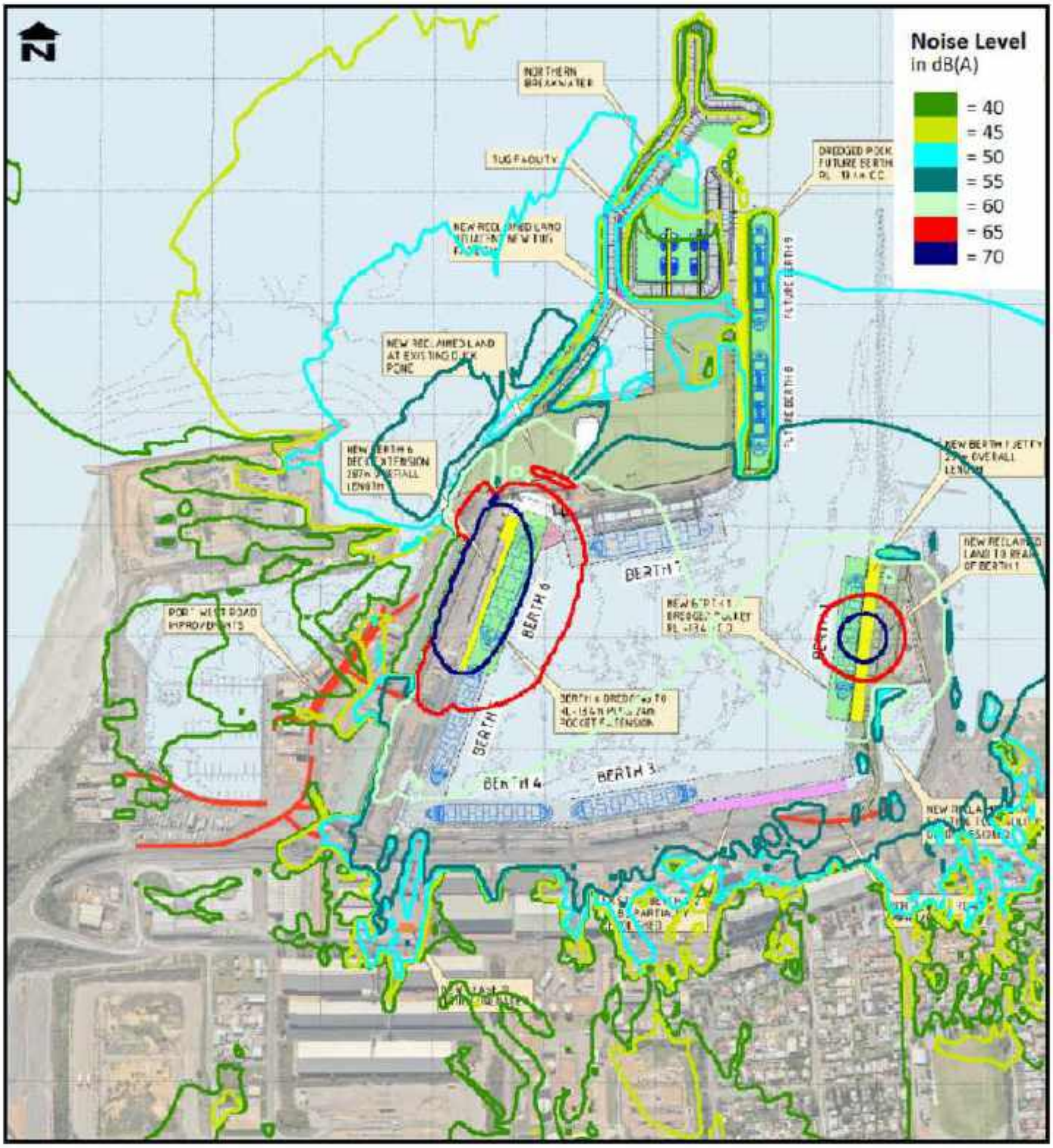


Figure 7 **t-case daytime noise contours for scenario 5.**

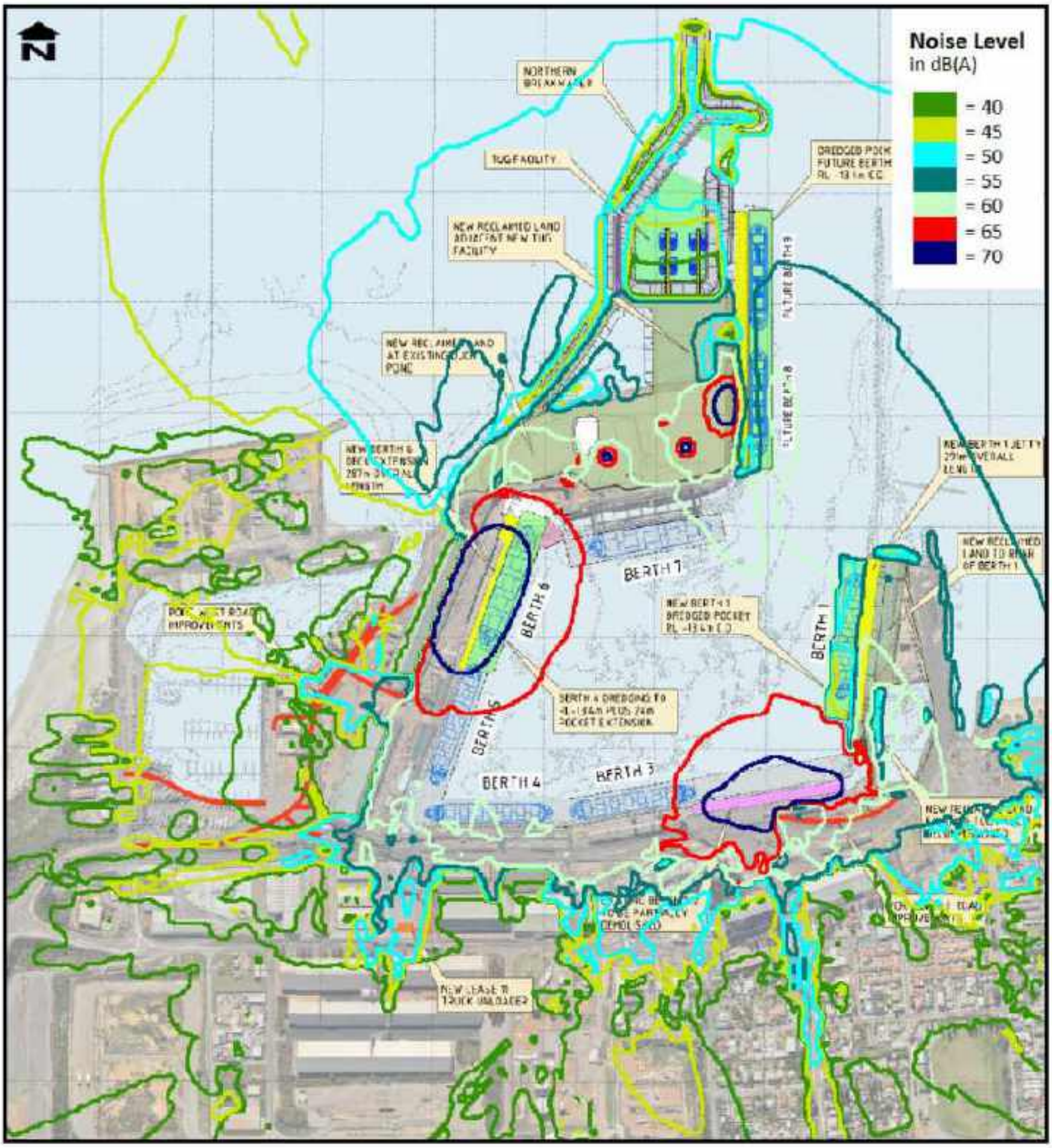


Figure 8 t-case daytime noise contours for scenario 6.

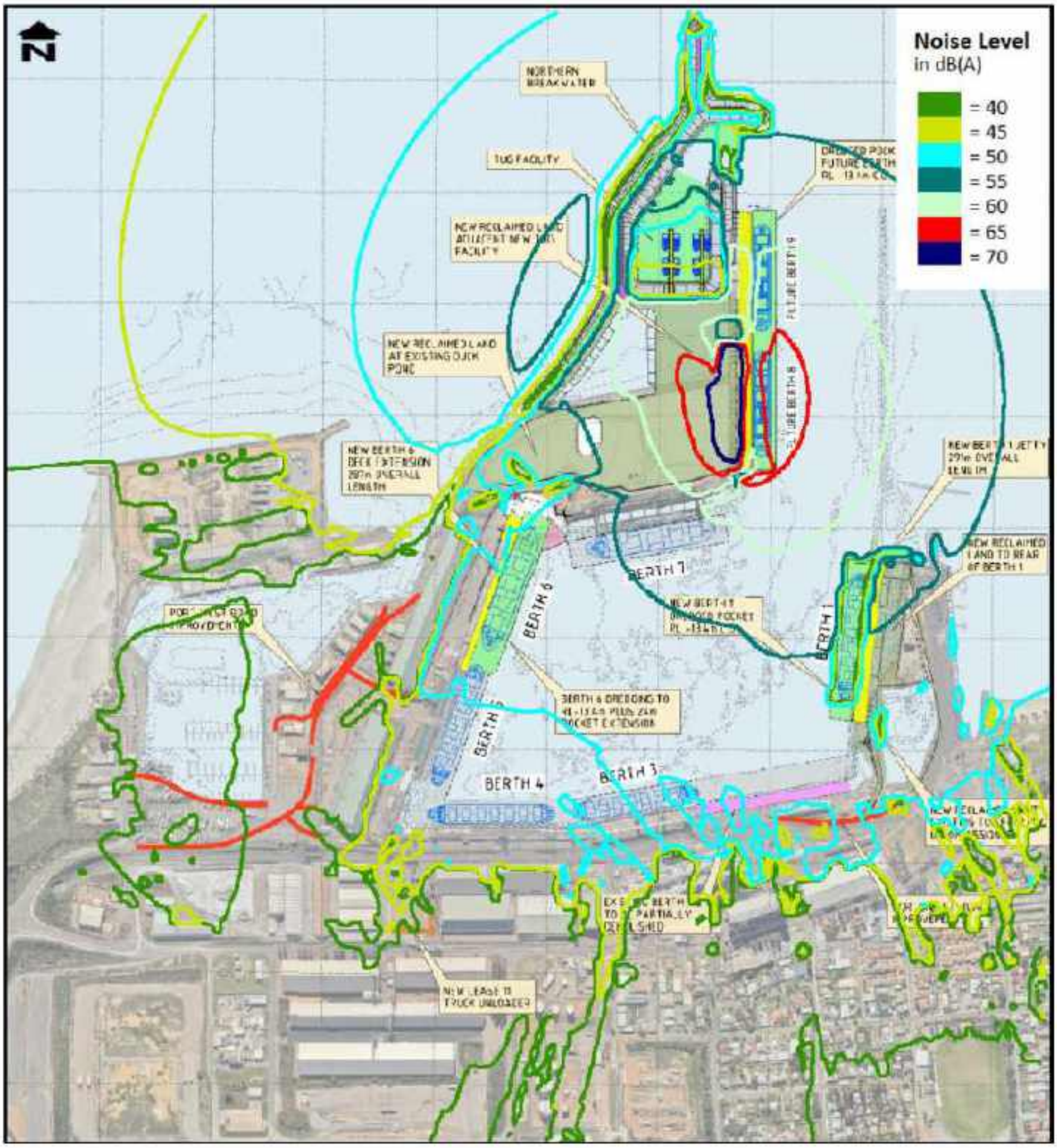


Figure 9 **t-case daytime noise contours for scenario 7.**

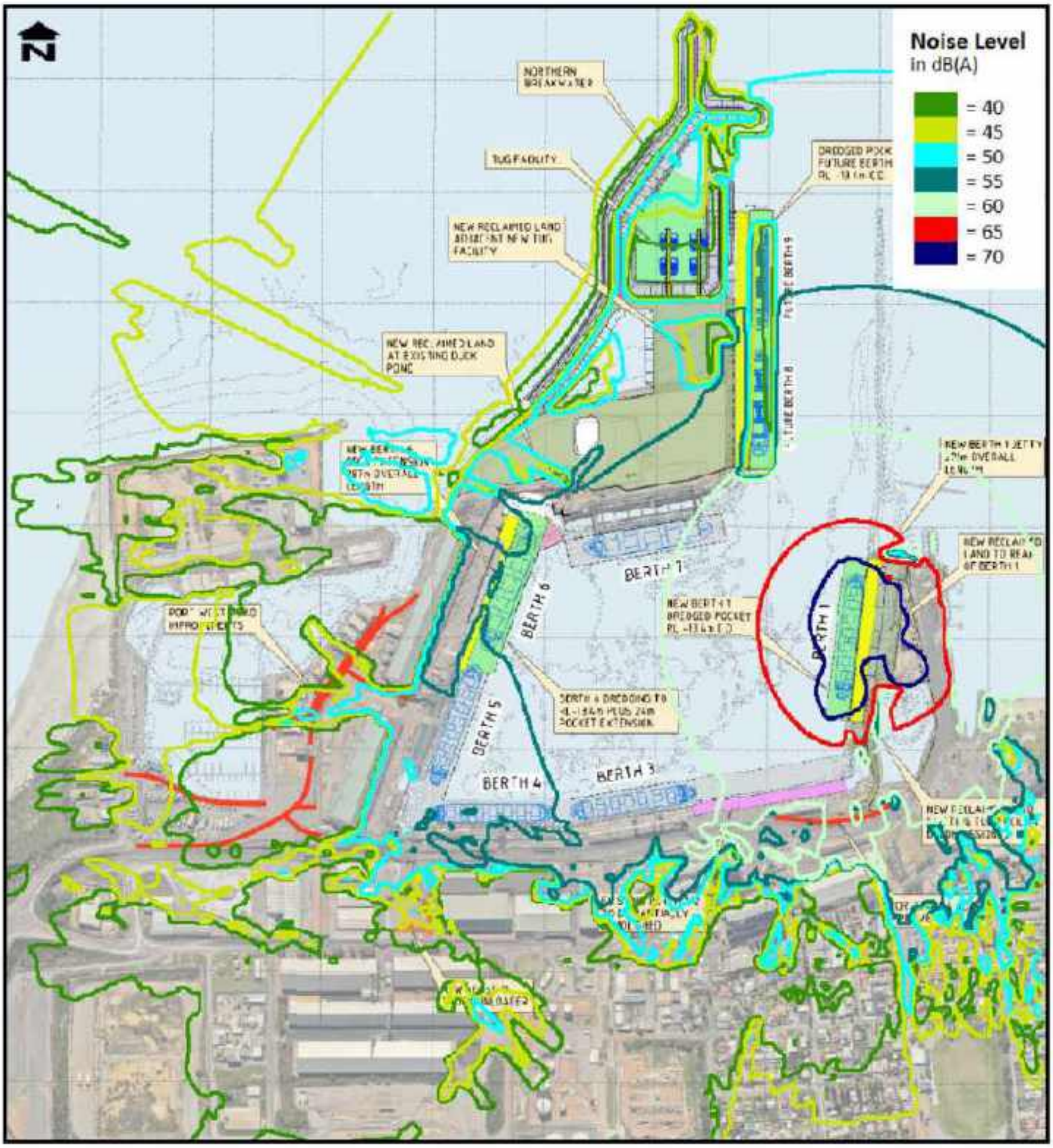


Figure 10: Worst-case night-time noise contours for scenario 8.

APPENDIX C COMPLAINT NOISE LOG

MWPA Noise Complaint Log

Date	Time	Method of complaint	Weather conditions and wind direction	Contact Details of complainant (Name and Phone)	Location of complainant	Nature of complaint	Response	Follow Up Action	Complaint Taken By
E.g. 18/9/24	7pm	Telephone	Light Westerly	John Smith, 0400 XXX XXX	2 XX Street, Geraldton	Loud noise between 5pm and 6pm	Verbal response. Problem solved	Noise Monitoring	Staff name

Appendix C: Design Drawings

Berth 1

P100184-5100-MA-DRG-0025_D MWPA - PMAXP Inner Harbour - Berth 1 General Arrangement Plan and Elevation

P100184-5100-MA-DRG-0044_D PMaxP Berth 1 Piling Schedule & Details Sheet 1

P100184-5100-MA-DRG-0045_D PMaxP Berth 1 Piling Schedule & Details Sheet 2

P100184-5100-CI-DRG-1003_B_IFT PMaxP Berth 1 Civil Drawings General Site Plan

P100184-5100-CI-DRG-1060_B_IFT PMaxP Berth 1 Civil Drawings General Details (incl Retention Swale)

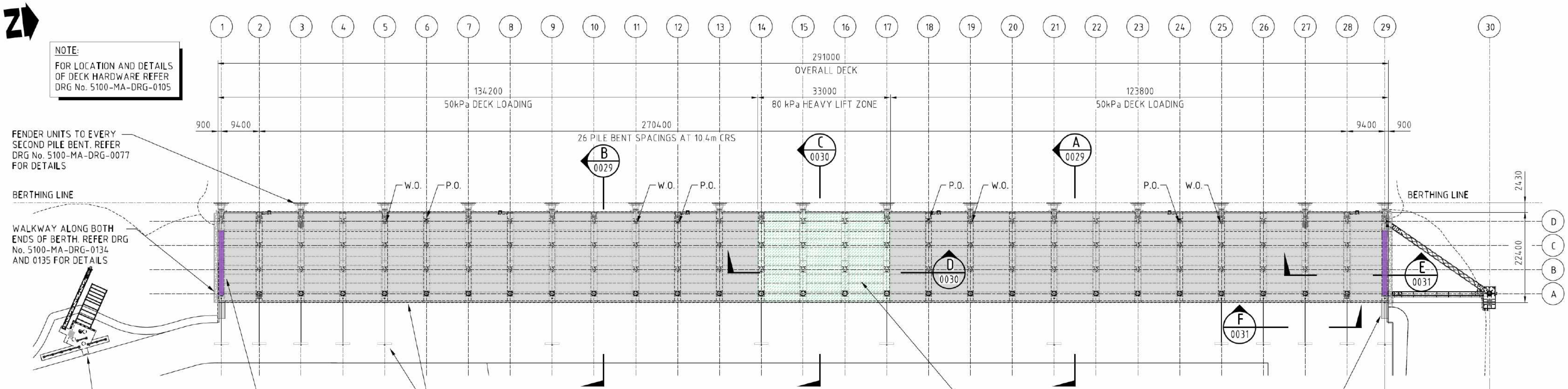
Berth 6

P100184-4200-MA-DRG-0025 PMaxP Berth 5 & 6 General Arrangement Plan & Elevations

P100184-4200-MA-DRG-0036 PMaxP Berth 5 & 6 Piling Schedule & Details Sheet 1

P100184-4200-MA-DRG-0037 PMaxP Berth 5 & 6 Piling Schedule & Details Sheet 2

P100184-4200-CI-DRG-0001 PMAXP Berth 5 & 6 Storm Water & Drainage Details



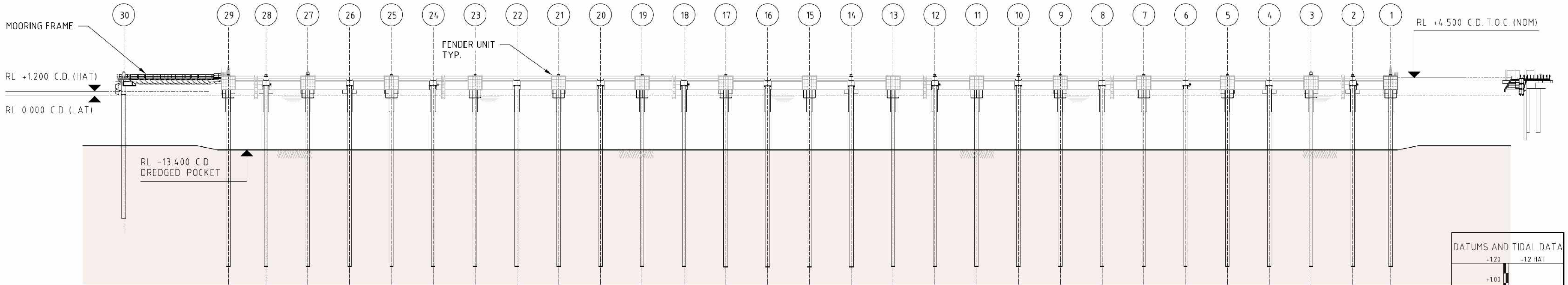
GENERAL ARRANGEMENT PLAN ON BERTH 1

1:500

NOTES:

P.O. DENOTES LOCATION OF CAST-IN POWER OUTLET. REFER DRG No. 5100-MA-DRG-0105 AND 0115 FOR DETAILS

W.O. DENOTES LOCATION OF BUNKERING WATER OUTLET. REFER DRG No. 5100-MA-DRG-0105 AND 0116 FOR DETAILS



GENERAL ARRANGEMENT ELEVATION ON BERTH 1 FENDERS

1:500

VIEW FROM BERTHING SIDE OF WHARF

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-5100-MA-DRG-0003 AND 0004

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

DATUMS AND TIDAL DATA

+1.20	+1.2 HAT
+1.00	+0.9 MHHW
+0.80	+0.8 MLHW
0.00 AHD +0.60	+0.6 MSL
+0.40	+0.3 MHLW
+0.20	+0.2 MLLW
0.000 CHART DATUM	0.000 LAT

ALL LEVELS ARE RELATIVE TO CHART DATUM

A.H.D. = AUSTRALIAN HEIGHT DATUM

DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
		D	14.03.25	ISSUED FOR TENDER	D.S.	K.W.	I.P.
		C	30.04.24	ISSUED FOR CLIENT 85% REVIEW	D.S.	K.W.	I.P.
		B	12.12.23	ISSUED FOR CLIENT 50% REVIEW	D.S.	K.W.	I.P.
		A	11.12.23	ISSUED FOR INTERNAL REVIEW	D.S.		

MID WEST PORTS

AGILITUS

DESIGNED	K.WRIGHT
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	12.12.23
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

This drawing must not be copied or reproduced in any form or used for any purpose other than originally intended without written approval of Agilitus

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 1
GENERAL ARRANGEMENT
PLAN AND ELEVATION

A1 | SCALE: AS NOTED | DRG No: P100184-5100-MA-DRG-0025 | REV: D

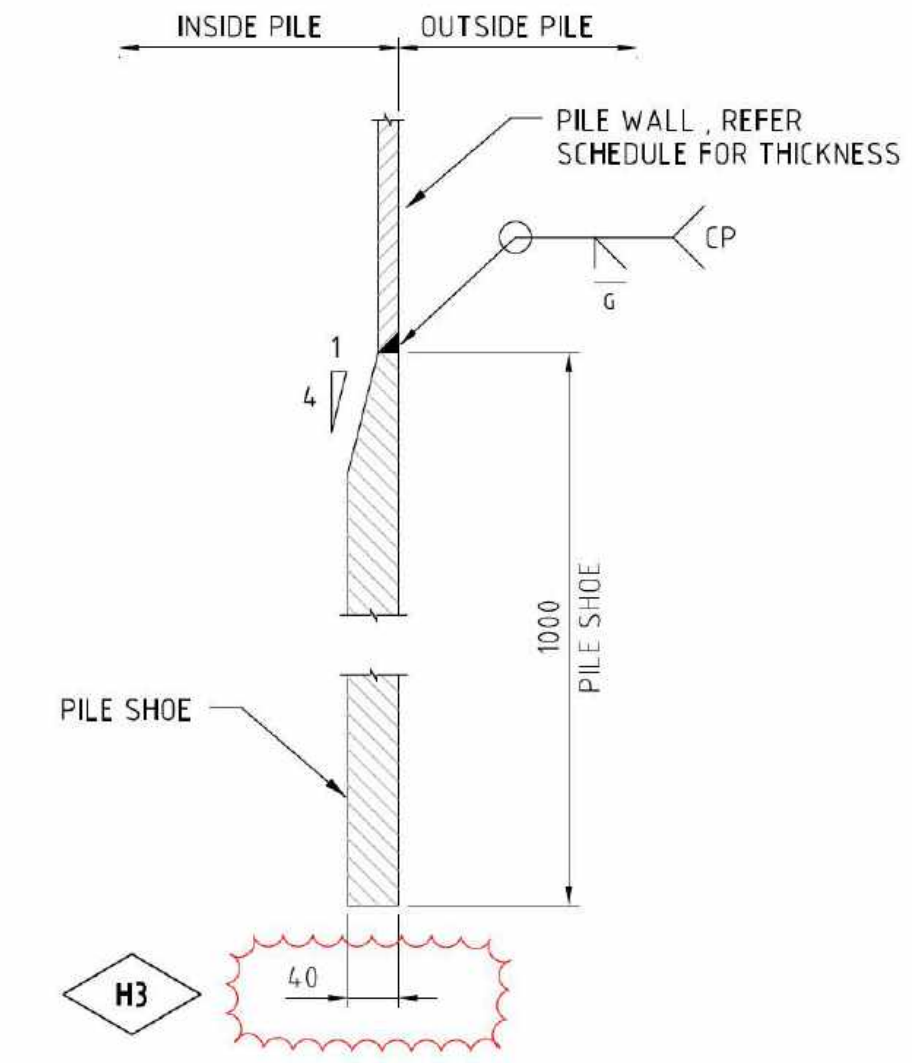
PILE SCHEDULE

PILE BENT	PILE No.	PILE SIZES	CUT-OFF LEVEL RL (m CD)	THEORETICAL PILE LENGTH (m)	MAXIMUM ULTIMATE STRUCTURAL TENSION (kN)	MAXIMUM ULTIMATE STRUCTURAL COMPRESSION (kN)	APPROX. SEABED LEVEL AFTER DREDGING RL (m CD)	ESTIMATED PILE TOE LEVEL RL (m CD)	MINIMUM DRIVEN TOE LEVEL FOR LATERAL FIXITY RL (m CD)	REMARKS	PILE ORDER ASSUMPTIONS: PROPOSED ORDERED LENGTH (m)	PILE COATING: PAINTING: UNPAINTED LENGTH FROM TOE (m)	PILE COATING: PAINTING: PAINTED PILE LENGTH (m)	PILE SLEEVE: PILE SLEEVES & GROUT ANNULUS REQUIRED (SEE ALSO DRG No. 5100-MA-DRG-0047)
1	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
2	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
3	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
4	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
5	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
6	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
7	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
8	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
9	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
10	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
11	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
12	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
13	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
14	P1	1050 OD x 22 GR 350	2.358	39.4	0	8500	-0.717	-37.0	-21.0	PILE PLUG TYPE 2A	42.0	42.0	0.0	YES
	P2	1050 OD x 22 GR 350	2.418	39.4	0	8500	-4.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	15.3	26.7	NO
	P3	1050 OD x 22 GR 350	2.478	39.5	0	8500	-8.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	11.3	30.7	NO
	P4	1050 OD x 22 GR 350	2.538	39.5	0	8500	-11.000	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	9.0	33.0	NO
15	P1	1050 OD x 22 GR 350	2.358	39.4	0	10000	-0.717	-37.0	-21.0	PILE PLUG TYPE 2A	42.0	42.0	0.0	YES
	P2	1050 OD x 22 GR 350	2.418	39.4	0	10000	-4.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	15.3	26.7	NO
	P3	1050 OD x 22 GR 350	2.478	39.5	0	10000	-8.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	11.3	30.7	NO
	P4	1050 OD x 22 GR 350	2.538	39.5	0	10000	-11.000	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	9.0	33.0	NO
16	P1	1050 OD x 22 GR 350	2.358	39.4	0	10000	-0.717	-37.0	-21.0	PILE PLUG TYPE 2A	42.0	42.0	0.0	YES
	P2	1050 OD x 22 GR 350	2.418	39.4	0	10000	-4.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	15.3	26.7	NO
	P3	1050 OD x 22 GR 350	2.478	39.5	0	10000	-8.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	11.3	30.7	NO
	P4	1050 OD x 22 GR 350	2.538	39.5	0	10000	-11.000	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	9.0	33.0	NO
17	P1	1050 OD x 22 GR 350	2.358	39.4	0	8500	-0.717	-37.0	-21.0	PILE PLUG TYPE 2A	42.0	42.0	0.0	YES
	P2	1050 OD x 22 GR 350	2.418	39.4	0	8500	-4.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	15.3	26.7	NO
	P3	1050 OD x 22 GR 350	2.478	39.5	0	8500	-8.717	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	11.3	30.7	NO
	P4	1050 OD x 22 GR 350	2.538	39.5	0	8500	-11.000	-37.0	-21.0	PILE PLUG TYPE 2B	42.0	9.0	33.0	NO
18	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-5100-MA-DRG-0003 AND 0004
2. FOR CONTINUATION OF PILE SCHEDULE REFER DRG No. P100184-5100-MA-DRG-0045
3. PILE LENGTH IS INCLUSIVE OF PILE SHOE, AS DETAILED ON THIS DRAWING
4. ALL PILES SHOULD BE DRIVEN TO ACHIEVE THE REQUIRED ULTIMATE GEOTECHNICAL CAPACITY AND ACHIEVE AT LEAST MINIMUM TOE LEVELS FOR LATERAL FIXITY
5. ESTIMATED PILE TOE LEVELS ARE BASED ON FOUNDING PILES IN DENSE CEMENTED FORMATIONS AT DEPTH. WHERE PILES ACHIEVE DESIGN SET WITHIN UPPER LIMESTONE LAYER, PILES MAY BE TERMINATED EARLY PROVIDED PDA TESTING PROVES SUFFICIENT
6. WHERE PILES FAIL TO ACHIEVE DESIGN SET VALUES, ADVICE MUST BE SOUGHT FROM SUPERINTENDENT. SPLICING AND FURTHER DRIVING MAY BE NECESSARY.
7. REQUIRED ULTIMATE GEOTECHNICAL PILE CAPACITIES ARE DETERMINED BY DIVIDING THE ULTIMATE STRUCTURAL LOAD PROVIDED BY A GEOTECHNICAL STRENGTH REDUCTION FACTOR (Øg) OF 0.73 TO AS2159. THIS VALUE SHALL BE CONFIRMED BY THE SUPERINTENDENT FOLLOWING RECEIPT OF ALL PDA TESTING RESULTS.
8. IF CHINESE SUPPLY OF PILES, THEN PLATE GRADE SHALL BE Q355C IN ACCORDANCE WITH THE SPECIFICATION
9. FOR PILE PLUG DETAILS REFER DRG No. P100184-5100-MA-DRG-0046



TYPICAL PILE SHOE

NOTES:
CONTRACTOR TO CONFIRM PILE SHOE DESIGN IS ADEQUATE FOR PILE INSTALLATION METHOD AND ANTICIPATED GEOTECHNICAL MATERIALS ENCOUNTERED

LIST OF HOLDS

H03	HOLD FOR CONFIRMATION OF PILE SHOE THICKNESS BY CONTRACTOR

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
		D	14.03.25	ISSUED FOR TENDER	D.S.	K.W.	I.P.
		C	30.04.24	ISSUED FOR CLIENT 85% REVIEW	D.S.	K.W.	I.P.
		B	12.12.23	ISSUED FOR CLIENT 50% REVIEW	D.S.	K.W.	I.P.
		A	11.12.23	ISSUED FOR INTERNAL REVIEW	D.S.		

MID WEST PORTS

AGILITUS

DESIGNED	K.WRIGHT
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	12.12.23
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

This drawing must not be copied or reproduced in any form or used for any purpose other than originally intended without written approval of Agilitus

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 1
PILING
SCHEDULE AND DETAILS - SHEET 1

A1 | SCALE: AS NOTED | DRG No: P100184-5100-MA-DRG-0044 | REV: D

PILE SCHEDULE

PILE BENT	PILE No.	PILE SIZES	CUT-OFF LEVEL RL (m CD)	THEORETICAL PILE LENGTH (m)	MAXIMUM ULTIMATE STRUCTURAL TENSION (kN)	MAXIMUM ULTIMATE STRUCTURAL COMPRESSION (kN)	APPROX. SEABED LEVEL AFTER DREDGING RL (m CD)	ESTIMATED PILE TOE LEVEL RL (m CD)	MINIMUM DRIVEN TOE LEVEL FOR LATERAL FIXITY RL (m CD)	REMARKS	PILE ORDER ASSUMPTIONS: PROPOSED ORDERED LENGTH (m)	PILE COATING: PAINTING: UNPAINTED LENGTH FROM TOE (m)	PILE COATING: PAINTING: PAINTED PILE LENGTH (m)	PILE SLEEVE: PILE SLEEVES & GROUT ANNULUS REQUIRED (SEE ALSO DRG No. 5100-MA-DRG-0047)
19	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
20	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
21	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
22	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
23	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
24	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
25	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
26	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
27	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
28	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
29	P1	914 OD x 22 GR 350	2.458	39.5	0	7000	-0.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	42.0	0.0	YES
	P2	914 OD x 22 GR 350	2.518	39.5	0	7000	-4.717	-37.0	-21.0	PILE PLUG TYPE 1A	42.0	15.3	26.7	NO
	P3	914 OD x 22 GR 350	2.578	39.6	0	7000	-8.717	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	11.3	30.7	NO
	P4	914 OD x 22 GR 350	2.638	39.6	0	7000	-11.000	-37.0	-21.0	PILE PLUG TYPE 1B	42.0	9.0	33.0	NO
30	P1	914 OD x 22 GR 350	4.280	37.3	2000	500	-8.030	-33.0	-21.0	N/A	42.0	12.0	30.0	N/A

NOTE: MOORING BLOCK AND LINE BOAT JETTY PILES

FOR DETAILS OF ONSHORE MOORING BLOCK AND LINE BOAT JETTY PILES REFER DRG No. 5100-MA-DRG-0148

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-5100-MA-DRG-0003 AND 0004
2. FOR CONTINUATION OF PILE SCHEDULE REFER DRG No. P100184-5100-MA-DRG-0044
3. FOR PILING NOTES REFER DRG No. P100184-5100-MA-DRG-0044

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
		D	14.03.25	ISSUED FOR TENDER	D.S.	K.W.	I.P.
		C	30.04.24	ISSUED FOR CLIENT 85% REVIEW	D.S.	K.W.	I.P.
		B	12.12.23	ISSUED FOR CLIENT 50% REVIEW	D.S.	K.W.	I.P.
		A	11.12.23	ISSUED FOR INTERNAL REVIEW	D.S.		

MID WEST PORTS

AGILITUS

DESIGNED	K.WRIGHT
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	12.12.23
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 1
PILING
SCHEDULE AND DETAILS - SHEET 2

A1 | SCALE: AS NOTED | DRG No: P100184-5100-MA-DRG-0045 | REV: D

POINT	EASTING	NORTHING	COMMENT	RL (mCD)	TOC (mCD)	POLE TYPE	FOOTING TYPE
LIGHT POLE SET OUT TABLE							
LP00	51794.584	165520.014	POLE INSTALLED BETWEEN ROCK BARRIER	2.392	2.592	12m	FT2
LP01	51801.748	165545.913		2.254	2.454	12m	FT2
LP02	51797.444	165572.790		2.996	3.196	12m	FT2
LP03	51793.016	165599.529		3.560	3.760	12m	FT2
LP04	51788.773	165625.160		3.561	3.761	12m	FT2
LP05	51794.230	165717.100	POLE PROTECTED BY 4 BOLLARDS REFER TO DRG P100184-5100-CI-DRG-1060	3.971	4.171	30m	FT1
LP06	51819.922	165751.326		3.538	3.738	30m	FT1
LP07	51826.747	165810.937		3.658	3.858	30m	FT1
LP08	51833.571	165870.548		3.888	4.088	30m	FT1
LP09	51847.918	165929.297		3.387	3.587	30m	FT1
LP10	51854.723	165880.854	ROADSIDE LIGHTING	3.039	3.239	12m	FT3
LP11	51862.754	165841.654		2.800	3.000	12m	FT3
LP12	51871.404	165802.560		2.560	2.760	12m	FT3
LP13	51880.733	165763.614		2.321	2.521	12m	FT3
LP14	51890.193	165724.679	POLE INSTALLED BETWEEN ROCK BARRIER	2.262	2.462	12m	FT3
LP15	51898.158	165685.270		2.222	2.422	12m	FT2
LP16	51901.880	165646.128		2.163	2.363	12m	FT2
LP17	51895.112	165604.894		2.118	2.318	12m	FT2
LP18	51881.006	165568.745		2.265	2.465	12m	FT2

LIGHT POLE SET OUT TABLE

POINT	EASTING	NORTHING	COMMENT	RL (mCD)	TOC (mCD)	POLE TYPE	FOOTING TYPE
LP19	51776.539	165612.274	SOUTH CAPSTAN				MOUNTED TO STRUCTURE
LP20	51766.175	165615.983	SOUTH CAPSTAN				MOUNTED TO STRUCTURE
LP21	51773.035	165654.124	NEXT TO SOUTHERN SHADOW TENSION UNIT. POLE PROTECTED BY 4 BOLLARDS REFER TO DRG P100184-5100-CI-DRG-1060	4.249	4.449	12m	FT2
LP22	51803.272	165945.356	NORTH CAPSTAN				MOUNTED TO STRUCTURE
LP23	51804.979	165960.258	NORTH CAPSTAN				MOUNTED TO STRUCTURE
LP24	51808.875	165964.838	NORTH CAPSTAN				MOUNTED TO STRUCTURE

LIGHT POLE SET OUT TABLE

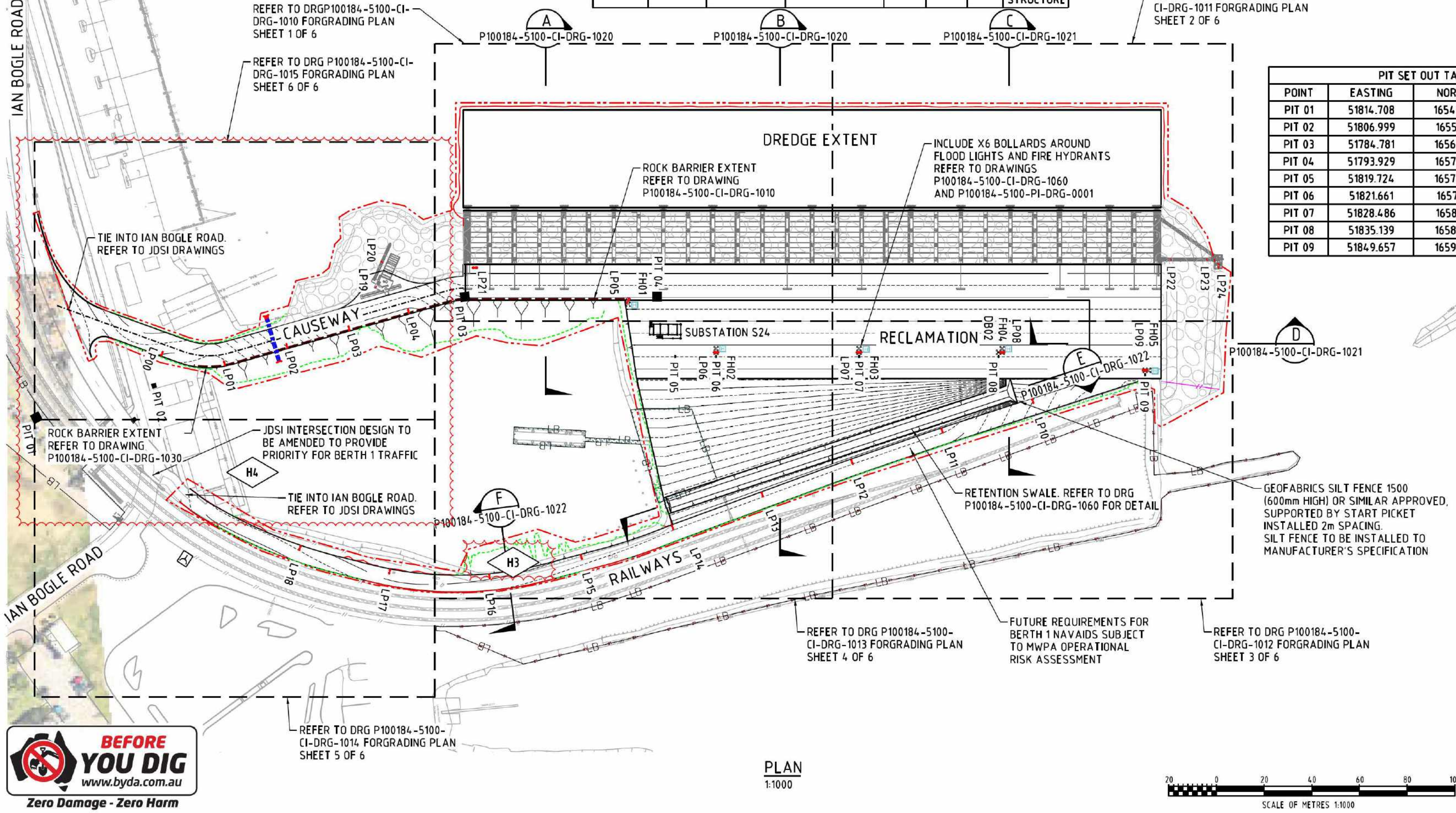
POINT	EASTING	NORTHING	COMMENT	RL (mCD)	TOC (mCD)	POLE TYPE	FOOTING TYPE
DB02	51831.948	165862.725	DISTRIBUTION BOARD PROTECTED BY BOLLARDS REFER TO DRG P100184-5100-CI-DRG-1060	3.946			
S24	51833.401	165869.057	LOCATION IS CENTRE	3.896			

FIRE HYDRANT SET OUT TABLE

FH01	FH5100-01	REFER DRAWING P100184-5100-PI-DRG-0001 FOR CO-ORDS	FIRE HYDRANTS PROTECTED BY BOLLARDS REFER TO DRG P100184-5100-PI-DRG-0001	FIRE HYDRANTS FOR 30m LIGHT TOWERS LP05-LP09	
FH02	FH5100-02				
FH03	FH5100-03				
FH04	FH5100-04				
FH05	FH5100-05				

PIT SET OUT TABLE

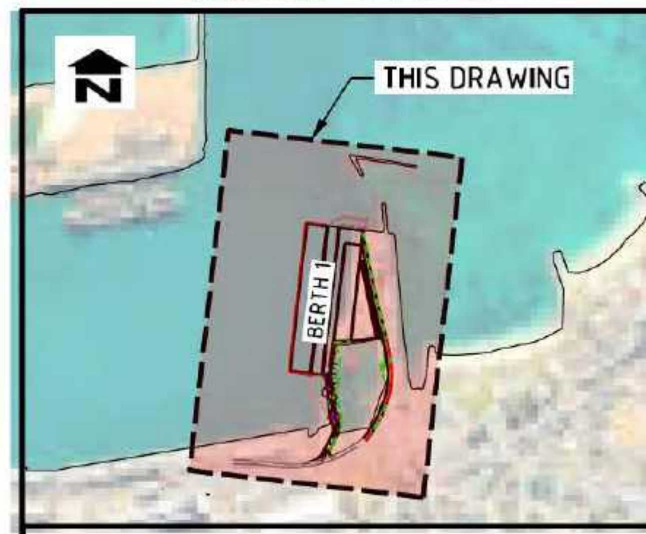
POINT	EASTING	NORTHING	RL (mCD)
PIT 01	51814.708	165464.824	FSL
PIT 02	51806.999	165515.380	
PIT 03	51784.781	165649.266	
PIT 04	51793.929	165729.333	
PIT 05	51819.724	165734.093	
PIT 06	51821.661	165751.127	
PIT 07	51828.486	165810.738	
PIT 08	51835.139	165868.859	
PIT 09	51849.657	165929.098	



PLAN
1:1000

SCALE OF METRES 1:1000

LOCALITY PLAN



SURVEY

COORDINATE REFERENCE SYSTEM:
GERALDTON COASTAL GRID 94 (GCG 94)

HEIGHT DATUM:
CHART DATUM (C.D.)

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. REFER TO DRAWING P10084-5100-CI-DRG-1002 FOR GENERAL NOTES.
3. SERVICES INFORMATION ARE INDICATIVE ONLY.

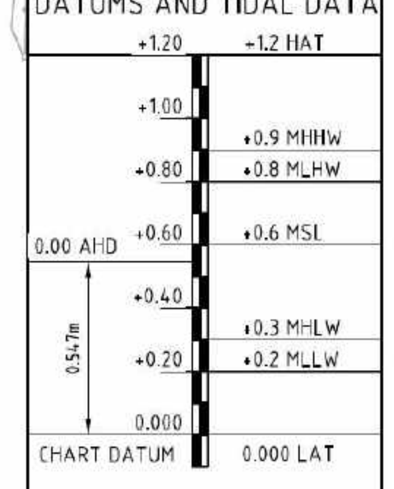
LEGEND

- EARTHWORKS CUT BATTER
- EARTHWORKS FILL BATTER
- ROAD REFERENCE LINE
- EXISTING EMBANKMENT TOE
- EXISTING EMBANKMENT TOP
- EXISTING SITE LAYOUT
- EXISTING ROCK REVETMENT
- FINISHED SURFACE MAJOR CONTOUR (0.2m INTERVAL)
- FINISHED SURFACE MINOR CONTOUR (0.1m INTERVAL)
- EXTENT OF WORKS BOUNDARY
- LB — LEASE BOUNDARY
- CADASTRAL BOUNDARY
- SILT FENCE
- LP01 LIGHT POLES
- SUBSTATION S24
- FH01 FIRE HYDRANT
- DB02 DISTRIBUTION BOARD
- ROCK BARRIER
- FENCE

HOLD

- H3 FUTURE REQUIREMENTS FOR BERTH 1 NAVAIDS SUBJECT TO MWPA OPERATIONAL RISK ASSESSMENT.
- H4 JDSI TIE IN TO BE CONFIRMED

DATUMS AND TIDAL DATA



ALL LEVELS ARE RELATIVE TO CHART DATUM

A.H.D. = AUSTRALIAN HEIGHT DATUM

DRAWING MUST BE PRINTED IN COLOUR TO CORRECTLY SHOW DETAILS

ISSUED FOR TENDER

NOT FOR CONSTRUCTION

FOR INFORMATION ONLY

BEFORE YOU DIG
www.byda.com.au
Zero Damage - Zero Harm

DRAWING NUMBER	REFERENCE DRAWING TITLE
P100184-5100-PI-DRG-0001	PIPING - FIRE AND POTABLE WATER SERVICES GA
P100184-5000-EL-DRG-0016-17	ELECTRICAL - BERTH 1 ELECTRICAL EQUIP-SHEET 1 TO 2
P100184-5100-CI-DRG-1025	EARTHWORKS - SECTION AND SEAWALL - SHEET 4 OF 4
P100184-5100-CI-DRG-1020-22	EARTHWORKS - SECTION AND SEAWALL - SHEET 1 TO 3
P100184-5100-CI-DRG-1010-14	EARTHWORKS - GRADING PLAN - SHEET 1 TO 6
P100184-5100-CI-DRG-1002	CIVIL DRAWINGS - GENERAL - NOTES

REV	DATE	DESCRIPTION	DRN	CHK	APP
B	14.08.25	ISSUED FOR TENDER	RC	HW	CM
A	11.08.25	ISSUED FOR INTERNAL REVIEW	RC	HW	CM

MID WEST PORTS

AGILITUS

DESIGNED	R.CONCEPCION	PROJECT NUMBER
DRAWN	R.CONCEPCION	RP22055
CHECKED	H.WIJAYA	
APPROVED	C.MEEKING	
APPROVED DATE	07.08.25	
DATUM	CHART DATUM	

This drawing must not be copied or reproduced in any form or used for any purpose other than originally intended without written approval of Agilitus

MWPA - PORT MAXIMISATION PROJECT
BERTH 1 - CIVIL DRAWINGS
GENERAL
SITE PLAN

SIZE	SCALE	DRG No:	REV:
A1	1:1000	P100184-5100-CI-DRG-1003	B

MAIN ROADS WA STANDARDS DRAWINGS	
DRAWING NUMBER	DRAWING DESCRIPTION
9331-0376-6	KERB TYPE
9331-0377-5	KERBING TREATMENTS

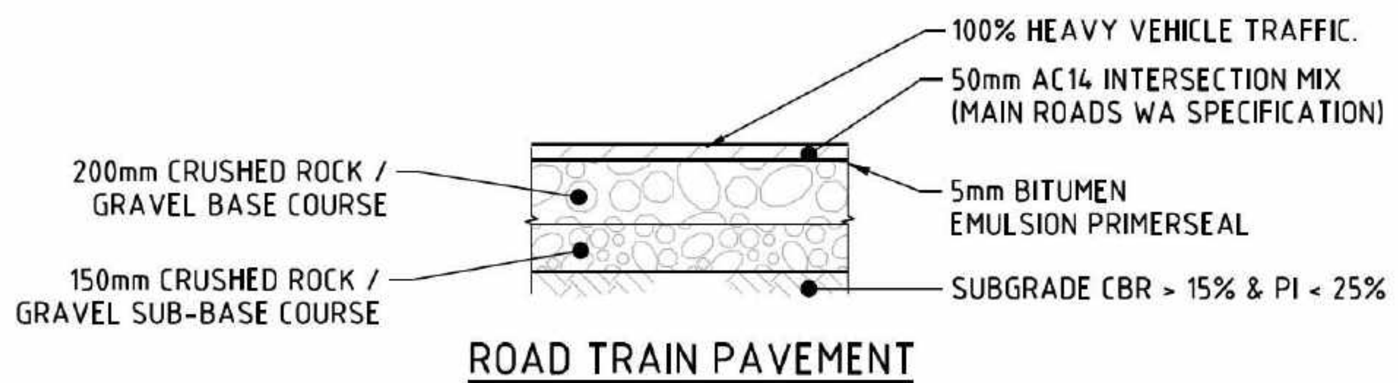
SURVEY

COORDINATE REFERENCE SYSTEM:
GERALDTON COASTAL GRID 94 (GCG94)

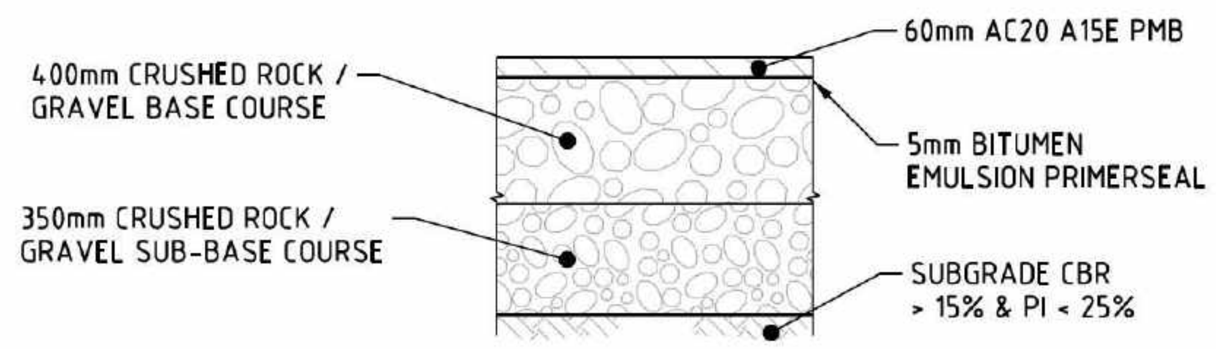
HEIGHT DATUM:
CHART DATUM (C.D.)

NOTES

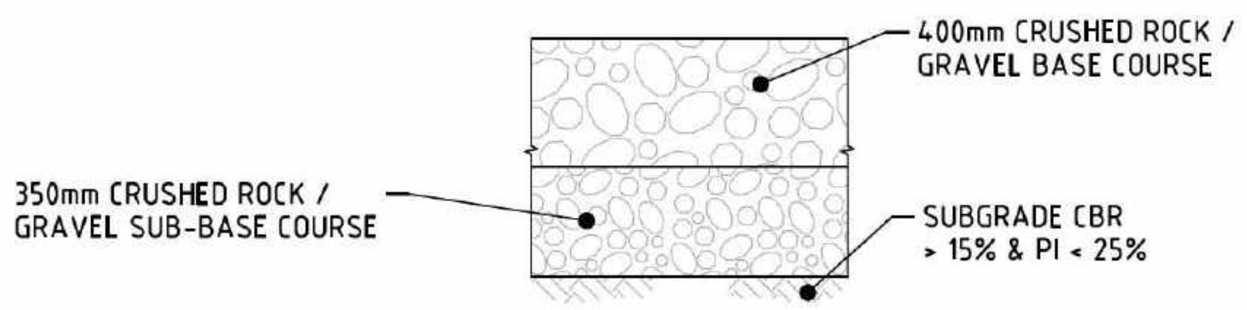
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. REFER TO DRAWING P10084-5100-CI-DRG-1002 FOR GENERAL NOTES.
3. ALL BOLLARDS TO BE FIXED WITH CONCRETE FOOTING. REFER TO DRAWING P100184-0000-CO-DRG-0010 FOR STANDARD DETAIL.
4. CENTRAL SET OUT COORDINATE FOR SUBSTATION REFER DRG P100184-5100-CI-DRG-1003. SUBSTATION DELIVERED BY DESIGN AND CONSTRUCT BY CONTRACTOR.



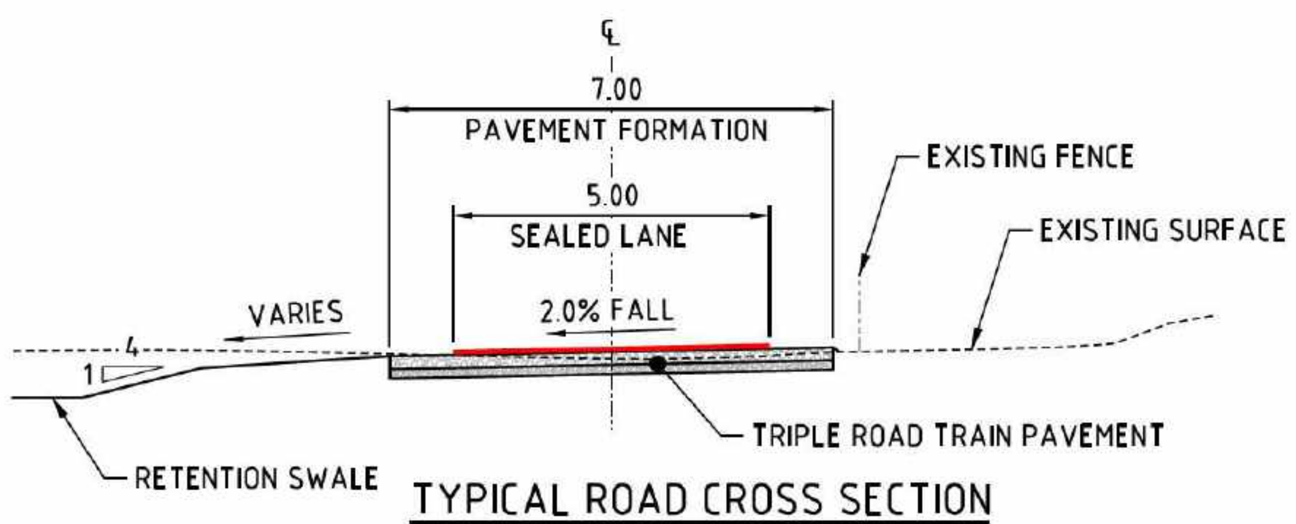
ROAD TRAIN PAVEMENT
206VPD - 1.0x10^7 ESA
SCALE 1:20



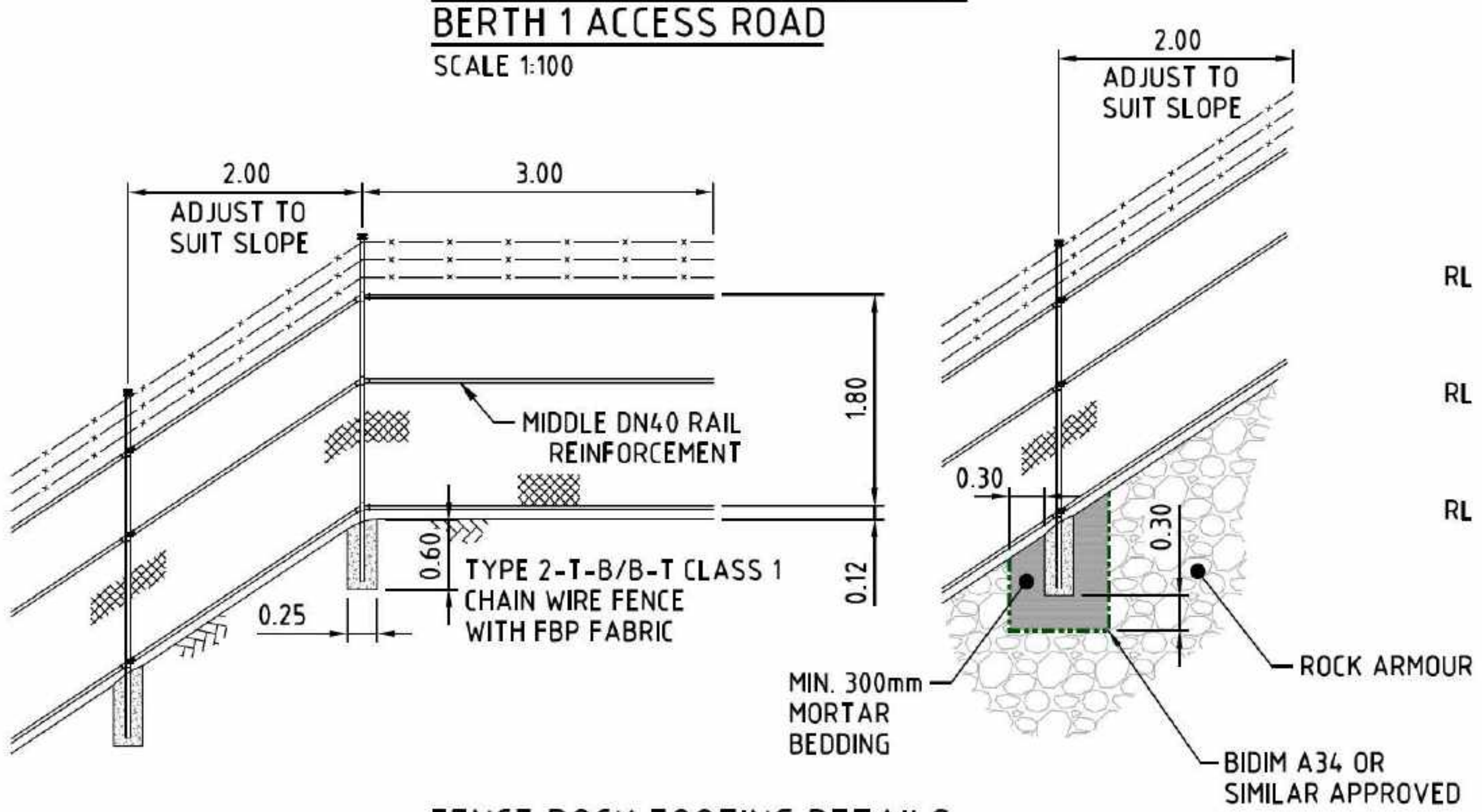
HARDSTAND PAVEMENT - SEALED
46T REACH STACKER
SCALE 1:20



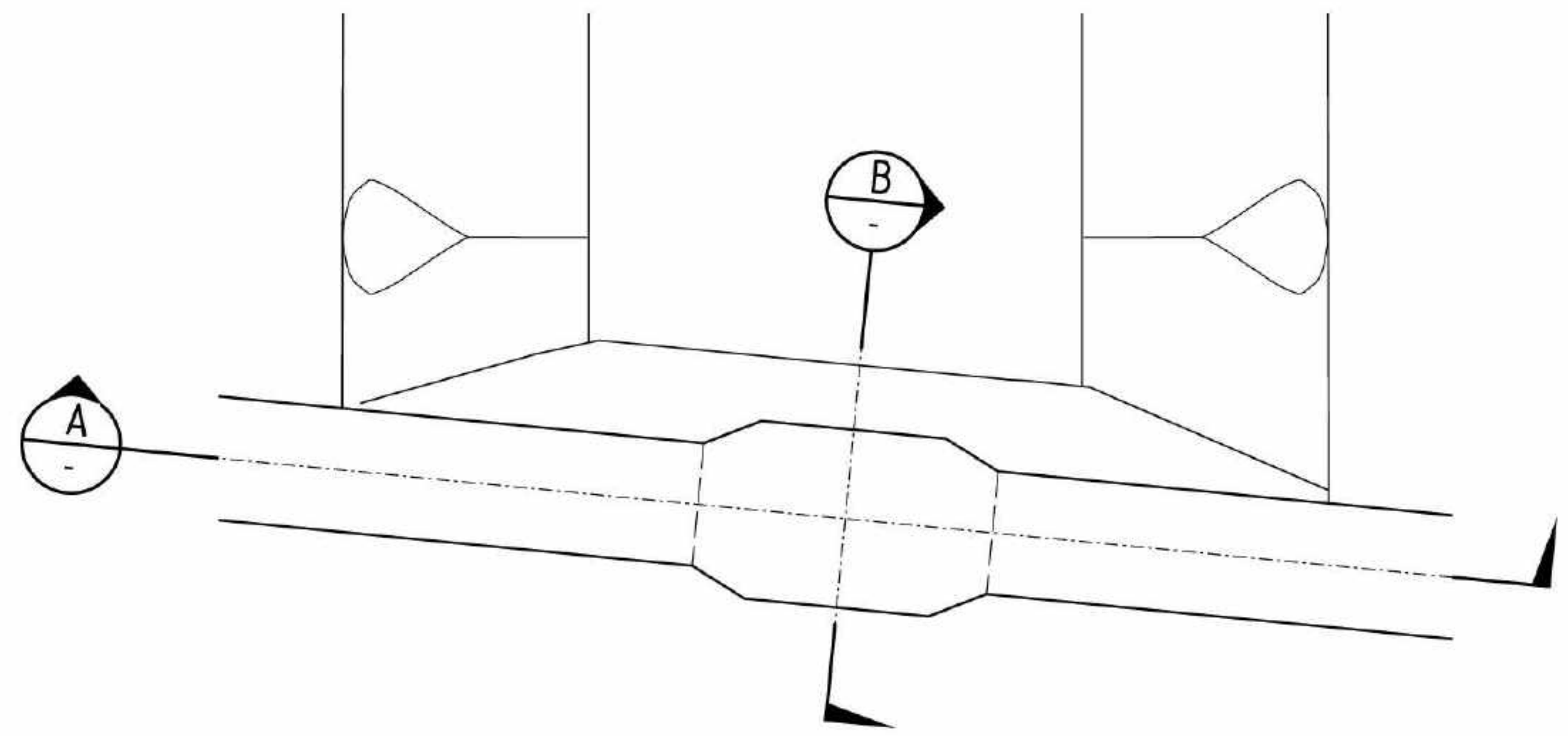
HARDSTAND PAVEMENT - UNSEALED
46T REACH STACKER
SCALE 1:20



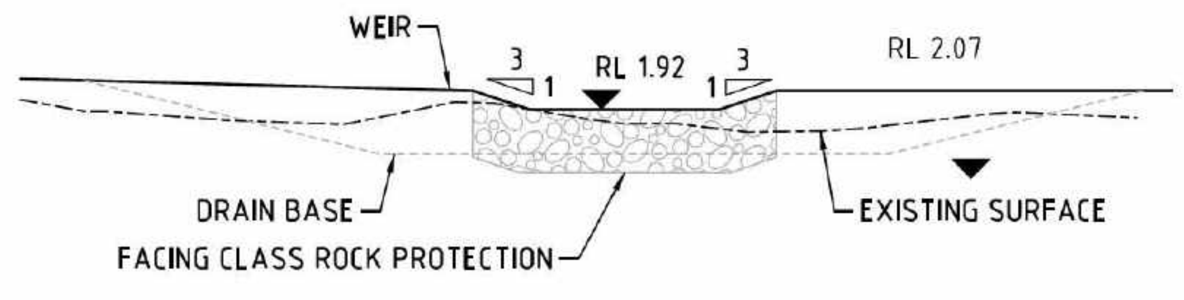
TYPICAL ROAD CROSS SECTION
BERTH 1 ACCESS ROAD
SCALE 1:100



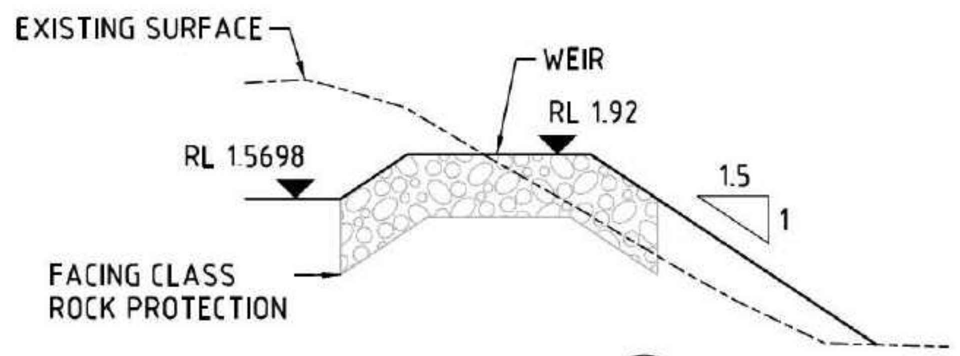
FENCE ROCK FOOTING DETAILS
SCALE 1:50



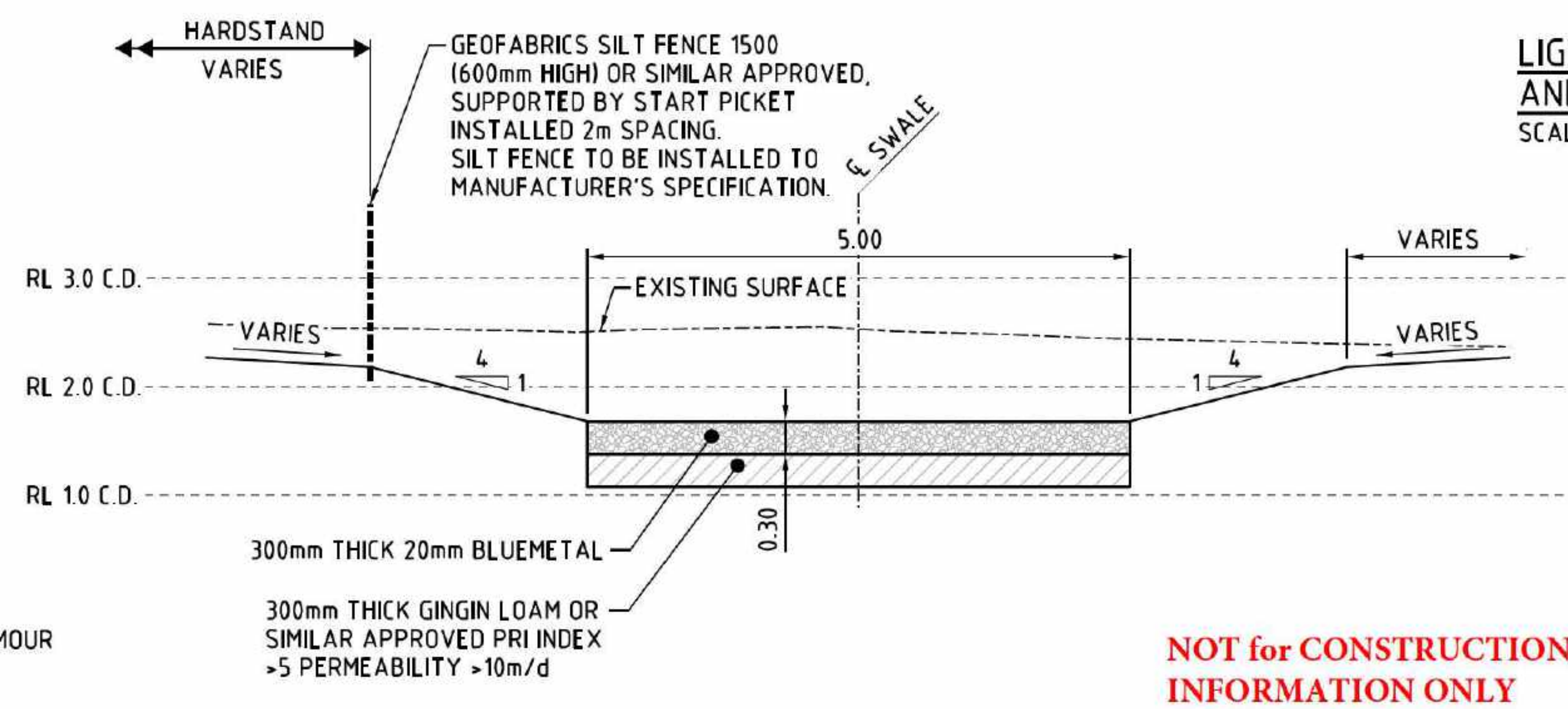
WEIR DETAIL
SCALE 1:50



SECTION A
1:50

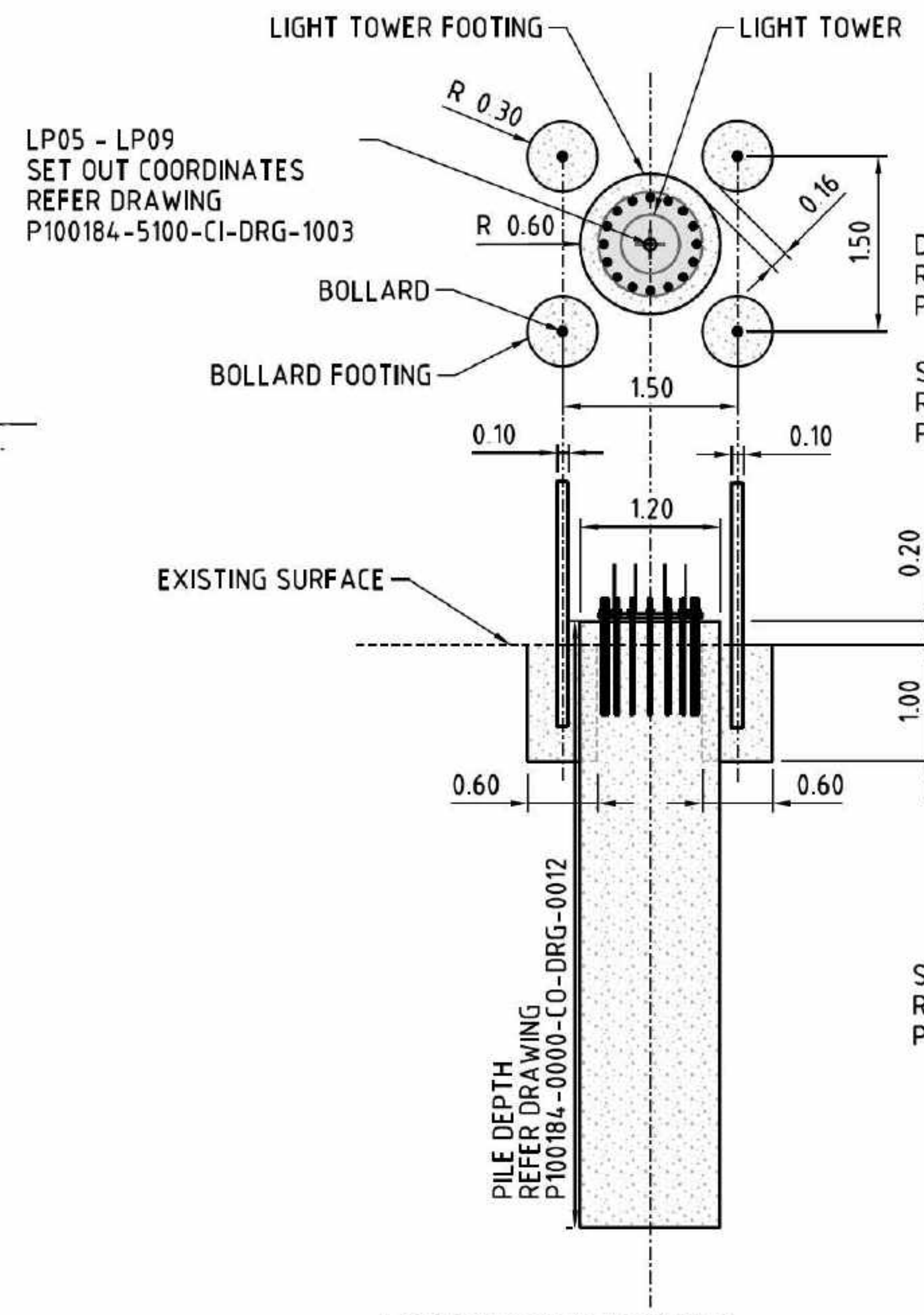


SECTION B
1:50

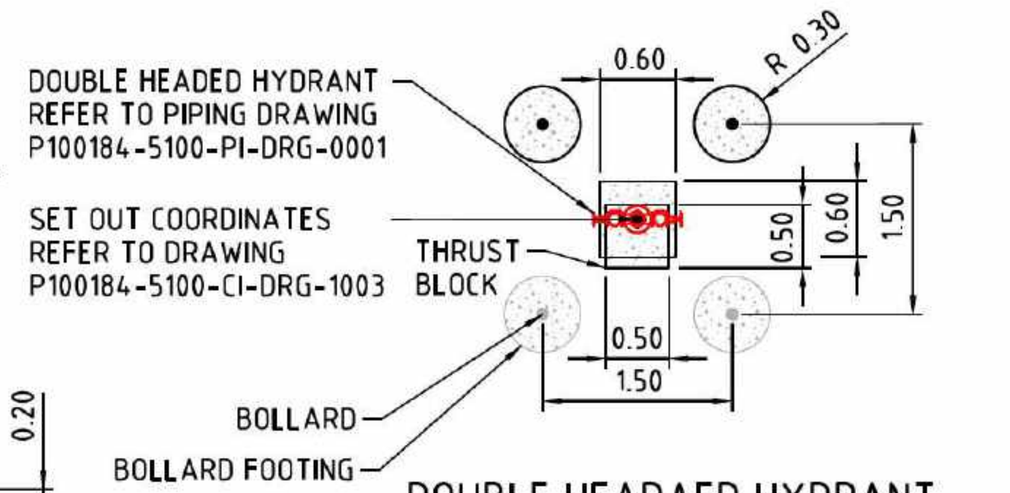


RETENTION SWALE DETAIL
SCALE 1:50

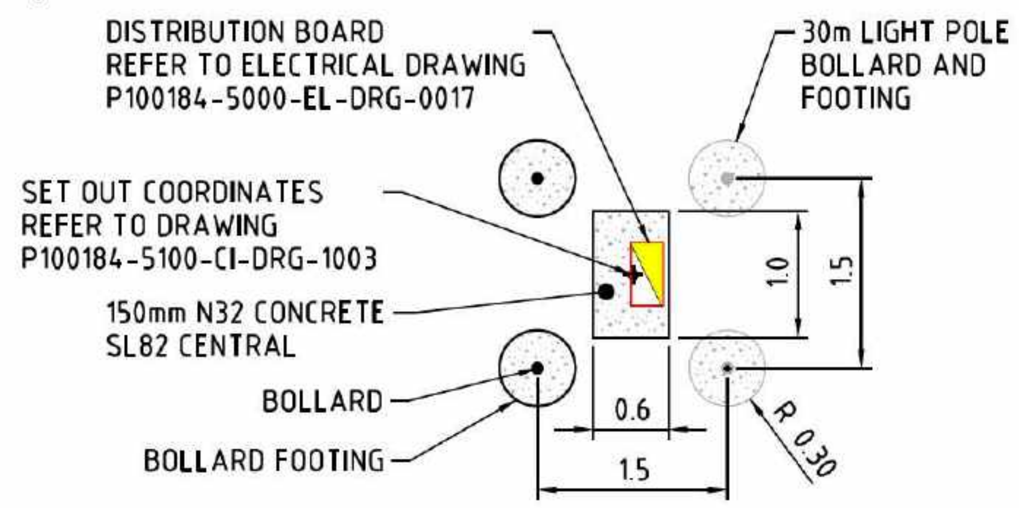
NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE



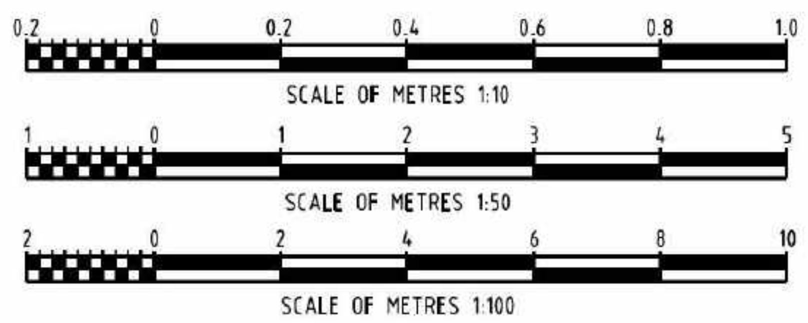
LIGHT POLE FOOTING
AND BOLLARDS SET OUT
SCALE 1:50



DOUBLE HEADAED HYDRANT
AND CONCRETE SLAB SET OUT
SCALE 1:50



DISTRIBUTION BOARD
AND CONCRETE SLAB SET OUT
SCALE 1:50



DRAWING MUST BE PRINTED IN COLOUR TO CORRECTLY SHOW DETAILS

ISSUED FOR TENDER

NOT FOR CONSTRUCTION

FOR INFORMATION ONLY

DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
P100184-5100-CI-DRG-1002	CIVIL DRAWINGS - GENERAL - NOTES	B	14.08.25	ISSUED FOR TENDER	RC	HW	CM
		A	11.08.25	ISSUED FOR INTERNAL REVIEW	RC	HW	CM

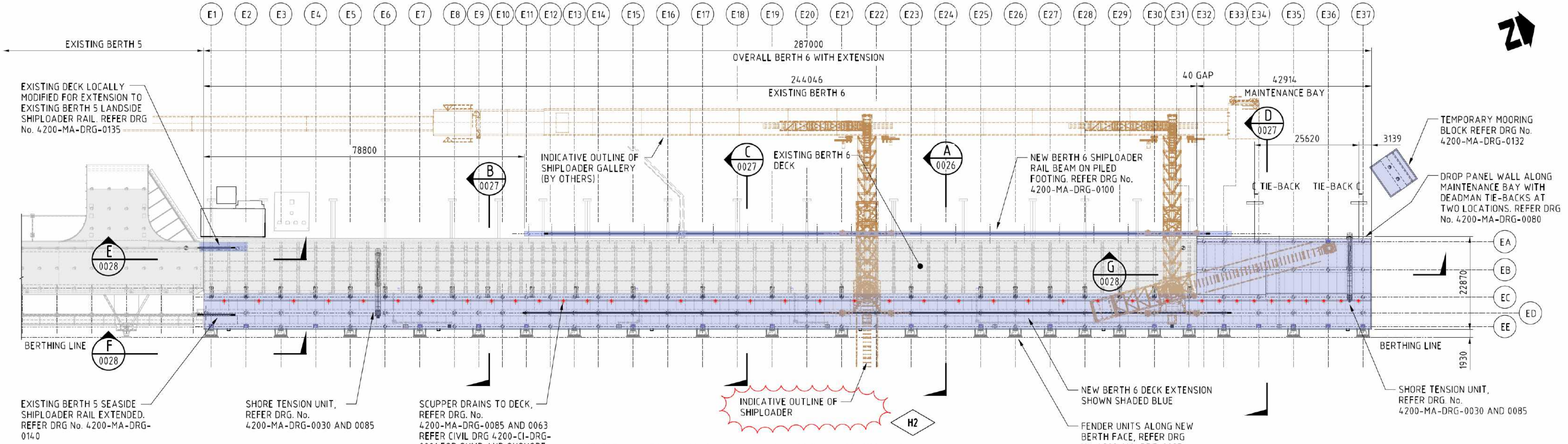
DESIGNED	R.CONCEPCION
DRAWN	R.CONCEPCION
CHECKED	H.WIJAYA
APPROVED	C.MEEKING
APPROVED DATE	07.08.25
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

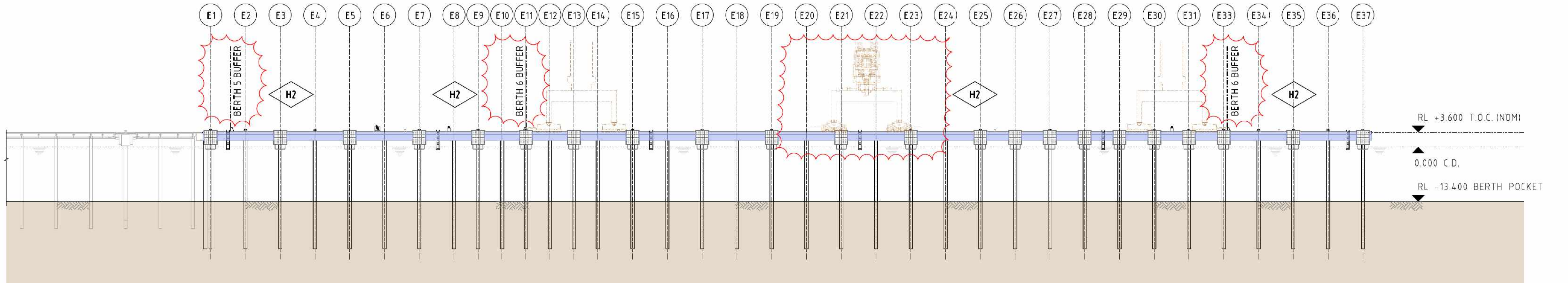
This drawing must not be copied or reproduced in any form or used for any purpose other than originally intended without written approval of Agilitus

MWPA - PORT MAXIMISATION PROJECT
BERTH 1 - CIVIL DRAWINGS
GENERAL DETAILS

SIZE	SCALE	DRG No:	REV:
A1	AS SHOWN	P100184-5100-CI-DRG-1060	B



GENERAL ARRANGEMENT PLAN ON BERTH 6 EXTENSION
1:500

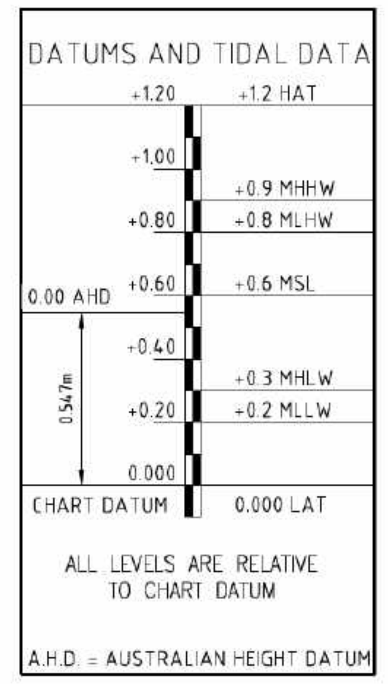


GENERAL ARRANGEMENT ELEVATION ON BERTH 6 EXTENSION
1:500

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-4200-MA-DRG-0002 AND 0003
2. FOR VESSEL MOORING PLAN REFER DRG No. P100184-4200-MA-DRG-0030
3. FOR DECK HARDWARE DETAILS REFER DRG No. P100184-4200-MA-DRG-0085



LIST OF HOLDS

H2 — HOLD FOR FINAL SHIPLOADER DESIGN AND VENDOR DETAILS OF BUFFER STOPS, STORM TIE DOWN AND JACKING POINTS

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	CHK	APP
E	13.06.25	ISSUED FOR TENDER	DS	MR	IP
D	28.06.24	ISSUED FOR TENDER	DS	AH	IP
C	28.07.23	ISSUED FOR CLIENT 85% REVIEW	DS	MR	IP
B	28.04.23	ISSUED FOR CLIENT 50% REVIEW	DS	MR	IP
A	27.04.23	ISSUED FOR INTERNAL REVIEW	DS		

DRAWING NUMBER	REFERENCE DRAWING TITLE

MID WEST PORTS

AGILITUS

DESIGNED	M.ROONEY
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	28.04.23
DATUM	CHART DATUM

PROJECT NUMBER RP22055

This drawing must not be copied or reproduced in any form or used for any purpose other than originally intended without written approval of Agilitus

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 5 & 6
GENERAL ARRANGEMENT
PLAN AND ELEVATIONS

A1 | SCALE AS NOTED | DRG No: P100184-4200-MA-DRG-0025 | REV. E

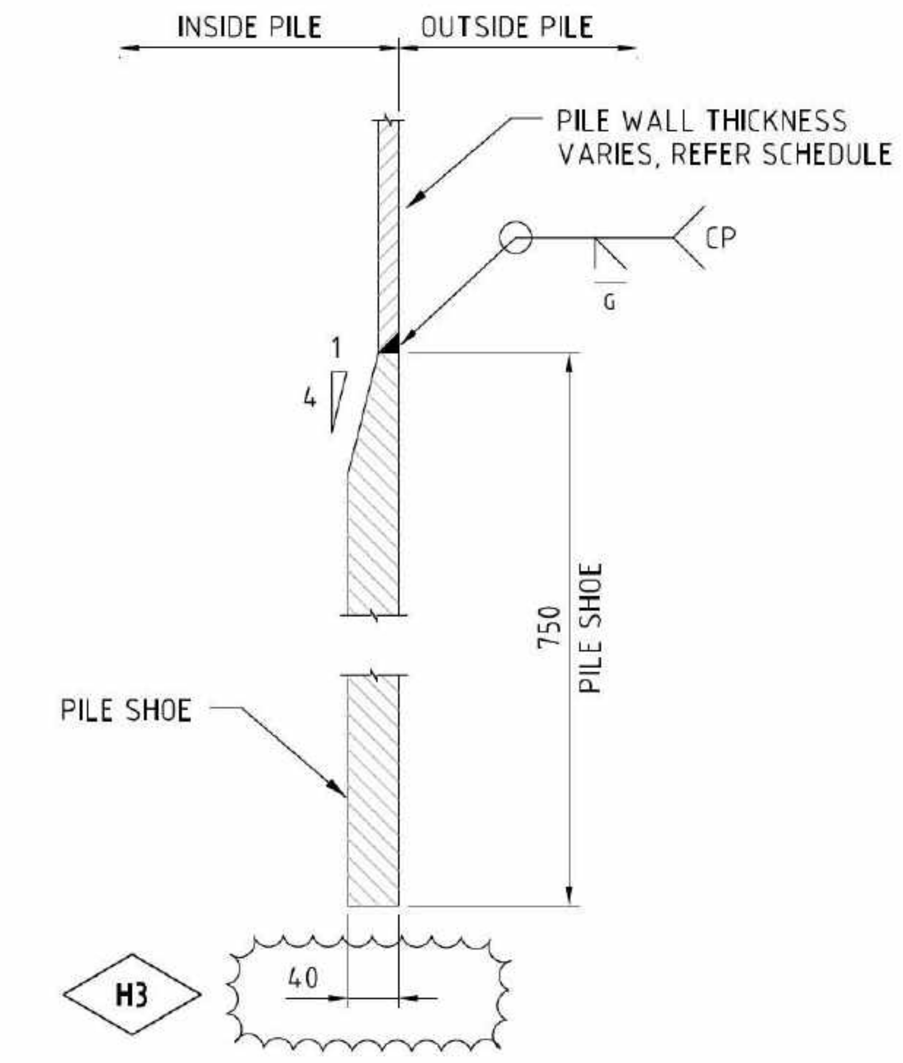
PILE SCHEDULE

PILE BENT	PILE No.	PILE SIZES	CUT-OFF LEVEL RL (m CD)	THEORETICAL PILE LENGTH (m)	MAXIMUM ULTIMATE STRUCTURAL TENSION (kN)	MAXIMUM ULTIMATE STRUCTURAL COMPRESSION (kN)	APPROX. SEABED LEVEL AFTER DREDGING RL (m CD)	TARGET PILE TOE LEVEL RL (m CD)	MINIMUM DRIVEN TOE LEVEL FOR LATERAL FIXITY RL (m CD)	REMARKS	PILE ORDER ASSUMPTIONS: CONCRETE PILE PLUG REQUIRED	PILE ORDER ASSUMPTIONS: PROPOSED ORDERED LENGTH (m)	PILE COATING & WELD BEAD: PAINTING: UNPAINTED LENGTH FROM TOE (m)	PAINTING: PAINTED PILE LENGTH (m)	WELD BEAD: START OF WELD BEAD DISTANCE FROM TOE (m)	WELD BEAD: WELD BEAD LENGTH (m)
E1	P1	762 OD x 20 GR 350	1.730	22.7	0	2600	-13.4	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	4100	-13.4	-21.0	-21.0	PILE OFFSET FROM GRID, PILE PLUG 2B	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	1800	-12.0	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
E2	P1	762 OD x 20 GR 350	1.730	22.7	0	2300	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3600	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E3	P1	762 OD x 20 GR 350	1.730	22.7	0	2200	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E4	P1	762 OD x 20 GR 350	1.730	22.7	0	2100	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E5	P1	762 OD x 20 GR 350	1.730	22.7	0	2200	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E6	P1	762 OD x 20 GR 350	1.730	22.7	0	2200	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E7	P1	762 OD x 20 GR 350	1.730	22.7	0	2200	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E8	P1	762 OD x 20 GR 350	1.730	22.7	0	2300	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2300	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E9	P1	762 OD x 20 GR 350	1.730	22.7	0	2400	-13.4	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	3500	-13.4	-21.0	-21.0	PILE PLUG TYPE 2B	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
E10	P1	762 OD x 20 GR 350	1.730	22.7	0	2500	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3800	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2600	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E11	P1	762 OD x 20 GR 350	1.730	22.7	0	2600	-13.4	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	4400	-13.4	-21.0	-21.0	PILE PLUG TYPE 2B	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2800	-12.0	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
E12	P1	762 OD x 20 GR 350	1.730	22.7	0	2800	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	4900	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E13	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2B	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
E14	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E15	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E16	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E17	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E18	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E19	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E20	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E21	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E22	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E23	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E24	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-4200-MA-DRG-0002 AND 0003
2. FOR CONTINUATION OF PILE SCHEDULE REFER DRG No. P100184-4200-MA-DRG-0037
3. PILE LENGTH IS INCLUSIVE OF PILE SHOE, AS DETAILED ON THIS DRAWING
4. TARGET PILE TOE LEVELS ARE BASED ON FOUNDING PILES WITHIN EITHER UPPER OR LOWER LIMESTONE HORIZON, ABOVE LOWER STRENGTH SANDY SUBSOILS.
5. PILES SHOULD NOT BE ADVANCED BEYOND LOWER TARGET DEPTH UNLESS THE PILE SET IS SIGNIFICANTLY BELOW THE MINIMUM REQUIRED OF THE DESIGN AND FINAL PILE TOE RESPONSE IS DEEMED LIKELY TO FALL BELOW ACCEPTABLE LIMITS.
6. UPON ESTABLISHING SET BETWEEN THE MINIMUM AND TARGET PILE DEPTHS, PILES SPECIFIED FOR CONCRETE SOCKET MUST BE DRILLED OUT TO 1.5 x PILE DIAMETER AND CONCRETE PLUGGED PER DETAILS ON P100184-4200-MA-DRG-0039.
7. WHERE PILES FAIL TO ACHIEVE DESIGN SET VALUES WITHIN THE TARGET DEPTH RANGE, ADVICE MUST BE SOUGHT FROM SUPERINTENDENT. SPLICING AND FURTHER DRIVING MAY BE NECESSARY.
8. FOR CALCULATION OF THE REQUIRED SET VALUES, REFER TO GENERAL NOTES.
9. ALL PILES SHOULD BE DRIVEN TO ACHIEVE THE REQUIRED ULTIMATE GEOTECHNICAL CAPACITY AND ACHIEVE AT LEAST MINIMUM TOE LEVELS FOR LATERAL FIXITY
10. REQUIRED ULTIMATE GEOTECHNICAL PILE CAPACITIES ARE DETERMINED BY DIVIDING THE ULTIMATE STRUCTURAL LOAD PROVIDED BY A GEOTECHNICAL STRENGTH REDUCTION FACTOR (Øg) OF 0.76 TO AS2159. THIS VALUE SHALL BE CONFIRMED BY THE SUPERINTENDENT FOLLOWING RECEIPT OF ALL PDA TESTING RESULTS.
11. IF CHINESE SUPPLY OF PILES, THEN PLATE GRADE SHALL BE Q355C IN ACCORDANCE WITH THE SPECIFICATION
12. PILES MARKED WITH ASTERIX (*) TO BE SUBJECT TO PILE PDA TESTING. REFER TO GENERAL NOTES AND SPECIFICATION.
13. FOR PILE PLUG DETAILS REFER DRG No. P100184-4200-MA-DRG-0038
14. FOR PILE SOCKET DETAILS REFER DRG No. P100184-4200-MA-DRG-0039



TYPICAL PILE SHOE

NOTES:
CONTRACTOR TO CONFIRM PILE SHOE DESIGN IS ADEQUATE FOR PILE INSTALLATION METHOD AND ANTICIPATED GEOTECHNICAL MATERIALS ENCOUNTERED

LIST OF HOLDS

H3 HOLD FOR CONFIRMATION OF PILE SHOE THICKNESS BY CONTRACTOR

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	CHK	APP
E	13.06.25	ISSUED FOR TENDER	DS	MR	IP
D	28.06.24	ISSUED FOR TENDER	DS	AH	IP
C	28.07.23	ISSUED FOR CLIENT 85% REVIEW	DS	MR	IP
B	28.04.23	ISSUED FOR CLIENT 50% REVIEW	DS	MR	IP
A	27.04.23	ISSUED FOR INTERNAL REVIEW	DS		

DRAWING NUMBER	REFERENCE DRAWING TITLE

MID WEST PORTS

AGILITUS

DESIGNED	M.ROONEY
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	28.04.23
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 5 & 6
PILING
SCHEDULE AND DETAILS - SHEET 1

A1 | SCALE: N/A | DRG No: P100184-4200-MA-DRG-0036 | REV: E

PILE SCHEDULE

PILE BENT	PILE No.	PILE SIZES	CUT-OFF LEVEL RL (m CD)	THEORETICAL PILE LENGTH (m)	MAXIMUM ULTIMATE STRUCTURAL TENSION (kN)	MAXIMUM ULTIMATE STRUCTURAL COMPRESSION (kN)	APPROX. SEABED LEVEL AFTER DREDGING RL (m CD)	TARGET PILE TOE LEVEL RL (m CD)	MINIMUM DRIVEN TOE LEVEL FOR LATERAL FIXITY RL (m CD)	REMARKS	PILE ORDER ASSUMPTIONS: CONCRETE PILE PLUG REQUIRED	PILE ORDER ASSUMPTIONS: PROPOSED ORDERED LENGTH (m)	PILE COATING & WELD BEAD – PAINTING: UNPAINTED LENGTH FROM TOE (m)	PAINTING: PAINTED PILE LENGTH (m)	WELD BEAD: START OF WELD BEAD DISTANCE FROM TOE (m)	WELD BEAD: WELD BEAD LENGTH (m)
E25	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E26	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
*	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E27	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E28	P1	762 OD x 20 GR 350	1.730	22.7	0	3000	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E29	P1	762 OD x 20 GR 350	1.730	22.7	0	3100	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E30 *	P1	762 OD x 20 GR 350	1.730	22.7	0	3100	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2*	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E31	P1	762 OD x 20 GR 350	1.730	22.7	0	3100	-13.4	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	5300	-13.4	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3500	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
E32	P1	762 OD x 20 GR 350	2.045	23.0	0	3000	-6.6	-21.0	-21.0	PILE PLUG TYPE 1B	YES	27.0	3.0	24.0	1.3	3.0
	P2	762 OD x 20 GR 350	2.365	23.4	0	1900	-4.0	-21.0	-21.0	PILE PLUG TYPE 1B	YES	27.0	3.0	24.0	1.3	3.0
E33	P1	762 OD x 20 GR 350	1.730	22.7	0	2800	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P2	914 OD x 20 GR 350	1.730	22.7	0	4800	-12.0	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3*	762 OD x 20 GR 350	2.125	23.1	0	4200	-10.7	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P4	762 OD x 20 GR 350	2.045	23.0	0	4100	-7.1	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
	P5	762 OD x 20 GR 350	2.365	23.4	0	2300	-3.4	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
E34	P1	762 OD x 20 GR 350	1.730	22.7	0	2200	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	3200	-12.0	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3600	-10.7	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P4*	762 OD x 20 GR 350	2.045	23.0	0	4900	-7.1	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
	P5	762 OD x 20 GR 350	2.365	23.4	0	2700	-3.4	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
E35	P1	762 OD x 20 GR 350	1.730	22.7	0	2000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	2800	-12.0	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3400	-10.7	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P4	762 OD x 20 GR 350	2.045	23.0	0	4800	-7.1	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
	P5	762 OD x 20 GR 350	2.365	23.4	0	2700	-3.4	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
E36	P1	762 OD x 20 GR 350	1.730	22.7	0	2000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	2900	-12.0	-21.0	-21.0	PILE PLUG TYPE 2A	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	3500	-10.7	-21.0	-21.0	PILE PLUG TYPE 3A	YES	27.0	3.0	24.0	1.3	3.0
*	P4*	762 OD x 20 GR 350	2.045	23.0	0	4800	-7.1	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
	P5	762 OD x 20 GR 350	2.365	23.4	0	2700	-3.4	-21.0	-21.0	PILE PLUG TYPE 1A	YES	27.0	3.0	24.0	1.3	3.0
E37	P1	762 OD x 20 GR 350	1.730	22.7	0	2000	-12.0	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
	P2	914 OD x 20 GR 350	1.730	22.7	0	2100	-12.0	-21.0	-21.0	PILE PLUG TYPE 2B	YES	27.0	3.0	24.0	1.3	3.0
	P3	762 OD x 20 GR 350	2.125	23.1	0	2500	-10.7	-21.0	-21.0	PILE PLUG TYPE 3B	YES	27.0	3.0	24.0	1.3	3.0
	P4	762 OD x 20 GR 350	2.045	23.0	0	3500	-7.1	-21.0	-21.0	PILE PLUG TYPE 1B	YES	27.0	3.0	24.0	1.3	3.0
	P5	762 OD x 20 GR 350	2.365	23.4	0	2000	-3.4	-21.0	-21.0	PILE PLUG TYPE 1B	YES	27.0	3.0	24.0	1.3	3.0
LINE BOAT	LH1	660 OD x 16 GR 350	3.817	15.3	0	100	-6.4	-11.5	-11.5		NO	19.0	5.0	14.0	N/A	N/A

LANDSIDE PILE SCHEDULE

PILE ORDER ASSUMPTIONS — PILE COATING & WELD BEAD

PILE	PILE SIZES	CUT-OFF LEVEL	THEORETICAL PILE LENGTH	MAX. ULT. TENSION	MAX. ULT. COMPRESSION	APPROX. SEABED LEVEL	TARGET PILE TOE LEVEL	MIN. DRIVEN TOE LEVEL	REMARKS	CONCRETE PILE PLUG REQUIRED	PROPOSED ORDERED LENGTH	UNPAINTED LENGTH FROM TOE	PAINTED PILE LENGTH	START OF WELD BEAD DISTANCE FROM TOE	WELD BEAD LENGTH
CP1 TO CP22	660 OD x 16 GR 350	2.066	15.1	400	3400	2.016	-13.0	-10.0	* TEST CP4 AND CP20	NO	19.0	5.0	14.0	N/A	N/A
LP1	660 OD x 16 GR 350	◆ 2.914	15.9	0	1350	XXXX	-13.0	-10.0		NO	19.0	5.0	14.0	N/A	N/A
LP2	660 OD x 16 GR 350	◆ 2.914	15.9	0	1350	XXXX	-13.0	-10.0		NO	19.0	5.0	14.0	N/A	N/A
LP3*	660 OD x 16 GR 350	◆ 2.914	15.9	0	1350	XXXX	-13.0	-10.0		NO	19.0	5.0	14.0	N/A	N/A
MB1 AND MB2	660 OD x 16 GR 350	2.350	14.4	0	0	XXXX	-12.0	-10.0		NO	19.0	5.0	14.0	N/A	N/A

NOTE:

◆ DENOTE PILES THAT REQUIRE A SLOPED CUT AT CUT-OFF LEVEL. REFER SECTION D ON DRG No. 4200-MA-DRG-0136

NOTES

1. FOR GENERAL NOTES REFER DRG No. P100184-4200-MA-DRG-0002 AND 0003
2. FOR CONTINUATION OF PILE SCHEDULE REFER DRG No. P100184-4200-MA-DRG-0036
3. FOR PILING NOTES REFER DRG No. P100184-4200-MA-DRG-0036

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE

FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
		E	13.06.25	ISSUED FOR TENDER	DS	MR	IP
		D	28.06.24	ISSUED FOR TENDER	DS	AH	IP
		C	28.07.23	ISSUED FOR CLIENT 85% REVIEW	DS	MR	IP
		B	28.04.23	ISSUED FOR CLIENT 50% REVIEW	DS	MR	IP
		A	27.04.23	ISSUED FOR INTERNAL REVIEW	DS		

MID WEST PORTS

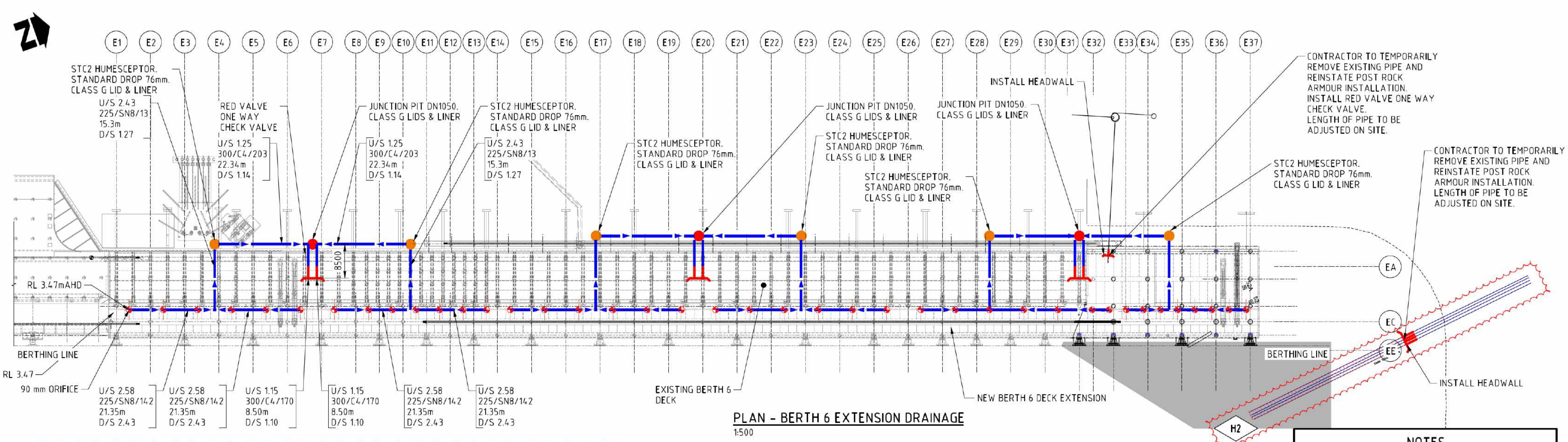
AGILITUS

DESIGNED	M.ROONEY
DRAWN	D.STARBUCK
CHECKED	A.HAWTON
APPROVED	I.PUTT
APPROVED DATE	28.04.23
DATUM	CHART DATUM

PROJECT NUMBER: RP22055

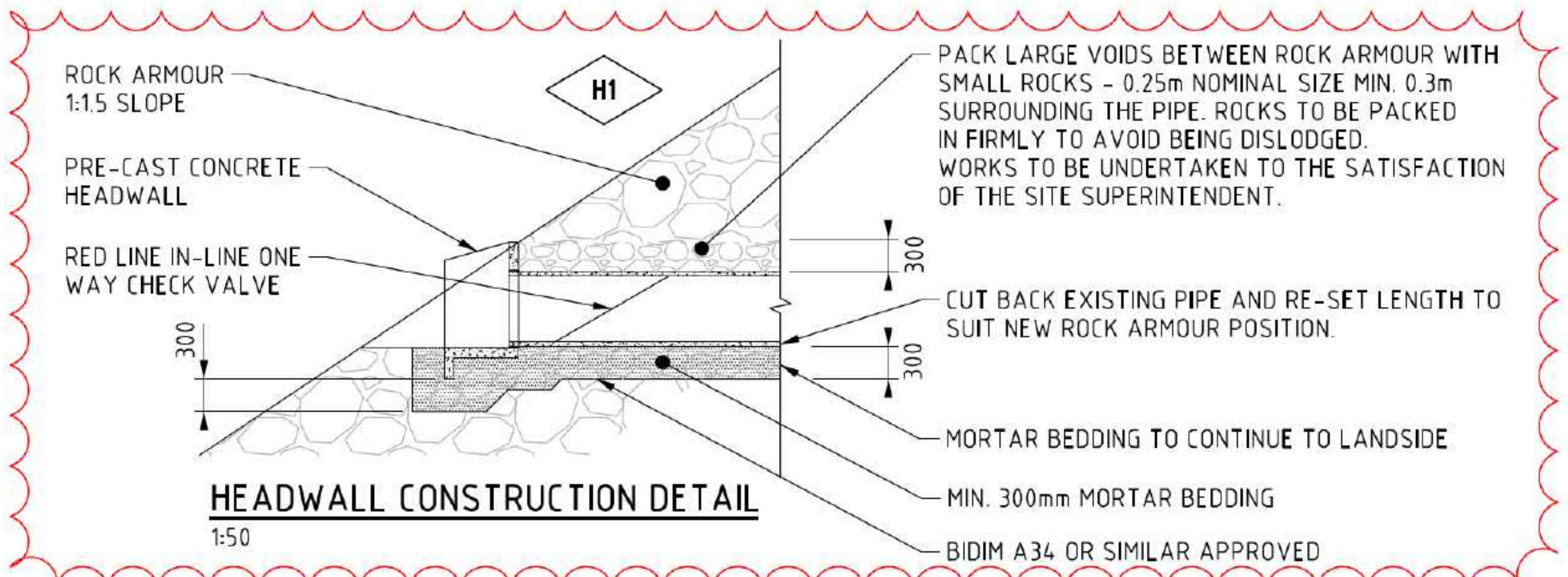
MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 5 & 6
PILING
SCHEDULE AND DETAILS - SHEET 2

A1 | SCALE: N/A | DRG No: P100184-4200-MA-DRG-0037 | REV: E



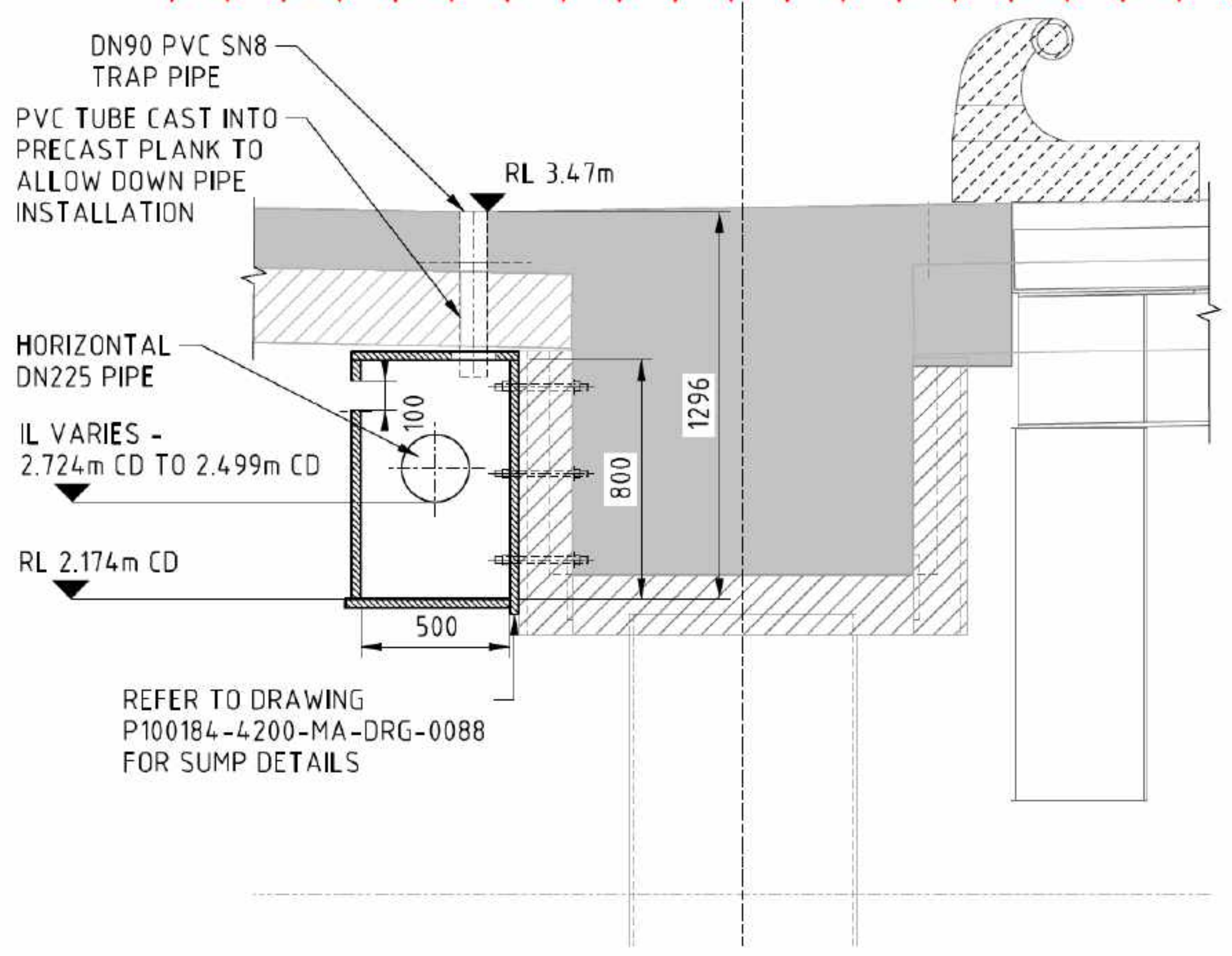
PLAN - BERTH 6 EXTENSION DRAINAGE

1:500



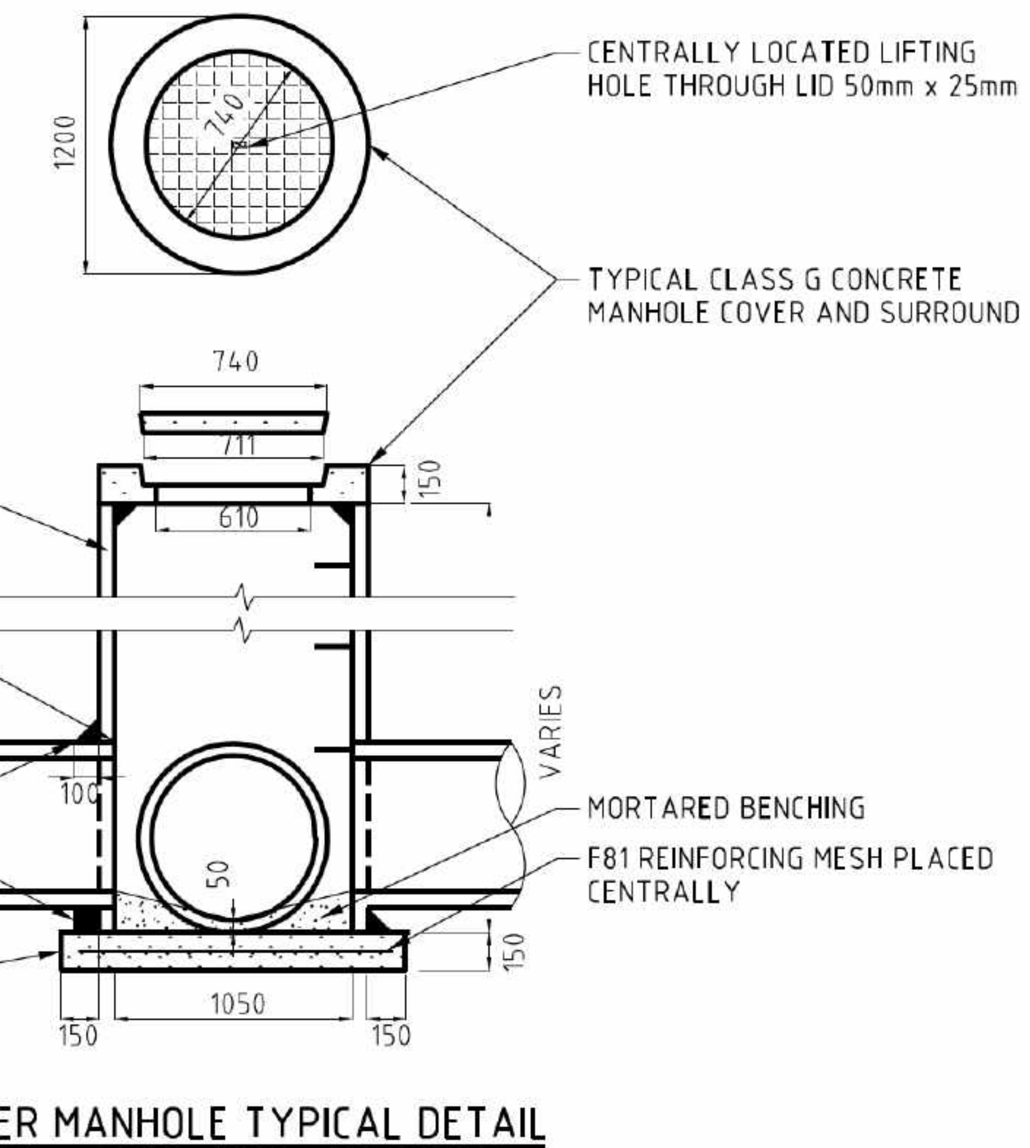
HEADWALL CONSTRUCTION DETAIL

1:50



DOWN PIPE TYPICAL DETAIL

1:20

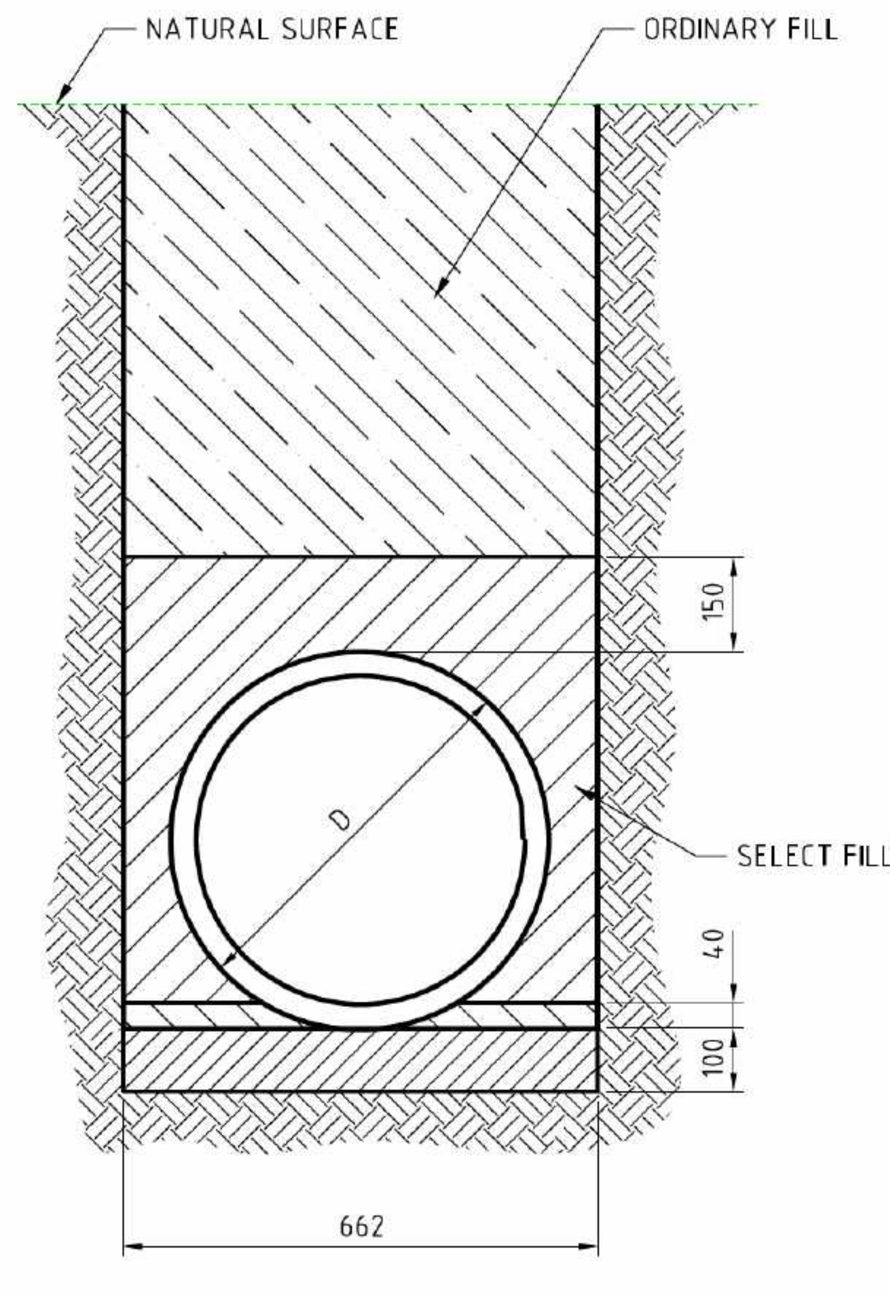


LINER MANHOLE TYPICAL DETAIL

(Φ225 - Φ600 THROUGH PIPES)

N.T.S.

NOT for CONSTRUCTION
INFORMATION ONLY
Subject to CHANGE



PIPE COMPACTION ZONES TYPICAL DETAIL

N.T.S.

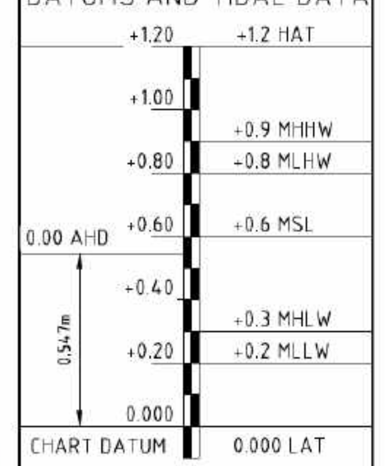
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL BELOW GROUND PIPEWORK TO BE REINFORCED CONCRETE (MARINE COVER) CLASS 4.
3. ALL BELOW DECK PIPEWORK TO BE PVC SN8 DWV PIPES.
4. PIPE COVER DESIGNED FOR REACH STACKER RS46
   - ALL CONCRETE PIPE TO BE CLASS 4 RCP MIN.COVER 1.1m
   - ALL PVC PIPE TO BE SN8 MIN. COVER 1.1m
5. ALL CONCRETE COMPONENT TO BE DESIGNED FOR AS5100.5 EXPOSURE CLASSIFICATION B2.

HOLD

H1	CONSTRUCTION DETAIL TO BE CONFIRMED
H2	HEADWALL DETAILS TO BE CONFIRMED

DATUMS AND TIDAL DATA



ALL LEVELS ARE RELATIVE TO CHART DATUM

A.H.D. = AUSTRALIAN HEIGHT DATUM

DRAWING MUST BE PRINTED IN COLOUR TO CORRECTLY SHOW DETAILS

SCALE OF METRES 1:20

SCALE OF METRES 1:50

SCALE OF METRES 1:500

DRAWING NUMBER	REFERENCE DRAWING TITLE
P100184-4200-MA-DRG-0088	BERTH 5 & 6 CAST-IN ITEMS AND MISC DETAILS - SHEET 4

REV	DATE	DESCRIPTION	DRN	CHK	APP
D	13.06.25	ISSUED FOR TENDER	IC	HW	CM
C	28.06.24	ISSUED FOR TENDER	PB	HW	CM
B	27.07.23	ISSUED FOR CLIENT 85% REVIEW	JB	HW	CM
A	27.07.23	ISSUED FOR INTERNAL REVIEW	JB	HW	CM

MID WEST PORTS

AGILITUS

DESIGNED	J.PARK
DRAWN	J.PARK
CHECKED	H.WIJAYA
APPROVED	C.MEEKING
APPROVED DATE	28.07.23
DATUM	CHART DATUM

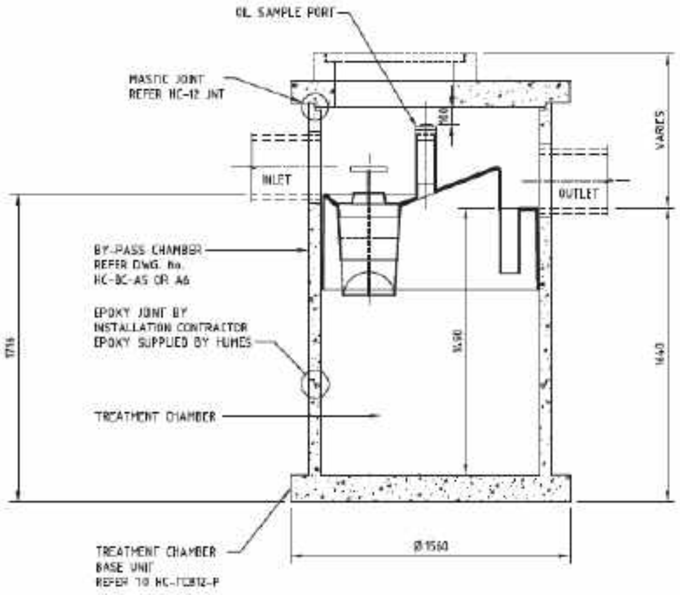
PROJECT NUMBER: RP22055

MWPA - PORT MAXIMISATION PROJECT
INNER HARBOUR - BERTH 5 & 6
STORMWATER DRAINAGE
PLAN AND DETAILS

A1 | SCALE: AS SHOWN | DRG No: P100184-4200-CI-DRG-0001 | REV: D

Appendix D: Humeceptor Specification / Info Sheet

ISSUE	DETAILS OF ALTERATIONS	DRN	DATE	CHD
0	ISSUED FOR MANUFACTURE	RGE	15.05.02	SO'C
1	UPDATED AND REISSUED FOR MANUFACTURE	M.Z.	23-11-03	DFW
2	GENERAL UPGRADE	RM	07-08-03	DFW

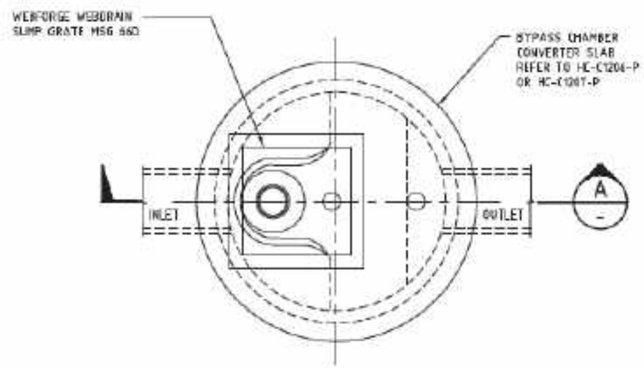


NOTE: STANDARD DROP INLET TO OUTLET IS 76mm

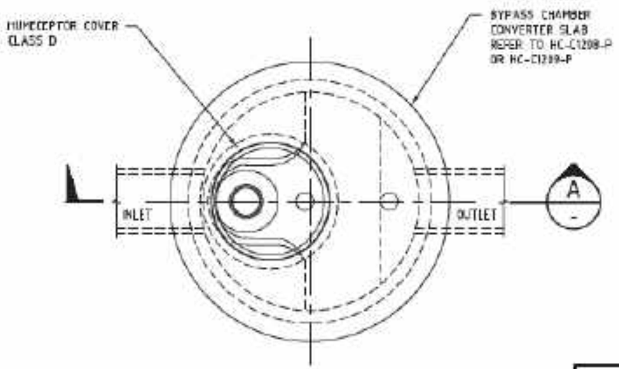
SECTION A
SCALE 1:20

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 1740 LITRES
   OIL STORAGE VOLUME = 350 LITRES
   SEDIMENT STORAGE VOLUME - 1.34m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) - 1130 kg
   BYPASS CHAMBER = VARIES
   BYPASS CHAMBER CONVERTER SLAB = 575 kg
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. FOR OUTLET PIPE CONNECTION DETAILS REFER HC-BC-A5 OR A6 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
7. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWING)
8. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.



PLAN - SQUARE OPENING
(PREFERRED)
SCALE 1:20



PLAN - CIRCULAR OPENING
(ALTERNATIVE)
SCALE 1:20

Humes TECHNICAL (DESIGN) SERVICES
BRISBANE, QUEENSLAND

Readymix Holdings Pty Limited

DSN.	SO'C	13-06-02
DWN.	RGE	13-06-02
CHK.	SO'C	13-06-02
APP.	DFW	13-06-02
SUPERSEDES		

HUMECEPTOR™
STANDARD DRAWING
STC-2 HUMECEPTOR™
c/w INLET AND OUTLET PIPES
ASSEMBLY DRAWING

PLOT SCALE	SIZE	DWG. NO.	ISSUE
1:20	A2	HC-STC2-B	2