FLANAGAN CONSULTING GROUP
Trusted Advisor to Northern Australia

Ports North

CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Draft Environmental Impact Statement

Supplementary Report

TABLE OF CONTENTS

1.0 INTRODUCTION

The Cairns Shipping Development Project Revised Draft Environmental Impact Statement (RDEIS) prepared by Ports North under the State Development and Public Works Organisation Act 1971 (Qld) (SDPWO Act) was subject to Community and Agency review following Public Notice in July 2017.

This Supplementary Report should be read in conjunction with the "Response to Submissions" which provided response to each of the 12 Agency submissions received and to the issues raised in Twenty Two (22) individual submissions received from members of the Community (categorised by OCG as14 from individuals, 2 from Businesses and 6 from Community Organisations) and the Seven Thousand Six Hundred and Twenty Nine (7,629) proforma identical submissions received (categorised by OCG as 7,523 GBR proforma letters and 108 CAFNEC proforma letters).

This Supplementary Report is provided by the Proponent (Ports North) to inform the Coordinator-General of the additional work undertaken as a consequence of both the Submissions on the RDEIS and from further discussions with the proprietors of the Northern Sands Sand Extraction facility which has resulted in an alternate configuration of the proposed soft clay Dredge Material Placement Area (DMPA).

This Supplementary Report also includes a Schedule of Proponent Commitments that lists further actions that Ports North has committed to undertake. It is expected that the Coordinator-General will reference the Schedule of Commitments in the Evaluation Report (CGER).

2.0 ALTERNATE NORTHERN SANDS DMPA CONFIGURATION

BACKGROUND

During the public notice of the revised Draft EIS, Ports North received preliminary agency feedback and advice from the Nortehrn Sands proprietor regarding revised business plans. Considerationof both these matters led to examination of an option for dredge material placemnt in the “full Northrn Sands void” as it will be at the proposed start of the dredging ion May 2019. This involved more detailed consideration of the “business as usual” without expediting sand extraction to determine the status of the void as at May 2019.

The anticipated extent of the void at the completion of sand extraction activities by May 2019 is shown in Flanagan Consulting Group Sketch 3527 – SK14D shown in Figure 2.1.

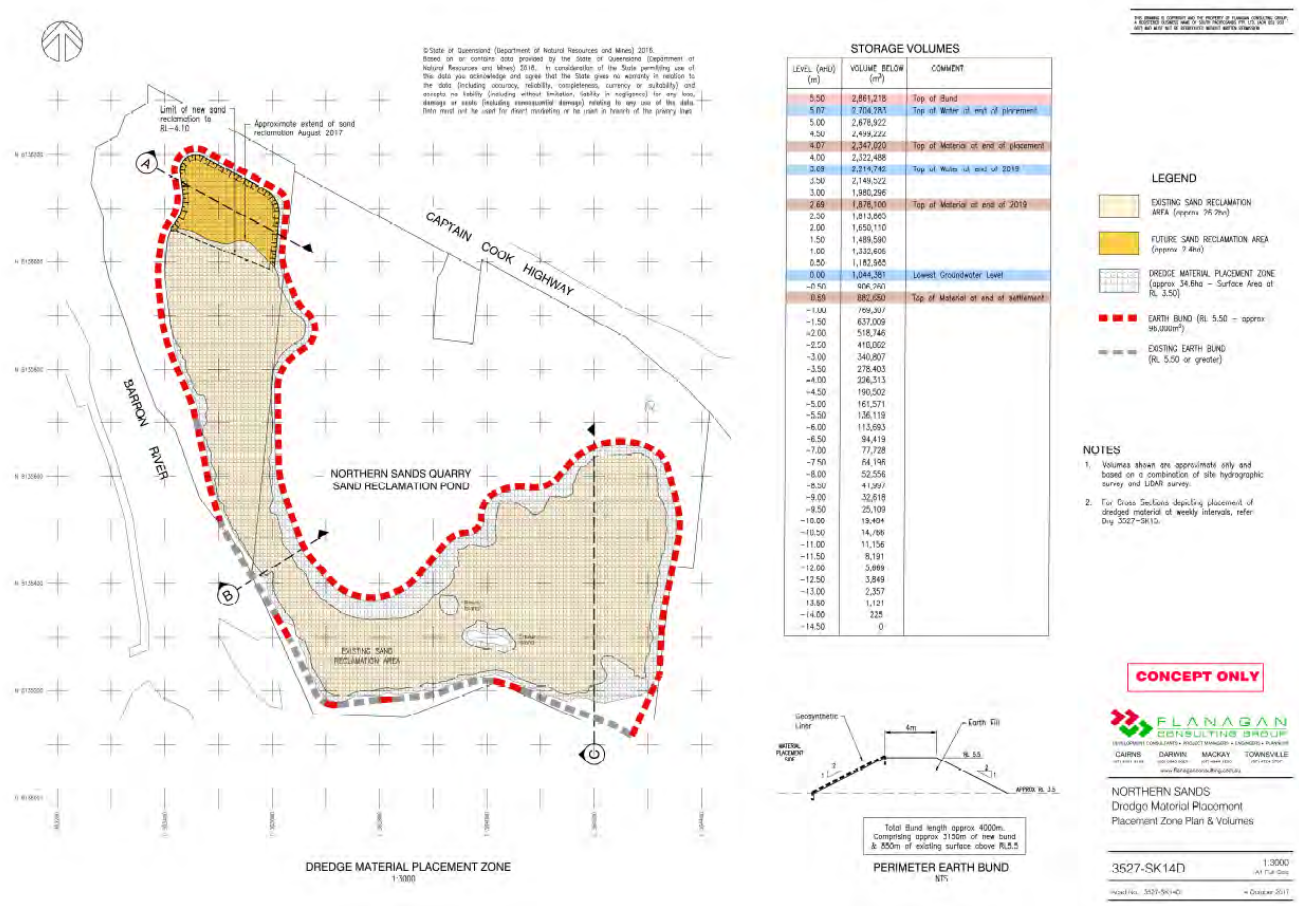

Figure 2.1 Northern Sands DMPA

A fill sized version of Sketch 3527 0 Sk 14D is attached in **Appendix A.**

FILL SEQUENCE

Also attached in **Appendix A** is Sketch 3527- Sk15A showing a series (14 sheets) of cross sections of placed material and water levels showing levels at the completion of each week of the dredging programme and at end of 2019 and at ultimate settlement (return to insitu volumes).

Volumes of material placed and water are based on the production rates included in the Akuna Dredging production rates included in Appendix Z of the RDEIS.

The alternate configuration means that the bunds are not required to provide substantial additional short term capacity as was the case with the using just the expanded northern pond as proposed in the revised Draft EIS.

The bund height is dictated by the 1% AEP flood height in order to minimise remobilisation risk in the short term until the material settles sufficiently. Once the material has settled sufficiently there will be adequate water depth over the material to minimise remobilisation risk during a flood event.

The alternate configuration operates at a significantly lower water level (RL 5.2m AHD) than the northern void with bunds height at 7.5m AHD with a maximum operating water level at 7.2M AHD.

A placement simulation of the alternate configuration has been undertaken by JFA (Technical Note TN-J16021-5 dated3/11/17). The technical note explaining the simulations methodology and results is attached in **Appendix B.**

The following key results were obtained from the simulations:

- An average placed dry density at the completion of the dredging campaign (short-term) of 337 kg/m3 was obtained with a settled bed level of +4.0m AHD. This figure includes the material trapped in suspension at the completion of the dredging campaign, as the solids rapidly settle out of the suspension to form the bed surface.

- An average placed dry density at the start of the wet season (1 December) of 372 kg/m^3 was obtained with a settled bed level of +3.0m AHD.

- An average placed dry density at 18 months of 506 kg/m^3 was obtained, with a settled bed level of +0.9m AHD.

- The proposed containment area, with Maximum Operating Water Level at RL 5.20 enclosing a storage volume of 2,757,900 m^3, has sufficient capacity to contain the dredged material (882,649m^3 with an in-situ dry density of 0.96 t/m^3).

- Whilst the model outputs indicates periods of exceedances of water quality thresholds near the end of the program, this can be managed through implementation of management measures. Particular attention is likely to be required over the last week of the campaign.

GROUNDWATER

The Groundwater modelling undertaken to assess the impacts of the northern void configuration assessed in the revised Draft EIS has been remodelled by Golder Associates to take into account the alternate configuration. The revised Groundwater Modelling Report (Ref: 1546223-024-R-Rev 2) is attached in **Appendix C**.

The conclusions of the Groundwater Modelling are:

- The results of the updated groundwater modelling indicate that after 2 years the extent of an increase in salinity in the upper aquifer around the lake due to currently proposed placement of dredged materials will be about 150 m. This will extend to the Barron River to the west of the site, plus the sugar cane land to the north and east of the site. It is noted that the assessed extent of the increase in salinity within two years of deposition is considered to be conservative as it is proposed to reduce the water level in the lake as the level of the dredged materials drops.
- The lateral migration of salinity through the surficial clay layer will be significantly less than the extent of migration through the upper sand layer. A general downward hydraulic gradient from the lake will limit the extent to which salt can migrate upwards into the surficial clay layer and it is assessed that negligible changes in the salinity of the near surface clays will occur. Notwithstanding this there is a potential for the root zone of the sugar cane in the adjacent property to the east of the site to be impacted by an increase in salinity where the layer of surface clay is about 1 m to 2m thick within the extent of the effected area. Within the extent of the aquifer influenced by outward salinity migration

resulting from the placement of the dredged material, salinity concentrations are likely to remain elevated in the long term (i.e. five to fifty years).

- *The potential groundwater impacts associated with the currently proposed placement of dredged materials at the Northern Sands DMPA are generally consistent with the previous groundwater impact assessment (Golder 2017b). The risks associated with potential impacts related to groundwater are assessed to be predominantly low, with a likely minor impact on water quality in the upper unconfined aquifer and a possible moderate impact on the near surface soils leading to medium risks.*

- *Groundwater monitoring is to be carried out to assess changes in water level and water quality parameters, to assess whether such changes are within the expected range. The proposed groundwater monitoring network will be used to collect both groundwater level and water quality data prior to, during, and after placement of dredged material.*

Based on the above, the risks associated with potential impacts related to groundwater are assessed to be predominantly low, with a likely minor impact on water quality in the upper unconfined aquifer and a possible moderate impact on the near surface soils leading to medium risks. These impacts are likely to be limited to a maximum distance of about 150 m from the placement area.

FLOODING AND BUND ASSESSMENT

The alternate configuration has flood immunity bunds at a lower level however the bunds will surround the entire void. The impacts on surrounding floodwater levels in the event of a flooding event have been subject to further modelling by BMT -WBM. The revised Flood Modelling Report (Ref: R.B22074.013.00) is attached in **Appendix D**.

The flood modelling report concluded that, *"…compared to the initial northern pond arrangement considered in the EIS the alternate pond and bund configuration does not change the impact assessment. The impact remains Low for flooding and overtopping impacts and negligible for remobilisation impacts."*

As part of the flood modelling exercise and in response to an issue raised by Cairns Regional Council (CRC) and the Department of Environment and Heritage Protection(DEHP) BMT WBM also undertook an assessment of Potential for Bund Wall Collapse and Dredge material release (Section 4). This was a Consequence Category Assessment (CCA) conducted in accordance with the DEHP Manual for assessing consequence categories and hydraulic performance of structures.

BMT-WBM observed that because of the low risk of resuspension, the low probability of having greater than ARI 100-year flood to cause overtopping (estimated to be 1% over a two-year period), the risk of general environmental harm is low. Under such a large flood event, overtopping of the bunds would have no effects on economic loss or property damage as the effect of the containment strategy on Barron River flooding is insignificant.

The proposed containment strategy on the Northern Sands site does not constitute a dam, but is a levee structure; however, with a low Consequence Category Assessment outcome, as detailed above, the bund is not a regulated structure. Hence, the requirements under the Manual in Section 2.2 and 2.2 do not apply.

BMT-WBM considered the failure mechanisms of bund wall collapse and dredge material resuspensions due to overtopping and in both cases assessed the significance of impact as "Minor" and the likelihood of impact as "Highly Unlikely" resulting is a consequential risk rating of "Negligible".

The alternate configuration of the Northern Sands DMPA does not result in any change to the risk assessments presented in the Revised Draft EIS for the placement in the northern part of the void.

The alternate whole of void area configuration has sufficient capacity, removes the need for a tertiary treatment pond, has lower bunds and therefore reduced potential for visual amenity concerns (raised by CRC) and does not require expediting of sand extraction.

3.0 DREDGE MATERIALS

In response to issues raised by DEHP regarding the sampling / testing of soils attached as **Appendix E** is Golders Associates Report (ref: 1546223-006-R-Rev2 October 2016) which provides details of the following:

- Previous investigations undertaken prior to the Preparation of the Revised Draft EIS
- Investigations undertaken as part of preparation of the Revised Draft EIS
- Marine Geophysical Survey
- The Developed Ground Model
- Dredge Material Properties

This report provides additional supporting information to the Dredge Material Properties assessment contained in Appendix J of the Revised Draft EIS.

To address concerns raised by DEHP regarding the treatment of Acid Sulfate Soils, Ports North commissioned Golder Associates to prepare an Acid Sulfate Soils Management Plan to deal with the placement of dredge material at the Northern Sands DMPA for soft clays and the Tingira Street DMPA for stiff clays. The proposed Acid Sulfate Soils Management Plan sets out details of:

- Project Overview
- Dredged Materials
- Barron Delta DMPA Operations
- Tingira Street DMPA Operations
- Mitigation Strategies and Contingency Options
- Management Procedures
- Responsibilities
- Non-Conformance and Corrective Action
- Auditing
- Community Relations
- Training

The proposed Acid Sulfate Soils Management Plan (ref:1546223-025-R-Rev1 October 2017) is included in **Appendix F.**

4.0 BASELINE WATER QUALITY DATA

The Revised Draft EIS was released for Public Notice prior to the completion of a full 12 months of baseline Water Quality data which is a necessary requirement for the setting of conditions.

Attached as **Appendix G** is BMT-WBM's Additional Field Studies Marine Water Quality (Ref.R.B229074.001.4) which replaces Version3 which was included as Appendix O of the revised Draft EIS. The updated version includes the full suite of water quality data collection to establish baseline water quality.

5.0 TRINTY BAY FISH HABITAT AREA

In response to a request from the Department of Agriculture and Forestry Ports North have prepared 2 plans showing the proposed amendments to the Trinity Bay Declared Fish Habitat Area as follows:

Plan No 921-015-01 Proposed Changes to Fish Habitat Area Boundaries including co-ordinates
Plan No 921-015-02 Proposed Changes to Fish Habitat Area Boundaries relative to bathymetric contours

These plans are shown in **Figures 5.1. and 5.2**.

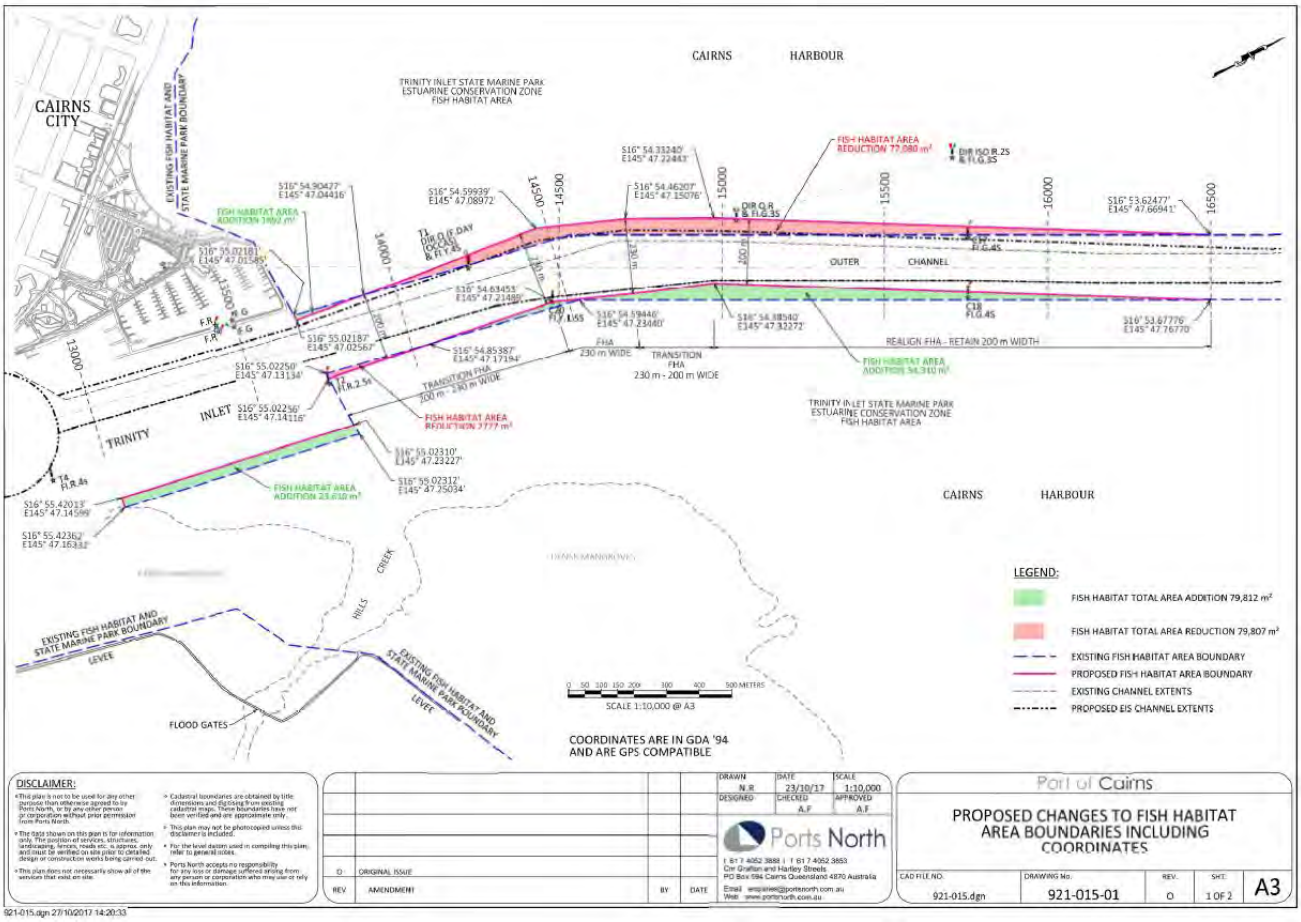

Figure 5.1 PN Plan N0 921-015-01

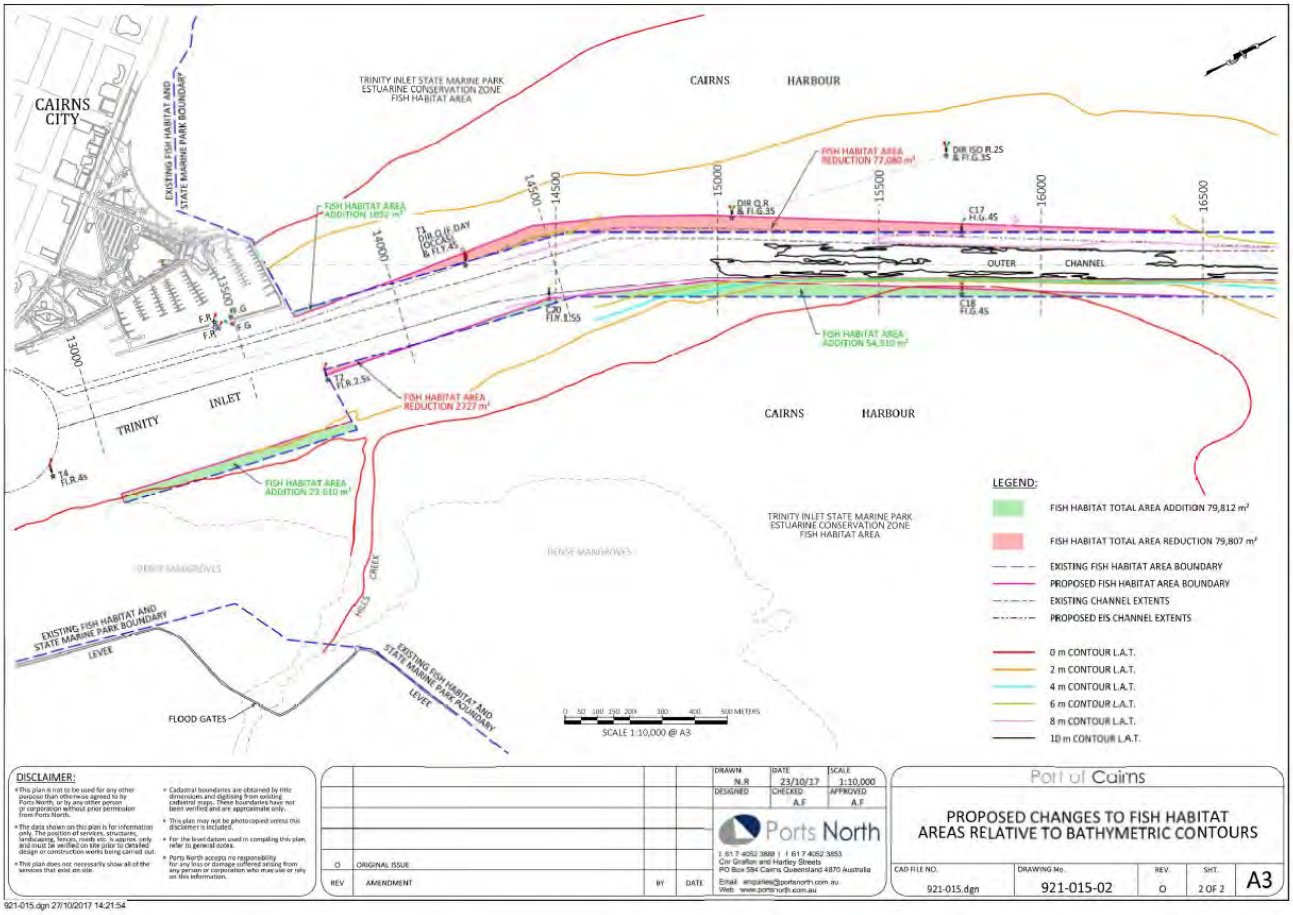

Figure 5.2 PN Plan N0 921-015-02

Full sized versions of Ports North Plans are attached in **Appendix H**.

In order to understand the habitat qualities of respective areas for FHA swap, Ports North commissioned JCU-Tropwater to undertake a baseline macrobenthic and algae survey of the proposed CSDP project are in 2013, which was inclusive of sampling within the areas relevant to the proposed areas of revocation or addition to FHA. These indicate that the areas are comparable as they are mostly open substrate with patches of medium density or low numbers of individuals on open muddy substrates. The JCU- Tropwater Report is accessible on TropWater's web site

https://research.jcu.edu.au/tropwater/publications/1339ABenthicMacroInvertebratesofCairnsHarbour.pdf

Areas of the proposed FHA addition are within the scope of the sample locations for the Port Baseline and Annual Seagrass Surveys scheduled to be done every three years, with works done in 2012 and 2015.

https://research.jcu.edu.au/tropwater/resources/13%2017%20Cairns%20Monitoring%20and%20Baseline%20report%202012.pdf

https://research.jcu.edu.au/tropwater/publications/1613SeagrasshabitatofCairnsharbourandTrinityinlet.pdf

These reports also show the historical extent surveys done as far back as 1994, which indicate an absence of actual seagrass meadows on the western side of channel in location of revocation (refer Map 3 of the 2015 report). The outcomes of these studies support the proosed "like for like" habitat condition and the suitability of the proposed swap areas for the FHA revocation process.

6.0 TINGIRA ST HABITAT VALUES

In response to submissions by Birdlife Australia and CAFNEC, Ports North commissioned Biotropica to undertake a further assessment of the proposed Tingira Street stiff clay placement site with specific reference to the habitat values for the Latham's Snipe.

Biotropica's original assessment include as Appendix AM of the revised draft EIS concluded that:

"As the highly disturbed Tingira Street site is unlikely to have any qualities not found in greater extent and better quality at nearby sites, it was concluded that any birds displaced by the CSDP were likely to relocate to nearby suitable habitats including East Trinity, the Esplanade or one of the many other areas of vegetation adjacent to water within the Cairns area. The impact of the proposed use of the Tingira Street site as a DMPA on G. hardwickii which did not reach the 'significant' threshold number under the EPBC Act, was considered to be a medium risk."

The revised assessment (Ref: FLA 17.10.01) is attached as **Appendix I**. The conclusions of the revised assessment are:

The Tingira Street site is a man-made and highly disturbed site in an industrial area of Cairns. A current EPBC approval exists for the development of part of the Tingira Street study area for a Common Use Barge Facility. This proposed development was **not** a controlled action under the EPBC Act.
An ecological assessment of the site by Biotropica Australia in 2017 showed that the site did not meet the required criteria to be considered an 'important habitat' for G. hardwickii under the EPBC Act. However, as a result of the public consultation of the revised draft EIS for the CSDP, a submission was made by Birdlife Australia stating that the 'important habitat' criteria of the presence of 18 G. hardwickii individuals had been reached.
The records provided by a Biotropica Australia commissioned bird specialist and the records from Birdlife Australia for the number of G. hardwickii present at Tingira Street on the same day are not consistent. In the absence of further standardised studies to document the use of the Tingira Street site in relation the habitat available in the surrounding area (such as Cairns Esplanade or other vegetation adjacent to water in the broader area), the importance of the Tingira Street site cannot be established.

In the light of the above, Ports North does not consider there is any reasonable justification to restrict the use of this highly modified artificial environment for the placement of the stiff clay dredge material and subsequent port uses as detailed in the RDEIS.

7.0 PROPOSED STATED CONDITIONS

To assist Coordinator General with the evaluation of the proposal and should it be determined that the project may proceed subject to reasonable and relevant conditions Ports North offers a set of proposed stated conditions for the consideration of relevant agencies in providing advice to Coordinator General's evaluation of the proposal.

The proposed Stated Conditions are attached in **Appendix J** and relate to the following:

- Environmental Authority for an ERA 16 (1) (d) Dredging
- Development Permit for an MCU for an Environmental Authority
- Preliminary Approval for Operational Work – Tidal works and Operational Works within a coastal management district.
- Approved Plans
- Proposed Terms of Referenced for an Expert Advisory Committee.

8.0 CDSP SCHEDULE OF COMMITMENTS

The Revised Draft EIS chapters include commitments to the implementation of mitigation measures and Management Plans. These commitments are collated in the CSDP Schedule of Commitments included in **Appendix K**. In response to issues raised in Agency and Community submissions Ports North makes the following commitments in the undertaking of the project.

Dredge Modelling

Ports North commits to validation of the dredge modelling at the beginning of the dredge campaign under different wave and tidal conditions This will input to the proposed Reactive Monitoring Program for capital dredging to be refined in conjunction with the Expert Advisory Panel.

Acid Sulfate Soils Management

Ports North commits to the inclusion of closure reporting and hand over testing in a detailed Acid Sulfate Soil Management Plan in accordance with Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines.

Ports North will undertake sampling and testing all material placed above -1m below permanent ground water and management of this material as per proposed ASSMP.

Mega Fauna

Ports North will engage with relevant researchers and government agencies with jurisdiction for management of inshore mega fauna to determine the need for conduct of surveys, and the detailed management measures to be included in the DMP and implemented during the works.

Tingira St Stormwater management

Ports North will prepare a Stormwater Management Plan for the Tingira Street DMPA as part of Operational Works applications prior to commencement.

Cultural Heritage

Ports North will prepare Cultural Heritage Management Plans to be developed with the relevant parties.

Ports North commits to engage suitably qualified archaeologist to monitor excavations in the vicinity of the Malay Town site, in the vicinity of the original Alligator and Lily Creek mouths and to address recovery, protection and/or documentation of archaeological artefacts, features and deposits that may be exposed.

Ports North may commit to engaging a suitably qualified maritime archaeologist to undertake a review of the hydrographic survey to determine the likelihood of the presence of as-yet-unknown maritime archaeological features and to establish extent of known shipwrecks and prepare a report on the likelihood of the presence of additional wrecks or maritime archaeological features in the development area.

Contaminated Land

Ports North will investigate properties affected by Landside works identified on the EMR to determine if contaminants exist, prior to undertaking any development. It is noted that such land affected by the landside works is Strategic Port Land, under existing management by Ports North who have a long term understanding of prior land use activities and numerous studies into the potential contamination status. Chapter C1 Construction EMP, includes proposed appropriate environmental and human health mitigation and management measures which will be developed as part of Operational Works applications and managed during the construction phase of the project through inclusion of relevant provisions for management of contaminated land in the Construction EMP and appointed Contractors EMP.

Air Quality

Ports North will conduct additional baseline air quality monitoring in the environs of the proposed Cruise Ship berthing wharves to inform future management decisions on future monitoring.

Potential construction phase air quality impacts on sensitive receptors in the vicinity of Trinity Wharf and pipeline/ DMPA infrastructure will be managed through the mitigation measures identified in Chapter C1 (Construction EMP) and the subordinate Contractors EMP.

Noise

Potential construction and operation phase (dredging) noise impacts on sensitive receptors in the vicinity of Trinity Wharf and pipeline/ DMPA infrastructure will be managed through the mitigation measures identified in B.10.5.1 and C1.7.3.

As part of the contractor procurement and detailed design process, noise impacts (particularly booster pump location and operation) will be reassessed to minimise impacts and ensure compliance with the EPP (Noise). All appropriate mitigation measures will be incorporated within the Construction EMPs and the DMP to ensure compliance with the ERA16 conditions for Noise.

Waste Management

Ports North will engage license regulated waste transporters for the management of applicable waste streams.

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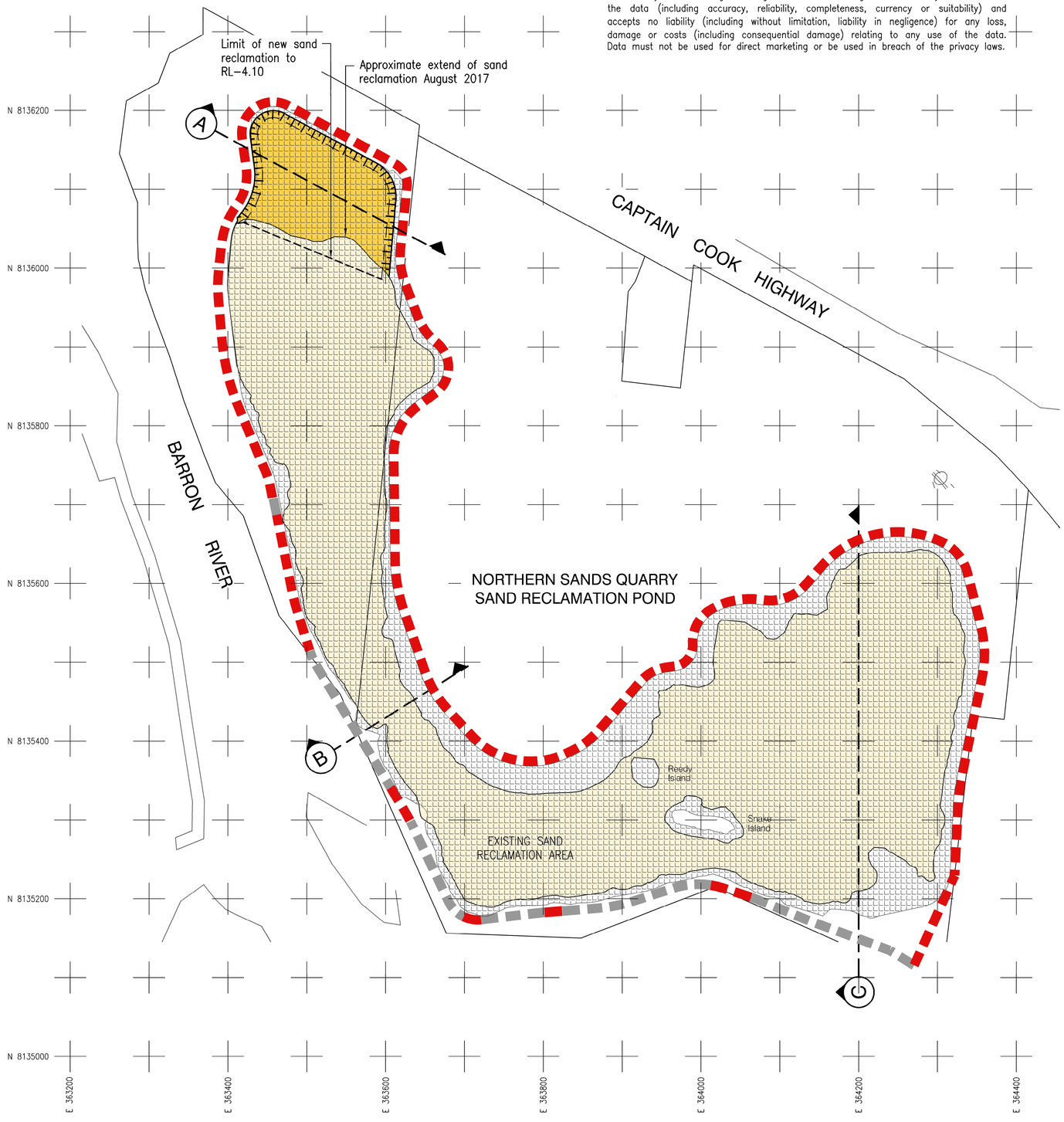
Appendix A: Northern Sands DMPA Sketches 3527-SK14D & 15A



DREDGE MATERIAL PLACEMENT ZONE
1:3000

STORAGE VOLUMES

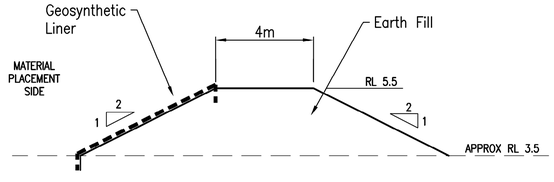
LEVEL (AHD) (m)	VOLUME BELOW (m^3)	COMMENT
5.50	2,861,218	Top of Bund
5.07	2,704,283	Top of Water at end of placement
5.00	2,678,922	
4.50	2,499,222	
4.07	2,347,020	Top of Material at end of placement
4.00	2,322,488	
3.69	2,214,742	Top of Water at end of 2019
3.50	2,149,522	
3.00	1,980,296	
2.69	1,878,100	Top of Material at end of 2019
2.50	1,813,865	
2.00	1,650,110	
1.50	1,489,590	
1.00	1,332,605	
0.50	1,182,965	
0.00	1,044,381	Lowest Groundwater Level
−0.50	906,260	
−0.59	882,650	Top of Material at end of settlement
−1.00	769,307	
−1.50	637,009	
−2.00	518,746	
−2.50	418,862	
−3.00	340,807	
−3.50	278,403	
−4.00	226,313	
−4.50	190,502	
−5.00	161,571	
−5.50	136,119	
−6.00	113,693	
−6.50	94,419	
−7.00	77,728	
−7.50	64,196	
−8.00	52,556	
−8.50	41,997	
−9.00	32,618	
−9.50	25,109	
−10.00	19,484	
−10.50	14,766	
−11.00	11,156	
−11.50	8,191	
−12.00	5,669	
−12.50	3,849	
−13.00	2,357	
−13.50	1,121	
−14.00	225	
−14.50	0	

LEGEND

- EXISTING SAND RECLAMATION AREA (approx 26.2ha)
- FUTURE SAND RECLAMATION AREA (approx 2.4ha)
- DREDGE MATERIAL PLACEMENT ZONE (approx 34.6ha – Surface Area at RL 3.50)
- EARTH BUND (RL 5.50 – approx 96,000m^3)
- EXISTING EARTH BUND (RL 5.50 or greater)

NOTES

1. Volumes shown are approximate only and based on a combination of site hydrographic survey and LiDAR survey.
2. For Cross Sections depicting placement of dredged material at weekly intervals, refer Drg 3527–SK15.



Total Bund length approx 4000m.
Comprising approx 3150m of new bund & 850m of existing surface above RL5.5

PERIMETER EARTH BUND
NTS

CONCEPT ONLY

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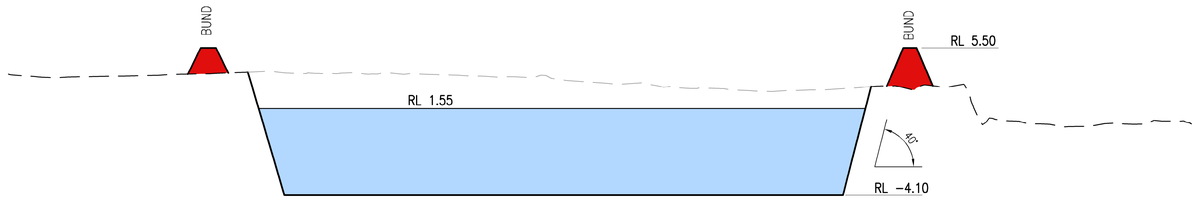
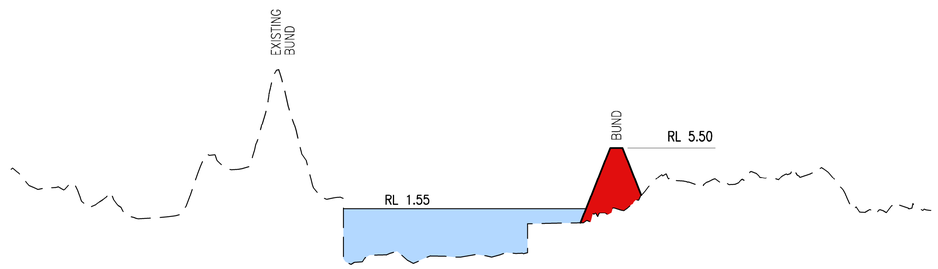
NORTHERN SANDS
Dredge Material Placement
Placement Zone Plan & Volumes

3527-SK14D
1:3000
A1 Full Size

Acad No. 3527-SK14D
4 October 2017



SECTION A



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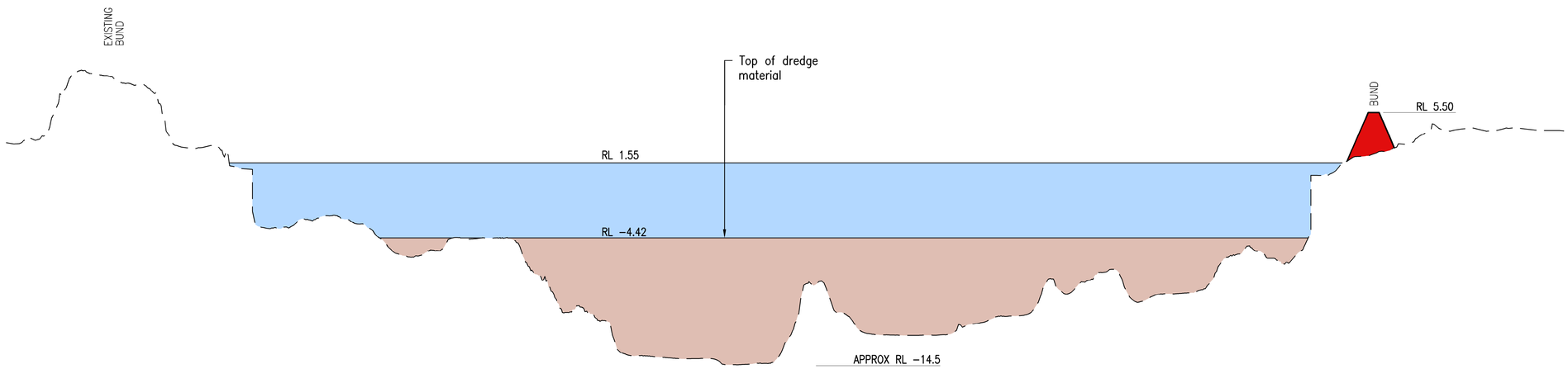

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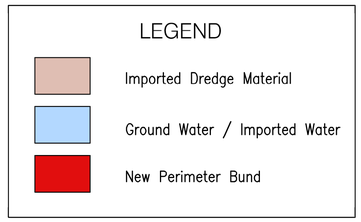

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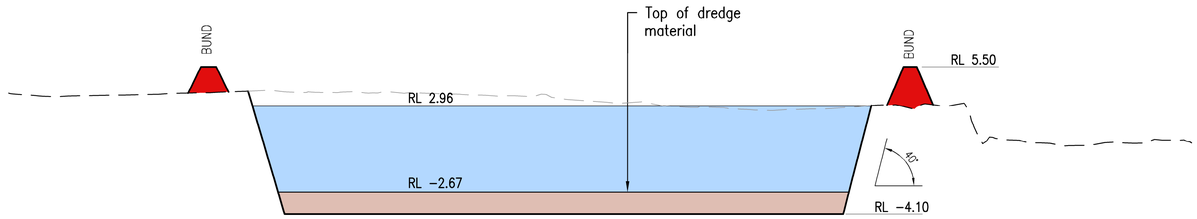
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 1

3527-SK15A

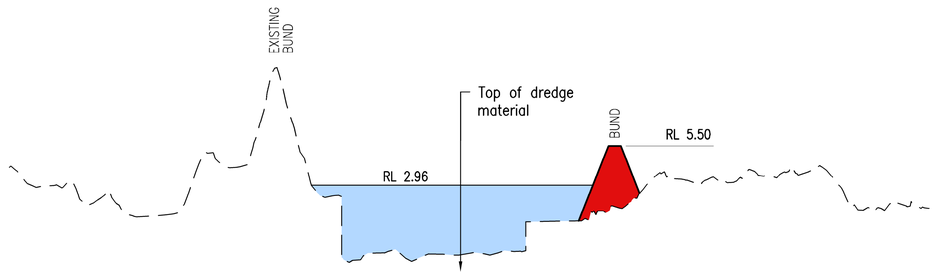
1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

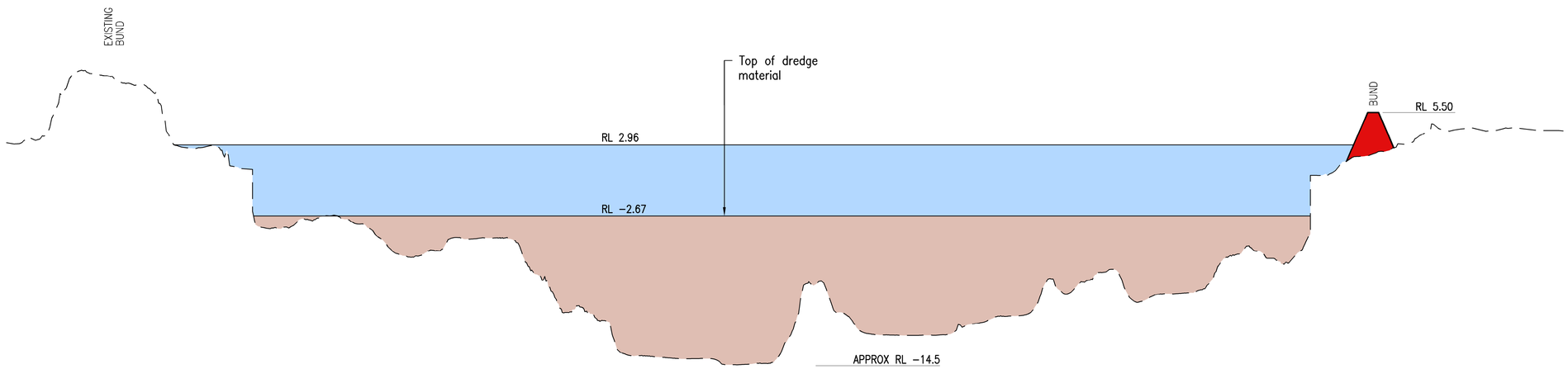
5 October 2017



SECTION A



SECTION B



SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

CONCEPT ONLY

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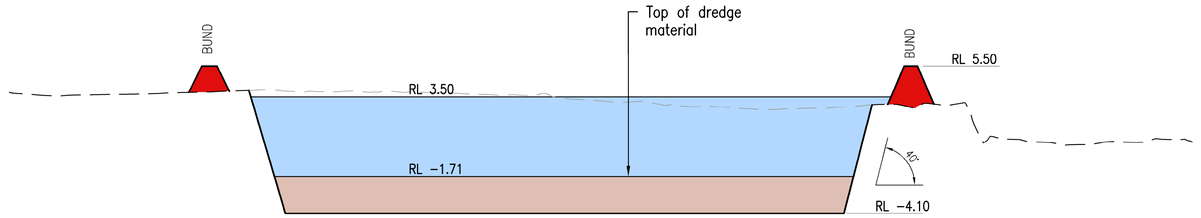
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 2

3527-SK15A

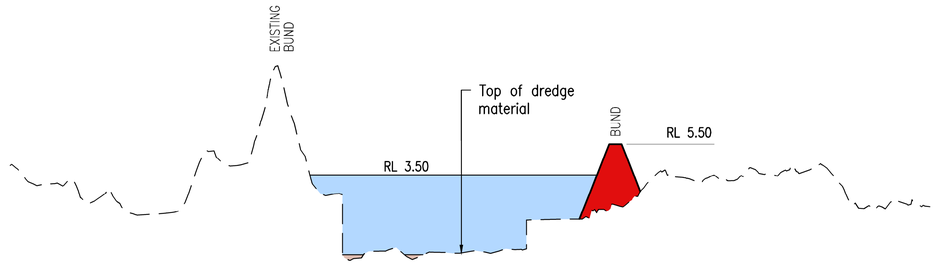
1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



SECTION A



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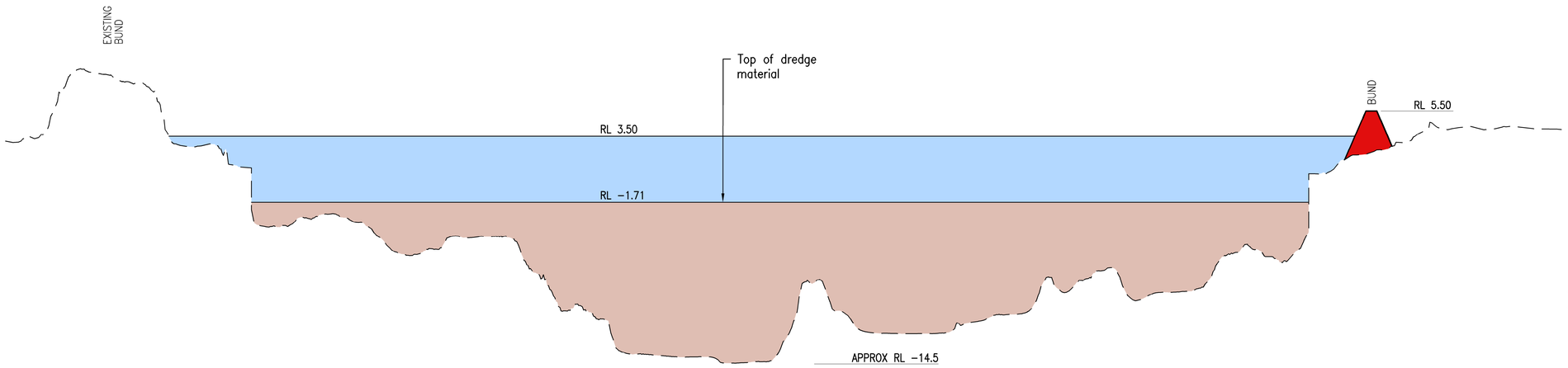

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

CONCEPT ONLY

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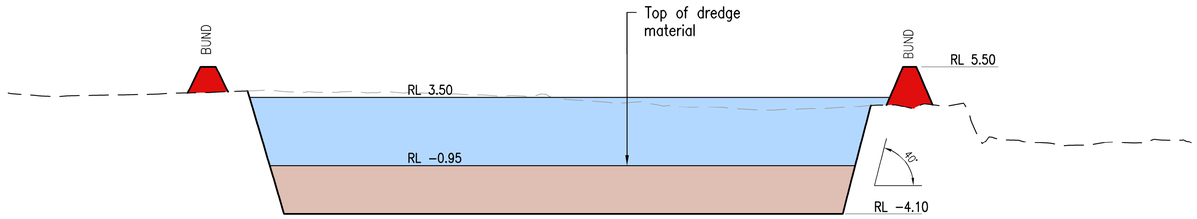
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 3

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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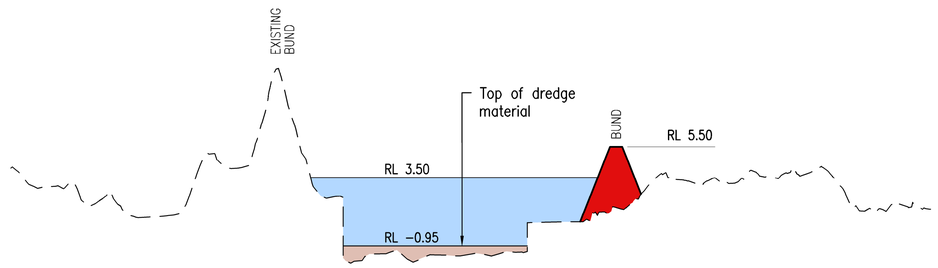

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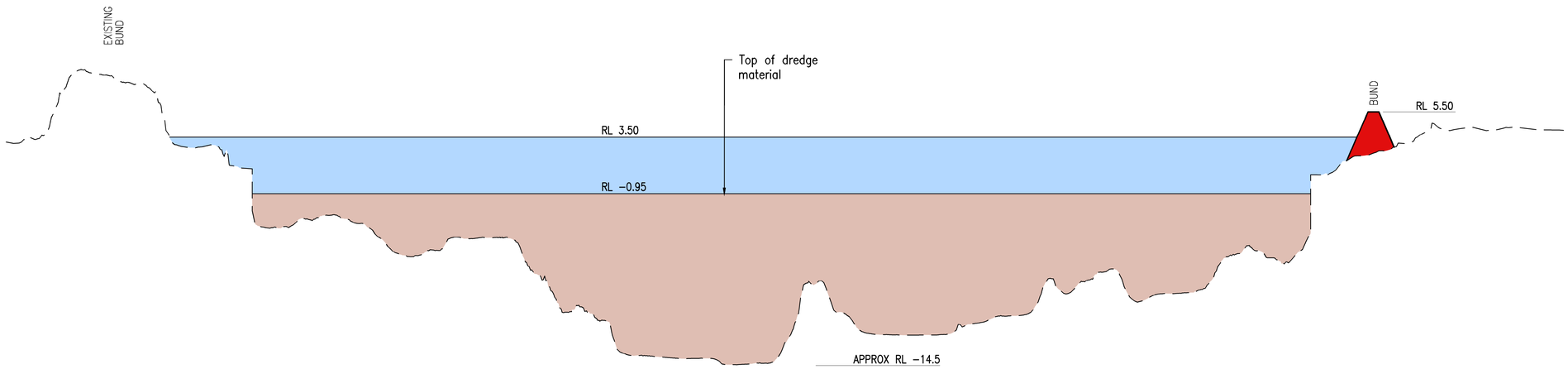

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

CONCEPT ONLY

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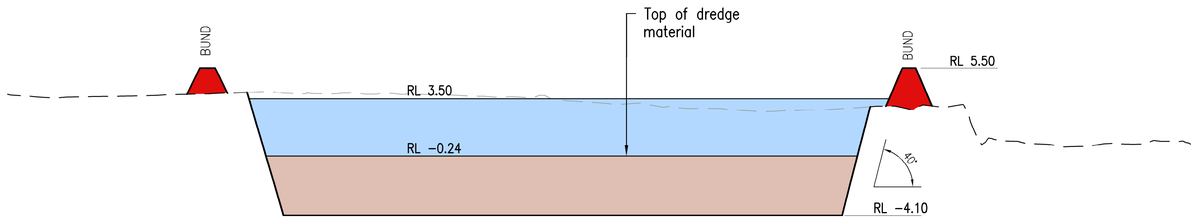
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 4

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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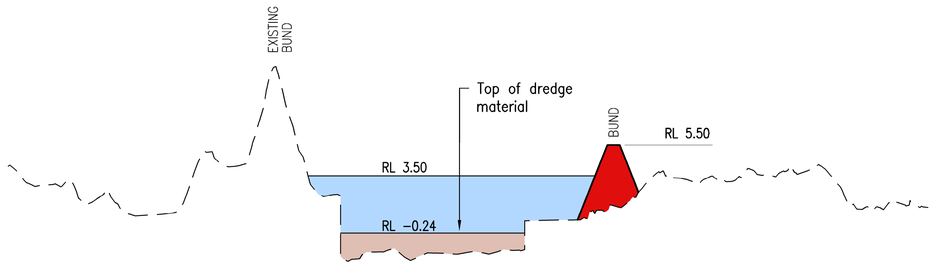

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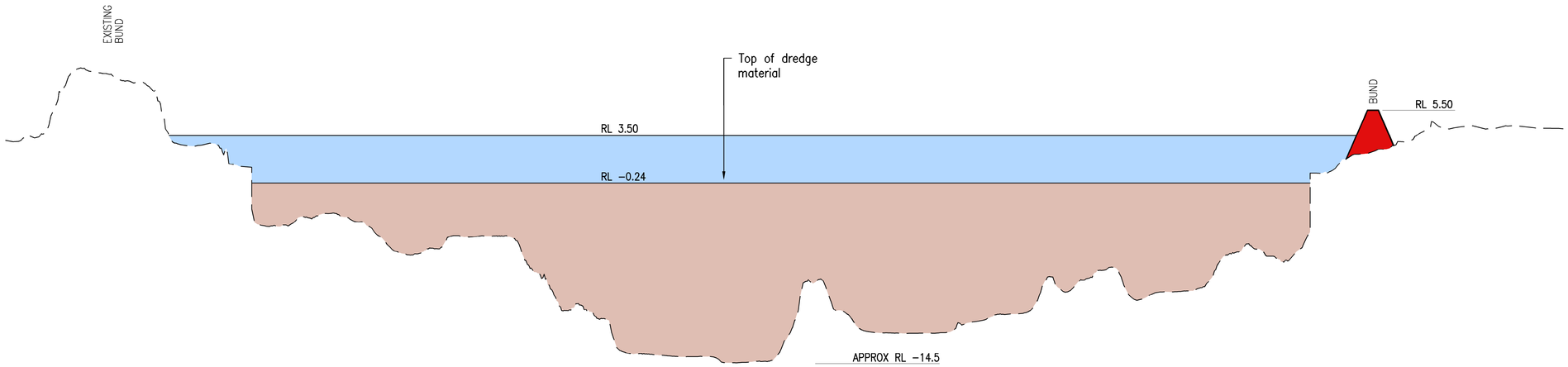

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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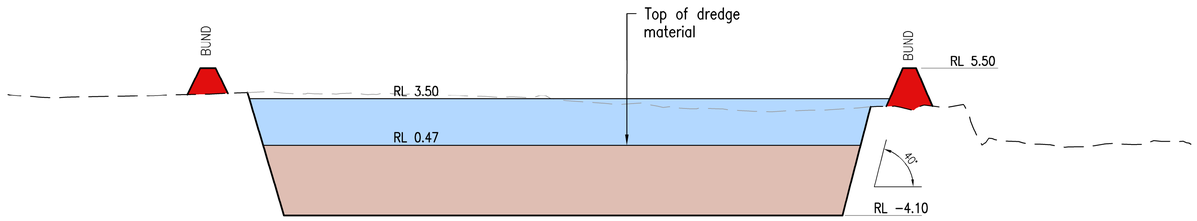
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 5

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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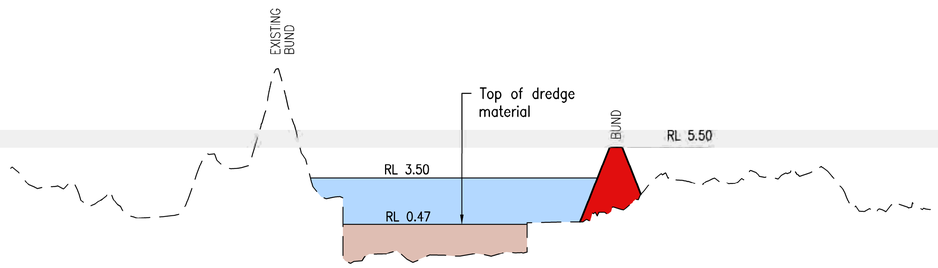

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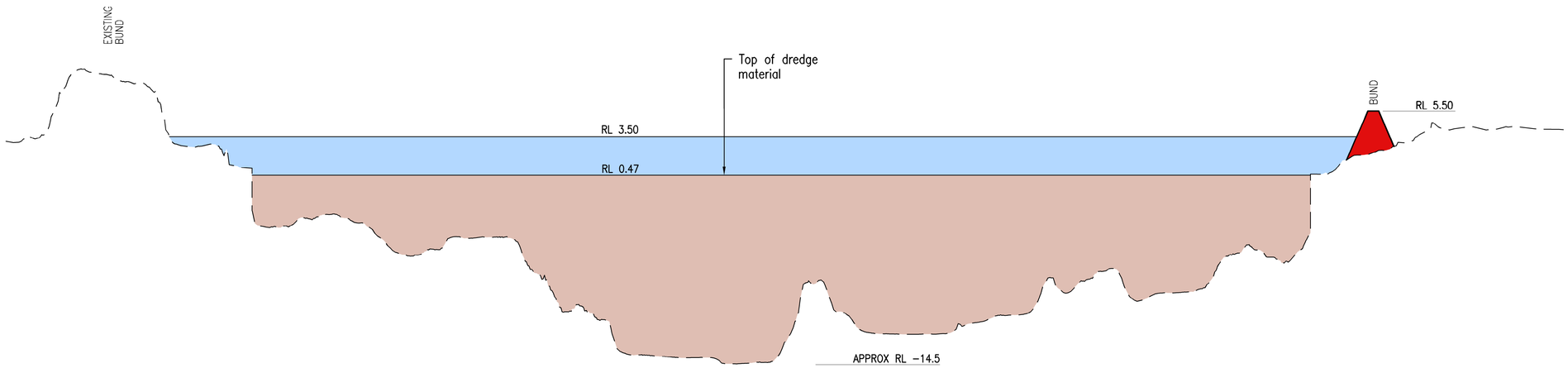

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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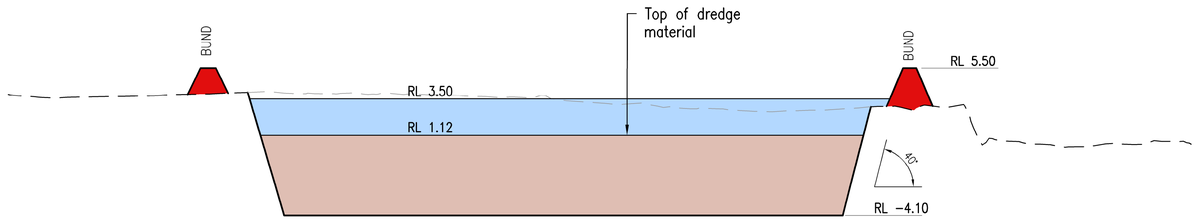
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 6

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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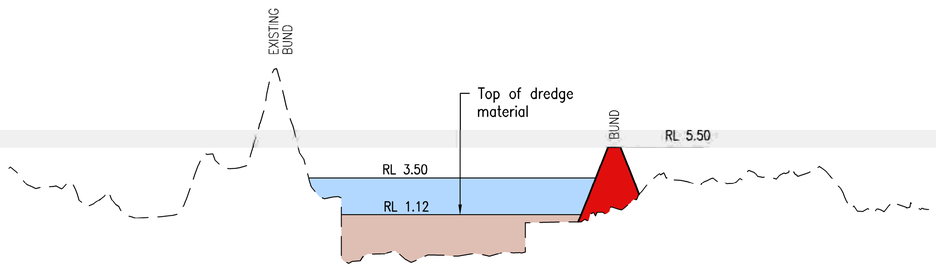

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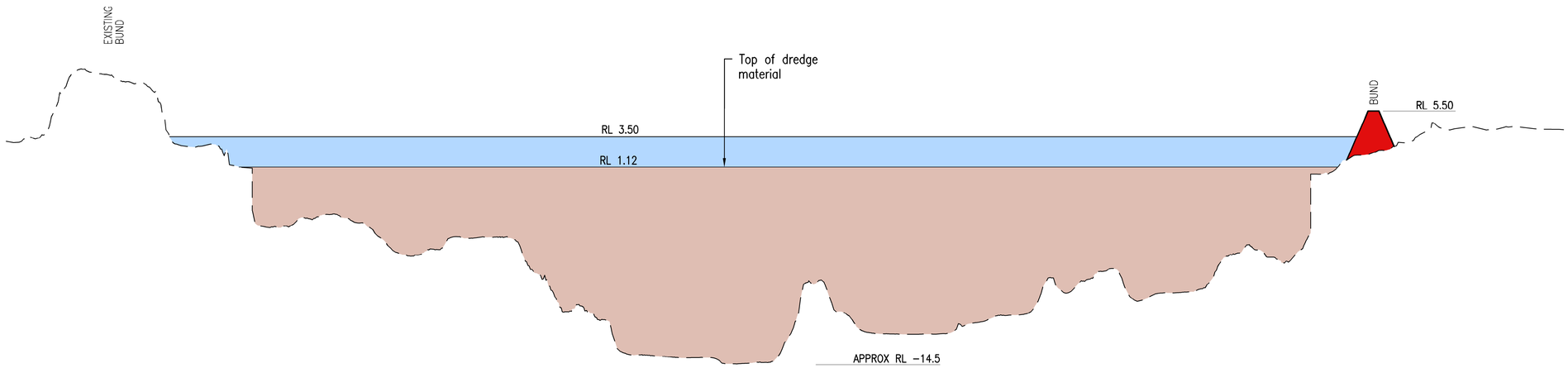

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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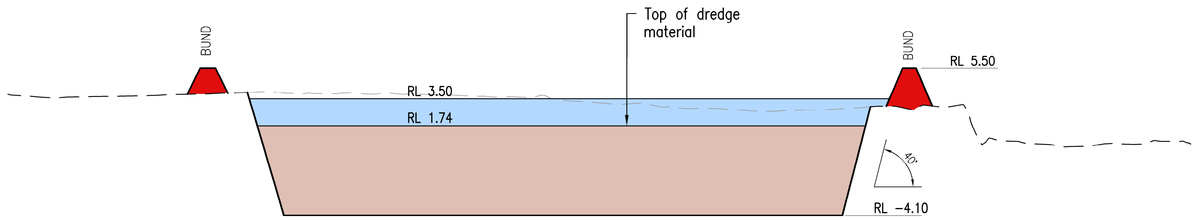
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 7

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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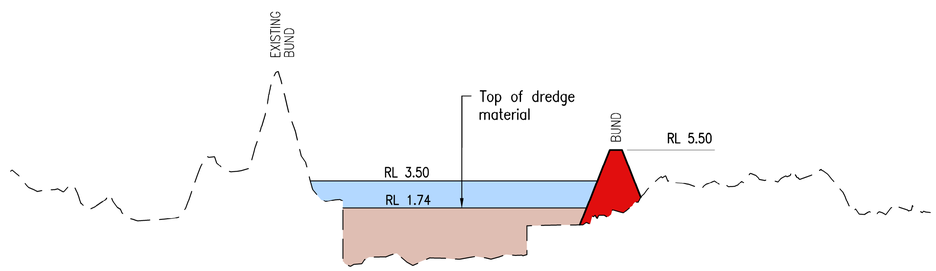

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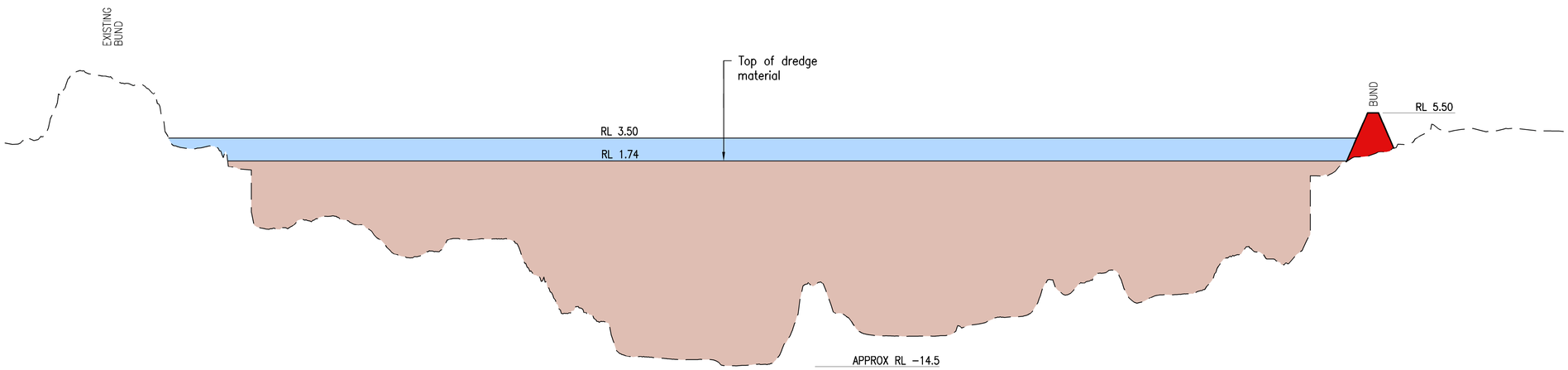

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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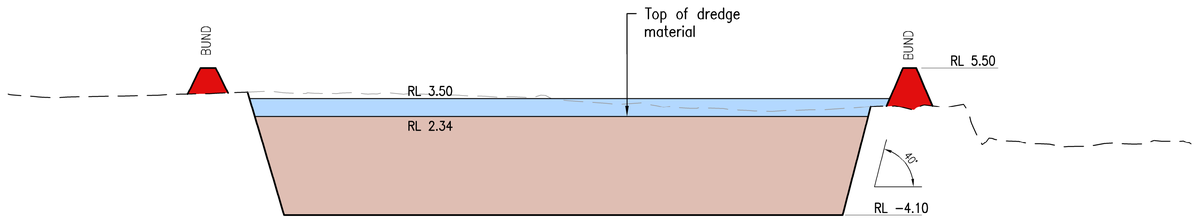
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 8

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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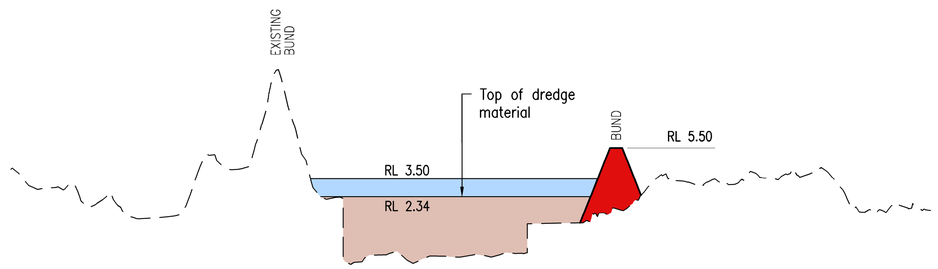

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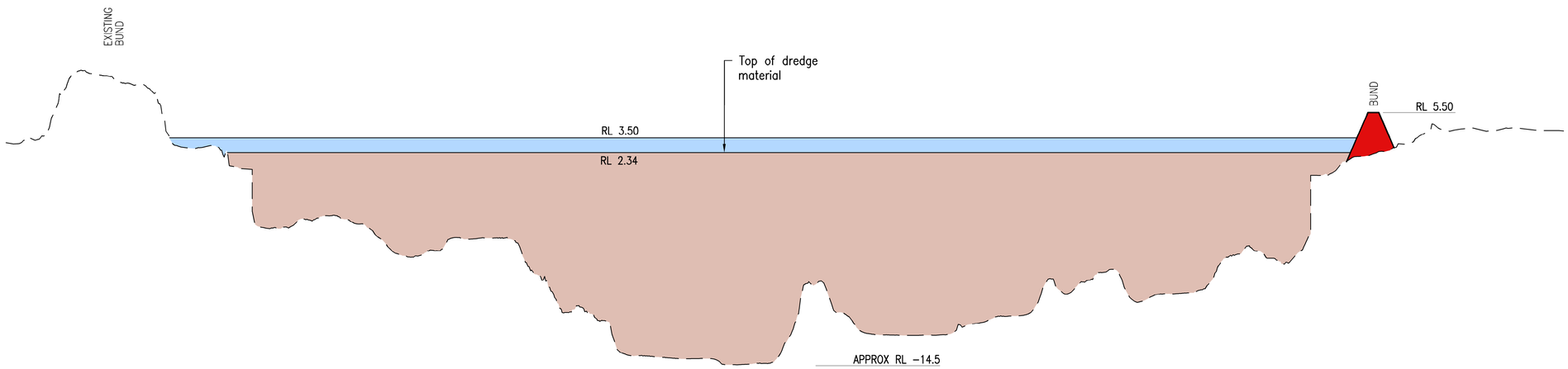

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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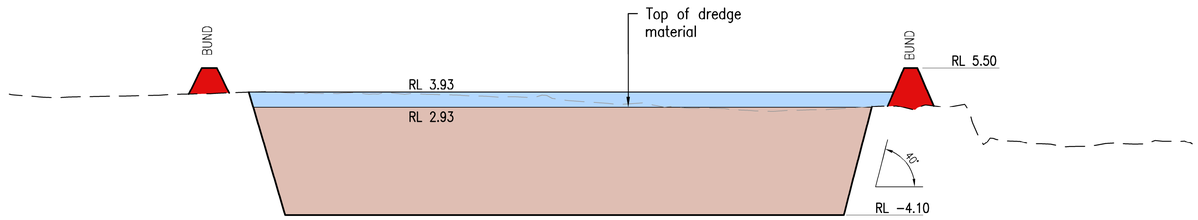
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 9

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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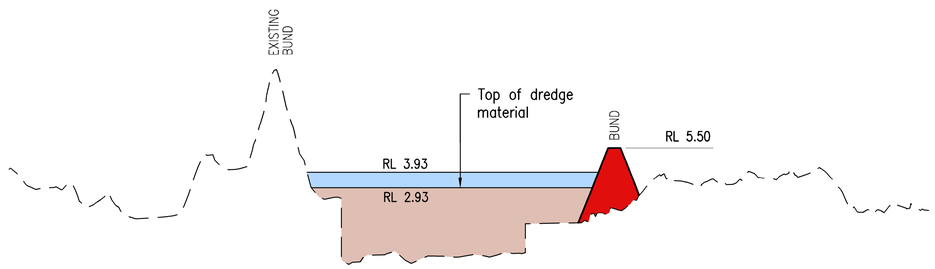

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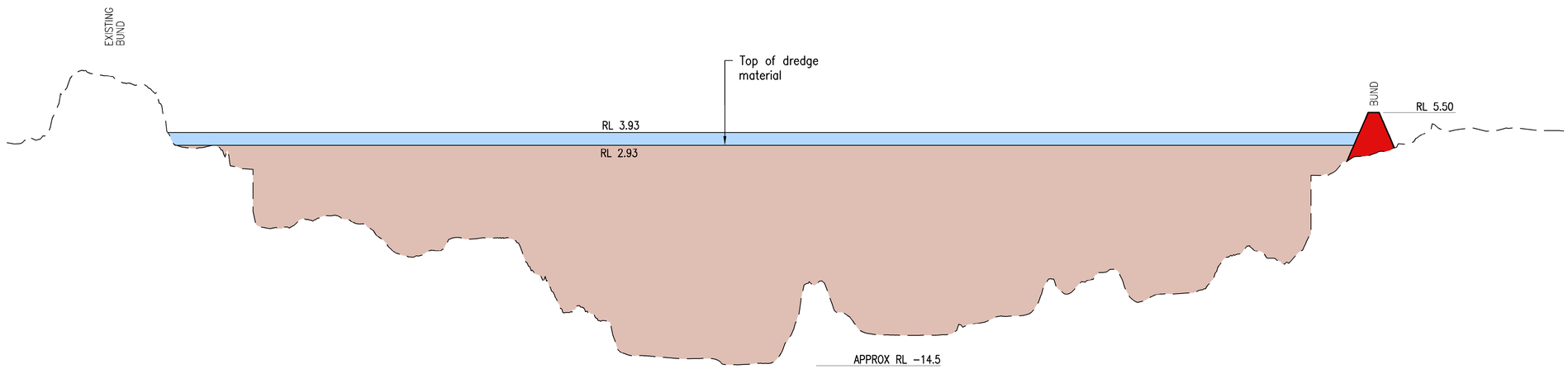

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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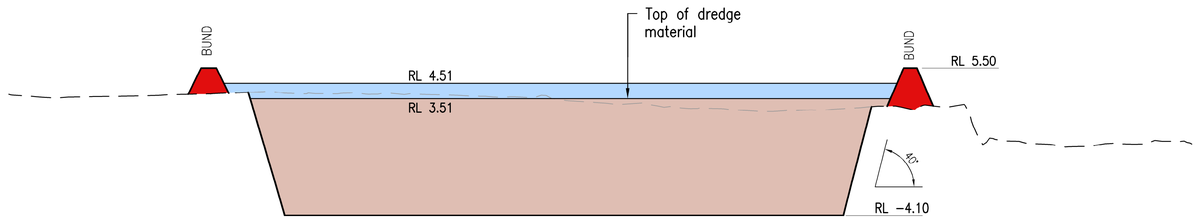
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 10

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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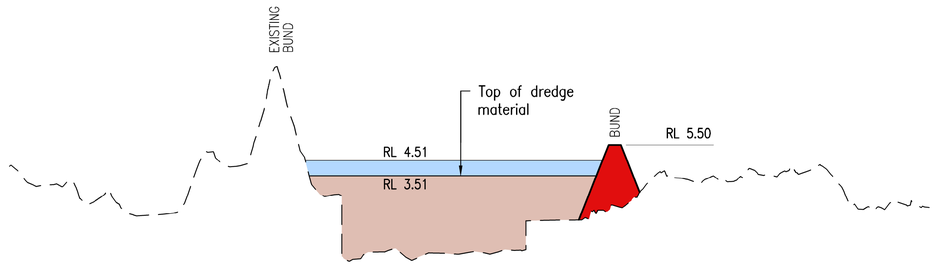

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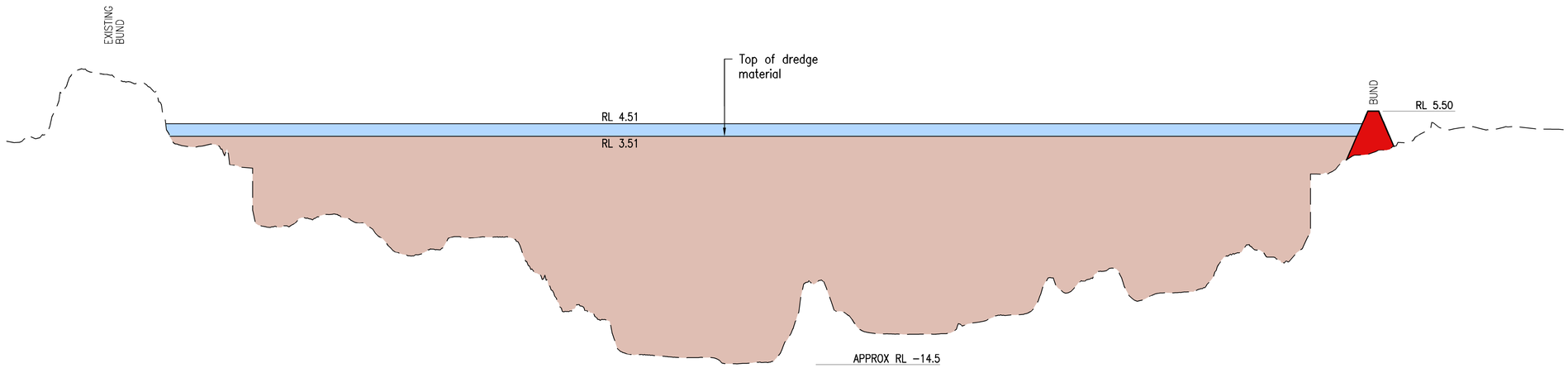

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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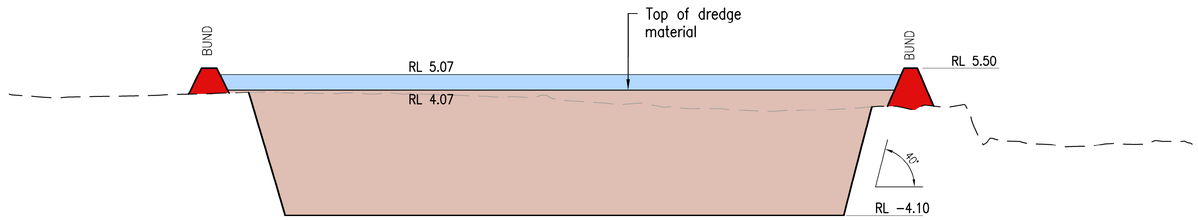
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 11

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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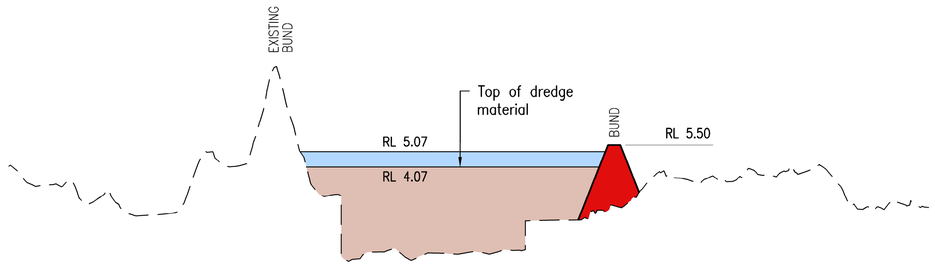

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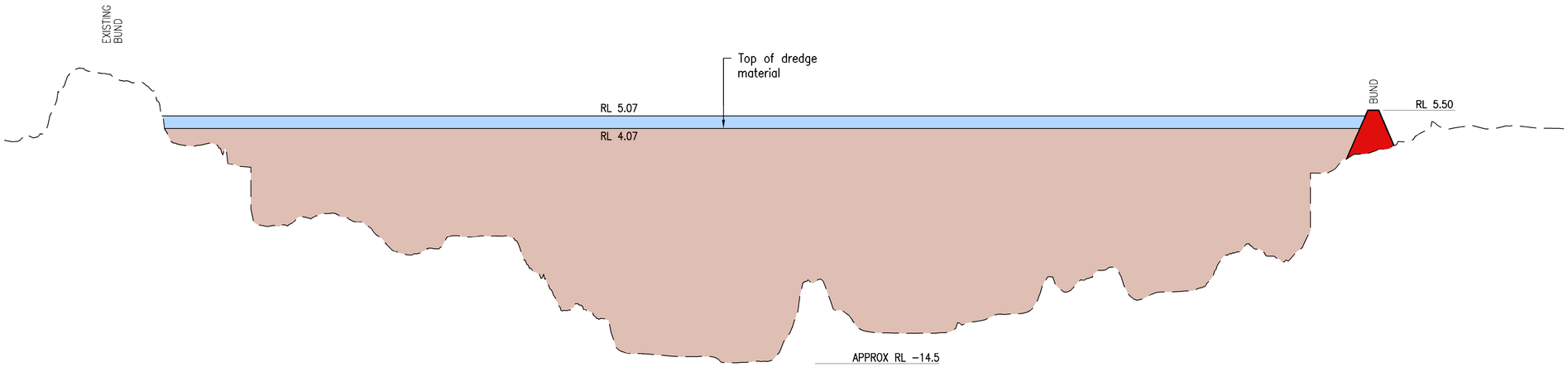

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

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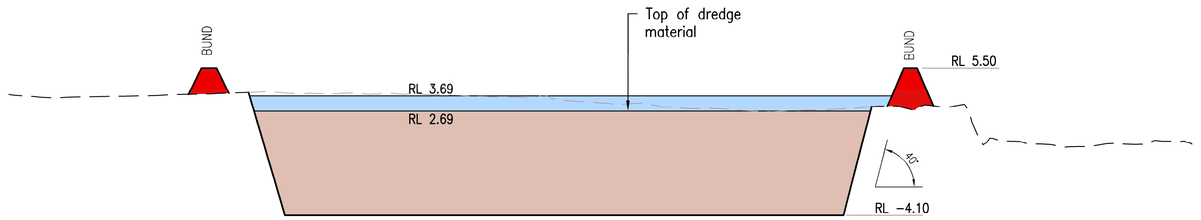
NORTHERN SANDS
Dredge Material Placement
Cross Sections
End of Week 12

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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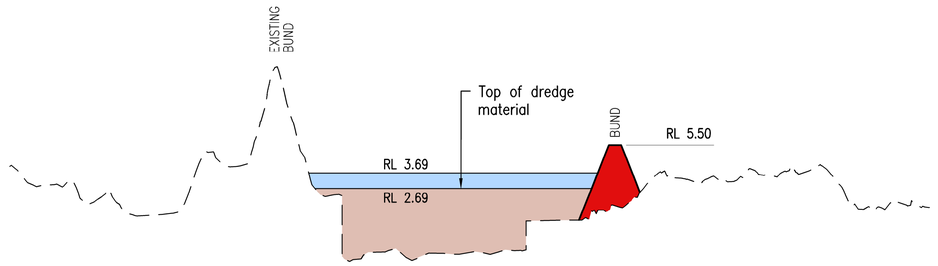

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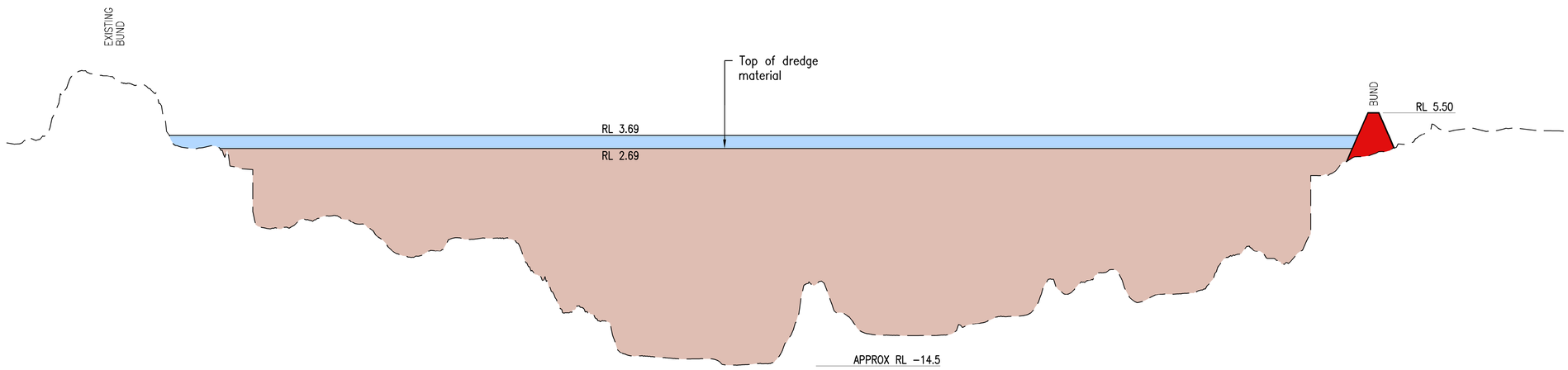

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

CONCEPT ONLY

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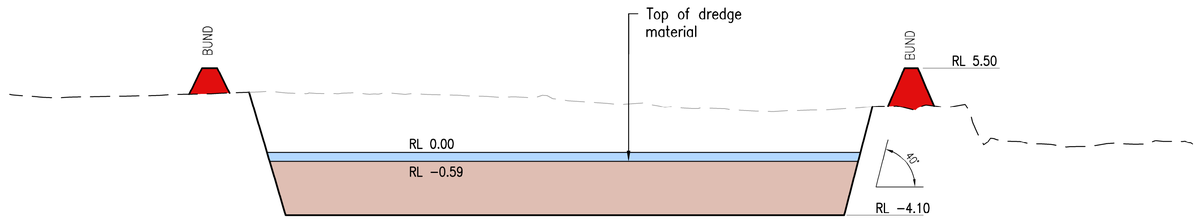
NORTHERN SANDS
Dredge Material Placement
Cross Sections
At End of Year 2019

3527-SK15A

1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A

5 October 2017



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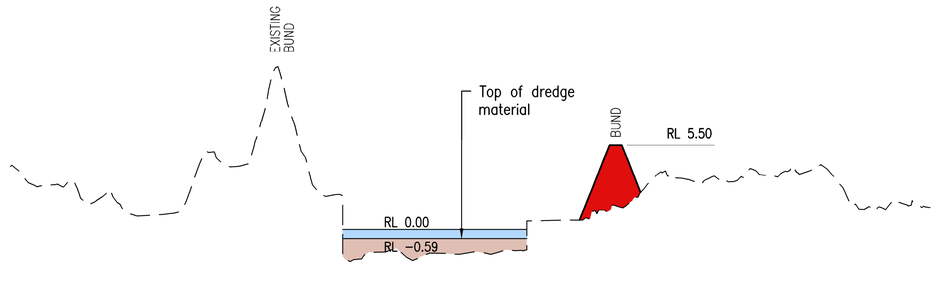

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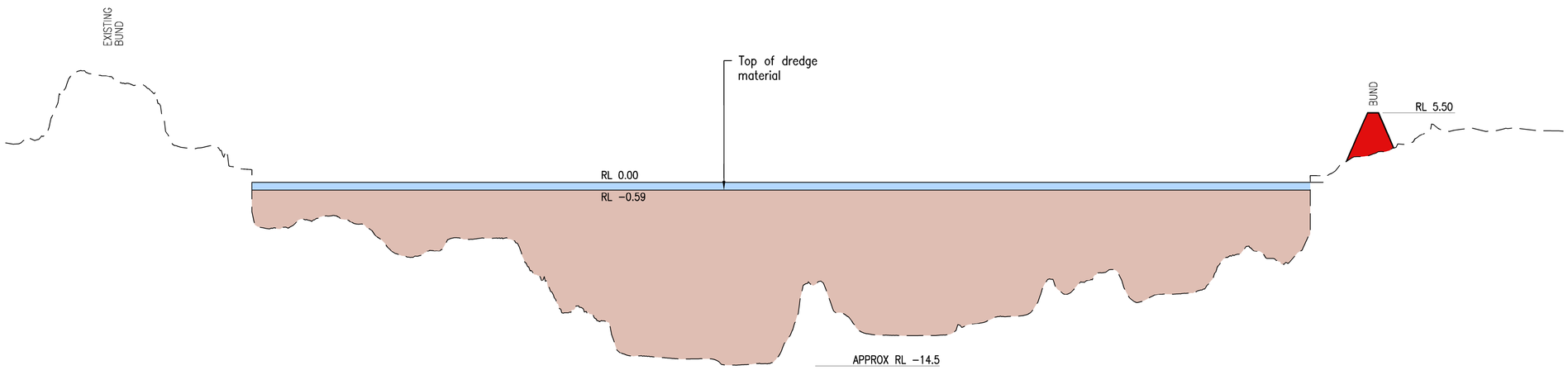

SECTION C

LEGEND

- Imported Dredge Material
- Ground Water / Imported Water
- New Perimeter Bund

CONCEPT ONLY

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NORTHERN SANDS
Dredge Material Placement
Cross Sections
At Time of Ultimate Settlement

3527-SK15A
1:1000H / 1:200V
A1 Full Size

Acad No. 3527-SK15A
5 October 2017