



# Aberdeen Harbour Expansion Project

## Construction Environmental Management Document

11<sup>th</sup> May 2017

**DRAGADOS**

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# Chapter 3

## Construction Method Statement

# Aberdeen Harbour Expansion Project

## Construction Method Statement

| Rev | Date          | Prepared By          | Reviewed By | Approved By          | Reason for Issue |
|-----|---------------|----------------------|-------------|----------------------|------------------|
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## 1. PURPOSE

This Construction Method Statement (CMS), prepared by Dragados UK, details the construction methodology for the Aberdeen Harbour Expansion Project (AHEP). It has been produced to inform stakeholders regarding the procedures and programme of the AHEP construction phase.



Figure 1 – Aerial view of the bay prior to construction

## 2. DESCRIPTION OF WORKS

The main activities and work packages for the construction of AHEP include:

- Dredging the existing bay to design depths varying from -9 to -10.5m chart datum (CD). The dredged material is expected to comprise of sand/alluvium, glacial till and rock materials.
- Profiling the existing Southern slopes of the bay. This is intended to reduce wave reflection within the central berthing and approach channel areas of the development by absorbing incoming waves.
- Construction of two rubble mound breakwaters 634 metres (North Breakwater) and 640 metres (South breakwater). The purpose of these structures is to protect the new facilities from damaging North Sea metocean conditions.
- Construction of approximately 886m of closed and 538m of open quays<sup>1</sup> to provide a combined total of over 1424m of quayside capable of berthing vessels.
- Land reclamation activities to provide a paved area immediately to the rear of the quayside installations. This will use materials recovered from dredging operations supplemented by imported materials.
- Provision of ancillary welfare accommodation, quayside furniture and water tank installations for the facilities operational stages.
- Numerous stages of off-site highway work to allow free flowing traffic around the new facilities during construction and operation. This will include improved access for Heavy Goods Vehicles (HGVs).



Figure 2 – Imposed aerial view of the bay after completion of construction

<sup>1</sup> Closed quays have a foundation with a solid construction, which presents a solid barrier to seawater under the deck. An open quay has a deck supported on piles, which allows seawater to pass through the underside of the deck.

### 3. SITE LAYOUT

#### 3.1 SITE ESTABLISHMENT AND WELFARE

There will be three temporary compounds used for the duration of the construction period:

- 1) Central Compound: area surrounding the junction of St Fitticks Road, Coast Road and Greyhope Road currently used for recreational purposes. The Central Compound will host the site offices (for management and engineering staff) and project welfare facilities (for operatives and skilled labour).
- 2) North Compound: area located in the existing Walker Park currently used for recreational purposes. The North Compound will house the visitor centre, an area to temporarily fabricate accropodes (concrete blocks) as a contingency measure, a storage area for the construction activities, and a construction workshop area.
- 3) South Compound: area located south of Nigg Bay currently used for agricultural purposes. This area will contain the accropode fabrication and storage facilities.

The location of the compounds in relation to the main construction activities means the site is accessible and serviced by one of the three compound areas without the need for a shuttle or mobile welfare services. Wheel-wash facilities will be implemented at the exit points as shown on Appendix 1 (A, B, C and D) to prevent dirt and debris from leaving the work areas.

See Appendix 1 (A, B, C and D) for proposed plans of the 3 construction compounds.

#### 3.2 ACCESS TO THE SITE

AHEP is accessible by several routes for light goods and personal vehicles travelling from the city centre and South. The site is limited to one single route from the south for HGV traffic.

The site will be signposted with all relevant restrictions shown in advance through a Traffic Management Plan. This includes the installation of semi-permanent traffic signs on poles and a dedicated customer enquiries telephone line.

##### 3.2.1 Access for LGV

Light goods vehicles (LGVs) and cars are permitted to access the site without restriction. If travelling from the South the route in Section 3.2.2 will be followed. If travelling from the North or City Centre then the route detailed below and in Figure 3 should be followed:

- Cross the A956 road bridge over the River Dee and take the first exit from the Roundabout onto South Esplanade West.
- Follow South Esplanade West until its Junction with Victoria Road under traffic signal
- Turn right at the traffic signals and follow Victoria Road in a Southeasterly direction. Follow signage for desired site access point.



**3.2.2 Access for HGV**

HGVs are restricted to one point of access to and from the site only. This access route has been agreed and documented with regulatory bodies and **MUST** be adhered to at all times. Under no circumstances will any HGV access the site by any other means unless fully authorised by the site team and appropriate regulatory authorities.

The route to be followed is as detailed in Figure 3.

- Travel East on Hareness Road from the A956
- Continue East leaving 2No roundabouts at their second exits
- At the T-Junction between Hareness and Coast Road, turn North (left)
- Follow Coast Road in a northerly direction passing over a railway bridge controlled by traffic signals. NOTE THIS STRUCTURE HAS A WEIGHT LIMIT OF 40T
- On leaving the railway bridge, follow signage for desired site access points (section 3.3)



Figure 3 – Designated access route for HGVs (blue), cars and LGVs (green) to access Nigg Bay

**3.3 ACCESS TO CONSTRUCTION AREAS**

Access within the site is provided by several temporary access routes, each serviced either by Coast Road or Greyhope Road.

The temporary access routes (Table 1) will be formed of a granular material and will be maintained to ensure that maximum accessibility is available. The routes form an additional 5 access points for the site to those listed in 3.2. Illustrative maps of access routes within



the three Construction Compound are provided within Section 6.4 of the Construction Traffic Management Plan, which can be found in Chapter 6 of this CEMD.

Table 1 – Description of temporary access routes.

| Termination Point               | Information   |
|---------------------------------|---|
| South Breakwater                | Access only from the Southern Compound. HGVs will use this route travelling from the south to deliver to the southern breakwater.   |
| Fabrication Yard                | Access to the fabrication facilities for all vehicles. Access to the southern breakwater for vehicles traveling from the north.   |
| Southern Slopes (Land Blasting) | Access for land blasting equipment to profile the Southern slopes which is not practical to complete from the marine environment.   |
| North Breakwater                | Access for HGVs and general traffic delivering material or requiring access to the North Breakwater.  |
| Project Offices                 | Accessible from Greyhope Road which will be closed at its junction with St. Fitticks. This access route will allow traffic to enter the project's office management facilities. |

#### 4. PROGRAMME OF WORKS

The programme duration of 176 weeks began with contract award 20<sup>th</sup> December 2016. The detailed programme is provided on Appendix 3 and summarised below.

The initial priorities are to:

- complete the discharge of relevant pre-construction planning conditions,
- commence the enabling works and surveys,
- achieve statutory consultees acceptance and approval of the project's Health & Safety, Quality and Construction Environmental Management Plans, and
- installation of temporary perimeter fencing to secure the site boundaries and earth works in the compound areas (anticipated in April 2017).

The completion of these activities leads on to the construction period for the temporary access routes. In addition the Central and Southern Compounds will be prepared for welfare and pre cast yard installations respectively. It is expected that by late April/May 2017 that the site offices will be operational and the fabrication of precast elements will be underway.

On completion of site installation activities in early to mid-2017, general construction activities and marine works will commence. The general construction activities include:

- fabrication of precast elements, such as accropodes (which continues into late 2018), and
- relocation of services and the temporary installation of utility supplies for the UFI, Marine Scotland and other buried services.

The first phase of marine construction activities are planned to be undertaken in the favourable weather window from May to September 2017. This will include dredging, drilling and blasting of the sea bed for north quay. The initial emphasis will be focused on the north breakwater including placement of core breakwater material and direct deposit of quarry material.

The marine activities are expected to be suspended by the end of September 2017 following the installation of armour and accropodes. It is anticipated at this stage that the breakwater levels will be completed to +6.5/7.5m CD and the first phase of the crown wall<sup>2</sup> will be complete. Construction of temporary rock protection will also be completed to protect the works during the winter season.

Over the winter of 2017, the caisson fabrication commences in mainland Spain. Preparatory and fabrication works are anticipated to run from December 2017 to July 2018. From April to August 2018 there are 4 planned voyages delivering at total of 22 caisson units.

The second phase of marine construction are planned from early 2018 to summer 2018. In this phase the north breakwater will be completed, followed by the south breakwater. South breakwater activity will be suspended in October 2018 and protected over the winter. The second phase of the south breakwater will start in March 2019 and completed by October 2019.

The north breakwater will provide shelter in Nigg bay enabling quay installations to begin. In April 2018 preparatory works for the east quay will commence and first caissons will be

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<sup>2</sup> A crown wall is a concrete structure installed on the top of a rubble mound breakwater. It can reduce the impacts of wave overtopping and provides a flat surface which allows access to the breakwater.

installed. Quay installation will occur between June 2018 and March 2019. Dredging activities will continue during the course of 2018 with some of the dredge material used to backfill the quays. Drainage, civil works and pavement installations complete the closed quay structure ready for building, furniture and installations beginning in April 2019.

Quayside activities and finishes will complete the programme. This includes the installation of water tanks, buildings and mechanical and electrical works which run from March 2019 through to April 2020. This will allowing a project handover to Aberdeen Harbour Board in May 2020.

These activities will be followed by the installation by Aberdeen Harbour Board of navigation aids, lights, CCTV and security. This are anticipated to be completed at least eight weeks prior to the planned AHEP completion date of 10<sup>th</sup> May 2020.

#### 4.1 WORKING HOURS

The construction programme takes into account realistic working hours and third party restrictions. Based on Dragados' previous experience we are confident that these working hours will allow the project to meet all key construction dates including incorporating a two week Christmas and one week Easter shutdown period.

Proposed working hours are detailed below, with general activities (any activity not listed within Table 2) being run 6 days per week from 07:00 to 19:00 Monday to Friday, and 09:00 to 16:00 on Saturdays with no Sunday working. As construction works progress, there is the potential for these working hours to be amended depending on progress.

*Table 2 – Representation of construction working hours*

| Work Aspect  | Activity                                  | Working Hours           |
|--------------|---|-------------------------|
| Dredging     | Drilling and blasting                     | During daylight hours   |
|              | Dredging                                  | 24 hours, 7 days a week |
| Breakwater   | Marine placement                          | 24 hours, 7 days a week |
|              | Direct placement                          | 24 hours, 7 days a week |
|              | Rock and Accropode armour placement       | 24 hours, 7 days a week |
|              | Crown Wall                                | 24 hours, 7 days a week |
| Quays        | Revetment bedding layer and cells filling | 16 hours, 6 days a week |
|              | Rotary Piling                             | 24 hours, 6 days a week |
|              | Superstructure                            | 16 hours, 6 days a week |
| Casting yard | Precast Fabrication                       | 16 hours, 6 days a week |
| Caissons     | Transport, placement and backfilling      | 24 hours, 7 days a week |

## 5. CONSTRUCTION ACTIVITIES

### 5.1 ENABLING WORKS

#### 5.1.1 Road Works

There are two main roadwork activities proposed (see Appendix 2 for plans):

- Works to the existing Coast Road to the South of AHEP, requiring the existing pavement surface to be widened to accommodate an increase in HGV traffic between Hareness Road and Doonies Farm.
- Realignment works to move the existing Coast, Greyhope and St. Fitticks Road(s) profiles to accommodate harbour entrance facilities.

##### 5.1.1.1 Widening Works to Coast Road

Pre-construction, traffic management will be in place and Coast Road closed, allowing safe and non-restricted access to the area for contractor(s). Site clearance works will be carried out, such as removal of boundary wall/fence, signpost, signage and other street furniture. Following clearance activities, earthwork activities will be completed involving the removal and importation of material(s) to form required profiles.

Once levelling has occurred, the existing blacktop surface will be removed through milling. The milling machine will run the route removing the required quantities of blacktop surface. The output material will be discharged directly into the back of a truck for removal from site for recycling.

Once the road surface has been reduced to required levels, blacktop components will be delivered via truck to the location. The material will be placed into the hopper of a paver and installed in the required thickness along the route. Following the paver, a roller will compact the material. The process will be continued until the pavement is complete in each individual characteristic layer.

On completion of the running layer, line markings and surface textures will be undertaken, signage reinstated, traffic management removed and the Coast Road opened to the public.

##### 5.1.1.2 Road Realignment to Coast, Greyhope and St. Fitticks Roads

Pre-construction, traffic management will be in place to allow safe working areas for the workforce and public around the realignment works. Site clearance works will be carried out including stripping of topsoil and furniture removal. All material will be stockpiled locally or managed according to the Waste Management Plan. Then earthwork will be completed including the removal and importation of material(s) to form required profiles. Milling activities will take place on existing carriageway tie in locations to form required profiles for the running surface transition.

Once the road surface has reached desired levels, blacktop will be placed at the required thickness along the route. Following the paver, a roller will compact the material. The process will be continued until the pavement is complete. Line markings and surface textures will be installed. Running simultaneously, boundary restraints and signage will be reinstated for full transition of traffic management to align vehicles to the new carriageway.

Some existing services along the Coast Road and St Fitticks Road need to be diverted to enable the existing junction re-alignment. Trial pits will be dug to determine the exact location of the existing services. The new cable trench will then be excavated, new services laid and new connections made by a specialised statutory services provider. The new lines will be tested and commissioned before they are brought into service.

### 5.1.2 Preparation of Contractors Working Areas

Prior to construction, boundary fencing will be installed around the working area. Depending on ground conditions, the fencing will be installed by mechanical or hand excavation means at post locations and secured with a concrete/post mix. Site access points (ie entrances) will be installed by excavators and trucks removing/importing material to form required ground profiles.

Within the site boundary, excavators and bulldozers will profile the land and install drainage. Bulldozers will push all material to a local point where excavators will load for removal future storage and reuse. Where the land is not workable by a bulldozer, a mechanical excavator will break out hard material and load directly to a truck. Mechanical excavators will locally form all service trenches.

On reaching required ground levels, imported material will be placed by truck for spreading via bulldozer. The bulldozer will be followed by a roller to compact the material to the required bearing pressure(s). Services will be installed and connected with local backfill completed by excavator.

Areas requiring higher bearing capacity will be completed and finished through concrete slabs. A blinding layer will be installed consisting of mass concrete mix delivered via a concrete truck and placed via excavator bucket. The concrete pour will be completed using direct discharge where possible. All concrete trucks will be sent back to the batching plant for washout.

The temporary office and welfare cabins will be modular. These will be installed using a Hiab or a 40 Ton crane on cast in situ footings. The cabins will then be fitted before brought into use.

The fabrication shed will comprise a steel structure with frames at 5m spaced PVC coated sandwich façade and roof and cast in situ footings. This will be erected using a Hiab or a 40 Ton crane.

The 3 construction compounds will require the following connections to the existing services:

- **Northern Compound:** will require a foul connection to the St Fitticks sewer to discharge the water from the temporary accropodes fabrication yard. This discharge will be through a surface pipe along the north side of Greyhope Road. The power supply will be provided by the local distribution operator (SSE) using an existing distribution route along Greyhope Road. Rainwater will be collected by the compound drainage system and discharged into the Girdleness outfall.
- **Central Compound:** will require an effluent trade connection into St Fitticks sewer. The power supply will be provided by SSE using an existing distribution route along St Fitticks Road.

- **Southern Compound:** will require a foul and effluent discharge into the existing 900mm combined sewer. The water to be discharge will be processed through a water treatment set before discharge. The power supply will be provided by SSE using an existing distribution route along the Coast Road. Rainwater will be collected by the compound drainage system and discharged into the sea, once approved.

### 5.1.3 Installation of Construction Phase SUDS

Sections 5.1.3.1. to 5.1.3.3. list the actions that will be taken to install the construction phase SUDS across the Northern, Central and Southern Compounds at the AHEP site.

#### 5.1.3.1 Northern Compound

The following sequence of works are anticipated on the northern compound:

1. Establish compound boundary fences and compound site access point;
2. Installation of temporary stilling pond and perimeter stockpile drainage. This is a cut – off ditch that will collect the run-off and convey to the stilling pond preventing any silty water from leaving the site area. This temporary arrangement will be in place for approximately 6 weeks;
3. Install surface water drainage connection to Girdleness sewer in Greyhope Road;
4. Installation of wheel washing facilities;
5. Topsoil strip and stockpile;
6. Installation of temporary cut off drains installed around the perimeter of each earthworks section prior to each earthwork phase;
7. Bulk earthworks to formation levels;
8. Installation of “permanent” main drainage (surface water and foul);
9. Construction of on-site roads and formation of storage areas and completion of compound permanent protection measures to drainage features (channels, gullies and connections); and
10. Construction of buildings.

#### 5.1.3.2 Central Compound

The following sequence of works are anticipated on the northern compound:

1. Establish boundary fences and temporary site access points;
2. Installation of temporary stilling pond and perimeter stockpile drainage. This is a cut – off ditch that will collect the run-off and convey to the stilling pond preventing any silty water from leaving the site area. This temporary arrangement will be in place for approximately 6 weeks;
3. Install surface water drainage connection to Girdleness sewer;



4. Installation of wheel washing facilities;
5. Topsoil strip and stockpile;
6. Installation of temporary cut off drains installed around the perimeter of each earthworks section prior to each earthwork phase;
7. Bulk earthworks to formation levels;
8. Installation of “permanent” drainage (surface water and foul);
9. Construction of on-site roads and formation of storage areas and completion of compound permanent protection measures to drainage features (channels, gullies and connections); and
10. Construction of buildings.

#### 5.1.3.3 Southern Compound

The following sequence of works are anticipated on the southern compound:

1. Establish boundary fences and temporary site access points;
2. Installation of temporary stilling pond and perimeter stockpile drainage. This is a cut – off ditch that will collect the run-off and convey to the stilling pond preventing any silty water from leaving the site area. This temporary arrangement will be in place for approximately 6 weeks;
3. Install surface water drainage outfall in Nigg Bay;
4. Installation of wheel washing facilities;
5. Topsoil strip and stockpile;
6. Installation of temporary cut off drains installed around the perimeter of each earthworks section prior to each earthwork phase;
7. Bulk earthworks to formation levels;
8. Installation of “permanent” drainage (surface water and foul);
9. Construction of on-site roads, formation of storage areas and final surfacing and completion of compound permanent protection measures to drainage features (channels, gullies and connections); and
10. Construction of buildings.

During the first stages of the works (earth works) a temporary drainage system will be installed. This will consist in a temporary trench 50cms deep and a temporary stockpile of material of 50cm on the external side of the temporary trench. This will discharge into a temporary pond at the lowest point of the each compound area. The layout of this temporary drainage system and the indicative section is shown in Appendix 4.

This temporary arrangement will be in place until the permanent compound drainage system is completed (approximately 6 weeks).

### 5.2 BREAKWATER CONSTRUCTION

Two breakwaters will be built to protect the harbours inner basin from the North Sea metocean conditions.

At 1274m combined length, the breakwaters firstly require a trench to be formed in shallow water to support the accropode units. On completion of the trench the core of the structure will be placed on the seabed using quarry material sized between 0.1-500kg. Secondary protection will be provided by placement of a heavier grade of rock sized between 0.3-3,000kg using the land dumping technique. The final layer of protection is provided by 8-16m<sup>3</sup> accropode units. The North breakwater will also include a crown wall system.

The cross section in Figures 6 shows the placement of the material in the north and south breakwaters.

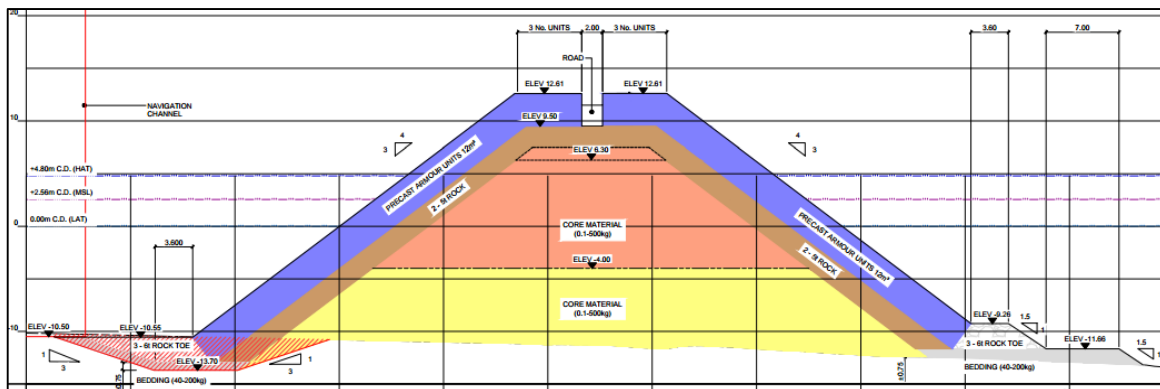


Figure 4 – South Breakwater Cross Section

Both breakwaters are anticipated to be completed in the 2017 and 2018 weather windows. Design levels show that the following quantities of material are required:

|                            | Unit of Measure | Quantities |          |
|----------------------------|-----------------|------------|----------|
|                            |                 | North BW   | South BW |
| Core Material              | Cubic metre     | 213 156    | 340 934  |
| Bedding Material           | Tonnes          | 7 581      | 13 640   |
| Secondary Protection       | Tonnes          | 51 580     | 86 134   |
| 8m <sup>3</sup> Accropode  | Units           | 3 077      | 1 508    |
| 12m <sup>3</sup> Accropode | Units           |            | 2 410    |
| 16m <sup>3</sup> Accropode | Units           |            | 1 502    |

**5.2.1 Temporary and Permanent Coastal/Cycle Route Alignment**

A primary network of paths borders the site location, consisting of the National Cycle Network and Coastal Path. The paths will be developed so that no section of the network will be closed before a new section is open to the public. Both the temporary and permanent makeup of paths are similar in nature and construction.

The layout of the cycle path can be found in Appendix 2. The approach to management of vehicles and cyclist/pedestrians is described in Traffic and Transport Management Plan.

**5.2.1.1 Cycle Path Construction**

Path installation will mainly be completed outside the current cycle route and will be independently fenced from surrounding activities. Where works are required on the existing cycle route, a segregation system will be introduced to allow half of the path width to be worked on while the other remains open.

Excavation and fill profiles will be completed using a small excavator and dump truck. The dump truck will transport a local stockpile in manageable volumes to be placed as required to form the permanent works. Likewise, manageable volumes will be removed in reverse order. On achieving required land profile, similar techniques will be used to place path make up. A roller will then be used to provide the required bearing pressure.

**5.2.2 Rock Trench Formation – South Breakwater**

Accropode units provide protection to the breakwater core material. In order to stabilise the accropodes, formation of a rock trench is required for the southern breakwaters outer footprint. As shown in Figure 7, the trench reacts by “locking in” the bottom accropode layers which supporting those above.

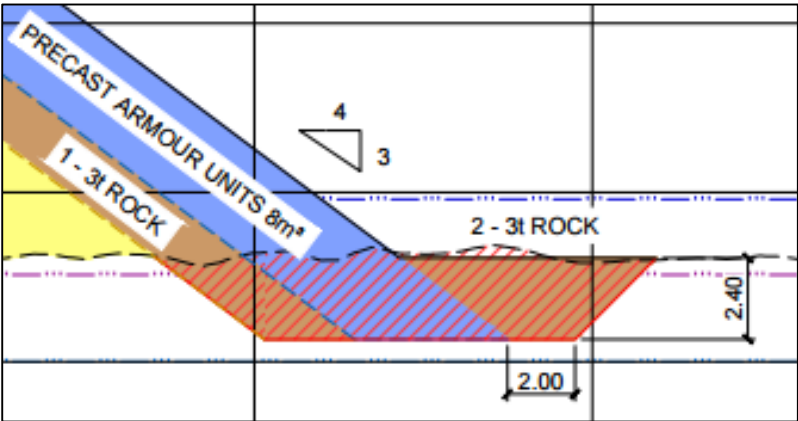


Figure 5 – Example of rock trench

**5.2.3 Core Material Placement**

Two separate methods of installation will be used to deal with the different bathymetric features of the construction location as follows:

- in shallower waters core material will be installed by direct placement by road going vehicles (see section 5.2.3), and
- in deeper waters core materials will initially be installed by marine placement to levels which then become suitable for direct placement by road (see section 5.2.4).

The cross sections in Figures 4 and 5 show the level each of material deposited by each method. Material which is placed by road going vehicles is shown in yellow, and those installed by marine placement is orange.

#### 5.2.4 Direct Placement of Core Material

Dump trucks and quarry vehicles will access the breakwater/land interface using the temporary access routes MC50 and MC00. These vehicles will progress to discharge material at varying locations dependant on the breakwater progression, from the land outwards towards the breakwater head. The material will be pushed by a bulldozer to the required location. Following this a long reach excavator will grade the core material to form the required design slopes for which allow installation of further material.



Figure 6 – Example of direct placement approach carried out by Dragados

#### 5.2.5 Marine Placement of Core Material

Marine placement increases bed levels to those reachable and manageable by direct placement (see section 5.2.3 above).

The marine placement of core material will be achieved by using a split hopper barge (see Figure 7). The barge will be loaded with core material from an auxiliary quay located beside the North breakwater of the site via dump trucks and quarry vehicles. This auxiliary quay will be built with concrete blocks. Once fully loaded, the barge will then position itself in the required location before opening its hull and releasing the core material into position. The barge will work from the land outwards.

Rock material from the dredging operation will be placed by a split barge as core material during the construction of the breakwaters.



*Figure 7 – Example of quarry vehicles loading a split barge hopper for future discharge*

### 5.2.6 Secondary Armour Placement

The secondary armour placements runs in tandem with core material placement. A heavy duty crawler crane will place secondary and toe<sup>3</sup> armour material. The secondary and toe armour will ensure the previously placed and shaped core material is contained. The toe armour acts as a stability mechanism.

Using orange peel grab(s) (Figure 8) or rock skip(s) the cranes will work together to place the material on the seaward and harbour boundaries of the breakwaters. The material will range from 0.3-3000kg in weight.



Figure 8 – Example of armour placement using orange peel grab carried out by Dragados

### 5.2.7 Armour Unit Placement (Accropodes)

The accropode units act as the primary layer of defence. They will be installed by a heavy duty crane already positioned on the breakwaters for previous construction activities. Fitted with specialized lifting tackle, the crane will install the accropode units one at a time as they are delivered from the fabrication yard on a specialised heavy duty trailer. Positioned with advanced GPS equipment, the accropode will be installed in its final location.

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<sup>3</sup> The toe armour is part of the secondary armour located at the base of the breakwater on the seaward side





*Figure 9 – Placement of Accropode units*

## 5.2.8 Construction of Crown Wall

The north breakwater crown wall will be constructed over two seasons in weather windows in 2018 and 2019. The coronation slab (a concrete slab on top of the breakwater) will be completed in 2019.

### 5.2.8.1 Coronation Slab

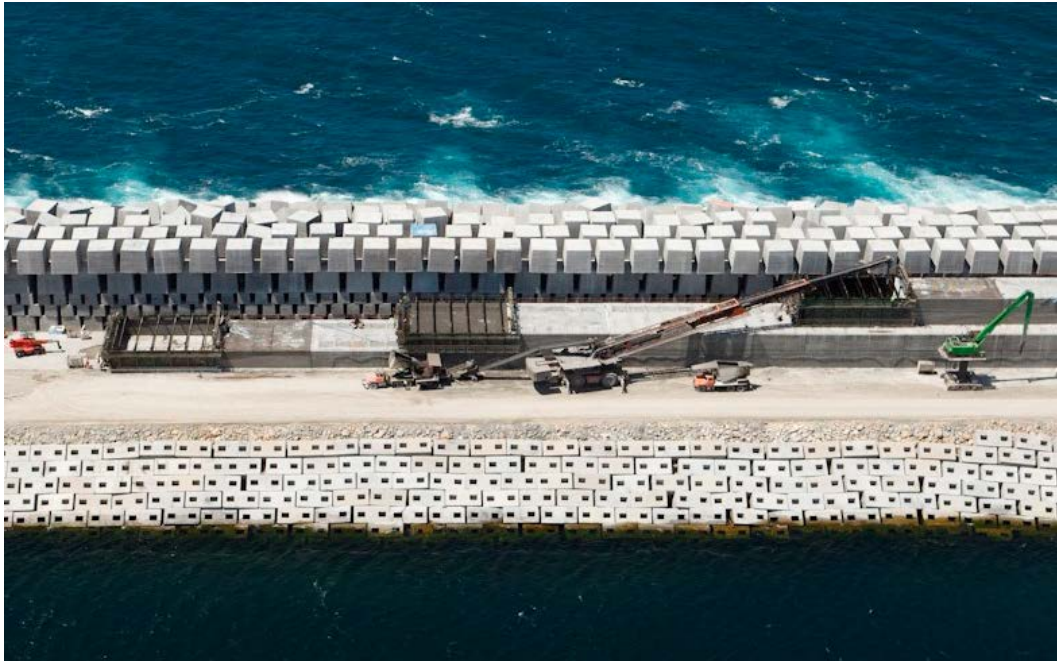
The coronation slab will be constructed by use of a traditional formwork system<sup>4</sup>. Manageable lengths of formwork will be constructed by concrete placed directly from a concrete truck/pump and finished to level. Successful curing of the pour will enable the formwork to be removed and constructed within the next section until the coronation slab is completed.

### 5.2.8.2 Crown Wall

The crown wall will be completed with a specialised travelling formwork system adapted to suit the specific job. The formwork will use the coronation slab and previous crown wall pour as guide to travelling along the element structure. The formwork is self-sufficient and is semiautomatic in operation with personnel and tools situated within (see Figure 12). The concrete will be transported by truck and placed via pump or conveyor.

---

<sup>4</sup> Formwork is the term given to moulds in which concrete is poured



*Figure 10 - Crown Wall Construction*

**5.3 DREDGING ACTIVITIES**

It is anticipated that dredging activities within the bay will remove three main types of material: sand & alluvium, glacial till and rock. Removal and workability of each respective material requires a different method of removal in both approach and plant selection. Please see Dredging & Dredge Spoil Disposal Management Plan for further detailed information.

Figure 11 and Table 3 indicates the position of the materials which require removal from the bay. This information has been produced from borehole and trial pit information.

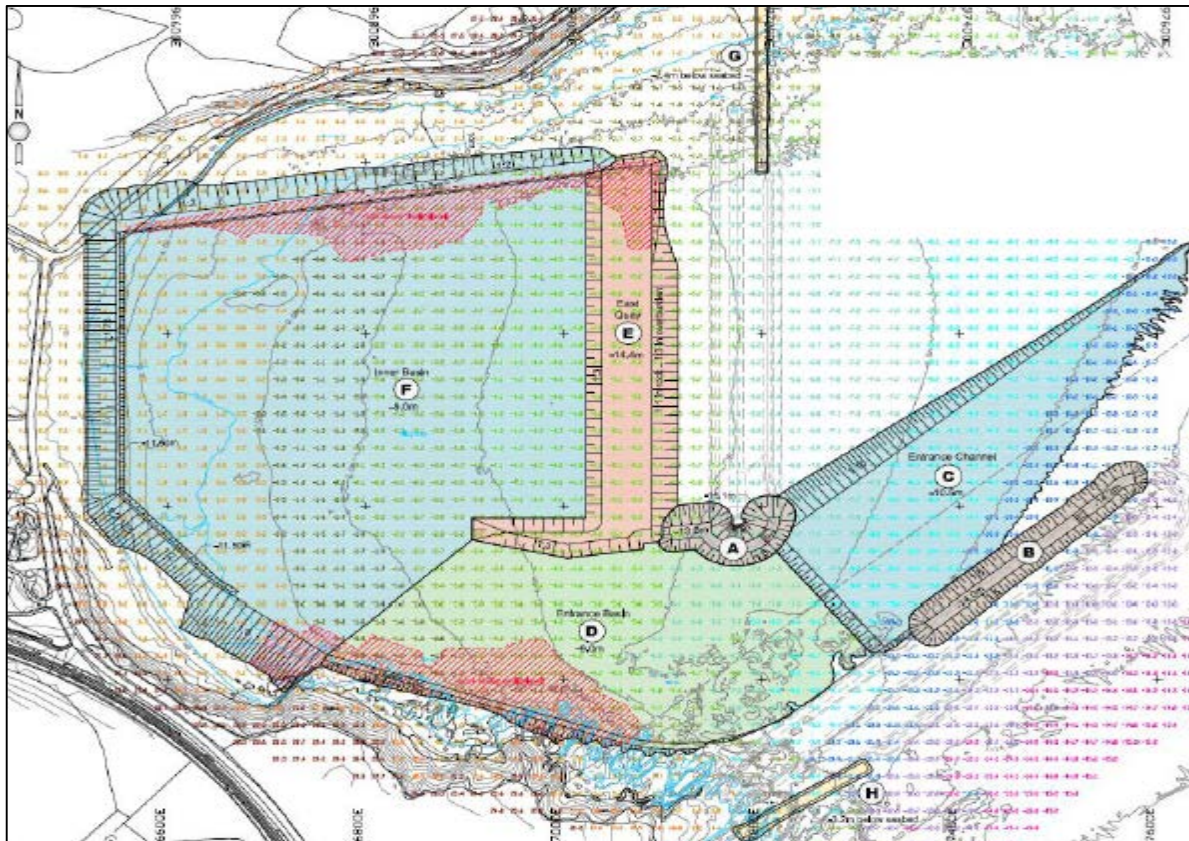


Figure 11 – Plan view of work showing dredging area – materials shown in Table 3

Table 3 – Materials which are anticipated to be encountered in zones A-H as shown in Figure 13

| Material      | A | B | C | D | E | F | G | H |
|---------------|---|---|---|---|---|---|---|---|
| Sand/Alluvium |   |   |   |   |   |   |   |   |
| Glacial Till  |   |   |   |   |   |   |   |   |
| Rock          |   |   |   |   |   |   |   |   |

Spread over the bay, all materials are anticipated to be removed in the 2017 and 2018 weather windows. Completion of dredging activities is anticipated to be achieved before the start of 2019.



### 5.3.1 Dredging Sand & Alluvium

Deposits of sand and alluvium are found within the top layers of the sea bed in Nigg Bay. Given their granular nature they are ideally removed by use of the trailing suction hopper dredge (TSHD) (see Figure 12).

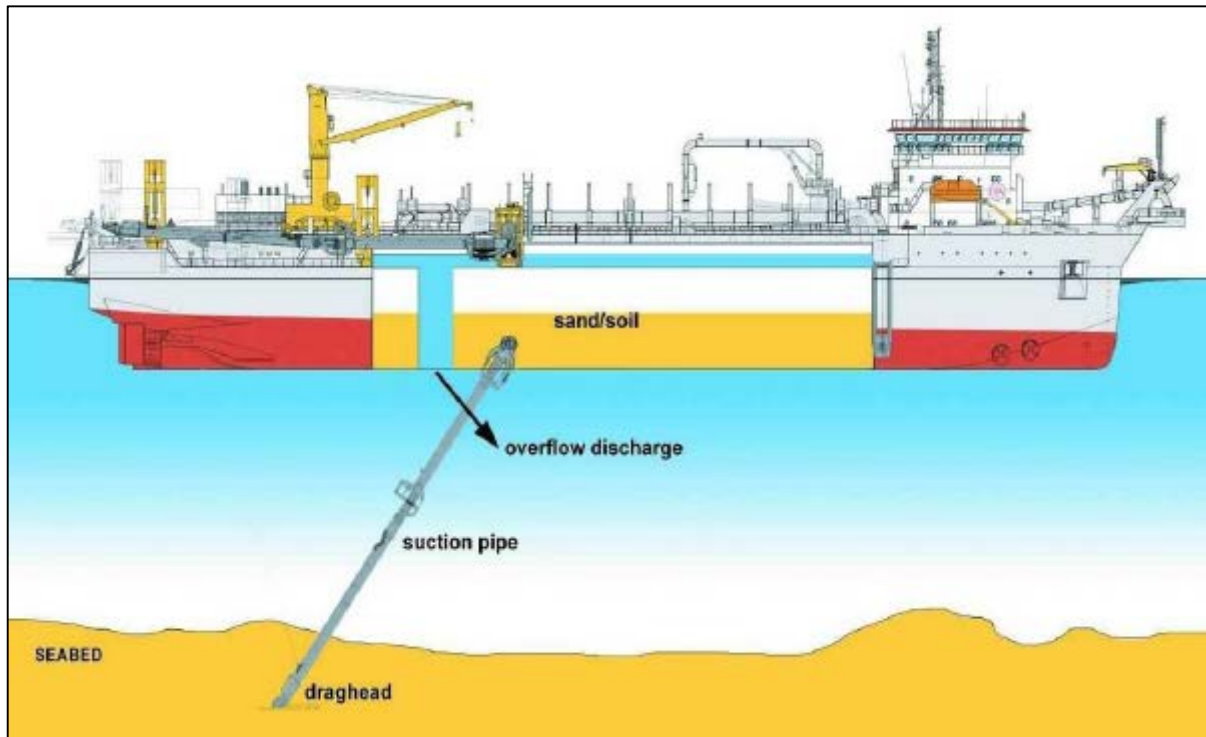


Figure 12 - Draghead representation

A self-propelled vessel, the TSHD will remove the granular material from the bed of the bay by trailing a draghead along the seabed. The draghead will be connected to the vessel by means of a suction pipe into the hull of the vessel. Comprising of several moving parts, the draghead will fit closely to the seabed contours. It uses a range of teeth and water jets to loosen the granular material. The loosened deposits are then vacuumed from the seabed up the suction pipe to the vessels hull by on-board sand pumps.

The material brought aboard the vessel will be stored locally in the vessels hull in a large compartment known as the hopper well. Emptying the material will be carried out in one of two ways:

- Bottom discharge at an offshore disposal site - The vessel will position over the disposal site (see section 5.3.4), and the bottom of the vessel will open up to discharge the stored material. Internal water jets will wash down the compartment before the bottom of the vessel is resealed for further dredging activity.
- Pumping onshore/into onshore vessel- The vessel will connect to a floating coupling which directs a pipeline to the shore side/structure. Jets within the vessel compartment will add water and fluidise the dredge material. The fluidised material will then be offloaded from the vessel through this series of pipework.

**5.3.2 Dredging Glacial Till**

Layers of glacial till can be found within the bay under the aforementioned layers of sand and alluvium. Due to its firm nature, many of the deposits are not fully recoverable by use of a TSHD, and best suited to a cutter suction dredgers (CSD).

A self-propelled vessel, the CSD is equipped with a rotating cutter head, for cutting and fragmenting hard material. The fragmented material is sucked up by means of dredge pumps, and discharged into split hopper barges that are moored alongside the CSD. These split hopper barges unload the soil at the offshore disposal site. During dredging the CSD vessel remains on station, secured by a 'spud' mooring lowered to the seabed. The dredger swings sideways by means of winches and anchors, and the cutter head cuts and removes the soil.



Figure 13 – CSD Zheng He (Courtesy of Jan de Nul)

**5.3.3 Drilling Rock**

Below the sand/alluvium and glacial till layers, more dense and tough rock material can be found flowing down to the bedrock layers. This material is not feasible to remove by TSHD or Backhoe Dredger (BHD) methods. As such a drilling and blasting operation is required.

A non-self-propelled jack up barge will be positioned by tug or another self-propelled vessel, and secured via spud legs. The jack up will support a moveable drill tower (see Figure 14).

**5.3.4 Dredge Disposal Volumes and Disposal Site**

| Dredge Area   | Dredge Depth (metres below CD) | Clay and Silt (<0.063mm) | Sand (0.063<Sand> 2.0mm) | Pebbles, Cobbles & Boulders (<2.0mm) | Quantity to be dredged (wet tonnes) |
|---------------|--------------------------------|--------------------------|--------------------------|--------------------------------------|-------------------------------------|
| Harbour Basin | 9.0                            | 14%                      | 69%                      | 17%                                  | 4,520,000                           |
| East Quay     | 10.5                           | 14%                      | 69%                      | 17%                                  | 1,202,000                           |

|                  |      |     |     |     |         |
|------------------|------|-----|-----|-----|---------|
| Entrance Channel | 10.5 | 14% | 69% | 17% | 280,000 |
| North Breakwater | 15.0 | 14% | 69% | 17% | 40,000  |
| South Breakwater | 14.0 | 14% | 69% | 17% | 78,000  |

Maximum quantity of capital dredge spoil to be deposited at authorised disposal site CR110-Aberdeen.

4,702,737 wet tonnes / 2,190,000 m<sup>3</sup>.



Figure 14 – Drilling Tower

**5.3.5 Drilling & Blasting**

The drilling and blasting works will be done from a platform on the jack up with the drill tower using the following procedure:

- Before drilling starts, the outer guidance tube is lowered on the seabed and pushed into the overlaying layer, down to the rock level, by means of air wash
- The vertical position of the outer guidance tube is used for recording the top of rock level. This level is logged in the blasting plan chart, and is later used to calculate the amount of explosive
- When the drilling of a hole is finished, the drill rod is removed, and the hole is ready for charging
- An igniter/starter is placed in the bottom of the hole and the hole is charged by pumping the explosive
- The drill rig is moved on top of the next hole position and the drilling and charging operation is repeated



- Upon completion of the row, the second row is drilled and charged, after that the pontoon is moved to its next spud position, by means of stepping round one lowered spud at a time.

Once the explosives have been detonated, a BHD vessel will remove and load the blasted material in barges for reuse at AHEP (see Figure 15 A non-self-propelled BHD will be positioned by a tug or other self-propelled vessel. The BHD will be fixed to a location by three spud legs. The spud legs together with an excavator bucket located on the BHD are capable of “walking” in parallel lines. This capability dictates that the dredging pattern must be completed in parallel lines.

Working in lanes of 10-15m, the excavator positioned at the tip of the barge will remove material over 5m lengths into self-propelled split barge vessel(s). The excavator will be controlled via GPS systems for optimum control, with the other controls being similar to that of a land based alternative. Once the material within the reach of the excavator has been removed, the vessel will remove its front spud leg from the seabed and “walk” backwards to uncover new ground.



Figure 15 – BHD and split barge

#### 5.4 QUAY INSTALLATION

The quay arrangement will be constructed in one of two ways:

- A closed quay solution spanning the south east, east and north quays, and
- An open quay solution spanning the west and western section of the north quay.

The closed quay will provide around 886m of berthing capacity with the open quay around 538m.

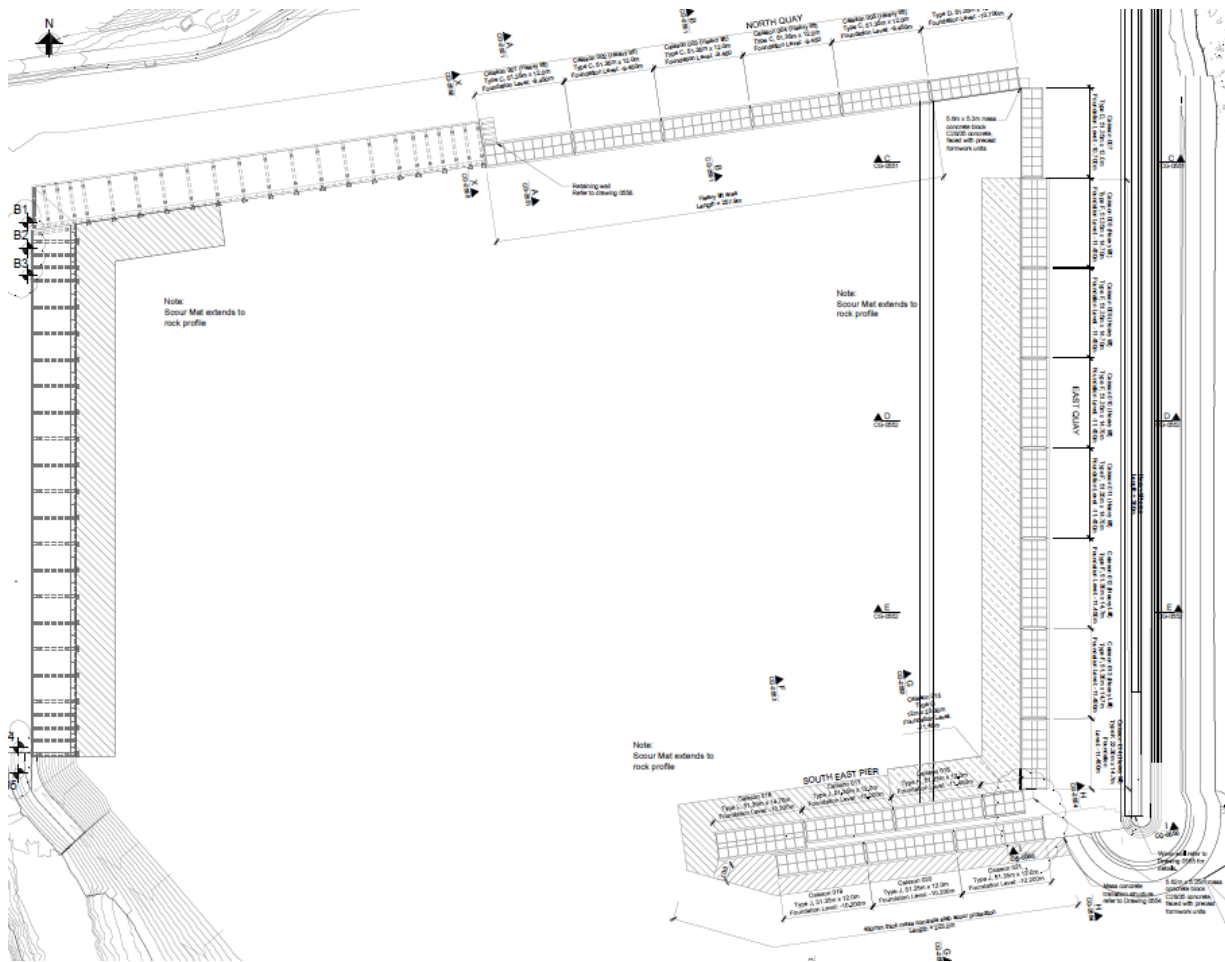


Figure 16 – Closed and open quay general arrangement (North top of page)

### 5.4.1 Closed Quay

The closed quay will be formed by a series of concrete caissons. These vary in dimensions to reflect specific loads and harbour characteristics they must represent when placed. A general caissons is formed with hollow concrete cells and is typically 51.35m long. It has variable widths up to 14.7m and 16.5m in height (see Figure 17). Once positioned, the hollow cells are filled with water to “sink” the caisson. Next the caissons are filled with granular material to ground it on the seabed floor to form a permanent quayside structure.

The structure of the caissons will be formed offsite in Spain.

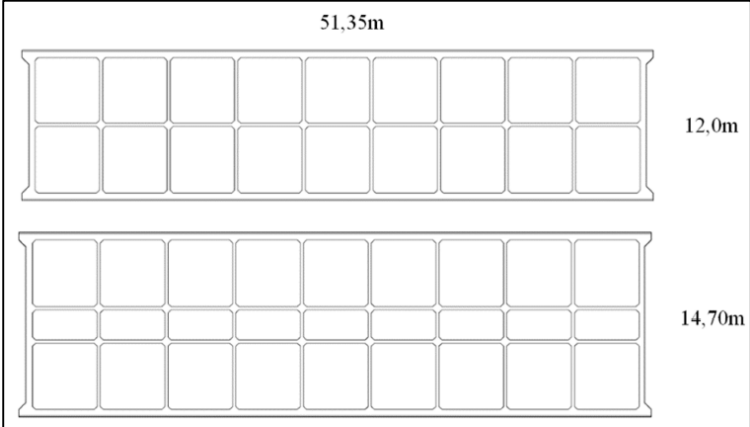


Figure 17 – General caisson arrangement

**5.4.2 Towage to UK**

The caissons will be delivered to the UK in groups of six on a semi-submersible vessel (Figure 18). A total of 22 caissons will be delivered over four trips. The caissons will be shipped direct to the vicinity of Nigg Bay, where they will be grouped with mooring lines for immediate towage to site (see section 5.4.3). If required, the caissons may be temporarily stored in other marine areas. Should caissons be stored in the marine environment outside the HRO boundary, a marine licence will be required.

The risk of introduction of non-natives will be managed through implementation of risk assessments as described in the Marine Invasive Non-Native Species and Biosecurity Management Plan.



Figure 18 – Submersible vessel

**5.4.3 Towage to site**

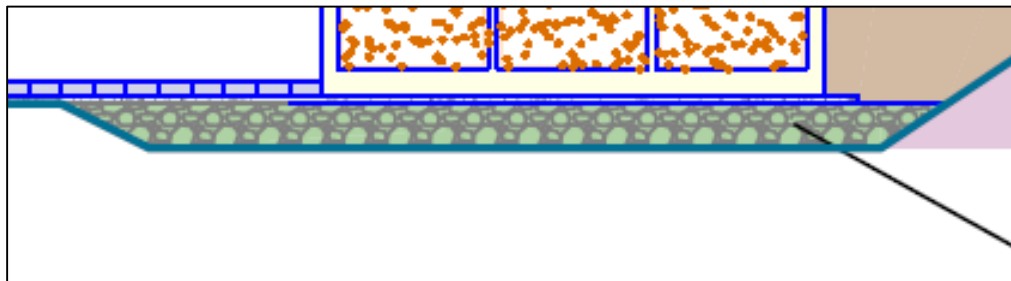
Towage to site will be completed by tug boats. The caissons will be secured and pushed/pulled to more sheltered conditions within the bay which will be protected by the north and south breakwaters. In order to install them the caissons will be towed one at a time and installed immediately in their final locations.



*Figure 19 – Towage of Caissons to site*

**5.4.4 Caisson Embankment (final location preparation)**

Prior to positioning the caissons on site the dredging activities documented in section 5.3 will form a trench below the caisson footprint. To provide continuous contact between the dredged trench and caisson base, a rock embankment and fine bedding layer is required (Figure 20).



*Figure 20 – Caisson and sea bed interaction*

Layers of rock and bedding will be installed by the same methodology and with the same marine vessel. Installation will be using an accurate discharge vessel which is manoeuvrable in all directions to precise precision (Figure 21). The vessel contains fall pipes and conveyor systems to accurately place the material as required with no need for further levelling.

The vessel will be loaded with material before setting sail to the installation location where in depth survey and discharge operations will commence.





Figure 21 – Marine discharge vessel for rock and bedding material layers

#### 5.4.5 Sinking of Caisson in position

The sinking of caissons in their final position will be conducted by filling all the caissons cells with sea water. Ballasting is undertaken by filling three independent groups of cells in order to maintain control the sinking operation. Once the caisson has been filled with water and sunk, two methods can be used to secure the caisson.

- The first scenario uses dredged and rock material and various items of plant. A spud pontoon loaded with a crane will positioning itself next to the caissons seaward boundary. A hopper barge will then position alongside the pontoon which will contain the dredged and rock material as loaded by a BHD vessel. Once positions are confirmed, the cable crane fitted with a bucket will transfer the material from barge to caisson.
- The second scenario uses sand and silt material. A TSHD will position a maximum of 200m from the caisson. The vessel will then connect via a floating pipeline to a landside network which will have an output within the caissons (see Figure 22). A series of jets will then fluidise the material stored from dredging activities and the vessel will pump this through the pipelines into the cells.

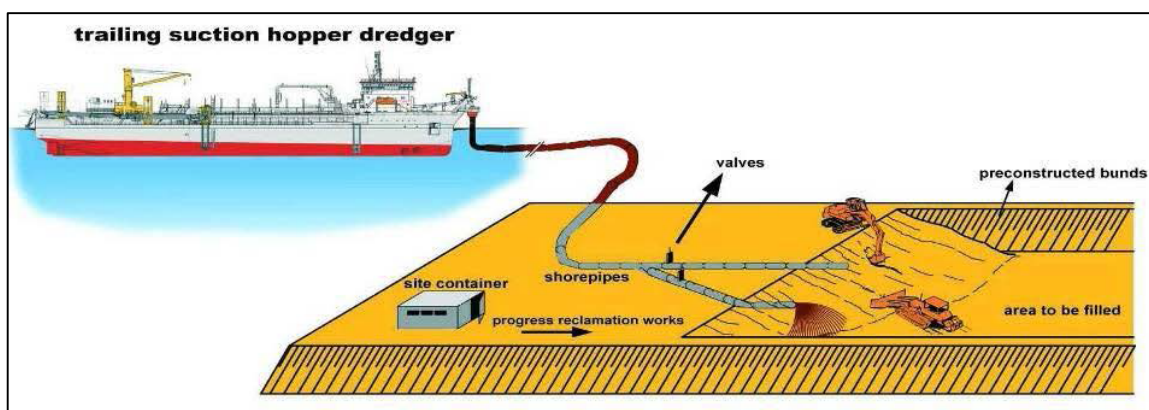


Figure 22 – Trailing Suction Hopper Dredge discharge

In both scenarios the caissons are full of water before being filled with granular material. During the filling of the caissons the water is displaced by the granular material.

### 5.4.6 Open Quay

The open quay will be formed by a series of concrete piles capable of supporting the quay deck. The deck is formed of a transversal and secondary beam arrangement with a false work and concrete slab system (see 5.4.6.3). The formation of a revetment profile (see 5.4.6.2) introduces the open properties of the quayside which have wave absorption properties.



*Figure 23 – Open Quay Details*

#### 5.4.6.1 Installation of Piles

The piles will be installed using a rotary bored cast-in-situ concrete method (please see Piling Management Plan for detailed information). The process will be as follows:

- The drill auger excavates the soil and rock to create an open bore at the required design depth
- To prevent collapse of the bore, temporary steel casing will be installed into the ground. In the case of deep bores where temporary steel casing may not be suitable, the use of a support fluid such as vinyl polymer or, more commonly, bentonite drilling fluid may be used
- Once the auger has reached design depth a cleaning bucket is used to ensure cleanliness of the base
- If bentonite be used to support the bore then the slurry is re-circulated and replaced within the bore to avoid any impact on concrete quality
- The reinforcement cage is lowered into the open bore
- Concrete is delivered into the bore by discharge into a hopper feeding a tremmie pipe. The concrete is poured from the base of the bore to surface
- The temporary steel casing is removed, leaving the concrete pile in situ



### 5.4.6.2 Formation of Revetment

On completion of pile installation in local areas, the revetment profile will be formed using a long reach excavator to form the required slopes. Where the excavator cannot create the slope, dredging apparatus will be mobilised.

The excavated surface will then be protected with an initial filter layer, installed using a rock skip/tray. The primary layer is placed over the initial filter using an orange peel capable of placing 1000-3000kg rock. Both forms of rock placement will be suspended from a suitable mobile crane (Figure 24)



Figure 24 – Methods of rock placement

### 5.4.6.3 Placement of Transversal and Secondary Beams

Transversal and secondary beams will be placed by a mobile crawler crane. The transversal beam will be placed firstly after a hydraulic cutter has been used to crop the pile heads. The beam will then be positioned over the two pile heads with any gaps sealed with concrete once the diaphragm is poured. Once two transversal beams have been installed the secondary beams can be installed one at a time using an additional crawler crane. The beams will be installed individually working from the landside out towards the quayside. The same crane will then be utilised to install the permanent formwork between the secondary beams to support a slab pour (Figure 25).

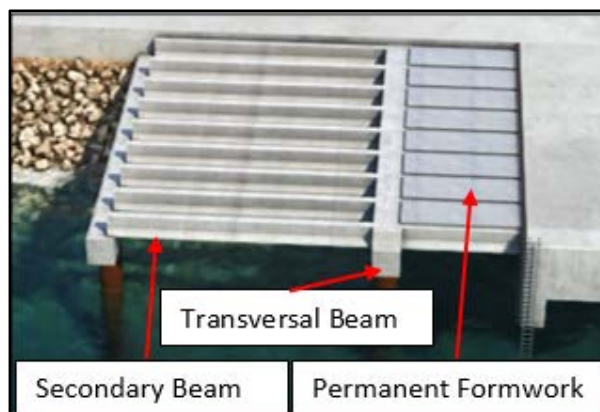


Figure 25 – Open Quay Beam Arrangement

### 5.4.7 Placement of Deck Slab

The deck slab will be poured on top of the beam and formwork arrangement shown in Figure 20. A system of temporary formwork will be constructed in panels to contain a pumped concrete mixture. On successful curing, the formwork will be removed and repositioned for the next pour.

## 5.5 RECLAMATION

Reclamation activities will be carried out by one of two methods, either importing quarry material or using marine dredged material.

### 5.5.1 Reclamation using imported material

Dump trucks and quarry vehicles will progress to discharge material at varying locations dependant on the reclamation progression. The material will be pushed by a bulldozer to the required location where an excavator will grade the material to form the required profiles for installation of further material.

### 5.5.2 Reclamation using locally dredged material

Where the preference is to use locally dredged material, a TSHD will position a maximum of 200m from the reclamation. The vessel will then connect via a floating pipeline to a landside network which will have an output within the area required. A series of jets will then fluidise the material stored from dredging activities and the vessel will pump this through the pipeline. After each discharge, the vessel will disconnect, continue to dredge and then reconnect. This material will be consolidated by preloading or by vibro-compaction.

## 5.6 PAVEMENT

The quay pavement will begin on completion of the reclamation, the pavement will be completed by direct discharge of concrete trucks in a controlled manor which will be finished and controlled by specialised items of plant (Figure 26). The plant will be laser guided, with expansion and crack joints introduced by road saws at later dates.



*Figure 26 – Pavement construction activities*

## 5.7 SURFACE FEATURES

Harbour infrastructure above +4.7m is referred to as part of the 'Surface Features'. Key elements associated with this are;

- Service Trenches

- Harbour Drainage
- Water Supply Infrastructure
- Electrical Distribution
- Security Infrastructure
- Weighbridges
- Harbour Buildings

In specific areas, notably drainage outfalls and service trench will extend below +4.7m as noted below.

#### **5.7.1 Service Trenches**

Service trenches are provided to distribute piped services to moored vessels via bunkering pits around the quay as defined within the Employers Requirements.

Service trench size is defined by the Employer as 1.45m wide and 1.8m clear height. Service trenches accommodate water supply pipework, fuel supply pipework and in some cases fuel/oil discharge pipework. Space is provided for specified future pipework for uses such as transfer of drilling mud.

Service trenches are proposed to be constructed in concrete with heavy duty removable covers at key locations to enable installation and ongoing maintenance and repair.

#### **5.7.2 Harbour Drainage**

The harbour storm drainage network is a gravity drainage system with the quay areas drained to continuous industrial-grade slot drains with collection pipework running through oil interceptors prior to discharge to sea.

In locations where it is necessary for the drainage to cross the service trench, the drainage will pass beneath the services trench, dictating the level mainly for the outfalls.

#### **5.7.3 Water Supply Infrastructure**

Within the harbour area provision is made for water storage for supply to visiting vessels. Supply pipework is to be provided via the service trenches noted above. Provision will be made for foundations for water storage tanks as define within the Employers Requirements in the Northeast area of the harbour site as defined on the works drawings. Dependant on ground conditions and imposed loadings, the water tank foundations may be based on a piled or raft design solution, to be determined through detailed design.

#### **5.7.4 Electrical Supply Distribution**

Distribution infrastructure will be incorporated in the works to facilitate the distribution of electrical power around the harbour in compliance with the Employers Requirements. This duct network will be integrated with that required to supply harbour lighting and comms systems (subject to the required separation and segregation).

### **5.7.5 Security Infrastructure**

Key elements of security infrastructure to be installed include;

- Main Gate Entry Barriers and controls
- Harbour perimeter security fencing
- CCTV provision and monitoring as defined in the Employers Requirements

### **5.7.6 Weighbridges**

Provision of 2 weighbridges will be made in accordance with the Employers Requirements

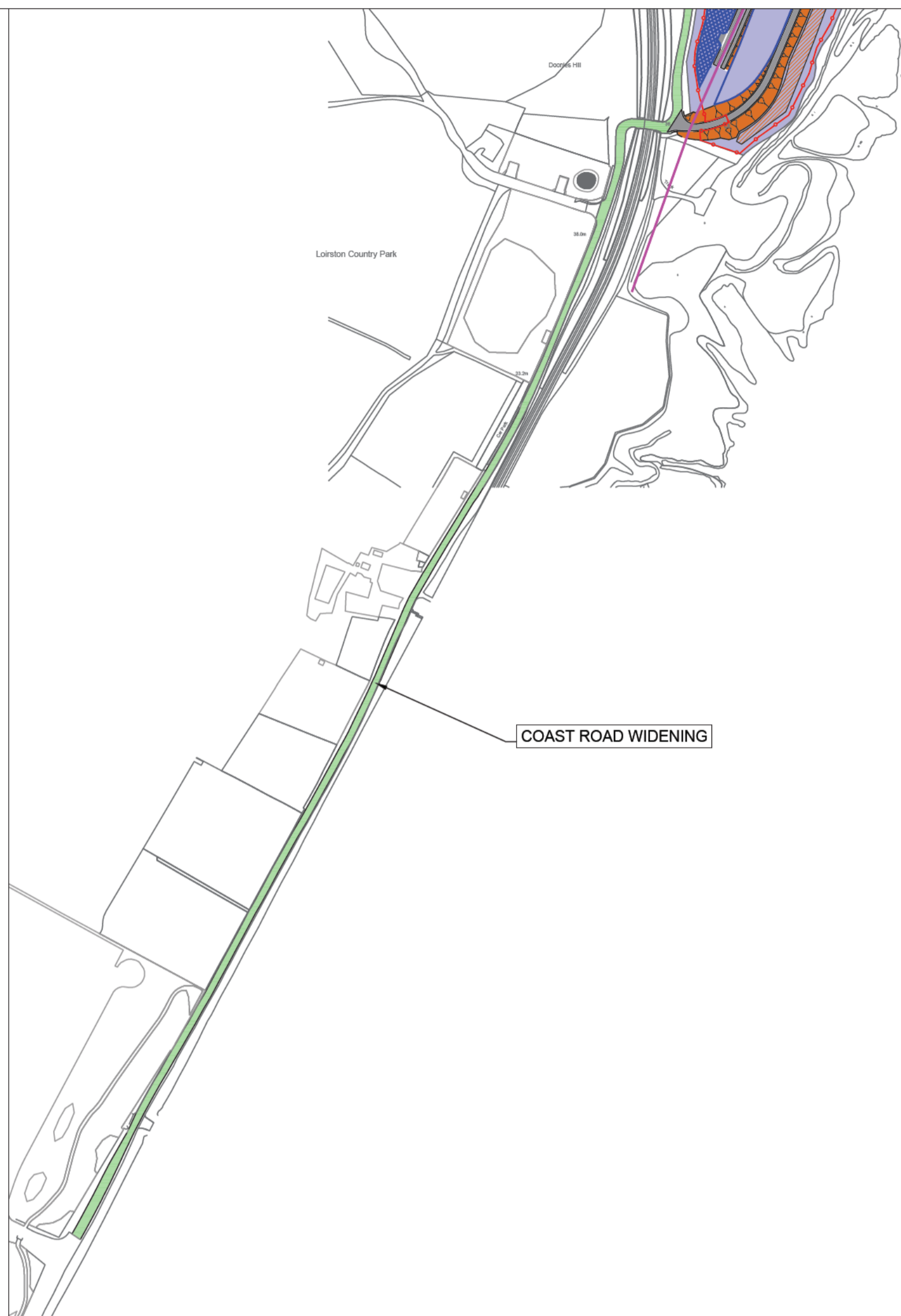
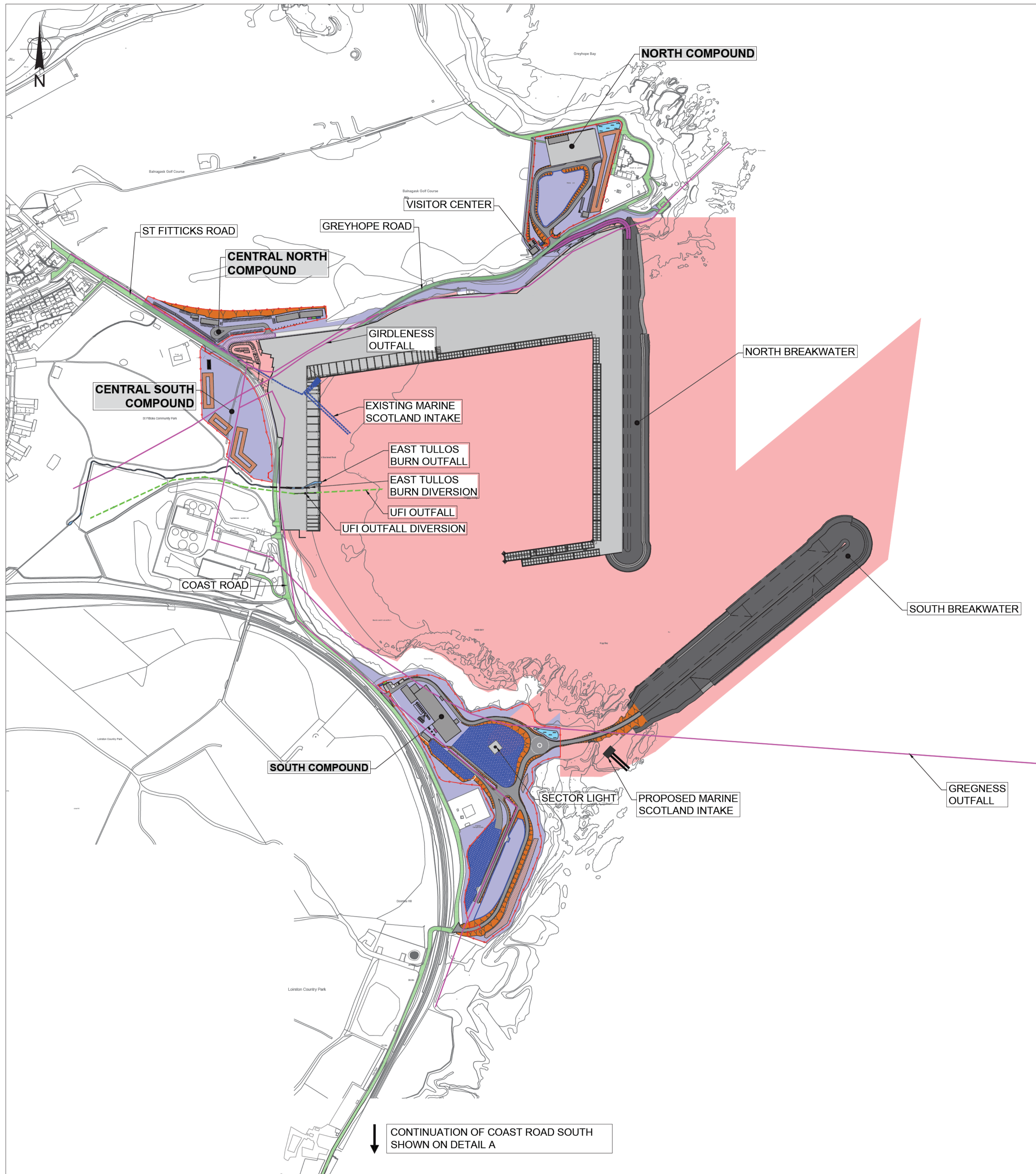
### **5.7.7 Harbour Buildings**

Provision of buildings on the harbour will be made in accordance with the Employers Requirements, to include entrance security provision and on-site welfare accommodation.

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**APPENDIX 1 A, B, C AND D – COMPOUNDS AREAS LAYOUT**





**DETAIL A**  
CONTINUATION OF COAST ROAD SOUTH

↓ CONTINUATION OF COAST ROAD SOUTH SHOWN ON DETAIL A

**NOTES:**

**KEY:**

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- GIRDLENESS SEWER
- UFI
- MARINE SCOTLAND INTAKE
- SITE COMPOUND FENCE
- EXISTING PUBLIC ROAD
- ROAD DIVERSIONS
- NORTH BREAKWATER ACCESS
- POWER CONNECTION
- WATER SUPPLY
- DISCHARGE CONNECTION
- ACCROPODE STORAGE AREA
- TOPSOIL STOCKPILE
- SITE ACCESS ROAD

| Rev. | Date     | By  | Chkd | Appd | Description   |
|------|----------|-----|------|------|---|
| 5    | 21.02.17 | TWC | MEG  | ACO  | Layout updated to ARUP design                         |
| 4    | 09.02.17 | TWC | MEG  | ACO  | Layout updated  |
| 3    | 26.01.17 | TWC | ACO  | ACO  | Central compound boundary updated & carpark extended. |
| 2    | 24.01.17 | TWC | ACO  | ACO  | UFI & ETB diversions added.                           |
| 1    | 20.01.17 | TWC | ACO  | ACO  | Site Layout   |



Citrus House  
Greenbank Road  
East Tullos Industrial Estate  
Aberdeen  
AB12 3BG  
Tel: +44 (0) 1224 439980  
Client



Job Title  
**Aberdeen Harbour  
Expansion Project**

Site Layout

Scale at A1 1:1000

Discipline Civil Engineering

Drawing Status

Drawing No  
**AHEP-DRA-SKE-001**

Revision  
**05**





NOTES:

**KEY:**

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- GIRDLENESS SEWER
- UFI
- MARINE SCOTLAND INTAKE
- SITE COMPOUND FENCE
- EXISTING PUBLIC ROAD
- ROAD DIVERSIONS
- NORTH BREAKWATER ACCESS
- POWER CONNECTION
- WATER SUPPLY
- DISCHARGE CONNECTION
- ACCROPODE STORAGE AREA
- TOPSOIL STOCKPILE

|     |          |     |      |      |                                   |
|-----|----------|-----|------|------|-----------------------------------|
| 4   | 21.02.17 | TWC | MEG  | ACO  | Layout updated to ARUP Design     |
| 3   | 09.02.17 | TWC | MEG  | ACO  | Layout Updated                    |
| 2   | 26.01.17 | TWC | ACO  | ACO  | Visitor center dimensions updated |
| 1   | 20.01.17 | TWC | ACO  | ACO  | Site Layout                       |
| Rev | Date     | By  | Chkd | Appd | Description                       |



Citrus House  
Greenbank Road  
East Tullos Industrial Estate  
Aberdeen  
AB12 3BG  
Tel: +44 (0) 1224 439980



Job Title  
Aberdeen Harbour  
Expansion Project

North Compound

Scale at A1 1:1000

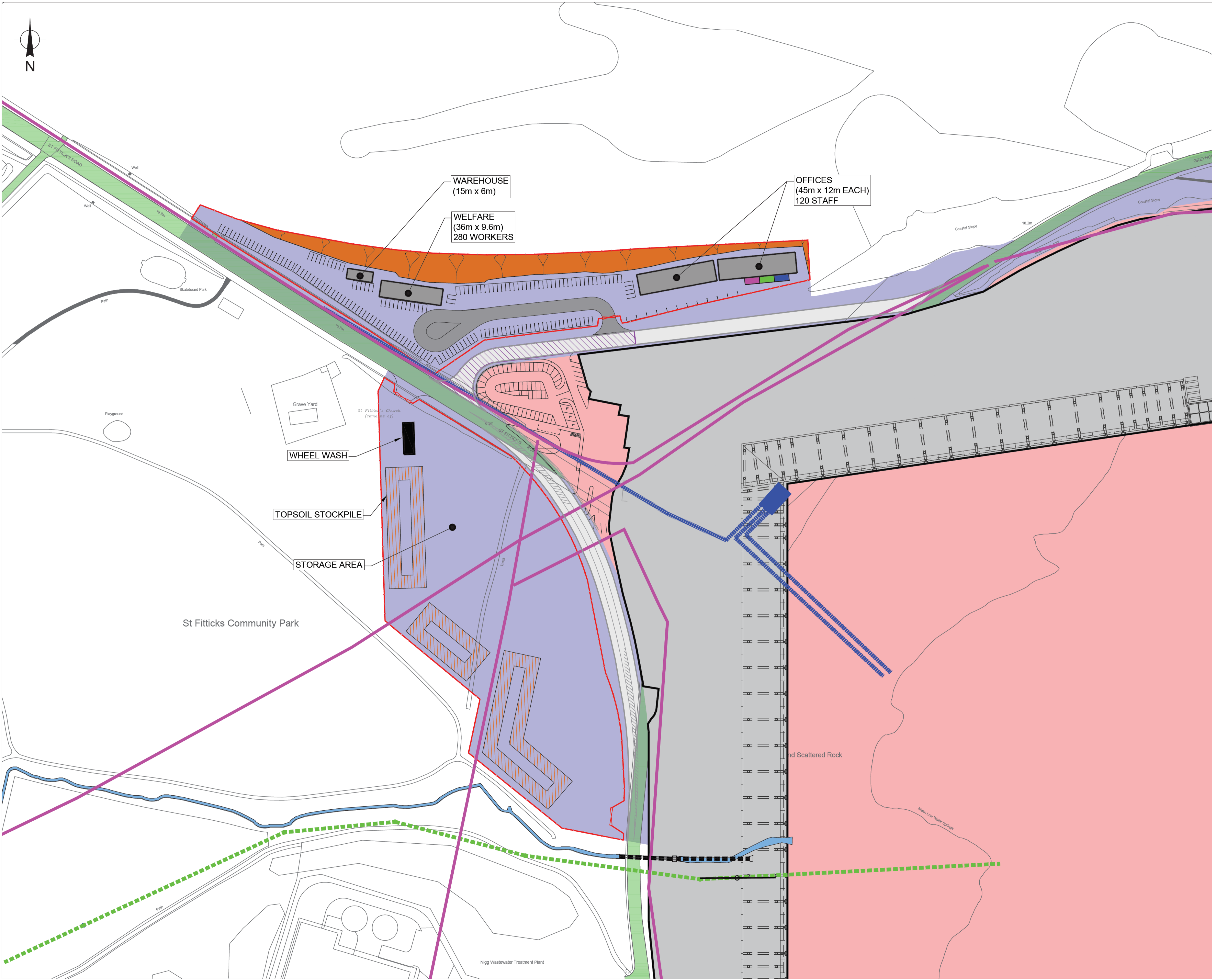
Discipline Civil Engineering

Drawing Status

Drawing No  
**AHEP-DRA-SKE-002**

Revision  
**04**





NOTES:

**KEY:**

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- GIRDLENESS SEWER
- UFI
- MARINE SCOTLAND INTAKE
- SITE COMPOUND FENCE
- EXISTING PUBLIC ROAD
- ROAD DIVERSIONS
- NORTH BREAKWATER ACCESS
- POWER CONNECTION
- WATER SUPPLY
- DISCHARGE CONNECTION
- ACCROPILE STORAGE AREA
- TOPSOIL STOCKPILE
- SITE ACCESS ROAD

| Rev. | Date     | By  | Chkd | Appd | Description                         |
|------|----------|-----|------|------|-------------------------------------|
| 4    | 21.02.17 | TWC | MEG  | ACO  | Layout updated to ARUP Design       |
| 3    | 09.02.17 | TWC | MEG  | ACO  | Layout Updated                      |
| 2    | 26.01.17 | TWC | ACO  | ACO  | Boundary extended and carpark added |
| 1    | 20.01.17 | TWC | ACO  | ACO  | Site Layout                         |



Citrus House  
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East Tullos Industrial Estate  
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AB12 3BG  
Tel: +44 (0) 1224 439980  
Client



Job Title  
**Aberdeen Harbour Expansion Project**

Central Compound

Scale at A1 1:1000

Discipline Civil Engineering

Drawing Status

Drawing No **AHEP-DRA-SKE-003** Revision **04**





NOTES:

- WELFARE (15m x 15m)
- WHEEL WASH
- FABRICATION SHED (115m x 38m)
- TEMPORARY STILLING POND
- AGGREGATE STORAGE (15m x 35m)
- BATCHING PLANT (42m x 22m)
- CONCRETE ASH DOWN AREA (15m x 35m)
- LAB (8.2m x 20.4m)
- WATER STORAGE TANK (Ø3m)
- WATER TREATMENT PLANT (3m x 1.5m)

Z=32.00m  
AREA= 1960m<sup>2</sup>  
183 ACCROPODE CAPACITY

Z=29.50m  
AREA= 10599m<sup>2</sup>  
1174 ACCROPODE CAPACITY

Z=34.50 m  
AREA= 4910m<sup>2</sup>  
433 ACCROPODE CAPACITY

Z=32.00 m  
AREA=5887m<sup>2</sup>  
ACCROPODE STORAGE  
AND CASTING AREA

- KEY:**
- HRO BOUNDARY
  - TEMP. LEASE BOUNDARY
  - GIRDLENESS SEWER
  - UFI
  - MARINE SCOTLAND INTAKE
  - SITE COMPOUND FENCE
  - EXISTING PUBLIC ROAD
  - ROAD DIVERSIONS
  - NORTH BREAKWATER ACCESS
  - POWER CONNECTION
  - WATER SUPPLY
  - DISCHARGE CONNECTION
  - ACCROPODE STORAGE AREA
  - TOPSOIL STOCKPILE

| Rev | Date     | By  | CHKd | Appd | Description                   |
|-----|----------|-----|------|------|-------------------------------|
| 4   | 21.02.17 | TWC | MEG  | ACO  | Layout updated to ARUP Design |
| 3   | 09.02.17 | TWC | MEG  | ACO  | Layout Updated                |
| 2   | 26.01.17 | TWC | ACO  | ACO  | Fab. shed dimensions updated  |
| 1   | 20.01.17 | TWC | ACO  | ACO  | Site Layout                   |

**DRAGADOS**

Citrus House  
Greenbank Road  
East Tullos Industrial Estate  
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Job Title  
Aberdeen Harbour  
Expansion Project

South Compound

Scale at A1 1:1250

Discipline Civil Engineering

Drawing Status

Drawing No  
**AHEP-DRA-SKE-004**

Revision  
**04**

Loirston Country Park



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## APPENDIX 2 – ROAD WORKS LAYOUT







## APPENDIX 3 – PROGRAMME

# AHEP - Contract Programme - Enabling works & Construction

| #  | ID             | Description  | Original Duration | Start     | Finish    | 24h work | 2017                                  |     |     |     |     |     |     |     |     |     |     |     | 2018 |     |     |     |     |     |     |     |     |     |     |     | 2019 |     |     |     |     |     |     |     |     |     |     |     | 2020 |     |     |     |     |
|----|----------------|--|-------------------|-----------|-----------|----------|---------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|
|    |                |  |                   |           |           |          | Jan                                   | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May |
| 1  |                | <b>Aberdeen DRA-PRG-00001 rev4 - March 2017</b>  | 757               | 10/04/17  | 08/05/20  |          | [Gantt bar from 10/04/17 to 08/05/20] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 2  |                | <b>Pre-Construction / Enabling Works</b>   | 163               | 10/04/17  | 29/11/17  |          | [Gantt bar from 10/04/17 to 29/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 3  |                | <b>Temporary Road - North Breakwater Access</b>  | 36                | 02/05/17  | 21/06/17  |          | [Gantt bar from 02/05/17 to 21/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 4  | PC-NBWAR-00025 | NBW Access - Earthworks 1st phase  | 17                | 02/05/17  | 24/05/17  |          | [Gantt bar from 02/05/17 to 24/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 5  | PC-NBWAR-00050 | NBW Access - Installation of Concrete Slab   | 8                 | 25/05/17  | 06/06/17  |          | [Gantt bar from 25/05/17 to 06/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 6  | PC-NBWAR-00060 | NBW Access - Earthworks 2nd phase  | 8                 | 07/06/17  | 16/06/17  |          | [Gantt bar from 07/06/17 to 16/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 7  | PC-NBWAR-00070 | NBW Access - Wheel Wash Facilities   | 4                 | 13/06/17  | 16/06/17  |          | [Gantt bar from 13/06/17 to 16/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 8  | PC-NBWAR-00065 | NBW Access - Surfacing   | 3                 | 19/06/17  | 21/06/17  |          | [Gantt bar from 19/06/17 to 21/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 9  |                | <b>Cycle Path / Realignment / Fencing</b>  | 163               | 10/04/17  | 29/11/17  |          | [Gantt bar from 10/04/17 to 29/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 10 |                | <b>Cycle path and Cycle way works</b>  | 39                | 10/04/17  | 07/06/17  |          | [Gantt bar from 10/04/17 to 07/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 11 |                | <b>Ch 0 to 1050 (Hareness to Railway bridge)</b>   | 39                | 10/04/17  | 07/06/17  |          | [Gantt bar from 10/04/17 to 07/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 12 | PC-CP00010     | Fencing and cyclefoot path works   | 39                | 10/04/17  | 07/06/17  |          | [Gantt bar from 10/04/17 to 07/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 13 |                | <b>Ch 1050 to 2370 (Railway bridge to St Fitticks)</b>   | 20                | 25/04/17  | 23/05/17  |          | [Gantt bar from 25/04/17 to 23/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 14 | PC-CP00020     | Fencing and cyclefoot path works   | 20                | 25/04/17* | 23/05/17  |          | [Gantt bar from 25/04/17 to 23/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 15 |                | <b>Closure of Greyhope Road</b>  | 3                 | 17/04/17  | 20/04/17  |          | [Gantt bar from 17/04/17 to 20/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 16 | PC-CPRA-00010  | Greyhope road - Fence of each side of closure area (temporary and permanent)                           | 1                 | 17/04/17  | 17/04/17  |          | [Gantt bar from 17/04/17 to 17/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 17 | PC-CPRA-00020  | Walker park - Fence accesses to closed stretch of Greyhope road (permanent)                            | 1                 | 17/04/17  | 17/04/17  |          | [Gantt bar from 17/04/17 to 17/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 18 | PC-CPRA-00035  | Reroute Cyclepath at St Fitticks to avoid Greyhope road  | 1                 | 17/04/17  | 17/04/17  |          | [Gantt bar from 17/04/17 to 17/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 19 | PC-CPRA-00050  | Greyhope Road - Fencing Golf course (permanent and temporary)  | 3                 | 18/04/17  | 20/04/17  |          | [Gantt bar from 18/04/17 to 20/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 20 |                | <b>Road realignment at St. Fitticks Jn.</b>  | 28                | 23/10/17  | 29/11/17  |          | [Gantt bar from 23/10/17 to 29/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 21 | PC-CPRA-00130  | Coast road realignment at St Fitticks - Temporary fencing  | 3                 | 23/10/17  | 25/10/17  |          | [Gantt bar from 23/10/17 to 25/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 22 | PC-CPRA-00140  | Coast road realignment at St Fitticks- Road construction   | 20                | 26/10/17  | 22/11/17  |          | [Gantt bar from 26/10/17 to 22/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 23 | PC-CPRA-00150  | Greyhope road realignment at St Fitticks - Road construction   | 20                | 26/10/17  | 22/11/17  |          | [Gantt bar from 26/10/17 to 22/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 24 | PC-CPRA-00160  | Coast road realignment at St Fitticks - Permanent fencing  | 5                 | 23/11/17  | 29/11/17  |          | [Gantt bar from 23/11/17 to 29/11/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 25 |                | <b>North Compound</b>  | 97                | 02/05/17  | 15/09/17  |          | [Gantt bar from 02/05/17 to 15/09/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 26 | PC-NC-00010    | North Compound and Walker Park - Perimeter & Other Temporary Fencing                                   | 5                 | 02/05/17  | 08/05/17  |          | [Gantt bar from 02/05/17 to 08/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 27 | PC-NC-00015    | North compound area - Slab and Civil Works for Visitor Centre  | 10                | 02/06/17  | 15/06/17  |          | [Gantt bar from 02/06/17 to 15/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 28 | PC-NC-00020    | North Compound - Wheel Wash Facilities   | 4                 | 14/08/17  | 17/08/17  |          | [Gantt bar from 14/08/17 to 17/08/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 29 | PC-NC-00030    | North Compound - Civil Works (Topsoil, temp earthworks, Drainage, Car Parking, Storage / Laydown area) | 15                | 14/08/17  | 01/09/17  |          | [Gantt bar from 14/08/17 to 01/09/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 30 | PC-NC-00040    | North Compound - Temporary MEP supplies / connections to North Compound                                | 15                | 21/08/17  | 08/09/17  |          | [Gantt bar from 21/08/17 to 08/09/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 31 | PC-NC-00050    | North Compound - Warehouse/Welfare Facilities  | 20                | 21/08/17  | 15/09/17  |          | [Gantt bar from 21/08/17 to 15/09/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 32 |                | <b>South Compound</b>  | 128               | 10/04/17  | 11/10/17  |          | [Gantt bar from 10/04/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 33 |                | <b>Construction</b>  | 128               | 10/04/17  | 11/10/17  |          | [Gantt bar from 10/04/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 34 | PC-SC-C-00010  | South compound - Perimeter & Other Temporary Fencing   | 5                 | 10/04/17  | 18/04/17  |          | [Gantt bar from 10/04/17 to 18/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 35 | PC-SC-C-00020  | South compound - Wheel Wash Facilities   | 4                 | 19/04/17  | 24/04/17  |          | [Gantt bar from 19/04/17 to 24/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 36 | PC-SC-C-00030  | South compound - Civil Works (Roads and platforms / Foundations and ductbanks)                         | 25                | 02/05/17  | 06/06/17  |          | [Gantt bar from 02/05/17 to 06/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 37 | PC-SC-C-00060  | South compound - Fabrication Shed  | 35                | 07/06/17  | 25/07/17  |          | [Gantt bar from 07/06/17 to 25/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 38 | PC-SC-C-00032  | South compound - Truck weighing scale  | 15                | 07/06/17  | 27/06/17  |          | [Gantt bar from 07/06/17 to 27/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 39 | PC-SC-C-00050  | South compound - Batching Plant - Assembly   | 40                | 20/06/17  | 15/08/17  |          | [Gantt bar from 20/06/17 to 15/08/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 40 | PC-SC-C-00040  | South compound - Temporary MEP supplies / connections to South Compound                                | 40                | 28/06/17  | 23/08/17  |          | [Gantt bar from 28/06/17 to 23/08/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 41 | PC-SC-C-00080  | South compound - Laboratory  | 25                | 28/06/17  | 01/08/17  |          | [Gantt bar from 28/06/17 to 01/08/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 42 | PC-SC-C-00090  | South compound - Office Block / Welfare  | 25                | 28/06/17  | 01/08/17  |          | [Gantt bar from 28/06/17 to 01/08/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 43 | PC-SC-C-00034  | South Compound - Water Treatment plant   | 24                | 28/06/17  | 31/07/17  |          | [Gantt bar from 28/06/17 to 31/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 44 | PC-SC-C-00070  | South compound - Carousel M&E Assembly   | 70                | 05/07/17  | 11/10/17  |          | [Gantt bar from 05/07/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 45 |                | <b>Accropodes Construction</b>   | 68                | 06/07/17  | 11/10/17  |          | [Gantt bar from 06/07/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 46 |                | <b>Stationery</b>  | 0                 | 06/07/17  | 06/07/17  |          | [Gantt bar from 06/07/17 to 06/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 47 | PC-SC-AC-00010 | Start Fabrication - Accropodes (from moulds)   | 0                 | 06/07/17  | 06/07/17  |          | [Gantt bar from 06/07/17 to 06/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 48 |                | <b>Carousel</b>  | 0                 | 11/10/17  | 11/10/17  |          | [Gantt bar from 11/10/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 49 | PC-SC-AC-00030 | Start Fabrication - Accropodes (from shed production)  | 0                 | 11/10/17  | 11/10/17  |          | [Gantt bar from 11/10/17 to 11/10/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 50 |                | <b>Central Compound</b>  | 54                | 24/04/17  | 10/07/17  |          | [Gantt bar from 24/04/17 to 10/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 51 | PC-CC-00010    | Central Compound - Perimeter & Other Temporary Fencing   | 5                 | 24/04/17  | 28/04/17* |          | [Gantt bar from 24/04/17 to 28/04/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 52 | PC-CC-00020    | Central Compound - Wheel Wash Facilities   | 4                 | 02/05/17  | 05/05/17* |          | [Gantt bar from 02/05/17 to 05/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 53 | PC-CC-00030    | Central Compound - Civil Works (Drainage, Car Parking, Storage / Laydown area etc)                     | 15                | 08/05/17  | 26/05/17* |          | [Gantt bar from 08/05/17 to 26/05/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 54 | PC-CC-00040    | Central Compound - Office Block  | 20                | 30/05/17  | 26/06/17* |          | [Gantt bar from 30/05/17 to 26/06/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 55 | PC-CC-00060    | Central Compound - Welfare Facilities  | 20                | 13/06/17  | 10/07/17* |          | [Gantt bar from 13/06/17 to 10/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 56 | PC-CC-00050    | Central Compound - Temporary MEP supplies / connections to Central Compound                            | 10                | 27/06/17  | 10/07/17* |          | [Gantt bar from 27/06/17 to 10/07/17] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 57 |                | <b>Construction</b>  | 727               | 25/05/17  | 08/05/20  |          | [Gantt bar from 25/05/17 to 08/05/20] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 58 |                | <b>Auxiliary works for harbour construction</b>  | 284               | 18/04/18  | 12/06/19  |          | [Gantt bar from 18/04/18 to 12/06/19] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 59 |                | <b>Auxiliary quay - Construction</b>   | 284               | 18/04/18  | 12/06/19  |          | [Gantt bar from 18/04/18 to 12/06/19] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 60 |                | <b>Auxiliary quay - Construction</b>   | 38                | 18/04/18  | 12/06/18  |          | [Gantt bar from 18/04/18 to 12/06/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 61 | C-AQ-C-00010   | Auxiliary quay - General filling   | 4                 | 18/04/18  | 23/04/18  |          | [Gantt bar from 18/04/18 to 23/04/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 62 | C-AQ-C-00020   | Auxiliary quay - Rock bedding layer  | 2                 | 24/04/18  | 25/04/18  |          | [Gantt bar from 24/04/18 to 25/04/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 63 | C-AQ-C-00030   | Auxiliary quay - Levelling with gravel   | 4                 | 26/04/18  | 01/05/18  |          | [Gantt bar from 26/04/18 to 01/05/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 64 | C-AQ-C-00040   | Auxiliary quay - Placing concrete blocks   | 6                 | 02/05/18  | 10/05/18  |          | [Gantt bar from 02/05/18 to 10/05/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 65 | C-AQ-C-00050   | Auxiliary quay - Backfill  | 2                 | 11/05/18  | 14/05/18  |          | [Gantt bar from 11/05/18 to 14/05/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 66 | C-AQ-C-00060   | Auxiliary quay - Rock 250-300kg  | 4                 | 15/05/18  | 18/05/18  |          | [Gantt bar from 15/05/18 to 18/05/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 67 | C-AQ-C-00070   | Auxiliary quay - Cantilever  | 10                | 21/05/18  | 04/06/18  |          | [Gantt bar from 21/05/18 to 04/06/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 68 | C-AQ-C-00080   | Auxiliary quay - Bollards  | 2                 | 05/06/18  | 06/06/18  |          | [Gantt bar from 05/06/18 to 06/06/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 69 | C-AQ-C-00090   | Auxiliary quay - Fenders   | 2                 | 07/06/18  | 08/06/18  |          | [Gantt bar from 07/06/18 to 08/06/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |
| 70 | C-AQ-C-000100  | Auxiliary quay - Ladder  | 2                 | 11/06/18  | 12/06/18  |          | [Gantt bar from 11/06/18 to 12/06/18] |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |

# AHEP - Contract Programme - Enabling works & Construction

| #   | ID               | Description   | Original Duration | Start     | Finish    | 24h work | 2017 |     |     |     |     |     |     |     |     |     |     |     | 2018 |     |     |     |     |     |     |     |     |     |     |     | 2019 |     |     |     |     |     |     |     |     |     |     |     | 2020 |     |     |     |     |     |  |  |  |  |  |  |
|-----|------------------|---|-------------------|-----------|-----------|----------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|--|--|--|--|--|--|
|     |                  |   |                   |           |           |          | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun |  |  |  |  |  |  |
| 71  |                  | <b>Auxiliary quay - Removal</b>   | 14                | 23/05/19  | 12/06/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 72  | C-AQ-R-00010     | Auxiliary quay - Ladders, bollards and fenders                                      | 3                 | 23/05/19  | 28/05/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 73  | C-AQ-R-00020     | Auxiliary quay - Cantilever   | 3                 | 29/05/19  | 31/05/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 74  | C-AQ-R-00030     | Auxiliary quay - Concrete blocks  | 8                 | 03/06/19  | 12/06/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 75  |                  | <b>Dredging &amp; Blasting</b>  | 320               | 16/06/17  | 28/09/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 76  |                  | <b>Dredging &amp; Blasting - Land works</b>   | 90                | 25/09/17  | 09/02/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 77  | C-DB-L-00010     | South West Drilling & Blasting  | 50                | 25/09/17  | 01/12/17  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 78  | C-DB-L-00020     | South West Excavation   | 60                | 06/11/17  | 09/02/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 79  |                  | <b>Drill &amp; Blasting</b>   | 145               | 07/07/17  | 09/02/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 80  | C-DB-M-00010     | Marine - Drill & Blasting - North Area  | 85                | 07/07/17  | 03/11/17  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 81  | C-DB-M-00020     | Marine - Drill & Blasting - South Area  | 60                | 06/11/17  | 09/02/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 82  |                  | <b>Dredging</b>   | 320               | 16/06/17  | 28/09/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 83  | C-DR-00010       | TSHD-Dredging of sand & alluvium - 1st season                                       | 25                | 16/06/17  | 20/07/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 84  | C-DR-00020       | BHD-Dredging of glacial till & boulders + Dredging of Blasted material - 1st season | 120               | 14/07/17  | 12/01/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 85  | C-DR-00025       | CSD-Dredging of glacial till & boulders - 1st season                                | 120               | 14/07/17  | 11/01/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 86  | C-DR-00030       | TSHD-Dredging of sand & alluvium - 2nd season                                       | 15                | 12/02/18  | 02/03/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 87  | C-DR-00040       | BHD-Dredging of glacial till & boulders + Dredging of Blasted material - 2nd season | 145               | 05/03/18  | 28/09/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 88  | C-DR-00045       | CSD-Dredging of glacial till & boulders - 2nd season                                | 145               | 05/03/18  | 28/09/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 89  |                  | <b>North Breakwater</b>   | 637               | 25/05/17  | 17/12/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 90  |                  | <b>NBW - Land Works</b>   | 637               | 25/05/17  | 17/12/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 91  |                  | <b>NBW - Land Works - 1st Phase</b>   | 105               | 25/05/17  | 20/10/17  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 92  | C-NBW-M-1-00010  | NBW - LW - 1st Ph - Core material   | 55                | 25/05/17  | 11/08/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 93  | C-NBW-M-1-00020  | NBW - LW - 1st Ph - Filter 1-3 t rock sea side, Land                                | 50                | 09/06/17  | 18/08/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 94  | C-NBW-M-1-00030  | NBW - LW - 1st Ph - Rear armour 0.3-1 t   | 55                | 16/06/17  | 01/09/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 95  | C-NBW-M-1-00040  | NBW - LW - 1st Ph - Bedding layer (P.K. 450 - 0.)                                   | 40                | 14/07/17  | 08/09/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 96  | C-NBW-M-1-00050  | NBW - LW - 1st Ph - Toe Armour  | 40                | 21/07/17  | 15/09/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 97  | C-NBW-M-1-00060  | NBW - LW - 1st Ph - Accropode II (8m3)  | 39                | 08/08/17  | 29/09/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 98  | C-NBW-M-1-00070  | NBW - LW - 1st Ph - Winter Closure  | 15                | 02/10/17  | 20/10/17  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 99  |                  | <b>NBW - Land Works - 2nd Phase</b>   | 170               | 26/02/18  | 26/10/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 100 | C-NBW-M-2-00010  | NBW - LW - 2nd Ph - Remove Winter Closure   | 20                | 26/02/18  | 23/03/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 101 | C-NBW-M-2-00020  | NBW - LW - 2nd Ph - Core material   | 45                | 26/03/18  | 31/05/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 102 | C-NBW-M-2-00030  | NBW - LW - 2nd Ph - Filter 1-3 t rock sea side, Land                                | 50                | 04/04/18  | 14/06/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 103 | C-NBW-M-2-00040  | NBW - LW - 2nd Ph - Temporary rear armour 0.3-1 t                                   | 50                | 11/04/18  | 21/06/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 104 | C-NBW-M-2-00050  | NBW - LW - 2nd Ph - Bedding layer (P.K. 450 - 0.)                                   | 55                | 18/04/18  | 05/07/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 105 | C-NBW-M-2-00060  | NBW - LW - 2nd Ph - Toe Armour  | 55                | 25/04/18  | 12/07/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 106 | C-NBW-M-2-00070  | NBW - LW - 2nd Ph - Accropode II (8m3)  | 65                | 02/05/18  | 02/08/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 107 | C-NBW-M-CW-00010 | NBW - Crownwall 1st phase to +6.50 / +9.00  | 60                | 03/08/18  | 26/10/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 108 |                  | <b>NBW - Crown Wall</b>   | 202               | 04/03/19  | 17/12/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 109 | C-NBW-M-CW-00020 | NBW - Crownwall 2nd phase (+9.00 / +17.50)  | 135               | 04/03/19* | 13/09/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 110 | C-NBW-M-CW-00030 | NBW - Crownwall - Filter 1-3t   | 30                | 12/08/19  | 20/09/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 111 | C-NBW-M-CW-00040 | NBW - Crownwall - Accropode II (8m3)  | 40                | 19/08/19  | 11/10/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 112 | C-NBW-M-CW-00050 | NBW - Crownwall - Slab  | 45                | 14/10/19  | 13/12/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 113 | C-NBW-M-CW-00050 | NBW - Crownwall - Foundation block (Beacon)   | 2                 | 16/12/19  | 17/12/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 114 |                  | <b>South Breakwater</b>   | 566               | 28/07/17  | 11/11/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 115 |                  | <b>SBW - Marine works (Under -4.00 m CD) from PK 0+553 to PK 0+000</b>              | 245               | 28/07/17  | 26/07/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 116 | C-SBW-L-00010    | SBW - Core material marine dumping to -4.00 m CD from rock dredging                 | 245               | 28/07/17  | 26/07/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 117 | C-SBW-L-00020    | SBW - Bedding layer marine dumping  | 80                | 12/03/18  | 05/07/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 118 |                  | <b>SBW - Land Works</b>   | 321               | 27/07/18  | 11/11/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 119 |                  | <b>SBW - Land Works - 1st Phase from PK 0+635 to PK 0+350</b>                       | 65                | 27/07/18  | 26/10/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 120 | C-SBW-M-1-00010  | SBW - Land Works - 1st Ph - Core material to +6.30m CD                              | 50                | 27/07/18* | 05/10/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 121 | C-SBW-M-1-00020  | SBW - Land Works - 1st Ph - Bedding layer land from PK 0+625 to PK 0+553            | 20                | 13/08/18  | 07/09/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 122 | C-SBW-M-1-00030  | SBW - Land Works - 1st Ph - Toe Armour Sea Side (16m3)                              | 35                | 15/08/18  | 03/10/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 123 | C-SBW-M-1-00040  | SBW - Land Works - 1st Ph - Winter Closure  | 15                | 08/10/18  | 26/10/18  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 124 |                  | <b>SBW - Land Works - 2nd Phase A - From PK 0+350 to PK 0+000</b>                   | 159               | 04/02/19  | 19/09/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 125 | C-SBW-M-2-00010  | SBW - Land Works - 2nd Ph - Remove Winter Closure                                   | 20                | 04/02/19* | 01/03/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 126 | C-SBW-M-2-00020  | SBW - Land Works - 2nd Ph - Core material to +6.30m CD                              | 55                | 04/03/19  | 22/05/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 127 | C-SBW-M-2-00030  | SBW - Land Works - 2nd Ph - Toe Armour Sea Side (16m3)                              | 70                | 04/03/19  | 13/06/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 128 | C-SBW-M-2-00050  | SBW - Land Works - 2nd Ph - Filter Sea Side to +6.30 m CD                           | 110               | 11/03/19  | 16/08/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 129 | C-SBW-M-2-00060  | SBW - Land Works - 2nd Ph - Filter Harbour Side to +6.30 m CD                       | 115               | 13/03/19  | 27/08/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 130 | C-SBW-M-2-00070  | SBW - Land Works - 2nd Ph - Accropodes II 8,12 & 16 m3 to 6.30 m CD                 | 120               | 27/03/19  | 17/09/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 131 | C-SBW-M-2-00040  | SBW - Land Works - 2nd Ph - Toe Armour Harbour (8m3)                                | 80                | 15/04/19  | 09/08/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 132 | C-SBW-M-2-00080  | SBW - Land Works - 2nd Ph - Foundation block roundhead (Beacon)                     | 2                 | 18/09/19  | 19/09/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 133 |                  | <b>SBW - Land Works - 2nd Phase B - Backwards from PK 0+000 to PK 0+635-1</b>       | 37                | 20/09/19  | 11/11/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 134 | C-SBW-M-2-00090  | SBW - Land Works - 2nd Ph - Core material to +7.4 m CD                              | 30                | 20/09/19  | 31/10/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 135 | C-SBW-M-2-00100  | SBW - Land Works - 2nd Ph - Filter Sea Side to +9.50 m CD                           | 30                | 24/09/19  | 04/11/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 136 | C-SBW-M-2-00110  | SBW - Land Works - 2nd Ph - Precast concrete road                                   | 30                | 26/09/19  | 06/11/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 137 | C-SBW-M-2-00120  | SBW - Land Works - 2nd Ph - Accropodes II 16,12 & 8 m3                              | 30                | 01/10/19  | 11/11/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 138 | C-SBW-M-2-00130  | SBW - Land Works - 2nd Ph - Foundation block (Beacon)                               | 2                 | 17/10/19  | 18/10/19  | Yes      |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 139 |                  | <b>South East Pier + East Quay</b>  | 191               | 13/06/18  | 21/03/19  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 140 | C-SEPEQ-00010    | South East Pier + East Quay - Rock bedding layer                                    | 30                | 13/06/18  | 24/07/18* |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |
| 141 | C-SEPEQ-00020    | South East Pier + East Quay - Levelling layer                                       | 29                | 20/06/18* | 30/07/18  |          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |  |  |  |  |  |  |





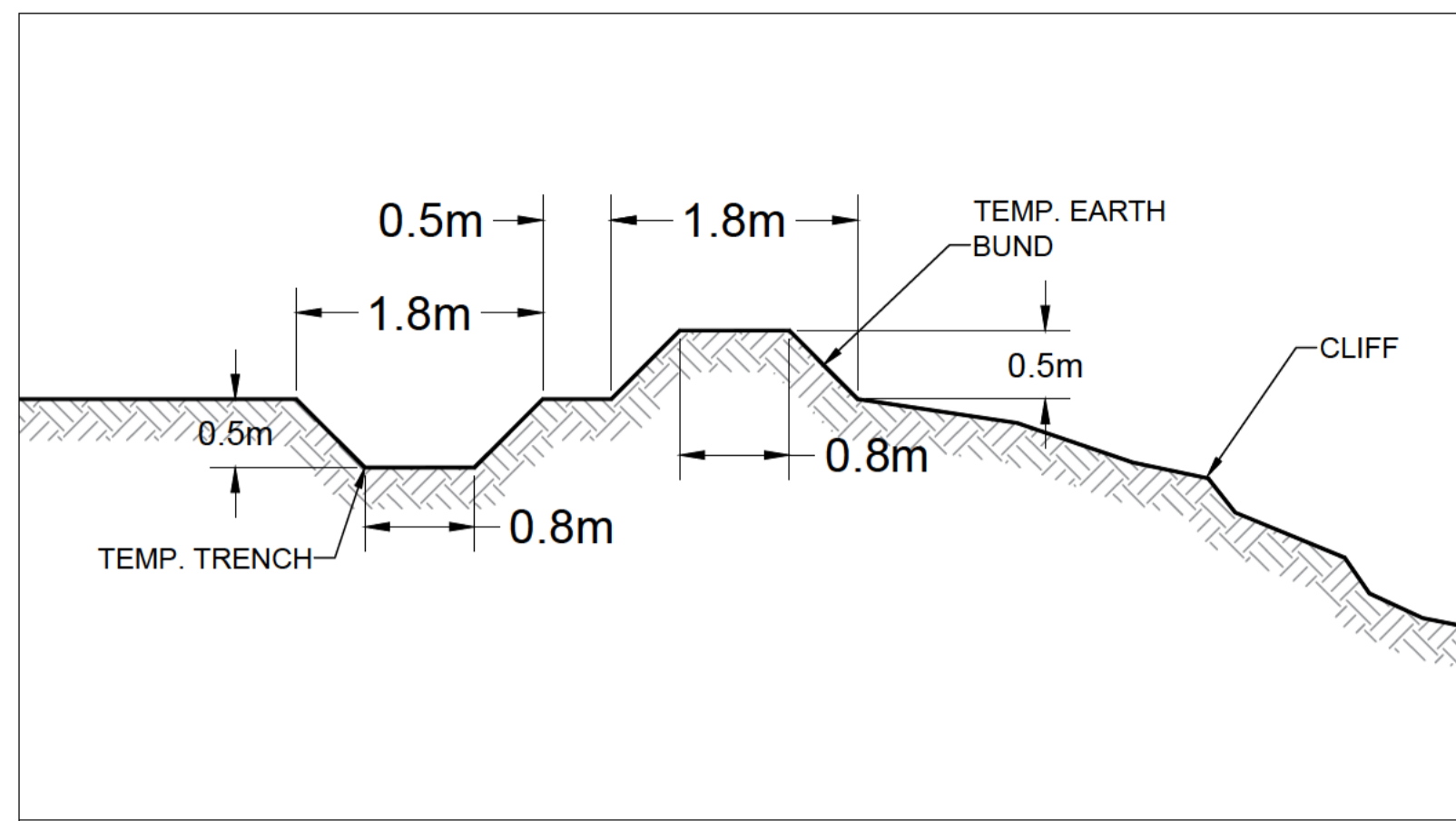
AHEP - Contract Programme - Enabling works & Construction

Table with columns: #, ID, Description, Original Duration, Start, Finish, 24h work, and monthly breakdown for years 2017, 2018, 2019, and 2020. Includes sections like North Open Quay, Southwest Corner, Superstructure Harbour Area, M&E Works, and Demobilisation & Reinstatement of Compounds.

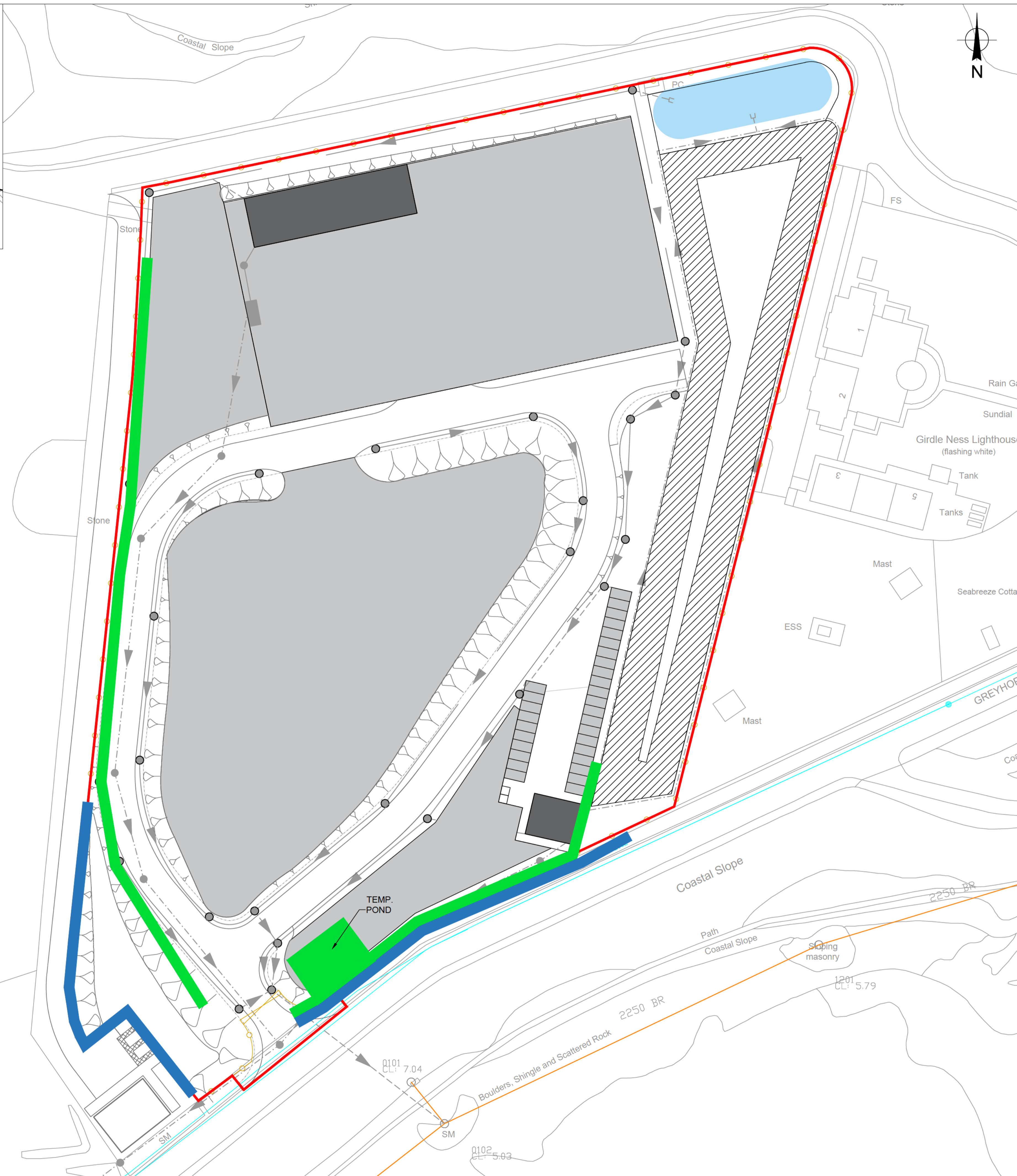
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**APPENDIX 4 – TEMPORARY DRAINAGE SYSTEM**





TYPICAL TEMP. TRENCH AND EARTH BUND DETAIL  
(SCALE 1:500)



NOTES:

**KEY:**

- TEMP. TRENCH AND EARTH BUND BARRIER DURING EARTH WORKS
- SILT FENCING

| Rev. | Date     | By  | Chkd | Appd | Description                   |
|------|----------|-----|------|------|-------------------------------|
| 0    | 16.03.17 | TWC | SPG  | ZC   | Surface Water Management Plan |

**DRAGADOS**

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Client

**Aberdeen Harbour**

Job Title  
Aberdeen Harbour Expansion Project

Surface Water Management Plan  
North Compound  
(Sheet 1 of 4)

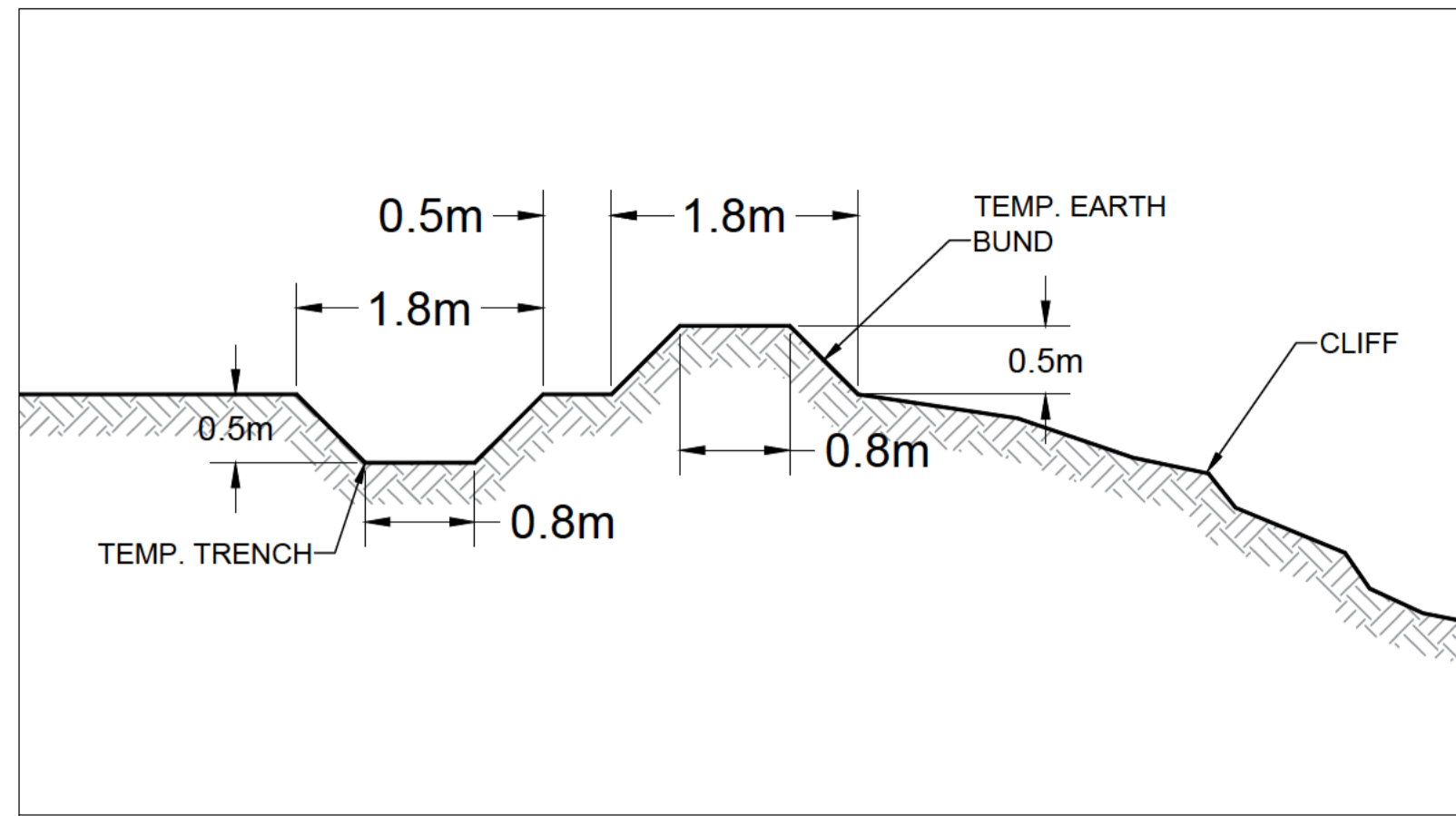
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Discipline Civil Engineering  
Drawing Status

Drawing No **AHEP-DRA-SKE-0031** Revision **00**

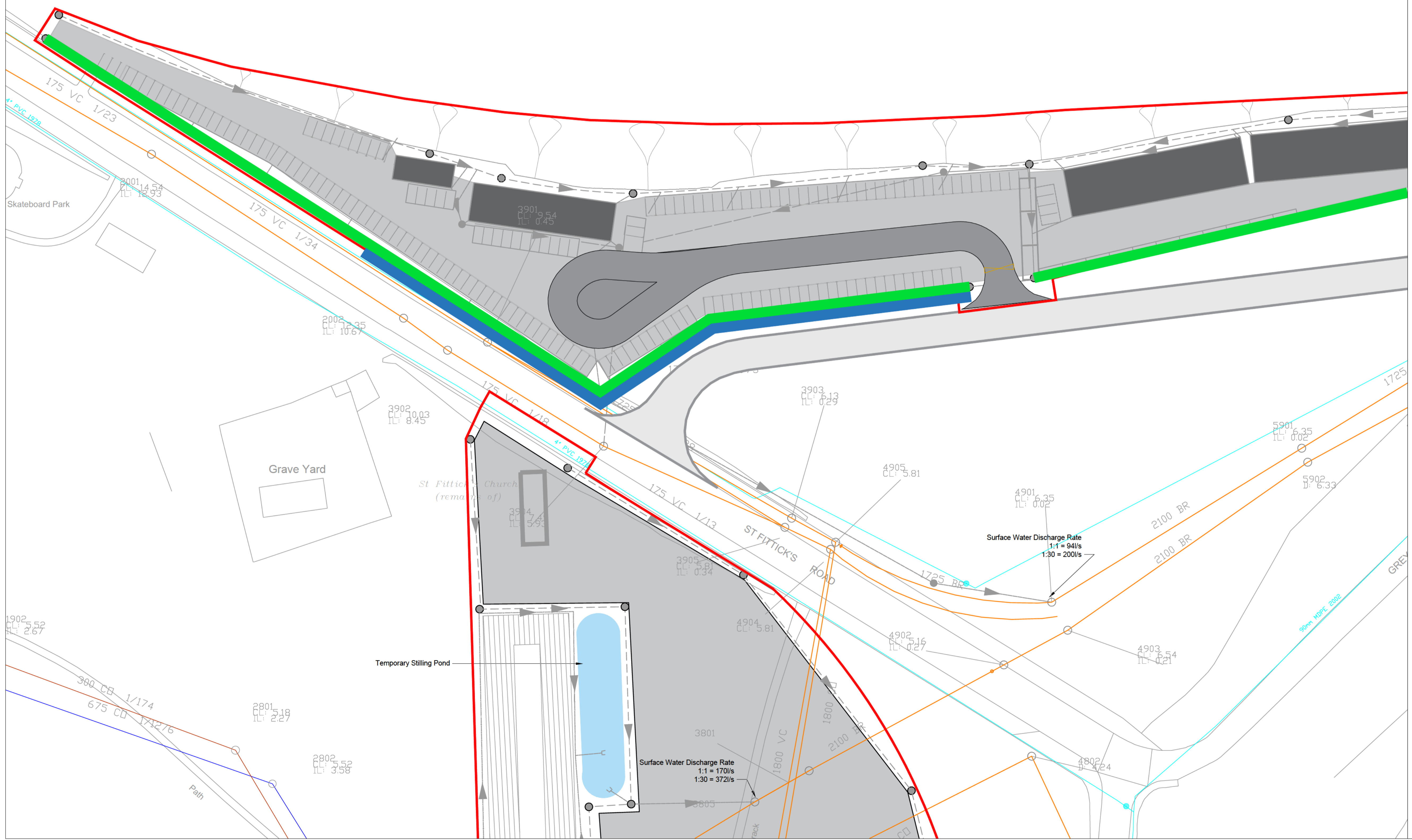




NOTES:



TYPICAL TEMP. TRENCH AND EARTH BUND DETAIL  
(SCALE 1:500)



**KEY:**

- TEMP. TRENCH AND EARTH BUND BARRIER DURING EARTH WORKS
- SILT FENCING

| Rev. | Date     | By  | Chkd | Appd | Description                   |
|------|----------|-----|------|------|-------------------------------|
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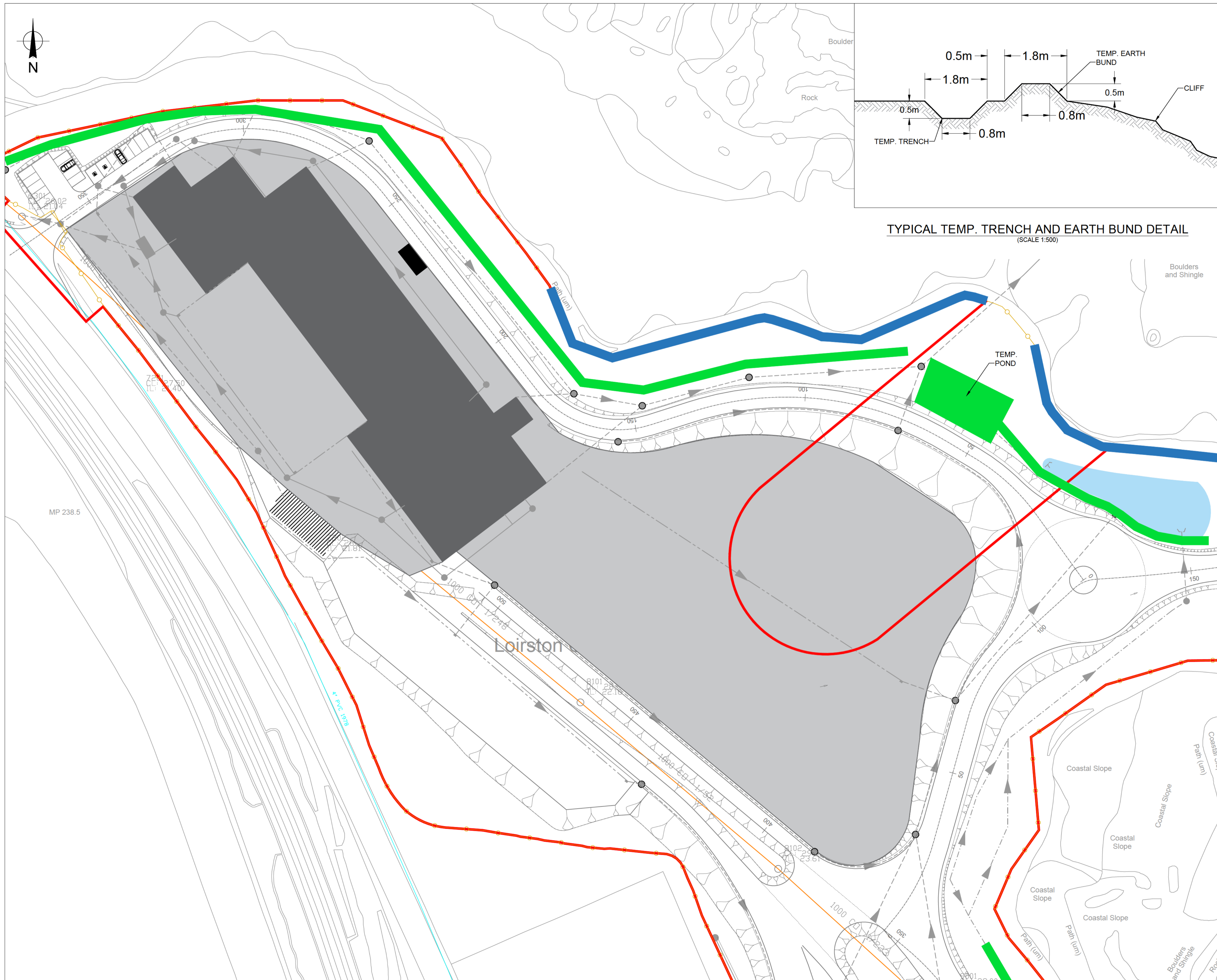
Job Title  
Aberdeen Harbour  
Expansion Project

Surface Water Management Plan  
Central Compound  
(Sheet 2 of 4)

Scale of A1 1:500 @ A1  
Discipline Civil Engineering  
Drawing Status

Drawing No  
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Revision  
**00**





TYPICAL TEMP. TRENCH AND EARTH BUND DETAIL  
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Job Title  
Aberdeen Harbour  
Expansion Project

Surface Water Management Plan  
South Compound  
(Sheet 3 of 4)

Scale at A1 1:500 @ A1

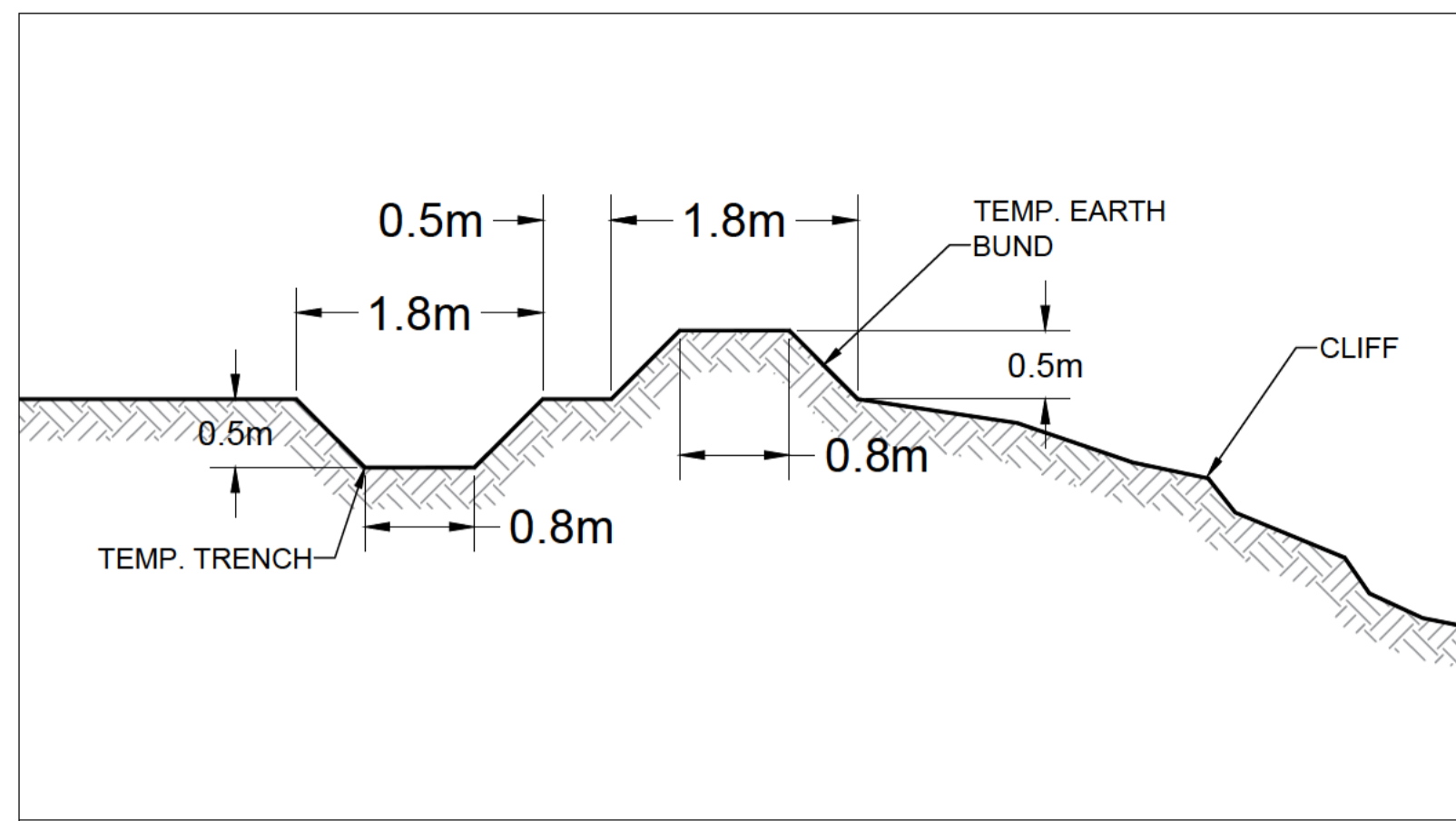
Discipline Civil Engineering

Drawing Status

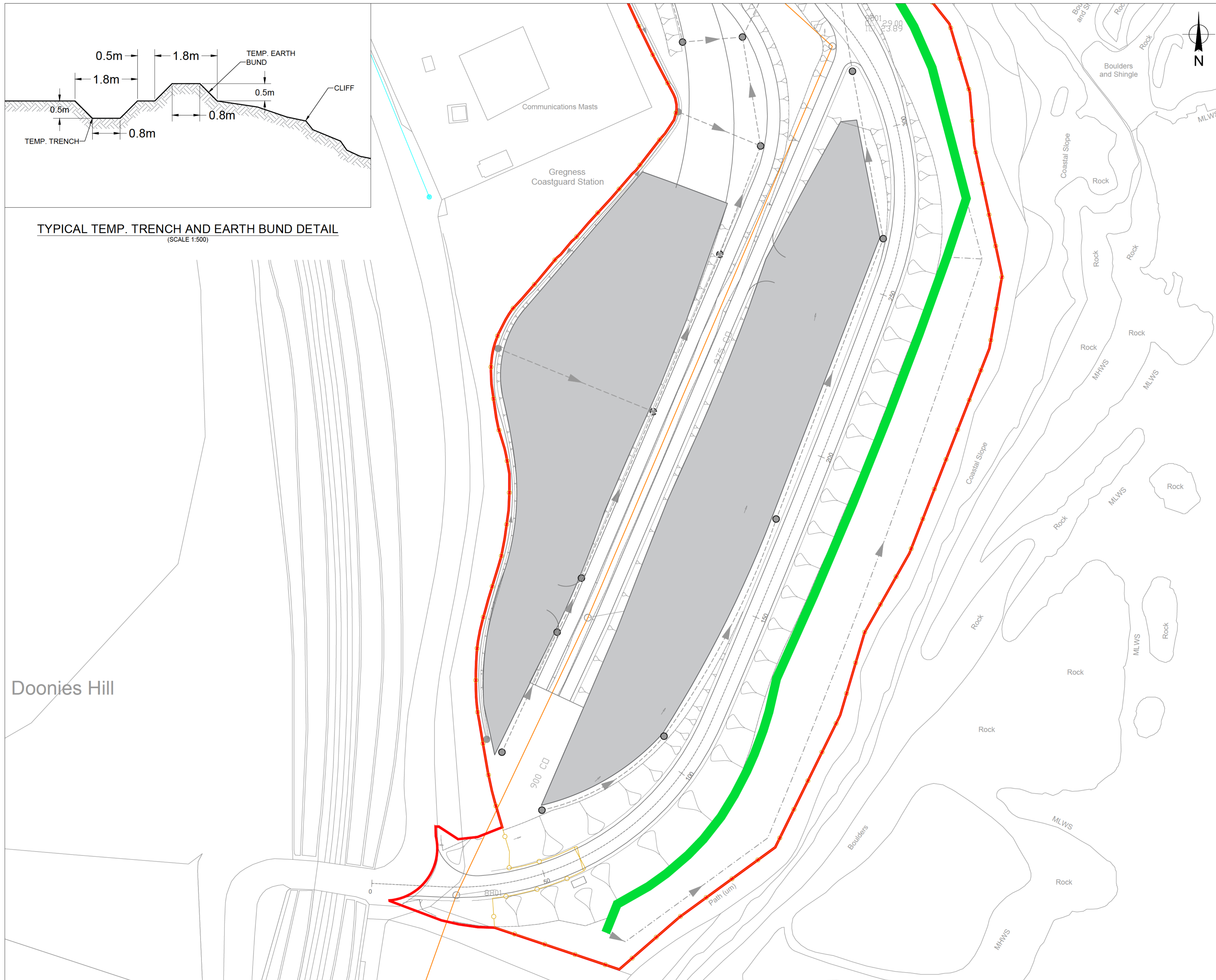
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Revision  
**00**





TYPICAL TEMP. TRENCH AND EARTH BUND DETAIL  
(SCALE 1:500)



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Job Title  
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Expansion Project

Surface Water Management Plan  
South Compound  
(Sheet 4 of 4)

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Discipline Civil Engineering  
Drawing Status

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**00**