Aberdeen Harbour Expansion Project

Construction Environmental Management Document

AHEP-DRA-MDS-0005 Rev 7
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DRAGADOS

Contents

Chapter 3
Construction Method Statement

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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. CONSTRUCTION WORKS

2.1 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 -15.25m 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 640 metres (North Breakwater) and 605 metres (South breakwater) long. The purpose of these structures is to protect the new facilities from the North Sea met ocean conditions.
- Construction of approximately 897m of closed and 535m of open quays[1] to provide a combined total of over 1432m 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).

[1] 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.

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

2.2 WORK COMPLETED

The following works have been completed in 2017,2018 and 2019:

- Completion of the enabling works and surveys;
- Installation of temporary perimeter fencing to secure the site boundaries and earth works in the compound area;
- Construction of the temporary access routes;
- Preparation of Central and Southern Compounds for welfare and pre cast yard installations respectively;
- Preparation of site offices in the Central compound;
- Installation of temporary visitor centre in the Northern Compound, as well as the Precast Concrete Blocks casting & storage areas.
- Fabrication of precast elements such as accropodes has begun. 6,408 units now fabricated;
- Coast Road Widening Works;
- St Fitticks Junction Road Works in progress up to 1st phase of the traffic management (one side of St Fitticks Road is completed).
- Installation of Construction Phase SUDS (described in Section 5.1.3.1 to 5.1.3.3);
- Temporary and Permanent Coastal/Cycle Path Construction and Alignment (Appendix 2);
- Construction of full length of North Breakwater (remedial works are still ongoing on limited areas);

- Construction of 80 metres of the SBW, including its access and its winter protection;
- Open Quay. 120 Piles performed at October 2019;
- Close Quay. 22 Caissons built in Spain and all have been shipped to Scotland. As of October 2019, 11 caissons have been installed at Aberdeen Harbour Expansion Project and 11 caissons are in storage in Cromarty;
- Caisson Infill, Backfill, and Closed Quay general fill have been performed on the areas where caissons have been placed. Progress has been sufficiently relevant in the East Quay, up to the point to commission a temporary quay on that area.
- Dredging and offshore deposit of approximately 2,150,000 m^3 of soft material using a trailer suction hopper dredger and backhoe vessels between 2017, 2018 and 2019;
- Drilling and Blasting approximately 45,000 m3 of rock in the North Quay
- Additionally, Rock removal by mechanical means has been performed, reaching in total (including blasted volume) 153,500 m3 of rock in the North Quay area and Southern areas.

Figure 3 - Aerial view of of the AHEP

3. SITE LAYOUT

3.1 SITE ESTABLISHMENT AND WELFARE

There are three temporary compounds being used for the duration of the construction period:

1) Central Compound: area surrounding the junction of St Fitticks Road, Coast Road and Greyhope Road previously used for recreational purposes. The Central Compound hosts the site offices (for management and engineering staff) and project welfare facilities (for operatives and skilled labour). Wheel-cleaning facilities are available at the entrance through to NBW.

2) North Compound: area located in the existing Walker Park. The North Compound houses the visitor centre, and acts as a storage area for the construction material, if required.

3) South Compound: area located south of Nigg Bay previously used for agricultural purposes. This area contains the precast and accropode fabrication plant and storage, laboratory, batching plant, two boreholes supplying water to the batching plant, temporary access to the storage facilities, as well as access to the Southern Breakwater.

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-cleaning facilities have been implemented at the exit points at the central and south compound to prevent dirt and debris from leaving the work areas.

See Appendix 1 (A, B and C) 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 is signposted with all relevant restrictions shown in advance though a Traffic Management Plan. This includes the installation of semi-permanent traffic signs on poles and a dedicated customer enquiries telephone line.

Further information is provided in the Construction Traffic Management Plan (Chapter 6 of the CEMD).

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 should be followed. If travelling from the North or City Centre then the route detailed below and in Figure 4 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 South easterly 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 4.

- 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 4 - Designated access route for HGVs (blue), cars and LGVs (green) to access Nigg Bay

3.2.3 Delivery of Stone

All HGVs transporting rock are required to follow the traffic access route to Nigg Bay as outlined in the Construction Traffic Management Plan (Chapter 6 of the CEMD).

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 may be not practical to complete from the marine environment.
North Breakwater	Access for HGVs and general traffic from the south, 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 (AS OF OCTOBER 2019)

The programme duration of 177 weeks began when contract was awarded on the 20th December 2016. The programme is provided in Appendix 3 and a description of remaining work has been summarised below. A description of completed work has been summarised in section 2.2.
Revised completion date is June 2020 due to unforeseeable extreme weather events which occurred at the start of 2018 (new duration of 181 weeks).
Planned completion date is in December 2021. Additional slippage is caused but not limited to effects of additional weather events (which have not still been considered).

The first phase of marine construction activities was undertaken from May to November 2017. The initial emphasis was focused on the north breakwater including placement of core breakwater material and direct deposit of quarry material.

The north breakwater activities ceased at the end of December 2018 for storm protection.

In early 2018, the caisson fabrication commenced in mainland Spain. Preparatory and fabrication works were undertaken from February 2018 to July 2018. The first 15no Caissons were delivered in September and October 2018. The following 7no caissons were transported from Spain to Cromarty Firth in July 2019 following extensive checks for non-native species.

The second phase of marine construction occurred from March to late 2019. In this phase the north breakwater has been completed. South breakwater activity will resume in 2020 and will be built with the blasted rock. Due to delays regarding planned blasting activities progress at the South Breakwater has been postponed.

The north breakwater provided shelter in Nigg Bay enabling quay installations to begin. Therefore, 11no caissons out of a total of 22no caissons have been placed in the East & North Quays.
South East Pier & relevant civil works of the Open Quays are limited by the progress of the South Breakwater (due to sheltering reasons as well).

Quay installation started in March 2019. Dredging activities continued from May 2019 with some of the dredge material used to in fill the caissons and behind the quays. Drainage, civil works and pavement installations complete the closed quay structure ready for building, furniture and installations.

Quayside activities and finishing works will complete the programme. This includes the installation of buildings and mechanical and electrical works which run from mid-2020. This will allow a project handover to Aberdeen Harbour Board in 2021.

These activities will be followed by the installation by Aberdeen Harbour Board of navigation aids, lights, CCTV and security.

4.1 WORKING HOURS

The construction programme takes into account realistic working hours and third party restrictions.

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/ Blasting/ Drilling	Blasting	During daylight hours
	Drilling associated with blasting	24 hours, 7 days a week
	Dredging	24 hours, 7 days a week
Breakwater	Marine placement	24 hours, 7 days a week
	Direct placement (from land)	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	24 hours, 7 days a week
	Rotary Piling	24 hours, 7 days a week
	Superstructure	16 hours, 7 days a week
Casting yard	Precast Fabrication	24 hours, 7 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 [COMPLETED]

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

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

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

On completion of the running layer, line markings and surface textures were 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 have been in place to allow safe working areas for the workforce and public around the realignment works. Site clearance works have been 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 have been diverted to enable the existing junction re-alignment. Trial pits have been 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 [COMPLETED]

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

Within the site boundary, excavators and bulldozers profiled the land and installed drainage. Bulldozers pushed all material to a local point where excavators loaded for removal future storage and reuse. Where the land was not workable by a bulldozer, a mechanical excavator broke out hard material and loaded directly to a truck. Mechanical excavators locally formed all service trenches.

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

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

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

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

The 3 construction compounds required the following connections to the existing services:

- **Northern Compound**: A septic tank has been installed at the Visitor Centre which will be emptied by a Licensed Waste carrier. Aberdeen City Council have advised that no drainage is required on the access road as there is sufficient camber on the road to allow rain water to percolate into the surrounding ground. The power supply will be provided by the local distribution operator (SSE) using an existing distribution route along Greyhope Road.
- **Central Compound**: A connection has been made to the St Fitticks sewer. The power supply was provided by SSE using an existing distribution route along St Fitticks Road. The water supply has been provided by SW using an existing distribution route along St Fitticks Road.
- **Southern Compound:** A foul and effluent discharge into the existing 900mm combined sewer has been connected. The power supply was provided by SSE using an existing

distribution route along the Coast Road. Rainwater is being collected by the compound drainage system and discharged into the sea, via settlement ponds.

5.1.3 Installation of Construction Phase SUDS [COMPLETED]

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 within the northern compound:

1. Establish compound boundary fences and compound site access point;
2. Topsoil strip and stockpile;
3. Bulk earthworks to formation levels;
4. Installation of Temporary Septic Tank and Water Tank;
5. Construction of on-site roads and formation of storage areas; and
6. Construction of Visitor Centre

5.1.3.2 Central Compound

The following sequence of works are anticipated within the Central compound:

1. Establish boundary fences and temporary site access points;
2. Install surface water drainage connection to Girdleness sewer; (Completed)
3. Installation of wheel cleaning facilities;
4. Topsoil strip and stockpile;
5. Bulk earthworks to formation levels;
6. Installation of "permanent" drainage (surface water and foul);
7. 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
8. Construction of Offices.
9. Connection with SSE power supply network (Completed)
10. Connection with SW supply network (Completed)

5.1.3.3 Southern Compound

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

1. Establish boundary fences and temporary site access points;
2. Installation of 2 permanent stilling ponds and perimeter stockpile drainage. This is a cut –off ditch that will collect the run-off and convey to the stilling ponds preventing any silty water from leaving the site area. This arrangement will be in place for the duration of the construction phase;

3. Install surface water drainage outfall in Nigg Bay;
4. Installation of wheel cleaning 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 accropode fabrication buildings.

During the first stages of the works (earthworks) a temporary drainage system will be installed. This will consist of a temporary trench 50cm deep and a temporary stockpile of material of 50cm on the external side of the temporary trench. This will discharge into two stilling ponds located at the lowest point of each compound area.

This temporary arrangement will be in place until the permanent compound drainage system is completed.

5.1.4 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 have been 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 the Construction Traffic Management Plan.

5.1.4.1 Cycle Path Construction [COMPLETED]

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

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

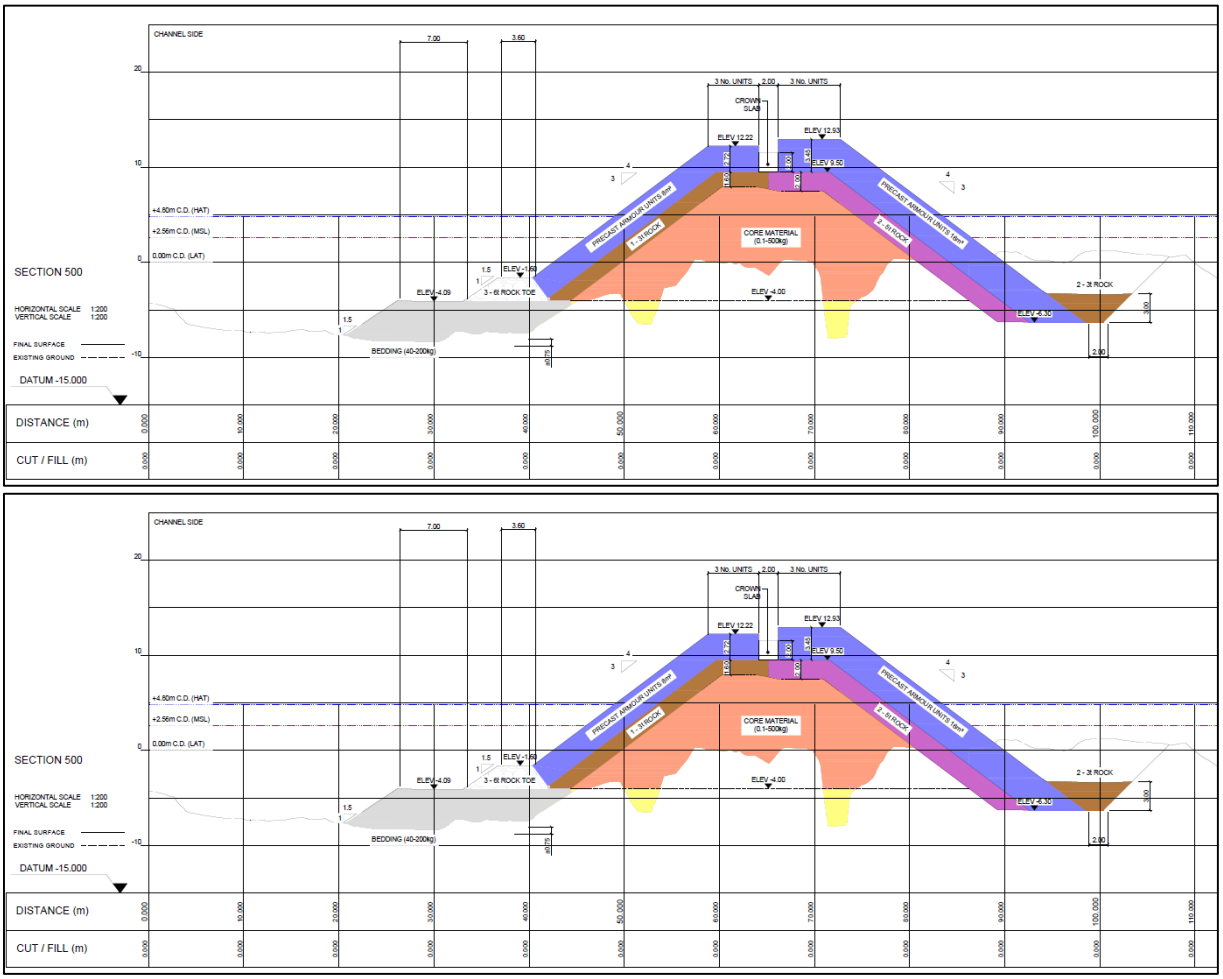
5.2 BREAKWATER CONSTRUCTION

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

At 1245m combined length, the breakwaters consist of core material / rock dredge material, secondary protection and accropodes. Core material 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 1,000-5,000kg and toe berm rock sized between 2,000kg-5,000kg 3,000kg-6,000kg us. The final layer of protection is provided by 8-16m3 accropode units. The North breakwater will also include a crown wall system.

The drawings below show the South & North Breakwater Cross Sections



Design levels show that the following quantities of material are required:

Table 3 – Indicative Quantities of material required for breakwater construction

	Unit of Measure	**Quantities**	
		North BW	South BW
Core Material/rock dredge material	Cubic metre	241,379	344,416
Bedding Material	Tonnes	11,237	22,504
Secondary Protection	Tonnes	52,316	101,671
8m^3 Accropode	Units	3,110	2,296
12m^3 Accropode	Units		1,839
16m^3 Accropode	Units		1,416

Completion of construction of the full length of the North Breakwater allowed start of the Crownwall construction works.

South Breakwater access and the initial 80 meters have been built in years 2018 and 2019. The works will continue after the winter period in 2019, once marine blasting operations start without constrains (except noise limits).

5.2.1 Rock Trench Formation

Accropode units provide protection to the breakwaters. In order to stabilise the accropodes, formation of a rock trench is provided for the breakwaters outer footprint. As shown in Figure 5, the trench reacts by "locking in" the bottom accropode layers which support those above. This toe will be created by drilling & blasting techniques to allow excavation and / or the use of rockwheel, trepano, hydraulic ripper, expansives or other mechanical means at shallow areas.

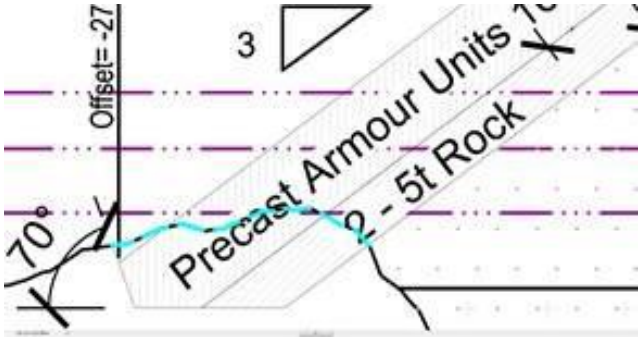


Figure 5 – Example of rock trench

5.2.2 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).

5.2.3 Direct Placement of Core Material

Dump trucks and quarry vehicles access the breakwater/land interface using the Breakwaters temporary access routes. These vehicles progress to discharge material at varying locations dependant on the breakwater progression, from the land outwards towards the breakwater head. The material is pushed by a bulldozer or excavator to the required location. Following this a long reach excavator grades 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

5.2.4 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, or transferred ship to ship from Norway vessels or directly from the dredging operation. This auxiliary quay will be built with a similar method to the breakwaters. 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. Marine equipment (backhoe or similar) will then profile the core / rock dredge material to the required tolerance.

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

5.2.5 Secondary Armour Placement

The secondary armour placements runs in tandem with core material placement. A heavy duty crawler crane and / or excavator placed the secondary and toe[2] armour material. The secondary and toe armour ensure the previously placed and shaped core material is contained. The toe armour acts as a stability mechanism and rests over a bedding layer material.

When a crane is used, (Figure 8), orange peel grab(s)or rock skip(s) place the material on the seaward and harbour boundaries of the breakwaters.
In the first section of the NBW (170 m landwards), toe is built using 44 Tn concrete blocks already stockpiled on site. Placement of these blocks is done with a heavy crawler crane from the NBW platform.
Before placing the blocks, it's necessary to prepare the seabed to ensure the right stability of the blocks.
Seabed preparation consists of achieving a regular base for the blocks by pecking locally the existing rock, with mechanical equipment.
Access to the seabed preparation works is achieved either by building a temporary causeway seaside of the NBW or gaining access directly from the NBW platform.

[2] The toe armour is part of the secondary armour located at the base of the breakwater on the seaward side

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

5.2.6 Armour Unit Placement (Accropodes)

The accropode units act as the primary layer of defence. They are installed by a heavy duty crane and / or excavator fitted with specialized lifting tackle. The accropode units are installed one at a time as they are delivered from the fabrication yard on a specialised heavy duty trailer. Positioned with advanced GPS or Echoscope equipment, the accropode will be installed in its final location.

Marine equipment like a jack-up or semisubmersible vessel will be used as well to enable the heavy duty crane and/or to place the deepest accropodes in the SBW.

Figure 9 – Placement of Accropode Units

5.2.7 Construction of Crown Wall

The north breakwater crown wall will be constructed over two seasons in weather windows in 2019 and 2020. The coronation slab (a concrete slab on top of the breakwater) will be completed in the last phase.

5.2.7.1 Coronation Slab

The coronation slab will be constructed by use of a traditional formwork system [3]. 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.

5.2.7.2 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 10). The concrete will be transported by truck and placed via pump or conveyor.

[3] Formwork is the term given to moulds in which concrete is poured

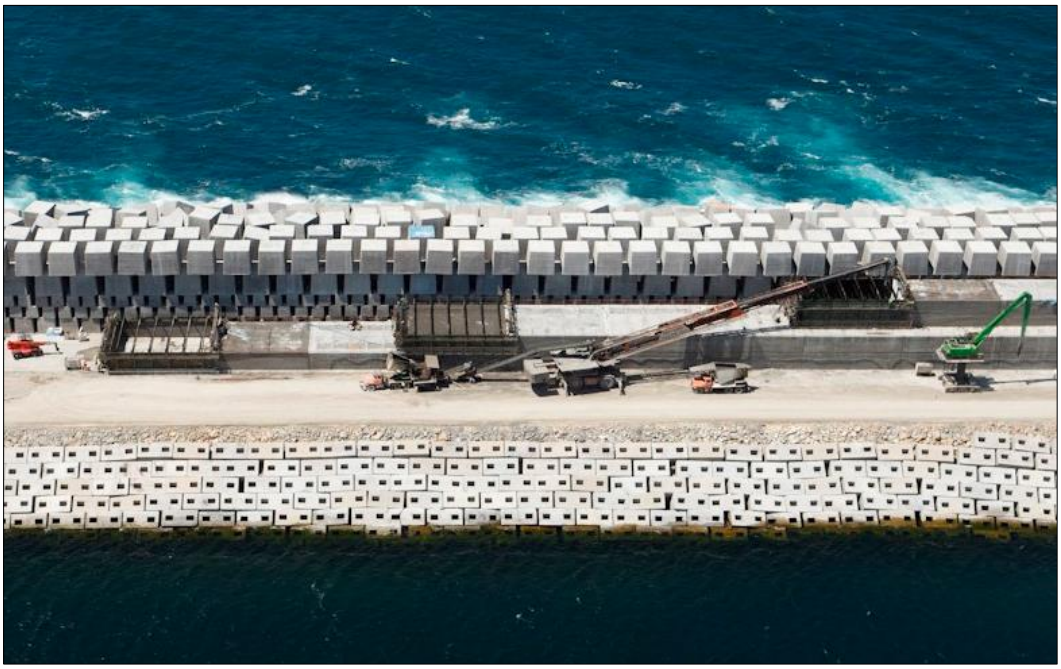
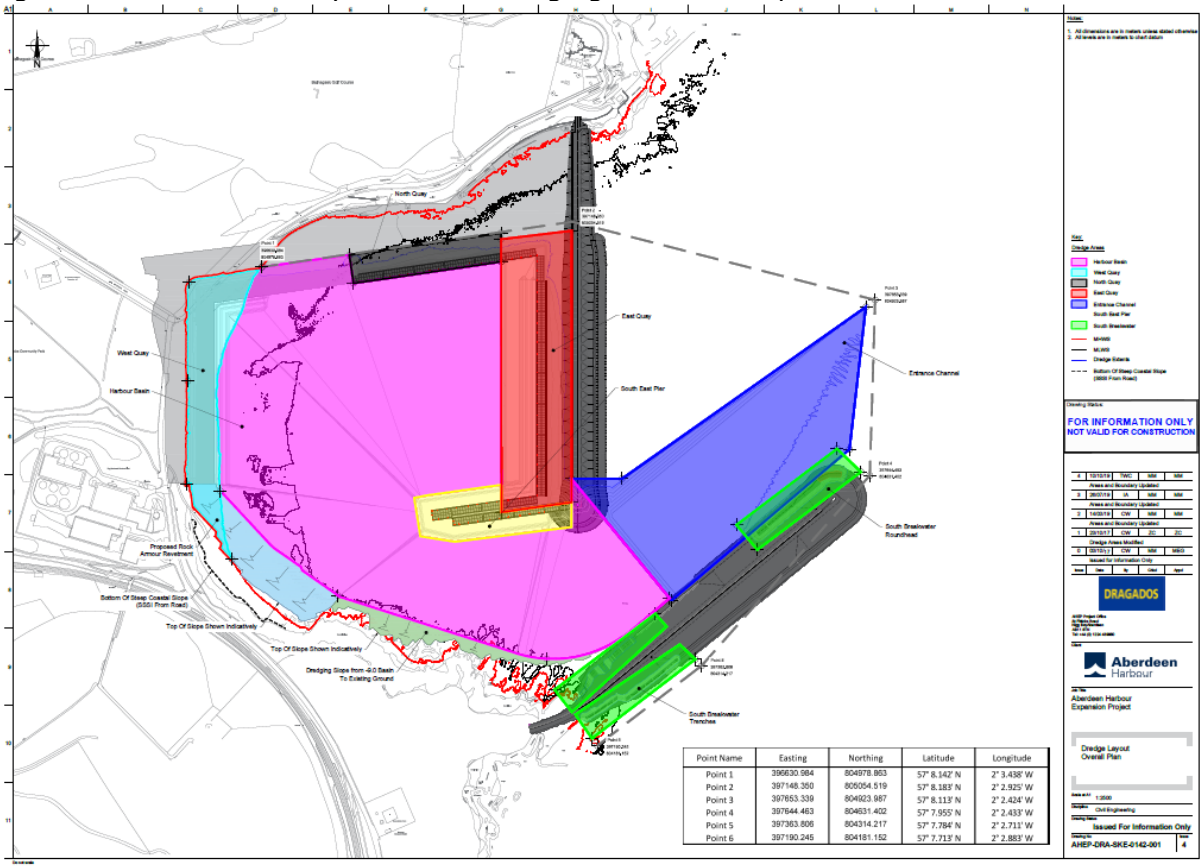


Figure 10 - Crown Wall Construction (indicative)

5.3 DREDGING ACTIVITIES

It is anticipated that dredging activities within the bay removes 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 indicates the layout of the dredging activities required



Point Name	Easting	Northing	Latitude	Longitude
Point 1	396630.984	804978.863	57° 8.142' N	2° 3.438' W
Point 2	397148.350	805054.519	57° 8.183' N	2° 2.925' W
Point 3	397653.339	804923.987	57° 8.113' N	2° 2.424' W
Point 4	397644.463	804631.402	57° 7.955' N	2° 2.433' W
Point 5	397363.606	804314.217	57° 7.784' N	2° 2.713' W
Point 6	397190.245	804181.152	57° 7.713' N	2° 2.883' W

Figure 11 – Layout of the Dredging Activities

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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 a backhoe dredger (BHD), trailing suction hopper dredge (TSHD) (see Figure 12) or possibly Cutter Suction Dredger (CSD).

Figure 12 – TSHD Draghead representation (Van Oord Volvox Terranova)

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 carried out by either:

- Bottom discharge at an offshore deposit site - The vessel will position over the deposit 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. It is also possible to transfer materials by conveyor

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 dredger (CSD) or a backhoe dredger. (BHD).

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 deposit 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.

When a BHD is used the dredged material is placed in the hopper barges and disposed of at the offshore deposit site.

5.3.3 Drum Cutter/ Rock Wheel

A drum cutter has been selected to sculpt areas of the harbour including trenches close to the breakwater and areas to the south of the bay. The use of blasting has been investigated in these areas however, it is unlikely that blasting will achieve the correct profile required and may result in over fracturing of material. At areas of shallow rock removal, an excavator mounted rock wheel will excavate out rock to level by grinding the rock to the required profile (Figure 13). This will likely occur at the east side of the north breakwater and at the west of the south breakwater. A drum cutter can also be used in more adverse weather conditions than blasting.

Figure 13 - Rock wheel

5.3.4 Marine Drilling & Blasting

Specific details relating to marine and land blasting can be found in Chapter 7 the Dredge Dredging and Dredge Spoil Disposal Management and Monitoring Plan.

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 without first fracturing the rock. As such a drilling and blasting operation is required.

One or two non-self-propelled jack up barges or similar vessels are positioned by tug or another self-propelled vessel, and secured, usually via spud legs. The jack up will support a moveable drill tower (see Figure 14).

The drilling and blasting works have been done from a platform on the jack up with the drill tower using the following procedure.

Drilling is carried out using hydraulic drilling towers fitted with top hammer rotation units and down-the-hole hammers. The drill towers run on rails fitted to the deck of the pontoon giving them full coverage over one side of the pontoon (longitudinal)

The top hammer rotation units is used to drive the casing and rotate the drill string. The drill strings is fitted with down-the-hole hammers to maximise drilling power and the rate of penetration. The down-the-hole drill hammers is powered pneumatically.

A typical work procedure entails that the holes are drilled in a sequence and such that the holes adjacent to the longitudinal free face are drilled first, thus allowing the shot to be safely fired even if the full pattern has not been completed. Stemming is used for confining the explosive energy within the blast holes to more effectively fragment the rock. Blasting does not occur over the whole of the bay but in distinct areas where rock is present, see Figure 14.

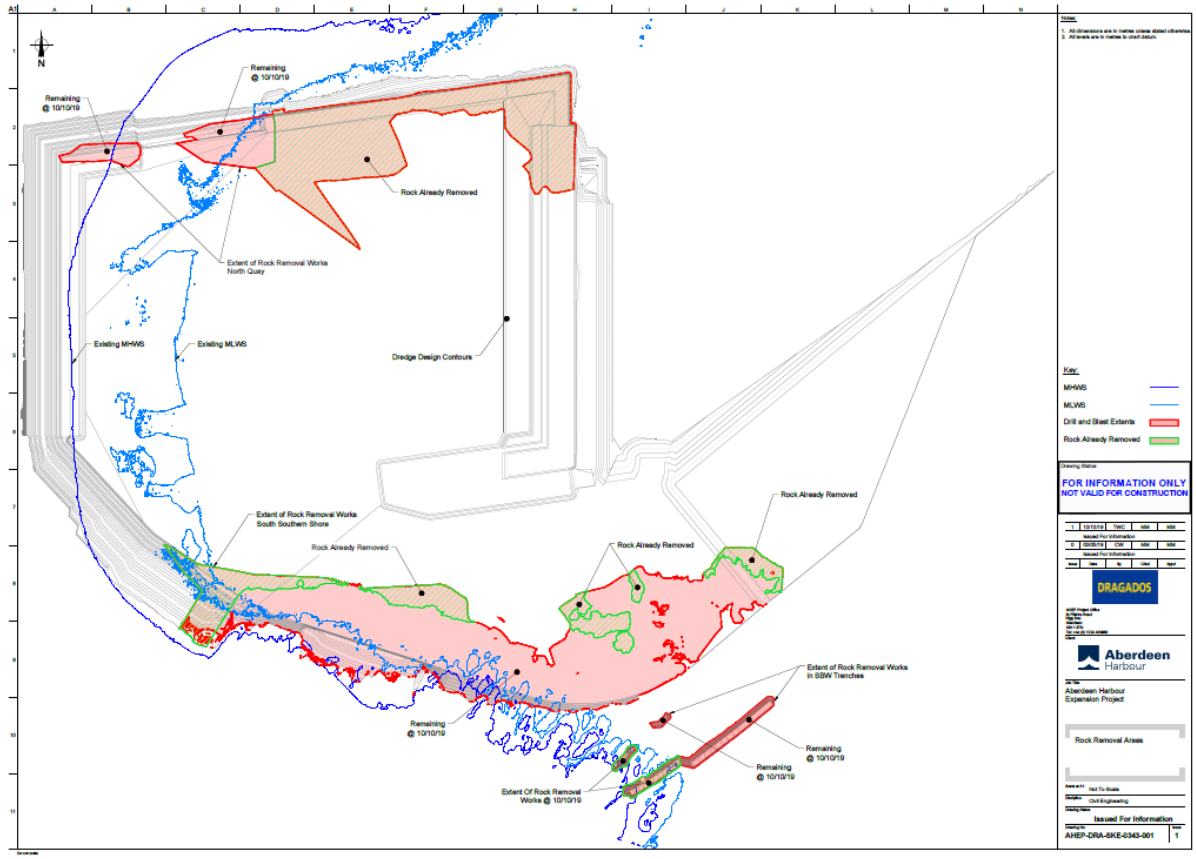

Figure 14 - Areas where rockbreaking has taken place (green) and is due to take place (red).

Once the explosives have been detonated, a BHD vessel removes and loads the blasted material in barges for reuse at AHEP (see Figure 15). It is likely that a non-self-propelled BHD is positioned by a tug or other self-propelled vessel. The BHD is 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.

Working in lanes, the excavator positioned at the tip of the barge removes material over 5m lengths into self-propelled split barge vessel(s). The excavator is 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 removes its front spud leg from the seabed and "walk" backwards to uncover new ground.

As an alternative, rock material removal could be ripped using an hydraulic ripper in the backhole or can be demolish with a trepano in the split barge lifting with a crane installed in the vessel. Another alternative could be an hydraulic hammer used to break the rock.

Figure 15 – BHD and Split Barge

5.3.5 Land Based Drill and Blast Operations

For areas around the southern slopes of Nigg Bay, South breakwater trenches, North East corner closed quay and at the north open quay, it is possible to undertake blasting from land.

Activities within areas below the current Mean High Water Spring are managed through the Marine Licence.

Activities within areas above the current Mean High Water Spring Level are out of the Marine Licence scope.

Earthwork access platforms will be constructed which will also be used as access / haul roads and lay down areas. Holes will be drilled through the platform into the rock layers below and then explosives set into these holes. Once blasting is completed the fractured rock will be excavated and used to either create the next stage of the rock platform and

ultimately in construction of the harbour such as placement in the southern breakwater or elsewhere. All blasting will be below the constructed platform and as such will not require containment.

The maximum charge weight to be used during the remaining blasting programme is limited by DUK's obligation to achieve the currently agreed threshold of 170 dB re 1 µPa rms (equivalent to 183 dB re 1µPa peak) at 400 m from the blast location or outside the double bubble curtain, whichever is the greater distance, or some revised threshold in light of new guidance (i.e. NMFS, 2018, Southall et al, 2019)

5.3.6 Dredge Deposit Volumes and Deposit Site

Dredge Area	License Depth m	Area m^2	Approximate Dredge Volume m^3	Approximate Dredge Volume Wet Tonnes
Harbour Basin	-9	287,348	2,254,627	4,841,515
North Quay	-9.85	12,033	39,600	85,035
East Quay	-12.95	53,205	258,700	555,525
Entrance Channel	-10.5	93,425	95,900	205,932
South East Pier	-11.45	15,945	102,500	220,105
SBW Roundhead	-15.24	9,602	12,200	26,198
West quay	-12.55	Included within harbour basin		
Total		**471558**	**2,762,527**	**5,932,163***

* Total Includes dredged material to be reused in the construction of AHEP so maximum deposit at CR110 will not exceed 4,702,737 wet tonnes / 2,190,000m^3

Table 4 – Dredge and deposit volumes and deposit site

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 897m of berthing capacity with the open quay around 535m.

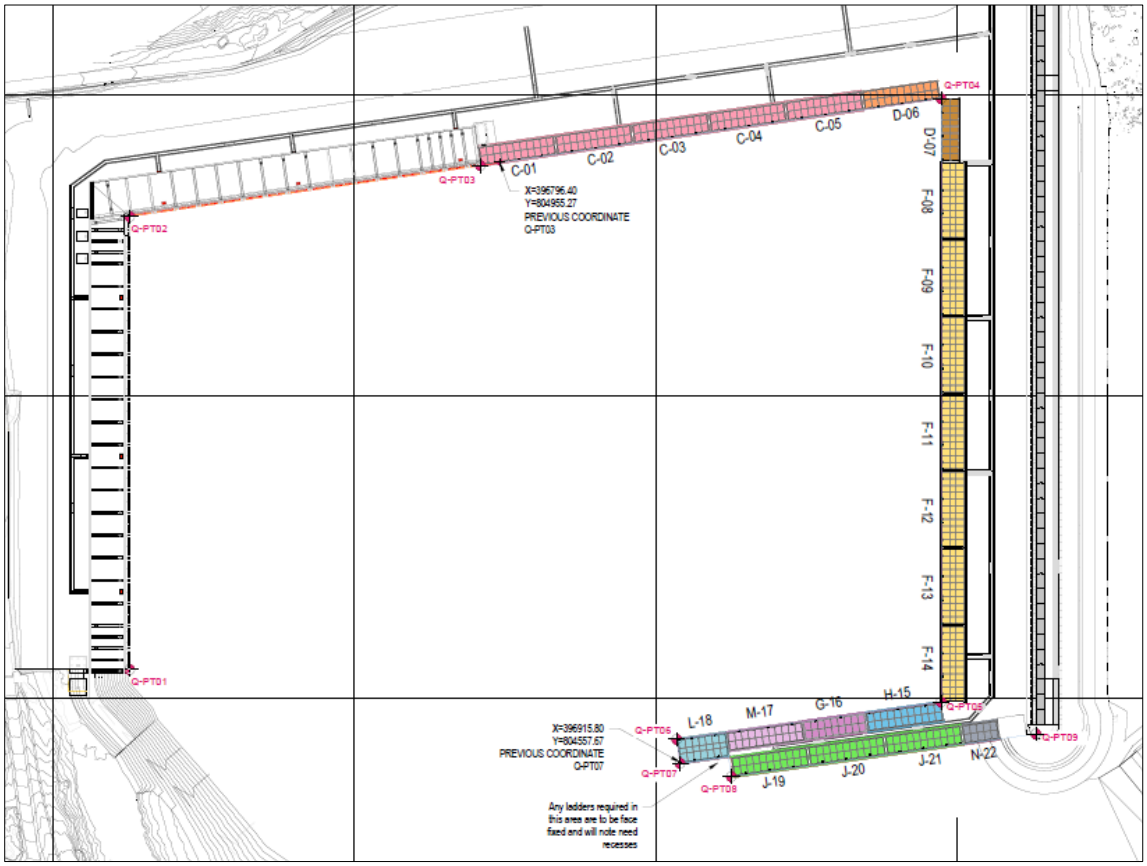

Figure 16 - Closed and Open Quay General Arrangement (North top of page)

5.4.1 Closed Quay

The closed quay will be formed by 22 concrete caissons. These vary in dimensions to reflect specific loads and harbour characteristics they must represent when placed. A caisson 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.

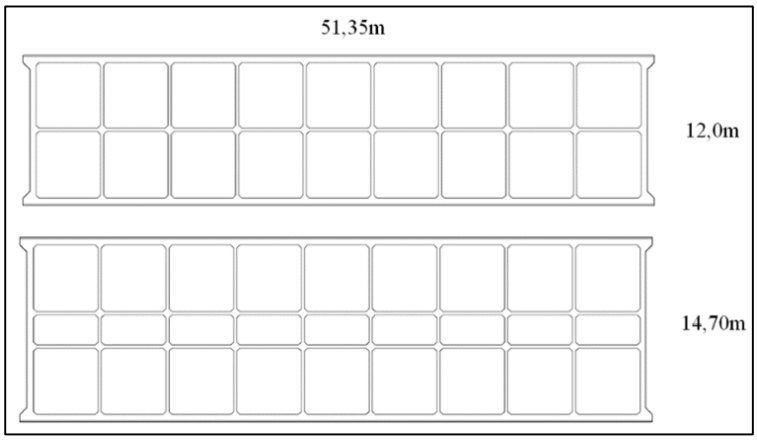

Figure 17 - General caisson arrangement

5.4.2 Towage to UK

The caissons have been delivered to the UK in groups of seven to eight on a semi-submersible vessel (Figure 18). A total of 22no caissons have been delivered. The caissons were shipped directly to Scotland (observing acceptable weather conditions) where they were grouped with mooring lines for storage and later towage to site (see section 5.4.3). The total of 22no caissons were unloaded and temporary stored in Cromarty.

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

Figure 18 - Submersible vessel (indicative)

5.4.3 Towage to Site

Towage to site will be completed by tug boat. 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 and installed immediately in their final locations.

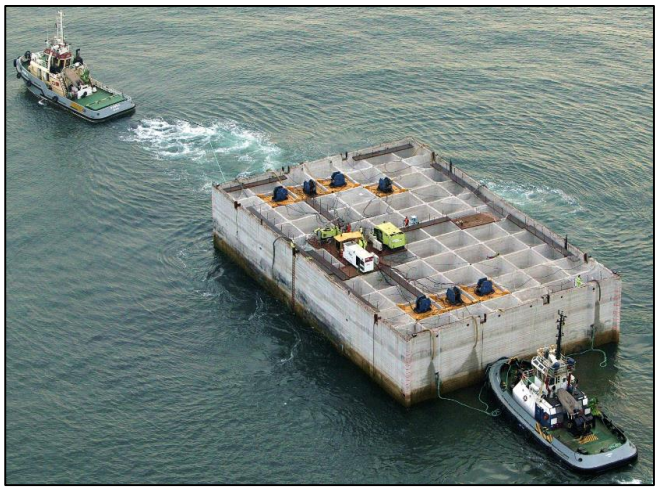

Figure 19 – Towage of Caissons to site (indicative)

5.4.4 Caisson Embankment (Final Location Preparation)

Prior to positioning the caissons on site the dredging activities documented in section 5.3 have been done to 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*).

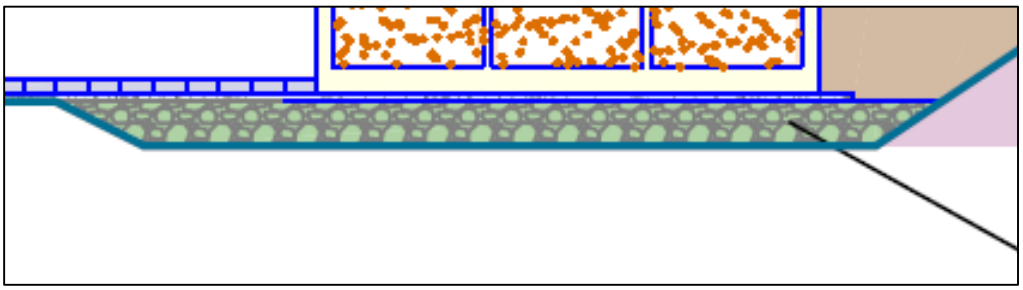

Figure 20 – Caisson and sea bed interaction

Layers of rock and bedding have been installed by a marine vessel outfitted with an excavator, crane mounted grab or conveyor system which is manoeuvrable in all directions to place the material to precise accuracy (Figure 21).

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 and scour protection placement

The sinking of caissons in their final position and mooring with anchors, 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 materials and rock material and various items of plant. A spud pontoon or other vessel loaded with a crane/excavator/conveyor/grab 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 or other equipment 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. 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. It is also possible to transfer materials by conveyor

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.
On completion of the caisson installation, quarry supplied stone, proprietary scour mattresses and in situ underwater concrete will be placed at the outside edges on the caisson to prevent material being washed out from caisson footprint.

5.4.6 Quay Transition Structures

There are two transition structures to be formed. One will be between the north open and closed quays and the other will be between the South East Pier and the North breakwater.

The transition structure will be composed by a number of precast concrete units (2.0m x 2.0m x 2.3m) as shown in (Figure 22) and (Figure 23). These units will then be arranged in a closed box-like form and backfilled with concrete (Figure 24). This enclosed boxes will be built up in 6no levels up to +5.8m ACD approx.

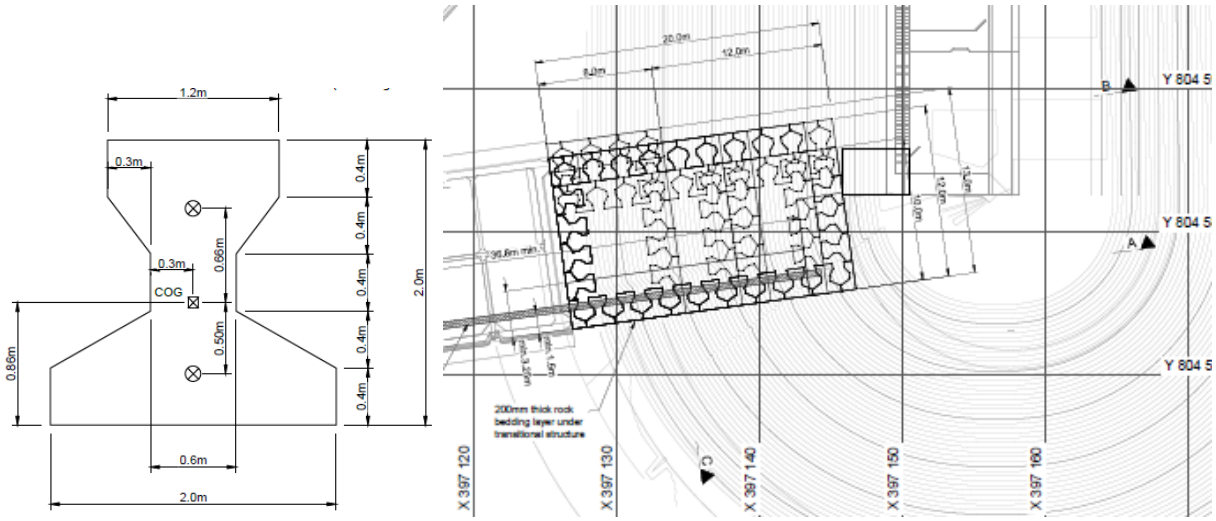

Figure 22 – Precast Concrete Units and Proposed Transition Structure Arrangement

This element of work will involve pouring underwater concrete (concrete class C25/30) as part of the backfill operations within the precast units. It is expected that the concrete pour will be filled half way on each level meaning that construction joints (as shown in Figure 23 below) with the transition structure are expected to be formed during this process.

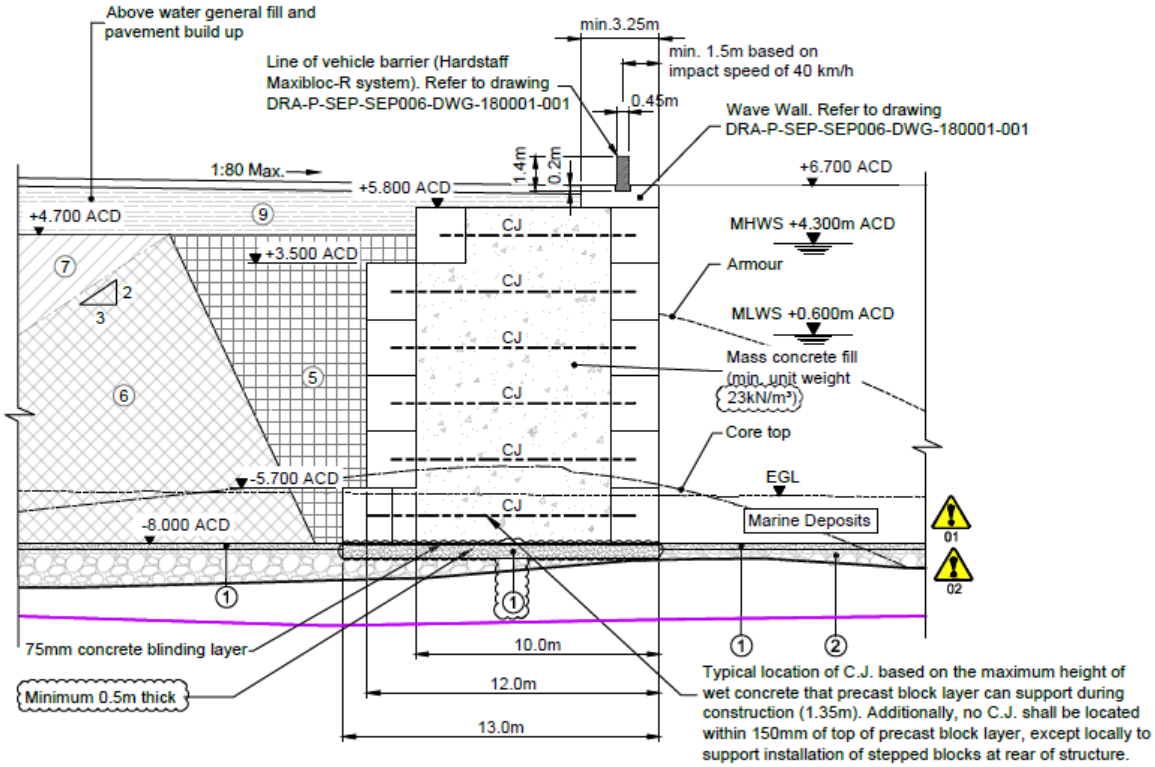

Figure 23 –Transition Structure at North breakwater showing Construction Joints

Figure 24 – Precast Concrete Units section underwater and layers above water

5.4.7 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. A piling platform along the open quay will be built to facilitate piling. This platform will be a width of 15 metres.

Figure 25 – Open Quay Details

5.4.7.1 Installation of Rotary Piles

The piling platform has been created, the piles behave been installed using a rotary bored cast-in-situ concrete method (please see Piling Management Plan for detailed information). The process is 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 would be necessary 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

5.4.7.2 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 equipment will be mobilised. The revetment also extends round the south west corner of the southern shore

The excavated surface will then be protected with an initial filter layer, installed using a land and marine based excavator and/or a rock skip/tray suspended from a crane. The primary

layer is placed over the initial filter using an excavator and/or a grab suspended from a crane capable of placing 1000-3000kg rock (Figure 26).

Figure 26 – Methods of rock placement

5.4.7.3 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 27).

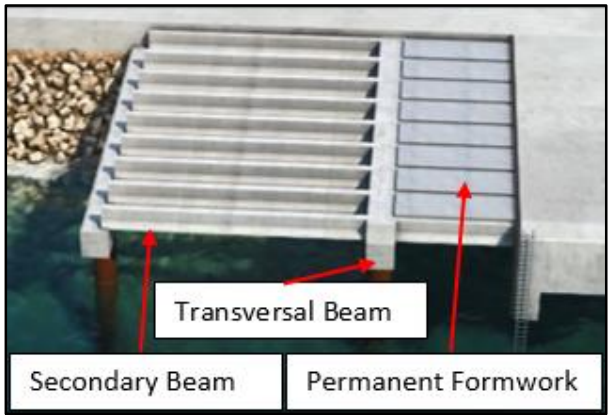

Figure 27 – Open Quay Beam Arrangement

5.4.8 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.

5.4.9 Reclamation

Reclamation activities will be carried out by one of two methods, either importing quarry material or using suitable site won material.

5.4.10 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.

5.4.11 Reclamation Using Locally Dredged Material

Where the preference is to use locally dredged material, a dredger 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 compaction techniques..

Figure 28 - Pumping ashore via pipeline system (Van Oord Costa Dorada)

5.4.12 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 manner which will be finished and controlled by specialised items of plant (Figure 29). The plant will be guided, with expansion and crack joints introduced by road saws at later dates.

Figure 29 – Pavement construction activities

5.4.13 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.

5.4.14 Service Trenches

Service trenches are provided to distribute piped services to moored vessels via bunkering pits around the quay as required by AHB.

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.

5.4.15 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.

5.4.16 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.

5.4.17 Electrical Supply Distribution

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

5.4.18 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

5.4.19 Weighbridges

Provision of 2 weighbridges will be made in accordance with AHB requirements.

5.4.20 Harbour Buildings

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

APPENDIX 1 A, B AND C – COMPOUNDS AREAS LAYOUT

A1

N

Welfare

Offices

Control Point
North Breakwater

Existing Marine Scotland Intake

WEST QUAY

St Fitticks Community Park

Grave Yard

Skateboard Park

Playground

Nigg Wastewater Treatment Plant

Do not scale

Notes:

KEY:

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- EXISTING PUBLIC ROAD
- ROAD DIVERSIONS
- NORTH BREAKWATER ACCESS

Drawing Status:

FOR INFORMATION ONLY
NOT VALID FOR CONSTRUCTION

Issue	Date	By	Chkd	Appd
13	04/05/18	TWC	CW	CW
	Layout Updated			
12	13/02/18	TWC	ROL	ROL
	Layout Updated			
11	12/12/17	TWC	ROL	ROL
	Layout Updated			
10	20/11/17	CW	MEG	MEG
	Layout Updated			
9	01/11/17	TWC	MEG	MEG
	Layout Updated			
8	11/09/17	TWC	MEG	MEG
	Layout Updated			
7	11/07/17	TWC	MEG	MEG
	Layout Updated			
6	02/05/17	TWC	MEG	ACO
	Layout Updated			
5	06/04/17	TWC	MEG	ACO
	Layout Updated			
4	21/02/17	TWC	MEG	ACO
	Layout Updated To ARUP Design			
3	09/02/17	TWC	ACO	ACO
	Layout Updated			
2	26/01/17	TWC	ACO	ACO
	Visitor Center Dims Updated			
1	20/01/17	TWC	ACO	ACO
	Site Layout			

DRAGADOS

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St Fitticks Road
Nigg BayAberdeen
AB11 8TN
Tel: +44 (0) 1224 439980

Client

Aberdeen Harbour

Job Title

Aberdeen Harbour
Expansion Project

Central Compound

Scale at A1 1:1000 @ A1

Discipline Civil Engineering

Drawing Status **For Information Only**

Drawing No **AHEP-DRA-SKE-0003-001**

Issue **13**

A1

N

Grayhope Bay Carpark

Car Park

Visitor Center Access

Visitor Center

Balnagask Golf Course

Walker Park

NORTH QUAY

GREYHOPE ROAD

Coastal Slope

Shingle

Stone

Boulders and Shingle

Rain Gauge

Sundial

Girdle Ness Lighthouse
(flashing white)

Tank

Tanks

Mast

Seabreeze Cottage

ESS

Fog Siren

Outfall

CH
640.000m

CH
600.000m

CH
500.000m

0%

1%

0+200

0+300

0+400

0+500

0+600

0+640.918

Do not scale

Notes:

KEY:

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- GIRDLENESS SEWER
- EXISTING PUBLIC ROAD
- NORTH BREAKWATER ACCESS

Drawing Status:

FOR INFORMATION ONLY
NOT VALID FOR CONSTRUCTION

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	Layout Updated			
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	Layout Updated			
4	21/02/17	TWC	MEG	ACO
	Layout Updated To ARUP Design			
3	09/02/17	TWC	ACO	ACO
	Layout Updated			
2	26/01/17	TWC	ACO	ACO
	Visitor Center Dims Updated			
1	20/01/17	TWC	ACO	ACO
	Site Layout			

DRAGADOS

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Client

Aberdeen Harbour

Job Title

Aberdeen Harbour
Expansion Project

North Compound

Scale at A1: 1:1000 @ A1

Discipline: Civil Engineering

Drawing Status

Issued For Information

Drawing No: **AHEP-DRA-SKE-0002-001**

Issue: **7**

A1

Aggregate Delivery & Plant Access
Wheel Wash
Fabrication Shed
Aggregate Storage
Batching Plant
Welfare
Lab
Water tanks
Pond 1
Pond 2
Pond 3
Marine Scotland Proposed Pump House Location
CH 600.000m
CH 618.000m
Communications Masts
Gregness Coastguard Station
Doonies Hill
36.8m
Coastal Slope
Rock
Shingle
Boulders and Shingle
As Built Toe Line
Path (Um)
MP 238.5

Notes:

KEY:

- HRO BOUNDARY
- TEMP. LEASE BOUNDARY
- EXISTING PUBLIC ROAD
- PROPOSED MARINE SCOTLAND INTAKE

Drawing Status:

FOR INFORMATION ONLY
NOT VALID FOR CONSTRUCTION

Issue	Date	By	Chkd	Appd
11	04/05/18	TWC	CW	CW
Layout Updated				
10	09/02/18	CW	ROL	ROL
Pond Locations Added				
9	12/12/17	TWC	ROL	ROL
Layout Updated				
8	11/09/17	TWC	MEG	MEG
Layout Updated				
7	11/07/17	TWC	MEG	MEG
Layout Updated				
6	02/05/17	TWC	MEG	ACO
Layout Updated				
5	06/04/17	TWC	MEG	ACO
Layout Updated				
4	21/02/17	TWC	MEG	ACO
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Visitor Center Dims Updated				
1	20/01/17	TWC	ACO	ACO
Site Layout				

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AB12 3BG
Tel: +44 (0) 1224 439980

Client: Aberdeen Harbour

Job Title: Aberdeen Harbour Expansion Project

South Compound

Scale at A1: 1:1000 @ A1

Discipline: Civil Engineering

Drawing Status: **For Information Only**

Drawing No: **AHEP-DRA-SKE-0004-001**

Issue: **11**

Do not scale

APPENDIX 2 – ROAD WORKS LAYOUT

A0

N

Live Road

Tie in to St Fittick's Road.

Forward visibility is obstructed by proposed Harbour Car Park and carriageway widening provided at bend does not comply with TD 42/95. A Departure from Standard will be submitted for this location (See Note 11)

Junction visibility to the left is obstructed by proposed Harbour Car Park. A Departure from Standard will be submitted for this location (See Note 11)

Buried Services

Buried Services

Buried Services

Grave Yard

St Fittick's Church (remains of)

Proposed Harbour Car Park

Harbour car park fence: refer to drawing NBY:ARP:□□:XX:DR:CH:1701 for details.

Proposed bus turning loop and taxi drop off. Bus shelter to be a Commutaports Cairngorm Standard Glazed Roof Shelter. Refer to note 10 for details.

Existing maintenance access to St Fittick's Park to be retained. Gate set back from the carriageway to accommodate one vehicle in the access without obstructing the carriageway.

Proposed junction to harbour expansion.

Realigned St Fitticks / Coast Road

Park

Buried Services

Invasive Species

Buried Services

Security Fence (2.4m minimum height)

Proposed Gatehouse.

Pedestrian turnstile and gate.

Proposed islands situated to prevent HGV access to and from the harbour expansion from Torry.

Security Fence (2.4m minimum height)

Proposed coach gate.

Security Fence (2.4m minimum height)

Retaining wall location in abeyance until quay levels confirmed

Buried Services

Watercourse

Refer to Inset A

Refer to Inset A

Tie in to Coast Road.

Tie into quay surface

Realigned Greyhope Road

Refer to drawing NBY:ARP:□□:XX:DR:CH:1401 for proposed road restraint system details.

Security Fence (2.4m minimum height)

Proposed 127m horizontal radius is 5 steps below desirable minimum. A Departure from Standard will be submitted for this location (See Note 11)

Existing layby of Greyhope Road to be enhanced to accommodate three cars.

Coastal Slope

Buried Services

Buried Services

Tie in to Greyhope Road.

Sloping masonry

Boulders and Scattered Rock

Proposed Harbour Extension

GREYHOPE ROAD

Boulders and Scattered Rock

Mean High Water Springs

Retaining wall location in abeyance until quay levels confirmed

Live Road

Watercourse

Refer to Inset A

Refer to Inset A

Tie in to Coast Road.

Retaining wall location in abeyance until quay levels confirmed

Retaining wall location in abeyance until quay levels confirmed

Refer to drawing NBY:ARP:□□:XX:DR:CH:1401 for proposed road restraint system details.

Refer to drawing NBY:ARP:□□:XX:DR:CH:1103 & 1104 for footpath / cyclepath layout.

El Sub Sta

Inset A

Notes

1. All dimensions are in metres unless stated otherwise.
2. Refer to drawing NBY:ARP:□□:XX:DR:CH:1121 for Longitudinal Sections.
3. Refer to drawings NBY:ARP:□□:XX:DR:CH:1131 to NBY:ARP:□□:XX:DR:CH:1133 for cross sections.
4. Refer to drawing NBY:ARP:□□:XX:DR:CH:1102 and NBY:ARP:□□:XX:DR:CH:1104 for proposed foot/cyclepath layout.
5. Refer to drawing NBY:ARP:□□:XX:DR:CH:1501 for the drainage layout.
6. Refer to drawing NBY:ARP:□□:XX:DR:CH:1701 to NBY:ARP:□□:XX:DR:CH:1707 for the engineering construction layouts.
7. Refer to drawing NBY:ARP:□□:XX:DR:CH:1801 for Adoptable Areas.
8. Refer to drawing NBY:ARP:□□:XX:DR:CH:2201 for road markings and signage layout.
9. Earthworks slopes to be lined with a 150mm seeded topsoil layer.
10. Bus Shelter to be Commutaports Cairngorm standard glazed roof shelter with aluminium frame: mid rails: full side information panel with backing plate and tablet bracket all powder coated dark green to colour reference RAL 6005 with a single bar perch seat to be powder coated yellow. The shelter dimensions are to be 3.2 metres x 1.3 metres and for a fully enclosed shelter it shall be positioned a minimum of 300mm from the rear of the footway and 600mm from the kerb edge.
11. A Departure from Standard application will be submitted to ACC for Greyhope Road which will outline the justification and appropriate mitigation measures for each Departure.

Legend

Retaining Wall

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

CONSTRUCTION PHASE

1. PLEASE REFER TO THE HA: ARD RISK REGISTER AND THE WORKS INFORMATION FOR DETAILS OF THE RISKS ASSOCIATED WITH THIS WORK.
2. IN PREPARATION OF CONSTRUCTION METHOD STATEMENTS CONSIDERATION SHOULD BE GIVEN TO THE CLOSE PROXIMITY OF ANY STRUCTURES THAT MAY BE AFFECTED BY CONSTRUCTION.
3. RESIDUAL HA: ARDS ARE LISTED HERE AND REFERENCED ON THE DRAWING.
   - 3.1 PRESENCE OF SIGNIFICANT STATUTORY UNDERTAKERS APPARATUS.
   - 3.1a EXISTING ELECTRIC AND COMMS IN WESTERN VERGE OF COAST ROAD. WATER IN EASTERN VERGE OF COAST ROAD. EXISTING ELECTRIC IN EASTERN AND WESTERN VERGES OF GREYHOPE ROAD. WATER IN WESTERN VERGE OF GREYHOPE ROAD.
   - 3.1b PRESENCE OF INVASIVE SPECIES IN WESTERN VERGE OF ST FITTICK'S ROAD ADJACENT TO GREYHOPE ROAD JUNCTION. REFER TO ENVIRONMENTAL MANAGEMENT PLAN FOR DETAILS OF TREATMENT.
   - 3.1c COMBINED SEWER LOCATED IN EASTERN VERGE OF COAST ROAD.
   - 3.1D GIRDLENESS SEWER CROSSES UNDER ST FITTICK'S ROAD AND CONTINUES IN WESTERN VERGE OF EXISTING GREYHOPE ROAD.
4. WORKS ADJACENT THE COASTAL SLOPE ON GREYHOPE ROAD. CONFINED WORKING WIDTH AND SEVERE FALL HA: ARD DUE TO STEEP SLOPE.
5. WORKING ADJACENT TO THE TULLUS BURN WATERCOURSE. RISK OF FALLS AND DROWNING DUE TO PRESENCE OF WATERCOURSE.
6. THE CONTRACTOR SHALL REFER TO STATUTORY UNDERTAKERS LAYOUT DRAWINGS AND IDENTIFY LOCATIONS OF EXISTING UNDERGROUND SERVICES PRIOR TO CARRYING OUT EXCAVATION WORKS.

ROAD CONSTRUCTION CONSENT

THIS IS THE DRAWING REFERRED TO IN THE APPLICATION

SIGNED _____

DATE 28/07/17

Rev	Date	By	Chkd	Appd
A3	28/07/17	ML	BHM	FM
	Issued for Approval			
I2	02/06/17	ML	BHM	FM
	Issued for Information			
A2	25/11/16	ML	BHM	JG
	Location of Departures from Standard added to drawing			
A1	11/11/16	ML	BHM	JG
	Issued for Approval			
I1	31/10/16	ML	BHM	JG
	Issued for Information			

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Client

DRAGADOS

Project Title

Aberdeen Harbour Expansion Project

Drawing Title

Road Layout

Scale at A0 1:500

Role Civil Highways

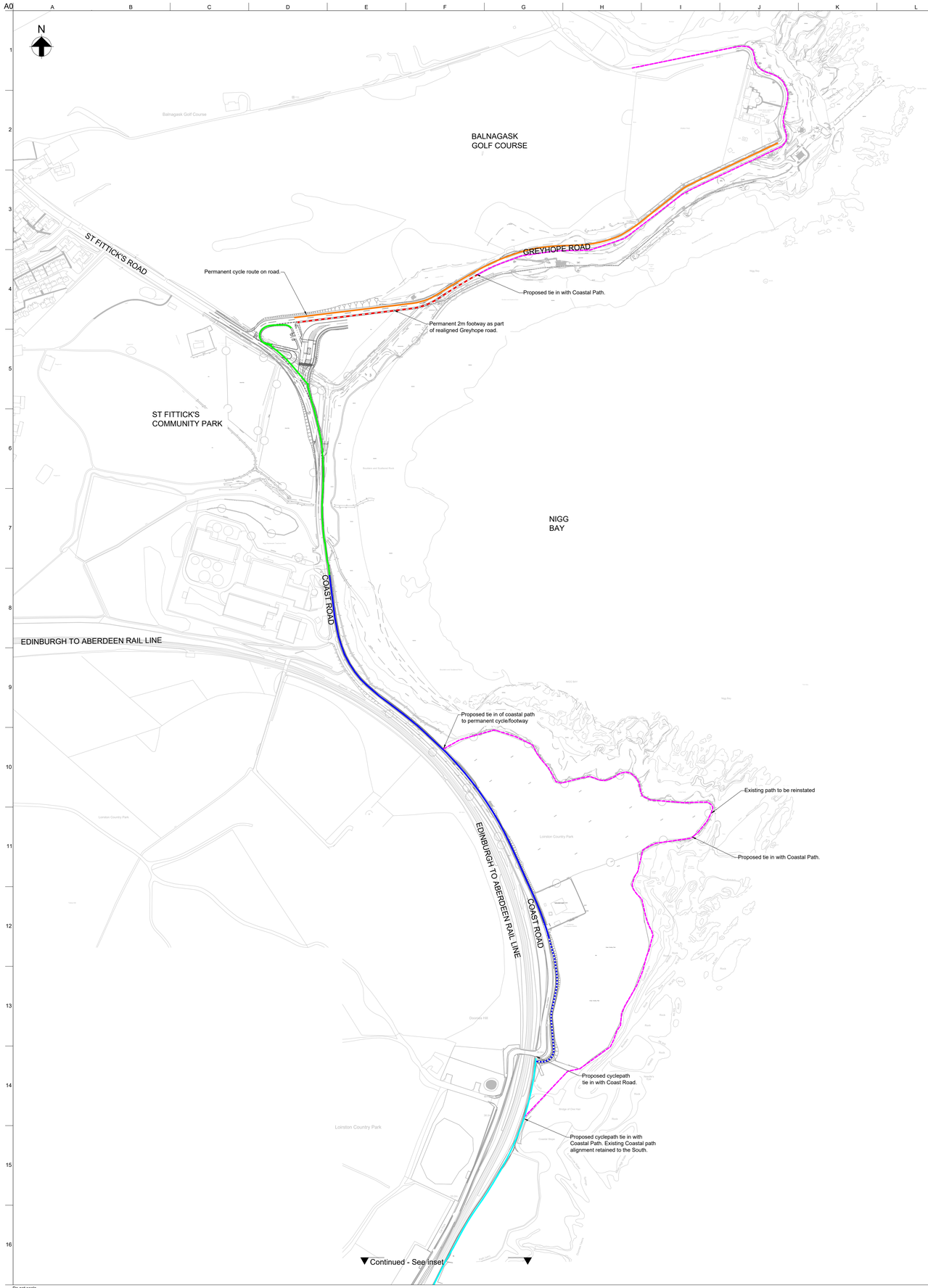
Suitability **S4 - For Approval**

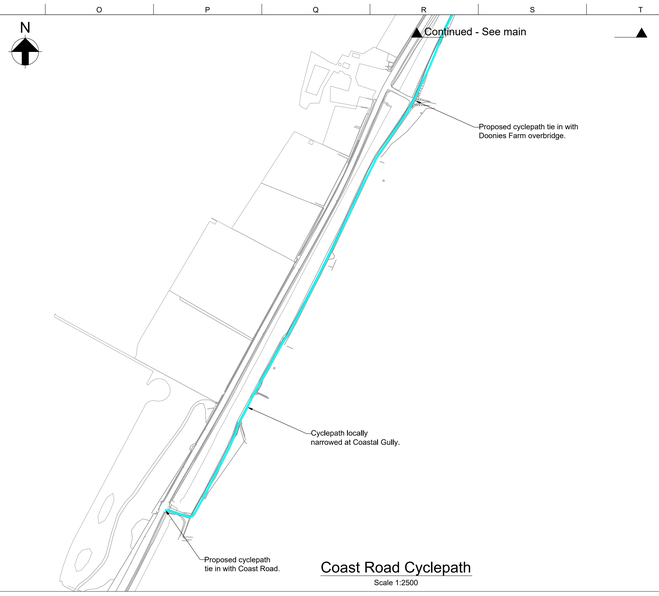
Arup Job No **247468-00**

Rev **A3**

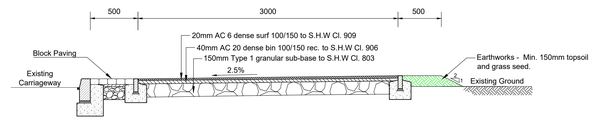
Name **NBY-ARP-ZZ-XX-DR-CH-1101**

Do not scale

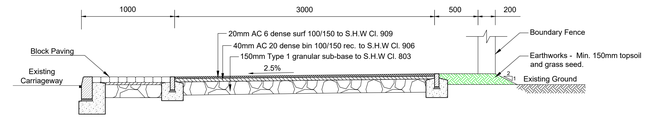




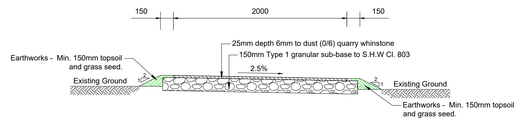
Coast Road Cyclepath
Scale 1:2500



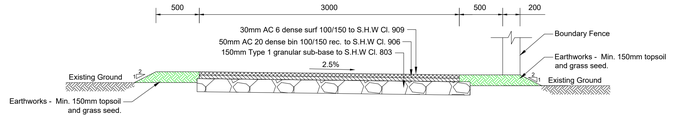
Detail A - Footway/Cycleway Construction Detail
Scale 1:25



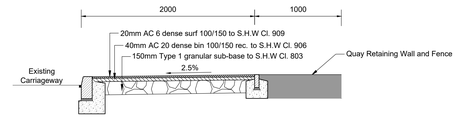
Detail B - Footway/Cycleway Construction Detail
Scale 1:25



Detail C - Footpath/ Cyclepath Construction Detail
Scale 1:25



Detail D - Footpath/Cyclepath Construction Detail
Coastguard Section
Scale 1:25



Detail E - Permanent Coastal Path Construction Detail
(Adjacent to Carriageway)
Scale 1:25

Notes

1. All dimensions are in metres unless stated otherwise.
2. Refer to drawing NBY-ARP-ZZ-XX-DR-CH-1003 for the temporary re-routing of the costal path during construction.
3. Refer to drawing NBY-ARP-ZZ-XX-DR-CH-1101 for the proposed road layout.

Legend

- Existing Coastal Path to be Retained
- Permanent Cycle Route (On Road)
- Permanent Cycle Route (Adjacent to Carriageway - Detail A)
- Permanent Cycle Route / Coastal Path (Adjacent to Carriageway - Detail B)
- Permanent Coast Road Footpath/Cyclepath (Remote from Carriageway - Detail C)
- Permanent Coastal Path (Remote from Carriageway - Detail D)
- Permanent Coastal Path (Adjacent to Carriageway - Detail E)

Rev	Date	By	Chkd	Appd
A5	10 /04/17	ML	FM	FM
	Route and Sections Amended			
A4	16 /02/17	ML	JG	JG
	Routes and Details Amended			
A3	15 /02/17	ML	BHM	JG
	Routes Amended			
A2	20 /12/16	ML	BHM	JG
	Footway detail added			
A1	11 /11/16	ML	BHM	JG
	Issued for Approval			
I1	31 /10/16	ML	BHM	JG
	Issued for Information			

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Client
DRAGADOS

Project Title
Aberdeen Harbour
Expansion Project

Drawing Title
Re-routing of Coastal Path After
Harbour Expansion

Scale at A0 1:2500
Role Civil - Highways
Suitability **S4 - For Approval**
Arup Job No **247468-00**
Rev **A5**
Name **NBY-ARP-ZZ-XX-DR-CH-1004**

APPENDIX 3 – PROGRAMME

DRAGADOS

AHEP - Rev11.5 - Streamline

ID	Unique ID	Task Name	Start	Finish	Duration
0	**0**	**AHEP-DRA-PRG-0001 Rev 11.5 - ISSUED FOR ACCEPTANCE**	**11/05/16**	**28/12/21**	**1470 d**
1	**20**	**Milestones**	**01/08/16**	**28/12/21**	**1350 d**
8	17	Completion of Works - Site demobilisation / Reinstatement Works - Global completion Phase 2	28/12/21	28/12/21	0 d
10	18	Planned completion date	28/12/21	28/12/21	0 d
2383	**1734**	**Pre-Construction / Enabling Works**	**01/08/16**	**03/11/20**	**1059.88 d**
2456	**1793**	**Intake, Outlet and Utility Diversions**	**20/12/16**	**03/11/20**	**958.88 d**
2457	**1794**	**Buried Services**	**20/12/16**	**21/12/19**	**745 d**
2461	**1800**	**Scottish and Southern Energy**	**22/02/17**	**21/12/19**	**707 d**
2474	**1817**	**United Fish Industries Outfall**	**26/02/18**	**03/11/20**	**670.88 d**
2480	**1821**	**UFI Outfall Installation of Bypass System**	**04/07/19**	**23/04/20**	**199 d**
2488	**1835**	**UFI Outfall Installation of Permanent System**	**10/03/20**	**06/04/20**	**20 d**
2496	**1843**	**UFI Outfall Permanent Diversion**	**13/01/20**	**03/11/20**	**207.88 d**
2500	**1847**	**East Tullos Burn - Culverts**	**02/08/18**	**11/05/20**	**437 d**
2509	**1856**	**Marine Scotland intake**	**01/08/16**	**25/09/20**	**1032.88 d**
2510	**1857**	**Marine Scotland Intake (Temporary Solution)**	**01/08/16**	**25/09/20**	**1032.88 d**
2524	7497	Marine Scotland Intake (Temporary Solution) - Dismantelling	23/09/20	25/09/20	2 d
2525	**1864**	**Marine Scotland Intake (Permanent Solution)**	**13/09/19**	**23/09/20**	**254.88 d**
2526	9390	MS Intake (Permanent Solution) - Construction - Well installation	13/09/19	17/10/19	25 d
2527	4410	MS Intake (Permanent Solution) - Construction - Intake Chamber Installation	22/10/19	11/11/19	15 d
2528	4411	MS Intake (Permanent Solution) - Construction - Pumphouse Civil Works	05/11/19	05/02/20	57 d
2529	4412	MS Intake (Permanent Solution) - Construction - Pipework Installation	05/11/19	27/01/20	50 d
2530	4413	MS Intake (Permanent Solution) - Construction - Installation of Pumps and Screens	23/01/20	19/02/20	20 d
2531	4414	Marine Scotland Intake (Permanent Solution) - Commissioning	13/02/20	11/03/20	20 d
2532	8025	Marine Scotland Intake (Permanent Solution) - MS Handover & Acceptance	16/09/20	23/09/20	5 d
2533	**2617**	**Marine Scotland Intake (Existing Facility)**	**15/04/19**	**13/03/20**	**226 d**
2536	4419	Marine Scotland Intake (Existing Pumphouse) - Dismantelling of Intake Screens	12/03/20	13/03/20	2 d
2537	**1871**	**Girdle Ness Sewer (Scottish Water)**	**17/11/16**	**23/01/20**	**783 d**
2542	**1877**	**Girdle Ness Sewer Works**	**30/08/19**	**23/01/20**	**95 d**
2543	1879	Girdle Ness Sewer - Produce and approve MS / RA for sewer works	30/08/19	14/11/19	55 d
2544	1885	Girdle Ness Sewer - Works on sewer	15/11/19	23/01/20	40 d
2695	**2011**	**Construction**	**31/05/17**	**28/12/21**	**1144 d**
2713	**1949**	**Road realignment at Saint Fitticks Junction**	**22/11/17**	**15/10/20**	**717 d**
2714	**4227**	**St. Fitticks Jn. Realignment - Greyhope Road**	**22/11/17**	**15/10/20**	**864 d**
2726	**8196**	**Greyhope Road retaining wall area**	**16/03/20**	**17/06/20**	**68 d**
2727	**8301**	**Greyhope Road retaining wall - Section 1**	**16/03/20**	**21/05/20**	**49 d**
2739	**8208**	**Greyhope Road retaining wall - Section 2**	**09/04/20**	**01/06/20**	**38 d**
2751	**8220**	**Greyhope Road retaining wall - Section 3**	**20/04/20**	**09/06/20**	**37 d**
2763	**8232**	**Greyhope Road retaining wall - Section 4**	**28/04/20**	**17/06/20**	**37 d**
2775	**4868**	**Greyhope Rd. realignment at St. Fitticks Jn - Civil works after retaining wall (inc. utilities)**	**29/05/20**	**15/10/20**	**100 d**
2789	**4268**	**St. Fitticks Jn. Realignment - Saint Fitticks Road**	**18/03/19**	**16/03/20**	**296.88 d**
2790	**8303**	**St Fitticks Phase 1 (Global)**	**18/03/19**	**15/03/20**	**260 d**
2821	**8305**	**St Fitticks Phase 1b South Tie in**	**01/08/19**	**18/10/19**	**57 d**
2834	**8314**	**St Fitticks Phase 3a South Tie in (Retaining wall area)**	**21/10/19**	**16/03/20**	**105.88 d**
2858	**8307**	**St Fitticks Phase 3b North Tie in**	**20/01/20**	**16/03/20**	**40.88 d**
2874	**2036**	**Auxiliary works for harbour construction**	**25/07/17**	**02/06/21**	**959 d**
2875	**2037**	**Armour and Precast Production**	**25/07/17**	**02/06/21**	**959 d**
2880	9361	Accropodes Production - from Carousel - 2019 Season - Production 3	02/09/19	08/10/19	27 d
2881	9362	Accropodes Production - from Carousel - 2020 Season - Production 1	01/04/20	27/05/20	38 d
2882	9360	Accropodes Production - from Carousel - 2020 Season - Production 2	28/05/20	26/08/20	64 d
2883	2421	Accropodes Production - from Carousel - 2020 Season - Production 3	27/08/20	10/09/20	11 d
2890	**9368**	**Caisson temporary placement at Nigg Bay**	**05/09/19**	**16/11/19**	**73 d**
2891	9369	Construction of Temporary Bedding	05/09/19	02/10/19	28 d
2892	9367	Caisson C2 temporary Sinking in Nigg Bay (weather depending)	19/10/19	19/10/19	1 d
2893	9370	Caisson C1 temporary Sinking in Nigg Bay (weather depending)	16/11/19	16/11/19	1 d
2894	**2064**	**Dredging & Rock Removal**	**04/09/17**	**11/02/21**	**854.88 d**

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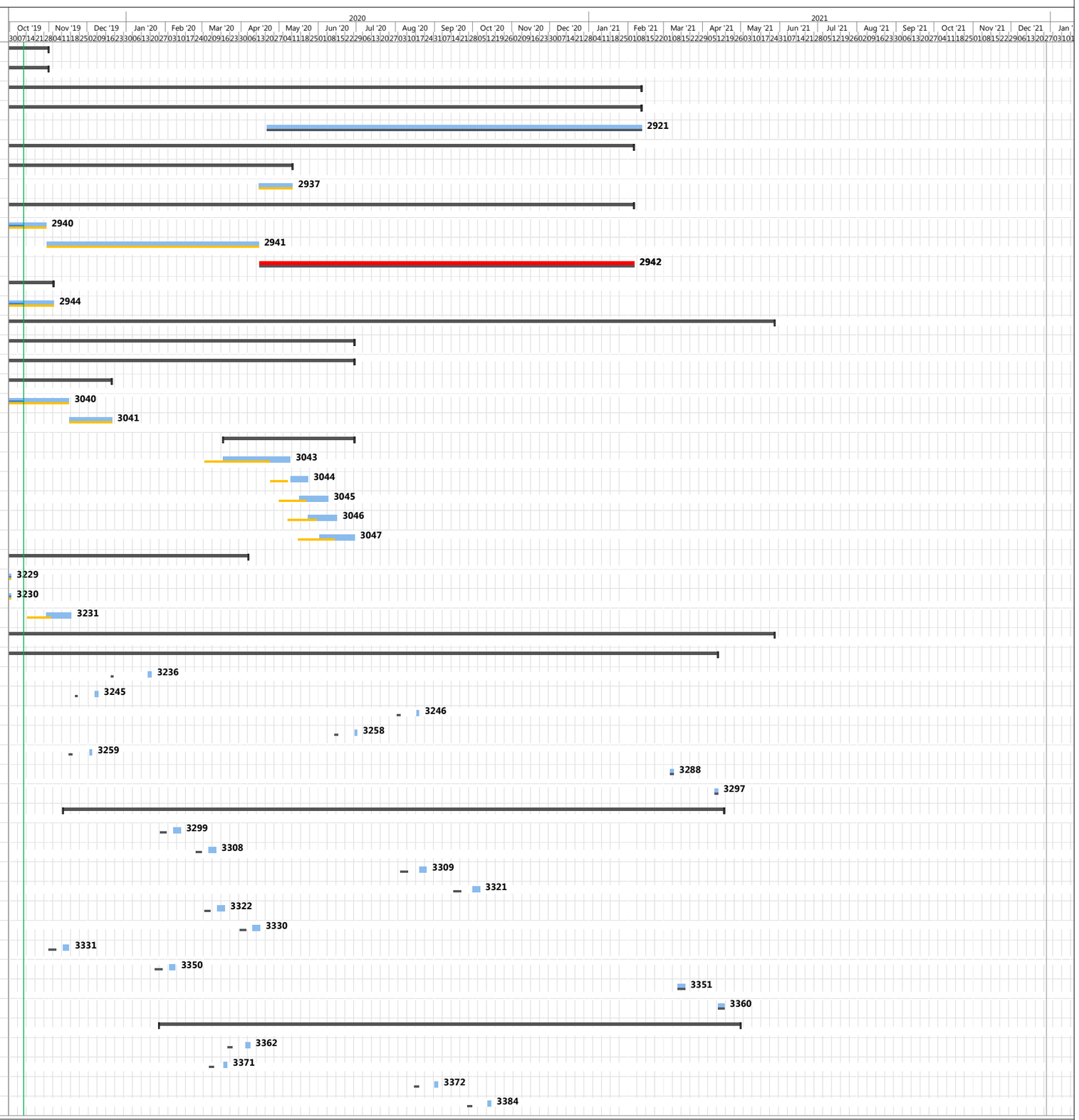
AHEP - Rev11.5 - Streamline

ID	Unique ID	Task Name	Start	Finish	Duration
2895	**2072**	**Dredging**	**04/09/17**	**31/10/19**	**537.88 d**
2907	**2556**	**Dredging - Third season**	**20/05/19**	**31/10/19**	**116.88 d**
2915	**2065**	**Rock Removal - Land works**	**13/09/18**	**11/02/21**	**599.88 d**
2919	**8977**	**Rock Removal - Land works - Southern Shores**	**17/04/19**	**11/02/21**	**476.88 d**
2921	9397	Land D&B at Southern Shores	21/04/20	11/02/21	297 d
2922	**2069**	**Marine Rock Removal**	**20/08/18**	**05/02/21**	**613 d**
2934	**8980**	**Rock removal by marine means - SBW deep trench**	**29/01/19**	**11/05/20**	**334.88 d**
2937	9648	Marine D&B - SBW trenches (pending on physical model conclusions)	15/04/20	11/05/20	27 d
2938	**8981**	**Rock Removal - Marine works - Southern Area**	**09/08/19**	**05/02/21**	**390.88 d**
2940	9319	Ripping at Southern Areas	12/08/19	29/10/19	79 d
2941	9318	Rock Removal at Southern Area by Trepano	30/10/19	14/04/20	168 d
2942	**2562**	**Marine D&B at Southern Shores - Blasting & dumping at SBW**	**15/04/20**	**05/02/21**	**297 d**
2943	**9345**	**Rock Removal - Marine Works - North Quay area**	**26/08/19**	**04/11/19**	**50 d**
2944	9344	Rock Removal by marine ripper at Open/Closed Quay transition area	26/08/19	04/11/19	60 d
2945	**2080**	**North Breakwater**	**31/05/17**	**27/05/21**	**995 d**
2959	**2093**	**North Breakwater - 1st Phase until Roundhead**	**06/03/18**	**29/06/20**	**574.88 d**
2972	**4039**	**North Breakwater - Land Works - 2nd Phase - Remedial works to damages caused by storm event(s) between Jan 2018 May 2018**	**06/07/18**	**29/06/20**	**516.88 d**
3039	**4874**	**North Breakwater - Land Works - Remedial works on 2017 slope - Phase 3**	**01/05/19**	**20/12/19**	**196 d**
3040	8423	North Breakwater - Land Works - Remedial works on 2017 slope (phase 3): from Ch 390 to 520	01/05/19	16/11/19	168 d
3041	9491	NBW - Remedial works on 2017 slope: Completion of protection for 2019-20 Winter period	16/11/19	20/12/19	28 d
3042	**9490**	**North Breakwater - Land Works - Remedial works on 2017 slope - Phase 4**	**17/03/20**	**29/06/20**	**74 d**
3043	9494	NBW - Remedial works from Ch 390 to 520 - Winter protection removal	17/03/20	09/05/20	44 d
3044	9493	NBW - Remedial works from Ch 390 to 520 - Re-profiling	09/05/20	23/05/20	12 d
3045	9492	NBW - Remedial works from Ch 390 to 520 - Trench excavation	16/05/20	08/06/20	18 d
3046	9495	NBW - Remedial works from Ch 390 to 520 - 44t block placement	23/05/20	15/06/20	18 d
3047	9489	NBW - Remedial works from Ch 390 to 520 - Accropode placement	01/06/20	29/06/20	24 d
3228	**9478**	**NBW 2019-2020 Winter Protection**	**06/09/19**	**06/04/20**	**151.88 d**
3229	9481	NBW 2019-20 Winter Protection - Installation of rock armour	06/09/19	01/10/19	22 d
3230	9479	NBW 2019-20 Winter Protection - Installation of Accropodes Ph1	12/09/19	01/10/19	17 d
3231	9498	NBW 2019-20 Winter Protection - Installation of Accropodes Ph2	29/10/19	18/11/19	17 d
3234	**7525**	**North Breakwater - 2nd Phase: Crown Wall**	**13/09/19**	**27/05/21**	**424.13 d**
3235	**8641**	**Blinding**	**13/09/19**	**12/04/21**	**411.13 d**
3236	8642	Blinding - From Ch.620 to Ch.610	18/01/20	20/01/20	2 d
3245	8651	Blinding - From Ch.530 to Ch.520	07/12/19	09/12/19	2 d
3246	8652	Blinding - From Ch.520 to Ch.510	17/08/20	19/08/20	2 d
3258	8664	Blinding - From Ch.400 to Ch.390	29/06/20	01/07/20	2 d
3259	8665	Blinding - From Ch.390 to Ch.380	03/12/19	04/12/19	2 d
3288	8694	Blinding - From Ch.100 to Ch.90	06/03/21	08/03/21	2 d
3297	8703	Blinding - From Ch.10 to Ch.0	10/04/21	12/04/21	2 d
3298	**8704**	**Foundation - Pours**	**12/11/19**	**17/04/21**	**374 d**
3299	8705	Foundation - From Ch.620 to Ch.610	07/02/20	12/02/20	5 d
3308	8714	Foundation - From Ch.530 to Ch.520	06/03/20	11/03/20	5 d
3309	8715	Foundation - From Ch.520 to Ch.510	19/08/20	25/08/20	5 d
3321	8727	Foundation - From Ch.400 to Ch.390	30/09/20	06/10/20	5 d
3322	8728	Foundation - From Ch.390 to Ch.380	13/03/20	18/03/20	5 d
3330	8736	Foundation - From Ch.310 to Ch.300	10/04/20	15/04/20	5 d
3331	8737	Foundation - From Ch.300 to Ch.290	12/11/19	16/11/19	5 d
3350	8756	Foundation - From Ch.110 to Ch.100	04/02/20	08/02/20	5 d
3351	8757	Foundation - From Ch.100 to Ch.90	12/03/21	17/03/21	5 d
3360	8766	Foundation - From Ch.10 to Ch.0	13/04/21	17/04/21	5 d
3361	**8780**	**Wall 1 - Pours**	**27/01/20**	**30/04/21**	**330 d**
3362	8781	Wall 1 - From Ch.620 to Ch.610	04/04/20	07/04/20	3 d
3371	8790	Wall 1 - From Ch.530 to Ch.520	18/03/20	20/03/20	3 d
3372	8791	Wall 1 - From Ch.520 to Ch.510	31/08/20	03/09/20	3 d
3384	8803	Wall 1 - From Ch.400 to Ch.390	12/10/20	15/10/20	3 d



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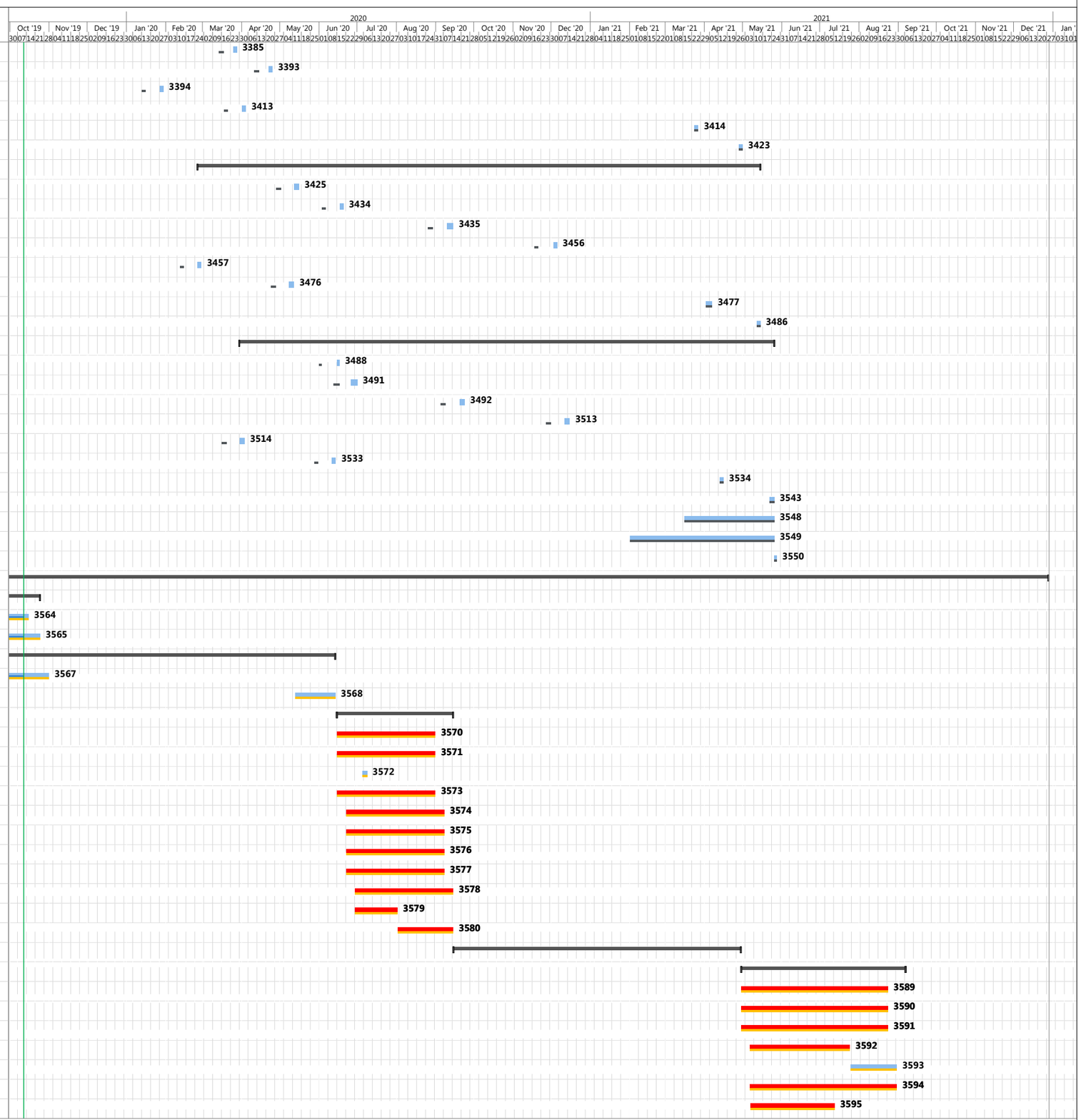
AHEP - Rev11.5 - Streamline

ID	Unique ID	Task Name	Start	Finish	Duration
3385	8804	Wall 1 - From Ch.390 to Ch.380	25/03/20	27/03/20	3 d
3393	8812	Wall 1 - From Ch.310 to Ch.300	22/04/20	24/04/20	3 d
3394	8813	Wall 1 - From Ch.300 to Ch.290	27/01/20	29/01/20	3 d
3413	8832	Wall 1 - From Ch.110 to Ch.100	01/04/20	03/04/20	3 d
3414	8833	Wall 1 - From Ch.100 to Ch.90	24/03/21	26/03/21	3 d
3423	8842	Wall 1 - From Ch.10 to Ch.0	28/04/21	30/04/21	3 d
3424	**8843**	**Wall 2 - Pours**	**26/02/20**	**14/05/21**	**318 d**
3425	9336	Wall 2 - From Ch.620 to Ch.610	12/05/20	15/05/20	4 d
3434	8847	Wall 2 - From Ch.530 to Ch.520	17/06/20	19/06/20	3 d
3435	8848	Wall 2 - From Ch.520 to Ch.510	09/09/20	14/09/20	4 d
3456	8869	Wall 2 - From Ch.310 to Ch.300	02/12/20	05/12/20	3 d
3457	8870	Wall 2 - From Ch.300 to Ch.290	26/02/20	28/02/20	3 d
3476	8889	Wall 2 - From Ch.110 to Ch.100	08/05/20	11/05/20	3 d
3477	8890	Wall 2 - From Ch.100 to Ch.90	02/04/21	06/04/21	4 d
3486	8899	Wall 2 - From Ch.10 to Ch.0	12/05/21	14/05/21	3 d
3487	**8900**	**Wall3 - Pours**	**30/03/20**	**25/05/21**	**351 d**
3488	8907	Wall 3 - From Ch.560 to Ch.550	15/06/20	16/06/20	2 d
3491	8910	Wall 3 - From Ch.530 to Ch.520	26/06/20	30/06/20	4 d
3492	8911	Wall 3 - From Ch.520 to Ch.510	19/09/20	23/09/20	3 d
3513	8932	Wall 3 - From Ch.310 to Ch.300	11/12/20	15/12/20	3 d
3514	8933	Wall 3 - From Ch.300 to Ch.290	30/03/20	02/04/20	4 d
3533	8952	Wall 3 - From Ch.110 to Ch.100	11/06/20	13/06/20	3 d
3534	8953	Wall 3 - From Ch.100 to Ch.90	13/04/21	15/04/21	3 d
3543	8962	Wall 3 - From Ch.10 to Ch.0	22/05/21	25/05/21	3 d
3548	7964	North Breakwater - Crownwall - Filter 1-3t	16/03/21	25/05/21	49 d
3549	7965	North Breakwater - Crownwall - Accropode II (8m3) (includes panel of SEP transition structure)	01/02/21	25/05/21	80 d
3550	7966	North Breakwater - Foundation block (Beacon)	26/05/21	27/05/21	2 d
3551	**2108**	**South Breakwater**	**26/06/18**	**28/12/21**	**878 d**
3562	**9190**	**SBW - 2019 Works**	**07/06/19**	**24/10/19**	**99.88 d**
3564	9192	SBW 2019 Land Works - Armour Rock placement - -4m to +6m - Ch600-540	13/07/19	15/10/19	95 d
3565	9649	SBW 2019 Marine Works - Core placement & Profiling	15/06/19	24/10/19	132 d
3566	**9413**	**SBW Winter Closure 2019-2020**	**23/09/19**	**13/06/20**	**190 d**
3567	9414	Winter Closure Construction at Ch540	23/09/19	31/10/19	39 d
3568	9415	Winter Closure Removal at Ch540	13/05/20	13/06/20	32 d
3569	**9416**	**SBW - 2020 Works**	**15/06/20**	**14/09/20**	**92 d**
3570	**9417**	**SBW 2020 Works - Core placement - Up to +6m - Ch540-300**	**15/06/20**	**31/08/20**	**78 d**
3571	**9418**	**SBW 2020 Works - Bedding - North - Ch540-300**	**15/06/20**	**31/08/20**	**78 d**
3572	9419	SBW 2020 Works - 2-5t Bedding - North - Ch540-300	05/07/20	08/07/20	4 d
3573	**9420**	**SBW 2020 Works - Bedding - South - Ch540-300**	**15/06/20**	**31/08/20**	**78 d**
3574	**9421**	**SBW 2020 Works - 2-5t Toe - North - Ch540-300**	**22/06/20**	**07/09/20**	**78 d**
3575	**9422**	**SBW 2020 Works - 3-6t Toe - South - Ch540-300**	**22/06/20**	**07/09/20**	**78 d**
3576	**9423**	**SBW 2020 Works - 1-3t Armour - North - Up to +6m - Ch540-300**	**22/06/20**	**07/09/20**	**78 d**
3577	9424	SBW 2020 Works - 2-5t Armour - South - Up to +6m - Ch540-300	22/06/20	07/09/20	78 d
3578	**9425**	**SBW 2020 Works - 8 m3 Accropodes - North Up to +6m - Ch540-300**	**29/06/20**	**14/09/20**	**78 d**
3579	**9426**	**SBW 2020 Works - 16 m3 Accropodes - South - Up to +6m - Ch550-385**	**29/06/20**	**01/08/20**	**34 d**
3580	**9427**	**SBW 2020 Works - 12 m3 Accropodes - South - Up to +6m - Ch385-300**	**02/08/20**	**14/09/20**	**44 d**
3581	**9428**	**SBW Winter Closure & Crest protection 2020-21**	**15/09/20**	**29/04/21**	**162.88 d**
3588	**9435**	**SBW - 2021 Works up to +6.0m**	**30/04/21**	**06/09/21**	**91.88 d**
3589	**9436**	**SBW 2021 Works - Core placement - Up to +6m - Ch480-300**	**30/04/21**	**23/08/21**	**116 d**
3590	**9437**	**SBW 2021 Works - Bedding - North - Ch300-RH**	**30/04/21**	**23/08/21**	**116 d**
3591	**9438**	**SBW 2021 Works - Bedding - South - Ch300-RH**	**30/04/21**	**23/08/21**	**116 d**
3592	**9439**	**SBW 2021 Works - 2-5t Toe - North - Ch300-140**	**07/05/21**	**24/07/21**	**79 d**
3593	9440	SBW 2021 Works - 3-6t Toe - North - Ch140-RH	25/07/21	30/08/21	37 d
3594	**9441**	**SBW 2021 Works - 3-6t Toe - South - Ch300-RH**	**07/05/21**	**30/08/21**	**116 d**
3595	**9442**	**SBW 2021 Works - 1-3t Armour - North - -4m to +6m - Ch300-120**	**07/05/21**	**12/07/21**	**67 d**



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ID	Unique ID	Task Name	Start	Finish	Duration
3596	9443	SBW 2021 Works - 2-5t Armour - North - -4m to +6m - Ch120-RH	13/07/21	30/08/21	49 d
3597	9444	SBW 2021 Works - 2-5t Armour - South - -4m to +6m - Ch300-RH	07/05/21	30/08/21	116 d
3598	9445	SBW 2021 Works - 8 m3 Accropodes - North -4m to +6m - Ch300-120	14/05/21	02/08/21	81 d
3599	9446	SBW 2021 Works - 12 m3 Accropodes - North - -4m to +6m - Ch120-65	03/08/21	14/08/21	12 d
3600	9447	SBW 2021 Works - 16 m3 Accropodes - North - -4m to +6m - Ch65-00	15/08/21	25/08/21	11 d
3601	9448	SBW 2021 Works - 12 m3 Accropodes - South - -4m to +6m - Ch300-60	14/05/21	10/08/21	89 d
3602	9449	SBW 2021 Works - 16 m3 Accropodes - South - -4m to +6m - Ch60-00	11/08/21	25/08/21	15 d
3603	9450	SBW 2021 Works - 16 m3 Accropodes - -4m to +6m - ROUNDHEAD	26/08/21	06/09/21	12 d
3604	**9451**	**SBW - 2021 Works over +6.0m**	**07/09/21**	**28/12/21**	**80 d**
3605	9452	SBW 2019-20 Land Works - Core placement - +6m to +7.5m - Ch618-RH	07/09/21	20/09/21	11 d
3606	9453	SBW 2019-20 Land Works - 2-5t Armour placement - +6m to +9.5m -	20/09/21	20/10/21	26 d
3607	9454	SBW 2019-20 Land Works - 1-3t Armour placement - +6m to +9.5m -	20/10/21	04/11/21	13 d
3608	9455	SBW 2019-20 Land Works - 16 m3 Accropodes - +8m to +12.5m - Ch550-385	04/11/21	11/11/21	6 d
3609	9456	SBW 2019-20 Land Works - 8 m3 Accropodes - +8m to +12.5m - Ch550-121	11/11/21	25/11/21	12 d
3610	9457	SBW 2019-20 Land Works - 12 m3 Accropodes - +8m to +12.5m - Ch385-65	25/11/21	11/12/21	13 d
3611	9458	SBW 2019-20 Land Works - 16 m3 Accropodes - +8m to +12.5m - Ch65-RH	11/12/21	18/12/21	6 d
3612	9459	SBW 2019-20 Land Works - Precast Road - +8m to +12.5m - Ch618-000	18/12/21	28/12/21	7 d
3614	**2133**	**Caissons Fabrication and Transport to site**	**10/01/18**	**22/09/20**	**673 d**
3799	**2139**	**Caissons - Transport & Intermediate works at Invergordon**	**27/02/18**	**22/09/20**	**639 d**
3877	**2177**	**East Quay (soft)**	**11/07/18**	**25/03/21**	**675 d**
3878	**4041**	**East Quay (soft) - Bedding and Levelling layers (areas 9-14)**	**11/07/18**	**29/11/19**	**362.88 d**
3885	9622	East Quay - Area F-14 - Additional levelling operations	25/11/19	29/11/19	5 d
3893	**2180**	**East Quay - Set caissons (areas 9-14)**	**28/02/19**	**21/09/20**	**389.88 d**
3899	3937	Caisson 14 (F) - Sinking at permanent position	18/09/20	21/09/20	4 d
3900	**8521**	**East Quay - Cells filling and joints**	**04/03/19**	**30/09/20**	**412.88 d**
3906	4172	East Quay - Cells filling - Position F14	21/09/20	30/09/20	7 d
3907	**8522**	**East Quay - Quarry run backfill**	**16/05/19**	**14/10/19**	**107.88 d**
3909	4173	East Quay - Quarry run backfill - Areas F11-F13	05/09/19	14/10/19	40 d
3910	**8524**	**East Quay - General filling to 0.40m above MHWS**	**31/05/19**	**29/10/19**	**107.88 d**
3912	4175	East Quay - General filling (including geotextile placement) to 0.40m above	05/09/19	29/10/19	55 d
3913	8564	East Quay - Fenders Reinforcement (F9-F13)	05/10/19	09/12/19	55 d
3914	2185	East Quay - Scour protection (F9-F13)	09/01/20	10/03/20	43 d
3915	2188	East Quay - Concrete slabs (F9-F13)	04/06/20	24/09/20	80 d
3916	2187	East Quay - Treatment of fill material (F9-F13)	08/07/20	30/09/20	60 d
3917	2186	East Quay - Concrete cope beam (F9-F13)	16/07/20	05/11/20	80 d
3918	2189	East Quay - Service trench, including bunkering pits (F9-F13)	30/07/20	12/01/21	114 d
3919	2190	East Quay General fill + Capping layer (F9-F13)	08/10/20	05/01/21	60 d
3920	2191	East Quay - Carrier drain and cable ductsV	11/12/20	19/01/21	25 d
3921	2192	East Quay - Kerbs, Channels, Edgings, HLM foundations, Footways and Paved	29/12/20	02/02/21	25 d
3922	2193	East Quay - Quay accessories (bollards, ladders) (F9-F13)	13/01/21	09/03/21	40 d
3923	2194	East Quay - Pavement (inc. HLM foundations) (F9-F13)	22/01/21	25/03/21	45 d
3924	**2195**	**North of East Quay + North Close Quay**	**08/10/18**	**04/05/21**	**639 d**
3926	**4047**	**North of East Quay + North Closed Quay - Bedding and Levelling layers (areas**	**29/11/18**	**24/11/19**	**257 d**
3933	4048	North Close Quay - Dredging & Levelling layer - Area C-02	05/11/19	14/11/19	10 d
3934	2197	North Close Quay - Dredging & Levelling layer - Area C-01	15/11/19	24/11/19	10 d
3944	**2198**	**North of East Quay + North Closed Quay - Set caissons (areas 8-1)**	**13/04/19**	**27/11/19**	**158.88 d**
3951	3944	Caisson 02 (C) - Sinking at permanent position	17/11/19	18/11/19	2 d
3952	3945	Caisson 01 (C) - Sinking at permanent position	25/11/19	27/11/19	3 d
3953	**8514**	**North of East Quay + North Closed Quay - Cells filling and joints Caissons**	**21/04/19**	**25/12/19**	**177.88 d**
3957	8519	North of East Quay + North Closed Quay - Cells filling and joints - C5	15/07/19	22/10/19	100 d
3958	8515	North of East Quay + North Closed Quay - Cells filling and joints - C4	26/09/19	18/10/19	23 d
3959	7507	North of East Quay + North Closed Quay - Cells filling and joints - C3	26/09/19	22/10/19	27 d
3960	7510	North of East Quay + North Closed Quay - Cells filling and joints - C2	19/11/19	07/12/19	19 d
3961	8520	North of East Quay + North Closed Quay - Cells filling and joints - C1	08/12/19	25/12/19	18 d
3962	**8511**	**North of East Quay + North Closed Quay - Quarry run backfill**	**03/06/19**	**14/01/20**	**162 d**

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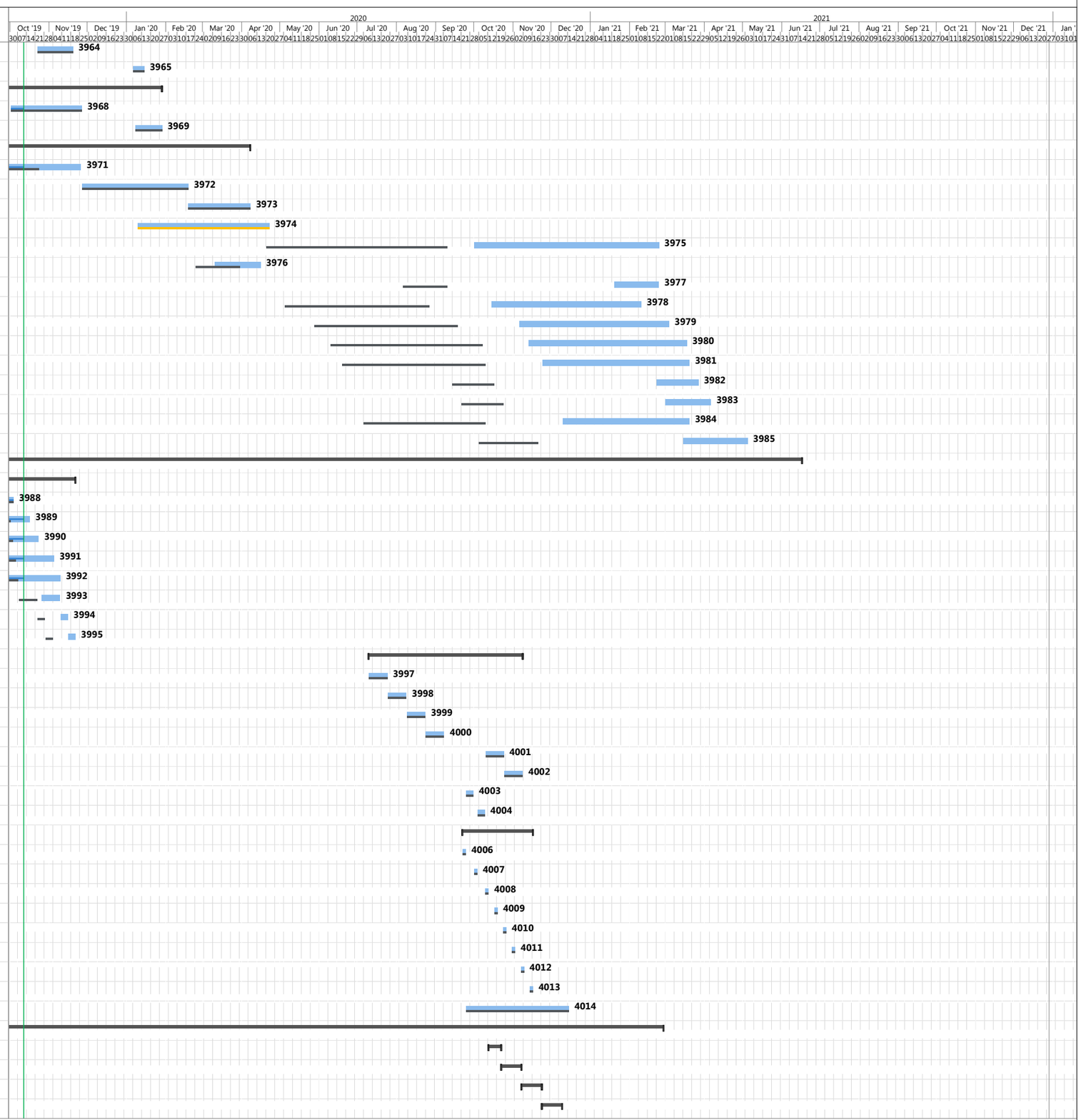
ID	Unique ID	Task Name	Start	Finish	Duration
3964	7508	North of East Quay + North Closed Quay - Quarry run backfill - Areas C5-C3	22/10/19	19/11/19	20 d
3965	7511	North of East Quay + North Closed Quay - Quarry run backfill - Area C2-C1	06/01/20	14/01/20	7 d
3966	**8512**	**North of East Quay + North Closed Quay - Geotextile**	**17/06/19**	**28/01/20**	**162 d**
3968	7509	North of East Quay + North Closed Quay - Geotextile - C5-C2	01/10/19	26/11/19	40 d
3969	7512	North of East Quay + North Closed Quay - Geotextile - Area C1	08/01/20	28/01/20	15 d
3970	**8513**	**North of East Quay + North Closed Quay - General filling to 0.40m above**	**19/09/19**	**07/04/20**	**143.88 d**
3971	2203	North of East Quay + North Closed Quay - General filling to 0.40m above	19/09/19	25/11/19	48 d
3972	7514	North of East Quay + North Closed Quay - General filling to 0.40m above	26/11/19	18/02/20	50 d
3973	7513	North of East Quay + North Closed Quay - General filling to 0.40m above	18/02/20	07/04/20	35 d
3974	8565	North of East Quay + North Closed Quay - Fender Reinforcement	09/01/20	22/04/20	73 d
3975	2204	North of East Quay + North Closed Quay - Treatment of filling material	01/10/20	23/02/21	100 d
3976	2205	North of East Quay + North Closed Quay - Scour protection	10/03/20	15/04/20	25 d
3977	2206	North of East Quay + North Closed Quay - Concrete ret wall + block interface	20/01/21	23/02/21	25 d
3978	2208	North of East Quay + North Closed Quay - Concrete Slabs	15/10/20	09/02/21	80 d
3979	2207	North of East Quay + North Closed Quay - Cope beam	06/11/20	03/03/21	80 d
3980	2209	North of East Quay + North Closed Quay - Service trench, including bunkering	13/11/20	17/03/21	85 d
3981	2210	North of East Quay + North Closed Quay - General fill + Capping layer	24/11/20	19/03/21	80 d
3982	2211	North of East Quay + North Closed Quay - Carrier drain and cable ducts	22/02/21	26/03/21	25 d
3983	2212	North of East Quay + North Closed Quay - Kerbs, channels, edgings, footways,	01/03/21	05/04/21	25 d
3984	2214	North of East Quay + North Closed Quay - Pavement (inc. HLM foundations)	10/12/20	19/03/21	69 d
3985	2213	North of East Quay + North Closed Quay - Quay accessories (bollards, ladders)	15/03/21	04/05/21	35 d
3986	**2159**	**South East Pier**	**30/05/19**	**16/06/21**	**513 d**
3987	**9372**	**South East Pier - Bedding layers (Areas 15-22)**	**11/09/19**	**21/11/19**	**51.88 d**
3988	9373	South East Pier - Bedding layers - Area H-15	11/09/19	03/10/19	23 d
3989	9374	South East Pier - Bedding layers - Area G-16	17/09/19	16/10/19	30 d
3990	9375	South East Pier - Bedding layers - Area M-17	19/09/19	23/10/19	35 d
3991	9376	South East Pier - Bedding layers - Area L-18	21/09/19	04/11/19	45 d
3992	9377	South East Pier - Bedding layers - Area J-19	23/09/19	09/11/19	48 d
3993	9378	South East Pier - Bedding layers - Area J-20	26/10/19	09/11/19	15 d
3994	9379	South East Pier - Bedding layers - Area J-21	10/11/19	15/11/19	6 d
3995	9380	South East Pier - Bedding layers - Area N-22	16/11/19	21/11/19	6 d
3996	**4055**	**South East Pier - Levelling layers (Areas 15-22)**	**10/07/20**	**08/11/20**	**86 d**
3997	4062	South East Pier - Levelling layers - Area H-15	10/07/20	24/07/20	15 d
3998	4061	South East Pier - Levelling layers - Area G-16	25/07/20	08/08/20	15 d
3999	4060	South East Pier - Levelling layers - Area M-17	09/08/20	23/08/20	15 d
4000	4059	South East Pier - Levelling layers - Area L-18	24/08/20	07/09/20	15 d
4001	4058	South East Pier - Levelling layers - Area J-19	10/10/20	24/10/20	15 d
4002	4057	South East Pier - Levelling layers - Area J-20	25/10/20	08/11/20	15 d
4003	4056	South East Pier - Levelling layers - Area J-21	25/09/20	30/09/20	6 d
4004	2161	South East Pier - Levelling layers - Area N-22	04/10/20	09/10/20	6 d
4005	**4135**	**South East Pier - Caisson sinking (Units 15-22)**	**22/09/20**	**16/11/20**	**39.88 d**
4006	3946	Caisson 15 (H) - Towing, checking & sinking at permanent position	22/09/20	24/09/20	3 d
4007	3952	Caisson 21 (J) - Towing, checking & sinking at permanent position	01/10/20	03/10/20	3 d
4008	3953	Caisson 22 (N) - Towing, checking & sinking at permanent position	10/10/20	12/10/20	3 d
4009	3947	Caisson 16 (G) - Towing, checking & sinking at permanent position	17/10/20	19/10/20	3 d
4010	3948	Caisson 17 (M) - Towing, checking & sinking at permanent position	24/10/20	26/10/20	3 d
4011	3949	Caisson 18 (L) - Towing, checking & sinking at permanent position	31/10/20	02/11/20	3 d
4012	3950	Caisson 19 (J) - Towing, checking & sinking at permanent position	07/11/20	09/11/20	3 d
4013	3951	Caisson 20 (J) - Towing, checking & sinking at permanent position	14/11/20	16/11/20	3 d
4014	2164	South East Pier - Cells filling and joints	25/09/20	14/12/20	56 d
4015	**8394**	**South East Pier - Connection S.E.P to North Breakwater (precast blocks+mass**	**30/05/19**	**27/02/21**	**457 d**
4018	**8339**	**SEP-NBW Transition - Level 1**	**12/10/20**	**22/10/20**	**9 d**
4024	**8345**	**SEP-NBW Transition - Level 2**	**22/10/20**	**07/11/20**	**14 d**
4031	**8352**	**SEP-NBW Transition - Level 3**	**07/11/20**	**23/11/20**	**13 d**
4038	**8359**	**SEP-NBW Transition - Level 4**	**23/11/20**	**09/12/20**	**13 d**



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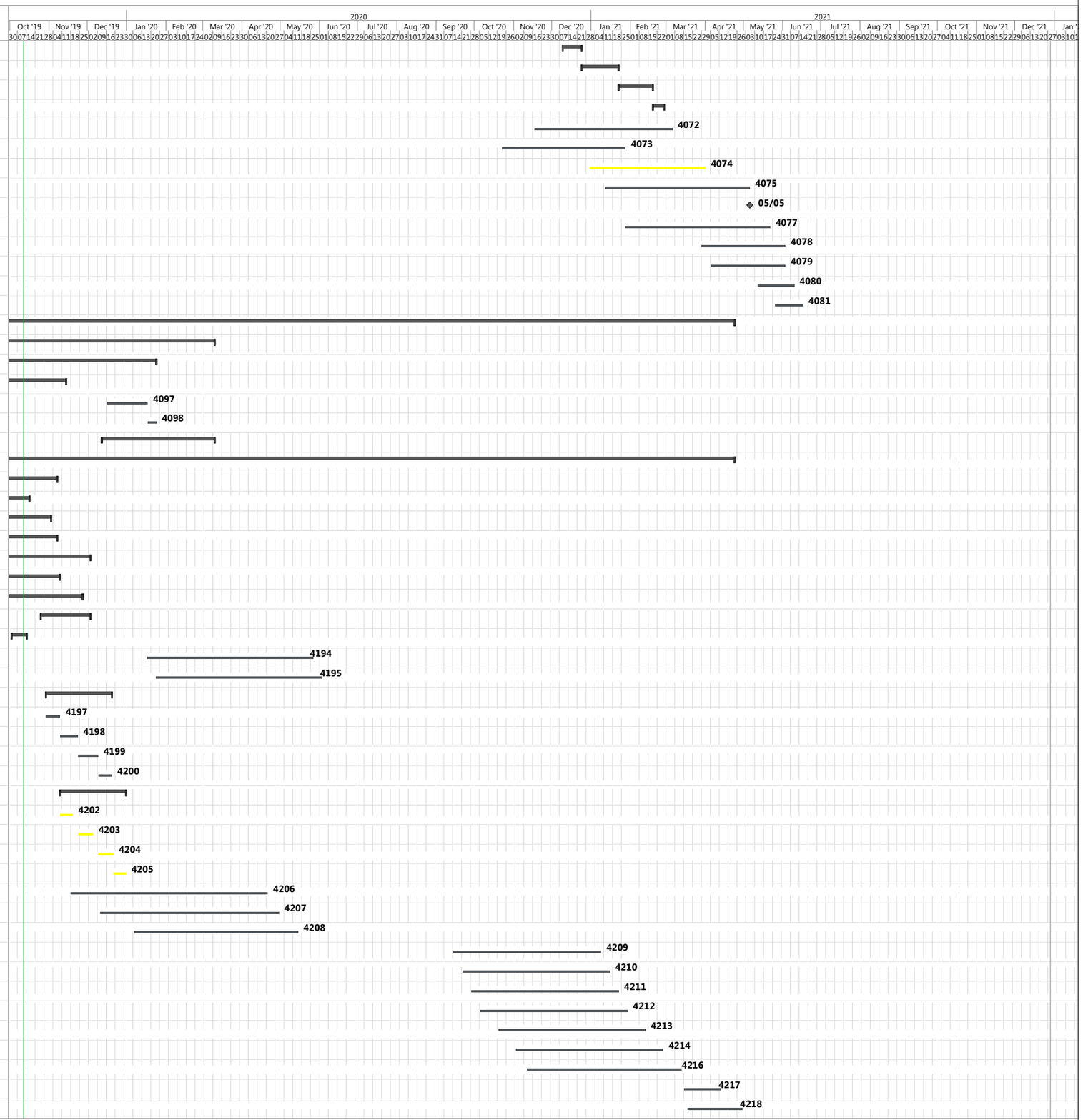
ID	Unique ID	Task Name	Start	Finish	Duration
4045	**8366**	**SEP-NBW Transition - Level 5**	**09/12/20**	**24/12/20**	**13 d**
4052	**8373**	**SEP-NBW Transition - Tying works with NBW works**	**24/12/20**	**22/01/21**	**21 d**
4059	**8380**	**SEP-NBW Transition - Level 6**	**22/01/21**	**18/02/21**	**23 d**
4069	**8390**	**SEP-NBW Transition - Completion of NBW Main Works**	**18/02/21**	**27/02/21**	**8 d**
4072	2165	South East Pier - Quarry run backfill & General fill at areas F14-N22	17/11/20	05/03/21	75 d
4073	2169	South East Pier - Scour protection at areas F14-N22	23/10/20	27/01/21	65 d
4074	8566	South East Pier - Fender Reinforcement at areas F14-N22	31/12/20	31/03/21	64 d
4075	2171	South East Pier - Concrete Slabs at areas F14-N22	12/01/21	05/05/21	80 d
4076	9069	South East Pier - Access for beacon installation	05/05/21	05/05/21	0 d
4077	2170	South East Pier - Cope beam (i/beacons foundations) at areas F14-N22	28/01/21	21/05/21	80 d
4078	2173	South East Pier - Services, including bunkering pits at areas F14-N22	29/03/21	02/06/21	45 d
4079	2174	South East Pier - Filling between cope beams /i/quarry run top + geotextile) at areas F14-N22	06/04/21	02/06/21	40 d
4080	2175	South East Pier - Quay accesories (bollards, ladders) at areas F14-N22	12/05/21	09/06/21	20 d
4081	2176	South East Pier - Pavement (inc. HLM foundations) at areas F14-N22	26/05/21	16/06/21	15 d
4082	**2215**	**West Quay**	**14/03/18**	**23/04/21**	**777 d**
4083	**2216**	**West Quay - Shore Mooring bollards**	**30/05/18**	**10/03/20**	**439.5 d**
4084	**2217**	**West Quay - Shore Mooring Bollards No.1 and No.2**	**30/05/18**	**24/01/20**	**407.5 d**
4085	**7479**	**Shore Mooring Bollards No.1 and No.2 - Piles**	**30/05/18**	**14/11/19**	**380.5 d**
4097	2219	Shore Mooring Bollards No.1 and No.2 - Foundation	16/12/19	17/01/20	15 d
4098	2220	Shore Mooring Bollards No.1 and No.2 - Installation of Shore mooring Bollards	17/01/20	24/01/20	5 d
4099	**2221**	**West Quay - Shore Mooring Bollards No.3, 4 and 5**	**12/12/19**	**10/03/20**	**54 d**
4104	**2225**	**West Quay - Land Works**	**14/03/18**	**23/04/21**	**777 d**
4107	**7478**	**West Quay - Land Works - Piling Operation**	**26/06/18**	**07/11/19**	**356.5 d**
4109	**8538**	**West Quay - Land Works - Piling Operation piles 1-14**	**26/06/18**	**16/10/19**	**340.5 d**
4125	**8539**	**West Quay - Land Works - Piling Operation piles 15-30**	**11/08/18**	**02/11/19**	**320 d**
4148	**8540**	**West Quay - Land Works - Piling Operation piles 31-44**	**30/07/18**	**07/11/19**	**332.5 d**
4181	**6616**	**West Quay - Corbel**	**05/07/19**	**03/12/19**	**107 d**
4182	**8004**	**West Quay - Corbel - Piles 1-14**	**05/07/19**	**09/11/19**	**90.63 d**
4185	**8005**	**West Quay - Corbel - Piles 15-30**	**23/07/19**	**27/11/19**	**91 d**
4188	**8006**	**West Quay - Corbel - Piles 31-44**	**25/10/19**	**03/12/19**	**27 d**
4191	**8007**	**West Quay - Corbel - Piles 45-58**	**02/10/19**	**14/10/19**	**8 d**
4194	2233	West Quay - Land Works - Concrete beams installation	13/01/20	19/05/20	90 d
4195	2234	West Quay - Land Works - Concrete infill box	20/01/20	27/05/20	90 d
4196	**8029**	**West Quay - Land Works - Excavation among piles**	**29/10/19**	**20/12/19**	**38 d**
4197	7452	West Quay - Land Works - Excavation among piles 1-14	29/10/19	09/11/19	10 d
4198	7441	West Quay - Land Works - Excavation among piles 15-30	09/11/19	23/11/19	12 d
4199	7443	West Quay - Land Works - Excavation among piles 31-44	23/11/19	09/12/19	12 d
4200	7442	West Quay - Land Works - Excavation among piles 45-58	09/12/19	20/12/19	10 d
4201	**9007**	**Dredging - West Quay - Volume between piles**	**09/11/19**	**31/12/19**	**36.38 d**
4202	9008	Dredging - West Quay - Volume between piles 1-14	09/11/19	19/11/19	10 d
4203	9009	Dredging - West Quay - Volume between piles 15-30	23/11/19	05/12/19	12 d
4204	9010	Dredging - West Quay - Volume between piles 31-44	09/12/19	21/12/19	12 d
4205	9011	Dredging - West Quay - Volume between piles 45-58	21/12/19	31/12/19	10 d
4206	2229	West Quay - Land Works - Heavy duty rock grade geotextile filter	18/11/19	20/04/20	100 d
4207	2230	West Quay - Land Works - Core material - Piles 45-58	11/12/19	29/04/20	91 d
4208	2232	West Quay - Land Works - Primary armour 1-3t	07/01/20	14/05/20	91 d
4209	2235	West Quay - Land Works - Precast beams installation	14/09/20	08/01/21	80 d
4210	2236	West Quay - Land Works - Installation of collaborating deck slabs	21/09/20	15/01/21	80 d
4211	2237	West Quay - Land Works - Sea side cope beam construction	28/09/20	22/01/21	80 d
4212	2238	West Quay - Land Works - Harbour side cope beam construction	05/10/20	29/01/21	80 d
4213	2239	West Quay - Land Works - Quarry rockfill	19/10/20	12/02/21	80 d
4214	2240	West Quay - Land Works - In situ concrete deck slab	02/11/20	26/02/21	80 d
4216	2241	West Quay - Land Works - Service trench, including bunkering pits	05/11/20	08/03/21	84 d
4217	2242	West Quay - Land Works - Bedding layer	09/03/21	06/04/21	20 d
4218	2243	West Quay - Land Works - Scour protection	12/03/21	23/04/21	30 d



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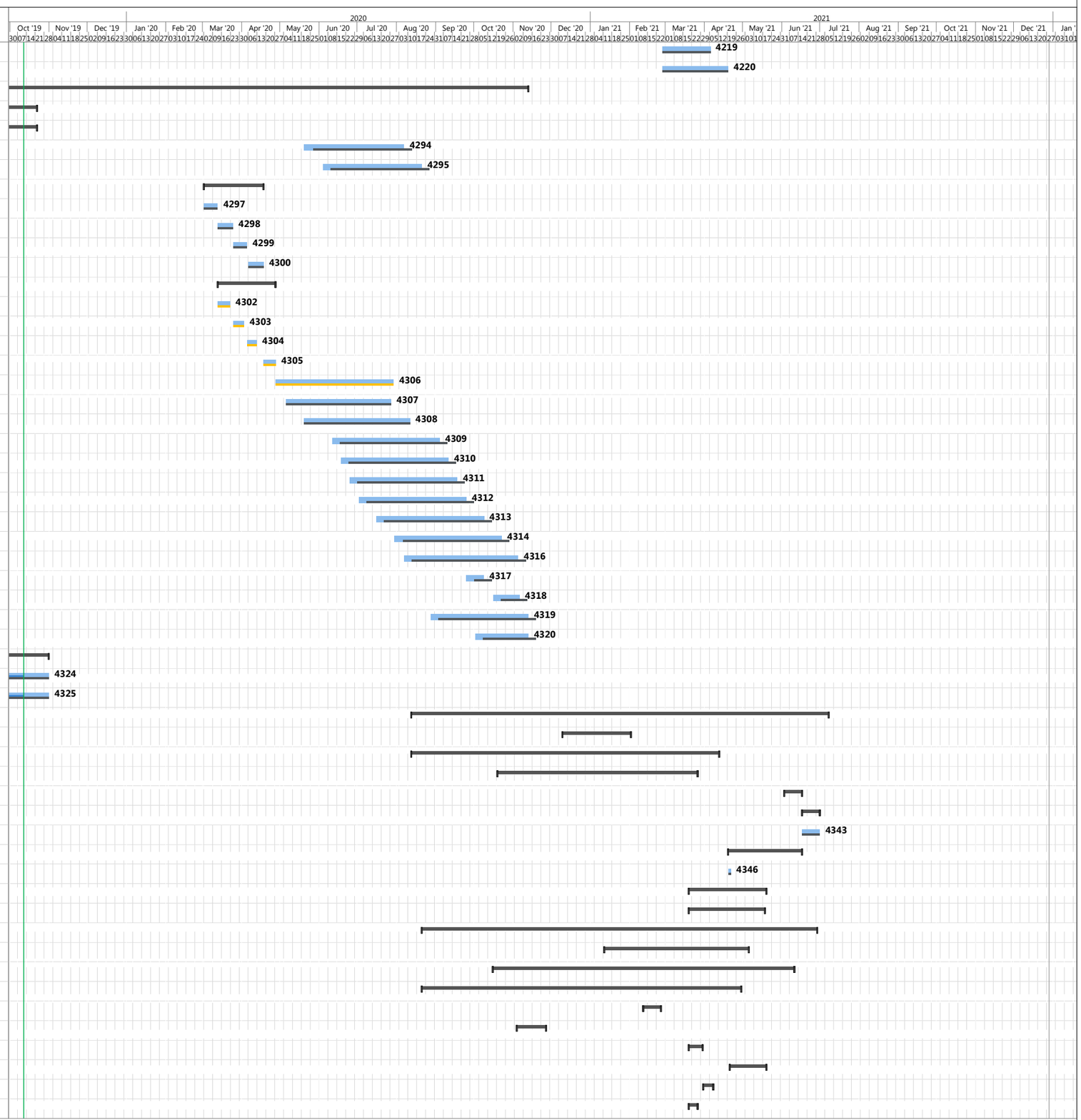
ID	Unique ID	Task Name	Start	Finish	Duration
4219	2244	West Quay - Land Works - Quay accessories (fenders, bollards 100t, 20 ladders)	26/02/21	05/04/21	25 d
4220	2245	West Quay - Land Works - Pavement (inc. HLM foundations)	26/02/21	19/04/21	35 d
4221	**2246**	**North Open Quay**	**05/03/18**	**12/11/20**	**673 d**
4281	**6675**	**North Open Quay - Corbel**	**15/07/19**	**22/10/19**	**71 d**
4282	**8008**	**North Open Quay - Corbel - Piles 1-14**	**28/09/19**	**22/10/19**	**16.38 d**
4294	2257	North Open Quay - Concrete beams installation	20/05/20	06/08/20	55 d
4295	2258	North Open Quay - Concrete infill box	04/06/20	20/08/20	55 d
4296	**8030**	**North Open Quay - Excavation among piles**	**02/03/20**	**17/04/20**	**35 d**
4297	7447	North Open Quay - Excavation among piles 1-14	02/03/20	12/03/20	10 d
4298	7446	North Open Quay - Excavation among piles 15-26	13/03/20	24/03/20	10 d
4299	7445	North Open Quay - Excavation among piles 27-38	25/03/20	04/04/20	10 d
4300	7444	North Open Quay - Excavation among piles 39-50	06/04/20	17/04/20	10 d
4301	**9012**	**Dredging - North Open Quay - Volume between piles**	**13/03/20**	**27/04/20**	**31.88 d**
4302	9013	Dredging - North Open Quay - Volume between piles 1-14	13/03/20	22/03/20	10 d
4303	9014	Dredging - North Open Quay - Volume between piles 15-26	25/03/20	02/04/20	9 d
4304	9015	Dredging - North Open Quay - Volume between piles 27-38	05/04/20	12/04/20	8 d
4305	9016	Dredging - North Open Quay - Volume between piles 39-50	18/04/20	27/04/20	10 d
4306	9381	North Open Quay - Heavy duty rock grade geotextile filter	27/04/20	29/07/20	65 d
4307	9382	North Open Quay - Core material	05/05/20	27/07/20	58 d
4308	9383	North Open Quay - Primary armour 1-3 t	19/05/20	11/08/20	58 d
4309	2259	North Open Quay - Precast beams installation	11/06/20	03/09/20	60 d
4310	2263	North Open Quay - Installation of collaborating deck slabs	18/06/20	10/09/20	60 d
4311	2260	North Open Quay - Sea Side cope beam construction	25/06/20	17/09/20	60 d
4312	2261	North Open Quay - Harbour side cope beam construction	02/07/20	24/09/20	60 d
4313	2262	North Open Quay - Quarry rockfill	16/07/20	08/10/20	60 d
4314	2264	North Open Quay - In situ concrete deck slab	30/07/20	22/10/20	60 d
4316	2265	North Open Quay - Service trench, including bunkering pits	07/08/20	04/11/20	64 d
4317	2266	North Open Quay - Bedding layer	25/09/20	08/10/20	10 d
4318	2267	North Open Quay - Scour protection	16/10/20	05/11/20	15 d
4319	2268	North Open Quay - Quay accessories (fenders, bollards and ladders)	28/08/20	12/11/20	55 d
4320	2269	North Open Quay - Pavement (inc. HLM foundations)	02/10/20	12/11/20	30 d
4321	**2270**	**Southwest Corner**	**04/10/18**	**31/10/19**	**267.88 d**
4324	8530	Southwest Corner - Core placement	31/07/19	31/10/19	93 d
4325	2271	Southwest Corner - Rock armour revetment	31/07/19	31/10/19	93 d
4326	**2272**	**Superstructure Harbour Area**	**12/08/20**	**07/07/21**	**228.13 d**
4327	**2273**	**Superstructure - Water Tanks**	**10/12/20**	**01/02/21**	**35 d**
4331	**9219**	**Superstructure - Buildings**	**12/08/20**	**12/04/21**	**168 d**
4337	**2283**	**Superstructure - Retaining walls**	**19/10/20**	**26/03/21**	**110 d**
4340	**9225**	**Superstructure - Surface Markings**	**03/06/21**	**16/06/21**	**10 d**
4342	**9227**	**Superstructure - Install Site Wide Traffic Signs**	**17/06/21**	**30/06/21**	**10 d**
4343	9228	Superstructure - Install Site Wide Traffic Signs - Install Site Wide Traffic Signs	17/06/21	30/06/21	10 d
4344	**9229**	**Superstructure - Metal Crash Barriers**	**19/04/21**	**16/06/21**	**40.13 d**
4346	9231	Superstructure - Metal Crash Barriers - Tubular System	19/04/21	21/04/21	2 d
4349	**2293**	**Harbour Entrance / Perimeter**	**19/03/21**	**19/05/21**	**41.13 d**
4350	**2294**	**Entrance Works**	**19/03/21**	**18/05/21**	**40 d**
4357	**9232**	**Mechanical & Electrical Works**	**21/08/20**	**28/06/21**	**215 d**
4358	**9233**	**Mechanical & Electrical Works - Power Distribution**	**12/01/21**	**05/05/21**	**80 d**
4361	**9236**	**Mechanical & Electrical Works - Cabling**	**16/10/20**	**10/06/21**	**163 d**
4372	**9247**	**Mechanical & Electrical Works - Pipework**	**21/08/20**	**29/04/21**	**175 d**
4378	**9253**	**Mechanical & Electrical Works - Aids To Navigation**	**11/02/21**	**25/02/21**	**10 d**
4381	**9256**	**Mechanical & Electrical Works- Lighting Installations Floodlights/Masts**	**04/11/20**	**26/11/20**	**17 d**
4384	**9259**	**Mechanical & Electrical Works - Electrical Charging Point Vehicle**	**19/03/21**	**30/03/21**	**7 d**
4386	**9261**	**Mechanical & Electrical Works - CCTV Installations**	**21/04/21**	**19/05/21**	**20 d**
4388	**9263**	**Mechanical & Electrical Works - Turnstile & Access**	**31/03/21**	**07/04/21**	**5 d**
4390	**9265**	**Mechanical & Electrical Works - Automatic Traffic Barriers**	**19/03/21**	**26/03/21**	**5 d**



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ID	Unique ID	Task Name	Start	Finish	Duration
4392	**9267**	**Mechanical & Electrical Works - Weighbridge Installations**	**13/11/20**	**04/12/20**	**15 d**
4394	**9269**	**Mechanical & Electrical Works - Vehicle No. Plate Rec. Power Point (Foundations)**	**19/03/21**	**19/04/21**	**20 d**
4396	**9271**	**Mechanical & Electrical Works - Fire Alarm System - Fire Fighting System**	**12/03/21**	**12/04/21**	**20 d**
4398	**9273**	**Mechanical & Electrical Works - Commissioning**	**12/03/21**	**28/06/21**	**73.13 d**
4404	**9279**	**Mechanical & Electrical Works (by AHB)**	**01/11/21**	**27/12/21**	**40 d**
4405	**9280**	**Mechanical & Electrical Works (by AHB) - Aids to Navigation**	**01/11/21**	**24/12/21**	**38 d**
4409	9284	M&E (AHB) - Aids to Navigation - Sector Lights (NA103, 104) / Leading Lights (NA101, 102)	01/11/21	12/11/21	10 d
4412	**9287**	**Mechanical & Electrical Works (by AHB) - Turnstile & Access**	**01/11/21**	**27/12/21**	**40 d**
4414	**9289**	**Mechanical & Electrical Works (by AHB) - Automatic Traffic Barriers**	**01/11/21**	**27/12/21**	**40 d**
4416	**9291**	**Mechanical & Electrical Works (by AHB) - Weighbridge Installations**	**01/11/21**	**27/12/21**	**40 d**
4418	**9293**	**Mechanical & Electrical Works (by AHB) - Vehicle Number Plate Recognition (VNPR) Power Point**	**01/11/21**	**27/12/21**	**40 d**
4420	**9295**	**Mechanical & Electrical Works (by AHB) - Communications**	**01/11/21**	**27/12/21**	**40 d**
4422	**2331**	**Finishing Works**	**29/06/21**	**28/12/21**	**128 d**
4423	**2332**	**Finishing works (including final snagging, and potential demobilisation activities)**	**29/06/21**	**28/12/21**	**128 d**
4424	**2351**	**Demobilisation & Reinstatement of Compounds**	**15/11/21**	**28/12/21**	**30 d**
4425	**2352**	**Compounds demobilisation**	**15/11/21**	**28/12/21**	**30 d**
4426	**2353**	**Demobilisation - South Compound Area**	**15/11/21**	**28/12/21**	**30 d**
4427	**2354**	**Demobilisation - Central Compound Area**	**29/11/21**	**28/12/21**	**20 d**
4428	2355	Demobilisation - North Compound Area	15/11/21	14/12/21	20 d
4429	**2356**	**Permanent Coastal Path rerouting and upgrading**	**10/12/21**	**28/12/21**	**12 d**
4430	2357	Potential permanent Path Around Walker Park	10/12/21	24/12/21	10 d
4431	**2358**	**Permanent Path Around Loirston Park**	**14/12/21**	**28/12/21**	**10 d**