

Fairbourne Short Sea Outfall Repair

Outline Method Statement

March 2019

Revised April 2019 to address NRW Concerns

Revised May 2019 to include NRW acceptance of changed compound location and access /egress route

Background

The existing 9" CI outfall pipe, from the tidal tank, has blocked or fractured resulting in a spill in the upper beach area with no pass forward flow to the existing outfall. In order to maintain the outfall in agreement with NRW a shorter temporary outfall has been put into operation. This was achieved by breaking into the existing damaged outfall at the toe of the shingle bank, to form a temporary discharge point. The exposed pipework at this location is badly cracked for an unknown length downstream of the temporary discharge point and can be considered in poor to very poor condition. The condition of the exposed pipework under the shingle bank (upstream of the temporary discharge point) is not known but is highly likely to be badly corroded. Replacement of the damaged pipework and the adjacent sections is therefore considered the most appropriate repair method. The replacement length will be from the existing valve chamber to a point to be determined by trial hole - this is shown as "Localised Repair 1".

The anticipated replacement length is 40m length. This will be subject to reduction, or increase depending on the findings of the proposed initial trial hole investigations. The aim will be to undertake the minimum amount of replacement needed to achieve a reasonable lifespan for the asset.

There is evidence of a break in the outfall approximately 150 metres down the beach from the shingle bank. This may be at the location of a previous repair and may also be the cause of the outfall failure. It is proposed as part of the works to undertake a short repair at this location, minimum 3m, but again exact length may increase subject to proposed trial hole investigations. On the contract drawing this repair is shown as - Localised Repair 2.

Principle Work Elements

1. Establish compound area with the car park at south location as agreed with the local Harbour Master. Landward of sea defence. Utilise the existing access ramp for site access and egress
2. Installation of over-pumping by-pass to current outfall - *to prevent the current discharge onto the beach from inundation of the working area*
3. Excavation of trial holes at both repair locations- *to determine exact extent of the repair lengths*
4. Cleanse by Hi pressure Jetting and CCTV between existing tidal tank and Localised Repair 2- *to remove accumulated beach sand carried into pipe by tidal action, CCTV to inspect for damage in buried portion.*
5. Cleanse by Hi pressure water jetting between Localised Repair 2 and the outfall- *to remove accumulated beach sand carried into pipe by tidal action*
6. Undertake the localised repairs 1 and 2 - *sequence determined by tidal conditions and weather*
7. Install Tideflex flap to outfall diffuser pipe - *to prevent future issues with sand deposition from open outlet*

Time table

Start date 03/06/2019

Completion (Subject to Tide and Weather) 12/07/2019

Labour

Site Manager Visiting
 Working Foreman/Chargehand
 Operative x2
 Machine Operative x1
(Possible - Banksman x1 in lieu of certain warning fences or guard rails)

Plant

1 x 13t 360 degree tracked excavator
 1 x 8t 360 degree tracked Hydraulic breaker
 1 x 9t dumper
 2 x light masts
 2 x 150mm acoustic pump
 Stihl Saw(s) Grinders, Breakers
 Portable Generator
 Compressor and Hand breakers anti vibration models
 Hi pressure jetter unit (compound) with slave reel (beach side)
 CCTV Unit
 Van and small tools

Equipment

Bunded fuel bowser
 Trench boxes - to suit repair minimum three
 Short piles
 Drip trays to suit
 eCat +4 and Genny
 Herras/GS7 Fencing- compound areas
 Scaffold barrier to sea ward local to work areas and/or roped off areas - no GS7 below spring high tide mark

Site safety signs

Welfare

“All in One” serviced unit
Security Store

General Rules relating to the works Method Statements

- Contractor to liaise with and maintain engagement with interested third parties to include Harbour Master, Fairbourne light railway.
- All plant and equipment will be delivered to site in cleansed condition and free from fuel or oil leaks. On leaving site will be cleaned down to maintain bio security.
- All plant and equipment when not in use shall be removed from the beach and parked to the landward side of the sea wall within the site compound.
- The compound is to be located in the existing public car park area approximately 650m south of the working area. This car park area is used by other contractors who maintain the sea defences and is preferred as the point of use as it is immediately adjacent an existing access ramp. There is a gap in the tank traps to allow access to the ramp.
- The car park will remain in use throughout the works so it is imperative that all deliveries are planned and scheduled, in addition all vehicle movements will need to be marshalled by a trained banksman and clear segregation and signing for the compound area will be installed prior to any work taking place
- The access on to the beach will be via an existing beach access from the car park and will not require a ramp to be created. However, bog mats or similar may be installed to prevent any damage to the existing surfaces. In addition, there is sufficient space between the tank traps to allow easy access at this point. We have been informed by the local Harbour Master that this point is where plant usually access the beach.
- Access and egress to the works area from the site compound shall be via the existing concrete ramp. The route to the working area shall be made by tracking down the beach parallel to the bottom of the cobble bank, as close to the bottom of the bank as practical avoiding any rock pools or other features keeping to the sand. The return route to be same avoiding any shortcuts to directly travel between points. As indicated below:



- There is to be no “free ranging” across the beach area.

- Tracking/travelling vehicles will give way to any public accessing the area and shall be under the control of a suitably trained banksman. Tide tables will be studied prior to works to allow shifts to be planned and this will be briefed out to workforce to ensure there is plenty of time for access and egress from the Beach.
- No refuelling shall take place on the sea ward side of the sea wall - all fuelling operations will be undertaken with suitable drip trays. Suitable spill kits to be readily available.
- Integrity of the sea wall shall be maintained at all times, and it shall not be reduced or damaged to facilitate access to the beach.
- Weather and tidal conditions are a considerable risk element and the works shall be constantly assessed to ensure that these are considered. No works are to be undertaken adjacent the sea wall if a significant storm event is predicted.
- All works are subject to tidal condition and will require careful management and control. Once commenced the works shall progress in shift pattern to complete as quickly as possible to a safe and secure position in minimum time possible. It is not intended to have any excavation open and works are not planned for more than a single tidal cycle. If a rest period in excess of a single tide cycle (weather permitting) is required, the excavation shall be fully backfilled.
- Signing and guarding to be provided to alert beach users of the presence of machines and equipment this may be a combination of roped off areas, secure barrier system using scaffold local to the repair locations and /or alert banksman to intercept and guide any pedestrian or other beach user around the works. Exact method to be determined by risk assessment based in part upon duration of the works.
- Any potential hazard to navigation being left in over a tidal period that may cause harm to a seaborne vessel shall be marked with at least two number 600mm yellow general-purpose buoys suitably tethered to the hazard. Example of such a hazard is a trench box left on location to facilitate repair over a couple of tidal inundations. Additionally, the use of marker post(s) at the sea wall will also facilitate alerting vessels of potential hazard - Harbour Master to be consulted for advice on what is considered relevant and appropriate in the area.
- Upon completion and restoration there is a potential for a localised area of quicksand to form over the repair site until the material has had opportunity to solidify. This may take place over more than one tide cycle. The area will therefore be securely fenced off with scaffold and signs placed to alert beach users. These will be removed as soon as possible upon solidification.

Method Statements

The content of the script below is to highlight the environmental aspects of the proposed works and not the technical aspects to provide information in support of the Marine Licence

1. Form Ramp

- The changed location of the compound allows the use of the existing concrete access ramp to the beach from the car park area.
- However bog mats or similar may be installed to prevent any damage to the existing surfaces in addition there is sufficient space between the tank traps to allow easy access at this point we have been informed by the local Harbour Master that this point is where plant usually access the beach
- The ramp does get covered at times with cobbles and sand these shall be removed and spread locally to adjacent flanks as often as required over the working period. This clearing work shall be subject to tide and weather conditions and may only be done at start if weather is favourable to be founded on suitable geotextile to maintain segregation of imported material from the natural substrate and to facilitate clean up and restoration upon completion.
- Upon completion the ramp shall be left to the sea condition to recover as before.

2. Over-pumping

This element is still subject to further discussion with DCWW, to determine whether the existing outfall can be temporarily isolated, and storage utilised. In discussion if weather is dry then the works can be isolated utilising existing storage. However, in a prolonged rainfall event due to the infiltration and contributing areas storm pumps will need to be used. These will require a dedicated discharge point. Trial holes will be used to confirm the need for a fixed over-pumping system. Should repairs be localised and not over a long length of time in dry weather then it may be possible and practical to undertake the repairs using the isolation method

Otherwise:

- As agreed, install a temporary discharge point to at 100m to south of current location, utilising a splitter arrangement to disperse flows (particularly storm)
- Either Install new tee and valve in the existing outfall pipe with rigid pipework to above sea wall, or subject to valve arrangement over pump directly from the sea tank.
- Outfall pipe shall be sized to match current pipe to accept storm flows.
- To ensure that the discharge from this pipe does not de-stabilise the cobble bank or wash out fines the discharge ends are to be buried (for public protection) with a Y branch to split flows to then discharge to two discreet end points approximately 5m apart. These will be within a 600mm square chamber positioned above mean high water level and approximately 1000mm deep. Please refer to the attached Sketch w2476-SK003 for supporting information.
- Maintain and manage for duration.
- Upon completion all material shall be removed, and cobble bank reinstated and as needed subject to method used the pump discharge pipework reinstated.

3. Trial Holes

- Erect suitable signage to alert beach users of working area on beach and transiting plant.
- Working on falling tide with reference to a suitable weather window, trial excavation will take place to expose the damaged pipe sections and follow the line of the existing pipe exposing the upper surface only to identify its condition.
- Excavated material to be placed adjacent for immediate replacement upon identification of the length /extent of repair required- segregating as needed
- Two machines may be required to maintain excavation within the fluid sand subject to discovery of actual ground conditions - use of a trench box(es) once the pipe is located will assist in

avoidance of trench creep.

- The open ends of any exposed section may be capped or plugged e.g. using a suitable “Vetter” type stopper with length of wire armoured discharge hose to facilitate jetting to cleanse. They will also be marked for ease of identification for return.
- Upon discovery of the extent of the repair/replacement if significantly different from current details the NRW will be contacted to ensure that the applied ML will be sufficient or if needed a suitable variation can be made.
- Additional note to clarify NRW concern regarding sea wall exposure
 - Use of trench box(es) when investigating the pipework at location 1 is to reduce the disturbance to the existing cobble bank and minimise the footprint required. Subject to discovery this maybe local to just the first few meters from the sand interface. In the worst case this will be up to the existing valve chamber. This chamber being a large block of concrete is not to be disturbed as it will assist in support/stability to the adjacent sea wall defence.
 - Trench box(es) used for the trial holes may be left in subject to assessment to facilitate the repair. If this is the case the trench box(es) shall be backfilled with the excavated material to restore the nature and slope of the cobble bank.
 - Any investigation works within the proximity of the sea wall shall only be undertaken during a low tide cycle and during a stable weather window with calm sea conditions.
 - In the event of a storm warning the trial hole excavation shall be abandoned, and any excavated cobble material returned to the ‘as before’ situation to maintain the integrity of the cobble storm bank protection
 - Reference sketch w2476-SK003 for supporting information

4. Hi Pressure Cleansing and CCTV

- During a suitable tide and weather window re-access the beach with excavator, to include signing and guarding as above.
- Using a suitable hi volume jet vac unit located on the landward side of the sea wall together with a slave reel of sufficient capacity the lengths of existing outfall pipe shall be cleansed of deposited seaborne sand and material.
- The recovered material shall be either brought back to one open end and/or blown out at the other open end -subject to method. It is expected that the material will be spread locally to be absorbed back into the beach
- Excavator will be used to cast aside as recovered from the pipe and regraded before tide returns to cover
- Stopper to remain in situ until cleansing and repairs are complete
- The restored length of pipe shall be cleansed for its full length upon completion - note this was successfully undertaken on regular intervals in the past using the local Fire service and one of their high-volume pump units. Upon installation of the Tideflex flap on the outfall diffuser the issue with seaborne material being deposited in the pipe will be near zero. Cleansing will then be a less regular requirement of this outfall
- CCTV is to be carried out if practical on the buried length between the two repairs. This will only be successful if pipe is cleansed and dry. This will be done from a road-based compound-based vehicle with umbilical extension to access the pipe length on falling tide once past the lower repair 2 point sufficient to pump out the pipe.

5. Repair 1

- Signing and guarding shall be implemented appropriate to the location and extent of the work.
- The repair within the cobble bank is the more risk laden as the cobble bank provides a substantial degree of wave protection to the sea wall defence. The proposed works as currently detailed will put a trench through the cobble bank to the rear of the existing valve chamber to within 5.9m of the sea wall. It is critically important that these works are undertaken in a period

of calm weather and lower tides to minimise risk. Irrespective should the excavation be open, and the weather changes this excavation will be immediately backfilled and restored to similar profile as adjacent slope.

- Cobble/shingle material will be placed locally for re-use and replacement if needed. Any sand recovered will be removed and stockpiled on suitable membrane above highest tide level for return to origin upon completion.
- Trench boxes are proposed to provide a defined trench within the cobble bank and to provide lateral stability. This will also provide suitable containment to refill in event that this becomes necessary. Subject to tide level the use of jumbo bags of a washed concrete sand or local gravel are placed within the excavation to facilitate rapid removal post tide retreat and exposure for next shift operation and minimise requirement for washed in material removal.
- The existing damaged pipe and concrete surround will be removed and broken up to a maximum size that facilitates removal and transport off the beach to a temporary stockpile area, or directly to receiving authorised waste disposal or recycling site.
- Repair/replacement method utilises pre-cast elements made off site to reduce the use of wet concrete to a minimum. There will still be a requirement for jointing pieces using in-situ wet concrete - this concrete will be high strength low slump with an additive to reduce grout loss. In addition, a protection mattress or fabric will be placed and secured to provide protection if tide submersion becomes likely before set.
- Pump used as needed to dewater excavation using a suitable filter to minimise material transport. Discharge to take place down slope towards the sea to a minimum distance of 30m
- Should there be a shortfall of material to reinstate the area on completion of the repair this shall be locally sourced, naturally occurring material of similar nature to the undisturbed material adjacent be it sand gravel or cobble. It shall reflect the nature of the adjacent material as closely as possible- e.g. Cefn Graianog Quarry or similar. The minimum amount shall be imported and placed to lower levels.
- The existing cobble which has been placed adjacent to works area shall be replaced carefully in reverse order of removal ensuring a similar makeup of the undisturbed section and to minimise visual or natural placement. The material shall be graded to match adjacent slope.
- Additional note to clarify NRW concern regarding sea wall exposure
 - Use of trench box(es) when undertaking the repair or replacement of the pipework at location 1 is to reduce the disturbance to the existing cobble bank, and minimise the footprint required. Subject to trial hole this maybe local to just the first few meters from the sand interface. In the worst case this will be up to the existing valve chamber. This chamber being a large block of concrete is not to be disturbed, as it will assist in support/stability to the adjacent sea wall defence.
 - Trench box(es) used for the trial holes may be left in subject to assessment to facilitate the repair. If this is the case then they shall be backfilled with the excavated material to restore the nature, and slope of the cobble bank.
 - Any investigation works within the proximity of the sea wall shall only be undertaken during a low tide cycle and during a stable weather window with calm sea conditions
 - In the event of a storm warning the excavation for the repair shall be abandoned, and any excavated cobble material returned to the 'as before' situation to maintain the integrity of the cobble storm bank protection
 - Reference sketch w2476-SK003 for supporting information

6. Repair 2

- Signing and guarding shall be implemented appropriate to the location and extent of the work. To include when plant is transiting the beach to and from the compound area - a banksman in addition to signs will be used.
- The repair is located approximately 150m seaward of the sea wall and is tide submerged twice daily. Tidal working will be required with suitable weather monitoring.

- A trench box will be used to provide a stable trench width and facilitate an efficient repair. This trench box will require suitable signing and guarding to include at least two marker buoys to be attached.
- The work will likely require three tide cycles to complete (subject to findings of trial holes), the use of jumbo bags of local washed sand or rounded gravel will be used to place into the box upon retreat from advancing to minimise recovery time upon return.
- Excavated sand shall be removed and stored on suitable membrane above the highest tide level for reuse upon completion of repair.
- The damaged pipe and concrete surround will be removed and broken up to a maximum size that facilitates removal and transport off the beach to a temporary stockpile area, or directly to receiving authorised waste disposal or recycling site.
- Repair method utilises pre-cast elements made off site to reduce the use of wet concrete to a minimum. There will still be a requirement for jointing pieces using in-situ wet concrete - this concrete will be high strength low slump with an anti-additive to reduce grout loss. In addition, a protection mattress or fabric will be placed and secured over prior to a tide submersion to assist in set and avoid wash out.
- Pump used as needed to dewater excavation using a suitable filter to minimise material transport. Discharge to take place down slope towards the sea to a minimum distance of 30m.
- Pump and lighting set to be permanently set upon tracked dumper for efficiency of set up and utilisation. This will also minimise risk of spill being contained within the skip.
- Should there be a shortfall of material to reinstate the area on completion of the repair this shall be locally sourced, naturally occurring material of similar nature to the undisturbed material adjacent be it sand gravel or cobble. It shall reflect the nature of the adjacent material as closely as possible- e.g. Cefn Graianog Quarry or similar. The minimum amount shall be imported and placed to lower levels.
- The inclusion of an access point in this repair is to facilitate the jet cleanse, particularly seaward of the existing outfall pipe upon completion.
- Once repair is made the stockpiled sand shall be returned and replaced in reverse order should there be visible changes within the material. Graded to match existing prior to tide submersion.
- Upon completion and restoration there is a potential for a localised area of quicksand to form over the repair site until the material has had opportunity to solidify. This may take place over more than one tide cycle. Should this be the case then the area will be securely fenced off with scaffold and signs placed to alert beach users. These will be removed as soon as practically possible upon solidification.

7. Tide Flap

- The current outfall is an open end and allows seaborne materials to freely enter and be deposited within the pipe.
- A new “duck bill” type flap by Tideflex is to be installed by a dive team during a suitable weather and tide.
- The existing pipe end will be manually cleaned, and the new flap secured by the divers.
- This is a minimum impact operation.

Emergency Conditions

Sea Breach – Repair 1

Location of the works is exposed and can experience very rough and aggressive sea conditions. The area to the rear of the sea wall is the town of Fairbourne which is low lying and a breach in the sea defence will be disastrous, potentially life threatening and would be extremely costly. The sea defence incorporates the cobble bank and the concrete wall above working in combination.

The works at Repair 1 location are the more critical activity to consider.

- During the works there will be a constant monitoring of the weather and tide conditions. Should it be necessary whilst engaged on this operation a 24-hour watch will be provided and if required 24hour call out for immediate mobilisation.
- The investigation works (trial hole) and the repair or replacement works shall only take place during a low tide cycle and during a period of stable weather with calm sea conditions.
- The proposed use of trench box support will facilitate the integrity of the cobble bank by minimising the footprint and provide support that can be readily backfilled if needed.
- The existing valve chamber which is a large concrete chamber structure approximate 3m square by 2.5m deep (half depth of proposed excavation) and located at its closest at 3.4m off the seaward side of the sea wall will provide a degree of protection to the sea wall. The use of the trench box method will increase this further to provide additional buttress support and stability to this structure and the sea wall beyond. The use of a trench box support method provides the ability to rapidly rebury and stabilise to reinstate the cobble bank protection if required; should there be any concern of a possible weather event or a tidal surge with rough seas even if long term forecast of calm weather was predicted at start of work process.

Pollution Event

- Suitable spill kits to be available with all plant items.
- Drip trays to be used.
- No refuelling or oil replacement seaward of sea wall.
- Any spill shall be attended to immediately and reported to DCWW - escalated to NRW if significant.
- Should one occur due to mechanical failure the source will be plugged and removed off the beach immediately. Spill kits applied and if needed the contaminated material excavated and removed off the beach onto landward side to be stored securely before safe disposal.