KAYMAC Marine & Civil Engineering Ltd

EASTMAN

METHOD STATEMENT & RISK ASSESSMENTS
Draft Revision 3

2022

NEWPORT EFFLUENT OUTFALL REPLACEMENT SCHEME
NRW REF: PA22001

Document Control Sheet

Title	Document No.
Effluent Outfall Replacement Scheme. Method Statement & Risk Assessments	KM-EASTMAN-RAMS-25/03/22-Rev3

Originator	Client
Kaymac Marine & Civil Engineering Ltd Osprey Business Park Byng Street Landore Swansea SA1 2NR Tel: 01792 301818	Eastman Chemical Company, Corporation Road, Newport, South Wales. NP19 4XF

Authorisation

Prepared by:	C. Hawkins	Signature	Date 25/03/2022
Checked By:	J. Colcombe	Signature	Date 25/03/2022
Approved by:	J. Lippiett	Signature	Date 25/03/2022

Distribution and Revision Status

Issue Date	Document Description	Status/Revision				
25/03/2022	This document covers the detailed methodology on the replacement of the effluent outfall in Newport on behalf of Eastman Chemical Company.	Draft	Project Issue	1	2	3
Copy No.	**Issued to**					
1	Eastman – Ian Barklam	✔	✔	✔	✔	✔
2	Eastman - David Davies (Engineering Manager)	✔	✔	✔	✔	✔
3	Eastman – Rhys Price	✔	✔	✔	✔	✔
4	Kaymac Marine Records	✔	✔	✔	✔	✔
5	NRW Marine Licensing	✔	✔	✔	✔	✔
6	APEM LTD – Nick O'Brien	✔	✔	✔	✔	✔

Amendments

Contents		
Section No.		Title
1.0		Introduction
	1.1	Description & Purpose of the Project
2.0		Project Details
	2.1	Project Site Location Details
	2.2	Site Location Map
	2.3	Access to site
3.0		Legislative and Site-Specific Compliance
	3.1	Statutory Legislation
	3.2	Additional Site-Specific Compliance
	3.3	Environmental Considerations
4.0		Project Resources
	4.1	Site Personnel
	4.2	Site Welfare and Storage
	4.3	Site Plant & Equipment
	4.4	Materials
	4.5	Personnel Protective Equipment (PPE)
5.0		Project Directory
	5.1	General Contact Numbers
	5.2	Emergency Contact Numbers
6.0		Method Statement
7.0		Emergency Procedures
	7.1	Local Hospital Details
	7.2	Hospital Location Map
	7.3	Actions on Minor Injuries
	7.4	Actions on Major Injuries
	7.5	Reporting Accidents, Work Related Diseases and Dangerous Occurrences
8.0		Risk Assessment Record
9.0		Briefing Attendance Record

Section 1.0	Introduction
1.1	Description & Purpose of Project

The outfall was originally constructed by Land & Marine in 1960 and is located near Nash in Newport. The offshore section of the outfall consists of a 1470m long concrete coated steel pipe that discharges treated effluent from the Eastman Chemical Plant into the Severn Estuary. The offshore section of pipe which commences approximately 15m north of the sea defence wall and terminates in the low water zone is nearing the end of its design life and is now due for replacement (see photograph below).

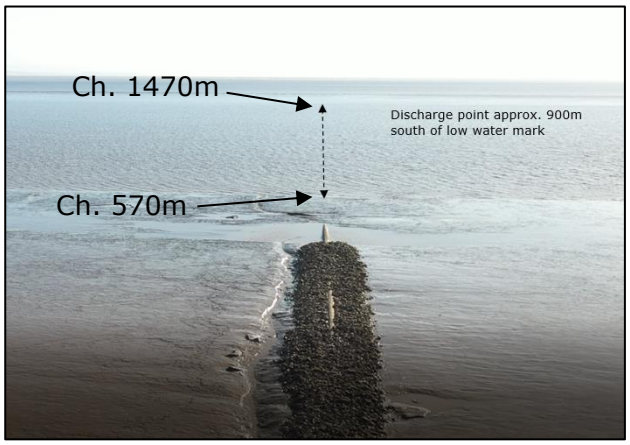
Photograph of the offshore outfall pipe taken in February 2022

Kaymac Marine and Civil Engineering Ltd have been contracted by the Eastman Chemical Company under 'Early Contractor Involvement' (ECI) to undertake the design and installation of the new outfall pipe. The installation is programmed to take place between the months of July and September 2022 subject to Newport Council Planning Permission and a Natural Resource Wales Band 3 Marine License. The new outfall pipe will consist of 12 x 125m lengths of 560 OD HDPE pipe which will be towed from the 'Pipelife' fabrication plant in Norway to the local ABP Wet Dock facility in Newport (see typical towing example in the photograph below). The pipe will be stored in the Wet Dock facility while preparations take place on site for the final installation.

Photograph courtesy of Pipelife

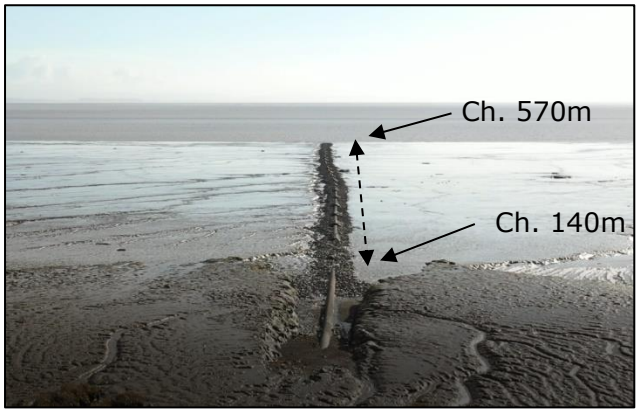
The overall installation can be defined under three main activities as described below:

1. **Offshore Phase**



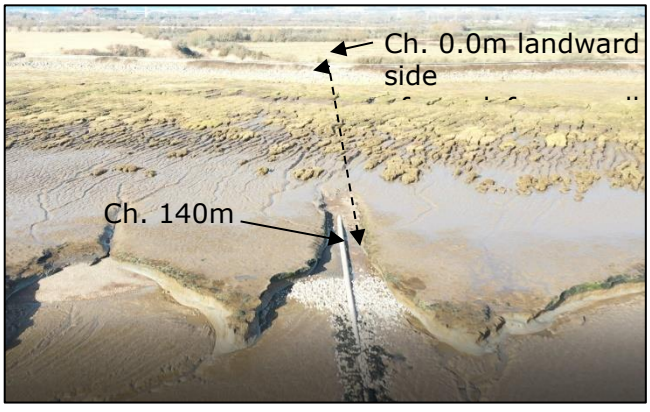
The 'Offshore Phase' relates to the section of pipe that remains underwater at all times. The discharge point within the Estuary is at chainage 1470m and the pipe becomes visible above the sea bed at chainage 570m. Floating plant such as a Back Hoe dredger will be used to excavate a trench adjacent to the existing outfall pipe in which the new pipe will be laid. Precast concrete mattresses will be lowered over the new pipe for protection and to prevent future movement. The trench throughout this section will be approximately 900m in length with a depth of between 1.2 and 2.0m.

2. **Intertidal zone**



This section is within the intertidal zone between chainages 570m and 140m. This beach area will dry out during the low water periods and will be accessed by landing craft. This section can be excaveted either from floating plant during high water periods or from the beach using land-based plant during low water periods. A combination of the two will be used to maximise the working windows. Much like the offshore section, the pipe will be laid within the trench and will be covered with precast concrete mattresses for protection.

3. **Salt Marsh zone**



This section is approximately 140m in length and runs under the Salt Marsh area of the beach. This will consist of a "slip-lining" method which involves pulling the new smaller 355mm OD diameter pipe through the larger existing 432mm ID pipe which completely removes the requirement for any interaction with the Salt Marsh area. The new pipe will then be connected to the original effluent system within a 'shutdown' period using a series of new valves that will be installed within a new cast insitu concrete chamber.
These works will take place during a planned shutdown.

PLEASE NOTE: The activities above will be carried out simultaneously by an offshore 'Marine based' team and a 'Land based' Civils team in accordance with the Contract Programme. The sequential order of the activities may overlap so the following methodology is laid out on a task-by-task basis for clarity. This document should be read in conjunction with contract programme for the actual detailed sequencing.

The following tasks can be carried out simultaneously prior to the planned shutdown date:

Offshore and intertidal works – Marine based team

- Delivery of the new outfall HDPE pipes from Norway to the Wet Dock Facility in Newport Docks,
- Preparation of the HDPE pipes which includes the fitting of concrete ballast collars,
- Excavation of the trench for the new pipeline within the offshore and intertidal sections (chainage 1470m – 140m),
- Installation of Tideflex valve diffuser at proposed discharge point,
- Submersion of the new pipe into the prepared trench
- Installation of precast concrete mattresses over new pipe
- Backfill trench with original excavated material.

'Dry' works north of the seawall – civils land-based team

- Undertake 'setting out' works
- Carry out CAT scan of area to identify existing services
- Local isolation of existing electric cabinet and removal of headwall structure
- Reduction of ground level with excavator (hand dig around services as required)
- Installation of temporary works including sheet piles and shoring system,
- Expose non return valve and outfall pipe

The following tasks can only be carried out during the planned shutdown period when the pipe will be isolated and discharging will be suspended.

'Dry' works north of the seawall – civils land-based team

- Isolation of outfall pipe
- Remove the existing non-return valve and pipe to the connection point with the slip lined section.
- Slip-line the new pipe through the existing pipe up to the shore connection point
- Installation of isolation and non-return valves including vertical transitional connection pipe and connectors
- Construction of cast insitu concrete chamber base and walls
- Installation of cover slab to valve chamber
- Replacement of existing anode bed (this currently gives cathodic protection to the steel pipe)
- Commission the pipeline
- Site clearance and demobilisation from site

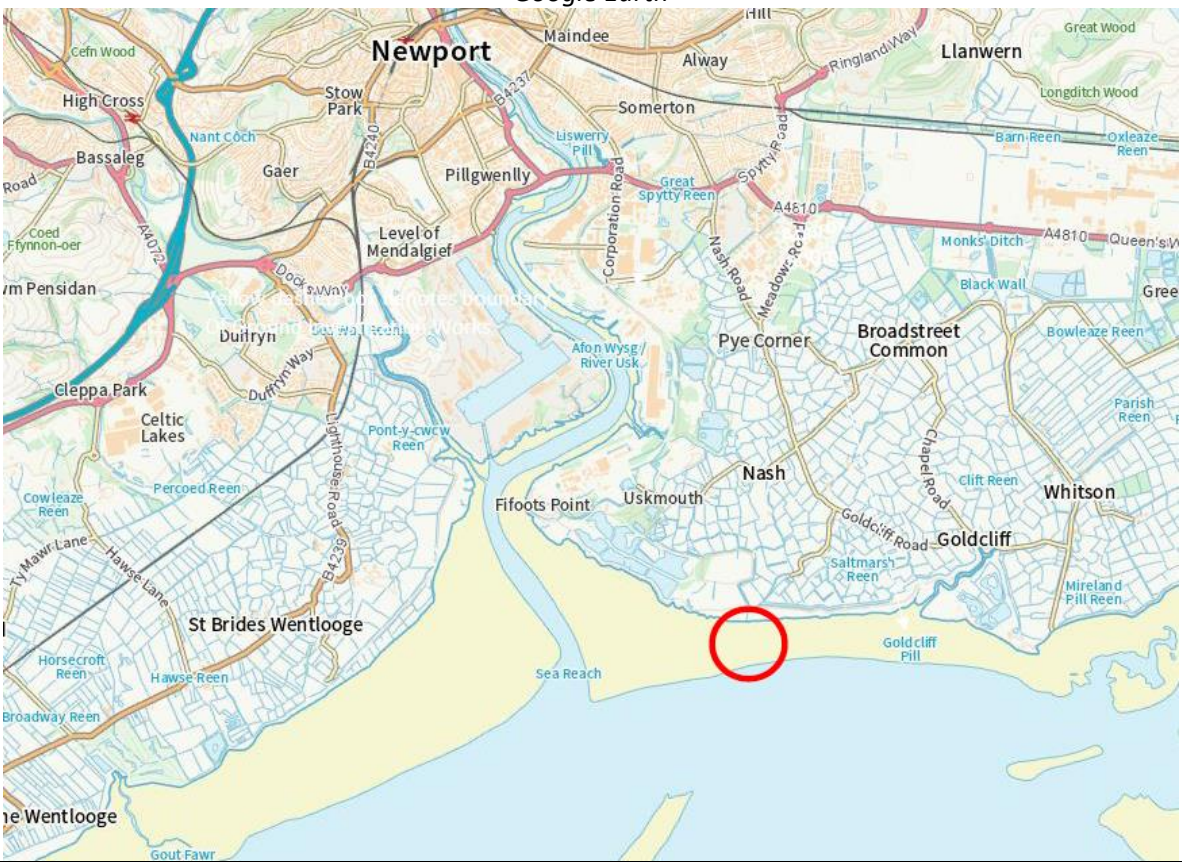
Offshore and intertidal works – Marine based team

- Cut into existing pipeline at chainage 140m
- Tow new section of 355mm OD HDPE pipe from Newport Harbour with Landing craft
- Line up new pipe and anchor in position
- Connect 355mm OD pipe to offshore section of pipe

Section 2.0	Site Location

2.1	Project Site Location Details		
Nearest Address	Salt Marsh Lane, Goldcliff, Nash, Newport, Wales		
Post Code	NP18 2AT		
OSGB	ST 34371 82340		
Lat/Lon	51.536134, -2.9476176	Easting / Northing	334371, 182340
2.2	Site Location Map		

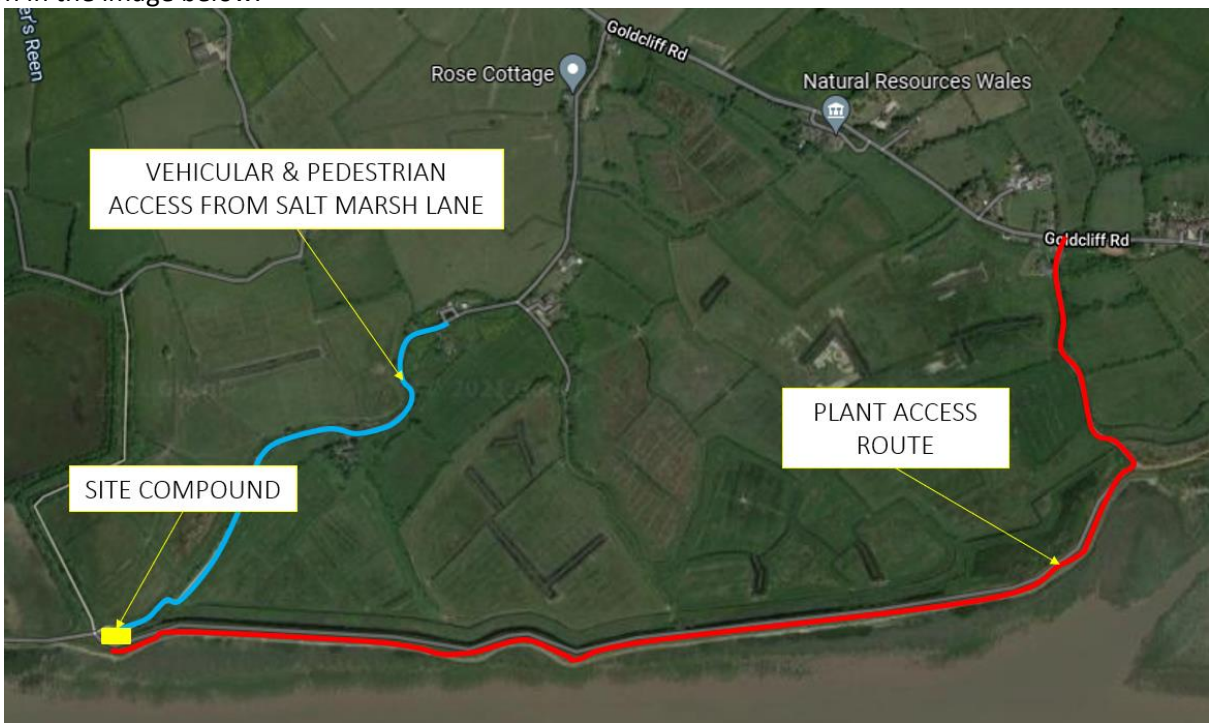
Approximate line of existing pipe and location of site compound north of sea defence wall - Image courtesy of Google Earth



2.3	Site Access

Access to the seaward side of the sea defence wall will be via the marine vessel travelling from Newport Wet Dock facility with all plant and equipment required to undertake the works at a suitable state of the tide.

Prior to the 96-hour shutdown period, Kaymac personnel setup a site compound north of the sea defence wall. Access to this area will be through Salt Marsh Lane for vehicles and pedestrians, and Boat Road for plant, as shown in the image below.



Access routes to site compound north of the sea defence wall – Image courtesy of Google Maps

Section 3.0	Legislative and Site-Specific Compliance

3.1	Statutory Legislation

This document has been prepared to comply with, as far as reasonably practicable, the following current relevant legislation (as applicable):

- The Health & Safety at Work etc. Act 1974
- The Management of Health & Safety at Work Regulations 1999
- The Health & Safety (First Aid) Regulations 1981
- The Lifting Operations and Lifting Equipment Regulations 1998
- The Work at Height Regulations 2005
- The Personal Protective Equipment at Work Regulations 1992
- The Manual Handling Regulations 2002
- The Control of Substances Hazardous to Health Regulations 2002
- The Reporting of Injuries, Diseases & Dangerous Occurrences (RIDDOR) Regulations 2013
- The Environmental Protection Act 1990
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)

3.2	Additional Site-Specific Compliance

- Throughout the works, Kaymac will (as far as reasonably practical) ensure that no activities will be completed in a manner that could damage or alter the existing beach profile
- Appropriate signage and barriers will be erected around the work site to inform possible beach users of the impending works
- Prior to demobilising from site, Kaymac will ensure that the beach profile is restored to its original state (so far as is reasonably practical)
- All operatives will hold current CSCS cards

- The relevant COVID-19 site procedures are to be adhered to at all times
- Any excavation will be suitably graded to an acceptable angle to prevent any collapse of the sides
- Kaymac will fill out and 'self-issue' a Permit to Dig and a Permit to Break Ground prior to any excavation works
- The Client is to issue an isolation permit for Kaymac make any connection into the existing outfall
- For purpose of this Methodology, all lifting operations will be carried out in accordance with an approved Lift Plan and all lifts will be under the control of a Lift Supervisor & Slinger/Signaller.

3.3	Environmental Considerations

Throughout all aspects of the works, Kaymac will actively aim to conduct activities in a manner that will cause minimum detrimental effects to the local ecology and wildlife and as a result, we will carry out the works with the following Environmental Actions:

- Prior to the commencement of any works, Kaymac will obtain all relevant Licenses and permits from NRW and any other regulatory authority. All works will be carried out in accordance with the above Licenses and permits.
- All plant delivered to site will be sourced from a trusted reputable company and upon ordering, Kaymac will enforce the notion that any plant to be delivered will need to be cleaned and fit for purpose (no leaks or damaged pipelines, hoses, etc).
- All materials to be used for installation will be inert and will not contain toxic elements which may be harmful to the marine environment, the living resources which it supports or human health.
- Upon arrival to site, the Kaymac Supervisor will proceed to inspect the plant for any visible signs of leaks or un-cleanliness that could potentially damage the ecology. All plant will also come with spill kits which all of Kaymac Personnel are trained in the use of.
- All plant that is to be used on the beach or the floating plant will be fitted with bio-degradable oil to negate any environmental issues in the unlikely event of a spillage or leak.
- No refuelling procedures are to be carried out at sea during the works. All re-fuelling will take place at the satellite compound within the nearby harbour.
- All equipment being used on or near to the watercourse will be appropriately 'bunded' to prevent any possible spillages from harming the local ecology and wildlife.
- If any protected species are found within the vicinity of the works, works will cease and the Client and Natural Resources Wales (NRW) representative informed. Works will not recommence until permission is granted by the Client and NRW representative.
- During the works, Kaymac will (as far as reasonably practical) ensure that no activities will be completed in a manner that could damage or permanently alter the existing seabed profile.
- Prior to demobilising from site, Kaymac will ensure that the seabed profile is restored to its original state (or as specified in the construction drawings).
- Any waste and unused materials will be removed from site in a safe manner by a licensed waste carrier upon completion of the works.
- The waste hierarchy (Reduce, Reuse, Recycle and Dispose) will be employed throughout the construction works.
- Care will be taken to only order the correct quantity of required materials, reducing disposal of unused materials.
- Any COSHH waste and special waste will be removed from site by a specialised waste carrier. COSHH waste should not be mixed with general waste and/or other recyclables.
- No plant, equipment, or construction works are to be undertaken on the salt marsh. The new pipe will be slip-lined to remove any requirement of works over this sensitive area (the Salt Marsh is only to be used infrequently for pedestrian access limited to 1 to 2 people).

Section 4.0	Project Resources

4.1 Kaymac Site Personnel

- 1 x Landing Craft Skipper
- 1 x Landing Craft Deck Hand
- 1 x Kaymac Site Manager
- 2 x Kaymac Site Supervisor / Engineer
- 1 x Kaymac Excavator Operator
- 1 x Kaymac Banksman
- 3 x Kaymac General Operatives / Divers

4.2 Site Welfare & Storage

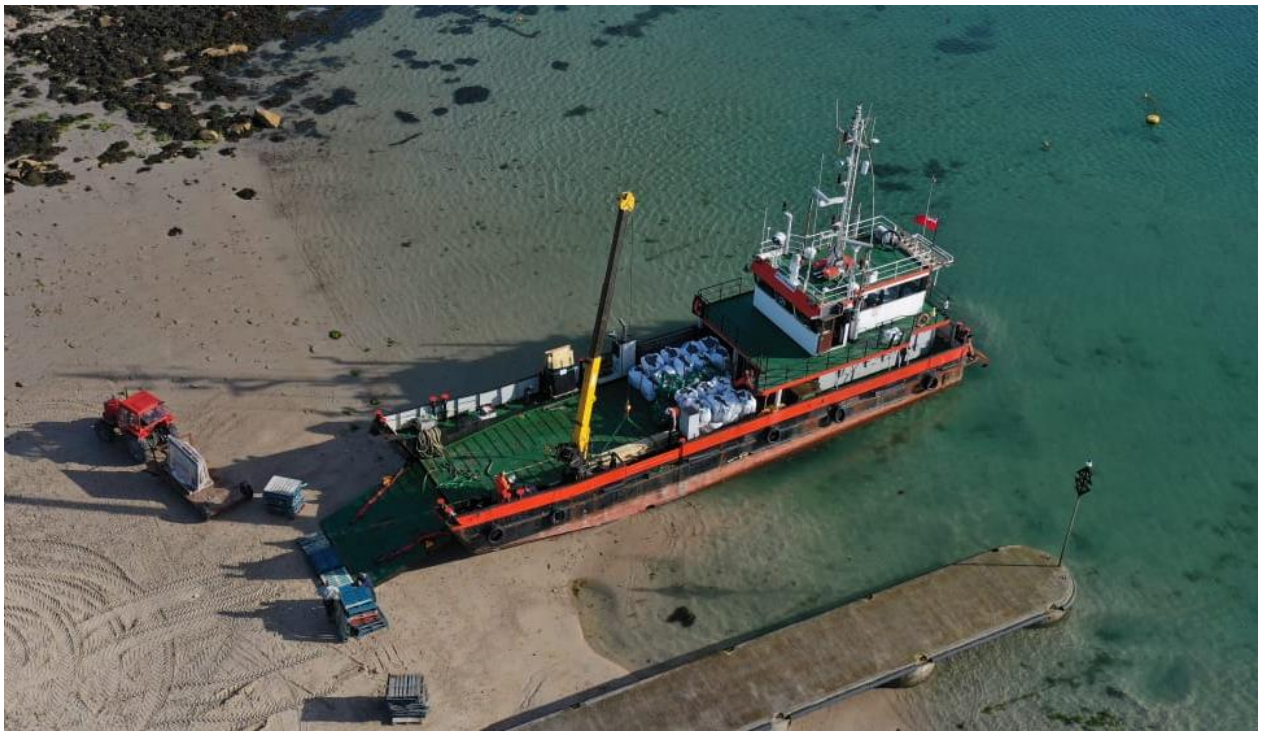
- Welfare facilities will be available on the landing craft and at the site compound when Kaymac have mobilised to the north side of the sea defence wall
- Welfare facilities within the harbour facility will be either within the satellite compound or in a harbour owned building with approval from the Harbour Master
- Suitably sized storage containers will be on site at both the satellite compound and the compound north of the sea defence wall

4.3 Site Plant & Equipment

- Back Hoe Dredger – offshore trench excavation

- Suitably sized 360˚ tracked excavator with Bio Oil and digging bucket
- Suitably sized wheeled dumper
- Fencing and signage as required
- Emergency stretcher for recovery to Boat Road
- GPS and surveying equipment
- Surface supplied diving equipment
- Fuel bowser
- Navi mats

- Small hand tools i.e., shovels etc.
- CAT & Genny
- Temporary works – formwork, sheet piling and shoring systems
- Landing Craft "Terramare 1" supplied by Marine & Towage Services (MTS) (or similar)



Landing Craft "Terramare 1"

4.4	Materials

560mm OD HDPE Pipe
355mm OD HDPE Pipe
Vertical and horizontal connectors/couplers
Concrete mattresses
Concrete collars
Ready mix concrete – Valve chamber
Steel reinforcement
1 x Non return valve
2 x Isolation valves
2 x fabricated 'T' pieces
Anodes and associated equipment

4.5	Personal Protective Equipment (PPE)

The minimum PPE requirements for the site will be:

- Safety Helmet to BS EN397:2012
- Safety Boots (or Wellington Boots) to ISO 20345:2011
- High Visibility Jacket/waistcoat to EN471:2003
- Safety Glasses to EN166
- Closed cell neoprene Dry Suits (if required)

Section 5.0	Project Directory	
5.1	General Contact Numbers	
Eastman UK Site Representative - David Davies		01633 754454
Kaymac Site Supervisor – TBC		TBC
Kaymac Marine & Civil Engineering Ltd-Swansea Office		01792 301818
Kaymac Operations Director-Jeff Lippiett		07971 880029
Kaymac Project Director-Rhys Colcombe		07950 501774
Kaymac Project Manager – Jon Colcombe		07771 803693
Kaymac Project Coordinator-Jon Dean		01792 301818
5.2	Emergency Contact Numbers	
The Grange University Hospital		01633 493100
HSE Incident Contact Centre		0845 3009923
HSE Infoline		08701 545500
Kaymac Health & Safety Manager-Gareth Crees		07971 880028
Ambulance, Police or Fire & Rescue Service		999

Section 6.0	Method Statement

All Kaymac personnel will attend the Eastman offices prior to commencement of the works on the start date agreed with the Client and as per the project programme. All operatives involved in the project will be site inducted to ensure they are away of:

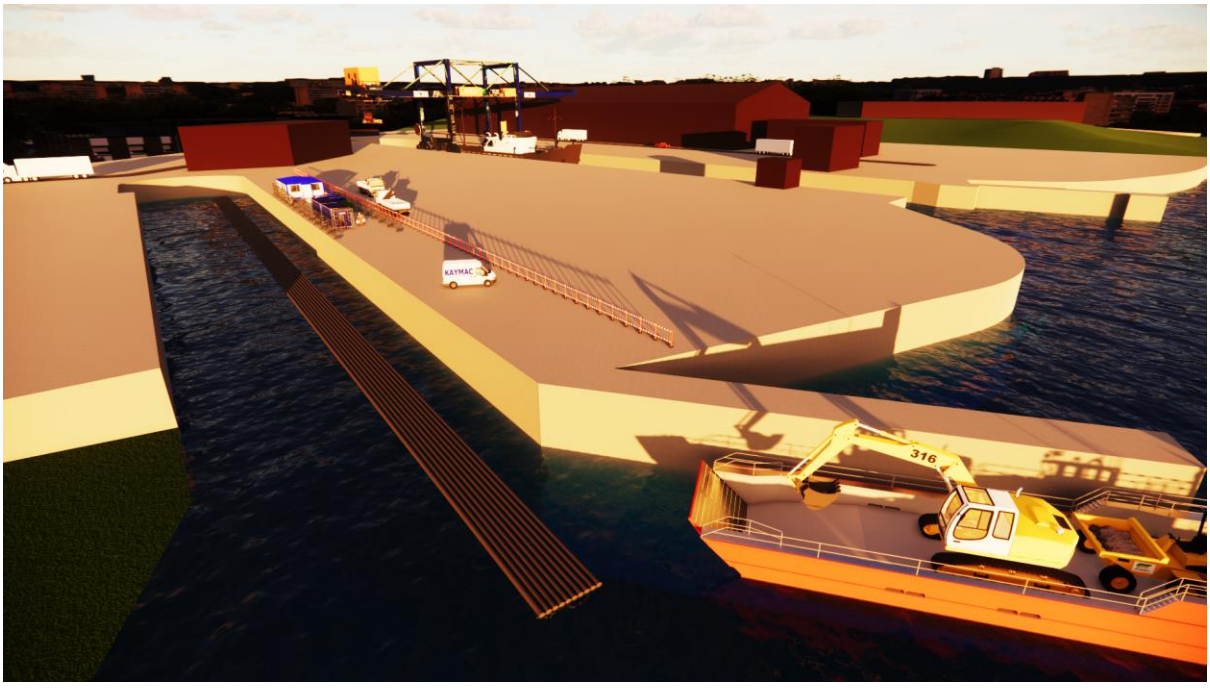
- The site layout
- Hazards and risks involved in carrying out the works
- Environmental considerations and site constraints
- The method of works and risk assessments
- Emergency arrangements in the event of an incident, including location of the nearest hospital

All Kaymac and sub-contract personnel will be required to sign the site attendance register prior to starting work each day, and to sign out at the end of each shift. The Kaymac Site Manager / Supervisor will be responsible for briefing the site-specific Method Statement and Risk Assessments appertaining to the project tasks to the site team.

Mobilisation and Delivery of Pipes

Kaymac personnel will setup a satellite compound at a nearby Harbour Facility, which will be used as storage for the marine plant and beach equipment when not in use. Note that the images shown in the following (Section 6.0) are indicative and are only included to provide a visual overview of the types of works to be undertaken.

Safety fencing will be erected around the compound to prevent any unauthorised access from other harbour users.



Satellite compound setup in nearby harbour facility and pipes delivered from manufacturing facility in Norway.

An approved Biosecurity Plan will be implemented to reduce the risk of the introduction or spread of invasive no-native species.

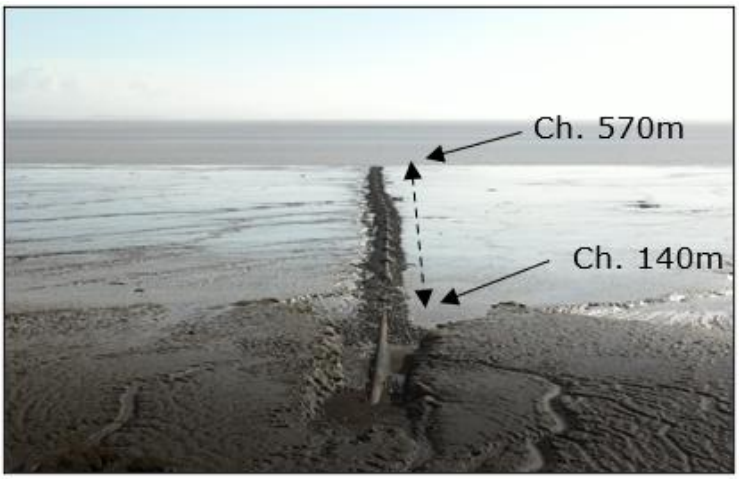
All the necessary plant and equipment to undertake the works will be loaded onto the landing craft and sea fastened at the nearby harbour.

Completion of the site setup will coincide with the delivery date of the pipes from the manufacturing facility in Norway, whereby the 12no. pipes will arrive by sea in 125m long sections.

All inspection and testing of the pipes will be undertaken in a controlled environment within the manufacturing facility, with Kaymac personnel undertaking visual inspections for any noticeable defects on arrival of the pipes to site.

Prior to commencing any works, the Kaymac Site Manager/Supervisor will carry out a safety briefing informing the site team of each individual's roles and responsibilities, emergency procedures in the event of an on-site incident, and the hazards and control measures relevant to the tasks required. All personnel in attendance will be required to sign the Briefing Attendance Record in section 9.0 of this document.

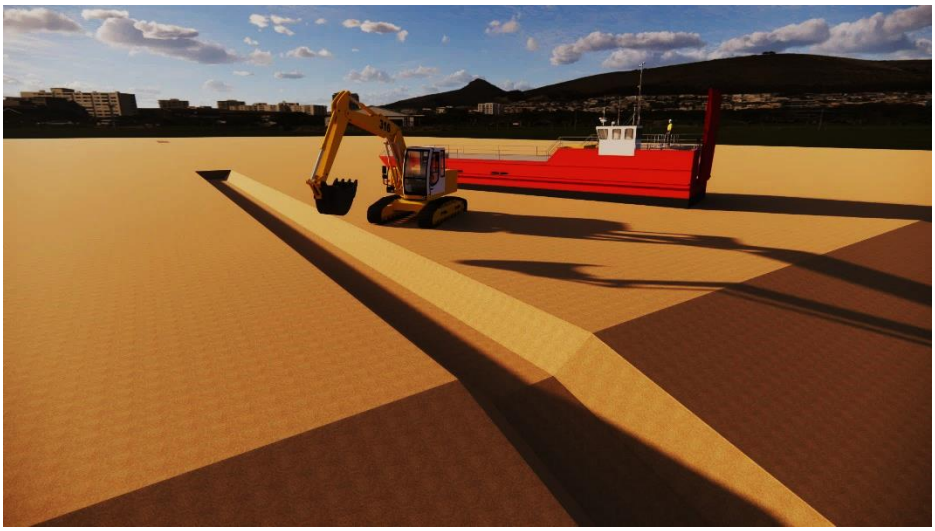
Trench Excavations between chainages 140m and 570m (intertidal zone)



Once the satellite site compound has been setup and the sections of pipe have been delivered, the landing craft vessel will leave the harbour with the excavator and any other plant and equipment required, and will mobilise to the site at Newport during a suitable state of tide.

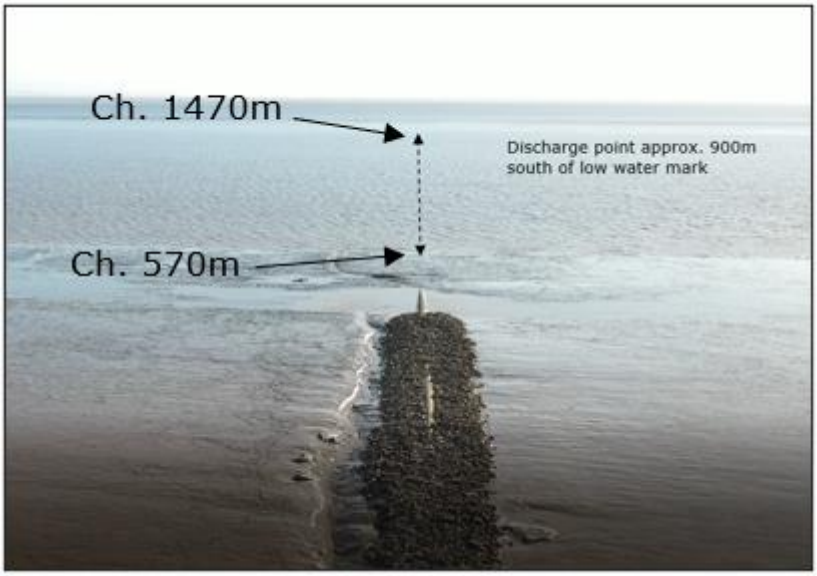
If the water level at low tide is **lower** than the existing pipe at the corresponding chainage, i.e., the pipe is dry, the landing craft will ground itself within the vicinity of the new pipe, with the first section of the new pipe being placed at chainage 140m-265m. The landing craft will position itself to maximise the working window before the tide comes back in. The plant and equipment will be checked for any leaks before any items are tracked off the landing craft and onto the beach.

In a methodical manner, the trench will be excavated ensuring all sides are battered back to a suitable angle of repose to prevent collapse and to prevent any material from falling back into the trench. All excavated bed material will be side-cast adjacent to the trench. Side-casting the material will also provide a more efficient backfilling process later on by reducing the requirement to transport material to and from site.



The trench excavation and the subsequent pipe installation will not be completed during one low water period, therefore, an element of re-work of the trench will need to be carried out prior to works commencing on the following Low water period.
The line and level of the trench will be monitored and checked by the on-site Kaymac Engineer to ensure that the invert level is to the correct specification and is in accordance with the contract drawings.

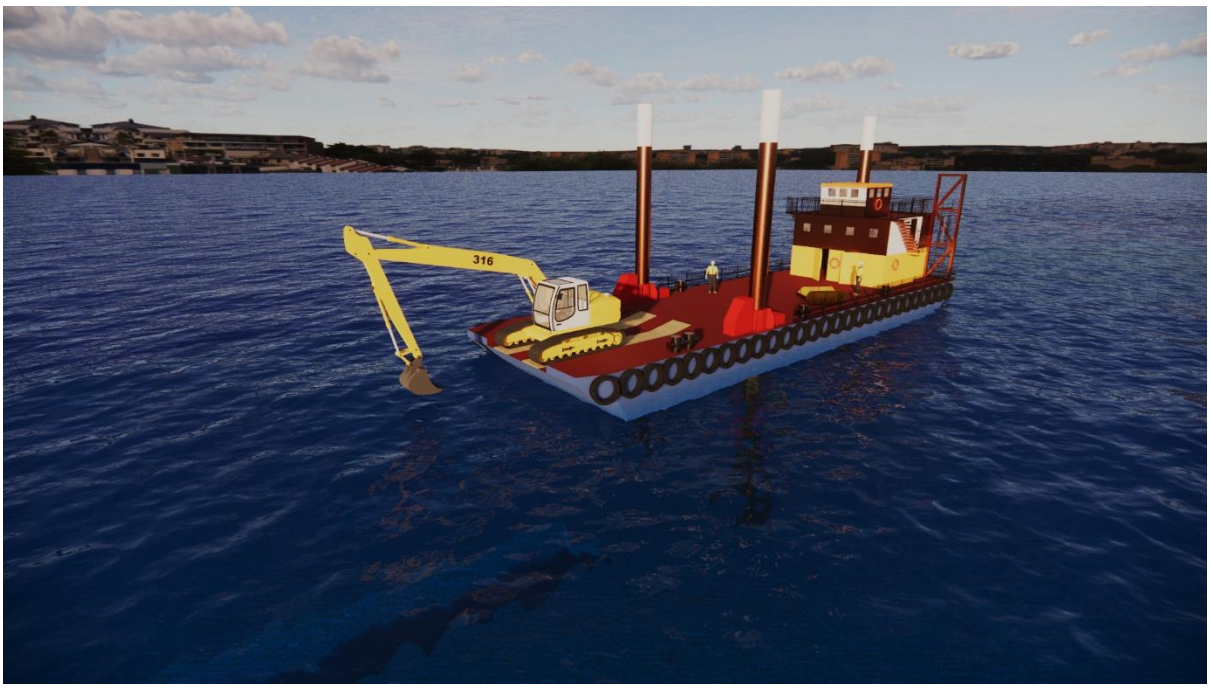
Trench Excavations between chainages 570m and 1470m (offshore zone)



If the water level at low tide is **higher** than the existing pipe at the corresponding chainage, i.e., the pipe is fully submerged, the marine vessel will be positioned above the trench in a suitable position to enable the excavator onboard to reach and dig the trench, as shown in the image below. Onboard GPS and surveying equipment will be utilised to accurately determine the position, line, and level of the trench from the water's surface.

As per the intertidal section, the trench will be excavated ensuring all sides are battered back to a suitable angle of repose to prevent collapse and to prevent any material from falling back into the trench. All excavated bed material will be side-cast adjacent to the trench. Side-casting the material will also provide a more efficient backfilling process later on by reducing the requirement to transport material to and from site.

In addition to using the on-board 'dig depth' surveying system, periodically during slack water periods, the Kaymac dive team will be utilised to carry out any checks that are deemed necessary by the on-site Kaymac Engineer. All diving operations will be carried out in accordance with site specific Dive Project Plan.

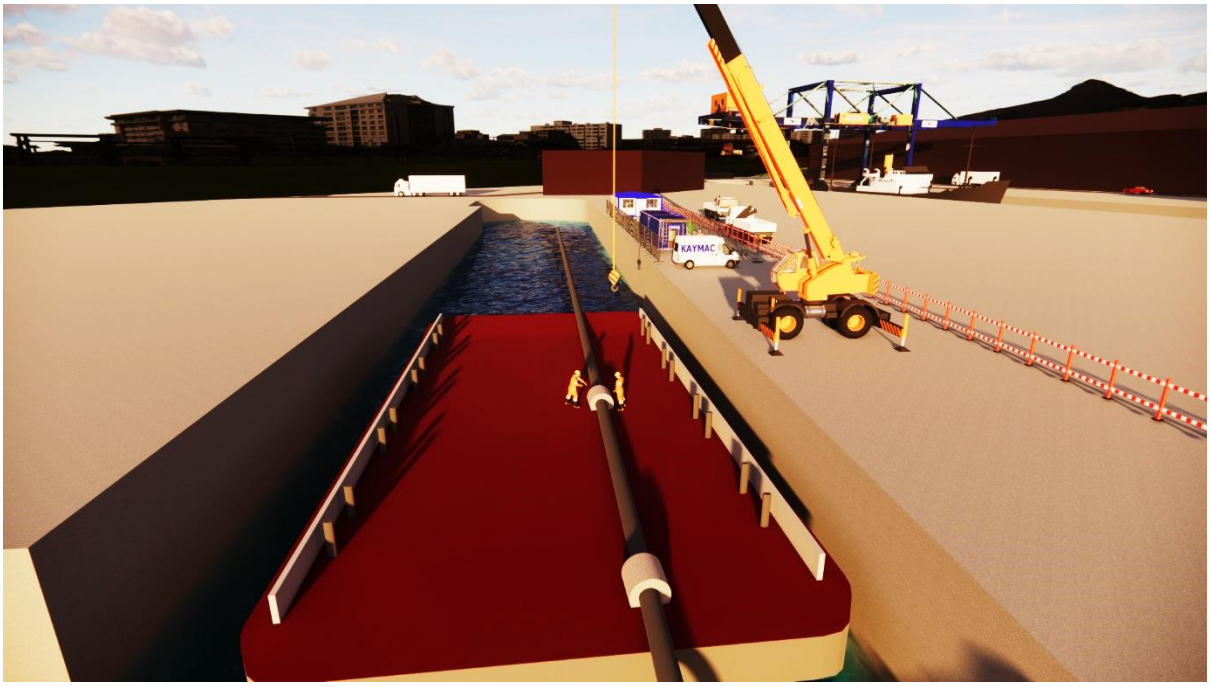


Excavator situated on the barge to excavate the trench.

Preparation of Pipes

Whilst the trench excavations are on-going, a separate Kaymac team will commence the installation of concrete collars to the pipe sections in the harbour in accordance with the design, this will aid in the submersion process of the pipe later on.

Each pipe section will be lifted over a pontoon within the harbour, enabling Kaymac personnel to fit the collars in a safe and controlled manner.



Concrete collars being installed to new pipe section in nearby harbour facility.
The collars have been designed so that when filled with water and sealed, the pipe is still able to float

Positioning and submersion of Pipe into trench

Once a 125m section of the trench is prepared and the line and level has been checked by the Site Manager / Engineer, the first 125m length of pipe will be pulled into position by a marine vessel during a high tide, as shown below.

New pipe being transported from the harbour facility into the required position.

The weather forecast will be frequently monitored prior to transportation to ensure the pipe is only transported during calm weather. The pipe will be towed into position on a rising tide only to ensure that the maximum time window is available to position and secure the pipe above the trench prior to submerging.

Submerging procedure

The planned 'sinking route' will be marked clearly with floating buoys to the surface to ensure the pipe is placed accurately.

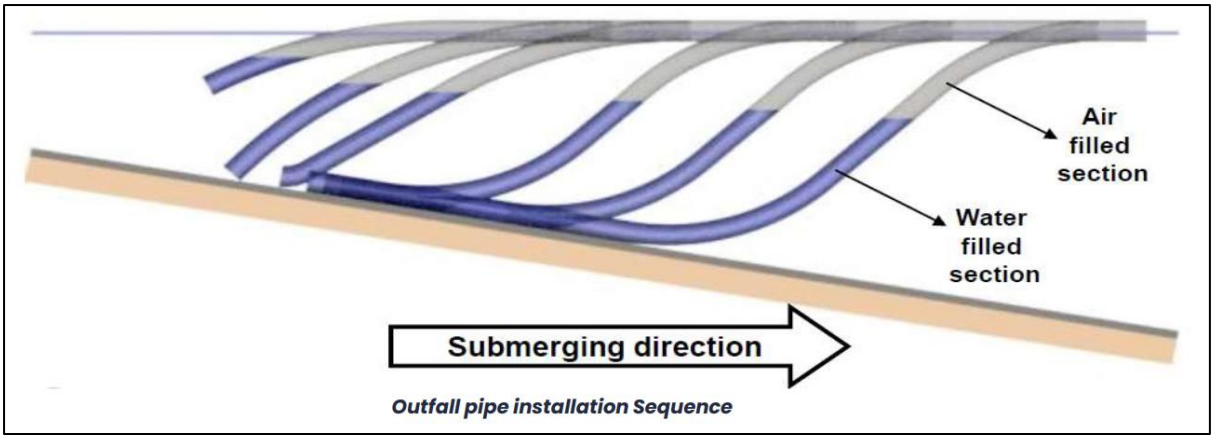
A winch system connected to a suitably sized excavator will be situated at chainage 140m and the suitably sized and tested winch cable will be attached to the towing head of the pipe. During the sinking procedure, the cable will be made taught to offer sufficient tension to maintain the position of the pipe.

The workboat supervisor will assess the weather forecast and make the decision as to whether it is safe to begin the sinking procedure. There should be minimal wind and waves during this process.

The pipeline will be positioned to follow the correct route by the supporting vessels on site.

The 'Beachside' end will be connected to the excavator via a suitably tested and certified winch line. The 'Seaward' end will then be attached to the winch on-board the workboat, to offer the necessary 'pulling force' required during the sinking process.

Diver's will then enter the water to open the inlet and outlet valves to the sinking lid on the 'seaward' end, which will allow the pipe to be sank in accordance with the manufacturer's sinking procedure (detailed in section below). The inlet valve will be used to flood the pipe with water, whilst the outlet valve will allow air to escape to the surface via a suitable length of hosing, when required.
The sinking process will be carried out in a manner to follow the manufacturer's recommended procedure, shown in the diagram below:



'S' bend installation method. Image courtesy of Pipelife.

By regulating the air pressure inside the pipeline, a controlled sinking operation with a constant speed will be achieved. The S-bend configuration shown is subject to the balance between the forces acting downwards (the concrete weight collars) and the upwards acting forces (the buoyancy force acting on the pipe).

The process will be carried out as a continuous process because if the sinking stops, the Elastic Modulus of the pipe material decreases with time and the minimum radius of curvature will be reduced analogously, which can cause buckling of the pipe. The specified ratio between the radius of curvature and the diameter of the pipe must not exceed 20, otherwise collapse or buckling of the pipe may occur.

If, for any reason, the sinking procedure needs to be stopped or disrupted, it will be necessary to start the compressor to reverse the sinking process. If required, this action must take place within the first 15 minutes of interruption.

Communication between the land and sea-based teams will be maintained at all times via radio and mobile phones.

Eventually, the S-Configuration will be transformed to a J-configuration just as the water reaches the 'Seaward' end of the pipeline. At this point, enough force must be exerted by the pulling winch to prevent any dynamic acceleration forces acting on the pipeline as the last volume of air leaves via the valve. The length of the pulling wire will be equal to the vertical distance between the seabed and winch to ensure that a 'safe' landing takes place as the pulling force is eventually reduced to zero.

On completion of the submerging process, divers will be deployed to check that the pipe is located within the trench in accordance with the contract drawings. If the pipe is out of line, then the excavator on board the floating plant will be able to adjust the position accordingly prior to placing the concrete mattresses over the top.

This process will be repeated until all the 11no x 125 lengths of pipe have been installed.

Connection of pipes underwater

Each 125m pipe is connected to the preceding length by 2 x Stainless Steel spinning flanges connected to each with 20nr M20 bolts.

Please note that when backfilling over the top of the pipe, a length of 20m will be left uncovered so that the end can be brought to the surface to allow connection to the next length of pipe.

Diffuser Installation

A diffuser section will be required to be installed at the discharge position at chainage 1470m as the design depth of the pipe invert is below the sea bed level.

Once the end of the pipe has been submerged and is in the correct position, the diffuser section will be attached to a crane or excavator which will be positioned on the workboat.

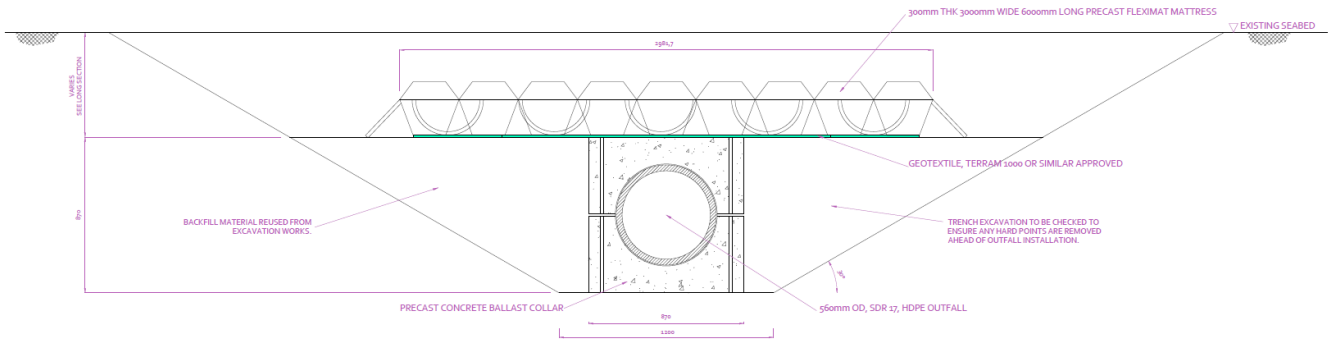
A dive team will be deployed and will remain in a position of safety (never directly under the load). The diffuser section will be lowered through the water and the position will be checked by divers.

When the diffuser is in the correct position the divers will connect the two flanges with the bolts supplied.

On completion of the installation, the dive team will be recovered from the water.

Backfill and Placement of Concrete Mattresses

Once the pipe is sunk into position within the trench, the previously excavated spoil, which was side-cast adjacent to the trench, will be used as the backfill material to fill the trench up to the top of the concrete collar level (please see detail below)

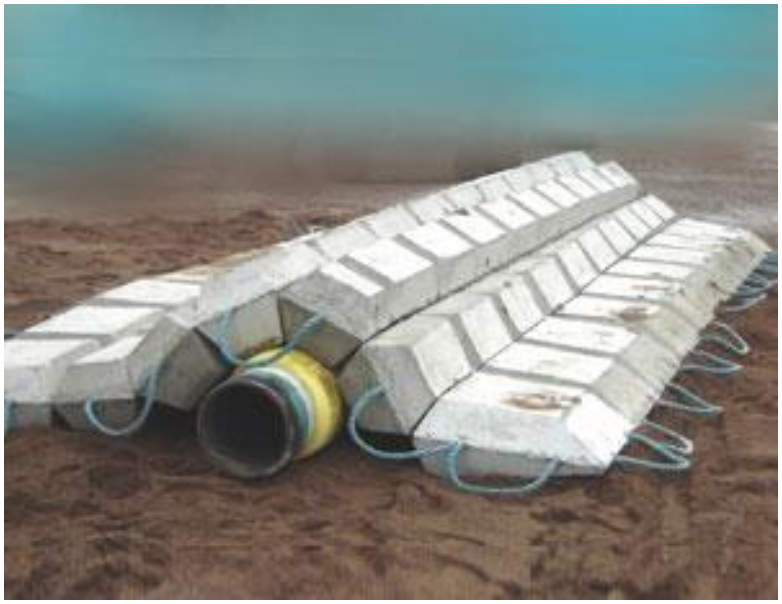


TYPICAL TRENCH PROFILE- SEABED
FRONT ELEVATION

Using an excavator positioned either on the sand or on floating plant (dependant on the works location relative to the tide), the concrete mattresses will be placed over the top.

Once the concrete mattresses are securely in position, a final layer of backfill will be placed over the pipe to achieve the specified finish level.

The image below is an example of the type of concrete mattress to be installed.

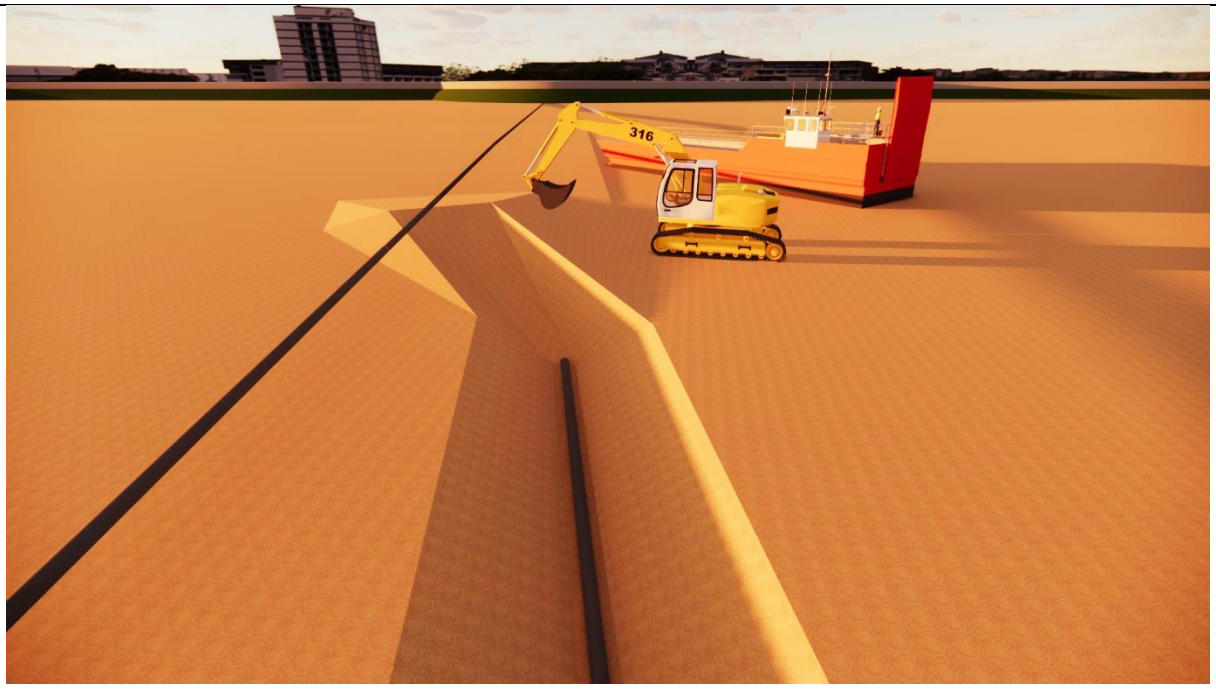


Concrete mattress example – Image courtesy of Subsea Protection Systems.

During the backfilling and installation process outlined above, the Kaymac Site Manager / Engineer will continuously check the levels to ensure the correct finished level is being achieved before moving onto the next section of pipe.

Prepare Trench at Approx. Chainage 140m

Once Kaymac have reached approx. chainage 140m using the process outlined above (i.e., excavating the trench, sinking the pipe sections, and backfilling with bed material and concrete mattresses), excavations will be undertaken to angle the trench towards the existing pipe to allow the new pipe to be smoothly slip-lined into the existing during the shutdown period later on.



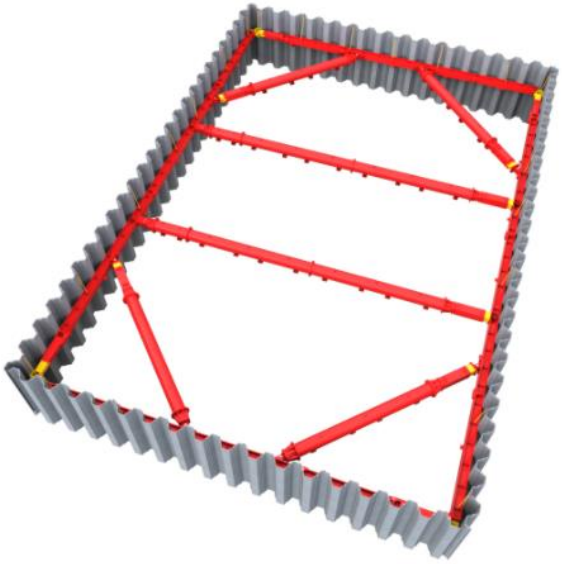
Trench being angled towards existing pipe at approx. 140m chainage.

Construction of Valve Chamber and Anode Bed- North of the Sea Defence Wall

Illustration showing the approximate location of the excavation required to expose the existing pipe for replacement and for the construction of the valve chamber (the temporary excavation support system has been omitted for clarity)

Ground reduction and installation of temporary works

To facilitate the replacement of the existing non-return valve and the installation of 2no new isolation valves, a temporary excavation support system will be installed. The existing non return valve is currently buried up 2m deep approximately 15m north of the seawall, therefore a support system approximately 15m long x 3m wide x 3m deep will be required to safely expose the old valve and install the new valves (please see example of the support system below).



Prior to any works commencing, a site compound area will be set up and Heras fencing will be erected to prevent any unauthorised access by the general public.

The new valves, pipes and the trenching system will be delivered to the compound. All deliveries will be escorted and a banksman will be in attendance at all times to ensure the safety of the general public.

All the required plant e.g., excavators (with piling attachment) and dumpers will be mobilised to site via the alternative 'Goldcliff' route down Boat Road. All plant deliveries will also be escorted and a banksman will be in attendance at all times to ensure the safety of the general public.

The area will be CAT scanned to locate any existing services and the Kaymac Engineer will mark out the area for the temporary trenching system. An existing anode bed which provides cathodic protection to the pipe is buried in the vicinity of the concrete headwall structure. This anode bed will also be located and marked out on the surface.

The electricity supply to this anode bed is currently fed from an electric box surrounded by a concrete headwall structure. The supply will be isolated and temporarily removed by Eastman and the headwall structure will be removed before any works begin (please see photograph below)

Photograph showing the electricity supply and surrounding structure

All necessary permits must be in place prior to any piling or excavation works can commence. A self issued 'permit to break ground' and 'permit to dig' will be completed by the Kaymac Site Manager.

Following the removal of the electricity supply and using a suitbaly sized excavator with a pecker attachment, the concrete headwalls and concrete base will be broken out and transported to a designated concrete waste skip for removal off site.

The ground around the line of the existing outfall will be reduced with an excavator and then hand dug to expose the pipe. The sides of the excavation will be battered to prevent collapse.

Once the line of the pipe has been clearly determined, using a suitably sized excavator with a piling attachment, the trench sheets will be driven to the design depth to of approximately 3m to form a rectangular shape to allow further excavation for the valve chamber.

When all the trenching sheets have been installed to the correct depth, excavation within the perimeter of the sheets will commence. The excavated material will be loaded into a dumper and transported to a designated storage area. Some of the material will be stockpiled for later reinstatement and landscaping works and the remaining material will be disposed of at a licensed facility.

As the excavation progresses, the shoring system will be lowered in place and connected to the inside perimeter of the trenching sheets as per the temporary works design. This shoring system will provide the lateral support to prevent movement of the trench sheets.

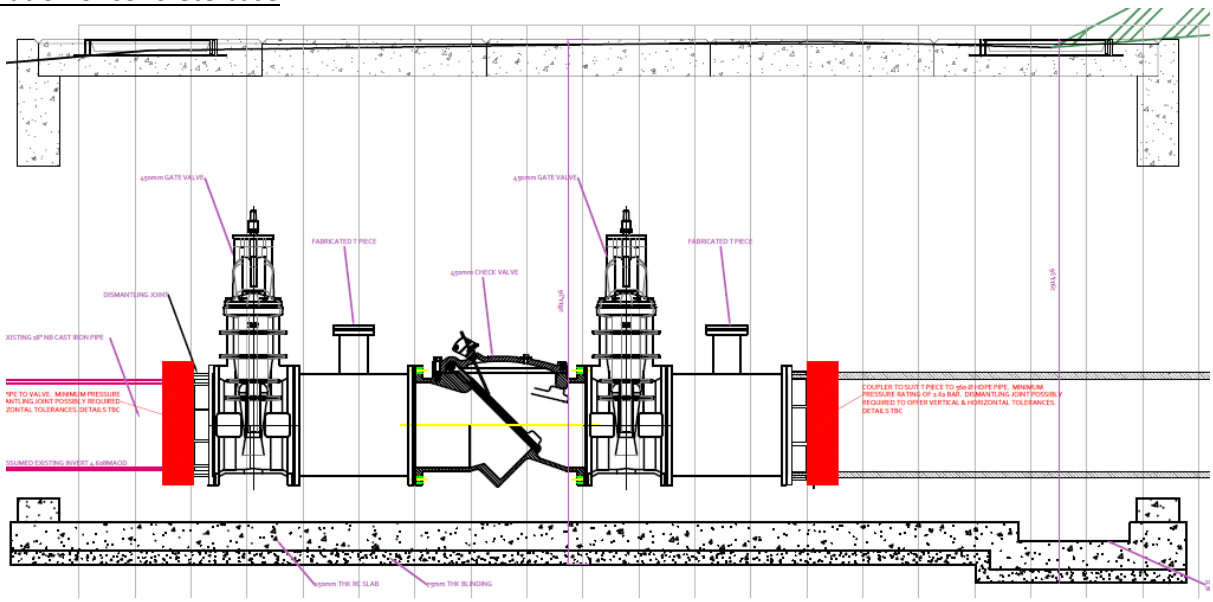
The ground reduction will continue using the excavator until such time as the existing non-return valve and the pipe is located. A hand dig will then be required to finaly expose all the buried elements to prevent damage.

A final clean up inside the temporary excavation support system will be carried out and an access staircase will be installed to allow easy access egress to all personnel.

It will be necessary to monitor the ingress of water as the excavation proceeds, and mitigation may be required if the ingress is excessive. A sump in the corner of the excavation may be created and a pump will be introduced to control any ground water as required. The water will be pumped into a settlement tank to allow the sediment to settle before releasing the water to drain naturally back into the ground.

Once the ground level has been reduced to the design depth a layer of type 1 aggregate will be spread evenly through out the invet to provide a dry working area.

Installation of concrete base



Typical detail of valve chamber

Prior to the planned shutdown, the base of the chamber will be constructed to provide a firm and clean area prior to the valve installation.

Steel reinforcement will be prepared on the surface in accordance with the design and then lowered into the excavation. Temporary shuttering will be placed around the perimeter of the proposed slab area to prevent the concrete from adhering to the trench sheets. Vertical reinforcement bars will be cast into the slab in preparation for the erection of the chamber walls at a later date.

The area will be measured to establish the volume of concrete required and the ready mix concrete will be ordered. The concrete will be delivered to site and all environmental protection measures such as polythene will be set up to prevent any concrete spillages. **Concrete test cubes will be taken accordingly to confirm the strength of the concrete.**

The concrete will be introduced by chute into the shuttering until the required level has been reached. A concrete poker will be used to prevent any air pockets. The concrete will then be floated off and left to cure overnight. The chamber walls and cover slab will be constructed following the planned shutdown. The concrete wagon will be washed out in the designated skip and will demobilise.

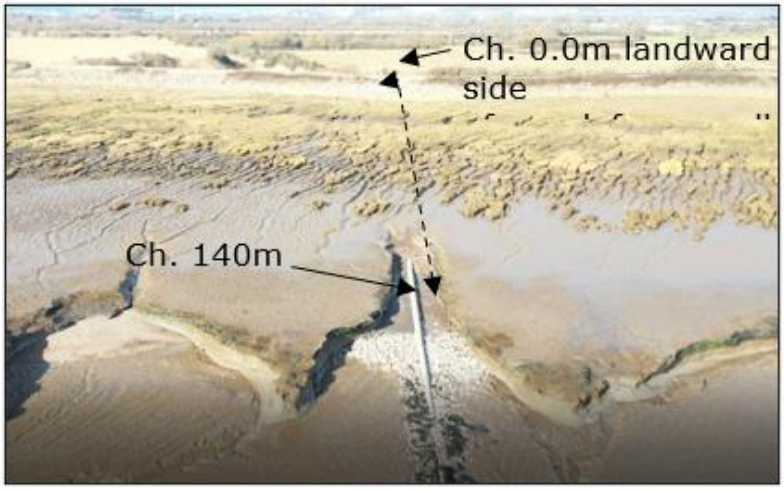
Planned Shutdown Period – 96 hours

HOLD POINT - Prior to the planned shutdown period, all advance preparatory works will be checked and accepted. This will include the works to the north of the seawall, the pipe on the foreshore and the preparation of the new pipe.

On acceptance of the above, the Client will isolate the existing outfall pipe and drawback any remaining effluent, allowing Kaymac to undertake the slip-lining and re-connection works between the existing and new pipe.

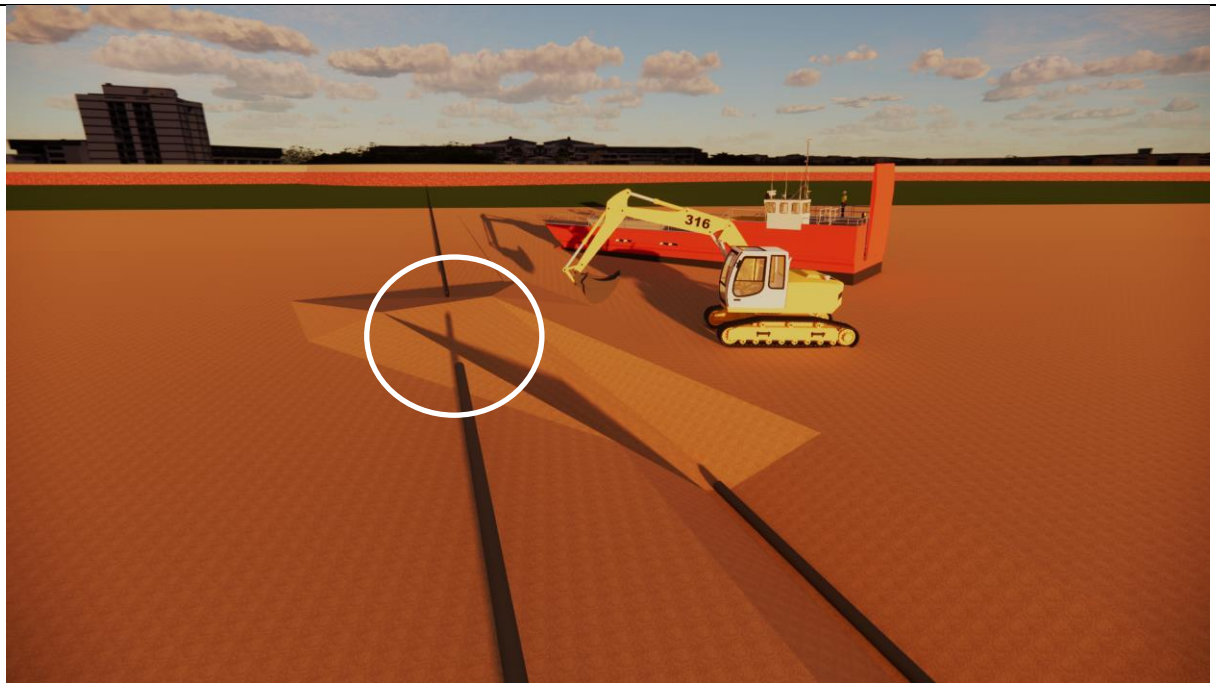
A permit will be issued by Eastman to Kaymac to allow the pipe intervention to commence.

Slip lining and final connection works between Chainage 140m – 0m (Salt Marsh area)

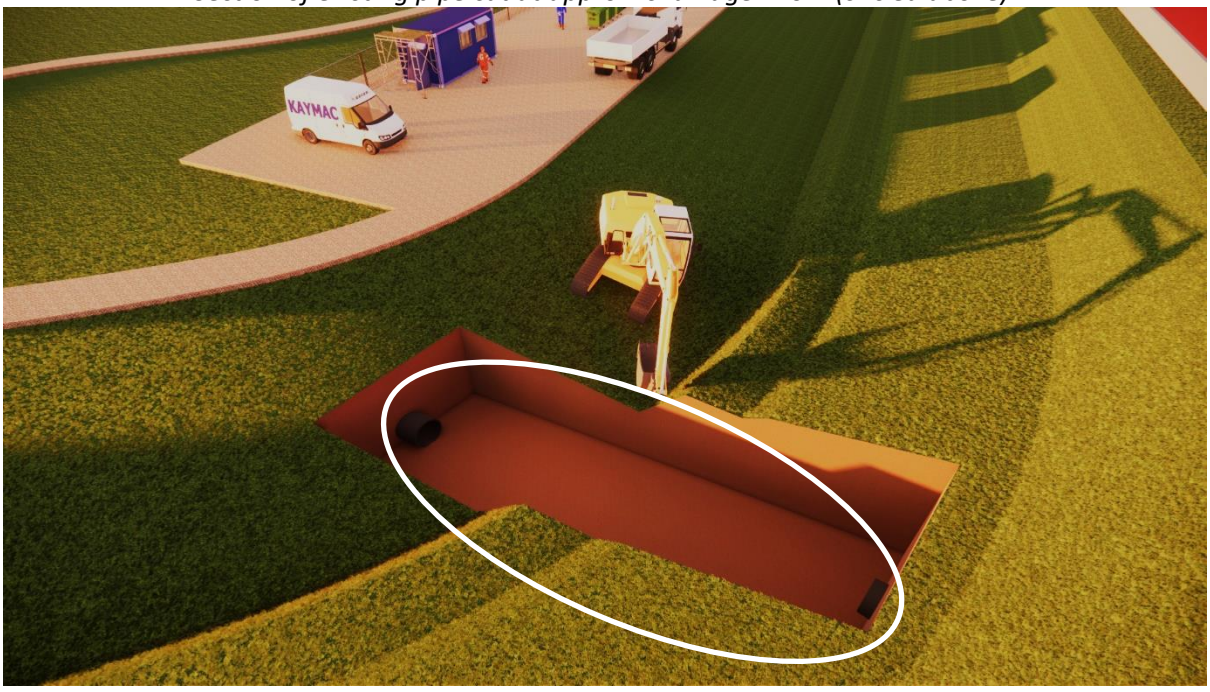


To facilitate the slip lining works, a section of the pipe at chainage 140m must be removed and the existing ‘swan neck’ section north of the sea defence wall to provide entry and exit points for the slip-lining of the new 355mm OD pipe.

Following the cutting of the existing pipe, it is expected there will be some remaining effluent discharging out of the pipe. The Client is expected to drawback as much effluent as possible prior to this cutting taking place, and Kaymac will also employ the services of a specialist subcontractor who can safely dewater any remaining effluent via a series of vacuum suction tankers. The specialist subcontractor will then dispose of the effluent at a licensed facility.



Section of existing pipe cut at approx. chainage 140m (circled above).



Swan neck section removed at the shore connection point (circled above)..

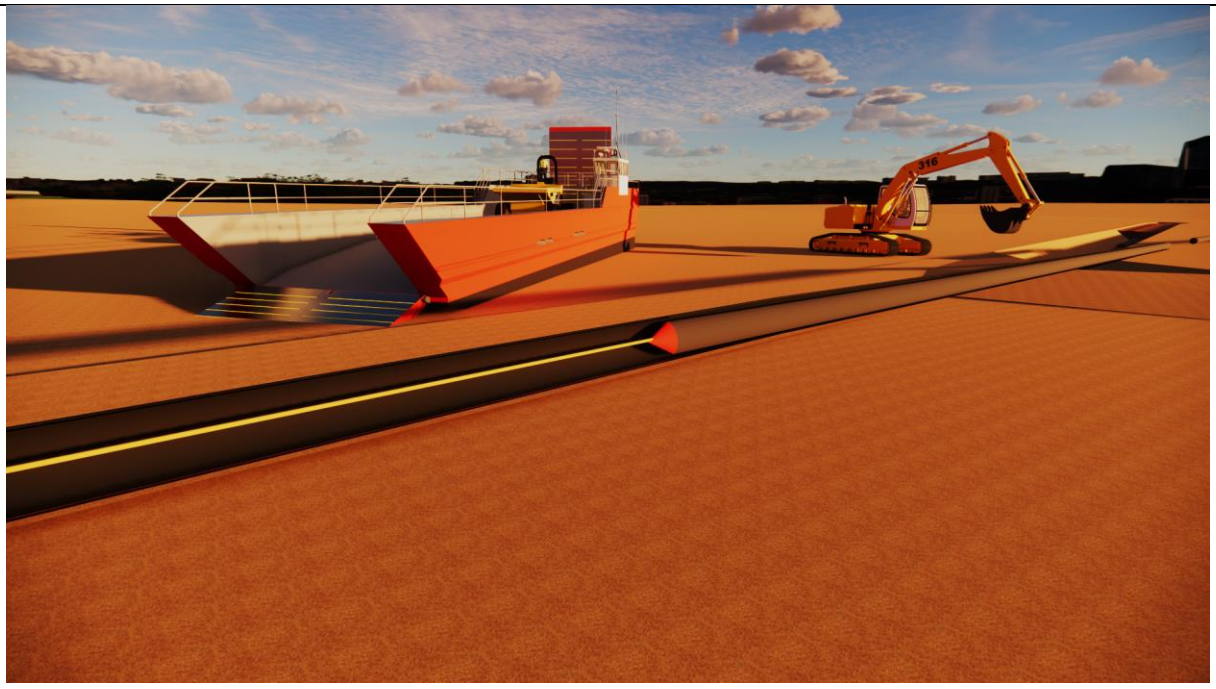
Once the sections of pipe have been removed, a winch will be setup at the shore connection point.

The winch cable will then be fed through the existing pipe until it comes out of the previously cut end at approx. 140m chainage.

The end of the winch cable will then be attached to the pulling head on the nose of the new 355mm ODpipe.

The winch will be operated slowly when pulling through the new pipe, and will continue pulling until the new pipe has extended sufficiently past the exit point (north of the sea defence wall) to enable the new 'swan neck' section to be installed.

Once slip lining is complete, the anulus between the existing mild steel pipe and the new355 HDPE pipe at the seaward end will be sealed.

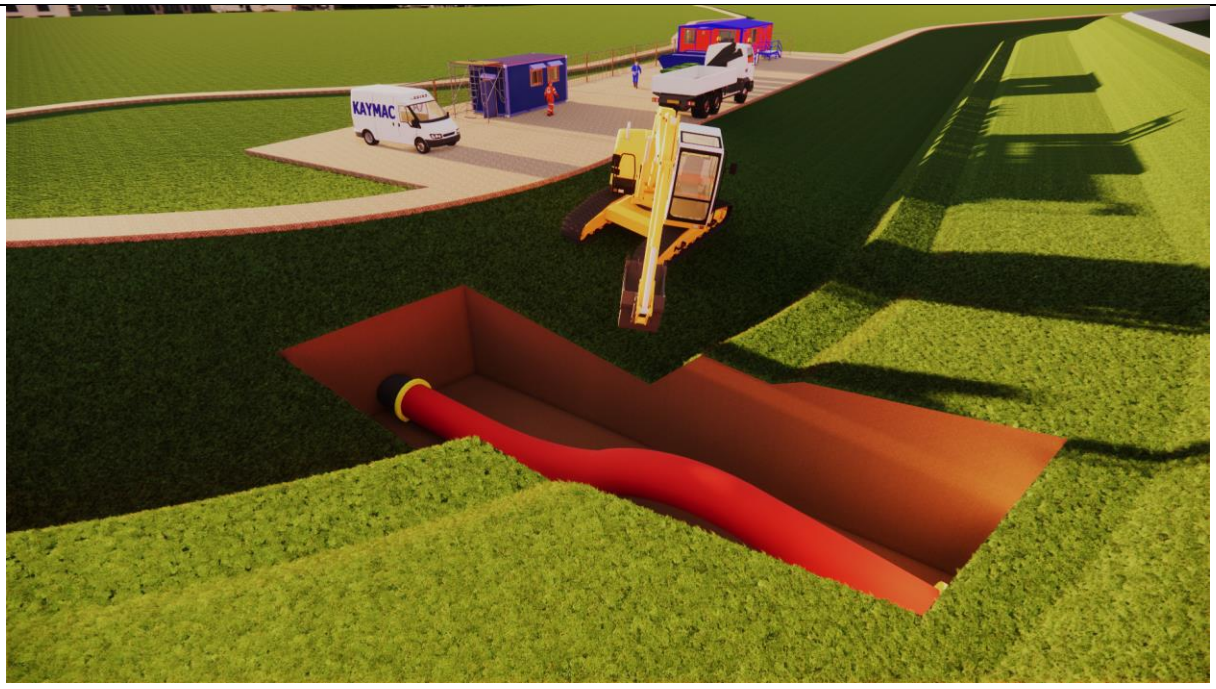


New 355mm OD pipe slip-lined through existing pipe.

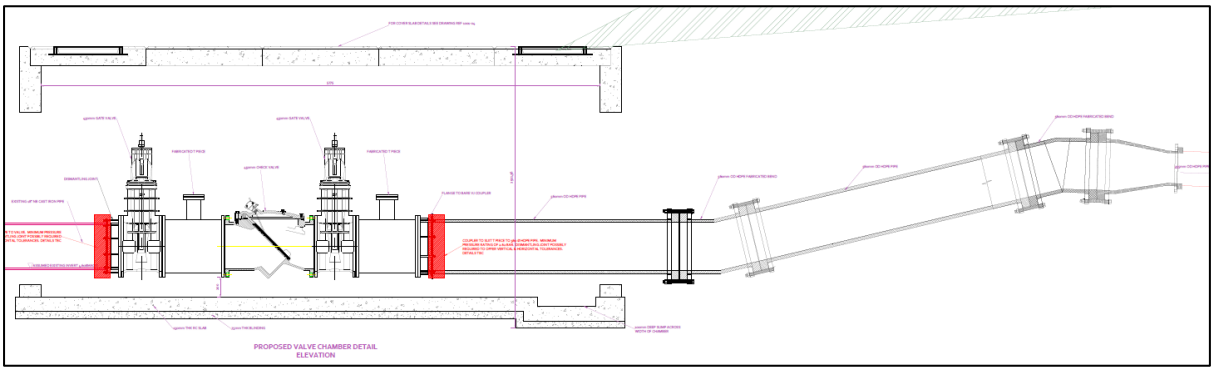
New 355mm OD pipe slip-lined through to the landward side of the sea defence wall.

Replacement of Swan Neck Section

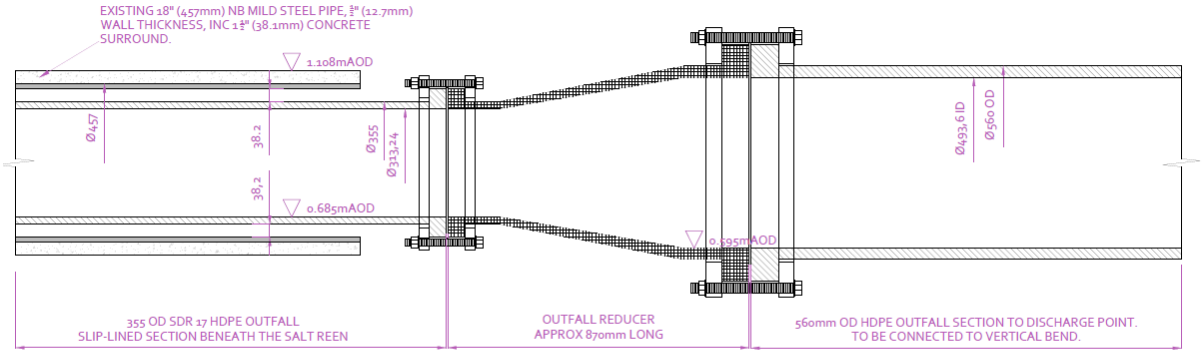
Once the new *355mm OD* section of pipe has been fully slip-lined through the existing pipe, a bespoke 'swan neck' section will be constructed on site and lifted into place using the onsite excavator and lifting equipment. Kaymac personnel will then join the existing and new pipe together with a bolted connection. This new section will also incorporate a non-return valve (NRV), 2no isolation valves and 2 no fabricated 'T' pieces.



New 'swan neck' section installed between the new 355mm OD pipe (right) and the existing pipe (left). The valves and the chamber have been omitted for clarity



Proposed new "Swan Neck" connection detail including the new valves



PROPOSED 560mm OD HDPE TO 355mm OD HDPE REDUCER CONNECTION DETAIL
SIDE ELEVATION

Proposed new connection detail between the 355mm OD slip lined pipe and the 560mm OD pipe on the beach

Commissioning of the Pipeline

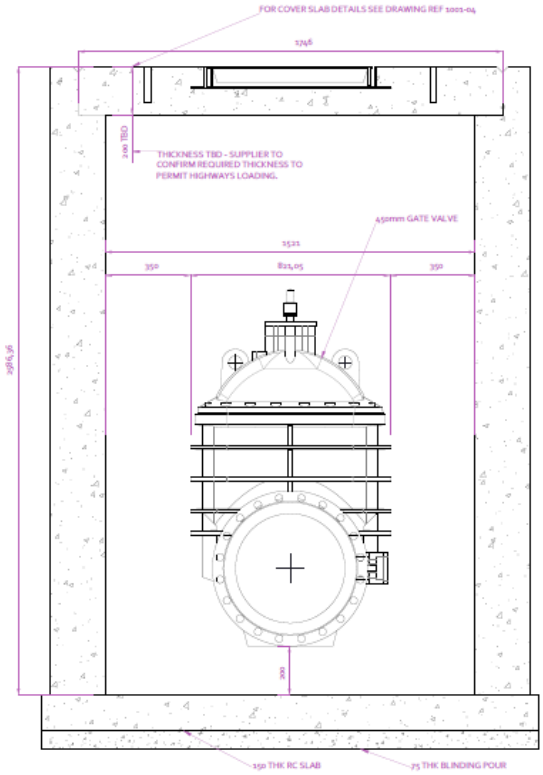
Following the successful connection of the new and existing pipe through the 'swan neck' section and the 'reducer section on the beach, the new outfall will be commissioned for use.

This commissioning process will largely consist of testing the connections and valves in and around the 'swan neck' section.

On approval from the Kaymac Site Manager that the new pipeline has been successfully installed, the 96-hour shutdown period will end, enabling the Client to recommence the discharging of effluent.

Construction of Chamber Walls and New Anode bed

To facilitate the construction of the chamber walls, and bespoke temporary formwork design will be prepared and approved by RMD Kwikform.



PROPOSED VALVE CHAMBER DETAIL
SECTION THROUGH GATE VALVE

The drawing (left) illustrates a section through the proposed chamber.

The steel reinforcement will be prepared on the surface in accordance with the design specifications and tied onto the existing reinforcement bars that were previously installed when the base slab was cast.

RMD formwork will be erected around the base of the perimeter of the slab in accordance with the temporary works design and any support restraints will be installed as required.

HOLD POINT – The Kaymac Temporary Works Supervisor will inspect the formwork which will be signed off before the concrete is installed.

The area will be measured to establist the volume of concrete required and the ready mix concrete will be ordered. The concrete will be delivered to site and all environmental protection measures such as polythene will be set up to prevent any concrete spillages.

The concrete will be introduced by chute into the shuttering until the required level has been reached. A concrete poker will be used to prevent any air pockets. **Concrete test cubes will be taken accordingly to confirm the strength of the concrete.** The concrete wagon will be washed out in the designated skip and will demobilise.

The concrete will be left to cure before the pre-cast cover slabs are installed.

The pre- cast cover slabs will be delivered to site and installed using an excavator.

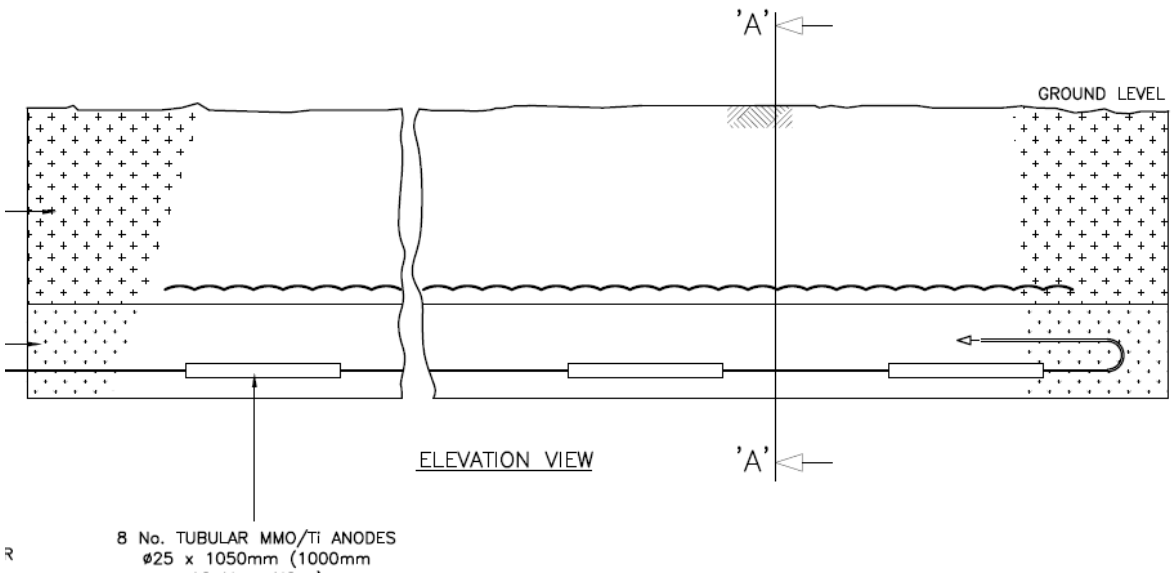
Installation of Anode Bed

The existing anode bed provides cathodic protection for the existing pipe. The anodes are currently buried in an area north of the sea defence wall and are due for replacement.

The anode bed location will be confirmed by the Client and will be marked out on the surface by the Kaymac Engineer.

The electricity supply has already been isolated so the bed will be excavated and the old anodes recovered and disposed of at a licensed facility.

The new anodes will be installed as per the design below and the new electricity box will be installed on a pre-cast concrete plinth.



Proposed Anode Bed design

Eastman will make the necessary electrical connections and the anode bed will be backfilled.

Following the completion of the chamber and anode bed, the temporary excavation support system will be removed using the excavator and any reinstatement or landscaping works will be carried to the required NRW standard.

Site Clearance and Demobilisation

On completion of the works, all equipment, plant, and material will be demobilised from site, including all hired plant such as excavators and dumpers.

Any further reinstatement required will be carried out in agreement with the Client.

A litter sweep will then be conducted at the site, removing any debris that arose from the works.

On completion of the works and the site being reinstated and left in a clean and tidy state, all the relevant authorities will be notified.

PLEASE NOTE

There is a risk that the necessary permits and applications will not be in place to allow the planned works to be undertaken in a singular visit in Summer 2022. As a result, we have allowed for a contingency measure to permit the landward section of works to be undertaken (Identified as Phase 1) in Summer 2022 and the remaining seaward section of outfall installation (identified as Phase 2) in Summer 2023.

Effectively, the only change will be that the new outfall (from ch 140m to the proposed outlet) will not be installed in the Summer of 2022. The slip-lined section will be undertaken as planned but rather than connecting to the new outfall, it will be connected to the existing at approx. ch 146m.

NOTE: In the event that the works are unable to be undertaken in a single-phase during Summer, the works will be undertaken in two separate phases, with the phase 1 change in works consisting of:

- Mobilise to site north of the sea wall as detailed above.
- Excavate around swan neck section as detailed above.
- Works to be undertaken during the 96-hour shutdown period:
  - Cut Out Pipe Sections – At the Swan Neck and at 140 to 146m Chainage
  - Slip-Line New Pipe from 140m Chainage to the Shore Connection Point
  - Replace Swan Neck Section and valves on the landward side
  - Connect new pipe section to existing pipe on seaward side (at approx. 140m. chainage) to allow effluent to connect flowing once pipe is recommissioned. Please see Drawing '1001-09 P1 SEAWARD CONNCTION TO EXISTING OUTFALL' in Appendix 1 of this document detailing the proposal.
  - This connection will remain in place until the Phase 2 works are undertaken.
  - Commission the pipeline
- Construct new RC chamber surrounding the new valves on the landward side of the works.

7.1	Local Hospital

A stretcher will be available on site at all times. In a man down scenario, the casualty will be placed on a stretcher by the remaining team and carried up the beach to Boat Road where they will be placed in a company vehicle and taken to the nearest access point for a waiting ambulance.

Recovery point address and post code: Salt Marsh Lane, Goldcliff, Nash, Newport, Wales, NP18 2AT.
What3Words: cluttered.blank.saddens
Grid Reference: ST 34776 82709

The nearest hospital with a 24-hour accident and emergency unit has been identified as:

The Grange University Hospital
Caerleon Road
Llanfrechfa
Cwmbran
NP44 8YN
Transfer time by road; 25 minutes (distance: 13 miles).

7.2	Hospital Location Map

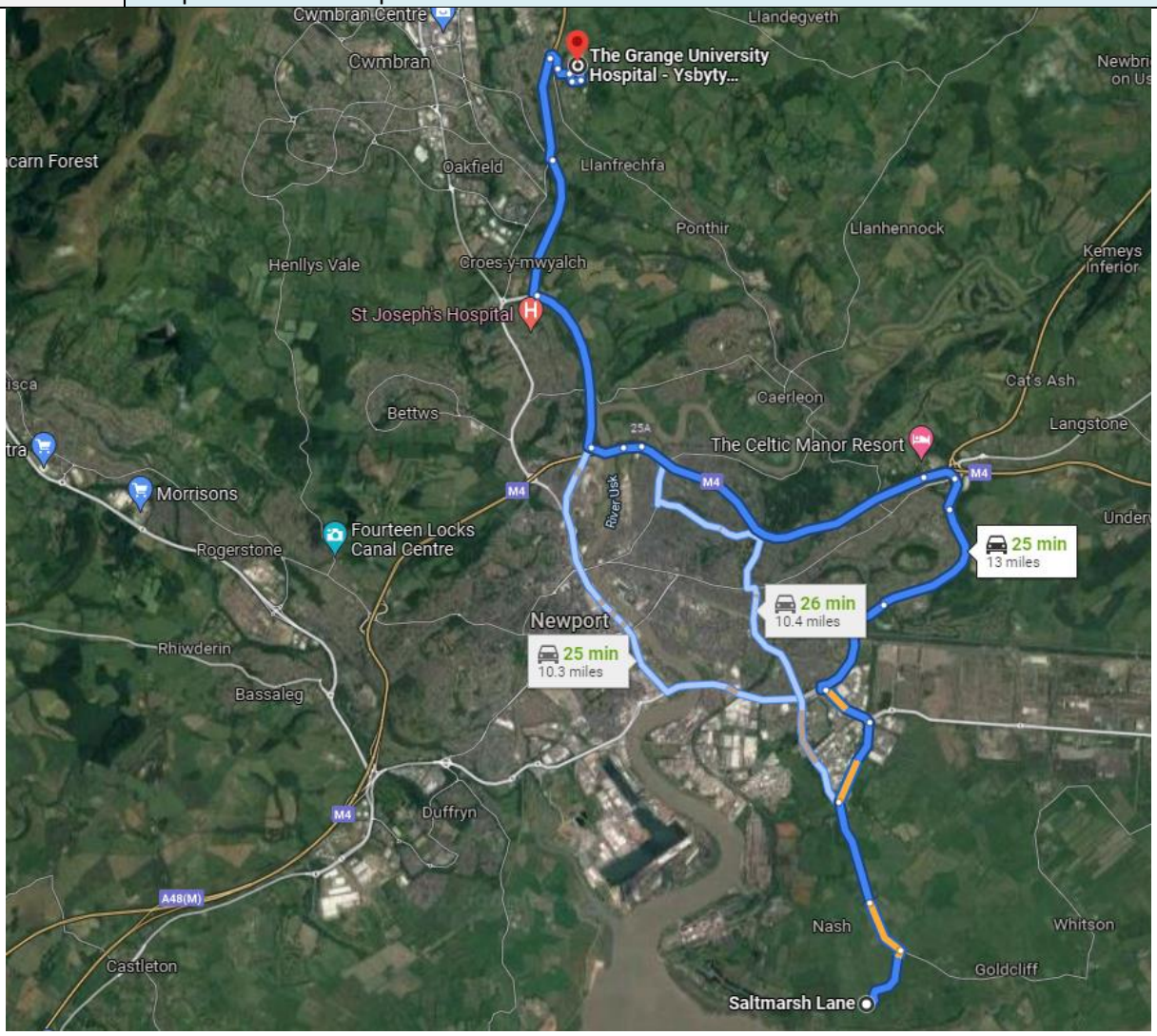


Image courtesy of Google Maps

7.3	Action on Minor Injuries

Administer First Aid on site.
From here the company vehicle will transport the injured person to the local casualty department at the above-mentioned hospital.
A record of the accident is to be entered with all details in the Company Accident Book, and notify the client's responsible person.

7.4	Action on Major Injuries

Administer First Aid on site, and then contact the emergency services requesting an ambulance to the site post code NP18 2AT. A record of the accident is to be entered with all details in the Company Accident Book, and notify the client's responsible person. Kaymac Site Manager or his deputy will record on the accident on Kaymac Accident & Incident Report form QPF11 and pass on Kaymac Health and Safety manager who will ensure H.S.E. is informed by way of form F2508.

7.5	Reporting Accidents, Work Related Diseases and Dangerous Occurrences

Reporting procedures

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) require that certain accidents that happen on site must be reported to the Health and Safety Executive. Any of the following types of accidents that occur on site have to be reported in the first instance to the company Safety Officer or Safety Manager who will then notify H.S.E.

Serious or fatal accidents must be notified without delay to HSE, by calling the Incident Contact Centre (ICC) during normal office hours on 0845 300 9923.

Outside these hours, the local HSE office must be contacted. For details of the nearest HSE office, telephone the HSE Infoline on 08701 545500.

This must be followed up with a completed accident report form (F2508) within 10 days. For less serious injuries, where the injured person is unfit (or unable) to do their normal working job for seven consecutive days, excluding the day of the accident, a completed accident report form F2508 must be sent to HSE within ten days.

If a dangerous occurrence happens on site, for example, a building, scaffold or false work collapse, failure of a crane or lifting device or contact with overhead lines, it must be reported immediately, normally by telephone, by calling the Incident Contact Centre (ICC) during normal office hours on 0845 300 9923 or the nearest HSE office. The details must be confirmed within ten days on a completed accident form (F2508).

If a worker suffers from a specified disease associated with their current job, it must be reported to the HSE on a completed disease report form (F2508A).

Keeping records

A record must be kept of any reportable injury, disease or dangerous occurrence. This must include the date and method of reporting; the date, time and place of the event, personal details of those involved and a brief description of the nature of the event or disease. The record can be kept in any form preferred, but each site is supplied with a copy of the Accident Book BI 510 issued by the HSE, and this is the company's preferred method of keeping such records.

Section 8.0	RISK ASSESSMENT RECORD	Page 1 of 4

RISK ASSESSMENT

RISK CALCULATION MATRIX

HARM						
5	5	10	15	20	25	
4	4	8	12	16	20	
3	3	6	9	12	15	
2	2	4	6	8	10	
1	1	2	3	4	5	
	1	2	3	4	5	
	LIKELIHOOD					

GUIDE BOX

CATEGORY	HARM	LIKELIHOOD
1	NON-INJURY	ALMOST IMPOSSIBLE
2	FIRST AID	UNLIKELY
3	< 7 DAYS	POSSIBLE
4	> 7 DAYS	LIKELY
5	MAJOR INJURY	ALMOST CERTAIN

RISK RATING, REVIEW AND ACTION REQUIRMENTS

RISK RATING	*Risk rating obtained at intersection of harm and likelihood in Calculation Matrix*	
	Review period	Action
1-4	12 months	No further immediate action. Review annually.
5-9	6 months	No further immediate action. Re-assess during next review.
10-16	3 months	Reduce risk and re-assess within review period.
17-25	Immediate	Stop-reduce risks/mitigate effects, re-assess immediately.

Hazard Identified	Persons at Risk	Controls in Place	Risk Rating before control measure	Actions to Further Reduce Risk	Risk Rating after control measure
Slips, Trips and Falls resulting in musculoskeletal injuries	Kaymac Site Operatives	Wear appropriate safety boots with good tread; avoid walking on slippery/wet surfaces, be vigilant and probe any soft ground before attempting to walk on it.	10	Take extra precautions when working in wet weather.	5
Manual Handling; back injuries	Kaymac Site Operatives	Wherever possible, mechanical lifting should be used for lifting loads. If manual lifting is necessary, use kinetic lifting techniques, share the load if possible; ensure ground is level and stable.	10	Carry out a Manual Handling Assessment where necessary; carry out health monitoring for personnel.	5
Working in/around contaminated water resulting in water borne infections including Leptospirosis.	Kaymac Site Operatives	Cover any cuts or abrasions with waterproof dressing prior to work. Wear gloves! Wash and disinfect hands prior to eating or drinking; report any injuries immediately to site management. Kaymac guidance notes on Leptospirosis to be available to personnel.	7	Report any flu like symptoms 7-10 days after possible infection; seek medical advice.	4
Exposure to wet or windy conditions	Kaymac Site Operatives	Appropriate clothing to be worn during poor weather conditions-surface swimmers to wear diver's dry suits (if applicable)	6	No further action required.	4
Sudden increase in water flow or level through rainfall or incoming tide	Kaymac Site Operatives	Check tide table and weather report prior to commencement of works and monitor during duration of shift. If flows or water levels are predicted to/or increase to a point where a risk is perceived, works should cease and all equipment and personnel should be withdrawn from the site.	10	No further action required.	6

Noise	Kaymac Site Operatives/Other Site Operatives	Ear defender to be available if noise levels rise to more than 80 dB(A) Daily Personal Exposure Level	9	Noise monitoring to be carried out by site management.	5
Pollution caused by leaking plant and machinery	Kaymac Site Operatives/Other Site Operatives	All plant and machinery to be checked at the start and end of each shift. All plant entering the watercourse will contain environmentally friendly Bio Oil. Spill kits to be available for all items of plant. Plant movements in the water are to be kept to a minimum	8	Checks are to be carried out daily and any issues reported straight to the site manager.	5
Substances hazardous to health i.e., diesel fuels	Kaymac Site Operatives	COSHH Assessments are to be completed and briefed to the workforce upon arrival to site.	10	All chemicals/substances, etc will be stored in a lockable COSHH storage unit on site.	6
Re-fuelling of plant & equipment	Pollution incident	No refuelling is to be carried out within 10m of the watercourse at any time.	9	No further action required.	6
Working with heavy plant i.e., 15t excavator	Kaymac Site Operatives	Select appropriate machine for the works; personnel to wear high visibility clothing, trained CPCS personnel to sling loads or direct machine operator.	10	No personnel to work under suspended load being lowered into watercourse.	5
Ecological hazards associated with wildlife	Injury/ death to animals, protected species, etc	WFD and HRA assessments to be undertaken prior to commencement on site.	9	The site will be monitored at all times for evidence of wildlife activity. Any activity will be reported to the site manager.	6
Contact with buried services.	Kaymac Site Operatives	Prior to any excavation or borehole drilling, the area is to be CAT Scanned by a trained operative.	15	Service drawing to obtained from the Client where possible	5
Movement of company vehicles during access / egress to site	Members of the Public/ Kaymac Site Operatives	Ensure that banksman is in attendance while moving vehicles on site.	15	Ensure site fencing or barriers are erected where required	5
Public interface. Death / injury of public following entry to working area.	Members of the Public	Border around work site to be fenced, preventing public from entering the works site.	15	Kaymac to remain vigilant at all times	5
Poor weather conditions causing high waves - Overturning of floating plant/ Drowning	Kaymac Site Operatives	Weather is to be monitored by the Kaymac supervisor throughout each day. If the conditions are deemed too poor to allow works to be carried out safely, works will cease until conditions improve.	15	No further action required.	5

Section 9.0 Briefing Attendance Record					
Time / Date and Subject Items of Briefing					
Project Title:				Doc. Ref. No:	
Date:		Job No:		Time:	
Subject Of Briefing:					
Name Of Person Giving Briefing:		Signature:			
SIGNATURE CONFIRMS ATTENDANCE AT ABOVE BRIEFINGS.					

Briefing Record

Name	Signature	Representing

Appendix 1- PHASE 1 OPTION- Drawing 1001-09 P1 SEAWARD CONNECTION TO EXISTING OUTFALL