

Dunnet Outfall: Project Execution Method Statement for Outfall Construction

Stockton Drilling Ltd
15 Navigation Court
Calder Park
Wakefield
WF2 7BJ

+ 44 (0) 1924 242128
www.stocktondrilling.com

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Review and Approval Record of the Present Document

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Revision Status

Rev	Date	Description	Prepared	Checked	Approved
A01	12.09.18	Draft	Re		
A02	14.09.18	Issued To Client	Re		
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A05	23.01.19	Updated by Red	Re		
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A07	18/04/19	Updated by Red	Re		

Revision	Summary Of Change
A01	Draft
A02	Issued to client for discussion
A03	Methodology change too: HDD exits onto seabed, HDPE pipe pushed fully through bore and onto seabed thus minimizing any subsea excavation works
A04	Diffuser installation now requires underwater excavation works
A05	Reference to temporary outfall removed.
A06	Detail of MMO for Drilling Breakthrough added.
A07	Minor amendments resultant from queries raised by Marine Scotland. Changes in accordance with email from Stockton Drilling dated 17/04/19.

Revision A04 represents a change to the diffuser detail which now requires underwater excavation works to install.

Amendments to this document have a vertical red line in the margin to enable the reader to identify new text.

This document to be re briefed to works crews

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1 INTRODUCTION

Stockton Drilling Ltd have been invited by Amey, Black & Veatch to provide early contractor involvement services to assist with the design and proposed construction methodology of the Dunnet Outfall.

1.1 WHO ARE STOCKTON DRILLING

Our Company

Stockton - is a privately owned Limited company specialising in horizontal directional drilling and open cut pipeline installation.

Our Location

Head office is based in Wakefield (West Yorkshire) and our plant yard is based in Barnsley (South Yorkshire), 10 miles from our Head Office. We operate predominately throughout the UK and Europe.

Our People

We permanently employ a highly motivated and technical team of individuals, ensuring we have continuity of competent and experience and technical "know how".



Figure 1 SDL Construction Crew

Our Clients

We have successfully completed many major and complex projects, and have had the opportunity to work alongside some fantastic clients: Shell, Eon, BP, Wessex Water, SSE, Scottish Water and many more.

Our Track Record

Complex HDD's, on shore and off shore, drilling distances from 200m to 2000m, pipe diameters from 100mm to 1200mm. Steel and HDPE pipe line installations from 100m to

4000m. Achilles scoring across all scopes averaging over 95%, showing Stockton's takes Safety, Quality and Environment extremely seriously.

2 PURPOSE OF DOCUMENT

The purpose of this document is to outline the procedure and methodologies for the works required to complete the installation of the outfall, thus allowing the reader to understand the works from conception to completion and how that is to be achieved.

3 DEFINITIONS & ABBREVIATIONS

3.1 DEFINITIONS

Term	Definitions
PROJECT	Dunnet Outfall
COMPANY	Scottish Water
CONTRACTOR	Amey Black & Veatch
SUBCONTRACTOR	Stockton Drilling Ltd.

3.2 ABBREVIATIONS

Abbreviation	Description
ABV	Amey Black & Veatch
AIS	Automatic Identification System
CH	Chainage
CMID	Common Marine Inspection Document
CWC	Concrete Weight Coating
DGPS	Differential Global Positioning System
DP	Dynamic Positioning
FDW	First Dry Weld
FID	Final Investment Decision
RFQ	Request for Quotation
KP	Kilometer Post
MS	Method Statement
MSL	Mean Sea Level
QHSE	Quality, Health, Safety and Environmental
RoW	Right of Way
RIB	Rigid Inflatable Boat
SDL	Stockton Drilling Ltd
TBC	To Be Confirmed
TBT	Toolbox Talk
TOP	Top of Pipe
UHF	Ultra High Frequency (Radio)
UXO	Unexploded Ordnance
WD	Water Depth

WwTW	Waste Water Treatment Works
WU	Work Unit

4 REFERENCE DOCUMENTS

4.1 REFERENCE DOCUMENTS COMPANY

Item	Document No.	Document/Drawing Title
[1]	Cerchar BH01 C12 4.10-4.24m	Abrasiveness of Rock Test Report - BH01 C12 4.10-4.24m
[2]	Cerchar BH01 C13 4.90-5.10m	Abrasiveness of Rock Test Report - BH01 C13 4.90-5.10m
[3]	Cerchar BH02 C10 4.50-4.60m	Abrasiveness of Rock Test Report - BH02 C10 4.50-4.60m
[4]	Cerchar BH02 C11 4.90-5.10m	Abrasiveness of Rock Test Report - BH02 C11 4.90-5.10m
[5]	Cerchar BH02 C12 5.50-5.60m	Abrasiveness of Rock Test Report - BH02 C12 5.50-5.60m
[6]	C5518-15 Dunnet Interim Draft Report	FACTUAL REPORT ON GROUND INVESTIGATION
[7]	Diffuser detail mark up	Outfall Discharge Point and Reinstatement
[8]	Dunnet Site Compound	Location Plan
[9]	Dunnet Site Compound	Location Plan
[10]	L5250-15-01 Bathymetric	BATHYMETRIC CHART L5250-15/01
[11]	L5250-15-01 Bathymetric	BATHYMETRIC CHART L5250-15/01
[12]	L5250-15-03-r0 Seabed Features	SEABEAD FEATURES CHART L5250-15/03
[13]	L5250-15-09-r0 Section	PROPOSED EXTENSION OPTIONS SECTIONS 1 to 4 L5250-15/09
[14]	404000-WW-DRA-04141100	SITE LAYOUT
[15]	404000-WW-DRA-04141200	LONG SECTION - DRILLING OPTION
[16]	404000-WW-DRA-04141300-0A	OUTFALL DISCHARGE POINT AND REINSTATEMENT
[17]	A5659_2D	TOPOGRAPHIC SURVEY DUNNET WWTW CAITHNESS
[18]	Chemical Summary1	CHEMICAL TESTS - SUMMARY OF RESULTS
[19]	INDEXSUM1	INDEX PROPERTIES - SUMMARY OF RESULTS
[20]	PSD1	Particle Size Distribution Analysis BH01 1m
[21]	PSD2	Particle Size Distribution Analysis BH01 2m
[22]	PSD3	Particle Size Distribution Analysis BH02 1m
[23]	PSD4	Particle Size Distribution Analysis Sample No 1-0370
[24]	PSD5	Particle Size Distribution Analysis Sample No 2-

		0570
[25]	PSD6	Particle Size Distribution Analysis Sample No 3-0670
[26]	PSD7	Particle Size Distribution Analysis Sample No 4-0645
[27]	Redoxsum	Measurement of Redox Potential - Summary of Results
[28]	S BOX BH01-L7	Determination of shear strength by direct shear BH01 2.00 - 2.50m
[29]	S BOX BH02-L5	Determination of shear strength by direct shear BH02 1.00 - 1.90m
[30]	404000-WW-DRA-04141201	LONG SECTIONS - OPTION 2 300m TO 600m CHAINAGE 600m TO DISCHARGE POINT
[31]	404000-WW-DRA-04141301	WWTW / SEPTIC TANK MODIFICATIONS
[32]	404000-WW-DRA-04141302	MH3.1 REBUILT SEPA CHAMBER
[33]	404000-WW-DRA-04141303	MH 6.0 FLUSHING CHAMBER
[34]	Dunnet Outfall_GDR_issue	Geotechnical Design Report
[35]	5000061660-WW-DRA-99-00-1003-03 scaled	
[36]	A5659_2D	
[37]	aBV-Modified Colour	
[38]	404000-WW-DRA-04141100-0B	SITE LAYOUT
[39]	404000-WW-DRA-04141200-0D DRILLING OPTION	LONGITUDINAL SECTIONS MH1.0 TO 3.0 VIA SEPTIC TANK MH1.0 TO 300m CHAINAGE
[40]	404000-WW-DRA-04141201-0C	LONGITUDINAL SECTIONS 300m TO 600m CHAINAGE 600m TO DISCHARGE POINT
[41]	Dunnet Outfall_GDR_issue	Geotechnical Design Report

4.2 REFERENCE DOCUMENTS SUBCONTRACTOR

Item	Document No.	Document/Drawing Title
[1]	WIE 12731-115-R-1-1-3	HDD Bore Profile Design Report
[2]	WIE 12731-115	HDD Hydrofracture calculations
[3]	WIE 12731-115	HDD Pushing Calculations
[4]	WIE 12731-WIE-ZZ-XX-DR-C-90100	General Arrangement Drawing
[5]	WIE 12731-WIE-ZZ-XX-DR-C-90101	HDD longitudinal section 1 of 3
[6]	WIE 12731-WIE-ZZ-XX-DR-C-90102	HDD longitudinal section 2 of 3
[7]	WIE 12731-WIE-ZZ-XX-DR-C-90103	HDD longitudinal section 3 of 3

4.3 ADDITIONAL REFERENCES

Item	Document No.	Document/Drawing Title
1	Avoidance of danger from Overhead cables	HS(G)06
2	Avoidance of danger from underground services	HS(G)47
3	Health and Safety in excavations	HS(G)185
4	CDM (Construction Design & Management) 2015	CDM 2015
5	Management of Health & Safety at Work Regulations 1992	HSAW
6	Lifting Operations & Lifting Equipment Regulations 1998	LOLER

5 PROJECT DESCRIPTION

5.1 PROJECT INTRODUCTION

An existing sewage outfall in the village of Dunnet in Caithness is to be extended to improve the water quality of the nearby bathing waters. This will be achieved by installing a new 700m long 225mm diameter outfall in deeper waters using trenchless technology to minimise disturbance to the seabed. At the SEPA approved offshore discharge point a permanent structure shall be built on the seabed to house a diffuser.

Note that the discharge point is at chainage 870m

The arrangement is shown on ABV drawings:

1. 404-WWDRA04141200
2. 404-WWDRA04141201

The arrangement is shown on SDL drawings:

1. WIE 12731-WIE-ZZ-XX-DR-C-90101 HDD longitudinal section 1 of 3
2. WIE 12731-WIE-ZZ-XX-DR-C-90102 HDD longitudinal section 2 of 3
3. WIE 12731-WIE-ZZ-XX-DR-C-90103 HDD longitudinal section 3 of 3

5.2 THE EXISTING OUTFALL

The current outfall consists of a 250mm diameter pipe which passes through three manholes on the shore line.

Following inspection and testing of the new outfall, flows will be directed into the new outfall.

6 PROJECT CONSTRAINTS

6.1 THE SITE

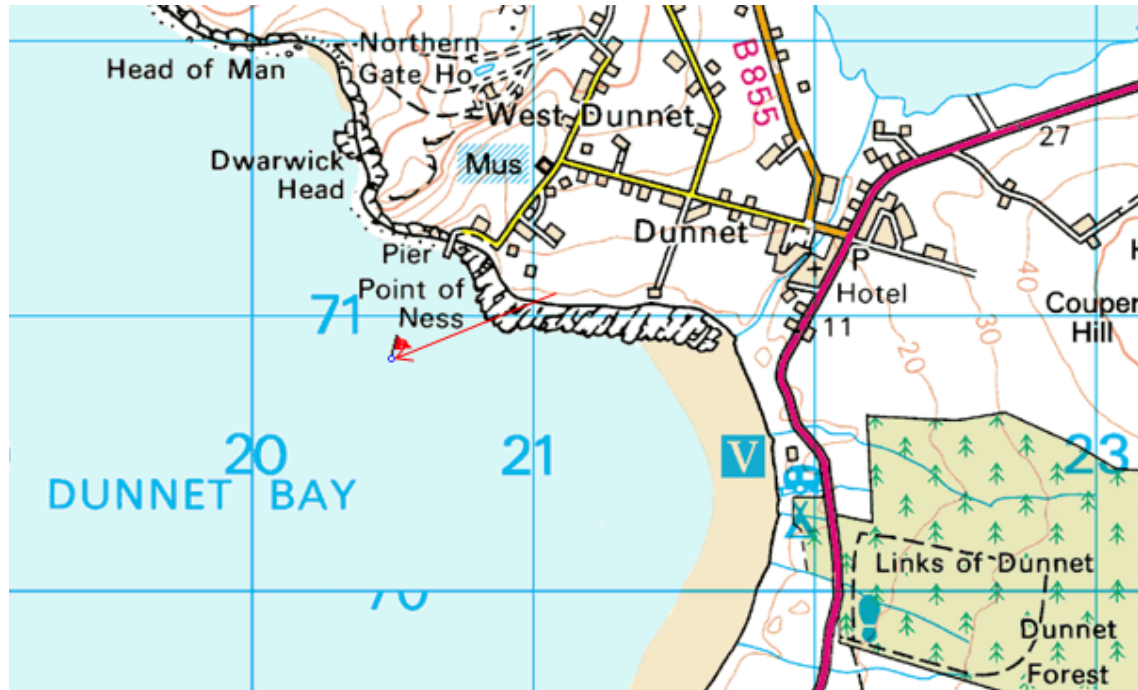


Figure 2: Project Location

No existing plant shall be removed from service by the Subcontractor without prior agreement from The Employer.

All construction areas will be enclosed with secure fencing at all times.

All construction traffic must be suitably parked in order to cause minimal disruption to local traffic/residents.

SDL shall liaise with The Employer and Contractor Communications Teams to inform local residents, schools and commercial properties of the project where there is potential disturbance, and to agree access and timings of the works.

SDL shall ensure sufficient protection measures are put in place to prevent environmental incidents.

SDL shall take account of the requirements and adhere to the conditions of the following project specific formal agreements with third party stakeholder. Such applications and Notices can include, but are not limited to:

- Marine Scotland - Marine License Conditions
- Scottish Water Traffic Management Plan – providing access/delivery arrangements that need to be adhered to when accessing the site for the works.

Appropriate communication is essential with all surrounding land users to minimise disruption during construction.

6.2 ACCESS TO THE SITE (ONSHORE)

The site is located at Dunnet one of the most northerly locations accessible without the use of a ferry in the United Kingdom.

SDLs construction and drilling equipment is located in the North of England and would need to be transported via road along the A9 to Thurso and then onto Dunnet using the A836 and subsequent last 100 meters on the B855.

None of these roads present a hindrance to the transportation of the required drilling equipment as the maxi drilling rig is conveniently transported via HGV and does require any specialist transport movement orders.

The junction between the A836 and B855 can be seen below, this is the 'tightest' junction encountered on route with the track of the offside tyres shown in red.



Figure 3: Junction between A836 & B855

Access to Scottish Water property (if required) shall be by an agreed Permit to Work and an agreed Access Transfer Certificate. Both of these will require detailed risk assessment method statements to be submitted, agreed and adhered to.

6.3 ACCESS TO THE SITE (OFFSHORE)

General access and egress to/from the exit point will be gained via a multicat vessel originating from Scrabster or Thurso Harbour. These are within 10km of the offshore exit point and should help to minimise transit time to and from the site.

All personnel transfers will be carried out in accordance with the Vessel Safety Manual.

6.4 DELIVERIES

The works is accessed via A9 > A836 > B855. SDL shall ensure that any vehicular movements to and from the site of the works are planned and managed with due consideration to local residents and road users.

Deliveries shall be between 08:00hrs and 18:00hrs and will require to have SDL attendance to manage the safe offloading of materials. A delivery plan is to be in place detailing where the unloading (Lifting RAMS) will take place and the protection methods used.

6.5 NOISE & VIBRATIONS

Noise and vibration restrictions if any will be detailed in the Marine License.

6.6 WORKING HOURS

There is no restriction on the working hours at this location.

SDL intend to work 12 hours a day 7 days a week, 07:00hrs to 19:00hrs.

6.7 PARKING

Provision of parking for site personnel and visitors is the responsibility of SDL. The Site Compound shall be made at a sufficient size to accommodate the vehicles attending the site in accordance with the Subcontractor's Traffic Management Plan.

Parking outside the Subcontractor's compound area should not adversely affect the local residents access to their properties without prior agreement by the residents affected.

In general a HDD compound is 60m x 60m and can be altered to some extent to fit the contours of the land, however the footprint of 3600m² is hard to reduce safely.

7 PROJECT PROGRAMME

7.1 KEY DATES

Start On Site : 08/07/2019

Completion : 21/01/2020

8 OBJECTIVES AND STRATEGIES

Stockton has responsibilities to all stakeholders in the project. We monitor and build upon previous lessons learned through the use of KPI's.

Stockton record two kinds of KPI's to help us build a safer and enhanced work force; these are:

8.1 REACTIVE KPI's:

- Fatality
- Lost Time Accident – LTA
- Medical Treatment Case – MTC Needs hospital / GP assistance off site
- First Aid Case – FAC
- Restricted Work Case – RWC Able to work on minor duties instead of those normally employed to undertake
- Environmental incidents

8.2 PROACTIVE KPI's:

- Safety documentation delivered on time
- Toolbox Talks completed as planned
- Induction Training completed for all persons
- Inspections and Audits completed as planned
- Near misses / Safety observation reports / cards
- Daily Walk and Talk Cards
- Number of inspections completed
- Contractor hours worked

8.3 SITE MONITORING AND MANAGEMENT

The following monitoring will be conducted on site, as required:

- Hazard reporting
- Excavation / Temporary Works Inspections
- Daily preventative maintenance records for operated plant
- Periodic inspections in accordance with LOLER and PUWER
- Weekly HSE and Welfare Inspections
- Weekly Hazard Spotting Inspections
- Stockton's Management HSQA Audits

High standards of communication with the workforce are to be developed through regular toolbox talks/ task-briefings conducted by our Site Project Manager. Stockton's will require all employees and subcontractors to attend daily safety toolbox talks prior to commencing works on site. We shall maintain a written record of attendance (toolbox talk record sheet) for these talks for the duration of the project within the project site folders for inspection.

Project Communication Modes			
Project Level	Site Project Meetings (including relevant stakeholders)		
Work-gang	Daily Toolbox Talks	Health & Safety Inductions	Method Statement Briefings
Individuals	Directly with each employee		'Open door policy'

Additional methods of communication beyond toolbox talks shall be determined by the Project Manager to ensure an adequate flow of on-site safety information reaches all site workers and these may include:

- Method statement briefings
- Safety committee meetings
- Trade Supplier/Manufacturer Safety Talks (Hilti, Speedy, etc.) – if required
- Safety notices
- Safety bulletins
- Posters

All statutory safety information and notices will be displayed in:

- a. The Site Manager's office
- b. The site welfare facilities on a specific Safety Notice Board
- c. In site areas as identified by site management

9 SAFETY

The CDM 2015 Regulations shall apply to the contract.

All works will be carried out in accordance with the Construction Phase Health & Safety Plan.

Prior to commencement of works, the Project Manager and Construction Manager will review the working conditions, risk and techniques, to ensure that Risk Assessments and Method Statements adequately cover the works.

A Foreman's Signature Record (Appendix A) will be signed by everyone to confirm that the Method Statement and Risk Assessment have been issued, read and understood and that the Risk Assessment is adequate for Site Conditions.

9.1 SITE AND LIFE SAVING RULES

Life-Saving Rules – what are they?



9.2 PPE

The PPE required for individual tasks shall be identified within the Risk Assessment although as a minimum all personnel on site shall wear safety boots, hard hats, safety gloves, eye protection, Hi Vis clothing.

PPE ITEM	STANDARD	WHEN	NOTES
Steel Toe Cap Boots	BS EN345/ EN 346	At all times	Steel toe cap wellingtons acceptable in wet conditions
Hard Hat	EN397	At all times	
Hi Viz Vest	BS EN471	At all times	Not required if coveralls are Hi Viz
Glasses	BS EN166	At all times	RAMS will identify type required
Flame Retardant Coveralls	EN 470 / EN 531	During hot works	

		activities	
Hearing Protection	EN352 PART 1	As required	If a conversation cannot be held ear protection is mandatory
Gloves	EN420	At all times	Must be on person at ALL times

9.3 OCCUPATIONAL HEALTH

None of the individual activities covered by this Method Statement require our operatives to undergo health surveillance.

9.4 MONITORING

All personnel working on site will be inducted and familiarised with SDL and ABV site rules.

Prior to commencing works on site the training and competency certificates for personnel will be checked and approved by SDL site management.

In addition, the following monitoring will be conducted on site, as required:

- Hazard reporting
- Excavation Inspections
- Daily preventative maintenance records for operated plant
- Periodic inspections in accordance with LOLER and PUWER
- Weekly HSE and Welfare Inspections
- Weekly Hazard Spotting Inspections
- SDL Management HSEQ Audits

9.5 SAFETY OF THE PUBLIC AND OCCUPIERS

The public and other occupiers will be excluded from the works by secure fencing and warning signs.

If deemed necessary security cameras/ guarding will be used during non-working hours.

9.6 PUBLIC NUISANCE

SDL shall endeavor at all times during the works to minimise disruption to the public. In the event that any debris is deposited on public roads during deliveries, SDL will organise road sweeping immediately and shall regularly monitor road conditions.

9.7 PLANT INSPECTION AND OPERATOR TRAINING

Plant/ Equipment Required	Operator Competence Required	Inspection/ Test Evidence required	Supplier
Ladder (Platform pole and/or cage)	N/A	Weekly PUWER and individual tag	
Lifting Equipment	CPCS Slinger for selection of correct accessory	Valid 6-month LOLER test certificate and TOTEM weekly LOLER	
Mobile Crane	Relevant training	PUWER	
Hiab	Relevant training	PUWER	
Excavator	Relevant training	PUWER	
Tipper truck	HGV License	PUWER	
Hand tools	N/A	Weekly PUWER	

9.8 TEMPORARY WORKS

A temporary works co coordinator (TWC) shall be appointed for the project and will be responsible for maintaining a register of works applicable under the temporary works scheme.

All works shall be carried out according to the relevant temporary works designs and drawings identified on the register document '100-571 SAF 057 Dunnet HDD Temporary Works Schedule'. A copy of this is at the back of this document for information and must not be taken as the latest up to date copy, **CHECK WITH TWC BEFORE WORK COMMENCES**

All temporary works are subject to 'permit to work'.

In general the primary item of temporary works is the maxi HDD rig anchor which in the conditions expected to be encountered will be a buried steel reinforced concrete anchor block. When the drill rig forces are calculated a size can be worked out, however past experience has shown they are typically 2 to 3m deep and 5m long with a width of 3m.

The concrete anchor block is installed below ground level. The block shall be left in situ at the end of the works due to the difficulty (Noise and time) encountered in removing them.

The installation of the diffuser and connection to the HDPE pipe will be carried out by diver intervention. A trench box of approx. dimensions 2.5m H x 3.0m W x 4.0m L will be fitted over the HDD pipe section to provide a safe working environment for the diver, and protection from back-filling or collapse of the excavated area.

10 EMERGENCY PROCEDURES

Please see the project Emergency Response Document: (To Be Developed)

Critical Emergency's Dial 999, and then alert your superior.

Redacted

11 ENVIRONMENT

All works will be carried out in accordance with the Project Environmental Management Plan
 Please see document the environmental plan for further details and clarifications

- Site based vehicles and machinery will be maintained at reasonable and clean condition.
- Environmental kits (spill kits) will be available on site.
- In addition to the 'environmental' content of Stockton project inductions, additional guidance will be given on sensitive environmental and ecological issues specific to the site area and activity covered by this Method Statement.

11.1 ENVIRONMENTAL CONTROLS

Potential Hazards	Environment	Control Measures to be implemented
Fuel spills		Site based vehicles and machinery will be maintained to a reasonable and clean condition. Drip trays will be placed under all stationary plant. Double bunded storage tanks – Spill kits available to suit potential spill volumes.
Dust		A 5mph speed limit will be established. Dust suppression will be used if necessary
Noise		Working times will be restricted to 07:00hrs to 19:00hrs Monday to Sunday. Silenced modern machinery will be used at all times. If necessary noise monitoring will be undertaken, the results will be recorded and any actions necessary undertaken.
Injury to Marine Mammals		An MMO (Marine Mammal Observer) will be in attendance for all marine works. This will be in line with the current GNCC Guidance.
Waste generated during the works		Correct methods for the treatment, storage and disposal
Surplus excavation arisings		Dispose of surplus arising off site via a registered waste carrier to a licensed facility.
General packaging waste		Disposed of in general skip
Mud on roads		Road sweeping when required, on advice from plant company roads will not be swept late in the day in freezing weather.

12 DRILLING FLUID

Drilling fluid, a composite made of Bentonite and water has the following functions:

- To remove cuttings from in front of the drill bit
- Power the mud motor

- To transport cuttings from the drill face through the annular space towards the surface
- Lubricate the drill string during drilling phases and HDPE strings during pull back
- Cooling the reamers (cutting tools)
- Hole stabilization
- Creation of a filter cake against the wall of the hole to minimize the risk of loss of drilling fluid or influx of groundwater penetration into the borehole

The characteristics of drilling fluid, especially the viscosity can be adjusted during the drilling phases by changing the structure of the composite.

The drilling fluid consists of a low concentration bentonite – water mixture. Depending on the formation to be drilled through, the concentration of is between 13 litres (30kg) and 35 litres (80kg) of dry bentonite clay per m³ of water.

The use of bentonite has a number of benefits:

- It is a natural material, so no chemical
- It is recyclable
- It is on the PLONOR list, so discharge is not a danger to the environment

However, owing to the long length, the total volume of fluids is considerable, but owing to the low concentration the total amount of bentonite is limited.

However, even though the material is not harmful to the environment, reduction is always sought. To further minimize the total discharge of bentonite the forward reaming option has been developed.

The system consists of a generator, combo mix/recycling unit, EW pump (high pressure pump), booster pump, BBA pumps (for drilling fluid), holding tanks, mud pits, return line and basins (for storage of drilling fluid and cuttings).

SDL will arrange for fresh water to be delivered to the drilling location. This will be either from a nearby river or provider of water and stored in holding tanks to be used for mixing. The fresh water will be mixed with Bentonite until the desired values for the composite are reached. From there, the drilling fluid will be transported by the EW pump which is connected on the rig. Normally a capacity of 30 to 40m³ per hour is needed during drilling phases. In case of drilling fluid loss, a capacity of 60 to 70m³ is required.

Mud pits, situated at the entry point of the HDD, create a first “holding” possibility for drilling fluid. From there, the drilling fluid will be transported by BBA pumps to the recycling unit to separate drilling fluid from cuttings. Recycled drilling fluid will be stored in tanks to be used in each drilling phase.

Parameters of drilling fluid will be monitored and registered on a regular base throughout the drilling phases. Monitoring includes:

- Registering amount of Bentonite added to the drilling fluid;
- Measuring viscosity of drilling fluid and drilling sand;

- Measuring percentage of sand in drilling fluid and drilling sand;
- Measuring specific weight of drilling fluid and drilling sand.

13 DRILLING FLUID BREAKOUT

Drilling fluid (bentonite) can sometimes break out of the bore in case of highly fissured clay, gravels or where there are large interconnected fissures in the ground. Breakouts may also occur where man made features are present (e.g. old SI boreholes). In the event of egress of drilling fluid from the bore it is only likely to reach ground level where there is a continuous path available to the surface.

The risk of a bentonite breakout during drilling cannot be fully assessed beforehand however any decrease in the mud volume returning to the entry pit will trigger the need for personnel to closely monitor the area around the drilling head.

For this reason a close watching brief during drilling activities and a detailed contingency plan is essential to ensure that any drilling fluid breakout is contained, banded and pumped back to the entry pit with minimum disturbance to the surrounding environment.

Drilling mud breakouts are only likely to happen when the fluid is under pressure, so during drilling, site monitoring will be carried out by dedicated personnel.

The site to be monitored will include an area of 100m in front or behind the drill head and 25m either side of the centre line of the drill route. The site will be divided into three areas which will be checked regularly. Records shall be maintained of inspections.

In addition, a downhole annular pressure sensor will be used during drilling. The maximum allowable annular pressure according to the design calculations will be plotted on screen with an alarm sounding if we get to 90% of that allowable limit. If this happens we stop drilling and retract the drilling assembly until the blockage has been cleared before continuing to drill.

It is proposed to use an advanced formula drilling fluid, a proprietary blended product using high-yielding sodium bentonite. The drilling fluid forms an impermeable filter cake around the drill annulus due to the alignment of the clay platelets.

Although drilling mud as used in HDD is environmentally friendly, it may spread over a large area and cause nuisance. In certain areas the sealing effect of the mud may cause problems when spreading over a surface. It must be agreed with the client, before the drilling operations start, which actions must be taken in case of a break out. Below listed are possible actions.

13.1 BREAKOUT ON LAND

1. Report immediately to drilling control cabin using site two-way radio
2. Stop drilling immediately
3. Contain the bentonite by constructing a bund with sandbags

4. Recover the bentonite from the bund by using 4" pump sets and 4" hoses
5. Discharge the bentonite into the recycling pit for recycling
6. Watch the area closely to check if breakout channel has sealed when pumping.
7. Pump lost circulation material or cement grout and allow to swell in the fracture
8. Continue pumping bentonite after waiting for lost circulation material to work according to manufacturers recommendations. If fracture cannot be sealed, continue to recover bentonite from the banded area using 4" pumps
9. For containment of break outs on land, sandbags will be stored where they can be easily and quickly brought to the breakout point. Personnel monitoring the site will be equipped with radios for instant communication with the driller.

13.2 DRILLING FLUID BREAKOUT UNDER WATER

1. Any loss of drilling fluid in the entry pit is reported immediately to the driller
2. Stop drilling immediately
3. Pump lost circulation material to seal fissure
4. Wait for the lost circulation material to swell in the fracture
5. Pump a mixture of 'Pure Bore' to see if circulation can be maintained.
6. If not, repeat the process with lost circulation material.
7. If the fracture cannot be sealed, either a grout plug of cement will be pumped at the end of the bore, or the drilling assembly will be withdrawn for a distance and a new profile drilled to avoid the problem area. This is dependent upon the rate of fluid loss and the geology encountered.

Fast and efficient reporting is an essential component of the contingency plan. Emergency telephone numbers are to be available for all the appropriate parties.

The site manager / drilling manager is to complete the breakout report as soon as practicable after the completion of the clean up.

14 DRILLING FLUID CONTROL DURING PUNCH OUT

To prevent bentonite drilling fluid from entering the ocean SDL propose to complete the initial pilot hole of the bore alignment to 'stop short' of punching out on the sea bed. This will be achieved by monitoring the distance and cuttings coming back from the cutting head.

At around chainage 845m the drill head will leave the bedrock and enter the sand that makes up the seabed deposits. At this point we will cease drilling forwards and trip back to surface at the onshore HDD drilling entry point

We will then equip the drill head with a reamer to widen the hole; This will be rotated and pushed into the bore using bentonite to aid its advancement,

An MMO will be used to monitor for Marine Mammal activity during the drilling of this last section. If dolphins are present within 500m of the breakout area work will halt until the area

is deemed as not to have Marine Mammals present by the MMO. At which point works will proceed.

When the reamer reaches the end of the bore SDL will stop running bentonite through the drill string to the reamer. We will continue rotating the reamer and advance the final 25m using fresh water.

This will contain the bentonite in the drilled bore and prevent a bentonite discharge into the sea.

15 QUALITY

It is the policy of Stockton to provide and execute all Works to a high standard of quality, and these will be delivered as defined in our Quality Plan and Inspection and Test Plan.

Quality shall be performed during all Contract Phases:

- Planning
- Design
- Procurement
- Installation
- Commissioning

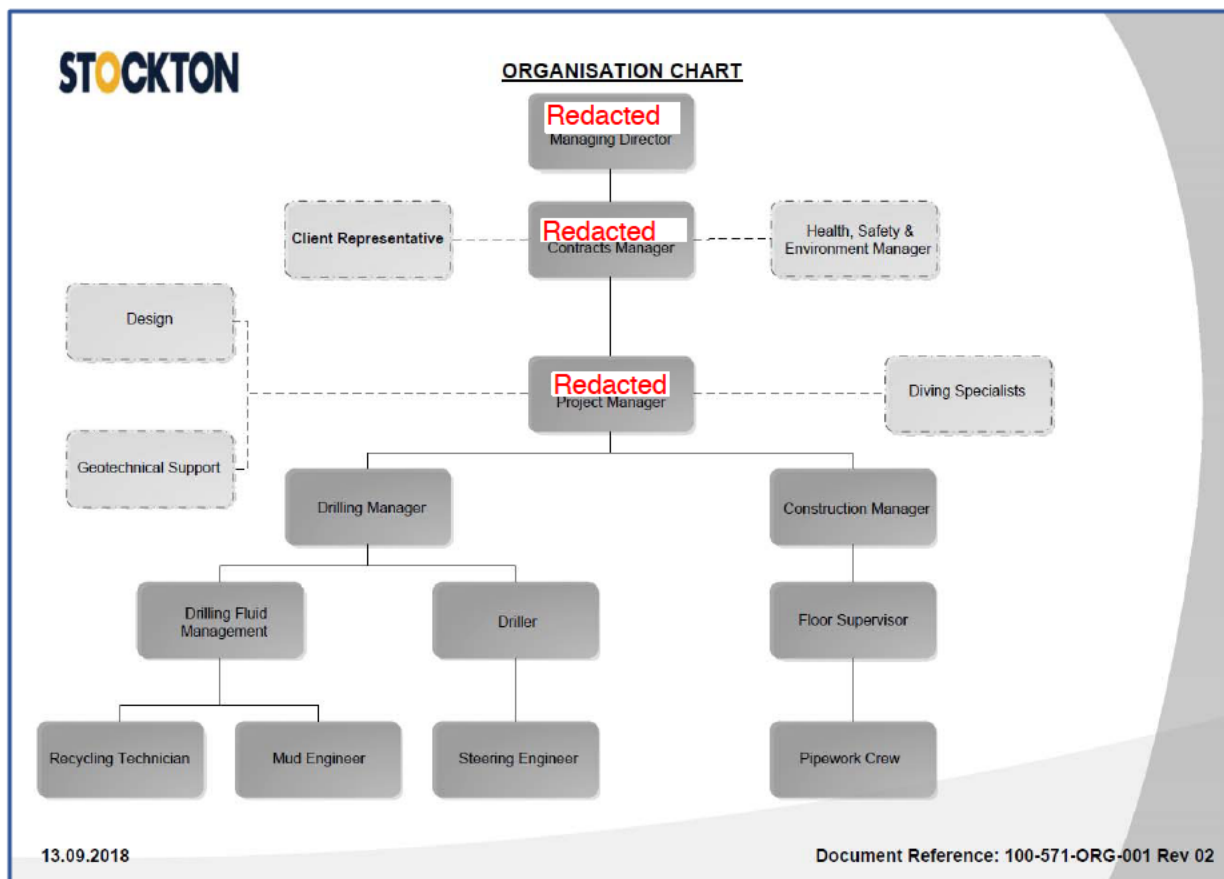
Stockton will prepare an Inspection and Testing Plan (ITP), for the scope of Works, according to the content of the contract identified.

The ITP will include but not limited to:

- Inspection and Test Audit Plans
- Risk managed components
- Names of Subcontractors
- Planning documents of QA

16 SITE MANAGEMENT

16.1 PROJECT ORGANOGRAM



16.2 RESPONSIBILITIES

The Managing Director has overall responsibility for the health, safety and welfare of employees (via delegation) by:

- Ensuring that health and safety policies and procedures are developed, widely communicated and implemented

- Ensuring that health and safety is monitored and reported on and that policies are reviewed and updated as necessary
- Ensuring site safety and that everyone (employees and contractors) is fully aware of their health and safety responsibilities
- Ensuring that suitably competent and trained persons are appointed and that good working practices are adhered to
- Ensuring training is available for all staff
- Encouraging health and safety communications across the organisation

The Project Manager is responsible to, and shall report to the Managing Director and is responsible for:

- Site safety and shall ensure that everyone is aware of their safety responsibilities, are working to safe systems of work and are competent for the work activities undertaken
- Ensuring that necessary method statements are written for site work, and that the degree of supervision, safe systems of work and competencies are available to ensure that staff maintain a high degree of site health and safety
- Carrying out the necessary preliminary and specific risk and COSHH assessments and ensuring that they are distributed to the project team and all site staff
- Monitoring adherence to the Health & Safety Plan and the Organisation's Health & Safety Policy
- Ensuring site inductions are carried out in accordance with the Organisation's standards
- Encouraging health and safety communications throughout the duration of the works between him/herself the, the Construction Manager, project team and subcontractors
- Ensuring that good site housekeeping discipline, which shall include correct disposal of all waste material at the end of each working shift
- Ensuring that adequate first aid and firefighting equipment is available at all times
- Prompt investigation, recording and reporting of accidents, incidents and safety defects
- Ensuring that (or undertaking) the necessary Site Safety Inspections and Audits are conducted and that the findings are acted upon
- Ensuring that any work being carried out does not hinder any other contractors by blocking escape routes, fire equipment, pedestrian routes and traffic routes or jeopardize the health and safety of other contractors in any way
- Liaising with the Health & Safety Executive, Environment Agency and other external bodies

The Site Superintendent and or Construction Manager is responsible to, and shall report to the Project Manager and is responsible for:

- Ensuring adherence to Method Statements, the Health & Safety Plan and the Organisation's Health & Safety Policy
- Implementing the health and safety induction, which all site personnel and visitors must attend. A record of this must be retained

- Ensuring that staff are given site briefings covering detail of fire escape routes, fire drills and assembly points on site
- Encouraging health and safety communications throughout the duration of the works between him/herself the project team and subcontractors
- Ensuring that good site housekeeping discipline, which shall include correct disposal of all waste material at the end of each working shift
- Ensuring that adequate first aid and firefighting equipment is available at all times
- Recording and reporting of accidents, incidents and safety defects and reporting of these to the Project Manager
- Informing the Project Manager of specific risk management issues such as COSHH, noise, work equipment, method statements etc.
- Carrying out as necessary Site Safety Inspections and ensuring that the findings are made known to Project Manager
- Ensuring that all site plant, tools and equipment are of the appropriate type, adequately maintained and operators are competent
- Ensuring that all plant, tools and equipment and materials is delivered and handled in a safe manner from delivery to installation
- Ensuring, with respective line managers, that any work being carried out does not hinder any other contractors by blocking escape routes, fire equipment, pedestrian routes and traffic routes or jeopardize the health and safety of other contractors in any way
- Encouraging Employees and Contractors to make suggestions to improve health and safety on site

All Employees

- Ensure familiarity and adherence to the Organisations Health & Safety Policy
- Observe all safety rules and codes of practice
- Ensure the appropriate safety equipment (PPE) is worn and appropriate safety devices are used where there is risk of injury
- Conform to appropriate instructions from those with responsibility for health and safety
- Report to Project Manager/Construction Manager any observed accidents and damage to property or equipment irrespective of whether persons are injured, using the appropriate Accident and Incident Form
- Report to Project Manager/Construction Manager all accidents to themselves whilst at work
- Be encouraged to make suggestions to improve company health and safety on site to the Project Manager/Construction Manager
- Report all hazards to Project Manager/Construction Manager
- When on customer/client site/premises, conform to the required signing on/off procedures and safety rules
- When on customer/client site/premises, conform to the required accident or near miss procedures
- Make themselves familiar with the fire and evacuation procedures

- Exercise strict housekeeping discipline and not cause fire or trip hazards by inconsiderate disposal of rubbish
- Assist the Safety and Fire representatives in the carrying out of their duties

17 PLANT AND EQUIPMENT

17.1 ONSHORE SPREAD

Item	Qty.	Description
1	1	Excavator
2	1	Dumper
3	1	Butt Fusion Welding Plant
4	1	Site Office
5	1	Welfare Container
6	1	Stores Container
7	1	Security Cabin
8	1	Perimeter Fencing
9	1	Generator for site welfare
10	2	Fuel Bowser
11	1	Waste Skips (Various)
12	1	HDD Maxi Rig
13	1	HDD Recycling unit
14	3	Various tanks for HDD

17.2 OFFSHORE SPREAD

Item	Qty.	Description
1	1	Multicat equipped with the following extras
2	1	Dive control facility
3	1	Compressor
4	1	Man basket
5	1	Dive Control Facility

18 SDL DETAILED WORKS PLANS & PROCEDURES

18.1 QA FORM 006 & 012 ACTIONS & RESPONSIBILITIES

QA Form 006 & 012 Actions & Responsibilities is a 'live' document that remains on SDLs server.

It details what each team member is required to do and what the deadlines are.

Thus it is a simple task to identify if tasks are becoming critical or if any particular actions have been delayed.

19 DIRECTIONAL DRILLING METHODOLOGY

19.1 PILOT HOLE AND GUIDANCE

After the rig-up is completed, the HDD will commence. Drilling mud/fluid, consisting of a mixture of water and bentonite clay will be pumped down the drill string to break up and flush the material in front of and around the jet bit and flow back via the drilled hole to the mud pit at the entry site.

An optional part of the process is the use of a recycling unit. The drilling slurry (bentonite mud and cuttings) will be transported towards the recycling unit via a mud pump. In the recycling unit the cuttings will be separated from the drilling slurry, allowing the drilling mud to be reused.

The drilling mud:

- Carries the cuttings out of the borehole;
- Stabilises the borehole;
- Prevents cross contamination of sea water on the land section; and
- Lubricates the drill string.

The pilot holes will be drilled using a 250 tonne pull force HDD rig with 90kNm torque. The drilling rig uses 6-5/8"FH drill pipes in 9.6 meter lengths. A 12 ½" HDX TCI bit will be utilized with a 8" mud motor, shock sub and gyro as detailed:

The mud motor will have a pre-set bend two metres behind the drill bit, to enable it to be steered. Behind this a downhole optical gyroscope is assembled together with a shock sub.

This assembly will be drilled through the ground to follow the predetermined profile trajectory towards the predetermined exit point. Directional control is accomplished by rotating the drill string to steer a bent housing on the downhole assembly. If a change in direction is required, the drill string is rotated, changing the bent housing to the desired orientation.

Periodic surface readings will be taken along the drill line to monitor the position of the drill head during the drilling operation. Just behind the drill head a sensor is located, which transmits a signal. This signal provides the surveyor with the receiver to locate the exact position of the drill head and advise the driller of the drilling line and steering requirements. To reduce drilling mud losses on the seabed it is envisioned that the pilot hole will be short stopped and retracted.

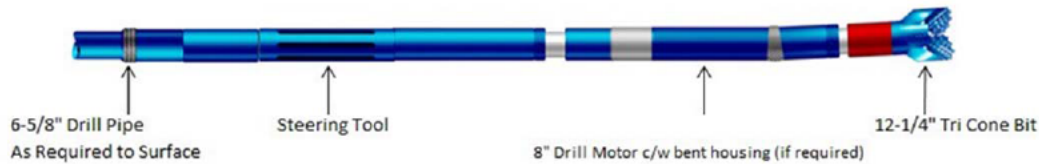


Figure 4 Down Hole Arrangement

19.2 DRILL BIT POSITIONING

The position of the drill bit is constantly monitored during the pilot by using an optical gyro measurement system.

To determine the position, the gyro sends a signal to the drill cabin via a wire that runs through the drill string. After determining the location, the wire will be disconnected in order to connect the next drill pipe, including wire for the gyro connection.

As the steering tool is an optical gyro it is not influenced by any magnetic interference. This results in very high accuracy, even when surrounding metal structures are present.

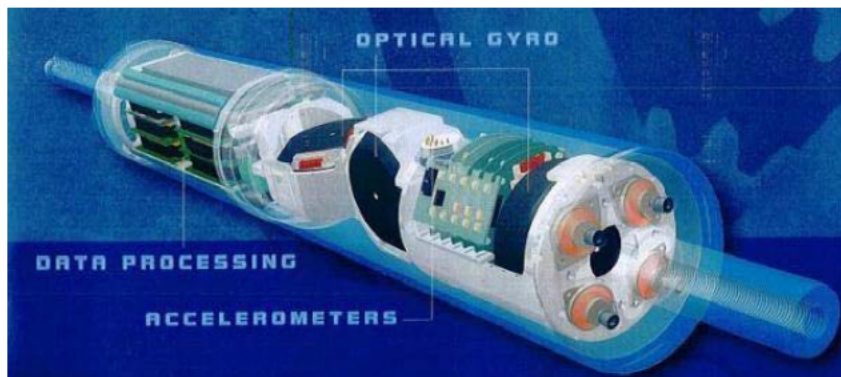
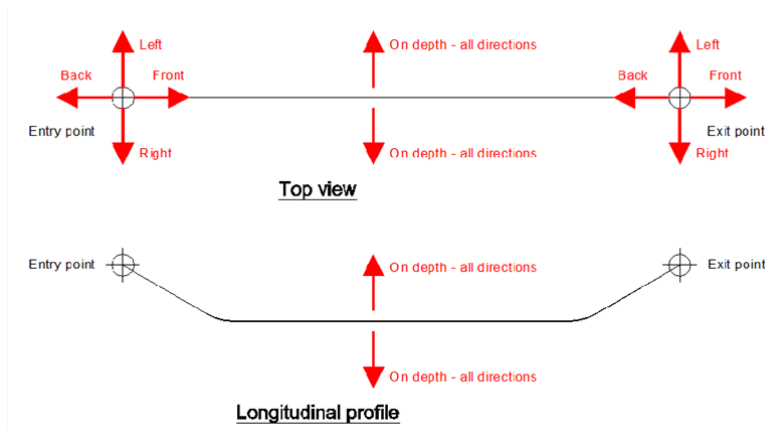


Figure 5 Schematic Of Down-Hole Gyro

Description	Direction	Meter
Deviation with reference to entry point	Front / back	0.5
	Left / right	1
Deviation with reference to exit point	Front	10
	Back	10
	Left / right	3
Deviation with reference to design on depth	All directions	3



20 SCOPE OF WORKS

20.1 OUTLINE

It is **assumed** that SDL shall be responsible for performing the following activities, all of which form part of the works.

To meet the Project objectives it is considered that the work will include the following main components:

- Temporary Works Designs
- Installation of temporary site compound at Dunnet for the HDD works
- Procurement of Construction Materials
- Construction of new outfall including provision and management of all plant/vessels, materials and labour
- Excavation and construction of diffuser head and surrounding scour protection
- Backfilling and reinstatement of outfall
- Inspection and Testing of new outfall
- Reinstatement of Site Compound back to original condition.

Excavated material will be suspended in the water via the use of an air-lift / suction pump, with subsequent settlement within the surrounding area. The seabed is expected to naturally level out in a short period of time. The estimated volume of excavated material will be 30m³ of seabed sand.

Following commissioning of the new outfall, the old outfall will be left in situ but decommissioned by filling the pipe with foamed concrete from the landward side.

Stockton Drilling shall be responsible for providing the foregoing and shall be responsible for verifying that the proposed scheme meets these Project Objectives.

20.2 WORKS SEQUENCING

The numbered list below is a high level overview of the envisaged works sequencing, these points are then explored in detail within the next section of this document.

1. Onshore site establishment, Install site offices, welfare.
2. Excavate at HDD entry point for the HDD anchor block and construct.
3. Install HDD rig at entry point.
4. Directional drill the required profile circa 750m.
5. Mobilise multicat to offshore exit point.
6. Weld HDPE SDR11 pipes onshore into one continuous length, set on temporary rollers. (It is possible to have more than one string of pipes to suit the land available, but every butt weld takes time and thus presents added risk in borehole collapse).
7. Pressure test HDPE pipeline
8. Upon completion of HDD bore move maxi rig away from entry point and install pipe pusher.
9. Push pipe into bore from onshore entry point, if required weld pipeline strings progressively together.
10. Post pipeline install, install diffuser from multicat using diver intervention.

20.3 PRE COMMENCEMENT OF THE WORKS

All personnel must be inducted onto the project, non-working visitors may be escorted around site by a Stockton manager if deemed appropriate.

Prior to any activity all personnel involved will familiarise themselves with the site layout, access and egress.

All personnel shall make themselves aware of the restricted or 'out of bounds' areas.

Prior to commencement of related works the location of Muster Points will be identified and a 'dry run' emergency evacuation procedure shall be conducted.

Prior to commencement of the activity 'Permits to Work' will be raised as/ where appropriate, or formal consent to proceed is given by the ABV representative.

Reference shall be made to all available statutory public utility and clients service plans and layouts. Pegs and notices shall be set out to identify all relevant service positions.

Immediately prior to commencement of works outlined in this Method Statement, (and at regular intervals thereafter) the Project Manager or other appointed supervisor will inspect the site and preview the activities, methods and risks with regard to the prevailing conditions

at the time to ensure that details and procedures outlined in this Method Statement adequately cover the works.

Prior to works it is imperative to check the latest drawing, document and temporary works register to ensure the correct documents are being worked too.

20.4 DETAILED SCOPE OF WORK – ONSHORE SITE SETUP

Task No.	Description Of Task	Tick When Complete
1	Tool Box Talk 'Site Establishment Works'	
2	Full detail found within RAMS 'Site Establishment'	
3	Site Manager / Construction Manager issues a permit to dig	
4	360 tracked excavator strips topsoil from the works area and moves into bunds circa 3m high. No mixing of topsoil and subsoil is allowed	
5	Hard standing shall be installed using local crushed stone and or a mixture of timber matting, CHECK with temporary works coordinator for thickness of matts / stone as the hard standing	
6	Offices, toilets & canteen etc. delivered to site using a hiab lorry	
7	GEN set delivered to site and wired into welfare by electrician and installation certificate received	
8	HOLD POINT With welfare and offices installed a full site induction can now be held	

20.5 DRILLING RIG ANCHOR POINT

Task No.	Description Of Task	Tick When Complete
9	Tool Box Talk 'Drilling Rig Anchor Point' , Full detail found within RAMS 'Drilling Rig Anchor Point'	
10	HOLD POINT: Check with temporary works coordinator for latest drawing and obtain permit to work	
11	Excavate trench for concrete restraint that drilling rig will be anchored too	
12	Install steel reinforcement	
13	Pour rapid cure ready mix concrete into excavation	
14	Allow 48 hours before setting rig above the concrete	

20.6 INSTALLATION OF DRILLING RIG

Task No.	Description Of Task	Tick When Complete
15	Induct crane driver and team	
16	Tool Box Talk 'Installation of Drilling Rig' Full detail found within RAMS 'Installation of Drilling Rig'	
17	HOLD POINT: TWC issues a permit to load to the contract lift team supervisor	

18	Crane sets up on site (Contract lift team)	
19	Unload awaiting flatbed trailers loaded with stores, mud recycling unit, fresh water tanks etc. as per the contract lift documentation	
20	Connect up all hydraulic and electrical systems	
21	Water required is estimated to be around 300 m ³ with an average demand of around 10 m ³ / day, assuming full drilling fluid returns are maintained	

20.7 DIRECTIONAL DRILLING

Task No.	Description Of Task	Tick When Complete
22	Tool Box Talk 'Directional Drilling' , Full detail within 'Directional Drilling RAMS'	
23	Install a 12 meter long 457mm diameter steel casing pipe which will be installed by excavator, as a guide pipe at the entry point	
24	The drill rig is set up, anchored to the steel sheet pile anchor wall and adjusted vertically to give the correct ground entry angle in accordance with the HDD design.	
25	Test all systems	
26	HOLD POINT: HDD supervisor completes the ' Green Button Form '	
27	The pilot hole will be drilled using a 250-ton pull force HDD rig with 90kNm torque. The drilling rig uses 6-5/8"FH drill pipes in 9.6 meter lengths. A 311mm diameter TCI rock bit is assembled on a 200mm diameter steerable downhole mud motor.	
28	The position of the drill is monitored by directional guidance equipment (gyroscopic steering tool) positioned behind the steerable mud motor assembly.	
29	Drill the bore profile through bedrock and stop within the sea bed sand deposits to prevent bentonite breakout	
30	457mm diameter forward ream, from drilling rig towards exit point	
31	At the end of the pilot hole stop running bentonite and switch to fresh water	
32	HOLD POINT: MMO will confirm the 500m area around the punch out is clear from Marine Mammals.	
33	Complete bore and punch out running only water thus preventing a bentonite breakout risk	
!	The reamer on the end of the drill string that is currently on the sea bed can either: A: Be recovered by the dive team to a multicat B: Pulled back through the bore to the onshore site	

20.8 WELD HDPE PIPES TOGETHER & INSTALLATION

Task No.	Description Of Task	Tick When Complete
33	Tool Box Talk 'HDPE Welding', Full detail within 'HDPE Welding RAMS'	
34	The pipeline will be strung out in one single length	
35	All butt fusion welded joints will be internally and externally debeaded	
36	The completed final pipeline will be pressure tested with water to 8 bar gauge	
37	The completed and tested pipeline will be left sealed with water under a pressure of 2 bar gauge ready for installation	
38	The HDD rig will be moved away from the entry point and replaced with a pipe pusher	
39	Pipe pusher clamps around the welded pipes and pushes them into the completed HDD bore	

20.9 MOBILISE MULTICAT

Task No.	Description Of Task	Tick When Complete
40	Passage plans will be compiled and submitted to the local Harbor Authority for approval with reasonable notice prior to any work barges being towed to site	
41	Tool Box Talk 'Mobilising Multicat', Full detail within 'Multicat Vessel Plan'	
!	HOLD POINT: Ensure trench box and type 6a backfill material is loaded before sailing	
42	The Multicat will have a DGPS Navigation system installed with the design position of the outfall pipeline pre-plotted on the screen. Additional consoles will be established on the Multicat to assist the Vessel Skipper to accurately position the asset in the correct location.	

20.10 DETAILED SCOPE OF WORK – OFFSHORE DIFFUSER INSTALLATION

Task No.	Task Description	Tick When Complete
43	Tool Box Talk : Offshore Diffuser Installation	
44	Site Manager / Construction Manager issues a permit to work	
45	Diver goes down to check the HDPE pipe has fully exited the seabed	
46	Measure angle of HDPE pipe and work out how far to measure back along the seabed surface to place the trench box	
47	Lower trench box over the planned final diffuser location, (Check license for coordinates)	
48	Excavate sea bed within trench box by use of dive team with airlift equipment	
49	When the HDPE pipe is located cut the pipe and fit vertical bend as per	

	diffuser drawing 404000-WW-DRA-04141300-0B	
50	Install vertical pipework and temporary end cap to above seabed level	
51	Diver exits trench box and trench box removed to surface	
52	Using crane on multicat lower bags of type 6a fill over seabed excavation and open draw cord on bag to fill the excavation	
53	Once the excavation is filled the temporary cap on the vertical pipe work can be removed and the diffuser head fitted	
54	GPS survey carried out to ensure compliance with discharge license	
55	HOLD POINT: Survey to be accepted by client	
56	Diver to install tide flex valve onto end of HDPE pipe as per diffuser drawing	
57	Divers install scour protection	

20.11 REINSTATEMENT

Activity No.	Activity Description	Tick When Complete
58	Upon completion of works, the multicat will assist with installation of the marker buoy any backfilling operations required before being towed away from site and demobilised.	
59	Multicat to Survey location of marker point and submit to client for review and submission to Lighthouse Board and Trinity House	
60	The seabed will be reinstated, the Inshore compound will be demobilised and the site will be taken back to its original condition.	

21 HOUSE KEEPING

Good housekeeping standards and litter management practices shall be implemented throughout the works. Housekeeping and litter management issues shall be identified during daily visual checks and during environmental inspections.

22 QC RECORDS AND PROJECT HANDOVER

Records and recording documentation shall be completed and retained for inclusion in the 'as built' file, or passed to the ABV representative as and where required.

Important – Immediate notification will be given to the ABV representative of any unforeseen item. Any quarantined item found with a fault/failure or circumstance which might have detrimental implications on the quality or performance on the project or the lease area.

If required and where directed by the ABV representative, works will be suspended pending further investigation/enquiry.

22.1 COMPLETION DEFINITION

The work required to be done by the Completion Date is the whole of the *works* including the provision of the following scope, documents and information forms part of the *works* and they

are required to be completed, prepared and supplied to the *Employer* one month before the Completion Date (*completion date*) for the whole of the *works*:

- H&S File
- As Built drawings have been submitted to the Employer
- Warranty Certification
- That all Defects have been captured by the Subcontractor and a programme of works has been agreed by the Contractor, and The Employer's Asset Planner and Customer Service Delivery Team Leader
- The Acceptance Criteria has been achieved and evidenced.

22.2 FINAL CLEAN

The working area should be left in a clean and tidy condition, all new structures should be free of construction related debris, equipment and surplus materials etc.

22.3 CORRECTING DEFECTS

The defects date and the defects correction period shall be as stated in the Subcontract Data.

Defects shall be corrected prior to covering up the apparatus.

Defects on road reinstatements, including street furniture are considered to have Health & Safety consequences and shall be rectified as soon as practicable.

23 CHANGE CONTROL

Any deviation to this method statement shall take place once agreed between SDL and client and formally recorded.

24 RISK ASSESSMENT ONSHORE

The Risk Rating or the Risk Assessments carried out for activities conducted on works shall be calculated using the following matrix :

						KEY			
CONSEQUENCE						L	Likelihood [1 (low) to 5 (high)]		
						C	Consequence [1 (low) to 5 (high)]		
						R	Risk Factor	(Likelihood x Consequence)	
						LIKELIHOOD	VALUE	CONSEQUENCE	
LIKELIHOOD	1	LOW	LOW	LOW	MEDIUM	MEDIUM	Almost Certain	5	Death with one or more fatality
	2	LOW	LOW	MEDIUM	MEDIUM	HIGH	Very Likely	4	Major injury resulting in long absence
	3	LOW	MEDIUM	MEDIUM	HIGH	HIGH	Likely	3	Reportable Injury
	4	MEDIUM	MEDIUM	HIGH	HIGH	HIGH	Unlikely	2	Medical Treatment or LTA
	5	MEDIUM	HIGH	HIGH	HIGH	HIGH	Extremely Unlikely	1	Minor injury
EVALUATION LEVEL			REQUIRED ACTION						
LOW		Acceptable Level		Proceed with activity ensuring the control measures are implemented					
MEDIUM		Unacceptable Level		Proceed with activity ensuring the control measures are implemented – should conditions change"STOP"report to the Health & Safety Advisor, Construction Manager, Project Manager or Systems Manager, as additional control measures may be required					
HIGH		Unacceptable Level		"STOP" - report to the Site Engineer, Site Manager or Health & Safety Advisor, as a full evaluation of the control measures is required.					
COMPILED BY :		Redacted				REVIEWED BY :		Redacted	
POSITION	SIGNATURE			DATE	POSITION	SIGNATURE			DATE
Redacted	Redacted			31.08.18	Redact	Redacted			14.09.18
i. All operatives are to be informed of the Control Measures PRIOR to work commencing									

No	ACTIVITY & ASSOCIATED HAZARDS	INHERENT RISK RATING	MITIGATION / CONTROL MEASURES REQUIRED	RESIDUAL RISK RATING
1.	Accessing Work Area <ol style="list-style-type: none"> Access/ Egress from/onto public roads Falls from height Vehicles entering excavation Collapse of excavation Open excavations 	M	<p>Use access points defined in traffic management plan. Traffic management plan to be followed at all times and drivers to be briefed on egress from spread out into traffic. Excavation to be fenced off by a physical barrier. Physical barriers to be installed to prevent vehicle entry. Excavations to be inspected prior to use. Warning signage to be displayed clearly around excavation. Buoyancy aid shall be provided where deemed necessary.</p>	L
2.	Unstable Ground Conditions <ol style="list-style-type: none"> Electric Shock Crushing, Trapping, Physical injuries Plant turning over/sinking 	H	<p>Permanent supervision at all times by banksman to watch for changing ground conditions. Areas of localised soft spots to be matted and machines to work off mats as required. Machines to only traffic over services at designated crossing points. Temporary Works design to be carried out and must be adhered to at all times. CAT scan and markers indicating buried services.</p>	L
3.	Open Excavations <ol style="list-style-type: none"> Physical Injuries Falls Entry into excavation Public trespass Working in excavations Toxic Atmosphere Confined Space 	H	<p>Erect & maintain barriers around pits using Herras fencing. Erect and maintain warning signage. No persons to enter an excavation unless it is safe to do so. Access shall be by steps or tied ladders into a safe zone. Ladders shall be clearly tagged / identified and inspected regularly. Excavations to be as per the temporary works design. Regular inspections of excavations (minimum daily and at the start of every shift & after changes of conditions) Gas monitors to be used to check the atmosphere. Ensure the monitor is calibrated and in date. Trained and competent personnel to use the equipment. Records to be kept. Do not site plant that may derogate the O2 levels within a confined space. Ensure when possible to have free flowing air circulation at all times Buoyancy aid shall be provided where deemed necessary. Authorised Personnel Only Fence off and ensure signage is in place at the end of each shift. Confined space entry shall be in accordance with Risk assessments and emergency plans.</p>	L

No	ACTIVITY & ASSOCIATED HAZARDS	INHERENT RISK RATING	MITIGATION / CONTROL MEASURES REQUIRED	RESIDUAL RISK RATING
4.	Plant Movements To include but not limited to <ol style="list-style-type: none"> 1. Plant Movement 2. Ground not sufficient bearing capacity 3. Live Overhead Services 4. Incorrect use of Plant 5. Underground Services 6. Crushing, Trapping Physical Injuries 7. Contact with Live Services 8. Lifting 9. Noise 	H	Where necessary use a banksman with all plant undertaking works and ensures operators are certified and competent. Ensure ground is firm enough to support excavation equipment or use matting to give temporary support for equipment. Ensure Temporary works designs are complied with. Erect Goal Posts and protection in accordance with GS 6, and ensure no spoil is stored under overheads. Erect warning signage to alert drivers. Ensure drivers are competent and experienced at operating the items of plant being used for the works. Ensure all drivers are briefed to travel below overheads with booms down. Underground services to be scanned, proved and identified. Follow agreed procedure with 3 rd parties for installing crossing protection. Ensure all personnel are clear of any lifts. Ensure lifting plan is in place. Noise assessments to be carried out and personnel to wear the appropriate hearing protection for the noise levels in the work area. Excavators with semi quick hitch couplers are not permitted.	L
5.	Weather Conditions To include but not be limited to <ol style="list-style-type: none"> 1. Eye / skin / physical injuries 2. Respiratory Problems 3. Plant losing control because of slippery surfaces 4. Falling into water 	H	Wear correct PPE to avoid injuries/ light eye protection to be worn at all times. If the site is generating a lot of dust operatives shall position themselves upwind of the stripping or wetting to be done. Ground conditions to be checked prior to start of work and monitored during the day. Excavation faces to be checked regularly. Buoyancy aid shall be provided where deemed necessary.	L
6.	Working in proximity to Overhead Cables <ol style="list-style-type: none"> 1. Electric shocks 2. Explosions/Burns 3. Plant damage 4. Unstable ground around services 	H	Erect adequate goal posts, bunting & signage as per GS 6. Competent banksman to supervise all plant crossing of overhead cables Establish protection height with owner and details can be found on Overhead Service Schedule. Ensure suitable medical assistance is available or contactable	L

No	ACTIVITY & ASSOCIATED HAZARDS	INHERENT RISK RATING	MITIGATION / CONTROL MEASURES REQUIRED	RESIDUAL RISK RATING
7.	Working in proximity to Underground Services <ol style="list-style-type: none"> 1. Electric shocks 2. Explosions/Burns 3. Unstable ground around services 	H	Follow good digging practice - HSG 47 regulations Obtain a permit to dig before any excavation work. Underground services to be scanned, proved and identified. Follow agreed procedure with 3 rd parties for installing crossing protection Ensure suitable medical assistance is available or contactable	L
8.	Refuelling/pollution/fire To include but not limited to <ol style="list-style-type: none"> 1. Pollution 2. Spills 3. Pumping 4. Fire 	M	Ensure plant is not refuelled close to watercourses (30m) and boreholes/aquifers (50m) and ensure that there are spill kits are available. Ensure that a Permit to Pump is in place – regular monitoring of pump system. Drip trays also required. Certified and in date fire extinguishers shall be on site at all times. Personnel shall be trained in the use of them and hazards identified on site.	L
9.	Slips, Trips and Falls <ol style="list-style-type: none"> 1. Physical injuries 2. Spillage of wet and dry substances 3. Unsuitable footwear 4. Trailing cables 5. Uneven Ground 	H	Adopt best working practices; <ul style="list-style-type: none"> • Practice excellent housekeeping • Keep walkways clear • Ensure full PPE is worn at all times, including suitable footwear, particularly with the correct type of sole. • Position equipment to avoid cables crossing pedestrian routes, use cable covers, restrict access to prevent contact. • Assess ground prior to entry, use of support e.g. handrails where appropriate, take extra care when crossing. 	L

No	ACTIVITY & ASSOCIATED HAZARDS	INHERENT RISK RATING	MITIGATION / CONTROL MEASURES REQUIRED	RESIDUAL RISK RATING
11.	Lifting Operations <ol style="list-style-type: none"> 1. Untrained personnel 2. Overloading/Overturning 3. Defective/damaged equipment 4. Use of wrong equipment 5. Incorrect lifting angle 6. Working on a slope 7. Physical injuries 8. Crushing due to failed load 	H	<p>All lifting operations are to be planned by an appointed person who shall produce the Lift Plan, all lifts shall be carried out under the supervision of the AP, or lift supervisor and all loads shall be secured by trained and competent slingers.</p> <p>All lifting equipment will be in good condition, fit for purpose and correctly colour coded. Exclusion zone will set up around the area, competent banksman & supervisors will supervise all lifting operations.</p> <p>Areas of work are to be kept clear of all personnel not involved in the lifting operations.</p> <p>Where possible, all lifts shall be performed on good, level ground, however if not possible mitigation shall be identified in the site specific Lift Plan.</p> <p>Clear communication system to be established and followed by the lift supervisor.</p> <p>Only use manufacturers recommended lift points on Direct Pipe machines</p>	L
12.	Plant and Machinery <ol style="list-style-type: none"> 1. Noise 2. Contact with other mobile plant. 3. Parts 4. Test Certificates 5. Untrained Operator 	H	<ul style="list-style-type: none"> • Wear the correct PPE and make sure it's of a clean standard to increase visibility. • All operators have the correct operator's certificates, CPCS card etc. • Make sure daily checks are done at the start of the work shift. • All machinery to be in good working order as per manufacturers specification • Vehicles to be in a road worthy condition • Not to wear loose clothing around plant. • Ensure any other workforce aware of work taking place • Oil / stroke diesel leaks with be identified and rectified immediately • Any spills will be cleaned up immediately and disposed of according to spill type 	L

25 RISK ASSESSMENT MATRIX OFFSHORE

RISK ASSESSMENT MATRIX										
SEVERITY CLASSIFICATION						PROBABILITY				
Value	Severity	Definitions / Actual or Potential Consequences				Highly Improbable	Improbable	Possible	Probable	Frequent
		Injury	Health	Damage	Pollution					
						A	B	C	D	E
1	Negligible	Minor first aid case or no specific treatment	No adverse health effects	No Cost	<1Ltr	L	L	L	L	L
2	Minor	First aid or medical aid case	Minor adverse health effect (e.g. mild rash)	<£5,000	1-10Ltr	L	L	L	M	M
3	Significant	Possible severe injury (medical aid case) leading to maximum of 1 day LTI	Moderate adverse health effects such as persistent dermatitis	£5,000-25,000	10-100Ltr	L	L	M	M	H
4	Severe	Major injury leading to 3 day+ LTI	Harmful health effects such as a dangerous infection	£25,000-500,000	100Ltr-100m ³	L	M	M	H	H
5	Catastrophic	Fatality or multiple major injuries	Terminal or permanent health damage	>£500,000	>100m ³	L	M	H	H	H
PROBABILITY CLASSIFICATION										
A	Highly Improbable	A possibility but extremely remote chance of occurrence								
B	Improbable	Unlikely to occur (very infrequent) during the operation								
C	Possible	May occur (infrequent) during the operation								
D	Probable	Is likely to occur often during regular operations								
E	Frequent	Is likely (common occurrence) to occur once or more during every operation								
RISK CLASSIFICATION										
L	Low Risk	Operations may proceed with care without identification of any further mitigating controls								
M	Medium Risk	Operation may proceed with caution, however further investigation into additional controls should be conducted to further reduce risk where possible								
H	High Risk	Operation must NOT proceed. Alternative methods / controls / substance to conduct the task must be developed / sought								

26 RISK ASSESSMENT OFFSHORE SCOPE

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
1.	Vehicle Movements / Driving	Use of Mobile Telephones; Other Road Users; Incompetent Persons; Vehicle Failure; Hazardous Substances; Tiredness; Reversing Vehicles	Traffic Accidents; Collisions; Damage to Vehicle & Contained Equipment; Spillage; Injury to Passengers; Trapping / Crushing Personnel	5	C	R	Competent Persons; Licence; Maintain Vehicle; Certified Vehicle; Applicable Vehicle Markings and Signs and Carriage of Dangerous Goods Notes; Travel Time to be Included in Working Day; Reversing Alarms (Where Fitted / Required); Others to Assist in Reversing.	5	A	L	Project Manager Personnel Administrator All Persons Driving Vehicle
2.	Personnel Embark / Disembark Vessels / Boats (in Port)	Vessel movements; unfamiliar personnel; wet surfaces; tidal movements.	Slips, trips & falls; personnel injury; man-over board.	2	D	M	Access / egress via gang plank only; all personnel to report to vessel reception on arrival; log personnel arriving & departing; vessel induction; vessel security management.	2	A	L	Vessel Master
3.	Crane Operations	Overhead working; Swinging loads; Public area; Heavy Load; Unstable Ground; Poor / Loss of Communication; Incorrectly Installed Rigging; Unsuitable Rigging; Padeye / Lift Point Failure; Unfamiliar Persons; Adverse Environmental Conditions (Wind Etc.); Poor Light Level; Uncertified / Damaged Lifting Device	Collision; Equipment / asset damage; Swinging Loads; Dropped Objects (Item Being Lifted); Asset Damage (Including Item Being Lifted); Crushing of Personnel; Serious injury - Potential Fatality	5	D	H	Tool-box Talk; LOLER Lifting Plans; Establish Clear Communications Between All Personnel & Operator; Continuous Monitoring of Environmental Conditions; Pre-Lift Safety Briefs / Personnel Familiarisation; Competent Persons to Design Dedicated Rigging Arrangements & Prepare Lift Plans – Approved by Appointed Person; Competent, Authorised Crane Operator and Lifting Team; Good, Clear Communications; Warning Notices and Signage; Barriers: Segregate work area to prevent unauthorised access; single crane operation.	5	A	L	Crane Operator Crane Supervisor Slinger / Banksman Appointed Person Mobilisation Supervisor All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
4.	Loading Equipment (Vessel Deck)	Heavy Loads; Excessive Loading; Swinging Loads; Congested Deck; Dropped Object; Fuels; Oils.	Injury to Personnel; Equipment Damage; Asset damage Environmental Contamination.	5	D	R	Mobilisation Plan; Pre-Mobilisation Safety Briefing; Ensure Adequate Communications; Deck Crew to Co-Ordinate; Warning Notices, Signs and Barriers; Competent Personnel; Certified Equipment; Pre-Approved Mobilisation Plan and Deck Plan; Personal Protective Equipment; Use of Checklists; Tool Box Talks; Vessel SMS; Interface Between 3rd Party Services e.g. Cranes / Transport / etc; non-involved personnel clear of deck; monitor environmental conditions; check loads prior to conducting lift.	5	A	L	Vessel Master Vessel Deck / Rigging Foreman Crane Operator Mobilisation Supervisor
5.	Hot Work (Sea-Fastening / Welding / Oxy-Arc Cutting / Grinding)	Fire; Trailing Hoses; Gas Cylinders; Fuel Storage Tanks; Bunkering Operations. Smoke; Fumes	Explosion; Fire; Personal Injury; Equipment / Asset Damage; Trips & Falls; Weld Failure (Sea-Fastening); Inhalation of Fumes	5	D	H	Vessel; Deck Crew to Co-Ordinate; Approval for Hot Work from Vessel Engineers; Permit to Work System; Procurement Procedure 3rd Party Services; Approved Welding Procedure & Inspection (MPI) for Sea-Fastening; Tool-Box Talk; Monitor 3rd Party Personnel; Use of Appropriate PPE; Competent Persons; Fire Watch; Fire-fighting equipment; Certified Equipment; Flash Awareness; Fire Blanket; Use of Welding Screens to Protect Others from Arc (Eyes); PPE.	5	A	L	Vessel Master Vessel Deck / Rigging Foreman 3rd Party Personnel Mobilisation Supervisor
6.	Working Adjacent to Exposed Edges / Over-side Working	Exposed Edges; Wet Surfaces; Adverse Weather Conditions; Tripping Hazards	Man-Overboard; Falls from Height; Drowning; Hyperthermia; Personal injury	5	D	H	Tool-Box Talk; Supervisor to Coordinate; Use of Appropriate PPE (Harness / Life-Jacket) Where Handrails Removed; Man-overboard Boat; Good Housekeeping; Use of Temporary Handrails to prevent Exposed Edges; Replace Handrails as Soon as Possible; Barrier off area; No one to work alone.	5	A	L	Supervisor All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
7.	Load Testing	Rigging / Equipment Failure; Persons Working in Vicinity During Test.	Asset Damage; Personal Injury.	5	C	H	Deck Crew to Co-ordinate; Procurement Procedures 3rd Party Services; Certified Equipment; Competent Personnel; Segregate Work-area; Permit to Work; Barriers	4	A	L	Vessel Master Mobilisation Supervisor 3 rd Party Test Engineer
8.	Electrical Tie-In to Vessel System (Interfacing)	High Voltage; Other Personnel Working in Area; Unfamiliar Personnel; Unauthorised / Uncoordinated Operations.	Electrocution; Fatality; Fire; Major Asset Damage; Damage to Equipment	5	D	H	Deck Crew / Offshore Project Manager to Co-Ordinate; Competent Personnel; Certified Equipment; Personnel Familiarity with Equipment; Isolations; Permit to Work; Liaison with Chief Engineer; Mobilisation Plan; Tool-box Talks; Pre-mobilisation Safety Brief; Effective Planning.	5	A	L	Electrical Technician Chief Engineer Mobilisation Supervisor
9.	Function Testing of Project Equipment	Use of machinery; Unauthorised Operation of Plant / Equipment; Other Personnel; Inadvertent Operation of Plant / Equipment. Unfamiliar personnel operation plant.	Personal Injury; Damage to Equipment.	4	C	M	Diving Supervisor to Co-Ordinate; Competent Personnel; Certified Equipment; Personnel Familiarity with Equipment – Dive System Familiarisation; Guards; Post Start-Up & Operating Procedures on Equipment; Dive System & Project Equipment Audits.	3	B	L	Mobilisation Supervisor Diving Supervisor Divers
10.	Unpacking Containers	Loose Items; Use of Knives to Open Packaging; Heavy Objects	Cuts to Hands & Fingers; Manual Handling Injuries; Persons Struck by Falling Objects (From Shelving & Loose Items When Opening Doors)	3	D	M	Dedicated Stores Containers with Fixed Storage; Use of Cargo Nets to Prevent Items Falling During Transit; Provision of Safety Knives; Tool-Box Talks & Mobilisation / Demobilisation Safety Briefing; Diving Supervisor to Co-ordinate Deck Activities; Use Good Manual Handling Technique.	3	B	L	All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
11.	Competence of Personnel	Persons Unfamiliar with Equipment / Operations Working on Site.	Personnel Injury; Asset Damage.	4	D	H	Project Manager to Co-Ordinate; UDS Personnel Competence Records; Site Induction; Project Pre-Mobilisation Safety Brief; Check Log Books and ORIGINAL Certification by UDS Supervisor on Personnel Arrival at Site Prior to Commencing Work.	4	A	L	UDS Project Manager UDS Diving Supervisor UDS Personnel Coordinators
12.	Housekeeping	Smoking; Trailing Cables & Hoses; Pressurised Gas Containers / Cylinders / Hoses etc.; Flammable Substances; Hazardous Substances; Build Up of Combustible Materials (Paper, Wood, Oil Soaked Rags etc.); Loose Items in Walkways; Items Blocking Escape Routes or Fire Fighting Equipment; Spills; Items Leaning Against Walls.	Persons Breathing Second-hand Smoke; Fire / Explosion; Slips, Trips & Falls; Electrocutation; Falling Objects; Machinery / Equipment Damage; Falling Items; Inability to Use Fire Fighting Equipment Which Could Result in Serious Injury or Fatality in Event of Fire.	4	D	H	Designated External Smoking Area; Combustible/Flammable Materials Kept Clear of Work Areas When Not in Use; Clean Up All Spillage Immediately; Tripping Hazards to be Removed; Use of Approved Waste Disposal Contractor All Staff Informed of Importance of Good Housekeeping – Awareness; Items Not in Use to be Stored Correctly; Extension Leads / Hose Runs to be Kept to a Minimum – Run Overhead Wherever Possible; Identify Escape Routes, Walkways and Traffic Routes & Mark Out; Personnel Encouraged to Report all Hazards	4	A	L	Mobilisation Supervisor All Personnel
13.	Waste Management	Hazardous Substances; Spillage.	Environmental Pollution; Adverse Health; Fire.	3	C	M	Segregation of Waste (Management); Competent Contractors; Operate in accordance with Site SMS and Environmental / Waste Management Plans; Briefing to UDS Personnel on the Site Waste Management System; Inform Site Manager of Any Spillage.	3	A	L	Site Manager Mobilisation Supervisor All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
14.	Working at Height (General)	Adverse Environmental Conditions; Unsuitable Working Platform (Incorrect Use of Ladder Etc.); Slippery Surfaces; Sharp Edges; Over-Reaching; Inexperienced Personnel; Complacency; Fear of Heights; Heavy Loads; Dropped Objects / Falling Debris.	Slips, Trips and Falls; Personal Injury - Possible Fatality; Equipment / Machinery Damage; Person Freezing; Injury to Persons at Ground Level (Falling Objects or Persons)	5	D	H	Tool-Box Talk; Permit to Work; Fall Arrestor to be Worn; Competent Persons; Power Tools to be Inspected Prior to Use; Do Not Carry Tools in Pockets; Do Not Leave Tools at Height; Good Housekeeping to be Maintained; Inspect Access Ways for Integrity; Ensure Adequate Supervision; PPE in Place, Check Footwear for Integrity and Ensure no Slippery Substances are Present on the Soles; Persons With Fear of Heights to Ensure they Inform Supervisor and Not Go Ahead With Work; Stop Work When Environmental Conditions Become unsafe; Erect Barriers to Segregate Work Areas.	5	A	L	Site Manager Mobilisation Supervisor All Personnel
15.	Working at Height (Use of Ladders)	Slippery Rungs; Damaged Equipment; Slippery / uneven Floor; Incorrect Equipment Selection; Lack of Securing at Top and Base of Ladders; Fear of Ladders or Heights; Over Reaching; Use of Tooling; Heavy Object; Inexperienced Personnel; Personnel Working Below; Adverse Environmental Conditions.	Falls from Height; Dropped / Falling Objects; Possible Fatality; Spinal Injury; Broken Bones / Fractures; Head Injuries; Personnel Freezing	5	D	H	Tool-Box Talk; Permit to Work; Barriers and Signs; Use of Ladder for Short Duration Tasks Only or Worksite Requirement; Ensure Ladder is at the Correct Safe Working Angle (Ratio of 4:1) Ensure Ladder Extends 1.05m above Intended Working Platform When Accessing Upper Levels; Use of Suitable Ladder; Inspect Access Equipment for Defects Prior to Use; Check Integrity of Footwear, No Slippery Substances on Soles; Fall Arrestor to be Worn; Ensure Ladder is Secured at the Top/Footed at the Bottom; Do Not Carry Tools in Pockets; Do Not Over Reach, Move the Equipment!; Competent Personnel; Stop Work When Environmental Conditions Become unsafe.	5	A	L	Site Manager All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
16.	Subcontractors Working Onsite	Unfamiliar Personnel; Personnel Not Signed onto Site; Incompatible Work tasks	Incomplete Roll-Call in the Event of an Emergency; Injury to Staff & Subcontractor Personnel.	4	C	M	Tool-Box Talk; Permit to Work; Subcontractor Personnel to Sign In / Register on Arrival; Provide Subcontractors with Site / Project Inductions / Familiarisations; Subcontractor Personnel to be Monitored During Time On-site; Subcontractor Method Statements & Risk Assessments for Work to be Carried Out & Documented; Competent Subcontractor Personnel	4	A	L	Site Manager Mobilisation Supervisor Subcontractor Personnel
17.	Manual Handling	Heavy Loads; Obstructions; Vessel Heave & Roll; Other Personnel; Sharp Edges.	Personal Injury.	4	D	H	Use of Mechanical Handling Methods Where Possible; Safety Manual; Competent Personnel; Good Technique; Mobilisation Plan; PPE.; Tool-Box-Talks; Briefings to Raise Awareness; Removal of Trip Hazards; Hand-out Information Cards During Initial Safety Brief Detailing Good Technique; Manual Handling Assessments;	4	A	L	All Personnel

			ACTIVITY OVERVIEW		MOBILISATION / DEMOBILISATION ACTIVITIES						
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
18.	Welfare & Security Provisions	Exposure to Environment; Contamination; Hazardous Substances; Life Support Equipment on Site; Poor or Inadequate Sanitary Conditions; Food & Drink Preparation and Consumption; Smoking; Visitors; Unfamiliar Persons; Intruders	General Illnesses; Other Illness – Leptospirosis (Weils Disease); Damage to Equipment; Stolen Equipment; Tampering with Equipment	3	C	M	Provision of Welfare Facilities – Toilet, Cleaning Areas (Separate for Men & Women where Necessary); Availability of Drinking Water & Shelter; Provision of Storage Containers; Certain Items to be Removed from Site; Regular Emptying of Waste Bins; Encourage Good Housekeeping Standards & Monitor to Ensure Implemented & Maintained; Clean Spillages; Report Hazards or Unsafe Conditions; Designated External Smoking Area in Compliance with Smoke-free Requirements; Allocate Suitable Rest Breaks During the Working Day; Maintain Security at Site In Accordance with Project Plan / Site Requirements; Ensure Compliance with CDM & Construction Phase Plan	3	A	L	UDS Project Manager Site Manager Mobilisation supervisor
19.	Working Adjacent to Waters Edge	Water; Unguarded Edges; Contamination; Rats	Drowning; Slips, Trips and Falls – Injury to Diver/Personnel; Leptospirosis (Weil’s Disease)	5	C	H	Permit to Work; Tool-Box Talk; Ensure Suitable Edge Protection in Place; Wear Life Jackets/Buoyancy Aids; PPE; Site Awareness; Good Housekeeping; Communication; Familiarisation; Use of Temporary Barriers Where Necessary; Post Warning Signs; Awareness of Risk of Leptospirosis – Good Hygiene	5	A	M	Dive Supervisor All Personnel

ACTIVITY OVERVIEW				DIVING INTERVENTION ACTIVITIES							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
1.	Emergency Procedures	Personnel Unaware of Emergency Procedures; Insufficient Emergency Procedures; Initiation of New Working Process without Revision & New Emergency Procedure	Confusion / Panic in emergency situations; Serious Injury to Personnel.	5	C	H	Site Induction; Project Familiarisation Programme; Safety Briefings; Emergency Procedures; Emergency Response Planning and Interfacing – Within Diving Project Plan (007-17-DPP-001); Conduct Drills & Exercises; Tool-Box Talks.	5	A	L	UDS Project Manager UDS QSHE Manager UDS Diving Supervisor CLIENT Project Manager
2.	Conducting Routine / Planned Maintenance	Degradation of Systems (e.g. Pressure Hoses); High Pressure; Electricity	Equipment Failure; Containment Failure; Electrocuting; Personnel Injury.	4	C	M	Perform in Accordance with Diving System Maintenance Programmes / Schedule; Competent Personnel; Dive System; Apply Equipment Power Isolations as appropriate; Maintain Good Communications; Monthly Certification & PMS Requirements Issued by UDS Certification Department (45 Day Requirements); Use of UDS PMS Database:	4	A	L	UDS Diving Supervisor UDS Certification Administrator UDS Technical Services Manager
3.	Management of Equipment Certification & Planned Maintenance Records	Insufficient / Incorrect Certification / PMS Information	Equipment Certification Period Expires / Degradation of Systems (e.g. Pressure Hoses etc.)	4	C	M	Requirements Performed in Accordance with Diving System Maintenance Programmes / Schedule (Manufacturer / IMCA D 018 Requirements & Relevant BS / International / Certifying Authority Standards); Competent Personnel; Maintain Good Communications; Use of UDS PMS Database (Certification & PMS Database);	4	A	L	UDS Diving Supervisor UDS Certification Administrator UDS Technical Services Manager
4.	Establish Diving Permit SITE PERMIT	Unfamiliar Persons; Other Activities; Uncoordinated Activities;	Injury; Serious Damage.	5	C	H	Permit-to-Work System; No Conflicting Work to Take Place During Diving Operations; Copy of Permit to be Posted in Dive Control; Emergency Response Plan; Maintain Communications with Permit Issuing Authority	5	A	L	UDS Diving Supervisor Site Manager Vessel Master

ACTIVITY OVERVIEW				DIVING INTERVENTION ACTIVITIES							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
5.	Pre-Dive Checks (Diving Operations)	Equipment Damage; Unfamiliarity; Complacency;	Personnel Injury; Equipment Damage.	3	C	M	Use of Checklists; Project Familiarisation Programme (007-17-DPP-001); Vessel Induction; Vessel Operations Manual; UDS Diving Procedures; Diving Methodology as Detailed Within the Diving Project Plan; Diving Supervisor to Co-ordinate; Competent Persons; Post Start-up and Operating Instructions on Equipment; Certification & Planned Maintenance System; Dive system Audit (ADC / IMCA D 023 or D 040).	3	B	L	UDS Diving Supervisor Dive Team
6.	Operation of Diving Equipment	Equipment Failure/ Loss of Power; Unfamiliarity with System; Noise; High Pressure; Oxygen.	Equipment Damage; Fire / Explosion; Asset Damage; Personnel Injury.	4	C	M	Certified / Maintained Equipment; Project Familiarisation Programme & Safety Brief (007-17-DPP-001); Competent Personnel; PPE; Perform Routine Maintenance in Accordance with System Specification; Use of Checklists; UDS Diving Procedures; Post Start-up and Operating Instructions on Equipment; Certification & Planned Maintenance System (PMS); Dive system Audit (ADC / IMCA D 023 or D 040).	4	A	L	UDS Diving Supervisor Dive Team

ACTIVITY OVERVIEW				DIVING INTERVENTION ACTIVITIES							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
7.	Diver Deployment using LARS System	Dropped Objects; Vessels – Operating in Vicinity; Injured / Unconscious Diver; Height; Swell (More Significant Hazard if Diving from a Vessel) – Moving Vessel; Poor / Loss of Communication; Incorrectly Installed Rigging; Unsuitable Rigging; Unsuitable Carrier (Basket); Unfamiliar Persons; Breakdown of Hydraulic Power Pack	Inability to Recover Divers; Equipment / Rigging Failure; Falls from Height; Exceed Bottom Time Limits; Injury to Divers – Potential Fatality	5	C	H	Tool-Box Talk; Dive Planning; Permit to Work; Personnel Awareness; Competent Personnel; Second Recovery System/Hydraulic Power Pack; Suitable, Certified Equipment – Rated for Man-Riding, Including the Carrier (Basket); Basket to have Overhead Protection & Be Able to Carry Two Persons; Perform Emergency Drills; Dive System Familiarisation; Review Site Layout Drawings, Water Depth & Survey Data etc.; Set Suitable Environmental Limits for Access & Egress (Swell Height); Planned Maintenance & Certification Routine; Colour Coded Rigging	5	A	L	Diving Supervisor LARS Operator Divers
8.	Diver Umbilical Management	Deployment; Sharp Edges; Risk of deposits; Thrusters; Underwater Structural Members / Structures; Debris	Snagging / Entanglement; Damage to Umbilical.	5	D	H	Dive Plan; Tool-Box-Talk; Tending with Procedure; Marking of Umbilical's Using Incremental Indications; Diving Methodology as Detailed Within the Diving Project Plan (007-17-DPP-001); Diving Operations Manual; Competent Personnel; Sufficient Personnel; Awareness of Possible Deposits / Contaminants; Appropriate PPE – Gloves for Tenders; Clean Recovered Equipment / Umbilical as Necessary.	5	A	L	Diving Supervisor Surface Tender Divers

ACTIVITY OVERVIEW				DIVING INTERVENTION ACTIVITIES							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
9.	Diving Operations (General)	Debris; Poor Visibility; Vessel Thrusters; Adverse Environmental Conditions; Tidal Flow; Loss of Communications; Cold Water; Water Depth	Injury to Diver; Exceed Bottom Time Limits; Decompression Sickness; Entanglement; Entrapment; Nitrogen Narcosis; Equipment Damage; Loss of Life support; Fatality.	5	C	H	Operations in Accordance with Diving at Work Regulations 1997 Inland/Inshore ACOP & ADC / IMCA; Competent / Experienced Personnel; Provision of ADC Diving Supervisor (Appointed in Writing); Tool-Box Talks; Dive Planning; Set Environmental Limits on Operations (Documented in Diving Project Plan); Monitor Environmental Conditions; Emergency Plans & Procedures; Diving Methodology as Detailed Within the Diving Project Plan (007-17-DPP-001); Back Up / Emergency Communications; All Operations to be Controlled by Activity Procedures; UDS Diving Operations Manual; Review Provided Documents & Drawings to Familiarise with Location & Layout; Diving Supervisor to Co-ordinate; Dedicated Standby Diver; Tender; Certified Equipment; Use of Pre-Dive Checklists; Provision of Suitable Medical Support & Shore Based Backup from Medical Specialists; DDC Within Travel Time Limits; Communications to Key Support Areas; Diving Supervisor to Take Primacy over Other Operations During Diving Operations (Such as Lifting Operations).	5	A	L	UDS Management UDS Diving Supervisor Divers

ACTIVITY OVERVIEW				DIVING INTERVENTION ACTIVITIES							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
10.	Underwater Visibility	Poor Visibility; Umbilical's; Debris	Disorientation; Entanglement; Umbilical Damaged/Diver Injured Due to Sharp Debris	4	D	H	Maybe Necessary for the Diver to Maintain Position by Tactile Means, While Ensuring Strict Umbilical Management; Dive Plan; Stop Work If Visibility Is Too Poor; Competent Persons; Diving Supervisor to Monitor Diver; Maintain Good Verbal Communications Between Diver & Diving Supervisor	4	A	L	Dive Supervisor Tender Diver
11.	Recovery of Injured Diver (Including Provision of Treatment)	Unconscious Diver; Damaged Equipment; Decompression Penalties; Manual Handling.	Inability to Recovery Unconscious Diver; Major Injury; Inability to Provide Treatment; Injury to Standby Diver.	5	C	H	Perform Regular Emergency Drills & Briefings for All Personnel to Contribute / Attend (Including Stretcher Drill); Provision of Adequate Qualified First Aiders (Minimum of Supervisor and One Diver – All Divers Whenever Possible); Provision of Nominated, Certified DDC within ACoP Travelling Time Limits from Site for Therapeutic Treatment; Project Familiarisation Programme; UDS Diving Operations Procedures; Emergency Planning – Documented Within Diving Methodology as Detailed Within the Diving Project Plan (007-17-DPP-001); Identify Suitable Medical Support (A&E Department) within Project Plan; Medical Support (DDRC Diving Medical Advice Helpline); Provision of Suitable First Aid Equipment – ADC Standard First Aid Kit & Oxygen at Site; Communications; Diving Supervisor to Coordinate.	5	A	L	UDS Diving Supervisor Standby Diver Dive Team First Aiders DDRC Diving Medical Advice Helpline

Activity Overview				Diving Intervention Activities							
Task No	Activity	Potential Hazards	Consequences	Initial			Control and Mitigating Factors Summary	Residual			Responsibility
				S	P	R		S	P	R	
12.	Transfer of Equipment to Worksite (Running Line)	Tidal Flow; Poor Visibility; Heavy Objects (Tooling); Rigging Failure; Potential for Dropped Objects	Entanglement of Diver and/or Umbilical; Trapped Fingers; Diver Being Struck by Load; Asset Damage; Loss of Equipment.	3	C	M	Activity Procedures; Tool-Box Talk; Establish and Maintain Clear Communications Between Diver - Diving Supervisor; Establish Running Line to Site from Surface; Use of Suitable Rigging (Shackles, Lines etc.) to Secure Items to Running Line (Secure Via Weak Link); Use of Tools Basket if Necessary; Install Visual Aids (Light Stick / Strobe) onto Items; Competent Personnel; Certified Rigging; Diver to Retreat to Safe Haven if Required; Check Diver Aware of Umbilical Location Prevent Entanglement / Entrapment; Good Management of Deployed Tools, Equipment & Lines	3	B	L	Diving Supervisor Divers

27 HDD RISK MITIGATION REGISTER

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STOCKTON			HDD RISK MITIGATION REGISTER - Dunnet Outfall				Author	Redacted	Date	11.09.18	
							Checked	Redacted	Date	14.09.18	
Ref	Hazard & Location	Risk	Mitigation Plan	Action	Action	Owner	Phase	Status	Comments	Signed	Date
No.		L/M/H		No							
1	THE ROUTE										
1.1	The investigative phase of the project will include walkthroughs.	M	Initial Phase H & S Plan. Risk Assessment. Method Statements. Inductions. Emergency Procedure. Monitoring. Daily Programme.	1.1.1	Identify and scope different types of investigations, surveys and inspections.		Before Surveys		Project Plan		
				1.1.2	Prepare method statement(s) for safe control of investigations, surveys and inspections.		Before Surveys		Method Statement		
1.2	Bore holes will be required during the early stages which may involve drilling on ground with standing water and offshore works. Boreholing also includes noise, dust and lubricant hazards.	M	Risk Assessment. COSHH. Method Statement. Inductions. Emergency Procedure. Monitoring. Daily Programme.	1.2.1	Identify the locations & risk assess areas that pose additional hazards over normal boreholing activities.		Before Boreholing		Drawings		
				1.2.2	Prepare method statement(s) for safe control of works.		Before Boreholing		Method Statement		
1.3	Excess water in the shaft/tunnel/pipeline is both a safety and an environmental hazard that must be controlled, pollution of water courses and standing water are inherent risks.	M	CEMP. Safe Working Procedures. Consents and Approvals.	1.3.1	Carry out risk assessment to determine conditions that would 'stop - work'.		Before Const'n		Risk Assessment		
				1.3.2	Identify locations along route where water run-off will be a potential hazard.		Before Const'n		Flood mitigation plan		
1.4	Dust is a hazard resulting from vehicle movements and excavation in periods of dry weather.	L	Risk Assessment. Ground Investigations. Safe Systems of Work. Damp Down Measures. PPE.	1.4.1	Survey ground conditions and identify degree of hazard.		Prior to Constr'n		CEMP		
				1.4.2	Develop and implement construction procedures.		Prior to Constr'n		CEMP		
1.5	Possible hazard from UXO.	L	Desk Top Study. Historical Records. Hazard Evaluation. Safe Systems of Work. Consultations.	1.5.1	Carry out desk top study, survey, consultations and investigation to identify possible locations.		Prior to Constr'n		UXO Survey		
				1.5.2	Communicate hazards and controls, and implement ongoing watching brief.		Prior to Constr'n		UXO Survey		
1.6	Geology	L	Geological Investigation	1.6.1	As per 1..2		Prior to Constr'n		Ground risk lies with client		
				1.6.2	Review of best available techniques		Prior to Constr'n		Direct Pipe selected		
2	HDD ROUTE : -										
2.1	The HDD route will exit subsea	H	Site Survey. Ground Investigation. Designed to Standards. Consultations. Consents and Approvals. Method Statements. Temporary Works Design.	2.1.1	Carry out assessment of subsea exit.		Prior to Constr'n		Bathymetry Survey		
2.1.2				Carry out consultations with controlling authorities, police and local interest groups. Obtain any consents required.		Prior to Constr'n		Consents			
2.1.3				Identify construction procedures and need for temporary works to control hazards and risks.		Prior to Constr'n		Temporary Works Register			
2.2	Deep excavations will be necessary on the shore side of the drill. These excavations may occur in readily accessible locations providing the potential for access by unauthorised persons. The excavations will be in a variety of ground conditions, with some being particularly unstable. Excavations have the inherent risks of collapse, falling objects and falling from height being ever present.	H	Ground Investigations and reports. Safe System of Work. Temporary Works Design to minimise required entry pit to circa 2m deep	2.2.1	Carry out all necessary ground investigations.		Prior to Constr'n		Borehole data		
				2.2.2	Dig trial holes for known and unknown buried services.		Prior to Constr'n		Utility Drawings		

				2.2.3	Plan and design safe system of work.		Prior to Const'n		Project Plan		
				2.2.4	Design temporary works.		Prior to Const'n		Temporary Works Register		
				2.2.5	Heras Fencing to be erected around all deep excavations		During Const'n				
2.3	Unauthorised access to the construction site may be possible	M	Temporary secure fencing. Site supervised and security procedures	2.3.1	Determine security measures during periods of non-attendance		During Const'n		Fencing complete		
				2.3.2	Carry out daily inspections		During Const'n		Daily reports		
3	CONSTRUCTION ISSUES GENERALLY: -										
3.1	There are many hazards and risks that are associated to the construction activities to this type of project. Whilst these hazards / risks may be common to this type of work, suitable and sufficient arrangements must be implemented to migrate the risk.	H	Construction Phase Health and Safety Plan. Detailed risk assessments. Working procedures. Specific activity method statements. Safe systems of works. Competent personnel. Supervision. Compliance monitoring.	3.1.1	Hazard identification, carry out and record risk assessments.		Before Const'n		ALL RAMS approved		
				3.1.2	Develop and implement suitable and sufficient health, safety and welfare arrangements.		Before Const'n		HS Plan approved		
				3.1.3	Induct and train all operatives in the site specific requirements and arrangements.		Before & During Const'n		Induction forms		
				3.1.4	Communicate hazards and risks.		Before & During Const'n		Take5 and Toolbox talks		
				3.1.5	Communicate working procedures, controls and method statements.		Before & During Const'n		Take5 and Toolbox talks		
3.2	Common hazards such as; Movement of plant, lifting, noise, COSHH, harmful substances, movement of materials, welfare, occupational health, training, construction specific activities and the like are all issues that must be assessed and safe working methods established.	H	Construction Phase Health and Safety Plan. Detailed risk assessments. Working procedures. Specific activity method statements. Safe systems of works. Competent personnel. Supervision. Compliance monitoring.	3.2.1	Hazard identification, carry out and record risk assessments.		Before Const'n				
				3.2.2	Develop and implement suitable and sufficient health, safety and welfare arrangements.		Before Const'n		Site welfare operational		
				3.2.3	Induct and train all operatives in the site specific requirements and arrangements.		Before & During Const'n		Induction forms		
				3.2.4	Communicate hazards and risks.		Before & During Const'n		Take5 and Toolbox talks		
				3.2.5	Communicate working procedures, controls and method statements.		Before & During Const'n		Take5 and Toolbox talks		
4	ENVIRONMENTAL ISSUES: -										
4.1	Excavations and shafts are likely to fill with groundwater. Construction activities will require the work area to be dewatered. Pumping and discharging of standing water must be carefully managed to avoid polluting surrounding land and groundwaters. silts are classed as pollutants.	H	CEMP. Permit to pump. Consents.	4.1.1	Establish means to ensure pumped water is clean at the point of discharge and identify all potential points of discharge.		Before Const'n		Discharge through straw bales		
				4.1.2	Develop and implement a permit to pump system.		Before Const'n				
4.2	There is the potential for protected species, local group species interest areas of nature conservation, and the like; to be identified along or in the near vicinity of the route. Noise, habitat damage, construction traffic, pollution, waste and the like are hazards that must be avoided or mitigated.	M	CEMP. Pollution prevention procedures. Emergency procedures. Best construction practices. Monitoring. Noise assessment. MMO attendance may be required as specified by the Marine Licence.	4.2.1	Identify and record locations of protected / of-interest species.		Prior to Const'n		CEMP		
				4.2.2	Carryout noise assessment of construction activities. Identify noise sensitive areas along the route.		Prior to Const'n				
				4.2.3	Implement Environmental Management Plan.		Prior to Const'n				

				4.2.4	Establish pollution prevention procedures.		Prior to Constr'n				
				4.2.5	Establish emergency pollution procedures.		Prior to Constr'n				
4.3	Contaminated land may be present which needs removing from the site. Waste management regulations must be adhered to.	M	Waste management plan	4.3.1	Implement Site Waste Management Plan.		During Const'n				
	Notes:										

28 TEMPORART WORKS SCHEDULE

STOCKTON

The Temporary Works Schedule captures the Temporary Works Design requirements identified during the Detailed Design Phase of the project and includes an initial assessment of the Temporary Works BS5975 Design Classification.

Upon appointment of a Principal Contractor the Temporary Works Schedule will need to be reviewed and updated.

It will be the Principal Contractors responsibility to assess the Temporary Works design classification and undertake all Temporary Works Design.

Project	Dunnet Outfall	Title	Dunnet Outfall - Temporary Works Schedule					Prepared By	Redacted	17.12.18
Document	Temporary Works Schedule	Document Ref	SAF 057	Date	Issued by	Changes		Approved for Issue		17.12.18
Client	Amey Black & Veatch	Revision	Rev A	17.12.18	SDL	First Issue				

No.	Item	Comments	Design Brief No.	Approx. Location e.g. OS Ref, Section, Plot, Road Name	Crossing Description X-Ref. type	Method of Crossing	Ground Description (from nearest BH or TP) incl. ground w ater info.	Excavation Support Type incl. name TW(s) Designer Draw g & Calculation Ref. Nos.	Initial BS5975 Temporary Works Design Classification	Temporary Works Design Responsibility	Excavated Material Storage Location	Method of Dewatering incl. receptor info.	Date Opened	Date Closed	Those Authorised to Inspect daily and [w eekly]
1.0 HDD Works															
1.01	Site Fencing/Hoarding	Temporary Works design required for the different types of fencing that may be required including Herras, solid hoardings and barriers, flooding to be considered when using solid hoarding fencing. Suitable fencing to used to provided demarcation areas.	TW NO.005	Dunnet HDD Compound	N/A	N/A	Glacial Till	Herras Fencing	Category 0	SDL	N/A	NA			Redacted
1.02	Site Roads and Car Parking	Temporary Works design required for constructing suitable areas for sites access, general access around the compound, car parking and the movement and lifting of heavy equipment.	TW NO.003	Dunnet HDD Compound	N/A	N/A	Glacial Till	NA	Category 0	SDL	Topsoil to be stacked circa 3m high in a bund around the site	Grips to be installed and discharged to straw bale lagoons			Redacted
1.03	Site Offices, Stores, Workshops and Welfare	Significant Site establishment areas are required including Site Offices, Storage and welfare facilities with ancillary support - diesel generators with elevated diesel storage.	TW NO.004	Dunnet HDD Compound	N/A	N/A	Glacial Till	NA	Category 0	SDL	Topsoil to be stacked circa 3m high in a bund around the site	Grips to be installed and discharged to straw bale lagoons			Redacted
1.04	Site Electricity Supply and Distribution	Ground preparation for generator compounds are required along with Temporary Works design for associated cable.	NA	Dunnet HDD Compound	N/A	N/A	NA	Not reqd	Category 0	SDL - Cabin / Generator hire firm to provide	N/A	NA			Redacted
1.05	HDD Anchor Point & Pipe Rusher	Concrete thrust block	TW NO002	Dunnet HDD Compound	HDD1	HDD	Glacial Till	45° buffer angle	Category 1	Watermans	Subsoil to be stored separate to topsoil	Discharge to straw bale lagoon			Redacted
1.06	Hydro Static Testing	Thermofuse to ensure pipe is tested as per clients spec.	Sub Contract	Dunnet HDD Compound	N/A	N/A	Conducted Above ground	N/A	Category 1	Thermofuse	N/A	Discharge clean water to fields			Thermofuse
2.0 SUBSEA WORKS															
2.01	Subsea HDD Disconnection works	HDD drill to exit on sea bed to prevent need for digging		CH870	NA	NA	Sand	NA	NA	SDL					Redact
2.02	Subsea diffuser installation works	Pipe pusher to push HDDC pipe right through bore onto seabed to negate need for sea bed excavation		CH870	NA	NA	Sand	NA	NA	SDL					Redac
2.03	Scour installation	Sea bed to be excavated using 'siltfl' or similar		CH870	NA	NA	Sand	Angle of repose	Category 0	SDL					Redac

APPENDIX A - FOREMANS SIGN ON SHEET

“I acknowledge that I have read through and understand this method statement”

Name	Signature	Date