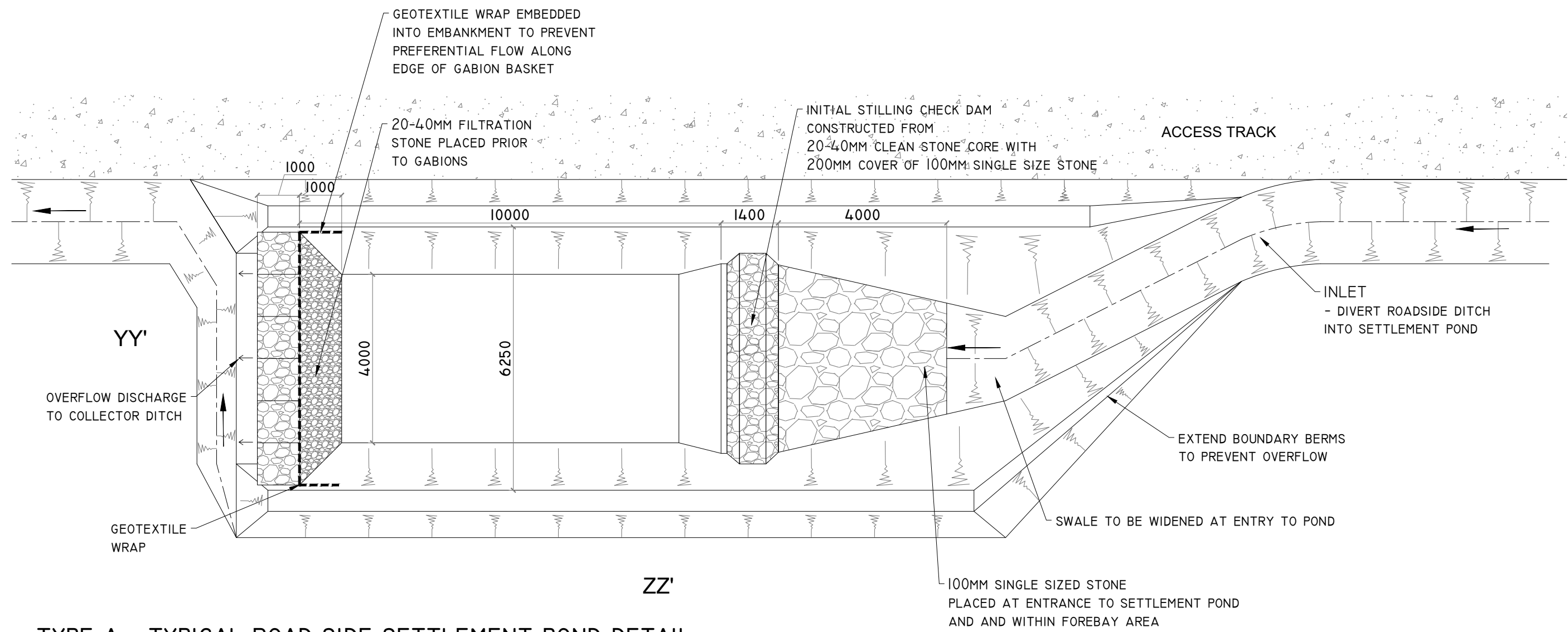




## APPENDIX 4-4

***DRAINAGE DESIGN  
DRAWINGS***



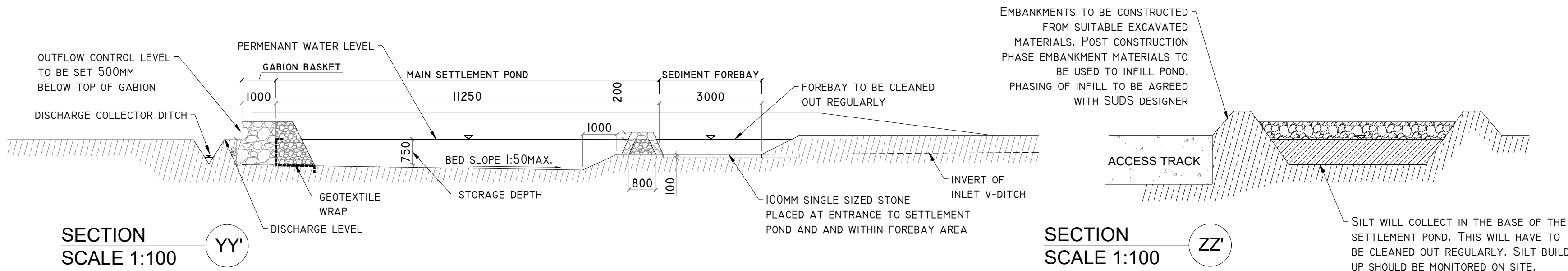


TYPE A - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL  
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)

## DETAIL A1

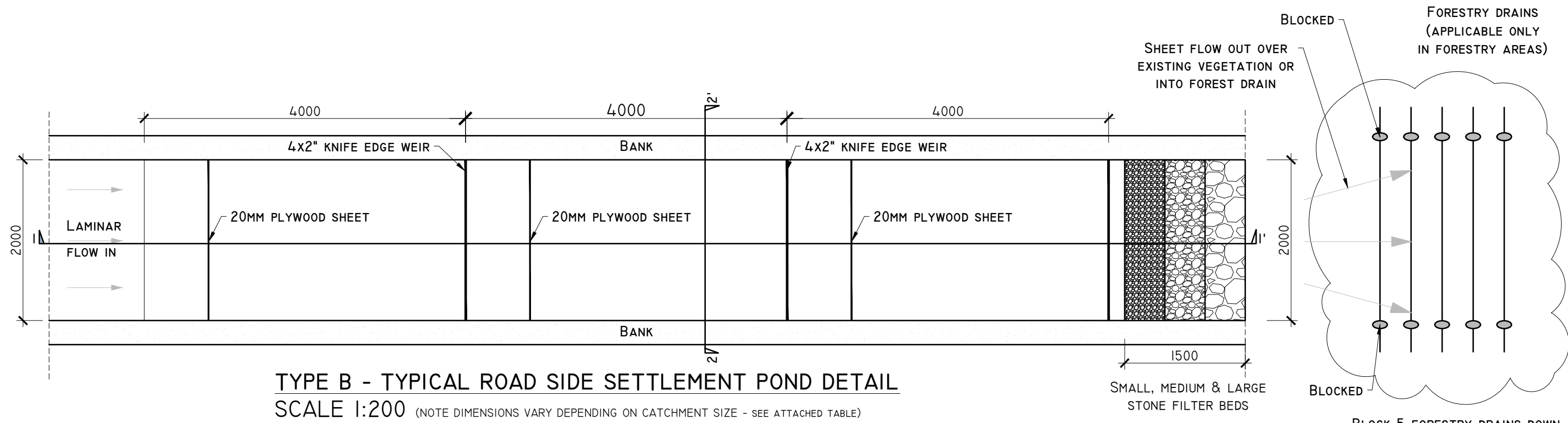
POND SIZE W [m] x L [m] x D [m]			TRACK/HARDSTAND CATCHMENT SIZE (m²)			BORROW PIT (m²)*		
RETURN PERIOD	10 YRS	STORM DURATION	500	1000	2000	5000	7500	10000
6HR RETENTION FOR COARSE SILT	6 HRS	3.5 x 10.5 x 1 m	4.5 x 16.5 x 1 m	6.5 x 22.5 x 1 m	N/A	N/A	N/A	
11HR RETENTION FOR MEDIUM SILT	12 HRS	3.5 x 13.5 x 1 m	5.5 x 17 x 1 m	7.5 x 25 x 1 m	N/A	N/A	N/A	
24HR RETENTION FOR FINE SILT	24 HRS	4.5 x 13 x 1 m	6 x 19.5 x 1 m	8 x 29.5 x 1 m	21 x 63 x 1 m**	25.5 x 77 x 1 m**	30 x 90 x 1 m**	

\*INCLUDES GW INFLOW  
\*\*COMBINATIONS OF 2 OR 3 SMALLER PONDS MAY BE USED

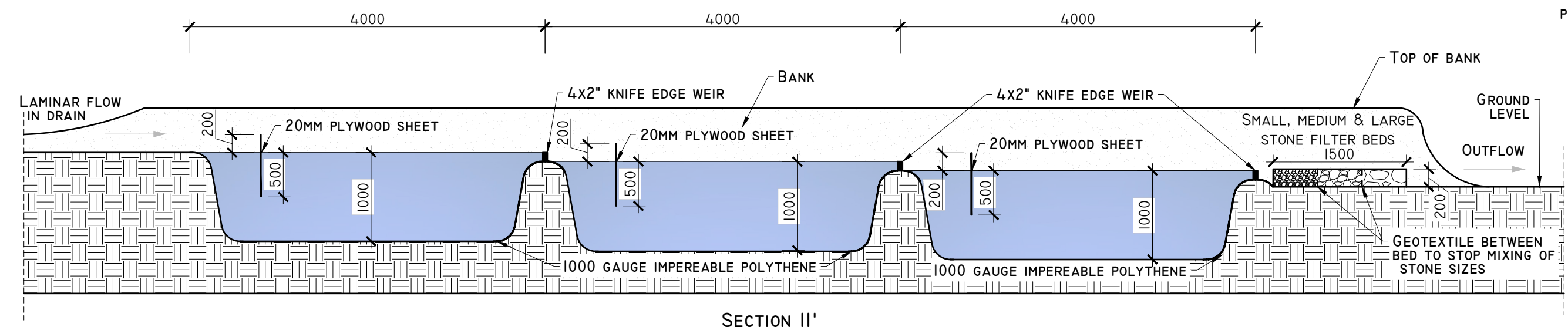


SECTION  
SCALE 1:100

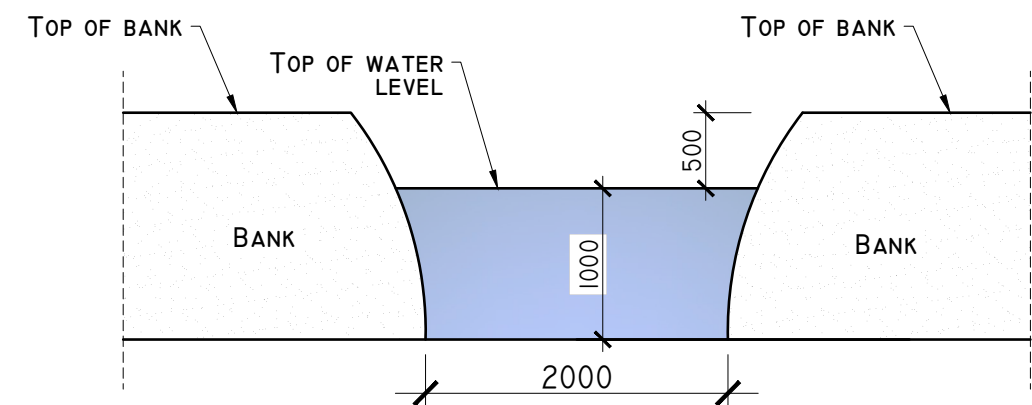
SECTION  
SCALE 1:100



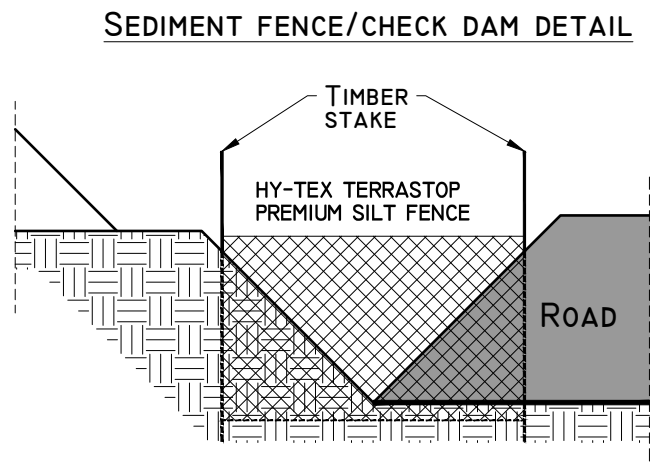
TYPE B - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL  
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)



SECTION II'



SECTION 22'



## DETAIL A2

PROJECT DESIGN DRAWING NOTES  
1. DRAWINGS ISSUED ARE FOR PLANNING STAGE ONLY.  
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.  
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.

16/01/24	Planning	MG	MG
Date	Description	Chkd	Signed
Revisions			

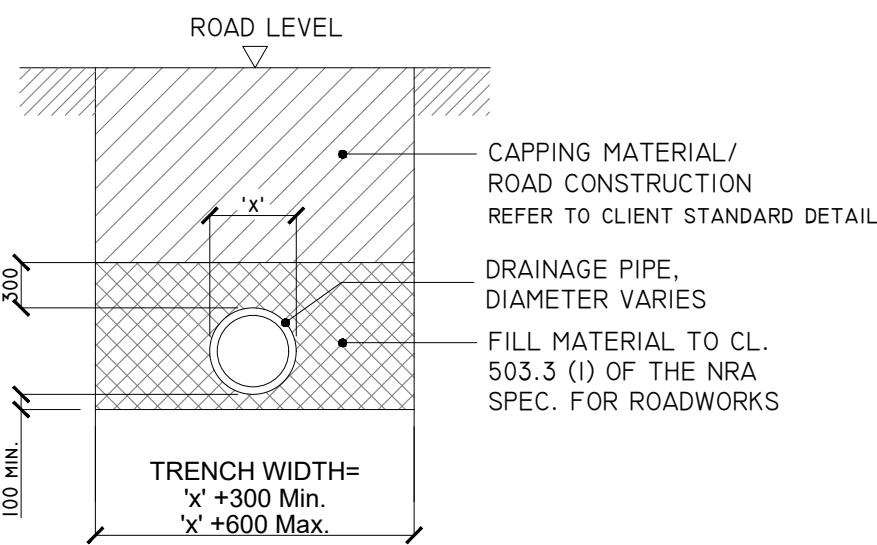
**HYDRO ENVIRONMENTAL SERVICES**  
22 Lower Main St  
Dungannon  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client:	FUTURENERGY IRELAND
Job:	KNOCKSHANVO WF, Co. CLARE
Title:	DRAINAGE DETAILS I
Figure No:	D501
Drawing No:	P1625-0-0124-A1-D501-00A
Sheet Size:	A1
Scale:	as shown (A1)
Date:	04/06/2024
Project No.:	P1625-0
Drawn By:	MG/GA
Checked By:	MG

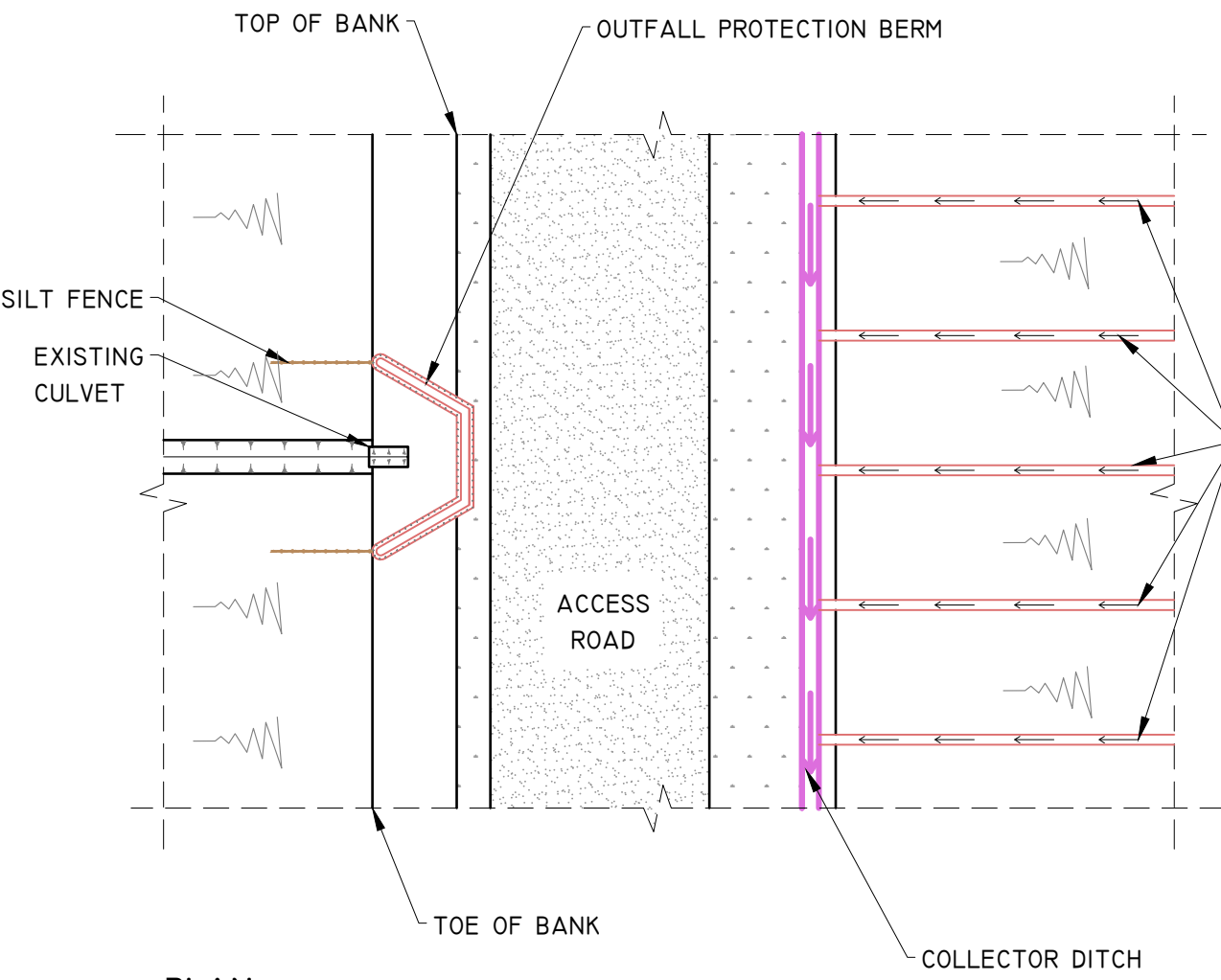


DETAIL B



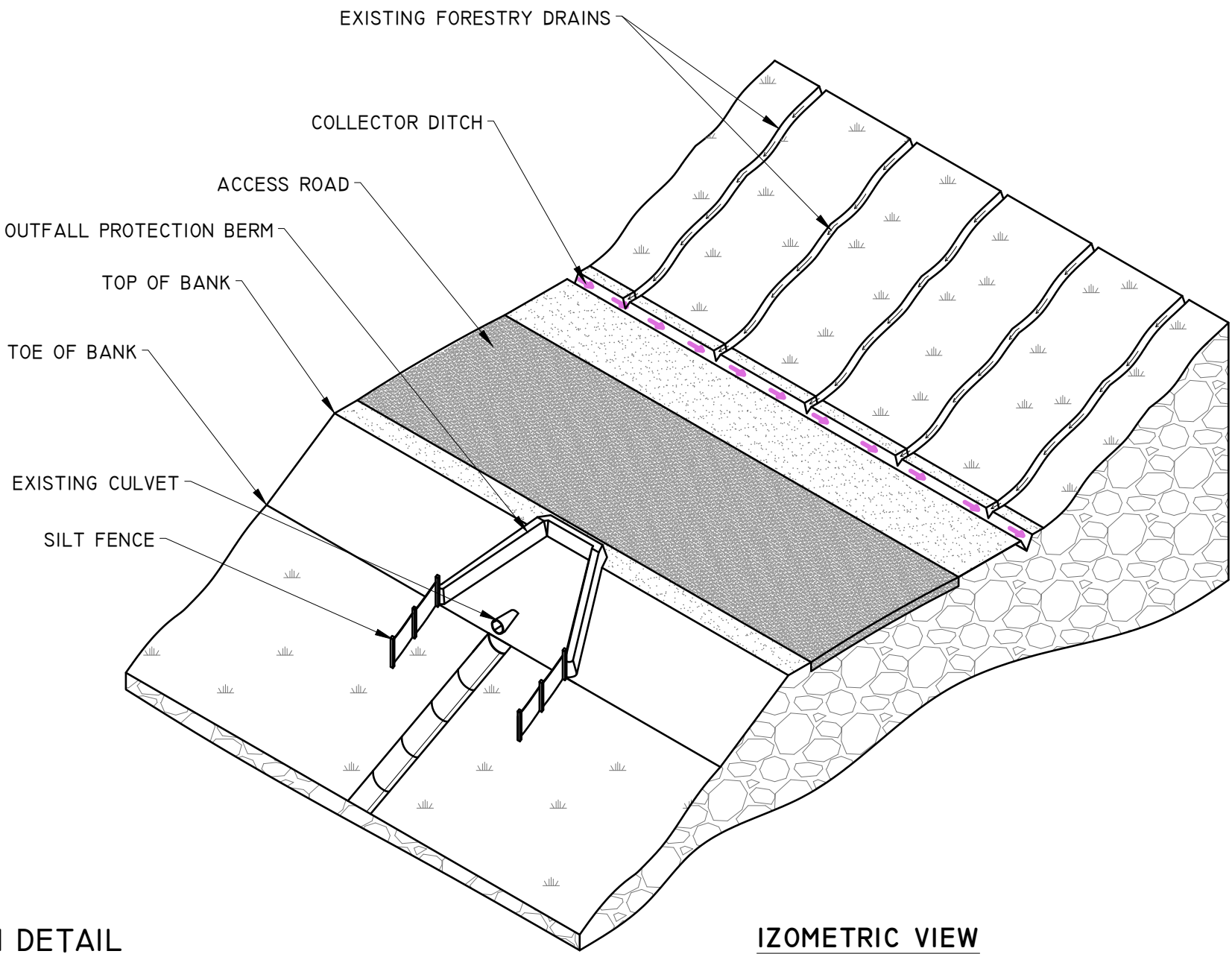
'TYPE B' CULVERT - DRAINAGE CROSSING BENEATH EXCAVATED ROAD  
SCALE 1:50

DETAIL BI



PLAN

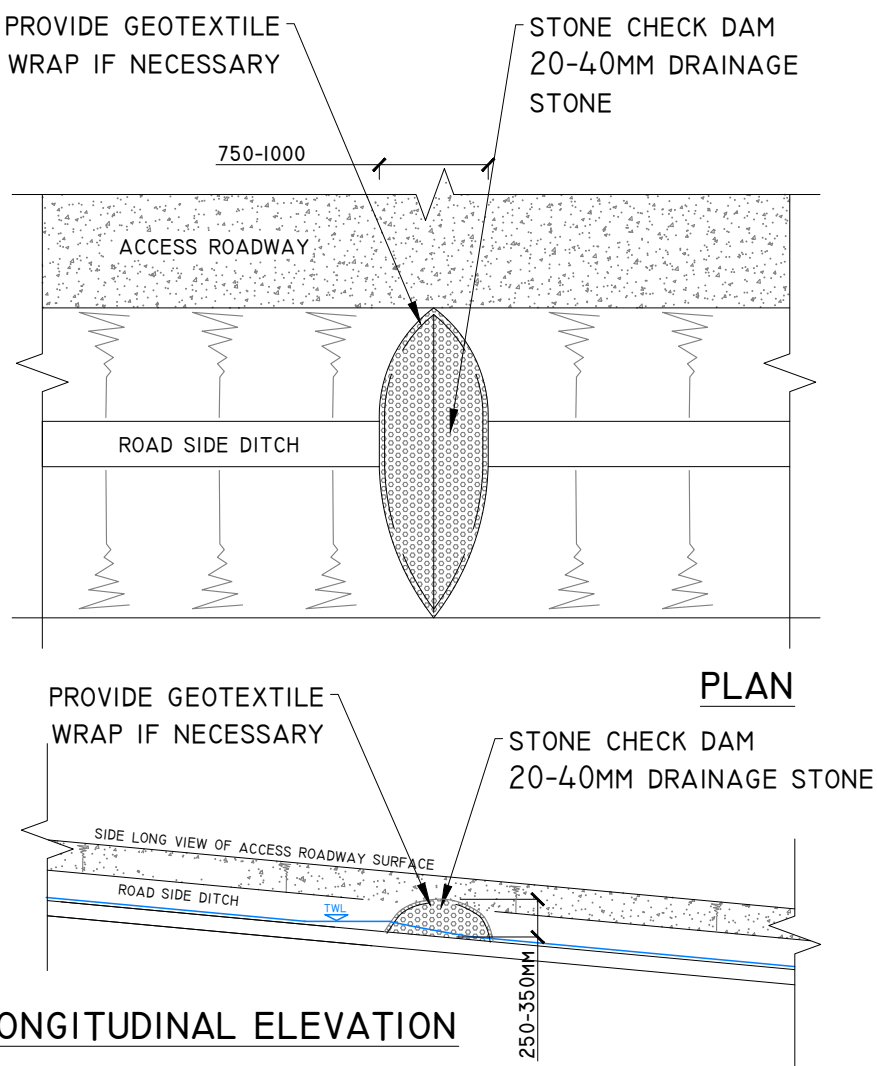
CULVERT - OUTFALL PROTECTION DETAIL  
SCHEMATIC - NOT TO SCALE



IZOMETRIC VIEW

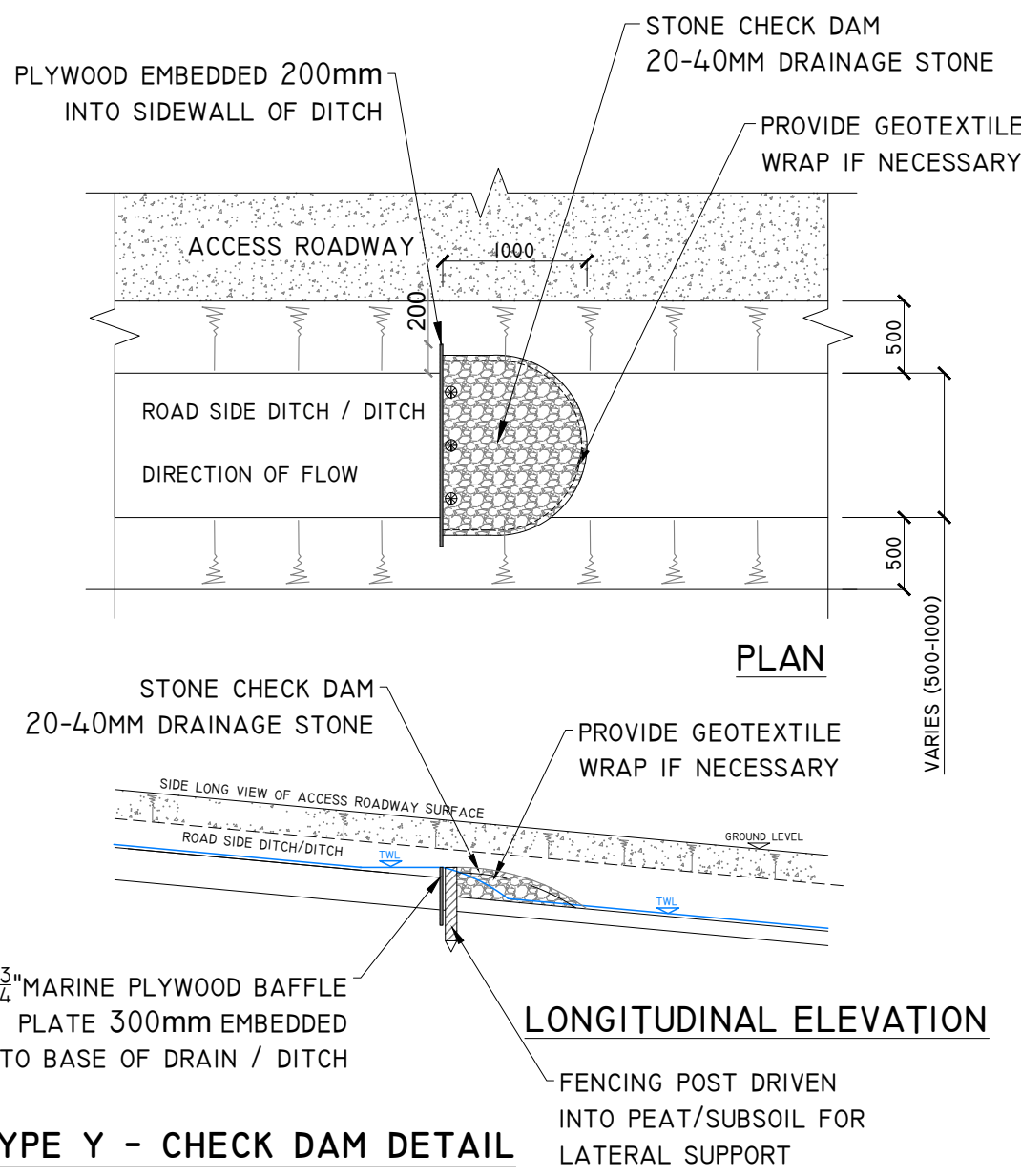
PROJECT DESIGN DRAWING NOTES  
1. DRAWINGS ISSUED ARE FOR PLANNING STAGE ONLY.  
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.  
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.

DETAIL C

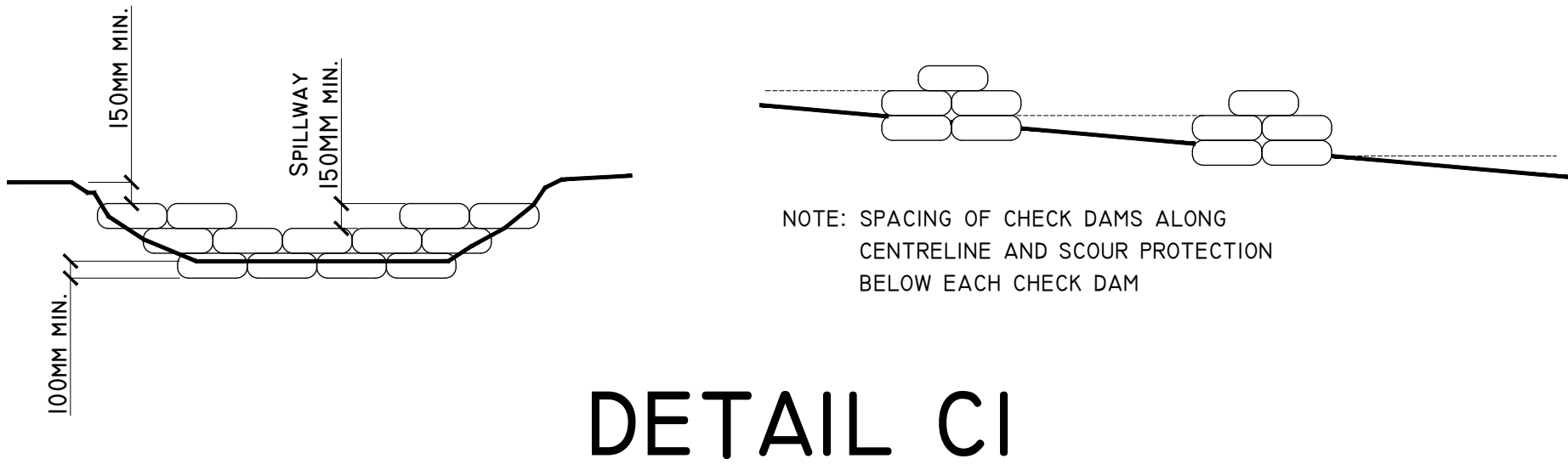


TYPE X - CHECK DAM DETAIL  
SCALE 1:50

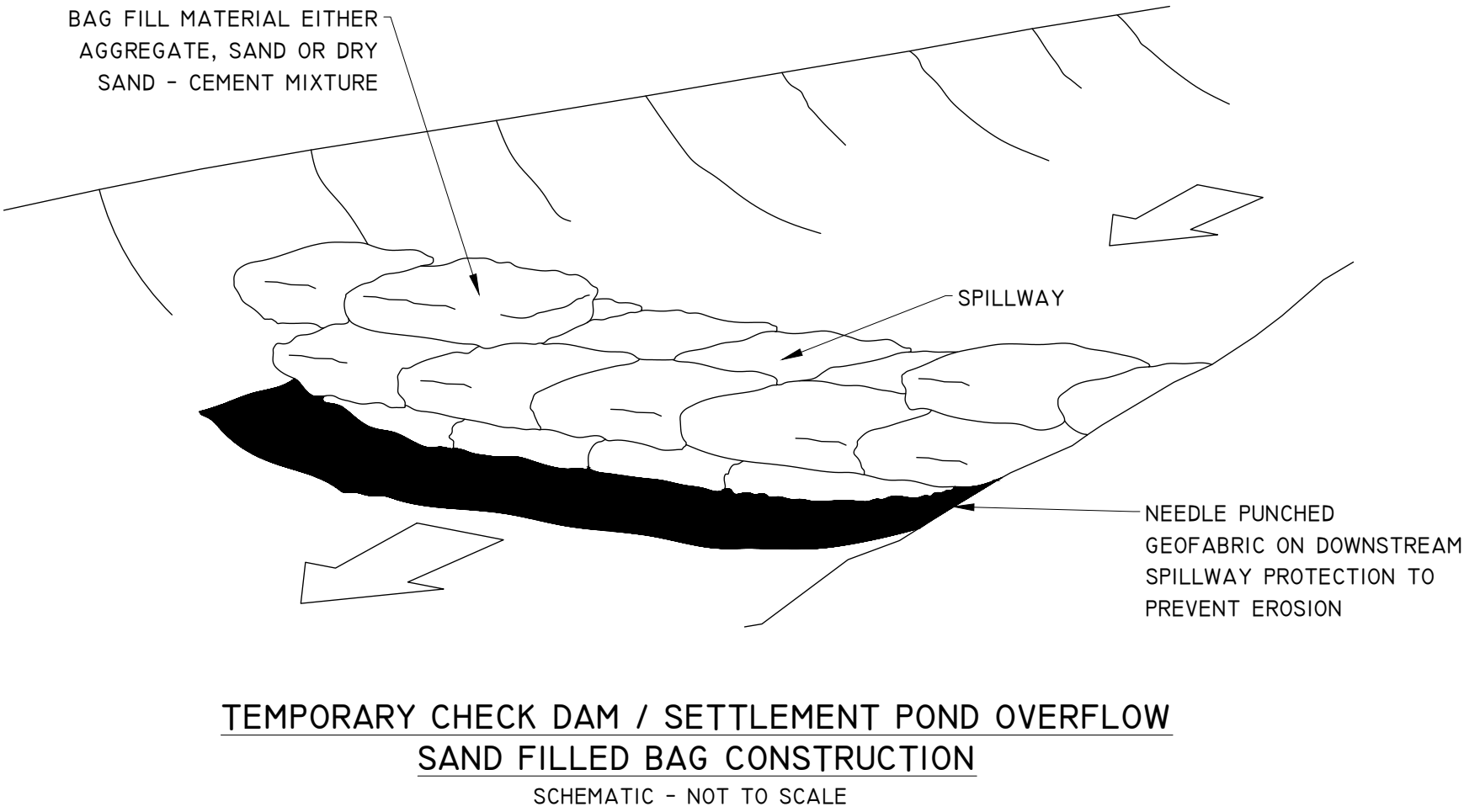
DETAIL D



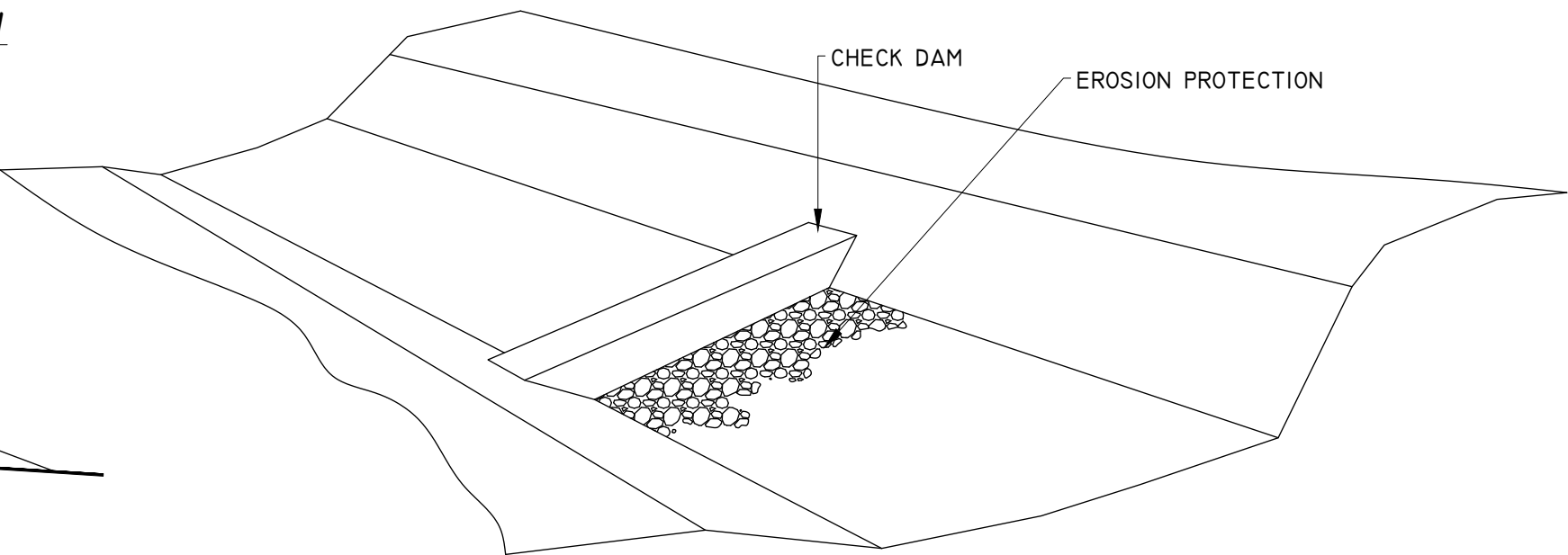
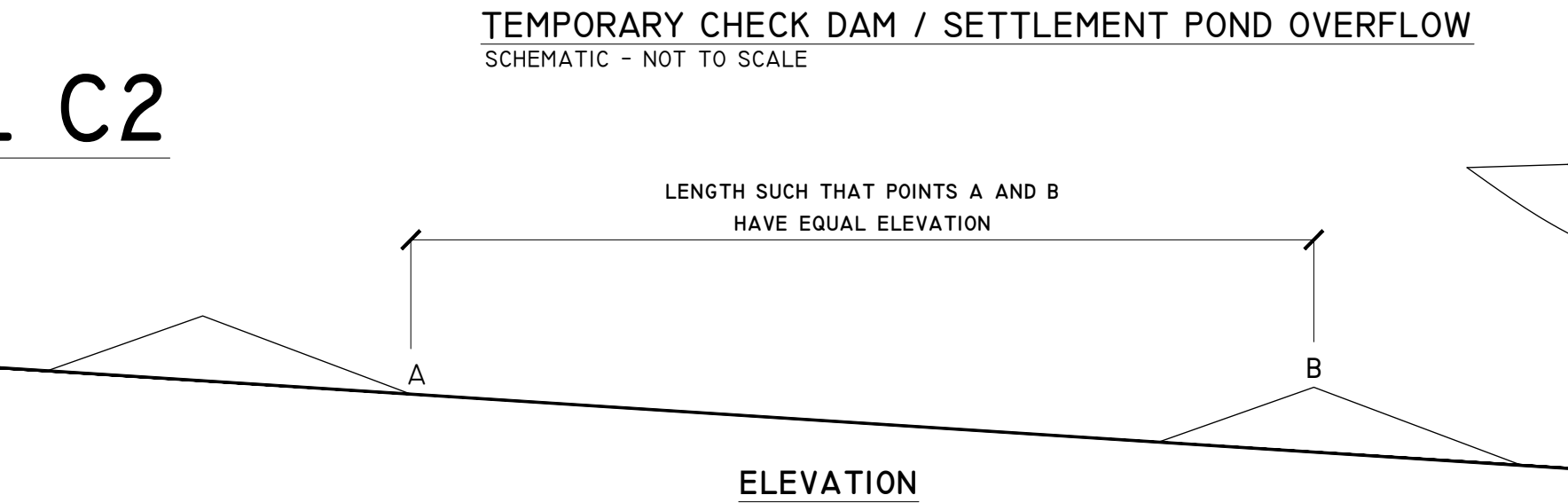
TYPE Y - CHECK DAM DETAIL  
SCALE 1:100



DETAIL CI



DETAIL C2



16/01/24	Planning	MG	MG
Date	Description	Chkd	Signed
Revisions			



**HYDRO  
ENVIRONMENTAL  
SERVICES**

22 Lower Main St  
Dungannon  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client:
FUTURENERGY IRELAND

Job:
KNOCKSHANVO WF, Co. CLARE

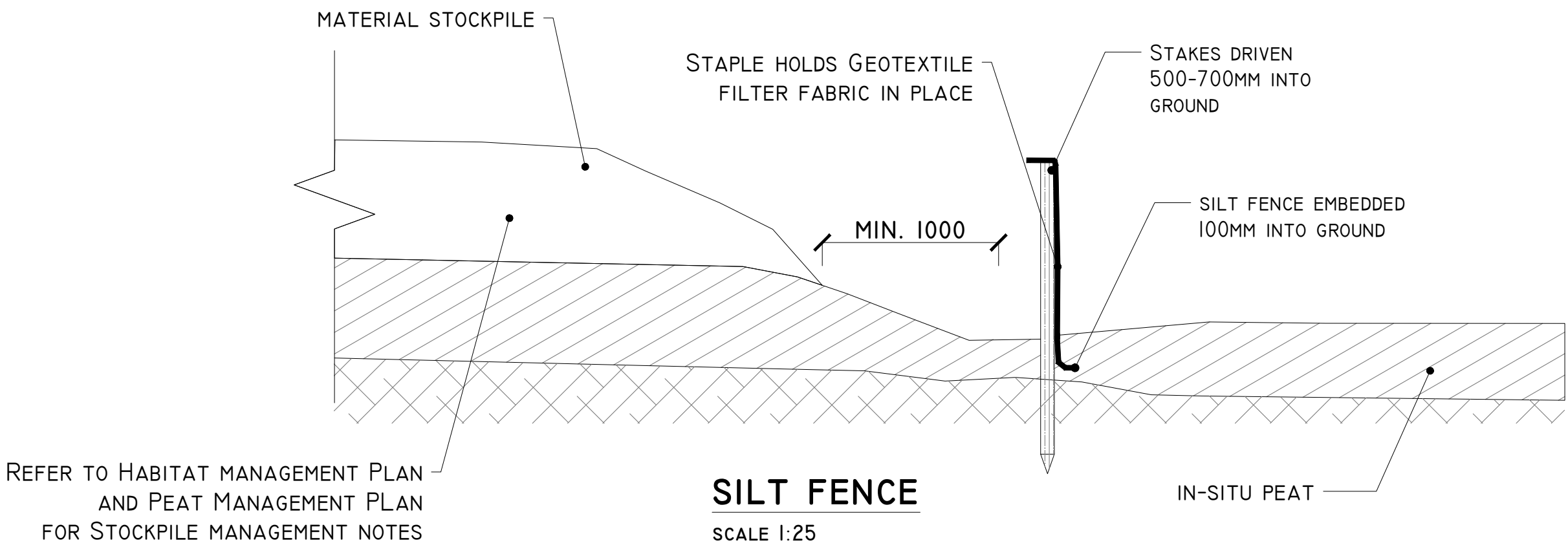
Title:
DRAINAGE DETAILS 2

Figure No:
D502

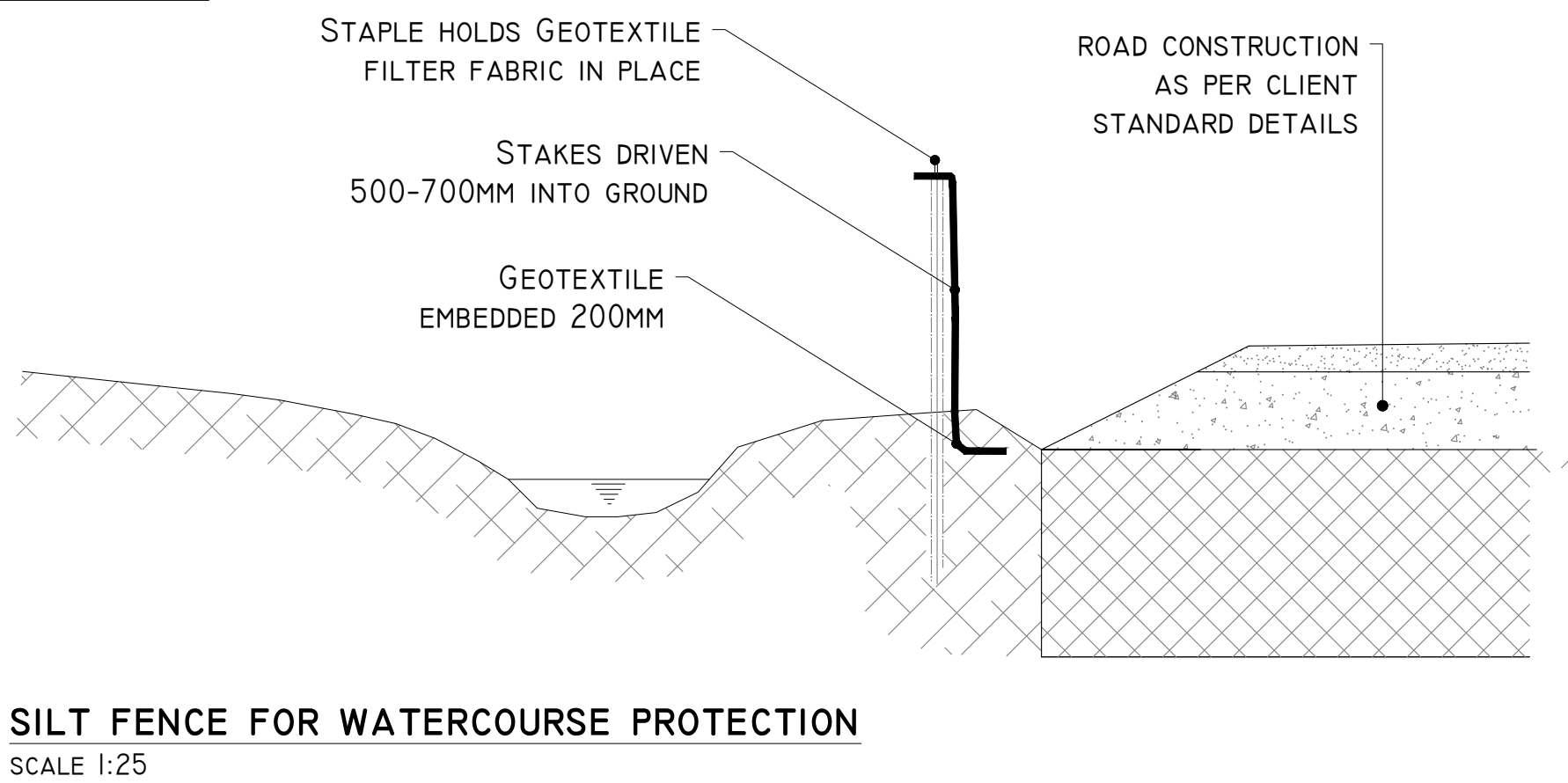
Drawing No: P1625-0-0124-A1-D502-00A	
Sheet Size: A1	Project No.: P1625-0
Scale: as shown (A1)	Drawn By: MG/GA
Date: 04/06/2024	Checked By: MG



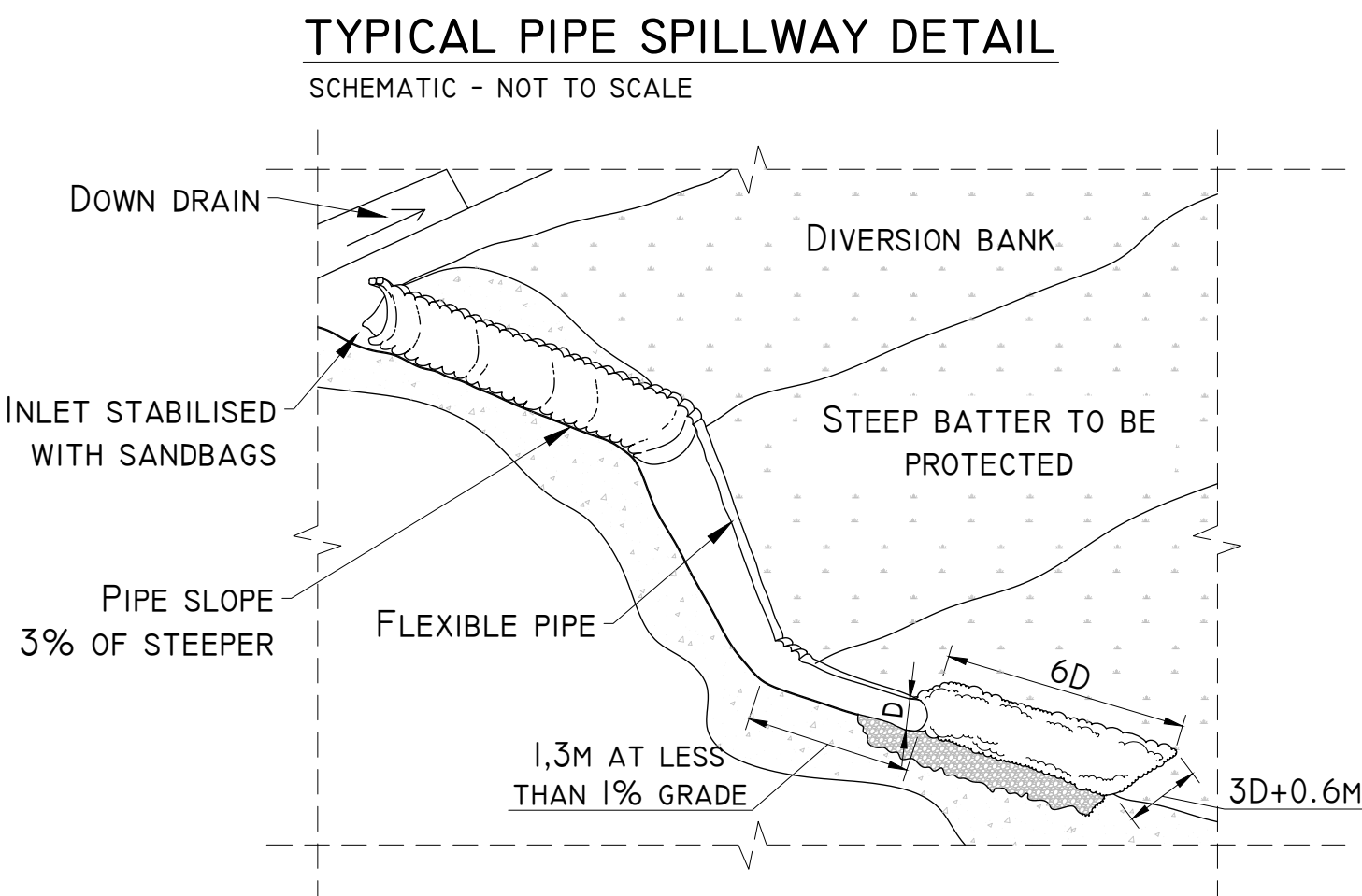
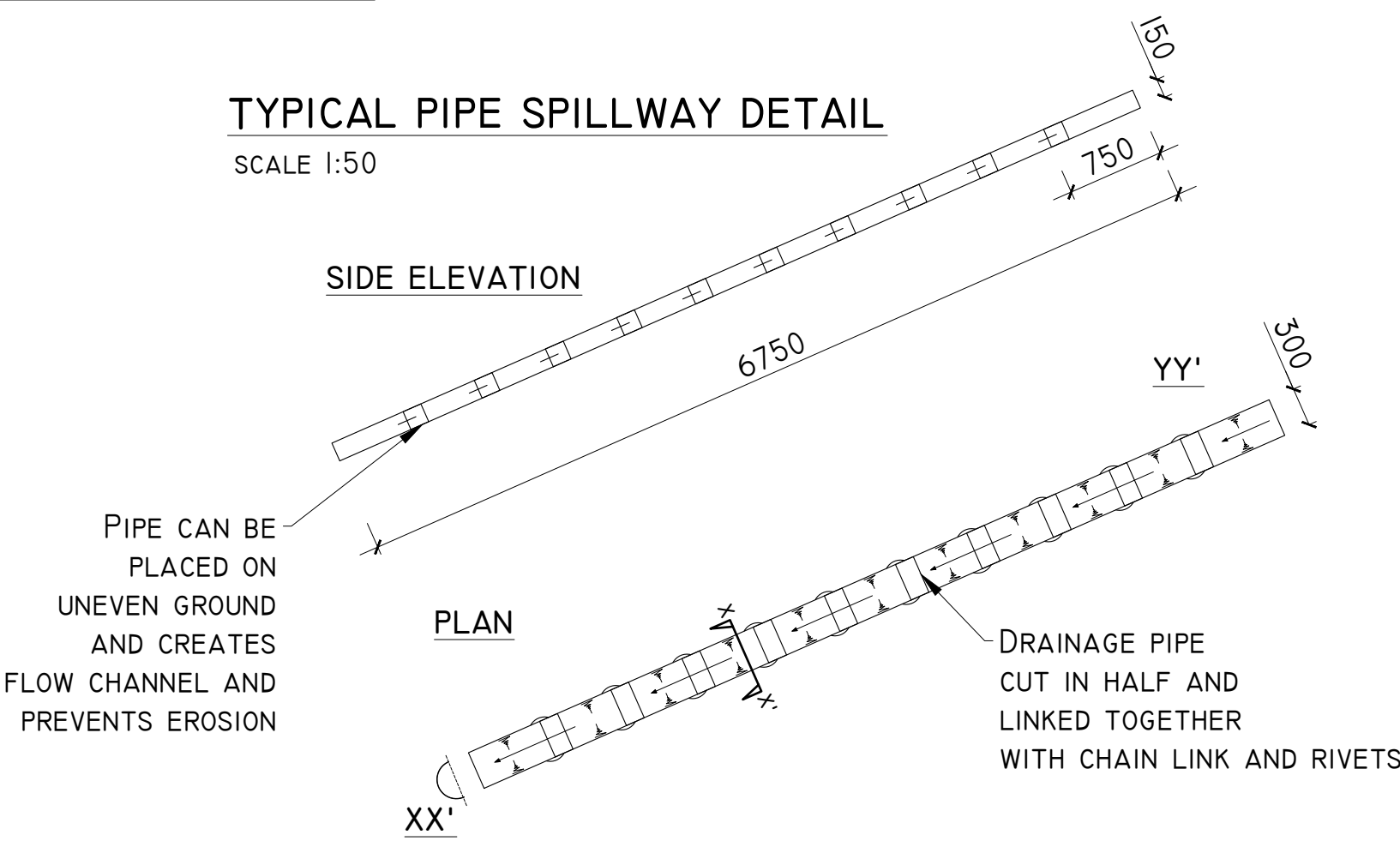
DETAIL F-I



DETAIL F-II



DETAIL G



16/01/24	Planning	MG	MG
Date	Description	Chkd	Signed
Revisions			

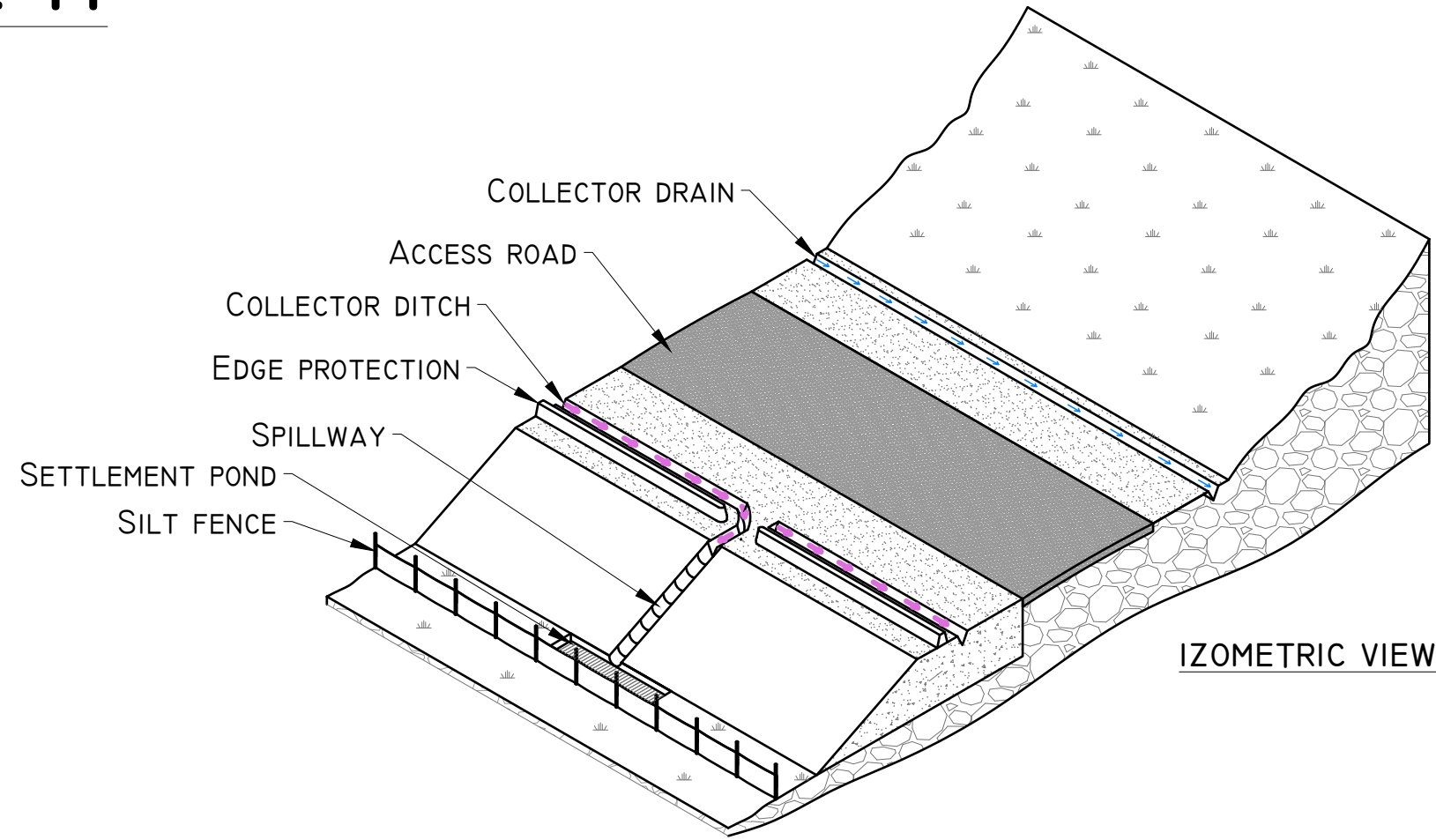
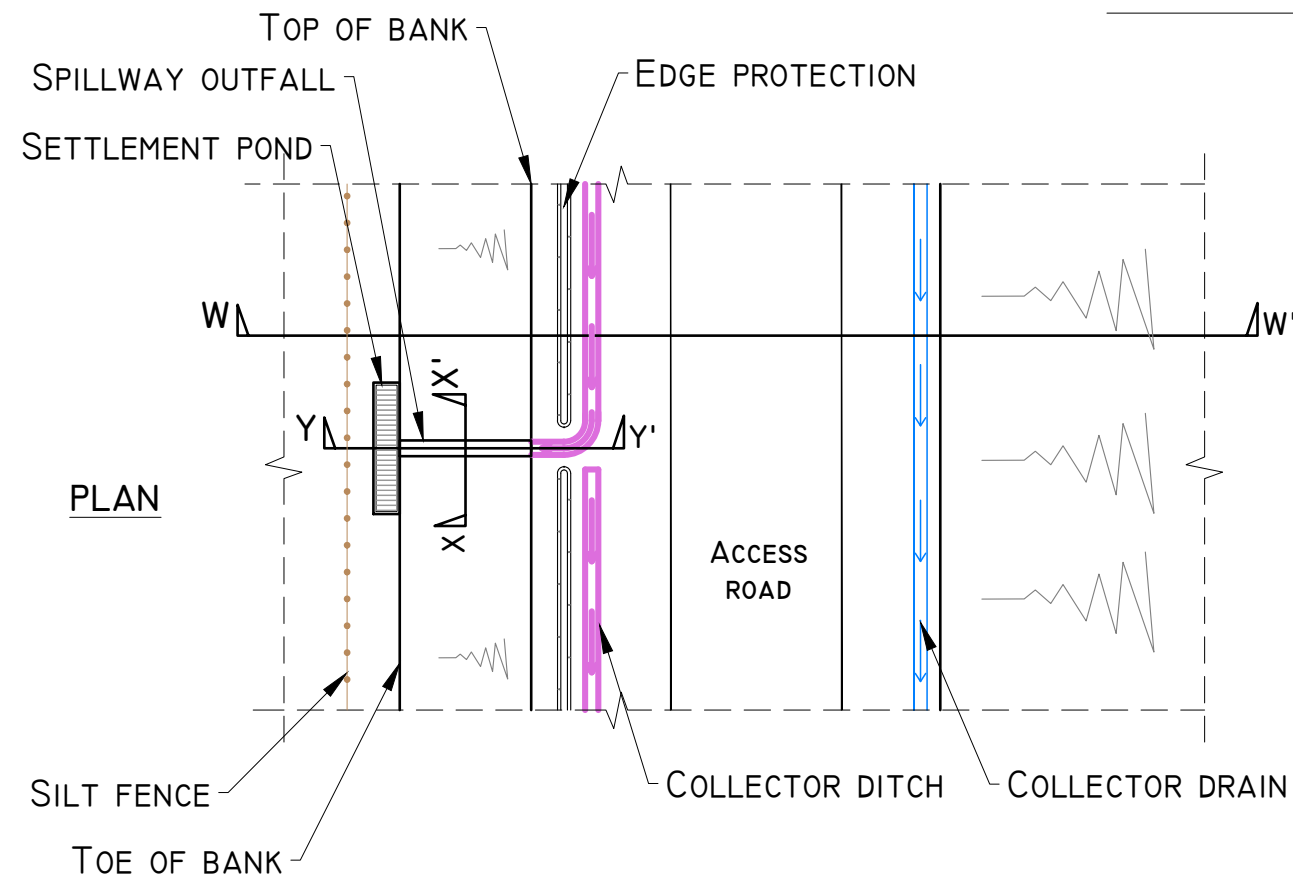
**HYDRO  
ENVIRONMENTAL  
SERVICES**

22 Lower Main St  
Dungannon  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

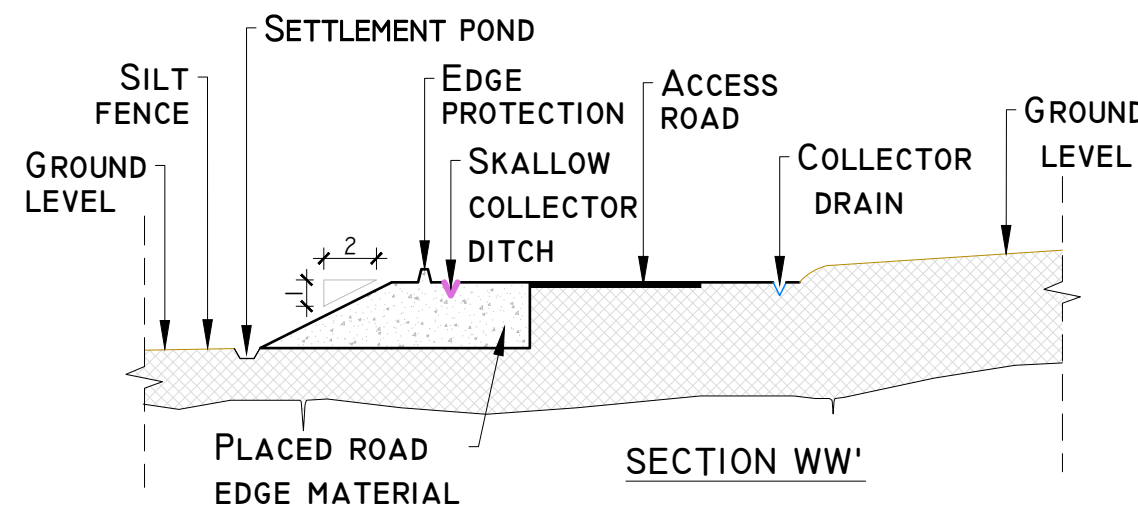
Client:	FUTUREENERGY IRELAND
Job:	KNOCKSHANVO WF, Co. CLARE
Title:	DRAINAGE DETAILS 3
Figure No:	D503
Drawing No:	P1625-0-0124-A1-D503-00A
Sheet Size: A1	Project No.: P1625-0
Scale: as shown (A1)	Drawn By: MG/GA
Date: 04/06/2024	Checked By: MG

# DETAIL H



## SPILLWAY OUTFALL PLAN

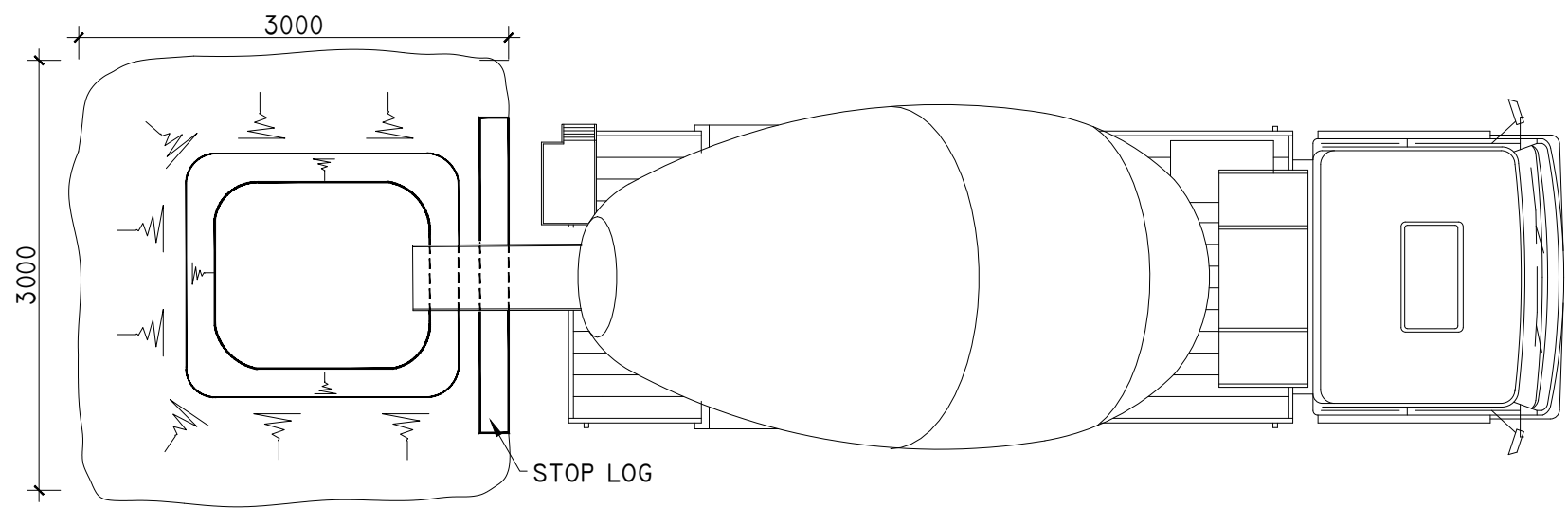
SCHEMATIC - NOT TO SCALE



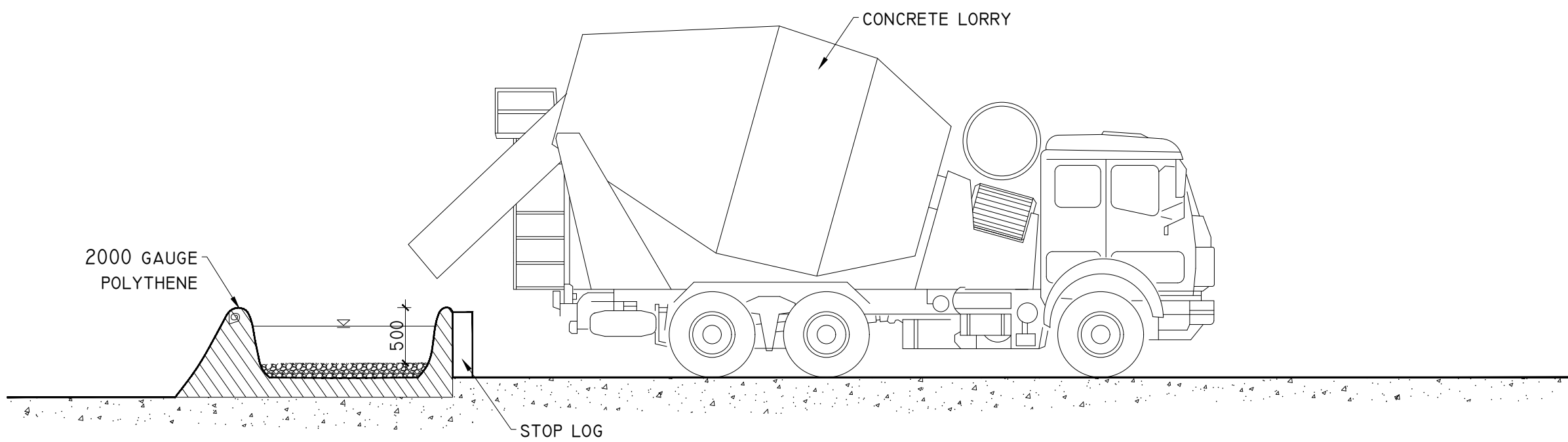
## TEMPORARY CONCRETE WASH OUT PIT

SCALE 1:50

PLAN



ELEVATION



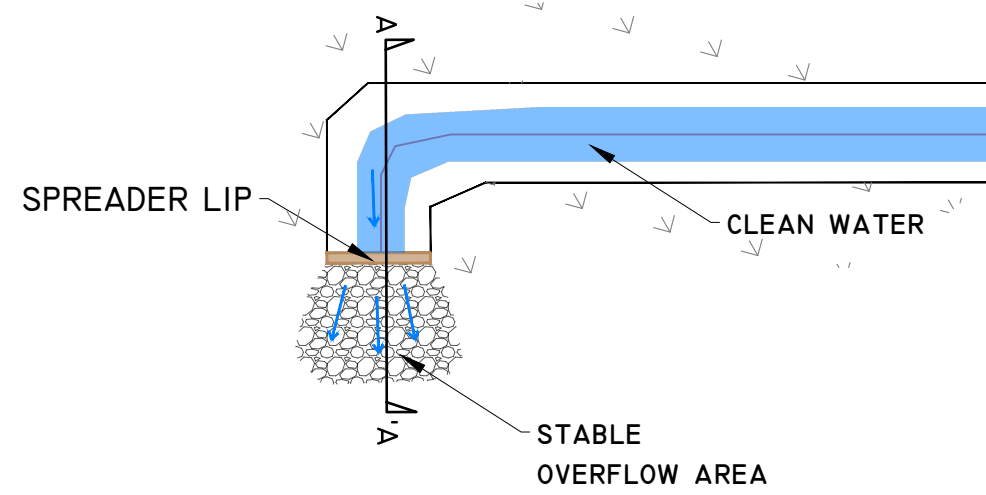
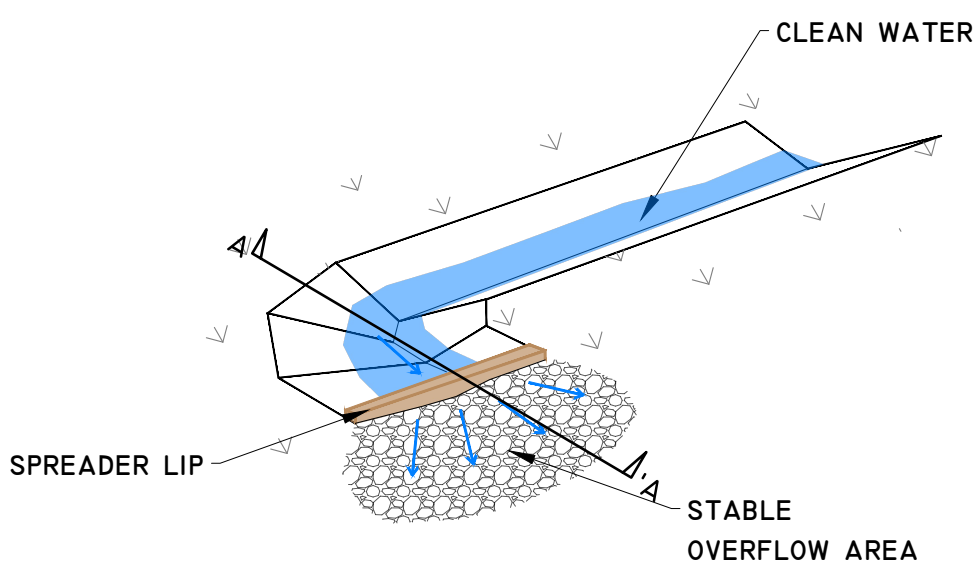
# DETAIL I

# DETAIL J-1

## LEVEL SPREADER DETAIL

SCHEMATIC - NOT TO SCALE

PLAN

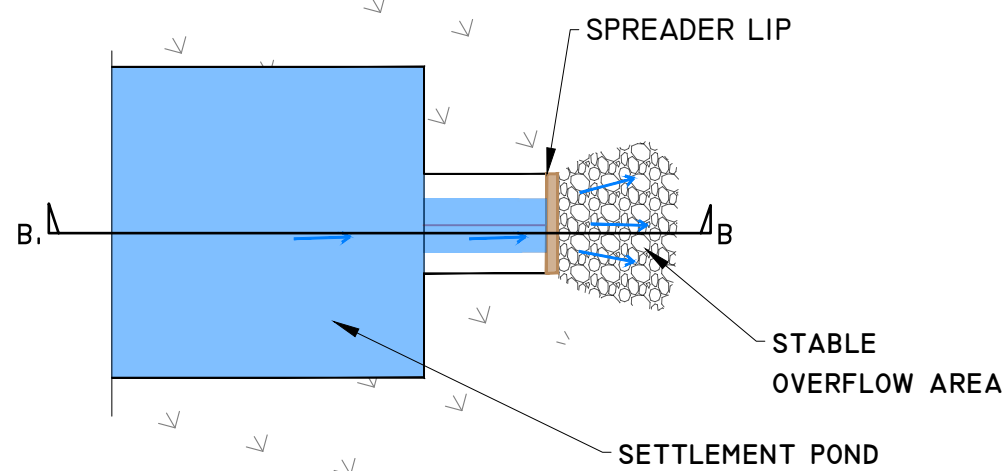
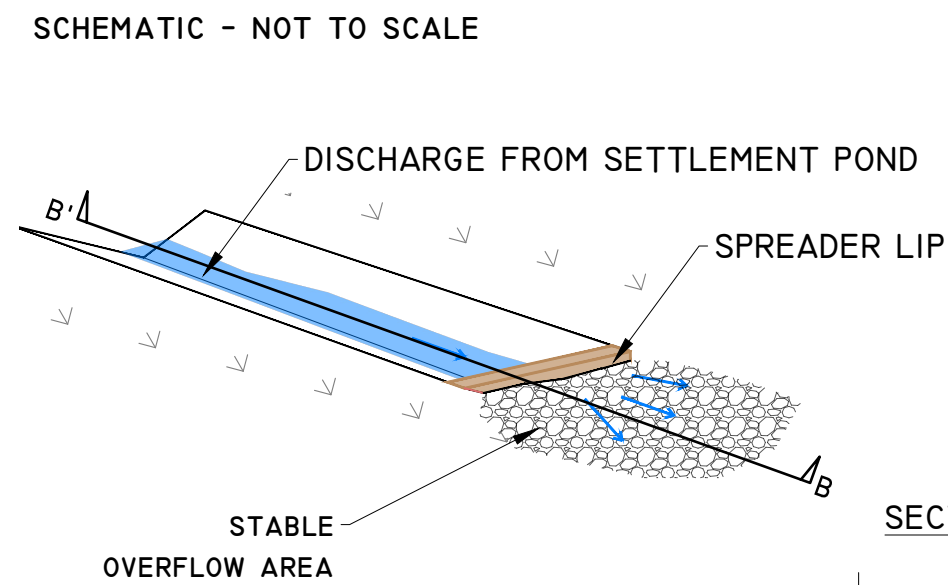


# DETAIL J-2

## LEVEL SPREADER DETAIL

SCHEMATIC - NOT TO SCALE

PLAN



PROJECT DESIGN DRAWING NOTES  
1. DRAWINGS ISSUED ARE FOR PLANNING STAGE ONLY.  
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.  
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.

16/01/24	Planning	MG	MG
Date	Description	Chkd	Signed
Revisions			

**HYDRO  
ENVIRONMENTAL  
SERVICES**

22 Lower Main St  
Dungannon  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client:		FUTUREENERGY IRELAND	
Job:		KNOCKSHANVO WF, Co. CLARE	
Title:		DRAINAGE DETAILS 4	
Figure No:		D504	
Drawing No: P1625-0-0124-A1-D504-00A			
Sheet Size: A1		Project No.: P1625-0	
Scale: as shown (A1)		Drawn By: MG/GA	
Date: 04/06/2024		Checked By: MG	



**POLLUTION PREVENTION NOTES:**

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

**DISCHARGES**

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

**EXCAVATIONS**

9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

**EXPOSED GROUND & STOCKPILES**

10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

**SITE TRACKS**

11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

**REFUELLING**

13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

**CONCRETE**

15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

**IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**

**STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

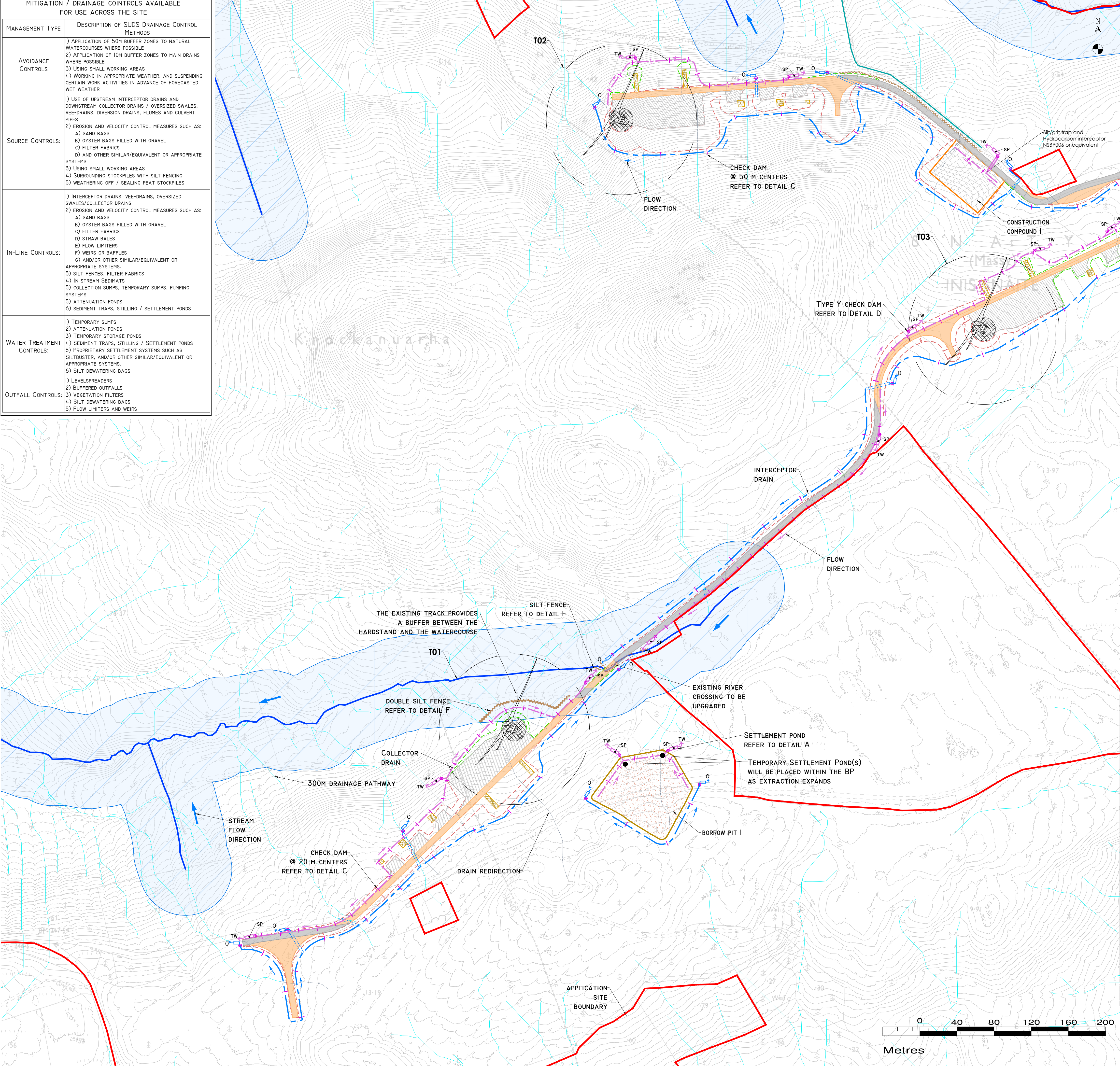
**CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

**NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

**DRAINAGE NOTES:**

1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
12. SILT FENCES TO BE PROVIDE ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FILMES AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING PEAT STOCKPILES
SOURCE CONTROLS:	1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) STRAW BALES E) FLOW LIMITERS F) WEIRS OR BAFFLES G) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) SILT FENCES, FILTER FABRICS 4) IN STREAM SEDIMATS 5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
IN-LINE CONTROLS:	1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE PONDS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 6) SILT DEWATERING BAGS
WATER TREATMENT CONTROLS:	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS
OUTFALL CONTROLS:	



**DRAWING LEGEND :**

RIVERS/STREAMS (WC - WATERCOURSE)

EXISTING DRAINS

RIVERS/STREAMS 50M BUFFER

STREAM FLOW DIRECTION

DRAINAGE PATHWAYS >500M LENGTH

REDIRECTED DRAINS

UPSTREAM INTERCEPTOR DRAIN

SWALES/DOWNSTREAM COLLECTOR DRAIN

DIRECTION OF FLOW

SILT FENCES

DOUBLE/TRIPLE SILT FENCES

SETTLEMENT POND - LEVEL SPREADER

CHECK DAM 'TYPE A'

CHECK DAM 'TYPE B'

PROPOSED WC CROSSING

EXISTING WC CROSSING

INTERCEPTOR DITCH CULVERT

COLLECTOR DITCH CULVERT

OVERLAND FLOW DISCHARGE

TREATED WATER DISCHARGE

SETTLEMENT POND

SEMI-NATURAL VEGETATION

SWALE / FILTER BED / SECONDARY SP

PUMPING SUMP

APPLICATION SITE BOUNDARY

EXISTING GROUND SURFACE

MINOR CONTOUR (1 M INTERVAL)

TURBINE AND SWEEP AREA

PROPOSED HARDCORED AREAS

EXISTING ROADS PROPOSED TO BE UPGRADED

SUBSTATION

CONSTRUCTION COMPOUND

HET MAST

BORROW PIT

CUT AREA

FILL AREA

**KEY PLAN**

D101

D102

D103

D104

D105

D106

D107

D107A

**DRAWING NOTES**

1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.

2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.

3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.

4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description		Chkd	Signed	

Revisions

--	--	--	--	--	--

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client:

**FUTURENERGY IRELAND**

Job:

**KNOCKSHANVO WF, Co. CLARE**

Title:

**PROPOSED DRAINAGE LAYOUT**

Figure No:

**D101**

Drawing No: P1625-0-0824-A1-D101-00C

Sheet Size: A1

Scale: 1:2,000 (A1)

Date: 07/08/2024

Project No.: P1625-0

Drawn By: GA

Checked By: MG



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

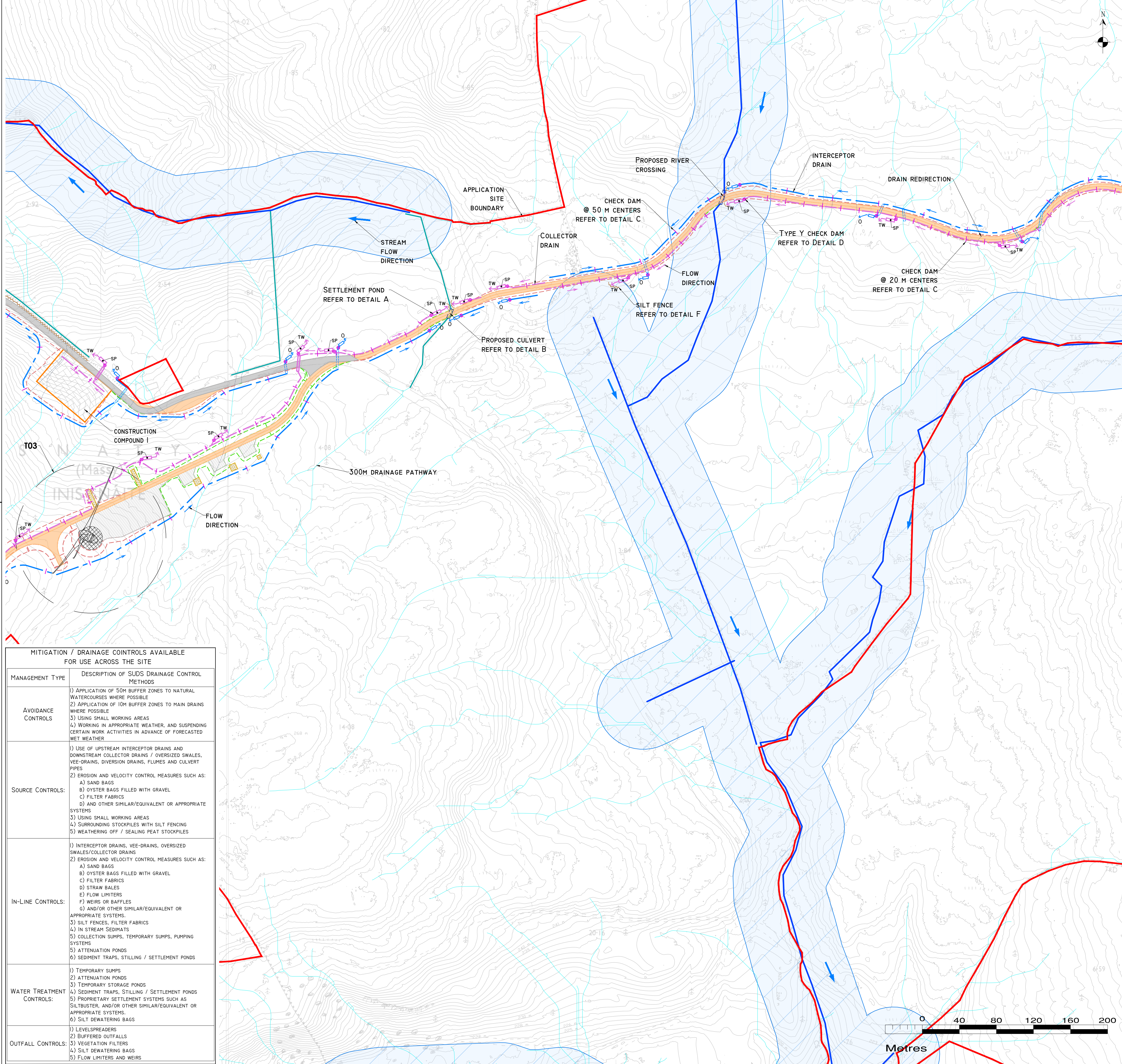
**STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

**CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

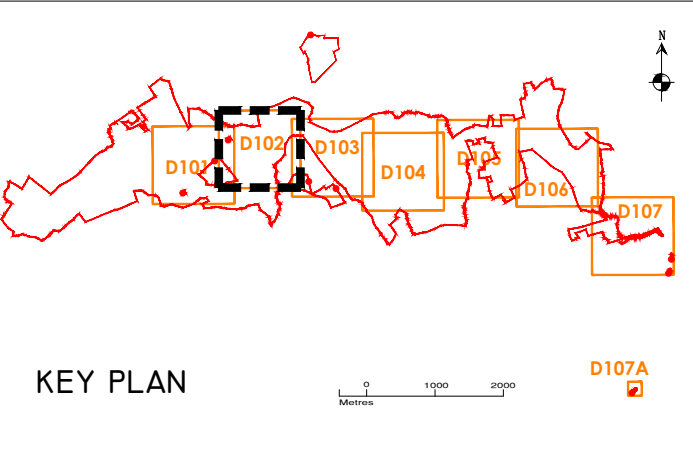
**NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE



- DRAWING LEGEND :**
- RIVERS/STREAMS (WC - WATERCOURSE)
  - EXISTING DRAINS
  - RIVERS/STREAMS 50M BUFFER
  - STREAM FLOW DIRECTION
  - DRAINAGE PATHWAYS >500M LENGTH
  - REDIRECTED DRAINS
  - UPSTREAM INTERCEPTOR DRAIN
  - SWALES/DOWNSTREAM COLLECTOR DRAIN
  - DIRECTION OF FLOW
  - SILT FENCES
  - DOUBLE/TRIPLE SILT FENCES
  - SETTLEMENT POND - LEVEL SPREADER
  - CHECK DAM 'TYPE A'
  - CHECK DAM 'TYPE B'
  - PROPOSED WC CROSSING
  - EXISTING WC CROSSING
  - INTERCEPTOR DITCH CULVERT
  - COLLECTOR DITCH CULVERT
  - OVERLAND FLOW DISCHARGE
  - TREATED WATER DISCHARGE
  - SETTLEMENT POND
  - SEMI-NATURAL VEGETATION
  - SWALE / FILTER BED /SECONDARY SP
  - PUMPING SUMP
  - APPLICATION SITE BOUNDARY
  - EXISTING GROUND SURFACE
  - MINOR CONTOUR (1 M INTERVAL)
  - TURBINE AND SWEEP AREA
  - PROPOSED HARDCORED AREAS
  - EXISTING ROADS PROPOSED TO BE UPGRADED
  - SUBSTATION
  - CONSTRUCTION COMPOUND
  - MET MAST
  - BORROW PIT
  - CUT AREA
  - FILL AREA



- DRAWING NOTES**
1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
  2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
  3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
  4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed
Revisions			

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: **FUTURENERGY IRELAND**

Job: **KNOCKSHANVO WF, Co. CLARE**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D102**

Drawing No: **P1625-0-0824-A1-D102-00C**

Sheet Size: A1	Project No.: P1625-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/08/2024	Checked By: MG



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

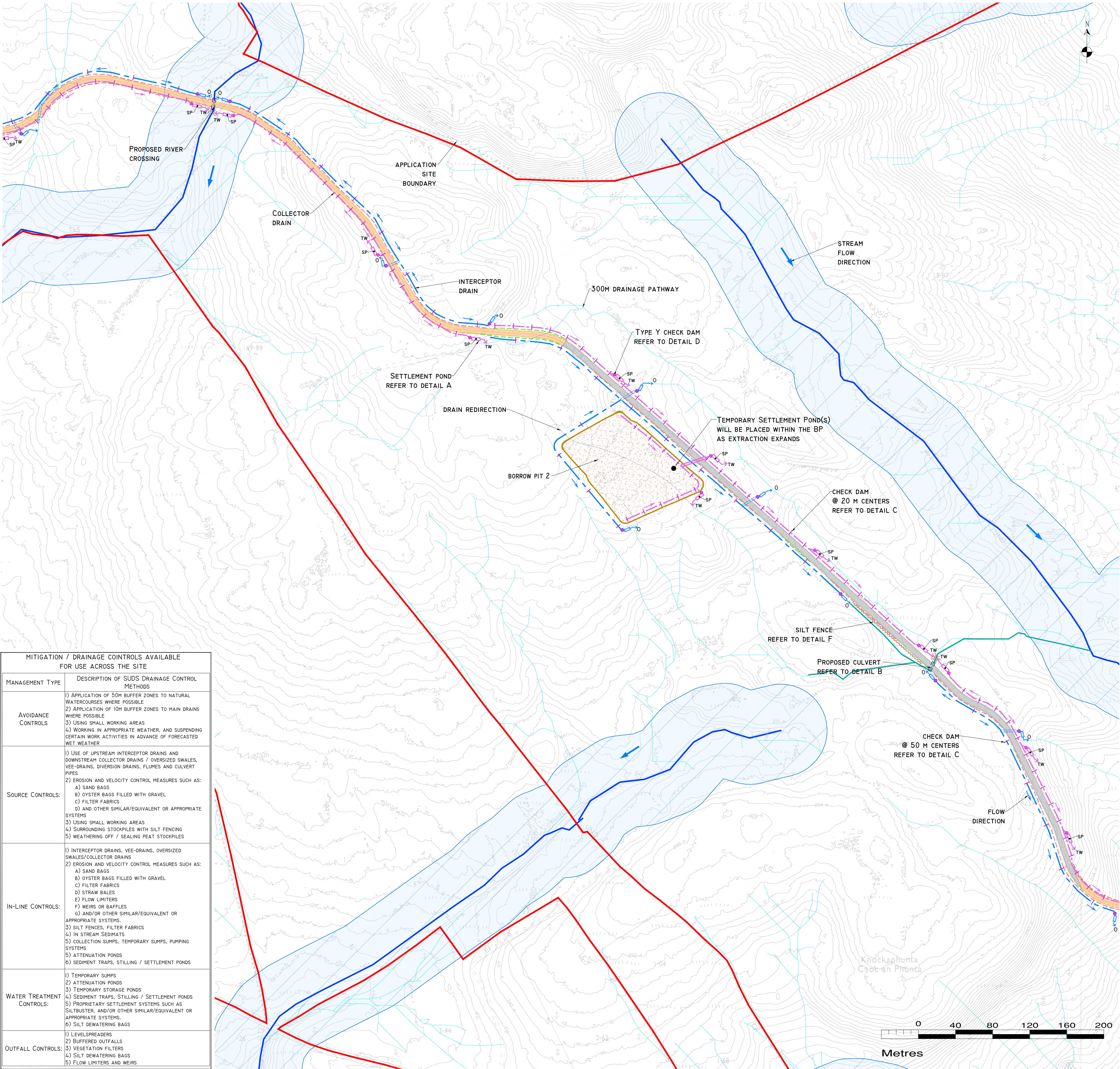
**STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

**CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

**NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

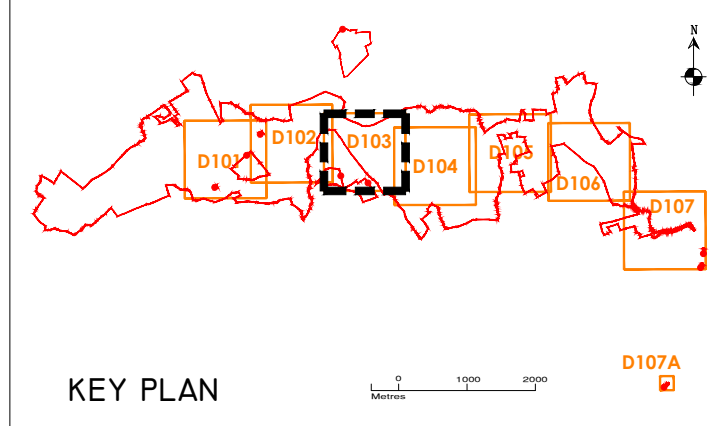
DRAINAGE NOTES:

1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT, WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORK COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE



- DRAWING LEGEND :**
- RIVERS/STREAMS (WC - WATERCOURSE)
  - EXISTING DRAINS
  - RIVERS/STREAMS 50M BUFFER
  - STREAM FLOW DIRECTION
  - DRAINAGE PATHWAYS >500M LENGTH
  - REDIRECTED DRAINS
  - UPSTREAM INTERCEPTOR DRAIN
  - SWALES/DOWNSTREAM COLLECTOR DRAIN
  - DIRECTION OF FLOW
  - SILT FENCES
  - DOUBLE/TRIPLE SILT FENCES
  - SETTLEMENT POND - LEVEL SPREADER
  - CHECK DAM 'TYPE A'
  - CHECK DAM 'TYPE B'
  - PROPOSED WC CROSSING
  - EXISTING WC CROSSING
  - INTERCEPTOR DITCH CULVERT
  - COLLECTOR DITCH CULVERT
  - OVERLAND FLOW DISCHARGE
  - TREATED WATER DISCHARGE
  - SETTLEMENT POND
  - SEMI-NATURAL VEGETATION
  - SWALE / FILTER BED /SECONDARY SP
  - PUMPING SLUMP

- APPLICATION SITE BOUNDARY
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET MAST
- BORROW PIT
- CUT AREA
- FILL AREA



- DRAWING NOTES**
1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
  2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
  3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
  4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 00447234  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: **FUTURENERGY IRELAND**

Job: **KNOCKSHANVO WF, Co. CLARE**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D103**

Drawing No: **P1625-0-0824-A1-D103-00C**

Sheet Size: A1 Project No.: P1625-0

Scale: 1:2,000 (A1) Drawn By: GA

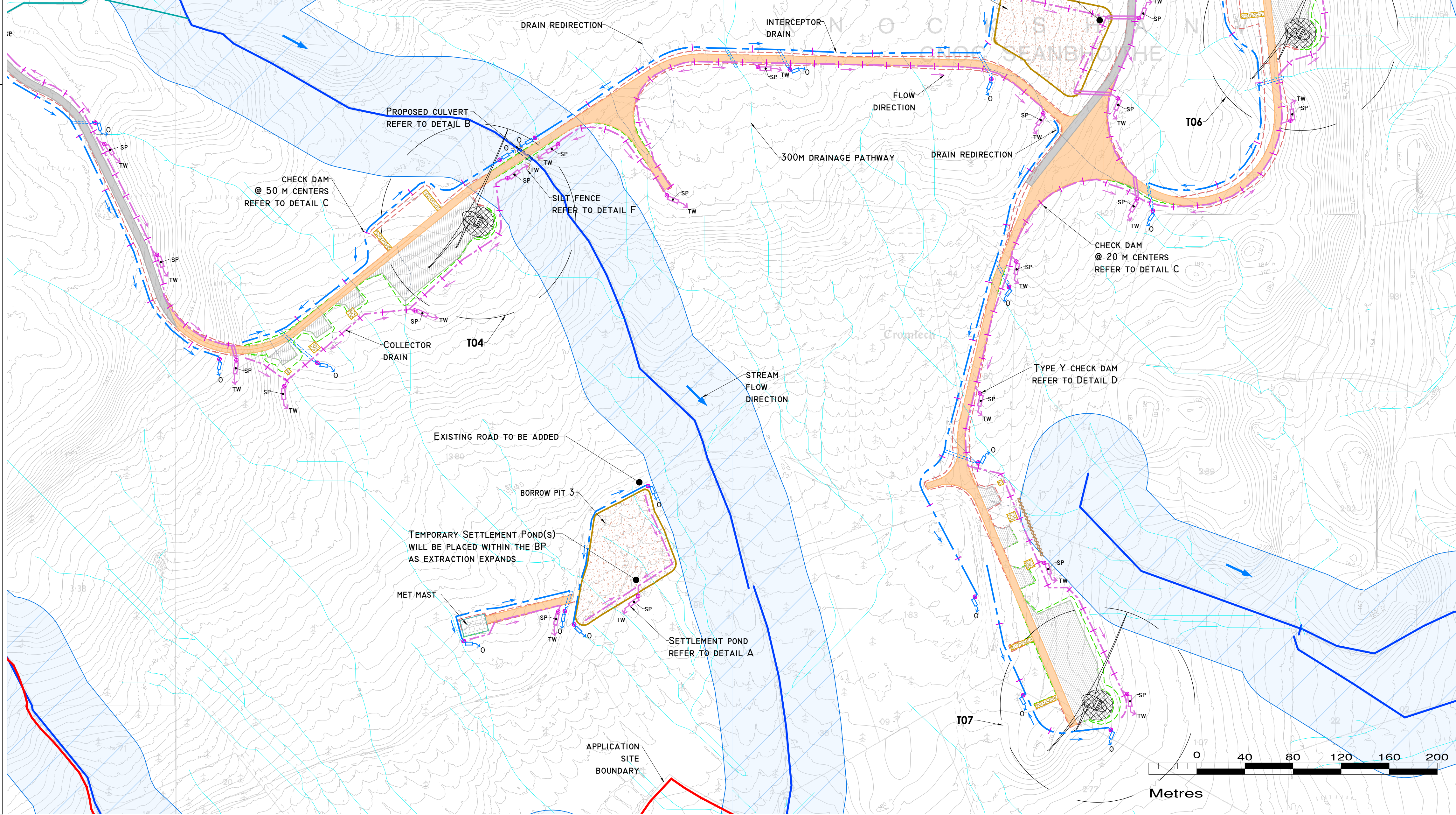
Date: 07/08/2024 Checked By: MG



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
  2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
  3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
  4. DISCHARGES  
WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
  5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
  6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
  7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
  8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
  9. EXCAVATIONS  
WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
  10. EXPOSED GROUND & STOCKPILES  
THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
  11. SITE TRACKS  
USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
  12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.
  13. REFUELLING  
REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
  14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
  15. CONCRETE  
CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
  16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.
- DRAINAGE NOTES:**
1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
  2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
  3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
  4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
  5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
  6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
  7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
  8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
  9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
  10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
  11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
  12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
  13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
  14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
  15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
  16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
  17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
  18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
  19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
  20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING PEAT STOCKPILES
SOURCE CONTROLS:	1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) STRAW BALES E) FLOW LIMITERS F) WEIRS OR BAFFLES G) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) SILT FENCES, FILTER FABRICS 4) IN STREAM SEDIMENTS 5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 6) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
IN-LINE CONTROLS:	1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE PONDS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 6) SILT DEWATERING BAGS
WATER TREATMENT CONTROLS:	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS
OUTFALL CONTROLS:	



**EXISTING DRAINAGE**

- RIVERS/STREAMS (WC - WATERCOURSE)
- EXISTING DRAINS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINAGE PATHWAYS >300M LENGTH
- REDIRECTED DRAINS

**PROPOSED DRAINAGE**

- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCES
- DOUBLE/TRIPLE SILT FENCES
- SETTLEMENT POND - LEVEL SPREADER
- CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED WC CROSSING
- EXISTING WC CROSSING
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SWM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- PUMPING SUMP

**OTHER FEATURES**

- APPLICATION SITE BOUNDARY
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- SUBSTATION
- CONSTRUCTION COMPOUND
- MET MAST
- BORROW PIT
- CUT AREA
- FILL AREA

**KEY PLAN**

**DRAWING NOTES**

1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: **FUTURENERGY IRELAND**

Job: **KNOCKSHANVO WF, Co. CLARE**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D104**

Drawing No: **P1625-0-0824-A1-D104-00C**

Sheet Size: **A1**

Scale: **1:2,000 (A1)**

Date: **07/08/2024**

Project No.: **P1625-0**

Drawn By: **GA**

Checked By: **MG**



1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.

6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

- SITE TRACKS
11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

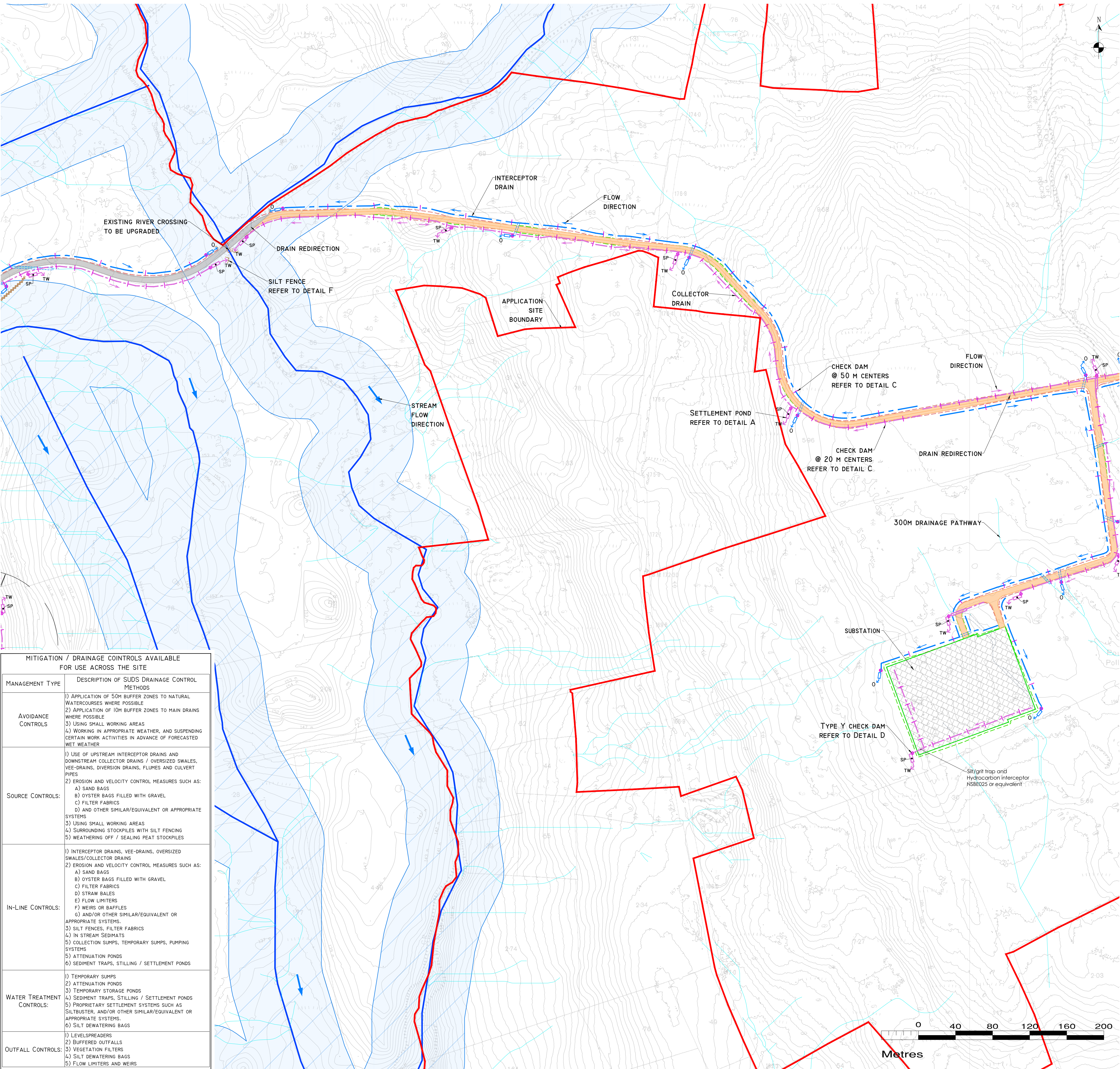
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.


































**CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.












**NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

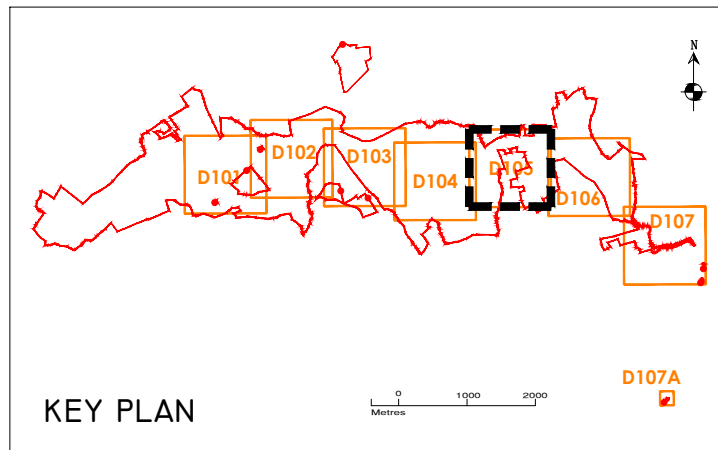
1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO MEET THE SPECIFICATION (I.E. BY OTHERS).
2. SPARE STRAW BALES/SILT FENCING/ OR CONSTRUCTION IS TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DRAINAGE OR STRUCTURE IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SLOUS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS IN RUNOFF DRAINAGE ARE CONSTRUCTED.
4. THE ACCESS TRACKS IN RUNOFF DRAINAGE ARE TO BE PLACED WITH STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
5. SILT INTERCEPTOR S/WALLES / DITCHES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
6. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS, REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER TO THE INTERCEPTOR S/WALLES / DITCHES.
7. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
8. WHERE POSSIBLE, A BUFFER ZONE OF  $\geq 20\text{M}$  TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
9. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEVELLED TO MATCH EXISTING WITH LOCAL SLOPE.
10. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE ARE BEING DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE TO THE SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D500.
11. STRAW BALES / OR SIMILAR SILT FENCES TO BE USED ALSO AROUND SLOP HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN THE SLOP HEAPS HAVE BEEN COVERED OR ESTABLISHED.
12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COME WITHIN  $\geq 5\text{M}$  OF EDGE OF ANY DITCH / DRAIN / EMERGENT CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED EROSION LANE SHOULD BE COVERED WITH SLOPE COVER AGGREGATE AND BE STORED LOCALLY AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STORE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY AVAILABLE WASH OR WOODEN LOGS OR SCISSOR DAMS TO BE USED FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STORE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND PROPOSED APPROVED METHOD OF REMOVAL OF SILT DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE ACCESS TRACKS.
18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. OIL FUEL SHOULD BE STORED WITH BUNDED CONTAINMENT STRUCTURES.
20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> <li>1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE</li> <li>2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE</li> <li>3) USING SMALL WORKING AREAS</li> <li>4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER</li> </ol>
SOURCE CONTROLS:	<ol style="list-style-type: none"> <li>1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTION DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES</li> <li>2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS:               <ol style="list-style-type: none"> <li>A) SAND BAGS</li> <li>B) OYSTER BAGS FILLED WITH GRAVEL</li> <li>C) FILTER FABRICS</li> <li>D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS</li> </ol> </li> <li>3) USING SMALL WORKING AREAS</li> <li>4) SURROUNDING STOCKPILES WITH SILT FENCING</li> <li>5) WEATHERING OFF / SEALING PEAT STOCKPILES</li> </ol>
IN-LINE CONTROLS:	<ol style="list-style-type: none"> <li>1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS</li> <li>2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS:               <ol style="list-style-type: none"> <li>A) SAND BAGS</li> <li>B) OYSTER BAGS FILLED WITH GRAVEL</li> <li>C) FILTER FABRICS</li> <li>D) STRAW BALES</li> <li>E) FLOW LIMITERS</li> <li>F) WEIRS OR BAFFLES</li> </ol> </li> <li>3) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS.</li> <li>4) SILT FENCES, FILTER FABRICS</li> <li>4) IN STREAM SEDIMENTS</li> <li>5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS</li> <li>5) ATTENUATION PONDS</li> <li>6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS</li> </ol>
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> <li>1) TEMPORARY SUMPS</li> <li>2) ATTENUATION PONDS</li> <li>3) TEMPORARY STORAGE PONDS</li> <li>4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS</li> <li>5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS.</li> <li>6) SILT DEWATERING BAGS</li> </ol>
OUTFALL CONTROLS:	<ol style="list-style-type: none"> <li>1) LEVELSPREADERS</li> <li>2) BUFFERED OUTFALLS</li> <li>3) VEGETATION FILTERS</li> <li>4) SILT DEWATERING BAGS</li> <li>5) FLOW LIMITERS AND WEIRS</li> </ol>



- |   |                                   |   |                   |
|---|-----------------------------------|---|-------------------|
|    | RIVERS/STREAMS (WC = WATERCOURSE) |    | EXISTING DRAINAGE |
|   | EXISTING DRAINS                   |   |                   |
|  | RIVERS/STREAMS 50M BUFFER         |   |                   |
|  | STREAM FLOW/DIRECTION             |   |                   |
|  | DRAINAGE PATHWAYS >500M LENGTH    |  | EXISTING DRAINAGE |
|  | REDIRECTED DRAINS                 |   |                   |
|  |                                   |   |                   |
|  |                                   |   |                   |
|  | UPSTREAM INTERCEPTOR DRAIN        |  | PROPOSED DRAINAGE |
|  | SWALES/DOWNSTREAM COLLECTOR DRAIN |   |                   |
|  | DIRECTION OF FLOW                 |   |                   |
|  | SILT FENCES                       |   |                   |
|  | DOUBLE/TRIPLE SILT FENCES         |  | PROPOSED DRAINAGE |
|  | SETTLEMENT POND - LEVEL SPREADER  |   |                   |
|  | CHECK DAM 'TYPE A'                |   |                   |
|  | CHECK DAM 'TYPE B'                |   |                   |
|  | PROPOSED WC CROSSING              |  | PROPOSED DRAINAGE |
|  | EXISTING WC CROSSING              |   |                   |
|  | INTERCEPTOR DITCH CULVERT         |   |                   |
|  | COLLECTOR DITCH CULVERT           |   |                   |
|  | OVERLAND FLOW DISCHARGE           |  | PROPOSED DRAINAGE |
|  | TREATED WATER DISCHARGE           |   |                   |
|  | SETTLEMENT POND                   |   |                   |
|  | SP-NATURAL VEGETATION             |   |                   |
|  | SWALE / FILTER BED /SECONDARY SP  |  | PROPOSED DRAINAGE |
|  | PUMPING SUM                       |   |                   |

- |   |  |
|---|--|
|  | EXISTING GROUND SURFACE                |
|  | MINOR CONTOUR (1 M INTERVAL)           |
|  | TURBINE AND SWEEPED AREA               |
|  | PROPOSED HARDCORE AREAS                |
|  | EXISTING ROADS PROPOSED TO BE UPGRADED |
|  | SUBSTATION                             |
|  | CONSTRUCTION COMPOUND                  |
|  | MET MAST                               |
|  | BORROW PIT                             |
|  | CUT AREA                               |
|  | FILL AREA                              |



1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signd

Client: **FUTUREENERGY IRELAND**

Job: KNOCKSHANVO WF, Co. CLARE

Title: PROPOSED DRAINAGE LAYOUT

Figure No: DI05

Drawing No: P1625-0-0824-A1-D105-00E

Sheet Size: A1	Project No.: P1625-0
----------------	----------------------

Scale: 1:2,000 (A1)	Drawn By: GA
---------------------	--------------

Date: 19/08/2024	Checked By: MG
------------------	----------------



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

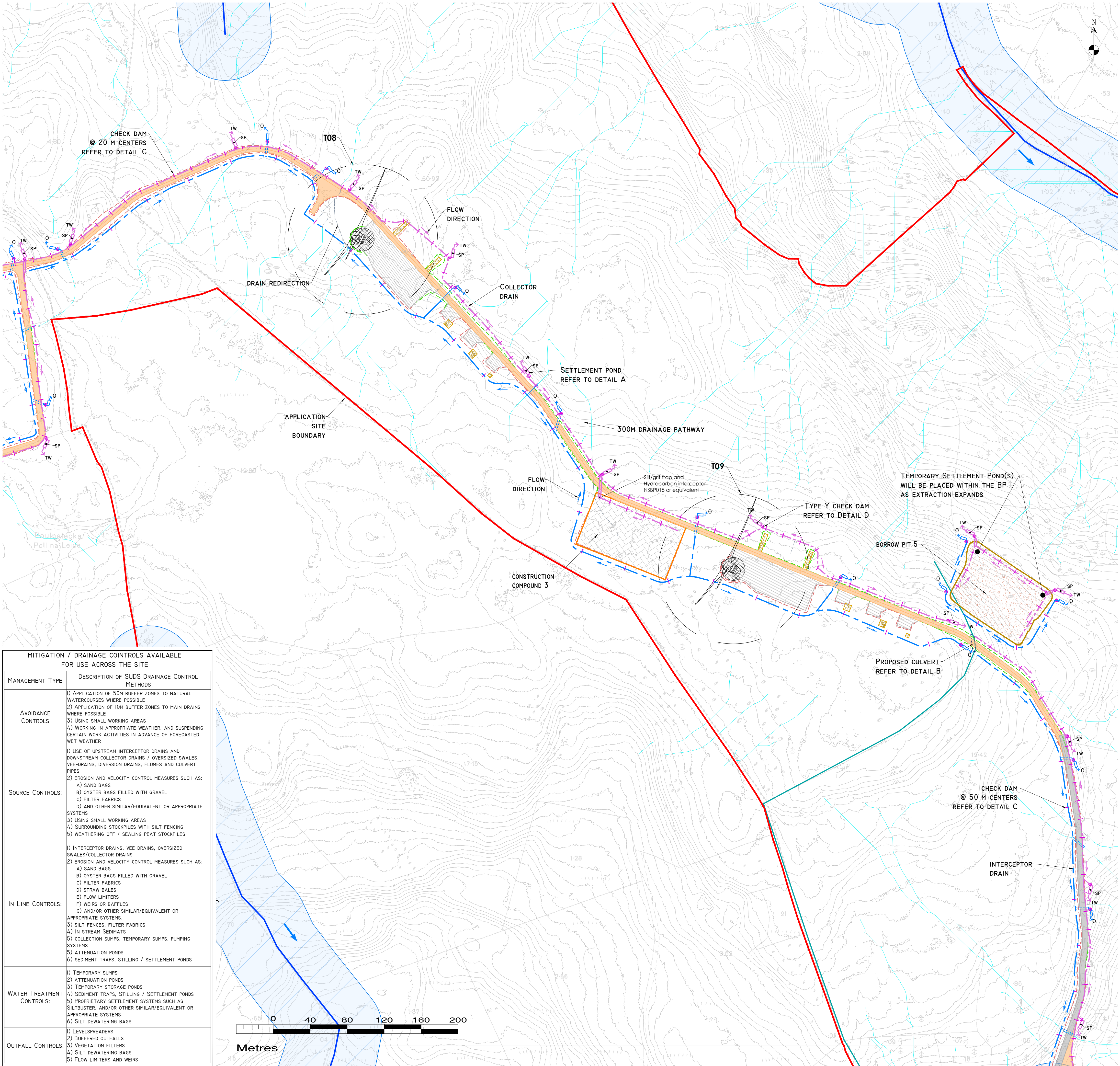
**STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

**CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

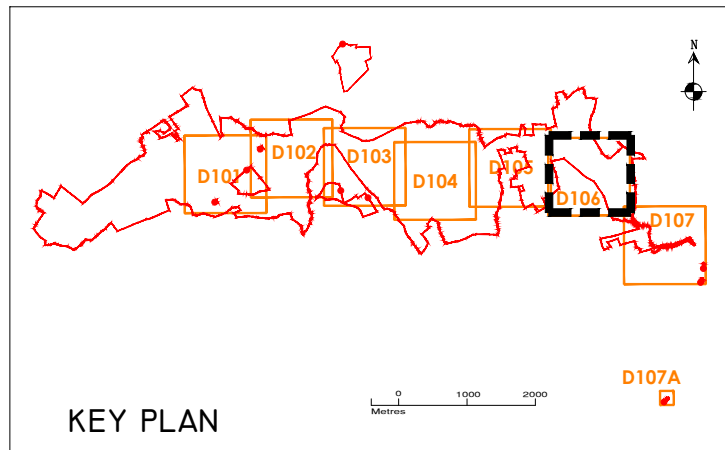
**NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUME OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE



- EXISTING DRAINAGE**
- RIVERS/STREAMS (WC - WATERCOURSE)
  - EXISTING DRAINS
  - RIVERS/STREAMS 50M BUFFER
  - STREAM FLOW DIRECTION
  - DRAINAGE PATHWAYS >300M LENGTH
  - REDIRECTED DRAINS
- PROPOSED DRAINAGE**
- UPSTREAM INTERCEPTOR DRAIN
  - SWALES/DOWNSTREAM COLLECTOR DRAIN
  - DIRECTION OF FLOW
  - SILT FENCES
  - DOUBLE/TRIPLE SILT FENCES
  - SETTLEMENT POND - LEVEL SPREADER
  - CHECK DAM 'TYPE A'
  - CHECK DAM 'TYPE B'
  - PROPOSED WC CROSSING
  - EXISTING WC CROSSING
  - INTERCEPTOR DITCH CULVERT
  - COLLECTOR DITCH CULVERT
  - OVERLAND FLOW DISCHARGE
  - TREATED WATER DISCHARGE
  - SETTLEMENT POND
  - SOD/NATURAL VEGETATION
  - SWALE / FILTER BED /SECONDARY SP
  - PUMPING SUMP
- APPLICATION SITE BOUNDARY**
- EXISTING GROUND SURFACE
  - MINOR CONTOUR (1 M INTERVAL)
  - TURBINE AND SWEEP AREA
  - PROPOSED HARDCORED AREAS
  - EXISTING ROADS PROPOSED TO BE UPGRADED
  - SUBSTATION
  - CONSTRUCTION COMPOUND
  - MET MAST
  - BORROW PIT
  - CUT AREA
  - FILL AREA



- DRAWING NOTES**
1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
  2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
  3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
  4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed
Revisions			

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: **FUTURENERGY IRELAND**

Job: **KNOCKSHANVO WF, Co. CLARE**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D106**

Drawing No: **P1625-0-0824-A1-D106-00C**

Sheet Size: **A1** Project No.: **P1625-0**

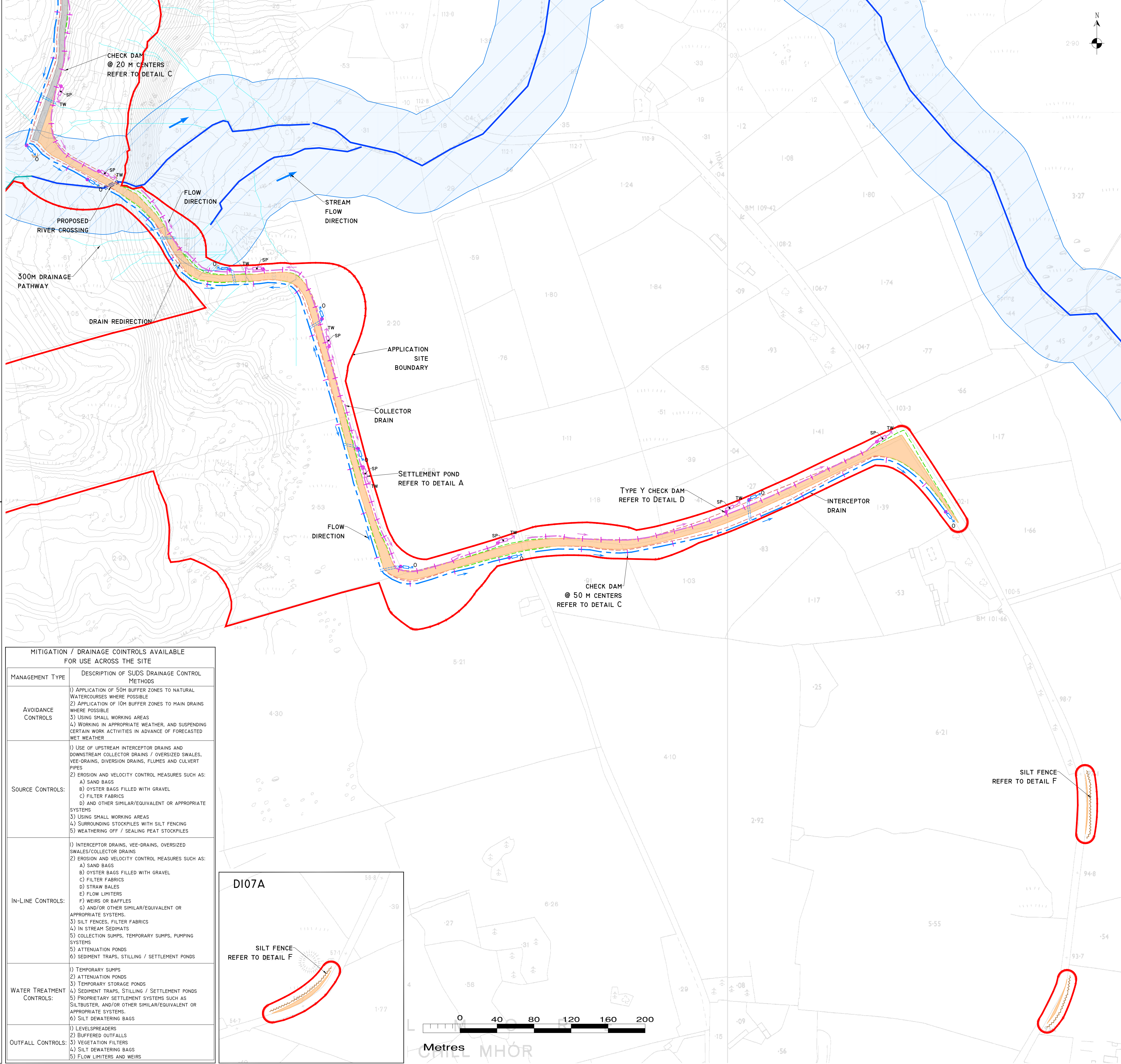
Scale: **1:2,000 (A1)** Drawn By: **GA**

Date: **07/08/2024** Checked By: **MG**



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
  2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
  3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES
4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
  5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
  6. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
  7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
  8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS
9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USE TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES
10. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS
11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
  12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING
13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
  14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE
15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
  16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:
- STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.
- DRAINAGE NOTES:
1. SITE TRACKS AND ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
  2. SPARE STRAW BALES/SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
  3. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
  4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
  5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES/DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
  6. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUME OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
  7. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
  8. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
  9. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT, WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
  10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON THE CATCHMENT AREA BEING SERVED. SAMPLE POND SIZES FOR VARIOUS CATCHMENT AREAS SHOWN ON DRAWING D501.
  11. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
  12. SILT FENCES TO BE PROVIDE ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN <15M OF EDGE OF ANY DITCH / DRAIN / EPHEMERAL CHANNELS.
  13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER ('SOD' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
  14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
  15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
  16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
  17. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
  18. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
  19. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
  20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE



**LEGEND**

**EXISTING DRAINAGE**

- RIVERS/STREAMS (WC - WATERCOURSE)
- EXISTING DRAINS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINAGE PATHWAYS >300M LENGTH
- REDIRECTED DRAINS

**PROPOSED DRAINAGE**

- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCES
- DOUBLE/TRIPLE SILT FENCES
- SETTLEMENT POND - LEVEL SPREADER
- CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED WC CROSSING
- EXISTING WC CROSSING
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- TW SETTLEMENT POND
- SP SEMI-NATURAL VEGETATION
- VS SWALE / FILTER BED /SECONDARY SP
- PUMPING SUMP

**GENERAL**

- APPLICATION SITE BOUNDARY
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- SUBSTATION
- CONSTRUCTION COMPOUND
- MET MAST
- BORROW PIT
- CUT AREA
- FILL AREA

**KEY PLAN**

**DRAWING NOTES**

1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

No.	Description	By	Date

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58-44122  
tel: +353 (0) 58-44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: **FUTUREENERGY IRELAND**

Job: **KNOCKSHANVO WF, Co. CLARE**

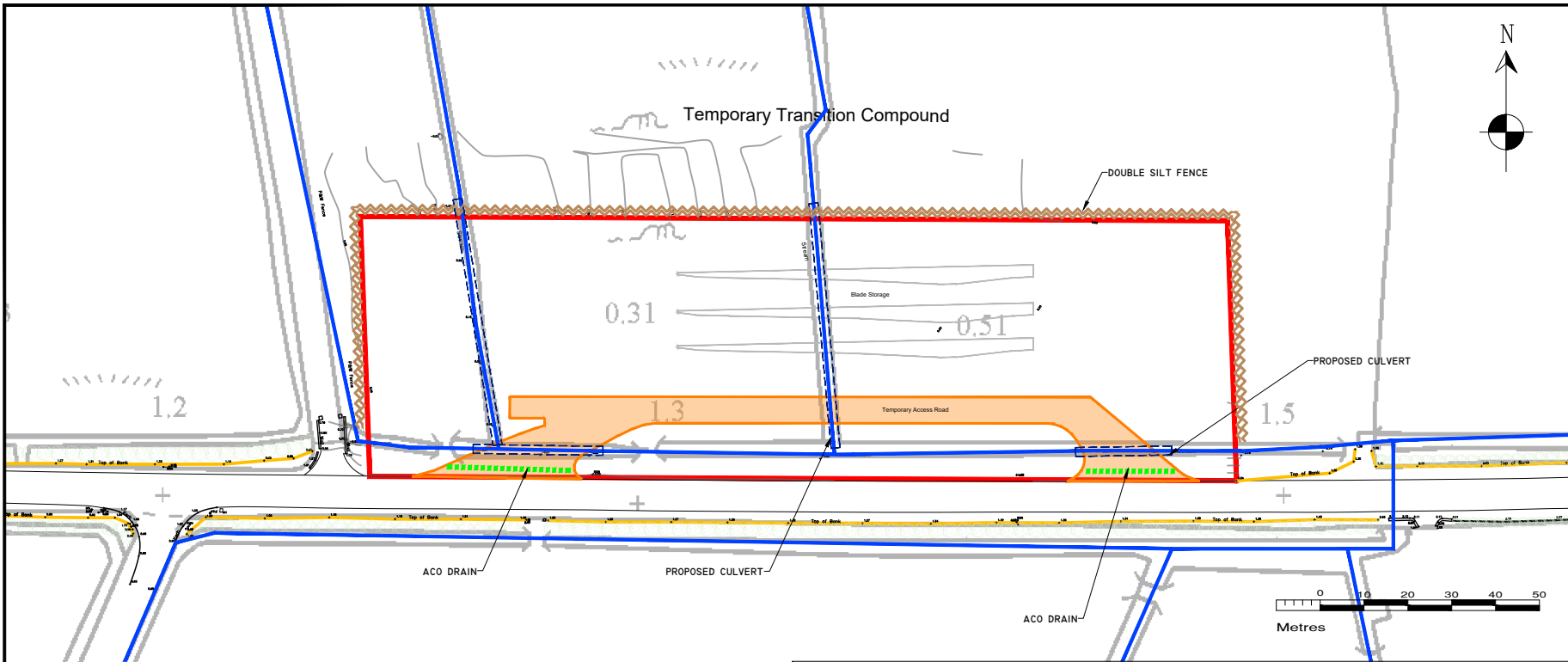
Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D107**

Drawing No: **P1625-0-0824-A1-D107-00C**

Sheet Size: A1	Project No.: P1625-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/08/2024	Checked By: MG





- DRAWING LEGEND :**
- RIVERS/STREAMS (WC - WATERCOURSE)
  - RIVERS/STREAMS 50M BUFFER
  - SILT FENCES
  - PROPOSED TEMPORARY CULVERTS
  - ACO DRAIN
  - APPLICATION SITE BOUNDARY
  - EXISTING GROUND SURFACE MINOR CONTOUR (1 M INTERVAL)
  - PROPOSED TEMPORARY ROAD
  - EXISTING DRAINAGE
  - PROPOSED DRAINAGE

- DRAWING NOTES**
1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
  2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
  3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
  4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044724  
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

**HYDRO ENVIRONMENTAL SERVICES**

22 Lower Main St  
Dungarvan  
Co. Waterford  
Ireland

tel: +353 (0) 58 44122  
tel: +353 (0) 58 44244  
email: info@hydroenvironmental.ie  
web: www.hydroenvironmental.ie

Client: FUTUREENERGY IRELAND

Job: TEMPORARY TRANSITION COMPOUND, CO. LIMERICK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D101\_TTC

Drawing No: P1625-0824-A4-D101-TTC-00C

Sheet Size: A4 Project No.: P1625-0

Scale: 1:1,500(A4) Drawn By: GA

Date: 07/08/2024 Checked By: MG

