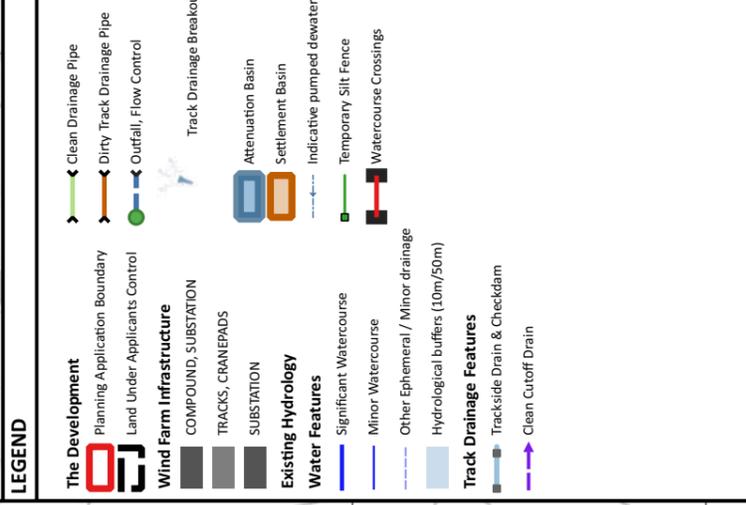
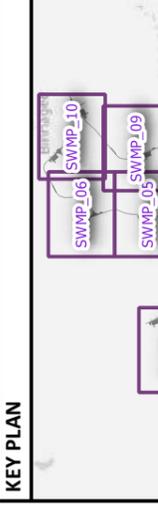
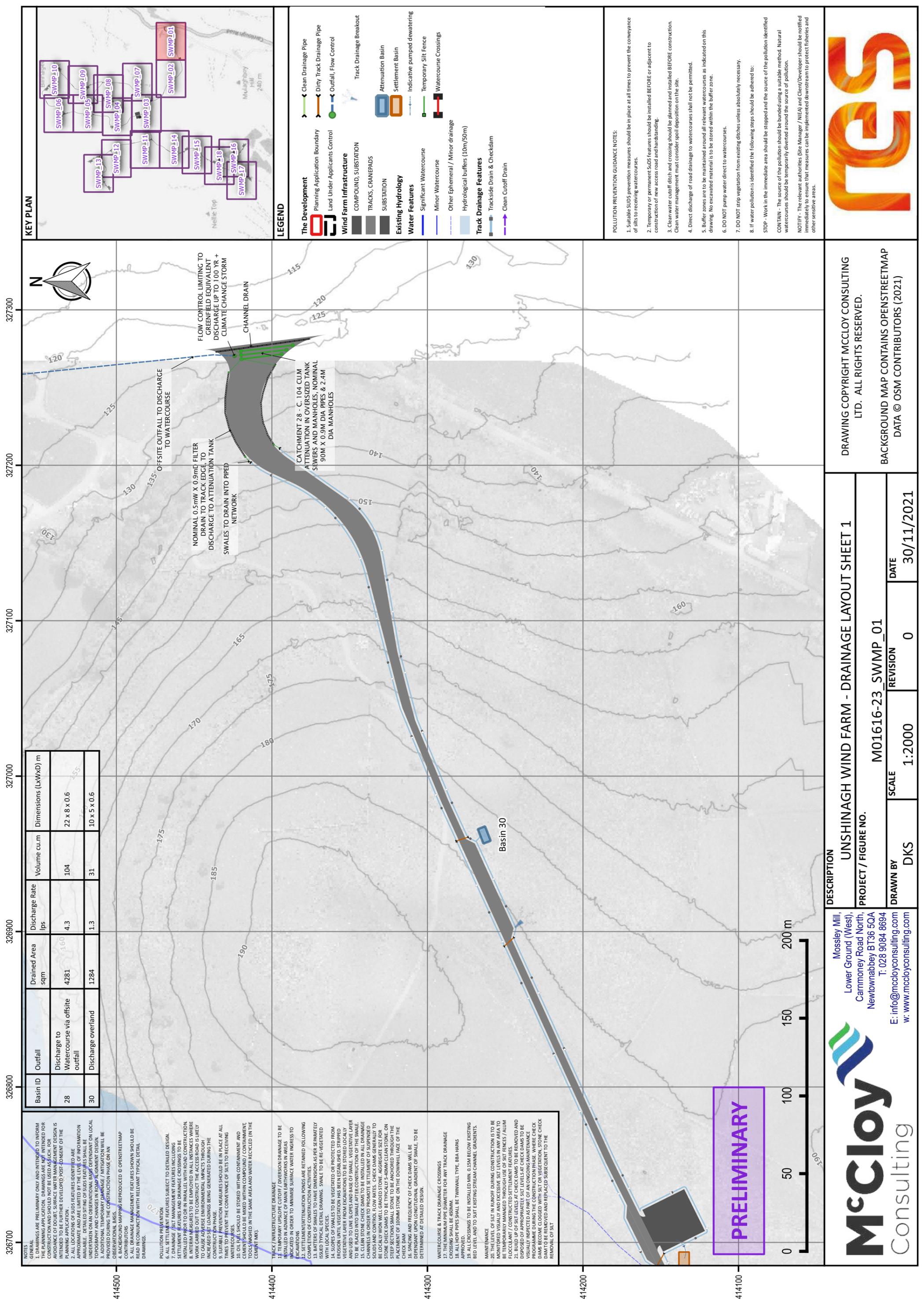


## Annex A

# Drainage Management - General Arrangement

M01616-23_SWMP_01	M01616-23 Drainage GA Sheet 1
M01616-23_SWMP_02	M01616-23 Drainage GA Sheet 2
M01616-23_SWMP_03	M01616-23 Drainage GA Sheet 3
M01616-23_SWMP_04	M01616-23 Drainage GA Sheet 4
M01616-23_SWMP_05	M01616-23 Drainage GA Sheet 5
M01616-23_SWMP_06	M01616-23 Drainage GA Sheet 6
M01616-23_SWMP_07	M01616-23 Drainage GA Sheet 7
M01616-23_SWMP_08	M01616-23 Drainage GA Sheet 8
M01616-23_SWMP_09	M01616-23 Drainage GA Sheet 9
M01616-23_SWMP_10	M01616-23 Drainage GA Sheet 10
M01616-23_SWMP_11	M01616-23 Drainage GA Sheet 11
M01616-23_SWMP_12	M01616-23 Drainage GA Sheet 12
M01616-23_SWMP_13	M01616-23 Drainage GA Sheet 13
M01616-23_SWMP_14	M01616-23 Drainage GA Sheet 14
M01616-23_SWMP_15	M01616-23 Drainage GA Sheet 15
M01616-23_SWMP_16	M01616-23 Drainage GA Sheet 16
M01616-23_SWMP_17	M01616-23 Drainage GA Sheet 17
M01616-23_SWMP_18	M01616-23 Drainage GA Sheet 18



**POLLUTION PREVENTION GUIDANCE NOTES:**

1. Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
2. Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and hardstanding.
3. Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
4. Direct discharge of road drainage to watercourses shall not be permitted.
5. Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
6. DO NOT pump water direct to watercourses.
7. DO NOT strip vegetation from existing ditches unless absolutely necessary.
8. If water pollution is identified the following steps should 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 contained using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.
  - NOTIFY - The relevant authorities (Site Manager / NEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.



Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m
28	Discharge to Watercourse via offsite outfall	4281	4.3	104	22 x 8 x 0.6
30	Discharge overland	1284	1.3	31	10 x 5 x 0.6

**NOTES**

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3. ADDITIONAL TEMPORARY DRAINAGE / MITIGATION WILL BE PROVIDED DURING THE CONSTRUCTION PHASE ON AN OBSERVATIONAL BASIS.
4. BACKGROUND MAPPING REPRODUCED © OPENSTREETMAP
5. ALL DRAINAGE MANAGEMENT FEATURES SHOWN SHOULD BE READ IN CONJUNCTION WITH RELEVANT TYPICAL DETAIL DRAWINGS.

**POLLUTION PREVENTION**

6. ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
7. DRAINAGE / SUDS MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION.
8. INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SUDS LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
9. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
10. ALL SUDS FEATURES SHOULD BE STORED WITHIN CONFINEMENT AND CAPABLE OF BEING WASHED WITHIN A COMPOUND / CONTAINMENT TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MK).

**TRACKS / INFRASTRUCTURE FRAMEWORK**

11. TEMPORARY SLOPE CUTOFF / CONVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.
12. SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
13. ALL TRACKS AND DRAINAGE FEATURES TO BE INSTALLED AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWING. SWALE TO BE RE-VEGETATED WITH LOCAL SPECIES.
14. SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED AS A TOP SOIL LAYER OR TO BE RE-VEGETATED WITH LOCAL SPECIES.
15. CLEAN STONE CHECK DAMS TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW RATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-40MM CLEANSITONE. ON THE DOWNHILL FACE OF THE CHECK DAM.
16. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.

**WATERCOURSE & TRACK DRAINAGE CROSSINGS**

17. THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
18. ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA HPAS APPROVED.
19. ALL CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.

**MAINTENANCE**

20. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY.
21. 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

**FLOW CONTROL LIMITING TO GREENFIELD EQUIVALENT DISCHARGE UP TO 100 YR + CLIMATE CHANGE STORM**

**CHANNEL DRAIN**

**NOMINAL 0.5mW X 0.9mD FILTER DRAIN TO TRACK EDGE, TO DISCHARGE TO ATTENUATION TANK**

**SWALES TO DRAIN INTO PIPED NETWORK**

**CATCHMENT 28 - C. 104 CLM ATTENUATION IN OVERSIZED TANK SEWERS AND MANHOLES, NOMINAL 90M X 0.9M DIA PIPES & 2.4M DIA MANHOLES**

**OFFSITE OUTFALL TO DISCHARGE TO WATERCOURSE**

**Basin 30**

**Basin 28**

**DESCRIPTION**

UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 1

PROJECT / FIGURE NO. M01616-23\_SWMP\_01

DRAWN BY DKS

SCALE 1:2000

REVISION 0

DATE 30/11/2021

DRAWING COPYRIGHT MCCLOY CONSULTING LTD. ALL RIGHTS RESERVED.

BACKGROUND MAP CONTAINS OPENSTREETMAP DATA © OSM CONTRIBUTORS (2021)

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Lower Ground (West),  
Carmoney Road North,  
Newtownabbey BT36 5QA  
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w: www.mccloyconsulting.com

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Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m	DESCRIPTION
29	Discharge to Drain / Watercourse	5795	5.8	141	29 x 8 x 0.6	NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL. NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL.

REF	DESCRIPTION
WX01	NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL.
WX02	NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL.

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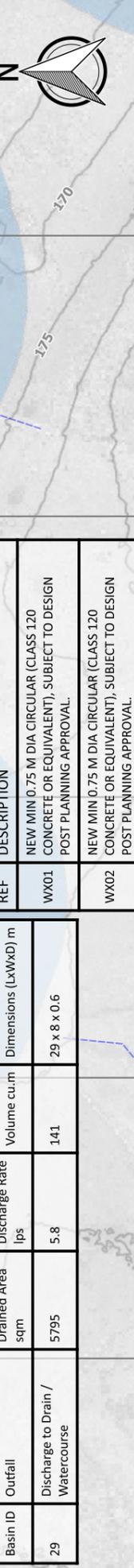
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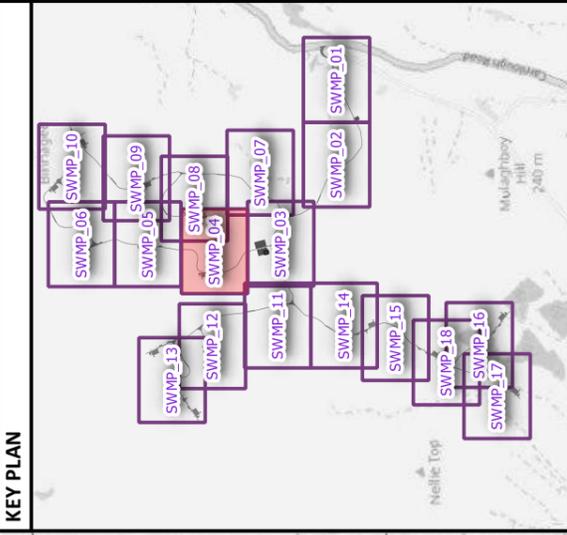
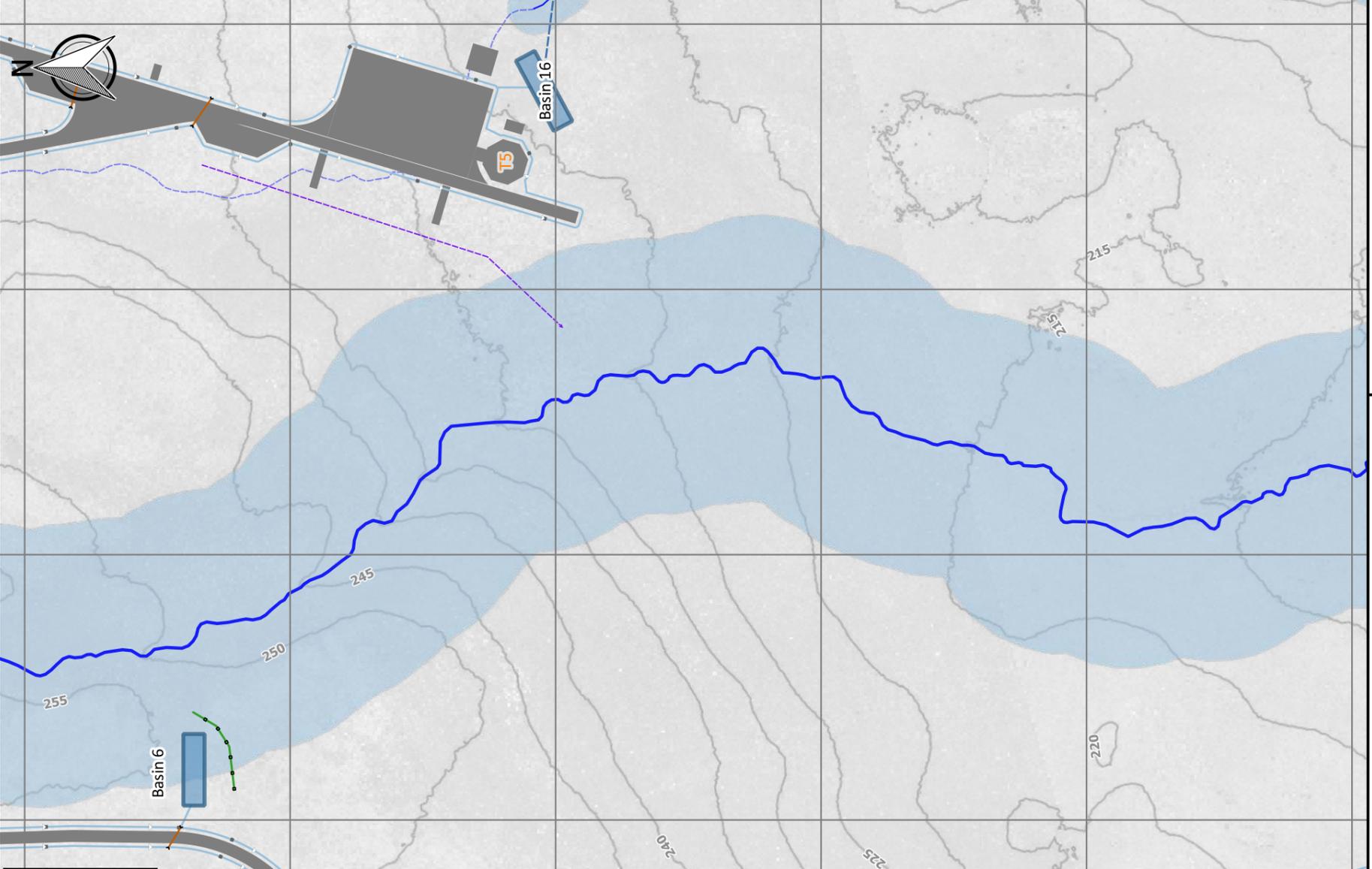
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**MAINTENANCE**

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Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m
6	Discharge overlaid	7052	7.1	172	27 x 8 x 0.8
16	Discharge to Drain / Watercourse	5900	5.9	144	30 x 8 x 0.6
18	Discharge to Drain / Watercourse	5627	5.6	137	29 x 8 x 0.6



**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

- Watercourse
- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Track Drainage Features**

- Trackside Drain & Checkdam
- Clean Cutoff Drain
- Clean Drainage Pipe
- Dirty Track Drainage Pipe
- Outfall, Flow Control
- Track Drainage Breakout
- Attenuation Basin
- Settlement Basin
- Indicative pumped dewatering
- Temporary Silt Fence
- Watercourse Crossings

**POLLUTION PREVENTION GUIDANCE NOTES:**

1. Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
2. Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and handstanding.
3. Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
4. Direct discharge of road drainage to watercourses shall not be permitted.
5. Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
6. DO NOT pump water direct to watercourses.
7. DO NOT strip vegetation from existing ditches unless absolutely necessary.
8. If water pollution is identified the following steps should 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 contained using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.  
NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.



**DESCRIPTION**

UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 4  
PROJECT / FIGURE NO. M01616-23\_SWMP\_04

DRAWN BY DKS  
SCALE 1:2000  
REVISION 0  
DATE 30/11/2021

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BACKGROUND MAP CONTAINS OPENSTREETMAP DATA © OSM CONTRIBUTORS (2021)

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**NOTES**

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- ALL LOCATIONS OF SUDS FEATURES IDENTIFIED ARE APPROXIMATE AND ARE LIMITED BY THE LEVEL OF INFORMATION AVAILABLE. THE DESIGN OF SUDS FEATURES SHOULD BE BASED ON LOCAL TOPOGRAPHY AND CHANGES IN ROAD ALIGNMENT DESIGN.
- ADDITIONAL TEMPORARY DRAINAGE / MITIGATION WILL BE PROVIDED DURING THE CONSTRUCTION PHASE ON AN OBSERVATIONAL BASIS.
- BACKGROUND MAPPING REPRODUCED © OPENSTREETMAP
- ALL DRAINAGE MANAGEMENT FEATURES SHOWN SHOULD BE READ IN CONJUNCTION WITH RELEVANT TYPICAL DETAIL DRAWINGS.

**POLLUTION PREVENTION**

- ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
- DRAINAGE / SILT MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION. WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
- WATERCOURSES SHOULD BE STORED WITHIN CONFINEMENT AND CLEANED REGULARLY TO PREVENT POLLUTION. ALL POLLUTION CONTROL TOOLS SHOULD BE WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MIX).

**TRACKS / INFRASTRUCTURE DRAINAGE**

- TEMPORARY CUTOFF / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.
- SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
- WATERCOURSES AND DRAINAGE FEATURES AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS. SWALE TO BE RE-VEGETATED WITH LOCAL SPECIES.
- SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED TO REVEGETATE SLOPES OF SWALES. VEGETATIVE WATER TO BE STORED IN SWALES UNTIL VEGETATION IS ESTABLISHED.
- CLEAN STONE CHECK DAMS TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW RATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-40MM CLEAN STONE ON PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.

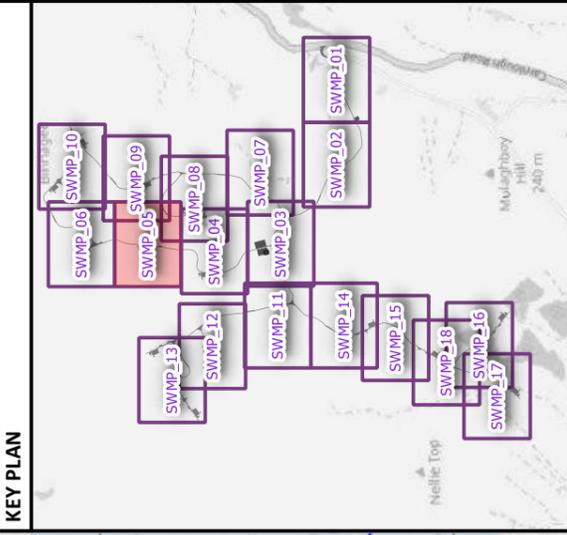
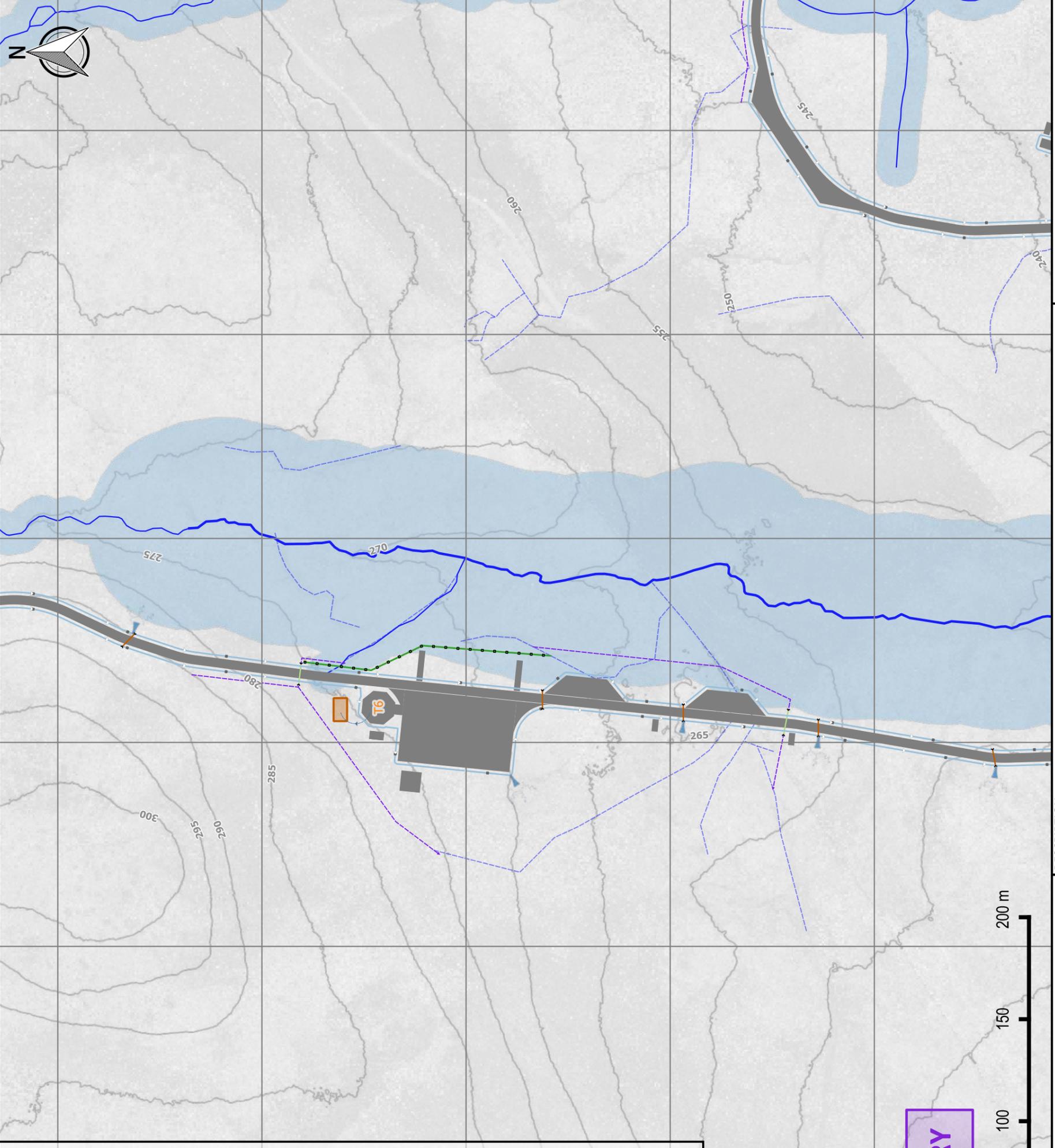
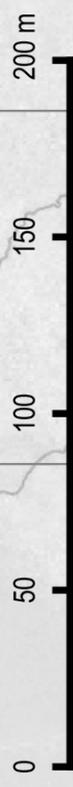
**WATERCOURSE & TRACK DRAINAGE CROSSINGS**

- THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
- ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA HPAS APPROVED.
- CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.

**MAINTENANCE**

- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY USING APPROPRIATE METHODS (E.G. FLOCCULANT / CONSTRUCTED SETTLEMENT FEATURES).
- 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

PRELIMINARY



**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

- Watercourse
- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Track Drainage Features**

- Trackside Drain & Checkdam
- Clean Cutoff Drain

**Water Features**

- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Watercourse Crossings**

- Watercourse Crossings

**Track Drainage Breakout**

- Clean Drainage Pipe
- Dirty Track Drainage Pipe
- Outfall, Flow Control

**Attenuation Basin**

- Attenuation Basin
- Settlement Basin

**Indicative pumped dewatering**

- Indicative pumped dewatering
- Temporary Silt Fence

**POLLUTION PREVENTION GUIDANCE NOTES:**

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  - CONTAIN - The source of the pollution should be bounded using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.
  - NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.



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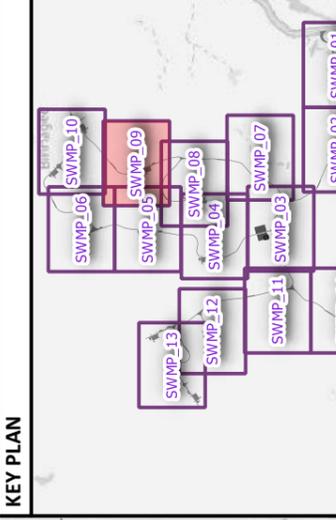
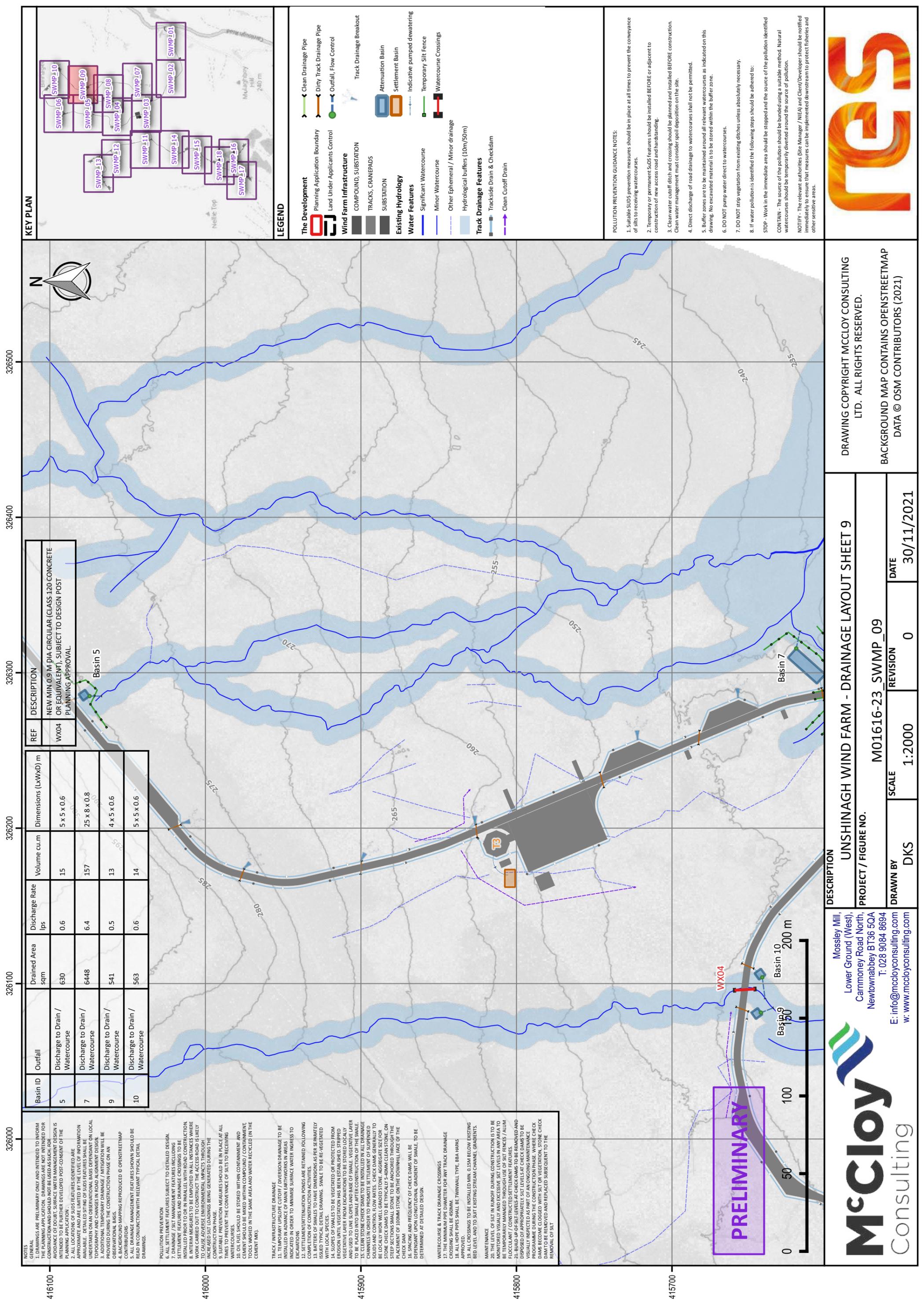
<b>DESCRIPTION</b>	
UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 5	
PROJECT / FIGURE NO. M01616-23_SWMP_05	
<b>DRAWN BY</b>	<b>SCALE</b>
DKS	1:2000
<b>REVISION</b>	<b>DATE</b>
0	30/11/2021

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**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control
- Wind Farm Infrastructure
  - COMPOUND, SUBSTATION
  - TRACKS, CRANEPADS
  - SUBSTATION
- Existing Hydrology
- Water Features
  - Significant Watercourse
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- Track Drainage Features
  - Trackside Drain & Checkdam
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**Track Drainage Breakout**

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Basin ID	Outfall	Discharge to Drain / Watercourse	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m	REF	DESCRIPTION
5	Discharge to Drain / Watercourse	630	0.6	15	5 x 5 x 0.6	WX04	NEW MIN 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT). SUBJECT TO DESIGN POST PLANNING APPROVAL.	
7	Discharge to Drain / Watercourse	6448	6.4	157	25 x 8 x 0.8			
9	Discharge to Drain / Watercourse	541	0.5	13	4 x 5 x 0.6			
10	Discharge to Drain / Watercourse	563	0.6	14	5 x 5 x 0.6			

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- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
- ALL EXCAVATIONS SHOULD BE STORED WITHIN CONFINEMENT, AND CARE SHOULD BE TAKEN TO PREVENT SPILLAGE OF OILS / CONTAMINANTS INTO THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MK).
- TRACK / INFRASTRUCTURE DRAINAGE
- TEMPORARY SLOPE CUTOFF / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INCREASES TO EXCAVATIONS
- SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
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UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 9  
 PROJECT / FIGURE NO. M01616-23\_SWMP\_09  
 DRAWN BY DKS  
 SCALE 1:2000  
 REVISION 0  
 DATE 30/11/2021

**DESCRIPTION**

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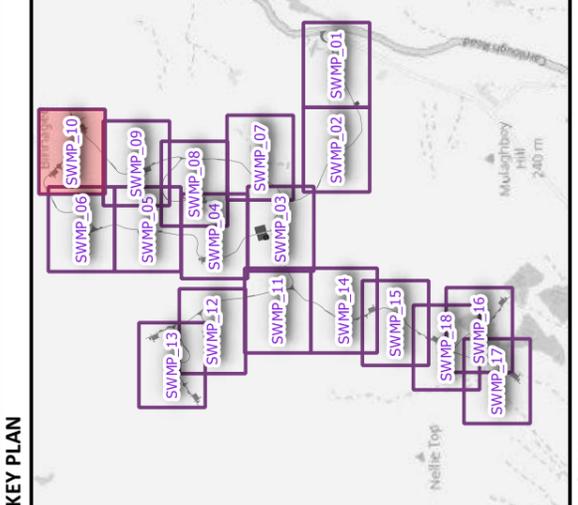
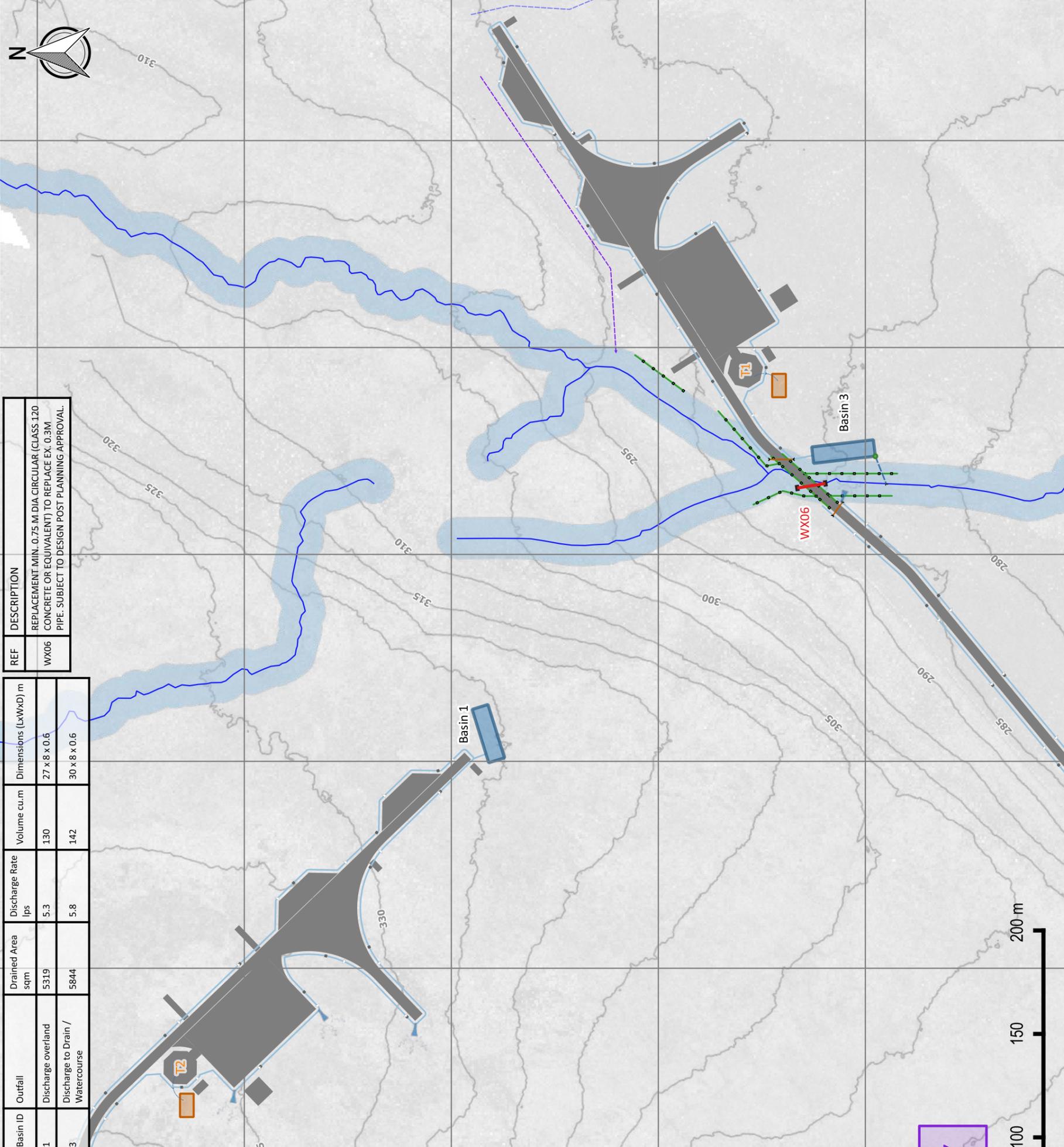
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Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m	REF	DESCRIPTION
1	Discharge to Drain / Watercourse	5319	5.3	130	27 x 8 x 0.6	WX06	REPLACEMENT MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) TO REPLACE EX. 0.3M PIPE. SUBJECT TO DESIGN POST PLANNING APPROVAL.
3	Discharge to Drain / Watercourse	5844	5.8	142	30 x 8 x 0.6		



**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

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<b>DESCRIPTION</b>	
UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 10	
PROJECT / FIGURE NO. M01616-23_SWMP_10	
<b>DRAWN BY</b>	<b>SCALE</b>
DKS	1:2000
<b>REVISION</b>	<b>DATE</b>
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**PRELIMINARY**

415000

414900

414800

414700

414600

324900

325000

325100

325200

325300

325400

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**POLLUTION PREVENTION**

- ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
- DRAINAGE / SILT MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION.
- INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
- ALL SILT SHOULD BE STORED WITHIN CONTAINMENT, AND CLEANERS SHOULD BE AWKED WITH COMBUSTIBLE / CONTAMINANT TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MIX).

**TRACK / INFRASTRUCTURE DRAINAGE**

- TEMPORARY SLOPE CUTS / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.
- SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
- ALL TRACKS AND SUBSTATIONS ARE TO BE SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS. SWALE TO BE RE-GENERATED WITH LOCAL SPECIES.
- SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED TO RE-GENERATE SWALES. VEGETATIVE LAYER TO BE STORED IN SITES AS IDENTIFIED ON THE DRAWINGS.
- CLEAN STONE CHECK DAMS TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW PATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-50MM CLEAN STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.

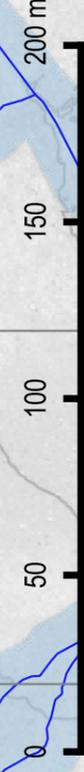
**WATERCOURSE & TRACK DRAINAGE CROSSINGS**

- THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
- ALL HOPE PIPES SHALL BE TWINWALL TYPE. BBA HPAS
- APPROVED CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.

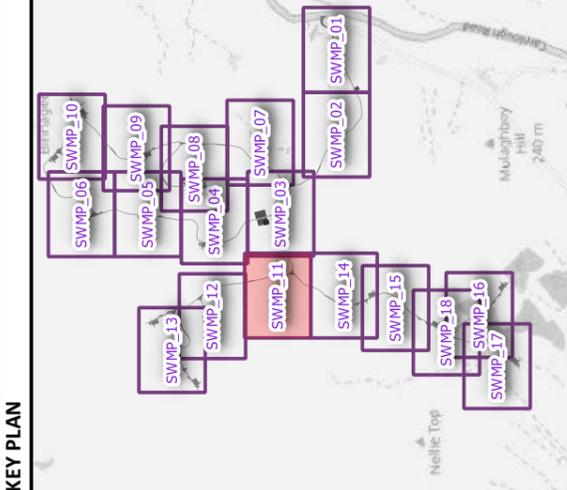
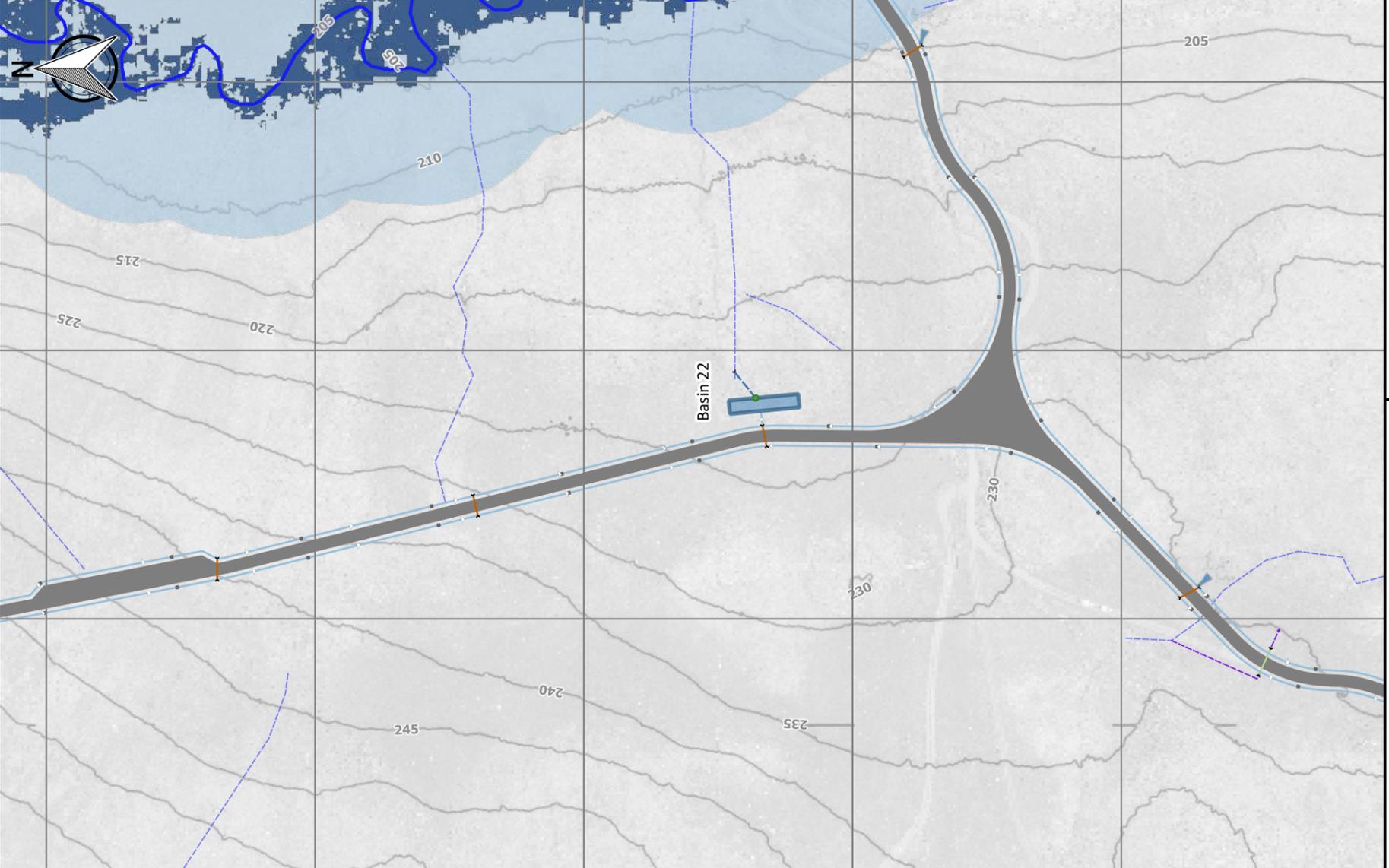
**MAINTENANCE**

- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY.
- 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

**PRELIMINARY**



Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m
22	Discharge to Drain / Watercourse	3343	3.3	81	27 x 5 x 0.6



**LEGEND**

- The Development**
- Planning Application Boundary
  - Land Under Applicants Control
- Wind Farm Infrastructure**
- COMPOUND, SUBSTATION
  - TRACKS, CRANEPADS
  - SUBSTATION
- Existing Hydrology**
- Water Features
  - Significant Watercourse
  - Minor Watercourse
  - Other Ephemeral / Minor drainage
  - Hydrological buffers (10m/50m)
- Track Drainage Features**
- Trackside Drain & Checkdam
  - Clean Cutoff Drain
- Water Features**
- Clean Drainage Pipe
  - Dirty Track Drainage Pipe
  - Outfall, Flow Control
  - Track Drainage Breakout
  - Attenuation Basin
  - Settlement Basin
  - Indicative pumped dewatering
  - Temporary Silt Fence
  - Watercourse Crossings

**POLLUTION PREVENTION GUIDANCE NOTES:**

- Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
- Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and handstanding.
- Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
- Direct discharge of road drainage to watercourses shall not be permitted.
- Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
- DO NOT pump water direct to watercourses.
- DO NOT strip vegetation from existing ditches unless absolutely necessary.
- If water pollution is identified the following steps should 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 contained using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.
  - NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

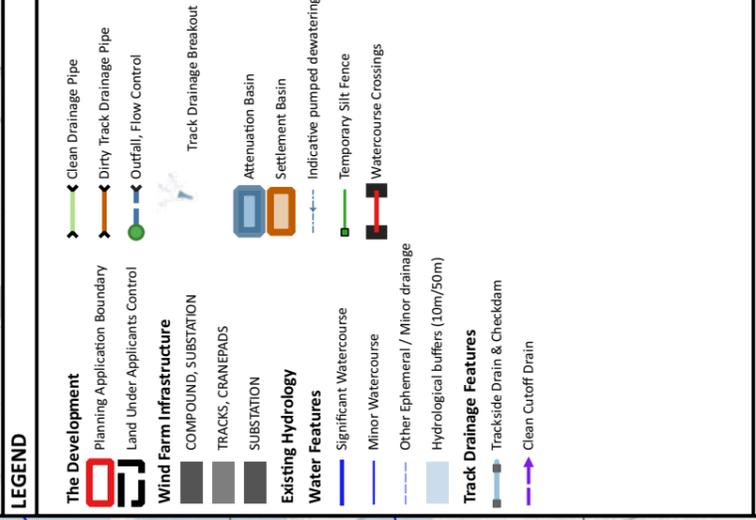
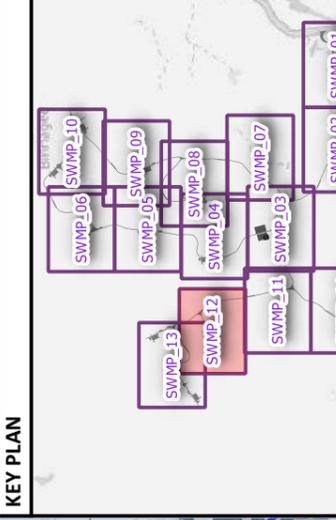
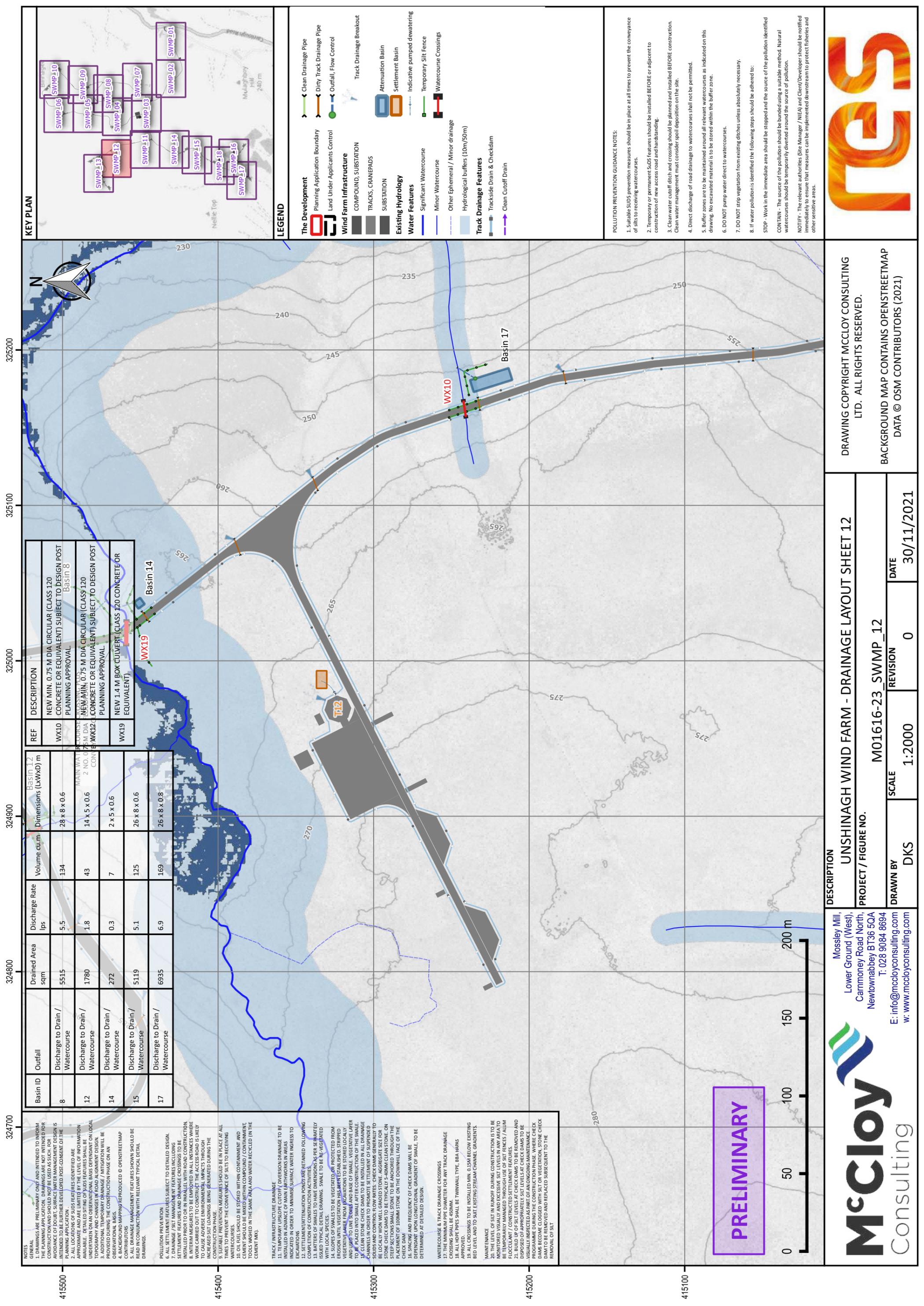


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DESCRIPTION	
UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 11	
PROJECT / FIGURE NO. M01616-23_SWMP_11	
DRAWN BY	DKS
SCALE	1:2000
REVISION	0
DATE	30/11/2021

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Carmoney Road North,  
Newtownabbey BT36 5QA  
T: 028 9084 8694  
E: info@mccloyconsulting.com  
w: www.mccloyconsulting.com



**POLLUTION PREVENTION GUIDANCE NOTES:**

1. Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
2. Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and handstanding.
3. Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
4. Direct discharge of road drainage to watercourses shall not be permitted.
5. Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
6. DO NOT pump water direct to watercourses.
7. DO NOT strip vegetation from existing ditches unless absolutely necessary.
8. If water pollution is identified the following steps should 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 contained using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.
  - NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.



REF	DESCRIPTION
WX10	NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL
WX19	NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL
WX20	NEW 1.4 M BOX CULVERT (CLASS 120 CONCRETE OR EQUIVALENT)

Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m
8	Discharge to Drain / Watercourse	5515	5.5	134	28 x 8 x 0.6
12	Discharge to Drain / Watercourse	1780	1.8	43	14 x 5 x 0.6
14	Discharge to Drain / Watercourse	272	0.3	7	2 x 5 x 0.6
15	Discharge to Drain / Watercourse	5119	5.1	125	26 x 8 x 0.6
17	Discharge to Drain / Watercourse	6935	6.9	169	26 x 8 x 0.8

**NOTES**

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2. ALL LOCATIONS OF SUDS FEATURES IDENTIFIED ARE APPROXIMATE AND ARE LIMITED BY THE LEVEL OF INFORMATION AVAILABLE. THE LEVEL OF INFORMATION IS BASED ON LOCAL UNDERGROUND UTILITY RECORDS, SURFACE TOPOGRAPHY AND CHANGES IN ROAD ALIGNMENT DESIGN.
3. ADDITIONAL TEMPORARY DRAINAGE / MITIGATION WILL BE PROVIDED DURING THE CONSTRUCTION PHASE ON AN OBSERVATIONAL BASIS.
4. BACKGROUND MAPPING REPRODUCED © OPENSTREETMAP
5. ALL DRAINAGE MANAGEMENT FEATURES SHOWN SHOULD BE READ IN CONJUNCTION WITH RELEVANT TYPICAL DETAIL DRAWINGS.
6. ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
7. DRAINAGE / SILT MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION.
8. INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
9. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
10. ALL SILT SHOULD BE STORED WITHIN CONFINEMENT, AND CEMENT SHOULD BE AWKED WITHIN A COMPOUND / CONTAINMENT TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MK).
11. TRACK / INFRASTRUCTURE DRAINAGE
12. SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
13. TEMPORARY SLOPE CUTOFFS / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.
14. SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAMAE FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED TO REVEGETATE SLOPES OF SWALES.
15. CLEAN STONE CHECK DAMS TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW PATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-50MM CLEAN STONE ON PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
16. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDANT UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.
17. THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
18. ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA HAPAS APPROVED.
19. CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.
20. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY BY HAND OR USING SUITABLE 'FLOCCULANT' CONSTRUCTED SETTLEMENT FEATURES.
21. 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

**DESCRIPTION**

UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 12

PROJECT / FIGURE NO. M01616-23\_SWMP\_12

DRAWN BY DKS

SCALE 1:2000

REVISION 0

DATE 30/11/2021

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BACKGROUND MAP CONTAINS OPENSTREETMAP DATA © OSM CONTRIBUTORS (2021)

**MCCLOY Consulting**

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Newtownabbey BT36 5QA  
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414500

324800

325000

325200

325300

325400

KEY PLAN

**NOTES**  
 GENERAL  
 1. DRAWINGS ARE PRELIMINARY ONLY AND INTENDED TO INFORM THE PLANNING APPLICATION. DRAWINGS ARE NOT INTENDED FOR AVOIDANCE OF EXISTING SURFACE WATER MANAGEMENT DESIGN IS INTENDING TO BE FURTHER DEVELOPED POST-CONSENT OF THE PLANNING APPLICATION.  
 2. ALL LOCATIONS OF SUDS FEATURES IDENTIFIED ARE APPROXIMATE AND ARE LIMITED BY THE LEVEL OF INFORMATION AVAILABLE. THE EXACT LOCATION OF SUDS FEATURES ON LOCAL TOPOGRAPHY AND CHANGES IN ROAD ALIGNMENT DESIGN UNDER TAKE ON CONSTRUCTION SHOULD BE REFERENCED ON LOCAL TOPOGRAPHY AND CHANGES IN ROAD ALIGNMENT DESIGN.  
 3. ADDITIONAL TEMPORARY DRAINAGE / MITIGATION WILL BE PROVIDED DURING THE CONSTRUCTION PHASE ON AN OBSERVATIONAL BASIS.  
 4. BACKGROUND MAPPING REPRODUCED © OPENSTREETMAP  
 5. ALL DRAINAGE MANAGEMENT FEATURES SHOWN SHOULD BE READ IN CONJUNCTION WITH RELEVANT TYPICAL DETAIL DRAWINGS.  
 POLLUTION PREVENTION  
 6. ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.  
 7. DRAINAGE / SILT MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION.  
 8. INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.  
 9. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.  
 10. ALL SILT SHOULD BE STORED WITHIN CONFINEMENT, AND CEMENT SHOULD BE AWKED WITHIN COMPOUND / CONTAMINANT TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MIX).  
 TRACK / INFRASTRUCTURE DRAINAGE  
 11. TEMPORARY SLOPE CUTOFFS / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.  
 12. SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.  
 13. ALL TRACKS AND DRAINAGE FEATURES SHOWN SHOULD BE ISSUED TYPICAL DETAIL DRAWING. SWALE TO BE RE-VEGETATED WITH LOCAL SPECIES.  
 14. SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED TO REVEGETATE SLOPES OF SWALES.  
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 16. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.  
 WATERCOURSE & TRACK DRAINAGE CROSSINGS  
 17. THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.  
 18. ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA HPAPS APPROVED.  
 19. CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.  
 MAINTENANCE  
 20. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY.  
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**Basin ID**  
27

**Outfall**  
Discharge to Drain / Watercourse

**Discharge Rate**  
lps  
2.6

**Draigned Area**  
sqm  
2601

**Volume**  
cu.m  
63

**Dimensions (LxWxD) m**  
21 x 5 x 0.6

**REF**  
WX13

**DESCRIPTION**  
NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.

**Basin 27**

**WX13**

**PRELIMINARY**

0 50 100 150 200 m

324800 325000 325200 325300 325400

414000 414100 414200 414300 414400

205 210 215 220 225 230 235

Mossley Mill  
Lower Ground (West),  
Carmoney Road North,  
Newtownabbey BT36 5QA  
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w: www.mccloyconsulting.com

**MCCloy**  
Consulting

**DESCRIPTION**  
UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 14  
PROJECT / FIGURE NO.  
M01616-23\_SWMP\_14

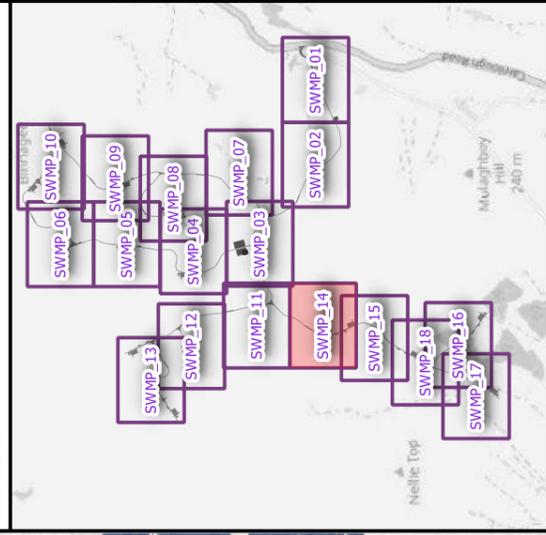
**DRAWN BY**  
DKS

**SCALE**  
1:2000

**REVISION**  
0

**DATE**  
30/11/2021

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**LEGEND**

- The Development**
- Planning Application Boundary
  - Land Under Applicants Control
- Wind Farm Infrastructure**
- COMPOUND, SUBSTATION
  - TRACKS, CRANEPADS
  - SUBSTATION
- Existing Hydrology**
- Watercourse
  - Significant Watercourse
  - Minor Watercourse
  - Other Ephemeral / Minor drainage
  - Hydrological buffers (10m/50m)
- Track Drainage Features**
- Trackside Drain & Checkdam
  - Clean Cutoff Drain
- Water Features**
- Significant Watercourse
  - Minor Watercourse
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- Attenuation Basin
  - Settlement Basin
  - Indicative pumped dewatering
  - Temporary Silt Fence
  - Watercourse Crossings
- Water Features**
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  - Minor Watercourse
  - Other Ephemeral / Minor drainage
  - Hydrological buffers (10m/50m)
- Track Drainage Features**
- Trackside Drain & Checkdam
  - Clean Cutoff Drain
- The Development**
- Clean Drainage Pipe
  - Dirty Track Drainage Pipe
  - Outfall, Flow Control

**POLLUTION PREVENTION GUIDANCE NOTES:**

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324700

324800

324900

325000

325100

325200

**NOTES**

**GENERAL**

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**POLLUTION PREVENTION**

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- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED AT DETAILED DESIGN.

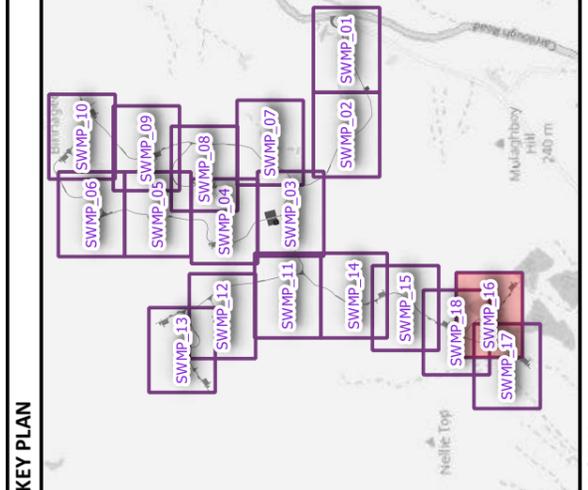
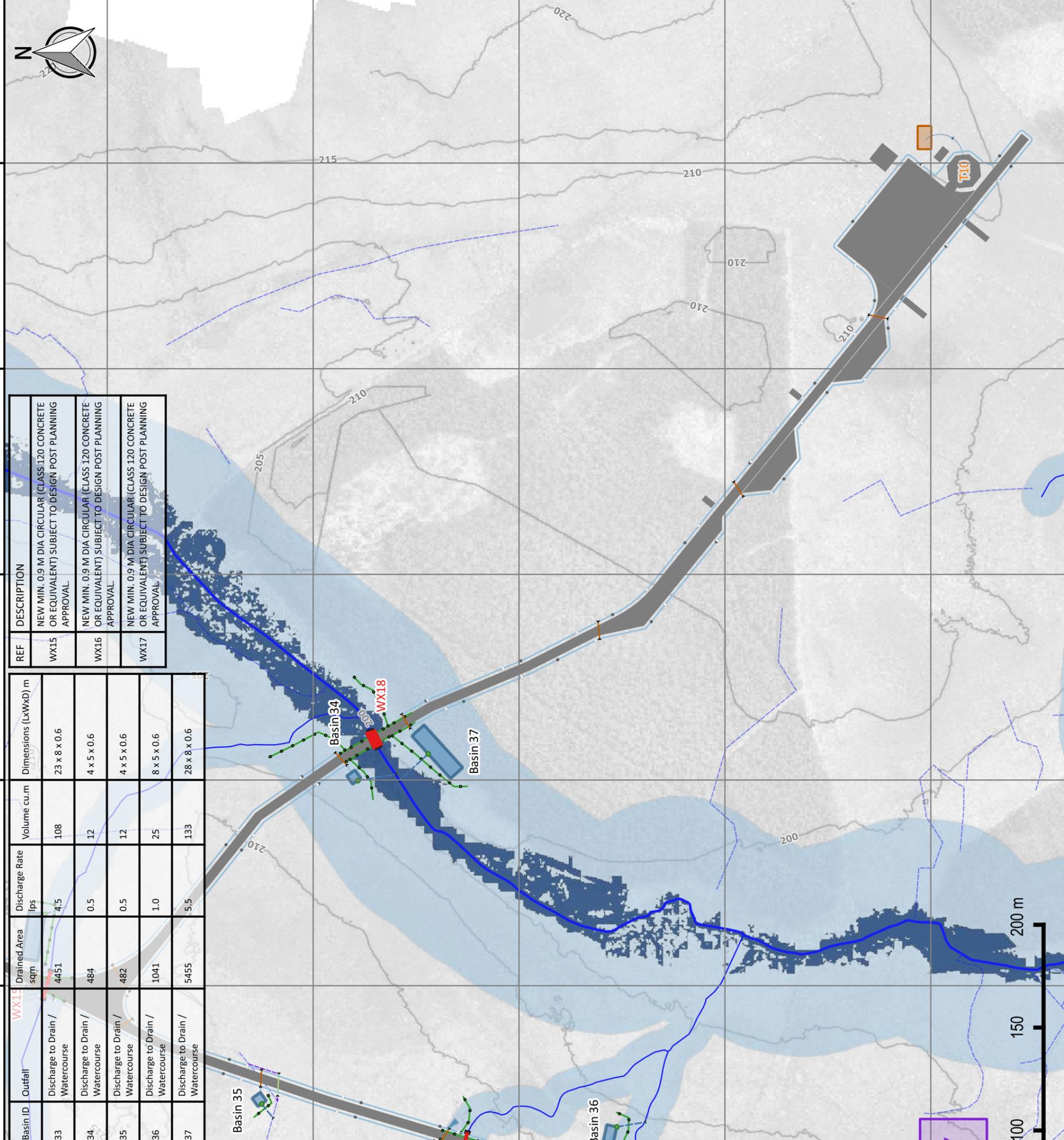
**WATERCOURSE & TRACK DRAINAGE CROSSINGS**

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- HOPE CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.

**MAINTENANCE**

- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY.
- CONSTRUCTED SETTLEMENT FEATURES / ALUMI FLOCCULANT CONSTRUCTED SETTLEMENT FEATURES.
- 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m	DESCRIPTION	REF
33	Discharge to Drain / Watercourse	4451	4.5	108	23 x 8 x 0.6	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.	WX15
34	Discharge to Drain / Watercourse	484	0.5	12	4 x 5 x 0.6	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.	WX16
35	Discharge to Drain / Watercourse	482	0.5	12	4 x 5 x 0.6	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.	WX17
36	Discharge to Drain / Watercourse	1041	1.0	25	8 x 5 x 0.6		
37	Discharge to Drain / Watercourse	5455	5.5	133	28 x 8 x 0.6		



**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

- Watercourse
- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Track Drainage Features**

- Trackside Drain & Checkdam
- Clean Cutoff Drain

**Water Features**

- Watercourse Crossings
- Watercourse
- Temporary Silt Fence
- Indicative pumped dewatering

**Track Drainage Breakout**

- Attenuation Basin
- Settlement Basin

**Water Features**

- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)
- Trackside Drain & Checkdam
- Clean Cutoff Drain

**The Development**

- Clean Drainage Pipe
- Dirty Track Drainage Pipe
- Outfall, Flow Control

**POLLUTION PREVENTION GUIDANCE NOTES:**

- Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
- Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and handstanding.
- Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
- Direct discharge of road drainage to watercourses shall not be permitted.
- Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
- DO NOT pump water direct to watercourses.
- DO NOT strip vegetation from existing ditches unless absolutely necessary.
- If water pollution is identified the following steps should 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 contained using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.
  - NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

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**UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 16**

PROJECT / FIGURE NO. M01616-23\_SWMP\_16

DRAWN BY DKS

SCALE 1:2000

REVISION 0

DATE 30/11/2021

DESCRIPTION

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**UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 16**

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REVISION 0

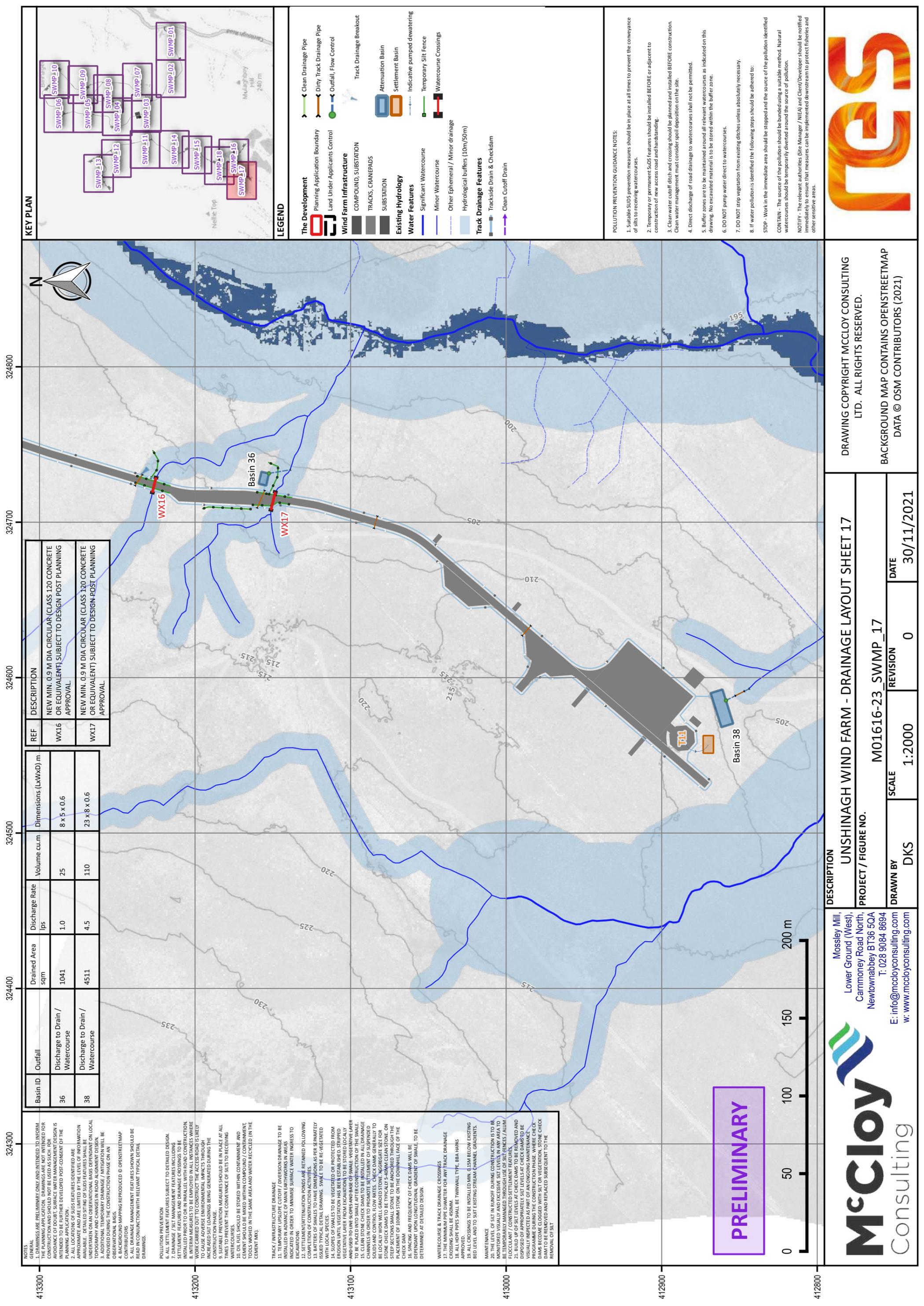
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DESCRIPTION

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NOTES

GENERAL

- DRAWINGS ARE PRELIMINARY ONLY AND INTENDED TO INFORM THE PLANNING APPLICATION. DRAWINGS ARE NOT INTENDED FOR AVOIDANCE OF LIABILITY. SURFACE WATER MANAGEMENT DESIGN IS INTENDING TO BE FURTHER DEVELOPED POST-CONSENT OF THE PLANNING APPLICATION.
- ALL LOCATIONS OF SUDS FEATURES IDENTIFIED ARE APPROXIMATE AND ARE LIMITED BY THE LEVEL OF INFORMATION AVAILABLE. THE LEVEL OF INFORMATION IS BASED ON LOCAL UNDERSTANDING OF THE SITE AND SHOULD BE VERIFIED ON LOCAL TOPOGRAPHY AND CHANGES IN ROAD ALIGNMENT DESIGN.
- ADDITIONAL TEMPORARY DRAINAGE / MITIGATION WILL BE PROVIDED DURING THE CONSTRUCTION PHASE ON AN OBSERVATIONAL BASIS.
- BACKGROUND MAPPING REPRODUCED © OPENSTREETMAP
- ALL DRAINAGE MANAGEMENT FEATURES SHOWN SHOULD BE READ IN CONJUNCTION WITH RELEVANT TYPICAL DETAIL DRAWINGS.

POLLUTION PREVENTION

- ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
- DRAINAGE / SILT MANAGEMENT FEATURES INCLUDING SETTLEMENT FEATURES AND DRAINAGE CROSSINGS TO BE INSTALLED PRIOR TO OR IN PARALLEL WITH ROAD CONSTRUCTION.
- INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS ROAD IS LIKELY TO INCREASE SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SILTS TO RECEIVING WATERCOURSES.
- ALL MATERIALS SHOULD BE STORED WITHIN CONFINEMENT, AND CARE SHOULD BE TAKEN TO AVOID SPILLAGE / CONTAMINATION. TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MIX).

TRACK / INFRASTRUCTURE DRAINAGE

- TEMPORARY SLOPE CUTOFFS / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS.
- SETTLEMENT/ATTENUATION PONDS ARE RETAINED FOLLOWING COMPLETION OF CONSTRUCTION ACTIVITIES.
- ALL SUDS FEATURES TO BE INSTALLED AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS. SWALE TO BE RE-VEGETATED WITH LOCAL SPECIES.
- SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED TO RE-VEGETATE SLOPES.
- ALL SUDS FEATURES TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW RATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-40MM CLEANSING STONE ON THE DOWNHILL FACE OF THE DAM.
- PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.

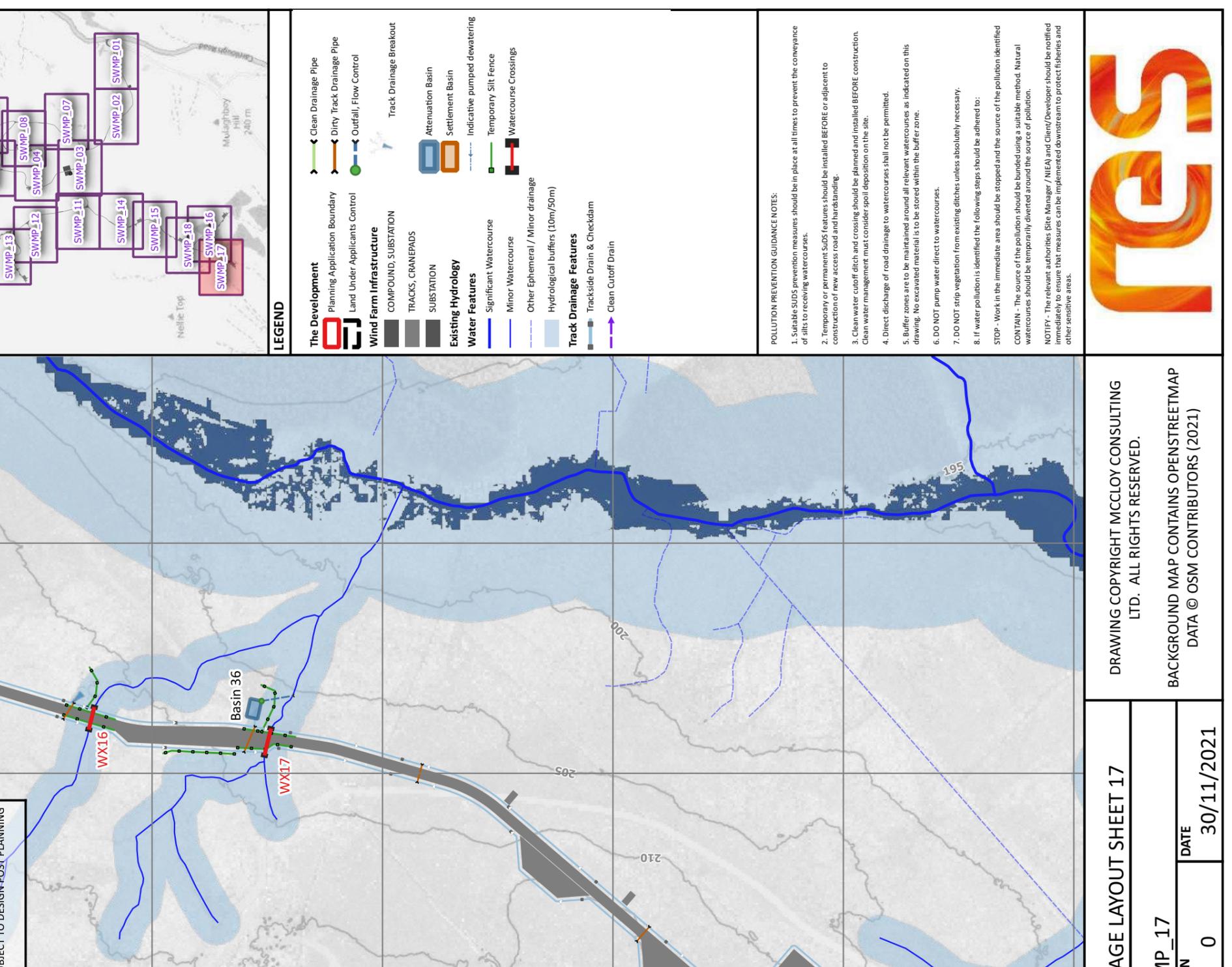
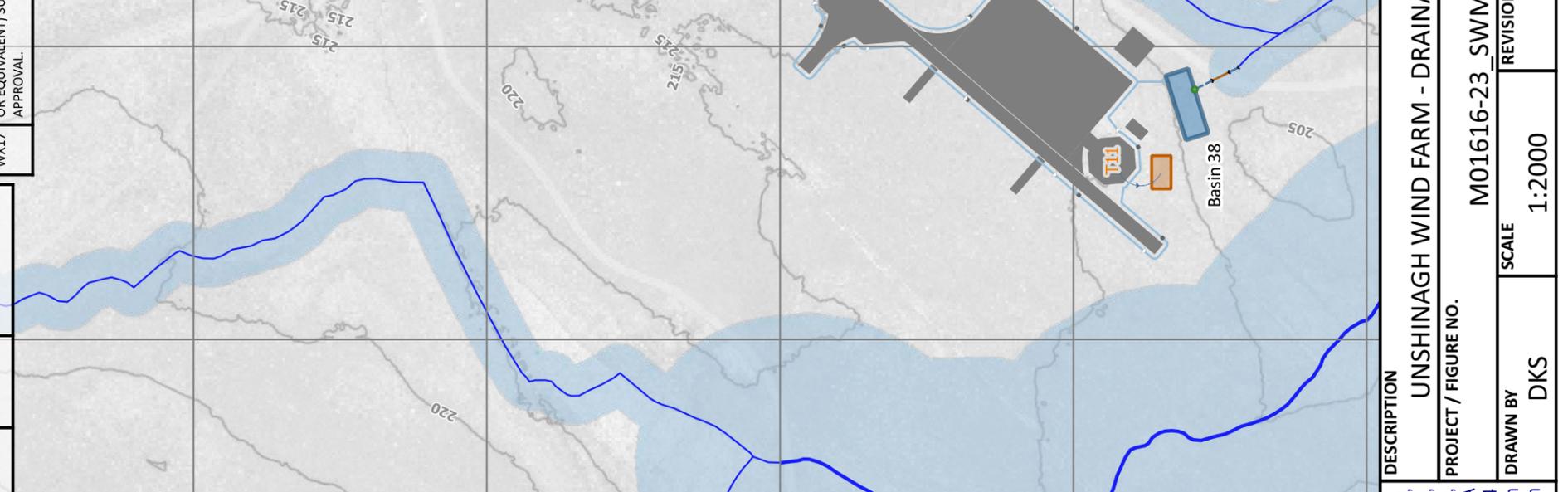
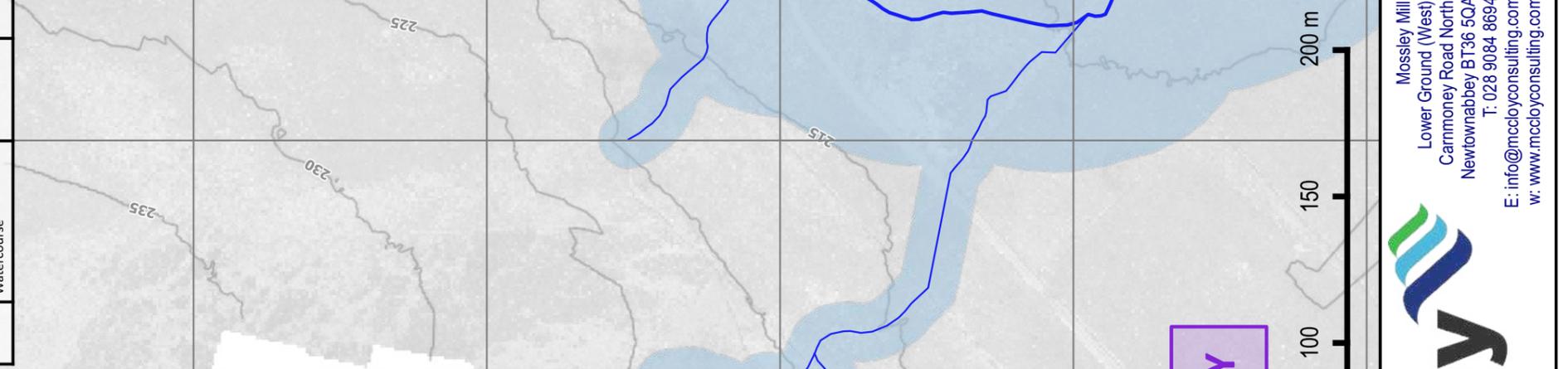
WATERCOURSE & TRACK DRAINAGE CROSSINGS

- THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
- ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA HIPS
- APPROVED CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.

MAINTENANCE

- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY.
- ALL SUDS FEATURES TO BE INSTALLED AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS.
- FLOCCULANT CONSTRUCTED SETTLEMENT FEATURES.
- 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.

Basin ID	Outfall	Drained Area sqm	Discharge Rate lps	Volume cu.m	Dimensions (LxWxD) m	REF	DESCRIPTION
36	Discharge to Drain / Watercourse	1041	1.0	25	8 x 5 x 0.6	WX16	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.
38	Discharge to Drain / Watercourse	4511	4.5	110	23 x 8 x 0.6	WX17	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.



**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

- Watercourse
- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Track Drainage Features**

- Trackside Drain & Checkdam
- Clean Cutoff Drain

**Water Features**

- Significant Watercourse
- Minor Watercourse
- Other Ephemeral / Minor drainage
- Hydrological buffers (10m/50m)

**Track Drainage Breakout**

- Attenuation Basin
- Settlement Basin
- Indicative pumped dewatering
- Temporary Silt Fence
- Watercourse Crossings

**Water Features**

- Significant Watercourse
- Minor Watercourse
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**Water Features**

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- Minor Watercourse
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- Hydrological buffers (10m/50m)

**POLLUTION PREVENTION GUIDANCE NOTES:**

- Suitable SUDS prevention measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
- Temporary or permanent SUDS features should be installed BEFORE or adjacent to construction of new access road and handstanding.
- Clean water cutoff ditch and crossing should be planned and installed BEFORE construction. Clean water management must consider spoil deposition on the site.
- Direct discharge of road drainage to watercourses shall not be permitted.
- Buffer zones are to be maintained around all relevant watercourses as indicated on this drawing. No excavated material is to be stored within the buffer zone.
- DO NOT pump water direct to watercourses.
- DO NOT strip vegetation from existing ditches unless absolutely necessary.
- If water pollution is identified the following steps should be adhered to:
  - Work in the immediate area should be stopped and the source of the pollution identified
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  - NOTIFY - The relevant authorities (Site Manager / NIEA) and Client/Developer should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

**UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 17**

PROJECT / FIGURE NO. M01616-23\_SWMP\_17

SCALE 1:2000

REVISION 0

DATE 30/11/2021

DRAWN BY DKS

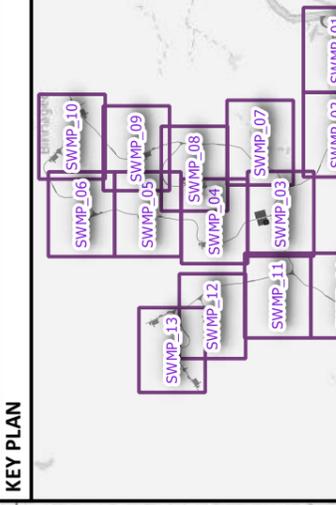
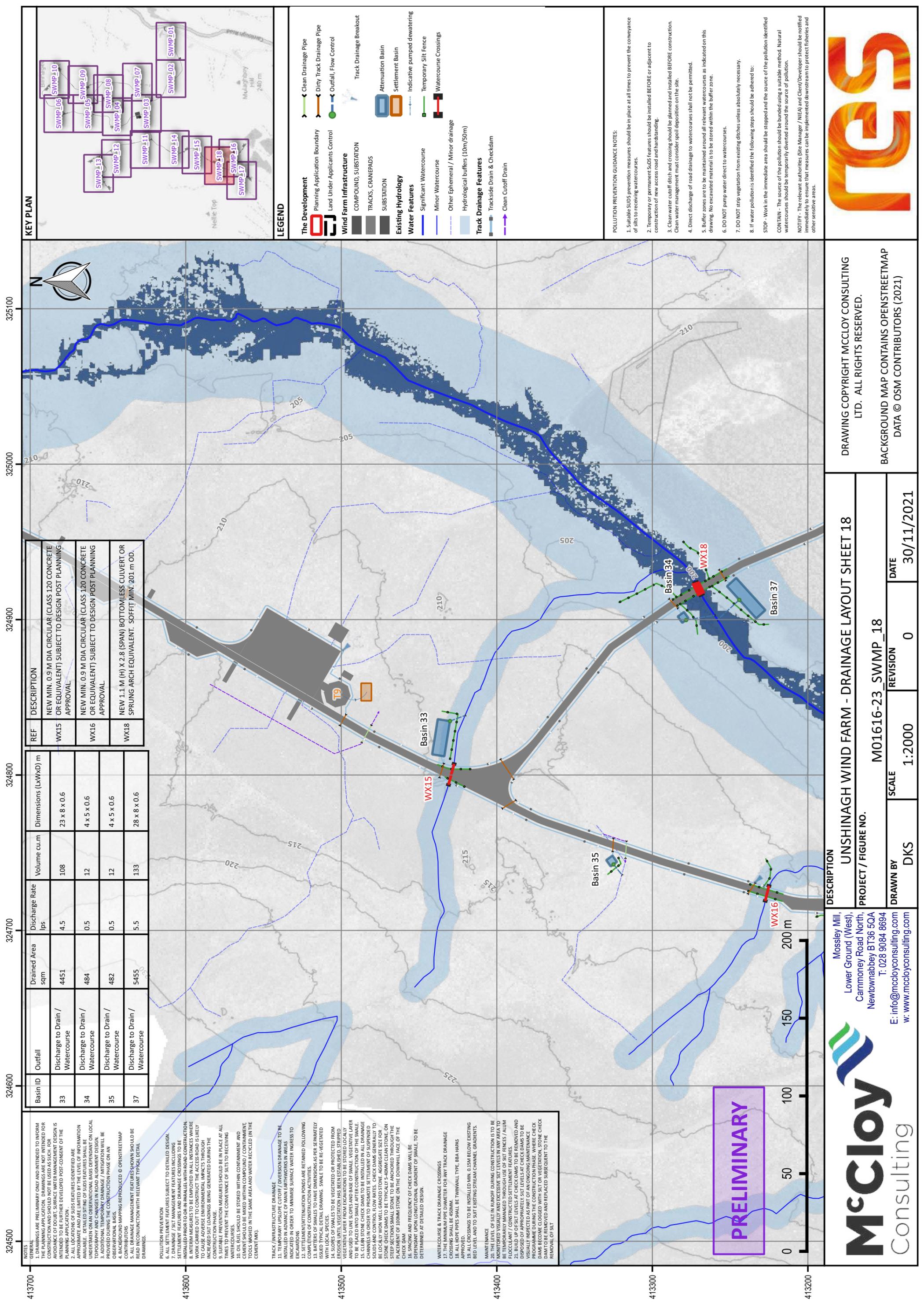
DESCRIPTION

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**LEGEND**

**The Development**

- Planning Application Boundary
- Land Under Applicants Control

**Wind Farm Infrastructure**

- COMPOUND, SUBSTATION
- TRACKS, CRANEPADS
- SUBSTATION

**Existing Hydrology**

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- Significant Watercourse
- Minor Watercourse
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- Hydrological buffers (10m/50m)

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- Clean Cutoff Drain

**Track Drainage Breakout**

- Clean Drainage Pipe
- Dirty Track Drainage Pipe
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34	Discharge to Drain / Watercourse	484	0.5	12	4 x 5 x 0.6	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.
35	Discharge to Drain / Watercourse	482	0.5	12	4 x 5 x 0.6	NEW MIN. 0.9 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.
37	Discharge to Drain / Watercourse	5455	5.5	133	28 x 8 x 0.6	NEW 1.1 M (H) X 2.8 (SPAN) BOTTOMLESS CULVERT OR SPRUNG ARCH EQUIVALENT. SOFFIT MIN. 201 m OD.

**NOTES**

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- ALL SETTLEMENT FEATURES SUBJECT TO DETAILED DESIGN.
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- INTERIM MEASURES TO BE EMPLOYED IN ALL INSTANCES WHERE INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
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- INTERIM MEASURES SHOULD BE STORED WITHIN CONFINEMENT, AND CARRY SHOULD BE AWAY WITHIN CONFINEMENT / CONTAINMENT TOOLS WASHED IN THE SAME AREA AND WATER RECYCLED (IN THE CEMENT MIX).
- TRACK / INFRASTRUCTURE DRAINAGE
- TEMPORARY SLOPE CUTOFF / DIVERSION DRAINAGE TO BE INSTALLED IN ADVANCE OF MAIN EARTHWORKS IN AREAS INDICATED IN ORDER TO MINIMISE SURFACE WATER INGRESS TO EXCAVATIONS
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- ALL SUDS FEATURES TO BE INSTALLED AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS. SWALE TO BE RE-VEGETATED WITH LOCAL SPECIES.
- SLOPES OF SWALES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER FROM EXCAVATIONS TO BE STORED LOCALLY AND RE-USED AS COVER FOR SWALE VEGETATION LAYER
- ALL SWALE SLOPES TO BE INSTALLED AS PER SEPARATELY ISSUED TYPICAL DETAIL DRAWINGS
- CLEAN STONE CHECK DAMS TO BE INSTALLED IN ALL DRAINAGE CHANNELS IN ORDER TO PROMOTE SETTLEMENT OF SUSPENDED SOLIDS AND CONTROL FLOW RATES. CHECK DAMS GENERALLY TO BE LOCALLY WON WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5-50MM CLEAN STONE. ON PLACEMENT OF 100MM STONE ON THE DOWNHILL FACE OF THE CHECK DAM
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DETERMINED UPON LONGITUDINAL GRADIENT OF SWALE. TO BE DETERMINED AT DETAILED DESIGN.
- WATERCOURSE & TRACK DRAINAGE CROSSINGS
- THE MINIMUM PIPE DIAMETER FOR ANY TRACK DRAINAGE CROSSING SHALL BE 450MM.
- ALL HOPE PIPES SHALL BE TWINWALL TYPE, BBA 14RAS APPROVED.
- APPROVED CROSSINGS TO BE INSTALLED MIN. 0.15M BELOW EXISTING BED LEVEL AND TO SUIT EXISTING STREAM CHANNEL GRADIENTS.
- MAINTENANCE
- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE REMOVED IMMEDIATELY BY THE CONTRACTOR USING 'FLOCCULANT' CONSTRUCTED SETTLEMENT FEATURES.
- 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 MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT

**PRELIMINARY**



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<b>DESCRIPTION</b>	
UNSHINAGH WIND FARM - DRAINAGE LAYOUT SHEET 18	
PROJECT / FIGURE NO. M01616-23_SWMP_18	
<b>DRAWN BY</b>	<b>SCALE</b>
DKS	1:2000
<b>REVISION</b>	<b>DATE</b>
0	30/11/2021

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