

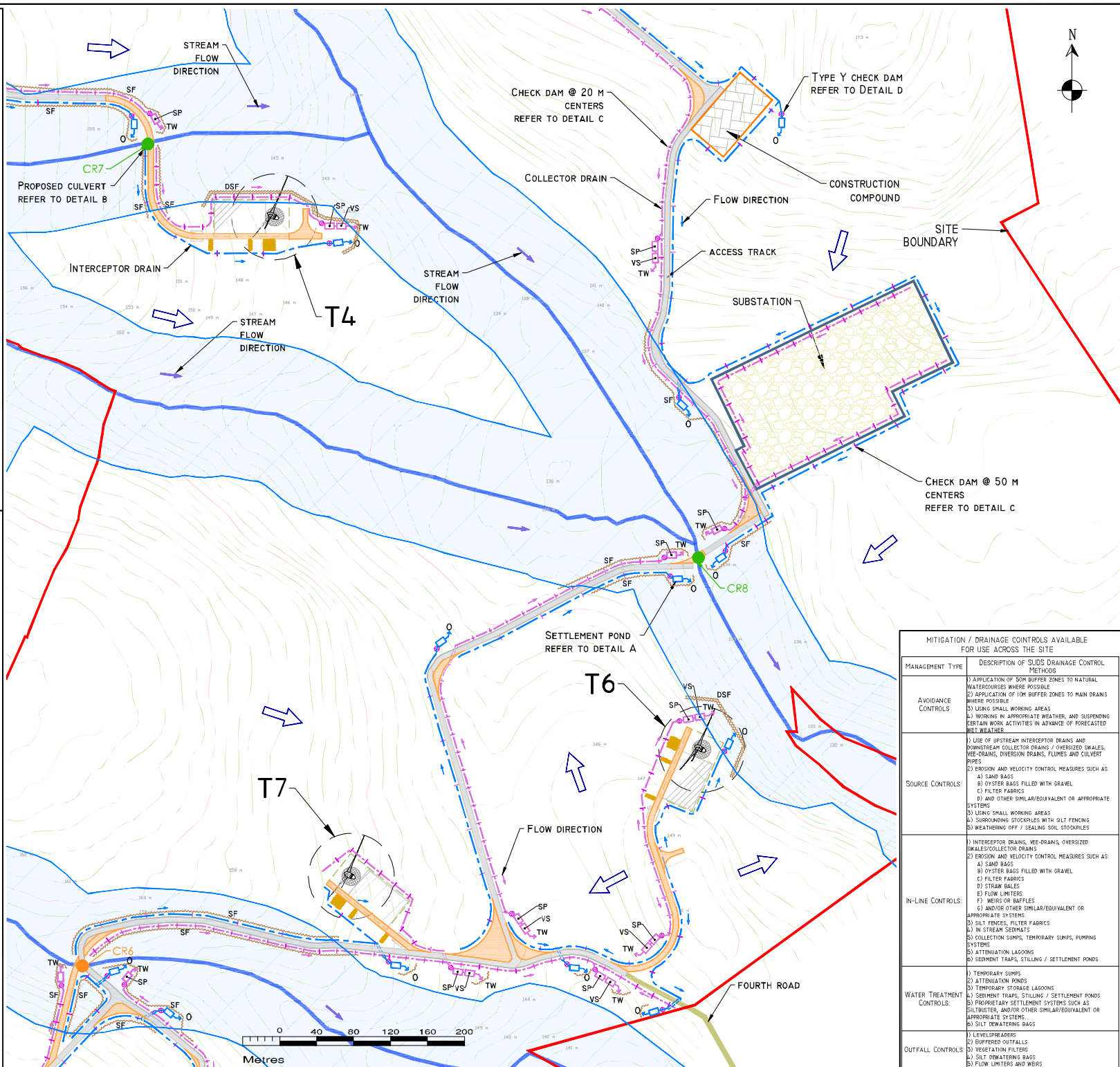


APPENDIX 4-6

DRAINAGE DESIGN DRAWINGS

POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PERSONNEL ARE ADVISED TO ENFORCE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, EROSION 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 RICHES.
- DEWATERING**
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 BIDE ETTES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OF OVER-PUMPING IN DRAINAGE DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW RATE/VELOCITY OR BY USE OF SLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROL.
 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 USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TRENCH 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.
- SILT TRACKS**
11. USE OF TRACK BIDE SWALES WITH CHECK DAMS, AND/OR PLYWOOD CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.
- DEWATERING**
13. REPLENISHING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REPLENISHING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / ETTES AND WATERCOURSES / WATERBODIES.
 14. SPLITS AND SHIP TRACKS 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.
- MAINTENANCE NOTES:**
1. DESIGN SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
 2. SPRING STAKE SWALES/SILT FENCING OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF S.I.T. IN RICH" DURING CONSTRUCTION TO BE MONITORED VISUALLY AND ACCESS WITH S.I.T. PINS IN ANY AREA TO BE TEMPORARILY MARKED BY "SLASH SILT FENCES, STAKE DRAINS, OR SIMILAR TO ADD TO I.D. CHECK DAMS AT THE PROBLEM AREAS. PINE LIL SUBSTITUTION SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED. ALSO 3. SLOTTED SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS, WITHIN PARAMETERS SUCH AS THE "HEIGHT OF STAKE SWALES/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 WORK. IN PLACE.
 4. SLOTTED PROTECTION MEASURES OTHER THAN 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 DRAIN/DRAINS WITH REFERRING TO "TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO IN TRACKS/ POINTS.
 6. DRAIN SWALES / DITCHES 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 W... NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSE.
 7. "WIND FENCING", A BUFFER ZONE OF 50M TO ANY EXISTING WATERCOURSE WILL BE PROVIDED AROUND OPENERS AND DISCHARGES OFF PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
 8. SLOTTED PROTECTION MEASURES "DITCHES TO HAVE A SLOPE OF BETWEEN 1:1, 5 TO 1:2 "DEPENDENT UPON DEPTH OF SWALE/DITCH AND W... BE LEFT AS IS TO RE-VEGETATE WITH LOCAL SPECIES.
 9. TRACK BIDE SWALES / DITCHES TO BE RE-PAVED WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY, AND WHERE SOURCE CONTROL IS NOT SUFFICIENT, WHERE NECESSARY TEST MAY BE REQUIRED TO COLLECT CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO RECONSTRUCTION.
 10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SITE REMOVAL AT TURNING BARS AND ROAD STANDING AREAS. POND SIZES, DEPENDING ON CATCHMENT "AREA SERVICE, SAMPLE POND SIZES SHOULD BE AS FOLLOWS: 1. STRAIN BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND POND AREA TO PREVENT SILT FROM ENTERING POND. BALE FENCES MAY BE REMOVED WITH SUITABLE VEGETATION COVER BE ESTABLISHED.
 12. SILT FENCES TO BE PROVIDED AROUND EDGE OF EXISTING WATERCOURSE WHERE WORKING ZONES WILL BE OPEN TO ANY ADJACENT EXISTING CHANNELS.
 13. SLOTTED PROTECTION MEASURES TO BE VEGETATED OR PROTECTED FROM BROWSE UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (SOIL "SOOT" FROM EXCAVATIONS TO BE STORED "SEPARATELY AND USED TO RE-VEGETATE AND BALE OF SWALES / DITCHES OR CONTEMPORANEOUS VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
 14. CHECK DAMS / VEGETATION SWALES KEPT TO A MINIMUM.
 15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF "LOCALLY WON / GEOLOGICALLY SIMILAR WELLS DRILLED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE "TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, WHEN CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE "ELEMENT OF STONE ON THE DOWNHILL "FACE OF THE CHECK DAM AND BE "WASHED AWAY VEGETABLE.
 16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND REDUCED AS APPROPRIATE. S.I.T. LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PERIOD. IF ANY DAMS ARE FOUND TO BE OVERFLOWING WITH SILT OF VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE "REMOVAL OF SILT.
 17. SWALES AND FLOWING OF CHECK DAMS WILL BE "PROTECTED FROM LONG TERM ABANDONMENT OF SWALE.
 18. LOCATION OF "TRAPS" ON CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED AT A HANDED WHERE THEY MAY BE EASY TO ACCESS AT A LATER DATE (POST COMPLETION OF THE WORKING AND "DRAINAGE CONTROL ONLY). ONLY SUITABLE MATERIALS BACKFILLED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
 19. OIL TRAP SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURE.
 20. SILT BASS WILL BE USED ON SITE AT F FLD DRAIN DISCHARGE AREA, 20M AS I.C. 20M.



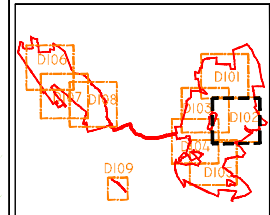
DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- LEVEL SPREADER
- CHECK DAM "TYPE A"
- CHECK DAM "TYPE B"
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR SPREADER
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SEM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- FIRMING SUMP
- MAJOR DRAINAGE ARROWS

EXISTING DRAINAGE

PROPOSED DRAINAGE

- SITE BOUNDARY
- EXISTING GROUND SURFACE
- MAJOR CONTOUR (10 M INTERVAL)
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEET AREA
- TURBINE FOUNDATION
- CRANE PLATFORM
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROAD
- REGIONAL ROAD
- THIRD ROAD
- FOURTH ROAD
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- NET MAST



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Job: LYBENCARRIGA W/F, Co. WATERFORD/Co. CORK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D102

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MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

| MANAGEMENT TYPE | DESCRIPTION OF SLOTTED DRAINAGE CONTROL |
|---------------------------|---|
| AVOIDANCE CONTROLS: | <ol style="list-style-type: none"> 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 SURROUNDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER |
| SOURCE CONTROLS: | <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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 SOIL STOCKPILES |
| IN-LINE CONTROLS: | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> a) SAND BAGS b) OYSTER BAGS FILLED WITH GRAVEL c) FILTER FABRICS d) STRAW BALES e) FLOW LIMITERS f) WEIRS OR BARRIERS 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) ATTENTION LAGOONS 7) TEMPORARY SUMPS 8) ATTENTION PONDS 9) TEMPORARY STORAGE LAGOONS 10) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 11) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS CULVERTS, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 12) SILT DEWATERING BAGS |
| WATER TREATMENT CONTROLS: | <ol style="list-style-type: none"> 1) LEVEL SPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS |
| OUTFALL CONTROLS: | <ol style="list-style-type: none"> 1) LEVEL SPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS |

POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT MEASURES ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SLURRY 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 RITCHES.
- DEMANDS:**
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 DISCHARGED INTO TRACK ROBE RITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAIN/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 VELOCITY OR BY USE OF PLASTIC PLATES, AND OTHER SIMILAR DISCHARGE CONTROL.
 8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

- EVALUATIONS:**
9. 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 TIRENE BASS 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.

- SILT TRAPS:**
11. USE OF TRACK ROBE SWALES WITH CHECK DAMS, AND/OR PALMTRON CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

- REVEGETATION:**
13. REVEGETATION OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REVEGETATION AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / RITCHES AND WATERCOURSES / WATERBODIES.
 14. SPLITS AND SHIP TRACKS 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:

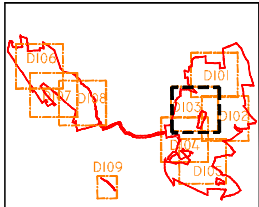
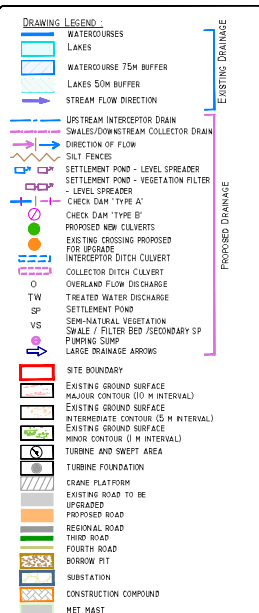
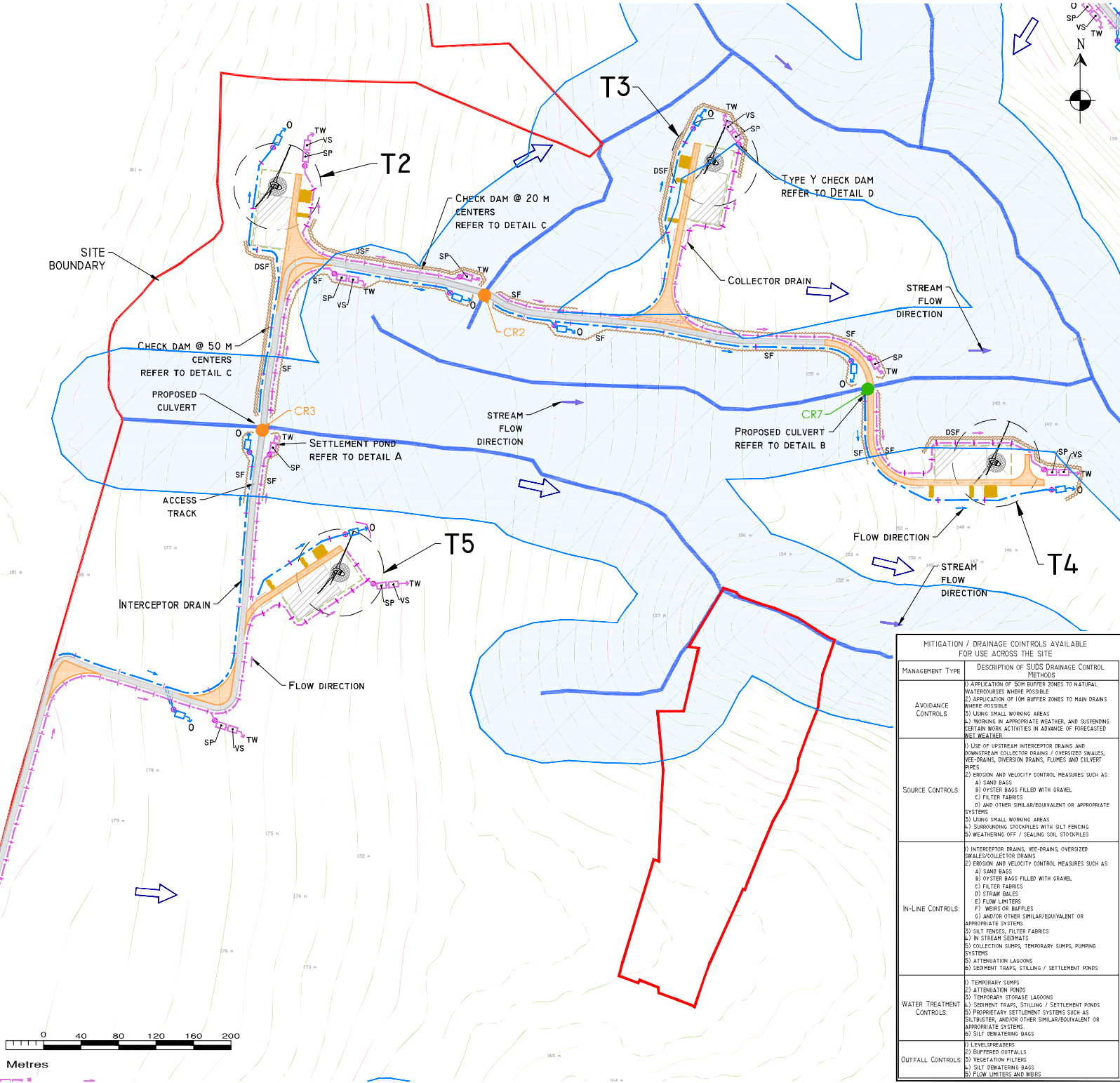
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

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.

MAINWORK NOTES:

1. DESIGN SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPOKE STAKES (SALES/SET FENCING) OR SIMILAR, TO BE STOKED ON SITE. THE LEVEL OF S.T. IN RITCHES DURING CONSTRUCTION TO BE MONITORED VISUALLY AND ACCESS WITH S.T. PINS IN ANY AREA TO BE RESPONSIBLE. MARKERS TO BE PLACED AT 10M INTERVALS, OR SIMILAR OF ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. PILE SILT SUBSTITUTION SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED. ALSO 3. SPOKE SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM REPAIRS SUCH AS THE REPAIRMENT OF STAKE SALES/SET 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 WORK. THIS IS TO BE AVOIDED BY PREVENTING THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT SURFACE WATER FLOWS. REGULAR CROSS DRAINS TO DISCHARGE TO FIELD DRAIN/DITCHES WITH REFERENCE TO TRANSFER / DRAINAGE CAPACITY WATER IN INTERCEPTOR DRAINS TO BE TRAPPED AT ALL POINTS.
6. DRAIN SWALES / DITCHES 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 W... NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF 50M TO ANY EXISTING WATERCOURSE WILL BE PROVIDED AROUND OPENINGS AND DISCHARGES. ALL PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. LAYERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND W... BE LEFT AS SUCH TO WEATHER WITH LOCAL STONES.
9. TRACK ROBE SWALES / DITCHES TO BE BUILT WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY. BED AND INFLATE SOURCE CONTROL TO BE INSTALLED. WHERE NECESSARY FIRST MAY BEEN DESIGNED IN CONNECTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO BEING BUILT.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURNING BAYS AND MAJOR STANDING AREAS. POND SIZES DEPENDING ON CATCHMENT AREA SERVICE. SLOPE POND SIZES GIVEN ON DRAWING D501.
11. STRAIN BARS / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND POND AREA TO PREVENT SILT FROM ENTERING POND. SILT FENCES MAY BE REMOVED WITH SUITABLE VEGETATION COVER BE ESTABLISHED.
12. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKING ZONES WITHIN ZONES OF USE OF ANY EXISTING / DISTURBED CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (SOIL / SOD) FROM EXCAVATIONS TO BE STORED SEPARATELY AND USED TO LINE SLOPES AND BARS OF SWALES / DITCHES OR CONTEMPORANEOUS VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
14. CHECK STRENGTH OF VEGETATION SLOPE TO BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WASHED / GEOLOGICALLY SIMILAR WASHED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, WHEN CHECK DAMS TO BE PROTECTED FROM WINDING WIND THROUGH THE PLACEMENT OF TIGHT STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY INSTALLING VEGETATION.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED AS APPROPRIATE. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. IF ANY CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND PLACED SEPARATELY TO 14M INTERVAL OR 3M.
17. SPACING AND FREQUENCY OF CHECK DAMS TO BE APPROPRIATE UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF FILTERS ON CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY REACHED AT A LATER DATE (POST COMPLETION OF THE FLOWING WASH AND SANDING WORK ONLY). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
19. SILT TRAPS SHOULD BE STORED WITHIN BUNDLED CONTAINMENT STRUCTURE.
20. SILT BASS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE POINTS. SILT BASS TO BE USED ON SITE AT FIELD DRAIN DISCHARGE POINTS.



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Job: **LYBENCARRIGA W/F, Co. WATERFORD/Co. CORK**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D103**

Drawing No: **P1453-0-0121-A1-D103-00A**
Sheet Size: **A1** Project No: **P1453-0**
Scale: **1:2,000 (A1)** Drawn By: **MG/GD**
Date: **04/01/2021** Checked By: **MG**

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"> 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 SURROUNDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WEATHER |
| SOURCE CONTROLS: | <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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 SOIL STOCKPILES |
| IN-LINE CONTROLS: | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) STRAW BALES E) FLOW LIMITERS F) NETS OR BAFLES G) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENTION LAGOONS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| WATER TREATMENT CONTROLS: | <ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) ATTENTION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SULTREX, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 6) SILT DRAINING BAGS |
| OUTFALL CONTROLS: | <ol style="list-style-type: none"> 1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DRAINING BAGS 5) FLOW LIMITERS AND WEIRS |

POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROCEDURES ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SLURTING 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.

EXCAVATIONS:

4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGE TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 50M 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 DRENCH/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 VELOCITY 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 USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURNING BACK 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.

SILT TRAPS:

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.

REVEGETATION:

13. REVEGETATION OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REVEGETATION 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:

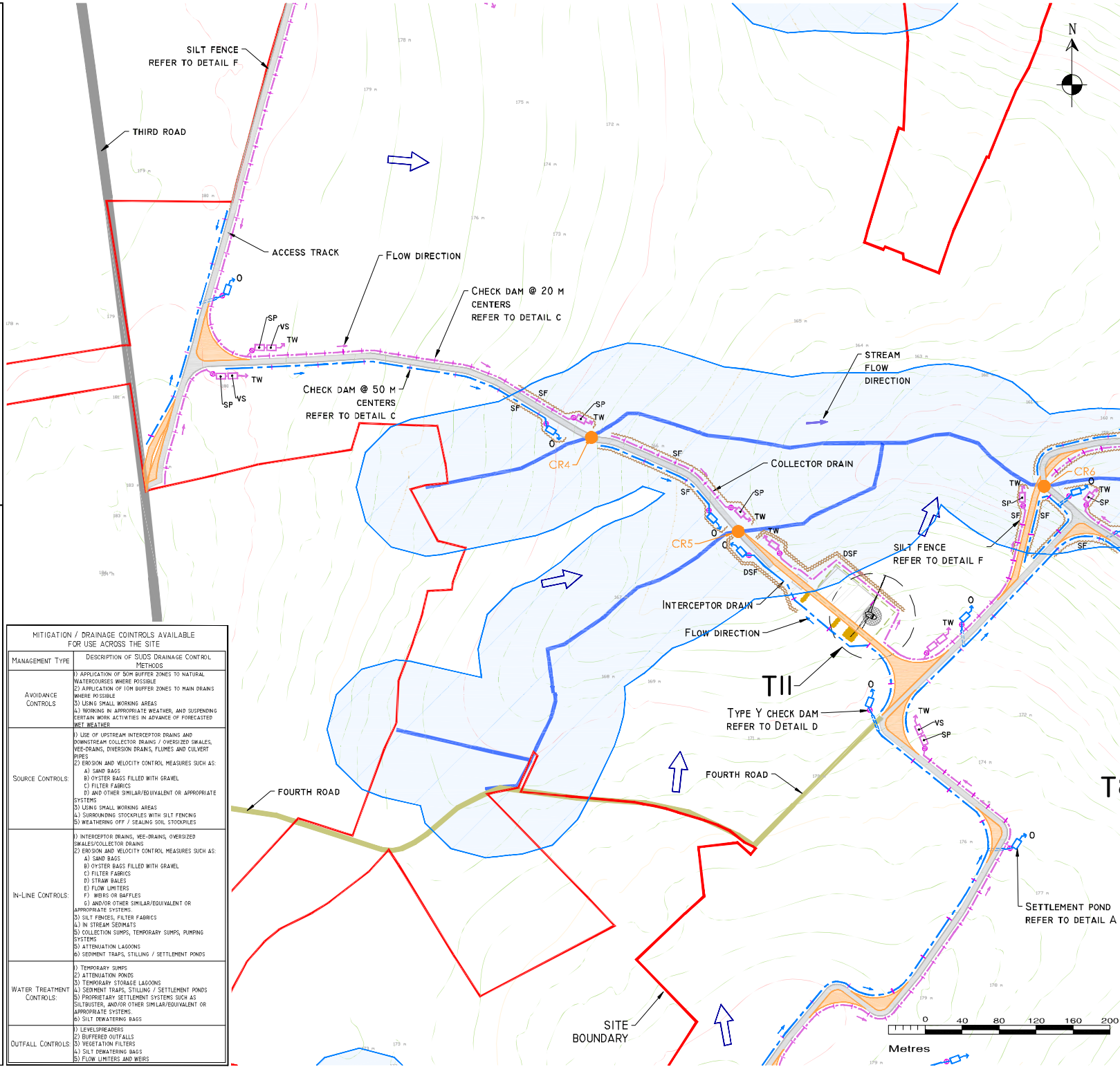
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

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.

MAINTAIN - NOTES:

1. SOILWATER POLLUTION DURING DESIGN AND CONSTRUCTION TO ENHANCE THE SITE'S CAPACITY TO FILTER POLLUTANTS (S.E. BY OTHERS).
2. SPILLAGE FROM EXCAVATION OR OTHER ACTIVITIES TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND FORWARDED TO THE RELEVANT AUTHORITIES. POLLUTION PREVENTION SYSTEMS TO BE AVAILABLE ON SITE FOR USE AS REQUIRED. ALSO
3. SLOPE SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS, IN ORDER TO PREVENT SILT FROM ENTERING THE TRACKS AT THE POINT OF STOPPING DRAINAGE INTO OR ON THE APPROVED METHOD OR BEST PRACTICE 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. EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED ARE THE CONSIDERATION AT ALL TIMES.
4. SUITABLE PREVENTION MEASURES TO 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 FLOW, FILLABLE CROSS DAMS / CHECKDAMS TO BE USED TO REDUCE FLOW VELOCITY, TO PREVENT EROSION OF CHANNELS AND TO PREVENT SILT FROM ENTERING MAIN DRAINS OR WATERCOURSES.
6. TRACK SIDE SWALES / DITCHES TO BE CONSTRUCTED WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY AND IMPROVE SOURCE CONTROL OF SILT CONVEYANCE. UNDER APPROPRIATE WEATHER CONDITIONS IN CONJUNCTION WITH SETTLEMENT PONDS AND S.T TRAPS, PRIOR TO RECEIVING WATER.
7. SETTLEMENT PONDS TO BE CONSTRUCTED FOR S.T. REMOVAL AT TURNING BACKS AND MAIN S.T. AREAS. POND SIZE DEPENDING ON CATCHMENT AREA SERVED. SAND POND SIZES OR GRADIENTS DSOI.
8. STRAW BALES / OR SIMILAR AND S.T. FENCES TO BE USED ALSO AROUND SITE WELLS TO PREVENT SILT FROM ENTERING WELLS THAT MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
9. SILT FENCES TO BE PROVIDED AROUND EDGE OF EXISTING WATERCOURSES WHERE PONDING OCCURS WITHIN REACH OF ANY EXISTING OR PROPOSED CHANNELS.
10. SLOPES OF THE SWALES / DITCHES TO BE REVEGETATED OR PROTECTED FROM BROODEN UNTIL VEGETATION HAS BEEN ESTABLISHED. 50% PROPOSED VEGETATION LAYER (SOI / SORAW) FROM EXCAVATIONS TO BE STORED LOCATED AND USED TO LINE SLOPES AND BANKS OF DRAINS / DITCHES OR LONGITUDINAL MOUND OF VEGETATION SWALES AT FLOOD DRAIN DISCHARGE POINTS.
11. AREAS OUTSIDE OF VEGETATION S.W. TO BE KEPT TO A MINIMUM.
12. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / LOCALS CALLED 'SPRAY WELL' GRADE STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE 20-40MM. CLEAN STONE CHECK DAMS ON SLOPING SECTIONS OF THE ACCESS TRACKS. WHEN CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE ACCEPTANCE OF LOW STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY VEGETATION IN GULLWAYS.
13. STONE OF SILT LEVELS AT CHECK DAMS TO BE PROVIDED AND DISPOSED OF APPROPRIATELY. SILT TRAPS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PERIOD. VISUAL CHECK DAMS SHOULD BE COVERED WITH SILT OF VEGETATION. STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
14. SPACING AND PROTECTION OF CHECK DAMS TO BE APPROPRIATE UPON LONGITUDINAL GRADIENT OF SWALE.
15. LOCATION OF FILTERATION CHECK DAMS (E. EQUIPPED) TO BE KEPT ON SITE WITH EXISTING SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY BY PASSED AT A LATER DATE (POST COMPLETION OF THE TURBINE AND WINDMILL FOUNDATION) ONLY SUITABLE MATERIALS TO BE USED FROM THE POND. SILT TRAPS TO BE PROVIDED ON THE DOWNHILL SIDE OF THE POND.
16. SILT BAGS SHOULD BE STORED WITHIN BUNDED GOVERNMENT STRUCTURES.
17. SILT BAGS WILL BE USED ON SITE AT FLOOD DRAIN DISCHARGE LOCALS AS REQUIRED.



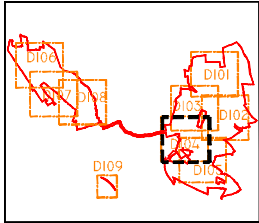
| MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE | |
|--|---|
| MANAGEMENT TYPE | DESCRIPTION OF SUDD'S DRAINAGE CONTROL MEASURES |
| Avoidance Controls | <ol style="list-style-type: none"> 1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING GREEN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER |
| Source Controls | <ol style="list-style-type: none"> 1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLAMES AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ul style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING SOIL STOCKPILES |
| In-Line Controls | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ul style="list-style-type: none"> 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) BUFFERED OUTFALLS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING SOIL STOCKPILES 6) ATTENTION LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| Water Treatment Controls | <ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) ATTENTION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILLUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 6) SILT Dewatering BAGS |
| Outfall Controls | <ol style="list-style-type: none"> 1) LEVEL SPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT Dewatering BAGS 5) FLOW LIMITERS AND WEIRS |

DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCE
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- LEVEL SPREADER
- CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR GRADE
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SEM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- FIRMING SUNG
- LARGE DRAINAGE ARROWS

SYMBOLS:

- SITE BOUNDARY
- EXISTING GROUND SURFACE MAJOR CONTOUR (10 M INTERVAL)
- EXISTING GROUND SURFACE INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEET AREA
- TURBINE FOUNDATION
- CRANE PLATFORM
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROAD
- REGIONAL ROAD
- THIRD ROAD
- FOURTH ROAD
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- NET MAST



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| Date | Description | Chkd | Signed |
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Job: LYBENACARRIGA W/F,
Co. WATERFORD/Co. CORK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D104

Drawing No: PI 453-0-0121-A1-D104-00A
Sheet Size: A1
Scale: 1:2,000 (A1)
Date: 04/01/2021

Project No: PI453-0
Scale: 1:2,000 (A1)
Drawn By: MG/GD
Checked By: MG

POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT MEASURES ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, EROSION 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 DRAINING AND ETTCHES.
- 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 ETTCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINAGE DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE EROSION OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITY OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
 8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EVALUATIONS

9. 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 TIREMINE 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 PLATFORM CHECK DAMS WILL REDUCE SILT RUNOFF WATER AS REQUIRED.
12. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REVEALING

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

CONCRETE

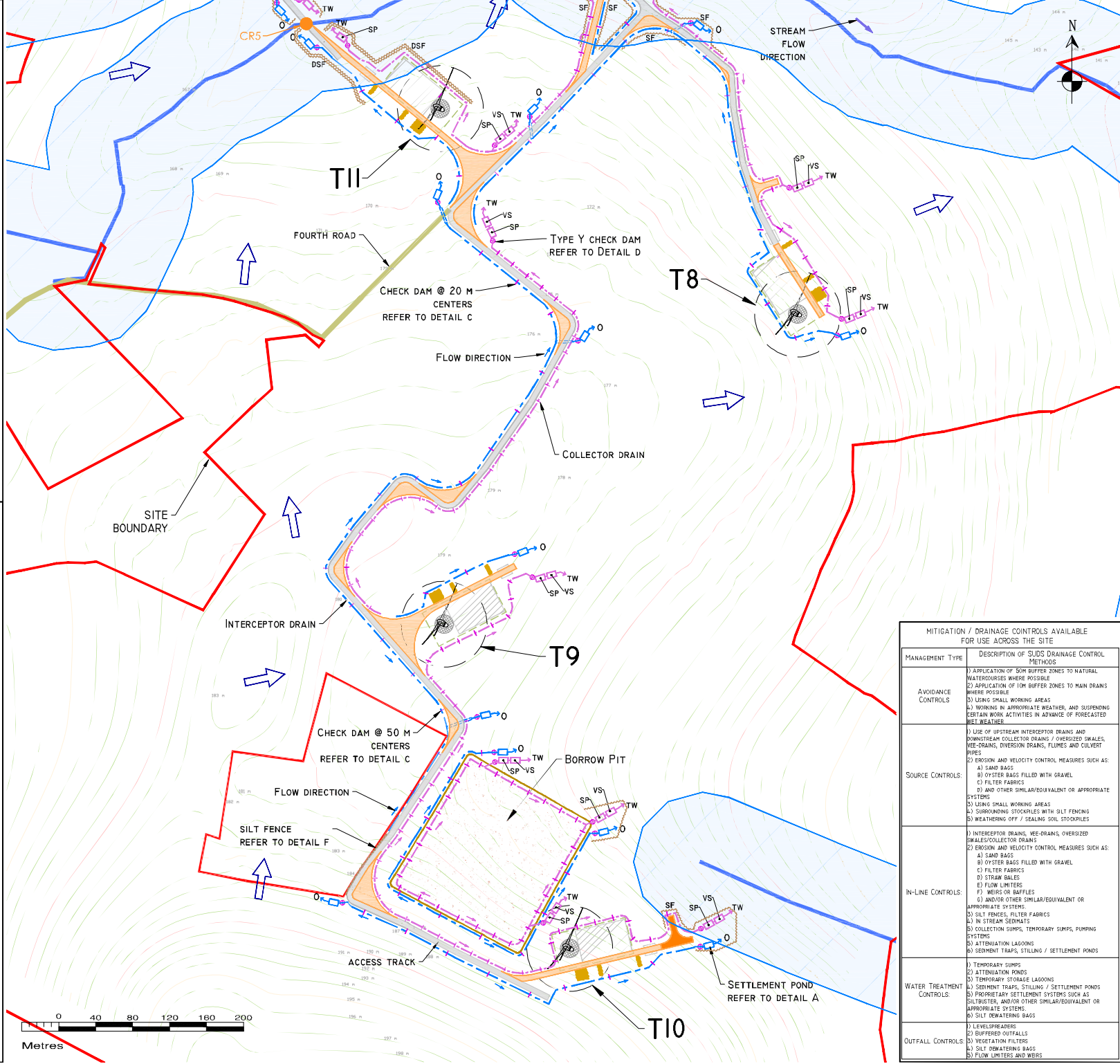
15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
16. CONCRETE WASH WATER AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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.

MAINTENANCE NOTES:

1. DESIGN SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPRINK STRIPS SHALL BE ERECTED OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF S.I.T IN RILICH" EARTH CONSTRUCTION ON BE TO BE MONITORED VISUALLY AND ACCESS WITH T.I.F.F.S IN ANY AREA TO BE RESPONSIBLY MAINTAINED BY "SLASHING SILT FENCES, STRAW BALES, OR SIMILAR OF ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. POSSIBLE ALTERNATIVE SYSTEMS TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED (E.G. S.I.T. SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS, DRAINAGE MEASURES SUCH AS THE "IN" OF SILT TRAP/SILT FENCE/SILT FENCE/SILT FENCE/SILT FENCE 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 WORK AND IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
3. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT SURFACE WATER "FLOODS, REGULAR CROSS-DRAINS / DISCHARGE TO FIELD DRAINAGE DRAINS WITH REFERENCE TO "TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO AN "ADDED / S.I.T. (OR AN "ADDED POINT).
4. DRAINAGE SWALES / DITCHES TO BE LOCATED ALONG THE ACCESS TRACKS, TRACK CROSS-DRAINS TO BE LOCATED ALONG THE 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 RE-ENTER DIRECTLY INTO EXISTING WATERCOURSES.
5. WHERE POSSIBLE, A BUFFER ZONE OF 20M TO ANY EXISTING WATERCOURSE WILL BE PROVIDED AND OVERLAND DISCHARGE OFF PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
6. LAYERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS SUCH TO RE-VEGETATE WITH LOCAL SPECIES.
7. TRACK SIDE SWALES / DITCHES TO BE BUILT WITH PROTECTED GRASS MATS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE EROSION. SEE NOTES ON POLLUTION PREVENTION.
8. SUBSTANTIAL VEGETATION MUST BE REMOVED PRIOR TO CONSTRUCTION. WHERE NECESSARY FIRST ANY REPTILES OR AMPHIBIANS IN CONTACT WITH SETTLEMENT PONDS AND SILT TRAPS PRIOR TO REMOVAL.
9. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURNING BARRIERS AND MAJOR STAKE AREAS. POND SIZES DEPENDING ON "CATCHMENT" AREA SERVICE. SUMPED POND SIZES SHOWN ON DRAWING D100.
10. STRAW BALES / OR SIMILAR SILT FENCES TO BE USED ALSO AROUND STOCKPILES TO PREVENT EROSION. SILT FENCES WILL BE REMOVED WITH SUITABLE VEGETATION COVER BE ESTABLISHED.
11. SILT FENCES TO BE PROVIDED AROUND EDGE OF EXISTING WATERCOURSE WHERE WORKING ZONES WILL BE OPEN TO ANY RISK OF EROSION CHANNELS.
12. SCHEDULES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. PROTECTED VEGETATION LAYER (E.G. "SOY" OR "SRAW") FROM EXCAVATIONS TO BE STORED "LOCALLY" AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR "CONTEMPORANEOUS" VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
13. CHECK STRIPES OF VEGETATION SHALL BE KEPT TO A MINIMUM.
14. CLEAN STOCKPILE CONTROL CHECK DAMS TO BE MADE OF "LOCAL WOOD" OR "GEOLOGICALLY" SIMILAR WOODEN STONE. AGGREGATE SIZE FOR STOCKPILE CHECK DAMS TO BE "TYPICAL" COARSE CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, CHECK DAMS TO BE PROTECTED FROM WINDING WINDY THROUGH THE "ELEMENT" OF WOOD STONE TO THE DOWNHILL FACE OF THE CHECK DAM AND BY "WINDING" WINDY VEGETABLE.
15. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED AS APPROPRIATELY. S.I.T. LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN Ongoing DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. IF ANY CHECK DAMS AREN'T DISCHARGE WITH SILT OF VEGETATION, STOCK CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE "REMOVAL OF SILT".
16. CHECK DAMS AND FREQUENCY OF CHECK DAMS WILL BE APPROPRIATE UPON LONGITUDINAL GRADIENT OF SWALE.
17. LOCATION OF "HATCH" ON CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A HANDY WHERE THEY MAY BE EASILY RE-LEAD AT A LATER DATE (POST COMPLETION OF THE "RELEVANT" WASH AND DRAINAGE CONTROL ONLY). ONLY SUITABLE MATERIALS BACKFILL FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
18. OIL TROL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURE.
19. SILT BASS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE (E.G. 20M AS I.C. 20M).

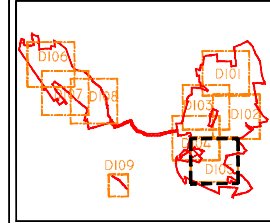


DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- LEVEL SPREADER
- CHECK DAM TYPE 'A'
- CHECK DAM TYPE 'B'
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR SWALES
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SEM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- FIRMING SUMP
- LARGE DRAINAGE ARROWS

EXISTING DRAINAGE

- SITE BOUNDARY
- EXISTING GROUND SURFACE
- MAJOR CONTOUR (10 M INTERVAL)
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEET AREA
- TURBINE FOUNDATION
- CRANE PLATFORM
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROAD
- REGIONAL ROAD
- THIRD ROAD
- FOURTH ROAD
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- NET MAST



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| Revisions | | | |

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Job: LYBENCARRIGA W/F, Co. WATERFORD/Co. CORK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D105

Drawing No: P1453-0-0121-A1-D105-00A
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Checked By: MG

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 |
| SOURCE CONTROLS: | 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) LONG SMALL WORKING AREAS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING SOIL STOCKPILES |
| IN-LINE 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 BARRIERS G) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENTION LAAGONS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| WATER TREATMENT CONTROLS: | 1) TEMPORARY SUMPS 2) ATTENTION PONDS 3) BUFFERED STORAGE LAAGONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS CULVERTS, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 6) SILT DEWATERING BAGS |
| OUTFALL CONTROLS: | 1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS |

POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROCEDURES 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 DRENCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN BERM/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 VELOCITY OR BY USE OF CRASH 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 USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE ARISING THROUGH BANK EXCAVATIONS.

FENCES AND STOCKPILES

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

SILT TRAPS

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

REPAIRS

13. REPAIRING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REPAIRING AREAS ONLY, PREFERABLY IN 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 STOPPED 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 REMEDIATION CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

2-MANHOLES NOTES:

1. ROADWAY SPP USING SES ON AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPACE STAIN BRISLEY FENCING OR SIM. A2, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXPOSURE TO SILT FIVE (5) IN ANY AREA TO BE TEMPORARILY FENCED TO PREVENT SILT FLOW. STRAW BALES / OR SIMILAR OR A300 ORAL CHECK DAMS AT THE PROBLEM AREA. POSSIBLE SILT TRAP SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
3. SLOPE SYSTEM TO BE CONSTRUCTED PRIOR TO OR AT THE SAME TIME AS THE ACCESS TRACKS, WITHIN HEADINGS SUCH AS THE "A" SECTION OF STRAW BALES/SILT FENCING OR SIMILAR APPROVED METHOD OR SILT TRAP CHECK DAMS AND 5-1 FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORKER CARRIED UP TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH SILT CONVEYANCE BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUTHERLY FERTILISATION SHOULD BE USED AS A MEASURE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR SWALES / DRENCHES TO BE USED TO COLLECT SURFACE WATER FLOWS, REGULAR CROSS DRAINS / JOGGING TO FIELD DRENCHES/STRAINS TO BE PROVIDED TO TRANSFER / DISCHARGE RUNOFF WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
6. ORIGINAL SWALES / DRENCHES TO BE MAINTAINED AS FAR AS POSSIBLE. ACCESS TRACKS, TRACKS, TRACKS AND DRENCHES TO BE CHECKED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DRENCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE OWNER AS ITS SURFACE WATER WILL NOT BE ALLOWED TO FLOW-WAY DIRECTLY INTO EXISTING WATERCOURSES.
7. WHERE POSSIBLE, A BUFFER ZONE OF 200m TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVERLAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
8. BATTERS OF ALL PROPOSED SWALES / DRENCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DRENCH AND WILL BE LEFT AS SUCH TO REVERSE AT THE LOCAL SLOPES.
9. TRACK SIDE SWALES / DRENCHES TO BE ALLOWED WITH HOEDRATED GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE MAY BE RELOCATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO COMMENCEMENT.
10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR 6 T REMOVAL AT TURNING BAYS AND HARD STAND AREAS. POND SIZES DEPENDING ON CATCHMENT AREA SHOULD SAMPLE POND PRESSURE ON EXISTING DRAIN.
11. STRAW BALES / OR SIMILAR OR S-T FENCES TO BE USED ALSO AND NON-SOIL WASHES TO BE USED TO REDUCE SILT FLOWS AND TO BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
12. S-T FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSES WHERE WORKS OCCUR WITHIN 50M OF ANY EXISTING STREAM CHANNELS.
13. SLOPES OF THE SWALES / DRENCHES TO BE CHECKED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATION LAYER (SOIL OR SCORUM) FROM EXCAVATION TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BATTERS OF SWALES / DRENCHES OF LONGITUDINAL CHANNELS OF VEGETATION SWALES AT FLOOD DRAIN EXCHANGE POINTS.
14. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
15. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY SOWN / RELOCATED/SHOWN WELL-GRADED STONE. AGGREGATE SIZE FOR S-T ONE CHECK DAMS TO BE 75mm TO 150mm. CLEAN STONE. CHECKING SECTION OF THE ACCESS TRACKS, LOWER CHECK DAMS TO BE INSPECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100% STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WEATHERING IN GEOTECHNICAL.
16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE MONITORED AND REPORTED APPROPRIATELY. SILT JAMS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WASH DAMS DAMS SHOULD BE COVERED WITH SILT OF VEGETATION. STONE CHECK DAMS TO BE REMOVED AND REPLACED WITH SILT / H. FLOWERS OF SILT.
17. SPACING AND FREQUENCY OF CHECK DAMS TO BE APPROPRIATE UPON LONGITUDINAL GRADIENT OF SWALE.
18. LOCATION OF STATION CHECK DAMS (EQUIPPED TO BE REMOVED) ON SITE WITH ENGINEER. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INSTALLED AT A LATER DATE (POST COMPLETION OF THE LAMBRE WASH AND HANDBOOK CONTINGENCY). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE INTERIOR AROUND THE POND.
19. OIL TRAP SHOULD BE STORED WITHIN BOUNDARY CONTAINMENT STRUCTURES.
20. S-T DAMS WILL BE USED ON SITE AT FIELD RAIN DISCHARGE LOCATIONS, AS REQUIRED.

| 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"> 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. |
| SOURCE CONTROLS | <ol style="list-style-type: none"> 1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, WE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> 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) WEATHERS OFF / SEALING SOIL STOCKPILES |
| IN-LINE CONTROLS | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, WE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> 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 LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| WATER TREATMENT CONTROLS | <ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 6) SILT DEWATERING BAGS 7) LEVEL SPREADERS 8) BUFFERED OUTFALLS 9) VEGETATION FILTERS 10) SILT DEWATERING BAGS 11) FLOW LIMITERS AND WEIRS |
| OUTFALL CONTROLS | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> 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 LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |

SETTLEMENT POND REFER TO DETAIL A

CHECK DAM @ 20 M CENTERS REFER TO DETAIL C

CHECK DAM @ 50 M CENTERS REFER TO DETAIL C

TYPE Y CHECK DAM REFER TO DETAIL D

REGIONAL ROAD

ACCESS TRACK

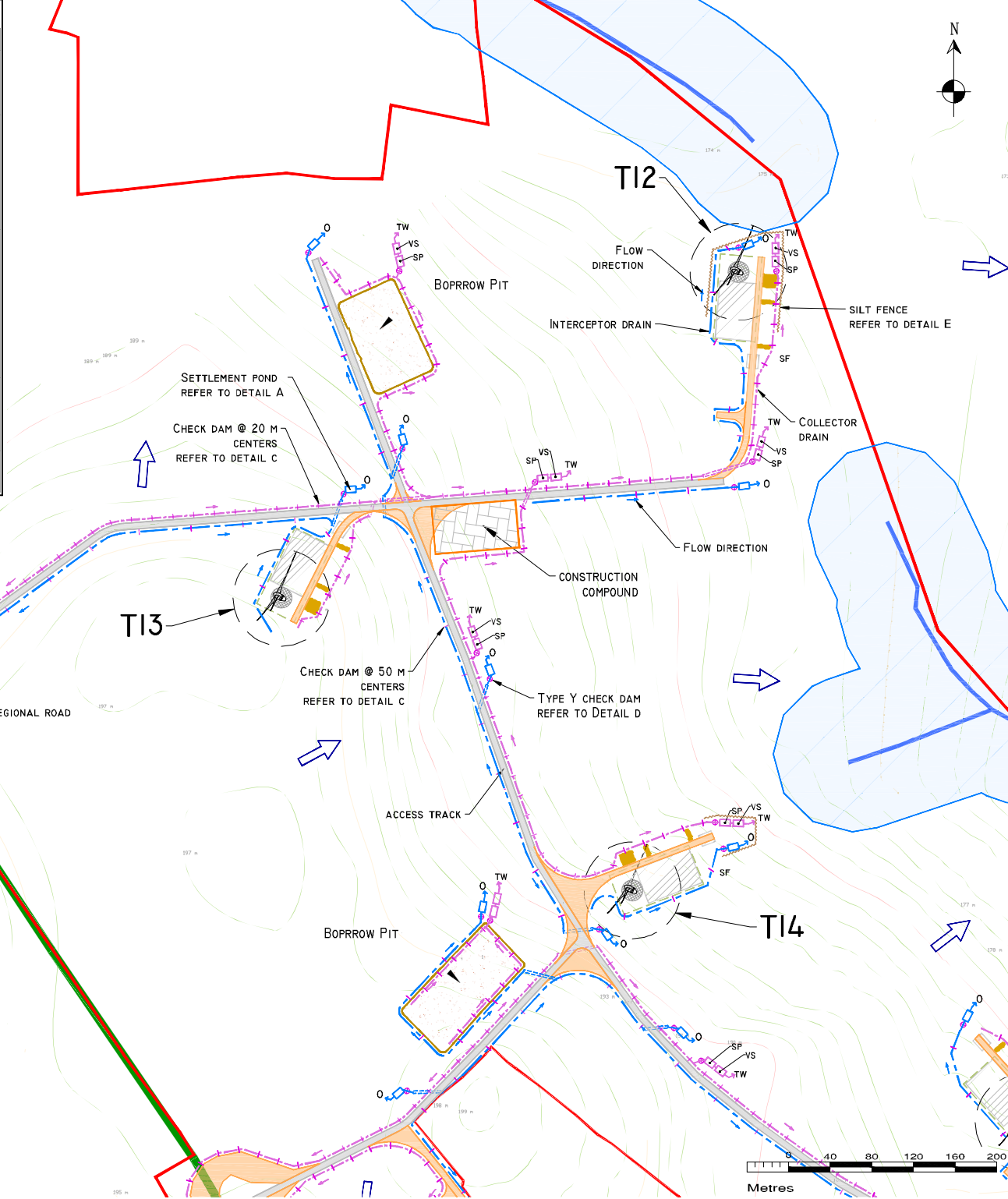
CONSTRUCTION COMPOUND

BOPPROW PIT

T12

T13

T14



DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALE/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCES
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- LEVEL SPREADER
- CHECK DAM TYPE 'A'
- CHECK DAM TYPE 'B'
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR SWALE
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- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SEMI-NATURAL VEGETATION SWALE / FILTER BED (SECONDARY SP)
- LARGE DRAINAGE AREAS
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- THIRD ROAD
- FOURTH ROAD
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- SUBSTATION
- CONSTRUCTION COMPOUND
- MET MAST

KEY PLAN:

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| Date | Description | Chkd | Signed |
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Title: PROPOSED DRAINAGE LAYOUT

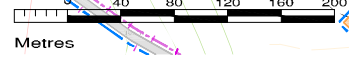
Figure No: D106

Drawing No: P1453-0-0121-A1-D106-00A

Sheet Size: A1 Project No: P1453-0

Scale: 1:2,000 (A1) Drawn By: MG/GD

Date: 04/01/2021 Checked By: MG



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PERSONNEL ARE ADVISED TO ENFORCE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, EROSION 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 MHEEL 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 FILTERS PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAIN/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE EROSION OR SILT AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITY 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 USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURNING BACK 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.

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

- REVEGETATION:**
13. REVEGETATION OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REVEGETATION AREAS ONLY. PREFERENCE FOR AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
 14. SPLITS AND SHIP TRACKS 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.

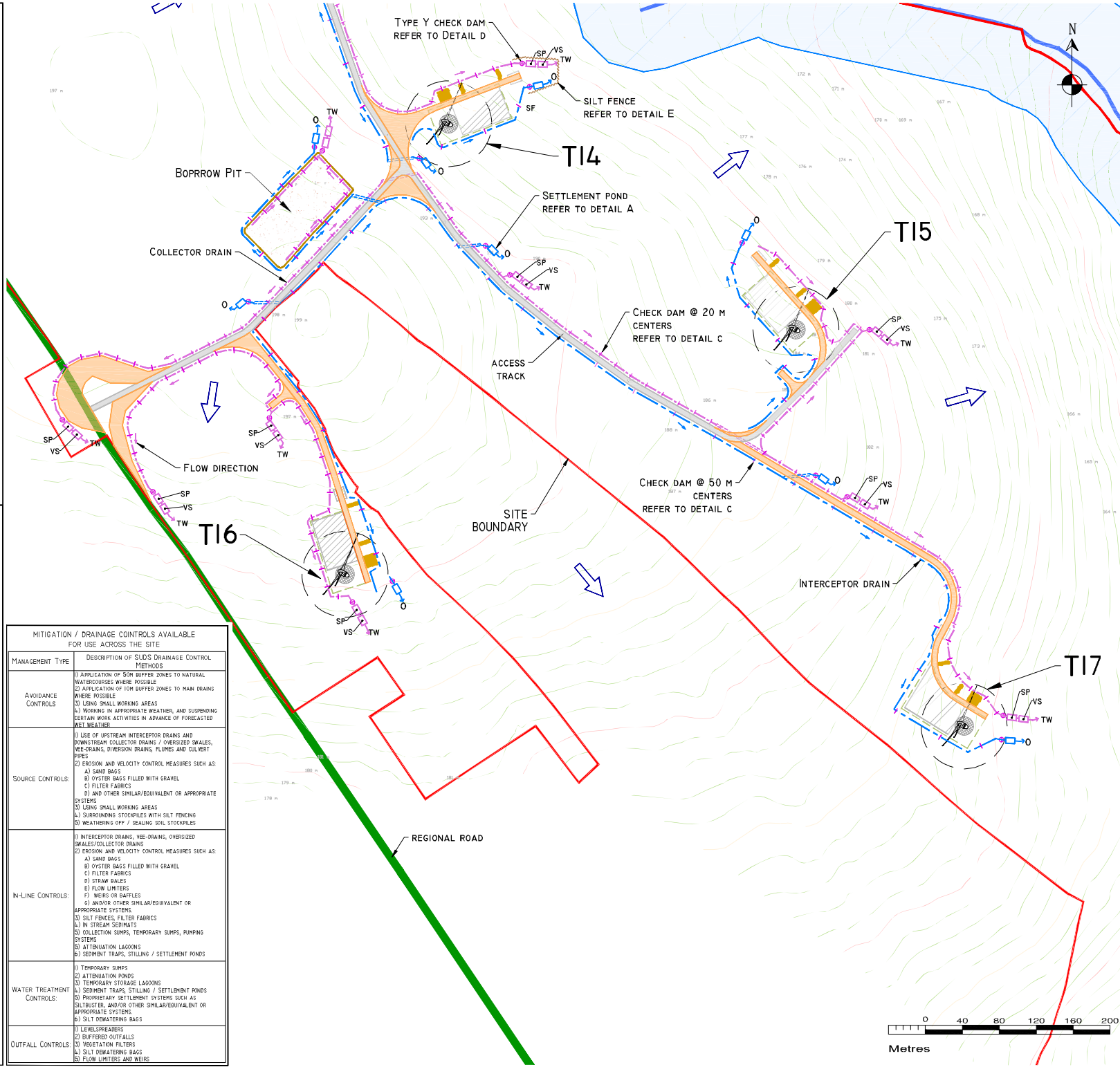
IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

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.

- REVISION NOTES:**
1. DESIGN SURFACING DESIGN AND CONSTRUCTION TO ENHANCE THE STABILITY OF SLOPES (U.S. BY OTHERS).
 2. SPRING STONE SWALES/STOCKPILES OR EMBANKMENT TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND ACCESS TO SILT TRAPS IN ANY AREA TO BE TEMPORARILY MAINTAINED BY PLACING SILT TRAPS, STRAW BALES, OR SIMILAR OF ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. PROTECT SILT TRAP SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED.
 3. SILT TRAP SYSTEM TO BE CONSTRUCTED PRIOR TO OR AT THE SAME TIME AS THE ACCESS TRACKS, DRAINAGE DITCHES SUCH AS THE PROTECTIVE OF STRAW BALES/SILT FENCES/VEGETATION FILTERS OR ADDITIONAL CHECK DAMS AND SILT FENCES. TO BE IMPLEMENTED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH WORKED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
 4. SUFFICIENT PROPORTION OF CHECK DAMS 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-CLEANING AND DISCHARGE TO FIELD DRAIN/DITCHES WITH AN INTERCEPTOR TO TRIGGER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAIN TO FIELD DRAIN AT ALL POINTS.
 6. DRAINAGE SWALES / DITCHES TO BE LAKELAND ADAPTED TO 10% ACCESS TRACKS, TRACK 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 IS NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
 7. WHERE POSSIBLE, A BUFFER ZONE 3' TO 5' TO ANY EXISTING WATERCOURSE WILL BE PROVIDED WHERE OVER- AND DISCHARGE ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
 8. SPACING OF ALL PROPOSED SWALES / DITCHES TO HAVE A SPACING OF BETWEEN 1 : 5 TO 1 : 2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS SUCH TO 10% OF THE RAINFALL LOCAL 5-DAY.
 9. TRACK SIDE SWALES / DITCHES TO BE BUILT WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY AND TO BE SPACED CONTROL OF SILT CONVEYANCE. WHERE NECESSARY, FIRST WASH AREAS SHOULD BE IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO RECEIVING WATERCOURSES.
 10. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURNING BACKS AND ROAD STAND AREAS. POND DEPTH DEPENDING ON CATCHMENT AREA SERVED. SWALES/PODS SHOULD BE DESIGNED TO 10% STRAIN BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SITE. MAX 5' TO 10' IN HEIGHT. SILT FENCES MAY BE REMOVED WITH SUITABLE VEGETATION COVER BE ESTABLISHED.
 11. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSES WHERE WORKS CONVEYANCE OF SILT TO ANY EXISTING WATERCOURSES CHANNELS.
 12. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATION LAYER (SOIL / SPOIL) FROM EXCAVATIONS TO BE STORED 'CLOSED' AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR CONSTRUCTION OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
 13. AREAS OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
 14. CLEAR STRIPPED 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 'MEDIUM' TO 'LOW' CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, WOOD CHECK DAMS TO BE PROTECTED FROM WINDING AWAY THROUGH THE 'CLEARANCE' OF WOOD STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY INSTALLING VEGETATION.
 16. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSAL OF A PROPORTION. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF A CRONOGRAM BASED MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WASH DAMS SHOULD BE CHECKED WITH SILT OF VEGETATION STONE CHECK DAMS TO BE REMOVED AND PLACED SUBSEQUENT TO THE REMOVAL OF SILT.
 17. SPACING AND POSITIONING OF CHECK DAMS WILL BE APPROPRIATE UPON LONGITUDINAL GRADIENT OF SWALE.
 18. LOCATION OF INTERCEPTOR DAMS (OR EQUIVALENT) 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-CONSTRUCTION) OF THE URBAN WASH AND DRAINAGE CONDUCTIONS. ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMPANMENT AROUND THE POND.
 19. SILT TRAP SHOULD BE SPACED WITHIN BUNDED CONVEYANCE STRUCK AREA.
 20. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE AREA. BAGS TO BE 50% FULL.



| MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE | |
|--|---|
| MANAGEMENT TYPE | DESCRIPTION OF SLEDS DRAINAGE CONTROL METHODS |
| Avoidance Controls | <ol style="list-style-type: none"> 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 |
| Source Controls | <ol style="list-style-type: none"> 1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLOWS AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) LONG SMALL WORKING AREAS 4) SURROUNDING STOCKPILES WITH SILT FENCING 5) WEATHERING OFF / SEALING SILT STOCKPILES |
| In-Line Controls | <ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) STRAW BALES E) FLOW LIMITERS F) WEIRS OR BARRIERS 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 LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| Water Treatment Controls | <ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS CULVERTS, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 6) SILT DOWNSWEEP BAGS |
| Outfall Controls | <ol style="list-style-type: none"> 1) LEVEL SPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DOWNSWEEP BAGS 5) FLOW LIMITERS AND WEIRS |

DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSWEEP STREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR UPGRADE
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- SETTLEMENT POND
- SEM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- FIRMING SUMP
- LARGE DRAINAGE ARROWS

EXISTING DRAINAGE

- SITE BOUNDARY
- EXISTING GROUND SURFACE
- MAJOR CONTOUR (10 M INTERVAL)
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEET AREA
- TURBINE FOUNDATION
- CRANE PLATFORM
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROAD
- REGIONAL ROAD
- THIRD ROAD
- FOURTH ROAD
- BORROW PIT
- CONSTRUCTION COMPOUND
- MET MAST

KEY PLAN

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Revisions

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Title: PROPOSED DRAINAGE LAYOUT

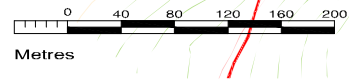
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Drawing No: PI 453-0-0121-A1-D107-00A

Sheet Size: A1 Project No: PI453-0

Scale: 1:2,000 (A1) Drawn By: MG/GD

Date: 04/01/2021 Checked By: MG



POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROCEDURES ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, EROSION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - 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 SPADING AND DITCHES.
- 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.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE BIFURCS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRENCH/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 VELOCITY OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROL.
 - VEGETATION WILL NOT BE STOPPED FROM EXISTING DRENCH/DITCHES UNLESS ABSOLUTELY NECESSARY.

- 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.

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

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

- REVEALING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRENCHES / DITCHES AND WATERCOURSES / WATERBODIES.
 - SPLATTER AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

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

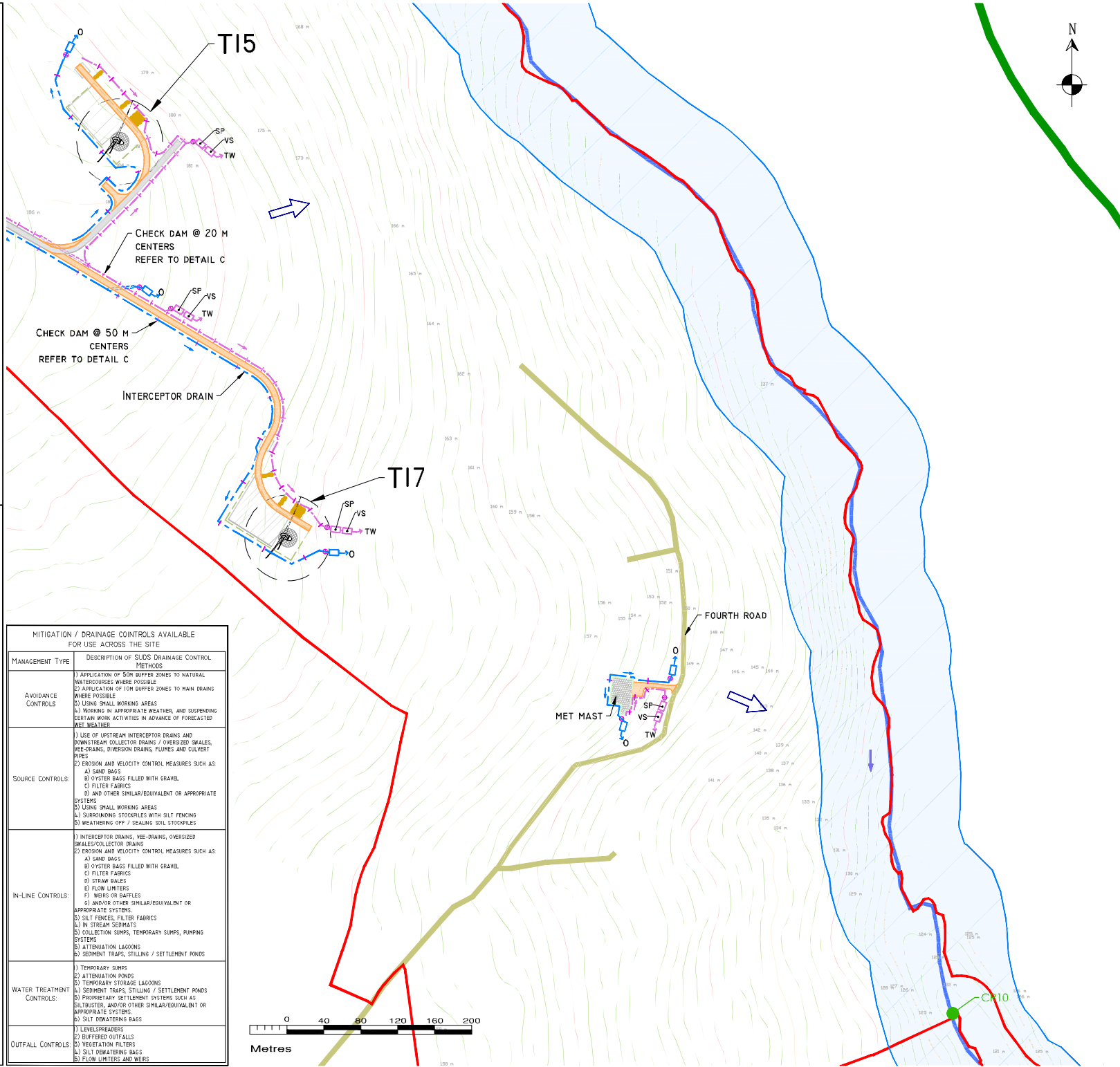
IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

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.

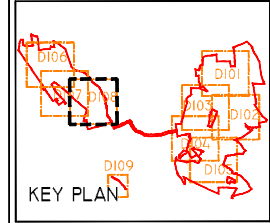
NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

- DESIGNATION NOTES:**
- SUBWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
 - SPACE STABILISED SUBSOLIDIFIED SOILS TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND PROVISION FOR SILT TRAPS IN ANY AREA TO BE TEMPORARILY PROVIDED BY PLACING SILT FENCES, STRAW BALES, OR SIMILAR TO ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. THE SILT TRAP SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED.
 - SILT TRAP SYSTEM TO BE CONSTRUCTED PRIOR TO OR AT THE SAME TIME AS THE ACCESS TRACKS. OTHER MEASURES SUCH AS THE PROVISION OF STORM DRAINAGE/STORM DRENCHES APPROVED METHOD OR ADJUSTABLE 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 BE NOT GENERATED DURING THE CONSTRUCTION PHASE.
 - STORM DRAINAGE/STORM DRENCHES TO BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
 - INTERCEPTOR SWALES - DRENCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD WATERCOURSES OR TO FIELD DRENCHES TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRENCHES TO NATURAL WATERCOURSES.
 - STRAW BALES / BURLAPS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DRENCHES. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE NEAREST SURFACE WATER BODY. NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
 - WHERE POSSIBLE, A BUFFER ZONE OF 250M TO ANY EXISTING WATERCOURSE WILL BE PROVIDED WHERE OPEN AND DISCHARGE OF PROPOSED FROM ACCESS TRACK SWALES / DRENCHES.
 - LOCATIONS OF ALL PROPOSED SWALES / DRENCHES TO HAVE A SLOPE OF BETWEEN 1:15 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DRENCH AND TO BE LEFT AS SUCH TO RE-VEGETATE WITH LOCAL SPECIES.
 - TRACK SIDE SWALES / DRENCHES TO BE SLOPED WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITY AND TO PREVENT SOURCE CONTROL OF SILT CONVEYANCE. WHERE NECESSARY TEST HAVE BEEN PERFORMED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS PRIOR TO RECONSTRUCTION.
 - SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND MAIN STAIR AREAS. POND SIZE DEPENDING ON CATCHMENT AREA SERVED. SWALE/POND SIZES SHOWN ON DRAWING DS01.
 - STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SITE WASH AREAS TO PREVENT SILT FLOWS FROM BEING REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
 - SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORK CONDUCTED WITHIN BUFFER ZONE OF ANY TYPE OF EXISTING CHANNELS.
 - LOCATIONS OF SWALES / DRENCHES TO BE VEGETATED OR PROTECTED FROM BROODER LATER VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (E.G. "SO" OR "SOM") FROM EXCAVATIONS TO BE STORED SEPARATELY AND USED TO REVEGETATE SLOPES AND BANKS OF SWALES / DRENCHES OR LONGITUDINAL BORDERS OF VEGETATION SWALES AT FIELD SPADING DISCHARGE POINTS.
 - AREAS SUBJECT TO VEGETATION SHALL BE KEPT TO A MINIMUM.
 - CLEAN STORE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / COLLECTED "SMALL WELL WASHED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICAL OF LOW CLEAR STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH PROVISION OF STORM DRENCHES TO THE DOWNHILL FACE OF THE CHECK DAM AND BY USING VEGETATION.
 - STORM DRENCHES TO BE PROVIDED AT CHECK DAMS TO BE PROVIDED AND PROPOSED APPROPRIATELY. SILT TRAPS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. SWAMP DRENCHES SHOULD BE LOCATED WITH SILT / VEGETATION STONE CHECK DAM TO BE REVEGETATED AND REVEGETATED SUBSEQUENT TO THE COMPLETION OF THE WORK.
 - SPACING AND PROVISION OF CHECK DAMS WILL BE APPROPRIATE UPON LOCAL/REGIONAL RAINFALL OF SWALES.
 - LOCATION OF INTERCEPTOR CHECK DAMS TO BE SITUATED TO AVOID LOCAL SITE WITH EXISTING SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY NOTICED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND MAIN STAIR CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
 - SILT TRAPS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
 - SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCAL AREAS AS REQUIRED.



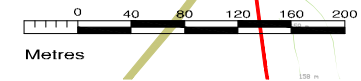
DRAWING LEGEND:

- WATERCOURSES
- LAKES
- WATERCOURSE 75M BUFFER
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCES
- SETTLEMENT POND - LEVEL SPREADER
- SETTLEMENT POND - VEGETATION FILTER
- LEVEL SPREADER
- CHECK DAM "TYPE A"
- CHECK DAM "TYPE B"
- PROPOSED NEW CULVERTS
- EXISTING CROSSING PROPOSED FOR UPGRADE
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- VS
- SEM-NATURAL VEGETATION SWALE / FILTER BED / SECONDARY SP
- FORMING SUMP
- LARGE DRAINAGE ARROWS
- SITE BOUNDARY
- EXISTING GROUND SURFACE
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROAD
- REGIONAL ROAD
- THIRD ROAD
- FOURTH ROAD
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- MET MAST



MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

| MANAGEMENT TYPE | DESCRIPTION OF SLODS' DRAINAGE CONTROL METHODS |
|---------------------------------|---|
| Avoidance Controls | <ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRENCHES WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER |
| Source Controls | <ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING STOCKPILES WITH SILT FENCING WEATHERING OFF / SEALING SLOD STOCKPILES |
| In-Line Controls | <ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR BARRIERS AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT FENCES, FILTER FABRICS IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION LADGONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| Water Treatment Controls | <ol style="list-style-type: none"> TEMPORARY SUMPS ATTENUATION PONDS TEMPORARY STORAGE LADGONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS CULVERTS, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT DEWATERING BAGS |
| Outfall Controls | <ol style="list-style-type: none"> LEVELLED/ROTTED BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS |



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Client: INNOVY RENEWABLES

Job: LYBENCARRIGA W/F, Co. WATERFORD/Co. CORK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D108

Drawing No: PI 453-0-0121-A1-D108-00A
Sheet Size: A1 Project No: PI453-0
Scale: 1:2,000 (A1) Drawn By: MG/GD
Date: 04/01/2021 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 USED 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:

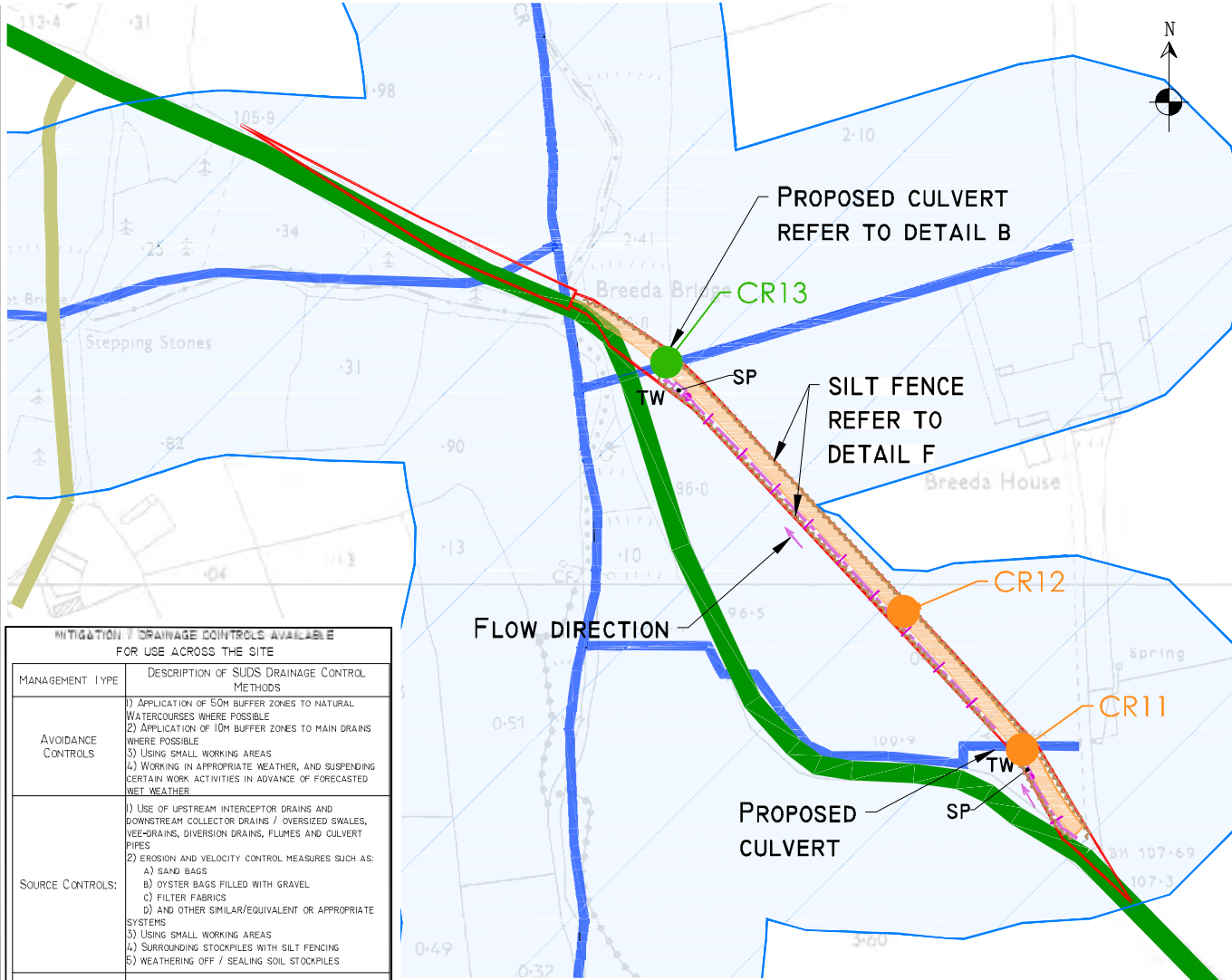
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

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.

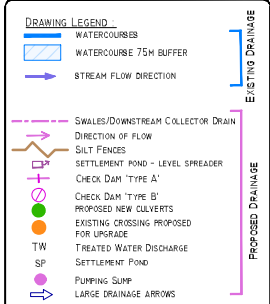
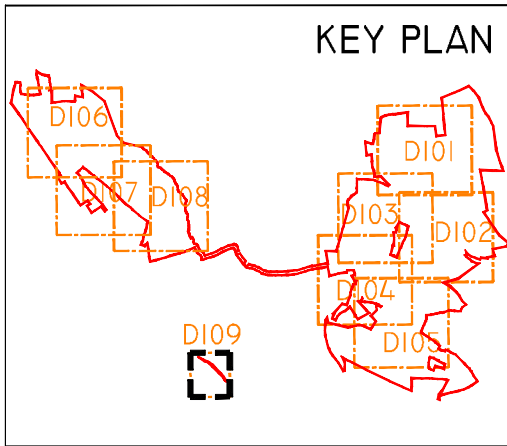
DRAINAGE NOTES:

1. 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 CATCHMENT AREA SERVED. SAMPLE POND SIZES 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 1/5M OF EDGE OF ANY DITCH / EPHEMERAL CHANNELS.
13. SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (SOIL, SODS OR 'SCKAW') 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 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 FILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDBAND 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 LOCATIONS, AS NECESSARY.



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 |
| SOURCE CONTROLS | 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 SOIL STOCKPILES |
| IN-LINE 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 LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS |
| WATER TREATMENT CONTROLS | 1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE LAGOONS 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 |
| OUTFALL CONTROLS | 1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS |



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| | | | |
| Revisions | | | |

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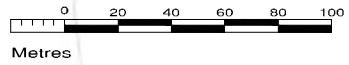
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Job: LYRENACARRIGA WF, CO. WATERFORD/CO. CORK

Title: PROPOSED DRAINAGE LAYOUT

Figure No: D109

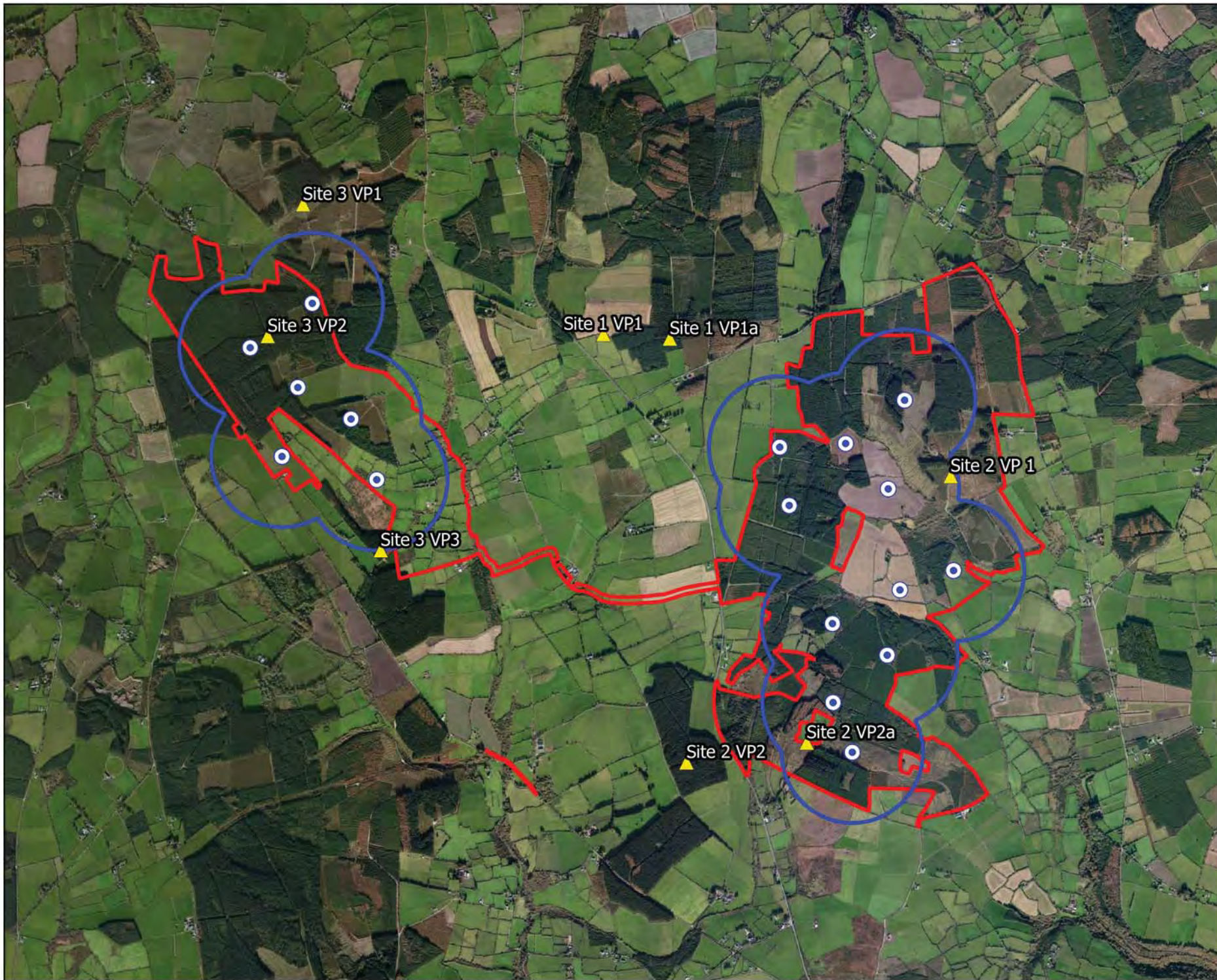
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 Scale: 1:2,000 (A3) Drawn By: GD
 Date: 04/01/2021 Checked By: MG





APPENDIX 4

**RELEVANT EIAR CHAPTER 8
ORNITHOLGY MAPS**



Map Legend

- Proposed Development Area
- Proposed Turbine Layout
- 500m Buffer of the Proposed Turbine Layout
- ▲ Vantage Point Locations



Drawing Title

Vantage Point Locations

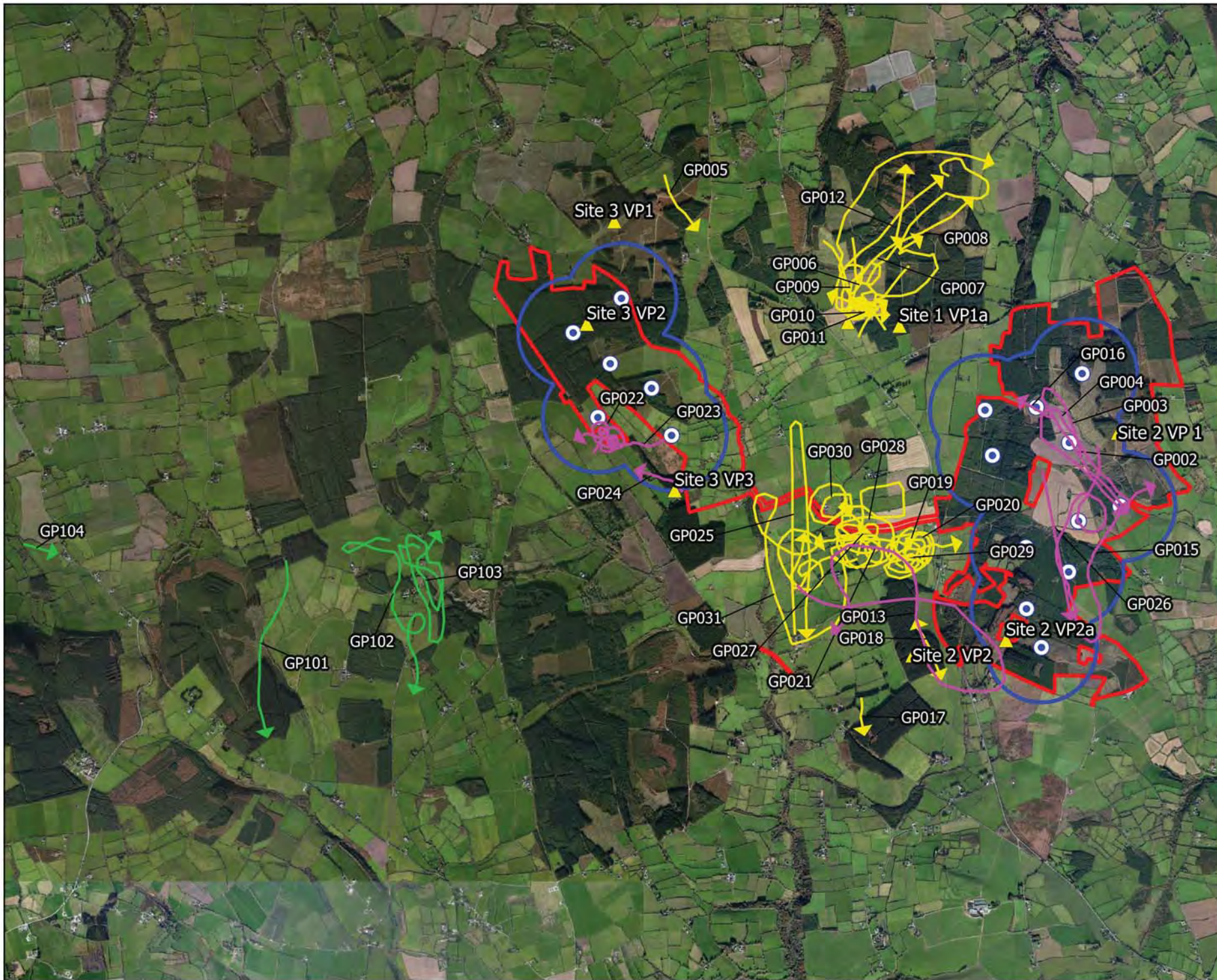
Project Title

Lyrenacarriga Windfarm

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|----------------|---------------|
| Drawn By | Checked By |
| Patrick Manley | Padraig Cregg |
| Project No. | Drawing No. |
| 170749 | Fig. 8.1 |
| Scale | Date |
| 1:35000 | 18.11.2020 |

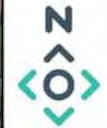


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Map Legend

- Proposed Development Area
- Proposed Turbine Layout
- 500m Buffer of the Proposed Turbine Layout
- ▲ Vantage Point Locations
- Flights Included in CRM
- Flights Not Included in CRM
- Flights from Discontinued VPs



| | |
|--|---------------|
| Drawing Title | |
| Golden Plover VP Flights (Sep 2016 - Sep 2018) | |
| Project Title | |
| Lyrenacarriga Windfarm | |
| Drawn By | Checked By |
| Patrick Manley | Padraig Cregg |
| Project No. | Drawing No. |
| 170749 | Fig. 8.1.1 |
| Scale | Date |
| 1:45000 | 18.11.2020 |
| MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 YW84 +353 (0)91 235611 email: info@mkolreland.ie Website: www.mkolreland.ie | |

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Map Legend

- Proposed Development Area
- Proposed Turbine Layout
- 500m Buffer of the Proposed Turbine Layout
- ▲ Vantage Point Locations
- Core VP Flights (Sites 2 & 3)



Drawing Title
Black-headed Gull VP Flights
 (Sep 2016 - Sep 2018)

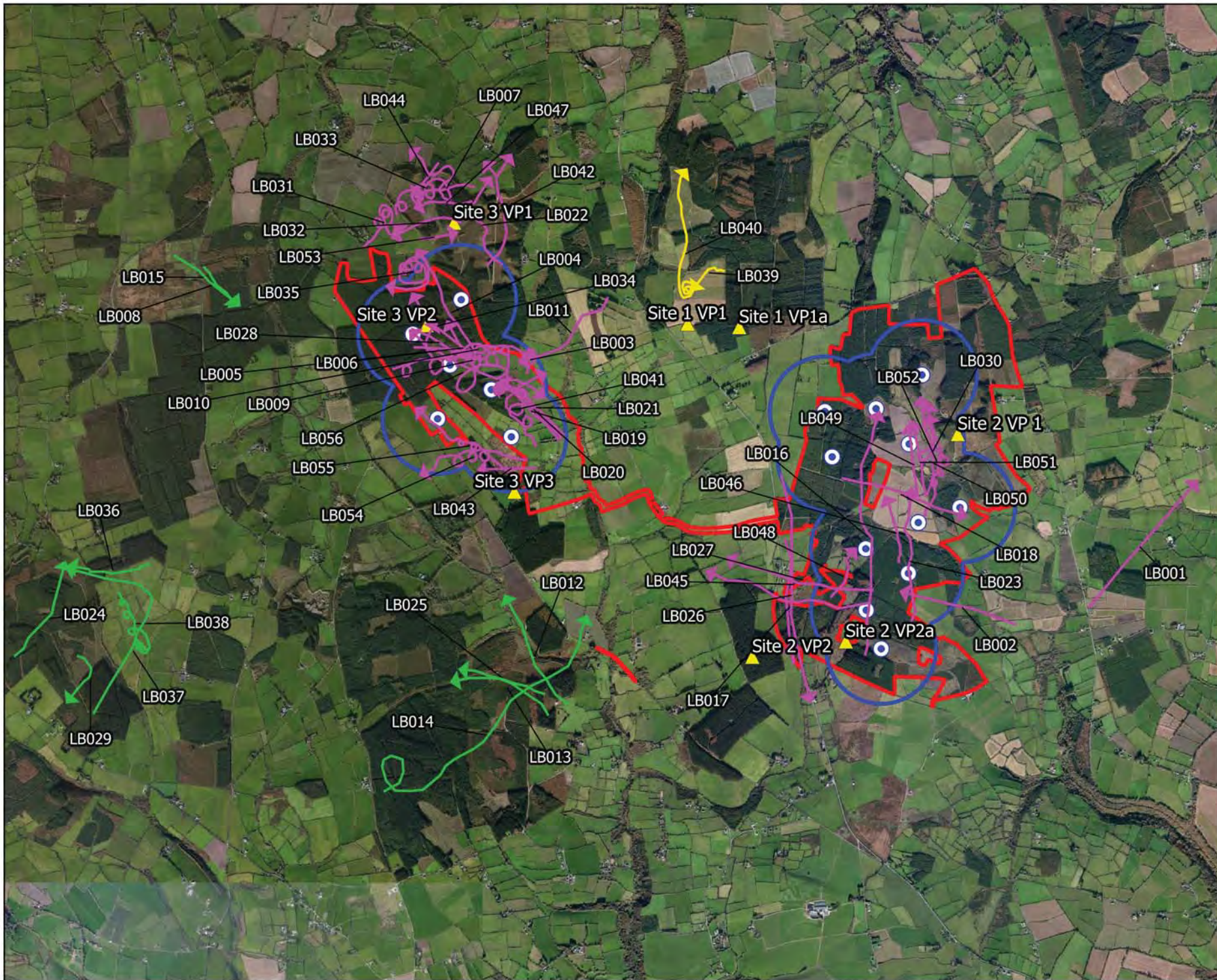
Project Title
Lyrenacarriga Windfarm

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| Drawn By Patrick Manley | Checked By Padraig Cregg |
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| Project No. 170749 | Drawing No. Fig. 8.1.6 |
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Map Legend

- Proposed Development Area
- Proposed Turbine Layout
- 500m Buffer of the Proposed Turbine Layout
- ▲ Vantage Point Locations
- Core VP Flights (Sites 2 & 3)
- Site 1 VP1(a) Flights
- Flights from Discontinued VPs



Drawing Title
Lesser Black-backed Gull VP Flights (Sep 2016 - Sep 2018)

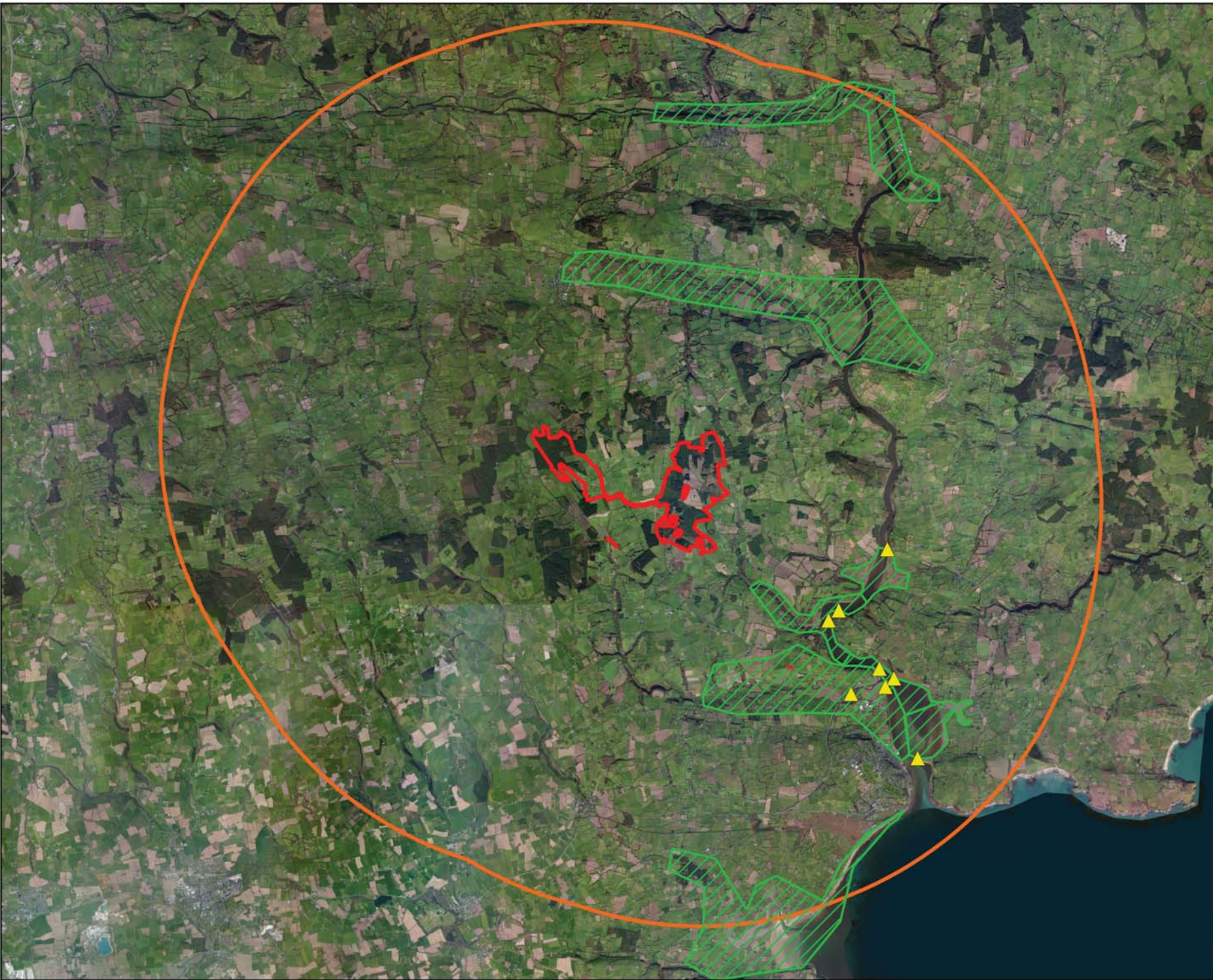
Project Title
Lyrenacarriga Windfarm

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| Project No. 170749 | Drawing No. Fig. 8.1.7 |
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Map Legend

- Proposed Development Area
- 12km Core Foraging Range of Golden Plover from the Proposed Development Area
- Golden Plover Survey Areas
- Vantage Point Locations



Drawing Title
Golden Plover Survey Locations

Project Title
Lyrenacarriga Windfarm

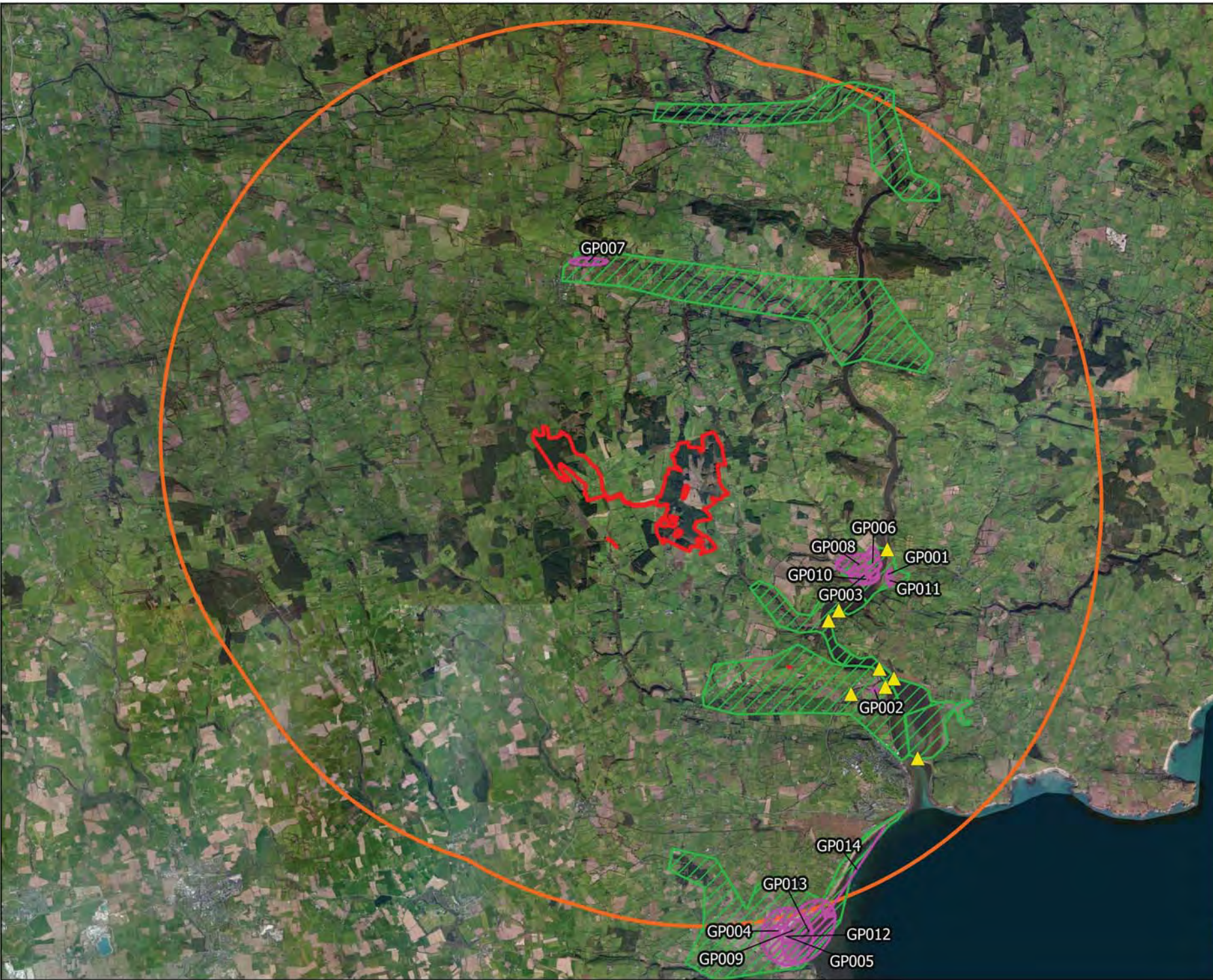
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| Drawn By Patrick Manley | Checked By Padraig Cregg |
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| Project No. 170749 | Drawing No. Fig. 8.7 |
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Map Legend

- Proposed Development Area
- 12km Core Foraging Range of Golden Plover from the Proposed Development Area
- Golden Plover Survey Areas
- Vantage Point Locations
- Golden Plover Observations
- Golden Plover Flights



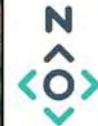
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| Drawing Title | |
| Golden Plover Survey Observations | |
| Project Title | |
| Lyrenacarriga Windfarm | |
| Drawn By | Checked By |
| Patrick Manley | Padraig Cregg |
| Project No. | Drawing No. |
| 170749 | Fig. 8.7.1 |
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Map Legend

- Original 7 Development Areas
- ▲ Original Vantage Point Locations



Drawing Title
Original Development Areas and Vantage Point Survey Locations

Project Title
Lyrenacarriga Windfarm

| | |
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