



FIGURE 2.2

WIND TURBINE ELEVATION



SIDE VIEW PHOTOGRAPH OF TYPICAL TURBINE

SUBSTATION CONNECTION

PERSON-

POWER CABLES
(INTERNAL TO TOWER)

BLADE -

NACELLE -

TOWER -

-HUB

N/A

T-LAYOUT NO. N/A

DRAWING NUMBER

03022D2304

SCALE - NTS @ A3

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

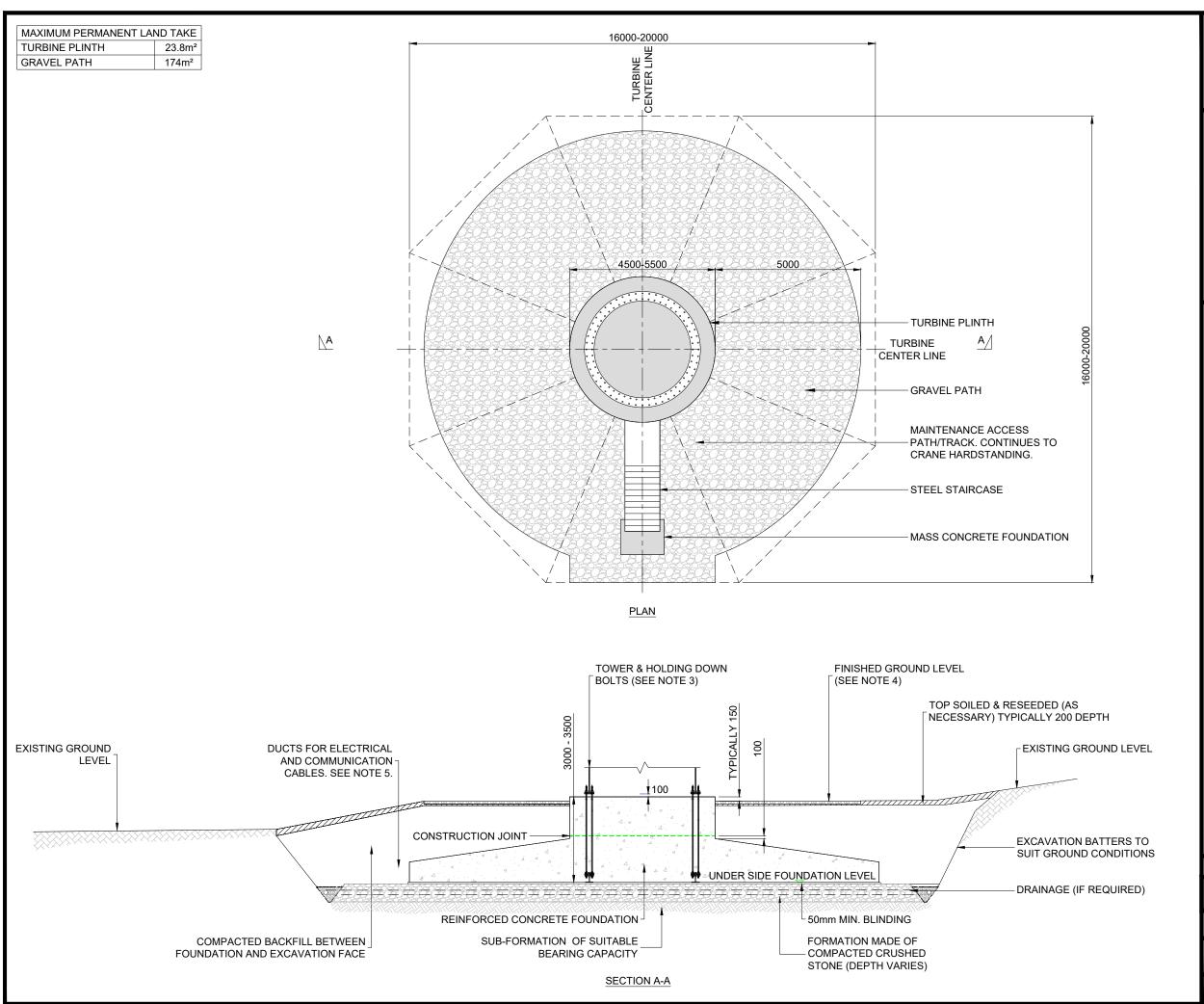




FIGURE 2.3

### TYPICAL GRAVITY BASE FOUNDATION

#### NOTES

- DIMENSIONS AND DETAILS ARE INDICATIVE ONLY AND MAY VARY DUE TO SPECIFIC TURBINE OR GROUND CONDITIONS.
- 2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
- THE HOLDING DOWN BOLT
  ARRANGEMENT SHOWN ON THIS
  DRAWING IS TYPICAL. HOWEVER
  ALTERNATIVE CAST IN
  ARRANGEMENTS ARE AVAILABLE AND
  MAY BE SUBSTITUTED DEPENDING ON
  ACTUAL TURBINE SELECTION.
- 4. GRADIENT OF FINISHED GROUND LEVEL OVER TURBINE BASE, MAX 1:12.
- 5. MATERIALS ARISING FROM
  EXCAVATIONS TO BE SEGREGATED
  AND PLACED IN AGREED LOCATIONS
  ADJACENT TO THE WORKING AREA
  FOR RE-USE. REINSTATEMENT AND /OR
  PEAT MANAGEMENT PLANS WILL BE
  DEVELOPED DURING THE DETAILED
  DESIGN OF SITE INFRASTRUCTURE, IN
  LINE WITH CURRENT BEST PRACTICE.

LAYOUT DWG N/A

T-LAYOUT NO. N/A

DRAWING NUMBER

03022D2303

SCALE - NTS @ A3

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FIGURE 2.4

### TYPICAL CRANE HARDSTAND

<u>KEY</u>

PERMANENT WORKS

TEMPORARY WORKS



EXTERNAL TRANSFORMER AND



SWITCHGEAR ENCLOSURE

AREA TO BE FREE FROM TOPOGRAPHICAL
AND ECOLOGICAL CONSTRAINTS



MAINTENANCE ACCESS TRACK



**NOTES** 

- 1. ALL DIMENSIONS IN METRES.
- HARDSTANDING ARRANGEMENT SUBJECT TO CHANGE DEPENDANT ON SPECIFIC WIND TURBINE MODEL SELECTED FOR CONSTRUCTION.
- 3. ALL HARDSTANDINGS TO BE CONSTRUCTED ON SUITABLE FOUNDATION MATERIAL.
- ALL HARDSTANDINGS TO BE FINISHED WITH CRUSHED ROCK, FORMING A FREE DRAINING SURFACE.
- 5. TRACK ADJACENT TO CRANE HARDSTANDING TO BE DESIGNED TO ACCEPT CRANE OUTRIGGER LOADING.
- THE PRELIMINARY CRANE HARDSTANDING
  LAYOUT HAS BEEN DEVELOPED TO
  ACCOMMODATE EITHER A SINGLE BLADE LIFT OR
  FULL ROTOR LIFT.
- 7. TO PROTECT AGAINST INJURY, SUITABLE EDGE PROTECTION IS REQUIRED WHERE THERE IS A DIFFERENCE OF GREATER THAN 1M BETWEEN THE HARDSTAND SURFACE AND THE ADJACENT GROUND.
- 8. TO CONFIRM HARDSTAND SUITABILITY FOR HH >130m PLEASE REFER TO DOCUMENT ENGO1-2513505, WHICH SUMMARISES THE RATIONALE BEHIND THIS DESIGN AND DETAILS THE SPECIFICATIONS USED TO GATHER DESIGN DATA.

LAYOUT DWG

N/A

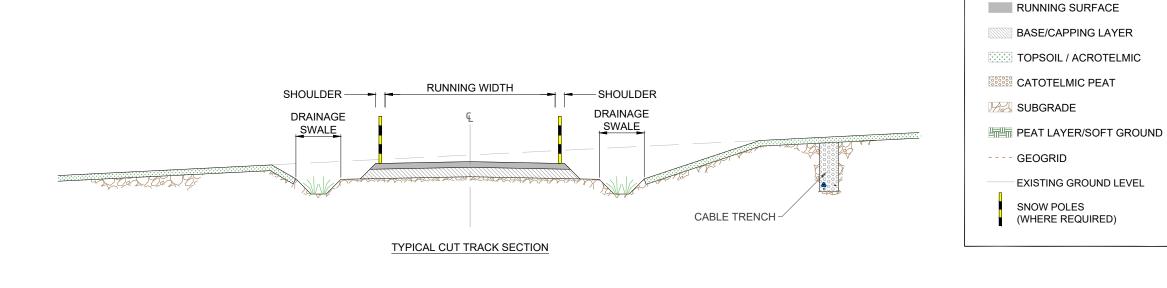
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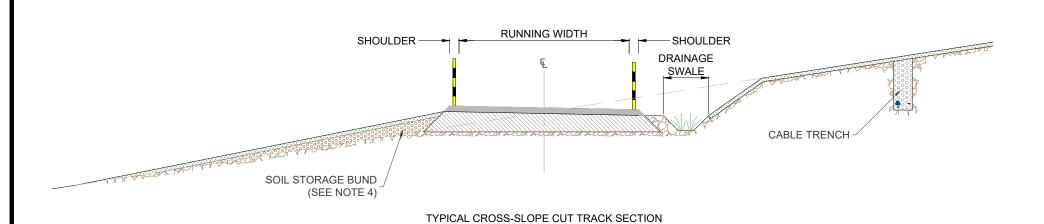
DRAWING NUMB

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SCALE - 1:500 @ A3

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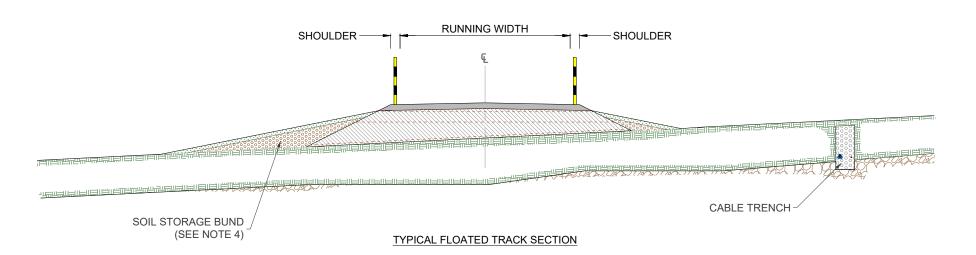




FIGURE 2.5

**TYPICAL ACCESS** TRACK DETAILS

#### NOTES

**KEY** 

EXISTING GROUND LEVEL

SNOW POLES

(WHERE REQUIRED)

- 1. DO NOT SCALE FROM THIS DRAWING.
- 2. TRACK WIDTH TO INCREASE ON BENDS AND PASSING PLACES.
- 3. ALL EMBANKMENT SLOPES TO BE PROVIDED AT A STABLE ANGLE BASED ON THE PROPERTIES OF THE MATERIAL **ENCOUNTERED ON SITE.**
- 4. TRACK CONSTRUCTION TYPE TO BE DETERMINED DURING DETAILED DESIGN. LAYOUT OF DRAINAGE, CABLE TRENCHES AND STORAGE BUNDS MAY VARY.
- 5. RUNNING SURFACE AND BASE/CAPPING LAYER TO BE FORMED FROM SUITABLE MATERIALS COMPACTED IN LAYERS.
- 6. GEOSYNTHETIC REINFORCEMENT OR SOIL STABILISATION MAY BE USED TO REDUCE THE DEPTH OF TRACK CONSTRUCTION. REQUIREMENT TO BE DETERMINED DURING DETAILED DESIGN.

N/A

N/A

03022D2402

SCALE - 1:100 @ A3

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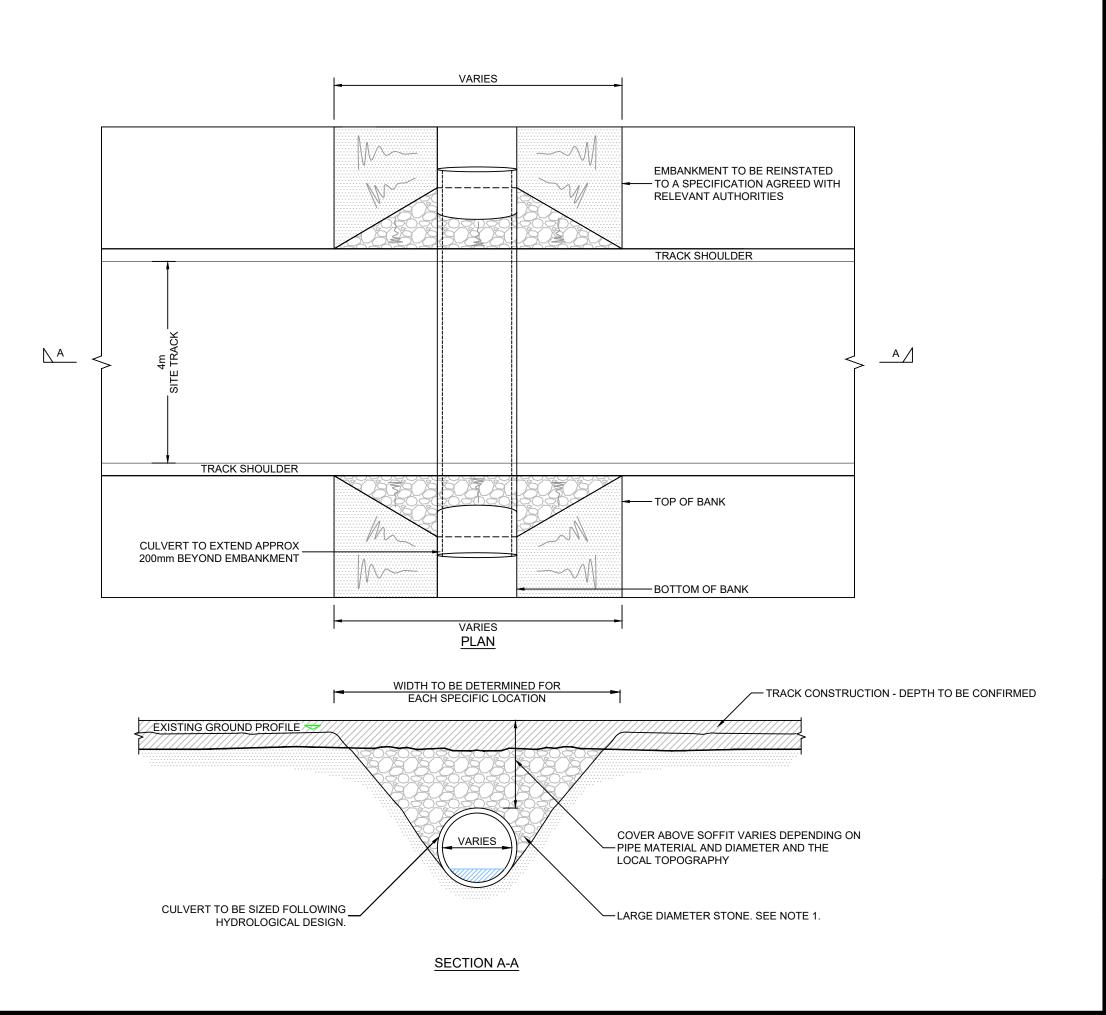




FIGURE 2.6

### TYPICAL WATER CROSSING DETAIL

#### <u>NOTES</u>

- FINAL SPECIFICATION AND
   INSTALLATION METHOD TO BE IN
   ACCORDANCE WITH THE
   REQUIREMENTS OF THE RELEVANT
   AUTHORITIES.
- 2. CULVERT TYPE AND SIZING TO BE DEFINED DURING DESIGN OF ON-SITE DRAINAGE SYSTEMS.
- 3. INFILL MATERIAL TO BE CLEAN CRUSHED ROCK.

AYOUT DWG N/A

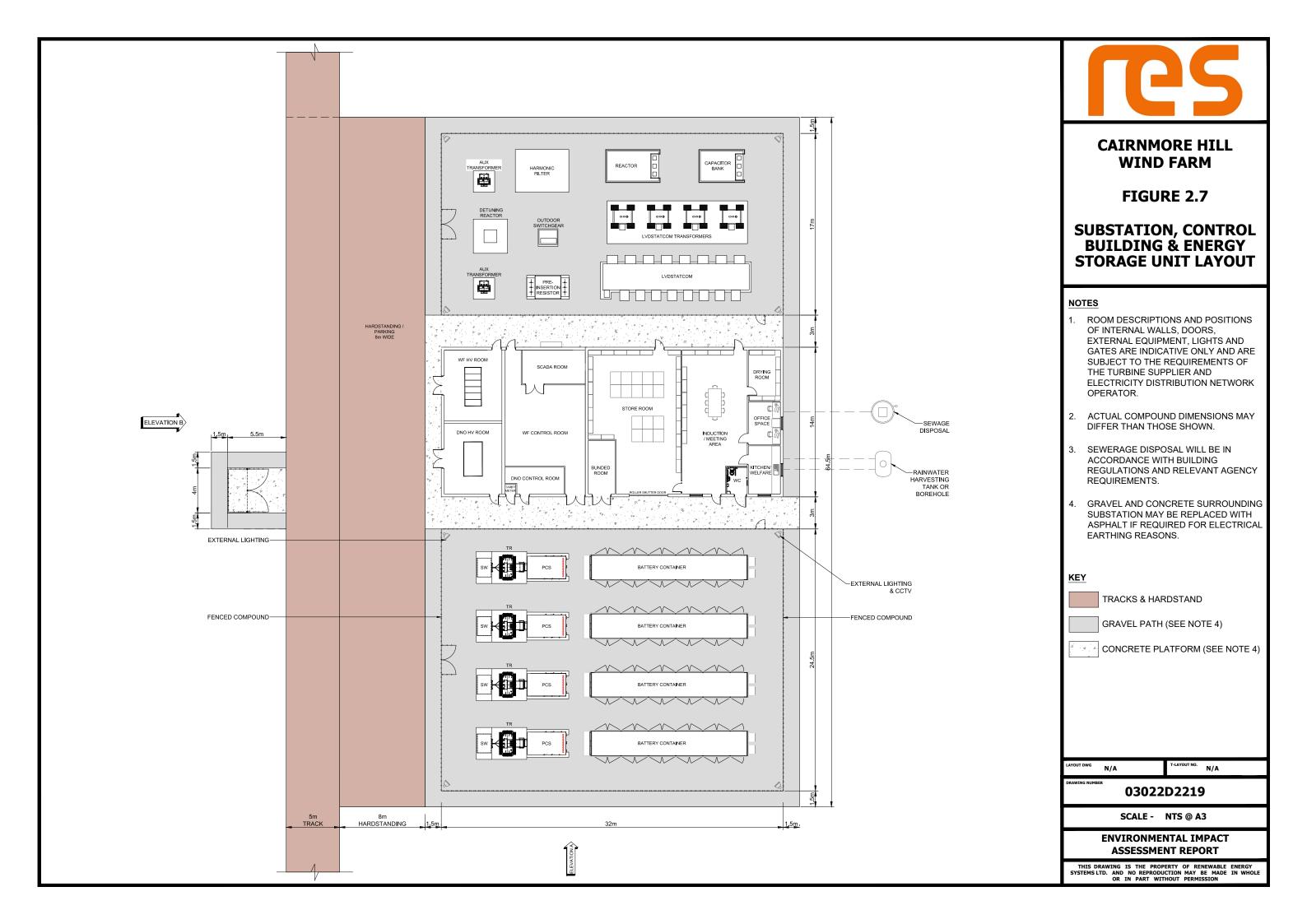
T-LAYOUT NO. N/A

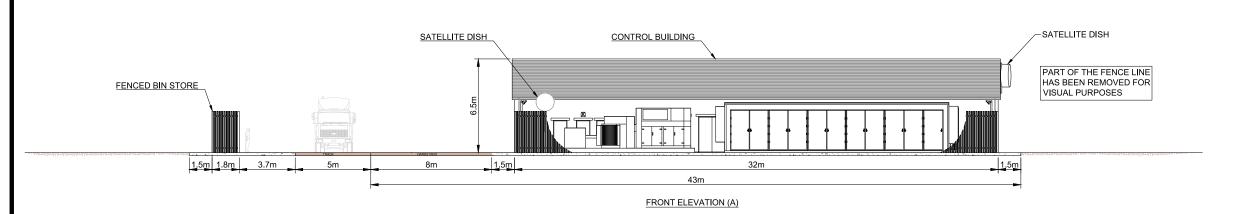
DRAWING NUMBER

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SCALE - NTS @ A3

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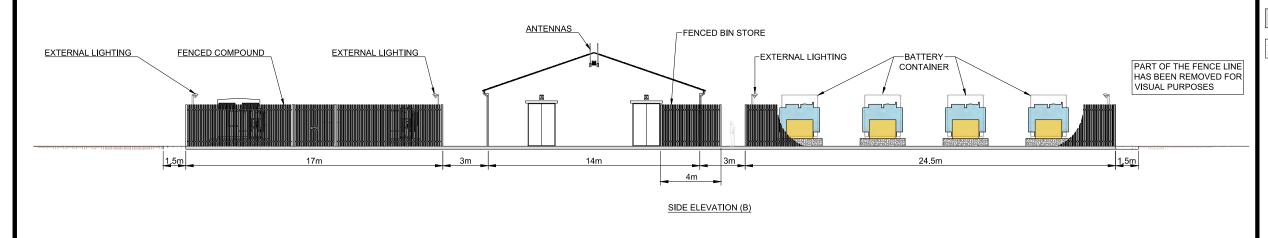




FIGURE 2.8

### SUBSTATION, CONTROL BUILDING & ENERGY STORAGE UNIT ELEVATION

#### NOTE

- 1. POSITIONS OF DOORS, EXTERNAL EQUIPMENT, LIGHTS AND GATES ARE INDICATIVE ONLY AND ARE SUBJECT TO THE REQUIREMENTS OF THE TURBINE SUPPLIER AND ELECTRICITY DISTRIBUTION NETWORK OPERATOR.
- ANTICIPATED WORST CASE ELECTRICAL EQUIPMENT REQUIREMENTS SHOWN. ACTUAL COMPOUND DIMENSIONS MAY BE LESS THAN THOSE SHOWN.
- 3. GRAVEL AND CONCRETE SURROUNDING SUBSTATION MAY BE REPLACED WITH ASPHALT IF REQUIRED FOR ELECTRICAL EARTHING REASONS.

#### **KEY**

TRACKS AND HARDSTANDINGS

GRAVEL PATH (SEE NOTE 5)

CONCRETE PLATFORM (SEE NOTE 5)

PIR LIGHTING

N/A

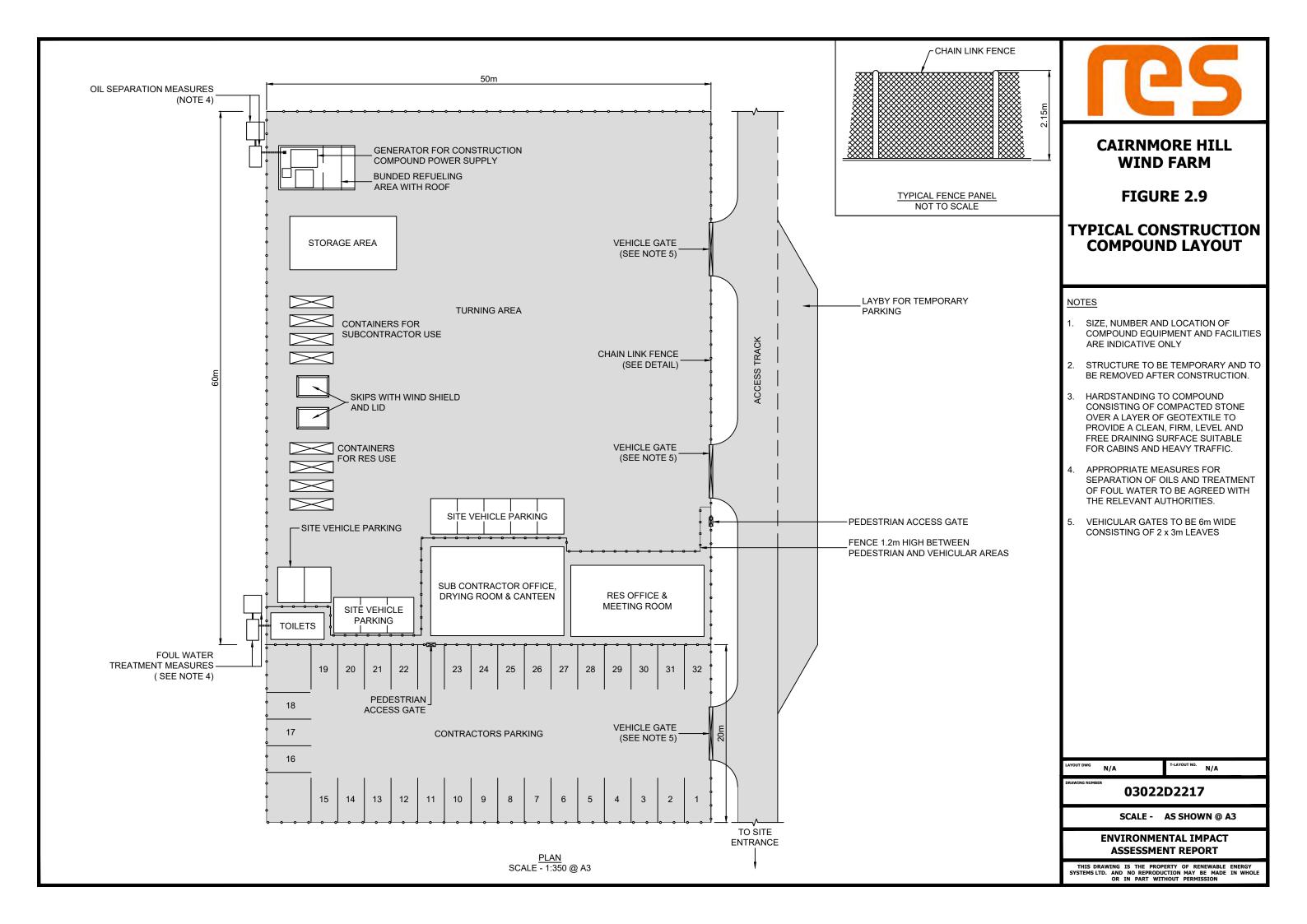
T-LAYOUT NO. N/A

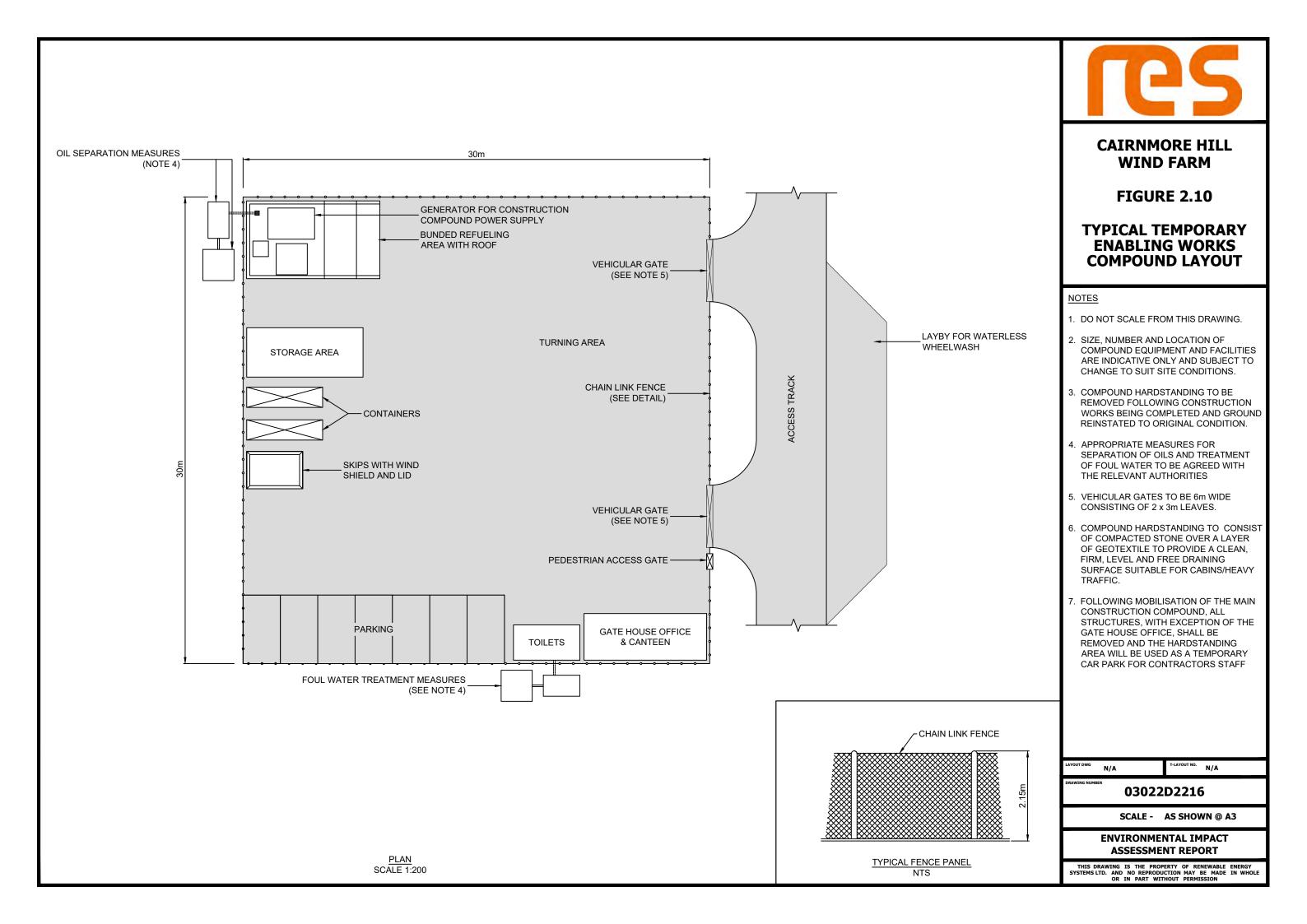
DRAWING NUMB

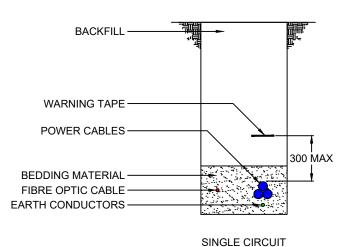
03022D2301

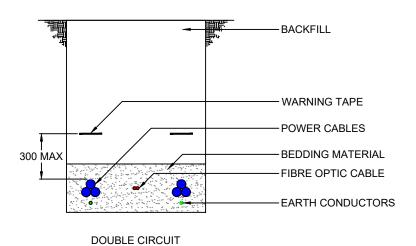
SCALE - 1:250 @ A3

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

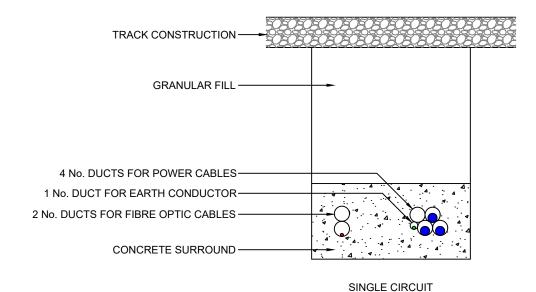


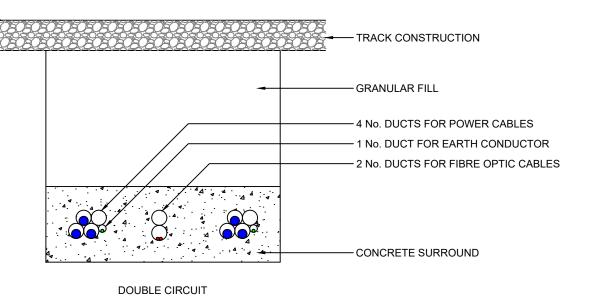






TYPICAL CABLE TRENCHES





TYPICAL TRACK CROSSINGS



# CAIRNMORE HILL WIND FARM

**FIGURE 2.11** 

### TYPICAL CABLE TRENCH DETAILS

#### **NOTES**

- 1. THIS DRAWING IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE AT THE DETAILED DESIGN STAGE.
- 2. ALL DIMENSIONS IN mm.
- 3. CABLES MAY BE INSTALLED BY CABLE PLOUGH FOR DISTANCES GREATER THAN 1km.

N/A

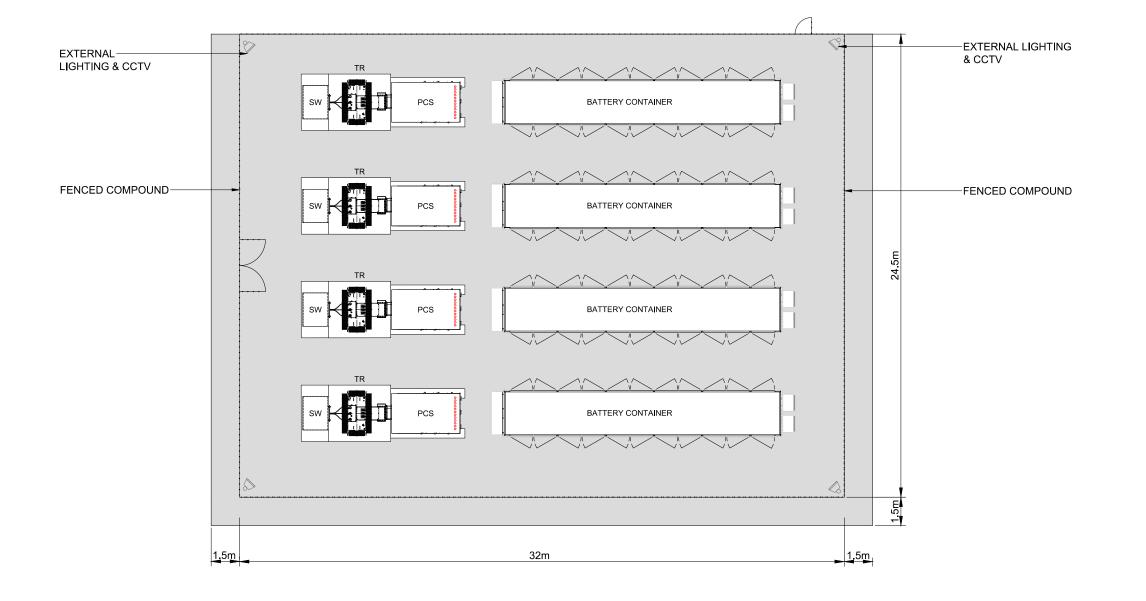
LAYOUT NO. N/A

RAWING NUMBER

03022D2307

SCALE - 1:25 @ A3

ENVIRONMENTAL IMPACT ASSESSMENT REPORT





**FIGURE 2.12** 

### TYPICAL ENERGY STORAGE UNIT LAYOUT

#### NOTES

- 1. ROOM DESCRIPTIONS AND POSITIONS OF INTERNAL WALLS, DOORS, EXTERNAL EQUIPMENT, LIGHTS AND GATES ARE INDICATIVE ONLY AND ARE SUBJECT TO THE REQUIREMENTS OF THE TURBINE SUPPLIER AND ELECTRICITY DISTRIBUTION NETWORK OPERATOR.
- 2. ACTUAL COMPOUND DIMENSIONS MAY DIFFER THAN THOSE SHOWN.
- 3. GRAVEL AND CONCRETE SURROUNDING SUBSTATION MAY BE REPLACED WITH ASPHALT IF REQUIRED FOR ELECTRICAL EARTHING REASONS.

#### KEY

GRAVEL PATH (SEE NOTE 3)

N/A

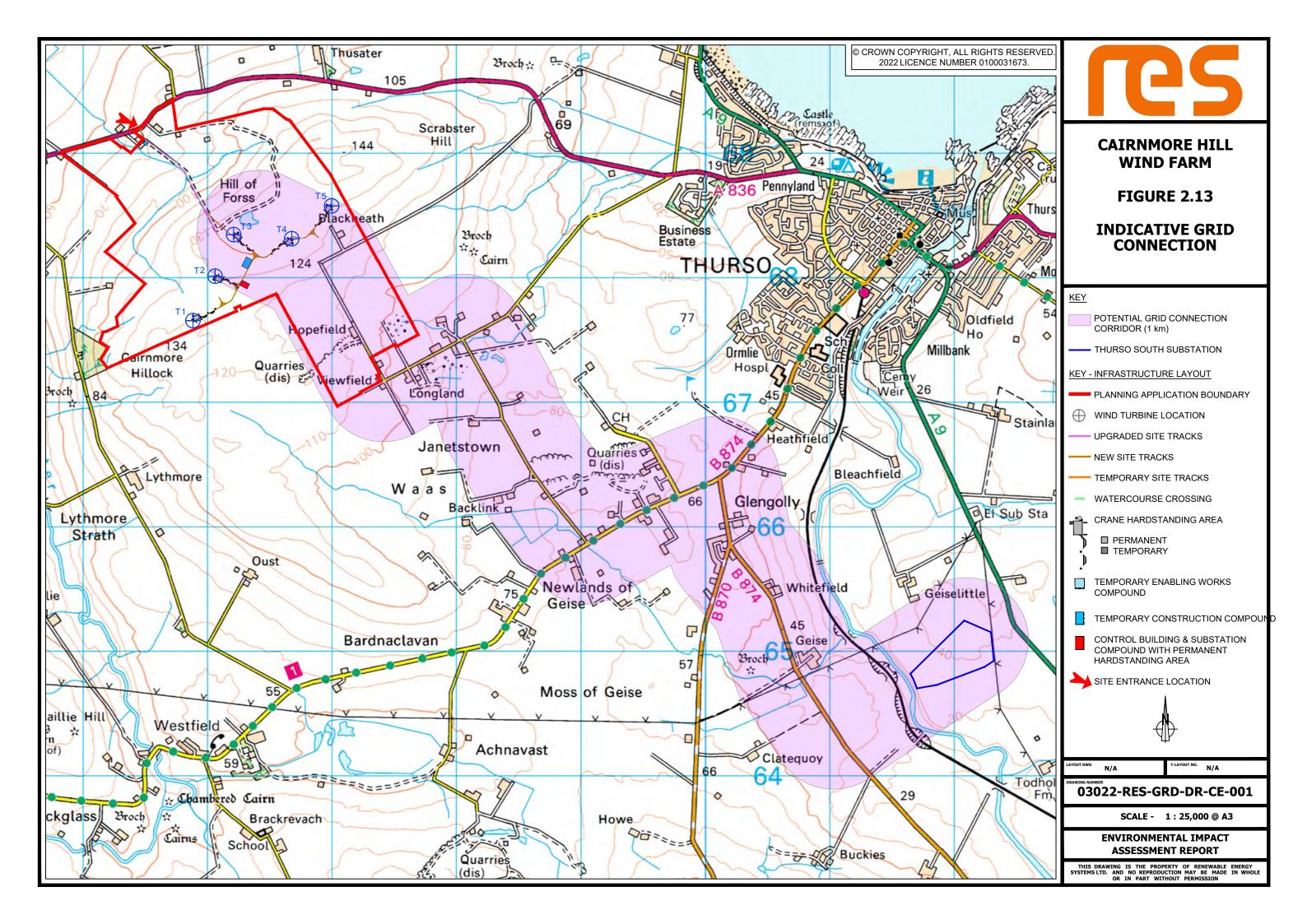
T-LAYOUT NO. N/A

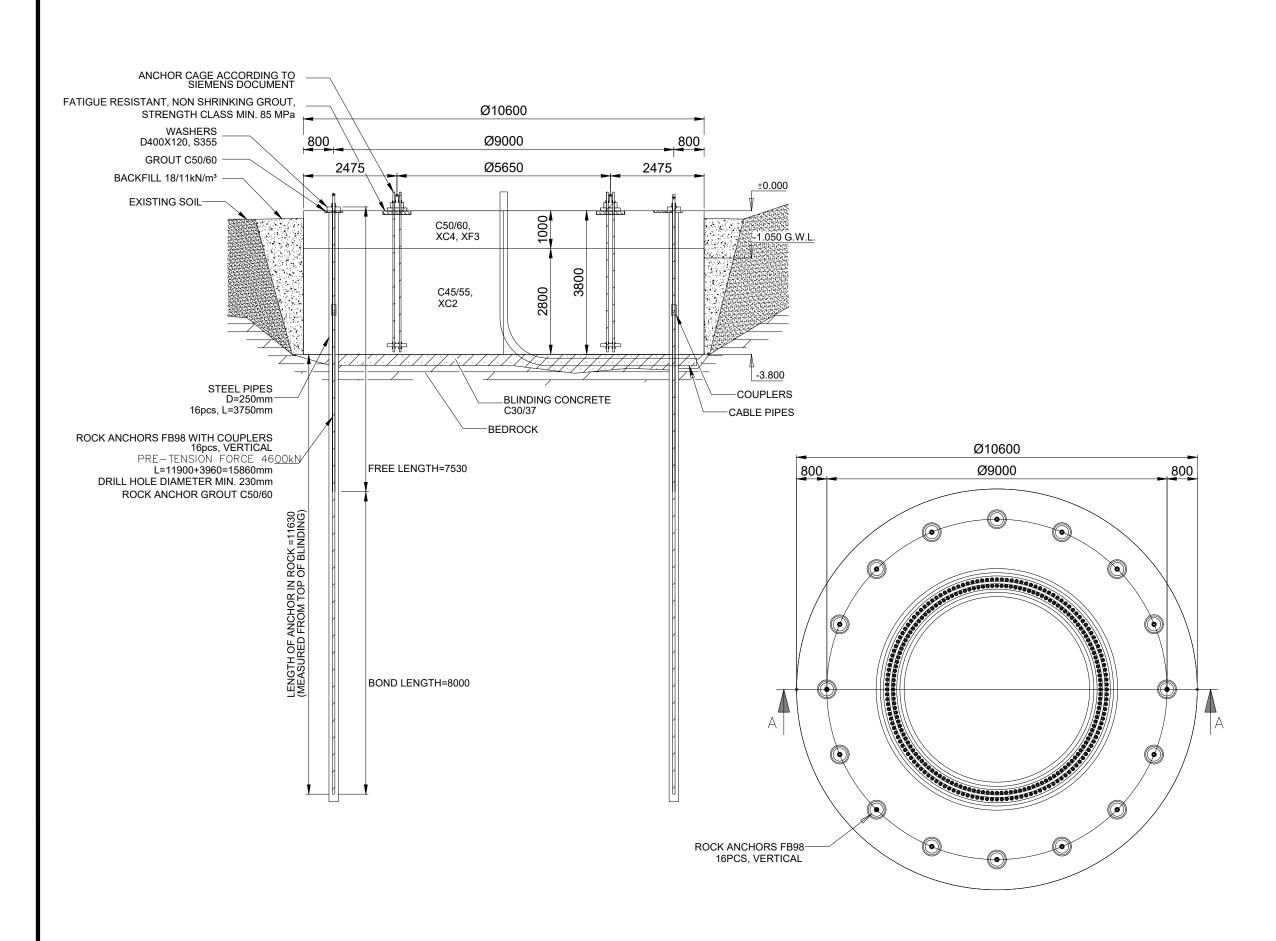
DRAWING NUMB

03022D2215

SCALE - 1:200 @ A3

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**FIGURE 2.14** 

### TYPICAL ROCK ANCHOR FOUNDATION

#### Assumed rock properties:

- Rock weight 26 kN/m³. Buoyancy effect taken into account.
- 2. Intermediate rock conditions apex angle 30°.
- 3. Rock bearing capacity (design value for production load level) 5 MPa.
- 4. Young modulus of rock 40 GPa (assumed).
- Shear bond strength in rock/grout interface 1.5 MPa(assumed).

#### Rock mass/site properties:

- All anchors are acceptance tested. Used proof load is 5750 kN.
- The rock and grout pullout resistance must be verified with pre-pullout tests before any anchor installations.
- Assumed rock conditions must be verified with rock investigations before and during construction works.
- 4. Rock is mainly homogenous with minor cracks of no importance.
- The determined rock level must not be lower than the bottom of the foundation on 10m radius around foundation centre. If the deviations occur, special backfill must be designed.
- The foundation is not located near a steep vertical cliff Design lifetime: 30 years.

#### Site investigations and actions:

- The weathered surface rock shall be excavated till fresh rock.
- 2. Ground water conditions must be verified by professional geologist.
- Rock strength must be confirmed with core drilling and strength tests.
- The rock and grout pullout resistance must be verified with pre-pullout tests before any anchor installations.
- 5. Used apex angle must be verified with rock investigations incl. geologic mapping.
- Fractured rock shall be pre-grouted.
- The rock conditions shall be verified during building works.

LAYOUT DWG

N/A

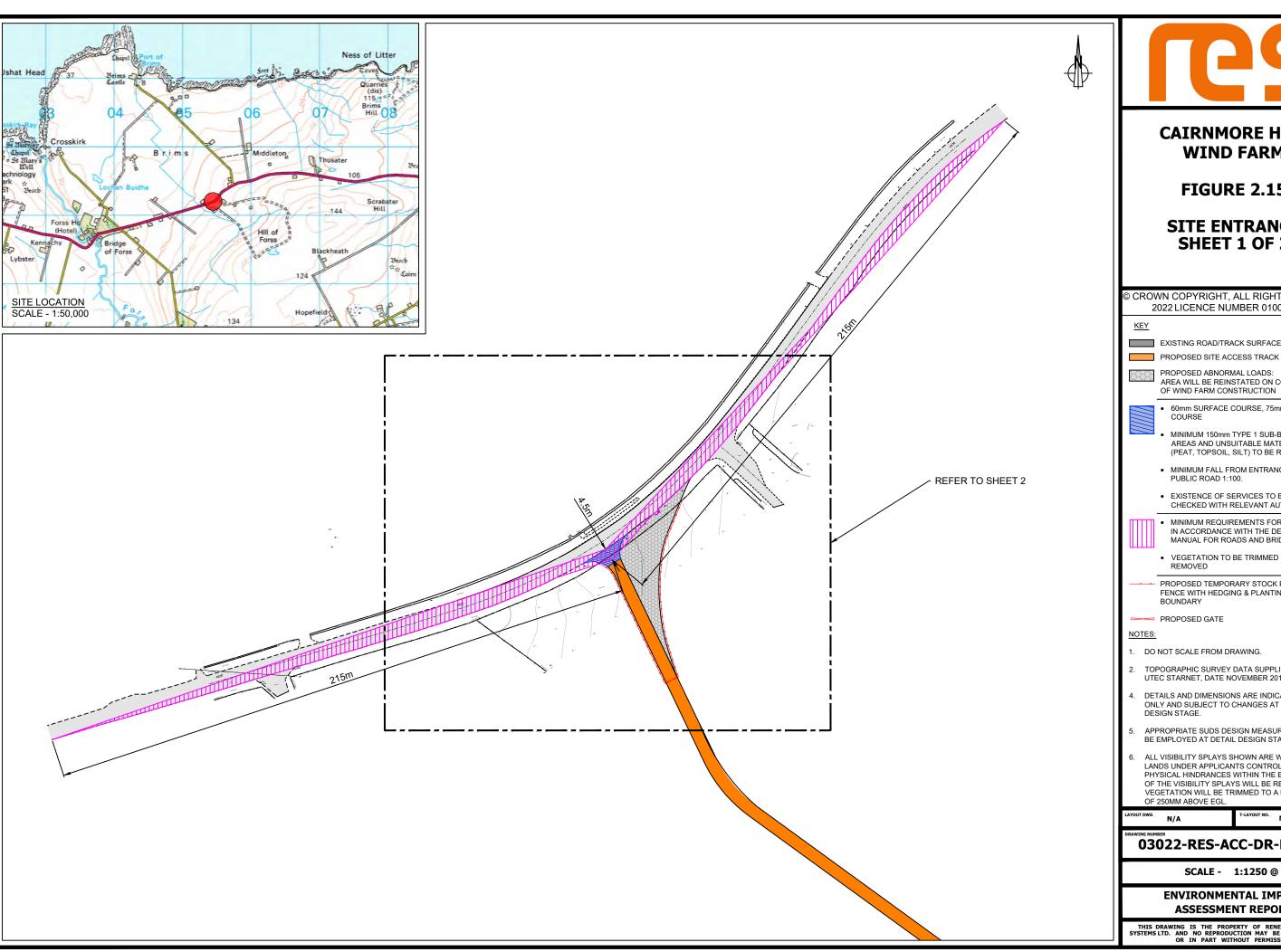
-LAYOUT NO. N/A

DRAWING NUMBER

03022-RES-FOU-DR-CE-001

SCALE - 1:100 @ A3

### ENVIRONMENTAL IMPACT ASSESSMENT REPORT





**FIGURE 2.15** 

### **SITE ENTRANCE** SHEET 1 OF 2

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EXISTING ROAD/TRACK SURFACE

PROPOSED ABNORMAL LOADS: AREA WILL BE REINSTATED ON COMPLETION OF WIND FARM CONSTRUCTION

- 60mm SURFACE COURSE, 75mm BINDER COURSE
- MINIMUM 150mm TYPE 1 SUB-BASE SOFT AREAS AND UNSUITABLE MATERIAL (PEAT, TOPSOIL, SILT) TO BE REMOVED.
- MINIMUM FALL FROM ENTRANCE GATE TO
- EXISTENCE OF SERVICES TO BE CHECKED WITH RELEVANT AUTHORITIES.
- MINIMUM REQUIREMENTS FOR VISIBILITY IN ACCORDANCE WITH THE DESIGN MANUAL FOR ROADS AND BRIDGES.
- VEGETATION TO BE TRIMMED OR REMOVED

PROPOSED TEMPORARY STOCK PROOF FENCE WITH HEDGING & PLANTING INSIDE BOUNDARY

PROPOSED GATE

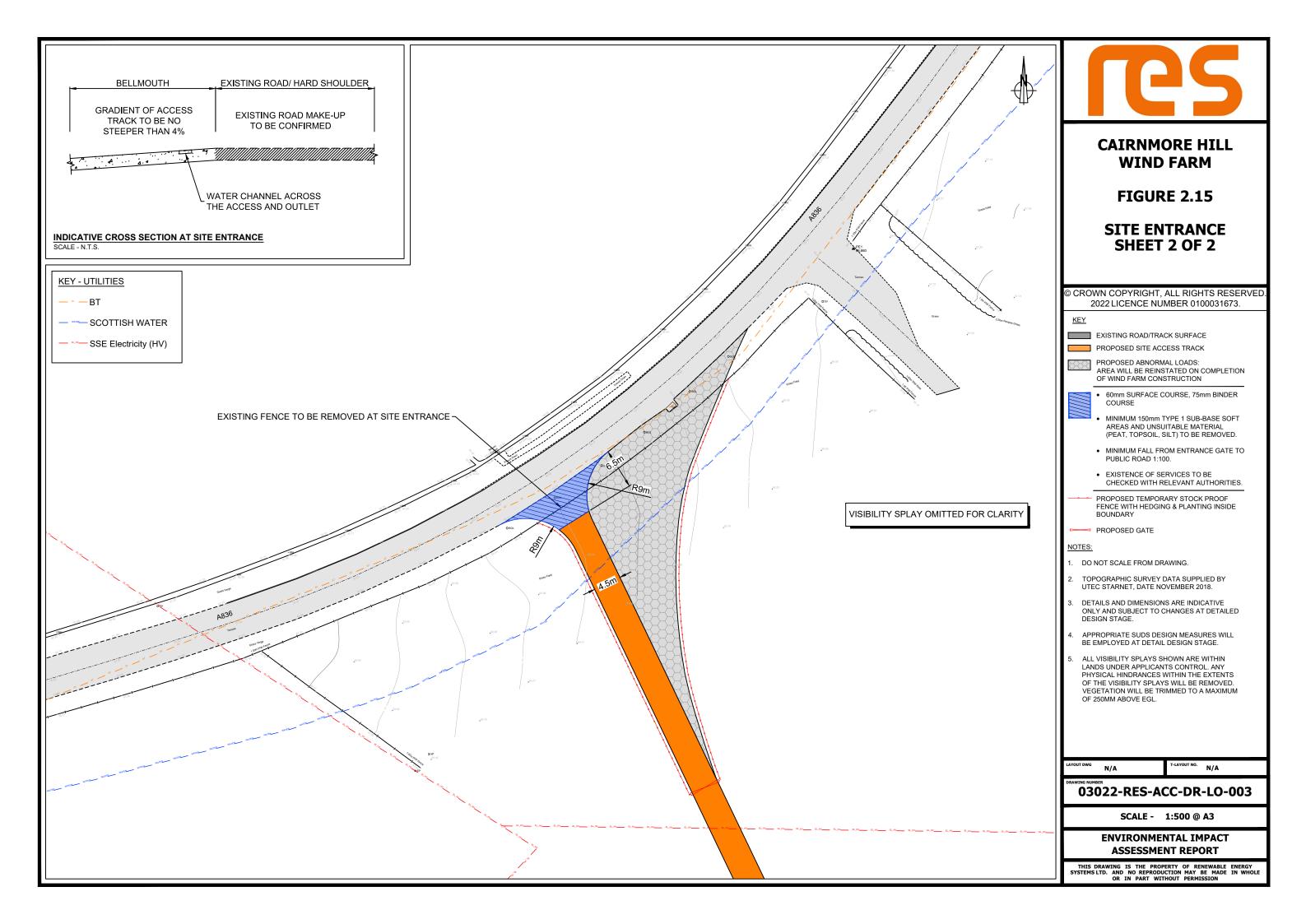
- 1. DO NOT SCALE FROM DRAWING.
- 2. TOPOGRAPHIC SURVEY DATA SUPPLIED BY UTEC STARNET, DATE NOVEMBER 2018.
- DETAILS AND DIMENSIONS ARE INDICATIVE ONLY AND SUBJECT TO CHANGES AT DETAILED DESIGN STAGE.
- APPROPRIATE SUDS DESIGN MEASURES WILL BE EMPLOYED AT DETAIL DESIGN STAGE.
- ALL VISIBILITY SPLAYS SHOWN ARE WITHIN LANDS UNDER APPLICANTS CONTROL. ANY PHYSICAL HINDRANCES WITHIN THE EXTENTS OF THE VISIBILITY SPLAYS WILL BE REMOVED. VEGETATION WILL BE TRIMMED TO A MAXIMUM OF 250MM ABOVE EGL.

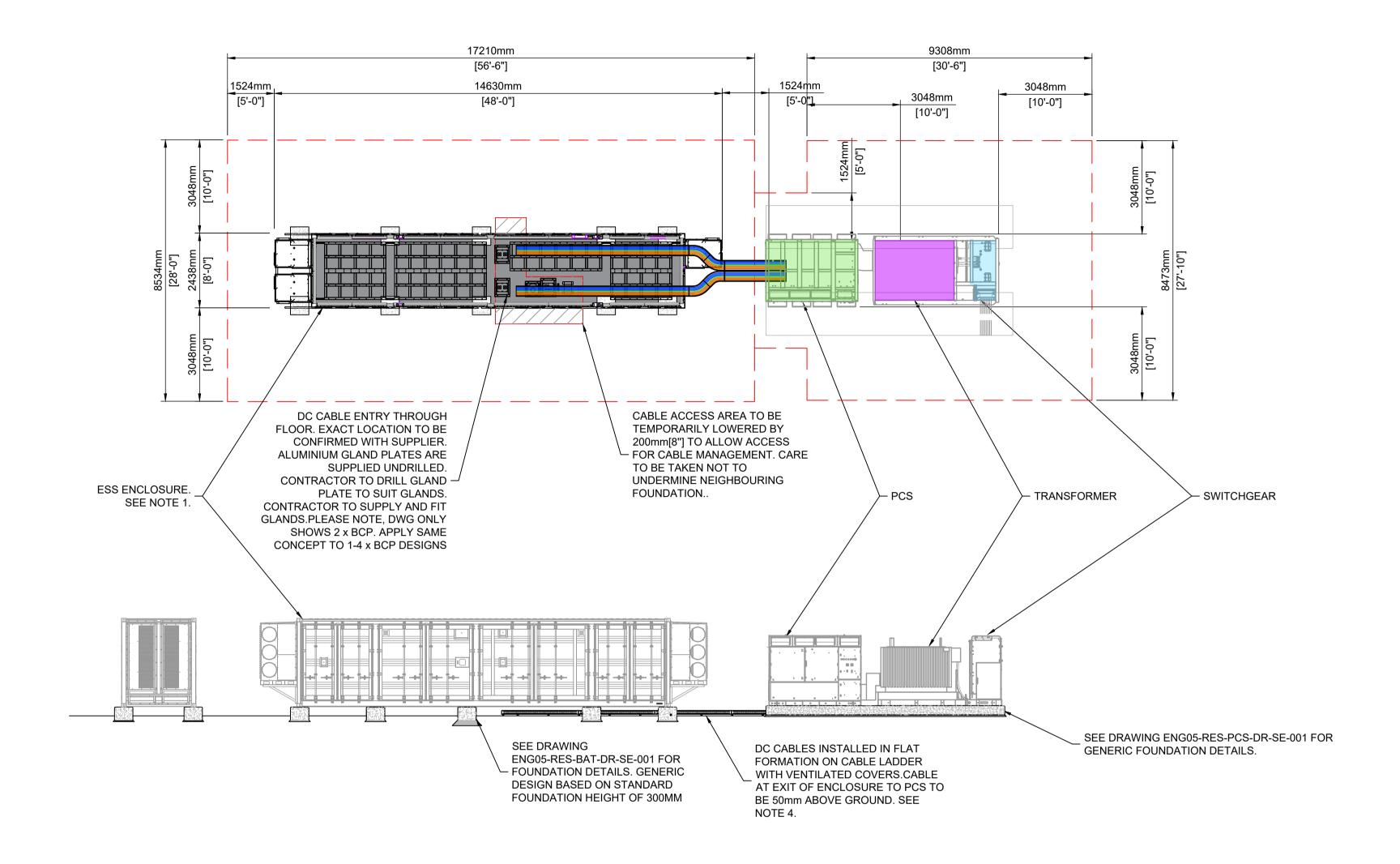
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03022-RES-ACC-DR-LO-003

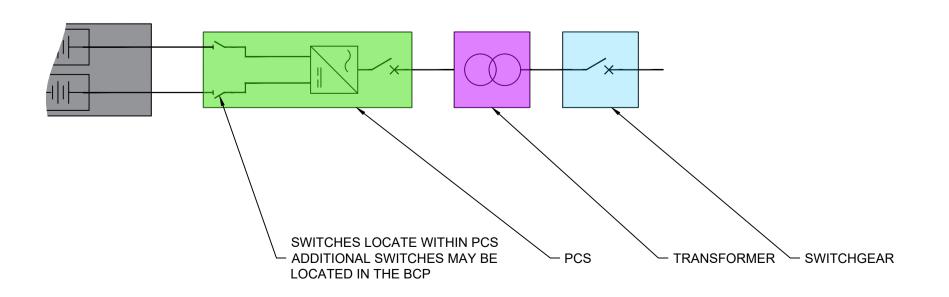
SCALE - 1:1250 @ A3

#### **ENVIRONMENTAL IMPACT** ASSESSMENT REPORT





PLAN & ELEVATION
SCALE 1:100



 $\frac{\mathsf{SLD}}{\mathsf{N.T.S}}$ 



# CAIRNMORE HILL WIND FARM

**FIGURE 2.16** 

# GENERAL STORAGE DESIGN

### NOTES:

ESS ENCLOSURE SHOWN AS 12190mm[40'] ISO SHIPPING CONTAINER. CAN BE EXCHANGED FOR SUPPLIER SPECIFIC ESS ENCLOSURE WITH HVAC DIMENSIONS, LOCATION AND CLEARANCE REQUIREMENTS TO BE CONFIRMED.

- 2. FOR BALANCE OF PLANT DESIGN GUIDANCE REFER TO EN00-018999.
- 3. ESS ENCLOSURE CLEARANCE BASED ON NFPA855 MINIMUM CLEARANCE TO EXPOSURE FOR ESS LOCATED NEAR EXPOSURES.

TRANSFORMER CLEARANCE BASED ON IEC 61936
ASSUMING TRANSFORMER OIL VOLUME <2000 L.
TRANSFORMER CLEARANCE CAN BE REDUCED
THROUGH USE OF LESS FLAMMABLE LIQUID
INSULATED TRANSFORMERS WITH ENHANCED
PROTECTION (SEE IEC 61936). IN THE US
TRANSFORMER CLEARANCES CAN BE REDUCED TO
2438mm[8'] TO MEET CONDITION 2 of NEC 110.34.

- 4. 300mm<sup>2</sup>; OR 400mm<sup>2</sup>; ONLY. SEE ENG01-2625987 & ENG01-2625988 FOR STANDARD CABLE CALCULATIONS
- 5. WHERE POWER CABLES ARE TO BE INSTALLED IN PARALLEL OR IN PROXIMITY TO COMMUNICATIONS CABLES, SAFETY SERVICES AND OTHER SERVICES THE INSTALLATION SHALL COMPLY WITH THE RELEVANT LOCAL NATIONAL STANDARDS.

### LEGEND

	CIRCUIT BREAKER
	FUSED SWITCH
\	NO LOAD ISOLATION SWITCH
	TRANSFORMER
네⊢	BATTERY
==	POWER CONVERSION SYSTEM 6x INDEPENDENT DC INPUTS
Δ	CABLE TERMINATION

GENERIC
LAYOUT AND
CABLE DETAILS

LAYOUT DWG N/A T-LAYOUT NO. N/A

03022-RES-BAT-DR-EE-001

SCALE - AS SHOWN @ A1

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