Planning and Environmental Consultants

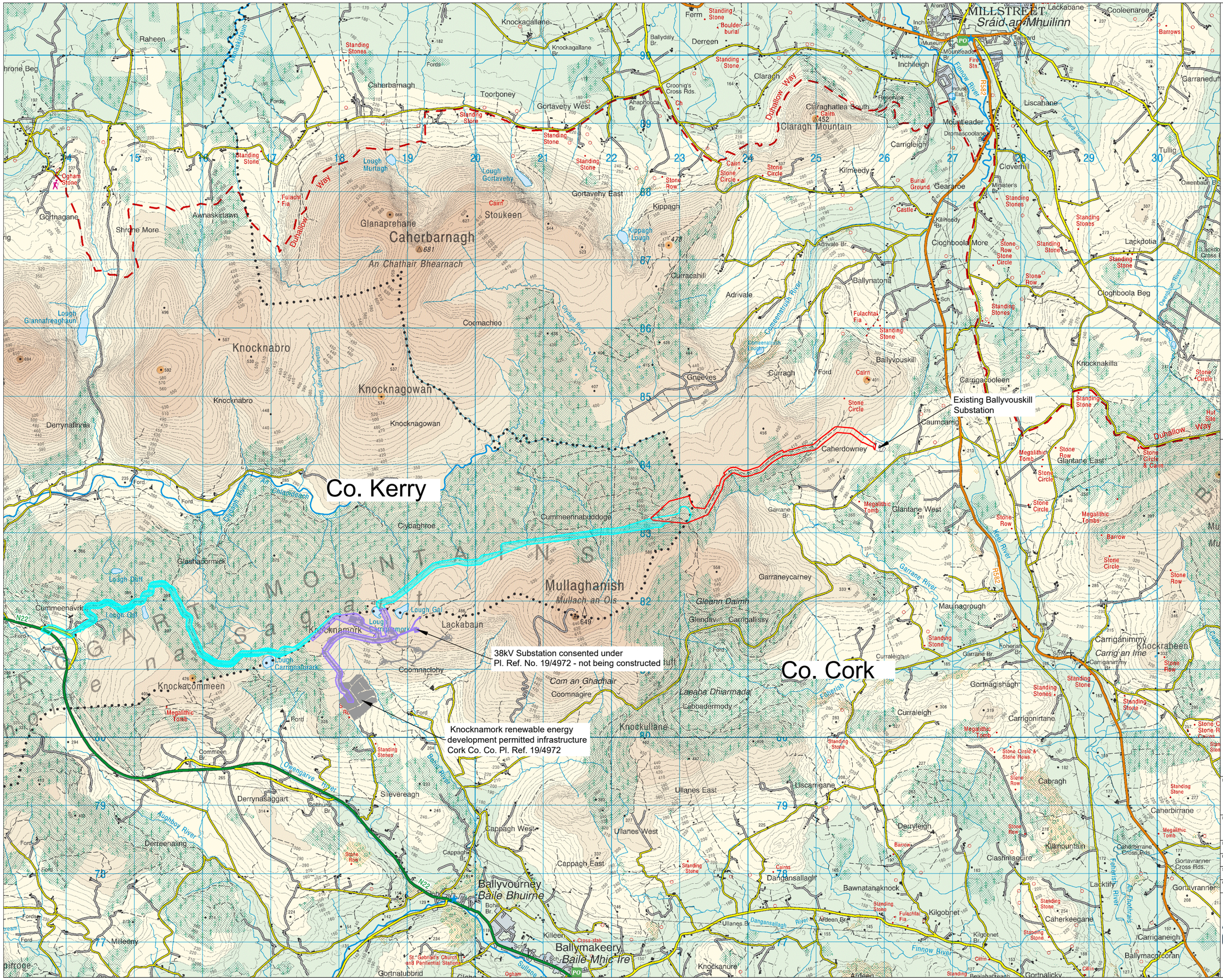
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

Planning Permission Application Drawings

Schedule of Drawings

Drawing No.	Drawing Title	Scale	Size
210732 – 01	Location Context Map	1: 50,000	@ A3
210732 – 02	Site Location Map	1: 40,000	@ A3
210732 – 02A	Site Location Map Sheet A	1: 5,000	@ A3
210732 – 02B	Site Location Map Sheet B	1: 5,000	@ A3
210732 – 03	Site Layout Overview	1: 40,000	@ A3
210732 – 04	Site Layout Keyplan	1: 40,000	@ A3
210732 – 05	Site Layout Sheet 1 of 4	1: 2,500	@ A3
210732 – 06	Site Layout Sheet 2 of 4	1: 2,500	@ A3
210732 – 07	Site Layout Sheet 3 of 4	1: 2,500	@ A3
210732 – 08	Site Layout Sheet 4 of 4	1: 2,500	@ A3
210732 – 09	Substation Compound Layout	1: 500	@ A3
210732 – 10	Substation Compound Elevations	1: 200	@ A1
210732 – 11	Substation Compound Sections	1: 200	@ A1
210732 – 12	Control Building 1 Plan	1: 100	@ A3
210732 – 13	Control Building 1 Elevations & Section	1: 100	@ A3
210732 – 14	Control Building 2 Plan	1: 100	@ A3
210732 – 15	Control Building 2 Elevations & Section	1: 100	@ A3
210732 – 16	Borrow Pit	1: 1,000	@ A3
210732 – 17	Borrow Pit Sections	1: 500	@ A3
210732 – 18	Joint Bay Location Map	1: 40,000	@ A3
210732 – 19	Joint Bay Location Map (1:10,000)	1: 40,000	@ A3
210732 – 20	Option A – Cross Section – 110kV	1: 20	@ A3
210732 – 21	Option B – Flat Bed Under Existing Pipe – 110kV	As Shown	@ A3
210732 – 22	Option C – Flat Bed Over Existing Pipe – 110kV	As Shown	@ A3
210732 – 23	Option D – Typical Horizontal Directional Drill – Cross Section	1: 200	@ A3
210732 – 24	Option E – Clear Span – 110kV	1: 50	@ A3
210732 – 25	Option F – Pipe Crossing – 110kV	1: 20	@ A3
210732 – 26	Option F – Pipe Crossing – 110kV	1: 20	@ A3
210732 – 27	Option G – Corrugated Steel Arch Culvert Crossing	1: 100	@ A3
210732 – 28	Proposed 110kV Road Detail	1 :50	@ A3
210732 – 29	Plan of Joint Bay	1: 25	@ A3
210732 – 30	Joint Bay Sections	1: 25	@ A3
210732 – 31	Upgrade of Existing Excavated Access Roads	1: 30	@ A3
210732 – 32	New Excavate and Replace Access Road	1: 50	@ A3

Drawing No.	Drainage Drawing Title	Scale	Size
D101	Proposed Drainage Layout	1:2,000	@ A1
D102	Proposed Drainage Layout	1:2,000	@ A1
D103	Proposed Drainage Layout	1:2,000	@ A1
D104	Proposed Drainage Layout	1:2,000	@ A1
D105	Proposed Drainage Layout	1:2,000	@ A1
D106	Proposed Drainage Layout	1:2,000	@ A1
D107	Proposed Drainage Layout	1:2,000	@ A1
D108	Proposed Drainage Layout	1:2,000	@ A1
D109	Proposed Drainage Layout	1:2,000	@ A1
D110	Proposed Drainage Layout	1:2,000	@ A1
D111	Proposed Drainage Layout	1:2,000	@ A1
D501	Drainage Details 1	As Shown	@ A1
D502	Drainage Details 2	As Shown	@ A1
D503	Drainage Details 3	As Shown	@ A1
D504	Drainage Details 4	As Shown	@ A1



Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary Cork County Council
- Application Boundary Kerry County Council

DRAWING TITLE:

Location Context Map

PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 01
SCALE: 1:50,000 @ A3	DATE: 26.07.2022
OS SHEET No.: OS1006, OS1008, OS1206, OS1208	

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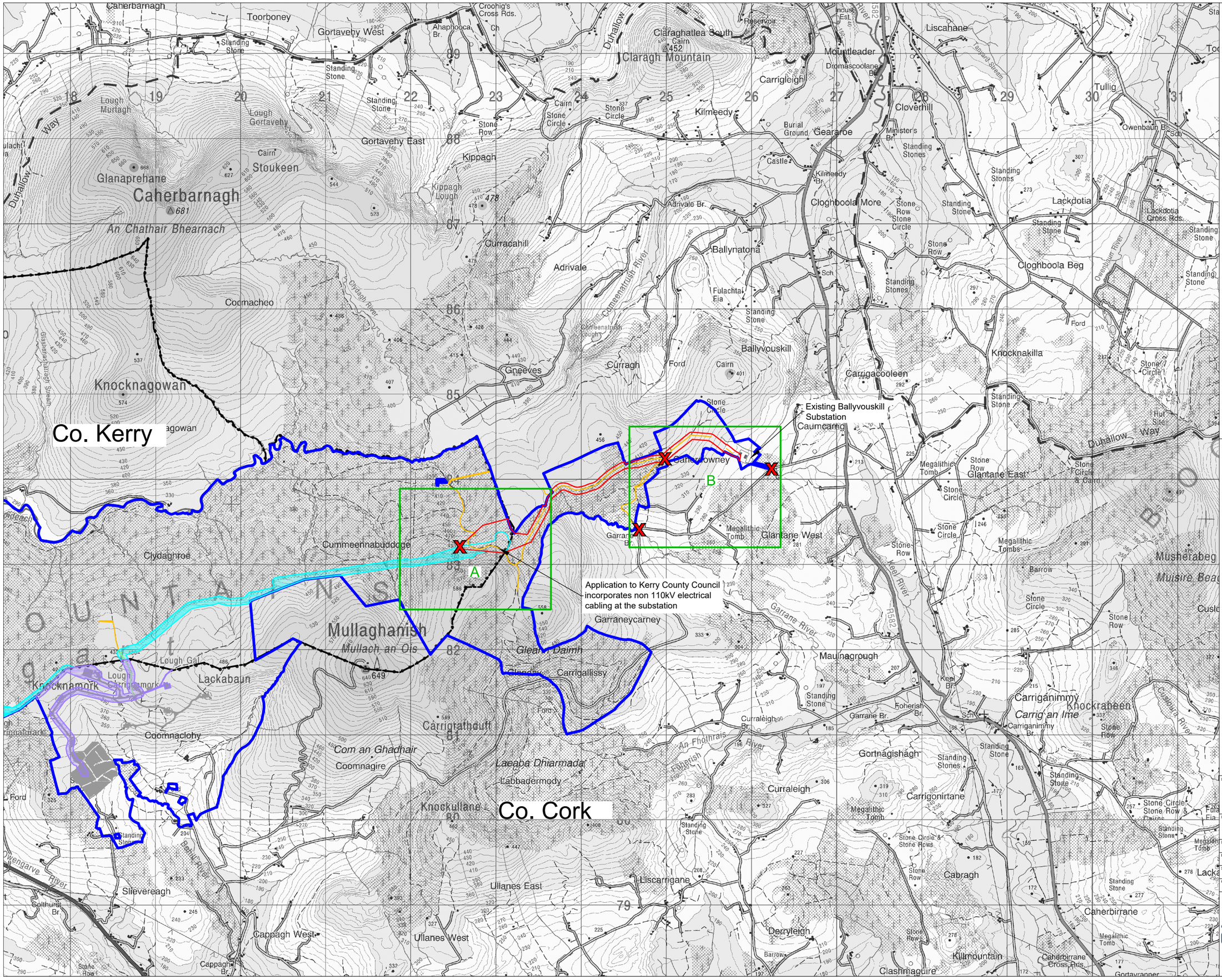

Drawing Legend

- Application Boundary An Bord Pleanala
- Landowners Boundary
- Application Boundary Kerry County Council
- Site Notice
- Wayleaves

DRAWING TITLE:

Site Location Map

PROJECT TITLE:

Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 02
SCALE: 1:40,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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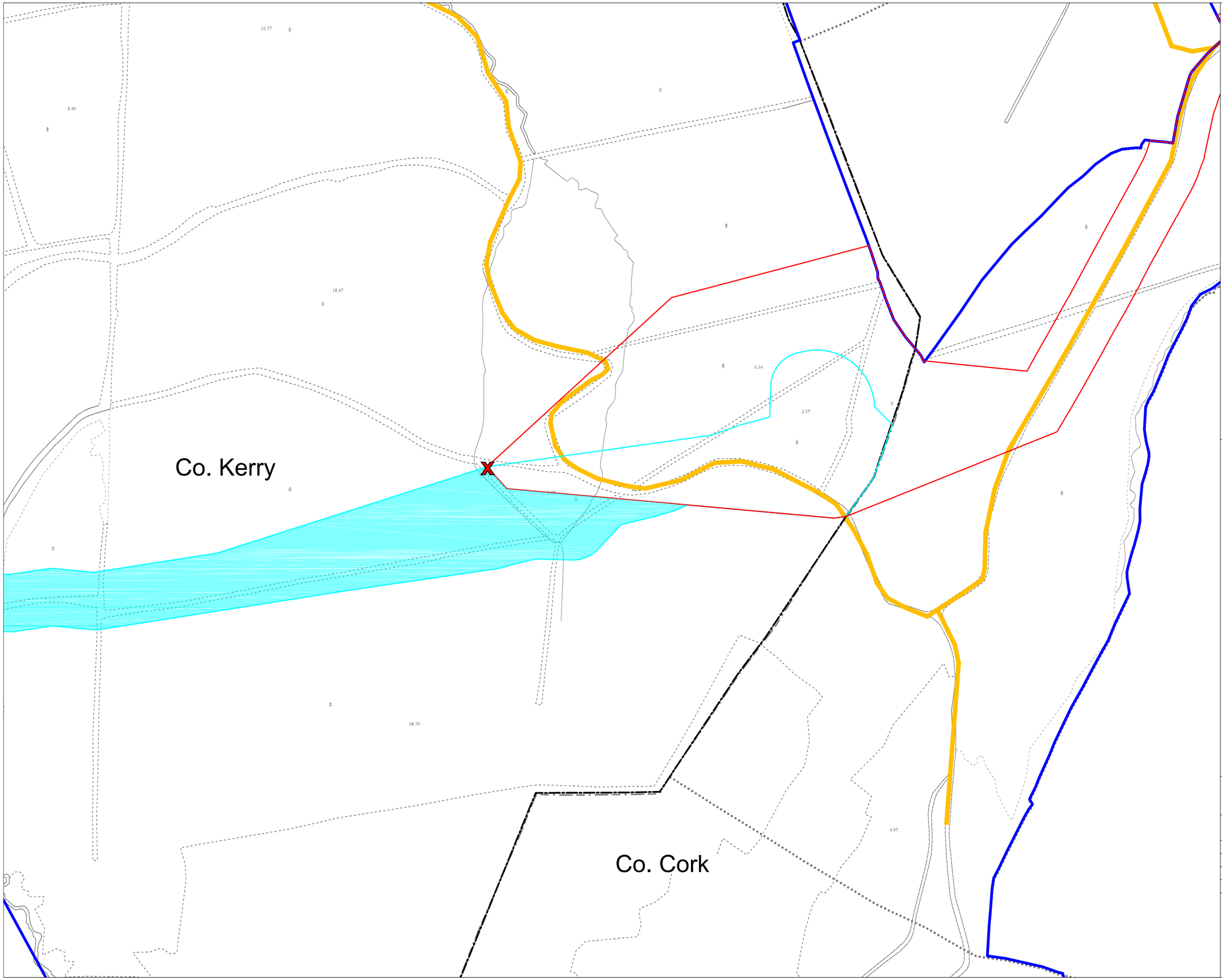

Drawing Legend

- Application Boundary An Bord Pleanala
- Landowners Boundary
- Application Boundary Kerry County Council
- Site Notice
- Wayleaves

N

DRAWING TITLE:
Site Location Map Sheet A

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 02A
SCALE: 1:5,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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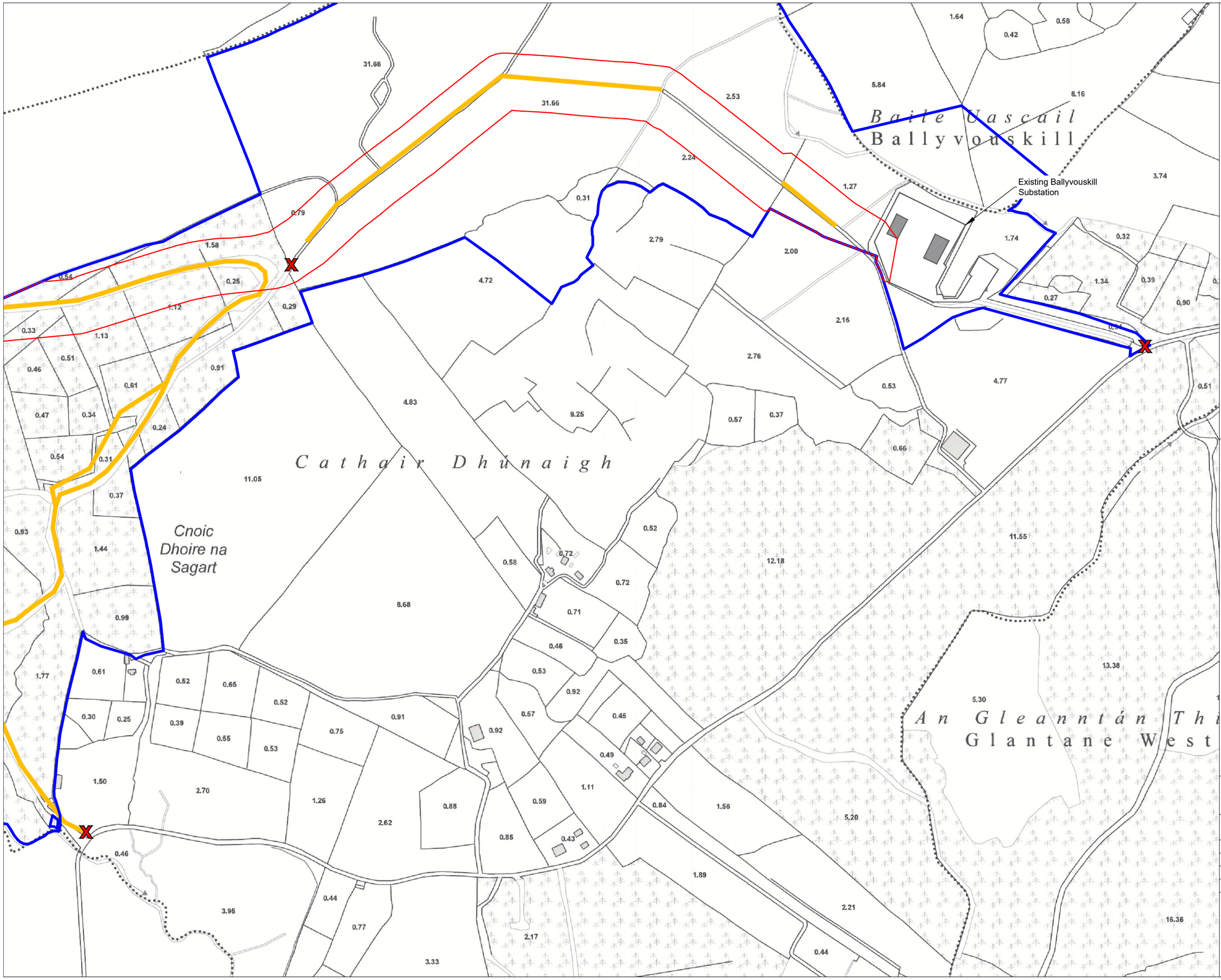

Drawing Legend

- Application Boundary An Bord Pleanala
- Landowners Boundary
- Site Notice
- Wayleaves

N

DRAWING TITLE:

Site Location Map Sheet B

PROJECT TITLE:

Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 02B
SCALE: 1:5,000 @ A3	DATE: 26.07.2022
OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277	

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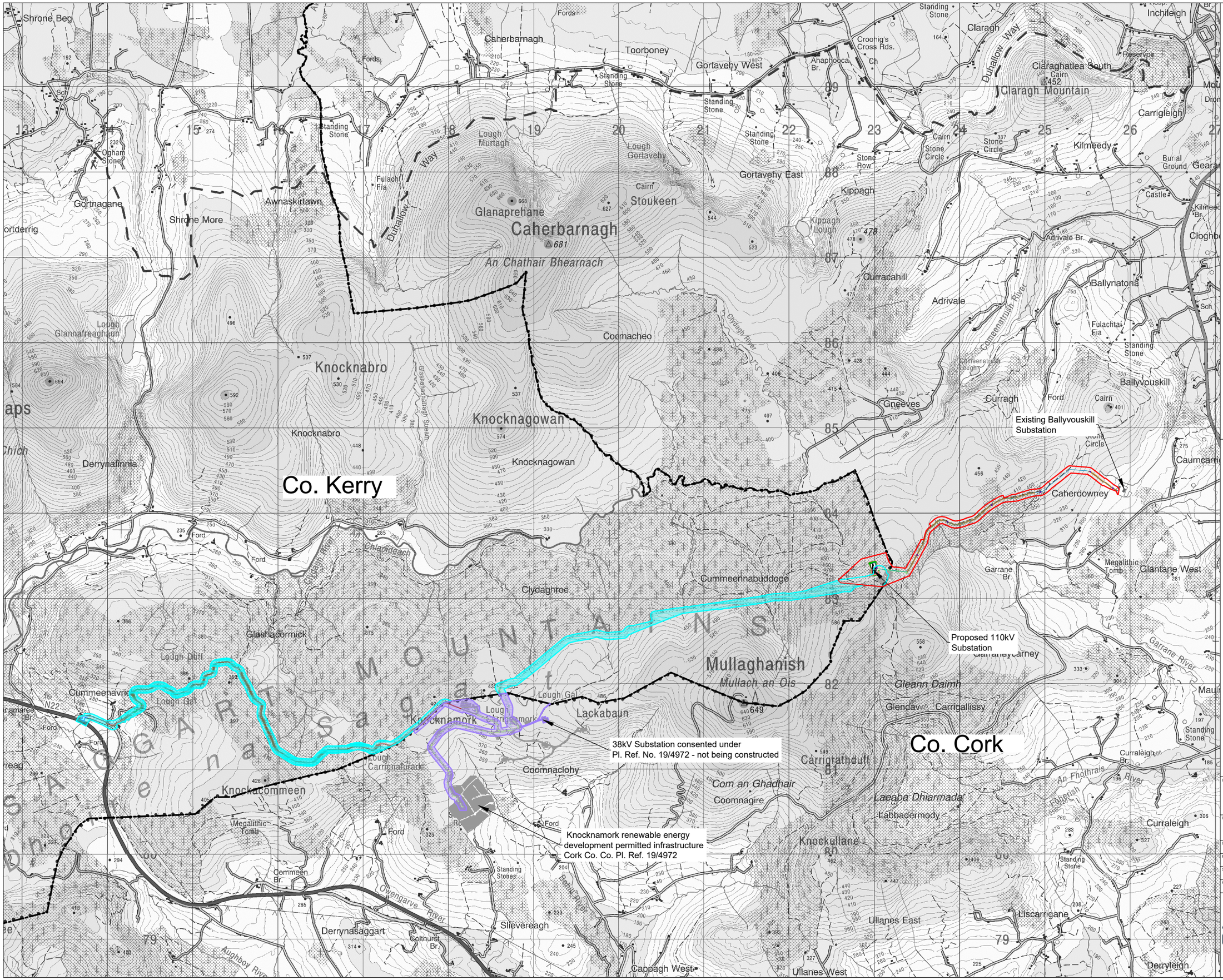

DRAWING TITLE:

Site Layout Overview

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 03
SCALE: 1:40,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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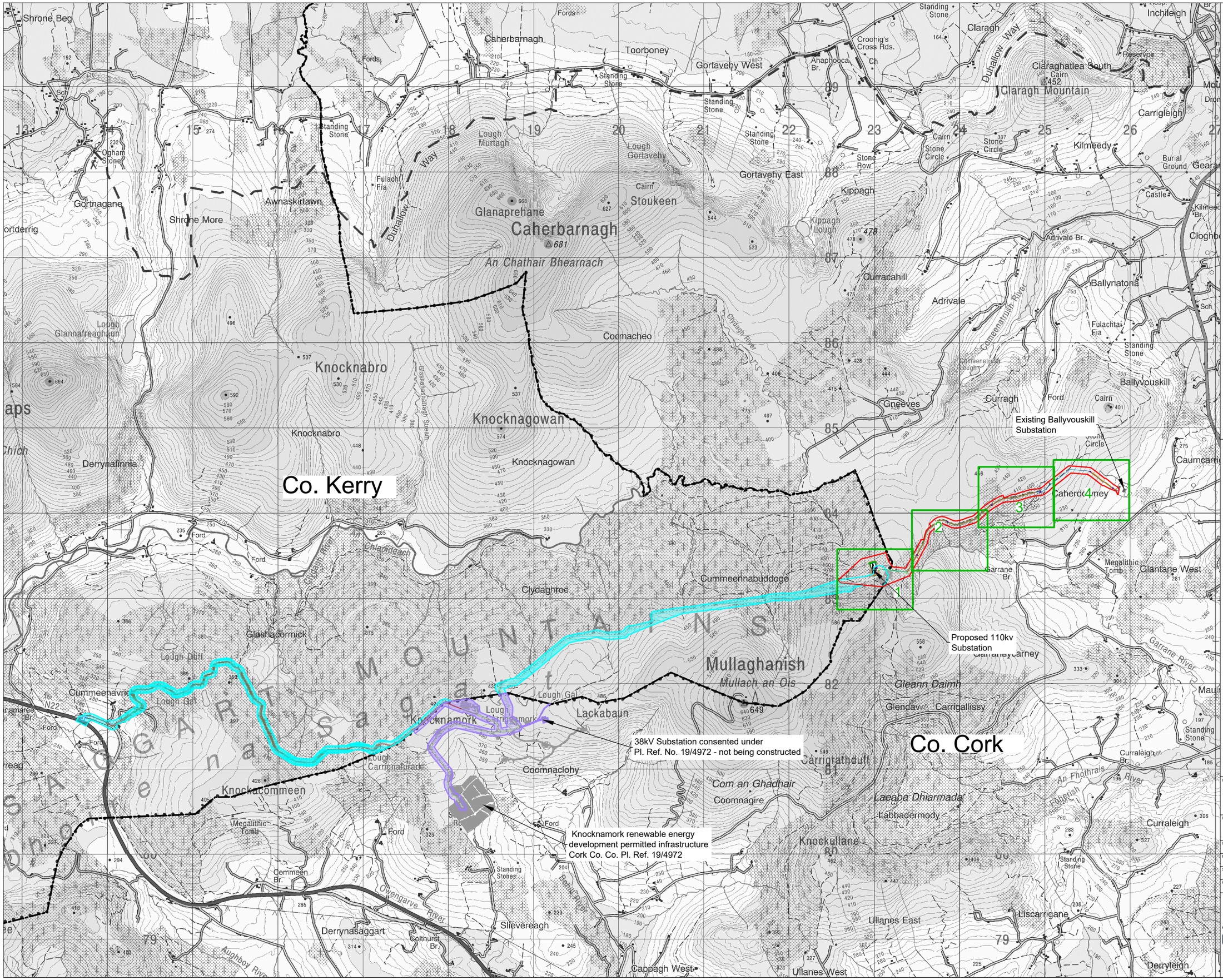

Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary Cork County Council
- Application Boundary Kerry County Council
- Proposed 110kV Electrical Cabling
- Permitted Knocknamork renewable energy development permitted infrastructure Cork Co. Co. Pl. Ref. 19/4972
- Proposed Electrical Cabling Maintenance Track
- Proposed Substation Access Track
- Joint Bay
- Cut
- Fill
- Borrow Pit
- County Border

N

DRAWING TITLE:

Site Layout Keyplan

PROJECT TITLE: **Knocknamork Grid Connection Infrastructure, An Bord Pleanala**

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 04
SCALE: 1:40,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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Proposed Substation
Refer to DWG
210732 -09

80000

155750

Joint Bay 1

Control Building

Non EPA Water Crossing 8
Refer to DWG 210732 - 21

40000

Joint Bay 2

Non EP
Refer t

40000

40000

Proposed Borrow Pit
Refer to DWG
210732-17

87945

43530

Application to Kerry County Council
incorporates non 110kV electrical
cabling at the substation

Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary Kerry County Council
- Proposed 110kV Electrical Cabling
- Proposed Electrical Cabling Maintenance Track
- Proposed Substation Access Track
- Joint Bay
- Cut
- Fill
- Borrow Pit
- County Border

N

DRAWING TITLE:

Site Layout Plan
Sheet 1 of 4

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 05
SCALE: 1:2,500 @ A3	DATE: 26.07.2022
OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277	

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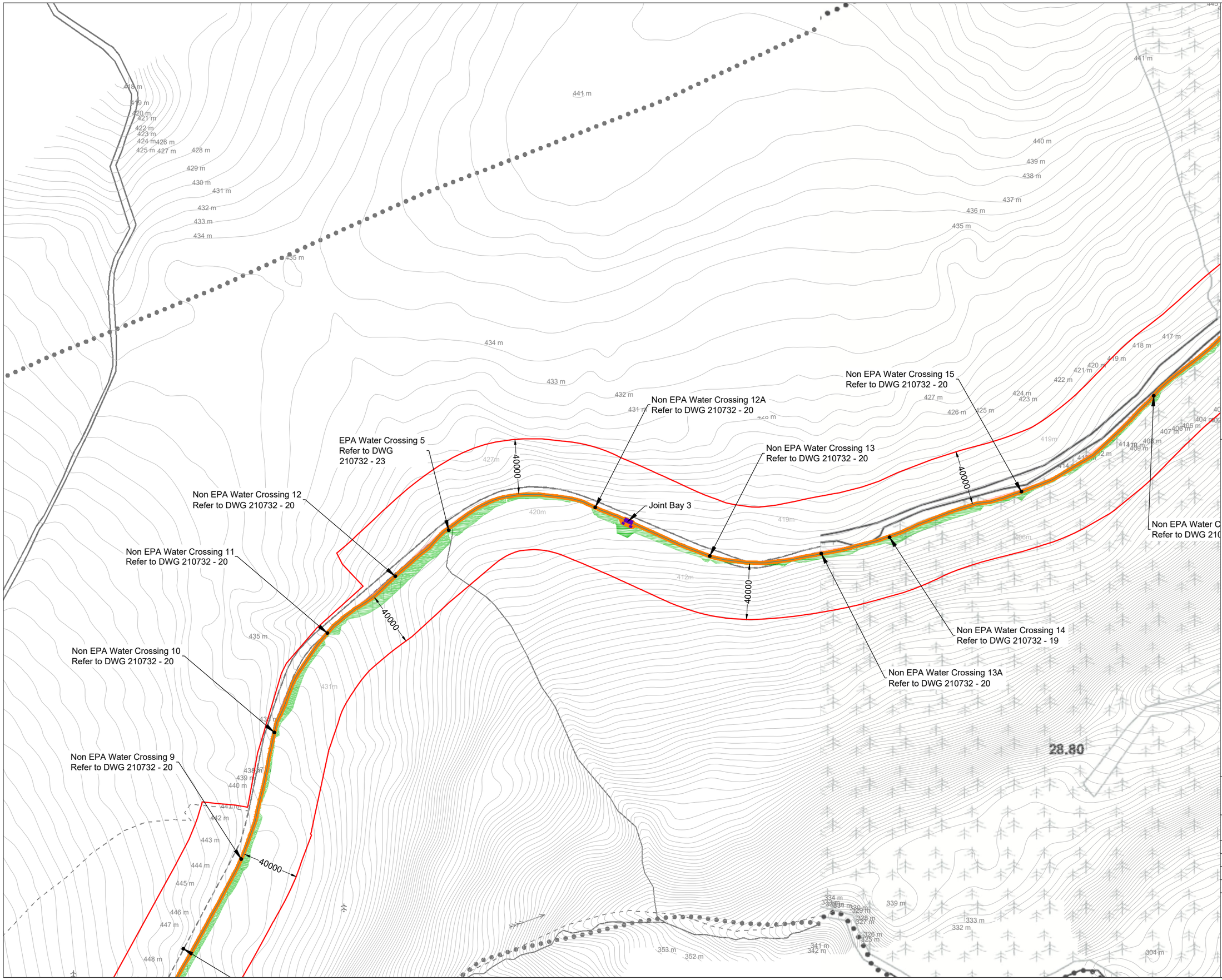

Drawing Legend

- Application Boundary An Bord Pleanala
- Proposed 110kV Electrical Cabling
- Proposed Electrical Cabling Maintenance Track
- Joint Bay
- Cut
- Fill

N

DRAWING TITLE:

Site Layout Plan
Sheet 2 of 4

PROJECT TITLE:

Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 06
SCALE: 1:2,500 @ A3	DATE: 26.07.2022
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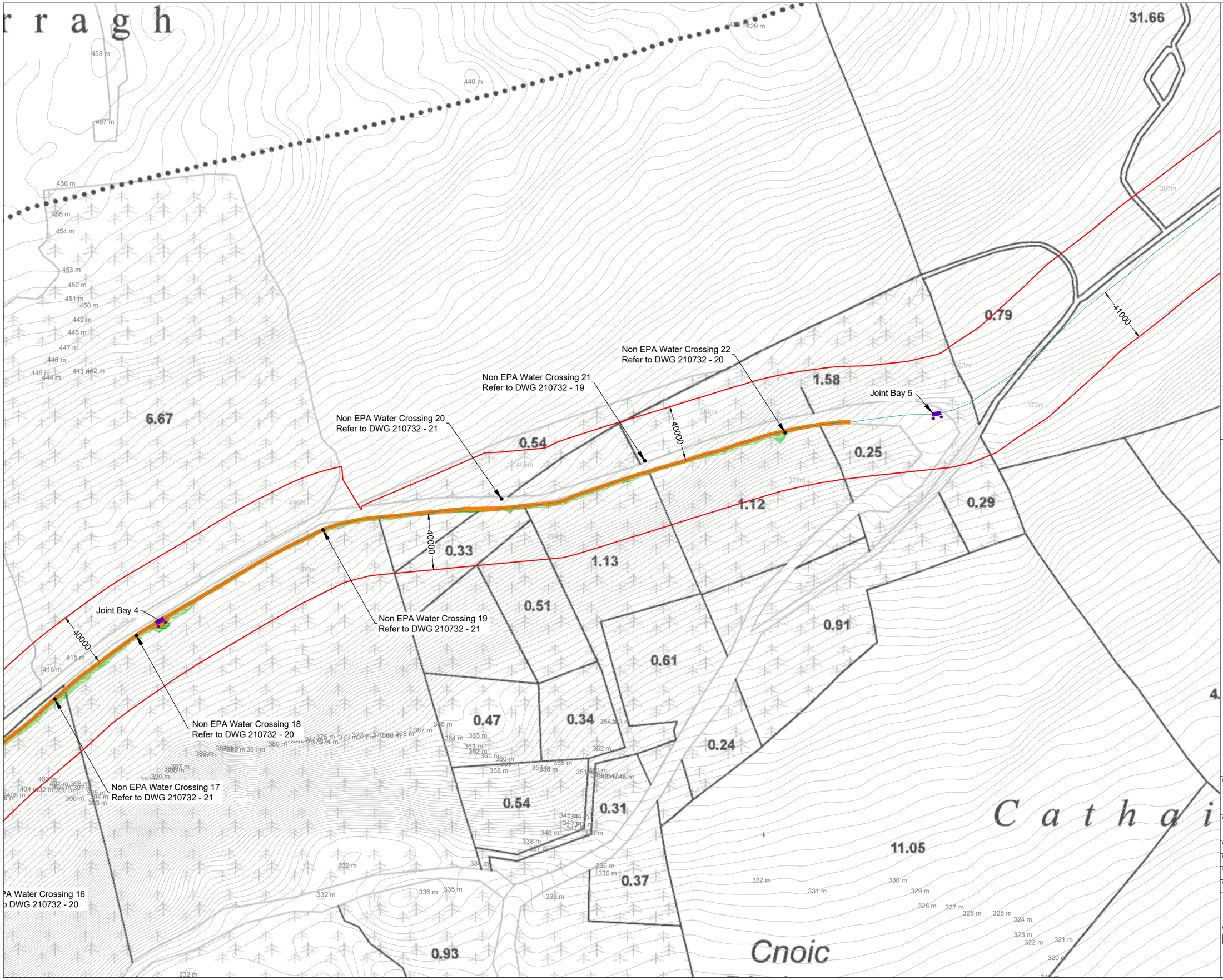

Drawing Legend

- Application Boundary An Bord Pleanala
- Proposed 110kV Electrical Cabling
- Proposed Electrical Cabling Maintenance Track
- Joint Bay
- Cut
- Fill

N

DRAWING TITLE:

Site Layout Plan
Sheet 3 of 4

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 07
SCALE: 1:2,500 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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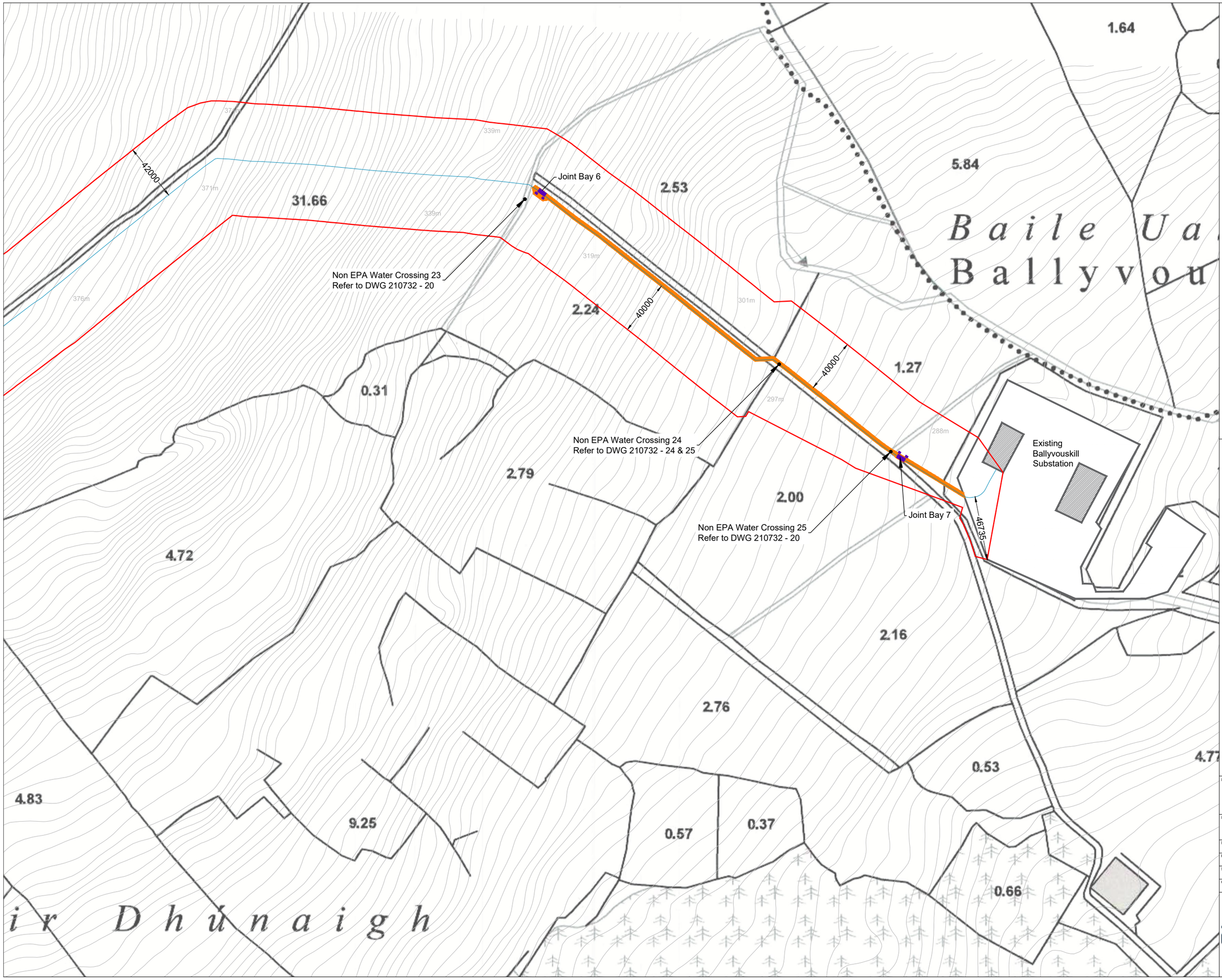

Drawing Legend

- Application Boundary An Bord Pleanala
- Proposed 110kV Electrical Cabling
- Proposed Electrical Cabling Maintenance Track
- Joint Bay
- Cut
- Fill

N

DRAWING TITLE:

Site Layout Plan
Sheet 4 of 4

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 08
SCALE: 1:2,500 @ A3	DATE: 26.07.2022

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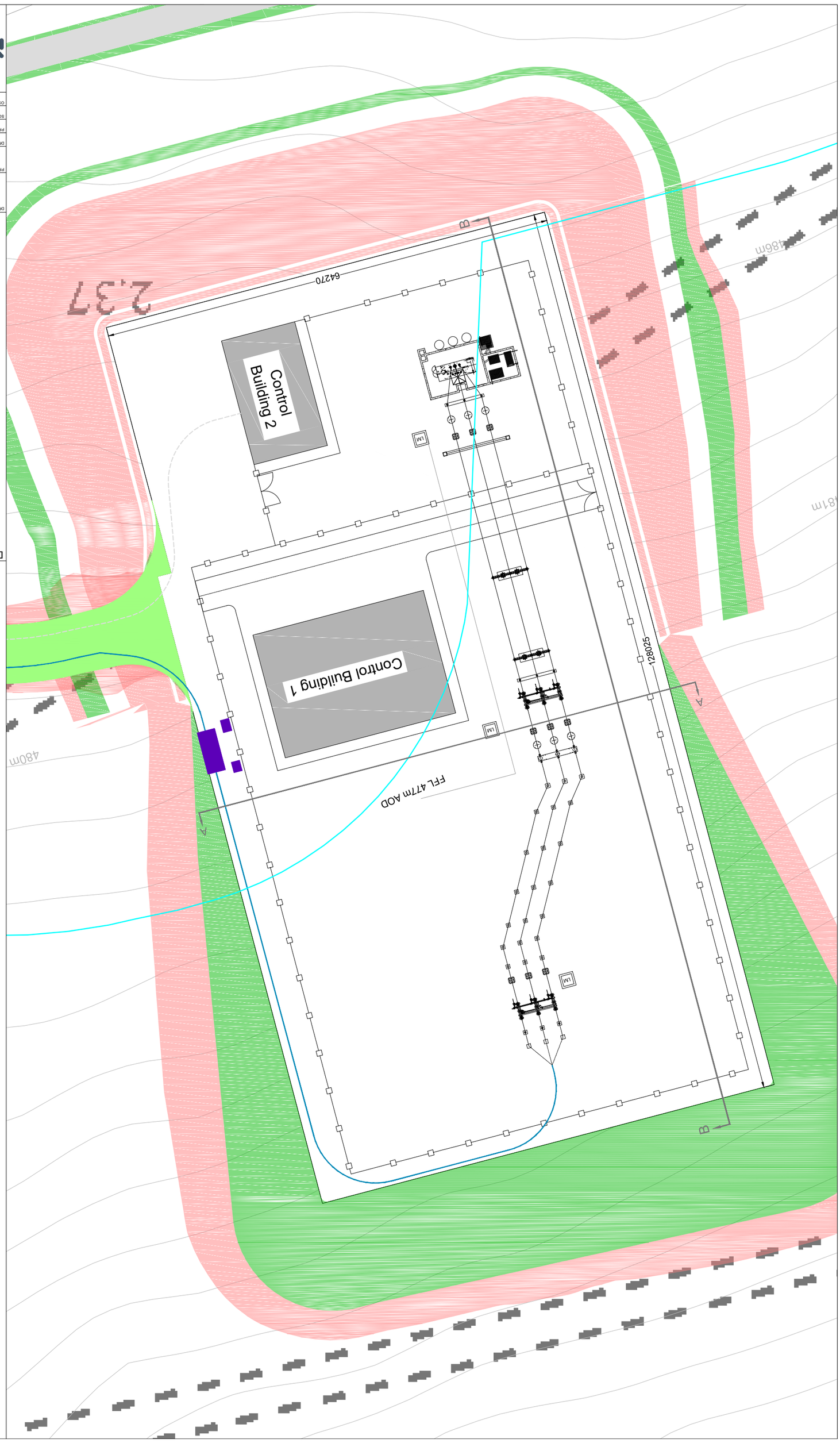

Drawing Legend

- Proposed 110kV Electrical Cabling
- Proposed Substation Access Track
- Joint Bay
- Cut
- Fill

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N

DRAWING TITLE:

Substation Compound Layout

PROJECT TITLE:

Knockanmork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: **Joseph O Brien**	CHECKED BY: **Meabhann Crowe**
PROJECT No.: **210732**	DRAWING No.: **210732 - 09**
SCALE: **1:500 @ A3**	DATE: **26.07.2022**
OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277	

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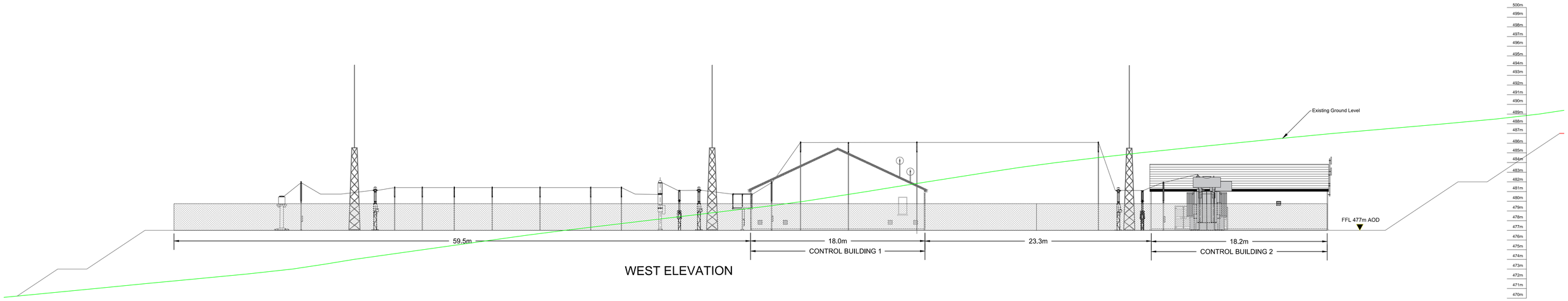
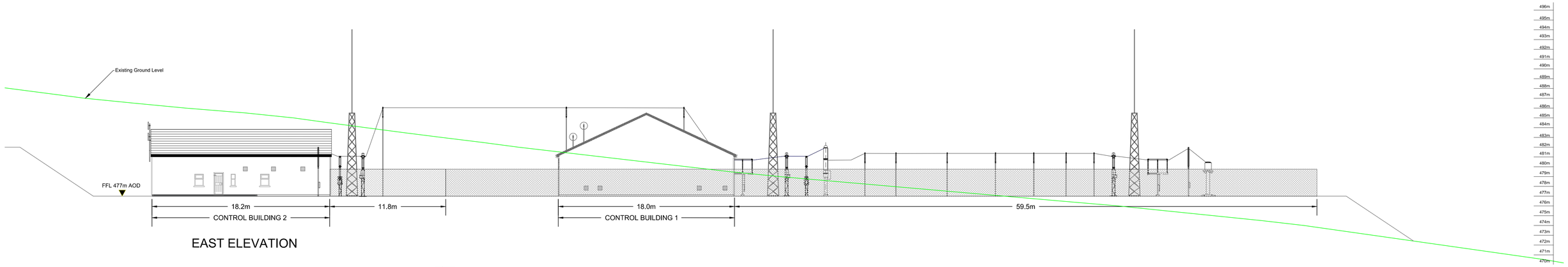
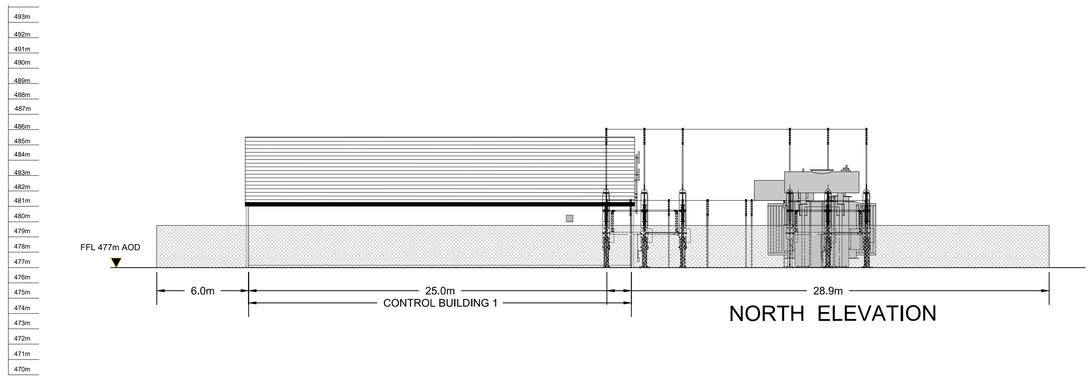


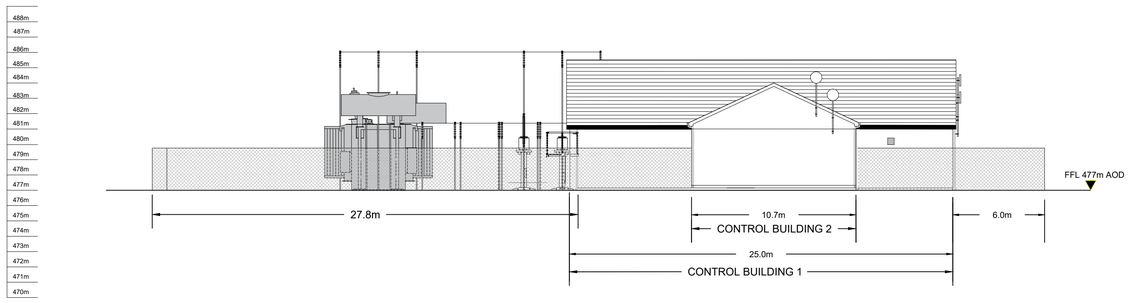
WEST ELEVATION



EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

DRAWING TITLE:
Substation Compound Elevations

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No: 210732	DRAWING No: 210732 - 10
SCALE: 1:200 @ A1	DATE: 26.07.2022

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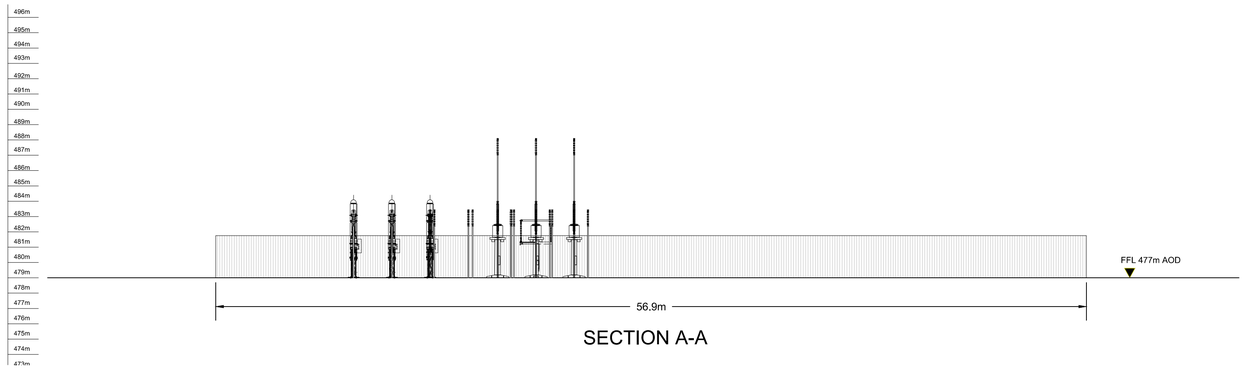
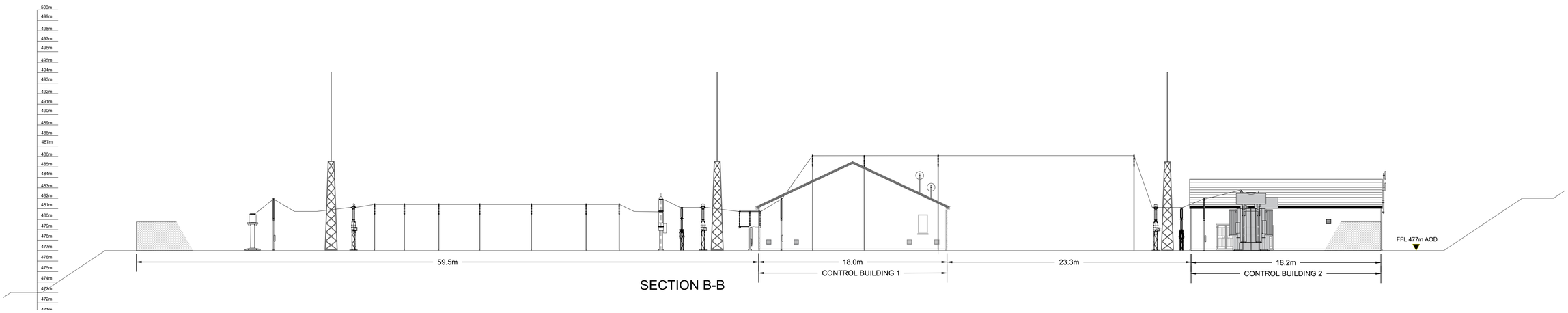


SECTION A-A



SECTION B-B

DRAWING TITLE:

Substation Compound Sections

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 11
SCALE: 1:200 @ A1	DATE: 26.07.2022

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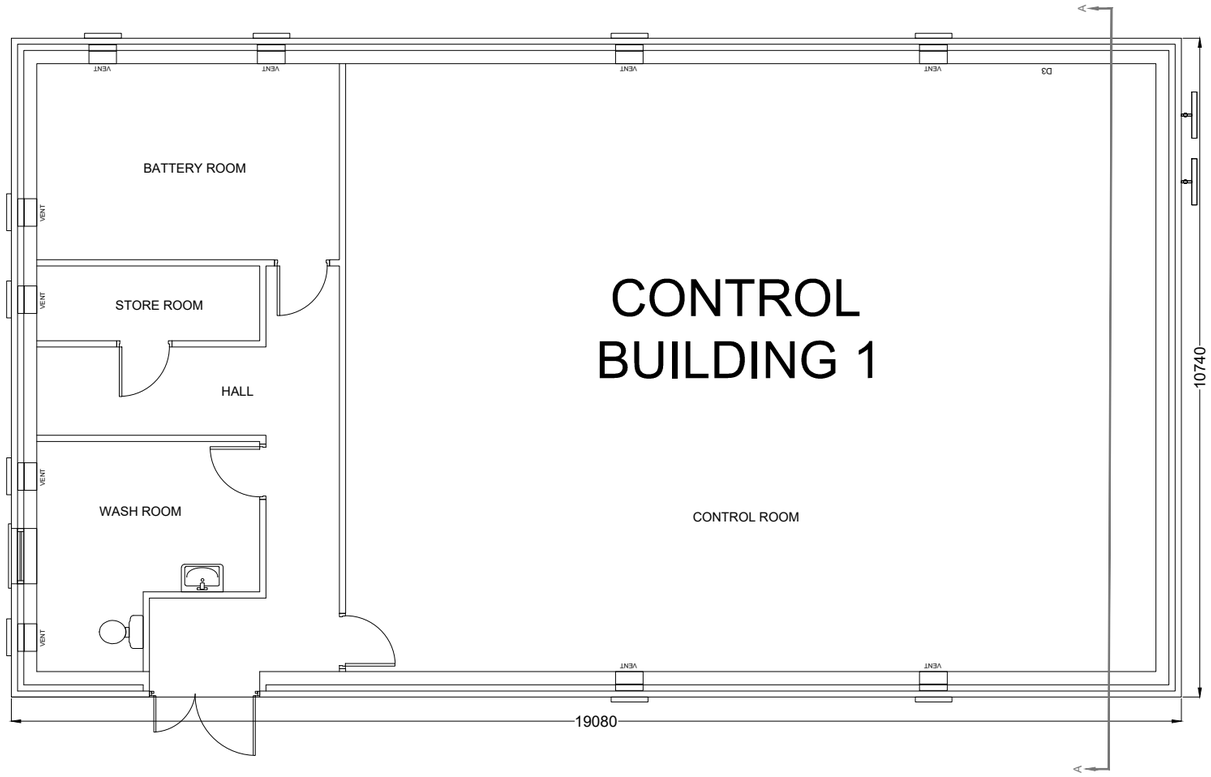

DRAWING TITLE:

Control Building 1 Plan

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 12
SCALE: 1:100 @ A3	DATE: 26.07.2022

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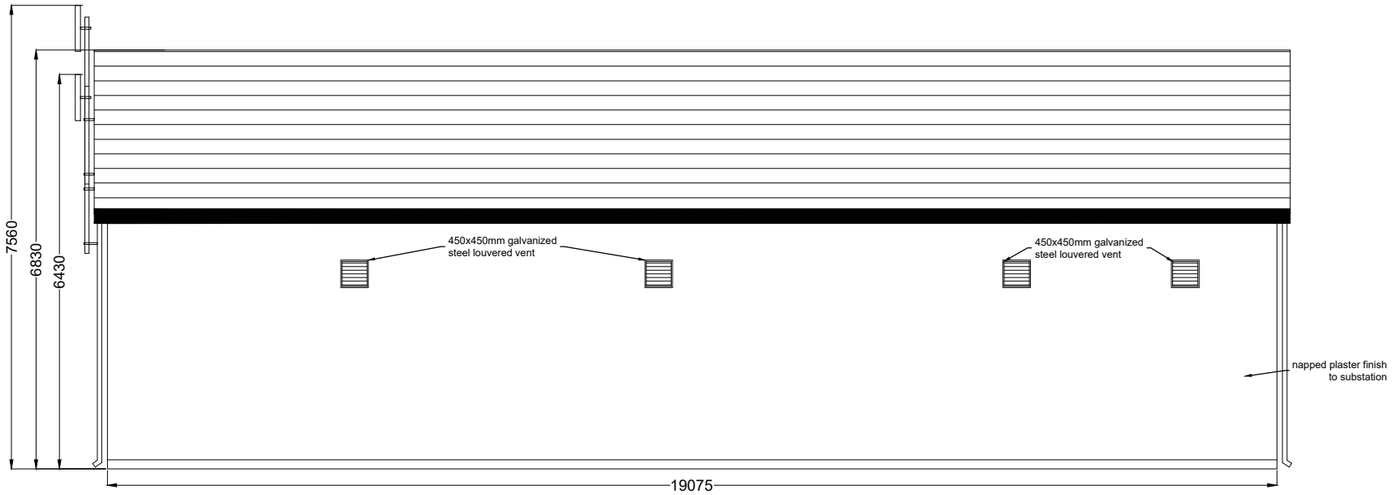
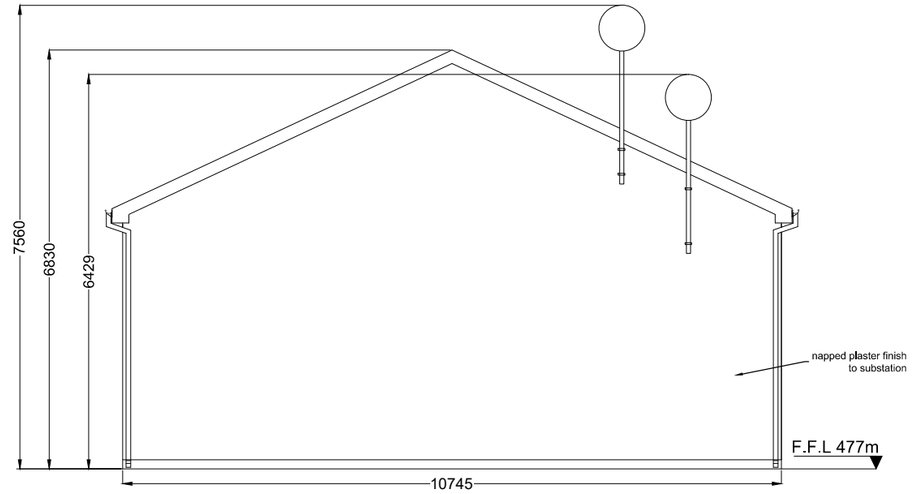
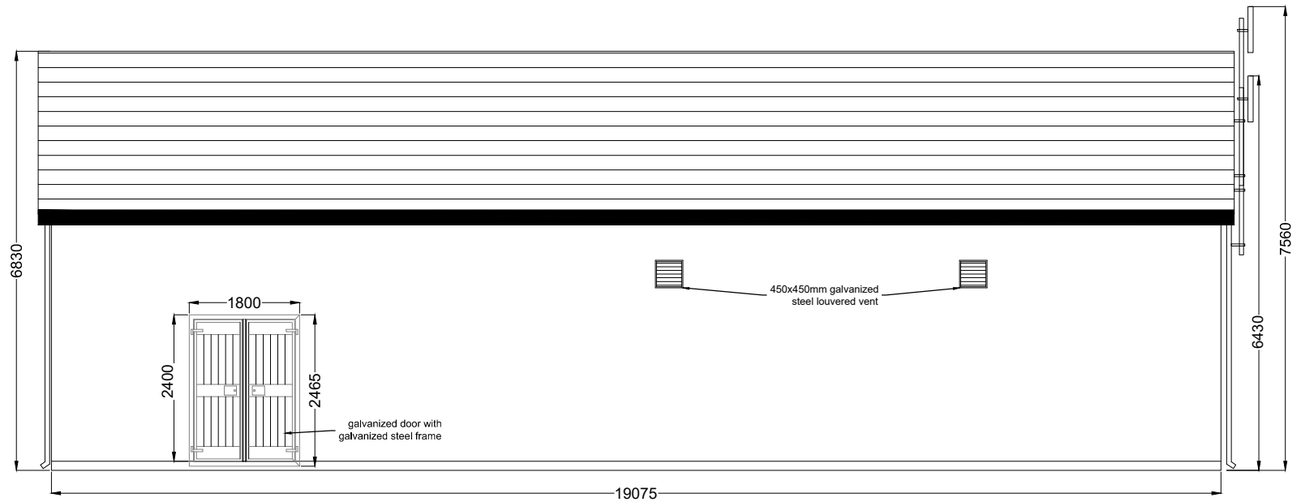


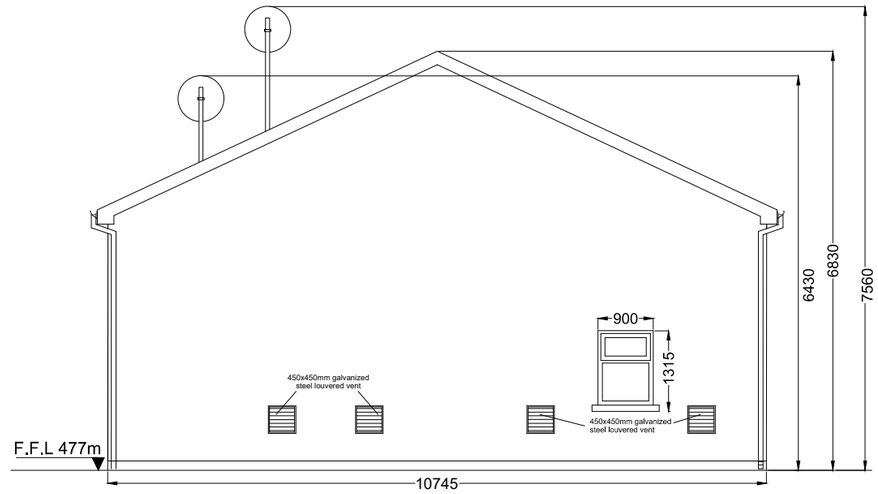
North Elevation



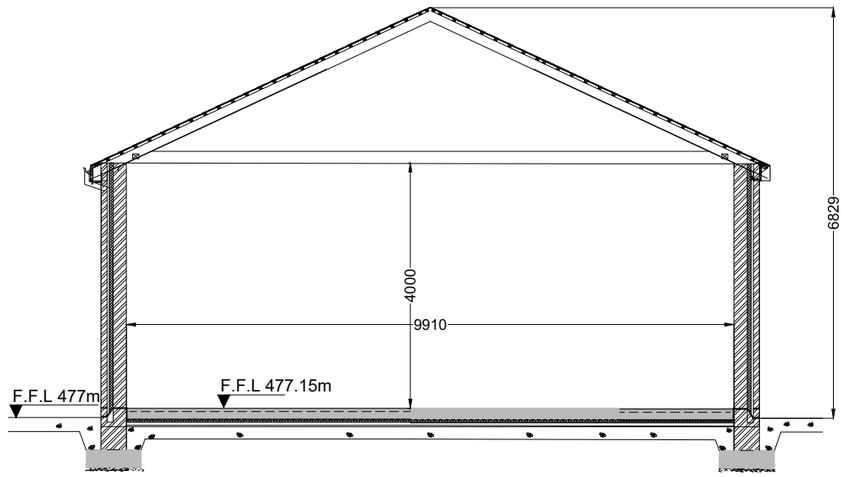
East Elevation



South Elevation



West Elevation



SECTION A-A

DRAWING TITLE:
Control Building 1 Elevations & Section

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 13
SCALE: 1:100 @ A3	DATE: 26.07.2022

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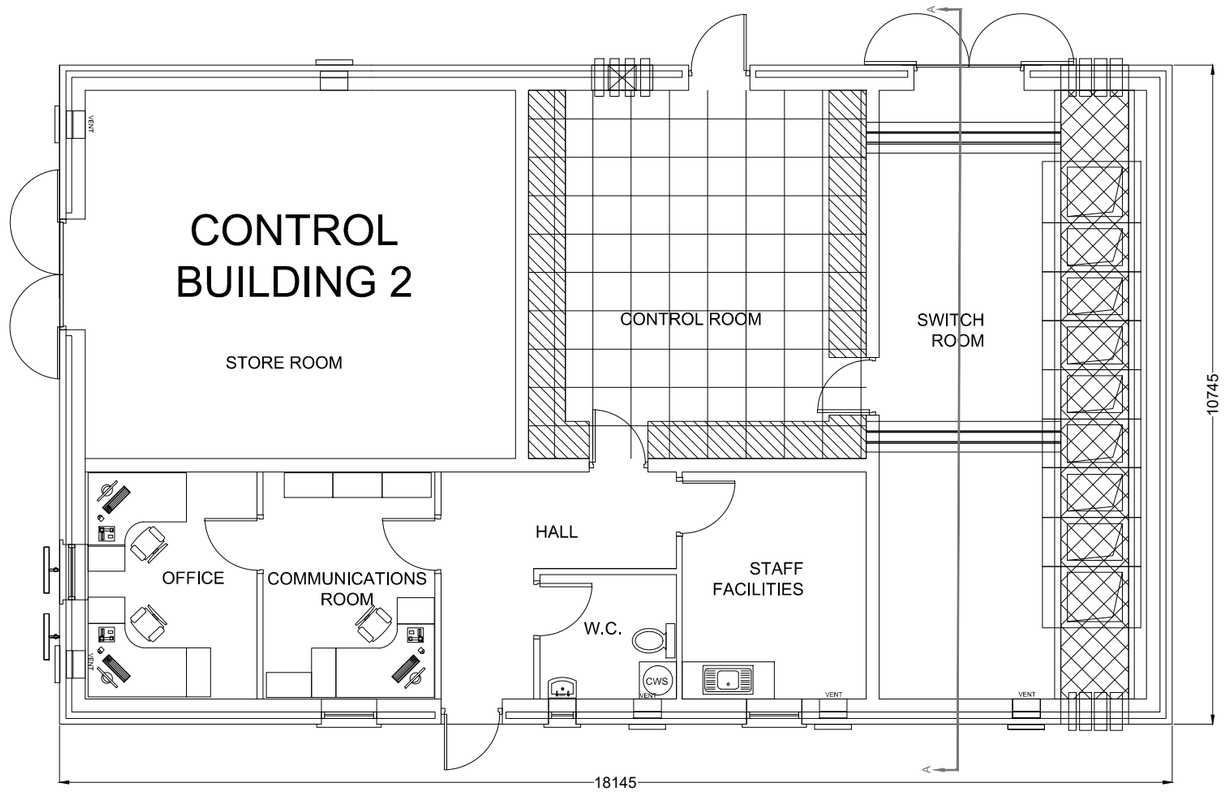

DRAWING TITLE:

Control Building 2 Plan

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 14
SCALE: 1:100 @ A3	DATE: 26.07.2022

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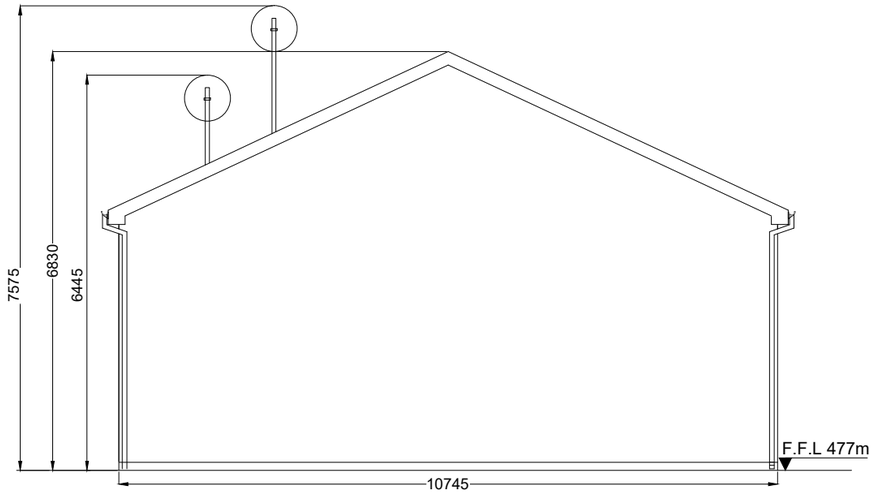
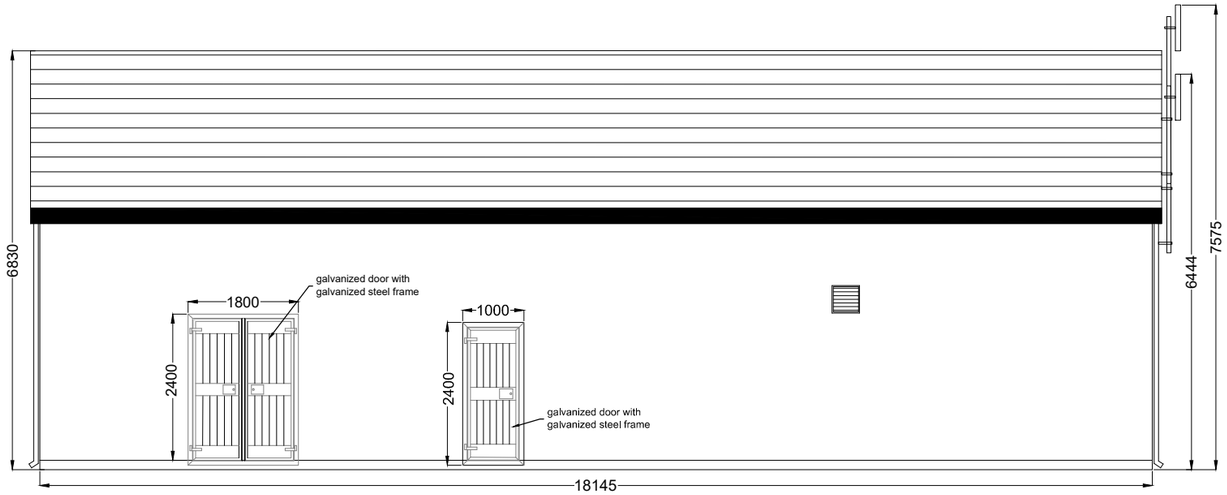
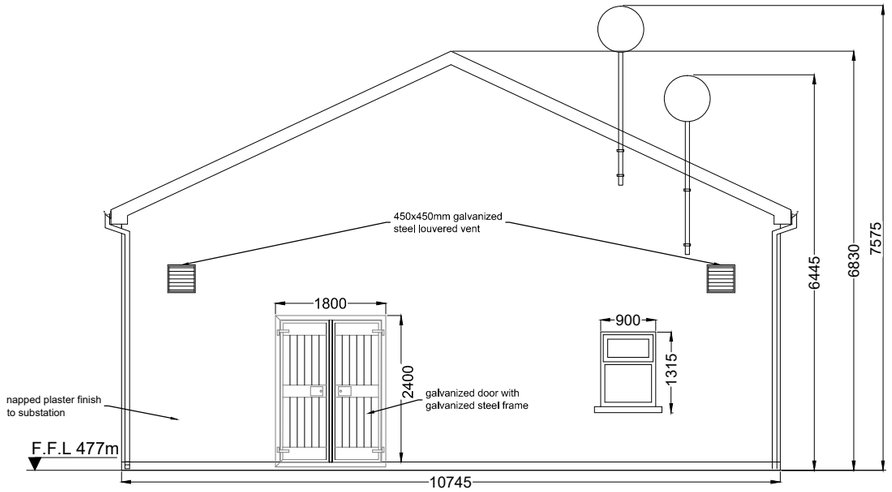


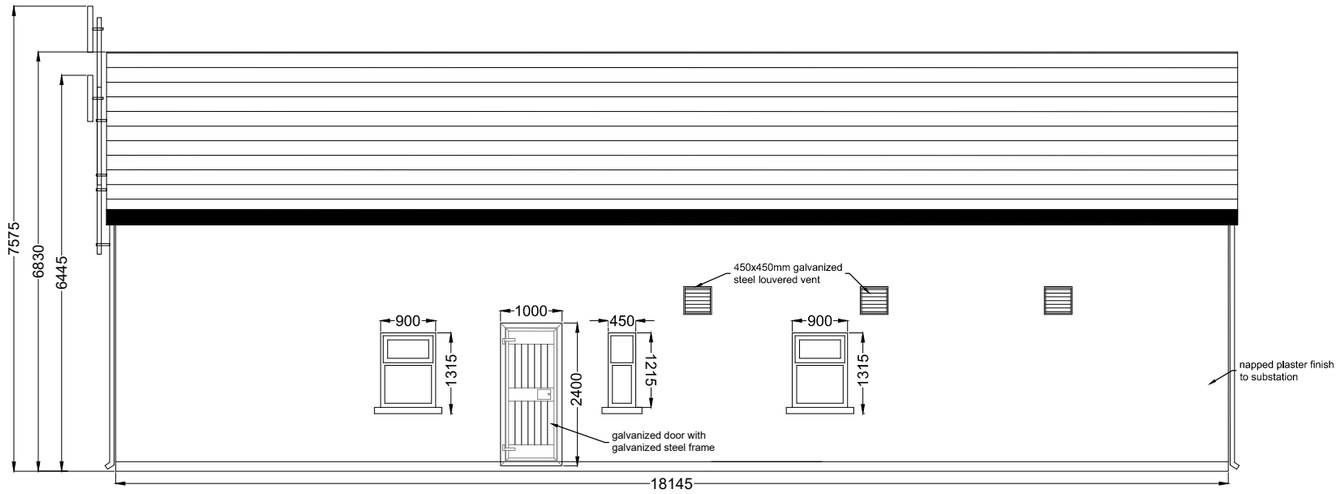
North Elevation



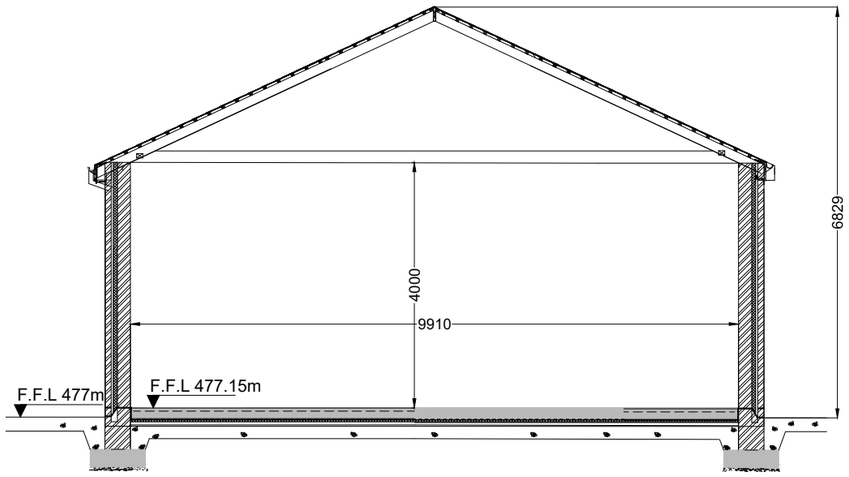
West Elevation



South Elevation



East Elevation



SECTION A-A

DRAWING TITLE:
Control Building 2
Elevations & Section

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: **Joseph O Brien**	CHECKED BY: **Meabhann Crowe**
PROJECT No.: **210732**	DRAWING No.: **210732 - 15**
SCALE: **1:100 @ A3**	DATE: **26.07.2022**

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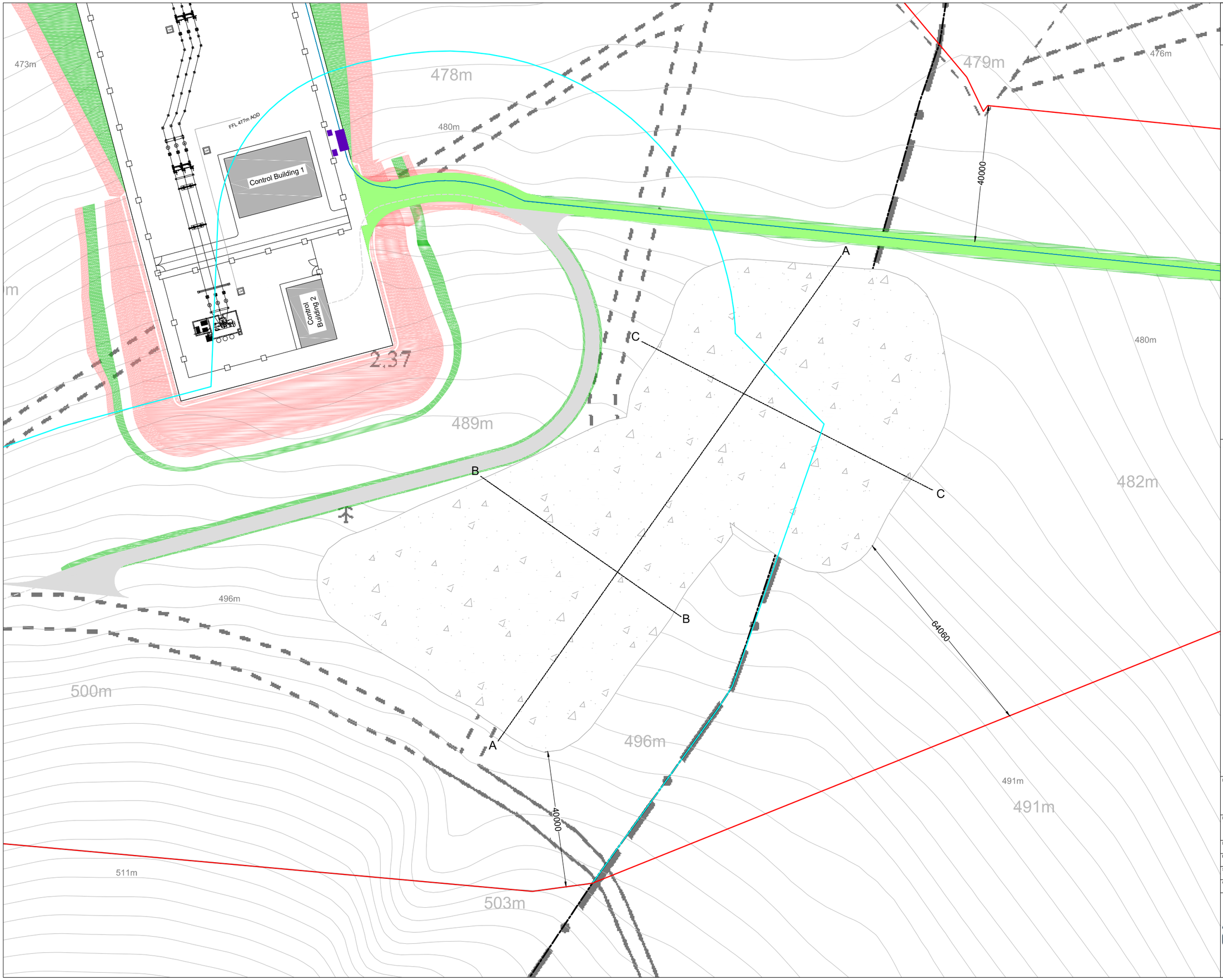

Drawing Note:
Refer to DWG
210732 -17 for Section Details

Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary KerryCounty Council
- Proposed 110kV Electrical Cabling
- Proposed Substation Access Track
- Joint Bay
- Cut
- Fill
- Borrow Pit

N

DRAWING TITLE:

Borrow Pit

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 16
SCALE: 1:1,000 @ A3	DATE: 26.07.2022
OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277	

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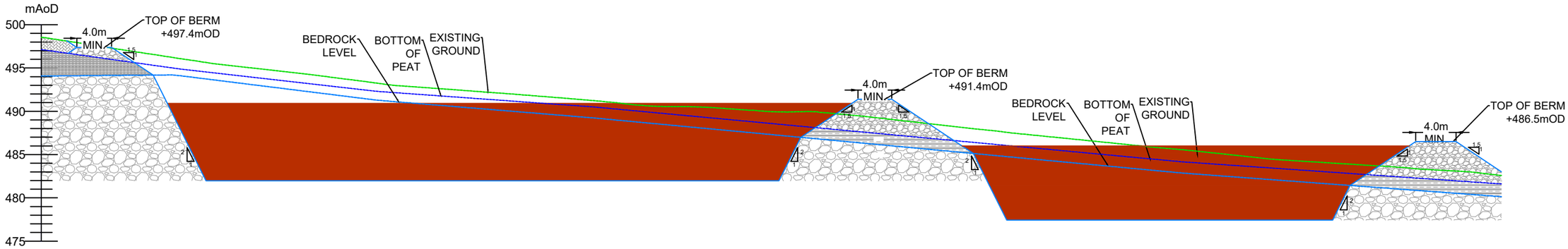
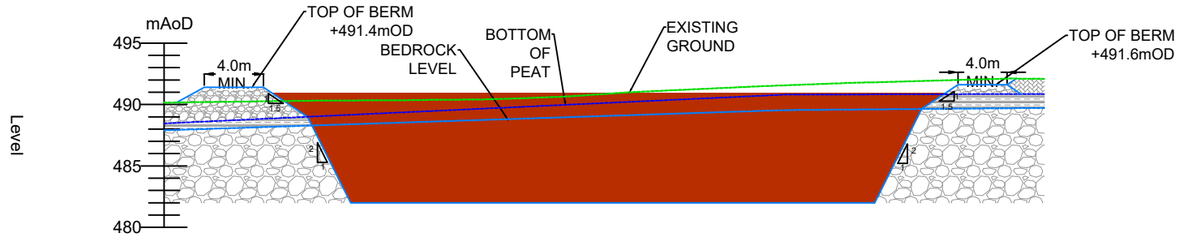
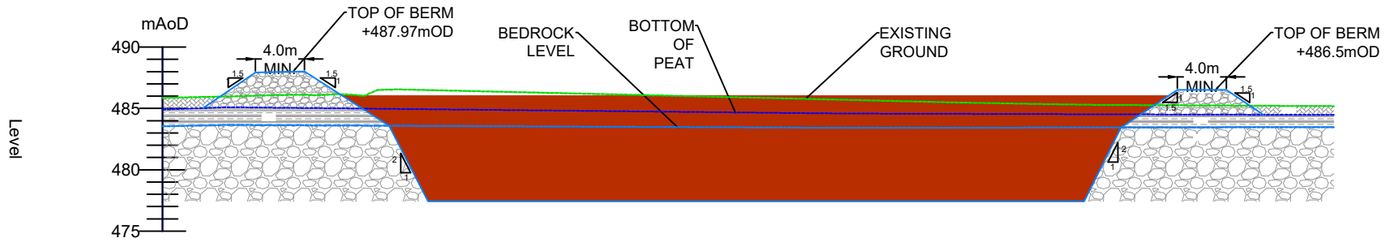


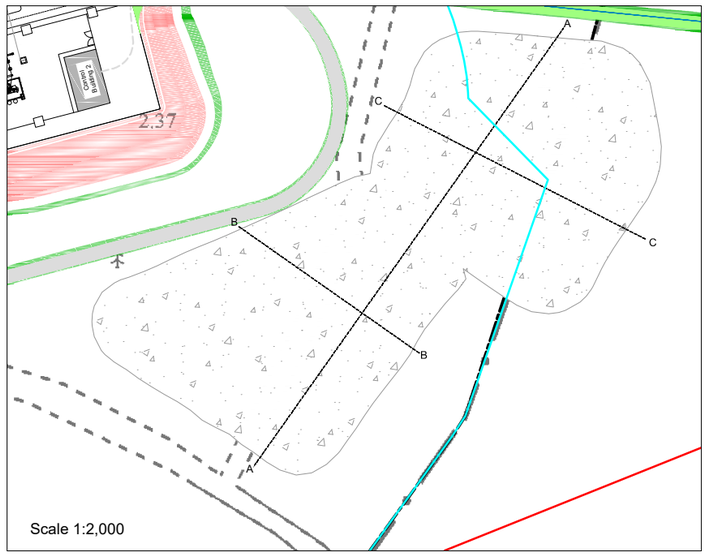
SECTION A-A



SECTION B-B



SECTION C-C



DRAWING TITLE:

Borrow Pit Sections

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 17
SCALE: 1:500 @ A3	DATE: 26.07.2022

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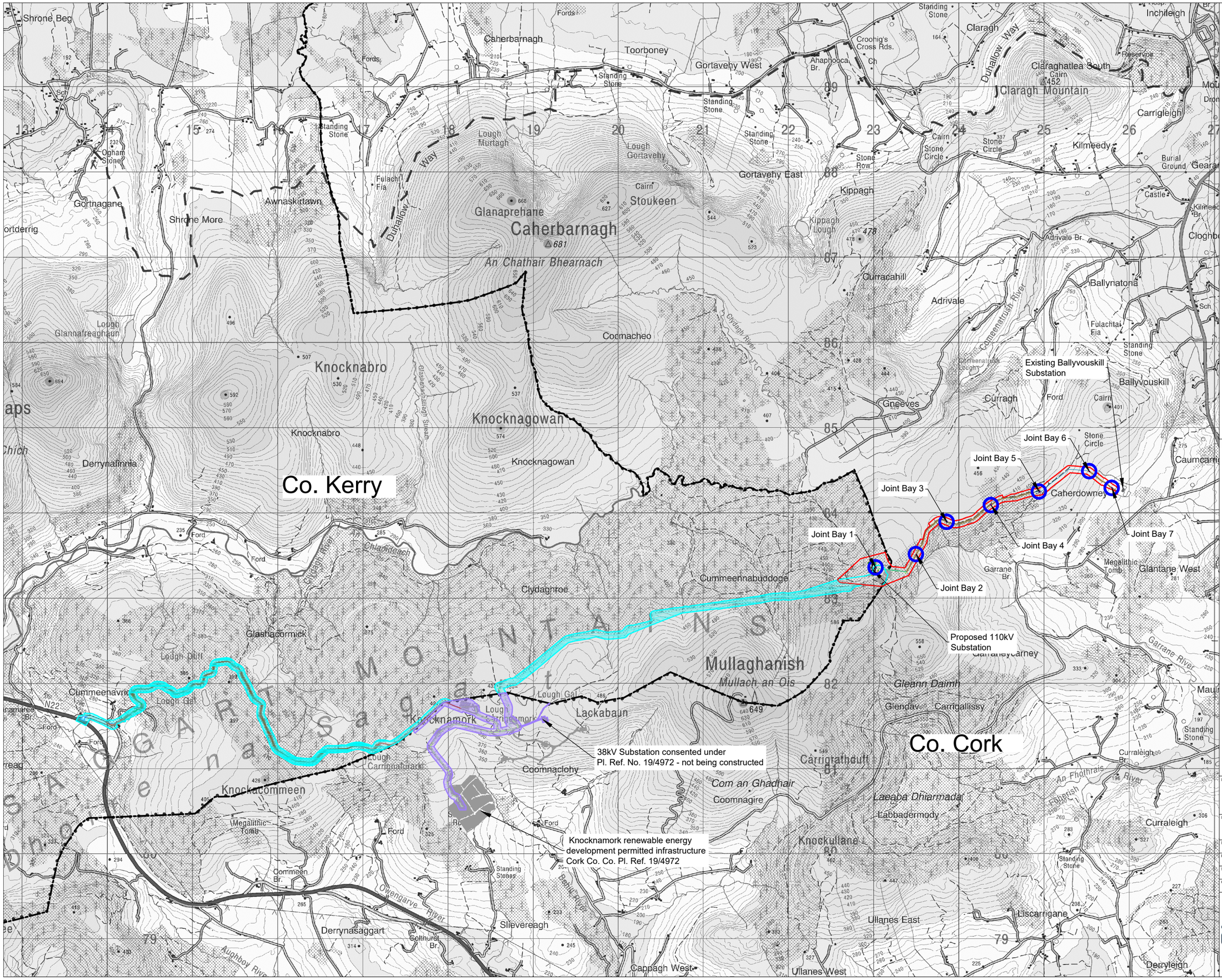

Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary Cork County Council
- Application Boundary Kerry County Council
- Proposed 110kV Electrical Cabling
- Permitted Knocknamork renewable energy development permitted infrastructure Cork Co. Co. Pl. Ref. 19/4972
- Proposed Electrical Cabling Maintenance Track
- Proposed Substation Access Track
- Joint Bay
- Turbine Delivery Access Temporary Hardcore Surface Area
- Cut
- Fill
- Borrow Pit
- County Border
- Joint Bay Locations

N

DRAWING TITLE:

Joint Bay Location Map

PROJECT TITLE:

Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 18
SCALE: 1:40,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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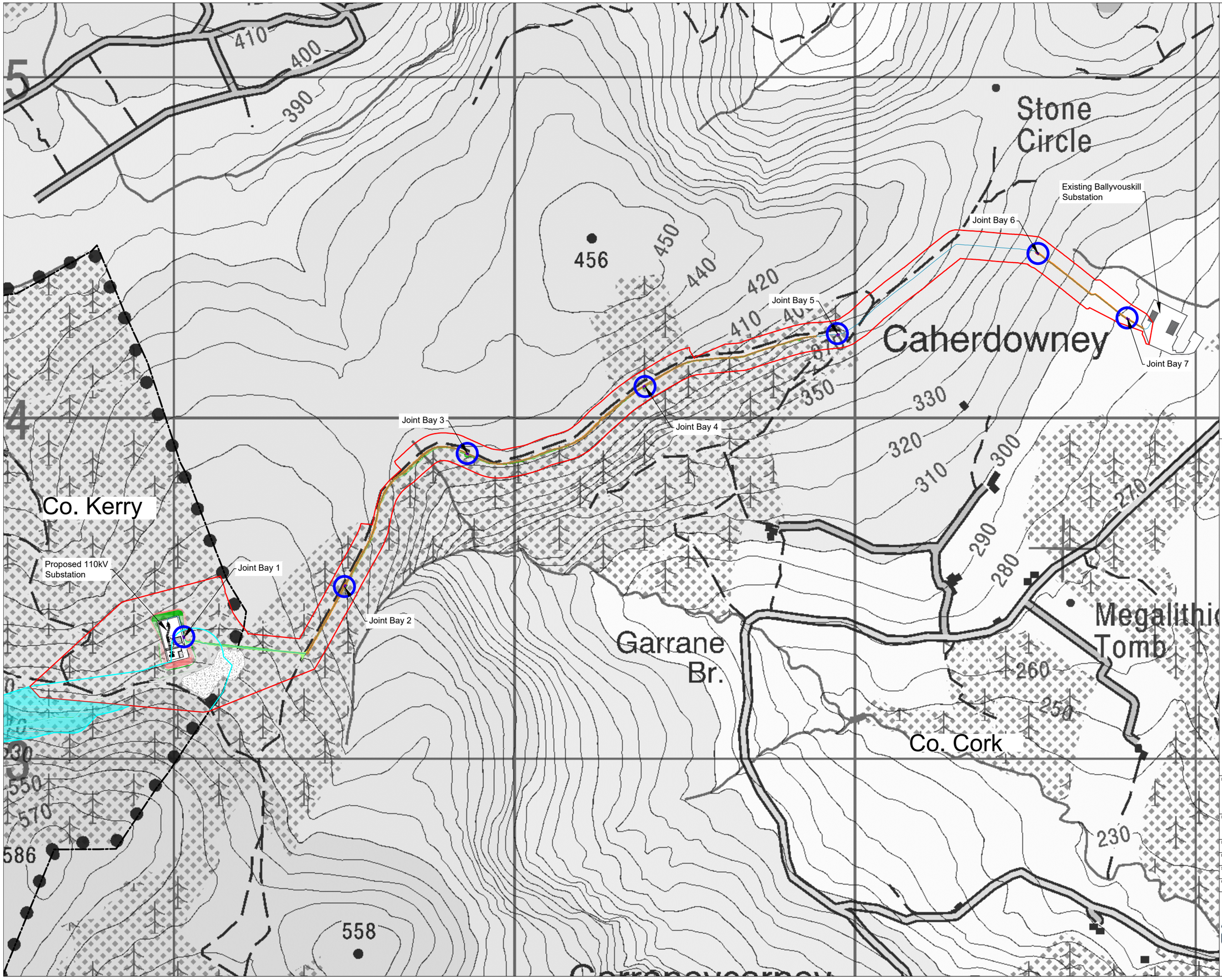

Drawing Legend

- Application Boundary An Bord Pleanala
- Application Boundary Kerry County Council
- Proposed 110kV Electrical Cabling
- Permitted Knocknamork renewable energy development permitted infrastructure Cork Co. Co. Pl. Ref. 19/4972
- Proposed Electrical Cabling Maintenance Track
- Proposed Substation Access Track
- Joint Bay
- Turbine Delivery Access Temporary Hardcore Surface Area
- Cut
- Fill
- Borrow Pit
- County Border
- Joint Bay Locations

N

DRAWING TITLE:
Joint Bay Location Map (1:10,000)

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 19
SCALE: 1:10,000 @ A3	DATE: 26.07.2022

OS SHEET No.: 6134, 6135, 6136, 6137, 6180, 6181, 6182, 6183, 6228, 6229, 6230, 6276, 6277

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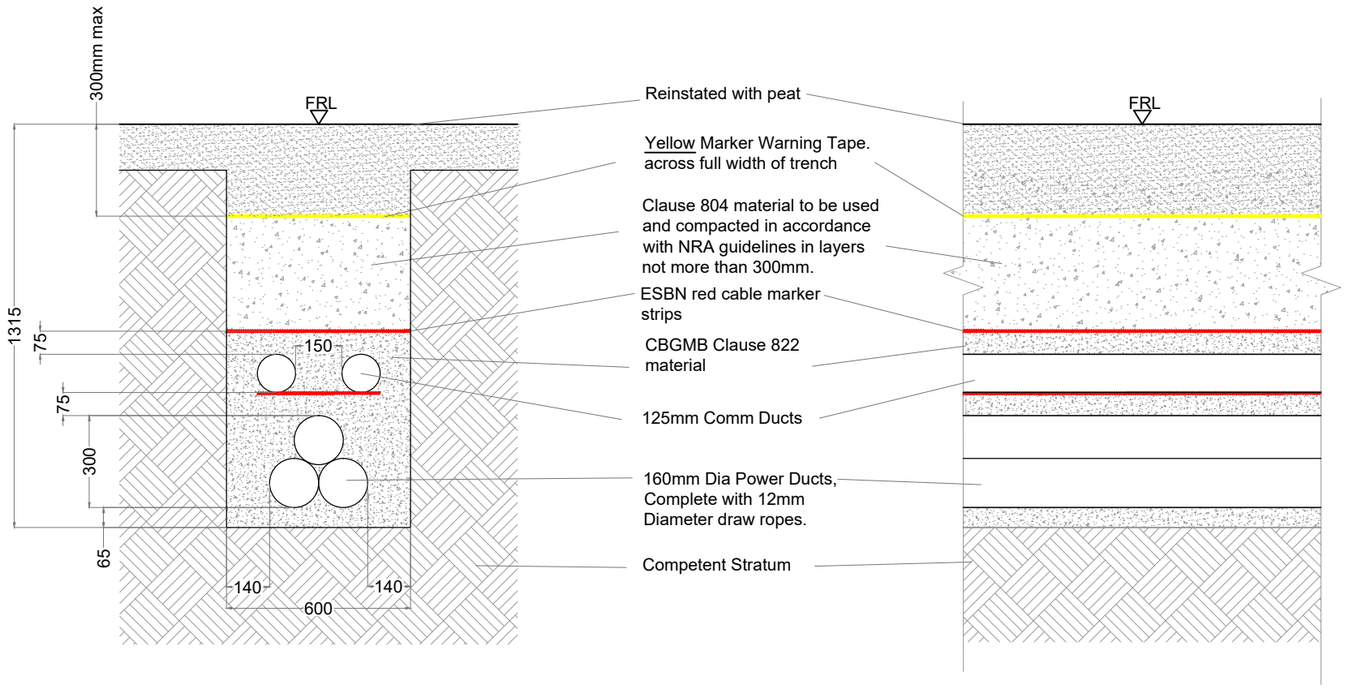
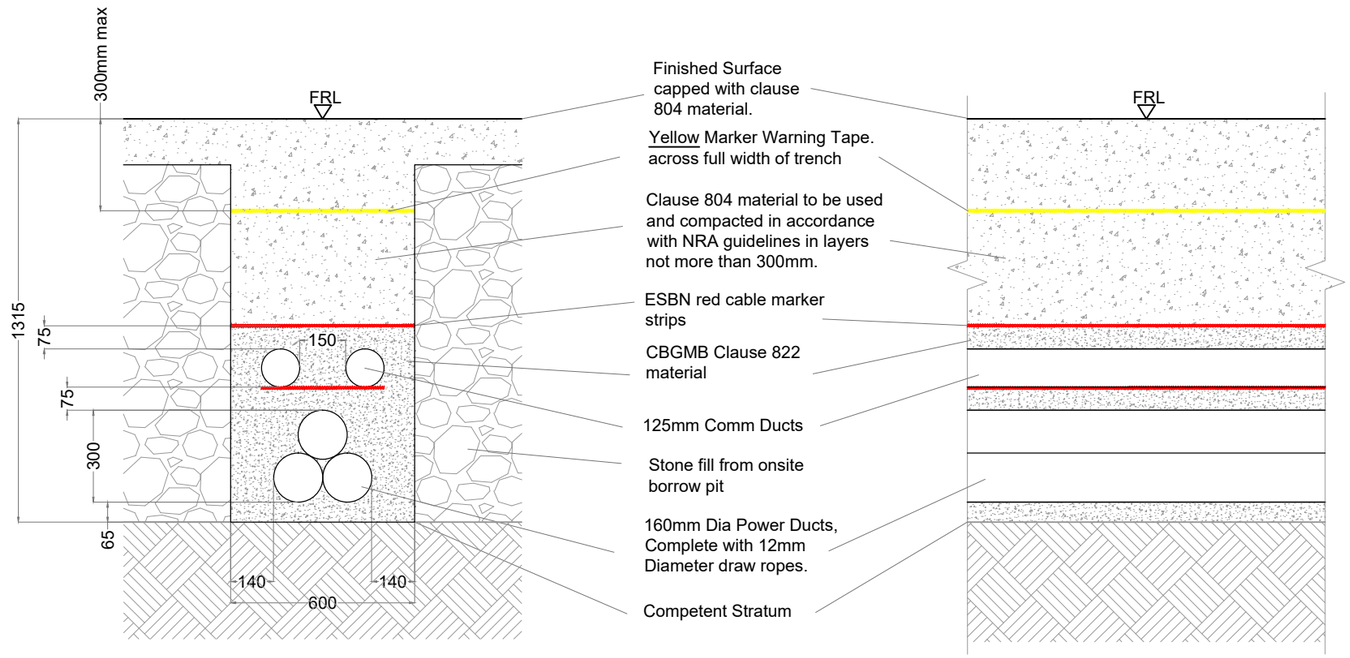


Option A - Cross section - 110kV

SCALE 1:20



Option A - Cross section - 110kV

SCALE 1:20

DRAWING TITLE: Option A - Cross Section - 110kV	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 20
SCALE: 1:20 @ A3	DATE: 26.07.2022

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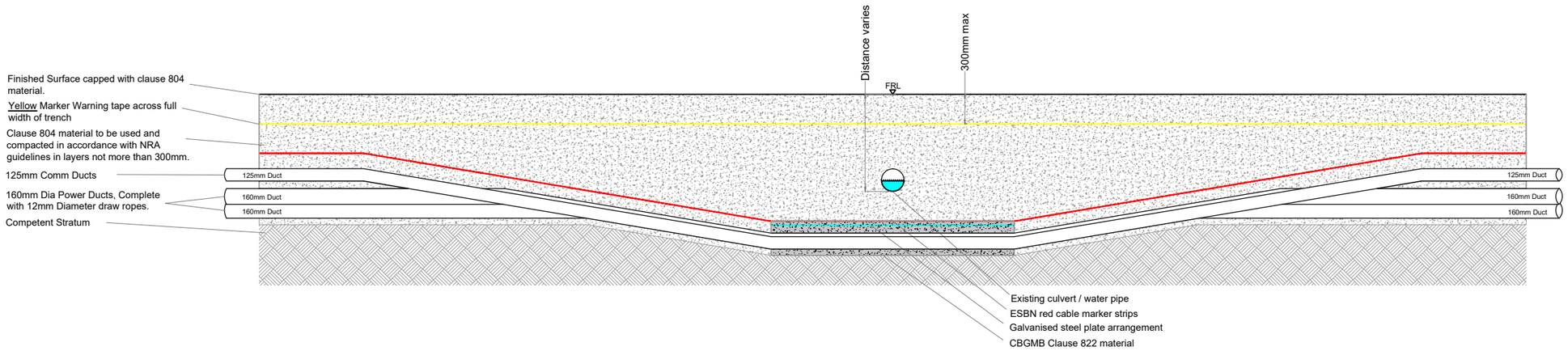
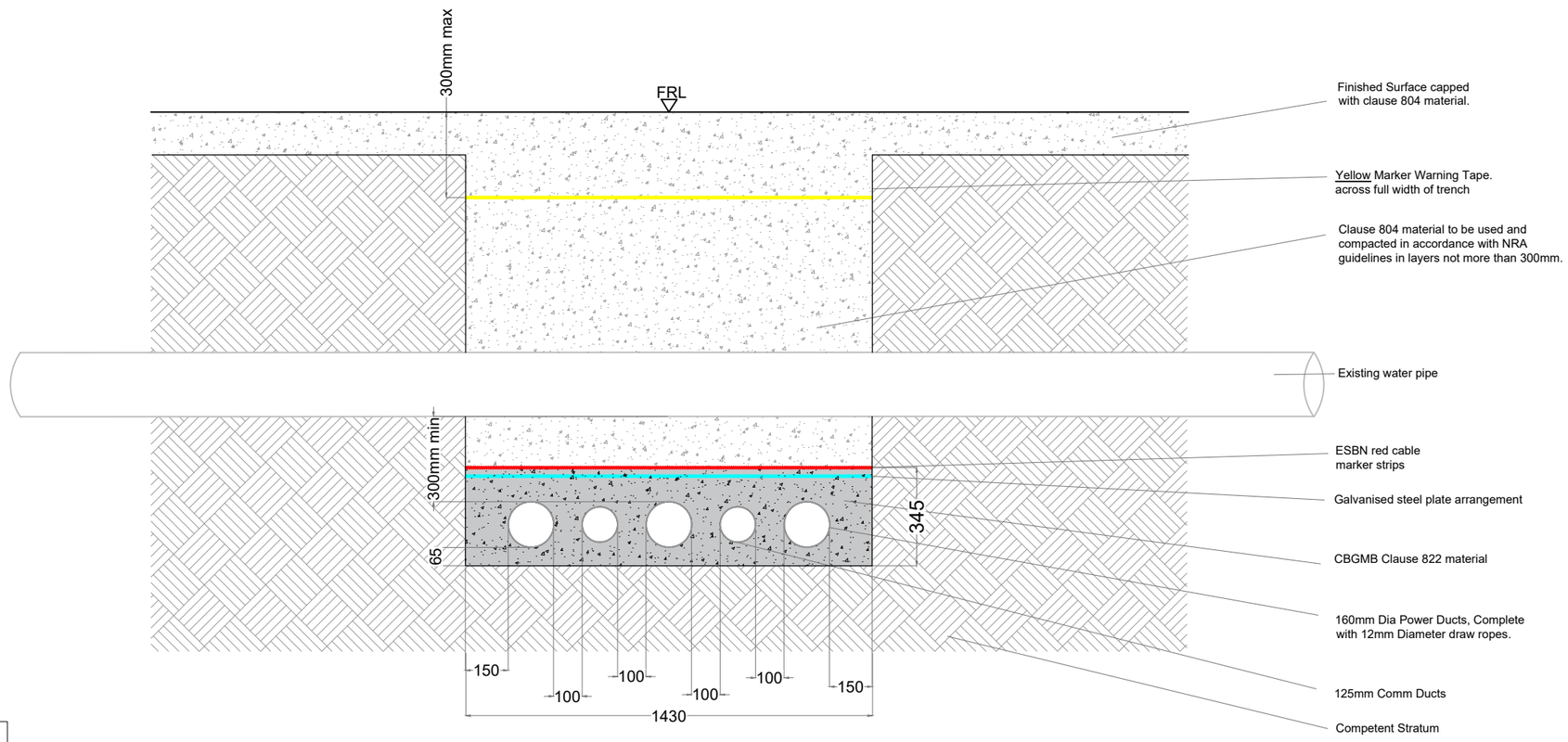


Option B - Flat bed under existing pipe - 110kV

SCALE 1:50



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For illustration purposes only. Exact size and appearance of unit subject to manufacturer selection.

Option B - Flat bed under existing pipe - 110kV

SCALE 1:20

DRAWING TITLE:
Option B - Flat Bed Under Existing Pipe - 110kV

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 21
SCALE: As Shown @ A3	DATE: 26.07.2022

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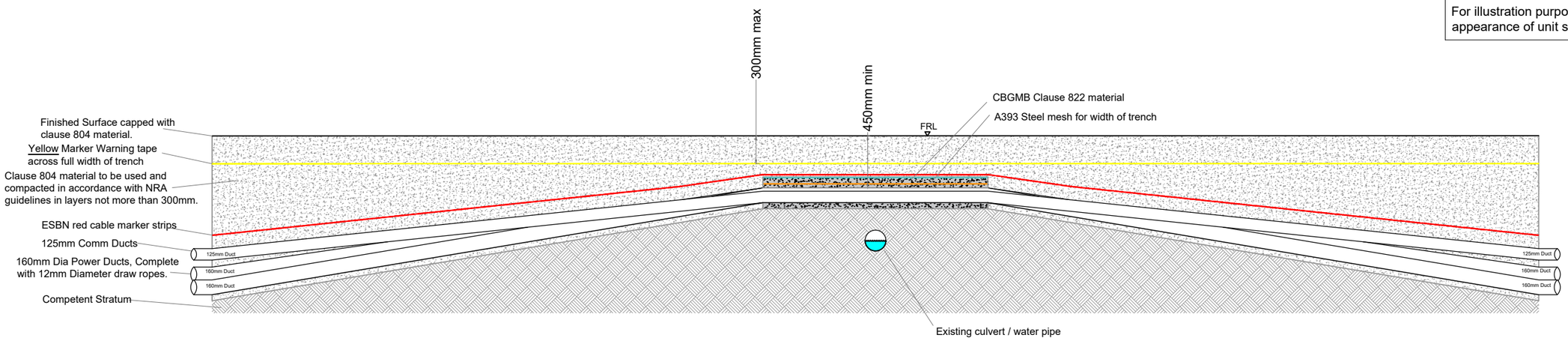
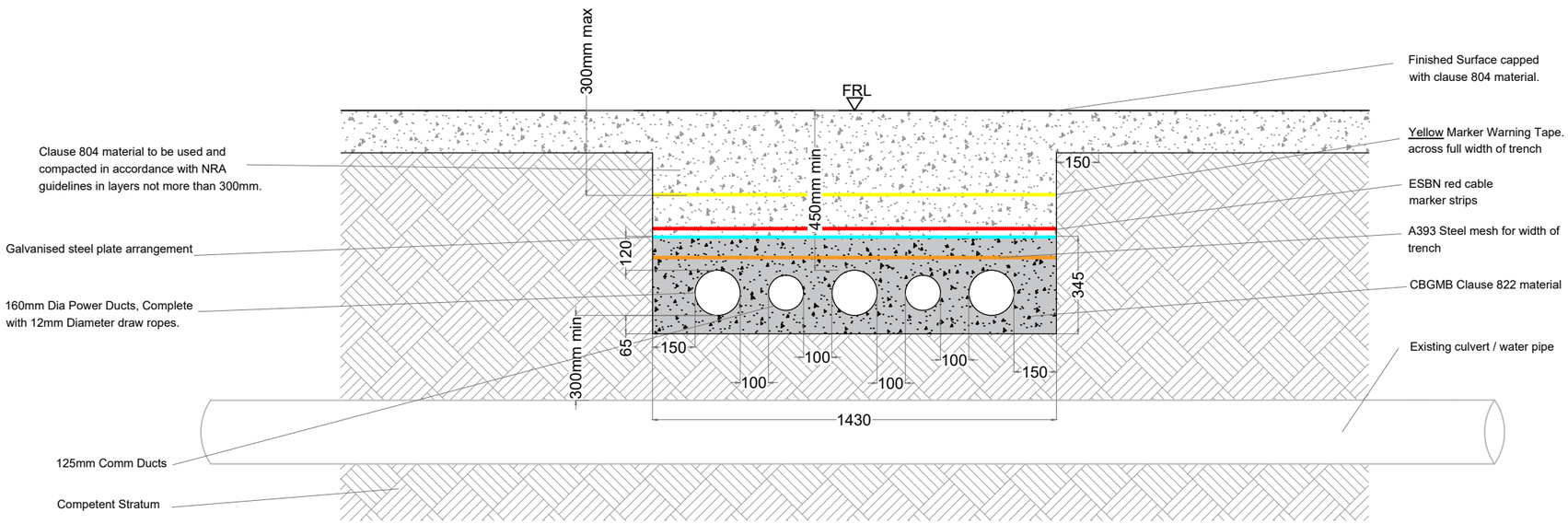


Option C - Flat bed over existing pipe - 110kV

SCALE 1:50



Option C - Flat bed over existing pipe - 110kV

SCALE 1:20

DRAWING TITLE:
Option C - Flat Bed Over Existing Pipe - 110kV

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: **Joseph O Brien**	CHECKED BY: **Meabhann Crowe**
PROJECT No.: **210732**	DRAWING No.: **210732 - 22**
SCALE: **As Shown @ A3**	DATE: **26.07.2022**

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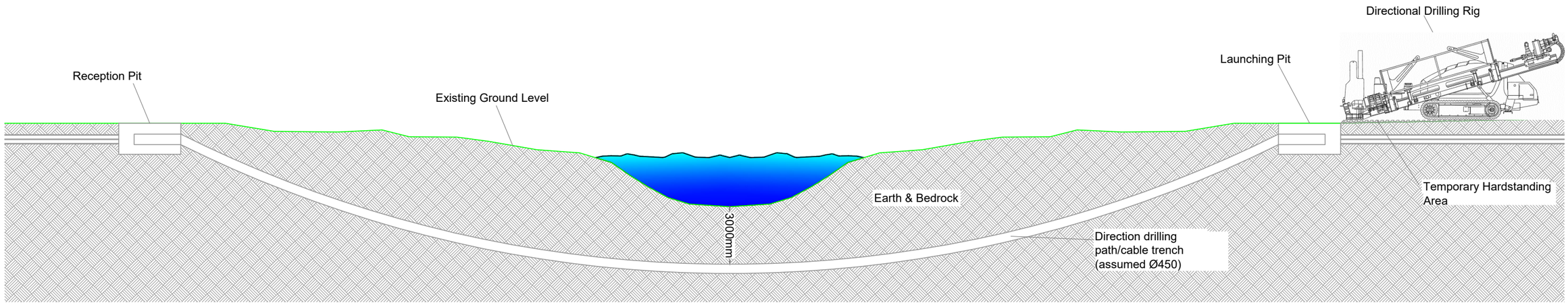

Option D - Typical Horizontal Directional Drill - Cross Section

SCALE: 1:200

DRAWING TITLE: **Option D - Typical Horizontal Directional Drill - Cross Section**	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: **Joseph O Brien**	CHECKED BY: **Meabhann Crowe**
PROJECT No.: **210732**	DRAWING No.: **210732 - 23**
SCALE: **1:200 @ A3**	DATE: **26.07.2022**

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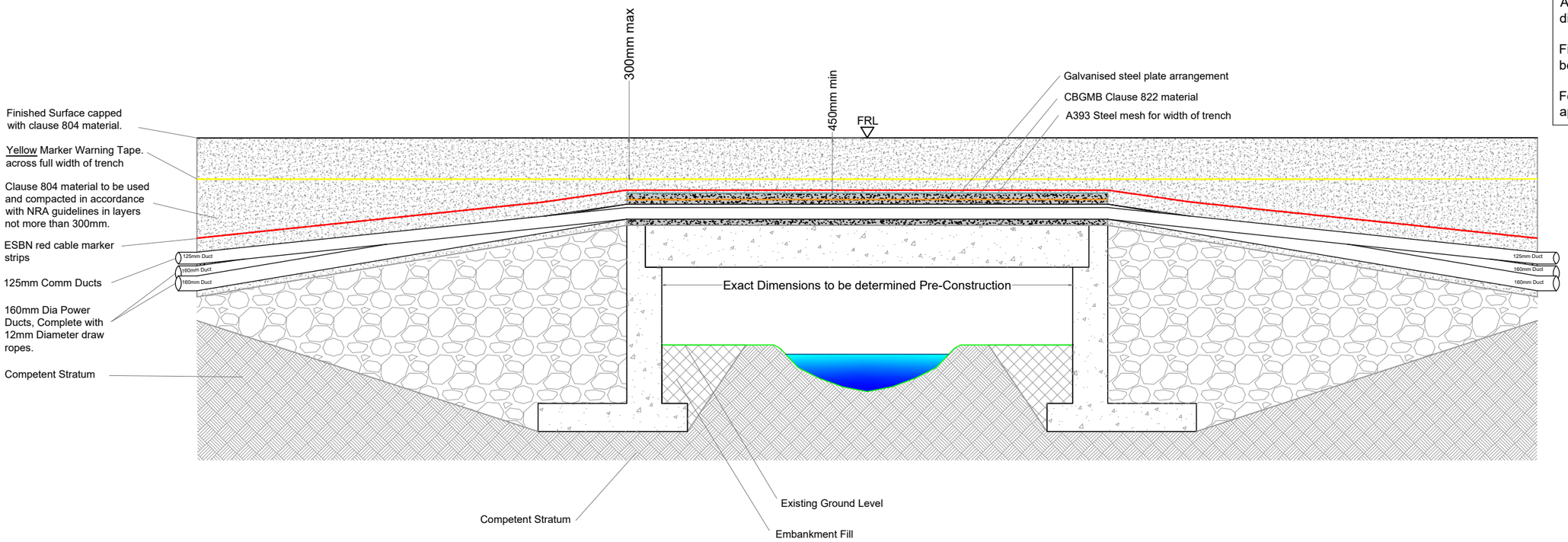
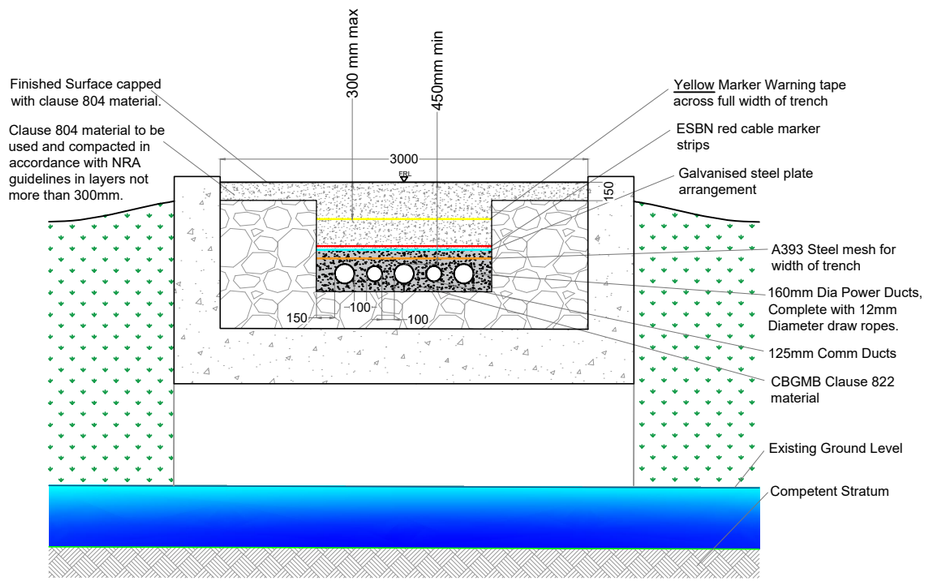


Option E - Clear Span - 110kV

SCALE 1:50



Option E - Clear Span - 110kV

SCALE 1:50

DRAWING TITLE: Option E - Clear Span - 110kV	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 24
SCALE: 1:50 @ A3	DATE: 26.07.2022

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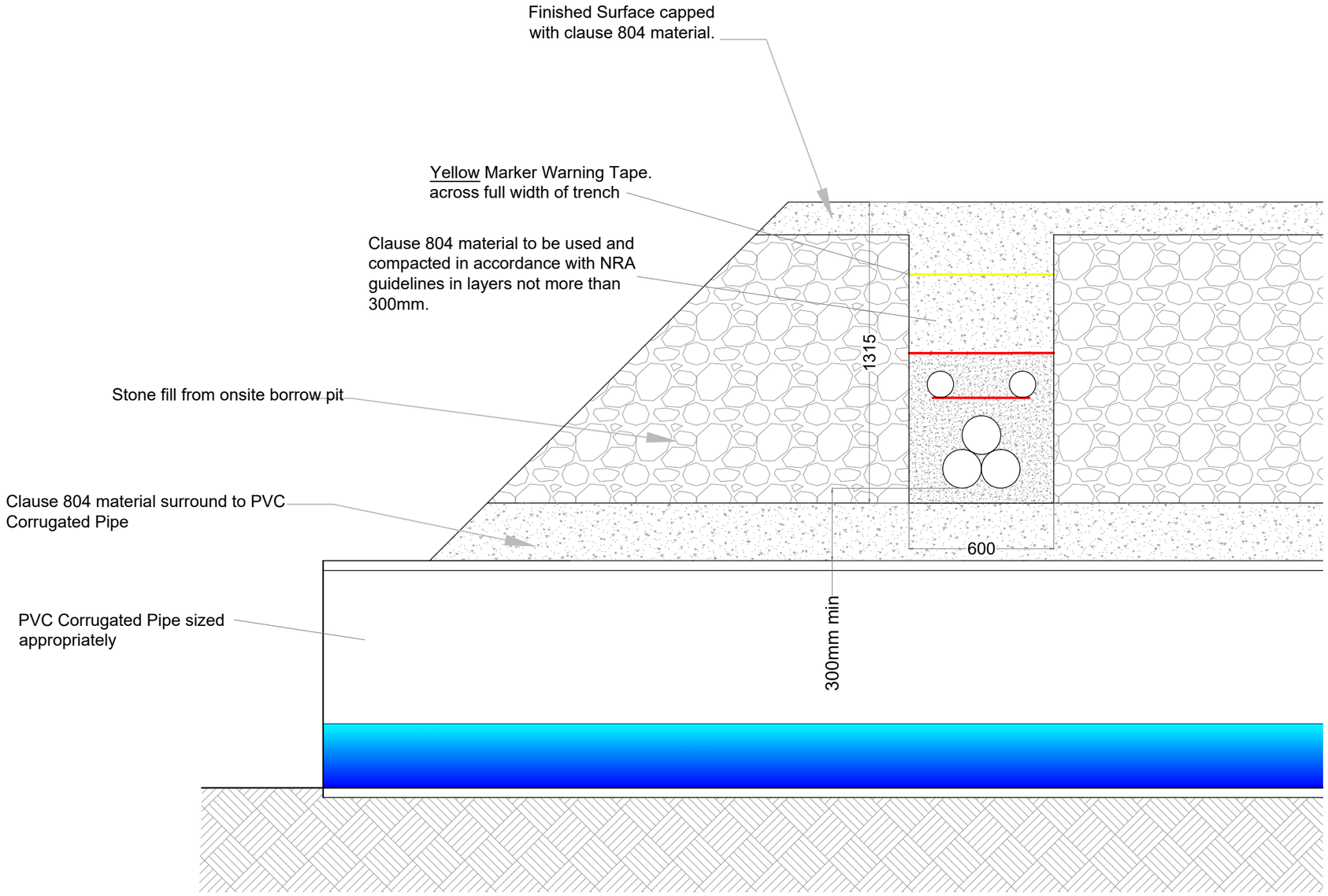

Option F - Pipe crossing - 110kV

SCALE 1:20

DRAWING TITLE: Option F - Pipe Crossing - 110kV	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 25
SCALE: 1:20 @ A3	DATE: 26.07.2022

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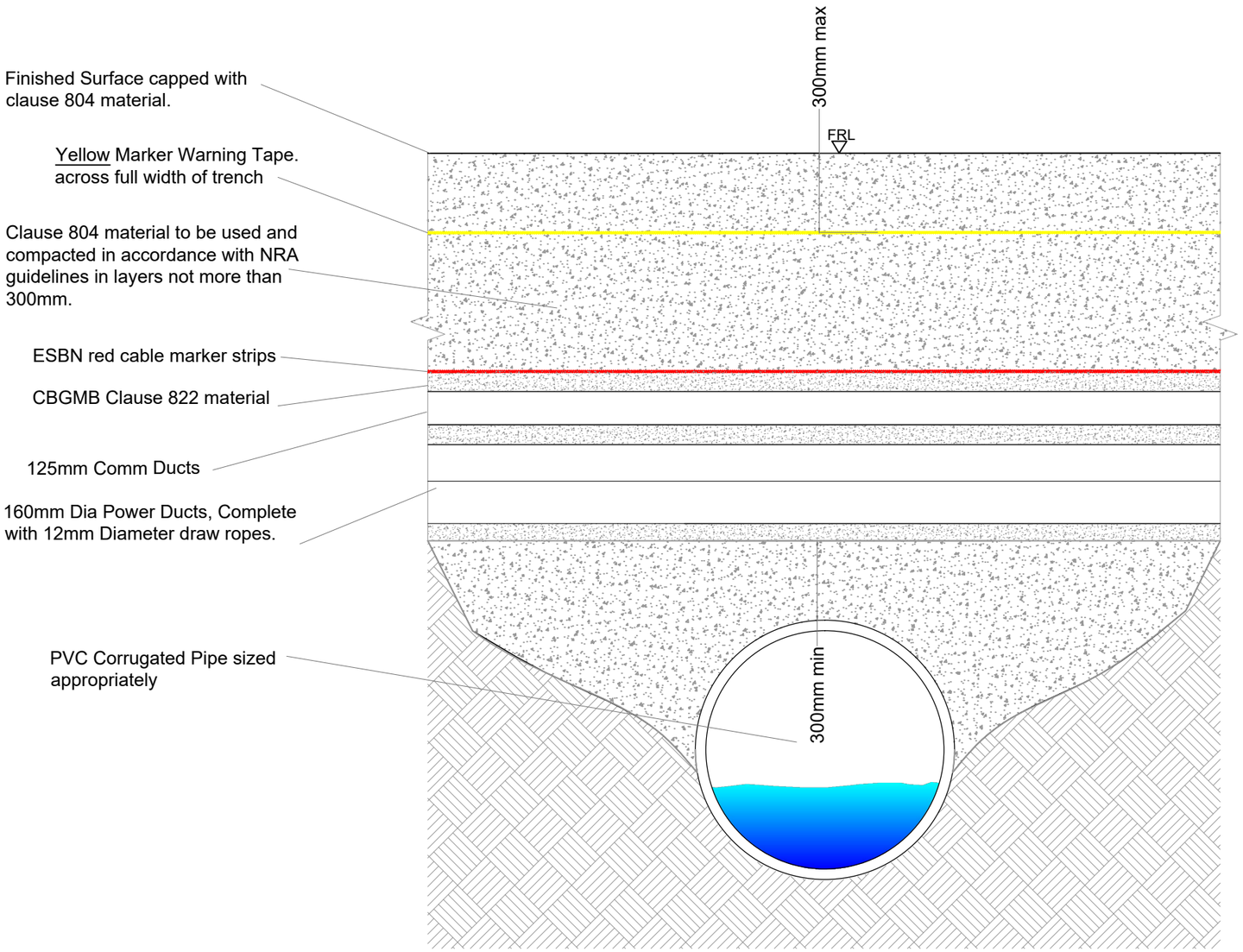

Option F - Pipe crossing - 110kV

SCALE 1:20

DRAWING TITLE: Option F - Pipe Crossing - 110kV	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 26
SCALE: 1:20 @ A3	DATE: 26.07.2022

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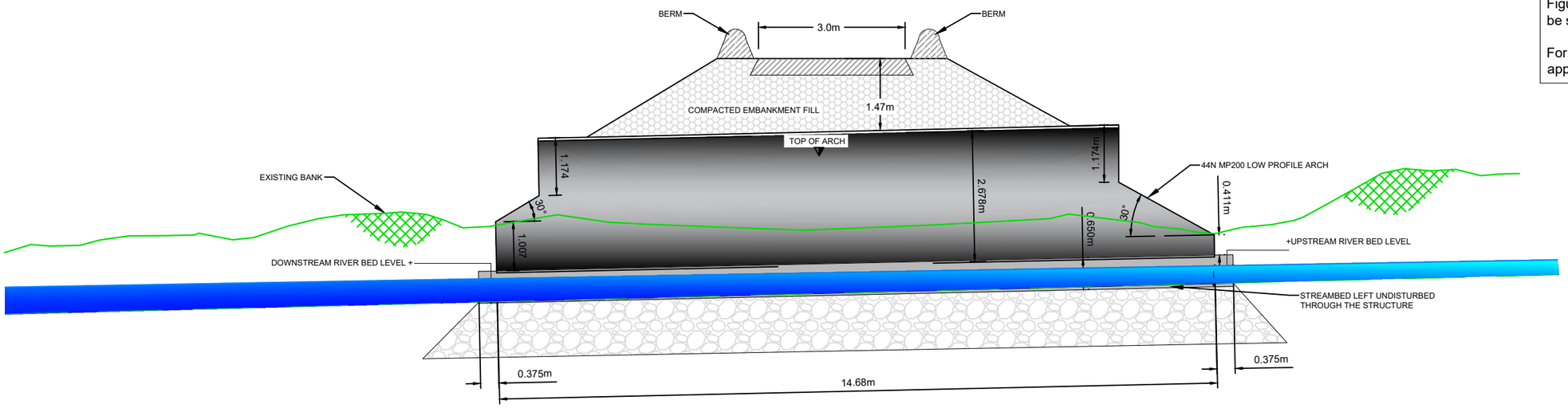
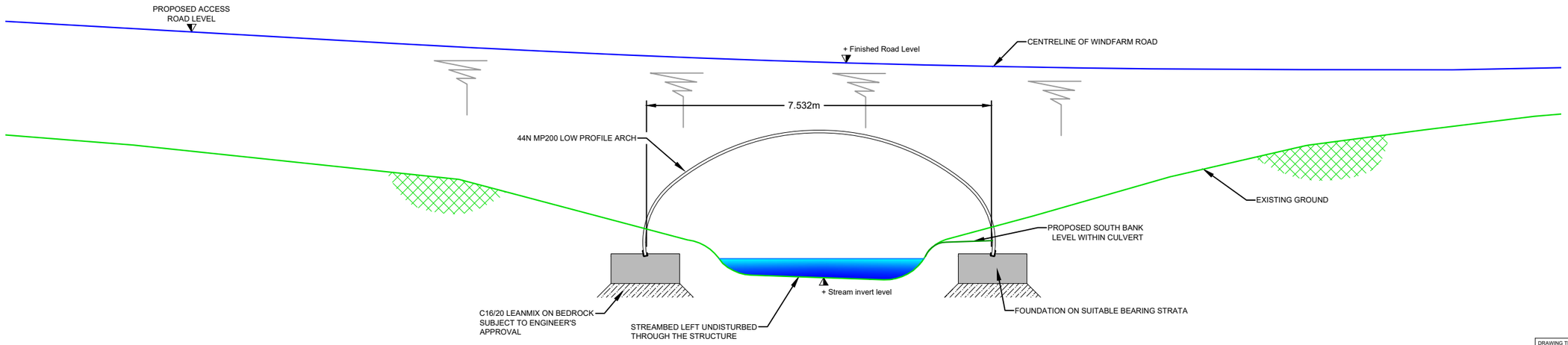


Option G - Corrugated Steel Arch Culvert Crossing

Scale 1:100



Option G - Corrugated Steel Arch Culvert Crossing

Scale 1:100

DRAWING TITLE:
Option G - Corrugated Steel Arch Culvert Crossing

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: **Joseph O Brien**	CHECKED BY: **Meabhann Crowe**
PROJECT No.: **210732**	DRAWING No.: **210732 - 27**
SCALE: **1:100 @ A3**	DATE: **26.07.2022**

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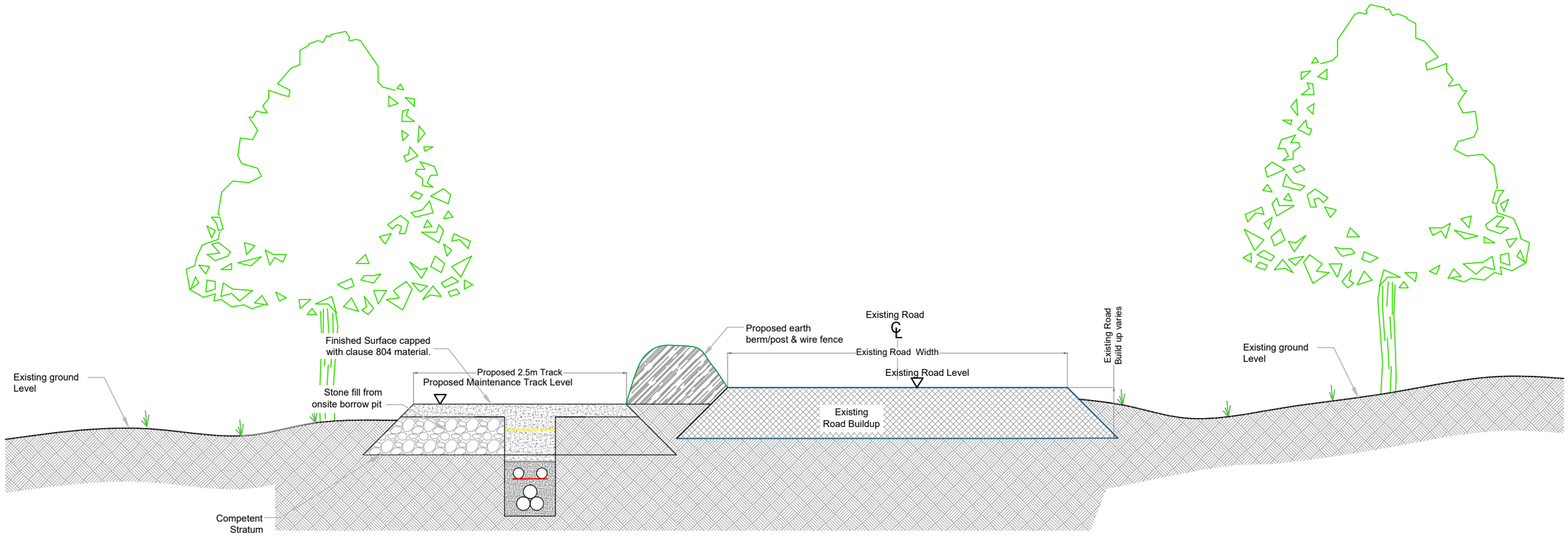

Proposed 110kV Track Detail

SCALE 1:50

DRAWING TITLE:
Proposed 110kV Road Detail

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 28
SCALE: 1:50 @ A3	DATE: 26.07.2022

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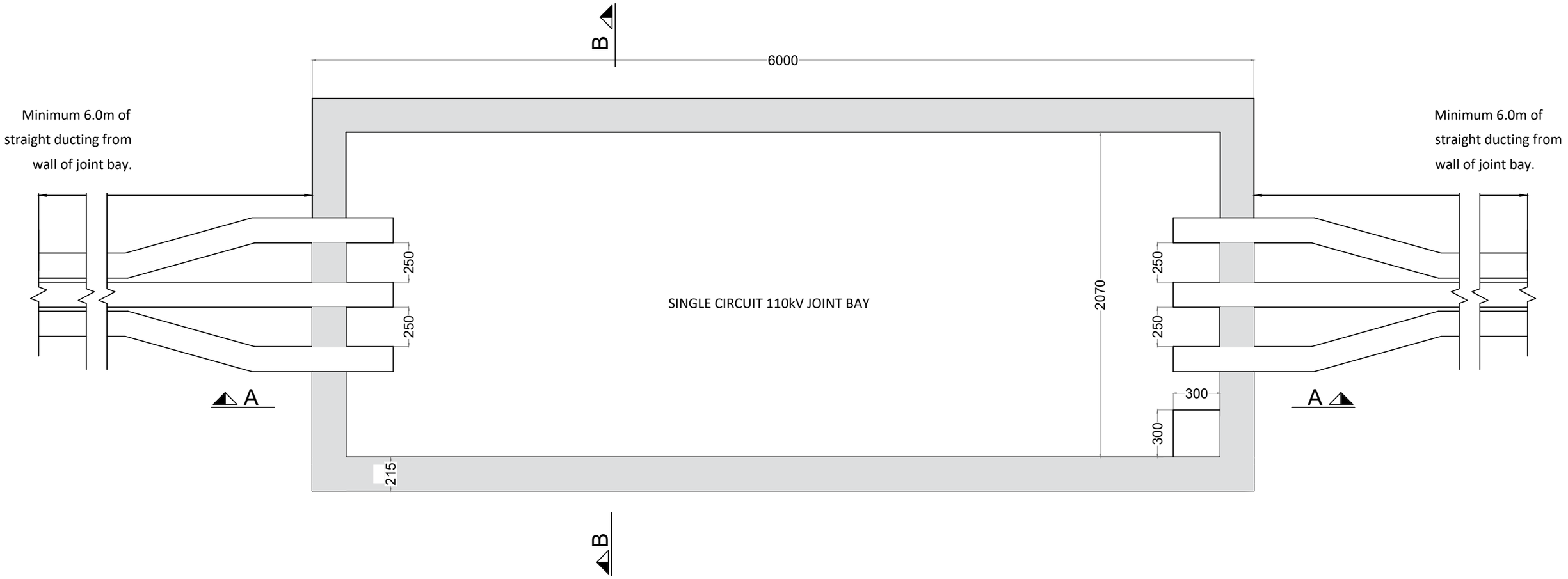

PLAN OF TYPICAL JOINT BAY

SCALE 1:25

DRAWING TITLE: Plan of Typical Joint Bay	
PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala	
DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 29
SCALE: 1:25 @ A3	DATE: 26.07.2022

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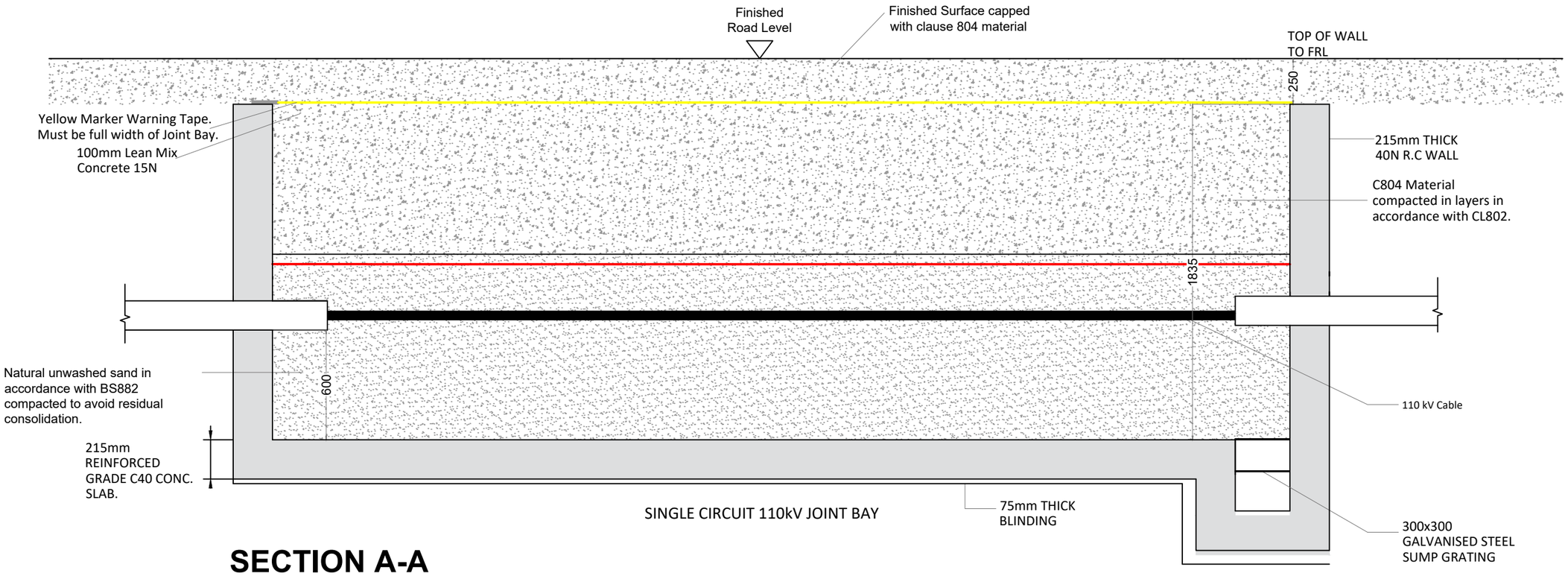
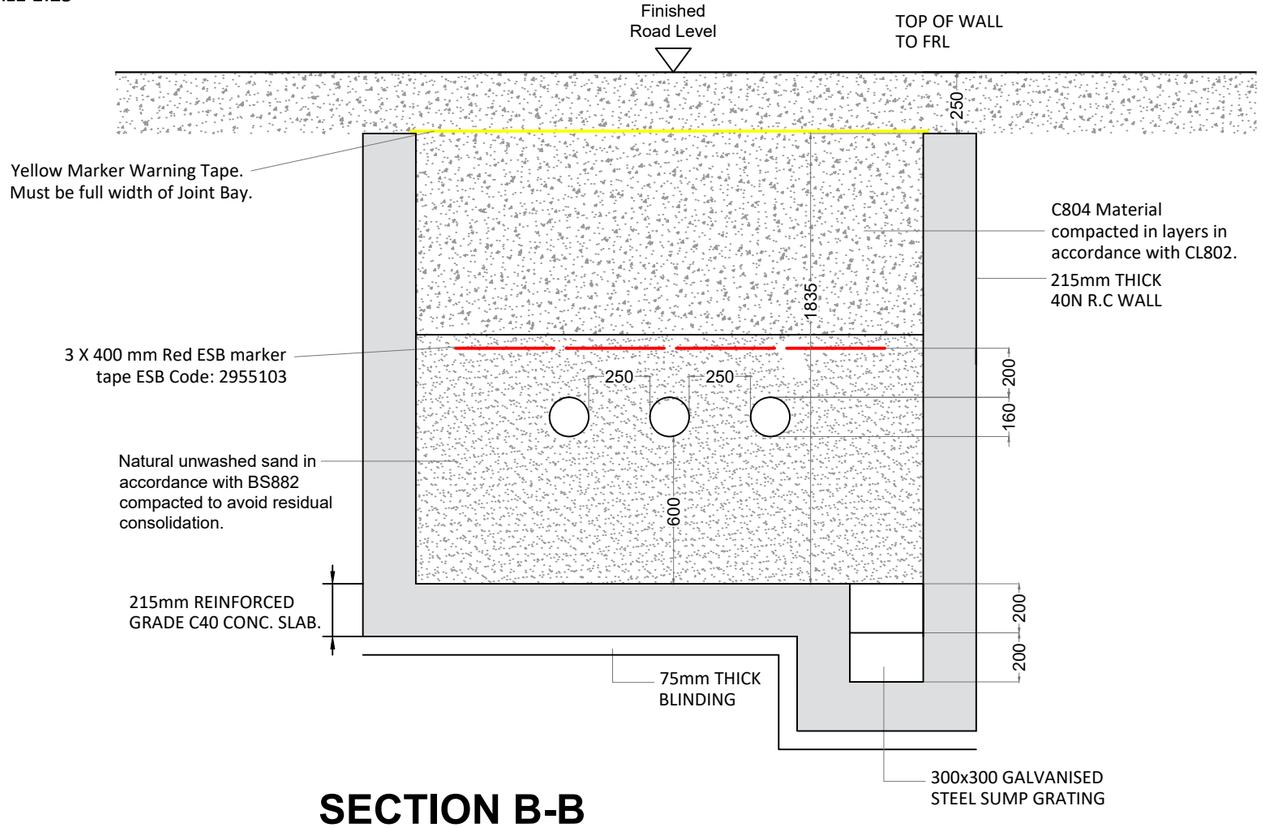


SECTION A-A

SCALE 1:25



SECTION B-B

SCALE 1:25

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DRAWING TITLE:

Joint Bay Sections

PROJECT TITLE: Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: Joseph O Brien	CHECKED BY: Meabhann Crowe
PROJECT No.: 210732	DRAWING No.: 210732 - 30
SCALE: 1:25 @ A3	DATE: 26.07.2022

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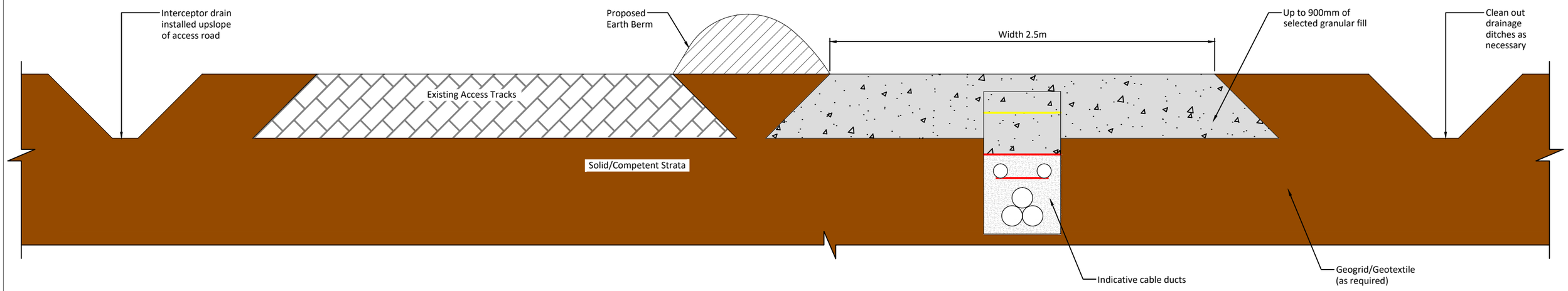
Website: www.mkoireland.ie



110 kV underground cabling route

DRAWING TITLE:
Upgrade of Existing Excavated Access Roads

PROJECT TITLE:
Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: POR	CHECKED BY: IH
PROJECT No.: 210732	DRAWING No.: 210732 - 31
SCALE: 1:30 @ A3	DATE: 26.07.2022
OS SHEET No.:	

FEHILY TIMONEY
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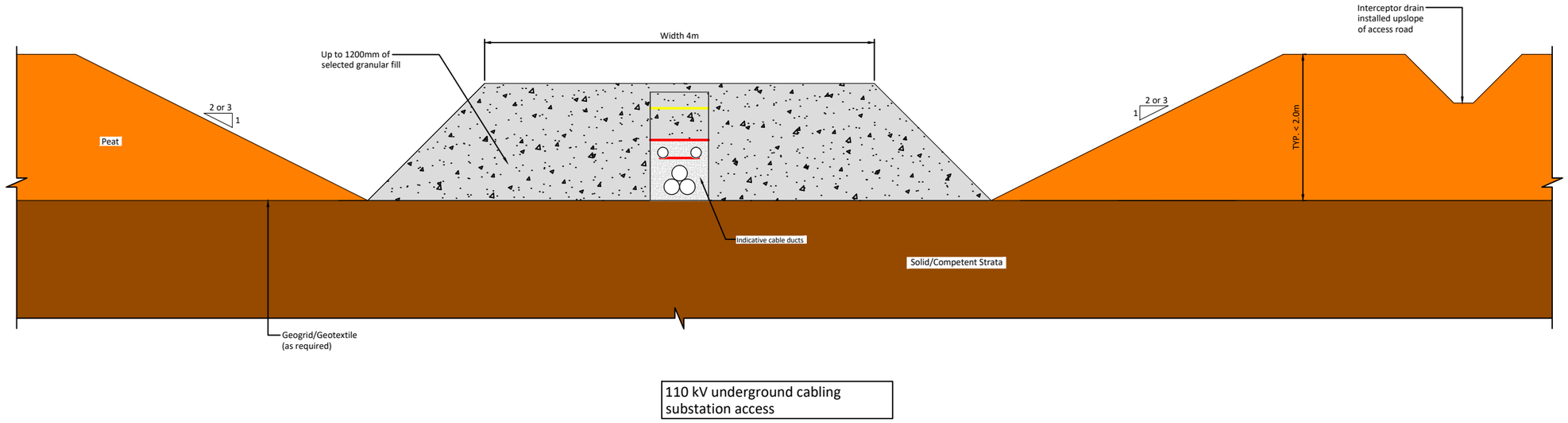

DRAWING TITLE:

New Excavate and Replace Access Road

PROJECT TITLE:

Knocknamork Grid Connection Infrastructure, An Bord Pleanala

DRAWING BY: POR	CHECKED BY: IH
PROJECT No.: 210732	DRAWING No.: 210732 - 32
SCALE: 1:50 @ A3	DATE: 26.07.2022
OS SHEET No.:	

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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 will be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will NOT be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

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.

MITIGATION / DRAINAGE COINTROLS 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 peat 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 Sedimats 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) 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

DRAINAGE NOTES:

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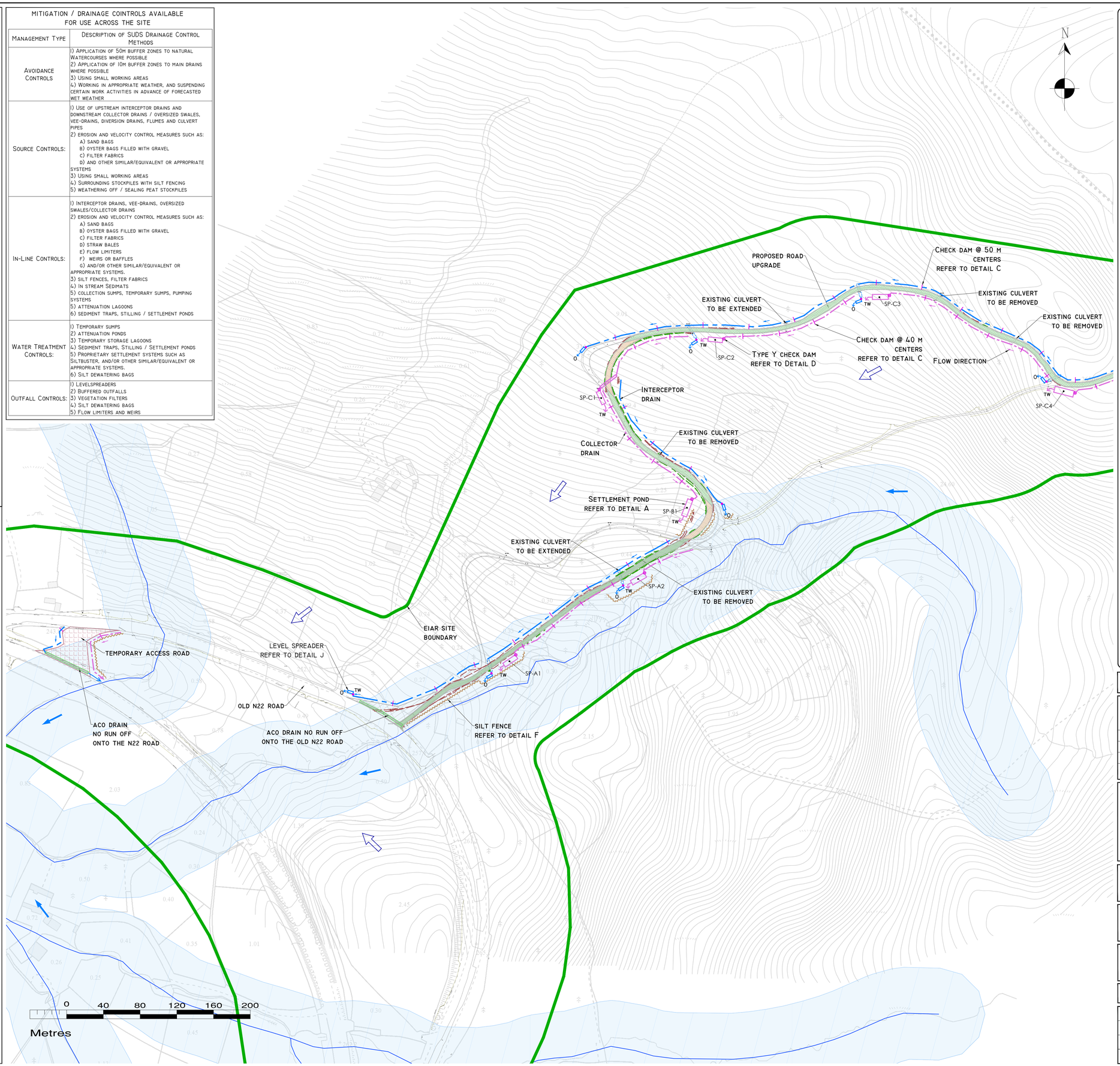
3. SUDS system to be constructed prior to, or at the same time as the access tracks. Interim measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences to be employed in all instances where work carried out to construct the access tracks is likely to cause adverse environmental effects through increased silt loadings being generated during the construction phase.
4. Suitable prevention measures will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.



Drawing Legend :

Existing Drainage
- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (*Completed in advance of access road works)
- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - Level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
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- Existing culverts to be removed
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- O Overland Flow Discharge
- TW Treated Water Discharge
- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /secondary SP
- SP-A3 settlement pond number
- Pumping Sump
- ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- proposed road upgrade
- proposed new roads
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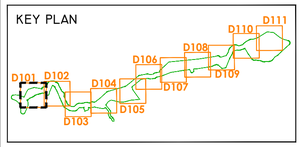
- Existing public road
- substation
- proposed borrow pit
- permitted borrow pit
- Ballyvouskill 220kV Substation
- Knocknamork Permitted Layout
- cut area
- fill area

KEY PLAN



Drawing Notes

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2.
3. Do not scale off this drawing. Figured metric dimensions only should be taken off this drawing.
4. All dimensions are in metres.

Date	Description	Chkd	Signed

Revisions

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

Client: Knocknamork Ltd

Job: Knocknamork WF, Co. Cork

Title: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Figure No: D101

Drawing No: P1421-1-0722-A1-D101-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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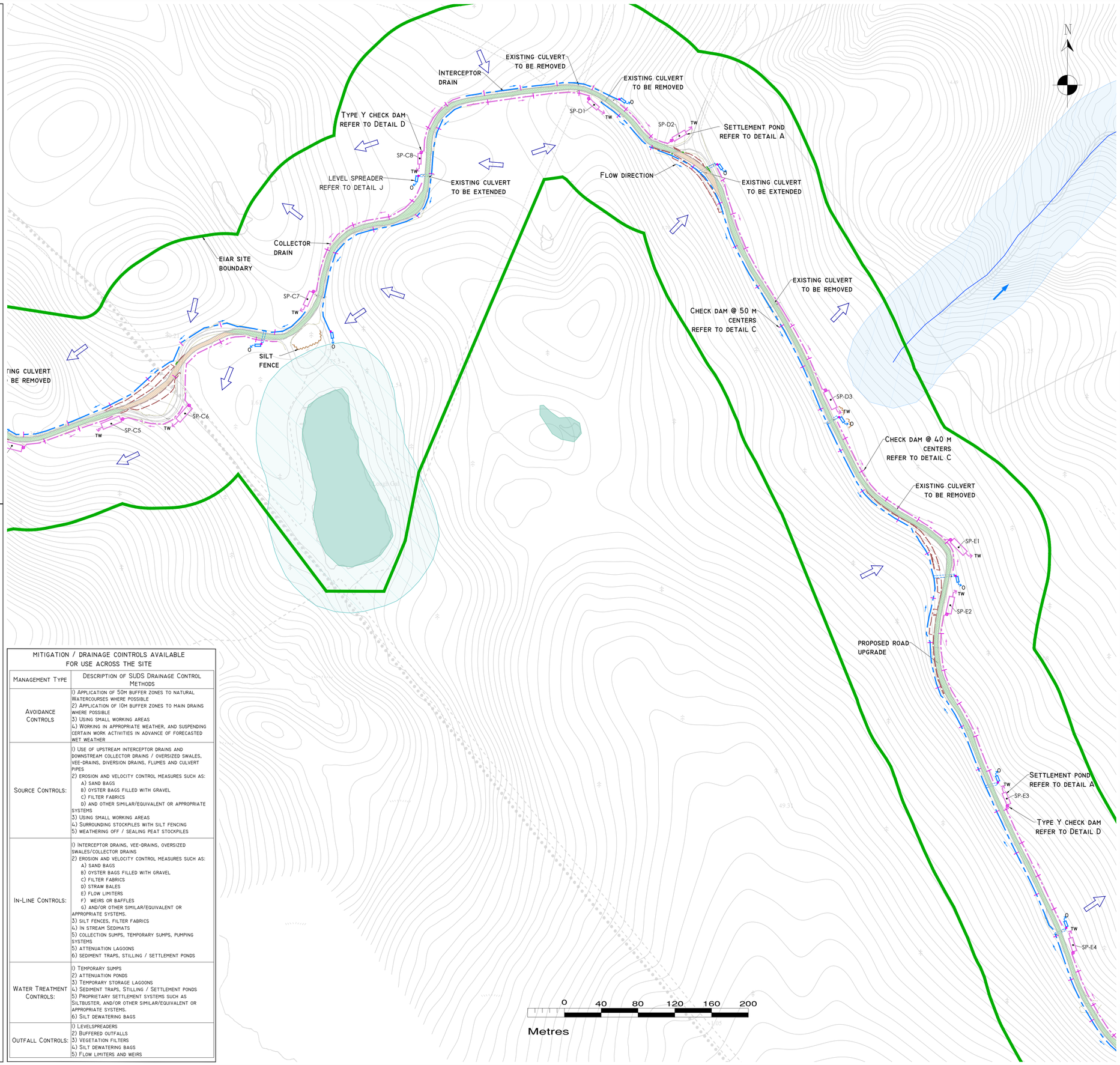

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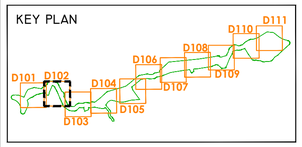

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4. All dimensions are in metres.

Date	Description	Chkd	Signed

Revisions

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email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D102**

Drawing No: P1421-1-0722-A1-D102-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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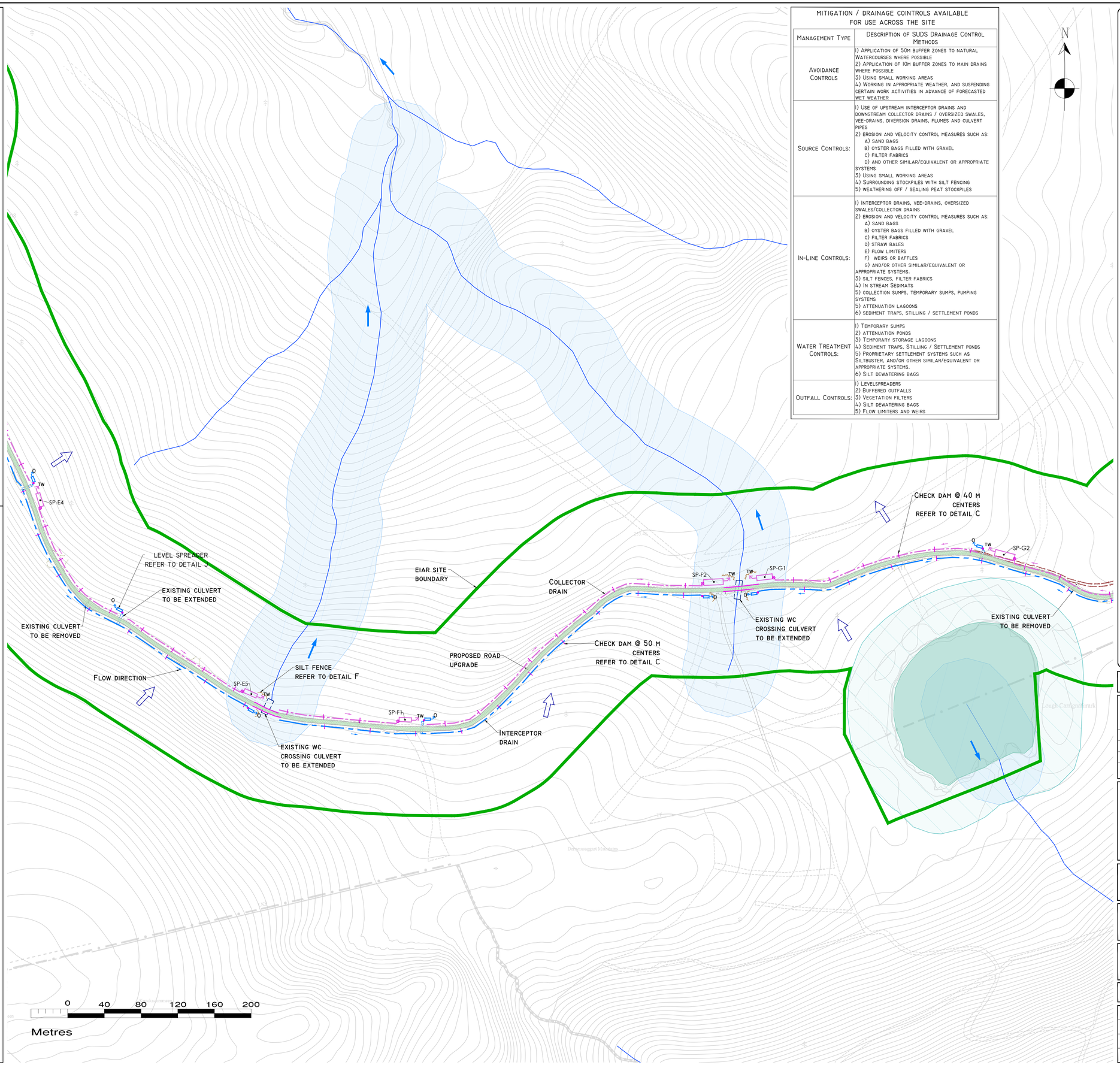
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.



MITIGATION / DRAINAGE COINTROLS 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 peat 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 Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation lagoons 6) 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

Drawing Legend :

Existing Drainage
- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (* completed in advance of access road works)
- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
- Existing culverts proposed to be extended
- Proposed new culverts
- Existing culverts to be removed
- Collector Ditch Culvert
- Watercourse drain protection berm
- O Overland Flow Discharge
- TW Treated Water Discharge
- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /secondary sp
- SP-A3 settlement pond number
- Pumping Sump
- Ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- Proposed road upgrade
- Proposed new roads
- Proposed road upgrade
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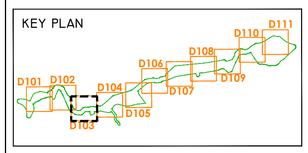
- Existing public road
- Substation
- Proposed borrow pit
- Permitted borrow pit
- Ballyvouskill 220kV Substation
- Knocknamork Permitted Layout
- Cut area
- Fill area

KEY PLAN



Drawing Notes

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Date	Description	Chkd	Signed

Revisions

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web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D103**

Drawing No: P1421-1-0722-A1-D103-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	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 will be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will NOT be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

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 will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
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16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
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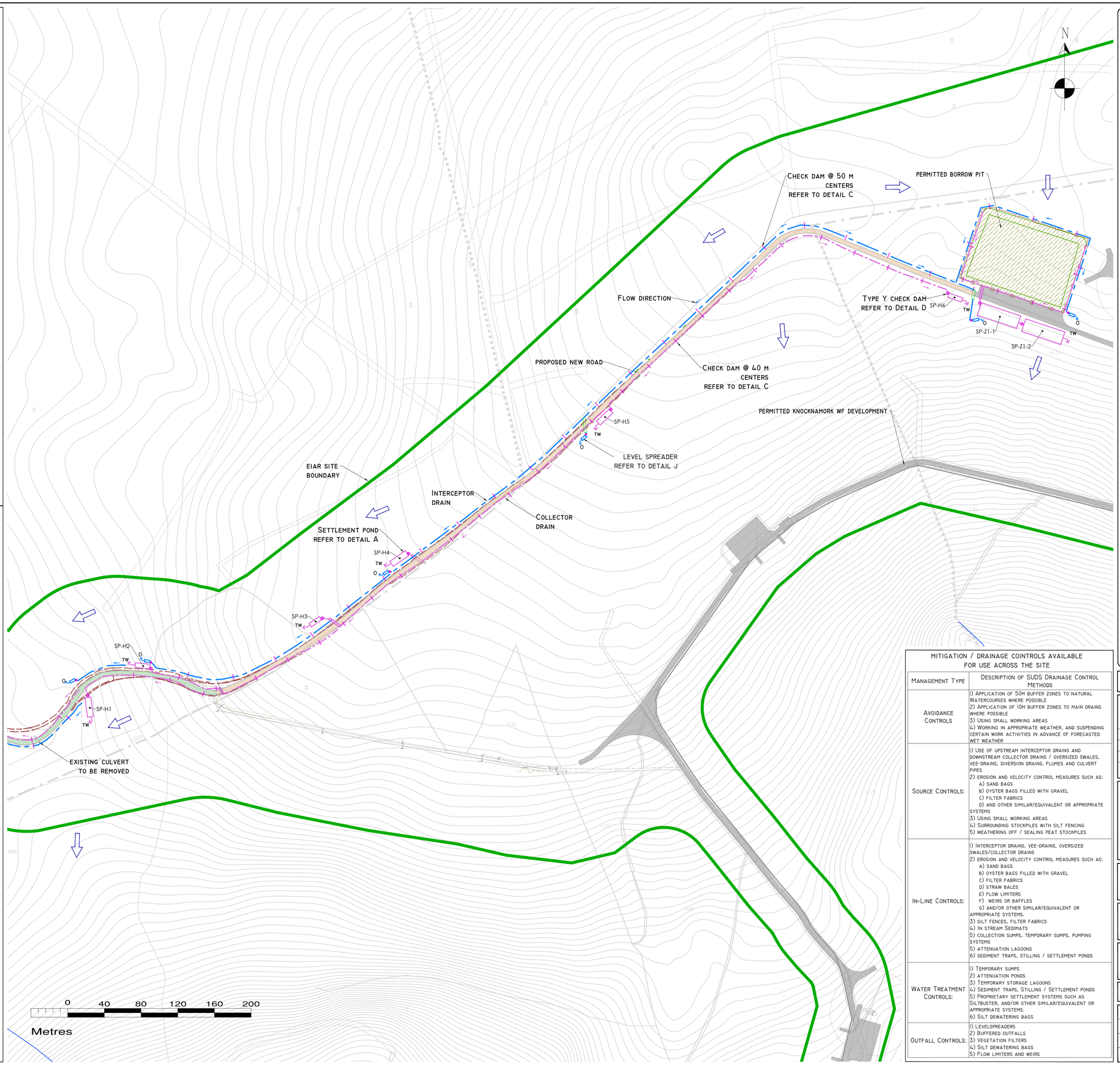

Drawing Legend :

Existing Drainage

- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (* completed in advance of access road works)

- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
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- SP-A3 settlement pond number
- Pumping Sump
- ground slope direction

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- Existing ground surface minor contour (1 m interval)
- proposed road upgrade
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- Existing public road
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- proposed borrow pit
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- Ballyvouskill 220kV Substation
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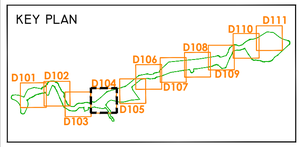
KEY PLAN



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MITIGATION / DRAINAGE COINTROLS 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 peat stockpiles
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Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs

Date	Description	Chkd	Signed

Revisions

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email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D104**

Drawing No: P1421-1-0722-A1-D104-00A

Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

POLLUTION PREVENTION NOTES:

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Exposed Ground & Stockpiles

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Site tracks

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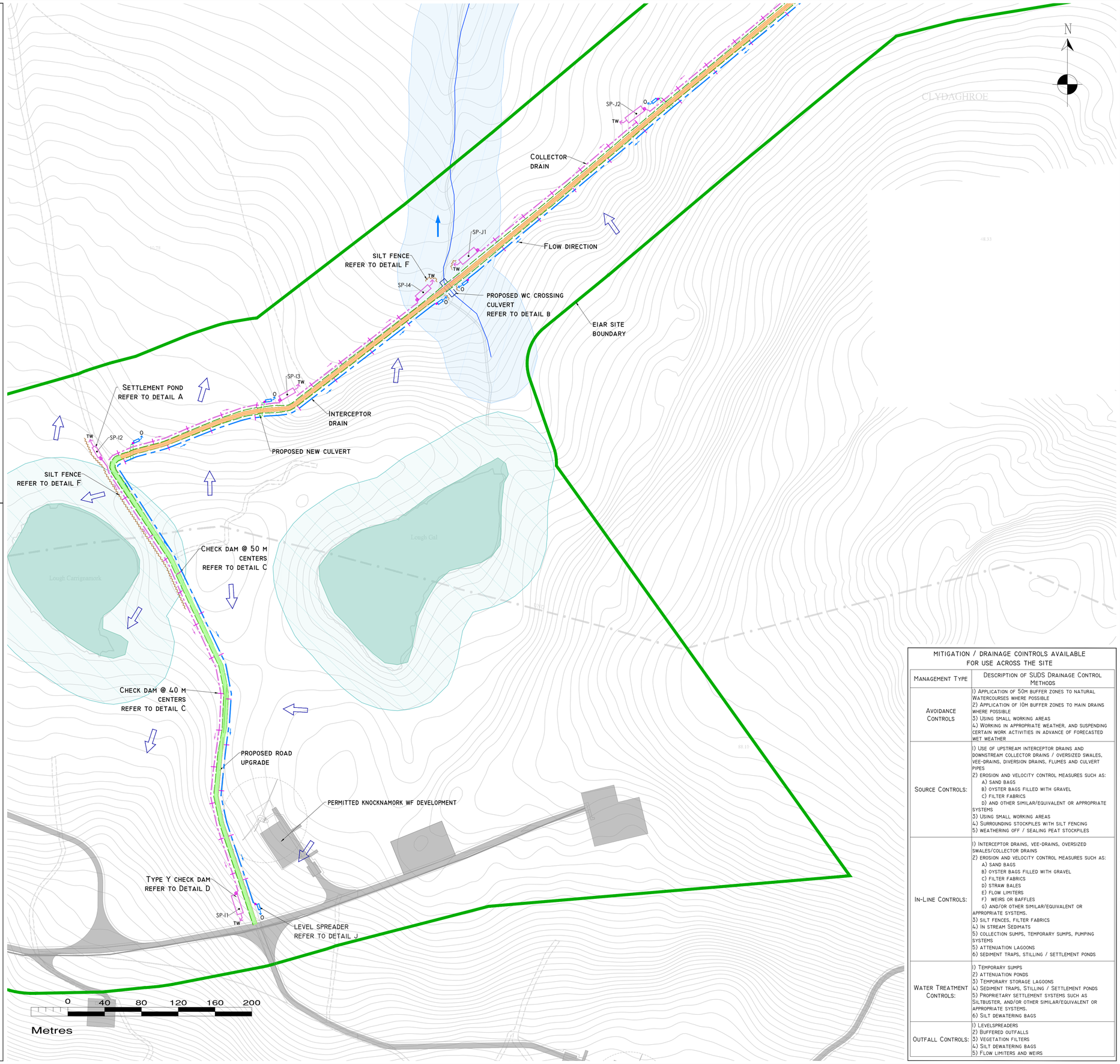

Drawing Legend :

Existing Drainage

- Rivers/streams
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- Lake 50m buffer
- Stream flow direction

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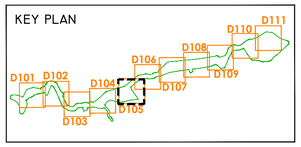
KEY PLAN



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MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

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Date	Description	Chkd	Signed

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web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: D105

Drawing No: P1421-1-0722-A1-D105-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will NOT be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

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.

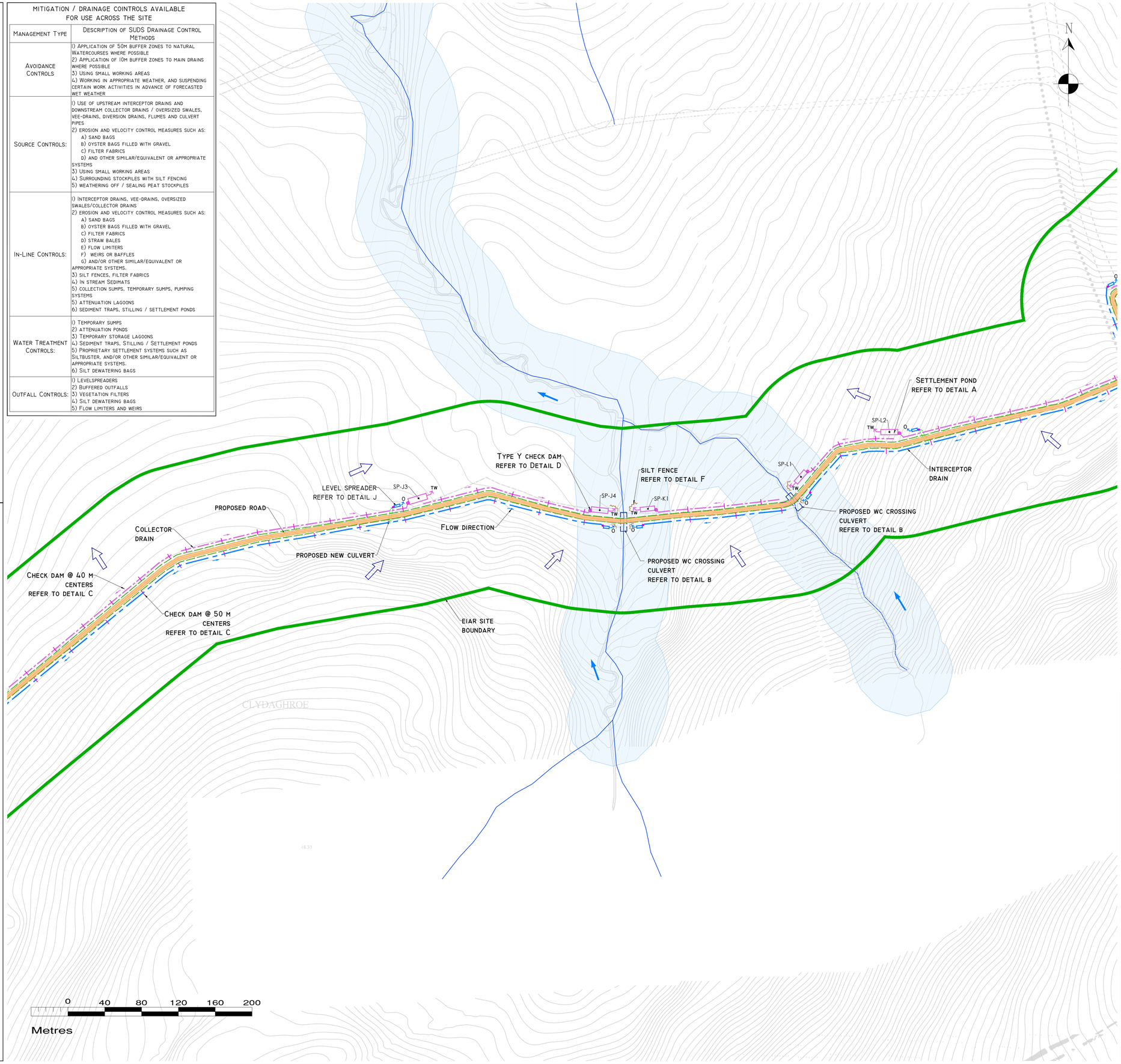
NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

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 will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

Mitigation / Drainage Cointrols 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 peat 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 Sedimats 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) 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



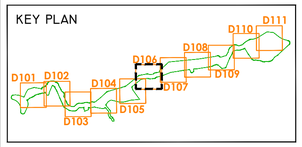
Drawing Legend :

Existing Drainage
- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (*completed in advance of access road works)
- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
- Existing culverts proposed to be extended
- Proposed new culverts
- Existing culverts to be removed
- Collector Ditch Culvert
- watercourse drain protection berm
- O Overland Flow Discharge
- TW Treated Water Discharge
- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /secondary sp
- SP-A3 settlement pond number
- Pumping Sump
- ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- proposed road upgrade
- proposed new roads
- proposed road upgrade
- proposed new roads
- Existing public road
- substation
- proposed borrow pit
- permitted borrow pit
- Ballyvouskill 220kV Substation
- Knocknamork Permitted Layout
- cut area
- fill area

KEY PLAN



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Date	Description	Chkd	Signed

Revisions

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Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: D106

Drawing No: P1421-1-0722-A1-D106-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	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 will be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will NOT be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site Tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

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.

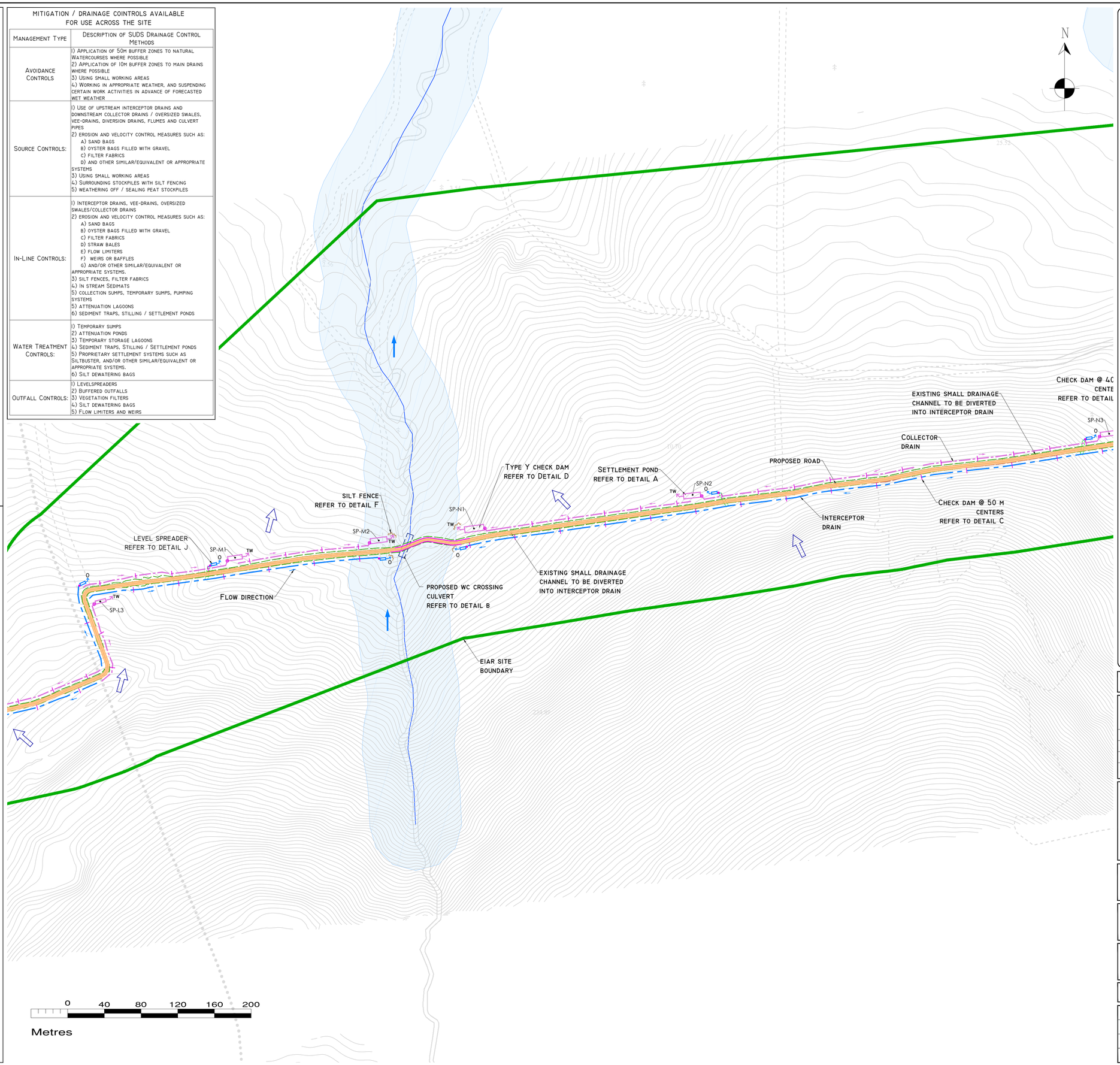
NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

MITIGATION / DRAINAGE COINTROLS 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 peat 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 Sedimats 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) 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

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 will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.



Drawing Legend :

Existing Drainage

- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (*completed in advance of access road works)

- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
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- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /secondary sp
- SP-A3 settlement pond number
- Pumping Sump
- Ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- Proposed road upgrade
- Proposed new roads
- Proposed road upgrade
- Proposed new roads
- Existing public road
- Substation
- Proposed borrow pit
- Permitted borrow pit
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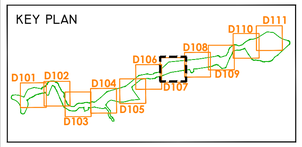
- Knocknamork Permitted Layout
- Cut area
- Fill area

KEY PLAN



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Date	Description	Chkd	Signed

Revisions

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web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D107**

Drawing No: P1421-1-0722-A1-D107-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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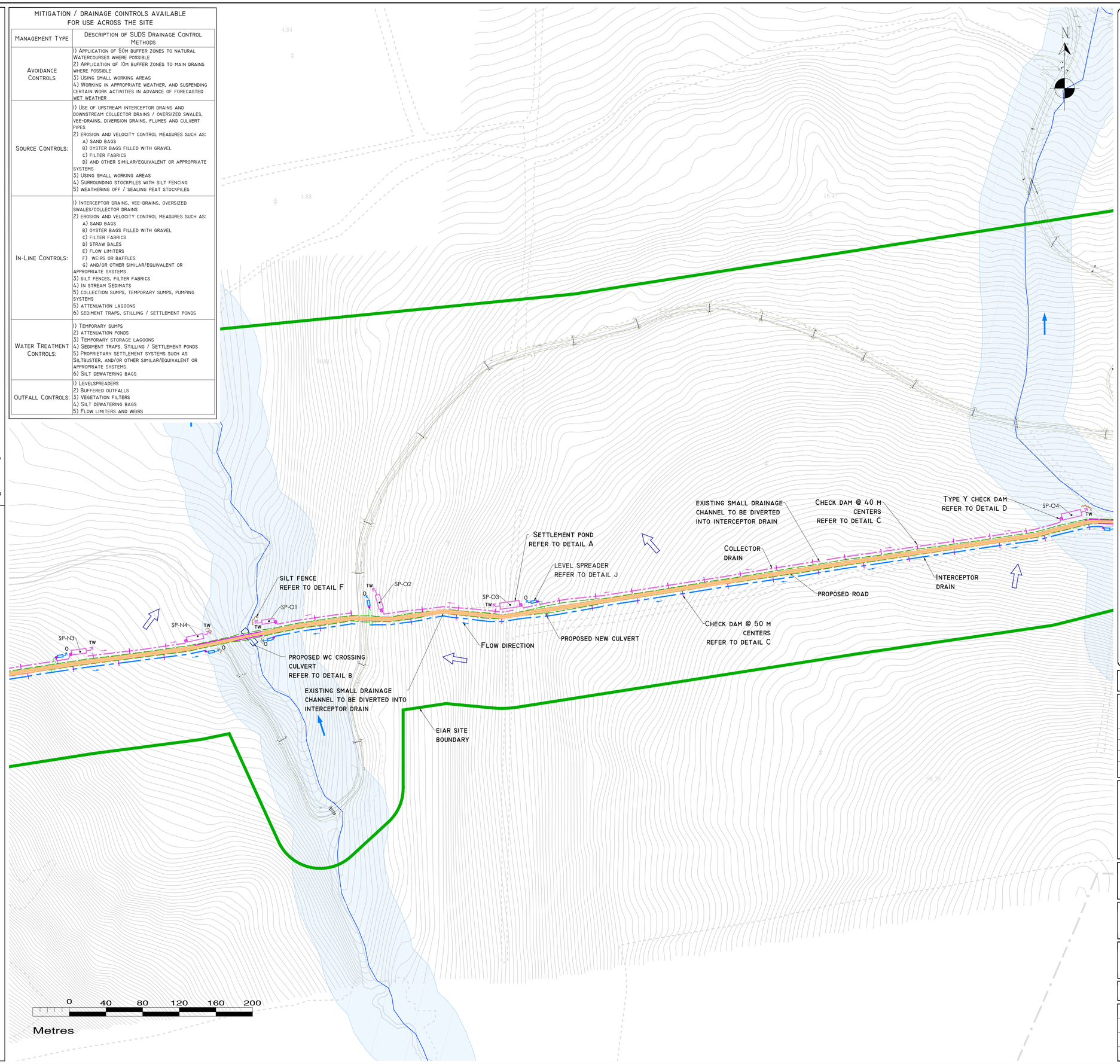

Drawing Legend :

Existing Drainage
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- Rivers/streams 50m buffer
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Proposed WF Construction Drainage (* completed in advance of access road works)
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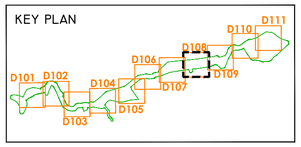
KEY PLAN



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Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: D108

Drawing No: P1421-1-0722-A1-D108-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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 will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

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 will be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will NOT be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

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.

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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.

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17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
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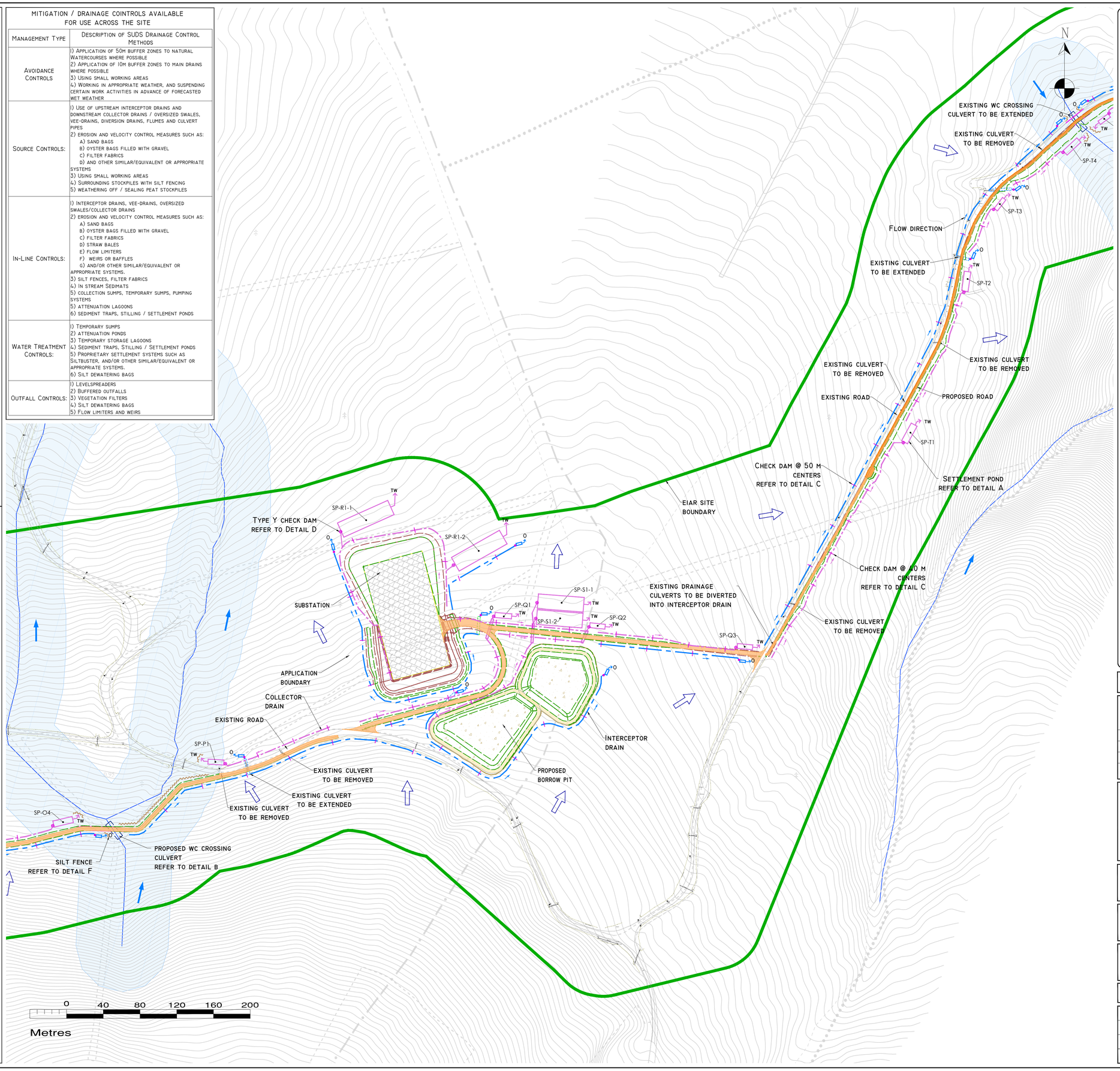
MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

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 peat 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 Sedimats 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) 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



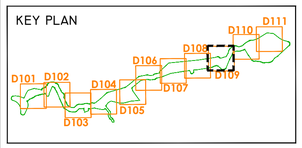
Drawing Legend :

Existing Drainage
- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (* completed in advance of access road works)
- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
- Existing culverts proposed to be extended
- Proposed new culverts
- Existing culverts to be removed
- Collector Ditch Culvert
- watercourse drain protection berm
- O Overland Flow Discharge
- TW Treated Water Discharge
- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /secondary sp
- SP-A3 settlement pond number
- Pumping Sump
- ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- proposed road upgrade
- proposed new roads
- proposed road upgrade
- proposed new roads
- existing public road
- substation
- proposed borrow pit
- permitted borrow pit
- Ballyvouskill 220kV Substation
- Knocknamork Permitted Layout
- cut area
- fill area

KEY PLAN



Drawing Notes

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4. All dimensions are in metres.

Date	Description	Chkd	Signed

Revisions

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web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D109**

Drawing No: P1421-1-0722-A1-D109-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

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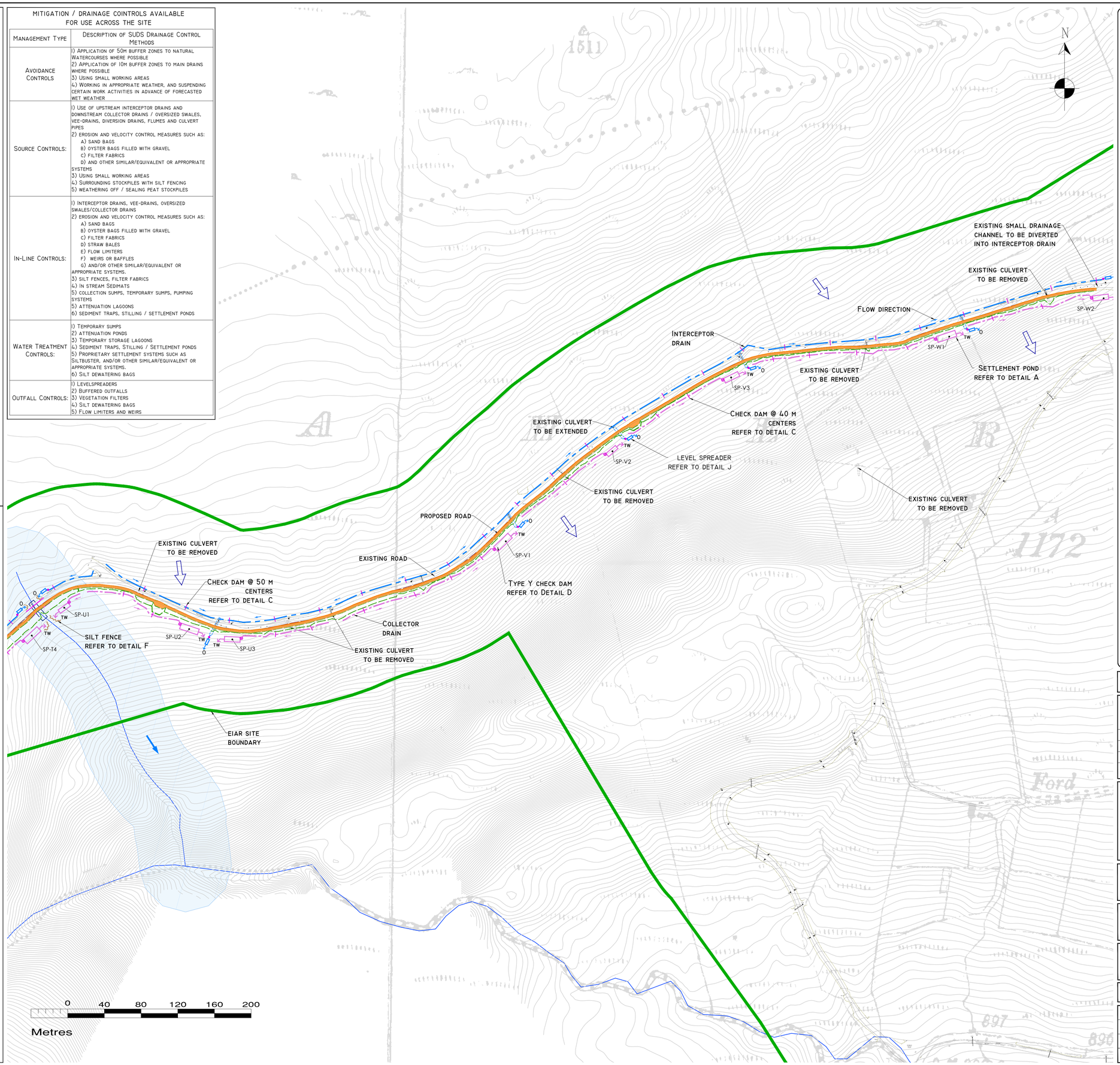

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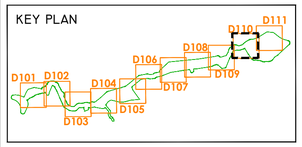

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Date	Description	Chkd	Signed

Revisions

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email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: Knocknamork Ltd

Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: **D110**

Drawing No: P1421-1-0722-A1-D110-00A	
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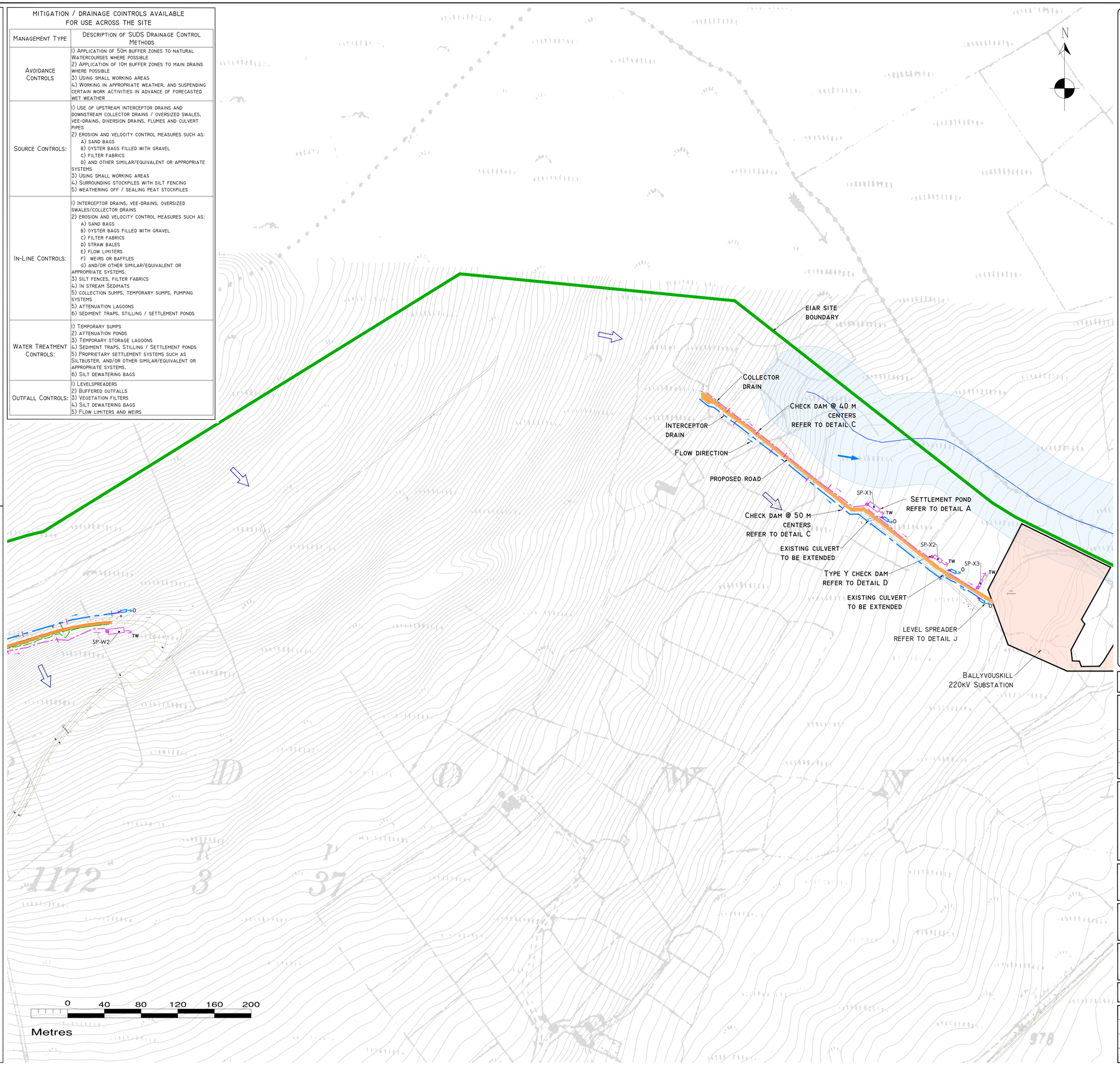
Avoidance Controls	1) Application of 50m buffer zones to natural Watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source 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 peat 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 Sedimats 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) 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

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 will 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 provide along edge of existing watercourse where works comes within <15m of edge of any ditch / ephemeral channels.
13. Slopes of the swales / ditches to be protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel will be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.



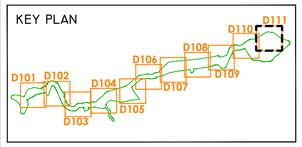
DRAWING LEGEND :

Existing Drainage
- Rivers/streams
- Rivers/streams 50m buffer
- Lakes
- Lake 50m buffer
- Stream flow direction

Proposed WF Construction Drainage (* completed in advance of access road works)
- Upstream Interceptor Drain*
- Swales/Downstream Collector Drain
- Direction of flow
- Silt Fences*
- Level spreader
- Settlement pond - vegetation filter - level spreader
- Check Dam 'type A'/Silt trap*
- Check Dam 'type B'/Silt Trap
- Proposed wc crossing culverts/bridges
- Existing culverts proposed to be extended
- Proposed new culverts
- Existing culverts to be removed
- Collector Ditch Culvert
- watercourse drain protection berm
- O — Overland Flow Discharge
- TW — Treated Water Discharge
- SP — Settlement Pond
- VS — Semi-Natural Vegetation Swale / Filter Bed /secondary sp
- SP-A3 — settlement pond number
- Pumping Sump
- ground slope direction

- EIAR site boundary
- Existing ground surface minor contour (1 m interval)
- proposed road upgrade
- proposed new roads
- proposed road upgrade
- proposed new roads
- existing public road
- substation
- proposed borrow pit
- permitted borrow pit
- Ballyvouskill 220kV Substation
- Knocknamork Permitted Layout
- cut area
- fill area

KEY PLAN



DRAWING NOTES

1. Drawings issued are for planning application purposes only.
2.
3. Do not scale off this drawing. Figured metric dimensions only should be taken off this drawing.
4. All dimensions are in metres.

Date	Description	Chkd	Signed

Revisions

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Client: Knocknamork Ltd

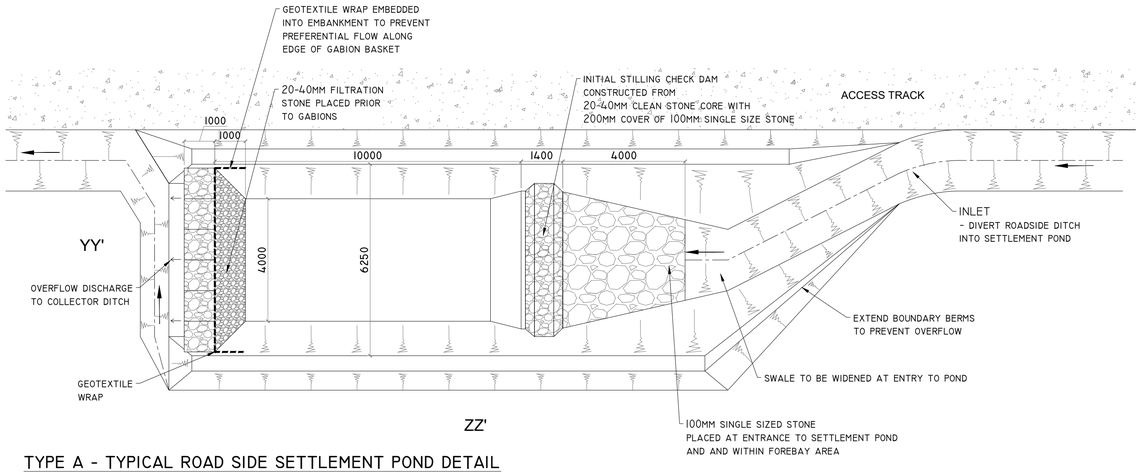
Job: Proposed Substation, Underground Cabling, Access Roads to Knocknamork Renewable Energy Development

Title: Proposed Drainage Layout

Figure No: D111

Drawing No: P1421-1-0722-A1-D111-00A	
Sheet Size: A1	Project No.: P1421-1
Scale: 1:2,000 (A1)	Drawn By: GD
Date: 15/07/2022	Checked By: MG

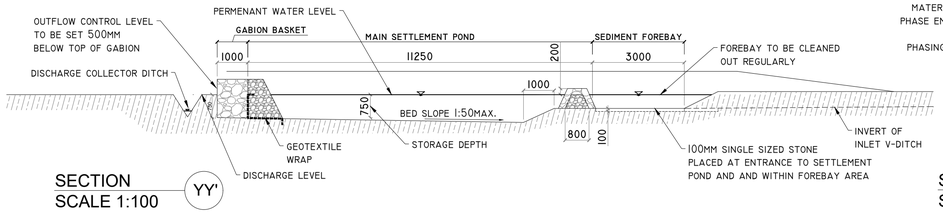
DETAIL A1



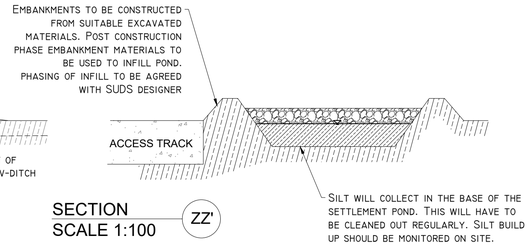
TYPE A - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL

SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE DRAINAGE SHEETS)

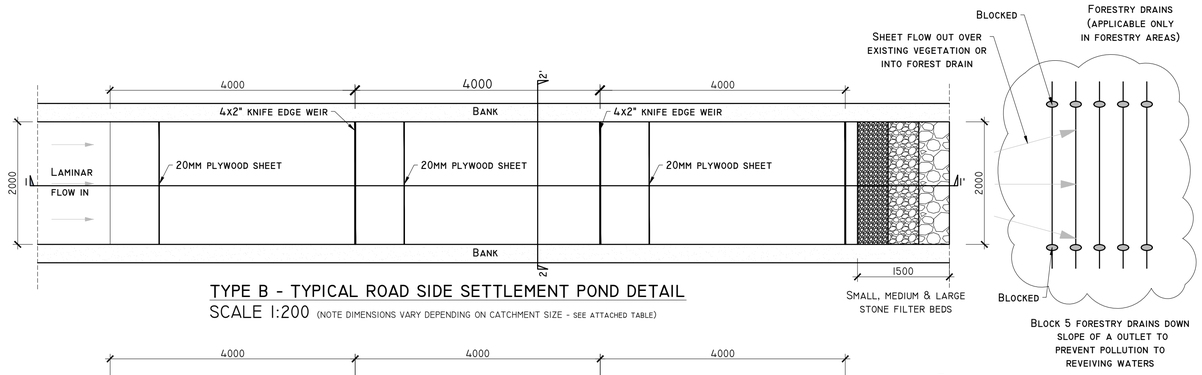
Pond Size W [m] x L [m] x D [m]			Catchment Size (m^2)		
Return Period	*50 yrs*	Storm Duration	500	1000	2000
6hr retention for coarse silt		6 hrs	2.8 x 9 x 1 m	4 x 13 x 1 m	5.7 x 18 x 1 m
11hr retention for medium silt		12 hrs	3.2 x 10 x 1 m	4.5 x 14 x 1 m	6.4 x 20 x 1 m
24hr retention for fine silt		24 hrs	3.5 x 11 x 1 m	5 x 16 x 1 m	7 x 22 x 1 m



SECTION YY'
SCALE 1:100

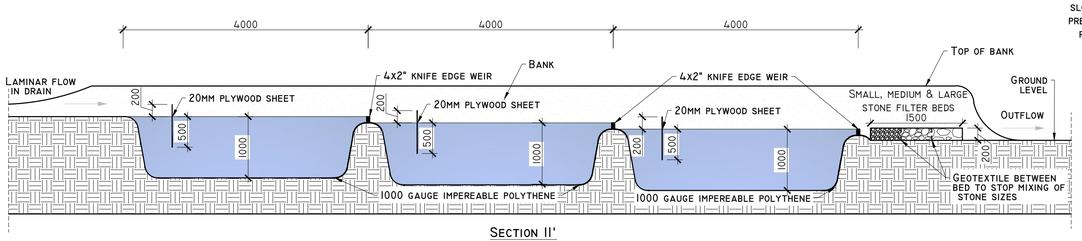


SECTION ZZ'
SCALE 1:100

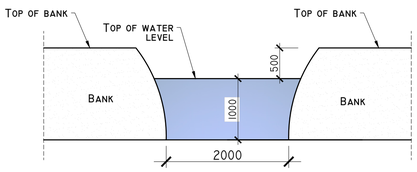


TYPE B - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL

SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)

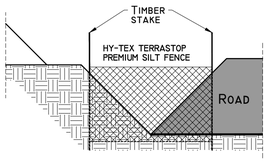


SECTION 11'



SECTION 22'

SEDIMENT FENCE/CHECK DAM DETAIL



DETAIL A2

Date	Description	Chkd	Signed
05/07/22	Planning	MG	MG

Revisions

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email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: KOCKNAMORK LTD

Job: PROPOSED SUBSTATION, UNDERGROUND CABLING, ACCESS ROADS TO KNOCKNAMORK RENEWABLE ENERGY DEVELOPMENT

Title: DRAINAGE DETAILS 1

Figure No: D501

Drawing No: P1421-1-0722-A1-D501-00A	
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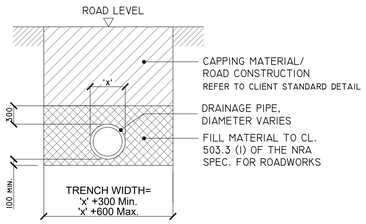
Scale: as shown (A1)	Drawn By: MG/GD
Date: 05/07/2022	Checked By: M.G.

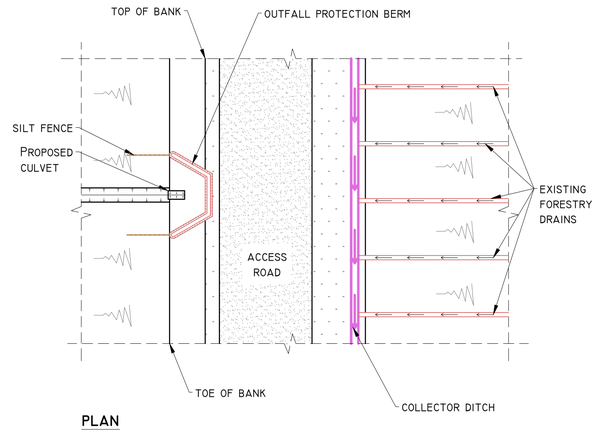
DETAIL B



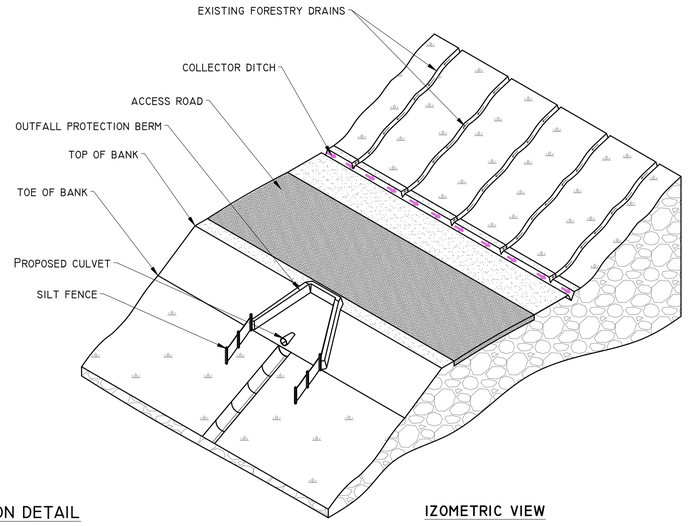
'TYPE B' CULVERT - DRAINAGE CROSSING BENEATH EXCAVATED ROAD

SCALE 1:50

DETAIL B1



PLAN

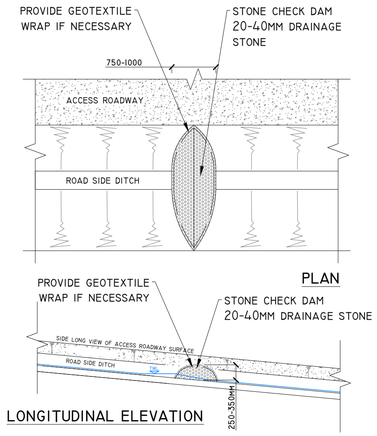


IZOMETRIC VIEW

CULVET - OUTFALL PROTECTION DETAIL

SCHEMATIC - NOT TO SCALE

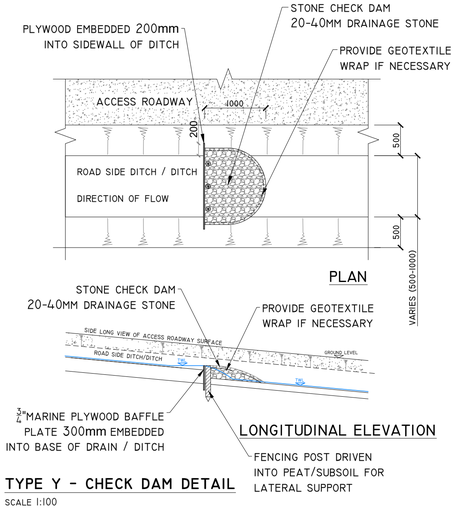
DETAIL C



TYPE X - CHECK DAM DETAIL

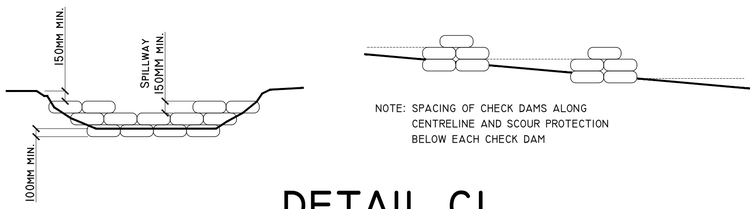
SCALE 1:50

DETAIL D

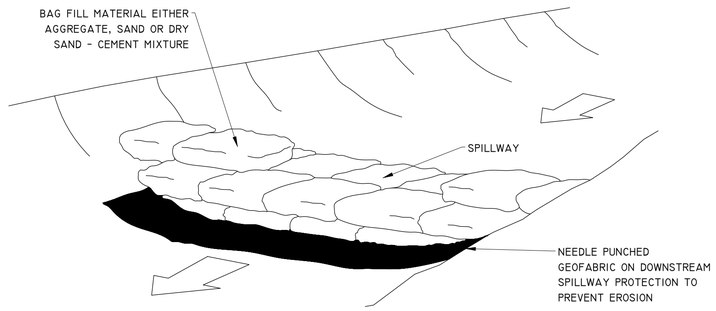


TYPE Y - CHECK DAM DETAIL

SCALE 1:100



DETAIL C1



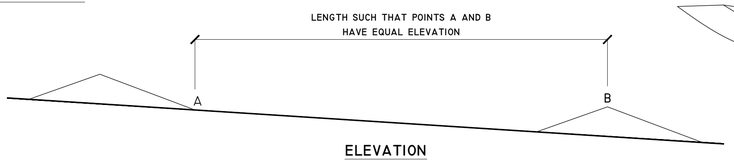
TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW
SAND FILLED BAG CONSTRUCTION

SCHEMATIC - NOT TO SCALE

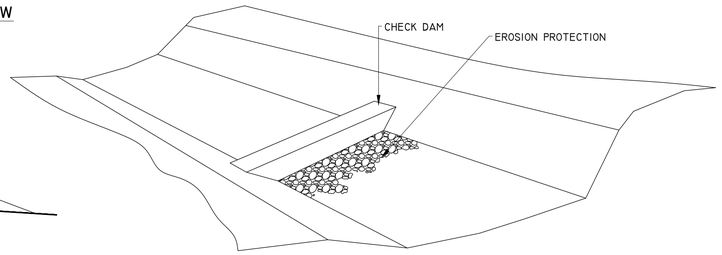
TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW

SCHEMATIC - NOT TO SCALE

DETAIL C2



ELEVATION



Date	Description	Chkd	Signed
05/07/22	Planning	MG	MG

Revisions

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Client: KOCKNAMORK LTD

Job: PROPOSED SUBSTATION, UNDERGROUND CABLING, ACCESS ROADS TO KNOCKNAMORK RENEWABLE ENERGY DEVELOPMENT

Title: DRAINAGE DETAILS 2

Figure No: D502

Drawing No: P1421-1-0722-A1-D502-00A	
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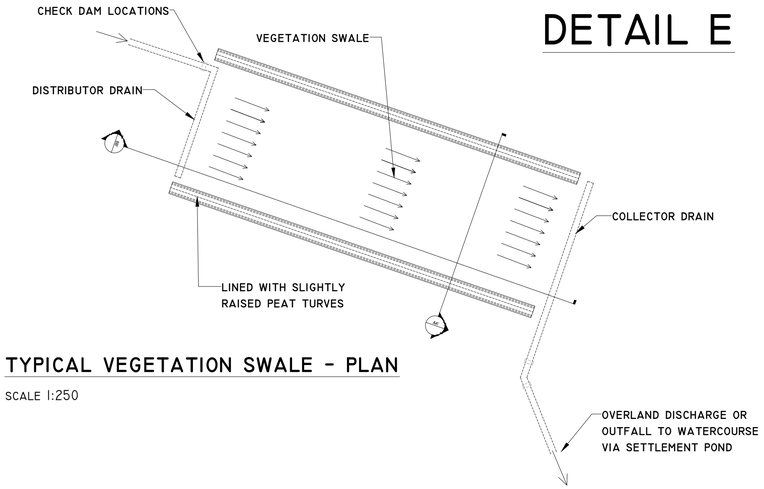
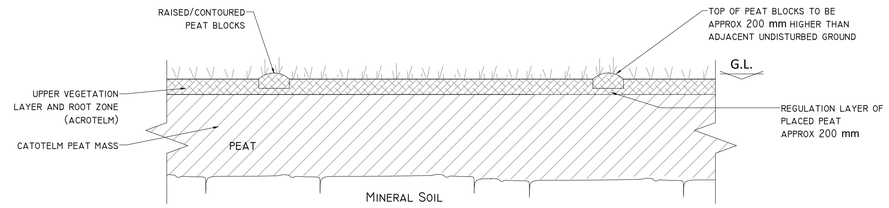
Scale: as shown (A1)	Drawn By: MG/GD
Date: 05/07/2022	Checked By: M.G.

DETAIL E



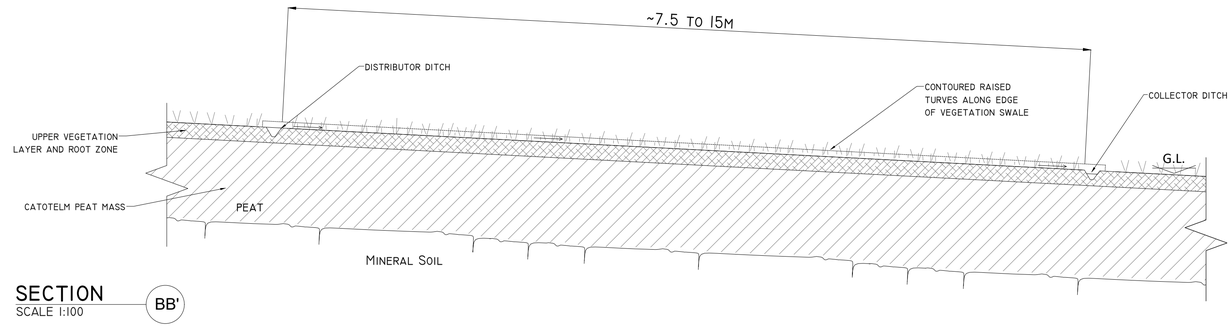
TYPICAL VEGETATION SWALE - PLAN

SCALE 1:250



SECTION AA'

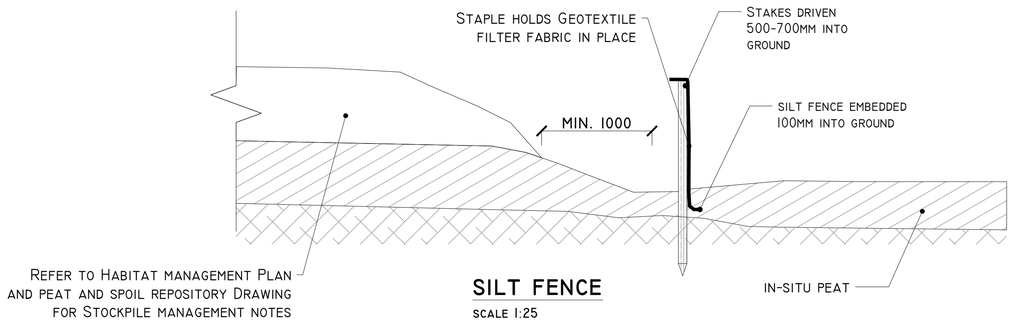
SCALE 1:200



SECTION BB'

SCALE 1:100

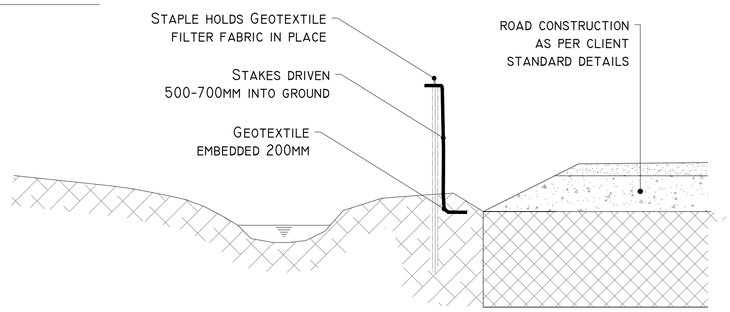
DETAIL F-I



SILT FENCE

SCALE 1:25

DETAIL F-II



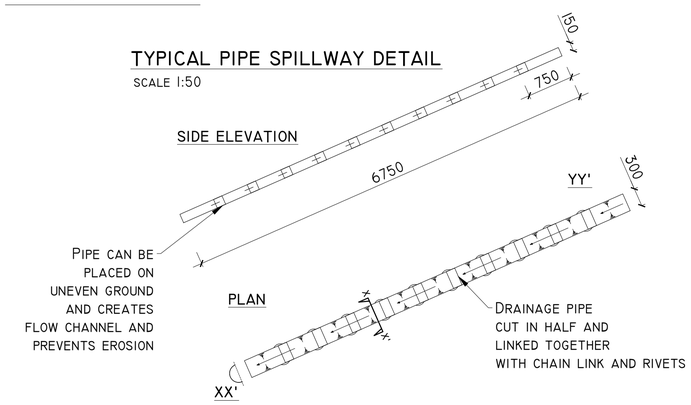
SILT FENCE FOR WATERCOURSE PROTECTION

SCALE 1:25

DETAIL G

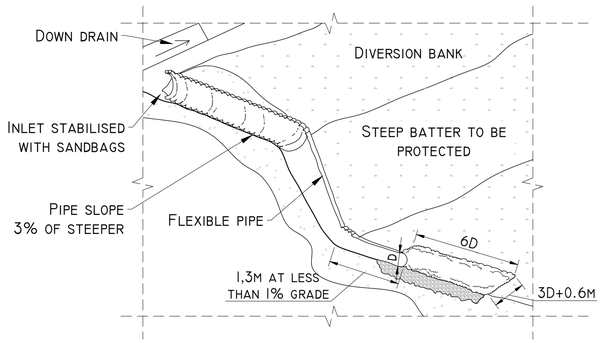
TYPICAL PIPE SPILLWAY DETAIL

SCALE 1:50



TYPICAL PIPE SPILLWAY DETAIL

SCHEMATIC - NOT TO SCALE



PROJECT DESIGN DRAWING NOTES

1. DRAWINGS ISSUED ARE FOR PLANNING STAGE ONLY.

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

Date	Description	Chkd	Signed
05/07/22	Planning	MG	MG

Revisions

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Client: KOCKNAMORK LTD

Job: PROPOSED SUBSTATION, UNDERGROUND CABLING, ACCESS ROADS TO KNOCKNAMORK RENEWABLE ENERGY DEVELOPMENT

Title: DRAINAGE DETAILS 3

Figure No: D503

Drawing No: P1421-1-0722-A1-D503-00A	
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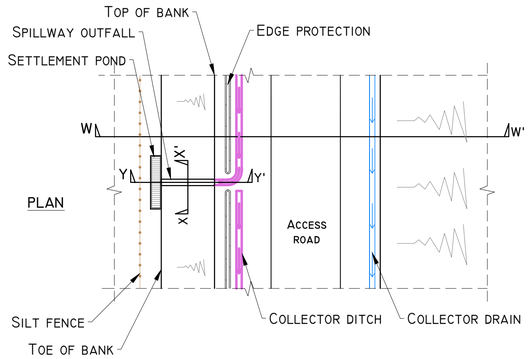
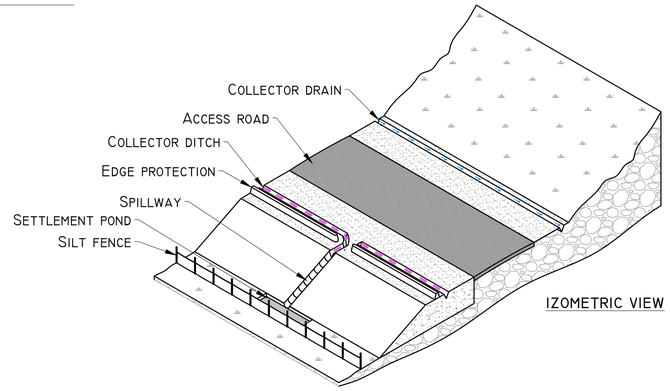
Scale: as shown (A1)	Drawn By: MG/GD
Date: 05/07/2022	Checked By: M.G.

DETAIL H



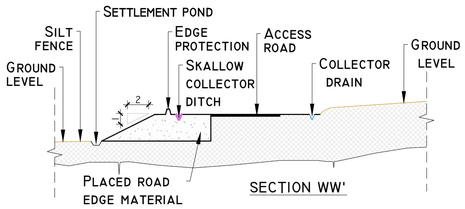
PLAN



IZOMETRIC VIEW

SPILLWAY OUTFALL PLAN

SCHEMATIC - NOT TO SCALE

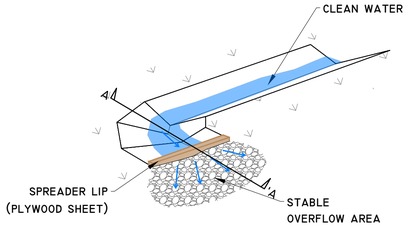


SECTION WW'

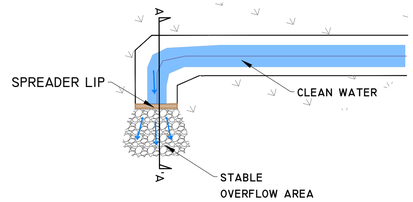
DETAIL J-1

LEVEL SPREADER DETAIL

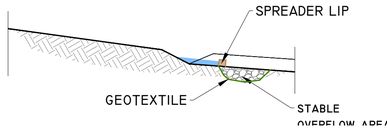
SCHEMATIC - NOT TO SCALE



PLAN



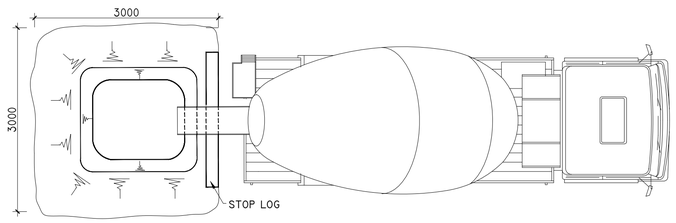
SECTION AA'



TEMPORARY CONCRETE WASH OUT PIT

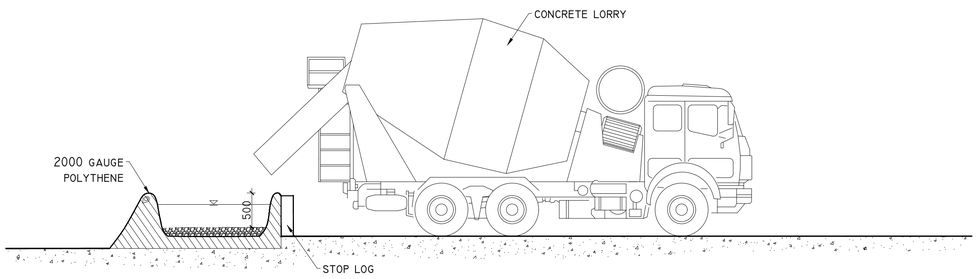
SCALE 1:50

PLAN



ELEVATION

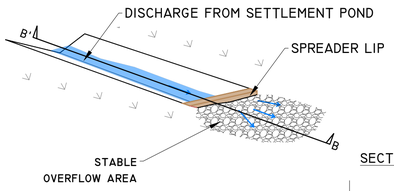
DETAIL I



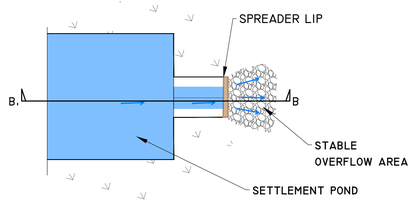
DETAIL J-2

LEVEL SPREADER DETAIL

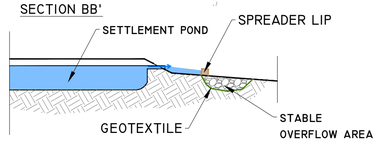
SCHEMATIC - NOT TO SCALE



PLAN



SECTION BB'



Date	Description	Chkd	Signed
05/07/22	Planning	MG	MG

Revisions

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Client: KOCKNAMORK LTD

Job: PROPOSED SUBSTATION, UNDERGROUND CABLING, ACCESS ROADS TO KNOCKNAMORK RENEWABLE ENERGY DEVELOPMENT

Title: DRAINAGE DETAILS 4

Figure No: D504

Drawing No: P1421-1-0722-A1-D504-00A

Sheet Size: A1	Project No.: P1421-1
Scale: as shown (A1)	Drawn By: MG/GD
Date: 05/07/2022	Checked By: M.G.