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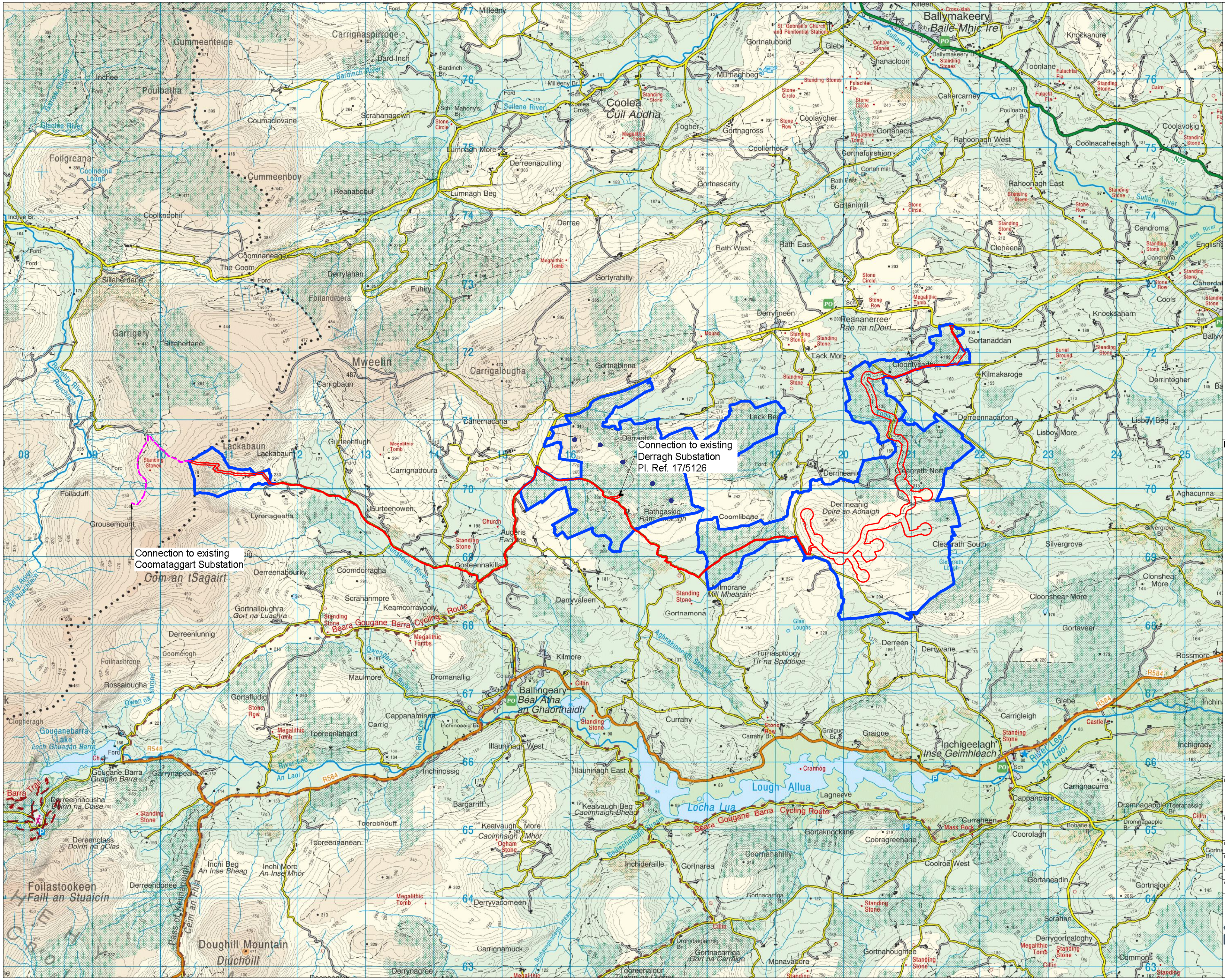
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.



Drawing Legend

- Planning Application Boundary
- Landowners Boundary
- Grid Connection in Co. Kerry
- Derragh Wind Farm Turbines

N

DRAWING TITLE: **Location Map**	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork	
DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 01
SCALE: 1:50,000 @A3	DATE: 13.08.2020
OS SHEET No.: OS1006, OS1206	

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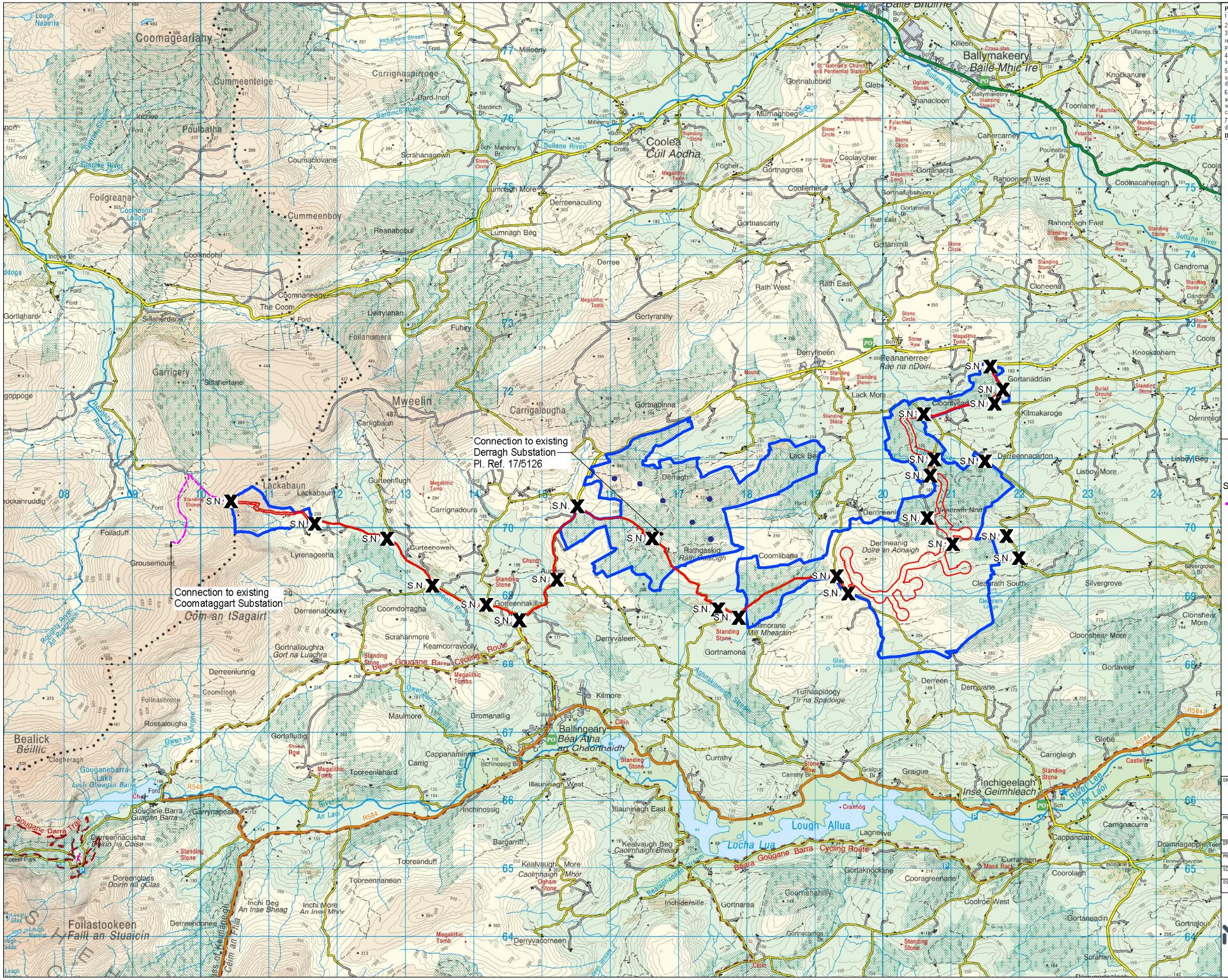
Website: www.mkoireland.ie



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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drawing Legend

- Planning Application Boundary
- Landowners Boundary
- S.N. X Site Notice
- Grid Connection in Co. Kerry
- Derragh Wind Farm Turbines

N

DRAWING TITLE:

Site Notice Location Map

PROJECT TITLE: Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 02
SCALE: 1:50,000 @A3	DATE: 13.08.2020
OS SHEET No.: OS1006, OS1206	

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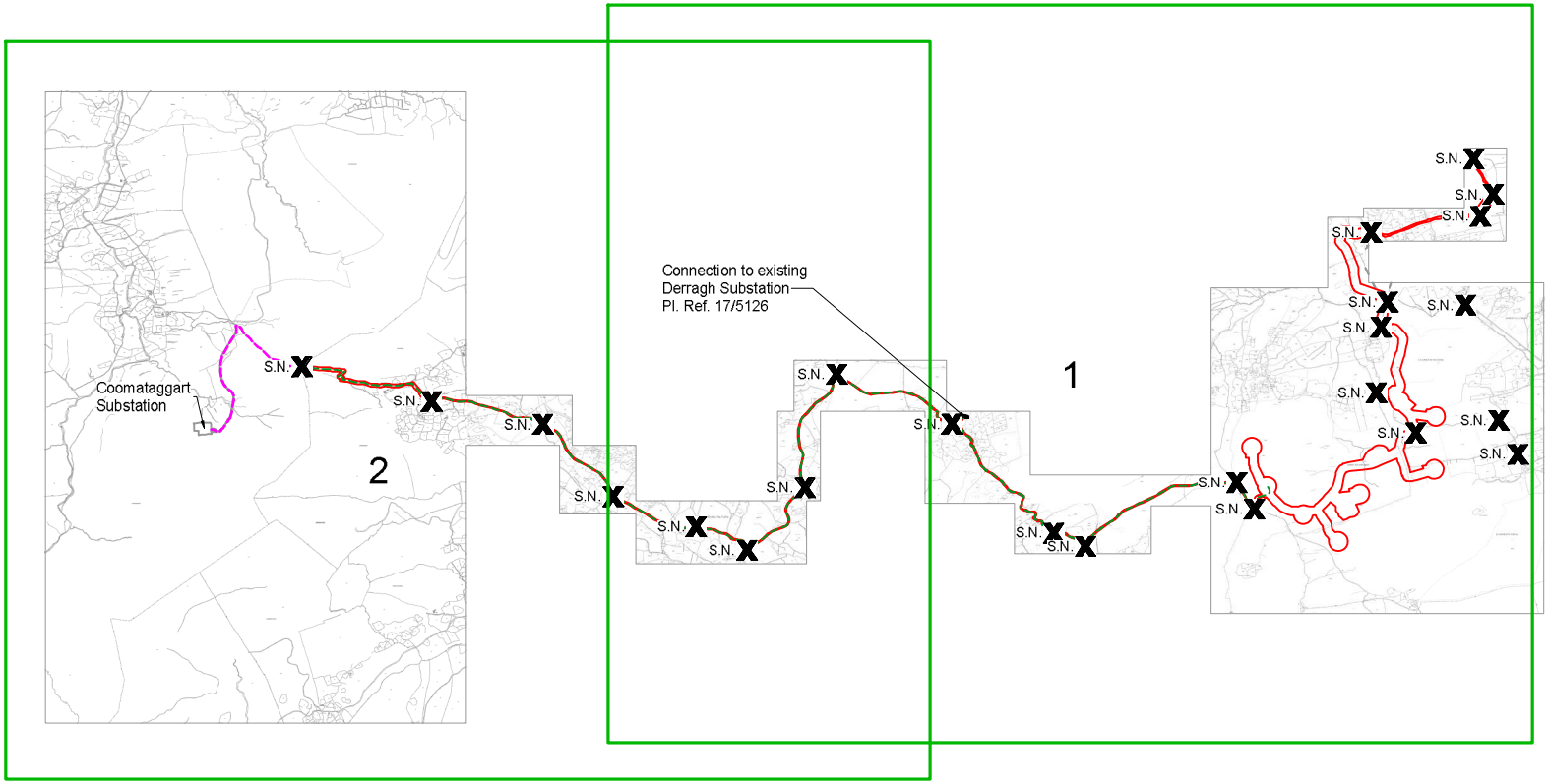

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- S.N. Site Notice
- Cable Trench to Grid Connection
- Grid Connection in Co. Kerry

N

DRAWING TITLE:

Site Location Key Plan

PROJECT TITLE:

Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 02A
SCALE: 1:50,000 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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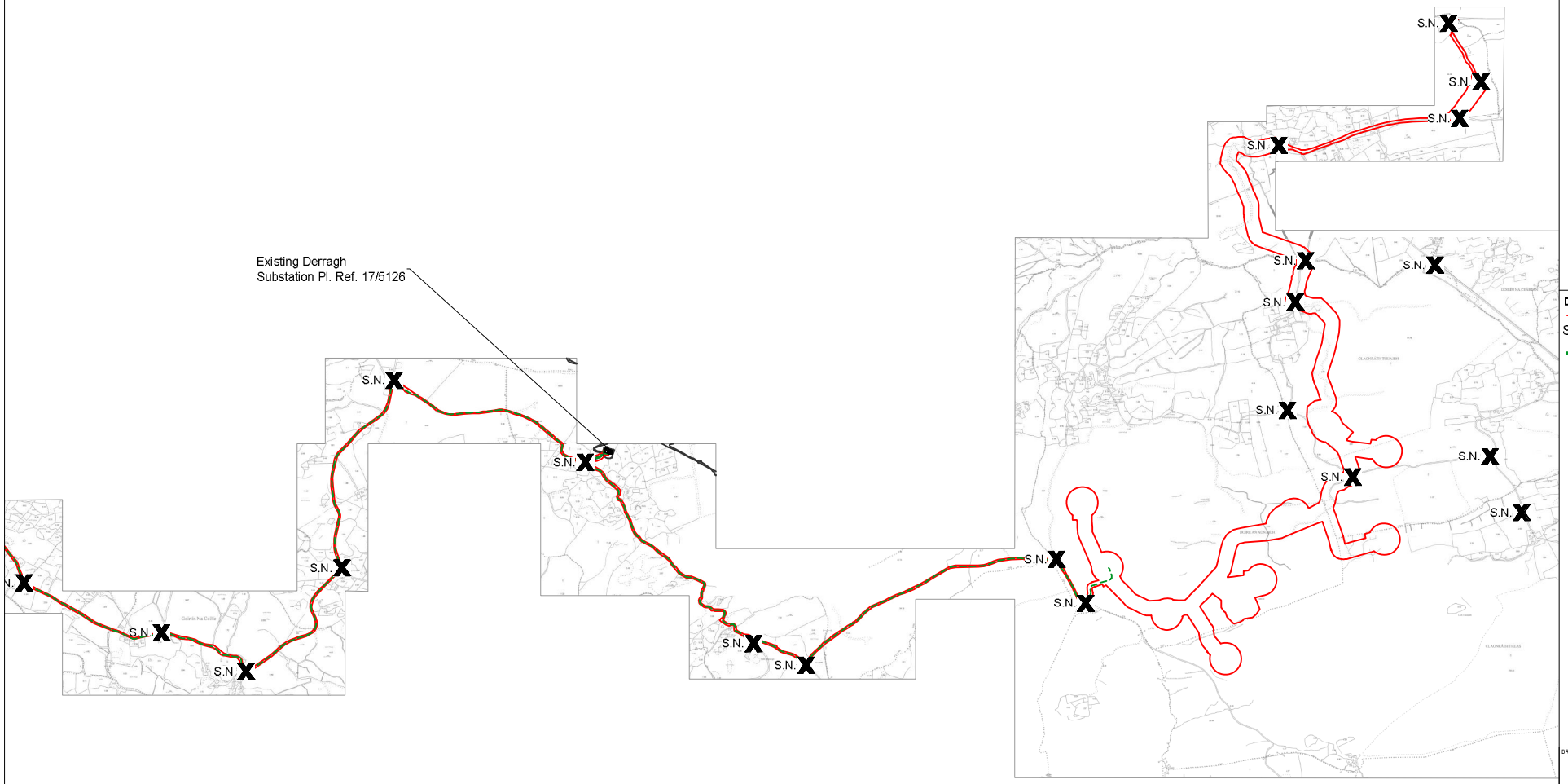

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- S.N. Site Notice
- Grid Connection Cable Route

N

DRAWING TITLE:

Site Location
Key Plan - Sheet 1 of 2

PROJECT TITLE:

Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 02B
SCALE: 1:25,000 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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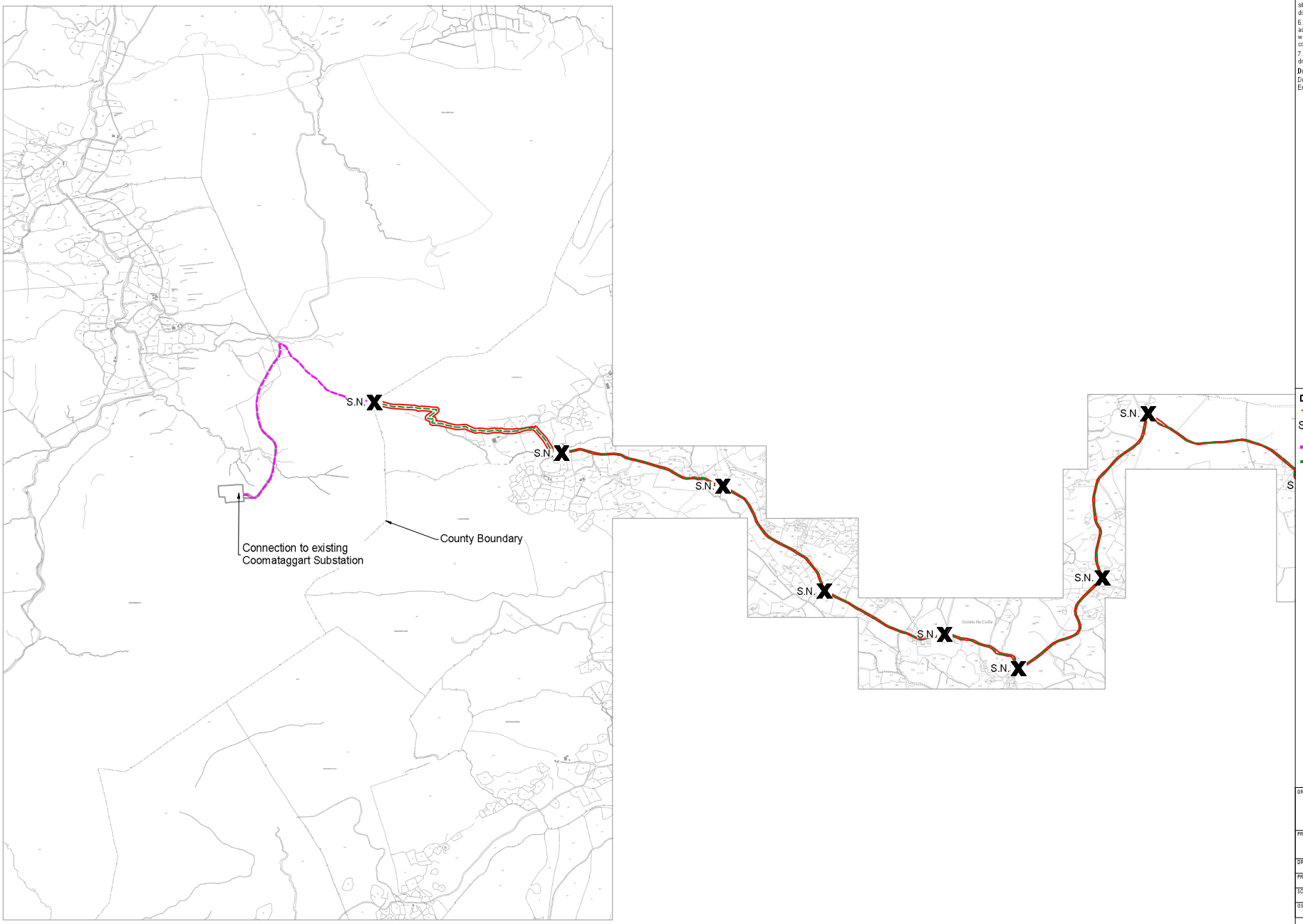

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- S.N. Site Notice
- Grid Connection in Co. Kerry
- Grid Connection Cable Route

N

DRAWING TITLE:

Site Location
Key Plan - Sheet 2 of 2

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 02C
SCALE: 1:25,000 @A3	DATE: 13.08.2020

OS SHEET No.:
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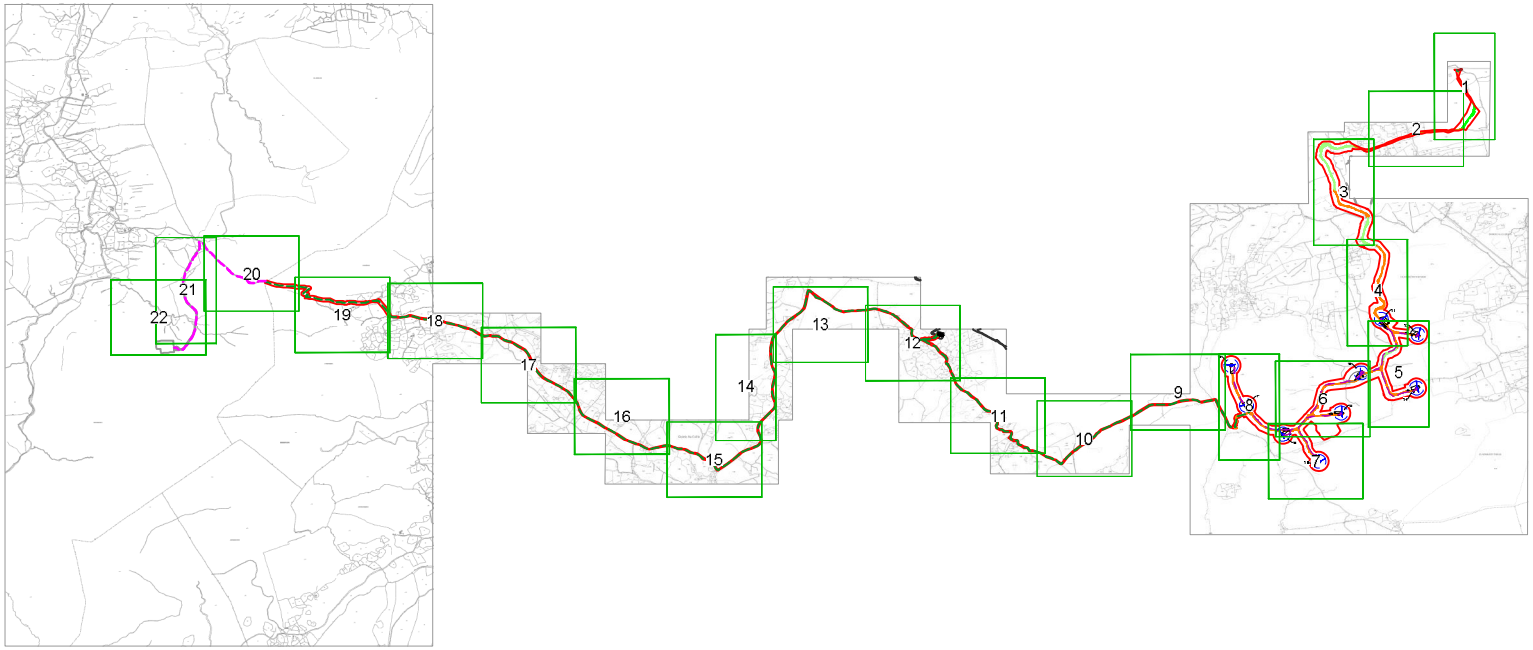

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Existing Road Upgraded
- New Road
- Temporary Road for Turbine Delivery
- Junction/Road Widening
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- Grid Connection into Co. Kerry
- Grid Connection Cable Route

N

DRAWING TITLE:

Site Layout Key Plan

PROJECT TITLE:

Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 03
SCALE: 1:50,000 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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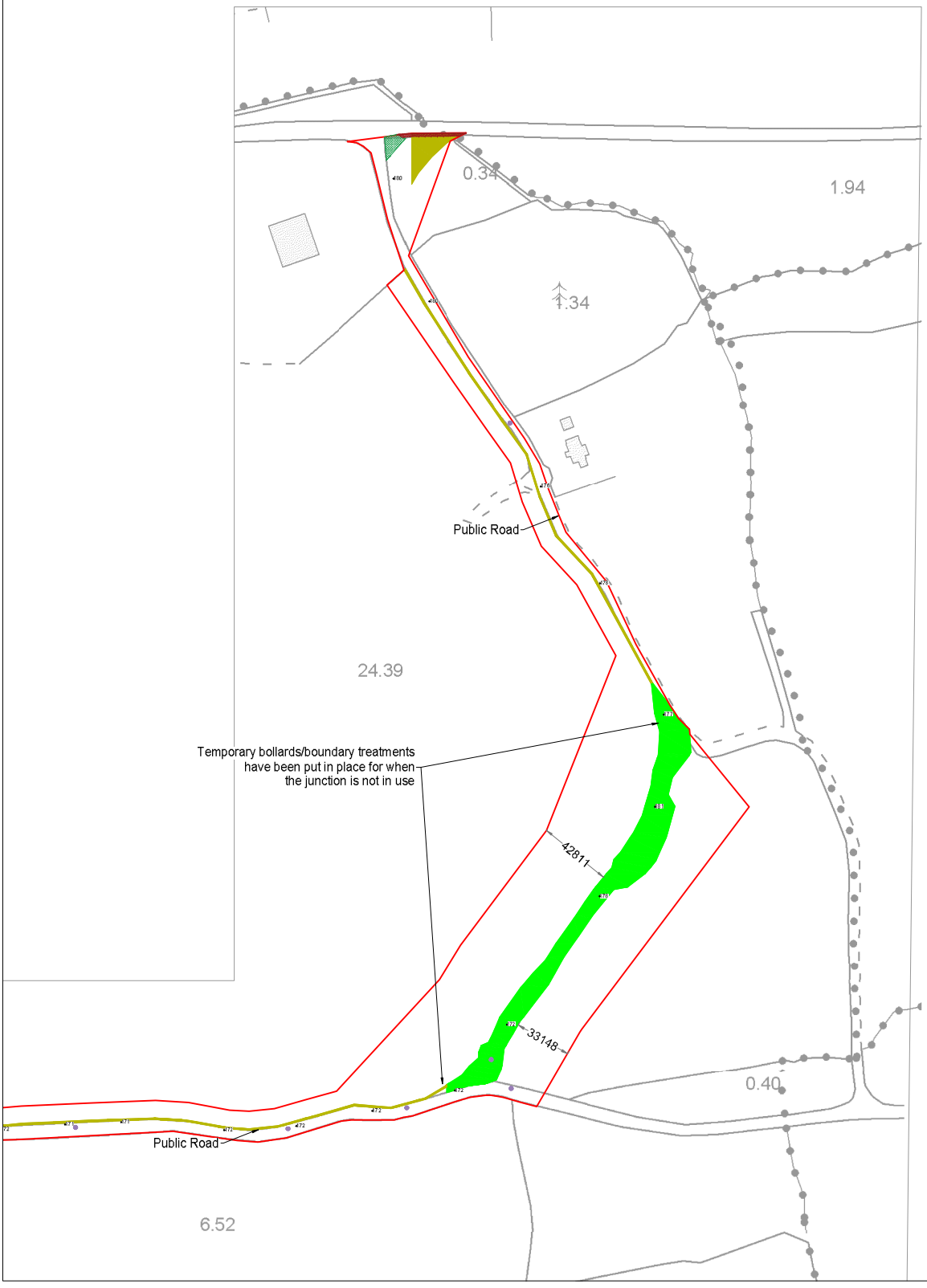

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- New Road
- Temporary Road for Turbine Delivery
- Junction/Road Widening
- Vegetation Area
- Berm
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 1 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 04
SCALE: 1:2,500 @A3	DATE: 13.08.2020
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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Temporary Road for Turbine Delivery
- Junction/Road Widening
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan Sheet 2 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 05
SCALE: 1:2,500 @A3	DATE: 13.08.2020

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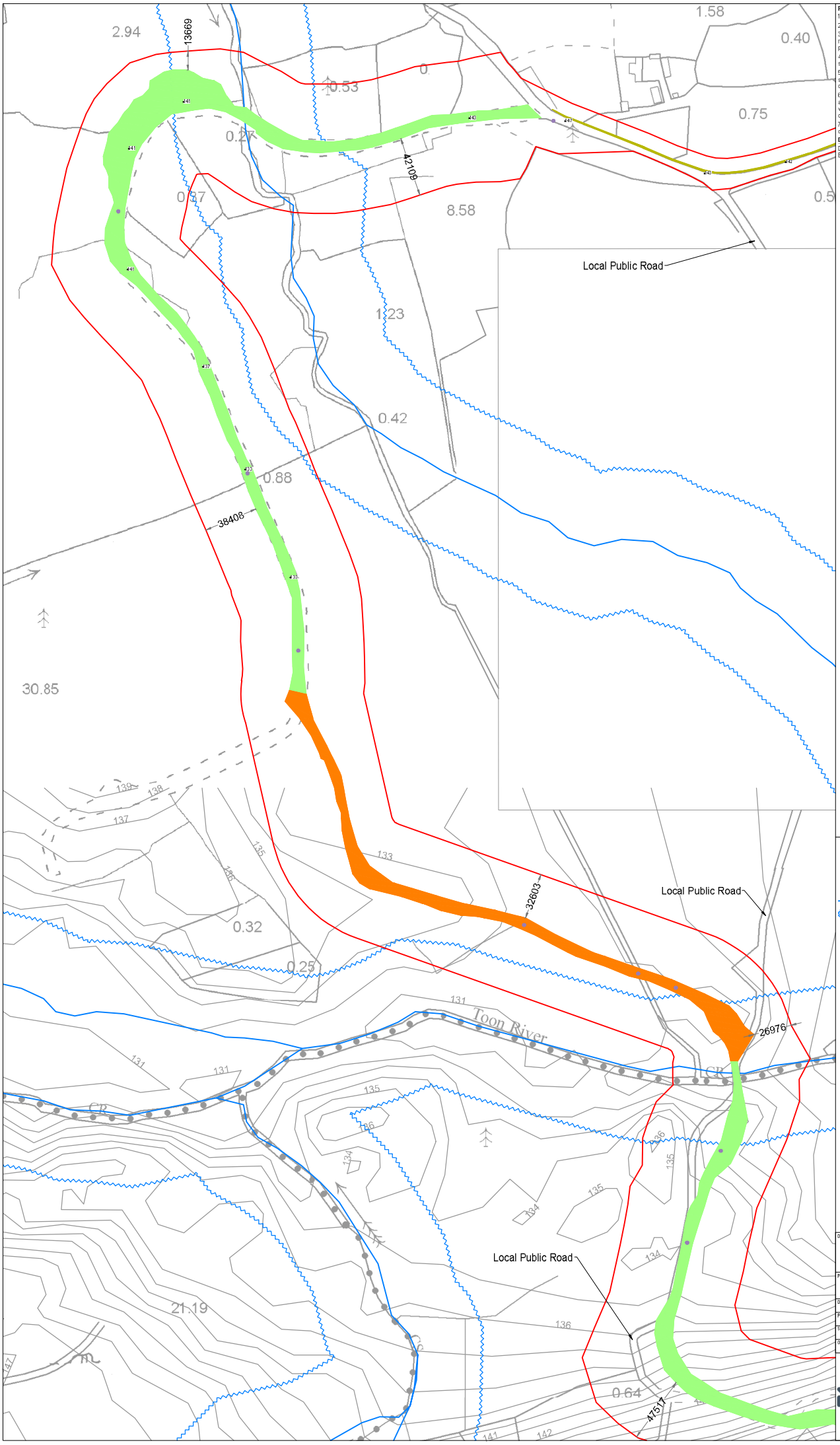

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Existing Road Upgraded
- New Road
- Junction/Road Widening
- River/Stream/Drain
- River/Stream/Drain Buffer 50m
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan Sheet 3 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 06
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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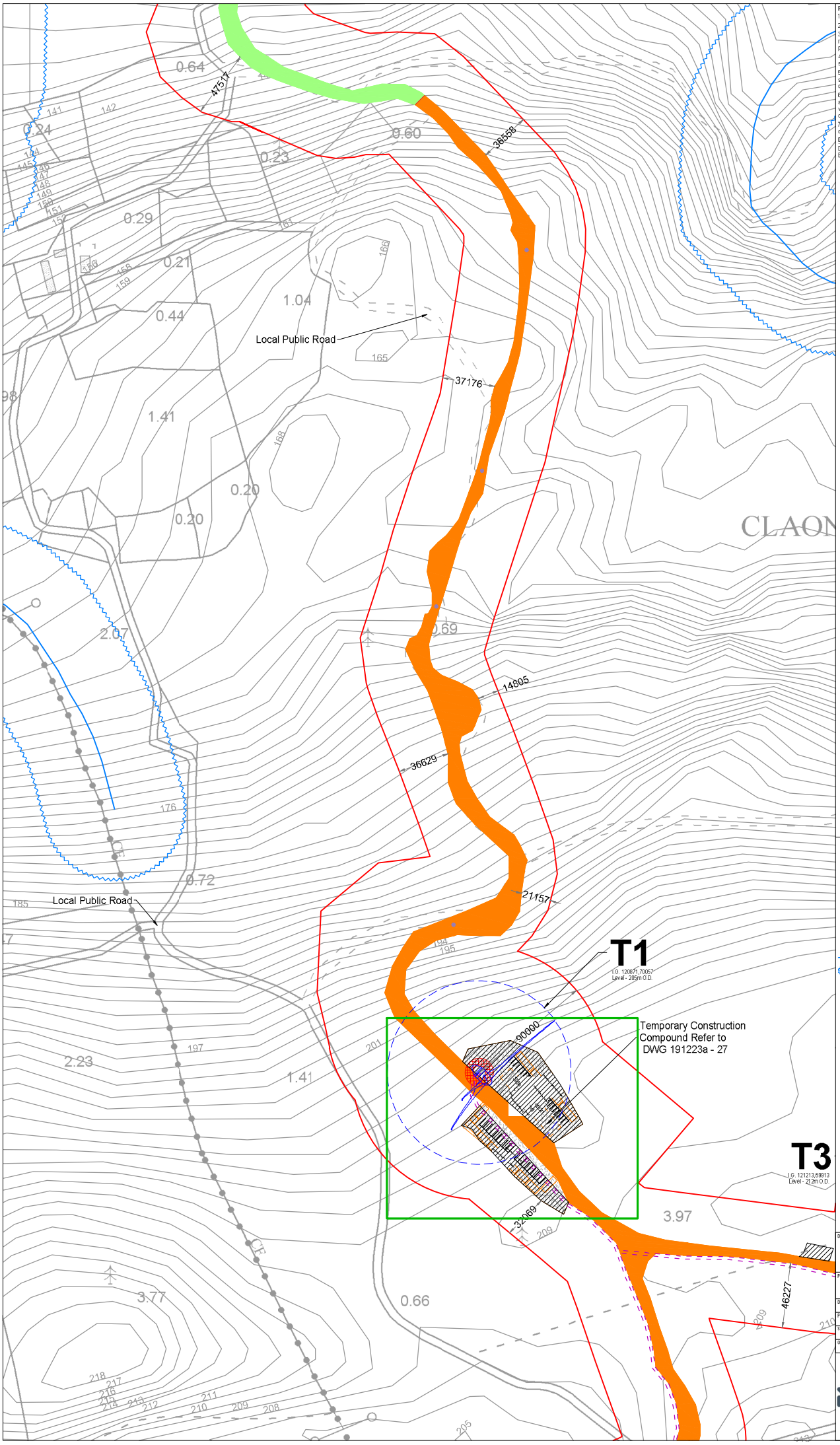

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Existing Road Upgraded
- New Road
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- River/Stream/Drain
- River/Stream/Drain Buffer 50m
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 4 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 07
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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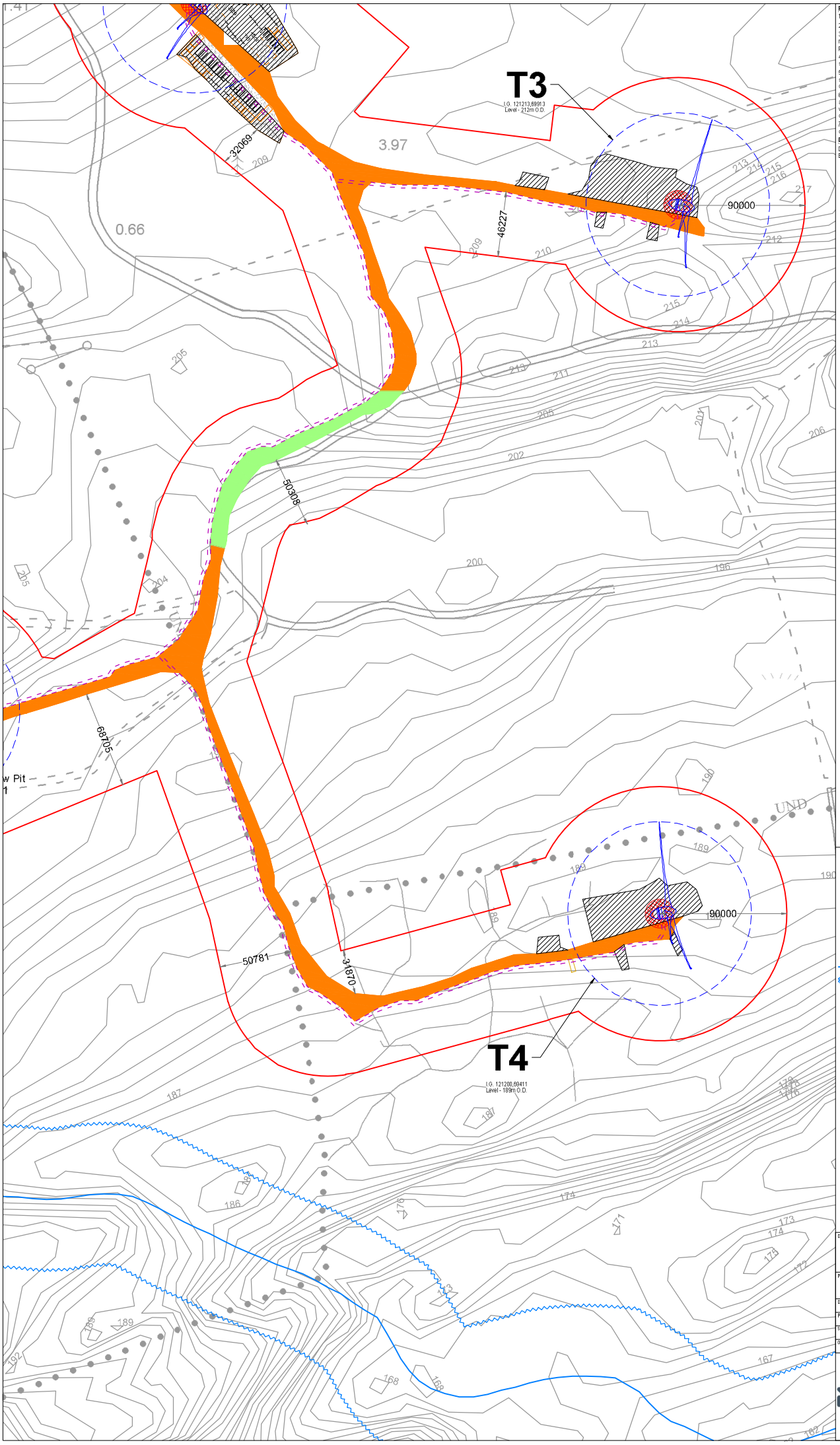

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Existing Road Upgraded
- New Road
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- River/Stream/Drain
- River/Stream/Drain Buffer 50m

N

DRAWING TITLE
Site Layout Plan
Sheet 5 of 22

PROJECT TITLE
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 08
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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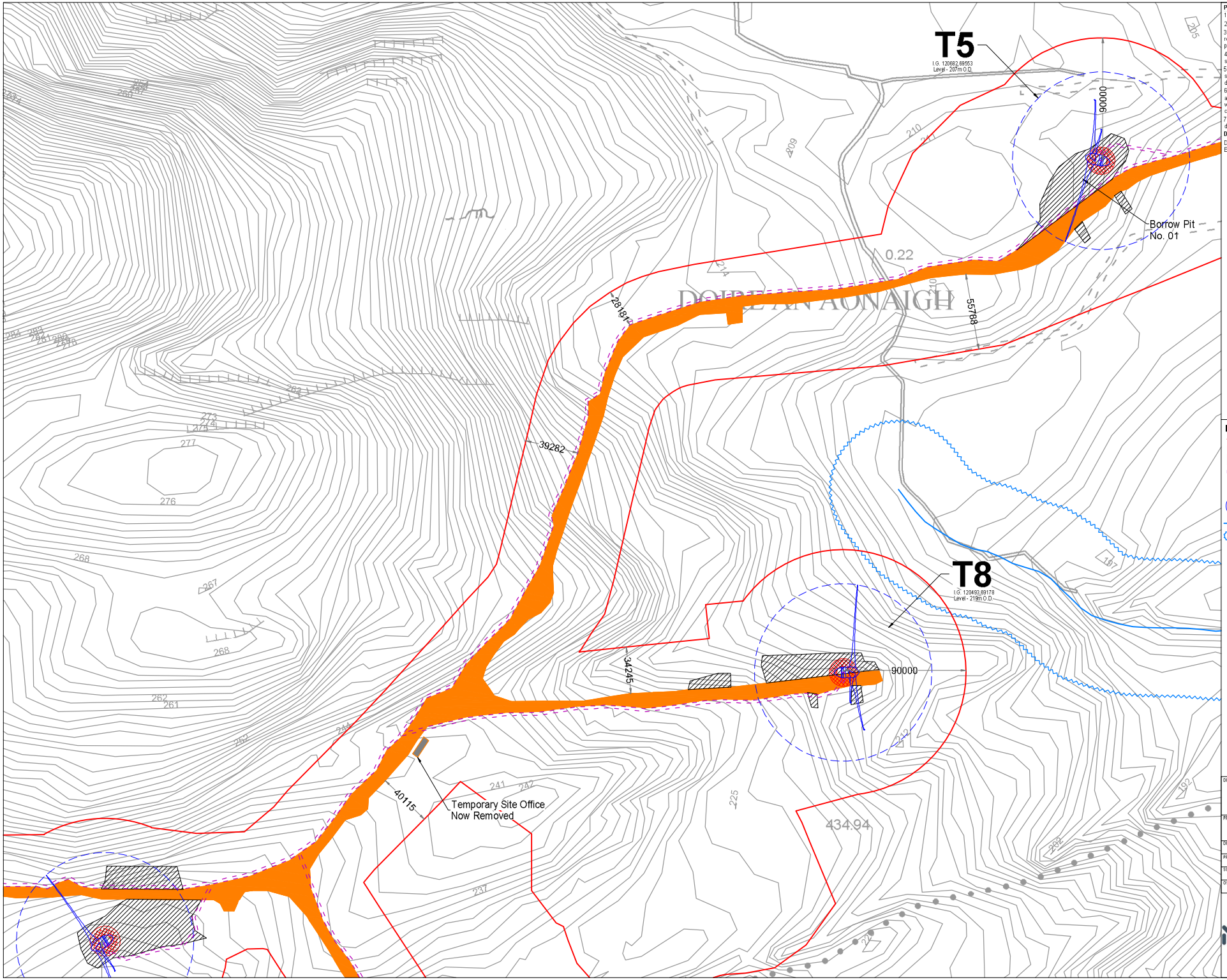

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- New Road
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- River/Stream/Drain
- River/Stream/Drain Buffer 50m

N

DRAWING TITLE:

Site Layout Plan
Sheet 6 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 09
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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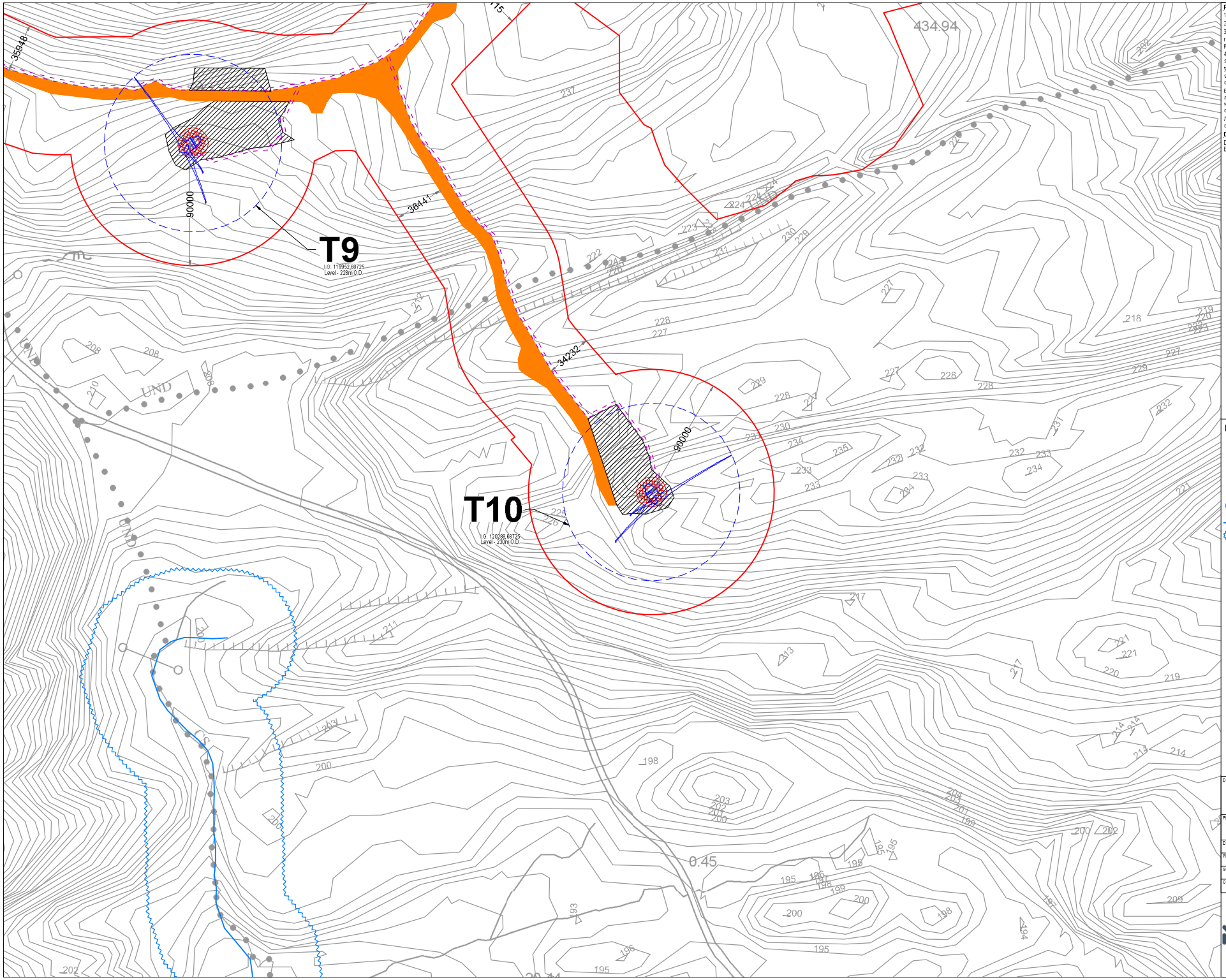

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- New Road
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- River/Stream/Drain
- River/Stream/Drain Buffer 50m

N

DRAWING TITLE:

Site Layout Plan
Sheet 7 of 22

PROJECT TITLE: Cleanrath Wind Farm, Co. Cork	
DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 10
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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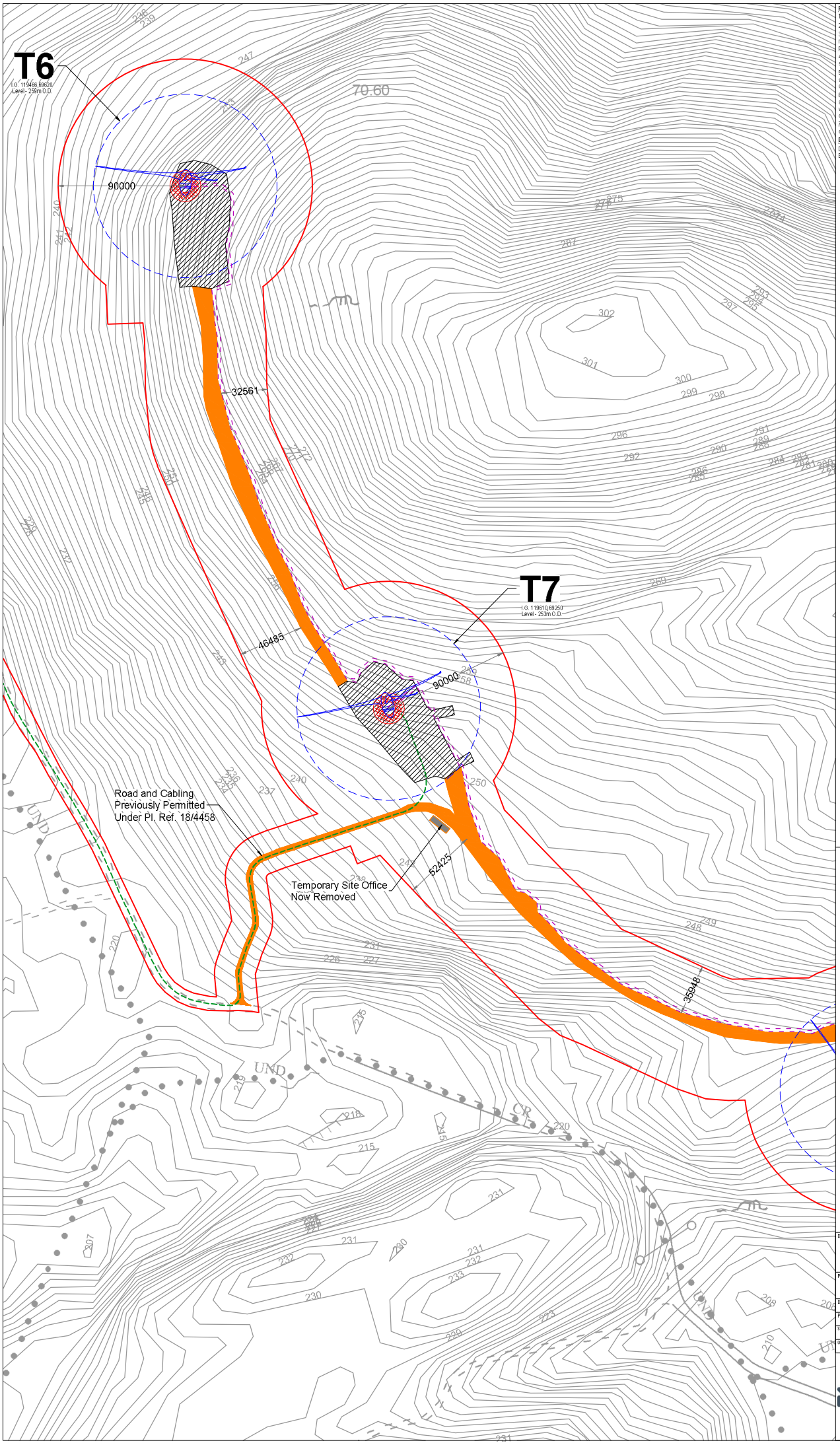

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- New Road
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area

N

DRAWING TITLE
Site Layout Plan
Sheet 8 of 22

PROJECT TITLE
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 11
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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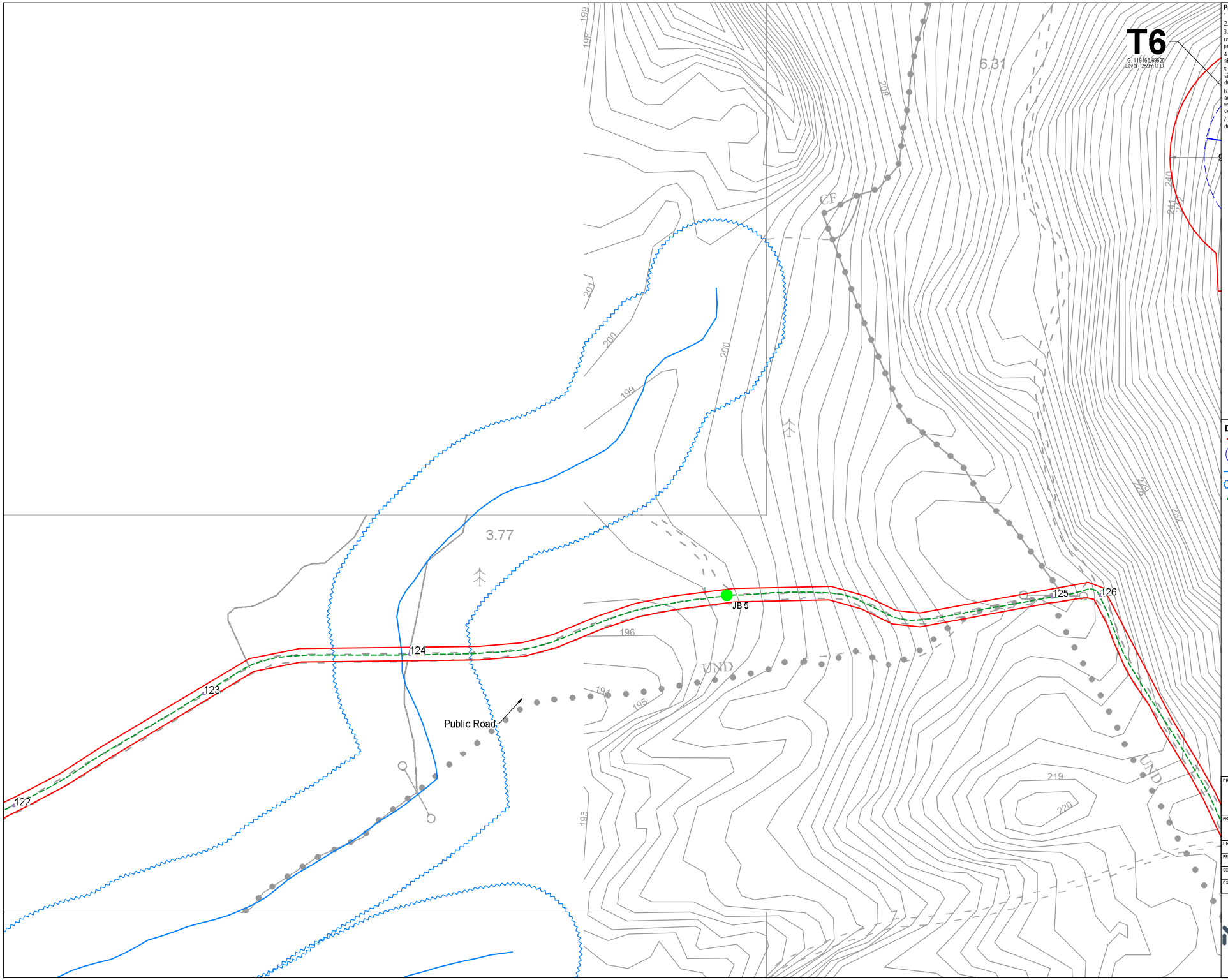

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drawing Legend

- Planning Application Boundary
- Turbine Sweep Area
- River/Stream/Drain
- River/Stream/Drain Buffer 50m
- Cable Route Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 9 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 12
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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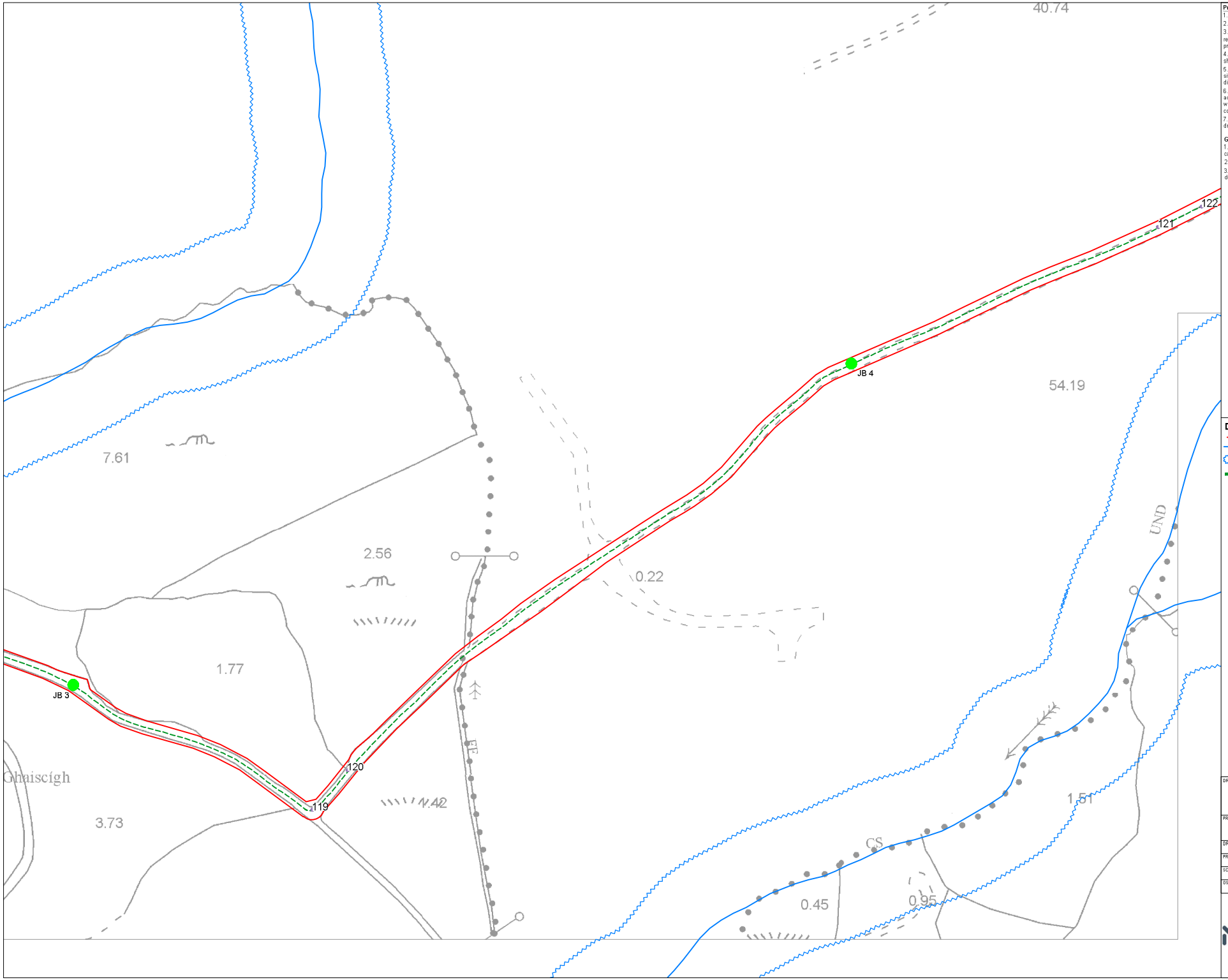

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- River/Stream/Drain
- River/Stream/Drain Buffer 50m
- Cable Route Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 10 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 13
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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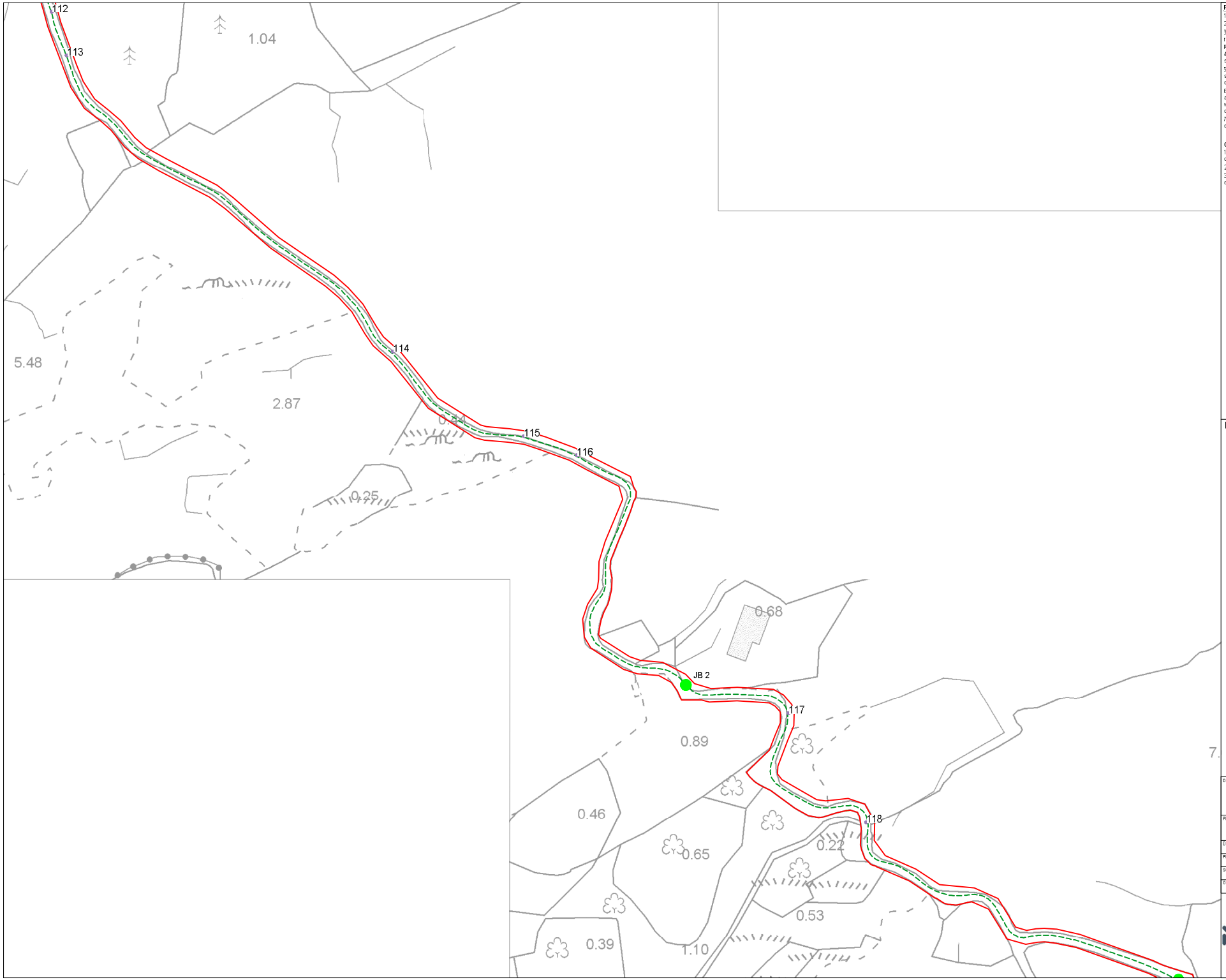

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 11 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 14
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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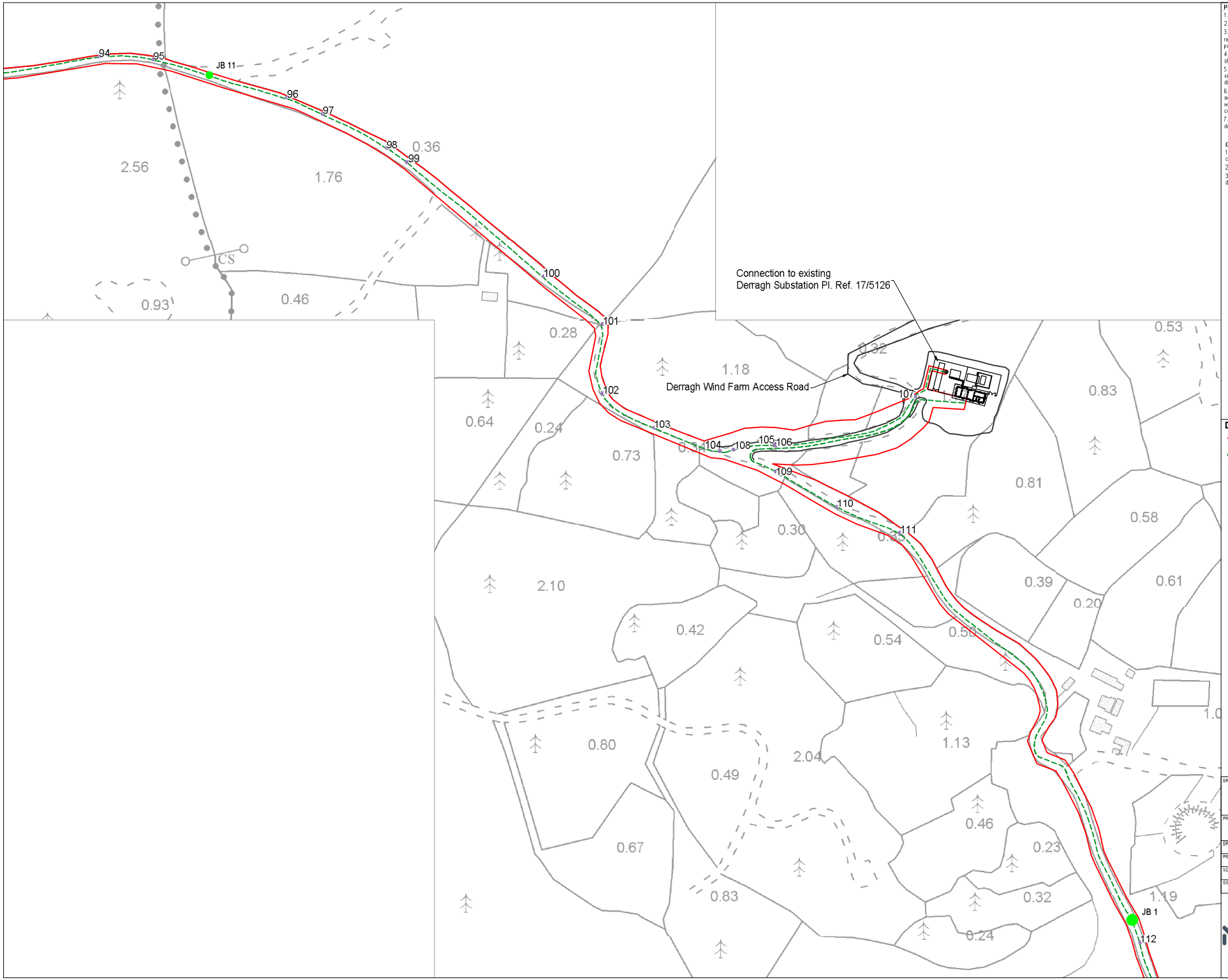

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 12 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 15
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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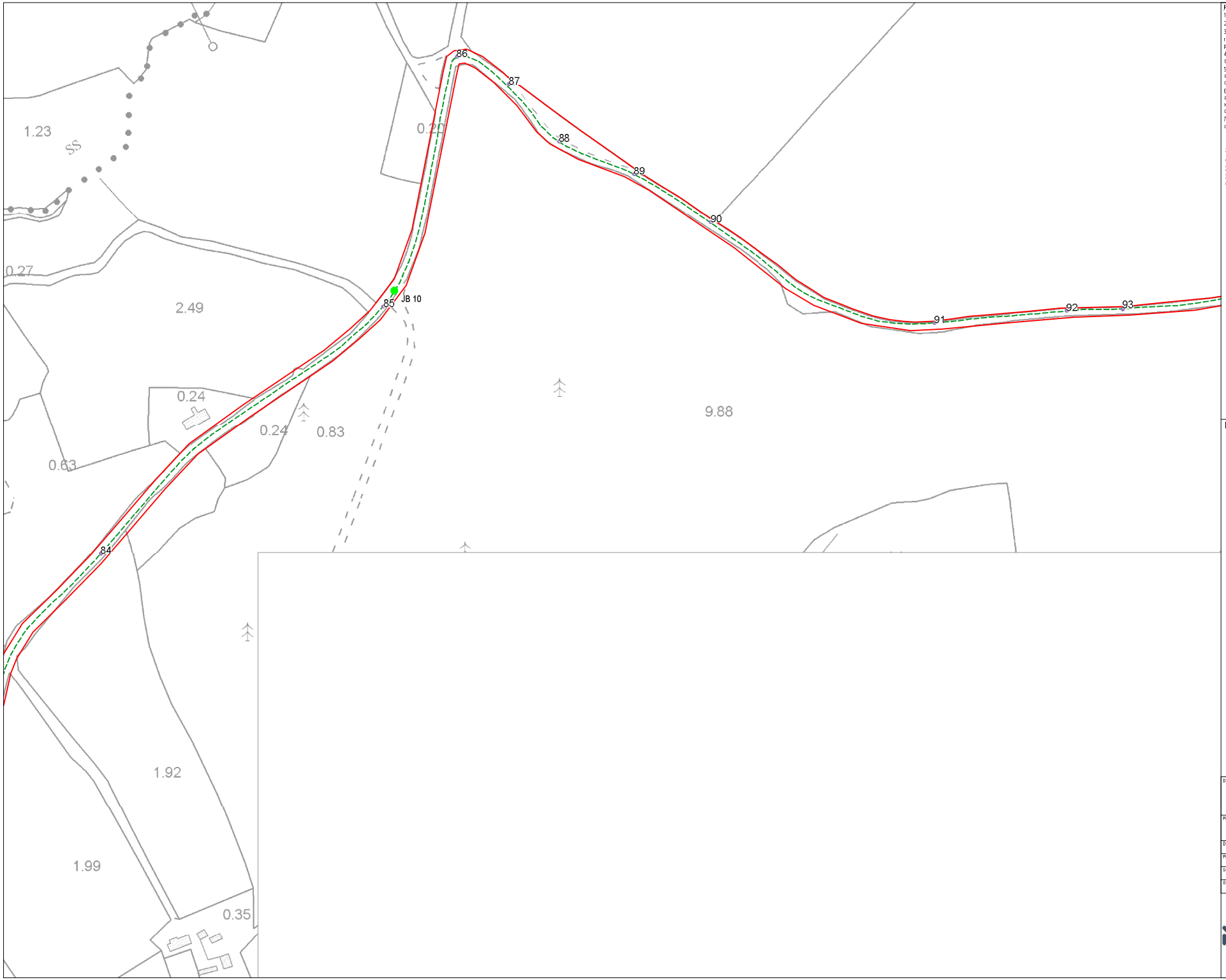

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:

Site Layout Plan
Sheet 13 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 16
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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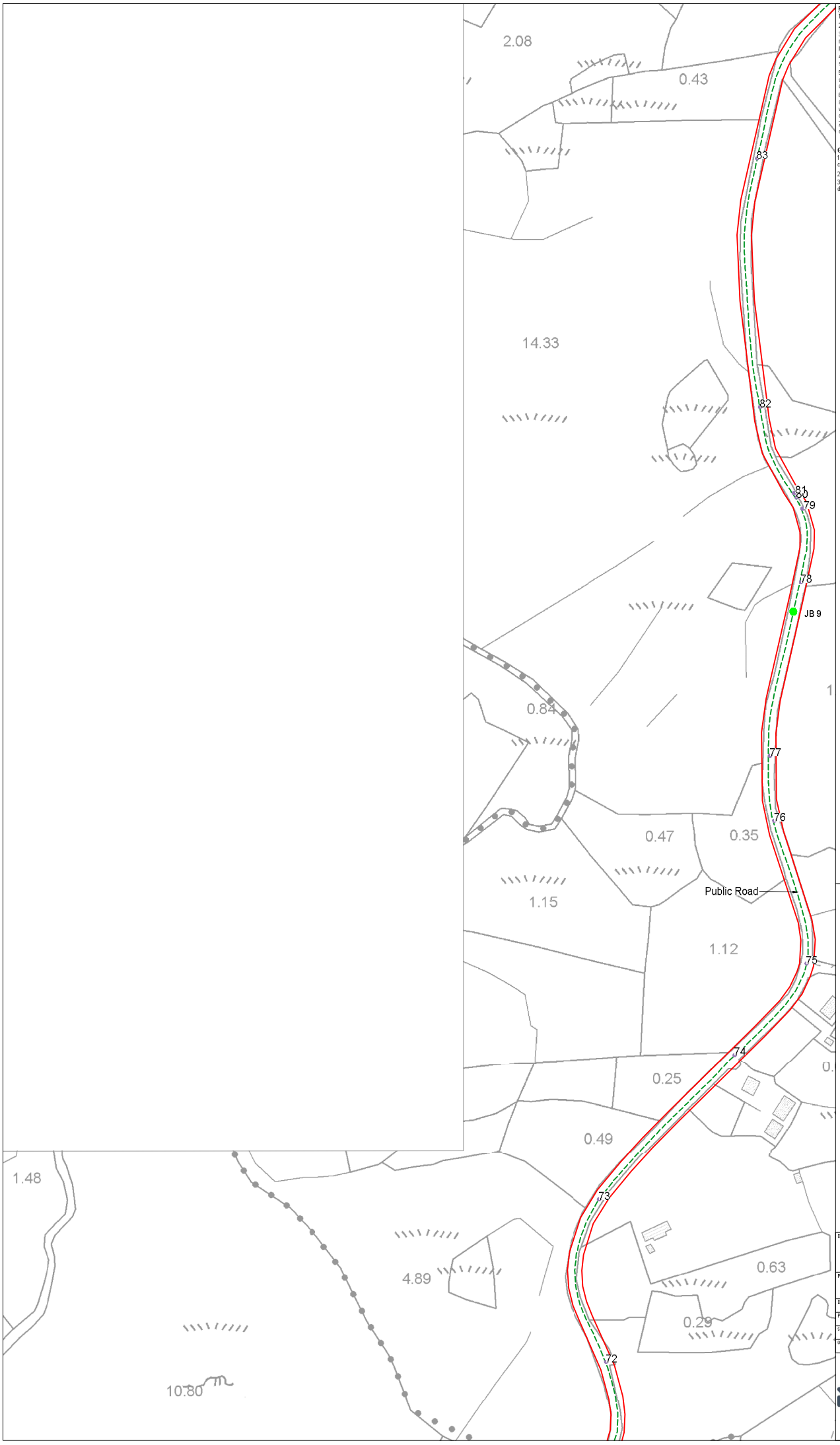

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 14 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 17
SCALE: 1:2,500 @A3	DATE: 13.08.2020
O S SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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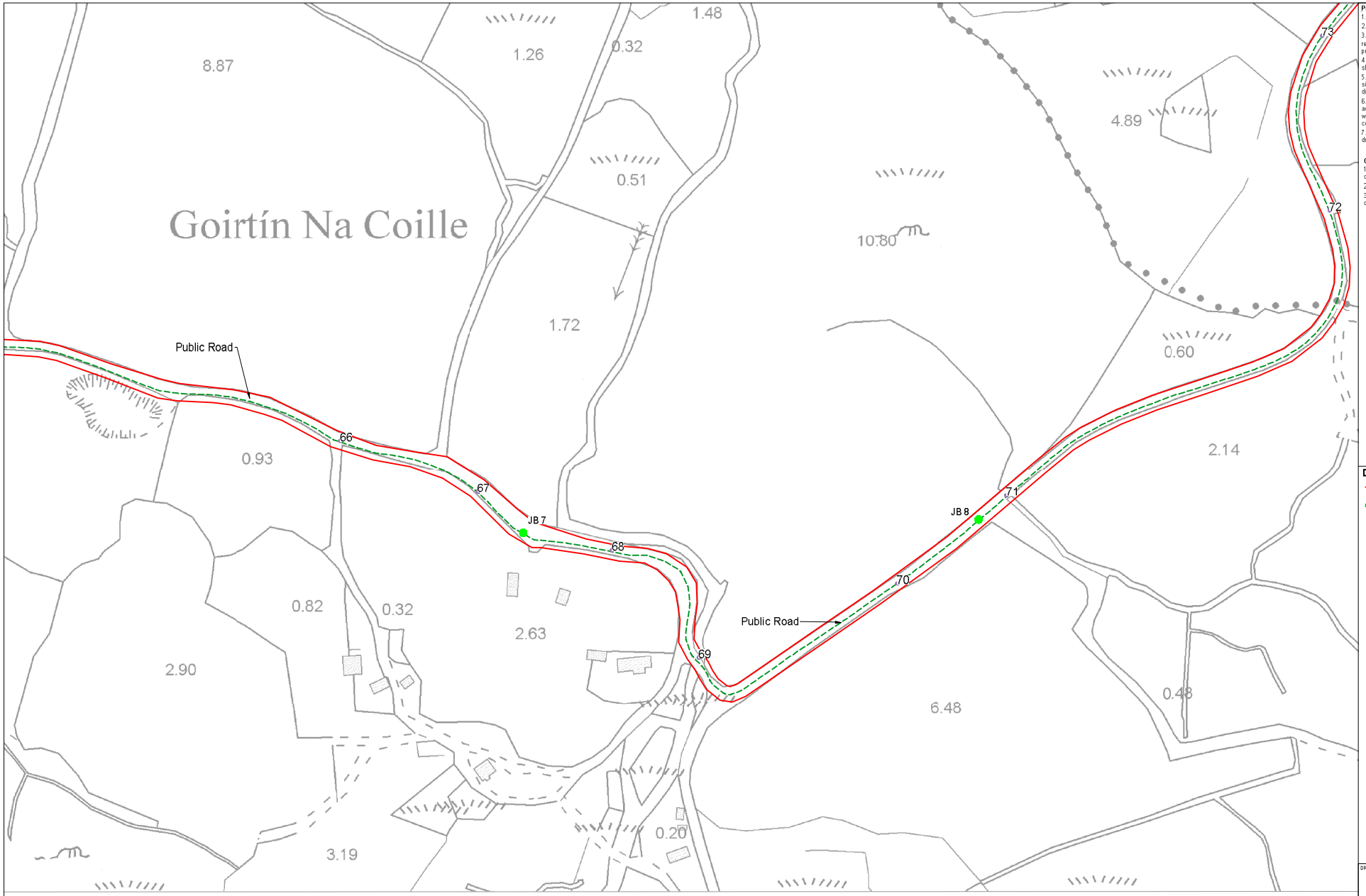

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 15 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 18
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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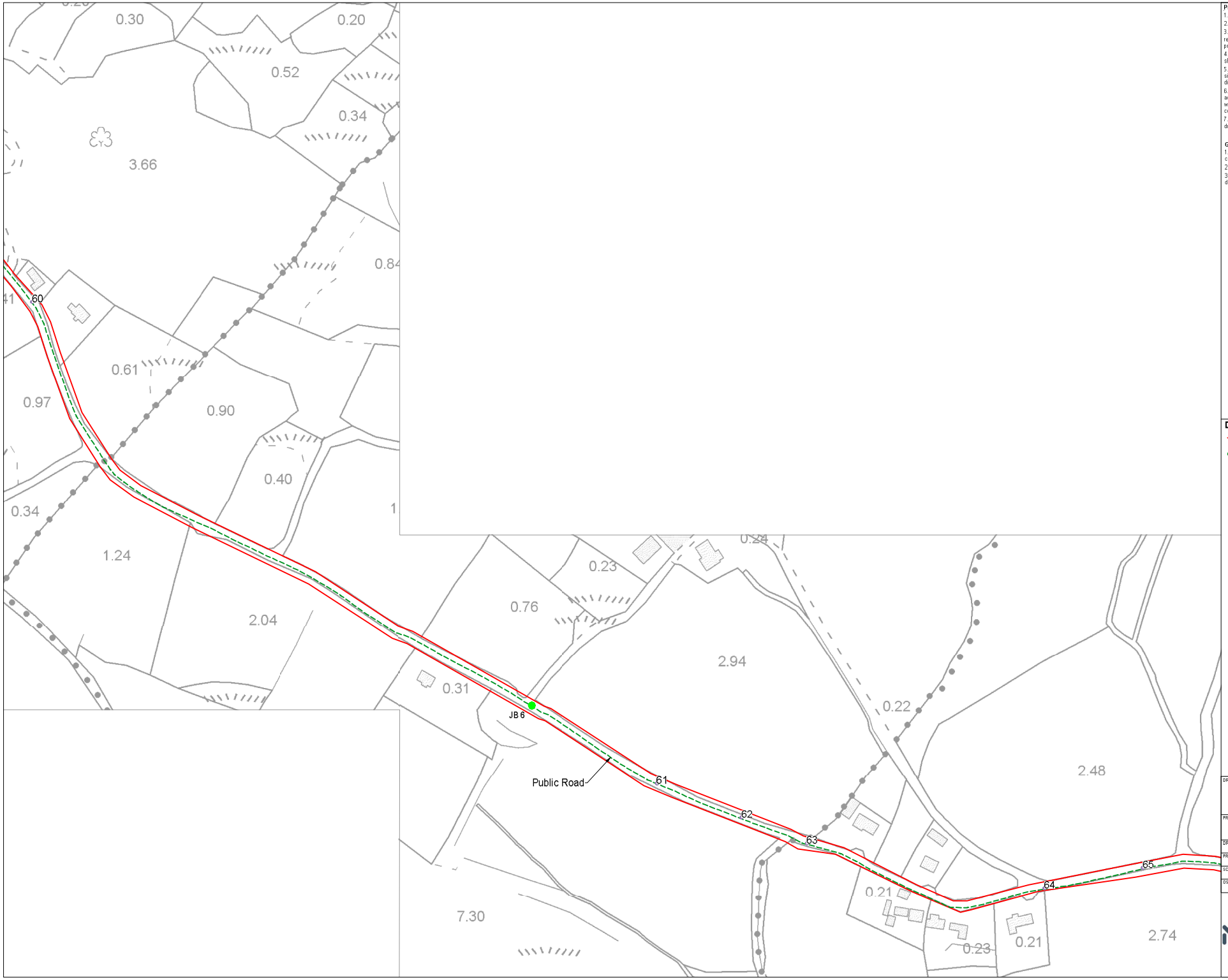

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:

Site Layout Plan
Sheet 16 of 22

PROJECT TITLE: Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191123a - 19
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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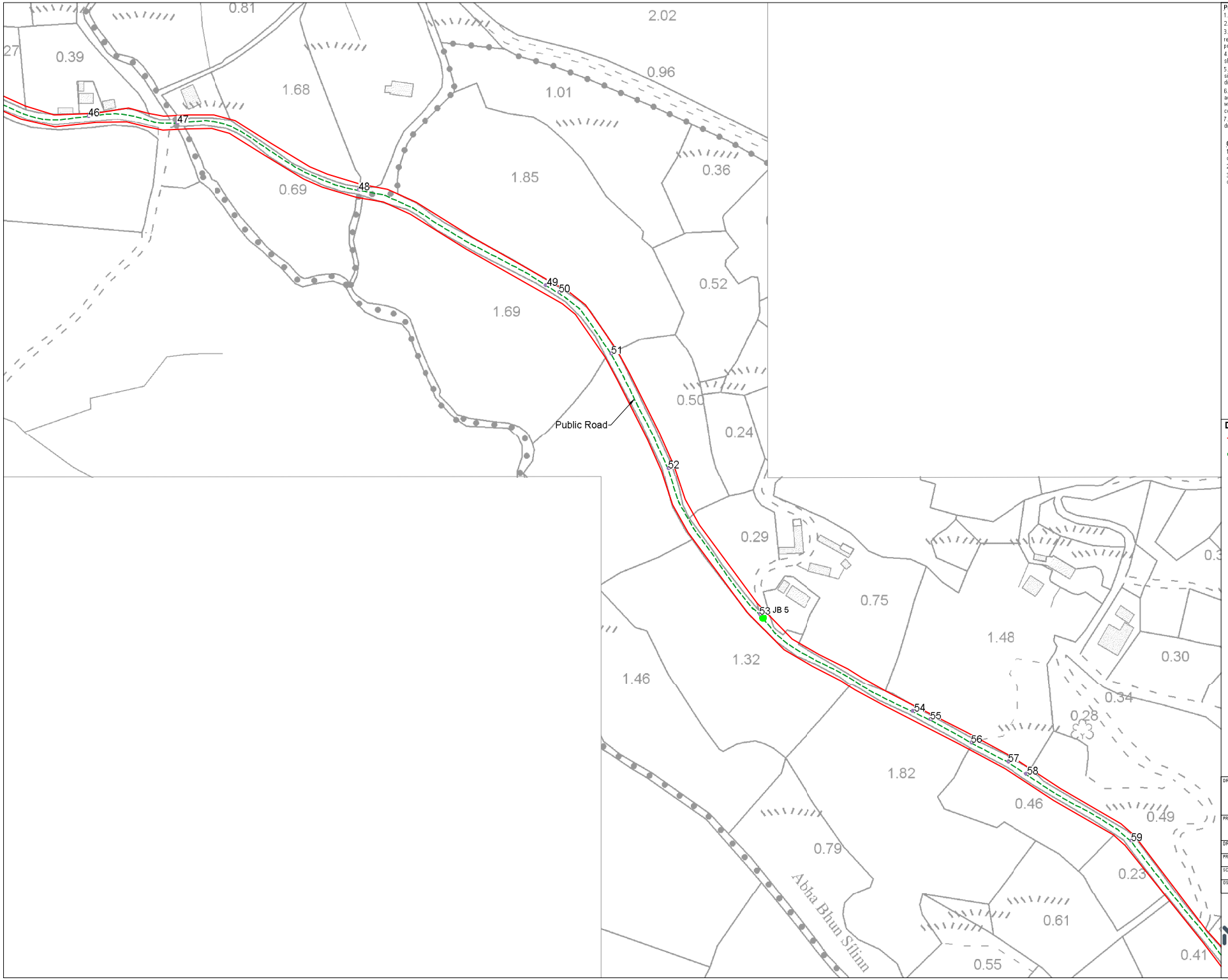

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 17 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 20
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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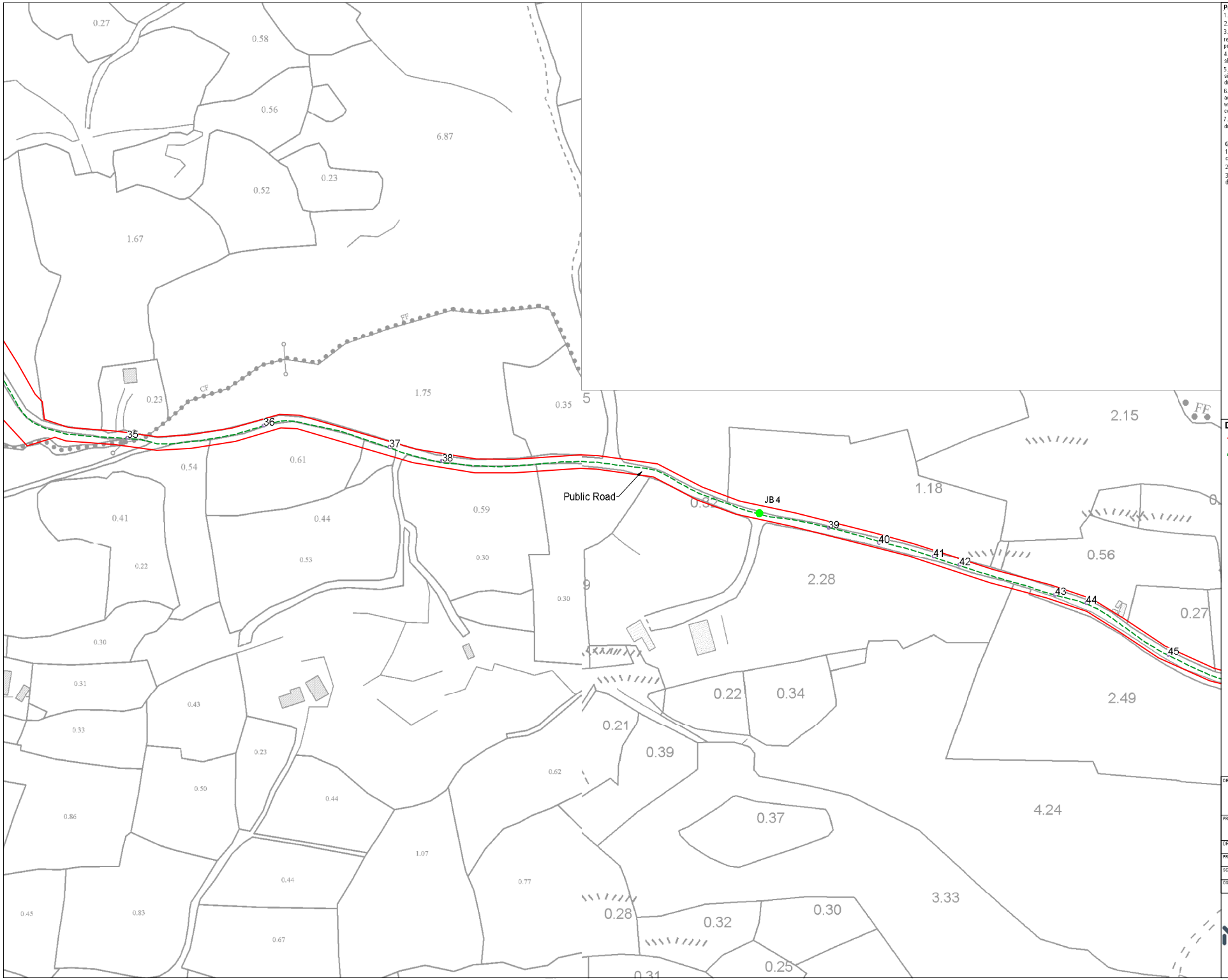

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 18 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 21
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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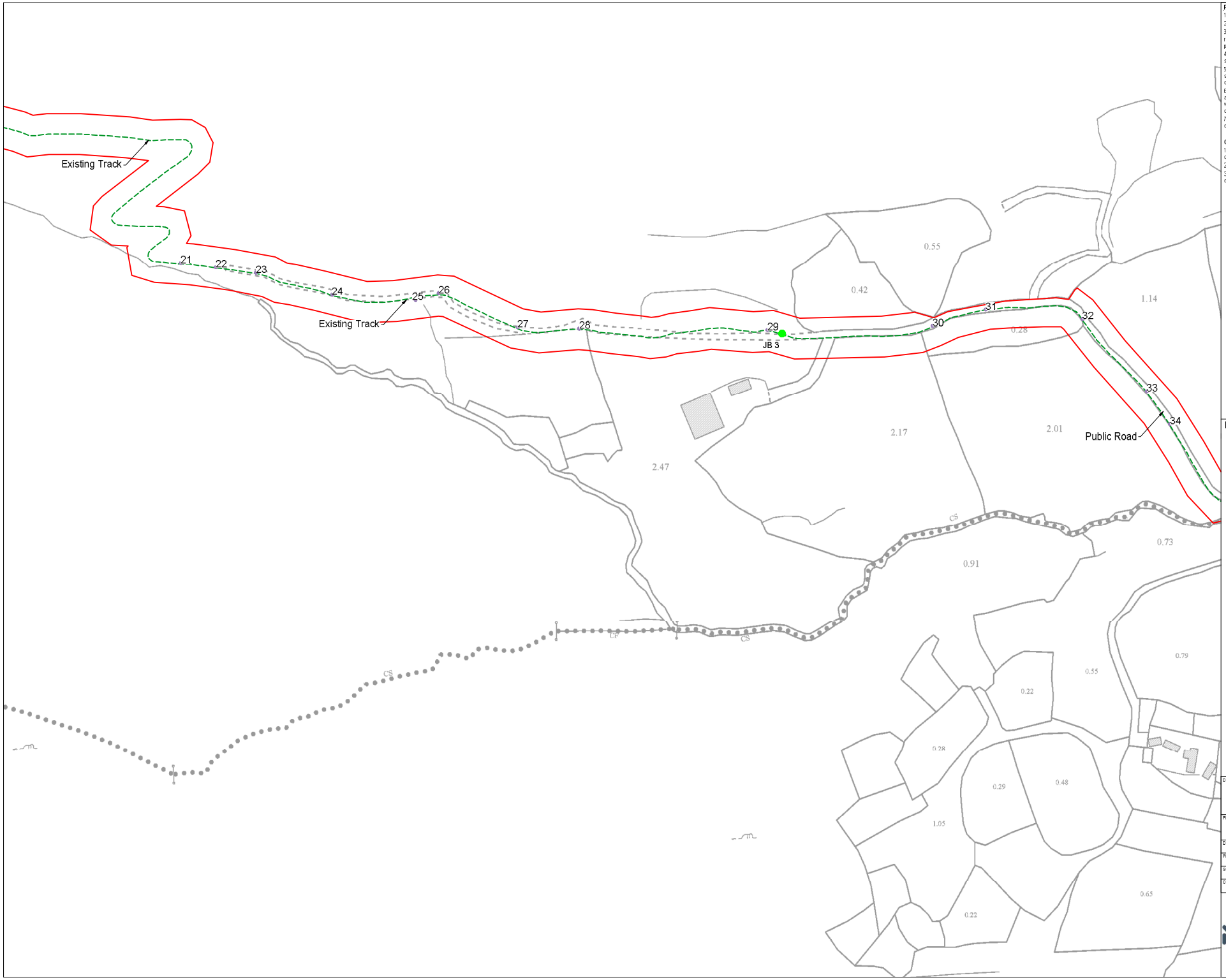

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 19 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 22
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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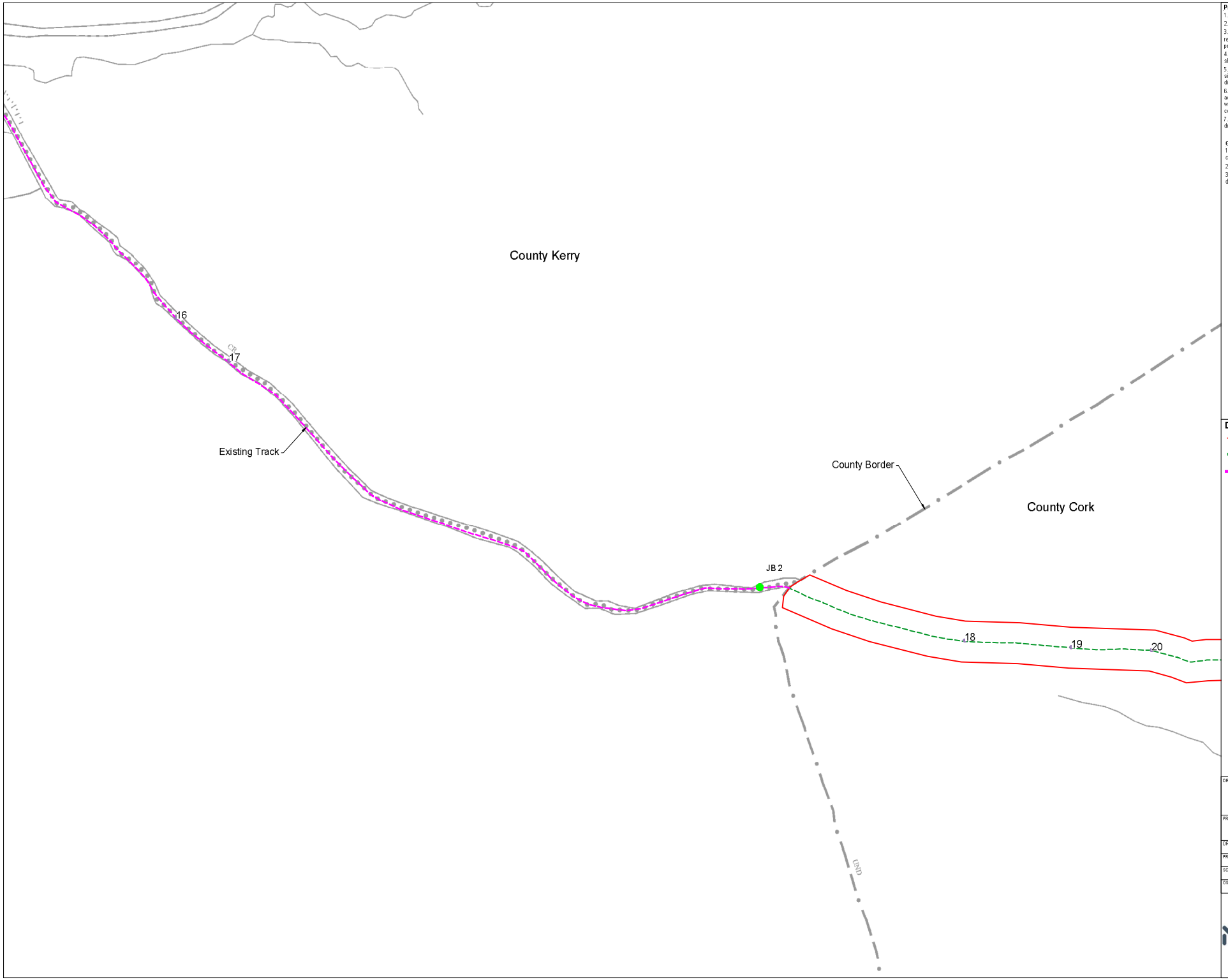

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Cable Route within Co. Kerry
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:

Site Layout Plan
Sheet 20 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 23
SCALE: 1:2,500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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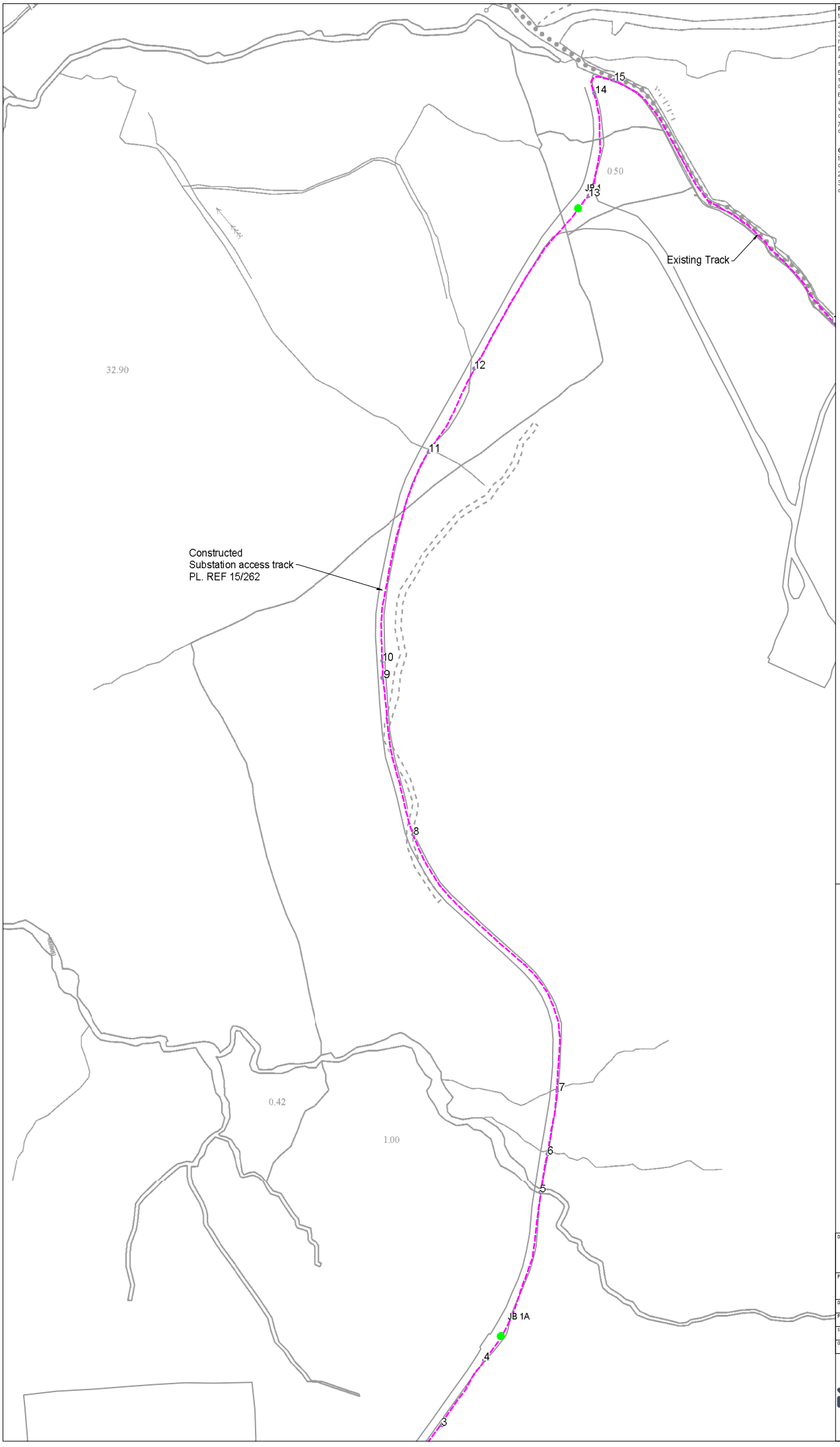

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Cable Route within Co. Kerry
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 21 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 24
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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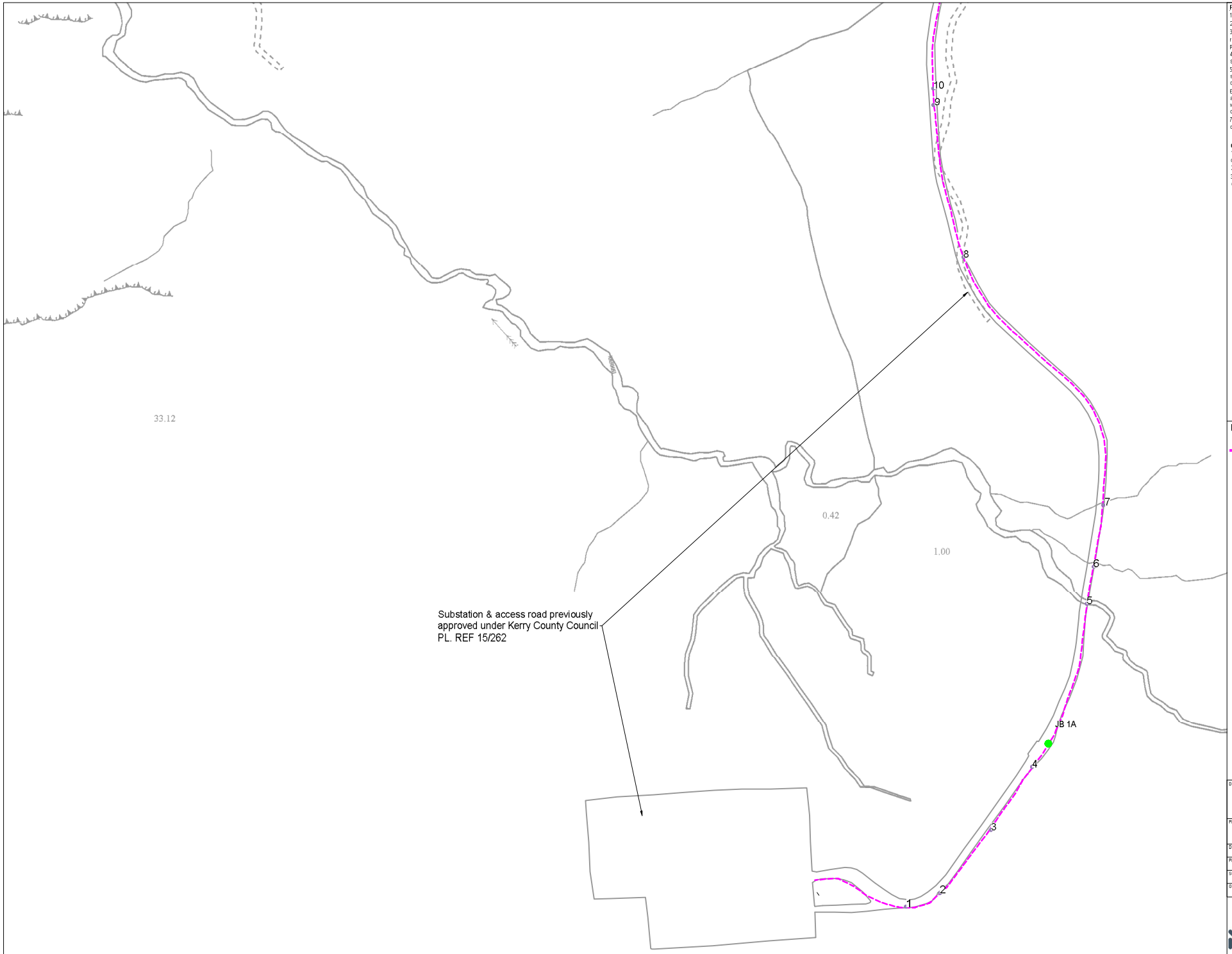

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Cable Route within Co. Kerry as permitted under KCC Pl. Ref. 15/1164
- Joint Bay
- Watercourse/Drain Crossings

N

DRAWING TITLE:
Site Layout Plan
Sheet 22 of 22

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 25
SCALE: 1:2,500 @A3	DATE: 13.08.2020
OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416	

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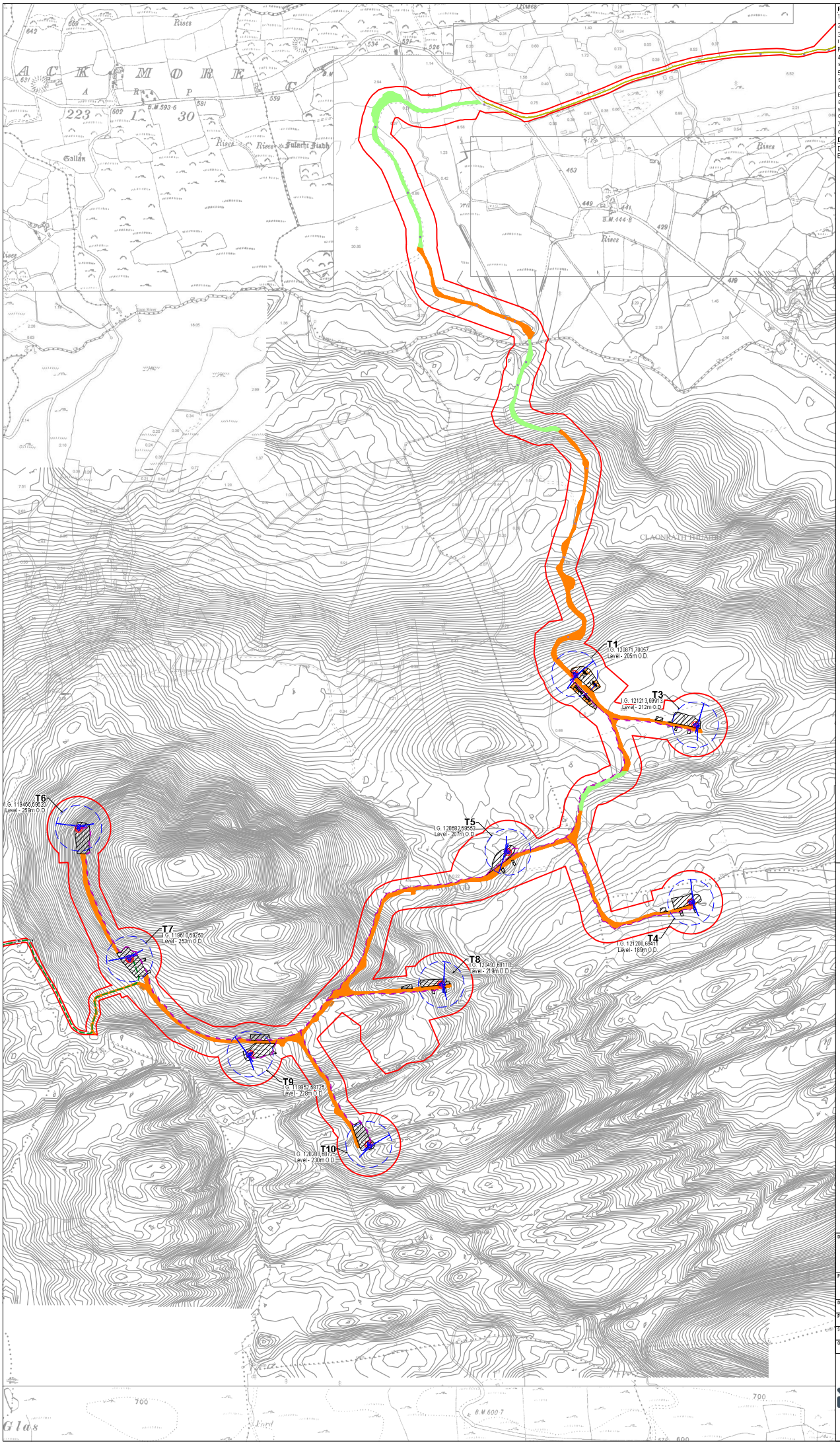

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note

Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend

- Planning Application Boundary
- Existing Road Upgraded
- New Road
- Temporary Road for Turbine Delivery
- Junction/Road Widening
- Crane Pad Hardstanding Area
- Electrical Cable Trench
- Turbine Foundation
- Turbine Sweep Area
- Cable Trench to Grid Connection

N

DRAWING TITLE:
Turbine Infrastructure Master Plan

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No: 191223a	DRAWING No: 191223a - 26
SCALE: 1:10,000 @A3	DATE: 13.08.2020

OS SHEET No: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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Note
1. All components of the Site Construction Compound have been removed and it has been re-purposed as a hardstanding for Turbine no. 1
2. Site offices and welfare facilities were in place during construction phase but have now been removed

Project Design Drawing Notes
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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Drainage Design Note
Drainage details are included in drawings prepared by Hydro Environmental Services

Drawing Legend
- Planning Application Boundary
- New Road
- Turbine Sweep Area

N

DRAWING TITLE:
Temporary Construction Compound

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 27
SCALE: 1:500 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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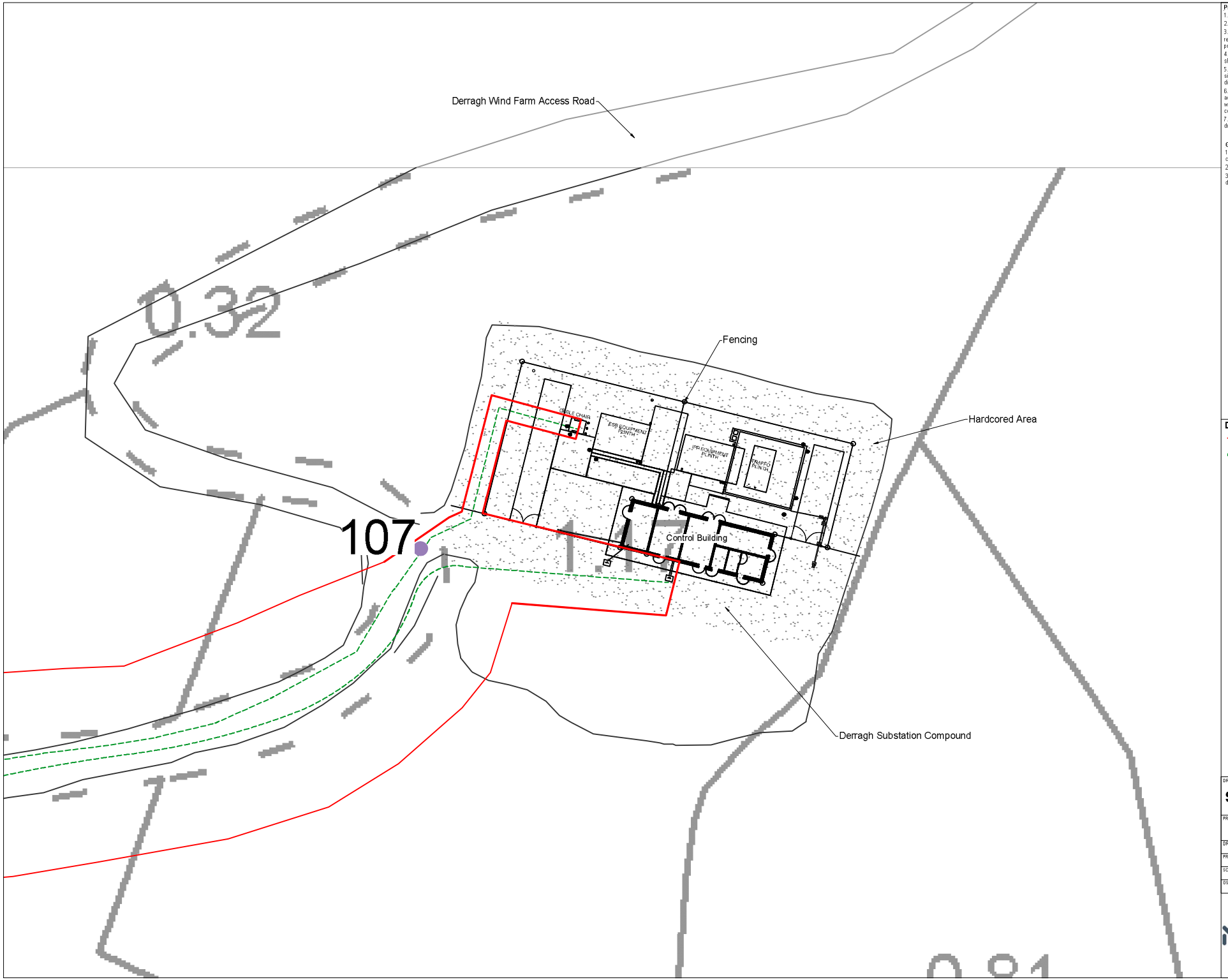

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.

Grid Connection Drawing Notes

1. Grid connection cabling works along the public road corridor carried out under under Road Opening Licence
2. Location of grid connection cable is 'as constructed'
3. All public/private services and utilities to be accommodated during grid connection cabling works.

Drawing Legend

- Planning Application Boundary
- Cable Trench to Grid Connection
- Watercourse/Drain Crossings

N

DRAWING TITLE:

Substation Layout Plan

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 28
SCALE: 1:500 @A3	DATE: 13.08.2020

OS SHEET No.:
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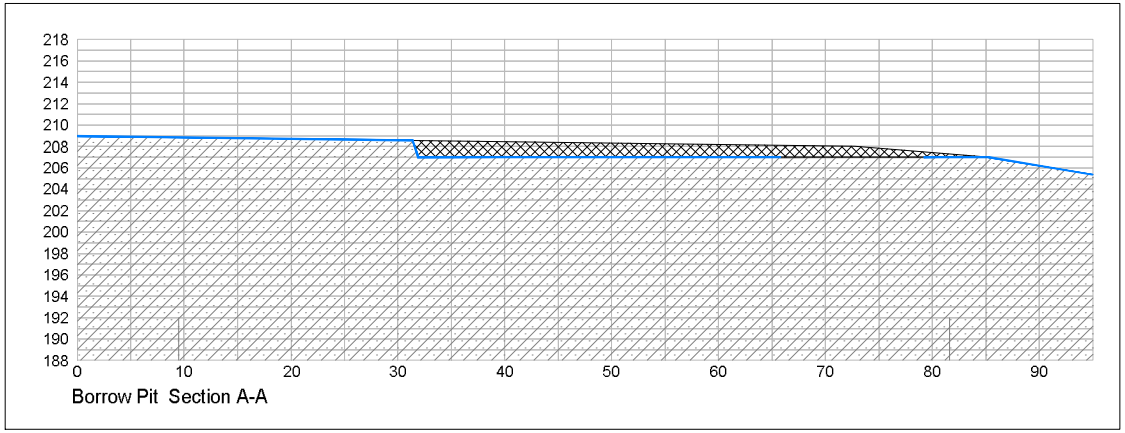
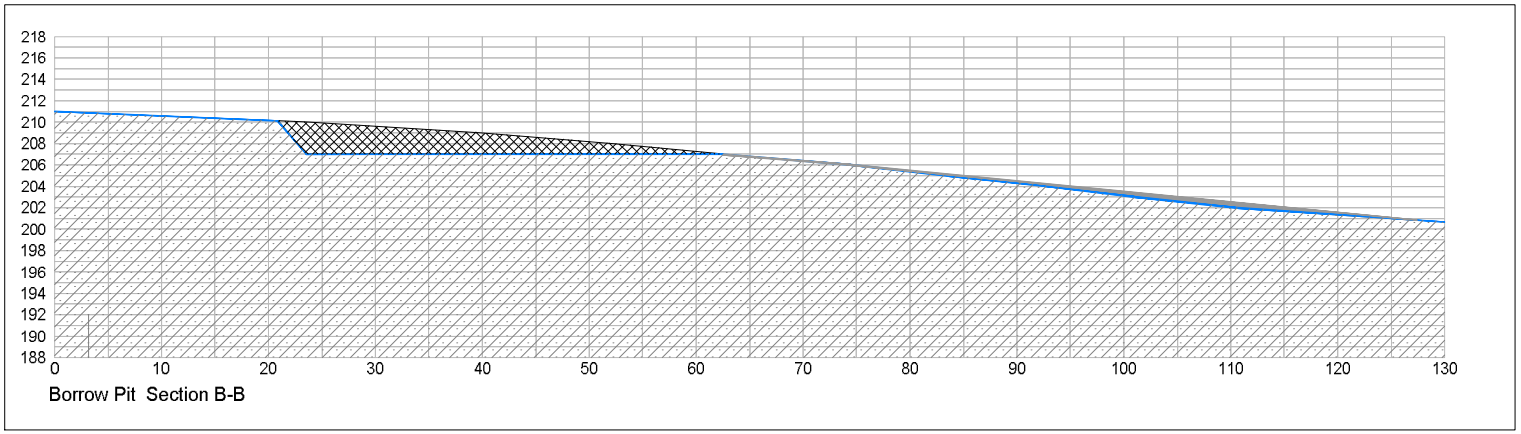
Drawing Legend

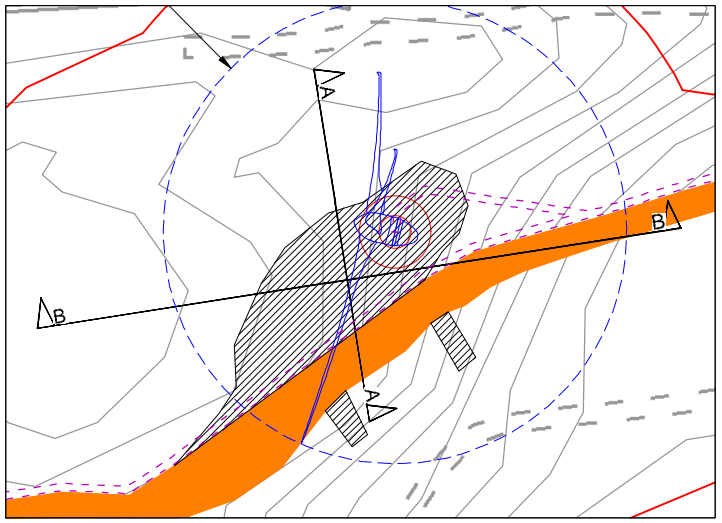
- Bedrock
- Excavated Area
- Roads
- Existing ground



Borrow Pit Section A-A



Borrow Pit Section B-B



Borrow Pits No. 1 Scale 1:1,500

DRAWING TITLE:
Borrow Pit Layouts & Sections

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph o Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 29
SCALE: 1:500 @A3	DATE: 13.08.2020

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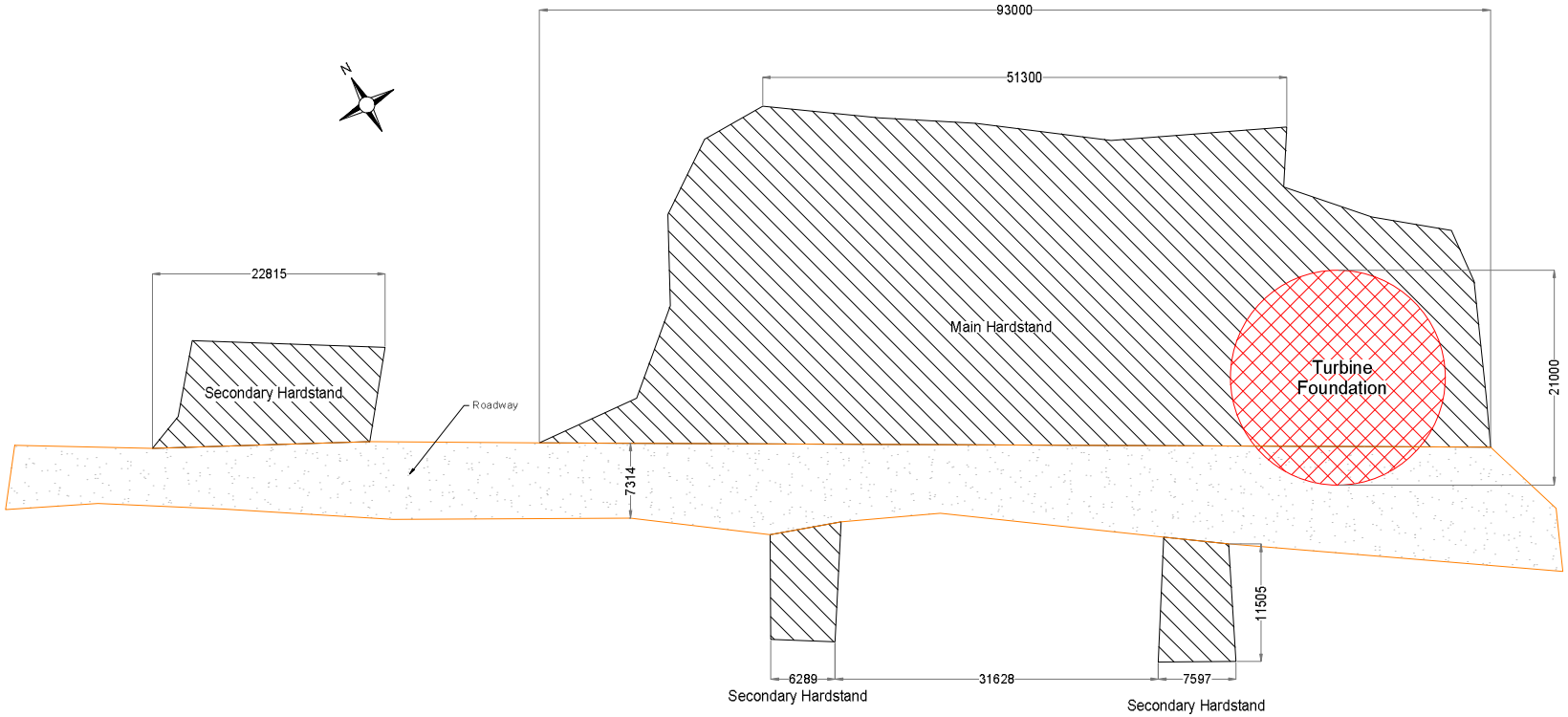

DRAWING TITLE:
Turbine Hardstand Layout Standard Detail Based on Turbine 3

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph O Brien	CHECKED BY: Eoin McCarthy
PROJECT No.: 191223a	DRAWING No.: 191223a - 30
SCALE: 1:500 @A3	DATE: 13.08.2020

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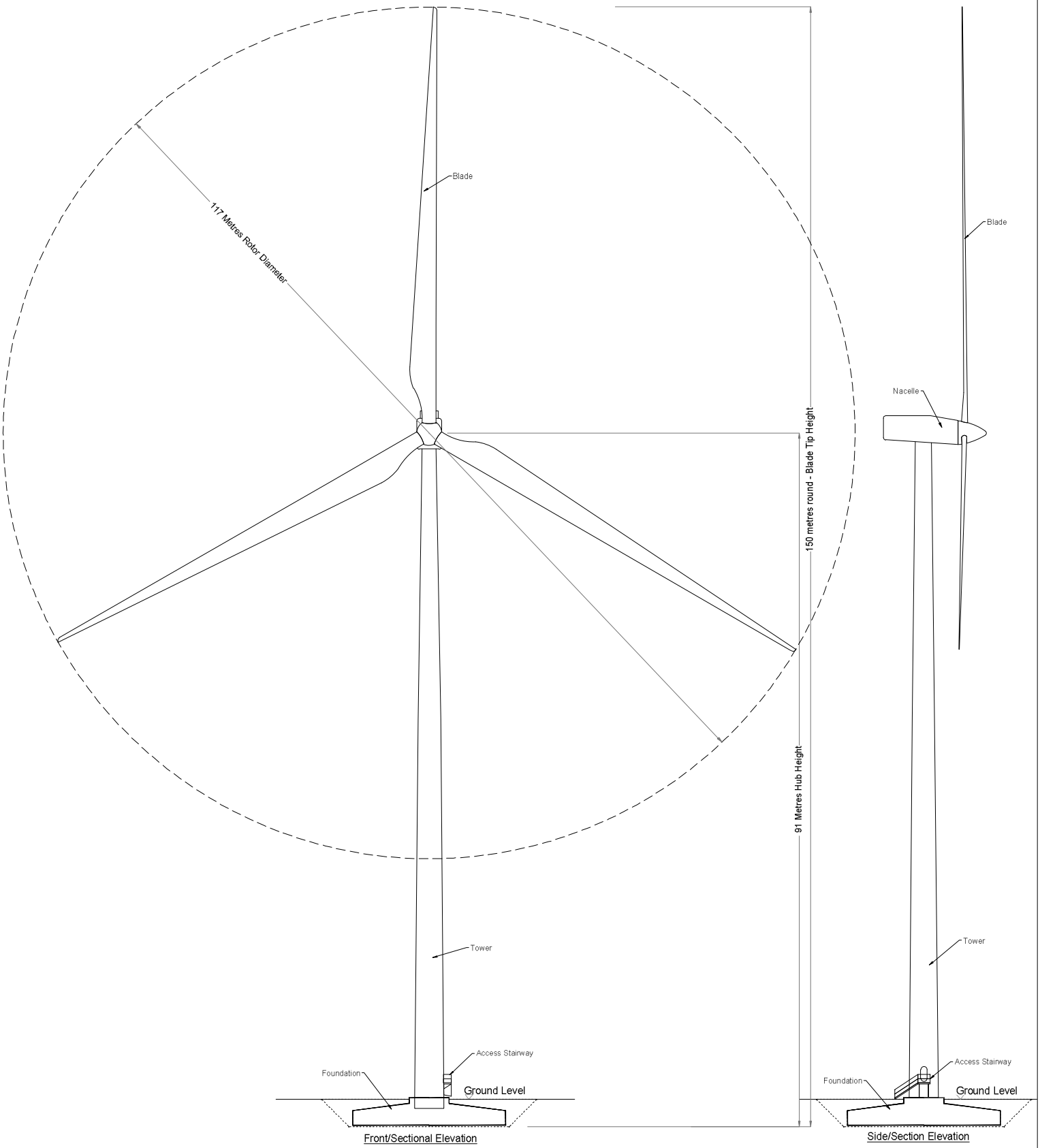

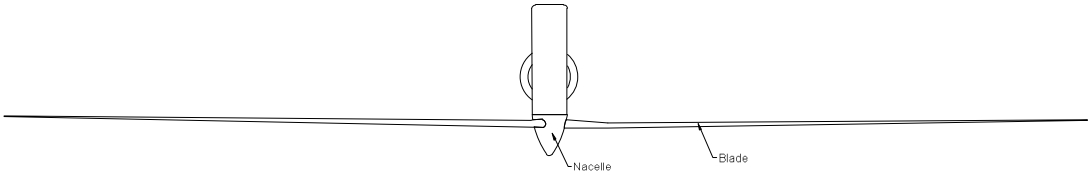

Plan

Drawing Notes

1. Wind turbines have a maximum ground to blade tip height of 150m.
2. Installed wind turbine is as per maximum size envelope set out above in blade length and hub-height configuration.

DRAWING TITLE:
Nordex N117 Elevation & Plan

PROJECT TITLE:	Cleanrath Wind Farm, Co. Cork
DRAWING BY: Joseph O Brien	CHECKED BY: Eoin McCarthy
PROJECT No.: 191223a	DRAWING No.: 191223a - 31
SCALE: 1:500 @A3	DATE: 13.08.2020

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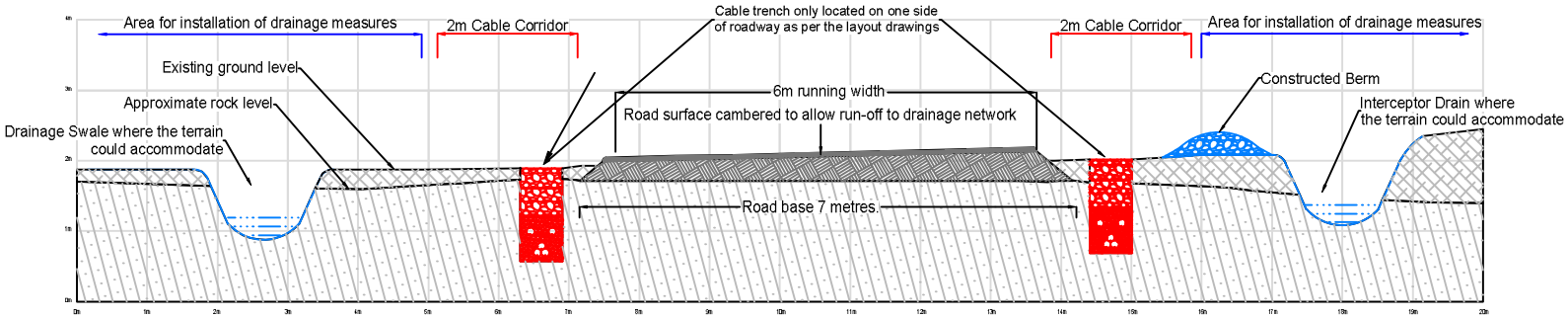
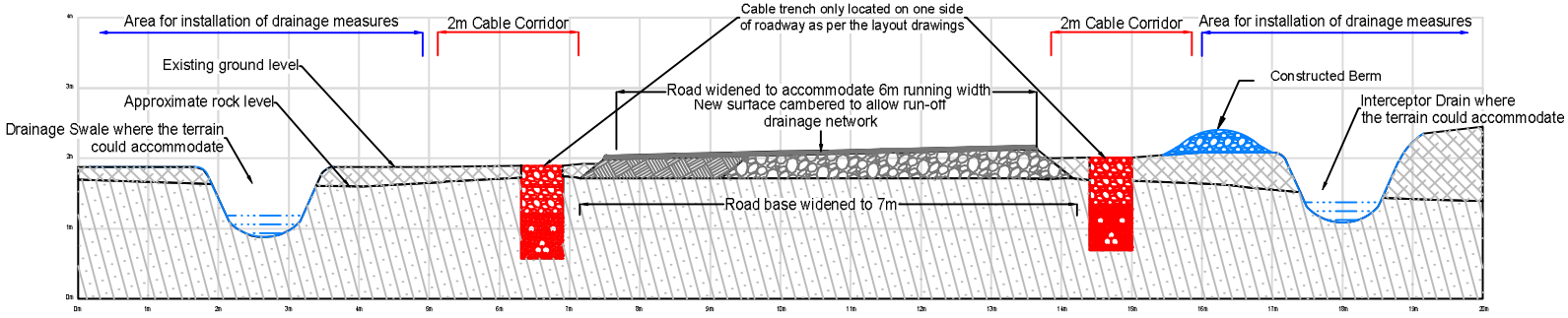
Drawing Notes

1. Widening occured on either side of existing roads dependent on site conditions.
2. Depths of road fill varied dependent on site conditions.



Typical excavated road section.



Typical existing excavated road widening section.

DRAWING TITLE:
Typical Excavated Road Sections

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph O Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 32
SCALE: 1:75 @A3	DATE: 13.08.2020

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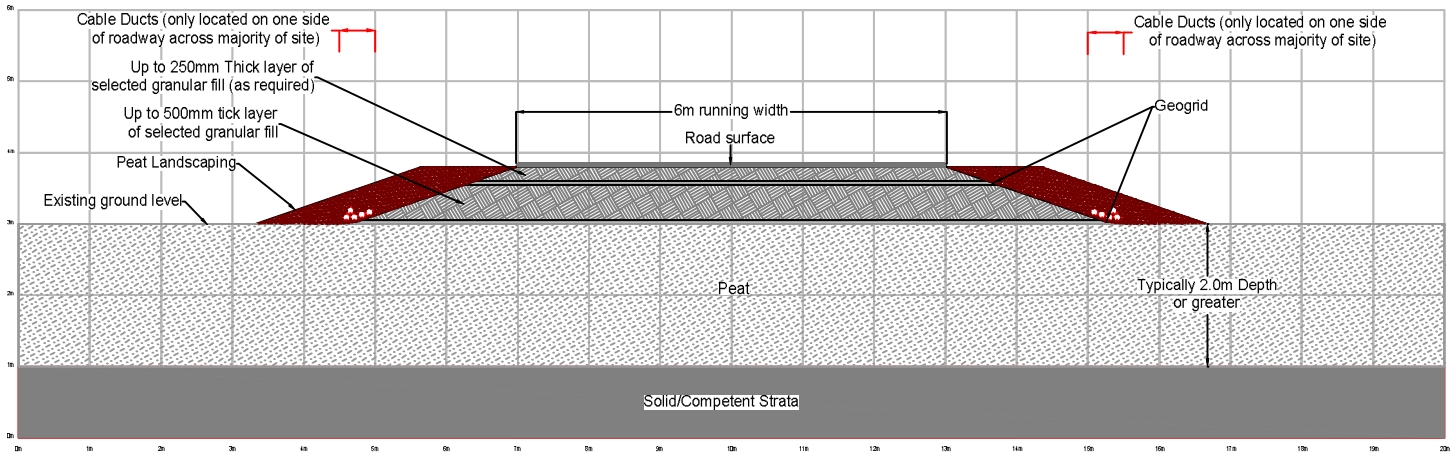
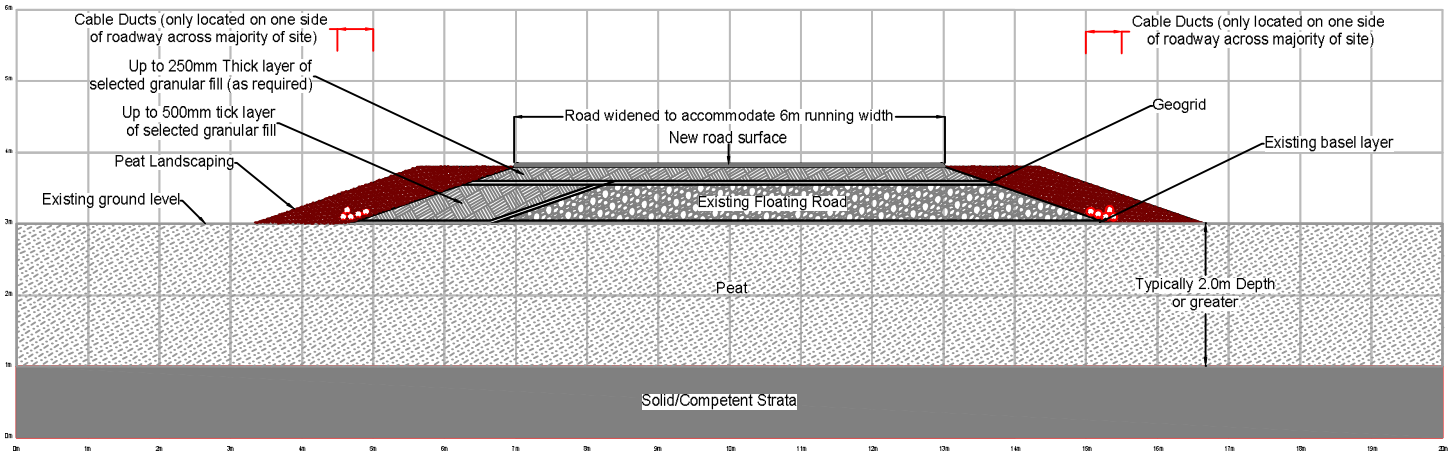
Drawing Notes

1. Widening occured on either side of existing roads dependent on site conditions.
2. Depths of road fill varied dependent on site conditions.



Typical floating road section.



Typical floating road widening section.

DRAWING TITLE:
Typical Floating Road Sections

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph O Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 33
SCALE: 1:75 @A3	DATE: 13.08.2020

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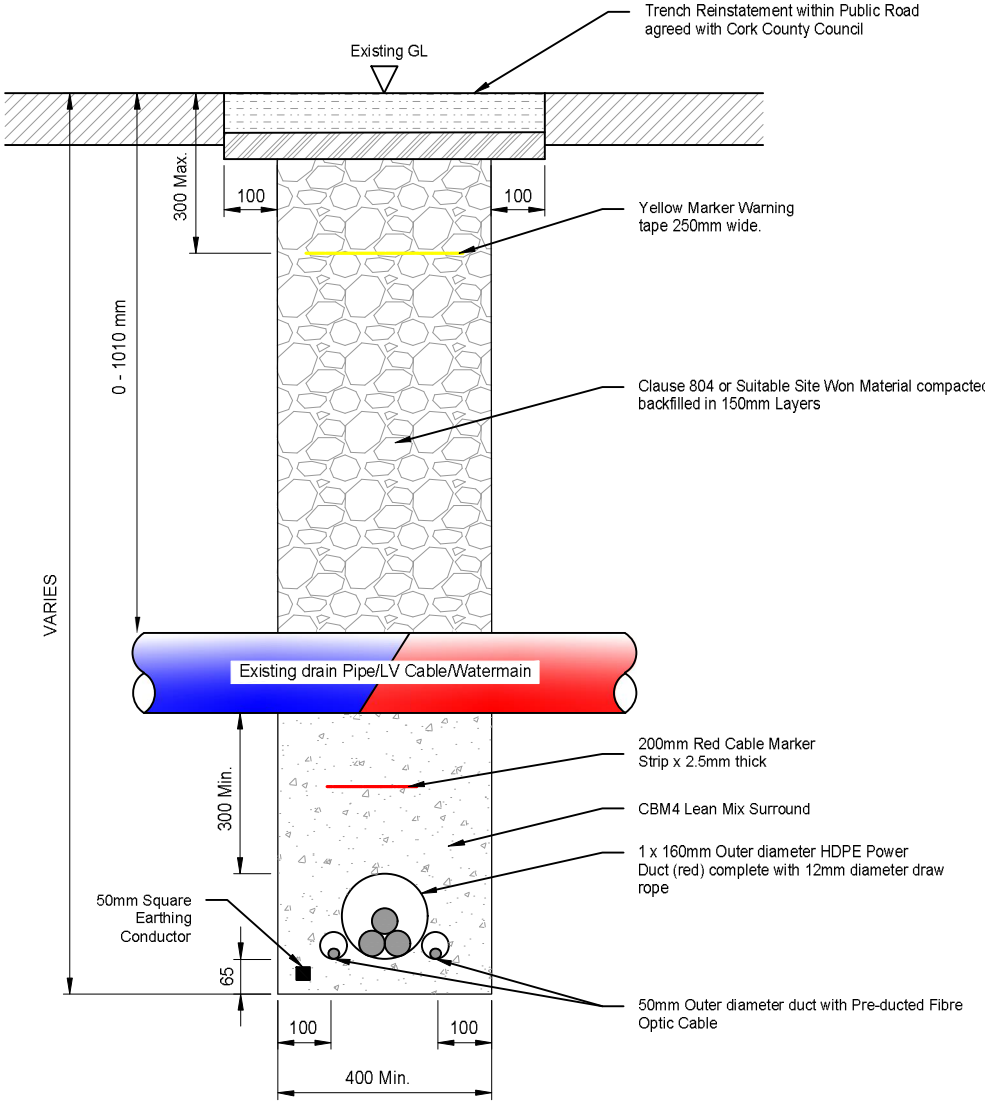
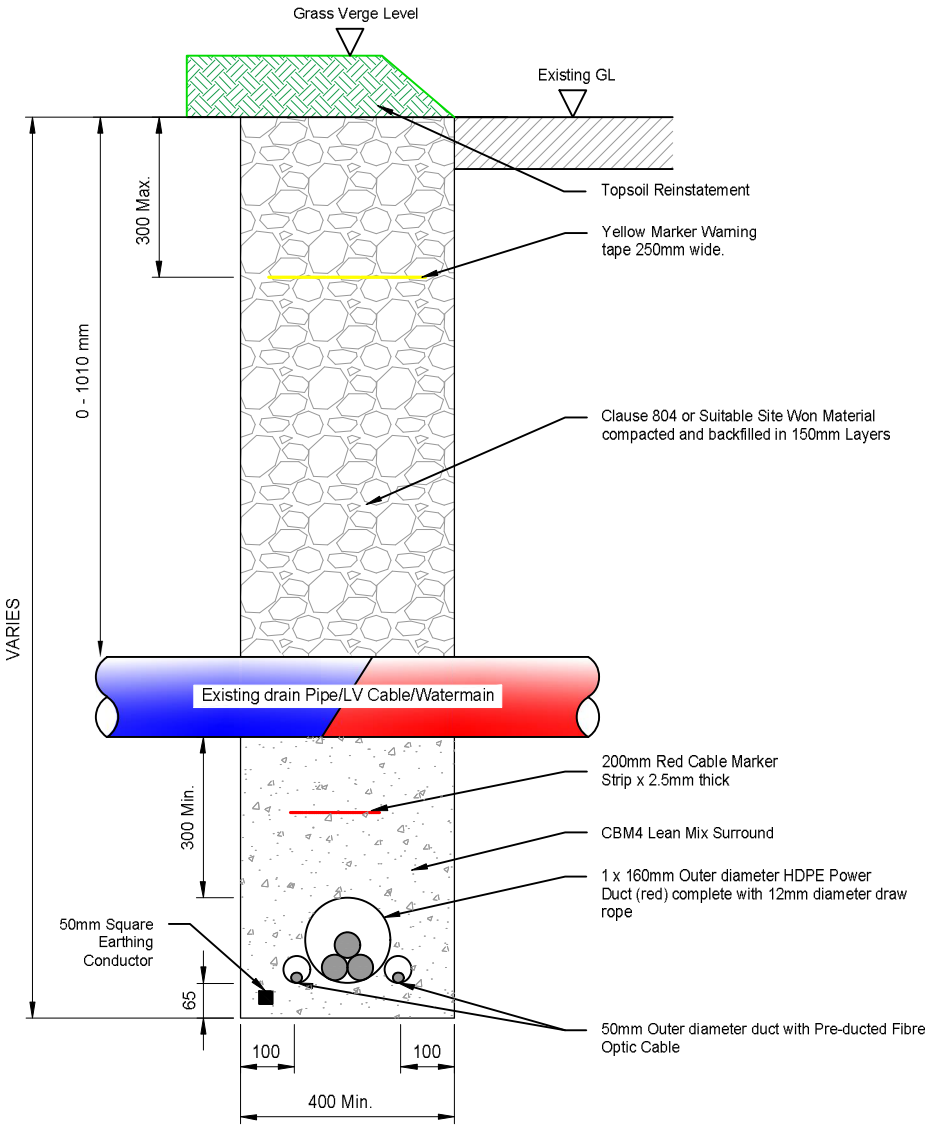


Typical 33kV Cable Trench Crossing Under Existing Services In Public Road Detail Scale 1:10



Typical 33kV Cable Trench Crossing Under Existing Services In Public Road Verge Detail Scale 1:10

DRAWING TITLE: Typical 33kV Cable Trench Crossing Under Existing Services in Public Road & Verge Detail		DRAWING No.: 191223a - 34	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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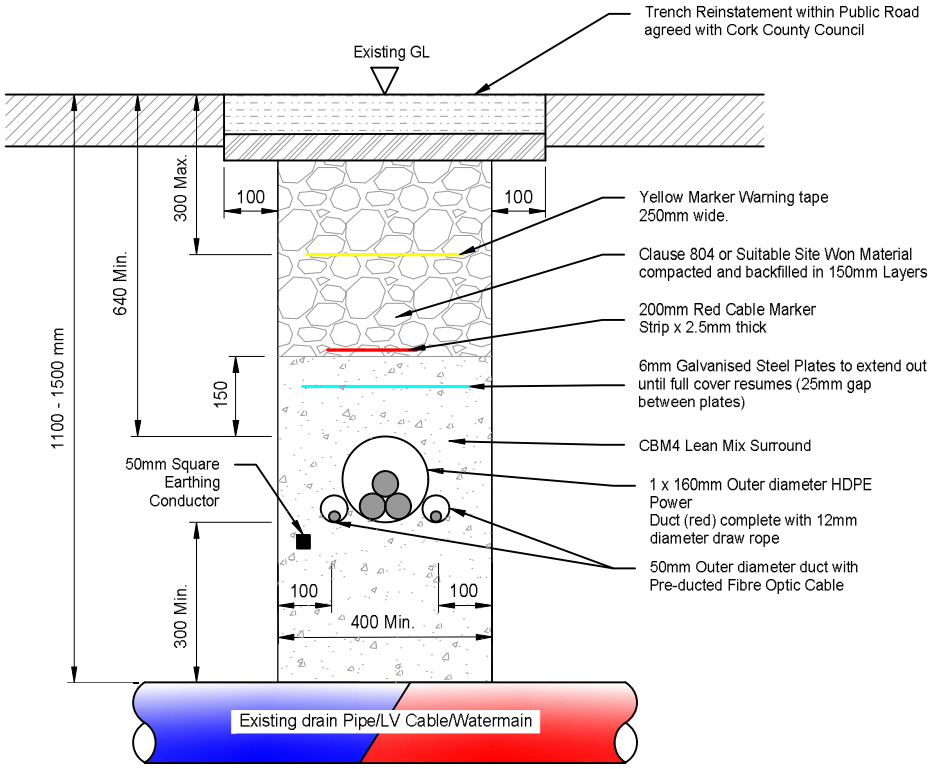
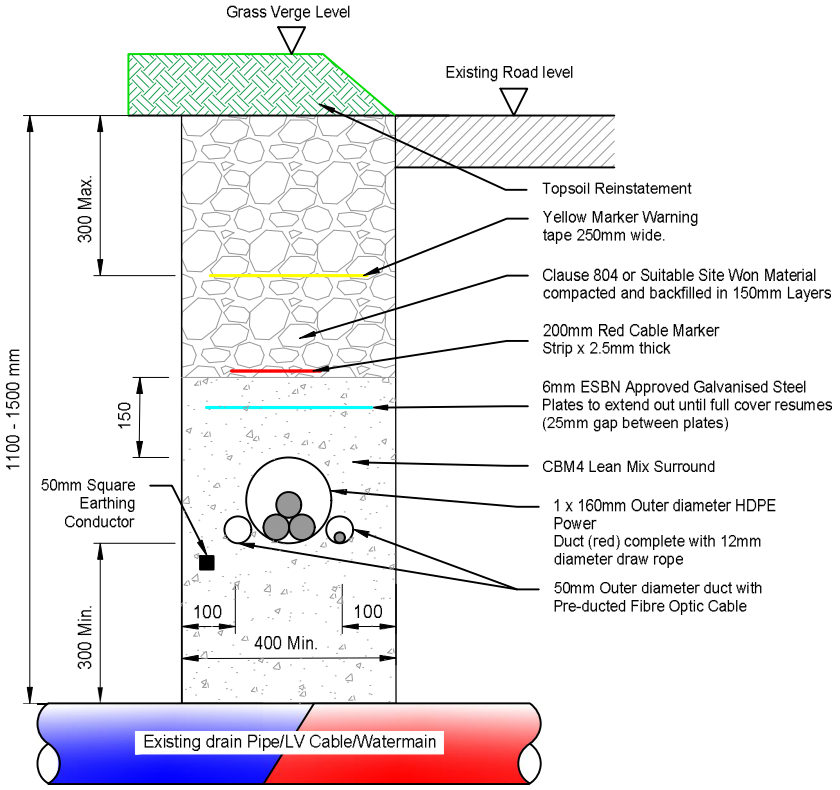


Typical 33kV Cable Trench Crossing Over Existing Services In Public Road Detail Scale 1:10



Typical 33kV Cable Trench Crossing Over Existing Services In Public Road Verge Detail Scale 1:10

DRAWING TITLE: Typical 33kV Cable Trench Crossing Over Existing Services in Public Road & Verge Detail Where Standard Separation Depth not Available		DRAWING No.: 191223a - 35	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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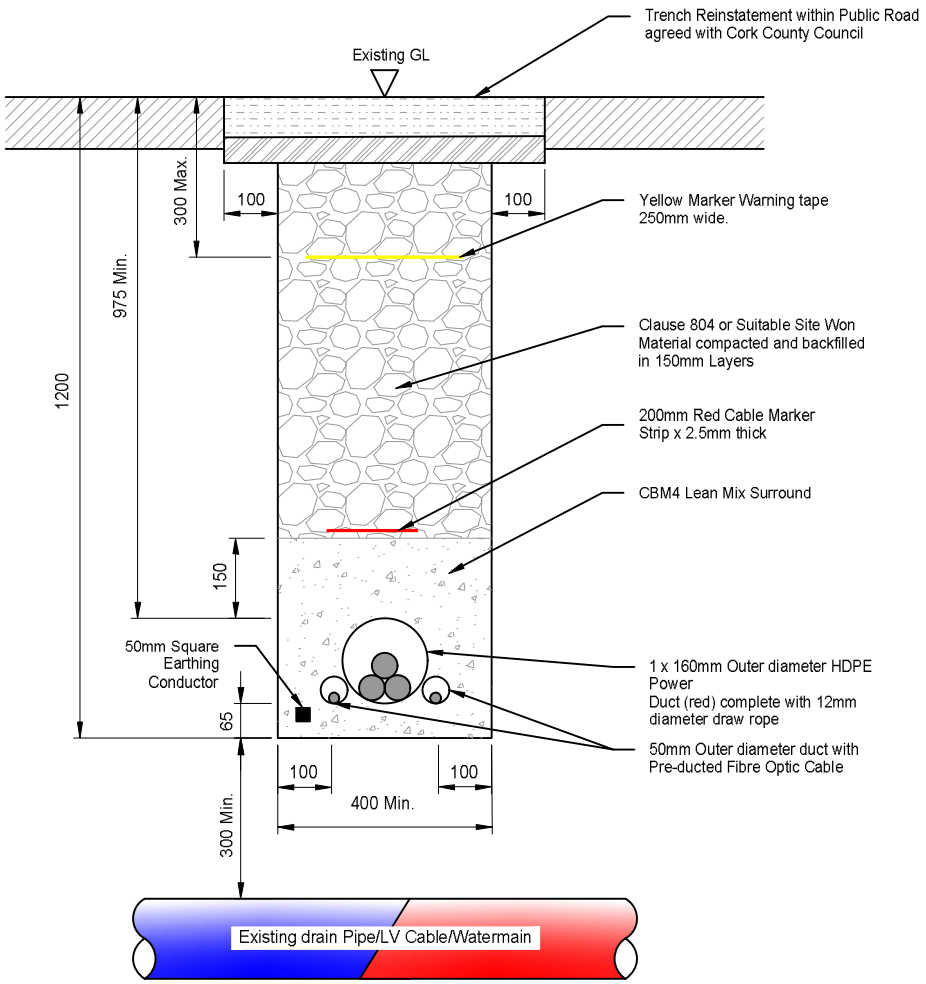
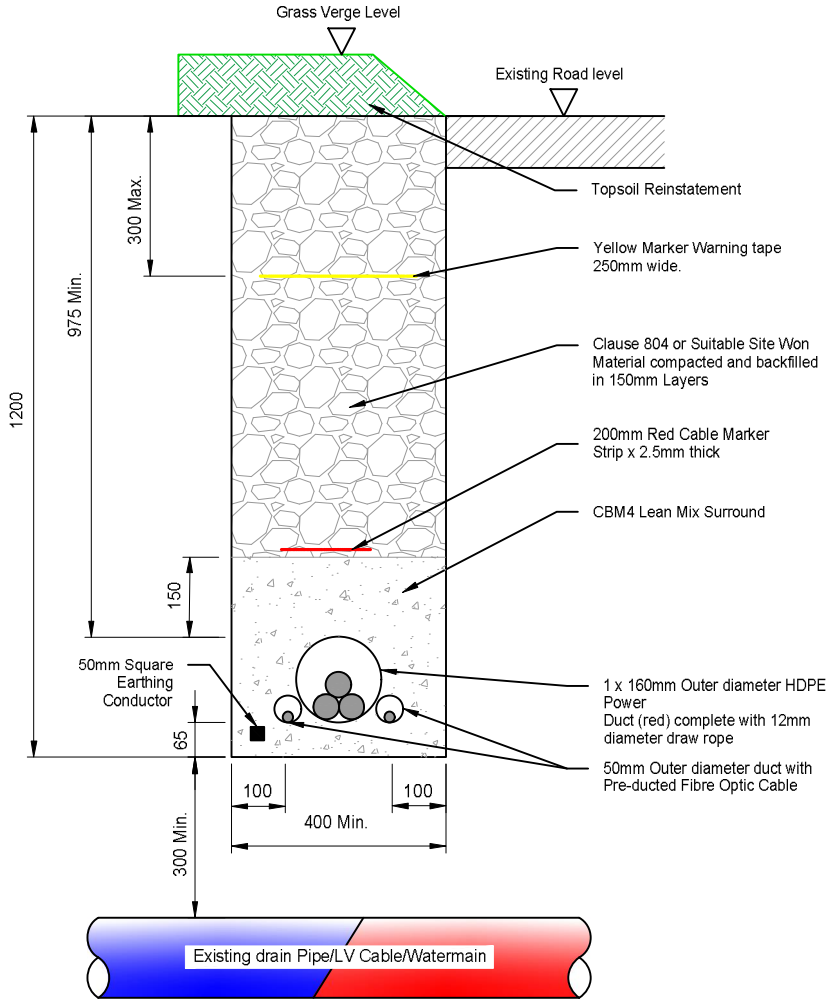


Typical 33kV Cable Trench Crossing Over Existing Services In Public Road Detail Scale 1:10



Typical 33kV Cable Trench Crossing Over Existing Services In Public Road Verge Detail Scale 1:10

DRAWING TITLE: Typical 33kV Cable Trench Crossing Over Where Standard Separation Depth/Cover is Available		DRAWING No.: 191223a - 36	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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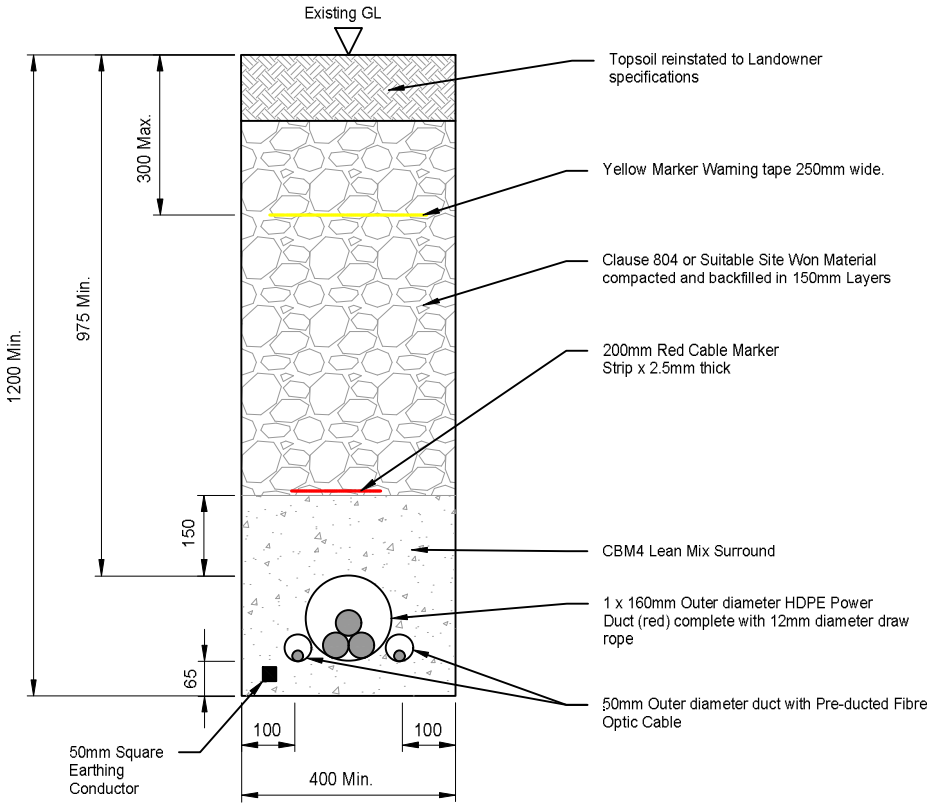
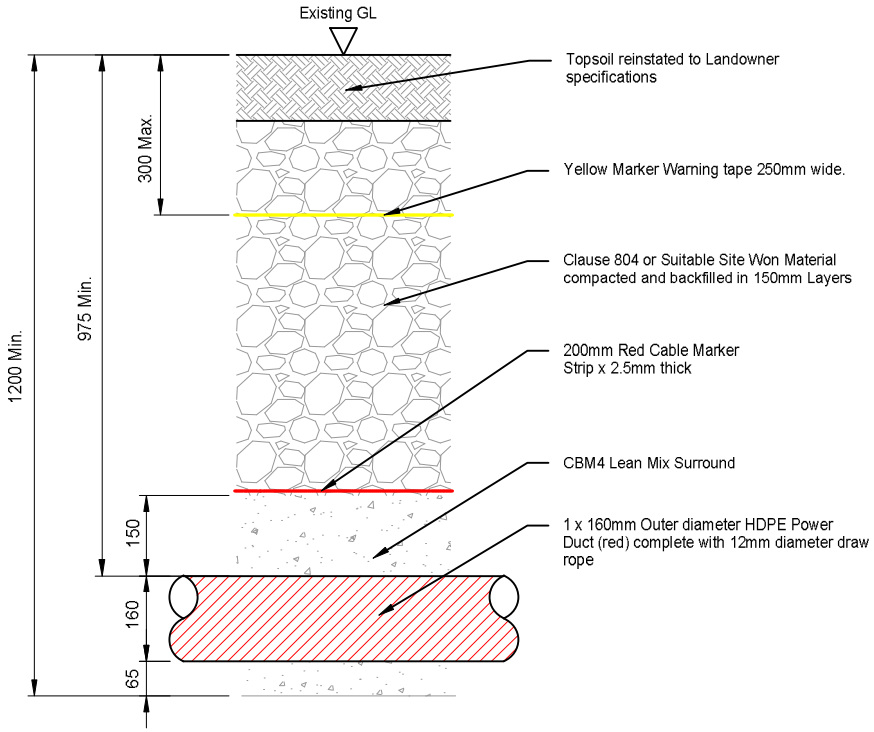


33kV Cable Trench In Open Ground End View Scale 1:10



33kV Cable Trench In Open Ground Elevation Scale 1:10

DRAWING TITLE: 33kV Cable Trench In Open Ground Details		DRAWING No.: 191223a - 37	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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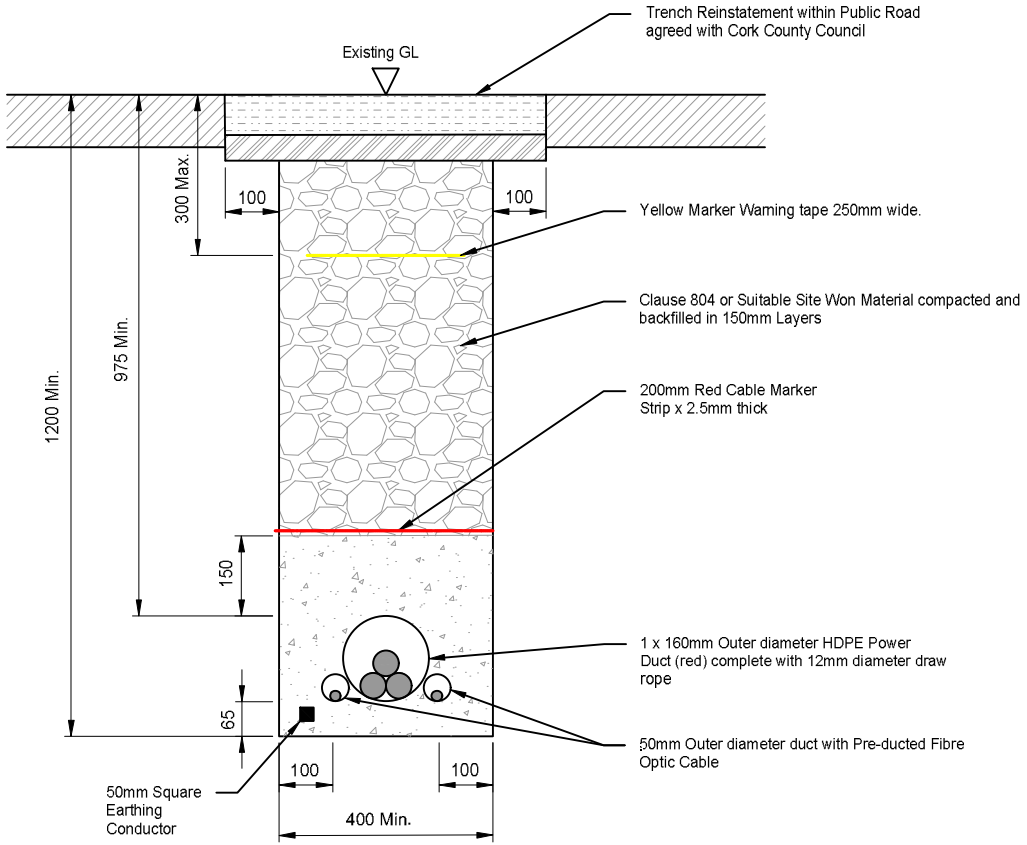
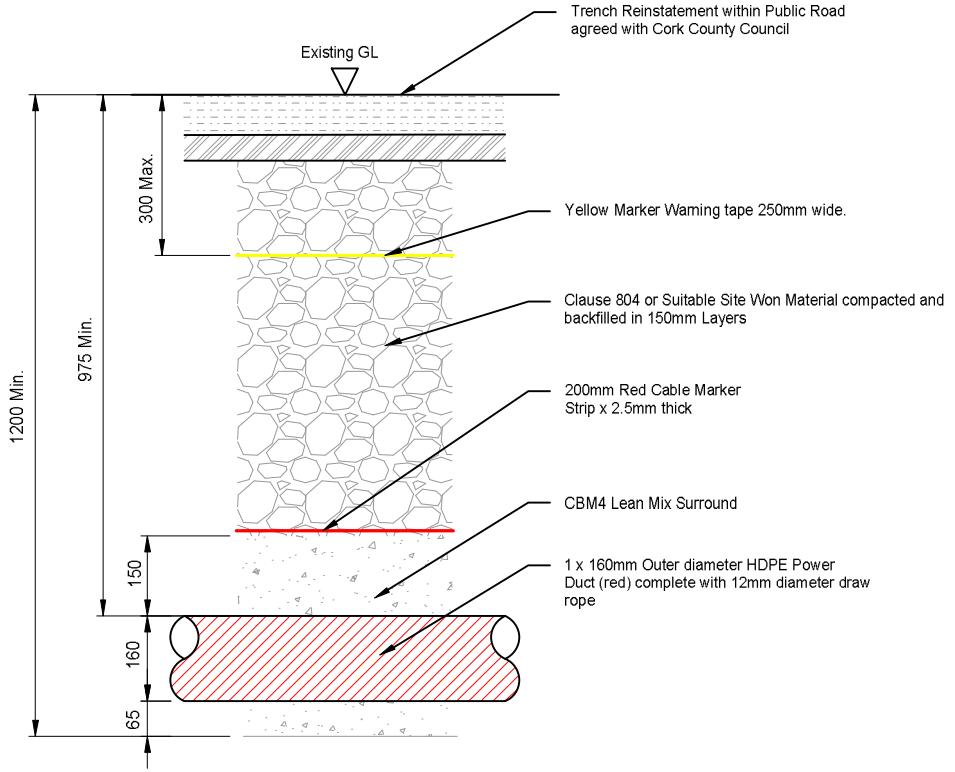


33kV Cable Trench In Public Roadway End View Scale 1:10



33kV Cable Trench In Public Roadway Elevation Scale 1:10

DRAWING TITLE: 33kV Cable Trench In Roadway Details		DRAWING No.: 191223a - 38	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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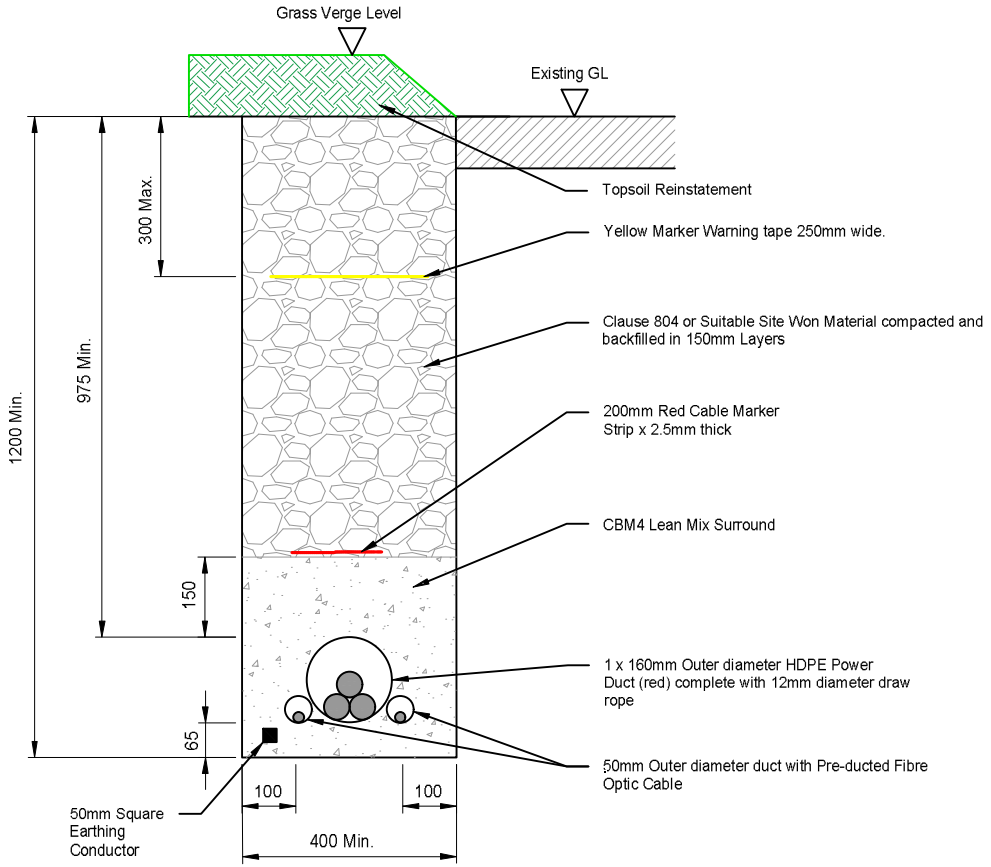
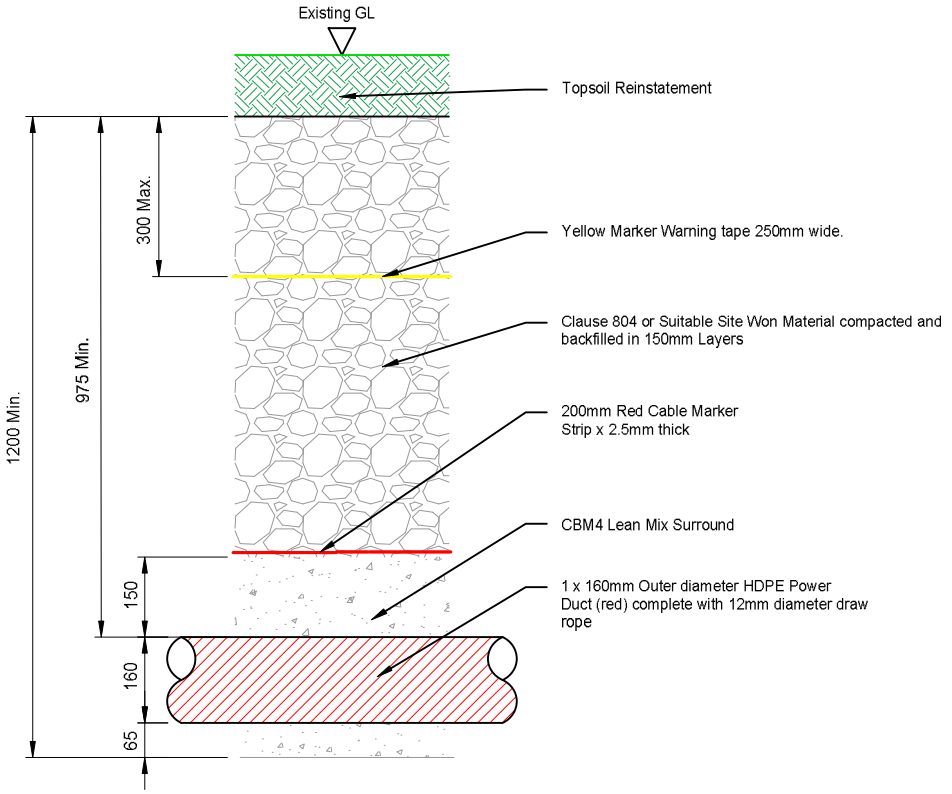


33kV Cable Trench In Road Verge End View Scale 1:10



33kV Cable Trench In Road Verge Elevation Scale 1:10

DRAWING TITLE: 33kV Cable Trench In Road Verge Details		DRAWING No.: 191223a - 39	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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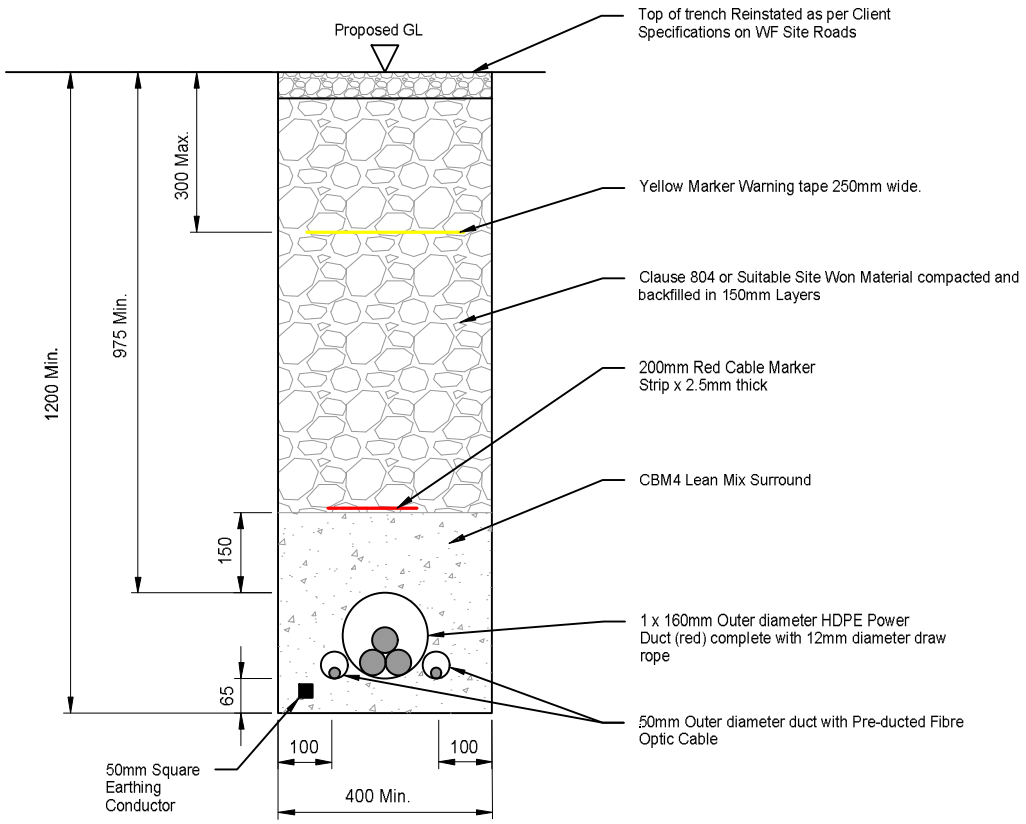
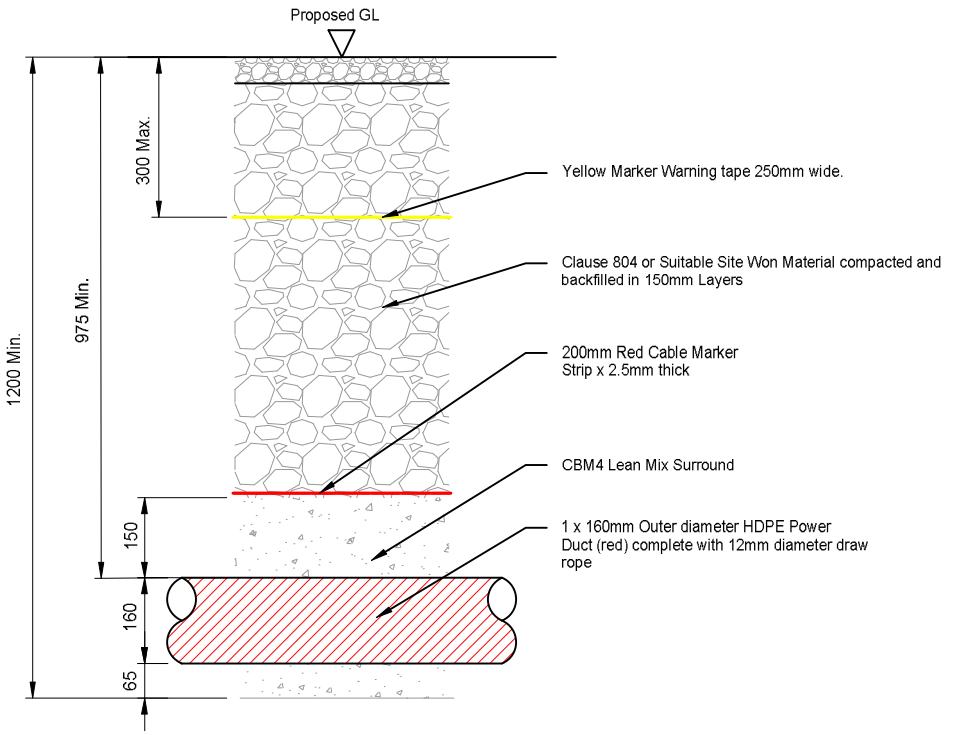


33kV Cable Trench In WF Site Road Detail End View Scale 1:10



33kV Cable Trench In WF Site Road Detail Elevation Scale 1:10

DRAWING TITLE: Typical 33kV Cable Trench In Wind Farm Site Road Details		DRAWING No.: 191223a - 40	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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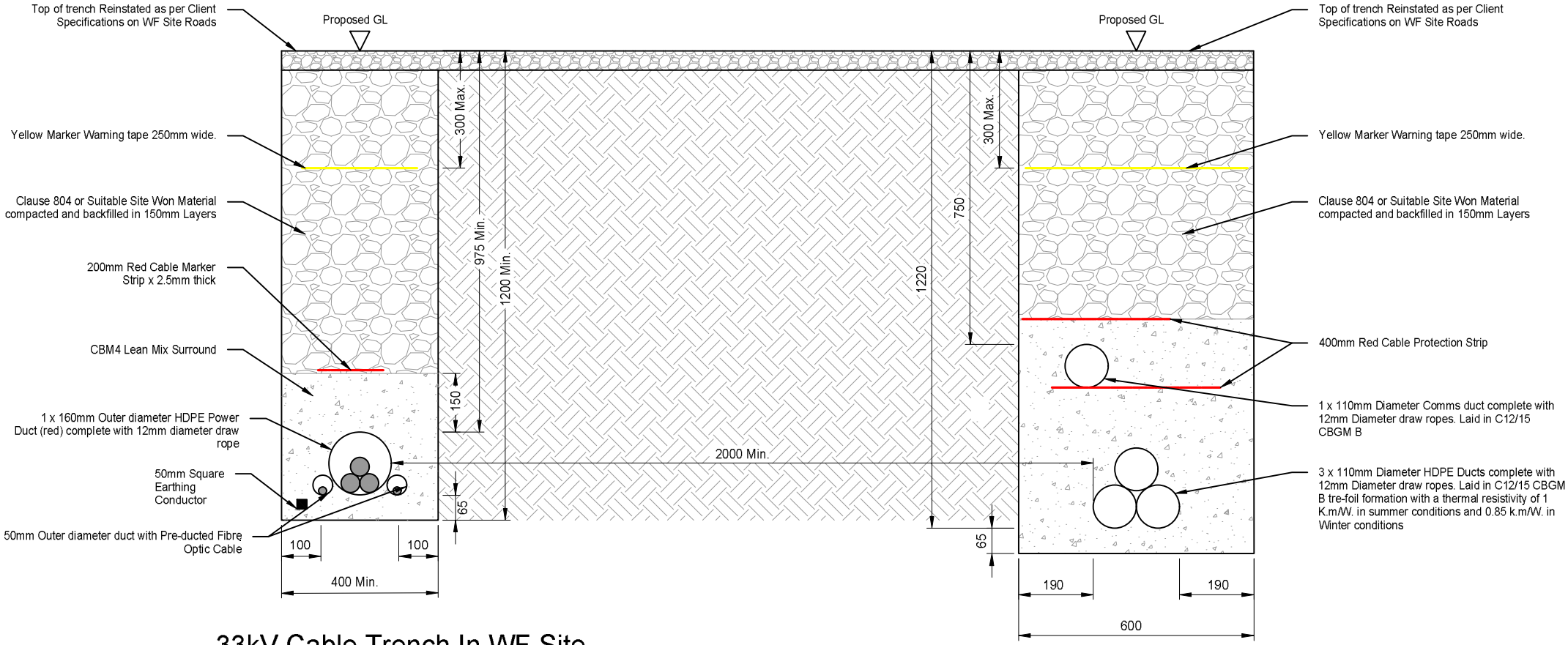

33kV Cable Trench In WF Site Road Detail End View Scale 1:10

38kV Cable Trench In WF Site Road Detail End View Scale 1:10

DRAWING TITLE: Typical 33kV and 38 kV Cable Trench In Wind Farm Site Road Details		DRAWING No.: 191223a - 41	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:10@A3	DATE: 13.08.2020

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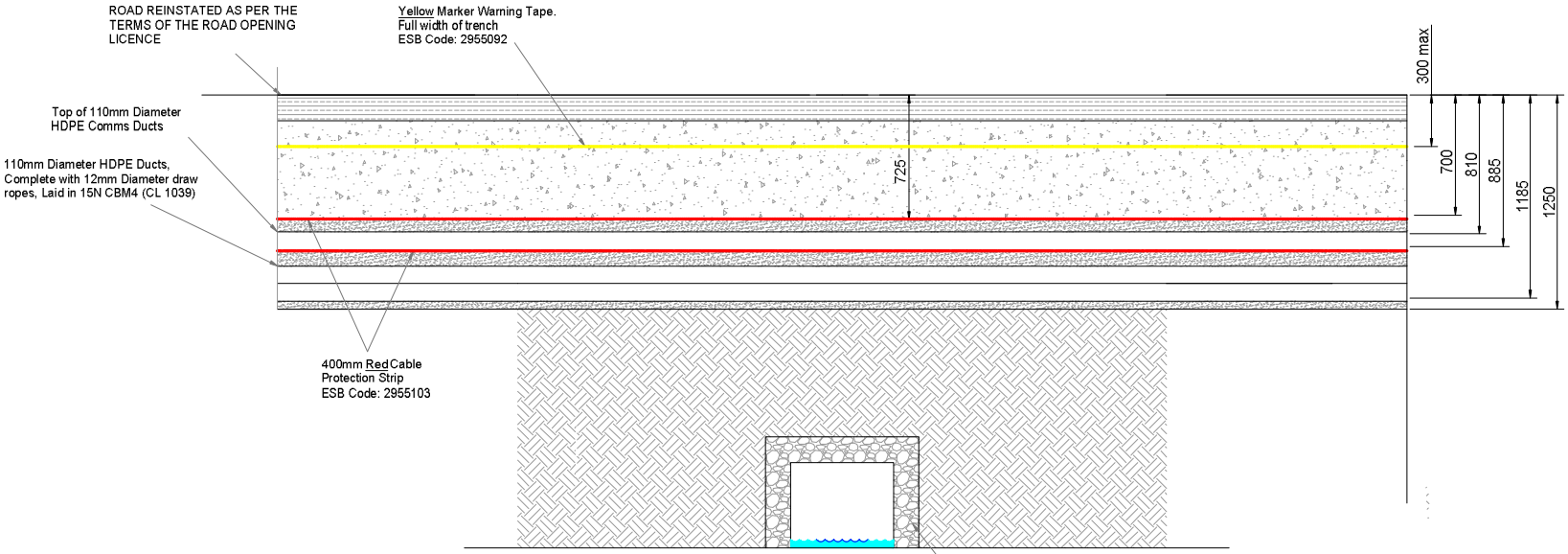
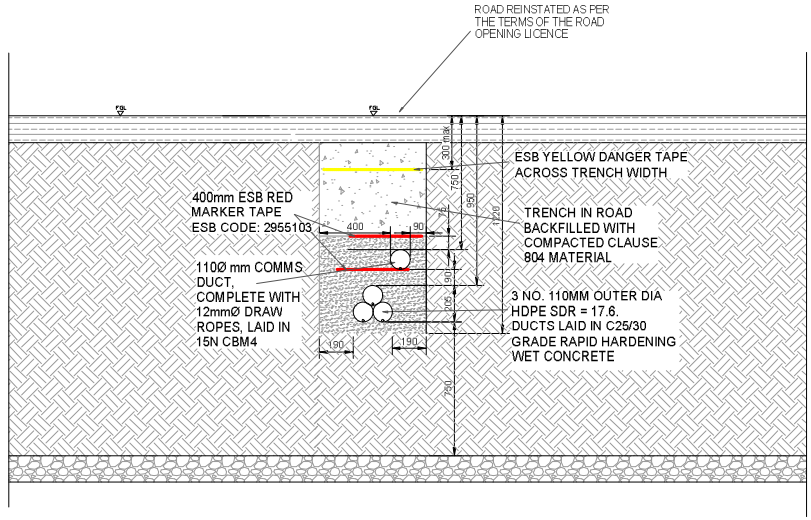


Longitudal Section at Watercourse Crossing



Cross Section at Watercourse Crossing

DRAWING TITLE: Typical Cable Trench Over Culvert in Trefoil Arrangement - Option 1		DRAWING No.: 191223a - 42	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:30@A3	DATE: 13.08.2020

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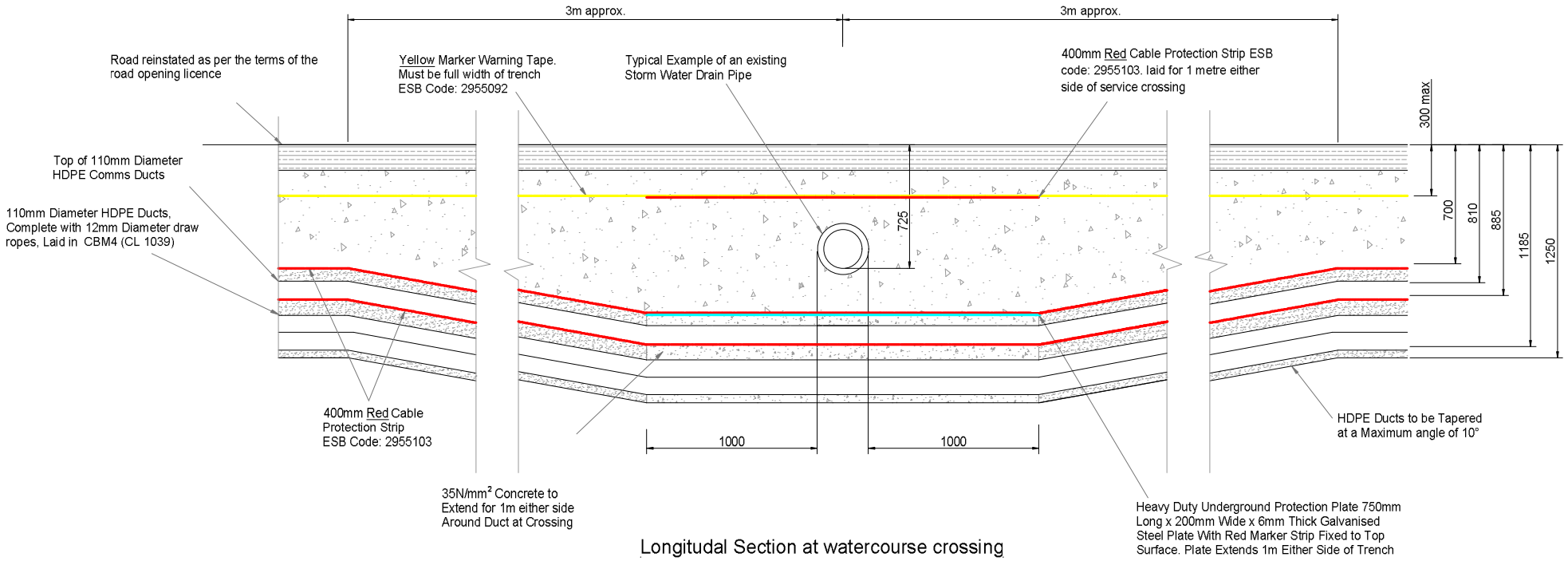
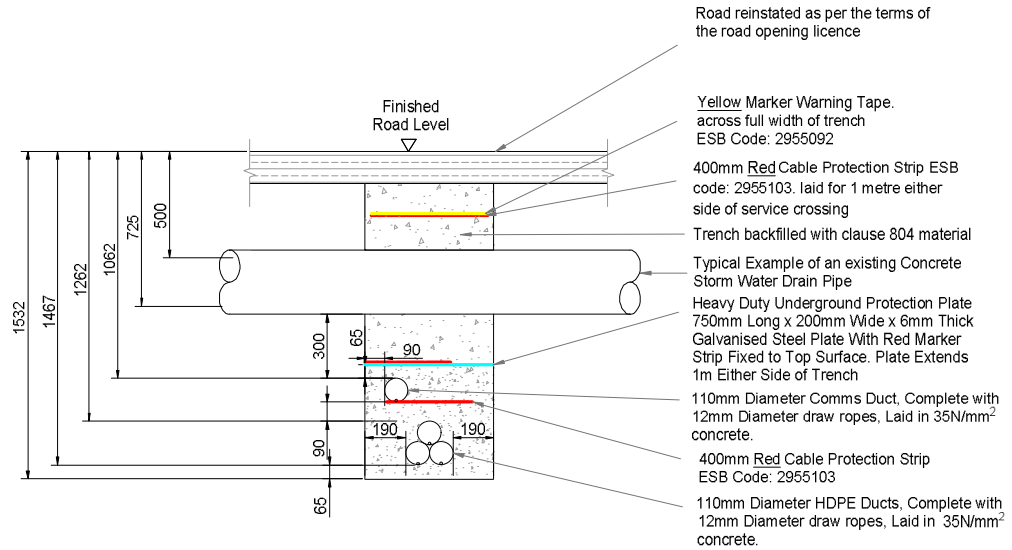


Longitudal Section at watercourse crossing



Cross Section at Watercourse Crossing

DRAWING TITLE: Typical Cable Trench under Piped Culvert in Trefoil Arrangement - Option 2		DRAWING No.: 191223a - 43	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: 1:25@A3	DATE: 13.08.2020

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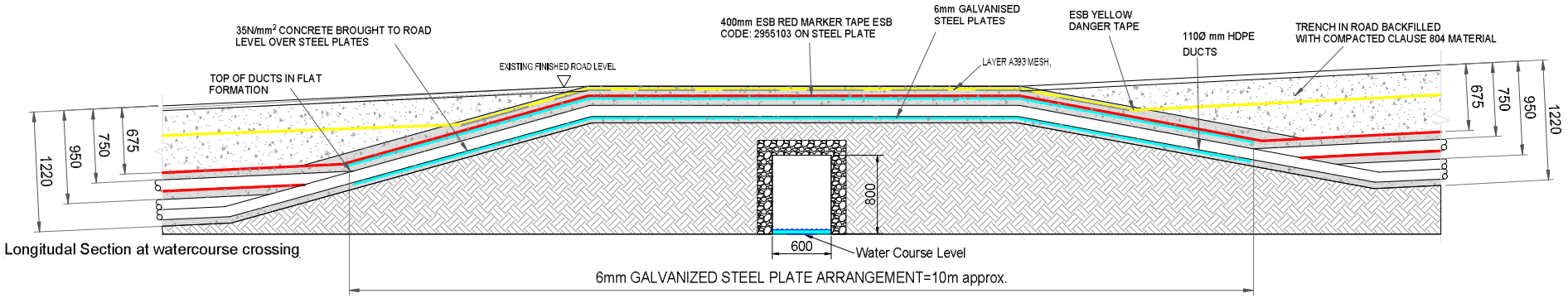
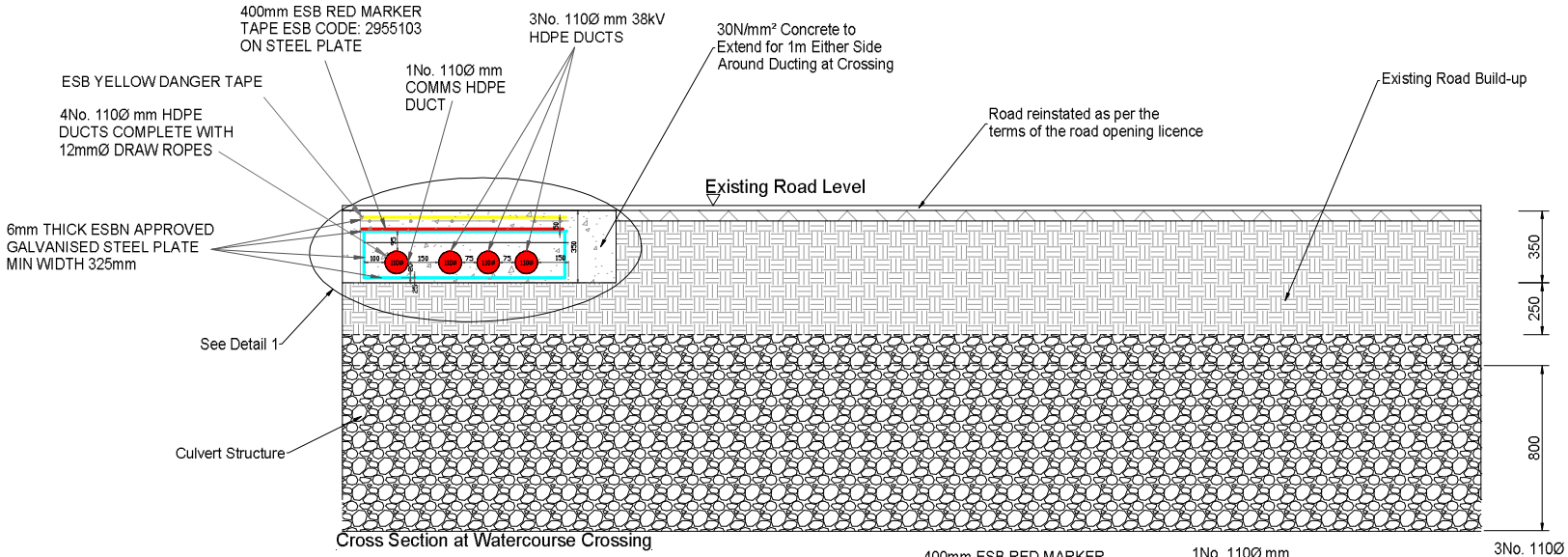
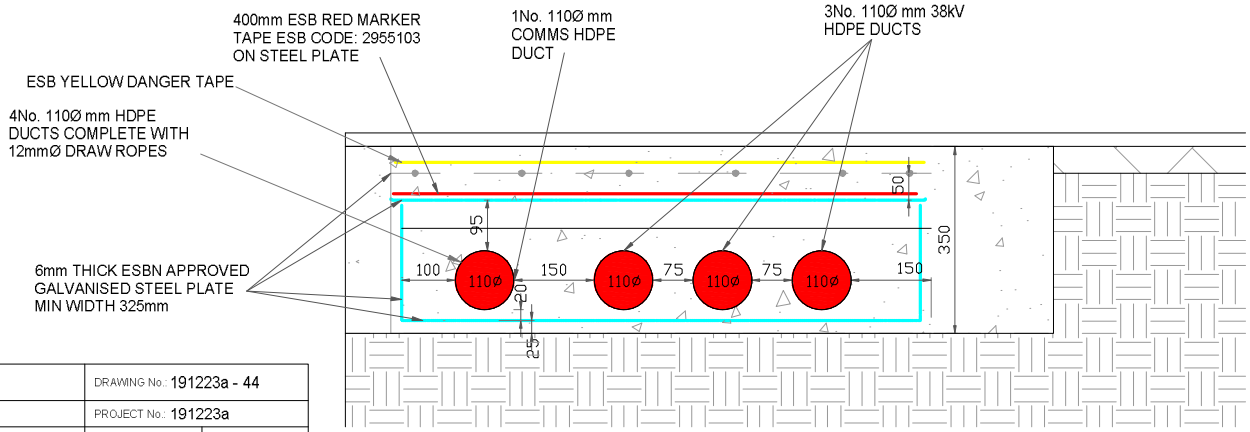


Longitudal Section at watercourse crossing



Cross Section at Watercourse Crossing



Detail 1
Scale 1:10

DRAWING TITLE: Typical Cable Trench Flatbed Formation Over Culvert - Option 3		DRAWING No.: 191223a - 44	
PROJECT TITLE: Cleanrath Wind Farm, Co. Cork		PROJECT No.: 191223a	
DRAWING/MODIFIED BY: Joseph O Brien	CHECKED BY: Owen Cahill	SCALE: As Shown @A3	DATE: 13.08.2020

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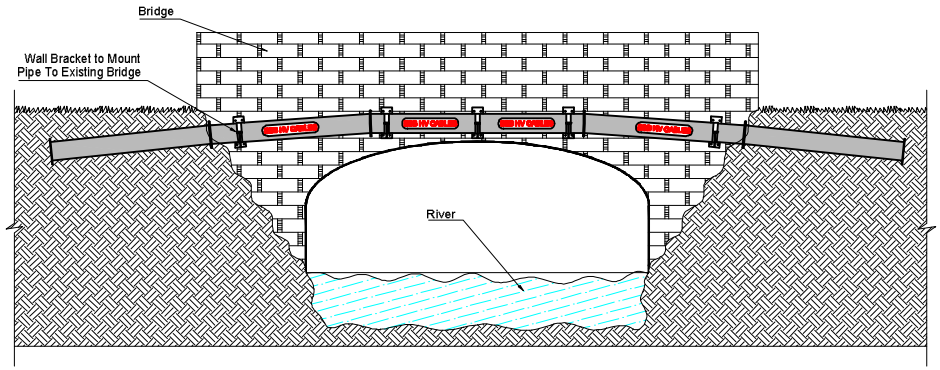
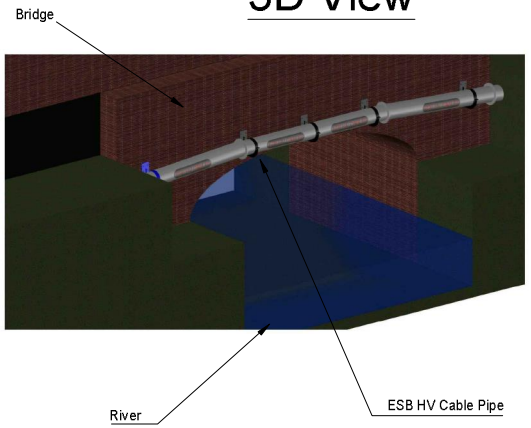
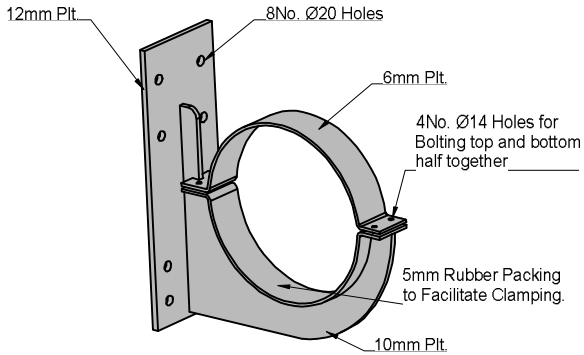


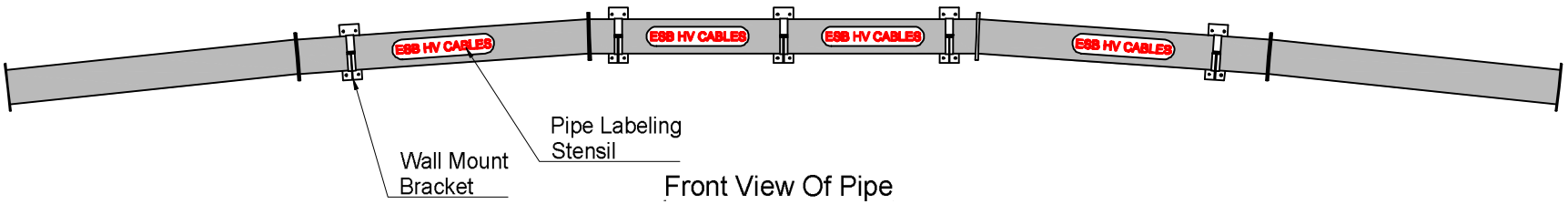
Front View
Showing Section of Bridge
1:100

3D View





3D View Of Wall Bracket



Front View Of Pipe
1:50

DRAWING TITLE:
Typical Piped Crossing Attached or Adjacent to Concrete Bridge Option 4

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY: Joseph O Brien	CHECKED BY: Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 45
SCALE: As Shown @ A3	DATE: 13.08.2020

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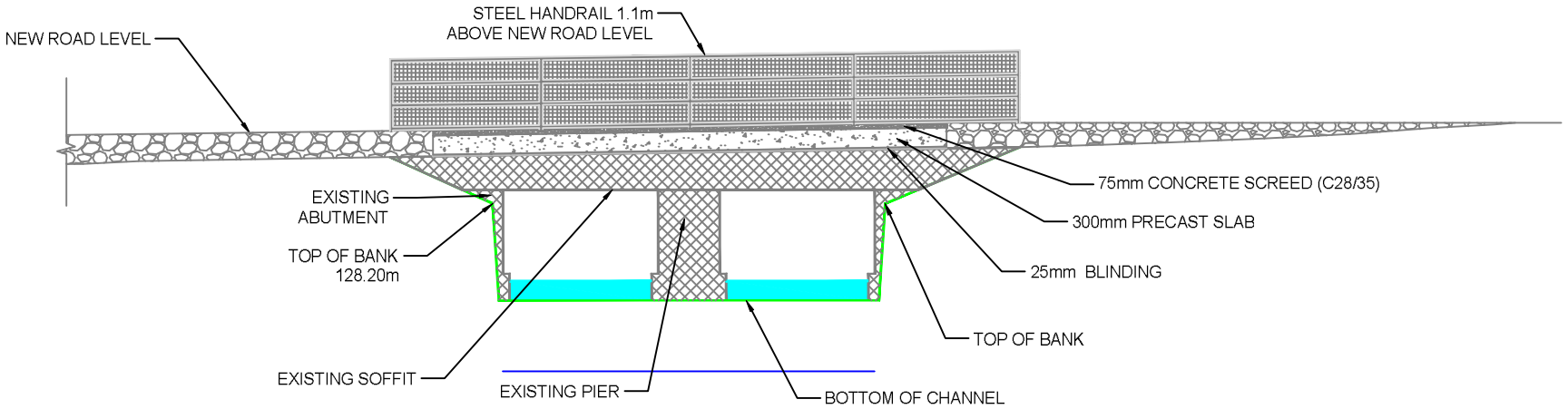

View of Bridge Facing South

End View of Bridge Upgrade

DRAWING TITLE:
Upgrade Works to Bridge at Northern Access

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph O Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 46
SCALE: 1:75 @ A3	DATE: 13.08.2020

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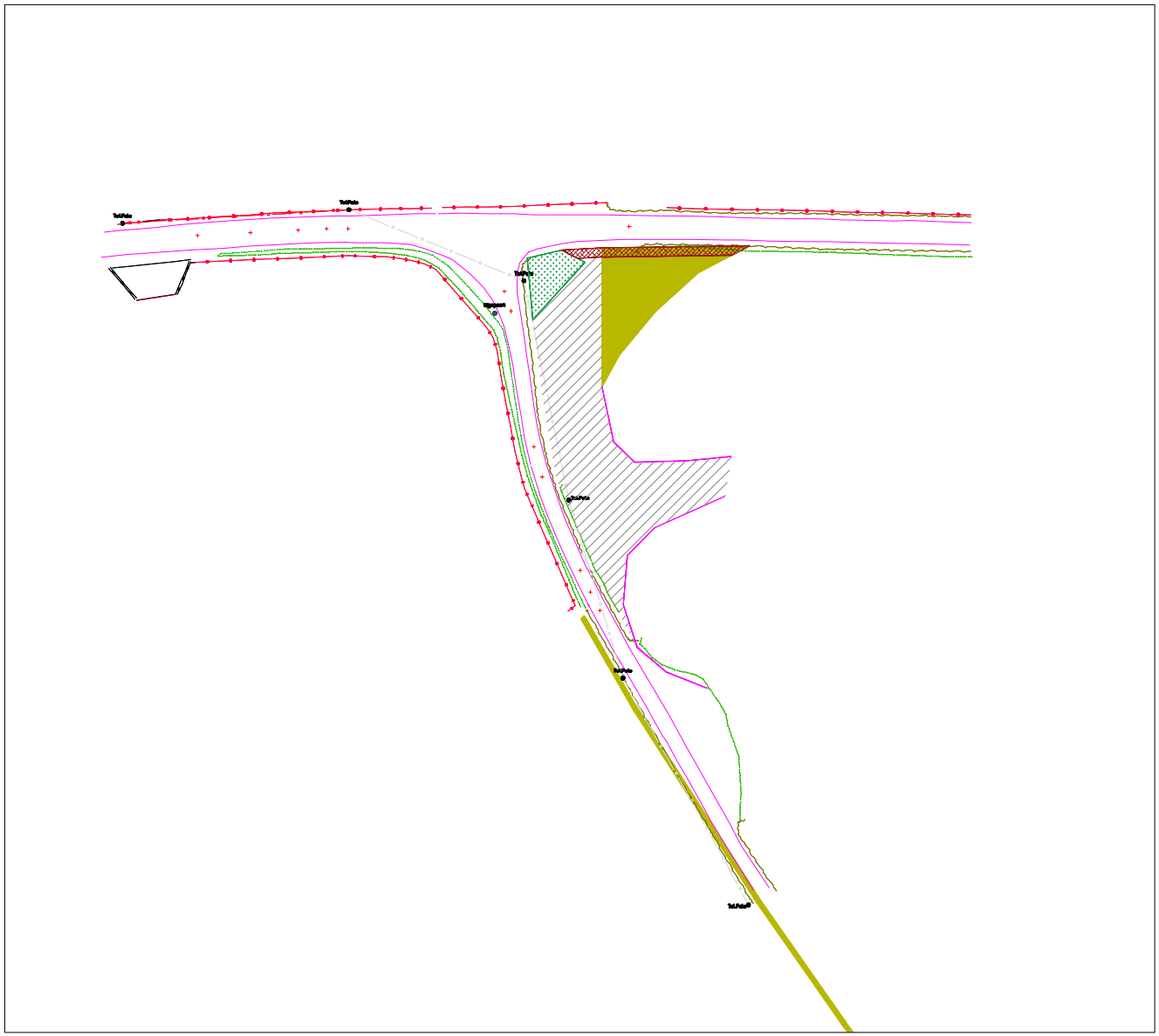
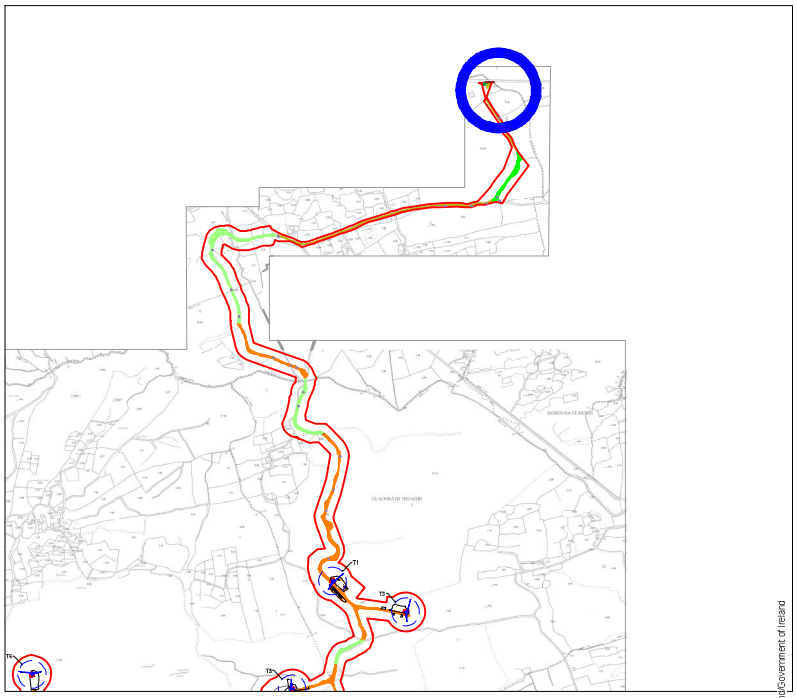
Drawing Legend

- Existing Road Edge
- Junction/Road Widening
- Existing Dwelling Access Area
- Embankment
- Vegetation Area
- Berm





1:25,000 Location on Context Map

N

DRAWING TITLE:
Junction at Sawmill at Cloontycarthy

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 47
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.:
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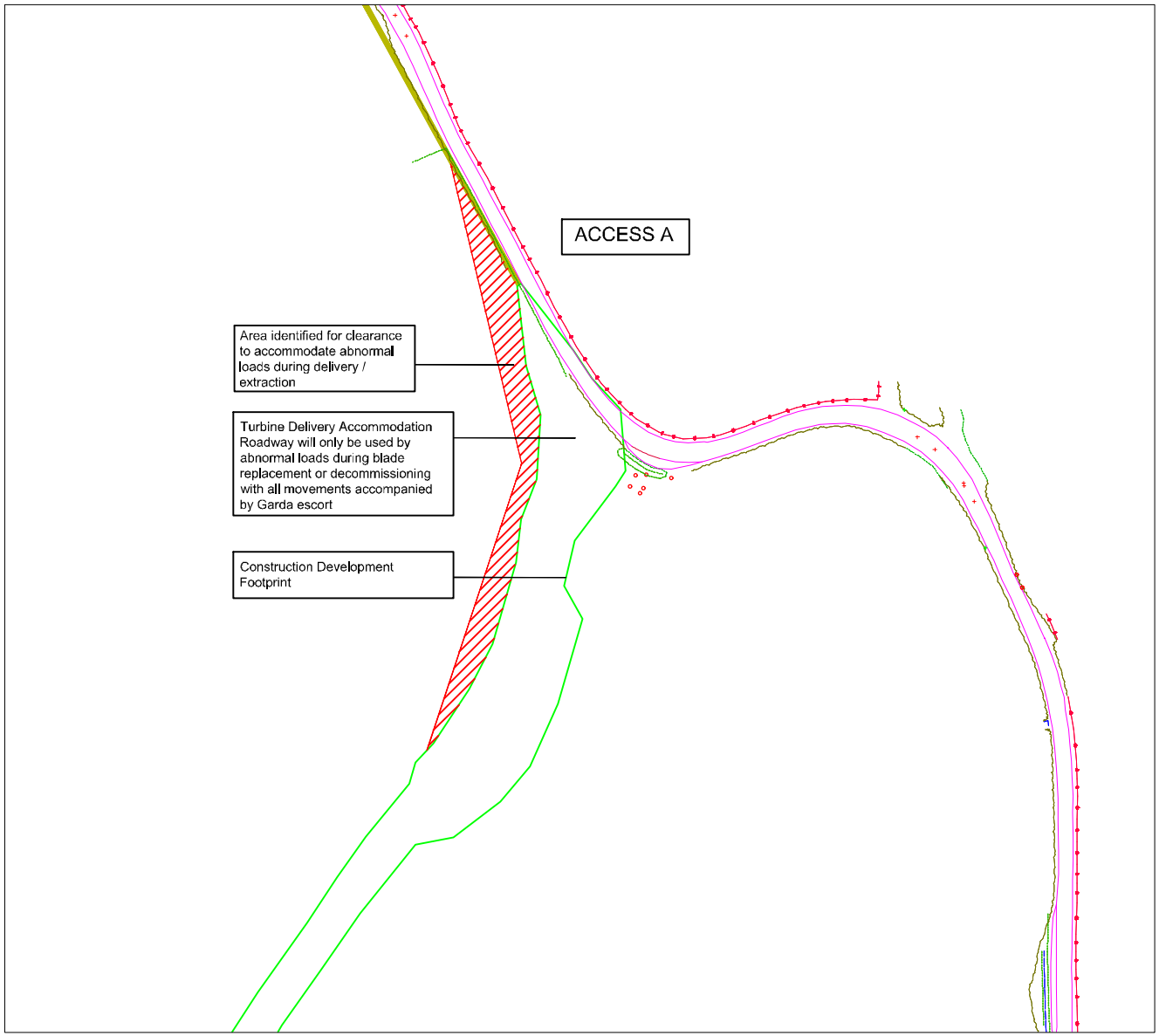
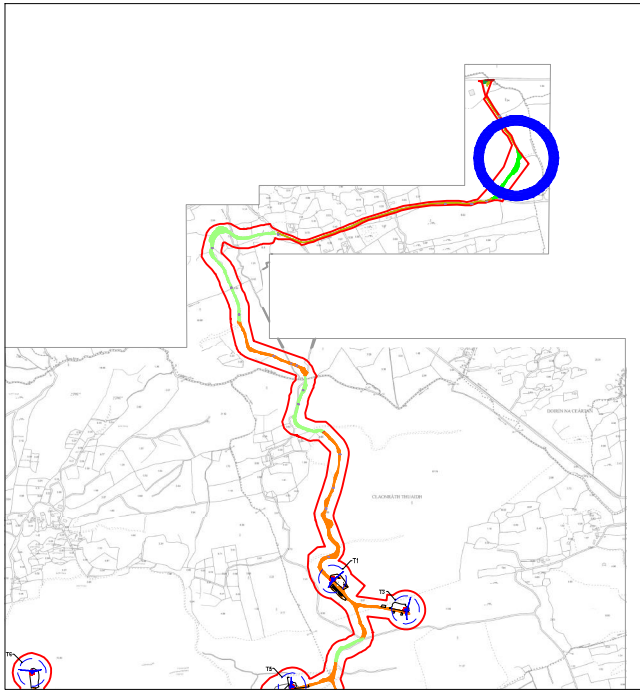
Website: www.mkoireland.ie

Drawing Legend

- Existing Road Edge
- As Constructed Accomodation Roadway
- Transport Runover Area
- Junction/Road Widening





1:25,000 Location on Context Map

N

DRAWING TITLE:
Access Junction A

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 48
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.:
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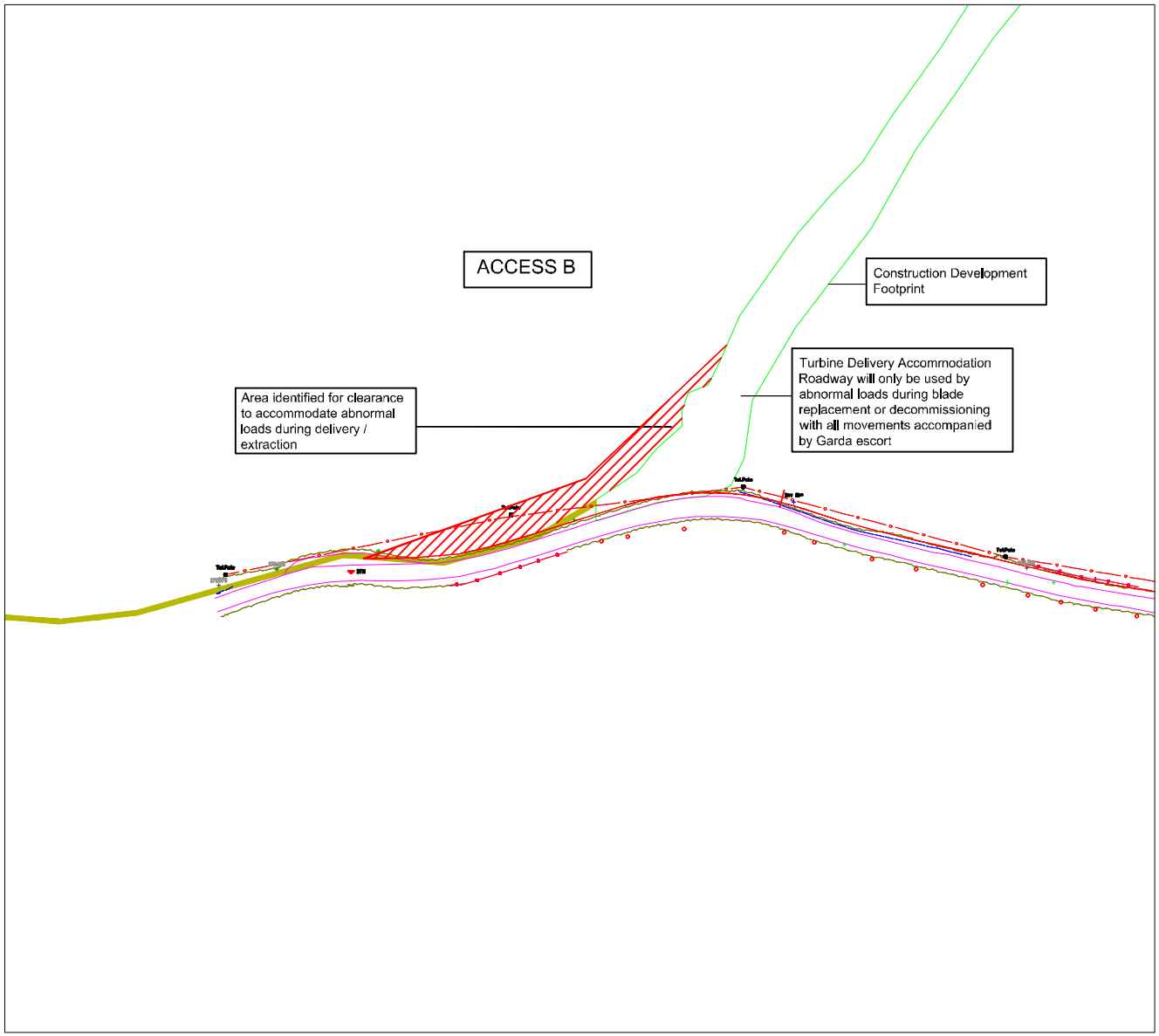
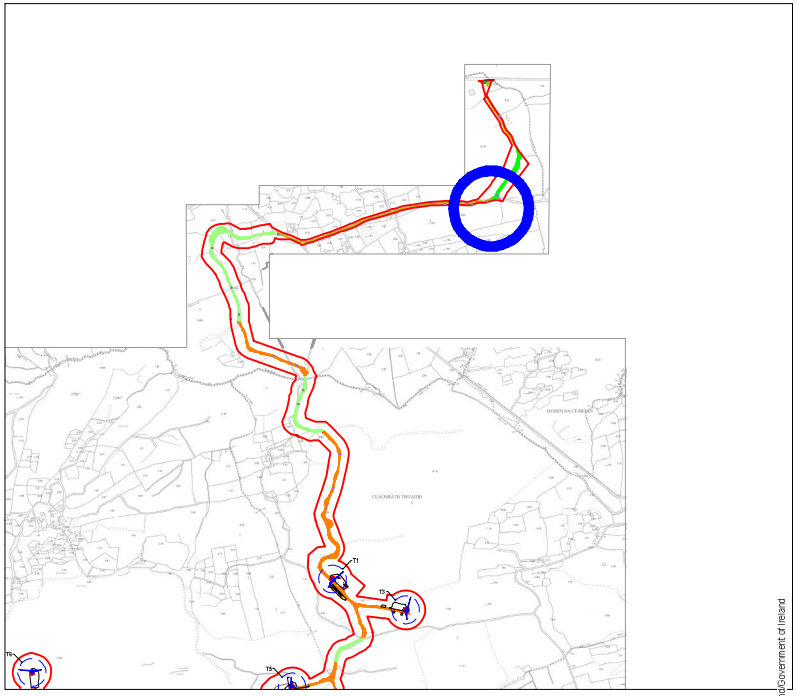
Drawing Legend

- Existing Road Edge
- As Constructed Accomodation Roadway
- Transport Runover Area
- Junction/Road Widening





1:25,000 Location on Context Map

N

DRAWING TITLE:
Access Junction B

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
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PROJECT No.: 191223a	DRAWING No.: 191223a - 49
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.:
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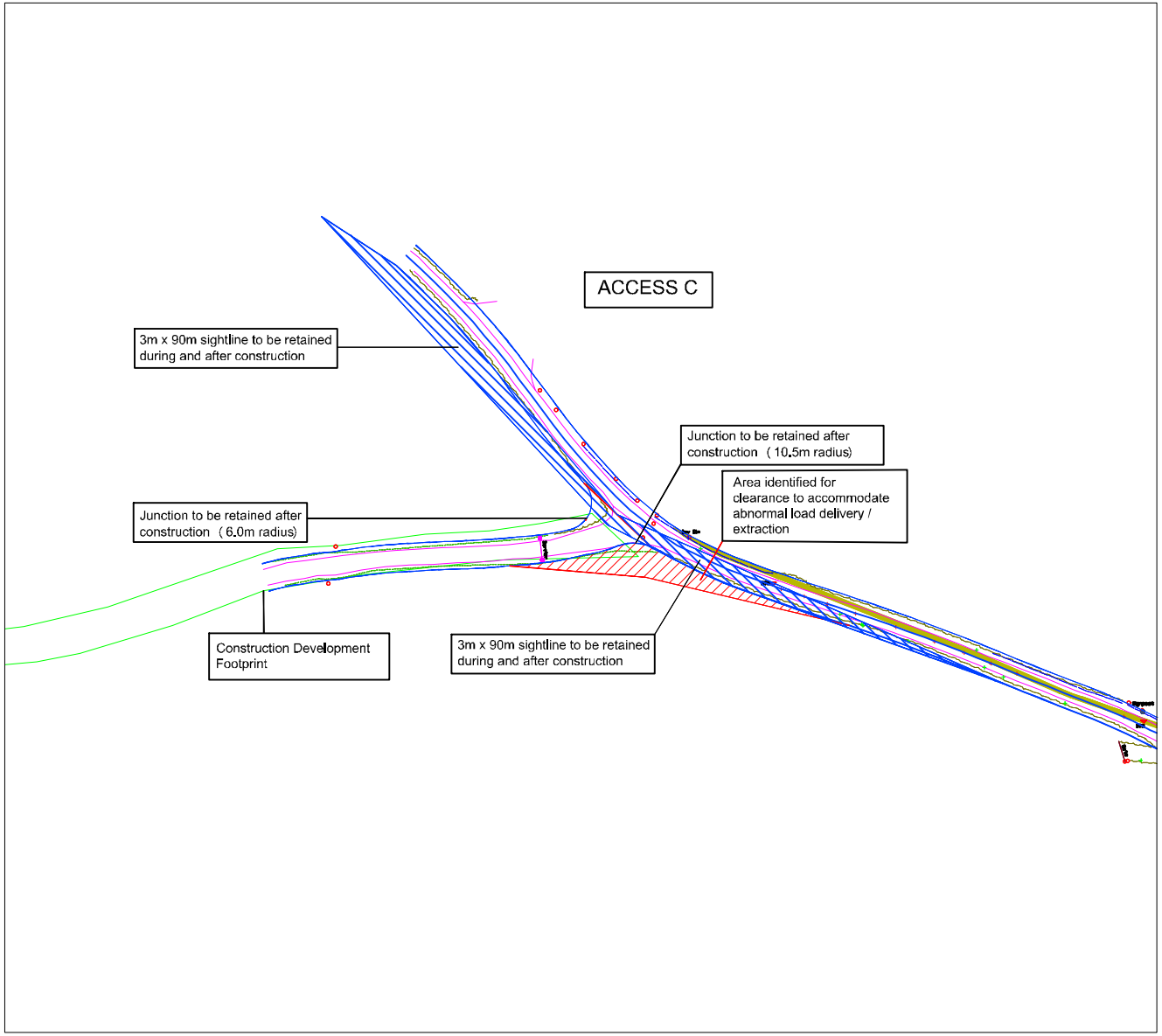
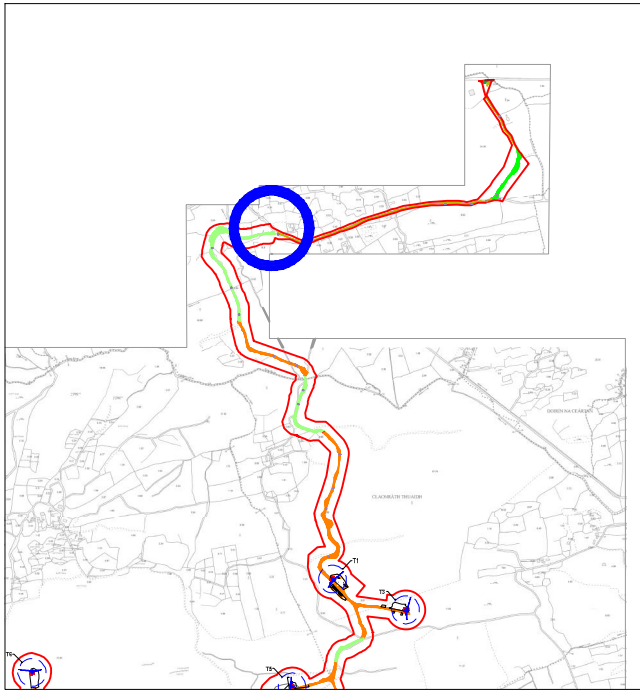
Drawing Legend

- Existing Road Edge
- As Constructed Wind Farm Access Track
- Transport Runover Area
- Sight line
- Junction/Road Widening





1:25,000 Location on Context Map

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DRAWING TITLE:
Access Junction C

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 50
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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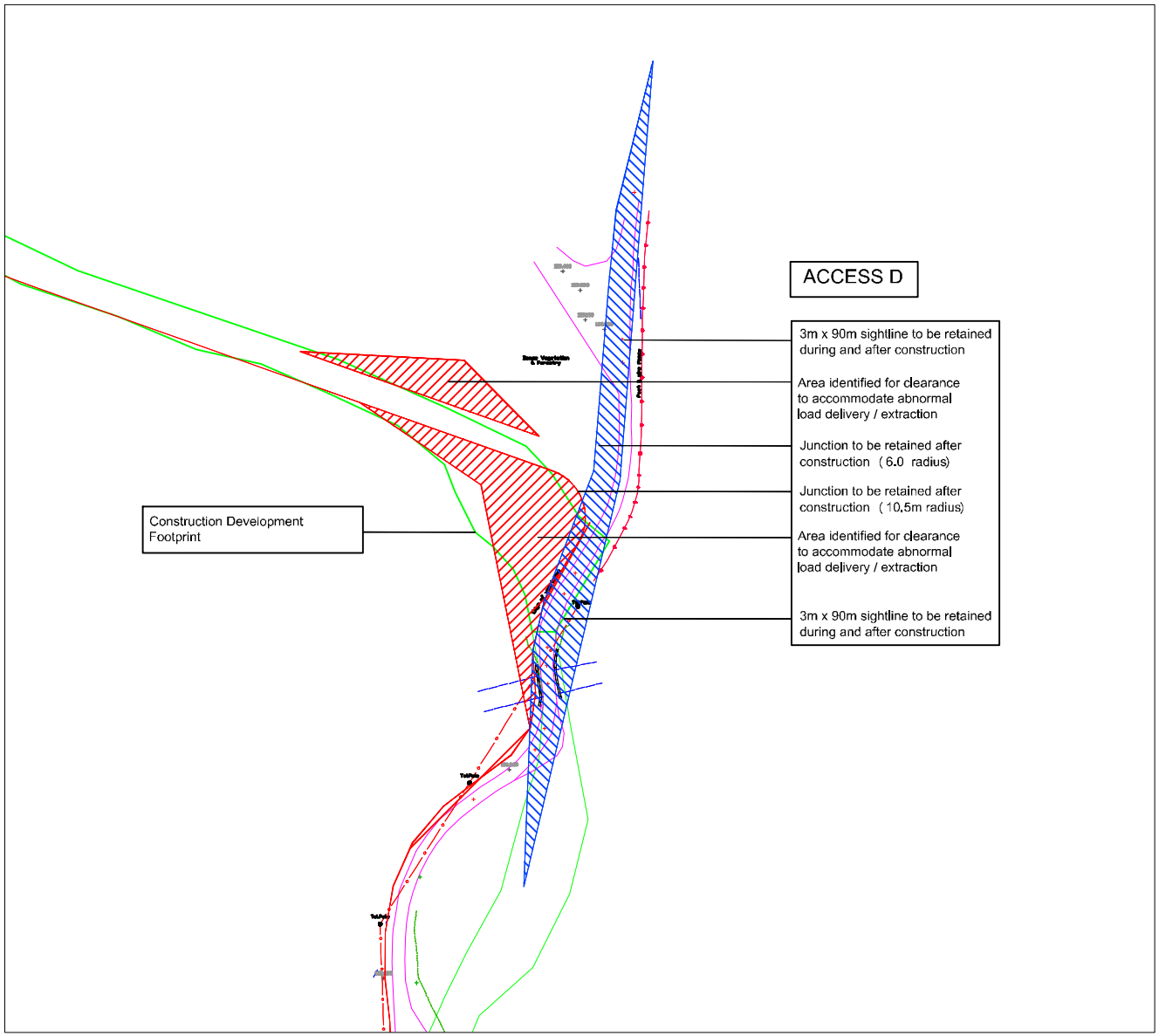
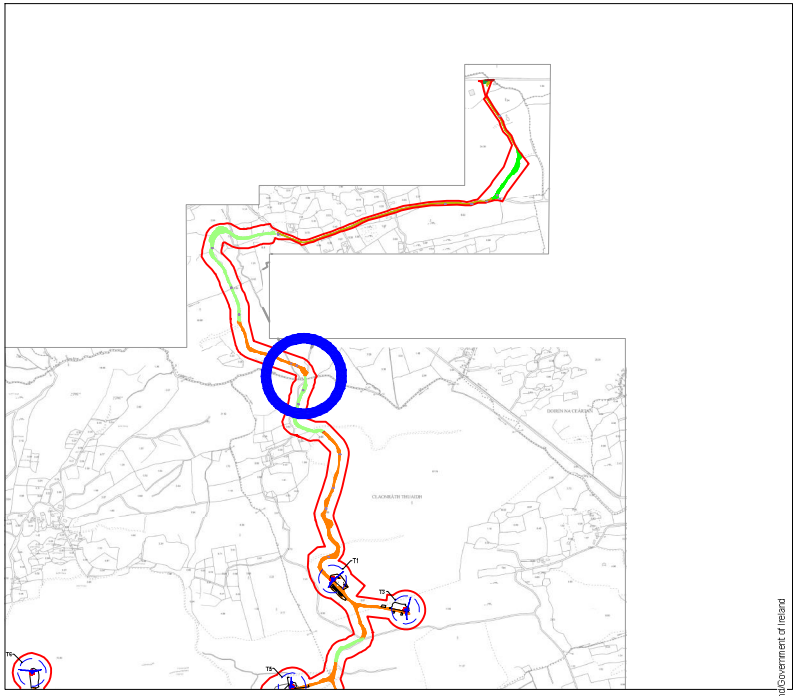
Drawing Legend

- Existing Road Edge
- As Constructed Wind Farm Access Track
- Transport Runover Area
- Sight line





1:25,000 Location on Context Map

N

DRAWING TITLE:
Access Junction D

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 51
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.:
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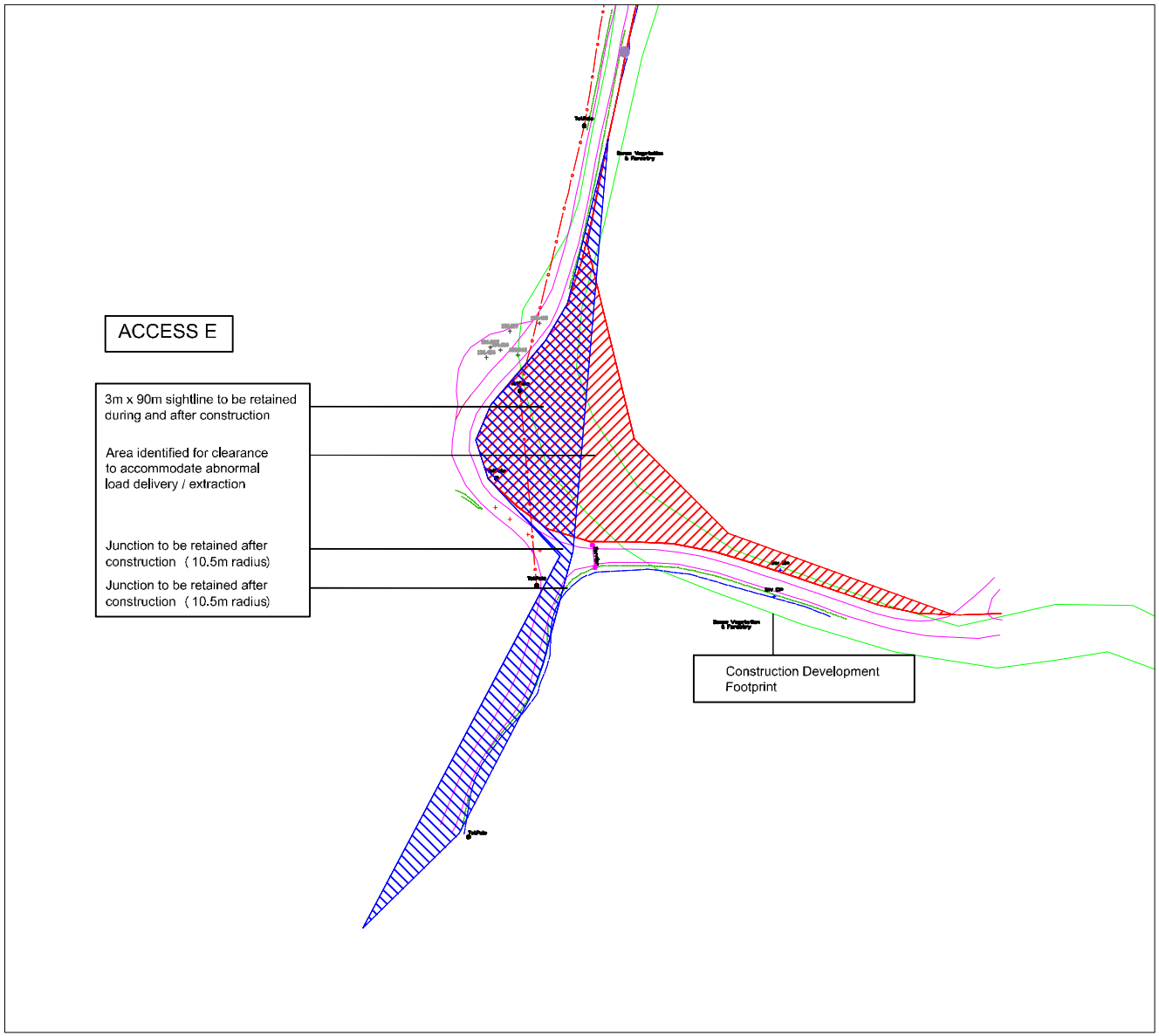
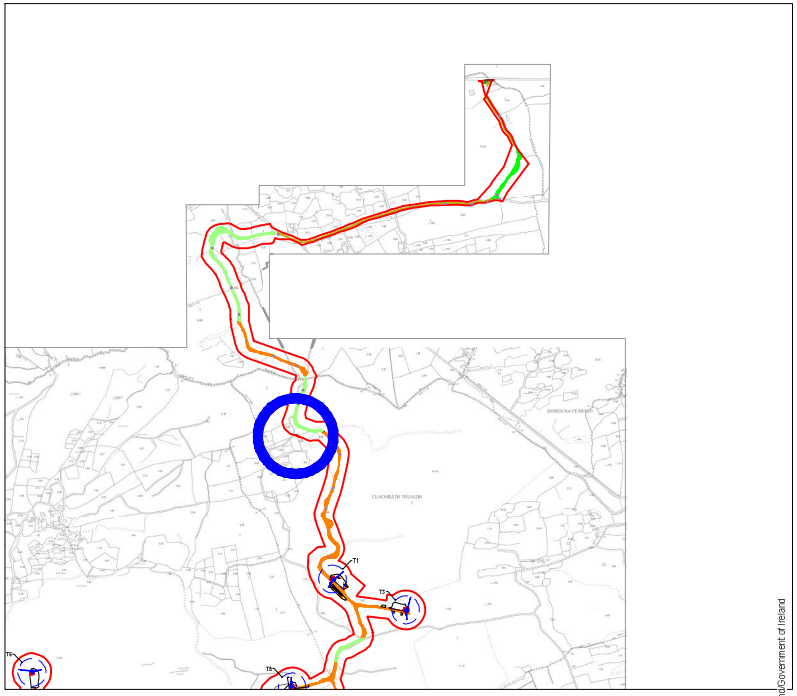
Drawing Legend

- Existing Road Edge
- As Constructed Wind Farm Access Track
- Transport Runover Area
- Sight line





1:25,000 Location on Context Map

N

DRAWING TITLE:
Access Junction E

PROJECT TITLE:
Cleanrath Wind Farm, Co. Cork

DRAWING BY:	CHECKED BY:
Joseph o Brien	Owen Cahill
PROJECT No.: 191223a	DRAWING No.: 191223a - 52
SCALE: 1:1,000 @A3	DATE: 13.08.2020

OS SHEET No.: 6367,6368,6369,6370,6371,6412,6413,6413,6415,6416

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Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as
vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

Pollution Prevention Notes:

1. Site management proposals are intended to ensure complete protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies.
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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site Tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

18. Care will be taken when completing concrete works on site to ensure no discharges occur.
19. 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.

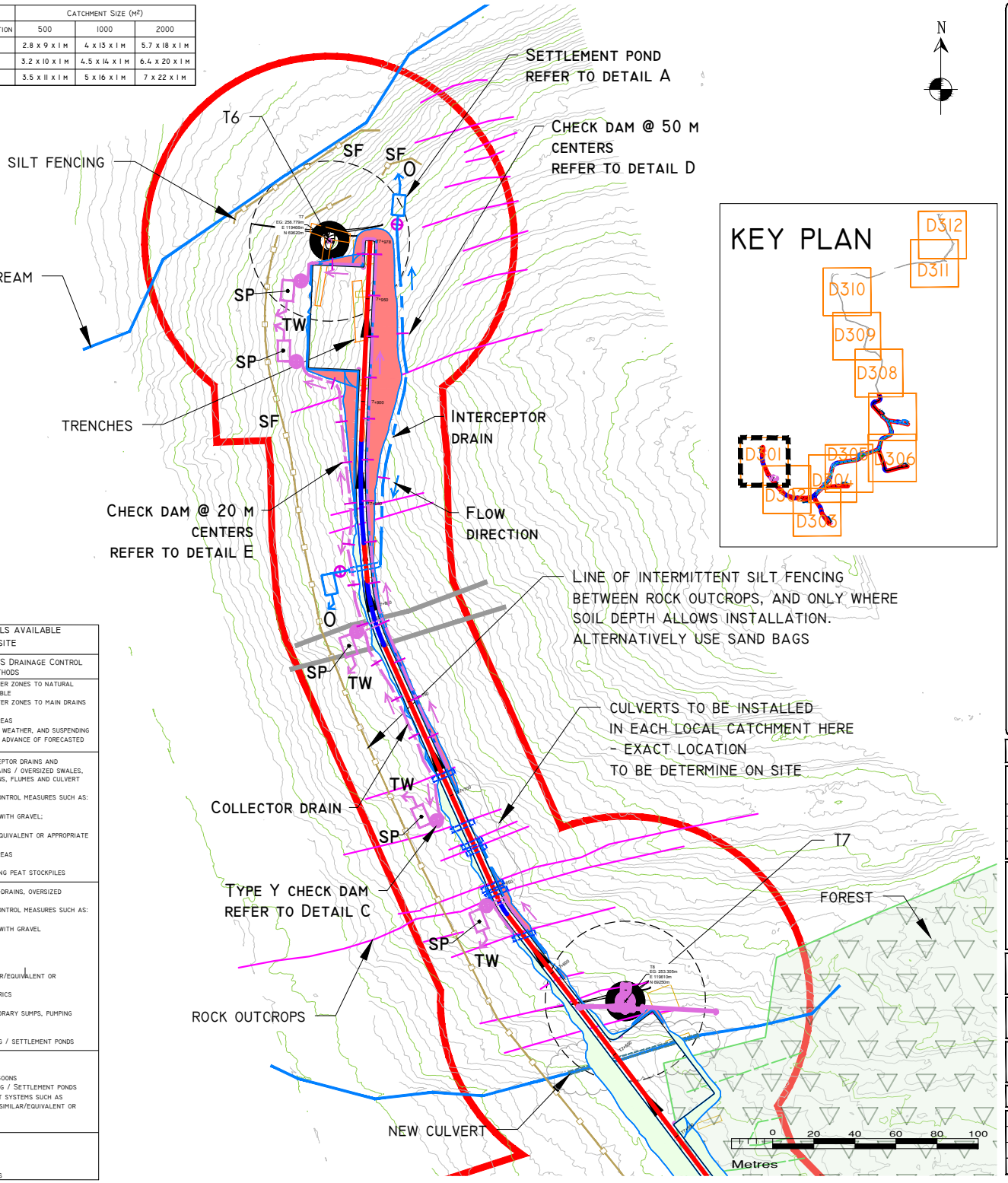
Pond Size W [m] x L [m] x D [m]			Catchment Size (m²)		
Return Period	50 yrs	Storm Duration	500	1000	2000
6hr retention for coarse silt		6 hrs	2.8 x 9 x 1 m	4 x 13 x 1 m	5.7 x 18 x 1 m
11hr retention for medium silt		12 hrs	3.2 x 10 x 1 m	4.5 x 14 x 1 m	6.4 x 20 x 1 m
24hr retention for fine silt		24 hrs	3.5 x 11 x 1 m	5 x 16 x 1 m	7 x 22 x 1 m

Drainage Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LIDAR topography data, no detailed site survey is available.
3. Where possible we have attempted to account for changes in ground level based on site observations, and available aerial photo information.
4. Settlement ponds and new drain locations shown on these drawings are indicative, and subject to site proofing by Site Engineer.
5. Settlement pond sizes and locations are indicative, and need to be scaled according to the catchment draining into each proposed pond. This needs to be determined on the ground. Pond sizes per catchment area are outlined in the Table provided within this drawing.

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) Covering stockpiles 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 Sediments 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



N

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing Drain
- Existing Culvert
- Forest Drain
- Land Streams/Drains

Existing Drainage

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Settlement Pond
- Cross Drain
- Check Dam 'Type A'
- Check Dam 'Type B'
- Proposed Culvert
- Silt Fence
- Interceptor Ditches
- Direction of Flow
- Drainage Swale - Collector Drain
- Stilling Pond (STP)
- Level Spreader (LP)

Proposed Drainage

- Planning Boundary
- Cut Area
- Fill Area
- Rock Outcrops (approx.)
- Farm Access Road
- Trenches
- Forest
- Existing Ground Surface Intermediate Contour (5 m interval)
- Existing Ground Surface Minor Contour (1 m interval)
- Turbine and Swept Area

Drawing Notes

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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D301

Drawing No: P1272-4-0619-A3-D301-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

Pollution Prevention Notes:

1. Site management proposals are intended to ensure complete protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies. 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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

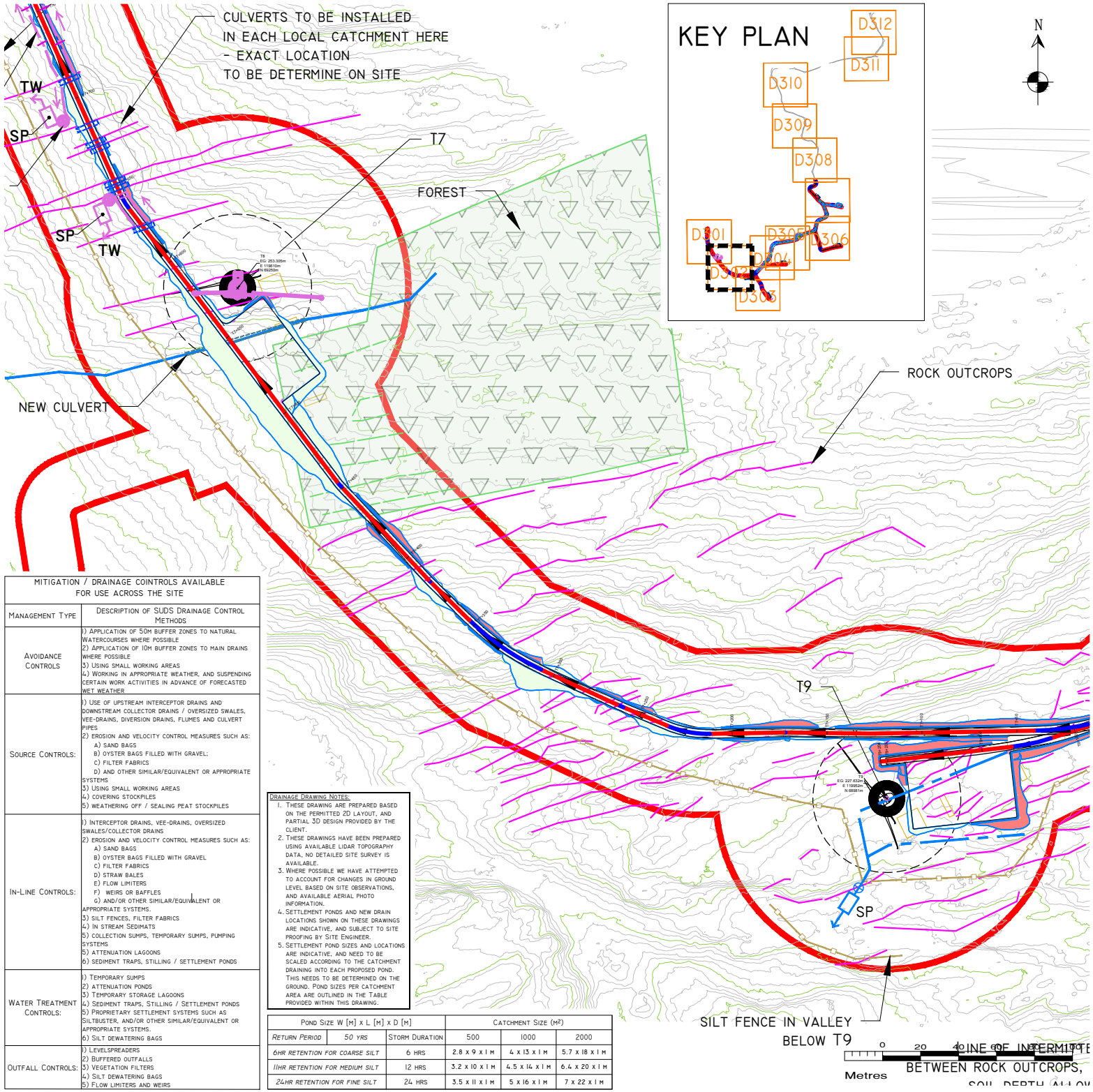
Concrete

18. Care will be taken when completing concrete works on site to ensure no discharges occur.
19. 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.



KEY PLAN

N

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Existing Drainage

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
- Cross drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed culvert
- Silt fence
- Interceptor Ditches
- Direction of Flow
- Drainage swale - collector drain
- Stilling Pond (STP)
- Level spreader (LP)

Proposed Drainage

- Planning boundary
- Cut area
- Fill area
- Rock outcrops (approx.)
- Farm access road
- Trenches
- Forest
- Existing ground surface intermediate contour (5 m interval)
- Existing ground surface minor contour (1 m interval)
- Turbine and swept area

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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D302

Drawing No: P1272-4-0619-A3-D302-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Metres 0 20 40 60 80 100

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) Covering stockpiles 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 Sediments 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 Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LIDAR topography data, no detailed site survey is available.
3. Where possible we have attempted to account for changes in ground level based on site observations, and available aerial photo information.
4. Settlement ponds and new drain locations shown on these drawings are indicative, and subject to site proofing by Site Engineer.
5. Settlement pond sizes and locations are indicative, and need to be scaled according to the catchment draining into each proposed pond. This needs to be determined on the ground. Pond sizes per catchment area are outlined in the Table provided within this drawing.

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

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as
vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

Pollution Prevention Notes:

1. Site management proposals are intended to ensure complete protection against surface water and groundwater pollution, siltation and erosion.
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3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies.
   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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site Tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

18. Care will be taken when completing concrete works on site to ensure no discharges occur.
19. 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.

Pond Size W [m] x L [m] x D [m]			Catchment Size (m²)		
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
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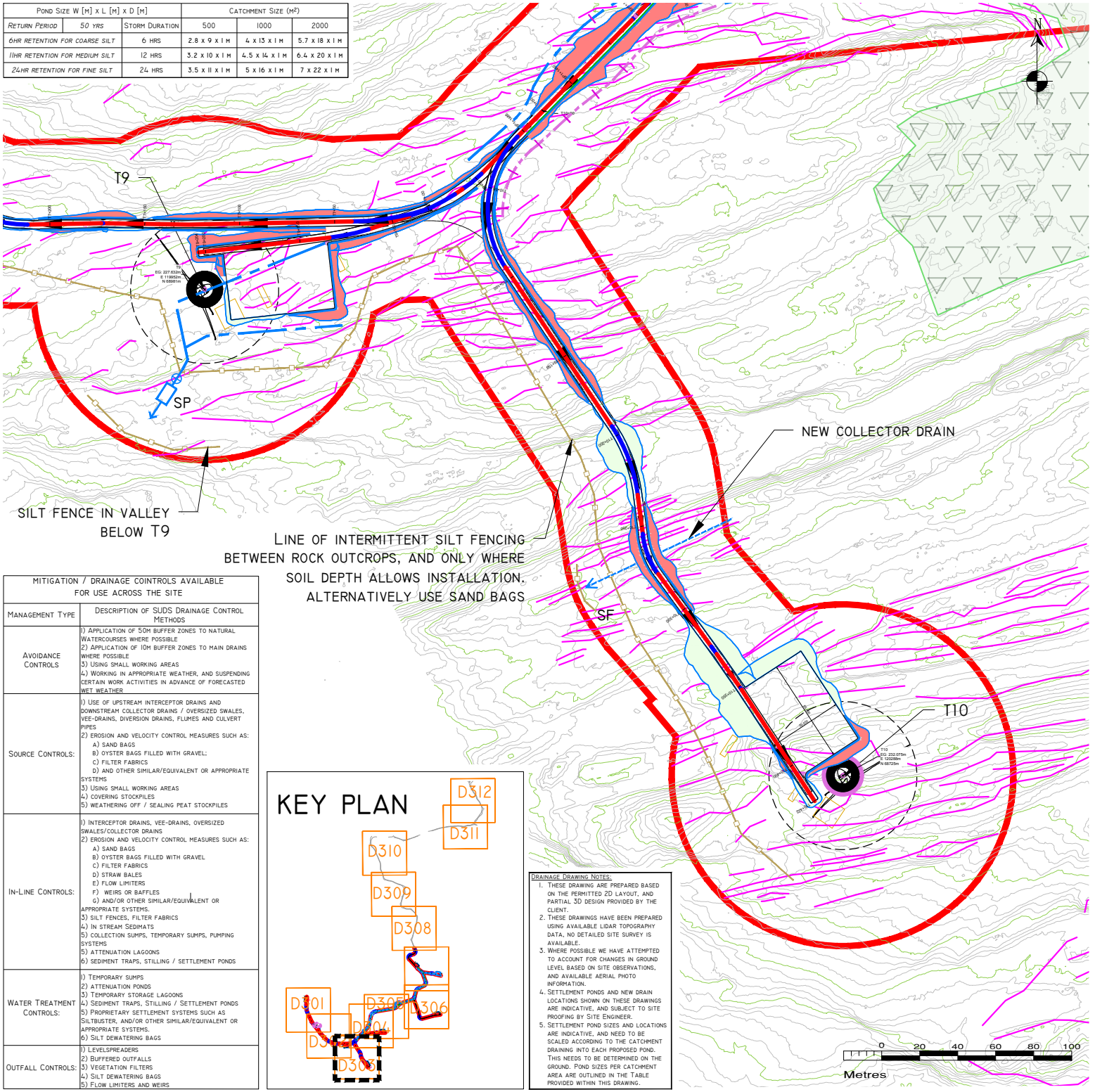

Mitigation / Drainage Cointrols Available for use across the site	
Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural Watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small 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) Covering stockpiles 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 Sediments 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 Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LiDAR topography data, no detailed site survey is available.
3. Where possible we have attempted to account for changes in ground level based on site observations, and available aerial photo information.
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5. Settlement pond sizes and locations are indicative, and need to be scaled according to the catchment draining into each proposed pond. This needs to be determined on the ground. Pond sizes per catchment area are outlined in the Table provided within this drawing.

Legend

Existing Drainage
- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Proposed Drainage
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
- Cross drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed culvert
- Silt fence
- Interceptor Ditches
- Direction of Flow
- Drainage swale - collector drain
- Stilling Pond (STP)
- Level spreader (LP)
- Planning boundary
- Cut area
- Fill area
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- Trenches
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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D303

Drawing No: P1272-4-0619-A3-D303-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

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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
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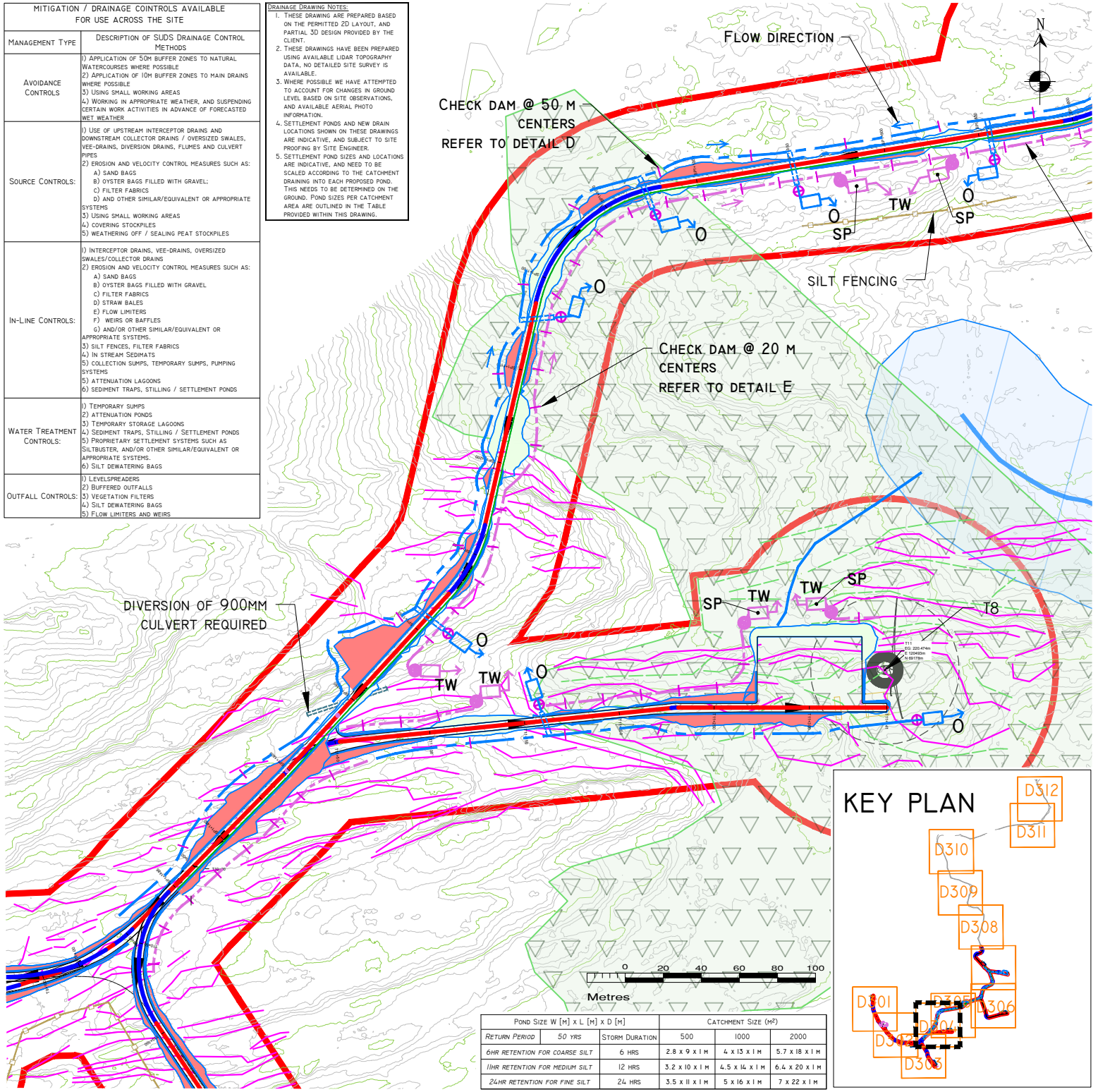

Pond Size W [m] x L [m] x D [m]		Catchment Size (m²)		
Return Period	50 yrs	Storm Duration	500	1000	2000
6hr retention for coarse silt		6 hrs	2.8 x 9 x 1 m	4 x 13 x 1 m	5.7 x 18 x 1 m
11hr retention for medium silt		12 hrs	3.2 x 10 x 1 m	4.5 x 14 x 1 m	6.4 x 20 x 1 m
24hr retention for fine silt		24 hrs	3.5 x 11 x 1 m	5 x 16 x 1 m	7 x 22 x 1 m

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing Drain
- Existing Culvert
- Forest Drain
- Land Streams/Drains

Existing Drainage

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Settlement Pond
- Cross Drain
- Check Dam 'Type A'
- Check Dam 'Type B'
- Proposed Culvert
- Silt Fence
- Interceptor Ditches
- Direction of Flow
- Drainage Swale - Collector Drain
- Stilling Pond (STP)
- Level Spreader (LP)

Proposed Drainage

- Planning Boundary
- Cut Area
- Fill Area
- Rock Outcrops (approx.)
- Farm Access Road
- Trenches
- Forest
- Existing Ground Surface Intermediate Contour (5 m interval)
- Existing Ground Surface Minor Contour (1 m interval)
- Turbine and Swept Area

Drawing Notes

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Key Plan

Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D304

Drawing No: P1272-4-0619-A3-D304-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as
vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

Pollution Prevention Notes:

1. Site management proposals are intended to ensure complete protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies.
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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

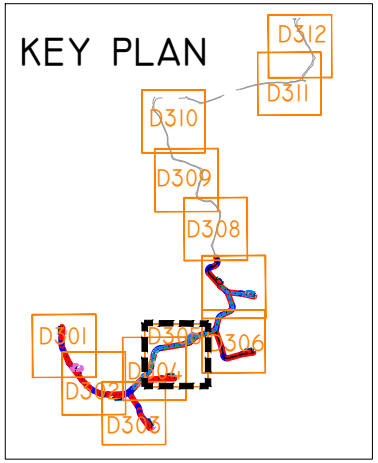
18. Care will be taken when completing concrete works on site to ensure no discharges occur.
19. Concrete wash water, and waste concrete will be managed appropriately on site.

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.

KEY PLAN



Pond Size W [m] x L [m] x D [m]			Catchment Size (m²)		
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

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Existing Drainage

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Settlement Pond
- Cross Drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed Culvert
- Silt Fence
- Interceptor Ditches
- Direction of Flow
- Drainage Swale - Collector Drain
- Stilling Pond (STP)
- Level Spreader (LP)

Proposed Drainage

- Planning Boundary
- Cut Area
- Fill Area
- Rock Outcrops (approx.)
- Farm Access Road
- Trenches
- Forest
- Existing Ground Surface Intermediate Contour (5 m Interval)
- Existing Ground Surface Minor Contour (1 m Interval)
- Turbine and Swept Area

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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) Covering stockpiles 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 Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LiDAR topography data, no detailed site survey is available.
3. Where possible we have attempted to account for changes in ground level based on site observations, and available aerial photo information.
4. Settlement ponds and new drain locations shown on these drawings are indicative, and subject to site proofing by Site Engineer.
5. Settlement pond sizes and locations are indicative, and need to be scaled according to the catchment draining into each proposed pond. This needs to be determined on the ground. Pond sizes per catchment area are outlined in the Table provided within this drawing.

Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D305

Drawing No: P1272-4-0619-A3-D305-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
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5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

POLLUTION PREVENTION NOTES:

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2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies. 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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site Tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

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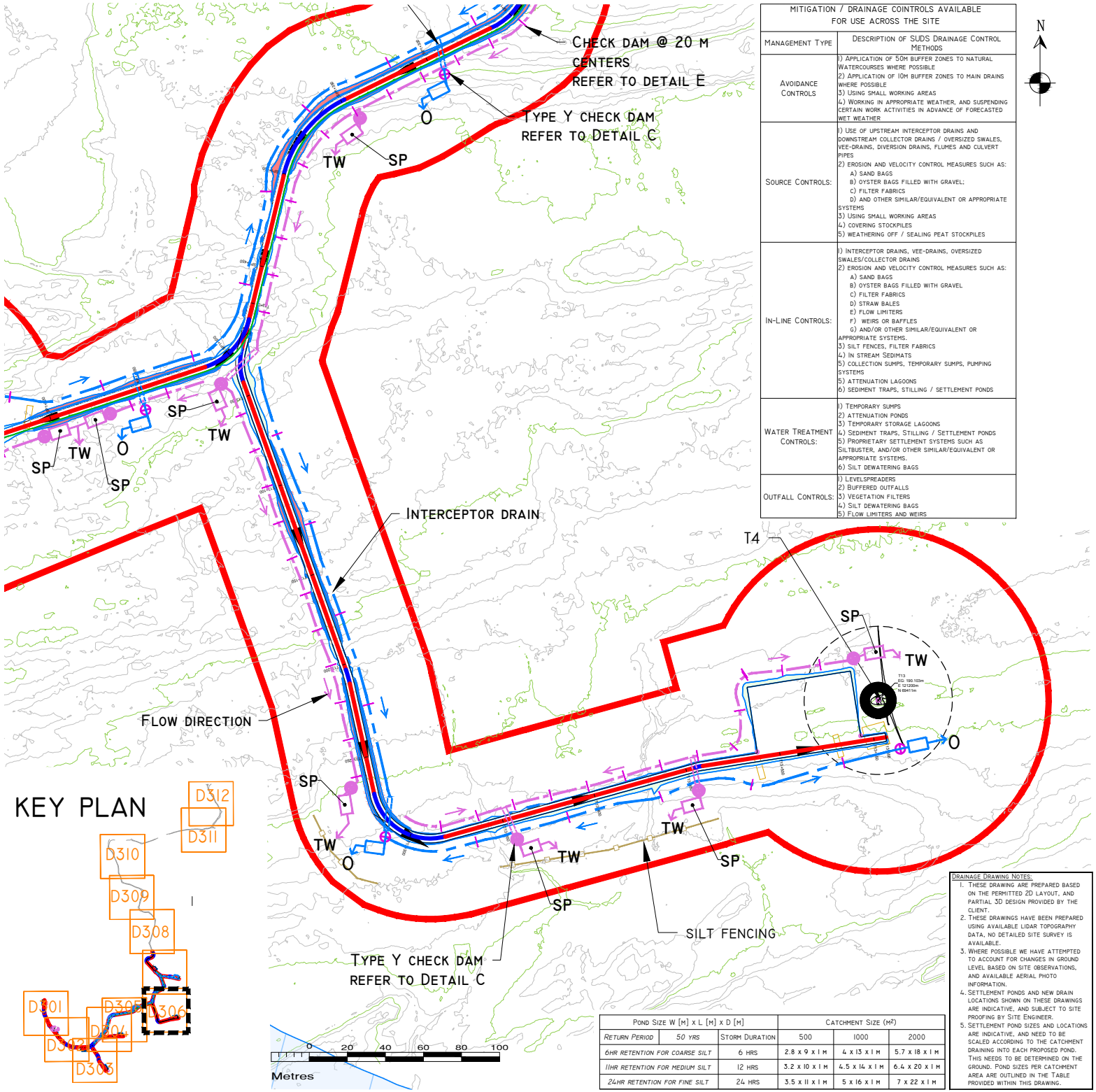

KEY PLAN

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) covering stockpiles 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

Pond Size W [m] x L [m] x D [m]

Return Period	50 yrs	Storm Duration	Catchment Size (m²) 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

Drainage Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LIDAR topography data, no detailed site survey is available.
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N

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Existing Drainage

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
- Cross drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed culvert
- Silt fence
- Interceptor Ditches
- Direction of Flow
- Drainage swale - collector drain
- Stilling Pond (STP)
- Level spreader (LP)

Proposed Drainage

- Planning boundary
- Cut area
- Fill area
- Rock outcrops (approx.)
- Farm access road
- Trenches
- Forest
- Existing ground surface intermediate contour (5 m interval)
- Existing ground surface minor contour (1 m interval)
- Turbine and swept area

Drawing Notes

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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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web: www.hydroenvironmental.ie

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D306

Drawing No: P1272-4-0619-A3-D306-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

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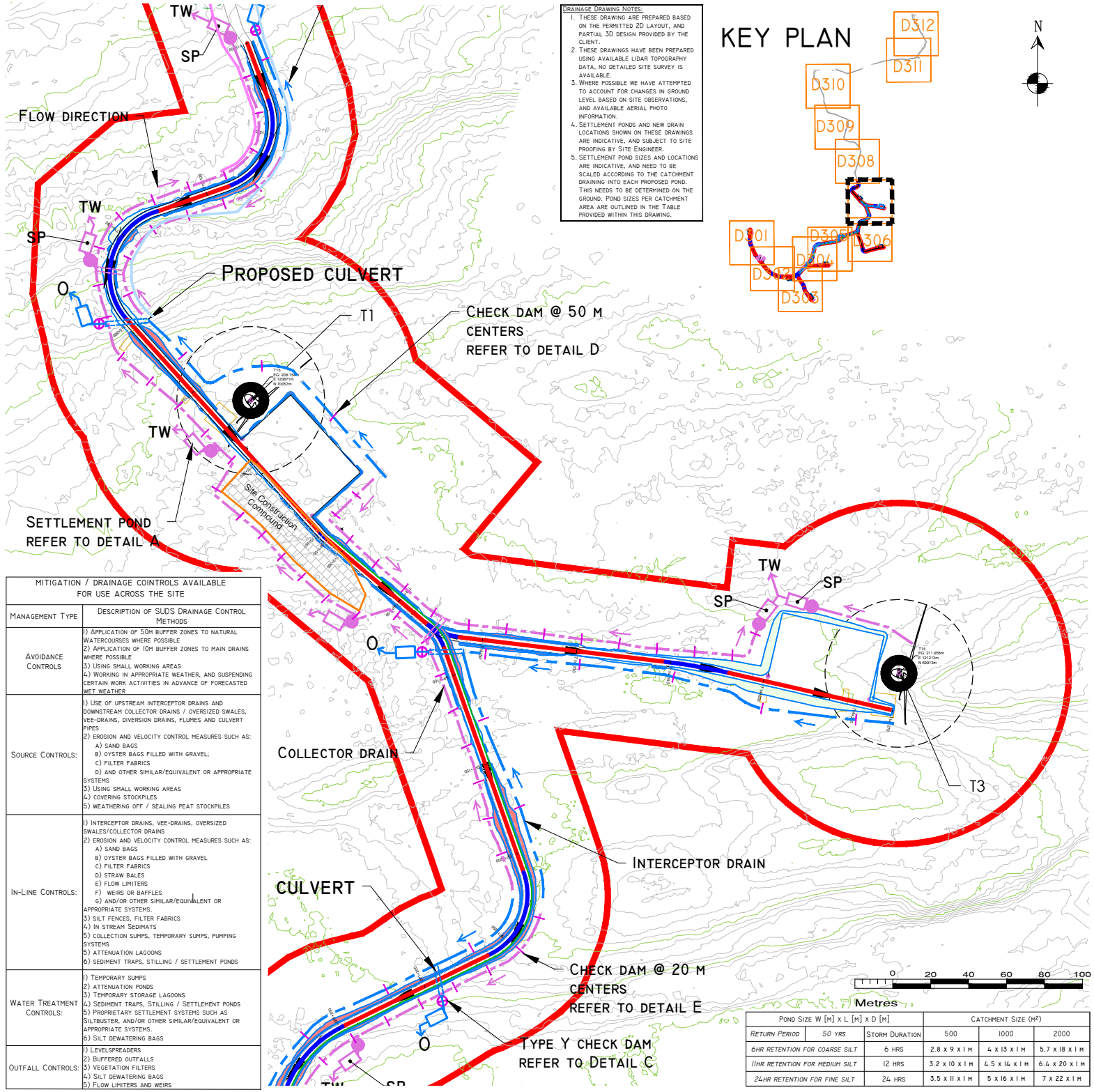

Key Plan

N

Legend

- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

(Existing Drainage)

- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
- Cross drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed culvert
- Silt fence
- Interceptor Ditches
- Direction of Flow
- Drainage swale - collector drain
- Stilling Pond (STP)
- Level spreader (LP)

(Proposed Drainage)

- Planning boundary
- Cut area
- Fill area
- Rock outcrops (approx.)
- Farm access road
- Trenches
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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D307

Drawing No: P1272-4-0619-A3-D307-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Mitigation / Drainage Cointrols Available for Use Across the Site

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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) covering stockpiles 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 Sediments 5) collection sumps, temporary sumps, pumping systems 5) attenuation lagoons 6) sediment traps, stilling / settlement ponds
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Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs

0 20 40 60 80 100
Metres

Pond Size W [m] x L [m] x D [m]			Catchment Size (m²)		
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

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
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14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

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2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies. 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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 excavations. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site Tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

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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) covering stockpiles 5) weathering off / sealing peat stockpiles
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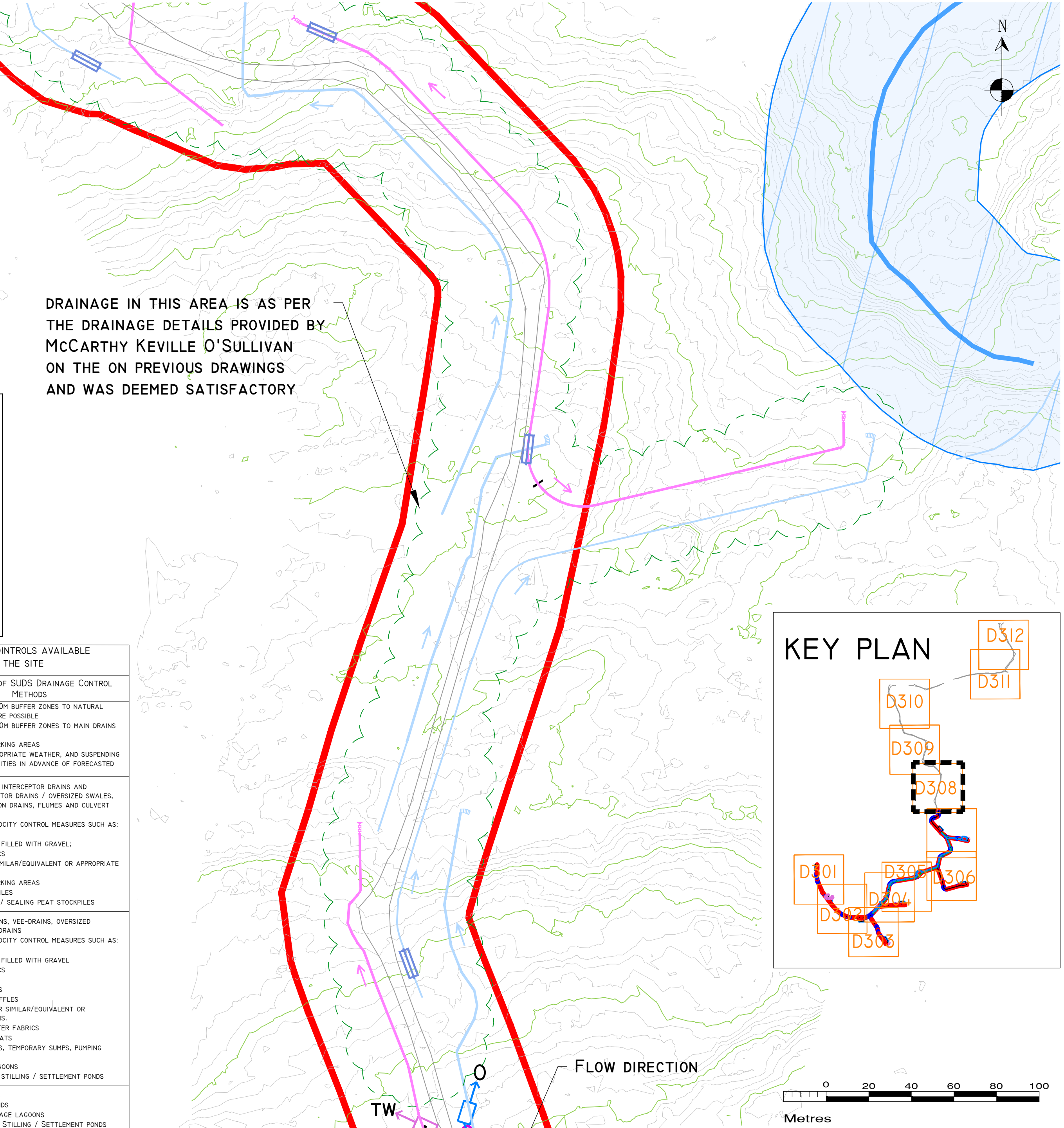

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Legend

Existing Drainage:
- Rivers/Streams
- Rivers/Streams 50m Buffer
- Existing Drain
- Existing Culvert
- Forest Drain
- Land Streams/Drains

Proposed Drainage:
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Settlement Pond
- Cross Drain
- Check Dam 'Type A'
- Check Dam 'Type B'
- Proposed Culvert

- Silt Fence
- Interceptor Ditches
- Direction of Flow
- Drainage Swale - Collector Drain
- Stilling Pond (STP)
- Level Spreader (LP)
- Planning Boundary
- Cut Area
- Fill Area
- Rock Outcrops (Approx.)
- Farm Access Road
- Trenches
- Forest
- Existing Ground Surface Intermediate Contour (5 m interval)
- Existing Ground Surface Minor Contour (1 m interval)
- Turbine and Swept Area

Drawing Notes

2. Do not scale off this drawing. Figured metric dimensions only should be taken off this drawing.

Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D308

Drawing No: P1272-4-0619-A3-D308-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

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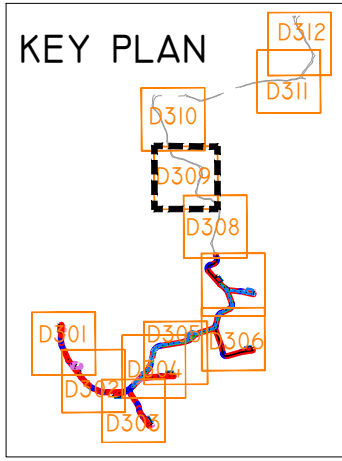
DRAINAGE IN THIS AREA IS AS PER THE DRAINAGE DETAILS PROVIDED BY McCARTHY KEVILLE O'SULLIVAN ON THE ON PREVIOUS DRAWINGS AND WAS DEEMED SATISFACTORY

KEY PLAN



0 20 40 60 80 100

Metres

Pond Size W [m] x L [m] x D [m]			Catchment Size (m^2)		
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Legend

Existing Drainage
- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Proposed Drainage
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
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- Check Dam 'type A'
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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St, Dungarvan, Co. Waterford, Ireland
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tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D309

Drawing No: P1272-4-0619-A3-D309-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

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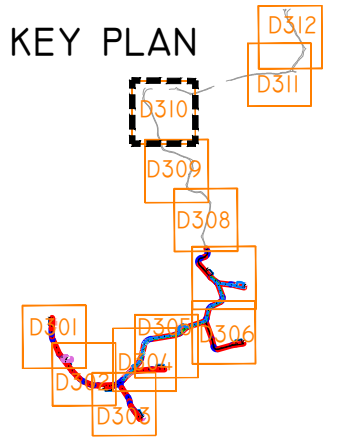
0 20 40 60 80 100
Metres

Key Plan



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Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St, Dungarvan, Co. Waterford, Ireland
tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: Cleanrath Windfarm Ltd.

Job: Cleanrath Wind Farm

Title: Drainage Plan

Figure No: D310

Drawing No: P1272-4-0619-A3-D310-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

Drainage Design Notes

1. All drainage subject to micro-siting and optimisation on site.
2. The locations of the interceptor drains, check dams, culverts, swales, stilling ponds and level spreaders are shown as indicative, and may be changed to suit the requirements of the local topography.
3. Supervising hydrologist or environmental clerk of works (environmental scientist) to oversee installation of drainage features following detailed drainage design.
4. Drainage measures to be installed prior to, or at the same time as the works areas they are intended to drain.
5. Design elevation of the water surface along the route of the interceptor drains or swales will not be lower then the design elevation of the water surface in the outlet at the level spreader or stilling pond.
6. The spacing and frequency of the check dams will be dependant on the gradient of the interceptor drain or swale in which they are being installed.
7. Check dam designs to be selected best to suit particular topography and hydrological environment.
8. Down gradient slope below level spreader onto which the water will dissipate to have a grade less the 6%.
9. No direct discharge or pumping to watercourses will be permitted. All discharges from level spreaders or stilling ponds to be via vegetated filters. Selection or suitable areas to use as
vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.
10. Stilling ponds to be sized according to the area they will be receiving water from.
11. Diversion of drainage ditches will only take place when alternative drainage ditch has been installed to handle the same water.
12. Existing drains/ditches to be incorporated or removed during wind farm construction.
13. All drainage system features to be subject of inspection and maintenance plan.
14. The layout shown is slightly offset for scale purposes, and all drainage would be installed as close to the road as possible, and within the planning boundary for the development.

Pond Size W [m] x L [m] x D [m]		Catchment Size (m²)		
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

POLLUTION PREVENTION NOTES:

1. Site management proposals are intended to ensure complete protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent the conveyance of silts to receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, stockpiles, plant and wheel wash, site roads/tracks, and disturbance of stream/river beds.

Discharges

4. Water containing silt will not be pumped directly to any watercourse / drain / or ditch. All discharges to be made over open vegetated ground at a minimum 20m from nearest watercourse unless otherwise stated.
5. A 15m buffer zone (or greater) to be maintained around all sensitive watercourses and waterbodies.
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 streams will be completed in a manner that does not cause scour or erosion at the point of discharge. This will be done by reducing the flow velocities or use of splash plates, and discharge controls.
8. Vegetation will NOT be stripped from existing 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 stockpiles open at any one time will be minimised as far as practicable.
11. Temporary stockpiles will be covered or sealed as soon as possible.
12. Silt fences will be used to reduce silty runoff from temporary peat storage areas, and/or bare peat areas as required.

Site tracks

13. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water.
14. Check dams to be inspected and cleaned regularly.
15. Discharges from site tracks will be via outfall spillways, settlement ponds and vegetation swales.

Refueling

16. Refuel mobile plant in designated refueling area only, preferably on an impermeable surface and away from drains / ditches and watercourses / waterbodies.
17. Spill kits and drip trays should be available on site.

Concrete

18. Care will be taken when completing concrete works on site to ensure no discharges occur.
19. 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.

DRAINAGE IN THIS AREA IS AS PER THE DRAINAGE DETAILS PROVIDED BY McCarthy Keville O'Sullivan ON THE ON PREVIOUS DRAWINGS AND WAS DEEMED SATISFACTORY

WATER/DRAIN CROSSING

WATER/DRAIN CROSSING

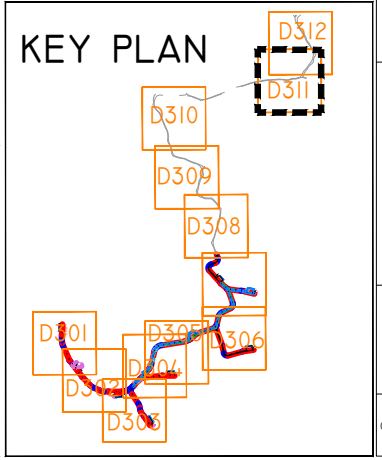
WATER/DRAIN CROSSING

WATER/DRAIN CROSSING

0 20 40 60 80 100

Metres

KEY PLAN



Drainage Drawing Notes:

1. These drawing are prepared based on the permitted 2D layout, and partial 3D design provided by the client.
2. These drawings have been prepared using available LIDAR topography data, no detailed site survey is available.
3. Where possible we have attempted to account for changes in ground level based on site observations, and available aerial photo information.
4. Settlement ponds and new drain locations shown on these drawings are indicative, and subject to site proofing by Site Engineer.
5. Settlement pond sizes and locations are indicative, and need to be scaled according to the catchment draining into each proposed pond. This needs to be determined on the ground. Pond sizes per catchment area are outlined in the Table provided within this drawing.

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) Covering stockpiles 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

LEGEND

Existing Drainage
- Rivers/Streams
- Rivers/Streams 50m buffer
- Existing drain
- Existing culvert
- Forest drain
- Land streams/drains

Proposed Drainage
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of flow
- Settlement pond
- Cross drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed culvert
- Silt fence
- Interceptor Ditches
- Direction of Flow
- Drainage swale - collector drain
- Stilling Pond (STP)
- Level spreader (LP)

- Planning boundary
- Cut area
- Fill area
- Rock outcrops (approx.)
- Farm access road
- Trenches
- Forest
- Existing ground surface intermediate contour (5 m interval)
- Existing ground surface minor contour (1 m interval)
- Turbine and swept area

Drawing Notes

1. Copyright, all rights reserved. No part here with may be copied or reproduced partially or wholly in any form whatsoever without the prior notice of the copyright owner Hydro-Environmental Services.
2. Do not scale off this drawing. Figured metric dimensions only should be taken off this drawing.

Date	Description	Chkd	Signed
14.01.19	Construction	MG	MG

Revisions

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Client: Cleanrath Windfarm Ltd.

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Title: Drainage Plan

Figure No: D311

Drawing No: P1272-4-0619-A3-D311-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

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Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs

WATER/DRAIN CROSSING

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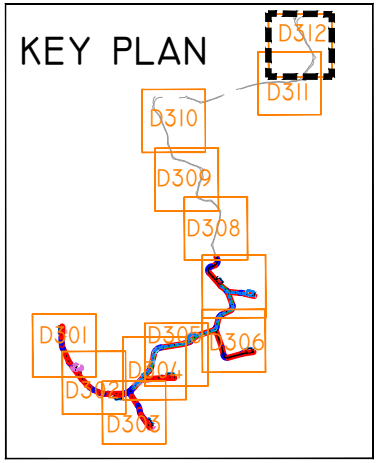
N

KEY PLAN



Legend

Existing Drainage
- Rivers/Streams
- Rivers/Streams 50m Buffer
- Existing Drain
- Existing Culvert
- Forest Drain
- Land Streams/Drains

Proposed Drainage
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Settlement Pond
- Cross Drain
- Check Dam 'type A'
- Check Dam 'type B'
- Proposed Culvert
- Silt Fence
- Interceptor Ditches
- Direction of Flow
- Drainage Swale - Collector Drain
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- Forest
- Existing Ground Surface Intermediate Contour (5 m Interval)
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- Turbine and Swept Area

0 20 40 60 80 100
Metres

Drawing Notes

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14.01.19	Construction	MG	MG

Revisions

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Client: Cleanrath Windfarm Ltd.

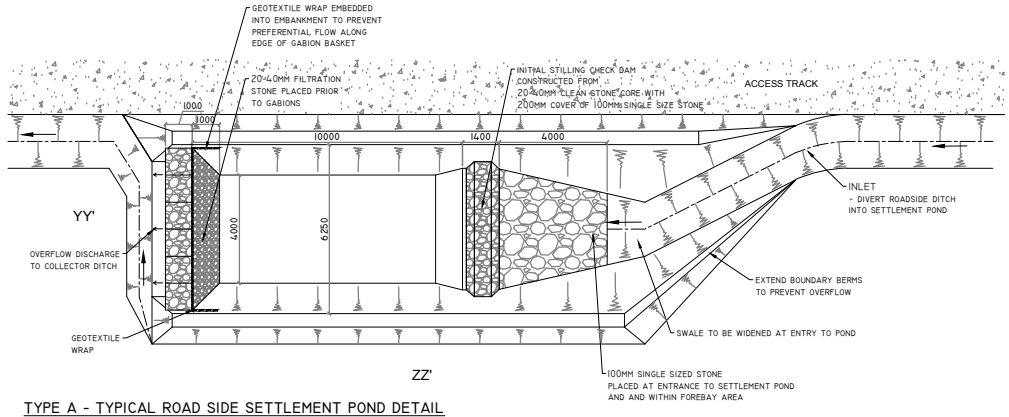
Job: Cleanrath Wind Farm

Title: Drainage Plan

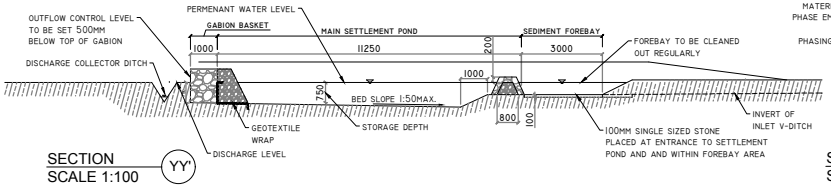
Figure No: D312

Drawing No: P1272-4-0619-A3-D312-00A	
Sheet Size: A3	Project No.: P1272-4
Scale: 1:2,000 (A3)	Drawn By: MG/GD
Date: 25/06/2019	Checked By: MG

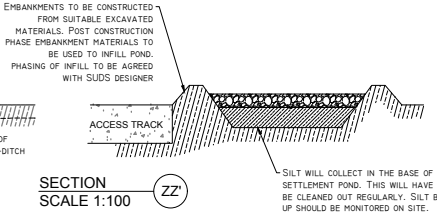
DETAIL AI



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



SECTION YY' SCALE 1:100



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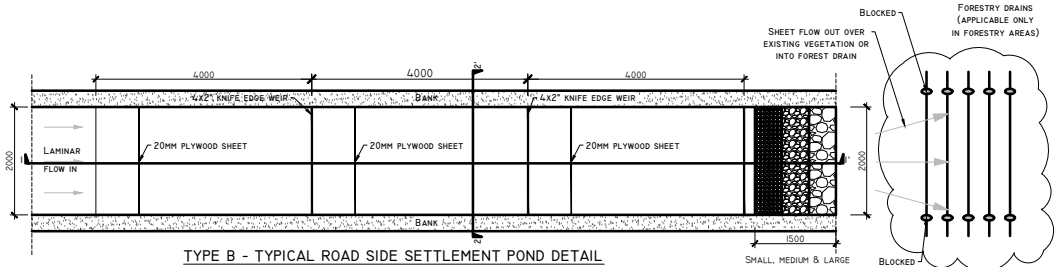
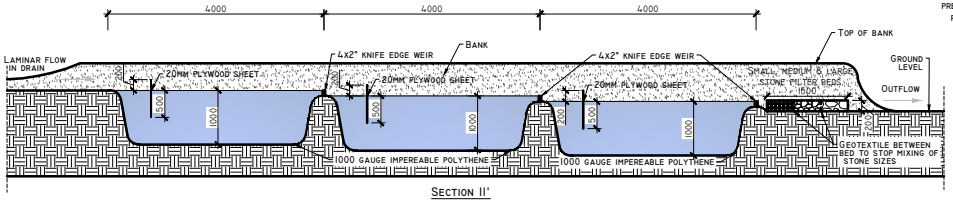
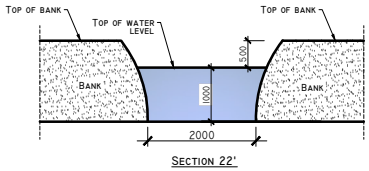


TYPE B - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)

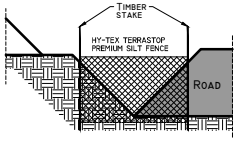


SECTION II'



SECTION 22'

SEDIMENT FENCE/CHECK DAM DETAIL



DETAIL A2

Project Design Drawing Notes
1. Drawings issued are for construction stage but are limited by available design information.
2. Copyright. All rights reserved. No part here with may be copied or reproduced partially or wholly in any form whatsoever without the prior notice of the copyright owner Hydro-Environmental Services.
3. Do not scale off this drawing. Figured metric dimensions only should be taken off this drawing. See notes on settlement pond sizes.
4. All contractors, whether main or sub-contractors, must visit the site and are responsible for taking and checking any and all dimensions and levels that relate to the works.
5. The use of or reliance upon this drawing shall be deemed to be acceptance of these conditions of use unless otherwise agreed in writing, such written agreement to be sought from and issued by the copyright holder to the use or reliance upon this drawing.

Date	Description	Chkd	Signed
21/06/19	Construction	MG	MG

Revisions

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Client: Inchee Energy Supply Ltd

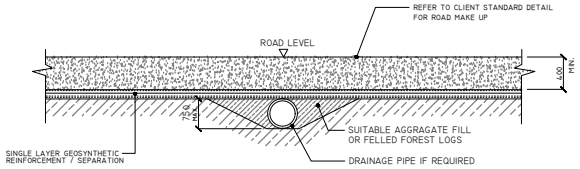
Job: Cleanrath WF, Co.Cork

Title: Drainage Details I

Figure No: D501

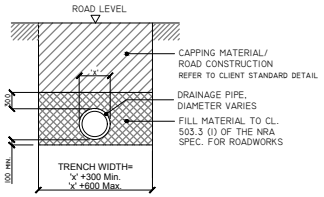
Drawing No: P1272-4-0619-A1-D501-00A	
Sheet Size: A1	Project No.: P1272-4
Scale: as shown (A1)	Drawn By: MG/GD
Date: 21/06/2019	Checked By: M.G.

DETAIL B



'TYPE A' CULVERT - DRAINAGE CROSSING BENEATH FLOATING ROAD

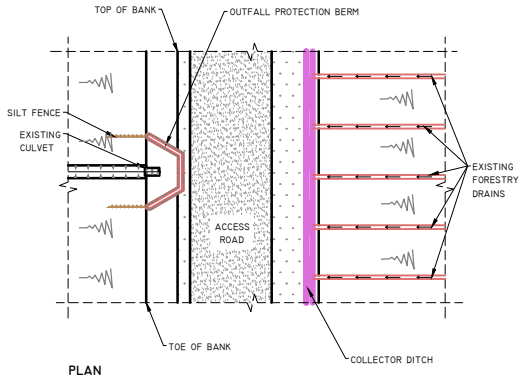
SCALE 1:100



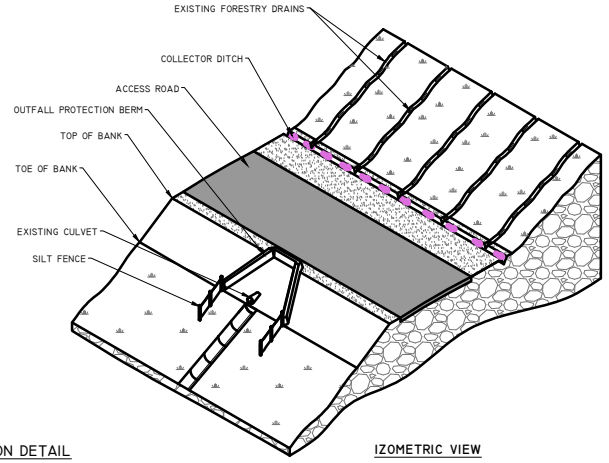
'TYPE B' CULVERT - DRAINAGE CROSSING BENEATH EXCAVATED ROAD

SCALE 1:50

DETAIL BI



PLAN

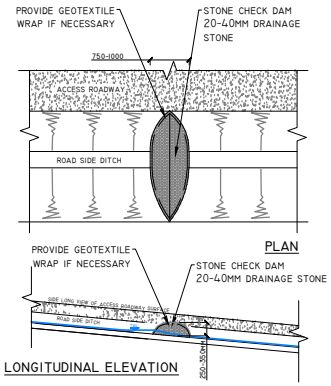


IZOMETRIC VIEW

CULVET - OUTFALL PROTECTION DETAIL

SCHEMATIC - NOT TO SCALE

DETAIL C

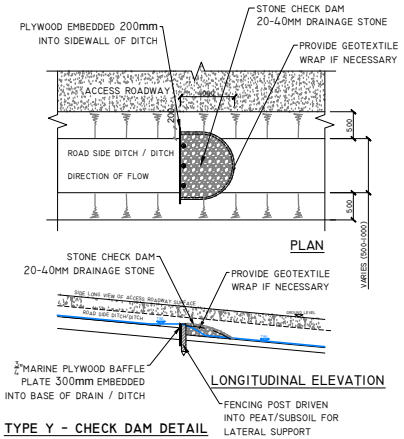


LONGITUDINAL ELEVATION

TYPE X - CHECK DAM DETAIL

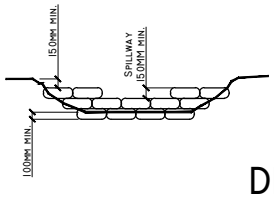
SCALE 1:50

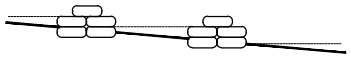
DETAIL D



TYPE Y - CHECK DAM DETAIL

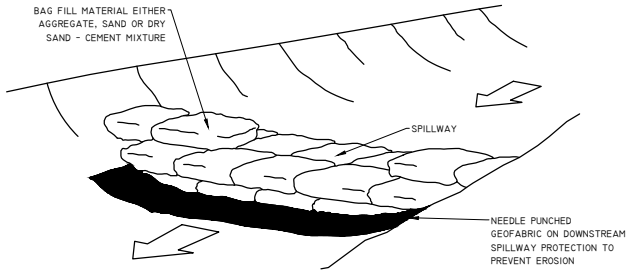
SCALE 1:100





NOTE: SPACING OF CHECK DAMS ALONG CENTRELINE AND SCOUR PROTECTION BELOW EACH CHECK DAM

DETAIL CI



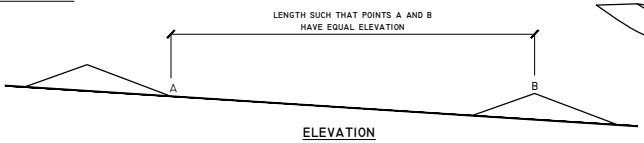
TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW
SAND FILLED BAG CONSTRUCTION

SCHEMATIC - NOT TO SCALE

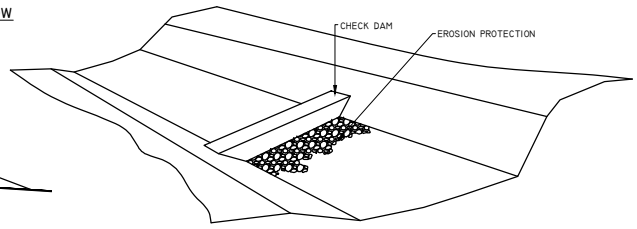
DETAIL C2

TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW

SCHEMATIC - NOT TO SCALE



ELEVATION



Date	Description		
21/06/19	Construction	MG	MG
	Revisions	Chkd	Signed

HYDRO ENVIRONMENTAL SERVICES

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Client: INCHEE ENERGY SUPPLY LTD

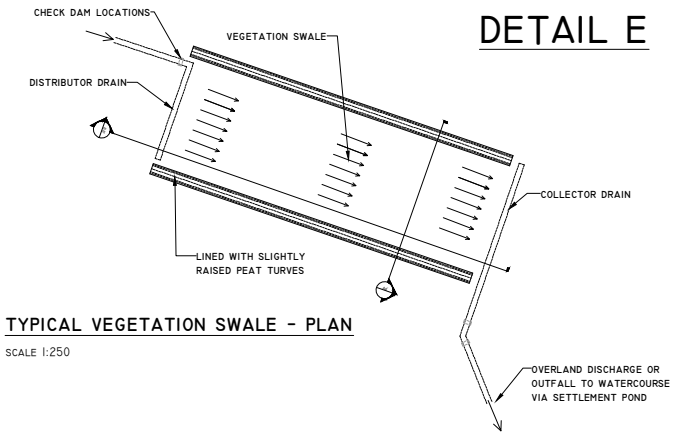
Job: CLEANRATH WF, CO.CORK

Title: DRAINAGE DETAILS 2

Figure No: D502

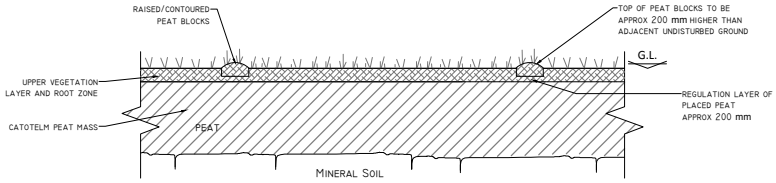
Drawing No.: P1272-4-0619-A1-D502-00A	
Sheet Size: A1	Project No.: P1272-4
Scale: as shown (A1)	Drawn By: MG/GD
Date: 21/06/2019	Checked By: M.G.

DETAIL E



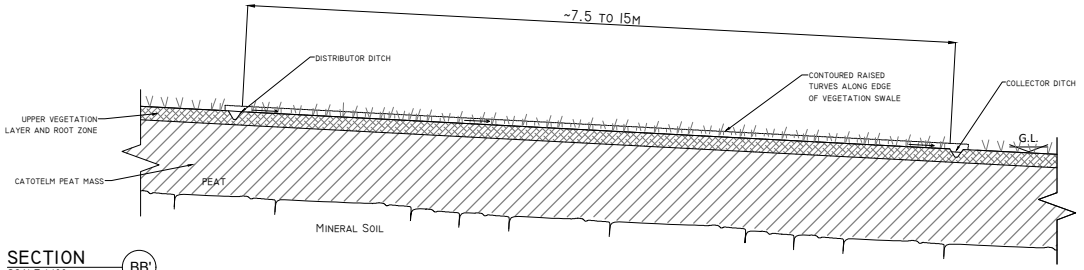
TYPICAL VEGETATION SWALE - PLAN

SCALE 1:250



SECTION AA'

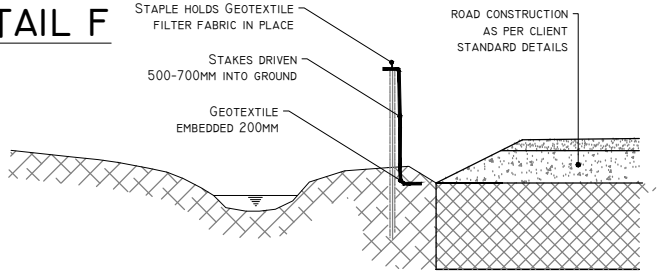
SCALE 1:200



SECTION BB'

SCALE 1:100

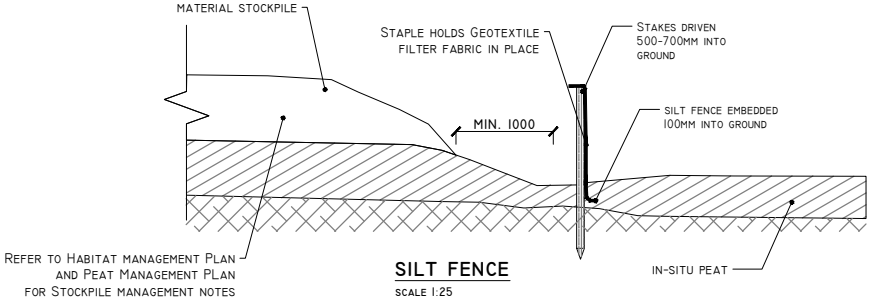
DETAIL F



SILT FENCE FOR WATERCOURSE PROTECTION

SCALE 1:25

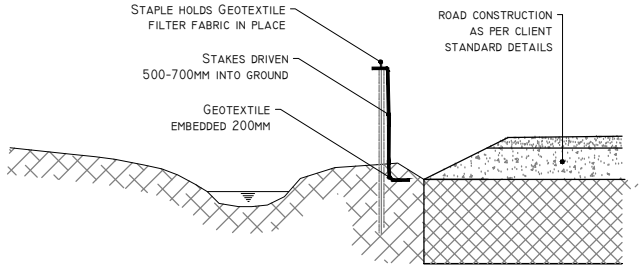
DETAIL G-I



SILT FENCE

SCALE 1:25

DETAIL G-II



SILT FENCE FOR WATERCOURSE PROTECTION

SCALE 1:25

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Date	Description	Chkd	Signed
21/06/19	Construction	MG	MG

Revisions

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Client: Inchee Energy Supply Ltd

Job: Cleanrath WF, Co.Cork

Title: Drainage Details 3

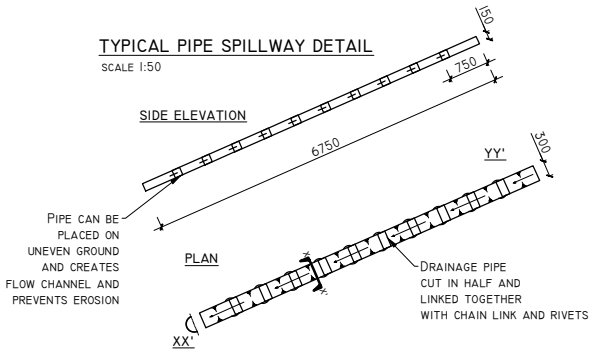
Figure No: D503

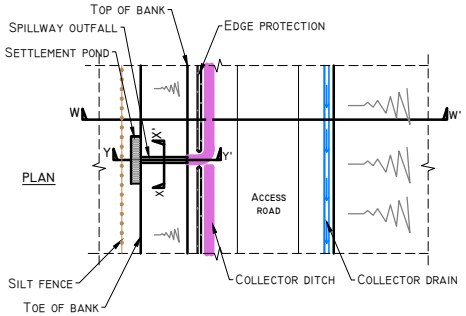
Drawing No: P1272-4-0619-A1-D503-00A	
Sheet Size: A1	Project No.: P1272-4
Scale: as shown (A1)	Drawn By: MG/GD
Date: 21/06/2019	Checked By: M.G.

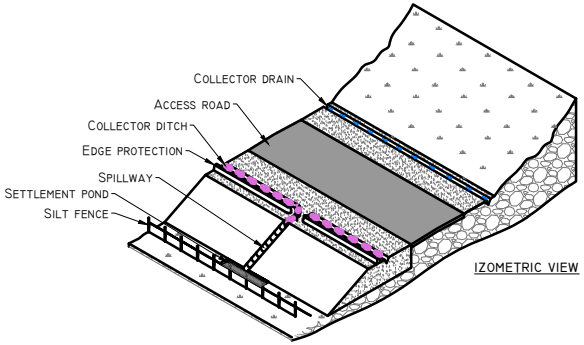
DETAIL H

TYPICAL PIPE SPILLWAY DETAIL

SCALE 1:50

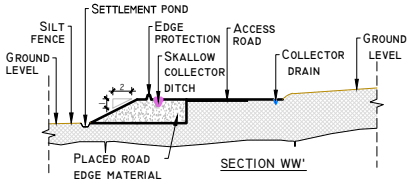






SPILLWAY OUTFALL PLAN

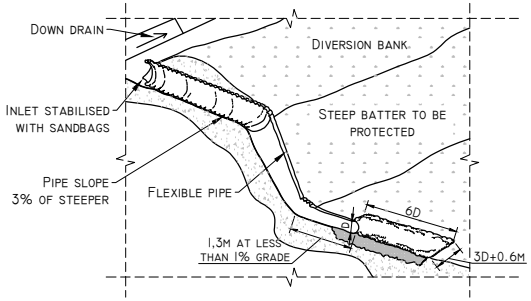
SCHEMATIC - NOT TO SCALE



DETAIL I

TYPICAL PIPE SPILLWAY DETAIL

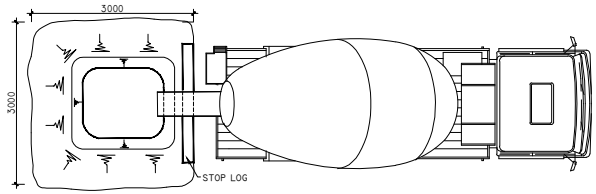
SCHEMATIC - NOT TO SCALE



TEMPORARY CONCRETE WASH OUT PIT

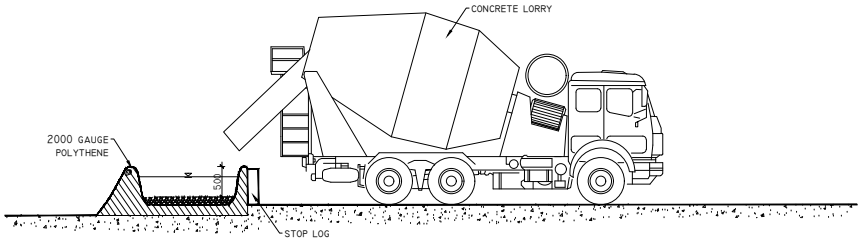
SCALE 1:50

PLAN



ELEVATION

DETAIL J



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Date	Description	Chkd	Signed
21/06/19	Construction	MG	MG

Revisions

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Client: Inchee Energy Supply Ltd

Job: Boolynaghleragh WF, Co.Clare

Title: Drainage Details 4

Figure No: D504

Drawing No: P1272-4-0619-A1-D504-00A	
Sheet Size: A1	Project No.: P1272-4
Scale: as shown (A1)	Drawn By: MG/GD
Date: 21/06/2019	Checked By: M.G.