Environmental Impact Assessment Report

Appendix B7 Biodiversity

Grangemouth Flood Protection Scheme 2024
Falkirk Council

GRANGEMOUTH
Flood Protection Scheme
Protecting the heart of our communities

Contents (links to appendices)

Environmental Impact Assessment Report

Appendix B7.1 Figures (Figures B7.1 - B7.8)

Grangemouth Flood Protection Scheme 2024
Falkirk Council

GRANGEMOUTH
Flood Protection Scheme
Protecting the heart of our communities

FIGURE B7.1A

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
- Ancient Woodland Inventory (AWI)
- Wildlife Site

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grangemouthfps@falkirk.gov.uk

Project: Grangemouth Flood Protection Scheme

Drawing Title: ECOLOGICAL DESIGNATIONS

SHEET 1 OF 7

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT
Scale @ A3	1:50,000 DO NOT SCALE
Jacobs No.	B2386100
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Drawing No.	Figure B7.1a

0 1 2 3 4 5 Kilometers

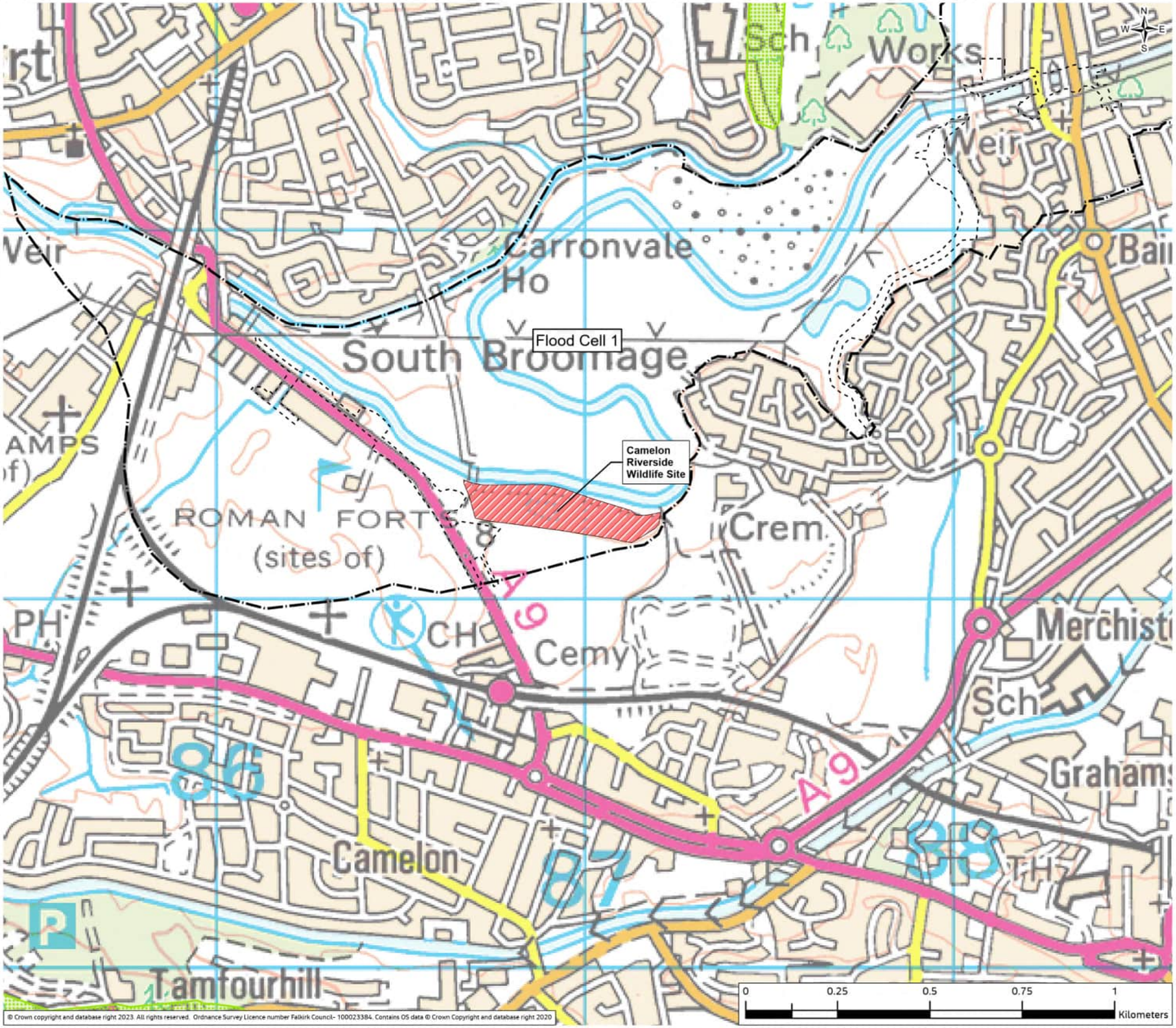

FIGURE B7.1B

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
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CAMELON RIVERSIDE WILDLIFE SITE (FLOOD CELL 1)
SHEET 2 OF 7

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FIGURE B7.1C

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
- Ancient Woodland Inventory (AWI)
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RIVER CARRON MEANDER SINC (FLOOD CELL 1)
SHEET 3 OF 7

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Drawing No.: Figure B7.1c

0 0.25 0.5 0.75 1 Kilometers

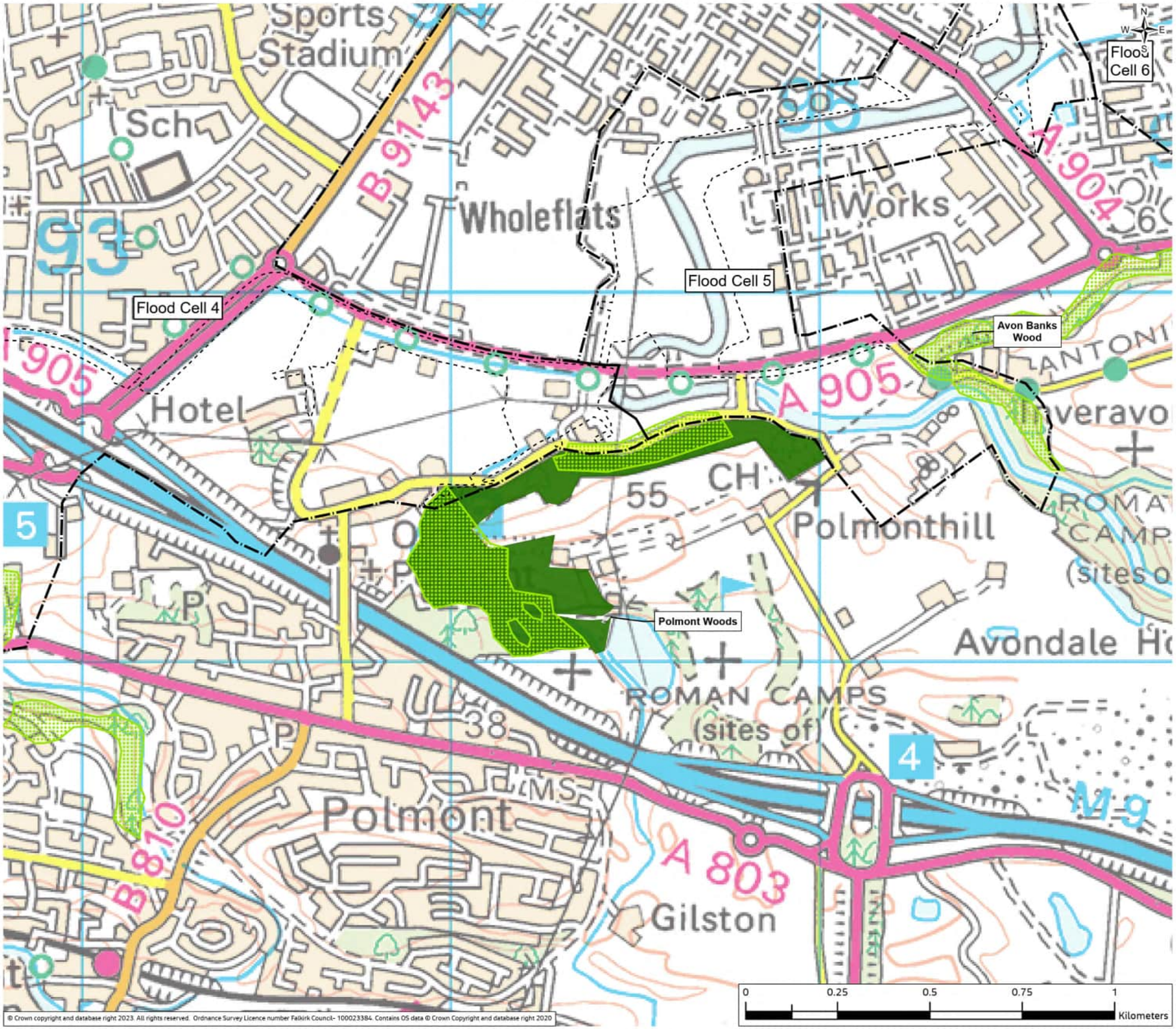

FIGURE B7.1D

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
- Ancient Woodland Inventory (AWI)
- Wildlife Site

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Drawing Title

ECOLOGICAL DESIGNATIONS
POLMONT WOODS SITE (FLOOD CELLS 4 & 5)

SHEET 4 OF 7

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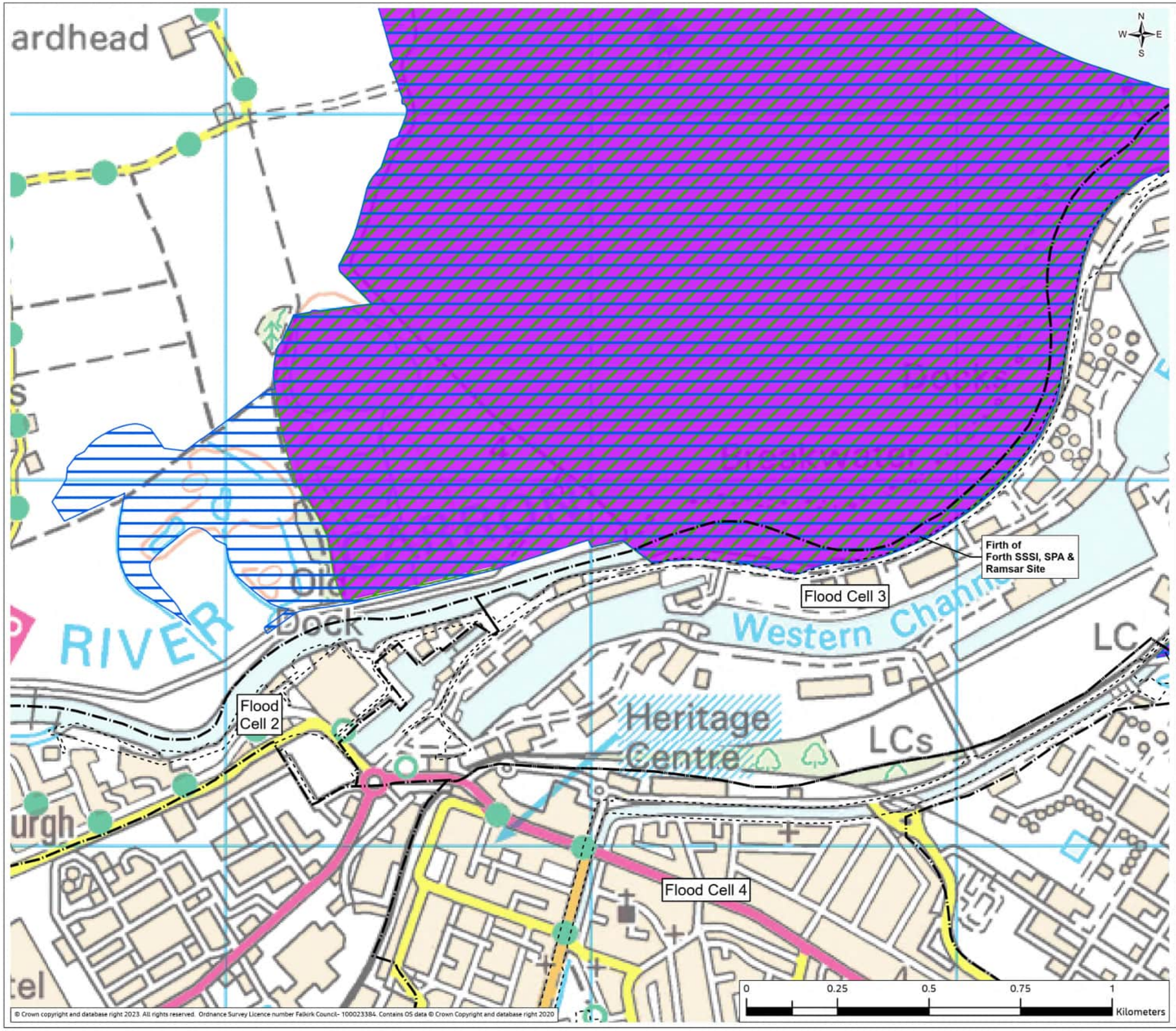
FIGURE B7.1E



Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
- Ancient Woodland Inventory (AWI)
- Wildlife Site

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Drawing Title
ECOLOGICAL DESIGNATIONS
FIRTH OF FORTH SSSI, SPA & RAMSAR SITE (FLOOD CELLS 2 & 3)
SHEET 5 OF 7

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Figure B7.1e

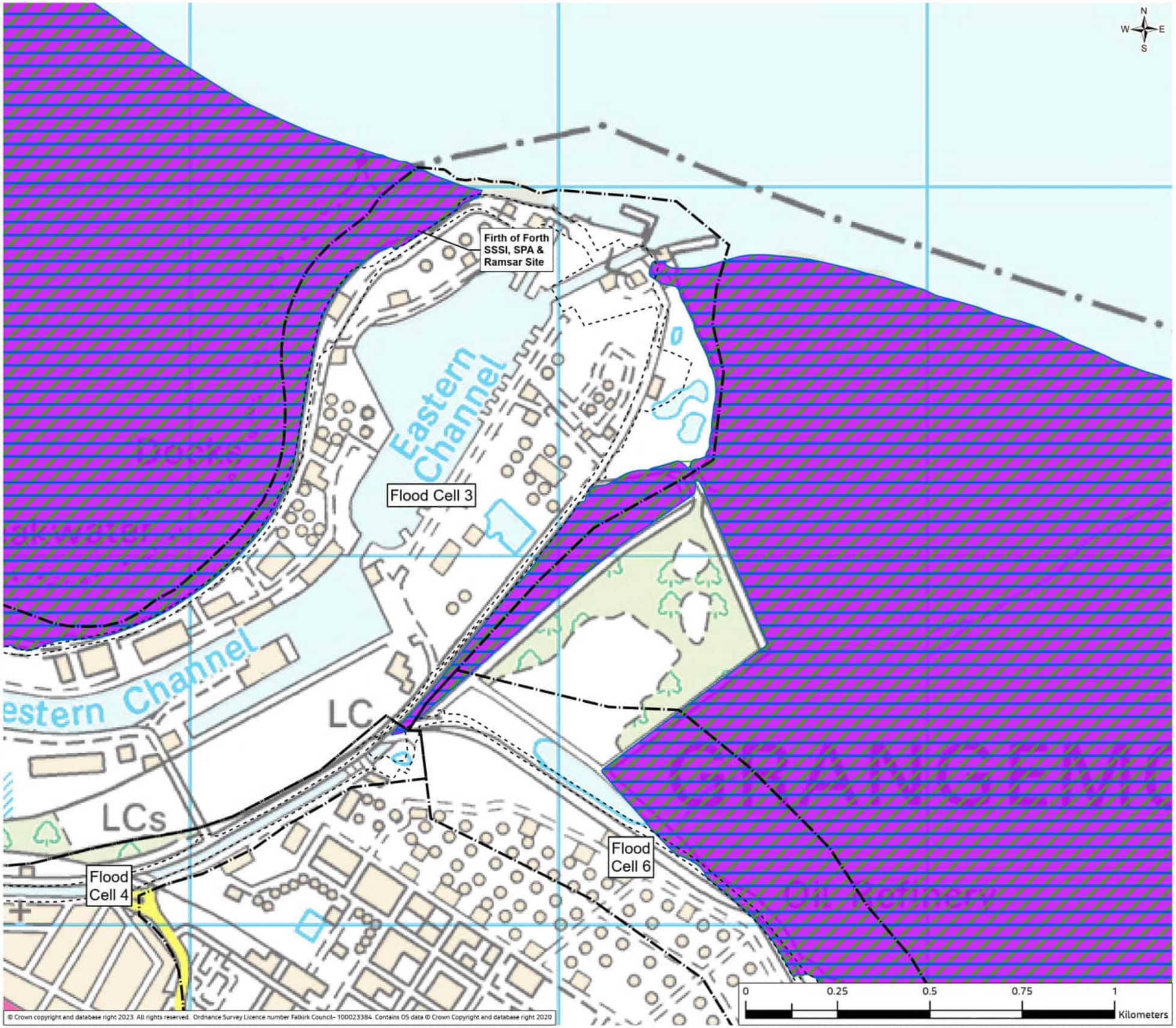

FIGURE B7.1F

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
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Drawing Title

ECOLOGICAL DESIGNATIONS
FIRTH OF FORTH SSSI, SPA & RAMSAR SITE (FLOOD CELLS 3 & 6)
SHEET 6 OF 7

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Figure B7.1f

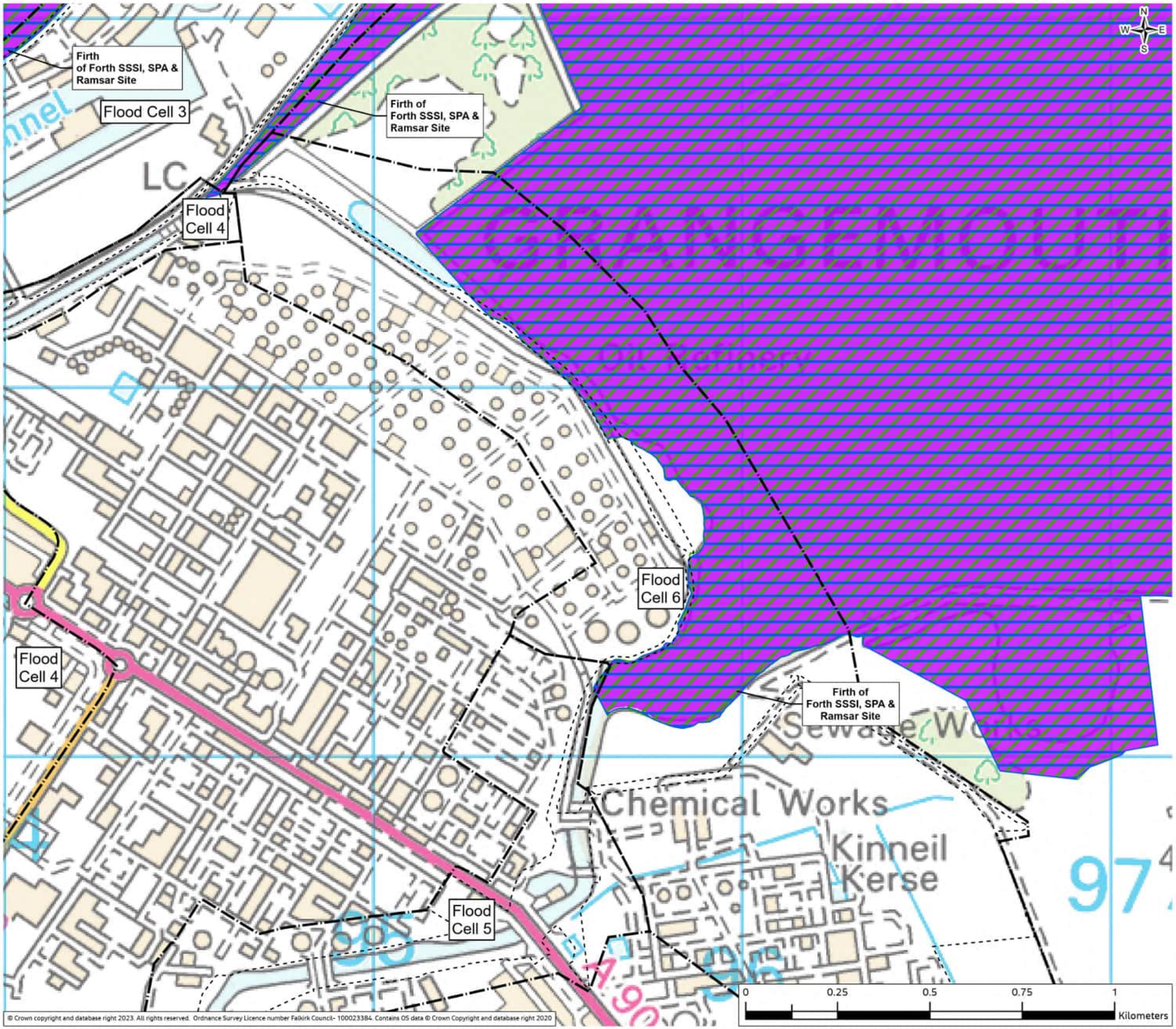

FIGURE B7.1G

Legend

- Flood Cell
- Site Boundary

Statutory Designated Sites

- Site of Special Scientific Interest (SSSI)
- Ramsar Site
- Special Protection Area (SPA)

Non-statutory Designated Sites

- Local Wildlife Site
- Site of Importance for Nature Conservation (SINC)
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Drawing Title
ECOLOGICAL DESIGNATIONS
FIRTH OF FORTH SSSI, SPA & RAMSAR SITE (FLOOD CELL 6)
SHEET 7 OF 7

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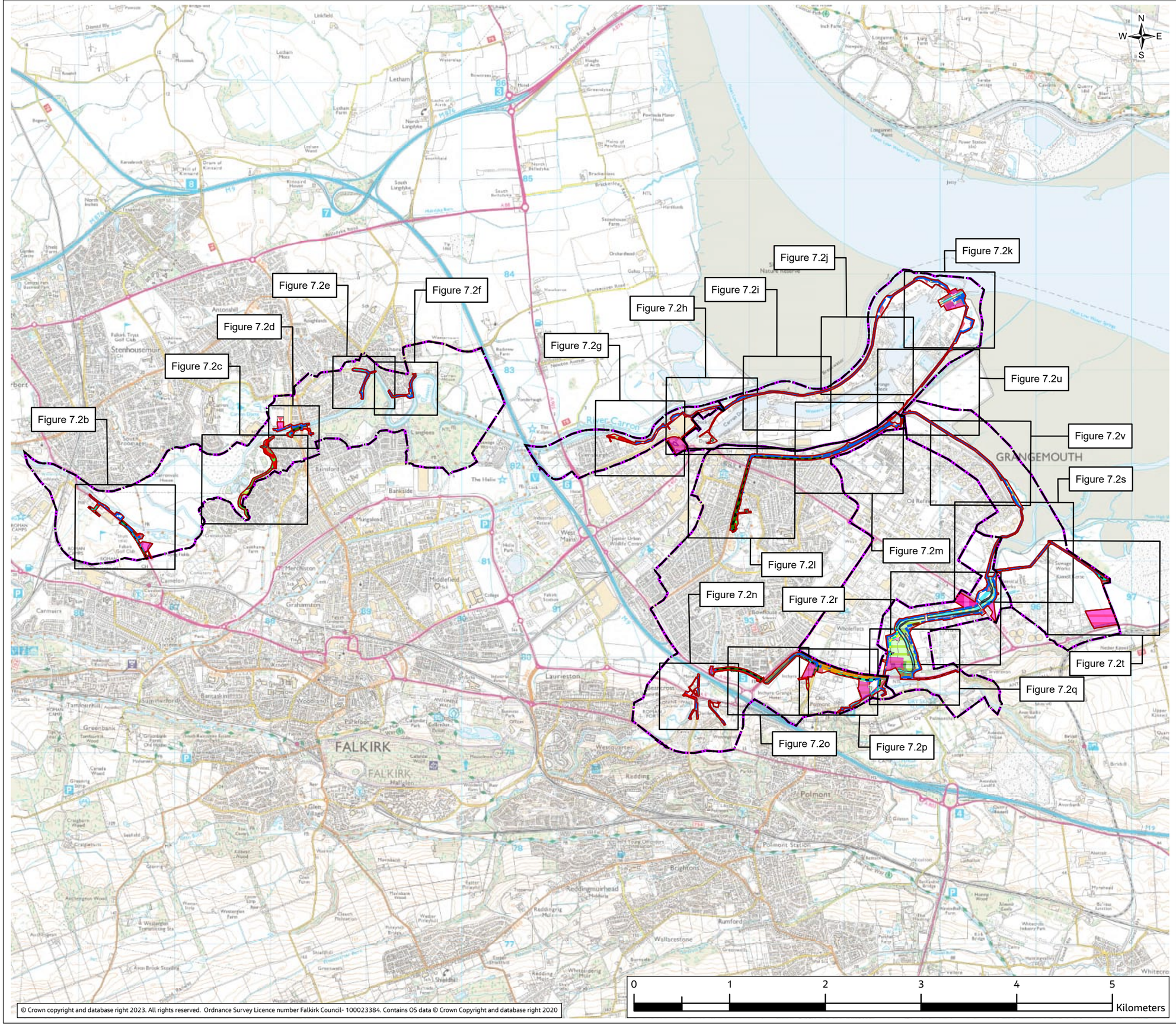
Drawing No.	Figure B7.1g	

FIGURE B7.2A



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

UK Habitat Classification Survey

- c1c - cereal crops
- f2a - lowland fens
- f2e - reedbeds
- f2f - other swamps
- g1d - other lowland acid grassland
- g3 - neutral grassland
- g3c - other neutral grassland
- g4 - modified grassland
- h3d - bramble scrub
- h3e - gorse scrub
- h3f - hawthorn scrub
- h3h - mixed scrub
- r1 - standing open water and canals
- r1a - eutrophic standing water
- r2 - rivers and lakes
- r2b - other rivers and streams
- t2a - coastal saltmarsh
- t2d - intertidal mudflats
- t2h - beach
- u1 - built-up areas and gardens
- u1a - open mosaic habitats on previously developed land
- u1b - developed land, sealed surface
- u1c - artificial unvegetated unsealed surface
- u1d - suburban mosaic of developed/ natural surfaces
- w1d - wet woodland
- w1f - lowland mixed deciduous woodland
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- h2 - hedgerows
- h2a - hedgerows (priority habitat)
- h2b - other hedgerows
- r1 - standing open water and canals
- r1a6 - other eutrophic standing waters
- r2 - rivers and streams
- r2b - other rivers and streams
- u1e - built linear features
- w1g6 - line of trees

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Drawing Title

UK HABITAT CLASSIFICATION SURVEY

SHEET 1 OF 22

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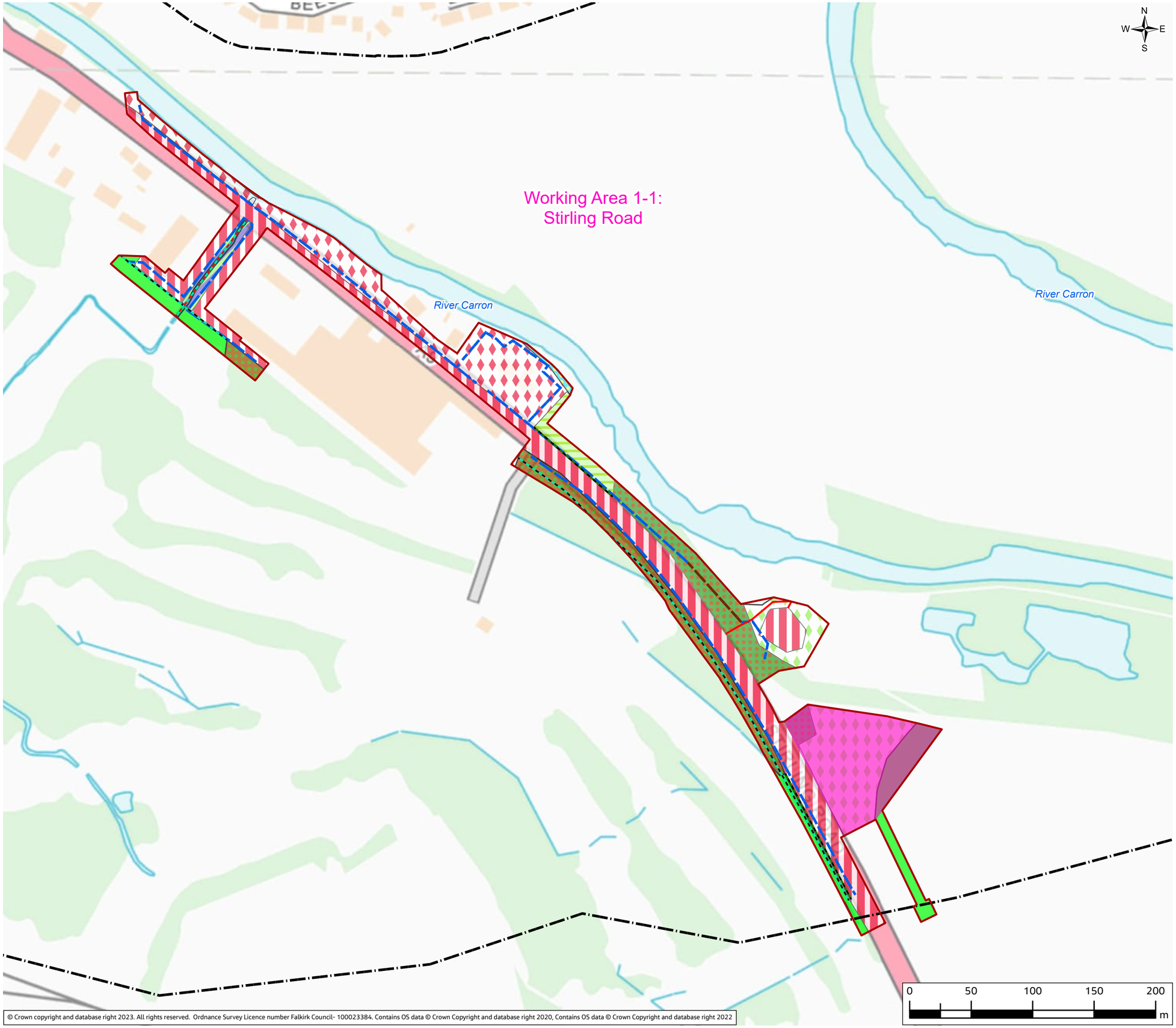
Figure B7.2a

FIGURE B7.2B



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall
- Seepage (below ground defence)

UK Habitat Classification Survey

- g1d - other lowland acid grassland
- g3c - other neutral grassland
- g4 - modified grassland
- h3d - bramble scrub
- r2 - rivers and lakes
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- h2 - hedgerows
- r1a6 - other eutrophic standing waters
- r2b - other rivers and streams
- u1e - built linear features
- w1g6 - line of trees

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Drawing Title

FLOOD CELL 1 - STIRLING ROAD

SHEET 2 OF 22

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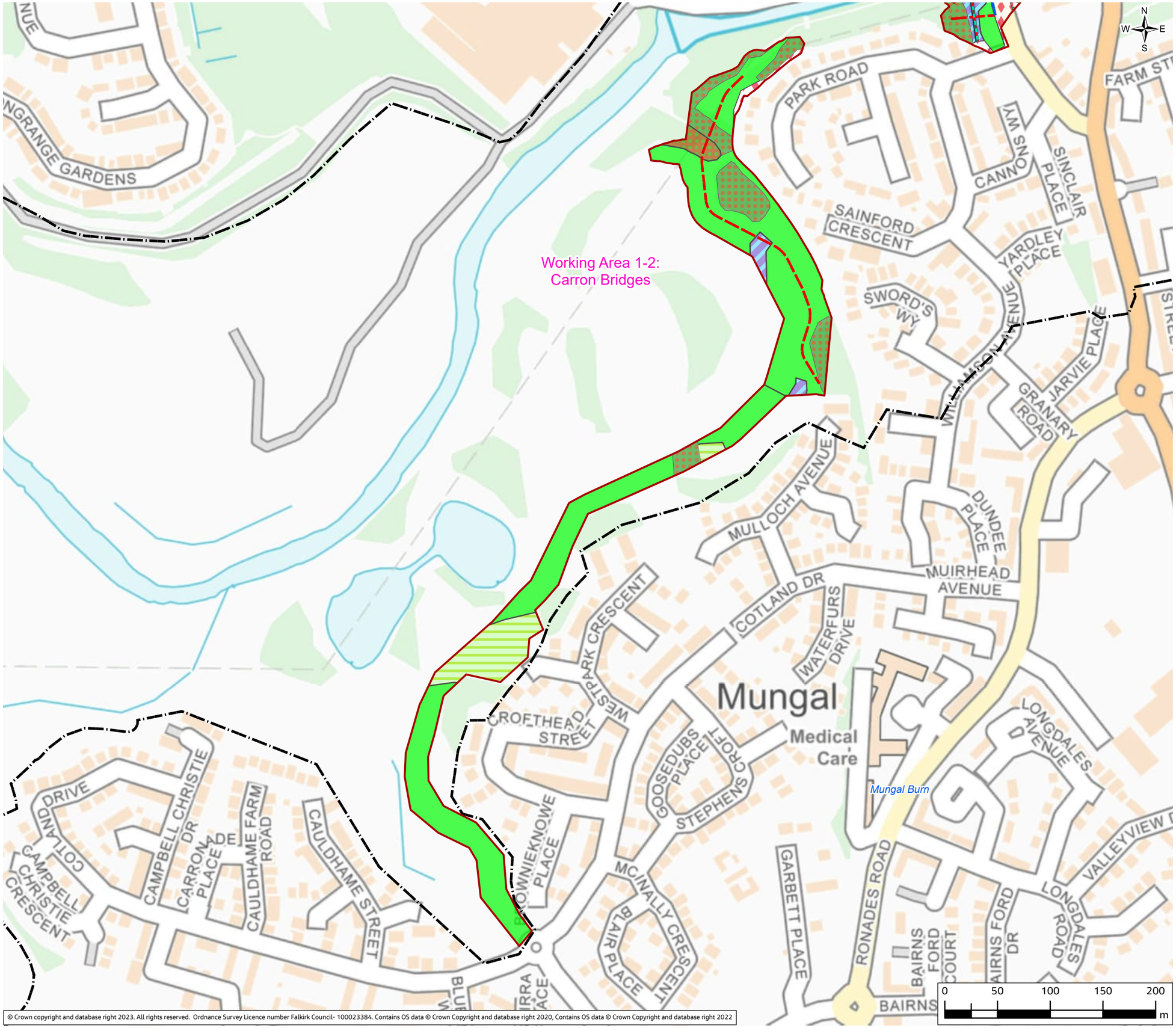
Figure B7.2b

FIGURE B7.2C



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- h3h - mixed scrub
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- r2b - other rivers and streams

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Drawing Title

FLOOD CELL 1 - CARRON BRIDGES

SHEET 3 OF 22

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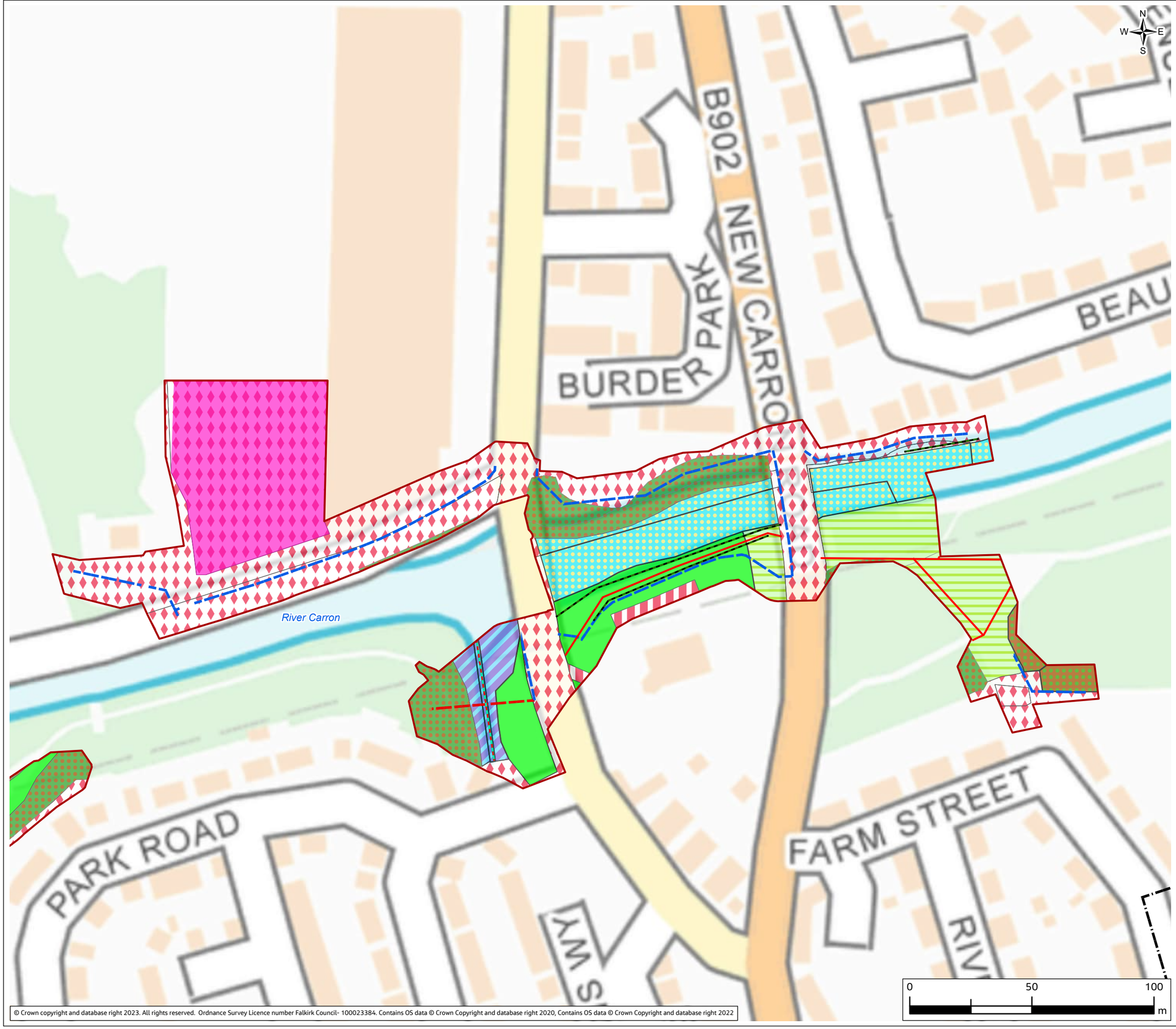


FIGURE B7.2D

Legend

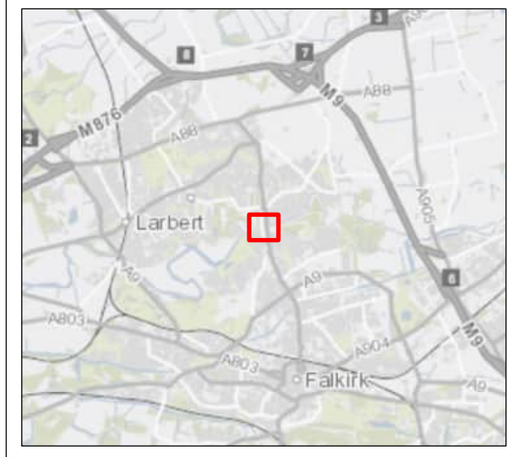
- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- h3h - mixed scrub
- r2 - rivers and lakes
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- r2b - other rivers and streams
- u1e - built linear features
- w1g6 - line of trees



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Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELL 1 - CARRON BRIDGES

SHEET 4 OF 22

Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

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Drawing No.

Figure B7.2d

FIGURE B7.2E

Legend

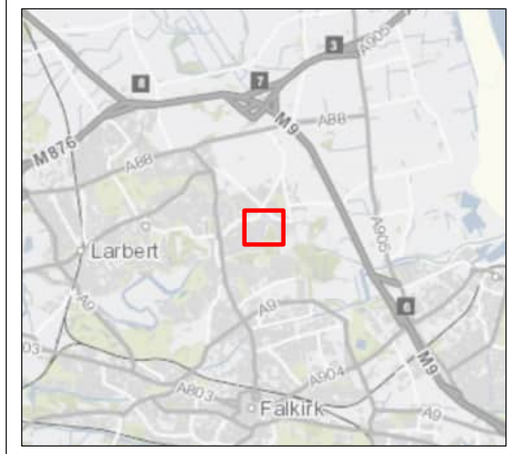
- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- h3d - bramble scrub
- h3h - mixed scrub
- r2 - rivers and lakes
- u1d - suburban mosaic of developed/natural surfaces
- r2 - rivers and streams



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Flood Protection Scheme

Drawing Title

FLOOD CELL 1 - DOCK STREET & CARRON HOUSE

SHEET 5 OF 22

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Drawing No.	Figure B7.2e	

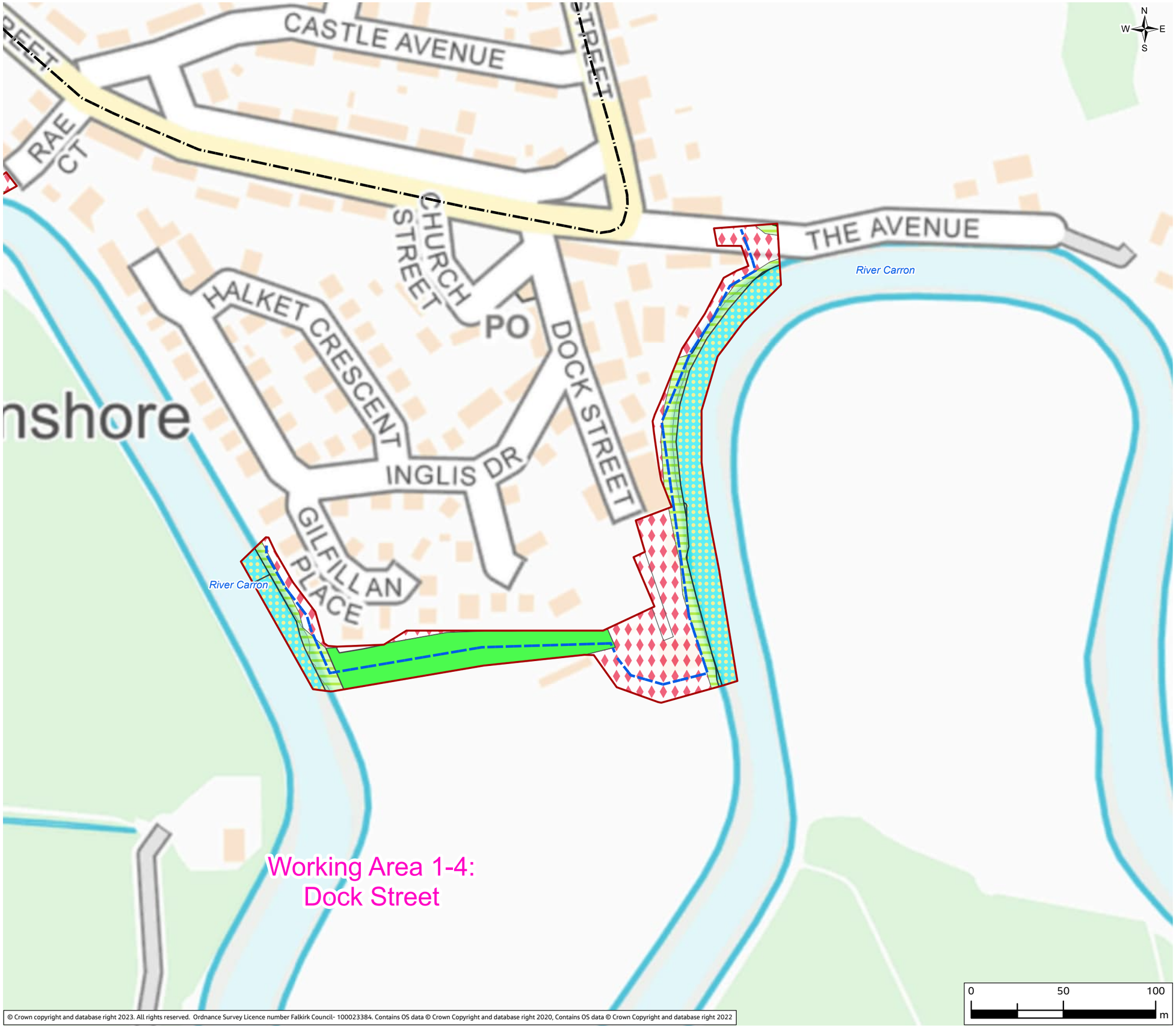

FIGURE B7.2F

Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- r2 - rivers and lakes
- u1d - suburban mosaic of developed/natural surfaces
- w1g6 - line of trees

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Project

Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELL 1 - DOCK STREET & CARRON HOUSE

SHEET 6 OF 22

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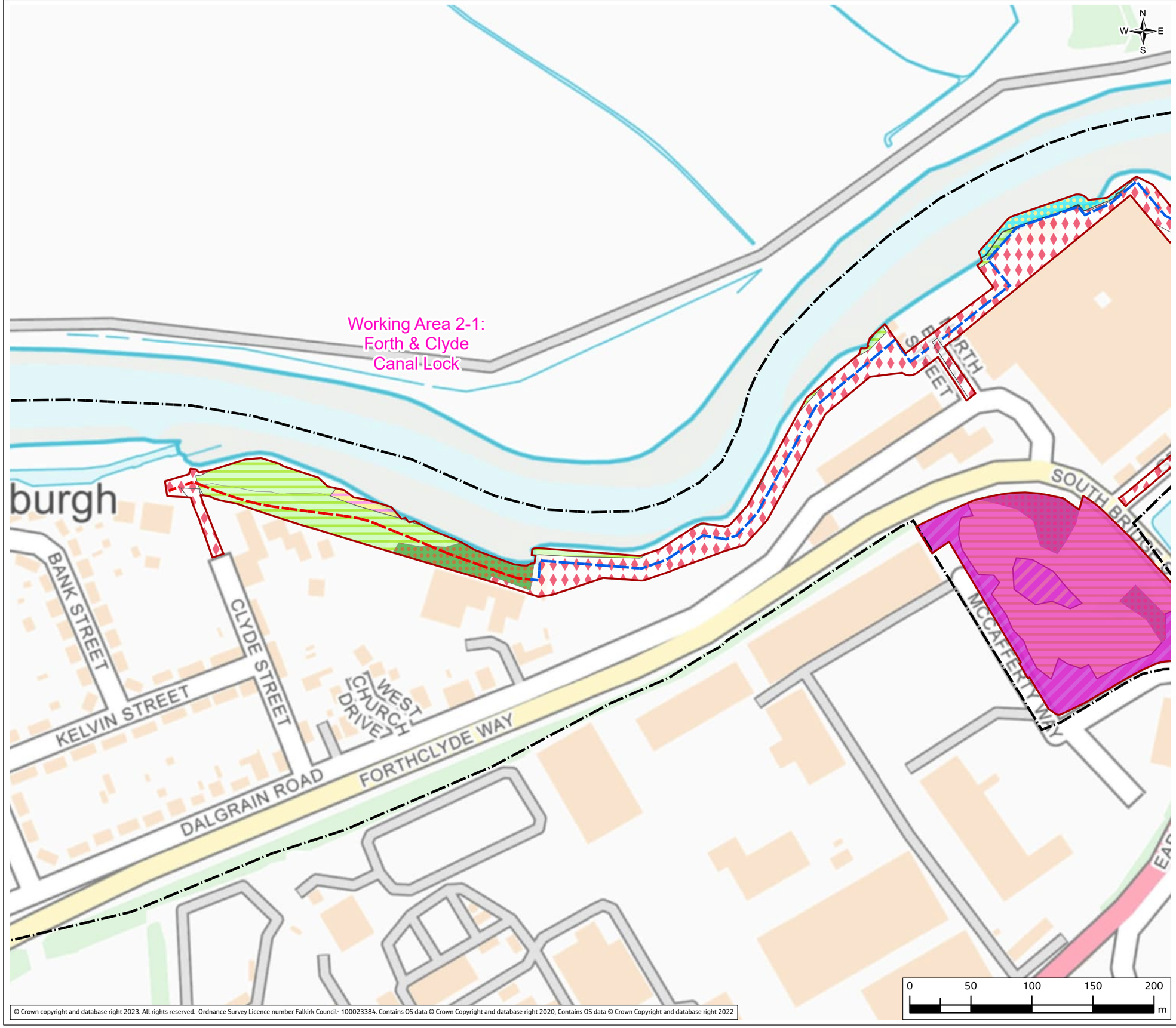
Drawing No.	Figure B7.2f	

FIGURE B7.2G



Legend

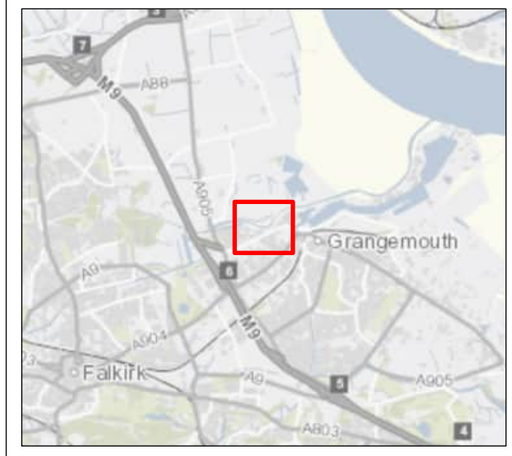
- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Flood Wall

UK Habitat Classification Survey

- f2e - reedbeds
- g3c - other neutral grassland
- h3d - bramble scrub
- h3h - mixed scrub
- r2 - rivers and lakes
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved



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Drawing Title

FLOOD CELL 2 - LOWER CARRON

SHEET 7 OF 22

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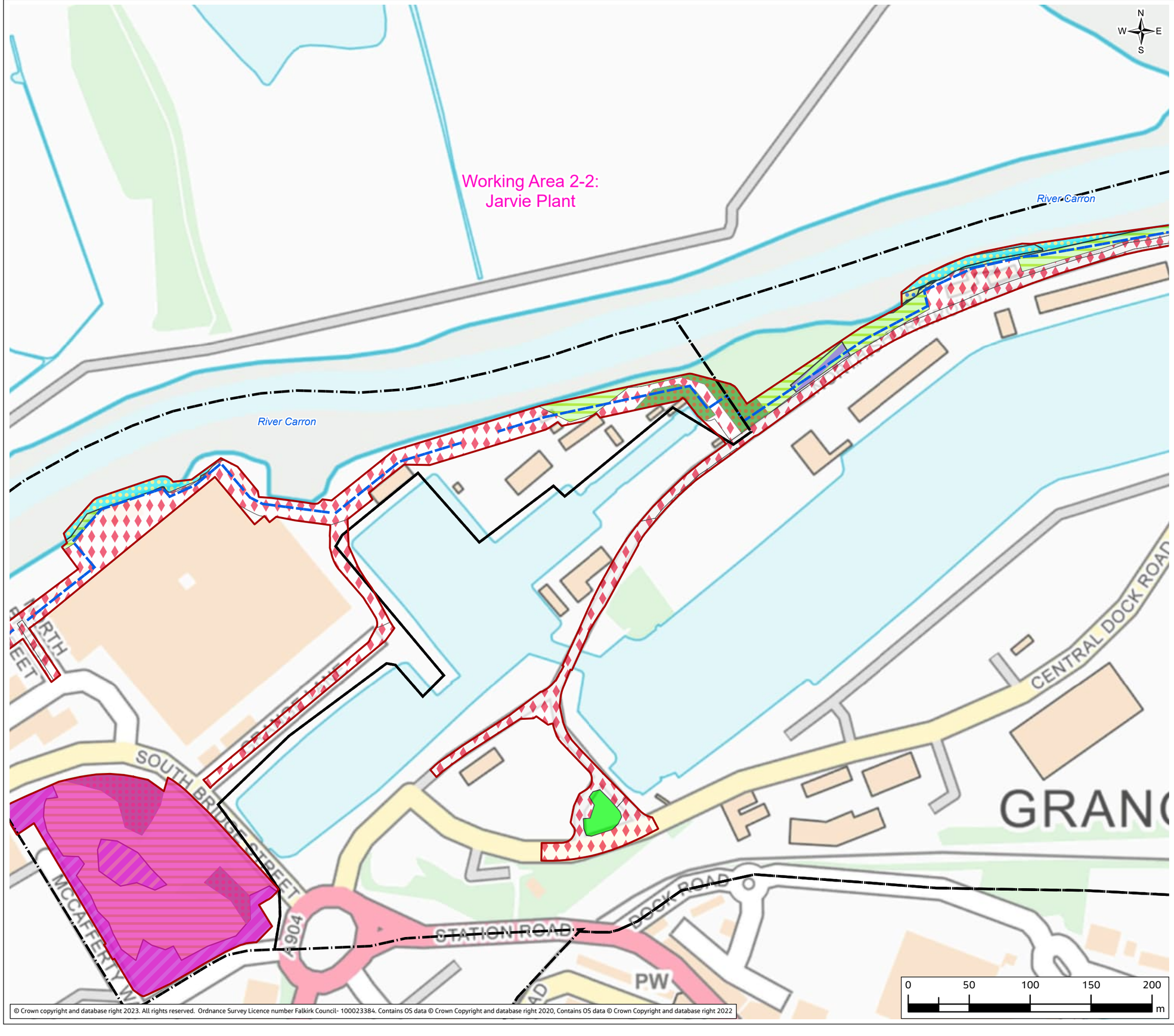
Figure B7.2g

FIGURE B7.2H



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- h3d - bramble scrub
- h3h - mixed scrub
- r2 - rivers and lakes
- t2d - intertidal mudflats
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved

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Drawing Title

FLOOD CELL 2 - LOWER CARRON

SHEET 8 OF 22

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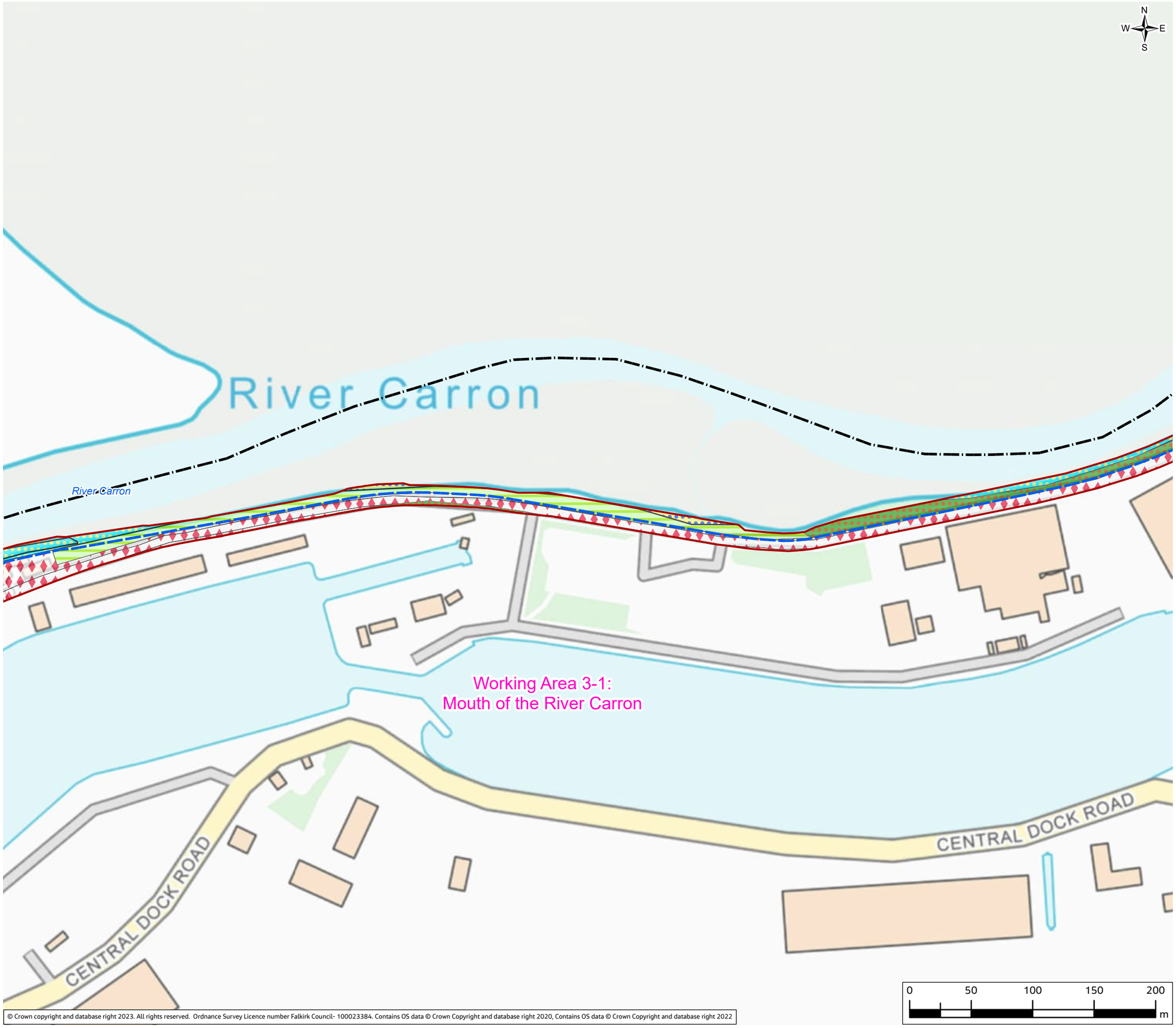
Client No.		
Drawing No.	Figure B7.2h	

FIGURE B7.2I



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- h3d - bramble scrub
- r2 - rivers and lakes
- t2d - intertidal mudflats
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved

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Project

Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELL 3 - RIVER CARRON

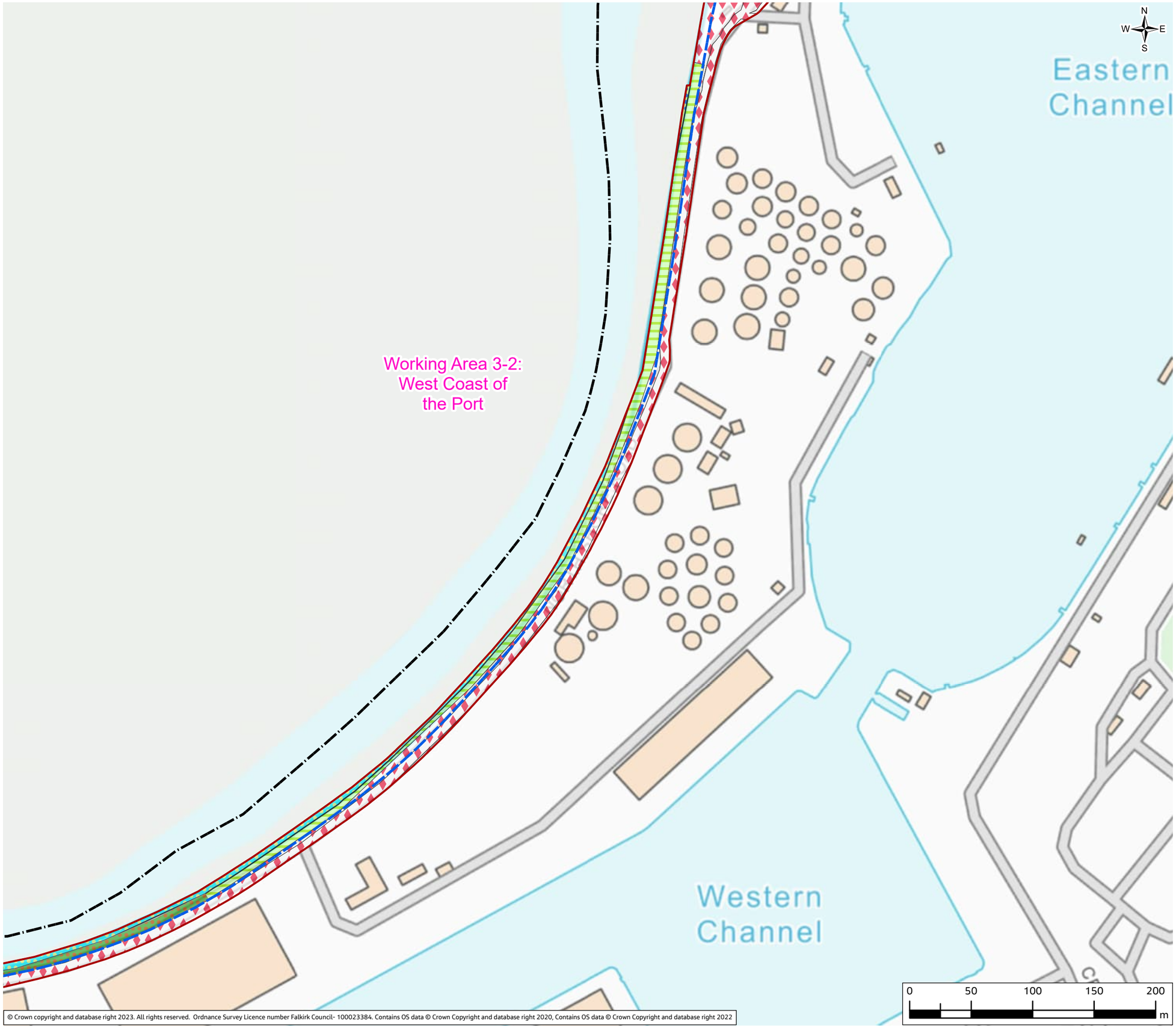
SHEET 9 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:3,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		

Drawing No.

Figure B7.2i

FIGURE B7.2J



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- g3c - other neutral grassland
- r2 - rivers and lakes
- t2d - intertidal mudflats
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved

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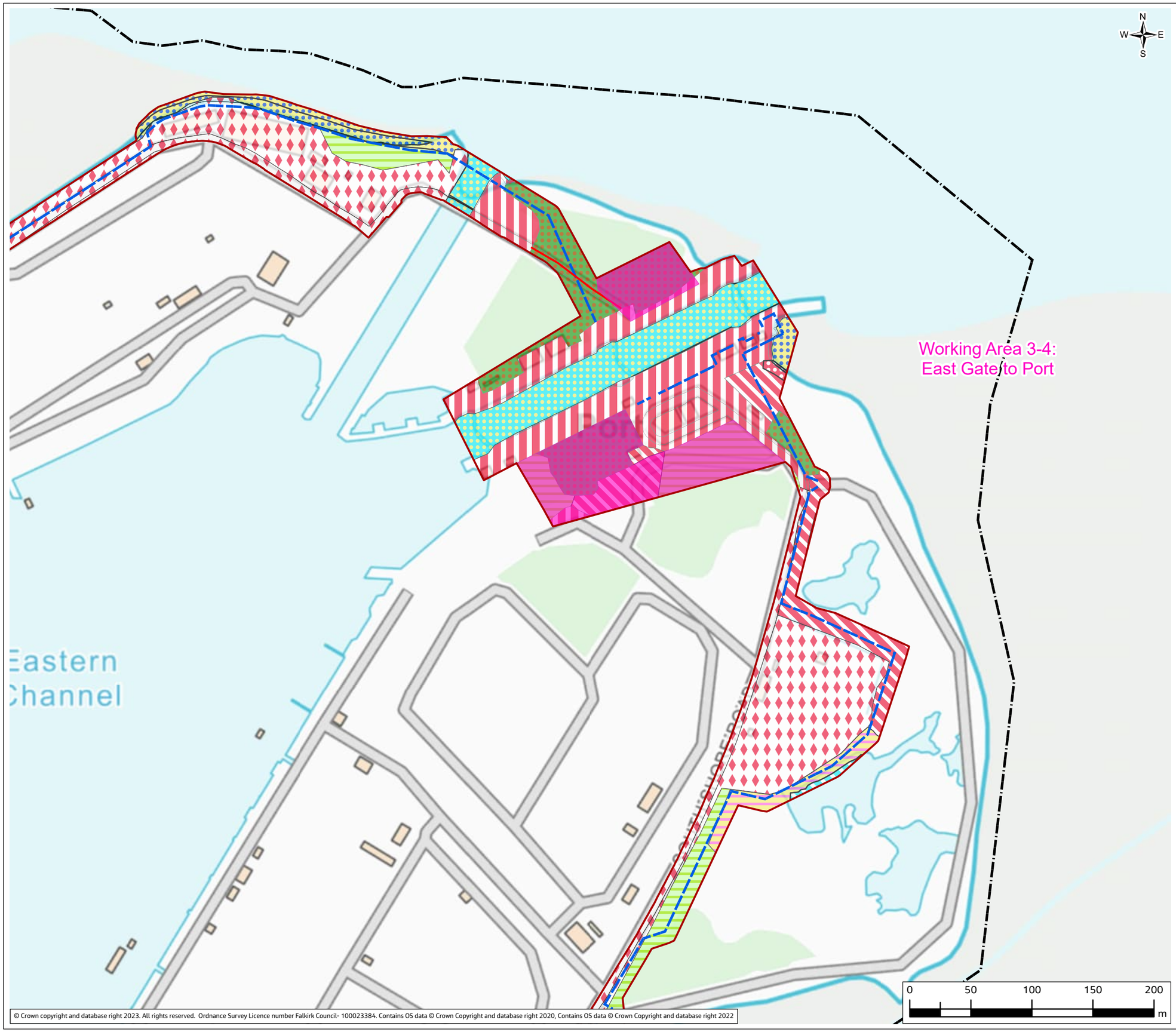
Drawing Title

FLOOD CELL 3 - RIVER CARRON

SHEET 10 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:3,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.2j	

FIGURE B7.2K



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- f2e - reedbeds
- g3c - other neutral grassland
- r1a - eutrophic standing water
- r2 - rivers and lakes
- t2d - intertidal mudflats
- u1a - open mosaic habitats on previously developed land
- u1b - developed land, sealed surface
- u1c - artificial unvegetated unsealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- u1e - built linear features

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Drawing Title

FLOOD CELL 3 - LOCK GATES

SHEET 11 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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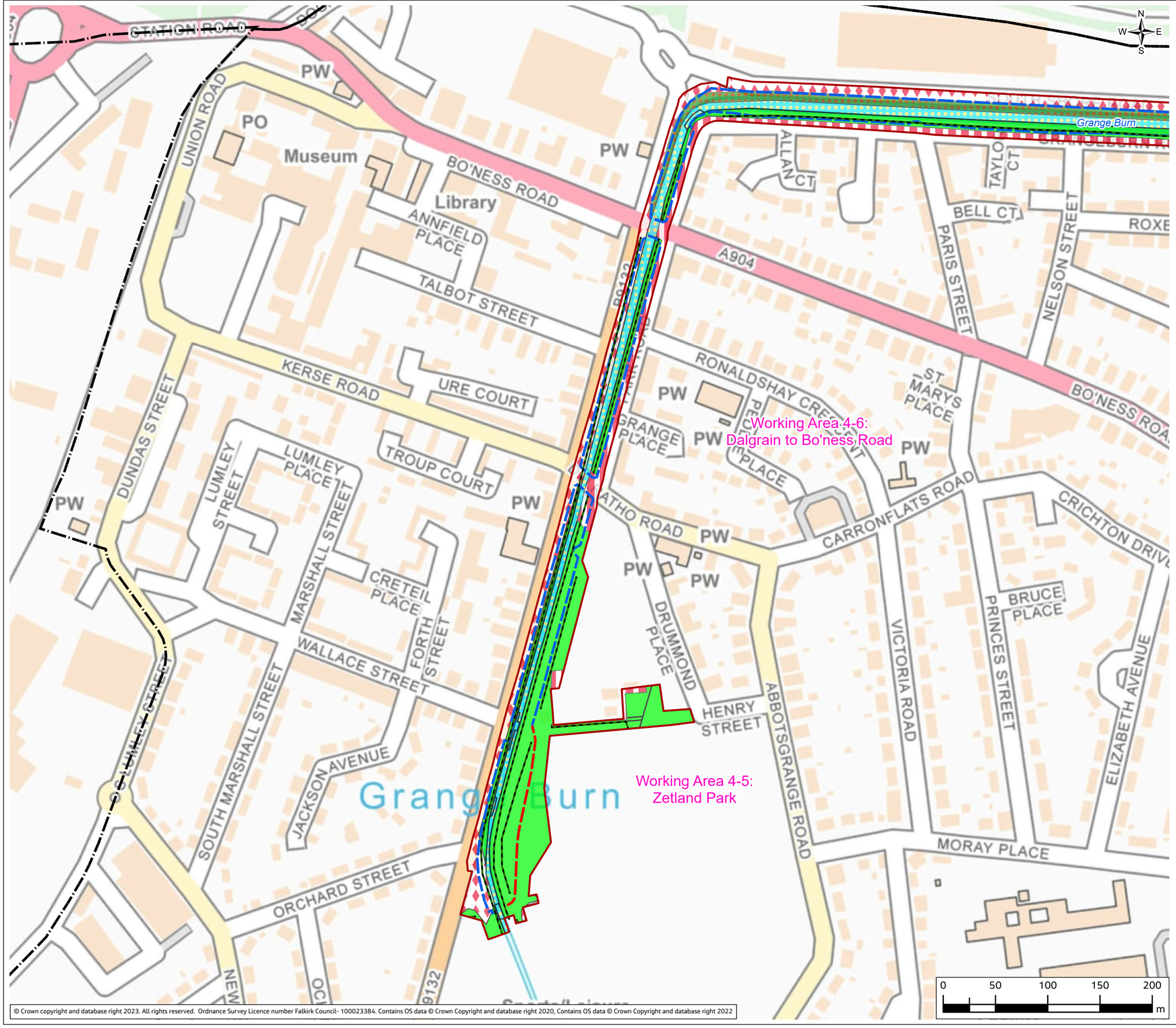
Jacobs No.	B2386100	
Client No.		

Drawing No.

Figure B7.2k

FIGURE B7.2L



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Flood Wall

UK Habitat Classification Survey

- g4 - modified grassland
- r2 - rivers and lakes
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- w1g6 - line of trees

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Drawing Title

FLOOD CELL 4 - LOWER GRANGE BURN

SHEET 12 OF 22

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Jacobs No.	B2386100	
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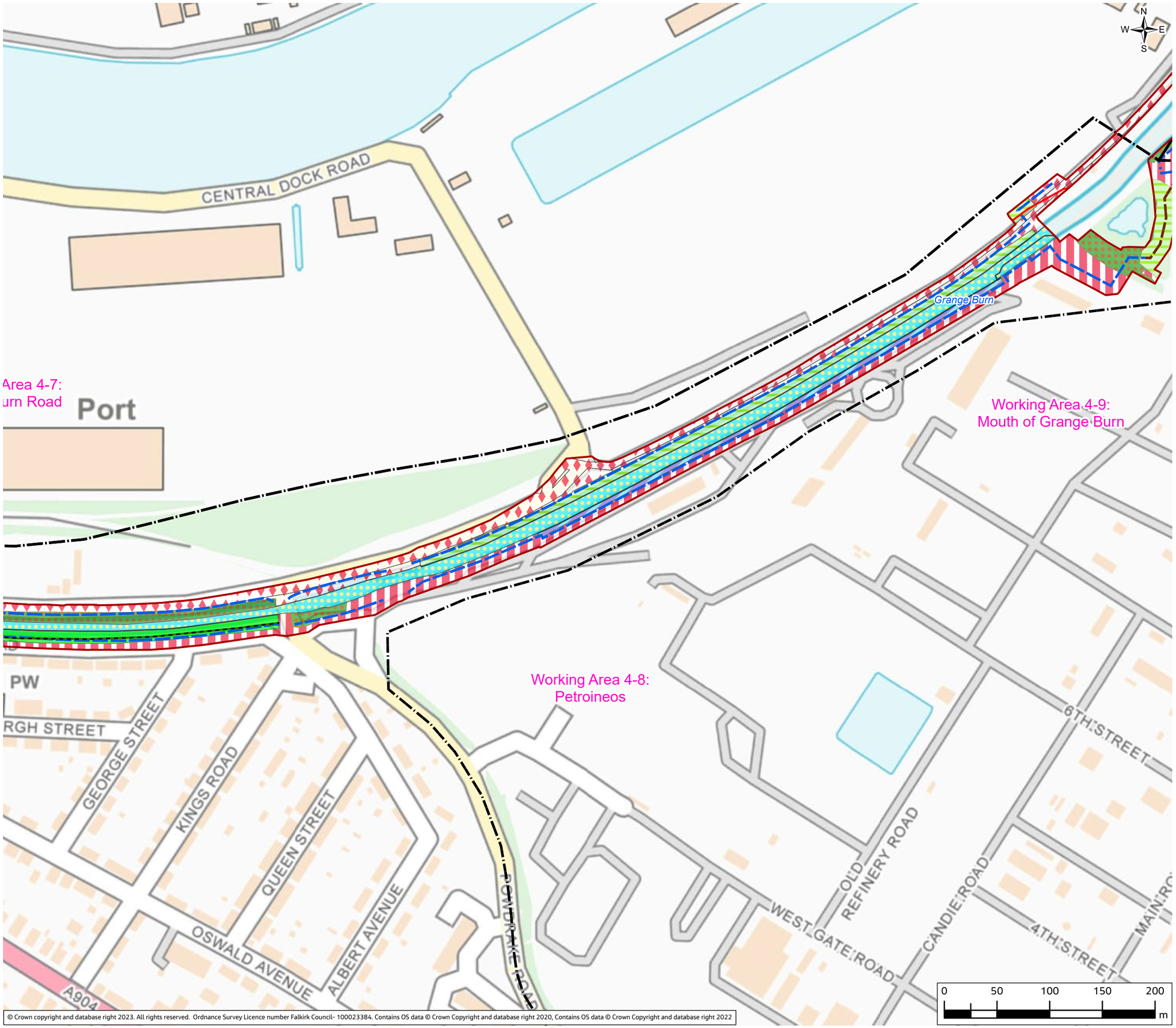
Drawing No.	Figure B7.2l	

FIGURE B7.2M



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall
- Seepage (below ground defence)

UK Habitat Classification Survey

- g3c - other neutral grassland
- g4 - modified grassland
- h3h - mixed scrub
- r2 - rivers and lakes
- t2d - intertidal mudflats
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- u1e - built linear features
- w1g6 - line of trees

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Drawing Title

FLOOD CELL 4 - LOWER GRANGE BURN

SHEET 13 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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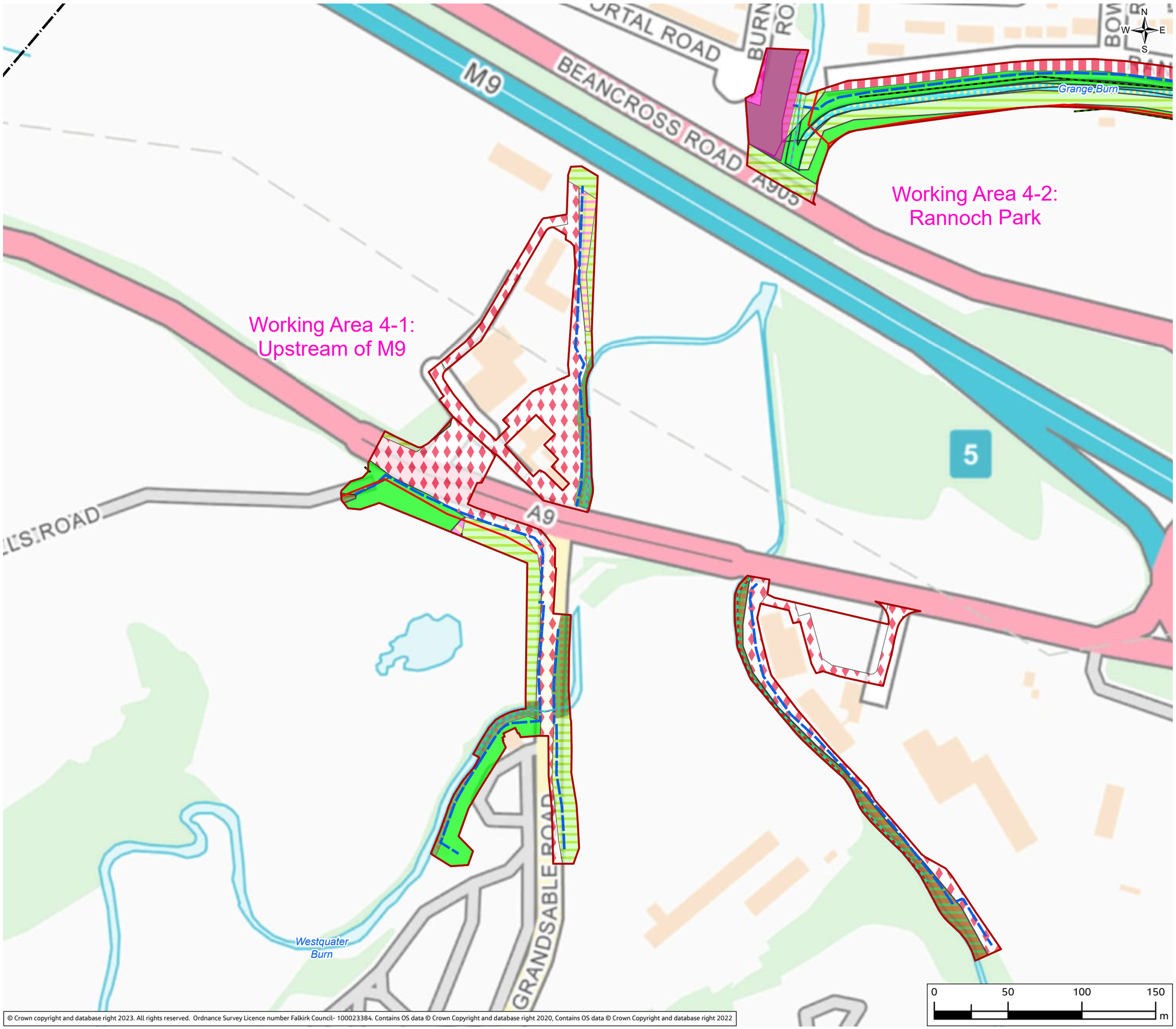
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.2m	

FIGURE B7.2N



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- f2a - lowland fens
- f2e - reedbeds
- g3c - other neutral grassland
- g4 - modified grassland
- r2 - rivers and lakes
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1f - lowland mixed deciduous woodland
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- r2 - rivers and streams
- r2b - other rivers and streams
- u1e - built linear features
- w1g6 - line of trees

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Drawing Title

FLOOD CELL 4 - FLOOD RELIEF CHANNEL/MILLHALL BURN

SHEET 14 OF 22

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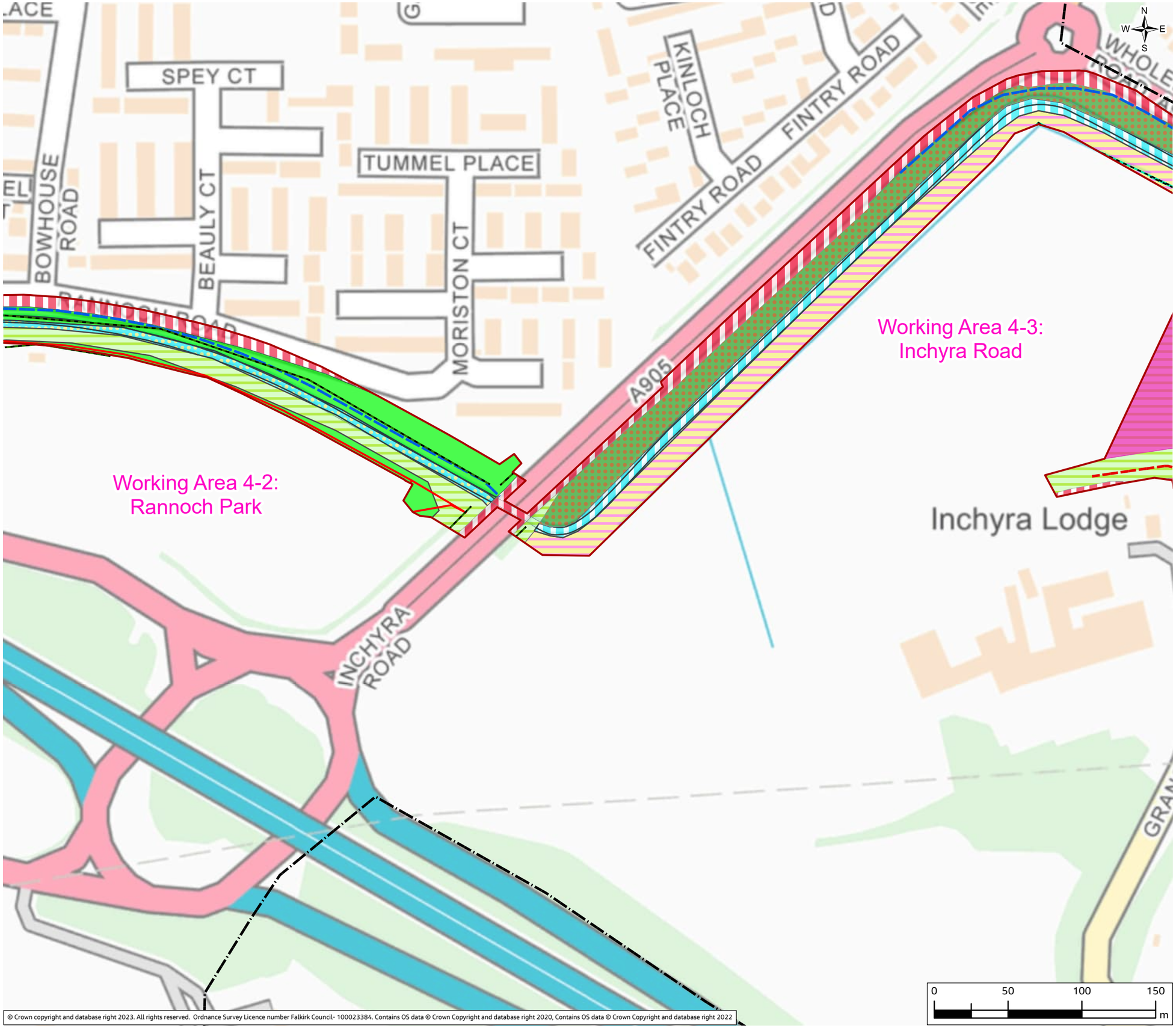
Drawing No.

Figure B7.2n

FIGURE B7.2O



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Flood Wall

UK Habitat Classification Survey

- f2e - reedbeds
- g3c - other neutral grassland
- g4 - modified grassland
- r2 - rivers and lakes
- r2b - other rivers and streams
- u1b - developed land, sealed surface
- w1g - other woodland, broadleaved
- r1a6 - other eutrophic standing waters
- u1e - built linear features
- w1g6 - line of trees

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Grangemouth
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Drawing Title

FLOOD CELL 4 - FLOOD RELIEF CHANNEL/MILLHALL BURN

SHEET 15 OF 22

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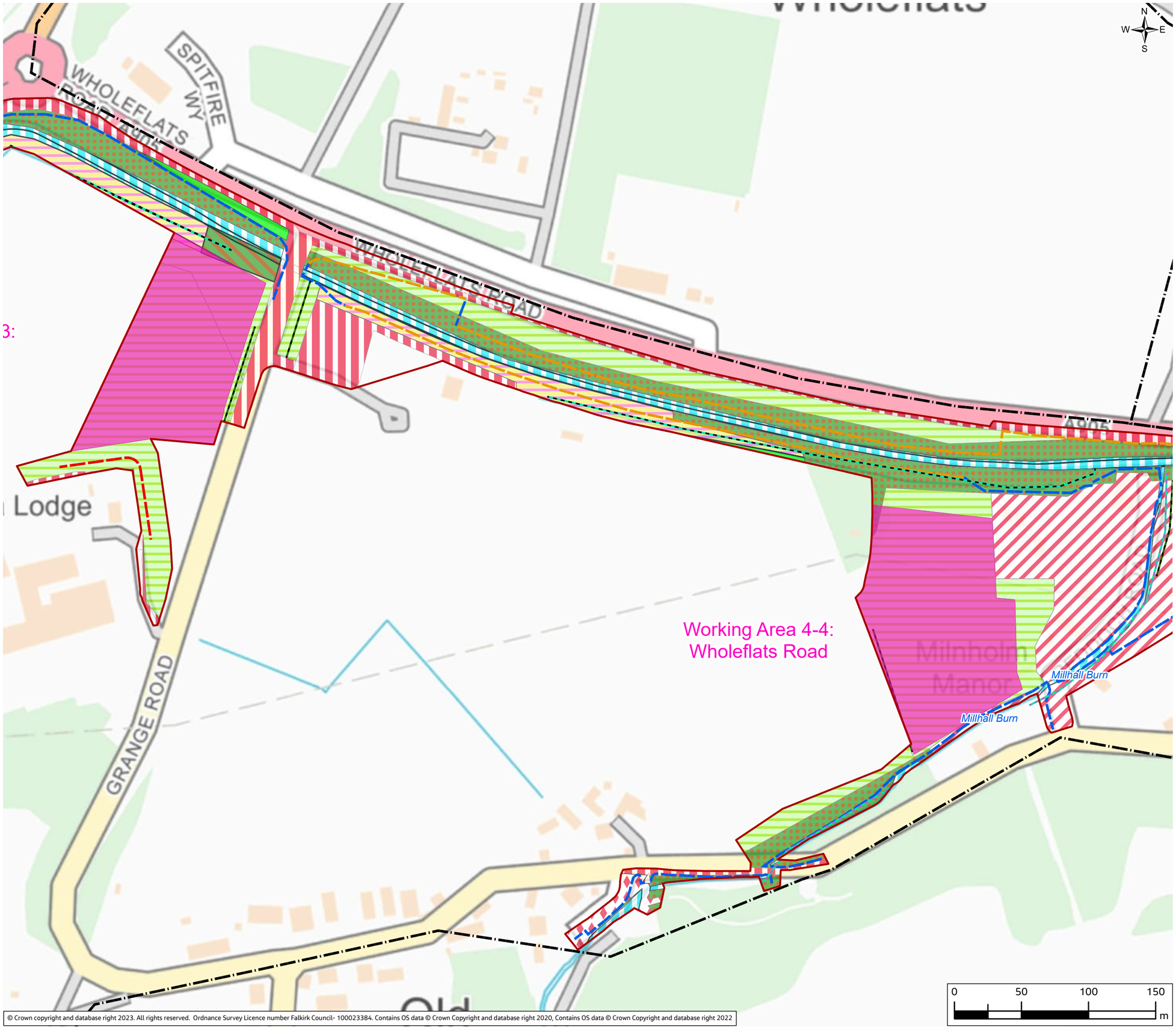
Drawing No.

Figure B7.2o

FIGURE B7.2P



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Embankment
- Ground Rising
- Flood Wall

UK Habitat Classification Survey

- f2e - reedbeds
- g3c - other neutral grassland
- g4 - modified grassland
- r2b - other rivers and streams
- u1 - built-up areas and gardens
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1d - wet woodland
- w1g - other woodland, broadleaved
- r1a6 - other eutrophic standing waters
- r2 - rivers and streams
- w1g6 - line of trees

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Drawing Title

FLOOD CELL 4 - FLOOD RELIEF CHANNEL/MILLHALL BURN

SHEET 16 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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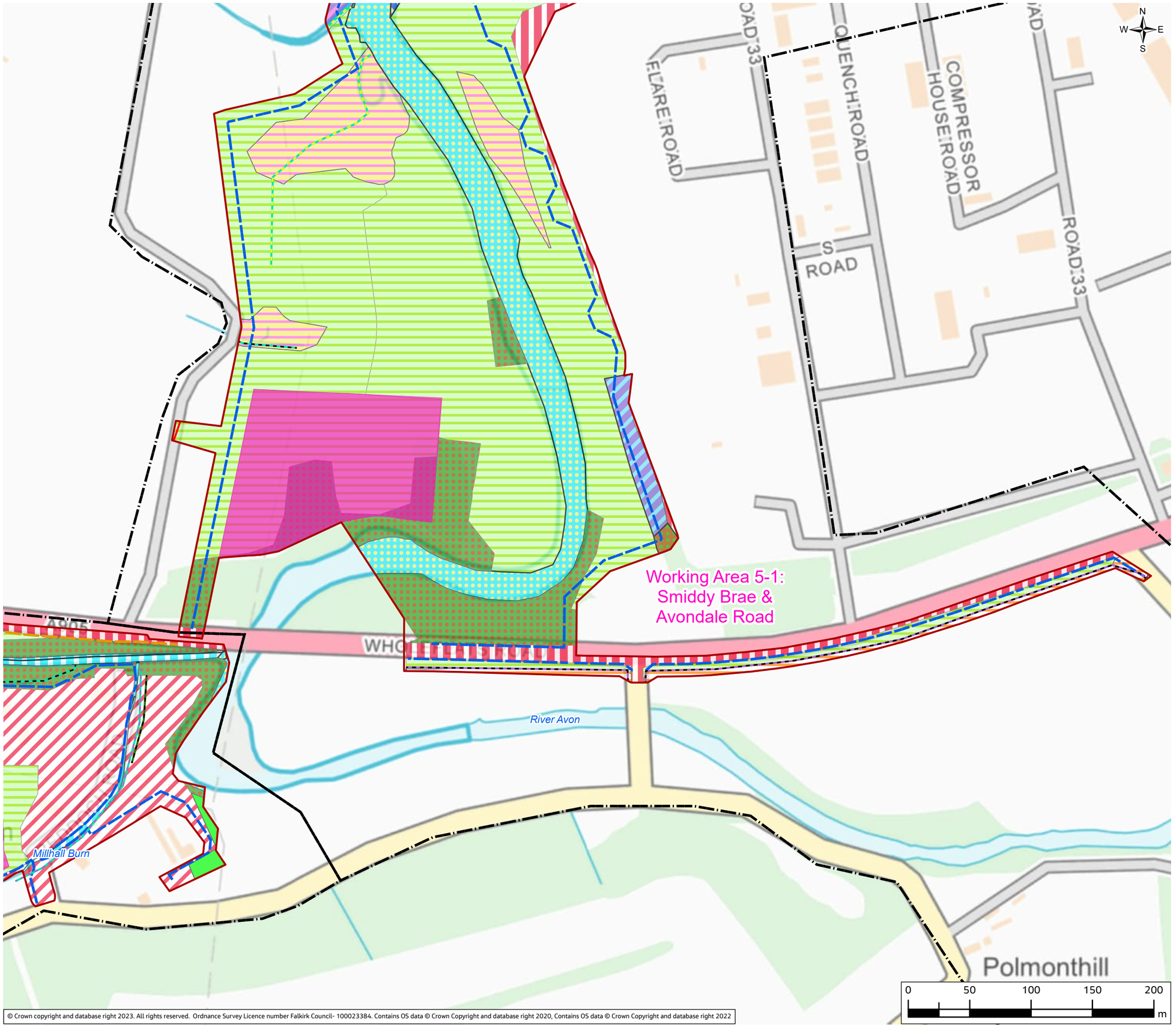
Drawing No.

Figure B7.2p

FIGURE B7.2Q



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Ground Rising
- Flood Wall

UK Habitat Classification Survey

- c1c - cereal crops
- f2e - reedbeds
- g3c - other neutral grassland
- g4 - modified grassland
- h3f - hawthorn scrub
- h3h - mixed scrub
- r2 - rivers and lakes
- r2b - other rivers and streams
- t2a - coastal saltmarsh
- u1 - built-up areas and gardens
- u1b - developed land, sealed surface
- w1g - other woodland, broadleaved
- w1h - other woodland, mixed
- h2a - hedgerows
- r1 - standing open water and canals
- r1a6 - other eutrophic standing waters
- r2 - rivers and streams
- u1e - built linear features
- w1g6 - line of trees

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Project

Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELLS 4 & 5 - INDUSTRIAL ZONE

SHEET 17 OF 22

Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

Scale @ A3	1:3,000	DO NOT SCALE
Jacobs No.	B2386100	
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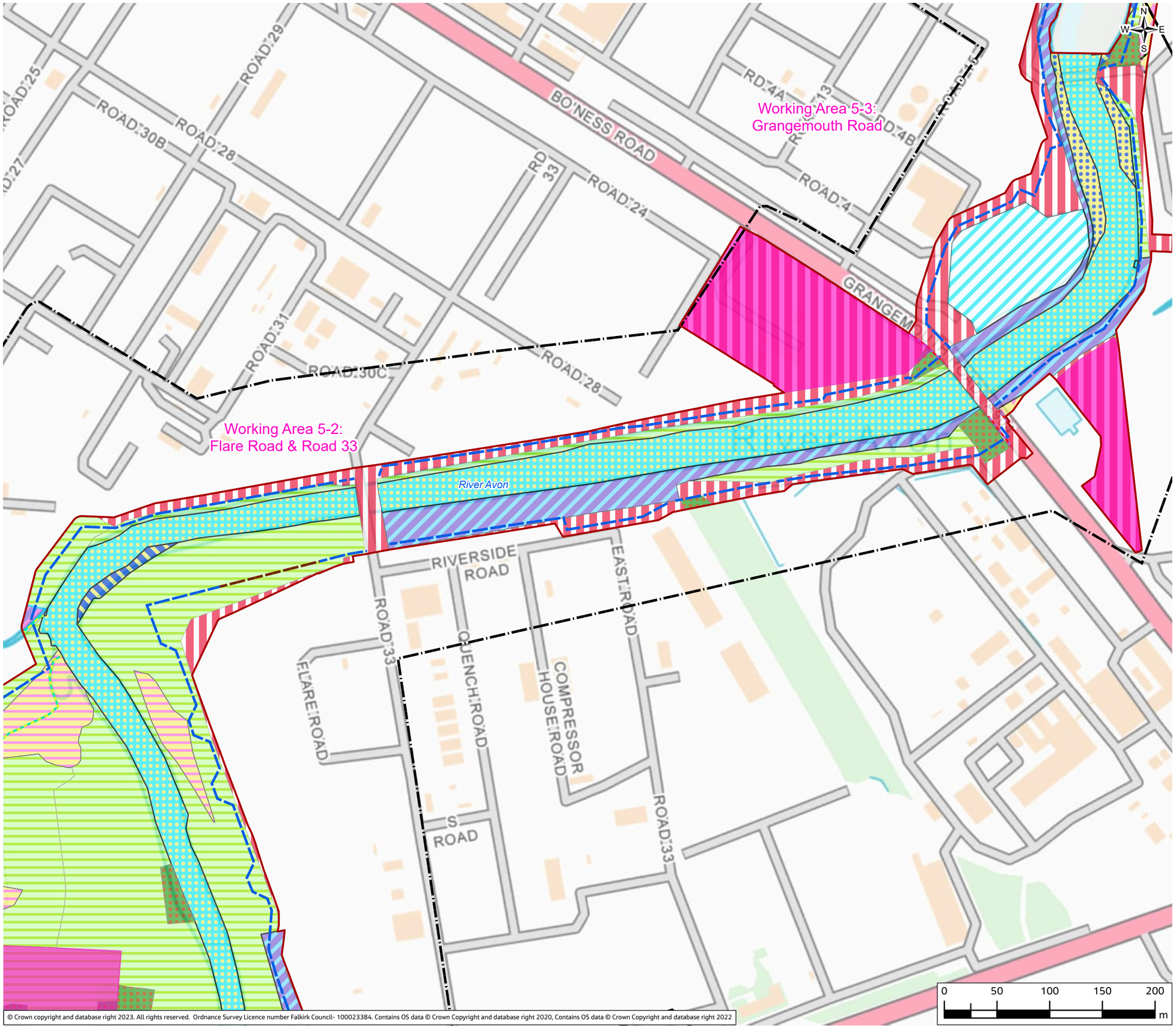
Drawing No.

Figure B7.2q

FIGURE B7.2R



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall
- Seepage (below ground defence)

UK Habitat Classification Survey

- f2e - reedbeds
- f2f - other swamps
- g3c - other neutral grassland
- h3f - hawthorn scrub
- h3h - mixed scrub
- r1 - standing open water and canals
- r2 - rivers and lakes
- t2a - coastal saltmarsh
- t2d - intertidal mudflats
- u1b - developed land, sealed surface
- u1c - artificial unvegetated unsealed surface
- w1g - other woodland, broadleaved
- h2b - other hedgerows
- r1 - standing open water and canals
- w1g6 - line of trees

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Flood Protection Scheme

Drawing Title

FLOOD CELLS 4 & 5 - INDUSTRIAL ZONE

SHEET 18 OF 22

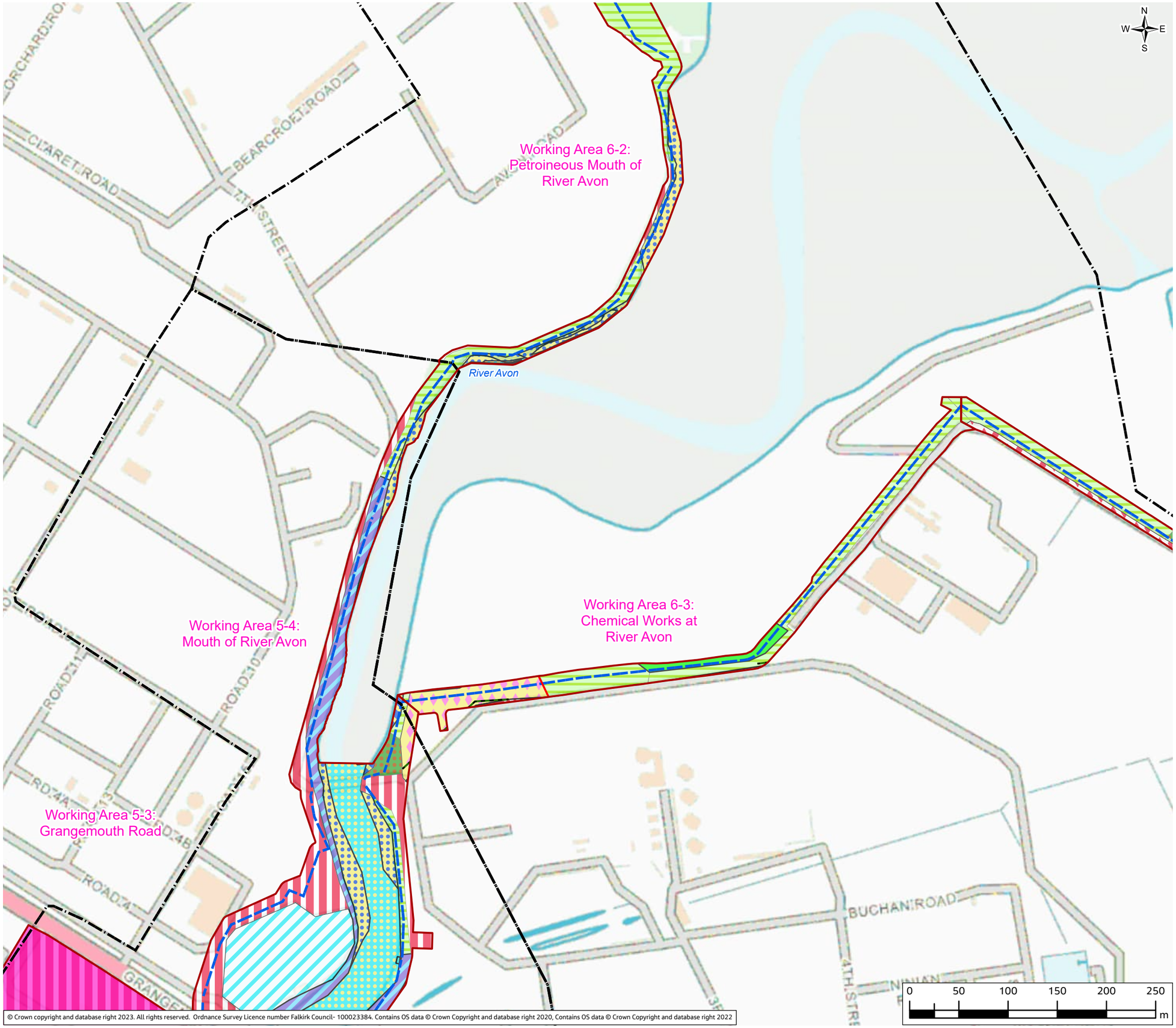
Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

Scale @ A3	1:3,500	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		

Drawing No.

Figure B7.2r

FIGURE B7.2S



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- f2a - lowland fens
- f2e - reedbeds
- f2f - other swamps
- g3c - other neutral grassland
- g4 - modified grassland
- h3h - mixed scrub
- r1 - standing open water and canals
- r2 - rivers and lakes
- t2a - coastal saltmarsh
- t2d - intertidal mudflats
- u1b - developed land, sealed surface
- u1c - artificial unvegetated unsealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- h2b - other hedgerows
- u1e - built linear features
- w1g6 - line of trees

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Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELLS 5 & 6 - KINNELL

SHEET 19 OF 22

Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

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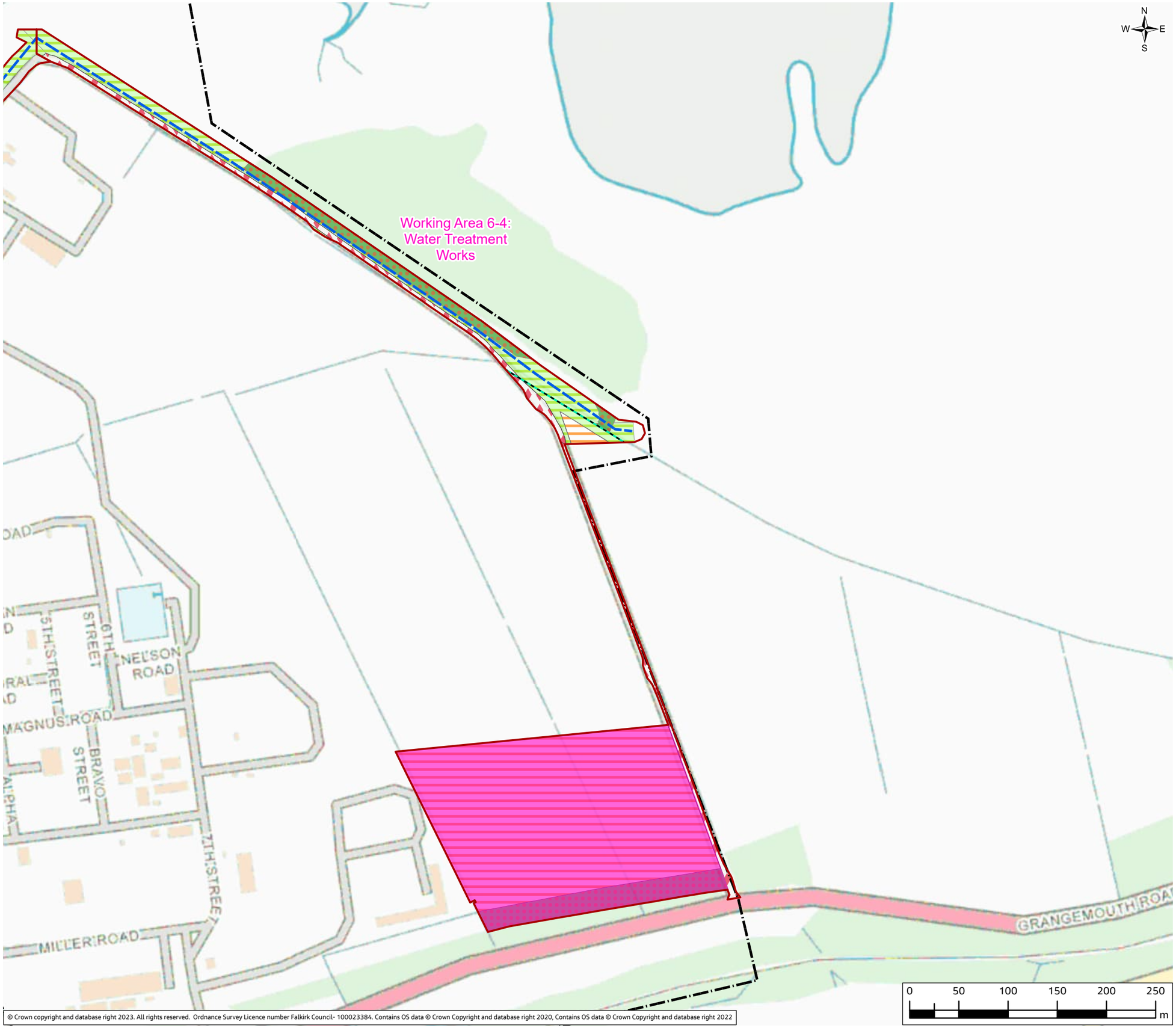
Jacobs No.	B2386100	
Client No.		

Drawing No.

Figure B7.2s

FIGURE B7.2T



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- c1c - cereal crops
- f2e - reedbeds
- g3c - other neutral grassland
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- r1a6 - other eutrophic standing waters

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Drawing Title

FLOOD CELLS 5 & 6 - KINNELL

SHEET 20 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:3,750	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.2t	

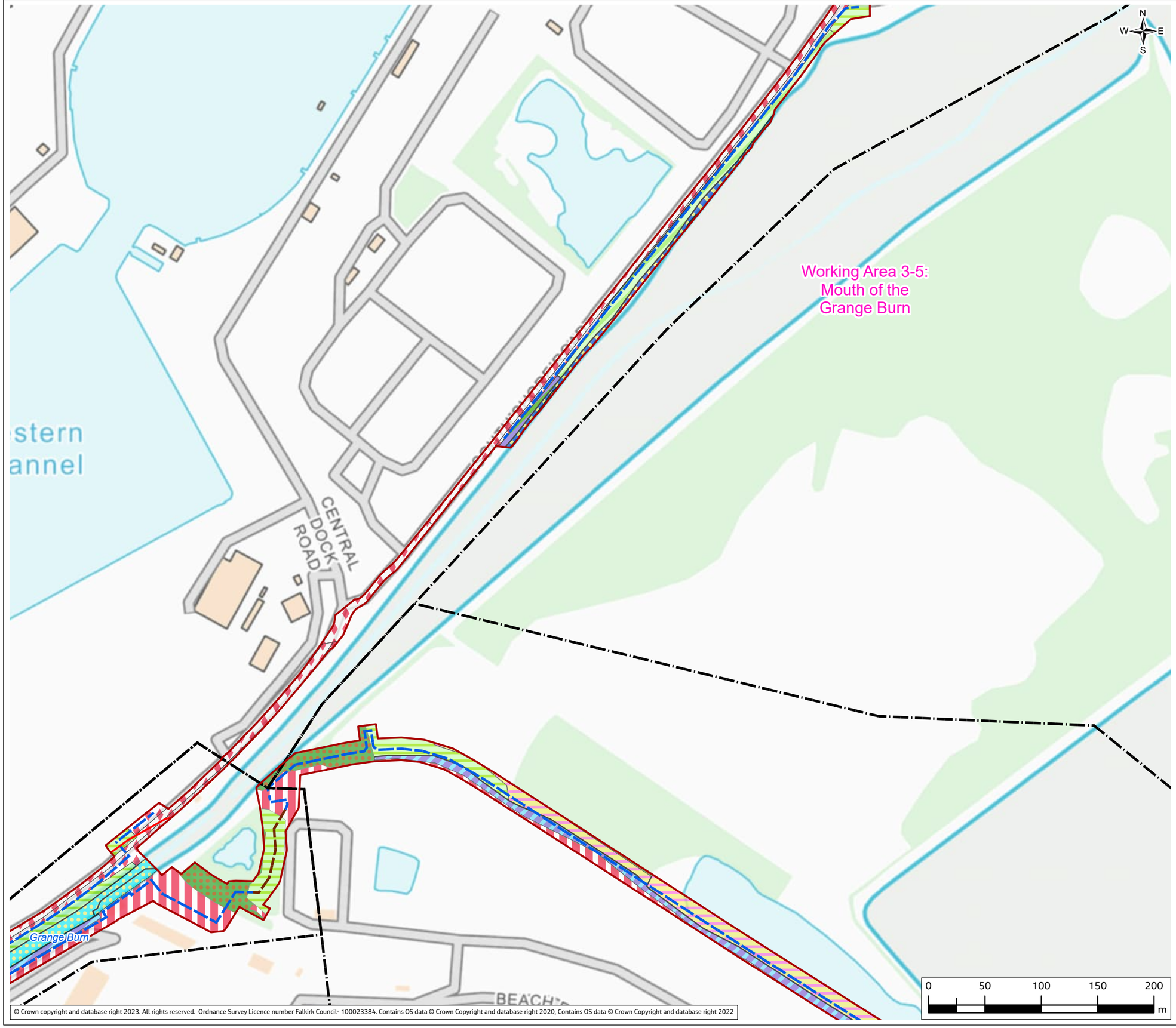

FIGURE B7.2U

Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall
- Seepage (below ground defence)

UK Habitat Classification Survey

- f2e - reedbeds
- g3 - neutral grassland
- g3c - other neutral grassland
- h3e - gorse scrub
- h3h - mixed scrub
- r2 - rivers and lakes
- t2a - coastal saltmarsh
- t2d - intertidal mudflats
- u1b - developed land, sealed surface
- u1d - suburban mosaic of developed/natural surfaces
- w1g - other woodland, broadleaved
- u1e - built linear features

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Project

Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELLS 4 & 6 - INDUSTRIAL ZONE AND COAST

SHEET 21 OF 22

Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

Scale @ A3	1:3,250	DO NOT SCALE
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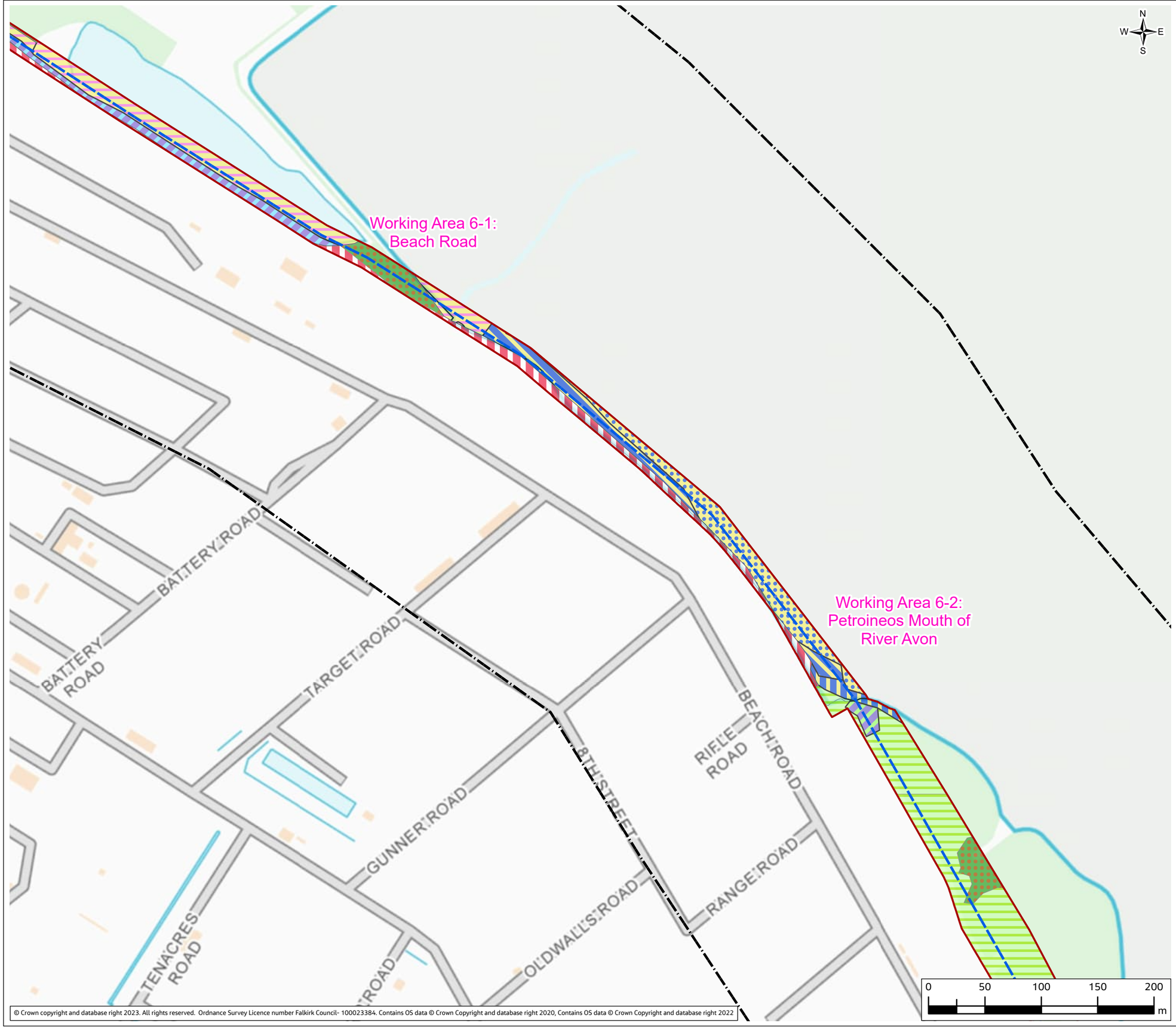
Client No.		

Drawing No.

Figure B7.2u

FIGURE B7.2V



Legend

- Site Boundary
- Flood Cell
- Site Compounds

Direct Defences

- Flood Wall

UK Habitat Classification Survey

- f2e - reedbeds
- g3c - other neutral grassland
- h3d - bramble scrub
- h3h - mixed scrub
- t2a - coastal saltmarsh
- t2d - intertidal mudflats
- t2h - beach
- u1b - developed land, sealed surface
- w1g - other woodland, broadleaved

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Grangemouth
Flood Protection Scheme

Drawing Title

FLOOD CELLS 4 & 6 - INDUSTRIAL ZONE AND COAST

SHEET 22 OF 22

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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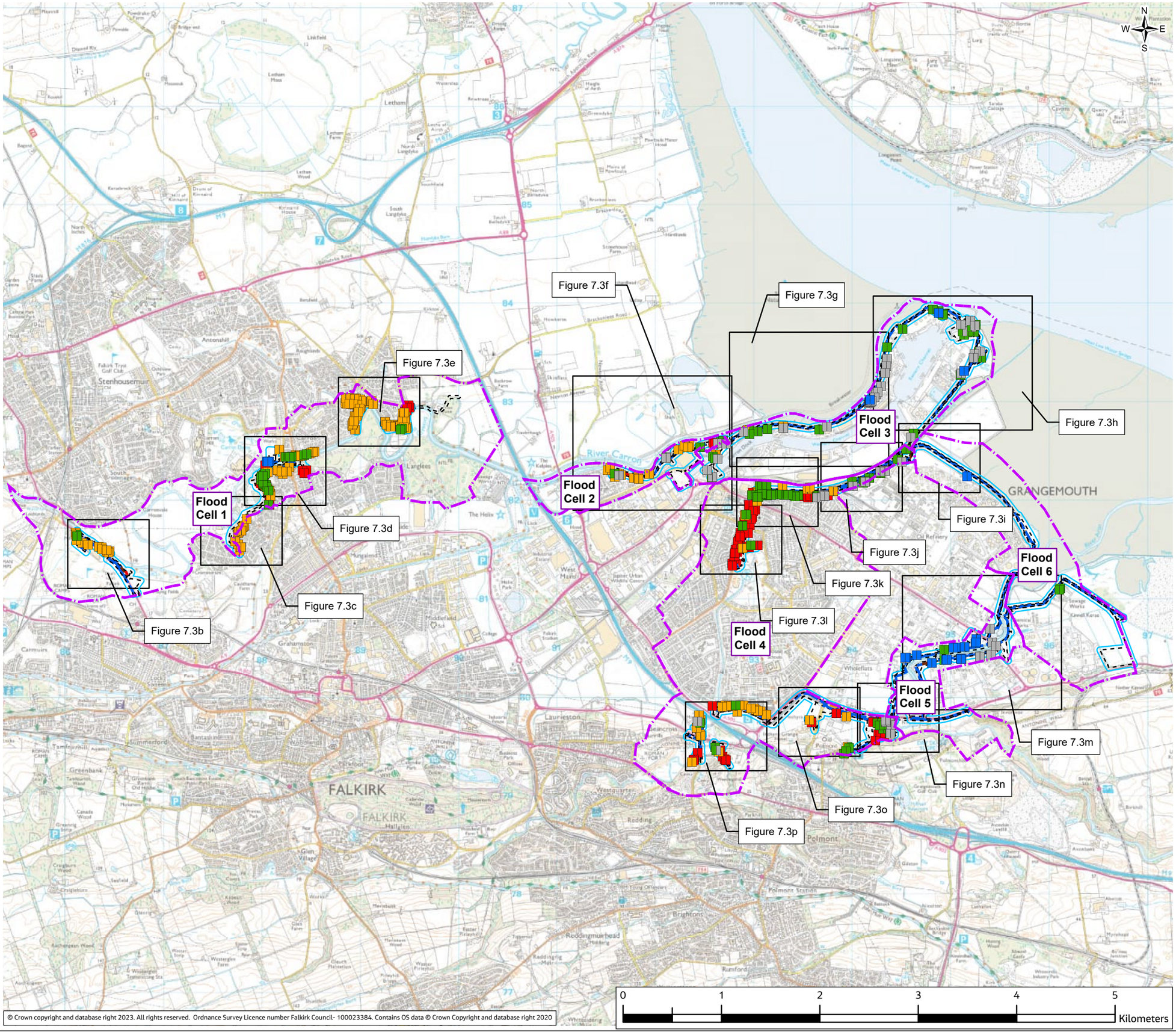
Client No.		
Drawing No.	Figure B7.2v	

FIGURE B7.3A



Legend

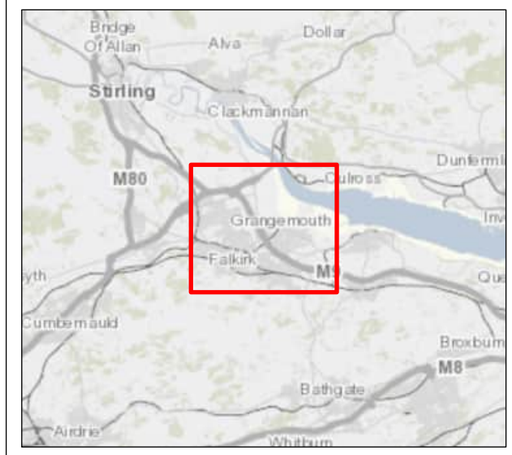
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- High,Moderate
- Moderate
- Moderate, Low
- Moderate, Not Assessed
- Low
- Low, Negligible
- Negligible, Negligible
- Not Assessed



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Grangemouth
Flood Protection Scheme

Drawing Title

BAT BUILDING SURVEY RESULTS

SHEET 1 OF 16

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Figure B7.3a

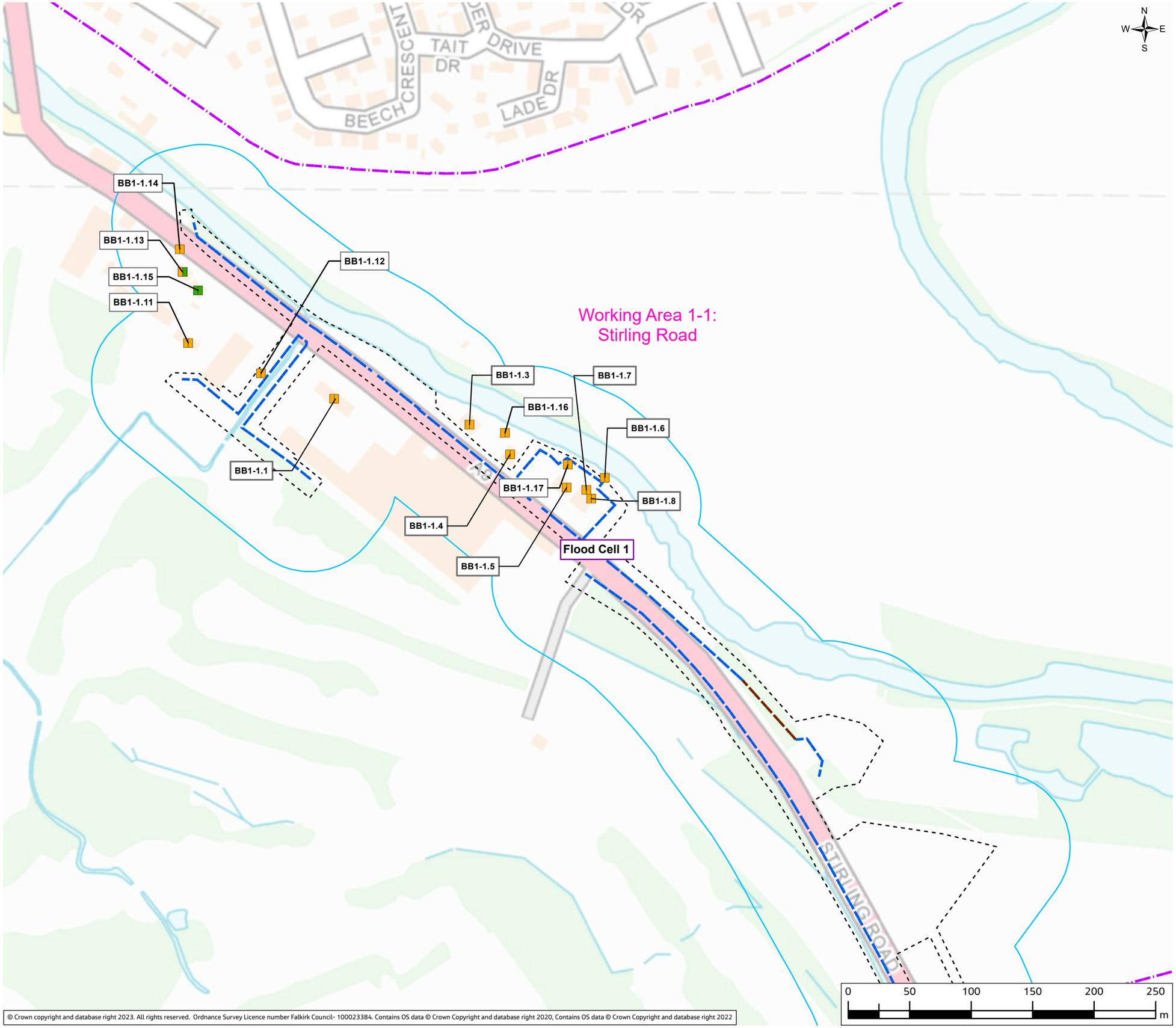


FIGURE B7.3B

Legend

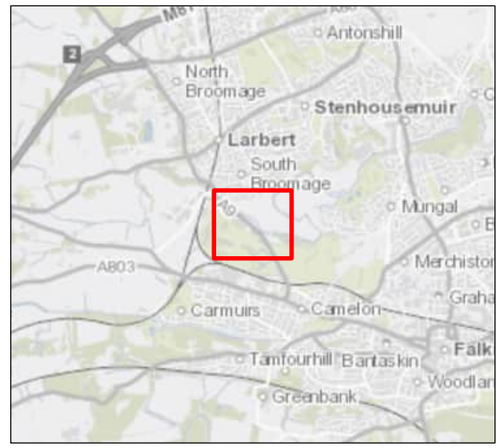
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Buildings (Left Summer Potential, Right Winter Potential)

- Moderate
- Moderate, Low
- Low



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BAT BUILDING SURVEY RESULTS

SHEET 2 OF 16

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Figure B7.3b

FIGURE B7.3C

Working Area 1-2:
Carron Bridges

Flood Cell 1

BB1-2.11
BB1-2.10
BB1-2.8
BB1-2.7
BB1-2.6
BB1-2.2
BB1-2.1
BB 1-2.111
BB 1-2.110
BB 1-2.108
BB 1-2.109
BB 1-2.106
BB 1-2.105
BB 1-2.107
BB 1-2.104
BB 1-2.101
BB 1-2.100a
BB 1-2.102
BB 1-2.100b
BB 1-2.97
BB 1-2.99
BB 1-2.98
BB 1-2.91

MULLOCH AVENUE
DUNDEE PLACE
MUIRHEAD AVENUE
COTLAND DR
WATERFURDS DRIVE
Mungal
Medical Care
GOOSEDUBS PLACE
STEPHENS CROFT
MCINALLY CRESCENT
BLAIR PLACE
GARBETT PLACE
RONADES ROAD
BAIRNS FORD COURT
BAIRNS FORD DR
BAIRNS FORD AVENUE
COTLAND WAY
CAMPBELL CHRISTIE DR
CARRON DE PLACE
CAULDHAME FARM ROAD
CAULDHAME STREET
BLUEBIRD WAY
SHERRA PLACE
FRANKLIN AVENUE
BROWNE KNOWE PLACE

N
W
E
S

0 50 100 150 200 250 m

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low

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BAT BUILDING SURVEY RESULTS

SHEET 3 OF 16

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Drawing No.: Figure B7.3c

FIGURE B7.3D

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment
- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Not Assessed

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Drawing No.

Figure B7.3d

Working Area 1-2:
Carron Bridges

Flood Cell 1

BB1-2.1, BB1-2.2, BB1-2.6, BB1-2.7, BB1-2.8, BB1-2.10, BB1-2.11, BB1-2.12, BB1-2.13, BB1-2.14, BB1-2.16, BB1-2.17, BB1-2.18, BB1-2.19, BB1-2.20, BB1-2.21, BB1-2.22, BB1-2.23, BB1-2.24, BB1-2.25, BB1-2.26, BB1-2.28, BB1-2.29, BB1-2.31, BB1-2.32, BB1-2.33, BB1-2.34, BB1-2.35, BB1-2.36, BB1-2.37, BB1-2.38, BB1-2.39, BB1-2.43, BB1-2.44, BB1-2.45, BB1-2.50, BB1-2.51, BB1-2.52, BB1-2.53, BB1-2.54, BB1-2.55, BB1-2.56, BB1-2.57, BB1-2.58, BB1-2.59, BB1-2.60, BB1-2.61, BB1-2.63, BB1-2.64, BB1-2.65, BB1-2.66, BB1-2.68, BB1-2.69, BB1-2.70, BB1-2.71, BB1-2.72, BB1-2.73, BB1-2.74, BB1-2.112, BB1-2.113, BB1-2.114, BB1-2.115, BB 1-2.92, BB 1-2.94, BB 1-2.95

0 50 100 150 200 250 m

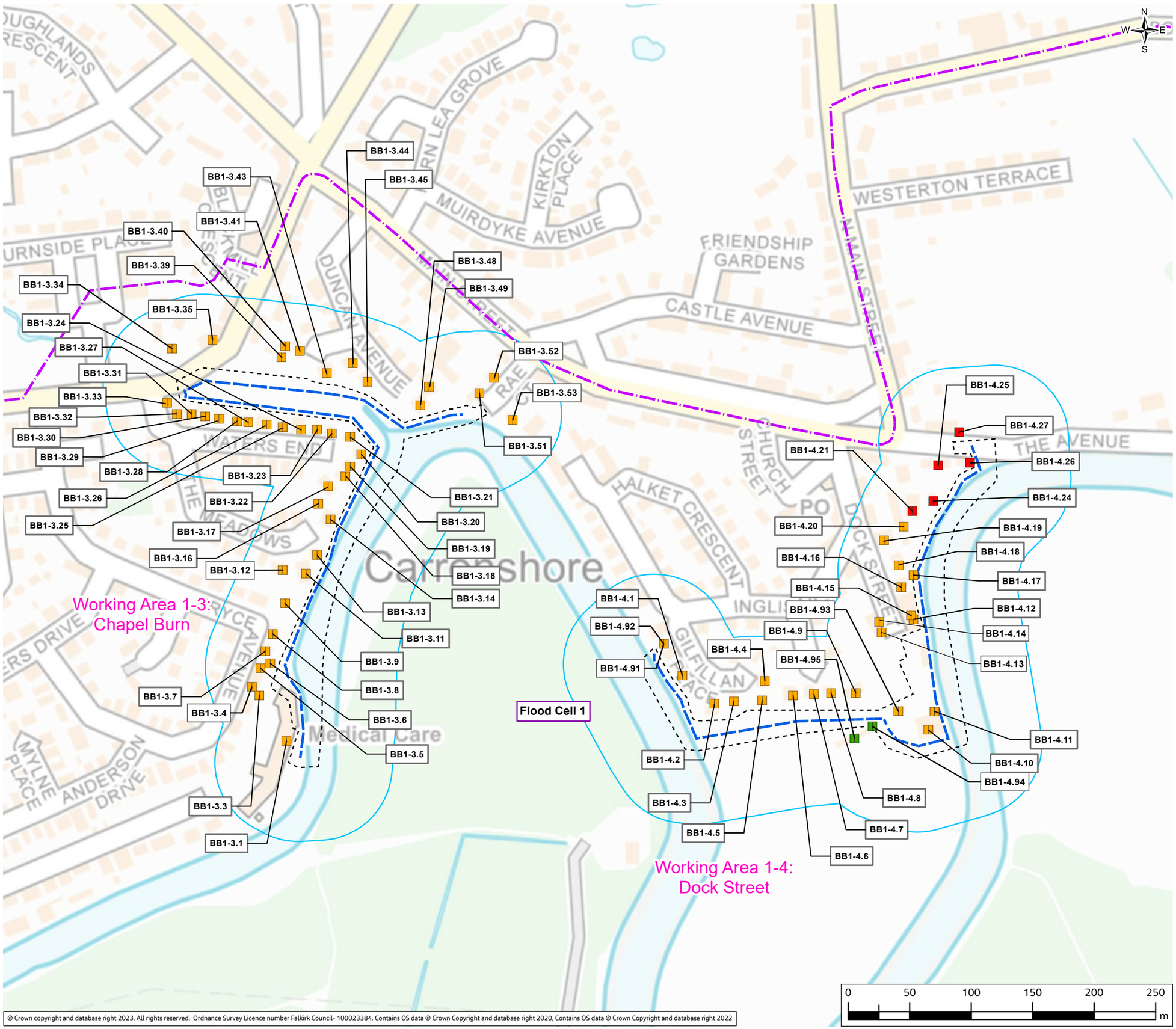


FIGURE B7.3E

Legend

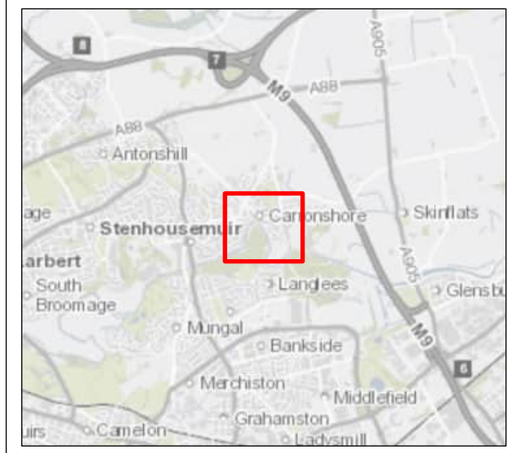
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low



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SHEET 5 OF 16

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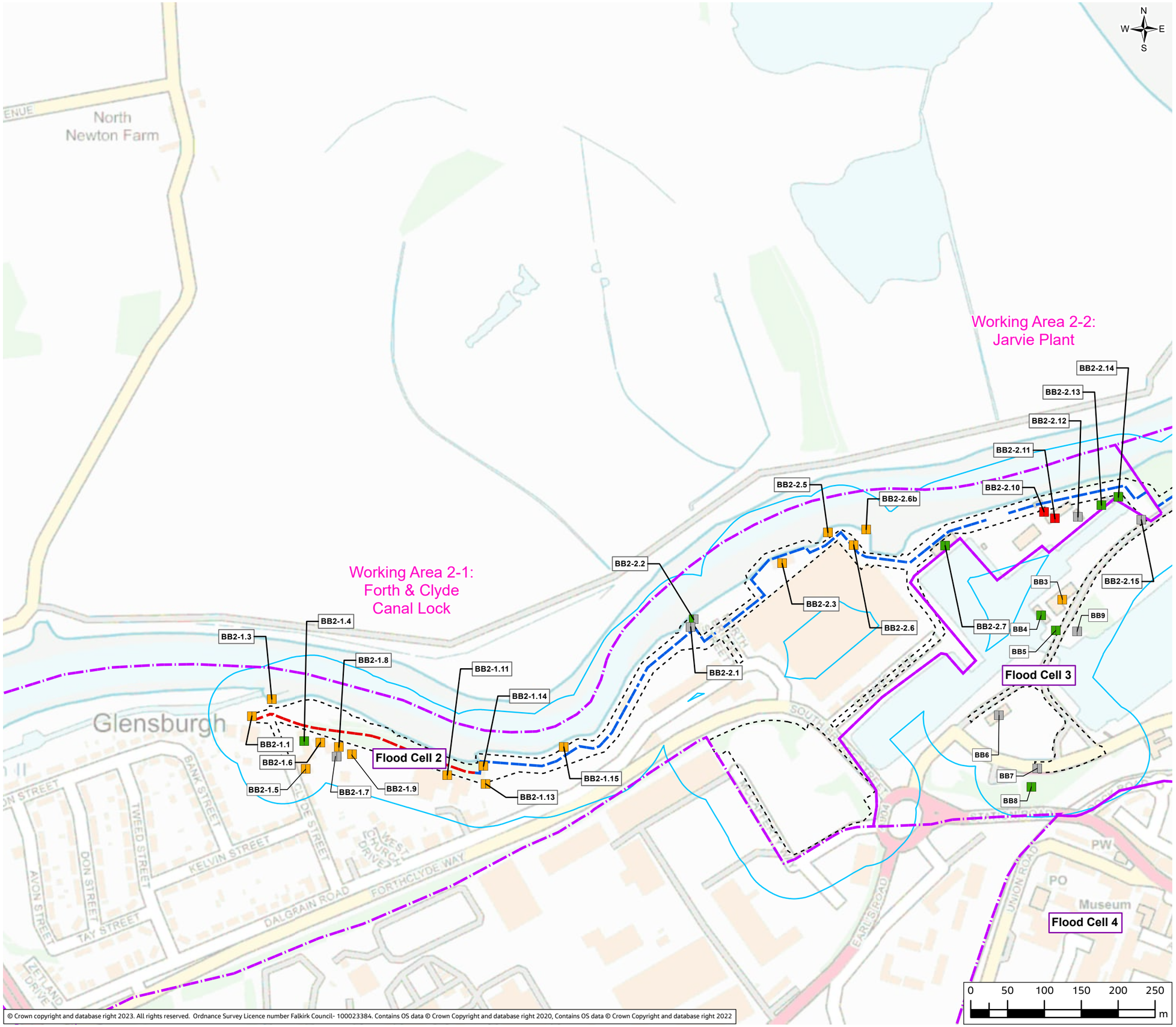
Figure B7.3e

FIGURE B7.3F



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment
- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Low, Negligible
- Negligible, Negligible

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BAT BUILDING SURVEY RESULTS

SHEET 6 OF 16

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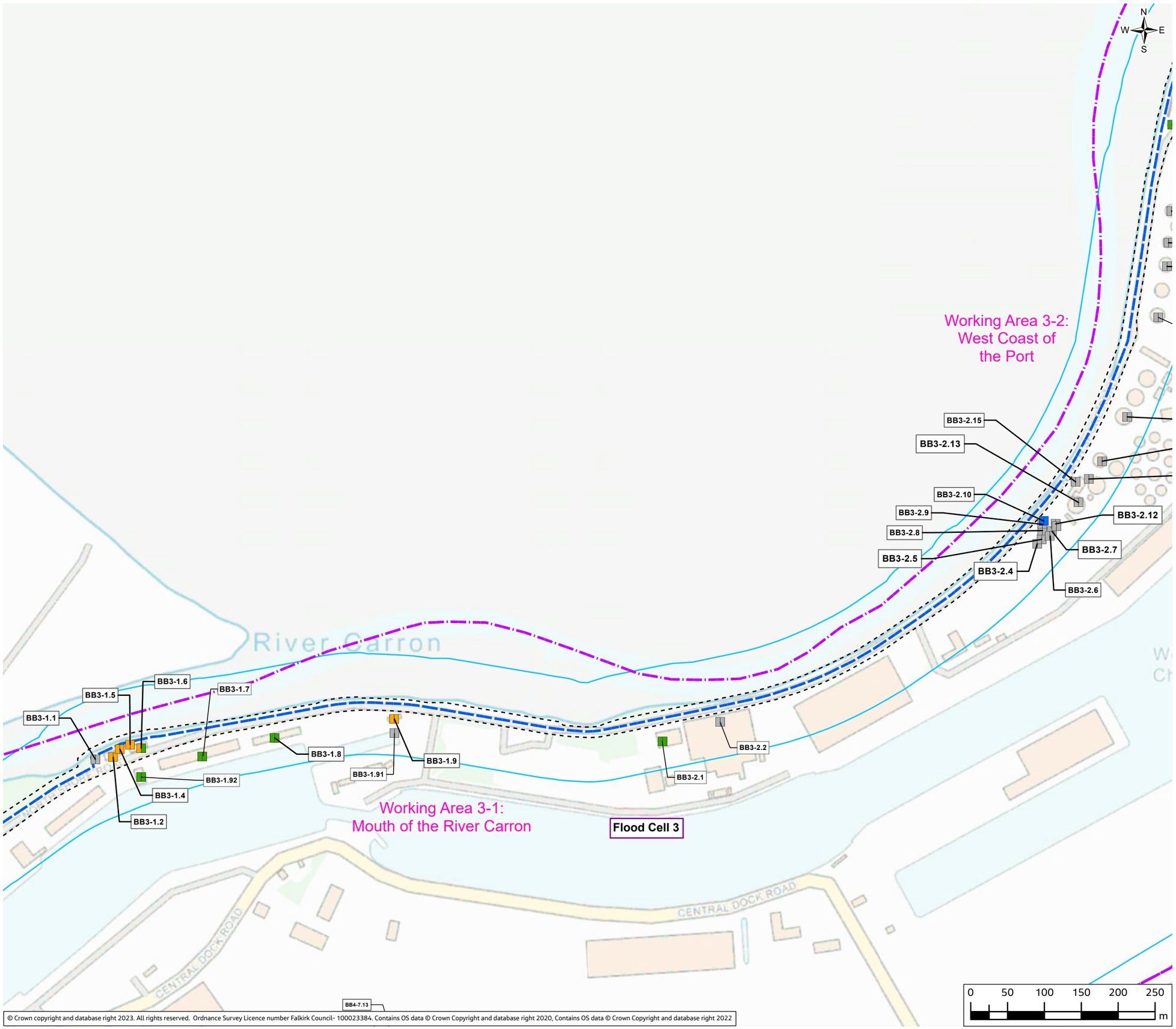
Drawing No.	Figure B7.3f	

FIGURE B7.3G



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- Moderate
- Moderate, Low
- Low
- Negligible, Negligible
- Not Assessed

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BAT BUILDING SURVEY RESULTS

SHEET 7 OF 16

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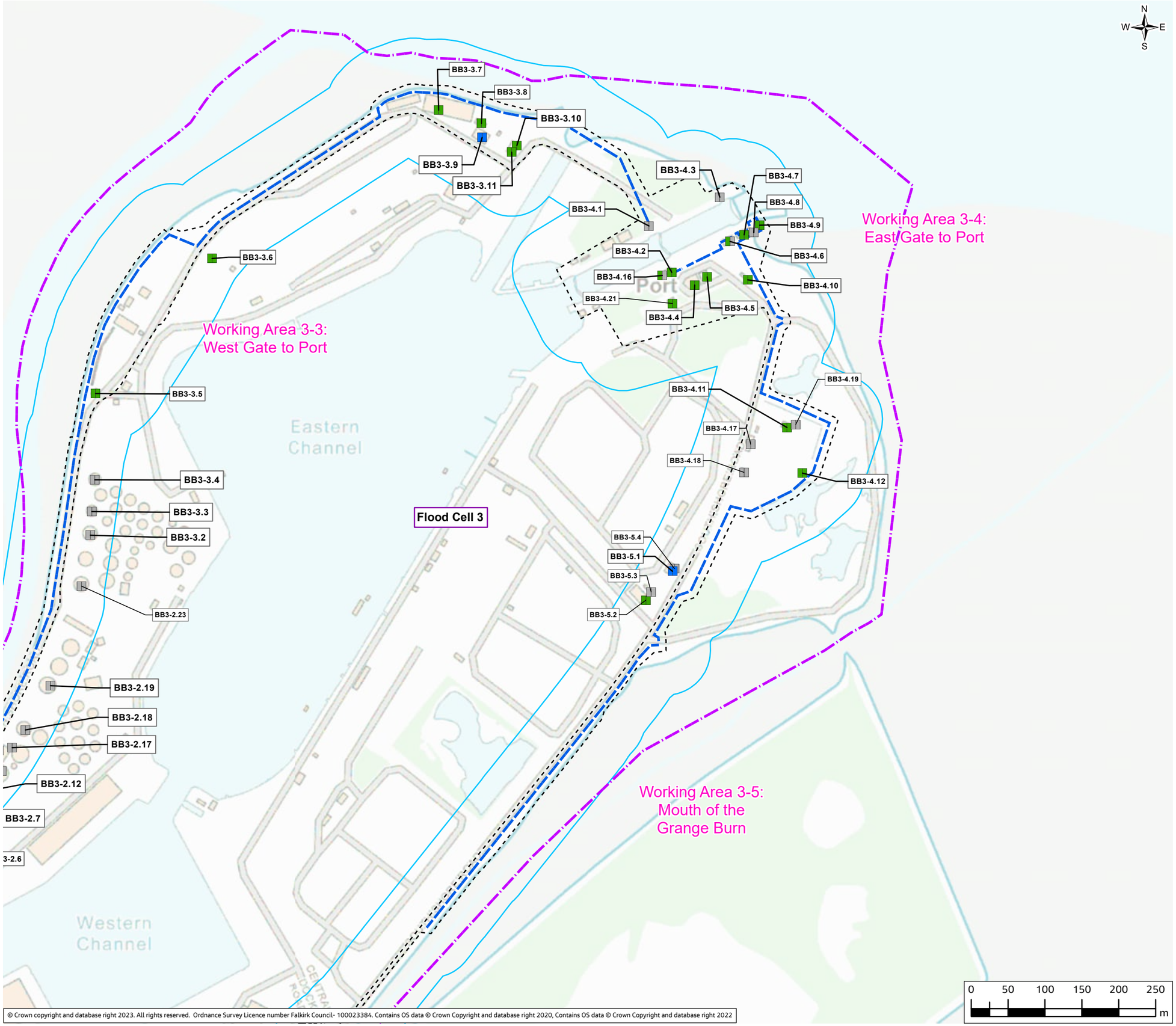
Drawing No.	Figure B7.3g	

FIGURE B7.3H



Legend

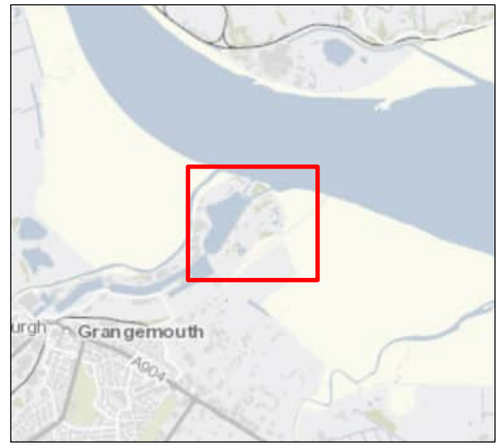
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- Low
- Low, Negligible
- Negligible, Negligible
- Not Assessed



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BAT BUILDING SURVEY RESULTS

SHEET 8 OF 16

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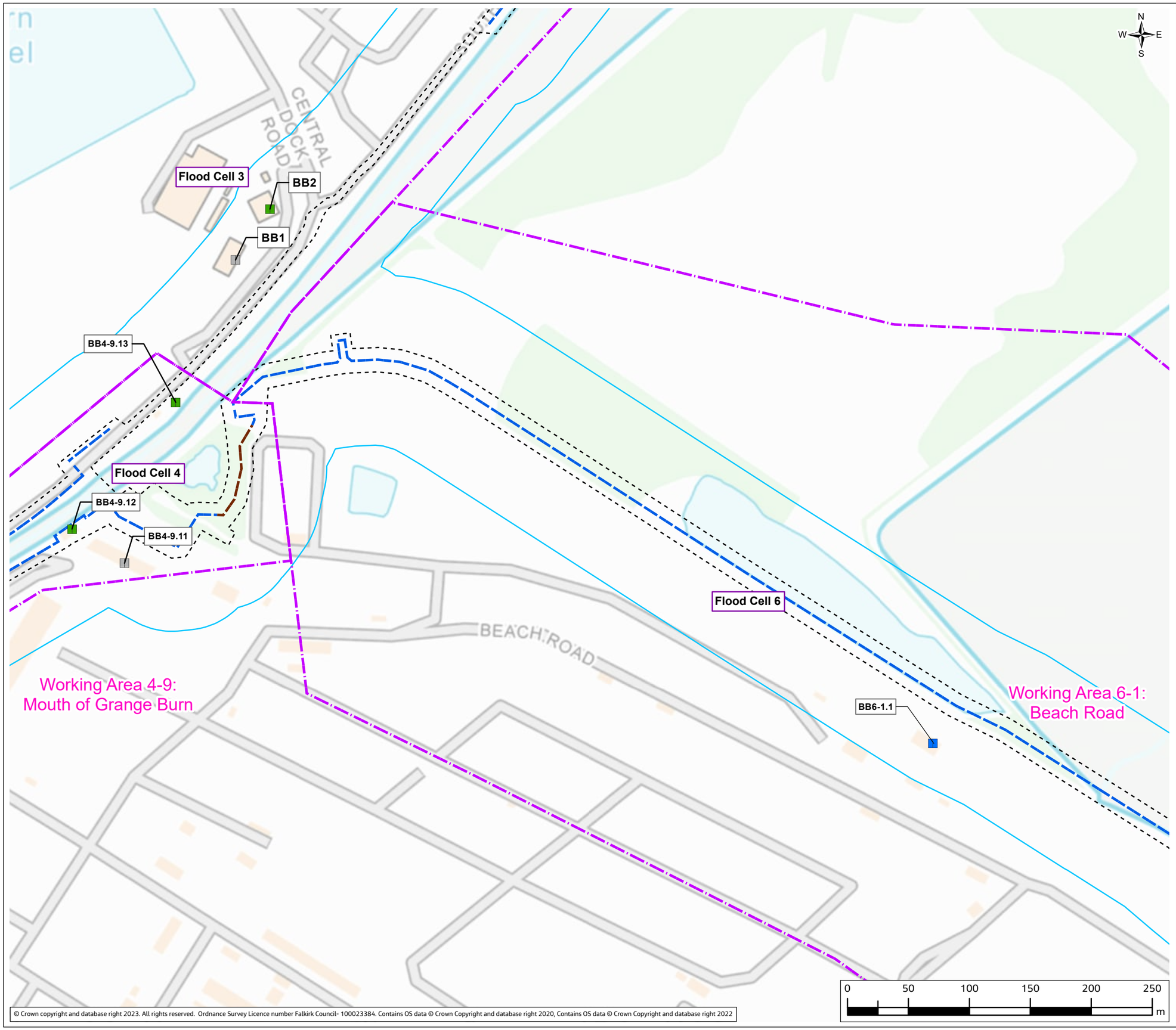
FIGURE B7.3I



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Buildings (Left Summer Potential, Right Winter Potential)

- Low
- Negligible, Negligible
- Not Assessed

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SHEET 16 OF 16

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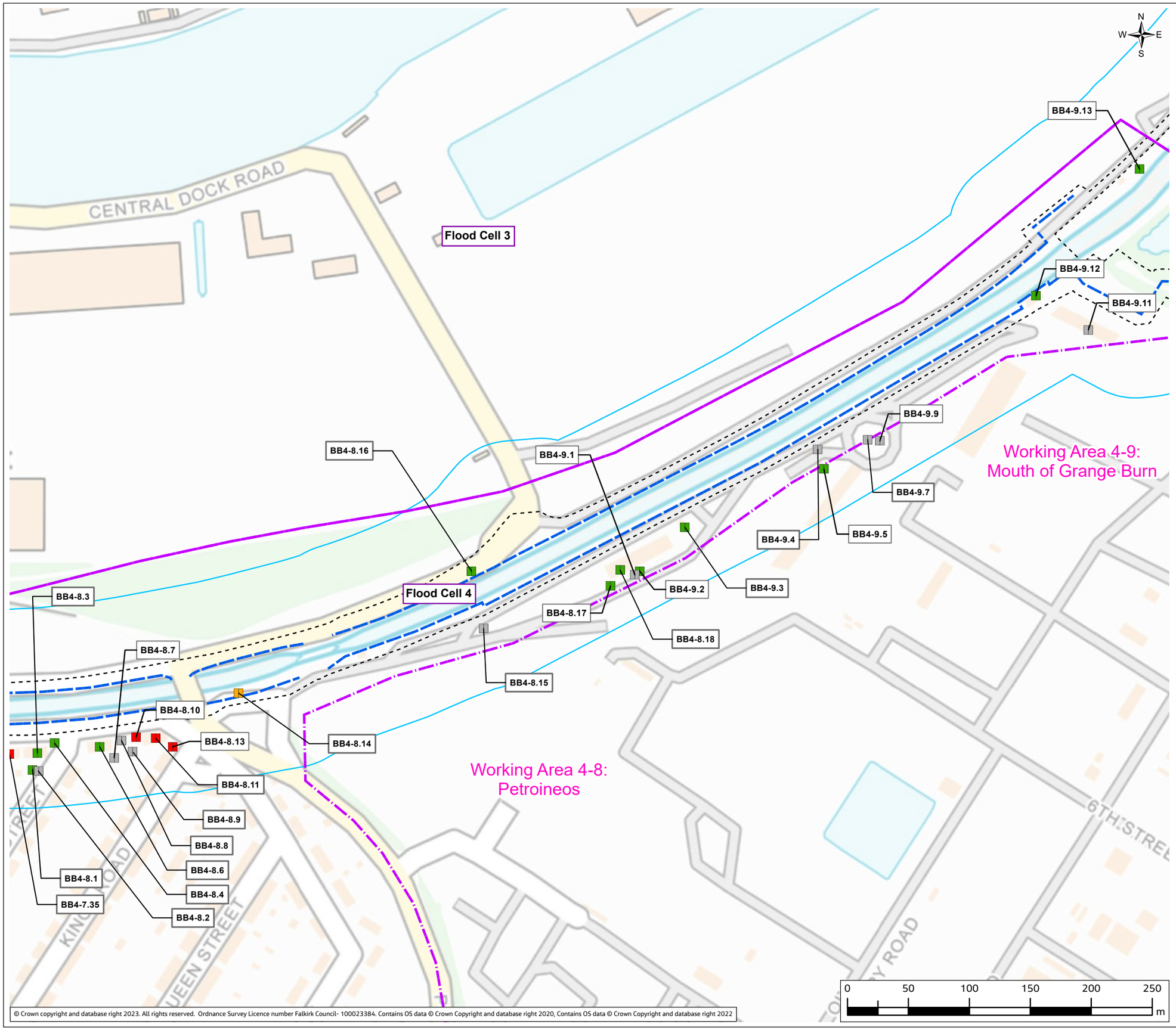
FIGURE B7.3J



Legend

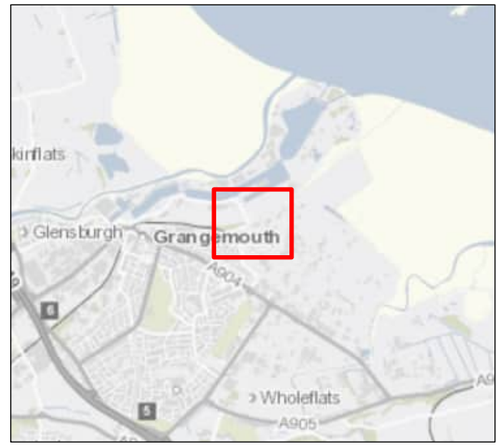
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Negligible, Negligible



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BAT BUILDING SURVEY RESULTS

SHEET 10 OF 16

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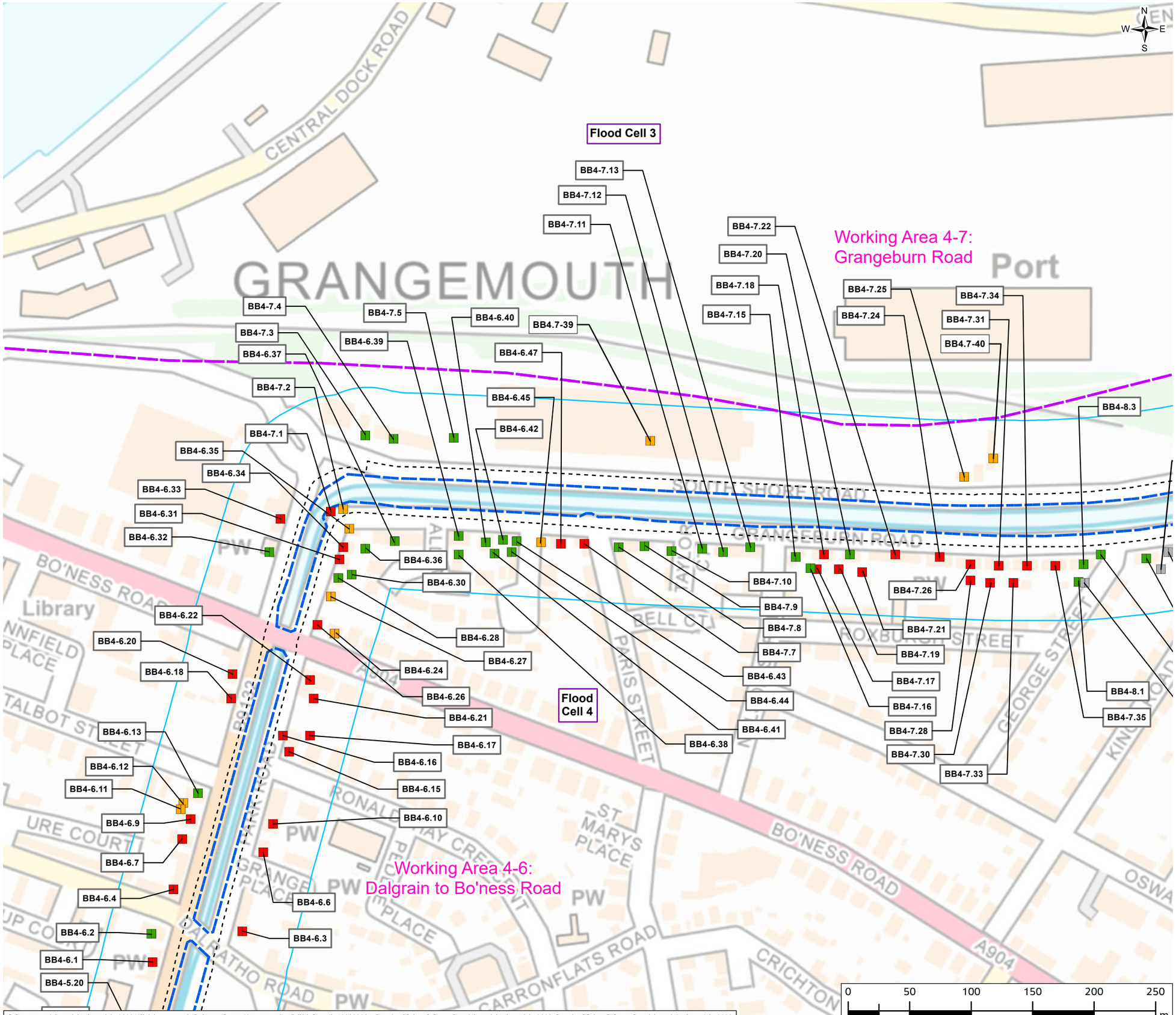
Figure B7.3j

FIGURE B7.3K



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Negligible, Negligible

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BAT BUILDING SURVEY RESULTS

SHEET 11 OF 16

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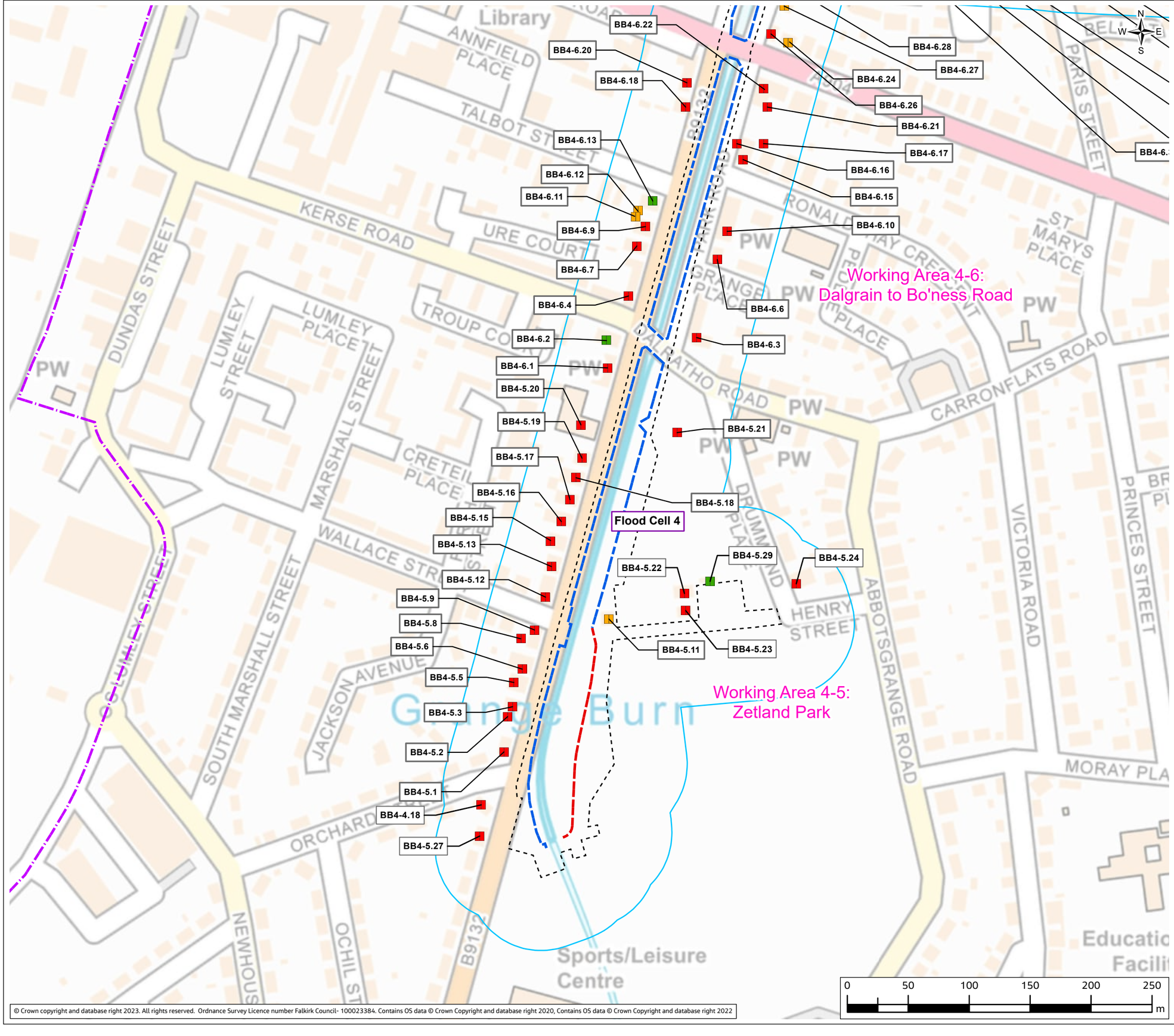
Figure B7.3k

FIGURE B7.3L



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment
- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low

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BAT BUILDING SURVEY RESULTS

SHEET 12 OF 16

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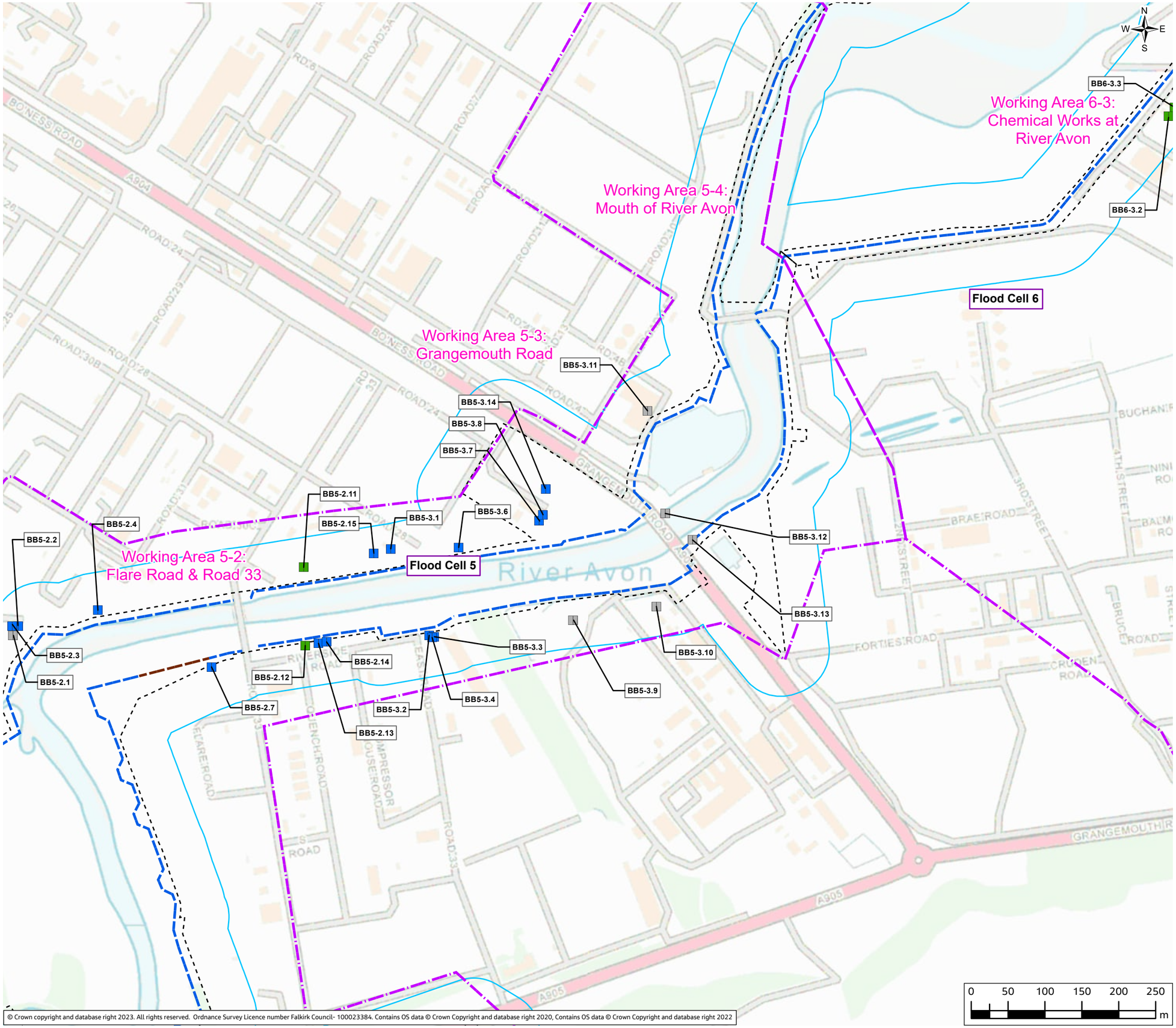
Drawing No.	Figure B7.3l	

FIGURE B7.3M



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Buildings (Left Summer Potential, Right Winter Potential)

- Low
- Negligible, Negligible
- Not Assessed

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SHEET 13 OF 16

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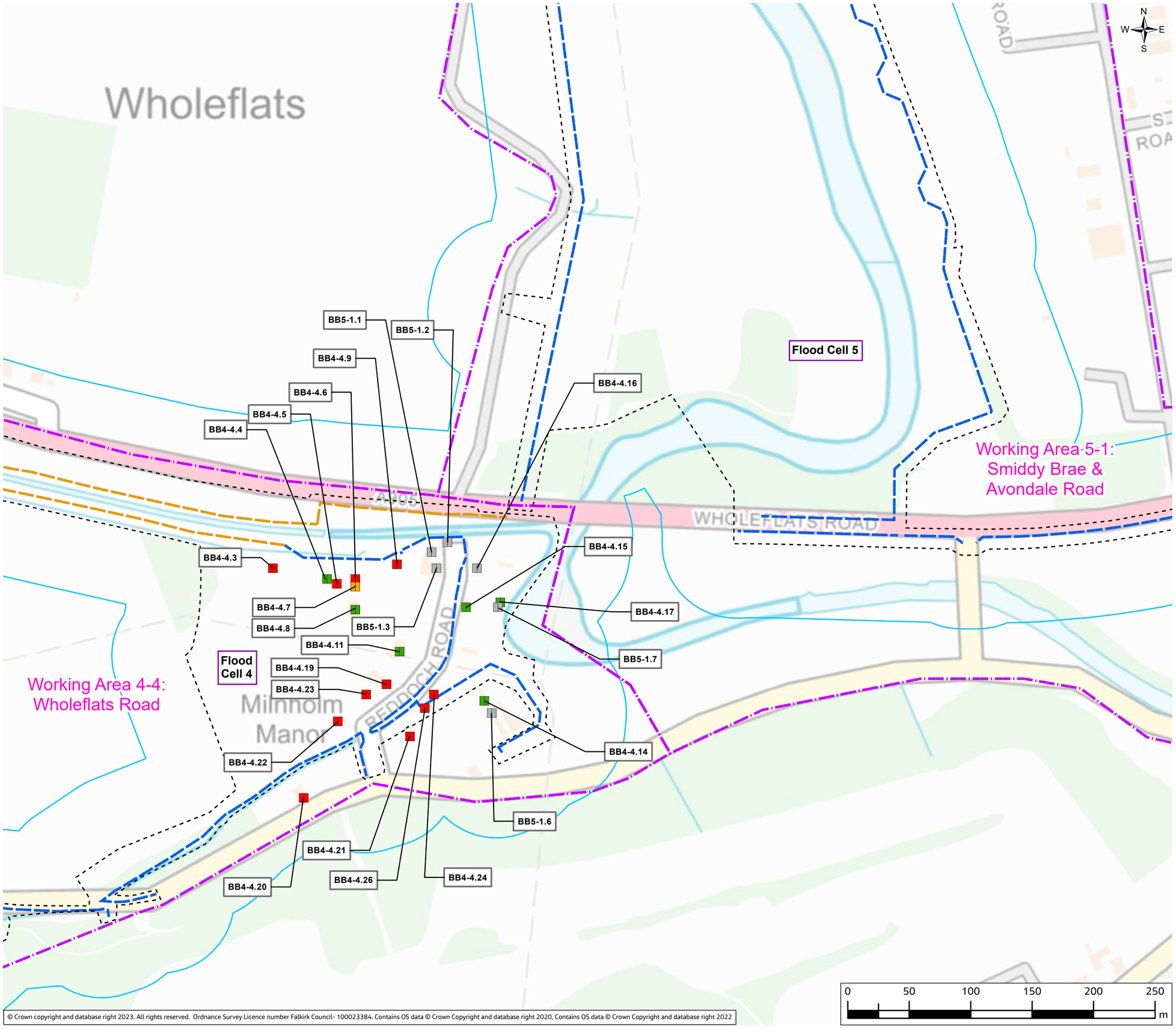
Figure B7.3m

FIGURE B7.3N



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Ground Rising
- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Negligible, Negligible

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SHEET 14 OF 16

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Figure B7.3n

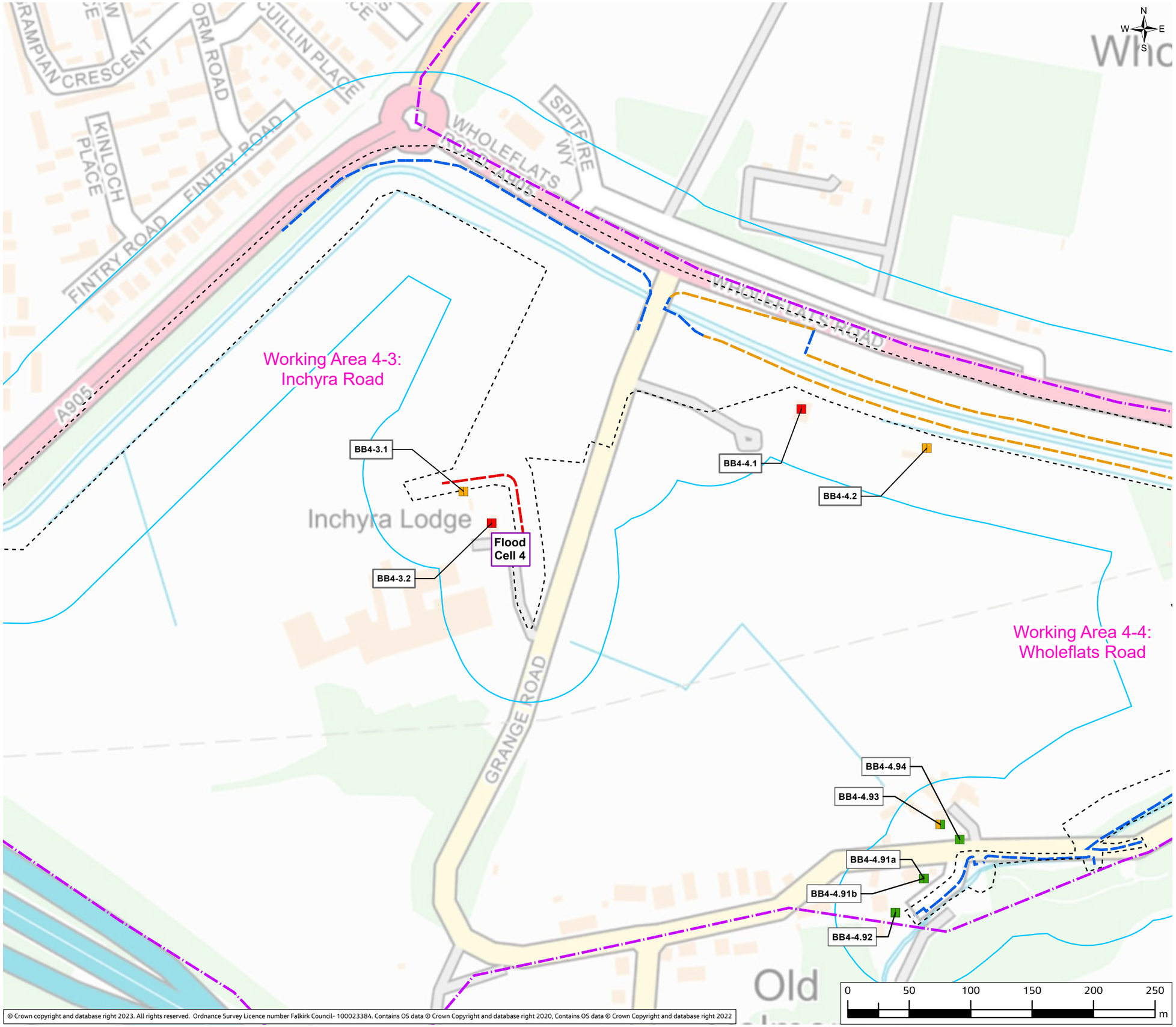


FIGURE B7.3O

Legend

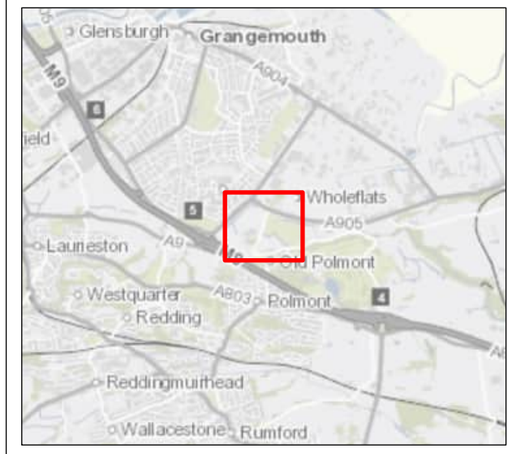
- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell
- Low

Direct Defences

- Embankment
- Ground Rising
- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Moderate, Low



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BAT BUILDING SURVEY RESULTS

SHEET 15 OF 16

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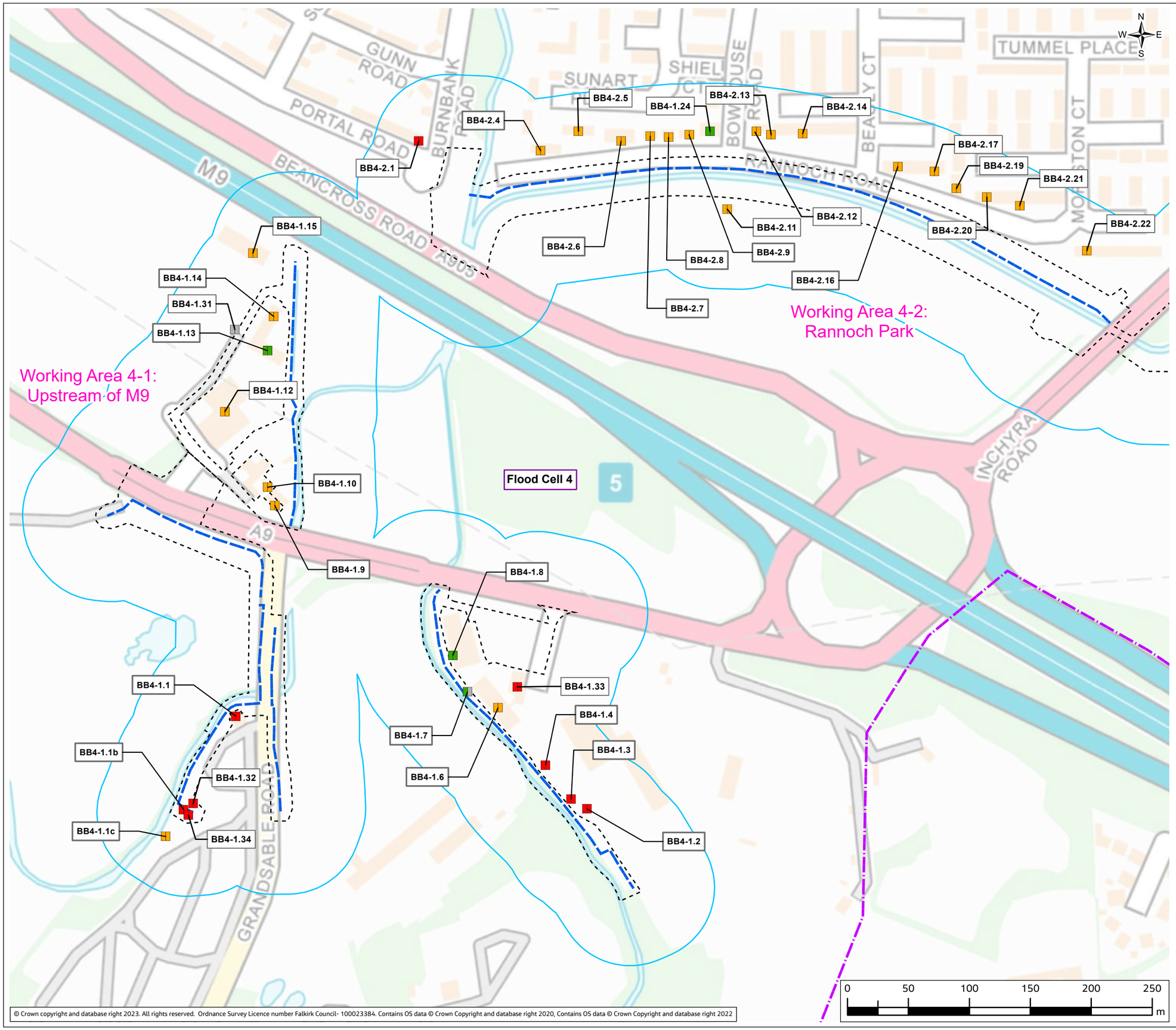
Figure B7.3o

FIGURE B7.3P



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Buildings (Left Summer Potential, Right Winter Potential)

- High
- Moderate
- Low
- Low, Negligible
- Negligible, Negligible

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Grangemouth
Flood Protection Scheme

Drawing Title

BAT BUILDING SURVEY RESULTS

SHEET 16 OF 16

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Figure B7.3p

FIGURE B7.4A

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences
- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

Bat Trees
- High
- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible

Bat Structures
- High
- Moderate
- Low
- Low, Negligible
- Negligible
- Not Assessed

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BAT STRUCTURES AND TREES
SURVEY RESULTS
SHEET 1 OF 13

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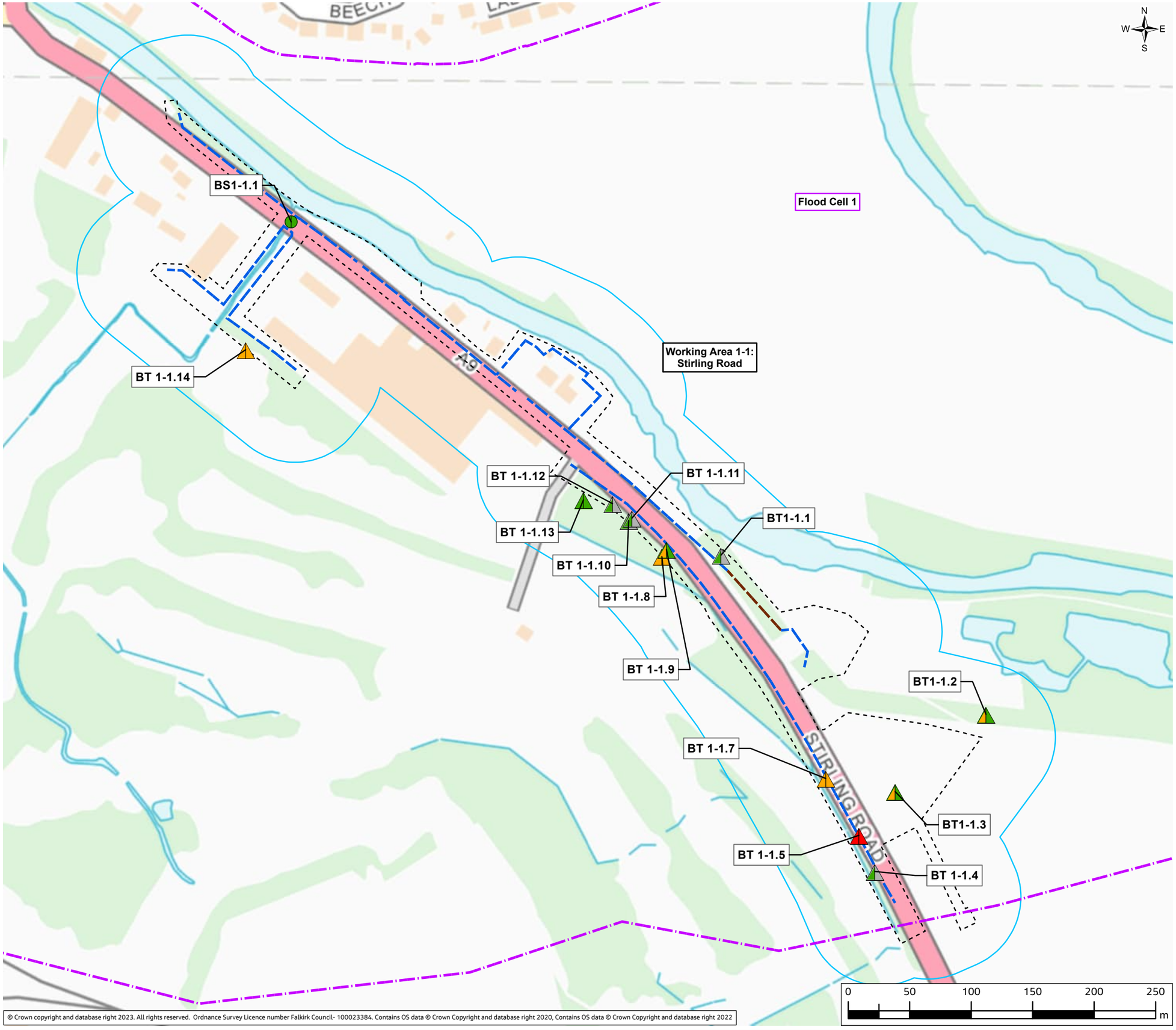
Figure B7.4a

0 1 2 3 4 5 Kilometers

FIGURE B7.4B



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Structures

- Low

Bat Trees

- High
- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible

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BAT STRUCTURES AND TREES
SURVEY RESULTS CONFIDENTIAL

SHEET 2 OF 13

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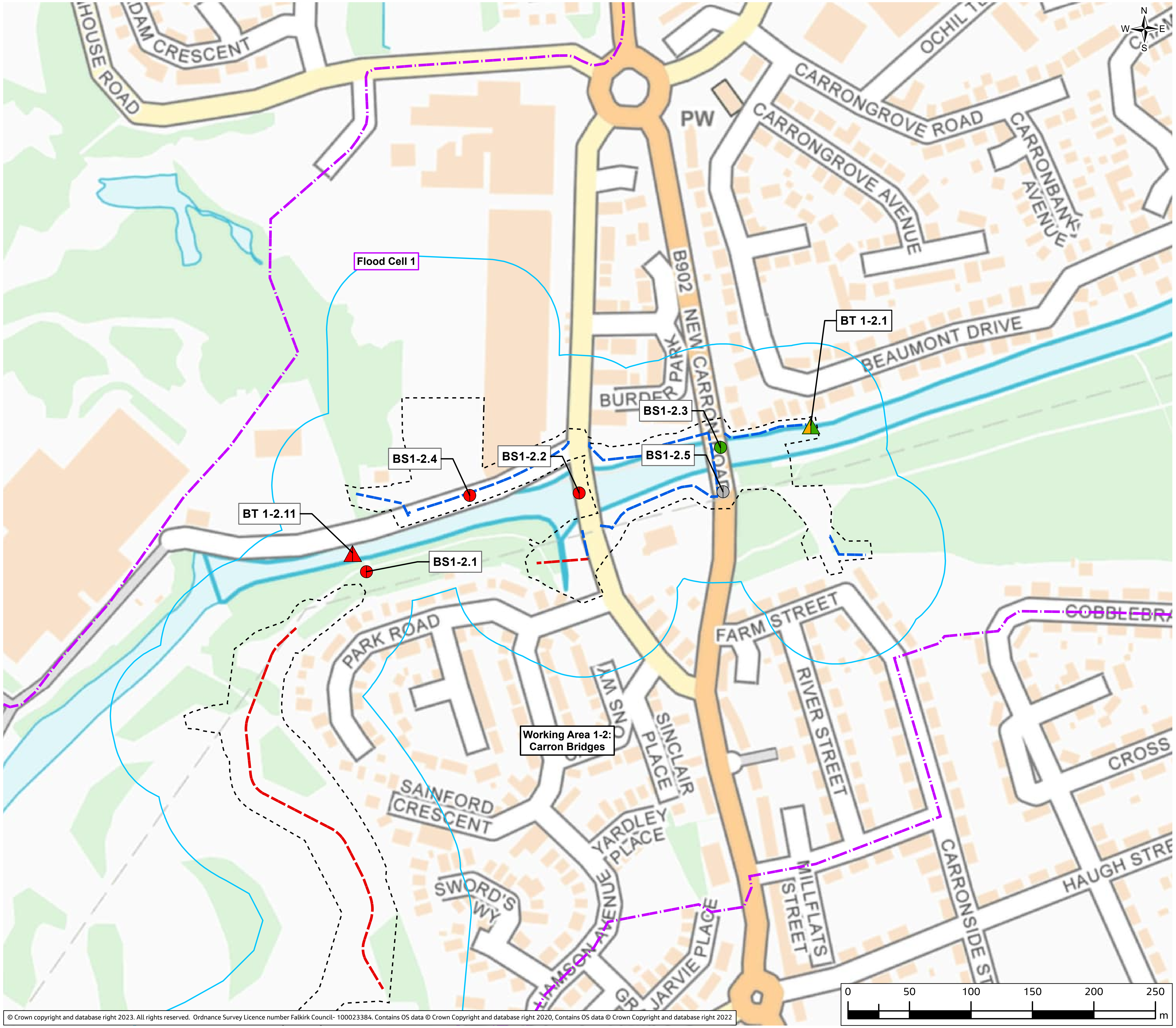

FIGURE B7.4C

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Embankment
- Flood Wall

Bat Structures

- High
- Low
- Negligible

Bat Trees

- High
- Moderate, Low

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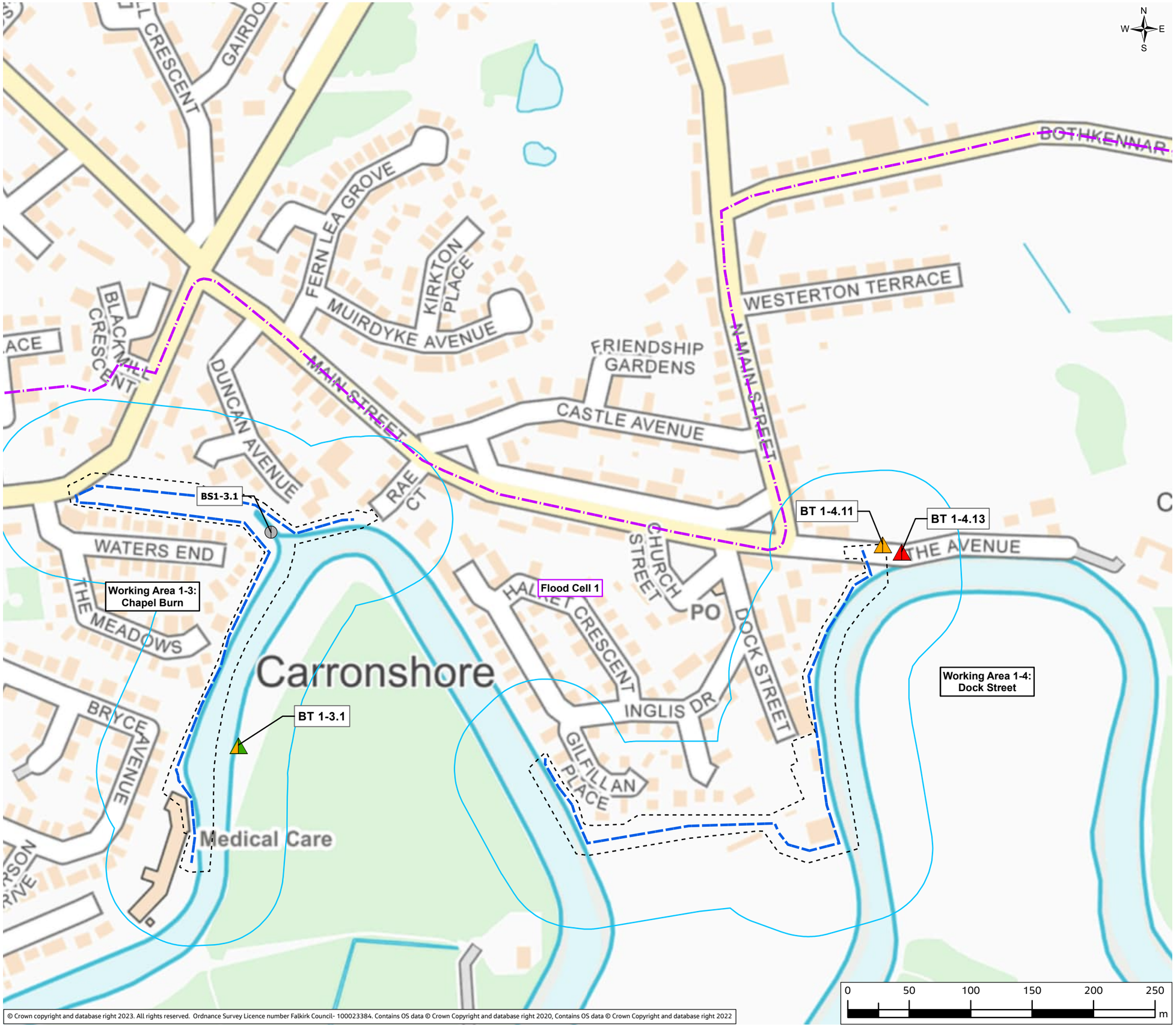
FIGURE B7.4D



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

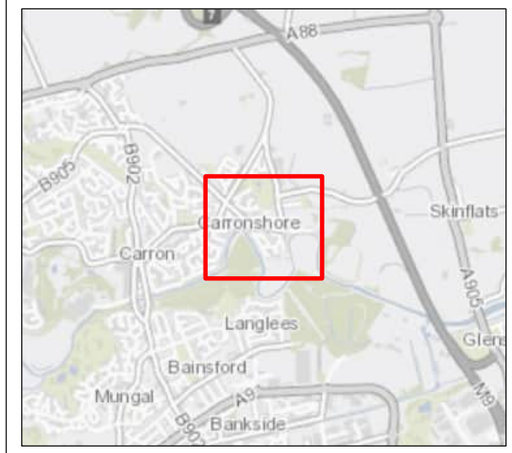
- Flood Wall

Bat Structures

- Negligible

Bat Trees

- High
- Moderate, Moderate
- Moderate, Low



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BAT STRUCTURES AND TREES
SURVEY RESULTS CONFIDENTIAL

SHEET 4 OF 13

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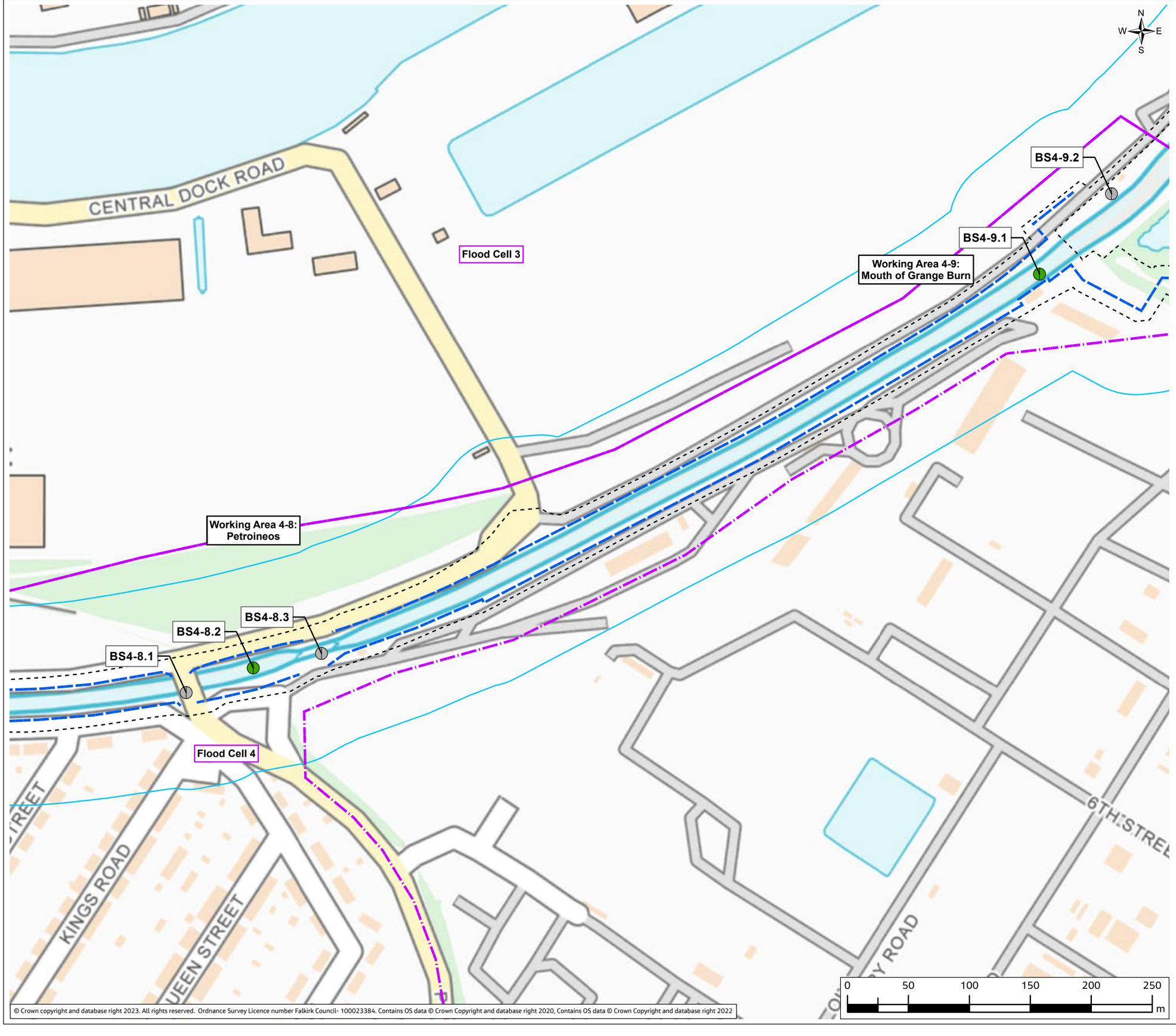
Drawing No.

Figure B7.4d

FIGURE B7.4E



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Structures

- Low
- Negligible

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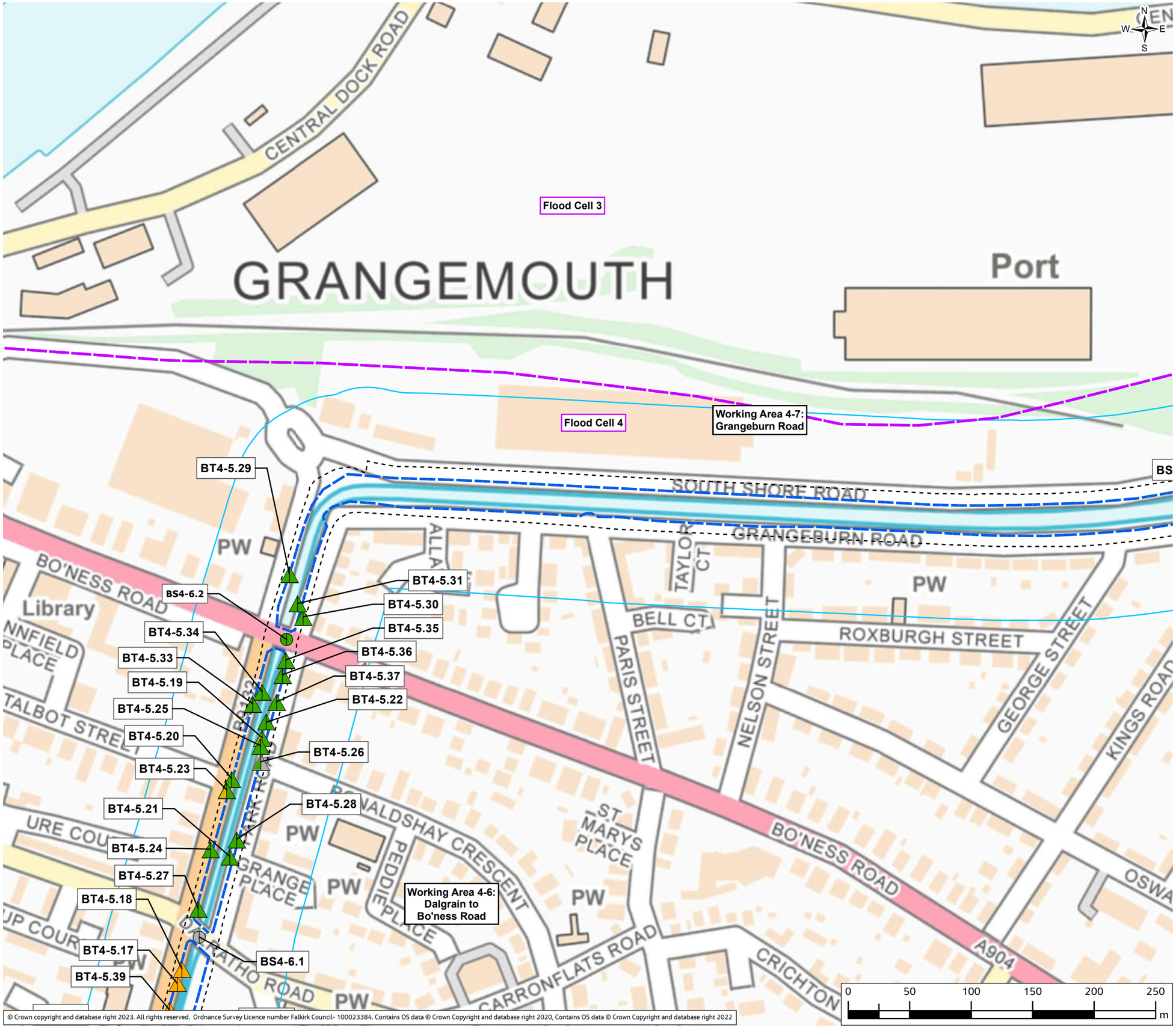
Figure B7.4e

FIGURE B7.4F



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

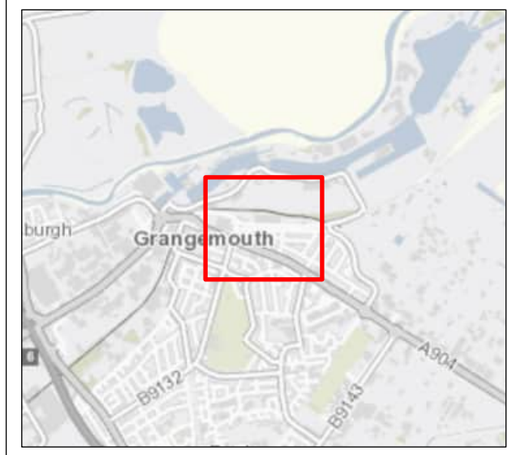
- Flood Wall

Bat Structures

- Low
- Negligible

Bat Trees

- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible



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Drawing No.	Figure B7.4f	

FIGURE B7.4G

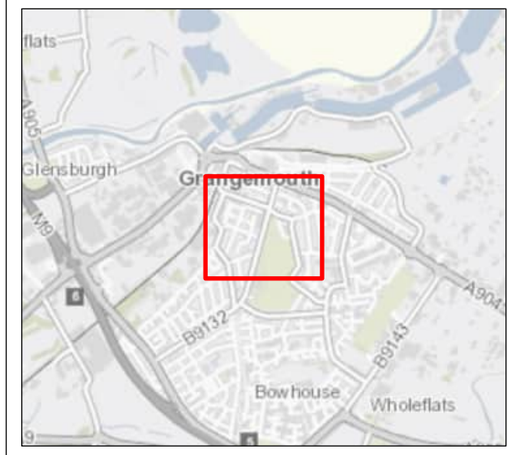
Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences
- Embankment
- Flood Wall

Bat Structures
- Low
- Negligible

Bat Trees
- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible



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Drawing No.	Figure B7.4g	

BT4-5.30
BT4-5.35
BT4-5.36
BT4-5.37
BT4-5.22
BT4-5.34
BT4-5.33
BT4-5.19
BT4-5.25
BT4-5.20
BT4-5.23
BT4-5.26
BT4-5.28
BT4-5.21
BT4-5.24
BT4-5.27
BT4-5.18
BT4-5.17
BS4-6.1
BT4-5.39
BT 4-5.5
BT 4-5.4
BT4-5.16
BT4-5.38
BT4-5.15
BT4-5.14
BT4-5.32
BT4-5.13
BT 4-5.12
BT 4-5.10
BS4-5.1
BT 4-5.11
BT 4-5.7
BT 4-5.6
BT 4-5.8
BT 4-5.9
BT 4-5.2
BS4-5.2

Flood Cell 4

Working Area 4-6: Dalgrain to Bo'ness Road

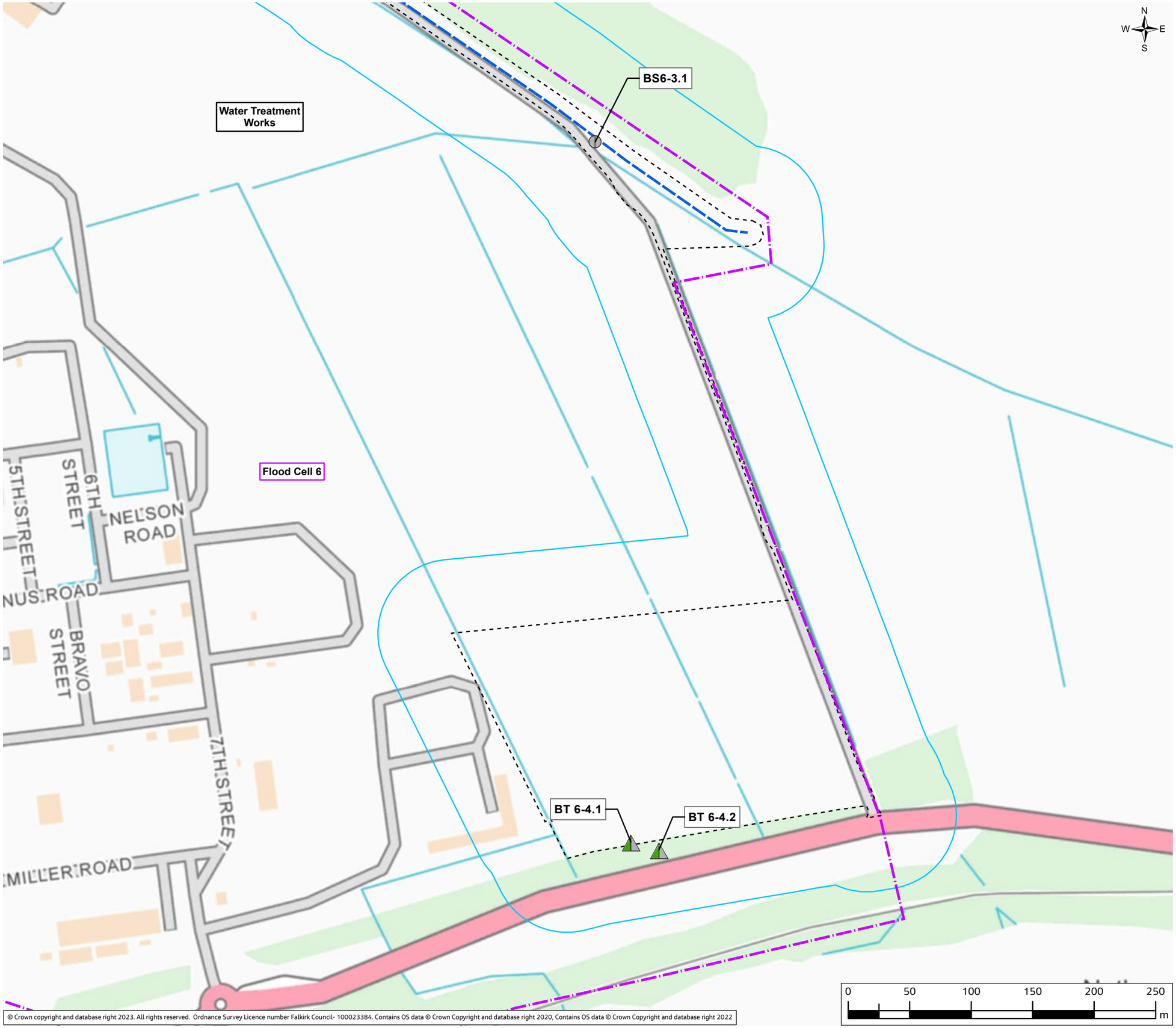
Working Area 4-5: Zetland Park

Grange Burn

Library
ANNFIELD PLACE
TALBOT STREET
KERSE ROAD
URE COURT
TROUP COURT
GRANGE PLACE
PEDDIE PLACE
WALDSHAY CRESCENT
ST MARYS PLACE
PARIS STREET
DUNDAS STREET
LUMLEY STREET
LUMLEY PLACE
MARSHALL STREET
CRETEIL PLACE
WALLACE STREET
SOUTH MARSHALL STREET
JACKSON AVENUE
ORCHARD STREET
NEWHOUSE
OCHIL STREET
B9132
ATHO ROAD
CARRONFLATS ROAD
DRUMMOND PLACE
HENRY STREET
ABBOTSGRANGE ROAD
VICTORIA ROAD
PRINCES STREET
MORAY PLACE
Sports/Leisure Centre
PW

0 50 100 150 200 250 m

FIGURE B7.4H



Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Structures

- Negligible

Bat Trees

- Low, Negligible

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SURVEY RESULTS CONFIDENTIAL

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FIGURE B7.4I

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall

Bat Structures

- Moderate
- Not Assessed

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Working Area 5-4: Mouth of River Avon
Working Area 5-3: Grangemouth Road
BS5-3.3
BS5-3.2
BS5-3.1
Flood Cell 5
River Avon
BO'NESS ROAD
GRANGEMOUTH ROAD
A904
BRAE ROAD
2ND STREET
FORTIES ROAD
EASTER ROAD
COMPRESSOR HOUSE ROAD
ROAD 11
ROAD 10
RD 4A
ROAD 13
RD 4B
ROAD 15
RD 33
ROAD 24
ROAD 4
ROAD 28
N
W
E
S
0 50 100 150 200 250 m

FIGURE B7.4J

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Structures

- Not Assessed

Bat Trees

- Moderate, Moderate
- Moderate, Low

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BAT STRUCTURES AND TREES
SURVEY RESULTS CONFIDENTIAL

SHEET 10 OF 13

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Drawing No.	Figure B7.4j	

FIGURE B7.4K

Wholeflats

Working Area 4-4: Wholeflats Road

Working Area 5-1: Smiddy Brae & Avondale Road

Flood Cell 5

Flood Cell 4

BT 5-1.1
BT 5-1.2
BT 5-1.3
BT 5-1.4
BT 5-1.5
BT 5-1.6
BT 4-4.19
BS4-4.1
BS5-1.1
BT4-4.6
BT4-4.10
BS4-4.2
BS4-4.6
BT 4-4.3
BS4-4.3
BT4-4.9
BT4-4.8
BT 4-4.7
BT 4-4.1
BT 4-4.5
BT 4-4.2
BT 4-4.4

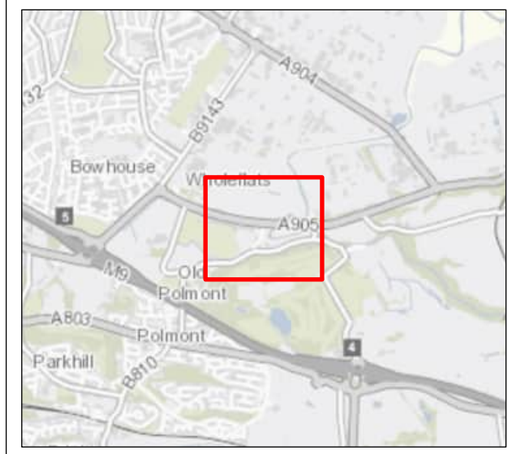
A905
WHOLEFLATS ROAD
BEDDOCH ROAD
Milnholm Manor

N
W
E
S

0 50 100 150 200 250 m

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell
- Direct Defences
  - Ground Rising
  - Flood Wall
- Bat Structures
  - Moderate
  - Low
  - Low, Negligible
  - Negligible
- Bat Trees
  - Moderate, Moderate
  - Moderate, Low
  - Low
  - Low, Negligible



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Drawing No.
Figure B7.4k

FIGURE B7.4L

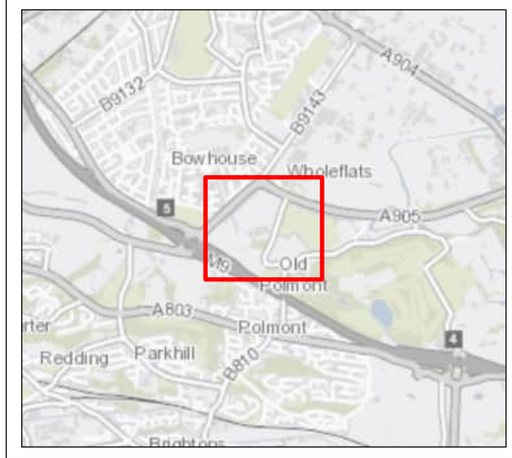
Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences
- Embankment
- Ground Rising
- Flood Wall

Bat Structures
- Moderate
- Low

Bat Trees
- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible



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SHEET 12 OF 13

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Drawing No.: Figure B7.4l

FIGURE B7.4M

Legend

- Site Boundary
- Site Boundary 30m Buffer
- Flood Cell

Direct Defences
- Flood Wall

Bat Structures
- Low
- Low, Negligible
- Negligible

Bat Trees
- High
- Moderate, Moderate
- Moderate, Low
- Low
- Low, Negligible

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SHEET 13 OF 13

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0 50 100 150 200 250 m

FIGURE B7.5A

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

Bat Transects

- Listening Points
- Passive Deployment
- Routes

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SHEET 1 OF 12

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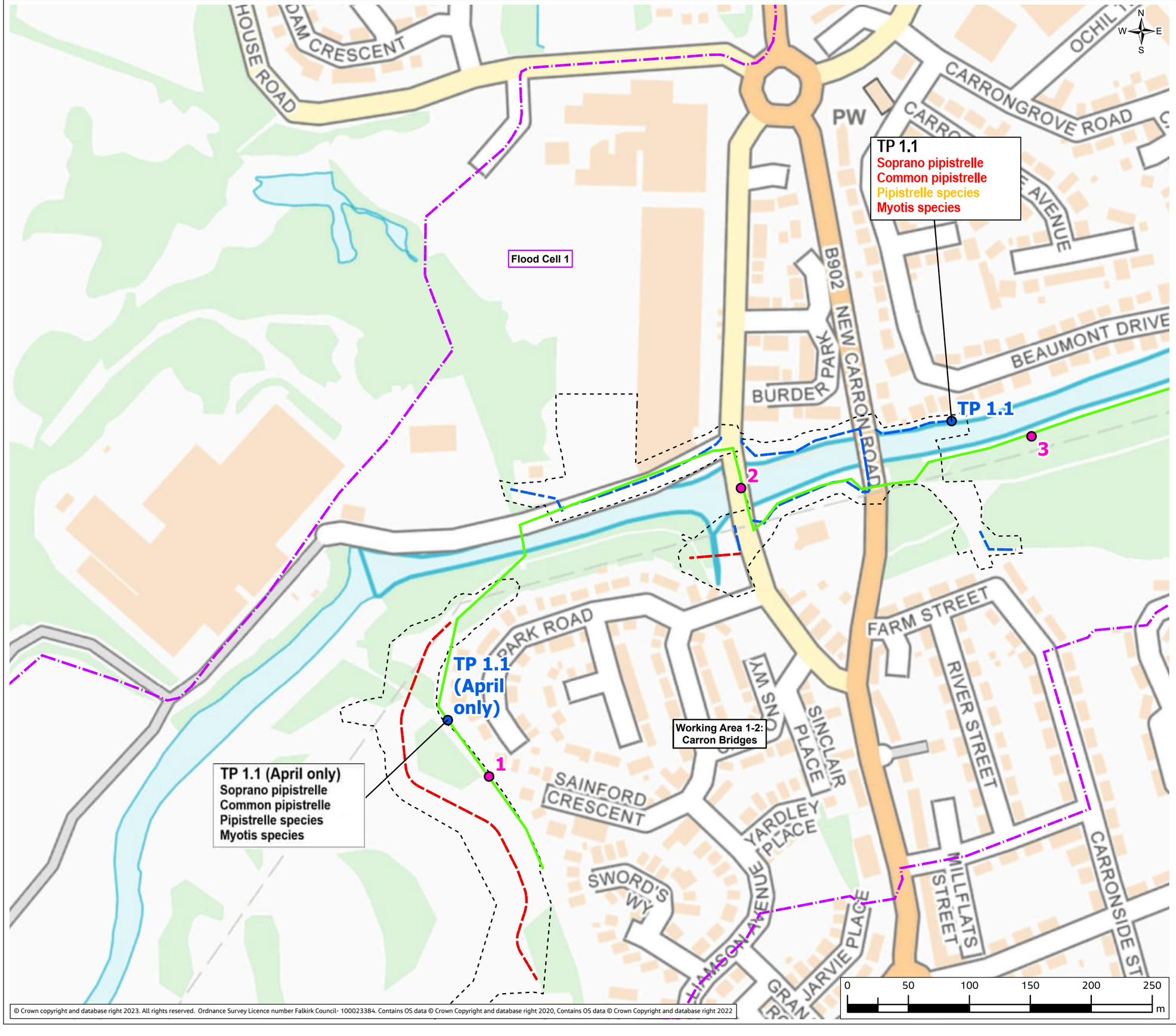
0 1 2 3 4 5 Kilometers

FIGURE B7.5B



Legend

- Site Boundary
- Flood Cell

Direct Defences

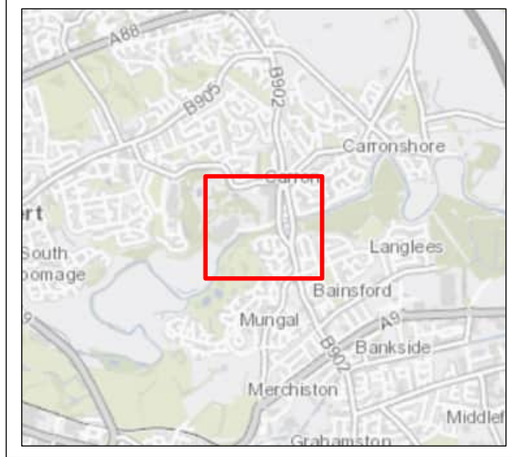
- Embankment
- Flood Wall

Bat Transects

- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D



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Project

Grangemouth
Flood Protection Scheme

Drawing Title

BAT ACTIVITY SURVEY

SHEET 2 OF 12

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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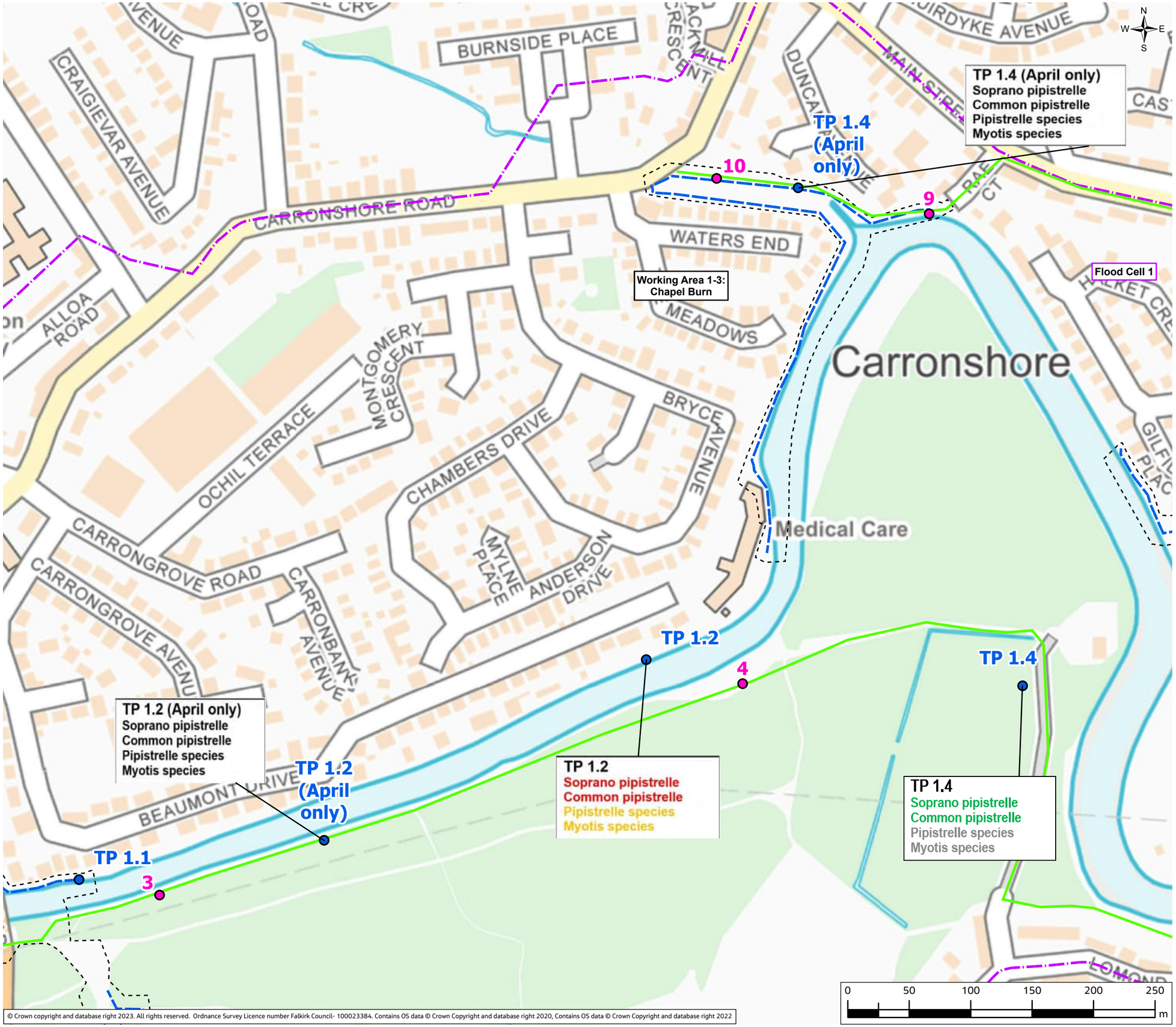
Drawing No.	Figure B7.5b	

FIGURE B7.5C



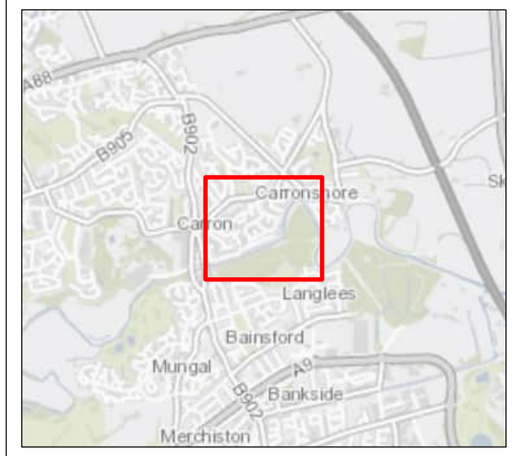
Legend

- Site Boundary
- Flood Cell

Direct Defences
- Flood Wall

Bat Transects
- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level
- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D



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Drawing Title: BAT ACTIVITY SURVEY

SHEET 3 OF 12

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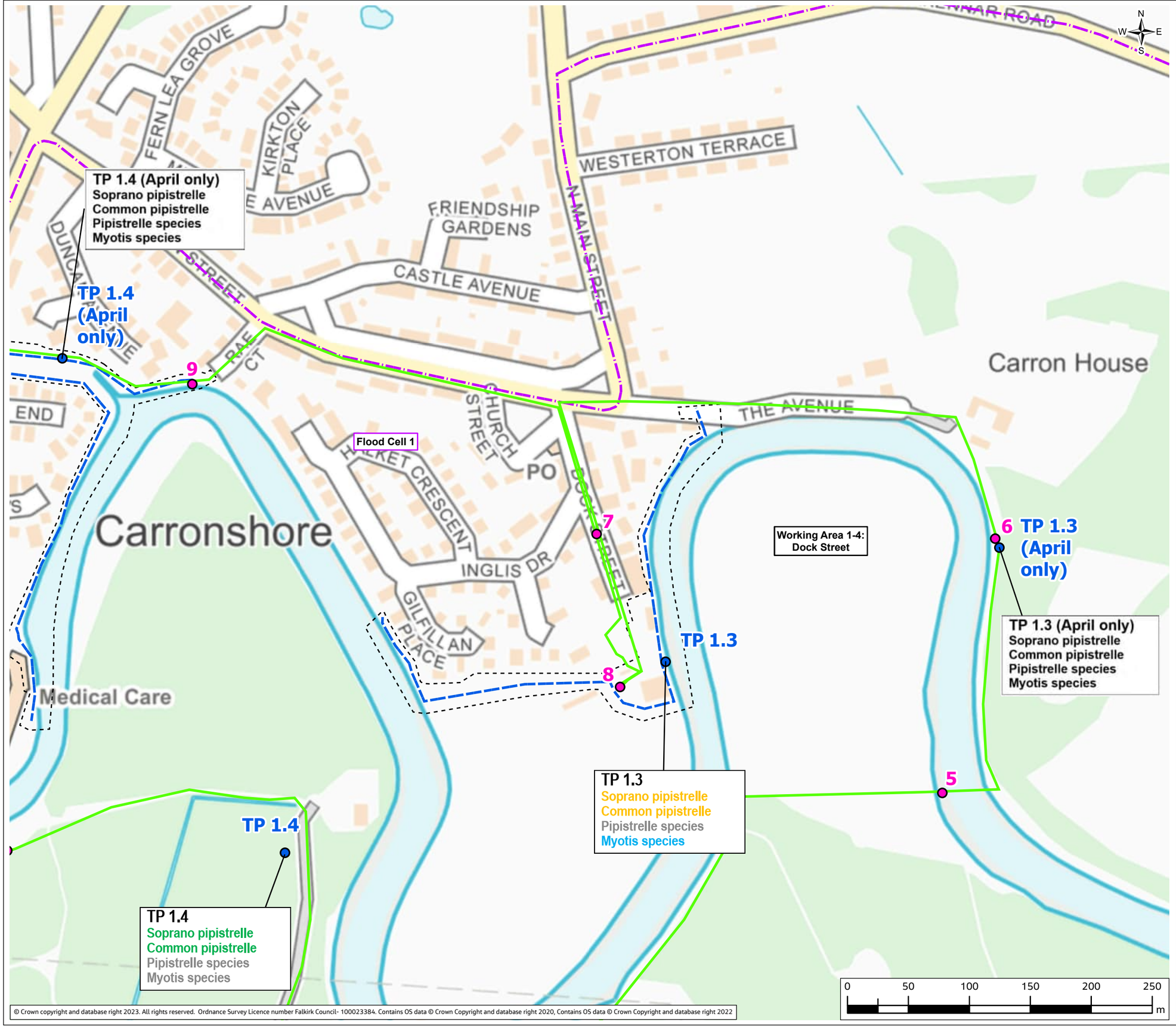
Drawing No.	Figure B7.5c	

FIGURE B7.5D



Legend

- Site Boundary
- Flood Cell

Direct Defences
- Flood Wall

Bat Transects
- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level
- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

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BAT ACTIVITY SURVEY

SHEET 4 OF 12

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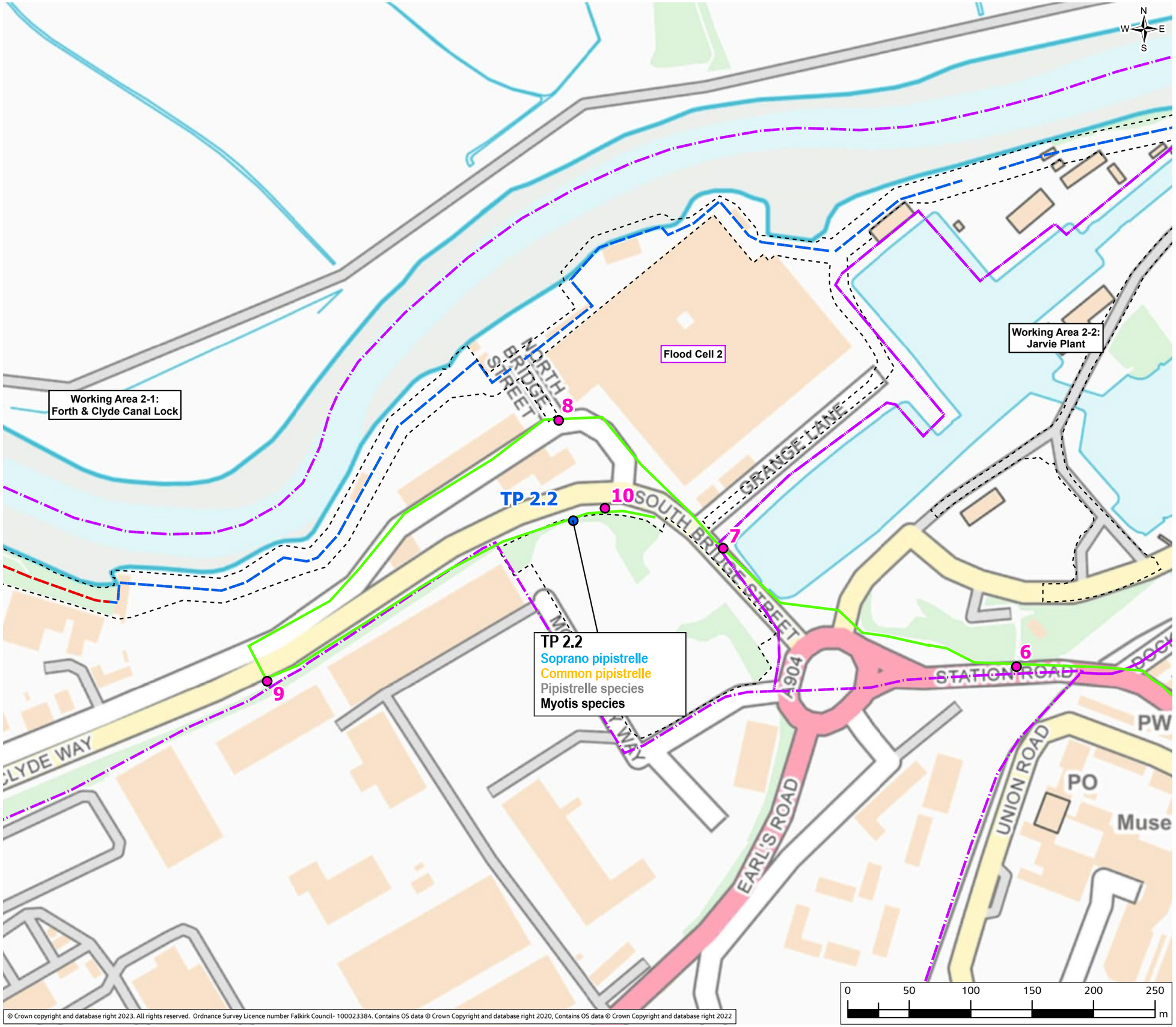
Drawing No.

Figure B7.5d

FIGURE B7.5E



Legend

- Site Boundary
- Flood Cell

Direct Defences

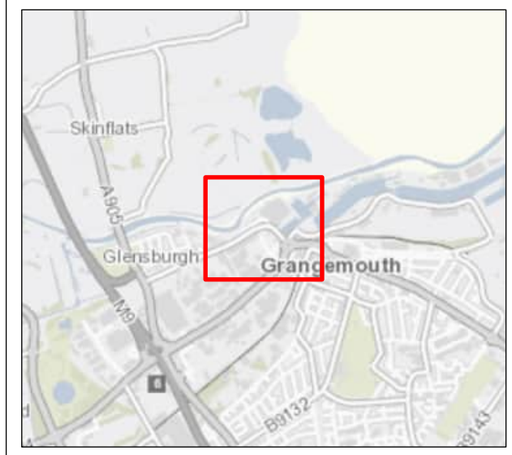
- Embankment
- Flood Wall

Bat Transects

- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D



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BAT ACTIVITY SURVEY

SHEET 5 OF 12

Drawing Status: S8-SUITABLE FOR STATUTORY CONSENT

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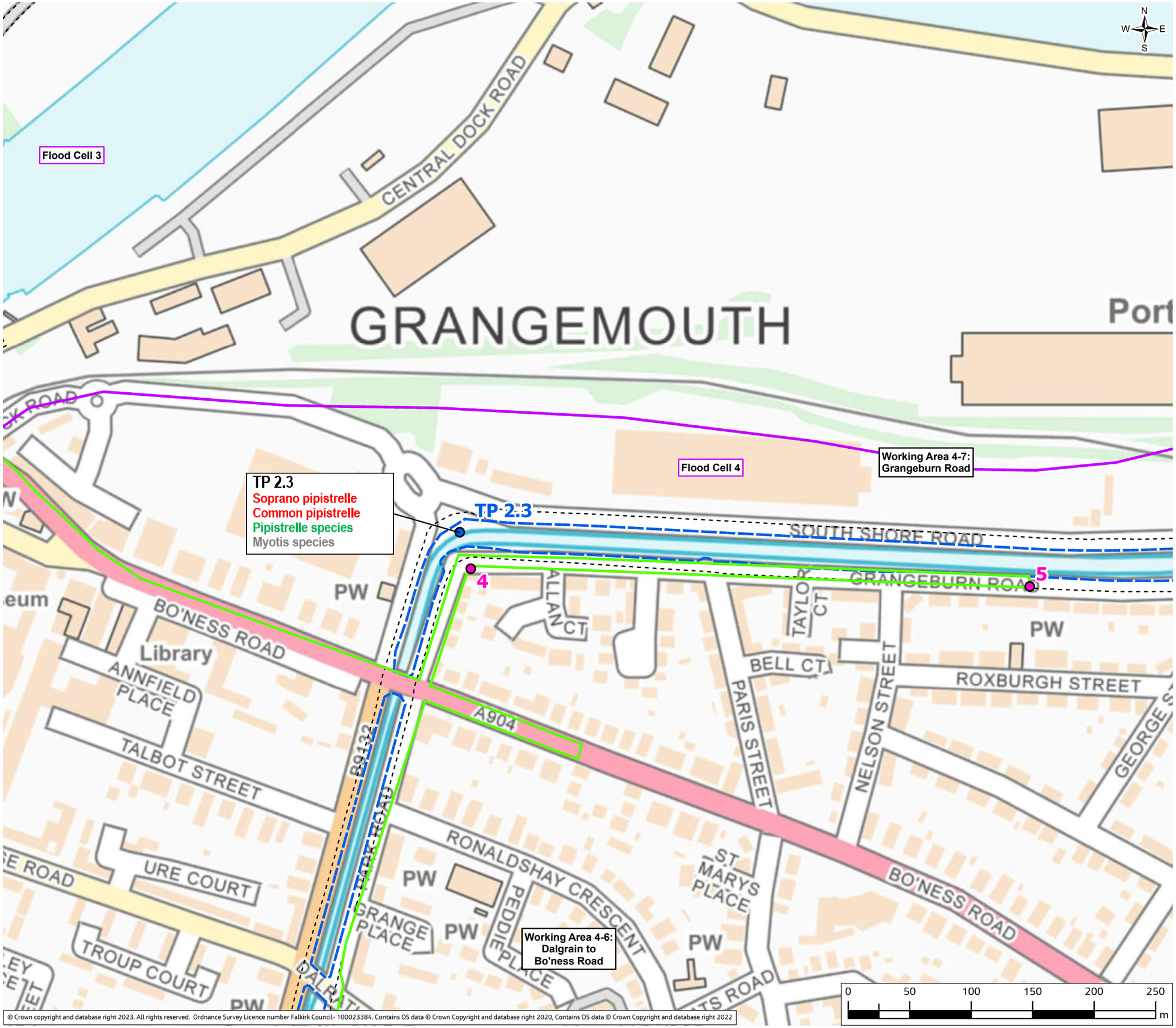
Client No.		

Drawing No.

Figure B7.5e

FIGURE B7.5F



Legend

- Site Boundary
- Flood Cell

Direct Defences

- Flood Wall

Bat Transects

- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

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Drawing Title

BAT ACTIVITY SURVEY

SHEET 7 OF 12

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Client No.		
Drawing No.	Figure B7.5f	

FIGURE B7.5G

CENTRAL DOCK ROAD

Flood Cell 3

Port

Working Area 4-8: Petroineos

Working Area 4-7: Grangeburn Road

SHORE ROAD

GRANGEBURN ROAD

5

10

Flood Cell 4

PW

ROXBURGH STREET

NELSON STREET

GEORGE STREET

KINGS ROAD

QUEEN STREET

ALBERT AVENUE

OSWALD AVENUE

BO'NESS ROAD

POWDRAKE ROAD

WEST GATE

0 50 100 150 200 250 m

Legend

- Site Boundary
- Flood Cell
- Direct Defences
- Flood Wall
- Bat Transects
- Listening Points
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

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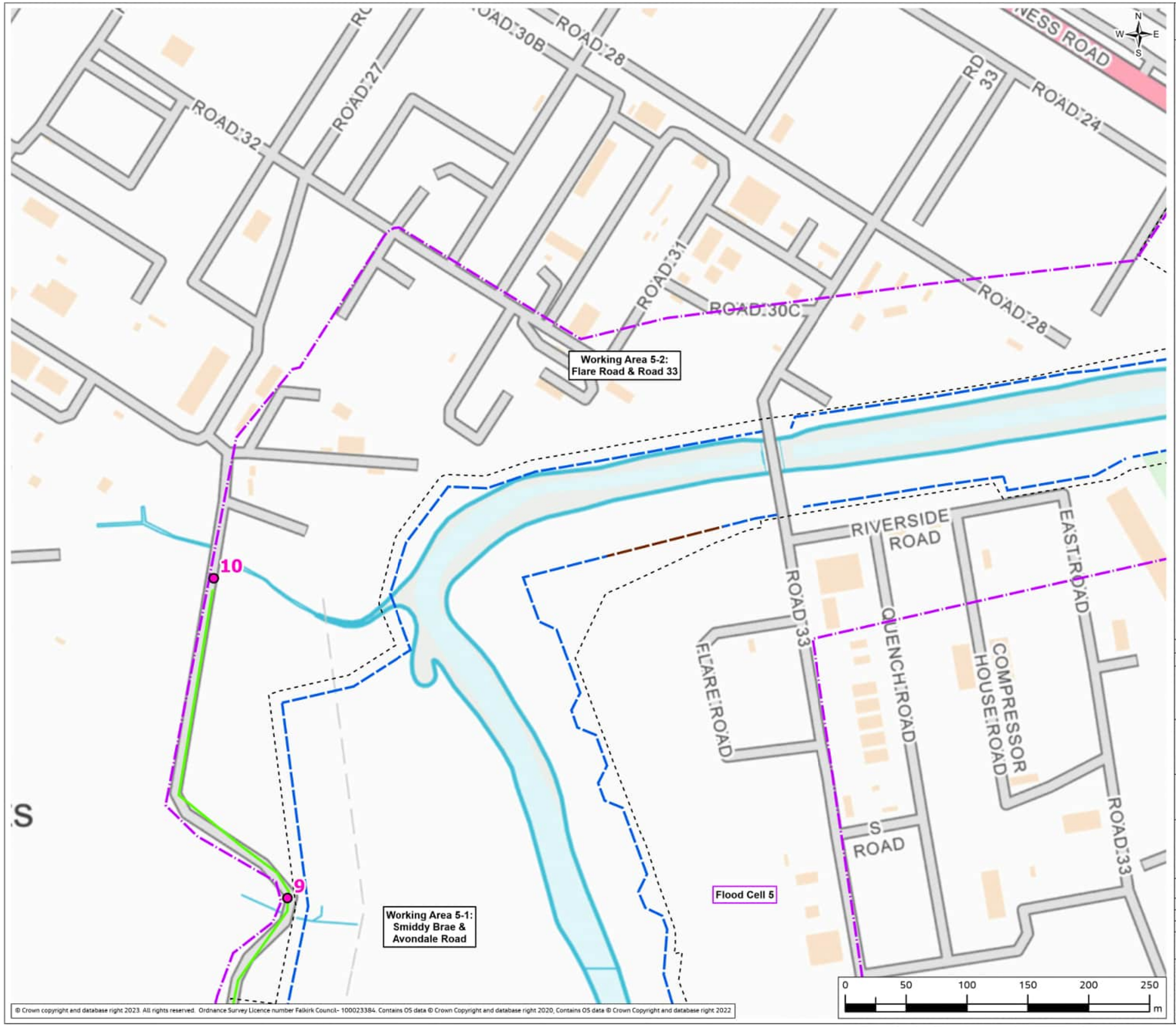
FIGURE B7.5I



Legend

- Site Boundary
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Bat Transects

- Listening Points
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

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Drawing Title

BAT ACTIVITY SURVEY

SHEET 9 OF 12

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Client No.		

Drawing No.

Figure B7.5i

FIGURE B7.5H

Legend

- Site Boundary
- Flood Cell

Direct Defences
- Embankment
- Flood Wall

Bat Transects
- Listening Points
- Passive Deployment
- Routes

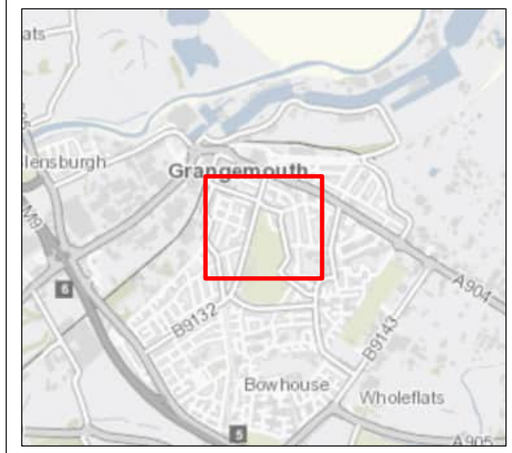
ECOBAT Activity Level-Text colour indicates activity level
- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

TP 2.1
Soprano pipistrelle
Common pipistrelle
Pipistrelle species
Myotis species

Working Area 4-6: Dalgrain to Bo'ness Road

Working Area 4-5: Zetland Park

Flood Cell 4



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BAT ACTIVITY SURVEY
SHEET 8 OF 12

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Drawing No.	Figure B7.5h	

FIGURE B7.5J

Wholeflats

Working Area 4-4: Wholeflats Road

Working Area 5-1: Smiddy Brae & Avondale Road

Flood Cell 5

Flood Cell 4

Milnholm Manor

A905

WHOLEFLATS ROAD

REDDOCH ROAD

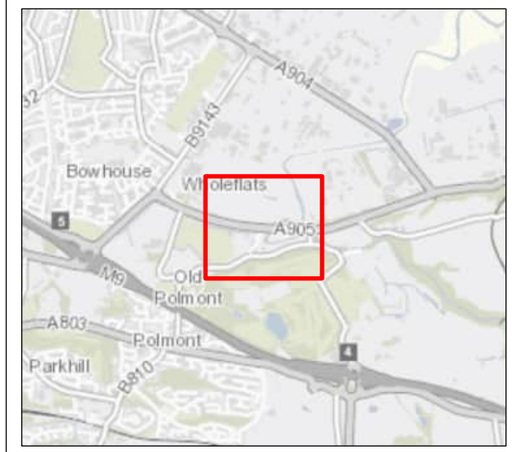
TP 3.3
Soprano pipistrelle
Common pipistrelle
Pipistrelle species
Myotis species

TP 3.3

6 7 8 9

N W E S

0 50 100 150 200 250 m



Legend

- Site Boundary
- Flood Cell

Direct Defences
- Ground Rising
- Flood Wall

Bat Transects
- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level
- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D

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BAT ACTIVITY SURVEY

SHEET 10 OF 12

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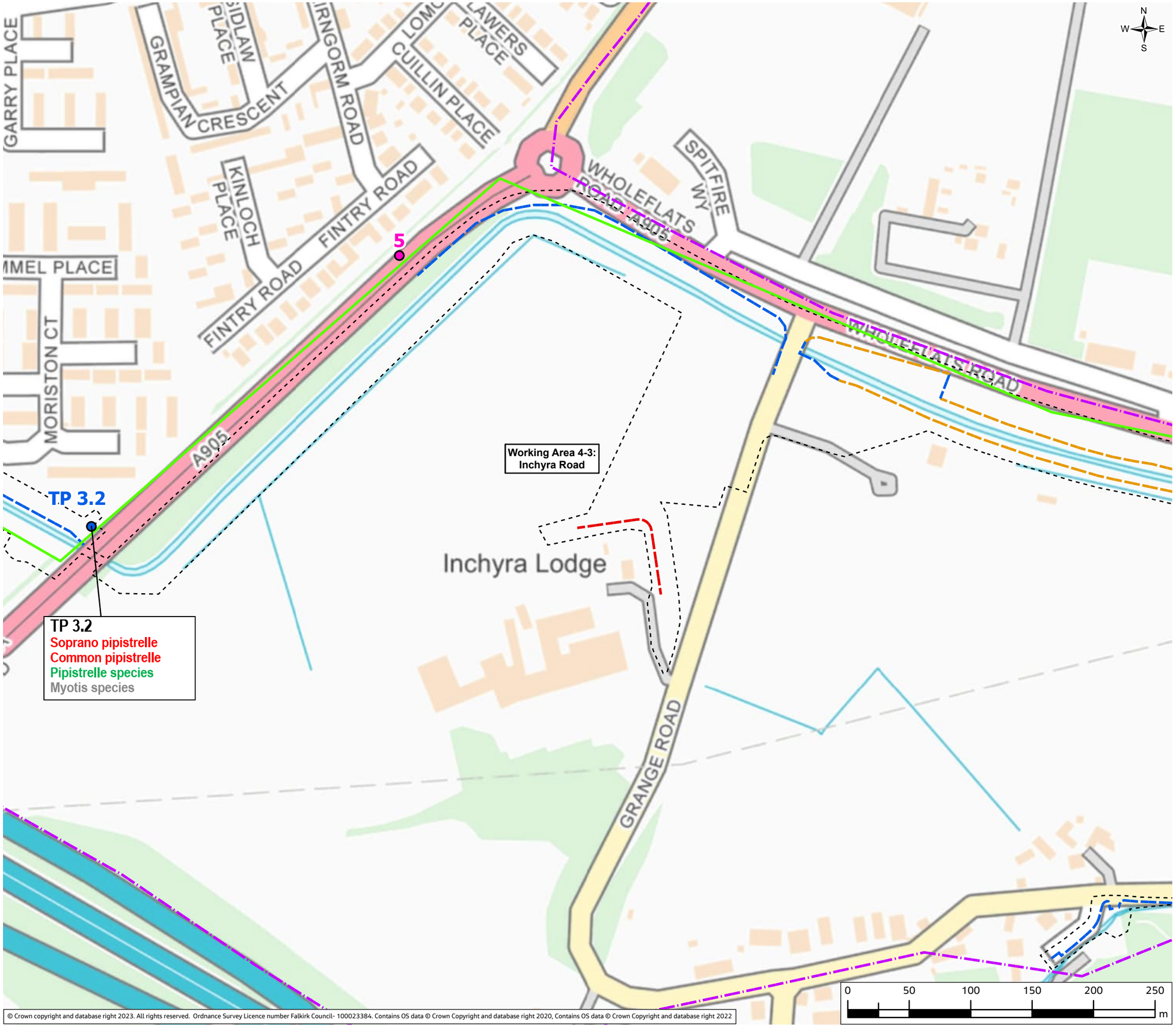
Drawing No.

Figure B7.5j

FIGURE B7.5K



Legend

- Site Boundary
- Flood Cell

Direct Defences

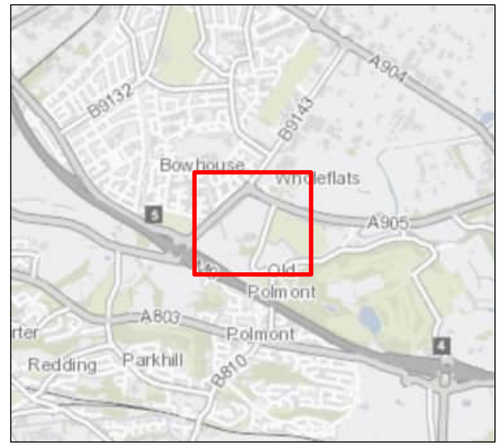
- Embankment
- Ground Rising
- Flood Wall

Bat Transects

- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D



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BAT ACTIVITY SURVEY

SHEET 11 OF 12

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Drawing No.	Figure B7.5k	

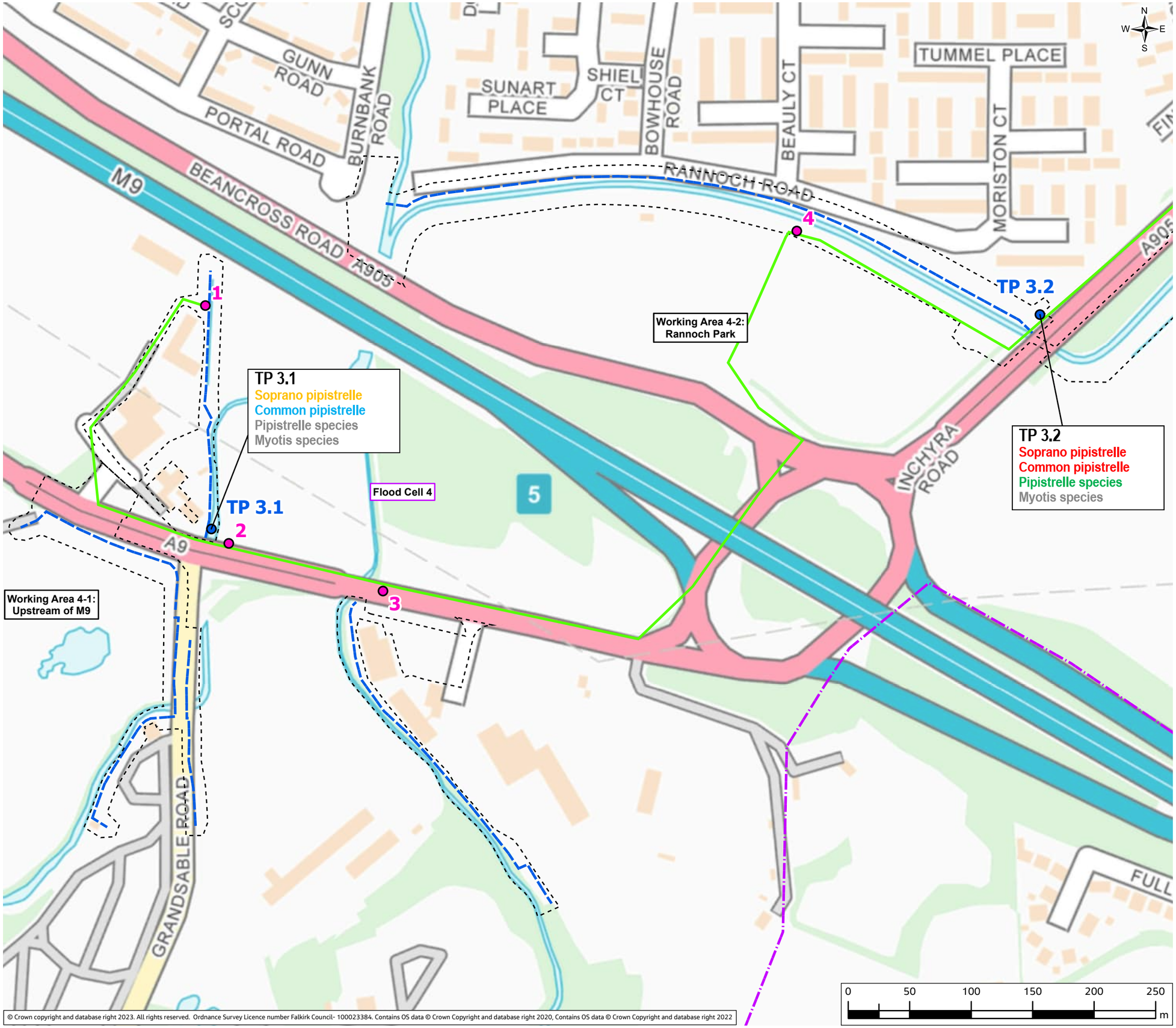


FIGURE B7.5L

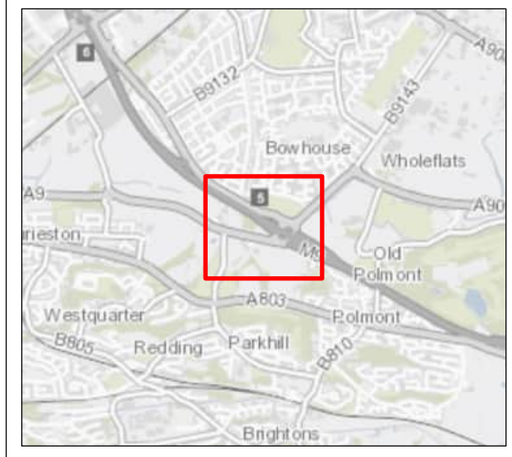
Legend

- Site Boundary
- Flood Cell

Direct Defences
- Flood Wall

Bat Transects
- Listening Points
- Passive Deployment
- Routes

ECOBAT Activity Level-Text colour indicates activity level
- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- N/D



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BAT ACTIVITY SURVEY

SHEET 12 OF 12

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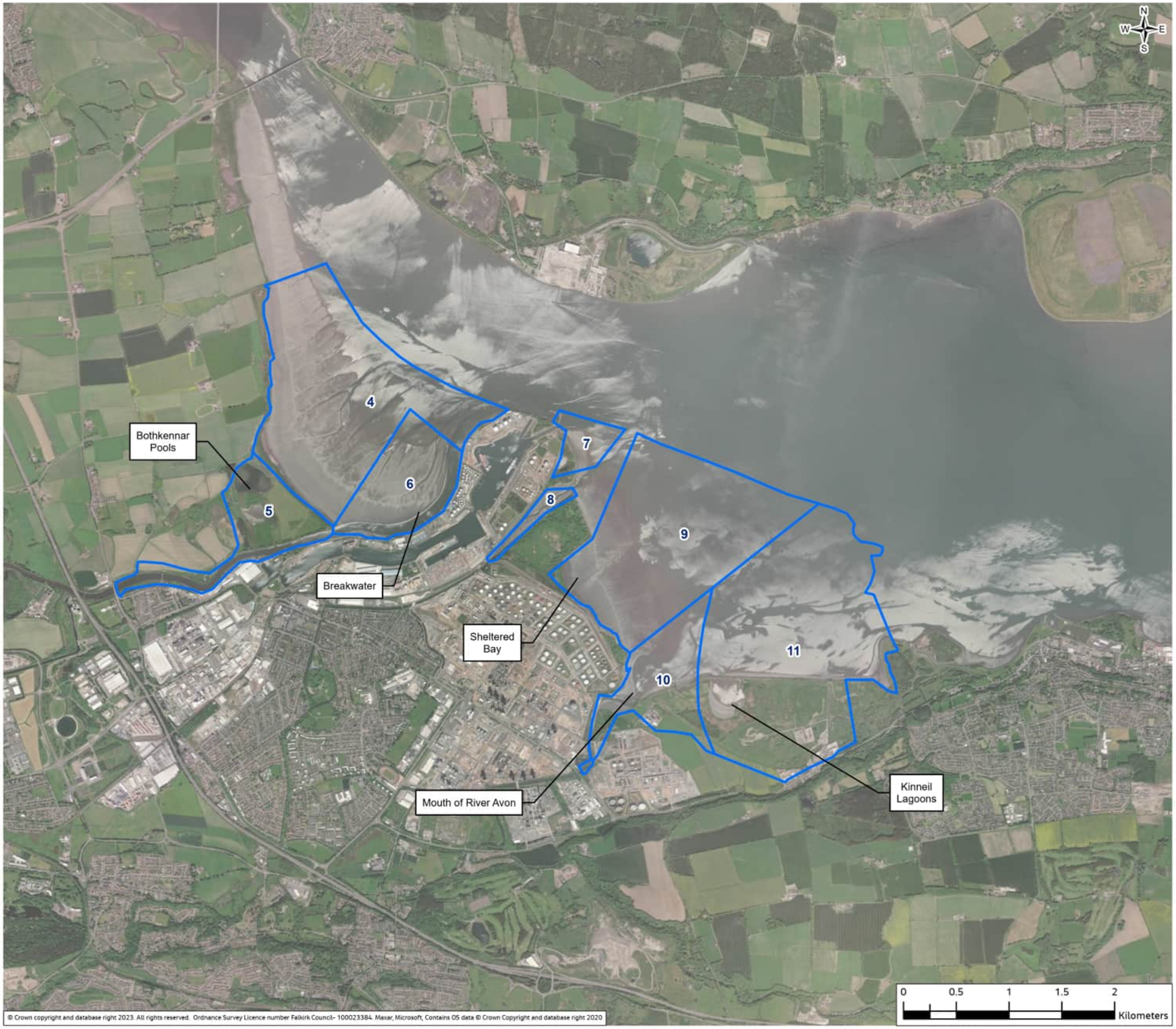
Drawing No.	Figure B7.5l

FIGURE B7.6



Legend

Sectors surveyed in 2015/16, 2016/17 and 2022/23

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Drawing Title

NON-BREEDING BIRD SECTORS

SHEET 1 OF 1

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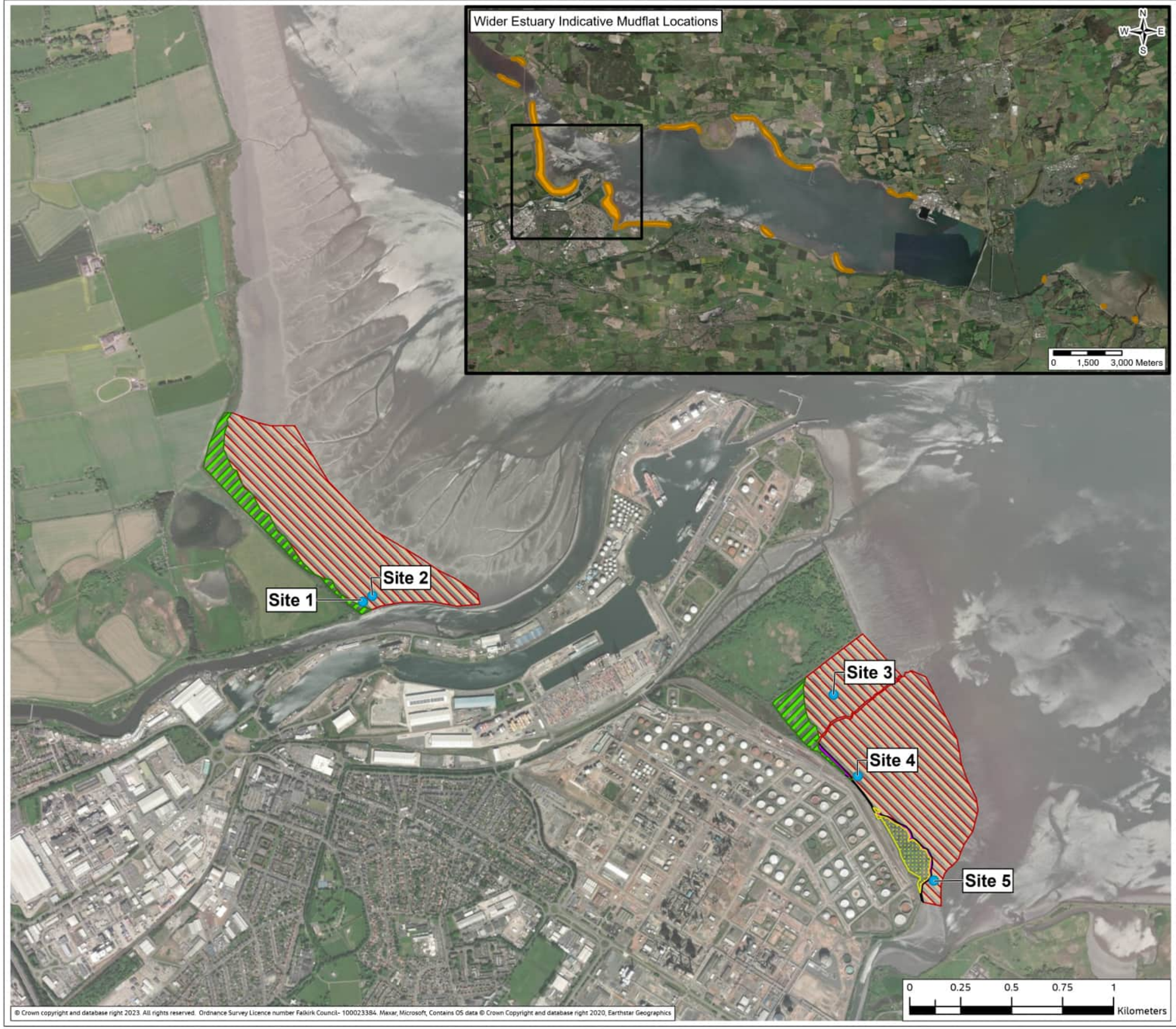
Drawing No.

Figure B7.6

FIGURE B7.7



Legend

- Intertidal Biotope Sampling Locations
- Mudflats

Intertidal Habitats

- Grassland with Scattered Scrub and Broadleaved
- LS.LMu.MEst.HedMac
- Rubble/Rock/Coarse Sediment
- Saltmarsh and Scattered Scrub

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Drawing Title

INTERTIDAL HABITATS

SHEET 1 OF 1

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Client No.		
Drawing No.	Figure B7.7	

FIGURE B7.8A

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- Tunnels with no hedgehog
- Tunnels with hedgehog

Great Crested Newt (GCN)

- Not Surveyed for eDNA
- Surveyed for eDNA

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Project: Grangemouth Flood Protection Scheme

Drawing Title: GREAT CRESTED NEWT (GCN) AND HEDGEHOG SURVEY RESULTS
SHEET 1 OF 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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Client No.		
Drawing No.	Figure B7.8a	

0 1 2 3 4 5 Kilometers

FIGURE B7.8B

Legend

- Site Boundary
- Flood Cell

Direct Defences

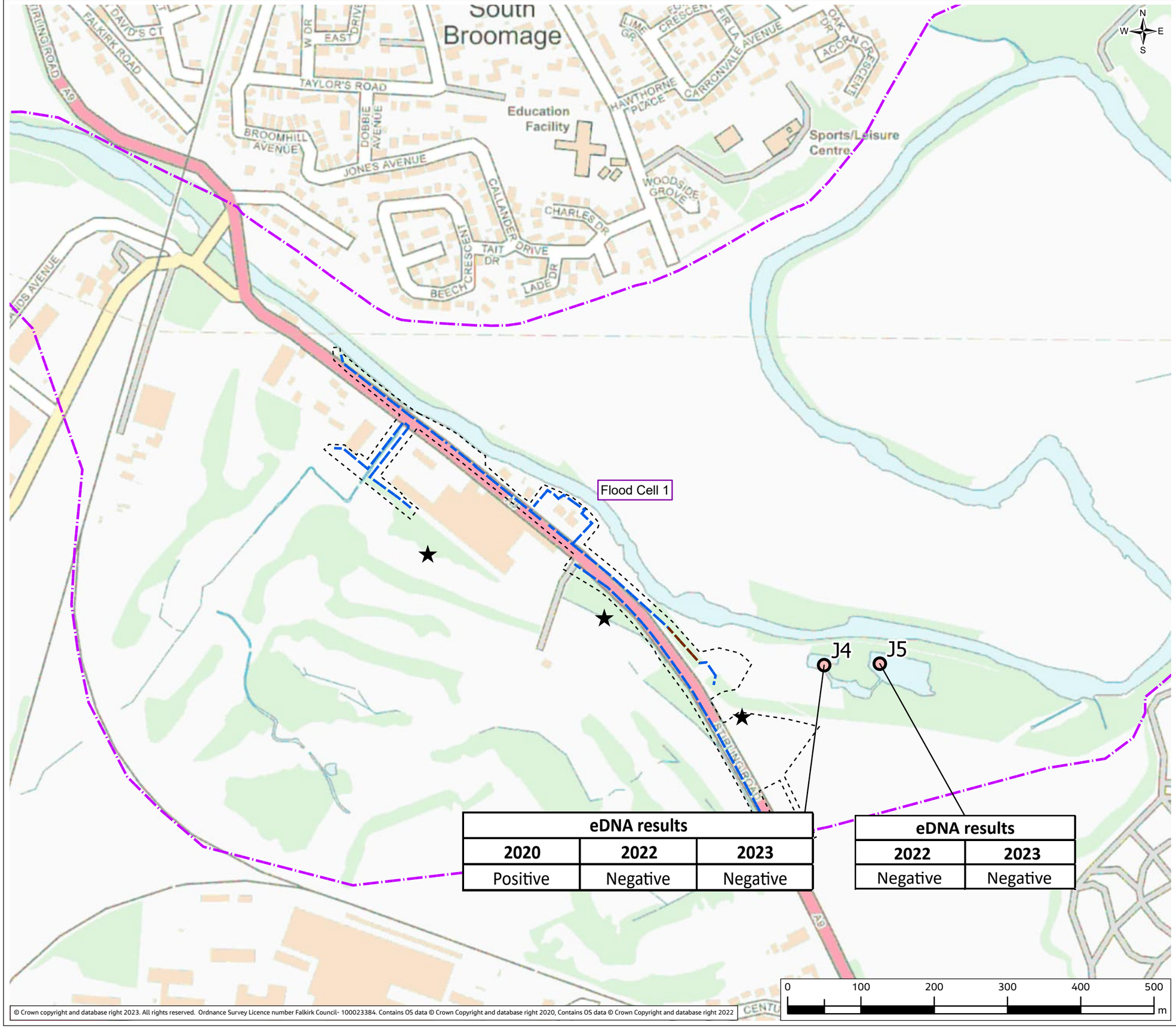
- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- Tunnels with no hedgehog

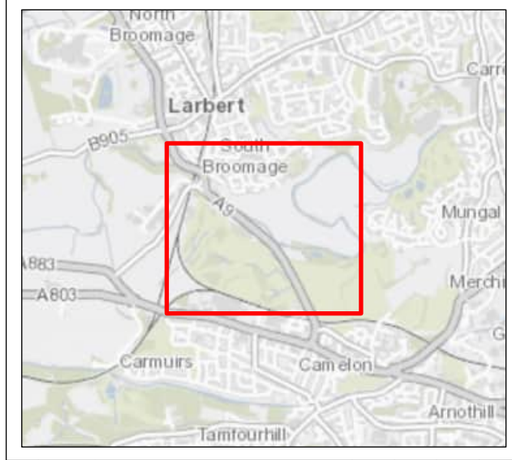
Great Crested Newt (GCN)

- Surveyed for eDNA



eDNA results		
2020	2022	2023
Positive	Negative	Negative

eDNA results	
2022	2023
Negative	Negative



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Flood Protection Scheme

Drawing Title

GREAT CRESTED NEWT (GCN)
AND HEDGEHOG SURVEY RESULTS

SHEET 2 Of 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
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Jacobs No.	B2386100	
Client No.		

Drawing No.

Figure B7.8b

FIGURE B7.8C

Legend

- Site Boundary
- Flood Cell

Direct Defences

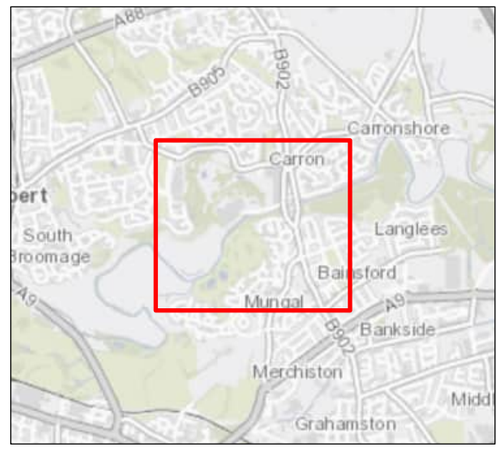
- Embankment
- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- Tunnels with no hedgehog

Great Crested Newt (GCN)

- Not Surveyed for eDNA
- Surveyed for eDNA



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Project

Grangemouth
Flood Protection Scheme

Drawing Title

GREAT CRESTED NEWT (GCN)
AND HEDGEHOG SURVEY RESULTS

SHEET 3 Of 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8c	

0 100 200 300 400 500 m

FIGURE B7.8D

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- ★ Tunnels with no hedgehog

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
P01.1	Mar 24	ISSUED FOR PUBLICATION	GB	AP	AP	AMc

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SHEET 4 Of 8

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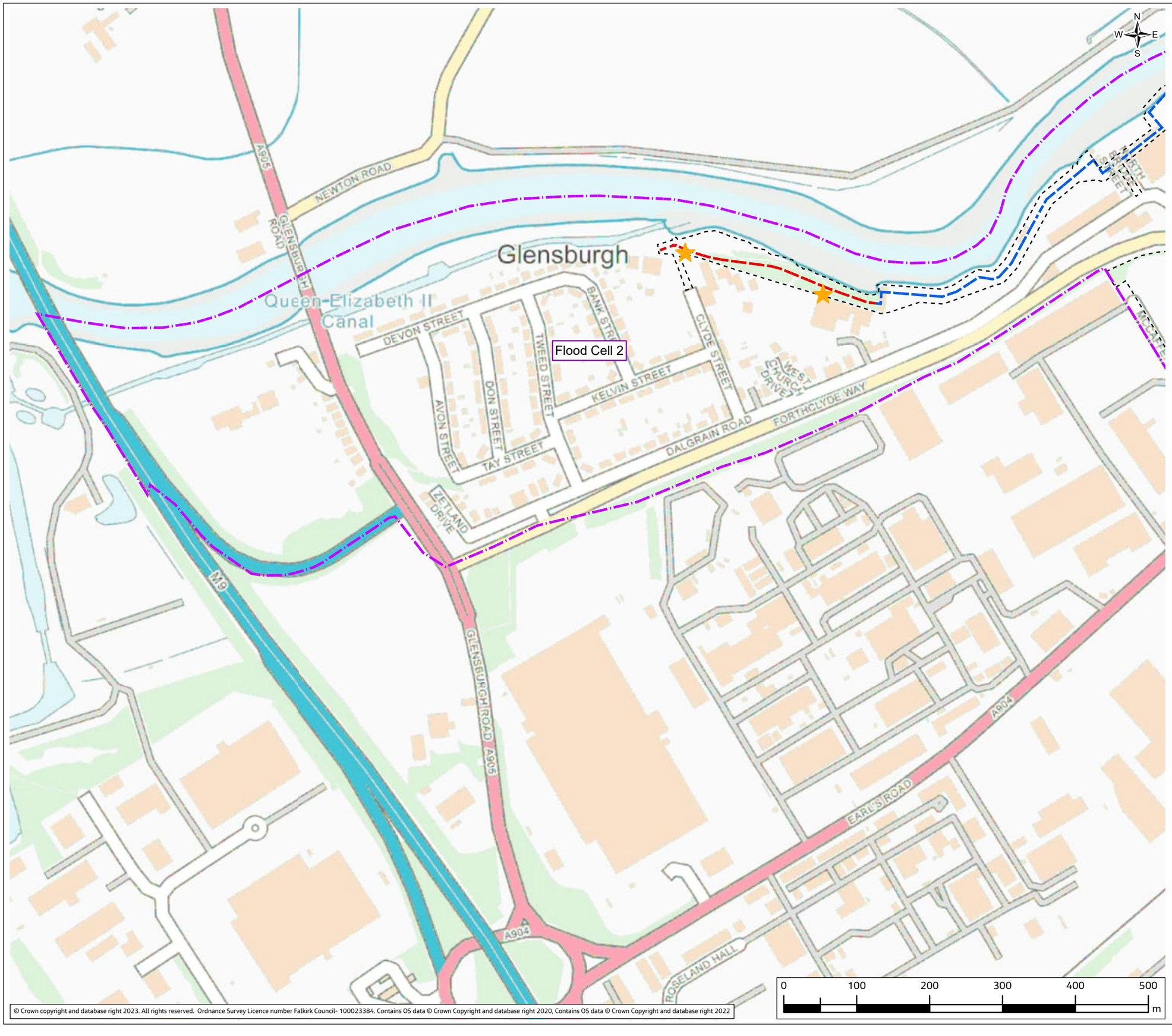
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8d	

0 100 200 300 400 500 m

FIGURE B7.8E



Legend

- Site Boundary
- Flood Cell

Direct Defences

- Embankment
- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- Tunnels with hedgehog

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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GREAT CRESTED NEWT (GCN)
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SHEET 5 Of 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8e	

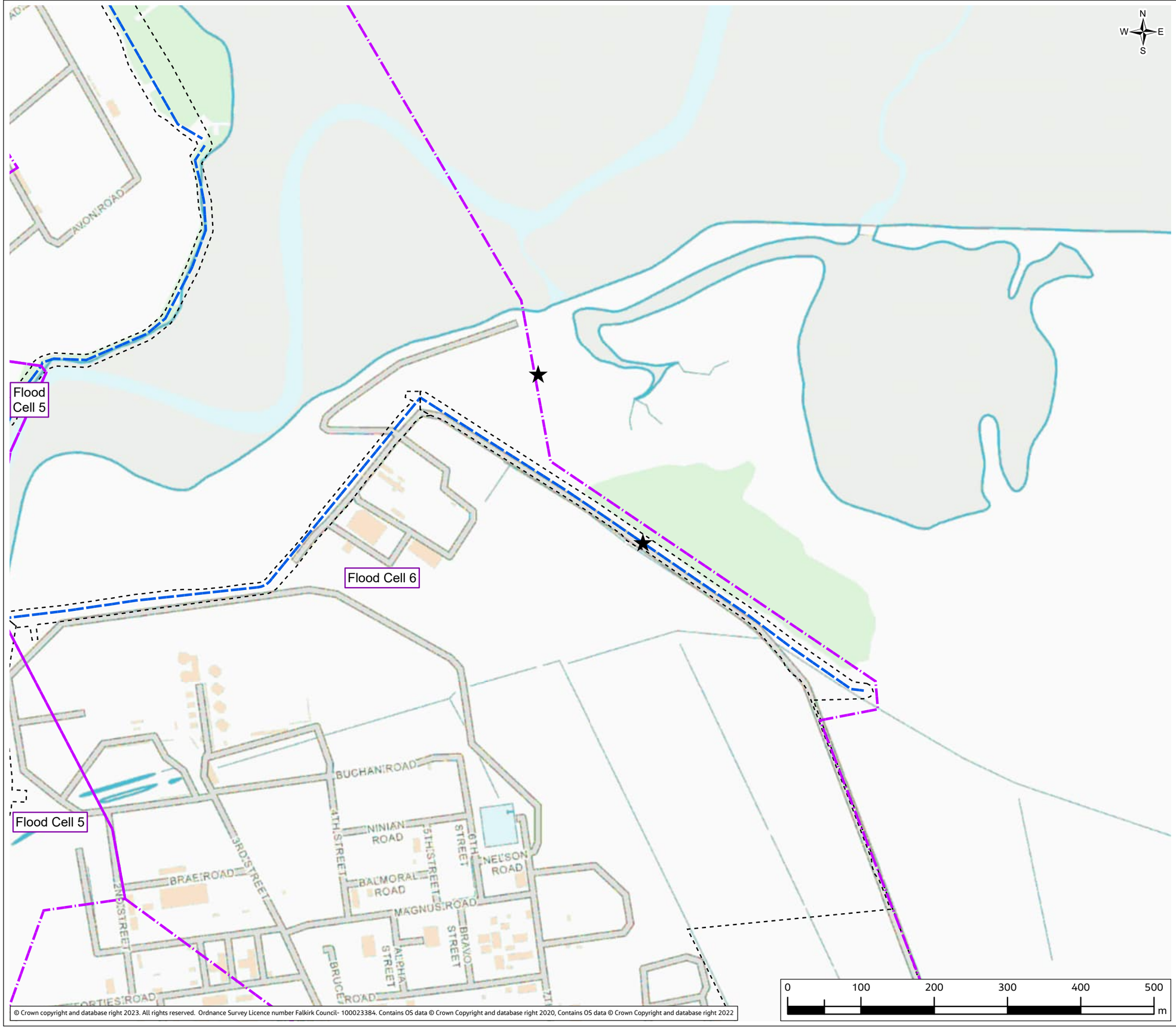

FIGURE B7.8F

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- ★ Tunnels with no hedgehog

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GREAT CRESTED NEWT (GCN)
AND HEDGEHOG SURVEY RESULTS

SHEET 6 Of 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8f	

FIGURE B7.8G

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Embankment
- Ground Rising
- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- ★ Tunnels with no hedgehog

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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GREAT CRESTED NEWT (GCN)
AND HEDGEHOG SURVEY RESULTS
SHEET 7 Of 8

Drawing Status	S8-SUITABLE FOR STATUTORY CONSENT	
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8g	

0 100 200 300 400 500 m

FIGURE B7.8H

Legend

- Site Boundary
- Flood Cell

Direct Defences

- Flood Wall
- Seepage (below ground defence)

Hedgehog Record

- Tunnels with no hedgehog
- Tunnels with hedgehog

Great Crested Newt (GCN)

- Surveyed for eDNA

eDNA results
2023
Negative

eDNA results		
2020	2022	2023
Positive	Negative	Negative

eDNA results		
2020	2022	2023
Negative	Negative	Negative

eDNA results	
2022	2023
Inconclusive	Negative

Flood Cell 4

J13 J6 J7 J8

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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SHEET 8 Of 8

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Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	B2386100	
Client No.		
Drawing No.	Figure B7.8h	

0 100 200 300 400 500 m

Environmental Impact Assessment Report

Appendix B7.1 Species Names

Grangemouth Flood Protection Scheme 2024
Falkirk Council

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Appendix B7.1: Species Names and Target Notes

1 Species names

A full list of species names mentioned in Chapter 7: Biodiversity and associated appendices is provided below for flora (Table B7.1a) and fauna (Table B7.1b). All higher plant names (common and scientific) are taken from Stace (2010). All bryophyte names (common and scientific) are taken from Atherton, Bosanquet and Llawley (2010). All bird names (common and scientific) are taken from British Ornithologists' Union (2017).

Table B7.1a: Species names of flora

Common Name	Scientific Name
Ash	*Fraxinus excelsior*
Beech	*Fagus sylvatica*
Blunt-flowered rush	*Juncus subnodulosus*
Bramble	*Rubus fruticosus* agg.
Buddleia	*Buddleja Sp.*
Broom	*Cytisus scoparius*
Bulrush	*Typha latifolia*
Cherry laurel	*Prunus laurocerasus*
Cleavers	*Galium aparine*
Cock's-foot	*Dactylis glomerata*
Common nettle	*Urtica dioica*
Common reed	*Phragmites australis*
Cow parsley	*Anthriscus sylvestris*
Cotoneaster species	*Cotoneaster Sp.*
Creeping buttercup	*Ranunculus repens*
Creeping bent	*Agrostis stolonifera*
Crested dog's tail	*Cynosurus cristatus*
Crosswort	*Cruciata laevipes*
Downy birch	*Betula pubescens*
Elder	*Sambucus nigra*
Elm sp.	*Ulmus* sp.
Few-flowered leek	*Allium paradoxum*
Giant hogweed	*Heracleum mantegazzianum*
Goat willow	*Salix caprea*
Great willowherb	*Epilobium hirsutum*
Grey willow	*Salix cinerea*
Hawthorn	*Crataegus monogyna*

Common Name	Scientific Name
Hazel	*Corylus avellana*
Himalayan balsam	*Impatiens glandulifera*
Japanese knotweed	*Reynoutria japonica*
Japanese rose	*Kerria japonicapho*
Marsh-bedstraw	*Galium palustre*
Marsh thistle	*Cirsium palustre*
Meadowsweet	*Filipendula ulmaria*
Oxeye daisy	*Leucanthemum vulgare*
Perennial ryegrass	*Lolium perenne*
Pointed spear-moss	*Calliergonella cuspidata*
Purple moor-grass	*Molinia caerulea*
Reed canary-grass	*Phalaris arundinacea*
Rhododendron	Rhododendron ferrugineum
Rosebay willowherb	*Chamerion angustifolium*
Sea club-rush	*Bolboschoenus maritimus*
Sharp-flowered rush	*Juncus acutiflorus*
Soft-rush	*Juncus effusus*
Snowberry	*Symphoricarpos sp.*
Sweet cicely	*Myrrhis odorata*
Sycamore	*Acer pseudoplatanus*
Three-cornered leek	*Allium triquetrum*
Tufted hair-grass	*Deschampsia cespitosa*
Wild angelica	*Angelica sylvestris*
Willow sp.	*Salix* sp.
Wych elm	*Ulmus glabra*
Yorkshire-fog	*Holcus lanatus*

Table B7.1b: Species names of fauna

Common Name	Scientific Name
Mammals	
Badger	*Meles meles*
Brown long-eared bat	*Plecotus auritus*
Common pipistrelle bat	*Pipistrellus pipistrellus*
Daubenton's bat	*Myotis daubentonii*
Hedgehog	*Erinaceus europaeus*
Leisler's bat/lesser noctule	*Nyctalus leisleri*
Nathusius pipistrelle	*Pipistrellus nathusii*
Noctule bat	*Nyctalus noctula*
Otter	*Lutra lutra*
Red squirrel	*Sciurus vulgaris*
Soprano pipistrelle bat	*Pipistrellus pygmaeus*
Water vole	*Arvicola amphibius*
Birds	
Arctic tern	*Sterna paradisaea*
Bar-tailed godwit	*Limosa lapponica*
Blackcap	*Sylvia atricapilla*
Barn owl	*Tyto alba*
Bar-tailed godwit	*Limosa lapponica*
Common scoter	*Melanitta nigra*
Common tern	*Sterna hirundo*
Cormorant	*Phalacrocorax carbo*
Curlew	*Numenius arquata*
Dunnock	*Prunella modularis*
Dunlin	*Calidris alpina*
Eider	*Somateria mollissima*
Gannet	*Morus bassanus*
Goldeneye	*Bucephala clangula*
Golden plover	*Pluvialis apricaria*
Goldfinch	*Carduelis carduelis*
Great crested grebe	*Podiceps cristatus*
Guillemot	*Uria aalge*
Kingfisher	*Alcedo atthis*
Kittiwake	*Rissa tridactyla*
Knot	*Calidris canutus*
Herring gull	*Larus argentatus*
Lapwing	*Vanellus vanellus*
Lesser black-backed gull	*Larus fuscus*

Common Name	Scientific Name
Little gull	*Larus minutus*
Long-tailed duck	*Clangula hyemalis*
Oystercatcher	*Haematopus ostralegus*
Pink-footed goose	*Anser brachyrhynchus*
Pheasant	*Phasianus colchicus*
Puffin	*Fratercula arctica*
Razorbill	*Alca torda*
Redshank	*Tringa totanus*
Red-throated diver	*Gavia stellata*
Reed bunting	*Emberiza schoeniclus*
Ringed plover	*Charadrius hiaticula*
Roseate tern	*Sterna dougallii*
Sandwich tern	*Thalasseus sandvicensis*
Shag	*Phalacrocorax aristotelis*
Shelduck	*Tadorna tadorna*
Slavonian grebe	*Podiceps auritus*
Turnstone	*Arenaria interpres*
Velvet scoter	*Melanitta fusca*
Whitethroat	*Sylvia communis*
Willow warbler	*Phylloscopus trochilus*
Woodpigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*
Fish	
Atlantic salmon	*Salmo salar*
Brook lamprey	*Lampetra planeri*
Brown/sea trout	*Salmo trutta*
Cod	*Gadus morhua*
Dab	*Limanda limanda*
European eel	*Anguilla anguilla*
Flounder	*Platichthys flesus*
Herring	*Clupea harengus*
Minnow	*Phoxinus phoxinus*
Plaice	*Pleuronectes platessa*
River lamprey	*Lampetra fluviatilis*
Sandeel	*Ammodytes tobianus*
Sand goby	*Pomatoschistus minutus*
Sea lamprey	*Petromyzon marinus*
Sparling	*Osmerus eperlanus*

Common Name	Scientific Name
Sprat	*Sprattus sprattus*
Stone loach	*Barbatula barbatula*
Three-spined stickleback	*Gasterosteus aculeatus*
Trout	*Salmo trutta*
Twaite had	*Alosa fallax*
Whiting	*Merlangius merlangus*
Amphibians	
Great crested newt	*Triturus cristatus*
Invertebrates	

Common Name	Scientific Name
Bivalves	*Bivalvia*
Mud snails	*Potamopyrgus spp.*
Nematodes	*Nematoda spp.*
Polychaete worm	*Polychaete spp.*
Stoneflies	*Perlodidae spp. and Leuctridae spp.*
N/A	*Podocopida* sp.
N/A	*Corophium volutator*
N/A	*Peringia ulvae*

2 Target Notes

Potential ground water dependent terrestrial ecosystems (GWDTEs) informed by habitat surveys, as referenced in Chapter 7: Biodiversity, are shown below in Table B7.1c. Potential GWDTEs were identified by a desk review of Phase 1 habitat surveys carried out in June 2019, followed by site visits to 16 locations (GW01-GW16) in 2020. A subsequent UK Habitat Classification survey was undertaken in 2022/2023, following which a desk review identified ten additional potential GWDTEs (GW17-GW26).

Details of invasive non-native species (INNS) plants recorded within the Site Boundary are presented in Table B7.1d. Species in bold text are those which cause the most damage in Scotland.

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Table B7.1c: Potential GWDTE locations

Site	Ecological Assessment	Potential GWDTE	National Grid Reference (NGR)
GW01	Vegetation composition indicates a mesotrophic grassland rather than a wetland therefore, it is not a GWDTE	No	NS 86602 81321
GW02	The western part of the site is small with a ponded area surrounded by vegetation which are not classed as GWDTE, however it would be considered a wetland.	No	NS 86862 81257
GW03	The woodland areas within the survey area were not mapped due to the high-water levels and difficult access, but woodland akin to the W4 *Betula pubescens-Molinia caerulea* woodland was present. Possible for some transitioning to something akin to W2 *Salix cinerea-Betula pubescens-Phragmites australis* woodland. The former is highly groundwater dependent whereas the latter is moderately dependent.	Yes	NS 87619 82606 NS 87866 82586
GW04	Carron Meander Site of Importance for Nature Conservation (SINC). Two areas of vegetation within the site largely comprise S4 *Phragmites australis* swamp and reed-beds and S28 *Phalaris arundinacea* tall-herb fen. Neither are GWDTEs but could be classed as a wetland.	No	NS 89587 82683 NS 89607 82797 NS 89669 82905 NS 89644 82625
GW05	Likely that higher, drier areas have been agriculturally improved and are MG6 *Lolium perenne-Cynosurus cristatus* grassland with small rather indistinct patches of MG10 *Holcus lanatus-Juncus effusus* rush pasture, a moderately water dependent GWDTE.	Yes	NS 89840 82796
GW06	The main area of GW06 is the same species composition as GW05. Therefore, contains GWDTE habitats.	Yes	NS 89992 82791
GW07	Revised UK Habitat mapping changed swamp to predominantly mudflats and a saltmarsh. This is not expected to be a GWDTE.	No	NS 91888 82376 NS 92225 82608
GW08	No vegetation classed as moderately or highly dependent on groundwater was present within the survey area however, this site features a large area of wetland.	No	NS 91973 82872
GW09	Initially identified as swamp, subsequent UK Habitat mapping identified f2e reedbeds. This habitat type is not a GWTDE but classifies as wetland.	No	NS 95305 83367 NS 95324 83579
GW10	Complex site comprised of a series of zones around an open water area. The majority of the vegetation types appeared to be non-groundwater dependant. However, the presence of M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture suggests some groundwater input. Subsequent UK Habitat mapping classed this area as f2a – Lowland fens.	Yes	NS 92319 79495

Site	Ecological Assessment	Potential GWDTE	National Grid Reference (NGR)
GW11	Includes an area of rushes identified as M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture which is highly dependent on groundwater. Within this area M27 *Filipendula ulmaria-Angelica sylvestris* mire is present. This is classed as moderately dependent on groundwater.	Yes	NS 92209 79285
GW12	Adjacent to the Grange Burn Flood Relief Channel the vegetation is non-GWDTE common reed, however this transitions into zones of GWDTE habitats 30-40m from the channel. The vegetation appeared to be M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, a highly groundwater dependent community. M23 can form a fringe around common reed communities which has happened here. Where the rush element is less extensive, the vegetation is more akin to MG10 *Holcus lanatus-Juncus effusus* rush-pasture - a moderate GWDTE. Additionally, where tufted hair-grass increased in cover and soft-rush declined the vegetation would be more like MG9 *Holcus lanatus-Deschampsia cespitosa* grassland, also a moderate GWDTE.	Yes	NS 93393 79874 NS 93555 79949 NS 93679 79921
GW13	The main rush area appeared to be M23 *Juncus subnodulosus-Cirsium palustre* fen-meadow, a high GWDTE. However, the community did not seem to be as species-rich as others – this could be a result of previous grazing regimes. Patches of OV28 *Agrostis stolonifera-Ranunculus repens* community appeared to be associated with this, and MG9/MG10 may have been present in even smaller patches (both are classified as moderately groundwater dependent).	Yes	NS 93820 79586 NS 93787 79516
GW14	Much of the area was grassland of various types. These areas could be very variable and in mosaics, and whilst they clearly contained species typical of damp soils, the vegetation was not a GWDTE.	No	NS 94539 80214 NS 94481 80052 NS 94417 80059
GW15	Much of this old lagoon area comprised common nettle, with cleavers. The swamp area appeared to comprise mainly common reed with patches of reed canary-grass. Patches of rosebay willowherb were also present. None of these vegetation types are GWDTEs.	No	NS 96247 81211 NS 96302 81081
GW16	The south of the site includes areas of Atlantic salt meadows, dense common reed habitats, and sea club-rush swamp, none of which are GWDTEs. However, the north of the site is a complex area of grassland types including three mesotrophic grassland types with moderate groundwater dependency.	Yes	NS 95080 82643 NS 95088 82383 NS 95236 82377 NS 95216 82313 NS 95307 82232
GW17	Survey notes indicated wet marshy areas at two locations within a modified grassland (golf course).	Yes	NS 86507 81254
GW18	Mapped as wetland in the north and is possibly reedbed. Mapped as grassland in the south but appears to be similar to northern area.	Yes	NS 89071 82930 NS 89013 82841
GW19	Mapped as swamp during Phase 1 habitat survey, but not revisited during UK Habitat Classification survey therefore, no additional information is available.	Yes	NS 89201 82695 NS 89147 82719 NS 89189 82659

Site	Ecological Assessment	Potential GWDTE	National Grid Reference (NGR)
GW20	An area of pond likely comprising reedbeds.	Yes	NS 94861 83075
GW21	Ornamental pond and wetland area in cemetery.	Yes	NS 92471 79207
GW22	Mapped as UK Habitat f2f - Other swamps. Comprises bulrush and soft-rush. Whilst soft-rush vegetation can be a GWDTE, bulrush vegetation isn't. There is a possibility that there could be some groundwater influence, but this is not possible to determine from the vegetation alone.	Yes	NS 95774 80945
GW23	Likely wet grassland but not confirmed.	Yes	NS 95707 80866
GW24	Kinneil Lagoons is predominantly wetland with small areas of potential moderate GWDTE.	Yes	NS 96813 80863 NS 96599 81134
GW25	Likely wet grassland but not confirmed.	Yes	NS 96119 80933
GW26	Likely wetland type habitat, but actual vegetation not confirmed.	Yes	NS 94591 82452 NS 94707 82450

Table B7.1d: Details of INNS plants recorded within the Site Boundary

Species of INNS	National Grid Reference (NGR)
Buddleia	NS 93459 82755 NS 91585 82306 NS 93008 82076 NS 88149 82386 NS 92477 79741 NS 95159 83687
Cherry laurel	NS 92706 79352 NS 88871 83003 NS 88204 82325 NS 88195 82347 NS 93622 82092
Cotoneaster species	NS 93014 82086 NS 88205 82324
Few-flowered leek	NS 92602 79472 NS 93673 79937

Species of INNS	National Grid Reference (NGR)
Giant hogweed	NS 94579 79867 NS 89469 82805 NS 89482 82734
Himalayan balsam	NS 93623 79674 NS 94095 79789 NS 94366 79712 NS 92669 79391 NS 86668 81281 NS 94579 79866 NS 93906 79844 NS 86179 81563
Japanese knotweed	NS 93535 80038 NS 93003 82048 NS 88994 82902 NS 88274 82408 NS 88380 82410 NS 88376 82434 NS 92237 82298 NS 94069 79496 NS 92387 79375 NS 94069 79496 NS 92387 79375 NS 86603 81270
Japanese rose	NS 94859 82901

Species of INNS	National Grid Reference (NGR)
Rhododendron	NS 93722 79870
Snowberry	NS 92682 79382
Three-cornered leek	NS 88243 82372 NS 86566 81269

3 References

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British Ornithologists' Union (2017). The British List: A Checklist of Birds of Britain (9th edition). Ibis 160: 190-240.

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Environmental Impact Assessment Report

Appendix B7.2 Aquatic Ecology

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Appendix B7.2: Aquatic Ecology

1 Intertidal Habitat

In their response to the Scoping Report (Appendix C3.2), SNH advised that biotope mapping of areas affected by the proposed Scheme should be undertaken in order to fully assess the importance of these areas to the qualifying interests of the SPA/Ramsar.

Core samples were collected from the intertidal mudflats at five sites, two on Skinflats and three in front of INEOS's petrochemical plant. Samples were taken using a 0.01 m^2 core, preserved using formalin and sent to the laboratory for infaunal analysis. Three replicate cores were taken at each of the five sites. A sediment sample was also taken from each of the five sites and sent to National Laboratory Services for particle size analysis. The species and abundance data were then combined with the results of the particle size analysis to assign a biotope to each of the five sites, in accordance with Connor *et al.* (2004). Intertidal core sampling for biotope mapping was undertaken on the 9 and 10 April 2019 to coincide with midday low tides. The date of collection and location for each site is detailed in Table 1 and locations are shown on Figure B7.10.

Table 1: Date and location of core samples.

Site	Date	Location	
		X	Y
Site 1	09/04/2019	293113	682923
Site 2	09/04/2019	293158	682952
Site 3	10/04/2019	295429	682466
Site 4	10/04/2019	295547	682066
Site 5	10/04/2019	295921	681553

The results of the particle size analysis and taxonomic analyses are shown in Tables 2 and 3. The sediment at all five sites was classified as slightly gravelly sandy mud. Taxa common to all sites were Nematoda, polychaete worms of the Eteoninae sub-family, *Hediste diversicolor* and *Streblospio* species, the small mud snail *Peringia ulvae* and the bivalve *Limecola* (previously *Macoma balthica*). Ostracods of the order Podocopida, and the oligochaete, *Tubificoides benedii*, were recorded only from the two sites at Skinflats, but not from the sites in front of the petrochemical plant. Cirratulid worms (including *Tharyx* species) were recorded only from the sites in front of the petrochemical plant, not from the sites on Skinflats.

Taxon richness (the number of taxa recorded) was relatively low at each site (between 13 and 18 taxa) and the evenness score (which ranges from 0 – no evenness to 1 – complete evenness) show that the sites have a few dominant taxa. Taxon diversity (Simpson's Index, which takes into account taxon richness and evenness and ranges from 0 – infinite diversity to 1 – no diversity) was relatively high at all sites (0.191 – 0.373).

The results of the sediment and infaunal analyses indicate that the intertidal benthic community at each of the five sites fit most closely with the *Hediste diversicolor* and *Limecola balthica* in littoral sandy mud biotope (LS.LMu.MEst.HedMac).

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Table 2: Particle size analysis (PSA).

	Site 1	Site 2	Site 3	Site 4	Site 5
Sediment Category	Slightly gravelly sandy mud	Slightly gravelly sandy mud	Slightly gravelly sandy mud	Slightly gravelly sandy mud	Slightly gravelly sandy mud
Median Particle Diameter (mm)	0.0188	0.0179	0.0202	0.0225	0.0226
Mean Grain Size Inclusive (mm)	0.0181	0.0174	0.0193	0.022	0.0225
Mean Particle Diameter (mm)	0.044	0.0327	0.0372	0.472	0.0912

Table 3: Species abundance results (P = present).

	Site 1			Site 2			Site 3			Site 4			Site 5		
Taxon Name	**Core 1**	**Core 2**	**Core 3**	**Core 4**	**Core 5**	**Core 6**	**Core 7**	**Core 8**	**Core 9**	**Core 10**	**Core 11**	**Core 12**	**Core 13**	**Core 14**	**Core 15**
Nemertea					3	4	2			1		1	3	5	2
Nematoda	29	72	54	13	32	57	2	6	2	56	151	62	71	7	47
***Pholoe* sp.**															1
Eteoninae	5	7	12	7	10	9	8	18	7	12	4	6	27	15	31
***Eteone longa* agg.**													1		
Nereididae juv.											1		4		7
Hediste diversicolor	2	2	1	3		15	3			2	1		4	3	5
***Polydora* sp.**											1				
***Spio* sp.**											1				
***Streblospio* sp.**	17	17	10	22	24		33	14	8	9	2	1	10	15	12
Cirratulidae										1			7		4
***Tharyx* sp.**							3	6	1			1	13	35	28
Tharyx killariensis													7		4
Heteromastus filiformis	1	1	1	1				1					5	4	15

	Site 1			Site 2			Site 3			Site 4			Site 5		
Taxon Name	**Core 1**	**Core 2**	**Core 3**	**Core 4**	**Core 5**	**Core 6**	**Core 7**	**Core 8**	**Core 9**	**Core 10**	**Core 11**	**Core 12**	**Core 13**	**Core 14**	**Core 15**
Naididae			1				1	1							
Paranais litoralis	5									2					
***Tubificoides* sp.**						1									
Tubificoides benedii	5	2	10	4	1	3									
Enchytraeidae									1	6	8				
Podocopida	1	1	2	2	10	5									
Corophium volutator	8	42	5				1			6	2			1	
Cephalaspidea															1
Peringia ulvae	107	115	109	68	83	117	42	37	34	64	52	23	90	75	88
***Limapontia* sp.**	4				8	7	2				1				
***Limaponia* juv.**		4	3	3	9	6	1					3			1
Bivalvia sp.													4		
Limecola balthica	3	7	13	20	32	21	6	5	3	12	4	2	25	15	17
Animalia eggs	P	P	P	P	P	P	P	P	P				P	P	P
COUNT	13	12	13	11	11	12	13	9	8	11	12	8	15	11	16
TOTAL	187	270	221	143	212	245	104	88	56	171	228	99	271	175	263
Taxon Richness	14			13			14			17			18		
Evenness	0.609			0.696			0.622			0.488			0.698		
Taxon Diversity (Simpson's Index)	0.304			0.253			0.278			0.373			0.191		

All of the taxa recorded in the present study are typical of intertidal estuarine mudflats and none are of particular note or conservation interest. Other sedimentary habitats in the Forth Estuary have been reported as the same or similar biotopes (Transport Scotland 2009; Jacobs 2011; Marine Scotland 2020).

The LS.LMu.MEst.HedMac biotope is assessed as having high resilience to most pressures, meaning that full recovery will normally occur within two years after removal of the pressure (Tillin and Rayment 2016). The characterising species of this biotope, *H. diversicolor* and *L. balthica*, have a reproductive lifecycle of one to two years and recovery of a habitat can occur through recovery of damaged individuals, adult migration from adjacent habitats or recolonisation of larvae. This suggests that areas of mudflat disturbed during the construction phase of the proposed Scheme will be expected to recover quickly post-construction. An assessment of the impact of the proposed scheme on intertidal habitats is provided in Chapter 7: Biodiversity.

2 Riverine Habitat Assessment

The habitat assessment included three main watercourses (River Carron, River Avon, Grange Burn (including the flood relief channel)) and five associated tributaries (Chapel Burn, Mungal Burn, Westquarter Burn, Polmont Burn and Millhall Burn).

2.1 River Carron

The River Carron is a medium sized river that flows from the Campsie Fells to the Firth of Forth, where it flows out between Skinflats and the Port of Grangemouth. With the exception of the Port of Grangemouth and the village of Carron, the River Carron is bordered primarily by agricultural and woodland/greenspace.

The tidal limit in the River Carron is approximately 300 m upstream of the Carron Bridge at Stenhouse Road (NS 87918 82314). Below this the river is brackish with predominantly soft silt substrates and banks. Above the tidal limit the River Carron is roughly 20-25 m wide with a mix of flow types ranging from shallow riffles to deep glides covering a mixture of aquatic habitats (Photograph 2-1). Substrates throughout the freshwater section were recorded to be mostly cobble and boulder. Overall, the river provides habitat for a range of fish species (e.g. salmonids, European eel, flounder and lamprey) and age classes, but within the Scheme study area, spawning opportunities are limited.

Photograph 2-1: River Carron between the Carron Bridges (NGR NS 88242 82387).

2.2 Chapel Burn

Chapel Burn is a small watercourse which flows through Stenhousemuir and Carron before joining the River Carron below the tidal limit. The channel has been significantly modified (straightened and deepened) and is generally less than 0.5 m wide with water depths less than 0.2 m (Photograph 2-2). It provides limited habitat for aquatic species.

Photograph 2-2: Chapel Burn at Burnside Place (NGR NS 88795 83043).

2.3 Mungal Burn

Mungal Burn is a minor watercourse that flows into the River Carron north of Bainsford and just below the tidal limit for the river. This small watercourse is culverted for approximately 800 m beneath residential properties in Bainsford with a debris screen at the outlet which was almost entirely blocked at the time of survey (Photograph 2-3). A short reach of channel, approximately 60 m, is open between the culvert and the River Carron. This section is straightened and approximately 1 m wide with around 0.15 m of water depth. The substrates were a mix of large cobble and pebble which, when combined with the overhanging tree cover, provide a small amount of habitat

suitable for juvenile salmonids, however, water quality appeared poor at the time of survey, being cloudy and containing domestic litter.

Photograph 2-3: Mungal Burn culvert (NGR NS 88205 82330).

2.4 Grange Burn

Grange Burn is a small, heavily modified, watercourse that flows through Rannoch Park, Zetland Park and out into the Firth of Forth between the Port of Grangemouth and the petrochemical plant. Below the tidal limit in Zetland Park (NS 92841 81336), the watercourse is straightened with wooden shuttering along much of the banks and embankments along Grangeburn Road. The channel ranges from around 8 m wide at the downstream end of Grangeburn Road to 3-4 m wide through Zetland Park. The substrates comprise sand and silt with little in the way of flow variation, and although its depth varies with the tide, it is a relatively shallow watercourse with a depth of 0.2 m recorded at the time of survey. Downstream of the rail and pipe bridges associated with the port and petrochemical plant, where it is less constrained, the Grange Burn channel widens significantly and large intertidal mudflats become exposed on both banks. Between the M9 and the tidal limit, the burn is slightly more natural in character, although it is still straightened with sloping grass banks (Photograph 2-4). Substrates comprise pebble and gravel with small amounts of cobble. Overall, the Grange Burn provides a limited amount of habitat for small or juvenile fish, but it does provide clear passage to Westquarter Burn upstream of the M9. The flow control structure on Grange Burn allows water to flow into the flood relief channel under high flow conditions (Photograph 2-5).

Photograph 2-4: Grange Burn downstream of the M9 (NGR NS 92620 79851).

Photograph 2-5: Grange Burn flow control structure (NGR NS 92621 79841).

2.5 Flood Relief Channel

The flood relief channel is a trapezoidal concrete channel which experiences intermittent flows and provides no functional aquatic habitat (Photograph 2-6). Substrates are mostly small (sand, silt and pebble) and the watercourse provides little fish habitat.

Photograph 2-6: Grange Burn flood relief channel adjacent to Wholeflats Road (NGR NS 93584 79999).

2.6 Millhall Burn

Millhall Burn flows into the River Avon, close to outfall from the flood relief channel. The lower reach is narrow, heavily modified, with a gabion mattress covering the substrates and gabion baskets reinforcing the left-hand bank. A large piped culvert discharges the burn into the River Avon. It is unknown whether the culvert presents a barrier to fish migrating upstream into the burn from the River Avon via the flood relief channel. The mid-section near to Polmont Woods, although straightened, retains more natural features with suitable habitat for fish (Photograph 2-7). At this location, mixed juvenile salmonid fish habitat is present, with areas suitable for trout spawning. The gravels are generally clean with pebbles/small cobbles dominating the instream habitat. Occasional pool habitat and tree roots provide parr habitat with the left-hand bank flood defence wall and bridge walls at the water interface providing habitat for eels. Patches of silt could provide habitat for lamprey ammocoetes. Flows are characterised by run/riffle/pool/glide features. The gradient increases from this point upstream to Millhall Reservoir.

Photograph 2-7: Millhall Burn adjacent to Polmont Woods car park (NGR NS 94054 79472).

2.7 Polmont Burn

Polmont Burn discharges into the flood relief channel at the flow control structure below the M9. Along its upstream extents, it is a typical woodland stream approximately 3 m wide and 0.2 m deep on average, and it flows down a gentle gradient through a mix of runs and small step/pool sequences (Photograph 2-8). Undercut banks, overhanging bank vegetation and heavy tree cover provide ideal habitat for small trout and European eel, however, given the condition of the flood relief channel and the impediment to fish passage at the flow control structure, connectivity for migratory fish is unlikely.

Photograph 2-8: Polmont Burn (NGR NS 92635 79436).

2.8 Westquarter Burn

Westquarter Burn is a small tributary that flows from its headwater east of Shieldhall into the Grange Burn. Flowing through residential areas for a large part of its course, it has previously been heavily modified and straightened to accommodate housing and protect properties from flooding. At Grandsable Road Bridge, instream habitat is very poor with the upstream section heavily silted with few instream features suitable for fish. Silted substrates are mostly pebble/cobble, flows are generally glide with a small section run/riffle. High embankments with inlaid stone feature on both sides of the watercourse. Downstream of the bridge a concrete/grouted stone channel, approximately 4 m wide, with shallow water depths provides no habitat for fish (Photograph 2-9). Raised embankments disconnect the watercourse from its floodplain.

Photograph 2-9: Westquarter Burn (NGR NS 92460 79459).

2.9 River Avon

The River Avon flows along the western edge of Linlithgow, under the M9, through the petrochemical plant, and out into the Firth of Forth. The tidal limit on the Avon is on the upstream side of Wholeflats Road (A905) (NS 94647 79723). As with the River Carron and Grange Burn, the substrates consist predominantly of silt throughout the tidal reach, but with a higher proportion of gravel and cobble deposition evident (Photograph 2-10). In contrast to the River Carron and the Grange Burn, the River Avon is relatively unconstrained, with evidence of historic bank reinforcement alongside the petrochemical plant and a section of gabion baskets at the corner adjacent to the flares. In the short, freshwater section within the Site Boundary, substrates form a mix of mostly cobble and boulder, and flows are varied. The river provides habitat for a range of fish species (e.g. salmonids, European eel, flounder and lamprey) and age classes, but within the Site Boundary, spawning opportunities are limited and the habitat is predominantly passage habitat.

Photograph 2-10: River Avon (NS 94682 80061).

3 References

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Environmental Impact Assessment Report

Appendix B7.3 Terrestrial Ecology Data

Grangemouth Flood Protection Scheme 2024
Falkirk Council

GRANGEMOUTH
Flood Protection Scheme
Protecting the heart of our communities

Appendix B.7.3: Terrestrial Ecology Data

1 Introduction

This appendix presents data for protected species recorded during surveys conducted to inform the Scheme Environmental Impact Assessment (EIA) Report. Due to the potential risk to protected species from locational data being publicly available, badger, otter, barn owl and bat (confirmed roosts) data is presented in a confidential report and is not published within the Biodiversity chapter. The confidential report is password protected and will be made available to NatureScot and Falkirk Council.

2 Badger

Badger surveys were conducted by Jacobs in April and May 2023. Targeted infra-red camera monitoring was conducted in 2019, 2020 and 2023. Incidental badger field signs were also recorded by Jacobs during other ecology surveys in 2022 and 2019.

Badger field signs were recorded within 100 m of the Site Boundary in Flood Cells 1, 3, 4 and 6. Nine active setts (one main, one subsidiary and seven outlier) were recorded within this buffer. Details of badger survey and monitoring results are presented in the confidential report.

3 Great crested newt

No water bodies potentially suitable for GCN were identified under the footprint of the Scheme. In 2020-2023, Jacobs ecologists conducted targeted HSI assessments on nine water bodies within 500 m of the Scheme Site Boundary.

In 2020, Jacob's ecologists conducted eDNA sampling on three of the nine water bodies subject to an HSI assessment in 2020. The two water bodies (J4 and J6) returned a positive result for GCN presence and one (J7) returned a negative result.

In 2022, eDNA sampling was conducted at five ponds (J4, J5, J6, J7 and J8). Four ponds returned a negative result, and J8 returned an inconclusive result.

In 2023 eDNA sampling was conducted at eight ponds (J1, J4, J5, J6, J7, J8, J10 and J13). All ponds returned a negative result.

The HSI assessment and eDNA results from surveys conducted in 2020, 2022 and 2023 are detailed in Table 7.1. Figure B7.8.

Table 7.1: HSI assessment and eDNA results for waterbodies with 500 m of the Site Boundary

Date	Pond ID	National Grid Reference	Flood Cell	Nearest Working Area	Distance from Site Boundary (m)	Description	HSI Score	Pond Suitability	eDNA results
25/06/2020 21/06/2022 26/06/2023	J1	NS 87935 82603	N/A	1-2	160	Standing water covered in pondweed, within wet woodland west of path on edge of Carron Dams Local Nature Reserve. Access to the water's edge was limited and the accessible water was too shallow to collect samples for eDNA testing during visit in 2020. The area was dry when revisited in 2022. An area of standing water was identified in 2023 which was subject to HSI and eDNA sampling.	0.67	Average	Negative (2023)
25/06/2020	J2	NS 87715 81825	1	1-2	69	Reid's Pond, south of River Carron, within a public green space. Breeding waterfowl were present on the east side of the pond and small fish were observed. Access to the water's edge was limited to a few locations: therefore, water samples for eDNA testing were not collected as they would not be representative of the waterbody.	0.32	Poor	N/A
24/06/2020 14/06/2022 31/05/2023	J4	NS 86778 81273	1	1-1	83	Pond (1 of 2) within Camelon Riverside Wildlife Site.	0.40	Poor	Positive (2020) Negative (2022) Negative (2023)
24/06/2020 14/06/2022 31/05/2023	J5	NS 86854 81275	1	1-1	119	Pond (2 of 2) within Camelon Riverside Wildlife Site. Access to the water's edge was limited to a few locations in 2020: therefore, water samples for eDNA testing were not collected as they would not be representative of the waterbody. Better access was available in 2022/ 2023 and therefore eDNA sampling was conducted.	0.58	Below Average	Negative (2022) Negative (2023)
23/06/2020 14/06/2022 31/05/2023	J6	NS 92454 79215	4	4-1	141	Pond (1 of 3) within New Grandsable Cemetery.	0.60	Average	Positive (2020) Negative (2022) Negative (2023)
23/06/2020 14/06/2022 31/05/2023	J7	NS 92477 79211	4	4-1	145	Pond (2 of 3) within New Grandsable Cemetery.	0.64	Average	Negative (2020) Negative (2022) Negative (2023)
23/06/2020 14/06/2022 31/05/2023	J8	NS 92445 79186	4	4-1	171	Pond (3 of 3) within New Grandsable Cemetery. All banks of pond were accessible; however, the water was too shallow to collect samples for eDNA testing in 2020. Water levels were	0.50	Below Average	Inconclusive (2022) Negative (2023)

Date	Pond ID	National Grid Reference	Flood Cell	Nearest Working Area	Distance from Site Boundary (m)	Description	HSI Score	Pond Suitability	eDNA results
						higher in 2022/ 2023 and therefore eDNA samples were collected.			
25/06/2020 21/06/2022 26/06/2023	J10	NS 87776 82680	1	1-2	337	On edge of Carron Dams Nature Reserve. Standing water, which covers large area in wet woodland west of path. Wet woodland was primarily willows, with some rowan, ash and sycamore. Standing water has 100% pondweed coverage. Too shallow to conduct eDNA in both 2020 and 2022 and access to water's edge was limited. The water depth permitted eDNA sampling to be undertaken in 2023 however, the soft ground conditions resulted in less than 50% of the water's edge being accessible for sampling. This is not considered a significant limitation as the area has below average suitability for GCN.	0.51	Below Average	Negative (2023)
14/06/2022 26/06/2023	J13	NS 92385 79510	4	4-1	55	Standing water within field south of A9, west of Grandsable Road. Area is generally waterlogged with no defined boundaries. Majority of surface water dominated by common reed and yellow flag iris with clusters of bull rush. Waterfowl observed on water and edges of standing water were poached by livestock. The area was visited in 2022 however, HSI and eDNA sampling was carried out in 2023. Only 50% of water's edge accessible for sampling due to health and safety concerns (soft ground conditions and presence of several horses at the southern extent of the area). However, this is not considered a significant limitation as the area has below average suitability for GCN.	0.58	Below Average	Negative (2023)

4 Barn Owl

Incidental observations were made of barn owl field signs at a derelict building within the survey area during bat surveys conducted by Jacobs ecologists. At this building, pellets were recorded during bat Preliminary Roost Assessment (PRA) surveys in March 2021 and barn owl were observed emerging and re-entering the building during bat activity surveys in July and August 2021.

A dedicated barn owl survey was conducted at this location in July 2022. This survey confirmed the presence of at least one individual inside the building. Access inside the building was not possible due to health and safety concerns, therefore, it was not possible to confirm nesting, but it is considered likely a nest is present. Detailed barn owl survey results and incidental sightings are presented in the confidential report.

5 Non-breeding birds

Non-breeding bird data collected between August to April by MacArthur Green (2015/16 to 2016/17) and Jacobs (2022/23) is presented in Table 7.2. The sectors surveyed for non-breeding birds are presented in Figure B7.6.

For each species of non-breeding bird recorded, the tables indicate whether they are qualifying species of the Firth of Forth SPA or SSSI, listed on the Scottish Biodiversity List (SBL) or listed on the Local Biodiversity Action Plan (LBAP). The tables also indicate the Birds of Conservation Concern (BoCC) category (red, amber, green) for each species.

Table 7.2: Non-breeding bird data

Species	Jacobs/ MacArthur Green	SPA	SSSI	SBL	BoCC	LBAP
Arctic skua	Jacobs	N	N	Y	Red	N
Bar-tailed godwit	Jacobs/MacArthur Green	Y	Y	Y	Amber	N
Black headed gull	Jacobs/MacArthur Green	N	N	Y	Amber	N
Black-tailed godwit	Jacobs/MacArthur Green	N	N	Y	Red	Y
Buzzard	Jacobs/MacArthur Green	N	N	N	Green	N
Canada goose	Jacobs/MacArthur Green	N	N	N	Introduced	N
Carrion crow	Jacobs	N	N	N	Green	N
Common gull	Jacobs/MacArthur Green	N	N	N	Amber	N
Common sandpiper	Jacobs/MacArthur Green	N	N	N	Amber	N
Common tern	Jacobs/MacArthur Green	N	N	Y	Amber	Y
Coot	Jacobs/MacArthur Green	N	N	N	Green	N
Cormorant	Jacobs/MacArthur Green	Y	Y	N	Green	N
Curlew	Jacobs/MacArthur Green	Y	Y	Y	Red	Y
Curlew sandpiper	MacArthur Green	N	N	N	Amber	N
Dunlin	Jacobs/MacArthur Green	Y	Y	Y	Red	Y
Eider	MacArthur Green	Y	Y	N	Amber	N
Gadwall	Jacobs	N	N	N	Amber	N
Gannet	MacArthur Green	N	N	N	Amber	N
Glaucous gull	MacArthur Green	N	N	N	Amber	N

Golden plover	Jacobs/MacArthur Green	Y	Y	Y	Green	Y
Goldeneye	Jacobs/MacArthur Green	Y	Y	N	Red	N
Goosander	Jacobs/MacArthur Green	N	N	N	Green	N
Great black-backed gull	Jacobs/MacArthur Green	N	N	N	Amber	N
Great crested grebe	Jacobs/MacArthur Green	Y	Y	N	Green	Y
Green sandpiper	MacArthur Green	N	N	Y	Amber	N
Greenshank	Jacobs/MacArthur Green	N	N	N	Amber	N
Grey heron	Jacobs/MacArthur Green	N	N	N	Green	N
Grey plover	Jacobs/MacArthur Green	Y	Y	N	Amber	N
Greylag goose	MacArthur Green	N	N	N	Amber	Y
Guillemot	Jacobs	N	N	N	Amber	N
Gull species	MacArthur Green	N	N	N	n/a	N
Herring gull	Jacobs/MacArthur Green	N	N	Y	Red	N
Kestrel	Jacobs/MacArthur Green	N	N	Y	Amber	Y
Kingfisher	Jacobs/MacArthur Green	N	N	Y	Green	Y
Kittiwake	MacArthur Green	N	N	N	Red	N
Knot	Jacobs	Y	Y	N	Amber	Y
Lapwing	Jacobs/MacArthur Green	Y	Y	Y	Red	Y
Lesser black-backed gull	Jacobs/MacArthur Green	N	N	N	Amber	N
Little egret	MacArthur Green	N	N	N	Green	N
Little grebe	Jacobs	N	N	N	Green	N
Mallard	Jacobs/MacArthur Green	Y	Y	N	Amber	N
Moorhen	Jacobs/MacArthur Green	N	N	N	Amber	N
Mute swan	Jacobs/MacArthur Green	N	N	N	Green	N
Oystercatcher	Jacobs/MacArthur Green	Y	Y	N	Amber	N
Peregrine	Jacobs/MacArthur Green	N	N	Y	Green	N
Pheasant	Jacobs	N	N	N	Introduced	N
Pink-footed goose	Jacobs/MacArthur Green	Y	Y	N	Amber	Y
Pintail	Jacobs/MacArthur Green	N	N	N	Amber	Y
Purple sandpiper	MacArthur Green	N	N	Y	Red	N
Raven	Jacobs	N	N	N	Green	N
Razorbill	Jacobs	N	N	N	Amber	N
Red-breasted merganser	Jacobs/MacArthur Green	Y	Y	N	Amber	Y
Redshank	Jacobs/MacArthur Green	Y	Y	N	Amber	Y
Red-throated diver	Jacobs	Y	Y	Y	Green	N
Reed bunting	MacArthur Green	N	N	Y	Amber	Y
Ringed plover	Jacobs/MacArthur Green	Y	Y	N	Red	N
Ruff	MacArthur Green	N	N	Y	Red	N
Sanderling	MacArthur Green	N	N	N	Amber	N

Sandwich tern	Jacobs/MacArthur Green	Y	Y	Y	Amber	N
Scaup	Jacobs/MacArthur Green	Y	Y	Y	Red	N
Shag	Jacobs/MacArthur Green	N	N	N	Red	N
Shelduck	Jacobs/MacArthur Green	Y	Y	N	Amber	Y
Shoveler	MacArthur Green	N	N	N	Amber	N
Snipe	MacArthur Green	N	N	N	Amber	Y
Sparrowhawk	Jacobs/MacArthur Green	N	N	N	Amber	N
Spotted Redshank	Jacobs/MacArthur Green	N	N	N	Amber	N
Starling	MacArthur Green	N	N	Y	Red	Y
Teal	Jacobs/MacArthur Green	N	N	N	Amber	Y
Turnstone	Jacobs/MacArthur Green	Y	Y	N	Amber	N
Water rail	Jacobs/MacArthur Green	N	N	N	Green	Y
Whimbrel	Jacobs/MacArthur Green	N	N	N	Red	N
Whooper swan	Jacobs	N	N	Y	Amber	N
Wigeon	Jacobs/MacArthur Green	Y	Y	N	Amber	N
Yellowhammer	MacArthur Green	N	N	Y	Red	Y

6 Kingfisher

Ornithology surveys were conducted by MacArthur Green between 2015 and 2017 and Echoes Ecology Ltd in 2018. Full details of the survey methods are provided in Appendices C7.1: Ornithology Report 2017 and C7.2: Breeding Bird Survey 2018.

Incidental observations were also made during Jacobs surveys (primarily non-breeding bird surveys) between 2019 and 2022.

Kingfisher was recorded along four watercourses (River Carron, Firth of Forth, Westquarter Burn and River Avon) and two water bodies (Unnamed pond and Kinneil Lagoon) in the vicinity of all six Flood Cells. No burrows (nesting sites) were recorded during surveys.

Kingfisher observations in the vicinity of the Scheme Working Areas are presented in Table 7.3. Where records are provided by Echoes Ecology Ltd or MacArthur Green, details in the 'Comment' column refer to the record ID presented in Appendices C7.1 and C7.2.

Table 7.3: Kingfisher sightings recorded within the vicinity of the Scheme

Date	Source	Flood Cell	Watercourse	Comment	National Grid Reference
13/09/2022	Jacobs	1	River Carron	One individual, calling and flying downstream	NS 86265 81607
15/11/2022	Jacobs	1	River Carron	Perched on rock	NS 88075 82350
05/11/2015	MacArthur Green	2	River Carron	One individual. No behaviour recorded.	NS 92007 82362
14/09/2022	Jacobs	2	River Carron	One individual, flying downstream	NS 92092 82490

Date	Source	Flood Cell	Watercourse	Comment	National Grid Reference
15/09/2015	MacArthur Green	2	River Carron	One individual. No behaviour recorded.	NS 92591 82668
19/09/2019	Jacobs	3	River Carron	Kingfisher flew upstream - seen from near GI location BHFP09	NS 94028 82923
14/11/2016	MacArthur Green	3	Unnamed Pond	Two individuals. Recorded foraging and loafing.	NS 95346 83438
14/11/2016	MacArthur Green	3	Unnamed Pond	One individual. Recorded foraging and loafing.	NS 95337 83581
14/11/2016	MacArthur Green	3	Unnamed Pond	One individual. Recorded foraging and loafing.	NS 95285 83384
10/10/2016	MacArthur Green	3	Unnamed Pond	One individual. Recorded foraging.	NS 95331 83436
14/09/2022	Jacobs	3	Grange Burn	One individual flew from upstream	NS 95087 83142
26/10/2022	Jacobs	3	Blackness Bay	One individual flying	NS 95363 83642
26/10/2022	Jacobs	3	Blackness Bay	One individual flying	NS 95349 83715
09/11/2022	Jacobs	3	Blackness Bay	One individual recorded loafing	NS 95330 83708
09/11/2022	Jacobs	3	Blackness Bay	One individual recorded flying along bay towards river mouth	NS 95353 83660
10/10/2016	MacArthur Green	3	Unnamed Pond	One individual. Recorded foraging, loafing and roosting.	NS 95358 83458
03/10/2016	MacArthur Green	3	River Carron	One individual. Recorded foraging, moving between perches.	NS 94172 83082
19/09/2019	Jacobs	3	River Carron	Kingfisher flew upstream	NS 94028 82923
14/09/2016	MacArthur Green	3	Grange Burn	One individual. Recorded foraging.	NS 95096 83181
08/01/2016	MacArthur Green	3	Firth of Forth	One individual. No behaviour recorded	NS 95499 83246
03/10/2016	MacArthur Green	3	Grange Burn	Two individuals. Recorded foraging.	NS 94796 82784
May/ June 2018	Echoes Ecology Ltd.	4	Westquarter Burn	One individual. No behaviour provided by Echoes Ecology Ltd. ID 338	NS 92131 79147
May/June 2018	Echoes Ecology Ltd.	5	River Avon	One individual. No behaviour provided by Echoes Ecology Ltd. ID 205	NS 95162 79630
12/10/2022	Jacobs	5	River Avon	One individual, flying upstream	NS 95530 80834
13/09/2016	MacArthur Green	6	River Avon	One individual. Recorded loafing (perched).	NS 95750 81275
21/09/2022	Jacobs	6	Blackness Bay	One individual flying	NS 95260 82362
08/03/2017	MacArthur Green	6	Firth of Forth	One individual. Recorded foraging.	NS 95330 82246
08/03/2017	MacArthur Green	6	Firth of Forth	One individual. Recorded foraging.	NS 95330 82246

Date	Source	Flood Cell	Watercourse	Comment	National Grid Reference
21/02/2017	MacArthur Green	6	Firth of Forth	One individual. Recorded foraging.	NS 95333 82260
13/10/2016	MacArthur Green	6	Firth of Forth	One individual. Recorded foraging.	NS 95298 82221
13/10/2016	MacArthur Green	6	Firth of Forth	One individual. Recorded foraging.	NS 95304 82218
23/01/2017	MacArthur Green	N/A	Kinneil Lagoon	One individual. Recorded foraging and loafing.	NS 96989 81325
23/01/2017	MacArthur Green	N/A	Kinneil Lagoon	One individual. Recorded foraging and loafing.	NS 96933 81390
23/01/2017	MacArthur Green	N/A	Kinneil Lagoon	One individual. Recorded foraging and loafing.	NS 96957 81401
23/11/2016	MacArthur Green	N/A	Kinneil Lagoon	One individual. Recorded foraging and loafing.	NS 96513 81362
23/11/2016	MacArthur Green	N/A	Kinneil Lagoon	Two individuals. Recorded foraging and loafing.	NS 96446 81287
12/10/2016	MacArthur Green	N/A	Lagoon	Two individuals. Recorded foraging, loafing and roosting.	NS 96545 81362
03/10/2016	MacArthur Green	N/A	Grange Burn	One individual. Recorded foraging.	NS 94857 82774

7 Otter

In January 2020, a targeted walkover survey was conducted by Jacob's ecologists to confirm the location of two otter shelters within the survey area. Further walkover surveys were conducted by Jacobs of the whole Scheme in April to May 2023. Incidental records of otter were also recorded during other ecology surveys. Targeted infra-red camera monitoring was conducted by Jacobs between 2022 and early 2023.

Otter presence was recorded on the River Carron, Grange Burn (and at its mouth on the Firth of Forth), Millhall Burn and on the River Avon. No otter holts were recorded within 200 m of the Site Boundary. Four otter couches were recorded within the survey area: two within the Site Boundary, and two within 200 m of the Site Boundary. Details of otter survey results and monitoring are presented in the confidential report.

8 Hedgehogs

Hedgehog footprint tunnel surveys were conducted by Jacob's ecologists in September 2022. The results of the surveys are presented in Table 7.4 and on Figure B7.8. Where hedgehog presence was confirmed, the location row is in bold. Other species recorded are also provided for reference. Hedgehog presence was recorded at three of the 20 tunnels: locations 9, 10 and 17.

Hedgehog presence was recorded on survey days 5 and 6 at location 9 and on day 6 only at location 10. Both footprint tunnels were deployed within an area of scrub between the right bank of the River Carron and a strip of industrial units and yards which are surrounded by residential properties, within Flood Cell 2.

Hedgehog presence was recorded on survey days 5 and 6 at location 17. This footprint tunnel was deployed in a hedgerow situated between grazing fields and a footpath adjacent to the A9, within Flood Cell 4.

Snails and slugs were regularly observed to have eaten parts of the paper sheets in the footprint tunnels, but this this did not impede the assessment of mammal footprints on most occasions. On one day (survey day 4) at location 8, there was insufficient paper to determine the presence/absence of hedgehog.

There is suitable habitat for hedgehogs (such as hedgerows, grassland, scrub and woodland) within the Scheme and it is acknowledged that hedgehogs are likely to be present in Flood Cells 1 to 6.

Table 7.4: Hedgehog footprint tunnel survey details

Location Number	National Grid Reference	Deployment Date	Collection Date	Hedgehog Recorded (Y/N)	Days Hedgehog Recorded	Other Species Recorded
1	NS 86237 81425	05/09/2022	13/09/2022	N	N/A	Slugs
2	NS 86478 81338	05/09/2022	13/09/2022	N	N/A	Slugs
3	NS 86666 81203	05/09/2022	13/09/2022	N	N/A	Slugs
4	NS 88022 81925	05/09/2022	13/09/2022	N	N/A	Slugs
5	NS 88436 82380	05/09/2022	13/09/2022	N	N/A	Slugs
6	NS 88539 82419	05/09/2022	13/09/2022	N	N/A	Slugs, spiders, snails
7	NS 89344 82693	05/09/2022	13/09/2022	N	N/A	Cat, slugs
8	NS 89523 82959	05/09/2022	13/09/2022	N	N/A	Slugs, snails
9	**NS 91555 82305**	**05/09/2022**	**13/09/2022**	**Y**	**5, 6**	**Cat**
10	**NS 91744 82248**	**05/09/2022**	**13/09/2022**	**Y**	**6**	**Cat**
11	NS 93986 79795	05/09/2022	13/09/2022	N	N/A	Brown rat, cat
12	NS 94647 79656	05/09/2022	13/09/2022	N	N/A	Slugs, small mammal (mouse, bank/field vole, shrew)
13	NS 94524 80184	05/09/2022	13/09/2022	N	N/A	Small mammal (mouse, bank/field vole, shrew)
14	NS 94395 79993	05/09/2022	13/09/2022	N	N/A	Slugs, small mammal (mouse, bank/field vole, shrew)
15	NS 96457 81012	05/09/2022	13/09/2022	N	N/A	Slugs, snails
16	NS 96314 81242	05/09/2022	13/09/2022	N	N/A	Small mammal (mouse, bank/field vole, shrew)
17	**NS 92387 79589**	**05/09/2022**	**13/09/2022**	**Y**	**5, 6**	**Brown rat, small mammal (mouse, bank/field vole, shrew)**
18	NS 92476 79763	05/09/2022	13/09/2022	N	N/A	Slugs
19	NS 92611 79835	05/09/2022	13/09/2022	N	N/A	Cat
20	NS 93557 79776	05/09/2022	13/09/2022	N	N/A	Slugs, snails

9 Bats

Bat surveys were conducted by Jacobs between 2019 and 2023. Full details of the Jacobs surveys methods can be found in EIA Report: Biodiversity, Chapter 7, Table 7-1. Details of surveys and the results used to inform the assessment are provided in the following sections.

9.1 Assessment of Buildings and Structures

High-level assessments and Preliminary Roost Assessments (PRAs) were conducted on buildings and structures within 30 m of the Site Boundary to categories the potential for them to be used by roosting bats. Categories used were negligible, low, moderate or high as per best practice guidance (Collins, 2016). A summary of the results is recorded below in Table 7.5.

A total of 481 buildings were identified within 30 m of the Site Boundary; 30 underwent a detailed PRA (Table 7.6) the remaining 453 underwent a high-level assessment (Table 7.5). Due to access constraints, detailed PRAs could not be conducted on one building to be demolished. Therefore, a high-level assessment was conducted using aerial photography and from publicly accessible land. Of the 453 high level assessment buildings, 22 could not undergo high level assessment due to access restrictions (such as being located within the Grangemouth petrochemical plant).

A total of 37 structures were identified within 30 m of the Scheme, however, four could not undergo high level assessment or PRA due to access restrictions, and 33 underwent a PRA (Table 7.7). Where buildings or structures were not assessed, they are captured in the "Not Assessed" column.

Buildings with bat roost potential within 30 m of the Site Boundary are shown on Figure B7.3. Structures with bat roost potential within 30 m of the Site Boundary are shown on Figure B7.4.

Detailed results of the roost assessments within 30 m of the Site Boundary are provided in the Tables 7.8 and 7.9.

Table 7.5: Summary of high-level assessment of buildings

Distance to Site Boundary (m)	Bat Roost Potential					
	High	Moderate	Low	Negligible	Not Assessed*	Total
Footprint	**6**	**3**	**1**	**1**	**0**	11
1-10	**15**	**47**	**33**	**17**	**16**	128
11-30	**67**	**132**	**73**	**36**	**6**	314
Total	88	182	107	54	22	453

Table 7.6: Summary of PRA results for buildings

Distance to Site Boundary (m)	Number of Buildings											
	Summer Bat Roost Potential						Winter Bat Roost Potential					
	Summer Roost	High	Moderate	Low	Negligible	Total	Hibernation Roost	High	Moderate	Low	Negligible	Total
Footprint	**1**	**0**	**0**	**0**	**0**	1	**0**	**0**	**0**	**1**	**0**	1
1-10	**3**	**1**	**7**	**9**	**4**	24	**0**	**3**	**8**	**6**	**8**	25
11-30	**3**	**0**	**1**	**1**	**0**	5	**0**	**2**	**1**	**0**	**1**	4
Total	7	1	8	10	4	30	0	5	9	7	9	30

Table 7.7: Summary of PRA and high-level assessment results for structures*

Distance to Site Boundary (m)	Number of Structures													
	Summer Bat roost Potential							Winter Bat roost Potential						
	Summer Roost	High	Moderate	Low	Negligible	Not Assessed	Total	Hibernation Roost	High	Moderate	Low	Negligible	Not Assessed	Total
Footprint	**1**	**0**	**2**	**10**	**11**	**4**	**28**	**0**	**1**	**2**	**7**	**14**	**4**	28
1-10	**0**	**1**	**0**	**2**	**3**	**0**	**6**	**0**	**1**	**0**	**2**	**3**	**0**	6
11-30	**0**	**1**	**1**	**1**	**0**	**0**	**3**	**0**	**1**	**1**	**1**	**0**	**0**	3
Total	1	2	3	13	14	4	37	0	3	3	10	17	4	37

*Note that walls which are located along the watercourse banks at various locations have not been included in these number

Table 7.8: Roost assessment results for buildings within 30 m of the Site Boundary: (-) indicates which buildings which were not assessed for roost or WHI potential

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-1.1	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 86233 81553
BB1-1.11	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS86114 81598
BB1-1.12	1-1	-	-	Moderate	-	0	No	High-level assessment	NS86173 81573
BB1-1.13	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS86109 81656
BB1-1.14	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS86107 81674
BB1-1.15	1-1	-	-	Low	-	11 - 30	No	High-level assessment	NS86122 81641
BB1-1.16	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS86371 81525
BB1-1.17	1-1	-	-	Moderate	-	0	No	High-level assessment	NS86422 81499
BB1-1.3	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86343 81532
BB1-1.4	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86376 81508
BB1-1.5	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86422 81481
BB1-1.6	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86453 81489
BB1-1.7	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86438 81479
BB1-1.8	1-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 86442 81472
BB1-2.1	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88068 81959
BB1-2.10	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88069 82103
BB1-2.100a	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87759 81557
BB1-2.100b	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87759 81557
BB1-2.101	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87729 81585
BB1-2.102	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87729 81585
BB1-2.104	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87758 81671
BB1-2.105	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87792 81694
BB1-2.106	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87792 81694
BB1-2.107	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87771 81685

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-2.108	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87806 81728
BB1-2.109	1-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87806 81728
BB1-2.11	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88079 82104
BB1-2.110	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87822 81744
BB1-2.111	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87845 81815
BB1-2.112	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88485 82481
BB1-2.113	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88501 82489
BB1-2.114	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88518 82494
BB1-2.115	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88535 82501
BB1-2.12	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88058 82118
BB1-2.13	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88050 82136
BB1-2.14	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88045 82142
BB1-2.15	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88055 82152
BB1-2.16	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88033 82153
BB1-2.17	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88047 82159
BB1-2.18	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88041 82161
BB1-2.19	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88030 82164
BB1-2.2	1-2	-	-	High	-	11 - 30	No	High-level assessment	NS 88079 81960
BB1-2.20	1-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 88015 82171
BB1-2.21	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88017 82183
BB1-2.22	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88012 82189
BB1-2.23	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88013 82199
BB1-2.24	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88007 82204
BB1-2.25	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 87992 82210
BB1-2.26	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 87996 82216
BB1-2.28	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 87992 82225
BB1-2.29	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 87994 82238

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-2.30	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88008 82235
BB1-2.31	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 87998 82246
BB1-2.32	1-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 87999 82251
BB1-2.33	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88012 82252
BB1-2.34	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88019 82260
BB1-2.35	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88024 82267
BB1-2.36	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88034 82277
BB1-2.37	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88046 82286
BB1-2.38	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88061 82290
BB1-2.39	1-2	-	-	High	-	11 - 30	No	High-level assessment	NS 88033 82359
BB1-2.43	1-2	-	-	-	-	1 - 10	No	No access	NS 88050 82399
BB1-2.44	1-2	-	-	-	-	1 - 10	No	No access	NS 88061 82397
BB1-2.45	1-2	-	-	-	-	1 - 10	No	No access	NS 88074 82401
BB1-2.50	1-2	Moderate	Moderate	-	-	1 - 10	Yes	A large, two-storey, open-sided industrial building composed of brick with a corrugated metal roof. A small section of building would be demolished to facilitate the placement of a proposed site compound.	NS 88177 82521
BB1-2.51	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88159 82310
BB1-2.52	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88169 82305
BB1-2.53	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88185 82296
BB1-2.54	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88201 82297
BB1-2.55	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88211 82272
BB1-2.56	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88259 82297
BB1-2.57	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88232 82447
BB1-2.58	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88242 82444
BB1-2.59	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88251 82444
BB1-2.6	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88089 82046

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-2.60	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88279 82340
BB1-2.61	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88271 82446
BB1-2.63	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88282 82445
BB1-2.64	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88292 82446
BB1-2.65	1-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 88303 82448
BB1-2.66	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88341 82465
BB1-2.68	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88347 82448
BB1-2.69	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88369 82449
BB1-2.7	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88087 82059
BB1-2.70	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88381 82456
BB1-2.71	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88393 82454
BB1-2.72	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88411 82457
BB1-2.73	1-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 88430 82466
BB1-2.8	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88085 82072
BB1-2.9	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88088 82085
BB 1-2.91	1-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 87773 81491
BB 1-2.92	1-2	-	-	High	-	11 - 30	No	High-level assessment	NS 88412 82305
BB 1-2.95	1-2	-	-	High	-	11 - 30	No	High-level assessment	NS 88453 82308
BB 1-2.97	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87787 81529
BB 1-2.98	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87787 81529
BB 1-2.99	1-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 87787 81529
BB1-3.1	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88946 82721
BB1-3.11	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88962 82857
BB1-3.12	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88943 82860
BB1-3.13	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88971 82872
BB1-3.14	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88982 82901
BB1-3.16	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88972 82914

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-3.17	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88980 82928
BB1-3.18	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88994 82936
BB1-3.19	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88998 82944
BB3.2	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88913 82752
BB1-3.20	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89007 82954
BB1-3.21	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88998 82968
BB1-3.22	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88983 82971
BB1-3.23	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88971 82974
BB1-3.24	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88958 82974
BB1-3.25	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88943 82976
BB1-3.26	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88930 82978
BB1-3.27	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88915 82980
BB1-3.28	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88906 82981
BB1-3.29	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88891 82983
BB1-3.3	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88924 82758
BB1-3.30	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88880 82985
BB1-3.31	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88869 82987
BB1-3.32	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88857 82987
BB1-3.33	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88849 82996
BB1-3.34	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88853 83040
BB1-3.35	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88886 83047
BB1-3.39	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88942 83033
BB1-3.4	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88918 82765
BB1-3.40	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88945 83042
BB1-3.41	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88957 83038
BB1-3.43	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88979 83020
BB1-3.44	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89000 83028

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-3.45	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89012 83013
BB1-3.48	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89055 82994
BB1-3.49	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89062 83009
BB1-3.5	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88925 82780
BB1-3.51	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89103 83004
BB1-3.52	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89115 83016
BB1-3.53	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89130 82982
BB1-3.6	1-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 88933 82784
BB1-3.7	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88929 82794
BB1-3.8	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88935 82808
BB1-3.9	1-3	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 88945 82833
BB1-4.1	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89268 82774
BB1-4.10	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89468 82730
BB1-4.11	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89473 82745
BB1-4.12	1-4	Moderate	Moderate	Moderate	-	1 - 10	Yes	Commercial buildings with harled walls, a tiled roof and barge boards. Some gaps under barge boards which could provide suitable roosting habitat.	NS 89456 82820
BB1-4.13	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89430 82809
BB1-4.14	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89428 82818
BB1-4.15	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89454 82823
BB1-4.16	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89446 82846
BB1-4.17	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89456 82856
BB1-4.18	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89444 82864
BB1-4.19	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89432 82884
BB1-4.2	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89294 82751
BB1-4.20	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89448 82895
BB1-4.21	1-4	-	-	High	-	11 - 30	No	High-level assessment	NS 89455 82908

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB1-4.24	1-4	-	-	High	-	1 - 10	No	High-level assessment	NS 89472 82916
BB1-4.25	1-4	-	-	High	-	11 - 30	No	High-level assessment	NS 89476 82945
BB1-4.26	1-4	-	-	High	-	1 - 10	No	High-level assessment	NS 89502 82947
BB1-4.27	1-4	-	-	High	-	11 - 30	No	High-level assessment	NS 89493 82972
BB1-4.3	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89310 82753
BB1-4.4	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89335 82770
BB1-4.5	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 89333 82754
BB1-4.6	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89358 82758
BB1-4.7	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89375 82759
BB1-4.8	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89389 82760
BB1-4.9	1-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 89409 82760
BB1-4.91	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 8925282800
BB1-4.92	1-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 8925282800
BB1-4.93	1-4	-	-	Moderate	-	0	No	High-level assessment	NS 8944382745
BB1-4.94	1-4	-	-	Low	-	0	No	High-level assessment	NS 8942282732
BB1-4.95	1-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 8940882723
BB2-1.1	2-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 91514 82312
BB2-1.11	2-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 91779 82232
BB2-1.13	2-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 91831 82220
BB2-1.14	2-1	High	High	-	-	1 - 10	Yes	Single-storey, brick built commercial building with a corrugated asbestos roof with two storey-section at the north. Externally there are PRFs along wall heads; gaps between timber panels at windows; gap in bitumen-felt flashing at southern gable end; gaps in windows lintels along west aspect; and missing bricks and pipe holes. Internally there are gaps between bricks; cavities in brickwork; piles of timber panelling; and gaps in doors lintels.	NS 91828 82244

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BB2-1.15	2-1	Moderate	Moderate	-	-	1 - 10	No	Brick-built storage shed with corrugated roof sheeting. Multiple gaps between the brick work, providing PRFs.	NS 91937 82270
BB2-1.2	2-1			High	-	11 - 30	No	High-level assessment	NS 91511 82279
BB2-1.3	2-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 91541 82335
BB2-1.4	2-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 91585 82278
BB2-1.5	2-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 91587 82240
BB2-1.6	2-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 91607 82276
BB2-1.7	2-1	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 91629 82257
BB2-1.8	2-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 91632 82270
BB2-1.9	2-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 91650 82260
BB2-2.1	2-2	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 92109 82433
BB2-2.10	2-2	High	High	-	High	1 - 10	No	Derelict brick building with pitched roof plus two outbuildings. Gaps under slate roof and under lifted lead edges. Gaps into building above door and by beams on door. Internally a false ceiling is present, so likely to be spaces between roof and ceiling suitable for roosting	NS 92588 82589
BB2-2.11	2-2	High	High	-	High	11 - 30	No	Abandoned school with slate roof and brick (likely double skinned) walls. Multiple PRFs allowing access into the building on all aspects, including at roof, windows, masonry and boarded up windows.	NS 92603 82580
BB2-2.12	2-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 92634 82582
BB2-2.13	2-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 92666 82598
BB2-2.14	2-2	Low	Low	Low	-	1 - 10	Yes	High-level assessment	NS 92689 82609
BB2-2.15	2-2	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 92720 82578
BB2-2.2	2-2	Low	Negligible	-	Negligible	1 - 10	Yes	Limited access. Building constructed from corrugated metal and adjacent to river. Did not appear to be any gaps into building and lower quality foraging and commuting habitat was present in the area.	NS 92113 82443
BB2-2.3	2-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92233 82519

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BB2-2.5	2-2	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92295 82561
BB2-2.6	2-2	Moderate	Moderate	-	Moderate	1 - 10	Yes	Workshop building within Yacht Club. Rendered brick walls and flat corrugated metal roof. Wooden bargeboards with some gaps underneath. Gable end bargeboards are flush to walls except for one gap at each corner.	NS 92330 82544
BB2-2.6b	2-2	Moderate	Moderate	-	Moderate	11 - 30	No	Clubhouse of Grangemouth Yacht Club (GYC). Weather boarded sides with corrugated metal roof. Some PRFs at gable ends under eaves and behind flashing. Also potential for small numbers of bats to roost behind GYC signs.	NS 92347 82565
BB2-2.7	2-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 92454 82543
BB3-1.1	3-1	Negligible	Negligible	-	-	1 - 10	No	Portacabins with no PRFs observed.	NS 92895 82700
BB3-1.2	3-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92919 82703
BB3-1.4	3-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92928 82714
BB3-1.5	3-1	Moderate	Moderate	-	Low	1 - 10	Yes	Derelict sea cadets hut. Single storey, brick and timber walled building with boarded up windows. Concrete flat roof (potential cavities internally).	NS 9294 282720
BB3-1.6	3-1	Moderate	Low	-	Moderate	1 - 10	Yes	Sea cadet building. Loose barge boarding with gaps and wooden window frames within which potential PRFs were present.	NS 92957 82715
BB3-1.7	3-1	-	-	Low	-	11 - 30	No	High-level assessment	NS 93040 82704
BB3-1.8	3-1	-	-	Low	-	11 - 30	No	High-level assessment	NS 93138 82729
BB3-1.9	3-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93300 82755
BB3-1.91	3-1	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 93300 82735
BB3-1.92	3-1	-	-	Low	-	11 - 30	No	High-level assessment	NS 92957 82676
BB3-2.1	3-2	-	-	Low	-	11 - 30	No	No access	NS 93664 82724
BB3-2.10	3-2	-	-	-	-	1 - 10	No	High-level assessment	NS 94181 83023
BB3-2.11	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94198 83016
BB3-2.12	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94197 83019
BB3-2.13	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94228 83048
BB3-2.15	3-2	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94224 83076

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB3-2.17	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94242 83080
BB3-2.18	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94260 83104
BB3-2.19	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94294 83164
BB3-2.2	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 9374282750
BB3-2.23	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 9433683299
BB3-2.4	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94172 82992
BB3-2.5	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94178 82998
BB3-2.6	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94189 83003
BB3-2.7	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94192 83009
BB3-2.8	3-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94179 83010
BB3-2.9	3-2	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94179 83019
BB3-3.10	3-3	-	-	Low	-	1 - 10	No	High-level assessment	NS 94926 83896
BB3-3.11	3-3	-	-	Low	-	1 - 10	No	High-level assessment	NS 94919 83887
BB3-3.2	3-3	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94348 83368
BB3-3.3	3-3	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94350 83400
BB3-3.4	3-3	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94354 83443
BB3-3.5	3-3	-	-	Low	-	1 - 10	No	High-level assessment	NS 94355 83560
BB3-3.6	3-3	-	-	Low	-	11 - 30	No	High-level assessment	NS 94513 83743
BB3-3.7	3-3	-	-	Low	-	1 - 10	No	High-level assessment	NS 94820 83944
BB3-3.8	3-3	-	-	Low	-	1 - 10	No	High-level assessment	NS 94878 83926
BB3-3.9	3-3	-	-	-	-	1 - 10	No	No access	NS 94879 83907
BB3-4.1	3-4	Negligible	Negligible	-	-	1 - 10	No	Single storey small control room for water gates. Constructed from brick with flat roof. No obvious PRFs, well sealed and no evidence.	NS 95105 83787
BB3-4.10	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 95239 83714
BB3-4.11	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 95292 83514
BB3-4.12	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 95313 83452

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB3-4.16	3-4	Low	Negligible	_	-	1 - 10	No	Cabin type structure. Wood panelled ends and metal corrugated front faces.	NS 95123 83720
BB3-4.17	3-4	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 9524383491
BB3-4.18	3-4	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 9523483453
BB3-4.19	3-4	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 9530483518
BB3-4.21	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 9513783682
BB3-4.2	3-4	Low	Low	-	-	1 - 10	No	Single story brick building with vents with boarding behind which could present roosting opportunities and small gaps between brick work which could lead into double skinned cavities.	NS 95136 83724
BB3-4.3	3-4	Negligible	Negligible	-	-	1 - 10	No	Single storey small control room for water gates. Constructed from brick with flat roof. Well-sealed with no visible PRFs.	NS 95201 83826
BB3-4.4	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 95167 83707
BB3-4.5	3-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 95184 83718
BB3-4.6	3-4	Low	Negligible	-	-	1 - 10	No	Water storage area under ground-level with flat topped concrete top and viewing area into water storage. Very limited PRFs.	NS 95215 83766
BB3-4.7	3-4	Low	Low	-	-	1 - 10	No	Single story brick building with vents with boarding behind which could present roosting opportunities and small gaps between brick work which could lead into double skinned cavities.	NS 95234 83775
BB3-4.8	3-4	Negligible	Negligible	-	-	1 - 10	No	Single storey small pump room, inside which water is sprayed periodically. Externally, no obvious PRFs. Internally there is a small crack into double skin wall, but access for bats into building not possible from outside.	NS 95247 83778
BB3-4.9	3-5	Low	Low	-	-	1 - 10	No	Building has small holes visible between bricks on all sides but are not visible from inside, so may lead into double skinned wall cavity or just be small crevices. Grates present on outside. Internally, no obvious access to inside with exception of gap above door. No suitable PRFs inside, room is well sealed.	NS 95255 83788
BB3-5.1	3-5	-	-	-	-	11 - 30	No	No access	NS 95139 83321

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BB3-5.2	3-5	-	-	Low	-	11 - 30	No	High-level assessment	NS 9510183280
BB3-5.3	3-5	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 9510883291
BB3-5.4	3-5	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 9513983321
BB4-1.1	4-1	-	-	High	-	1 - 10	No	High-level assessment	NS 92429 79442
BB4-1.1b	4-1	-	-	High	-	1 - 10	No	High-level assessment	NS 92386 79365
BB4-1.1c	4-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92371 79343
BB4-1.10	4-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92455 79630
BB4-1.12	4-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92420 79692
BB4-1.13	4-1	-	-	Low	-	11 - 30	No	High-level assessment	NS 92455 79742
BB4-1.14	4-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92460 79770
BB4-1.15	4-1	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92443 79822
BB4-1.2	4-1	-	-	High	-	1 - 10	No	High-level assessment	NS 92717 79366
BB4-1.24	4-1	-	-	Low	-	11 - 30	No	High-level assessment	NS 92818 79922
BB4-1.3	4-1	-	-	High	-	1 - 10	No	High-level assessment	NS 92704 79374
BB4-1.31	4-1	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 9242879759
BB4-1.32	4-1	-	-	High	-	0	No	High-level assessment	NS 9239479370
BB4-1.33	4-1	-	-	High	-	11-30	No	High-level assessment	NS 9265979466
BB4-1.34	4-1	-	-	High	-	0	No	High-level assessment	NS9239079360
BB4-1.4	4-1	-	-	High	-	1 - 10	No	High-level assessment	NS 92683 79402
BB4-1.6	4-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92644 79449
BB4-1.7	4-1	Low	Negligible	-	-	1 - 10	No	Substation cabin of metal construction. PRF between wall head and flat roof that may lead into building. Potential for opportunistic use by bats.	NS 92619 79462
BB4-1.8	4-1	-	-	Low	-	1 - 10	No	High-level assessment	NS 92607 79492
BB4-1.9	4-1	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 92461 79615
BB4-2.1	4-2	-	-	High	-	11 - 30	No	High-level assessment	NS 92579 79914
BB4-2.11	4-2	Moderate	Moderate	-	-	1 - 10	Yes	Single-storey building with metal corrugated pitched roof. A number of gaps are present along	NS 92832 79858

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								the metal fascia and there is a single gap at the west gable end where cables of flood lights come out from the building.	
BB4-2.12	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92856 79922
BB4-2.13	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92868 79919
BB4-2.14	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92894 79920
BB4-2.16	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92972 79893
BB4-2.17	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93002 79889
BB4-2.19	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93020 79875
BB4-2.20	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93045 79868
BB4-2.21	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93072 79861
BB4-2.22	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93127 79824
BB4-2.23	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93153 79820
BB4-2.4	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92679 79906
BB4-2.5	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92710 79922
BB4-2.6	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92745 79914
BB4-2.7	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92769 79918
BB4-2.8	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92784 79917
BB4-2.9	4-2	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92801 79919
BB4-3.1	4-3	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 93565 79772
BB4-3.2	4-3	-	-	High	-	11 - 30	No	High-level assessment	NS 93588 79746
BB4-4.1	4-4	-	-	High	-	11 - 30	No	High-level assessment	NS 93840 79839
BB4-4.11	4-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 94315 79684
BB4-4.14	4-4	-	-	Low	-	11 - 30	No	High-level assessment	NS 94384 79644
BB4-4.15	4-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 94369 79720
BB4-4.16	4-4	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94378 79752
BB4-4.17	4-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 94397 79724
BB4-4.2	4-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93942 79807

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-4.3	4-4	-	-	High	-	1 - 10	No	High-level assessment	NS 94212 79752
BB4-4.4	4-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 94256 79743
BB4-4.5	4-4	-	-	High	-	1 - 10	No	High-level assessment	NS 94264 79739
BB4-4.6	4-4	-	-	High	-	1 - 10	No	High-level assessment	NS 94279 79743
BB4-4.7	4-4	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 94279 79737
BB4-4.8	4-4	-	-	Low	-	1 - 10	No	High-level assessment	NS 94279 79718
BB4-4.9	4-5	-	-	High	-	1 - 10	Yes	High-level assessment	NS 94313 79755
BB4-4.91a	4-4	-	-	Low		11 - 30	No	High-level assessment	NS 9393979456
BB4-4.91b	4-4	-	-	Low		11 - 30	No	High-level assessment	NS 9393979456
BB4-4.92	4-4	-	-	Low		1 - 10	No	High-level assessment	NS 9391679429
BB4-4.93	4-4	-	-	Moderate		11 - 30	No	High-level assessment	NS 9395379500
BB4-4.94	4-4	-	-	Low		1 - 10	No	High-level assessment	NS 9396879488
BB4-5.1	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92801 81409
BB4-5.11	4-5	Moderate	Moderate	-	Moderate	1 - 10	Yes	Zetland Park kiosk. It is a single storey building with a tiled roof that is well covered in moss but looked to be in good condition and sealed. Gaps between bricks that appear to lead into the cavity wall. There is also a timber porch with a false ceiling with gaps present that lead internally. There are also gaps under the barge boards and into soffit all around building. No internal access of the kiosk was possible during the PRA.	NS 92887 81518
BB4-5.12	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92835 81536
BB4-5.13	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92840 81561
BB4-5.15	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92839 81582
BB4-5.16	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92848 81598
BB4-5.17	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92855 81616
BB4-5.18	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92860 81634
BB4-5.19	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92865 81650
BB4-5.2	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92804 81438

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-5.20	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92864 81677
BB4-5.21	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92943 81671
BB4-5.22	4-5	-	-	High	-	1 - 10	No	High-level assessment	NS 9294981539
BB4-5.23	4-5	-	-	Low	-	1 - 10	No	High-level assessment	NS 9295081525
BB4-5.24	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 9304081547
BB4-5.27	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 9278181340
BB4-5.29	4-5	-	-	Low	-	1 - 10	No	High-level assessment	NS 9297081549
BB4-5.3	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92808 81446
BB4-5.5	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92809 81466
BB4-5.6	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92816 81477
BB4-5.8	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92815 81502
BB4-5.9	4-5	-	-	High	-	11 - 30	No	High-level assessment	NS 92826 81509
BB4-6.1	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92886 81724
BB4-6.10	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92984 81836
BB4-6.11	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92909 81848
BB4-6.12	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92911 81853
BB4-6.13	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 92923 81861
BB4-6.15	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92997 81895
BB4-6.16	4-6	-	-	High	-	1 - 10	No	High-level assessment	NS 92992 81908
BB4-6.17	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93014 81908
BB4-6.18	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92950 81938
BB4-6.2	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 92885 81747
BB4-6.20	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92951 81958
BB4-6.21	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93017 81938
BB4-6.22	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93014 81953
BB4-6.24	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93034 81991
BB4-6.26	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93020 81998

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-6.27	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93031 82021
BB4-6.28	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS9303782036
BB4-6.3	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92959 81749
BB4-6.30	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93048 82039
BB4-6.31	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93038 82051
BB4-6.32	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 92981 82057
BB4-6.33	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92990 82084
BB4-6.34	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93041 82061
BB4-6.35	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93046 82076
BB4-6.36	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93059 82060
BB4-6.37	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93083 82066
BB4-6.38	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93135 82055
BB4-6.39	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93135 82070
BB4-6.4	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92903 81783
BB4-6.40	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93157 82065
BB4-6.41	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93164 82056
BB4-6.42	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93171 82067
BB4-6.43	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93182 82066
BB4-6.44	4-6	-	-	Low	-	11 - 30	No	High-level assessment	NS 93178 82057
BB4-6.45	4-6	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93202 82065
BB4-6.47	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 93218 82064
BB4-6.6	4-6	-	-	High	-	11 - 30	No	High-level assessment due to limited access to conduct PRA. However, limited data gathered during emergence/re-entry surveys in 2022., Three storey, brick-built building with a tiled roof. Features identified included: gaps at the wall heads of the building, gaps under guttering on the northwest and south west, gaps around roof apex/gable end.	NS 92976 81813

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-6.7	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92910 81824
BB4-6.9	4-6	-	-	High	-	11 - 30	No	High-level assessment	NS 92917 81840
BB4-7.1	4-7	High	High	-	-	1 - 10	No	Scottish Water building on corner of Grange Burn, brick-built with slate pitched roof and flashing. Wall heads tight to soffits with a low potential PRF at gap above window on north face.	NS 93031 82090
BB4-7.10	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93308 82058
BB4-7.11	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93333 82060
BB4-7.12	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93350 82057
BB4-7.13	4-7	-	-	Low	-	1 - 10	No	High-level assessment	NS 93372 82061
BB4-7.15	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93409 82053
BB4-7.16	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93421 82044
BB4-7.17	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93426 82043
BB4-7.18	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93432 82055
BB4-7.19	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93444 82043
BB4-7.2	4-7	-	-	Moderate	-	1 - 10	No	High-level assessment	NS 93041 82092
BB4-7.20	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93453 82055
BB4-7.21	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93463 82041
BB4-7.22	4-7	-	-	High	-	1 - 10	No	High-level assessment	NS 93490 82055
BB4-7.24	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93526 82053
BB4-7.25	4-7	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93546 82118
BB4-7.26	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93551 82047
BB4-7.28	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93551 82034
BB4-7.3	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93059 82152
BB4-7.30	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 935678 2032
BB4-7.31	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93574 82046
BB4-7.33	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93586 82032
BB4-7.34	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93597 82046

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-7.35	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93620 82046
BB4-7.38	4-7	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93599 82036
BB4.7-39	4-7	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 93290 82147
BB4.7-40	4-7	-	-	Moderate		11 - 30		High-level assessment	NS 9356982133
BB4-7.4	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93082 82149
BB4-7.5	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93131 82150
BB4-7.7	4-7	-	-	High	-	11 - 30	No	High-level assessment	NS 93237 82064
BB4-7.8	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93265 82061
BB4-7.9	4-7	-	-	Low	-	11 - 30	No	High-level assessment	NS 93286 82062
BB4-8.1	4-8	-	-	Low	-	11 - 30	No	High-level assessment	NS 93639 82033
BB4-8.10	4-8	-	-	High	-	11 - 30	No	High-level assessment	NS 93724 82060
BB4-8.11	4-8	-	-	High	-	11 - 30	No	High-level assessment	NS 93740 82059
BB4-8.13	4-8	-	-	High	-	11 - 30	No	High-level assessment	NS 93754 82052
BB4-8.14	4-8	Moderate	Moderate	-	-	1 - 10	No	Scottish Water building alongside the Grange Burn, brick-built with a concrete flat roof and rendered walls. Unmeshed concrete vents are present at wall heads provide potential internal access.	NS 93808 82096
BB4-8.15	4-8	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94009 82149
BB4-8.16	4-8	-	-	Low	-	1 - 10	No	High-level assessment	NS 93999 82196
BB4-8.17	4-8	-	-	Low	-	11 - 30	No	High-level assessment	NS 94113 82184
BB4-8.18	4-8	-	-	Low	-	11 - 30	No	High-level assessment	NS 94121 82197
BB4-8.2	4-8	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 93644 82032
BB4-8.3	4-8	-	-	Low	-	11 - 30	No	High-level assessment	NS 93643 82047
BB4-8.4	4-8	-	-	Low	-	1 - 10	No	High-level assessment	NS 93657 82055
BB4-8.6	4-8	-	-	Low	-	11 - 30	No	High-level assessment	NS 93694 82052
BB4-8.7	4-8	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 93706 82043
BB4-8.8	4-8	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 93712 82057

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB4-8.9	4-8	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 93721 82048
BB4-9.1	4-9	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94133 82193
BB4-9.11	4-9	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94505 82394
BB4-9.12	4-9	Low	Low	-	-	1 - 10	Yes	Brick built workshop building about 2.5m high with a flat concrete roof. Metal bargeboards were bolted to a layer of concrete around top of walls. Appears well sealed.	NS 94462 82422
BB4-9.13	4-9	-	-	Low	-	1 - 10	No	High-level assessment	NS 94547 82526
BB4-9.2	4-9	-	-	Low	-	11 - 30	No	High-level assessment	NS 94137 82196
BB4-9.3	4-9	-	-	Low	-	11 - 30	No	High-level assessment	NS 94174 82232
BB4-9.4	4-9	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94283 82296
BB4-9.5	4-9	-	-	Low	-	11 - 30	No	High-level assessment	NS 94288 82280
BB4-9.7	4-9	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94324 82304
BB4-9.9	4-4	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94334 82303
BB4-4.18	4-4	-	-	High	-	11 - 30	No	High-level assessment	NS 92782 81365
BB4-4.19	4-4	-	-	High	-	11 - 30	No	High-level assessment	NS 94304 79657
BB4-4.20	4-4	-	-	High	-	11 - 30	No	High-level assessment	NS 94237 79565
BB4-4.21	4-4	-	-	High	-	1 - 10	No	High-level assessment	NS 94323 79615
BB4-4.22	4-4	-	-	High	-	0	No	High-level assessment	NS 94264 79627
BB4-4.23	4-4	-	-	High	-	0	No	High-level assessment	NS 94287 79649
BB4-4.24	4-4	-	-	High	-	0	No	High-level assessment	NS 94342 79649
BB4-4.25	4-4	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 94372 79587
BB4-4.26	4-4	-	-	High	-	0	No	High-level assessment	NS 94335 79638
BB5-1.1	5-1	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94341 79765
BB5-1.2	5-1	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94354 79773
BB5-1.3	5-1	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94345 79752
BB5-1.6	5-1	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94390 79634
BB5-1.7	5-1	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 94395 79720

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB5-2.1	5-2	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94540 80395
BB5-2.11	5-2	-	-	Low	-	11 - 30	No	High-level assessment	NS 94934 80487
BB5-2.12	5-2	-	-	Low	-	1 - 10	No	High-level assessment	NS 94936 80381
BB5-2.13	5-2	-	-	-	-	1 - 10	No	No access	NS 94954 80384
BB5-2.14	5-2	-	-	-	-	1 - 10	No	No access	NS 94965 80386
BB5-2.15	5-2	-	-	-	-	11 - 30	No	No access	NS 95029 80506
BB5-2.2	5-2	-	-	-	-	11 - 30	No	No access	NS 94547 80407
BB5-2.3	5-2	-	-	-	-	11 - 30	No	No access	NS 94539 80407
BB5-2.4	5-2	-	-	-	-	1 - 10	No	No access	NS 94655 80429
BB5-2.7	5-2	-	-	-	-	1 - 10	No	No access	NS 94809 80352
BB5-3.1	5-3	-	-	-	-	11 - 30	No	No access	NS 95052 80512
BB5-3.10	5-3	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 95412 80434
BB5-3.11	5-3	Low	Negligible	-	-	11 - 30	Yes	Large warehouse building composed of brick and corrugated metal. There is gap between the upper metal walls and the brickwork which runs around the base of the building. Limited roosting availability between the brickwork and corrugated metal but could be used opportunistically.	NS 95400 80699
BB5-3.12	5-3	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 95424 80560
BB5-3.13	5-3	-	-	Negligible	-	1 - 10	No	High-level assessment	NS 95461 80524
BB5-3.14	5-3	-	-	-	-	1 - 10	No	No access	NS 95262 80593
BB5-3.2	5-3	-	-	-	-	1 - 10	No	No access	NS 95104 80395
BB5-3.3	5-3	-	-	-	-	1 - 10	No	No access	NS 95111 80393
BB5-3.4	5-3	-	-	-	-	1 - 10	No	No access	NS 95108 80392
BB5-3.6	5-3	-	-	-	-	1 - 10	No	No access	NS 95144 80514
BB5-3.7	5-3	-	-	-	-	1 - 10	No	No access	NS 95253 80550
BB5-3.8	5-3	-	-	-	-	1 - 10	No	No access	NS 95258 80558
BB5-3.9	6-1	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 95299 80415
BB6-1.1	6-3	-	-	-	-	11 - 30	No	No access	NS 95168 82246

ID	Working Area	PRA Summer Roost Potential	PRA Winter Roost Potential	High-level Potential	WHI	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BB6-3.2	6-3	-	-	Low	-	11 - 30	No	High-level assessment	NS 96106 81098
BB6-3.3	6-3	-	-	Low	-	11 - 30	No	High-level assessment	NS 96114 81110
BB1	-	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 94596 82642
BB2	-	-	-	Low	-	11 - 30	No	High-level assessment	NS 94624 82684
BB3	-	-	-	Moderate	-	11 - 30	No	High-level assessment	NS 92613 82470
BB4	-	-	-	Low	-	11 - 30	No	High-level assessment	NS 92584 82448
BB5	-	-	-	Low	-	1 - 10	No	High-level assessment	NS 92604 82428
BB6	-	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 92527 82313
BB7	-	-	-	Negligible	-	0	No	High-level assessment	NS 92579 82241
BB8	-	-	-	Low	-	11 - 30	No	High-level assessment	NS 92570 82216
BB9	-	-	-	Negligible	-	11 - 30	No	High-level assessment	NS 92632 82426

Table 7.9: Roost assessment results for structures

ID	Working Area	Summer Bat Roost Potential	Winter Bat Roost Potential	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BS1-1.1	1-1	Low	Low	0	No	Older bridge arch with newer deck, flat in centre of bridge. No PRFs on eastern face or under the arch. No access to assess other side of bridge, but no obvious features on the face.	NS 86210 81608
BS 1-2.1	1-2	High	High	11 - 30	No	Old, two-span, partially dismantled stone rail bridge over the River Carron and adjacent footpath. Limited ability to inspect the structure due to its location, however there are PRFs noted on the abutments and under the arch over the river. Due to being unable to inspect them it is unknown how deep they are.	NS 88044 82322
BS1-2.2	1-2	High	High	1 - 10	No	Double span flat decked bridge. Concrete deck with concrete abutments/stone piers. Tall wall running west from bridge, with the potential to have PRFs. Both faces of bridge look well maintained, but there could be PRFs underneath. Difficult to assess structure from riverbanks due to health and safety constraints.	NS 88217 82386
BS1-2.3	1-2	Low	Low	0	No	Flat decked concrete road bridge over the River Carron (B902). Possible PRFs in the expansion joints.	NS 92633 79853
BS1-2.4	1-2	High	High	0	No	High stone wall which runs along the road north of the River Carron. Various PRF's along the length of the wall.	NS 88128 82384

ID	Working Area	Summer Bat Roost Potential	Winter Bat Roost Potential	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BS1-2.5	1-2	Negligible	Negligible	0	No	Pedestrian underpass associated with BS1-2.3. Half pipe lined with corrugated metal. No PRFs observed.	NS 88334 82387
BS1-3.1	1-3	Negligible	Negligible	0	No	Old concrete walkway. No PRFs observed.	NS 89022 82976
BS4-1.11	4-1	Negligible	Negligible	1 - 10	No	Concrete bridge with no PRFs.	NS 92601 79552
BS4-1.12	4-1	Negligible	Low	1 - 10	No	Concrete bridge with stone wall at top but no visible PRFs and rocks cages on E embankment.	NS 92478 79594
BS4-1.13	4-1	Negligible	Negligible	0	No	Concrete bridge with no PRFs.	NS 92397 79615
BS4-2.2	4-2	Low	Negligible	0	No	Single span metal pedestrian bridge. Abutments met shallow brick area near ground. Wooden deck underneath with small crevice PRFs between wooded areas with potential for opportunistic bats.	NS 92879 79877
BS4-2.3	4-2	Low	Low	0	No	Single span concrete short pedestrian bridge. Some small PRFs around edge of abutments on each side.	NS 92633 79853
BS4-2.4	4-2	Low	Low	0	No	Single span concrete flat deck short pedestrian bridge. Some damp PRFs in abutments.	NS 93136 79760
BS4-3.1	4-3	Low	Low	1 - 10	No	Stone wall with shallow, low potential gaps.	NS 93565 79772
BS4-3.3	4-3	Low	Low	0	No	Single span and long concrete box bridge running under two major roads. No access to other side of bridge. Assessment limited due to access constraints.	NS 93144 79761
BS4-3.4	4-3	Low	Low	0	No	Concrete bridge. Small gaps under some areas of drainage pipe which runs along one side. Otherwise all very sealed and no PRFs.	NS 93722 79928
BS4-4.1	4-4	Moderate	Moderate	11 - 30	No	Assessment limited due to access constraints. Appeared to be a simple single span concrete flat deck road bridge carrying A905.	NS 94468 79796
BS4-4.2	4-4	Negligible	Negligible	0	Yes	The bridge is in good condition and no PRFs were identified during the PRA. A WHI inspection was also conducted at the same time as the PRA.	NS 94288 79614
BS4-4.3	4-4	Moderate	Moderate	0	Yes	A small stone bridge over a watercourse used as part of a cycle path. There are numerous small gaps between stonework on each side of the bridge and on the underside on the arch. A WHI inspection was also conducted at the same time as the PRA.	NS 93986 79460
BS4-4.4	4-4	Negligible	Negligible	0	Yes	Underpass below the A9 road to the west of Westquarter Burn.	NS 92390 79599
BS4-4.6	4-6	Low	Negligible	1-10	No	Stone bridge. South aspect, one small gap in arch stones, right hand side. North aspect, some small gaps under cap stones around metal support for razor wire.	NS 94076 79478
BS4-5.1	4-5	Negligible	Negligible	0	No	Metal single span pedestrian bridge and abutments met straight to ground.	NS 92859 81510

ID	Working Area	Summer Bat Roost Potential	Winter Bat Roost Potential	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
BS4-5.2	4-5	Negligible	Negligible	0	Yes	No PRFs identified on the bridge	NS 92840 81335
BS4-6.1	4-6	Negligible	Negligible	0	No	Concrete deck single span bridge. Unable to see under deck due to access constraints. Upon inspection of one side of an abutment, no PRFs identified.	NS 92924 81744
BS4-6.2	4-6	Low	Low	0	No	Stone and concrete bridge. No gaps on faces but small gaps to side of abutment. Bridge deck relatively close to water.	NS 92995 81986
BS4-8.1	4-8	Negligible	Negligible	0	No	Concrete deck and abutments with no apparent gaps going into abutments. Bridge deck was relatively close to the water.	NS 93765 82094
BS4-8.2	4-8	Low	Negligible	0	No	Single span metal bridge with concrete deck. Bridge deck was very close to the water, and as such would limit the likely roosting potential of the structure. Additionally, looks very wet underneath. No PRFs identified.	NS 93820 82114
BS4-8.3	4-8	Negligible	Negligible	0	No	Two half pipe culverts lined with corrugated metal. No PRFs identified.	NS 93876 82126
BS4-9.1	4-9	Low	Negligible	0	No	Bridge with three pipe infrastructures also crossing adjacent to it. Appears to have limited PRFs, with potential to only be opportunistically used by bats. It is likely that high tides may cover the PRFs, hence decreasing the roosting potential of the bridge.	NS 94465 82437
BS4-9.2	4-9	Negligible	Negligible	1 – 10	No	Concrete and steel bridge over Grange Burn carrying railway and ethane pipe. No PRFs identified.	NS 94524 82503
BS5-1.1	5-1	Low	Low	11 - 30	No	Single span steel deck bridge with aluminium looking parapet. Stone abutment and stone wing walls. Wing walls look well sealed. Possible PRF at gaps in stones at abutments.	NS 94780 79733
BS5-2.1	5-2	Not Assessed	Not Assessed	0	No	No access	NS 94573 80292
BS5-2.2	5-2	Not Assessed	Not Assessed	0	No	No access	NS 94851 80409
BS5-3.1	5-3	Not Assessed	Not Assessed	0	No	No access	NS 95263 80485
BS5-3.2	5-3	Moderate	Moderate	0	No	Stone road bridge over River Avon. Limited view.	NS 95426 80530
BS5-3.3	5-3	Not Assessed	Not Assessed	0	No	No access	NS 95536 80823
BS6-3.1	6-3	Negligible	Negligible	0	No	No PRFs	NS 96634 80883

ID	Working Area	Summer Bat Roost Potential	Winter Bat Roost Potential	Distance to Site Boundary (m)	To be Demolished	Description	National Grid Reference
N/A	Various	Low-High	Low-High	Various	Unknown	Walls were present throughout the Scheme as part of existing flood defences and could offer bat roost potential where gaps/cracks are present. However, only a high-level assessment has been made of these, no PRAs have been undertaken at this time.	-

9.2 Assessment of Trees

PRA surveys were undertaken at trees within the Site Boundary plus a 30 m buffer. Of the trees surveyed, 104 were recorded as having low, moderate or high suitability for roosting bats (Collins, 2016). A summary of these results is provided in Table 7.10. Trees with bat roost potential within 30 m of the Site Boundary are shown on Figure B7.4.

Table 7.10: Trees with bat roost potential within 30 m of the Site Boundary

Distance to Site Boundary (m)	Bat Roost Potential									
	Summer Bat Roost Potential					Winter Bat Roost Potential				
	High	Moderate	Low	Negligible	Totals	High	Moderate	Low	Negligible	Totals
Footprint	2	39	29	0	70	2	18	41	9	70
1-10	3	12	8	0	23	3	7	9	4	23
11-30	4	5	2	0	11	4	1	5	1	11
Total	9	56	39	0	104	9	26	55	14	104

9.3 Emergence and Re-Entry Surveys

Emergence and re-entry surveys were undertaken on 17 buildings and six structures with bat roost potential that had potential to be demolished or altered as part of the works. One to three surveys were conducted at each site by up to five surveyors between May-September 2021, July-August 2022 and May-August 2023. Dusk emergence surveys began 20 minutes before sunset and continued for approximately two hours after sunset. Dawn re-entry surveys began two hours before sunrise and continued for approximately 20 minutes after sunrise. Surveys were carried out as per best practice (Collins, 2016).

Echo Meter Touch (EMT) bat detectors were used with iPads during these surveys to record bat activity. The data was then analysed by experienced ecologists using Kaleidoscope Analysis Software.

Six roosts, and one possible roost, were identified during these surveys, including a soprano pipistrelle and Daubenton's maternity colony. Survey details of buildings and structures where no roosts were confirmed are presented in Table 7.11. Confirmed roosts are presented in the confidential report.

Table 7.11: Emergence and re-entry survey results of buildings and structures

ID	Distance from Site Boundary (m)	Survey Date/Type	Roosting Species	Roost Type	Details
BB1-2.50	10-30	Emergence: 07/06/2021 Emergence: 03/08/2021 Re-entry: 18/05/2023 Emergence: 13/07/2023	N/A	N/A	Soprano pipistrelle, common pipistrelle and *Myotis* sp. Bats observed flying through the open warehouse and commuting and foraging on site.
BB2-1.14	0	Emergence: 06/06/2023 Emergence: 14/08/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB2-2.14	1-10	Emergence: 19/07/2022	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB2-2.6	0	Emergence: 19/05/2021 Re-entry: 09/05/2021 Emergence: 05/06/2021 Emergence: 08/06/2023 Emergence: 12/07/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB3-1.4	0	Emergence:15/05/2023 Emergence: 07/06/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.

ID	Distance from Site Boundary (m)	Survey Date/Type	Roosting Species	Roost Type	Details
BB3-1.5	1-10	Emergence: 17/05/2021 Emergence: 06/07/2021 Re-entry: 04/08/2021 Emergence: 15/05/2023 Emergence: 07/06/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB4-5.11	1-10	Re-entry: 19/05/2021 Emergence: 10/06/2021 Emergence: 24/05/2023 Re-entry: 15/08/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB4-7.1	0	Emergence: 18/05/2021 Emergence: 07/07/2021	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB4-9.12	0	Emergence: 09/06/2021	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BB5-3.11	10-30	Emergence: 04/08/2021	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BS1-2.1	10-30	Emergence: 20/07/2022 Emergence: 02/08/2022 Emergence: 04/08/2022	N/A	N/A	Soprano pipistrelle, common pipistrelle and *myotis* sp. Bats observed commuting and foraging on site.
BS1-2.2	1-10	Emergence: 21/07/2022	N/A	N/A	Soprano pipistrelle, common pipistrelle and *myotis* sp. Bats observed commuting and foraging on site.
BS1-2.3	0	Re-entry: 20/07/2022 Re-entry: 03/08/2022	N/A	N/A	Soprano pipistrelle, common pipistrelle and myotis sp. Bats observed commuting and foraging on site.
BS4-2.2	0	Emergence: 16/05/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.
BS4-4.3	0	Emergence: 18/05/2023 Emergence: 05/06/2023	N/A	N/A	Soprano pipistrelle and common pipistrelle observed commuting and foraging on site.

9.4 Winter Hibernation Surveys

Buildings and structures with hibernation potential were surveyed where appropriate and where access could be taken. Those surveyed were scheduled for demolition to facilitate the Scheme or were likely to be highly disturbed by works.

In total, ten buildings underwent a winter hibernation inspection survey in early March 2021 and two in February 2023, while four structures were surveyed in February 2023. Buildings were assessed externally (and internally where access was provided) from the ground using binoculars, endoscopes and a high-powered torch. Signs of roosting bats (droppings, live/dead bats and staining), and features which could be suitable for use by bats (e.g. holes, cracks, and crevices), were recorded. Hibernation potential was categorised as negligible, low, moderate or high as per best practice guidance (Collins, 2016). Due to access constraints, it was not appropriate to deploy passive monitoring bat detectors on site.

No evidence of hibernating bats were identified during the winter surveys. For further detail refer to Table 7.12 and 7.13.

9.5 Active Transect Surveys

Three walked transect routes were undertaken to obtain a measure of bat activity and species richness in habitats throughout the Scheme to help identify those areas of higher value to bats. The transect routes were designed to encompass a range of habitats at varying proximity to the habitats within the Site Boundary. Each transect route was subject to a total of six surveys, with one survey a month conducted at each route between April and September 2021.

The surveys were carried out using hand-held full spectrum EMT bat detectors with iPads, which recorded the position of each registration and observation during the transect survey. The acoustic files recorded during the surveys were analysed using Kaleidoscope Analysis Software.

The bat species with the highest number of passes across all transects combined was soprano pipistrelle (406 passes) with 66.9%, 52.5% and 35.1% of passes for transects 1, 2 and 3 respectively. However, common pipistrelle made up the majority (56.4%) of passes on transect 3. *Myotis* sp. Bats were only recorded at transect 1 and only one pass of brown long-eared bat was recorded (transect 3). See Table 7.12 for full details of activity levels during the transect surveys. The results are also presented on Figure B7.5.

Table 7.12: Number of passes (and % of total) of all bat species recorded during transect surveys

Transect ID	Soprano pipistrelle	Common pipistrelle	*Pipistrellus* species*	*Myotis* species	Brown long-eared bat	Total Bat passes
1	144 (66.9)	36 (16.7)	6 (2.7)	29 (13.4)	0 (0)	**215**
2	196 (52.5)	177 (47.5)	0 (0)	0 (0)	0 (0)	**373**
3	66 (35.1)	106 (56.4)	15 (8.0)	0 (0)	1 (0.5)	**188**
Total bat passes for each species	**406**	**319**	**21**	**29**	**1**	**776**

**Pipistrelle* species bats passes denotes passes where the species could not be assigned between the three *pipistrelle* species present in Scotland.

9.6 Passive Transect Surveys

Surveys were carried out using static bat detectors (Anabat Swift and Anabat Express) in 2021. Detectors were deployed at 10 locations along the three transect routes for a minimum of 8 nights per month over the summer and autumn (April to September). The deployment period covered the active bat season which includes pre-maternity, maternity and post-maternity periods.

The acoustic files were analysed using Kaleidoscope Analysis Software and automatic species identification within the software. All data was run through the automatic identification software within Kaleidoscope, which was then subject to manual checks to determine reliability. Wildlife acoustics (Wildlife Acoustics, 2023) quote the accuracy to soprano pipistrelle and common pipistrelle bat species at 85% and 95% respectively using their classifier. However, the accuracy of successful identification of all other Scottish species using the classifier is lower and therefore all bat IDs, except those identified as being soprano pipistrelle and common pipistrelle, underwent a 100% check to confirm recordings were identified correctly. To confirm and address the error ratio for soprano pipistrelle and common pipistrelle calls, a randomised sample of 20% of the files was checked.

Twenty percent of files with no label applied and 10% of files identified as being noise (non-bat sounds) were checked to assess the software was correctly differentiating bats from background noise or other animals (such as other small mammals) recorded.

Six bat species were recorded during the passive transects. Table 7.13 provides for full details of activity levels during the transect surveys.

Table 7.13: Number of passes of all bat species recorded during passive transect surveys

Transect ID	Soprano pipistrelle	Common pipistrelle	Nathusius Pipistrelle	*Pipistrellus* species*	*Myotis* species	Brown long-eared bat	*Nyctalus* Species	Total Bat passes
TP1.1	21965	1779	16	683	3710	3	5	**28161**
TP1.2	27352	3574	2	479	581	37	5	**32030**
TP 1.3	1622	643	2	9	275	3	1	**2555**
TP 1.4	26	60	0	13	5	3	0	**107**
TP 2.1	1126	2617	0	31	0	0	0	**3774**
TP 2.2	656	1071	0	6	0	0	0	**1733**
TP 2.3	35380	12241	24	303	9	1	0	**47958**
TP 3.1	3686	433	3	39	37	2	0	**4200**
TP 3.2	11980	8218	6	115	4	0	0	**20323**
TP 3.3	525	65	0	10	19	0	42	**661**
Total	**104318**	**30701**	**53**	**1688**	**4640**	**49**	**53**	**141502**

**Pipistrelle* species bat passes denotes passes where the species could not be assigned between the three *pipistrelle* species present in Scotland.

To assess bat activity levels, the results of the static monitoring are normally entered into the ECOBAT database, an online tool run by The Mammal Society for the standardised, rigorous interpretation of bat activity data (The Mammal Society, 2023). The ECOBAT database compiles observations of bat activity (bat passes) at a national level. This is then compared to bat activity recorded at a focal site and contextualised against reference levels such as those recorded in the same region and at the same time of year. The 'reference range' is a stratified dataset by which percentile outputs are generated.

The reference range for analysing data on ECOBAT is normally stratified to include:

- only records from within 30 days of the survey data;
- only records from within 100 km^2 of the survey locations; and
- records using any make of bat detector.

The percentiles provide a numerical indicator of the relative importance of a night's worth of bat activity. For example, activity data in the 70th percentile would indicate that the recorded data was in the top 30% of activity for the reference range. Bat activity levels in the 0-20 percentile is considered low activity, 21-40 is low to moderate, 41-60 is moderate, 61-80 is moderate to high and 81-100 is high activity.

However, this tool was closed for maintenance at the time of writing and no timeline is in place regarding future availability. In the absence of ECOBAT, an assessment has been made by comparing the passive data gathered to the ECOBAT results from a similar project, Musselburgh Flood Protection Scheme (MFPS). MFPS is located

approximately 40 km from the GFPS and covers similar habitat; further details of the MFPS can be found on the MPFS website (East Lothian Council, 2023). As the two Schemes are within 100 km^2 of each other, it has been assumed that there would be considerable overlap within the reference database. Therefore, percentile assessments applied to MFPS should also largely apply to GFPS.

The results of the analysis are presented in Table 7.14. Insufficient data was available to conduct an analysis for brown long-eared bat, *Nathusius pipistrelle* and *Nyctalus* species bats as these were not observed during MFPS surveys. However, for the purpose of the EIA we have made a precautionary assessment assuming that a population of these species are present in the Study Area with moderate to high activity levels along the River Carron and Avon.

Table 7.14: Activity Levels at the passive monitoring locations based on median bat activity per night

Transect ID	Bat Activity Level			
	Soprano pipistrelle	Common pipistrelle	*Pipistrelle* species	*Myotis* species
TP1.1	High	High	Moderate to High	High
TP1.2	High	High	Moderate to High	Moderate to High
TP 1.3	Moderate to High	Moderate to High	Low	Moderate
TP 1.4	Low to Moderate	Low to Moderate	Low	Low
TP 2.1	Moderate to High	Moderate to High	Low to Moderate	N/D
TP 2.2	Moderate	Moderate to High	Low	N/D
TP 2.3	High	High	Low to Moderate	Low
TP 3.1	Moderate to High	Moderate	Low	Low
TP 3.2	High	High	Low to Moderate	Low
TP 3.3	Low to Moderate	Low	Low	Low

Environmental Impact Assessment Report

Appendix B7.4 Approach to Positive Effects for Biodiversity

Grangemouth Flood Protection Scheme 2024
Falkirk Council

GRANGEMOUTH
Flood Protection Scheme
Protecting the heart of our communities

Contents

1. Introduction

1.1 Background

The Planning (Scotland) Act 2019 requires the National Planning Framework (NPF) to contain a statement about how Scottish Ministers consider that development will contribute to an outcome of 'securing positive effects for biodiversity'. The Act does not provide further detail on the scope or content of how this should be achieved.

The NPF 4, adopted by Scottish Ministers in February 2023, contains a strategy and policies which help to secure positive effects for biodiversity, with most of the detail provided within Policy 3 Biodiversity, (Scottish Government, 2023a).

To meet this policy requirement, the approach for securing positive effects for biodiversity must go beyond no net loss of biodiversity and be clearly differentiated from the mitigation and compensation required to achieve no net loss, (prior to the adoption of NPF4, as a minimum, only mitigation and compensation for significant environmental effects required inclusion in EIA).

This document provides an outline of the policy requirements for positive effects for biodiversity and a summary of the approach adopted to secure positive effects for biodiversity for the Grangemouth Flood Protection Scheme (the Scheme).

2. Relevant Policy and Guidance

2.1 Fourth National Planning Framework

The NPF4 (Scottish Government, 2023a) is the long-term (to 2045) national spatial planning strategy for Scotland and replaces the NPF3 (Scottish Government, 2014a) and Scottish Planning Policy (Scottish Government 2014b). In conjunction with the relevant Local Development Plan, NPF4 forms the statutory development plan for any given area of Scotland. Both documents are read together; however, where there is an incompatibility between a provision of an LDP and of NPF4 the more recent publication takes precedence. With regards to the Scheme, the Falkirk Local Development Plan 2 (LDP2) (Falkirk Council, 2020a), which was adopted by Falkirk Council in 2020, and NPF4 form the statutory development plan for the Falkirk area.

NPF4 is required by law to contribute to six outcomes, one of which is 'securing positive effects for biodiversity', and it incorporates a plan led approach to achieve this. NPF4 states: '*To respond to the global diversity crisis, nature recovery must be at the heart of future places. We will secure positive effects for biodiversity, create and strengthen nature networks and invest in nature-based solutions to benefit natural capital and contribute to net zero… The nature crisis, together with the global climate emergency, underpinned the spatial strategy as a whole*'. By securing positive effects for biodiversity, NPF4 aims to create and strengthen nature networks whilst still encouraging and facilitating development.

There are a number of policies within NPF4 that are relevant to securing positive effects for biodiversity.

Policy 1 Tackling the climate and nature crises states that '*when considering all development proposals significant weight will be given to the global climate and nature crises.*' Any future development plans will have to address these crises by promoting nature recovery and restoration in the area resulting in nature positive places.

Policy 3 Biodiversity is the principal biodiversity policy, and it sets out the requirement for development proposals to secure positive effects for biodiversity. As this Scheme is a national development, the most pertinent sections of this policy are listed below:

- 3a) '*Development proposals will contribute to the enhancement of biodiversity, including where relevant, restoring degraded habitats and building and strengthening nature networks and the connections between them. Proposals should also integrate nature-based solutions, where possible*'.

- 3b) '*Development proposals for national or major development, or for development that requires an Environmental Impact Assessment will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity, including nature networks so they are in a demonstrably better state than without intervention. This will include future management…To inform this, best practice assessment methods should be used. Proposals within these categories will demonstrate how they have met all of the following criteria'.*

    - i.) *the proposal is based on an understanding of the existing characteristics of the site and its local, regional and national ecological context prior to development, including the presence of any irreplaceable habitats*;

    - ii.) *wherever feasible, nature-based solutions have been integrated and made best use of*;

    - iii.) *an assessment of potential negative effects which should be fully mitigated in line with the mitigation hierarchy prior to identifying enhancements*;

    - iv.) Proposals will demonstrate how '*significant biodiversity enhancements are provided, in addition to any proposed mitigation. This should include nature networks, linking to and strengthening habitat connectivity within and beyond the development, secured within a reasonable timescale and reasonable certainty. Management arrangements for their long-term retention and monitoring should be included, wherever appropriate; and'*

    - iv.) *local community benefits of the biodiversity and/or nature networks have been considered.*

- 3d) '*Any potential adverse impacts, including cumulative impacts, of development proposals on biodiversity, nature networks and the natural environment will be minimized through careful planning and design. This will take into account the need to reverse biodiversity loss… and build resilience by enhancing nature networks and maximizing the potential for restoration*.'

The following NPF4 policies are also relevant to securing positive effects for biodiversity for the Scheme:

- Policy 4 Natural places: this policy contains provisions that are intended to protect, restore and enhance natural assets making best use of nature-based solutions.

- Policy 6 Forestry, woodlands and trees: this policy contains provisions that are intended to protect and expand forests, woodland and trees.

2.2 Supporting Guidance for NPF4

To inform NPF4, NatureScot was commissioned by the Scottish Government to produce a report outlining potential options for securing positive effects for biodiversity. This report, 'Delivering Scotland's Ambition to Secure Positive Effects for Biodiversity' (NatureScot, 2020), outlined seven potential options for delivering positive effects at the individual development level, which ranged from a simple policy-based approach to a target-based approach using a complex metric. The different options are not considered mutually exclusive, as a combination of different options could be applied

to different scales, types or categories of development for which they are best suited. The document states that the chosen approach should complement and deliver existing national, regional and local land use policies and strategies for biodiversity, such as National and Local Biodiversity Action Plans and forestry and woodland strategies. Such alignments will ensure biodiversity measures for a project will be ecologically coherent, relevant and integrated into wider biodiversity strategies to provide better habitat and species resilience.

Guidance documents such as 'Developing with Nature guidance' (NatureScot, 2023) and the Scottish Biodiversity Strategy to 2045 (Scottish Government, 2022a), give some indication as to how securing positive effects for biodiversity may be achieved, but do not address how EIA scale projects in Scotland should meet the obligations. The Scottish Biodiversity Strategy sets out a clear ambition to have restored and regenerated biodiversity across Scotland by 2045, with a key milestone of '*halting biodiversity loss by 2030*' and with two of the priority actions for 2030 being *'accelerate restoration and regeneration'* and *'recover and protect vulnerable and important species'*.

In England and Wales, biodiversity enhancement as part of development is delivered through the mechanism of Biodiversity Net Gain (BNG), which has been made mandatory through the Environment Act 2021. This process uses a metric (currently Natural England Biodiversity Metric 4.0), which considers habitat type and condition as a proxy measure of biodiversity, and provides a measurement in 'biodiversity units'. Whilst the Scottish Government approach of securing biodiversity enhancement within the consenting process differs to England and Wales, in the absence of definitive guidelines applicable to Scotland, some development proposals have adopted the BNG approach and associated metric to ensure positive effects for biodiversity. It is recognised that the metric was developed for use in England and not Scotland, and some aspects of the metric, such as the method for determining distinctiveness of habitats, may require adaptation for some habitats in Scotland (CIEEM, 2021).

The Scottish Government commissioned McVittie *et al*. (2023) to '*review and recommend methodologies for the measurement of biodiversity at the site level in Scotland'*. The report outlines the considerations required in developing a metric specific to Scotland and identified that an *'approach for Scotland may benefit from incorporating certain elements from existing metrics, but additional work is needed to fully address the list of priority criteria identified by stakeholders, including habitat condition, species indicators, ecosystem health, ecological connectivity and wider ecosystem benefits*'.

At the time of writing, no guidance has been published by the Scottish Government or NatureScot which stipulates how EIA scale projects in Scotland should meet the obligations of securing positive effects for biodiversity. The document 'Draft Planning Guidance: Biodiversity' (Scottish Government, 2023b) published in November 2023 stated that '*NatureScot will shortly commence work to develop an adapted biodiversity metric suitable for use in supporting delivery of NPF4 policy 3b. Further information will be provided on this work in due course.'* Notably, the document states: *'In the meantime, the absence of a universally adopted Scottish methodology/tool should not be used to frustrate or delay decision making, and a flexible approach will be required*.'

3. Approach

As noted in the previous section, in absence of definitive guidance on delivering positive effects for biodiversity on EIA scale projects in Scotland, a flexible approach is required.

3.1 Approach Outline

At the outline design stage, the Scheme is committed to securing positive effects for biodiversity in line with the requirements of NPF4.

To meet the policy requirement stipulated within NPF4, the approach must clearly differentiate measures to achieve positive effects from the mitigation and compensation required to achieve no net

loss as reported for the EIA Report. Enhancement measures to secure positive effects for biodiversity should align with NPF4 Policy 3 Biodiversity and draw upon enhancement suggestions detailed within other relevant policy and guidance documents (some of which are discussed in Section 2). The key themes for securing positive effects for biodiversity should focus on restoring degraded habitats, strengthening existing nature networks, and measures to benefit protected and priority species. Where possible, these measures should be within the vicinity of the Scheme, but it may be appropriate to incorporate some biodiversity enhancements elsewhere.

This approach would seek to achieve nature conservation outcomes that demonstrably and significantly exceed existing obligations (i.e. to be additional to EIA based mitigation, compensation related to the Scheme and other biodiversity measures that would occur regardless of the Scheme).

3.2 Enhancement Measures

Within the EIA, potential enhancement measures for positive effects for biodiversity, such as tree, riparian, hedgerow, scrub/shrub and wildflower planting and the provision of artificial shelters for wildlife, such as bat boxes have been identified, and these measures are outlined in Table 1.1. These measures are not exhaustive and may be added to at various stages of the project, post publication of Scheme. It is important to emphasize that the process for identifying measures will extend beyond the Scheme publication stage and is likely to continue throughout the detailed design stage and involve significant input from external organisations.

Some enhancement measures will be located within the site boundary of the Scheme. It is considered there is insufficient land available to secure significant positive effects for biodiversity for the Scheme within the site boundary, therefore, additional land will be required. Additional land will comprise of land under Falkirk Council ownership and, where feasible, private land available for purchase/management. This means that although the commitment to confirm and secure positive enhancement measures for the Scheme has been made and will be secured at the outline design stage, the detailed measures will not be confirmed until the detailed design stage. This stage will only commence following confirmation of the Scheme under the Flood Risk Management (Scotland) Act 2009 and associated regulations. It should be noted that the detailed design stage of this project will be spread over many years and be linked to the construction phases.

The commitment to enhancement measures for securing positive effects for biodiversity for the Scheme at detailed design is included within the EIA as Mitigation Item E26.

The approach taken to confirm measures to secure positive effects for biodiversity at the detailed design stage rather than the outline design stage for the Scheme has been formed on the following basis:

- There are risks and limitations associated with Falkirk Council purchasing land before the Scheme has been confirmed under the FRM Act. If land for positive effects for biodiversity was purchased without the Scheme having been confirmed, this could result in the Council owning land that is not used which would not be financially prudent or environmentally sustainable.

- It is anticipated that the Scheme will be completed in four phases over an estimated 10-year construction programme, meaning it is likely that any land purchase will be tied to the specific construction phase and the baseline biodiversity conditions are likely to change over that time.

- It is important to identify measures in a connected, informed, holistic sense rather than on an ad hoc basis which could potentially happen with less design detail available at outline design and less opportunity for land acquisition/purchase.

- Confirming locations at the detailed design stage gives greater scope and opportunity to involve and collaborate with statutory bodies such as NatureScot and other conservation organisations

such as RSPB and Scottish Wildlife Trust (SWT) as well as local community groups in the development of feasible and workable measures, on Council owned and potentially privately owned land. These measures cannot be fully identified at the outline design stage due to the legalities, funding and limitations associated with land purchase/ownership.

- At the detailed design stage, measures for positive effects for biodiversity will be presented and feedback sought at community engagement events to seek public feedback and involve the local community in defining workable measures that could also provide opportunity for community buy-in on local enhancement, taking into consideration those areas where the public have already voiced the need for improvements.

3.3 Securing Measures

As it is not feasible for the locations of positive effects for biodiversity measures to be confirmed at the outline design stage, a commitment has been made by Falkirk Council and in the EIA to develop and confirm the locations of these measures during the detailed design stage. The details of such measures would be incorporated as suspensive planning conditions which would need to be discharged prior to commencing the construction works e.g. a suspensive planning condition would require the precommencement submission and approval of a Biodiversity Enhancement Plan (BEP) for each phase of the Scheme. The condition could require that each BEP provide details of the biodiversity enhancement measures to be implemented, the location(s) of enhancement measures, the timescale for implementation and proposals for long-term management; proposals would be prepared in accordance with relevant guidance and best practice. This would ensure there is a mechanism in place to ensure that the requirement for significant biodiversity enhancement, as set out in NPF4, is incorporated as a legal obligation within the Scheme consent.

The following steps will require to be taken to secure significant positive effects for biodiversity in line with NPF4 Policy 3 Biodiversity:

- The EIA includes the commitment that the enhancement measures for securing positive effects for biodiversity for the Scheme will be confirmed at detailed design. This commitment is made within the EIA Report (in Chapter 7: Biodiversity and in Chapter 16: Schedule of Environmental Commitments) as committed mitigation (Mitigation Item E26).
- The requirements of Mitigation Item E26 and the commitment for measures to secure positive effects on biodiversity, and how this will be assessed/ measured will be included in the objectives/ project requirements at the detailed design stage.
- Any new published guidance on positive effects for biodiversity in Scotland will be considered at the commencement of the detailed design process. The project design team for the detailed design will liaise with Falkirk Council (and NatureScot where required) to refine the approach to positive effects for biodiversity.
- The Scheme design team will establish a Working Group which conservation organisations (e.g. SWT, RSPB) and local community groups will be invited to join to work together to identify suitable local measures or projects that can be taken forward that would contribute to positive effects for biodiversity.
- A review of Falkirk Council land and other land plots will be conducted to identify other areas within the vicinity of the Scheme that could be enhanced and contribute to positive effects for biodiversity.
- A PEB (positive effects for biodiversity) Management Plan will be developed which will be updated and maintained by Falkirk Council in association with the Scheme design team and Working Group and the contractor appointed to undertake the works. This plan will detail the enhancement measures to be implemented and managed in the long-term to ensure positive effects for biodiversity are achieved and can be evidenced. To ensure that this is delivered as part of the schedule under the environmental commitments of the Scheme, the requirement for a PEB

Management Plan will be included as part of Mitigation Item E26 and therefore as committed mitigation within the EIA Report.

3.4 Potential Enhancement Measures

Whilst the enhancement measures to secure positive effects for biodiversity will be confirmed at the detailed design stage, some potential measures to enhance biodiversity are presented in Chapter 7: Biodiversity of the EIA Report and are replicated in Table 1.1 below (the Working Areas referred to are shown in Appendix A of the EIA Report).

These potential enhancement measures are limited to the Scheme site boundary/land affected by the implementation of the Scheme and do not represent the complete set of measures that would be required to secure positive effects for biodiversity; confirmation/development of these initial potential measures, as well as additional measures will be required. Additional measures (not included in the initial measures) following Scheme confirmation, will require land outwith the Scheme extents. These potential measures and those identified following confirmation of the Scheme will be considered further at detailed design and will require consultation with Falkirk Council, landowners, local community groups and other organisations (through the Working Group) to determine their viability and feasibility. Implementation and management requirements of confirmed enhancement measures will be detailed in the PEB Management Plan as outlined in Section 3.3 above.

Table 1.1 Potential Enhancement Measures included within the EIA Report (Chapter 7: Biodiversity)

Potential Enhancement Measures
Planting Habitat reinstatement within the Site Boundary will be undertaken as part of mitigation requirements. During reinstatement, opportunities to enhance low value habitat (e.g. amenity grassland) or habitats assessed as poor condition during habitat surveys will be explored to provide PEB. Riparian, hedgerow, scrub/ shrub and wildflower planting is proposed within the Site Boundary to provide PEB. The location of proposed planting is indicated below and in the OLEHMP (Appendix B9.10). ***Riparian planting*** Riparian planting to support biodiversity will be provided at the locations along Grange Burn where Chapter 10: Water Environment has identified mitigation to restore watercourse morphological diversity. This planting does not form part of the Water Environment mitigation, but the combination of riparian planting and improvements to the channel will provide positive effects for biodiversity. Riparian planting will be provided along the following sections of Grange Burn: • Section of Grange Burn extending beyond Working Areas - NS 92685 80288 to NS 92706 80968; • Working Area 4-5 - NS 92684 80946 to NS 92827 81371; • Working Areas 4-5, 4-6 - NS 92827 81371 to NS 92993 81990; and, • Working Areas 4-7, 4-8, 4-9 - NS 92993 81990 to NS 94587 82541. This will provide additional riparian planting which will create habitat for wildlife and potential wildlife corridors to improve habitat connectivity. ***Hedgerow planting*** Where appropriate, flood defences could be transformed into wildlife corridors by planting native species-rich hedgerows. Green screens, fence or trellis like structures that support climbing plants

and tall shrubs planted in the ground, could also be installed in certain locations. Hedgerow planting within the Site Boundary is proposed along the following sections of flood defences:

- Working Area 1-2 – along sections of earth embankment defence (Mungal Community Woodland);
- Working Area 1-4 – along concrete wall defence (Stables adjacent to Dock Street);
- Working Area 4-1- along concrete wall defence (A9/ Grandsable Road);
- Working Areas 5-1, 5-2, 5-3 – along sheet pile wall (Ineos land); and,
- Working Area 6-3 - along sheet pile wall with a section of earth embankment to conceal the wall (Kinneil area).

This will provide additional hedgerow planting which would provide connectivity and habitat for wildlife.

Scrub/ shrub planting

Scrub/ shrub planting has been proposed to provide connectivity and habitat for wildlife. Suggested locations for planting within the Site Boundary are provided below:

- Working Area 1-2 - scrub planting on earth embankment defence (Mungal Community Woodland);
- Working Area 2-1 – scrub planting on earth embankment defence (Port of Grangemouth adjacent to River Carron);
- Working Area 4-5 – appropriate shrub planting on earth embankment defence (Zetland Park); and,
- Working Area 6-3 – scrub planting on earth embankment defence (Kinneil Area).

Wildflower planting

Wildflower meadows have been proposed at the following areas within the Site Boundary:

- Working Area 1-1 – amenity grassland (Stirling Road);
- Working Area 1-2 – amenity grassland (Mungal Community Woodland); and,
- Working Area 4-1 – amenity grassland (Zetland Park).

Tree planting

Sites for tree planting and woodland creation to secure PEB will be identified in land plots beyond the Site Boundary at detailed design in consultation with the relevant stakeholders. This could include a 'wee forest' in appropriate locations. This is a small (typically the size of a tennis court), dense and fast-growing native woodland with native trees and shrubs planted in an urban location. They are rich in biodiversity, capable of attracting a variety of animal and plant species and require low management and maintenance after the first two years. The wee forest can incorporate features such as paths or benches to make them easily accessible to the public.

Corners or boundary edges of existing parks, such as Zetland Park, could be suitable locations. This would ensure the wee forest is easily accessible to the public, with suitable infrastructure already in place.

Provision of artificial shelters

Artificial shelters can provide additional sheltering opportunities for wildlife within suitable habitat, particularly where there is limited scope to extend the existing habitat or where the vegetation is not yet established enough to provide sufficient natural shelter opportunities.

Bat boxes and/or bricks could be incorporated into suitable flood defence walls (e.g., along the River Carron and River Avon) to provide additional roosting opportunities for bats. If incorporating

artificial bat roosts within the flood defences is not feasible, sections of brick/stone clad wall adjacent to watercourses (e.g., on River Carron or Grange Burn) or lines of trees would also be suitable. Possible locations for bat boxes and bat bricks within the Site Boundary are provided below:

- Working Area 1-1 – pockets of woodland within this area that are to be retained are potentially suitable for bat boxes;
- Working Area 1-2 – a pocket of woodland to be retained adjacent to the River Carron is a potentially suitable location for bat boxes. Bat bricks could be incorporated in the section of brick clad wall which is over 2 m located alongside the River Carron;
- Working Area 1-3 - bat bricks could be incorporated into the section of brick clad wall which is over 2 m located alongside the River Carron;
- Working Area 4-5 – trees to be retained alongside the Grange Burn provide a potentially suitable location for bat boxes; and,
- Working Area 5-1 – trees to be retained alongside the River Avon provide a potentially suitable location for bat boxes.

Bee bricks and boxes can be incorporated within, or adjacent to, suitable flood defences. Bug hotels or boxes can be placed within existing areas of grassland, scrub or woodland. Hedgehog houses can be sited within scrub, under bushes or hedgerows in an area that would not encourage movement near roads or other hazards.

Suitable high tide roosting habitat for bird species could be incorporated within the Scheme design at targeted locations along the Forth Estuary. Within Flood Cell 6, where the flood defences incorporate rock armour revetment, it is proposed that flatter rocks are selected to create a ledge approximately 1 m wide at the top of rock armour revetments. The estuary edge in the vicinity is known to attract high aggregations of birds, and this enhancement measure will provide additional high tide roosting opportunities with good visibility.

Working with conservation organisations and local community groups

At the detailed design stage, the Scheme will liaise with conservation organisations (e.g., SWT, RSPB) and local community groups to identify any suitable measures or projects that can be taken forward that would contribute to PEB. For example, the Scheme could work with local Ranger services and wildlife groups to arrange monitoring of mitigation once the committed post-construction monitoring has ended. This could include monitoring of bat boxes to gather data on long term uptake.

4. Summary

In addition to mitigating potentially significant effects on the environment associated with construction and operation of the Scheme at the EIA stage, since the publication of NPF4 in February 2023, all EIA development is required to achieve positive effects for biodiversity. The approach to achieving positive effects for biodiversity are provided within this appendix and are set out in Chapter 7: Biodiversity of the EIA Report (Section 7.9: Positive Effects for Biodiversity). The requirement to submit the details of such measures for approval would be incorporated as suspensive planning conditions which would need to be discharged prior to commencing the construction works. This would ensure there is a mechanism in place to ensure the details of the measures required to achieve positive effects for biodiversity are legal obligations incorporated into the Scheme design. The scope and nature of proposals required to secure positive effects for biodiversity in accordance with NPF4 will be developed further at the detailed design stage and in consultation with relevant statutory bodies and other organisations.

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