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Newry Southern Relief Road

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Stage 2 Scheme Assessment Report - Appendices Part B

Department for Infrastructure (DfI) Roads

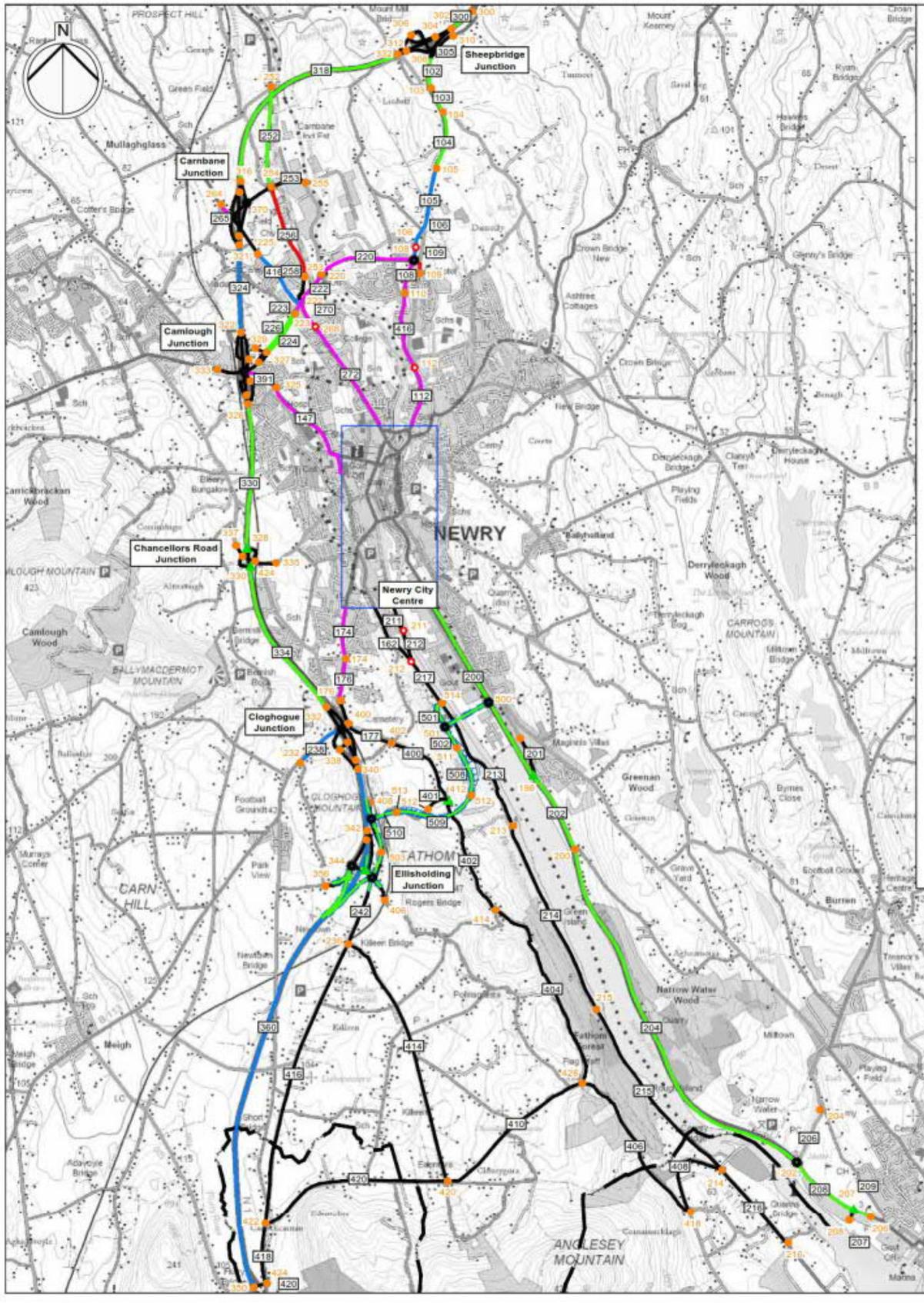
FINAL

Project number: 60472927

September 2018

Department for Infrastructure
An Roinn Bonneagair
www.infrastructure-ni.gov.uk

Appendix A Figures (not in the main body of text)



Project Title

NEWRY SOUTHERN RELIEF ROAD

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Client

Department for Infrastructure / An Roinn Bonneagair

Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
VEHICLE TRAVELLER
DRIVER STRESS
DO-SOMETHING BLUE ROUTE OPTION 2

KEY

- Low Driver Stress
- Medium Driver Stress
- High Driver Stress
- Link
- 134 Node Number
- 190 Link Number
- International Border
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point

Route Option

- Blue Route Option 2

Scale @ A3
NOT TO SCALE

AECOM Internal Project Number
60472927

FIGURE 5.9.6

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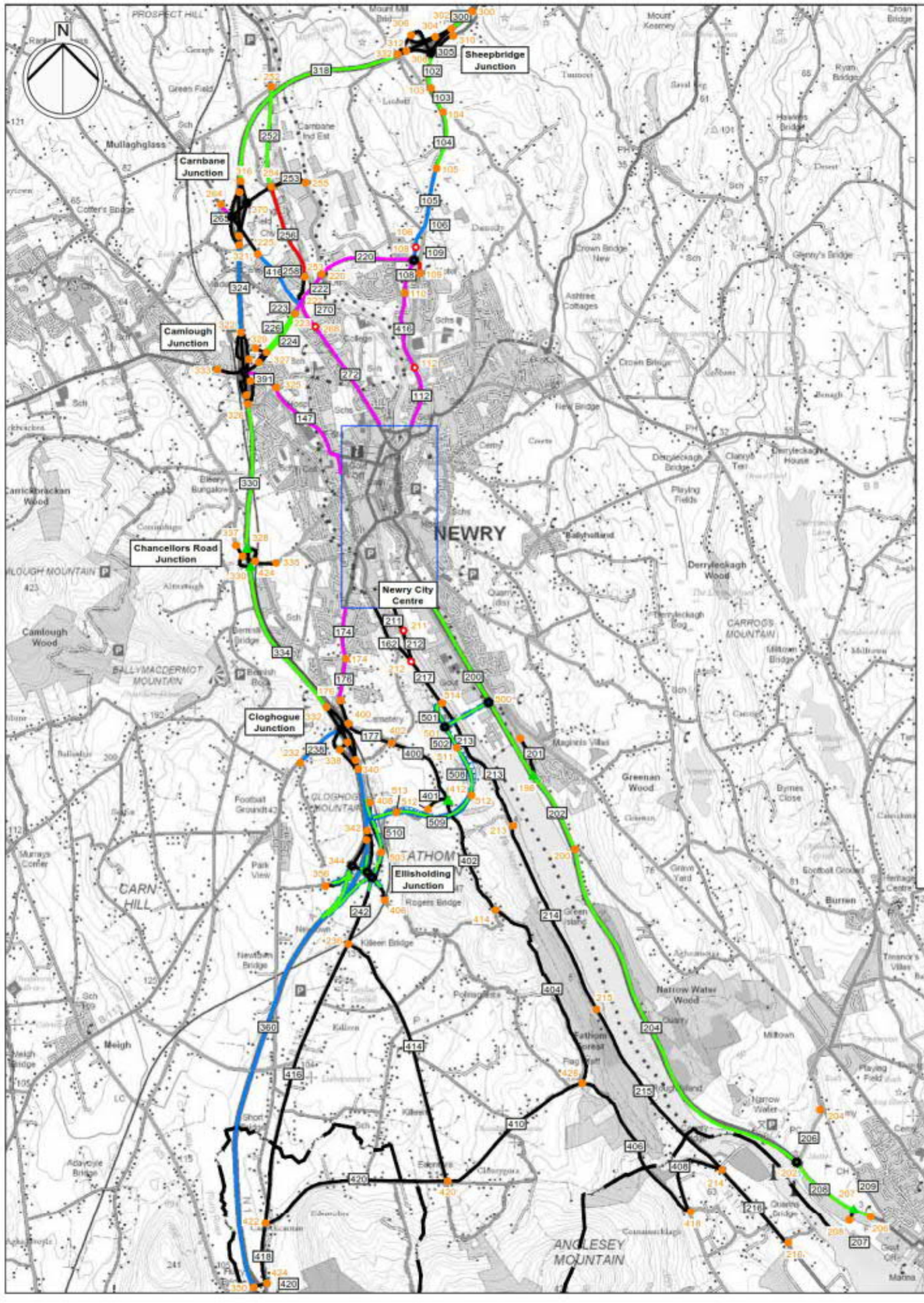

Project Title

NEWRY SOUTHERN RELIEF ROAD

Co-financed by the European Union
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Client

Department for Infrastructure / An Roinn Bonneagair

Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
VEHICLE TRAVELLER
DRIVER STRESS
DO-SOMETHING BLUE ROUTE OPTION 3

KEY

- Low Driver Stress
- Medium Driver Stress
- High Driver Stress
- Link
- 134 Node Number
- 190 Link Number
- International Border
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point

Route Option

- Blue Route Option 3

Scale @ A3
NOT TO SCALE

AECOM Internal Project Number
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FIGURE 5.9.7

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SCALE BAR
0M 500M 1000M 1500M

Project Title
NEWRY SOUTHERN RELIEF ROAD

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Client
Department for Infrastructure An Roinn Bonneagair

Drawing Title
STAGE 2 SCHEME ASSESSMENT REPORT
ROAD DRAINAGE & THE WATER ENVIRONMENT
WATERCOURSE FLOODING

KEY
- Watercourse
- Lake / Lough
- Extent of Q_{100} Flood Event

Route Options
- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
1:20,000

AECOM Internal Project Number
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FIGURE 5.10.1

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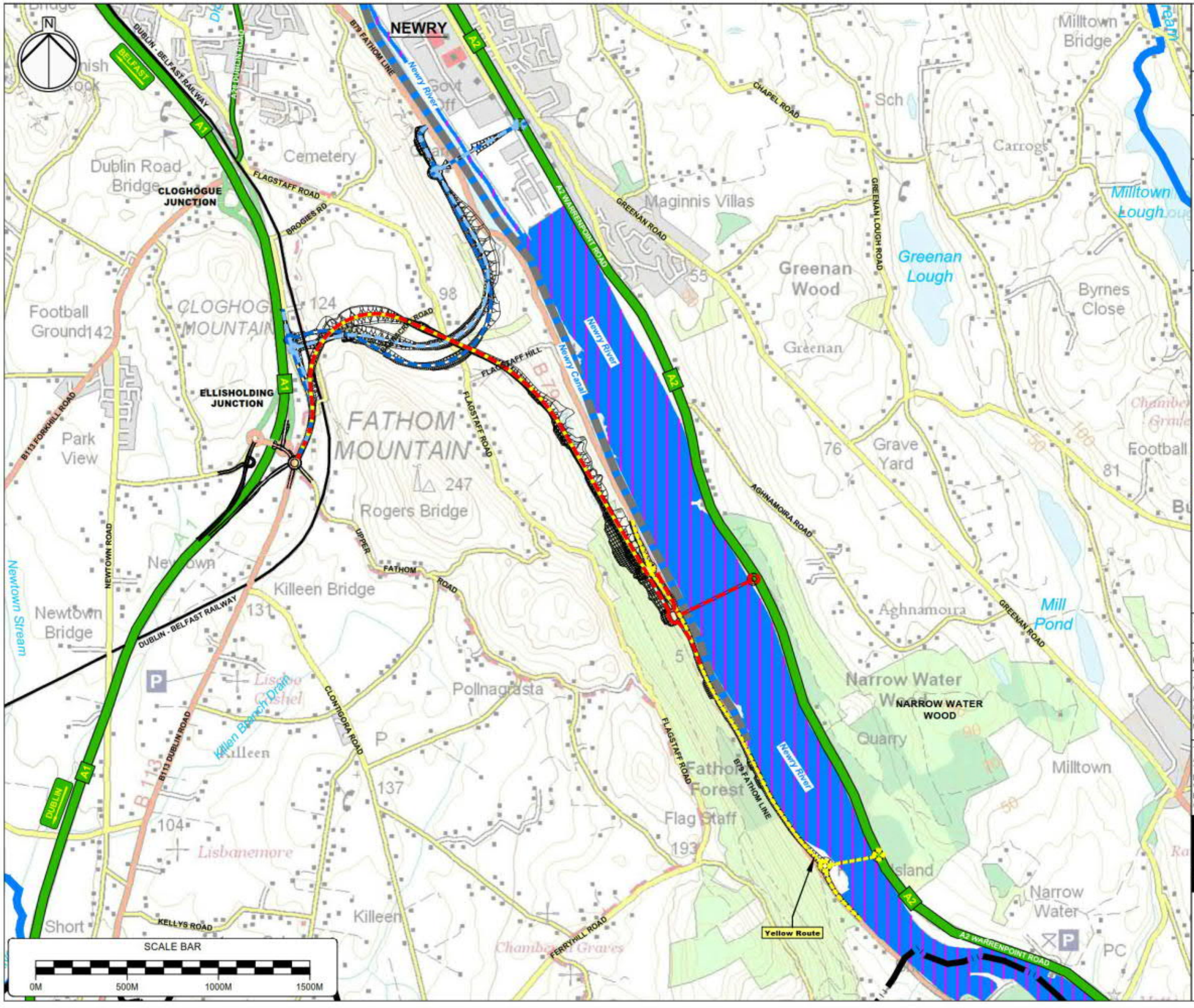

Project Title

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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
ROAD DRAINAGE & THE WATER ENVIRONMENT
ECOLOGICAL STATUS OF WATERBODIES

KEY

- River / Canal - Moderate
- River / Canal - MEP (Moderate Ecological Potential)
- Transitional Water Bodies - MEP (Moderate Ecological Potential)

Source: http://appsd.daera-ni.gov.uk/RiverBasinViewer/

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

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FIGURE 5.10.2

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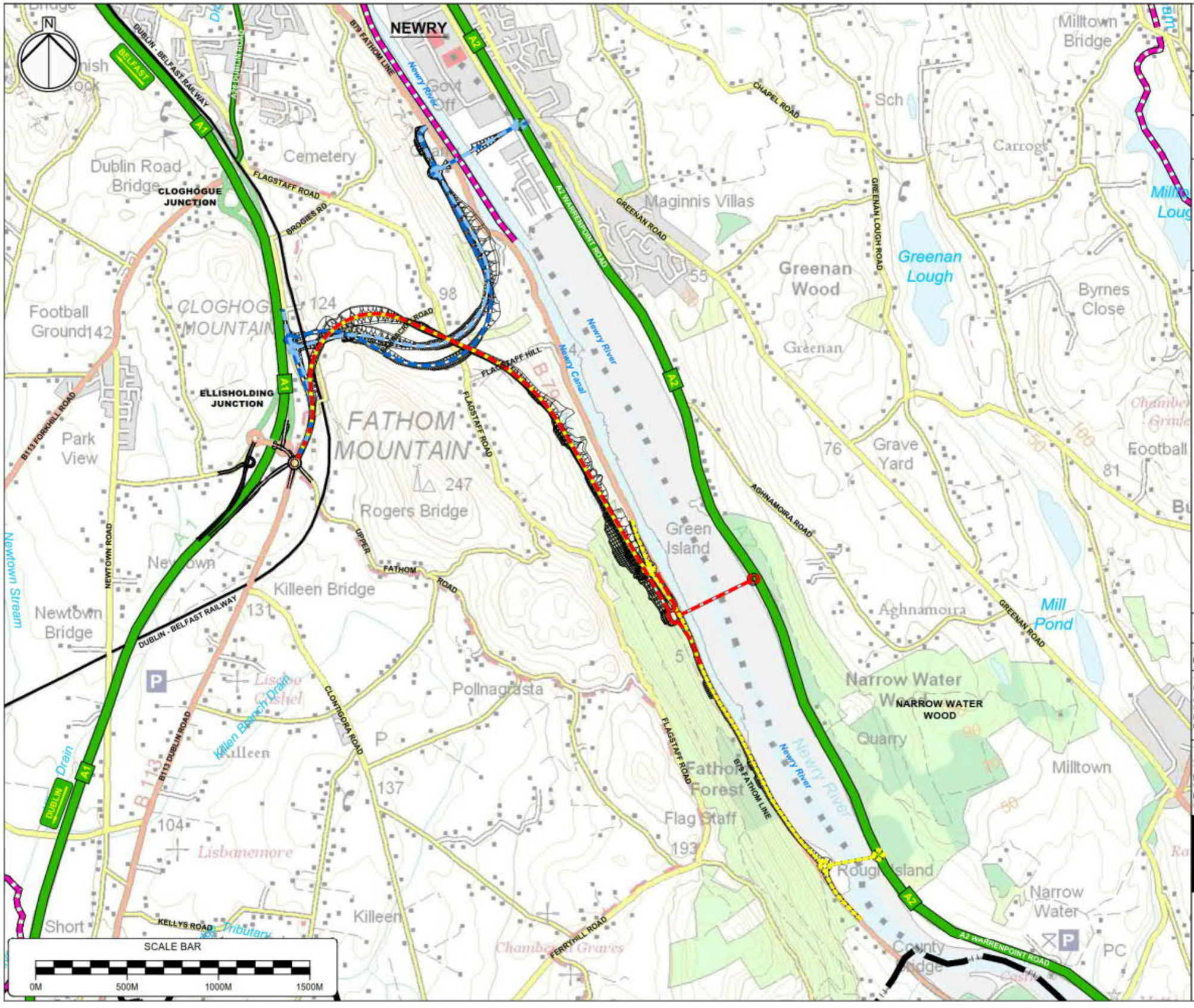

Project Title

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Client

Department for Infrastructure / An Roinn Bonneagair

Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
ROAD DRAINAGE & THE WATER ENVIRONMENT
PROTECTED WATERBODIES

KEY

Protected Watercourse

Source: http://appsd.daera-ni.gov.uk/RiverBasinViewer/

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
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- International Border

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FIGURE 5.10.3

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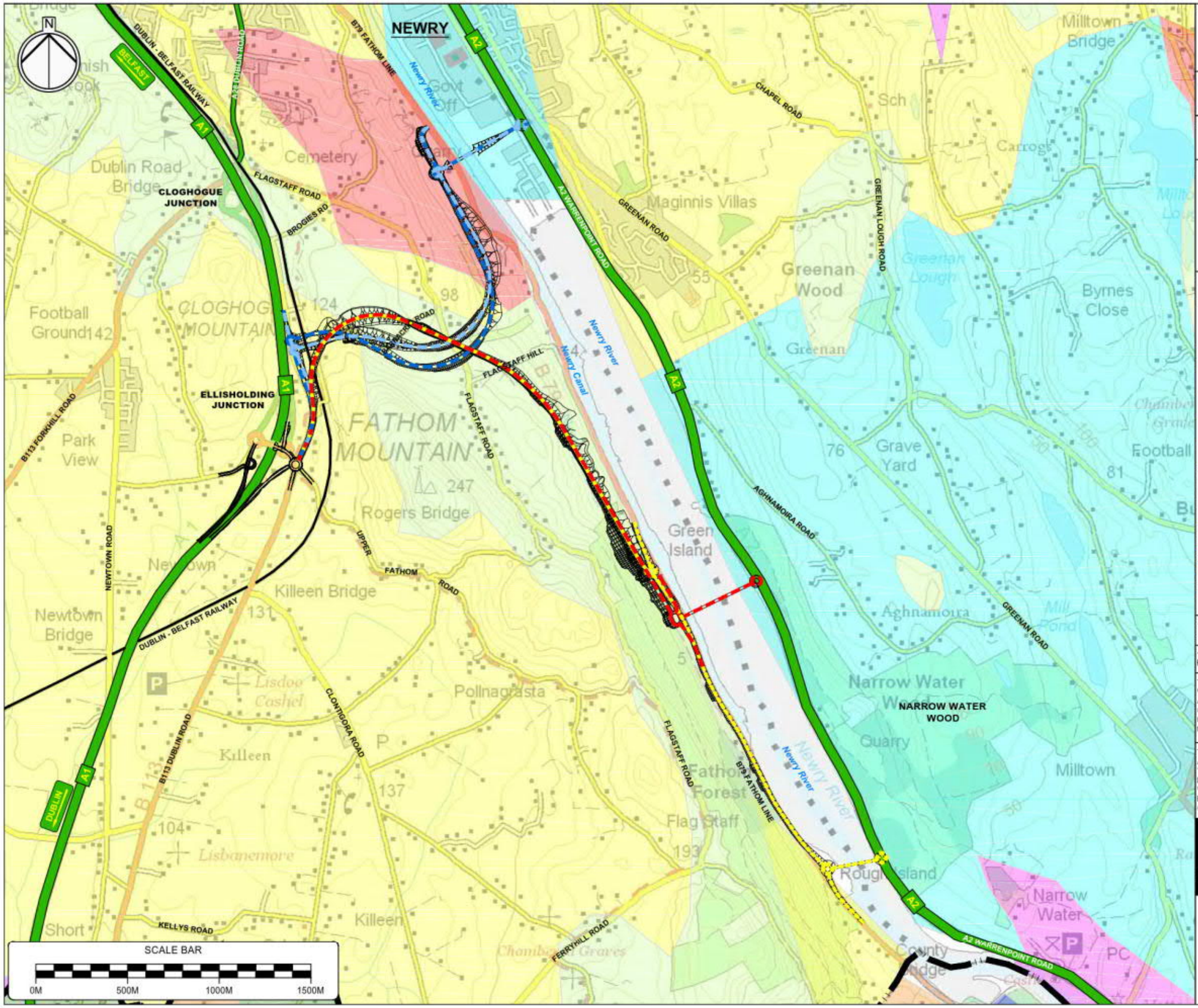

Project Title

NEWRY SOUTHERN RELIEF ROAD

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Client

Department for Infrastructure
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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
ROAD DRAINAGE & THE WATER ENVIRONMENT
GROUNDWATER VULNERABILITY

KEY

Groundwater Vulnerability Classes

Five classes of vulnerability have been mapped.

Highest				Lowest
5	4	3	2	1

-2

4a - Sand and gravel cover (non-aquifer)

4c - Low permeability cover

4e - Where superficial aquifers are present

5

SOURCE: GROUNDWATER VULNERABILITY MAP OF NORTHERN IRELAND (Geo Index)

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.10.4

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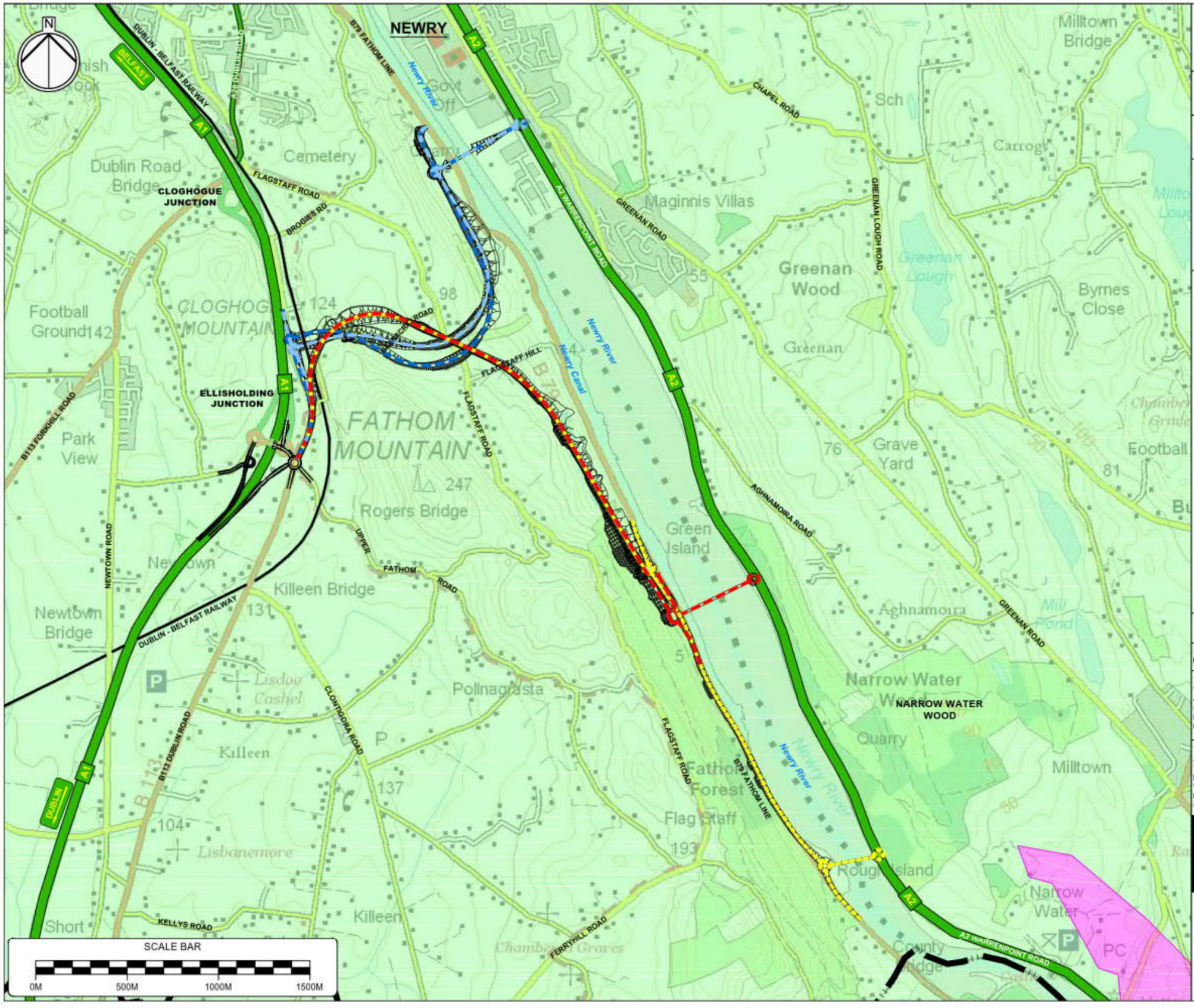

Project Title

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Client

Department for Infrastructure / An Roinn Bonneagair

Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
ROAD DRAINAGE & THE WATER ENVIRONMENT
HYDRO-GEOLOGY

KEY

Hydrogeology

- Bedrock Aquifer - Limited potential productivity fracture flow [Moderate yields unusual. Low yields more common. Regional flow limited. Mainly shallow, local flow].
- Potential Superficial Aquifer

SOURCE: Hydro-Geology map layers from GSNI & GSI.

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.10.5

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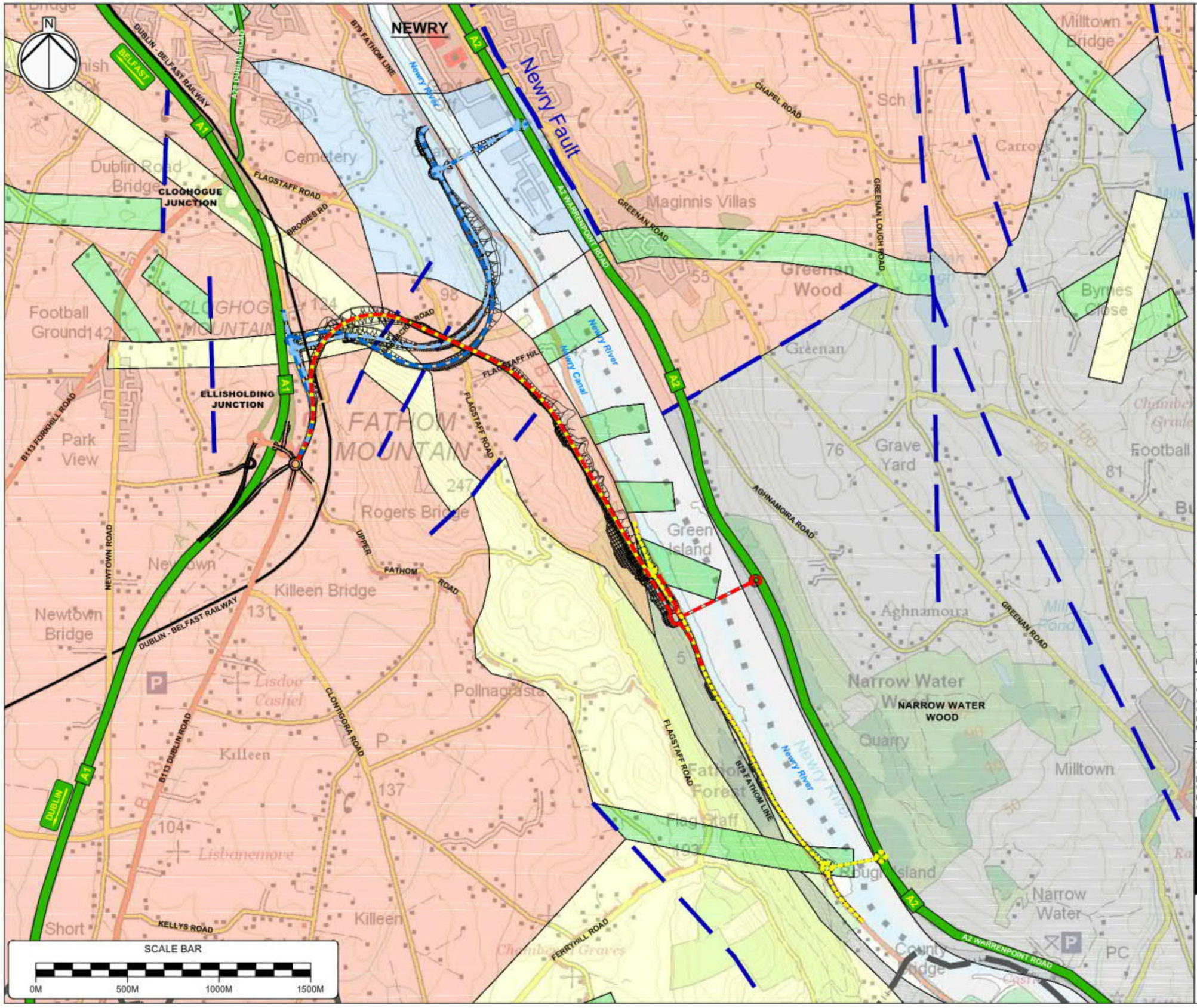

Project Title

NEWRY SOUTHERN RELIEF ROAD

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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
GEOLOGY & SOILS

SOLID GEOLOGY

KEY

Bedrock Geology

- Felsite
- Gabbro Dyke
- Granodiorite
- Granophyric Granite
- Dolerite & Basalt Intrusive Dyke
- Greywacke & Shale (Gala Group)
- Greywacke & Red Shale (Hawick Group)
- Fault
- No Feature Identified

SOURCE: GSNI 1:250,000 SOLID GEOLOGY MAP OF NORTHERN IRELAND

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.11.1

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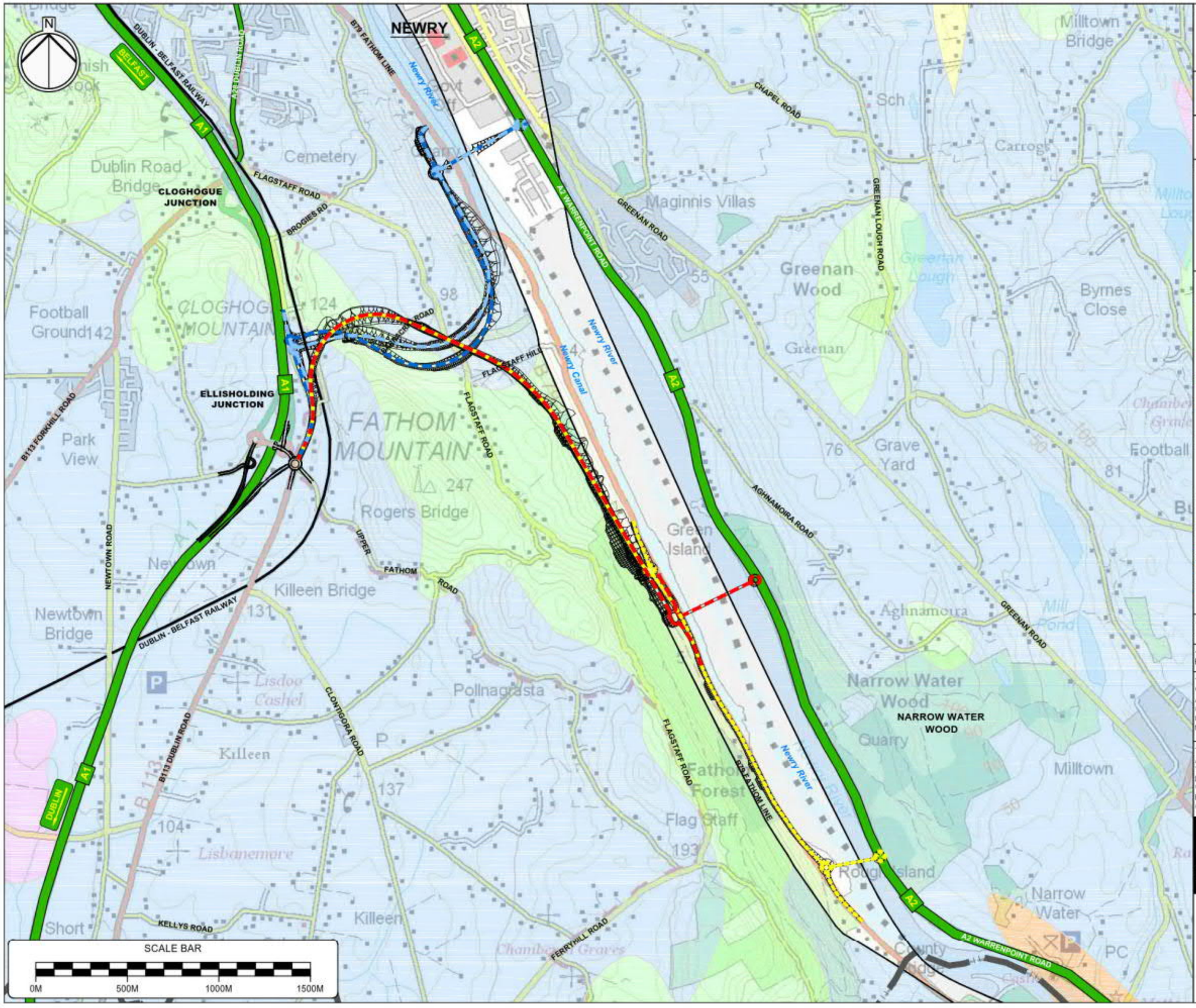

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NEWRY SOUTHERN RELIEF ROAD

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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
GEOLOGY & SOILS

DRIFT GEOLOGY

KEY

Superficial Geology

- Alluvium
- Bedrock at or near the surface
- Peat
- Raised Beach Deposits
- Till
- No Feature Identified
- Recent Marine Deposit

SOURCE: GSNI 1:250,000 DRIFT GEOLOGY MAP OF NORTHERN IRELAND

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.11.2

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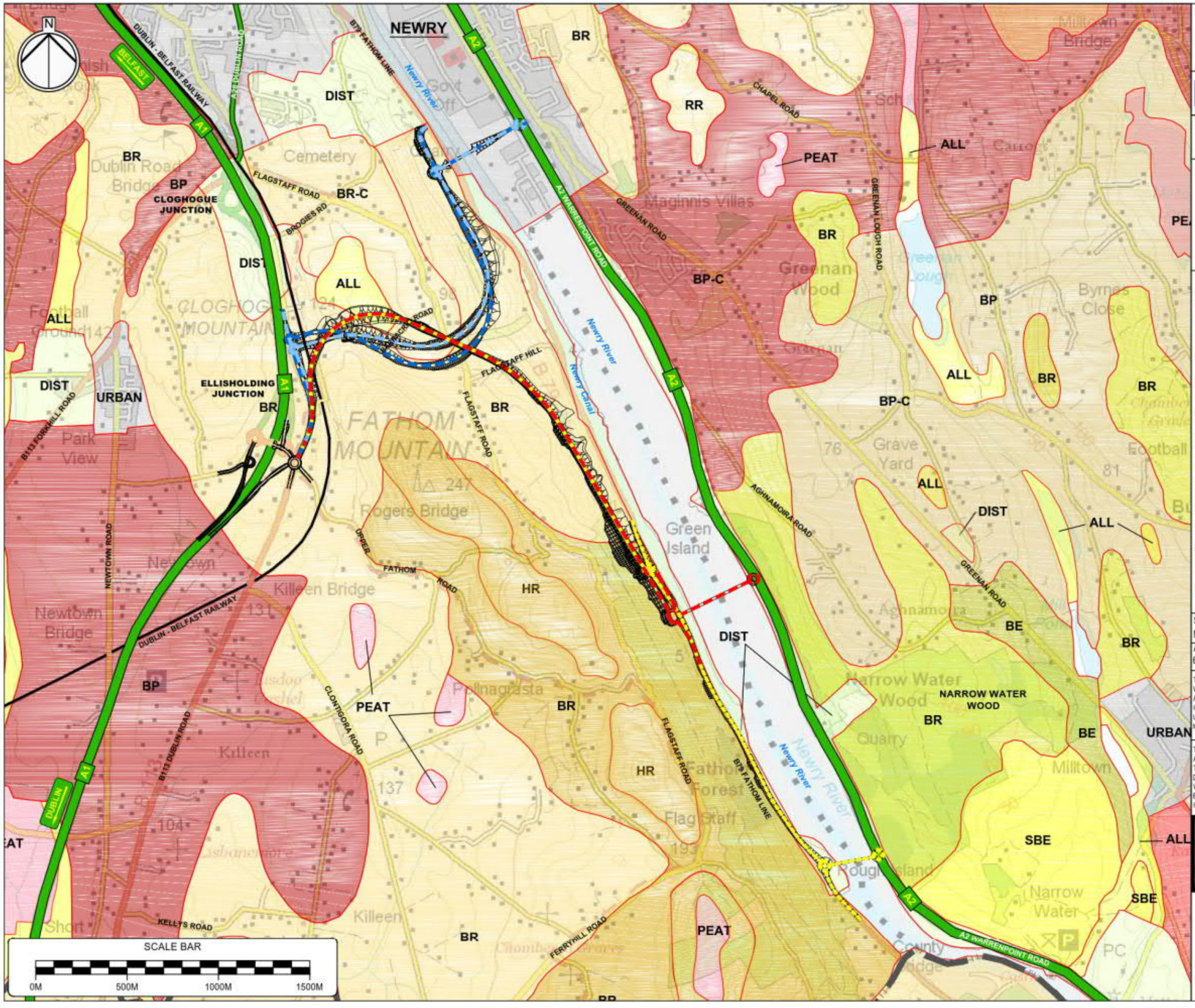

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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
GEOLOGY & SOILS

SOIL TYPES

KEY

Soils

BE	Brown Earth on Granite	HR	Humic Ranker on Shale
BP	Brown Podzol on Granite	BP	Brown Podzol on Shale Till
BR	Brown Ranker on Granite	SBE	Shallow Brown Earth on Shale Till
HR	Humic Ranker on Granite	G2	Groundwater Gley
RR	Rock Ranker on Granite	SWG1	Surface Water Gley on Granite Till
BR	Brown Ranker on Felsite	URBAN	Urban
HR	Humic Ranker on Felsite	ALL	Alluvium
BE	Brown Earth on Shale	PEAT	Peat > 50cm Deep
BP	Brown Podzol on Shale	DIST	Disturbed
BR	Brown Ranker on Shale		

SOURCE:OSNI 1:50,000 SOILS SERIES MAP (SHEET 29) 1994

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.11.3

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Reference	Years of Operation	Information
A	1904 1982	Quarry
B	1856	Gravel Pit
	1904 1982	Quarry
C	1834 1856 1904 1930 1982	Quarry
D	1979 1930 1904 1856	Quarry
E	1930 1979	Quarry
F	1904 1930	Quarry
Drumalane Quarry	1990 - Present	Quarry
Bigwood Quarry	~	Quarry

Project Title

NEWRY SOUTHERN RELIEF ROAD

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Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
GEOLOGY & SOILS

LICENSED MINERAL EXTRACTION

KEY

- Mineral Extraction Site
- Historical Mineral Extraction Site
- Site of Local Nature Conservation Importance (SLNCI) [Geological]
- Area of Special Scientific Interest (ASSI)[Geological]

Source: GSNI GeoIndex & NIEA Historic Land Use Layer

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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FIGURE 5.11.4

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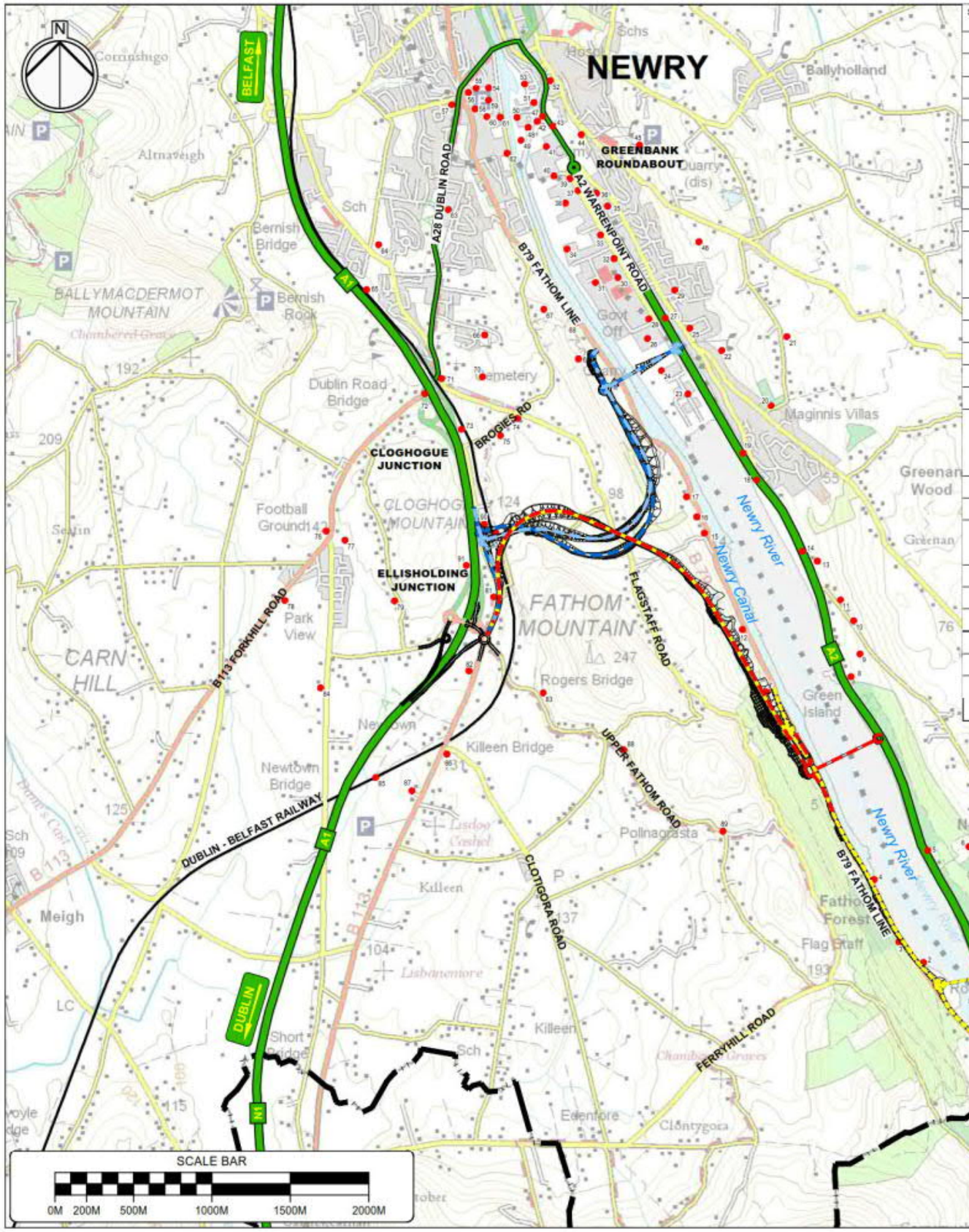

Source No.	Description	Source No.	Description	Source No.	Description
1	Historic civil	31	Recreational/amenity activity	51	Sewage & Effluent
2	Building civil	32	Engineering works, industrial/chemical/petrochemical/pharmaceutical	52	Traditional
3	Mineral workings	33	Engineering works, industrial/chemical/petrochemical/pharmaceutical	53	Sewage & Effluent
4	Graveyards & dockyards	34	Sewage, sewage & sewage farms	54	Transport, distribution, facilities, depots
5	Historic civil	35	Quarry & Extraction	55	Landscaping
6	Mineral workings	36	Quarry & Extraction	56	Mineral workings
7	Mineral workings	37	Former petroleum	57	Waste recycling, landfills & other waste disposal sites
8	Mineral workings	38	Engineering works, industrial/chemical/petrochemical/pharmaceutical	58	Mineral workings
9	Mineral workings	39	Petroleum, fuel depot	59	Mineral workings
10	Historic civil	40	Recreational/amenity activity	60	Agriculture
11	Historic civil	41	Petrol	61	Orchards
12	Railway land	42	Petrol	62	Waste recycling, landfills & recycling sites
13	Historic civil	43	Quarry & Extraction	63	Landscaping
14	Historic civil	44	Petroleum	64	Infrastructure & utilities
15	Transport & distribution	45	Petroleum	65	Petroleum, petrochemical & industrial works
16	Petroleum depot	46	Quarry	66	Quarry
17	Graveyards & dockyards	47	Industry, petrol depot	67	Offices
18	Sunken, general docks	48	Quarry & Extraction	68	Pillar Junction
19	Railway land	49	Petroleum	69	Waste recycling, landfills & recycling sites
20	Historic civil	50	Petroleum	70	Landscaping
21	Landfill	51	Quarry & Extraction	71	Mineral workings
22	Cemetery	52	Petroleum	72	Petroleum depots
23	Petrochemical	53	Petroleum & petroleum	73	Mineral workings
24	Waste recycling, landfills & other waste disposal sites	54	Quarry & Extraction	74	Agriculture
25	Landfill & Waste tip	55	Industry, petrol depot	75	Petroleum
26	Historic	56	Old landfill	76	Agriculture
27	Railway land	57	Railway land	77	Landfills
28	Engineering works, industrial/chemical/petrochemical/pharmaceutical	58	Petroleum & petroleum	78	Agriculture
29	Quarry	59	Petroleum	79	Agriculture
30	Unspecified industrial works	60	Sewage mill	80	Orchards
				81	Graveyards and Burial Grounds

Project Title

NEWRY SOUTHERN RELIEF ROAD

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Client

Department for Infrastructure | An Roinn Bonneagair

Drawing Title

STAGE 2 SCHEME ASSESSMENT REPORT
GEOLOGY & SOILS
POTENTIAL CONTAMINATED LAND SOURCES

KEY

- Potential Contaminated Land Source

SOURCE: NIEA Land Database, OS Maps, Google Maps.

Route Options

- Yellow Route
- Red Route
- Blue Route Option 1
- Blue Route Options 2 & 3
- Indicative Ellisholding Junction Arrangement (coincident with all routes)
- A Class Road
- Railway
- International Border

Scale @ A3
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AECOM Internal Project Number
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FIGURE 5.11.5

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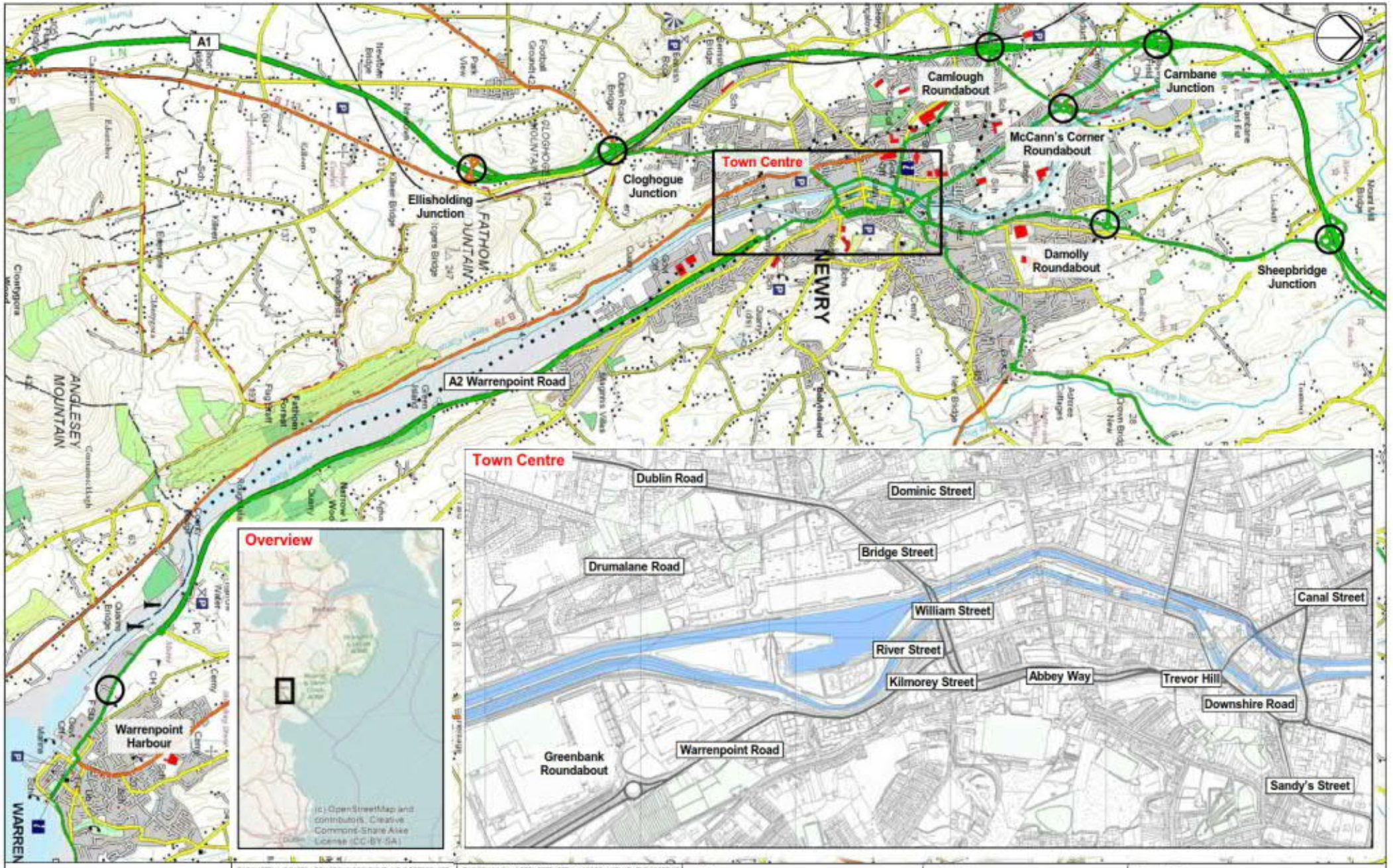

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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

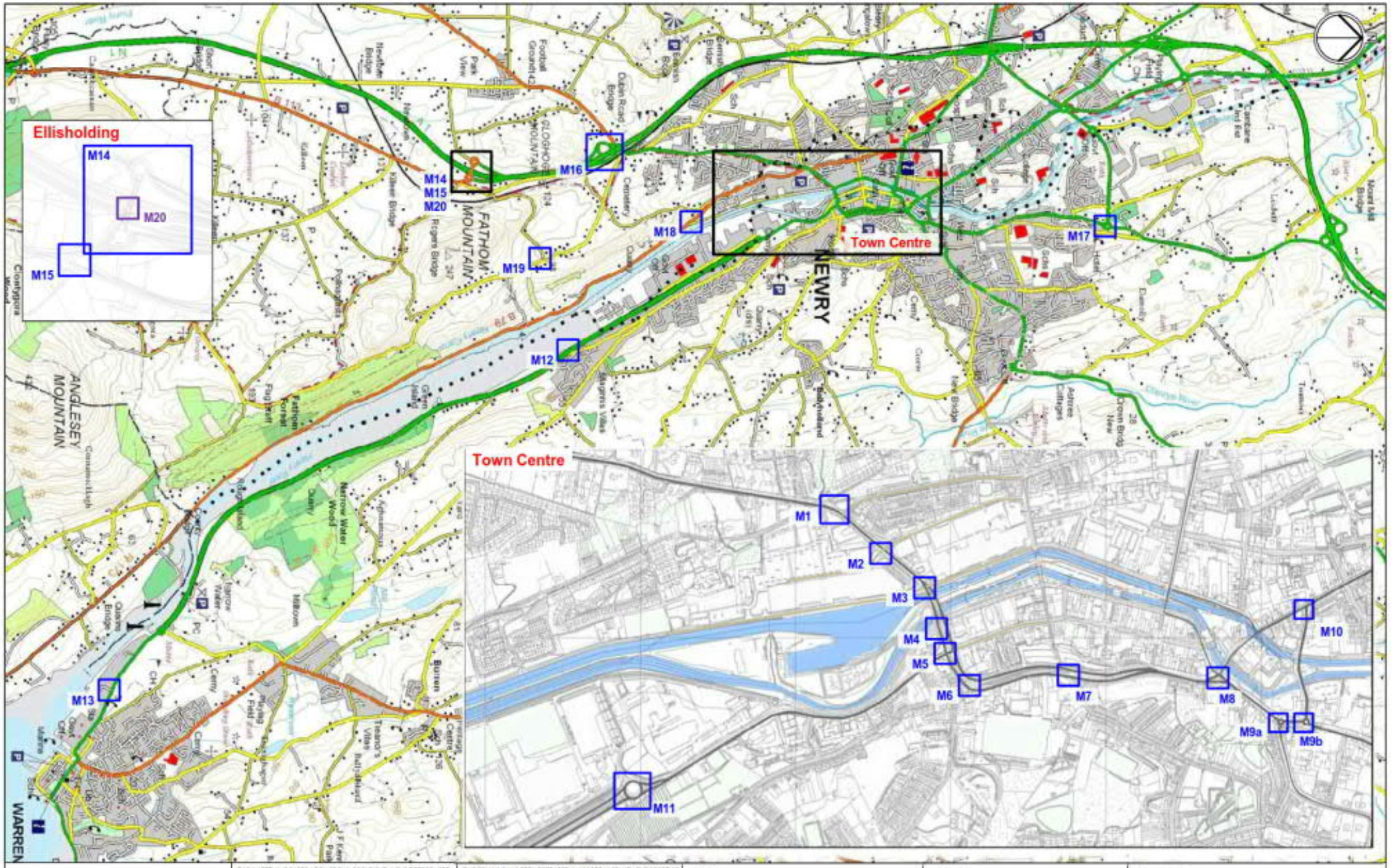
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
GENERAL LOCATION PLAN

Figure 6.1.1



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KEY

Day of Survey: Tuesday 6 and 13 June 2017

- MCC Location (Full Turning Count)
- MCC Location (Full Turning Count and A1 Mainline Flow)

Project Title
NEWRY SOUTHERN RELIEF ROAD

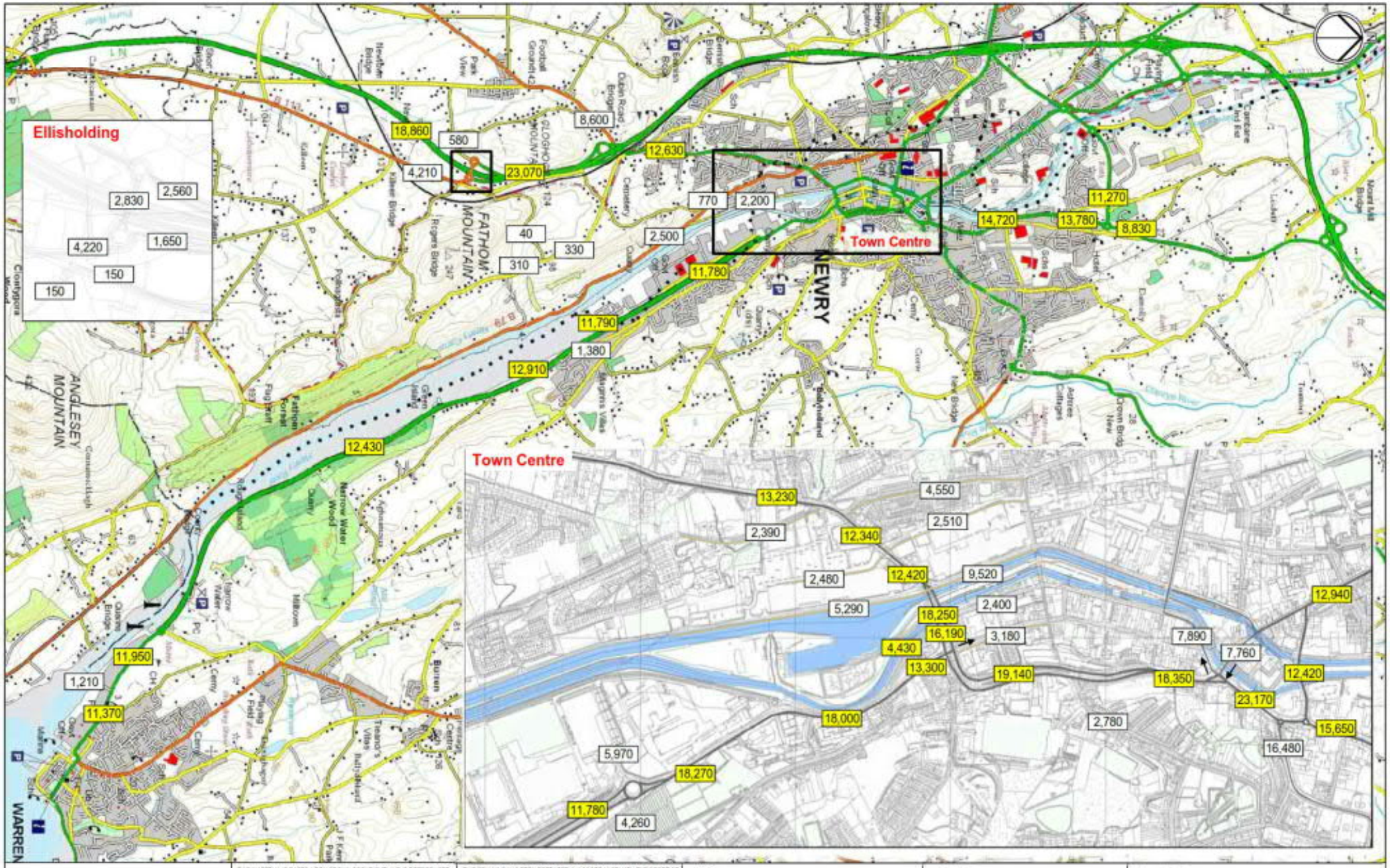
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
MANUAL CLASSIFIED COUNT LOCATIONS JUNE 2017

Figure 6.2.1



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Department for Infrastructure Bonneagair

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KEY

Day of Survey: Tuesday 6 & 13 June 2017

10,000 Main Road Traffic Flow

10,000 Side Road Traffic Flow

Project Title
NEWRY SOUTHERN RELIEF ROAD

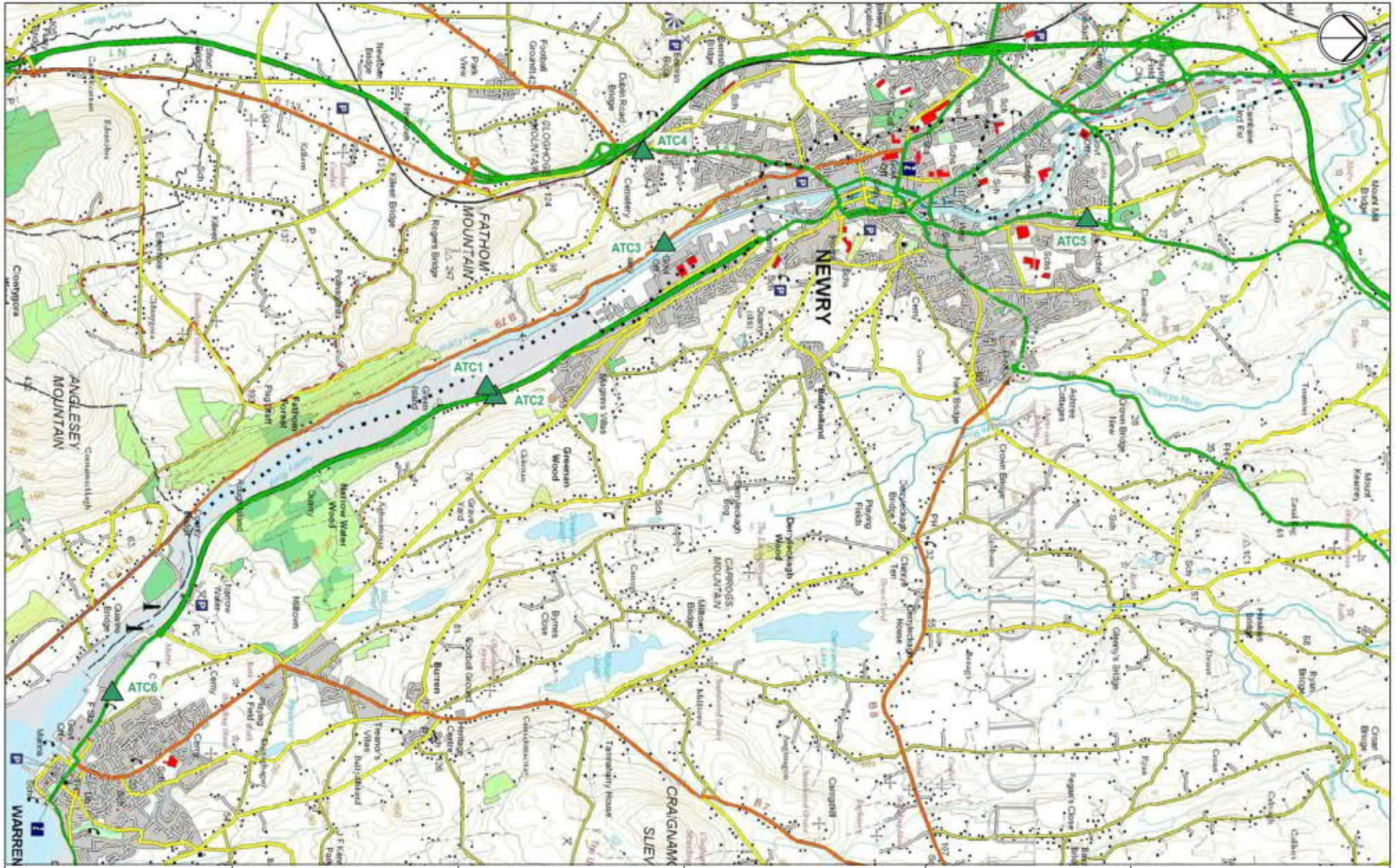
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
MANUAL CLASSIFIED COUNTS
OBSERVED WEEKDAY TWO-WAY
12-HOUR LINK FLOWS

Figure 6.2.2



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KEY

▲ Temporary Automatic Traffic Count Location

Project Title
NEWRY SOUTHERN RELIEF ROAD

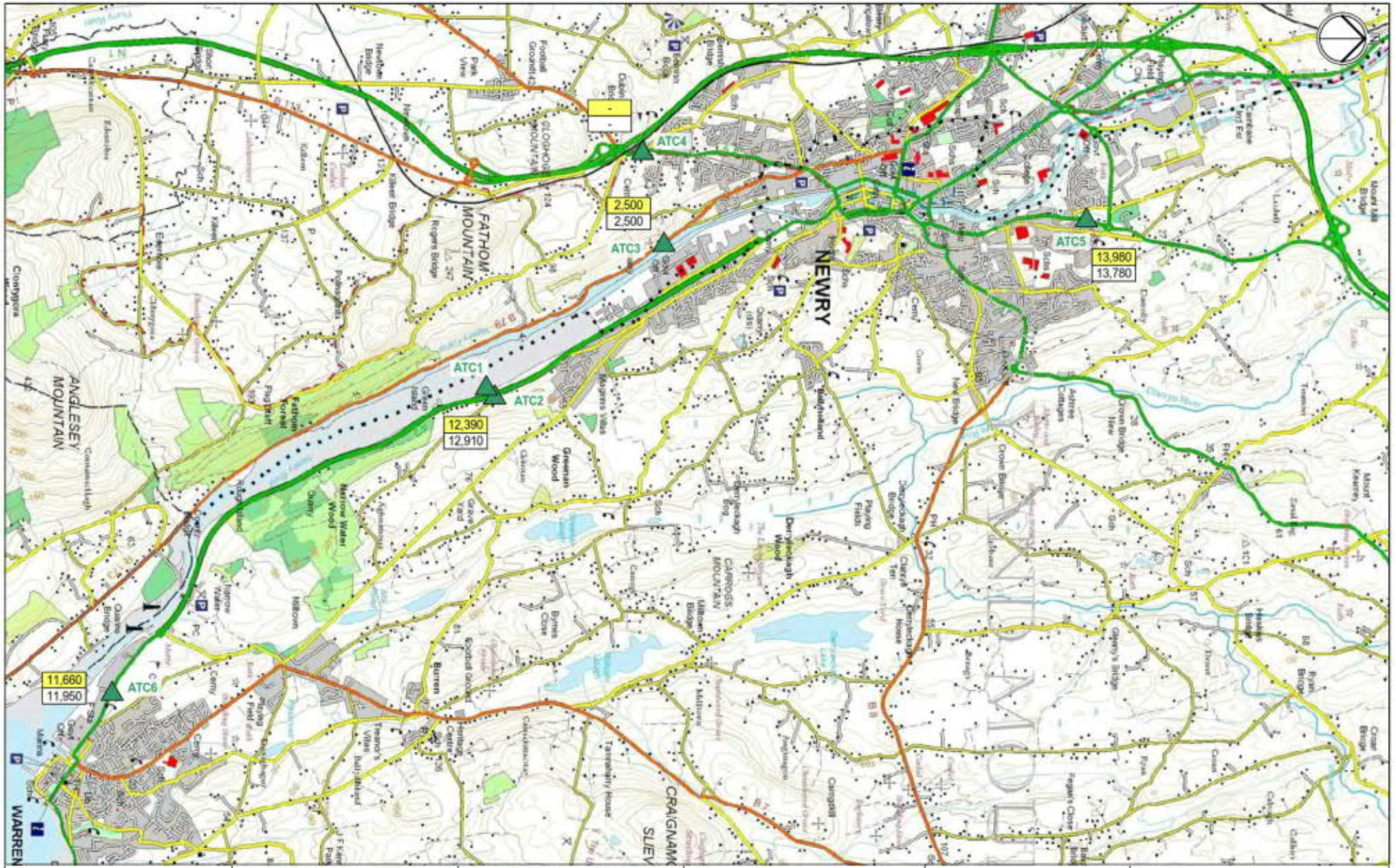
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
TEMPORARY AUTOMATIC TRAFFIC COUNT LOCATIONS
JUNE 2017

Figure 6.2.3



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KEY
10,000 ATC 12-Hour Traffic Flow
10,000 MCC 12-Hour Traffic Flow

Project Title
NEWRY SOUTHERN RELIEF ROAD

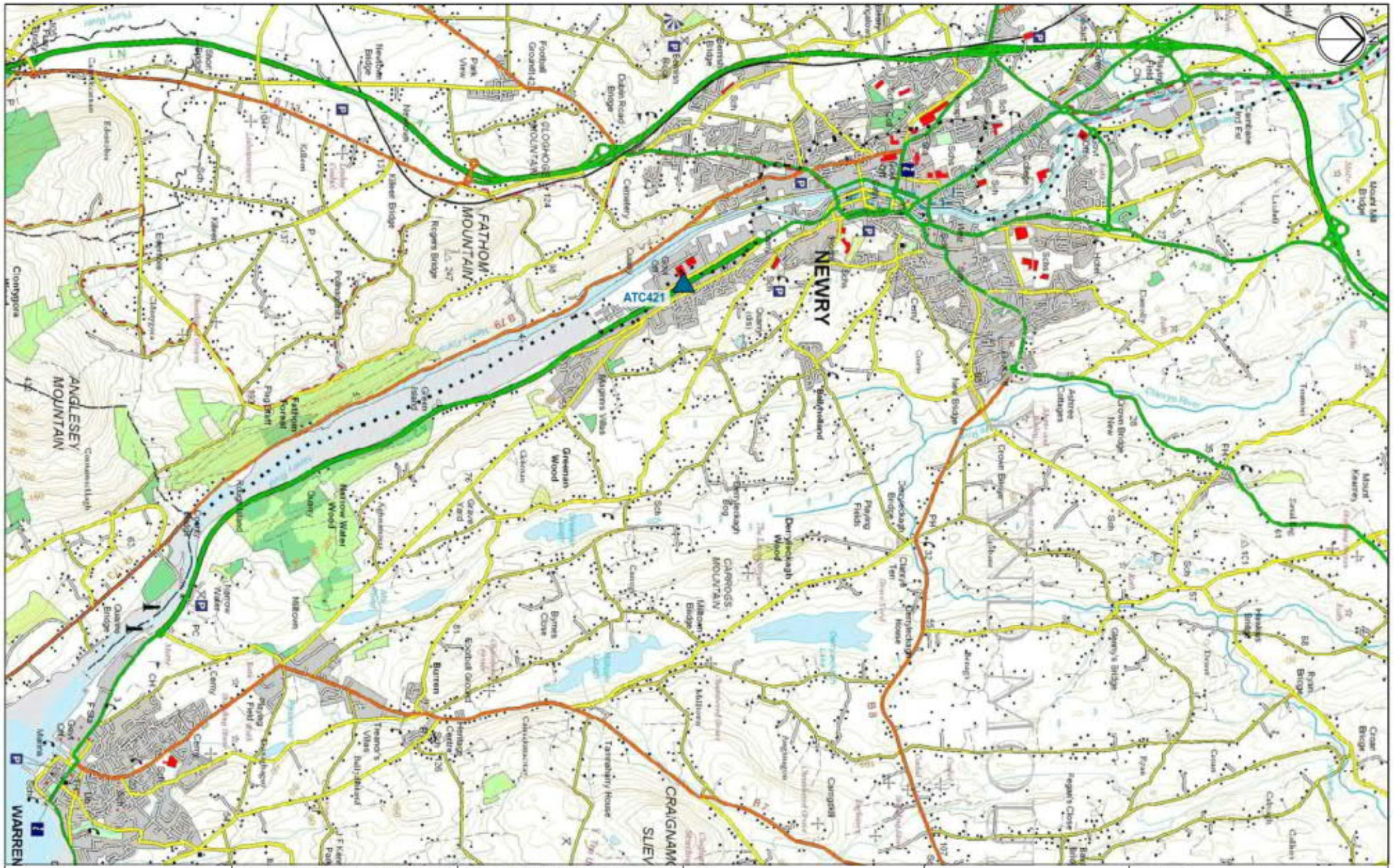
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
TEMPORARY AUTOMATIC TRAFFIC COUNTS
COMPARISON OF ATC & MCC TRAFFIC FLOWS
07:00 HOURS – 19:00 HOURS

Figure 6.2.4



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Co-financed by the European Union
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KEY

▲ Permanent Automatic Traffic Count Location

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

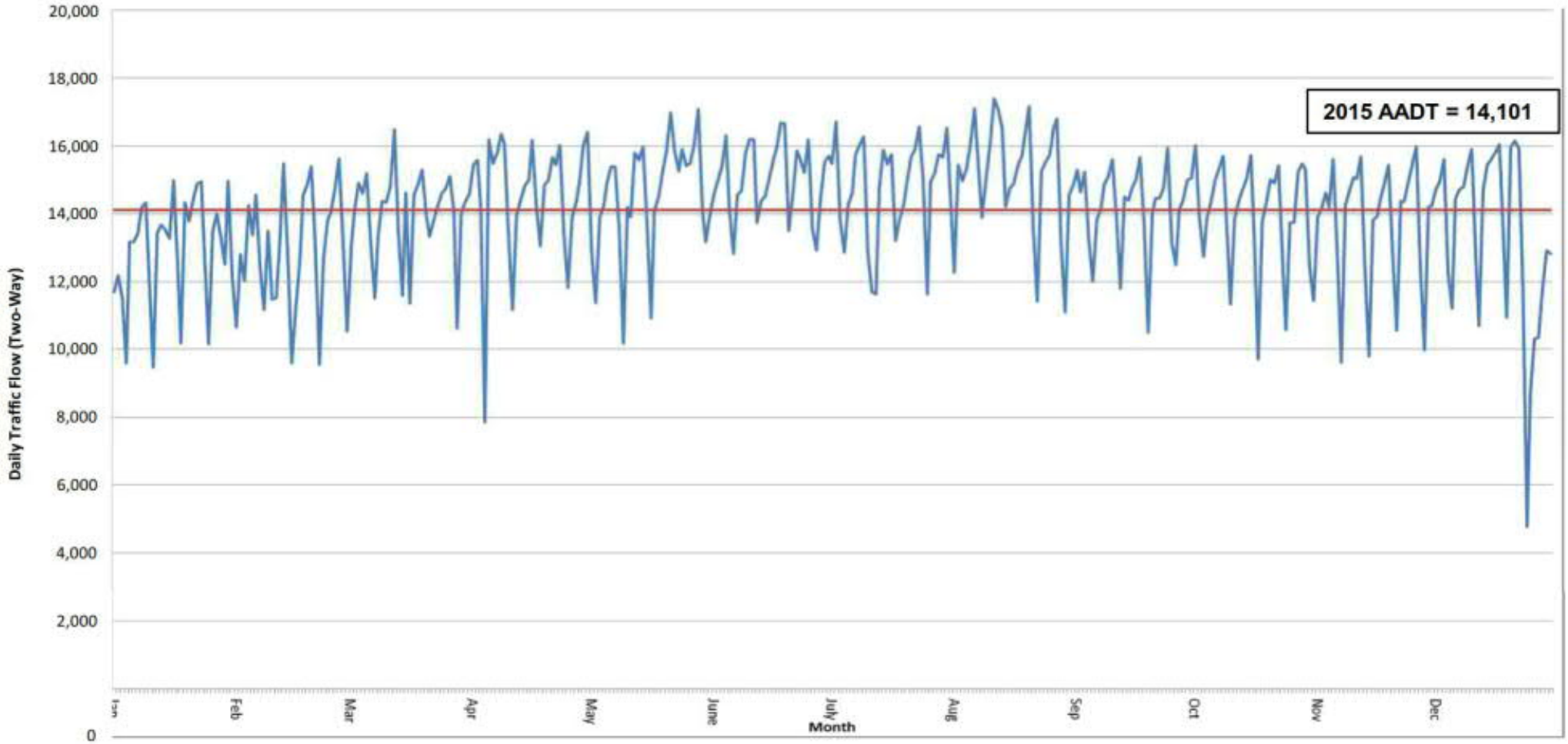
AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
PERMANENT AUTOMATIC TRAFFIC COUNT LOCATION
ATC 421 – A2 WARRENPOINT ROAD

Figure 6.2.5

ATC Site 421: A2 Warrenpoint Road
Variations in 2015 Daily Traffic Flows



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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

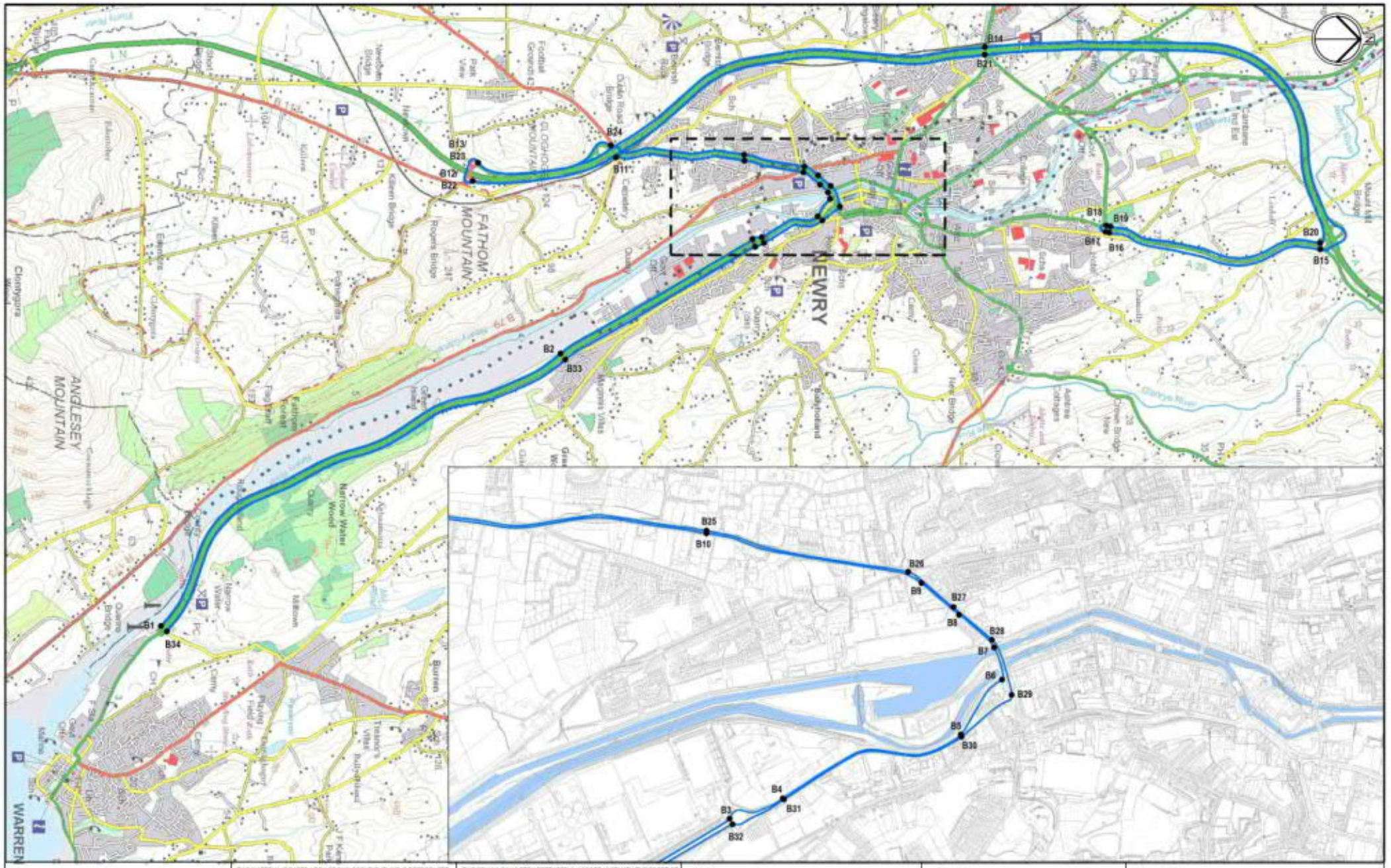
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
PERMANENT AUTOMATIC TRAFFIC COUNT
ATC SITE 421
VARIATIONS IN DAILY TRAFFIC FLOWS 2015

Figure 6.2.6



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KEY

● Journey Time Survey Measurement Point

Project Title
NEWRY SOUTHERN RELIEF ROAD

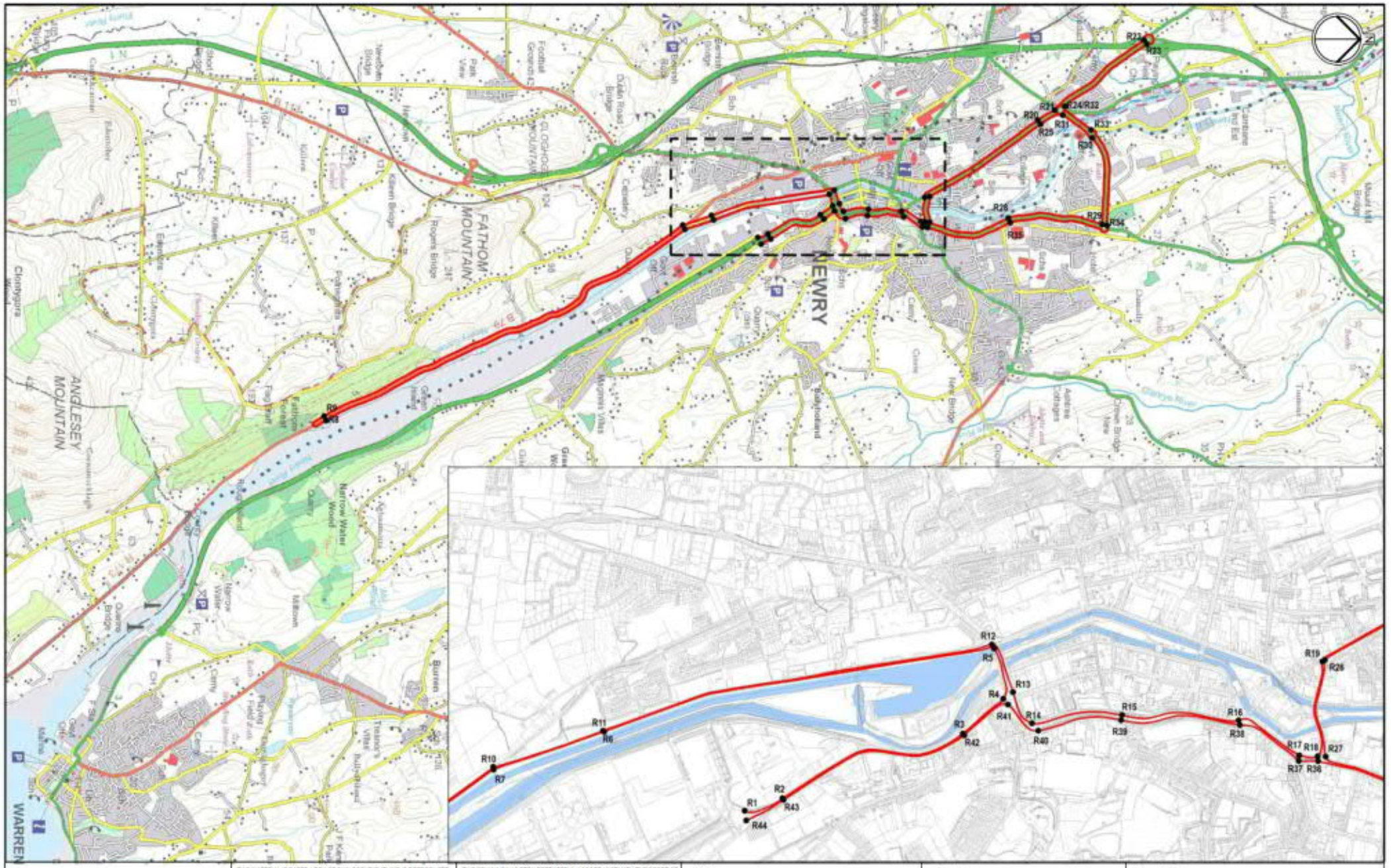
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY LOCATION
BLUE ROUTE

Figure 6.2.7



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KEY

● Journey Time Survey Measurement Point

Project Title
NEWRY SOUTHERN RELIEF ROAD

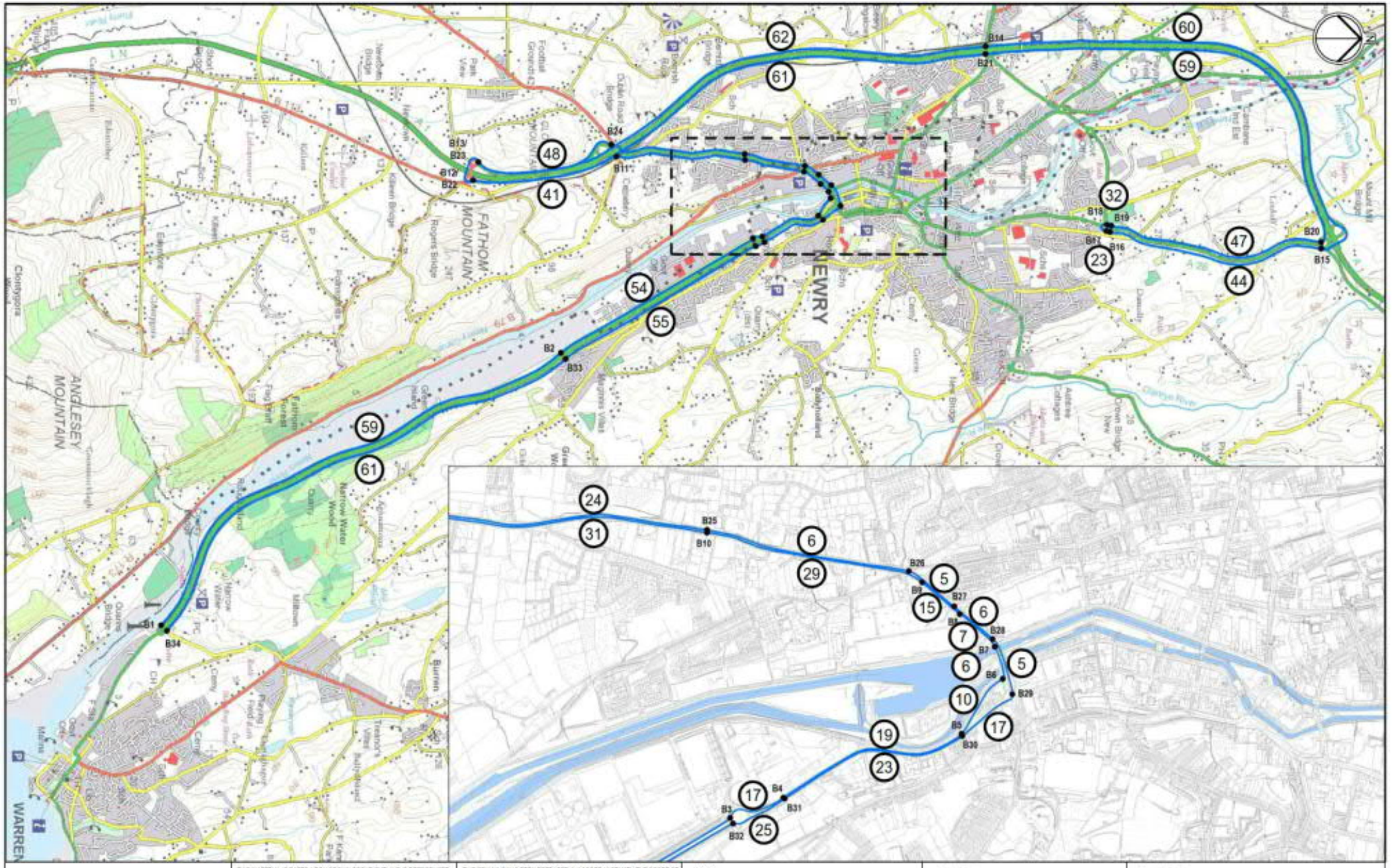
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY LOCATION
RED ROUTE

Figure 6.2.8



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KEY

- Journey Time Survey Measurement Point
- (30) Average 12-Hour Speed (mph)

Project Title
NEWRY SOUTHERN RELIEF ROAD

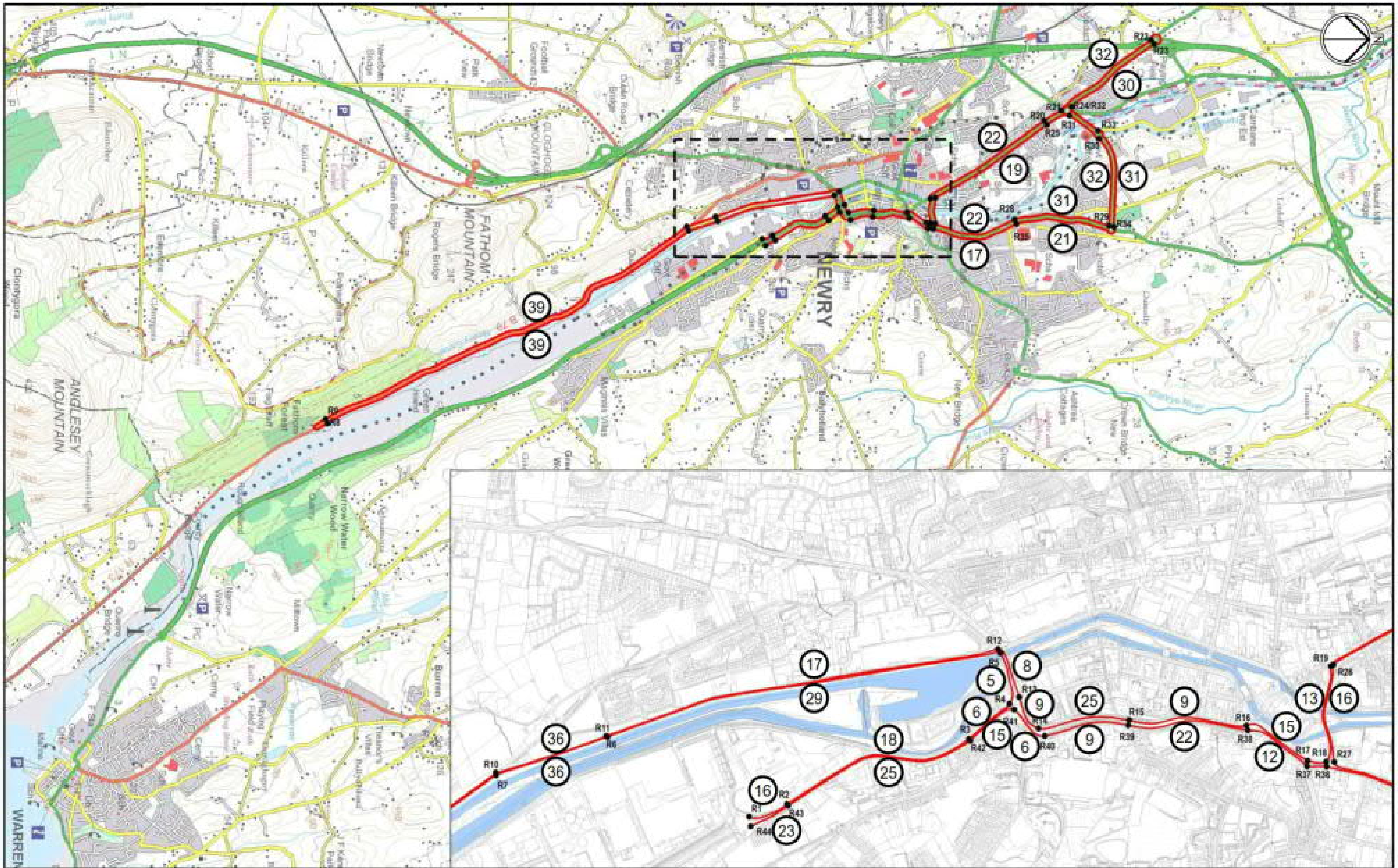
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – BLUE ROUTE
AVERAGE DIRECTIONAL SPEEDS
07:00 HOURS – 19:00 HOURS

Figure 6.2.9



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KEY

● Journey Time Survey Measurement Point

(30) Average 12-Hour Speed (mph)

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

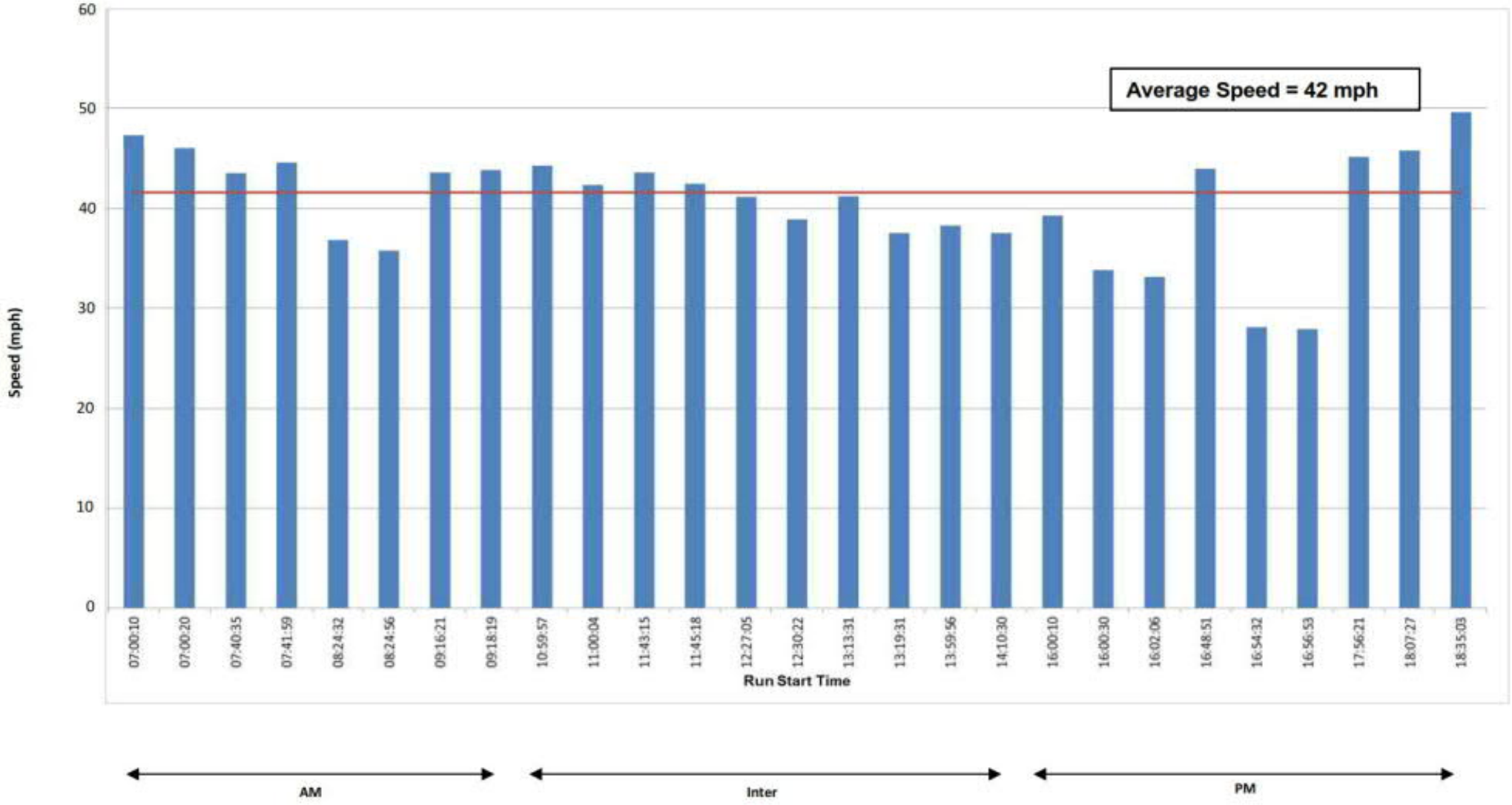
Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – RED ROUTE
AVERAGE DIRECTIONAL SPEEDS
07:00 HOURS – 19:00 HOURS

Figure 6.2.10

Blue Route Journey Time Speeds

Tuesday 6, 7 and 20 June 2017



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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

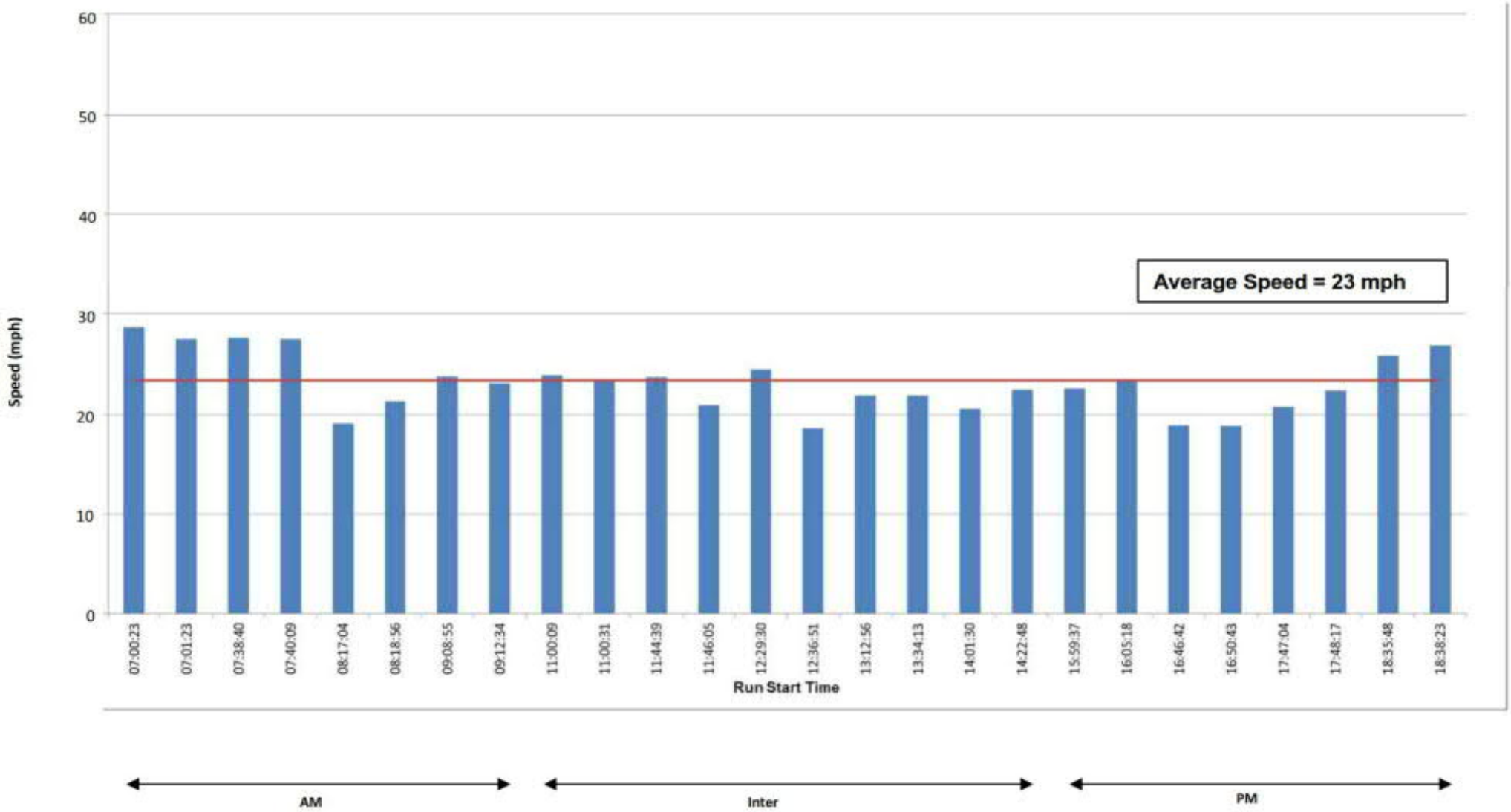
Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – BLUE ROUTE
JOURNEY TIME SPEEDS (MPH)
07:00 HOURS – 19:00 HOURS

Figure 6.2.11

Red Route Journey Time Speeds

Tuesday 6 and 7 June 2017



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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

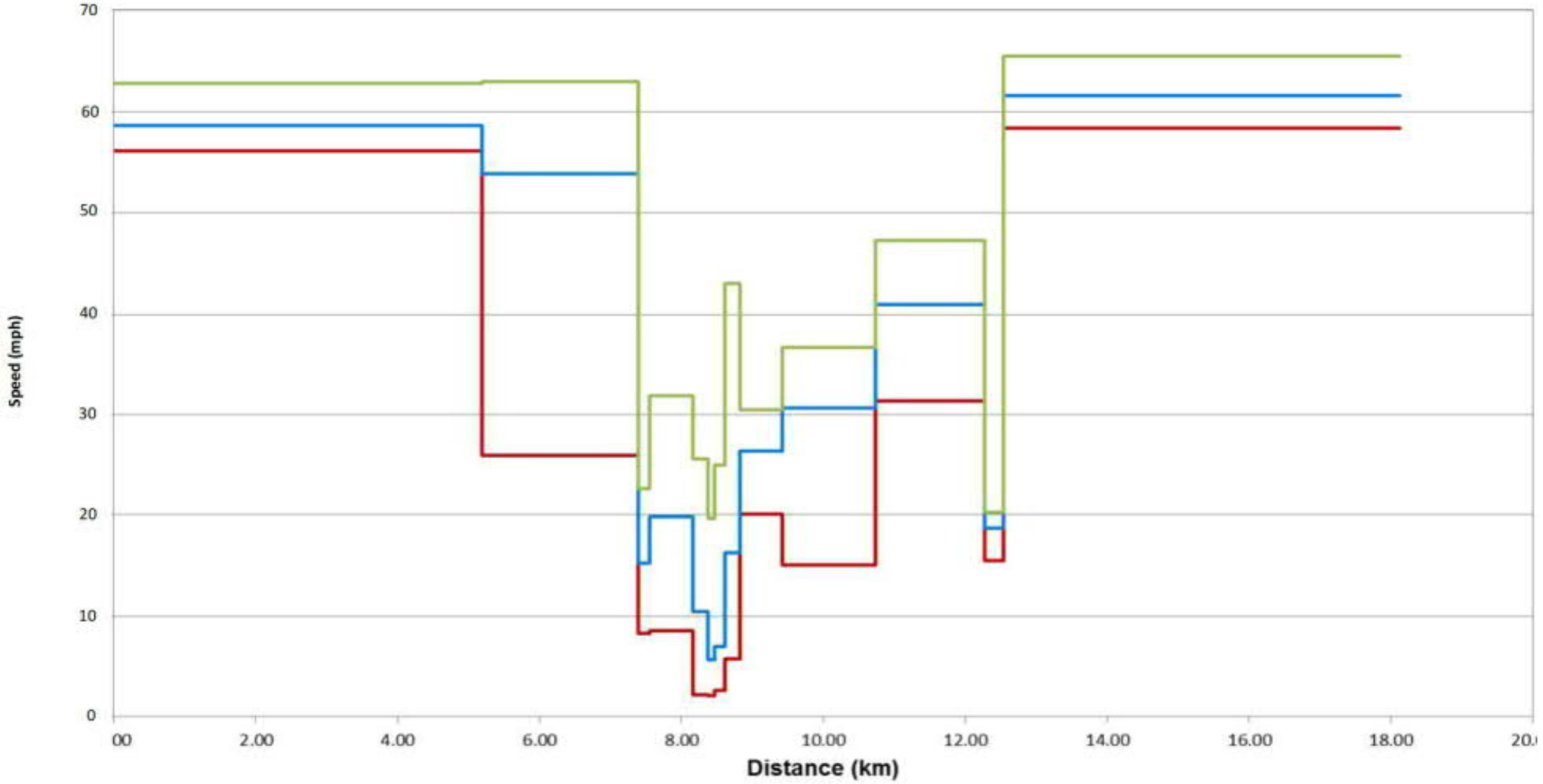
Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – RED ROUTE
JOURNEY TIME SPEEDS (MPH)
07:00 HOURS – 19:00 HOURS

Figure 6.2.12

Blue Route Journey Time Speeds

JTS B1 – JTS B14



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KEY
- Min Speed (mph)
- Average Speed (mph)
- Max Speed (mph)

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

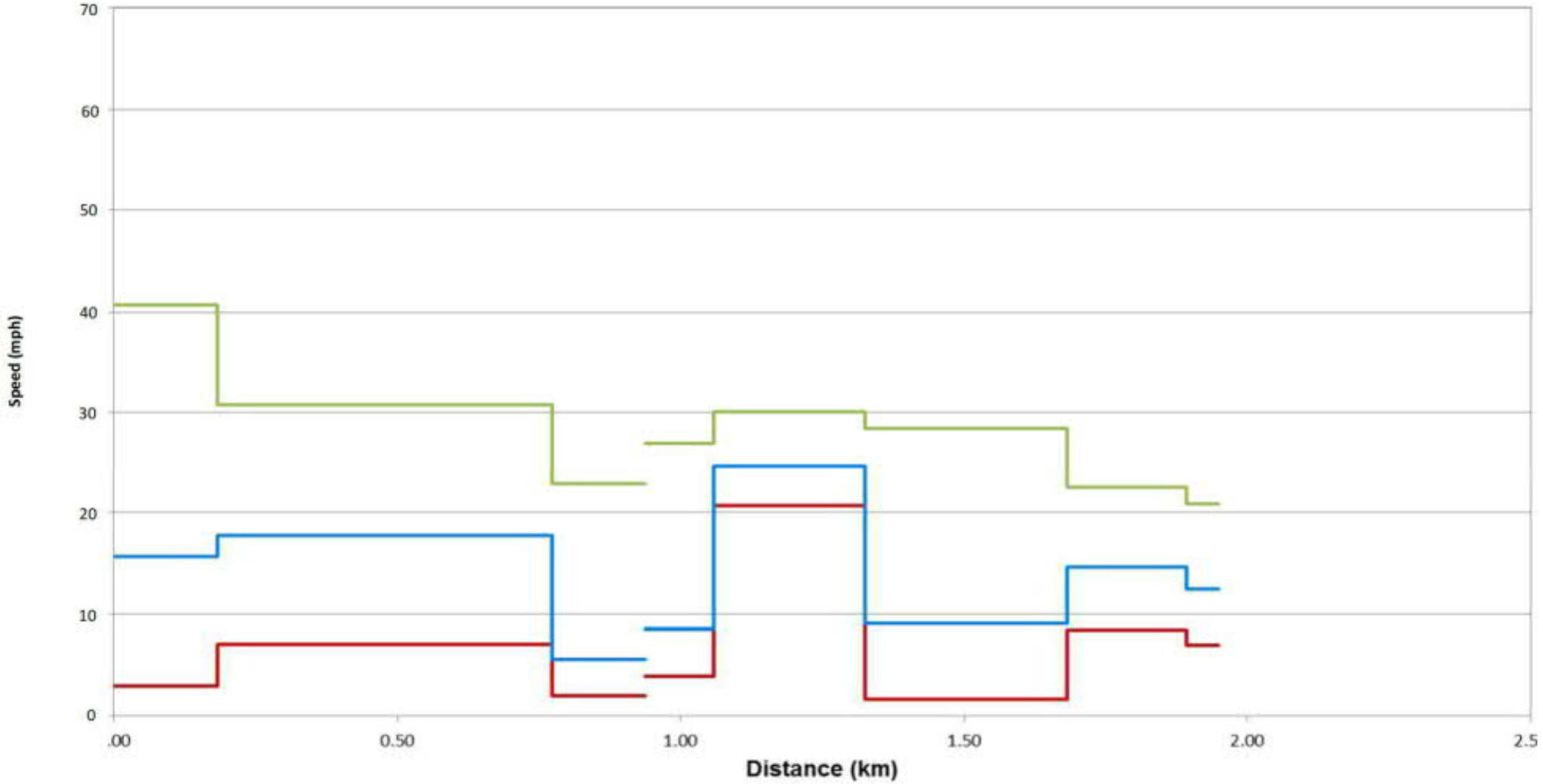
Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – BLUE ROUTE
VARIATIONS IN JOURNEY TIME SPEEDS (MPH)
07:00 HOURS – 19:00 HOURS

Figure 6.2.13

Red Route Journey Time Speeds

JTS R1 – JTS R4 / JTS R13 – JTS R18



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KEY
- Min Speed (mph)
- Average Speed (mph)
- Max Speed (mph)

Project Title
NEWRY SOUTHERN RELIEF ROAD

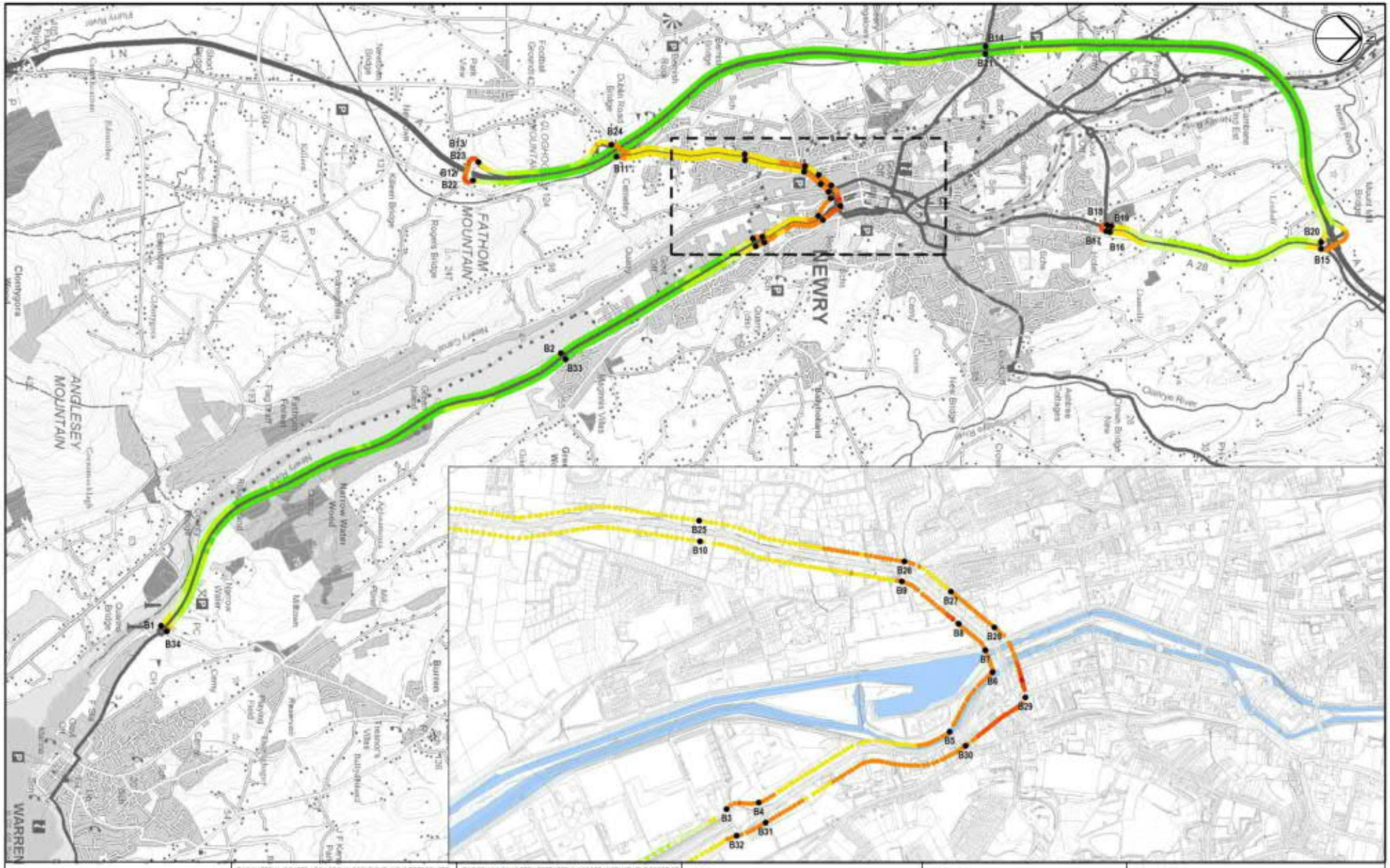
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
JOURNEY TIME SURVEY – RED ROUTE
VARIATIONS IN JOURNEY TIME SPEEDS (MPH)
07:00 HOURS – 19:00 HOURS

Figure 6.2.14



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KEY

Speed (mph)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

Project Title
NEWRY SOUTHERN RELIEF ROAD

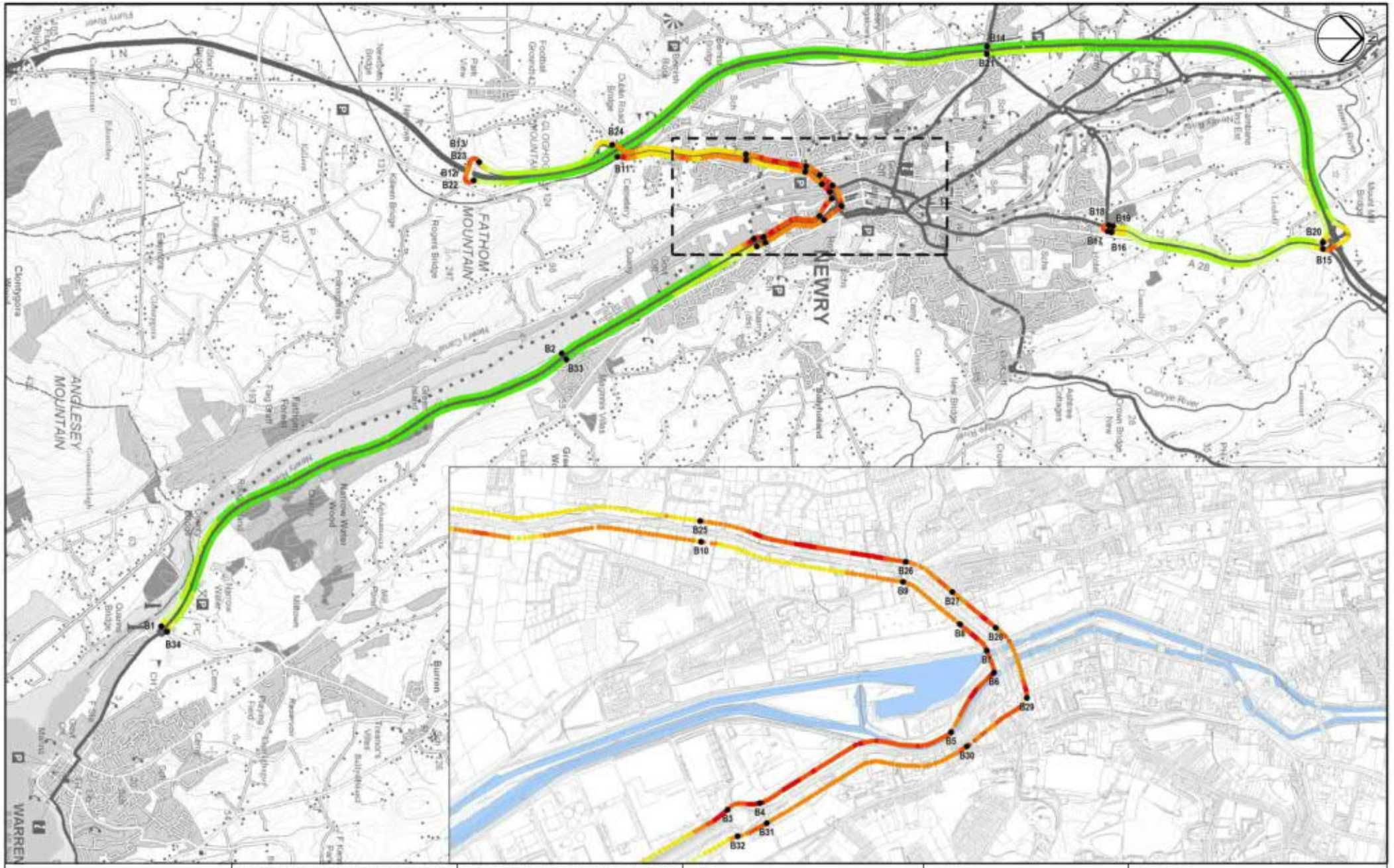
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
BLUE ROUTE JOURNEY TIME SURVEYS
WEDNESDAY 07 JUNE 2017
RUN START TIME : 07:00:10

Figure 6.2.15



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KEY

Speed (mph)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

Project Title
NEWRY SOUTHERN RELIEF ROAD

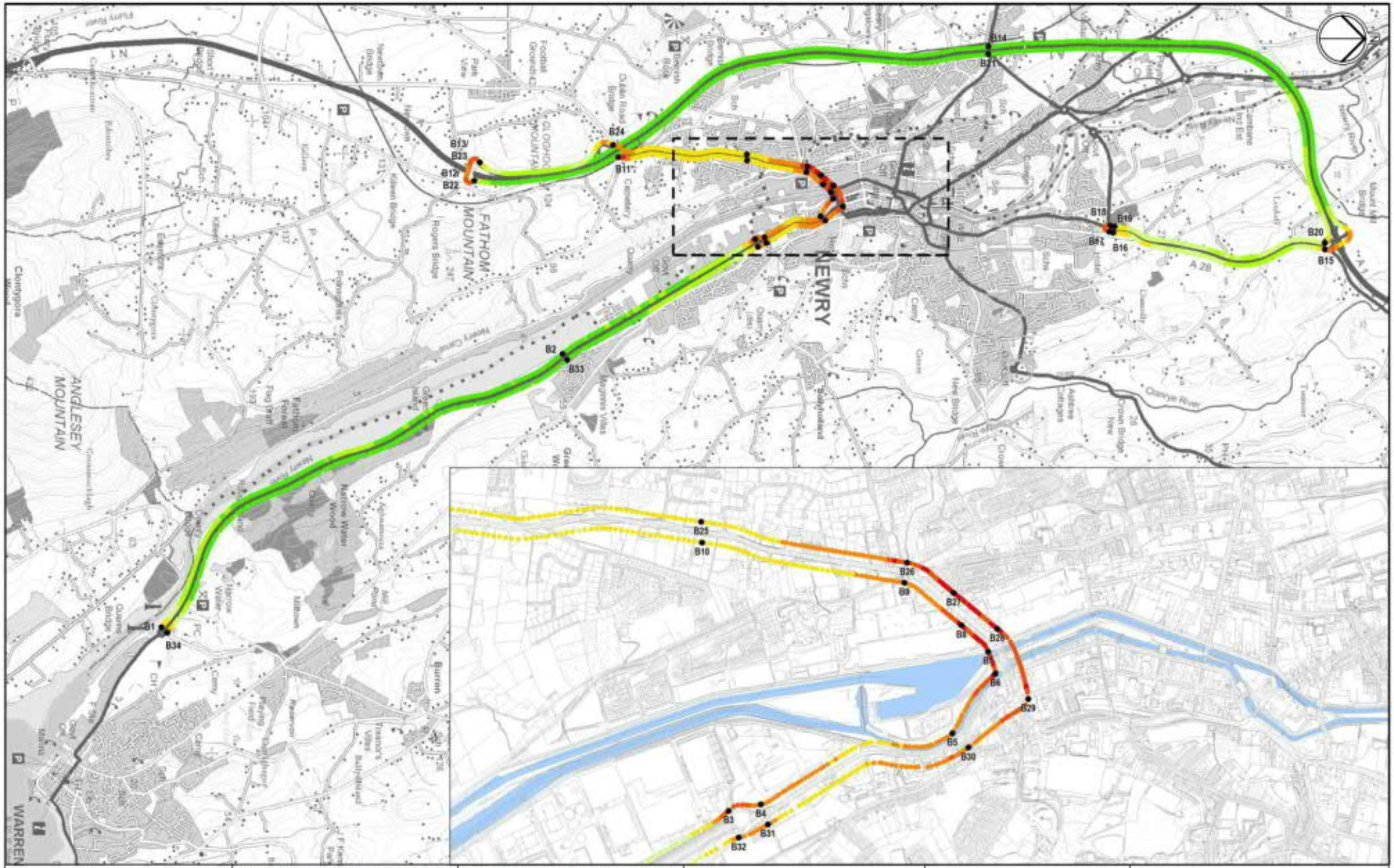
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
BLUE ROUTE JOURNEY TIME SURVEYS
TUESDAY 06 JUNE 2017
RUN START TIME : 08:24:56

Figure 6.2.16



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KEY

Speed (mph)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

Project Title
NEWRY SOUTHERN RELIEF ROAD

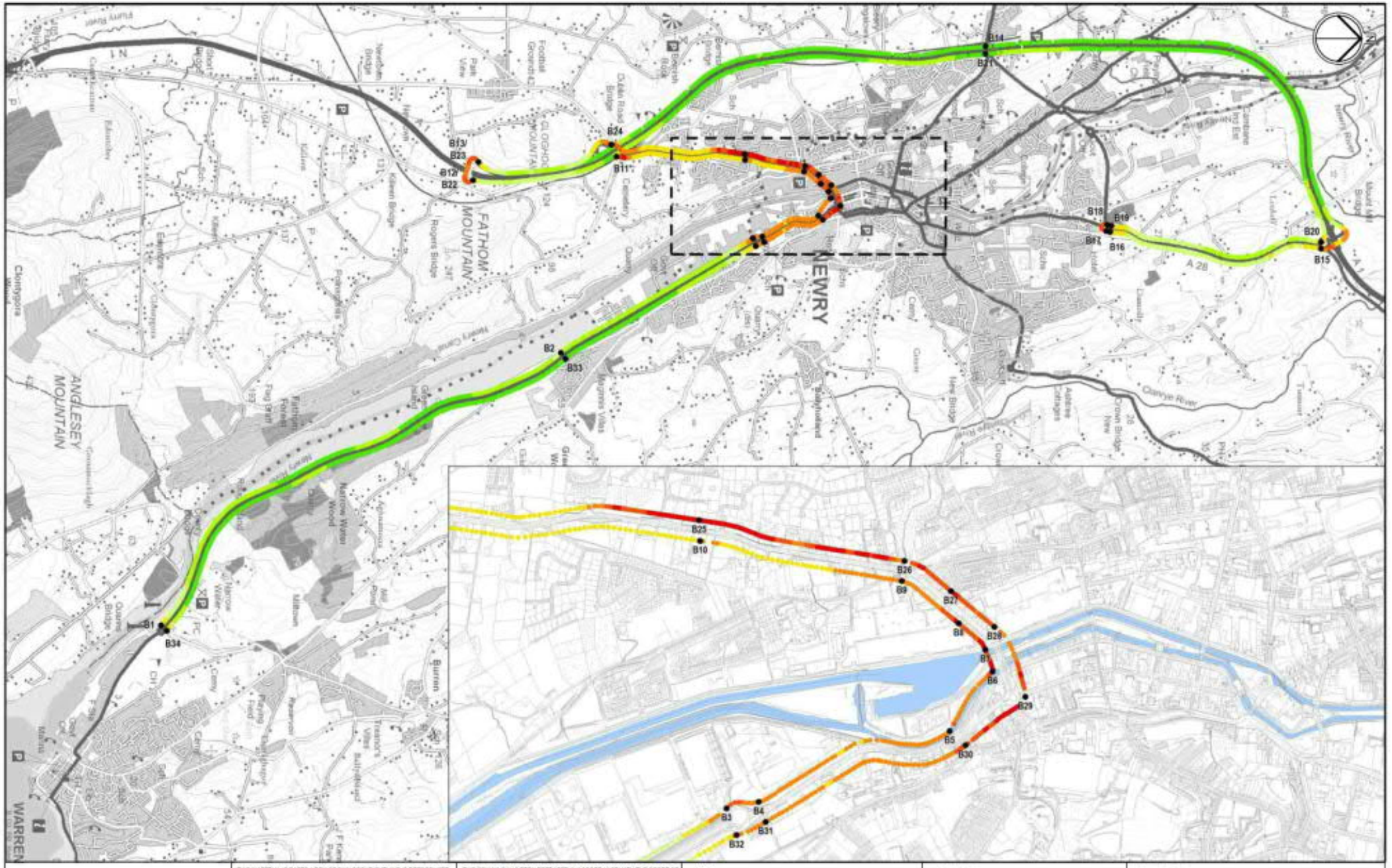
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
BLUE ROUTE JOURNEY TIME SURVEYS
TUESDAY 06 JUNE 2017
RUN START TIME : 13:13:31

Figure 6.2.17



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KEY

Speed (mph)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

Project Title
NEWRY SOUTHERN RELIEF ROAD

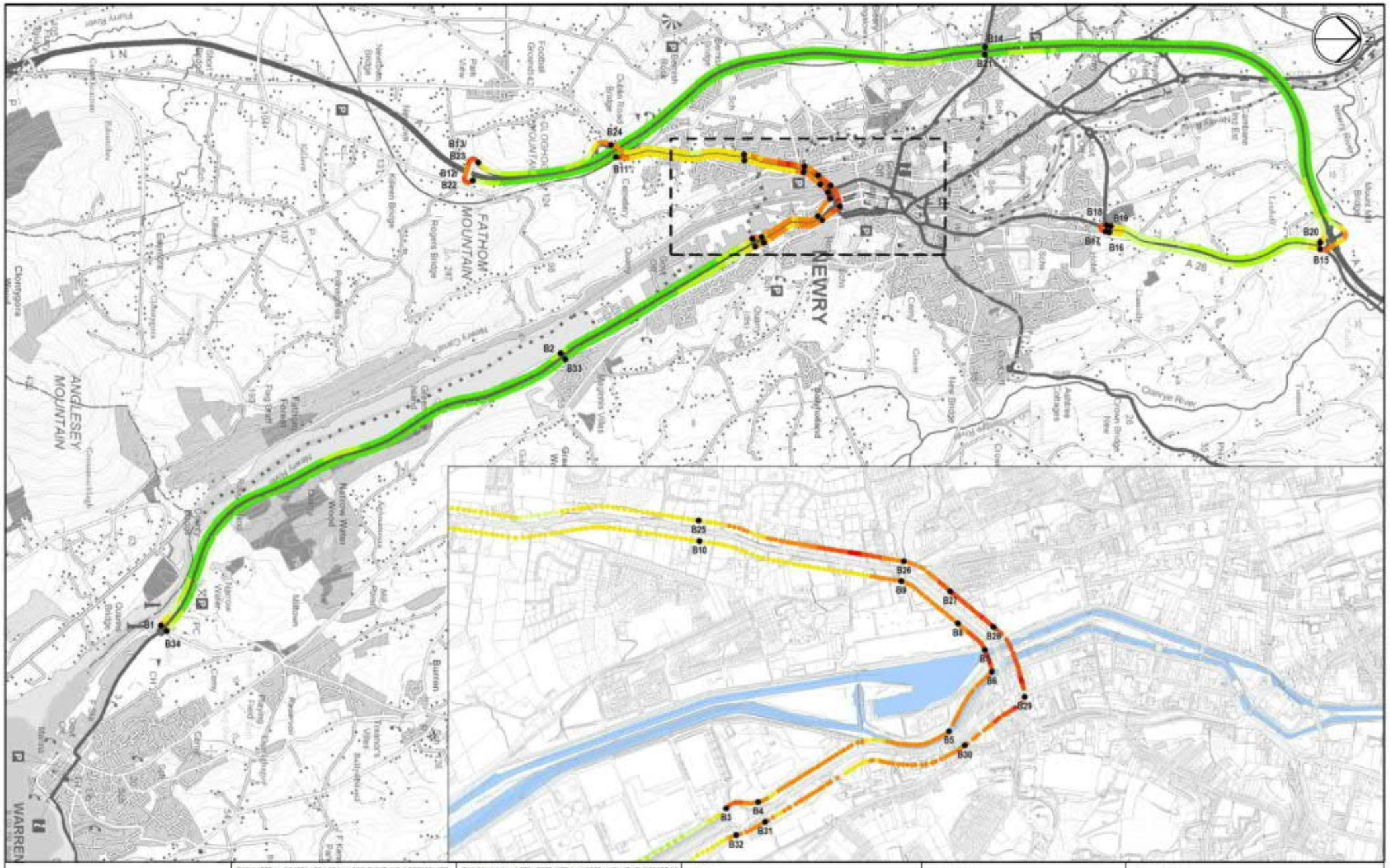
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
BLUE ROUTE JOURNEY TIME SURVEYS
WEDNESDAY 07 JUNE 2017
RUN START TIME : 16:56:53

Figure 6.2.18



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KEY

Speed (mph)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

Project Title
NEWRY SOUTHERN RELIEF ROAD

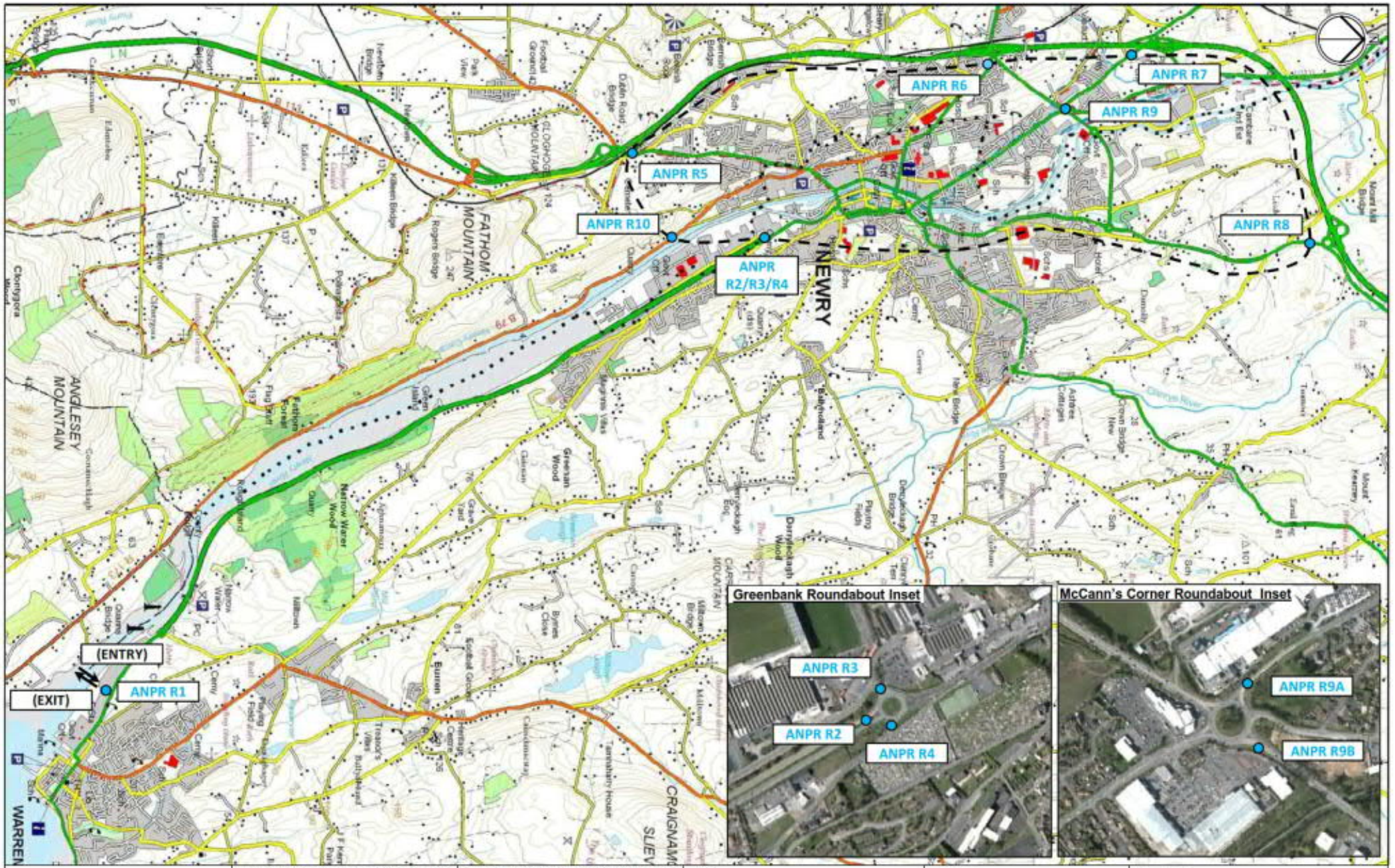
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
BLUE ROUTE JOURNEY TIME SURVEYS
WEDNESDAY 07 JUNE 2017
RUN START TIME : 18:07:27

Figure 6.2.19



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KEY

- Automatic Number Plate Recognition Survey Location
- Primary Survey Cordon

Project Title
NEWRY SOUTHERN RELIEF ROAD

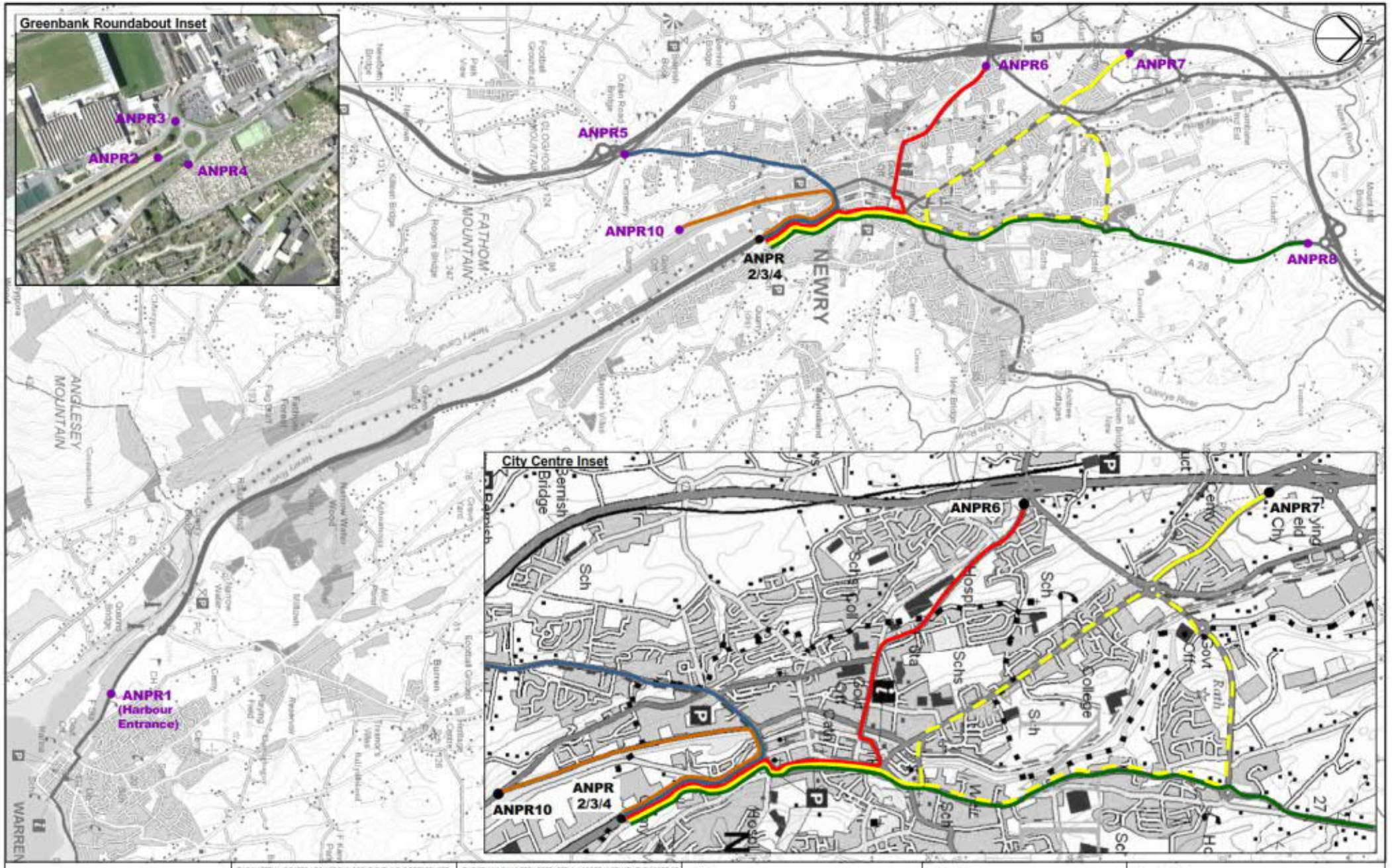
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
AUTOMATIC NUMBER PLATE RECOGNITION SURVEY LOCATIONS

Figure 6.2.20



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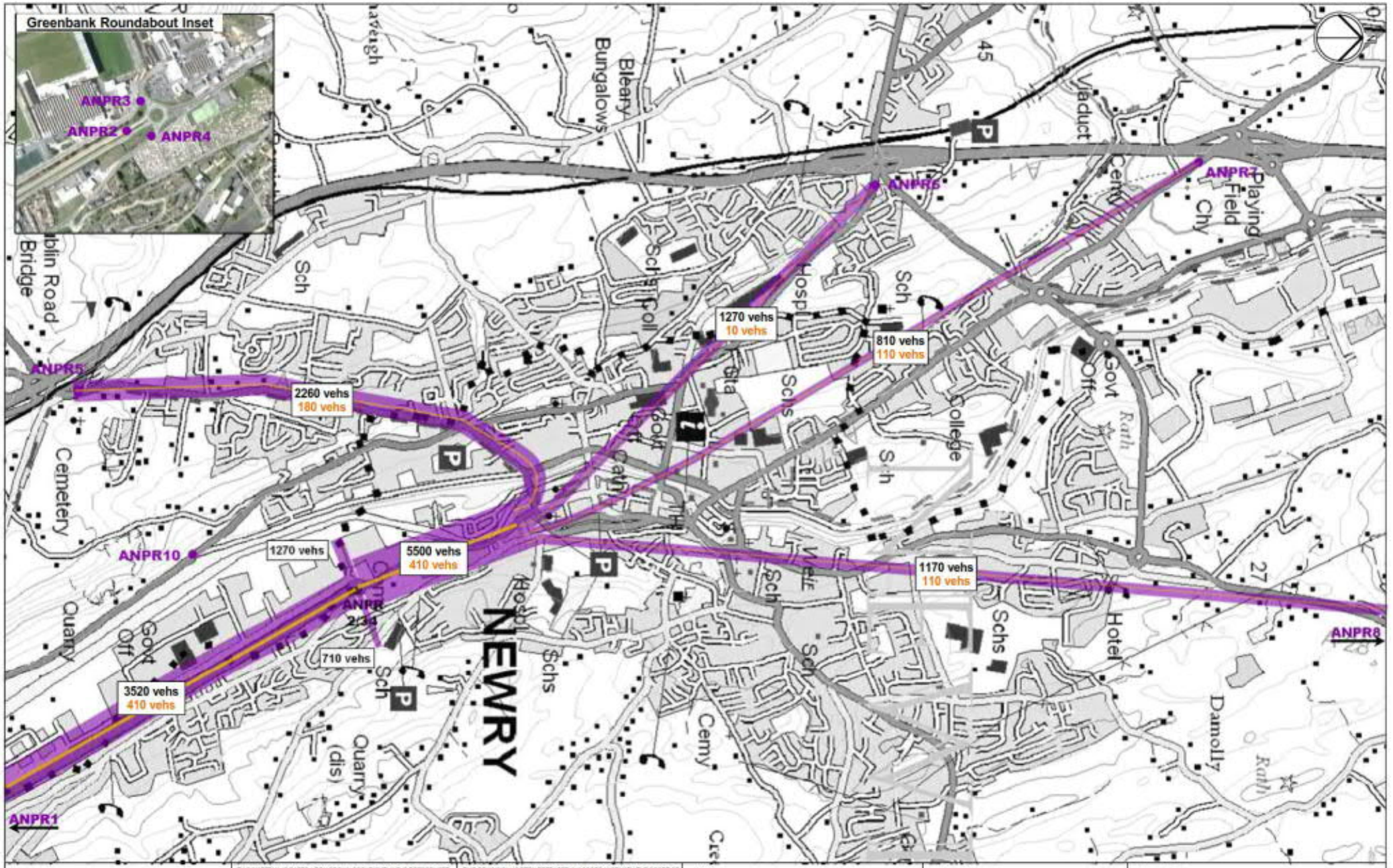
KEY
- 2,3,4 - 5, 5 – 2,3,4
- 2,3,4 - 6, 6 – 2,3,4
- 2,3,4 - 7, 7 – 2,3,4
- 2,3,4 - 8, 8 – 2,3,4
- 2,3,4 - 10, 10 – 2,3,4
- ANPR Site Location
- Route Options

Project Title: NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927
Scale @ A3: NTS

Drawing Title: ANPR Key Movements

Figure 6.2.21



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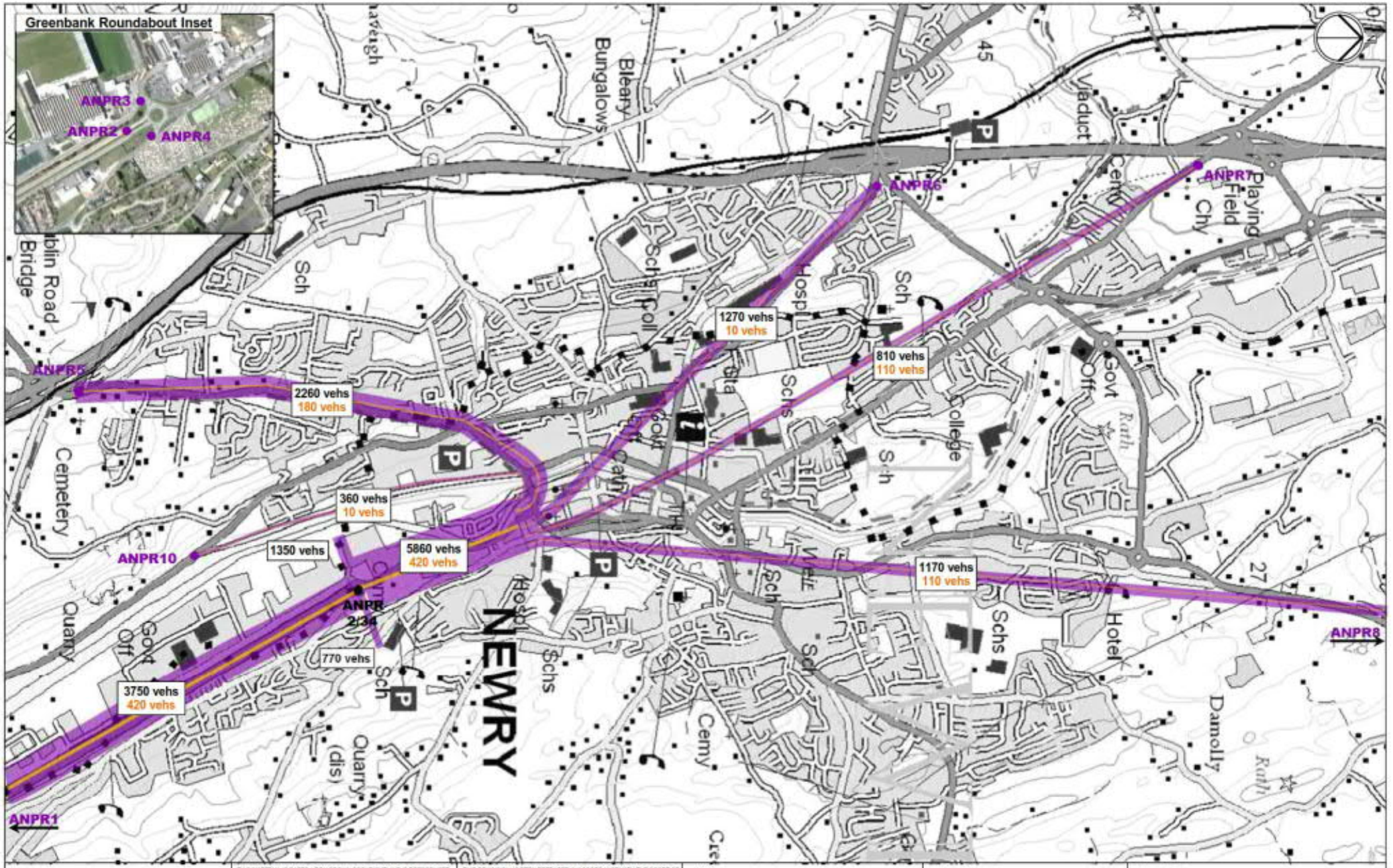
KEY
ANPR Trips To/From Warrenpoint Harbour
ANPR Trips To/From Greenbank Roundabout (Excluding Internal Movements)

Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927
Scale @ A3: NTS

Drawing Title
ANPR 12-HOUR TWO-WAY STRATEGIC TRIPS (DURATION LESS THAN 30 MINUTES)

Figure 6.2.22



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KEY
- ANPR Trips To/From Warrenpoint Harbour
- ANPR Trips To/From Greenbank Roundabout (Excluding Internal Movements)

Project Title
NEWRY SOUTHERN RELIEF ROAD

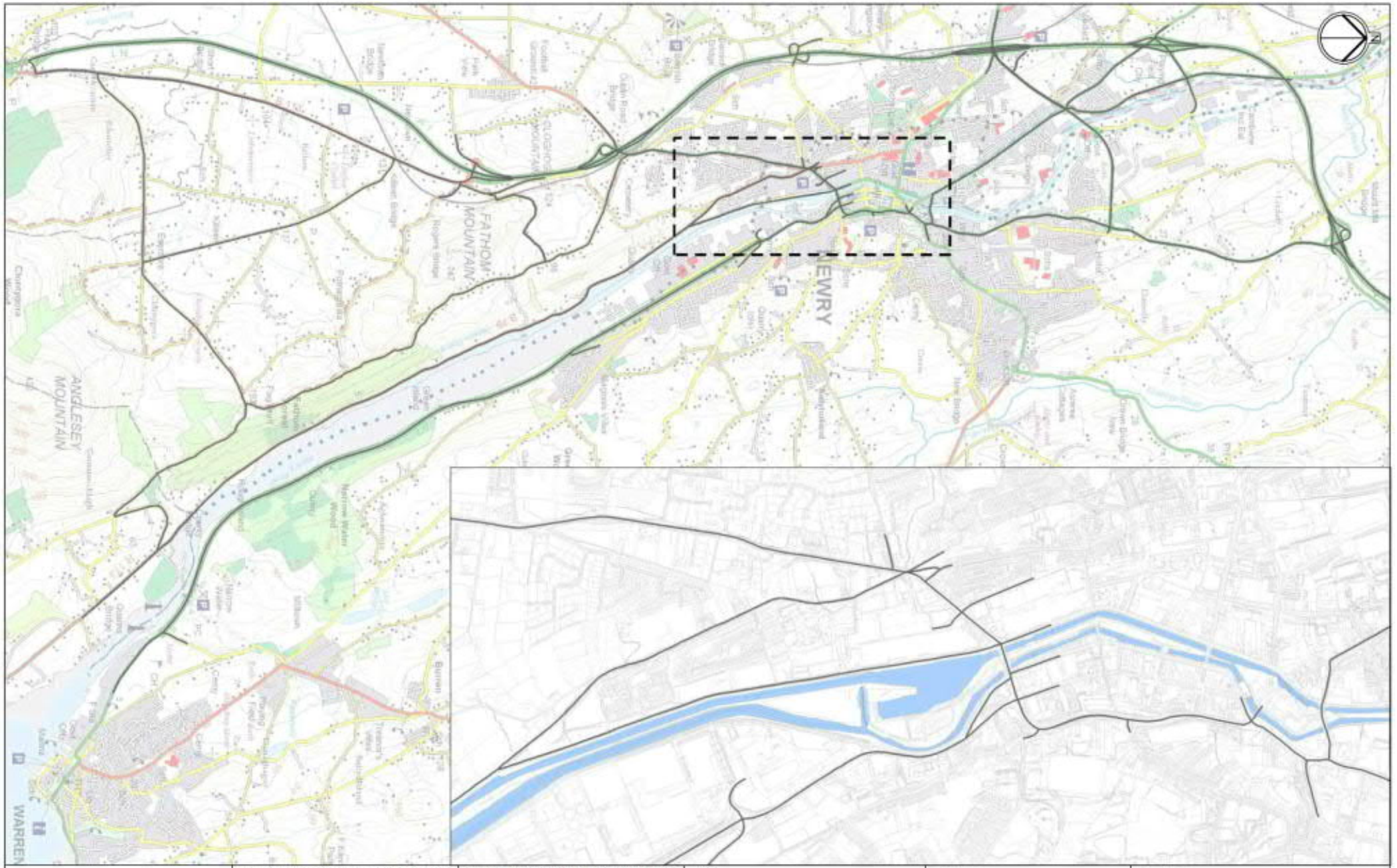
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
ANPR 12-HOUR TWO-WAY OVERALL TRIPS (DURATION LESS THAN 30 MINUTES)

Figure 6.2.23



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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

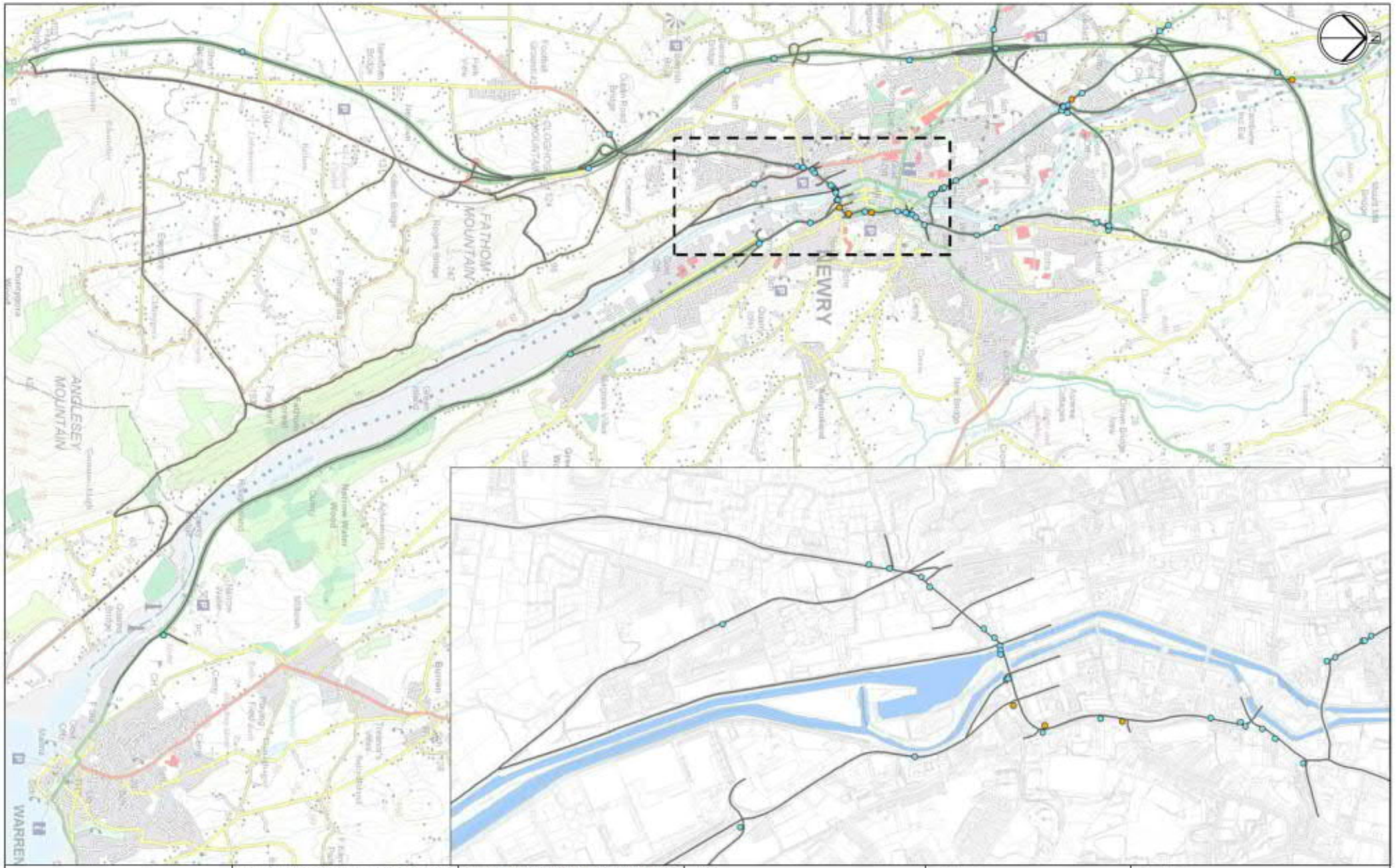
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
NEWRY ACCIDENT STUDY AREA

Figure 6.2.24



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Client
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KEY

Accident Severity

- Fatal
- Serious
- Slight

Project Title
NEWRY SOUTHERN RELIEF ROAD

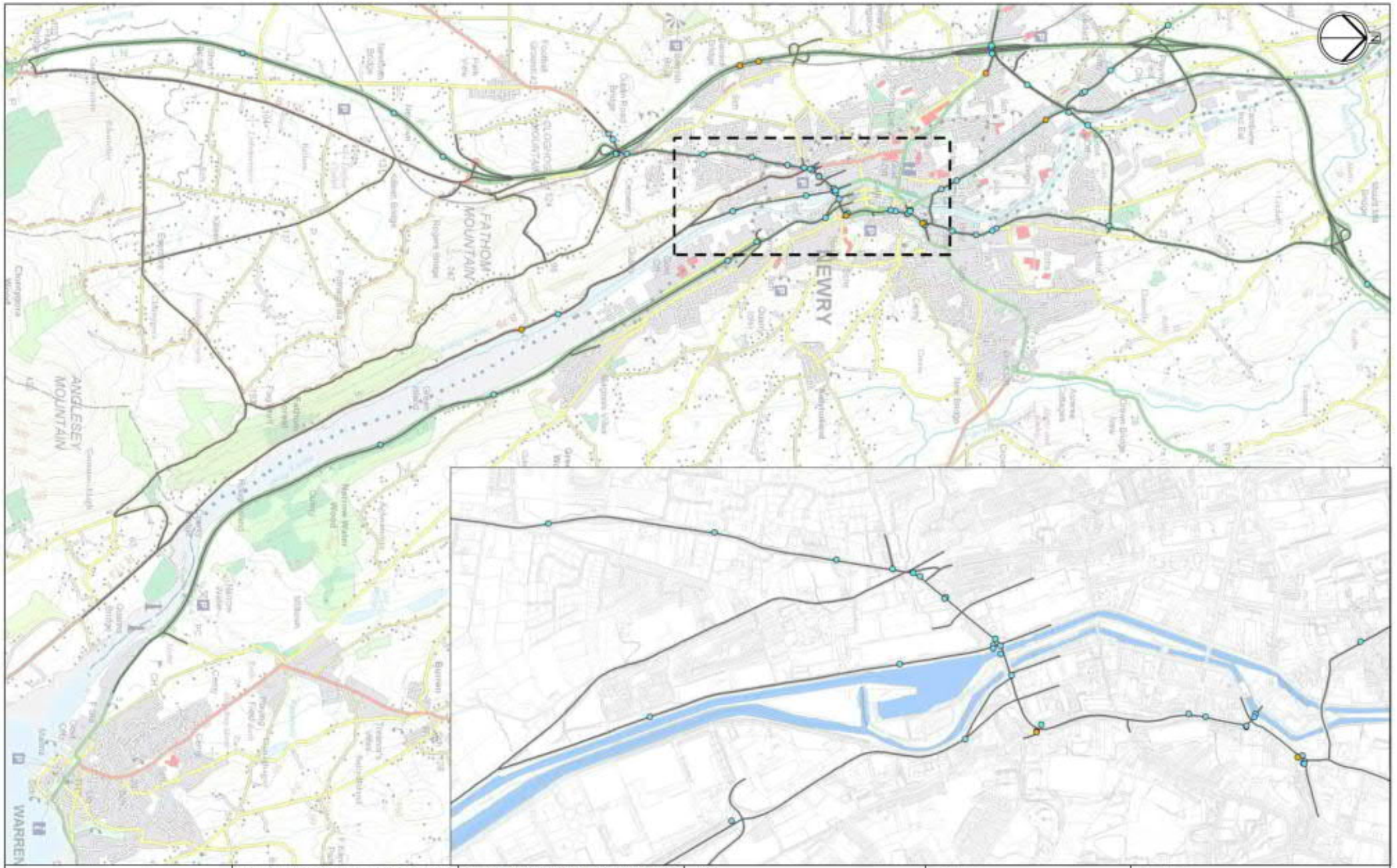
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/12 – 31/03/13 ACCIDENT DATA

Figure 6.2.25



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KEY

Accident Severity
- Fatal
- Serious
- Slight

Project Title
NEWRY SOUTHERN RELIEF ROAD

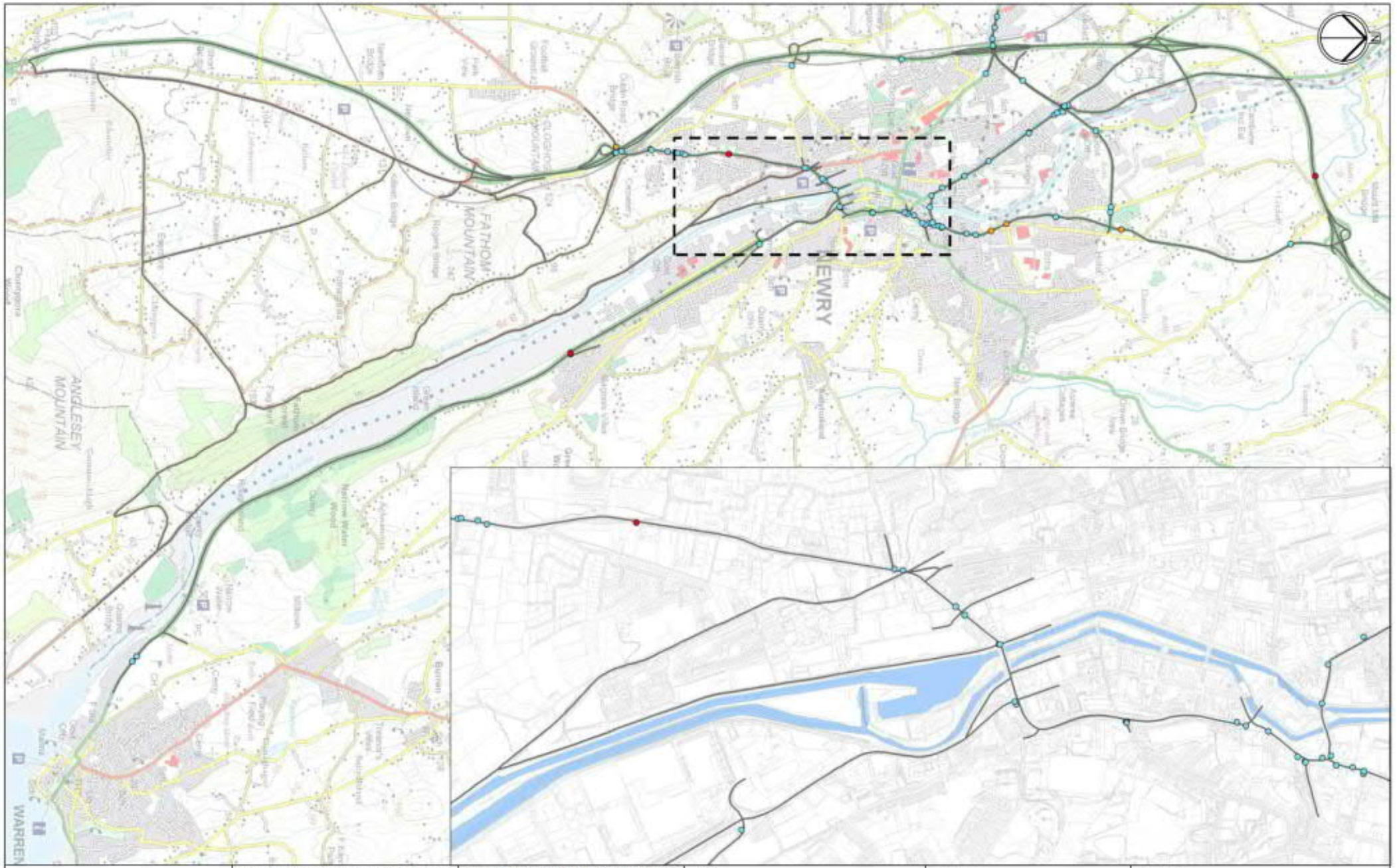
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/13 – 31/03/14 ACCIDENT DATA

Figure 6.2.26



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Client

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KEY

Accident Severity

- Fatal
- Serious
- Slight

Project Title
NEWRY SOUTHERN RELIEF ROAD

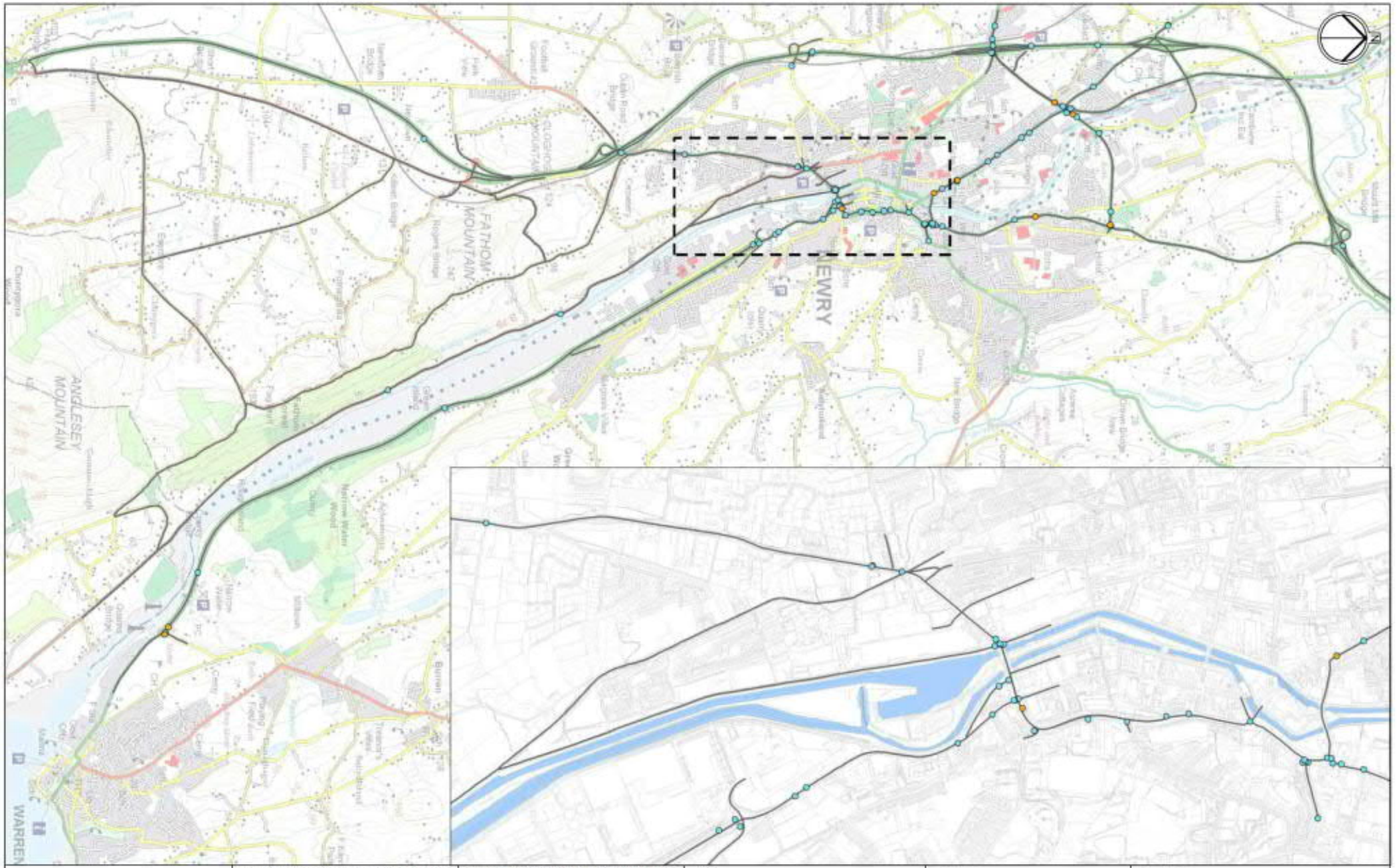
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/14 – 31/03/15 ACCIDENT DATA

Figure 6.2.27



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Client
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Co-financed by the European Union
Trans-European Transport Network (TEN-T)

KEY

Accident Severity
- Fatal
- Serious
- Slight

Project Title
NEWRY SOUTHERN RELIEF ROAD

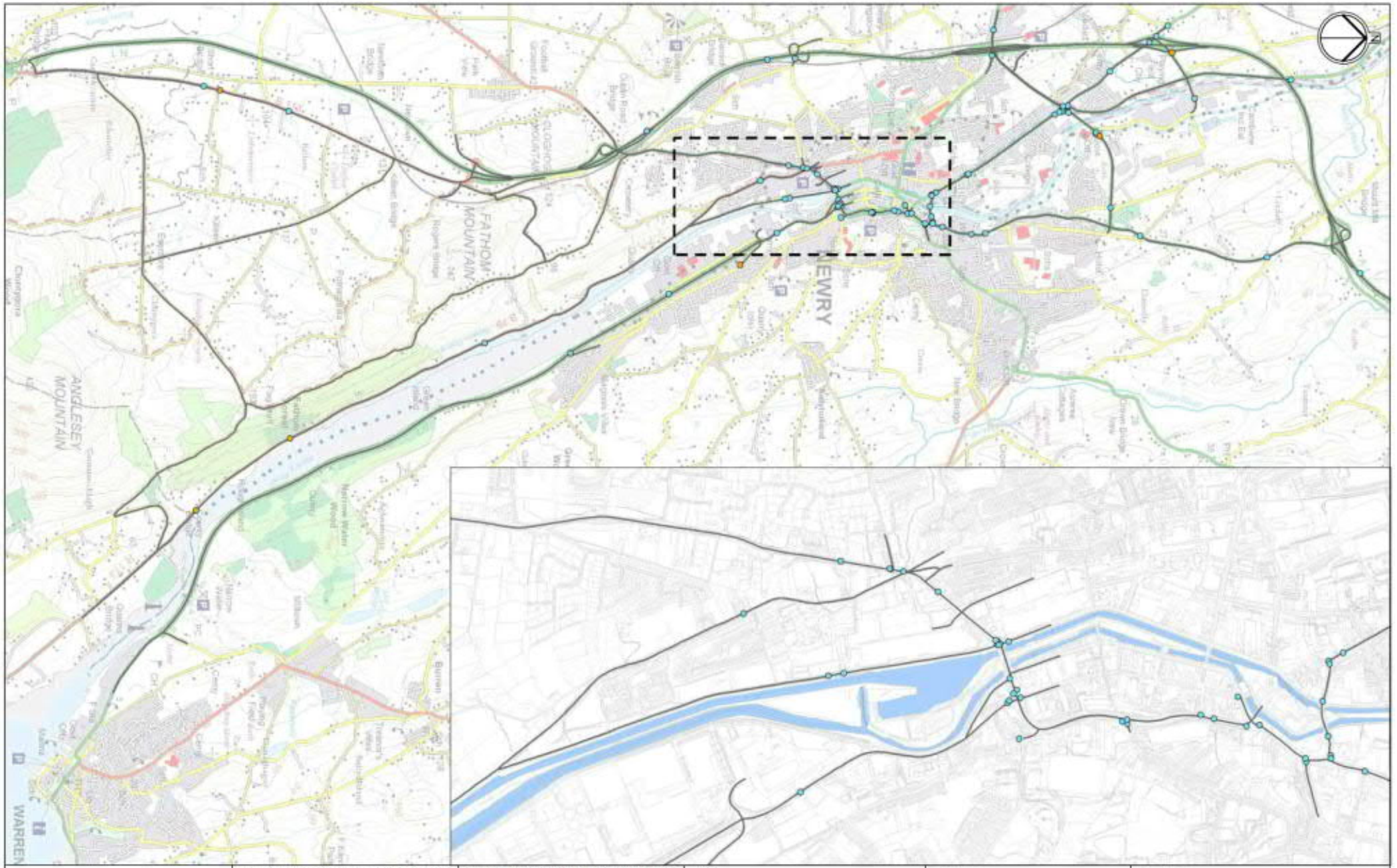
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/15 – 31/03/16 ACCIDENT DATA

Figure 6.2.28



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KEY

Accident Severity

- Fatal
- Serious
- Slight

Project Title
NEWRY SOUTHERN RELIEF ROAD

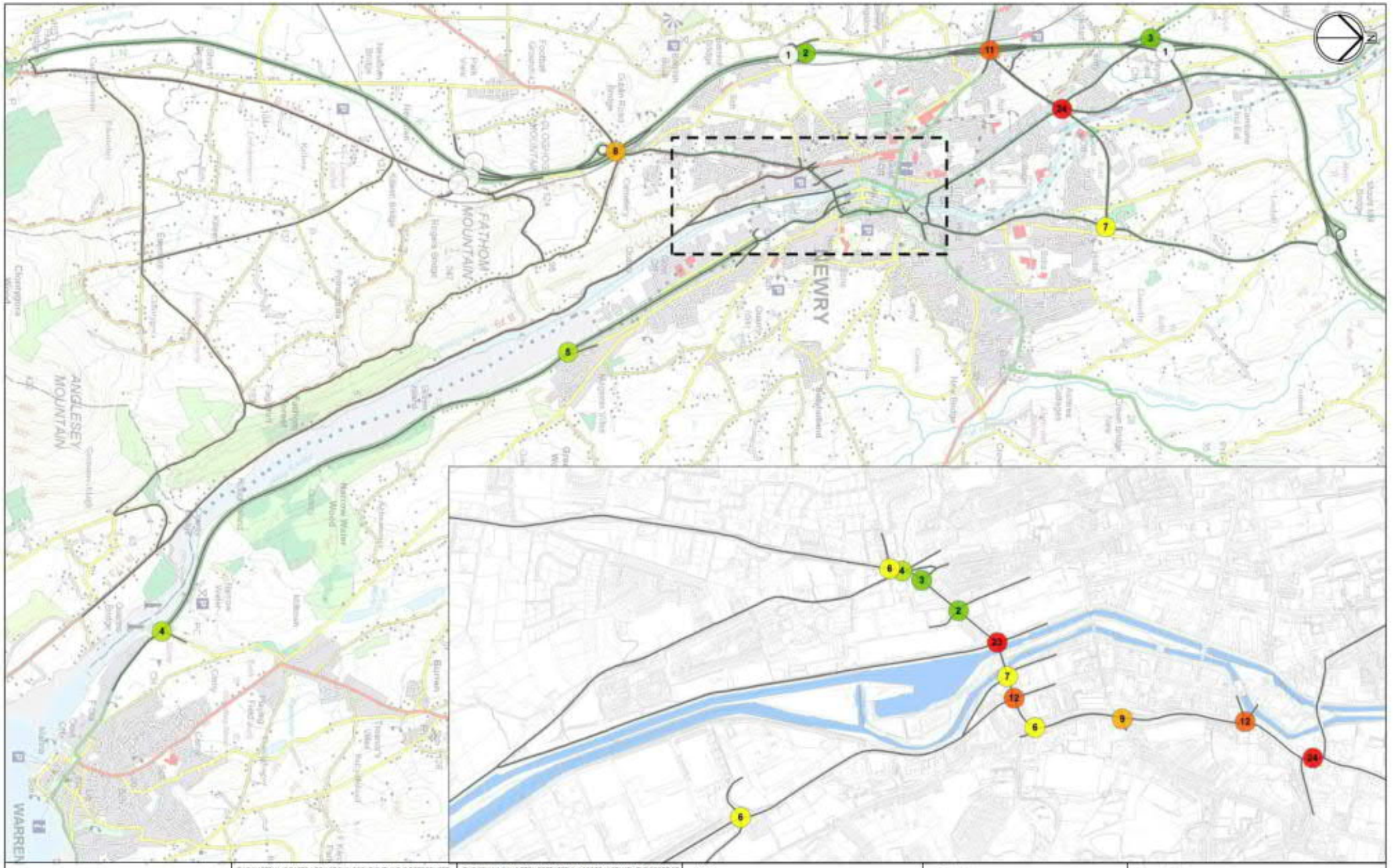
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/16 – 31/03/17 ACCIDENT DATA

Figure 6.2.29



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KEY

Number of Accidents

0 - 1	8 - 10
2 - 3	11 - 20
4 - 5	21 - 30
6 - 7	

COBA Junction

Project Title
NEWRY SOUTHERN RELIEF ROAD

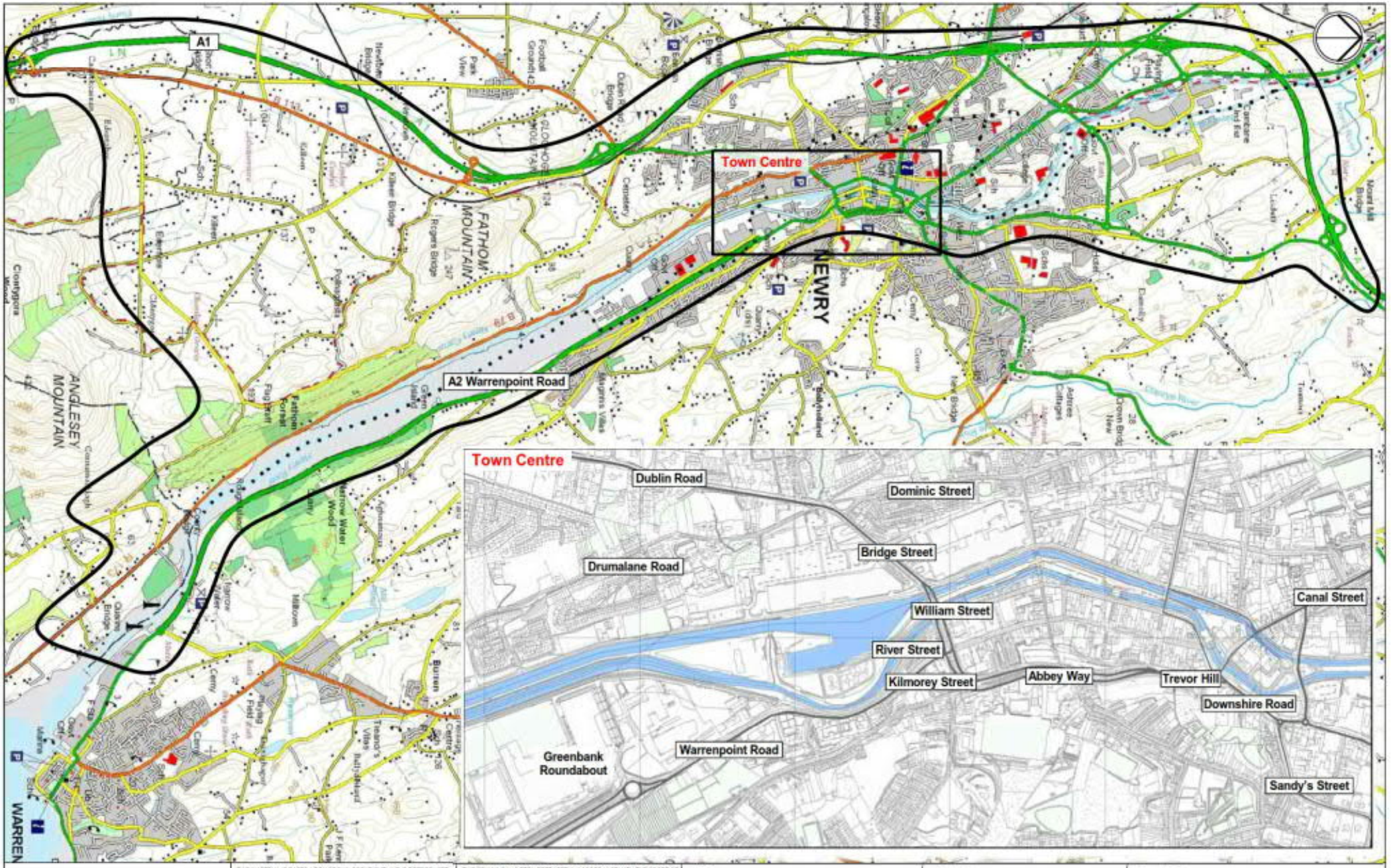
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
01/04/12 – 31/03/17 ACCIDENT DATA

Figure 6.2.30



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KEY

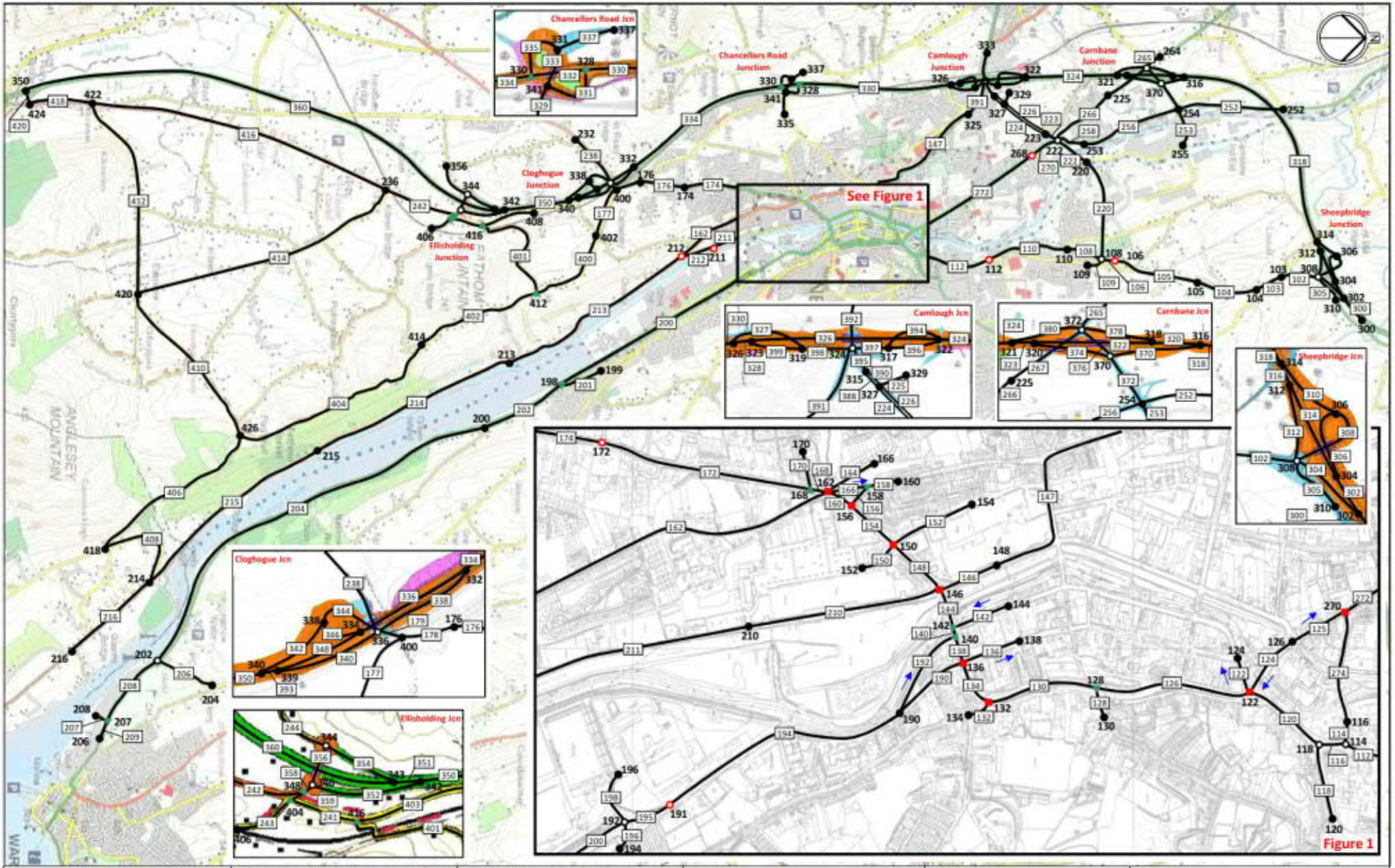
Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
COBA DO-MINIMUM NETWORK
STUDY AREA

Figure 6.4.1



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KEY
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- 100 Link Number
- Do-Minimum Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

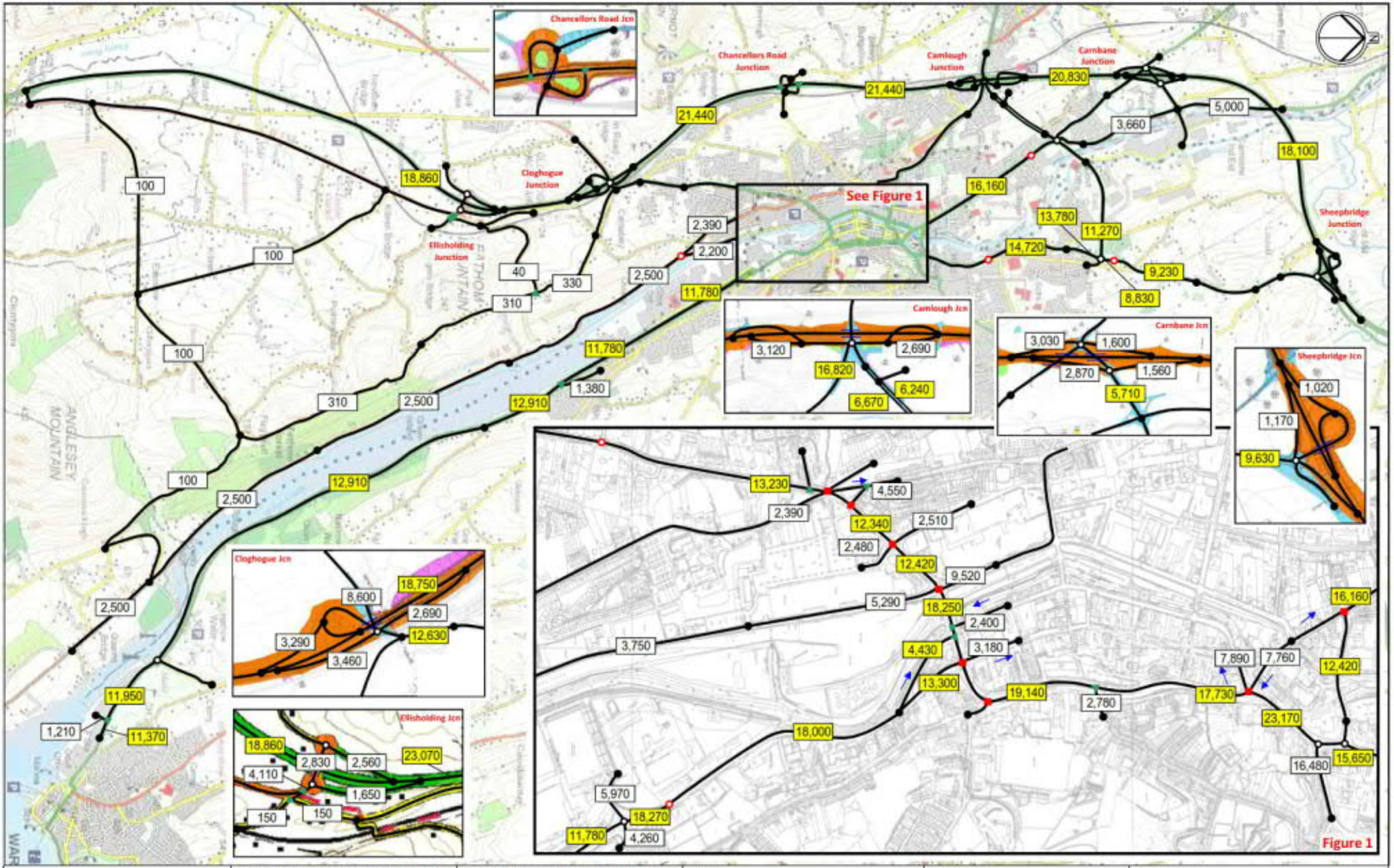
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-MINIMUM NETWORK
COBA LINK AND NODE DIAGRAM

Figure 6.4.2



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KEY

Day of Survey: Tuesday 6 & 13 June 2017

10,000 Main Road Traffic Flow

10,000 Side Road Traffic Flow

Project Title
NEWRY SOUTHERN RELIEF ROAD

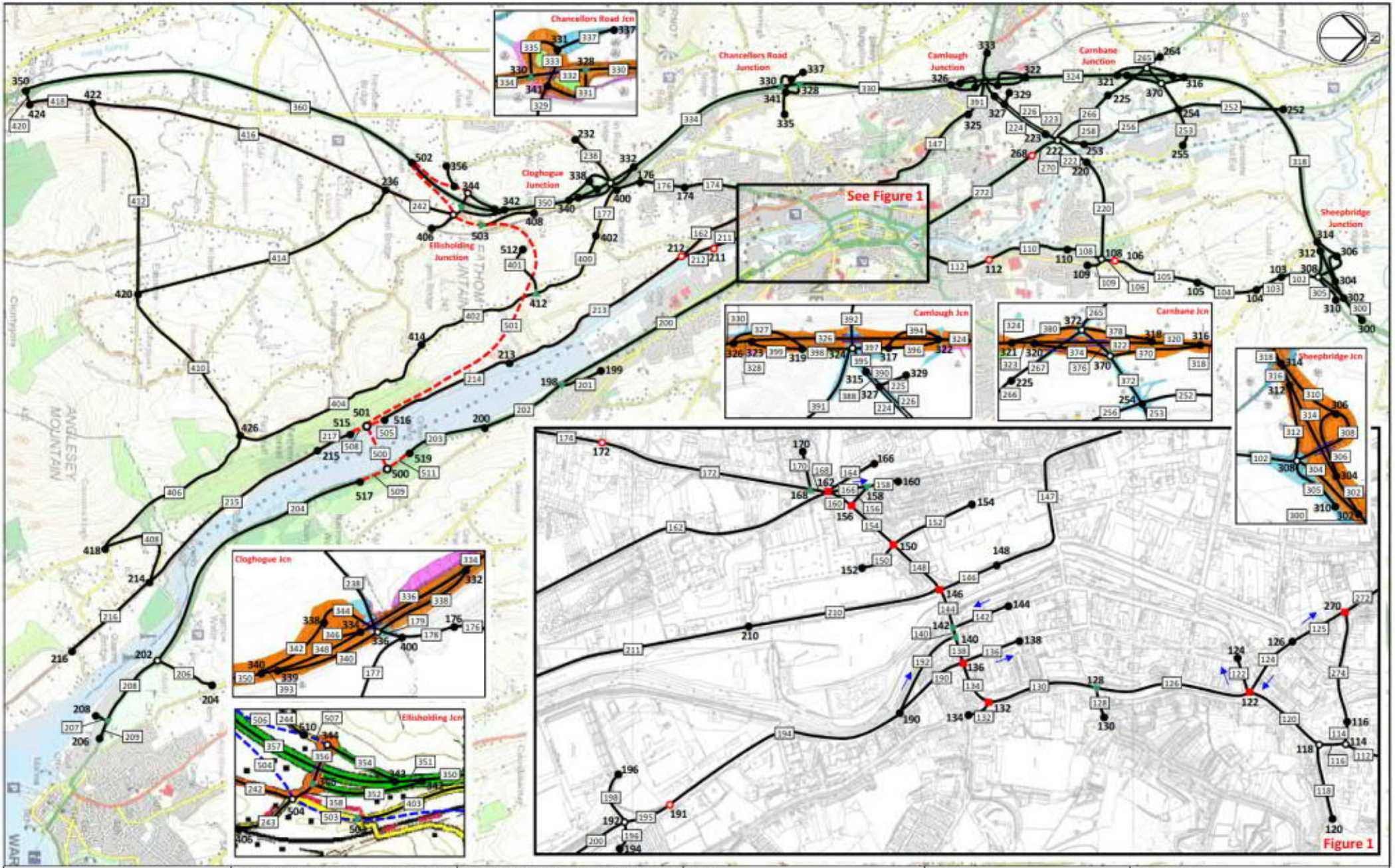
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-MINIMUM NETWORK
2017 BASE YEAR MODELLED 12-HOUR FLOWS

Figure 6.4.3



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KEY
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- 100 Link Number
- Do-Minimum Link
- Do-Something Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

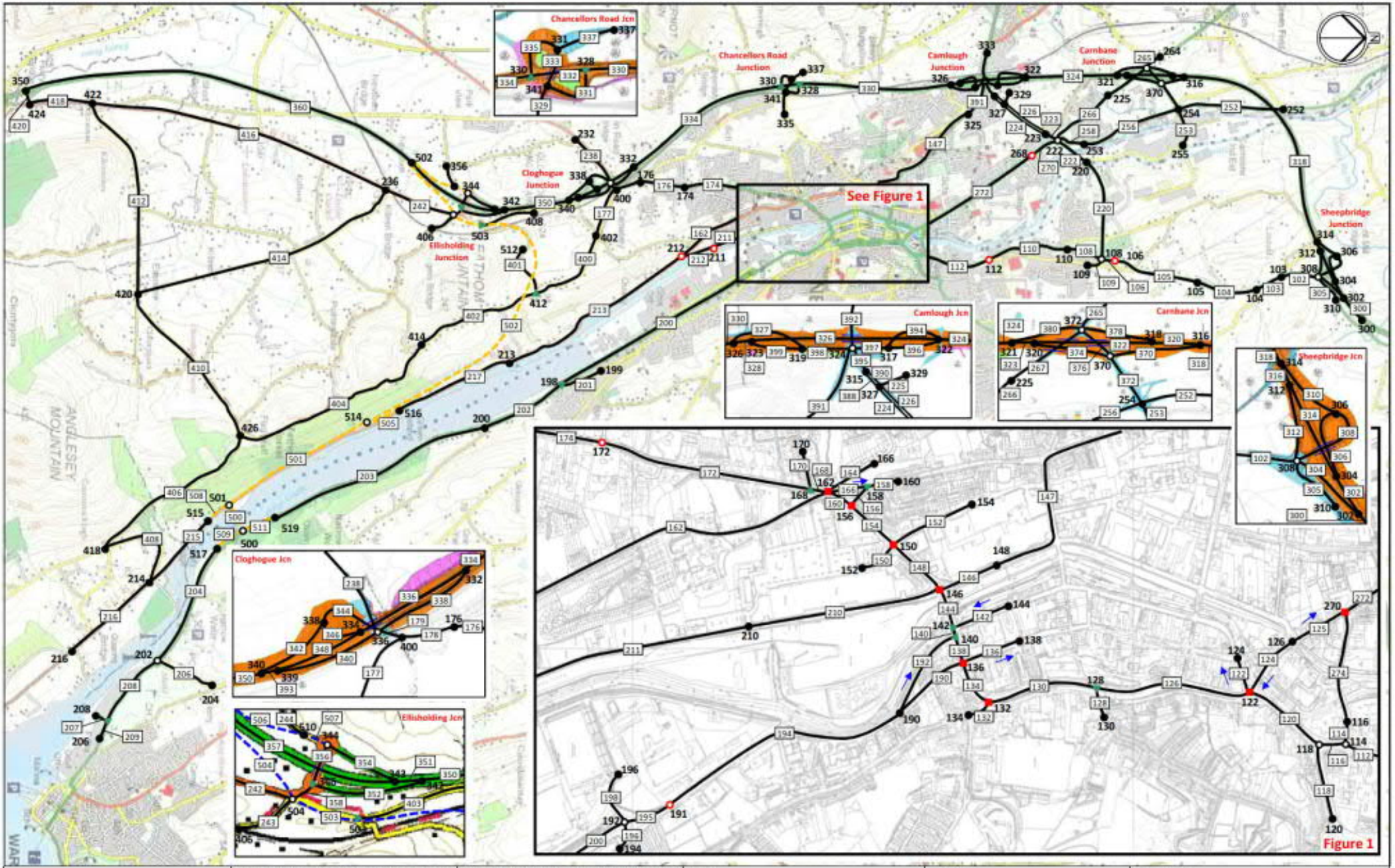
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA LINK AND NODE DIAGRAM
RED ROUTE

Figure 6.4.4



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KEY
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- 100 Link Number
- Do-Minimum Link
- Do-Something Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

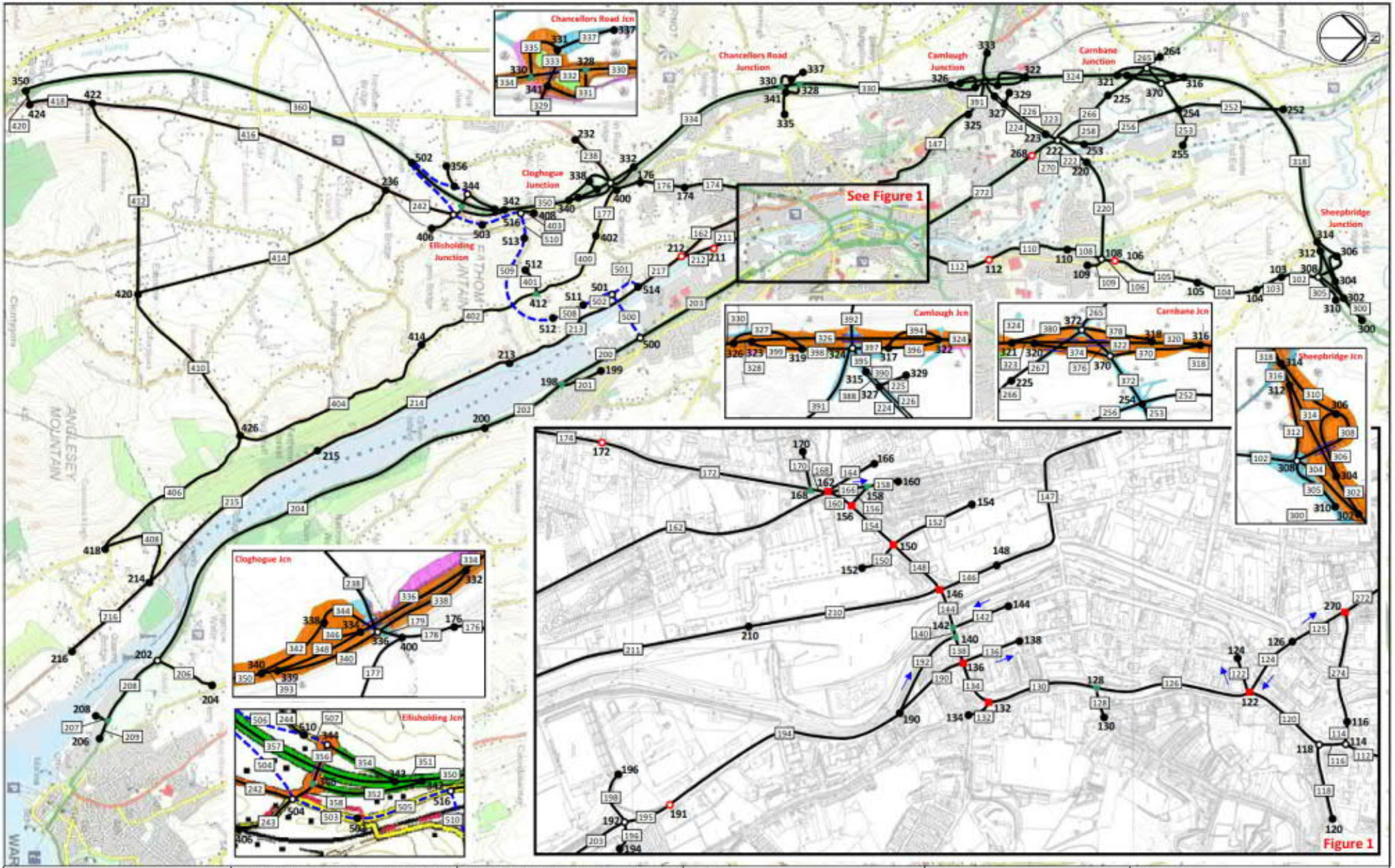
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA LINK AND NODE DIAGRAM
YELLOW ROUTE

Figure 6.4.5



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KEY

- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- [100] Link Number
- Do-Minimum Link
- Do-Something Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

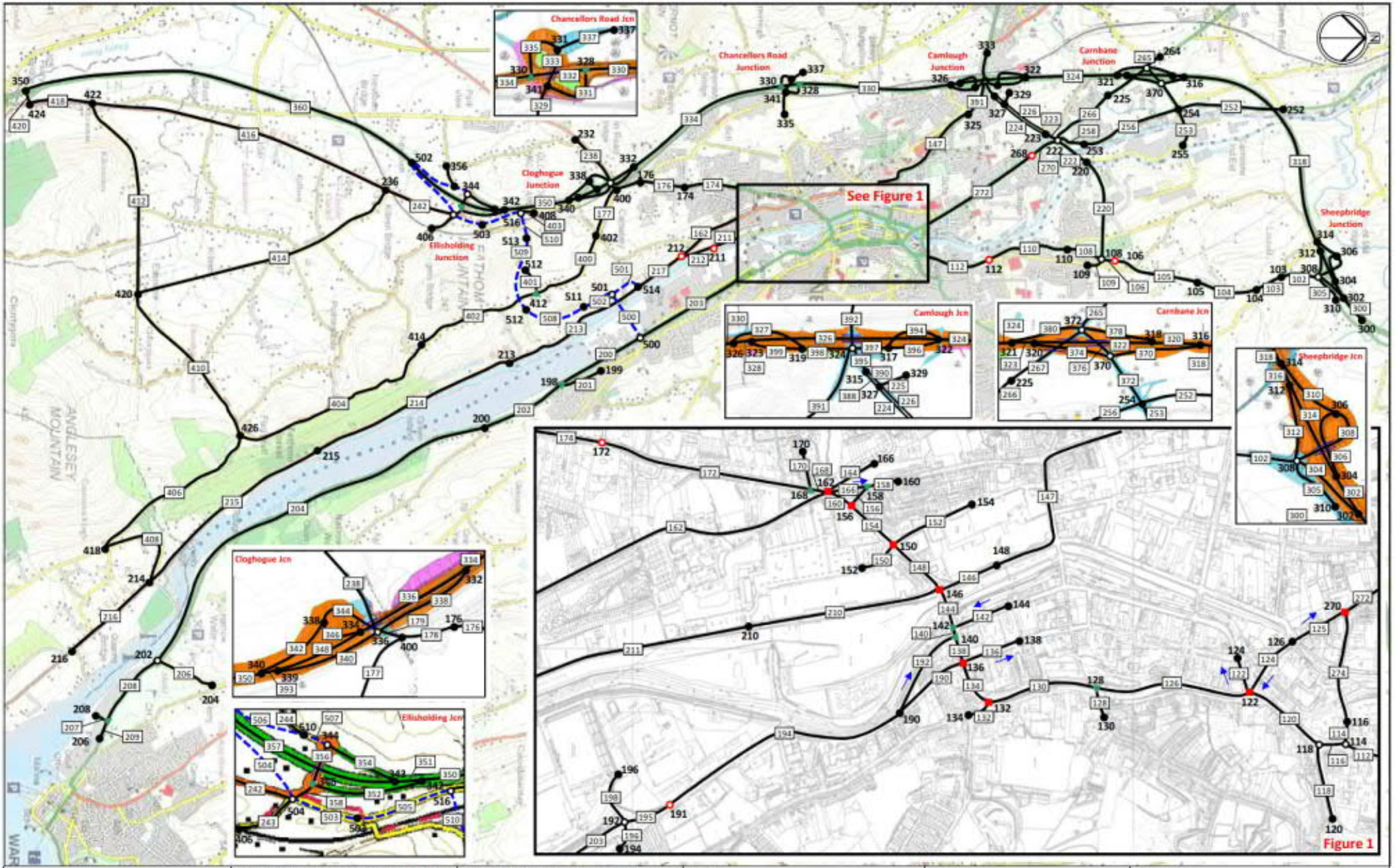
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA LINK AND NODE DIAGRAM
BLUE ROUTE OPTION 1

Figure 6.4.6



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KEY

- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- 100 Link Number
- Do-Minimum Link
- Do-Something Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

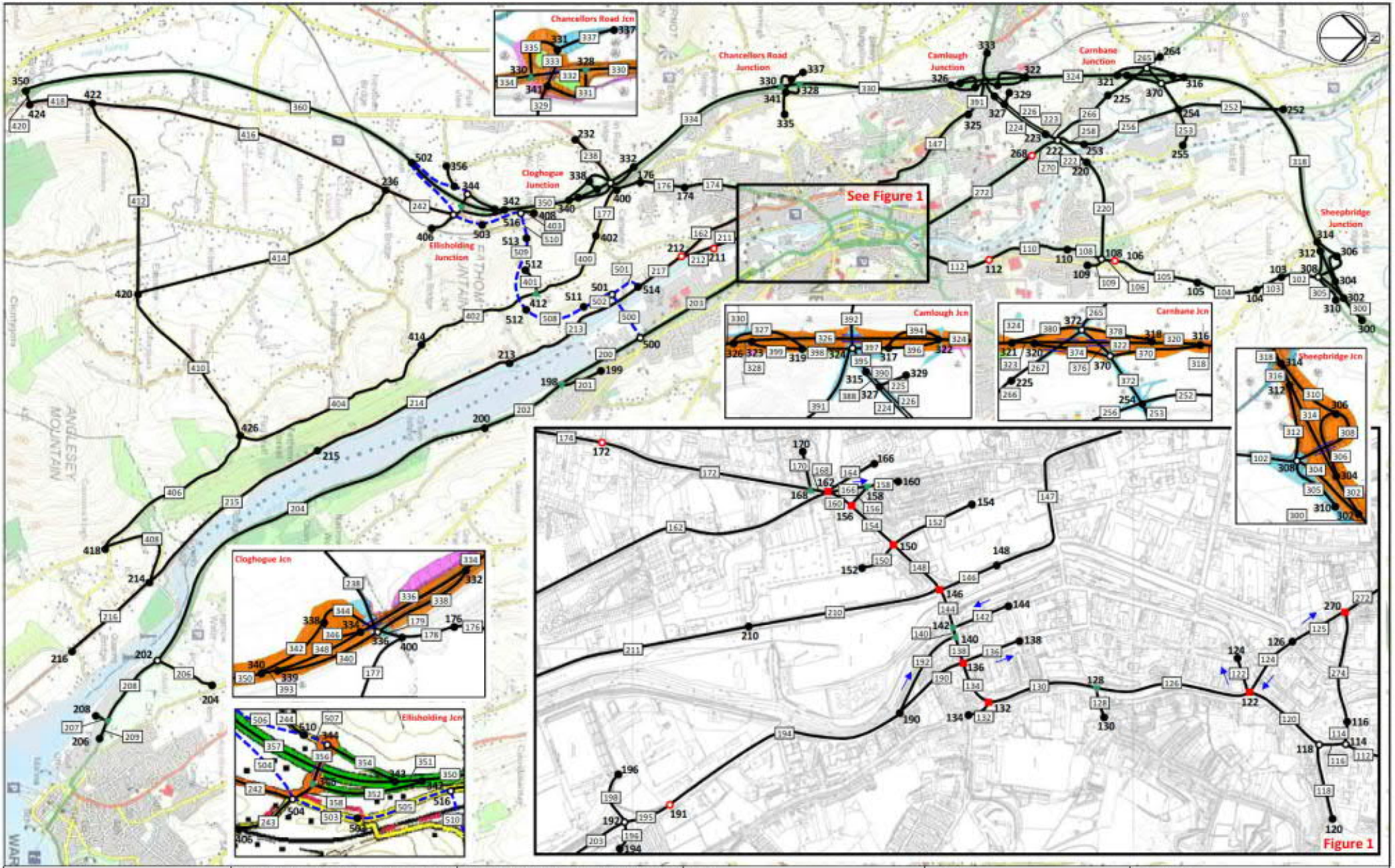
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA LINK AND NODE DIAGRAM
BLUE ROUTE OPTION 2

Figure 6.4.7



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KEY
- Node Point
- Roundabout
- Traffic Signals
- Priority Junction
- Speed Limit Change Point
- 100 Node Number
- [100] Link Number
- Do-Minimum Link
- Do-Something Link

Project Title
NEWRY SOUTHERN RELIEF ROAD

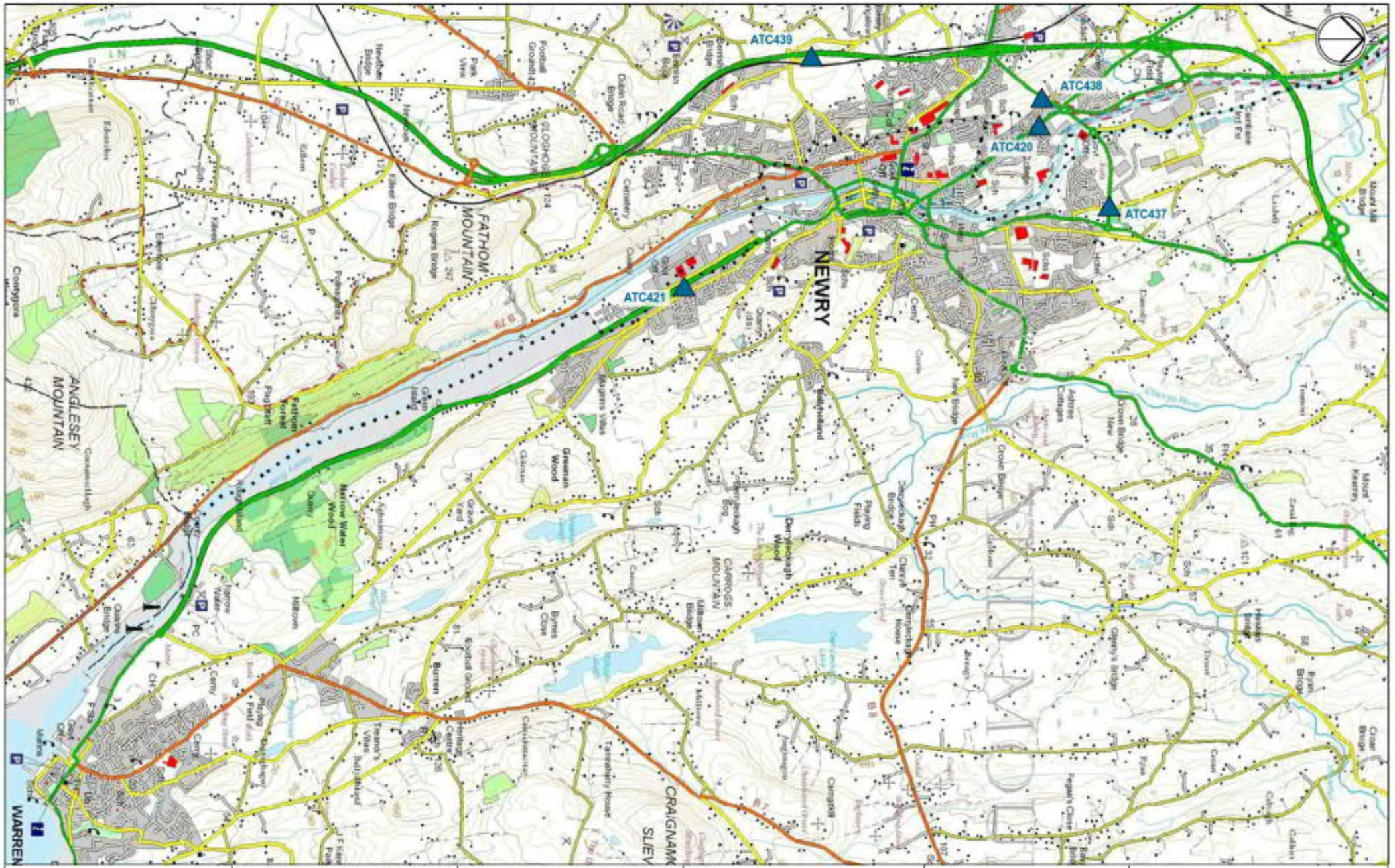
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA LINK AND NODE DIAGRAM
BLUE ROUTE OPTION 3

Figure 6.4.8



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KEY

▲ Permanent Automatic Traffic Count Location

Project Title
NEWRY SOUTHERN RELIEF ROAD

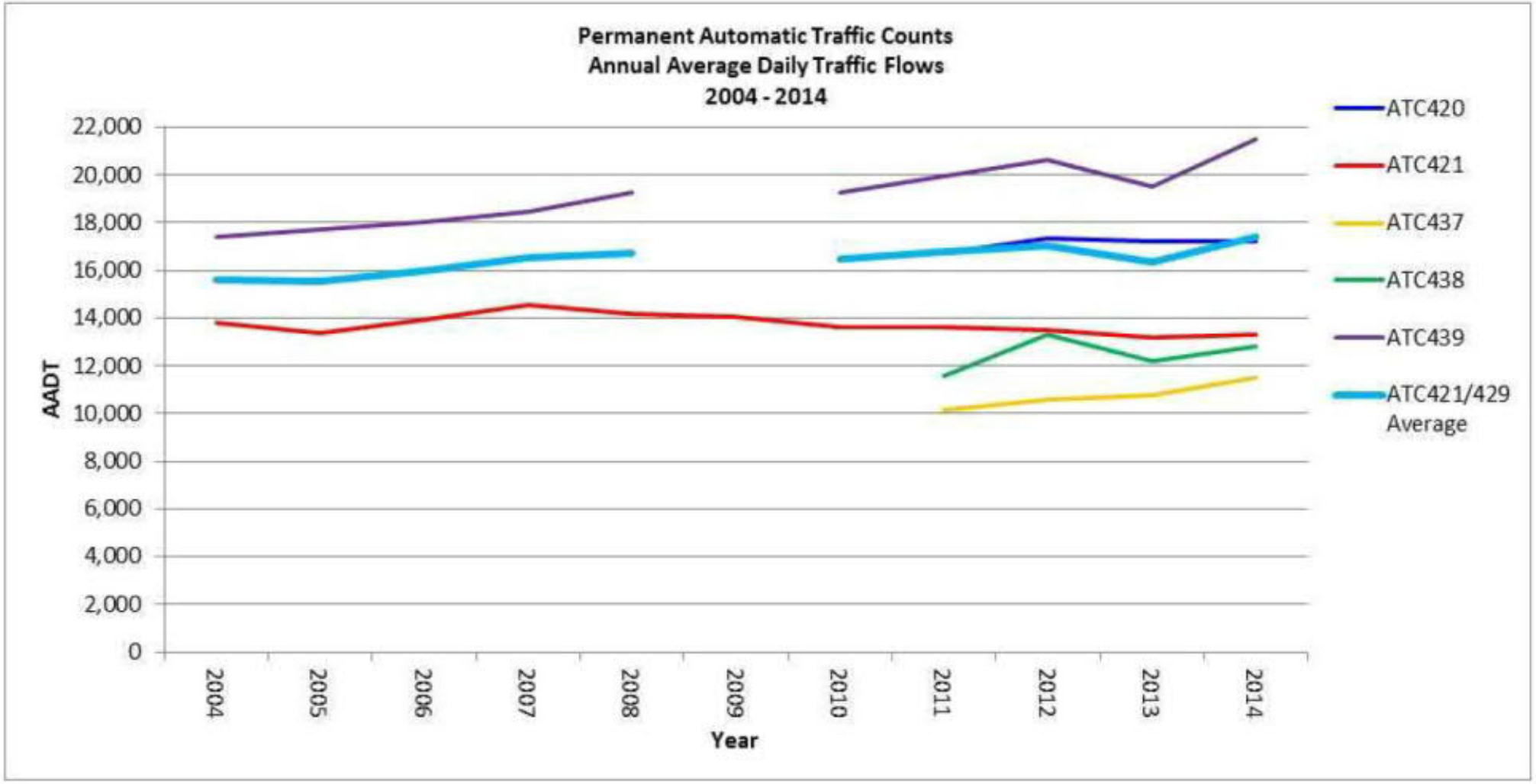
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
PERMANENT AUTOMATIC TRAFFIC COUNT LOCATIONS

Figure 6.4.9



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KEY

Project Title
NEWRY SOUTHERN RELIEF ROAD

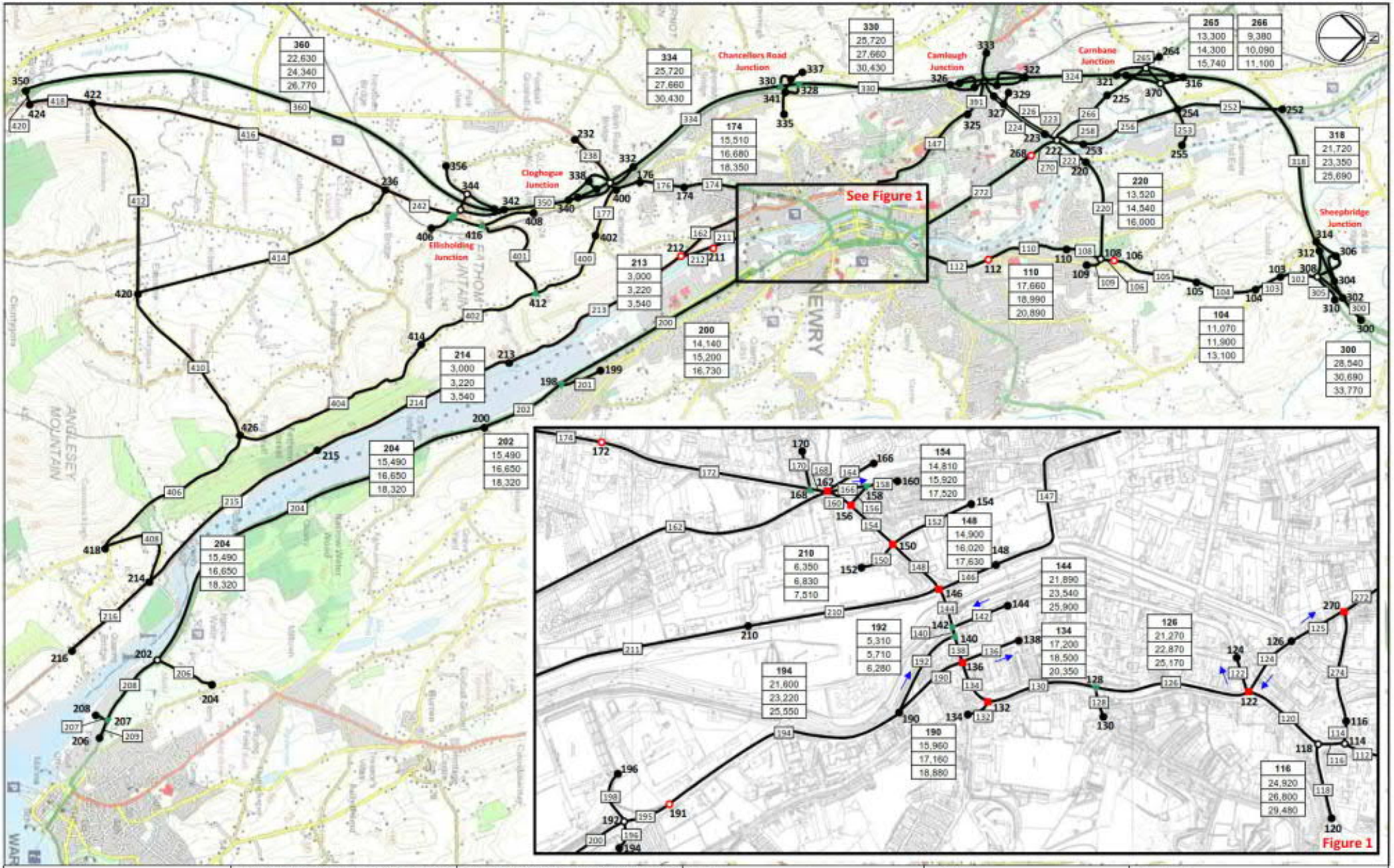
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
PERMANENT AUTOMATIC TRAFFIC COUNT
2004 – 2014 TRAFFIC FLOWS

Figure 6.4.10



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KEY

Link Ref.
2017 Base Year
2023 Opening Year
2037 Design Year

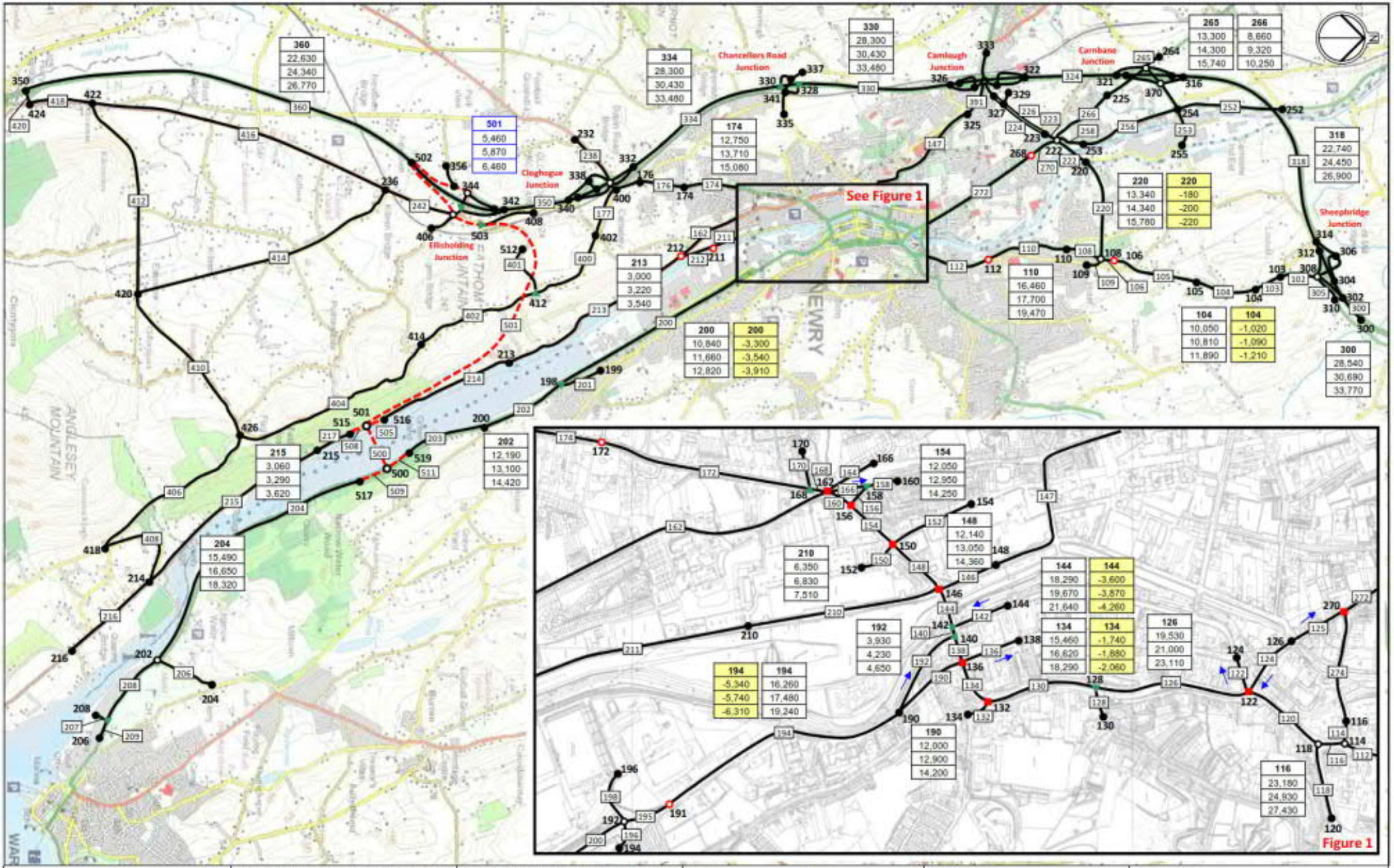
Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-MINIMUM NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS

Figure 6.5.1



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KEY

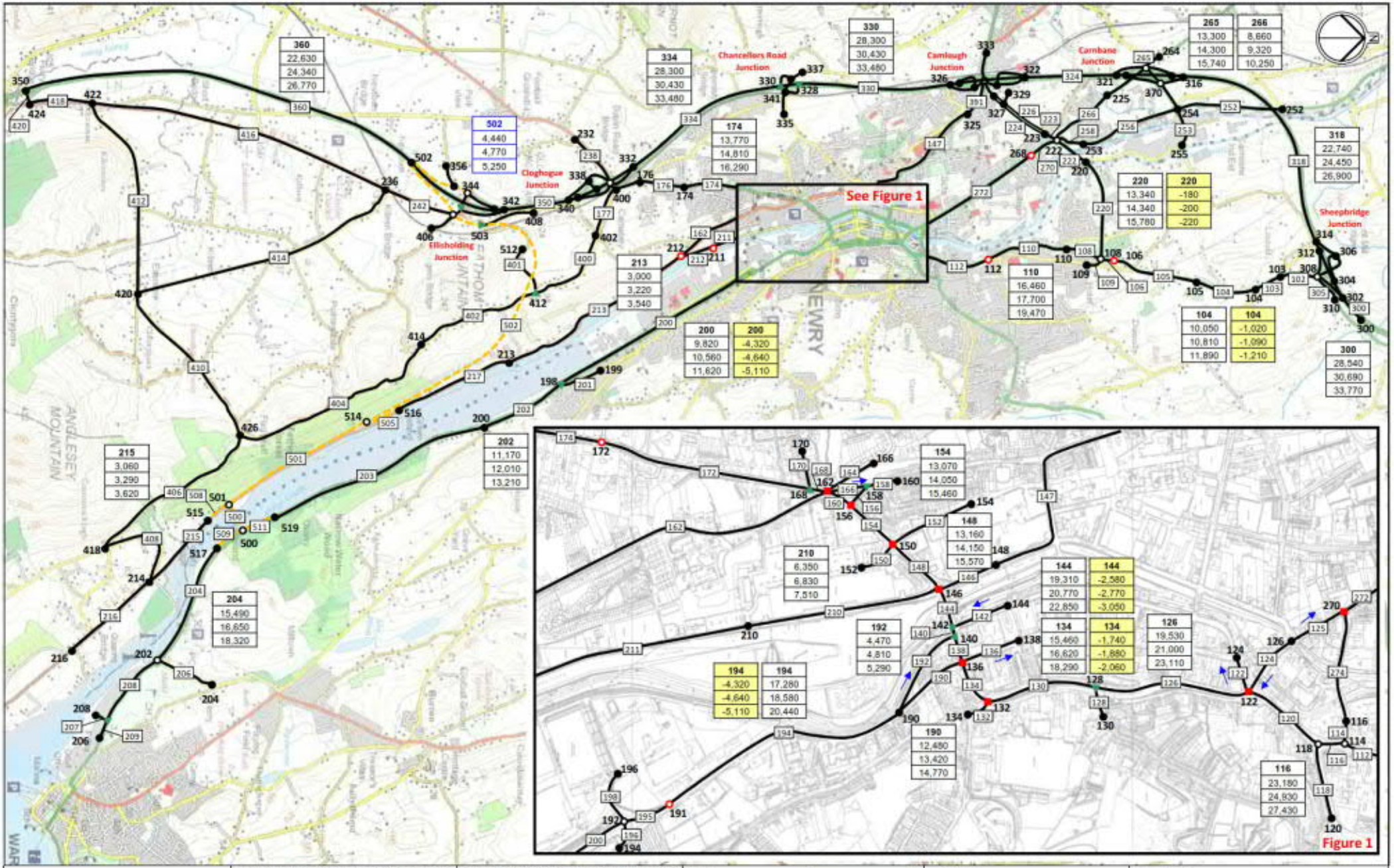
Link Ref.	Link Ref.
2017 Base Year (Equivalent)	2017 Flow Difference vs. Do-Minimum
2023 Opening Year	2023 Flow Difference vs. Do-Minimum
2037 Design Year	2037 Flow Difference vs. Do-Minimum

Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927
Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS
RED ROUTE

Figure 6.5.2



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KEY

Link Ref.	Link Ref.
2017 Base Year (Equivalent)	2017 Flow Difference vs. Do-Minimum
2023 Opening Year	2023 Flow Difference vs. Do-Minimum
2037 Design Year	2037 Flow Difference vs. Do-Minimum

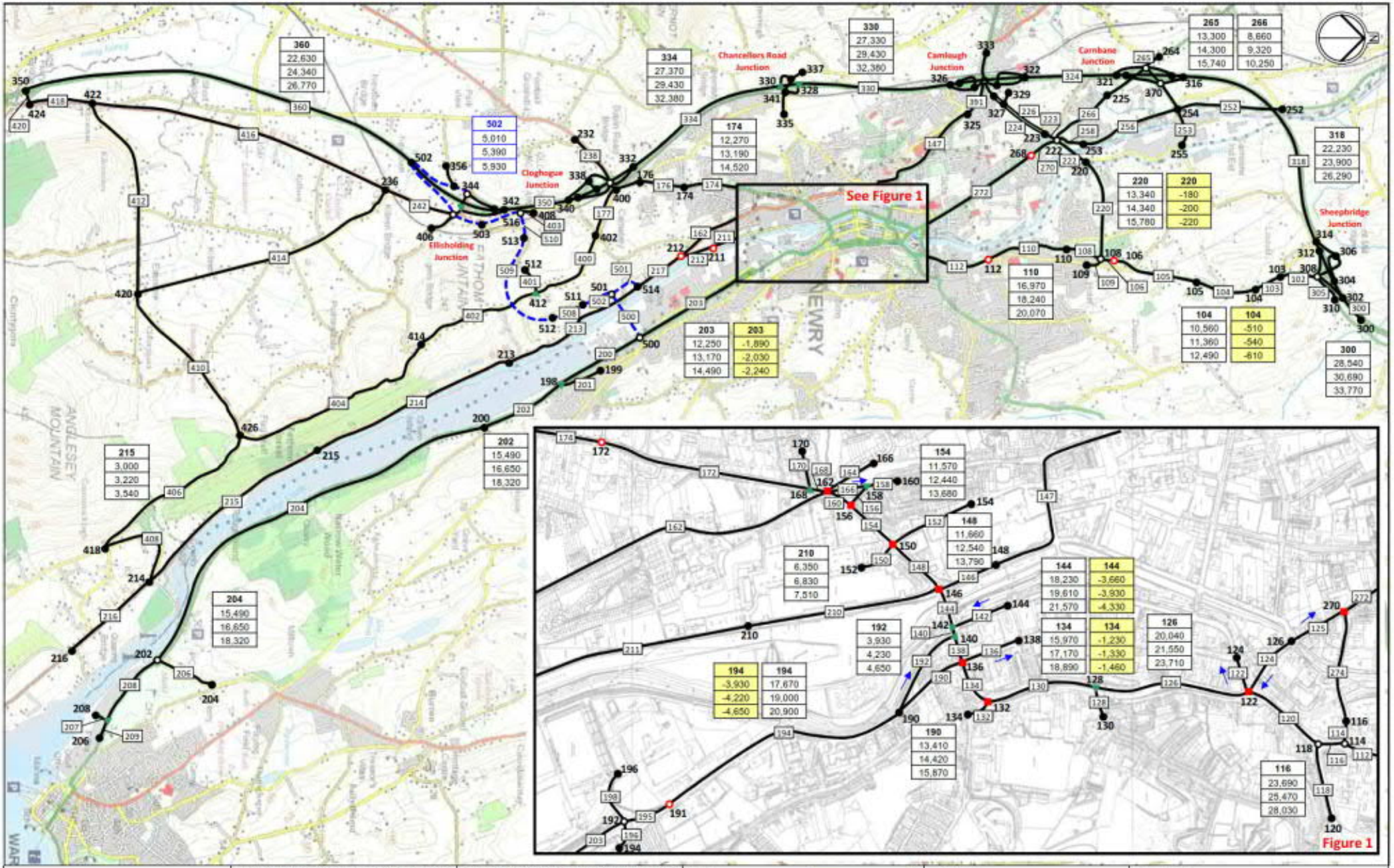
Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS
YELLOW ROUTE

Figure 6.5.3



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KEY

Link Ref.	Link Ref.
2017 Base Year (Equivalent)	2017 Flow Difference vs. Do-Minimum
2023 Opening Year	2023 Flow Difference vs. Do-Minimum
2037 Design Year	2037 Flow Difference vs. Do-Minimum

Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS
BLUE ROUTE OPTION 1

Figure 6.5.4

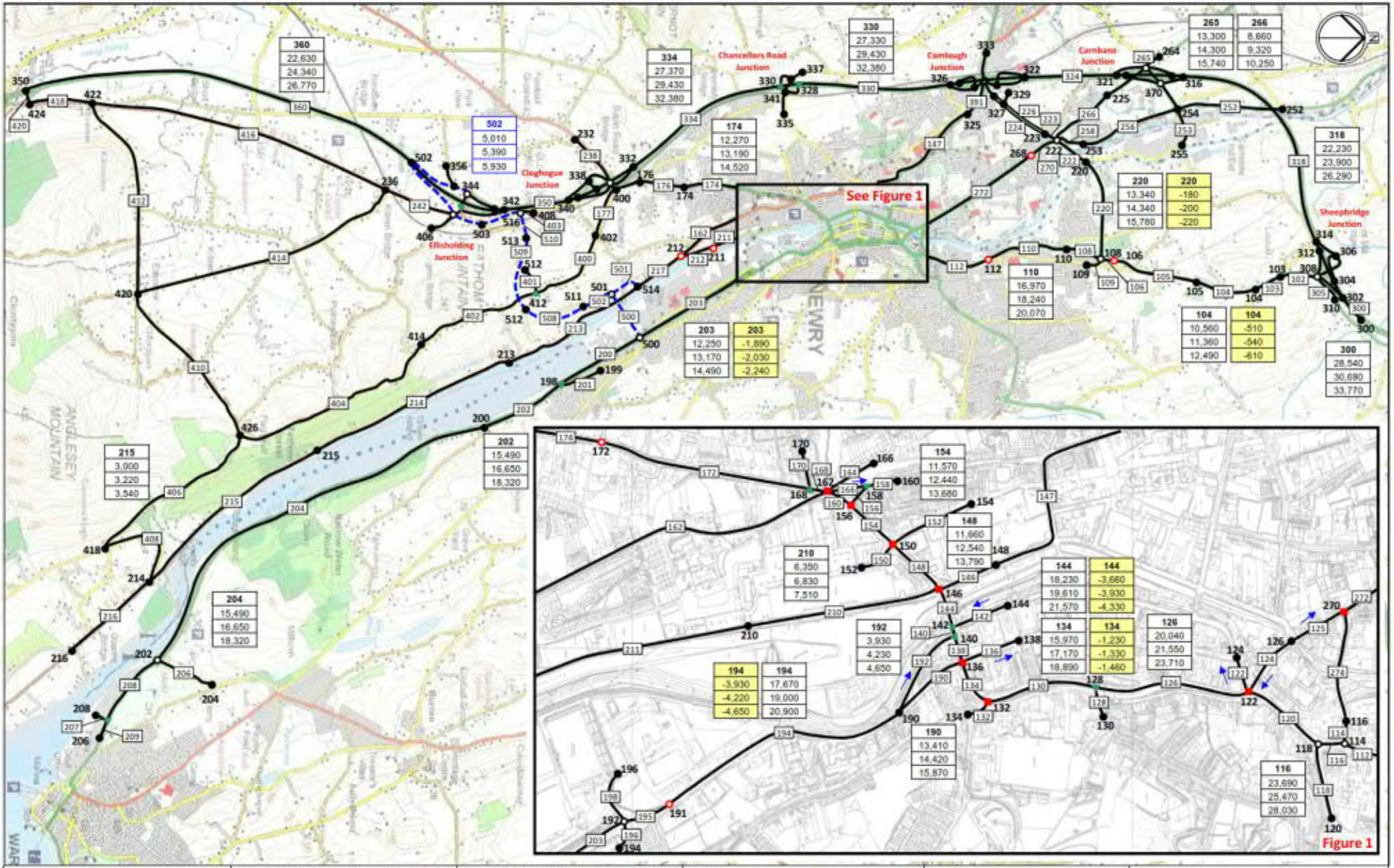

Figure 1

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KEY

Link Ref.	Link Ref.
2017 Base Year (Equivalent)	2017 Flow Difference vs. Do-Minimum
2023 Opening Year	2023 Flow Difference vs. Do-Minimum
2037 Design Year	2037 Flow Difference vs. Do-Minimum

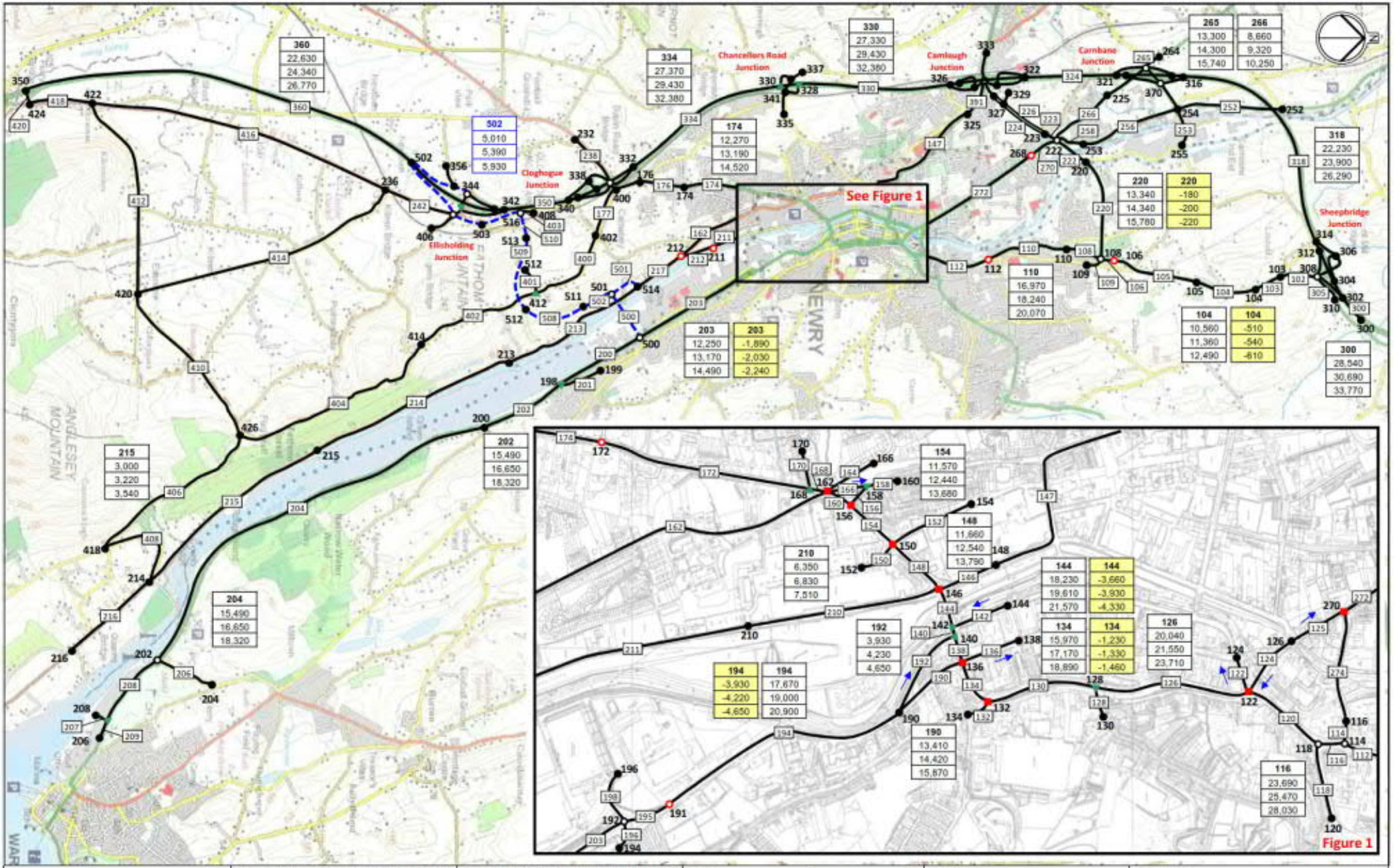
Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS
BLUE ROUTE OPTION 2

Figure 6.5.5



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KEY

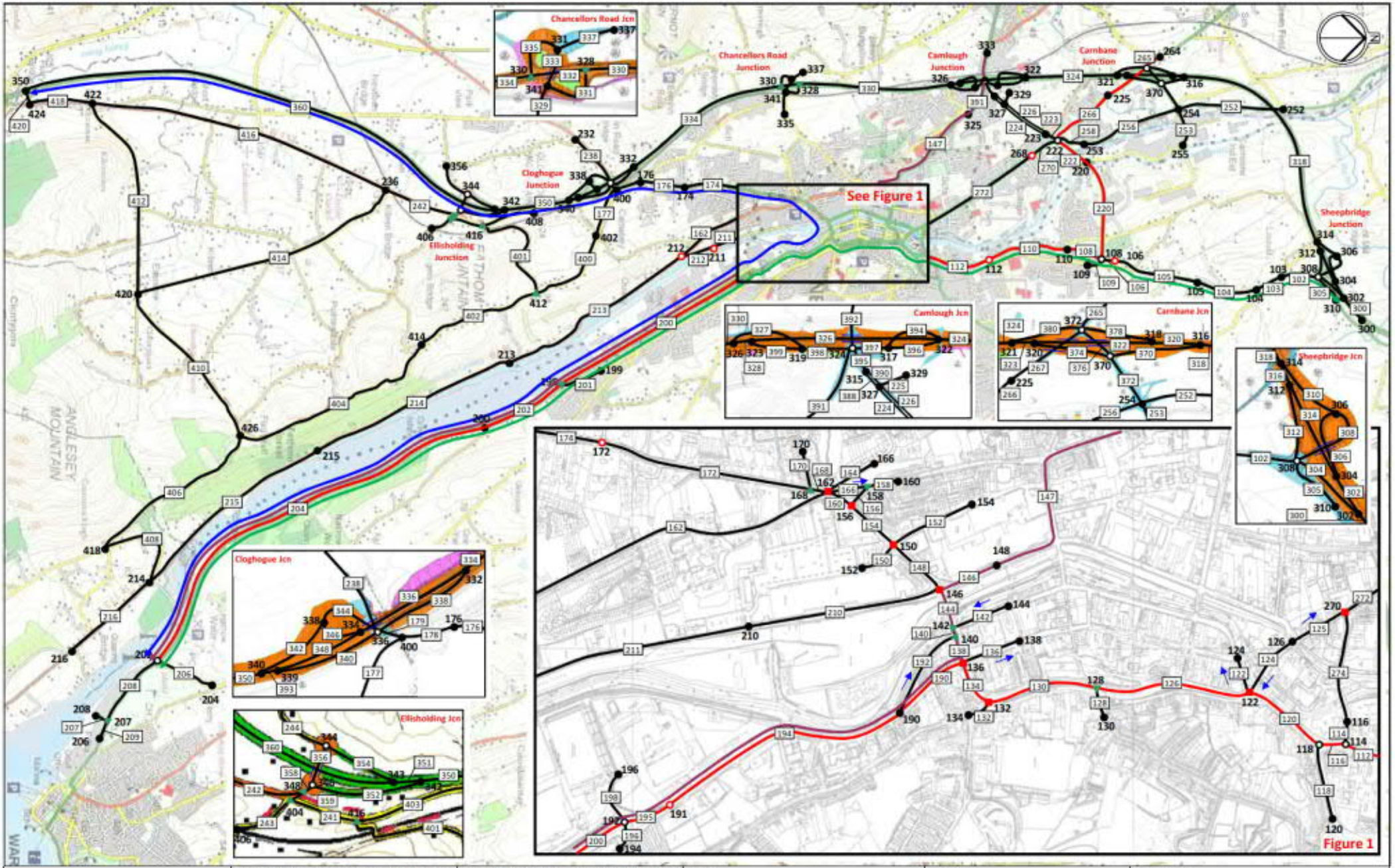
Link Ref.	Link Ref.
2017 Base Year (Equivalent)	2017 Flow Difference vs. Do-Minimum
2023 Opening Year	2023 Flow Difference vs. Do-Minimum
2037 Design Year	2037 Flow Difference vs. Do-Minimum

Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927
Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA MODELLED 24-HOUR TRAFFIC FLOWS
BLUE ROUTE OPTION 3

Figure 6.5.6



KEY

- Journey Time Route: Warrenpoint Harbour to/from Carrickcarnan Jcn.
- Journey Time Route: Warrenpoint Harbour to/from Carnbane Jcn.
- Journey Time Route: Warrenpoint Harbour to/from Camlough Jcn.
- Journey Time Route: Warrenpoint Harbour to/from Sheepbridge Jcn.

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Project Title
NEWRY SOUTHERN RELIEF ROAD

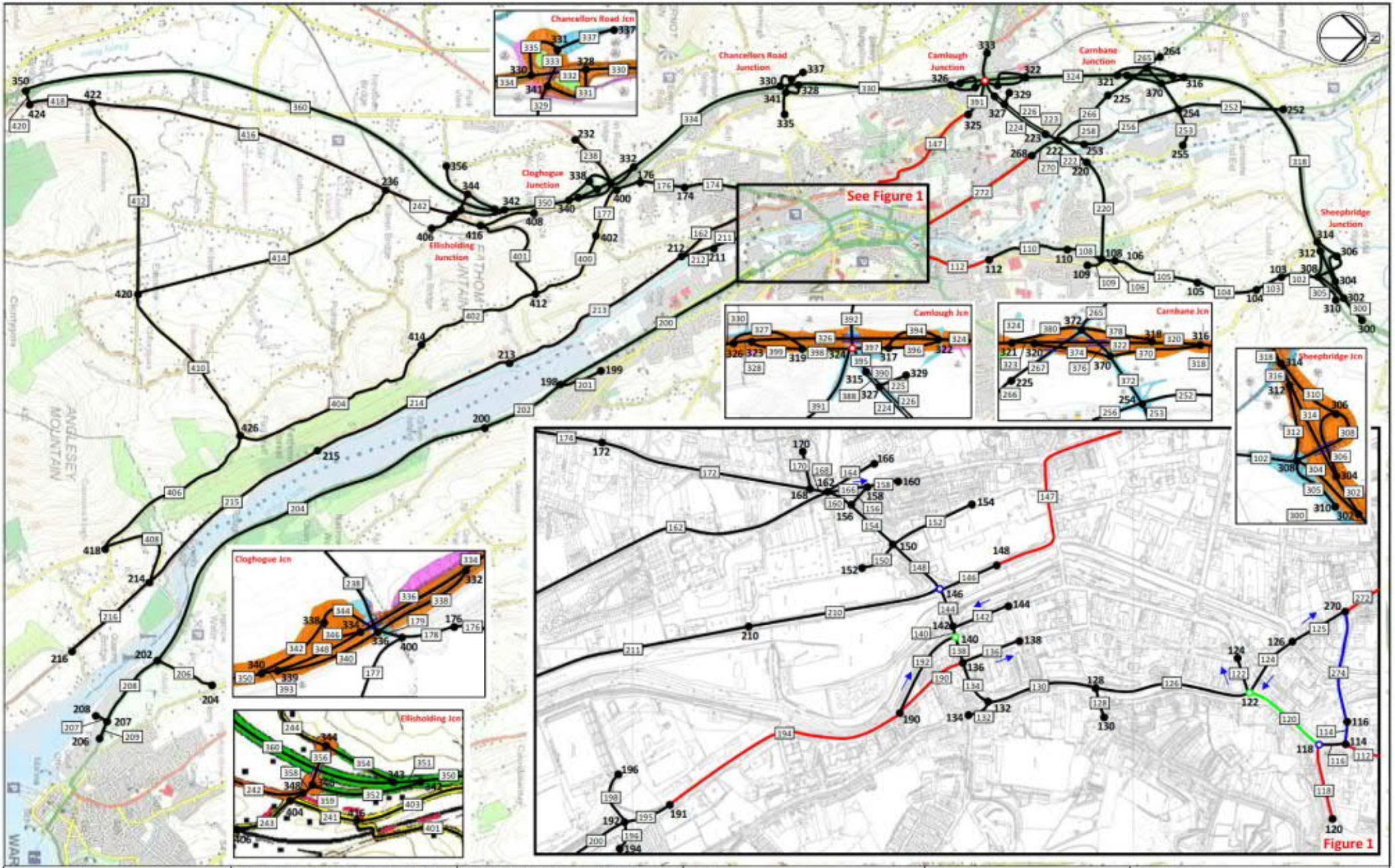
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-MINIMUM NETWORK
MODELLED JOURNEY TIME ROUTES

Figure 6.5.7



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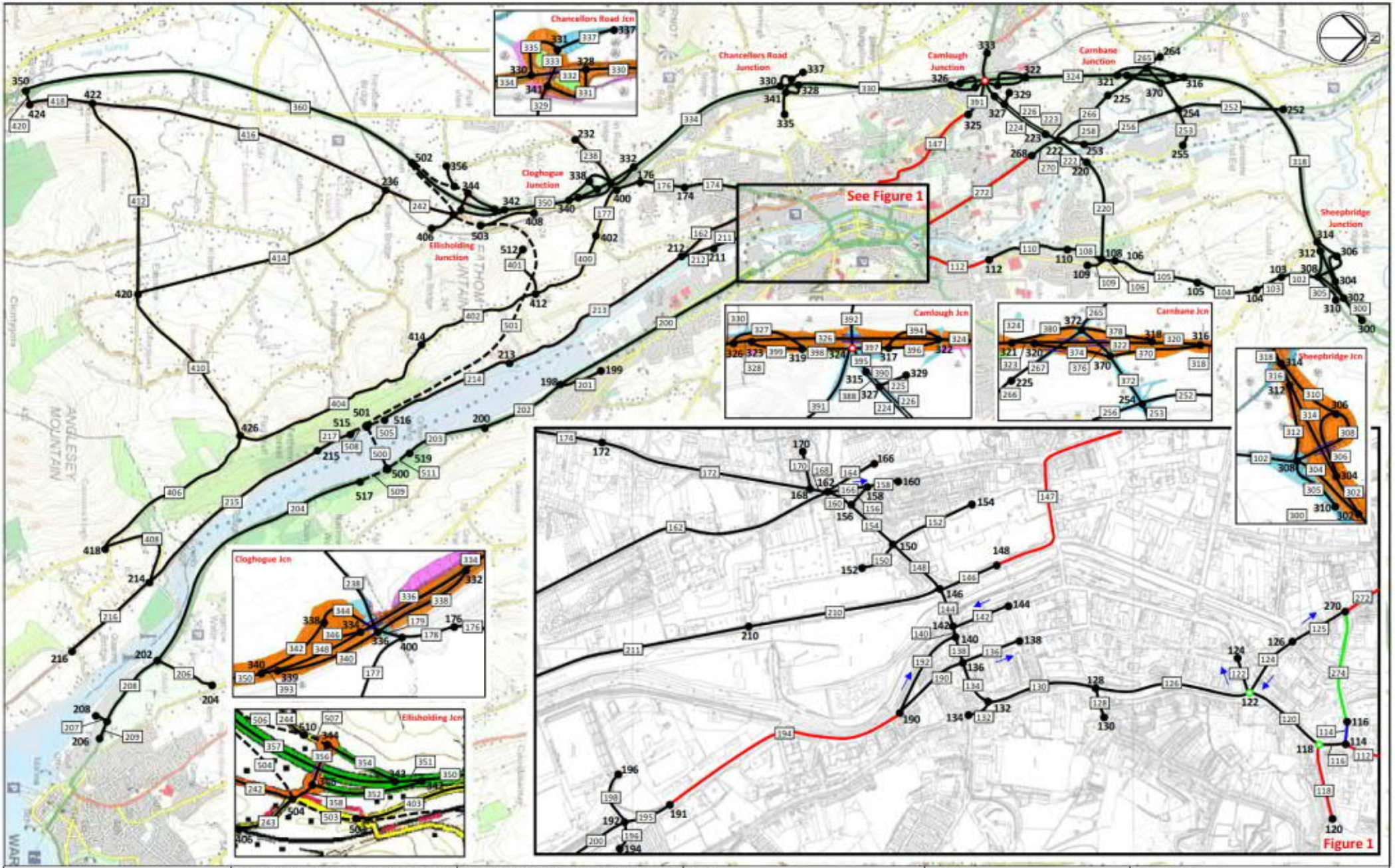
Project Title
NEWRY SOUTHERN RELIEF ROAD
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-MINIMUM NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS

Figure 6.5.8



KEY

- Over-Capacity Link – 2017 Base Year
- Over-Capacity Link – 2023 Opening Year
- Over-Capacity Link – 2037 Design Year
- Over-Capacity Junction – 2017 Base Year
- Over-Capacity Junction – 2023 Opening Year
- Over-Capacity Junction – 2037 Design Year

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Project Title
NEWRY SOUTHERN RELIEF ROAD

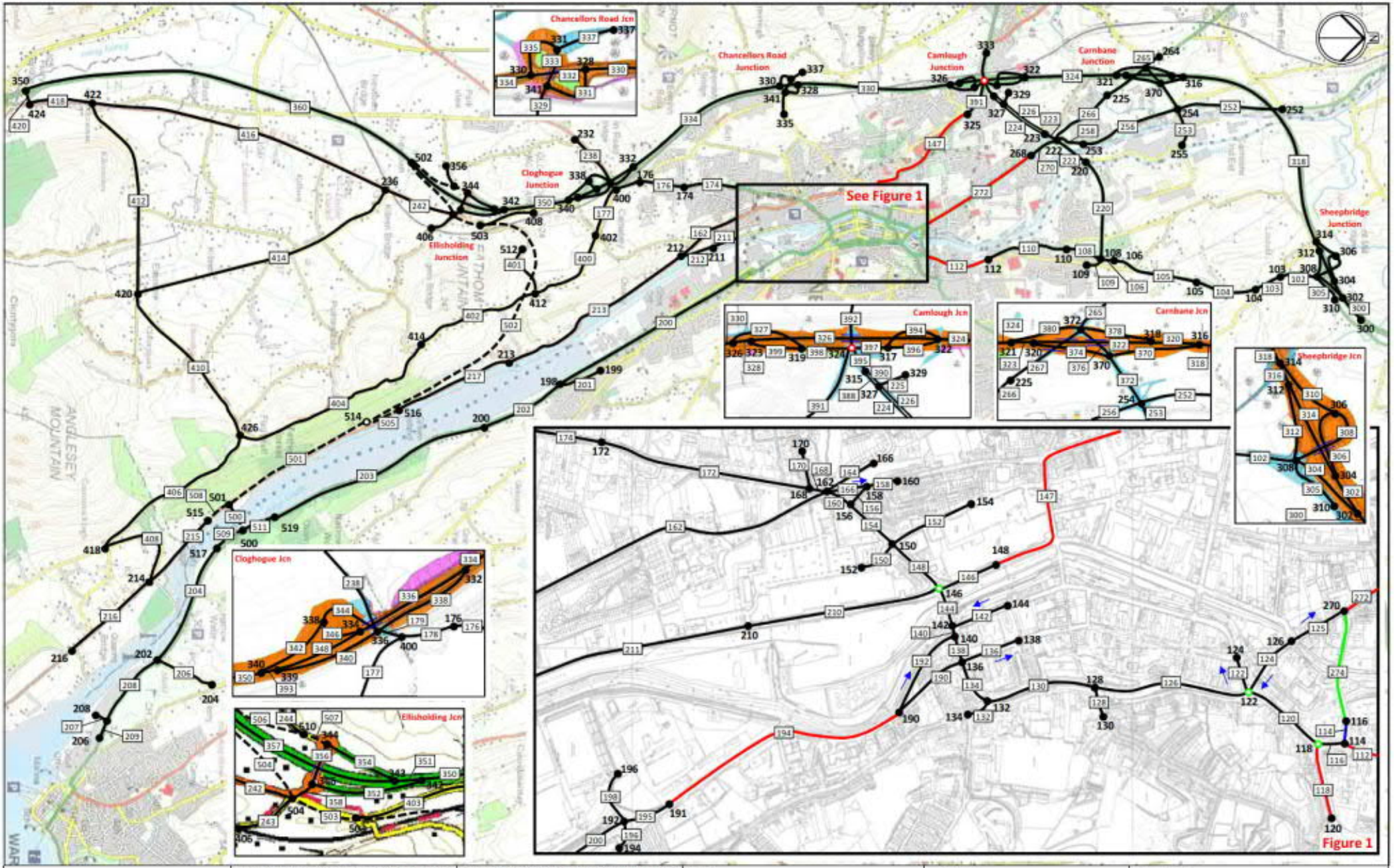
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS
RED ROUTE

Figure 6.5.9



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KEY
- Over-Capacity Link – 2017 Base Year
- Over-Capacity Link – 2023 Opening Year
- Over-Capacity Link – 2037 Design Year
- Over-Capacity Junction – 2017 Base Year
- Over-Capacity Junction – 2023 Opening Year
- Over-Capacity Junction – 2037 Design Year

Project Title
NEWRY SOUTHERN RELIEF ROAD

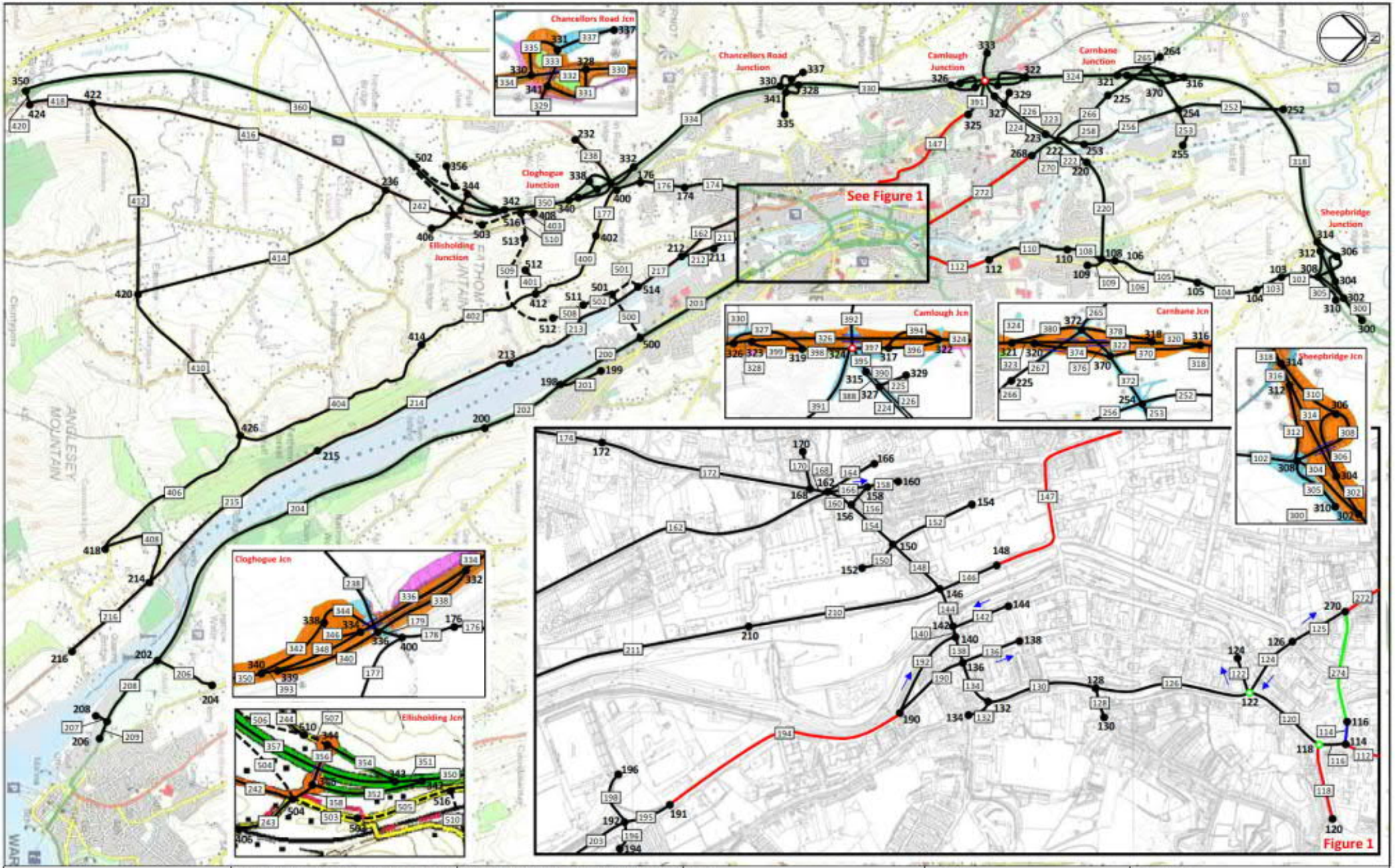
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS
YELLOW ROUTE

Figure 6.5.10



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Co-financed by the European Union
Trans-European Transport Network (TEN-T)

KEY
- Over-Capacity Link – 2017 Base Year
- Over-Capacity Link – 2023 Opening Year
- Over-Capacity Link – 2037 Design Year
- Over-Capacity Junction – 2017 Base Year
- Over-Capacity Junction – 2023 Opening Year
- Over-Capacity Junction – 2037 Design Year

Project Title
NEWRY SOUTHERN RELIEF ROAD

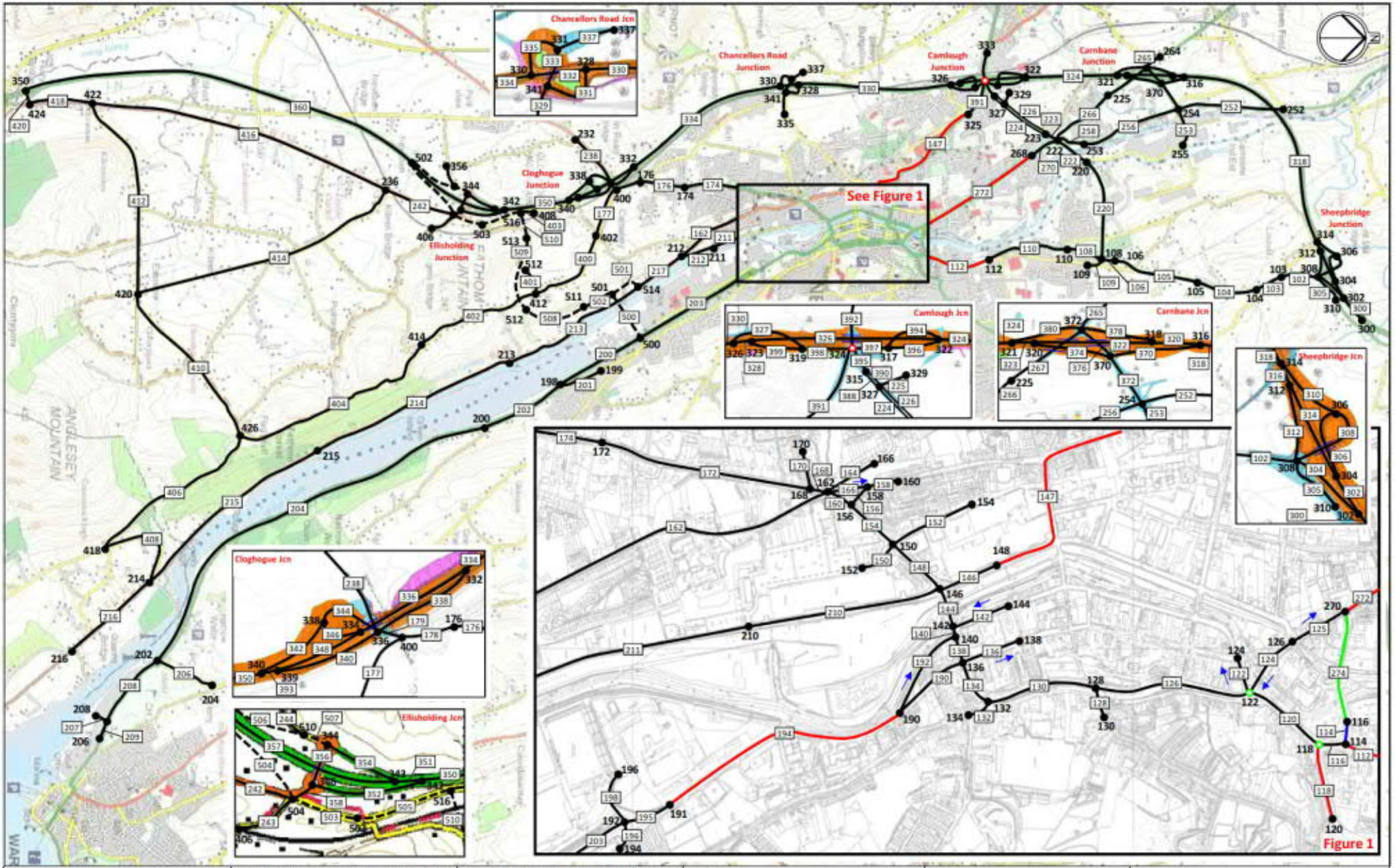
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS
BLUE ROUTE OPTION 1

Figure 6.5.11



KEY

- Over-Capacity Link – 2017 Base Year
- Over-Capacity Link – 2023 Opening Year
- Over-Capacity Link – 2037 Design Year
- Over-Capacity Junction – 2017 Base Year
- Over-Capacity Junction – 2023 Opening Year
- Over-Capacity Junction – 2037 Design Year

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Project Title
NEWRY SOUTHERN RELIEF ROAD

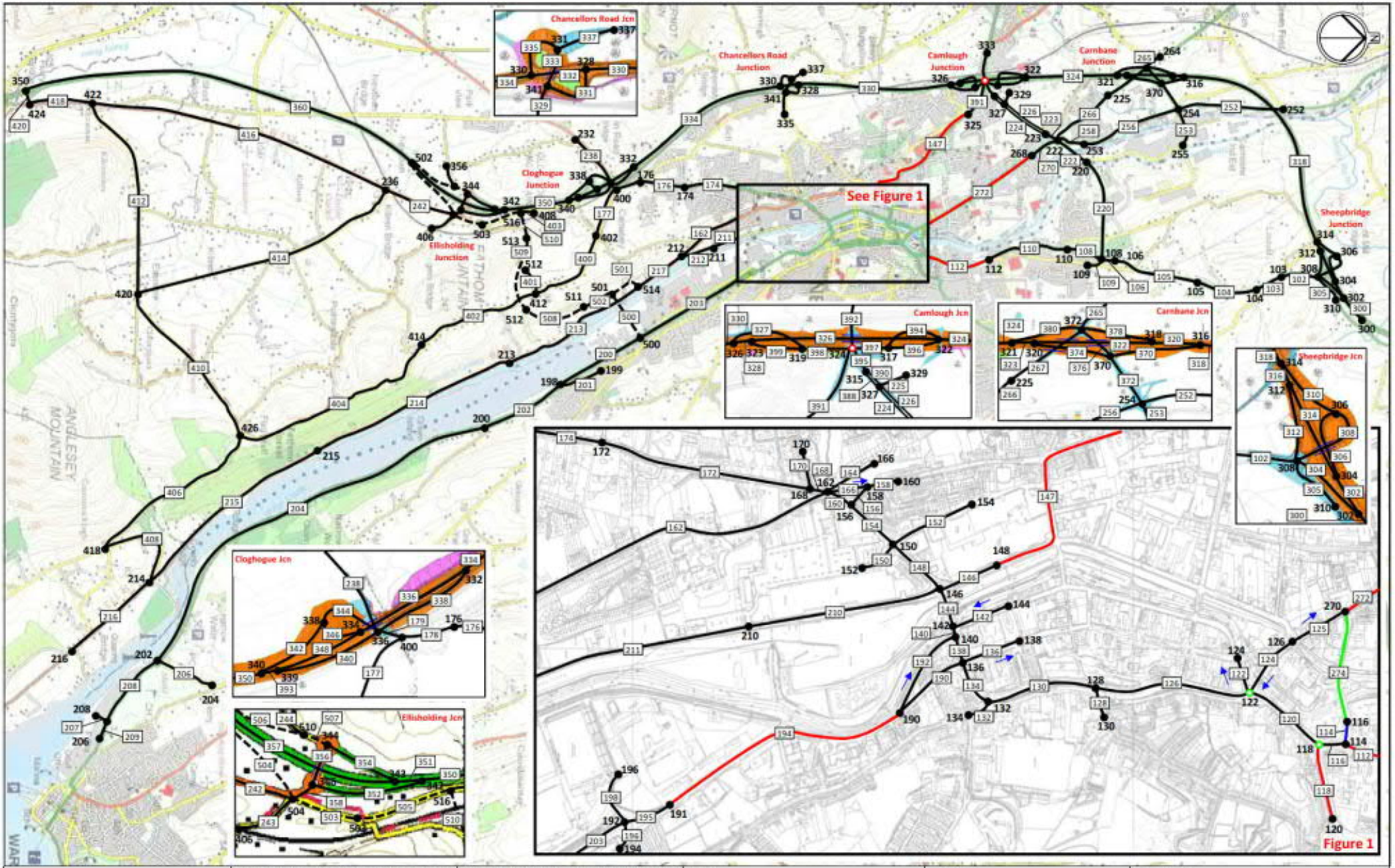
STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS
BLUE ROUTE OPTION 2

Figure 6.5.12



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Client: Infrastructure Bonneagair

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Trans-European Transport Network (TEN-T)

KEY
- Over-Capacity Link – 2017 Base Year
- Over-Capacity Link – 2023 Opening Year
- Over-Capacity Link – 2037 Design Year
- Over-Capacity Junction – 2017 Base Year
- Over-Capacity Junction – 2023 Opening Year
- Over-Capacity Junction – 2037 Design Year

Project Title
NEWRY SOUTHERN RELIEF ROAD

STAGE 2
SCHEME ASSESSMENT REPORT

AECOM Internal Project Number: 60472927

Scale @ A3: NTS

Drawing Title
DO-SOMETHING NETWORK
COBA OVER-CAPACITY LINKS AND JUNCTIONS
BLUE ROUTE OPTION 3

Figure 6.5.13

Appendix B Air Quality

Appendix B Annex A

Background pollutant concentrations for 2017, 2023 and 2030 (based on DEFRA 2015 Maps)

Background pollutant concentration in the vicinity of the receptor locations for Base Year 2017

Receptor Number and Name		Background Air Quality Irish Grid Reference		NO_x µg m^{-3} annual mean	NO_2 µg m^{-3} annual mean	PM_{10} µg m^{-3} annual mean
1	[redacted]	308500	325500	9.28	7.15	9.85
2	[redacted]	308500	323500	6.63	5.19	8.46
3	[redacted]	309500	324500	7.50	5.83	9.07
4	[redacted]	309500	323500	6.49	5.08	8.44
5	[redacted]	309500	322500	5.68	4.47	8.00
6	[redacted]	309500	322500	5.68	4.47	8.00
7	[redacted]	309500	322500	5.68	4.47	8.00
8	[redacted]	308500	308500	5.78	4.54	8.00
9	[redacted]	308500	322500	5.78	4.54	8.00
10	[redacted]	308500	322500	5.78	4.54	8.00

Background pollutant concentration in the vicinity of the receptor locations for Opening Year 2023

Receptor Number and Name		Background Air Quality Irish Grid Reference		NO_x µg m^{-3} annual	NO_2 µg m^{-3} annual	PM_{10} µg m^{-3} annual
1	[redacted]	308500	325500	6.94	5.41	9.54
2	[redacted]	308500	323500	5.05	3.98	8.19
3	[redacted]	309500	324500	5.70	4.48	8.80
4	[redacted]	309500	323500	4.95	3.91	8.17
5	[redacted]	309500	322500	4.36	3.46	7.75
6	[redacted]	309500	322500	4.36	3.46	7.75
7	[redacted]	309500	322500	4.36	3.46	7.75
8	[redacted]	308500	308500	4.45	3.53	7.75
9	[redacted]	308500	322500	4.45	3.53	7.75
10	[redacted]	308500	322500	4.45	3.53	7.75

Background pollutant concentration in the vicinity of the receptor locations for Design Year 2030

Receptor Number and Name		Background Air Quality Irish Grid Reference		NO_x µg m^{-3} annual	NO_2 µg m^{-3} annual	PM_{10} µg m^{-3} annual
1	[redacted]	308500	325500	5.73	4.50	9.42
2	[redacted]	308500	323500	4.19	3.32	8.07
3	[redacted]	309500	324500	4.75	3.75	8.69
4	[redacted]	309500	323500	4.11	3.26	8.06
5	[redacted]	309500	322500	3.60	2.87	7.63
6	[redacted]	309500	322500	3.60	2.87	7.63
7	[redacted]	309500	322500	3.60	2.87	7.63
8	[redacted]	308500	308500	3.71	2.95	7.63
9	[redacted]	308500	322500	3.71	2.95	7.63
10	[redacted]	308500	322500	3.71	2.95	7.63

Grid References only represent the centre point from where background air quality was estimated, they do not represent the actual receptor locations, these can be seen in this appendix for receptor details. Background Air Quality data is derived from figures produced by NETCEN, on behalf of Defra.

In accordance with DMRB, 'while the mapped background concentrations may be directly appropriate for most urban situations, there are few measurements available for rural locations. Rural background concentrations allocated to individual grid squares containing road links indicates that they may be unduly influenced by the road. It is then inappropriate to add a second contribution from the road. Where this issue is considered significant, it is recommended that concentrations are used derived from the average background concentration up to four grid squares away from either side of the road where there are no other significant sources of pollution'.

Following this advice, averages for air quality data were calculated for each of the receptors. Data was taken from the closest air quality receptor location, plus the eight closest surrounding points and averaged. Baseline and assumed year of opening data was downloaded from DEFRA website for pollutants NO2, NOx and PM10.

Traffic data and Link information for Local Air Quality Assessment

Receptor Number 1 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
192	51.3	5311.05	34.57	D	94.5%	5.5%
138	58.8	19427.43	22.23	D	94.5%	5.5%
190	8.4	15961.90	23.42	D	94.5%	5.5%
136	69.2	3812.29	48.00	D	94.5%	5.5%
2023 Do-Minimum						
192	51.3	5710.60	34.19	D	94.5%	5.5%
138	58.8	20888.99	21.78	D	94.5%	5.5%
190	8.4	17162.77	22.29	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%
2023 Do-Something Blue 1						
192	51.3	4226.83	35.57	D	94.5%	5.5%
138	58.8	18437.53	22.54	D	94.5%	5.5%
190	8.4	14421.01	24.84	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%
2023 Do-Something Blue 2						
192	51.3	4226.83	35.57	D	94.5%	5.5%
138	58.8	18437.53	22.54	D	94.5%	5.5%
190	8.4	14421.01	24.84	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%
2023 Do-Something Blue 3						
192	51.3	4226.83	35.57	D	94.5%	5.5%
138	58.8	18437.53	22.54	D	94.5%	5.5%
190	8.4	14421.01	24.84	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%
2023 Do-Something Yellow						
192	51.3	4807.43	35.03	D	94.5%	5.5%
138	58.8	19018.14	22.36	D	94.5%	5.5%
190	8.4	13421.07	25.77	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%
2023 Do-Something Red						
192	51.3	4226.83	35.57	D	94.5%	5.5%
138	58.8	18502.04	22.52	D	94.5%	5.5%
190	8.4	12904.98	26.25	D	94.5%	5.5%
136	69.2	4099.09	48.00	D	94.5%	5.5%

Receptor Number 2 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
177	15.4	399.59	63.71	D	94.5%	5.5%
340	118	4155.48	74.73	D	94.5%	5.5%
348	153	19578.63	104.78	D	94.5%	5.5%
179	141.5	15149.56	48.23	D	94.5%	5.5%
346	181.4	2914.72	45.00	D	94.5%	5.5%
2023 Do-Minimum						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	4468.10	74.45	D	94.5%	5.5%
348	153	21051.55	104.69	D	94.5%	5.5%
179	141.5	16289.28	47.22	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%
2023 Do-Something Blue 1						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	2726.28	76.13	D	94.5%	5.5%
348	153	22825.63	104.53	D	94.5%	5.5%
179	141.5	12805.63	50.31	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%
2023 Do-Something Blue 2						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	2726.28	76.13	D	94.5%	5.5%
348	153	22825.63	104.53	D	94.5%	5.5%
179	141.5	12805.63	50.31	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%
2023 Do-Something Blue 3						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	2726.28	76.13	D	94.5%	5.5%
348	153	22825.63	104.53	D	94.5%	5.5%
179	141.5	12805.63	50.31	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%
2023 Do-Something Yellow						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	3564.93	75.32	D	94.5%	5.5%
348	153	23825.57	104.44	D	94.5%	5.5%
179	141.5	14418.43	48.88	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%
2023 Do-Something Red						
177	15.4	429.65	63.72	D	94.5%	5.5%
340	118	2984.32	75.88	D	94.5%	5.5%
348	153	23825.57	104.44	D	94.5%	5.5%
179	141.5	13321.73	49.85	D	94.5%	5.5%
346	181.4	3133.99	45.00	D	94.5%	5.5%

Receptor Number 3 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
200	39.4	14140.39	98.97	D	94.5%	5.5%
2023 Do-Minimum						
200	39.4	15204.19	98.92	D	94.5%	5.5%
2023 Do-Something Blue 1						
200&203	27.4	14186.19	99.10	D	94.5%	5.5%
500	79.9	5257.73	88.14	D	94.5%	5.5%
2023 Do-Something Blue 2						
200&203	27.4	14186.19	99.10	D	94.5%	5.5%
500	79.9	5257.73	88.14	D	94.5%	5.5%
2023 Do-Something Blue 3						
200&203	27.4	14186.19	99.10	D	94.5%	5.5%
500	79.9	5257.73	88.14	D	94.5%	5.5%
2023 Do-Something Yellow						
200	39.4	10559.32	99.33	D	94.5%	5.5%
2023 Do-Something Red						
200	39.4	11656.03	99.23	D	94.5%	5.5%

Receptor Number 4 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
213	86.5	2996.31	65.09	D	94.5%	5.5%
2023 Do-Minimum						
213	86.5	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Blue 1						
213	86.5	3221.73	64.99	D	94.5%	5.5%
508	119	5386.75	93.20	D	94.5%	5.5%
2023 Do-Something Blue 2						
213	86.5	3221.73	64.99	D	94.5%	5.5%
508	110	5386.75	87.39	D	94.5%	5.5%
2023 Do-Something Blue 3						
213	86.5	3221.73	64.99	D	94.5%	5.5%
508	110	5386.75	86.91	D	94.5%	5.5%
2023 Do-Something Yellow						
213	86.5	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Red						
213	86.5	3221.73	64.99	D	94.5%	5.5%

Receptor Number 5 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
402	14.5	369.59	64.45	D	94.5%	5.5%
401	78.5	44.40	45.00	D	94.5%	5.5%
2023 Do-Minimum						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	45.00	D	94.5%	5.5%
2023 Do-Something Blue 1						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	53.01	D	94.5%	5.5%
509	185.1	5386.75	86.01	D	94.5%	5.5%
2023 Do-Something Blue 2						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	53.01	D	94.5%	5.5%
508/509	90.3	5386.75	87.39	D	94.5%	5.5%
2023 Do-Something Blue 3						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	53.01	D	94.5%	5.5%
508/509	90.3	5386.75	87.53	D	94.5%	5.5%
2023 Do-Something Yellow						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	52.13	D	94.5%	5.5%
502	63.3	4773.89	90.82	D	94.5%	5.5%
2023 Do-Something Red						
402	14.5	397.39	64.44	D	94.5%	5.5%
401	78.5	47.74	53.01	D	94.5%	5.5%
501	63.3	5870.59	90.85	D	94.5%	5.5%

Receptor Number 6 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
402	14.5	369.59	64.45	D	94.5%	5.5%
2023 Do-Minimum						
402	14.5	397.39	64.44	D	94.5%	5.5%
2023 Do-Something Blue 1						
402	14.5	397.39	64.44	D	94.5%	5.5%
509	45.7	5386.75	86.01	D	94.5%	5.5%
2023 Do-Something Blue 2						
402	14.5	397.39	64.44	D	94.5%	5.5%
509	150.4	5386.75	87.27	D	94.5%	5.5%
2023 Do-Something Blue 3						
402	14.5	397.39	64.44	D	94.5%	5.5%
509	150.4	5386.75	87.53	D	94.5%	5.5%
2023 Do-Something Yellow						
402	14.5	397.39	64.44	D	94.5%	5.5%
502	125.1	4773.89	90.82	D	94.5%	5.5%
2023 Do-Something Red						
402	14.5	397.39	64.44	D	94.5%	5.5%
501	125.1	5870.59	90.85	D	94.5%	5.5%

Receptor Number 7 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
214	32.9	2996.31	65.09	D	94.5%	5.5%
2023 Do-Minimum						
214	32.9	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Blue 1						
214	32.9	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Blue 2						
214	32.9	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Blue 3						
214	32.9	3221.73	64.99	D	94.5%	5.5%
2023 Do-Something Yellow						
217	32.9	3286.24	64.96	D	94.5%	5.5%
502	79.8	4773.89	90.82	D	94.5%	5.5%
2023 Do-Something Red						
214	32.9	3221.73	64.99	D	94.5%	5.5%
501	81.8	5870.59	90.85	D	94.5%	5.5%

Receptor Number 8 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
403	30	221.99	80.44	D	94.5%	5.5%
352	60.5	1973.94	88.73	D	94.5%	5.5%
360	85.9	22632.54	102.81	D	94.5%	5.5%
354	106.7	3075.51	88.19	D	94.5%	5.5%
2023 Do-Minimum						
403	30	238.69	80.46	D	94.5%	5.5%
352	60.5	2122.44	88.63	D	94.5%	5.5%
360	85.9	24335.21	102.69	D	94.5%	5.5%
354	106.7	3306.89	88.01	D	94.5%	5.5%
2023 Do-Something Blue 1						
352	60.5	3025.61	87.76	D	94.5%	5.5%
357	85.9	20851.57	100.16	D	94.5%	5.5%
354	106.7	4177.80	87.17	D	94.5%	5.5%
505	31.5	5448.68	82.29	D	94.5%	5.5%
2023 Do-Something Blue 2						
352	60.5	3025.61	87.76	D	94.5%	5.5%
357	85.9	20851.57	100.16	D	94.5%	5.5%
354	106.7	4177.80	87.17	D	94.5%	5.5%
505	47.8	5448.68	82.29	D	94.5%	5.5%
2023 Do-Something Blue 3						
352	60.5	3025.61	87.76	D	94.5%	5.5%
357	85.9	20851.57	100.16	D	94.5%	5.5%
354	106.7	4177.80	87.17	D	94.5%	5.5%
505	47.8	5448.68	82.29	D	94.5%	5.5%
2023 Do-Something Yellow						
403	30	319.98	80.42	D	94.5%	5.5%
352	60.5	3541.71	87.26	D	94.5%	5.5%
357	85.9	22464.37	100.01	D	94.5%	5.5%
354	106.7	4661.64	86.70	D	94.5%	5.5%
502	54.8	4773.89	90.82	D	94.5%	5.5%
2023 Do-Something Red						
403	30	319.98	80.42	D	94.5%	5.5%
352	60.5	3541.71	87.26	D	94.5%	5.5%
357	85.9	21367.66	100.11	D	94.5%	5.5%
354	106.7	4661.64	86.70	D	94.5%	5.5%
501	54.8	5870.59	90.85	D	94.5%	5.5%

Receptor Number 9 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
360	130.5	22632.54	102.81	D	94.5%	5.5%
356&358	55.5	4158.48	60.13	D	94.5%	5.5%
241	24.3	177.59	82.00	D	94.5%	5.5%
401	183.5	44.40	45.00	D	94.5%	5.5%
352	78.2	1973.94	88.73	D	94.5%	5.5%
2023 Do-Minimum						
360	130.5	24335.21	102.69	D	94.5%	5.5%
356&358	55.5	4471.33	60.01	D	94.5%	5.5%
241	24.3	190.96	82.02	D	94.5%	5.5%
401	183.5	47.74	45.00	D	94.5%	5.5%
352	78.2	2122.44	88.63	D	94.5%	5.5%
2023 Do-Something Blue 1						
357	130.5	20851.57	100.16	D	94.5%	5.5%
358	57.6	8796.86	45.00	D	94.5%	5.5%
503	24.3	5448.68	91.29	D	94.5%	5.5%
352	77.9	3025.61	87.76	D	94.5%	5.5%
504	105.3	1741.82	89.87	D	94.5%	5.5%
2023 Do-Something Blue 2						
357	130.5	20851.57	100.16	D	94.5%	5.5%
358	57.6	8796.86	45.00	D	94.5%	5.5%
503	24.3	5448.68	91.29	D	94.5%	5.5%
352	77.9	3025.61	87.76	D	94.5%	5.5%
504	105.3	1741.82	89.87	D	94.5%	5.5%
2023 Do-Something Blue 3						
357	130.5	20851.57	100.16	D	94.5%	5.5%
358	57.6	8796.86	45.00	D	94.5%	5.5%
503	24.3	5448.68	91.29	D	94.5%	5.5%
352	77.9	3025.61	87.76	D	94.5%	5.5%
504	105.3	1741.82	89.87	D	94.5%	5.5%
2023 Do-Something Yellow						
357	130.5	22464.37	100.01	D	94.5%	5.5%
358	57.6	9022.65	45	D	94.5%	5.5%
503	24.3	4835.82	91.59	D	94.5%	5.5%
352	77.9	3541.71	87.26	D	94.5%	5.5%
504	105.3	903.17	90.68	D	94.5%	5.5%
2023 Do-Something Yellow						
357	130.5	21367.66	100.11	D	94.5%	5.5%
358	57.6	9538.74	45	D	94.5%	5.5%
503	24.3	5932.52	91.04	D	94.5%	5.5%
352	77.9	3541.71	87.26	D	94.5%	5.5%
504	105.3	1483.78	90.12	D	94.5%	5.5%

Receptor Number 10 at [redacted]						
Link Number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
		AADT	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV	Total % HDV
Base Year 2017						
244	37.5	697.18	73.95	D	94.5%	5.5%
356	74.4	3391.10	60.13	D	94.5%	5.5%
360	45.4	22632.54	102.81	D	94.5%	5.5%
352	145	1973.94	88.73	D	94.5%	5.5%
2023 Do-Minimum						
244	37.5	749.63	73.95	D	94.5%	5.5%
356	74.4	3646.22	60.01	D	94.5%	5.5%
360	45.4	24335.21	102.69	D	94.5%	5.5%
352	145	2122.44	88.63	D	94.5%	5.5%
2023 Do-Something Blue 1						
356	74.4	6258.95	83.87	D	94.5%	5.5%
357	45.4	20851.57	100.16	D	94.5%	5.5%
507	36.3	2491.45	93.29	D	94.5%	5.5%
504	126.7	1741.82	89.87	D	94.5%	5.5%
352	134.5	3025.61	87.76	D	94.5%	5.5%
2023 Do-Something Blue 2						
356	74.4	6258.95	83.87	D	94.5%	5.5%
357	45.4	20851.57	100.16	D	94.5%	5.5%
507	36.3	2491.45	93.29	D	94.5%	5.5%
504	126.7	1741.82	89.87	D	94.5%	5.5%
352	134.5	3025.61	87.76	D	94.5%	5.5%
2023 Do-Something Blue 3						
356	74.4	6258.95	83.87	D	94.5%	5.5%
357	45.4	20851.57	100.16	D	94.5%	5.5%
507	36.3	2491.45	93.29	D	94.5%	5.5%
504	126.7	1741.82	89.87	D	94.5%	5.5%
352	134.5	3025.61	87.76	D	94.5%	5.5%
2023 Do-Something Yellow						
356	74.4	6484.75	83.76	D	94.5%	5.5%
357	45.4	21367.66	100.11	D	94.5%	5.5%
507	36.3	2233.41	93.41	D	94.5%	5.5%
504	126.7	1483.78	90.12	D	94.5%	5.5%
352	134.5	3541.71	87.26	D	94.5%	5.5%
2023 Do-Something Red						
356	74.4	5968.65	84.01	D	94.5%	5.5%
357	45.4	22464.37	100.01	D	94.5%	5.5%
507	36.3	1717.31	93.66	D	94.5%	5.5%
504	126.7	903.17	90.68	D	94.5%	5.5%
352	134.5	3541.71	87.26	D	94.5%	5.5%

Appendix B Annex B

DMRB: Assessment of Local Air Quality

OUTPUT SHEET

Current receptor

Receptor Name	[redacted] (Blue 2)	Receptor number	20
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.00	0.00	mg/m³	Annual mean*	0.00	mg/m³
Benzene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
1,3-butadiene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
NO_x	0.0	0.7	0.7	µg/m³	Not applicable		
NO_2	0.0	0.4	0.4	µg/m³	Annual mean*	0.4	µg/m³
PM_{10}	8.2	0.06	8.23	µg/m³	Annual mean	8.2	µg/m³
					Days >50µg/m³	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m³)	Benzene (µg/m³)	1,3-butadiene (µg/m³)	NOx (µg/m³)	PM_{10} (µg/m³)
1	0.00	0.00	0.00	0.32	0.03
2	0.00	0.00	0.00	0.33	0.03
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	[redacted] (Base)	2017	0.16	0.18	0.15	20.01	6.50	12.04	0.00
2	[redacted] (Do Min)	2023	0.17	0.20	0.16	19.32	6.32	11.71	0.00
3	[redacted] (Red)	2023	0.13	0.15	0.12	15.75	5.37	11.28	0.00
4	[redacted] (Yellow)	2023	0.14	0.15	0.12	16.41	5.55	11.36	0.00
5	[redacted] (Blue Options 1-3)	2023	0.15	0.16	0.13	17.14	5.75	11.45	0.00
6	[redacted] (Base)	2017	0.01	0.01	0.01	1.46	0.74	8.60	0.00
7	[redacted] (Do Min)	2023	0.01	0.01	0.01	1.43	0.72	8.33	0.00
8	[redacted] (Red)	2023	0.01	0.01	0.01	1.33	0.68	8.32	0.00
9	[redacted] (Yellow)	2023	0.01	0.01	0.01	1.38	0.70	8.33	0.00
10	[redacted] (Blue 1-3)	2023	0.01	0.01	0.01	1.29	0.66	8.32	0.00
11	[redacted] (Base)	2017	0.02	0.02	0.02	5.76	2.36	9.68	0.00
12	[redacted] (Do Min)	2023	0.02	0.02	0.02	5.78	2.37	9.42	0.00
13	[redacted] (Red)	2023	0.02	0.02	0.01	4.48	1.91	9.28	0.00
14	[redacted] (Yellow)	2023	0.01	0.01	0.01	4.06	1.78	9.24	0.00
15	[redacted] (Blue Options1-3)	2023	0.03	0.03	0.03	8.04	3.11	9.66	0.00
16	[redacted] (Base)	2017	0.00	0.00	0.00	0.32	0.19	8.47	0.00
17	[redacted] (Do Min)	2023	0.00	0.00	0.00	0.32	0.19	8.20	0.00
18	[redacted] (Red& Yellow)	2023	0.00	0.00	0.00	0.32	0.19	8.20	0.00
19	[redacted] (Blue 1)	2023	0.00	0.00	0.00	0.60	0.34	8.22	0.00
20	[redacted] (Blue 2)	2023	0.00	0.00	0.00	0.65	0.36	8.23	0

* See Footnote 32 in DMRB Volume 11 Chapter 3

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	[redacted] (Blue)	Receptor number	20
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.01	0.01	mg/m³	Annual mean*	0.01	mg/m³
Benzene	0.00	0.01	0.01	µg/m³	Annual mean	0.01	µg/m³
1,3-butadiene	0.00	0.01	0.01	µg/m³	Annual mean	0.01	µg/m³
NO_x	0.0	1.2	1.2	µg/m³	Not applicable		
NO_2	0.0	0.6	0.6	µg/m³	Annual mean*	0.6	µg/m³
PM_{10}	7.8	0.10	7.85	µg/m³	Annual mean	7.8	µg/m³
					Days >50µg/m³	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m³)	Benzene (µg/m³)	1,3-butadiene (µg/m³)	NOx (µg/m³)	PM_{10} (µg/m³)
1	0.01	0.01	0.01	1.16	0.10
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	[redacted] (Blue 3)	2023	0.00	0.00	0.00	0.65	0.36	8.23	0.00
2	[redacted] (Base)	2017	0.00	0.00	0.00	0.24	0.15	8.02	0.00
3	[redacted] (Do Min)	2023	0.00	0.00	0.00	0.24	0.15	7.77	0.00
4	[redacted] (Red)	2023	0.01	0.01	0.01	1.41	0.71	7.88	0.00
5	[redacted] (Yellow)	2023	0.00	0.01	0.00	1.19	0.62	7.86	0.00
6	[redacted] (Blue 1)	2023	0.00	0.00	0.00	0.33	0.20	7.78	0.00
7	[redacted] (Blue 2)	2023	0.00	0.00	0.00	0.78	0.43	7.82	0.00
8	[redacted] (Blue 3)	2023	0.00	0.00	0.00	0.79	0.43	7.82	0.00
9	[redacted] (Base)	2017	0.00	0.00	0.00	0.10	0.07	8.01	0.00
10	[redacted] (Do Min)	2023	0.00	0.00	0.00	0.10	0.07	7.76	0.00
11	[redacted] (Red)	2023	0.00	0.00	0.00	0.36	0.21	7.78	0.00
12	[redacted] (Yellow)	2023	0.00	0.00	0.00	0.31	0.19	7.78	0.00
13	[redacted] (Blue 1)	2023	0.01	0.01	0.01	1.67	0.83	7.90	0.00
14	[redacted] (Blue 2)	2023	0.00	0.00	0.00	0.24	0.15	7.77	0.00
15	[redacted] (Blue 3)	2023	0.00	0.00	0.00	0.24	0.15	7.77	0.00
16	[redacted] (Base)	2017	0.01	0.01	0.00	1.16	0.60	8.09	0.00
17	[redacted] (Do Min)	2023	0.01	0.01	0.01	1.16	0.60	7.85	0.00
18	[redacted] (Red)	2023	0.01	0.01	0.01	1.91	0.93	7.92	0.00
19	[redacted] (Yellow)	2023	0.01	0.01	0.01	1.82	0.89	7.91	0.00
20	[redacted] (Blue 1-3)	2023	0.01	0.01	0.01	1.16	0.60	7.85	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	[redacted] (Blue 1-3)	Receptor number	11
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.03	0.03	mg/m^3	Annual mean*	0.03	mg/m^3
Benzene	0.00	0.03	0.03	$\mu g/m^3$	Annual mean	0.03	$\mu g/m^3$
1,3-butadiene	0.00	0.02	0.02	$\mu g/m^3$	Annual mean	0.02	$\mu g/m^3$
NO_x	0.0	5.9	5.9	$\mu g/m^3$	Not applicable		
NO_2	0.0	2.4	2.4	$\mu g/m^3$	Annual mean*	2.4	$\mu g/m^3$
PM_{10}	7.8	0.57	8.32	$\mu g/m^3$	Annual mean	8.3	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NOx ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
1	0.00	0.00	0.00	0.73	0.08
2	0.01	0.01	0.01	1.76	0.17
3	0.01	0.01	0.01	2.85	0.28
4	0.00	0.00	0.00	0.42	0.04
5	0.00	0.00	0.00	0.12	0.01
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Days >50$\mu g/m^3$
1	[redacted] (Base)	2017	0.01	0.01	0.01	3.20	1.44	8.34	0.00
2	[redacted] (Do Min)	2023	0.01	0.01	0.01	3.13	1.41	8.09	0.00
3	[redacted] (Red)	2023	0.02	0.02	0.02	4.81	2.03	8.24	0.00
4	[redacted] (Yellow)	2023	0.02	0.02	0.02	4.58	1.95	8.21	0.00
5	[redacted] (Blue 1)	2023	0.02	0.02	0.02	4.56	1.94	8.20	0.00
6	[redacted] (Blue 2&3)	2023	0.02	0.02	0.02	4.56	1.94	8.20	0.00
7	[redacted] (Base)	2017	0.01	0.01	0.01	2.12	1.01	8.20	0.00
8	[redacted] (Do Min)	2023	0.01	0.01	0.01	2.10	1.00	7.96	0.00
9	[redacted] (Red)	2023	0.03	0.03	0.03	6.33	2.55	8.36	0.00
10	[redacted] (Yellow)	2023	0.03	0.03	0.02	5.64	2.32	8.30	0.00
11	[redacted] Blue 1-3)	2023	0.03	0.03	0.02	5.87	2.40	8.32	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	[redacted] (Blue 2)	Receptor number	6
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.03	0.03	mg/m^3	Annual mean*	0.03	mg/m^3
Benzene	0.00	0.03	0.03	$\mu g/m^3$	Annual mean	0.03	$\mu g/m^3$
1,3-butadiene	0.00	0.03	0.03	$\mu g/m^3$	Annual mean	0.03	$\mu g/m^3$
NO_x	0.0	7.8	7.8	$\mu g/m^3$	Not applicable		
NO_2	0.0	3.0	3.0	$\mu g/m^3$	Annual mean*	3.0	$\mu g/m^3$
PM_{10}	7.8	0.82	8.57	$\mu g/m^3$	Annual mean	8.6	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NOx ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
1	0.00	0.00	0.00	0.97	0.10
2	0.00	0.00	0.00	0.91	0.08
3	0.02	0.03	0.02	5.73	0.63
4	0.00	0.00	0.00	0.07	0.01
5	0.00	0.00	0.00	0.11	0.01
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Days >50$\mu g/m^3$
1	[redacted] (Base)	2017	0.03	0.03	0.03	7.23	2.85	8.79	0.00
2	[redacted] (Do Min)	2023	0.03	0.03	0.03	7.03	2.78	8.53	0.00
3	[redacted] (Red)	2023	0.03	0.03	0.03	7.79	3.03	8.57	0.00
4	[redacted] (Yellow)	2023	0.03	0.03	0.03	7.60	2.97	8.55	0.00
5	[redacted] (Blue 1)	2023	0.03	0.03	0.03	7.79	3.03	8.57	0.00
6	[redacted] (Blue 2 & 3)	2023	0.03	0.03	0.03	7.79	3.03	8.57	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

This spreadsheet calculates the nitrogen dioxide concentration from the modelled oxides of nitrogen concentrations

1). Confirm that the General inputs spreadsheet has been completed
The input selections are shown at the head of the Table below.
2.) Type in (or paste and copy from another spreadsheet)

1) the receptor identifier (Receptor ID) and its Easting and Northing. [Optional]
2) the modelled contribution from roads to oxides of nitrogen concentrations (Road increment NO_x)
3) the local background concentration as NO_2 (2d.p)
You may alternatively enter the local background as Nox
Leave the redundant background NO_x or NO_2 columns blank as appropriate
Note that calculations are faster if you input background NO_x rather than background NO_2

3). The default set-up is to use the fraction of oxides emitted as NO_2 from the General Inputs spreadsheet
Leave the "Fraction emitted as NO_2" column empty to use the default set up.
However, you can overwrite the defaults by typing appropriate values (0-1) into this column.
The fNO2 spreadsheet provides additional values.

4) Click the mouse on the run button to run the model.
The model will calculate:
a) the total nitrogen dioxide concentration at the receptor (Total NO_2)
b) the incremental contribution to nitrogen dioxide concentrations from the road vehicle emissions (Road NO_2)

Run NO_x to NO_2

Copy and paste the results to another spreadsheet.

5) Click the mouse on the Clear button to clear the spreadsheet

Clear spreadsheet

Local Authority: **Newry Mourne and Down** **Year:** **2017**
Traffic Mix: **All non-urban UK traffic**

Receptor ID	Easting,m	Northing, m	Road increment NO_x $\mu g\ m^{-3}$	Background NO_x $\mu g\ m^{-3}$	Background NO_2 $\mu g\ m^{-3}$	Fraction emitted as NO_2	Total NO_2 $\mu g\ m^{-3}$	Road NO_2 $\mu g\ m^{-3}$	Notes
[redacted] (Base)			20.01	**9.28**	7.15		17.9	10.75	
[redacted] (Base)			1.46	6.63	5.19		6.01	0.82	
[redacted] (Base)			5.76	7.5	5.83		9.03	3.2	
[redacted] (Base)			0.32	6.49	5.08		5.26	0.18	
[redacted] (Base)			0.24	5.68	4.47		4.6	0.13	
[redacted] (Base)			0.10	5.68	4.47		4.53	0.06	
[redacted] (Base)			1.16	5.68	4.47		5.12	0.65	
[redacted] (Base)			3.20	5.78	4.54		6.34	1.8	
[redacted] (Base)			2.12	5.78	4.54		5.73	1.19	
[redacted] (Base)			7.23	5.78	4.54		8.57	4.03	

This spreadsheet calculates the nitrogen dioxide concentration from the modelled oxides of nitrogen concentrations

1). Confirm that the General inputs spreadsheet has been completed
The input selections are shown at the head of the Table below.
2.) Type in (or paste and copy from another spreadsheet)

1) the receptor identifier (Receptor ID) and its Easting and Northing. [Optional]
2) the modelled contribution from roads to oxides of nitrogen concentrations (Road increment NO_x)
3) the local background concentration as NO_2 (2d.p)
You may alternatively enter the local background as Nox
Leave the redundant background NO_x or NO_2 columns blank as appropriate
Note that calculations are faster if you input background NO_2 rather than background NO_x

3). The default set-up is to use the fraction of oxides emitted as NO_2 from the General Inputs spreadsheet
Leave the "Fraction emitted as NO_2" column empty to use the default set up.
However, you can overwrite the defaults by typing appropriate values (0-1) into this column.
The fNO2 spreadsheet provides additional values.

4) Click the mouse on the run button to run the model.
Run NO_x to NO_2
The model will calculate:
a) the total nitrogen dioxide concentration at the receptor (Total NO_2)
b) the incremental contribution to nitrogen dioxide concentrations from the road vehicle emissions (Road NO_2)

Copy and paste the results to another spreadsheet.

5) Click the mouse on the Clear button to clear the spreadsheet
Clear spreadsheet

Local Authority: Newry Mourne and Down | **Year:** 2023 | **Traffic Mix:** All non-urban UK traffic

Receptor ID	Easting,m	Northing, m	Road increment NO_x $\mu g\ m^{-3}$	Background $\mu g\ m^{-3}$ NO_2	Background $\mu g\ m^{-3}$ NO_x	Fraction emitted as NO_2	Total NO_2 $\mu g\ m^{-3}$	Road NO_2 $\mu g\ m^{-3}$	Notes
[redacted]	(Do Min)		19.32	6.94	5.41		15.73	10.32	
[redacted]	(Red)		15.75	6.94	5.41		13.89	8.48	
[redacted]	(Yellow)		16.41	6.94	5.41		14.24	8.83	
[redacted]	(Blue Options 1-3)		17.14	6.94	5.41		14.61	9.2	
[redacted]	(Do Min)		1.43	5.05	3.98		4.78	0.9	
[redacted]	(Red)		1.33	5.05	3.98		4.72	0.74	
[redacted]	(Yellow)		1.38	5.05	3.98		4.75	0.77	
[redacted]	(Blue 1-3)		1.29	5.05	3.98		4.7	0.72	
[redacted]	(Do Min)		5.78	5.7	4.48		7.67	3.19	
[redacted]	(Red)		4.48	5.7	4.48		6.96	2.48	
[redacted]	(Yellow)		4.98	5.7	4.48		6.73	2.25	
[redacted]	(Blue Options1-3)		8.04	5.7	4.48		8.9	4.42	
[redacted]	(Do Min)		0.32	4.95	3.91		4.09	0.18	
[redacted]	Red& Yellow)		0.32	4.95	3.91		4.09	0.18	
[redacted]	(Blue 1)		0.60	4.95	3.91		4.25	0.34	
[redacted]	(Blue 2)		0.65	4.95	3.91		4.28	0.37	
[redacted]	(Blue 3)		0.65	4.95	3.91		4.27	0.36	
[redacted]	(Do Min)		0.24	4.36	3.46		3.59	0.13	
[redacted]	(Red)		1.41	4.36	3.46		4.25	0.79	
[redacted]	(Yellow)		1.19	4.36	3.46		4.13	0.67	
[redacted]	(Blue 1)		0.33	4.36	3.46		3.64	0.18	
[redacted]	(Blue 2)		0.78	4.36	3.46		3.9	0.44	
[redacted]	(Blue 3)		0.79	4.36	3.46		3.9	0.44	
[redacted]	(Do Min)		0.10	4.36	3.46		3.52	0.06	
[redacted]	(Red)		0.36	4.36	3.46		3.88	0.2	
[redacted]	(Yellow)		0.31	4.36	3.46		3.83	0.17	
[redacted]	(Blue 1)		1.67	4.36	3.46		4.4	0.94	
[redacted]	(Blue 2)		0.24	4.36	3.46		3.59	0.13	
[redacted]	(Blue 3)		0.24	4.36	3.46		3.59	0.13	
[redacted]	(Do Min)		1.16	4.36	3.46		4.11	0.65	
[redacted]	(Red)		1.91	4.36	3.46		4.53	1.07	
[redacted]	(Yellow)		1.82	4.36	3.46		4.48	1.02	
[redacted]	(Blue 1-3)		1.16	4.36	3.46		4.11	0.65	
[redacted]	(Do Min)		3.13	4.45	3.53		5.28	1.75	
[redacted]	(Red)		4.81	4.45	3.53		6.2	2.67	
[redacted]	(Yellow)		4.58	4.45	3.53		6.08	2.55	
[redacted]	(Blue 1)		4.56	4.45	3.53		6.06	2.53	
[redacted]	(Blue 2&3)		4.56	4.45	3.53		6.06	2.53	
[redacted]	(Do Min)		2.10	4.45	3.53		4.7	1.17	
[redacted]	(Red)		6.33	4.45	3.53		7.03	3.5	
[redacted]	(Yellow)		5.64	4.45	3.53		6.66	3.13	
[redacted]	(Blue 1-3)		5.67	4.45	3.53		6.79	3.26	
[redacted]	(Do Min)		7.03	4.45	3.53		7.41	3.88	
[redacted]	(Red)		7.79	4.45	3.53		7.83	4.3	
[redacted]	(Yellow)		7.60	4.45	3.53		7.73	4.2	
[redacted]	(Blue 1)		7.79	4.45	3.53		7.83	4.3	
[redacted]	(Blue 2 & 3)		7.79	4.45	3.53		7.83	4.3	

Appendix B Annex C

Highways Agency Long Term Gap Analysis Calculator v1.0

Please Select:

Base Year: 2017 | Pollutant: NO2 | Calculate

Assessment Year: 2023

Receptor ID	Enter Modelled Annual Mean NO2 Concentrations (µg/m³) Base Year	Projected Base Year	Do-Minimum	Do-Something	Modelled 2017 Base Year / 2023 Do-Minimum (Ratio A)	Long Term Adjustment Factor Between 2017 / 2023 (Ratio B)	Gap Factor	Adjusted Annual Mean NO2 Concentrations (µg/m³) Do-Minimum	Do-Something
[redacted]	17.9	15.3	15.73	13.89	0.85	0.96	1.12	17.6	15.5
[redacted]	6.01	4.75	4.78	4.72	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	6.96	0.83	0.96	1.16	8.9	8.0
[redacted]	5.26	4.08	4.09	4.09	0.78	0.96	1.23	5.0	5.0
[redacted]	4.6	3.58	3.59	4.25	0.78	0.96	1.23	4.4	5.2
[redacted]	4.53	3.51	3.52	3.66	0.77	0.96	1.23	4.3	4.5
[redacted]	5.12	4.06	4.11	4.53	0.79	0.96	1.21	5.0	5.5
[redacted]	6.34	5.21	5.28	6.2	0.82	0.96	1.16	6.1	7.2
[redacted]	5.73	4.64	4.7	7.03	0.81	0.96	1.18	5.6	8.3
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.24	0.85	0.96	1.12	17.6	15.9
[redacted]	6.01	4.75	4.78	4.75	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	6.73	0.83	0.96	1.16	8.9	7.8
[redacted]	5.26	4.08	4.09	4.09	0.78	0.96	1.23	5.0	5.0
[redacted]	4.6	3.58	3.59	4.13	0.78	0.96	1.23	4.4	5.1
[redacted]	4.53	3.51	3.52	3.63	0.77	0.96	1.23	4.3	4.5
[redacted]	5.12	4.06	4.11	4.48	0.79	0.96	1.21	5.0	5.4
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.66	0.81	0.96	1.18	5.6	7.9
[redacted]	8.57	7.29	7.41	7.73	0.85	0.96	1.12	8.3	8.7
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.25	0.78	0.96	1.23	5.0	5.2
[redacted]	4.6	3.58	3.59	3.64	0.78	0.96	1.23	4.4	4.5
[redacted]	4.53	3.51	3.52	4.4	0.77	0.96	1.23	4.3	5.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.28	0.78	0.96	1.23	5.0	5.3
[redacted]	4.6	3.58	3.59	3.9	0.78	0.96	1.23	4.4	4.8
[redacted]	4.53	3.51	3.52	3.59	0.77	0.96	1.23	4.3	4.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.27	0.78	0.96	1.23	5.0	5.3
[redacted]	4.6	3.58	3.59	3.9	0.78	0.96	1.23	4.4	4.8
[redacted]	4.53	3.51	3.52	3.59	0.77	0.96	1.23	4.3	4.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Baseline Regional		
Year	2017	Number of links	46
Pollutant		Total emission	Units
CO		63,717	kg/year
THC		7,866	kg/year
NO_x		36,444	kg/year
PM_{10}		1,165	kg/year
C		4,961	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	232	30	123	3	16
2	134	1,054	132	309	10	52
3	138	707	89	216	7	36
4	140	136	17	40	1	7
5	144	1,195	148	335	11	57
6	148	1,418	174	388	13	66
7	154	1,250	155	351	12	60
8	160	640	79	179	6	31
9	168	395	48	109	4	19
10	172	5,527	681	1,528	52	261
11	174	2,485	330	1,138	30	154
12	176	1,875	249	858	23	116
13	178	1,118	149	491	13	68
14	179	447	59	197	5	27
15	190	1,518	193	473	16	78
16	192	460	60	170	5	26
17	194	4,516	597	1,756	52	258
18	195	885	118	374	10	52
19	200	6,833	824	5,013	156	655
20	202	2,981	362	2,156	66	283
21	214	1,499	197	803	20	106
22	241	12	1	7	0	1
23	243	14	2	6	0	1
24	244	60	8	35	1	5
25	304	345	44	218	6	29
26	306	333	44	179	4	24
27	327	319	39	220	6	29
28	328	200	24	150	5	20
29	330	8,269	978	6,201	212	806
30	332	1,034	122	775	27	101
31	334	9,302	1,100	6,976	239	907
32	336	2,213	261	1,661	57	216
33	340	418	54	249	6	33
34	342	279	35	188	5	25
35	344	295	37	195	5	26
36	348	1,798	212	1,350	47	175
37	352	190	24	129	4	17
38	354	270	34	183	5	24
39	356	137	18	69	2	9
40	358	156	21	76	2	10
41	359	3	0	1	0	0
42	374	292	37	184	5	24
43	380	236	30	152	4	20
44	398	15	2	10	0	1
45	399	331	43	201	5	27
46	403	29	4	18	0	2

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Do Minimum 2023		
Year	2023	Number of links	46
Pollutant		Total emission	Units
CO		68,695	kg/year
THC		8,466	kg/year
NO_x		37,296	kg/year
PM_{10}		1,205	kg/year
C		5,180	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	247	33	125	3	17
2	134	1,151	144	316	11	55
3	138	786	97	219	7	38
4	140	149	19	41	1	7
5	144	1,318	162	343	12	60
6	148	1,573	192	398	14	70
7	154	1,378	170	360	12	63
8	160	705	87	183	6	32
9	168	437	53	112	4	20
10	172	6,114	749	1,566	54	276
11	174	2,680	356	1,159	31	161
12	176	2,022	269	875	23	122
13	178	1,211	161	501	14	71
14	179	485	64	200	6	28
15	190	1,680	212	486	16	83
16	192	495	65	173	5	27
17	194	4,964	654	1,799	54	274
18	195	944	125	380	11	55
19	200	7,269	878	5,133	163	682
20	202	3,179	385	2,209	68	295
21	241	12	2	8	0	1
22	243	15	2	6	0	1
23	244	63	8	36	1	5
24	304	368	47	223	6	30
25	308	356	47	183	4	25
26	327	340	42	224	6	30
27	328	214	25	154	5	20
28	330	8,815	1,042	6,352	219	838
29	332	1,102	130	794	27	105
30	334	9,917	1,172	7,146	247	943
31	336	2,359	279	1,702	58	225
32	340	447	58	254	6	34
33	342	298	37	192	5	26
34	344	314	39	199	5	27
35	348	1,917	226	1,384	48	183
36	352	203	25	132	4	18
37	354	266	36	187	5	25
38	356	147	19	71	2	10
39	358	167	22	77	2	10
40	359	3	0	1	0	0
41	374	312	40	187	5	25
42	380	252	32	155	4	21
43	398	16	2	10	0	1
44	399	354	45	205	5	28
45	403	31	4	19	0	3
46	214	1,601	210	819	20	110

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Red Option 2023		
Year	2023	Number of links	56
Pollutant		Total emission	Units
CO		75,372	kg/year
THC		9,242	kg/year
NO_x		44,918	kg/year
PM_{10}		1,436	kg/year
C		6,133	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	223	29	113	3	15
2	134	1,002	126	280	10	49
3	138	662	84	192	6	33
4	140	122	15	34	1	6
5	144	1,022	127	277	9	48
6	148	1,162	144	310	11	54
7	154	1,033	129	282	10	49
8	160	531	66	144	5	25
9	168	331	41	89	3	16
10	172	4,637	575	1,245	43	218
11	174	2,145	265	950	25	131
12	176	1,618	215	717	19	99
13	178	903	127	407	11	57
14	179	381	51	163	4	23
15	190	1,121	144	347	11	56
16	192	356	47	127	4	20
17	194	3,385	449	1,315	38	192
18	195	714	95	287	8	41
19	200	5,594	673	3,946	126	524
20	202	2,504	303	1,744	54	233
21	203	2,110	256	1,469	46	196
22	217	220	29	112	3	15
23	243	15	2	6	0	1
24	244	80	11	32	1	5
25	304	328	42	199	5	27
26	306	317	42	164	4	22
27	327	383	48	252	7	34
28	328	234	28	169	6	22
29	330	9,685	1,146	6,973	240	921
30	332	1,211	143	872	30	115
31	334	10,896	1,289	7,844	270	1,036
32	336	2,626	310	1,893	65	250
33	340	296	35	171	4	23
34	342	193	24	127	4	17
35	344	251	31	160	4	22
36	348	2,166	256	1,563	54	206
37	352	339	42	218	6	29
38	354	406	51	260	7	35
39	356	222	28	138	4	19
40	357	5,053	606	3,585	116	475
41	358	323	43	130	4	19
42	374	345	44	207	5	28
43	380	277	35	170	4	23
44	398	18	2	12	0	2
45	399	394	51	227	6	31
46	403	41	5	25	1	3
47	500	598	74	387	11	52
48	501	3,976	491	2,640	75	356
49	503	353	44	235	7	32
50	504	220	27	146	4	20
51	505	183	23	114	3	15
52	506	183	23	116	3	16
53	507	43	5	29	1	4
54	508	210	26	135	4	18
55	509	893	108	620	19	83
56	511	788	95	549	17	73

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Yellow 2023		
Year	2023	Number of links	55
Pollutant		Total emission	Units
CO		82,855	kg/year
THC		10,167	kg/year
NO_x		49,405	kg/year
PM_{10}		1,571	kg/year
C		6,742	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	223	29	113	3	15
2	134	1,002	128	280	10	49
3	140	129	16	36	1	6
4	144	1,101	137	295	10	52
5	148	1,304	161	342	12	60
6	154	1,153	143	310	11	54
7	160	592	73	158	5	28
8	168	368	45	97	3	17
9	172	5,151	636	1,360	47	239
10	174	2,339	311	1,027	27	142
11	176	1,765	234	775	20	107
12	178	1,046	139	442	12	62
13	179	418	56	177	5	25
14	190	1,181	151	363	12	61
15	192	409	54	145	4	22
16	194	3,662	485	1,405	41	207
17	195	758	101	305	9	44
18	200	5,070	610	3,580	115	475
19	202	2,295	278	1,599	50	213
20	203	6,189	749	4,312	134	575
21	217	738	97	377	9	51
22	244	80	11	32	1	5
23	304	326	42	199	5	27
24	306	317	42	164	4	22
25	327	383	48	252	7	34
26	328	234	28	169	6	22
27	330	9,685	1,146	6,973	240	921
28	332	1,211	143	872	30	115
29	334	10,896	1,289	7,844	270	1,036
30	336	2,626	310	1,893	65	250
31	340	355	46	203	5	27
32	342	230	29	150	4	20
33	344	273	34	174	5	23
34	348	2,166	256	1,563	54	206
35	352	339	42	218	6	29
36	354	406	51	260	7	35
37	356	204	26	128	3	17
38	357	5,310	637	3,766	122	499
39	358	306	41	123	3	18
40	374	345	44	207	5	28
41	380	277	35	170	4	23
42	398	18	2	12	0	2
43	399	394	51	227	6	31
44	403	41	5	25	1	3
45	500	296	37	193	5	26
46	501	3,205	401	2,048	55	276
47	502	2,939	363	1,951	56	263
48	503	288	35	192	6	26
49	504	134	17	89	3	12
50	505	196	25	121	3	16
51	506	120	15	76	2	10
52	507	33	4	22	1	3
53	508	255	32	155	4	21
54	509	1,322	160	918	28	123
55	511	748	91	521	16	69

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Blue Option 1 2023		
Year	2023	Number of links	41
Pollutant		Total emission	Units
CO		36,211	kg/year
THC		4,565	kg/year
NO_x		17,594	kg/year
PM_{10}		530	kg/year
C		2,503	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	660	83	192	6	33
2	140	121	15	34	1	6
3	144	1,018	127	276	9	48
4	148	1,099	136	296	10	52
5	154	979	122	269	9	47
6	160	503	63	138	5	24
7	168	315	39	85	3	15
8	172	4,406	548	1,192	41	209
9	174	2,055	273	914	24	126
10	176	1,551	206	689	18	95
11	178	910	121	391	10	54
12	179	364	48	156	4	22
13	190	1,304	167	395	13	67
14	192	356	47	127	4	20
15	194	3,771	499	1,439	42	213
16	195	775	103	312	9	45
17	203	3,756	452	2,648	84	352
18	217	406	54	209	5	28
19	244	80	11	32	1	5
20	340	270	35	156	4	21
21	342	175	22	115	3	15
22	344	240	30	153	4	21
23	352	269	36	187	5	25
24	354	364	45	234	6	32
25	356	214	27	134	4	18
26	357	4,932	591	3,500	113	464
27	358	298	40	120	3	17
28	374	345	44	207	5	28
29	380	277	35	170	4	23
30	403	11	1	7	0	1
31	500	581	72	377	10	51
32	501	8	1	5	0	1
33	502	149	18	101	3	14
34	503	324	40	216	6	29
35	504	259	32	170	5	23
36	505	503	64	309	8	42
37	506	215	27	136	4	18
38	507	48	6	32	1	4
39	508	344	42	233	7	31
40	509	1,720	216	1,095	29	146
41	510	217	27	144	4	19

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Blue Option 2 2023		
Year	2023	Number of links	41
Pollutant		Total emission	Units
CO		36,013	kg/year
THC		4,540	kg/year
NO_x		17,472	kg/year
PM_{10}		526	kg/year
C		2,486	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	660	83	192	6	33
2	140	121	15	34	1	6
3	144	1,018	127	276	9	48
4	148	1,099	136	296	10	52
5	154	979	122	269	9	47
6	160	503	63	138	5	24
7	168	315	39	85	3	15
8	172	4,406	548	1,192	41	209
9	174	2,055	273	914	24	126
10	176	1,551	206	689	18	95
11	178	910	121	391	10	54
12	179	364	48	156	4	22
13	190	1,304	167	395	13	67
14	192	356	47	127	4	20
15	194	3,771	499	1,439	42	213
16	195	775	103	312	9	45
17	203	3,756	452	2,648	84	352
18	217	406	54	209	5	28
19	244	80	11	32	1	5
20	340	270	35	156	4	21
21	342	175	22	115	3	15
22	344	240	30	153	4	21
23	352	269	36	187	5	25
24	354	364	45	234	6	32
25	356	214	27	134	4	18
26	357	4,932	591	3,500	113	464
27	358	298	40	120	3	17
28	374	345	44	207	5	28
29	380	277	35	170	4	23
30	403	11	1	7	0	1
31	500	581	72	377	10	51
32	501	8	1	5	0	1
33	502	138	17	93	3	12
34	503	324	40	216	6	29
35	504	259	32	170	5	23
36	505	503	64	309	8	42
37	506	215	27	136	4	18
38	507	48	6	32	1	4
39	508	916	114	590	16	80
40	509	973	121	627	17	85
41	510	206	25	140	4	19

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Blue Option 3		
Year	2023	Number of links	41
Pollutant		Total emission	Units
CO		36,014	kg/year
THC		4,540	kg/year
NO_x		17,474	kg/year
PM_{10}		527	kg/year
C		2,487	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	660	83	192	6	33
2	140	121	15	34	1	6
3	144	1,018	127	276	9	48
4	148	1,099	136	296	10	52
5	154	979	122	269	9	47
6	160	503	63	138	5	24
7	168	315	39	85	3	15
8	172	4,406	548	1,192	41	209
9	174	2,055	273	914	24	126
10	176	1,551	206	689	18	95
11	178	910	121	391	10	54
12	179	364	48	156	4	22
13	190	1,304	167	385	13	67
14	192	356	47	127	4	20
15	194	3,771	499	1,439	42	213
16	195	775	103	312	9	45
17	203	3,756	452	2,648	84	352
18	217	406	54	209	5	28
19	244	80	11	32	1	5
20	340	270	35	156	4	21
21	342	175	22	115	3	15
22	344	240	30	153	4	21
23	352	269	36	187	5	25
24	354	364	45	234	6	32
25	356	214	27	134	4	18
26	357	4,932	591	3,500	113	464
27	358	298	40	120	3	17
28	374	345	44	207	5	28
29	380	277	35	170	4	23
30	403	11	1	7	0	1
31	500	581	72	377	10	51
32	501	8	1	5	0	1
33	502	195	24	132	4	18
34	503	324	40	216	6	29
35	504	259	32	170	5	23
36	505	503	64	309	8	42
37	506	215	27	136	4	18
38	507	48	6	32	1	4
39	508	1,145	143	735	20	99
40	509	629	79	406	11	55
41	510	264	32	178	5	24

DMRB: Regional Impact Assessment — OUTPUT SHEET

Summary

Name	Do Minimum 2037		
Year	2025	Number of links	44
Pollutant		Total emission	Units
CO		76,503	kg/year
THC		9,418	kg/year
NO_x		40,844	kg/year
PM_{10}		1,320	kg/year
C		5,699	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	272	36	137	3	18
2	134	1,309	162	352	12	62
3	138	862	108	243	8	42
4	140	169	21	46	2	8
5	144	1,524	186	385	13	68
6	148	1,831	222	448	16	79
7	154	1,591	194	404	14	71
8	160	816	100	206	7	36
9	165	508	62	126	4	22
10	172	7,109	864	1,763	61	311
11	174	2,993	398	1,275	34	178
12	176	2,258	300	962	26	135
13	178	1,363	181	553	15	79
14	179	545	72	221	6	32
15	190	1,954	245	546	19	95
16	192	550	72	190	6	30
17	194	5,710	750	2,005	62	312
18	195	1,038	138	417	12	60
19	200	8,008	965	5,626	179	749
20	202	3,493	424	2,421	75	324
21	214	1,762	232	898	22	121
22	241	14	2	8	0	1
23	244	70	9	39	1	5
24	304	406	52	243	6	33
25	306	394	52	200	5	27
26	327	374	46	245	7	33
27	330	9,676	1,145	6,956	239	920
28	332	1,209	143	870	30	115
29	334	10,885	1,288	7,826	269	1,035
30	336	2,590	306	1,864	65	247
31	340	492	64	278	7	37
32	342	327	41	210	6	28
33	344	346	43	218	6	30
34	348	2,105	248	1,516	53	200
35	352	223	28	145	4	20
36	354	317	39	204	6	28
37	356	162	21	78	2	11
38	358	184	24	85	2	12
39	359	3	0	1	0	0
40	374	343	44	205	5	28
41	380	277	35	170	4	23
42	398	18	2	11	0	2
43	399	390	50	224	6	30
44	403	34	4	21	1	3

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Red Design Year		
Year	2025	Number of links	54
Pollutant		Total emission	Units
CO		83,206	kg/year
THC		10,203	kg/year
NO_x		49,102	kg/year
PM_{10}		1,572	kg/year
C		6,726	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	246	32	124	3	17
2	134	1,134	141	311	11	54
3	138	742	94	213	7	37
4	140	137	17	38	1	7
5	144	1,167	144	308	11	54
6	148	1,333	164	347	12	61
7	154	1,176	146	314	11	55
8	160	605	75	161	6	28
9	168	379	47	99	3	17
10	172	5,307	654	1,391	48	245
11	174	2,388	317	1,044	28	145
12	176	1,801	239	788	21	109
13	178	1,066	142	448	12	63
14	179	426	57	179	5	25
15	190	1,276	163	387	13	65
16	192	394	52	139	4	22
17	194	3,832	507	1,455	43	216
18	195	785	104	315	9	45
19	200	6,147	740	4,329	138	576
20	202	2,752	333	1,912	59	255
21	203	2,319	281	1,611	50	215
22	217	242	32	123	3	17
23	244	88	12	36	1	5
24	304	361	46	218	6	29
25	308	350	46	179	4	24
26	327	421	52	276	8	37
27	330	10,630	1,259	7,635	262	1,010
28	332	1,329	157	954	33	126
29	334	11,959	1,416	8,589	294	1,136
30	336	2,883	341	2,073	71	274
31	340	326	42	187	5	25
32	342	213	26	139	4	19
33	344	276	35	175	5	24
34	348	2,378	281	1,712	59	226
35	352	372	47	239	6	32
36	354	447	56	285	8	39
37	356	244	31	152	4	20
38	357	5,550	666	3,928	127	521
39	358	355	47	143	4	21
40	374	380	49	226	6	31
41	380	305	39	186	5	25
42	398	20	2	13	0	2
43	399	435	56	249	6	34
44	403	46	6	27	1	4
45	500	657	82	424	12	57
46	501	4,371	540	2,890	82	390
47	503	388	48	257	7	35
48	504	242	30	160	4	22
49	505	201	25	125	3	17
50	506	202	25	127	3	17
51	507	47	6	32	1	4
52	508	230	29	148	4	20
53	509	981	119	680	21	91
54	511	866	105	601	19	80

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Yellow 2037		
Year	2025	Number of links	55
Pollutant		Total emission	Units
CO		92,348	kg/year
THC		11,333	kg/year
NO_x		54,260	kg/year
PM_{10}		1,725	kg/year
C		7,437	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	106	246	32	124	3	17
2	134	1,134	141	311	11	54
3	138	768	97	219	7	38
4	140	146	18	40	1	7
5	144	1,261	155	330	11	58
6	148	1,505	184	383	13	68
7	154	1,320	163	348	12	61
8	160	678	83	177	6	31
9	168	423	52	109	4	19
10	172	5,928	727	1,524	53	269
11	174	2,607	346	1,129	30	157
12	176	1,967	261	852	23	118
13	178	1,173	156	486	13	69
14	179	469	62	195	5	28
15	190	1,348	172	405	13	69
16	192	454	60	159	5	25
17	194	4,158	550	1,556	46	233
18	195	833	111	335	9	46
19	200	5,571	670	3,925	126	522
20	202	2,522	305	1,753	54	234
21	203	6,802	824	4,728	147	632
22	217	813	107	414	10	56
23	244	88	12	36	1	5
24	304	361	46	218	6	29
25	308	350	46	179	4	24
26	327	421	52	276	8	37
27	330	10,630	1,259	7,635	262	1,010
28	332	1,329	157	954	33	126
29	334	11,959	1,416	8,589	294	1,136
30	336	2,883	341	2,073	71	274
31	340	391	50	223	6	30
32	342	232	31	164	5	22
33	344	300	38	190	5	28
34	348	2,378	281	1,712	59	226
35	352	372	47	239	6	32
36	354	447	56	285	8	39
37	356	224	28	140	4	19
38	357	5,832	700	4,125	133	548
39	358	336	45	135	4	19
40	374	380	49	226	6	31
41	380	305	39	186	5	25
42	398	20	2	13	0	2
43	399	435	56	249	6	34
44	403	46	6	27	1	4
45	500	325	41	211	6	28
46	501	3,526	442	2,241	60	303
47	502	3,231	399	2,137	61	288
48	503	316	39	210	6	28
49	504	148	18	98	3	13
50	505	218	28	132	3	18
51	506	131	17	83	2	11
52	507	36	4	25	1	3
53	508	280	36	170	4	23
54	509	1,452	176	1,006	31	135
55	511	822	100	571	18	76

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Blue Option 1 2037		
Year	2025	Number of links	41
Pollutant		Total emission	Units
CO		40,445	kg/year
THC		5,092	kg/year
NO_x		19,382	kg/year
PM_{10}		585	kg/year
C		2,768	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	739	93	212	7	37
2	140	137	17	38	1	7
3	144	1,162	144	308	11	54
4	148	1,257	155	331	11	58
5	154	1,113	138	300	10	53
6	160	572	71	154	5	27
7	168	359	44	95	3	17
8	172	5,030	622	1,330	46	234
9	174	2,286	304	1,004	26	139
10	176	1,725	229	758	20	105
11	178	1,017	135	430	12	60
12	179	407	54	172	5	24
13	190	1,494	190	441	15	75
14	192	394	52	139	4	22
15	194	4,286	567	1,595	47	239
16	195	852	113	342	10	49
17	203	4,127	497	2,903	93	386
18	217	449	59	229	6	31
19	244	88	12	36	1	5
20	340	297	38	171	4	23
21	342	193	24	126	4	17
22	344	264	33	168	5	23
23	352	318	40	205	6	28
24	354	400	50	256	7	35
25	356	235	30	146	4	20
26	357	5,417	650	3,835	124	509
27	358	328	44	132	4	19
28	374	380	49	226	6	31
29	380	305	39	186	5	25
30	403	12	1	8	0	1
31	500	638	80	413	11	56
32	501	9	1	5	0	1
33	502	164	20	110	3	15
34	503	356	44	236	7	32
35	504	285	35	187	5	25
36	505	553	70	339	9	46
37	506	237	30	149	4	20
38	507	52	6	35	1	5
39	508	378	46	255	7	34
40	509	1,891	237	1,200	32	162
41	510	239	30	158	4	21

DMRB: Regional Impact Assessment — OUTPUT SHEET

Summary

Name	Blue 2 2037		
Year	2025	Number of links	41
Pollutant		Total emission	Units
CO		40,226	kg/year
THC		5,065	kg/year
NO_x		19,227	kg/year
PM_{10}		581	kg/year
C		2,750	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	739	93	212	7	37
2	140	137	17	38	1	7
3	144	1,162	144	308	11	54
4	148	1,257	155	331	11	58
5	154	1,113	138	300	10	53
6	160	572	71	154	5	27
7	168	359	44	95	3	17
8	172	5,030	622	1,330	46	234
9	174	2,286	304	1,004	26	139
10	176	1,725	229	758	20	105
11	178	1,017	135	430	12	60
12	179	407	54	172	5	24
13	190	1,494	190	441	15	75
14	192	394	52	139	4	22
15	194	4,286	567	1,595	47	239
16	195	852	113	342	10	49
17	203	4,127	497	2,903	93	386
18	217	449	59	229	6	31
19	244	88	12	36	1	5
20	340	297	38	171	4	23
21	342	193	24	126	4	17
22	344	264	33	168	5	23
23	352	316	40	205	6	28
24	354	400	50	256	7	35
25	356	235	30	146	4	20
26	357	5,417	650	3,835	124	509
27	358	328	44	132	4	19
28	374	380	49	226	6	31
29	380	305	39	186	5	25
30	403	12	1	8	0	1
31	500	638	80	413	11	56
32	501	9	1	5	0	1
33	502	151	19	102	3	14
34	503	356	44	236	7	32
35	504	285	35	187	5	25
36	505	553	70	339	9	46
37	506	237	30	149	4	20
38	507	52	6	35	1	5
39	508	1,007	126	647	18	87
40	509	1,070	134	687	19	93
41	510	227	28	153	4	21

DMRB: Regional Impact Assessment

OUTPUT SHEET

Summary

Name	Blue 3 2037		
Year	2025	Number of links	41
Pollutant		Total emission	Units
CO		40,229	kg/year
THC		5,065	kg/year
NO_x		19,229	kg/year
PM_{10}		581	kg/year
C		2,750	tonnes/year

All links

Link number	Link title	Emissions				
		CO (kg/year)	THC (kg/year)	NO_x (kg/year)	PM_{10} (kg/year)	C (tonnes/year)
1	138	739	93	212	7	37
2	140	137	17	38	1	7
3	144	1,162	144	308	11	54
4	148	1,257	155	331	11	58
5	154	1,113	138	300	10	53
6	160	572	71	154	5	27
7	168	359	44	95	3	17
8	172	5,030	622	1,330	46	234
9	174	2,286	304	1,004	26	139
10	176	1,725	229	758	20	105
11	178	1,017	135	430	12	60
12	179	407	54	172	5	24
13	190	1,494	190	441	15	75
14	192	394	52	139	4	22
15	194	4,286	567	1,595	47	239
16	195	852	113	342	10	49
17	203	4,127	497	2,903	93	386
18	217	449	59	229	6	31
19	244	88	12	36	1	5
20	340	297	38	171	4	23
21	342	193	24	126	4	17
22	344	264	33	168	5	23
23	352	316	40	205	6	28
24	354	400	50	256	7	35
25	356	235	30	146	4	20
26	357	5,417	650	3,835	124	509
27	358	328	44	132	4	19
28	374	380	49	226	6	31
29	380	305	39	186	5	25
30	403	12	1	8	0	1
31	500	638	80	413	11	56
32	501	9	1	5	0	1
33	502	214	26	144	4	19
34	503	356	44	236	7	32
35	504	285	35	187	5	25
36	505	553	70	339	9	46
37	506	237	30	149	4	20
38	507	52	6	35	1	5
39	508	1,259	158	805	22	109
40	509	692	86	445	12	60
41	510	290	36	195	6	26

DMRB: Assessment of Local Air Quality

OUTPUT SHEET

Current receptor

Receptor Name	20 Ellisholding Road	Receptor number	10
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.03	0.03	mg/m^3	Annual mean*	0.03	mg/m^3
Benzene	0.00	0.03	0.03	$\mu g/m^3$	Annual mean	0.03	$\mu g/m^3$
1,3-butadiene	0.00	0.03	0.03	$\mu g/m^3$	Annual mean	0.03	$\mu g/m^3$
NO_x	0.0	6.8	6.8	$\mu g/m^3$	Not applicable		
NO_2	0.0	2.7	2.7	$\mu g/m^3$	Annual mean*	2.7	$\mu g/m^3$
PM_{10}	7.8	0.76	8.51	$\mu g/m^3$	Annual mean	8.5	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NOx ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
1	0.00	0.00	0.00	0.23	0.02
2	0.00	0.00	0.00	0.45	0.04
3	0.02	0.03	0.02	6.07	0.69
4	0.00	0.00	0.00	0.06	0.01
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Days >50$\mu g/m^3$
1	[redacted]	2023	0.16	0.18	0.15	18.47	6.10	11.61	0.00
2	[redacted]	2023	0.01	0.01	0.01	1.37	0.70	8.33	0.00
3	[redacted]	2023	0.02	0.02	0.02	5.42	2.24	9.38	0.00
4	[redacted]	2023	0.00	0.00	0.00	0.30	0.18	8.19	0.00
5	[redacted]	2023	0.00	0.00	0.00	0.22	0.14	7.77	0.00
6	[redacted]	2023	0.00	0.00	0.00	0.09	0.06	7.76	0.00
7	[redacted]	2023	0.01	0.01	0.00	1.08	0.57	7.84	0.00
8	[redacted]	2023	0.01	0.01	0.01	3.01	1.37	8.08	0.00
9	[redacted]	2023	0.01	0.01	0.01	1.99	0.96	7.94	0.00
10	[redacted]	2023	0.03	0.03	0.03	6.80	2.71	8.51	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

This spreadsheet calculates the nitrogen dioxide concentration from the modelled oxides of nitrogen concentrations

1). Confirm that the General inputs spreadsheet has been completed
The input selections are shown at the head of the Table below.
2.) Type in (or paste and copy from another spreadsheet)

1) the receptor identifier (Receptor ID) and its Easting and Northing. [Optional]
2) the modelled contribution from roads to oxides of nitrogen concentrations (Road increment NO_x)
3) the local background concentration as NO_2 (2d.p)
You may alternatively enter the local background as Nox
Leave the redundant background NO_x or NO_2 columns blank as appropriate
Note that calculations are faster if you input background NO_x rather than background NO_2

3). The default set-up is to use the fraction of oxides emitted as NO_2 from the General Inputs spreadsheet
Leave the "Fraction emitted as NO_2" column empty to use the default set up.
However, you can overwrite the defaults by typing appropriate values (0-1) into this column.
The fNO2 spreadsheet provides additional values.

4) Click the mouse on the run button to run the model.
The model will calculate:
a) the total nitrogen dioxide concentration at the receptor (Total NO_2)
b) the incremental contribution to nitrogen dioxide concentrations from the road vehicle emissions (Road NO_2)

Run NO_x to NO_2

Copy and paste the results to another spreadsheet.

5) Click the mouse on the Clear button to clear the spreadsheet

Clear spreadsheet

Local Authority: Newry Mourne and Down **Year:** 2023 **Traffic Mix:** All non-urban UK traffic

Receptor ID	Easting,m	Northing, m	Road increment NO_x µg m^{-3}	Background µg m^{-3} NO_x	Background µg m^{-3} NO_2	Fraction emitted as NO_2	Total NO_2 µg m^{-3}	Road NO_2 µg m^{-3}	Notes
[redacted]			18.47	6.94	5.41		15.3	9.89	
[redacted]			1.37	5.05	3.98		4.75	0.77	
[redacted]			5.42	5.70	4.48		7.47	2.99	
[redacted]			0.30	4.95	3.91		4.08	0.17	
[redacted]			0.22	4.36	3.46		3.58	0.12	
[redacted]			0.09	4.36	3.46		3.51	0.05	
[redacted]			1.08	4.36	3.46		4.06	0.6	
[redacted]			3.01	4.45	3.53		5.21	1.68	
[redacted]			1.99	4.45	3.53		4.64	1.11	
[redacted]			6.80	4.45	3.53		7.29	3.76	

Highways Agency Long Term Gap Analysis Calculator v1.0

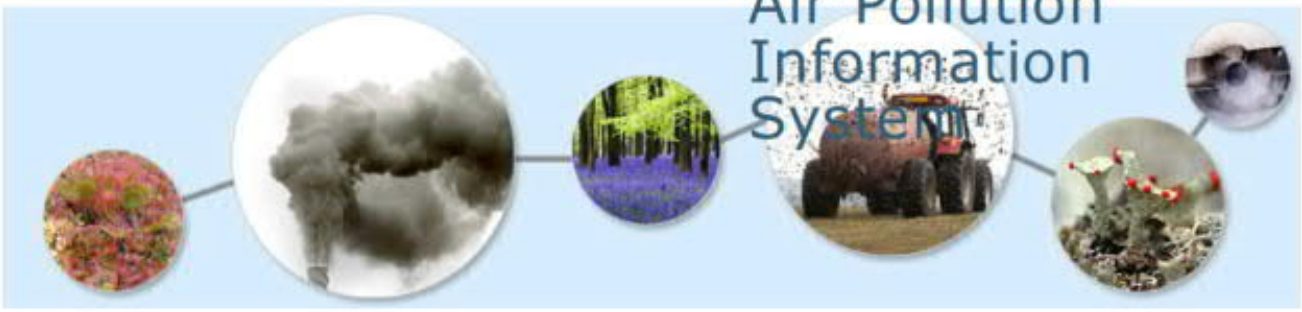
Please Select:
Base Year: 2017 | Pollutant: NO2 | Calculate
Assessment Year: 2023

Receptor ID	Enter Modelled Annual Mean NO2 Concentrations (µg/m³) Base Year	Projected Base Year	Do-Minimum	Do-Something	Modelled 2017 Base Year / 2023 Do-Minimum (Ratio A)	Long Term Adjustment Factor Between 2017 / 2023 (Ratio B)	Gap Factor	Adjusted Annual Mean NO2 Concentrations (µg/m³) Do-Minimum	Do-Something
[redacted]	17.9	15.3	15.73	13.89	0.85	0.96	1.12	17.6	15.5
[redacted]	6.01	4.75	4.78	4.72	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	6.96	0.83	0.96	1.16	8.9	8.0
[redacted]	5.26	4.08	4.09	4.09	0.78	0.96	1.23	5.0	5.0
[redacted]	4.6	3.58	3.59	4.25	0.78	0.96	1.23	4.4	5.2
[redacted]	4.53	3.51	3.52	3.66	0.77	0.96	1.23	4.3	4.5
[redacted]	5.12	4.06	4.11	4.53	0.79	0.96	1.21	5.0	5.5
[redacted]	6.34	5.21	5.28	6.2	0.82	0.96	1.16	6.1	7.2
[redacted]	5.73	4.64	4.7	7.03	0.81	0.96	1.18	5.6	8.3
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.24	0.85	0.96	1.12	17.6	15.9
[redacted]	6.01	4.75	4.78	4.75	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	6.73	0.83	0.96	1.16	8.9	7.8
[redacted]	5.26	4.08	4.09	4.09	0.78	0.96	1.23	5.0	5.0
[redacted]	4.6	3.58	3.59	4.13	0.78	0.96	1.23	4.4	5.1
[redacted]	4.53	3.51	3.52	3.63	0.77	0.96	1.23	4.3	4.5
[redacted]	5.12	4.06	4.11	4.48	0.79	0.96	1.21	5.0	5.4
[redacted]	6.34	5.21	5.28	6.08	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.66	0.81	0.96	1.18	5.6	7.9
[redacted]	8.57	7.29	7.41	7.73	0.85	0.96	1.12	8.3	8.7
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.25	0.78	0.96	1.23	5.0	5.2
[redacted]	4.6	3.58	3.59	3.64	0.78	0.96	1.23	4.4	4.5
[redacted]	4.53	3.51	3.52	4.4	0.77	0.96	1.23	4.3	5.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.28	0.78	0.96	1.23	5.0	5.3
[redacted]	4.6	3.58	3.59	3.9	0.78	0.96	1.23	4.4	4.8
[redacted]	4.53	3.51	3.52	3.59	0.77	0.96	1.23	4.3	4.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8
[redacted]	17.9	15.3	15.73	14.61	0.85	0.96	1.12	17.6	16.3
[redacted]	6.01	4.75	4.78	4.7	0.79	0.96	1.21	5.8	5.7
[redacted]	9.03	7.47	7.67	8.9	0.83	0.96	1.16	8.9	10.3
[redacted]	5.26	4.08	4.09	4.27	0.78	0.96	1.23	5.0	5.3
[redacted]	4.6	3.58	3.59	3.9	0.78	0.96	1.23	4.4	4.8
[redacted]	4.53	3.51	3.52	3.59	0.77	0.96	1.23	4.3	4.4
[redacted]	5.12	4.06	4.11	4.11	0.79	0.96	1.21	5.0	5.0
[redacted]	6.34	5.21	5.28	6.06	0.82	0.96	1.16	6.1	7.1
[redacted]	5.73	4.64	4.7	6.79	0.81	0.96	1.18	5.6	8.0
[redacted]	8.57	7.29	7.41	7.83	0.85	0.96	1.12	8.3	8.8

Appendix B Annex D

APIS

(http://www.apis.ac.uk/)



(http://www.apis.ac.uk/)

Results (http://www.apis.ac.uk/srcl/results)

SRCL home (http://www.apis.ac.uk/srcl) | SSSI (http://www.apis.ac.uk/srcl/select-a-site?SiteType=SSSI) | Fathom Upper (http://www.apis.ac.uk/srcl/select-a-feature?site=ASSI238&SiteType=SSSI) | Lowland Meadows (http://www.apis.ac.uk/srcl/results?sitecode=ASSI238&sitetype=SSSI&features=GRASNELOUP,PH29)

Site/Feature Information

Site Name: Fathom Upper
Interest Name: Lowland Meadows - (Lowland Meadow)
EUNIS Habitat: Critical loads for nitrogen are based on the EUNIS habitat classification. The EUNIS classes corresponding with the BAP habitat you have selected ('Lowland Meadow ') are listed in the box below. Therefore please select below the EUNIS class that best fits the particular habitat type at the SSSI you have selected. If you have more detailed habitat classification at your site (e.g. NVC class) you can use the **habitat correspondence table (http://www.jncc.gov.uk/files/NBNdictionary_habitat_correspondances_20080205.zip)** to look up the corresponding EUNIS class. If you do not have this information, then for the purpose of a screening assessment, you are advised to select the first habitat in the list which is the most

sensitive.

You can find out more information on interest feature(s) at your selected A/SSSI by using the country agency websites - **NIEA, (http://www.ni-environment.gov.uk/protected_areas_home/new_assi_landing_page.htm) SNH (http://gateway.snh.gov.uk/portal/page?_pageid=53,910284,53_920284&_dad=portal&_schema=PORTAL) , Natural England, (http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm) & CCW (http://www.ccw.gov.uk/interactive-maps/official-maps-search.aspx)**

Select a EUNIS Habitat: E2.2: Low and medium altitude hay meadows

[Note: Habitats in the select menu above may give the same nitrogen and acidity values]

Enter a grid reference >>

Impacts and Critical Loads | **Deposition & Critical Load Graphs** | **Source Attribution**

Nutrient Nitrogen

Habitat sensitive to Nitrogen? Yes
Relevant Nitrogen Critial Load Class: Low and medium altitude hay meadows ⓘ

Empirical Critical Loads: 20-30 kg N/ha/yr
Uncertainty in these values? expert judgement
EUNIS ecosystem class: E2.2
Exceedance Impacts: Increase in tall grasses, decrease in diversity.

Acidity

Habitat sensitive to Acidity? Yes

Acidity Class: Calcareous grassland (using base cation) ⓘ
Exceedance Impacts: Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions; mobilisation of Al3+ may cause toxicity to plants and mycorrhiza; may have direct effect on lower plants (bryophytes and lichens).

Nutrient Nitrogen

Habitat sensitive to Nitrogen? Yes
Relevant Nitrogen Critial Load Class: Low and medium altitude hay meadows ⓘ

Empirical Critical Loads: 20-30 kg N/ha/yr
Uncertainty in these values? expert judgement
EUNIS ecosystem class: E2.2
Exceedance Impacts: Increase in tall grasses, decrease in diversity.

Acidity

Habitat sensitive to Acidity? Yes

Acidity Class: Acid grassland ⓘ

Exceedance Impacts: Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions, mobilisation of Al3+ may cause toxicity to plants and mycorrhiza, may have direct effect on lower plants (bryophytes and lichens).

Acidity Critical Loads (keq):
MaxCLminN: 1 MaxCLMaxN: 5 MaxCLMaxS: 4
MinCLminN: 0.857 MinCLMaxN: 4.857 MinCLMaxS: 4**Acidity Critical Loads** (keq):
MaxCLminN: 0.224 MaxCLMaxN: 0.664 MaxCLMaxS: 0.44
MinCLminN: 0.224 MinCLMaxN: 0.664 MinCLMaxS: 0.44

Post updated: Wed, 15/03/2017 - 23:03

Assessment of Designated Ecological Sites

Method for Assessing NO$_x$ Concentrations & Nitrogen Deposition Rates

Fathom Upper

Irish Grid Ref: 250690, 409670

Low and Medium Altitude Hay Meadow

STEP 1

Obtain total average N deposition for 5km grid square (data derived from APIS website).

N Deposition data source for year 2012-2014 (3 year average). This is taken to be equivalent to those in 2013 (Data provided by Centre for Ecology and Hydrology, Edinburgh).	2013	
	19.88	kg N/ha^{-1}/year^{-1}

N Deposition Rates should be reduced by 2% per year to estimate deposition rates for assessment years

N Deposition Rate equivalent to year 2014	19.5	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2015	19.1	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2016	18.7	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2017	18.3	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2018	18.0	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2019	17.6	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2020	17.3	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2021	16.9	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2022	16.6	kg N/ha^{-1}/year^{-1}
N Deposition Rate equivalent to year 2023	**16.2**	kg N/ha^{-1}/year^{-1}

N Deposition Critical Loads for Hay Meadows (APIS)

Low and Medium Altitude Hay Meadows	20 - 30	kg N/ha^{-1}/year^{-1}

Local Air Quality Assessment Output

Fathom Upper

STEP 3

Estimate dry deposition of NO$_2$ Scaling Factor = 1µg/m^3 of NO$_2$ = 0.1 kg N/ha^{-1}/year^{-1}

Calculated using the Local Application of the DMRB Screening Spreadsheet

Name	Distance	Year	NO$_x$ Annual mean µg/m^3	NO$_2$* Annual mean µg/m^3	Dry deposition of NO$_2$ in a transect near the road		Road increment to NO$_2$ dry deposition		Total deposition rate	
cSAC/ASSI (Base Year)	20	2017	5.26	4.11	0.41	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	18.32	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Base Year)	70	2017	5.12	4.03	0.40	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	18.31	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Base Year)	155	2017	5.07	4.00	0.40	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	18.31	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Base Year)	175	2017	5.06	4.00	0.40	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	18.31	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Base Year)	200	2017	5.06	4.00	0.40	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	18.31	kg N/ha^{-1}/year^{-1}

Name	Distance	Year	NO$_x$ Annual mean µg/m^3	NO$_2$* Annual mean µg/m^3	Dry deposition of NO$_2$ in a transect near the road		Road increment to NO$_2$ dry deposition		Total deposition rate	
cSAC/ASSI (Do-Min)	20	2023	4.14	3.24	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.23	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Min)	70	2023	4.00	3.16	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Min)	155	2023	3.96	3.13	0.31	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Min)	175	2023	3.96	3.13	0.31	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Min)	200	2023	3.94	3.13	0.31	kg N/ha^{-1}/year^{-1}	-0.03	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}

Name	Distance	Year	NO$_x$ Annual mean µg/m^3	NO$_2$* Annual mean µg/m^3	Dry deposition of NO$_2$ in a transect near the road		Road increment to NO$_2$ dry deposition		Total deposition rate	
cSAC/ASSI (Do-Some) RED	20	2023	7.57	5.15	0.52	kg N/ha^{-1}/year^{-1}	0.18	kg N/ha^{-1}/year^{-1}	16.42	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) RED	70	2023	5.00	3.72	0.37	kg N/ha^{-1}/year^{-1}	0.03	kg N/ha^{-1}/year^{-1}	16.28	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) RED	155	2023	4.10	3.22	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.23	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) RED	175	2023	4.07	3.20	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) RED	200	2023	4.01	3.17	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}

Name	Distance	Year	NO$_x$ Annual mean µg/m^3	NO$_2$* Annual mean µg/m^3	Dry deposition of NO$_2$ in a transect near the road		Road increment to NO$_2$ dry deposition		Total deposition rate	
cSAC/ASSI (Do-Some) Yellow	20	2023	6.93	4.79	0.48	kg N/ha^{-1}/year^{-1}	0.14	kg N/ha^{-1}/year^{-1}	16.38	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) Yellow	70	2023	4.81	3.62	0.36	kg N/ha^{-1}/year^{-1}	0.02	kg N/ha^{-1}/year^{-1}	16.27	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) Yellow	155	2023	4.07	3.20	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) Yellow	175	2023	4.05	3.19	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}
cSAC/ASSI (Do-Some) Yellow	200	2023	4.00	3.18	0.32	kg N/ha^{-1}/year^{-1}	-0.02	kg N/ha^{-1}/year^{-1}	16.22	kg N/ha^{-1}/year^{-1}

STEP 2

Obtain background NO$_x$ and NO$_2$ Concentrations (using same method as local assessment)

	NO$_x$	
*(Not Adjusted) 2017 value =	5.057	µg/m^3
*(Not Adjusted) 2023 value =	3.94	µg/m^3
	NO$_2$	
*(Not Adjusted) 2017 value =	3.99	µg/m^3
*(Not Adjusted) 2023 value =	3.13	µg/m^3

Background concentrations were obtained for 1km squares up to 4km from road so that the road contribution is not double counted.

*adjusted after DMRB screening s/sheet

NO$_x$ Critical level = 30.00 µg/m^3

Obtain the average NO$_2$ concentration for 5km grid square

(data derived from information provided by DEFRA website)

0.43	kg N/ha^{-1}/year^{-1} (2017)
4.28	µg/m^3 (2017)
0.34	kg N/ha^{-1}/year^{-1} (2023)
3.4	µg/m^3 (2023)

NOx Annual Mean Inputs - Base Year

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	Base 2017 200m	Receptor number	5
Assessment year	2017		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.00	0.00	mg/m³	Annual mean*	0.00	mg/m³
Benzene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
1,3-butadiene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
NO_x	5.1	0.0	5.1	µg/m³	Not applicable		
NO_2	0.0	0.0	0.0	µg/m³	Annual mean*	0.0	µg/m³
PM_{10}	0.0	0.00	0.00	µg/m³	Annual mean	0.0	µg/m³
					Days >50µg/m³	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m³)	Benzene (µg/m³)	1,3-butadiene (µg/m³)	NOx (µg/m³)	PM_{10} (µg/m³)
1	0.00	0.00	0.00	0.00	0.00
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	Base 2017 20m	2017	0.00	0.00	0.00	5.26	0.08	0.02	0.00
2	Base 2017 70m	2017	0.00	0.00	0.00	5.12	0.02	0.00	0.00
3	Base 2017 155m	2017	0.00	0.00	0.00	5.07	0.00	0.00	0.00
4	Base 2017 175m	2017	0.00	0.00	0.00	5.06	0.00	0.00	0.00
5	Base 2017 200m	2017	0.00	0.00	0.00	5.06	0.00	0.00	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

NOx Annual Mean Inputs - 2023 Opening Year

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	Yellow 200	Receptor number	15
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.00	0.00	mg/m³	Annual mean*	0.00	mg/m³
Benzene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
1,3-butadiene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
NO_x	3.9	0.1	4.0	µg/m³	Not applicable		
NO_2	0.0	0.0	0.0	µg/m³	Annual mean*	0.0	µg/m³
PM_{10}	0.0	0.01	0.01	µg/m³	Annual mean	0.0	µg/m³
					Days >50µg/m³	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m³)	Benzene (µg/m³)	1,3-butadiene (µg/m³)	NOx (µg/m³)	PM_{10} (µg/m³)
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.06	0.01
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	Do Min/Blue	2023	0.00	0.00	0.00	4.14	0.09	0.02	0.00
2	Do Min/Blue	2023	0.00	0.00	0.00	4.00	0.03	0.00	0.00
3	Do Min/Blue	2023	0.00	0.00	0.00	3.95	0.00	0.00	0.00
4	Do Min/Blue	2023	0.00	0.00	0.00	3.95	0.00	0.00	0.00
5	Do Min/Blue	2023	0.00	0.00	0.00	3.94	0.00	0.00	0.00
6	Red 20	2023	0.01	0.01	0.01	7.57	1.42	0.35	0.00
7	Red 70	2023	0.00	0.00	0.00	5.00	0.44	0.10	0.00
8	Red 155	2023	0.00	0.00	0.00	4.10	0.07	0.02	0.00
9	Red 175	2023	0.00	0.00	0.00	4.07	0.06	0.01	0.00
10	Red 200	2023	0.00	0.00	0.00	4.01	0.03	0.01	0.00
11	Yellow 20	2023	0.01	0.01	0.01	6.93	1.19	0.28	0.00
12	Yellow 70	2023	0.00	0.00	0.00	4.81	0.37	0.08	0.00
13	Yellow 155	2023	0.00	0.00	0.00	4.07	0.06	0.01	0.00
14	Yellow 175	2023	0.00	0.00	0.00	4.05	0.05	0.01	0.00
15	Yellow 200	2023	0.00	0.00	0.00	4.00	0.03	0.01	0.00

* See Footnote 32 in DMRB Volume 11 Chapter 3

NOx Background for Conversion To NO2

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	Fathom Yellow	Receptor number	20
Assessment year	2023		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.00	0.00	mg/m³	Annual mean*	0.00	mg/m³
Benzene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
1,3-butadiene	0.00	0.00	0.00	µg/m³	Annual mean	0.00	µg/m³
NO_x	0.0	0.1	0.1	µg/m³	Not applicable		
NO_2	0.0	0.0	0.0	µg/m³	Annual mean*	0.0	µg/m³
PM_{10}	0.0	0.01	0.01	µg/m³	Annual mean	0.0	µg/m³
					Days >50µg/m³	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m³)	Benzene (µg/m³)	1,3-butadiene (µg/m³)	NOx (µg/m³)	PM_{10} (µg/m³)
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.06	0.01
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	Fathom 20 (Base)	2017	0.00	0.00	0.00	0.20	0.13	0.02	0.00
2	Fathom 70 (Base)	2017	0.00	0.00	0.00	0.06	0.04	0.00	0.00
3	Fathom 155 (Base)	2017	0.00	0.00	0.00	0.01	0.01	0.00	0.00
4	Fathom 175 (Base)	2017	0.00	0.00	0.00	0.01	0.01	0.00	0.00
5	Fathom 200 (Base)	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Fathom 20 (Mn/Blues)	2023	0.00	0.00	0.00	0.20	0.13	0.02	0.00
7	Fathom 70 (Mn)	2023	0.00	0.00	0.00	0.06	0.04	0.00	0.00
8	Fathom 155 (Mn)	2023	0.00	0.00	0.00	0.01	0.01	0.00	0.00
9	Fathom 175 (Mn)	2023	0.00	0.00	0.00	0.01	0.01	0.00	0.00
10	Fathom 200 (Mn)	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Fathom Red 20m	2023	0.01	0.01	0.01	3.83	1.60	0.35	0.00
12	Fathom Red 70m	2023	0.00	0.00	0.00	1.06	0.56	0.10	0.00
13	Fathom Red 155m	2023	0.00	0.00	0.00	0.16	0.10	0.02	0.00
14	Fathom Red 175m	2023	0.00	0.00	0.00	0.13	0.09	0.01	0.00
15	Fathom Red 200m	2023	0.00	0.00	0.00	0.07	0.05	0.01	0.00
16	Fathom Yellow 20m	2023	0.01	0.01	0.01	2.99	1.36	0.28	0.00
17	Fathom Yellow 70m	2023	0.00	0.00	0.00	0.87	0.47	0.08	0.00
18	Fathom Yellow 155m	2023	0.00	0.00	0.00	0.13	0.09	0.01	0.00
19	Fathom Yellow 175m	2023	0.00	0.00	0.00	0.11	0.07	0.01	0.00
20	Fathom Yellow 200m	2023	0.000242506	0.000245954	0.000210437	0.060854002	0.043856912	0.005793566	0

* See Footnote 32 in DMRB Volume 11 Chapter 3

This spreadsheet calculates the nitrogen dioxide concentration from the modelled oxides of nitrogen concentrations

1). Confirm that the General inputs spreadsheet has been completed
The input selections are shown at the head of the Table below.
2.) Type in (or paste and copy from another spreadsheet)

1) the receptor identifier (Receptor ID) and its Easting and Northing. [Optional]
2) the modelled contribution from roads to oxides of nitrogen concentrations (Road increment NO_x)
3) the local background concentration as NO_2 (2d.p)
You may alternatively enter the local background as Nox
Leave the redundant background NO_x or NO_2 columns blank as appropriate
Note that calculations are faster if you input background NO_x rather than background NO_2

3). The default set-up is to use the fraction of oxides emitted as NO_2 from the General Inputs spreadsheet
Leave the "Fraction emitted as NO_2" column empty to use the default set up.
However, you can overwrite the defaults by typing appropriate values (0-1) into this column.
The fNO2 spreadsheet provides additional values.

4) Click the mouse on the run button to run the model.
The model will calculate:
a) the total nitrogen dioxide concentration at the receptor (Total NO_2)
b) the incremental contribution to nitrogen dioxide concentrations from the road vehicle emissions (Road NO_2)

Copy and paste the results to another spreadsheet.

Run NO_x to NO_2

5) Click the mouse on the Clear button to clear the spreadsheet

Clear spreadsheet

Local Authority: **Newry Mourne and Down** **Year:** **2017**
Traffic Mix: **All non-urban UK traffic**

Receptor ID	Easting,m	Northing, m	Road increment NO_x $\mu g\ m^{-3}$	Background $\mu g\ m^{-3}$		Fraction emitted as NO_2	Total NO_2 $\mu g\ m^{-3}$	Road NO_2 $\mu g\ m^{-3}$	Notes
				NO_x	NO_2				
Fathom 20 (Base)			0.20	5.05724444	3.99293333		4.11	0.11	
Fathom 70 (Base)			0.06	5.05724444	3.99293333		4.03	0.03	
Fathom 155 (Base)			0.01	5.05724444	3.99293333		4	0	
Fathom 175 (Base)			0.01	5.05724444	3.99293333		4	0	
Fathom 200 (Base)			0.00	5.05724444	3.99293333		4	0	

This spreadsheet calculates the nitrogen dioxide concentration from the modelled oxides of nitrogen concentrations

1). Confirm that the General inputs spreadsheet has been completed
The input selections are shown at the head of the Table below.
2.) Type in (or paste and copy from another spreadsheet)

1) the receptor identifier (Receptor ID) and its Easting and Northing. [Optional]
2) the modelled contribution from roads to oxides of nitrogen concentrations (Road increment NO_x)
3) the local background concentration as NO_2 (2d.p)
You may alternatively enter the local background as Nox
Leave the redundant background NO_x or NO_2 columns blank as appropriate
Note that calculations are faster if you input background NO_x rather than background NO_2

3). The default set-up is to use the fraction of oxides emitted as NO_2 from the General Inputs spreadsheet
Leave the "Fraction emitted as NO_2" column empty to use the default set up.
However, you can overwrite the defaults by typing appropriate values (0-1) into this column.
The fNO2 spreadsheet provides additional values.

4) Click the mouse on the run button to run the model.
The model will calculate:
a) the total nitrogen dioxide concentration at the receptor (Total NO_2)
b) the incremental contribution to nitrogen dioxide concentrations from the road vehicle emissions (Road NO_2)

Run NO_x to NO_2

Copy and paste the results to another spreadsheet.

5) Click the mouse on the Clear button to clear the spreadsheet

Clear spreadsheet

Local Authority: **Newry Mourne and Down** **Year:** **2023**
Traffic Mix: **All other urban UK traffic**

Receptor ID	Easting,m	Northing, m	Road increment NO_x $\mu g\ m^{-3}$	Background $\mu g\ m^{-3}$		Fraction emitted as NO_2	Total NO_2 $\mu g\ m^{-3}$	Road NO_2 $\mu g\ m^{-3}$	Notes
				NO_x	NO_2				
Fathom 20 (Min/Blues)			0.20	3.937	3.129		3.24	0.11	
Fathom 70 (Min)			0.06	3.937	3.129		3.16	0.03	
Fathom 155 (Min)			0.01	3.937	3.129		3.13	0	
Fathom 175 (Min)			0.01	3.937	3.129		3.13	0	
Fathom 200 (Min)			0.00	3.937	3.129		3.13	0	
Fathom Red 20m			3.63	3.937	3.129		5.15	2.02	
Fathom Red 70m			1.06	3.937	3.129		3.72	0.59	
Fathom Red 155m			0.16	3.937	3.129		3.22	0.09	
Fathom Red 175m			0.13	3.937	3.129		3.2	0.07	
Fathom Red 200m			0.07	3.937	3.129		3.17	0.04	
Fathom Yellow 20m			2.99	3.937	3.129		4.79	1.67	
Fathom Yellow 70m			0.87	3.937	3.129		3.62	0.49	
Fathom Yellow 155m			0.13	3.937	3.129		3.2	0.07	
Fathom Yellow 175m			0.11	3.937	3.129		3.19	0.06	
Fathom Yellow 200m			0.060854002	3.937	3.129		3.16	0.03	

Appendix C Cultural Heritage

Appendix C Annex A

GAZETTEER OF HERITAGE ASSETS

Y = Within 300m route option – initial assessment of potential impact.

S = Within 1km of route option – initial assessment of potential setting impact.

N = No initial assessment of potential physical or setting impact.

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
DOW 046:500 & ARM 029:500	Newry Canal Reach 1A	NEWRY CANAL (Co. Armagh) This number covers the portion of Newry Canal in Co. Armagh - c.f. DOW 046:500 for the portion in Co. Down. The Canal is an IHR site [IHR 172], given an SMR no. as part of the scheduling process. NEWRY CANAL (Co. Down) This number covers the portion of Newry canal that is in Co. Down - ARM 029:500 covers the portion in Armagh. This is an IHR site which has been given an SMR no. as part of the scheduling process. An archaeological evaluation was carried out on works situated at the former entrance to a canal basin on the Newry Canal. The area was covered with modern overburden up to 1.7m deep immediately overlying subsoil. Once this was cleared, it was obvious that the majority of the entrance to the canal basin had been removed previously. Only a small portion of the basal course remained [ADS, 2006].	Scheduled	Modern, c18th/c19th	J0962223407	Various	Y	Y	Y	Y	Y
HB16/11/019A	Narrow Water Castle	1820 - 1839 Narrow Water Castle, Newry Road, Warrenpoint, Co Down BT34 3LE. This imposing mid 19th C Tudor Revival-style mansion (designed by Thomas Duff of Newry, 1830s), is set within an attractive informally landscaped demesne. It retains all of its original external character, and the splendid internal detailing	Listed A	Modern, 19th century	J1234 1971	Narrow Water	N	N	N	N	N

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
		survives intact. Along with the servant's accommodation (HB16/11/019B), Gardener's House and walled garden (HB16/11/020), Stable yard (HB16/11/021), ice house (HB16/11/043), Steward's House (HB16/11/044) old farmyard (HB16/11/045) and gate screen (HB16/11/018), it forms an important and substantial group of buildings.									
HB16/29/017A	Church	1900 - 1919 Church of the Sacred Heart (RC) Adj. to 134 Dublin Road, Newry, Co Down. An important basilica plan 20th century church in a Hiberno-Romanesque style, an architectural landmark set on a prominent elevated site. High quality contemporary interior, with fine detailing, relatively unaltered.	Listed B+	Modern, 20th century	J0820 2390	Drumalane	S	S	S	S	S
HB16/11/019B	Former Servant's Accommodat-ion to Narrow Water Castle	1700 - 1719 Former Servant's Accommodation to Narrow Water Castle Warrenpoint Road, Newry, Co Down, BT34 2PN. This building was known as Mount Hall and is believed to have been erected by Francis Hall in 1707. It was the main house prior to the erection of Narrow Water Castle, built by Roger Hall in 1835 to designs by Thomas Duff. Duff re-modelled the exterior of Mount Hall to complement the new house. Internally it was converted to servants' accommodation. This, the earliest building on the site, re-modelled in the 19th C in the Tudor style, is both of historical and architectural interest.	Listed B1	Modern, early 18th century	J1233 1974	Narrow Water	N	N	N	N	N
HB16/13/005	Fathom House	1720 - 1739 Fathom House, 45 Fathom Line, Fathom Park, Newry, Co Armagh, BT35 8QN . A well-proportioned, early 18thC symmetrical house, occupying a magnificent maturely planted site overlooking the Newry River/ canal. The interior is believed to be little altered, retaining most of the original features. Along with its	Listed B1	Modern, 18th century	J0967 2302	Fathom Lower	S	S	S	S	S

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
		ruinous stable block and belvedere (HB16/13/029), it forms a pleasing and important architectural group.									
HB16/29/017 C	Gates and Walling	1900 - 1919 Gates and Walling at Church of the Sacred Heart (RC) Adj. to 134 Dublin Road, Newry, Co Down. Pair of cast and wrought iron gates with granite piers and flanking walls. These gates, piers and walls provide a plain entrance into the church complex, which is a mature landscape and an attractive setting for the church. The gates are executed in a similar style and materials to the rest of the buildings in the group and remain intact and good condition.	Listed B1	Modern, 20th century	J0813 2386	Drumalane	N	N	N	N	N
HB16/11/018	Entrance Screen, Narrow Water Demesne	1820 - 1839 Entrance Screen Narrow Water Demesne, Warrenpoint Road, Newry, Co Down, BT34 2PN. This gate screen leading into Narrow Water Castle Demesne was designed by Newry architect, Thomas Duff. It is constructed in local materials and designed to complement the original Narrow Water Castle (directly opposite), with decorative stepped and embattled coping and arrow loop openings.	Listed B2	Modern, 19th century	J1259 1943	Narrow Water	N	N	N	N	N
HB16/11/018	Gates	1820 - 1839 Entrance Screen Narrow Water Demesne, Warrenpoint Road, Newry, Co Down, BT34 2PN. This gate screen leading into Narrow Water Castle Demesne was designed by Newry architect, Thomas Duff. It is constructed in local materials and designed to complement the original Narrow Water Castle (directly opposite), with decorative stepped and embattled coping and arrow loop openings.	Listed B2	Modern, 19th century	J0950 2287	Fathom Lower	N	N	N	N	N
HB16/11/020	Former Gardener's House Narrow Water Castle	1800 - 1819 Former Gardener's House, Narrow Water Castle ,Newry Road, Warrenpoint, Newry, Co Down, BT34 2PN. Although somewhat altered in the recent past, this building is	Listed B2	Modern, 19th century	J1238 1995	Narrow Water	N	N	N	N	N

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
		still of strong character and, with the walled garden, forms part of the overall estate grouping.									
HB16/11/021	Stable Yard at Narrow Water Castle	1800 - 1819 Stable Yard at Narrow Water Castle, Newry Road, Warrenpoint, Newry, Co Down. Two attractive and well-proportioned stable blocks in enclosed cobbled yard of value as part of the Narrow Water demesne. They retain their external character and, although internally subdivided, some historic detail remains.	Listed B2	Modern, 19th century	J1236 1978	Narrow Water	N	N	N	N	N
HB16/13/029	Belvedere Tower	1760 - 1779 Belvedere, Fathom Park ,Fathom Line, Newry, Co Armagh. A large and impressive belvedere looking N over the Clanrye valley situated on the hillside of Fathom Park. See also Fathom House (HB16/13/005).	Listed B2	Modern, 18th century	J0950 2287	Fathom Lower	S	S	S	S	S
HB16/13/028	Belvedere Tower	1780-1799 Belvedere Ashton House Fathom Line Newry The Belvedere Tower is an octagonal tower with felted roof, central cast-iron lantern and boxed timber eaves. The building has been repaired in concrete blockwork	Record only	Modern, 18th century	J0946 2317	Fathom Lower	Y	Y	Y	N	N
HB16/13/009	Ashton House	1780-1799 Ashton House Fathom Line Newry It is a pleasantly situated and much altered late 18th century Georgian house with impressive entrance door case and original door. It has undergone internal refurbishment and retains few features of interest	Record only	Modern, 18th century	J0958 2323	Fathom Lower					
HB16/13/013	Bridge	1840-1859 Barracric Road, Fathom Lower Road bridge carrying the road over the double track Belfast-Dublin railway. Erected in 1851 this bridge has historical associations with Sir John Macneill and William Dargan ('father' of Irish railways). It is also an Industrial Heritage feature (00062:100:00).	Record only	Modern, 19th century	J0855 2252	Fathom Lower					

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
HB16/13/069	Canal Locks	1840-1859 Victoria Locks Fathom Road Newry Co Armagh This is the largest single lock chamber in Northern Ireland. Its size reflects the importance of maritime trade to Newry and it also has associations with Sir John Rennie. This site is part of the scheduled Newry canal and is an Industrial Heritage feature (00172:041:00)	Record only	Modern, 19th century	J1083 2081	Fathom Upper					
D-041	Narrow Water Castle demesne	NARROW WATER CASTLE, Co. Down (REGISTERED SITE – AREA PLAN NEWRY & MOURNE 16). The present house was built during the years 1831 to 1837 to the designs of Thomas Duff of Newry (listed HB 16/11/19). It replaced an earlier house, known as Mount Hall (the name of the occupants), of which a wing survives. A map of 1800 shows this house with garden, grove and shrubbery, orchard, pasture, woods, and parkland trees. It is thought that Sir Joseph Paxton made plans for the Italian Garden, notable for its impressive grass terraces, balustrading, cut stone steps and urns. Horizontal ground was once filled with flower beds, remembered in photographs but now grassed. Early 20th century photographs also show the wild garden in the Pleasure Grounds to the north-west of the house, said to have been created by Thomas Smith of Newry. This is no longer maintained. Articles in garden journals at the end of the 19th century mention the garden and remarkable trees are noted in Trees of Great Britain and Ireland of 1909 and 1910. A folly summer house survives on high ground in woodland. There are extensive plantations of trees. The parkland trees are few and far between. The walled garden is not cultivated and glasshouses have gone. The Head Gardener's House (or Steward's House) is very impressively large (listed HB 16/11/20). 18th century outbuildings are listed (HB 16/11/21). Two gate lodges survive, Castle Gate	Register of Parks, Gardens and Demesnes of Special Historic Interest	Modern, 19th century		Narrow Water	N	N	N	N	N

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
		and Tudor Lodge by Duff (listed HB 16/11/23) and contemporary with the house. However, Duff's Newry Gate has gone and the earlier rear gate. SMR: DOWN 51:38 enclosure. The south-east corner of the demesne is a golf course. Private.									
ARM029:020	Tree ring	No information or description available. Designed landscape feature.	SMR	Modern, c18th/c19th	J0980022500	Fathom Lower	N	N	N	Y	Y
ARM029:021	Tree ring	One of a group with ARM 029:020,022 & 023. No information or description available. Designed landscape feature.	SMR	Modern, c18th/c19th	J0988022370	Fathom Lower	N	N	N	Y	Y
ARM029:022	Tree ring	One of a group of landscape features including ARM 029:020,021 & 023. No information or description available.	SMR	Modern, c18th/c19th	J0992022250	Fathom Lower	N	N	N	Y	Y
ARM029:023	Tree ring	One of a group with ARM 029:020,021 & 022. No information or description available	SMR	Modern, c18th/c19th	J0999022120	Fathom Lower	N	N	N	Y	N
ARM029:025	Enclosure	OLD FORT, THE OLD FORT On a level terrace on the steep north-east side of Fathom Mountain, commanding an extensive view over the Newry River below. An "old fort" is remembered in this area, but there are no visible remains, and much building debris now occupies the site.	SMR	Uncertain	J0944022420	Fathom Lower	N	N	N	S	S
ARM029:033	Tower house	TOWER-HOUSE According to Paterson, there was an "old castle at Fathom" held by the O'Neills and temporarily by Elizabeth I. It was demolished 1730 in building canal and was roughly in position of the first lock.	SMR	Late-med	J1000020000	Fathom Upper	N	N	N	N	N
ARM029:042	Battle site	BATTLE SITE, 1600 This is the site of an ambush on an English Column led by Lord Deputy Mountjoy, by Hugh O'Neill on 14th October 1600. No visible remains (all above ground features removed).	SMR	Post-med, c17th	J0990022200	Fathom Lower	N	N	N	Y	Y
DOW051:044	Narrow Water Castle	NARROW WATER CASTLE This castle, protecting the entrance to a part of Carlingford Lough, is thought to have been built by the English c1560.	State Care	Late-med	J1256019390	Narrow Water	N	N	N	N	N

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
		After James II's defeat in 1691, it was confiscated and granted to the Halls. It is a tower 11.2m x 10.1, standing 3 storeys and an attic high. The entrance is defended by a machicolation. The tower stands within a rectangular bawn, c.36m square with walls 0.6m thick & 2m high internally, but more on the outside where it rises from the shore. There is a modern gateway through the bawn at N.									
00062:099:00	Bridge	GNR Main Line Belfast - Border	IHR		J08272347	Cloghoge	S	S	S	S	S
00062:100:00	Bridge	GNR Main Line Belfast - Border	IHR		J08412303	Cloghoge	S	S	S	S	S
00062:102:00	Bridge	GNR Main Line Belfast - Border	IHR		J08552252	Fathom Lower	Y	N	Y	Y	Y
00062:103:00	Bridge	GNR Main Line Belfast - Border	IHR		J08552195	Fathom Lower	Y	N	Y	Y	Y
00172:041:00	Victoria Lock	Newry Canal	IHR		J10842082	Fathom Upper	N	N	N	S	S
00172:042:00	Dock House	Newry Canal	IHR		J10852072	Fathom Upper	N	N	S	Y	N
00172:093:00	Quay	Newry Canal	IHR		J10892073	Fathom Upper	S	S	S	N	N
00172:096:00	Spill weir	Newry Canal	IHR		J09392374	Cloghoge	S	S	S	N	N
00172:039:00	Canal Locks	Newry Canal	IHR		J09982278	Fathom Lower	S	S	S	N	N
00172:113:00	Lock House	Newry Canal	IHR		J09852295	Fathom Lower	N	N	N	S	S
00172:112:00	Pump House	Newry Canal	IHR		J10792082	Fathom Upper	N	N	N	S	S
00478	Former railway line	GNR Branch Line; Goraghwood-Warrenpoint	IHR			Multiple	N	N	N	Y	Y

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
00538:002:00	Bridge	GNR Branch Line, Newry - Greenore	IHR			Fathom Lower	N	N	N	Y	Y
00538:003:00	Milepost	GNR Branch Line, Newry - Greenore	IHR			Fathom Lower	N	N	N	Y	Y
00538:005:00	Signal Post	GNR Branch Line, Newry - Greenore	IHR			Fathom Lower	N	N	N	Y	Y
00538:006:00	Bridge	GNR Branch Line, Newry - Greenore	IHR			Fathom Lower	N	N	N	Y	Y
00538:007:00	Milepost	GNR Branch Line, Newry - Greenore	IHR			Fathom Lower	N	N	N	N	N
MRD 2616	Shipwreck	British steam vessel (name unknown) partial loss in Newry River / harbour in June 1887;	Designated Wreck Zone	Modern 19th century			N	N	N	N	Y
MRD 2631	Shipwreck	British vessel (name unknown) partial loss in Newry River / harbour on 30.06.1891	Designated Wreck Zone	Modern 19th century			N	N	N	Y	N
MRD 2655	Shipwreck	British vessel (name unknown) partial loss in Newry River / harbour on 30.07.1894	Designated Wreck Zone	Modern 19th century			N	N	N	Y	N
MRD 2672	Shipwreck	Vessel (name unknown) partial loss in Newry River / harbour on 30.07.1897	Designated Wreck Zone	Modern 19th century			N	N	N	N	Y
MRD 2705	Shipwreck	British vessel (name unknown) partial loss in Newry River / harbour on 30.07.1903	Designated Wreck Zone	Modern 19th century			N	N	N	Y	N
	Townland Boundary	Boundary between the townlands of Fathom Lower / Cloghoge	Landscape Feature			Fathom Lower / Cloghoge	Y	Y	Y	Y	Y
WT895	Historic woodland	Long-established woodland (Planted mixed) (77ha).	Woodland Trust Old Woods		J107205	Fathom Upper	N	N	N	Y	Y
WT896	Historic woodland	Ancient Woodland (3) (Scrub) (2ha)	Woodland Trust Old Woods		J099222	Fathom Lower (Main Portion)	N	N	N	S	Y
WT904	Historic woodland	Long-established woodland (Parkland) (4ha)	Woodland Trust Old Woods		J122198	Narrow Water	N	N	N	N	S

SMR No.	Description	Long description	Type	Date	Grid Ref	Townland	Blue 1	Blue 2	Blue 3	Red	Yellow
WT905	Historic woodland	Long-established woodland (Parkland) (11ha)	Woodland Trust Old Woods		J125196	Narrow Water	N	N	N	S	S
WT906	Historic woodland	Long-established woodland (Planted mixed) (1ha)	Woodland Trust Old Woods		J123195	Narrow Water	N	N	N	S	S
WT907	Historic woodland	Long-established woodland (Planted mixed) (68ha)	Woodland Trust Old Woods		J113208	Narrow Water	N	N	N	S	S
WT940	Historic woodland	Long-established Woodland (1ha)	Woodland Trust Old Woods		J094229	Fathom Lower (Main Portion)	S	S	S	S	Y
WT943	Historic woodland	Long-established Woodland (1ha)	Woodland Trust Old Woods		J093233	Fathom Lower (Main Portion)	S	S	S	S	Y
CH-01	Possible site	Complex field boundaries and stands of trees, west of Hillhead Road.	AP Analysis		J 08533 24246	Cloghoge	Y	Y	Y	N	N
CH-02	Area of palaeoenvironmental potential	Area of palaeoenvironmental potential, Barracric Road.	AP Analysis		J 08512 23041	Cloghoge	Y	Y	Y	Y	Y
CH-03	Possible site	Possible site of Wellington Inn, marked on OS 1st ed (1829-1835). Now a field S of Barracric Road.	Historic Map Analysis		J 08530 22473	Cloghoge	Y	Y	Y	Y	Y

Appendix C Annex B

Photograph 5.3.1 Looking across residential and industrial areas at north

Plate 5.3.2 Looking across river at Fathom House (HB16/13/005)

Plate 5.3.3 Belvedere (HB16/13/029) associated with Fathom House

Plate 5.3.4 CH-02 area for potential palaeoenvironmental remains

Plate 5.3.5 Bridge (HB16/13/013)carrying Barracric Road over the railway

Plate 5.3.6 Victoria Locks (HB16/13/069) on the Newry Canal

Plate 5.3.7 Remains of railway bridge (00538:006:00)

Plate 5.3.8 Section of Newry River bank where railway (00478.000.00) was located

Plate 5.3.9 Section of the Newry Canal (DOW/ARM 029:500)

Plate 5.3.10 Church of the Sacred Heart (HB16/29/017A).

Plate 5.3.11 Narrow Water Castle (HB16/11/019A)

Plate 5.3.12 Looking north from route options towards Church of the Sacred Heart (HB16/29/017A)

Plate 5.3.13 Looking south from church towards route options

Plate 5.3.14 Looking towards area of Narrow Water Castle

Plate 5.3.15 Looking from the grounds of Narrow Water Castle towards area of scheme

Appendix D Noise

Red Option																	
	Results												Comparisons				
	Scenario												LA10,18hr			% Nuisance	
	Do Min						Do Some						DM 2023	DM 2023	DM 2023	DM 2023	DM 2023
	2023	2023	2023	2037	2037	2037	2023	2023	2023	2037	2037	2037	vs	vs	vs	vs	vs
Location	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	DM 2037	DS 2023	DS 2037	DM 2037	DS 2037
1	61.1	51.2	15	61.4	51.5	15	61.1	51.2	15	61.5	51.6	15	0.3	0	0.4	0.5	1
2	55.8	46.5	8	56.2	46.8	9	57	47.5	10	57.4	47.9	10	0.4	1.2	1.6	0.4	2
3	55.8	46.5	8	56.2	46.8	9	57.1	47.6	10	57.6	48.1	10	0.4	1.3	1.8	0.4	2
4	56.1	46.7	9	56.5	47.1	9	57.3	47.8	10	57.8	48.3	10	0.4	1.2	1.7	0.4	2
5	56	46.6	9	56.3	46.9	9	57.6	48.1	10	57.9	48.3	11	0.3	1.6	1.9	0.3	2
6	55.3	46.0	8	55.6	46.3	8	57.2	47.7	10	57.6	48.1	10	0.3	1.9	2.3	0.3	2
7	54.7	45.5	7	55.1	45.8	8	57	47.5	10	57.4	47.9	10	0.4	2.3	2.7	0.3	3
8	54.6	45.4	7	54.9	45.6	8	57.2	47.7	10	57.7	48.2	10	0.3	2.6	3.1	0.3	3
9	54.4	45.2	7	54.7	45.5	7	56.9	47.4	10	57.3	47.8	10	0.3	2.5	2.9	0.2	3
10	54.1	44.9	7	54.5	45.3	7	57.2	47.7	10	57.6	48.1	10	0.4	3.1	3.5	0.3	3
11	53.7	44.6	7	54.1	44.9	7	56.3	46.9	9	56.7	47.3	9	0.4	2.6	3	0.3	3
12	53.9	44.7	7	54.3	45.1	7	56.1	46.7	9	56.5	47.1	9	0.4	2.2	2.6	0.3	2
13	53.7	44.6	7	54	44.8	7	55.8	46.5	8	56.2	46.8	9	0.3	2.1	2.5	0.2	2
14	53.9	44.7	7	54.3	45.1	7	58.5	48.9	11	59	49.3	12	0.4	4.6	5.1	0.3	5
15	51.7	42.8	5	52	43.0	6	57.4	47.9	10	57.9	48.3	11	0.3	5.7	6.2	0.2	5
16	51.1	42.2	5	51.5	42.6	5	58.1	48.5	11	58.5	48.9	11	0.4	7	7.4	0.2	6
17	50.5	41.7	5	50.8	42.0	5	57.1	47.6	10	57.6	48.1	10	0.3	6.6	7.1	0.2	6
18	50	41.2	4	50.3	41.5	5	58.1	48.5	11	58.6	49.0	11	0.3	8.1	8.6	0.2	7
19	50	41.2	4	50.3	41.5	5	61.2	51.3	15	61.7	51.8	16	0.3	11.2	11.7	0.2	11
20	51.4	42.5	5	51.6	42.7	5	57.5	48.0	10	58	48.4	11	0.2	6.1	6.6	0.1	6
21	51.2	42.3	5	51.4	42.5	5	56.8	47.4	9	57.3	47.8	10	0.2	5.6	6.1	0.1	5
22	50.8	42.0	5	51.1	42.2	5	54.9	45.6	8	55.3	46.0	8	0.3	4.1	4.5	0.2	3
23	50.9	42.0	5	51.2	42.3	5	55.4	46.1	8	55.8	46.5	8	0.3	4.5	4.9	0.2	4
24	50.6	41.8	5	50.8	42.0	5	53.9	44.7	7	54.3	45.1	7	0.2	3.3	3.7	0.1	2
25	50.2	41.4	4	50.5	41.7	5	53.8	44.7	7	54.2	45.0	7	0.3	3.6	4	0.2	3
26	49.5	40.8	4	49.7	41.0	4	52.1	43.1	6	52.5	43.5	6	0.2	2.6	3	0.1	2
27	49.1	40.4	4	49.3	40.6	4	52.3	43.3	6	52.6	43.6	6	0.2	3.2	3.5	0.1	2
28	47.1	38.6	3	47.3	38.8	3	49.9	41.1	4	50.2	41.4	4	0.2	2.8	3.1	0.1	1
29	47.2	38.7	3	47.3	38.8	3	49.9	41.1	4	50.2	41.4	4	0.1	2.7	3	0.0	1
30	46	37.6	3	46.1	37.7	3	48.4	39.8	4	48.7	40.1	4	0.1	2.4	2.7	0.0	1
31	44.4	36.2	2	44.5	36.3	2	46.7	38.3	3	47	38.5	3	0.1	2.3	2.6	0.0	1
32	45.1	36.8	2	45.2	36.9	3	47.9	39.3	3	48.2	39.6	4	0.1	2.8	3.1	0.0	1
33	60.3	50.5	14	60.8	51.0	14	67.9	57.3	28	68.4	57.8	29	0.5	7.6	8.1	0.7	16
34	50.7	41.9	5	51.1	42.2	5	58.5	48.9	11	59	49.3	12	0.4	7.8	8.3	0.2	7
35	65	54.7	22	65.4	55.1	23	65.6	55.3	23	66.1	55.7	24	0.4	0.6	1.1	0.8	2
36	68.6	58.0	30	69	58.3	31	68.7	58.1	30	69.2	58.5	32	0.4	0.1	0.6	1.0	2
37	67.4	56.9	27	67.8	57.3	28	67.8	57.3	28	68.2	57.6	29	0.4	0.4	0.8	1.0	2
38	57.5	48.0	10	57.8	48.3	10	57.8	48.3	10	58.2	48.6	11	0.3	0.3	0.7	0.3	1
39	63.3	53.2	18	63.7	53.6	19	63.5	53.4	19	63.9	53.7	20	0.4	0.2	0.6	0.7	1
40	56.9	47.4	10	57.2	47.7	10	57.8	48.3	10	58.1	48.5	11	0.3	0.9	1.2	0.3	1
41	65.2	54.9	22	65.6	55.3	23	65.4	55.1	23	65.8	55.5	23	0.4	0.2	0.6	0.8	1
42	69.2	58.5	32	69.6	58.9	33	69.3	58.6	32	69.7	59.0	33	0.4	0.1	0.5	1.0	1
43	62.1	52.1	16	62.5	52.5	17	63	52.9	18	63.4	53.3	19	0.4	0.9	1.3	0.7	2
44	63.2	53.1	18	63.6	53.5	19	64.1	53.9	20	64.6	54.4	21	0.4	0.9	1.4	0.7	3
45	66.3	55.9	25	66.7	56.3	25	66.8	56.4	26	67.3	56.8	27	0.4	0.5	1	0.9	2
46	54.4	45.2	7	54.7	45.5	7	54.9	45.6	8	55.3	46.0	8	0.3	0.5	0.9	0.2	1
47	67.3	56.8	27	67.8	57.3	28	67.3	56.8	27	67.8	57.3	28	0.5	0	0.5	1.2	1
48	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
49	60.3	50.5	14	60.7	50.9	14	60.3	50.5	14	60.7	50.9	14	0.4	0	0.4	0.6	1
50	54.4	45.2	7	54.8	45.6	8	54.4	45.2	7	54.8	45.6	8	0.4	0	0.4	0.3	0
51	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
52	50.8	42.0	5	51.2	42.3	5	50.8	42.0	5	51.2	42.3	5	0.4	0	0.4	0.2	0
53	47.7	39.2	3	48	39.4	3	47.7	39.2	3	48	39.4	3	0.3	0	0.3	0.1	0
54	63.4	53.3	19	63.8	53.7	19	66.1	55.7	24	66.5	56.1	25	0.4	2.7	3.1	0.7	6
54	61.6	51.7	16	62.1	52.1	16	66.1	55.7	24	66.6	56.2	25	0.5	4.5	5	0.8	10
55	61.5	51.6	15	62	52.0	16	66.3	55.9	25	66.8	56.4	26	0.5	4.8	5.3	0.8	10
56	60	50.2	13	60.4	50.6	14	66.9	56.4	26	67.4	56.9	27	0.4	6.9	7.4	0.6	14
57	59.2	49.5	12	59.6	49.9	13	66.4	56.0	25	66.9	56.4	26	0.4	7.2	7.7	0.5	14
58	60.1	50.3	13	60.6	50.8	14	62.4	52.4	17	62.9	52.8	18	0.5	2.3	2.8	0.7	4
59	59.4	49.7	12	59.8	50.1	13	60.5	50.7	14	60.9	51.0	15	0.4	1.1	1.5	0.5	2
60	63	52.9	18	63.4	53.3	19	63.3	53.2	18	63.7	53.6	19	0.4	0.3	0.7	0.7	1
62	67.7	57.2	28	68.1	57.5	29	67.7	57.2	28	68.1	57.5	29	0.4	0	0.4	1.0	1
61	60.3	50.5	14	60.7	50.9	14	60.5	50.7	14	60.9	51.0	15	0.4	0.2	0.6	0.6	1
67	58.4	48.8	11	58.9	49.2	12	58.5	48.9	11	58.9	49.2	12	0.5	0.1	0.5	0.6	1
66	60.1	50.3	13	60.5	50.7	14	60.2	50.4	14	60.6	50.8	14	0.4	0.1	0.5	0.6	1
65	60.9	51.0	15	61.3	51.4	15	60.9	51.0	15	61.4	51.5	15	0.4	0	0.5	0.6	1
64	62.5	52.5	17	63	52.9	18	62.6	52.6	17	63	52.9	18	0.5	0.1	0.5	0.9	1
68	72.3	61.3	40	72.7	61.7	41	72.3	61.3	40	72.7	61.7	41	0.4	0	0.4	1.2	1
63	64.1	53.9	20	64.6	54.4	21	64.2	54.0	20	64.6	54.4	21	0.5	0.1	0.5	1.0	1
70	50.8	42.0	5	51.1	42.2	5	58.1	48.5	11	58.6	49.0	11	0.3	7.3	7.8	0.2	7
71	59.4	49.7	12	59.8	50.1	13	68.1	57.5	29	68.6	58.0	30	0.4	8.7	9.2	0.5	18
72	75.4	64.1	49	75.8	64.5	50	75.4	64.1	49	75.8	64.5	50	0.4	0	0.4	1.2	1

Yellow Option

	Results												Comparisons				
	Scenario												LA10,18hr			% Nuisance	
	Do Min						Do Some						DM 2023	DM 2023	DM 2023	DM 2023	DM 2023
	2023	2023	2023	2037	2037	2037	2023	2023	2023	2037	2037	2037	vs	vs	vs	vs	vs
Location	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	DM 2037	DS 2023	DS 2037	DM 2037	DS 2037
1	61.1	51.2	15	61.4	51.5	15	61.1	51.2	15	61.5	51.6	15	0.3	0	0.4	0.5	1
2	55.8	46.5	8	56.2	46.8	9	56.9	47.4	10	57.2	47.7	10	0.4	1.1	1.4	0.4	1
3	55.8	46.5	8	56.2	46.8	9	57	47.5	10	57.4	47.9	10	0.4	1.2	1.6	0.4	2
4	56.1	46.7	9	56.5	47.1	9	57.2	47.7	10	57.6	48.1	10	0.4	1.1	1.5	0.4	2
5	56	46.6	9	56.3	46.9	9	57.4	47.9	10	57.7	48.2	10	0.3	1.4	1.7	0.3	2
6	55.3	46.0	8	55.6	46.3	8	57	47.5	10	57.4	47.9	10	0.3	1.7	2.1	0.3	2
7	54.7	45.5	7	55.1	45.8	8	56.8	47.4	9	57.1	47.6	10	0.4	2.1	2.4	0.3	2
8	54.6	45.4	7	54.9	45.6	8	57	47.5	10	57.4	47.9	10	0.3	2.4	2.8	0.3	3
9	54.4	45.2	7	54.7	45.5	7	56.7	47.3	9	57.1	47.6	10	0.3	2.3	2.7	0.2	2
10	54.1	44.9	7	54.5	45.3	7	57.1	47.6	10	57.5	48.0	10	0.4	3	3.4	0.3	3
11	53.7	44.6	7	54.1	44.9	7	56.3	46.9	9	56.7	47.3	9	0.4	2.6	3	0.3	3
12	53.9	44.7	7	54.3	45.1	7	56.1	46.7	9	56.5	47.1	9	0.4	2.2	2.6	0.3	2
13	53.7	44.6	7	54	44.8	7	55.8	46.5	8	56.1	46.7	9	0.3	2.1	2.4	0.2	2
14	53.9	44.7	7	54.3	45.1	7	58.6	49.0	11	58.9	49.2	12	0.4	4.7	5	0.3	5
15	51.7	42.8	5	52	43.0	6	57.4	47.9	10	57.8	48.3	10	0.3	5.7	6.1	0.2	5
16	51.1	42.2	5	51.5	42.6	5	58	48.4	11	58.4	48.8	11	0.4	6.9	7.3	0.2	6
17	50.5	41.7	5	50.8	42.0	5	57.1	47.6	10	57.4	47.9	10	0.3	6.6	6.9	0.2	5
18	50	41.2	4	50.3	41.5	5	58.1	48.5	11	58.5	48.9	11	0.3	8.1	8.5	0.2	7
19	50	41.2	4	50.3	41.5	5	61.2	51.3	15	61.6	51.7	16	0.3	11.2	11.6	0.2	11
20	51.4	42.5	5	51.6	42.7	5	57.6	48.1	10	57.9	48.3	11	0.2	6.2	6.5	0.1	5
21	51.2	42.3	5	51.4	42.5	5	56.9	47.4	10	57.3	47.8	10	0.2	5.7	6.1	0.1	5
22	50.8	42.0	5	51.1	42.2	5	54.8	45.6	8	55.2	45.9	8	0.3	4	4.4	0.2	3
23	50.9	42.0	5	51.2	42.3	5	55.5	46.2	8	55.8	46.5	8	0.3	4.6	4.9	0.2	4
24	50.6	41.8	5	50.8	42.0	5	54	44.8	7	54.5	45.1	7	0.2	3.4	3.7	0.1	2
25	50.2	41.4	4	50.5	41.7	5	53.8	44.7	7	54.1	44.9	7	0.3	3.6	3.9	0.2	2
26	49.5	40.8	4	49.7	41.0	4	52	43.0	6	52.3	43.3	6	0.2	2.5	2.8	0.1	2
27	49.1	40.4	4	49.3	40.6	4	52.2	43.2	6	52.5	43.5	6	0.2	3.1	3.4	0.1	2
28	47.1	38.6	3	47.3	38.8	3	49.7	41.0	4	50	41.2	4	0.2	2.6	2.9	0.1	1
29	47.2	38.7	3	47.3	38.8	3	49.7	41.0	4	50	41.2	4	0.1	2.5	2.8	0.0	1
30	46	37.6	3	46.1	37.7	3	48.2	39.6	4	48.4	39.8	4	0.1	2.2	2.4	0.0	1
31	44.4	36.2	2	44.5	36.3	2	46.6	38.2	3	46.8	38.4	3	0.1	2.2	2.4	0.0	1
32	45.1	36.8	2	45.2	36.9	3	47.6	39.1	3	47.9	39.3	3	0.1	2.5	2.8	0.0	1
33	60.3	50.5	14	60.8	51.0	14	67.4	56.9	27	67.8	57.3	28	0.5	7.1	7.5	0.7	14
34	50.7	41.9	5	51.1	42.2	5	58.4	48.8	11	58.7	49.1	12	0.4	7.7	8	0.2	7
35	65	54.7	22	65.4	55.1	23	65.5	55.2	23	65.9	55.5	24	0.4	0.5	0.9	0.8	2
36	68.6	58.0	30	69	58.3	31	68.7	58.1	30	69.1	58.4	31	0.4	0.1	0.5	1.0	1
37	67.4	56.9	27	67.8	57.3	28	67.7	57.2	28	68.1	57.5	29	0.4	0.3	0.7	1.0	2
38	57.5	48.0	10	57.8	48.3	10	57.8	48.3	10	58.1	48.5	11	0.3	0.3	0.6	0.3	1
39	63.3	53.2	18	63.7	53.6	19	63.5	53.4	19	63.9	53.7	20	0.4	0.2	0.6	0.7	1
40	56.9	47.4	10	57.2	47.7	10	57.7	48.2	10	58	48.4	11	0.3	0.8	1.1	0.3	1
41	65.2	54.9	22	65.6	55.3	23	65.4	55.1	23	65.8	55.5	23	0.4	0.2	0.6	0.8	1
42	69.2	58.5	32	69.6	58.9	33	69.2	58.5	32	69.7	59.0	33	0.4	0	0.5	1.0	1
43	62.1	52.1	16	62.5	52.5	17	62.9	52.8	18	63.2	53.1	18	0.4	0.8	1.1	0.7	2
44	63.2	53.1	18	63.6	53.5	19	61.9	51.9	16	62.4	52.4	17	0.4	-1.3	-0.8	0.7	-1
45	66.3	55.9	25	66.7	56.3	25	66.2	55.8	24	66.6	56.2	25	0.4	-0.1	0.3	0.9	1
46	54.4	45.2	7	54.7	45.5	7	63.5	53.4	19	63.9	53.7	20	0.3	9.1	9.5	0.2	12
47	67.3	56.8	27	67.8	57.3	28	71.2	60.3	37	71.6	60.7	38	0.5	3.9	4.3	1.2	11
48	60.8	51.0	14	61.2	51.3	15	62.4	52.4	17	62.8	52.8	18	0.4	1.6	2	0.6	3
49	60.3	50.5	14	60.7	50.9	14	61.8	51.9	16	62.2	52.2	17	0.4	1.5	1.9	0.6	3
50	54.4	45.2	7	54.8	45.6	8	56.3	46.9	9	56.7	47.3	9	0.4	1.9	2.3	0.3	2
51	60.8	51.0	14	61.2	51.3	15	61.7	51.8	16	62.2	52.2	17	0.4	0.9	1.4	0.6	2
52	50.8	42.0	5	51.2	42.3	5	52.8	43.8	6	53.2	44.1	6	0.4	2	2.4	0.2	2
53	47.7	39.2	3	48	39.4	3	50	41.2	4	50.3	41.5	5	0.3	2.3	2.6	0.1	1
54	63.4	53.3	19	63.8	53.7	19	65.8	55.5	23	66.2	55.8	24	0.4	2.4	2.8	0.7	6
54	61.6	51.7	16	62.1	52.1	16	65.7	55.4	23	66.1	55.7	24	0.5	4.1	4.5	0.8	8
55	61.5	51.6	15	62	52.0	16	65.9	55.5	24	66.3	55.9	25	0.5	4.4	4.8	0.8	9
56	60	50.2	13	60.4	50.6	14	65.9	55.5	24	66.3	55.9	25	0.4	5.9	6.3	0.6	11
57	59.2	49.5	12	59.6	49.9	13	65.2	54.9	22	65.6	55.3	23	0.4	6	6.4	0.5	11
58	60.1	50.3	13	60.6	50.8	14	61.9	51.9	16	62.3	52.3	17	0.5	1.8	2.2	0.7	3
59	59.4	49.7	12	59.8	50.1	13	60.1	50.3	13	60.5	50.7	14	0.4	0.7	1.1	0.5	2
60	63	52.9	18	63.4	53.3	19	63.3	53.2	18	63.7	53.6	19	0.4	0.3	0.7	0.7	1
62	67.7	57.2	28	68.1	57.5	29	67.7	57.2	28	68.1	57.5	29	0.4	0	0.4	1.0	1
61	60.3	50.5	14	60.7	50.9	14	60.5	50.7	14	60.9	51.0	15	0.4	0.2	0.6	0.6	1
67	58.4	48.8	11	58.9	49.2	12	58.5	48.9	11	58.9	49.2	12	0.5	0.1	0.5	0.6	1
66	60.1	50.3	13	60.5	50.7	14	60.2	50.4	14	60.6	50.8	14	0.4	0.1	0.5	0.6	1
65	60.9	51.0	15	61.3	51.4	15	60.9	51.0	15	61.3	51.4	15	0.4	0	0.4	0.6	1
64	62.5	52.5	17	63	52.9	18	62.6	52.6	17	63	52.9	18	0.5	0.1	0.5	0.9	1
68	72.3	61.3	40	72.7	61.7	41	72.3	61.3	40	72.7	61.7	41	0.4	0	0.4	1.2	1
63	64.1	53.9	20	64.6	54.4	21	64.2	54.0	20	64.6	54.4	21	0.5	0.1	0.5	1.0	1
70	50.8	42.0	5	51.1	42.2	5	58.1	48.5	11	58.5	48.9	11	0.3	7.3	7.7	0.2	6
71	59.4	49.7	12	59.8	50.1	13	67.1	56.6	26	67.5	57.0	27	0.4	7.7	8.1	0.5	15
72	75.4	64.1	49	75.8	64.5	50	75.4	64.1	49	75.8	64.5	50	0.4	0	0.4	1.2	1

Blue Route Option 1

	Results												Comparisons				
	Scenario												LA10,18hr			% Nuisance	
	Do Min						Do Some						DM 2023	DM 2023	DM 2023	DM 2023	DM 2023
	2023	2023	2023	2037	2037	2037	2023	2023	2023	2037	2037	2037	vs	vs	vs	vs	vs
Location	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	DM 2037	DS 2023	DS 2037	DM 2037	DS 2037
1	61.1	51.2	15	61.4	51.5	15	67	56.5	26	67.4	56.9	27	0.3	5.9	6.3	0.5	12
2	55.8	46.5	8	56.2	46.8	9	56.4	47.0	9	56.8	47.4	9	0.4	0.6	1	0.4	1
3	55.8	46.5	8	56.2	46.8	9	56.3	46.9	9	56.7	47.3	9	0.4	0.5	0.9	0.4	1
4	56.1	46.7	9	56.5	47.1	9	56.5	47.1	9	56.9	47.4	10	0.4	0.4	0.8	0.4	1
5	56	46.6	9	56.3	46.9	9	56.9	47.4	10	57.2	47.7	10	0.3	0.9	1.2	0.3	1
6	55.3	46.0	8	55.6	46.3	8	56.4	47.0	9	56.8	47.4	9	0.3	1.1	1.5	0.3	1
7	54.7	45.5	7	55.1	45.8	8	56	46.6	9	56.4	47.0	9	0.4	1.3	1.7	0.3	2
8	54.6	45.4	7	54.9	45.6	8	56	46.6	9	56.3	46.9	9	0.3	1.4	1.7	0.3	2
9	54.4	45.2	7	54.7	45.5	7	55.8	46.5	8	56.1	46.7	9	0.3	1.4	1.7	0.2	1
10	54.1	44.9	7	54.5	45.3	7	55.7	46.4	8	56.1	46.7	9	0.4	1.6	2	0.3	2
11	53.7	44.6	7	54.1	44.9	7	55.2	45.9	8	55.5	46.2	8	0.4	1.5	1.8	0.3	1
12	53.9	44.7	7	54.3	45.1	7	55.1	45.8	8	55.5	46.2	8	0.4	1.2	1.6	0.3	1
13	53.7	44.6	7	54	44.8	7	55	45.7	8	55.4	46.1	8	0.3	1.3	1.7	0.2	1
14	53.9	44.7	7	54.3	45.1	7	56.3	46.9	9	56.7	47.3	9	0.4	2.4	2.8	0.3	2
15	51.7	42.8	5	52	43.0	6	54.7	45.5	7	55	45.7	8	0.3	3	3.3	0.2	2
16	51.1	42.2	5	51.5	42.6	5	54.7	45.5	7	55.1	45.8	8	0.4	3.6	4	0.2	3
17	50.5	41.7	5	50.8	42.0	5	54.3	45.1	7	54.6	45.4	7	0.3	3.8	4.1	0.2	3
18	50	41.2	4	50.3	41.5	5	54.3	45.1	7	54.6	45.4	7	0.3	4.3	4.6	0.2	3
19	50	41.2	4	50.3	41.5	5	54.5	45.3	7	54.9	45.6	8	0.3	4.5	4.9	0.2	3
20	51.4	42.5	5	51.6	42.7	5	55.5	46.2	8	55.9	46.5	9	0.2	4.1	4.5	0.1	3
21	51.2	42.3	5	51.4	42.5	5	55.7	46.4	8	56.1	46.7	9	0.2	4.5	4.9	0.1	4
22	50.8	42.0	5	51.1	42.2	5	56.1	46.7	9	56.4	47.0	9	0.3	5.3	5.6	0.2	4
23	50.9	42.0	5	51.2	42.3	5	55.4	46.1	8	55.7	46.4	8	0.3	4.5	4.8	0.2	3
24	50.6	41.8	5	50.8	42.0	5	54	44.8	7	54.3	45.1	7	0.2	3.4	3.7	0.1	2
25	50.2	41.4	4	50.5	41.7	5	53.1	44.0	6	53.5	44.4	7	0.3	2.9	3.3	0.2	2
26	49.5	40.8	4	49.7	41.0	4	50.9	42.0	5	51.2	42.3	5	0.2	1.4	1.7	0.1	1
27	49.1	40.4	4	49.3	40.6	4	51.1	42.2	5	51.4	42.5	5	0.2	2	2.3	0.1	1
28	47.1	38.6	3	47.3	38.8	3	49.1	40.4	4	49.3	40.6	4	0.2	2	2.2	0.1	1
29	47.2	38.7	3	47.3	38.8	3	49.1	40.4	4	49.4	40.7	4	0.1	1.9	2.2	0.0	1
30	46	37.6	3	46.1	37.7	3	47.4	38.9	3	47.6	39.1	3	0.1	1.4	1.6	0.0	1
31	44.4	36.2	2	44.5	36.3	2	45.6	37.3	3	45.7	37.4	3	0.1	1.2	1.3	0.0	0
32	45.1	36.8	2	45.2	36.9	3	47	38.5	3	47.2	38.7	3	0.1	1.9	2.1	0.0	1
33	60.3	50.5	14	60.8	51.0	14	63.7	53.6	19	64.1	53.9	20	0.5	3.4	3.8	0.7	6
34	50.7	41.9	5	51.1	42.2	5	62.5	52.5	17	62.9	52.8	18	0.4	11.8	12.2	0.2	13
35	65	54.7	22	65.4	55.1	23	65.5	55.2	23	65.9	55.5	24	0.4	0.5	0.9	0.8	2
36	68.6	58.0	30	69	58.3	31	68.5	57.9	30	68.9	58.2	31	0.4	-0.1	0.3	1.0	1
37	67.4	56.9	27	67.8	57.3	28	67.7	57.2	28	68.1	57.5	29	0.4	0.3	0.7	1.0	2
38	57.5	48.0	10	57.8	48.3	10	59.9	50.1	13	60.2	50.4	14	0.3	2.4	2.7	0.3	3
39	63.3	53.2	18	63.7	53.6	19	63.7	53.6	19	64.1	53.9	20	0.4	0.4	0.8	0.7	1
40	56.9	47.4	10	57.2	47.7	10	58.1	48.5	11	58.5	48.9	11	0.3	1.2	1.6	0.3	2
41	65.2	54.9	22	65.6	55.3	23	65.3	55.0	22	65.8	55.5	23	0.4	0.1	0.6	0.8	1
42	69.2	58.5	32	69.6	58.9	33	69.2	58.5	32	69.6	58.9	33	0.4	0	0.4	1.0	1
43	62.1	52.1	16	62.5	52.5	17	62.1	52.1	16	62.5	52.5	17	0.4	0	0.4	0.7	1
44	63.2	53.1	18	63.6	53.5	19	63.2	53.1	18	63.6	53.5	19	0.4	0	0.4	0.7	1
45	66.3	55.9	25	66.7	56.3	25	66.3	55.9	25	66.7	56.3	25	0.4	0	0.4	0.9	1
46	54.4	45.2	7	54.7	45.5	7	54.4	45.2	7	54.7	45.5	7	0.3	0	0.3	0.2	0
47	67.3	56.8	27	67.8	57.3	28	67.3	56.8	27	67.8	57.3	28	0.5	0	0.5	1.2	1
48	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
49	60.3	50.5	14	60.7	50.9	14	60.3	50.5	14	60.7	50.9	14	0.4	0	0.4	0.6	1
50	54.4	45.2	7	54.8	45.6	8	54.4	45.2	7	54.8	45.6	8	0.4	0	0.4	0.3	0
51	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
52	50.8	42.0	5	51.2	42.3	5	50.8	42.0	5	51.2	42.3	5	0.4	0	0.4	0.2	0
53	47.7	39.2	3	48	39.4	3	47.7	39.2	3	48	39.4	3	0.3	0	0.3	0.1	0
54	63.4	53.3	19	63.8	53.7	19	68.8	58.2	30	69.2	58.5	32	0.4	5.4	5.8	0.7	13
54	61.6	51.7	16	62.1	52.1	16	68.7	58.1	30	69.1	58.4	31	0.5	7.1	7.5	0.8	16
55	61.5	51.6	15	62	52.0	16	68.1	57.5	29	68.5	57.9	30	0.5	6.6	7	0.8	14
56	60	50.2	13	60.4	50.6	14	66.2	55.8	24	66.6	56.2	25	0.4	6.2	6.6	0.6	12
57	59.2	49.5	12	59.6	49.9	13	65.4	55.1	23	65.8	55.5	23	0.4	6.2	6.6	0.5	11
58	60.1	50.3	13	60.6	50.8	14	62.1	52.1	16	62.5	52.5	17	0.5	2	2.4	0.7	4
59	59.4	49.7	12	59.8	50.1	13	60.3	50.5	14	60.8	51.0	14	0.4	0.9	1.4	0.5	2
60	63	52.9	18	63.4	53.3	19	63.1	53.0	18	63.6	53.5	19	0.4	0.1	0.6	0.7	1
62	67.7	57.2	28	68.1	57.5	29	67.7	57.2	28	68.1	57.5	29	0.4	0	0.4	1.0	1
61	60.3	50.5	14	60.7	50.9	14	60.5	50.7	14	60.9	51.0	15	0.4	0.2	0.6	0.6	1
67	58.4	48.8	11	58.9	49.2	12	58.5	48.9	11	58.9	49.2	12	0.5	0.1	0.5	0.6	1
66	60.1	50.3	13	60.5	50.7	14	60.2	50.4	14	60.6	50.8	14	0.4	0.1	0.5	0.6	1
65	60.9	51.0	15	61.3	51.4	15	60.9	51.0	15	61.3	51.4	15	0.4	0	0.4	0.6	1
64	62.5	52.5	17	63	52.9	18	62.6	52.6	17	63	52.9	18	0.5	0.1	0.5	0.9	1
68	72.3	61.3	40	72.7	61.7	41	72.3	61.3	40	72.7	61.7	41	0.4	0	0.4	1.2	1
63	64.1	53.9	20	64.6	54.4	21	64.2	54.0	20	64.6	54.4	21	0.5	0.1	0.5	1.0	1
70	50.8	42.0	5	51.1	42.2	5	56.8	47.4	9	57.2	47.7	10	0.3	6	6.4	0.2	5
71	59.4	49.7	12	59.8	50.1	13	67.6	57.1	28	68	57.4	28	0.4	8.2	8.6	0.5	16
72	75.4	64.1	49	75.8	64.5	50	75.4	64.1	49	75.8	64.5	50	0.4	0	0.4	1.2	1

Blue Route Option 2																	
	Results												Comparisons				
	Scenario												LA10,18hr			% Nuisance	
	Do Min						Do Some						DM 2023	DM 2023	DM 2023	DM 2023	DM 2023
	2023	2023	2023	2037	2037	2037	2023	2023	2023	2037	2037	2037	vs	vs	vs	vs	vs
Location	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	DM 2037	DS 2023	DS 2037	DM 2037	DS 2037
1	61.1	51.2	15	61.4	51.5	15	68.1	57.5	29	68.5	57.9	30	0.3	7	7.4	0.5	15
2	55.8	46.5	8	56.2	46.8	9	56.8	47.4	9	57.2	47.7	10	0.4	1	1.4	0.4	1
3	55.8	46.5	8	56.2	46.8	9	56.6	47.2	9	57	47.5	10	0.4	0.8	1.2	0.4	1
4	56.1	46.7	9	56.5	47.1	9	56.9	47.4	10	57.2	47.7	10	0.4	0.8	1.1	0.4	1
5	56	46.6	9	56.3	46.9	9	57.3	47.8	10	57.6	48.1	10	0.3	1.3	1.6	0.3	2
6	55.3	46.0	8	55.6	46.3	8	56.8	47.4	9	57.1	47.6	10	0.3	1.5	1.8	0.3	2
7	54.7	45.5	7	55.1	45.8	8	56.3	46.9	9	56.7	47.3	9	0.4	1.6	2	0.3	2
8	54.6	45.4	7	54.9	45.6	8	56.3	46.9	9	56.6	47.2	9	0.3	1.7	2	0.3	2
9	54.4	45.2	7	54.7	45.5	7	56.1	46.7	9	56.4	47.0	9	0.3	1.7	2	0.2	2
10	54.1	44.9	7	54.5	45.3	7	56.1	46.7	9	56.5	47.1	9	0.4	2	2.4	0.3	2
11	53.7	44.6	7	54.1	44.9	7	55.6	46.3	8	56	46.6	9	0.4	1.9	2.3	0.3	2
12	53.9	44.7	7	54.3	45.1	7	55.6	46.3	8	56	46.6	9	0.4	1.7	2.1	0.3	2
13	53.7	44.6	7	54	44.8	7	55.4	46.1	8	55.8	46.5	8	0.3	1.7	2.1	0.2	2
14	53.9	44.7	7	54.3	45.1	7	58.6	49.0	11	59	49.3	12	0.4	4.7	5.1	0.3	5
15	51.7	42.8	5	52	43.0	6	57.3	47.8	10	57.7	48.2	10	0.3	5.6	6	0.2	5
16	51.1	42.2	5	51.5	42.6	5	57.9	48.3	11	58.3	48.7	11	0.4	6.8	7.2	0.2	6
17	50.5	41.7	5	50.8	42.0	5	57.2	47.7	10	57.5	48.0	10	0.3	6.7	7	0.2	6
18	50	41.2	4	50.3	41.5	5	58.2	48.6	11	58.6	49.0	11	0.3	8.2	8.6	0.2	7
19	50	41.2	4	50.3	41.5	5	60.1	50.3	13	60.5	50.7	14	0.3	10.1	10.5	0.2	10
20	51.4	42.5	5	51.6	42.7	5	56	46.6	9	56.3	46.9	9	0.2	4.6	4.9	0.1	4
21	51.2	42.3	5	51.4	42.5	5	56.8	47.4	9	57.1	47.6	10	0.2	5.6	5.9	0.1	5
22	50.8	42.0	5	51.1	42.2	5	55.2	45.9	8	55.5	46.2	8	0.3	4.4	4.7	0.2	3
23	50.9	42.0	5	51.2	42.3	5	54.7	45.5	7	55.1	45.8	8	0.3	3.8	4.2	0.2	3
24	50.6	41.8	5	50.8	42.0	5	53.7	44.6	7	54.1	44.9	7	0.2	3.1	3.5	0.1	2
25	50.2	41.4	4	50.5	41.7	5	53.4	44.3	6	53.7	44.6	7	0.3	3.2	3.5	0.2	2
26	49.5	40.8	4	49.7	41.0	4	51.3	42.4	5	51.7	42.8	5	0.2	1.8	2.2	0.1	1
27	49.1	40.4	4	49.3	40.6	4	51.6	42.7	5	52	43.0	6	0.2	2.5	2.9	0.1	2
28	47.1	38.6	3	47.3	38.8	3	49.7	41.0	4	50	41.2	4	0.2	2.6	2.9	0.1	1
29	47.2	38.7	3	47.3	38.8	3	49.7	41.0	4	50	41.2	4	0.1	2.5	2.8	0.0	1
30	46	37.6	3	46.1	37.7	3	48.3	39.7	4	48.6	40.0	4	0.1	2.3	2.6	0.0	1
31	44.4	36.2	2	44.5	36.3	2	46.3	37.9	3	46.5	38.1	3	0.1	1.9	2.1	0.0	1
32	45.1	36.8	2	45.2	36.9	3	47.6	39.1	3	47.9	39.3	3	0.1	2.5	2.8	0.0	1
33	60.3	50.5	14	60.8	51.0	14	65	54.7	22	65.3	55.0	22	0.5	4.7	5	0.7	9
34	50.7	41.9	5	51.1	42.2	5	64.3	54.1	20	64.7	54.5	21	0.4	13.6	14	0.2	16
35	65	54.7	22	65.4	55.1	23	65.5	55.2	23	65.9	55.5	24	0.4	0.5	0.9	0.8	2
36	68.6	58.0	30	69	58.3	31	68.8	58.2	30	69.2	58.5	32	0.4	0.2	0.6	1.0	2
37	67.4	56.9	27	67.8	57.3	28	67.8	57.3	28	68.2	57.6	29	0.4	0.4	0.8	1.0	2
38	57.5	48.0	10	57.8	48.3	10	59.5	49.8	13	59.8	50.1	13	0.3	2	2.3	0.3	3
39	63.3	53.2	18	63.7	53.6	19	63.6	53.5	19	64	53.8	20	0.4	0.3	0.7	0.7	1
40	56.9	47.4	10	57.2	47.7	10	58	48.4	11	58.4	48.8	11	0.3	1.1	1.5	0.3	2
41	65.2	54.9	22	65.6	55.3	23	65.3	55.0	22	65.8	55.5	23	0.4	0.1	0.6	0.8	1
42	69.2	58.5	32	69.6	58.9	33	69.2	58.5	32	69.6	58.9	33	0.4	0	0.4	1.0	1
43	62.1	52.1	16	62.5	52.5	17	62.1	52.1	16	62.5	52.5	17	0.4	0	0.4	0.7	1
44	63.2	53.1	18	63.6	53.5	19	63.2	53.1	18	63.6	53.5	19	0.4	0	0.4	0.7	1
45	66.3	55.9	25	66.7	56.3	25	66.3	55.9	25	66.7	56.3	25	0.4	0	0.4	0.9	1
46	54.4	45.2	7	54.7	45.5	7	54.4	45.2	7	54.7	45.5	7	0.3	0	0.3	0.2	0
47	67.3	56.8	27	67.8	57.3	28	67.3	56.8	27	67.8	57.3	28	0.5	0	0.5	1.2	1
48	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
49	60.3	50.5	14	60.7	50.9	14	60.3	50.5	14	60.7	50.9	14	0.4	0	0.4	0.6	1
50	54.4	45.2	7	54.8	45.6	8	54.4	45.2	7	54.8	45.6	8	0.4	0	0.4	0.3	0
51	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
52	50.8	42.0	5	51.2	42.3	5	50.8	42.0	5	51.2	42.3	5	0.4	0	0.4	0.2	0
53	47.7	39.2	3	48	39.4	3	47.7	39.2	3	48	39.4	3	0.3	0	0.3	0.1	0
54	63.4	53.3	19	63.8	53.7	19	66.6	56.2	25	66.9	56.4	26	0.4	3.2	3.5	0.7	7
54	61.6	51.7	16	62.1	52.1	16	65.9	55.5	24	66.1	55.7	24	0.5	4.3	4.5	0.8	8
55	61.5	51.6	15	62	52.0	16	65.5	55.2	23	65.7	55.4	23	0.5	4	4.2	0.8	8
56	60	50.2	13	60.4	50.6	14	66.5	56.1	25	66.6	56.2	25	0.4	6.5	6.6	0.6	12
57	59.2	49.5	12	59.6	49.9	13	66.2	55.8	24	66.4	56.0	25	0.4	7	7.2	0.5	13
58	60.1	50.3	13	60.6	50.8	14	62.4	52.4	17	62.7	52.7	17	0.5	2.3	2.6	0.7	4
59	59.4	49.7	12	59.8	50.1	13	60.5	50.7	14	60.8	51.0	14	0.4	1.1	1.4	0.5	2
60	63	52.9	18	63.4	53.3	19	63.1	53.0	18	63.5	53.4	19	0.4	0.1	0.5	0.7	1
62	67.7	57.2	28	68.1	57.5	29	67.7	57.2	28	68.1	57.5	29	0.4	0	0.4	1.0	1
61	60.3	50.5	14	60.7	50.9	14	60.5	50.7	14	60.9	51.0	15	0.4	0.2	0.6	0.6	1
67	58.4	48.8	11	58.9	49.2	12	58.5	48.9	11	58.9	49.2	12	0.5	0.1	0.5	0.6	1
66	60.1	50.3	13	60.5	50.7	14	60.2	50.4	14	60.6	50.8	14	0.4	0.1	0.5	0.6	1
65	60.9	51.0	15	61.3	51.4	15	60.9	51.0	15	61.3	51.4	15	0.4	0	0.4	0.6	1
64	62.5	52.5	17	63	52.9	18	62.6	52.6	17	63	52.9	18	0.5	0.1	0.5	0.9	1
68	72.3	61.3	40	72.7	61.7	41	72.3	61.3	40	72.7	61.7	41	0.4	0	0.4	1.2	1
63	64.1	53.9	20	64.6	54.4	21	64.2	54.0	20	64.6	54.4	21	0.5	0.1	0.5	1.0	1
70	50.8	42.0	5	51.1	42.2	5	59	49.3	12	59.4	49.7	12	0.3	8.2	8.6	0.2	8
71	59.4	49.7	12	59.8	50.1	13	67.7	57.2	28	67.8	57.3	28	0.4	8.3	8.4	0.5	16
72	75.4	64.1	49	75.8	64.5	50	75.4	64.1	49	75.8	64.5	50	0.4	0	0.4	1.2	1

Blue Route Option 3

	Results												Comparisons				
	Scenario												LA10,18hr			% Nuisance	
	Do Min						Do Some						DM 2023	DM 2023	DM 2023	DM 2023	DM 2023
	2023	2023	2023	2037	2037	2037	2023	2023	2023	2037	2037	2037	vs	vs	vs	vs	vs
Location	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	LA10,18hr	Lnight	% Nuisance	DM 2037	DS 2023	DS 2037	DM 2037	DS 2037
1	61.1	51.2	15	61.4	51.5	15	68.2	57.6	29	68.6	58.0	30	0.3	7.1	7.5	0.5	15
2	55.8	46.5	8	56.2	46.8	9	56.7	47.3	9	57.1	47.6	10	0.4	0.9	1.3	0.4	1
3	55.8	46.5	8	56.2	46.8	9	56.5	47.1	9	56.9	47.4	10	0.4	0.7	1.1	0.4	1
4	56.1	46.7	9	56.5	47.1	9	56.8	47.4	9	57.2	47.7	10	0.4	0.7	1.1	0.4	1
5	56	46.6	9	56.3	46.9	9	57.1	47.6	10	57.4	47.9	10	0.3	1.1	1.4	0.3	1
6	55.3	46.0	8	55.6	46.3	8	56.5	47.1	9	56.8	47.4	9	0.3	1.2	1.5	0.3	1
7	54.7	45.5	7	55.1	45.8	8	56	46.6	9	56.3	46.9	9	0.4	1.3	1.6	0.3	1
8	54.6	45.4	7	54.9	45.6	8	55.9	46.5	9	56.3	46.9	9	0.3	1.3	1.7	0.3	2
9	54.4	45.2	7	54.7	45.5	7	55.7	46.4	8	56.1	46.7	9	0.3	1.3	1.7	0.2	1
10	54.1	44.9	7	54.5	45.3	7	55.7	46.4	8	56.1	46.7	9	0.4	1.6	2	0.3	2
11	53.7	44.6	7	54.1	44.9	7	55.1	45.8	8	55.5	46.2	8	0.4	1.4	1.8	0.3	1
12	53.9	44.7	7	54.3	45.1	7	54.9	45.6	8	55.3	46.0	8	0.4	1	1.4	0.3	1
13	53.7	44.6	7	54	44.8	7	54.8	45.6	8	55.1	45.8	8	0.3	1.1	1.4	0.2	1
14	53.9	44.7	7	54.3	45.1	7	57	47.5	10	57.3	47.8	10	0.4	3.1	3.4	0.3	3
15	51.7	42.8	5	52	43.0	6	54.4	45.2	7	54.8	45.6	8	0.3	2.7	3.1	0.2	2
16	51.1	42.2	5	51.5	42.6	5	54.8	45.6	8	55.2	45.9	8	0.4	3.7	4.1	0.2	3
17	50.5	41.7	5	50.8	42.0	5	53.4	44.3	6	53.8	44.7	7	0.3	2.9	3.3	0.2	2
18	50	41.2	4	50.3	41.5	5	53.7	44.6	7	54	44.8	7	0.3	3.7	4	0.2	3
19	50	41.2	4	50.3	41.5	5	55.3	46.0	8	55.7	46.4	8	0.3	5.3	5.7	0.2	4
20	51.4	42.5	5	51.6	42.7	5	54.3	45.1	7	54.7	45.5	7	0.2	2.9	3.3	0.1	2
21	51.2	42.3	5	51.4	42.5	5	54.6	45.4	7	54.9	45.6	8	0.2	3.4	3.7	0.1	3
22	50.8	42.0	5	51.1	42.2	5	53.5	44.4	7	53.9	44.7	7	0.3	2.7	3.1	0.2	2
23	50.9	42.0	5	51.2	42.3	5	53.4	44.3	6	53.8	44.7	7	0.3	2.5	2.9	0.2	2
24	50.6	41.8	5	50.8	42.0	5	52.7	43.7	6	53	43.9	6	0.2	2.1	2.4	0.1	1
25	50.2	41.4	4	50.5	41.7	5	52.4	43.4	6	52.7	43.7	6	0.3	2.2	2.5	0.2	1
26	49.5	40.8	4	49.7	41.0	4	50.8	42.0	5	51.1	42.2	5	0.2	1.3	1.6	0.1	1
27	49.1	40.4	4	49.3	40.6	4	50.9	42.0	5	51.2	42.3	5	0.2	1.8	2.1	0.1	1
28	47.1	38.6	3	47.3	38.8	3	49	40.3	4	49.3	40.6	4	0.2	1.9	2.2	0.1	1
29	47.2	38.7	3	47.3	38.8	3	49	40.3	4	49.3	40.6	4	0.1	1.8	2.1	0.0	1
30	46	37.6	3	46.1	37.7	3	47.5	39.0	3	47.8	39.3	3	0.1	1.5	1.8	0.0	1
31	44.4	36.2	2	44.5	36.3	2	45.7	37.4	3	45.8	37.5	3	0.1	1.3	1.4	0.0	0
32	45.1	36.8	2	45.2	36.9	3	47	38.5	3	47.3	38.8	3	0.1	1.9	2.2	0.0	1
33	60.3	50.5	14	60.8	51.0	14	64.9	54.6	22	65.3	55.0	22	0.5	4.6	5	0.7	9
34	50.7	41.9	5	51.1	42.2	5	66.4	56.0	25	66.8	56.4	26	0.4	15.7	16.1	0.2	21
35	65	54.7	22	65.4	55.1	23	65.4	55.1	23	65.9	55.5	24	0.4	0.4	0.9	0.8	2
36	68.6	58.0	30	69	58.3	31	68.7	58.1	30	69.2	58.5	32	0.4	0.1	0.6	1.0	2
37	67.4	56.9	27	67.8	57.3	28	67.8	57.3	28	68.2	57.6	29	0.4	0.4	0.8	1.0	2
38	57.5	48.0	10	57.8	48.3	10	59.8	50.1	13	60.1	50.3	13	0.3	2.3	2.6	0.3	3
39	63.3	53.2	18	63.7	53.6	19	63.6	53.5	19	64	53.8	20	0.4	0.3	0.7	0.7	1
40	56.9	47.4	10	57.2	47.7	10	57.7	48.2	10	58.1	48.5	11	0.3	0.8	1.2	0.3	1
41	65.2	54.9	22	65.6	55.3	23	65.3	55.0	22	65.7	55.4	23	0.4	0.1	0.5	0.8	1
42	69.2	58.5	32	69.6	58.9	33	69.2	58.5	32	69.6	58.9	33	0.4	0	0.4	1.0	1
43	62.1	52.1	16	62.5	52.5	17	62.1	52.1	16	62.5	52.5	17	0.4	0	0.4	0.7	1
44	63.2	53.1	18	63.6	53.5	19	63.2	53.1	18	63.6	53.5	19	0.4	0	0.4	0.7	1
45	66.3	55.9	25	66.7	56.3	25	66.3	55.9	25	66.7	56.3	25	0.4	0	0.4	0.9	1
46	54.4	45.2	7	54.7	45.5	7	54.4	45.2	7	54.7	45.5	7	0.3	0	0.3	0.2	0
47	67.3	56.8	27	67.8	57.3	28	67.3	56.8	27	67.8	57.3	28	0.5	0	0.5	1.2	1
48	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
49	60.3	50.5	14	60.7	50.9	14	60.3	50.5	14	60.7	50.9	14	0.4	0	0.4	0.6	1
50	54.4	45.2	7	54.8	45.6	8	54.4	45.2	7	54.8	45.6	8	0.4	0	0.4	0.3	0
51	60.8	51.0	14	61.2	51.3	15	60.8	51.0	14	61.2	51.3	15	0.4	0	0.4	0.6	1
52	50.8	42.0	5	51.2	42.3	5	50.8	42.0	5	51.2	42.3	5	0.4	0	0.4	0.2	0
53	47.7	39.2	3	48	39.4	3	47.7	39.2	3	48	39.4	3	0.3	0	0.3	0.1	0
54	63.4	53.3	19	63.8	53.7	19	66.3	55.9	25	66.7	56.3	25	0.4	2.9	3.3	0.7	7
54	61.6	51.7	16	62.1	52.1	16	65.5	55.2	23	65.9	55.5	24	0.5	3.9	4.3	0.8	8
55	61.5	51.6	15	62	52.0	16	65.2	54.9	22	65.6	55.3	23	0.5	3.7	4.1	0.8	8
56	60	50.2	13	60.4	50.6	14	66	55.6	24	66.4	56.0	25	0.4	6	6.4	0.6	12
57	59.2	49.5	12	59.6	49.9	13	65.7	55.4	23	66.1	55.7	24	0.4	6.5	6.9	0.5	12
58	60.1	50.3	13	60.6	50.8	14	62.2	52.2	17	62.6	52.6	17	0.5	2.1	2.5	0.7	4
59	59.4	49.7	12	59.8	50.1	13	60.4	50.6	14	60.8	51.0	14	0.4	1	1.4	0.5	2
60	63	52.9	18	63.4	53.3	19	63.1	53.0	18	63.5	53.4	19	0.4	0.1	0.5	0.7	1
62	67.7	57.2	28	68.1	57.5	29	67.7	57.2	28	68.1	57.5	29	0.4	0	0.4	1.0	1
61	60.3	50.5	14	60.7	50.9	14	60.4	50.6	14	60.9	51.0	15	0.4	0.1	0.6	0.6	1
67	58.4	48.8	11	58.9	49.2	12	58.5	48.9	11	58.9	49.2	12	0.5	0.1	0.5	0.6	1
66	60.1	50.3	13	60.5	50.7	14	60.2	50.4	14	60.6	50.8	14	0.4	0.1	0.5	0.6	1
65	60.9	51.0	15	61.3	51.4	15	60.9	51.0	15	61.3	51.4	15	0.4	0	0.4	0.6	1
64	62.5	52.5	17	63	52.9	18	62.6	52.6	17	63	52.9	18	0.5	0.1	0.5	0.9	1
68	72.3	61.3	40	72.7	61.7	41	72.3	61.3	40	72.7	61.7	41	0.4	0	0.4	1.2	1
63	64.1	53.9	20	64.6	54.4	21	64.2	54.0	20	64.6	54.4	21	0.5	0.1	0.5	1.0	1
70	50.8	42.0	5	51.1	42.2	5	55.7	46.4	8	56.1	46.7	9	0.3	4.9	5.3	0.2	4
71	59.4	49.7	12	59.8	50.1	13	67.2	56.7	27	67.6	57.1	28	0.4	7.8	8.2	0.5	15
72	75.4	64.1	49	75.8	64.5	50	75.4	64.1	49	75.8	64.5	50	0.4	0	0.4	1.2	1

Appendix E Assessment Summary Tables

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

<table>
<tr><th>Objective</th><th>Sub-Objective</th><th>Qualitative Impacts</th><th>Quantitative Assessment</th><th>Assessment</th></tr>
<tr><td rowspan="3">ENVIRONMENT</td><td>Air Quality</td><td>Red Route is forecasted to have a beneficial local air quality effect by removing a proportion of traffic (particularly HDVs) from the city centre, leading to less congestion and reduced pollution. Two existing AQMAs would be indirectly affected as a result of removal of some strategic traffic from the city. However, the change would likely not be significant enough to result in the AQMAs being revoked. In terms of impacts upon sensitive vegetation, the Red Route would be least preferred.
NO_2 and PM_{10} levels at each assessed receptor would be 'Well Below' the NAQS limit values and the significance of effect in all cases would be Negligible, irrespective of the absolute adverse or beneficial change concentrations. The route would however result in an increase in regional emissions.</td><td>Number of properties within 200m of indicative alignment centreline:
<table><tr><th>Centreline – 50m</th><th>50-100m</th><th>100-150m</th><th>150-200m</th><th>Total</th></tr><tr><td>10</td><td>11</td><td>15</td><td>7</td><td>43</td></tr></table></td><td>Slight Adverse – Slight Beneficial</td></tr>
<tr><td>Cultural Heritage</td><td>Red Route has the possibility of impacting upon a 1600's battle site (ARM029:042), four tree ring sites in Fathom Lower (ARM029:020; ARM029:021; ARM029:022; ARM029:023), the former lines of the Industrial Heritage Record GNR Branch Line from Goraghwood to Warrenpoint (00478) and the Newry and Greenore Railway (00538), long-established woodland of historic value at Fathom Upper (WT895) whilst also crossing the boundaries between the townland of Cloghogue with Fathom Upper.
The crossing of the Newry River may also impact upon shipwrecks in the river and upon the setting of the Newry Ship Canal (especially Victoria Lock); the bridge carrying the Barracric Road over the Belfast-Dublin railway line; and Fathom House & its associated Belvedere Tower.</td><td>Nine low value assets would be at risk of direct physical impact, as detailed under qualitative impacts.
Five assets of unknown value would be at risk of direct physical impact, including areas of palaeoenvironmental potential and the possible site of the former Wellington Inn while the river crossing could impact upon at least three recorded shipwrecks.
Has the potential to impact upon the setting of a range of heritage assets, including the Newry Ship Canal, the B+ listed Church of the Sacred Heart (and associated B1 listed gates and walling and its non-designated Parochial House), the high value B2 listed Belvedere Tower (Fathom Lower), the low value undated enclosure or 'fort' in Fathom Lower and three low value areas of historic woodland in Fathom Lower, comprising ancient woodland (WT896) and long-established woodland (WT940 & WT907).</td><td>Large Adverse</td></tr>
<tr><td>Ecology & Nature Conservation</td><td>Carlingford Shore SAC is approximately 3.5km south-east of the Red Route. A bridge approximately 480m long would traverse Carlingford Lough ASSI. Piers would be required through the estuarine sediments. Habitat connectivity between Fathom Upper ASSI and Fathom Lower Woods & Grasslands SLNCI would be fragmented. The Red Route would have major direct impacts on several SLNCIs (including very significant adverse impacts upon ancient and long-established woodland). This route also traverses agricultural land with numerous hedgerows. As Priority Habitat and important wildlife corridors, hedgerow loss would be</td><td>N/A
(Qualitative Assessment Only)</td><td>Large Adverse</td></tr>
</table>

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		detrimental, causing habitat fragmentation for local wildlife.		
	Landscape Effects	Slight encroachment into Mourne AONB, though the route would have a significant impact on the Ring of Gullion AONB, resulting in significant loss of mature woodland vegetation, in combination with major earthworks on the western valley side. However, the road would follow contours as much as possible. Would however require the removal of large areas of long established woodland as well as sections of ancient woodland. The bridge crossing would potentially divide the river basin and indeed the overall river valley into two parts by creating a strong visual and physical barrier when viewed from the A2. Red Route is least preferred as it would cross the river valley at its widest point resulting in maximum landscape and visual impact. The limited number of receptors would minimise visual impacts over this section of the route.	N/A (Qualitative Assessment Only)	**Landscape** Large Adverse to Very Large Adverse **Visual** Moderate Adverse to Large Adverse
	Land Use	Would not encroach into the settlement development limit as designated in the Banbridge / Newry & Mourne Area Plan 2015. Would marginally encroach into Narrow Water Forest SLNCI, but cause no severance. Would encroach into and sever the most southerly (and by far the largest) of the three parcels associated with Fathom Lower Woods & Grasslands SLNCI resulting in significant losses from this zoned area and a significant impact upon its nature conservation, setting and amenity value. All route options would traverse a similar length of agricultural land. Would not affect any designated Community areas or facilities; however, the route may affect publically accessible woodland at Fathom Forest. Would have by far the greatest impact on Forest Service woodlands and long-established/ancient woodland. Would impact the greatest amount of non-Forest Service woodland. Would include a bascule bridge over the canal to negate any restriction on ship passage.	Seven properties at risk of demolition (including six residential properties and one commercial property). Five residential properties at risk of private land loss, all being subject to minor impacts. Six planning applications at risk of direct impacts. For those that are still extant, the impact would be minor.	Slight Adverse - Large Adverse
	Noise & Vibration	Would have the lowest number of receptors, both within 50m, (the zone where noise levels would be greatest), and within 300m. Would require a significant degree of earthworks (cutting and embankments) and bridge works, though as it is not located close to the more populous part of Newry, this would be preferred.	When comparing the Do-Minimum in the Baseline Year (year of opening) with the Do-Something in the Future Year (15th Year) for the Red Route, 62 properties would experience a less than 10% increase in noise nuisance. 7 would experience a 10-20% increase in noise nuisance, and 3 would experience no change. Under this scenario, it is predicted that the 68 dB $L_{A10,\ 18hr}$ value would be exceeded at 7 properties under the 'Do-Something' scenario. It is noted that 6 of these properties would exceed this value under the 'Do-Minimum' scenario due to the	Neutral – Large Adverse

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment		Assessment	
			existing road network. There are 17 properties which would be exposed to levels in excess of 55 dB $L_{night, outside}$ under the 'Do-Something' scenario in the Future assessment year.			
	Vehicle Travellers	New and interesting views would be opened-up. Currently, driver stress levels through the affected road network of Newry are considered to be 'High', and would be expected to reduce on completion of the scheme.	N/A (Qualitative Assessment Only)		Views : Moderate Beneficial Driver Stress: Moderate Beneficial	
	Road Drainage & the Water Environment	Would not directly affect any designated or known shellfishery beds. It would however traverse Carlingford Lough ASSI. Would not be located within the Q_{100} river and surface water floodplain associated with the Newry River or the Q_{200} Sea Floodplain associated with the Newry Estuary. The feeder stream to Bensons Glen Fish Hatchery would be directly affected.	N/A (Qualitative Assessment Only)		Moderate Adverse	
	Geology & Soils	Would potentially have a greater impact on soils as a result of its rural location and overall length. Would potentially have a lower potential impact on contaminated soils/groundwater.	N/A (Qualitative Assessment Only)		Slight Adverse	
ECONOMY	**Transport Economic Efficiency**	Significantly reduced peak and off-peak journey times on the road network in the 2023 year of opening compared to existing routes by avoiding the congested urban road network within Newry City Centre.	**For the Opening Year:**	**RTF 2015 Growth**	**TEE (RTF 2015 Growth)**	
			Total Vehicle-Hours Saved (Two-Way):	214,000	**Consumer PVB:**	£67.337m
			Average Journey Time Change (Mins/Veh):	8.9 mins saved on strategic route Warrenpoint to / from Carrickcarnan 3.2 mins saved on strategic route Warrenpoint to / from Camlough 6.0 mins saved on strategic route Warrenpoint to / from Carnbane 3.9 mins saved on strategic route Warrenpoint to / from Sheepbridge	**Business PVB:**	£38.340m
					Private PVB:	£0.342m
					ITR PVB:	-£1.734m
					Emissions PVB:	£0.294m
					Government	**£59.262m**

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment	
					3.6 mins saved on strategic route Greenbank Rbt to / from Carrickcarnan -0.5 mins saved on strategic route City Centre to / from Carrickcarnan			**Funding PVC:**	
								Overall PVB	£109.498m
								Overall PVC	£59.899m
								NPV	£49.599m
								BCR	1.828
	Reliability	Improved journey time reliability through the provision of a Newry Southern Relief Road to address acknowledged operational congestion through Newry City Centre.	N/A – Qualitative Assessment Only						
SOCIAL	**Pedestrians, Cyclists & Equestrians**	Would potentially affect two alleged PROWs, (at Middlebank, and Hillhead Road), and cross the Ring of Gullion Waymarked Way. The proposed high off-road cycle and walking greenway to be developed along Middlebank would be indirectly impacted in terms of setting. Would impact on existing and proposed National Cycle Networks / Sustrans proposals. No known equestrian facilities would be directly affected. Would impact on the setting/amenity of the Ship Canal as an angling facility. Likely significant reduction in traffic on Kilmorey Street and overall reduction in rat-running.	N/A (Qualitative Assessment Only)					Slight Adverse – Slight Beneficial	
	Accidents	Significant savings in the number of accidents and the number of serious and slight casualties due to the provision of a Newry Southern Relief Road to remove traffic from the heavily trafficked junctions on the urban road network within Newry City Centre, based on the application of national accident characteristics.	**Growth**	**Accidents**	**Deaths**	**Serious**	**Slight**	**Accidents PVB (RTF 2015 Growth)**	
			RTF 2015 Growth	140.9	-0.2	13.7	161.9	£4.918m	
	Community Severance	Significant volumes of traffic would continue to be drawn into the city from all directions; however the relief of some of the traffic on the urban road network may improve access to community facilities, with a possible reduction in vehicular/pedestrian conflict due to the slight easing of congestion. The benefit of relieving some traffic and slight easing of congestion may also be experienced throughout the wider network of urban roads which have become heavily used routes by traffic wishing to avoid/bypass the congested areas. Not only may this lead to improved access to community facilities throughout the wider urban area, but also partially reduce the degree of	N/A (Qualitative Assessment Only)					Slight Beneficial	

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		community severance. It may also serve to encourage journeys into the city by those previously deterred by the high levels of traffic on the city roads.		
	Access to Public Transport	Access to the local road network would be maintained for local Ulsterbus services linking the surrounding towns and villages. The route would likely result in reduction in delays for public transport services through separation of local and strategic traffic to a certain degree. There would be no long-term impact upon rail services.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Transport Interchange	As a long-term strategic road improvement to link from the A1 Dublin Road (a key strategic route), to the A2 Warrenpoint Road (a trunk road leading to Warrenpoint Port) the provision of a relief road to the south of Newry would provide an obvious benefit to the transport interchanges, particularly with regards to the potential for removal of a significant proportion of port-related HGV movements from the city centre road network. A maximum gradient of 6% occurs for approximately 0.3km. A significant cut from the proposed Fathom Line Roundabout to approximate chainage 0+400m would potentially require rock blasting. Significant works would be required to upgrade Flagstaff Road as the proposed route would not provide adequate clearance. This would involve raising Flagstaff Road considerably.	N/A (Qualitative Assessment Only)	Slight -Moderate Beneficial
	Land-Use Planning	Conforms to policies in the RDS, RTS and RSTNTP. Specifically, the route would help achieve the strategic aims of the RDS (2035) and conforms to its specific regional guidance; to deliver a balanced approach to transport infrastructure. The route would help maximise the potential of the RSTN, by removing bottlenecks on the key road network where lack of capacity is causing congestion and improving the environment by providing bypasses, relieving the effects of heavy through traffic. The scheme is part of the Strategic Road Improvement Programme, and is currently in DfI's 10 year Forward Planning Schedule, as of April 2015. Extensive woodland loss.	N/A (Qualitative Assessment Only)	Moderate Adverse - Moderate Beneficial
	Other Government Policies	The scheme is supported by proposals contained within the Banbridge/Newry and Mourne Area Plan 2015 and the Newry City Masterplan, which in turn are largely in conformance with other Government Department Objectives for integrated transport.	N/A (Qualitative Assessment Only)	Moderate Beneficial

Newry Southern Relief Road - Red Route	**Description** – A 4.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £83.201m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £113.404m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
PUBLIC ACCOUNTS	**Affordability**			(Excl. Optimism Bias) – £83.201m (Incl. 36.3% OB) – £113.404m

Newry Southern Relief Road - Yellow Route	**Description** – A 5.30km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £77.241m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £105.279m**

<table>
<tr><th>Objective</th><th>Sub-Objective</th><th>Qualitative Impacts</th><th>Quantitative Assessment</th><th>Assessment</th></tr>
<tr><td rowspan="4">ENVIRONMENT</td><td>Air Quality</td><td>Yellow Route is forecasted to have a beneficial local air quality effect by removing a proportion of traffic, (particularly HDVs) from the city centre, leading to less congestion and reduced pollution. Two existing AQMAs would be indirectly affected as a result of removal of some strategic traffic from the city. However, the change would likely not be significant enough to result in the AQMAs being revoked. In terms of sensitive vegetation, the Yellow Route would impact on some areas.
NO_2 and PM_{10} levels at each assessed receptor would be 'Well Below' the NAQS limit values and the significance of effect in all cases would be Negligible, irrespective of the absolute adverse or beneficial change concentrations. The route would however result in an increase in regional emissions.</td><td>Number of properties within 200m of indicative alignment centreline:
<table><tr><th>Centreline – 50m</th><th>50-100m</th><th>100-150m</th><th>150-200m</th><th>Total</th></tr><tr><td>15</td><td>10</td><td>14</td><td>9</td><td>48</td></tr></table></td><td>Slight Adverse – Slight Beneficial</td></tr>
<tr><td>Cultural Heritage</td><td>Yellow Route has the possibility of impacting upon a 1600's battle site (ARM029:042), four tree ring sites in Fathom Lower (ARM029:020; ARM029:021; ARM029:022; ARM029:023), the former lines of the Industrial Heritage Record GNR Branch Line from Goraghwood to Warrenpoint (00478) and the Newry and Greenore Railway (00538), ancient woodland (WT896) and long-established woodland (WT895, WT943 & WT940), whilst also crossing the boundaries between the townland of Cloghogue with Fathom Upper.
The crossing of the Newry River may also impact upon shipwrecks in the river and upon the setting of the Newry Ship Canal (especially Victoria Lock); the bridge carrying the Barracric Road over the Belfast-Dublin railway line; and Fathom House & its associated Belvedere Tower.</td><td>12 low value assets would be at risk of direct physical impact, as detailed under qualitative impacts.
Four assets of unknown value would be at risk of direct physical impact including areas of palaeoenvironmental potential and the possible site of the former Wellington Inn while the river crossing could impact upon at least three recorded shipwrecks.
Yellow Route also has the potential to impact upon the setting of a range of heritage assets, including the Newry Ship Canal, the B+ listed Church of the Sacred Heart (and associated B1 listed gates and walling and its non-designated Parochial House), the high value B2 listed Belvedere Tower (Fathom Lower), the low value undated enclosure or 'fort' in Fathom Lower. and three low value areas of historic woodland at Narrow Water (WT904; WT905; WT906; WT907).</td><td>Large Adverse</td></tr>
<tr><td>Ecology & Nature Conservation</td><td>Carlingford Shore SAC is approximately 0.5km south-east of the Yellow Route. A bridge approximately 285m long would traverse Carlingford Lough ASSI. Piers would be required through the estuarine sediments. Habitat connectivity between Fathom Upper ASSI and Fathom Lower Woods & Grasslands SLNCI would be fragmented. The Yellow Route would have major direct impacts on several SLNCIs (including significant adverse impacts upon ancient and long-established woodland). This route also traverses agricultural land with numerous hedgerows. As Priority Habitat and important wildlife corridors, hedgerow loss would be detrimental, causing habitat fragmentation for local wildlife.</td><td>N/A
(Qualitative Assessment Only)</td><td>Large Adverse</td></tr>
<tr><td>Landscape Effects</td><td>Slight encroachment into Mourne AONB, though the route would have</td><td>N/A</td><td>Landscape</td></tr>
</table>

Newry Southern Relief Road - Yellow Route	**Description** – A 5.30km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £77.241m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £105.279m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		a significant impact on the Ring of Gullion AONB, resulting in significant loss of mature woodland vegetation in combination with major earthworks on the western valley side. However, the road would follow contours as much as possible. Would however require the removal of large areas of long-established woodland as well as sections of ancient woodland. The bridge crossing would potentially divide the river basin and indeed the overall river valley into two parts by creating a strong visual and physical barrier when viewed from the A2. River valley bridge location of the Yellow Route would take advantage of a natural narrowing of Newry River resulting in a shorter bridge. While it would still divide the valley into two parts, it could be integrated better into the overall valley environs. The limited number of receptors would minimise visual impacts over this section of the route.	(Qualitative Assessment Only)	Large Adverse to Very Large Adverse **Visual** Moderate Adverse to Large Adverse
	Land Use	Would not encroach into the settlement development limit as designated in the Banbridge / Newry & Mourne Area Plan 2015. Would marginally encroach into Narrow Water Forest SLNCI, but cause no severance. Would encroach into and sever the most southerly (and by far the largest) of the three parcels associated with Fathom Lower Woods & Grasslands SLNCI, resulting in significant losses from this zoned area and a significant impact upon its nature conservation, setting and amenity value. All route options would traverse a similar length of agricultural land. Would not affect any designated Community areas or facilities, however it may affect publically accessible woodland at Fathom Forest. Would have by far the greatest impact on Forest Service woodlands and long-established/ancient woodland. Would impact the greatest amount of non-Forest Service woodland. Would include a bascule bridge to negate any restriction on ship passage.	Seven properties at risk of demolition (including five residential properties and two commercial properties).	Slight Adverse - Large Adverse
			Seven residential properties and one community property at risk of private land loss, all being subject to minor impacts.	
			Seven planning applications at risk of direct impacts. For those that are still extant, the impact would be minor.	
	Noise & Vibration	Would have the lowest number of receptors, both within 50m, (the zone where noise levels would be greatest), and within 300m. Would require a significant degree of earthworks (cutting and embankments) and bridge works, though as it is not located close to the more populous part of Newry, this would be preferred.	When comparing the Do-Minimum in the Baseline Year (year of opening) with the Do-Something in the Future Year (15th Year) for the Yellow Route, 64 properties would experience a less than 10% increase in noise nuisance. 7 would experience a 10-20% increase in noise nuisance. Under this scenario, it is predicted that the 68 dB $L_{A10,\ 18hr}$ value would be exceeded at 7 properties under the 'Do-Something' scenario. It is noted that 6 of these properties would exceed this value under the 'Do-Minimum' scenario due to the existing road network. There are 17 properties which would be exposed to levels in excess of 55 dB $L_{night,}$	Slight Adverse – Large Adverse

Newry Southern Relief Road - Yellow Route

Description – A 5.30km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.

Main Constraints – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.

Total Scheme Cost (Excl. Optimism Bias) – £77.241m
Total Scheme Cost (Incl. 36.3% Optimism Bias) – £105.279m

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment		Assessment	
			outside under the 'Do-Something' scenario in the future assessment year.			
	Vehicle Travellers	New and interesting views would be opened-up. Currently, driver stress levels through the affected road network of Newry are considered to be 'High', and would be expected to reduce on completion of the scheme.	N/A (Qualitative Assessment Only)		Views : Moderate Beneficial Driver Stress: Moderate Beneficial	
	Road Drainage & the Water Environment	Would not directly affect any designated or known shellfishery beds but would be located in closest proximity to them at Narrow Water. It would also directly affect Carlingford Lough ASSI. Bridge crossing point and alignment would increase the potential for establishment of preferential pathways and sediment release. Would not be located within the Q_{100} river and surface water floodplain associated with the Newry River or the Q_{200} Sea Floodplain associated with the Newry Estuary. The feeder stream to Bensons Glen Fish Hatchery would be directly affected.	N/A (Qualitative Assessment Only)		Moderate Adverse	
	Geology & Soils	Would potentially have a greater impact on soils as a result of its rural location and overall length. Would potentially have a lower potential impact on contaminated soils/groundwater.	N/A (Qualitative Assessment Only)		Slight Adverse	
ECONOMY	**Transport Economic Efficiency**	Significantly reduced peak and off-peak journey times on the road network in the 2023 year of opening compared to existing routes by avoiding the congested urban road network within Newry City Centre.	**For the Opening Year:**	**RTF 2015 Growth**	**TEE (RTF 2015 Growth)**	
			Total Vehicle-Hours Saved (Two-Way):	174,000	**Consumer PVB:**	£58.459m
			Average Journey Time Change (Mins/Veh):	8.5 mins saved on strategic route Warrenpoint to / from Carrickcarnan 2.8 mins saved on strategic route Warrenpoint to / from Camlough 5.7 mins saved on strategic route Warrenpoint to / from Carnbane 3.6 mins saved on strategic route Warrenpoint to / from Sheepbridge 1.2 mins saved on strategic route Greenbank Rbt to / from Carrickcarnan -3.0 mins saved on strategic route	**Business PVB:**	£33.292m
					Private PVB:	£0.430m
					ITR PVB:	-£3.619m
					Emissions PVB:	£0.594m
					Government Funding PVC:	**£55.021m**
					Overall PVB	**£92.269m**
					Overall PVC	**£55.573m**

Newry Southern Relief Road - Yellow Route

Description – A 5.30km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.

Main Constraints – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.

Total Scheme Cost (Excl. Optimism Bias) – £77.241m
Total Scheme Cost (Incl. 36.3% Optimism Bias) – £105.279m

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment	
				City Centre to / from Carrickcarnan				**NPV**	**£36.696m**
								BCR	**1.660**
	Reliability	Improved journey time reliability through the provision of a Newry Southern Relief Road to address acknowledged operational congestion through Newry City Centre.	N/A – Qualitative Assessment Only						
SOCIAL	**Pedestrians, Cyclists & Equestrians**	Would potentially affect two alleged PROWs, (at Middlebank, and Hillhead Road), and cross the Ring of Gullion Waymarked Way. The proposed high off-road cycle and walking greenway to be developed along Middlebank would be indirectly impacted in terms of setting. Would impact on existing and proposed National Cycle Networks / Sustrans proposals. No known equestrian facilities would be directly affected. Would impact on the setting/amenity of the Ship Canal as an angling facility. Likely significant reduction in traffic on Kilmorey Street and overall reduction in rat-running.	N/A (Qualitative Assessment Only)					Slight Adverse – Slight Beneficial	
	Accidents	Significant savings in the number of accidents and the number of serious and slight casualties due to the provision of a Newry Southern Relief Road to remove traffic from the heavily trafficked junctions on the urban road network within Newry City Centre, based on the application of national accident characteristics.	**Growth**	**Accidents**	**Deaths**	**Serious**	**Slight**	**Accidents PVB (RTF 2015 Growth)**	
			RTF 2015 Growth	102.4	-0.6	8.1	115.4	£3.114m	
	Community Severance	Significant volumes of traffic would continue to be drawn into the city from all directions; however the relief of some of the traffic on the urban road network may improve access to community facilities, with a possible reduction in vehicular/pedestrian conflict due to the slight easing of congestion. The benefit of relieving some traffic and slight easing of congestion may also be experienced throughout the wider network of urban roads which have become heavily used routes by traffic wishing to avoid/bypass the congested areas. Not only may this lead to improved access to community facilities throughout the wider urban area, but also partially reduce the degree of community severance. It may also serve to encourage journeys into the city by those previously deterred by the high levels of traffic on the city roads.	N/A (Qualitative Assessment Only)					Slight Beneficial	
	Access to Public Transport	Access to the local road network would be maintained for local Ulsterbus services linking the surrounding towns and villages. The Route would likely result in reduction in delays for public transport	N/A (Qualitative Assessment Only)					Slight Beneficial	

Newry Southern Relief Road - Yellow Route	**Description** – A 5.30km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £77.241m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £105.279m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		services through separation of local and strategic traffic to a certain degree. There would be no long-term impact upon rail services.		
	Transport Interchange	As a long-term strategic road improvement to link from the A1 Dublin Road (a key strategic route), to the A2 Warrenpoint Road (a trunk road leading to Warrenpoint Port) the provision of a relief road to the south of Newry would provide an obvious benefit to the transport interchanges, particularly with regards to the potential for removal of a significant proportion of port-related HGV movements from the city centre road network. A maximum gradient of 6% occurs for approximately 0.4km. An extremely large cut from the proposed Fathom Line Roundabout would require rock blasting. Significant works would be required to upgrade Flagstaff Road as the proposed route would not provide adequate clearance. This would involve raising Flagstaff Road considerably.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Land-Use Planning	Conforms to policies in the RDS, RTS and RSTNTP. Specifically, the route would help achieve the strategic aims of the RDS (2035) and conforms to its specific regional guidance; to deliver a balanced approach to transport infrastructure. The route would help maximise the potential of the RSTN, by removing bottlenecks on the key road network where lack of capacity is causing congestion and improving the environment by providing bypasses, relieving the effects of heavy through traffic. The scheme is part of the Strategic Road Improvement Programme, and is currently in DfI's 10 year Forward Planning Schedule, as of April 2015. Extensive woodland loss.	N/A (Qualitative Assessment Only)	Moderate Adverse - Moderate Beneficial
	Other Government Policies	The scheme is supported by proposals contained within the Banbridge/Newry and Mourne Area Plan 2015 and the Newry City Masterplan, which in turn are largely in conformance with other Government Department Objectives for integrated transport.	N/A (Qualitative Assessment Only)	Moderate Beneficial
PUBLIC ACCOUNTS	**Affordability**			(Excl. Optimism Bias) – £77.241m (Incl. 36.3% OB) – £105.279m

Newry Southern Relief Road – Blue Route Option 1	**Description** – A 3.20km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £40.269m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £54.887m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment
ENVIRONMENT	**Air Quality**	Blue Route Option 1 is forecasted to have a beneficial local air quality effect by removing a proportion of traffic (particularly HDVs) from the city centre, leading to less congestion and reduced pollution. Two existing AQMAs would be indirectly affected as a result of removal of some strategic traffic from the city. However, the change would likely not be significant enough to result in the AQMAs being revoked. The route option would have minimal perceptible impact upon designated ecological sites. NO_2 and PM_{10} levels at each assessed receptor would be 'Well Below' the NAQS limit values and the significance of effect in all cases would be Negligible, irrespective of the absolute adverse or beneficial change concentrations. The route option would also result in a decrease in regional emissions.	Number of properties within 200m of indicative alignment centreline:					Slight Adverse – Slight Beneficial
			Centreline – 50m	50-100m	100-150m	150-200m	Total	
			18	8	30	51	107	
	Cultural Heritage	Blue Route Option 1 has the possibility of impacting upon historic woodland, a 'record-only' Belvedere Tower (HB16/13/009) associated with Ashton House, the former lines of the Industrial Heritage Record GNR Branch Line from Goraghwood to Warrenpoint (00478) and the Newry and Greenore Railway (00538), and the boundary between the townlands of Cloghogue and Fathom Lower. It could also impact upon the settings of the scheduled Newry Canal; the bridge carrying the Barracric Road over the Belfast-Dublin railway line; Fathom House & its associated Belvedere Tower, and the listed church at Cloghogue.	Four low value assets would be at risk of direct physical impact as detailed under qualitative impacts. Three assets of unknown value would be at risk of direct physical impact including a possible area of complex field boundaries, areas of palaeoenvironmental potential, the possible site of a 19th Century building, Wellington Inn and previously unrecorded archaeological features and deposits within greenfield areas. Blue Route Option 1 also has the potential to impact upon the setting of a range of heritage assets, including the Newry Ship Canal; the B+ listed Church of the Sacred Heart (and associated B1 listed gates and walling and its non-designated Parochial House); the high value B1 listed Fathom House and its associated high value B2 listed Belvedere Tower; the low value Record-Only Ashton House (HB16/13/028); the Industrial Heritage Record railway bridge on the GNR Main Line (00062:102:00) which is also a Record-Only Historic Building (HB16/13/013); and ancient woodland in Fathom Lower (WT940, WT943).					Large Adverse
	Ecology & Nature Conservation	Blue Route Option 1 would not directly affect Carlingford Lough ASSI, though would cross the Newry River and canal requiring several bridge piers within the wider channel. The bridging point would also likely affect the scrub habitat, riparian corridor on the canal and intertidal river bank habitat causing fragmentation. The northern-most and central parcels of the Fathom Lower Woods & Grassland SLNCI complex would be directly affected. Blue Route Option 1 would have a major impact on the woodland habitat as it would traverse long-established woodland and adjoining undesignated woodland within the central section of Fathom Lower Woods & Grassland SLNCI (Benson's Glen), leading to irreplaceable	N/A (Qualitative Assessment Only)					Large Adverse

Newry Southern Relief Road – Blue Route Option 1	**Description** – A 3.20km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £40.269m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £54.887m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		loss of long-established woodland habitat. Additionally, this would fragment this SLNCI. Significant fragmentation would prevent movement of species across the landscape. This route also traverses agricultural land with numerous hedgerows. As Priority Habitat and important wildlife corridors, hedgerow loss would be detrimental, causing habitat fragmentation for local wildlife.		
	Landscape Effects	The river bridge location of Blue Route Option 1 within Greenbank Industrial Estate would likely become a gateway / landmark between the city and the river valley further south-east due to its required high clearing between the bridge and Newry River / Canal. Considering its location within the urban and light industrial southern fringe of Newry, the development would be able to integrate into its urban / light industrial context and would not detract considerably from the overall character in the area Whilst Blue Route Option 1 would have major landscape and visual effects due to significant sections of cut & fill, it has the highest potential to integrate into the environment as it is located in an area of transition between the sub-urban end of Newry and the rural and wooded parts of the river valley. Blue Route Option 1 would have the least amount of embankments facing east towards the Newry River valley when compared with Blue Route Options 2 and 3. Of all Blue Route options, it would result in the greatest amount of sensitive woodland loss and would traverse the LLPA NY114 Newry Canal / River.	N/A (Qualitative Assessment Only)	**Landscape** Moderate Adverse to Large Adverse **Visual** Moderate Adverse to Large Adverse
	Land Use	Would encroach into the settlement development limit as designated in the Banbridge / Newry & Mourne Area Plan 2015, notably affecting a major area of existing open space, effectively resulting in its loss and functionality from a community / recreational perspective (Gerry Brown Park). Would also split an existing area of economic development associated with Greenbank Industrial Estate, however would result in no loss of land from this zoned area (may also improve access). Would directly affect the Newry Canal/River LLPA (NY 114). Would marginally encroach into the most northerly of the three parcels associated with Fathom Lower Woods & Grasslands SLNCI and would also encroach into and sever the central parcel of this SLNCI (Benson's Glen) (including the loss of long-established woodland). All route options would traverse a similar length of agricultural land. Does not include a bascule bridge over the canal at this stage, creating a potential restriction or obstacle to passage for tall ships.	Eight properties at risk of demolition, including five residential properties, one community property and two commercial properties. Seven residential properties at risk of private land loss, with one being subject to moderate adverse impacts and the remainder subject to minor impacts. Six planning applications at risk of direct impacts. For those that are still extant, the impact would be minor.	Slight Adverse – Large Adverse

Newry Southern Relief Road – Blue Route Option 1	**Description** – A 3.20km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £40.269m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £54.887m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment		Assessment	
	Noise & Vibration	Would have the third highest number of receptors, both within 50m, (the zone where noise levels would be greatest), and within 300m. These are primarily highly sensitive residential receptors. In terms of road gradient, steepest gradient (6%), over the second longest distance. The longer the length of road at this gradient; the higher the potential there is for adverse noise impacts. Would require a significant degree of earthworks (cutting and embankments) and bridge works.	When comparing the Do-Minimum in the Baseline Year (year of opening) with the Do-Something in the Future Year (15th Year) for Blue Route Option 1, 59 properties would experience a less than 10% increase in noise nuisance. 8 would experience a 10-20% increase in noise nuisance and 5 would experience no change. Under this scenario, it is predicted that the 68 dB $L_{A10,\ 18hr}$ value would be exceeded at 7 properties under the 'Do-Something' scenario. It is noted that 6 of these properties would exceed this value under the 'Do-Minimum' scenario due to the existing road network. There are 17 properties which would be exposed to levels in excess of 55 dB $L_{night,\ outside}$ under the 'Do-Something' scenario in the Future assessment year.		Neutral – Large Adverse	
	Vehicle Travellers	New and interesting views would be opened-up. Currently, driver stress levels through the affected road network of Newry are considered to be 'High', and would be expected to reduce on completion of the scheme.	N/A (Qualitative Assessment Only)		Views : Moderate Beneficial Driver Stress: Moderate Beneficial	
	Road Drainage & the Water Environment	Would not directly affect any designated or known shellfishery beds, nor would it directly affect Carlingford Lough ASSI. Bridge crossing point and alignment would minimise the potential for establishment of preferential pathways and sediment release. Would be located within the Q_{100} floodplain. The feeder stream to Bensons Glen Fish Hatchery would be directly affected.	N/A (Qualitative Assessment Only)		Slight Adverse	
	Geology & Soils	Would potentially have less impact on soils as a result of its being partially within urban and disturbed soil types and shorter overall length. However, its partial location within the urban area would increase the potential to encounter contaminated soils/groundwater (particularly within Greenbank Industrial Estate).	N/A (Qualitative Assessment Only)		Slight Adverse	
ECONOMY	**Transport Economic Efficiency**	Significantly reduced peak and off-peak journey times on the road network in the 2023 year of opening compared to existing routes by avoiding the congested urban road network within Newry City Centre.	**For the Opening Year:**	**RTF 2015 Growth**	**TEE (RTF 2015 Growth)**	
			Total Vehicle-Hours Saved (Two-Way):	174,000	**Consumer PVB:**	£53.943m
			Average Journey Time Change (Mins/Veh):	7.1 mins saved on strategic route Warrenpoint to / from Carrickcarnan	**Business PVB:**	£31.255m
					Private PVB:	£0.264m

Newry Southern Relief Road – Blue Route Option 1	**Description** – A 3.20km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £40.269m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £54.887m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment	
							1.4 mins saved on strategic route Warrenpoint to / from Camlough 4.3 mins saved on strategic route Warrenpoint to / from Carnbane 2.2 mins saved on strategic route Warrenpoint to / from Sheepbridge 5.3 mins saved on strategic route Greenbank Rbt to / from Carrickcarnan 1.1 mins saved on strategic route City Centre to / from Carrickcarnan	**ITR PVB:**	-£1.069m
								Emissions PVB:	£0.184m
								Government Funding PVC:	**£28.688m**
								Overall PVB	**£89.098m**
								Overall PVC	**£29.165m**
								NPV	**£59.924m**
								BCR	**3.055**
	Reliability	Improved journey time reliability through the provision of a Newry Southern Relief Road to address acknowledged operational congestion through Newry City Centre.	N/A – Qualitative Assessment Only						
SOCIAL	**Pedestrians, Cyclists & Equestrians**	Would potentially affect one alleged PROW (at Middlebank) and cross the Ring of Gullion Waymarked Way. The proposed high off-road cycle and walking greenway to be developed along Middlebank would be indirectly impacted in terms of setting. Would impact on existing and proposed National Cycle Networks / Sustrans proposals. No known equestrian facilities would be directly affected. Would impact on the setting/amenity of the Ship Canal as an angling facility. Likely significant reduction in traffic on Kilmorey Street and overall reduction in rat-running.	N/A (Qualitative Assessment Only)					Slight Adverse – Slight Beneficial	
	Accidents	Significant savings in the number of accidents and the number of serious and slight casualties due to the provision of a Newry Southern Relief Road to remove traffic from the heavily trafficked junctions on the urban road network within Newry City Centre, based on the application of national accident characteristics.	**Growth**	**Accidents**	**Deaths**	**Serious**	**Slight**	**Accidents PVB (RTF 2015 Growth)**	
			RTF 2015	127.8	-0.1	12.7	147.0	£4.513m	
	Community Severance	Significant volumes of traffic would continue to be drawn into the city from all directions; however the relief of some of the traffic on the urban road network may improve access to community facilities, with a possible reduction in vehicular/pedestrian conflict due to the slight easing of congestion. The benefit of relieving some traffic and slight easing of congestion may also be experienced throughout the wider network of urban roads which have become heavily used routes by traffic wishing to avoid/bypass the congested areas. Not only may this lead to improved access to community facilities throughout the wider urban area but also partially reduce the degree of community severance. It	N/A (Qualitative Assessment Only)					Slight Beneficial	

Newry Southern Relief Road – Blue Route Option 1	**Description** – A 3.20km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £40.269m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £54.887m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		may also serve to encourage journeys into the city by those previously deterred by the high levels of traffic on the city roads.		
	Access to Public Transport	Access to the local road network would be maintained for local Ulsterbus services linking the surrounding towns and villages. The Route would likely result in reduction in delays for public transport services through separation of local and strategic traffic to a certain degree. There would be no long-term impact upon rail services.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Transport Interchange	As a long-term strategic road improvement to link from the A1 Dublin Road (a key strategic route), to the A2 Warrenpoint Road (a trunk road leading to Warrenpoint Port) the provision of a relief road to the south of Newry would provide an obvious benefit to the transport interchanges, particularly with regards to the potential for removal of a significant proportion of port-related HGV movements from the city centre road network. A maximum gradient of 6% occurs for approximately 1.4km. A significant cut along the Fathom Line connector could potentially require blasting. Similarly, a significant cut, crossing Flagstaff Road may require blasting. This cut would however provide sufficient clearance for an overbridge at Flagstaff Road.	N/A (Qualitative Assessment Only)	Moderate Beneficial
	Land-Use Planning	Conforms to policies in the RDS, RTS and RSTNTP. Specifically the route would help achieve the strategic aims of the RDS (2035) and conforms to its specific regional guidance; to deliver a balanced approach to transport infrastructure. The route would help maximise the potential of the RSTN, by removing bottlenecks on the key road network where lack of capacity is causing congestion and improving the environment by providing bypasses, relieving the effects of heavy through traffic. The scheme is part of the Strategic Road Improvement Programme, and is currently in DfI's 10 year Forward Planning Schedule, as of April 2015.	N/A (Qualitative Assessment Only)	Slight Adverse - Moderate Beneficial
	Other Government Policies	The scheme is supported by proposals contained within the Banbridge/Newry and Mourne Area Plan 2015 and the Newry City Masterplan, which in turn are largely in conformance with other Government Department Objectives for integrated transport.	N/A (Qualitative Assessment Only)	Moderate Beneficial
PUBLIC ACCOUNTS	**Affordability**			(Excl. Optimism Bias) – £40.269m (Incl. 36.3% OB) – £54.887m

Newry Southern Relief Road – Blue Route Option 2	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £53.177m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £72.481m**

<table>
<tr><th>Objective</th><th>Sub-Objective</th><th>Qualitative Impacts</th><th>Quantitative Assessment</th><th>Assessment</th></tr>
<tr><td rowspan="4">ENVIRONMENT</td><td>Air Quality</td><td>Blue Route Option 2 is forecasted to have a beneficial local air quality effect by removing a proportion of traffic (particularly HDVs) from the city centre, leading to less congestion and reduced pollution. Two existing AQMAs would be indirectly affected as a result of removal of some strategic traffic from the city. However, the change would likely not be significant enough to result in the AQMAs being revoked. The route option would have no perceptible impact upon designated ecological sites.
NO_2 and PM_{10} levels at each assessed receptor would be 'Well Below' the NAQS limit values and the significance of effect in all cases would be Negligible, irrespective of the absolute adverse or beneficial change concentrations. The route option would also result in a decrease in regional emissions.</td><td>Number of properties within 200m of indicative alignment centreline:
<table><tr><th>Centreline – 50m</th><th>50-100m</th><th>100-150m</th><th>150-200m</th><th>Total</th></tr><tr><td>16</td><td>11</td><td>29</td><td>52</td><td>108</td></tr></table></td><td>Slight Adverse – Slight Beneficial</td></tr>
<tr><td>Cultural Heritage</td><td>Blue Route Option 2 has the possibility of impacting upon a record-only Belvedere Tower (HB16/13/009) associated with Ashton House; the former lines of the Industrial Heritage Record GNR Branch Line from Goraghwood to Warrenpoint (00478) and the Newry and Greenore Railway (00538); and the boundary between the townlands of Cloghogue and Fathom Lower.
It could also impact upon the settings of the scheduled Newry Canal; the bridge carrying the Barracric Road over the Belfast-Dublin railway line; Fathom House and its associated Belvedere Tower; and the listed church at Cloghogue.</td><td>Four low value assets would be at risk of direct physical impact, as detailed under qualitative impacts.
Three assets of unknown value would be at risk of direct physical impact, including a possible area of complex field boundaries, areas of palaeoenvironmental potential, the possible site of a 19th Century building, Wellington Inn and previously unrecorded archaeological features and deposits within greenfield areas.
Blue Route Option 2 also has the potential to impact upon the setting of a range of heritage assets, including the Newry Ship Canal; the B+ listed Church of the Sacred Heart (and associated B1 listed gates and walling and its non-designated Parochial House); the high value B1 listed Fathom House and its associated high value B2 listed Belvedere Tower; the low value Record-Only Ashton House (HB16/13/028); the Industrial Heritage Record railway bridge on the GNR Main Line (00062:102:00) which is also a Record-Only Historic Building (HB16/13/013) and ancient woodland in Fathom Lower (WT940, WT943).</td><td>Large Adverse</td></tr>
<tr><td>Ecology & Nature Conservation</td><td>Blue Route Option 2 would not directly affect Carlingford Lough ASSI, though would cross the Newry River and canal requiring several bridge piers within the wider channel. The bridging point would also likely affect the scrub habitat, riparian corridor on the canal and intertidal river bank habitat causing fragmentation.
Does not traverse Fathom Lower Woods & Grassland SLNCI, though passes in close proximity to it, affecting undesignated woodland fringe habitat, leaving the remaining woodland habitat more exposed to disturbance and lead to significant habitat fragmentation. This route also traverses agricultural land with numerous hedgerows. As Priority Habitat and important wildlife corridors, hedgerow loss would</td><td>N/A
(Qualitative Assessment Only)</td><td>Moderate Adverse</td></tr>
</table>

Newry Southern Relief Road – Blue Route Option 2	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £53.177m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £72.481m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		be detrimental, causing habitat fragmentation for local wildlife.		
	Landscape Effects	The river bridge location of Blue Route Option 2 within Greenbank Industrial Estate would likely become a gateway / landmark between the city and the river valley further south-east due to its required high clearing between the bridge and Newry River / Canal. Considering its location within the urban and light industrial southern fringe of Newry, the development would be able to integrate into its urban / light industrial context and would not detract considerably from the overall character in the area. Would traverse the LLPA NY114 Newry Canal / River. Whilst Blue Route Option 2 would have major landscape and visual effects due to significant sections of cut & fill, it has the potential to integrate into the environment as it is located in an area of transition between the sub-urban end of Newry and the rural and wooded parts of the river valley. Blue Route Option 2 would have extensive embankments facing east towards the Newry River valley when compared with Blue Route Options 1 and 3.	N/A (Qualitative Assessment Only)	**Landscape** Moderate Adverse to Large Adverse **Visual** Moderate Adverse to Large Adverse
	Land Use	Would encroach into the settlement development limit as designated in the Banbridge / Newry & Mourne Area Plan 2015, notably affecting a major area of existing open space effectively resulting in its loss and functionality from a community/recreational perspective (Gerry Brown Park). Would also split an existing area of economic development associated with Greenbank Industrial Estate, however would result in no loss of land from this zoned area (may also improve access). Would directly affect the Newry Canal/River LLPA (NY 114). Would avoid direct encroachment into Fathom Lower Woods & Grasslands SLNCI. All route options would traverse a similar length of agricultural land. Does not include a bascule bridge over the canal at this stage, creating a potential restriction or obstacle to passage for tall ships.	Seven properties at risk of demolition, including five residential properties, one community property and one commercial property. Eight residential properties at risk of private land loss, with two being subject to moderate adverse impacts and the remainder subject to minor impacts. Six planning applications at risk of direct impacts. For those that are still extant, the impact would be minor.	Slight Adverse – Large Adverse

Newry Southern Relief Road – Blue Route Option 2	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £53.177m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £72.481m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment		Assessment	
	Noise & Vibration	Would have a comparatively high number of receptors, both within 50m, (the zone where noise levels would be greatest), and within 300m. These are primarily highly sensitive residential receptors. In terms of road gradient, steepest gradient (6%), over the second longest distance. The longer the length of road at this gradient; the higher the potential there is for adverse noise impacts. Would require a significant degree of earthworks (cutting and embankments) and bridge works.	When comparing the Do-Minimum in the Baseline Year (year of opening) with the Do-Something in the Future Year (15th Year) for Blue Route Option 2, 62 properties would experience a less than 10% increase in noise nuisance. 6 would experience a 10-20% increase in noise nuisance and 4 would experience no change. Under this scenario, it is predicted that the 68 dB $L_{A10,\ 18hr}$ value would be exceeded at 9 properties under the 'Do-Something' scenario. It is noted that 6 of these properties would exceed this value under the 'Do-Minimum' scenario due to the existing road network. There are 18 properties which would be exposed to levels in excess of 55 dB $L_{night,\ outside}$ under the 'Do-Something' scenario in the Future assessment year.		Neutral – Large Adverse	
	Vehicle Travellers	New and interesting views would be opened-up. Currently, driver stress levels through the affected road network of Newry are considered to be 'High', and would be expected to reduce on completion of the scheme.	N/A (Qualitative Assessment Only)		Views : Moderate Beneficial Driver Stress: Moderate Beneficial	
	Road Drainage & the Water Environment	Would not directly affect any designated or known shellfishery beds, nor would it directly affect Carlingford Lough ASSI. Bridge crossing point and alignment would minimise the potential for establishment of preferential pathways and sediment release. Would be located within the Q_{100} floodplain. The feeder stream to Bensons Glen Fish Hatchery would be directly affected.	N/A (Qualitative Assessment Only)		Slight Adverse	
	Geology & Soils	Would potentially have less impact on soils as a result of its being partially within urban and disturbed soil types and shorter overall length. However, its partial location within the urban area would increase the potential to encounter contaminated soils/groundwater (particularly within Greenbank Industrial Estate).	N/A (Qualitative Assessment Only)		Slight Adverse	
ECONOMY	**Transport Economic Efficiency**	Significantly reduced peak and off-peak journey times on the road network in the 2023 year of opening compared to existing routes by avoiding the congested urban road network within Newry City Centre.	**For the Opening Year:**	**RTF 2015 Growth**	**TEE (RTF 2015 Growth)**	
			Total Vehicle-Hours Saved (Two-Way):	178,000	**Consumer PVB:**	£55.528m
			Average Journey Time Change (Mins/Veh):	7.2 mins saved on strategic route Warrenpoint to / from Carrickcarnan	**Business PVB:**	£32.104m
					Private PVB:	£0.300m

Newry Southern Relief Road – Blue Route Option 2	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £53.177m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £72.481m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment	
							1.6 mins saved on strategic route Warrenpoint to / from Camlough 4.4 mins saved on strategic route Warrenpoint to / from Cambane 2.3 mins saved on strategic route Warrenpoint to / from Sheepbridge 5.4 mins saved on strategic route Greenbank Rbt to / from Carrickcarnan 1.2 mins saved on strategic route City Centre to / from Carrickcarnan	**ITR PVB:**	-£1.539m
								Emissions PVB:	£0.259m
								Government Funding PVC:	**£37.880m**
								Overall PVB	**£91.270m**
								Overall PVC	**£38.328m**
								NPV	**£52.942m**
								BCR	**2.381**
	Reliability	Improved journey time reliability through the provision of a Newry Southern Relief Road to address acknowledged operational congestion through Newry City Centre.	N/A – Qualitative Assessment Only						
SOCIAL	**Pedestrians, Cyclists & Equestrians**	Would potentially affect one alleged PROW (at Middlebank) and cross the Ring of Gullion Waymarked Way. The proposed high off-road cycle and walking greenway to be developed along Middlebank would be indirectly impacted in terms of setting. Would impact on existing and proposed National Cycle Networks / Sustrans proposals. No known equestrian facilities would be directly affected. Would impact on the setting/amenity of the Ship Canal as an angling facility. Likely significant reduction in traffic on Kilmorey Street and overall reduction in rat-running.	N/A (Qualitative Assessment Only)					Slight Adverse – Slight Beneficial	
	Accidents	Significant savings in the number of accidents and the number of serious and slight casualties due to the provision of a Newry Southern Relief Road to remove traffic from the heavily trafficked junctions on the urban road network within Newry City Centre, based on the application of national accident characteristics.	**Growth**	**Accidents**	**Deaths**	**Serious**	**Slight**	**Accidents PVB (RTF 2015 Growth)**	
			RTF 2015	129.4	-0.1	13.0	149.1	£4.617m	
	Community Severance	Significant volumes of traffic would continue to be drawn into the city from all directions; however the relief of some of the traffic on the urban road network may improve access to community facilities, with a possible reduction in vehicular/pedestrian conflict due to the slight easing of congestion. The benefit of relieving some traffic and slight easing of congestion may also be experienced throughout the wider network of urban roads which have become heavily used routes by traffic wishing to avoid/bypass the congested areas. Not only may this lead to improved access to community facilities throughout the wider urban area but also partially reduce the degree of community severance. It	N/A (Qualitative Assessment Only)					Slight Beneficial	

Newry Southern Relief Road – Blue Route Option 2	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £53.177m** **Total Scheme Cost (Incl. 36.3% Optimism Bias) – £72.481m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		may also serve to encourage journeys into the city by those previously deterred by the high levels of traffic on the city roads.		
	Access to Public Transport	Access to the local road network would be maintained for local Ulsterbus services linking the surrounding towns and villages. The Route would likely result in reduction in delays for public transport services through separation of local and strategic traffic to a certain degree. There would be no long-term impact upon rail services.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Transport Interchange	As a long-term strategic road improvement to link from the A1 Dublin Road (a key strategic route), to the A2 Warrenpoint Road (a trunk road leading to Warrenpoint Port) the provision of a relief road to the south of Newry would provide an obvious benefit to the transport interchanges, particularly with regards to the potential for removal of a significant proportion of port-related HGV movements from the city centre road network. A maximum gradient of 6% occurs for approximately 1.6km. A significant cut along the Fathom Line connector could potentially require blasting. The route would result in a substantial embankment to the west of Fathom Line with slope lengths up to 70m. Flagstaff Road would require realignment in order to gain sufficient clearance for an overbridge.	N/A (Qualitative Assessment Only)	Moderate Beneficial
	Land-Use Planning	Conforms to policies in the RDS, RTS and RSTNTP. Specifically the route would help achieve the strategic aims of the RDS (2035) and conforms to its specific regional guidance; to deliver a balanced approach to transport infrastructure. The route would help maximise the potential of the RSTN, by removing bottlenecks on the key road network where lack of capacity is causing congestion and improving the environment by providing bypasses, relieving the effects of heavy through traffic. The scheme is part of the Strategic Road Improvement Programme, and is currently in DfI's 10 year Forward Planning Schedule, as of April 2015.	N/A (Qualitative Assessment Only)	Slight Adverse - Moderate Beneficial
	Other Government Policies	The scheme is supported by proposals contained within the Banbridge/Newry and Mourne Area Plan 2015 and the Newry City Masterplan, which in turn are largely in conformance with other Government Department Objectives for integrated transport.	N/A (Qualitative Assessment Only)	Moderate Beneficial
PUBLIC ACCOUNTS	**Affordability**			(Excl. Optimism Bias) – £53.177m (Incl. 36.3% OB) – £72.481m

Newry Southern Relief Road – Blue Route Option 3	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £43.468m** **Total Scheme Cost (Incl. 44% Optimism Bias) – £59.247m**

<table>
<tr><th>Objective</th><th>Sub-Objective</th><th>Qualitative Impacts</th><th>Quantitative Assessment</th><th>Assessment</th></tr>
<tr><td rowspan="4">ENVIRONMENT</td><td>Air Quality</td><td>Blue Route Option 3 is forecasted to have a beneficial local air quality effect by removing a proportion of traffic, (particularly HDVs) from the city centre, leading to less congestion and reduced pollution. Two existing AQMAs would be indirectly affected as a result of removal of some strategic traffic from the city. However, the change would likely not be significant enough to result in the AQMAs being revoked. The route option would have no perceptible impact upon designated ecological sites.
NO_2 and PM_{10} levels at each assessed receptor would be 'Well Below' the NAQS limit values and the significance of effect in all cases would be Negligible, irrespective of the absolute adverse or beneficial change concentrations. The route option would also result in a decrease in regional emissions.</td><td>Number of properties within 200m of indicative alignment centreline:
<table><tr><th>Centreline – 50m</th><th>50-100m</th><th>100-150m</th><th>150-200m</th><th>Total</th></tr><tr><td>16</td><td>11</td><td>29</td><td>52</td><td>108</td></tr></table></td><td>Slight Adverse – Slight Beneficial</td></tr>
<tr><td>Cultural Heritage</td><td rowspan="3">Blue Route Option 3 has the possibility of impacting upon a record-only Belvedere Tower (HB16/13/009) associated with Ashton House; the former lines of the Industrial Heritage Record GNR Branch Line from Goraghwood to Warrenpoint (00478) and the Newry and Greenore Railway (00538); and the boundary between the townlands of Cloghogue and Fathom Lower.
It could also impact upon the settings of the scheduled Newry Canal; the bridge carrying the Barracric Road over the Belfast-Dublin railway line; Fathom House and its associated Belvedere Tower; and the listed church at Cloghogue.</td><td>Five low value assets would be at risk of direct physical impact, as detailed under qualitative impacts.

Three assets of unknown value would be at risk of direct physical impact, including a possible area of complex field boundaries, areas of palaeoenvironmental potential, the possible site of a 19th Century building, Wellington Inn and previously unrecorded archaeological features and deposits within greenfield areas.

Blue Route Option 3 also has the potential to impact upon the setting of a range of heritage assets, including the Newry Ship Canal; the B+ listed Church of the Sacred Heart (and associated B1 listed gates and walling and its non-designated Parochial House); the high value B1 listed Fathom House and its associated high value B2 listed Belvedere Tower; the low value Record-Only Ashton House (HB16/13/028); the Industrial Heritage Record railway bridge on the GNR Main Line (00062:102:00) which is also a Record-only Historic Building (HB16/13/013) and ancient woodland in Fathom Lower (WT940, WT943).</td><td>Large Adverse</td></tr>
<tr><td>Ecology & Nature Conservation</td><td>Blue Route Option 3 would not directly affect Carlingford Lough ASSI, though would cross the Newry River and canal requiring several bridge piers within the wider channel. The bridging point would also likely affect the scrub habitat, riparian corridor on the canal and intertidal river bank habitat causing fragmentation.
Does not traverse Fathom Lower Woods & Grassland SLNCI, though passes in close proximity to it, affecting undesignated woodland fringe habitat, leaving the remaining woodland habitat more exposed to disturbance and lead to significant habitat fragmentation. This route also traverses agricultural land with numerous hedgerows. As Priority Habitat and important wildlife corridors, hedgerow loss would be detrimental,</td><td>N/A
(Qualitative Assessment Only)</td><td>Moderate Adverse</td></tr>
</table>

Newry Southern Relief Road – Blue Route Option 3	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints –** The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £43.468m** **Total Scheme Cost (Incl. 44% Optimism Bias) – £59.247m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		causing habitat fragmentation for local wildlife.		
	Landscape Effects	The river bridge location of Blue Route Option 3 within Greenbank Industrial Estate would likely become a gateway / landmark between the city and the river valley further south-east due to its required high clearing between the bridge and Newry River / Canal. Considering its location within the urban and light industrial southern fringe of Newry, the development would be able to integrate into its urban / light industrial context and would not detract considerably from the overall character in the area. Would traverse the LLPA NY114 Newry Canal / River. Whilst Blue Route Option 3 would have major landscape and visual effects due to significant sections of cut & fill, it has the greatest potential to integrate into the environment as it is located in an area of transition between the sub-urban end of Newry and the rural and wooded parts of the river valley. Blue Route Option 3 would have extensive embankments facing east towards the Newry River valley.	N/A (Qualitative Assessment Only)	**Landscape** Moderate Adverse to Large Adverse **Visual** Moderate Adverse to Large Adverse
	Land Use	Would encroach into the settlement development limit as designated in the Banbridge / Newry & Mourne Area Plan 2015, notably affecting a major area of existing open space effectively resulting in its loss and functionality from a community/recreational perspective (Gerry Brown Park). Would also split an existing area of economic development associated with Greenbank Industrial Estate, however would result in no loss of land from this zoned area (may also improve access). Would directly affect the Newry Canal/River LLPA (NY 114). Would avoid direct encroachment into Fathom Lower Woods & Grasslands SLNCI. All route options would traverse a similar length of agricultural land. Does not include a bascule bridge over the canal at this stage, creating a potential restriction or obstacle to passage for tall ships.	Seven properties at risk of demolition, including five residential properties, one community property and one commercial property. Eight residential properties at risk of private land loss, with two being subject to moderate adverse impacts and the remainder subject to minor impacts. Six planning applications at risk of direct impacts. For those that are still extant, the impact would be minor.	Slight Adverse – Large Adverse

Newry Southern Relief Road – Blue Route Option 3

Description – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.

Main Constraints – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.

Total Scheme Cost (Excl. Optimism Bias) – £43.468m
Total Scheme Cost (Incl. 44% Optimism Bias) – £59.247m

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment		Assessment	
	Noise & Vibration	Would have a comparatively high number of receptors, both within 50m, (the zone where noise levels would be greatest), and within 300m. These are primarily highly sensitive residential receptors. In terms of road gradient, steepest gradient (8%). The longer the length of road at this gradient; the higher the potential there is for adverse noise impacts. Would require a significant degree of earthworks (cutting and embankments) and bridge works.	When comparing the Do-Minimum in the Baseline Year (year of opening) with the Do-Something in the Future Year (15th Year) for Blue Route Option 3, 62 properties would experience a less than 10% increase in noise nuisance, 4 would experience a 10-20% increase in noise nuisance, 1 would experience a 20-30% increase in noise nuisance and 4 would experience no change. Under this scenario, it is predicted that the 68 dB $L_{A10,\ 18hr\ value}$ would be exceeded at 9 properties under the 'Do-Something' scenario. It is noted that 6 of these properties would exceed this value under the 'Do-Minimum' scenario due to the existing road network. There are 19 properties which would be exposed to levels in excess of 55 dB $L_{night,\ outside}$ under the 'Do-Something' scenario in the Future assessment year.		Neutral – Large Adverse	
	Vehicle Travellers	New and interesting views would be opened-up. Currently, driver stress levels through the affected road network of Newry are considered to be 'High', and would be expected to reduce on completion of the scheme.	N/A (Qualitative Assessment Only)		Views : Moderate Beneficial Driver Stress: Moderate Beneficial	
	Road Drainage & the Water Environment	Would not directly affect any designated or known shellfishery beds, nor would it directly affect Carlingford Lough ASSI. Bridge crossing point and alignment would minimise the potential for establishment of preferential pathways and sediment release. Would be located within the Q_{100} floodplain. The feeder stream to Bensons Glen Fish Hatchery would be directly affected.	N/A (Qualitative Assessment Only)		Slight Adverse	
	Geology & Soils	Would potentially have less impact on soils as a result of its being partially within urban and disturbed soil types and shorter overall length. However, its partial location within the urban area would increase the potential to encounter contaminated soils/groundwater (particularly within Greenbank Industrial Estate).	N/A (Qualitative Assessment Only)		Slight Adverse	
ECONOMY	**Transport Economic Efficiency**	Significantly reduced peak and off-peak journey times on the road network in the 2023 year of opening compared to existing routes by avoiding the congested urban road network within Newry City Centre.	**For the Opening Year:**	**RTF 2015 Growth**	**TEE (RTF 2015 Growth)**	
			Total Vehicle-Hours Saved (Two-Way):	178,000	**Consumer PVB:**	£55.549m
			Average Journey Time Change (Mins/Veh):	7.2 mins saved on strategic route Warrenpoint to / from Carrickcarnan 1.6 mins saved on strategic route Warrenpoint to / from Camlough	**Business PVB:**	£32.114m
					Private PVB:	£0.300m
					ITR PVB:	-£1.538m

Newry Southern Relief Road – Blue Route Option 3

Description – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.

Main Constraints – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.

Total Scheme Cost (Excl. Optimism Bias) – £43.468m
Total Scheme Cost (Incl. 44% Optimism Bias) – £59.247m

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment					Assessment	
				4.4 mins saved on strategic route Warrenpoint to / from Carnbane 2.3 mins saved on strategic route Warrenpoint to / from Sheepbridge 5.4 mins saved on strategic route Greenbank Rbt to / from Carrickcarnan 1.2 mins saved on strategic route City Centre to / from Carrickcarnan			**Emissions PVB:**	£0.259m
								Government Funding PVC:	**£30.966m**
								Overall PVB	**£91.303m**
								Overall PVC	**£31.413m**
								NPV	**£59.889m**
								BCR	**2.906**
	Reliability	Improved journey time reliability through the provision of a Newry Southern Relief Road to address acknowledged operational congestion through Newry City Centre.	N/A – Qualitative Assessment Only						
SOCIAL	**Pedestrians, Cyclists & Equestrians**	Would potentially affect one alleged PROW (at Middlebank) and cross the Ring of Gullion Waymarked Way. The proposed high off-road cycle and walking greenway to be developed along Middlebank would be indirectly impacted in terms of setting. Would impact on existing and proposed National Cycle Networks / Sustrans proposals. No known equestrian facilities would be directly affected. Would impact on the setting/amenity of the Ship Canal as an angling facility. Likely significant reduction in traffic on Kilmorey Street and overall reduction in rat-running.	N/A (Qualitative Assessment Only)					Slight Adverse – Slight Beneficial	
	Accidents	Significant savings in the number of accidents and the number of serious and slight casualties due to the provision of a Newry Southern Relief Road to remove traffic from the heavily trafficked junctions on the urban road network within Newry City Centre, based on the application of national accident characteristics.	**Growth**	**Accidents**	**Deaths**	**Serious**	**Slight**	**Accidents PVB (RTF 2015 Growth)**	
			RTF 2015	129.4	-0.1	13.0	149.1	£4.618m	
	Community Severance	Significant volumes of traffic would continue to be drawn into the city from all directions; however the relief of some of the traffic on the urban road network may improve access to community facilities, with a possible reduction in vehicular/pedestrian conflict due to the slight easing of congestion. The benefit of relieving some traffic and slight easing of congestion may also be experienced throughout the wider network of urban roads which have become heavily used routes by traffic wishing to avoid/bypass the congested areas. Not only may this lead to improved access to community facilities throughout the wider urban area but also partially reduce the degree of community severance. It may also serve to	N/A (Qualitative Assessment Only)					Slight Beneficial	

Newry Southern Relief Road – Blue Route Option 3	**Description** – A 3.00km S2/Wide Single Carriageway Climbing Lane Section links the A2 Warrenpoint Road to the A1/N1 Belfast Dublin Corridor.	**Main Constraints** – The majority of traffic currently passing through Newry converges in the centre of the city, resulting in considerable congestion.	**Total Scheme Cost (Excl. Optimism Bias) – £43.468m** **Total Scheme Cost (Incl. 44% Optimism Bias) – £59.247m**

Objective	Sub-Objective	Qualitative Impacts	Quantitative Assessment	Assessment
		encourage journeys into the city by those previously deterred by the high levels of traffic on the city roads.		
	Access to Public Transport	Access to the local road network would be maintained for local Ulsterbus services linking the surrounding towns and villages. The Route would likely result in reduction in delays for public transport services through separation of local and strategic traffic to a certain degree. There would be no long-term impact upon rail services.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Transport Interchange	As a long-term strategic road improvement to link from the A1 Dublin Road (a key strategic route), to the A2 Warrenpoint Road (a trunk road leading to Warrenpoint Port) the provision of a relief road to the south of Newry would provide an obvious benefit to the transport interchanges, particularly with regards to the potential for removal of a significant proportion of port-related HGV movements from the city centre road network. A maximum gradient of 8% occurs for approximately 0.4km. This could potentially discourage HGV drivers from using the route due to higher costs and performance issues associated with the steeper gradient. A significant cut along the Fathom Line connector could potentially require blasting. The route would result in a substantial embankment to the west of Fathom Line with slope lengths up to 60m. Flagstaff Road would require realignment in order to gain sufficient clearance for an overbridge.	N/A (Qualitative Assessment Only)	Slight Beneficial
	Land-Use Planning	Conforms to policies in the RDS, RTS and RSTNTP. Specifically the route would help achieve the strategic aims of the RDS (2035) and conforms to its specific regional guidance; to deliver a balanced approach to transport infrastructure. The route would help maximise the potential of the RSTN, by removing bottlenecks on the key road network where lack of capacity is causing congestion and improving the environment by providing bypasses, relieving the effects of heavy through traffic. The scheme is part of the Strategic Road Improvement Programme, and is currently in DfI's 10 year Forward Planning Schedule, as of April 2015.	N/A (Qualitative Assessment Only)	Slight Adverse - Moderate Beneficial
	Other Government Policies	The scheme is supported by proposals contained within the Banbridge/Newry and Mourne Area Plan 2015 and the Newry City Masterplan, which in turn are largely in conformance with other Government Department Objectives for integrated transport.	N/A (Qualitative Assessment Only)	Moderate Beneficial
PUBLIC ACCOUNTS	**Affordability**			(Excl. Optimism Bias) – £43.468m (Incl. 36.3% OB) – £59.247m

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