BARROW BOROUGH TRANSPORT IMPROVEMENTS STUDY

FINAL REPORT

SEPTEMBER 2016

WSP | PARSONS BRINCKERHOFF

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Cumbria County Council and Barrow Borough Council

Final Report

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1 WSP | Parsons Brinckerhoff has been commissioned by Cumbria County Council (CCC) and Barrow Borough Council (BBC) to undertake a transport improvements study for Borough of Barrow-in-Furness to support the proposed Barrow Local Plan for the period up to 2031.

1.1.2 This study consists of three linked elements:

- Identification of the impacts of growth allocated in Local Plan, what are the current capacity problems and physical constraints against other major developments and aspirations for growth at identified locations in the area.
- Identification of a range of potential sustainable transport improvements that can be delivered in Barrow-in-Furness, Dalton-in-Furness and Askam-in-Furness with the aim of encouraging modal shift from the car to other means of transport and reduce the impact of vehicular traffic on the road network.
- Identification of potential highways improvements at roads and junctions as agreed with Cumbria County Council and Barrow Borough Council in order to increase junction capacity or provide prioritisation for pedestrians and therefore improve facilities at key traffic pinch points in the area. These improvements would be subject to further consultation as the schemes proposals are developed.

1.1.3 These three elements intend to mitigate the impact of transport growth associated with the development growth identified in the Local Plan.

1.2 POTENTIAL INFRASTRUCTURE MEASURES

1.2.1 The potential sustainable transport improvements and road capacity improvements identified in this study have undergone various stages of design development following a number or consultations and workshops with CCC, BBC and Councillors of BBC .

1.2.2 The improvements are intrinsically linked to the delivery of the Local Plan. No individual elements of the schemes identified in this report will sustainably deliver the Local Plan in full. It is therefore of critical importance that the full range of proposals set out in this report are considered for every development identified to be built over the plan period. Sustainable transport initiatives, such as bus and cycle improvements, should be prioritised in the first instance to either limit or reduce the residual number of vehicles on the Barrow Borough road network.

1.2.3 Junction and link improvements have been identified in this report to release extra capacity that will effectively manage anticipated vehicle demand. Further assessment, beyond the scope of this report, will be required to understand when these interventions are required to be delivered as the plan is delivered in more detail.

1.2.4 The integration of bus routes, cycle routes and road improvements required to deliver conglomerations of development at intermediate years between now and 2031 and in certain areas of Barrow Borough, should be planned in detail within the context of an Area Masterplan or Area Action Plan. This is to ensure that a holistic approach to securing appropriate infrastructure is achieved and the cost to the developer (and other funding sources) for delivery of schemes are fairly distributed and achieve maximum benefit for the local community.

1.3 DELIVERY OF INFRASTRUCTURE

1.3.1 This report identifies the potential measures that will help deliver Local Plan growth in Barrow Borough by providing extra capacity on the districts roads, more and better connected cycleways, and measures to improve sustainable transport to enhance people's journey quality, health, and improve travel choices.

1.3.2 There is no overall standard, statutory or prescribed process, or framework for seeking funding for a programme of infrastructure improvements such as that identified in this report. This is because in general, public and private sector funding tends to be attached to or associated with individual schemes which consider the costs and benefits of each scheme in isolation. Therefore a bespoke composite solution, promoted by one party, and delivered by many parties, for the specific programme of infrastructure improvements is the best compromise in the absence of any standard model.

1.3.3 Therefore, this study is limited to highlighting the need for sustainable improvement schemes over the plan period and to identifying the outline design and associated costs of these improvements. The report does not present a delivery model of how these schemes may be funded and constructed. Delivery will rely upon developer contributions such as planning obligations or Section 278 agreements. Where there is a shortfall funding could be through external sources such as Cumbria LEP (Local Enterprise Partnership).

1.4 PURPOSE OF REPORT

1.4.1 The Barrow Transport Improvements Study report will form part of the Barrow Borough Local Plan evidence base and will specifically inform Barrow Borough Council's Infrastructure Delivery Plan.

1.4.2 It will be used by Cumbria County Council and Barrow Borough Council to identify transport improvements that could help address the cumulative effects of development over the plan period.

1.5 REPORT STRUCTURE

1.5.1 The remainder of this report is structured as follows:

- *Chapter 2:* **Assessment Methodology** - Details on the sustainable transport review, the selection process for each junction improvement and how traffic data has been collected and utilised to review the junction improvements.
- *Chapter 3:* **Sustainable Transport Improvements** - A review of existing walking, cycling, public transport and travel plan provision in the Barrow Borough, with supplied details of proposed improvements for each mode.
- *Chapter 4:* **Traffic Impact Assessment** - Details and assessment of junction improvements for all identified junctions.
- *Chapter 5:* **Infrastructure Cost Summary** - Costing's for sustainable transport improvements and junction improvements.
- *Chapter 6*: **Conclusions** - Outline the key findings of the study.

2 ASSESSMENT METHODOLOGY

2.1 SUSTAINABLE INFRASTRUCTURE

2.1.1 Baseline sustainable travel infrastructure has been reviewed as part of this study with the aim of identifying potential location specific interventions. Having identified areas for potential improvement on the transport network, through consultation with Barrow Borough Council and Cumbria County Council, a range of sustainable infrastructure measures have been recommended with the target of further improving viable alternatives to car based trips.

2.1.2 Improvements have been identified for :

- cycling infrastructure,
- public transport infrastructure, and;
- walking infrastructure.

2.2 TRAFFIC IMPACT ASSESSMENT

2.2.1 This section describes the methodology of the junction appraisal and includes the assessment years, peak hours, traffic flow and forecasting assumptions including committed development, the software used, and the process used to select specific junctions to be included within the study.

2.2.2 The assessment is based on the results of the Barrow-in-Furness SATURN strategic model, developed by Cumbria County Council to assess the transport implications of the Local Plan. The transport model contains separate vehicle classes for cars, light goods vehicles (LGVs) and heavy goods vehicles (HGVs). It consists of a morning peak period (08:00-09:00) and an evening peak period (17:00-18:00) which have been run for the following two future year scenarios:

- Scenario 1: 2031 Base – includes developments completed between October 2014 and April 2016, and developments with full or outline planning permission as of April 2016.
- Scenario 2: 2031 Local Plan – includes Local Plan proposals for housing, employment, retail and leisure.

2.2.3 The outputs from the traffic model were analysed by Cumbria County Council for delay at junctions and a list was prepared containing a total of 57 junctions that would operate at more than 85% of their operational capacity in 2031. This list was independently reviewed by WSP Parsons Brinckerhoff.

2.3 TRAFFIC FLOW, FORECAST YEARS, AND PEAK HOURS OF ASSESSMENT

2.3.1 All the traffic flow information used in the assessment was provided to WSP|PB by Cumbria County Council and originated from the Barrow SATURN model. These flows have been used in the traffic modelling and each junction has been assessment for the following:

- 2031 Base AM
- 2031 Base PM
- 2031 Local Plan AM
- 2031 Local Plan PM

2.3.2 The forecast assumptions used within the traffic modelling undertaken by Cumbria County Council follow the guidance set out in the Department for Transport's Transport Appraisal Guidance Unit M4: Forecasting and Uncertainty (November 2014).

2.3.3 Further details of the forecasting methodology used in the SATURN modelling can be found in the 'Barrow Borough Local Plan - Transport Modelling Report, May 2016' produced by Cumbria County Council.

2.4 JUNCTION ASSESSMENT SOFTWARE

2.4.1 The junction assessment software used in this study is set out below:

- Junctions 8 ARCADY (Assessment of Roundabout Capacity and DelaY) module - for roundabouts;
- Junctions 8 PICADY (Priority Intersection Capacity and DelaY) module - for priority T-junctions and priority crossroads;
- LinSig 3 for signalised junctions;

2.4.2 ARCADY and PICADY, developed by the Transport Research Laboratory (TRL) provide an industry-standard method for assessing the capacity, queuing and delay at roundabout and priority junctions respectively. The software reports the junction results as a Ratio of Flow to Capacity (RFC). The RFC is a measure of junction performance, as a ratio of traffic demand to available junction capacity. An RFC of less than 0.85 indicates that the junction is performing efficiently, above 0.85 indicates that the junction is nearing capacity and if greater than 1.00 this confirms the junction is operating over capacity.

2.4.3 LinSig is an industry-standard computer software package developed by JCT Consultancy, and used for the assessment and design of traffic signal junctions either individually or as a network comprised of a number of junctions. LinSig reports the junction results as Degree of Saturation (DOS) which is identical to the RFC but presented as a percentage. A DOS of less than 90% indicates that the junction is performing efficiently, above 90% indicates that the junction nearing capacity and greater than 100% confirms that the junction is operating over capacity.

2.4.4 The traffic flows have been entered in passenger car units (PCU) for one hour period. All ARCADY and PICADY models have used the 'One Hour' flow profile to ensure robustness.

2.5 JUNCTIONS INCLUDED IN THE STUDY

2.5.1 The initial 57 junctions identified by the SATURN model consisted of key locations identified as experiencing high levels of delay or high RFC in the forecast year scenarios. The 57 junctions were narrowed down to 31 which were modelled, and further narrowed to 17 following detailed assessment undertaken in this study. Further information on the prioritisation process is documented in Section 4.

2.5.2 Table 2-1 provides the list of junctions considered for assessment.

Table 2-1: Junctions identified for Assessment

SATURN Node No.	Junction Description	Existing Junction Type
1180	A590 Park Road/Bank Lane	Priority Junction
1190	A590 Park Road - Ormsgill	Priority Junction
1210	A590 Walney Rd/Phoenix Road	Priority Junction
1220	A590 Walney Road/Wilkie Road	Priority Junction
1225	A590 Walney Road/Asda	Priority Junction
1240	A590 Walney Rd/Ironworks Road	Traffic Signals
1980	A590 Ironworks Road / Phoenix Road	Priority Junction
1790	Greengate Street/Risedale Road	Priority Junction
1800	Park Drive/Bridgegate Ave/Risedale Road	Priority Junction
1050	Abbey Road/Hollow Lane/Hawcoat Lane	Traffic Signals
1100	Abbey Road/Rawlinson Street/Holker Street	Traffic Signals
1490	A5087 Roose Rd / Risedale Rd	Traffic Signals
1530	Holbeck Road/Leece Lane	Priority Junction
1910	A590 North Road/Bridge Road	Roundabout
2010	A590 Jubilee Bridge/Promenade/Central Drive	Traffic Signals
3030	Abbey Road/Market Street	Priority Junction
3060	Long Lane/Newton Road	Priority Junction

2.5.3 Junctions with a forecast RFC greater than 1.00 or DoS greater than 100% have been included in the study as this demonstrates that they will experiencing capacity issues in 2031.

2.5.4 Following this initial filtering process, the remaining 17 junctions were progressed to the next stage of the assessment which analysed specific capacity issues associated with each junction. Potential mitigation measures were designed where appropriate and the junctions re-modelled to illustrate the potential impact of mitigation.

3 SUSTAINABLE TRANSPORT IMPROVEMENTS

3.1 INTRODUCTION

3.1.1 This section considers the existing mode share in Barrow-in-Furness and identifies sustainable transport improvements which would be expected to increase the sustainable transport modal share.

3.1.2 Cumbria County Council have looked to develop, promote and implement the approaches and measures set out in the Local Transport Plan, including:

- Maintain the existing highway infrastructure
- Work with partners to develop rail services and passenger facilities
- Support communities to improve accessibility to services for people without access to a car
- Maximise opportunities for investment in new H&T infrastructure and service through development and grant funding.
- Improve accessibility for people with impaired mobility
- Develop sustainable community transport solutions through work with communities and the Third Sector
- Work to ensure we retain and improve local rail services, infrastructure and connectivity through active engagement in the national refranchising and investment programmes.

3.1.3 It is important to increase the existing sustainable transport modal share in Barrow-in-Furness for the following reasons:

- Congestion – reduction of the number of cars on the road will improve traffic flow throughout Barrow-in-Furness and the surrounding area.
- Environment – reduction in the number of car journeys will result in improved air quality and reduce the carbon footprint from road traffic.
- Health – over the last 25 years, adult obesity rates have almost quadrupled, and 66% of UK adults are now considered overweight or obese; opportunities to walk or cycle contribute to a healthier lifestyle, which is return offers economic benefits and reduces the pressure on local services.
- Deprivation – providing alternative travel opportunities for households who may not be able to afford their own car. Offers improved access to employment areas and other essential services.

3.1.4 The following points form the basis of this review of sustainable infrastructure provision in Barrow-in-Furness:

- Identification of the existing travel to work modal share to assess potential areas for improvement, including a review of trends across each of the wards across the Barrow-in-Furness.
- A review of existing and future sustainable transport infrastructure provision across Barrow-in-Furness, this comprised the following :
  - A review of the existing infrastructure provision for each mode and the associated issues.

- A review of current aspirational infrastructure improvements for each mode based on existing policy documents
- Analysis of potential further schemes that could realistically be introduced in Barrow-in-Furness

3.2 TRAVEL TO WORK

3.2.1 Table 3-1 shows the travel to work data from the 2011 Census for the working population, which clearly indicates that compared to the North West of England, Barrow-in-Furness district has:

- → a higher share of journeys to work by car/van/taxi/motorcycle than the national average
- → more than double the share of journeys by bicycle
- → a higher share of journeys to work on foot
- → a smaller proportion of people that work from home in comparison to the North West region and national statistics
- → a lower share of journeys by public transport

Table 3-1: Travel to Work Modal Share in Barrow-in-Furness (Source: Census 2011)

TRAVEL MODE	BARROW-IN-FURNESS	NORTH WEST	ENGLAND
Car/Van/Taxi/Motorcycle	63.9%	67.0%	60.2%
Public Transport	6.8%	11.4%	16.4%
Walk	17.0%	10.0%	9.8%
Bicycle	5.2%	2.1%	2.9%
Work from home	6.4%	9.0%	10.3%
Other	0.7%	0.4%	0.4%

3.2.2 The census data indicates that although the proportion of residents that drive to work is higher than the national average, the number of journeys to work by foot or by bicycle is also higher. However the statistics indicate that public transport is an area with significant need for improvement. This may be due to the popularity of walking and cycling in the area but currently there are discussions regarding the potential for a more efficient bus interchange in Barrow town centre, as the town currently does not have a bus station. The transport interchange should be located in an area convenient for passenger needs, for example close to the main shopping area.

3.2.3 In the following section, Census data has been presented at ward level in Barrow-in-Furness on the heat maps below, illustrating the percentage of residents travelling to work by the following modes:

- → Car Travel (Figure 4-1).
- → Bus Travel (Figure 4-2).
- → Cycle (Figure 4-3).
- → Rail Travel (Figure 4-4).
- → On Foot (Figure 4-5).
- → Work from home (Figure 4-6).

Figure 3-1: Car Travel to Work Mode Share (Source: Census 2011)

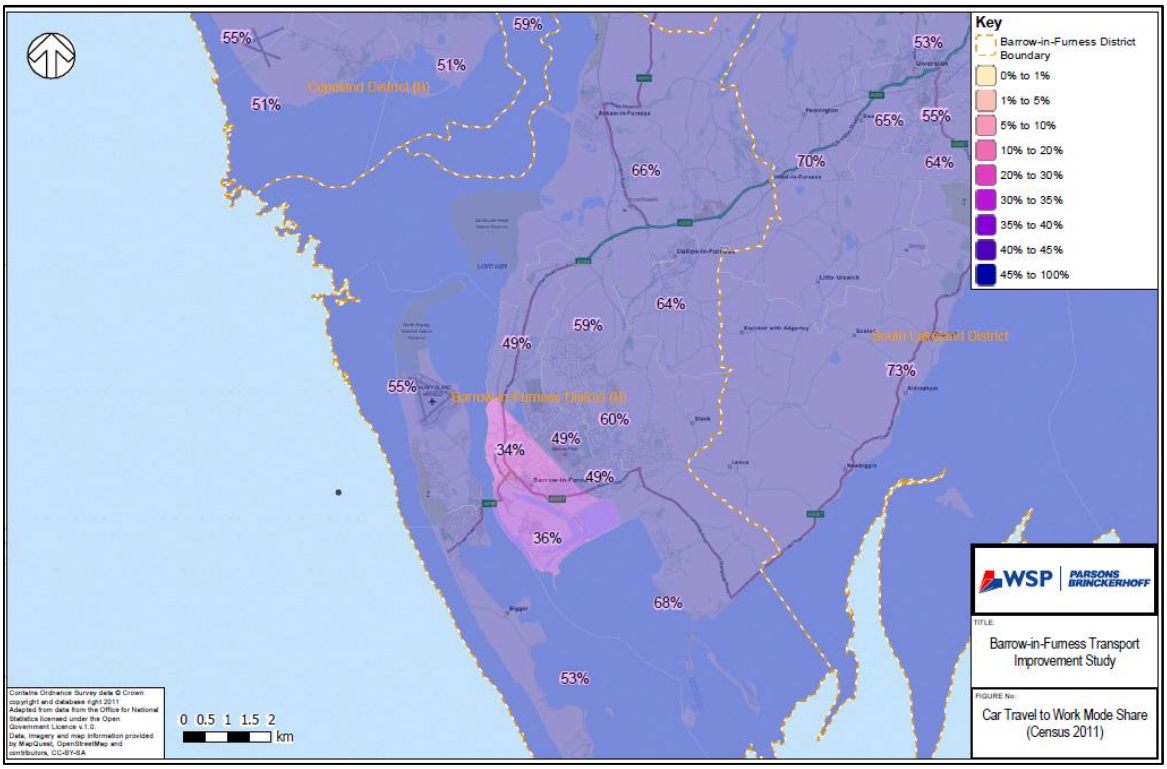


Figure 3-2: Bus Travel to Work Mode Share (Source: Census 2011)

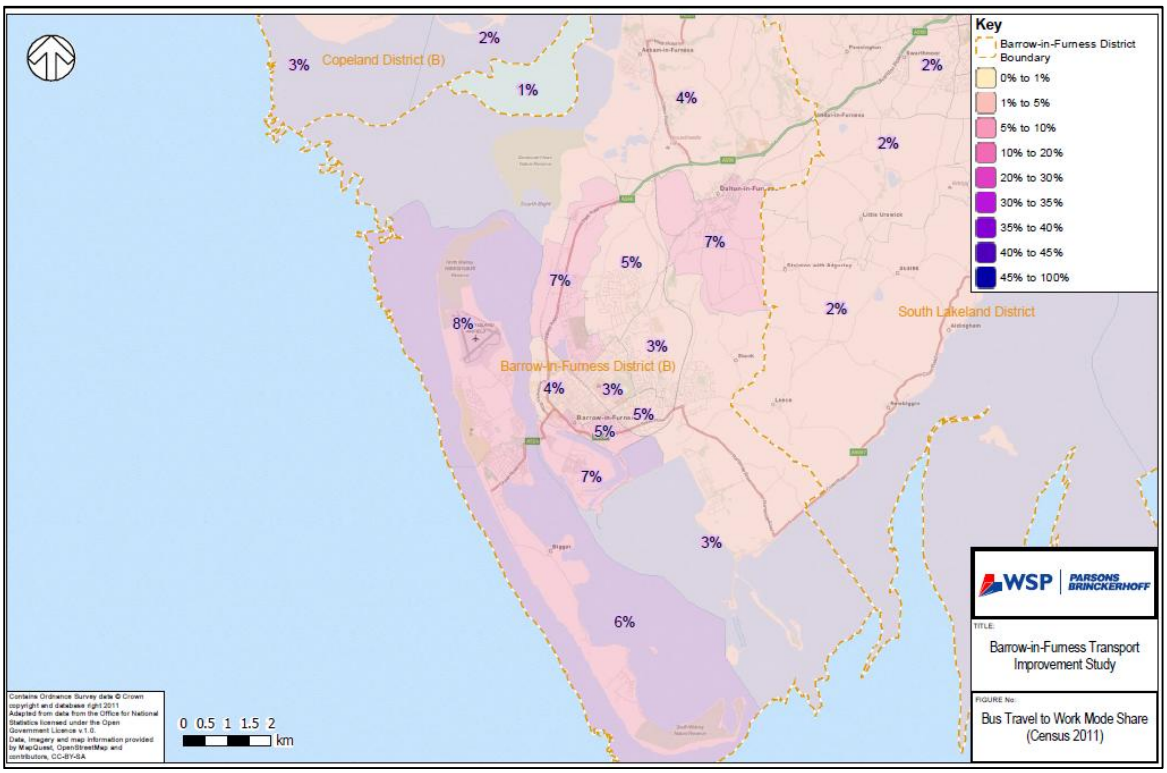


Figure 3-3: Cycle to Work Mode Share (Source: Census 2011)

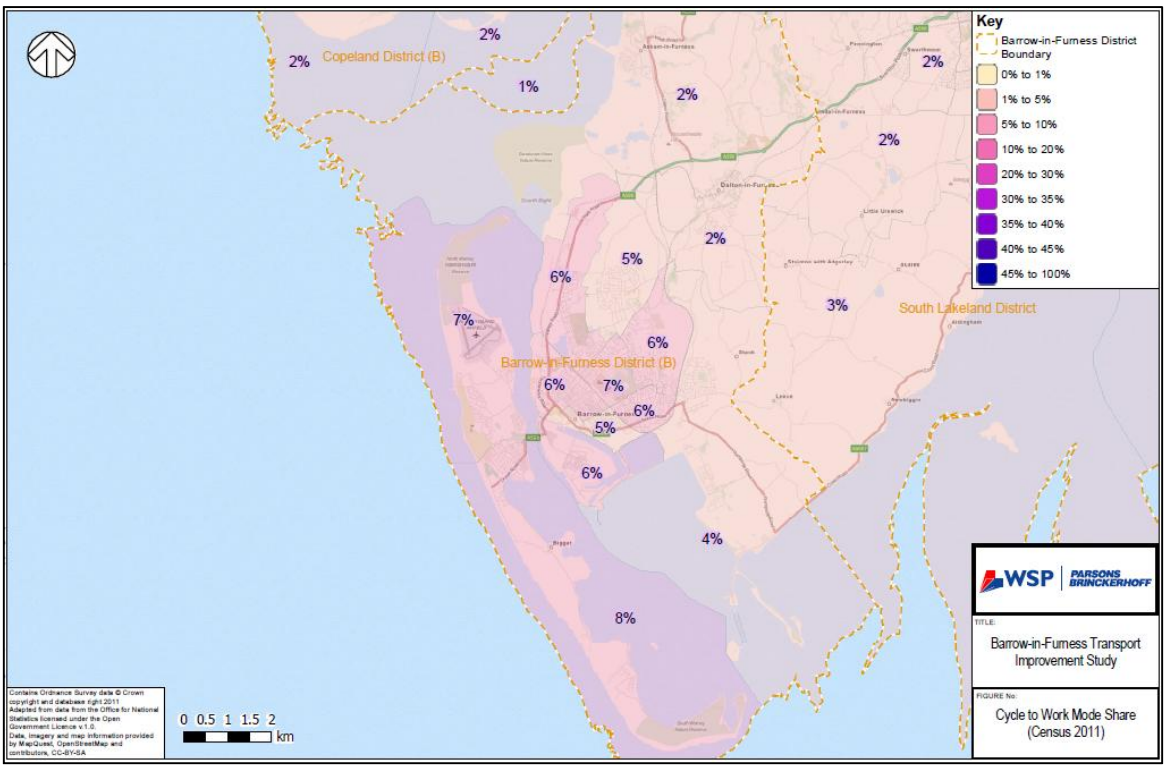


Figure 3-4: Rail Travel to Work Mode Share (Source: Census 2011)

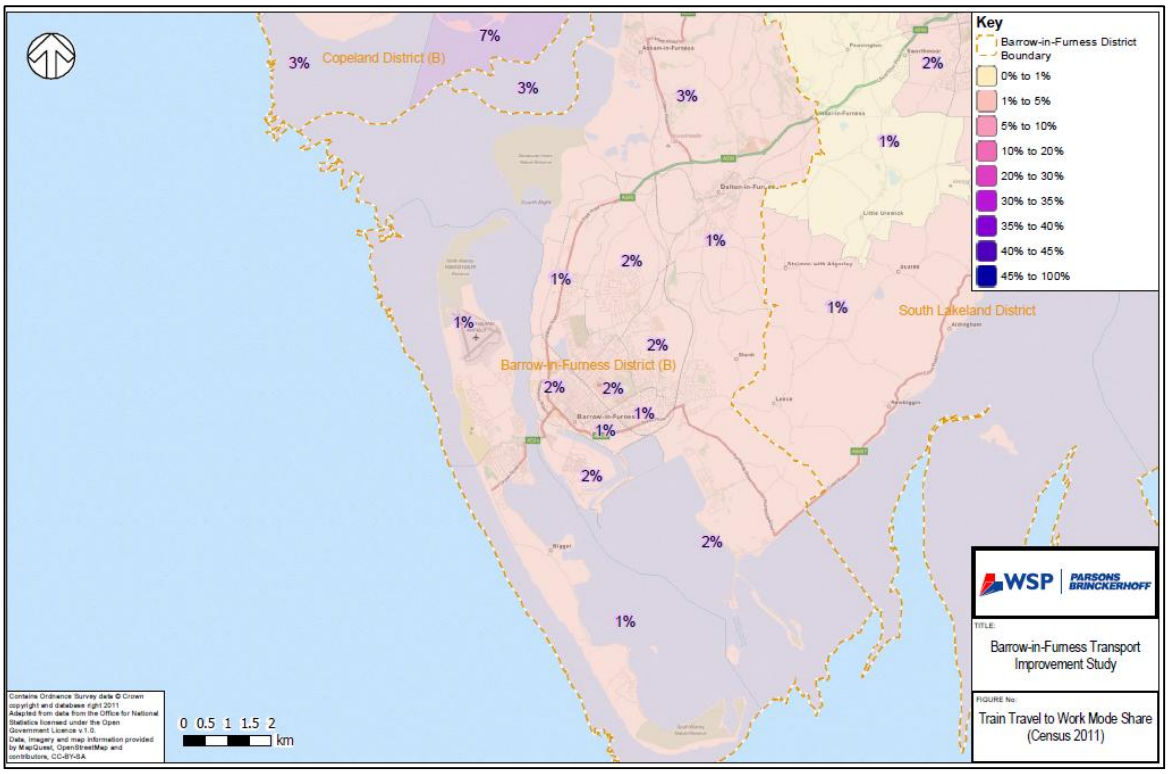


Figure 3-5: Walk to Work Mode Share (Source: Census 2011)

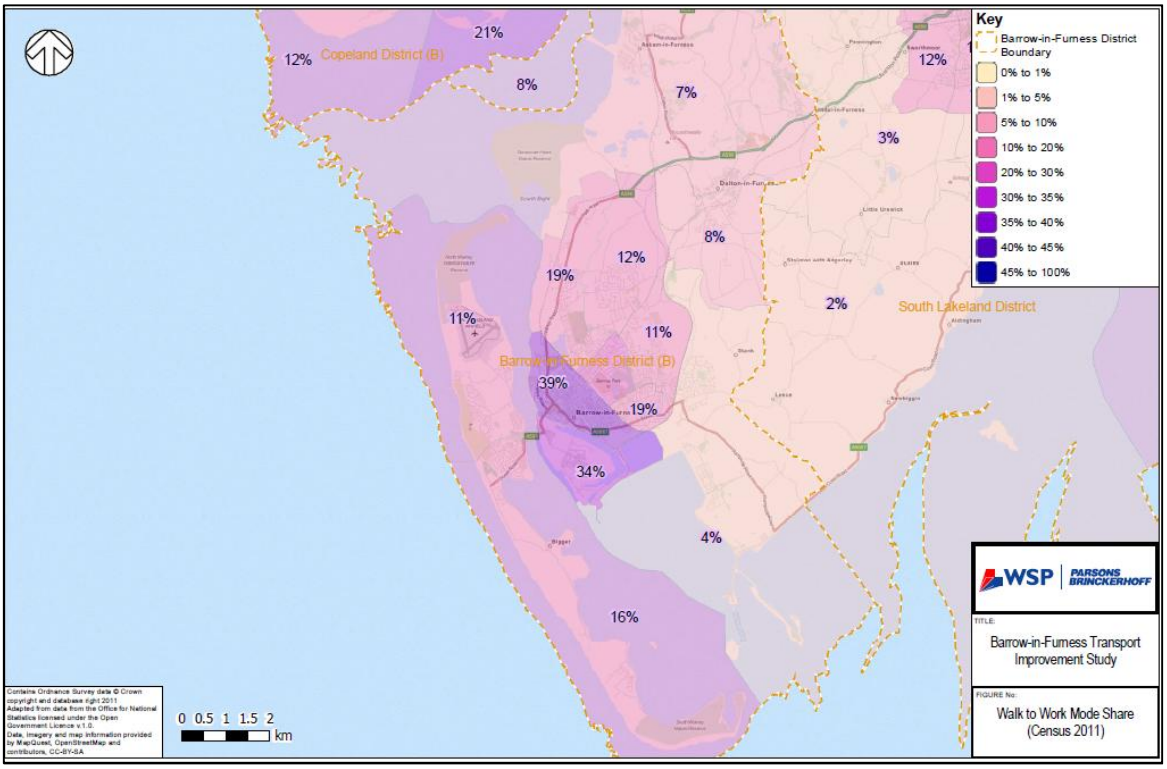
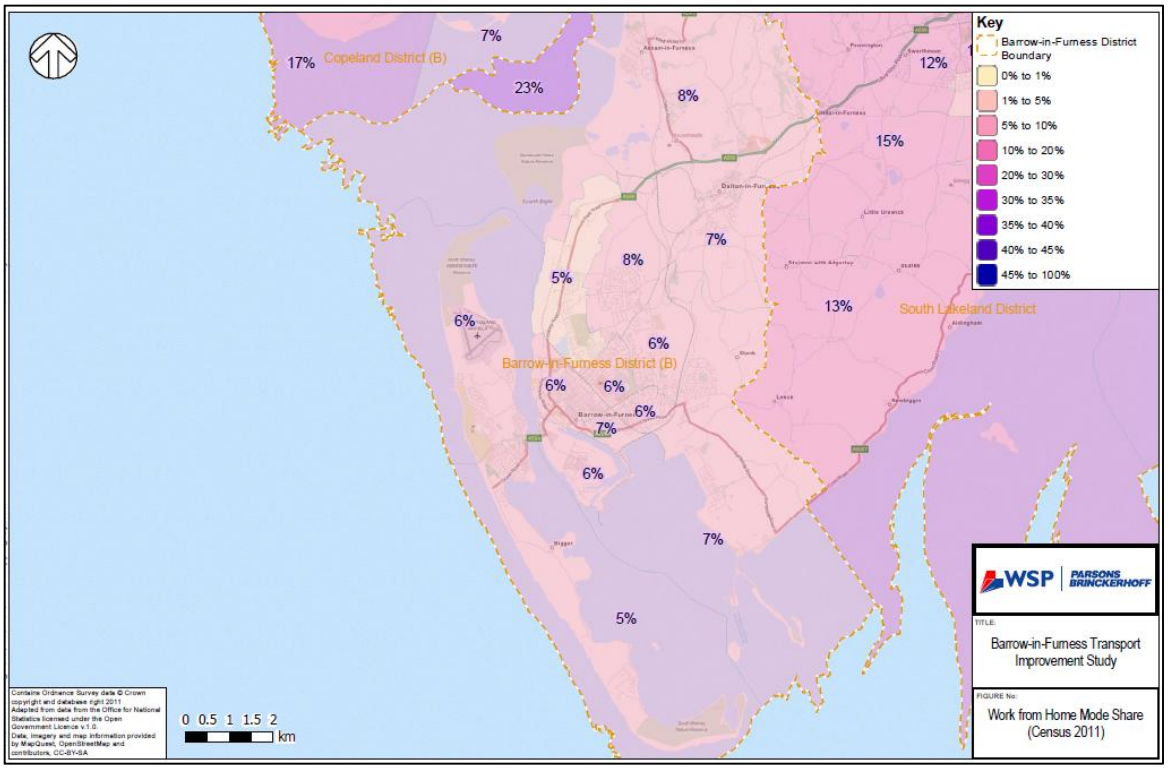


Figure 3-6: Work From Home Mode Share (Source: Census 2011)



3.2.4 The maps illustrate varying uses of modal share. Towards the centre of Barrow, car trips are significantly reduced in favour of a higher percentage of walkers and cyclists, likely due to the reduced distance between home and employment sites. Bus travel across the district is relatively low with higher proportions of residents on Walney Island.

3.2.5 Cycling in Barrow town centre and on Walney island is high at between 5-8%. This percentage reduces further east and north, likely due to longer distances to travel by cycle to work and lack of suitable cycle infrastructure to encourage this mode.

3.3 WALKING

EXISTING INFRASTRUCTURE AND OPPORTUNITIES

3.3.1 Currently 17% of people in Barrow walk to work which is significantly higher than the national average of 9.8%. In Barrow Centre, up to 39% of people walk travel to work. This high proportion demonstrates the proximity of existing employment areas to houses in Barrow town centre and also the good availability of walk routes connecting employment sites.

3.3.2 The compact nature of Barrow town centre encourages people to travel on foot and there are further opportunities to increase the proportion of short journeys for housing and employment development to be located close together. Some of Barrow town centre is now pedestrianised as a result of extensive public realm improvement works, which further helps to encourage walking, outside of commuting patterns too. There have also been significant improvements to the pedestrian environment on key routes into the town centre from surrounding areas. In addition, new coastal footpaths have been created which enable local opportunities for leisure walking.

CURRENT INITIATIVES

3.3.3 Barrow Borough Council has published a series of short walks within easy reach of public transportation around the Furness Peninsula. Providing information on the routes, distance, nearby parking and public transport and other facilities nearby to help encourage the general public to consider walking for the health benefits but also to enjoy the local natural spaces.

3.3.4 The borough council are to commission a phased development strategy for the delivery of the Marina Village housing site, in line with the Barrow Port Area Action Plan and the forthcoming Local Plan. The development will be expected to provide a network of streets and public spaces which are pedestrian and cycle friendly, including the possibility of a footbridge for pedestrians and cyclists connecting Marina Village to the Waterfront Business Park.. This type of development and the sustainable infrastructure being proposed, will improve the sustainability of the site and Barrow Borough as a whole.

RECOMMENDED IMPROVEMENTS

3.3.5 It is essential that proposed employment and housing developments provide good quality links to the existing pedestrian network to encourage and maintain the high percentage of walkers within the town.

3.3.6 The following infrastructure improvements are recommended in order to consolidate and improve the high quality pedestrian infrastructure that already exists in Barrow-in-Furness.

1. High quality residential streets with coherent connections to the existing network.
2. Improved way finding and signage to assist in linking pedestrians between key attractors in the town centre, the bus stops and railway stations.
3. Improved access to public transport stations, stops and routes

4. Improved access to cycle parking
5. Further incentives provided by businesses and the local authority to encourage the health benefits of walking

3.4 CYCLING

EXISTING INFRASTRUCTURE AND OPPORTUNITIES

3.4.1 5.2% of Barrow-in-Furness population cycle to and from work which is almost double the national average of 2.9%. This figure is as high as 8% on Walney Island.

3.4.2 Figure 3-7 shows a map of the existing cycle network in Barrow-in-Furness which consists of a number of on road and off route cycle routes across the Peninsula. A larger map can be found in Appendix A-1. It shows a cycle network that serves only a few key corridors in Barrow Borough, with opportunity to close a number of gaps in the network. The greatest density of cycle network is located in Barrow town centre, and there are notable gaps between Askam-in-Furness, Dalton-in-Furness and other residential areas further away from Barrow town centre.

3.4.3 National cycle routes that pass through the Borough currently include:

- National Route 72
- National Route 70
- National Route 700
- Cumbria Coastal Way

Figure 3-8 shows the proportion of car trips to work against the existing cycle network. Improvements to the cycle network in areas of high car use, where there is no current network, is likely to have a larger impact than improving existing cycle facilities on designated cycleways.

3.4.4 At present there are a number of unadopted cycle lanes along carriageways, which are currently used for cycle access. It would be beneficial to convert some of these unadopted routes into cycle paths shared with pedestrians, and an example of this is along Park Road situated between Barrow-in-Furness and Dalton-in-Furness. This is one route recommended for improvement.

Figure 3-7: Map of existing cycle routes in Barrow

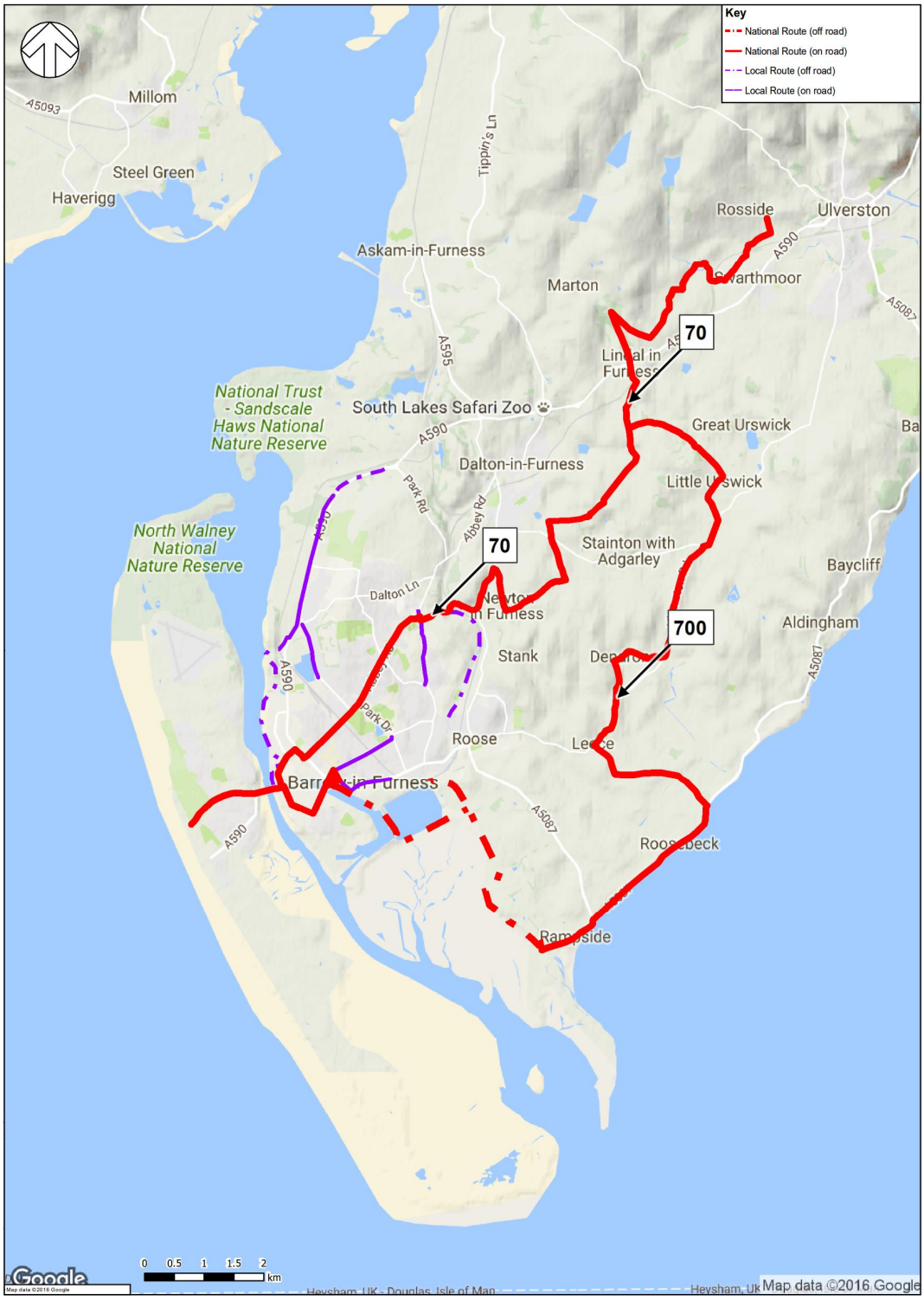
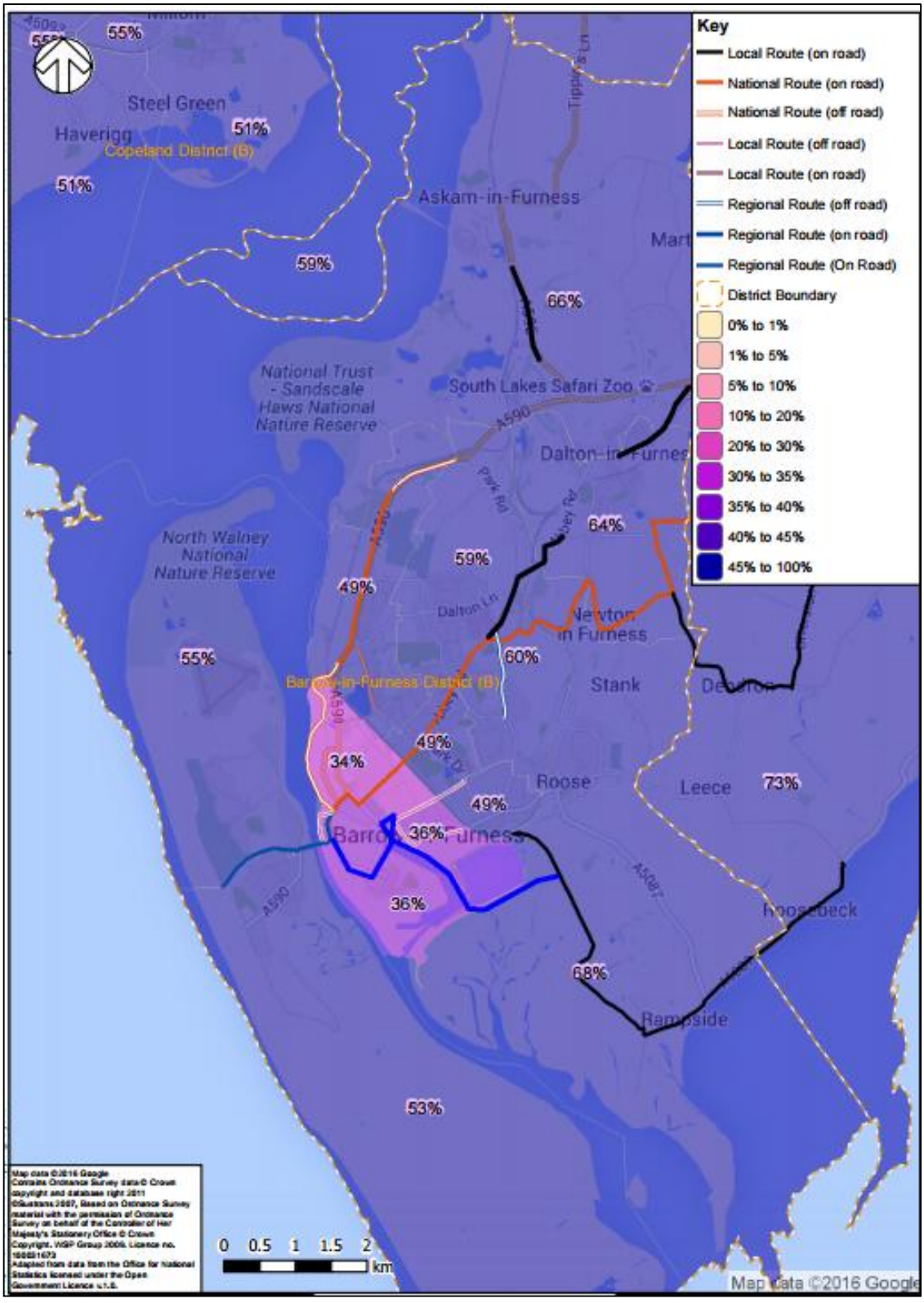


Figure 3-8: Car mode share and Cycle network (Source: Census 2011)



3.4.5 Appendices A-2 and A-3 shows the existing cycle network in the context of future Local Plan developments. Appendix A-2 shows the number of potential employment sites in the area, which are heavily concentrated to the North West of the town, which although is currently served by a cycle route, would benefit from wider connections to residential areas.

3.4.6 Appendix A-3 shows that a number of the proposed housing developments identified in the Local Plan are not currently served by a nearby cycle lane. Cycle infrastructure would need to be delivered to provide a coherent link between the town centre and these sites and this should be a requirement of planning permission for new housing sites.

3.4.7 The following issues have been identified as part of a review of the cycle facilities:

- The need for improved connectivity in the cycle network within the town's residential areas, and east and west of the national cycle route
- Lack of cycle network connections to new Local Plan sites in particular new housing developments.
- Areas of high proportion car journeys to work which can be targeted for cycle improvements.
- Due to the narrow nature of Bank Lane and Rakesmoor Road and a recent cycling fatality, careful consideration will be given at the design stage into what improvements for both pedestrians and cyclists are possible.

3.4.8 Additionally, it has been reported that some cyclists have previously been subject to a fine by the police for cycling on the footway on Jubilee Bridge. A scheme which allows for a dedicated cycle lane crossing the bridge should therefore be developed.

CURRENT INITIATIVES

Cycle routes:

- Bay Cycle Way, sign and improve 200km of relatively flat cycle routes around Morecambe Bay, which runs from Walney to Glasson
- North West Coastal Trail, passes along coastline of the Borough currently but will be rerouted and upgraded in some sections to form part of the England Coastal Path.

RECOMMENDED IMPROVEMENTS FOR THE LOCAL PLAN

3.4.9 To increase the mode share of cyclists in Barrow Borough, a number of new potential cycle routes have been identified, the delivery of the new routes have been designed to provide cycle access between the Local Plan sites, the town centres and to connect up to the existing cycle network.

3.4.10 The improvements are linked to new development sites and therefore are targeted at new trips, for which sustainable behaviours could be influenced at the outset. Developer contributions could be sought to fund the delivery of these improvements as outlined in Table 3-2 with outline costs.

Table 3-2: Proposed cycle lanes and developer contributions

Cycle Route ID	Location	Type	Developer Contributions	Estimated Cost
1	Lesh Lane/Harrel Lane	On-road	SHL070a, SHL047, Rec18	£21,600
2	Ainslie Street	On-road	REC19b	£10,800
3	Park Road (East)	Off-road	SHL082	£360,000
4	Bank Lane/Rakesmoor Lane	On-road	SHL037, SHL082	£37,440
5	Salthouse Road	On-road	SHL001, SHL002	£9,360
6	Greystone Lane/Station Road	On-road	REC25	£16,560
7	Roose Road	On-road	REC26	£21,600
8	Walney Island	On-road	SHL010	£21,600
		Off-road	SHL010	£140,000
9	Dalton Lane/Ormsgill Lane	On-road	Rec 09, SHL13b	£36,000
10	Barrow Road	On-road	REC34	£35,280
11	Askam to Thwaite Flat / Dalton	Off/On-road	SHL086	£72,000
12	Leece Lane	Off/On-Road	REC26, REC19b	£15,120

3.4.11 It is recommended in order to increase the mode share of cyclists in Barrow Borough, implementation of new cycle routes are required, Appendix B-1 outlines the routes which have been designed to provide better access across the Borough, connecting up existing cycle network and also to provide access between Local Plan sites, employment sites and the town centres.

3.4.12 The new potential network provides completeness to many pre-existing gaps in the network and provides significant expansion to provide near complete connections between all major residential and employment sites in the Borough. With the widespread locations of housing developments across the Borough there has been in total 12 proposed cycle routes to increase the accessibility by cycling in the area.

3.4.13 Appendix B-2 shows the new routes designed for the Borough in relation to housing sites, it is noted that each of the new sites will have direct access within 100m of a new or existing cycle route. Walney Island has three new housing developments planned, and it has been proposed for new cycle lanes to extend northwards on the Island where the new sites are proposed and also connect to a caravan park in the north providing path for recreational rides for tourists.

3.4.14 These routes have also been considered in relation to new employment sites (see Appendix B-3). The majority of new employment is located along the A590 corridor along the west of the town. There is already a cycle route which connects with some residential areas, so it is proposed that new routes spur off to make the employment areas better connected to wider area, improving accessibility for residents, including a route along Rakesmoor Lane and Ainslie Street connecting onto Abbey Road.

3.4.15 Travel plans for each development site will be important to secure through the planning process, and facilities should include cycle parking and proposing additional suitable cycle links through the master planning process of sites. For employment sites, these should include secure cycle parking.

3.4.16 Shower facilities also to be encouraged at employment generating development. It is advised for new employment sites to build shower facilities to encourage staff to walk/cycle to work.

3.4.17 It is also recommended to improve cycling facilities along Jubilee Bridge, with the potential for dedicated cycle lanes.

3.5 PUBLIC TRANSPORT - BUS

3.5.1 The 2011 census travel to work data indicates that only 6.8% of Barrow-in-Furness travel to work by public transport compared to the 16.4% national average. Many bus stops in the area have limited facilities with the town itself not having a central bus station. The current bus shelters outside the town hall are classed as the town's major interchange. A new transport interchange will be considered in the forthcoming Central Barrow Masterplan.

3.5.2 With the close proximity of employment sites to housing sites in Barrow Town Centre, it is evident that public transport modal share is in part a consequence of people choosing to travel to work by cycling or walking once wait times and bus fares are taking into account.

3.5.3 BAE, the area's largest employer had only 1.74% members of respondents from their travel survey travel to work via public transport. Staff reasons for not travelling to site by train include lack of service (37.73%), proximity of the railway station from home/work (30.2%) and unsuitably timed services. Other reasons were expense (3.79%), duration of journey (2.2%) and unreliability (1.63%) which are all reasons to consider when looking improving the local service to the area.

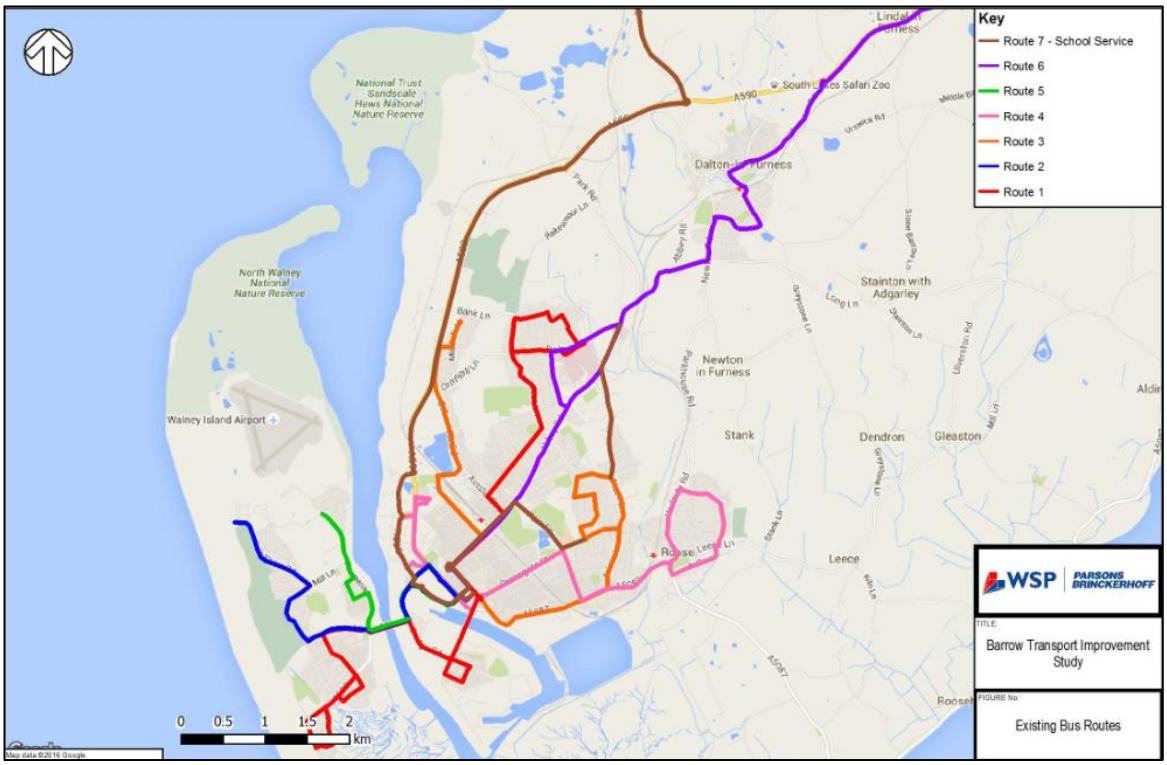
3.5.4 Reasons for not travelling to work by bus included 45.87% indicating that service times were unsuitable, and lack of services near where staff reside. Inconvenience (39.12%), journey duration (26.88%), expense (27.28%) and unreliability (22.0%), Staff may be persuaded to use more public transport is services were more conductive to shift patterns and the implementation of financial incentives.

3.5.5 The bus stops are made up of shelters, in particularly in the town centre with many stops outside of town centre consist of no more than a flag pole. Due to the simplicity of the stop, waiting for a bus particularly in poor weather is likely to be a key factor that discourages bus use across Barrow. New bus stops would also benefit of real time information which help the traveller to make an informed decision of how, and when to travel.

3.5.6 The current extent of the bus network in Barrow-in-Furness is shown in Figure 3-9 for all regular services. Routes are typically radial; passing through the town centre, the list of services, all operated by Stagecoach, are as follows:

- 1 – South Walney to Hawcoat
- 2 – North Walney to Town Centre
- 3 – Newbarns to Ormsgill
- 4 – Holbeck Park to Asda/Furness College
- 5 – Walney Island to Town Centre
- 6/X6 – Town Centre to Ulverston/Kendal/Windermere
- 7 – Runs as a school bus in some areas, only runs 2-3 times a day.

Figure 3-9: Existing bus network in Barrow-in-Furness



3.5.7 Working alongside the County Council Bus Services Officer , a gap analysis of the existing public transport provision and future development locations has been undertaken with new routes being identified for future consideration. It is proposed that bus services in the area are extended to serve potential developments identified in the Local Plan. In particular, there appears to already be potential demand for a bus route to serve the industrial estate along Park Road, as currently there is no direct bus route that runs through this area other than a school bus. Service frequency would also expect to increase as buses begin to exceed capacity with greater demand. Location of new Local Plan sites are highlighted in Appendix C-1 identifying nearby existing bus network and the potential expansion routes.

3.5.8 As local sites come forward in the planning process, developers should seek to engage with local bus operators to identify the specific requirements of public transport provision to manage sustainable travel.

3.5.9 Appendix C-2 illustrates the proposed housing developments in the Local Plan in relation to the existing network. It should be ensured that new development sites are within easy access of a bus stop.

3.5.10 In light of this, and to align with Local Plan development sites, Routes 1, 3 and 4 should be extended (or new routes created) to capture the demand from new and existing sites.

3.5.11 Appendices D-1 and D-2 show the recommended bus route extensions in relation to the Local Plan employment sites and housing sites respectively. The improvements are linked to specific development sites which will help to improve the sustainability of these sites.

3.5.12 Developer contributions could be sought to fund the delivery of these improvements as outlined in Table 3-3.

Table 3-3: Proposed bus routes and developer contributions

Proposed Route	Location	Developer Contributions
1	Waterfront Business Park	EMR03
3	Rakesmoor Lane/Bank Lane	SHL082, SHL037
	Park Road (West)	EM14, EMR05, EMR07, SHL037
4	Park Road (West)	EMR01, EMR16, EMR08, EMR06, EMR07, EMR14, EMR06
	Leece Lane	REC05 REC26

3.5.13 To include new bus stops it is anticipated that new stops near Local Plan sites could receive developer contributions. Many of the bus stops across Barrow-in-Furness will also be subject to an upgrade, it has been estimated that this would cost £6k-8k per bus stop.

3.5.14 An estimate of cost for a new bus service operating with a 20 minute frequency would expect to cost £240k per annum, however, a diverted service would be anticipated to cost around half of this sum.

3.5.15 We have not prepared a detailed cost breakdown of potential proposed bus infrastructure relating to new bus stops and extensions of existing routes due to the detailed nature of these requirements usually developed during masterplanning or a planning application. It should be required that contributions from developers fund these sustainable bus measures.

3.6 PUBLIC TRANSPORT - RAIL

3.6.1 According to 2011/2012 figures, 1.5 million passengers used the Furness line. In Barrow Borough, there are 4 railway stations: Roose, Dalton-in-Furness (which runs regular services to Lancaster) and Barrow and Askam (connecting the coastal route to Carlisle).

3.6.2 The new Northern Passenger Rail franchise will benefit from a £1billion investment by Arriva in better trains, faster journeys, with more customer facing staff, simpler ticketing and improved station facilities. By 2019, brand new 100mph trains will operate on the network of fast Northern Connect services from Barrow-in-Furness, Blackpool and Windermere to Manchester and Manchester Airport.

3.6.3 The future infrastructure of the coastal route is planned to be upgraded to meet the demands of the future projects of Moorside, Drigg and Sellafield. The track itself has various single track sections and speed restrictions reduce capacity. Between 60 and 70% of journeys on the line are used for tourism and leisure purposes.

3.6.4 The Community Rail Manager has confirmed that Dalton Station has recently been fitted with an electronic travel information system with train times and local information on both platforms. Roose Station has no passenger information facilities. There are also no car parks at either station reducing potential for a park and ride system into Barrow town centre.

3.6.5 It is recommended that improvements are made to station facilities (parking, cycle parking and waiting faculties) to encourage longer journeys to be made via rail.

PUBLIC TRANSPORT - RECOMMENDED IMPROVEMENTS

3.6.6 The following infrastructure improvements are recommended in order to increase the modal share of public transport use in Barrow-in-Furness:

- Extensions of routes and increased frequency to allow improved accessibility to current and Local Plan sites.
- Enhancements to bus stop infrastructure in residential areas, where appropriate they should include, upgrading flag poles to shelters and seating, raised curbs for wheelchair and pushchair access.
- Ensure all bus stops have printed timetables and to consider real time information particularly for major routes, with sustainable funding sources.
- Secured funding arrangements for ongoing maintenance of new bus infrastructure
- New Local Plan sites should be planned with the consideration to have a layout that accommodates easy access to bus stops.
- Frequency of rail services should be assessed and an improvement to the quality of facilities at stations
- Improved bus connectivity to Dalton Rail Station in addition to the existing Route 6.

3.7 BUSINESS ENGAGEMENT AND TRAVEL PLANNING

3.7.1 Cumbria County Council is working closely with Barrow Borough Council to implement the Local Transport Plan Strategy to increase the proportion of trips by sustainable travel modes, reducing the need to travel through the planning process and developers accordingly.

3.7.2 The present focus on Travel Planning at Cumbria County Council focuses around ensuring that new development is accompanied with a robust Travel Plan, secured through a Section 106 agreement.

3.7.3 Whilst all of the key requirements for Travel Plans are addressed within Cumbria County Council's Planning Obligation Policy, a bespoke Travel Plan Strategy document produced to support the Local Plan could be utilised to deliver an analysis of the site specific measures that should be included in Travel Plans for Local Plan sites. These measures should draw from the findings in this report and ensure that other measures are secured which complement the proposed infrastructure (such as cycle parking) to maximise the benefit.

3.7.4 Officers at Cumbria County Council should ensure that all delivered Travel Plans should cover the following aspects, as enshrined within Cumbria County Council's Planning Obligation Policy:

- Site Specific Measures (Action Plan) or Travel Plan Contribution.
- Travel Plan Coordinator Admin Fee.
- Bus Service Funding (where no existing services).
- Bus Stop Infrastructure.
- Target of 10% reduction in car trips.
- Monitoring during peak hours

3.7.5 It is Cumbria County Council's preference to have site specific measures within a Travel Plan as opposed to a Travel Plan Contribution, which will only be sought if the measures are deemed insufficient. This contribution would then be utilised if the developer is not achieving the agreed targets.

3.7.6 A limitation of the focus on Travel Planning on future development is that it will not impact upon pre-existing travel to work or travel to school patterns.

3.7.7 It is recommended that a programme of business engagement is utilised in Barrow–in-Furness to secure voluntary Travel Plans and tackle the number of car travel to work trips. This involves engagement with local businesses in the Borough to encourage staff to consider travelling to work by alternate modes of travel and the implementation of travel plans.

3.7.8 Business engagement schemes have been successful to help reduce car modal share. Businesses could be identified that have proximity to sustainable travel infrastructure.

3.7.9 Once the business has been brought to the scheme as a result of awareness and encouragement to uptake. The scheme can deliver a tailored toolkit of measures suited to the business.

3.7.10 Measures could include:

- Cycle Training
- Dr Bike
- Fix it Yourself Courses
- Car share websites
- Eco Friendly Driver Training
- Walking/Pedometer Challenges
- Smarter Working Seminars
- Funding incentives for Showers/Cycle parking within the work place.

3.7.11 The impact of the scheme at each business should be monitored by staff travel surveys upon signing up to the programme and the following year to assess a change in modal shift.

3.7.12 Raising awareness about public transport systems and cycle lanes in the town will also help to encourage people to travel more sustainably as they may not be aware of the existence of sustainable alternatives.

3.7.13 Reducing the need to travel to work by car will also reduce over capacity problems in car parking spaces, and will allow for spaces to be allocated for visitors and clients. Businesses could also introduce car share spaces which would increase capacity as staff would consider car sharing if the offer of a guaranteed space was available.

3.7.14 Behavioural change programmes can be difficult to implement as not everyone will seek to consider alternate modes of travel, though if staff chose to travel just once a week by public transport this can reduce congestion on the roads by 20%.

3.8 OVERVIEW OF MEASURES

3.8.1 The measures detailed in this section provide a mixture of transport improvements for all sustainable modes utilised within Barrow-in-Furness.

3.8.2 With the recommendations provided above, the area will have a more extensive cycle network allowing residents to safely cycle across Barrow to more accessible sites and with relevant education and awareness raised, people may be encouraged to cycle to and from work.

3.8.3 Improved bus routes particularly to the west of the town may encourage people to commute to work on public transport with the new links between employment sites and to residential areas, including new housing sites identified in the Local Plan.

3.8.4 Workplace travel planning accompanied by the implementation of hard infrastructure measures can aid the reduction in car modal share. It has been found that that with a mixture of these means, congestion can be alleviated amongst a targeted group as much as up to 18% for staff and 10% for school trips, achieving a peak hour reduction of traffic of up to 5%. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427135/webtag-tag-unit-m5-2-modelling-smarter-choices.pdf)

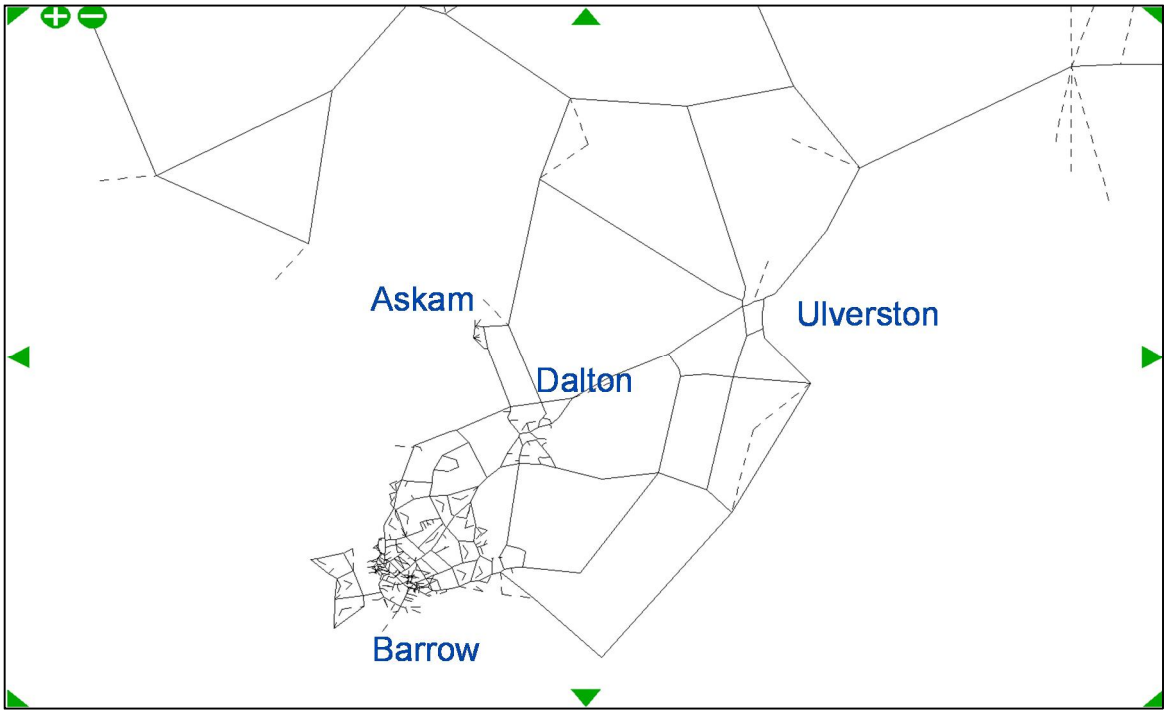
4 TRAFFIC IMPACT ASSESSMENT

4.1 BARROW TRANSPORT MODEL

4.1.1 The Barrow Transport Model was developed by Cumbria County Council in the modelling software SATURN in 2009. The base model was further updated in 2012 and 2014.

4.1.2 The 2014 model was used for assessing the Transport impact of the development proposals associated with the Local Plan. Figure 4-1 shows a screenshot of the Barrow SATURN model.

Figure 4-1: Barrow Transport Model Network



4.1.3 In 2016, the same model was also used for assessing the traffic impact of the following scenarios related to the Barrow Local Plan;

- → Scenario 1: 2031 Base – includes developments completed between October 2014 and April 2016, and developments with full of outline planning permission as of April 2016.
- → Scenario 2: 2031 Local Plan – includes Local Plan proposals for housing, employment, retail and leisure.

4.1.4 A Forecasting Report has been produced by CCC titled 'Barrow Borough Local Plan – Transport Modelling, May 2016' that presents the modelling methodology and findings from the SATURN modelling.

4.1.5 A number of junctions are identified as operating at or over capacity in the SATURN model in both Scenario 1 and 2 mentioned above.

4.2 JUNCTION ASSESSMENT METHODOLOGY

4.2.1 The results from the SATURN modelling undertaken by CCC were independently reviewed by WSP Parsons Brinckerhoff as they were envisaged to form the input for the Junction Modelling that forms part of this study.

4.2.2 The SATURN model identified a total of 57 junctions that would operate at more than 85% of their operational capacity in 2031. A further sifting of junctions was undertaken based on;

- → Whether junction is located on the critical road network, such as the A590, and
- → Whether any potential improvements are proportionate to the problem.

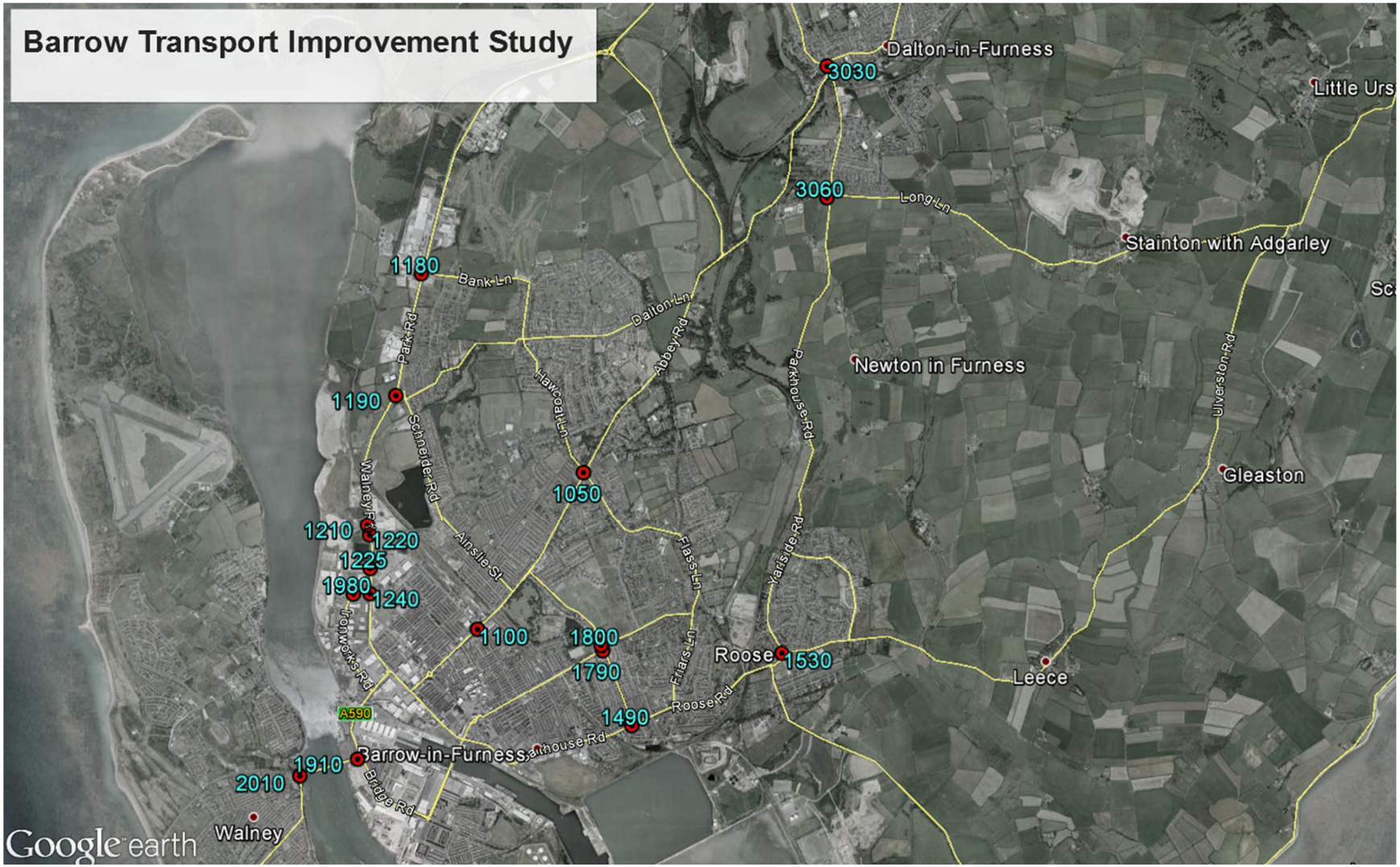
4.2.3 17 junctions were identified to operate at or above 100% capacity in 2031 and Table 4-1 shows these 17 junctions included in the junction modelling and their existing and proposed layout types. Figure 4-2 shows their locations.

Table 4-1: Junctions identified for Assessment

SATURN Node No.	Junction Description	Existing Junction Type
1180	A590 Park Road/Bank Lane	Priority Junction
1190	A590 Park Road - Ormsgill	Priority Junction
1210	A590 Walney Rd/Phoenix Road	Priority Junction
1220	A590 Walney Road/Wilkie Road	Priority Junction
1225	A590 Walney Road/Asda	Priority Junction
1240	A590 Walney Rd/Ironworks Road	Traffic Signals
1980	A590 Ironworks Road / Phoenix Road	Priority Junction
1790	Greengate Street/Risedale Road	Priority Junction
1800	Park Drive/Bridgegate Ave/Risedale Road	Priority Junction
1050	Abbey Road/Hollow Lane/Hawcoat Lane	Traffic Signals
1100	Abbey Road/Rawlinson Street/Holker	Traffic Signals
1490	A5087 Roose Rd / Risedale Rd	Traffic Signals
1530	Holbeck Road/Leece Lane	Priority Junction
1910	A590 North Road/Bridge Road	Roundabout
2010	A590 Jubilee Bridge/Promenade/Central Drive (	Traffic Signals
3030	Abbey Road/Market Street	Priority Junction
3060	Long Lane/Newton Road	Priority Junction

4.2.4 The 11 priority junctions and one roundabout junction has been assessed in Junctions 8 software. The 5 signal controlled junctions have been assessed in LINSIG V3.

Figure 4-2: Locations of final 17 junctions identified for assessment



4.3 JUNCTION MODELLING RESULTS

4.3.1 The junctions were assessed for the AM and PM peaks for the two scenarios discussed at 4.1.3, and the following results have been presented from the assessment;

- → RFC: Ratio of Flow to Capacity (for Priority Junctions and Roundabouts)
- → DoS: Degree of Saturation (for Signalised junctions)
- → MMQ: Mean Maximum Queue (PCUs)

4.3.2 Additionally, a satellite image of each junction is presented that shows the arms that are either nearing capacity, or at/over capacity in any of the scenarios as following;

- Nearing Capacity (RFC 0.85 – 0.99, or DoS 90%-99%)
- At or Over Capacity (RFC 1.00 and above, or DoS 100% and above)

4.3.3 The modelling results are followed by potential improvements in the respective section for each assessed junction. The improvements have been designed to accommodate HGV swept paths at the junctions.

1180: A590 PARK ROAD / BANK LANE AND 1190: A590 PARK ROAD / ORMSGILL

MODELLING RESULTS, 1180 AND 1190

4.3.4 These two junctions have been considered together due to the common residential areas that they serve to the east of the A590 and the similar traffic issues they would experience in 2031.

4.3.5 Figure 4-3 shows the location for node **1180 – Park Road / Bank Lane** along with the arm that operates over capacity. The junction modelling results are shown in Table 4-2.

Figure 4-3: 1180 - Park Road / Bank Lane Existing Junction

Table 4-2: 1180 - Park Road / Bank Lane Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S2 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Bank Lane	L	0.14	0.17	Inf	20.49	0.22	0.27	3.03	53.84
	R	0.00	0.00	Inf	18.06	0.00	0.00	2.92	8.54
A590 South	R	0.10	0.11	0.05	0.06	0.12	0.13	0.33	0.50
Maximum RFC		**0.14**		**Inf**		**0.22**		**Inf**	

4.3.6 Figure 4-4 shows the location for node **1190 – A590 Park Road / Ormsgill** along with the arm that operates over capacity. The junction modelling results are shown in Table 4-3.

Figure 4-4: 1190 - A590 Park Road-Ormsgill Existing Junction

Table 4-3: 1190 - A590 Park Road / Ormsgill Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Canterbury Terrace	L, R	0.63	1.58	Inf	44.00	0.44	0.77	1.94	36.38
A590 Park Road	R	0.15	0.17	0.11	0.12	0.20	0.25	0.17	0.20
Maximum RFC		**0.63**		**Inf**		**0.44**		**1.94**	

4.3.7 Table 4-2 and Table 4-3 indicate that there will be significant capacity issues on the minor arms at both junctions. Bank Lane arm at 1180 and Ormsgill arm at 1190 operate at an RFC of more than 1.00.

POTENTIAL IMPROVEMENT, 1180 AND 1190

4.3.8 Without introducing a mechanism to stop the major road flow, the side road traffic will find it difficult to enter the junction safely. A full signal control junction layout would assist the side road traffic during peak hours, however it is likely to create unnecessary delays to main road traffic, especially during the off-peak hours.

4.3.9 The following potential improvements could be considered for junctions 1180 and1190;

- Node 1180: New pedestrian crossing on A590, south of Bank Lane, primarily to assist right turning traffic from Bank Lane, and triggered by presence of vehicles on the side road.
- Node 1180: Alternatively, a new roundabout junction layout.
- Node 1190: Replace current junction with a new roundabout layout further south on A590 (this will also allow development traffic from south-eastern residential areas to join A590 for travelling north).

4.3.10 The above improvements are indicated in Figure 4-5, and the layouts are shown in Drawing No. DR_1180 and DR_1190 included in Appendix E.

Figure 4-5: Junctions 1180 and 1190 Potential Improvement Concept

RESULTS AFTER IMPROVEMENT, 1180 AND 1190

4.3.11 The roundabout improvement layouts for 1180 and 1190 were assessed for capacity in Junctions 8. Table 4-4 and Table 4-5 show the Junctions 8 results for the new roundabout layouts at these two junctions.

Table 4-4: 1180 - A590 Park Road / Bank Lane New Roundabout Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Bank Lane East	L,A,R	0.14	0.17	0.28	0.43	0.15	0.20	0.28	0.42
A590 South	L,A,R	0.37	0.65	0.44	0.87	0.69	2.45	0.82	4.82
Bank Lane West	L,A,R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A590 North	L,A,R	0.75	3.18	0.80	4.19	0.43	0.82	0.51	1.15
Maximum RFC		**0.75**		**0.80**		**0.69**		**0.82**	

Table 4-5: 1190 - A590 Park Road-Ormsgill New Roundabout Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Ormsgill	L,A,R	0.48	0.99	0.56	1.30	0.31	0.50	0.35	0.58
A590 South	L,A,R	0.44	0.87	0.55	1.33	0.81	4.65	0.88	7.65
A590 North	L,A,R	0.71	2.65	0.79	3.98	0.42	0.80	0.53	1.22
Maximum RFC		**0.71**		**0.79**		**0.81**		**0.88**	

4.3.12 Table 4-4 and Table 4-5 shows that proposed new roundabout layout at A590 Park Road / Bank Lane junction and the A590 Park Road-Ormsgill junction would operate within capacity for all scenarios in 2031.

4.3.13 The cost to install the pedestrian crossing on the A590 at 1180 is estimated to be £91,743, and for the roundabout layout at this location the cost is estimated to be £1,210,293. This does not include land take costs. It should be noted that in terms of traffic operations, the roundabout layout would be the more effective solution for node 1180. The A590 is envisaged to carry heavy two-way traffic flows in 2031. The impact of installing a pedestrian crossing on the A590 could lead to traffic delays on the main road.

4.3.14 The cost to implement the roundabout improvement at 1190 is estimated to be £1,119,002. This does not include land take costs..

JUNCTIONS 1210, 1220, 1225, 1240, 1980

MODELLING RESULTS, 1210, 1220, 1225, 1240, 1980

4.3.16 These five junctions have been considered together since they are included in a single improvement (described in 4.3.27 later).

4.3.17 Figure 4-6 shows the location for node **1210 – A590 Walney Road / Phoenix Road** along with the arm that operates over capacity. The junction modelling results are shown in Table 4-6.

Figure 4-6 A590 Walney Road/Phoenix Road Existing Junction

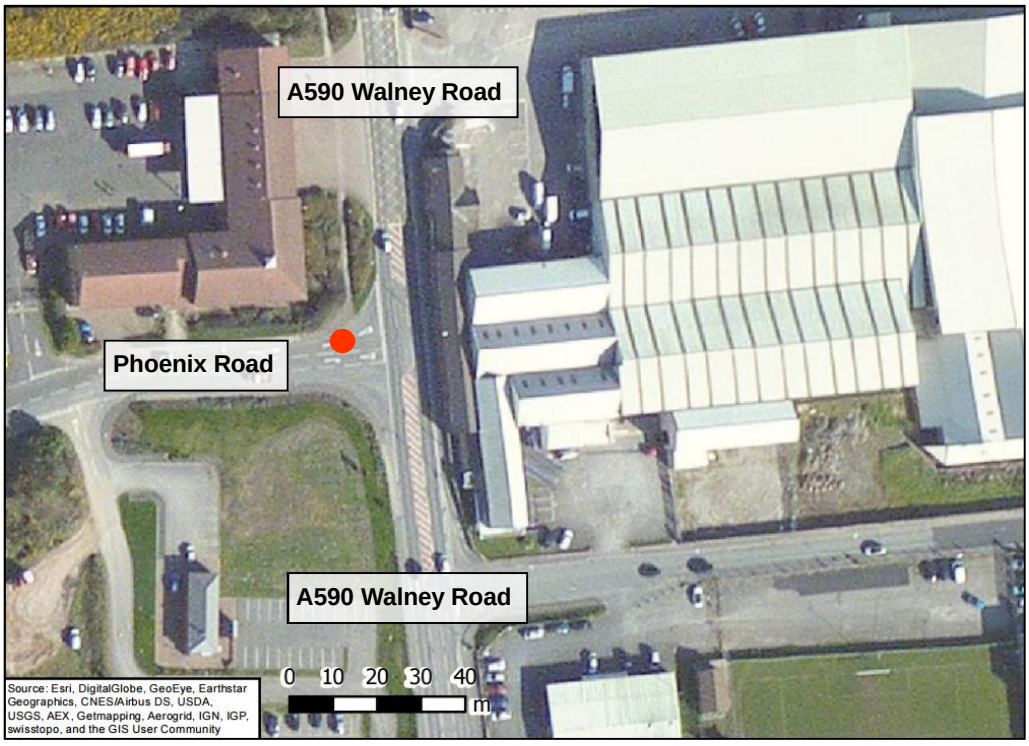


Table 4-6: 1210 - A590 Walney Road/Phoenix Road Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Phoenix Road	L	0.17	0.21	Inf	57.91	20.59	45.07	Inf	92.13
	R	0.12	0.13	Inf	43.36	20.09	7.27	Inf	94.42
A590 North	R	0.54	1.37	0.17	0.22	0.72	2.71	0.11	0.12
Maximum RFC		**0.54**		**Inf**		**20.59**		**Inf**	

4.3.18 The table shows that Phoenix Road would operate considerably over capacity in 2031 in both AM and PM peaks. This indicates that traffic from Phoenix Road would find it difficult to enter the junction due to lack of suitable gaps in mainline flow on the A590.

4.3.19 Figure 4-7 shows the location for node **1220 – A590 Walney Road / Wilkie Road** along with the arm(s) that are approaching capacity or operate at or over capacity. The junction modelling results are shown in Table 4-7.

Figure 4-7: 1220 - A590 Walney Road/Wilkie Road Existing Junction

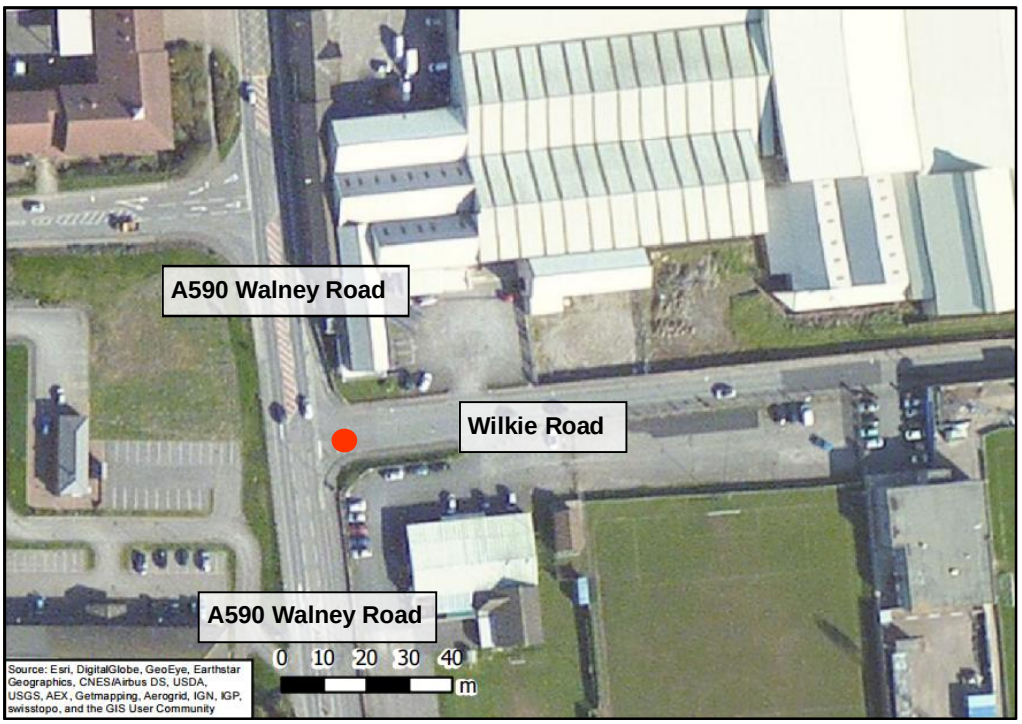


Table 4-7: 1220 - A590 Walney Road/Wilkie Road Junctions 8 Results

Arm	Lane	2031 S1 Flows AM Peak		2031 S2 Flows AM Peak		2031 S2 Flows PM Peak		2031 S2 Flows PM Peak	
	Turn	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Wilkie Road	L	0.57	1.23	1.13	9.54	1.14	11.65	Inf	94.09
	R	0.65	1.58	0.91	2.46	1.05	4.24	Inf	14.81
A590 South	R	0.26	0.34	0.35	0.55	0.23	0.30	0.32	0.47
Maximum RFC		**0.65**		**1.13**		**1.14**		**Inf**	

4.3.20 The table shows Wilkie Road would operate over capacity in 2031 in both AM and PM peaks. This indicates that traffic from Wilkie Road would find it difficult to enter the junction due to lack of suitable gaps in mainline flow on the A590.

4.3.21 Figure 4-8 shows the location for node **1225 – A590 Walney Road / ASDA** along with the arm(s) that are approaching capacity or operate at or over capacity. The junction modelling results are shown in Table 4-8.

Figure 4-8: 1225 - A590 Walney Road/ASDA Existing Junction

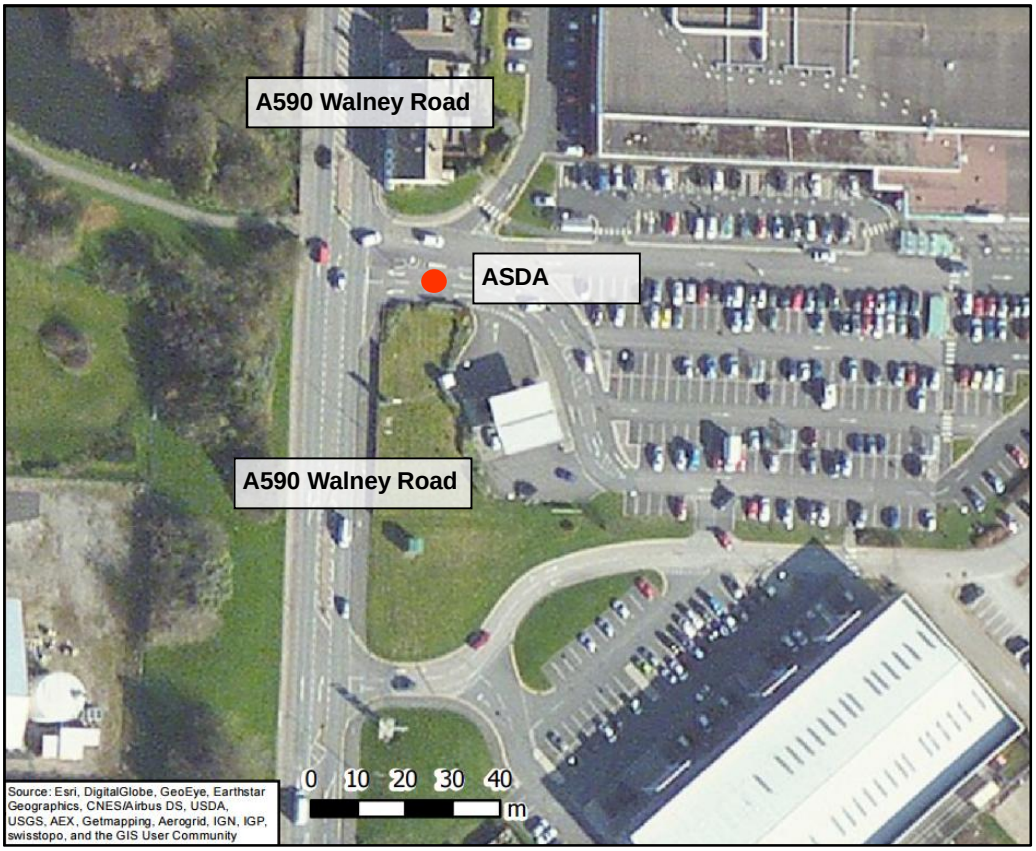


Table 4-8: 1225 - A590 Walney Road/ASDA Junctions 8 Results

Arm	Lane	2031 S1 Flows AM Peak		2031 S2 Flows AM Peak		2031 S2 Flows PM Peak		2031 S2 Flows PM Peak	
	Turn	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Wilkie Road	L	0.28	0.39	0.32	0.46	0.28	0.38	0.37	0.58
	R	0.35	0.51	0.60	1.27	0.52	0.95	7.28	14.21
A590 South	R	0.20	0.24	0.19	0.23	0.11	0.12	0.11	0.13
Maximum RFC		**0.65**		**0.60**		**0.52**		**7.28**	

4.3.22 The table shows that ASDA access would operate over capacity in 2031 in the Local Plan PM peak scenario. The RFC of 7.28 on the right turn from ASDA indicates that this movement would find it difficult to enter the junction due to lack of suitable gaps in mainline flow on the A590.

4.3.23 Figure 4-9 shows the location for node **1240 – A590 Walney Road / Ironworks Road** along with the arm(s) that are approaching capacity or operate at or over capacity. The junction modelling results are shown in Table 4-9.

Figure 4-9: 1240 - A590 Walney Rd/Ironworks Road Existing Junction

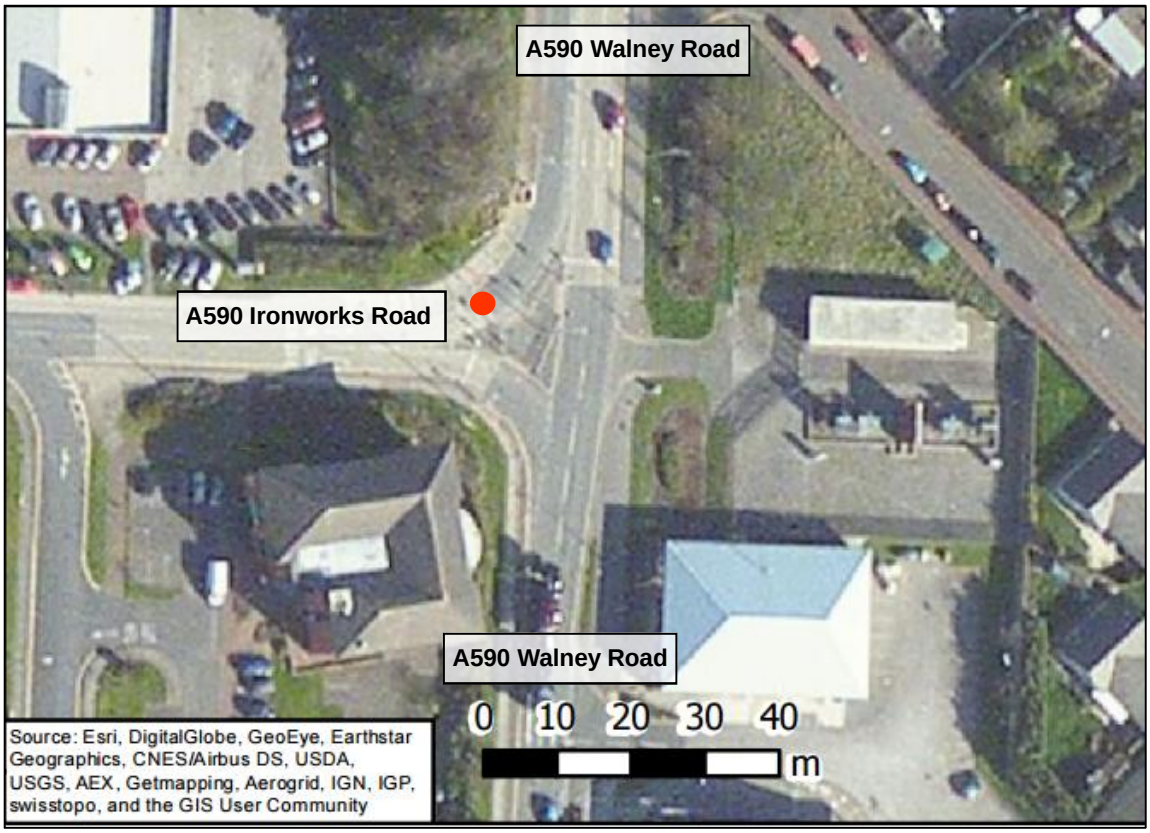


Table 4-9: 1240 - A590 Walney Rd/Ironworks Road Linsig Results

Arm	Lane	2031 S1 AM		2031 S2 AM		2031 S1 AM		2031 S2 AM	
	Turn	DOS	MMQ	DOS	MMQ	DOS	MMQ	DOS	MMQ
Walney Road N	A	69.6%	6.2	72.4%	7.0	52.8%	4.7	62.8%	6.1
Ironworks Road	L	62.2%	6.5	74.7%	10.0	120.7%	177.0	128.0%	229.8
	R	62.5%	3.6	59.3%	3.9	56.4%	4.3	59.6%	4.6
Maximum RFC		**69.6%**		**74.7%**		**-34.1%**		**128.0%%**	

4.3.24 Both the AM scenarios work well in terms of performance however the PM scenarios show that the junction would operate over capacity. This is primarily due to the pedestrian crossing across the left turn out of Ironworks Rd. Given the large flow in the PM scenarios, as soon as this traffic is held even briefly a major queue is developed.

4.3.25 Figure 4-10 shows the location for node **1980 – A590 Ironworks Road / Phoenix Road** along with the arm(s) that are approaching capacity or operate at or over capacity. The junction modelling results are shown in Table 4-10.

Figure 4-10: 1980 - A590 Ironworks Road / Phoenix Road Location and Description

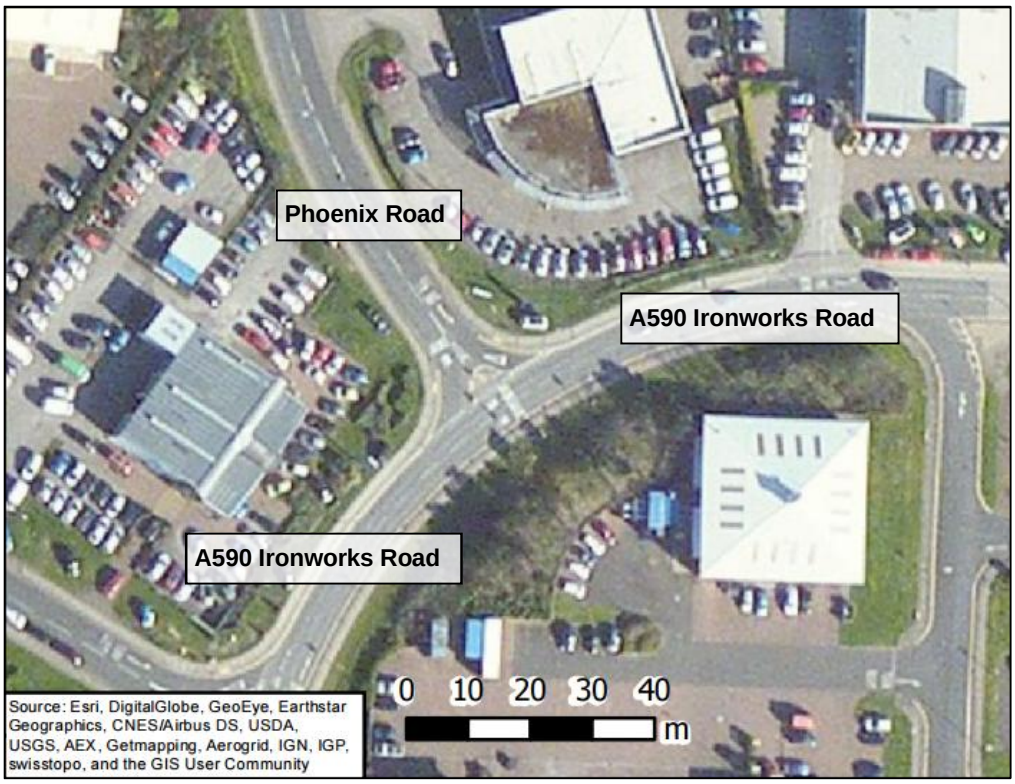


Table 4-10 1980 - A590 Ironworks Road / Phoenix Road Location and Description

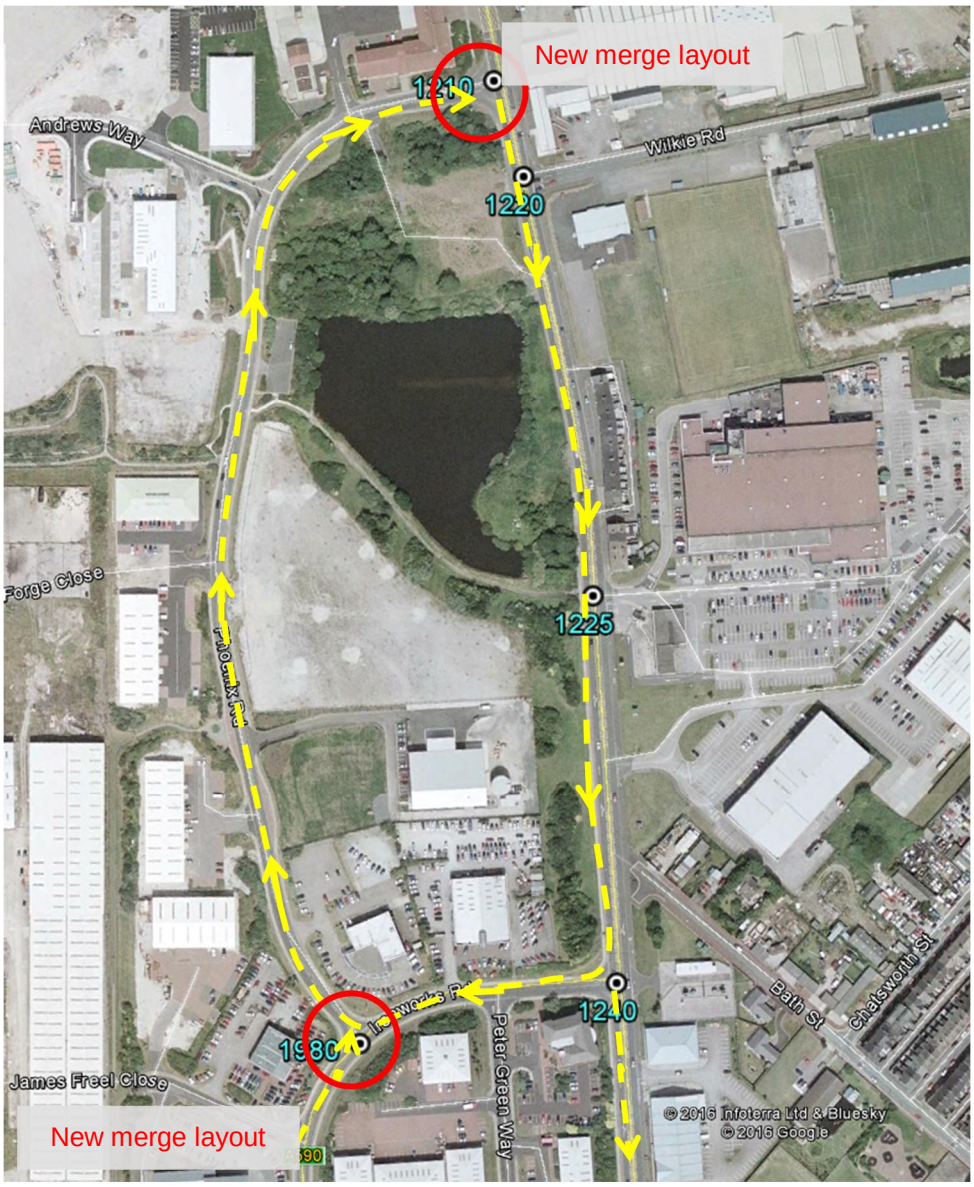
Arm	Lane	2031 S1 AM		2031 S2 AM		2031 S1 AM		2031 S2 AM	
	Turn	DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
Phoenix Road	L	0.29	0.41	0.36	0.57	0.42	0.70	0.53	1.07

4.3.26 The results show that the junction would operate within capacity in both AM and PM.

POTENTIAL IMPROVEMENT, 1210, 1220, 1225, 1240 AND 1980

4.3.27 The potential improvement consists of extending the current A590 one way gyratory system further to the north to include Phoenix Road, and the A590 between Phoenix Road and Ironworks Road. The clockwise operation of the extended gyratory system is shown in Figure 4-11.

Figure 4-11: Potential extended gyratory system, 1210, 1220, 1225, 1240 and 1980



4.3.28 The junctions along the new gyratory system would be left in and left out traffic operations with dedicated exit and exit lanes for turning traffic. A concept diagram of the improvement is shown in Drawing No. DR_1210 included in Appendix E. Although the distance for a small number of drivers would increase to navigate around the new gyratory, the overall level of delay and journey time but be significantly lower than if the existing layouts were to be retained.

4.3.29 The cost to implement this improvement is estimated to be £253,078 including resurfacing only at junctions, and £445,346 including full resurfacing of junctions and carriageway. This does not include land take costs.

1790: RISEDALE ROAD / GREENGATE STREET AND 1800: RISEDALE ROAD / BRIDGEGATE AVENUE

MODELLING RESULTS, 1790 AND 1800

4.3.30 These two junctions have been considered together due to their proximity to each other and the interaction between the two nodes.

4.3.31 Figure 4-12 shows the location for node **1790 – Risedale Road / Greengate Street** along with the arm(s) that operate over capacity. The junction modelling results are shown in Table 4-11.

Figure 4-12: 1790 - Greengate Street/Risedale Road Existing Layout

Table 4-11: 1790 - Greengate Street/Risedale Road Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Greengate Street	L, R	0.89	5.65	0.94	8.35	0.96	9.98	0.98	11.42
Risedale Road N	R	1.21	54.07	1.24	40.46	1.06	11.49	1.09	12.75
Maximum RFC		**1.21**		**1.24**		**1.06**		**1.09**	

4.3.32 The table shows that junction would operate over capacity in both AM and PM. The right turn from Risedale Road North into Greengate Street would experiences oversaturation in all scenarios.

4.3.33 Figure 4-13 shows the location for node **1800 – Risedale Road / Bridgegate Avenue** along with the arm(s) that operate over capacity. The junction modelling results are shown in Table 4-12

Figure 4-13: 1800 - Park Drive/Bridgegate Ave/Risedale Road Existing Junction

Table 4-12: 1800 - Park Drive/Bridgegate Ave/Risedale Road Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Bridgegate Avenue	L, R	0.89	6.54	0.87	5.66	0.84	4.82	0.87	5.74
Risedale Road	R	0.67	1.98	0.74	2.69	0.88	5.16	1.00	10.68
Maximum RFC		**0.89**		**0.87**		**0.88**		**1.00**	

4.3.34 The table shows that junction would operate over capacity 2031 with all Local Plan development traffic on the road network. The right turn from Risedale Road into Bridgegate Avenue will experience oversaturation.

POTENTIAL IMPROVEMENT, 1790 AND 1800

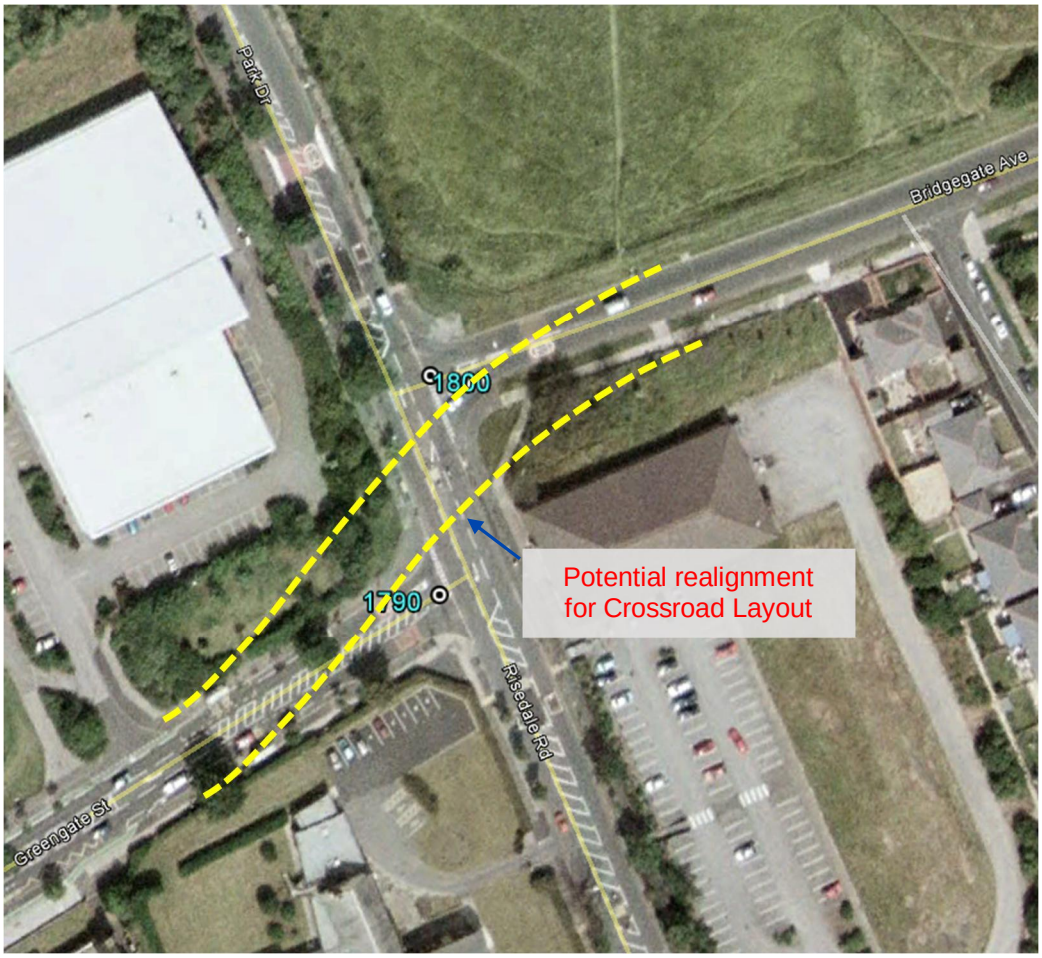
4.3.35 Two potential improvement are possible for these two junctions;

- → Signal control of both junctions under a single controller and maintaining the current staggered layout
- → Signal control of both junctions under a single controller with a new crossroad junction layout, re-aligning both Bridgegate Avenue and Greengate Street.

4.3.36 The advantage of the second option is that it would make the junction more compact, and as such require shorter intergreen times between conflicting stages as compared to a staggered signal layout.

4.3.37 The land to the north of Greengate Street is owned by the council therefore private land take can be minimised south of Bridgegate Avenue. Figure 4-14 shows the concept plan for the realignment of the side roads to form a signal crossroad layout. Drawing No. DR_1790 included in Appendix E shows the junction layout.

Figure 4-14: Potential signal crossroad layout, 1790 and 1800



4.3.38 Table 4-13 shows the results for the signal crossroad layout at **1790 and 1800, Risedale Road / Bridgegate Avenue / Greengate Street** junction.

Table 4-13: 1790 and 1800 Signal Crossroads LINSIG Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
Park Drive	L, A	81.4%	6.5	85.3%	8.8	85.3%	9.2	88.6%	12.1
	R	79.0%	6.3	85.7%	7.1	85.7%	7.1	88.2%	8.2
Bridgegate Avenue	L, A, R	82.5%	15.2	82.8%	13.7	88.2%	15.8	87.1%	15.4
Risedale Road	L, A	35.4%	1.7	7.7%	0.6	65.4%	5.3	8.8%	0.8
	R	0.9%	0.1	74.5%	5.3	18.8%	1.0	84.7%	7.3
Greengate Street	L, A, R	83.3%	10.5	85.5%	11.5	85.8%	11.7	88.5%	13.1
Maximum DoS		**83.3%**		**85.7%**		**88.2%**		**87.1%**	

4.3.39 The table shows that with the signal crossroad layout, the junction would operate within capacity in all scenarios in 2031.

4.3.40 The cost to implement the signal crossroad layout at 1790 and 1800 is estimated to be £901,621. This does not include land take costs.

1050: ABBEY ROAD / HOLLOW LANE / HAWCOAT LANE

MODELLING RESULTS, 1050

4.3.41 Figure 4-15 shows the location for node **1050 – Abbey Road / Hollow Lane / Hawcoat Lane** along with the arms that operate over capacity. The junction modelling results are shown in Table 4-14.

Figure 4-15: 1050 - Abbey Road/Hollow Lane/Hawcoat Lane Existing Junction

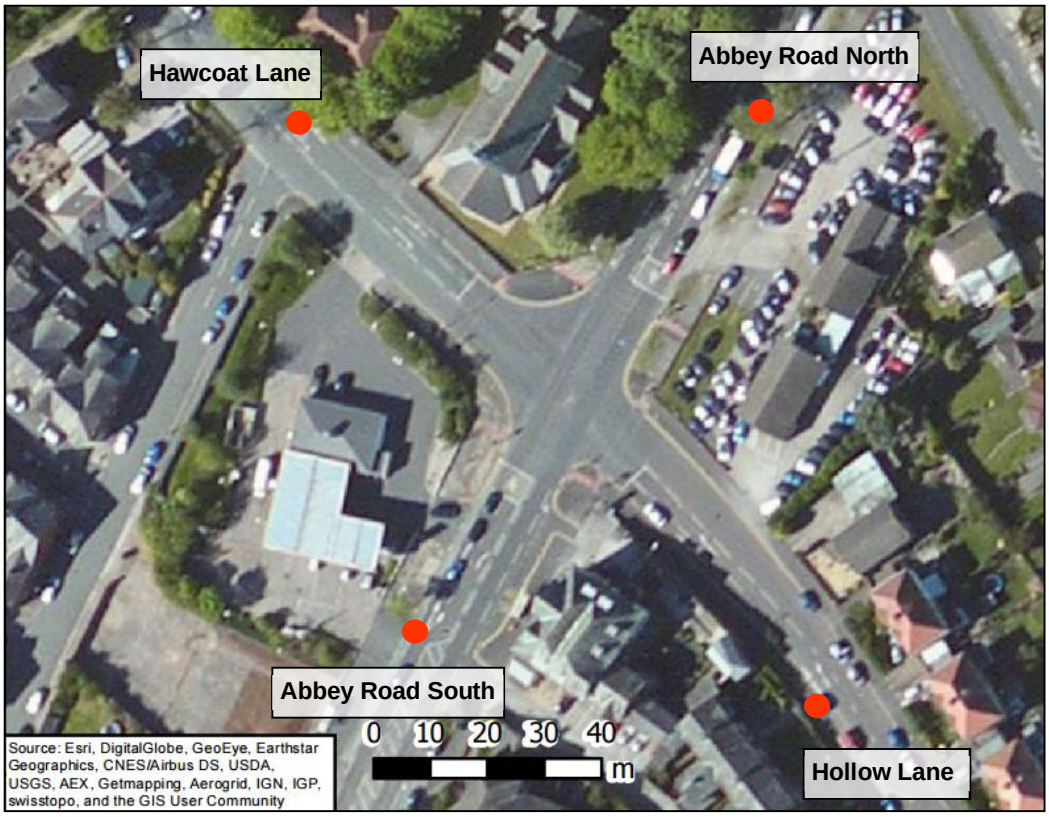


Table 4-14: 1050 - Abbey Road/Hollow Lane/Hawcoat Lane Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
Abbey Road N	L, A, R	126.5%	117.5	127.7%	124.8	148.0%	111.9	159.4%	136.7
Hollow Lane	L, A, R	127.7%	89.7	134.4%	108.7	143.7%	77.6	151.8%	109.0
Abbey Road S	L, A, R	90.0%	21.1	89.8%	21.4	88.2%	26.9	85.8%	24.7
Hawcoat Lane	L, A, R	128.9%	101.7	130.7%	107.8	156.8%	112.7	160.0%	133.7
Maximum DoS		**128.9%**		**134.7%**		**156.8%**		**-160.0%**	

4.3.42 The results show that the junction is oversaturated in all scenarios. The signal timings have been optimised within the existing specification for best green splits as this junction normally runs MOVA. However even with this optimisation the junction will operate over capacity as the demand across the junction exceeds the limits of what the junction can cope with. A re-design of the junction will be required.

POTENTIAL IMPROVEMENT, 1050

4.3.43 A potential improvement at this junction could comprise widening on all arms to include 3 lane entry approaches on all four arms. An indicative layout of this improvement is shown in Drawing DR_1050 included in Appendix E .

RESULTS AFTER IMPROVEMENT, 1050

Table 4-15: 1050 - Abbey Road/Hollow Lane/Hawcoat Lane Improvement Linsig Results

Arm	Turn	2031 S1 Flows AM Peak		2031 S2 Flows AM Peak		2031 S1 Flows PM Peak		2031 S2 Flows PM Peak	
		DOS	MMQ	DOS	MMQ	DOS	MMQ	DOS	MMQ
Abbey Road North	L	8.8%	1.2	3.8%	0.5	9.6%	1.4	10.0%	1.5
	A	85.3%	22.4	94.1%	29.1	38.5%	8.3	42.5%	9.2
	R	43.1%	3.0	39.9%	2.2	83.5%	7.3	91.2%	9.9
Hollow Lane	L, A	83.9%	10.2	77.0%	9.8	86.0%	9.9	74.1%	10.2
	R	85.4%	12.9	86.8%	13.4	87.8%	10.3	91.4%	11.7
Abbey Road South	L	12.7%	1.9	13.9%	2.1	5.1%	0.7	6.3%	0.9
	A	60.1%	13.0	61.3%	13.4	86.8%	25.1	91.5%	26.0
	R	9.7%	0.3	5.0%	0.1	2.9%	0.2	9.9%	0.6
Hawcoat Lane	L, A	78.4%	9.1	67.2%	7.6	83.0%	9.2	70.4%	8.7
	R	85.8%	13.0	93.7%	16.0	53.9%	4.8	84.1%	9.2
Maximum DoS		**85.8%**		**94.1%**		**87.8%**		**91.5%**	

4.3.44 The results in the above table correspond to a staging sequence that includes a dedicated pedestrian stage when all traffic phases are on red. This stage is called during every cycle.

4.3.45 An alternate staging sequence has been tested that calls the all-red traffic phase every other cycle. This is to determine the capacity benefit that could be achieved if pedestrian demand is not activated during every cycle.

4.3.46 The results for the alternate staging sequence for Scenario 2 are shown in Table 4-16 and they show that the junction would operate within capacity during both the peak hours.

4.3.47 The cost to implement the improvement at 1050 is estimated to be £460,987. This does not include land take costs.

Table 4-16: 1050 - Abbey Road/Hollow Lane/Hawcoat Lane Improvement, Peds every other cycle, Linsig Results

Arm	Turn	2031 S2 AM		2031 S2 PM	
		DOS	MMQ	DOS	MMQ
Abbey Road North	L	3.5%	0.4	9.2%	1.4
	A	85.1%	19.9	39.3%	8.4
	R	31.5%	1.6	82.2%	8.7
Hollow Lane	L, A	72.8%	7.6	71.6%	8.0
	R	83.0%	11.6	82.1%	8.0
Abbey Road South	L	12.6%	1.6	4.7%	0.7
	A	55.4%	10.0	68.6%	17.6
	R	2.4%	0.1	6.5%	0.5
Hawcoat Lane	L, A	60.6%	6.2	63.1%	6.6
	R	85.1%	12.2	75.1%	6.7
Maximum DoS		**85.1%**		**82.2%**	

1100 - ABBEY ROAD / RAWLINSON STREET / HOLKER STREET

4.3.48 Figure 4-16 shows the location for node **1100 – Abbey Road / Rawlinson Street / Holker Street** along with the arms that operate over capacity. The junction modelling results are shown in Table 4-17.

Figure 4-16: 1100 - Abbey Road / Rawlinson Street / Holker Street Existing Junction

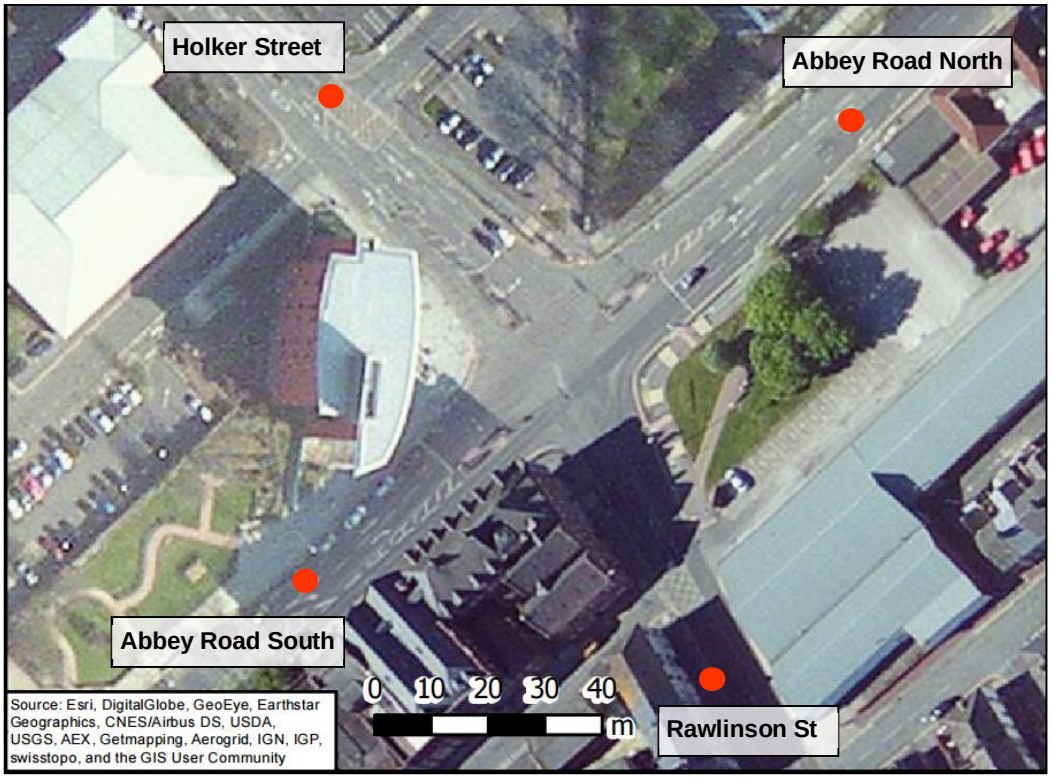


Table 4-17: 1100 - Abbey Road / Rawlinson Street / Holker Street Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
Abbey Road North	L, A	102.5%	59.7	107.2%	81.7	69.5%	13.9	71.5%	14.8
	R	75.0%	5.8	71.1%	5.3	33.3%	2.1	24.4%	1.5
Rawlinson Street	L, A, R	100.7%	25.6	103.0%	26.9	110.6%	58.1	111.6%	57.9
Abbey Road South	L	3.2%	0.5	3.2%	0.5	5.5%	0.8	5.8%	0.9
	A, R	61.4%	13.2	63.3%	13.7	113.0%	89.6	115.6%	101.0
Holker Street	L	28.7%	3.4	31.7%	3.9	53.1%	6.1	57.5%	6.1
	A, R	85.5%	9.7	94.0%	13.6	76.9%	6.3	115.3%	25.0
Max DoS		**102.5%**		**107.2%**		**113.0%**		**115.6%**	

4.3.49 All scenarios modelled are over capacity, timings have been optimised for a 120 cycle time. All stages are run to serve both traffic and pedestrian demands. Given the level of over capacity at this junction, a junction improvement scheme would have to be undertaken to solve the capacity issues.

POTENTIAL IMPROVEMENT, 1100

4.3.50 A potential improvement at this junction could comprise local widening on Rawlinson Street and addition of staggered pedestrian crossing across this arm. Additionally, through detailed design, measures to remove illegal on street loading/parking could be incorporated. The junction layout is shown in Drawing No. DR_1100 included in Appendix E.

RESULTS AFTER IMPROVEMENT, 1100

4.3.51 The improvement was assessed for Local Plan traffic and Table 4-18 shows the results.

Table 4-18: Abbey Road/ Rawlinson Street/Holker Street Improvement, Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
Abbey Road North	L, A	95.2%	34.7	99.6%	46.5	70.0%	13.0	70.9%	13.8
	R	77.5%	6.0	73.5%	5.4	34.5%	2.1	25.3%	1.5
Rawlinson Street	L, A, R	94.9%	18.9	95.1%	19.3	106.7%	43.0	103.6%	34.8
Abbey Road South	L, A	27.3%	5.1	30.7%	5.8	109.4%	66.7	102.0%	42.9
	R	32.9%	5.6	37.6%	5.2	94.8%	10.0	94.8%	10.4
Holker Street	L	48.9%	4.1	52.9%	4.7	73.2%	7.2	78.0%	7.4
	A, R	78.0%	8.8	85.7%	11.1	55.0%	5.0	80.0%	7.0
Max DoS		**94.9%**		**95.1%**		**109.4%**		**103.6%**	

4.3.52 The results in the above table correspond to a staging sequence that includes a dedicated all-red traffic stage when those pedestrian phases that are not 'walk-with-traffic' can operate. This all red traffic stage is called during every cycle.

4.3.53 An alternate staging sequence has been tested that calls the all-red traffic phase every other cycle. This is to determine the capacity benefit that could be achieved if pedestrian demand is not present during every cycle. The results for the alternate staging sequence for Scenario 2 are shown in Table 4-19 and they show that the junction would operate within capacity during both the peak hours.

Table 4-19: Abbey Road/ Rawlinson Street/Holker Street Improvement, Linsig Results

Arm	Turn	2031 S2 AM		2031 S2 PM	
		DoS	MMQ	DoS	MMQ
Abbey Road North	L, A	90.6%	32.1	74.8%	16.4
	R	88.2%	11.2	22.5%	1.5
Rawlinson Street	L, A, R	90.0%	16.8	86.1%	15.2
Abbey Road South	L, A	31.2%	6.3	86.2%	22.1
	R	60.7%	4.9	85.5%	8.2
Holker Street	L	50.1%	4.6	52.0%	5.8
	A, R	81.5%	10.5	54.2%	5.7
Max DoS		**90.6%**		**86.2%**	

4.3.54 Table 4-19 shows that by calling the all-red stage once every other cycle, the junction would operate with a DoS of less than 100% during both peak hours.

4.3.55 The cost to implement the assessed improvement at 1100 is estimated to be £140,124. This does not include land take costs.

1490 - A5087 ROOSE RD / RISEDALE RD

MODELLING RESULTS, 1490

4.3.56 Figure 4-17 shows the location for node **1490 – Abbey Road / Rawlinson Street / Holker Street** along with the arms that operate over capacity. The junction modelling results are shown in Table 4-23.

Figure 4-17: 1490 - A5087 Roose Rd / Risedale Rd Existing Junction

Table 4-20: 1490 - A5087 Roose Rd / Risedale Rd Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S2 PM		2031 S2 PM	
		DOS	MMQ	DOS	MMQ	DOS	MMQ	DOS	MMQ
Roose Road E	A, R	87.3%	30.3	108.9%	86.5	101.7%	23.1	105.9%	84.8
Risedale Rd	L, R	84.8%	10.0	107.9%	28.8	100.4%	17.8	101.3%	18.8
Roose Road W	L, A	44.1%	7.7	58.3%	12.1	105.0%	79.8	105.0%	35.8
DoS		87.3%		108.9%		105.0%		105.9%	

4.3.57 In the Base AM scenario the junction is close to capacity with the rest of the scenarios running well over capacity. The operation is simple 3 stage operation where pedestrian movements are run every cycle. The cycle time is set to 120 seconds. Physical changes would need to be applied to resolve the capacity issues at this junction.

POTENTIAL IMPROVEMENT , 1490

4.3.58 The current junction layout includes straight pedestrian crossings across all arms of the junction. An all red traffic stage has to be called within the staging sequence for the pedestrian stage to be operational. This results in wastage of green times at the junction, this reducing its capacity.

4.3.59 A potential improvement at this junction could comprise local widening to include staggered pedestrian crossings on Roose Road West and Risedale Road arms. This would allow for pedestrians to cross these two arms via a 'walk with traffic' phase.

4.3.60 The pedestrian crossing on Roose Road East arm, which is a straight crossing without any islands, could be called only when there is pedestrian demand. To reflect this in the model, this pedestrian phase is included in every other cycle in the staging sequence. The left turn filter from Roose Road West can operate along with this pedestrian phase as they do not conflict with each other.

4.3.61 The junction improvement is shown in Drawing No. DR_1490 included in Appendix E. Results from the LINSIG analysis of the proposed improvement are shown in Table 4-21.

RESULTS AFTER IMPROVEMENT, 1490

Table 4-21: 1490 - A5087 Roose Rd / Risedale Rd Improvement Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S2 PM		2031 S2 PM	
		DOS	MMQ	DOS	MMQ	DOS	MMQ	DOS	MMQ
Roose Road E	A, R	72.9%	23.3	83.4%	32.4	75.7%	9.4	80.5%	12.4
Risedale Rd	L	27.3%	2.1	52.1%	4.4	87.3%	9.7	89.2%	10.4
	R	72.8%	6.8	83.5%	9.0	33.8%	2.8	37.1%	3.1
Roose Road W	L, A	37.7%	6.4	48.8%	9.7	88.8%	37.4	89.1%	37.4
DoS		**72.9%**		**83.5%**		**88.8%**		**89.2%**	

4.3.62 Table 4-21 shows that with the proposed improvement in place, the junction would operate with a DoS of less than 100% during both peak hours.

4.3.63 The cost to implement the proposed improvement at 1490 is estimate to be £334,309. This does not include land take costs.

JUNCTION 1530- HOLBECK ROAD/LEECE LANE

MODELLING RESULTS, 1530

4.3.64 Figure 4-18 shows the location for node **1530 – Holbeck Road / Leece Lane** along with the arm that operates over capacity. The junction modelling results are shown in Table 4-22.

Figure 4-18: 1530 - Holbeck Road/Leece Lane Existing Junction

Table 4-22: 1530 - Holbeck Road/Leece Lane Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Holbeck Road	L, R	1.14	49.82	1.17	55.70	0.72	2.52	0.97	12.57
Leece Lane E	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum RFC		**1.14**		**1.17**		**0.72**		**0.97**	

4.3.65 The table shows that Holbeck Road would operate over capacity in the AM peak in 2031.

PROPOSED JUNCTION IMPROVEMENT, 1530

4.3.66 A review of the turning movements at this junction indicates that the main flow is between Leece Lane South and Holbeck Road in both directions. As such, a potential improvement at this junction would be to change the priority at the junction, with Leece Lane East as the minor road.

4.3.67 The junction layout for the proposed change in priority is shown in Drawing No. DR_1530 included in Appendix E.

RESULTS AFTER IMPROVEMENT, 1530

4.3.68 Table 4-23 shows the results for the change of priority improvement at **1530 – Holbeck Road / Leece Lane** junction.

Table 4-23: 1530 - Holbeck Road/Leece Lane Improvement Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Leece Lane East	L, R	0.00	0.00	0.21	0.26	0.00	0.00	0.04	0.04
Leece Lane South	R	0.00	0.00	0.05	0.07	0.02	0.02	0.32	0.98
Maximum RFC		**0.00**		**0.21**		**0.02**		**0.32**	

4.3.69 The table shows that with the change in priority, the junction would operate well within capacity in all scenarios in 2031.

4.3.70 The improvement can initially be tested on location as a temporary measure using traffic cones as a sense check on the turning movements to see whether a permanent scheme is warranted. Appropriate measures to deliver pedestrian safety at the junction could be incorporated within the improvement.

4.3.71 The cost to implement the proposed improvement at 1530 is estimated to be £30,687. This does not include land take costs.

1910 – A590 NORTH ROAD/BRIDGE ROAD

MODELLING RESULTS

4.3.73 Figure 4-19 shows the location for node **1910 – A590 North Road / Bridge Road / Jubilee Bridge** along with the arms that are approaching capacity or operate over capacity. The junction modelling results are shown in Table 4-24.

Figure 4-19: 1910 - A590 North Road/Bridge Road Existing Junction

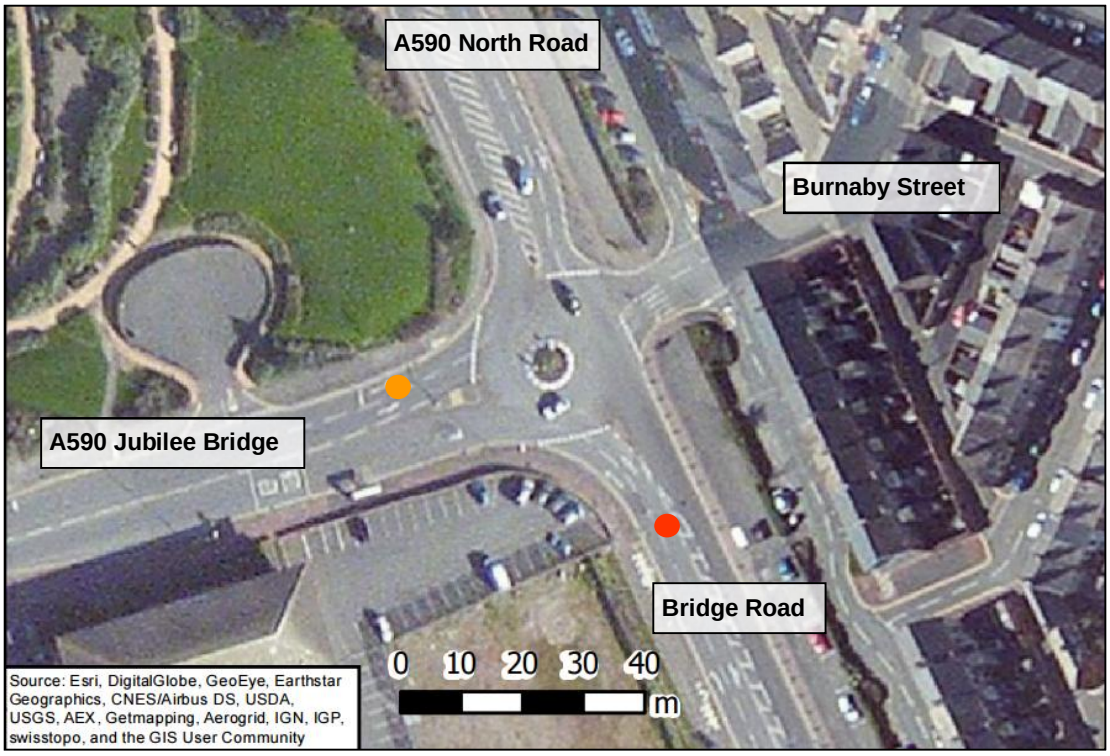


Table 4-24: 1910 - A590 North Road/Bridge Road Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Burnaby Street	L,A,R	0.07	0.07	0.03	0.03	0.06	0.07	0.03	0.03
Bridge Road (S)	L,A,R	0.39	0.63	0.48	0.93	1.08	68.19	1.17	128.77
Jubilee Bridge	L,A,R	0.93	11.42	0.97	18.18	0.65	1.80	0.72	2.53
A590 North Road	L,A,R	0.50	0.99	0.52	1.06	0.54	1.16	0.56	1.28
Maximum RFC		**0.93**		**0.97**		**1.08**		**1.17**	

4.3.74 The table shows that junction operates nearly at capacity in both AM peak scenarios. The Jubilee Bridge approach shows signs of saturation as traffic from Walney Island travels to Barrow in the AM.

4.3.75 Similarly in the PM peak, is it Bridge Road (S) approach that operates over capacity. This is primarily due to giving way to the heavy right turn flow from A590 North Road of traffic travelling back to Walney island.

POTENTIAL IMPROVEMENT, 1910

4.3.76 The modelling shows that there is a need for an improvement to the existing junction to address the impact of increased traffic in 2031. Incorporated with any improvements should also be provision for non-motorised users.

4.3.77 The capacity benefits of an upgrade to this junction have been assessed for Scenario 2 traffic flows and Table 4.25 shows the results.

Table 4-25: 1910 A590 North Road Road Upgraded Junction Results

Arm	Lane Group	2031 S1 AM		2031 S2 AM	
		DoS	Queue	DoS	Queue
Bridge Street	L	69.7%	7.7	87.3%	22.6
	L,A	85.5%	11.6	85.4%	18.1
Jubilee Bridge	L	86.1%	28.8	86.8%	20.9
	L,R	76.9%	13.6	84.0%	10.5
A590 North	A,R	66.9%	8.7	79.6%	12.2
	R	46.2%	6.4	69.6%	10.6
Maximum DoS		**87.3%**		**86.1%**	

4.3.78 While there are deliverable solutions for this location; the identification of the most effective approach will be subject to ongoing consideration. The indicative costs for such an improvement could lie in the range £750,000 to £1,250,000

2010 - A590 JUBILEE BRIDGE/PROMENADE/CENTRAL DRIVE

MODELLING RESULTS

4.3.79 Figure 4-20 shows the location for node **2010 – A590 Jubilee Bridge / Promenade / Central Drive** along with the arms that operate over capacity. The junction modelling results are shown in Figure 4-20.

Figure 4-20: 2010 A590 Jubilee Bridge/Promenade/Central Drive Location and Description

Table 4-26 2010, A590 Jubilee Bridge / Promenade / Central Drive Linsig Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		DOS	MMQ	DOS	MMQ	DOS	MMQ	DOS	MMQ
Promenade North	L, A, R	113.8%	69.6	119.7%	103.2	34.2%	5.3	44.4%	7.5
Jubilee Bridge	L, A	74.1%	18.8	66.4%	16.6	99.4%	44.5	103.0%	57.1
	R	28.7%	3.8	27.0%	4.1	87.6%	20.7	88.5%	21.6
Promenade South	L, A, R	110.0%	38.0	116.1%	35.1	97.8%	20.0	104.0%	28.0
Central Drive	L, A, R	114.4%	55.3	116.5%	62.3	67.3%	10.7	77.9%	11.9
Maximum DoS		**114.4%**		**119.7%**		**99.4%**		**104.0%**	

4.3.80 The results for the existing junction show that the junction would operate over capacity in all 2031 scenarios. The operation includes all 5 stages including an 'all-red' traffic phase for pedestrian demands. The cycle time for all scenarios is running at 120 seconds as per the controller specification. The queue lengths are extensive due to the junction performing over capacity.

4.3.81 A sensitivity test was undertaken to determine any capacity benefits if the pedestrian stage was called every other cycle. The results of this test are shown in Table 4-27 and they show that the junction would still operate over capacity.

Table 4-27: 2010 A590 Jubilee Bridge / Promenade / Central Drive, Peds in every other cycle, Linsig Results

Arm	Turn	2031 S2 AM		2031 S2 PM	
		DOS	MMQ	DOS	MMQ
Promenade North	L, A, R	105.9%	68.4	42.5%	7.5
Jubilee Bridge	L, A	58.6%	15.4	92.0%	40.6
	R	23.3%	4.0	79.4%	20.3
Promenade South	L, A, R	103.8%	30.6	91.9%	26.3
Central Drive	L, A, R	105.6%	42.0	64.3%	10.9
Maximum DoS		**105.9%**		**92.0%**	

4.3.82 The junction analyses for the A590 Jubilee Bridge / Promenade / Central Drive junction indicates that physical improvements are required at the junction.

PROPOSED JUNCTION IMPROVEMENT

4.3.83 Currently, there is a single lane exit on Jubilee Bridge, and during the AM peak this acts as a pinch point at the junction by restricting the exit capacity for traffic from Walney Island towards Barrow. An initial assessment of potential improvements for this junction indicated that the junction layout would require two exit lanes on the Jubilee Bridge approach to operate within capacity.

4.3.84 With the constraint on the Jubilee Bridge exit, it is recommended to implement the upgrades with links to the wider UTC in Barrow to optimise demand responsive signals. Additional traffic management measures on Walney Island could be implemented to reduce vehicular demand.

4.3.85 It is therefore important that any proposed development on Walney Island should consider improving sustainable transport links between Walney Island and Barrow. As such, we have proposed an extension to the existing National Cycle route across Jubilee Bridge to the north of Walney Island where new housing development is proposed. This will seek to take advantage of Islands already relatively high proportion of cyclists, seeking to cross the bridge. The improved signals at this location, along with the improvement at the A590 North Road / Bridge Road junction, will deliver increased pedestrian capacity.

4.3.86 There is also the potential of using one of the footways across Walney Bridge for pedestrians amd other for cyclists.

3030- ABBEY ROAD/MARKET STREET

MODELLING RESULTS, 3030

4.3.87 Figure 4-21 shows the location for node **3030 – Market Street / Abbey Road** along with the arm that operate at or over capacity. The junction modelling results are shown in Table 4-28.

Figure 4-21: 3030 - Abbey Road/Market Street Location and Description

Table 4-28: 3030 - Abbey Road/Market Street Location and Description

Arm	Turn	2031 S1 Flows AM Peak		2031 S2 Flows AM Peak		2031 S1 Flows PM Peak		2031 S2 Flows PM Peak	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Abbey Road	L, R	1.35	102.08	1.39	92.80	1.13	34.19	1.30	68.20
Market Street W	R	0.07	0.09	0.19	0.27	0.20	0.30	0.30	0.53
Maximum RFC		**1.35**		**1.39**		**1.13**		**1.30**	

4.3.88 The table shows that Abbey Road would operate over capacity in all scenarios in 2031.

PROPOSED JUNCTION IMPROVEMENT, 3030

4.3.89 A review of the turning movements at this junction indicates that the main flow, in both directions, is between Abbey Road and Market Street East. This is likely due to the fact that majority of the residential area of Dalton, as well as Dalton train station, is to the east of Abbey Lane. As such, a potential improvement at this junction would be change of priority with Market Street West as the minor road, and Abbey Road and Market Street East as the through major road.

4.3.90 Furthermore, there is a distinct difference in road character between Abbey Road as it approaches the junction and Market Street with its narrow width and frontage accesses to a number of properties. Therefore, it is important that the potential improvement incorporates traffic calming measures on Abbey Road.

4.3.91 The junction layout for the proposed change in priority is shown in Drawing No. DR_3030 included in Appendix E.

RESULTS AFTER IMPROVEMENT, 3030

4.3.92 Table 4-29 shows the results for the change of priority improvement at **3030 – Market Street / Abbey Road** junction.

Table 4-29: 3030 - Abbey Road/Market Street Improvement Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Market Street (West)	L, R	0.19	0.24	0.41	0.69	0.44	0.78	0.63	1.66
Market Street (East)	R	0.10	0.13	0.43	0.93	0.10	0.13	0.14	0.18
Maximum RFC		**0.19**		**0.43**		**0.44**		**0.63**	

4.3.93 The table shows that with the change in priority, the junction would operate well within capacity in all scenarios in 2031.

4.3.94 The improvement can initially be tested on location as a temporary measure using traffic cones as a sense check on the turning movements to see whether a permanent scheme is warranted.

4.3.95 The cost to implement this improvement at 3030 is estimated to be £48,928. This does not include land take costs.

JUNCTION 3060- LONG LANE/NEWTON ROAD

MODELLING RESULTS, 3060

4.3.96 Figure 4-22 shows the location for node **3060 – Long Lane / Newton Road** along with the arms that are either approaching capacity or operate over capacity. The junction modelling results are shown in Table 4-30.

Figure 4-22: 3060 - Long Lane/Newton Road Existing Junction

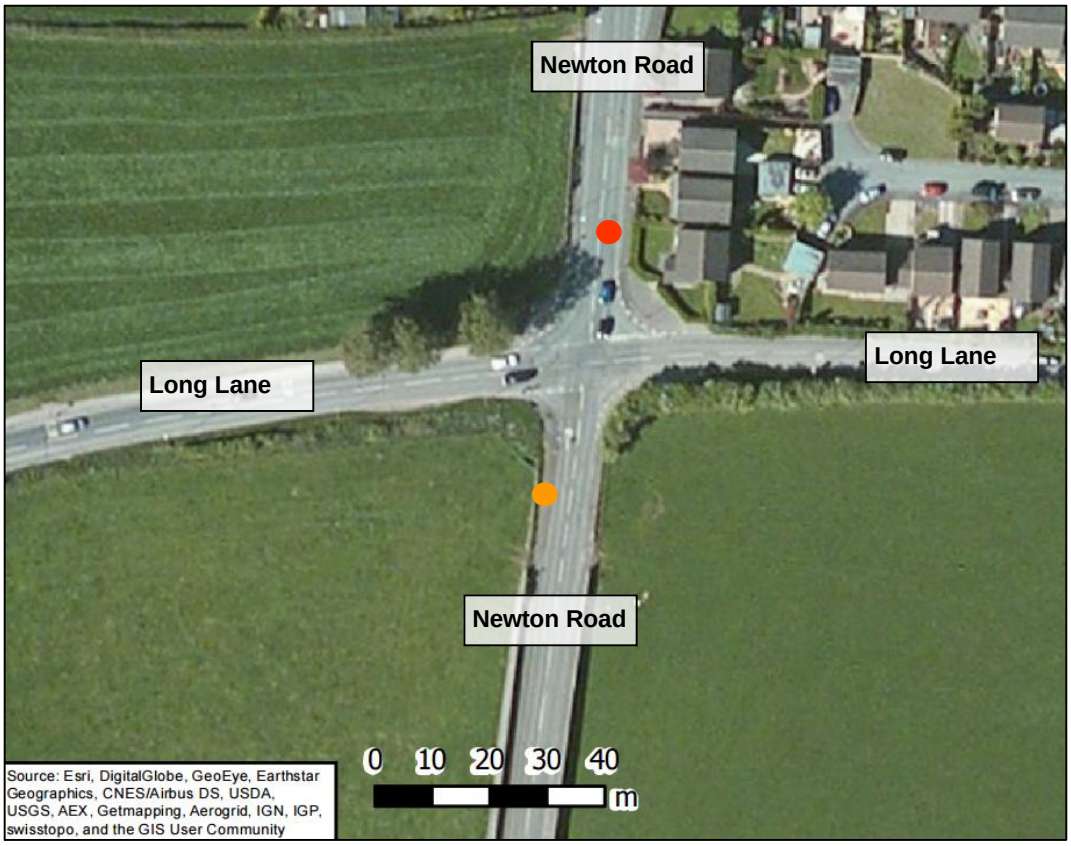


Table 4-30: 3060 - Long Lane/ Newton Road Junctions 8 Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Long Lane E	R	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Newton Road S	L, A, R	0.76	2.90	0.98	11.90	0.75	2.78	0.88	5.51
Long Lane W	R	0.02	0.02	0.03	0.04	0.02	0.02	0.32	0.71
Newton Road N	L, A, R	1.03	20.8	1.07	26.84	1.10	32.39	1.05	21.08
Maximum RFC		**1.03**		**1.07**		**1.10**		**1.05**	

4.3.97 The table shows that the junction would operate over capacity in all scenarios in 2031. Newton Lane north approach would be oversaturated in all scenarios which is indicated by the RFC greater than 1.00

POTENTIAL IMPROVEMENT

4.3.98 A potential improvement at this location would be a new roundabout layout. Drawing No. DR_3060 included in Appendix E shows the proposed layout.

4.3.99 The roundabout layout was assessed for capacity in Junctions 8 and the results are shown in Table 4-31. The entry lane simulation within Junction 8 was utilised to model the roundabout due to the unequal lane usage on three out of the four approaches.

Table 4-31: 3060 - Long Lane/ Newton Road Improvement Results

Arm	Turn	2031 S1 AM		2031 S2 AM		2031 S1 PM		2031 S2 PM	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Long Lane E	L, A, R	0.369	0.57	0.196	0.16	0.088	0.06	0.196	0.20
Newton Road S	L, A	0.430	0.51	0.392	0.46	0.358	0.39	0.443	0.56
	R	0.306	0.33	0.504	0.71	0.260	0.27	0.247	0.21
Long Lane W	L	0.491	0.67	0.476	0.68	0.700	1.29	0.583	0.94
	A,R	0.166	0.13	0.262	0.24	0.285	0.28	0.530	0.85
Newton Road N	L,A	0.484	0.73	0.590	1.05	0.398	0.42	0.270	0.29
	R	0.839	1.90	0.810	1.76	0.485	0.55	0.527	0.71
Maximum RFC		**0.839**		**0.810**		**0.700**		**0.583**	

4.3.100 The table shows that with the new roundabout layout would operate within capacity in all scenarios in 2031.

4.3.101 The cost to implement the proposed improvement at 3060 is estimated to be £1,241,186.

5 INFRASTRUCTURE COST SUMMARY

5.1 SUSTAINABLE TRANSPORT INFRASTRUCTURE COSTS

5.1.1 Table 5-1 provides a list of proposed sustainable transport measures for cycle paths and their estimated costs, which have been calculated based upon figures supplied by Cumbria County Council and previous experience of designing similar schemes elsewhere in the country.

Table 5-1:Estimate Costs for Cycle Infrastructure

Proposed Lane ID	Location	Type	Length (m) (approximate)	Estimated Cost
1	Lesh Lane/Harrel Lane	On-road	1500	£21,600
2	Ainslie Street	On-road	750	£10,800
3	Park Road (East)	Off-road	1800	£360,000
4	Bank Lane/Rakesmoor Lane	On-road	2600	£37,440
5	Salthouse Road	On-road	650	£9,360
6	Greystone Lane/Station Road	On-road	1150	£16,560
7	Roose Road	On-road	1500	£21,600
8	Walney Island	On-road	1500	£21,600
		Off-road	700	£140,000
9	Dalton Lane/Ormsgill Lane	On-road	2500	£36,000
10	Barrow Road	On-road	2450	£35,280
11	Askam to Thwaite Flat	On-road	5000	£72,000
12	Leece Lane	On-Road	500	£7,200
		Off Road	500	£100,000
Total			**23,100**	**£889,440**

5.2 HIGHWAY INFRASTRUCTURE COSTS

5.2.1 A detailed cost estimate has been undertaken for each improvement. Appendix F shows the breakdown for the cost estimates.

5.2.2 The cost estimates' excludes any costs associated with land purchase. The estimates' include additional assumption for elements for each improvement such as;

- Overheads: (Supervision, Attendances, Engineering, HSE, Management etc.) + Profit
- Out of Out-of-Hours working costs
- Risk (Increased rate of materials, additional quantities, unforeseen changes)
- Statutory Undertaker Costs

5.2.3 Table 5-2 shows the cost summary for all improvement schemes.

Table 5-2: Highway Infrastructure Costs

JN ID	DESCRIPTION	IMPROVEMENT	TOTAL ESTIMATE	DRAWING NO
1180	A590 Park Road / Bank Lane	New roundabout layout	£1,210,293	Dr_1100
		New pedestrian crossing only	£91,743	
1190	A590 Park Road / Ormsgill	New roundabout layout	£1,119,002	Dr_1190
1210	A590 Walney Road / Phoenix road	New gyratory layout comprising A590 Walney Road, A590 Ironworks Road and Phoenix Road, including left in left out priority junctions	£253,078 (Resurfacing at junctions only)	Dr_1210
1220	A590 Walney Road / Wilkie Road			
1225	A590 Walney Road / Asda		£445,346 (Full resurfacing)	
1240	A590 Walney Road / Ironworks Road			
1980	A590 Ironworks Road / Phoenix Road			
1790	Risedale Road / Greengate Street	Signal crossroad layout	£901,621	Dr_1790
1800	Park Drive / Bridgegate Avenue /			
1050	Abbey Road / Hollow Lane	Junction widening on all arms	£460,987	Dr_1050
1100	Abbey Road / Rawlinson Street	New staggered ped crossing on Rawlinson Street arm	£140,124	Dr_1100
1490	A5087 Roose Road / Risedale Road	Junction widening and staggered pedestrian crossings	£334,309	Dr_1490
1530	Holbeck Road / Leece Lane	Change of priority	£30,687	Dr_1530
1910	A590 North Road / Bridge Road	Junction Improvement	£725k - £1.25m	Dr_1910
3030	Abbey Road / Markey Street	Change of priority	£48,928	Dr_3030
3060	Long Lane / Newton Road	New roundabout layout	£1,241,186	Dr_3060

5.2.4 The total construction cost of the highway improvements is estimated to be in the range estimate of £6.6m - £7.2m.. This assumes;

- the roundabout option for A590 Park Road / Bank Lane junction,
- higher of the two costs for the new gyratory system,
- and a range of £725k to £1.25m for potential improvement at A590 North Road / Bridge Road junction

5.2.5 Note that this does not include land take costs and so the overall cost of all improvements is likely to be higher than £7.2m.

5.3 SCHEME FUNDING

5.3.1 It is intended that funding for these schemes should be primarily be secured through developer funding mechanisms such as through Section 106 or 278 Agreements. The Planning Advisory Service (PAS) describes these as follows;

- **Section 106 agreements (or Planning Obligations):** are obligations secured pursuant to Section 106 of the Town and Country Planning Act 1990.They are entered into as legal agreements between local planning authorities, landowners, developers and potentially other affected third parties. They can impose financial and non-financial obligations on a person or persons with an interest in the land and become binding on that parcel of land. Planning obligations are used to make acceptable development which would otherwise be unacceptable in planning..
- **Section 278 agreement:** is an agreement between the Council and developer which describes proposed modifications to the existing highway network to facilitate or service a proposed development . It includes any off site works that are required to mitigate the impact of the development on the existing road network . Examples of works covered by this type of agreement could include roundabouts, signalised junctions, right turn lanes, safety related works such as traffic calming, street lighting, improved facilities for pedestrians and cyclist

5.3.2 Where there is a shortfall in developer funding, Cumbria County Council and Barrow Borough Council will work jointly to secure funding through other external sources such as the Cumbria Local Enterprise Partnership. Examples of external funding sources include:

- Department for Transport
- Cumbria Local Enterprise Partnership Funding
- Local Growth Fund
- European Regional Development Fund

6 CONCLUSIONS

6.1 SUMMARY

6.1.1 WSP | Parsons Brinckerhoff was commissioned by Cumbria County Council and Barrow Borough Council to undertake a transport improvements study for Barrow Borough.

6.1.2 The study report will form part of Barrow Borough Council's Local Plan evidence base and will specifically inform the Infrastructure Delivery Plan. It will be used by Barrow Borough Council to support the Local Plan through the Examination in Public.

6.1.3 This study consists of two key elements:

- Identification of potential sustainable transport improvements, with the target to increase modal share of walking, cycling and public transport trips in Barrow-in-Furness.
- Identification of potential highway/junction improvements to improve traffic network capacity

6.1.4 The above key elements are deliverables that are integral to unlocking future growth in Barrow Borough through the delivery of the specific development sites identified in the Barrow Borough Local Plan (2016–2031).

6.1.5 A key thrust of the vision underpinning the Local Plan is for Barrow to develop as a highly accessible, sustainable and healthy town. Consequently there is a strong desire to identify and pursue sustainable transport improvements both to help accommodate growth through reducing pressures on the highway network securing modal shift and through recognition of the wider benefits sustainable modes of travel can entail for the population.

6.1.6 A range of sustainable transport measures have been included in this report, specifically related to improvements to walking, cycling and public transport infrastructure. Enhancement to Travel Planning has also been recommended to maximise the benefits of the recommended infrastructure.

6.1.7 The junctions selected for review and redesign were selected in consultation with Cumbria County Council, based on outputs from the strategic SATURN model for Barrow-in-Furness, using criteria relating to junction operational performance.

6.1.8 A total of 17 junctions were selected with particular focus on junctions along A590, A5087 and Abbey Road corridors.

6.1.9 Traffic flow data for base and future years utilised the strategic traffic model, created and operated by Cumbria County Council.

6.1.10 Existing performance of the identified junctions was undertaken using industry standard junction modelling software, specifically LinSig and Junctions 8 (PICADY and ARCADY). These models presented information on existing junction capacity and queue lengths on each junction arm.

6.1.11 Where junctions were found to have capacity issues, potential junction improvements were identified with the intention of improving traffic flow on these arms without compromising the operation of the junction as a whole. Suggested improvements range from amending traffic signals and new junction layouts to improve traffic management through to the creation of additional road space to increase capacity.

6.1.12 These potential improvements were then remodelled to assess the capacity improvements.

6.1.13 Highway improvement and sustainable infrastructure schemes have all been listed with supplied estimated costs, based either on existing figures supplied by Cumbria County Council, past WSP | Parsons Brinckerhoff experience, or through review of other similar schemes in the UK.

6.2 DELIVERY OF INFRASTRUCTURE

6.2.1 This report identifies the potential measures that will help deliver Local Plan growth in Barrow Borough by providing extra capacity on the districts roads, more and better connected cycleways, and measures to improve sustainable transport to enhance people's journey quality, health, and improve travel choices.

6.2.2 There is no overall standard, statutory or prescribed process, or framework for seeking funding for a programme of infrastructure improvements such as that identified in this report. This is because in general, public and private sector funding tends to be attached to or associated with individual schemes which consider the costs and benefits of each scheme in isolation. Therefore a bespoke composite solution, promoted by one party, and delivered by many parties, for the specific programme of infrastructure improvements is the best compromise in the absence of any standard model.

6.2.3 Therefore, this study is limited to highlighting the need for highway improvement schemes over the plan period and to identifying the outline design and associated costs of these improvements. The report does not present a delivery model of how these schemes may be funded and constructed. However, It is likely that the following sources of funding would form part of a delivery model for any one of the schemes.

- Private developer Funding
- Cumbria Local Enterprise Partnership Funding
- Local Growth Fund
- European Regional Development Fund
- Department for Transport

6.3 CONCLUSIONS

6.3.1 The following conclusions have been drawn from the study as summarised above:

- A number of junctions in Barrow-in-Furness are operating at and above capacity, and without interventions traffic flows would be expected to worsen as Local Plan development is completed.
- There are a number of opportunities to enhance junction capacity at a number of pinch point junctions, through the redesign of junctions.
- Detailed junction modelling supports that proposed highway improvements are capable of enhancing capacity on the Barrow road network and therefore enabling future development growth.
- There are a number of opportunities to deliver improved sustainable transport infrastructure in Barrow. Barrow is a compact town that with further improvements can be made highly accessible for pedestrians, cyclists and public transport users.

6.3.2 It is anticipated that delivery of the recommended sustainable transport schemes can realistically achieve a 5% reduction in traffic across Barrow Borough, contributing to improved traffic flows and creating a more accessible, healthier living borough.

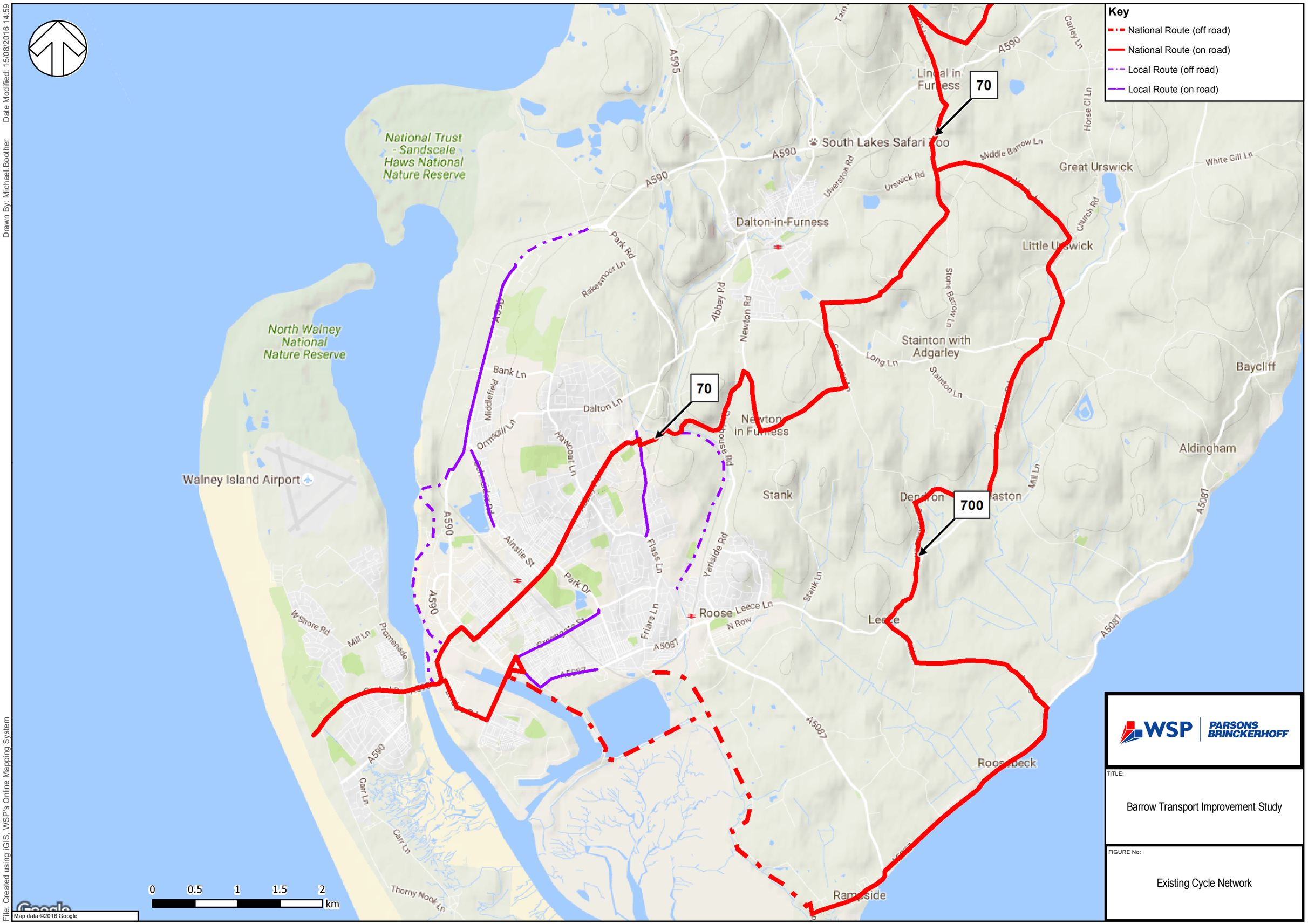
Appendix A

EXISTING CYCLE NETWORK

APPENDIX A-1

EXISTING CYCLE ROUTES

Drawn By: Michael.Boother Date Modified: 15/08/2016 14:59



File: Created using iGIS, WSP's Online Mapping System

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TITLE:

Barrow Transport Improvement Study

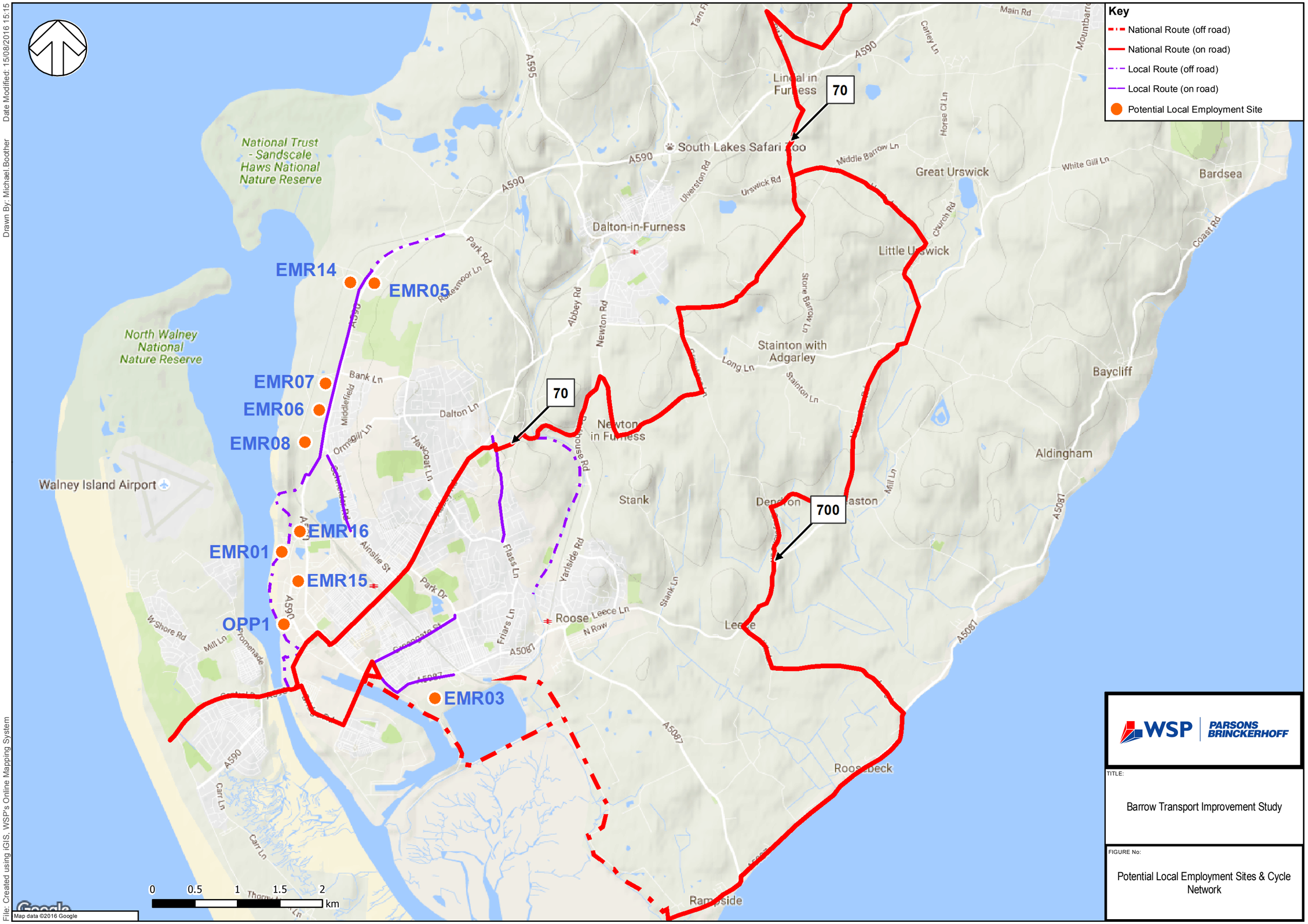
FIGURE No:

Existing Cycle Network

APPENDIX A-2

EXISTING CYCLE ROUTES & LOCAL PLAN EMPLOYMENT SITES

Drawn By: Michael.Boother Date Modified: 15/08/2016 15:15



File: Created using iGIS, WSP's Online Mapping System

WSP | PARSONS BRINCKERHOFF

TITLE:

Barrow Transport Improvement Study

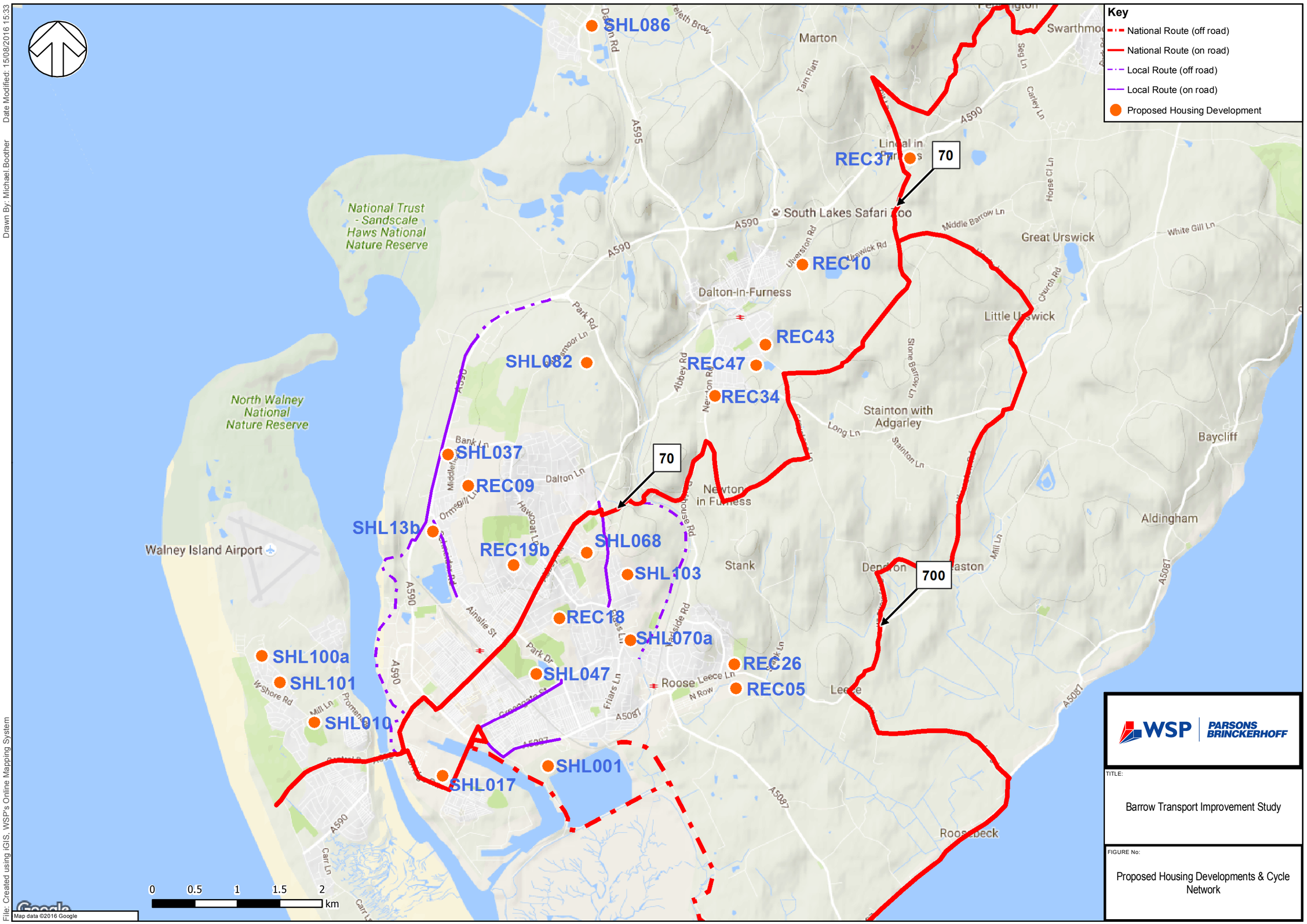
FIGURE No:

Potential Local Employment Sites & Cycle Network

APPENDIX A-3

EXISTING CYCLE ROUTES AND LOCAL PLAN HOUSING SITES

Drawn By: Michael.Boother Date Modified: 15/08/2016 15:33



File: Created using iGIS, WSP's Online Mapping System

WSP | PARSONS BRINCKERHOFF

TITLE:

Barrow Transport Improvement Study

FIGURE No:

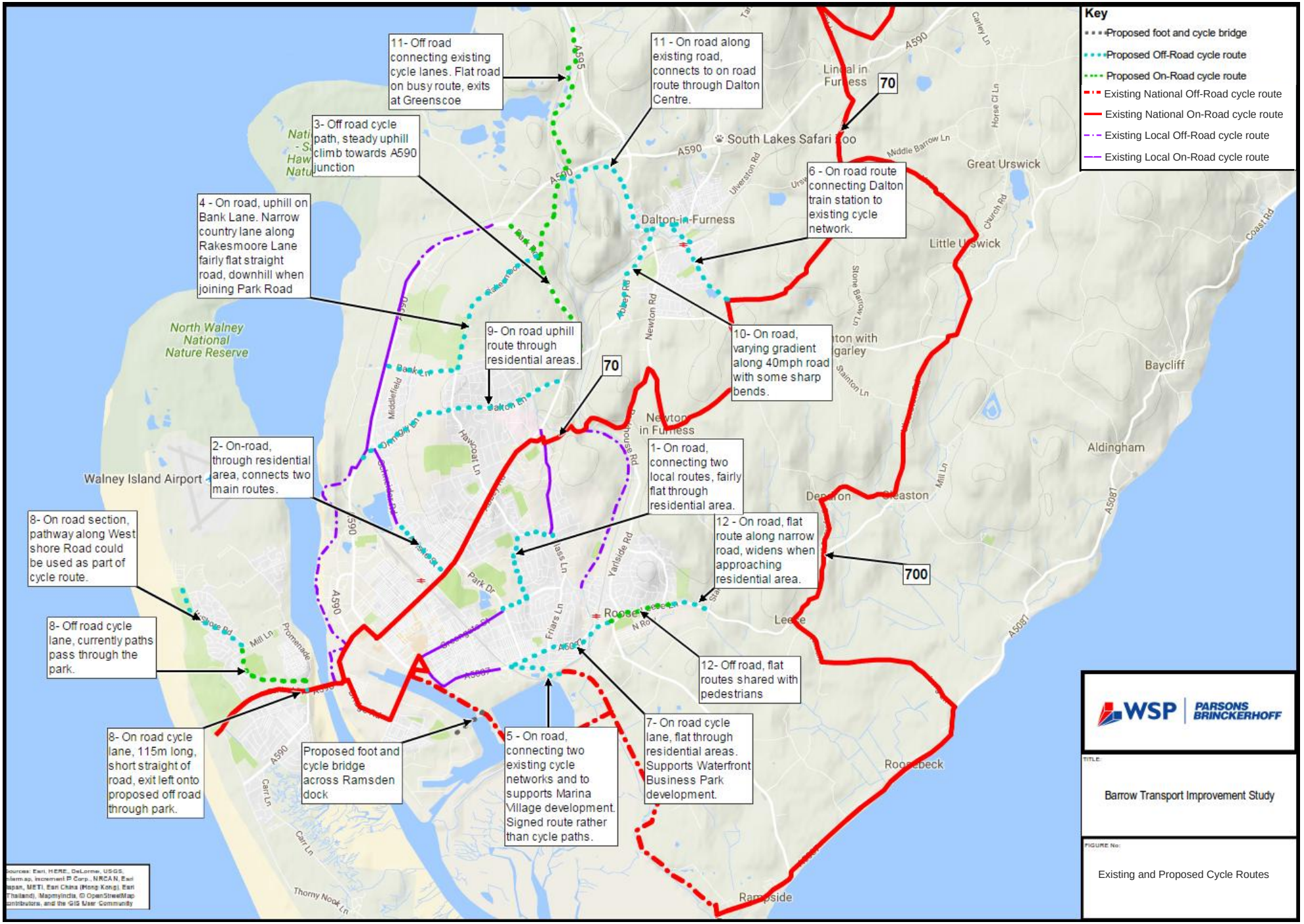
Proposed Housing Developments & Cycle Network

Appendix B

PROPOSED CYCLE NETWORK

APPENDIX B-1

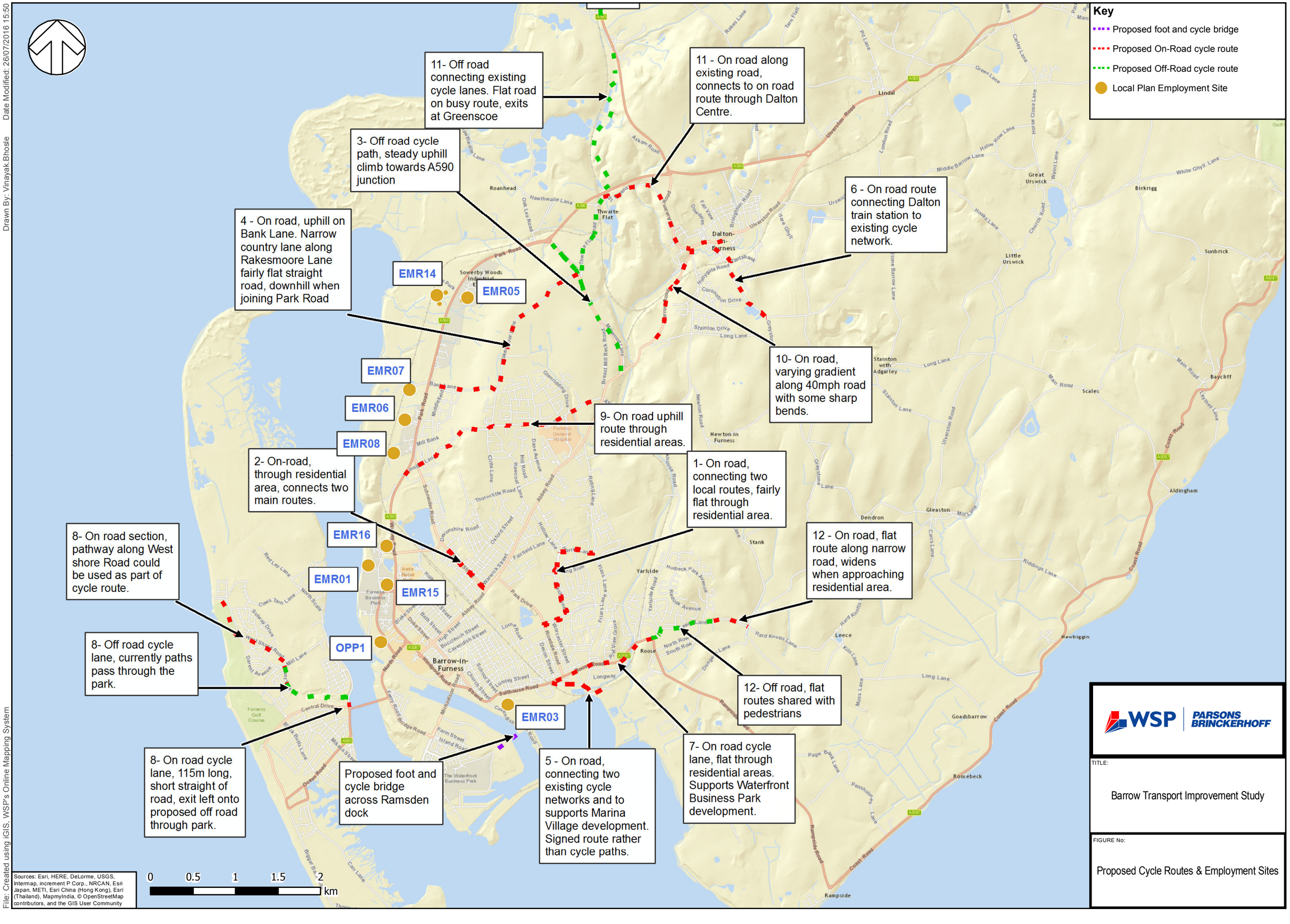
PROPOSED CYCLE ROUTES


Key
Proposed foot and cycle bridge
Proposed Off-Road cycle route
Proposed On-Road cycle route
Existing National Off-Road cycle route
Existing National On-Road cycle route
Existing Local Off-Road cycle route
Existing Local On-Road cycle route
11- Off road connecting existing cycle lanes. Flat road on busy route, exits at Greenscoe
11 - On road along existing road, connects to on road route through Dalton Centre.
3- Off road cycle path, steady uphill climb towards A590 junction
4 - On road, uphill on Bank Lane. Narrow country lane along Rakesmoore Lane fairly flat straight road, downhill when joining Park Road
6 - On road route connecting Dalton train station to existing cycle network.
9- On road uphill route through residential areas.
10- On road, varying gradient along 40mph road with some sharp bends.
2- On-road, through residential area, connects two main routes.
1- On road, connecting two local routes, fairly flat through residential area.
12 - On road, flat route along narrow road, widens when approaching residential area.
8- On road section, pathway along West shore Road could be used as part of cycle route.
8- Off road cycle lane, currently paths pass through the park.
12- Off road, flat routes shared with pedestrians
8- On road cycle lane, 115m long, short straight of road, exit left onto proposed off road through park.
Proposed foot and cycle bridge across Ramsden dock
5 - On road, connecting two existing cycle networks and to supports Marina Village development. Signed route rather than cycle paths.
7- On road cycle lane, flat through residential areas. Supports Waterfront Business Park development.
South Lakes Safari Zoo
Dalton-in-Furness
Great Urswick
Little Urswick
Newton in Furness
Walney Island Airport
North Walney National Nature Reserve
Baycliff
Aldingham
Leece
Roosebeck
Ramsside
WSP | PARSONS BRINCKERHOFF
TITLE:
Barrow Transport Improvement Study
FIGURE No:
Existing and Proposed Cycle Routes

APPENDIX B-2

PROPOSED CYCLE ROUTES & LOCAL PLAN EMPLOYMENT SITES

Drawn By: Vinayak.Bhosle Date Modified: 26/07/2016 15:50



File: Created using iGIS, WSP's Online Mapping System

WSP | PARSONS BRINCKERHOFF

TITLE:

Barrow Transport Improvement Study

FIGURE No:

Proposed Cycle Routes & Employment Sites

APPENDIX B-3

PROPOSED CYCLE ROUTES AND LOCAL PLAN HOUSING SITES

Drawn By: Vinayak.Bhosle Date Modified: 26/07/2016 15:13

Key

- Proposed foot and cycle bridge
- Proposed On-Road cycle route
- Proposed Off-Road cycle route
- Local Plan Housing Site

11- Off road connecting existing cycle lanes. Flat road on busy route, exits at Greenscoe

11 - On road along existing road, connects to on road route through Dalton Centre.

3- Off road cycle path, steady uphill climb towards A590 junction

4 - On road, uphill on Bank Lane. Narrow country lane along Rakesmoore Lane fairly flat straight road, downhill when joining Park Road

6 - On road route connecting Dalton train station to existing cycle network.

10- On road, varying gradient along 40mph road with some sharp bends.

9- On road uphill route through residential areas.

2- On-road, through residential area, connects two main routes.

1- On road, connecting two local routes, fairly flat through residential area.

8- On road section, pathway along West shore Road could be used as part of cycle route.

12 - On road, flat route along narrow road, widens when approaching residential area.

8- Off road cycle lane, currently paths pass through the park.

12- Off road, flat routes shared with pedestrians

8- On road cycle lane, 115m long, short straight of road, exit left onto proposed off road through park.

Proposed foot and cycle bridge across Ramsden dock

5 - On road, connecting two existing cycle networks and to supports Marina Village development. Signed route rather than cycle paths.

7- On road cycle lane, flat through residential areas. Supports Waterfront Business Park development.

REC37 REC10 REC43 REC47 REC34 SHL082 SHL037 REC09 SHL13b REC19b SHL068 SHL103 REC18 SHL047 SHL070a REC26 REC05 SHL100a SHL101 OPP1 SHL010 SHL001 SHL017

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

0 0.5 1 1.5 2 km

File: Created using iGIS, WSP's Online Mapping System

WSP | PARSONS BRINCKERHOFF

TITLE:

Barrow Transport Improvement Study

FIGURE No:

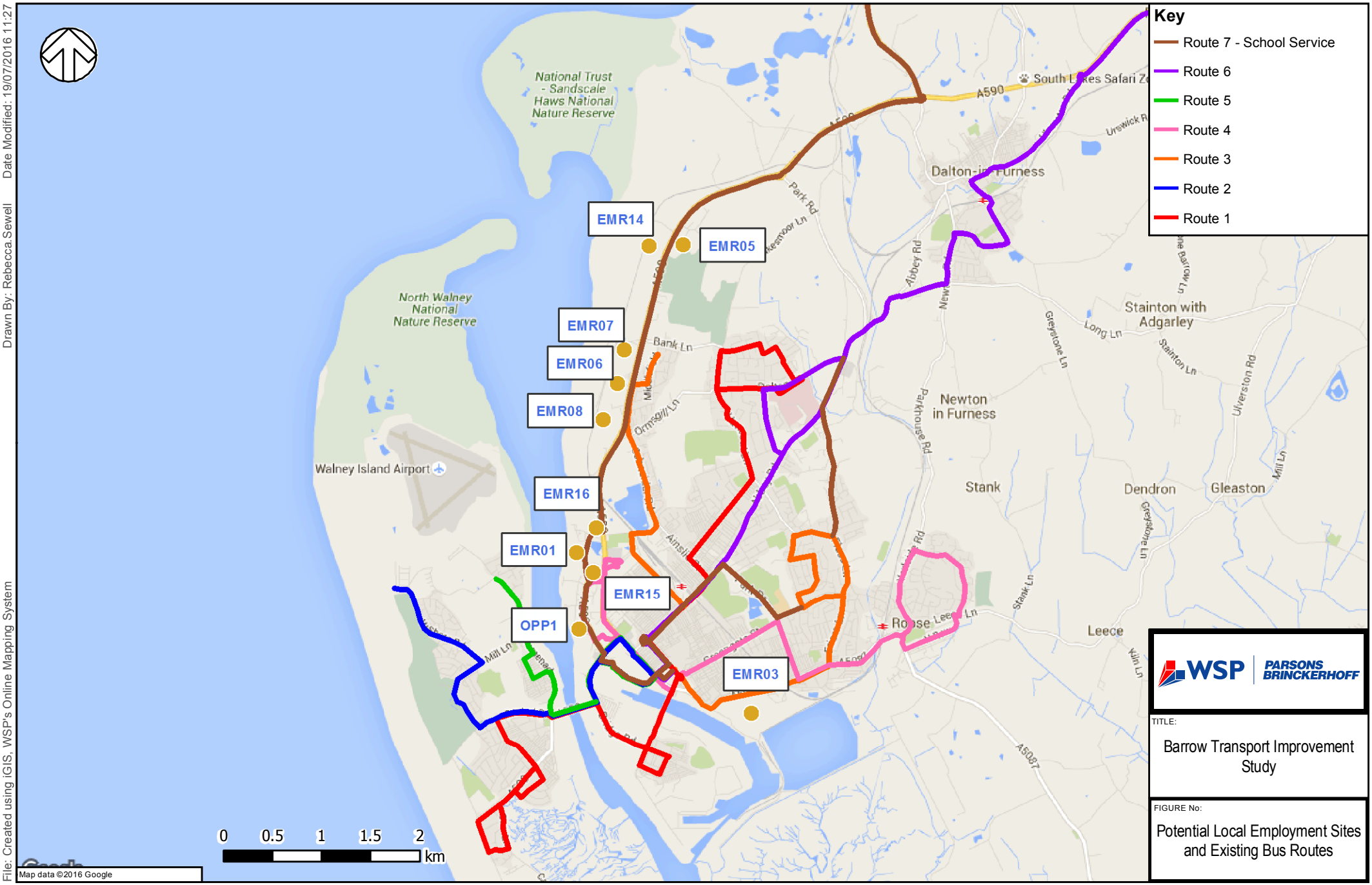
Proposed Cycle Routes & Housing Sites

Appendix C

EXISTING PUBLIC TRANSPORT PROVISION

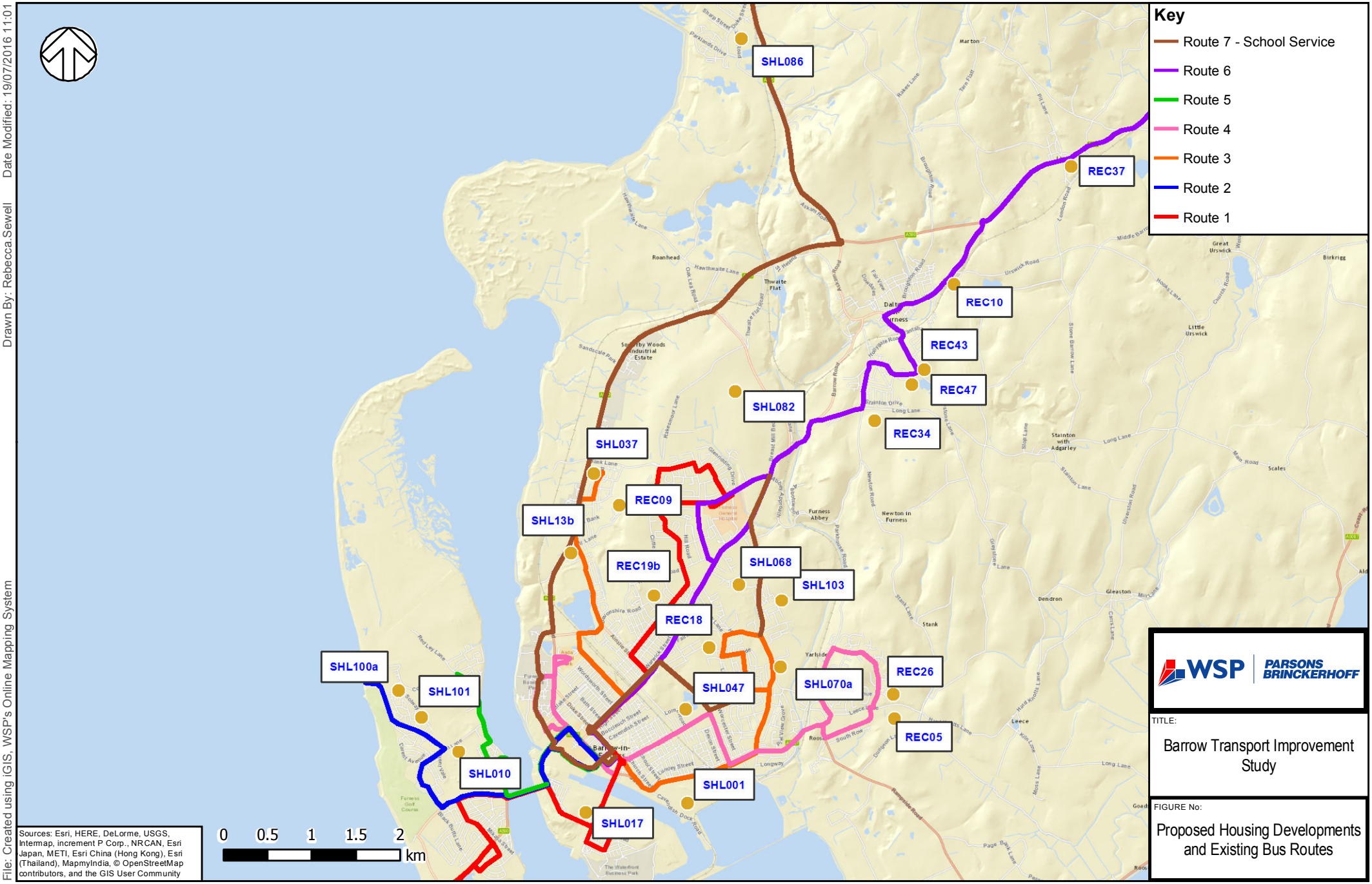
APPENDIX C-1

EXISTING BUS ROUTES & LOCAL PLAN EMPLOYMENT SITES


Key
Route 7 - School Service
Route 6
Route 5
Route 4
Route 3
Route 2
Route 1
EMR14
EMR05
EMR07
EMR06
EMR08
EMR16
EMR01
EMR15
OPP1
EMR03
National Trust - Sandscale Haws National Nature Reserve
North Walney National Nature Reserve
Walney Island Airport
Dalton-in-Furness
Newton in Furness
Stainton with Adgarley
Stank
Dendron
Gleaston
Leece
A590
A5087
0 0.5 1 1.5 2 km
Map data ©2016 Google
WSP | PARSONS BRINCKERHOFF
TITLE:
Barrow Transport Improvement Study
FIGURE No:
Potential Local Employment Sites and Existing Bus Routes
File: Created using iGIS, WSP's Online Mapping System
Drawn By: Rebecca.Sewell
Date Modified: 19/07/2016 11:27

APPENDIX C-2

EXISTING BUS ROUTES AND LOCAL PLAN HOUSING SITES

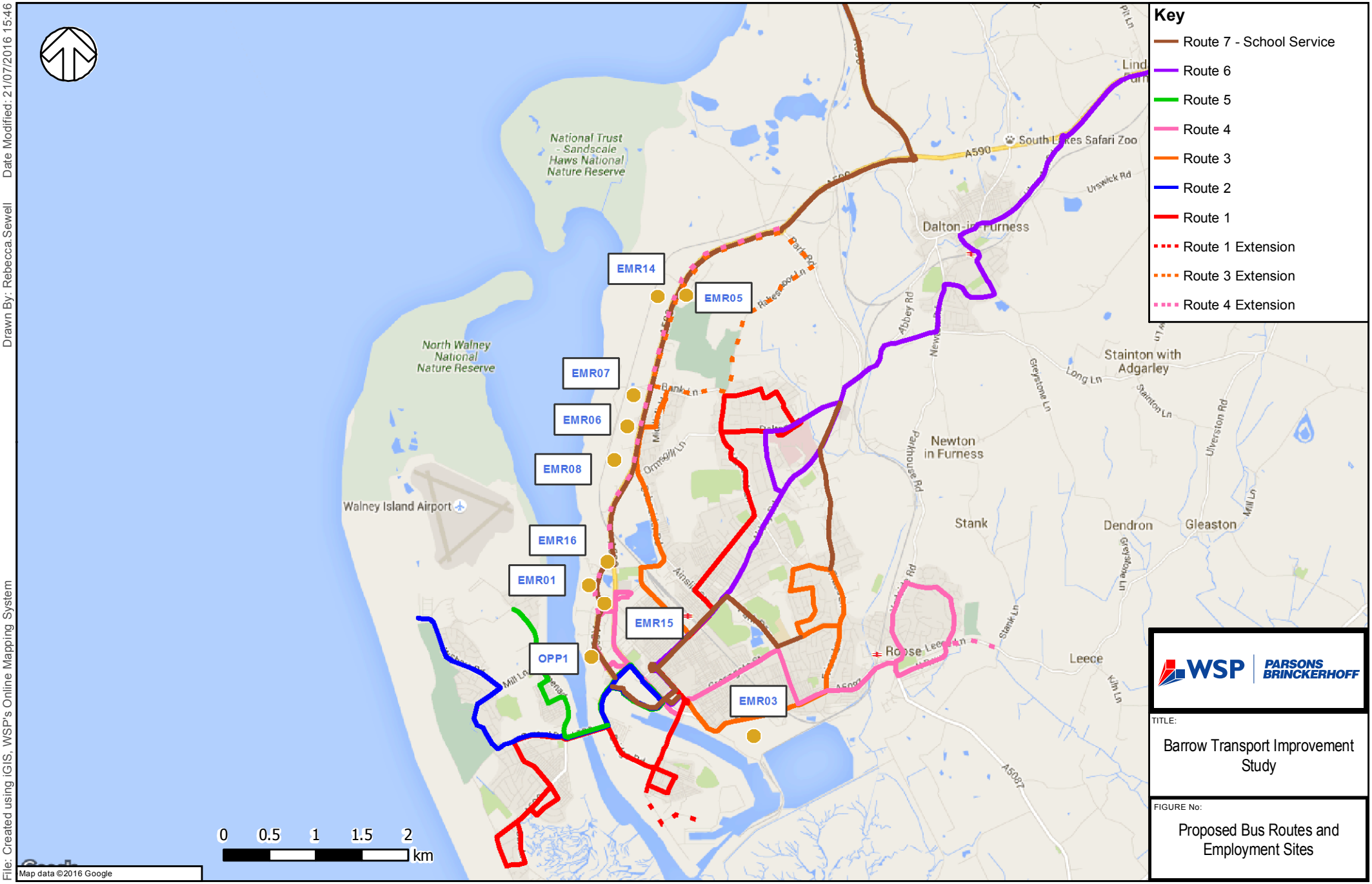

Key
Route 7 - School Service
Route 6
Route 5
Route 4
Route 3
Route 2
Route 1
SHL086
REC37
REC10
REC43
REC47
SHL082
REC34
SHL037
REC09
SHL13b
REC19b
SHL068
SHL103
REC18
SHL100a
SHL101
SHL047
SHL070a
REC26
REC05
SHL010
SHL001
SHL017
0 0.5 1 1.5 2
km
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
WSP | PARSONS BRINCKERHOFF
TITLE:
Barrow Transport Improvement Study
FIGURE No:
Proposed Housing Developments and Existing Bus Routes
File: Created using iGIS, WSP's Online Mapping System
Drawn By: Rebecca.Sewell
Date Modified: 19/07/2016 11:01

Appendix D

PROPOSED BUS ROUTES

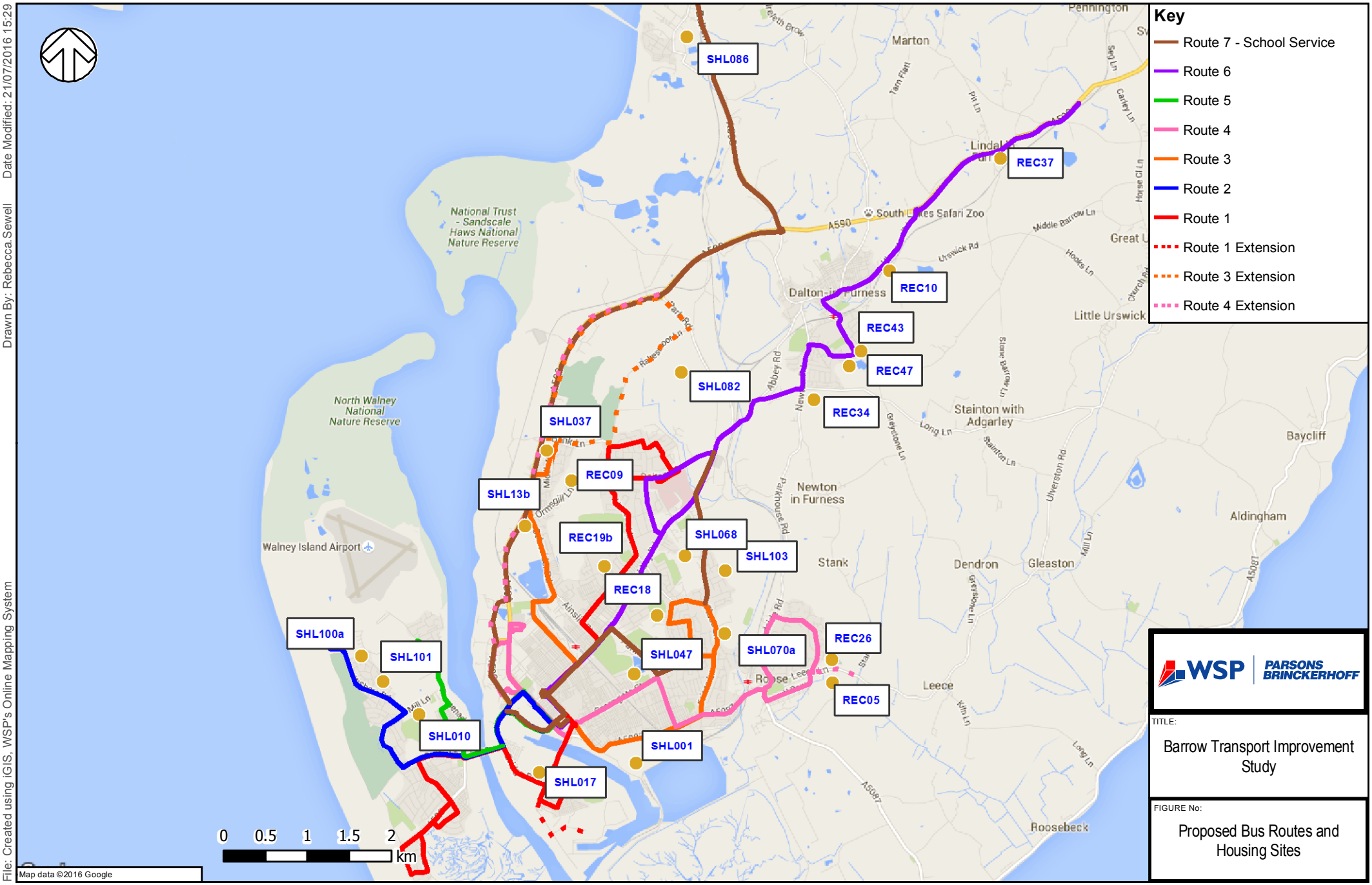
APPENDIX D-1

PROPOSED BUS ROUTES & LOCAL PLAN EMPLOYMENT SITES


Key
Route 7 - School Service
Route 6
Route 5
Route 4
Route 3
Route 2
Route 1
Route 1 Extension
Route 3 Extension
Route 4 Extension
EMR14
EMR05
EMR07
EMR06
EMR08
EMR16
EMR01
EMR15
OPP1
EMR03
National Trust - Sandscale Haws National Nature Reserve
North Walney National Nature Reserve
Walney Island Airport
South Lakes Safari Zoo
Dalton-in-Furness
Newton in Furness
Stainton with Adgarley
Stank
Dendron
Gleaston
Leece
A590
A5087
0 0.5 1 1.5 2 km
Map data ©2016 Google
WSP | PARSONS BRINCKERHOFF
TITLE:
Barrow Transport Improvement Study
FIGURE No:
Proposed Bus Routes and Employment Sites
Date Modified: 21/07/2016 15:46
Drawn By: Rebecca.Sewell
File: Created using iGIS, WSP's Online Mapping System

APPENDIX D-2

PROPOSED BUS ROUTES AND LOCAL PLAN HOUSING SITES



WSP | PARSONS BRINCKERHOFF

TITLE:

Barrow Transport Improvement Study

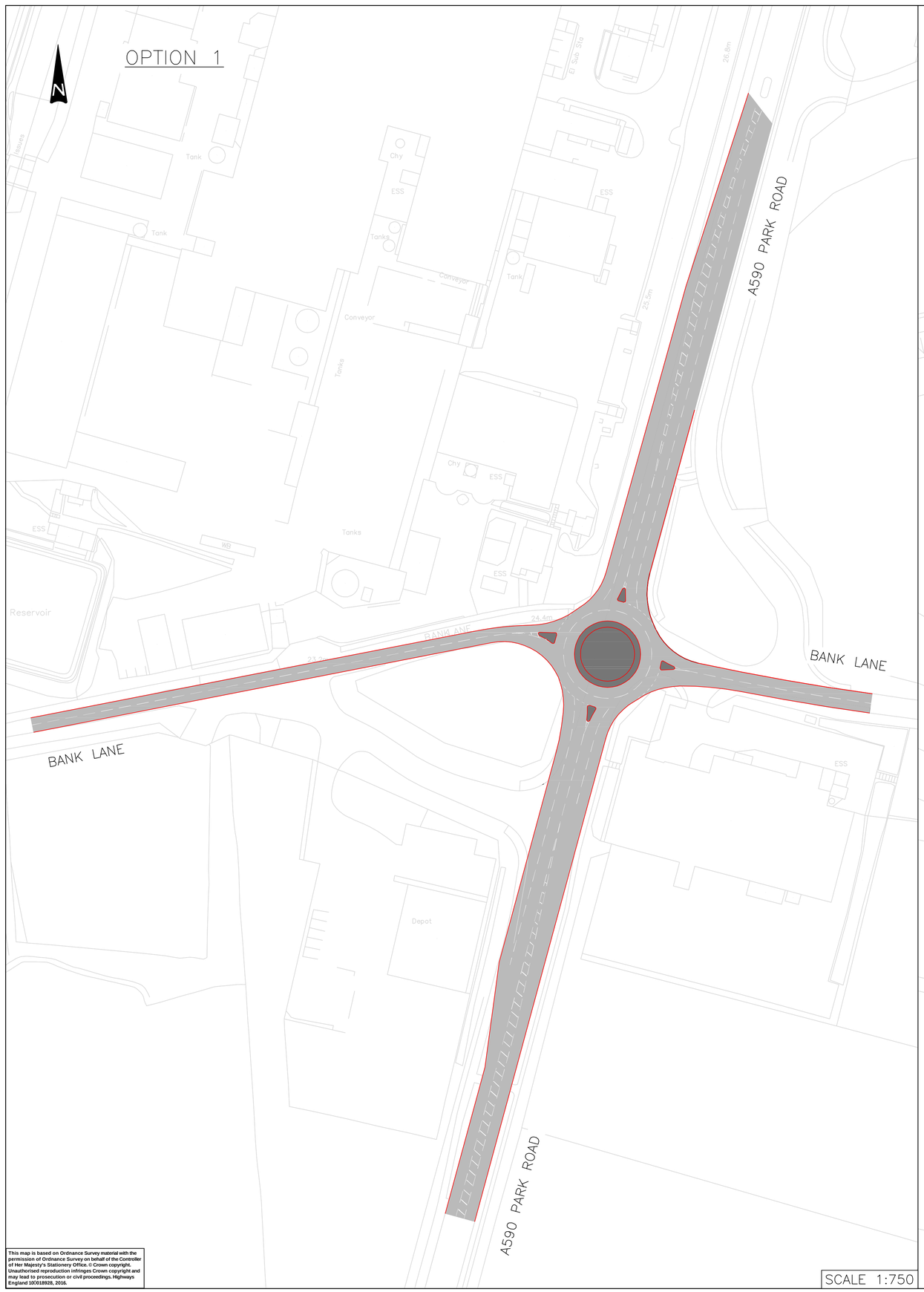
FIGURE No:

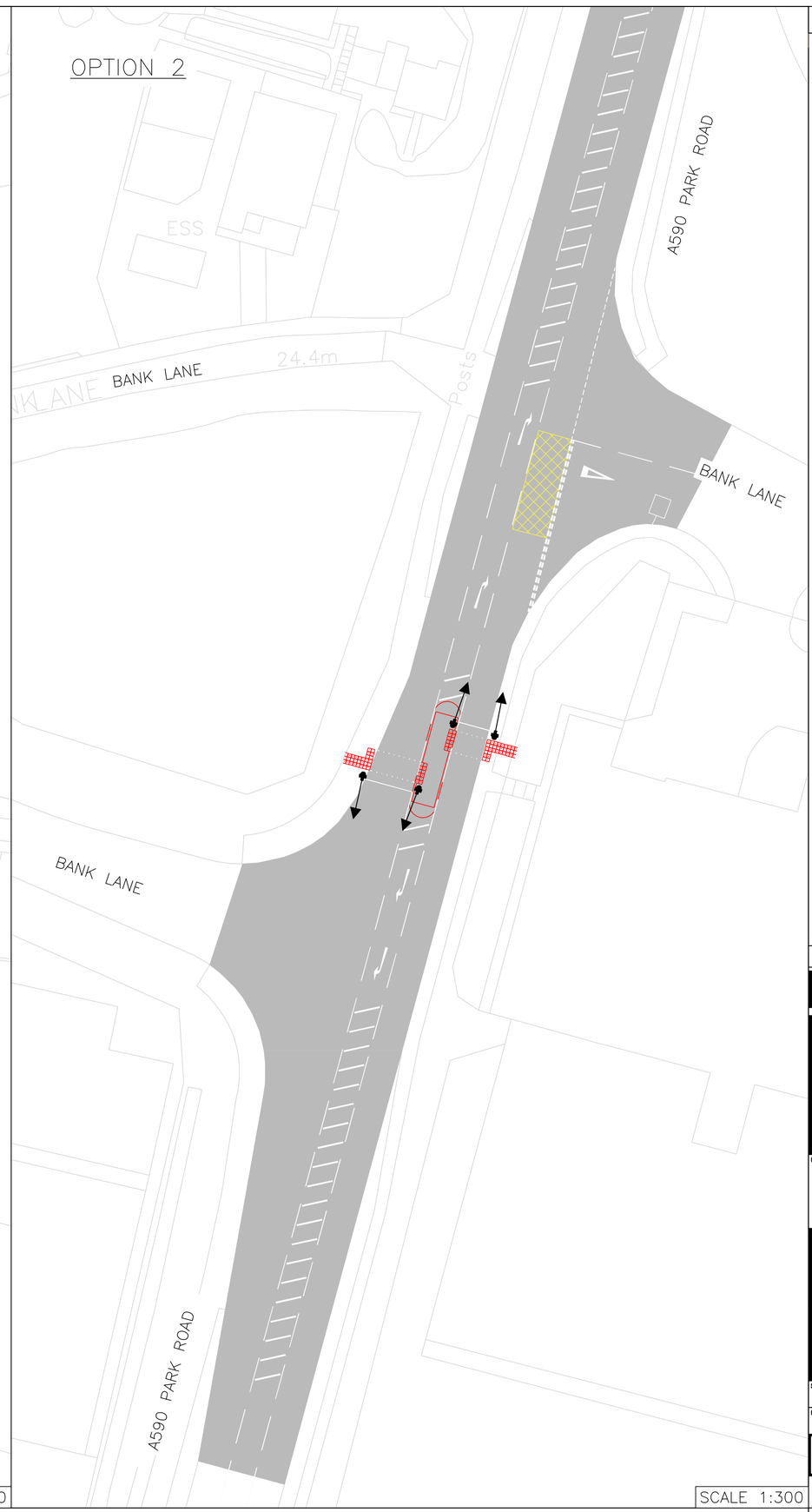
Proposed Bus Routes and Housing Sites

File: Created using iGIS, WSP's Online Mapping System Drawn By: Rebecca.Sewell Date Modified: 21/07/2016 15:29

Appendix E

HIGHWAY MITIGATION DRAWINGS





SCALE 1:750

SCALE 1:300

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

WSP | PARSONS BRINCKERHOFF
Amber Court, William Armstrong Drive,
Newcastle upon Tyne, NE4 7YQ
Tel: +44 (0)191 298 1000, Fax: +44 (0)191 298 1149
www.wspgroup.com - www.pbworld.com

CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1080 - A590 Park Road/ Bank Lane
Options 1 & 2
General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
AS SHOWN	KJM	ADS
CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 1180.dwg	JD	18th July 2016
PROJECT No:	DRAWING No:	REV:
70018120	DR_1180	P01

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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Amber Court, William Armstrong Drive,
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Tel: +44 (0)191 298 1000, Fax: +44 (0)191 298 1149
www.wspgroup.com - www.pbworld.com

CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1190 - A590 Park Road/ Ormsgill Lane General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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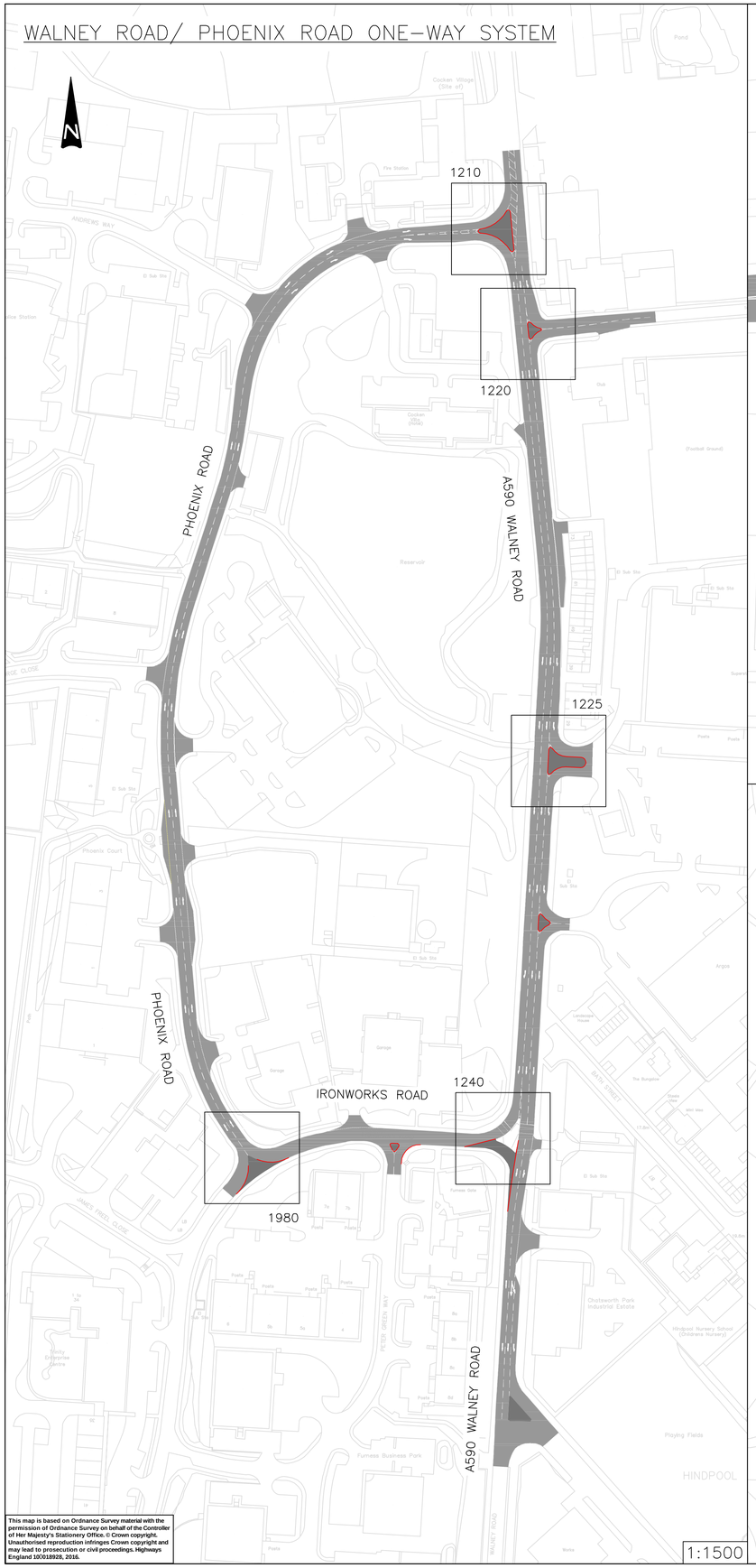
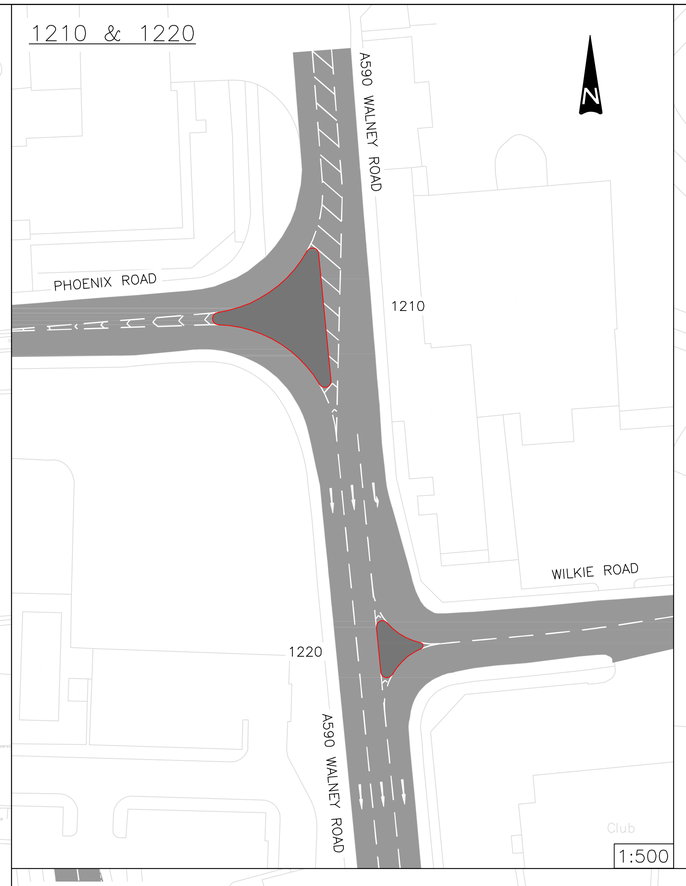
CAD FILE: 70021622 - DR - 1190.dwg	DESIGN-DRAWN: JD	DATE: 18th July 2016
PROJECT No: 70018120	DRAWING No: DR_1190	REV: P01

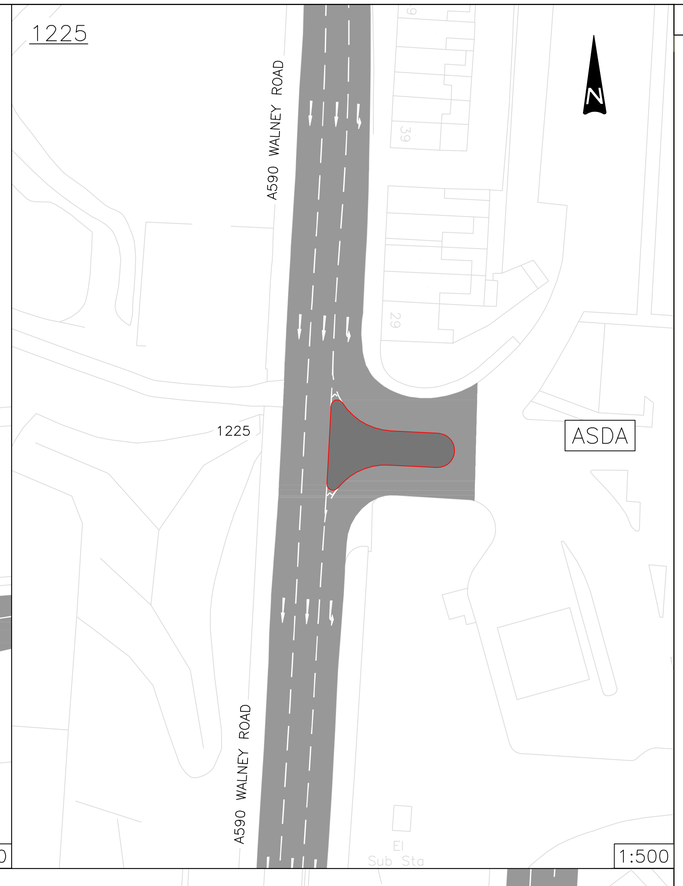
WALNEY ROAD/ PHOENIX ROAD ONE-WAY SYSTEM



1210 & 1220



1225



1980 & 1240

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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www.wspgroup.com - www.pbworld.com

CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: A590 Walney Road One-Way System: Junctions 1210, 1220,1225, 1240 & 1980 General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
As Shown	KJM	ADS
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PROJECT No:	**DRAWING No:**	**REV:**
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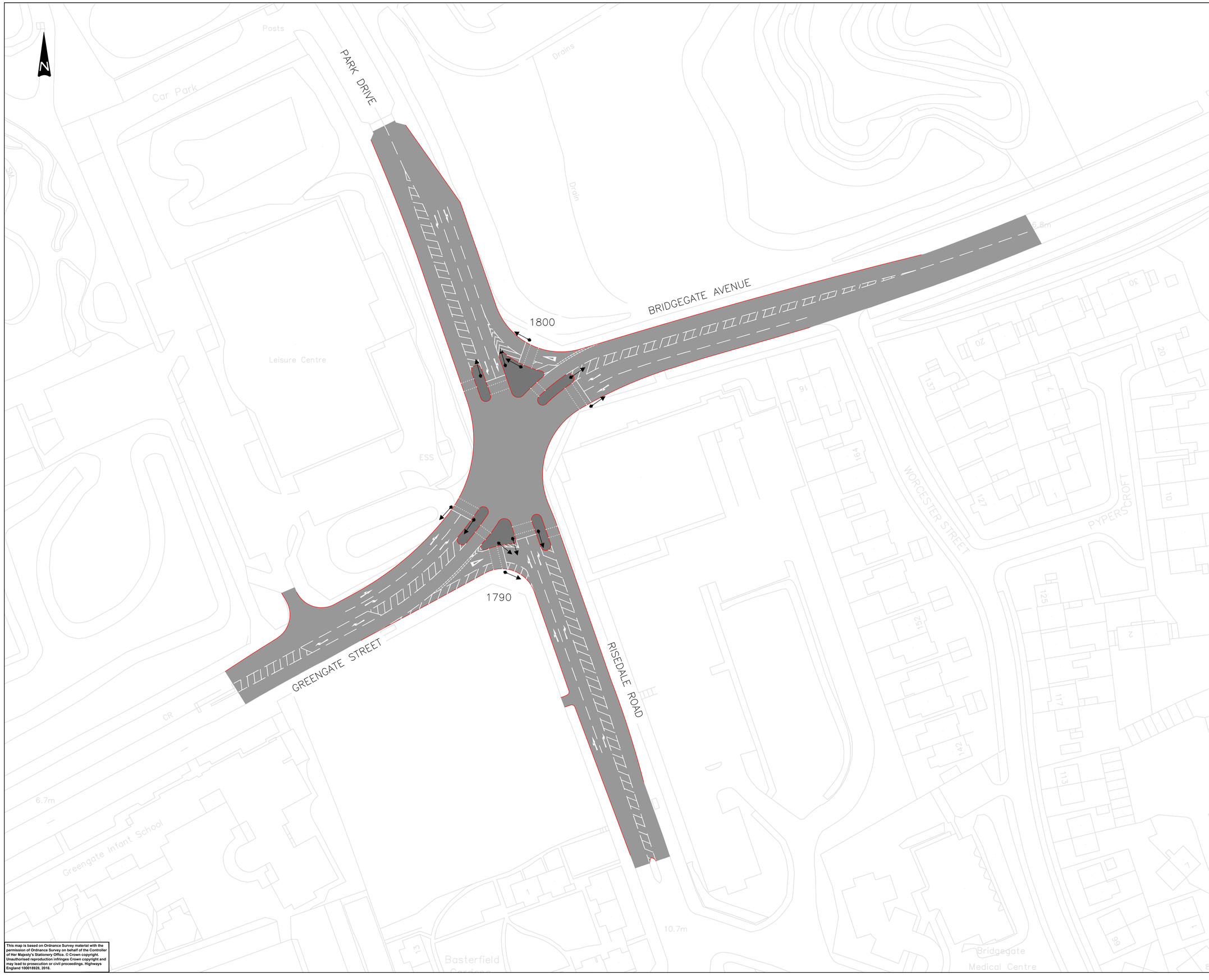

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1790 - Greengate Street/ Risedale Road
1800 - Park Drive/ Bridgegate Street/ Risedale Road
General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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PROJECT No:	DRAWING No:	REV:
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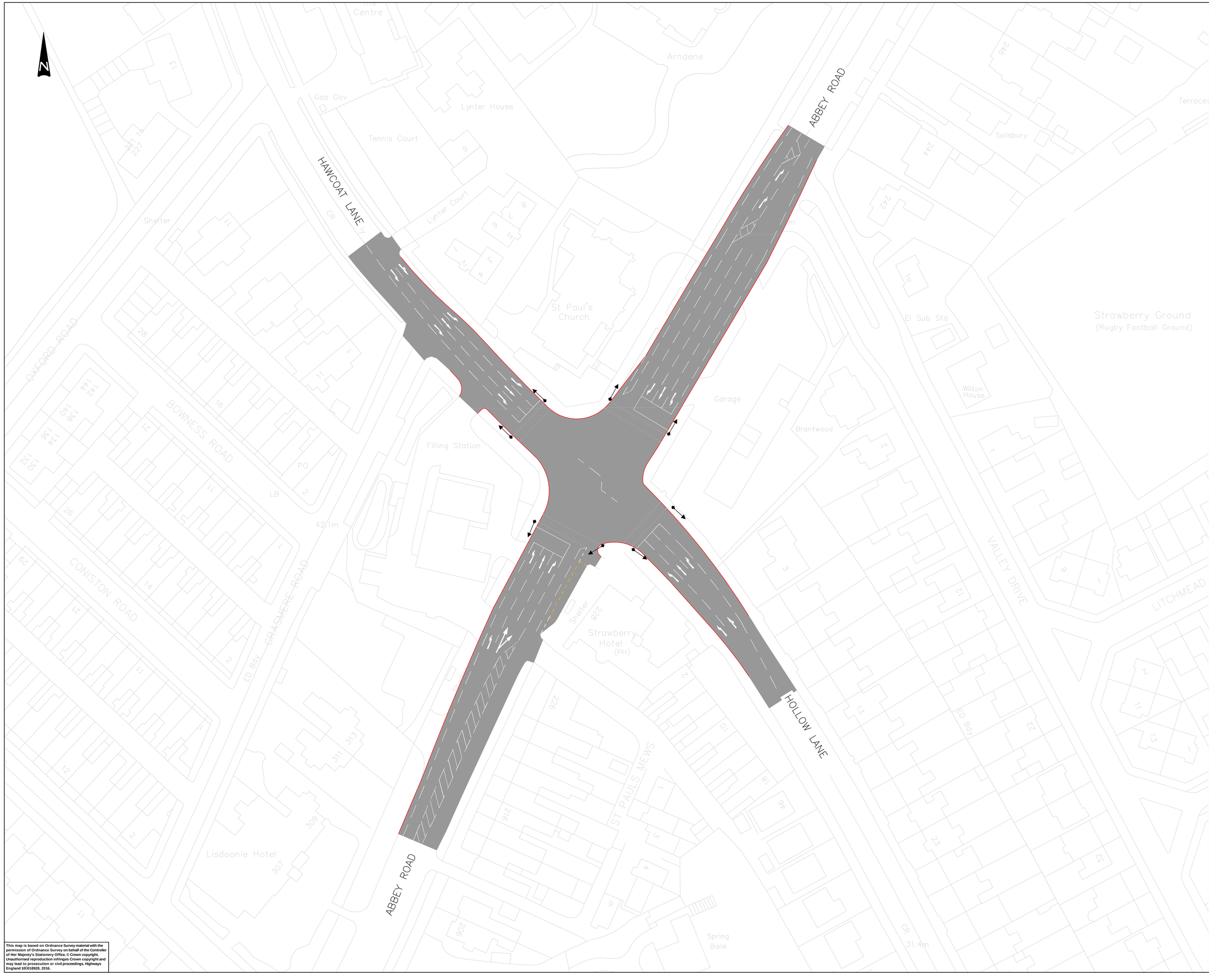

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DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1050 - Abbey Road/ Hollow Lane/ Hawcoat Lane General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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CAD FILE: 70021622 - DR - 1050.dwg	DESIGN-DRAWN: JD	DATE: 18th July 2016

PROJECT No:	DRAWING No:	REV:
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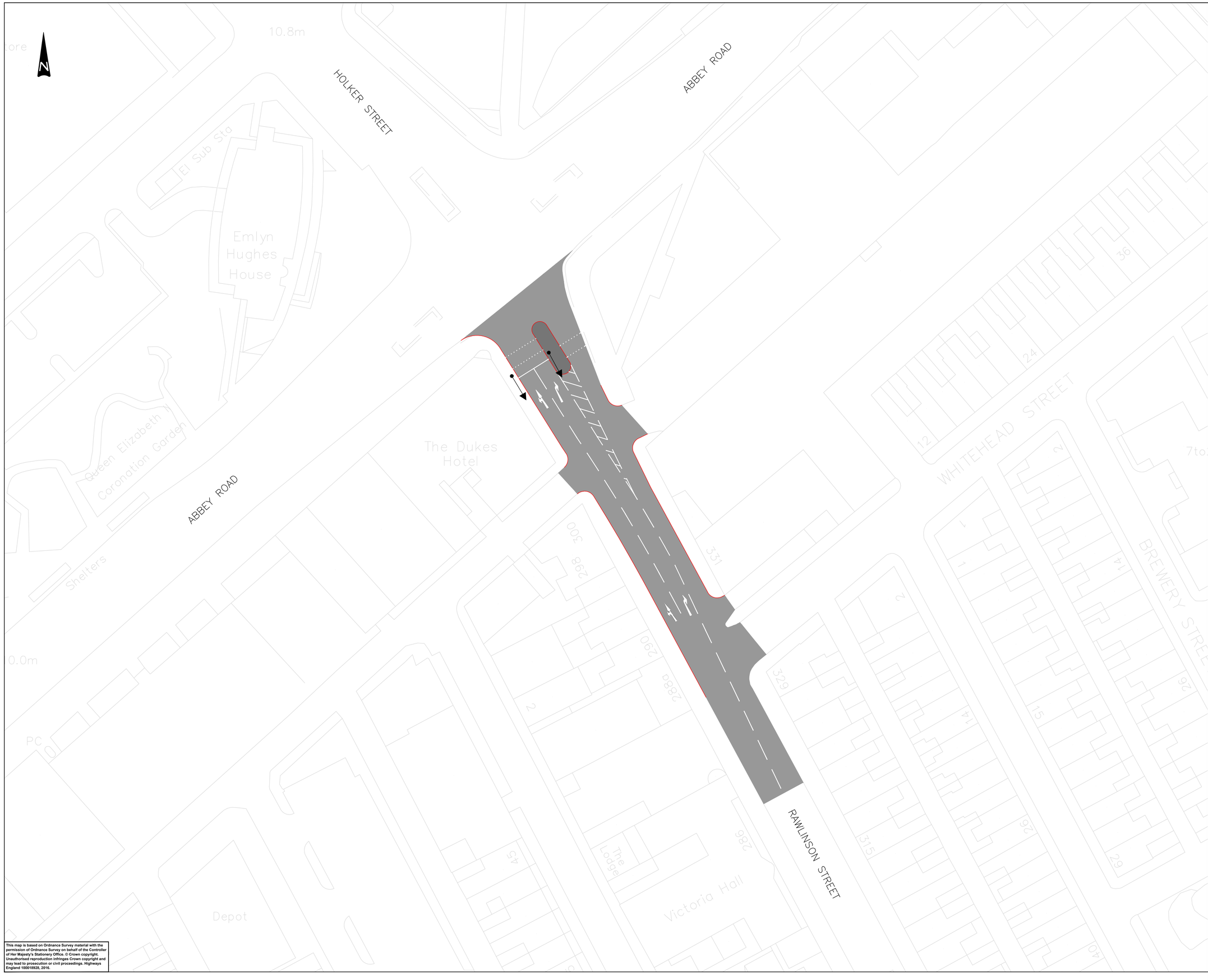

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1100 - Abbey Road / Rawlinson Street General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 1100.dwg	JD	18th July 2016

PROJECT No:	DRAWING No:	REV:
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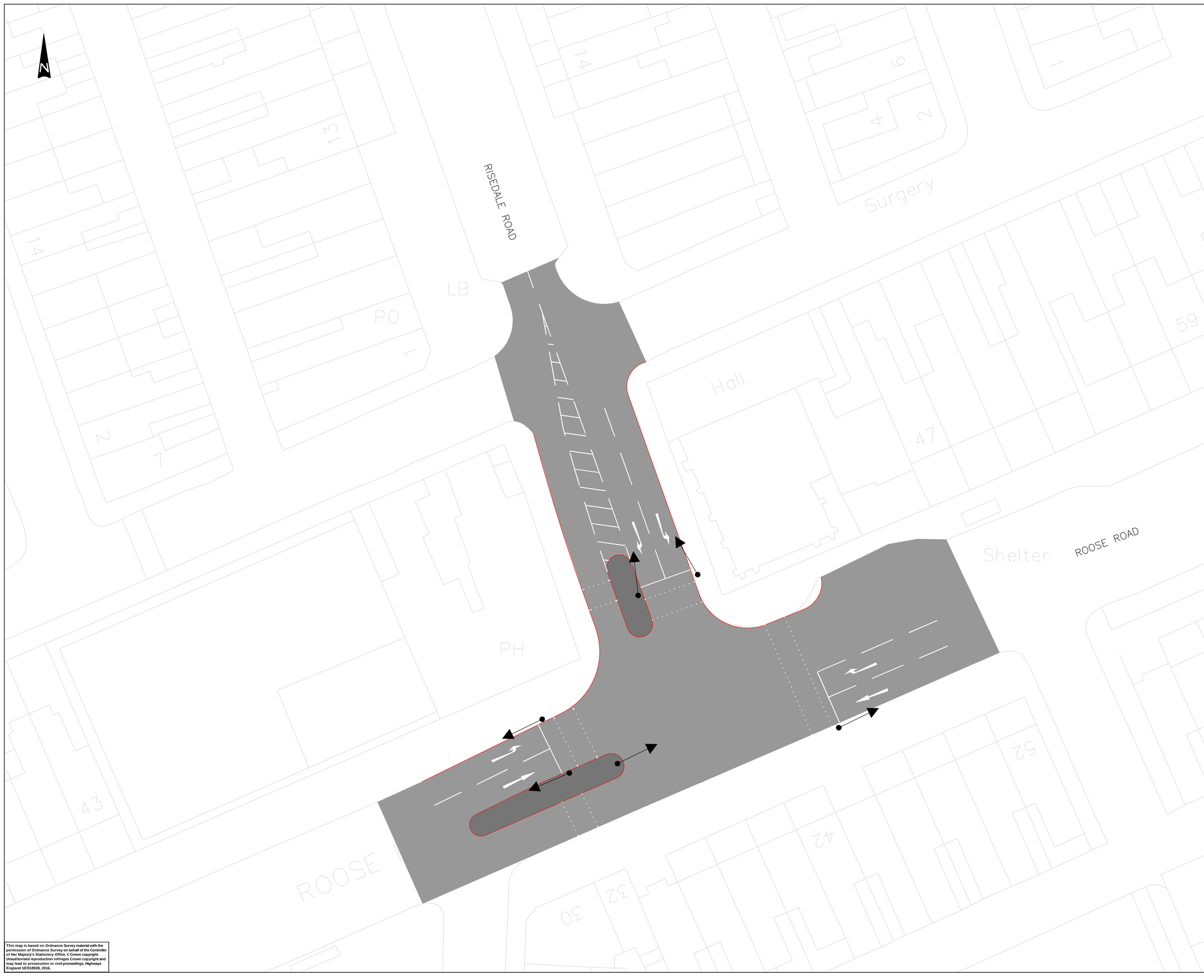

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DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface
- Proposed Traffic Signals

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1490 - A5087 Roose Road/ Risedale Road General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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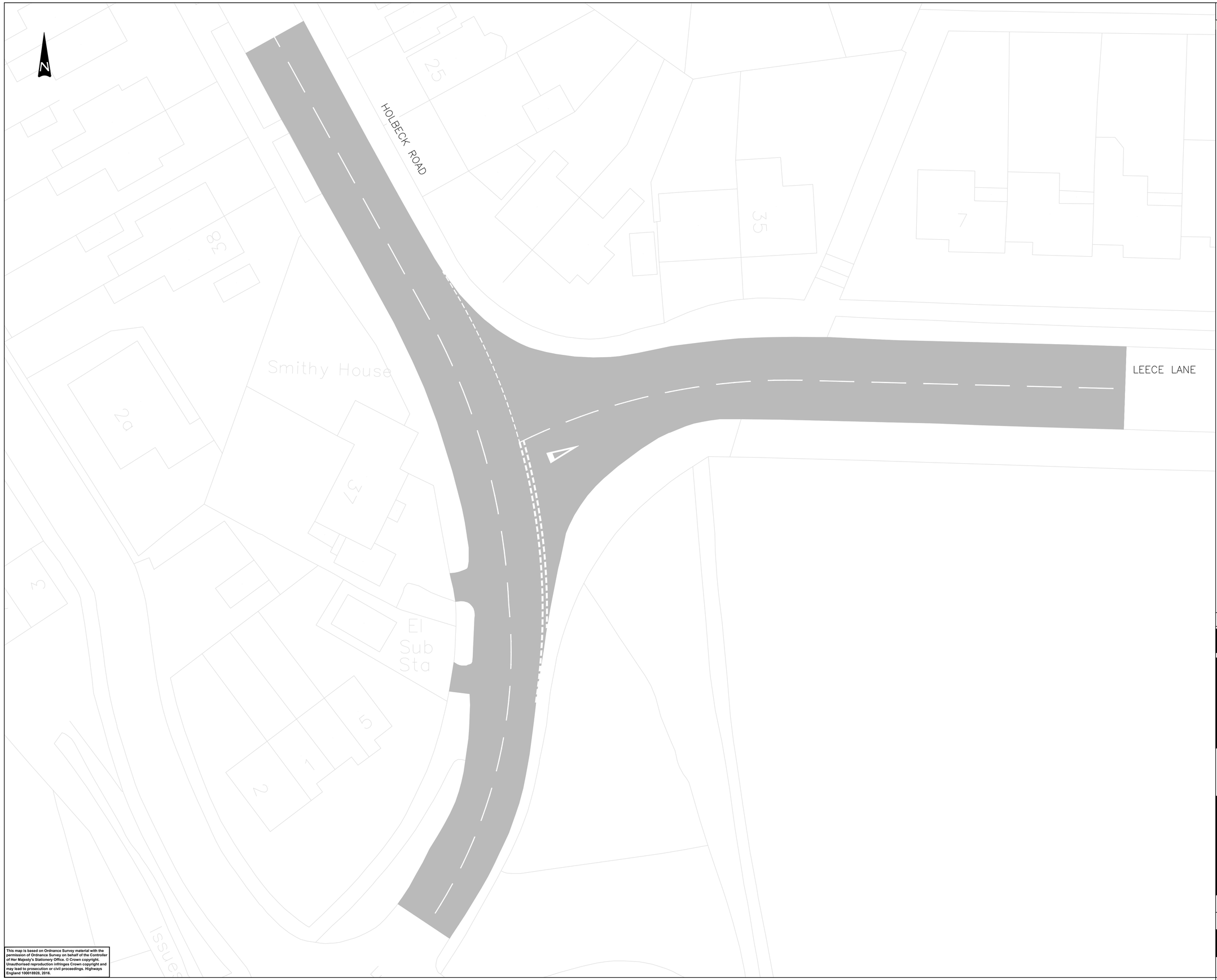
CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 1490.dwg	JD	18th July 2016

PROJECT No:	DRAWING No:	REV:
70018120	DR_1490	P01



DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

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CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 1530 - Holbeck Road/ Leece Lane General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
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CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 1530.dwg	JD	18th July 2016

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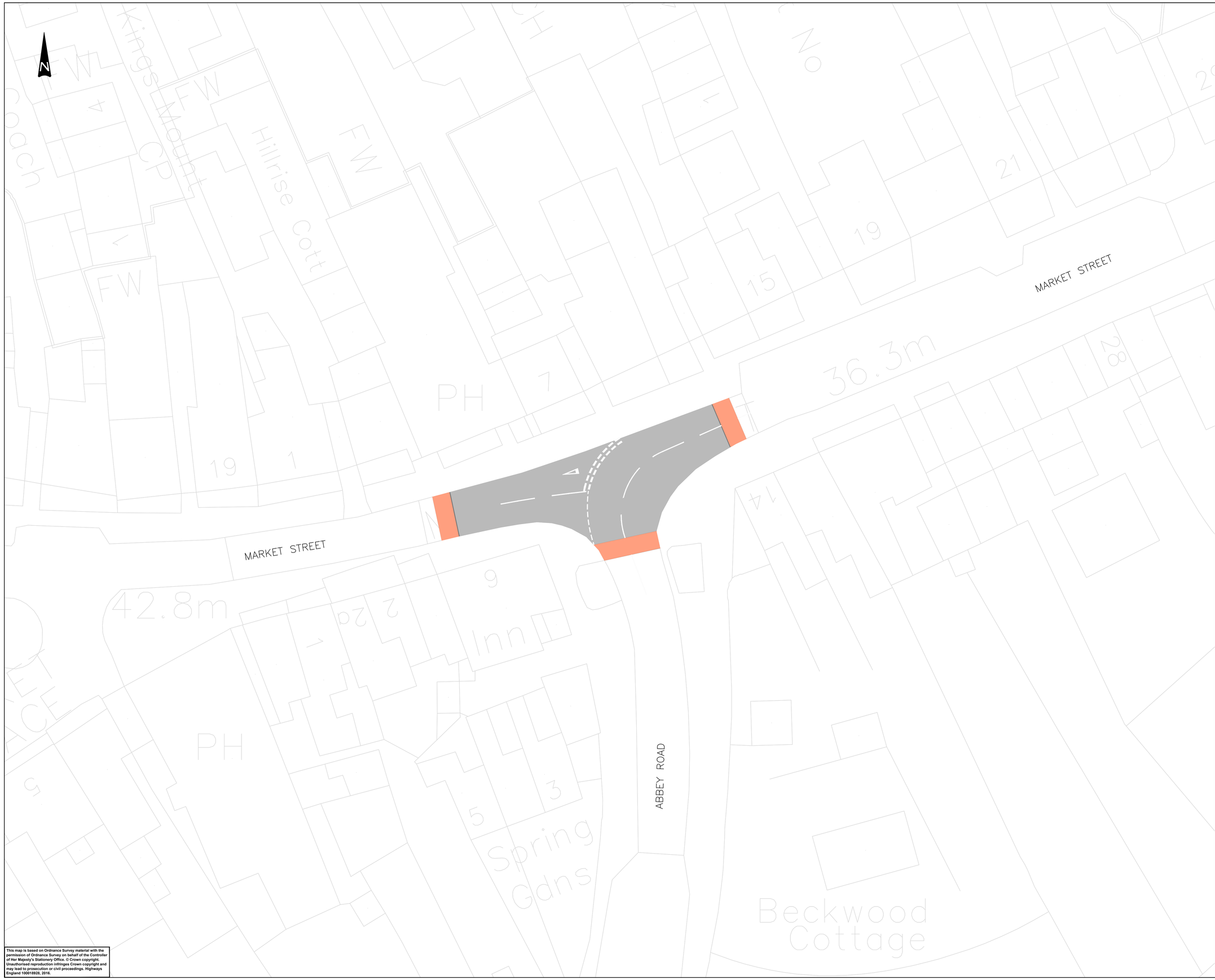

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface
- Block Paved Areas

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

WSP | PARSONS BRINCKERHOFF
Amber Court, William Armstrong Drive,
Newcastle upon Tyne, NE4 7YQ
Tel: +44 (0)191 298 1000, Fax: +44 (0)191 298 1149
www.wspgroup.com - www.pbworld.com

CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 3030 - Market Street/ Abbey Road General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
1:200	KJM	ADS
CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 3030.dwg	JD	18th July 2016

PROJECT No:	DRAWING No:	REV:
70018120	DR_3030	P01

DO NOT SCALE

NOTES

- Proposed road markings
- Proposed kerb lines
- Road surface

REV	DATE	BY	DESCRIPTION	CHK	APD
P01	18/07/16	JD	INITIAL ISSUE	KJM	ADS

DRAWING STATUS: WIP

WSP | PARSONS BRINCKERHOFF
Amber Court, William Armstrong Drive,
Newcastle upon Tyne, NE4 7YQ
Tel: +44 (0)191 298 1000, Fax: +44 (0)191 298 1149
www.wspgroup.com - www.pbworld.com

CLIENT: Cumbria County Council

PROJECT: Barrow Junction Improvements

TITLE: 3060 - Long Lane/ Newton Road
General Arrangement Plan

SCALE @ A1:	CHECKED:	APPROVED:
1:500	KJM	ADS
CAD FILE:	DESIGN-DRAWN:	DATE:
70021622 - DR - 3060.dwg	JD	18th July 2016
PROJECT No:	DRAWING No:	REV:
70018120	DR_3060	P01

Appendix F

HIGHWAY MITIGATION COST SUMMARY

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1180 (Roundabout Option)

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£12,271.62	
				Page 2		£3,286.85	
				Page 3		£250,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£12,735.80	
				Page 2		£447.72	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£6,831.70	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£111,164.32	
				Page 2		£13,147.74	
	6	0	0	**Earthworks**			
				Page 1		£31,228.53	
				Page 2		£27,596.60	
	7	0	0	**Pavements**		£212,306.21	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£149,404.81	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£13,762.02	
				Page 2		£1,682.81	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£7,167.40	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£11,910.16	
				Page 2		£8,913.75	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
				Direct Works - Sub-total Carried Forward		**£873,858.05**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1180 (Roundabout Option)

SPONS Highways Series Nr					Description		
					Direct Works - Sub-total Brought Forward		**£873,858.05**
2	**4**	**0**	**0**		**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**		**Special Structures**		
2	**7**	**0**	**0**		**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**		**Landscaping and Ecology**		
5	**0**	**0**	**0**		**Maintenance Painting of Steelwork**		
				A	**Direct Works Total**		**£873,858.05**
				B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£87,385.80**
				C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£96,124.39**
				D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£87,385.80**
				E	**Add Estimate of Costs of Staututory Udertaker Costs 7.5% of A**		**£65,539.35**
				F	**Add Estimate of Cost for Land Purchase**		
				G	**Add Estimate of Cost for Culvert**		
					Second Pass Estimated Total Cost =		**£1,210,293.40**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1180 (Pedestrian Crossing)

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£0.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£0.00	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£0.00	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£0.00	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£0.00	
				Page 2		£33.20	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£70,000.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	

Direct Works - Sub-total Carried Forward **£70,033.20**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1180 (Pedestrian Crossing)

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£70,033.20**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£70,033.20**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£7,003.32**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£7,703.65**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 5.00% of A**		**£3,501.66**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£3,501.66**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				<u>Second</u> Pass Estimated Total Cost =		**£91,743.50**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1190

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£12,271.62	
				Page 2		£3,286.85	
				Page 3		£250,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£20,522.02	
				Page 2		£1,104.73	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£10,608.48	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£70,193.20	
				Page 2		£21,281.64	
	6	0	0	**Earthworks**			
				Page 1		£44,052.86	
				Page 2		£19,907.01	
	7	0	0	**Pavements**		£305,672.06	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£36,360.76	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£2,457.50	
				Page 2		£1,524.13	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£12,751.80	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£10,801.02	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
				Direct Works - Sub-total Carried Forward		**£822,795.68**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1190

SPONS Highways Series Nr					Description		
					Direct Works - Sub-total Brought Forward		**£822,795.68**
2	**4**	**0**	**0**		**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**		**Special Structures**		
2	**7**	**0**	**0**		**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**		**Landscaping and Ecology**		
5	**0**	**0**	**0**		**Maintenance Painting of Steelwork**		
				A	**Direct Works Total**		**£822,795.68**
				B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£82,279.57**
				C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£90,507.52**
				D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£82,279.57**
				E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£41,139.78**
				F	**Add Estimate of Cost for Land Purchase**		
				G	**Add Estimate of Cost for Culvert**		
					<u>Second</u> Pass Estimated Total Cost =		**£1,119,002.13**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1210, 1220, 1225, 1240 & 1980

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£25,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£496.75	
				Page 2		£670.60	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£0.00	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£280,669.20	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£42,095.73	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£1,187.79	
				Page 2		£4,738.09	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
				Direct Works - Sub-total Carried Forward		**£354,858.16**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1210, 1220, 1225, 1240 & 1980

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£354,858.16**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£354,858.16**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£35,485.82**
			C	**Add Estimate Cost of Out-of-Hours Working : 5.00 % of A & B**		**£19,517.20**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£35,485.82**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£0.00**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				Second Pass Estimated Total Cost =		**£445,346.99**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1790 & 1800

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£75,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£4,002.25	
				Page 2		£335.30	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£0.00	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£198,002.55	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£28,929.13	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£353,932.03	
				Page 2		£2,755.49	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	

Direct Works - Sub-total Carried Forward **£662,956.75**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1790 & 1800

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£662,956.75**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£662,956.75**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£66,295.68**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£72,925.24**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£66,295.68**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£33,147.84**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				<u>Second</u> Pass Estimated Total Cost =		**£901,621.18**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1050

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£25,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£1,211.58	
				Page 2		£111.77	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£6,258.24	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£134,172.05	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£14,544.30	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£142,785.18	
				Page 2		£2,858.63	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	

Direct Works - Sub-total Carried Forward **£326,941.75**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1050

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£326,941.75**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£326,941.75**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£32,694.17**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£35,963.59**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£32,694.17**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 10.00 % of A**		**£32,694.17**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				<u>Second</u> Pass Estimated Total Cost =		**£460,987.86**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1100

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£10,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£466.21	
				Page 2		£228.99	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£625.82	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£19,169.11	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£76,362.26	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£163.83	
				Page 2		£358.59	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	

Direct Works - Sub-total Carried Forward **£107,374.82**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1100

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£107,374.82**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£107,374.82**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£10,737.48**
			C	**Add Estimate Cost of Out-of-Hours Working : 5.00 % of A & B**		**£5,905.61**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£10,737.48**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£5,368.74**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				Second Pass Estimated Total Cost =		**£140,124.14**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1490

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£25,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£810.64	
				Page 2		£284.57	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£1,251.65	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£23,485.96	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£214,302.80	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£122.88	
				Page 2		£406.61	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£716.74	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
				Direct Works - Sub-total Carried Forward		**£266,381.84**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1490

SPONS Highways Series Nr					Description		
					Direct Works - Sub-total Brought Forward		**£266,381.84**
2	**4**	**0**	**0**		**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**		**Special Structures**		
2	**7**	**0**	**0**		**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**		**Landscaping and Ecology**		
5	**0**	**0**	**0**		**Maintenance Painting of Steelwork**		
				A	**Direct Works Total**		**£266,381.84**
				B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£26,638.18**
				C	**Add Estimate Cost of Out-of-Hours Working : 5.00 % of A & B**		**£14,651.00**
				D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£26,638.18**
				E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£0.00**
				F	**Add Estimate of Cost for Land Purchase**		
				G	**Add Estimate of Cost for Culvert**		
					Second Pass Estimated Total Cost =		**£334,309.21**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1530

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£0.00	
				Page 2		£0.00	
				Page 3		£10,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£0.00	
				Page 2		£111.77	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£0.00	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£0.00	
				Page 2		£0.00	
	6	0	0	**Earthworks**			
				Page 1		£0.00	
				Page 2		£0.00	
	7	0	0	**Pavements**		£11,753.08	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£0.00	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£327.67	
				Page 2		£371.74	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£0.00	
				Page 2		£0.00	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	

Direct Works - Sub-total Carried Forward **£22,564.25**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 1530

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£22,564.25**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£22,564.25**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£2,256.43**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£2,482.07**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£2,256.43**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£1,128.21**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				<u>Second</u> Pass Estimated Total Cost =		**£30,687.38**

Barrow Transport Improvements								
Cost Estimate								
Junction Ref: 3030								
SPONS Highways Series Nr					Description		Total Amount	Notes on Pricing
	1	0	0		**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
					Page 1		£0.00	
					Page 2		£0.00	
					Page 3		£10,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0		**Site Clearance**			
					Page 1		£0.00	
					Page 2		£111.77	
					Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0		**Fencing**		£0.00	
	4	0	0		**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0		**Drainage and Service Ducts**			
					Page 1		£0.00	
					Page 2		£0.00	
	6	0	0		**Earthworks**			
					Page 1		£0.00	
					Page 2		£0.00	
	7	0	0		**Pavements**		£26,219.71	
1	1	0	0		**Kerbs, Footways and Paved Areas**		£318.95	
1	2	0	0		**Traffic Signs and Road Markings**			
					Page 1		£327.67	
					Page 2		£371.74	
1	3	0	0		**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£0.00	
1	4	0	0		**Electrical Work for Road Lighting and Traffic Signs**			
					Page 1		£0.00	
					Page 2		£0.00	
1	5	0	0		**Motorway Communications**			
1	6	0	0		**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0		**Structural Concrete**		£0.00	
1	8	0	0		**Steelwork For Structures**			
1	9	0	0		**Protection of Steelwork against Corrosion**			
2	0	0	0		**Waterproofing for Structures**			
2	1	0	0		**Bridge Bearings**			
2	3	0	0		**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
					Direct Works - Sub-total Carried Forward		**£37,349.83**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 3030

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£37,349.83**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£0.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£37,349.83**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 15.00% of A**		**£3,734.98**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£4,108.48**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 5% of A**		**£1,867.49**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£1,867.49**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				<u>Second</u> Pass Estimated Total Cost =		**£48,928.28**

Barrow Transport Improvements

Cost Estimate

Junction Ref: 3060

SPONS Highways Series Nr				Description		Total Amount	Notes on Pricing
	1	0	0	**Preliminaries**			**Source of Unit Rates : SPONS Civil and Highways 2014**
				Page 1		£12,271.62	
				Page 2		£3,286.85	
				Page 3		£250,000.00	**For Increased Costs : 2.00% Per year added for 3 years (2014, 2015 & 2016) = 6.00 % (see individual breakdown).**
	2	0	0	**Site Clearance**			
				Page 1		£23,122.74	
				Page 2		£496.48	
				Page 3			**Labour unit rates are for all labour (and small plant and tools) up to Ist Tier supervision (chargehand or the like). All other Supervision is part of Overheads %age.**
	3	0	0	**Fencing**		£10,113.42	
	4	0	0	**Road Restraint Systems (Vehicle and Pedestrian)**		£0.00	
	5	0	0	**Drainage and Service Ducts**			
				Page 1		£156,428.44	
				Page 2		£17,530.32	
	6	0	0	**Earthworks**			
				Page 1		£62,513.88	
				Page 2		£24,586.28	
	7	0	0	**Pavements**		£198,225.16	
1	1	0	0	**Kerbs, Footways and Paved Areas**		£32,533.31	
1	2	0	0	**Traffic Signs and Road Markings**			
				Page 1		£13,762.02	
				Page 2		£735.60	
1	3	0	0	**Road Lighting Columns & Brackets, CCTV Masts & Cantilever Masts**		£34,403.53	
1	4	0	0	**Electrical Work for Road Lighting and Traffic Signs**			
				Page 1		£51,213.69	
				Page 2		£8,913.75	
1	5	0	0	**Motorway Communications**			
1	6	0	0	**Piling and Embedded Retaining Walls**		£0.00	
1	7	0	0	**Structural Concrete**		£0.00	
1	8	0	0	**Steelwork For Structures**			
1	9	0	0	**Protection of Steelwork against Corrosion**			
2	0	0	0	**Waterproofing for Structures**			
2	1	0	0	**Bridge Bearings**			
2	3	0	0	**Bridge Expansion Joints and Sealing of Gaps**		£0.00	
				Direct Works - Sub-total Carried Forward		**£900,137.09**	

Barrow Transport Improvements

Cost Estimate

Junction Ref: 3060

SPONS Highways Series Nr				Description		
				Direct Works - Sub-total Brought Forward		**£900,137.09**
2	**4**	**0**	**0**	**Brickwork, Blockwork and Stonework**		
2	**5**	**0**	**0**	**Special Structures**		
2	**7**	**0**	**0**	**Accomodation Works, Works for Statutory Undertakers**		£12,500.00
3	**0**	**0**	**0**	**Landscaping and Ecology**		
5	**0**	**0**	**0**	**Maintenance Painting of Steelwork**		
			A	**Direct Works Total**		**£912,637.09**
			B	**Overheads (Supervision, Attendances, Engineering, HSE, Management, etc) + Profit : Add 10.00% of A**		**£91,263.71**
			C	**Add Estimate Cost of Out-of-Hours Working : 10.00 % of A & B**		**£100,390.08**
			D	**Risk (Increased Rates for materials, additional quantities, Unforeseen charges) : 10% of A**		**£91,263.71**
			E	**Add Estimate of Costs of Staututory Udertaker Costs 5.00 % of A**		**£45,631.85**
			F	**Add Estimate of Cost for Land Purchase**		
			G	**Add Estimate of Cost for Culvert**		
				Second Pass Estimated Total Cost =		**£1,241,186.44**