Rotherham Metropolitan Borough Council

A630 SHEFFIELD PARKWAY WIDENING

Full Business Case

wsp

Balfour Beatty

70047347
JUNE 2020

CONFIDENTIAL

Rotherham Metropolitan Borough Council

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Full Business Case

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LIST OF ABBREVIATIONS/ACRONYMS

AADF – Annual Average Daily Flow

AADT – Annual Average Daily Traffic

AADT 24 – Annual Average Daily Traffic 24

AAHT – Annual Average Hourly Traffic

ADM – Area of Detailed Modelling

AMID – Advanced Manufacturing Innovation District

AQMA – Air Quality Management Area

AST – Appraisal Summary Table

ATC – Automatic Traffic Count

BCR – Benefit Cost Ratio

CAZ – Clean Air Zone

CO_2 – Carbon Dioxide

CO – Carbon Monoxide

COBALT – Cost and Benefit to Accidents – Light Touch

DECC – Department for Energy and Climate Change

DEFRA – Department for Environment, Food and Rural Affairs

DfT – Department for Transport

DMRB – Design Manual for Roads and Bridges

DNO – Distribution Network Operator

D2AP – Dual Two-Lane All-Purpose

D3UAP – Dual Three-Lane All-Purpose

ECC – Engineering and Construction Contract

ECI – Early Contractor Involvement

EFT – Emissions Factor Toolkit

FEMA – Functional Economic Market Area

FTE – Full Time Equivalent

FYRR – First Year Rate of Return

GDP – Gross Domestic Product

GEA – Gross External Area

GHG – Greenhouse Gas

GIS – Geographical Information System

GVA – Gross Value Added

HDV – Heavy Duty Vehicle

HE – Highways England

HPI – Habitats of Principal Importance

IAAP – Integrated Assurance and Approval Plan

IEF – Important Ecological Feature

IMD – Index of Multiple Deprivation

IP – Inter Peak

ITB – Integrated Transport Block

JAQU – Joint Air Quality Unit

KPI – Key Performance Indicator

KSI – Killed/Seriously Injured

LAD – Local Authority District

LCR – Leeds City Region

LDVM – Lower Don Valley Model

LEP – Local Enterprise Partnership

LGF – Local Growth Fund

LLSOA – Lower Level Super Output Area

LNR – Local Nature Reserve

LSOA – Lower Super Output Area

LUTI – Land Use Transport Interaction

MCA – Mayoral Combined Authority

MES – Monitoring and Evaluation Strategy

MIDAS – Motorway Incident Detection and Automatic Signalling

MLG – Modelling Liaison Group

MOVA – Microprocessor Optimised Vehicle Actuation

NAEI – National Atmospheric Emissions Inventory

NAQP – National Air Quality Plan

NCN – National Cycle Network

NO_2 – Nitrogen Dioxide

NOx – Nitrogen Oxide

NPV – Net Present Value

NSL – National Speed Limit

OAF – Option Assessment Framework

OAR – Options Appraisal Report

OBC – Outline Business Case

OD – Origin-Destination

OJEU – Official Journal of the European Union

OMHPD – Open Mosaic Habitat on Previously Developed Land

PBRA – Preliminary Bat Roost Assessment

PCM – Pollution Climate Mapping

PCU – Passenger Car Unit

PTI – Passenger Transport Interchange

PVC – Present Value Cost

QRA – Quantified Risk Assessment

QUADRO – QUeues And Delays at ROadworks

RCB – Rigid Concrete Barrier

RIP – Regional Investment Programme

RMBC – Rotherham Metropolitan Borough Council

RRS – Road Restraint System

SCR – Sheffield City Region

SCRCA – Sheffield City Region Combined Authority

SCR ID – Sheffield City Region Innovation District

SCRIF – Sheffield City Region Investment Fund

SCRTM1 – Sheffield City Region Transport Model

SHA – Strategic Housing Allocation

SME – Small and Medium Sized

SOBC – Strategic Outline Business Case

SPZ – Source Protection Zone

SRN – Strategic Road Network

SRO – Senior Responsible Owner

SUDs – Sustainable Drainage System

TAG – Transport Analysis Guidance

TASM – Transport Appraisal and Strategic Modelling

TCF – Transforming Cities Fund

TCIP – Transportation Capital Investment Programme

TPS RTM – Trans Pennine South Regional Transport Model

TSCO – Traffic Safety and Control Officer

TUBA – Transport User Benefit Appraisal

VDM – Variable Demand Modelling

VfM – Value for Money

VOC – Vehicle Operating Costs

VoT – Value of Time

WFD – Water Framework Directive

WITA – Wider Impacts Transport Appraisal

EXECUTIVE SUMMARY

Overview

This document provides the final Full Business Case for the A630 Sheffield Parkway widening scheme, which has been allocated £42.26 million in funding through the Sheffield City Region Investment Fund (SCRIF) programme. As a retained scheme, the ability of Rotherham Metropolitan Borough Council (RMBC) to draw down this funding rests with the Department for Transport's (DfT's) approval of this Business Case.

The proposed scheme is a highway improvement within the existing highway boundary, that will provide an additional lane in each direction of the 2.1-kilometre section of the A630 Parkway between the M1 Junction 33 and the Catcliffe Interchange. Scheduled for delivery between September 2020 and June 2022, the scheme will address existing and forecast issues of traffic congestion, improve safety, reduce the overall maintenance liability and deliver improvements in air quality.

The draft Full Business Case was submitted to the DfT in October 2019. Since then, additional information has been shared separately with the DfT in response to clarification questions.

Additional economic tests have been carried out to determine the sensitivity of the scheme to changes in various assumptions and the results of these have been included in the Economic Case within this final version, with further detail in the technical note in Appendix Q. The VfM for the core scenario has not changed since the draft Business Case submission and remains high. The results of low and high growth scenario testing demonstrate that, in the worst case scenario, the initial BCR is 1.2. However, all of the downsides from the sensitivity tests are highly unlikely to occur in combination and the VfM of the scheme remains high or very high in all other scenarios for both initial and adjusted BCRs.

In accordance with the DfT's 'The Transport Business Cases'[1], this Business Case is split into five Cases, and a summary of each is provided in the remainder of this chapter:

- Strategic Case – provides evidence of a robust case for change, set against the wider local, City Region and national policy context;
- Economic Case – demonstrates the Value for Money of the scheme, based on traffic modelling and economic appraisal;
- Financial Case – demonstrates the financial affordability of the scheme, based on the expected cost and funding profile;
- Commercial Case – evidences the commercial viability of the scheme, and contract management arrangements; and
- Management Case – demonstrates the deliverability of the scheme, based on consideration of governance, the project programme, risk, stakeholder engagement and monitoring and evaluation.

Strategic Case

The SCR is home to 1.8 million people, providing 842,000 jobs and annual Gross Value Added (GVA) of over £30 billion. Despite good recent performance in actual GVA growth, GVA per person remains low relative to other City Regions and the wider UK. The SCR Local Enterprise Partnership (LEP) has set out an ambitious vision for the City Region:

'Sheffield City Region will be the best place to collaborate, to invest, to innovate and grow a business, and live, work, play and study. It will be supported by an unrivalled skills base and quality of life.'

The main objective set out in the SCR Strategic Economic Plan[2] is to create 70,000 new private sector jobs and 6,000 new businesses in the city region over the period 2015-2025.The area around the A630 Parkway is of particular importance to the growth and development of the City Region economy. The Advanced Manufacturing Innovation District (AMID), which incorporates the Advanced Manufacturing Park (AMP), is one of seven spatial growth zones and has the potential to be the SCR's primary economic driver, as well as supporting the wider growth objectives of the Northern Powerhouse and the UK economy as a whole. Furthermore, there are large Strategic Housing Allocations (SHAs) at Waverley New Community (4,000 homes) and the Norfolk Estate (1,470 homes).

There are currently 19 commercial, 29 housing and 2 mixed-use development site opportunities being promoted through local planning within the A630 Parkway corridor, totalling 50 development opportunities which are largely expected to be delivered over the next 10-15 years. Analysis of site capacities suggests that there is sufficient capacity across the corridor development site portfolio to support a total of around 8,300 new dwellings and around 454,900 sqm of new Gross External Area (GEA) commercial space[3]. It is estimated that these sites could support 6,171 net additional FTE jobs at the SCR level by 2038, bringing £774m in cumulative GVA towards the UK economy by 2038 (£569m at Net Present Value (NPV)).

Rotherham's Economic Growth Plan[4] identifies transport as a key enabler of economic growth, and the importance of an effective, integrated and sustainable transport network that provides outstanding intra-region and inter-region connectivity cannot be overstated. However, issues of traffic congestion and delay currently constrain the extent to which development can come forward in this area.

As a dual carriageway with Annual Average Daily Traffic (AADT) of approximately 65,000 vehicles, the A630 regularly operates close to capacity, leading to delay, congestion and impacts on journey time reliability, as well as associated negative impacts on air quality. There are regular queues along the A630, particularly in the PM peak, with consequent unreliability for traffic travelling towards the M1 from Sheffield. Typical PM peak journeys can vary between nine and 22 minutes for the 3-mile journey between the A57 and M1, with speeds as low as 10mph.

[1] The Transport Business Cases (DfT, January 2013)
[2] Sheffield City Region Local Enterprise Partnership Strategic Economic Plan 2015-2025 (SCR LEP, March 2014)
[3] A630 Sheffield Parkway Wider Economic Benefits (Genecon, September 2019)
[4] Rotherham Economic Growth Plan 2015-2025 (RMBC)

The M1 also suffers from delay, and the stretch between Junctions 33 and 35 is recognised in the top 20% of vehicle hours delay over Highways England's network. Although the Junction 32 to 35a Smart Motorway scheme has delivered additional capacity on the motorway mainline, the slip roads and motorway junctions have not been improved.

The following wider key issues also demonstrate the need for intervention:

- Use of local routes by strategic traffic – which detracts from the quality of the local environment in areas such as Brinsworth and Catcliffe;
- Misuse of the bus gate at Wood Lane by strategic traffic avoiding congestion on the A630 Parkway – on average 83% of the total vehicles which use this facility are unauthorised;
- Lack of sustainable transport alternatives, with poor public transport connectivity – although this will improve over the medium to long term, with plans to introduce a new rail station in Waverley and a new mainline rail station in Rotherham;
- Road safety – with Junction 33 of the M1 ranked within the highest 250 accident locations on the SRN, in part due to congestion and issues of driver legibility on the roundabout;
- Air quality – the north side of the study area is designated as an Air Quality Management Area (AQMA), due to levels of nitrogen dioxide (NO_2) that exceed the permitted standard, to which traffic emissions are a major contributor.

Without intervention, each of these key issues will worsen, as well as compromising the ability to achieve local, regional and national economic growth objectives.

Five scheme objectives have been defined, to address the identified problems, as shown in Table 1.

Table 1 – Scheme Objectives

Objective	Outcomes
Objective 1: Support economic growth and productivity improvements	Improved journey times on the A630 Parkway and across the M1 J33 Released highway capacity along the A630 Parkway corridor, facilitating consented development growth in the region and key movements between Sheffield/Rotherham Unlocked development capacity and growth of jobs, businesses and housing across the wider region
Objective 2: Reduce congestion and improve network reliability and resilience	Reduced congestion and delays along the A630 Parkway and improved journey times for all traffic Improved network resilience to incidents, reduced number and severity of accidents Reduced maintenance on road and rail bridges
Objective 3: Improve Safety	Improved corridor and junction safety through enhanced design, lining and signage and driver warning aids, technology Reduced accident frequency through reduced delays, queuing and driver frustration Reduced requirement for maintenance on rail and road bridges (by designing for maintenance), reducing the exposure of maintenance staff to health and safety risks
Objective 4: An improved environment	Improved air quality and reduced noise levels by easing congestion along the A630 Parkway corridor, and reducing speeds

Objective 5: Deliver a more accessible and integrated network	Delivery of capacity enhancements to the local SRN, which supports decongestion on surrounding local roads, providing positive benefits for local communities and active travellers

A three-stage process, consisting of a multi-criteria option assessment framework supported by local junction modelling, was used to identify, assess and sift options that best meet the scheme objectives. Five main intervention options were identified, comprised of 29 sub-options. The assessment identified Option 4B as the preferred option, as it can best meet the scheme objectives and ensure the delivery of the connectivity, accessibility and wider benefits required. This option also incorporates improvements within the existing highway boundary that can be delivered within the available funding drawdown period.

The existing carriageway will be enhanced from a 'rural' dual two-lane all-purpose (D2AP) to an 'urban' dual three-lane all-purpose (D3UAP) carriageway, with a rigid concrete barrier in a hardened central reserve. The widened route will utilise narrow lanes and operate at a mandatory 50mph speed limit, a reduction from the existing National Speed Limit (NSL). The new 50mph speed limit will be extended beyond the western extent of the scheme, to Handsworth Roundabout (approximately 1.8 kilometres away), where a 50mph speed limit is already in operation. At the M1 Junction 33, it is proposed to widen both the northbound and southbound off slips to four lanes; however, it is not proposed to widen the two motorway overbridges.

Key risks and financial, programme and environmental constraints have been identified, which have been considered in the development and design of the preferred option.

The scheme is expected to deliver the following benefits:

- Congestion reduction;
- Improvements to journey time reliability;
- Reduction in the use of local routes by strategic traffic, enabling investment in active travel;
- Improved safety;
- Economic growth;
- An improved environment; and
- A reduction in the overall maintenance liability.

The scheme benefits align well against local, regional and national transport and economic policy objectives, and stakeholder feedback demonstrates the level of support for the scheme, particularly amongst the business community.

Overall, the proposed A630 Parkway widening scheme will deliver a clear improvement against the existing arrangements, in line with wider transport and economic objectives.

Economic Case

A range of qualitative, quantitative and monetised assessment techniques have been used to derive the scheme benefits, which have been used to develop the overall Value for Money (VfM) statement.

The traffic impacts of the proposed scheme were assessed using an updated version of the Trans Pennine South Regional Transport Model (TPS RTM). A series of updates and refinements were carried out, to develop a reliable and robust representation of current network conditions, such that the future year forecasts which underpin the scheme appraisal are equally reliable.

The model is representative of a typical weekday, in a neutral month in 2015. Three time periods have been modelled: AM peak (average hour between 07:00 and 10:00); Inter Peak (average hour between 10:00 and 16:00) and PM peak (average hour between 16:00 and 19:00). Forecast year models were developed for 2021 and 2036.

In the Do Something scenarios, journey times show a general decrease on the eastbound routes in all years and time periods compared to respective Do Minimum scenarios. The westbound direction generally shows an increase in journey time because of the reduction in speed limit from 70mph to 50mph as part of the proposed scheme.

The proposed scheme is forecast to reduce the delay on every approach at the M1 Junction 33, with the biggest impacts in the AM peak from the M1 off-slips and the biggest impacts in the PM peak from the A630 Parkway. The scheme is however forecast to increase the delay on the southern approach of Rotherway roundabout, due to the increased flow on this approach.

In terms of traffic flows, in 2021 there is forecast to be negligible change in AADT on the A630 Parkway northbound, and a 2% increase on the A630 Parkway southbound. In 2036 a 1% increase in AADT is forecast on the A630 Parkway northbound and southbound. Traffic flows on the M1 mainline are forecast to experience little change, in the region of +/-1% in both forecast years. In 2021, traffic flows on the M1 Junction 33 entry slips are forecast to experience negligible change, with the exit slips seeing an increase of 9% on the southbound exit slip and 5% on the northbound exit slip. In 2036, the northbound entry and exit slips show the biggest change, at 3% and 5% respectively.

TUBA time saving benefits were calculated for both fixed and elastic demand assignments for the opening year (2021) and design year (2036), for the three time periods (AM, IP, PM). The benefits for the reference case assignment and the elastic assignment were then compared, and it was established and agreed with the DfT that Variable Demand Modelling (VDM) is not required.

Table 2 summarises the range of scheme impacts appraised and their use in the VfM assessment.

Table 2 – Types of Scheme Impact and Use of VfM Assessment

Type	Impacts	Use in Assessment
Established monetised impacts	Journey time savings Vehicle operating costs Accidents Noise Air quality Greenhouse gases Indirect tax Delays during construction (NB this is recorded as a disbenefit)	Included in initial and adjusted BCR calculations
Evolving monetised impacts	Reliability Static clustering (agglomeration) Output in imperfectly competitive markets Labour supply impacts	Included in adjusted BCR calculations
Indicative monetised impacts	Dependent development GVA impacts Construction and operation jobs	Used to underpin the narrative in the Strategic Case and contribute to the VfM statement

Type	Impacts	Use in Assessment
Non-monetised impacts	Journey quality Accessibility Affordability Severance Townscape Historic environment Landscape Biodiversity Water environment	Used to underpin the narrative in the Strategic Case and contribute to the VfM statement

Table 3 shows the initial Benefit Cost Ratio (BCR) calculated for the scheme.

Table 3 – Initial BCR

Criteria	Value (£000s)
User Benefits	64,572
Accident Benefits	3,977
Greenhouse Gas Benefits	964
Air Quality Benefits	-50
Noise Benefits	-492
Construction Impacts	-3,334
Total PVB	**65,637**
PVC	**28,593**
Initial BCR	**2.30**
VFM Category	**High**

All values are in 2010 prices, discounted to 2010

Table 4 shows the adjusted BCR range calculated for the scheme, based on two separate assessments of the Wider Economic Benefits.

Table 4 – Adjusted BCR

Benefits	Adjusted BCR 1 (£000s)	Adjusted BCR 2 (£000s)
User Benefits	64,572	64,572
Accident Benefits	3,977	3,977
Greenhouse Gas Benefits	964	964
Air Quality Benefits	-50	-50
Noise Benefits	-492	-492
Construction Impacts	-3,334	-3,334
Wider Economic Benefits	25,371	51,886
Reliability Benefits	17,338	17,338
PVB	**108,346**	**134,861**
PVC	**28,593**	**28,593**
Adjusted BCR	**3.79**	**4.72**

Benefits	Adjusted BCR 1 (£000s)	Adjusted BCR 2 (£000s)
VfM Category	High	Very High

All values are in 2010 prices, discounted to 2010

Table 5 summarises the non-monetised social impacts of the scheme.

Table 5 – Non-Monetised Social Impacts

Assessed Indicator	Summary of Key Impacts	Seven Point Scale Assessment
Physical Activity	The scheme focuses on a highway improvement and does not impact on active modes, therefore the impact on physical activity will be negligible.	Neutral
Severance	Severance can be an issue where either vehicle flows are large enough to significantly impede pedestrian movement or where infrastructure presents a physical barrier to movement. Although some links are forecast to see an increase in traffic flow, overall, the scheme reduces the level of traffic across the network. This improves accessibility to local amenities and community facilities for motorised users through reduced delay in the area and for non-motorised users through reducing the level of congestion as a perceived barrier to travel.	Slight Beneficial
Journey Quality	The proposed scheme provides additional capacity on the A630 Parkway and the speed limit will reduce to 50mph. It is expected that the scheme will result in reduced journey times and congestion and improved reliability. The scheme will improve journey quality for vehicle travellers using the A630 Parkway and the surrounding road network. The scheme will reduce congestion and enable drivers to drive at more consistent speeds relative to the standard of the road and the proposed new speed limit.	Moderate Beneficial
Personal Affordability	The majority of income groups will experience a reduction in vehicle operating costs as an indirect consequence of the scheme.	Moderate Beneficial

Table 6 summarises the non-monetised Distributional Impacts.

Table 6 - Distributional Impacts

Assessed Indicator	Seven Point Scale Assessment
User Benefits	Slight Beneficial
Noise	Moderate Adverse
Air Quality	Not applicable
Accidents	Slight Beneficial
Affordability	Moderate Beneficial
Severance	Slight Beneficial
Security	Neutral
Accessibility	Not applicable

The approach to the traffic modelling and economic appraisal was agreed with the DfT in 2017 and has subsequently been undertaken in line with relevant TAG guidance. It was agreed with the DfT that variable demand modelling was not required.

The core tests show an initial BCR of 2.30 (High VfM) and an adjusted BCR of 4.72 (Very High VfM), the latter taking account of wider benefits. Low and high growth tests show a spread of benefits between £34.7m and £71.8m. Various sensitivity tests have been undertaken to assess the effects on the BCR of a reduction in user benefits of up to 15% and also the impact of a 3.5% increase in construction cost and the adjusted VfM remains high in both scenarios. Dependant development tests have a positive impact on the scheme benefits, improving the BCR from 2.29 to 2.76 and thus VfM remaining high. Even with downside projections, the BCR remains positive and high, according to TAG and at the time of completion of the final FBC.

It is considered that further reduction of the scheme benefits to reflect possible changes in future traffic or future changes in the economy fail to recognise the regional context and importance of the scheme and are not justified for a scheme that has already been tested against such effects in its low growth and reduced benefits assessments.

On this basis the A630 improvements are promoted as a key strategic intervention that will deliver high VfM and improvements in journey time reliability and journey quality for local and strategic travellers in one of the key economic growth areas of the City Region.

Financial Case

The total cost of delivering the A630 Sheffield Parkway widening scheme, including appropriate allowances for risk and inflation, and an allowance for monitoring and evaluation, is £46,389,455. A total of £5,089,169 has been spent on scheme preparation from 2015/2016 up to the end of Quarter 4 2019/2020, leaving £41,300,286 remaining to spend. The costs include a further £238,016 in preparation costs prior to planned start on site in September 2020. Construction completion is programmed for May 2022, with the Contractor and Local Authority aspiration to complete before that date if possible.

The cost of maintaining and operating the scheme, which is forecast to be lower than the existing situation, will be met by RMBC through its ITB allocation.

RMBC is seeking a total contribution of £42,260,010 from the SCRIF (retained Local Growth Fund (LGF)), subject to the DfT's approval of this final Full Business Case. A further £3,458,350 is being put forward by RMBC for preparation, monitoring and evaluation, which will be reimbursed by DfT, giving a total funding requirement of £45,718,360.

Since the submission of the draft Full Business Case, the scheme cost has risen from £45,718,360 to £46,389,455. This is a result of a six-month delay in starting on site and an associated increase in construction cost, updated statutory utilities costs and accounting for uncertainty around potential COVID-19 impacts on cost and programme. The total funding requirement remains the same as reported in the draft Business Case, at £45,718,360, with £42,260,010 sought through the SCRIF and a further £3,458,350 put forward by RMBC for preparation, monitoring and evaluation, which will be reimbursed by DfT. RMBC will underwrite the additional £671,095 that is required and absorb the cost.

Commercial Case

The procurement strategy has been designed to ensure:

- Continuity of the design process;
- Scheme delivery in line with timescales for funding drawdown;
- Value for money – RMBC has a duty to secure value for money in all of its transactions;
- Compliance with statutes and regulations within both the UK and European Union; and
- Avoidance of fraud and corruption with a transparent and visible approach and tightly controlled limits to potential fraud and corruption.

The procurement process has been undertaken in strict accordance with the legislative framework set out within RMBC's Procurement Strategy. The process is therefore governed by the Council's own constitutional Contract Procedure Rules (2017) and is subject to the Council's Procurement Gateway Process.

It is important that the type of contract used manages the risks and reduces cost uncertainty. Three main options were considered: a traditional contract; a partnering contract with Early Contractor Involvement (ECI) and a Design and Build contract. A Design and Build contract was chosen, primarily as the contractor takes on the responsibility and risk related to the detailed design and construction of complex elements. This reduces risk to RMBC, whilst the integration of detailed design with construction generates efficiencies.

Stage 1 has been procured using the NEC3 Professional Services Contract and it is intended that Stage 2 will be procured using the NEC3 Engineering and Construction contract. Early involvement of Balfour Beatty as the principal contractor helps to ensure the development of a buildable and affordable scheme.

In terms of the form of contract, Option C (target cost with activity schedule) was chosen, as it incurs less risk in terms of the likelihood of project spend being significantly under or over the target cost, and incorporates a no pain no gain philosophy, with the flexibility of costs being capped to ensure no unexpected large overspends. The Scape procurement process has been chosen as the preferred procurement approach, as it provides the framework for an entire project lifecycle approach and a dedicated framework and relationship management team.

There are robust and effective payment mechanisms in place within the contractual arrangements to ensure continuity of delivery, with in-built incentives to drive on-time and on-budget delivery. The majority of the risk allocation is transferable from RMBC as the scheme promoter to Balfour Beatty as the contractor and this is a major benefit of the Scape framework design and build approach.

The main risk inherent in the contract type is that at completion the Price for Work Done to Date may exceed the Total of Prices and RMBC would then need to consider how to recover any overpayment. This could potentially lead to cash flow and covenant risk which must be considered and monitored via the risk management process contained within the Risk Management Strategy (Appendix L) and recorded via the Risk Register.

The contract milestones are set out in Table 7.

Table 7 - Contract Milestones

Milestone	Date
Design finalisation	W/C 05 August 2019
Issue of fixed price and contract schedule	End September 2019

Milestone	Date
Final Full Business Case submission to DfT	By 15 June 2020
Contract Award	03 August 2020
Construction works	01 September 2020 to 09 May 2022
Completion of construction and opening to traffic	10 May 2022 to 21 June 2022

Performance management will be achieved via a range of critical success factors and performance indicators.

Management Case

RMBC has an excellent track record in delivering large scale highway improvement schemes in accordance with planned budgets and implementation timescales, including the A630 College Road Roundabout Congestion Improvement scheme currently being delivered via Scape, and New York Junction Roundabout, which was delivered under budget. As part of a culture of continuous improvement, the Council carries out in-depth post project reviews on each major highway project to identify lessons learnt, and these have been applied to the development of the A630 Parkway widening scheme.

As a major transport scheme, the A630 Parkway widening scheme is being delivered via a three-tier governance structure, with a dedicated Project Board reporting to RMBC's Major Schemes Project Board, supported by a multidisciplinary delivery team. Within the governance structure, there is clear allocation of roles and responsibilities, with the outcomes of monthly A630 Widening Project Board meetings feeding into monthly Major Schemes Project Board meetings.

Stakeholders are incorporated into the governance structure, ensuring that they are engaged and informed as appropriate throughout the project lifecycle. Key stakeholders including the SCR Mayor, the three MPs and the LEP have all confirmed their support for the proposed scheme, as indicated in the Letters of Support (Appendix O), alongside a host of wider public and private stakeholders.

Key tasks and dates from the project plan are set out in Table 8.

Table 8 – Project Plan Key Tasks and Dates

Task	Start Date	Finish Date
Whole Scheme Lifecycle	**28/12/2018**	**21/06/2022**
Stage 1: Pre-Construction	**28/12/2018**	**31/07/2020**
Scheme Design Programme (WSP)	28/12/2018	31/07/2020
GI Works	08/04/2019	13/06/2019
Submission of Draft Full Business Case to DfT	25/10/2019	25/10/2019
Baseline Data Collection	01/11/2019	30/11/2019
Internal Gateway Review by Contractor	04/05/2020	08/05/2020
Submission of Final Full Business Case to DfT	**By 15/06/2020**	**By 15/06/2020**

Task	Start Date	Finish Date
DfT Full Business Case Review Period / Approval	15/06/2020	30/07/2020
DfT Approval to Proceed	**31/07/2020**	**31/07/2020**
Contract Award	03/08/2020	03/08/2020
Pre-Construction Issue of Documents and Post Award Meetings	03/08/2020	03/08/2020
Consents and Notices	03/08/2020	03/08/2020
Subcontractor Procurement	10/08/2020	29/07/2021
RMBC Grant Approval to Proceed to Stage 2 Construction	17/08/2020	17/08/2020
Stage 2: Construction	**01/09/2020**	**23/05/2022**
Site Establishment	01/09/2020	14/09/2020
Enabling Works	15/09/2020	06/10/2020
Construction Phases 1 to 20	07/10/2020	09/05/2022
Construction Completion	09/05/2022	09/05/2022
Produce As Built Information	10/05/2022	23/05/2022
Stage 3: Defects Correction & Lessons Learned	**10/05/2022**	**21/06/2022**
Defects Correction	10/05/2022	31/05/2022
Lessons Learned	14/06/2022	21/06/2022
Stage 4: Monitoring and Evaluation (Year 1)	01/06/2023	30/06/2023
Stage 5: Monitoring and Evaluation (Year 5)	01/06/2027	30/06/2027

Assurance and approvals processes are in place at RMBC, SCR and DfT levels, to ensure that the ongoing development of the scheme accords with the required processes and that it continues to pass successfully through the necessary gateways.

From the project outset, a comprehensive approach has been taken to stakeholder engagement and communications, based on clear identification of relevant stakeholders and their level of interest and influence. Scheme-specific engagement and communications activities range from public events to individual meetings, press releases and resident communications. Support for the scheme is evident, particularly in terms of the congestion relief that it will bring and the improved attractiveness of the area around the AMID to potential inward investors.

Project Risk is being actively managed by RMBC, alongside Balfour Beatty as the Principal Contractor and WSP as the Design Team. A project Risk Register has been developed, which is being maintained as a live document throughout the project lifecycle. The current version of the Risk Register identifies the risks at detailed design stage, with an assessment of the likelihood and potential level of impact of each risk. A QRA has been carried out, based on the Risk Register, to calculate an appropriate risk allowance to incorporate into the scheme costs presented in the Financial Case, at the P80 level. A Risk Management Strategy has been developed, that sets out how risks will be designed out, managed or mitigated as appropriate.

It is important to carry out robust monitoring and evaluation of the scheme following delivery, in order to determine its performance against the stated objectives. A Monitoring and Evaluation

Strategy has therefore been put in place, in accordance with the enhanced monitoring arrangements set out in the DfT's (DfT) Monitoring and Evaluation Framework for Local Authority Major Schemes[5] guidance. This sets out the baseline data collection activities that will be undertaken prior to the start of construction, and the monitoring activities that will underpin the Year 1, 3 and 5 reports. A Benefits Realisation Plan has also been developed, that will enable RMBC to understand the extent to which the scheme benefits have been fully realised. Simon Moss as the appointed Business Change Manager will hold overall responsibility for ensuring that the scheme benefits are fully realised.

Summary

This Full Business Case evidences the strategic rationale, VfM, affordability, commercial viability and overall deliverability of the proposed A630 Parkway widening scheme. Subject to DfT approval of the final Business Case in July 2020, the funding required for construction will be released, enabling contract award in August 2020 and a start date on site in September 2020.

[5] DfT Monitoring and Evaluation Framework for Local Authority Major Schemes 2012 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf)

1

STRATEGIC CASE

1 STRATEGIC CASE

1.1 INTRODUCTION

This Strategic Case evidences the rationale for the proposed A630 Parkway scheme, providing information on:

- The **strategic and policy context** in which the scheme will be delivered, with an ambitious vision set out by the SCR to be the best place to collaborate, invest, innovate and grow a business; and live, work, play and study.
- The transport specific and wider economic, environmental and social **problems identified**, that the scheme aims to address.
- The **impact of not changing** and allowing the status quo to continue.
- The **objectives** developed for the scheme.
- The **constraints and interdependencies** that have been considered in scheme development.
- The **scheme options considered** to meet the stated objectives.
- The **design** of the **preferred scheme option**, and the **benefits** that it is anticipated to deliver.
- Key **risks**, and how they have been managed throughout the scheme development process.
- The approach taken to **stakeholder engagement** and information provision.
- How the success of the scheme will **be monitored and evaluated**, and how RMBC will ensure that the **benefits will be fully realised**.

Together with the other four cases, the Strategic Case explains why this investment is needed now, in order to address existing and future problems and capitalise on opportunities for economic growth and development.

The Strategic Case has been produced with reference to the DfT's Strategic Case Supplementary Guidance Rebalancing Toolkit[1]. The toolkit supports authors of strategic cases in assessing how a proposed scheme fits with the national objective of spreading growth across the country. Although rebalancing economic growth is not a primary objective of the proposed A630 scheme, the scheme is expected to support economic growth within the SCR and could therefore contribute to the rebalancing agenda. Therefore, the guidance in the toolkit has been applied in a proportionate manner.

1.2 STRATEGIC CONTEXT

1.2.1 INTRODUCTION

This section sets out the proposed A630 scheme's geographical scope, and the economic, demographic and social context of the impact area, demonstrating how the scheme will help to improve both local and regional performance.

The A630 provides a major key route between Rotherham and Sheffield and is one of the busiest highways in the SCR, with an Annual Average Daily Flow (AADF) of approximately 65,000 vehicles[2]. The route is of particular importance for commuters into Sheffield.

[1] Strategic Case Supplementary Guidance Rebalancing Toolkit (DfT, December 2017)
[2] Two-way trips in 2017

Under the Transport Management Act 2004, RMBC as the Local Highway Authority is responsible for securing and facilitating the expeditious movement of traffic on its roads and the roads of nearby authorities. Noting that the A630 and the M1 Junction 33 are also key to the functioning of the Strategic Road Network (SRN), there is also a need to work closely with Highways England to provide sufficient capacity and ensure an efficient, safe transport network.

A 2017 study of 13 UK cities by Admiral Insurance (reported in Rotherham Business News[3]) revealed that the route between Rotherham and Sheffield is ranked as the 7th most congested route, falling just behind key routes in cities such as London, Bristol, Manchester, Newcastle and Liverpool. Journey times between Rotherham and Sheffield were found to take 14 minutes on a Sunday, compared to 40 minutes in the Monday morning peak hour, showing that travel times can be approximately 185% higher in the peak periods.

Wider health, wellbeing and social care considerations are interlinked with transport and economic drivers for the proposed A630 Parkway scheme. Rotherham's Joint Strategic Needs Assessment[4] identifies transport as a key issue. This is predominantly due to the existing traffic congestion on key routes for relatively short periods of time i.e. the morning peak, exacerbated by forecast increases of an additional 73,000 vehicles on the network by 2026[5], based on a 2007 baseline. General traffic over all periods is also expected to increase by 10% for both car and bus travel.

Almost everyone in Rotherham uses the local road network in some modal-form, with an associated risk of injury increasing as the network becomes busier. In 2014, a total of 820 people were injured on Rotherham's road network, with an associated cost of £59 million, including the cost to the NHS. Current pressures are also exacerbated by an ageing population, with the number of residents aged over 75 years set to increase by 12,000 people (61%) between 2010 and 2027, reflecting the national trend. There is therefore an increasing demand for older people to be able to travel regularly, cheaply and independently.

Rotherham's Transport Strategy 2016-2026 identifies the challenges caused by the current congestion and changing demands on the road network. There is not only a need to reduce delays and improve traffic flows on the A630; but also to use the road space more efficiently, particularly for people who need to drive to access opportunities, or who cannot use alternatives.

Key themes and actions for the Strategy include the requirement to reduce the amount of productive time lost on the strategic and local road networks and to improve resilience and reliability. Drivers for change include ensuring that roads and junctions are well maintained and are designed to reduce emissions and protect the natural environment whenever possible; whilst also supporting economic growth. This in turn will help to reduce driver stress and delay.

The Transport Strategy 2016-2026 states:

'Transport and accessibility are the glue that binds the Borough together. As the Borough grows it is essential to connect people with jobs, services, friends and families but the demand for travel needs to be balanced with a need to manage traffic congestion and to reduce the negative effects of vehicle use and emissions' (Transport Strategy 2016 -2026).

[3] Rotherham Business News: Parkway journey "one of the UK's most congested routes" (online)
[4] Rotherham Joint Strategic Needs Assessment 2019 (online)
[5] Rotherham Transport Strategy 2016-2026

Car dependency needs to be managed against complex economic and growth factors and balanced with more sustainable alternatives, if the ambitious economic vision at City Region level is to be achieved.

1.2.2 AN AMBITIOUS ECONOMIC VISION

1.2.2.1 SCR Strategic Economic Plan

The SCR is currently home to 1.8 million people, providing 842,000 jobs and annual Gross Value Added (GVA) of over £30 billion. Despite good recent performance in actual GVA growth, GVA per person remains low relative to other City Regions and the wider UK, with the SCR ranked 36th out of 39 LEP areas in England for GVA per person[6]. In 2015, the GVA per head of population was £17,984 compared to £21,341 per head for Leeds City Region (LCR) and £21,626 per head for Greater Manchester.

The SCR Local Enterprise Partnership (LEP) has set out an ambitious vision for the City Region:

'Sheffield City Region will be the best place to collaborate, to invest, to innovate and grow a business, and live, work, play and study. It will be supported by an unrivalled skills base and quality of life.'

This vision will be achieved by:

- Increasing the Gross Value Added (GVA);
- Increasing the number of jobs/overall employment rate;
- Rebalancing the economic base of the City Region, by:
  - Increasing the proportion of the workforce employed in the private sector
  - Helping address the economic performance gap that exists between the City Region (as with other northern city regions) and the Greater South East; and
- Capitalising and enhancing the quality of life in the SCR and delivering sustainable economic growth.

The main objective set out in the SCR Strategic Economic Plan[7] is to create 70,000 new private sector jobs and 6,000 new businesses in the City Region over the period 2015-2025. By 2017, activity led by the LEP and Combined Authority had already contributed 16,000 new jobs and leveraged approximately £318 million of private sector investment. This is in significant contrast to the period between 1998 and 2008, where the SCR was the only region in the UK to experience a net reduction in private sector jobs. A further aim is to reduce the gap between south east and key northern towns and cities and redress the balance in the UK economy.

1.2.2.2 Rotherham Economic Growth Plan

A similar level of ambition is set out in Rotherham's Economic Growth Plan[8] , where the vision for growth is to make Rotherham a place where:

- Businesses will flourish and grow;
- The population is highly skilled and enterprising; and

[6] Table A3: Nominal Gross Value Added per Head by Local Enterprise Partnership, (Office for National Statistics,1997-2015)
[7] Sheffield City Region Local Enterprise Partnership Strategic Economic Plan 2015-2025 (SCR LEP, March 2014)
[8] Rotherham Economic Growth Plan 2015-2025 (RMBC)

- The necessary infrastructure, including housing, is provided to support economic growth.

To achieve the vision, the aims set out in Rotherham's Growth Plan over the period 2015-2025 are to:

- Seek to deliver 10,000 net new jobs in the private sector;
- Seek to create 750 additional new businesses, by targeting the sectors with the greatest potential; and
- Seek to increase GVA through starting, growing and attracting businesses.

The Sheffield-Rotherham Economic Corridor is identified as a priority area for business growth, with the Advanced Manufacturing Innovation District (AMID) the first manufacturing based innovation district. Effective transport links to the AMID will be fundamental to its ongoing success as an investment and business development location.

This ambitious local and regional economic vision complements the wider objectives of the Northern Powerhouse agenda. The North's 'Performance Gap' (measured by GVA per capita) is persistent, averaging around 25% below the rest of England, and 10-15% when London is removed[9]. The productivity gap is largely driven by gaps in skills, technology and investment, as well as a lack of agglomeration and poor connectivity. Advanced Manufacturing is identified as one of the North's 'prime capabilities' that can help to address this gap.

As one of the SCR's key strengths, continued investment in Advanced Manufacturing in the City Region could help to close this gap and rebalance the economy, supporting a transformed future for the North with GVA 15% (£97bn) higher and productivity 4% than the business as usual projection by 2050. However, investment in the SCR and in other areas of the north is currently severely constrained by the need for simultaneous investment in transport connectivity and capacity, which is a key enabler of economic growth.

1.2.3 TRANSPORT AS A KEY ENABLER OF ECONOMIC GROWTH

1.2.3.1 Enabling Growth Through Transport Intervention

The Rotherham Economic Growth Plan identifies transport as a key theme. Transport is a key enabler of economic growth, as it provides residents with the chance to access employment, education, retail and leisure opportunities and enables businesses to transport goods and services. The importance of an effective, integrated and sustainable transport network that provides outstanding intra-region and inter-region connectivity cannot be overstated.

Rotherham benefits from its strategic location on the motorway network via the M1 and M18, with a heavy reliance on the car given the lack of mainline rail stops and in the context of declining bus patronage. The majority of residents work within Rotherham or neighbouring boroughs, with more than 33,000 daily 'travel to work' trips between Sheffield and Rotherham; hence local and City Region connectivity is paramount to achieving the economic growth objectives.

The SCR Mayor's transport vision[10] recognises the important role that transport has to play in economic growth and quality of life:

[9] The Northern Powerhouse Independent Economic Review: Final Executive Summary Report (SQW, 24 June 2016)
[10] The Mayor's Vision for Transport (SCR)

'By 2040 we will be a City Region with comprehensive, effective and integrated transport connections, which support economic growth and improve quality of life for all.'

The Mayor recognises that access to major employment sites and land available for development is currently constrained by congestion, which reduces productivity and competitiveness and restricts access to services, retail and leisure opportunities. By 2026, it is forecast that there will be an additional 500,000 journeys on the road and rail network every day, with continued development at sites such as the AMID generating additional jobs and additional demand for travel. The Mayor makes a commitment to ensuring that local, regional and national road and rail investment delivers for the SCR, with capacity improvements on the road network, particularly for east-west links, identified as a key intervention.

The SCR Transport Strategy[11] demonstrates how the SCR Combined Authority (SCRCA) intends to work alongside Transport for the North, Government, national delivery agencies and local partners in order to bring transport improvements that will allow the city region to achieve its economic ambition. The transport vision set out in the Strategy is:

'We will continue to be a forward-looking city region with integrated transport connections that support economic growth and improve quality of life for all.'

Two of the specific goals set are to:

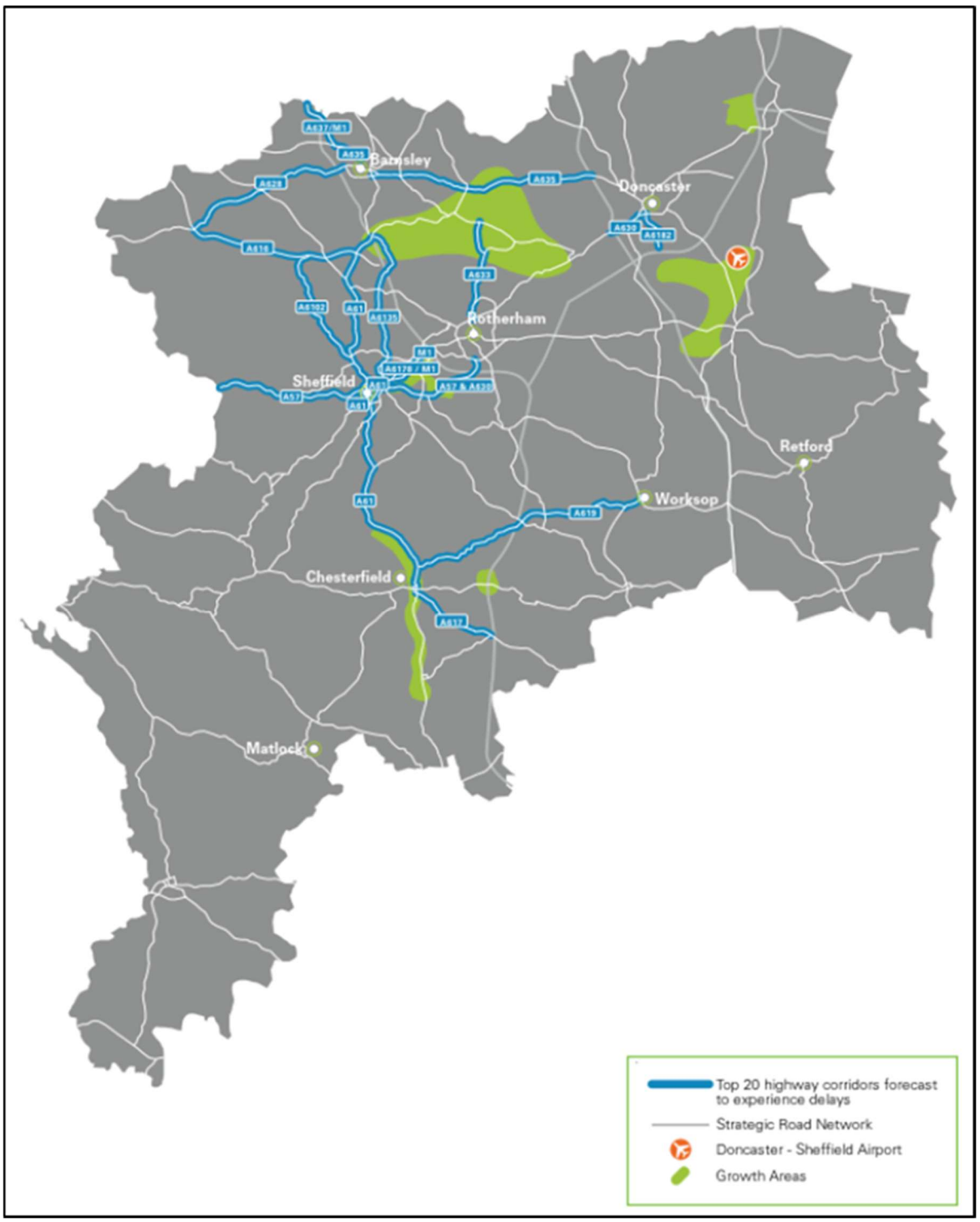
1. Increase productivity by £500 million through reducing delays on the transport network; and

2. Increase productivity by £75 million through technology-based efficiencies and reduced journey times.

The Transport Strategy sets out a commitment to develop a programme of improvements for the top 20 highway corridors in the SCR that are forecast to experience increased delay as a result of population and economic growth by 2025, which are shown in Figure 1-1. Without intervention, this forecast growth will cause congestion to increase, worsening delays, journey time reliability issues and contributing to secondary impacts on health, noise and air quality.

[11] Sheffield City Region Transport Strategy 2018-2040 (SCR, November 2017)

Figure 1-1 - Top 20 SCR Highway Corridors Forecast to Experience Increased Delay



Source: SCR Transport Strategy

1.2.3.2 Investing in Development Opportunities

The Sheffield City Region Investment Fund (SCRIF) includes a £650 million investment into the transport network, to support economic growth through to 2021. This includes the A630 Parkway scheme between the Catcliffe Interchange and the M1 Junction 33, where investment aims to

reduce congestion and improve journey times to support housing and employment growth around the Advanced Manufacturing Park and Waverley New Community.

Waverley New Community/Highfield Commercial Development

The Waverley regeneration project is the largest brownfield site development in South Yorkshire, covering 741 acres, an area bigger than Sheffield City Centre. The site has a SHA of 4,000 homes, 1,000 of which have now been built as part of a 20-year build out programme.

Between 2012 and 2016, Taylor Wimpey, Harron Homes and Barratt Homes were the first housebuilders on site to deliver the first 500 homes. This was continued in 2017 by Avant developing two further plots to deliver 281 homes, with Taylor Wimpey adding a further 130 new homes and a development of 40 two-bedroomed homes on the parcel of land known as Sky House. In 2019, Barratt Homes purchased a site on the eastern side known as Delta. The site is currently developing at a rate of approximately 150 homes per year, described by the Harworth Group (the Waverley regeneration company) as *'the birth of new community and once fully built out over the next 10 years will see a bustling population of around 9,000 people living in a green and attractive lakeside development.'*

Furthermore, plans to deliver a new £50 million retail, leisure and office development (Highfield Commercial Development), which will create 700 new jobs, have also been approved by RMBC.

Distinct planning applications were submitted for the residential and commercial elements of development at Waverley, including Waverly New Community and the subsequent Highfield Commercial development, which comprises of 60,000m^2 office space, 4,000m^2 hotel and 500m^2 ancillary retail.

The cumulative traffic impacts were noted as significant, with the need for mitigation proposals for the Poplar Way/Highfield Lane junction to support the wider development. Mitigation included junction improvements on the A630 Parkway/Poplar Way/Europa Way, with the creation of a third circulatory lane at the Europa Way junction and widening of the approach to two lanes. The A630 Parkway widening scheme will therefore complement other planned mitigation measures.

Within the Transport Assessment for the Highfield Commercial development (2008), it is acknowledged that in the 2019 Forecast Year, AADT will increase on the A630 Parkway, further emphasising the necessity for appropriate mitigation measures:

- AADT of 74,504 on the A630 Parkway, north of Poplar Way, equating to a 1.6% increase.
- AADT of 88,335 on the A630 Parkway / Poplar Way to Handsworth Road, equating to an increase of 3.8%.

Norfolk Estate

There are also plans to develop the Norfolk Estate land to the west of the rail line, known as Handsworth Hall Farm, where there is an allocation of up to 1,470 homes and 22ha of community space.

These two sites are fundamental to the delivery of the ambitious housing growth targets set out in Local Plan documentation.

Although these two sites have good accessibility to the SRN via the A630, the sheer scale of the development proposed, which is already being substantially delivered, has the potential to generate a significant number of vehicle trips. This will be a particular issue in the short to medium term, prior

to planned improvements to the public transport network coming forward. Pressures on the A630 will increase to unacceptable levels, threatening the ability to bring forward further development.

AMID Spatial Growth Zone

The Transport Strategy highlights the particular importance of the AMID, which incorporates the AMP, to the wider economic success of the City Region. Located in the Don Valley Corridor, the AMID is one of seven spatial growth zones identified as a priority to support the City Region's growth aspirations and has the potential to be the SCR's primary economic driver, as well as supporting the wider growth objectives of the Northern Powerhouse and the UK economy as a whole.

The AMP is the largest in Europe and has quickly developed a reputation as a centre for excellence for advanced manufacturing and precision engineering at a national and global level. The Park has already attracted significant inward investment from leading private sector organisations such as Rolls Royce and Boeing, in addition to world leading research centres such as the University of Sheffield's Factory 2050.

There are still 67 acres of commercial space available on the site and plans to further expand the Sheffield Airport site to the north of the Parkway (AMP2), which will deliver additional commercial development land. These development aspirations will place additional pressure on the local highway network, in particular the A630 Parkway, which provides direct access to the site. Investment in transport infrastructure is required to address existing capacity issues, which are forecast to worsen with increased demand, and to unlock the potential for growth on these sites, in order to:

- Attract and retain talent;
- Boost competition; and
- Harness the benefits of agglomeration.

Improved transport infrastructure is required to ensure that the benefits of AMID are seen across the City Region, building on the success of investment from world-renowned corporations such as McLaren.

Alongside the proposed A630 Parkway scheme, a further major highways improvement scheme is also being progressed within the AMID. The SCR Innovation District (SCR ID) scheme will deliver a new strategic road corridor across the AMID that will radically improve connectivity and free up additional capacity for growth, complementing the proposed A630 Parkway scheme. However, the A630 stands alone in providing crucial east-west connectivity across the region.

1.2.4 THE SCALE OF THE CHALLENGE

1.2.4.1 The SCR Economic Area

The City of Sheffield and the Metropolitan Borough of Rotherham operate as a single highly integrated economy within the Northern Powerhouse, located at the geographical heart of England. With a combined population of over 840,000 people, and an economy worth £15.7 billion annually, the area is similar in size and economic significance to Newcastle and Liverpool.

Drawing on a 200-year history of manufacturing excellence, Sheffield and Rotherham are internationally recognised for iron and steel-making and associated heavy engineering. Sheffield has also grown as a major university city with an annual enrolment of around 60,000 students. This

combination of manufacturing expertise and university-led research capability has resulted in significant investment in applied research and development, leading to a shift to advanced manufacturing.

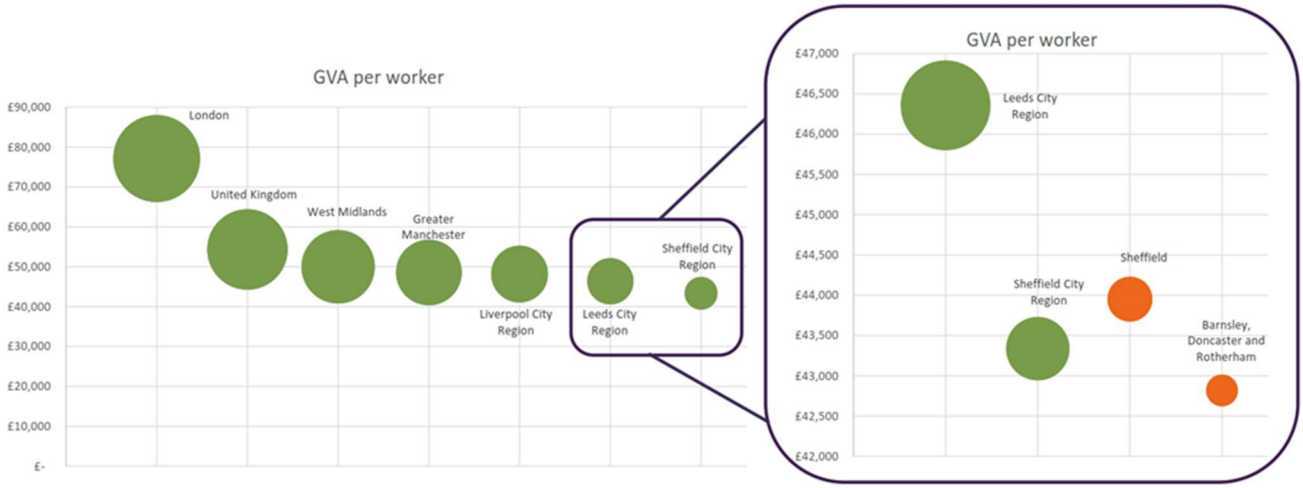
A culture of innovation has formed, focused in the Lower Don Valley area, and the AMID is now recognised as the UK's largest research-led advanced manufacturing cluster, supporting a number of physical assets:

- **Advanced Manufacturing Park** – home to 50 companies in research and development and advanced manufacturing sub-sectors and supporting 70 jobs.
- **Sheffield Business Park** – with 30 companies, and host to Sheffield University's £43 million manufacturing research facility Factory 2050.
- **The Olympic Legacy Park** – a strategically important centre for sports and learning.
- **Tinsley Park Enterprise Zone** – ideal for modern manufacturing and distribution activities, with 16 hectares of the total 20 hectares currently undeveloped.
- **Europa Link Enterprise Zone** – one of Yorkshire's largest business parks, and host to HSBC, Siemens and South Yorkshire Police.
- **Sheffield City Centre, Rotherham Town Centre and Meadowhall Shopping Centre** – comprehensive retail and leisure facilities, as well as a number of prominent business quarters

1.2.4.2 A Growing but Underperforming Economy

Although the SCR has a growing economy, the economy has consistently underperformed since the 1970s, leaving its relative position unchanged. Figure 1-2 shows that the GVA per worker in the SCR is lower than that for other city regions and the UK as a whole. The low GVA per worker in Barnsley, Doncaster and Rotherham (sub-£43,000) brings down the performance of the SCR as a whole.

Figure 1-2 - GVA Per Worker

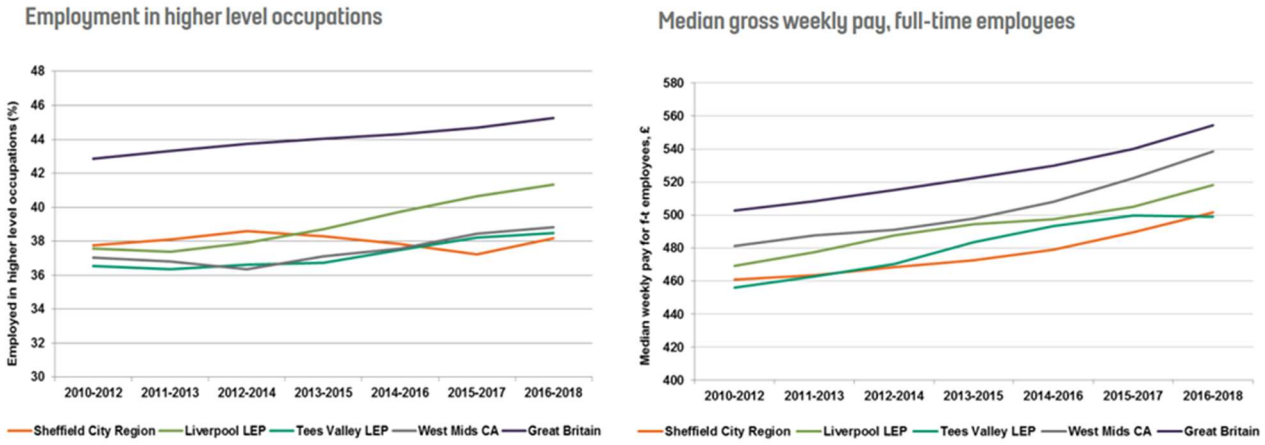


Source: ONS GVA per Worker Estimates (2018)

Employment and productivity growth has largely been in low pay and low productivity sectors, and not at the scale that can drive transformational economic growth. Figure 1-3 shows that employment in higher level occupations lags behind other UK LEP areas, with around 38% of employees in higher level occupations, compared to over 41% in Liverpool and over 45% for the country as a

whole. The median gross weekly pay in the SCR is around £500, which is on a par with the Tees Valley LEP area but behind Liverpool, the West Midlands and the country as a whole.

Figure 1-3 - Employment in Higher Level Occupations/Median Gross Weekly Pay

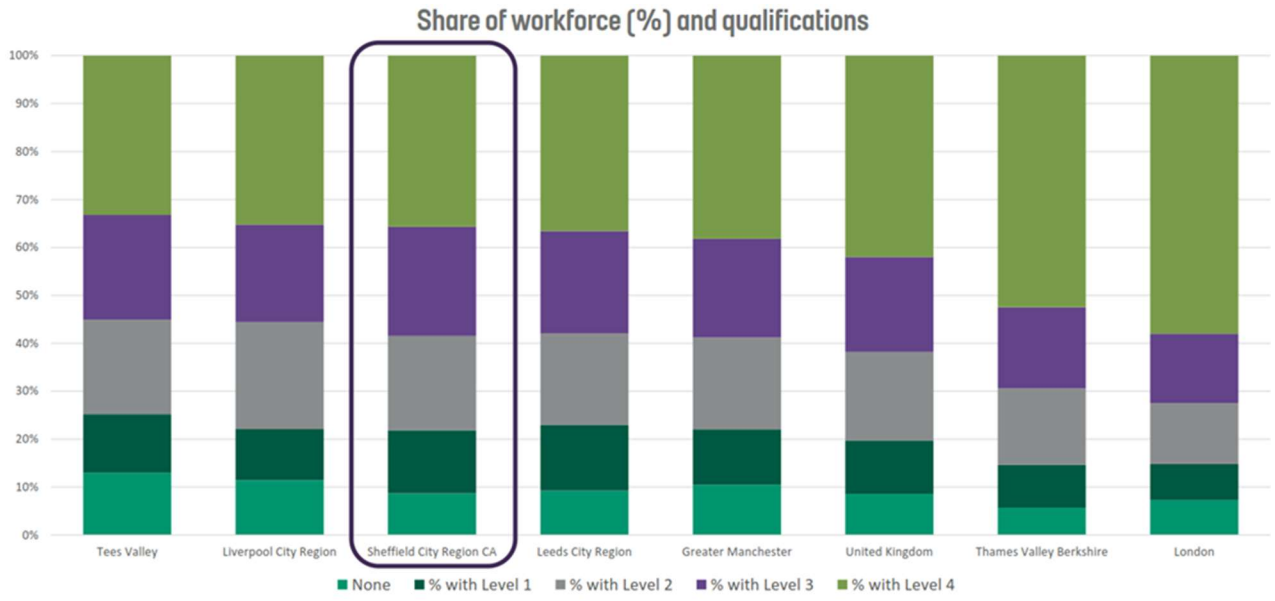


Source: CRESR Inclusive Growth Report (2019)

The SEC is a lower skilled economy, as evidenced by the proportion of the workforce with higher level qualifications. There are 186,300 across the city region employed in low wage sectors and the SCR has a lower share of managerial and professional occupations in its economy compared to the national economy.

Figure 1-4 shows that approximately 35% of the SCR workforce has a Level 4 qualification, compared to over 40% in the UK as a whole. However, the proportion of the SCR workforce with no qualifications is slightly lower than that for Tees Valley, the Liverpool City Region, Leeds City Region and Greater Manchester.

Figure 1-4 - Workforce Qualifications by City Region

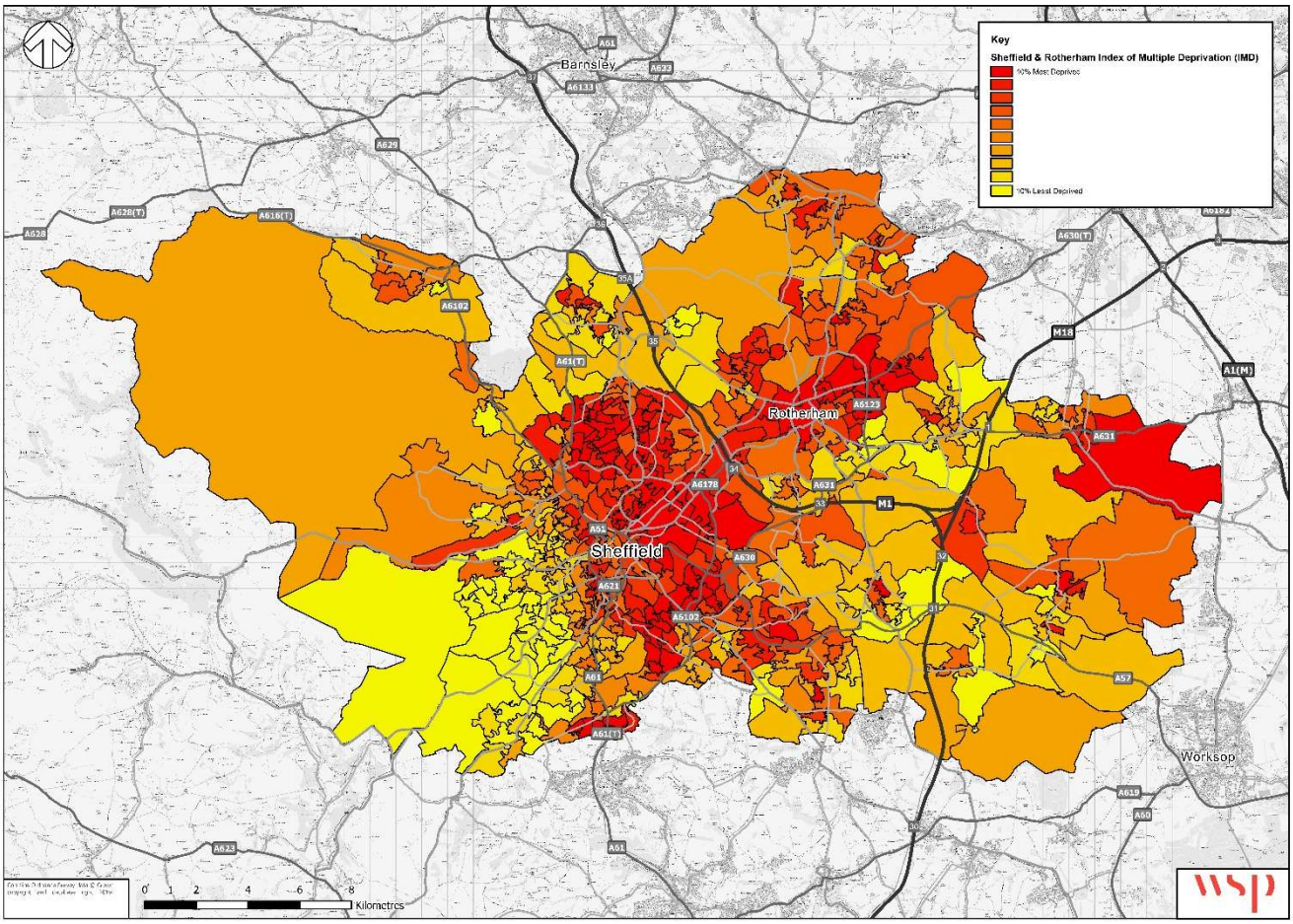


Source: Annual Population Survey (2018)

Structural change in the SCR economy gives cause for concern, most notably in relation to slow wage growth, low productivity, the increasing proportion of people working in low pay sectors, and the stagnation in the proportion of employment in higher level occupations. This highlights a need for inclusive growth to identify how residents and workers in SCR can increase access to opportunities.

The SCR ranks as the 7th most deprived LEP area in England. Figure 1-5 shows that there are widespread areas within our City Region that are within the most deprived in the country, including areas traversed by the A630 Parkway, and in some locations such as Rotherham, deprivation increased between 2007 and 2015.

Figure 1-5 - SCR Index of Multiple Deprivation

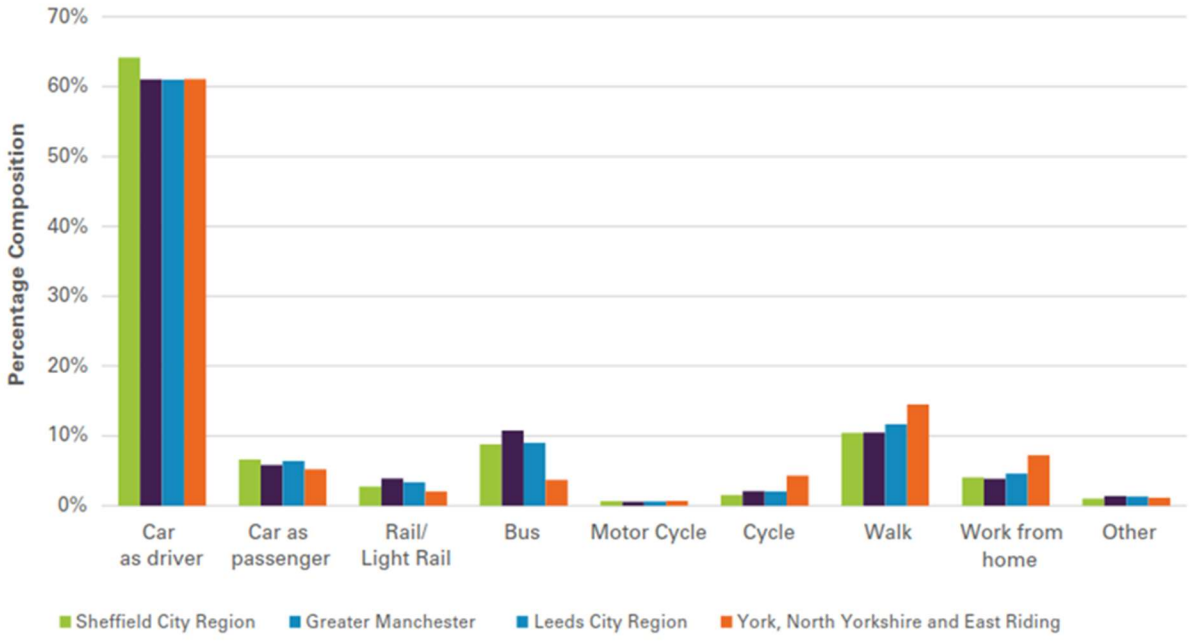


At the more localised Rotherham level, the 2019 economic activity rate for those aged 16-64 (75.9%) has remained relatively unchanged since 2004 (75.7%). Over the same period, the unemployment rate for those aged 16-64 increased, from 3.8% to 5.4%. The proportion of those who are economically inactive but who would like a job increased substantially, from 15.4% to 30.9%. The proportion of people with no qualifications decreased significantly, from 17.2% in 2004 to 8.6% in 2019. The proportion of people with higher level qualifications also increased, from 16.8% of those aged 16-64 with NVQ4 in 2004 to 25.9% in 2018.

In terms of travel behaviour, the proportion of people travelling to work by car in the SCR is higher than in other northern LEP areas, as shown in Figure 1-6. This shows the reliance of local people on

the car, and the need to invest in the highway network to facilitate fast, reliable journeys, as well as investing in public transport, walking and cycling, to reduce reliance on the car.

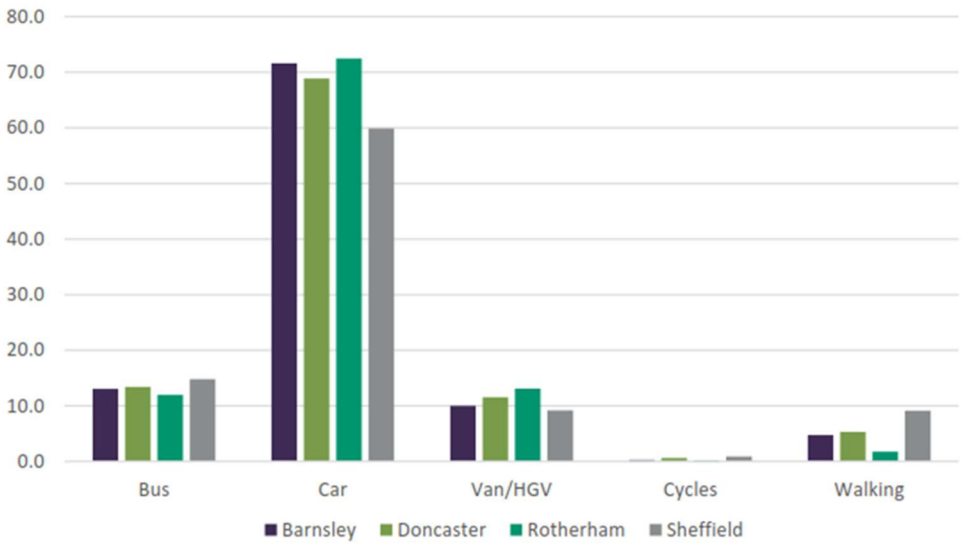
Figure 1-6 - Mode Share Comparison of SCR with other LEP Areas



Source: SCR Transport Strategy, based on Census 2011 data

Furthermore, car use in the SCR has increased since 2001, in contrast to the national trend of decreasing car use. Rotherham in particular shows high levels of car use, at more than 70% mode share, as shown in Figure 1-7. This is illustrative of its lack of mainline rail services, proximity to the motorway network, and predominance of areas where the bus does not offer a practical or attractive alternative to the car, including the area around the AMID.

Figure 1-7 - Cordon Count Mode Share (%)



Source: Annual Population Survey (2018)

1.2.4.3 The Role of Transport in Driving Economic Growth

Greater transport network connectivity and capacity is needed to support economic growth, particularly in terms of ensuring that people are able to gain the skills that they need and that the right people are matched with the right jobs. In order to perform at the economic level expected in line with other LEP areas, the number and proportion of highly skilled jobs needs to increase, which highlights the importance of attracting further investment into the AMID, as a key innovation district.

Transport connectivity and capacity issues threaten the ability of the City Region to continue to attract investment from high-profile employers who offer high-skilled jobs. Furthermore, these transport issues limit the ability of people to access employment. Improved connectivity enables people to travel further to access a wider pool of employment and training opportunities.

There are ambitious proposals set out in the SCR Transport Strategy to develop a mass transport network, that will facilitate inter-regional and intra-regional connectivity and help to reduce the reliance on the car. As nearly 75% of commuting distances for jobs in the SCR are under ten kilometres[12], public transport offers a viable alternative to the car, with active modes more suitable for shorter trips.

However, changes in annual bus patronage from approximately 114 million in the 2003/4 financial year to just over 100 million in the 2016/17 financial year[13] indicate the scale of the challenge in terms of reversing a significant decline in bus use.

The development of a mass transit network is a long-term prospect, and investment in shorter term proposals is needed to accommodate the demand for travel in the interim. This is particularly important for Sheffield-Rotherham travel to work movements, which comprise of nearly 33,000 trips per day[14]. The A630 is one of the key routes for travel between Sheffield and Rotherham, and demand for use of this route is forecast to continue to increase.

Policy CS15 in RMBC's Local Plan[15] regarding key routes and the SRN states:

'Concentrating through traffic on motorways and A roads with best use made of the existing road capacity to enable this'… 'improving specific key routes to manage congestion including traffic management measures'…

Hence, investment on key routes such as the A630 Parkway supports the Core Strategy, by enabling better use of the existing road network through enhanced capacity.

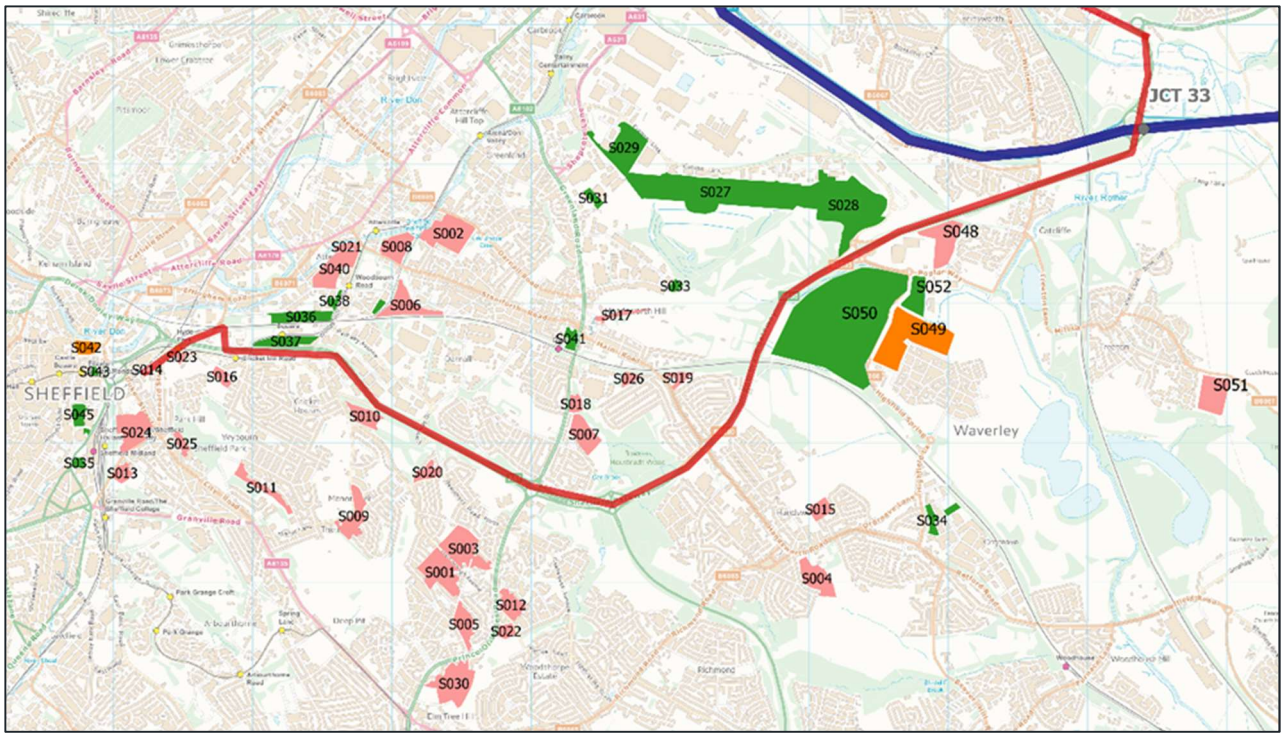
1.2.5 BOOSTING OUR ECONOMIC PERFORMANCE

There are currently 19 commercial, 29 housing and 2 mixed-use development site opportunities being promoted through local planning within the A630 Parkway corridor, totalling 50 development opportunities which are largely expected to be delivered over the next 10-15 years. Analysis of site capacities suggests that there is sufficient capacity across the corridor development site portfolio to support a total of around **8,300 new dwellings** and around **454,900 sqm** of new Gross External Area (GEA) commercial space[16]. It is currently anticipated that the commercial space could support

[12] Annual Population Survey (2018)
[13] Bus Patronage Data (SYPTE, 2017)
[14] SCR Transport Strategy 2018-2040 (SCR, November 2017)
[15] Rotherham Local Plan Core Strategy 2013-2028 (RMBC, adopted 2014)
[16] A630 Sheffield Parkway Wider Economic Benefits (Genecon, September 2019)

a range of uses, including A1-3 Retail, B1a Office, B2 Manufacturing, B8 Warehousing, C1 hotels and D2 Leisure. Figure 1-8 illustrates the development site opportunities.

Figure 1-8 - Sheffield Parkway Corridor Impact Area & Development Site Opportunities



Source: A630 Sheffield Parkway Widening Assessment of Wider Economic Benefits (Genecon, September 2019)

Whilst there are development opportunities across the corridor, it is notable that the proposed highway works on the A630 Parkway are directly adjacent to the AMP and SBP opportunities, which are widely known to be the major opportunities for growth not only in the corridor but also across the AMID. Future opportunities at the AMP and SBP alone have capacity to support around **80% (309,200 sqm GEA)** of future commercial space within the Parkway corridor.

With significant identified existing highways constraints in the local area, it is increasingly difficult for new developments to be permissible through planning. Even with the proposed A630 Parkway widening scheme in place, it is considered that much of the Parkway corridor growth opportunity could not be progressed. It is for this reason that the SCR Innovation District Scheme (SCR ID) is also being progressed, to free-up further capacity to help maximise development outcomes across the AMID.

Genecon's Wider Economic Benefits assessment for the SCR ID Scheme (2018) concluded that a maximum of 30% of AMID growth could be achieved without the scheme, and this level of growth is also considered to be the maximum possible outcome in the Parkway corridor, even with the A630 Parkway widening scheme in place.

It is therefore considered that the delivery of the preferred options for both of these schemes effectively has potential to influence to some extent the viability of delivering a **maximum of 30% of the 50 development sites within the Impact Area**, equating to around **117,000 sqm of new commercial space** and around **2,300 new housing units**.

Modelling of the potential impacts across the development sites[17] suggests that they could support approximately **11,929 gross new Full Time Equivalent (FTE) jobs**. Taking into account leakage, displacement and multiplier effects, it is anticipated that when delivered the portfolio of sites could support around **1,394 net additional FTE jobs within the UK labour market by 2038**. When considering the effects of economic rebalancing within the UK, it is estimated that the portfolio of sites could support around **6,171 net additional FTE jobs at the SCR level by 2038**. This is in addition to temporary construction-related employment associated with bringing these sites forward.

The wider impact of these additional jobs on the economy is estimated to be approximately **£774m in cumulative Gross Value Added (GVA) towards the UK economy by 2038 (£569m at Net Present Value (NPV))**. Moreover, modelling suggests that the development of these sites has the potential to additionally bring approximately **£734m in gross Land Value Uplift, £121m in Business Rate Returns** and **£95m in Council Tax returns by 2038**.

This growth potential will support wider aspirations for growth and development in the City Region, and help to meet the scale of the economic challenge identified in the Strategic Economic Plan over the period to 2025, as follows:

- 70,000 jobs to narrow the gap with other parts of the country;
- An additional 6,000 businesses to reduce the enterprise deficit;
- 30,000 highly skilled occupations to create a more prosperous economy; and
- An increase in GVA in excess of £3 billion to close the productivity gap.

In recognition of the significance of infrastructure in driving economic growth, the SCR has developed an Integrated Infrastructure Plan[18] that sets out three complementary types of infrastructure required to deliver growth in the City Region, as follows:

- External connecting infrastructure: supporting external connectivity with neighbouring LEPs or across greater spatial scales.
- Transformational infrastructure: directly contributing to the delivery of growth, investment and jobs within the City Region; and
- Enabling infrastructure: offering opportunities to unlock growth and sites which would otherwise have been constrained. This type could also include schemes which enable the development of other infrastructure types.

Transport in particular has a key enabling role to play. Investment in the transport network can help to increase levels of employment, by improving access to jobs, increasing productivity and allowing faster access to markets.

Public transport services in key growth areas such as the AMID and Waverley New Community are limited, as they are not served by tram or a high frequency bus network. Although there are longer-term plans to address public transport connectivity, action is needed in the short term to address issues of traffic delay and congestion, given the current reliance on the car.

[17] A630 Sheffield Parkway Wider Economic Benefits (Genecon, September 2019)
[18] Sheffield City Region Integrated Infrastructure Plan (April 2016)

The strategic rationale for the A630 Parkway widening scheme incorporates the need to improve the key highway route between Sheffield and Rotherham, improve the resilience of the wider SRN around Rotherham and deliver an essential capacity improvement to the transport network that will support major developments in the AMID and Waverley New Community.

There are ambitious plans to improve the economic performance of the SCR, and transport has a key role to play in this. The importance of the car in the local context is evident, and although there are longer term plans to transform the public transport network, additional highway capacity is needed in the short term.

The A630 Parkway widening scheme will provide additional capacity in an area of significant growth and development, with limited public transport provision. The ability of local people to make reliable, efficient journeys to work, education and for other purposes is paramount in a growing economy.

This section has highlighted the role of the proposed scheme as an enabler for economic change, that could support delivery of 783 net FTE jobs (construction and operation) at SCR level and 173 net FTE jobs (construction and operation) at UK level, as well as £77.9 million GVA (NPV) at UK level and £352.7 million GVA (NPV) at SCR level.

1.3 BARRIERS TO ECONOMIC GROWTH

1.3.1 OVERVIEW

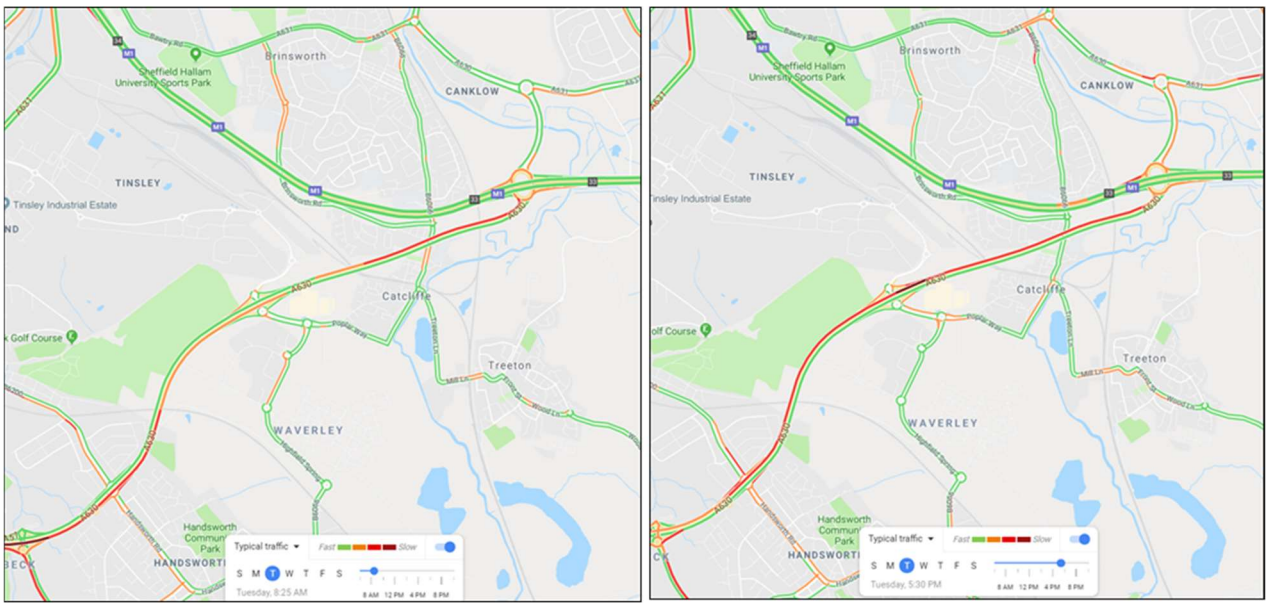
This section identifies the transport and wider problems that the proposed A630 Parkway scheme aims to address. Each problem is discussed in terms of its severity and impact, underpinning the rationale behind the proposed scheme.

1.3.2 TRAFFIC DELAY AND CONGESTION

The A630 is a key link within the local and wider strategic transport network, providing access to both the district centres of Sheffield and Rotherham and also feeding traffic from those centres onto the SRN at Junction 33 of the M1. It is one of three competing routes for crossing the SRN in this area, alongside the minor routes of Long Lane and the B6066 Whitehall Lane. The majority of traffic uses the A630 Parkway to cross the SRN in all time periods. The AM peak period for northbound traffic (Sheffield to Rotherham) is the most heavily trafficked.

As a dual carriageway with AADT of approximately 65,000 vehicles, the A630 regularly operates close to capacity, leading to delay, congestion and impacts on journey time reliability, as well as associated negative impacts on air quality. There are regular queues along the A630, as shown in Figure 1-9, particularly in the PM peak, with consequent unreliability for traffic travelling towards the M1 from Sheffield. Typical PM peak journeys can vary between nine and 22 minutes for the 3-mile journey between the A57 and M1, equating to speeds as low as 10mph. This is due to a variety of factors, the most prevalent being insufficient lane capacity on the A630 approaching the motorway junction.

Figure 1-9 - AM Peak (Left) and PM Peak (Right) Typical Traffic Conditions



The M1 itself also suffers from delay, and the stretch between Junctions 33 and 35 is recognised in the top 20% of vehicle hours delay over Highways England's network. In 2017, Highways England completed a scheme to convert the M1 Junctions 32 to 35a to smart motorway, to help accommodate the 110,000 vehicles using this section. The scheme provided an additional lane to traffic, thus helping to reduce congestion on the motorway mainline. However, the provision of increased capacity attracts additional traffic, leading to issues on the slip roads and at the motorway junctions, which have not been improved as part of this work. Mitigation is needed to address this, in particular at the signalised roundabout at Junction 33.

In 2014, a £2 million improvement scheme was completed at Junction 33, as part of the Highways England Pinch Point programme. This included widening the southbound exit slip road and roundabout to four lanes, building on a previous scheme to widen the northbound exit slip road to four lanes. The scheme also incorporated Microprocessor Optimised Vehicle Actuation (MOVA) upgrade.

These relatively minor improvements produced a First Year Rate of Return (FYRR) of 58%, one of the largest total benefits in the Pinch Point Programme at just over £1 million in the first year[19]. The impact of congestion was reduced from 2013 (before delivery of the Pinch Point scheme) at around ten minutes of delay over an evening peak lasting over two hours, to around three minutes of delay lasting less than two hours in 2014[20]. However, despite these improvements, congestion is still regularly seen at the junction in the peak periods. This affects the motorway slip roads and the A630 in both the morning and evening peaks. Analysis of the flows captured by the MOVA units shows that the critical lanes are at capacity in both peaks, leaving virtually no scope for traffic growth on the heaviest movements without exceeding junction capacity.

[19] National Pinch Point Programme: One Year After Evaluation Meta-Analysis (Highways England, November 22nd 2017 | 5150707January 2019)
[20] M1 Junction 33 MOVA Traffic Signal Control Implementation – April 2014 (Mouchel, 17/12/2014)

There are particularly significant capacity issues on the M1 between Junctions 33 and 34, caused in part by the interaction of local and strategic traffic on the SRN and exacerbated by relatively few access points for Rotherham-Sheffield traffic to cross the SRN, impacting on journey time reliability. A significant proportion of all trips accessing Junctions 33 and 34 are localised trips which are travelling between the key destinations of Sheffield, Rotherham and Meadowhall. This includes the Junction 33 northbound off-slip to the A630 Parkway, which is a key route providing strategic access to the advanced manufacturing cluster and AMID site.

These localised traffic movements place unnecessary stress on strategic movements at the junctions and on their approaches and, without sufficient mitigation, these issues are likely to worsen. Delay has increased with increases in traffic demand. The predicted increases in traffic demand associated with both overall growth forecasts and proposed development near the M1 Junction 33 are forecast to result in substantially higher delay, as the junction reaches capacity. In order to gain significant further improvements in junction performance, widening of the A630 Parkway is essential, to allow three lanes through the junction for the heavily trafficked movements to and from the A630 Parkway.

Base year (2015) traffic modelling indicates the following network performance statistics when compared to the interpeak, taking the interpeak to represent 'free-flow' conditions:

- **AM Peak** - the models indicate capacity to be at 78% just after the M1 northbound on-slip at Junction 33 on the motorway mainline; also at the M1 northbound Junction 34 off-slip where those remaining on the motorway links are at 79% capacity due to the motorway reducing to two lanes (pre-SMART motorway flows).
- **PM Peak** - the models show two instances of capacity above 80%, these being the mainline motorway at the Junction 34 northbound off- and on-slips (81% and 104% respectively).

Traffic modelling undertaken for 2021 shows that:

- **AM Peak** - the M1 northbound on-slip at Junction 33 is forecast to experience a large increase in delay despite the implementation of the SMART motorway scheme, with the on-slip at 80% capacity and the mainline motorway at 86% capacity. The other significant issue experienced in the model is the M1 northbound Junction 34 on-slip, where the main motorway flow is at 77% capacity. Significant capacity issues are therefore forecast during the AM peak hour, and as such impact on journey time reliability. With additional traffic growth, junctions will become over capacity and delays will increase.
- **PM Peak** - the M1 northbound on-slip at Junction 33 is forecast to experience a large increase despite the implementation of the SMART motorway scheme, with the motorway mainline at 80% capacity. The SMART motorway scheme is however forecast to have a positive impact on capacity issues at the M1 northbound Junction 34 on-slip, which is forecast to operate at 98%. However, with forecast traffic growth, it is anticipated that all motorway junctions in this area that are close to capacity will be pushed over capacity.

These model outputs should also be viewed with the knowledge that the peak hour models represent an average hourly flow over the three-hour peak, and therefore underestimate the true peak hour.

Traffic delay and congestion issues are frequently highlighted by stakeholders as having a negative impact on business and investment. In 2014, the Sheffield Chamber of Commerce Transport Forum identified the A630 as one of the key congestion hotspots limiting the potential for growth:

"The Chamber is still concerned not enough is being done to improve traffic flows, and urges the Council, Highways Agency and the Local Enterprise Partnership to work more closely to get schemes in place to improve the situation" (Tim Hale, Sheffield CoC Transport Chair, 2014).

In addition, RMBC regularly receives complaints from local residents regarding congestion on the A630 Parkway and associated congestion on local routes in surrounding residential areas.

The A630 Parkway scheme will be fundamental in reducing existing and forecast delay and congestion, and in addressing resident and business concerns.

1.3.3 INTERACTION OF LOCAL AND STRATEGIC TRAFFIC

Issues of delay and congestion on the A630 Parkway lead strategic traffic to seek out quieter local routes as a means of reducing journey time delays. This has adverse effects on local communities, in particular Brinsworth and Catcliffe, where the volume of traffic in peak times worsens air quality, creates noise and limits the ability to develop communities that support walking and cycling.

The bus gate at Wood Lane is subject to a high number of contraventions on a daily basis, as a result of drivers travelling to Sheffield Business Park seeking to avoid congestion on the A630 Parkway. An Automatic Traffic Count (ATC) carried out in January 2018 by RMBC shows that, on weekdays, there are approximately 500-550 vehicles travelling through the bus gate in a 24-hour period, of which only 80-100 are buses. In the 7-day period that the traffic count was undertaken, over 3,000 vehicles used the bus gate, of which only 500 were buses. Therefore 83% of vehicles were abusing the facility, highlighting the congestion faced.

The A630 Parkway scheme is essential to reduce the current adverse impact of strategic traffic on local communities.

1.3.4 LACK OF SUSTAINABLE TRANSPORT ALTERNATIVES

1.3.4.1 Overview

The A630 forms part of the key route network for commuting between Sheffield and Rotherham and the surrounding residential areas of Brinsworth, Tinsley, Wickersley, Whiston, Treeton, Catcliffe and the developing area around Waverley.

Currently there is poor public transport connectivity in the area around the A630 Parkway, which limits access to jobs and opportunities at the AMID and increases reliance on car trips. Car use in the wider SCR has increased since 2001, in contrast to a decline nationally, and the SCR travel to work car mode share is higher than other northern LEP areas. Rotherham in particular shows high levels of car use, at more than 70% mode share[21].

Car travel is therefore an essential choice for many commuters across the wider region, as well as being a preferred method for leisure and retail use. Furthermore, in the context of an ageing population, car use will remain a necessary means of independence.

1.3.4.2 Bus Provision

Public transport accessibility to the AMID is largely limited to bus services, with three bus services serving the site as follows:

[21] Annual Population Survey (2018)

- The 74a operated by First, which operates on a 30-minute frequency at peak times, travelling between Sheffield and Harthill via Attercliffe, Sheffield Business Park, Catcliffe, Treeton, Aston and Todwich.
- The A1 operated by TM Travel, which runs on a 30-minute frequency between Rotherham and Parkgate Shopping Centre.
- The new express X6 service operated by Stagecoach, which runs every hour between Sheffield and Doncaster Sheffield Airport, with 30-minute frequency services to Waverley Advanced Manufacturing Park.

Although overall bus accessibility to the AMID is reasonable, congestion and network reliability issues impact on the reliability of bus services. As a result, many employees in the area, or those seeking jobs within the AMID, often cite poor bus service accessibility as a barrier to use. Demonstrable critical mass is needed to enable bus operators to introduce new commercial services.

Within the wider area, public transport services are sporadic, with relatively low frequency bus services as shown in Table 1-1.

Table 1-1 - Bus Services on the A630 Parkway and in the Wider Area

Service	Operator	Route	Frequency (Mon – Fri)	Frequency (Sat & Sun)
Services on the A630 Parkway				
X6	Stagecoach	Sheffield – Handsworth – Waverley AMP – Wickersley – Bramley – iPort – Doncaster Sheffield Airport	04:30 – 23:15 every 30 minutes	Saturday 08:44 – 23:10 every hour; Sunday 06:53 – 21:05 every 90 minutes
X7	Powell Bus	Sheffield – Maltby	16:40 – 17:40 every 30 minutes	No weekend service
A1	Powell Bus	Sheffield – Meadowhall	08:50 – 16:20 every hour	No weekend service
X54	TM Travel / First	Sheffield Business Park (Sundays) – Catcliffe – Treeton – Swallownest – Aston – Todwick - Harthill	06:52 – 18:17 every hour	Saturday 08:00 – 18:17 every hour; no Sunday service
X74	First	Sheffield – Parkway Industrial Estate – Tinsley Park - Rotherham	04:40 – 08:35 every 30 mins; 16:55 – 21:00 every hour	Saturday 04:40 – 21:00 every hour with no services between 08:10 and 18:00; no Sunday service
Services Routing Adjacent to the A630 Parkway				
74 and 74a	First	74 Rotherham to Sheffield 74a Rotherham to Waverley	74: 07:15 – 19:55 every hour 74a: 07:40 – 16:25 every hour	74: Saturday 08:32 – 18:55 every hour 74a: 08:55 to 15:55 every hour

Service	Operator	Route	Frequency (Mon – Fri)	Frequency (Sat & Sun)
				No services on Sunday
73	First	Rotherham – Sheffield only peak services goes to Sheffield – inter peak stops at Treeton	05:31 and 06:31 in AM and then hourly from 18:25 to 22:22	06:02 and 07:02 and then hourly from 17:55 to 22:25
X5	First	Sheffield to Dinnington	05:32 - 23:32, approximately every 30 mins	Saturday as per Monday-Friday Sunday hourly service between 05:25 – 22:25
X55	First	Sheffield - Dinnington	06:48 – 16:13; 10 services throughout the day	Saturday 10:10 – 15:10 No Sunday service
X30	TM Travel	Sheffield - Harthill	One service at 07:00	No service

1.3.4.3 Tram Provision

In addition to the employment hubs around the AMID, Meadowhall Shopping Centre is a key employment and retail/leisure facility which is served by the SuperTram from Sheffield city centre. The Meadowhall stop is on the reserved track Meadowhall route, alongside the Sheffield – Rotherham passenger railway line, part of the Meadowhall Passenger Transport Interchange (PTI). The line however only runs between Sheffield City Centre to Meadowhall, Halfway and Middlewood, with short branch lines to Malin Bridge and Herdings Park. It does not serve the AMID or the new development area around Waverley.

1.3.4.4 Rail Provision

In terms of rail, services are limited, with stations at Darnall and Woodhouse which are approximately 2 kilometres and 3 kilometres from the Catcliffe Interchange edge of the scheme boundary respectively. Both stations are on the Sheffield to Lincoln line, with regular hourly services westbound to Sheffield and eastbound to Gainsborough Central via the Worksop and Retford line, with connections also to Grimsby and Cleethorpes. Although these services pass by the scheme area, they do not provide access to the local area in terms of the AMID or Waverley New Community and do not operate at a high enough frequency to be a considered a good commuter route.

The Sheffield City Region Integrated Rail Plan, which was launched in 2018, sets out proposals for the future development of the rail network in the local area. These include:

- A commitment to deliver a mainline station in Rotherham by 2029, to improve intercity connectivity; and
- The development of a business case to support a new station at Waverley on the Sheffield to Lincoln line, for delivery in 2024-2029.

A feasibility study has been carried out to assess the potential of providing the new rail station at Waverley, which would be equidistant between the current stations at Darnall and Woodhouse. The

station would form part of a wider public transport investment package partly funded through developer contributions, which will free up capacity in the road network and offer a viable alternative to using the car.

1.3.4.5 Travel Modal Split at the AMID

Information from the Sheffield Business Park 2017 Travel Plan staff travel survey provides an indication of the modal split for journeys to work within the AMID, demonstrating the current low reliance on public transport. Although the proportion of lone car drivers decreased from 81% in 2015 to 79% in 2017, over three quarters of staff still travel to work by car alone, with 13% travelling by public transport. A Framework Travel Plan has been in place for the Park since 2004, with each individual business required to produce and maintain its own Company Travel Plan. The target set for 2019 is to further reduce the proportion of employees travelling by car alone to 78%. However, this is still a high proportion, reflecting the out of town location of the Park and the limited public transport service provision.

1.3.4.6 Pedestrians and Cyclists

Severance is a key issue for pedestrians and cyclists accessing areas of the AMID, as there are only two underpasses available between Junctions 33 and 34 of the M1. There are a number of Public Rights of Way within the study area; however, only one path crosses the A630 scheme boundary – this is in the form of an overhead footbridge, linking the residential areas in Catcliffe, to the north and south of the A630.

There is no National Cycle Route on the A630. However, the Sustrans National Cycle Network (NCN) Sheffield to Rotherham (via Meadowhall) route is located approximately 2.9 kilometres to the northwest of the site area. In addition, the Trans Pennine Trail routes between Sheffield and Rotherham via the Tinsley Canal, just north of the Europa link Road, approximately 150 metres to the north of the site area.

1.3.4.7 A Lack of Sustainable Alternatives to the Car

Overall, the evidence shows that the ability to use sustainable alternatives to the car in the area surrounding the scheme is currently limited. Although there are plans in the medium to long term to improve public transport provision as further critical mass is generated, the location of the AMID means that the existing reliance on the car is likely to continue, at least in the short term and potentially over the longer term. **Hence, the A630 Parkway scheme is essential to support the efficiency of the existing and future highway network.**

1.3.5 ROAD SAFETY AND DRIVER LEGIBILITY

One of the main objectives set out by Highways England is to make the SRN safer and to achieve the Key Performance Indicator (KPI) of a 40% reduction in KSI (Killed/Seriously Injured) casualties by 2020 from the 2005-2009 baseline[22].

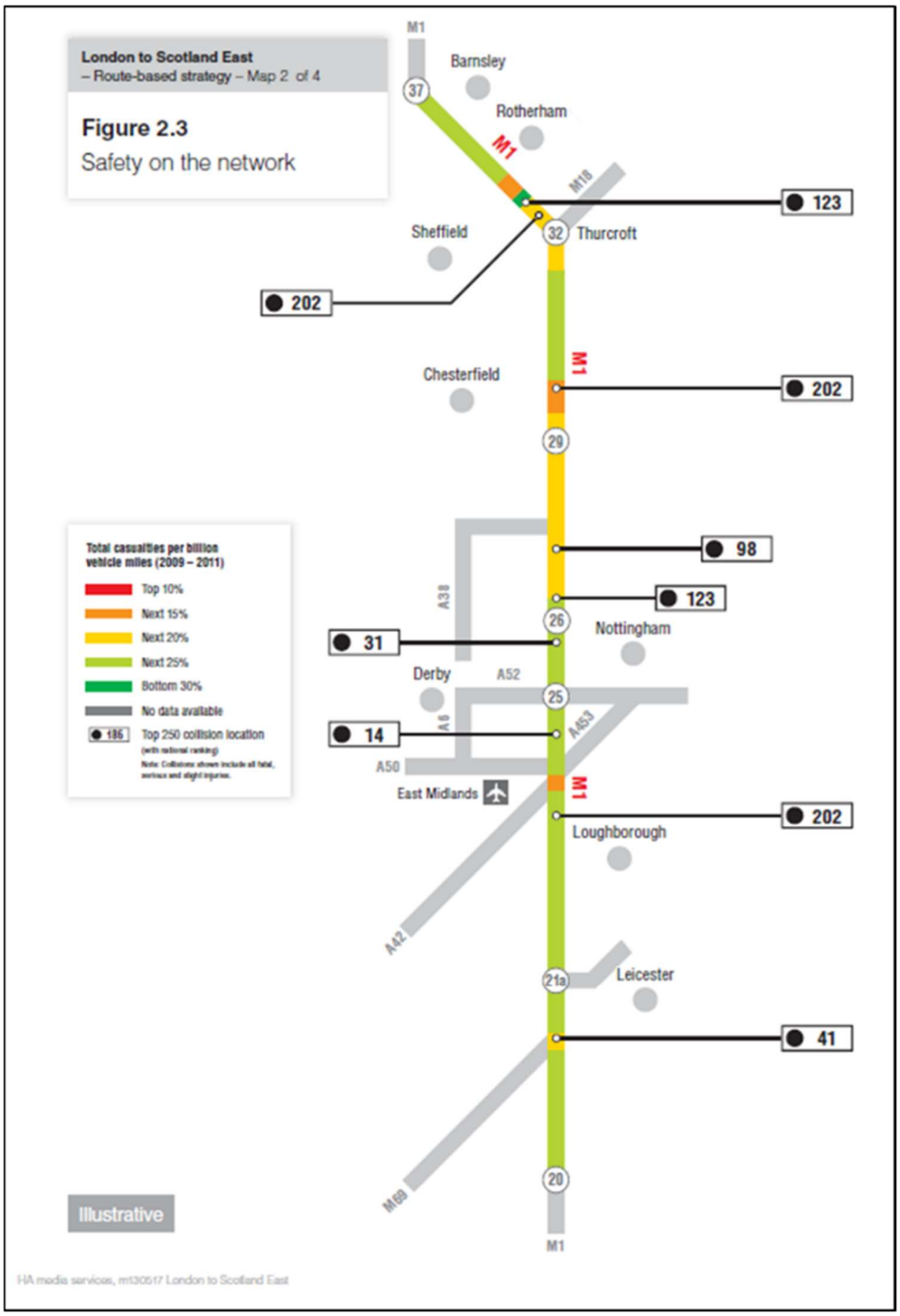
Highways England's London to Scotland East Route Strategy Evidence Report[23] demonstrates that J33 of the M1 is ranked within the highest 250 accident locations on the SRN. Figure 1-10 shows

[22] Highways England: SRN Casualty 2017
[23] London to Scotland East Route Strategy Evidence Report (Highways England, 2014)

that there are two significant accident locations ranked 123 and 202 of the top 250 accident locations on the M1 north of J32.

Congestion is recorded as one of the key contributing factors to accidents, and the introduction of measures to reduce congestion issues, particularly for traffic using Junction 33 and the A630 Parkway, would therefore help to address the safety issue.

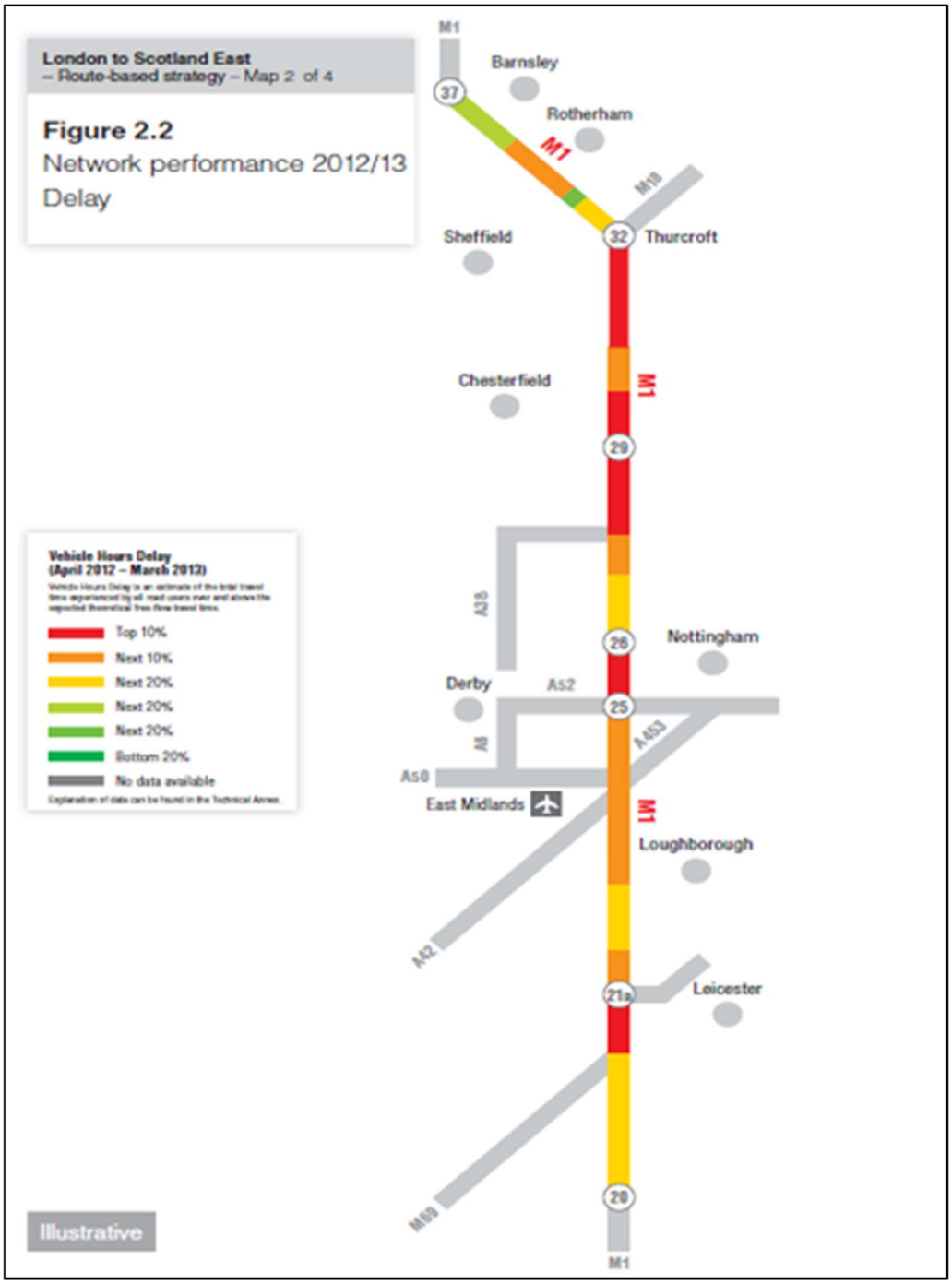
Figure 1-10 - Safety on the SRN



Source: Highways England London to Scotland East Route Strategy Evidence Report

One of the key issues in the vicinity of the SRN near to the scheme is the proximity of the junctions in the local area, with traffic merging and diverging at short intervals, resulting in road safety issues. The Evidence Report states there are a number of locations on the M1 where peak hour speeds are much lower than the recorded average, which results in increased vehicle hour delays. Figure 1-11 shows the percentage of vehicle hours delay (April 2012 – March 2013) as an estimate of the total travel time experienced by all road users over and above the expected theoretical free-flow travel time. There is evident considerable delay in the vicinity of the M1 Junction 33.

Figure 1-11 - Network Performance



Source: Highways England London to Scotland East Route Strategy Evidence Report

National accident statistics (DfT Statistics RAS40003 Reported Accidents and casualties by severity, road type and speed limit (Great Britain))[24] reiterate the potential risks associated with specific road types. Statistics show that dual carriageways account for 15% of accidents overall on the SRN and 17% of all casualties, with slip roads accounting for 1% of accidents and associated casualties. RAS4002 Reported accident, vehicles and casualties by severity, road class, built-up and non-built-up roads (Great Britain 2017) (see footnote 21) reports that 41% of all accidents are on built-up A-roads. The national statistics indicate that the scheme is within a particularly volatile road class and would benefit from improvements which facilitate improved safety.

Speed is also a factor, with 53% of the fatal accidents occurring on dual carriageways and 33% on slip roads where a 70mph limit is imposed. This reduces to 11% for dual carriageways operating at a 50mph limit but remains the same for slip roads. Inherently therefore, for the A630 road type there is a notable correlation between severity and speed, supporting the necessity to reduce the speed limit to 50mph as part of the scheme design proposals.

The proposed A630 Parkway scheme, in reducing speeds, improving congestion and traffic flows and making navigation clearer, has an important role to play in improving road safety across the wider SRN.

On the regional perspectives, RMBC regularly receives complaints regarding difficulties in navigating around the M1 Junction 33 roundabout, particularly for drivers who are unfamiliar with the layout. Complaints concern the legibility of lane markings and signage and confusion over the correct lane discipline. These issues lead to a high incidence of minor collisions, which although not reported in KSI accident records, still cause congestion, delay and inconvenience to motorists.

The most recent KSI accident data for the period January 2014 to June 2019 in the scheme location has been assessed. This includes the area from the Catcliffe Interchange to the M1 Junction 33. Over this period, 42 accidents occurred, 37 of which were slight, 4 of which were serious and 1 of which was fatal. Table 1-2 shows all recorded injury accidents, grouped by severity, and Figure 1-12 provides a plan showing the locations.

Table 1-2 - Summary of KSI Accident Data (January 2014 – June 2019)

Year	Slight	Serious	Fatal	Total
2014	2			2
2015	12			12
2016	10		1	11
2017	6	2		8
2018	6	2		8
2019	1			1
Total	**37**	**4**	**1**	**42**

Assessment of the data shows that there is an identifiable cluster of injury accidents around the M1 Junction 33, with eight of the slight accidents occurring in this location. There were also two further accidents on the M1 itself slightly outside of the scheme boundary. The full report shows that

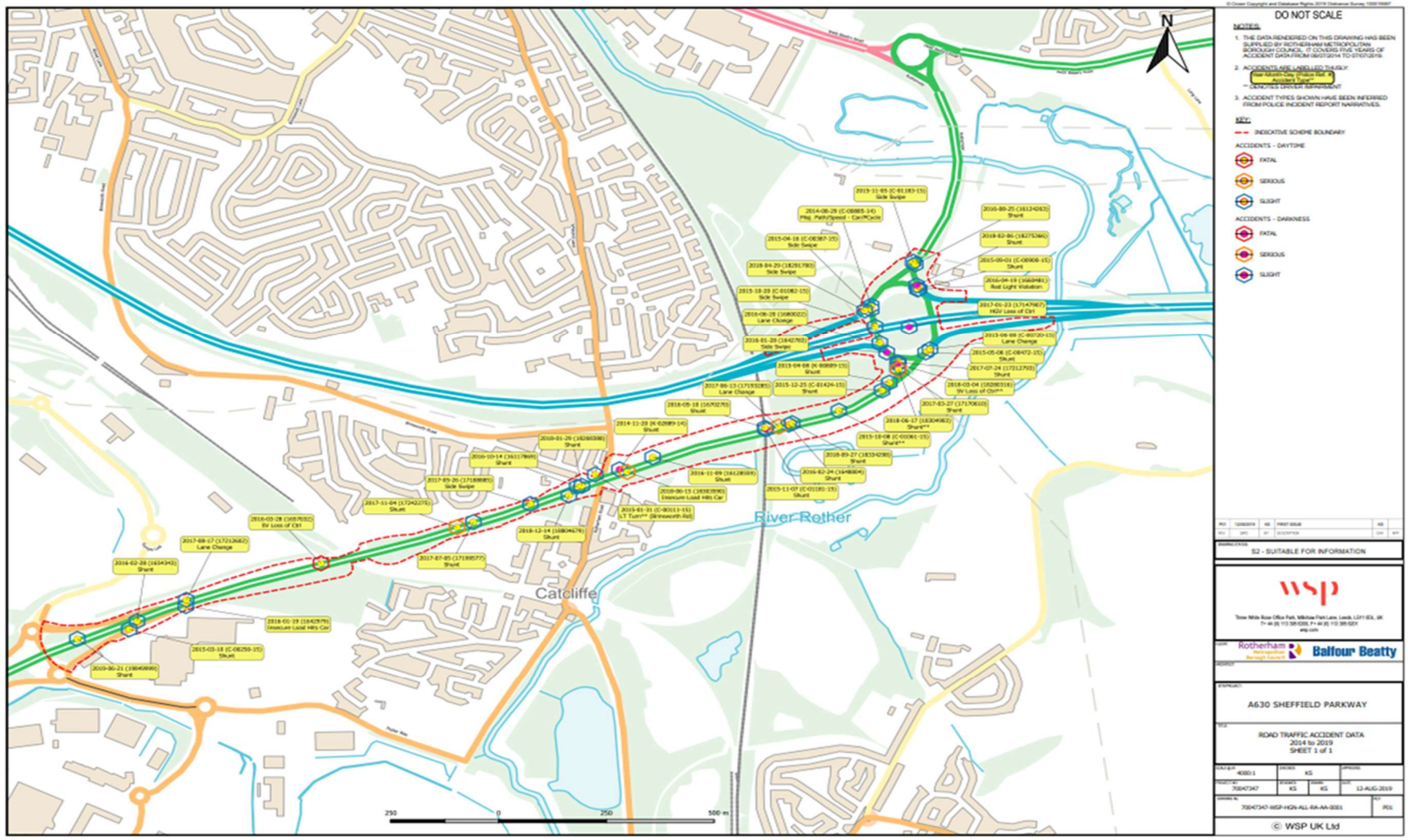
[24] Reported Road Casualties Great Britain: 2017 Annual Report Moving Britain Ahead

congestion in the form of queuing traffic was a factor in 17 of the total accidents, with one of these being serious in terms of severity.

The fatal accident occurred when a HGV travelling along the A630 away from Sheffield, close to the M1 Junction 33 collided with the near side barrier, striking the bridge parapet before travelling down the embankment. The main contributory factor was inclement weather, with the driver losing control of the vehicle.

The A630 Parkway widening scheme will **improve the road restraints and skid resistance** on the A630 Parkway, with the new pavement **improving the ability to deal with inclement weather**. In addition, the introduction of the 50mph speed limit as part of the scheme will help to **reduce the frequency and severity of road traffic accidents**.

Figure 1-12 - Location of KSI Accidents (January 2014 – June 2019)



1.3.6 AIR QUALITY

1.3.6.1 Context

In Rotherham, it is estimated that poor air quality directly contributes to over 100 deaths per year and affects the quality of life for people across the Borough[30].

Air pollution is a significant social justice issue as it is often the poorer and more vulnerable communities that are most exposed to and suffer the consequences of harmful air. In addition, poor air quality is also an economic issue: the illnesses caused by poor air quality affects people of working age and it is known that this causes significant time off work and early retirement.

1.3.6.2 Nitrogen Dioxide

Road network congestion leads to issues of poor air quality. In the majority of areas in Rotherham, air quality is good; however, along with most urban areas in England, there are areas of elevated air pollution which have been designated as Air Quality Management Areas (AQMAs). The north side of the scheme study area is within a designated AQMA (Rotherham AQMA 1 Part1, declared on 01/01/2002) due to levels of nitrogen dioxide (NO_2) that exceed the permitted standard, to which traffic emissions are a major contributor.

Furthermore, the whole of the urban area of Sheffield (excluding the Peak Park area) is designated as an AQMA for exceedances of the NO_2 annual mean (declared 01/12/2006), exceedance of NO_2 hourly mean more than 18 times (declared 08/03/2010) and the PM_{10} 24 hour mean just less than the Objective level (declared 01/12/2006). Sheffield is in breach of EU legal limits which should have been met by 2010. Sheffield has subsequently been identified by national government as one of 29 cities that has a duty to reduce NO_2 below the statutory annual average mean of 40µg/m³. As a significant concern, NO_2 is the primary focus of the Sheffield Clean Air Strategy (2017).

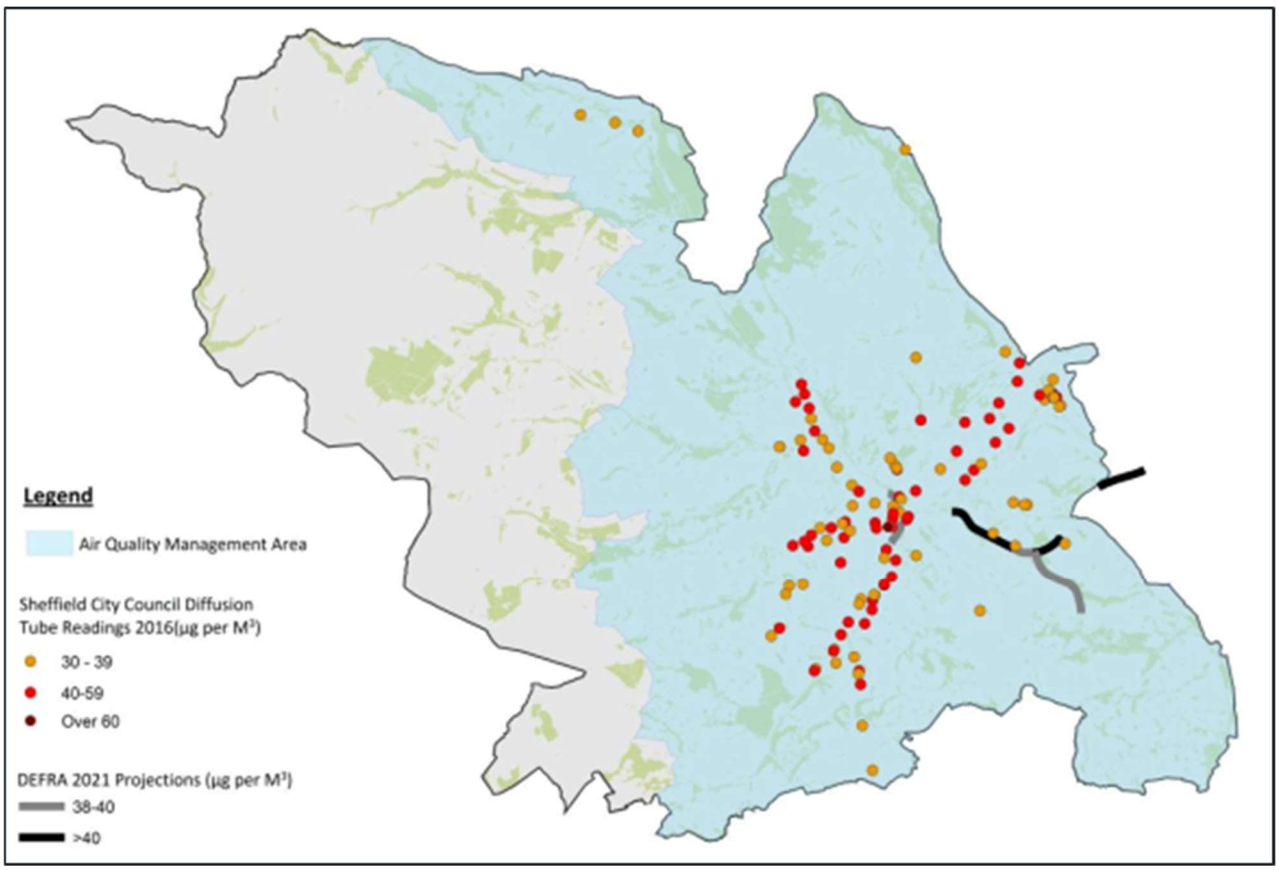
The A630 is the most significant area of exceedance in Sheffield and Rotherham that has been identified by DEFRA and is effectively the reason that Sheffield and Rotherham have been directed to undertake a Clean Air Zone (CAZ) feasibility study. There is a great urgency in dealing with this, as the Government has directed that action should be taken in 'the shortest possible time'.

Overall, the City Region faces significant air quality issues, with 29 AQMAs and high levels of carbon emissions around the centre of Sheffield and along the motorways and A Roads. Analysis carried out by DEFRA has identified 28 Local Authority areas, including Sheffield, which have the greatest problem with exceedances projecting beyond the next 3-4 years.

The map in Figure 1-13 shows nitrogen dioxide pollution levels within the study area. Black and grey lines show exceedances on particular routes from DEFRA data. Local information, presented as red and orange dots, show areas of high pollution at a localised level. It also shows the extent of the AQMA. The AMID is circled in yellow on the map. As the map shows, key transport corridors into and out of the city centre of Sheffield to and from Rotherham experience high (or 'problem') levels of air pollution.

[30] RMBC Air Quality Cabinet Note (December 2018)

Figure 1-13 - Study Area Air Quality Map (Sheffield Clean Air Strategy)



Local air quality monitoring is undertaken by Sheffield City Council and RMBC. RMBC undertakes a combination of continuous and passive monitoring across the borough. The nearest monitoring locations to the A630 Parkway are positioned along Main Street, New Brinsworth Road and the B6533. The most recent monitoring results for these locations are presented in Table 1-3.

Table 1-3 - RMBC Air Quality Monitoring Locations in Proximity to Proposed Scheme

Site ID	Road Name	Site Type	OS X	OS Y	Height (m)	Valid DC 2017(%)	Annual Mean Concentration (µg/m³)		
							2014	2015	2016
R38	B6067 New Brinsworth Road	Roadside	442576	388974	2.0	100	**41.1**	**42.8**	**40.7**
R40	B6066 Main Street	Urb BKG	442586	388588	2.0	83	30.6	27.9	27.9
R42	B6067 New Brinsworth Road	Roadside	442576	388974	2.0	100	22.7	24.7	23.4
R45	A630 Parkway	Roadside	441407	388400	2.0	100	**42.5**	**42.4**	30.1
R46	B6533 Poplar Way Rbt	Roadside	441407	388299	2.0	100	**40.7**	38.9	33.0
R47	B6533 Poplar Way Rbt	Roadside	441748	388209	2.0	75	27.9	30.8	24.4

*Exceedance of NO_2 annual mean objective in **bold***

Levels of air pollution in Rotherham are generally slowly decreasing. The existing AQMAs are where houses are close to busy roads in areas such as St Ann's, Bradgate, Brinsworth and Blackburn. However, Table 1-3 indicates that in 2016, there was an exceedance of the NO_2 Annual Mean Objective at R38, which is situated along the B6067 New Brinsworth Road. This location is approximately 150 metres to the north of the A630 Parkway.

Projections for concentrations of NO_2 and oxides of nitrogen (NOx) across the UK in the years 2017 - 2030 inclusive, have been calculated as part of a Pollution Climate Mapping (PCM) model assessment for the development of the UK plan for tackling roadside NO_2 concentrations. The area around Catcliffe, including the scheme location, is in the Yorkshire and Humberside Non-Agglomeration Zone (UK0034). The A630 Parkway is included within the PCM model as CENSUSID 73910. By the scheme opening date of 2021, a roadside NO_2 concentration of 42.8 µg/m^3 is predicted. It is predicted that by 2023, roadside NO_2 concentrations will be below the NO_2 annual mean limit value, with a concentration of 38.1 µg/m^3.

1.3.6.3 Greenhouse Gases

The UK is legally bound by the Climate Change Act 2008 to achieve a target to reduce greenhouse gas emissions to at least 80% below base year (1990) levels by 2050. The Act introduced 'carbon budgets', which set maximum greenhouse gas emission limits not to be exceeded during the respective period, to achieve a specified reduction in emissions versus base year levels. So far, five carbon budgets have been transposed into law that run to 2032.

The budgets are set as follows:

- 2008 – 2012; 3,018 million tonnes CO_2e ($MtCO_2e$); 23% reduction below base year;
- 2013 – 2017; 2,782 $MtCO_2e$; 29% reduction below base year;
- 2018 – 2022; 2,544 $MtCO_2e$; 35% reduction below base year by 2020;
- 2023 – 2027; 1,950 $MtCO_2e$; 50% reduction below base year by 2025; and
- 2028 – 2032; 1,765 $MtCO_2e$; 57% reduction below base year by 2030.

All Local Authorities are required to annually report their CO_2 emissions to DEFRA.

The latest available Greenhouse Gas Emissions Report (2013/14) produced by RMBC states that,

'Between April 2013 and March 2014, the Council's greenhouse gas (GHG) emissions were equivalent to 35,240 tonnes of CO_2, down from 48,461 tonnes of CO_2 in 2009/2010. The 2013/14 financial year delivered a 9% decrease on 2012/13 emissions and a 27.3% reduction on 2009/10.'

The emissions of greenhouse gases are altered when there is a change of traffic flow in terms of the speed or volume of traffic.

RMBC has adopted an Environment and Climate Change Adaptation Strategy and Action Plan (2011-2015) which sets out an objective to reduce greenhouse gas emissions by 80% by 2050, against a 1990 baseline. The Strategy sets out three key themes, with transport infrastructure identified as a key area with the greatest ability to experience change. The Strategy states an aim in *'Ensuring that our transport network takes account of positive and negative impacts on the environment.'* Specific transport measures cited include investment in road improvements to ease congestion, accelerating the uptake low-emission vehicles, retrofitting technology to vehicles, promoting active travel modes and investment in bus services.

The National Atmospheric Emissions Inventory (NAEI) is operated by the Department for Energy and Climate Change (DECC) and provides outputs of UK emissions of GHG. The latest national statistics were published in June 2018 and are made available from 2005 until 2016.

At a national level, GHG emissions from the transport sector account for 41.4% of total emissions, with transport emissions within Yorkshire and the Humber area equating to 37.3% of total regional emissions. Road transport accounted for 28.0% of the total emissions generated for the Rotherham Metropolitan Area.

Road transport CO_2e emissions generated for 2016 within the Rotherham area accounted for 3.85% of the total road transport emissions attributed to the Yorkshire and the Humber region.

At a national level, the Rotherham district accounted for 0.36% of the road transport total generated in England in 2016.

The wider issues and barriers to economic growth that the scheme will help to address are clear. The existing traffic delay and congestion on the A630 Parkway is a constraint to business growth and new investment in the AMID. The interaction of local and strategic traffic is also a key driver for the scheme, with associated adverse impacts on local communities, including delay and air and noise pollution.

The high level of car dependency in the scheme area presents a further driver for the scheme, given the lack of public transport alternatives to/from the AMID and between key residential conurbations and employment, leisure and retail destinations. Although there are transformational plans for public transport to be delivered over the medium to long term, action is needed now to address issues of congestion and in recognition of the fact that the car will remain important.

Road safety and driver navigation issues have also been considered, with the need for safety improvements and improved legibility through the M1 Junction 33 roundabout to be delivered as part of the proposed scheme.

1.4 IMPACT OF NOT CHANGING

Issues of traffic congestion and journey time reliability already restrict the growth of the SCR, and the SCRCA believes that a lack of intervention to reduce the levels of congestion will significantly restrict the region's future productivity and ability to meet its full growth potential. With forecast growth in both employment and housing in the Don Valley Corridor, without intervention the congestion experienced on the local and strategic road network will increase, with worsening delays for road users.

This will continue to impact negatively on local people in terms of their ability to access employment, training and education, and will limit investor confidence. Businesses located at the AMID frequently highlight good levels of accessibility and connectivity to the SRN and reliability as being crucial to their successful operation and development. Ongoing congestion issues will therefore jeopardise the ability to continue to develop the AMID and also Waverley New Community to their full potential.

The M1 Junctions 32 to 35a smart motorway scheme has provided additional capacity on the motorway mainline; however, continuing heavy flows on the A630 Parkway and the M1 Junction 33 roundabout have the potential to undermine the associated benefits, if left unchecked. By improving

capacity on the A630 Parkway, the risk of traffic on the local highway network impeding flows on the national network can be reduced. In addition, improved traffic flows on both the A630 Parkway and onwards onto the M1 will result in more predictable journey times, by reducing reassignment onto alternative routes. The continued use of local routes by strategic traffic threatens the ability to introduce measures to improve walking and cycling accessibility in local communities in the scheme area.

Many of the existing traffic congestion issues result from the interface between local traffic and motorway traffic at and around Junctions 33 and 34 of the M1. The economic relationship between Sheffield and Rotherham results in a growing movement between the two places, the most dominant cross boundary movement in the City Region, with the majority of those journeys having to pass through a motorway junction. Without improvements to capacity and direct connectivity, existing issues of congestion and delay will worsen, and this will result in a number of related impacts, including persisting poor air quality and a lack of investor confidence. Traffic forecast data indicates a significant increase in the demand for travel, as well as car ownership levels in the Sheffield and Rotherham area, which will further worsen the identified problems.

The M1 Junction 33 is a complex roundabout junction, with a need to manage flows more effectively and improve driver legibility. At peak times, signals hold traffic back on the M1 to manage the traffic flow through the junction; however, with increasing demand as a result of development at the AMID and at Waverley New Community, this will create further congestion issues on the motorway mainline. Driver confusion at the motorway roundabout currently leads to a high incident of minor shunts and collisions, and without intervention to improve signage and lane markings, this problem will persist and worsen with increasing traffic demand.

If the proposed A630 Parkway scheme does not come to fruition, the impact will be an exacerbation of the traffic-related problems outlined above. Furthermore, air quality issues associated with traffic congestion will persist, limiting the ability of local people to lead healthy lives and reducing the ability to achieve local, City Region and national emissions targets.

As set out in Section 1.2.4, there are inherent structural weaknesses within the SCR economy, which is underperforming compared to both regional and national averages. There is an identified need to address the performance gap by attracting investment and supporting higher value job creation and industry development. There is also a need to support the further development of high-value industries such as advanced manufacturing. The SCR has set its sights on a transformational growth scenario, including 70,000 new jobs and an increase in GVA in excess of £3 billion. Given the concentration of high-value jobs within the AMID, and the scale of housing development at Waverley New Community, this will result in a significantly increased need to travel within the scheme area. Without the proposed A630 Parkway scheme, the ability to achieve these ambitious targets will be limited.

It is important to ensure that the market perception of the area as a strategic investment location does not become one of significant development potential and agglomeration advantages which is nonetheless constrained by inadequate strategic road and public transport access, leading to at worst, failure, or at best stalling of the strategy.

The impact of not delivering the proposed scheme is apparent. There is a need to more effectively manage traffic, both on the A630 Parkway and at the M1 Junction 33. The impacts of not changing include persisting and worsening traffic congestion and delay and associated impacts on air quality, journey time reliability issues, driver legibility and safety issues and the resultant negative impacts on local communities. There is also the potential to undermine the benefits of the complementary Smart Motorway scheme. These issues threaten the ability to grow and develop the AMID in line with the ambitious economic vision set out for the SCR.

1.5 OBJECTIVES

1.5.1 OVERVIEW

The definition of clear objectives plays a key role in steering the development of transport schemes, providing a framework within which to identify the preferred scheme option and carry out post-delivery monitoring and evaluation to understand the extent to which the scheme has achieved what it set out to deliver.

1.5.2 SCHEME OBJECTIVES

The primary objective of the scheme is to deliver capacity enhancements along the A630 corridor, a critical transport corridor within the SCR that provides access to Europe's largest Advanced Manufacturing Research and Science Park, facilitates movement between the joint economies of Rotherham and Sheffield and provides access to the SRN at the M1 Junction 33.

The full list of scheme objectives is set out in Table 1-4. These were developed based on the identified issues and opportunities set out above, and were used to identify, sift and appraise scheme options in order to determine the preferred option.

Table 1-4 – Scheme Objectives

Objective	Outcomes
Objective 1: Support economic growth and productivity improvements	Improved journey times on the A630 Parkway and across the M1 J33 Released highway capacity along the A630 Parkway corridor, facilitating consented development growth in the region and key movements between Sheffield/Rotherham Unlocked development capacity and growth of jobs, businesses and housing across the wider region
Objective 2: Reduce congestion and improve network reliability and resilience	Reduced congestion and delays along the A630 Parkway and improved journey times for all traffic Improved network resilience to incidents, reduced number and severity of accidents Reduced maintenance on road and rail bridges
Objective 3: Improve Safety	Improved corridor and junction safety through enhanced design, lining and signage and driver warning aids, technology

Objective	Outcomes
	Reduced accident frequency through reduced delays, queuing and driver frustration Reduced requirement for maintenance on rail and road bridges (by designing for maintenance), reducing the exposure of maintenance staff to health and safety risks
Objective 4: An improved environment	Improved air quality and reduced noise levels by easing congestion along the A630 Parkway corridor, and reducing speeds
Objective 5: Deliver a more accessible and integrated network	Delivery of capacity enhancements to the local SRN, which supports decongestion on surrounding local roads, providing positive benefits for local communities and active travellers

The delivery of the scheme objectives will support delivery of wider City Region objectives around increasing the number of jobs and overall GVA as a result of reduced delays and congestion and improved journey time reliability.

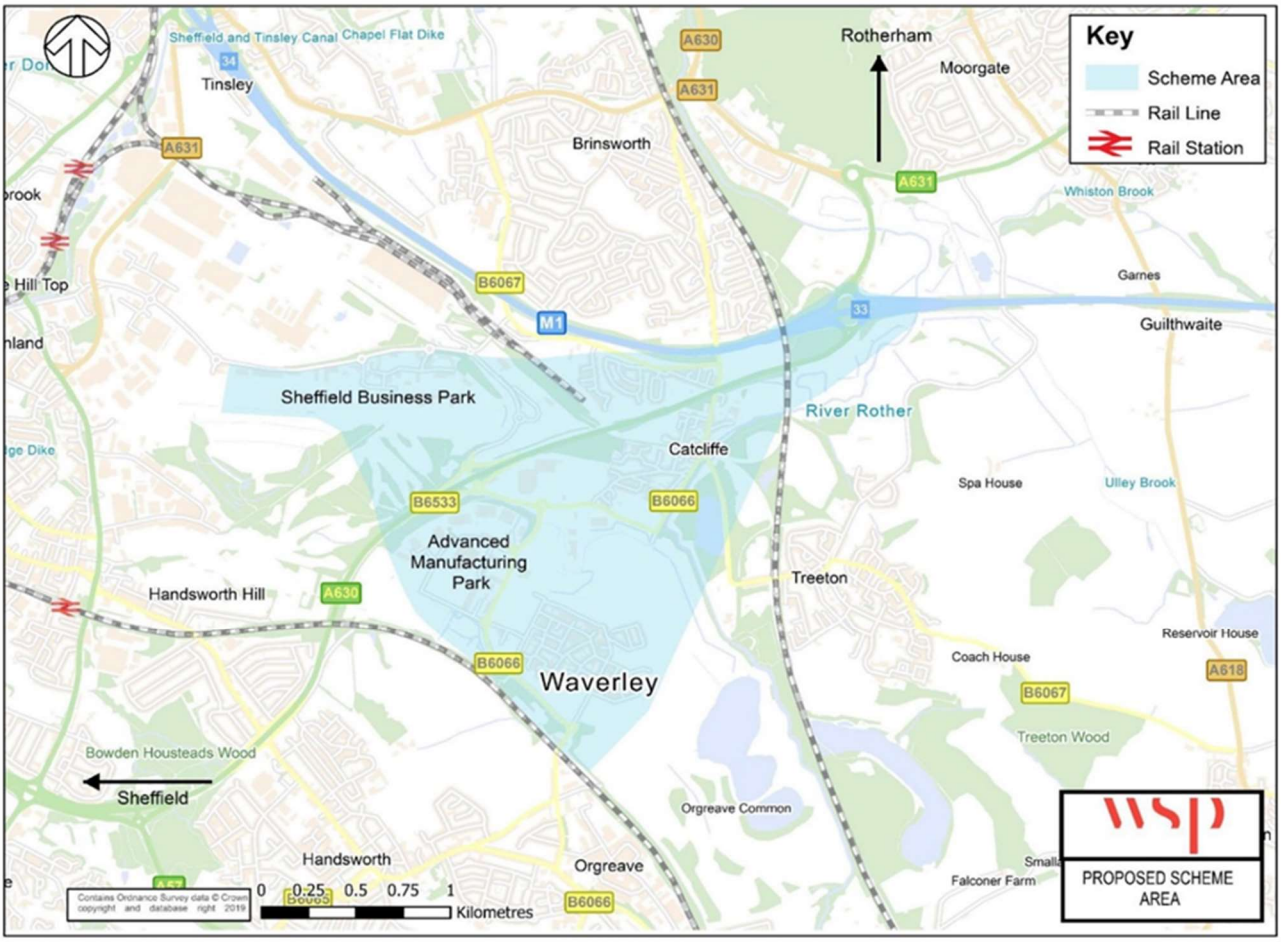
The primary scheme objective is to deliver capacity enhancements along the A630 corridor to reduce congestion and delay, which in turn will support economic growth, unlock development potential and improve safety, through the delivery of a more accessible, integrated and resilient network.

1.6 SCHEME SCOPE

The geographical area of intervention extends from the Catcliffe Interchange to the M1 Junction 33, as shown in Figure 1-14. It is bounded by:

- North – Sheffield Business Park;
- North/East - The M1 motorway at Junction 33;
- South – A630 Parkway into Sheffield; and
- West – Advanced Manufacturing Plant / Waverley development.

Figure 1-14 - Geographical Area of Intervention



The scope of the scheme is to provide additional highway capacity on the A630 Parkway between the Catcliffe Interchange and the M1 Junction 33, in order to address existing issues of traffic congestion, noise and air quality, and support more effective connectivity between the strategic/local road network and the AMID.

The geographical area of intervention represents the immediate area where various interventions on the transport network have been considered to arrive at the preferred option, where many of the benefits will be fully realised. The wider area of impact will encompass journeys between Rotherham and Sheffield, as the main strategic morning and evening peak movement.

The scope of the scheme and its geographic extent have been developed to address the identified issues and problems in an appropriate and proportionate manner and achieve the objectives set.

1.7 CONSTRAINTS AND INTERDEPENDENCIES

1.7.1 CONSTRAINTS

It is important to consider the potential internal and external constraints and interdependencies that could impact on the successful delivery of the A630 scheme. The two overarching constraints to the scheme development process are **financial constraints** and **programme constraints**.

RMBC does not have the internal resources required to deliver the scheme without the designated SCRIF funding allocation. Therefore, if the Business Case is not approved by the DfT, and permission is not granted for funding drawdown, a scheme that meets the objectives set cannot be delivered.

The drawdown of the SCRIF funding for the construction works is split over the period 2020/21 to 2022/2023, as detailed in the Financial Case. This means that construction must start and end during these financial years, which constrains the amount of time available for scheme development and design. The detailed design process and the development of the target cost needed to be completed in 2019 in order to provide sufficient time for the DfT to review the draft Full Business Case, provide comments and review and approve the final Full Business Case and for Balfour Beatty as the Principal Contractor to undertake the necessary construction preparation activities, confirm the supply chain and start work on site. The use of a Design and Build contract, and rigorous programme management, has helped to overcome this challenge.

Other more specific design constraints are set out below.

1.7.2 ENVIRONMENTAL CONSTRAINTS

There are a number of environmental constraints in the study area, which, unless otherwise stated, is defined as the area within a one-kilometre boundary around the scheme. These were identified at an early stage in scheme development, to understand their potential impact on the design and to take mitigatory action where required. A summary of these constraints is provided in this section, with full details provided in the scheme Environmental Assessment Report[31].

1.7.2.1 Air Quality

There is an AQMA within the scheme extents, which is referenced as Rotherham AQMA 1- Part 1 (NO_2). The pollutant declared to be monitored in this was NO_2 on 01/01/2002. The scheme is also situated in close proximity to a citywide AQMA designated by Sheffield City Council.

1.7.2.2 Biodiversity

There are no internationally designated sites within a 10-kilometre radius search area or a 30-kilometre radius search area for sites designated for bats. There are three nationally designated sites within a 2-kilometre search area, which are all Local Nature Reserves: Catcliffe Flash; Bowden Housteads Wood/Carbrook Ravine and Woodhouse Washlands. There are 15 locally designated sites within the 2-kilometre search area.

Several ecological surveys have been carried out to date for the purposes of the scheme:

- Extended Phase 1 Habitat Survey (November 2018 & April 2019);
- Great crested newt eDNA Survey (two surveys in April 2019);

[31] A630 Sheffield Parkway Widening Environmental Assessment Report (WSP, forthcoming October 2019)

- Potential Bat Roost Assessment Surveys (April & July 2019);
- Bat Emergence/Re-Entry Surveys of Old Flatts Bridge (August 2019);
- Badger Surveys (three surveys in April 2019);
- Water Vole Surveys (May & July 2019); and
- Reptile Surveys (seven surveys between April & July 2019).

The surveys carried out incorporate a full range of statutory and voluntary surveys to provide a robust approach to the identification of ecological constraints that require special consideration.

1.7.2.3 Habitats of Principal Importance / Protected and Notable Species

Habitats of Principal Importance (HPI) are listed in Section 41 of the NERC Act 2006. Under Section 40 of this legislation, every public body (including planning authorities) must, *'in exercising its functions, have regard so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'*.

The following HPI have been identified within the scheme area:

- Lowland Mixed Deciduous woodland, both semi-natural and plantation, is present within the proposed scheme boundary on the M1 Junction 33 roundabout and in limited sections of the A630 embankment. Woodlands are predominantly comprised of Oak, Sycamore, Hawthorn and Willow.
- Grazing floodplain habitat is present immediately adjacent to the eastern end of the proposed scheme boundary. Grassland in this area is highly improved with a low diversity of perennial grass species with a short-grazed sward.
- Rivers and Streams: The River Rother runs adjacent to the eastern end of the proposed scheme boundary, running south to north, under the eastern section of the M1 and under the northern branch of the A630. An unnamed flowing drain is located along the southern edge of the A630 embankment, within the existing highway boundary and the boundary of the Proposed Scheme. The value of the river and stream habitats within the Study Area are judged to be of Low/Local scale value.
- There is Open Mosaic Habitat on Previously Developed Land (OMHPD) within the 50-metre study area, with a total area of 0.8ha. This is part of a larger area of approximately 4ha, located between the A630, M1 and Junction 33 roundabout. The limited extent of OMHPD habitat within the proposed scheme boundary results in it being judged to be of Negligible importance.
- Grassland habitats on the floodplain outside the proposed scheme boundary also have low potential value for ground nesting species.
- Scrub and woodland habitats within the proposed scheme boundary have value for nesting birds during the breeding season (February to August). Breeding birds are judged to have a Low Value/Local scale Importance and are judged to be an Important Ecological Feature (IEF) to be carried forward for assessment of effects.
- Roosting Bats: Scrub and woodland habitats within the Proposed Scheme boundary offer potential bat foraging habitat particularly where they border other suitable habitats. The findings of the Preliminary Bat Roost Assessment surveys conclude that no bat roosts were identified within any of the structures along the A630 and no effects on buildings adjacent to the existing road are anticipated either as a result of noise or lighting effects.

- Barn Owls: Bat surveyors carrying out Preliminary Bat Roost Assessments (PBRA) of Old Flatts Bridge observed what was believed to be a roosting barn owl fly from beneath the parapet of the bridge in July 2019. Subsequent surveying evidenced suggestive temporary use of the bridge as a roost. There are no other potential barn owl nesting locations within the Proposed Scheme boundary or within the Survey area.
- Badger surveys found no evidence of the species presence within the proposed scheme boundary or within the wider Survey Area.
- There are no suitable amphibian breeding ponds within the boundary of the proposed scheme. The proximity of water bodies to suitable terrestrial amphibian habitats within the proposed scheme development boundary such as woodland, scrub and rough grassland means common toad is present.
- The scrub, woodland and grassland habitats within the proposed scheme boundary all have value for hedgehog. However, as hedgehog is a widespread species and likely to be present in good numbers in the neighbouring and surrounding habitats the value of the population within the Proposed Scheme boundary is judged to be Negligible.
- Two species of Invasive Non-Native Species (Japanese Knotweed / Himalayan balsam) listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded as present within the proposed scheme boundary.

In conclusion, the following are the sensitive receptors/Important Ecological Features that potentially pose a constraint to the scheme development, and have been considered at length during the design process:

- Habitats of Principal Importance;
- Rivers and streams;
- Breeding birds;
- Barn owl;
- Water vole; and
- Invasive Non-Native Species.

1.7.2.4 Noise

It is expected that the baseline noise environment within the vicinity of the proposed scheme is dominated by road traffic noise from the A630, M1 and other local roads. It is possible that commercial/industrial operations such as the Morrisons supermarket to the south west and Sheffield Business Park to the north west, will also contribute to the baseline noise environment for areas close to such facilities.

The operation of the railway routing north-south under the A630 and the M1 will also contribute to baseline noise levels within the study area.

The current Noise Action Plan for major roads (Defra, 2014) outlines numerous Noise Important Areas (NIAs) at Round 2 of the UK noise mapping project, identified in accordance with the requirements of the EU Environmental Noise Directive and associated English regulations. NIAs are locations where it has been identified that the 1% of the population which are affected by the highest noise levels are located. NIAs have been defined in order to identify the areas that require potential action. There are nine Round 2 NIAs which fall within the study area, as follows:

- NIA 2176 – A short section of the A360 to the south of the railway line;

- NIA 2114 – Small section of the south east bound carriageway of the M1 encompassing two dwellings on Derwent Crescent;
- NIA 2113 – Short section of the A630 as it crosses the B6066 Rotherham Road within the Scheme extents;
- NIA 2112 – Eastbound carriageway of the M1 immediately west of the railway line;
- NIA 2129 – South-eastbound carriageway of the A630 immediately to the south of West Bawtry Road;
- NIA 6445 – eastern section of Rotherway Roundabout encompassing Howarth Lodge Livery Centre;
- NIA 2143 – Small section of the westbound carriageway of the A631 West Bawtry Road immediately to the west of the intersection between the A631 and the A618; and
- NIA 6447 – westbound carriageway of the M1 immediately to the east of the A618.

There is potential for the scheme to result in increased noise and vibration within the NIA during construction and operation which, unless mitigated, could have negative impacts on nearby sensitive receptors.

1.7.2.5 Cultural Heritage

There are no World Heritage Sites, Registered Parks and Gardens, Registered Battlefields or Conservation Areas within the one-kilometre study area. There are no known heritage assets within the scheme extents and, as the works will take place within the footprint of the existing A630, previously unknown below ground assets are extremely unlikely.

The desktop appraisal of the proposed scheme identified three Scheduled Monuments and five Listed Buildings within the one-kilometre study area. Of these, the following were considered to require further assessment:

- Scheduled Monuments
  - The glassworks cone, Catcliffe (NHLE1004819); and
  - Blue Man's Bower moated site, Whiston (NHLE1012201).
- Listed Buildings
  - Grade I: The glassworks cone (NHLE1132732);
  - Grade II: 25 Bole Hill, Treeton (NHLE1132727); and
  - Grade II: Manor Farmhouse, Catcliffe (NHLE1314631).

The Schedule designation for the glassworks cone covers below ground remains of the glassworks as well as the Grade I Listed cone.

The appraisal also identified two non-designated built heritage assets within the study area, which were included for further assessment:

- Catcliffe Primary School (WSP001); and
- St Mary's Church, Catcliffe (WSP002).

1.7.2.6 Former Landfills

There are six former landfills located within the study area.

1.7.2.7 Hydrology

The eastern end of the study area is located within the floodplain of the River Rother. The River Rother is categorised as a Main River (a watercourse for which the maintenance and ownership obligations lie with the Environment Agency) and is a designated Water Framework Directive (WFD) receptor.

The proposed scheme (eastern end) is also located within a flood storage area known as Canklow Reservoir. This is a statutory Environment Agency defence with a 1 in 25-year standard of protection. With respect to flood risk, the area is designated as 'area for flood storage'. It is considered that severe floods might reach the bottom of the earthworks that the A630 Parkway sits on but would not flood the road itself. This was one of the main influencing factors on the chosen scheme design.

Within Canklow Reservoir there are a number of historic riverine features comprising detached oxbow lakes which have subsequently filled with water and become vegetated. These represent potential habitat areas. Beyond Canklow reservoir extend areas of functional floodplain of the Rother both down and upstream.

A review of the Environment Agency Catchment Data Explorer indicates the Rother is part of the wider Rother and Doe Lea catchment. The main issues relating to WFD status include point source pollution, physical modifications and diffuse pollution from rural and urban areas. The watercourse is classed as heavily modified, and as of 2016 had Moderate ecological status.

In conclusion, the following hydrologically sensitive receptors have been assessed:

- Canklow Reservoir;
- Oxbow Lake features; and
- River Rother.

1.7.2.8 Hydrogeology

The MAGIC Online Database indicates that the alluvium underlying the eastern section of the site associated with the various watercourses in this location and the Pennine Middle Coal Measures (Sandstone) beneath the study area are classified as Secondary A aquifers. Secondary A aquifers can supply water at a local rather than strategic scale and can form an important source of base flow to rivers.

The site is not located within a groundwater Source Protection Zone (SPZ).

The EA Catchment Data Explorer indicates that the groundwater body underlying the site is part of the Don and Rother Millstone Grit and Coal Measures Operational Catchment (GB40402G992300) with an overall WFD classification in 2016 of Poor. The reason for the catchment not achieving Good overall status is due to abandoned mines and quarrying. The groundwater body is classified as a Drinking Water Protected Area.

1.7.2.9 Landscape

There are no National Parks or Areas of Outstanding Natural Beauty in the study area.

There are no Registered Parks and Gardens within the study area and the Site and wider study area is not within any Conservation Areas.

The study area includes several landscape related designations, as follows:

- There is one Local Nature Reserve (LNR), Catcliffe Flash LNR, which is to the south of the scheme. This is an open stretch of water formed as a result of subsidence and surrounded by a well-developed area of marshland and willow-carr, covering an area of 12ha. Beyond the carr grassland stretches to the river.
- There is Ancient Woodland to the west of the junction with Poplar Way and Europa Link.

1.7.2.10 Existing Equipment

The presence of known and unknown equipment represents a key constraint, as equipment that will be disturbed by the scheme construction process will need to be re-provided. There is an existing traffic count site on the A630 Parkway, with one inductive loop in each of the two lanes. Three loops will need to be provided as a result of the widening to three lanes, alongside appropriate calibration and commissioning.

There are also MIDAS (Motorway Incident Detection and Automatic Signalling) loops on the M1 exit slips to the Junction 33 roundabout, which will require reinstatement if disturbed by the proposed construction works.

The existing air quality monitor will also need to be reinstated.

1.7.2.11 Construction Phasing and Traffic Management

The A630 Parkway and the M1 Junction 33 already suffer from congestion and delays during peak periods. Given the strategic importance of the route for journeys between Rotherham and Sheffield, this poses a constraint in terms of construction phasing and traffic management.

There will be a need to keep two lanes of the A630 open during the day, and to undertake works at night to minimise disruption to journeys. A full Construction Management Plan is being developed by Balfour Beatty and will contain full details on traffic management throughout all stages of construction.

Route users will need to be informed of the works and potential impacts on their journeys in advance of construction commencing, with continuous information provision during the construction period. This will include residential leaflet drops prior to the construction stage and at key points of progress. In addition, signage plans will be in place and will include the following:

- ‘Free Recovery Await Rescue’ signage placed on alternate sides of the carriageway at 800m spacings;
- Average Speed Check cameras placed on alternate sides at 500m spacings;
- Warning Roadworks sign and narrow lane signage on the carriageway; and
- Roadworks, directional delays and warning ‘Queue Likely’ signage on the diversion routes.

Traffic Management will align with the programme of works with the retention of two lanes of traffic in both directions during the daytime. Narrow lanes and a reduced speed limit to 50mph will be in operation to accommodate the works.

Diversions will only occur overnight and will be undertaken as follows:

- Eastbound traffic will be diverted from the Parkway to the J33 M1 via Europa Link, and the A631 (Shepcote Lane, becoming Bawtry Road), and the A630 Rotherway;
- During both the Northbound and Southbound J33 M1 Northbound exit slip road closures, traffic will be diverted via A630 Rotherway/Centenary Way and the A6178 Sheffield Road; and

- Westbound traffic will be diverted via the A630 Rotherway/ Centenary Way and then the A6178 Sheffield Road onto the A631 Shepcote Lane/Bawtry Road.

In addition, Yorkshire Police will provide a rolling roadblock for the installation of the lane closures on the slip road of the M1 Junction 33, due to Smart Motorway regulations.

An indicative Traffic Management programme was provided with the draft Full Business Case submitted in October 2019. Due to the delay in programme following this, it has been agreed for the contractor to present an approved final version in August 2020 prior to the start of the works.

Ongoing consultation and management of the traffic management implications will be managed through close collaboration between RMBC, South Yorkshire Police and Highways England.

1.7.3 INTERDEPENDENCIES

The proposed A630 Parkway widening is a standalone scheme in that it can be delivered independently of other schemes and developments. However, it represents a critical infrastructure upgrade that will support further development coming forward at the AMID and enable it to achieve its full growth potential.

Analysis undertaken by Genecon for the proposed A630 Parkway scheme (Appendix A) identifies that there is capacity for over 454,880 sqm of new Gross External Area (GEA) business floorspace and for over 8,300 new dwellings spread across 50 development site opportunities within the Parkway Corridor, which spans the southern side of the AMID opportunity. It is considered that the delivery of the A630 scheme has potential to influence to some extent the viability of delivering a maximum of 30% of the 50 Development Sites within the Impact Area, equating to around 117,000 sqm of new commercial space and around 2,300 new housing units.

The proposed A630 scheme complements work being undertaken on the proposed Innovation Corridor, which is located in the AMID between the M1 Junctions 33 and 34. In 2016, the SCR successfully secured funding through the Large Local Majors fund to identify and deliver highways improvements in the area, with the intention of unlocking economic growth by easing and circumventing the worst traffic congestion, namely the interface between strategic and local traffic at the two motorway junctions.

The UK government has identified Sheffield and Rotherham as one of 29 areas in England which contains locations where the annual average concentrations of Nitrogen Dioxide (NO_2) exceed statutory limits and are projected to continue to do so for a number of years. The Government's National Air Quality Plan (NAQP) identified a small number of corridors in the Sheffield and Rotherham area, including the A630 Parkway, which are predicted to still be breaching the statutory 40 $\mu g/m^3$ limit on the annual average concentration of NO_2 by 2021, under a 'Business as Usual' forecast scenario.

The A630 corridor was also identified in RMBC and DEFRA's Joint Air Quality Unit (JAQU) detailed Feasibility Study (2018), as one of four key sites where there is a need to identify mitigating actions to improve air quality. Evidence from this report indicates that Rotherham's NO_2 problem is caused by road traffic, a disproportionate vehicular type mix and is focused in particular locations. As such, the mitigation for the A630 Parkway requires an 8% reduction in NO_2.

Council's that are breaching standards were tasked with developing a strategy to become compliant with the statutory limit 'in the shortest time possible'. The preferred option mitigation for the A630 Sheffield to Rotherham route is to develop a charging Clean Air Zone (CAZ) Category C in Sheffield

from the inner ring road inwards (applies to non-compliant buses, taxis, HGVs and LGVs – not private cars), plus supporting measures (to be in operation form January 2021). This assumes that the proposed 50mph speed limit, associated with the widening of the Parkway in Rotherham is introduced, supporting the proposed design of the scheme.

In November 2019, RMBC submitted its final Transforming Cities Fund (TCF) Business Case to Government, the content of which was agreed by the SCR. The submission set out a TCF 'ask' of £220m for three main focus areas, one of which was the AMID (£99m). Included in the AMID programme were the provision of a new station on the tram-train network at Magna; improving active travel facilities; improving Darnall railway station and trialling low-emission buses. The TCF projects put forward in the submission complement the objectives of the A630 scheme in terms of removing strategic traffic from the local road network and opening up road capacity to enable active travel opportunities. In March 2020, Government announced a total TCF funding allocation of £160m for the SCR.

The two overarching constraints to the scheme development process are financial and programme components, with a need to deliver the proposed scheme within the available funding drawdown period. A number of environmental constraints have been identified, which have been considered as part of the scheme design process and mitigation measures implemented accordingly.

An indicative Construction Management Plan has been developed to ensure effective traffic management throughout the construction period, that causes minimum delay and disruption to road users. A final agreed Plan will be developed in August 2020 prior to the start of works.

Although the delivery of the proposed A630 scheme is not directly dependent on the delivery of any other schemes, it provides a critical infrastructure upgrade which will support further development at the AMID and the associated TCF connectivity proposals, as well as supporting the City Region's Clean Air Zone proposals.

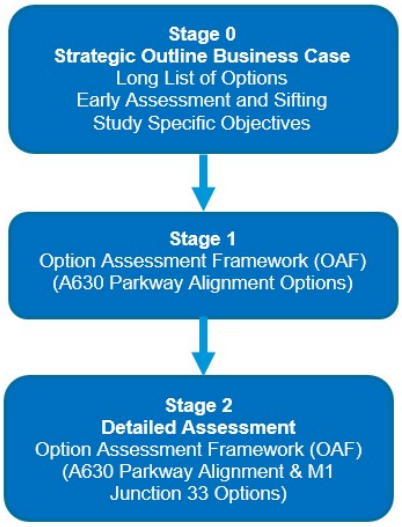
1.8 OPTIONS IDENTIFICATION, SIFTING AND SELECTION

The Options Appraisal Report (OAR) in Appendix B provides full details of how potential scheme options were identified, assessed and sifted to determine the preferred option. A summary is provided in this section.

1.8.1 OPTIONS IDENTIFICATION, SIFTING AND SELECTION PROCESS

A three-stage process, using a multi-criteria option assessment framework, supported by local junction modelling, was used to identify, assess and sift options that best meet the scheme objectives, as shown in Figure 1-15.

Figure 1-15 - Options Identification & Selection Process



1.8.2 STAGE 0

At Stage 0, two broad categories of options were identified as follows:

- **Do Minimum Interventions**: existing, committed or advanced options aimed at improving the operation of the A630 Parkway; and
- **Do Something Interventions**: identified alignment options aimed at improving the A630 Parkway to facilitate future year traffic and mitigate associated development traffic impacts.

The A630 Parkway corridor between the Catcliffe interchange and the M1 Junction 33 routes through residential/employment areas and flood plains to the north and south and with the road built upon a significant embankment. There were therefore limited Do Minimum interventions or advanced opportunities that could be considered.

It was determined that some form of strategic highway improvement is needed to mitigate the scale of the anticipated future year growth/capacity issues on the A630 Parkway corridor and on the approach to the M1, due to:

- A lack of road capacity on the A630 Parkway to cater for future year traffic demands;
- Adverse impacts on journey time reliability;
- High levels of congestion at the M1 Junction 33;
- Poor air quality due to stationary traffic; and
- Significant road safety risks due to queuing blocking issues on the strategic road network.

There are a limited number of bus services currently using the A630 Parkway corridor. Furthermore, the opportunities for promoting bus priority at the M1 J33 are limited due to the scale of existing congestion and the fact that significant bus interventions would likely displace traffic to other parts of the SRN. Purely public transport based options were therefore not considered further; however, the potential to include public transport improvements as part of the preferred scheme has been considered.

The development of Do Something interventions was therefore limited to highway based options, with five options identified as follows:

- Option 1A – full widening to three lanes (70mph) in each direction;
- Option 1B – full widening to three lanes (50mph) in each direction;

- Option 2 – partial widening to three lanes northbound, with two lanes southbound;
- Option 3 – partial widening to three lanes southbound and two lanes northbound; and
- Option 4 – hybrid technology option (tidal lane scheme).

This list of options was presented to the project Stakeholder Reference Group and consideration was given to the extent to which each option met the scheme objectives, as shown in Table 1-5.

Table 1-5 - Alignment of Options with Scheme Objectives

Option	Scheme Objectives Met
Option 1A (Six Lanes, 70mph)	1, 2, 3, 4 & 5
Option 1B (Six Lanes, 50mph)	1, 2, 3, 4 & 5
Option 2 (Five Lanes, Three N/B & Two S/B)	1, 2, 3, 4 & 5
Option 3 (Five Lanes, Two N/B & Three S/B)	1, 2, 3, 4 & 5
Option 4 (Tidal Lane Scheme)	1, 3, 4 & 5

It can be seen that four of the five options under consideration met all of the scheme objectives.

1.8.3 STAGE 1

Subsequently a fifth link based option was added to consider accommodating improvements within the existing highway. The shortlisted options were renamed and are as set out in Table 1-6.

Table 1-6 - Revised & Adopted Options for Appraisal

Option	Description
Option 1: Widening to Three Lanes	Option 1a & 1b: The full widening (both directions) to 3 lanes of the A630 from the Catcliffe Interchange to the M1 Junction 33 and associated amendments to the M1 Junction 33 Roundabout. The strengths of this option are that this will provide additional capacity and will ensure that there will not be a further request for capacity in several years' time when demand increases to forecast. Option variants can also include 70mph (a) and 50mph (b) alternatives. The weakness of this option is that the scheme delivery timescales may not be achieved (planning and land requirements) and it will also likely be a costly option.
Options 2 & 3: Partial Widening to Three Lanes	The partial widening to 3 lanes of the link between the Catcliffe Interchange and the M1 Junction 33, with the associated amendments to the M1 Junction 33 Roundabout. The strengths of this option are that this will provide some additional capacity and will cater for the sections of the Parkway that are most heavily used, and which suffer from congestion most regularly. This will also be a more cost-effective option, as widening partially will cost significantly less than bi-directional widening. The weaknesses of these options are that it may not provide fully for future demand and may result in additional capacity works being required in the near future. This would inefficient in terms of preparation and procurement cost and economies of scale for the project would be reduced.
Option 4: Widening to Three Lanes Within the Existing Carriageway	Option 4a: This delivers narrower lanes but achieves widening to three lanes within the existing highway boundary. This delivers the benefits of Option 1, but at reduced cost, and environmental impact associated with required land take. This option retains the 70mph speed limit.

	Option 4b: As above, but with a 50mph speed limit, to reduce both emissions (pollutant and noise) in the area, as well further improve road safety on the approach to the junction.
Option 5: Technology Solutions	Extended widening to enhance wider SCR connectivity or alternative technological solution. It is likely that this option will be based on a Tidal Lane scheme. The viability of the scheme which will be dependent on existing and future year traffic volume patterns (tidal flow) during both peak periods and the availability of sufficient lane widths and access (to and from the tidal lane) provision.

The performance of the M1 Junction 33 is critical to the identification of a satisfactory solution and detailed modelling in TRANSYT was undertaken to identify complementary, integrated improvements to the motorway roundabout, which identified two potential scheme designs. Both improvement options are consistent with the provision of capacity and the Parkway lane definition(s), with all slip roads (from all approaches) flaring to four lanes at the junction approach.

However, to provide additional network resilience for the right-turn movement from the M1 Northbound to Rotherham (noting its critical interaction with east-west flows at the junction) the option with an additional fifth flare lane on the M1 Junction 33 northbound approach was preferred. This enables additional capacity for that movement, but also critically provides for greater resilience at the junction as a whole, due to improved separation of Rotherham and Sheffield bound traffic, which enables green times to be more appropriately balanced at this node for all movements.

The benefit of this was particularly noted in the future year TRANSYT model outputs, where significant and longer-term benefits are forecast, particularly in the context of future development growth directly to the west of the junction. An option with a fifth flare lane on the northbound off-slip, combined with the A630 widening to three narrow lanes, was favoured as no alternative link based option is considered deliverable and financially sustainable within the timescales of delivery, given the fundamental need to acquire both land and proceed through Statutory powers. In terms of potential, alternative sub-options, whilst a 70mph narrower lane option is potentially feasible, and may produce a higher level of travel time savings, it is difficult to meet supporting scheme objectives.

From the five main intervention options, 29 sub-options were identified to address the public transport and technology derivatives, as shown in Table 1-7.

Table 1-7 - Full List of Sub-Options for Assessment

Option	Package	Issue	Option	Description
1A	None	Road capacity / Route Resilience	3 lanes each direction (70mph)	Provide a three-lane carriageway to current design standards (70mph)
1B	None	Road capacity / Route Resilience	3 lanes each direction (50mph)	Provide a three-lane carriageway to current design standards (50mph)
Final 4a	None	Road capacity / Route Resilience	3 lanes each direction (70mph)	within existing carriageway and junction upgrade

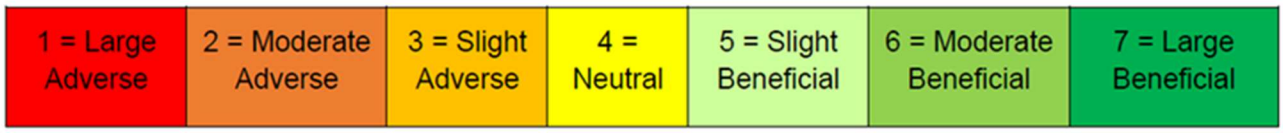
Option	Package	Issue	Option	Description
Final 4b	None	Road capacity / Route Resilience	3 lanes each direction (50mph)	within existing carriageway and junction upgrade
1C	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	3 lanes each direction (70mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
1D	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	3 lanes each direction (50mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
1E (PT)	1A with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes each direction (70mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 1A (Bus service X7 - 6 buses/day)
1F (PT)	1B with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes each direction (50mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 1B (Bus service X7 - 6 buses/day)
1G (PT)	1C with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes each direction (70mph), M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 1C (Bus service X7 - 6 buses/day)
1H (PT)	1D with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes each direction (50mph), M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 1D. (Bus service X7 - 6 buses/day)
2A	None	Road Capacity / Junction Capacity / Route Resilience	3 lanes NB & 2 lanes SB (50mph)	Provide a 3NB & 2SB lane carriageway to current design standards (70mph)
2B	None	Road Capacity / Junction Capacity / Route Resilience	3 lanes NB & 2 lanes SB (50mph)	Provide a 3NB & 2SB lane carriageway to current design standards (50mph)
2C	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	3 lanes NB & 2 lanes SB (70mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
2D	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	3 lanes NB & 2 lanes SB (50mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme

Option	Package	Issue	Option	Description
2E (PT)	2A with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes NB & 2 lanes SB (70mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 2A (Bus service X7 - 6 buses/day)
2F (PT)	2B with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes NB & 2 lanes SB (50mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 2B (Bus service X7 - 6 buses/day)
2G (PT)	2C with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes NB & 2 lanes SB (70mph), M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 2C (Bus service X7 - 6 buses/day)
2H (PT)	2D with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	3 lanes NB & 2 lanes SB (50mph), M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 2D. (Bus service X7 - 6 buses/day)
3A	None	Road Capacity / Junction Capacity / Route Resilience	2 lanes NB & 3 lanes SB (50mph)	Provide a 3NB & 2SB lane carriageway to current design standards (70mph)
3B	None	Road Capacity / Junction Capacity / Route Resilience	2 lanes NB & 3 lanes SB (50mph)	Provide a 3NB & 2SB lane carriageway to current design standards (50mph)
3C	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	2 lanes NB & 3 lanes SB (70mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
3D	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	2 lanes NB & 3 lanes SB (50mph) with M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
3E (PT)	3A with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	2 lanes NB & 3 lanes SB (70mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 3A - 70mph (Bus service X7 - 6 buses/day)
3F (PT)	3B with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	2 lanes NB & 3 lanes SB (50mph) with PT provision	Investigate the provision of PT priority, with the addition of Option 3B - 50mph (Bus service X7 - 6 buses/day)
3G (PT)	3C with Public Transport	Road Capacity / Junction Capacity /	2 lanes NB & 3 lanes SB (70mph),	Investigate the provision of PT priority, with the

Option	Package	Issue	Option	Description
	Priority Provision	Route Resilience / PT Provision	M1 Jct 33 Upgrade with PT provision	addition of Option 3C - 70mph (Bus service X7 - 6 buses/day)
3H (PT)	3D with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	2 lanes NB & 3 lanes SB (50mph), M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 3D - 50mph (Bus service X7 - 6 buses/day)
4A (final 5a)	None	Road Capacity / Junction Capacity / Route Resilience	5 Lane Tidal Flow (50mph)	Provide a 5-lane carriageway to current design standards (50mph) with centre Tidal Lane
4B (final 5b)	M1 Jct 33 Upgrade	Road Capacity / Junction Capacity / Route Resilience	5 Lane with Tidal Flow (50mph) M1 Jct 33 Upgrade	Include M1 Jct 33 Upgrade as part of the scheme
4C (PT) (final 5c)	4A with Public Transport Priority Provision	Road Capacity / Junction Capacity / Route Resilience / PT Provision	5 Lane with Tidal Flow (50mph) M1 Jct 33 Upgrade with PT provision	Investigate the provision of PT priority, with the addition of Option 4A (Bus service X7 - 6 buses/day)

The DfT's Option Assessment Framework (OAF) was used to assess and sift the five options. The OAF is a bespoke qualitative appraisal framework using EAST principles, tailoring and focusing the appraisal against the objectives of the study and using the seven-point scale set out in Figure 1-16.

Figure 1-16 - OAF Seven-Point Assessment Scale



For each option, a qualitative assessment was carried out on the following:

- Strategic Fit
- Value for Money
- Impact on the Economy
- Impact on the Environment
- Impact on Society
- Public Accounts
- Indicative Benefit Cost Ratio
- Financial Case
- Delivery Case
- Commercial Case

The top four ranked options are shown in Table 1-8, and the full results are shown in the OAR in Appendix B. The assessment identified that Option 4B is likely to ensure that sufficient connectivity, accessibility and wider benefits can be delivered and meet the overall key objectives for A630 Parkway scheme, incorporating improvements within the existing highway boundary that can be

delivered within the available funding drawdown period. Option 4B was therefore taken forward as the preferred scheme option.

Table 1-8 - OAF Assessment – Top Ranked Scheme Options

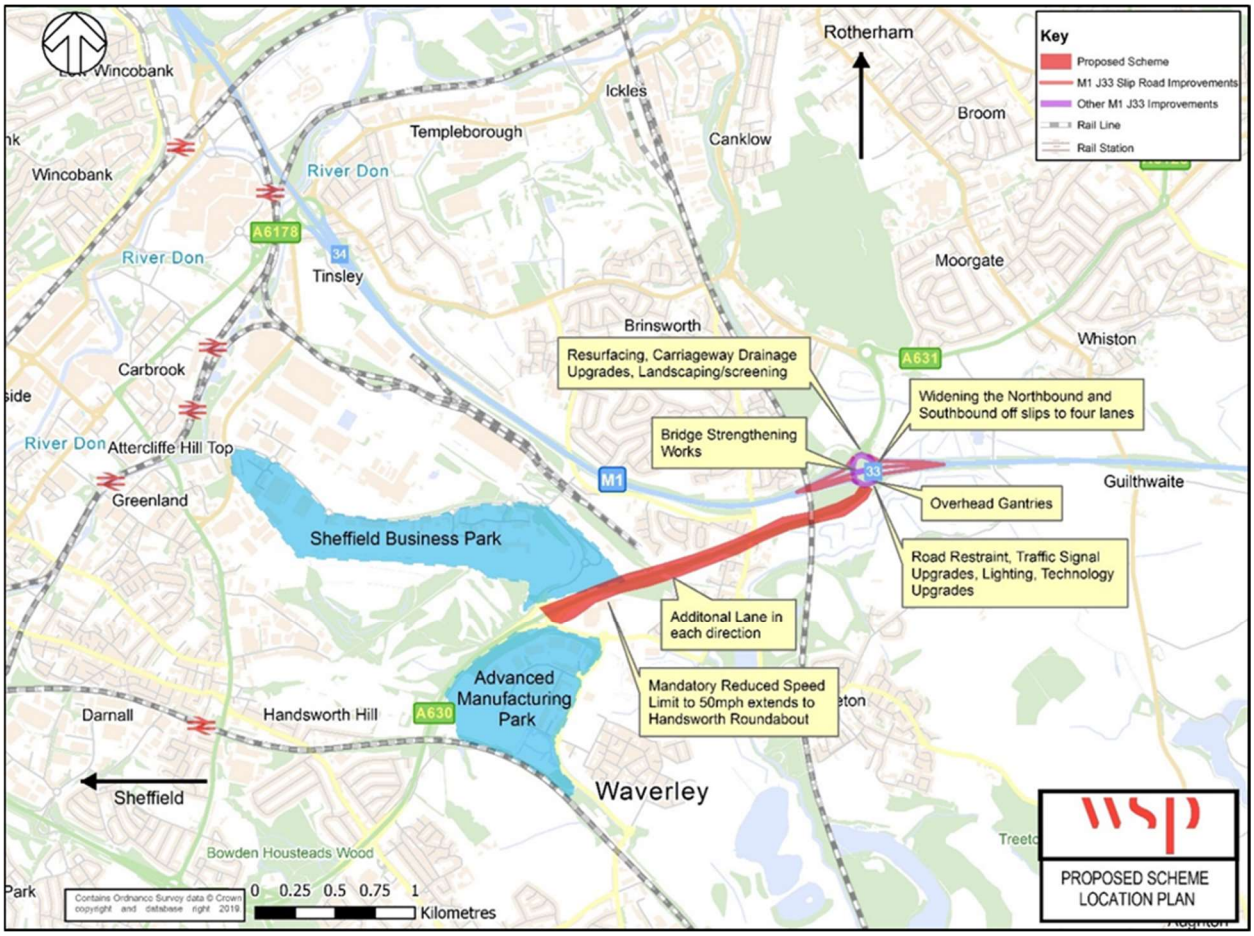
Rank	Option	Score	Rank	Speed Limit
1	Option 4B	113	3 lanes each direction, within existing carriageway limits and M1 J33 junction upgrade	50 mph
2	Option 1B	112	3 lanes each direction, provide a three-lane carriageway to current design standards with adjacent land	50 mph
3	Option 1D	110	3 lanes each direction and with M1 J33 upgrade with adjacent land	50 mph
4	Option 4A	107	3 lanes each direction, within existing carriageway limits and M1 J33 junction upgrade	70 mph

A robust options identification, sifting and selection process has been used to determine the preferred scheme option. A three-stage process was adopted, using a multi-criteria Options Assessment Framework. Option 4B was the highest ranked scheme option and was taken forward as the preferred option due to its performance against the scheme objectives of capacity, journey time reliability, safety and resilience, and the ability to deliver an improvement within the existing highway boundary within the funding drawdown constraints.

1.9 THE PROPOSED SCHEME

The proposed scheme is a highway improvement within the current highway boundary, that will provide an additional lane in each direction of the 2.1-kilometre section of the A630 Parkway between the M1 Junction 33 and the Catcliffe Interchange as shown in Figure 1-17. General arrangement drawings of the scheme proposals are provided in Appendix C.

Figure 1-17 - Scheme Location Plan



The existing carriageway will be enhanced from a 'rural' dual two-lane all-purpose (D2AP) to an 'urban' dual three-lane all-purpose (D3UAP) carriageway, with modifications also made to the M1 Junction 33 itself. The widened route will utilise narrow lanes and operate at a mandatory 50mph speed limit, a reduction from the existing NSL. The new 50mph speed limit will be extended beyond the western extent of the scheme, to Handsworth Roundabout (approximately 1.8 kilometres away), where a 50mph speed limit is already in operation.

The existing carriageway width, including the central reserve, is on either an embankment or, as is the case near the Catcliffe footbridge, a cutting. A rigid concrete barrier is proposed in a hardened central reserve. The proposed paved carriageway width, including the central reserve, is approximately 22.9 metres. A mixture of geotechnical (modifications to the existing earthworks slopes) and structural (use of retaining walls) solutions are proposed throughout the scheme, and a hierarchy of interventions based on a balance between environmental, cost, programme and constructability constraints has been developed based on the results of a detailed topographical survey. The paved elements have been designed with a 40-year design life.

To ensure that existing discharge rates from the highway drainage networks are not increased, the additional runoff generated from the increase in paved area will be attenuated. As there is no space within the existing highway boundary to provide Sustainable Urban Drainage systems (SUDs) features, online attenuation is proposed via use of oversized pipes and flow control features in the verge. Consequently, to accommodate these oversized pipes, it is anticipated that proposed verges

will be approximately 0.5 metres wider than existing (increasing from 2.5 metres to 3.0 metres, where required). Coupled with the proposed increase to the width of the carriageway cross section, this results in the need to amend the existing embankment and cutting slopes.

At the M1 J33, it is proposed to widen both the northbound and southbound off slips to four lanes; however, it is not proposed to widen the two motorway overbridges.

Additional highway works include new:

- Signing and lining;
- One overhead gantry at the M1 Junction 33;
- Road restraint;
- Traffic signal upgrades;
- Technology reinstatement upgrades (currently proposed as like-for-like replacement of traffic cameras, weather monitoring etc, with the addition of a new air quality monitoring station);
- Lighting;
- Resurfacing;
- Carriageway drainage upgrades;
- Fencing reinstated
- Structural retaining walls; and
- Landscaping/screening.

1.10 SCHEME BENEFITS

The scheme will deliver a number of essential improvements to the current constraints identified, which will align to the anticipated achievement of the scheme objectives, as set out below.

1.10.1.1 Reducing Congestion and Improving Network Reliability and Resilience / Delivering a more Accessible and Integrated Network *(Objectives 2 & 5)*

The scheme will provide capacity enhancements along a critical strategic transport corridor that provides access to Europe's largest Advanced Manufacturing Research and Science Park, facilitates more effective movement between the joint economies of Rotherham and Sheffield and provides access to the SRN at the M1 Junction 33.

This will complement wider transport investment, including earlier improvements made to the M1 Junction 33 roundabout in 2014 (delivered using Pinch Point funding), and the Smart Motorway scheme on the M1 between Junctions 31 and 35. The scheme will help to cement the benefits of this investment, helping to ensure that the improvements delivered by those schemes are not compromised by congestion issues on the local highway network, and giving potential investors the confidence to bring forward development proposals.

One of the key benefits of the scheme will be to reduce traffic diverting from the A630 onto local roads, which causes localised congestion issues and severance, air and noise issues – complaints from residents. Congestion on surrounding A-roads such as the A631 Bawtry Road and the A6178 will also be alleviated. The decongestion on surrounding local roads will therefore provide positive benefits for local communities and active travellers.

The scheme will also support the development and delivery of wider programmes of transport investment in the area. In particular, the effectiveness of the TCF programme depends on the ability to remove strategic traffic from the local road network, opening up this space for enhanced walking

and cycling opportunities and enabling quieter local streets. The delivery of more reliable journey times on strategic routes, coupled with increasing critical mass associated with development at the AMID and Waverley New Community, will also help to bring forward further bus-based public transport services.

1.10.1.2 Supporting Economic Growth *(Objective 1)*

The existing network will struggle to accommodate the forecast level of traffic growth, and, by improving capacity on the A630, the risk of traffic on the local highway network impeding flows on the national network, in particular during the AM and PM peak periods, can be reduced.

Improved traffic flows on both the A630 and onwards onto the M1, whilst also unlocking employment and housing development capacity, will result in more predictable journey times, particularly for journeys between Sheffield and Rotherham, and greater efficiencies in times of generalised costs for travellers, by reducing reassignment onto alternative routes. In the morning and evening traffic peak hours the model predicts journey time savings along A630 corridor in the eastbound direction but shows a very slight increase in the journey times in the westbound direction. The A630 widening scheme provides additional capacity along the A630 which will reduce delays and improve journey time reliability by reducing traffic congestion. The model runs shows that the traffic previously using the adjacent local road network re-routing onto the improved A630 link.

Economic modelling (further details of which are provided in the Economic Case) shows that the proposed scheme could create 173 net FTE jobs (construction and operation) at UK level, and 785 net FTE jobs (construction and operation) at SCR level. In addition, the scheme is forecast to generate £77.7 million cumulative GVA (NPV) by 2038 at UK level, and £351.5 million cumulative GVA (NPV) by 2038 at SCR level.

Wider benefits will also ensue:

- Acceleration of private sector investment and employment growth in the Don Valley Corridor;
- Creation of additional employment opportunities, and the efficient transport network needed for people to access those opportunities;
- Supporting the wider aims of the SCR SEP in terms of GVA and employment increases;
- Improved journey times resulting in improved reliability for businesses in terms of commuting of staff and supplies / deliveries.
- Improvements to wider fiscal benefits including Land Value Uplift, Business Rates Returns and Council Tax Returns; and
- Improved overall satisfaction of key stakeholders in the area

Further details are provided in the Wider Economic Benefits report in Appendix A.

1.10.1.3 Improving Safety *(Objective 3)*

The enhanced design, lining and signage of the A630 Parkway, in line with the proposed reduction in speed limit to 50mph and improved driver legibility at the M1 Junction 33 roundabout is expected to reduce the frequency and severity of injury accidents, in addition to the number of minor shunts which occur.

Such improvements to safety are essential given that the M1 Junction 33 is ranked by Highways England within the top 250 accident locations on the SRN. Furthermore, Highways England sets out a KPI objective for a 40% reduction in KSI casualties by 2020 (from the 2005-2009 baseline).

1.10.1.4 An Improved Environment *(Objective 4)*

It is anticipated that the A630 Parkway scheme will improve local air quality and reduce noise levels through the redistribution of traffic on the local road network and the easing of current congestion issues and thus less queuing and delay on the A630 Parkway. As such, the scheme should give rise to more residential properties that will experience an environmental improvement rather than worsening – both in terms of both noise and air quality (particulate matter and nitrogen dioxide).

In addition, through the scheme facilitating road vehicles to flow more smoothly with fewer accelerations and decelerations, there is an expected significant benefit for greenhouse gases (CO_2e) through the implementation of the scheme (in both traded and non-traded carbon), which will assist in meeting both regional and national carbon targets.

No detrimental impacts are anticipated in terms of the Water/Historic Environment or Biodiversity.

1.10.1.5 Reducing Highway Maintenance Requirements *(Objectives 2 & 3)*

It is anticipated that there will be maintenance savings in several areas as a result of scheme implementation, which will reduce the exposure of maintenance staff to health and safety risks, as follows:

- **Pavement repairs** – the full pavement will be replaced as part of scheme implementation, which will reduce the potential number of interventions for carriageway failures. At present, the poor condition of the pavement requires a programme of frequent patching/repair. The pavement has a 40-year design life.
- **Roadside technology** – all of the feeder pillars will be sited in one location, with off-network access. This will remove any need for temporary traffic management to access the pillars. Similarly, the replacement of the Environmental Sensor Station with a non-intrusive version will reduce the need to access any sensors within the carriageway surface.
- **Traffic signals** – the six-metre poles will be hinged, therefore removing the need for specific plant for working at height, although this will remain for the four-metre poles. The controllers will be located adjacent to the existing maintenance hardstandings which will reduce the need for temporary traffic management.
- **Sign gantry** – as there is no technology on the gantry, any interventions will be for inspections only.
- **Central reserve barrier** – the replacement of steel fence with a concrete barrier in the central reserve will remove the need to undertake safety fence repairs following incidents and thus will also remove the need for temporary traffic management.

Although there are potential areas of increased cost, such as inspection and maintenance of the retaining walls, this is not expected to be over and above anything which RMBC already maintains. Therefore, the overall maintenance liability is considered to be lower with the scheme in place compared to the existing situation (refer to Section 2.5.2 in the Economic Case).

These savings are expected to reduce the frequency and extent of maintenance activity, thus reducing the overall cost of maintenance and the need for associated temporary traffic management.

The scheme will deliver essential capacity enhancements along a critical strategic transport corridor, complementing wider transport investment, whilst supporting economic growth in Rotherham and the wider SCR, including a significant contribution to GVA. Improvements to journey time reliability will be critical in maintaining an efficient highway network that can accommodate growth.

The scheme will reduce the risk of traffic on the local highway network impeding flows on the national network, whilst also reducing the diversion of traffic from the A630 onto local roads, which causes localised congestion and severance and air quality and noise issues.

The introduction of a reduction in speed limit on the A630 Parkway will contribute to fewer and less severe injury accidents, and improved driver legibility on the M1 Junction 33 roundabout will reduce the number of shunts, which currently cause additional delay and frustration.

Wider benefits include the acceleration of private sector investment, increased employment opportunities and more efficient access to employment, supporting the aims of the SCR SEP and improving the overall satisfaction of key stakeholders.

It is also anticipated that the implementation of the scheme will deliver a maintenance saving to RMBC.

1.11 KEY RISKS

Alongside its key delivery partners Balfour Beatty and WSP, RMBC is taking a proactive approach to risk management, which is an implicit part of the core SCAPE framework agreement through which the project is being delivered.

A project Risk Register has been developed, which captures all of the risks associated with the project, as identified by the discipline leads and the project management team. The Risk Register is held by the designated project Risk Manager. Commencing in March 2019, key risk owners have attended bi-monthly risk workshops, in addition to ongoing communications with the Risk Manager to add risks, update existing risks and discuss and, where appropriate, implement mitigation measures. This collaborative approach enables early identification of risks and opportunities and the early management of risk. Overall responsibility for risk is held by the RMBC Project Board, which is accountable to the RMBC Major Transport Infrastructure Programme Board.

The main risk types have been identified as whole project risk type, noting that some will reduce as the project is delivered with their probability, impact and the associated mitigation response changing at each stage. Risk types include:

- Programme;
- Environmental;
- Technical;
- Reputational;
- Construction;
- Political;
- Project Management;
- Regulatory/Legal; and

- Stakeholder Management.

Further information on the key risks, the Quantified Risk Assessment (QRA) and the resulting risk allowance included within the scheme costs, is provided in Section 5.10 in the Management Case and Section 3.2.2 in the Financial Case.

The key risks for the scheme have been considered as appropriate at the detailed design stage, and robust mitigation measures have been put in place to minimise the likelihood that these risks will occur, and to reduce their potential impact. Risk identification and management is ongoing during the scheme development and delivery process.

1.12 STRATEGIC ALIGNMENT

A range of relevant local, regional and national policies and strategies have been reviewed to ensure that the scheme proposals are in alignment with broader objectives and proposals. Table 1-9 summarises each policy/strategy and demonstrates how the proposed scheme helps to support them.

Table 1-9 - Scheme Alignment with National, Regional & Local Policy

Policy	Summary	Scheme Alignment
National		
Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)	▪ The Strategy sets out air quality objectives, and policy options, with the overall aim of further improving air quality in the UK. In addition, the Strategy expresses the need to ensure that transport can improve environment conditions, by linking technological progress with better planning, better management and smarter ways of using our transport network.	▪ The proposed scheme will help to improve local air quality as a result of reduced congestion and queueing, with the expectation that more residential properties will experience an improvement rather than a worsening. In particular, there is an expected significant benefit for greenhouse gases, through fewer accelerations and decelerations, with a reduction in NO_X emissions. The scheme will also help to cement the benefits of the wider M1 J32-35a Smart Motorway scheme.
The Carbon Plan, Delivering our Low Carbon Future (2010)	▪ Outlines Government plans in terms of achieving committed emissions reductions and includes key actions and milestones to support this.	▪ The proposed scheme will help to achieve improved air quality in the local area as a result of decreased queueing. In particular, through the scheme facilitating road vehicles to flow more smoothly with fewer accelerations and decelerations, there is an expected significant benefit for greenhouse gases (CO_2e), which will assist in meeting both regional and national carbon targets.
National Policy Planning Framework (DCLG, 2012)	▪ The NPPF defines the purpose of the planning system as contributing to the achievement of sustainable development, identifying the three key dimensions of an economic role, social role and environmental role.	▪ The proposed scheme aligns with these core principles in terms of enhancing connectivity between Sheffield and Rotherham, reducing congestion on the A630 Parkway and around the M1 Junction 33 and maximising growth and development at the AMID.
National Infrastructure Delivery Plan 2016-2021 (HM Treasury, 2016)	▪ Outlines Govt investment of over £100 billion in economic, housing and social infrastructure between 2016 and 2021. ▪ This includes £15 billion of investment in roads and £38 billion of investment in rail. ▪ Investment will facilitate growth, job creation, raise levels of productivity, encourage growth in specialist industry and boost international competitiveness.	▪ The proposed scheme will support increased private sector investment in the AMID and facilitate job creation in advanced manufacturing, increasing the SCR's national and international competitiveness.

Policy	Summary	Scheme Alignment
Building Our Industrial Strategy (HM Govt, 2017)	▪ Levels of productivity are below most G7 countries. ▪ Strategy seeks to address gaps in economic performance across the country, which have resulted in regional differences in the UK that are greater than any western European country. ▪ The industrial strategy is underpinned by 10 key pillars.	▪ The A630 Parkway widening scheme will play a key role in raising levels of GVA output for the SCR, by encouraging increased inward investment into the AMID as a result of enhanced connectivity, journey times and journey time reliability.
Transport Investment Strategy (DfT, 2017)	▪ The Strategy identifies four key aims: • Create a more reliable, less congested, and better-connected transport network; • Build a stronger, more balanced economy by enhancing productivity; • Enhance our global competitiveness; and • Support development of new housing.	▪ The proposed scheme aligns with each of the identified aims in the Strategy, by addressing key connectivity and reliability issues on the local network and its links to the strategic network, and supporting investment, growth and development.
DfT Creation of the Major Road Network (MRN) Government Response (2018)	▪ As part of the Transport Investment Strategy, the government consulted on proposals for the creation of a Major Road Network (MRN), which it will now proceed with: • A specific new funding stream to raise the standards of economically and regionally important roads in England that will join seamlessly with and complement the existing SRN • The five central policy objectives for the MRN are to reduce congestion, support economic growth and rebalancing, support housing delivery, support all road users and support the SRN.	▪ The indicative map of the MRN published by Government includes the A630. ▪ The scheme proposals meet each of the five central policy objectives.
Regional		
Northern Powerhouse Independent Economic Review (TfN, 2016)	▪ Outlines how the north of England suffers from a persistent performance gap in terms of GVA per capita of 25% below the rest of England, and 15% below England excluding London. ▪ The productivity gap is the result of deficits in skill levels, technology, investment, connectivity, agglomeration and enterprise rates. ▪ The Review identifies four key capabilities that can compete at a national and international level; Advanced Manufacturing, Health Innovation, Energy and	▪ The proposed scheme directly supports further development within the NPIER prime capability of advanced manufacturing. ▪ Whilst specialising in advanced manufacturing, the AMID also has a presence of the Healthcare Technologies, Creative and Digital Services, and Financial and Business Services, further supporting development of the prime and enabling capabilities of the North.

Policy	Summary	Scheme Alignment
	Digital. These are supported by three enabling capabilities; financial and professional services, logistics and education. ▪ A transformed northern economy could yield an increase in GVA of up to 15% by 2050, growth in productivity of up to 4%, and 850,000 additional jobs by 2050.	▪ A more efficient, reliable local transport network, with high quality links to the SRN, will encourage inward investment by the private sector, helping to bring sites forward for development and contributing to enhanced GVA and job creation.
The Northern Powerhouse: One Agenda, One Economy, One North (HM Govt / TfN, 2015)	▪ The Agenda sets out the vision for how the Northern economy can be transformed into a 'global powerhouse', which will re-balance the economy of the country. ▪ Key to the vision is creating a 'world class transport system' which will facilitate increased productivity by providing links to wider talent pools and supporting business engagement and access to markets.	▪ Through increasing capacity on a key section of the local network in order to unlock investment in advanced manufacturing, the proposed scheme supports the wider vision for the North, helping to increase productivity and growth by tackling connectivity constraints. ▪ By encouraging high-value businesses to locate in a single area, the project is expected to generate agglomeration effects, which will help deliver other benefits such as an increase in GVA per capita.
Strategic Transport Plan: Initial Major Roads Report (TfN, 2017)	▪ The Report defines the draft Major Road Network (MRN) as "the road network that is most economically important to securing the North's productivity and growth; both now and in the future". The Major Road Network comprises not just the SRN but Local Highway Authority roads which fulfil this role. ▪ The report states there is a direct link between transforming connectivity and allowing the North's economy to thrive, that existing capacity is an inhibitor of demand. ▪ Poor connectivity has been identified as limiting the economic potential of the North. ▪ A reliable and resilient road network helps to develop greater agglomeration by bringing businesses, organisations and people closer together resulting in greater productivity and competitiveness.	▪ The SCR is identified in the STP as a priority for improvements in connectivity to enable this economic potential of the city region, and the north, to be realised. ▪ Advanced manufacturing and logistics and freight, both prominent in the SCR, are expected to be key growth sectors within the NPIER. This means the performance of the SRN and MRN is fundamental in offering improved connectivity. ▪ The A630 Parkway is a key route connecting the AMID to the SRN and is included in TfN's MRN along with the M1, reflecting their importance to the economies of both the SCR and the wider North. ▪ The scheme will support the aims of the Report by enabling greater investment and trade, releasing growth in key employment and housing sites and increasing the overall resilience of the economy.
Strategic Transport	▪ Understanding the future travel needs of a transformed North of England is critical in terms of understanding where improved connectivity and infrastructure	▪ The findings demonstrate a significant increase in demand for road-based travel within the north, with the

Policy	Summary	Scheme Alignment
Plan: Future Transport Demand Statement (TfN, 2017)	investment is needed to support the anticipated levels of economic growth associated with the Northern Powerhouse. ▪ Under a transformed North scenario, total demand for road-based travel is forecast to increase by up to 54% by 2050; however, road demand growth in a less connected North could be half that amount.	strongest growth being concentrated on trips between City Regions. However, transformational economic growth is also likely to increase travel demand significantly within City Regions, such as the SCR. ▪ The transformational growth scenarios demonstrate the need to provide sufficient capacity on the key transport networks to cater for increased demand and facilitate economic growth. ▪ Therefore, constraints limiting connectivity to the SRN, congestion and journey times are all key issues to be addressed through schemes such as the A630 Parkway widening scheme.
Local		
SCR Integrated Infrastructure Plan (SCR / Arup, 2016)	▪ The Infrastructure Plan evidences the diverse opportunities that infrastructure investment will bring to the area and sets out spatial requirements, linked to supporting the economic priority areas identified in the Strategic Economic Plan.	▪ The Plan specifically references the importance of providing high quality connectivity to the AMID, and to tackle delay on the A630, which the A630 Parkway widening scheme will address.
SCR Transport Strategy Refresh 2019-2040 (SCR, 2019)	▪ The strategy refresh sets out the SCR's priorities up to 2040. The SCR aims to better connect urban and economic growth centres and improve the flow of people and goods to support growth. ▪ To support the transport vision three goals have been identified: ▪ Residents and businesses connected to economic opportunity ▪ A cleaner and greener Sheffield City Region ▪ Safe, reliable and accessible transport network	▪ The A630 widening scheme will offer improved connectivity for residents and businesses, with reduced journey times and increased journey time reliability. ▪ The Strategy specifically identifies the proposed A630 scheme as one of its strategic transport interventions to reduce congestion and support housing and employment growth around the Advanced Manufacturing Park and Waverley New Community.
SCR Integrated Rail Strategy (SCR, 2019)	▪ Highlights that only 2% of commutes within the SCR are made by rail, or 3% if light rail is included. 71% of commutes are made by car. ▪ Recognises that Rotherham has relatively poor intercity rail connections at present, requiring passengers to interchange.	▪ The current reliance on the car in terms of the commuter car mode share puts pressure on the SRN, including the A630 Parkway.

Policy	Summary	Scheme Alignment

	▪ Proposals include:
	  ▪ A new rail station serving businesses and the community in the Advanced Manufacturing Innovation District at Waverley on the Sheffield to Lincoln line, for delivery in 2024-2029;
	  ▪ A new mainline station at Rotherham to improve intercity connectivity, for delivery by 2029; and
	  ▪ One of the short-term priorities is for the tram-train operation between Rotherham and Parkgate and Rotherham and Sheffield to be made permanent.
		▪ There are proposals to significantly increase public transport provision in the SCR, with specific proposals for Rotherham, the AMID and Waverley that will help to reduce the current reliance on the car.
		▪ However, these proposals will not be delivered in the short term, and action is needed now to address severe congestion on the A630 Parkway to alleviate existing issues and help to accommodate future development traffic, in recognition that car will remain a key mode of travel even with an enhanced public transport network.

M1 J33 to 35 Infrastructure Study (HE, 2016)	▪ Study assessed the current performance of M1 J33-35 in terms of operational issues, constraints, safety and environment. ▪ Identified the need to mitigate the high levels of congestion and delay regularly observed along this section of the M1. ▪ Study highlighted that investment to mitigate the identified issues is crucial in order to unlock the economic potential of the AMID. Failure to do so would limit the GVA growth potential of the AMID's specialist capabilities.	▪ The A630 widening scheme includes complementary improvements to the M1 J33, to help relieve the bottleneck that currently exists and reduce queueing traffic on the slip road and backing onto the motorway.
Rotherham Core Strategy 2013-2028 (RMBC, 2014)	▪ Outlines development priorities to 2028. ▪ Highlights multiple growth areas (residential and commercial) including considerable development taking place on the edge of the urban area at Waverley, with the development of a new community and consolidation of the AMP.	▪ The proposed scheme will support key objectives of the Plan including delivery of development in sustainable locations and supporting a dynamic economy through facilitating and enabling the growth of the advanced manufacturing cluster.
Rotherham Transport Strategy (2016-26)	▪ The Strategy sets out the Borough's aspirations for the future development of transport in the area ▪ The Strategy sets out a transportation vision which centres around three key strands, one of which is to 'be a connected place – people and places are connected by an integrated, safe and efficient transport network'. Six key objectives are set out to support the vision, one of which relates to the challenge of traffic congestion and specifies the following: 'Roads and Freight – to develop and manage an efficient road network for the movement of people and goods that can be shared by everyone'	▪ The A630 widening scheme is stated as planned investment in the Strategy, to cater for the anticipated increase in trips resulting from Waverley, Sheffield Business Park and other Lower Don Valley developments. Also, to improve reliability for trips to M1 from Sheffield City Centre.

Policy	Summary	Scheme Alignment
Rotherham Economic Growth Plan (2015-25)	▪ The Rotherham Economic Growth Plan maps out a programme of investment in economic growth and infrastructure, highlighting the AMID as a priority project and advanced manufacturing as one of a small number of target sectors where Rotherham possesses existing strengths and/or a competitive advantage to build on. It also highlights the development of housing at Waverley to dovetail with the employment being generated.	▪ The proposed scheme will support the continued growth and development of the AMID and local housing development by improving the connectivity offer to residents and businesses/inward investors, based on reduced congestion and improved journey time reliability.
Rotherham Publication Sites and Policies DPD (2015)	▪ The Rotherham Publication Sites and Policies DPD is an integral part of the Rotherham Local Plan. It identifies the Advanced Manufacturing Park as a major regeneration site and a regionally important cluster 'aimed at specialist companies in the advanced manufacturing sector'. It is also designated as a Special Policy Area to ensure the type of development in the area is controlled to fully contribute to the AMID concept.	▪ The proposed scheme will support the continued growth and development of the AMP by improving the connectivity offer to businesses/inward investors, based on reduced congestion and improved journey time reliability.

The proposed scheme aligns with the objectives set out in national, regional and local policy and aligns with the wider aspirations across the SCR and Northern Powerhouse. The scheme will enhance the capacity and efficiency of the SRN, namely the key commuter route between Rotherham and Sheffield, whilst also supporting socio-economic development.

1.13 EVIDENCE OF STAKEHOLDER SUPPORT

Stakeholder engagement and effective communications with all those that may be affected by the scheme is an essential part of the scheme development and delivery process. Information on relevant stakeholders and engagement and communications activities is provided in Section 5.8 of the Management Case, with the full Stakeholder Communication and Engagement Strategy provided in Appendix D.

As part of the Strategy, a live Communication and Engagement Action Plan has been developed, which is reviewed and amended regularly as appropriate. The Plan identifies the most effective communication techniques for keeping stakeholder both informed and onboard. The wider Strategy also acknowledges the varying and diverse stakeholders involved in the scheme and the need to tailor the approach accordingly.

Stakeholders recognise the need for the scheme and welcome the benefits it will bring in terms of congestion relief and supporting economic growth. Furthermore, stakeholders demonstrate a clear understanding of the strategic alignment of the scheme with both local growth aspirations and the shared economic priorities of the Local Authorities and the Combined Authority/Local Enterprise Partnership.

Strategic level support for the scheme is clear, as demonstrated by senior representatives from RMBC and the Sheffield Chamber of Commerce:

"Improvement to the efficiency and effectiveness of our transport network is vital if we are to meet the future needs of our populations and for a more sustainable way of living. Investment in transport infrastructure not only delivers improvements such as faster journey times, promote healthier lifestyles and deliver considerable environmental benefits, but it is also key to helping to unlock economic growth and regeneration."

Chris Read, Rotherham Council Leader (July 2019):

"The proposed A630 widening scheme will provide much needed additional capacity along a strategic transport corridor that facilitates access to Europe's largest Advanced Manufacturing Research and Science Park. The improvements will reduce delays and congestion, provide more reliable journey times and reduce the number and severity of accidents, as well as unlocking development capacity, supporting the growth of jobs, businesses and housing across the wider City Region, in line with our economic vision."

Peter Kennan, Chair of Sheffield Chamber of Commerce & Industry Transport Forum (August 2019).

The SCR Mayor has also written to confirm his ongoing support for the scheme (Appendix O).

A series of breakfast seminars were undertaken in 2017 and 2018, with clear support from business representatives and landowners seeking to develop strategic housing and employment sites and maximise growth within the AMID. The feedback provided at these events was used to shape the emerging scheme proposals and construction plans around existing key issues and business operational needs, with concerns allayed at an early stage. The need to deliver an improvement to the M1 Junction 33 roundabout was identified as a particular stakeholder 'ask' and was accommodated into the scheme proposals.

A scheme specific public engagement event was held on 21 August 2019, at which Ward members and the general public were invited to learn more about the scheme proposals. The timing of this

event was aligned with consultation into the CAZ proposals, as the proposed 50mph speed limit on the A630 Parkway aligns with the wider 50mph speed limit proposals set out as part of the CAZ. Approximately 45 people attended this event and opinions towards the scheme were largely positive. Particular support was evident from the business community, in relation to the forecast reductions in congestion, particularly around the Catcliffe Interchange, and travel times through the area.

The importance of stakeholder engagement has been recognised and instigated from the earliest stages of scheme development, with stakeholders and the wider public engaged throughout the design process. The SCR Mayor and the Leader of RMBC have both confirmed their support for the scheme. Stakeholders will continue to be engaged and kept informed throughout delivery.

1.14 MEASURES FOR SUCCESS

It is important to consider from the outset what constitutes the successful delivery of the overarching objectives (Section 1.5) set for the scheme, as this informs:

- The development and appraisal of the scheme;
- The selection of the preferred options for procurement and delivery; and
- The monitoring and evaluation of the scheme's performance after construction.

There is a need to consider and assess the causal relationship between the inputs, outputs, outcomes and associated benefits of the scheme.

A robust monitoring and evaluation process has been put in place, to ensure that the scheme delivers its primary objectives of supporting economic growth, reducing congestion and improving reliability/resilience on the network, alongside improved safety, and associated environmental and accessibility improvements. Effective monitoring and evaluation and the assessment of benefits realisation is key to measuring the levels of success of the scheme.

It is acknowledged that evaluation is a time critical concept, with a lag between the delivery of the infrastructure and the full realisation of the benefits. In addition, the mechanism for monitoring and evaluation are distinct from then capturing the benefits. There is also a need for evaluation to be set in the regional strategic context of wider economic aspirations of the Sheffield City Region. In order to effectively measure the success of the scheme, a Monitoring and Evaluation Strategy and a Benefits Realisation Plan have been produced, which are provided in Appendix E.

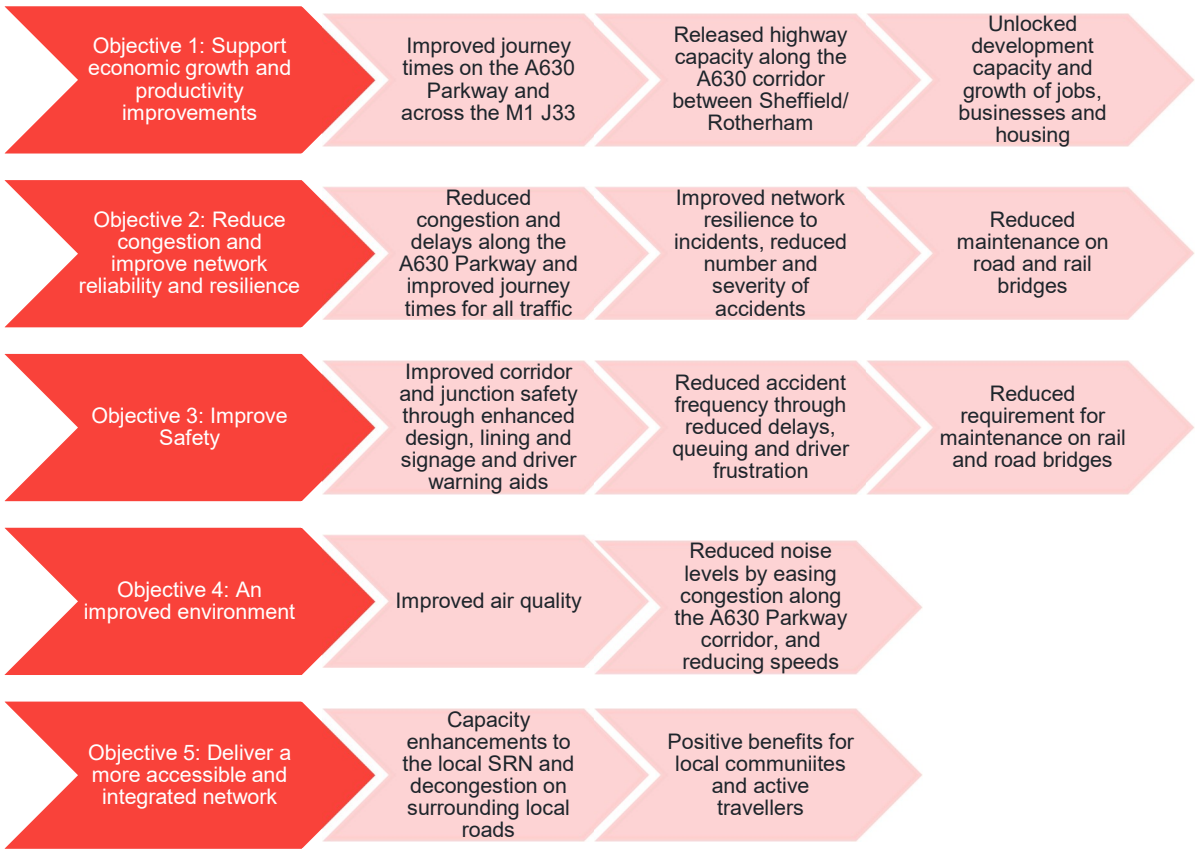
Both documents are in alignment with the DfT's Monitoring and Evaluation Framework for Local Authority Major Schemes guidance[32] and HM Treasury's Magenta Book Guidance for Evaluation[33]. The monitoring and evaluation of the A630 Parkway scheme is proportionate to its size, complexity and expected scale of benefits, providing a robust yet cost effective approach.

[32] DfT Monitoring and Evaluation Framework for Local Authority Major Schemes 2012 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf)
[33] HM Treasury The Magenta Book Guidance for Evaluation 2011 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf)

1.14.1.1 Achievement of Objectives - Cause and Effect

There is a direct relation between the scheme objectives and the potential outcomes as shown below and further detailed in the Monitoring and Evaluation Strategy. In terms of measuring the scheme's success, these outcomes are considered to be the critical deliverables which will be measured and linked back to the objectives as the starting basis for the wider evaluation process. Building upon this, the Monitoring and Evaluation Strategy then demonstrates the development of robust monitoring and evaluation parameters. Figure 1-18 shows the overarching relationship between the scheme objectives and outcomes.

Figure 1-18 - Objectives and Outcomes



1.14.1.2 Monitoring and Evaluation

Due to the potentially significant economic impacts of the scheme, the monitoring and evaluation approach is closely aligned with the DfT's enhanced monitoring parameters and is based on the three key principles of proportionality, partnership and prioritisation.

The Monitoring and Evaluation Strategy sets out how the delivery and performance of the scheme will be monitored and assessed in line with the stated objectives. It forms the first part of the process in terms of understanding the impacts of the proposed widening of the A630 Sheffield Parkway and how these are closely aligned to the objectives set out above. The Monitoring and Evaluation Strategy also recognises the linkages with the SCR Transport Strategy and Mayor's Transport Vision, alongside the broader SCR Economic Plan objectives.

The collection and collation of data is critical, and this will be undertaken without distracting from the delivery of the scheme. The Monitoring and Evaluation Strategy sets out a clear programme for baseline and monitoring data collection and analysis, as well as for the dissemination and reporting of the findings.

In addition, the Benefits Realisation Plan sets out how the expected benefits of the scheme will be planned for, tracked and realised through the scheme's implementation. It will apply the logical progressive approach of assessing the scheme objectives and the related outcomes and then identifying the associated benefits, key beneficiaries, responsibilities and enablers. It then sets out how these will be assessed and reported upon at key stages in the delivery process. Closely aligned to the best practice approach undertaken within the Monitoring and Evaluation Strategy, the Benefits Realisation Plan will ultimately enable RMBC to evaluate whether the expected scheme benefits have been fully realised.

Effective monitoring and evaluation is pivotal to understanding if the overarching scheme objectives have been met. A robust Monitoring and Evaluation strategy has therefore been put into place, which accords with the DfT's enhanced regime for monitoring the success of larger schemes with a potentially significant economic impact. A clear programme for data collection and reporting is set out.

The associated Benefits Realisation Plan sets out how the expected benefits of the scheme will be planned for, tracked and realised. It will ultimately enable RMBC to understand the overall success of the scheme.

1.15 STRATEGIC RATIONALE

This Strategic Case demonstrates the level of ambition set out at SCR level, where there are plans to create 70,000 new private sector jobs and 6,000 new businesses in the City Region over the period 2015-2025.

'Sheffield City Region will be the best place to collaborate, to invest, to innovate and grow a business, and live, work, play and study. It will be supported by an unrivalled skills base and quality of life.'

By 2017, activity led by the LEP and Combined Authority had already contributed 16,000 new jobs and leveraged approximately £318 million of private sector investment. However, transport remains a key challenge in terms of the ability to deliver on economic objectives at a local and City Region level, with congestion, delay and safety issues all prevalent along the A630 Parkway and the M1 Junction 33. There are also wider issues around air quality and noise.

The development corridor around the A630 Parkway has the potential to accommodate 8,300 new dwellings and around 454,900 sqm of new GEA commercial space, and the delivery of the proposed A630 Parkway widening, and Innovation Corridor schemes could support the delivery of around 30% of the 50 local development sites. The A630 Parkway scheme is predicted to generate 783 net FTE jobs at SCR level and 173 net FTE jobs at UK level, as well as £77.9 million GVA (NPV) at UK level and £352.7 million GVA (NPV) at SCR level.

Furthermore, the proposed scheme will offer a wider range of benefits, in terms of reduced congestion, improved journey time reliability and improved safety, as well as a reduction in greenhouse gas emissions. The re-routing of strategic traffic back onto the SRN as a result of the

scheme will improve the local environment in residential areas around the A630, supporting the ability to bring forward investment in active travel through the TCF and other funding streams.

The next section sets out the Economic Case for the proposed scheme, demonstrating the high VfM that it will bring.

2

ECONOMIC CASE

2 ECONOMIC CASE

2.1 INTRODUCTION

This section provides the Economic Case for the proposed A630 Parkway scheme, setting out the approach, methodology and assumptions used in the traffic modelling and economic appraisal and presenting the economic scheme cost and expected benefits. A range of qualitative, quantitative and monetised assessment techniques have been used to derive the scheme benefits, which have been used to develop the overall VfM statement. A series of sensitivity tests have been carried out, which demonstrate that the scheme retains positive VfM under all scenarios.

2.2 OPTIONS APPRAISED

As set out in the Strategic Case, five main scheme options were considered, which comprised of 29 sub-options. A qualitative assessment of each option was carried out using the DfT's OAF, to determine which option best met the stated scheme objectives. Option 4B was identified as the preferred scheme option and was subsequently taken forward for economic assessment.

2.3 TRAFFIC MODELLING METHODOLOGY AND ASSUMPTIONS

2.3.1 MODEL SELECTION

Comparative analysis of three models was undertaken in liaison with Highways England and the DfT, to identify the most appropriate model to support the A630 scheme appraisal:

- Lower Don Valley Model (LDVM) 2015 Update;
- Trans Pennine South Regional Transport Model (TPS RTM);
  - Existing TPS RTM
  - RTM cordon with local calibration
  - Use OD data to update LDVM
- Sheffield City Region Transport Model (SCRTM1).

Technically, it was considered that both the TPS RTM and SCRTM1 could provide suitable platforms. However, given the imperative of programme, and the funding risk associated with delays in the business case preparation, a local scheme specific model developed from the existing and already HE approved RTM was considered the most appropriate model. Full details of the model selection process are provided in the Modelling Specification Report[1]. This approach was accepted by the DfT in an email dated 1 August 2018.

2.3.2 MODEL DEVELOPMENT, CALIBRATION AND VALIDATION

The TPS RTM was developed for Highways England by AECOM, Atkins and SYSTRA as part of a programme to develop five RTMs covering England (i.e. Northern, Trans Pennine South, Midlands, South East and South West) to support the Regional Investment Programme (RIP).

The main advantages to this approach are:

[1] A630 Parkway Widening: Model Specification Report (WSP, 14 February 2018)

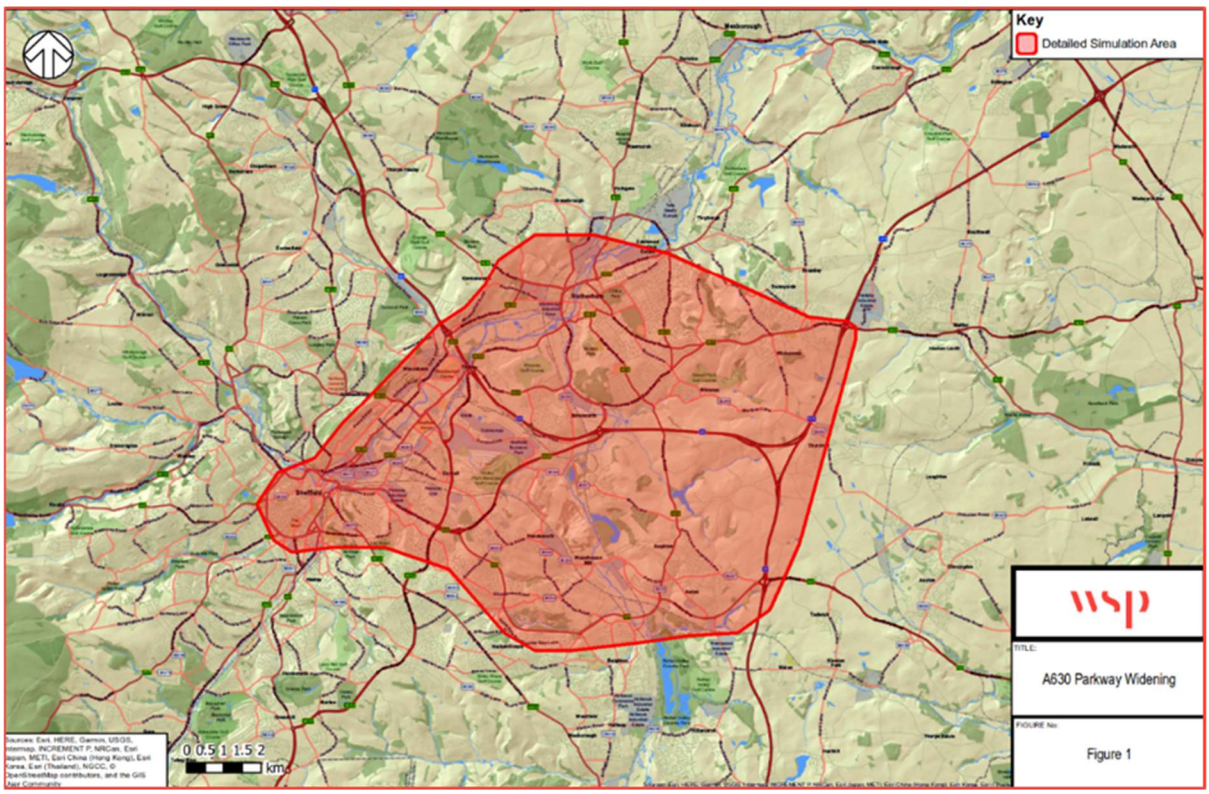
- The model already covers the A630 area of influence in some detail, with the scheme being adjacent to and directly joining onto the M1;
- Agreements to access, run and develop a cordon model have already been discussed and agreed with HE; and specifically, the Transport Planning Group at HE that maintain the model;
- The HE RTM represents an approved starting position for a local cordon model; from both HE and DfT perspectives. The age of data, technical assurance and provenance of the existing mobile phone matrix development incorporated in the model are all suitable and agreed by both parties;
- The model has a 2015 base, which allows re-use of existing RMBC data (that was also mainly collected in 2015). This minimises any further data collection, and costs;
- The HE model is based on an average hour model of the 3-hour peak period. This is considered more suitable to flow profiles on the A630 Parkway (that are similar to the SRN), and to maximise consistency with the demand modelling, and future appraisal;
- In principle, the cordoning approach will provide a more easily controlled network to calibrate and validate. This should help technical and programme aspects from a risk and delivery perspective; and
- The HE model is linked to a DIADEM VDM, with TUBA and standard economic packages already linked to the model.

The updated traffic model needs to produce a reliable and robust representation of current network conditions, such that the production of future year forecasts which underpin the scheme appraisal is equally reliable, and the model is considered fit for purpose. Particular attention was paid to the A630, the M1 (northbound and southbound) and the strategic A roads that feed these routes, as the routes expected to see the largest impact from scheme implementation.

The refinements made to the model were therefore to:

- Add in significantly more simulation network detail into the Area of Detailed Modelling (ADM), including locally important roads and rat-runs;
- Extend the area of full simulation coding to the full area of influence of the scheme, extending to the north east of the Sheffield Inner Ring Road using the A6109 as a northern boundary, the A57 towards the M1 as a southern boundary, west of the M18 towards Rotherham Town Centre and as far as M1 Junction 34 north (refer to Figure 2-1);
- Disaggregate the zone structure to Lower Super Output Area (LSOA) to provide additional zonal detail across the scheme area of impact;
- Include additional development zones around the scheme area into the base model (with zero demand), to ensure a consistent approach to future year forecasting;
- Convert the simulation network outside of the detailed simulation area to fixed speed flow to remove significant model noise experienced in external areas and improve model convergence;
- Make use of 2015 ATC data collected by RMBC to calibrate and validate the updated model, whilst keeping existing and reviewed Highways England calibration/validation counts from the RTM on the SRN; and
- Update and recalibrate the model to a comprehensive and consistent set of new Trafficmaster journey time data, for a 2015 base year.

Figure 2-1 - Fully Modelled Area



The model is representative of a typical weekday, in a neutral month in 2015. Three time periods have been modelled, as shown in Table 2-1. These are the average AM and PM hours (when demand on the network is highest and in particular when demand at the Catcliffe Roundabout to the north is at its highest), together with an average Inter-Peak (IP) hour. These are consistent with the time periods in the TPS RTM.

Table 2-1 - Model Time Periods

Time Period	Hours
AM Peak	Average hour between 07:00 and 10:00
Inter-Peak	Average hour between 10:00 and 16:00
PM Peak	Average hour between 16:00 and 19:00

Traffic demand is retained as per the TPS RTM, separated into three vehicle classes of car, LGV and HGV. Car trips have been further divided into three trip purposes: employer's business; commuting and other. The trip matrices (for assignment) are in origin-destination (OD) format and there is no differentiation between home-based and non-home-based trips.

The base year model networks and trip matrices were calibrated through an iterative process of model analysis and adjustment, in accordance with the acceptability guidelines set out in TAG M3.1. This process started with the network, and routing analysis and adjustment to improve the model as much as possible prior to undertaking further calibration through matrix estimation. At each stage of this process model outputs were compared to observed data such as traffic counts and journey times to check that model was representative of base year conditions.

Having ensured sensible routing through the study area, and enhanced journey time performance in all peaks, the model then went through final calibration by means of matrix estimation. This was firstly run with calibration screenlines only, prior to then including all count data (as mini screenlines) within the final run of matrix estimation. In the first run of matrix estimation, the main A630 and M1 strategic routes perform well in comparison to counts and journey times, with 100% link flow performance in the AM peak. This is also maintained at above 85% across calibration and validation counts in the IP and PM peak.

In terms of independent validation, performance on this network is also good across all vehicle types.

The calibration and validation performance shows that the modelled level of traffic on the strategic network around the scheme is considered robust for the appraisal of the proposed scheme, with a level out-turn performance. This is also the case for calibration link flows across the rest of the modelled area, which are close to the TAG criterion of 85%. This is considered reasonable for a large area urban model, where mobile data is controlled with synthetic data at a larger MSOA level. This is supported by independent journey time validation at 82% in the AM and PM peaks, and 100% in the IP.

However, it was noted that model validation performance on lower flow, non-strategic urban roads across the rest of the model typically remained in the high 60% flow performance, when retaining independent validation.

A final run of matrix estimation to improve this was therefore undertaken, including all counts as mini-screenline constraints in the final model. The calibration and validation performance shows that the modelled level of traffic on the strategic network around the scheme is considered robust for the appraisal of the proposed scheme, with a high level out-turn performance.

This is supported by independent journey time validation results in the final model of 86%, 95% and 82% across the 22 defined routes respectively.

Further details can be found in the Local Model Validation Report (LMVR)[2] in Appendix F.

2.3.3 FORECASTING

The forecast model has been developed in accordance with the guidance set out in TAG Unit M4[3], and in consultation with RMBC and the SCR. The model must demonstrate a reliable and robust forecast of both network conditions and demand for travel, with key transport and land use developments included within the modelling of explicit areas of interest, in order to underpin a robust and stable scheme appraisal. Full details are set out in the Forecasting Report[4] in Appendix G.

The forecast years are 2021 (opening year) and 2036 (15 years after opening year). Generalised cost parameters have been calculated for each of the future years and time periods, based on the methodology set out in TAG Unit A1.3[5], using the latest TAG Databook[6] at the time of undertaking the work.

[2] Local Model Validation Report – A630 Widening (WSP, September 2019)
[3] TAG Unit M4 Forecasting and Uncertainty (DfT, May 2018)
[4] A630 Parkway Widening: Forecast Report (WSP, September 2019)
[5] TAG Unit A1.3 User and Provider Impacts (DfT, March 2017)
[6] TAG Data Book (May, 2019)

The business case has been developed for the most likely scenario (referred to as the core scenario) based on the most unbiased and realistic assumptions about the scheme design, changes to the transport network, traffic growth and land use. However, in order to take into account uncertainty regarding those assumptions, alternative low and high growth scenarios have been developed as sensitivity tests to the core scenario, to assess the impact of the use of high and low growth traffic forecasts on the value for money of the scheme.

In order to develop the core and alternative scenarios, an uncertainty log was developed, that defines the level of uncertainty around planned growth in households and employment sites that are listed in RMBC's Local Plan and other documents. The log also contains information on committed transport schemes around Rotherham and Sheffield within the simulation area, that have been applied to the relevant modal year based on their likely year of construction, for all Do Minimum forecast year scenarios. These schemes include the conversion of the M1 J33/A630 Parkway to MOVA and the Smart Motorways programmes on the M1 Junctions 28 to 31 and 32a to 35a, all of which are forecast to be complete by 2021.

The log was developed in Autumn 2018 based on the most relevant information available at the time and was approved by RMBC as containing appropriate levels of information regarding the housing and employment densities and phasing allocated to each individual development site.

Trip rates were developed from information supplied by Sheffield City Council for future developments. These were considered appropriate by RMBC and have been followed through from the SCC Local Plan and applied to the Rotherham area due to the similarity between Rotherham and Sheffield Developments. Background growth was applied using NTEM v7.2, utilising TEMPro.

Based on fixed demand, various tests were carried out to examine convergence in the future year models, to assess the degree of stability. Future year convergence performance was found to accord with the standards set out in TAG Unit M3.1[7].

In the Do Minimum scenarios for the assessed years, the traffic models forecast an overall notable increase in the average delays in the local highway network in the AM, IP and PM time periods. However, there are a few notable decreases due to committed schemes in the area. In the respective Do Something scenarios, some delay decreases are observed in the simulation area as a result of the proposed A630 scheme.

The main journey time route along the A630 shows that in the Do Minimum scenarios, there is forecast to be an overall increase in journey times compared to the 2015 base year in the AM, IP and PM time periods. In the Do Something scenarios, journey times show a general decrease on the eastbound routes in all years and time periods compared to respective Do Minimum scenarios. The westbound direction generally shows an increase in journey time because of the speed limit reducing from 70mph to 50mph as part of the proposed scheme.

The proposed scheme is forecast to reduce the delay on every approach at the M1 J33, with the biggest impacts in the AM peak from the M1 off-slips and the biggest impacts in the PM peak from the A630 Parkway. The scheme is however forecast to increase the delay on the southern approach of Rotherway roundabout, due to the increased flow on this approach.

[7] TAG Unit M3.1 Highway Assignment Modelling (DfT, January 2014)

In terms of traffic flows, in 2021 there is forecast to be negligible change in Average Annual Daily Traffic (AADT) on the A630 Parkway northbound, and a 2% increase on the A630 Parkway southbound. In 2036 a 1% increase in AADT is forecast on the A630 Parkway northbound and southbound. Traffic flows on the M1 mainline are forecast to experience little change, in the region of +/-1% in both forecast years. In 2021, traffic flows on the M1 Junction 33 entry slips are forecast to experience negligible change, with the exit slips seeing an increase of 9% on the southbound exit slip and 5% on the northbound exit slip. In 2036, the northbound entry and exit slips show the biggest change, at 3% and 5% respectively.

2.3.4 DEPENDENT DEVELOPMENT TESTING

The local area is the primary focus of the City Region's economic growth, with the AMRC key to future growth plans. Dependent development testing was therefore carried out, to determine to what extent future developments are dependent on the A630 Parkway widening scheme being delivered.

Based on the guidance in TAG Unit A2.2, a dependency test was carried out based on a comparison of two initial scenarios from the full fixed demand runs:

- Baseline scenario – without the development and without any form of transport scheme; and
- Scenario Q – with the whole development but without any form of transport scheme.

If a reasonable level of service is not demonstrated, then the development is assumed to be dependent. In order to demonstrate the amount of development that could be built before the network becomes over capacity, four future network operational assessment tests were undertaken, both with and without the A630 Parkway widening scheme:

- No Dependant Development – this allows a 'business-as-usual' approach with and without the Parkway Widening scheme to identify areas of congestion;
- 25% Dependant Development – this shows the operational performance of the network if a quarter of the development is built;
- 50% Dependant Development – this shows the network performance if half of the development is built; and
- 100% Dependant Development – this identifies the maximum amount of dependant development that the network can contain.

Operational assessment was undertaken on a series of links and on the turning movements at key junctions. In a 2026 forecast year, it is clear that even with signal timing adjustments, the dependent development tests show significant operational issues on the immediate network. The signals at the M1 J33 have been optimised for the Saturn flows in the intermediate year and therefore no further improvement in the operation of the junction is feasible using signal optimisation.

As the findings show that the immediate network adjacent to the A630 Parkway widening scheme is stressed even with no (0%) dependent development for the assessed time periods in 2026, this implies that at least some of the new development will operationally be likely to be dependent on the A630 scheme, which provides additional network capacity. However, although some of the new development is identified as being dependent on the A630 Parkway widening scheme being delivered, the development is not solely reliant on this scheme.

The A630 Parkway widening scheme achieves the objectives set out in the initial OAR by increasing capacity towards the motorway junction, and it is therefore not intended to provide extra capacity for any dependent development, nor required to do so in a planning context.

Therefore, it was proposed not to include the AMRC development within the testing of the scheme and the DfT subsequently confirmed this decision. Further information is provided in the Dependent Development Technical Note provided in Appendix Q.

2.3.5 VARIABLE DEMAND MODELLING

TAG Unit M2[8] provides guidance with respect to VDM. A Variable Demand assessment is required where the following criteria are satisfied:

- Schemes with a capital cost of more than £5 million; or
- There is congestion on the network in the forecast years (10 to 15 years after opening), in the absence of the scheme; and
- The scheme will have an appreciable effect on competition between private and public transport in the corridor(s) containing the scheme.

The proposed A630 Parkway scheme satisfies the first two criteria listed above.

In accordance with the guidance, preliminary quantitative estimates of the potential effects of Variable Demand on both traffic levels and benefits were made. Output instability was significant; therefore, an elasticity-based assignment was carried out as an initial test prior to any further Variable Demand modelling.

TAG Unit M2 states that a Variable Demand assessment should be carried out if the following additional criteria are satisfied:

- Traffic suppression without the scheme impacts significantly on the reference case forecasts, i.e. time saving benefits of the scheme reduce by more than 10% in the Opening Year and 15% in the Design Year; and
- Extra traffic induced by the scheme is likely to reduce the time saving benefits of the scheme by more than 10% in the Opening Year and 15% in the Design Year.

TUBA time saving benefits were calculated for both fixed and elastic demand assignments for the opening year (2021) and design year (2036), for three time periods (AM, IP, PM). The benefits for the reference case assignment and the elastic assignment were then compared, to establish whether or not Variable Demand modelling is required.

The difference in the total user benefits between the fixed and elastic assignment is approximately 1.25% in the opening year and 2.3% in the design year. These values are well within the TAG guidelines of 10% for the opening year and 15% for the design year for the individual AM, IP and PM time periods.

It is therefore clear that separate Variable Demand modelling is not a necessary approach when assessing the effects of varying traffic demand for the improvement proposals on the A630 Parkway, and the DfT has confirmed its acceptance of this conclusion.

[8] TAG Unit M2 Variable Demand Modelling (DfT, May 2019)

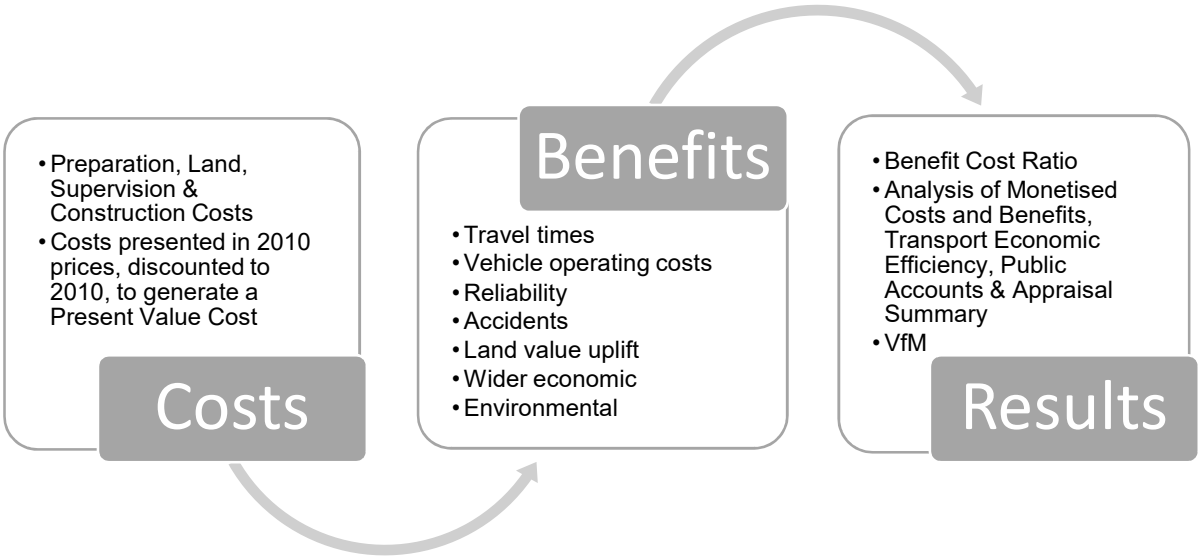
2.4 ECONOMIC APPRAISAL METHODOLOGY AND ASSUMPTIONS

2.4.1 OVERVIEW

The full methodology for the economic appraisal is presented in the Economic Assessment Report[9], and a summary is provided here. The economic appraisal has been undertaken in line with the guidance provided in TAG, specifically Unit A1.1 Cost Benefit Analysis[10] and Unit A1.3 User and Provider Impacts[11], and in accordance with the approach set out in the scheme Appraisal Specification Report (Appendix H). Modelling and appraisal values were taken from the latest version of the TAG Data Book[12] at the time of carrying out the work.

Figure 2-2 provides an overview of the appraisal process, which focuses on the identification of the costs and benefits associated with the scheme proposals to produce a BCR, that helps to identify the VfM.

Figure 2-2 - Economic Appraisal Methodology



The economic appraisal was carried out for a 60-year appraisal period following the scheme opening year of 2021, with a final assessment year of 2080. Economic assessment was undertaken for the weekday AM peak (average hour between 07:00 and 10:00), IP (average hour between 10:00 and 16:00), PM peak (average hour between 16:00 and 19:00) and Off Peak (average hour between 19:00 and 07:00) periods. Weekends and bank holidays were excluded from the assessment.

Costs and benefits are distributed differently throughout the 60-year appraisal period and benefits are considered to be more valuable in the present period rather than those that are accrued further into the future. The costs and benefits have therefore been discounted to a common price base and

[9] A630 Widening Scheme Economic Assessment Report (WSP, September 2019)
[10] TAG Unit A1.1 Cost Benefit Analysis (DfT, May 2018)
[11] TAG Unit A1.3 User and Provider Impacts (DfT, May 2019)
[12] TAG Data Book v1.12 (DfT, May 2019)

a common value (known as the Present Value Year), which are both currently 2010. All costs and benefits presented in this chapter are in 2010 prices, discounted to 2010.

Table 2-2 summarises the appraisal methodology used to assess each of the three main scheme impacts (economic, environmental and social) and the constituent sub-impacts for the proposed A630 Parkway scheme, as well as the impacts on public accounts.

Table 2-2 - Summary of Appraisal Methodology

Impacts	Sub-Impacts	Appraisal Methodology	Appraisal Output
Economy	Business Users & Transport Providers	TUBA assessment of travel times and Vehicle Operating Cost (VOC) benefits. QUADRO assessment of construction delay benefits.	Quantitative/Monetised/ Distributional
	Reliability Impact on Business Users	MyRIAD assessment.	Quantitative/Monetised
	Regeneration	Not applicable – assessment of Wider Economic Impacts has been undertaken as set out below.	N/A
	Wider Impacts	Assessment of agglomeration, output change in imperfectly competitive markets, labour supply impacts, dependent development and land value uplift.	Quantitative/Monetised
Environment	Noise	WebTAG Noise workbook.	Quantitative/Monetised/ Distributional
	Air Quality	WebTAG Local Air Quality Workbook/Air Quality Valuation Workbook.	Quantitative/Monetised/ Distributional
	Greenhouse Gases	TUBA output.	Quantitative/Monetised
	Landscape	WebTAG Landscape Worksheet.	Qualitative
	Townscape	WebTAG Townscape Worksheet.	Qualitative
	Historic Environment	WebTAG Historic Environment Worksheet.	Qualitative
	Biodiversity	WebTAG Biodiversity Worksheet.	Qualitative
	Water Environment	WebTAG Water Environment Worksheet.	Qualitative
Social	Commuting and Other Users	TUBA assessment of travel times and Vehicle Operating Cost (VOC) benefits. QUADRO assessment of construction delay benefits.	Quantitative/Monetised/ Distributional
	Reliability Impact on Commuting and Other Users	MyRIAD assessment.	Quantitative/Monetised/ Qualitative
	Physical Activity	Not applicable – scheme is not expected to impact on pedestrian and cyclist journey times.	N/A
	Journey Quality	Assessment of journey quality impacts such as information, potential accidents and route uncertainty.	Qualitative
	Accidents	COBALT analysis for links where there is a significant change in traffic flow as a result of the scheme.	Quantitative/Monetised/ Distributional

Impacts	Sub-Impacts	Appraisal Methodology	Appraisal Output
	Security	Not applicable – scheme is not expected to impact on security.	N/A
	Accessibility	Scheme impacts on access to services.	Qualitative
	Affordability	Affordability benefits as a function of change in VOC for DI analysis.	Qualitative/Distributional
	Severance	Change in severance as a result of the scheme.	Qualitative/Distributional
	Option Values	Not applicable – scheme is not expected to substantially change the availability of transport services in the study area.	N/A
Public Accounts	Cost to Broad Transport Budget	Scheme cost including risk, Optimism Bias and inflation adjustment.	Quantitative
	Indirect Tax Revenues	Calculated within TUBA.	Quantitative

There are various types of scheme impact which each have a different use in the VfM assessment. Table 2-3 summarises each of the anticipated impacts of the proposed A630 Parkway scheme, identifying which impacts will be considered as part of the initial BCR, which impacts will be considered as part of the adjusted BCR and which impacts are considered as part of the VfM statement but do not feed into BCR calculations.

Table 2-3 - Types of Scheme Impact and Use of VfM Assessment

Type	Impacts	Use in Assessment
Established monetised impacts	Journey time savings Vehicle operating costs Accidents Noise Air quality Greenhouse gases Indirect tax Delays during construction (NB this is recorded as a disbenefit)	Included in initial and adjusted BCR calculations
Evolving monetised impacts	Reliability Static clustering (agglomeration) Output in imperfectly competitive markets Labour supply impacts	Included in adjusted BCR calculations
Indicative monetised impacts	Dependent development GVA impacts Construction and operation jobs	Used to underpin the narrative in the Strategic Case and contribute to the VfM statement
Non-monetised impacts	Journey quality Accessibility Affordability Severance Townscape Historic environment Landscape Biodiversity Water environment	Used to underpin the narrative in the Strategic Case and contribute to the VfM statement

The following sections provide an overview of the assumptions and methodology used for each component part of the appraisal. Full details are provided in the Economic Assessment Report and accompanying technical appendices in Appendix I.

2.4.2 TRANSPORT USER BENEFITS

Transport user benefits are comprised of travel time benefits and Vehicle Operating Costs (VOC). Travel time benefits for the proposed A630 Parkway scheme have been derived by comparing the travel times in the Do Minimum scenario with travel times in the Do Something scenario. It will generally take a shorter time to travel through the study area when the scheme is implemented. These time savings have then been converted into a monetary value. When road vehicles are used, costs are incurred, including fuel costs and the costs of maintenance. These costs are known as VOC.

When the scheme is implemented, a variety of changes in speed and distance could occur. Traffic that transfers onto uncongested links will experience less delay and quicker journeys. However, some of that traffic may travel a slightly longer distance. Such traffic therefore has a mixture of increases and decreases in VOC. Other users in the study area could experience an increase in journey times due to increases in traffic caused by variable demand responses. Such traffic could have an increase or decrease in VOC depending upon the resultant speeds.

For the appraisal of travel time and VOC benefits, distance, time and trip skim matrices from the traffic model have been entered into the Transport User Benefit Appraisal (TUBA) software, along with other scheme specific data. The skims were carried out separately for each user class, for each time period, in each modelled year.

TUBA assesses travel time savings over the modelled area and then applies monetary values known as Values of Time (VoT) to derive the equivalent monetary benefits of those time savings. Default VoT parameters and forecast changes in their values over future years are included in the TUBA economics file. The latest version of TUBA has been used for the assessment (Version 1.9.13), which is based on the most recent TAG Databook (May 2019).

The following assumptions were made:

- First Year – This has been taken as the opening year of the scheme, defined as 2021.
- Horizon Year – Based on a 60-year appraisal period, this is defined as 2080.
- Modelled Years – This has been defined as the opening year (2021) and the design year (2036).

TUBA is able to provide user benefits for up to 8,760 hours within a year and it allocates each hour into one of four-time periods that represent the different flow group characteristics as follows:

- Weekday AM average period – 07:00-10:00;
- Weekday Inter Peak average period – 10:00-16:00;
- Weekday PM average period – 16:00-19:00; and
- Weekday average Off Peak period – 19:00-07:00.

The traffic models developed for the proposed scheme consist of three distinct time slices:

- AM peak hour (08:00-09:00);
- Inter Peak (average of 10:00-16:00); and
- PM peak (17:00-18:00).

Non-modelled hours have therefore been included in the TUBA analysis by expanding modelled hours to the relevant period. Annualisation factors were then used to forecast a 24-hour day across a single year. The annualisation factors used are shown in Table 2-4.

Standard annualisation factors have been used for the weekday AM, Inter Peak and PM peak periods. As there is no model for the Off Peak period, the Inter Peak has been used, with a different annualisation factor applied. Due to the level of traffic expected in the Off Peak being smaller than the AM and PM peak, and there not being any evidenced tidality of flow in either northbound or southbound direction on the A630 Parkway, a factor of the Inter Peak is considered to be most representative of Off Peak conditions. The annualisation factor was calculated using C2 Traffic Data on the A630 Parkway for both periods, where the total flow in both periods was compared with a factor calculated using the values. This factor was then applied to the Inter Peak annualisation to calculate the Off Peak annualisation.

Table 2-4 - Annualisation Factors

Time Period	Annualisation Factor
Weekday AM Peak	759
Weekday Inter Peak	1518
Weekday PM Peak	759
Weekday Off Peak	959

Note that the Off Peak benefits are included in the TUBA analysis; however, any benefits during weekends and bank holidays are excluded from the assessment, as no specific weekend model exists.

It is important to ensure that the TUBA results look sensible, not only in terms of the profiles, but also in terms of the spatial patterns of users who benefit. Otherwise, given the size of the A630 Parkway widening model, and potential associated noise with its size, it is very easy to get results that are either counter-intuitive, or are driven by parts of the model that would not be expected to produce significant levels of benefit/disbenefits from the flow change analyses.

To ensure that only benefits/disbenefits that are directly attributable to each distributor road option were included in the economic assessment, and for the ease of output analysis, the traffic model zones (2169 in total) were therefore aggregated into 22 sectors. Further details are provided in the Economic Assessment Report in Appendix I.

TUBA has also been used to calculate changes in Indirect Tax Revenues as a result of changes in speed and distance. These changes affect the amount of fuel being used and therefore affect the tax income the Government receives.

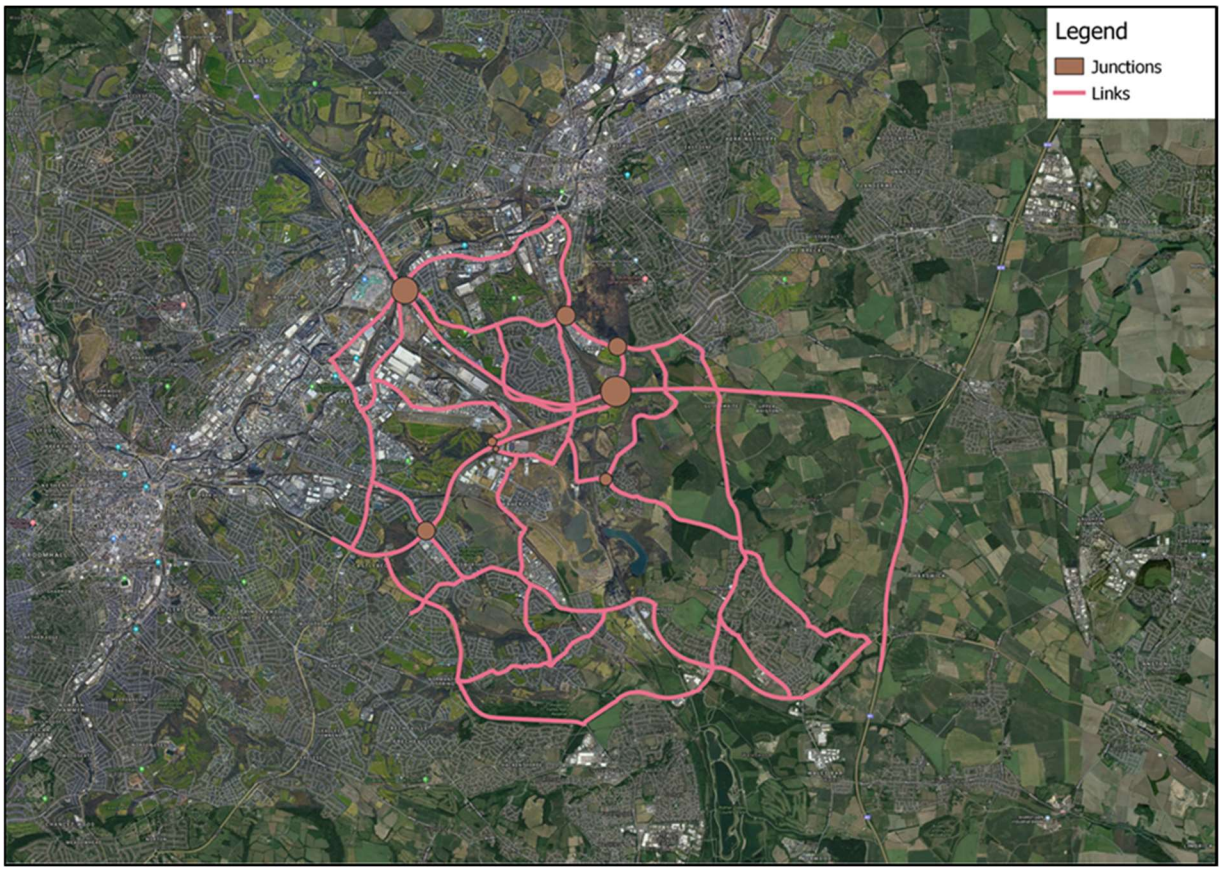
2.4.3 ACCIDENT BENEFITS

The software package COBALT (COst and Benefit to Accidents – Light Touch[13]) has been used to determine the accident benefits associated with the proposed scheme.

[13] Version 2013.02

The extent of the network used for the COBALT analysis is presented in Figure 2-3. This area was selected based on examination of the SATURN models to assess where there are large flow changes that can reasonably be attributed to the scheme.

Figure 2-3 - COBALT Network



In terms of the junctions within the COBALT network, junction classification parameters were input to COBALT for each of the selected junctions, including the highest standard, number of lanes and speed limit. Junction flows were input for base year flows, without scheme flows and with scheme flows. The flows were input for each arm of each junction in the form of Average Annual Daily Traffic 24 (AADT 24). For junctions, national accident rates were used as a full dataset was not available for all junctions in the study area, in particular the M1 Junction 33.

In terms of the links within the COBALT network, for each link the road type, length and speed limit were defined, and AADT 24 flows were extracted from the traffic model. For links, local accident data was used as an input to COBALT. This data covers each of the full years 2014-2018. Data from 2019 was excluded due to the fact that only data from the year to date is available.

The methodology used is a combination of the combined approach in COBALT and the junction approach, where the junctions that are forecast to experience a key flow change have been assessed as individual junctions, and the wider network has been assessed using the combined link and junction approach.

2.4.4 JOURNEY TIME RELIABILITY BENEFITS

The MyRIAD software programme[14] has been used to calculate the monetised reliability and incident delay impacts of the proposed scheme, using data extracted from the traffic model and external calculations, and in accordance with the guidance set out in TAG Unit A1.3[15].

Journey time reliability relates to the predictability of travel times. The less variability there is in journey times between an origin and destination, the more predictable or reliable the journey time becomes – and vice versa. Apart from the voluntary choice of speed available to the driver, the main factors affecting journey time variability are incidents and congestion. MyRIAD is used to measure the change in journey time variability arising from interventions which affect incident rates and/or congestion.

A series of parameters were input to MyRIAD, including global parameters, link definition and route definition. Default values were used for the delay threshold and the maximum diversion proportion, as recommended by Highways England. The HGV PCU conversion factor was taken from the traffic model.

Appraisal was undertaken for both directions, for the assessment years of 2021 and 2036. Five time periods were used: AM; PM; IP; Off Peak and Weekend, and a Volume/Capacity value for feeder links was defined for each. The default value of 0.6 V/C was used for the busiest period (PM), which was lower proportionally in line with traffic levels. The Inter Peak model was used to calculate the V/C for the Off Peak and Weekend, using C2 traffic data on the A630 Sheffield Parkway in the base year and comparing the average traffic per hour between the two to work out a factor to apply to the Inter Peak V/C.

Link flows were extracted from the traffic model for both directions, for both the Do Minimum and Do Something scenarios. A HGV PCU factor was applied to the HGVs, and the percentage of HGVs was then calculated for each period.

The monetised impacts of the reliability assessment have been included in the PVB used for the calculation of the adjusted BCR.

2.4.5 WIDER ECONOMIC BENEFITS

As stated in TAG Unit A2.1[16], the full range of benefits of a transport scheme may not be realised through analysis of user benefits if there are 'distortions' or market failures that mean the economy does not function efficiently. These benefits are defined as 'wider impacts' and will arise as the impact of transport improvements are transmitted into the wider economy. These impacts can be large and form an important element of the overall appraisal of a transport scheme.

The types of wider impacts that the DfT includes in transport appraisals are:

WI1 – Agglomeration: the concentration of economic activity over an area, also known as the effective density. Transport schemes can alter the accessibility of firms in an area to other firms and workers, thereby affecting the level of agglomeration. Businesses derive benefits from being located close to one another through greater business interaction; more efficient/effective labour market interaction and knowledge/technology spill overs.

[14] Version 2018 has been used, with relevant values updated based on the May 2019 TAG Databook
[15] TAG Unit A1.3 User and Provider Impacts (DfT, March 2017)
[16] TAG Unit A1.2 Wider Economic Impacts Appraisal (DfT, May 2018)

WI2 – Output change in imperfectly competitive markets: A reduction in transport costs (to business and/or freight) allows firms to profitably increase output of the goods or services that require use of transport in their production. A transport intervention that leads to increased output of goods and services will deliver a welfare gain as consumers' willingness to pay for the increased output will exceed the cost of producing it.

WI3a – Tax revenues arising from labour supply impacts: Transport costs are likely to affect the incentives for an individual to work. In deciding whether or not to work, an individual will weigh the costs associated with work, including travel costs, against the wage of the job. A change in transport costs alters the net financial return to individuals from employment. This is likely to affect the number of people choosing to work and as a result, the overall amount of labour supplied in the economy.

There are also changes in tax revenues arising from moves to more or less productive jobs (WI3b). However, as stated in TAG Unit A2.1[17], the assessment of benefits associated with this should only be calculated where a Land Use Transport Interaction (LUTI) model has been developed. Therefore, the implications of a move to more or less productive jobs have not been assessed for the proposed A630 Parkway scheme.

The Wider Impacts for the scheme have been calculated using the DfT's Wider Impacts in Transport Appraisal (WITA) v2.0 Beta tool. Since it is not possible to model every individual year over an appraisal period, the Wider Impact benefits for the non-modelled years are either interpolated or extrapolated from the modelled years as follows:

- For non-modelled years between the modelled years, wider impact benefits are interpolated using the lower bound and upper bounds' modelled years; and
- For non-modelled years after the last modelled year, the calculation of wider impact benefits uses the benefits produced from the last modelled year and growth by the GDP growth rates to the end of the appraisal period.

Economic and employment data were obtained from the latest WebTAG Wider Impacts dataset[18] v3.1, released in May 2019. This data is available by Local Authority Districts (LAD) from 2016 to 2081 in five-year intervals.

The assessment also uses the following information from the TUBA economics file:

- Value of Time (VoT) for business users;
- Forecast growth in VoT;
- Discount rates;
- Vehicle occupancies;
- Proportion of travel in work and non-work time;
- Fuel Costs and VAT rates; and
- Vehicle operating cost parameters.
- The economics file for TUBA v1.9.13 was used to be consistent with the economic data that was used for the TUBA benefits.

[17] TAG Unit A1.2 Wider Economic Impacts Appraisal (DfT, May 2018)
[18] TAG Wider Impacts Dataset v3.1 (DfT, May 2019)

For the purposes of the WITA assessment, the traffic model zones within the simulation area were grouped into Local Authority District (LAD) level to form the WITA zones. Model zones within the buffer area of the model were grouped to form larger WITA zones, comprising multiple LADs.

Annualisation factors were used to change peak hour modelled flows to a yearly figure. This figure uplifts all benefits expected in 1 hour to 1 hour for every workday within a single year. This was done using the annualisation factors set out in Table 2-4.

WITA benefits are only calculated for commute and business trips; therefore all 'other' trips were excluded. Due to the large scale of the traffic model, WITA reports benefits across the whole country. In reality, trips between the majority of model zones are unlikely to benefit from the scheme and the assessment is likely to result in an over-estimation of benefits. Therefore, benefits between zones that are unlikely to be impacted by the scheme were masked, and the benefits were calculated purely for trips between, and to or from, the core study area.

To support the assessment of wider economic benefits, Genecon has developed a bespoke Economic and Fiscal Benefits Model that quantifies the impacts of the A630 Parkway scheme proposal on the wider UK and SCR labour markets and economy. The approach taken is consistent with HM Treasury Green Book principles and DfT TAG appraisal guidance. Outputs from the model show the economic impact of the scheme over the next 20 years (2019-2038) compared to a likely reference case position in terms of gross and net employment effects, GVA impacts, welfare-related labour supply and additional relevant WEBs. The full methodology and list of assumptions is provided in the report in Appendix A.

Beyond this the Level 2 labour supply impacts have also been calculated, to demonstrate the national level welfare-related Gross Domestic Product (GDP) impacts arising from induced effects on labour supply locally brought about through the scheme. Two values for Level 2 WEBs have therefore been produced for the A630 Parkway scheme; the value calculated using WITA and the value calculated using Genecon's model. These two values have been used to develop two iterations of the adjusted BCR.

2.4.6 CONSTRUCTION IMPACTS

It is likely that delays will be experienced by road users during the construction of the scheme, producing a short-term disbenefit. Information on construction phasing and duration was obtained from Balfour Beatty as the Principal Contractor to assess the construction delay impact. The delay impact of any maintenance activity over the 60-year appraisal period has not been assessed. The provision of an additional lane in each direction on the A630 Parkway is expected to provide a benefit compared to the existing situation in terms of the ability to keep lanes open during maintenance periods.

The construction works will be accommodated using Traffic Management arrangements comprising narrow lanes with a reduction in speed limit to 50mph, overnight lane closures and contraflow arrangements. The works will be carried out over a period of 85 weeks over 2020-2021, split into six phases. Eastbound and westbound diversion routes have also been specified.

The assessment was undertaken using QUADRO (QUeues And Delays at ROadworks) Version 2018. QUADRO is used to establish the total cost to road users of construction and maintenance works, by estimating delays to vehicles and combining this information with the value of time, VOCs and accident costs. QUADRO provides an accurate reflection of delays, as it uses lane widths to

develop the speed flow relationship for the roadworks section. This allows QUADRO to take into account the speed reductions that occur as flows approach capacity; however, this does not affect the flow level beyond which queues start to build up.

Volumetric traffic data was downloaded from the Drakewell website for the A630 between Poplar Way and the M1 Junction 33, for the one-year period from 01 January to 31 December 2018. The Annual Average Daily Traffic (AADT) flow was 31,461 vehicles eastbound and 31,657 vehicles westbound, and the two-way Annual Average Hourly Traffic (AAHT) flow was calculated to be 2,630 vehicles. Although there are seasonal variations in traffic flows, as the construction period is for a period of approximately 18 months, these average flows were considered to be suitable for the assessment. The same traffic flow data was also extracted from the Drakewell website for the two diversion routes. These flows were growthed to 2020/2021 levels for use in QUADRO, to reflect the scheme construction period.

By including the diversion route coding, all traffic had the option to use the full traffic management length or the unaffected diverted route within the QUADRO analysis. The QDIV function within QUADRO was used to calculate the speed-flow curves and two-way AAHT flows for the diversion routes. The inputs for this module within QUADRO come from the modelled flow data for each link within the diverted route.

To fully capture the effect of the narrow lanes in QUADRO, it is necessary to input user specific lane capacities in Passenger Car Units (PCUs). There is guidance in the Traffic Signs Manual, Chapter 8 on appropriate lane capacities in roadworks situations. These capacities are dependent on the proportion of HGVs in the traffic flow and can be reduced to reflect narrow lanes. In QUADRO, these are expressed as average capacities per lane where there are two or more lanes of varying width. The width of the narrow lane sections was taken from the cross-section Traffic Management drawings supplied by Balfour Beatty.

HGV proportions were not available for the mainline route; therefore, default QUADRO values were applied. HGV proportions could be calculated from the data obtained for the diversion routes and these values were used in the assessment.

2.4.7 GREENHOUSE GASES

The following years have been used in the assessment:

- Present Value Base Year – 2010
- Current Year – 2019
- Proposal / Scheme Opening Year – 2021
- Forecast / Design Year – 2036
- 60-year appraisal period – up to year 2080.

The TAG methodology has been used to assess the changes in CO_2e emissions arising as an impact of the scheme over the 60-year period to 2080.

Background traffic emissions have been calculated using the standardised WebTAG approach, based on existing traffic flows.

CO_2 data has then been assessed for the opening and forecast years using TUBA, with an assumption that beyond 2050 CO_2 emissions will then remain constant to 2080. Benefits from the change in GHG emissions from the scheme were derived by estimating the changes in fuel consumption to produce an impact in the monetary value at a 2010 price base.

Annual CO_2e emissions in tonnes have been split by traded and non-traded CO_2e for both the without-scheme and with-scheme forecasts. The outputs then show the changes in terms of CO2e that the scheme will instigate and assesses the Net Present Value of carbon dioxide equivalent emissions of the proposed scheme. If the score gives a positive value this reflects a net benefit in terms of an actual reduction in CO_2e emissions and improvement to the environment. In addition, the sensitivity analysis shows the Upper and Lower Estimate Net Present Values of CO_2 emissions of the proposed scheme.

2.4.8 AIR QUALITY

The impact of the scheme on local air quality has been predicted using a dispersion model (ADMS-Roads) populated with emissions factors derived from traffic flow data, in accordance with the local air quality assessment methodology in DMRB HA 207/07 and TAG Unit A3 Chapter 3. Total mass emissions were calculated by incorporating the Department for Environment, Food and Rural Affairs (DEFRA) Emissions Factor Toolkit and traffic flow data to predict NOx releases for the opening (2021) and design year (2036) of assessment.

As described in the Strategic Case, the scheme traverses through an AQMA designated by RMBC and is situated in close proximity to the citywide AQMA designated by Sheffield City Council. The redistribution of traffic on the local road network as a result of the scheme, may therefore cause subsequent impacts upon air quality, in particular for NO_2 and $PM_{2.5}$ concentrations. Environmental assessment has been undertaken, which includes quantification and monetisation of air quality benefits for the areas where a relatively large change in traffic flows is expected.

The DEFRA Pollutant Climate Mapping (PCM) model is used to estimate pollutant concentrations at background and roadside locations throughout the UK. Noting the PCM model includes a section of the A630 Sheffield Parkway, the roadside annual mean NO_2 concentrations from the PCM model, including subsequent years from 2019 until the predicted compliance year of 2023, have been used in the assessment.

Background pollutant data for 2017 and 2021 has been obtained through the DEFRA background maps website and applied in both the model verification procedure and calculation of total annual mean concentrations of NO_2.

Traffic data for the proposed scheme in 2021 has been extracted from the PCM, for the A630 Sheffield Parkway road link and the on/off slip links at the B6533 Poplar Way roundabout, to assist the preliminary dispersion modelling exercise.

The following parameters have been assessed for the Do Minimum (without-scheme) and Do Something (with-scheme) scenarios:

- Annual Average Daily Traffic (AADT24);
- Percentage of Heavy-Duty Vehicles (HDV); and
- Daily average speed (km/h).

ADMS-Roads has been used to predict the roadside annual mean concentrations of NO_2 and provide a preliminary examination of conditions with the scheme in place. Hourly sequential meteorological data was obtained from the Sheffield Doncaster met station for 2017 and used for the modelling exercise. Vehicle NOx emissions rates were derived within the ADMS-Roads model based on the respective traffic flows and the latest Emissions Factor Toolkit (EFT) V9.0 as mentioned above.

Model verification involved a comparison between predicted and measured concentrations at one or more suitable local sites, and adjustment of the modelled concentrations if necessary. Diffusion tube monitoring data for 2017 was acquired through the RMBC community mapping website[19] and incorporated into the model verification process, whereby an adjustment factor was derived[20] and applied to road-contributions of NOx, prior to conversion to NO_2[21].

2.4.9 NOISE

A noise assessment has been undertaken to understand the impacts of the scheme on noise levels, and to inform mitigation measures and the measures adopted in the construction management plan. The existing road traffic noise climate has primarily been determined using a 3D noise model populated with traffic flow data.

The standard methodology contained within the DMRB (HD213/110) guidance states that in terms of reporting the most robust assessment of noise impacts should be made:

'vi) Where a building is predicted to experience different changes in noise level on different façades, the least beneficial change in noise level should be reported in the assessment Table. When all facades show a decrease in noise level, then the smallest decrease should be reported. When all facades show an increase in noise level then the largest increase should be reported. If this approach would lead to the reporting of two or more facades (i.e. where the same least beneficial change in noise level is shown on two or more facades) then the change on the façades with the highest noise level in the Do-Minimum scenario should be reported. A similar approach of reporting the least beneficial change in noise level should be used for the impact at areas within open spaces or sensitive receptors such as footpaths.'

Therefore, the LA10 18h noise levels have been converted to LAeq 16 hr value in accordance with the TAG guidance. The LAeq 16 hr values have then been banded and input into the noise workbook for the full assessment, contained with the Environmental Assessment Report[22]. The assessment is based on a scheme opening year of 2021 and a forecast year of 2036.

2.4.10 SOCIAL DISTRIBUTIONAL IMPACT

2.4.10.1 Overview

Analysis has been undertaken to ascertain the Social and Distributional Impacts of the proposed scheme. Social Impacts relate to the human experience of the transport system, and the following factors have been assessed:

- Accidents (quantitative assessment using COBALT, refer to Sections 2.4.3 and 2.6.2);
- Severance (qualitative assessment);
- Journey quality (qualitative assessment);
- Physical activity (qualitative assessment); and

[19] RMBC (2019) RMBC Community Mapping – 2017 Monitoring Locations [online] http://communitymapping.rotherham.gov.uk/gis/CMFindit/
[20] A road-NOx adjustment value of 2.37 was derived, using data for five roadside monitoring sites in proximity to A630 Parkway. A Root Mean Square Error (RMSE) of 4.1 µg/m3 was calculated post-adjustment, which equates to 10.25% of the annual mean NO2 objective.
[21] DEFRA (2019) NOx to NO_2 Conversion V7.1 [online] https://laqm.defra.gov.uk/documents/NOx_to_NO_2_Calculator_v7.1.xlsm
[22] A630 Parkway Widening Environmental Assessment Report (WSP, forthcoming October 2019)

- Personal affordability (qualitative assessment).

The SI assessment has been prepared in accordance with the guidance in TAG Unit A4.1[23]. A largely qualitative assessment has been undertaken, with the exception of the accident analysis.

Accessibility, security and option and non-use values were scoped out of the assessment.

Distributional Impacts relate to the variance of transport intervention impacts across different social groups. The DI assessment has been prepared in accordance with the guidance in TAG Unit A4.2[24]. The following have been assessed for the proposed A630 scheme:

- User benefits;
- Noise;
- Air quality;
- Accidents;
- Severance;
- Security; and
- Affordability.

Accessibility has been scoped out of the assessment.

The Distributional Impacts have been assessed on a seven-point scale, ranging from large adverse (adverse and the population impacted is significantly greater than the proportion of the group in the total population) to large beneficial (beneficial and the population impacted is significantly greater than the proportion of the group in the total population).

The full screening proforma can be found in the Social Distributional Impact Report contained in the EAR.

2.4.10.2 Transport Users

The transport user benefits were extracted for every LSOA in the scheme impact area from the TUBA model used for the economic assessment. Only non-business user benefits were included, as non-business journey purposes by residents (e.g. travel to work and education) are most susceptible to a change in travel cost. Consistent with TAG Unit A4.2, origin benefits have been used for the AM peak and destination benefits for the PM peak. IP benefits use both the origin and destination benefits from each zone divided into two, so that the total accrual of benefits is not double-counted.

The user benefits for each LSOA were attributed to the associated income group quintile (from the national IMD and the split of benefits per population in the income group calculated by aggregating user benefits for LSOAs in each income group quintile. The impact was assessed by calculating the percentage point difference between the distribution of the population in each income group and the distribution of the total user benefits each income group experienced.

2.4.10.3 Accidents

Accident saving benefits for the scheme were calculated using COBALT, which assesses changes in the number and severity of accidents over a 60-year appraisal period. These results were plotted, to identify the areas where accident rates are likely to change (by +/-10%) as a result of the scheme.

[23] TAG Unit A4-1 Social Impact Appraisal (May 2019)
[24] TAG Unit A4-2 Distributional Impact Appraisal (December 2015)

Six groups were considered in detail:

- Children (Under 16);
- Young Adults (Aged 16-24);
- Elderly (Over 70);
- Pedestrians;
- Cyclists;
- Motorcyclists; and
- Young Male Drivers.

The proximity of clusters of these groups to those links forecast to experience a noticeable change in the accident rate was analysed in order to draw conclusions regarding the impact of the scheme on vulnerable groups in the local resident population.

2.4.10.4 Severance

Links within one kilometre of the proposed scheme with an AADT flow change greater than 10% were considered in the assessment. Changes in traffic flow were identified by comparing traffic model flows for the design year 2036 Do Minimum scenario compared with the 2036 Do Something scenario.

Certain groups are particularly vulnerable to the effects of severance, including children, elderly, households without access to a car and those with disabilities. The proportion of these groups in the scheme impact area was assessed against the forecast changes in traffic flow, along with the locations of three sites where there are crossing facilities for pedestrians in areas where there are a number of key local amenities. These sites were then individually appraised in line with TAG Unit A4.2.

2.4.10.5 Personal Affordability

Fuel and non-fuel VOCs are forecast to change as a result of the proposed scheme, due to changes in journey speed and traffic rerouting. This will impact on personal affordability.

The area of impact for the personal affordability distributional appraisal is the same as that used for the user benefit appraisal and comprises of the SATURN model simulation area. User benefits were compared to income quintiles to examine the distribution of VOC across the population within the impact area by national income deprivation quintile.

2.4.10.6 Security

The scheme does not include any changes to existing public transport interchanges or pedestrian/cycle provision; therefore the impact on security is neutral.

2.4.10.7 Noise

In total there are 1,672 residential properties within the Noise Calculation Area, with an estimated population of 38,457 (based a factor of 2.3 per household).

TAG Unit A4-2 requires the impacts of noise on the following social groups to be assessed:

- Income Distribution;
- Children: proportion of population aged <16; and
- Older people: proportion of population aged 70+.

The LSOAs in the study area, their population and their income profile were defined. Quintiles were normalised to the scheme and defined locally considering the national ranking as a basis for assigning quintiles. Each LSOA was allocated to one of the five income quintiles. The LSOAs with a lower number assigned to the IMD were assigned to the lower percentage quintile.

Using a Geographic Information System (GIS), the number of residential properties experiencing an increase, decrease or no change in noise level, in each of the LSOAs, as a result of the scheme in the 15th year after opening were identified.

The noise impact of the proposed scheme for each quintile in the income domain of IMD was calculated, alongside an assessment of the noise impact of the scheme on children and over 70s.

2.4.10.8 Air Quality

The study area for the air quality Distributional Impact assessment screening was defined based on guidance given in the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07. In total, there are 13,299 sensitive receptor locations identified in the air quality study area, with an estimated population of 127,116, based on the mid-2017 population estimates for each Lower Level Super Output Area (LLSOA). Most of the assessed dwellings are houses.

In terms of the Distributional Impact Assessment the following groups have been assessed.

- Income Distribution; and
- Children: proportion of population aged less than 16 years.

There are 73 LLSOAs in the study area, which cover the full range of income distribution quintiles. Using GIS, the number of residential properties experiencing an improvement, deterioration or no change in concentrations of nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of 10µm (PM_{10}) and 2.5µm ($PM_{2.5}$) as a result of the proposed scheme in the opening year of 2021 was joined to the LLSOA dataset. Analysis was then undertaken of the properties experiencing positive and negative changes in air quality by income domain. The proportion of young people in the study area was also assessed, alongside the quantities of various amenities such as schools/nurseries, parks and open spaces and hospitals.

2.5 SCHEME COSTS

2.5.1 CONSTRUCTION COSTS

The scheme costs used for the purposes of economic appraisal comprise of four main elements as follows:

- Base cost (construction + land + preparation + supervision costs);
- Inflation allowance;
- Risk allowance; and
- Uncertainty allowance (optimism bias).

The base scheme cost, which excludes spend to date and includes inflation is £36,447,008 in Quarter 1 2020/2021 prices. The risk allowance, based on the mean risk value from the QRA, is £3,780,093, which gives a risk-adjusted economic cost estimate of £40,227,101. For the purposes of economic assessment, a further 3% (£1,206,813) has been added to account for uncertainty or

optimism bias, in accordance with the guidance in TAG Unit A1.2 Table 8[25]. This gives a total scheme cost for the purposes of economic appraisal of £41,433,914 in Quarter 1 2020/2021 prices.

The costs used in the economic appraisal differ from the outturn costs used for funding decisions, as the former are adjusted to the DfT's standard present value year for appraisal (2010) to allow direct comparison with the monetised benefits, and the costs are in calendar years. Scheme costs used for funding submissions are the outturn costs in the expected years of expenditure and are in financial years converted to market price units of account.

Costs and benefits occur in different years throughout the assessment period e.g. the construction costs occur before the scheme opens, whilst the benefits occur in the 60 years afterwards. In addition, it is considered that benefits that accrue now are more valuable than those that accrue further into the future.

The financial scheme cost estimates were therefore rebased to the DfT's standard 2010 price base, discounted at a rate of 3.5% per year for the first 30 years from the current year and 3% per year thereafter and converted to market prices. This gives a Present Value Cost (PVC) of £28,593,408. Further information on these calculations is provided in the EAR in Appendix I.

2.5.2 OPERATION AND MAINTENANCE COSTS

Baseline maintenance data for the A630 Parkway was not available at the time of preparing this Full Business Case; therefore, an estimate of the likely maintenance liability of the proposed scheme compared to the existing situation has been prepared. This has been carried out using a Section 278 Highways England proforma, which enables the calculation of a commuted lump sum for maintenance over a 60-year appraisal period, based on the derived annual charge rate for routine maintenance of the additional carriageway area, and the renewal/replacement of elements. The completed proforma is provided in Appendix J.

The following assumptions have been made:

- The frequency of renewal is 20 years;
- The Highways England rate of £1.43 for Area 12 routine maintenance (2004/5) has been uplifted by 20% to account for inflation and economies of scale between Highways England and RMBC;
- The existing double-sided flexible Road Restraint System (RRS) will be replaced with a more durable Rigid Concrete Barrier (RCB);
- There is a net change of -3 luminaires, with the replacement cost per unit taken from a comparable scheme example (A46(T) Shottery Western Relief Road);
- Traffic signals are maintained by Highways England and have therefore been excluded from the assessment;
- The Air Quality Monitoring Station has been excluded from the assessment, as it is considered a separate matter relative to the scheme;
- The existing CCTV will not be reinstated; and
- The existing road pavement sensor and traffic counters will be replaced on a like-for-like basis and are not considered to induce a change in maintenance cost.

Based on this assessment, it is calculated that the proposed scheme will incur a reduction in maintenance costs compared to the existing situation, of -£123,830 over the 60-year appraisal

[25] TAG Unit A1.2 Scheme Costs (DfT, July 2017)

period (in 2010 prices, discounted to 2010). This is primarily a result of the change to a rigid concrete step barrier in the central reserve and the removal of lighting columns in the central reserve.

For this reason, and in accordance with TAG Unit A1.2[26], maintenance costs have not been included in the economic appraisal. In order to represent the most robust case, and given the lack of existing maintenance data, the predicted maintenance saving has also not been included in the economic appraisal, in order to provide a cautious assessment.

2.6 SCHEME BENEFITS

2.6.1 TRANSPORT USER BENEFITS

The total transport user benefits for the core scenario are shown in Table 2-5, broken down into the type of benefit.

Table 2-5 - Transport User Benefits – Core Scenario

Scenario	Benefit (£000s)
Time Saving Benefit	60,035
Fuel VOC (Vehicle Operating Costs)	3,945
Non-Fuel VOC	2,742
Indirect Tax Revenue	-2,150
Total	**64,572**

All values are in 2010 prices, discounted to 2010

It can be seen that the majority of benefits come from time savings (£60.0 million), with small benefits from VOC (£6.7 million). There is a small disbenefit in indirect tax revenue (-£2.2 million), leading to an overall transport user benefit of £64.6 million.

The full set of results is provided in Appendix I, broken down by time period and journey purpose. The time period showing the most benefits is the PM peak, which is to be expected as most congestion in the area at present occurs during this period, as a result of traffic heading towards the M1. The largest level of benefits is shown for commuting journeys, as would be expected on the A630 Parkway as a key strategic route between the principal employment areas of Sheffield and Rotherham.

The benefits from the high and low growth scenarios are shown in Table 2-6 and Table 2-7 respectively.

[26] TAG Unit A1.2 Scheme Costs (DfT, July 2017), Section 2.3

Table 2-6 – Transport User Benefits - High Growth Scenario

Scenario	Benefit (£000s)
Time Saving Benefit	67,504
Fuel VOC (Vehicle Operating Costs)	3,101
Non-Fuel VOC	2,036
Indirect Tax Revenue	-1,795
Total	**70,846**

All values are in 2010 prices, discounted to 2010

The transport user benefits are higher overall than in the core scenario, with the largest benefit again coming from time savings. The fuel and non-fuel VOC benefits are lower than in the core scenario; however, the decrease is lower than the increase in time savings, hence high benefits overall.

Table 2-7 – Transport User Benefits – Low Growth Scenario

Scenario	Benefit (£000s)
Time Saving Benefit	31,883
Fuel VOC (Vehicle Operating Costs)	2,186
Non-Fuel VOC	1,237
Indirect Tax Revenue	-1,189
Total	**34,117**

All values are in 2010 prices, discounted to 2010

In the low growth scenario, there is a reduction in the value of each type of transport user benefit, resulting in a lower overall level of transport user benefits compared to the core scenario. The significant decrease in time saving benefits is due to lower traffic levels in the area around the scheme and less delay.

2.6.2 ACCIDENT BENEFITS

The calculated accident benefits are shown in Table 2-8.

Table 2-8 - Accident Benefits

Description	Value (£000s)
Total Without-Scheme Accident Costs	416.6
Total With-Scheme Accident Costs	412.6
Total Accident Benefits Saved by Scheme	3,976.7

All values in 2010 prices, discounted to 2010

The scheme is predicted to generate a total accident benefit of £3.98 million over the 60-year appraisal period, with 133 accidents saved.

Overall, there is a larger benefit to the links than the junctions; however, both are positive. The A630 to the M1 Junction 33 link shows a large benefit, as this link currently has a higher than average accident rate. The Handsworth to Catcliffe link shows a small consistent benefit across the appraisal period with the reduction in speed limit providing the benefit. Local routes such as the B6066 see a benefit in terms of accident reduction as a result of a reduction in traffic associated with strategic traffic rerouting back onto the A630 Parkway as a result of the scheme.

2.6.3 GREENHOUSE GAS BENEFITS

The TUBA assessment shows that in the core scenario, the scheme is forecast to produce a net greenhouse gas benefit of £963,834, based on the following predicted changes in carbon over the 60-year appraisal period:

- Change in non-traded carbon over 60y (CO_2e): -21,864; and
- Change in traded carbon over 60y (CO_2e): -240.

This is as a result of the additional capacity provided on the A630 Parkway, which will alleviate congestion and allow traffic to flow more smoothly, with fewer accelerations and decelerations.

The net greenhouse gas benefit for the low growth scenario is £503k and £890k for the high growth scenario.

2.6.4 AIR QUALITY BENEFITS

Overall, there is forecast to be a slight net deterioration in local air quality with the proposed scheme in place, with local assessment scores totalling 5.5 and 1.5 for NO_2 and $PM_{2.5}$ respectively. Although the proposed scheme is predicted to give rise to more properties that will experience an improvement of local air quality conditions, the predicted benefits are offset by the magnitude of change by those properties that are experiencing a deterioration.

Exceedances of the NO_2 objectives are identified in both the Do Minimum and Do Something scenarios for 2021; yet none are predicted in regard to $PM_{2.5}$ concentrations.

The PCM links which have been identified within the study area, have a range of concentrations between 21.7 µg/m^3 and 42.8 µg/m^3 quoted for annual mean NO_2 in 2021. Of those PCM links that are in exceedance of the EU Limit Value, these are contained to the A630 Parkway, whereby the magnitude of change is predicted to be negligible.

In the opening year (2021), total mass emissions of NO_X are predicted to decrease as a consequence of the proposed scheme. In the design year (2036), NOx emissions are predicted to increase through the scheme attraction, albeit at a minimal level.

The Damage Cost (Emissions) Present Value of Change in NOx Emissions = £5,479 with the Present Value of Change in PM10 Emissions = -£55,565. Therefore, the total value of the change in Air Quality is -£50,086. This reflects a minor air quality net disbenefit.

2.6.5 NOISE BENEFITS

The assessment shows an overall disbenefit in monetary terms of -£492,050. The assessment is based on the most robust TAG approach methodology of 'facades with least beneficial change in noise level', and therefore reflects the worst-case scenario. The predicted adverse impacts are due to predicted increases in noise levels in the two forecast years (2021 and 2036) when comparing the Do Minimum and Do Something scenarios.

The following findings are noted:

With Banding applied:

- Within the 2021 opening year Do Minimum scenario versus the 2021 opening year Do Something scenario, 12 receptors experience an increase in noise, 40 experience a decrease and 1,620 remain unchanged.
- Within the 2036 design year Do Minimum scenario versus the 2036 design year Do Something scenario, 11 receptors experience an increase, 0 experience a decrease and 1,561 remain unchanged.

Without Banding applied:

- Within the 2021 opening year Do Minimum scenario versus the 2021 opening year Do Something scenario, 164 receptors experience an increase in noise, 781 experience a decrease and 727 remain unchanged.
- Within the 2036 design year Do Minimum scenario versus the 2036 design year Do Something scenario, 1,527 receptors experience an increase in noise, 23 experience a decrease and 122 remain unchanged.

The predicted increases in noise, which range between 0.1 and 1.3dB, are generally associated with changes in traffic speeds and, in some cases, an increase in traffic movements. It is difficult to separate out the distinct impact of the scheme on noise compared to the impact that would be seen as a result of background traffic growth without the scheme in place.

There are no properties predicted to be subject to road traffic noise levels in excess of 80 dBLAeq, 16h in either the opening year or design year for both the Do Minimum and Do Something scenarios.

Within the 2021 opening year, between the Do Minimum and Do Something scenarios the greatest decrease is -0.9dB and the greatest increase is +0.6dB.

In the 2036 design year, the greatest decease is -0.3dB and the greatest increase is +1.3dB. There are 5 dwellings predicted to experience a 1dB increase or greater, with all other changes in noise being of lower magnitude.

Detailed pre-mitigation noise predictions have been carried out for a total of 1672 residential receptors, together with 28 non-residential noise-sensitive receptors. In the short-term, the scheme is predicted to result in a decrease in the number of properties above the Significant Observed Adverse Effect Level (SOAEL), which indicates a slight improvement as a result of the scheme.

In the long-term, during the day, the scheme is predicted to result in an increase in the number of dwellings above the SOAEL. There is also predicted to be a corresponding reduction in the number of dwellings subject to noise levels between the Lowest Observed Adverse Effect Level (LOAEL) and SOAEL and below the LOAEL. The increase in dwellings experiencing noise levels above the SOAEL in the 2036 Do Something scenario is predominantly as a result of natural traffic growth rather than due to the scheme. The scheme does however result in an additional six dwellings experiencing noise levels above the SOAEL, suggesting slight adverse effects in the long-term at these receptors.

Whilst the above summary of pre-mitigation noise levels in terms of the LOAEL and SOAEL suggests that the scheme would not have a particularly adverse or beneficial impact on noise-sensitive receptors; when the individual changes in noise level at each receptor are considered, the assessment indicates slightly more beneficial impact at a number of sensitive receptors in the 2021 opening year. This is because noise levels can change but still fall in the same noise threshold band (i.e. remain within the above SOAEL band).

In the short term, the scheme ranges from having negligible adverse effects to negligible beneficial effects due to the online widening of the A630 in the Do Something scenario and in the absence of mitigation. The majority of noise-sensitive receptors are predicted to experience either no change or a negligible decrease in noise level (i.e. a decrease which they are unlikely to perceive).

The long-term effects are similar to those anticipated in the short-term, with the majority of properties experiencing a negligible change in noise level.

Considering the 17 receptors within the 3 NIAs located inside the 600-metre calculation area, all are predicted to experience less than a 1dB change in noise level.

Two receptors within NIA 6445 are predicted to experience a 0.3 dB increase in the opening year and a 0.5 dB increase in the future year. The six receptors within NIA 2112 are predicted to experience no change in the opening year and a 0.3dB increase in the future year. The 9 receptors within NIA 2113 are predicted to experience changes ranging between -0.2 and 0.1 dB in the opening year and between 0.0 and 0.4 dB in the future year. Further information is contained in Chapter 11 of the Environmental Assessment Report for the scheme[27].

It is considered that the disbenefit shown in monetary terms is overly pessimistic. In real terms, the changes forecast to be experienced by sensitive receptors are negligible and the changes in noise levels will not be discernible. Furthermore, although there is predicted to be a disbenefit for some dwellings based on the façade of least beneficial change, the assessment does not take account of potential benefits to other receptor facades.

There will be some temporary impacts on noise as a result of the scheme construction. These will be outlined in the Construction Management Plan, alongside appropriate mitigation measures.

[27] A630 Parkway Widening Environmental Assessment Report (WSP, forthcoming October 2019)

2.6.6 CONSTRUCTION IMPACTS

The QUADRO results are presented in Table 2-9. Construction impacts are always presented as a negative value, reducing the PVB from other benefit streams.

Table 2-9 - Construction Impacts Summary

	Monetised Impact (£000s)		
	Total-Both Ways	Total- Eastbound	Total- Westbound
1. Non-Exchequer Impacts			
1.1. Net Consumer Impact	2,069	957	1,112
1.2. Net Business Impact	1,344	595	749
2. Accident Cost	0	0	0
3. Fuel Carbon Emission Cost	0.158	0.079	0.079
Total Non-Exchequer Impacts	**3,414**	**1,553**	**1,861**
4. Government Funding			
4.1. Present Value Costs	-79	-34	-45
Overall Impact	**-3,335**	**-1,518**	**-1,816**

All values are in 2010 prices, discounted to 2010

The results show that there is a total two-way disbenefit of £3.3 million during construction, as a result of lane closures, narrow lanes with reduced speed and overnight traffic diversions.

2.7 INITIAL BENEFIT – COST RATIO

The initial BCR results are shown in Table 2-10 for the core, low and high growth scenarios.

Table 2-10 – Initial BCR: Core, Low and High Growth Scenarios (£)

Element	Description	Low Growth	Core	High Growth
BENEFITS	TUBA	34,118	64,572	70,846
	QUADRO	-3,334		
	COBALT	3,977		
	NOISE	-492		
	AIR QUALITY	-50		
	GREENHOUSE GAS	503	964	890
	PVB	34,723	65,637	71,838
COSTS	PVC	28,593		
BCR	BCR	1.21	2.30	2.51
Unadjusted Value for Money		Low	High	High

All values are in 2010 prices, discounted to 2010

2.8 ADDITIONAL BENEFITS

2.8.1 WIDER ECONOMIC BENEFITS

The results of the WITA assessment are shown in Table 2-11.

Table 2-11 - Wider Economic Benefits (WITA)

Wider Impact	Benefits (£000s)
Agglomeration	23,250
Output changes in imperfectly competitive markets	1,286
Labour supply impacts	835
Total	**25,371**

All values are in 2010 prices, discounted to 2010

Based on the WITA assessment, the wider economic impacts of the scheme are calculated to be £25.4 million, largely as a result of agglomeration.

The results of the wider economic impacts assessment which uses Genecon's alternative method of calculating the labour supply impacts are provided in Table 2-12. A range of labour supply impacts was calculated, and the average value is reported here as part of a cautious assessment.

Table 2-12 - Wider Economic Benefits (Genecon Alternative)

Wider Impact	Benefits (£000s)
Agglomeration	23,250
Output changes in imperfectly competitive markets	1,286
Labour supply impacts	27,350
Total	**51,886**

All values in 2010 prices, discounted to 2010

The use of the alternative methodology produces a much higher assessment of wider economic benefits, at £51.9 million. This is largely driven by the increase in labour supply impacts.

2.8.2 RELIABILITY BENEFITS

The calculated reliability benefits are shown in Table 2-13.

Table 2-13 - Reliability Benefits

Year	Benefits (£000s)
2021	256
2036	367
Total	**17,338**

All values are in 2010 prices, discounted to 2010

The benefits shown in Table 2-13 are a combination of the incident delay benefits and the travel time variability benefits. Overall, the scheme provides a large benefit of £17.3 million over the 60-

year appraisal period, with positive benefits in both of the two individual modelled years. The two individual modelled years which have been used to inform the total benefit are both positive.

The majority of benefits stem from the increased reliability in travel times. Almost two thirds of the benefits come from decreased variability in travel times along the A630 Parkway. The scheme is forecast to have a positive impact on journey time reliability in all time periods, although the largest benefits are seen in the busier AM and PM peak periods. In terms of the composition of the benefits, the majority come from accidents and breakdowns, with over half the overall benefit stemming from Multi Lane Accidents. This is due to the nature of the scheme, where the additional lane frees up extra capacity compared to the existing situation, creating greater resilience when incidents occur.

2.9 ADJUSTED BENEFIT COST RATIO

The adjusted BCRs for each scenario are presented in Table 2-14.

Table 2-14 – Adjusted BCR: Core, Low and High Growth Scenarios(£000s)

Benefits	Low		Core		High	
	Adjusted BCR 1	Adjusted BCR 2	Adjusted BCR 1	Adjusted BCR 2	Adjusted BCR 1	Adjusted BCR 2
User Benefits	34,118	34,118	64,572	64,572	70,846	70,846
Accident Benefits	3,977	3,977	3,977	3,977	3,977	3,977
Greenhouse Gas Benefits	503	503	964	964	890	890
Air Quality Benefits	-50	-50	-50	-50	-50	-50
Noise Benefits	-492	-492	-492	-492	-492	-492
Construction Impacts	-3,334	-3,334	-3,334	-3,334	-3,334	-3,334
Wider Economic Benefits	25,371	51,886	25,371	51,886	25,371	51,886
Reliability Benefits	17,338	17,338	17,338	17,338	17,338	17,338
PVB	**77,431**	**103,946**	**108,346**	**134,861**	**114,546**	**141,061**
PVC	**28,593**	**28,593**	**28,593**	**28,593**	**28,593**	**28,593**
Adjusted BCR	**2.71**	**3.64**	**3.79**	**4.72**	**4.01**	**4.93**
VfM Category	High	High	High	Very High	Very High	Very High

All values are in 2010 prices, discounted to 2010

2.10 CONSTRUCTION COST SENSITIVITY TEST

The following section was presented based on previous preparation and construction costs based on the cost estimate provided in Quarter 2 2019 prices as part of an earlier draft FBC submission in May 2020. It has not been updated to reflect the new PVC presented in this final FBC, as it was a sensitivity test around the then estimated costs to show the marginal impact of cost increases on the BCR. The findings have been retained to allow comparison and similarity with the updated costs presented in the final appraisal.

An increase in construction cost was calculated for the following two scenarios:

- Increase in construction costs of £500,000; and
- Increase in construction cost by 3.5%.

The resulting change in the PVC is summarised in Table 2-15.

Table 2-15 – Change in PVC

Scenario		PVC
Initial	PVC1	28,620,185
£500,000 increase	PVC2	28,976,345
3.5% increase	PVC3	29,458,646

Table 2-16 shows the resulting change in adjusted BCR for the core, low and high growth scenarios.

Table 2-16 – BCR Results: Construction Cost Sensitivity Test

Description	Initial BCR			Adjusted BCR 1			Adjusted BCR 2		
	Low	Core	High	Low	Core	High	Low	Core	High
PVB	34,722	65,637	71,837	77,431	108,346	114,546	103,946	134,961	141,061
PVC1	28,620	28,620	28,620	28,620	28,620	28,620	28,620	28,620	28,620
BCR	1.21	2.29	2.51	2.71	3.79	4.00	3.63	4.71	4.93
VfM	**Low**	**High**	**High**	**High**	**High**	**V High**	**High**	**V High**	**V High**
PVB	34,722	65,637	71,837	77,431	108,346	114,546	103,946	134,961	141,061
PVC2	28,976	28,976	28,976	28,976	28,976	28,976	28,976	28,976	28,976
BCR	1.20	2.27	2.48	2.67	3.74	3.95	3.59	4.65	4.87
VfM	**Low**	**High**	**High**	**High**	**High**	**High**	**High**	**V High**	**V High**
PVB	34,722	65,637	71,837	77,431	108,346	114,546	103,946	134,961	141,061
PVC3	29,459	29,459	29,459	29,459	29,459	29,459	29,459	29,459	29,459
BCR	1.18	2.23	2.44	2.63	3.68	3.89	3.53	4.58	4.79
VfM	**Low**	**High**	**High**	**High**	**High**	**High**	**High**	**V High**	**V High**

All values are in 2010 prices, discounted to 2010

Even with a pessimistic 3.5% increase in the construction cost, the initial BCR only reduces from 2.29 to 2.23 in the core scenario, retaining a High VfM category. At worst, the VfM falls to Low in the low growth initial BCR scenario; however, High or Very High VfM is retained in all other scenarios.

2.11 SOCIAL IMPACT ANALYSIS

Social impacts that cannot be assessed quantitatively or monetised have been assessed qualitatively, and a summary of the results is presented in Table 2-17. The full set of results is provided in the Social Distributional Impact report appended to the Economic Assessment Report.

Table 2-17 - Summary of Social Impact Analysis

Assessed Indicator	Summary of Key Impacts	Seven Point Scale Assessment
Physical Activity	The scheme focuses on a highway improvement and does not impact on active modes, therefore the impact on physical activity will be negligible.	Neutral
Severance	Severance can be an issue where either vehicle flows are large enough to significantly impede pedestrian movement or where infrastructure presents a physical barrier to movement. Although some links are forecast to see an increase in traffic flow, overall, the scheme reduces the level of traffic across the network. This improves accessibility to local amenities and community facilities for motorised users through reduced delay in the area and for non-motorised users through reducing the level of congestion as a perceived barrier to travel.	Slight Beneficial
Journey Quality	The proposed scheme provides additional capacity on the A630 Parkway and the speed limit will reduce to 50mph. It is expected that the scheme will result in reduced journey times and congestion and improved reliability. The scheme will improve journey quality for vehicle travellers using the A630 Parkway and the surrounding road network. The scheme will reduce congestion and enable drivers to drive at more consistent speeds relative to the standard of the road and the proposed new speed limit.	Moderate Beneficial
Personal Affordability	The majority of income groups will experience a reduction in vehicle operating costs as an indirect consequence of the scheme.	Moderate Beneficial

2.12 DISTRIBUTIONAL IMPACT ANALYSIS

The indicators and the respective assessments that were carried out are included in the Social and Distributional Impact report that is appended to the Economic Assessment Report and a summary is provided here.

Table 2-18 – Summary of Distributional Impact Analysis

Impact	Summary	Seven Point Scale Assessment
User Impacts/ Benefits	There are overall net benefits from the scheme; however, residents in the second most deprived quintile experience an overall disbenefit. Residents in the most deprived quintile are set to benefit from the scheme; however, they receive a disproportionately small share of the benefits on the whole. Although four of the five income quintiles experience benefits as a result of the scheme, as the second most vulnerable income quintile experiences a disbenefit, the overall user benefits DI impact has only been appraised as slight beneficial. In summary, around 73% of the user benefits are experienced by people living in the impact area of which: ▪ 29% are experienced by people living in the 20% most deprived communities; ▪ The remaining 44% benefits are experienced by people living in the 40%-100% income groups; and	Slight beneficial

Impact	Summary	Seven Point Scale Assessment
	▪ People living in the second most deprived communities will receive an overall disbenefit (100%).	
Noise	People living within the most deprived 20% income bands are likely to be negatively impacted by noise as the proportion with a net disbenefit is in line with the proportion of the population within this quintile. It is evident that predicted noise level changes will also have an adverse impact at schools and care homes within the study area.	Moderate adverse
Air Quality	Undertaken as part of the Environmental Assessment	Not applicable
Accidents	The analysis of road casualty data and accidents demonstrates that there are slightly more links experiencing a decrease in accidents than are forecast to increase. This results in a positive impact for all vulnerable groups in the impact area including children (under 16), young people (16-24), elderly people (over 70). As the proportion of these vulnerable social groups living in the area are broadly in line with their national averages, the DI accident assessment has been appraised as slight beneficial. £3.979m in benefits are generated through accident prevention savings as a result of the scheme. The assessment of accidents has been appraised as slight beneficial.	Slight beneficial
Affordability	In general, the scheme will lead to an increase in vehicle operating costs across four of the five quintiles. The scheme is anticipated to affect the third most deprived income quintile the most, causing the share of disbenefits to be disproportionate. In summary: ▪ Around 60% of the benefits (i.e. reduction in costs) are forecast to be experienced by people living in the 20% most deprived income quintile; ▪ The remaining 40% of benefits are forecast to be experienced by people living in the 40% to100% income quintiles; and ▪ People living in the second most deprived income group (20% to 40%) will have an increase in costs. As the majority of the income quintiles will receive a benefit in terms of decreased VOCs, including the most deprived quintile which is forecast to receive a large share (60%), the DI for personal affordability is appraised as moderate beneficial.	Moderate beneficial
Severance	Socio demographic analysis shows that the impact area has key amenities such as schools and concentrations of vulnerable groups meaning there are potentially high pedestrian flows in the area. The scheme will result in the majority of links experiencing a decrease in traffic flows within the impact area which will reduce severance. The WebTAG worksheet shows that all vulnerable groups assessed – children (under 16), elderly people (70+), no car households and residents with long term health problems or disabilities will all benefit from the reduced severance impacts of the scheme.	Slight beneficial

Impact	Summary	Seven Point Scale Assessment
	The overall severance DI impact is therefore appraised as slight beneficial.	
Security	No impact anticipated as the scheme does not include any amendments to the existing public transport interchanges and pedestrian/cycle provision.	Neutral
Accessibility	Scoped out of the assessment.	Not applicable

2.13 APPRAISAL SUMMARY

Table 2-19 provides a summary of the appraisal undertaken. The full Appraisal Summary Tables for the core, low and high scenarios, which summarise all of the predicted impacts of the scheme, are provided in Appendix K.

Table 2-19 – Project Appraisal Summary

Description	Low Growth	Core	High Growth
Base year model	2015		
Scheme Opening Year	2021		
Scheme Design Year	2036		
Appraisal Period	60 years		
Financial Cost	**£41,300**		
Economic Cost (excl. OB)	**£40,227**		
PVC	**£28,593**		
PVB	**£34,722**	**£65,637**	**£71,837**
NPV	**£6,131**	**£37,044**	**£43,246**
Initial BCR (VfM)	**1.21 (Low)**	**2.30 (High)**	**2.51 (High)**
VfM (Adjusted BCR1)	**High (2.71)**	**High (3.79)**	**Very High (4.01)**
VfM (Adjusted BCR2)	**High (3.64)**	**Very High (4.72)**	**Very High (4.93)**

All values in 2010 prices, discounted to 2010, in £000s

2.14 VALUE FOR MONEY STATEMENT

The approach to the traffic modelling and economic appraisal was agreed with the DfT in 2017. It uses a TAG-compliant strategic highway SATURN model to show the network effects of improvements to the A630 between Sheffield and Rotherham and along the M1 between Junction 18 and Meadowhall, with robust economic appraisal of monetised and non-monetised benefits undertaken in line with relevant DfT guidance.

Congestion relief and speed reduction are key improvements that assist both the safe movement of traffic in the area and also the consistent objectives promoted by Highways England, RMBC and the SCR, including the emerging CAZ policies.

The traffic modelling used to support the business case examined the need to represent variable demand in the corridor. Elastic assignment tests have shown that the variation in total user benefits between fixed and elastic assignments is around 1.25% at opening year and 2.3% at design year. These are well within the TAG guidelines of 10% and 15% respectively and negate the need for variable demand modelling. The DfT has confirmed its acceptance of the approach taken and the conclusion that variable demand modelling is not required.

The draft business case was submitted to the DfT in October 2019. The core tests reported in the draft business case were founded on an approved methodology and showed an initial BCR of 2.29 (High VfM) and an adjusted BCR of 4.71 (Very High VfM) which took account of wider benefits.

Subsequently, additional tests have been carried out, and responses provided to DfT clarification questions. Low and high growth tests have been undertaken which show a spread of benefits between £34.7m and £71.8m. Various sensitivity tests have been undertaken to assess the effects on the BCR of a reduction in user benefits of up to 15% and also the impact of a 3.5% increase in construction cost and the adjusted VfM remains high in both scenarios.

Dependant development tests have a positive impact on the scheme benefits, improving the BCR from 2.29 to 2.76 and thus VfM remaining high.

Furthermore, the scheme is an important enabler for wider economic change, that could support the delivery of 783 net FTE jobs (construction and operation) at SCR level and 173 net FTE jobs (construction and operation) at UK level, as well as £77.9 million GVA (NPV) at UK level and £352.7 million GVA (NPV) at SCR level.

Further reduction of the scheme benefits to reflect possible changes in future traffic fails to recognise the regional context and importance of the scheme, the downside tests that have already been completed and the proportionate assessment requirements of the appraisal process.

Further erosion of scheme benefits to mimic ‘possible’ future changes in economy (including the removal of all off peak scheme benefits), travel and appraisal methods, are not justified in the context of a scheme that has already been tested against such effects in its low growth and reduced benefits assessments.

This is an important scheme that has local and City Region support, allocated regional funds from Central Government, is shown to be able to achieve its local and strategic objectives and achieves high VfM. Robust sensitivity testing shows that even with downside projections, the BCR remains positive and high, according to TAG guidance in 2019/20 and at the time of completion of the business case.

On this basis the A630 improvements are promoted as a key strategic intervention that will deliver high VfM and improvements in journey time reliability and journey quality for local and strategic travellers and generate additional FTE jobs and GVA in one of the key economic growth areas of the City Region.

3

FINANCIAL CASE

3 FINANCIAL CASE

3.1 INTRODUCTION

This Financial Case sets out the calculated base scheme cost and the risk-adjusted scheme cost estimate, in line with the requirements set out in TAG Unit A1[1]. Funding and spend profiles are provided over the full scheme development and delivery period from 2015/16 to 2023/2024, demonstrating the affordability of the scheme.

3.2 SCHEME COSTS

Scheme costs have been developed for the proposed A630 Parkway widening and the associated improvements to the M1 Junction 33 Catcliffe roundabout. These are based on the detailed design proposals, for which Balfour Beatty as the Principal Contractor has developed a target cost for construction. General arrangement drawings of the scheme proposals are provided in Appendix C.

The following assumptions apply to the construction cost estimate provided by Balfour Beatty:

- Compound locations have been agreed with National Grid and JF Finnegan Ltd. However, no allowance has been made for business rates and/or obtaining planning permission for the temporary site accommodation.
- Access to the works is assumed to be permitted based on discussions with the necessary third parties, although it is accepted that this is a contractor's risk.
- Allowance has been made for a full-time Traffic Safety and Control Officer (TSCO), who will call a local offsite emergency recovery service to remove any vehicle breakdown if required.
- Necessary winter maintenance will be carried out by RMBC/Highways England, as required.
- A site investigation and subsequent classification of earthworks materials has been carried out, which forms the basis of the construction strategy.
- Allowance has been made for management and coordination of the statutory utilities, together with an allowance for ductwork and Distribution Network Operators (DNO) connections. Northern Powergrid and BT diversions will be procured by RMBC.
- No allowance has been made for any diversion works associated with the 11kV or High-Pressure gas mains, although it is not anticipated that this will be required.
- The phasing of the main construction works has been developed to maintain two lanes of traffic each way on the A630 during the daytime, wherever possible. There will, however, be the need to put eastbound, westbound and M1 Junction 33 complete closures in place at relevant times to suit the programme.
- No allowance has been made for any additional traffic management constraints that might be imposed, such as bespoke local events.
- Works are carried out within the seasonal limits for de-vegetation works.
- Appropriate environmental and ecological surveys have been carried out in 2019. There have been no specific findings regarding protected and/or invasive species or other environmental issues. Therefore, no allowance has been made for any subsequent constraints.

[1] TAG Unit A1.2 Scheme Costs (Department for Transport, July 2017)

- With regard to the M1 Junction 33 southbound off-slip, the submission is based on an agreement between JF Finnegan Ltd/Highways England/RMBC to carry out the earthworks solution to create the extra lane.

3.2.1 BASE SCHEME COSTS

Table 3-1 provides a summary of the base scheme costs, excluding sunk costs incurred up to the end of Quarter 4 2019/20 and excluding allowance for risk. The costs assume a start date on site in September 2020 and a completion date in May 2022, as per the updated delivery programme.

The base scheme cost is £35,398,392. A construction cost inflation allowance of 3% per annum and a non-construction cost inflation allowance of 2% per annum have been added, giving a total base scheme cost of £36,447,008.

Table 3-1 – Base Scheme Costs (Q1 2020/21 Prices)

Scheme Element	Estimated Cost (£)
Preparation and Design (excluding sunk costs)	238,016
Construction Cost	33,078,065
Supervision	1,035,000
Land and Buildings	250,000
Fees (TROs etc)	20,000
Utilities	577,311
Monitoring and Evaluation	200,000
Base Scheme Cost	**35,398,392**
Construction Inflation Allowance @ 3% per annum	1,023,033
Non-Construction Item Inflation Allowance @ 2% per annum	25,583
Total Base Scheme Cost	**36,447,008**

The following assumptions apply to the base cost and inflation estimates:

- The construction cost assumes a contractor access date of 1 September 2020 and completion on site on 5 May 2022;
- Supervision costs are based on the use of a Design and Build contract;
- An allowance of £252,500 (including inflation) has been made for any compensatory measures required by local residents, businesses and/or third parties arising as a result of the permanent works;
- The construction inflation allowance over the scheme delivery period was calculated using the BCIS General Civil Engineering Cost Index as published on 27 May 2020; and
- The inflation amount applied to all other base cost items is based on the most recent Bank of England CPI inflation rate release in May 2020.

3.2.2 RISK ADJUSTED SCHEME COSTS

The final cost of delivering the scheme will not be known until after construction completion. There are many factors that could affect the actual delivery cost and programme, including exceptional weather events, the current COVID-19 global pandemic and the discovery of protected species that were not identified during the surveys undertaken previously.

An allowance has therefore been added to the total base scheme cost to account for both estimating uncertainty and events-driven uncertainty, or risk. An allowance for estimating uncertainty is included in the base costs for each scheme element, based on experience of similar schemes at the detailed design stage. Project Risk is being actively managed by RMBC, alongside Balfour Beatty and WSP as its key design and delivery partners. The risk management process, and the transfer of an appropriate level of risk to the Principal Contractor, is described more fully in the Management and Commercial Cases.

Multi-disciplinary technical specialists and members of the project management team from RMBC, WSP and Balfour Beatty have identified and discussed key risks associated with the delivery of the preferred scheme option at bi-monthly risk management meetings and at a scheme risk workshop held on 30 April 2019. The outputs have been used to develop and maintain the scheme Risk Register (Appendix L), which sets out pre and post mitigation scores for each identified risk in terms of the likelihood that they will occur, and their potential impact on cost and programme

TAG Unit A1.2[2] requires that, for schemes with a base cost greater than five million pounds in 2010 prices, all project related risks that could impact on the scheme costs should be identified and quantified in a Quantified Risk Assessment (QRA), in order to produce a risk-adjusted cost estimate. A QRA enables the calculation of a risk-adjusted cost estimate, by considering the expected value of the cost of the scheme. This is defined as the average of all possible outcomes, taking account of the different probabilities of those outcomes occurring.

The QRA follows a four-stage process, using the Risk Register as a basis upon which to assess the risks:

- Risk identification;
- Assessing the impacts of risk;
- Estimating the likelihood of the impacts of risk; and
- Deriving the overall distribution and expected value of risk for the scheme.

As many risks are linked, modelling has been undertaken using Monte Carlo simulation to fully understand the distribution and range of costs. This gives the probability of the scheme cost estimate being less than or equal to a specified value. The QRA identifies a P80 (80th percentile) value of £4,853,278, which has been added to the base scheme cost to produce the risk-adjusted cost estimate shown in Table 3-2.

Table 3-2 – Risk Adjusted Cost Estimate (Quarter 1 2020/2021 Prices)

Cost Item	Cost Estimate (£)
Total Base Scheme Cost	36,447,008

[2] TAG Unit A1.2 Scheme Costs (DfT, July 2017)

Cost Item	Cost Estimate (£)
Risk Allowance @ P80 (13%)	4,853,278
Total Risk Adjusted Cost Estimate	**41,300,286**

3.3 DEVELOPMENT COSTS

In line with the guidance set out in TAG Unit A1.2[3], the scheme cost estimate does not include the scheme development costs incurred prior to the preparation of the Full Business Case. Table 3-3 provides the profile of scheme preparation costs incurred from the start of scheme development in 2015/2016 up to the end of Quarter 4 2019/2020, which total £5,089,169. As set out in Table 3-1, a further £238,016 will be spent on scheme preparation in Quarters 1 and 2 in 2020/2021 prior to scheme delivery commencing in September 2020, giving a total scheme preparation cost of £5,327,185.

Table 3-3 – Scheme Development Costs (£, Outturn Costs)

Scheme Element	2015/16	2016/17	2017/18	2018/19	2019/20	Total
Preliminary and Detailed Design	71,419	271,937	236,343	947,486	3,561,984	**5,089,169**

3.4 SPEND PROFILE

Subject to obtaining DfT approval of the final Full Business Case and release of the SCRIF funding to the SCRCA as the accountable body, construction of the scheme will start in September 2020 and complete on site in May 2022; therefore the drawdown of construction funding will take place from 2020/2021 to 2022/2023. The full spend profile over the scheme preparation and delivery period is set out in Table 3-4 overleaf.

[3] TAG Unit A1.2 Scheme Costs (DfT, July 2017)

Table 3-4 - Spend Profile (£, Development Costs in Outturn Prices; Delivery Costs in Quarter 1 2020/2021 Prices)

Scheme Element	2015/16	2016/17	2017/18	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Preparation	71,419	271,937	236,343	3,561,984	238,016	-	-	-	**5,327,185**
Supervision	-	-	-	-	300,000	735,000	-	-	**1,035,000**
Land and Buildings	-	-	-	-	125,000	125,000	-	-	**250,000**
Fees	-	-	-	-	14,000	6,000	-	-	**20,000**
Utilities	-	-	-	-	364,156	213,156	-	-	**577,311**
Monitoring and Evaluation	-	-	-	-	-	-	-	200,000	**200,000**
Inflation @ 2%	-	-	-	-	-	21,583	-	4,000	**25,583**
Construction Cost	-	-	-	-	10,781,882	19,059,040	3,237,143	-	**33,078,065**
Construction Inflation @ 3%	-	-	-	-	333,460	589,455	100,118	-	**1,023,033**
Sub-Total	**71,419**	**271,937**	**236,343**	**3,561,984**	**12,156,514**	**20,749,234**	**3,337,261**	**204,000**	**41,536,177**
Risk Allowance @ P80	-	-	-	-	1,618,759	2,762,965	444,389	27,165	**4,853,278**
Total	**71,419**	**271,937**	**236,343**	**3,561,984**	**13,775,273**	**23,512,198**	**3,781,650**	**231,165**	**46,389,455**

NB figures may not sum exactly due to rounding

3.5 WHOLE LIFE COSTS

The capital funding sought through the submission of the Business Case is for the construction of the proposed scheme. Additional costs will be incurred for operation and maintenance. As described in Section 2.5.2 of the Economic Case, the maintenance liability on the A630 Parkway is calculated to decrease as a result of scheme implementation compared to the existing situation. Therefore, a separate allowance for maintenance and operation has not been included in the financial or economic estimates.

The full cost of operating and maintaining the scheme will be borne by RMBC and funded through its Integrated Transport Block (ITB) allocation, as per the existing situation.

3.6 BUDGETS AND FUNDING

Since the submission of the draft Full Business Case in October 2019, some adjustments have been made to the scheme costs, including:

- Adjustment of the construction cost to account for the six-month delay in the planned start date, from March 2020 to September 2020;
- Adjustment of the utilities costs based on updated information from utilities providers; and
- The Risk Register has been updated to reflect the potential risk of the COVID-19 pandemic impacting the scheme cost and delivery programme, and to adjust the likelihood and impact scoring of other risks based on reducing levels of uncertainty as the scheme reaches delivery stage.

These adjustments have increased the total scheme cost to £46,389,455, from the previous cost of £45,718,360. The total funding requirement remains the same as reported in the draft Business Case, at £45,718,360, with £42,260,000 sought through the SCRIF (the Local Growth Fund (LGF) contribution retained by the DfT), and a further £3,458,350 put forward by RMBC for preparation, monitoring and evaluation, which will be reimbursed by DfT. RMBC will underwrite the additional amount of £671,095 that is required and absorb the cost.

Table 3-5 overleaf shows the funding required over the full scheme preparation and delivery programme, including the additional funding underwritten by RMBC.

The signed declaration provided by RMBC's Section 151 Officer (Appendix M) confirms that the scheme costs are accurate and that RMBC accepts responsibility to meet any costs over and above the funding contribution requested.

Table 3-5 – Scheme Funding (£, Previous Costs in Outturn Prices; Future Costs in Q1 2020/21 Prices)

Funding Source	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
SCRIF Preparation	-	-	-	900,000	1,200,000	-	-	-	-	2,100,000
SCRIF Works	-	-	-	-	-	13,361,692	23,161,068	3,637,250	-	40,160,010
Total SCRIF	**-**	**-**	**-**	**900,000**	**1,200,000**	**13,361,692**	**23,161,068**	**3,637,250**	**-**	**42,260,010**
RMBC Preparation	71,419	271,937	236,343	47,486	2,361,984	238,016	-	-	-	3,227,185
RMBC Monitoring & Evaluation	-	-	-	-	-	-	-	-	231,165	231,165
Total RMBC	**71,419**	**271,937**	**236,343**	**47,486**	**2,361,984**	**238,016**	**-**	**-**	**231,165**	**3,458,350**
Total Funding Ask	**71,419**	**271,937**	**236,343**	**947,486**	**3,561,984**	**13,599,708**	**23,161,068**	**3,637,250**	**231,165**	**45,718,360**
RMBC Absorbed Cost	-	-	-	-	-	175,565	351,130	144,400	-	671,095
Overall Total	**71,419**	**271,937**	**236,343**	**947,486**	**3,561,984**	**13,775,273**	**23,512,198**	**3,781,650**	**231,165**	**46,389,455**

NB figures may not sum exactly due to rounding

3.7 SUMMARY OF THE FINANCIAL CASE

The total cost of delivering the A630 Parkway widening scheme, including appropriate, robust allowances for risk and inflation, and an allowance for monitoring and evaluation, is £46,389,455. Between 2015/2016 and 2019/2020, a total of £5,089,169 has been spent on scheme preparation, with a further £238,016 in preparation costs to spend in Quarters 1 and 2 2020/2021, prior to the planned start date on site in September 2020. This gives a total preparation cost of £5,327,185, leaving a total of £41,062,270 to spend over the delivery period between September 2020 and May 2022.

The cost of maintaining and operating the scheme, which is forecast to be lower than the existing situation, will be met by RMBC through its ITB allocation.

RMBC is seeking a total contribution of £42,260,010 from the SCRIF (retained LGF funding), subject to the DfT's approval of the final Full Business Case. A total of £2,100,000 has already been received for scheme preparation, leaving £42,260,010 remaining for delivery.

A further £3,458,350 has been put forward by RMBC for preparation, monitoring and evaluation, of which £469,181 is remaining to spend on final preparation in Quarters 1 and 2 2020/2021 and monitoring and evaluation in 2023/2024. This amount will be reimbursed by DfT.

The funding requirement is £45,718,360. Of the £702,260 increase in scheme cost that has been calculated following the delay to the planned start on site from March 2020 to September 2020, some £671,095 will be absorbed by RMBC. Section 151 Officer approval has been given in terms of underwriting this amount and any unanticipated additional amount over and above the forecast scheme cost.

4

COMMERCIAL CASE

4 COMMERCIAL CASE

4.1 INTRODUCTION

This Commercial Case provides evidence of the commercial viability of the scheme, including information on the procurement strategy that has been used to engage the supplier and ultimately deliver the scheme. The type and form of contract, sourcing options and payment mechanisms are also described, alongside arrangements for contract management. Key commercial risks are identified, and the approach to risk allocation and transfer is described. A statement of the overall commercial viability of the scheme is also provided.

4.2 OUTPUT BASED SPECIFICATION

As part of the Commercial Case, the required scheme outputs are identified, against which alternative procurement and contractual options are assessed. The scheme outputs are as follows:

- Widening of the 2.1km stretch of the A630 Parkway between the M1 Junction 33 and the Catcliffe Interchange within the current footprint to an urban dual three-lane all-purpose carriageway, including:
  - Provision of a rigid concrete barrier in a hardened central reserve;
  - Online attenuation of oversized pipes and flow control features in the verge, with associated amendments to the existing embankment and cutting slopes; and
  - Implementation of geotechnical (modifications to the existing earthworks slopes) and structural (use of retaining walls) solutions.
- Modifications to the M1 Junction 33, incorporating carriageway widening and resurfacing.

The preferred procurement strategy and contract must:

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding;
- Minimise further scheme preparation costs with respect to design by ensuring appropriate quality and best value;
- Allow for contractor experience and input to the construction programme to ensure that it is robust and achievable; and
- Allow for contractor input to risk management, including mitigation measures, to reduce risks to a level that is as low as reasonably practicable and improve outturn cost certainty, as well as transferring risk to the contractor, where appropriate

4.3 PROCUREMENT STRATEGY

Procurement is an integral part of the project management process. The procurement strategy has therefore been designed to ensure:

- Continuity of the design process;
- Scheme delivery in line with timescales for funding drawdown;
- Value for money – RMBC is under a duty to secure value for money in all of its transactions;
- Compliance with statutes and regulations within both the UK and European Union; and
- Avoidance of fraud and corruption with a transparent and visible approach and tightly controlled limits to potential fraud and corruption.

The procurement process has been undertaken in strict accordance with the legislative framework set out within RMBC's Council Procurement Strategy. The process is therefore governed by the Council's own constitutional Contract Procedure Rules (2017) and is subject to the Council's Procurement Gateway Process.

Under the Procurement Gateway Process, the procurement route was subject to review by the Council's Procurement Manager, Senior Legal Officer and Senior Officers from across RMBC. This process ensures that highly experienced members of staff are included in the evaluation of strategic procurement decision making and contract management. Express approval must be gained from the Procurement Gateway Board, firstly to enable the tender documentation to be released and secondly to enable the procurement to move to the award procedure stage following review of the award recommendation.

This strategy will ensure that the scheme is delivered effectively within the regulatory process and that it is proportionate in terms of budget and timescales. To this end, rigorous project management procedures and the Principal Contractor and Design Team were put in place at the earliest opportunity.

4.4 TYPE OF CONTRACT

It is important that the type of contract used manages the risks and reduces cost uncertainty. Three main options have been considered: a traditional contract; a partnering contract with Early Contractor Involvement (ECI) and a design and build contract. Table 4-1 provides analysis of the advantages and disadvantages of each type of contract.

Table 4-1 - Type of Contract: Advantages and Disadvantages

Type of Contract	Advantages	Disadvantages
Traditional Contract	Principles developed over many years and widely understood Client develops the specification Risk managed by the Client Client retains control and flexibility to change specification Award of contract on lowest price basis demonstrates Value for Money	Client retains risk of delivery on time and to budget No incentive for contractor to innovate No link between design and construction Nature of all risks is not fully realised at the point of award, resulting in the potential for an increase in outturn cost and delays in scheme completion.
Partnering Contract with Early Contractor Involvement (ECI)	Collaboration between parties Risks are more clearly defined than with a traditional contract Opportunities to link design and construction	Many of the disadvantages of traditional procurement can remain Difficulties in getting appropriate people involved at an early stage of development
Design and Build	Integration of design and construction leads to efficiencies in cost and time Single point of responsibility for the Client	Reduced competition with fewer companies interested Contractor takes on greater risk and prices accordingly

Type of Contract	Advantages	Disadvantages
	Risks clearly identified and allocated during the procurement phase Stimulates innovation, reducing cost Allows the contractor to review the buildability of the design	Lack of flexibility to change the specification Quality may be overridden by cost efficiency

A traditional contract does not provide an active link between design and construction, and a lack of early clarity on risks increases the likelihood of cost overruns and delays in delivery.

A partnering contract with ECI adds value in terms of enabling input into the construction methodology and helping to more clearly define the risks. However, the procurement process potentially takes longer than with a design and build contract, which would lengthen the overall timescale for scheme delivery.

With a design and build contract the contractor takes on the responsibility and risk related to the detailed design and construction of complex elements. This reduces risk to the client, whilst the integration of detailed design with construction brings about efficiencies. Ensuring affordability and reducing the risk of cost increases are key considerations for the proposed A630 scheme, as the available SCRIF funding is capped at a level which cannot be increased.

For these reasons, it was concluded that a Design and Build form of contract is the most appropriate for this project. Stage 1 has been procured using the NEC3 Professional Services Contract and it is intended that Stage 2 will be procured using the NEC3 Engineering and Construction contract. Early involvement of the contractor helps to ensure the development of a buildable and affordable scheme.

4.5 FORM OF CONTRACT

RMBC is using the NEC3 Engineering and Construction (ECC) form of contract, which is the standard form of contract for engineering and construction work in the UK, including any level of design responsibility. Within it, the NEC3 ECC consists of a set of Core Clauses to which may be added one of the following Options:

- Option A: Priced with activity schedule;
- Option C: Target cost with activity schedule;
- Option E: Time based contract; and
- Option G: Term contract.

Option C has been chosen for the delivery of the A630 widening scheme, which involves a target cost supported by a full programme of activity. This method incurs less risk in terms of the likelihood of project spend being significantly under or over the target cost, and incorporates a no pain no gain philosophy, with the flexibility of costs being capped to ensure no unexpected large overspends.

The Scape procurement process has been chosen as the preferred procurement approach, to initiate this contract as detailed below. The process accords to the following key stages:

- **Stage 1 Inception** – Options for are procurement established and the purpose and nature of the scheme is clarified.

- **Stage 2 Feasibility** – the Value for Money solution is agreed; the Relationship Management Plan is established and the Social Value Action Plan is developed.
- **Stage 3 Pre-Construction** – tender documentation is finalised and the Project Implementation Plan is produced, budget and programme certainty is achieved, collaborative working practices are refined in the Relationship Management Plan and the Social Value Action Plan is finalised.
- **Stage 4 Construction** – collaboration is further developed and works are delivered defect free, on time and on budget. Stakeholders are engaged and satisfied and the community benefits from the delivery of social values. The Completion Certificate is issued.
- **Stage 5 Post Construction** – Value for Money is demonstrated and the Value Report is developed. The social value legacy for the community is established, the client and stakeholder reputation is enhanced and collaboration is in place for the next commission.

4.6 SOURCING OPTIONS

Consideration has been given to both best practice and RMBC's internal resource capability and capacity. Due to the nature and scale of the works, which will include significant structural work to the existing bridges, carriageways and traffic signalling works, it is not possible to use internal resources within RMBC to deliver a scheme of this size and complexity. Therefore, the decision was taken to use an external contractor.

Three sourcing options were considered, as described below. A key factor for the procurement decision was the ability to involve the contractor at an early stage and utilise its experience in programme sequencing, sub-contractor selection and pre-contract arrangements. In addition, the ability to achieve continuity in design, traffic modelling and business case development as part of the overall scheme development process was an important factor, given the relatively short timescales associated with scheme design and delivery in accordance with funding availability.

4.6.1 OPTION 1: SCAPE NATIONAL CIVIL ENGINEERING FRAMEWORK 2019-2023

The 'Scape Procure' (Scape) framework was originally set up in 2006 by a group of Local Authorities in 2006 to deliver greater value for money within the procurement process. Now owned and controlled by a consortium of local authorities, it offers the ability to procure and deliver a variety of project types via framework agreements, ranging from individual schemes to programmes of work, with values from £50,000 to £100 million and above.

Scape incorporates a variety of frameworks, with the Civil Engineering framework being the most suitable for the A630 widening scheme. RMBC entered into an Access Agreement with Scape on 16 November 2017 to allow access to the available frameworks. Scape allows RMBC to retain control of its investment at all stages.

The use of this framework offers a number of advantages over other more resource intensive options. In particular, Scape as a third-party organisation ensures best practice and provides the framework for an entire project lifecycle approach and a dedicated framework and relationship management team.

The key advantages and disadvantages of using Scape are set out in Table 4-2.

Table 4-2 - Scape: Advantages and Disadvantages

Advantages	Disadvantages
Best practice procurement in line with UK and EU regulations, including PAS91 and OJEU compliant Civils and Infrastructure and compliant with public procurement regulations	Potential that Value for Money may be impacted by awarding the contract to a single supplier
Fastest route to market by negating the need for RMBC to undertake its own procurement, saving an average of 20 weeks on projects over £5m	Complete dependence on a single supplier and its supply chain
Provides a collaborative, reduced risk partnership approach proven to secure optimum results	
Continuous performance management improvements required for successful delivery and quality for contractor to retain position on framework	
Client control and choice at all stages, with transparency and visibility through partnering with NEC3 contracts.	
Framework secures high number of projects and services enabling competitive prices and fixed rates	
Resource intensive activities such as the management of sub-contractors and design consultants is passed to the contractors; however, client involvement is maintained in pre-selection and appointment	
Already being used by RMBC to deliver the A630 College Road Roundabout Congestion Improvement scheme, which commenced in August 2019	

4.6.2 OPTION 2: OPEN OR RESTRICTED TENDER (OJEU)

As of 2018/19, the threshold for the Official Journal of the European Union (OJEU) works contract is approximately £4.5 million. One option for delivery of the A630 widening scheme is therefore for RMBC to utilise the competitive tender process (open or restricted) using this notice. The key difference between an open and restricted tender is that whilst the open tender is open to anyone and on the open market, the restricted tender can be whittled down to a pre-determined number of specialised tenderers.

The OJEU process can be intensive in terms of timescales and assessments. The key advantages and disadvantages are summarised in Table 4-3.

Table 4-3 - OJEU Tenders: Advantages and Disadvantages

Advantages	Disadvantages
Well established method and form of contract	Resource implications of potentially lengthy tendering/tender evaluation process
Risks can be transferred to the contractor	No opportunities to discuss and refine bids
Opportunities for design/construction efficiencies and collaboration during the design and construction phase through the Design and Build OJEU specification	Poor quality bids and unrealistic pricing submitted
Organisations of all sizes have the opportunity to submit proposals, increasing the potential for innovation and more competitive pricing	Increased risk of challenge due to the number of responses and time and resources which tenderers will spend in preparation
	Difficult to build in innovation and embed social values in the specification

4.6.3 OPTION 3: MIDLANDS HIGHWAY ALLIANCE FRAMEWORK

RMBC has access to other framework agreements awarded by central government; including the Midlands Highway Alliance Framework. This framework spans a collaboration of 20 local authorities and can be used to deliver both small and medium scale transport schemes, with the intention of achieving consistency across approach and delivery.

The framework manages the requirements and process for tenders. This framework is however more focused on the delivery of medium-sized schemes and the initial support in sourcing the correct design team and contractors. The key advantages and disadvantages of this approach are summarised in Table 4-4.

Table 4-4 - Midlands Highway Alliance: Advantages and Disadvantages

Advantages	Disadvantages
Collaborative framework allows for best practice expertise and cost savings	Limits direct involvement with the contractor
Encourages innovation solutions and helps develop contractual relationship between the developer/scheme promoters and contractors/sub-contractors	More targeted at the scheme development phases, including Preliminary Design and assignment of the contractor
Coherent and consistent approach	Does not provide whole life cycle support
	More suited to smaller and medium schemes
	Does not allow continuity of design, modelling and business case development throughout the scheme, with early partnering.

4.6.4 PREFERRED PROCUREMENT OPTION

Having considered the relative advantages and disadvantages of each approach, RMBC made the decision to use Scape as the preferred procurement option for both stages of the contract. Balfour Beatty is the lead framework partner and has been involved in the development of the A630 widening scheme since the initial design phase.

Scape is already being used successfully to deliver the A630 College Road Roundabout Congestion Improvement scheme, using the Civil Engineering framework. RMBC therefore has confidence in this approach, which has worked effectively on other schemes.

The main benefits of this route are its robustness in ensuring criteria are met, whilst being the quickest route to market for the public sector with, *'Certainty, speed and efficiency facilitated through the delivery of defined simple processes.'*[1] Scape also has broader connotations with community benefits in utilising local labour resources and providing community opportunities and benefits throughout the project.

Scape allows RMBC to procure the main contractor in a cost effective and time efficient manner, with early input from the contractor and continuity of the design team from preliminary design through to the detailed design stages.

Independent studies have identified that significant time and cost savings can be achieved on major construction projects by using Scape as opposed to procurement through OJEU. This can be in the region of 200 days and a cost saving of at least £75,000, allowing for all professional costs.[2]

Scape is supported by a distinct specialist strategic support team and embedded in this approach is the need to deliver Social Value and Performance. The key benefit for RMBC is the reassurance of less risk due to the fixed target cost approach which in turn enables the realisation of outcomes and social value. Social Value is measured via the National Themes Outcomes Measures (TOMs) Framework established by the Social Value Portal, in partnership with the Scape Procure team.

"The Scape framework allowed input through the early stages of the scheme development and access to Balfour Beatty resources to help meet very tight timescales, which otherwise may not have been possible, in particular to offer a level of certainty around available budgets and delivery programmes. Added value is the tried and tested performance management by Scape on the contractor KPIs, and a commitment to local employment and the use of SMEs on our projects"

(David Boyer, Assistant Director of Transport and Operations, Warrington Borough Council)

It is acknowledged that all procurement activity will be undertaken in line with UK Public Contract Regulations 2015 and EU Public Procurement Legislation.

4.7 PAYMENT MECHANISMS

The final contract value for scheme delivery is set out in the Delivery Contract between RMBC and Balfour Beatty as the Principal Contractor. Balfour Beatty will continue to procure WSP as its design partner throughout the development process, to ensure design continuity from preliminary through to detailed design and ultimately the start of construction.

[1] Scape Procure Brochure 2019
[2] Scape Procure Single Supplier Frameworks: The Benefits

Payment mechanisms to Balfour Beatty are contained within the Contract Schedule, which includes two types of payments:

- Payments to the Contractor and their agents; and
- SCAPE Procure Management Team payments.

In terms of the use of Scape, a nominal fee is payable, which is a percentage of the contract value. This is recoverable on a pro rata spend basis for any chargeable work undertaken. It is highlighted that the payments direct to the contractors or contractor's agents will be based on fee quotations or the target contract cost, as per the Contract Schedule.

Under the SCAPE framework, and in essence via the NEC3 ECC Contract type, payment is made in accordance with performance against the KPIs. Payments to local subcontractors are made on a 25-day payment schedule.

4.8 PRICING FRAMEWORK AND CHARGING MECHANISMS

There is a clear contractual relationship procured via Scape between RMBC as the client and Balfour Beatty as the Principal Contractor. The contractual terms follow the NEC3 Engineering and Construction Contract (ECC) Option C and the associated terminology.

One advantage of this contractual type is that it allows for flexibility in payment terms and a robust approach in setting out the target contract with the activity schedule, in the format of the Contract Schedule, at an early stage. An activity schedule provides a list of activities alongside priced amounts, with a lump sum for each activity.

A clear and precise methodology has been utilised by Balfour Beatty in the formulation of the activity list, noting that payments will only be made against completed activities which are subcategorised into grouped activities and stages to allow for clarity of payment expectations. This is set out in the Contract Schedule.

The NEC3 Engineering and Construction Contract (ECC) Option C therefore sets a cost-plus contract payment mechanism, that incorporates a pain/gain share mechanism by reference to the agreed target cost (built up from the activity schedule). Within ECC there is no separate 'contract sum', but the term 'prices' is used. The fee received by the contractor is part of the calculated Price for Work Done to Date and is calculated by applying an agreed percentage across the Defined Cost. Price is defined as each lump sum against each of the activities in the Contract Schedule.

The Defined Costs have the following two elements, noting the Contract Schedule is used for assessing the levels of work undertaken and payments due:

- The principal constituent of the Contractor's payment for work done; and
- The cost of subcontracted work.

Under the contract, Balfour Beatty is entitled to claim interim payments, which are certified by RMBC at each assessment date, as stated in the contract. RMBC will certify the amount that is payable for the first certified payment and subsequent payments will take account of changes in the amount due from the previous certifications. Certification is therefore based on a gross assessment less sums previously certified. The amount will be known as the Price for Work Done to Date.

In addition, Balfour Beatty is paid for any other amounts due; for example, VAT or other separate entitlements, over and above the cost of the work itself. These are paid less the amount paid by or retained by Balfour Beatty and may include items such as liquidated damages that become payable.

Balfour Beatty invoices RMBC directly at set periods throughout the delivery process, in accordance with the target cost and Contract Schedule. Balfour Beatty has a Project Sponsor who oversees delivery of the scheme and compliance with Scape, liaising with RMBC. Invoicing to RMBC is in accordance with the key stages and activity types as defined in the Contract Schedule, as agreed at the contract commencement.

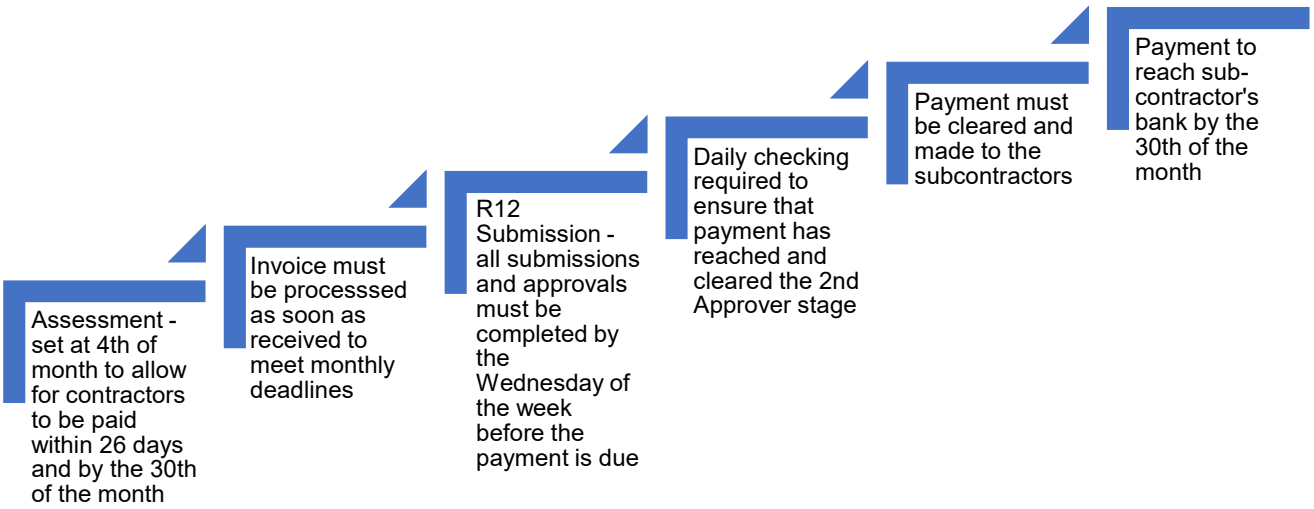
RMBC reserves the right to deduct Disallowed Costs from the Defined Costs, including costs not justified by the accounts records or costs which should have been paid in accordance with the subcontractor's agreement with Balfour Beatty, or costs incurred for dispute proceedings or plan and materials not used. This therefore reduces the risk of overspending against the target cost.

Compensation events will also apply, with the financial impact of the cost of compensation against the Defined Cost of work that has been done, the forecast Defined Cost of work not yet done and the resulting fee. It is important to note that for the chosen contract type the Defined Cost is the costs that will be incurred before the next assessment date, therefore keeping Balfour Beatty in a cash neutral position.

The pain-gain share is assessed with reference to the difference between the Total of the Prices and the Price for Work Done to Date at completion of the works. It will be made at completion of the contract and be based on the forecast figures. The figures will be determined between RMBC and Balfour Beatty, enabling RMBC to encourage efficient and on-time delivery, at a cost which is less than the Total of Prices.

Balfour Beatty manages the relationship with sub-contractors directly, with pricing largely based around the Scape Fair Payment KPI, which sets an indicator of 100% of suppliers paid on time every time. This KPI follows a set process as illustrated in Figure 4-1.

Figure 4-1 - Fair Payment KPI for Scape



Balfour Beatty initiates this process, and payment evidence is downloaded from the R12 and submitted alongside the Monthly KPI Toolkit on the 1st of every month to the KPI Co-Ordinator. In the event that a sub-contractor/supplier does not provide an assessment or an invoice, a payment is

still due within the payment terms based on an assessment which must therefore be undertaken by Balfour Beatty's own commercial team.

This tested approach ensures that there are robust and effective payment mechanisms in place to ensure continuity of delivery, with in-built incentives to drive on-time and on-budget delivery.

4.9 RISK ALLOCATION AND TRANSFER

The scheme risks, their allocation and the mitigation strategies have been fully considered by RMBC and are documented within the project Risk Register and accompanying Risk Management Strategy in Appendix L. All potential programme and construction risks have been considered and scored appropriately for a scheme at detailed design stage upon submission of the final Full Business Case.

RMBC manages risk effectively by using Scape to set a target cost price and Contract Schedule, thus inherently reducing the overall risks of budgetary or resourcing overspends. Balfour Beatty records and reports on changing risk and mitigation factors on a monthly basis as part of the delivery of the core KPIs set out in Scape. By setting the target cost there will be a no pain no gain philosophy with the need to deliver the project as close to the target cost as possible. Furthermore, the use of an ECI contract helps to design out/mitigate a proportion of risks at the design/pre-construction stage.

The majority of the risk allocation is therefore transferable from RMBC as the scheme promoter to Balfour Beatty as the contractor and this is a major benefit of the Scape framework design and build approach. The main risk inherent in the contract type is that at completion the Price for Work Done to Date may exceed the Total of Prices and RMBC would then need to consider how to recover any overpayment. This could potentially lead to cash flow and covenant risk which must be considered and monitored via the risk management process contained within the Risk Management Strategy and recorded via the Risk Register.

A QRA has been completed, which assesses and quantifies the identified risks that may impact on scheme costs, in order to derive the expected value of risk for the proposed scheme. This is described in detail in the Management Case, where Table 5-5 sets out the top-scoring risks.

4.10 CONTRACT LENGTH

The contract length will be in accordance with the Contract Schedule, which is provided in Appendix N. The detailed design stage started in early 2018, and scheme completion is expected in 2022. This is based on a series of key milestones, as set out in Table 4-5.

Table 4-5 - Contract Milestones

Milestone	Date
Design finalisation	W/C 5 August 2019
Issue of fixed price and contract schedule	End September 2019
Draft Full Business Case submission to DfT	By 25 October 2019
Final Full Business Case submission to DfT	By 15 June 2020

Milestone	Date
Contract Award	3 August 2020
Construction works	1 September 2020 to 23 May 2022
Completion of construction and opening to traffic	30 September to 11 November 2021

4.11 CONTRACT MANAGEMENT

Significant human resource is required to ensure the delivery of the contract, including by the scheme promoter (RMBC), the design team (WSP) and the contractor (Balfour Beatty), as well as its sub-contractors. RMBC is responsible for overseeing the delivery, with the design team undertaking the majority of its work over the pre-construction stages. The contractor is involved at an early stage, acting as a key point of liaison between all parties to ensure the scheme progresses to and through the construction phase.

To provide additional support, the Scape Framework Management team takes a lead role in ensuring that the programme is fully optimised to deliver high performance. The Scape team continuously interrogates and analyses performance against KPIs. Balfour Beatty is responsible for monitoring its performance against the KPIs and then collating this into monthly reporting outputs for RMBC and the Scape senior management team.

KPIs for the framework include time and cost predictability, defects at completion, health and safety, client satisfaction (both product and service), waste management, achievement of employment and skills targets (particularly for local workforces), local spend and local employment (noting that that use of small and medium sized (SMEs) is also monitored.

In addition to the continuous assessment of KPI data, the Scape management team conducts project audits to ensure that delivery partners continue to provide excellent service, Value for Money and are, at the very least, working to the minimum requirements of the framework.

The management team holds formal quarterly performance meetings, in which each delivery partner has their performance reviewed in depth. In this forum, any improvement opportunities are discussed in detail and if required, time constrained rectification strategies agreed.

Scape requires delivery partners to seek to improve upon their original commitments as the framework progresses. These commitments require Balfour Beatty to actively manage its own performance to ensure that it can demonstrate the incremental value that its scaling operations bring to RMBC.

The Scape framework will therefore ensure the performance management is achieved via a range of critical success factors and performance indicators. Key criteria include:

- Time;
- Cost;
- Quality;
- Health and safety;
- Client satisfaction;
- Local labour;
- Local spend;

- Fair payment;
- Supply chain satisfaction; and
- Waste diverted from landfill.

4.12 COMMERCIAL VIABILITY

This Commercial Case demonstrates the commercial viability of the proposed A630 scheme. The chosen procurement strategy and form of contract offer value for money, continuity in terms of design, traffic modelling and business case development, continuous performance monitoring via KPIs and reduction of the risk of a significant overspend through the use of a target cost approach.

The Scape framework has been 100% market tested with over £12 billion of collective buying power to realise cost savings. RMBC therefore has reassurance that the approach is driven by insights gained from customer and market research within the industry.

With Scape being compliant with EU Procurement Regulations there is rigorous assurance that the rules are complied with, and no award via Scape has previously been challenged.

The Scape framework is itself tendered to ensure highly competitive rates for a wide range of built environment services, including specialist services through a pre-qualified Tier 1 supply chain and an open source approved Tier 2 supply chain. Balfour Beatty has competitively tendered for its place on the framework as Principal Contractor and the appointment of a single supplier helps to set costs and the overheads / profits for the project.

Noting the remaining project costs are then sub-contracted work packages, these can then be locally tendered open book to a managed supplier chain to ensure competitive tensions are maintained, by effective price benchmarking and cost targeting to achieve Value for Money. This also allows for the Social Value elements to be realised.

The direct award framework approach used as part of Scape provides for continuity of personnel across repeat business/programmes of work, enabling lessons learnt and continuous improvements to be captured and applied.

'The client can be involved in the supply chain procurement, setting their procurement strategy. This approach to smart working and client/partner collaboration realises a near 100% success rate in meeting project budget and projects programmes. Risk is identified early, shared and managed appropriately and enables projects to be delivered efficiently'

(Scape Procure Single Supplier Framework – The benefits)

The approach to procurement and the chosen type and form of contract offer a commercially viable strategy for delivery of the A630 widening scheme.

5

MANAGEMENT CASE

5 MANAGEMENT CASE

5.1 INTRODUCTION

This Management Case evidences the deliverability of the proposed A630 scheme, in terms of:

- RMBC's track record in delivering schemes of a similar size and value, and key lessons learnt that have been applied to the development of the A630 scheme;
- The governance structure for scheme delivery, and the roles and responsibilities held by key individuals;
- Project reporting procedures;
- The project delivery plan, with key dates, dependencies and milestones highlighted;
- Tolerances and constraints, in terms of time, cost and quality;
- The RMBC, SCR and DfT assurance processes for the development and approval of the Business Case and the drawdown of scheme funding;
- Stakeholder communications and engagement;
- Risk management, with key risks and mitigation measures identified;
- How lessons learned will be identified and applied to future projects and programmes; and
- Monitoring and evaluation arrangements, and how the scheme benefits will be realised.

5.2 EVIDENCE OF SIMILAR PROJECTS

RMBC has an excellent track record in delivering large scale highway improvement schemes in accordance with planned budgets and implementation timescales. Table 5-1 provides information on RMBC projects that are similar to the proposed A630 widening scheme, including information on planned and actual delivery timescales and budgets, as well as the procurement arrangements used to deliver the work.

Table 5-1 - Evidence of Delivery of Similar Projects

Project	Procurement Arrangements	Timescale	Budget
New York Junction Roundabout	• Midlands Highway Alliance Framework	• Commenced June 2014 • Planned Delivery March 2015 • Actual Delivery July 2015	• Planned £5.1m • Actual £4.9m
Chantry Bridge/Corporation Street Environmental Improvements and Cycle/Pedestrian Improvements	• RMBC's in-house scheme delivery team	• Commenced April 2017 • Planned Delivery March 2018 • Actual Delivery June 2018	• Planned £1.15m • Actual £1.28m

Project	Procurement Arrangements	Timescale	Budget
A634 Maltby to Nottinghamshire Boundary Accident Remediation Measures	• RMBC's in-house scheme delivery team	• Commenced April 2017 • Planned Delivery March 2019 • Actual Delivery March 2019	• Planned £900,000 • Actual £821,244
A57/A618 Junction Improvements	• RMBC's in-house scheme delivery team	• Commenced April 2017 • Planned Delivery March 2018 • Actual Delivery April 2019	• Planned £500,000 • Actual £514,440
A630 College Road Roundabout Congestion Improvement	• Scape	• Commenced August 2019 • Planned Delivery April 2020	• Planned £3.5m
Fenton Road Cycle Infrastructure	• RMBC's in-house scheme delivery team	• Commenced July 2019 • Planned Delivery March 2020	• £850,000

As part of a culture of continuous improvement, the Council carries out in-depth post project reviews on each major highway project to identify lessons learnt that can be used to shape the successful delivery of future schemes.

The following key lessons learnt from the delivery of similar projects have been used to shape the preparation and delivery of the proposed A630 scheme:

- Strong governance arrangements, with a scheme-specific Project Board supported in key decision-making by RMBC's Major Schemes Project Board, and clearly defined reporting arrangements and shared information systems;
- Continuity in design, traffic modelling and business case development throughout the scheme development process, which drives efficiencies in terms of reducing the need for knowledge transfer across different teams;
- The importance of undertaking early on-site surveys to understand the full implications and potential programme delays associated with statutory diversion and other related engineering risks;
- The benefits of the use of Early Contractor Involvement (ECI), including pre-meetings and early identification of delivery procedures and issues at the design phase;
- Development and agreement of the target price using a bill of quantities, which simplifies the process for assessing and agreeing the price;

- The use of management and monitoring procedures, as well as shared information systems which add value through improved financial monitoring in line with the target price and efficiency in cross-team working;
- The delivery of continuous, effective stakeholder and public communications and engagement during the design and construction phases, which is particularly important in terms of informing members of the public of any disruption and diversions during construction; and
- The timing of construction works to coincide with periods of reduced traffic flows e.g. during school holidays where possible, to minimise potential disruption on the network.

The use of the ECI approach on the A630 widening scheme is a key advantage, and on-site surveys have already been undertaken where required in order to identify potential issues that could delay the programme.

5.3 PROJECT GOVERNANCE, ROLES AND RESPONSIBILITIES

5.3.1 OVERVIEW

RMBC adopts a PRINCE2 approach to project management, operating under the Managing Successful Programmes philosophy to ensure successful scheme delivery. Major transport schemes are delivered via three-tier governance arrangements, with a dedicated Project Board reporting to RMBC's Major Schemes Project Board and supported by a multidisciplinary delivery team. With respect to retained schemes such as the A630 Parkway widening, the Project Board reports to the DfT as the investment decision maker.

An active approach to consultation with all interested parties is delivered through the existing partnership boards and communication channels developed by RMBC. At critical stages in the project delivery programme, dialogue is undertaken with key stakeholders, which ensures a constructive feedback and endorsement process. Benefits are regularly communicated to ensure interest and involvement is maintained.

5.3.2 GOVERNANCE STRUCTURE

5.3.2.1 Corporate Ownership

Corporate ownership of the A630 widening scheme sits with RMBC's Regeneration and Environment Directorate, led by Paul Woodcock as the Strategic Director. Paul also chairs the Major Schemes Project Board and Joint Member Update meeting and is the Senior Responsible Owner (SRO) for the A630 Parkway widening project.

The Regeneration and Environment Directorate is committed to delivering services for Rotherham which focus on economic regeneration, whilst at the same time ensuring it keeps its neighbourhoods safe, clean, green and well maintained. Currently it is reforming its approach to delivering these services, to ensure that they are delivered in a flexible, efficient and sustainable way.

In order to achieve this, the Directorate has identified four key underlining themes to assist in shaping and developing services and service delivery over the next three years to 2022:

1. Economic and Housing Growth;

2. Modernisation;

3. Being more commercial and maximising income generation; and

4. Engaging with and empowering communities.

These four themes guide the Directorate and provide a framework for future direction, service provision, and prioritisation, and help steer budget decisions. The themes complement the key Council Plan priorities which provide the overall vision for RMBC and which impact most directly on the delivery of services within the Regeneration and Environment Directorate.

The Council Plan priorities are:

- Every child making the best start in life;
- Every adult secure, responsible and empowered;
- A strong community in a clean, safe environment; and
- Extending opportunity, prosperity and planning for the future.

The Directorate plays an influential role in the SCR to ensure that Rotherham receives tangible benefits and especially funding to deliver on priorities. RMBC will achieve this by developing a culture of innovative service delivery, including different delivery methods and vehicles, exploring the use of new technologies, identifying and optimising income generation opportunities, encouraging creativity in service design and delivery across departments which will inform future operational asset management requirements across the Council and its partners.

The success of this approach will be monitored and evaluated through a comprehensive performance management framework across RMBC.

5.3.2.2 Governance Arrangements

The delivery of capital projects such as the A630 Parkway widening scheme is based on RMBC's Capital Strategy and Capital Programme. The Capital Strategy formalises the approvals process and monitoring of the performance of the capital programme.

The internal governance for the programme of interventions associated with the A630 widening scheme is, as far as possible, managed through existing project boards and delivery groups within the wider Regeneration and Environment Directorate.

Governance takes place across three tiers, as shown in Figure 5-1:

1. RMBC's Major Schemes Project Board;

2. A dedicated A630 Widening Project Board; and

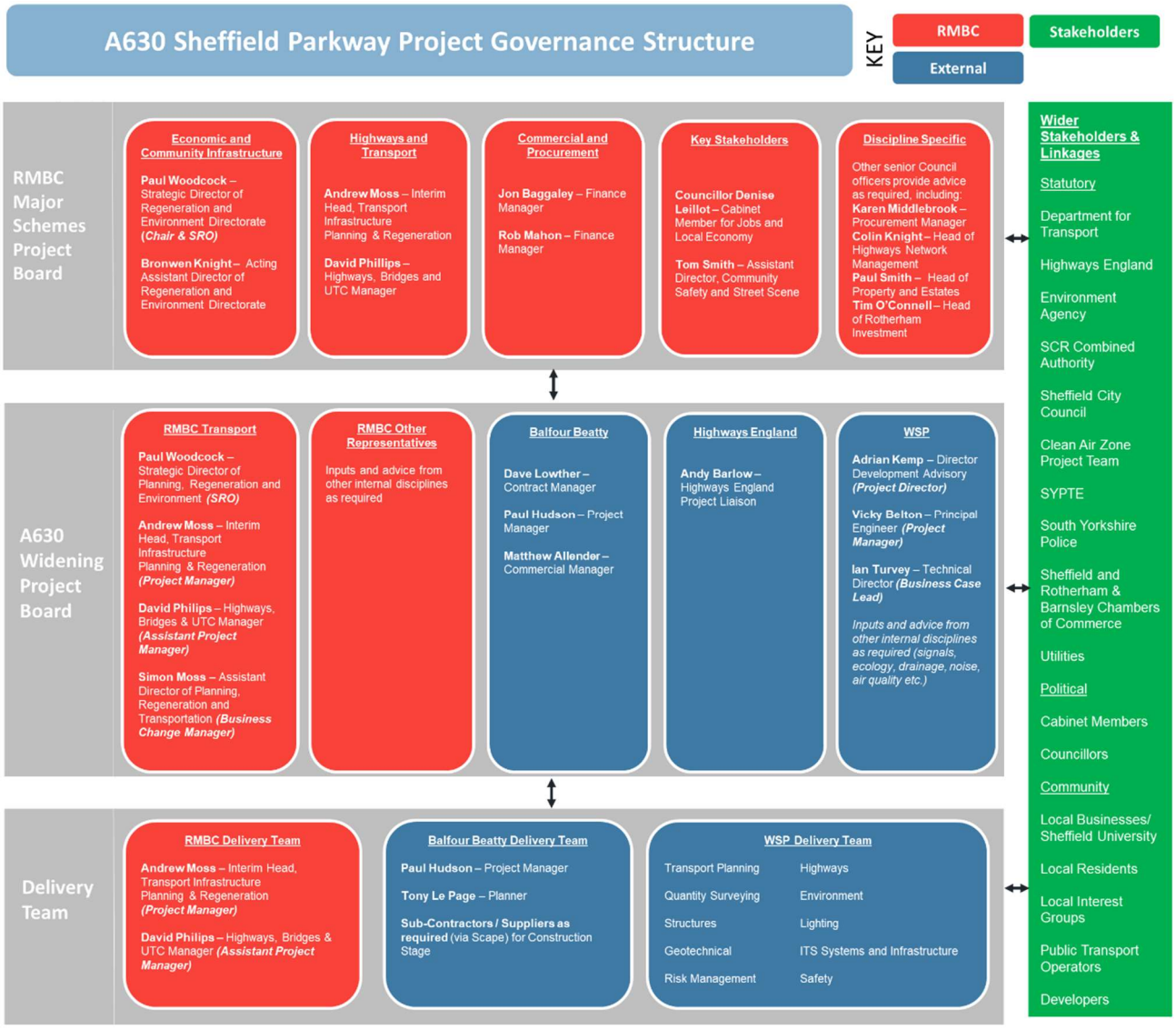
3. An A630 Delivery Team.

RMBC's Major Schemes Project Board comprises of senior representatives from across the disciplines of Economic and Community Infrastructure, Highways and Transport, Commercial and Procurement and Transport Policy, as well as key stakeholders. Other discipline leads provide ad hoc advice and support as required.

The bespoke A630 Widening Project Board comprises of the scheme SRO, the Project Manager and Assistant Project Manager and the Business Change Manager, who will be responsible for realising the benefits from the scheme in the post-delivery period. The Project Board also benefits from inputs from other RMBC discipline representatives as required. External members of the Board include the Balfour Beatty Contract Manager, representatives from Highways England, and the WSP Project Director, Project Manager and Business Case Lead.

The Delivery Team comprises of the RMBC Project Manager and Assistant Project Manager, alongside representatives from Balfour Beatty (Principal Contractor for design and build) and WSP (multidisciplinary design partners and business case lead).

Figure 5-1 - Governance Structure



Within RMBC, the SRO, Project Manager and Assistant Project Manager all sit on both the Major Schemes Project Board and the A630 Widening Project Board, ensuring continuity and driving strong communications between the two tiers.

This structure is consistent with the approach adopted on all other major infrastructure construction schemes delivered by RMBC.

5.4 ROLES AND RESPONSIBILITIES

The A630 Widening Project Board takes the strategic lead on scheme delivery, working closely with the Project Delivery Team to:

- Progress the scheme design and development in line with the Project Plan, identifying any potential delays and mitigation measures required;
- Undertake the work required as per the stated budget, identifying any potential overspend and putting in place mitigation actions where required;
- Maintain dialogue with Highways England and the DfT, to ensure that the scheme proposals are acceptable to wider stakeholders;
- Drive effective stakeholder engagement and information provision; and
- Fulfil reporting requirements, both to the RMBC Transport Major Schemes Programme Board and to DfT as the ultimate approving body for the business case.

The A630 Widening Project Board meets on a monthly basis, providing a highlight report in advance of the monthly Major Schemes Project Board meeting. The highlight report raises any key issues, such as increased or unexpected risk to programme delivery and any variation to the expected delivery costs for escalation and action. This involves fully disclosing the quantum of variation and the potential options for realigning the deliverables to meet the Target Cost where feasible. The nature of the Design and Build Contract, which encompasses early involvement by Balfour Beatty, reduces the risk of exceeding the budget, with financial overspend borne by Balfour Beatty as the Principal Contractor.

The A630 Widening Project Board also provides regular updates and reports to relevant Cabinet Members.

The Transport Major Schemes Project Board also meets monthly, acting as a sounding board for the key issues raised by the A630 Widening Project Board. Although the A630 Widening Project Board has the authority to make decisions, the Transport Major Schemes Project Board must agree before action is taken.

Any significant changes post approval that require amendment to the grant agreement would be managed by the change control process embedded in the SCR Assurance Framework[1]. This involves submission of a change request form, which is reviewed and presented to the Appraisal Panel. Approval of significant changes to the Full Business Case approval or grant agreement is made by the appropriate delegated authority. A Deed of Variation is then issued.

The A630 Widening Project Board takes the lead on engagement with wider stakeholders, including the DfT as the investment decision maker, SCRCA, Sheffield City Council and statutory consultees such as Highways England, although liaison with key external stakeholders takes place at all three tiers. Further detail on stakeholder engagement is provided in the Stakeholder Engagement and Communications Strategy within Appendix D.

The Project Delivery Team manages the day-to-day scheme development process, with weekly calls attended by all discipline leads within Balfour Beatty and WSP, who maintain continuous dialogue with RMBC's internal team. The RMBC team monitors and manages risks and takes responsibility for liaising with representatives from DfT to ensure that the proposals, modelling and appraisal and wider business case accord with requirements.

[1] Sheffield City Region Assurance Framework (SCR, 2019)

In terms of performance management, the KPIs which are inherent to Scape help to provide assurance that performance is in line with stated requirements, as well as making sure that financial, legal and project controls are clear.

Table 5-2 sets out the roles and responsibilities of key members within the project governance structure.

Table 5-2 - Key Roles and Responsibilities

Role	Name	Responsibilities	Position
SRO/Chair of RMBC Major Schemes Project Board	Paul Woodcock	Responsible for the successful delivery of the A630 project, ensuring that it meets its objectives and delivers its intended benefits.	Strategic Director of Regeneration and Environment Directorate
Project Manager	Andrew Moss	Managing the A630 project to ensure that it delivers the required products within the agreed constraints, and co-ordinates the work of the delivery team.	Interim Head of Transport Infrastructure, Planning and Regeneration
Assistant Project Manager	David Phillips	Deputises for the Project Manager as required.	Highways, Bridges and UTC Manager
Business Change Manager	Simon Moss	Responsible for realisation of the scheme benefits after the programme has closed.	Assistant Director of Planning, Regeneration and Transportation
Contract Manager (Balfour Beatty)	Dave Lowther	Manages the scheme design and target cost development process and holds responsibility for the appointment of sub-contractors.	Contract Manager
Project Director (WSP)	Adrian Kemp	Holds overall responsibility for WSP's performance in line with the contract.	Director, Development Advisory
Project Manager (WSP)	Vicky Belton	Leads the delivery of the design and technical elements for the scheme.	Principal Engineer

These governance arrangements help to ensure that delivery is achieved within the target price and according to key delivery dates, as well as providing continuous opportunities to identify, discuss and address risks.

In relation to the wider strategic fit with RMBC's Capital Strategy and associated Capital Programme, the Delivery Board oversees the delivery of capital projects in line with the programme, managing approvals, variations and strategic level changes.

5.5 PROGRAMME AND PROJECT PLAN

RMBC has worked closely with the Project Delivery Team to develop a programme for project delivery that is achievable and aligns with the availability of funding drawdown. The full Project Plan is provided in Appendix N, which sets out all of the tasks, milestones and dependencies involved in delivering the scheme. Table 5-3 provides a summary of key tasks/milestones and delivery dates.

Table 5-3 - Key Tasks and Dates

Task	Start Date	Finish Date
Whole Scheme Lifecycle	**28/12/2018**	**21/06/2022**
Stage 1: Pre-Construction	**28/12/2018**	**31/07/2020**
Scheme Design Programme (WSP)	28/12/2018	31/07/2020
GI Works	08/04/2019	13/06/2019
Submission of Draft Full Business Case to DfT	25/10/2019	25/10/2019
Baseline Data Collection	01/11/2019	30/11/2019
Internal Gateway Review by Contractor	04/05/2020	08/05/2020
Submission of Final Full Business Case to DfT	**By 15/06/2020**	**By 15/06/2020**
DfT Full Business Case Review Period / Approval	15/06/2020	30/07/2020
DfT Approval to Proceed	**31/07/2020**	**31/07/2020**
Contract Award	03/08/2020	03/08/2020
Pre-Construction Issue of Documents and Post Award Meetings	03/08/2020	03/08/2020
Consents and Notices	03/08/2020	03/08/2020
Subcontractor Procurement	10/08/2020	29/07/2021
RMBC Grant Approval to Proceed to Stage 2 Construction	17/08/2020	17/08/2020
Stage 2: Construction	**01/09/2020**	**23/05/2022**
Site Establishment	01/09/2020	14/09/2020
Enabling Works	15/09/2020	06/10/2020
Construction Phases 1 to 20	07/10/2020	09/05/2022
Construction Completion	09/05/2022	09/05/2022
Produce As Built Information	10/05/2022	23/05/2022
Stage 3: Defects Correction & Lessons Learned	**10/05/2022**	**21/06/2022**
Defects Correction	10/05/2022	31/05/2022
Lessons Learned	14/06/2022	21/06/2022
Stage 4: Monitoring and Evaluation (Year 1)	01/06/2023	30/06/2023
Stage 5: Monitoring and Evaluation (Year 5)	01/06/2027	30/06/2027

The Project Plan is maintained and updated by Balfour Beatty as part of its ongoing project performance monitoring. Any changes are raised with RMBC and action taken as required.

5.6 TOLERANCES AND CONSTRAINTS

As described in the Commercial Case, the A630 Parkway widening scheme is being delivered through an NEC contract. NEC contracts have a clear, simple process for early warning, where both the Project Manager and the Principal Contractor share the responsibility to formally notify each other of an early warning of certain types of event.

These are events that could, if they occur:

- Increase the price (as part of a compensation event under the contract);
- Delay meeting a key date;
- Delay completion; or
- Impact on quality.

NEC3 contracts commercially incentivise Balfour Beatty as the Principal Contractor to give early warnings to RMBC. If Balfour Beatty does not give early warning, it risks having any additional costs incurred disallowed. If RMBC as the Project Manager does not provide an early warning, there will be a lost opportunity to manage potential risks and reduce the likelihood that the event does occur or reduce its impact. Early warnings will be reported in the project Risk Register, which is discussed at monthly Project Board meetings, or more frequently where required.

Contractor's time risk has been built into the project programme provided by Balfour Beatty, at 30 days (10/05/2022 – 21/06/2022). Mechanisms are also built into the contract to account for an over or underspend in relation to the Target Cost.

5.7 ASSURANCE AND APPROVALS

5.7.1 DFT ASSURANCE AND APPROVALS

As a retained scheme, DfT approval of the Full Business Case is required before the retained LGF funding for scheme implementation is released to the SCR as the accountable body. The DfT generally follows a three-stage gateway process for funding approval:

- Programme Entry: SCR's acceptance of RMBC's Strategic Outline Business Case (SOBC) for SCRIF funding acted as the programme entry agreement.
- Conditional Approval: although a formal Outline Business Case (OBC) was not prepared, meetings were held with the DfT in 2017 and 2018 to ensure it was satisfied with the modelling and optioneering process.
- Full Approval: this final Full Business Case is based on the final detailed scheme design and target cost. Once approved by the DfT, RMBC can draw down funding to start construction, subject to execution of a grant agreement and submission of defrayal evidence to the satisfaction of the SCR as the accountable body.

RMBC's Section 151 Officer has confirmed that the scheme costs are accurate, that sufficient budget has been allocated to deliver the scheme on the basis of the local funding contribution and that the Council accepts responsibility for meeting any cost overruns, as evidenced in Appendix M.

The Full Business Case has been prepared in accordance with relevant guidance, including the HMT Green Book[2], which provides the detailed framework and guidance within which government departments subject all new policies, programmes and projects to comprehensive but proportionate assessment.

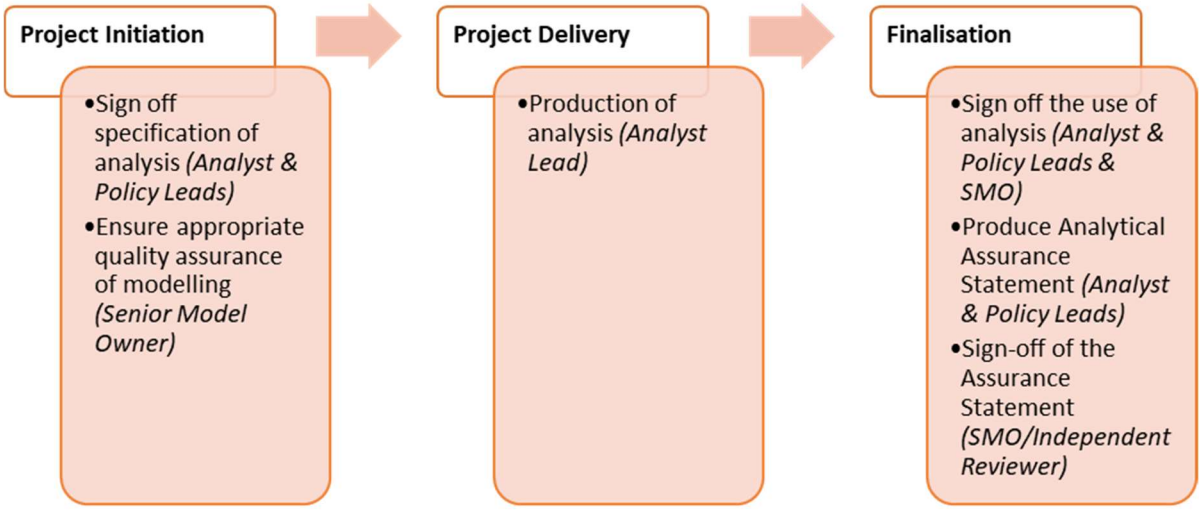
The DfT also has its own guidance on transport business cases[3], which provides guidance on how to develop a five-case business case to support decision-making around the five key assessment areas: strategic; economic; financial; commercial and management.

This is supported by the Value for Money Framework[4], which sits alongside the DfT's Transport Analysis Guidance (TAG), explaining how to use appraisal results to provide Value for Money advice for decision makers. The VfM statement in the Economic Case summarises the VfM position for sign-off by the DfT's Transport Appraisal and Strategic Modelling (TASM) division.

The DfT's assurance and approvals processes are set out in the DfT Analytical Assurance Framework[5], which establishes the framework within which analysis is specified, produced and used and sets out how assurance is given to the Permanent Secretary and Secretary of State that analysis used to inform decision-making is 'right' – striking the correct balance between robustness, timeliness and cost.

Figure 5-2 sets out the responsibilities over the project lifecycle. At project initiation, an Appraisal Specification Report[6] was developed and agreed with the DfT. This defined the scope, assumptions and methodologies that would be used for the appraisal of the A630 Parkway scheme.

Figure 5-2 - Responsibilities over the Project Lifecycle



In order for a project to be signed off by either an Investment Board or Ministers, an Analytical Assurance Statement is required. An Analytical Assurance Statement is a short statement that is produced by DfT officials, to highlight the degree of assurance attached to the analysis which underpins the decision-making. It is designed to convey the strengths, limitations, risks and

[2] The Green Book: Central Government Guidance on Appraisal and Evaluation (HM Treasury, 2018)
[3] The Transport Business Cases (DfT, January 2013)
[4] Value for Money Framework: Moving Britain Ahead (DfT, 2015)
[5] Strength in Numbers: The DfT Analytical Assurance Framework (May 2013, updated September 2014)
[6] A630 Widening Scheme Appraisal Specification Report (WSP, September 2018)

uncertainties associated with the analysis, to reach a conclusion on the overall level of confidence. Where the analytical advice plays a major role in decision-making by Tier 1 and Tier 2 investment boards, and/or when the decision could expose the department to legal, financial or reputational risks, independent review of the Analytical Assurance Statement is required.

5.7.2 SHEFFIELD CITY REGION ASSURANCE AND APPROVALS

The proposed scheme was identified as a priority scheme as part of the SCRIF programme, which is a framework of funding streams to deliver essential strategic infrastructure to increase economic growth and jobs in the SCR. Key funding components of the SCRIF are major scheme transport funding devolved down from DfT and Single Local Growth Fund through the City Region Growth Deal (the latter secured in principle during 2014).

The SCRIF programme delivers essential strategic infrastructure that is supportive of the region's economic and employment ambitions. The SCR Assurance Framework provides accountability and transparency of process to ensure that the benefits to be derived from the investment programme are distributed across the SCR Functional Economic Market Area (FEMA).

The SCR Assurance Framework requires transport schemes to demonstrate a BCR of at least 2, based on an appraisal consistent with the Green Book five case business case model and proportionate to the funding request, complexity and level of risk. Where particular technical expertise or specialist advise is required, independent appraisers are instructed to assist. This may include full WebTAG appraisal for grant requests above £5 million.

A summary of the technical analysis, including a VfM statement, is completed at the final stage of the appraisal process. This is considered by the SCR Appraisal Panel, consisting of representatives of each of the Statutory Officers and is chaired by an independent LEP Board member. The Panel makes recommendations on the level of risk of a project, whether to endorse, defer or reject funding applications and any conditions of grant approval.

The Thematic Board has the authority to approve projects with a grant value of less than £2 million, which are then presented to the Mayoral Combined Authority (MCA) in a report noting delegated decisions. Where projects have a grant value of £2 million and above, the recommendation can be endorsed by the Thematic Board but approval lies with the MCA. Full approval and delegated agreement to enter into a grant agreement can be requested, where necessary, under the same paper.

The Programme and Performance Unit leads on projects post full approval, including the management of the grant agreement. Submission of performance reports, review meetings and site visits are expected quarterly. The management and mitigation of risks and issues is also predominant during these review periods.

The A630 Parkway widening scheme is classified in governmental terms as a major project that requires HM Treasury approval; therefore, an Integrated Assurance and Approval Plan (IAAP) is required. The IAAP ensures that appropriate assurance activities are effectively planned, scheduled, coordinated and that resources are secured in advance, as well as providing a timetable for Treasury approval. As the SCR is the custodian of the Local Growth Fund (LGF) programme, the IAAP requirements will be covered through this governance arrangement. As the scheme moves through the delivery process, the SCR as the funding holder will require appropriate scrutiny and approvals in accordance with the delivery milestones.

5.7.3 RMBC CITY REGION ASSURANCE AND APPROVALS

The delegated decision to proceed with the proposed A630 scheme was made by Cabinet on 8 July 2019. As the Strategic Director for Regeneration and Environment, and as the A630 widening scheme SRO, Paul Woodcock holds responsibility for the decision to approve and submit the Business Case to the DfT.

The RMBC elements of the project will be managed primarily through the assurance processes established through SCC's role as the project management office regionally. However, each capital scheme and project delivered by RMBC is subject to an internal assurance process, therefore RMBC will undertake service audits, technical reviews and project audits on the A630 widening scheme, as appropriate:

- Service Audits – dependent on the project's level of risk and prior history of issues or management concerns, project specific risks are highlighted through individual service planning and mitigation will be outlined. The risk register associated with each Service Plan is reported and reviewed every 6 months and procedures are put in place to escalate issues for further action.
- Technical Reviews – the scheme delivery will be reviewed at key stages through the project management process to understand technical expertise and effectiveness/suitability of the proposal, as agreed by Service Delivery Manager. In relation to costs, the potential escalation of project expenditure is controlled via the project management process. This process continually monitors the cash flow of the project using in-house financial systems to ensure costs remain within budget.
- Project Audits – auditing levels will be related to the basis of their level of risk. To prevent scope creep, and reduce impact on successful delivery against the programme, the PM team for the A630 widening scheme will implement a change control process.

The process of change control is as follows:

- Change request is reported to the Major Schemes Project Board;
- A high-level assessment of the request is undertaken to grade the priority of the request (low/medium/high);
- Change request is logged on the change log and submitted to the Major Schemes Project Board; and
- The grading results in the identification of the potential for changes in timescales for attention from the Project Manager. The Project Manager then assesses the impact of the project tolerances.

At the strategic Council level, all capital project leads provide monthly forecasts, through collaborative planning on the performance and potential outturn of their project. The Capital Finance Team has responsibility for monitoring the overall performance against the Council's wider Capital Programme. A brief overview monitoring report is provided on a monthly basis to the Senior Leadership Team within RMBC and within a bi-monthly update to the Cabinet, providing the current key budgetary positioning.

Project Managers and Project Sponsors are responsible for ensuring that they follow RMBC's contractual and procedural rules fully. Within RMBC, the Capital Programme Monitoring and Delivery Board is responsible for the oversight of the approved capital development programme and manages approvals, recommendations, variations and completion reporting on the higher level

against the capital funding and strategy. This ensures consistency of approvals and that the key documentation is in place, as well as making sure that there is sufficient Cabinet Member and senior management involvement in the decision-making process from the earliest stages.

5.7.3.1 Performance Management

RMBC's Performance Management Framework is a critical means by which the Council uses performance information to challenge its effectiveness.

The framework follows four principles:

- Honesty and Transparency;
- Timeliness;
- Working together; and
- Council-wide responsibility.

Performance and Quality will support the services within Regeneration and Environment by lending their experience in the fields of Performance Management and Service Improvement and Transformation. Customer Insight through the volunteer Customer Inspection Group also helps to ensure honesty and transparency.

Individual services within the Regeneration and Environment Directorate also have in place their own suite of service level performance indicators which are monitored and reported at service-level Management Team meetings. If any issues are highlighted which may require support from Performance and Quality, they can be raised directly with the Performance and Quality lead officer for the Regeneration and Environment Directorate.

Key service measures and the Council Plan measures are reported on the Regeneration and Environment Performance Scorecard. This scorecard and the update report that accompanies it are produced by the Council's Performance and Quality Team, which collates relevant data against indicators and reports to the Regeneration and Environment Directorate Leadership Team on a quarterly basis. Performance Clinics are held to examine the reasons behind poor or failing performance and to identify improvement actions.

Directorate reporting protocols align with the Corporate Reporting timetable. Data for corporate measures is collected by the Performance and Quality Team on a monthly, quarterly or annual basis to populate the Council's Corporate Scorecard. To ensure that the Council Plan is effectively performance managed, formal quarterly performance reports are presented to the Directorate Leadership Team and at meetings with Cabinet Members. The Performance and Quality Team, with the support of senior managers, produces the Regeneration and Environment section of the report.

5.8 COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

Stakeholder engagement and effective communications with all those that may be affected by the scheme is an essential part of the scheme development and delivery process. Early and continuous engagement enables the Project Team to understand and respond to key concerns. It is acknowledged that the effects of the scheme may be far reaching, with impacts on commuters between Rotherham and Sheffield and within the surrounding area, as well as local businesses.

Key stakeholders are supportive of the proposed scheme, as evidenced in the Letters of Support contained in Appendix O. The SCR Mayor has confirmed his full support, in terms of addressing

issues of delay and congestion and supporting economic growth through more reliable access to the AMID.

The full approach taken to stakeholder engagement and communications is provided in the Stakeholder Communication and Engagement Strategy in Appendix D. Key statutory and non-statutory stakeholders are listed in Table 5-4, alongside a summary of their interests and the main engagement methods used.

Table 5-4 - Key Stakeholders

Stakeholder Type	Name	Level of Influence / Interest	Main Engagement Methods
Statutory	Department for Transport	Investment Decision Maker - Key Influence – keep engaged / onboard	Telephone, email and meetings
	Highways England	Key Influence – keep engaged / onboard	Telephone, email and meetings
	SCR Combined Authority	Accountable Body - Key Influence - keep engaged / onboard	Telephone, email, review meetings, performance reports
	SCR Combined Authority Modelling Liaison Group (MLG)	Key Interest - keep engaged / onboard	Monthly meetings over the last two years to discuss scheme options, design, modelling and appraisal, and the relationship between the A630 Parkway widening scheme and the Sheffield Innovation Corridor scheme.
	South Yorkshire Passenger Transport Authority	Key Influence – keep engaged / onboard	Telephone, email and meetings if required
	South Yorkshire Police	Key Interest - keep informed	Telephone, email and meetings if required
	Utilities companies, i.e. electric, water, gas, telecoms	Key Influence – keep engaged / onboard	Email, telephone, consultation events and one to one meeting if required
	Environment Agency	Key Influence – keep engaged / onboard	Telephone, email and meetings
Political	Leader of the Council and individual Council Members	Key Influence – keep engaged / onboard	Via Programme Board and Council wide communications
	Local Parish Council	Key Interest - keep engaged / onboard	Email, online and meetings if required

Stakeholder Type	Name	Level of Influence / Interest	Main Engagement Methods
	Clean Air Zone – Project Team	Key Interest - keep engaged / onboard	Email and wider regional meetings
	Chief Executive of RMBC	Key Influence – keep engaged / onboard	Via internal wider communications and reports from Programme Board
	RMBC Highway Network Management and Asset Management Representatives	Key Influence – keep engaged / onboard	Via internal wider comms and reports from Programme Board and ad hoc attendance at Board meetings
	RMBC Public Health Representatives	Key Influence – keep engaged / onboard	Via internal wider comms and reports from Programme Board and ad hoc attendance at Board meetings
Community	Local Businesses	Key Interest – maintain two-way communications	Engagement events, email/ online updates
Community	Local Residents / and commuters through the area	Key Interest – keep two-way comms	Public Consultation engagement events, email/ online updates
Community	Local Interest Groups	Key Interest – keep two-way comms	Public Consultation engagement events, email/ online updates
Community	Public Transport operators (i.e. Stagecoach Bus etc)	Key Influence – keep engaged /onboard	Public Consultation/ engagement events, emails and one to one where required
Community	Local developers – both commercial and residential	Key Interest – keep informed	Public Consultation/ engagement events, emails, online content

To date, a number of engagement and communications events and activities have taken place, including:

- Letter drops to existing landowners in the area surrounding the scheme to agree necessary site access arrangements;
- A scheme overview plan has been tabled at relevant internal Council meetings;
- Meetings have been held with Network Rail to determine access to its land for survey purposes, and there is ongoing liaison in terms of permanent works; and
- Meetings have been held with the Environment Agency on flood risk and permitting the scheme requirements.

On 10 February 2017, a Breakfast Seminar was held with key business stakeholders at the University of Sheffield's Advanced Manufacturing Park Campus at the heart of the science park at Waverley. The workshop updated public and private sector stakeholders on the A630 widening

scheme principles, delivery timescales and expected outcomes and outputs. It also supported wider understanding of business operation needs around the A630 Parkway, and how these can be accommodated to maximise growth aspirations.

The response to the scheme was very positive, specifically from landowners who are seeking to develop strategic housing and employment sites across the nearby Advanced Manufacturing Park. The workshop presented all scheme development options and the feedback from businesses was used to help shape the 'acceptability' of the different proposals as well as allowing their concerns and recommendations to be taken on board at an early stage.

Principally this included the need to reduce delay and disruption during construction and the need to provide an improvement to the motorway roundabout at the M1 Junction 33. Both issues were considered and through this valuable third-party engagement have been included within the preferred option, presented within this business case.

On 21 June 2018, a further Breakfast Seminar was held with key business stakeholders and wider public-sector partners at the Mercure Hotel close to the A630 Parkway. The purpose of the event was to update attendees on the business case development process and inform them of how the preferred option was identified.

Support for preferred scheme was clear, and stakeholders were keen to understand how they could help to promote the key messages and scheme benefits through appropriate channels. Stakeholders demonstrated a clear understanding of the strategic alignment of the scheme with both local growth aspirations and the shared economic priorities of the Local Authorities and the Combined Authority/Local Enterprise Partnership.

On 21 August 2019 a public engagement event was held in Brinsworth (Parish Centre), at which members of the public were informed of the latest scheme design proposals, and the anticipated scheme benefits, as well as being given the opportunity to ask questions of the project team. Approximately 45 people attended the event and opinions towards the scheme overall were positive. The main issue raised by attendees was the existing noise levels related to traffic congestion. Local businesses showed support for the scheme proposals, echoing feedback from earlier engagement events. The main scheme benefit envisaged by businesses are the improvements to Catcliffe Interchange lower levels of traffic congestion. A copy of the information presented at this event and the flyers sent out beforehand is provided within Appendix D.

In addition to the above, there has been extensive internal engagement and consultation with Members through regular briefings and discussions. The scheme is also mentioned in RMBC's Clean Air Zone proposals and has been communicated to the public on several occasions through the public engagement events associated with the business case development of that project. Responses regarding the proposed A630 widening scheme through the CAZ consultation have been positive.

An important element of the engagement and communications strategy is to ensure that local residents, commuters and wider members of the public are informed of the temporary traffic management arrangements and diversions during scheme construction, balanced against the longer-term benefits of the scheme once open to traffic. RMBC will carry out letter drops to addresses that may be affected by the construction works, as well as providing ongoing progress updates via the 'News' section of its website.

5.9 PROJECT REPORTING

The Project Manager is responsible for the accurate and timely communication of information dissemination, both upwards to the Programme Board for approvals and across the A630 Project Board, Delivery Team and wider stakeholders for inclusion into the design process.

The SRO provides written monthly updates to the Programme Board, which set out delivery against the project plan, actual project spend against forecast expenditure, commentary on key risks and any issues arising. These updates are then discussed at the monthly Programme Board meetings, and the decisions taken are fed back to the Project Board at monthly meetings and to the Delivery Team through ongoing communications.

Cabinet Reports are prepared as required to facilitate key decision making and Briefing Notes are prepared to communicate project progress. A Cabinet Report of 08 July 2019 outlined the Transportation Capital Investment Programme (TCIP) for schemes to be delivered and developed in the financial year 2019/20 and provided an update on the A630 Parkway Widening scheme. Cabinet was asked to note the specific funding allocations and programme for the 2019/20 financial year, as well as noting progress on the A630 Parkway Widening scheme, which is programmed to start delivery in 2020/21, subject to DfT approval of the final Full Business Case.

As the funding for the scheme will be administered using an SCR grant agreement, RMBC will prepare and submit quarterly reports to the SCRCA, as well as holding regular review meetings and site visits. The reports can be shared and/or enhanced based on DfT requirements. RMBC will also submit the Risk Register to the SCRCA throughout project delivery. Project Learning Reviews are also required at the Completion Date (following practical completion of works) and the Final Review Date (following delivery of the outcomes).

In terms of reporting on the effectiveness of the scheme delivery process and the post-delivery outcomes in line with the stated objectives, the following monitoring reports will be produced by RMBC and submitted to the DfT:

- One Year Post Opening of Scheme – agreed and published within two years of the scheme opening; and
- Final Report – including data collected over five years post opening and published within six years.

All reports will be issued in draft to internal Council stakeholders and the SCRCA for comments prior to finalisation. The reports will then be submitted to the DfT and published on the Council website.

5.10 LESSONS LEARNED

The delivery of the A630 Parkway widening scheme will provide RMBC with a key opportunity to look at existing project management and delivery processes and determine whether current project controls are adequate. As part of the ongoing management of project delivery, the identification of these lessons learnt will not only support future stage delivery but will also ensure that there is a project management legacy developed as part of the scheme. Those insights can then be used to create process change, manage projects more efficiently, ensure effective decision making and help the project team work more collaboratively in the future.

Following the commencement of delivery, regular run reviews/issues logs will be completed, to support identification of the successes and improvements needed (or happening) throughout the

process. By taking the insights that come out of these discussions and applying them to global lessons across the project, RMBC can ensure that the decisions and issues are dealt with effectively if they should occur again. Furthermore, the impact on time and cost associated with project delivery will be mitigated as much as possible.

A live Lessons Learned report will be set up, and lessons learned will be a key standing item on the Project Delivery Team Meeting agenda. Through this process, successes and failures will be captured and logged with sufficient detail to understand what could have been done in hindsight and how preventative measures can be put in place to prevent a repeat recurrence.

Once the Lessons Learned Report is completed, a Lessons Learned Database template will be created. This will be a multi-project directory that can be edited to fit the needs of any future project. This will act as the main holding ground for all of the project's lessons learned (compiled with the delivery of transportation projects) delivered through RMBC's project management team. It will be used as a reference at the start of new projects and will be essential in terms of identifying process improvements that can be made throughout the Council. The database will also document successes and recurring issues throughout the project as they happen.

The information collected will be used to support future project planning, process improvement and project evaluation. The implementation of a formal, documented lessons learnt process means that a roadmap to success can be outlined at the outset of the project concept stage on every future project.

5.11 RISK MANAGEMENT

Project Risk is being actively managed by RMBC, alongside Balfour Beatty and WSP as its key design and delivery partners.

Risks have been identified by specialists in highways and structural engineering, construction, geotechnics, transport planning/modelling, quantity surveying, lighting and the environmental disciplines. Commencing in March 2019, all key risk owners have attended bi-monthly Risk Management meetings chaired by the scheme Risk Manager, alongside ongoing face-to-face and email communication as required.

A Risk Management Workshop was held on 30 April 2019, to consider the detailed risks associated with the delivery of the preferred scheme option and support the continued development of the scheme Risk Register. Taking a 'bottom up' and 'top down' approach, the workshops considered both specific risks identified by the project team and also risks prompted by consideration of a range of risk categories, including:

- Programme – delays in obtaining project approval/business case approval;
- Environmental – discovery of contamination, evasive species;
- Technical – unidentified services, unforeseen constraints on-site;
- Reputational – delays, unforeseen issues on site during construction;
- Construction – third party interference issues, unforeseen contamination/environmental issues;
- Political – political changes/changes to Council Members;
- Project Management – severe weather conditions, delays, reductions in resourcing;
- Regulatory/Legal – delays in obtaining TROs, changes to regulations; and
- Stakeholder Management/Communications – unforeseen complaints and lack of engagement pre-construction.

In August 2019, one-to-one meetings were held between the scheme Risk Manager and individual risk owners, to finalise the Risk Register, which is included in the Risk Management Strategy in Appendix L. The Risk Register demonstrates the fact that some risks have either been designed out or are no longer applicable, as the scheme has progressed from outline to detailed design stage and following various investigative surveys.

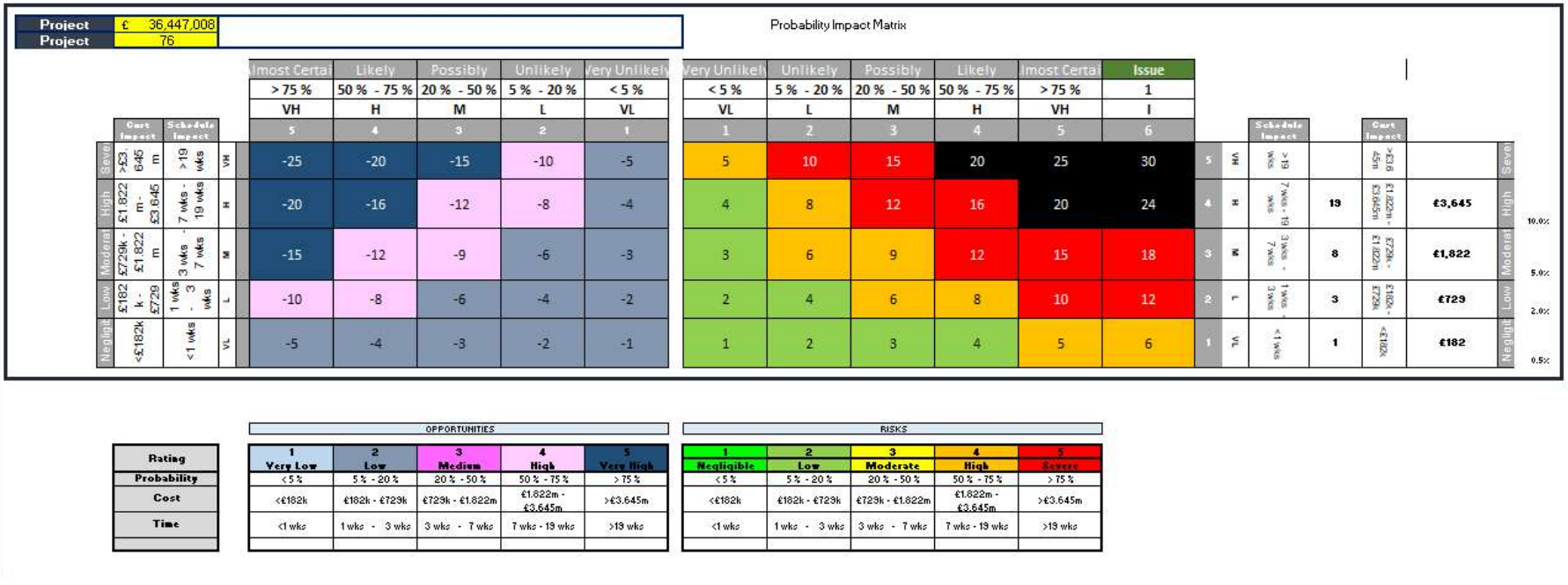
The Risk Management Strategy identifies the full set of risks identified, their level of likelihood and impact, and mitigation measures. It also sets out the risk management responsibilities and arrangements. Wider programme and project management risk will be managed by RMBC's Project Board.

The Risk Register was updated following the submission of the draft Full Business Case to identify a new risk related to the COVID-19 global pandemic, and to update the scoring and mitigation actions for other risks. Table 5-5 identifies the top scoring risks at the point of the final Full Business Case submission, based on those risks with the highest risk score according to their likelihood and level of impact. The table also highlights the mitigation measures that have been put in place to reduce the likelihood that the risk will occur, and/or reduce its impact if it does occur.

Table 5-5 - Top Scoring Risks and Associated Mitigation

Risk Type	Risk	Cause and Consequences	Pre- Mitigation Score	Mitigation Actions	Post Mitigation Score
Construction	Potentially ongoing requirements in terms of social distancing	As a result of the current COVID-19 global pandemic, social distancing procedures may need to be used during construction, which could jeopardise the programme or cause an increase in cost.	20	Balfour Beatty to put in place contingency plans to keep to the target cost and programme whilst adhering to changing regulations and guidance during construction as far as possible.	12
Technical	Noise complaints from sheet piling during night works.	Construction constraints (TM/Working space), mean that sheet piling is conducted at night. May require an impact hammer to install to design lengths. Impact on noise and nuisance from the scheme, leading to complaints. Delays during construction/increased costs for re-design/due to slower productivity during shorter shifts.	20	Obstructions/difficult driving conditions encountered during the GI taken into account during detailed design to reduce the impact of the risk. Change of retaining wall solution (move away from sheet piling) to reflect this. Close liaison with specialist contractors through ECI - Balfour Beatty to facilitate. Trials have now taken place.	16
Construction	Inclement weather during construction.	Inclement weather due to the timing of works, which includes work during the winter months. Potential impacts on programme and cost due to delays in carrying out activities.	15	Plan works seasonally as best as possible, i.e. earthworks in summer. A 30-day time risk allowance has been included in the contractor's delivery programme.	8
Construction	Theft and vandalism during construction.	Incidents experienced during construction that damage equipment/compromise the ability to continue works as per programme, with potential impacts on cost (replacing equipment) and delays.	12	Ensure site compounds are safe and secure, being locked/inaccessible to members of the public. Install CCTV if required.	12
Construction	Network Rail not approving method statements in a timely manner.	Network Rail queries or does not give approval for method statements within the required timescale, leading to delays in the programme.	12	Early and close liaison with Network Rail; make timescales clear at outset. Ensure method statements conform to Network Rail's working practices where appropriate.	9
Technical	Non-performance of stats.	Statutory utilities companies do not engage/provide new connections in a timely fashion, leading to potential programme delays.	12	Early and close liaison with utility companies; make timescales clear at outset.	9

Risk Type	Risk	Cause and Consequences	Pre- Mitigation Score	Mitigation Actions	Post Mitigation Score
Construction	Dealing with asbestos during construction.	Asbestos is found, which requires appropriate safety and handling procedures. This could lead to delays in the programme, in order to contain the asbestos and dispose of it correctly and safely, as well as associated costs.	12	Schedule potential areas early, programme works to accommodate low outputs and have provisions in place.	8
Technical	Significant obstructions in the ground e.g. boulders/slag etc or difficult driving conditions.	Significant obstructions are encountered, including slag/metal industrial waste in the embankment and/or boulders within the natural deposits. The impact would be changes to the design, which may affect excavations and/or sheet piling (i.e. difficult driving conditions). This may result in sheet piles having to be increased in section sizes which would increase costs or at worst be unsuitable, leading to re-design.	12	1) Preliminary GI Results fed into the geotechnical design as they become available. Obstructions that have been encountered during the GI taken into account during detailed design to reduce impact of the risk. 2) Close liaison with specialist contractors through ECI - Balfour Beatty to facilitate.	8
Construction	Flooding of EA land during construction.	Flooding as a result of natural or other causes, leading to delays in programme, delay costs and possible remediation costs to rectify flooding damage.	12	Plan works seasonally as best as possible, i.e. earthworks in summer. 30-day time risk allowance included within the contractor's programme.	8



Project	£ 36,447,008
Project	76

Probability Impact Matrix

Cost Impact	Schedule Impact		Almost Certain	Likely	Possibly	Unlikely	Very Unlikely
			> 75 %	50 % - 75 %	20 % - 50 %	5 % - 20 %	< 5 %
			VH	H	M	L	VL
			5	4	3	2	1
Severe	>£3 645 m	> 19 wks	VH	-25	-20	-15	-10	-5
High	£1.822 m - £3.645	7 wks - 19 wks	H	-20	-16	-12	-8	-4
Moderate	£729k - £1.822 m	3 wks - 7 wks	M	-15	-12	-9	-6	-3
Low	£182 k - £729	1 wks - 3 wks	L	-10	-8	-6	-4	-2
Negligible	<£182k	<1 wks	VL	-5	-4	-3	-2	-1

	Very Unlikely	Unlikely	Possibly	Likely	Almost Certain	Issue							
	< 5 %	5 % - 20 %	20 % - 50 %	50 % - 75 %	> 75 %	1							
	VL	L	M	H	VH	I							
	1	2	3	4	5	6							
	5	10	15	20	25	30	5	VH	> 19 wks		>£16 45m		Severe
	4	8	12	16	20	24	4	H	7 wks - 19 wks	19	£1.822m - £3.645m	€3,645	High
	3	6	9	12	15	18	3	M	3 wks - 7 wks	8	£729k - £1.822m	€1,822	Moderate
	2	4	6	8	10	12	2	L	1 wks - 3 wks	3	£182k - £729k	€729	Low
	1	2	3	4	5	6	1	VL	<1 wks	1	<£182k	€182	Negligible

10.0%
5.0%
2.0%
0.5%

Rating	OPPORTUNITIES					RISKS				
	1	2	3	4	5	1	2	3	4	5
	Very Low	Low	Medium	High	Very High	Negligible	Low	Moderate	High	Severe
Probability	< 5 %	5 % - 20 %	20 % - 50 %	50 % - 75 %	> 75 %	< 5 %	5 % - 20 %	20 % - 50 %	50 % - 75 %	> 75 %
Cost	<€182k	€182k - €729k	€729k - €1.822m	€1.822m - €3.645m	>€3.645m	<€182k	€182k - €729k	€729k - €1.822m	€1.822m - €3.645m	>€3.645m
Time	<1 wks	1 wks - 3 wks	3 wks - 7 wks	7 wks - 19 wks	>19 wks	<1 wks	1 wks - 3 wks	3 wks - 7 wks	7 wks - 19 wks	>19 wks

A Quantified Risk Assessment (QRA) has been undertaken using Monte Carlo analysis, based on the Risk Register. The results of this analysis have been used to derive the overall distribution and expected value of risk for the scheme. The 80th percentile risk value (P80) has been added to the total base scheme cost to provide the risk-adjusted cost estimate reflected in Section 3.2.2 of the Financial Case.

5.12 MONITORING, EVALUATION & BENEFITS REALISATION

5.12.1 OVERVIEW

The SCR is committed to developing an understanding of the implications of policy making and delivery decisions through the use of evidence. This evidence will be utilised to ensure that investment from the SCRIF delivers Value for Money for the taxpayer and enables assessment of previous funding decisions to inform future funding decisions.

Effective, scheme-specific evaluation is important not only to understand how the outcomes of the scheme meet the intended objectives, but also to identify where lessons can be learnt and applied to future major transport schemes.

In alignment with the DfT's Monitoring and Evaluation Framework for Local Authority Major Schemes[1] guidance and HM Treasury's Magenta Book Guidance for Evaluation[2], a tailored approach is being taken to monitoring and evaluation of the proposed A630 scheme, which is cost effective and proportionate to its size, complexity and expected scale of benefits.

Although the value of the proposed scheme is lower than the £50 million benchmark suggested by the DfT for enhanced monitoring, the scheme is expected to have potentially significant economic impacts, therefore a robust monitoring process will be put in place that is more closely aligned to the enhanced monitoring methodology.

The full Monitoring and Evaluation Strategy and Benefits Realisation Plan are provided in Appendix E. This section provides a summary of how the performance of the scheme will be measured in line with the stated objectives, and how the benefits will be realised, based on logic mapping.

5.12.2 MONITORING AND EVALUATION APPROACH AND METHODOLOGY

Figure 5-3 provides a logic map that illustrates the scheme inputs, outputs, impacts and outcomes, alongside commentary on how scheme performance will be monitored.

[1] DfT Monitoring and Evaluation Framework for Local Authority Major Schemes 2012 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf)
[2] HM Treasury The Magenta Book Guidance for Evaluation 2011 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf)

Figure 5-3 - Logic Map

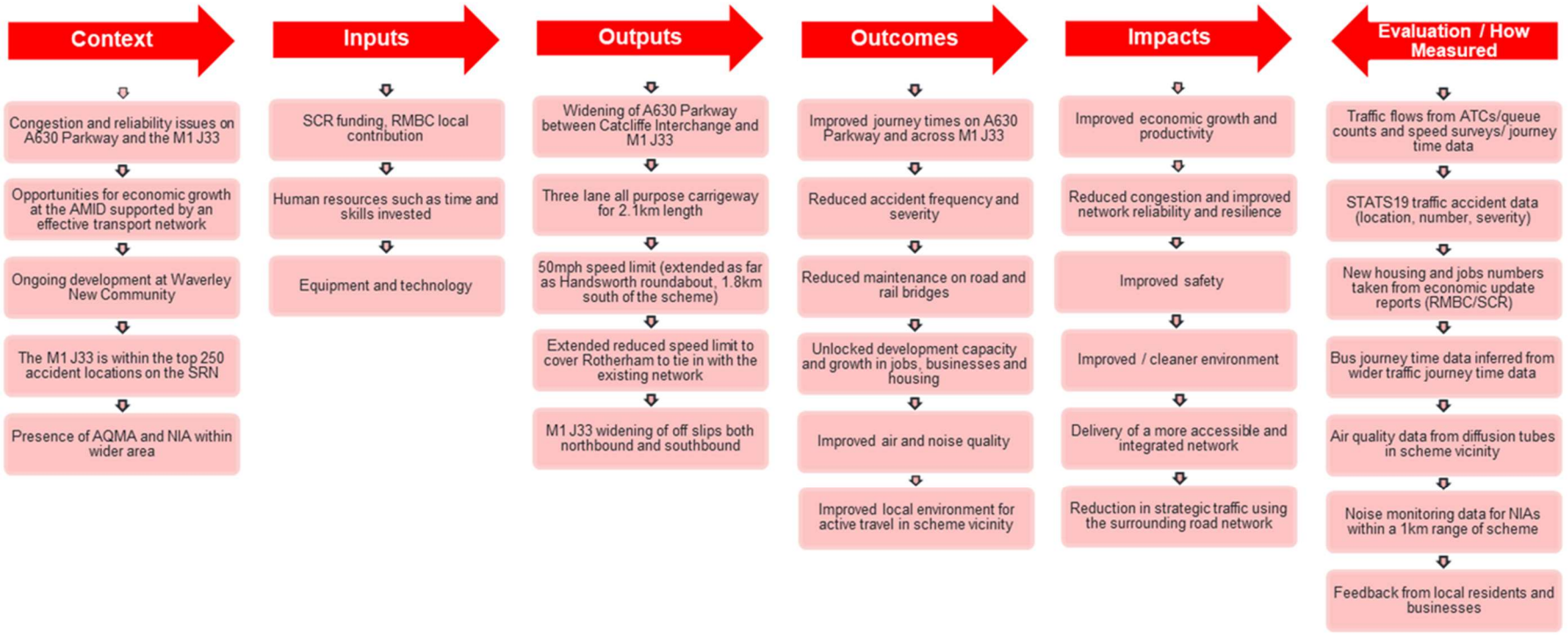


Table 5-6 sets out the information and data to be collected to inform the monitoring process, and the timescales for collection and reporting. Baseline data will be collected prior to construction starting. Appropriate historic data will be used where the COVID-19 pandemic impacts on travel make it difficult to collect robust data in 2020.

Table 5-6 - Information/Data Collection Methods and Timescales

Information/Data to be Collected	Source of Data	Timescales for Collection & Reporting
Volumetric and classified count data (primarily, but not exclusively related to the SRN and adjacent network in the Sheffield and Rotherham area)	Existing Local Authority ATCs Highways England WebTRIS data Permanent DfT ATC count data	Collection: Baseline; Years 1, 3 and 5 Reporting: Years 1 & 5
Journey time information – end to end journey times, for AM, inter-peak and PM periods, for the A630 Parkway and M1 in the vicinity of the scheme	Strat-e-gis database – Trafficmaster data will be used for the designated area defined as the core M1 and A630 routes, and parallel roads (e.g. Sheffield to Rotherham via J34S, into Sheffield from J32 of the M1) and a range of key urban routes	Collection: Baseline; Years 1, 3 and 5 Reporting: Years 1 & 5
GVA, Employment figures, skills breakdown and deprivation indices	Will be monitored by RMBC as part of Transport Strategy monitoring, including the take-up of new business opportunities on the AMID site	Collection and Reporting: Baseline, Year 1 & Year 5
Public transport reliability and journey times	Inferred using journey time information for the wider network as described above	Collection: Baseline; Years 1, 3 and 5 Reporting: Years 1 & 5
Network maintenance costs	Recorded by RMBC	Collection: annually from 2019 (baseline) Reporting: Years 1 & 5
Air Quality Emissions	The A630 is the most significant area of exceedance in Sheffield and Rotherham that has been identified by DEFRA and is effectively the reason that Sheffield and Rotherham have been directed to undertake a Clean Air Zone (CAZ) feasibility study. Data collected by Sheffield City Council and Rotherham MBC	Collection and Reporting: Baseline, Years 1 & 5
Carbon	Modelled based on vehicle demand/speed data collected	Collection: Baseline; Years 1 & 5

Information/Data to be Collected	Source of Data	Timescales for Collection & Reporting
	as part of analysis of scheme impact on travel demand and journey times	Reporting: Years 1 & 5
Noise Emissions	To be collected by RMBC, noting there is one Noise Important Area within the proximity of the scheme and three other NIAs within a 1km area	Collection and Reporting: Baseline, Years 1 & 5
Accident Data	STATS19 data – number, location and severity of accidents in scheme area of influence	Collection: annually from 2019 (baseline) Reporting: Year 5

In accordance with DfT requirements, a 'one year after' report will be published within two years of scheme opening, and a 'final report' covering up to five years after scheme opening will be published within six years of scheme opening. These reports will be produced in draft and shared with internal Council stakeholders and with the SCRCA for comment before being finalised and submitted to the DfT.

A Post Implementation Review will be undertaken by the SRO approximately one year after scheme opening. This will focus on scheme delivery, covering:

- Construction – including the efficiency and cost of the infrastructure contractor procurement exercise, and the extent to which the construction programme was delivered within the specified timescales and budget; and
- Project Management – including the cost of project management resources, as well as the extent to which the overall scheme timescales were achieved.

The key output of this process will be a Lessons Learnt Log, which will be used to shape the planning and delivery of future schemes.

Table 5-7 sets out the key monitoring and evaluation activities that will be undertaken.

Table 5-7 - Key Monitoring and Evaluation Activities

Stage	Activity	Timescale
Scheme Approval	Finalise Monitoring & Evaluation and Benefits Realisation Plan	August 2019
	Baseline data collection	September/October 2019
Scheme Implementation	Monitoring and update report on delivery & data collection for Post Implementation Review	September 2020-May 2022
Post Scheme Implementation	Monitoring	From June 2022 for 5 years
	Post Implementation Review	June 2022

Stage	Activity	Timescale
	First Monitoring & Evaluation Report (Year 1)	June 2023
	Final Monitoring & Evaluation Report (Year 5)	June 2027

The delivery of the Monitoring and Evaluation Strategy will be managed by RMBC's in-house A630 Programme Board, coordinated by Andrew Moss as the Project Manager and owned by Paul Woodcock as the SRO. RMBC has allocated a budget of £231,165 (including inflation and risk allowance) to deliver the Monitoring and Evaluation Strategy.

5.12.3 BENEFITS REALISATION

RMBC is committed to ensuring that the expected scheme benefits are fully realised and has put in place a Benefits Realisation Plan that provides a framework within which to realise the anticipated scheme benefits, by enabling them to be planned for, tracked and realised. The Plan ultimately demonstrates how the scheme objectives will be achieved.

Owned by Paul Woodcock as the SRO, and managed by Andrew Moss as the Project Manager, the Plan sets out the key activities needed to manage the successful realisation of the benefits in the short, medium and long term, who is responsible for each activity and timescales. Simon Moss as the appointed Business Change Manager will hold overall responsibility for ensuring that the scheme benefits are fully realised.

The Benefits Realisation Plan is set out in Table 5-8. This uses the scheme objectives as a starting point, then follows a logical progression as follows:

- Scheme Objectives – the main aims of the scheme;
- Scheme Outcomes – what will happen if the scheme objectives are achieved;
- Benefits Experienced – the benefits that will occur through the successful delivery of each outcome;
- Key Beneficiaries – who will experience the identified benefits;
- Benefit Owners – who has responsibility for delivering the stated benefits; and
- Benefit Enablers – actions that can be undertaken to achieve the objectives, outcomes and benefits.

Table 5-8 - Benefits Realisation Plan

Scheme Objectives	Outcomes	Benefits	Beneficiaries	Benefit Owners	Benefit Enablers
Support economic growth and productivity improvements	Improved journey times on the A630 Parkway and across the M1 J33 Released highway capacity along the A630 Parkway corridor, facilitating consented development growth in the region and key movements between Sheffield/Rotherham Unlocked development capacity and growth of jobs, businesses and housing across the wider region	More reliable journey times for commuters between Sheffield and Rotherham Continued growth and development of the Advanced Manufacturing Innovation District (AMID), attracting inward investment, creating additional jobs and attracting high quality employees Increased GVA/productivity Supporting the delivery of additional housing and enhancing the housing offer to promote social demographic and economic change Improved noise levels and air quality Resilience in the supply chain for businesses Improved accessibility to employment opportunities	Residents Employees Existing businesses Future/potential investors Visitors	Rotherham Metropolitan Borough Council Local Businesses Developers/House Builders Public sector bodies including Sheffield City Region and Transport for the North	Completion of the A630 Sheffield Parkway widening scheme, including modifications to the M1 J33 Integration of the scheme into the existing network, with improvements to signals, signage, road markings, lighting and road surfacing Marketing/promotion to potential inward investors Engagement with stakeholders at AMID and other key employment sites
Reduce congestion and improve network reliability and resilience	Reduced congestion and delays along the A630 Parkway and improved	More reliable journey times for commuters between Sheffield and Rotherham	Residents Employees Existing businesses	Rotherham Metropolitan Borough Council Highways England	Completion of the A630 Sheffield Parkway widening scheme,

Scheme Objectives	Outcomes	Benefits	Beneficiaries	Benefit Owners	Benefit Enablers
	journey times for all traffic Improved network resilience to incidents, reduced number and severity of accidents Reduced maintenance on road and rail bridges	Continued growth and development of the Advanced Manufacturing Innovation District (AMID), attracting inward investment, creating additional jobs and attracting high quality employees Increased GVA Supporting the delivery of additional housing Improved noise levels and air quality Improved health, wellbeing and safety prospects for residents and road users Reduced network maintenance liability for RMBC Reduced congestion at J33 benefits SRN users and Highways England	Future/potential investors Visitors		including modifications to the M1 J33 Integration of the scheme into the existing network, with improvements to signals, signage, road markings, lighting and road surfacing Marketing/promotion to potential inward investors Engagement with stakeholders at AMID and other key employment sites Complementary road safety campaign Review of maintenance requirements and changes to existing regime
Improve Safety	Improved corridor and junction safety through enhanced design, lining and signage and driver warning aids, technology Reduced accident frequency through reduced delays, queuing and driver frustration	Improved safety prospects for residents and road users as a result of fewer accidents/reduced severity of accidents Reductions in delays caused by accidents and incidents	Residents Employees Visitors	Rotherham Metropolitan Borough Council	Completion of the A630 Sheffield Parkway widening scheme, including modifications to the M1 J33 Integration of the scheme into the existing network, with improvements to signals, signage, road markings,

Scheme Objectives	Outcomes	Benefits	Beneficiaries	Benefit Owners	Benefit Enablers
	Reduced requirement for maintenance on rail and road bridges (by designing for maintenance), reducing the exposure of maintenance staff to health and safety risks	Reduced network maintenance liability for RMBC			lighting and road surfacing Complementary road safety campaign Review of maintenance requirements and changes to existing regime
An improved environment	Improved air quality and reduced noise levels by easing congestion along the A630 Parkway corridor, and reducing speeds	Improved noise levels and air quality, with associated improvements to quality of life	Residents Employees Visitors	Rotherham Metropolitan Borough Council	Completion of the A630 Sheffield Parkway widening scheme, including modifications to the M1 J33 Integration of the scheme into the existing network, with improvements to signals, signage, road markings, lighting and road surfacing Continued promotion of multi-modal journeys, including bus use Noise and air quality monitoring to identify improvements
Deliver a more accessible and integrated network	Delivery of capacity enhancements to the local SRN, which supports decongestion on surrounding local roads, providing positive benefits for local communities and active travellers	Improved journey times and journey time reliability for all vehicles Businesses are able to make deliveries efficiently/staff can travel on business effectively	Residents Employees Existing businesses Future/potential investors Visitors	Rotherham Metropolitan Borough Council	Completion of the A630 Sheffield Parkway widening scheme, including modifications to the M1 J33 Integration of the scheme into the existing network, with

Scheme Objectives	Outcomes	Benefits	Beneficiaries	Benefit Owners	Benefit Enablers
		More pleasant journeys An enhanced multi-modal transport offer Improvements to local communities in terms of the walking and cycling environment as a result of less strategic traffic using local routes Attracting new investors, residents and employees to the area			improvements to signals, signage, road markings, lighting and road surfacing Continued promotion of bus use for longer journeys Continued promotion of active travel for local journeys

5.13 DELIVERABILITY

This Management Case demonstrates the deliverability of the proposed A630 scheme in terms of:

- **Evidence of Similar Projects** – RMBC has demonstrated the recent successful delivery of a number of similar schemes to the A630, which were largely delivered to time and budget.
- **Governance** – a robust, three-tier governance structure has been put in place, comprising of key representatives from RMBC, Balfour Beatty and WSP, with clearly defined roles, responsibilities and reporting arrangements.
- **Project Plan** – a clear Project Plan is in place, with milestones and dependencies highlighted. Construction is programmed to start in September 2020 and complete in May 2022. Progress against the Project Plan is continually monitored, with proactive steps taken to reduce any slippage. A 30-day time allowance has been made by the contractor to account for any unforeseen delays in delivery.
- **Assurance and Approvals** – as a retained scheme, the approval of the SCRIF funding is subject to DfT approval of this final Full Business Case. The business case has been prepared in accordance with relevant DfT and SCR guidance, and to date the scheme has successfully passed through RMBC's internal assurance process, with full sign-off from the RMBC Section 151 Officer (Appendix M).
- **Stakeholder Engagement** – key stakeholders and their level of interest and influence were mapped in the early stages of the project. Various engagement activities have been undertaken to inform stakeholders of the scheme proposals and seek feedback. Key stakeholders, including the SCR Mayor, have confirmed their support for the proposed scheme (Appendix O). The focus is now on informing those who may be affected by the construction process of the likely disruption and contingency arrangements.
- **Risk Management** – a Risk Management Strategy has been developed, that identifies key risks at the detailed design stage, their level of likelihood and impact, and mitigation measures. A QRA has been undertaken to calculate the proportion of risk allowance to add to the scheme costs, and risks are being actively managed by RMBC and its delivery partners, including the potential new risk related to the COVID-19 global pandemic and the associated potential need for social distancing during construction.
- **Monitoring and Evaluation** – a Monitoring and Evaluation Strategy has been developed, that sets out how the delivery process and the performance of the scheme will be monitored and evaluated in line with the stated objectives and details the data collection and reporting activities that will take place pre- and post-scheme delivery. RMBC has allocated a budget of £231,165 (including inflation and risk allowance) for monitoring and evaluation.
- **Benefits Realisation** – RMBC has put in place a robust Benefits Realisation Plan, to track whether the anticipated scheme benefits are fully realised, in line with the stated objectives. Simon Moss as the appointed Business Change Manager will hold overall responsibility for ensuring that the scheme benefits are fully realised.

6

RESPONSES TO DFT OBSERVATIONS

6 RESPONSES TO DFT OBSERVATIONS

6.1 INTRODUCTION

This section summarises key responses to the DfT's clarification questions related to the draft Full Business Case submission for the proposed A630 Parkway widening scheme, which was submitted to the DfT in October 2019.

The final Full Business Case submission, as presented in this document, is being made in June 2020. This has been updated with an adjusted scheme cost and QRA, a corresponding slight change in the PVC and associated economic tests, additional sensitivity tests and clarifications and an updated construction delivery programme. It should be noted that the core scenario has not changed since the draft submission and the scheme continues to demonstrate high VfM.

6.2 TIMELINE OF RESPONSES

Following the draft Full Business Case submission, in November 2019 the DfT raised questions related to various elements of the Forecasting Report and the Economic Assessment Report. The timeline of submission of evidence and responses to these questions to DfT is presented in Table 6-1.

Table 6-1 – Timeline of Responses to DfT

Date	Type	Description
2019		
23-Aug	Response	Variable Demand Modelling Note
02-Sep	Submission	Monitoring and Reliance Strategies
13-Sep	Response	Variable Demand Second Response
20-Sep	Response	Reduced Benefits Test Note
10-Oct	Response	Revised Costs Breakdown
14-Oct	Submission	ALL Draft Business Case Documents
16-Oct	Submission	Comments on Economic Case
18-Oct	Submission	Economic Assessment Report (EAR)
18-Oct	Submission	EAR Appendices
04-Nov	Response	Benefit Uplift Methodology Report
12-Dec	Response	Modelling Comments 1/2/3
13-Dec	Response	Distribution Impact Questions
20-Dec	Response	Agreement on Submission of Full Business Case

Date	Type	Description
2020		
07-Jan	Response	TUBA Benefits Reduction Questions
10-Jan	Response	Further Modelling Questions
24-Jan	Response	Traffic Forecasting Comments
01-Feb	Response	Air Quality Distributional Benefits Questions
14-Feb	Response	Business Case Clarification
28-Feb	Response	Dependant Development Clarification Note
18-Mar	Response	TAG Scenario R results
30-Mar	Submission	Updated Economic Assessment Report v02
03-Apr	Response	COBALT Methodology Questions
07-May	Response	Annualisation Methodology Clarification

The next sections summarise key points in relation to the choice of traffic model and subsequent agreement with the DfT and summarise the DfT's main observations and subsequent responses.

6.3 TRAFFIC MODELLING BACKGROUND

As part of the traffic model selection process, a number of different model approaches were collaboratively considered in defining a suitable platform for assessing the scheme. The following three models were available as the starting point for the update and development of the A630 Parkway Widening Scheme:

- Lower Don Valley Model (LDVM) 2015 Update - existing;
- Trans-Pennine South (TPS) Regional Traffic Model (RTM) – existing; and
- Sheffield City Region Transport Model (SCRTM1) - under development and not fit for purpose.

The use of the TPS-RTM as a basis for producing a local model was considered the most appropriate option of those available and was approved by the DfT.

Given the short timeframe to develop and construct the improvements within the funding availability parameters, and the need for an additional contingency should the larger SCRTM1 model be delayed for any reason (which it was), a local scheme specific model developed from the existing and already HE approved RTM was considered the most appropriate model.

The use of the TPS-RTM model also satisfied Highways England as a key stakeholder in the delivery of the A630 Parkway widening scheme.

This outcome was agreed through engagement with DfT, in a review of the Model Specification Report (MSR), which sets out the intended approach to deriving a scheme specific model using the existing TPS and RTM model.

The principle advantages of using the TPS-RTM model were:

- The model already covered the A630 area of influence;
- Agreements to access, run and maintain the model were agreed with all the parties involved; and
- The model had a 2015 base, which allowed the re-use of existing RMBC data (which was mainly collected in 2015) and which minimised further data collection costs.

The methodology was therefore agreed with DfT in 2018 and the outcomes were to be viewed in a proportionate manner consistent with the tools available in recognition that the analysis that was to follow had to be (because of time constraints) held within that framework.

6.4 SUMMARY OF MAIN DFT OBSERVATIONS

6.4.1 VARIABLE DEMAND MODELLING

During the preliminary VDM test runs, as outlined in the Appraisal Specification Report (ASR), output instability was significant and therefore, in accordance with TAG guidance, an elasticity-based assignment (so-called 'elastic assignment') was undertaken as an initial test prior to any further Variable Demand modelling being deemed to be required.

Following a meeting with the DfT held earlier in 2018, in August 2018 it was agreed that the A630 traffic forecasts satisfied the criteria set out in TAG Unit 3.10.1, which provides advice with respect to when Variable Demand modelling needs to be considered.

The guidance recommends that Variable Demand Modelling should be undertaken if the traffic induced by the scheme is likely to reduce the time saving benefits by more than 10% in the Opening Year and 15% in the Design Year (70047347-WSP-STM-ALL-RP-TP-0002 v2.docx). (NOTE 1)

The elasticity test undertaken with and without the proposed A630 improvements showed that additional induced traffic is likely to change the time saving benefits by significantly less than 10% in the Opening Year (2026) and also significantly less than 15% in the Design Year (2036).

As the results were well within the guidance thresholds that are used to determine the need, or not, for additional modelling, in August 2019 it was proposed that Variable Demand Modelling would not be necessary.

Beyond this, in subsequent discussions with the DfT (September, 2019 - 70047347-WSP-STM-ALL-RP-TP-0002 v3.docx), the impact of a reduction in the benefits produced by TUBA, of 10% in 2021 (Opening Year) and 15% in 2026 (Design Year), on the Benefit to Cost Ratio (BCR) was requested as a further test of robustness (NOTE 2). This was undertaken to model the effect of the potential impact of VDM; hence the benefits were reduced using the criteria for the elastic tests (10% in the Opening Year and 15% in the Design Year).

The scheme benefits were reduced by over £9m and the initial BCR changed from over 2 to just below 2 and the adjusted BCR changed from 4.52 to 4.22 when the further reduction in TUBA benefits was applied.

In accordance with the banding categories taken from the DfT's 'Guidance on Value for Money' the Value for Money (VfM) position is defined in 5 categories with a range of values for each category:

- Poor VfM if the BCR is below 1.0
- Low VfM if the BCR is between 1.0 and 1.5
- Medium VfM if the BCR is between 1.5 and 2.0
- High VfM if the BCR is between 2.0 and 4.0
- Very High VfM if the BCR is greater than 4.0

Under this test, the initial BCR for the fixed demand run is in the High VfM category and the adjusted BCR is in the Medium VfM category.

6.5 FUEL AND INCOME ADJUSTMENT FACTORS

In December 2019, as a further test of robustness, the DfT requested that the impact of the application of income and cost adjustment factors to the fixed demand matrix be investigated (70047347-WSP-STM-ALL-RP-TP-0004 v1.docx).

The uplift to the TEMPro constrained matrices was undertaken in accordance with TAG Unit M4 7.4.13 which states:

'Where fixed demand takes values of time and vehicle operating costs into account, these parameters should be updated in a similar way to variable demand models. Where there is no demand model, the trip matrix should be multiplied by two factors, one for growth in income, the other for growth in fuel. The factors are given in the TAG Data Book Table M4.2.1.'

Two tests were undertaken that showed that even with a reduction in benefits the scheme represents High VfM (NOTE 3):

- Test 1; which represents a reduction of 10% in the Opening Year and 15% in the Design Year (onwards) predicts a small reduction in the BCR from 3.25 to 3; still reflecting High VfM.
- Test 2; which represents a 'worst impact scenario' with double reduction of 20% in the Opening and 30% in the Design Year (onwards) predicts a further small reduction in the BCR from 3 to 2.75; still reflecting High VfM.

6.6 ECONOMIC APPRAISAL

Points of clarification were fully addressed in December 2019 and a revised EAR was submitted in March 2020, with further clarification provided on the COBALT accident benefits in April 2020.

It should be noted that in all scenarios tested, with the exception of the worst possible case scenario, the scheme demonstrates High or Very High VfM. All of the downsides from the sensitivity tests are highly unlikely to occur; therefore in the final business case our VfM statement reflects a High VfM position.

6.7 DISTRIBUTIONAL IMPACT

Points of clarification were fully addressed in January 2020 along with a further note on Social Impacts – with no further DfT response. (NOTE 4, SHEET 3a; the Air Quality aspects are addressed in NOTE 6, SHEET 3b).

6.8 FORECASTING

Points of clarification related to the Forecasting Report were fully addressed in January 2020 along with a further note on Network Capacity – with no further DfT response. (NOTE 5, SHEET 2).

6.9 BUSINESS CASE

Points of clarification were addressed in February and May 2020 – with no further DfT response.

6.10 DEPENDENT DEVELOPMENT

Dependent development tests were addressed in February 2020 and a further clarification regarding TAG scenario R was provided to the DfT in March 2020.

Operational assessments of links and junctions were produced as clarification responses. Based on the evidence provided, it was agreed with the DfT that there were no dependent developments to be tested as part of the scheme.

6.11 ANNUALISATION AND OFF PEAK BENEFITS

On 24 April 2020, the DfT confirmed in an email that there were no further queries related to the EAR. On 6 May 2020, the inclusion of Off Peak benefits calculated using the annualisation factor was questioned.

WSP provided a response clarifying the method used to calculate the Off Peak benefits in the absence of an Off Peak model. WSP had also highlighted that the method had been used in 2019 on another project which was successful in securing funding from DfT.

WSP has also undertaken TUBA assessments based on the uplifted matrices for the core, high and low scenarios.

A summary of these results and the impact on the BCR is set out in Table 6-2 as a wider summary of the range of tests that have been undertaken.

These results have been produced using the income and fuel uplifts agreed with the DfT and sensitivity tests are included to provide a robust comparison with the results reported in the EAR v04.

Table 6-2 – Draft Results of TUBA Assessment Using the Uplifted Matrices

Benefits from	INITIAL BCR						ADJUSTED BCR 1						ADJUSTED BCR 2					
	EAR v03 reported			Adjusted (uplifted)			EAR v03 reported			Adjusted (uplifted)			EAR v03 reported			Adjusted (uplifted)		
	Low	Core	High	Low	Core	High	Low	Core	High	Low	Core	High	Low	Core	High	Low	Core	High
TUBA with Off peak	£34,118	£64,572	£70,846	£37,081	£46,565	£86,323	£34,118	£64,572	£70,846	£37,081	£46,565	£86,323	£34,118	£64,572	£70,846	£37,081	£46,565	£86,323
TUBA Without Off Peak	£35,057	£59,885	£63,258	£35,103	£42,908	£74,681	£35,057	£59,885	£63,258	£35,103	£42,908	£74,681	£35,057	£59,885	£63,258	£35,103	£42,908	£74,681
QUADRO	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334	-£3,334
COBALT	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977	£3,977
WITA	£0	£0	£0	£0	£0	£0	£25,371	£25,371	£25,371	£25,371	£25,371	£25,371	£51,886	£51,886	£51,886	£51,886	£51,886	£51,886
MYRIAD	£0	£0	£0	£0	£0	£0	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338	£17,338
NOISE	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492	-£492
AQ	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50	-£50
Greenhouse gas	£503	£964	£890	£520	£851	£891	£503	£964	£890	£520	£851	£891	£503	£964	£890	£520	£851	£891
PVB with Off Peak	£34,722	£65,637	£71,837	£37,702	£47,517	£87,315	£77,431	£108,346	£114,546	£80,411	£90,226	£130,024	£103,946	£134,861	£141,061	£106,926	£116,741	£156,539
PVB Without Off Peak	£35,661	£60,950	£64,249	£35,724	£43,860	£75,673	£78,370	£103,659	£106,958	£78,433	£86,569	£118,382	£104,885	£130,174	£133,473	£104,948	£113,084	£144,897
PVC (adj to market prices)	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593	£28,593
BCR with off peak	1.21	2.30	2.51	1.32	1.66	3.05	2.71	3.79	4.01	2.81	3.16	4.55	3.64	4.72	4.93	3.74	4.08	5.47
BCR Without Off Peak	1.25	2.13	2.25	1.25	1.53	2.65	2.74	3.63	3.74	2.74	3.03	4.14	3.67	4.55	4.67	3.67	3.95	5.07
Value for Money category with Off peak	Low	High	High	Low	Medium	High	High	High	Very High	High	High	Very High	High	Very High	Very High	High	Very High	Very High
Value for Money category without Off Pea	Low	High	High	Low	Medium	High	High	High	High	High	High	Very High	High	Very High	Very High	High	High	Very High

6.12 IMPACTS ON COST, RESOURCING AND PROGRAMME

The Principal Contractor, Balfour Beatty, produced an original delivery programme which showed commencement on site in March 2020, as reflected in the draft business case submitted to DfT in October 2019. Following the draft submission, and the extended clarifications period prior to this final submission, a new programme has been developed, which reflects a new start date on site in September 2020 and completion in May 2022. This is dependent upon securing DfT approval in July 2020 and contract award in August 2020.

This final Full Business Case includes an updated construction cost which allows for the six-month delay in the start date, and which includes additional risk allowance for COVID-19 related impacts on cost and programme and updated utilities costs. The Financial Case has been updated accordingly, showing the ongoing affordability of the scheme within the available funding. The Economic Case has been amended to include a small adjustment to the PVC and BCRs.

DfT sign-off of the Monitoring and Evaluation Strategy and Benefits Realisation Strategy was achieved in 2019 and these documents have been updated in June 2020 with adjusted dates for the final submission. Baseline data collection has been carried out in accordance with those documents, with the use of appropriate historic data where this provides a more robust evidence base than current travel behaviour during the COVID-19 pandemic.

Small changes have been made to the governance structure to reflect changes in personnel at RMBC since the draft business case submission.

6.13 SUMMARY

The responses provided address the queries raised by the DfT and, where necessary, the required background detail and computational outputs have been included in annexes to the responses and transmitted electronically.

A copy of all technical notes and responses along with supporting information is included in Appendix Q for convenience.

Appendix A

WIDER ECONOMIC IMPACTS REPORT

Appendix B

OPTIONS APPRAISAL REPORT

Appendix C

SCHEME DRAWINGS

Appendix D

STAKEHOLDER COMMUNICATION AND ENGAGEMENT STRATEGY

Appendix E

MONITORING AND EVALUATION STRATEGY AND BENEFITS REALISATION PLAN

Appendix F

LOCAL MODEL VALIDATION REPORT

Appendix G

FORECASTING REPORT

Appendix H

APPRAISAL SPECIFICATION REPORT

Appendix I

ECONOMIC APPRAISAL REPORT

Appendix J

S278 COMMUTED LUMP SUM CALCULATIONS

Appendix K

APPRAISAL SUMMARY TABLE

Appendix L

RISK MANAGEMENT STRATEGY

Appendix M

SECTION 151 OFFICER LETTER

Appendix N

CONTRACT SCHEDULE /PROGRAMME

Appendix O

LETTERS OF SUPPORT

Appendix P

BUSINESS CASE CHECKLIST

Appendix Q

TECHNICAL NOTES TO DFT

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