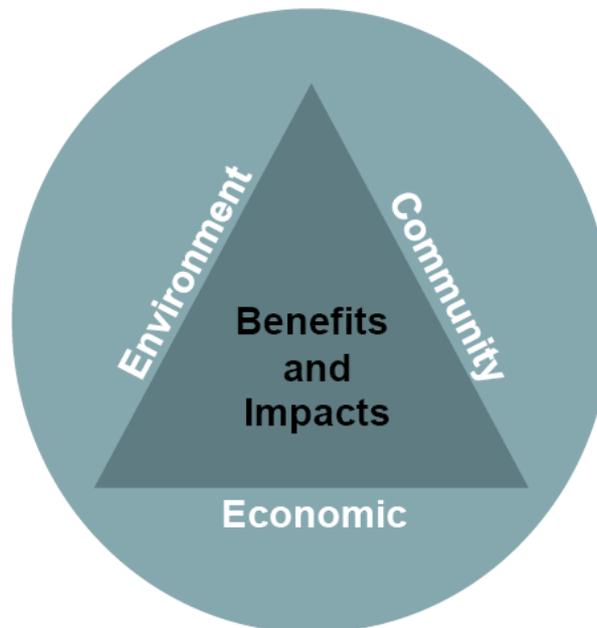


Planning for high capacity transit in the region

HCT evaluation framework

2035 RTP Evaluation Framework

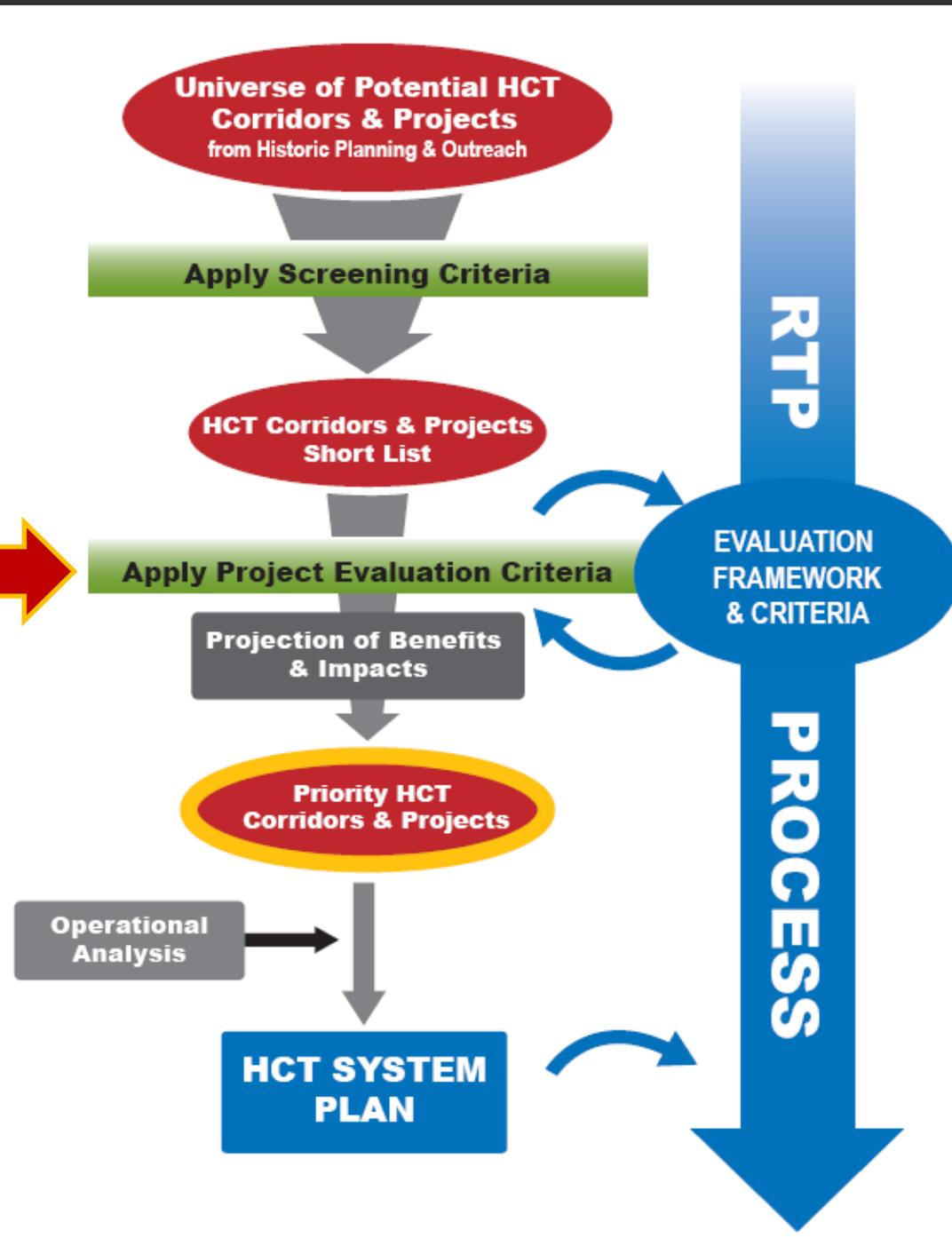


METRO

PEOPLE PLACES
OPEN SPACES

HCT evaluation framework overview

Detailed HCT evaluation framework



Planning for high capacity transit in the region

Evaluation: Approach

- Assume a common reference case against which each corridor is compared
 - (2035 RTP Financially Constrained System)
- Ensure a consistent level of detail across the criteria and be commensurate with the level of project information available
- Enable sufficiently disaggregate scoring, in order that the level of impact can be differentiated between corridors
- Present the information clearly, concisely and on a consistent basis so that decision makers can compare corridors against each other



Planning for high capacity transit in the region

Evaluation: Approach

- For each short listed corridor the most plausible forms of mode investment based upon the screening assessment (e.g. potential ridership, land use issues) will be identified
 - light rail may be the only mode option for corridors (ie, extensions of the existing system)
 - For other corridors light rail, BRT, commuter rail and streetcar may all be considered
- Each defined corridor/project will be evaluated



Planning for high capacity transit in the region

Federal Transit Administration New Starts evaluation

- Cost and ridership = Cost effectiveness
- Mobility improvements
- Environmental benefits
- Operating efficiencies
- Land Use



Planning for high capacity transit in the region

Evaluation: Multiple Account Evaluation (MAE)

- The MAE approach is based on the UK methodology for project evaluation (NATA):
 - Environment
 - Safety
 - Economy
 - Accessibility
 - Integration
 - Supporting analyses for deliverability and acceptability



Planning for high capacity transit in the region

Evaluation: MAE

- The MAE framework aligns with the hierarchy of objectives
 - Region 2040 Vision
 - 2035 RTP – to implement the region's 2040 Vision
 - HCT – supporting the RTP's 10 goals

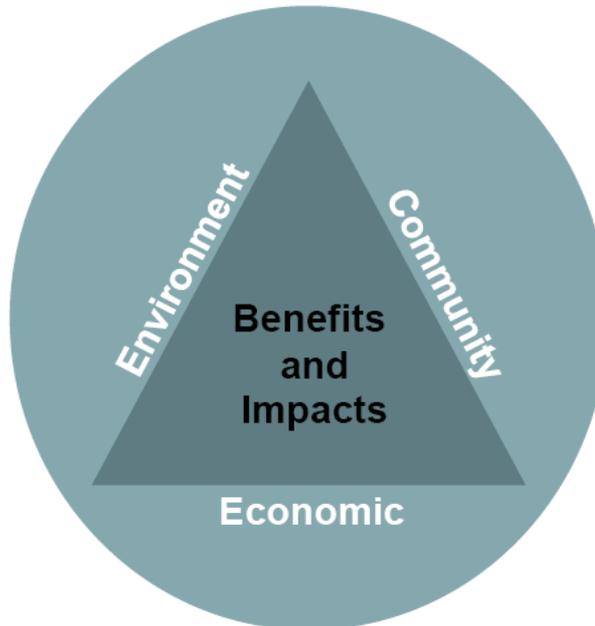


Planning for high capacity transit in the region

Evaluation: MAE

- The goals fit with the RTP outcomes-based evaluation framework – providing three evaluation categories

2035 RTP Evaluation Framework



Planning for high capacity transit in the region

Evaluation: MAE

- A fourth category for **deliverability** has also been defined
- For each evaluation category criteria addressing different aspects of the category are presented



Planning for high capacity transit in the region

Evaluation: MAE

- Against each criteria a quantified or qualitative assessment is made
- 7-point scale used for each criteria
 - Significant benefit
 - Moderate benefit
 - Slight benefit
 - Neutral
 - Slightly adverse
 - Moderately adverse
 - Significantly adverse
- MAE can be used for corridor prioritization and mode selection



Planning for high capacity transit in the region

Evaluation: Applying NATA

- Case Study: Liverpool, Greater Liverpool (Merseyside)
- 10 year strategic plan
- Including 3-line light rail network (Merseytram)
- Project justification required a NATA assessment of technology and corridor choices



Planning for high capacity transit in the region



Planning for high capacity transit in the region



Planning for high capacity transit in the region



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Planning for high capacity transit in the region

Evaluation: Merseytram network

Problem Identification

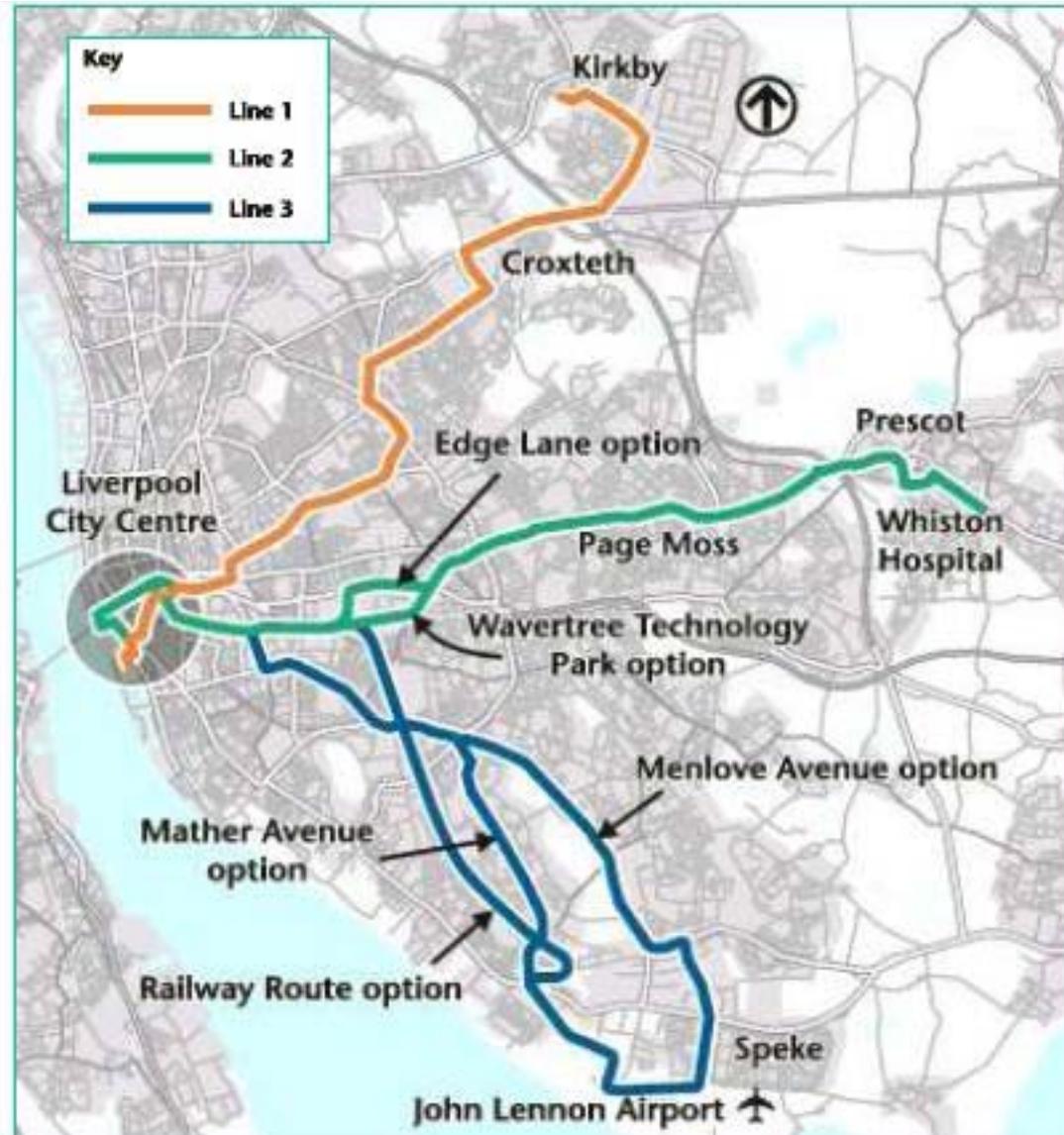
- quality and capacity

Assessing Alternatives

- corridor studies
- technology appraisal
- keep it "demand-led"

Think Network

Project Development



Planning for high capacity transit in the region

Evaluation: Summary Table

Description of Scheme: Light rail from Liverpool City Centre via West Derby Road/Utting Ave East to Kirkby		Problems: High levels of deprivation in Duke St/Cornwallis (L1), Stanley, Queens, 580, Kirkby & Parks Pathway areas. Poor public transport accessibility within corridor due to poor quality and reliability of bus and absence of rail service.	1) Total Cost of the Proposal £207.7m	
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Noise introduced to environment from tram operation, though impacts will be largely mitigated. Potential for some reductions in noise from reduced road traffic.		Slight Adverse
	Local Air Quality	No significant impact from light rail vehicles; car transfer results in lower emission levels.		Slight Beneficial
	Greenhouse Gases	Net reduction as saving from car transfers outweighs increases at power stations.		Slight Beneficial
	Landscape	No significant impact		Neutral
	Townscape	Passes through adjacent to nine Conservation Areas and one proposed Conservation Area. Affects urban green space and public open space. At same time, scheme can act as catalyst for urban renewal.		Slight Adverse
	Heritage of Historic Resources	Potential impacts on archaeology and potential for impacts on setting of listed buildings.		Slight Adverse
	Biodiversity	Scheme runs adjacent to, and through, non-statutory nature conservation designations.		Neutral
	Water Environment	No significant impact		Neutral
	Physical Fitness	Enhanced provision for pedestrians and cyclists.		Slight Beneficial
	Journey Ambience	High quality in-vehicle environment, stop facilities and travel information.		Strong Beneficial
SAFETY	Accidents	Reduction in accidents to both Merseytram car transferees and to car users remaining on the highway network.	£5.6m PV to Merseytram car transfers.	Strong Beneficial
	Security	High visibility at stops and access from high quality lighting. CCTV at all stops. Park and ride site will be maintained and have CCTV.		Beneficial
ECONOMY	Transport Efficiency	Strong operating ratio of 1.7:1. Full economic BCR of 1.15 : 1 demonstrates scheme's overall value.	Users PV: Private Providers: Public Providers: Other Government:	+£234.8m PV -£44.1m PV no impact -£153.9m PV
	Reliability	Merseytram will provide a fast reliable service through off vehicle ticket sales, a high level of segregation and priorities at on-street sections.		+ £8.2m PV
	Wider Economic Impacts	LTP strategy, where Line 1 is the number 1 priority scheme, developed to support wider regeneration objectives of Merseyside. Scheme estimated to create 11,500 - 13,800 new local jobs.		Strong Beneficial
ACCESSIBILITY	Option Values	Serves a population of 94,000 within 800m of route, and a higher number within a bus catchment.		Beneficial
	Severance	Some severance on segregated sections--new crossings provided. Enhanced pedestrian facilities at many stops.		Neutral
	Access to Transport System	Route serves areas of high deprivation and low car ownership. All vehicles and stops are fully accessible to the mobility impaired.		Strong Beneficial
INTEGRATION	Transport Interchange	Improved interchange with: Bus - Kirkby, Croxteth, Queens Drive and City Centre, Rail - City Centre, Car - new park and ride, Cycle - facilities at stops. Interchange facilitated by integrated ticketing, network branding		Strong Beneficial
	Land Use Policy	Scheme developed as part of an integrated land use and transport strategy to promote sustainable regeneration in Merseyside. Fully consistent with national, and regional land use policies.		Strong Beneficial
	Other Government Policies	Scheme supportive of a range of Government initiatives and themes - welfare to work, access to education, opportunity for all, reducing social exclusion and access to healthcare.		Strong Beneficial

Planning for high capacity transit in the region

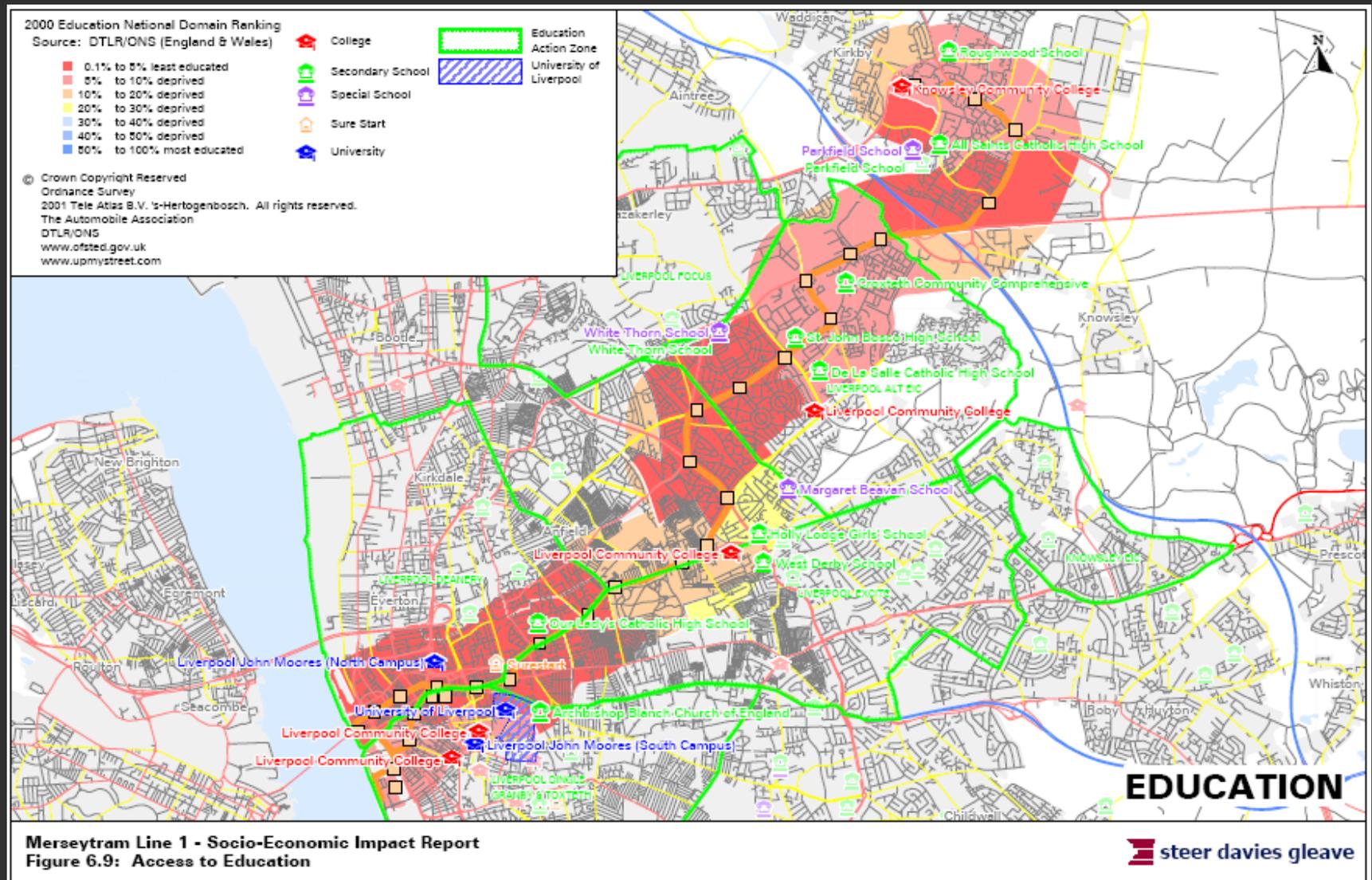
Proposed evaluation criteria for metro area HCT evaluation



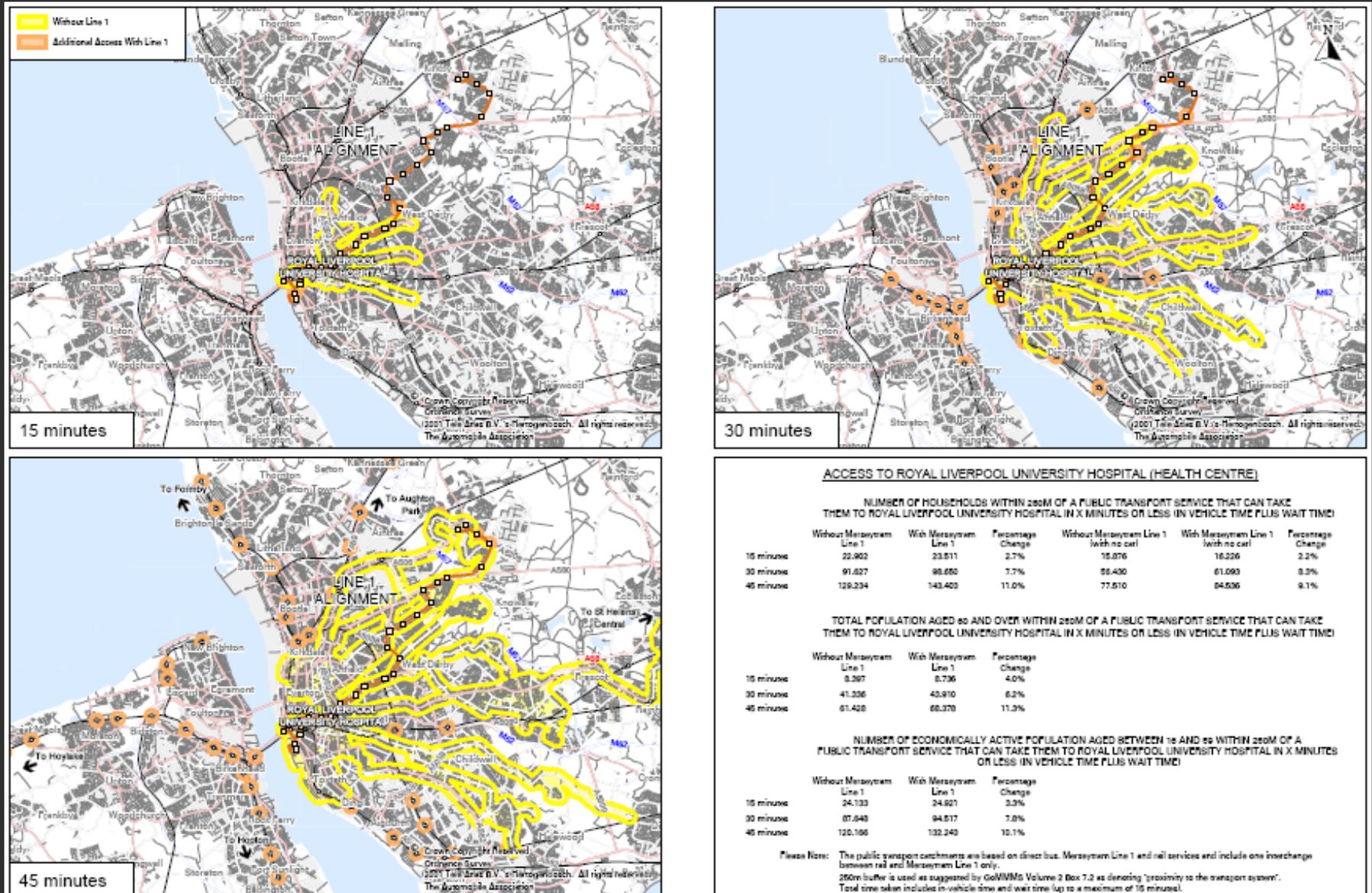
Community

Criterion	Measure
Support of regional and policies and Aspirations	Qualitative scoring
Land use integration	Identification of major activity centers served
Transport network integration	Identification of whole journey benefits due to integration with transit transfer centers and interchange opportunities
Equity	Catchment analysis for social groups (low income and minority census tract) within walking access (1/4 mile) to a stop
Safety	Qualitative, based on adherence to good design standards
Personal security	Qualitative, based on adherence to good design standards and policing policies
Health	Comprehensiveness of pedestrian and cycling network Increase in average bicycle and pedestrian mode share

Illustrative example of assessing land use integration - Pop with access to Schools & Universities



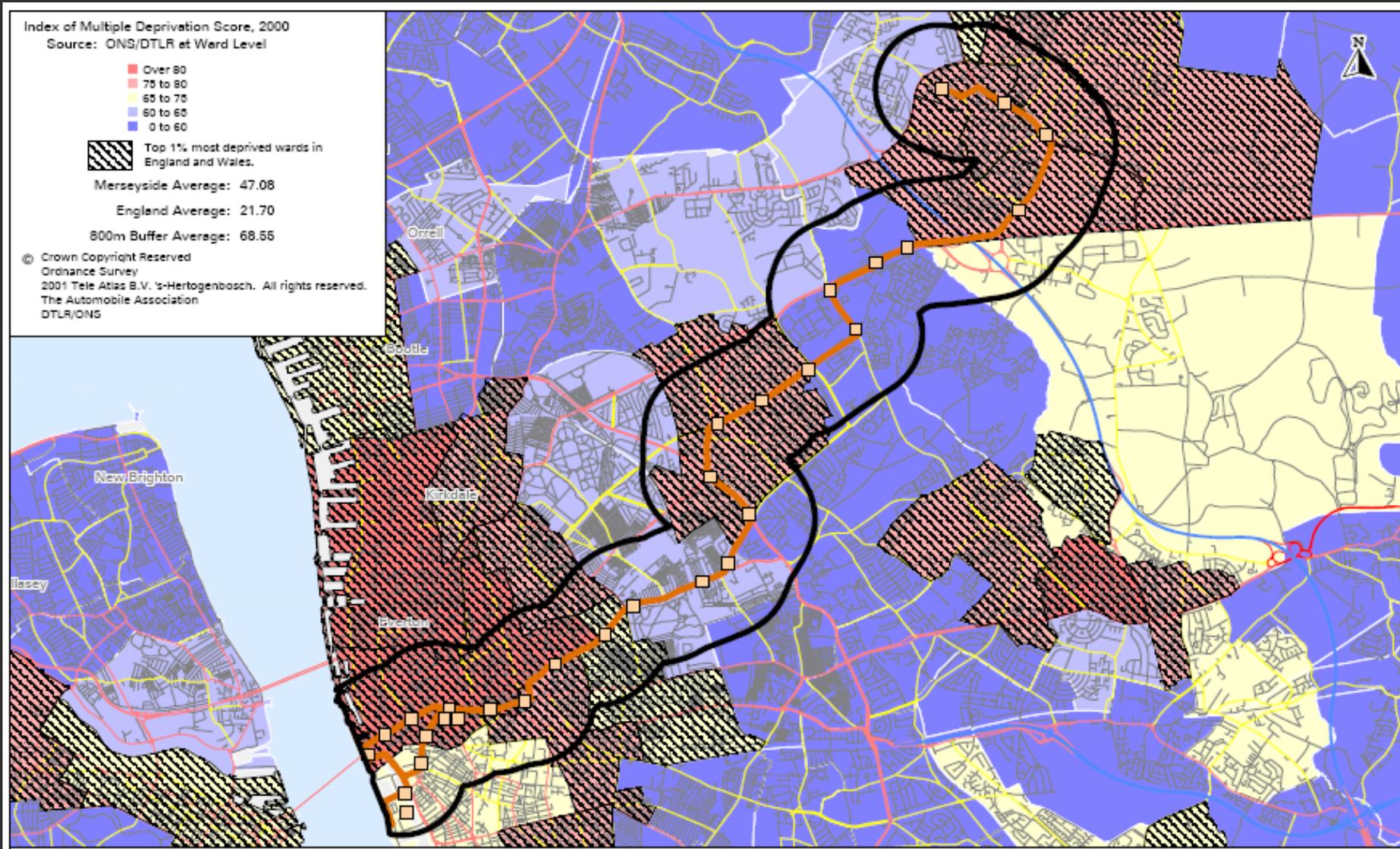
Illustrative example of assessing land use integration - Journey time to Medical Facilities & Hospitals



Merseytram Line 1 - Socio-Economic Impact Report
Figure 6.2: Public Transport Accessibility to Royal Liverpool University Hospital (Health Centre): With and Without Line 1

Illustrative example of assessing equity

-Corridor alignment vs. areas of deprived population



Merseytram Line 1 - Socio-Economic Impact Report
Figure 6.6: Index of Multiple Deprivation Score, 2000, in the Vicinity of Merseytram Line 1

Environment

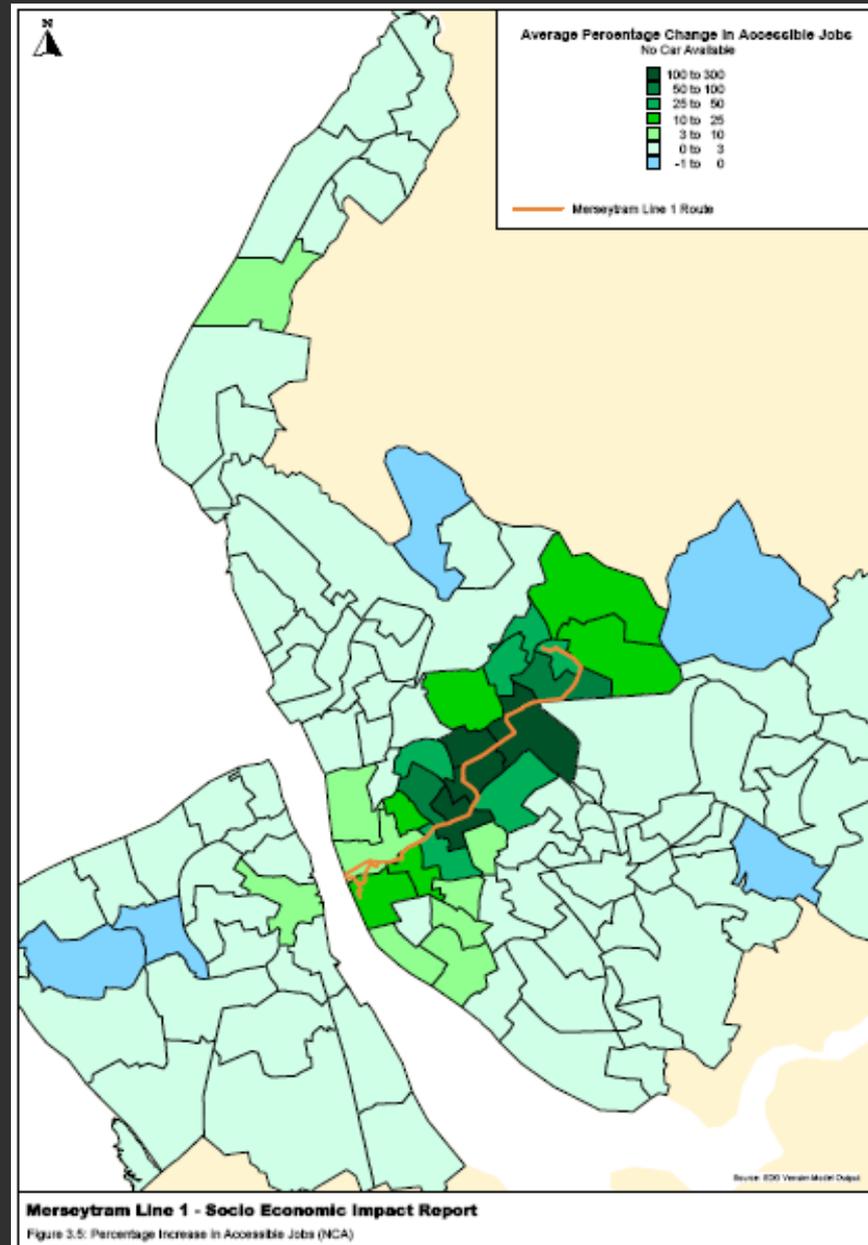
Criterion	Measure
Emissions and disturbance	Change in VMT and resulting emission levels for CO2. (Potentially for the full scheme life-cycle)
Habitat	Identification of sensitive habitats
Open space	Acres of open space lost
Urban design	Identification of impacts of property loss and qualitative assessment of its significance
Urban form	Identification of impacts on urban composition

Economy

Criteria	Measure
Transport efficiency (users)	Average journey time benefit per rider and distribution of Transport System User Benefits (TSUB).
Transport efficiency (operator)	Farebox recovery and cost per new rider
Economic competitiveness	Change in employment catchment for employment centers (in the reference case) and identification of impacts on supporting redevelopment of industrial / commercial sites.

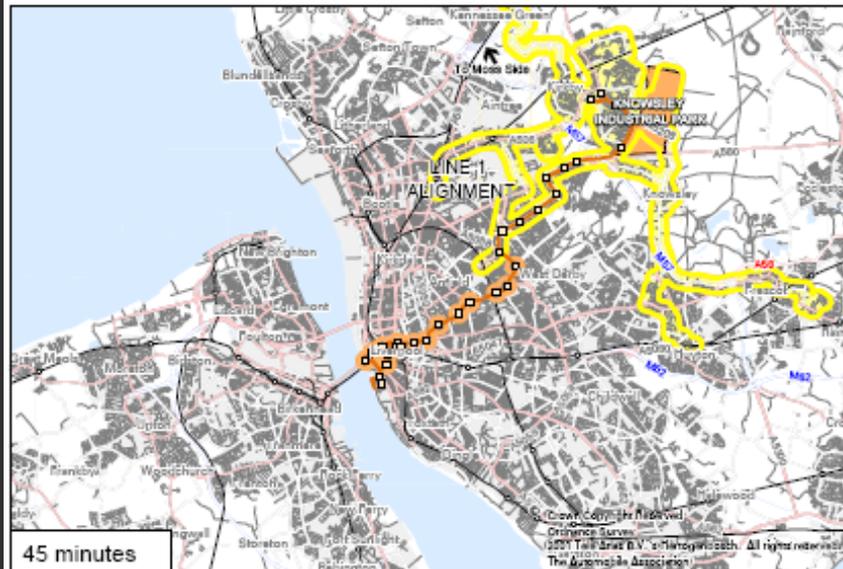
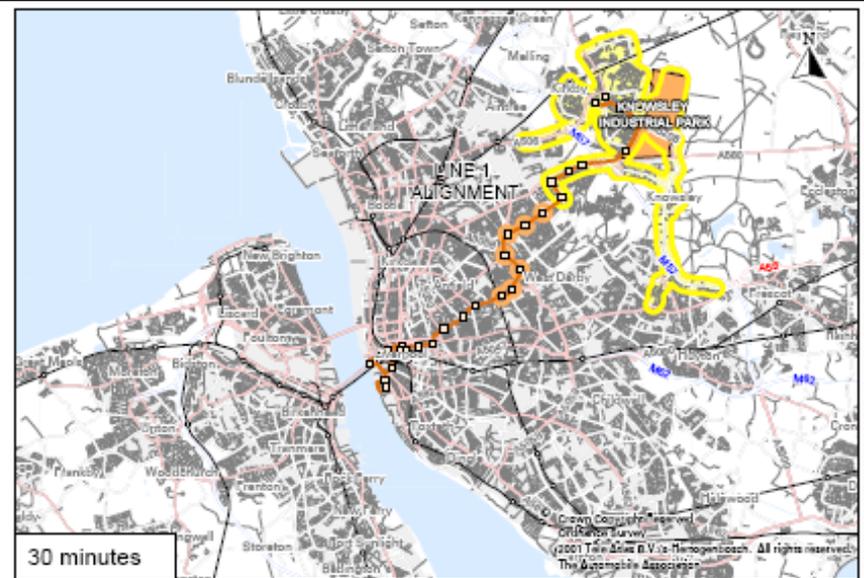
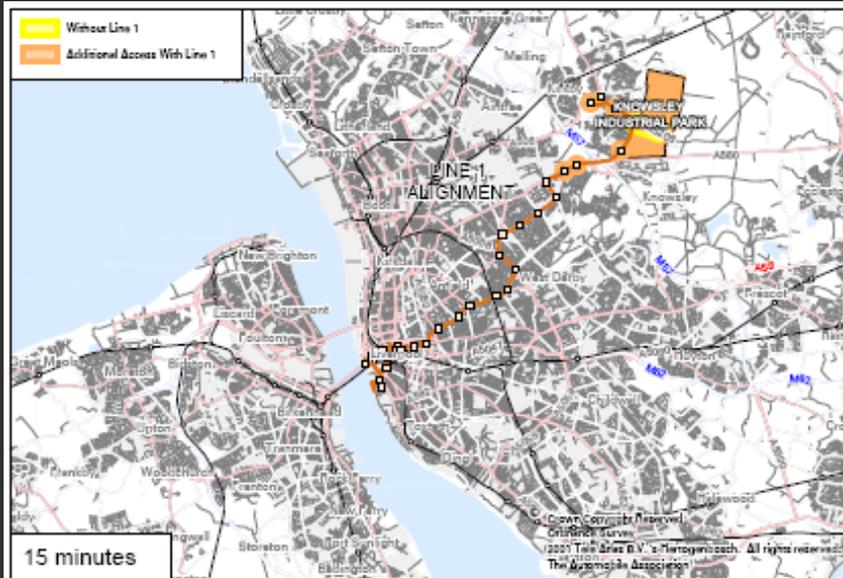
Illustrative example of assessing economic competitiveness

Increase in accessibility to jobs along transit route



Illustrative example of assessing economic competitiveness

-Journey time to Industrial job centers



ACCESS TO KNOWSLEY INDUSTRIAL PARK (EMPLOYMENT CENTRE)

NUMBER OF HOUSEHOLDS WITHIN 200M OF A PUBLIC TRANSPORT SERVICE THAT CAN TAKE THEM TO KNOWSLEY INDUSTRIAL PARK IN X MINUTES OR LESS (IN VEHICLE TIME PLUS WAIT TIME)

	Without Merseytram Line 1	With Merseytram Line 1	Percentage Change	Without Merseytram Line 1 (with no car)	With Merseytram Line 1 (with no car)	Percentage Change
15 minute	125	1,257	905.6%	06	890	939.4%
30 minute	17,273	20,791	20.4%	11,516	13,625	18.3%
45 minute	35,716	39,400	10.3%	20,404	22,927	11.9%

TOTAL POPULATION AGED 60 AND OVER WITHIN 200M OF A PUBLIC TRANSPORT SERVICE THAT CAN TAKE THEM TO KNOWSLEY INDUSTRIAL PARK IN X MINUTES OR LESS (IN VEHICLE TIME PLUS WAIT TIME)

	Without Merseytram Line 1	With Merseytram Line 1	Percentage Change
15 minute	52	946	952.0%
30 minute	7,647	9,470	23.0%
45 minute	17,900	19,516	9.6%

NUMBER OF ECONOMICALLY ACTIVE POPULATION AGED BETWEEN 16 AND 59 WITHIN 200M OF A PUBLIC TRANSPORT SERVICE THAT CAN TAKE THEM TO KNOWSLEY INDUSTRIAL PARK IN X MINUTES OR LESS (IN VEHICLE TIME PLUS WAIT TIME)

	Without Merseytram Line 1	With Merseytram Line 1	Percentage Change
15 minute	339	1,630	382.3%
30 minute	14,999	17,950	20.5%
45 minute	31,350	35,715	13.9%

Please Note: The public transport catchments are based on direct bus, Merseytram Line 1 and rail services and include one interchange between rail and Merseytram Line 1 only. 250m buffer is used as suggested by GoWMMs Volume 2 Box 7.2 as denoting 'proximity to the transport system'. Total time taken includes in-vehicle time and wait time (up to a maximum of 15 minutes).

Merseytram Line 1 - Socio-Economic Impact Report
Figure 6.4: Public Transport Accessibility to Knowsley Industrial Park (Employment Centre): With and Without Line 1

Deliverability

Criteria	Measure
Feasibility (construction)	Construction duration and technological challenges for construction
Feasibility (operations)	The scheme must be operable in terms of the capacity of the system (vehicles, stops, depots, etc.) to meet the demands on them and enable reliable levels of service to be delivered
Acceptability	Public and political support for the investment
Funding	Budget limits
Cost effectiveness	FTA criteria

Planning for high capacity transit in the region

Evaluation: Summary sheet

- Summary sheet derived from each evaluation
 - provides overview for each corridor
 - allows decision makers to identify and confirm the mode investments and corridors to be prioritized
- It will include a summary of the corridor characteristics, as identified by the screening exercise



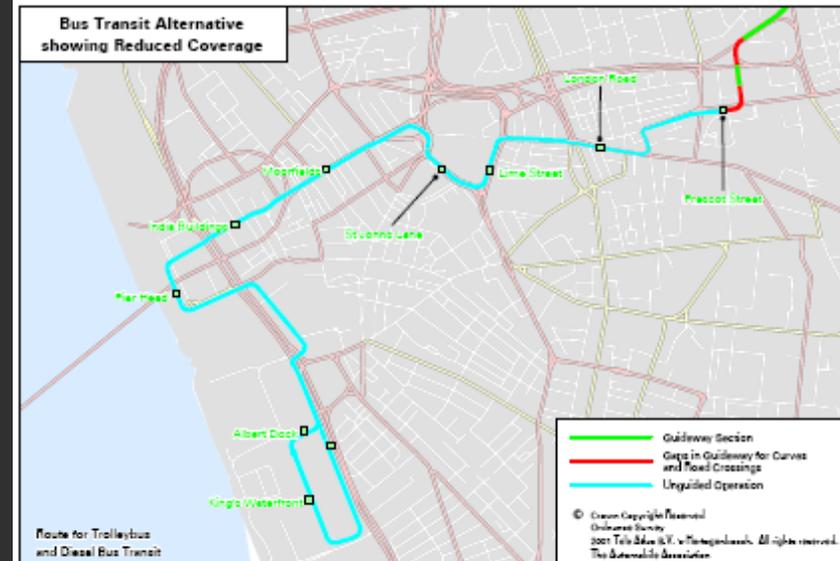
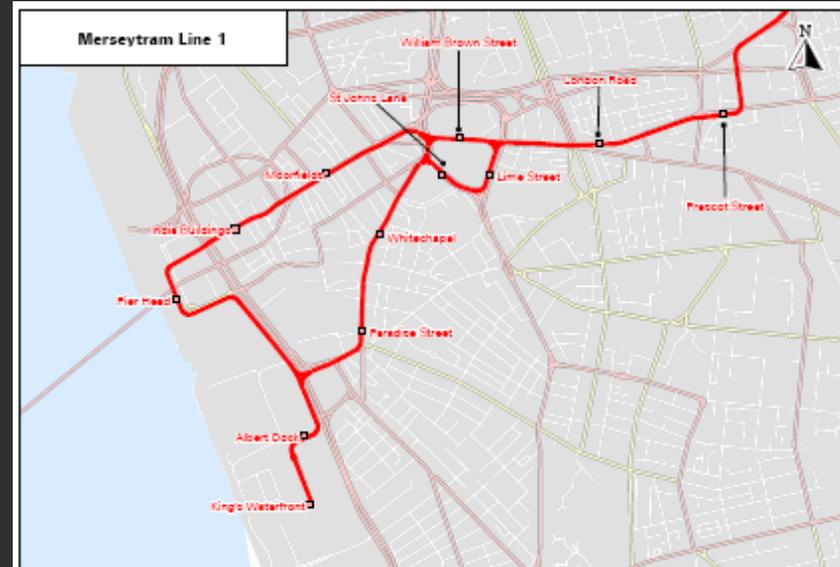
Corridor characteristics

Criteria	Measure
Corridor length	Distance
Catchment population	Population (within walking distance, via connecting services, park & ride)
Population density / land use intensity	Land use intensity (urban hubs, suburban sprawl)
Current ridership	Passenger demand
Share of ridership transit dependent	Percentage share [within catchment] based on automobile ownership statistics
Future ridership potential	Passenger demand

Illustrative example of presenting corridor characteristics



Figure 2: Merseytram Line 1 Route



Merseytram Update and Bus-based Alternatives
Figure 14: Comparison of Merseytram and Bus Transit City Centre Networks



Summary sheet

Detailed HCT Evaluation Framework Summary Sheet			
Corridor	[HCT corridor title]		
Description:	[Description of corridor based on characteristics from screening exercise, i.e. corridor length, catchment population, land use intensity and ridership]		
Evaluation Category	Criteria	Commentary	Assessment
COMMUNITY	Support of policies & Aspirations	[Commentary on the Impact]	[Qualitatively scored on 7-point scale: significant / moderate / slight, benefit / adverse & neutral or quantified if analysis available]
	Land use integration		
	Transport network integration		
	Equity		
	Safety		
	Personal security		
	Health		
ENVIRONMENT	Emissions & disturbance		
	Habitat		
	Open Space		
	Urban design		
	Urban form		
ECONOMY	Transport efficiency (Users)		
	Transport efficiency (Operators)		
	Economic competitiveness		
DELIVERABILITY	Feasibility (Construction)		
	Feasibility (Operations)		
	Acceptability		
	Funding		
	Cost effectiveness		

Scorecard approach

Format allows for easy summary and comparison

Rank	Route ID	Route Name	Environment	Economy	Accessibility	Integration	Affordability	Bus Impact
1	B10a	Basildon-Laindon (via Upper Mayne)	High	Low	High	Low	High	High
2	B10b	Basildon-Laindon (via Great Knightleys)	High	High	High	Low	High	High
3	B5	Basildon-Pitsea (via Broadmayne)	Low	High	High	Low	High	Low
4	B11	Basildon-Laindon	Low	High	Low	Low	High	High
5	B8	Basildon-Dry Street (via Basildon Hospital)	High	Low	High	Low	High	Low
6	S3b	Southend-The Ranges (via Thorpe Bay)	Low	High	High	Low	High	High
7	S9	Ranges Loop	High	Low	High	Low	High	High
8	B4	Basildon-Burnt Mills	Low	High	High	Low	High	Low
9	S3a	Southend-The Ranges (via Southchurch Boulevard)	Low	High	High	Low	High	Low
10	S1a	Southend-Airport (via Victoria Avenue)	High	Low	High	Low	High	High
11	T3b	Lakeside-Tilbury (via Chadwell)	Low	High	High	Low	High	High
12	T3a	Lakeside-Tilbury	Low	High	High	Low	High	High
13	T4a	Lakeside-Purfleet (via Turrock Way)	High	Low	High	Low	High	High
14	S1b	Southend-Airport (via Sutton Road)	Low	High	High	Low	High	High
15	B1	Basildon-Wickford	High	High	Low	High	High	Low
16	T4b	Lakeside-Purfleet (via Weston Avenue)	High	Low	High	Low	High	High
17	S5a	Southend-Leigh On Sea	Low	High	High	Low	High	Low
18	B7	Wickford-Pitsea	High	Low	High	Low	High	Low
19	S5b	Southend-Leigh On Sea (via Prittlewell)	Low	High	High	Low	High	Low
20	S4	Southend Loop	Low	High	High	Low	High	Low
21	B3	Basildon-Pitsea (via Cranes)	Low	High	High	Low	High	Low
22	S8b	Southend-Rayleigh (via Bridgewater Drive)	Low	High	High	Low	High	Low
23	T2	Lakeside-Shell Haven	Low	High	High	Low	High	High
24	S7	Southend-Basildon	Low	High	High	Low	High	Low
25	B9	Basildon-Shell Haven	High	Low	High	Low	High	Low
26	S8a	Southend-Rayleigh (via Eastwood Road)	Low	High	High	Low	High	Low
27	S2	Airport-The Ranges	High	Low	High	Low	High	High
28	B2	Basildon-Rayleigh	High	Low	High	Low	High	Low
29	T1b	Lakeside-Basildon (via Grays)	Low	High	High	Low	High	Low
30	B6c	Basildon-Canvey (via Fryerns & Benfleet)	Low	High	High	Low	High	Low
31	S6	Southend-Canvey	Low	High	High	Low	High	Low
32	T1a	Lakeside-Basildon (via Arterial Road)	Low	High	High	Low	High	High
33	T1c	Lakeside-Basildon (via South Stifford)	Low	High	High	Low	High	Low

Key

High Priority  Medium Priority  Low Priority 

Project advancement

Ridership development plan

- Each station along a proposed alignment should be evaluated for ridership potential based on the jurisdiction's demonstrated willingness to promote transit supportive development.
 - Ridership thresholds should be set for light rail, BRT and other HCT modes.
- Corridor thresholds set, requiring jurisdictions to work together on project advancement.
- Furthermore, each station should undergo an evaluation to determine the:
 - capacity for station area development
 - ability to create good station access for all modes
 - issues for station capacity and functionality.

Project advancement

New cost effectiveness evaluation with TOD

- Cost-effectiveness re-evaluated based on jurisdictions' commitment to developing ridership at proposed stations
- This provides an opportunity for communities to take credit for land use policy changes implemented after HCT System Plan completion.

Project advancement

Financial capacity evaluation

- Demonstrate capacity to fund capital and operations with no significant negative consequences to existing infrastructure or transit system operations.

- **Capital and operating finance plans**

- Level of project funding
- The stability, reliability and availability of proposed funding sources
- Competition for funding that would be used for core system capacity enhancements or maintenance.

Project advancement

System capacity.

- Justify that new extension will enhance (at best) or at least minimize demands on the core systems, particularly:
 - Yard / Support facilities.
 - Redundancy / Recovery capabilities.
 - Station and line haul capacity.