



UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks and adjoining land, Bedford

Appendix 3.4 Table 1 - Summary of Assumptions - Transport

Report reference: 4.3.4.0

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Table 1 – Summary of Assumptions – Transport

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
Entertainment Resort Complex (ERC)						
1	Proposed Development (Core Zone)	Theme Park (TP) Entertainment Resort Complex Support Entry Plaza (EP) TP & EP car park and coach park Hotel (500 bedrooms) Valet Parking service area Transport Hub Team Member Car Park	ES Chapter 2: Description of Proposed Development (Volume 1) and ES Part 4 – Appendix 5.1-Transport Assessment – para 4.9	Likely	N/A	M&M
2	Proposed Development (Lake Zone)	Business Hotels (2000 bedrooms) Hotels/Accommodation (3370 bedrooms) Entertainment Resort Complex Support Only applies to Future Year – not built in Primary Opening Year - 1724 Staff (additional to Core Zone Team Members) Guests are linked to Core Zone visitors or Convention Centre visitors	ES Chapter 2: Description of Proposed Development (Volume 1) and ES (Part 4) – Appendix 5.1-Transport Assessment – para 4.9 and para 4.31	Used for purpose of assessment. Except for a proportion of the business hotel rooms that are associated with the convention centre (see below) all are largely related to activities in Core Zone.	Low	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
2a	Convention Centre (Lake Zone)	<p>Convention Centre (gross internal area (GIA) 55,000sqm)</p> <p>Only applies to Future Year – not built in Primary Opening Year</p> <p>– Standalone / Not related to Core Zone activity only for the purpose of trip generation in the Transport Assessment</p> <p>- 200 Staff (additional to Core Zone Team Members)</p>	ES (Volume 3) – Appendix 5.1-Transport Assessment – para 4.31b	<p>Cautious worst case</p> <p>Used for purpose of assessment. (assessment assumes a 3000 delegate event every day but in reality not all days will host events)</p>	Low	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
3	Proposed Development (West Gateway Zone)	<p>Highway Service Area (16 pumps) Restaurants (up to 5,866 sq.m) Hotel (200 bedroom) Entertainment Resort Complex Support</p> <p>Only applies to Future Year – not built in Primary Opening Year</p> <p>Only applies to Future Year – not built in Primary Opening Year</p> <ul style="list-style-type: none"> - Demands assessed using traditional methods based retail type and floorspace. - 75% of restaurant customers linked to Core Zone Visitors (25% additional to Core Zone) - 50% of a.m. and 75% of p.m. Highway Service Area customers linked to Core Zone Visitors. Remainder are additional to Core Zone) - 75% of Hotel guests linked to Core Zone Visitors (25% additional to Core Zone) 	ES (Volume 1) - Chapter 2: Description of Proposed Development and ES (Volume 3) – Appendix 5.1 Transport Assessment – para 4.9	<p>Representative in terms of trips</p> <p>Used for purpose of assessment. Largely related to activities in Core Zone.</p>	Low	M&M
Total Visitors Core Zone						

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
4	Total Annual Visitors to Core Zone	8.5M Primary Opening Year 12.5M Future Year	Consideration of other UDX destinations as included in the 'Global Attractions Attendance Report' published by Themed Entertainment Association (TEA). ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.13 and Table 4.2 (other UDX locations including Japan)	Likely	Low	M&M
5	Domestic/International Visitor splits	70%:30% for Primary Opening Year; 52%:48% for Future Year.	ES (Volume 3) – Appendix 5.1 Transport Assessment – Table 4-1 and Para 4.14 with comparison to Disneyland Paris	Likely Advised by UDX and sense checked against Disneyland Paris	Medium	M&M
6	Daily Number of Visitors – Primary Opening Year	Low – 10,000 (80 days) Average – 23,000 (230 days) Busy – 40,000 (40 days) Peak – 55,000 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment – Para 4.16 – 4.19 and Table 4.3	Likely Advised by UDX	Low	M&M
7	Daily Number of Visitors – Future Year	Low – 18,750 (50 days) Average – 31,250 (265 days) Busy – 60,417 (35 days) Peak – 81,250 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment – Para 4.16 – 4.19 and Table 4.3	Likely Advised by UDX	Medium	M&M
8	Daily Profile (Arrival / Departure) Theme Park	Arrival /Departure Profile based upon advice from UDX assumed typical Theme Park opening hours 0900-2100hrs	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note - Para 2.28 to 2.30 + Table 2.4 and Fig 2.1.)	Likely Advised by UDX and sense checked against Hollywood and Beijing Limited by Monitor and Manage	Medium	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
International Visitors Core Zone						
9	Forecast Visitors (Annual)	2.55M Opening Year 6M Future Year	ES (Volume 3) – Appendix 5.1 Transport Assessment Para 4.14 - 4.15 and Table 4-2 (other UDX locations including Japan)	Likely Advised by UDX	Medium	M&M
10	Mode Split into the UK	70% Air / 27% Train / 3% Car	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme [Appendix 6 – International Trip Assumptions - Fig 12.1.]	Professional judgement Used for the purpose of assessment	Low	M&M
11	Visitors by Air (70%) - UK Airport proportional splits	22.5% Gatwick 43.3% Heathrow 1.8% London City 9.3% Luton 16.7% Stanstead 6.4% Birmingham	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 6 – International Trip Assumptions – Para 12.3]. Proportion of total annual airport arrivals)	Professional judgement Based on size of airport and 2/3 of air arrival visitors stay overnight in nearby cities and 1/3 direct to resort	Low	M&M
12	Mode Split arrivals to the Site	50% Rail / 40% Coach / 5% Car / 5% taxi	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note [Appendix 6 – International Trip Assumptions – Fig 12.1]	Professional judgement	Low	M&M
13	Vehicle Occupancy	Car - 3.4 Taxi – 3.4 Coach – 50 Wixams – 65 per shuttle	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 3.10)	Likely Derived from observed effects calculation and vehicle size (see Vehicle Occupancy – Domestic)	Low	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
14	Daily Number of Visitors (Seasonality) – Opening Year	Low – 3,000 (80 days) Average – 6,900 (230 days) Busy – 12,000 (40 days) Peak – 16,500 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment Para 4.17 and Table 4-5	Likely Advised by UDX	Low	M&M
15	Daily Number of Visitors (Seasonality) – Future Year	Low – 9,000 (50 days) Average – 15,000 (265 days) Busy – 29,000 (35 days) Peak – 39,000 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment Para 4.17 and Table 4-5	Likely Advised by UDX	Medium	M&M
Domestic Visitors Core Zone						
16	Forecast Visitors (Annual)	5.95M Primary Opening Year 6.5M Future Year	ES (Volume 3) – Appendix 5.1 Transport Assessment Para 4.14, 4.15 and Table 4.2 (other UDX locations including Japan)	Likely Advised by UDX	Medium	M&M
17	Daily Number of Visitors (Seasonality) – Opening Year	Low – 7,000 (80 days) Average – 16,100 (230 days) Busy – 28,000 (40 days) Peak – 38,500 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.17 and Table 4-4	Likely Advised by UDX	Low	M&M
18	Daily Number of Visitors (Seasonality) – Future Year	Low – 9,750 (50 days) Average – 16,250 (265 days) Busy – 31,417 (35 days) Peak – 42,250 (15 days)	ES (Volume 3) – Appendix 5.1 Transport Assessment- Para 4.17 and Table 4-4	Likely Advised by UDX	Medium	M&M
19	Mode Split Arrivals to the Site (Primary Opening Year)	Car – 46% Rail – 28% Coach – 17% Taxi – 4% Shuttle (Hotels) – 4% Local Buses – 1%	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 2.49 and Table 2-17)	Likely Derived from Logit Model. Sense checked against Warner Bros. Studios, Leavesden 50% car	Low	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
19a	Mode Split Arrivals to the Site (Future Year)	Car – 59% Rail – 26% Coach – 12% Taxi – 1% Shuttle (Hotels) – 1% Local Buses – 1%	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 2.49 and Table 2-17)	Cautious worst case Derived from Logit Model. Assumes the relative operating cost of car travel reduces compared to other travel in the future therefore maximising travel by car.	Medium	M&M
20	Vehicle Occupancy	Car (Opening Yr) - 3.28-3.44 Car (Future Yr) – 3.31-3.57 Taxi – as car occupancy Coach – 50 Wixams – 65 per shuttle MK buses – 55 per shuttle Hotel buses – 30 per shuttle	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 2.52)	Likely Derived from Logit Model. Sense checked against Alton Towers (3.6 per car) and Thorpe Park (3.7 per car)	Low	M&M
Domestic Visitors Core Zone – Distribution and Mode Choice (Gravity Model & Logit Model)						
21	Gravity Model Zones	70 zones of origin across the UK with a finer breakdown (58 zones) covering the four regions in closest proximity to the Site	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 2.5)	N/A	N/A	N/A
22	Gravity Model	Single Origin Point for each Zone (main city or town/railway station) to calculate average driving journey times and Public Transport journey times	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Para 2.6)	N/A	Low	N/A
23	Domestic visitor demand for costing in the Gravity Model	10 visitor group types (for instance families or couples) identified with proportional split provided by UDX	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park - Table 2.1)	Likely Advised by UDX	Medium	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
24	Gravity Model Specification	<ul style="list-style-type: none"> -Single level mode choice -Fixed demands in each time period -Single destination applied -Distance parameter (α) of 1.1 	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 2 – Gravity Model Specification – Para 8.5 and Table 8.2]).	Professional judgement resulting in cautious worst case	Low	N/A
25	Logit Model Scenarios	Scenario 1 – 2023 Existing Scenario 3 – Reference Case Scenario 4 – Primary Opening Year Scenario 5 – Future Year Scenario 5a – Scenario 5 + EWR to Cambridge Scenario 5b – Scenario 5 with rail discount removed	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park – para 2.3)	N/A	N/A	N/A
26	Logit Model Zones	70 zones of origin across the UK with a finer breakdown (58 zones) covering the four regions in closest proximity to the Site	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.2 – 7.3])	N/A	N/A	N/A
27	Logit Model – Average Journey Times for car driver and Public Transport	Transport travel times by time of day and day of week derived from Google Maps for the highways 2023 existing travel times and Trainline for rail 2023 travel times. Adjusted for Opening Year and Future Year for changes in traffic speed by region and road type based on DfT National Road Traffic Projections. Adjustments made to rail travel times to reflect Wixams Station and EWR scenarios.	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.3])	Reasonable estimate based upon industry standard data	Low	N/A

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
28	Logit Model – Cost data for each zone (car/rail/coach)	<p>Rail costs applied by group size and based on fares from rail fares database by time of day and day of week.</p> <p>Weekday off-peak fares assumed for travel on a weekday with a sensitivity test assuming peak fares apply during peak periods.</p> <p>Generalised costs applied to car travel based on TAG operating costs</p> <p>Parking costs at £35/day assumed</p> <p>DfT TAG recommended Value of Time (VoT) for non-work other purposes.</p> <p>Coach Travel Generalised Time – in accordance with TAG with:</p> <ul style="list-style-type: none"> -Travel Time Factor 1.15 -Time Weighting Factor 2 applied to wait, walk and access times -Coach fare %age of Rail 67% 	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.15 – 7.17])	<p>Professional judgement</p> <p>For the purpose of assessment based upon industry standard data in line with TAG conventions</p>	Medium (in respect of the parking charge)	M&M
29	Logit Model – Growth Factors	Growth applied to 2023 using DfT NRTP for Primary Opening Year and Future Year	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.5 – 7.40])	<p>Professional judgement</p> <p>In line with DfT Common Analytical Scenario (CAS) appraisals</p>	Low	N/A

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
30	Logit Model – Travel	Travel is segmented by person/group type and by time of day/day of week	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex D: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.7])	Likely Advised by UDX	Medium	N/A
31	Logit Model equation to obtain probability of mode by each group type	Standard Logit Model equation with λ^M taken from DfT National Transport Model.	ES (Volume 3) – Appendix 5.1 Transport Assessment (Annex 4: Trip Forecasting Note Theme Park [Appendix 1 – Logit Model Specification – Para 7.20-7.21 and Table 7-4])	N/A	N/A	N/A
Team Members (TM) Core Zone						
32	Total Team Members	Primary Opening Year – 8,050 Future Year – 10,000 Team Members are the staff employed in the Core Zone.	ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.20 & 4.21	Likely As advised by UDX	Low	M&M
33	Team Members on Peak Attendance Days – Primary Opening Year	Between 78-80% - 6,360 TMs – maximum on site on any one day Busy Day Team Members on site = 75% = 6083 Average Day Team Members on site = 70% = 5635	ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.20	Likely As advised by UDX	Low	M&M
34	Team Members on Peak Attendance Days – Future Year	80% - 8,000 TMs – maximum on site on any one day Busy Day Team Members on site = 75% = 7500 Average Day Team Members on site = 70% = 7000	ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.20	Likely As advised by UDX	Low	M&M

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
35	Shift Patterns for Team Members	<p>Based upon other UDX destinations, three shift patterns have been considered</p> <p>S1: Start 04:00-12:00 – Finish 10:00-18:00 (48%)</p> <p>S2: Start 09:00-17:00 – Finish 18:00-24:00 (42%)</p> <p>S3: Start 19:00-22:00 – Finish 05:00-08:00 (10%)</p> <p>Maximum Team Members per shift:</p> <p>Primary</p> <p>Opening Year S1=3053 S2=2671 S3=636</p> <p>Future Year S1=3840 S2=3360 S3=800</p>	ES (Volume 3) – Appendix 5.1 Transport Assessment - Para 4.20 and Table 4.6	<p>Likely</p> <p>As advised by UDX</p>	Low	M&M
Paramics Model (Microsimulation Modelling)						
36	Base/Observed Year	Surveys collected during March 2023	Level crossings on the Marston Vale Line (MVL) not operational during this period	N/A	N/A	N/A
37	Base/Observed - Model Extent	Covers the A421 from Black Cat interchange to M1 J13 – including each junction along A421. A6 around Kempston and Wixams. Local Routes through Kempston Hardwick, Stewartby and Wixams.		N/A	N/A	N/A

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
38	Base/Observed -Time Periods	<p>Duplicate models for a neutral weekday and Saturday</p> <p>Covers 07:00 to 22:00, this full period has been assessed.</p> <p>Covers commuter peak (08:00 to 09:00 and 17:00 to 18:00) plus 'development peak' (09:00 to 10:00 and 21:00 to 22:00).</p>	Includes an hour long warm up period (06:00 to 07:00). This is not assessed and is used only to ensure network is fully loaded at the start of the assessment period	N/A	N/A	N/A
39	Construction Scenarios	<p>Used the 2023 baseline.</p> <p>Considered peak construction traffic informed by trajectory</p>	Average construction traffic levels (between start of construction and opening of resort also considered)	Advised by UDX Construction Team	Low	N/A
40	Construction Scenario - Construction Traffic	<p>Cautious Worst Case considers construction traffic pertaining to the Proposed Development. This includes the new road connections/junctions and internal road network, as well as the separate construction of the East West Rail project and proposed on-site station, and Wixams station enhancements.</p> <p>Includes staff/TMs cars and HGVs separately</p>		Advised by UDX Construction Team	Low	Planning Condition
41	Construction Scenario - Construction Access	<p>2 points provided on Broadmead Road (either side of the rail line). Covers EWR station construction (as a cautious worst case)</p> <p>Wixams station – 4th arm added to B530/Manor Road junction. Remains a priority junction.</p> <p>OCEMP caps construction traffic to 500 HDV deliveries per day, and 3,035 pcus on Manor Road</p>	Broadmead Road Accesses – Most of the demand assigned to access to east of rail line. Worst Case this traffic has to cross the level crossing.	Advised by UDX Construction Team	High	Planning Condition

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
42	Construction Scenario - Woburn Road/Broadmead Road Junction	Temporary signalisation required to allow all additional demand out of Broadmead Road and prevent significant rat-running through Stewartby		Advised by UDX Construction Team	High	Planning Condition
43	Construction Scenario - Manor Road	Closed at rail line (MVL). Construction traffic can only route from the east (B530). No through traffic.		Advised by UDX Construction Team	Low	N/A
44	Construction Scenario - HGV Routeing	Proposed strategy applied. LGV/HGV traffic remains on the M1/A1/A421 for as long as possible, exiting the A421 via Marsh Leys or Elstow junction, depending on the internal access used, or typically does not route along local roads within Wixams, Stewartby or Marston Moretaine.		For the purpose of good traffic management and minimising environmental impact	High	Planning Condition
45	Construction Scenario - Construction Traffic Profile	Car traffic in peak periods (06:00 to 10:00 – with most around 07:00. 17:00 to 20:00 – majority at 17:00). HGV regular throughout the day 08:00 to 18:00.		As advised by UDX Construction Team	Medium	Planning Condition
46	Forecast Scenario (Reference Case) Period	Reference Case based on committed developments.	Background growth derived from Committed Development noting that this is greater than TEMPro derived growth to notionally the year 2030. Further growth outside of the Committed Development would be significantly more uncertain and did not match the test for inclusion in the model.	For the purpose of assessment	Low	N/A

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
47	Forecast Scenario (Reference Case) Highway Schemes	Capacity constraints on the edge of model have been removed in some scenarios		The mathematical assessment considers the effects of the demand forecasts on the bases that the National Highways separate investigation for Junction 13 results in a scheme that allows more traffic in peak periods to pass through the junction. It does this to maximise the ability of the demand forecasts and background traffic to reach the new A421 junction, and so to assess the new infrastructure associated with the Planning Proposal on that basis	Low	N/A
48	Forecast Scenario (Reference Case) Marston Vale Line (MVL) Level Crossings	Re-introduced in forecast and all development scenarios. Assumes 2 passing trains each hour. 'Barrier down' for 3 minutes		Professional judgement For the purpose of assessment	Low	N/A

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
49	Development Scenario - General	Cautious Worst Case. Future Year (20 years after opening). Tested in both weekday and Saturday models. 'Average' Weekday and 'Busy' Saturday.	Also tested a Primary Opening Year and various sensitivity scenarios. Logit model covered 'Low', 'Average', 'Busy' and 'Peak' attendance cases. 'Peak' Attendance does not apply to neutral day modelling as this will occur during holiday periods only	Narrative	N/A	N/A
50	Development Scenario – Profile of arrivals and departures	The Theme Park opens at 09:00hrs. Visitors start arriving from 07:00hrs). Theme Park closes at 21:00hrs and visitors continue to depart up to 22:00hrs. Hotel Arrivals occur later at 15:00hrs, coinciding with check in times.	ES (Volume 3) – Appendix 5.1 Transport Assessment – Annex 5 (Appendix D Fig 7.1)	Cautious worst case For the purpose of assessment, the assumed morning peak demand proportion is higher than what UDX advises happens at reasonable comparables (Hollywood and Beijing)	Medium	M&M
51	Development Scenario - Development Access	A421 Slip Roads Access. 2 large, connected roundabouts. To the west connects to southbound on and off-slips, Woburn Road and Broadmead Road. To the east connects northbound off-slip, Public Road A and West Gateway Zone. Manor Road dual-carriageway and realigned (Closed to west of rail line) Dual-carriageway Public Road A through Site Lake Zone Link Road with access on B530 and Manor Road	Primary Opening Year does not include Lake Zone link road	Narrative	N/A	Planning Condition

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52	Development Scenario - East-West Rail	Between Oxford and Milton Keynes (MK) only. Buses from MK to the resort	ES (Volume 3) – Appendix 5.1 Transport Assessment - Section 6 para. 6.12	Likely A sensitivity test has included EWR extended to Cambridge and a new station at the resort	High (in respect of buses from MK)	Travel Plan (buses)
53	Development Scenario - Wixams Train Station	Upgraded to 4 platforms by NR. Shuttle bus access to be provided by UDX via 4 th arm to B530/Manor Road junction –Signalised		Likely Critical to the scheme	High	Planning Condition (station) and Travel Plan (shuttle bus)
54	Development Scenario - Team Member	Up to 10,000 in total, with 8,000 on site during peak days. Arrivals/Departures based on 3 likely shift patterns through the day		Likely Advised by UDX	Low	M&M
55	Development Scenario - Other Vehicles (Visitors)	Also considers taxis and coaches. Using separate access point.		Likely Advised by UDX	Low	M&M
56	Development Scenario - Other Vehicles (Servicing)	Consistent across all scenarios – 100 deliveries daily, regular through the day.		Likely Advised by UDX	Low	M&M
57	Development Scenario - Manor Road	Manor Road level crossing is closed and replaced by an all-vehicle bridge in accord with Network Rail's committed scheme. Sensitivity Test assumes closure of the level crossing and replacement with an Active Travel only bridge. This is the preferred option.	ES (Volume 3) – Appendix 5.1 Transport Assessment – Annex 5 Para 5.21 and 5.22.	All options are possible	Low	Planning Condition

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58	Development Scenario - Broadmead Road/Woburn Road	Permanent signalisation of junction between Broadmead Road and Woburn Rd.		Likely Not strictly necessary but has benefits and was agreed with Parish Council	Low	Planning Condition
Highway Mitigation Design Assumptions (Embedded Mitigation)						
59	Proposed A421 Junction Location	The proposed A421 junction was located through an optioneering process which reviewed weaving length and potential routes into the Core Zone. The proposed location for this junction is outside the weaving length of the Marston Moretaine and Marsh Leys junctions. However, it is located within the weaving length for the lay-bys on the A421. Options were developed with how this could be resolved and the options in this location discussed with National Highways.	Highway Illustrative Arrangements / DMRB CD 122 4.1	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
60	Proposed A421 Junction Slip Road Types	The proposed slip roads within the scheme are to be adopted by National Highways. We have reviewed the proposed slip road types based on the modelled traffic figures. These have currently been designed to the below layout types from CD 122: <ul style="list-style-type: none"> • Northbound A421 diverge is a grade separated 2-lane Layout B option 1 - ghost island diverge • Southbound A421 diverge is an at grade single lane Layout A option 1 - taper diverge • Southbound A421 merge is an at grade 2-lane Layout C - ghost island merge 	Highway Illustrative Arrangements / DMRB CD 122	Narrative	N/A	Planning Condition and Subsequent Highways Agreement

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61	A421 Northbound Diverge Slip Road	Design shows a length of carriageway 742m from back of the diverge nose to be compliant with CD122 standards of a Slip Road. The design proposes a radius of 180m (2 steps-below) resulting in a relaxation as per CD109 70kph standards. However, CD122 Section 1.3 states relaxations prescribed by CD 109 shall not be applied to this document. Therefore, a departure from standard is required for horizontal alignment. There is a gradient of 5.62% from the start of the back of the diverge nose, and then a return gradient of -5.02% on the downhill segment into the West Gateway Zone. These values do not adhere to the CD109 Table 5.1 desirable minimum conditions whereby the maximum vertical gradient for all-purpose dual carriageways is 4%. A departure from standard is required for the vertical alignment. These has been reviewed by National Highways.	Highway Illustrative Arrangements / DMRB CD 122	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
62	West Gateway, Core, Lake and East Gateway Zones Cross-section	The Bedford Borough Council website page for 'Highway Design Guides' states they have their own highway design guides, however these are currently being updated and should be read alongside national guidance contained in 'Manual for Streets' and the 'Design Manual for Roads and Bridges' and other guidance detailed. To allow for the review of internal proposed roadways an all-purpose urban dual carriageway cross-section to Figure 2.1N1g within the DMRB CD 127 has been used throughout. This has been reviewed with Bedford Borough Council.	Highway Illustrative Arrangements / DMRB CD 127 Figure 2.1N1g	Narrative	N/A	Planning Condition and Subsequent Highways Agreement

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63	West Gateway, Core, Lake and East Gateway Zones Active Travel provision	A 5m proposed 2-way cycle lane and footway provision throughout the West Gateway, Core, Lake and East Gateway Zones has been proposed to meet the requirements of LTN 1/20. The active travel provisions within the scheme zones have been shown to Bedford Borough Council to reflect key destination and key links as described in the Transport Assessment	Highway Illustrative Arrangements / LTN 1/20 Transport Assessment	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
64	West Gateway, Core, Lake and East Gateway Zones design speed	The proposed speed limit is 30mph throughout all of the proposed roadways in the West Gateway, Core, Lake and East Gateway Zones providing a design speed of 60B kph.	Highway Illustrative Arrangements / DMRB CD 109	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
65	Signalisation of proposed junctions across scheme and West Gateway Roundabouts	We have reviewed the proposed junctions throughout the scheme based on the modelled traffic figures and road cross-sections proposed. Due to the dual carriageway cross-section, location and traffic numbers several of the junctions have been proposed to be signalised.	Highway Illustrative Arrangements / CD 123	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
66	Severance of existing Manor Road	A review of existing Manor Road was undertaken to assess whether it could be upgraded to allow for the required cross-section and vehicle movements for the scheme. It was clear that due to the narrow carriageway width, small radii bends and proximity of residential and commercial properties to the road that upgrades to existing Manor Road would not be feasible. Therefore, a realignment of the road and severance of the elements where residential and commercial properties had direct access was proposed.	Highway Illustrative Arrangements	Narrative	N/A	Planning Condition and Subsequent Highways Agreement

Item No	Description	Assumption/Derivation	Reference	Judgement/Comment	Sensitivity to Change	Control
67	Options related to the closure of Manor Road Level Crossing	<p>Network Rail have a TWAO and permission to develop a bridge over the Marston Vale Line to close the existing level crossing on Manor Road.</p> <p>The understanding is that the principal aim of NR is to close the crossing as a response to the EWR proposed delivery of EWR rail services on the MVL.</p> <p>The Transport Assessment assesses on this basis. It also assesses the effect of Option B which is to close the level crossing and deliver an Active Travel bridge. This is the preferred option.</p>	Highway Illustrative Arrangements	Narrative	N/A	Planning Condition and Subsequent Highways Agreement
68	A minimum headroom of 6.3m on bridges over rail lines	Through discussions with Network Rail they have specified a 6.3m headroom be implemented on all rail overbridges to ensure there is sufficient clearance for future electrification of their assets.	Highway Illustrative Arrangements	Narrative	N/A	N/A
69	Stage 1 Road Safety Audit	A Designers response to the RSA was provided to National Highways and Bedford Brough Council with all recommendations being accepted and incorporated into the design or to be implemented in the post-planning stage.	GG 119	Narrative	N/A	N/A
70	Enabling Works on Manor Road, Broadmead Road and signalisation on Woburn Road Junction	Construction phasing has been reviewed through the development of the scheme proposals. To gain access to the Core Zone construction traffic would need to be routed through Manor Road and Broadmead Road. The proposals for enabling works to support this proposal have been shown to Network Rail and Bedford Borough Council.	Highway Illustrative Arrangements	Narrative	N/A	Planning Conditions And Subsequent Highways Agreement