

Technical Note 8

Title	Inglewood (P/2017/1133): Windy Corner Junction - Proposed Improvements and Traffic Capacity Analysis				
Prepared by	Stephen Le Flohic	Checked by	Roger Key	Reviewed by	Roger Key
Date	21 st November 2019			Version	1.1 (Dec 19)

1. Introduction

- 1.1. Key Transport Consultants (KTC) is retained by Abacus Projects Ltd/Deeley Freed Estates to provide transport advice in respect of the proposed Inglewood development on land south of White Rock, Paignton, TQ4 7BQ. A Transport Assessment (TA) and Transport Assessment Addendum 1 (TAA) have been submitted to Torbay Council (TC) to support an application for up to 400 residential dwellings, a two-form entry primary school and a public house.
- 1.2. The A3022 Brixham Road/A379 Dartmouth Road junction, known locally as Windy Corner, has recently been improved by TC. KTC proposed further improvements in association with the proposed development as shown on drawing 0734-053 enclosed as **Appendix A**. The traffic capacity of the junction has been modelled using LinSig V3 as set out in the November 2017 TA and the January 2018 TAA. Further analysis was requested by TC allowing for further committed development traffic and this was set out in KTC Technical Note 5 dated June 2018. All previously submitted capacity analysis pre-dates the implementation of the TC improvement works.
- 1.3. In October 2019 further drawings were produced by KTC to clarify the proposed improvements and in the light of the improvements undertaken and, by then, completed by TC. Following liaison with TC Highway Officers, further modifications have been made to the proposed improvements as described below. The traffic capacity of the revised proposed improvements has also been assessed, as described below.
- 1.4. The purpose of this Technical Note (TN) is to set out the revised improvements to the Windy Corner junction and the findings of the additional traffic capacity analysis. This TN continues in Section 2 with an overview of the TC junction improvements and Section 3 describes the revisions to the KTC proposed junction improvements. Section 4 compares the results of the traffic capacity analysis of the existing Windy Corner layout without the Inglewood development, with the revised proposed improvements including Inglewood development traffic. Section 5 sets out conclusions.

2. Torbay Council Improvements

- 2.1. The recently implemented TC improvements are shown on TC drawing 8/9/7_100 enclosed as **Appendix B**. This drawing does not show the layout of the northern Dartmouth Road arm of the Windy Corner junction, so KTC has produced its own version of the existing layout, drawing 0734-

060 enclosed as **Appendix C**, which shows the existing road markings on the northern Dartmouth Road and Brixham Road arms. The drawing is otherwise the same as the TC drawing and reflects the newly completed existing layout.

- 2.2. At present, only one lane is available for the southbound ahead movement on Dartmouth Road. The improvement shown on drawing 0734-053 proposed to provide two southbound lanes on Dartmouth Road to the south of the junction enabling both lanes to be used by southbound traffic entering on Dartmouth Road and a short length of two lane approach on Brixham Road.

3. KTC Revised Improvements

- 3.1. KTC has provided a new drawing 0734-061 enclosed as **Appendix D** which, apart from the changes outlined below, reflects the previously proposed improvements shown on drawing 0734-053. It is based on the existing junction layout.
- 3.2. The changes include a minor modification to tie in with the layout of the northbound bus stop on A379 Dartmouth Road shown on the TC drawing. Drawing 0734-061 also addressed buildability of the proposed improvement on the southbound side of the junction. The layout on drawing 0734-053 showed widening of the southbound carriageway into a steeply sloping verge. This would require a short length of retaining wall between the footway and widened carriageway and the relocation of a control box for the traffic signals. Drawing 0734-061 retains sufficient lane widths for two ahead lanes, while starting the widening into the verge (shown red on the plan) south of the above features. Hence, it would be feasible to leave the steep verge and control box untouched, significantly simplifying the construction work.
- 3.3. Alongside the red arc of widened southbound carriageway there is an equivalent blue arc of widened footway/cycleway. According to KTC records, this encroaches into land owned by TC that is not designated as public highway and which is not common land. It was previously agreed with TC Highway Officers that TC non-highway land could be included within the scheme. The proposed layout ties in the new kerb line with the existing kerb to the north of the southern end of the TC land because it is understood that the verge to the south has become common land in the land swap for TC's own scheme. All other proposed changes to the layout remain as shown on KTC's drawing 0734-053, are within the existing public highway and do not encroach onto common land.
- 3.4. The revised drawing was forwarded to TC Highway Officers for their consideration in October 2019. Following this consideration and a meeting with KTC in November, further changes have been made. KTC drawing 0734-061 Revision A, enclosed as **Appendix E**, includes the following minor changes:

- the island in centre of Brixham Road has been moved back to be 1.5m clear of the Dartmouth Road edge of lane;
- the swept path for the right turn into Brixham Road has been slightly adjusted;
- the arrow in the left lane on Brixham Road has been changed to left only and the right lane to right only; and
- an island has been introduced in the hatched area to the south of junction to make clear to southbound drivers that they have to merge left of the island beyond.

4. Revised Traffic Analysis

4.1. The analysis described below compares the traffic capacity of the existing Windy Corner junction, including the recent TC improvements but prior to the addition of Inglewood development traffic, with the revised KTC proposed junction improvements shown on drawing 0734-061 Rev A and with the Inglewood development traffic. The analysis is based upon a forecast year of 2024 with all consented and committed development traffic included in the base flows, as agreed with TC. The results of the capacity analysis of the existing Windy Corner junction were previously set out in KTC Technical Note 5.

4.2. A summary of the results from the LinSig analysis is provided in Tables 4.1 and 4.2 below. The LinSig output is provided at **Appendix F**.

Table 4.1: Windy Corner Junction - AM Peak Hour					
		08:00 – 09:00			
		Existing Layout 2024 + Adjusted Consented and Committed Development + Additional Committed Development (Wall Park)		Revised Proposed Layout 2024 + Adjusted Consented and Committed Development + Additional Committed Development (Wall Park) + Inglewood Development	
		% Sat	MMQ	% Sat	MMQ
1/1	A379 Dartmouth Road (north) Ahead	71.7%	14.4	71.1%	14.2
1/2	A379 Dartmouth Road (north) Ahead + Right	39.5%	1.1	42.7%	1.1
2/1	A379 Dartmouth Road (south) Left	81.2%	-	81.9%	-
2/2	A379 Dartmouth Road (south) Ahead	81.2%	15.9	81.9%	15.5
3/1	A3022 Brixham Road Left + Right	80.4%	15.5		
3/1 + 3/2	A3022 Brixham Road Left + Right			80.2%	16.4
Total	Cycle Time = 90 sec	PRC	10.8%	PRC	9.8%

Table 4.2: Windy Corner Junction – PM Peak Hour					
		16:00 – 17:00			
		Existing Layout 2024 + Adjusted Consented and Committed Development + Additional Committed Development (Wall Park)		Proposed Layout 2024 + Adjusted Consented and Committed Development + Additional Committed Development (Wall Park) + Inglewood Development	
		% Sat	MMQ	% Sat	MMQ
1/1	A379 Dartmouth Road (north) Ahead	82.4%	15.7	75.1%	13.4
1/2	A379 Dartmouth Road (north) Ahead + Right	30.4%	1.0	35.0%	1.8
2/1	A379 Dartmouth Road (south) Left	70.5%	-	71.5%	-
2/2	A379 Dartmouth Road (south) Ahead	100.0%	15.5	94.1%	15.1
3/1	A3022 Brixham Road Left + Right	98.9%	36.7		
3/1 + 3/2	A3022 Brixham Road Left + Right			94.6%	30.3
Total	Cycle Time = 90 sec	PRC	-11.1%	PRC	-5.1%

- 4.3. It can be seen from Tables 4.1 and 4.2 above that the existing Windy Corner junction is predicted to be within its design and saturation capacities in all AM peak hour tests. However, the existing junction is predicted to exceed its design and saturation capacities in the PM peak on the A379 Dartmouth Road (south) ahead and A3022 Brixham Road approaches. The PM peak practical reserve capacity (PRC) for the whole junction is forecast at -11.1%.
- 4.4. With the revised KTC junction improvements and the addition of Inglewood development traffic, the forecast AM peak queues and saturation flows are forecast to be broadly similar to those for the existing junction. One additional vehicle is forecast to queue on the A3022 Brixham Road approach. The PRC is forecast to be 9.8%, a slight reduction from the 10.8% forecast for the existing junction.
- 4.5. In the PM peak the revised junction is predicted to be in excess of its design and saturation capacities on the A379 Dartmouth Road (south) ahead and A3022 Brixham Road approaches similar to the existing junction but with slightly shorter queues. The PM peak PRC is forecast at -5.1% which is an improvement on the -11.1% forecast for the existing junction.

5. Conclusions

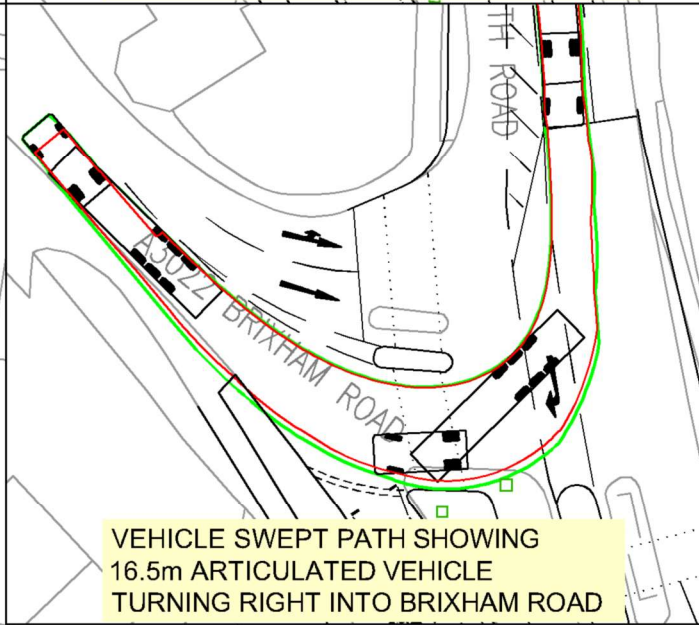
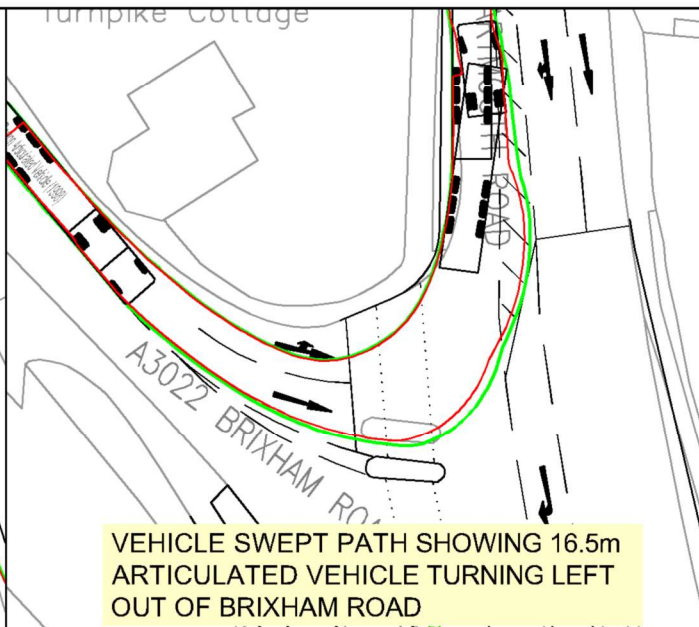
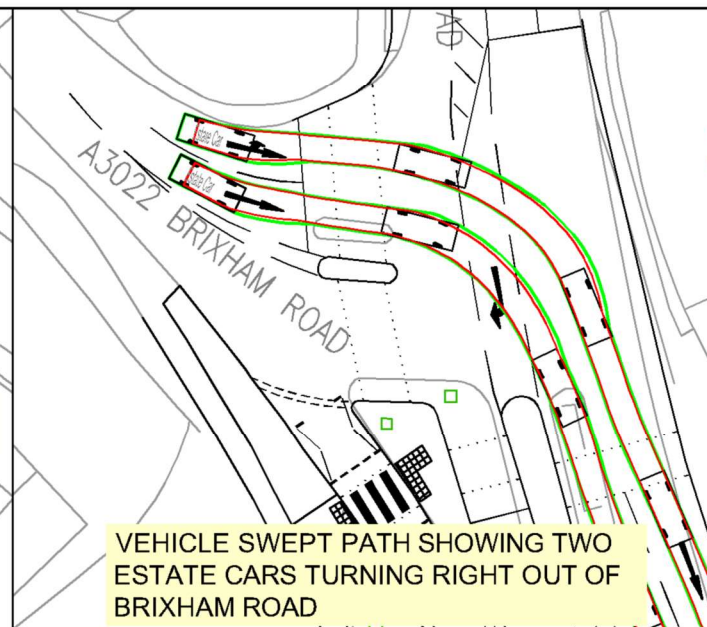
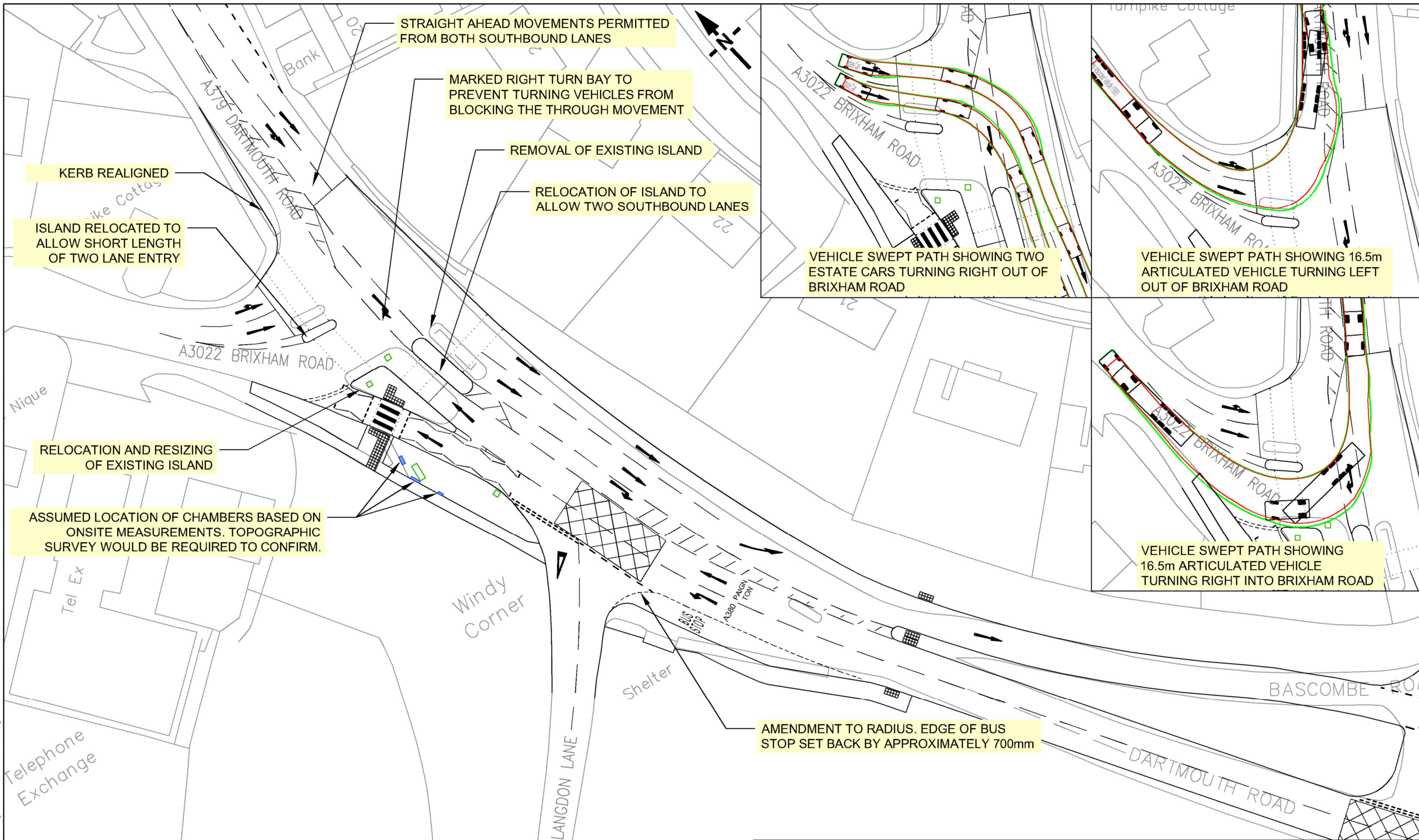
- 5.1. The traffic capacity analysis indicates that the Windy Corner junction is forecast to operate satisfactorily in the AM peak hour in both scenarios examined. In the PM peak hour the junction is forecast to be in excess of its design and saturation capacities but that the revised junction layout shown on drawing 0734-061 Revision A is forecast to operate better than the existing junction. Therefore, it is clear that the residual traffic impact of the additional development traffic

at the Windy Corner junction would not be severe.

- 5.2. The delivery of the KTC proposed highway works shown on drawing 0734-061 Revision A can be secured by imposing a Grampian condition upon a planning consent. This would overcome any grounds for refusal of the Inglewood application with respect to its traffic impact at Windy Corner.

APPENDIX A

NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN KEY TRANSPORT CONSULTANTS LIMITED AND MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR WRITTEN CONSENT
 CAD FILE NAME : F:\DATA\A\0734 White Rock 2, Paignton\AutoCAD\0734-053.dwg



KEY

- █ EXISTING COVER LOCATIONS
- █ EXISTING BT CABINETS

REV		DR	CH	PA	DATE

NOTE: INCLUDES ALL IMPROVEMENTS ALREADY PROPOSED ON TORBAY COUNCIL'S DRAWING, TITLE: WESTERN CORRIDOR WINDY CORNER JUNCTION IMPROVEMENT, PRELIMINARY DESIGN OPTION 1, DRAWING NUMBER: 8/9/7_01B

INGLEWOOD				ABACUS PROJECTS LTD			
WINDY CORNER HIGHWAY IMPROVEMENTS OPTION 3B MAINTAINING EXISTING WESTERN KERBLINE				KEY TRANSPORT CONSULTANTS LTD 26 BERKELEY SQUARE BRISTOL BS8 1HP Tel : 0117 920 9430 E-mail : info@key-transport.com			
DRAWN BY	CHECKED BY	PASSED BY	DATE				
FF	DRK	DRK	OCT 17	1:500@A3	PRELIMINARY	0734-053	

APPENDIX B



REVISIONS				
no.	date	by	checked	details

NOTES

Key	
	Existing carriageway
	Existing footway or central reservation
	New carriageway or carriageway widening
	New footway
	Grass verge

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drawn	RJW	scale(s)	1:500 @ A1
checked	RDS	date	21/08/18

TOR HILL HOUSE TORQUAY, TQ2 5GH
TEL: 01803 208973 ; FAX: 01803 208976



SCHEME TITLE
WESTERN CORRIDOR
WINDY CORNER JUNCTION IMPROVEMENT

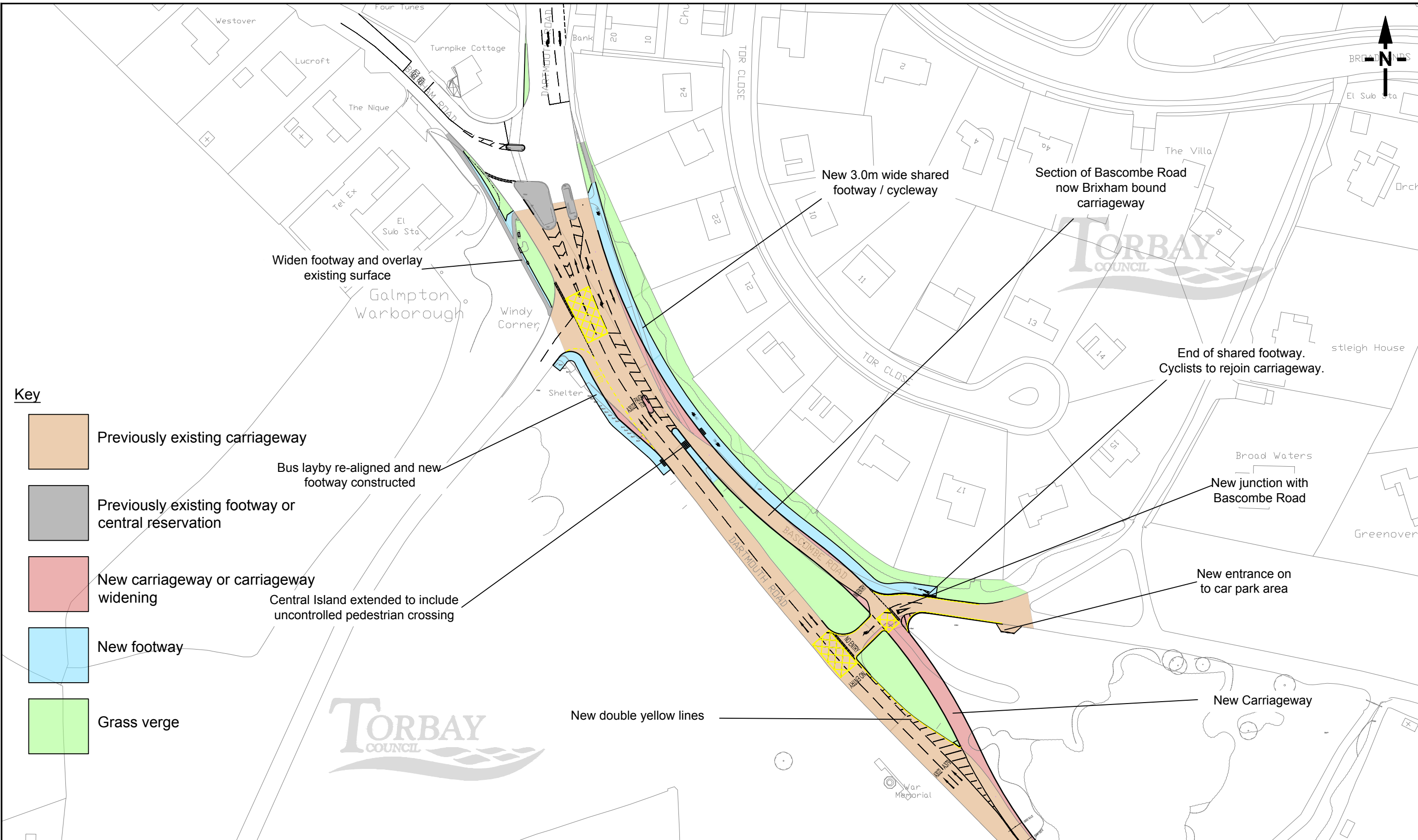
DRAWING TITLE
General Arrangement


Purpose	FOR TENDER	
Drawing number	8/9/7_100	rev: -

drawing number 8/9/7_100

APPENDIX C

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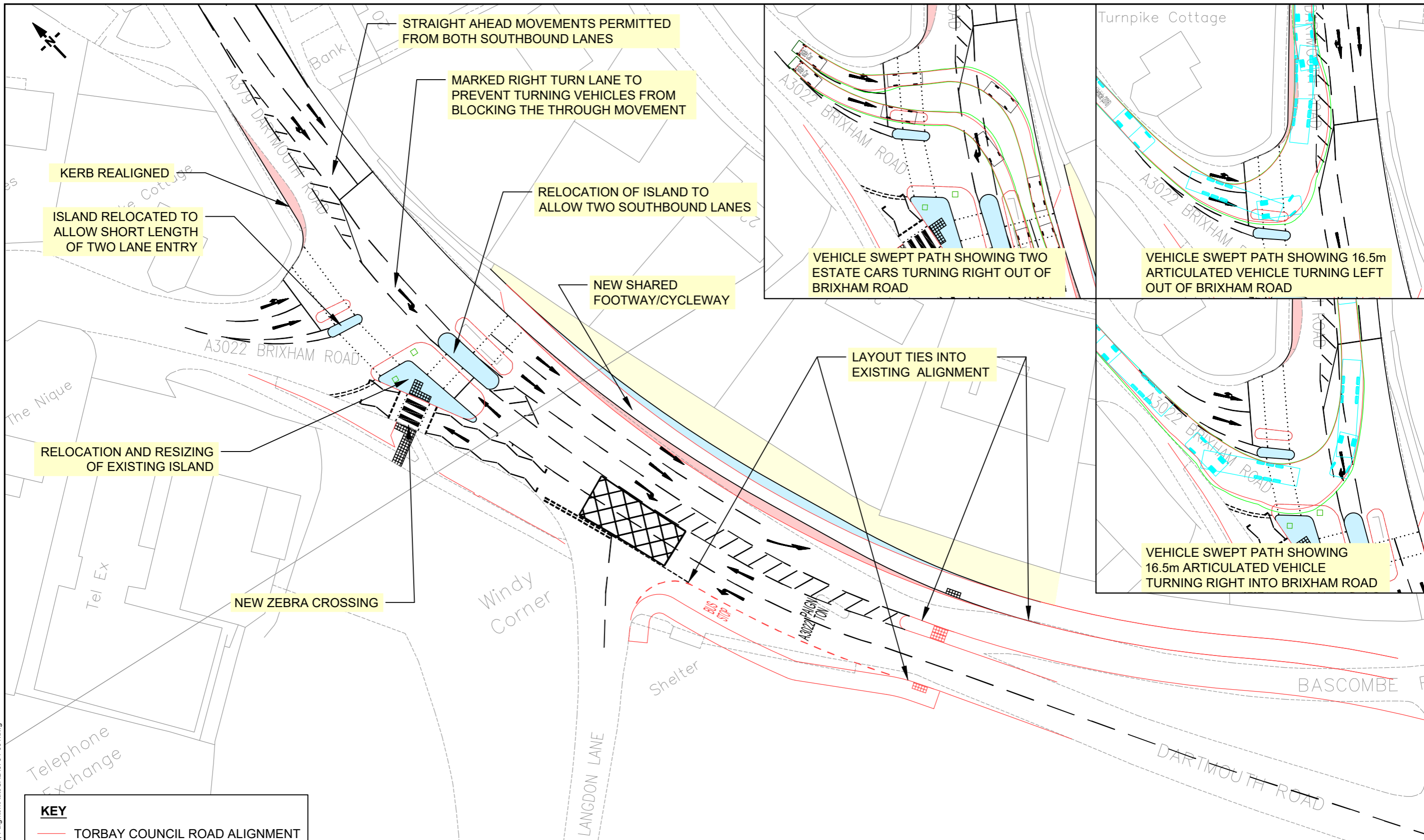


INGLEWOOD, PAIGNTON						ABACUS PROJECTS LTD	
EXISTING WINDY CORNER LAYOUT INCLUDING TORBAY COUNCIL 2019 IMPROVEMENTS						 <p>KEY TRANSPORT CONSULTANTS LTD 26 BERKELEY SQUARE BRISTOL BS8 1HP Tel : 0117 920 9430 E-mail : info@key-transport.com</p>	
DRAWN BY	CHECKED BY	PASSED BY	DATE	SCALES @ A3 SIZE	ISSUE STATUS	DRAWING NUMBER	REV.
BE	MJ	RK	OCT 19	1:1,000	PRELIMINARY	0734-060	

REV	DR	CH	PA	DATE


APPENDIX D

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KEY	
	TORBAY COUNCIL ROAD ALIGNMENT
	NEW FOOTWAY
	NEW CARRIAGEWAY
	TORBAY COUNCIL GRASS VERGE

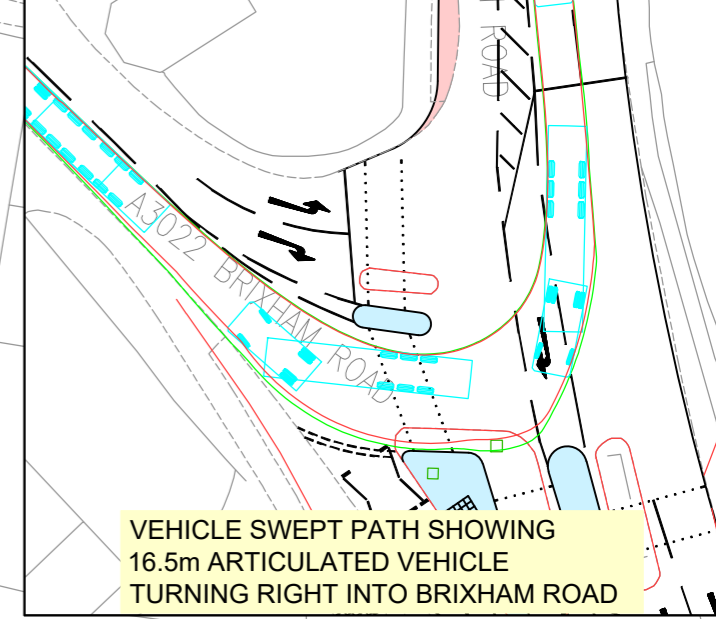
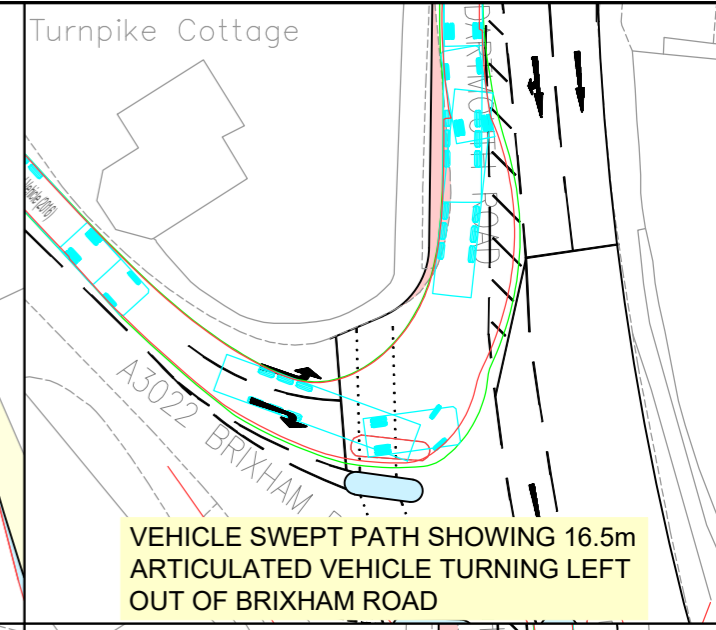
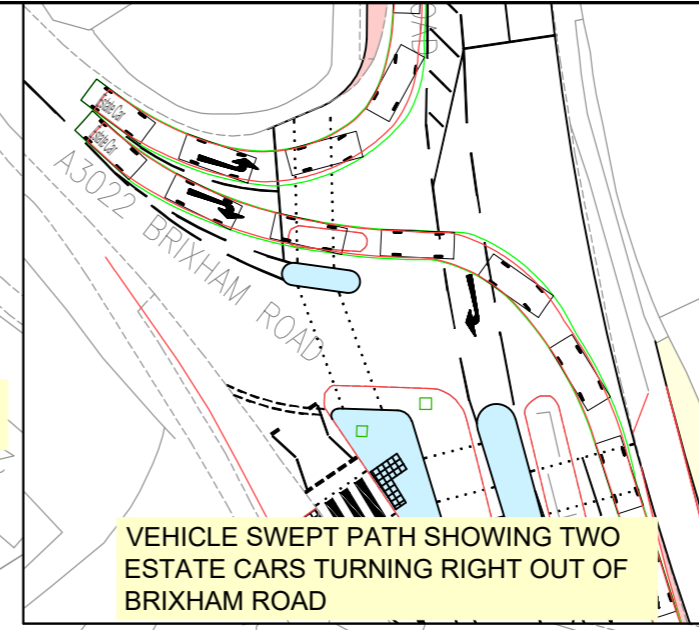
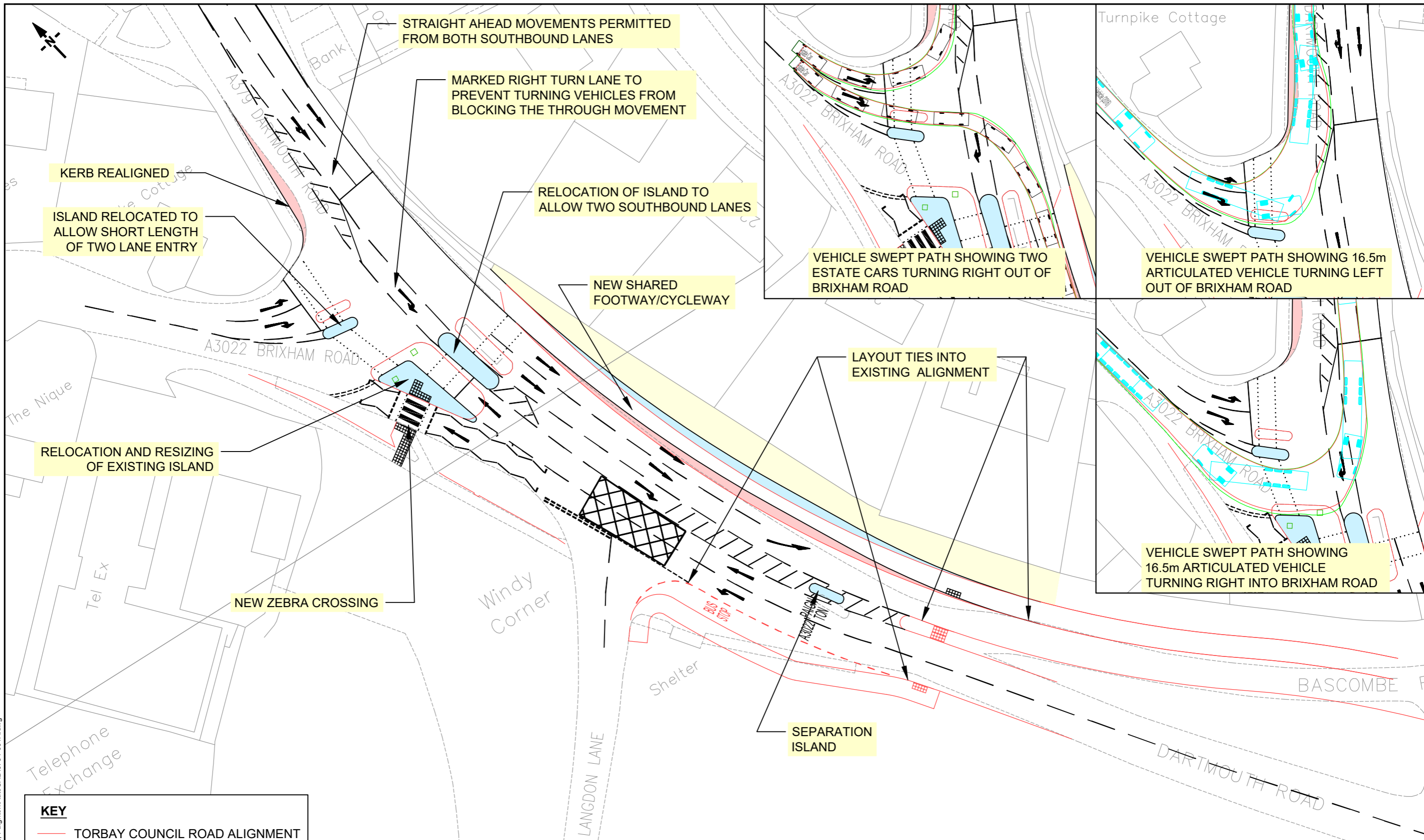
REV	DR	CH	PA	DATE

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APPENDIX E

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KEY

- TORBAY COUNCIL ROAD ALIGNMENT
- NEW FOOTWAY
- NEW CARRIAGEWAY
- TORBAY COUNCIL GRASS VERGE

A	AMENDMENTS TO BRIXHAM ROAD APPROACH. CENTRAL SEPARATION ISLAND ADDED ON DARTMOUTH ROAD	DRT	SLF	DRK	NOV'19
REV		DR	CH	PA	DATE

INGLEWOOD				ABACUS PROJECTS LTD			
WINDY CORNER HIGHWAY IMPROVEMENTS TYING IN TO TORBAY COUNCIL 2019 IMPROVED LAYOUT				<div style="font-size: 8px; margin-top: 5px;"> KEY TRANSPORT CONSULTANTS LTD 26 BERKELEY SQUARE BRISTOL BS8 1HP Tel : 0117 920 9430 E-mail : info@key-transport.com </div>			
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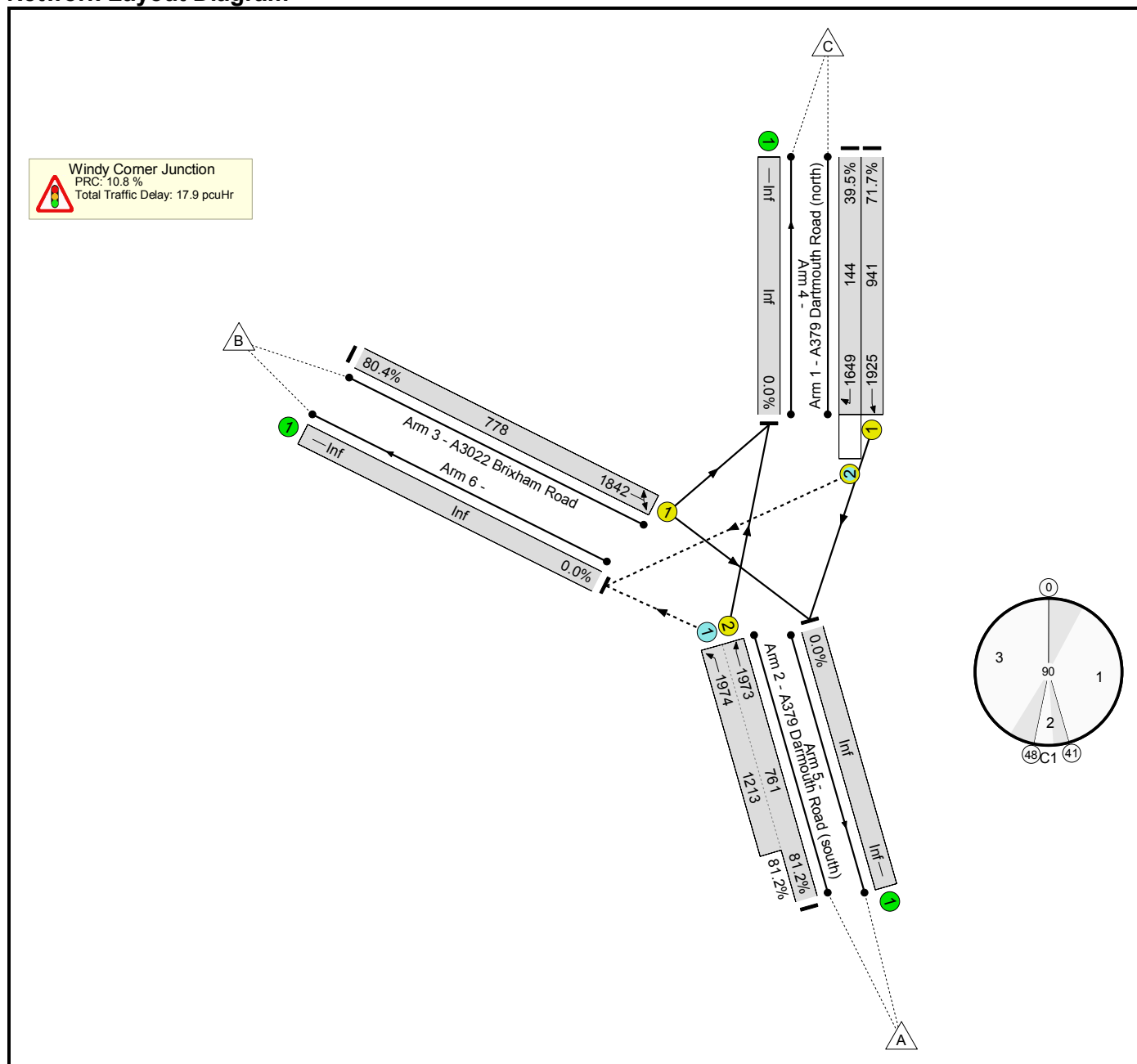
APPENDIX F

Basic Results Summary
Basic Results Summary

User and Project Details

Project:	Inglewood
Title:	Windy Corner Junction - with Torbay Council Proposed Highway Works
Location:	
Additional detail:	
File name:	Windy Corner Existing Copy (modelled with Torbay proposed highway works 0734-033A) - additional committed development.lsg3x
Author:	FF
Company:	Key Transport Consultants
Address:	26 Berkeley Square, Bristol, BS8 1HP

Scenario 19: 'Add Com Dev 2024 AM' (FG27: '2024 + Add Com Dev AM', Plan 1: 'Network Control Plan 1')
Network Layout Diagram



Basic Results Summary

Network Results


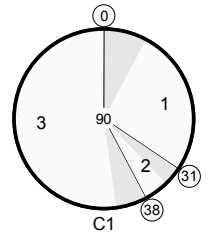
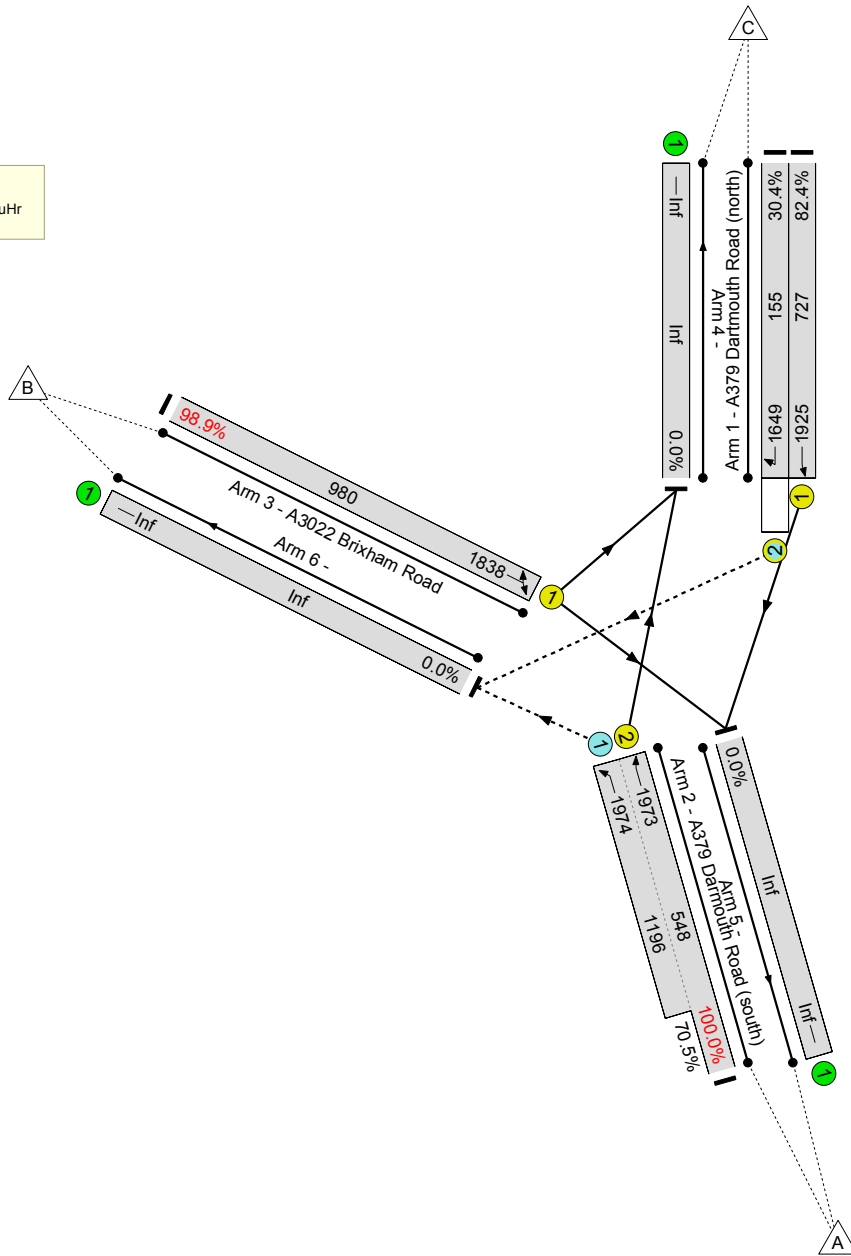
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Windy Corner Junction - with Torbay Council Proposed Highway Works	-	-	-		-	-	-	-	-	-	81.2%	539	503	0	17.9	-	-
Windy Corner Junction	-	-	-		-	-	-	-	-	-	81.2%	539	503	0	17.9	-	-
1/1	A379 Dartmouth Road (north) Ahead	U	A		1	43	-	675	1925	941	71.7%	-	-	-	4.7	24.8	14.4
1/2	A379 Dartmouth Road (north) Right	O	A	D	1	43	4	57	1649	144	39.5%	57	0	0	1.0	61.0	1.1
2/2+2/1	A379 Darmouth Road (south) Ahead Left	U+O	B -		1	34	-	1603	1973:1974	761+1213	81.2 : 81.2%	482	503	0	6.3	14.2	15.9
3/1	A3022 Brixham Road Left Right	U	C		1	37	-	625	1842	778	80.4%	-	-	-	5.9	34.2	15.5
C1					PRC for Signalled Lanes (%):		10.8	Total Delay for Signalled Lanes (pcuHr):			17.90	Cycle Time (s):		90			
					PRC Over All Lanes (%):		10.8	Total Delay Over All Lanes(pcuHr):			17.90						

Basic Results Summary

Scenario 20: 'Add Com Dev 2024 PM' (FG28: '2024 + Add Com Dev PM ', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

Windy Corner Junction
 PRC: -11.1 %
 Total Traffic Delay: 32.6 pcuHr

Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Windy Corner Junction - with Torbay Council Proposed Highway Works	-	-	-		-	-	-	-	-	-	100.0%	365	525	0	32.6	-	-
Windy Corner Junction	-	-	-		-	-	-	-	-	-	100.0%	365	525	0	32.6	-	-
1/1	A379 Dartmouth Road (north) Ahead	U	A		1	33	-	599	1925	727	82.4%	-	-	-	6.5	38.9	15.7
1/2	A379 Dartmouth Road (north) Right	O	A	D	1	33	4	47	1649	155	30.4%	47	0	0	0.7	53.7	1.0
2/2+2/1	A379 Dartmouth Road (south) Ahead Left	U+O	B -		1	24	-	1391	1973:1974	548+1196	100.0 : 70.5%	318	525	0	6.9	17.8	15.5
3/1	A3022 Brixham Road Left Right	U	C		1	47	-	969	1838	980	98.9%	-	-	-	18.6	69.0	36.7
		C1	PRC for Signalled Lanes (%):		-11.1		Total Delay for Signalled Lanes (pcuHr):		32.64		Cycle Time (s):		90				
			PRC Over All Lanes (%):		-11.1		Total Delay Over All Lanes(pcuHr):		32.64								

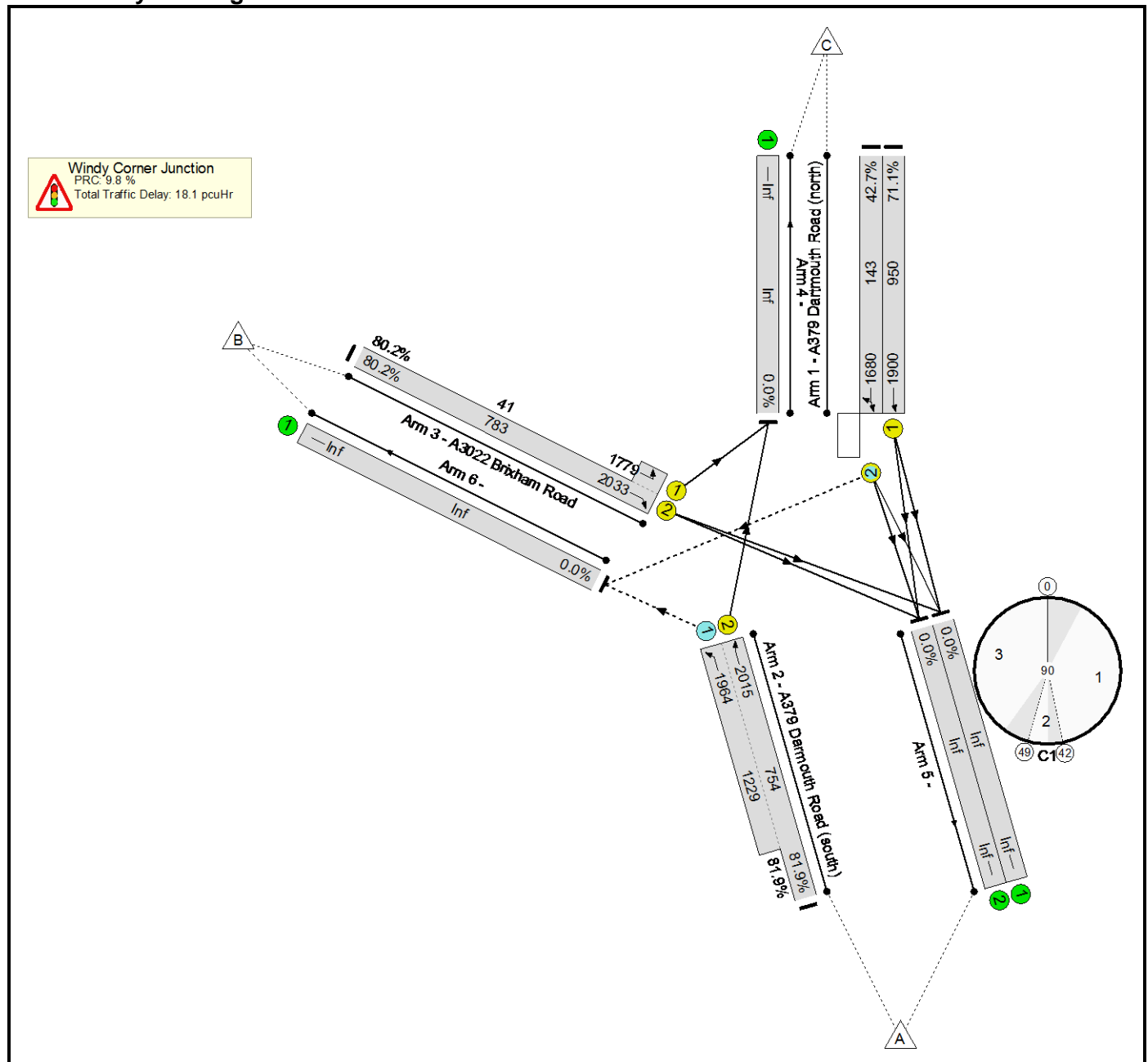
Basic Results Summary
Basic Results Summary

User and Project Details

Project:	Inglewood
Title:	Windy Corner Junction - KTC proposed highway works
Location:	
Additional detail:	
File name:	Windy Corner (KTC proposed highway works 0734-61) - additional committed development.lsg3x
Author:	FF
Company:	Key Transport Consultants
Address:	26 Berkeley Square, Bristol, BS8 1HP

Scenario 19: 'Add Com Dev + Dev 2024 AM' (FG29: '2024 + Add Com Dev + Dev AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

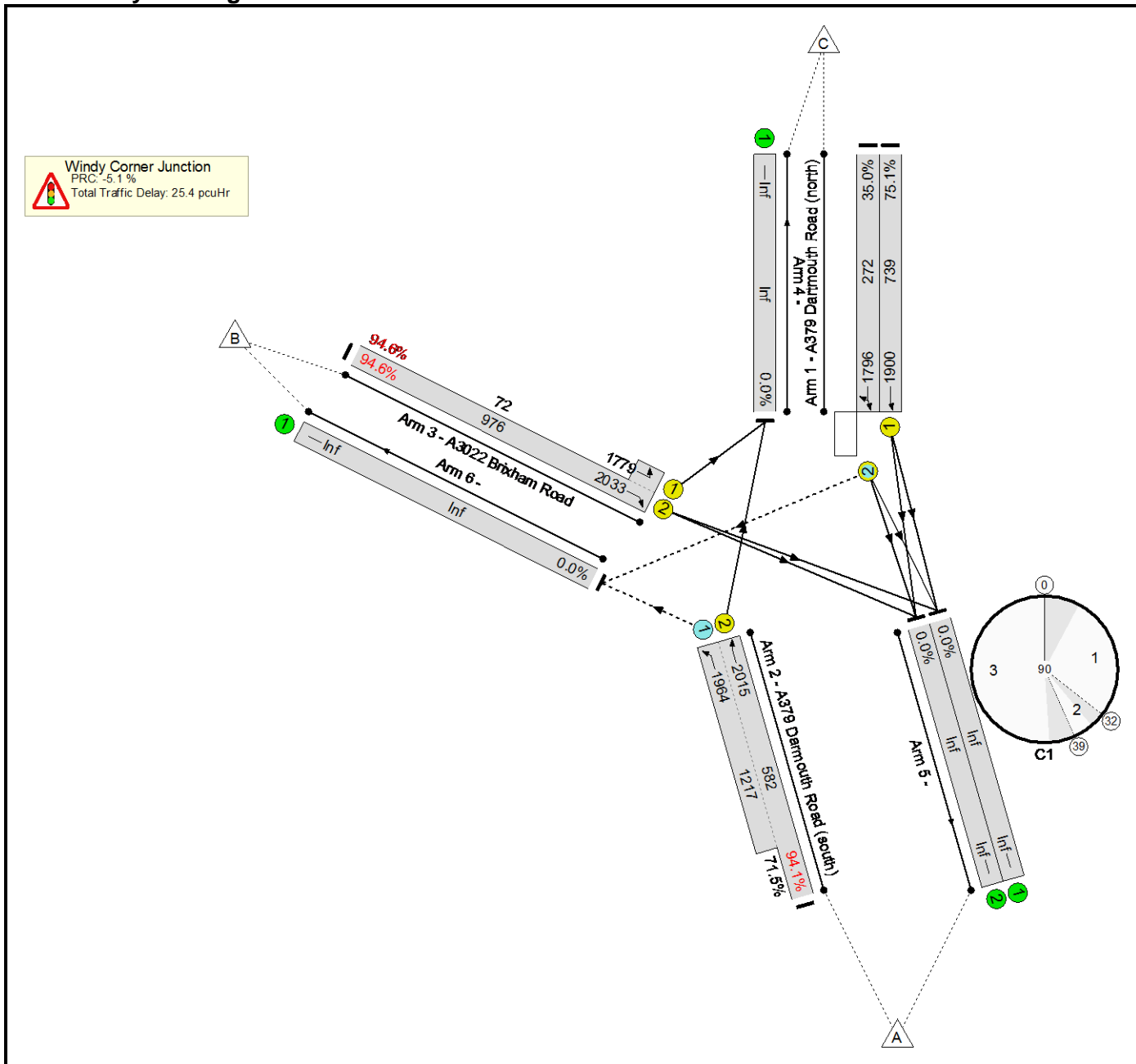
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)					
Network: Windy Corner Junction - KTC proposed highway works	-	-	-		-	-	-	-	-	-	81.9%	564	503	0	18.1	-	-					
Windy Corner Junction	-	-	-		-	-	-	-	-	-	81.9%	564	503	0	18.1	-	-					
1/1	A379 Dartmouth Road (north) Ahead	U	A		1	44	-	675	1900	950	71.1%	-	-	-	4.5	23.9	14.2					
1/2	A379 Dartmouth Road (north) Ahead Right	O	A	D	1	44	4	61	1680	143	42.7%	61	0	0	1.1	63.6	1.1					
2/2+2/1	A379 Dartmouth Road (south) Ahead Left	U+O	B -		1	35	-	1625	2015:1964	754+1229	81.9 : 81.9%	503	503	0	6.3	13.9	15.5					
3/2+3/1	A3022 Brixham Road Left Right	U	C		1	36	-	661	2033:1779	783+41	80.2 : 80.2%	-	-	-	6.3	34.1	16.4					
		C1	PRC for Signalled Lanes (%):		9.8		PRC Over All Lanes (%):		9.8		Total Delay for Signalled Lanes (pcuHr):		18.09		Total Delay Over All Lanes(pcuHr):		18.09		Cycle Time (s):		90	

Basic Results Summary

Scenario 20: 'Add Com Dev + Dev 2024 PM' (FG30: '2024 + Add Com Dev + Dev PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)					
Network: Windy Corner Junction - KTC proposed highway works	-	-	-		-	-	-	-	-	-	94.6%	389	532	0	25.4	-	-					
Windy Corner Junction	-	-	-		-	-	-	-	-	-	94.6%	389	532	0	25.4	-	-					
1/1	A379 Dartmouth Road (north) Ahead	U	A		1	34	-	555	1900	739	75.1%	-	-	-	5.1	33.4	13.4					
1/2	A379 Dartmouth Road (north) Ahead Right	O	A	D	1	34	4	95	1796	272	35.0%	51	0	0	1.0	38.7	1.8					
2/2+2/1	A379 Dartmouth Road (south) Ahead Left	U+O	B -		1	25	-	1418	2015:1964	582+1217	94.1 : 71.5%	338	532	0	6.6	16.8	15.1					
3/2+3/1	A3022 Brixham Road Left Right	U	C		1	46	-	991	2033:1779	976+72	94.6 : 94.6%	-	-	-	12.6	45.8	30.3					
		C1	PRC for Signalled Lanes (%):		-5.1		PRC Over All Lanes (%):		-5.1		Total Delay for Signalled Lanes (pcuHr):		25.37		Total Delay Over All Lanes(pcuHr):		25.37		Cycle Time (s):		90	