TECHNICAL REPORT

HARTLEY GARDENS, CLACTON

SPD TRANSPORT REPORT

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1. INTRODUCTION

1.1 Purpose of Document

1.1.1 This Technical Report has been prepared by SYSTRA to provide a summary of a number of technical exercises and associated analysis relating to the transport and highways proposals for the site at Hartley Gardens, Clacton.

1.1.2 The site is allocated in the current Tendring Local Plan for approximately 1700 dwellings and associated community facilities (including a primary school and local centre). Up to seven hectares of employment land is also included in the allocation. Tendring District Council (TDC) are the local planning authority and Essex County Council (ECC) are the local highway authority.

1.1.3 These exercises have been undertaken to identify the expected transport impacts of the development and to describe the processes by which the site's access strategy and broad requirements for off-site improvements have been developed. The site's Supplementary Planning Document (SPD) includes policies and plans which identify the transport infrastructure and supporting measures required in principle; these will subsequently be expanded upon to form the basis of the Transport Assessment (TA) and Framework Travel Plan (FTP) which will be submitted as part of the Outline Planning Application (OPA) for the site.

1.1.4 The work described in this technical report has been undertaken with input and subsequent feedback from both TDC and ECC, and includes discussion of options which have been considered in order for the preferred strategy to be determined. SYSTRA and the project team will be continuing to progress development of the site's Transport Strategy and associated transport provision and mitigation through continued working with TDC and ECC in the lead-up to the OPA submission.

1.2 Technical Report Structure

1.2.1 The technical report addresses a number of topics, as follows:

1. Introduction
2. Site Masterplan Context
3. Site Accesses – Demand Data
4. A133 / Progress Way / St Osyth Road
5. St Johns Road / Little Clacton Road
6. Legerton Drive Access
7. St Johns Road / Jaywick Lane (New Southern Access)
8. Access for Public Transport and Active Modes

2. SITE MASTERPLAN CONTEXT

2.1 The SPD Masterplan and its relationship to Transport

2.1.1 The SPD spatial framework has undergone a series of development and revisions in response to technical information developed by SYSTRA, and feedback received from the PPA meetings (both those focusing on transport and more general matters) and the external Design Review held with Essex Place Services.

2.1.2 Significant work and discussions have been undertaken with regard to the siting of the proposed primary school within the development, with Natural England in regards to Open Space provision, and with the Environment Agency in relation to their requirements for any crossing of Pickers Ditch. It is noted that a general specification for the Pickers Ditch crossing of the main street has been developed and this will facilitate further technical discussions with ECC Highways and their structure team. These matters will have impacts upon internal trip routings and the overall degree of internalisation which will be considered in further detail in the subsequent TA report.

2.1.3 Notwithstanding this, the SPD spatial framework has been progressed to a stage where it is considered that the on-site and off-site impacts of the development are sufficiently understood to allow the access and modal strategies to be developed in turn.

2.1.4 For clarity, the exercises described in this technical report assume a housing development quantum of 1870 dwellings. This includes a 10% uplift to be consistent with the requirements of the Environmental Impact Assessment (EIA) which will be required at the OPA stage.

3. SITE ACCESSES – DEMAND DATA

3.1 Site Trip Assumptions (Trip Generation and Trip Distribution)

3.1.1 Table 1 shows the current expected vehicular trip generation for the Weekday AM and PM peak hours (08.00 to 09.00 and 17:00 to 18.00) which would be associated with the whole of the SPD spatial framework (the calculations apply a figure of 1,870 dwellings which represents the allocation of 1,700 plus a 10% addition) and with various proportions of that total. These calculations reflect the trip generation information which has previously been shared with ECC as part of the scoping for the traffic surveys, and assume that usage of modes other than the private car (walking, cycling, and public transport) would be similar to that observed in the surrounding residential areas, i.e., no deductions have been made for the expected impacts (reductions in vehicle trip generations) of the sustainable transport strategy associated with the SPD masterplan.

Table 1. Initial Estimate of Expected Vehicular Trip Generation (1,870 Dwellings)

	AM IN	AM OUT	PM IN	PM OUT
Vehicle Trip Rate Per Dwelling	0.146	0.365	0.338	0.157
Current Assumed Total (1,870 Dwellings)	273	683	632	294
100 Dwellings	15	37	34	16
250 Dwellings	36	91	84	39
500 Dwellings	73	183	169	79
1,000 Dwellings	146	365	338	157
1,500 Dwellings	219	548	507	236

3.1.2 We have calculated that, based on available local Census data (currently using the 2011 full Journey to Work Origin-Destination figures, as the complete data for 2021 is not yet released), there will be a likely split between users wanting to travel north (40%) and south (60%). This means that, if/ when the Site has more than one point of access, traffic would be expected to travel through the Site to the access which gives the shortest journey overall, depending on the destination for that journey. Table 2 provides a summary of the southbound (60%) trips as these are the trips which will always use the southern access point(s) and which are relevant to the discussion of the southern access options from section 5 onward.

Table 2. Southbound Trips (60% of vehicular trips)

	AM IN	AM OUT	PM IN	PM OUT
Vehicle Trip Rate Per Dwelling	0.146	0.365	0.338	0.157
Current Assumed Total (1,870 Dwellings)	273	683	632	294
Southbound Trips (60% of total)	164	410	379	176
100 Dwellings	9	22	20	10
250 Dwellings	22	55	50	23
500 Dwellings	44	110	101	47
1,000 Dwellings	88	219	203	94
1,500 Dwellings	131	329	304	142

3.1.3 Capacity discussions within this technical report are based on the full build-out of residential dwellings.

3.1.4 The trip generation and trip distribution work will need to be refined further as part of the ongoing discussions with ECC and TDC prior to any planning submission, but is considered to represent a suitably robust estimate for the purposes of the SPD and Spatial Framework.

4. A133 / PROGRESS WAY / ST OSYTH ROAD

4.1 Roundabout Improvement Proposals

4.1.1 Figure 1 below shows the initial concept design for the A133 / Progress Way / St Osyth Road roundabout junction.

Figure 1. A133 / Progress Way / St Osyth Road Roundabout Concept

4.1.2 In examining the options for enhancing the existing roundabout whilst minimising the physical extent of required works, we have considered whether a five-arm arrangement would be possible which would retain the direct connection to St Osyth Road. Such a roundabout would need to be considerably larger and would potentially require the entire existing junction to be relocated in order for it to be deliverable within the allocated site and highway land.

4.1.3 A further option considered but not taken forward at present is the retention of the existing roundabout with the main street of the development connecting into the existing St Osyth Road. This option raises concerns over the available space between the existing roundabout and the point at which the main street would need to make the new connection – there would also be a concern that an increased volume of traffic would use St Osyth Road and Little Clacton Road as a alternative to the main A133 corridor. Whilst this option has not been definitively excluded from consideration, at present it is considered that a re-configuration of the existing roundabout as shown in Figure 1 is preferable. However, there is potential for an "interim" access arrangement to be designed in this manner to provide flexibility in the early stages of development; this will be explored further as part of the OPA submission.

4.1.4 The concept shown in Figure 1 (and on drawing GB01T22C91-dwg-100-01) would entail the stopping up of St Osyth Road and the corresponding arm of the existing junction re-designed

to connect to the proposed main street. A new connection would be made from the main street across to the southern end of St Osyth Road to enable existing residents to access the A133 from the new main street arm of the junction. Whilst this would slightly increase journey times and travel distance for these residents the number of properties affected would be limited (approximately 25 individual properties and Meadowview Park, with the travel distance for the latter being the least impacted), and the route of the previous connection has the potential to be re-designed to serve walking and cycling (there is currently no footpath or other provision for sustainable modes on the part of St Osyth Road in question).

4.1.5 It is important to note that the concept design as presently shown is compliant with the requirements of DMRB, however it does not presently incorporate any facilities for pedestrians or cyclists. There is an aspiration to create a cycling link to Progress Way as part of the emerging wider walking and cycling strategy for the site; further work is therefore required to determine the best method to achieve cycle connectivity in this location, with LTN 1/20 being considered to be the primary standard to be met. It is very likely that further discussion and joint working will be required with Essex CC in particular in order to balance safe and compliant cycle provision with the wider safety and capacity considerations for more general traffic, and the pivotal importance of this junction and the A133 for vehicular access to Clacton as a whole.

4.1.6 Initial exploratory modelling of the existing junction and the concept shown in figure 1 above has been carried out; tables 1 to 2 below provide a summary of the model results. This assumes 1,870 dwellings are served with 40% of all associated vehicle trips using this junction (i.e. trips to the south use one of the southern access points discussed later in this note).

Table 3. A133 / Progress Way Existing Junction Model Results

	AM PEAK			PM PEAK		
Arm	Queue (PCU)	Delay (Seconds)	RFC	Queue (PCU)	Delay (Seconds)	RFC
2023 Base						
A133 (north)	2.1	7.63	0.65	4.1	11.67	0.8
Progress Way	2.2	13.61	0.67	4.2	24.11	0.81
A133 (south)	2.8	13.47	0.72	2.2	11.71	0.69
St Osyth Road	7.0	55.86	0.9	1.1	13.24	0.52

	AM PEAK			PM PEAK		
2028 Future Year						
A133 (north)	2.4	8.32	0.68	5.0	14.01	0.84
Progress Way	2.5	15.22	0.70	5.5	30.57	0.85
A133 (south)	3.2	15.29	0.75	2.5	13.12	0.72
St Osyth Road	10.1	76.91	0.95	1.2	14.19	0.54

Table 4. A133/Progress Way Proposed Junction Model Results

	AM PEAK			PM PEAK		
Arm	Queue (PCU)	Delay (Seconds)	RFC	Queue (PCU)	Delay (Seconds)	RFC
2023 Base						
A133 (north)	2.2	7.92	0.66	4.3	12.4	0.81
Progress Way	2.2	13.61	0.67	4.2	24.11	0.81
A133 (south)	2.8	13.47	0.72	2.2	11.71	0.69
New Road	0.6	4.39	0.37	0.3	3.33	0.21
2028 Future Year						

	AM PEAK			PM PEAK		
A133 (north)	3.5	11.55	0.76	15.3	39.21	0.96
Progress Way	3.4	19.77	0.76	20.1	96.67	1.00
A133 (south)	4.0	18.44	0.79	4.0	19.91	0.81
New Road	1.5	6.97	0.60	0.5	3.94	0.31
2028 Future Year + Development						
A133 (north)	5.4	17.22	0.84	66.2	131.24	1.07
Progress Way	5.0	27.77	0.83	57.0	259.70	1.13
A133 (south)	5.1	23.40	0.83	6.6	31.97	0.88
New Road	4.2	14.93	0.82	0.7	4.44	0.40

4.1.7 It can be seen from the initial modelling that, whilst the existing junction operates in a satisfactory manner in both 2023 and 2028, the initial concept design for the revised junction operates very close to capacity in the "do minimum" scenario and has two arms exceeding capacity when the proposed development traffic is added. The results indicate that some modification will be required to the current concept design to improve the overall functioning of the roundabout, which is expected to entail further amendment to the affected arms; further, it is noted that this testing does not take account of any measures to reduce vehicular trips as part of the sustainable transport strategy.

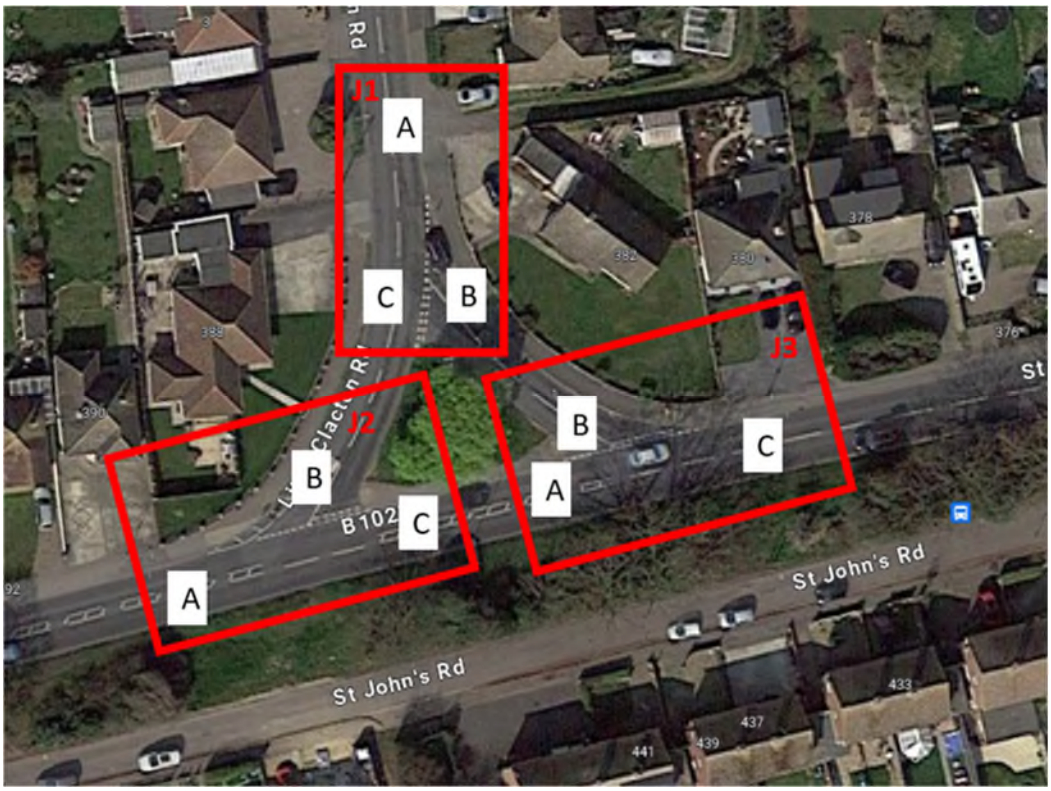
5. ST JOHNS ROAD / LITTLE CLACTON ROAD

5.1.1 Previous Local Plan work has assumed some degree of use of Little Clacton Road by development traffic. We are aware from the technical evidence produced to support the adoption of the current Local Plan that it was anticipated that a change to the existing Little Clacton Road / St John's Road junction would potentially be required; this would entail loss of the existing mature tree (investigations have confirmed that this tree is not currently subject to a Tree Protection Order or other similar measure). SYSTRA's view, based on the new survey data and associated testing, is that it is likely that it will still be necessary to amend this junction in some form; our present view is that introducing signals on all arms would be potentially disruptive, but that creating a more standard three-arm layout with a carefully positioned pedestrian crossing to serve the westbound bus stop would improve overall capacities without inducing further "rat running" behaviour on Little Clacton Road. We have tested this concept and the results of this test are reported below.

5.1.2 It is also noted that previous surveys undertaken (and the resulting base model of the junction) did not indicate any significant queuing or delays at the junction in the peak hours; the 2023 survey data indicates that the situation has now changed significantly, and it is considered highly likely that the earlier data would have been impacted by the wider effects of the Covid 19 pandemic, as although no lockdowns were in place, traffic figures in Essex and elsewhere are now known to have remained somewhat suppressed during this period, with data collected in that time being treated with considerable caution.

5.1.3 For context and comparison with any proposed improvement options, we have produced our own tests of the existing Little Clacton Road / St John's Road junction, using the advance modelling tools within Junctions 10 to represent the current multiple stop-line junction layout. Due to the three arms of the junction being split to accommodate the existing tree, and with the two forks of Little Clacton Road comprising of both entry and exit lanes, the junction has been tested using three separate (but linked) models, representing the northern, southeastern, and southwestern corners individually. Figure 3 below provides a reference image for use with the results tables.

Figure 2. Arm references for Little Clacton Road / St Johns Road models



5.1.4 A summary of the results is given below; the applied modelling methodology does not enable RFC values to be calculated for individual movements, so only the queue figures are shown.

Table 6. Little Clacton Road North Model Results

JUNCTION	ARM	AM PEAK			PM PEAK		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2023 Base							
Junction 1 (Northern Corner)	A	4.2	41.54	N/A	5.9	63.29	N/A
	B	0.5	11.96	N/A	0.4	10.50	N/A
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 2 (Southwestern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	1.6	41.57	N/A	1.6	41.72	N/A

JUNCTION	ARM	AM PEAK			PM PEAK		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 3 (Southeastern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	2.2	45.59	N/A	2.2	46.31	N/A
	C	5.8	30.87	N/A	3.8	21.08	N/A
2028 Future Year							
Junction 1 (Northern Corner)	A	6.0	61.22	N/A	7.0	67.84	N/A
	B	0.5	12.27	N/A	0.4	10.82	N/A
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 2 (Southwestern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	1.8	44.41	N/A	1.9	43.61	N/A
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 3 (Southeastern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	2.3	45.92	N/A	2.4	47.36	N/A
	C	6.2	35.57	N/A	4.7	24.11	N/A
2028 With Development							
	A	135.6	1162.79	N/A	96.0	898.70	N/A

JUNCTION	ARM	AM PEAK			PM PEAK		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Junction 1 (Northern Corner)	B	0.8	15.32	N/A	0.8	14.96	N/A
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 2 (Southwestern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	2.1	47.38	N/A	2.6	51.66	N/A
	C	0.0	0.0	N/A	0.0	0.0	N/A
Junction 3 (Southeastern Corner)	A	0.0	0.0	N/A	0.0	0.0	N/A
	B	2.8	52.27	N/A	2.2	48.57	N/A
	C	41.0	163.43	N/A	64.0	276.20	N/A

5.1.5 As anticipated, applying the full number of vehicle trips associated with the entire development site leads to very substantial increases in queues and delays at the junction. Table 7 below presents a summary of the same flow data applied to a model of a "standardised" form of the junction (i.e. where the tree is removed).

Table 7. "Standardised" St Johns Road / Little Clacton Road junction model results summary

	AM PEAK			PM PEAK		
Arm	Queue (PCU)	Delay (Seconds)	RFC	Queue (PCU)	Delay (Seconds)	RFC
2023 Base						
Little Clacton Road (left/right)	9.5	114.20	0.96	9.5	112.66	0.96

	AM PEAK			PM PEAK		
St Johns Road (right turn)	1.3	7.21	0.42	0.8	5.87	0.30
2028 Future Year (DM)						
Little Clacton Road (left/right)	15.1	166.99	1.03	15.0	163.52	1.03
St Johns Road (right turn)	1.4	7.57	0.45	0.9	6.00	0.32
2028 Future Year (With Development)						
Little Clacton Road (left/right)	187.7	1847.47	2.01	179.6	1961.33	2.09
St Johns Road (right turn)	4.2	14.03	0.70	5	15.47	0.74

5.1.6 It can be observed from the data that, with the standardised junction layout, whilst the Little Clacton Road arm is operating well beyond capacity in the "with development" model, the right turn into Little Clacton Road operates well within capacity, which is a major improvement in comparison to the existing junction results (where lengthy queues and delays are expected on St John's Road itself.

5.1.7 The do minimum results indicate that, with the standardised layout, Little Clacton Road will effectively operate at capacity; however, it is noted that these models do not reflect the fact that signal controls are present at the junctions to either side and that it has been observed on site that this creates a series of "gaps" in traffic which aids vehicles making these movements. Therefore, based on the table of trips associated with early phases (Table 1 above), we consider that up to 250 - 300 homess could be served purely from Little Clacton Road if the standardised layout were to be implemented. We also consider that this figure

could increase if an additional access point is created at Legerton Drive; the basis for this is explained below.

6. LEGERTON DRIVE ACCESS

6.1 Access Concept Designs

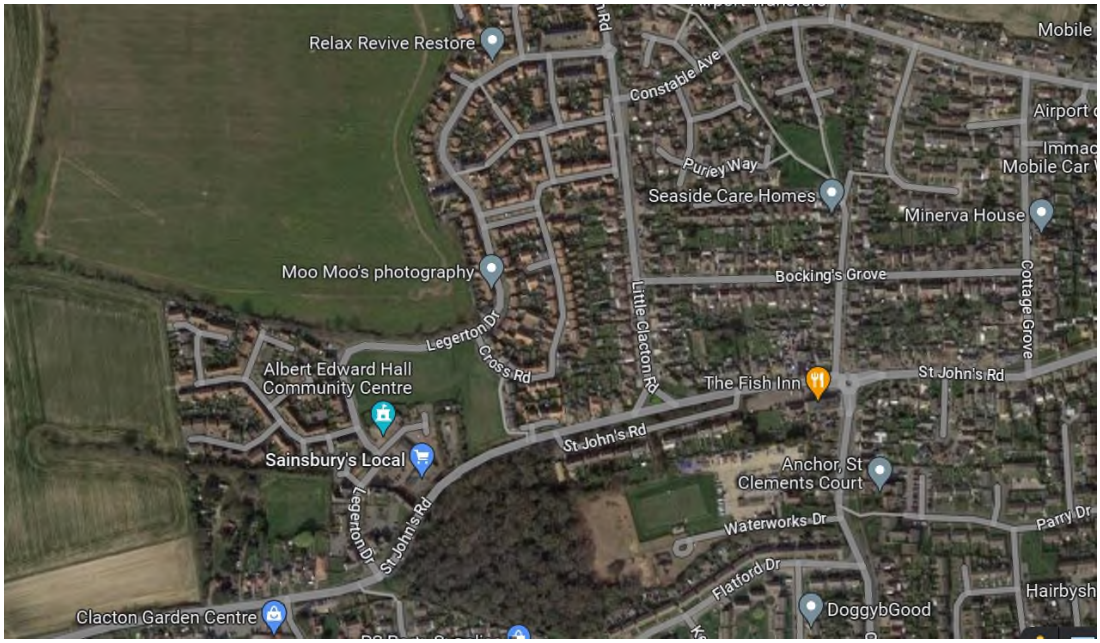
6.1.1 Figures 4 and 5 below present two concept designs which have been prepared for a potential access point on to Legerton Drive.

Figure 3. Legerton Drive New Access – All Vehicle Types

Figure 4. Legerton Drive New Access – Cars and Light Vehicles only

6.1.2 Legerton Drive forms part of the road network which presently serves an existing area of residential development to the north of St John's Road. Figure 6 below shows this context, including the connection between Legerton Drive and Little Clacton Road.

Figure 5. Legerton Drive – Local Highway Network context



6.1.3 It is recognised that the provision of a vehicular access from Legerton Drive (as opposed to a walking and cycling access point) will be constrained by the capacity and safety considerations of the surrounding networks. The current designs are intended to be compatible with these networks. For the purposes of the initial tests, we have calculated

a split of development traffic which divides between the Legerton Drive and Little Clacton Road routes to St Jonh's Road, based on its ultimate destination and which route is more logical for a driver to take. A summary of the current junction concept model tests is provided below.

Table 8. Legerton Drive Access Modelling Results

	AM PEAK			PM PEAK		
Arm	Queue (PCU)	Delay (Seconds)	RFC	Queue (PCU)	Delay (Seconds)	RFC
2028 With Development (Car and light vehicles only layout)						
New Road – Legerton Drive E	0.6	12.28	0.39	0.2	8.10	0.15
New Road – Legerton Drive W	0.7	17.93	0.43	0.2	13.91	0.20
Legerton Drive E – New Road	0.1	7.20	0.13	0.5	9.62	0.31
2028 With Development (All Vehicles layout)						
New Road – Legerton Drive E	0.5	9.32	0.32	0.2	6.85	0.13
New Road – Legerton Drive W	0.6	13.47	0.36	0.2	11.53	0.17
Legerton Drive E –	0.1	7.21	0.13	0.5	9.64	0.31

	AM PEAK	PM PEAK
New Road		

6.1.4 The initial tests indicate that the current concept junction layouts would have capacity to accommodate the anticipated traffic travelling to and from destinations to the south; this is expected to continue to be the case when alternative distribution assumptions are tested (some alternatives are discussed below).

6.2 Interactions between Legerton Drive / St John's Road and Little Clacton Road / St Johns Road Junctions

6.2.1 The creation of a new junction on to Legerton Drive would make it simpler and more convenient for development traffic to use the Legerton Drive / St Johns Road signalised junction to access the St Johns Road corridor. Initial testing of this junction has indicated that there will be some capacity for growth here, based on optimisation of the existing signals; it is noted that theoretically there is nothing to prevent traffic approaching from the site via Little Clacton Road from utilising this route, however it would involve a right-turn across traffic to reach Legerton Drive and drivers are likely to prefer to remain on Little Clacton Road, even if this means waiting in a queue, especially if they are heading toward the town centre as the "double back" could be perceived as significant. Conversely, traffic entering the network on to Legerton Drive would be expected to experience noticeably shorter journey times using the signalised access on to St John's Road as their travel time to this point will be very short, and the signals will guarantee "green time" for this movement, whereas the corresponding "gaps" at Little Clacton Road will be much shorter.

6.2.2 Based on the available information, we currently estimate that between 500 and 700 homess could be served with the addition of a new access at Legerton Drive (on top of the Little Clacton Road junction standardisation), on the assumption that drivers use the most direct routes as outlined above. Beyond this point, we consider that some form of additional direct Southern access point on to St Johns Road will be required; this is discussed in the following section.

7. ST JOHNS ROAD / JAYWICK LANE (NEW SOUTHERN ACCESS)

7.1 Existing Junction Layout and Performance

7.1.1 The allocation site includes an area of frontage on to St Johns Road in the vicinity of Jaywick Lane. The existing St Johns Road / Jaywick Lane junction takes the form of a three-arm mini roundabout; this layout has been modelled and a summary of the results for the 2023 baseline and 2028 future baseline scenarios is provided at Table 10 below.

7.1.2 It is noted that the nearby planning consent for Rouses' Farm includes a requirement for this junction to be converted to a three-arm signalised junction. This has not been directly considered here as the build-out timeframe for this site is uncertain, but it has been taken into account when considering the potential southern site access options.

Table 10. Existing Junction Model Results Summary

	AM PEAK			PM PEAK		
Arm	Queue (PCU)	Delay (Seconds)	RFC	Queue (PCU)	Delay (Seconds)	RFC
2023 Baseline						
St Johns Road (East)	4.5	24.15	0.83	8.0	40.80	0.91
Jaywick Lane	4.9	40.18	0.85	4.5	39.06	0.84
St Johns Road (West)	4.7	24.84	0.84	7.9	38.84	0.91
2028 Future Baseline						
St Johns Road (East)	5.8	30.21	0.87	11.6	56.54	0.95
Jaywick Lane	6.7	53.31	0.90	5.9	50.12	0.88

	AM PEAK			PM PEAK		
St Johns Road (West)	6.0	30.91	0.87	11.2	53.16	0.94

7.2 Initial access options

7.2.1 Figures 7 and 8 below show the first two concept designs which were prepared for a potential new access point to St John's Road from the southern edge of the allocation site.

Figure 6. St John's Road New Access – Compact Roundabout

Figure 7. St John's Road New Access – Signalised Junction (single lanes)

7.2.2 The above concept designs are compliant with Manual for Streets requirements and are based on the new connection being made directly opposite Jaywick Lane. This connection would provide good connectivity to the south, particularly for pedestrians and cyclists. It is noted that the data from the traffic surveys indicates that an alternative new T-junction access may also be feasible to the east of Jaywick Lane; further consideration of this option is set out below.

7.3 Enlarged four arm signalised junction

7.3.1 Of the two initial concepts, it is presently SYSTRA's view that a signalised layout would offer the best level of provision for non-motorised modes and also the potential to prioritise public transport; however, initial modelling of the layout shown in figure 7 has indicated that this arrangement with single lanes at each arm will have insufficient capacity to accommodate existing flows on St Johns Road without creating very significant additional queuing and delay.

7.3.2 Figure 9 below shows an expanded layout which provides two lanes on each of the St Johns Road approaches. The approach on Jaywick Lane is unable to be widened due to a lack of available land to make these lanes long enough to be helpful in increasing capacity on this approach.

Figure 8. St John's Road New Access – Signalised Junction (two lanes)

7.3.3 Table 11 below provides a summary of the results of a Linsig model of this junction arrangement. (The development flows represent full build-out of the scheme with 40% of development traffic assumed to use the northern site access, i.e. an effective "end state"). The traffic figures additionally include specific flows taken from the Rouses' Farm TA to ensure that the impacts of this consented scheme are also accounted for.

Table 12. St Johns Road / Jaywick Lane / New Access two-lane signalised junction model results summary

	AM PEAK			PM PEAK		
Arm	DoS	MMQ	Delay (s/PCU)	DoS	MMQ	Delay (s/PCU)
2028 With Development						
Development Access	55.0%	9.1	44.1	28.8%	3.7	42.2
St Johns Road (East)	74.8%	20.0	31.3	76.1%	20.8	30.2
Jaywick Lane	118.0%	54.4	377.1	108.7%	40.1	245.5

	AM PEAK			PM PEAK		
St Johns Road (West)	118.9%	71.5	338.6	110.0%	52.3	218.1

7.3.4 The results of the modelling indicate that there would be considerable delays to traffic in both the AM and PM peak periods on the St Johns Road West and Jaywick Lane arms of the junction, even with signal optimisation applied. The issues observed are due to the inability to increase the capacity on Jaywick Lane, and the need to keep queues and delays on St John's Road East within a level that does not lead to knock-on disruption to the Legerton Drive junction to the east.

7.3.5 It is noted that, as has been commented on in relation to the Little Clacton Road junction, there would be some staggering of traffic flows approaching from the east due to the presence of the Legerton Drive signals. However, the magnitude of the observed delays means that we do not consider that this would allow for any further significant changes to the proposed signal arrangement at the new junction to be made.

7.3.6 We have therefore carried out an initial further concept exercise to examine how further capacity and operational flexibility could be created through a staggered arrangement of junctions, offsetting the new development access point to the east; this is discussed below.

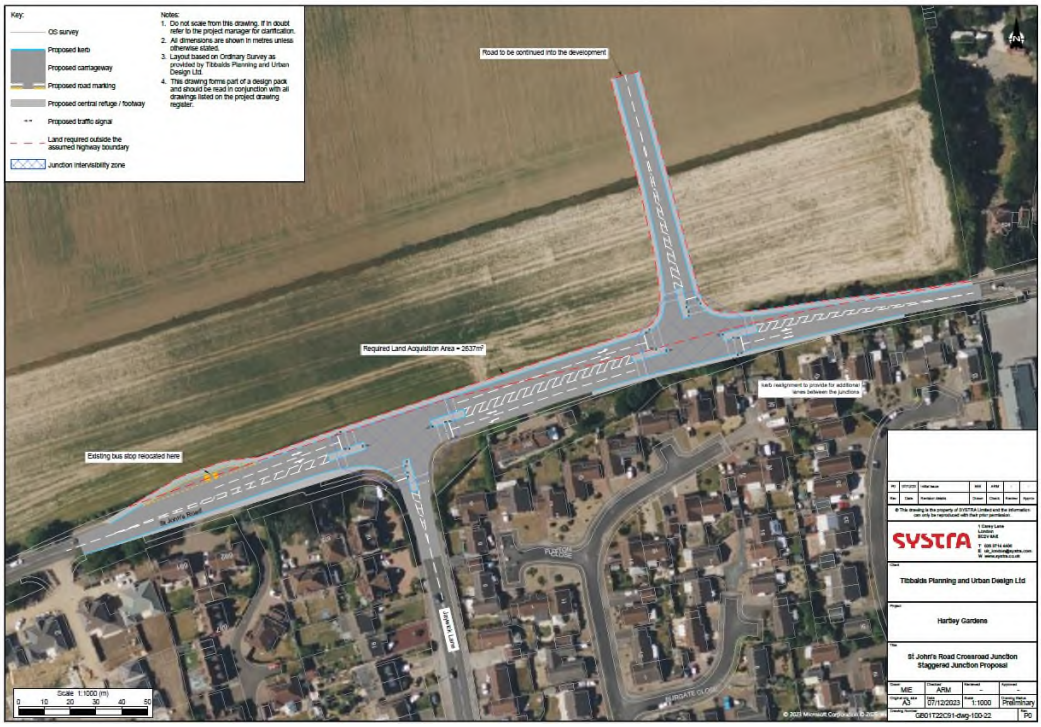
7.4 Staggered Signalised Junction Arrangement

7.4.1 In principle, the use of a staggered arrangement has the potential to allow more road space to be created via a more extensive widening of St John's Road along the allocation site frontage. This significantly expands the available space for creating a right-turn reserve, whilst the off-set allows two lanes to continue to be provided at the existing St Johns Road / Jaywick Lane junction, expanding the mainline capacity in this area.

7.4.2 We have firstly considered whether a simple T-junction arrangement would be sufficient, broadly retaining the current junction forms to east and west. However, the volume of traffic on St John's Road, and the anticipated future operation of the existing St John's Road / Jaywick Lane junction close to capacity before any development impacts are taken into account would make this highly unlikely to be acceptable, and the addition of lanes at the Jaywick Lane junction without some form of signal control is expected to create safety concerns, as the current mini-roundabout design does not have sufficient circulation space to accommodate these and applying a priority layout instead would make it extremely difficult for traffic to exit from Jaywick Lane.

7.4.3 We have therefore prepared a concept design for a staggered pair of signal controlled junctions, as shown in Figure 10 below. We have iterated on this design to find the optimum placement of the new access arm, so that there is maximised separation and queuing capacity at the Jaywick Lane junction, but also significant capacity in the right-turn lane for the new access junction.

Figure 9. Concept Design – Staggered Signalised Junction Layout



7.4.4 Due to the presence of the Legerton Drive signalised junction, and the spacing between Jaywick Lane and the new access, we have undertaken to model the junction in two different methods, as follows:

1) A model of the layout shown in figure 10, which does not include Legerton Drive – this model is able to be constructed from existing survey and future development trip generation and trip distribution data and enables us to optimise the signal timings to manage flows in the widened central section; and

2) An expanded model which includes the Legerton Drive signals and therefore represents the full extent of St Johns Road between Jaywick Lane and Legerton Drive. In order to create this model we have used estimation techniques to calculate certain movements that are not directly observable in the baseline data – this is explained further below, but is necessary in order for the model to make sensible assumptions around which lanes traffic would be most likely to use depending on their ultimate "destination" in the model.

7.4.5 Figures 11 and 12 below provide a reference map to aid interpretation of the model data summary tables.

Figure 10. Jaywick Lane / St Johns Road / New Access References

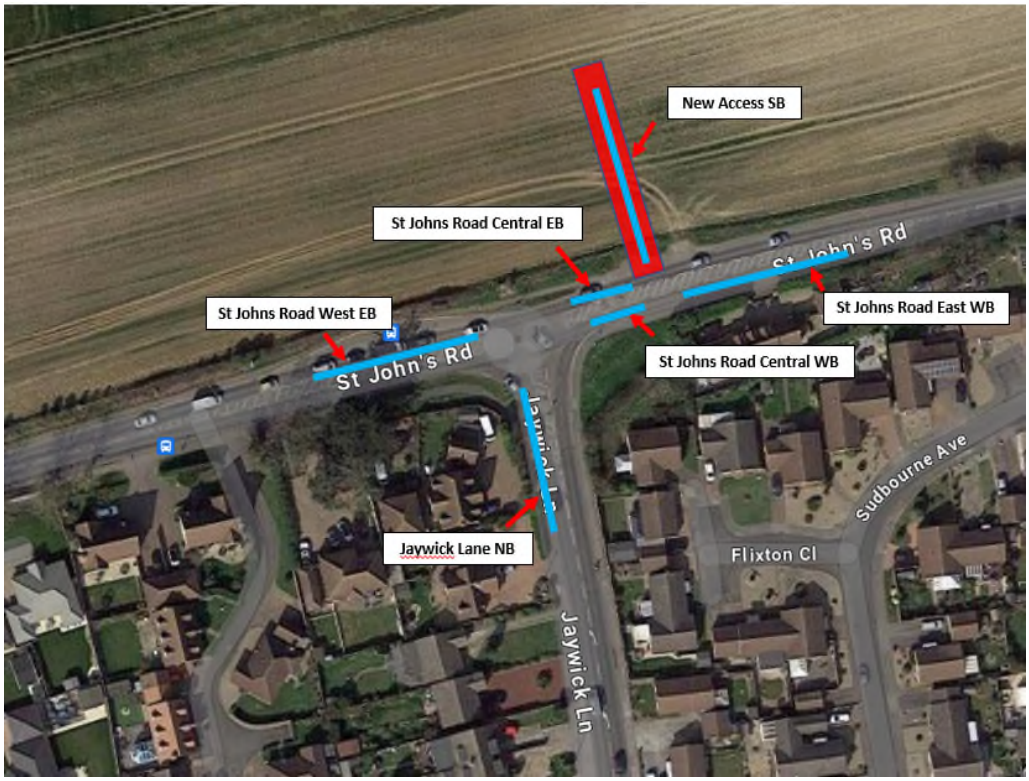
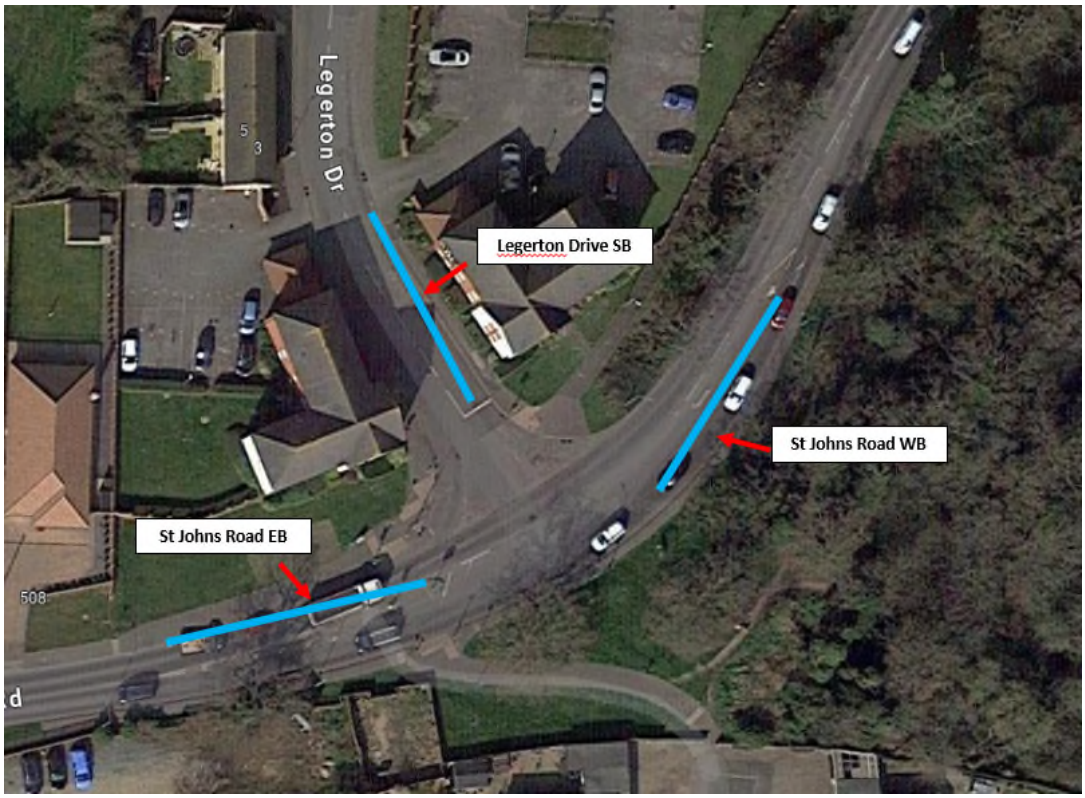


Figure 11. St Johns Road / Legerton Drive References



7.4.6 Tables 14 to 16 summarise the results of the first modelling exercise (the layout shown in Figure 10, excluding Legerton Drive).

Table 14. Model Summary Results (Jaywick Lane / St Johns Road / New Access)

ARM	AM		PM	
	DoS	MMQ	DoS	MMQ
St John's Road West EB	120.0%	84.7	123.3%	108.0
St John's Road Central EB	82.8%	12.6	82.4%	13.4
St John's Road East WB	105.7%	43.8	116.4%	88.8
St John's Road Central WB	82.9%	12.5	76.4%	11.7
Site Access	124.5%	41.4	80.5%	5.0
Jaywick Lane NB	112.2%	40.8	120.7%	52.2

Table 15. Jaywick Lane/New Access Internal Arm Stacking Space

INTERNAL ARM	CAPACITY (PCU)	CAPACITY (M)
St John's Road EB (Site Access Stopline)	13.4	76.8
St John's Road WB (Jaywick Lane Stopline)	13.1	75.1

Table 16. St Johns Road Westbound Stacking Space to Legerton Drive Junction

ARM	CAPACITY (PCU)	CAPACITY (M)
St Johns Road WB (Site Access Stopline)	45.2	260

7.4.7 The summary results are for models which have been optimised to ensure that the queuing within the junction (as evidenced in tables 15 and 16) is managed at a level where "blocking back" is avoided. In practice, this means that once drivers enter the area of St Johns Road between the approach to the new access and Jaywick Lane, they are able to proceed through in a single "cycle" even during the peak periods. Achieving this outcome requires traffic to be held at certain locations, primarily St Johns Road eastbound at its junction with Jaywick Lane, Jaywick Lane itself, and at the new access arm, through balanced or reduced green time; this results in the substantial queuing and delay observed on these arms.

7.4.8 In appraising this data, the following points should be noted:

- The widening of the St John's Road entry into the Jaywick Lane junction to two lanes creates some additional capacity and allows vehicles turning right their own space so that the amount of traffic able to proceed on each green phase is maximised.

- It is not possible to alter the Jaywick Lane entry into the junction in a similar manner and as such this acts as a constraint as to how much traffic can move into St John's Road on each green phase. The signals have been adjusted to allow as much green time as is feasible but the need to control movements means that increases in delays and queuing compared to the current mini-roundabout arrangement are unavoidable.
- The combination of the linked signal timings and the creation of two lanes in each direction on St Johns Road east of Jaywick Lane means that the "new" road space is able to accommodate the demand associated with the new access road from vehicles approaching from both east and west. This means that the development traffic is not "taking away" space for other traffic in comparison with the current layout and capacity of St Johns Road.
- It has been considered whether this approach could work for a non-signalled junction arrangement. However, the increased carriageway width would require at least one signalised pedestrian crossing, which it is expected would be called frequently in the peak periods; this would be likely to create issues with the Legerton Drive signals and traffic would also be highly likely to additionally block back to the Jaywick Lane junction. The current signal arrangements allow for regular pedestrian stages which run in harmony with the wider sequence, so good connectivity is maintained for active modes without compromising wider corridor movement for vehicles.

7.4.9 In summary, the staggered layout would be likely to lead to some increase in journey times for existing traffic in comparison to those currently observed. However, the data from the initial modelling of the existing St Johns Road / Jaywick Lane junction indicates that the volume of expected future traffic which is not connected to the Hartley Gardens site would mean that delays and unreliability of journey times will increase on this corridor and, whilst there will still be notable impacts associated with the introduction of the new sets of signals, the reliability of journey times, and the safe movement of the expected traffic volumes, is anticipated to be either the same or better with the proposed southern access design implemented. This is also expected to be the case if the signals associated with the Rouses' Farm development are implemented.

7.4.10 Tables 17 to 19 summarise the results for the second modelling exercise (which models Jaywick Lane, the new access and the Legerton Drive junctions in a single linked model). It is noted that the performance of the internal stacking areas (tables 18 and 19) has been maintained in this model from the previous version and the results are therefore consistent with this arrangement.

Table 17. Model Summary Results (Jaywick Lane / St Johns Road / New Access / Legerton Drive)

ARM	AM		PM	
	DoS	MMQ	DoS	MMQ
Junction 1 – Jaywick Lane/St Johns Road/New Access				
St Johns Road West EB	134.6%	112.7	139.6%	146.5

ARM	AM		PM	
	DoS	MMQ	DoS	MMQ
St Johns Road Central EB	87.9%	13.5	85.7%	13.8
Jaywick Lane NB	126.4%	59.5	131.7%	65.2
New Access SB	114.9%	31.6	80.5%	5.0
St Johns Road East WB	105.9%	51.6	106.0%	56.7
St Johns Road Central WB	80.0%	12.7	70.4%	10.4
Junction 2 - St Johns Road/Legerton Drive				
St Johns Road West EB	59.9%	5.8	66.7%	10.3
Legerton Drive SB	86.9%	7.7	57.3%	5.7
St Johns Road East WB	78.4%	17.2	103.9%	46.9

Table 18. Jaywick Lane/New Access Internal Arm Stacking Space

INTERNAL ARM	CAPACITY (PCU)	CAPACITY (M)
St John's Road EB (Site Access Stopline)	13.4	76.8
St John's Road WB (Jaywick Lane Stopline)	13.1	75.1

Table 19. St Johns Road Westbound Stacking Space to Legerton Drive Junction

ARM	CAPACITY (PCU)	CAPACITY (M)
St Johns Road WB (Site Access Stopline)	45.2	260

7.4.11 The inclusion of the Legerton Drive signals into the model enables the effects of further optimisations to be tested. It is particularly noted that adjustments to the Legerton Drive signals allows for better management of traffic flows westbound toward Jaywick; in the AM peak this is achieved whilst maintaining the operation of all arms of the junction within capacity, whilst in the PM peak there is some extension of queues at the westbound stopline

(this is logical due to the volume of traffic travelling west in the PM peak away from the central areas of town, either to access Jaywick Lane or to proceed westwards toward Jaywick itself.

7.4.12 It is also important to note that the current tests assume that all traffic which would be expected to access the site from the south (i.e. the 60% of total identified earlier in this report) has been assumed to use the new southern access. In practice, it is likely that some development traffic will use Legerton Drive and some will use Little Clacton Road – it can be noted that the second model test confirms that there is some potential capacity for this on Legerton Drive. It is well understood that local consultees wish to see increased use of Little Clacton Road kept to a minimum; however, as the new Southern access is also assumed to attract a significant amount of "through" traffic away from Little Clacton Road, the net effects across the entire stretch of the St Johns Road corridor between Jaywick Lane and Little Clacton Road would be expected to adjust over time so that journey routes and available capacities are aligned in an efficient manner. There is likely to be some discussion around how much additional traffic and delay local residents, members and ECC Highways consider acceptable in the earliest phases of the development (where Little Clacton Road and Legerton Drive will be the primary access points) and whether there is a desire or preference to accept greater impact if the existing junction layout (and tree) at Little Clacton Road is retained.

7.4.13 To further assist with the management of day-to-day variances in demand, it is envisaged that, subject to discussions with ECC, detector loops could be used to identify situations where delays / queues for particular traffic movements are becoming extended, and a responsive signalling system could be employed to assist in managing these situations if they arise. This is a very common intervention in urban settings where traffic signals are used and is not dependent on a larger "area wide" system such as SCOOT being implemented.

7.4.14 Our view based on this capacity testing is that a layout of this type offers the opportunity to bring development traffic to and from the St Johns Road corridor whilst minimising the impacts on other vehicular traffic, and specifically prioritises the movement of vehicles along the St John's Road corridor within the extent of the modelled area. It is also noted that the proposed layouts would provide excellent connectivity for active modes, particularly to the Jaywick Lane corridor, and that there would also be the possibility of considering integration of bus recognition into the signalling system, to provide resilience to bus access and journey times through this part of the network.

7.5 Alternative Large Roundabout Arrangement

7.5.1 Notwithstanding the analysis of the staggered signalised arrangement for the southern access junction, SYSTRA has also investigated a larger version of the original roundabout design. As noted above, the initial roundabout was too small to accommodate all of the demands being placed upon it, therefore consideration was then directed to a significantly larger roundabout design, which would provide a "step change" in vehicular capacity.

7.5.2 Creating such a junction requires the entire stretch of St Johns Road along the site frontage to be pushed north, and a number of iterations were sketched before an arrangement was found which was considered to be acceptable purely in geometric terms. This concept sketch is shown in the figure below.

Figure 12. Large Roundabout Concept Sketch

7.5.3 This sketch was used for an initial modelling test, using the traffic flow data for a four-arm junction design previously applied to earlier design work (thus comparing "like with like"). These initial tests indicated that, in principle, a junction of this scale could operate for vehicles within capacity (i.e. with RFC values below 0.85 on all arms in both peak periods). As such, it was determined that the concept design should be developed further, principally to address the following issues:

- Integrating access arrangements for affected properties with frontage access on to St Johns Road (including refuse and large vehicle access)
- Addressing the relocation of the existing bus stops
- Improving provision for pedestrians and cyclists
- Confirming suitability of the design for buses / larger vehicles

7.5.4 The updated large roundabout design is shown in Figure 14 below.

Figure 13. Large Roundabout updated design (preliminary)

Modelling Results

7.5.5 Table 20 below provides a summary of the highway capacity modelling for the updated layout. (Some minor amendments have been made from the initial concept to reflect the updated design geometries).

Table 20. Large Roundabout Highway Capacity Modelling Summary Results

ARM	AM			PM		
	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)
2028 With Development						
Site Access	0.26	0.3	3.71	0.11	0.1	3.08
St Johns Road East	0.46	0.9	3.89	0.57	1.3	4.54
Jaywick Lane	0.38	0.6	4.83	0.39	0.7	5.22

ARM	AM			PM		
	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)
St Johns Road West	0.49	1.0	3.94	0.55	1.2	4.50
2034 With Development						
Site Access	0.28	0.4	4.20	0.12	0.1	3.27
St Johns Road East	0.49	1.0	3.99	0.64	1.8	5.41
Jaywick Lane	0.39	0.7	5.07	0.42	0.7	5.89
St Johns Road West	0.58	1.4	4.73	0.60	1.5	5.11

7.5.6 The model results show that the roundabout would be expected to operate well within capacity on all arms in all time periods, with minimal delays and queue lengths.

Access to Properties on St Johns Road

7.5.7 The updated design incorporates revised access arrangements for the properties which currently have direct access on to St Johns Road. The space which is created by the necessary re-alignment of the main carriageway has been used to create new service roads, incorporating turning space for large vehicles where possible. On the western side, due to the number of properties requiring access and their arrangement, we have determined that large vehicles would need to enter from the entry point closest to the roundabout and exit from the corresponding junction to the west; this will require vehicles approaching from the west on St John's Road to circulate the roundabout before entering the service road. However, given the short distance involved and the performance of the roundabout we do not consider that this arrangement is unduly onerous, and the frequency of large vehicle access being required to the small number of properties involved is expected to be very low.

7.5.8 It is noted that the separation between the western service road exit and the existing private access drive to adjacent properties is not fully compliant with Manual for Streets requirements, however this cannot be rectified in the space available as moving the exit any closer to the roundabout would make it impossible to reprovide the existing bus stop.

Provision for Pedestrians and Cyclists

7.5.9 All footpaths and crossing points within the design are compliant with current ECC and Manual for Streets / DMRB guidelines. Due to the size of the roundabout we have considered specifically what can additionally be done for active users, particularly those currently travelling east to west on St John's Road; as such, the design for the areas to the south of the roundabout has been designed to act as an alternative "bypass" route for cyclists, linking the two new service roads directly to the new crossing on Jaywick Lane. We have reviewed the positions of the new access junctions specifically for cyclists travelling west to east; these avoid the need to cross multiple lanes of traffic as far as possible, though the arrangement on the eastern side of the main junction is wider than would be preferred.

7.5.10 Notwithstanding this, the roundabout layout means that pedestrians and cyclists moving to and from the development have to travel considerably further to move around the roundabout than is the case with the direct access from the new junction as part of the signalised arrangement. It is also not possible to provide islands on all four arms of the junction in locations which match the expected "desire line" for pedestrians.

7.5.11 As previously noted, our current view is that the introduction of signal crossings for pedestrians and/or cyclists in a location which is attractive to these street users would re-introduce the issues observed in the signalised junction arrangement, and the sheer size of the large roundabout remains a concern in terms of the street environment for active travel users. However, we note that the upgrade to the pedestrian footpath on the northern side of St Johns Road will significantly improve access to the existing pedestrian crossings incorporated into the St Johns Road / Legerton Drive signalised junction.

7.6 Provision for Buses

7.6.1 The layout of the area to the south of the main roundabout has been designed to incorporate re-provision of the existing bus stops. Lay-bys have been provided to minimise the risk of disruption to vehicles approaching or exiting the roundabout; this also provides an opportunity for enhanced provision of shelters, timetables and related infrastructure.

7.6.2 It is noted that, as an alternative, the lay-bys could be replaced with on-street bus cages (the proposed shelters and timetables would still be provided). This would eliminate any potential delays to bus services associated with the need to merge back into traffic.

7.6.3 It is noted that passengers alighting from the eastbound bus stop would be expected to walk back west to the dropped kerb to cross over St Johns Road and then along the southern footpaths to access Jaywick Lane or proceed eastward on St Johns Road. This is due to the fact that incorporating crossing points closer to the roundabout would be very challenging with the geometric arrangements which are necessary to correctly align the new St Johns Road carriageway and the junction entry arms.

7.6.4 With regards to further reducing delays to public transport services during busy periods, it is considered feasible to add a bus gate to the new development arm of the central junction. This would enable bus services leaving the development to bypass queuing vehicles; it is considered that this would significantly reduce or eliminate delays for services using this route. Due to the physical constraints on St Johns Road it is not considered feasible to provide similar dedicated bus infrastructure on other arms of the junction.

7.6.5 Considering the junction arrangement as a whole, it is considered that provision of a selective detection system could be integrated into the signal system. This would utilise transponders on equipped vehicles to enable the signals to detect approaching buses and adjust the signal timings so that the movement of these vehicles is prioritised. It is noted that this system is largely used currently in cities and as part of wider flexible / demand responsive signal technologies, however that would not prevent its implementation in this context. There would be additional installation costs compared with a traditional signal system and a yearly cost associated with the maintenance of on-bus equipment, however there would be potential in future to utilise the technology elsewhere in Clacton where signalling upgrades are being considered.

Other Points of Note

7.6.6 From a pure capacity perspective, the large roundabout design offers much greater vehicular capacity than can be achieved with the signalised junction layout previously examined. However, this is at the cost of significant compromise in terms of the directness and quality of provision for pedestrians and cyclists, and the footprint of the junction is very much greater, which will increase both construction and future maintenance costs.

7.6.7 It is also noted that, from an urban design perspective, the large roundabout sits entirely out of proportion with both the existing built environment and the proposed spatial framework masterplan.

7.6.8 Further, it is known that the large roundabout would impinge upon land which is currently identified as having importance for over-wintering birds (functionally linked land).

7.7 Comparison of Signalised Scheme and Alternative Roundabout Scheme

7.7.1 The table below summaries the key benefits and dis-benefits of the signalised layout and the alternative layout for the new southern access junction.

Table 21. Comparison Table – Southern Access Main Design Options

CRITERIA	SIGNALISED LAYOUT	LARGE ROUNDABOUT LAYOU
Policy Compliance	Positive – prioritises active modes, can include priority for public transport	Neutral / Negative – prioritises vehicular capacity, provision for active modes is technically adequate but does not encourage mode use
Urban Design	Positive - Includes limited section of dual carriageway but retains an urban “feel” and scale consistent with the wider masterplan	Negative - Very large junction footprint which is out of proportion with both existing and planned urban form.
Pedestrian Provision	Positive - High quality signalised direct crossings and new / upgraded footways.	Neutral - Island crossing points and footways which comply with minimum requirements, plus additional “quiet” route to south of roundabout.

CRITERIA	SIGNALISED LAYOUT	LARGE ROUNDABOUT LAYOU
Cyclist Provision	Positive – crossings are suitable for cyclists and advanced stop lines can be incorporated into the design as required.	Neutral / Negative – "bypass" provided on southern side of roundabout but no additional provision possible within the main roundabout itself.
Public Transport Provision	Positive / Neutral – bus stops retained as part of design, however eastbound stop / layby may experience some delay in the peaks due to queuing traffic.	Positive / Neutral – bus stops are retained with new laybys. Capacity of roundabout means delays to services should be minimal, but access to eastbound stop requires a longer walking route than existing or signalised layout.
General Traffic Capacity	Negative – the introduction of signals increases delay and queue lengths substantially in the peaks in comparison to a "do minimum" scenario.	Positive – the roundabout has spare capacity in both peak periods on all arms.
Highway Safety	Positive – the conditions for active modes would be significantly improved, with facilities for pedestrians and cyclists experiencing a "step change" which would seek to encourage increased use of these modes.	Neutral – the layout is considered to meet basic technical requirements for all modes but offers no significant improvement in safety terms.

7.7.2 In examining the potential options for access to the south, we have identified those options which would potentially be acceptable from a highway design perspective and have then tested these in a series of configurations to determine what arrangements would be most suitable in terms of overall capacities, impacts to existing and expected future traffic on the St Johns Road corridor, the prioritisation of active and sustainable modes, and safety considerations for all modes. We envisage that an "end state" with a new access between Jaywick Lane and Legerton Drive will serve to bring traffic to and from the site and will also naturally attract westbound traffic away from the Little Clacton Road junction; whilst some development traffic would still be expected to use the Legerton Drive junction and Little Clacton Road, the internal layout of the site as shown in the current SPD spatial Framework Masterplan would assist in managing this behaviour. Further work is to be undertaken with TDC, ECC and other stakeholders to determine which concept for the Southern access (the staggered interlinked signals, or the large roundabout) will be included within the OPA.

7.7.3 The overall access strategy therefore seeks to achieve appropriate and efficient access for development traffic to the north and south, with an emphasis on facilitating active and sustainable mode connections to the locations where shorter distance and local trips are

expected to be focused. The internal layout of the site seeks to maximise opportunities for internalisation of trips, and it is noted that the design of the main street in particular, whilst not excluding through-traffic, is being developed to ensure that active modes and public transport are prioritised and that there is not an increase overall in traffic from outside the development using the main street in preference to the A133 corridor into the town.

8. ACCESS FOR PUBLIC TRANSPORT AND ACTIVE MODES

8.1 Achieving Public Transport Access and Integration with current Networks

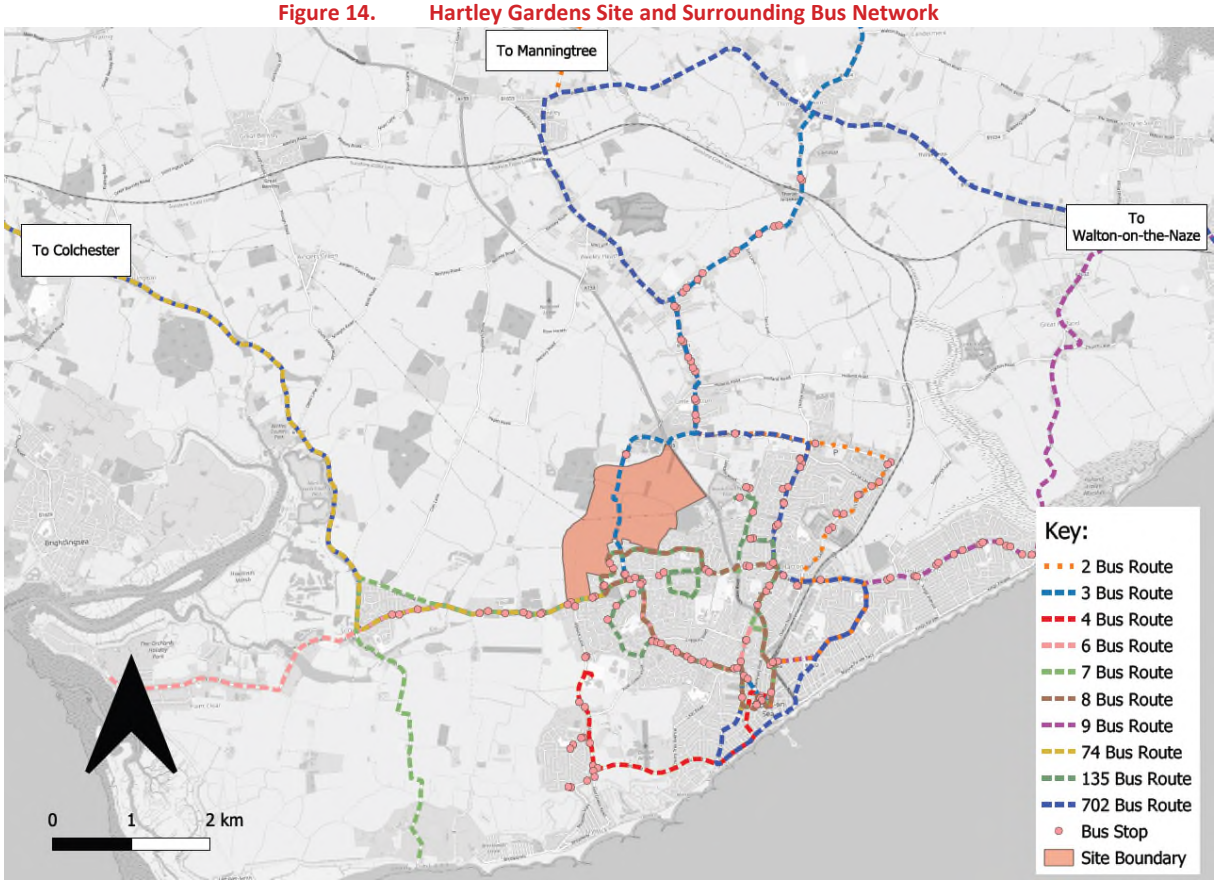
8.1.1 The access strategy as it has been analysed and interrogated in the work done to date has primarily been concerned with providing vehicular access to the north and south of the wider site area, with “active” modes largely concentrated on the southern access points due to the much larger number of destinations which can feasibly be reached on foot and by cycle from these starting points. (It is noted that the existing subway towards Brook Park West is also a significant route for active modes, however the analysis carried out by Space Syntax and reviewed by SYSTRA indicates that the demand for travel via this route is expected to be relatively modest).

8.1.2 It is noted that the current spatial framework masterplan assumes there will be active mode connections through to the relatively recently developed areas adjacent to the A133 corridor (including those within the control of Britton Land), but that these have yet to be specified in detail.

8.1.3 A further critical part of the access strategy will be how access is delivered and maintained for public transport (principally bus services) over the different stages of development. The strategy will need to be flexible so that it can adjust as the phasing of the development evolves; more information is expected to be available at the SPD consultation, outline pre-application, and outline submission stages. However, it is considered that some general observations and concepts as to how a coherent strategy could be developed are helpful to put forward alongside the access proposals.

8.1.4 Figure 13 indicates the Site boundary and the surrounding local bus routes in relation to it.

Figure 14. Hartley Gardens Site and Surrounding Bus Network



8.1.5 It can be seen that there is one bus route (route 3) which currently routes along Little Clacton Road; there are three routes (routes 7,8 and 135) which directly serve the adjacent residential areas and pass by the site's southern boundary on Legerton Drive. Additionally, routes 6, 74 and 702 run along St John's Road and are therefore somewhat accessible to the southern part of the site.

8.1.6 The existing routing data indicates that there is some potential in early phases for short diversions of existing routes using Legerton Drive, so that the "accessible" area of the site can be expanded without incurring significant additional journey times or operating costs for these routes. Once the new southern access is in place, there is potential for these routes to use this access rather than the Legerton Drive / St John's Road junction to reach the St John's Road corridor. Careful consideration will need to be given as to what level of financial support would be required to achieve an acceptable frequency of service, and what the "knock on" impacts would be for existing passengers. However, this approach is considered to be generally consistent with ECC's recent bus strategy work and responsive to anticipated concerns from bus operators.

8.1.7 It is anticipated that, at an appropriate point associated with sufficient progression of the Main Street, an "end to end" route will become the more attractive option for serving what should be an increasing population at the site. One particular opportunity could be presented with route 135, which currently runs relatively close to both the northern and southern ends of the site, and could potentially be "recast" to run through and form a genuine "orbital" route for the town. Any changes to the route around Little Clacton Road and Legerton Drive could be addressed through a strengthening of other routes serving this area.

8.1.8 More work is expected to be carried out around the operations and viability of public transport services and access as the spatial framework masterplan develops and an OPA submission is prepared. However, the access strategy as currently envisaged is considered to be broadly compatible with existing bus services and future bus strategy, and this provides additional evidence that a suitably flexible (but still robust) strategy for the integration of sustainable modes into the masterplan is achievable.

APPROVAL					
Version	**Name**		**Position**	**Date**	**Modifications**
1	Author	Hazel Morton	Associate Director	23/07/2025	
	Checked by	Jamshid Soheili	Director	23/07/2025	
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