Tendring Local Plan Modelling Support Stage 3

Essex County Council

Demand Update and Results

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Technical Note

31 May 2017

integrated expertise

Tendring Local Plan Modelling Stage 3

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Contents

Executive Summary

In March 2015, Tendring District Council (TDC) asked Essex County council (ECC) for traffic modelling support in response to their local plan proposals. ECC in turn requested Jacobs through Essex Highways to carry out this work. Through a staged process, two phases of work with associated reporting have been produced. Following that, TDC have requested as a third stage of work, additional modelling support to test the preferred option scenario for the local plan and investigate potential mitigation measures.

Following submission of that report, ECC have subsequently requested that Jacobs produce revised modelling for TDC's preferred development scenario.

The objectives of this study are the updating of the demand data and of the junction models according to the revised residential and employment developments contained within the preferred scenario, the assessment of the junction traffic flows and the qualitative assessment of achievability of demand reduction.

The forecast traffic flows resulting from the development proposals were calculated using trip generation data from TRICS and using Census journey to work data for the trip distribution. For the background growth, count data factored up using adjusted TEMPro factors was used. LinSig and Arcady/Picady software were used in order to build the junction models by taking the junction geometries and checking high definition aerial images. The forecasted traffic flows were also added to the junction models and an assessment of the junction performance was made.

The results of junction modelling suggested that a number of junctions would be adversely affected due to the emerging of the proposed residential and employment developments. Specifically for this study 16 key junctions have been identified where mitigation measures have been evaluated against projected future junction demand. The mitigation measures that were assumed have improved the traffic situation in all the tested junctions, however not all of them have been improved to the extent that all arms perform within acceptable levels of service. For those junctions whose performance was in excess of capacity even after the proposed mitigation measures, further measures have been suggested.

An engineering assessment of the proposed measures has been carried out, along with outline scheme drawings being produced. The assessment has identified a range of factors to be taken in to consideration if the mitigation schemes are to be developed further in the future.

1. Introduction

1.1 Introduction

In March 2015, Tendring District Council (TDC) asked Essex County Council (ECC) for traffic modelling support in relation to their Local Plan Proposals. ECC in turn requested Jacobs through Essex Highways to carry out this work. Through a staged process, so far two phases of work have been completed. Updates to the Local Plan were provided via e-mail in February 2017, these have been assessed at a high level, for compatibility with work undertaken, but have not been specifically modelled.

Following this TDC have requested, as a third stage of work, additional modelling support to test the preferred option scenario for the local plan and to investigate potential mitigation measures.

This report summarises the updates undertaken to the traffic model and the results from subsequent model runs. Specifically, it identifies the developments assumptions for the Preferred Local Plan Development Scenario and for the Committed Development Scenario, presents the results of the junction modelling, and assesses the achievability of the required demand reductions at the problematic junctions. The land use assumptions were based on data provided via e-mail from TDC in October 2016.

The note reports only on the results of the New Preferred Scenario. For this phase of work there have been slight changes to the forecasting methodology used. Where these differences occur details are included in this report. Where the methodology is the same, reference is made to the relevant documents from the previous work.

1.2 Objectives

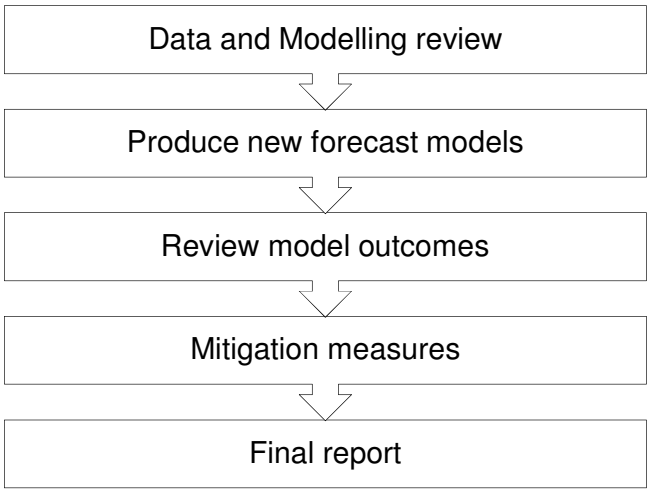
The objectives of the project are:

- the review of assumptions in the forecasting model, against known data sources;
- the production of revised forecast models reflecting TDC's development scenario and other updates to the modelling methodology;
- the review of the model outcomes and the identification of the junctions with flows that need to be mitigated
- the proposal of highway mitigation measures; and
- the production of highway mitigation measures, including outline design and costing.

1.3 Methodology

In order to meet the objectives, the study is divided into 5 stages as shown in Figure 1.

Figure 1: Stage Division



For the calculation of the future traffic volumes through key junctions in Tendring, in the absence of an existing traffic assignment model, a two stage approach was applied. Initially, the peak hour traffic volumes currently using the junctions was ascertained from a number of manual classified turning count surveys. Background growth (i.e. growth in traffic due to factors other than the specific modelled developments) was applied to the count data using TEMPro forecasts. After that, trips generated by the developments were calculated and added to the turning flows. During the collection of the turning count surveys a road traffic accident caused the closure of the A133, affecting a limited number of surveyed junctions in the vicinity of the A133 between Weeley and Clacton. For these junctions, only the AM peak traffic counts were used, which was sufficient to demonstrate a future impact at those junctions. The absence of PM peak traffic data was therefore not a constraint.

To calculate the additional traffic generated by the new local plan developments, TRICS trip rates were applied to each development. An appropriate trip distribution was then applied to the generated trips. The distribution identified the origin and destination locations for the trips generated by the development. On the basis of the trip origin and destination, an assessment of the most likely route taken through Tendring by that trip was made. The combined movement of all the development trips through the district thereby allowed identification of the turning movements through the assessed junctions.

The process is detailed in the following sections.

2. Ongoing studies and projects

There are several studies for future transport improvements and developments that are currently ongoing within the wider Essex area. While these are acknowledged, it has not always been possible to incorporate them fully into the modelling work undertaken up to January 2017 either due to their current status or the stage which they are at. It is important though to note that some of these transport schemes and developments in surrounding areas may have an impact on travel patterns in the Tendring area. The Tendring transport model has used the best information available as of January 2017.

2.1 A12 Widening (between M25 and A12 J25, and between J25 and J29)

Highways England are currently investigating widening the A12 to three lanes in each direction between the M25 and Junction 25 on the A12 at Marks Tey. The section between Chelmsford and Marks Tey has been identified in the RIS 1 document to be delivered first, with construction outlined to start by the end of 2020. The widening of the remainder of the route is to be included in RIS2with the aim to complete construction by the end of 2025. HE are also beginning the process of investigating widening the A12 to three lanes in each direction on the A12 between Junctions 25 and 29 - known as the Colchester A12 bypass. It is not anticipated that this will have an impact on the work undertaken within Tendring.

2.2 A120 Braintree to Marks Tey Improvements

Highway England (HE) is currently investigating the potential for junction improvements, along with improvements to safety and adjustments to maintenance, to the A120 between Braintree and Marks Tey. It is not anticipated that this will have an impact on the work undertaken within Tendring.

2.3 A120 Braintree to A12 Route Options

It has been agreed between the DfT, HE and ECC that ECC is to lead on the feasibility work to determine options for a new A120 route between Braintree and the A12, with ECC to determine a favoured position by summer 2017. It is envisaged that ECC will recommend to HE and the Secretary of State the preferred route for inclusion in the next Government Road Investment Strategy (RIS), which will run from 2020 to 2025. It is not anticipated that this will have an impact on the work undertaken within Tendring.

2.4 Garden Communities

Three new Garden Communities have been proposed:

- Tendring/Colchester border – to deliver up to 2,500 homes within the Plan period
- Colchester/Braintree Borders – to deliver up to 2,500 within the Plan period
- West of Braintree – to deliver up to 2,500 homes within the Plan period

As part of the planning and design for the Garden Communities, a study has been undertaken to forecast the likely traffic impacts of the new communities, including evaluating the potential public transport requirements during the plan period, the potential for the internalisation of trips, and the likely trip distribution. There is an aspiration of achieving a modal split of: 40% Active[1], 30% Public Transport and 30% Car. The garden communities study has developed a simple transport demand tool for each of the developments, which provides trip ends to use in transport models, based on different modal splits being achieved.

For this piece of work the development on the Tendring/Colchester Borders was included, as it is likely to have an impact on the traffic flows within Tendring. Trip generation at the development was based on standardised trip rates used across the county for all local plan assessments, however the aspirational 30% car mode share is not reflected in those rates. Confirmation of the trip rates used for the Garden Communities study, reflecting the low car mode share took place after the modelling for the Tendring local plan work had finished. It is not

[1] Active modes refers to those trips not made by public transport or car, and include all walking and cycling trips.

anticipated that the developments to the West of Colchester will have a significant impact within Tendring, and so these are not included.

2.5 Colchester Local Plan Study

The Colchester local plan study contains detailed transport modelling evidence for testing local plan development options of Colchester Borough Council's (CBC's) Local Plan (2017-2033). Although the methodology used in this study and the Tendring modelling project differs, there is consistency in the assumptions of developments included on the border of Tendring and Colchester. Namely the Tendring/Colchester Borders Garden Community. There is also consistency in the trip generation rates applied, which are consistent with other development work undertaken across the county, and are based on the same trip rate analysis.

2.6 Braintree Local Plan Study

Braintree District has also commissioned traffic modelling via ECC in order to inform its local plan. The methodology employed is similar to that used for the Tendring study, and there is also consistency in the trip generation rates applied. Given the separation between Braintree and Tendring districts, the two studies are independent of each other, in terms of assumptions around specific developments.

3. Local Plan Development Scenario

The Local Plan Development Scenario is an update to TDC's preferred local plan scenario development assumptions. It is a new version of the old preferred scenario and it is planned to be fulfilled by the end of the year 2032. It comprises of 8 residential developments, ranging from 100 to 2,500 dwellings, and 10 employment sites located within Tendring District. The focus of this study has been the larger development sites and as such smaller sites have not been modelled explicitly but instead are included within the background growth figures. This information was provided via e-mail by TDC in October 2016.

The 2,500 dwelling development at Colchester/Tendring Borders has also been assessed as part of a similar study for Colchester, albeit with a different methodology. Only 1,250 of the 2,500 dwellings here are within Tendring but the full 2,500 has been tested for the Local Plan Development Scenario in order to ascertain the impact of the whole development.

A description of the residential and employment sites for the Local Plan Development Scenario is given in Table 1 and Table 2.

Table 1: Local Plan Development Scenario – Residential Sites

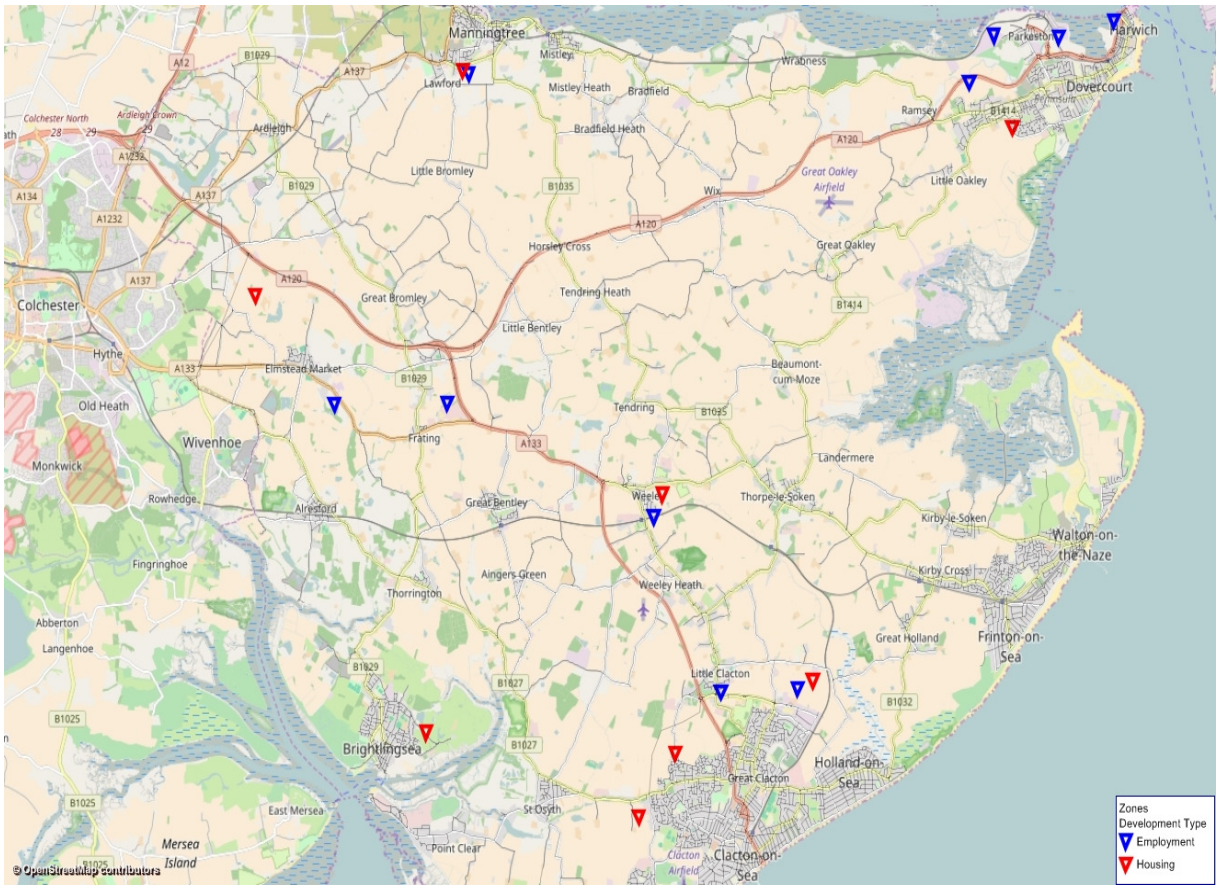
Number	Site	Purpose	Development Scale/Type
1	Hartley Garden Village, Bockings Elm	Residential	800
2	Oakwood Park, Bursville / Lt. Clacton & Weeley	Residential	750
3	Rouses Farm, Bockings Elm	Residential	800
4	Land west of Low Road, Harwich West	Residential	315
5	Land south of Council Offices, Lt. Clacton & Weeley	Residential	280
6	Colchester/Tendring Borders	Residential	2,500
7	Land east of Bromley Road, Lawford	Residential	210
8	Robinson Road, Brightlingsea	Residential	100

Table 2: Local Plan Development Scenario – Employment Sites

Number	Site	Purpose	Development Scale/Type
1	Pond Hall Farm, Harwich	Employment	6.3 ha (B2/B8)
2	Mercedes Site, Bathside Bay	Employment	7.4 ha (B1/B2/B8)
3	Carless Extension, Harwich	Employment	2.41 ha (B1/B2/B8)
5	Oakwood Extension ('Dalau Site')	Employment	2.43 ha (B1/B2/B8)
6	Hartley Gardens, Clacton Gateway	Employment	7 ha (A1-Food/A3/D2)
7	Stanton Europark	Employment	3.3 ha (B2/B8)
8	Landswoodpark, Elmstead Market	Employment	4.34 ha (B1/B2/B8)
9	Land south of Thorpe Road, Weeley	Employment	1 ha (B1/B2/B8)
10	Tendring Colchester Borders Garden Community	Employment	10 ha (B1/B2/B8)
11	Land South of Long Road, Mistley	Employment	2 ha (B1/B2/B8)

The locations of the new housing and employment developments are shown in Figure 2.

Figure 2: Development Locations Map



The two tables and figure reflect the latest development scenario provided by TDC on 23rd October 2016.

The total (specific site) planned developments for the Local Plan Development Scenario is shown in Table 3. These values do not include sites with fewer than 100 houses; these are included in the background growth which is detailed in the tables in Section 4 of this report

Table 3: Development Summary for All Scenarios

Scenario	Dwellings	A1/A3/A4/A5 m^2	B1/B2/B8 m^2	D2 m^2
Local Plan Development Scenario	5,755	3,034	202,489	752

In April 2017 TDC provided an updated set of development assumptions for the local plan. The table below contain the updated assumptions up to 2033, and details of how they differ from the modelled assumptions.

Table 4: Details of updated residential development assumptions

Number	Site	Purpose	Revised development	Difference
1	Hartley Garden Village, Bockings Elm	Residential	1000	Increase of 200

Number	Site	Purpose	Revised development	Difference
2	Oakwood Park, Bursville / Lt. Clacton & Weeley	Residential	500	Decrease of 250
3	Rouses Farm, Bockings Elm	Residential	750	Decrease of 50
4	Land west of Low Road, Harwich West	Residential	300	Decrease of 15
5	Land south of Council Offices, Lt. Clacton & Weeley	Residential	280	No change
6	Colchester/Tendring Borders	Residential	2,500	No change
7	Land east of Bromley Road, Lawford	Residential	0	Decrease of 210
8	Robinson Road	Residential	100	Increase of 100
-	EDME Maltings	Residential	150	Increase of 150
-	Greenfield Farm	Residential	164	Increase of 164

Table 5: Details of updated commercial development assumptions

Number	Site	Purpose	Development Scale/Type	Change
1	Pond Hall Farm, Harwich	Employment	0	Decrease of 6.3 ha
2	Mercedes Site, Bathside Bay	Employment	7.4 ha (B1/B2/B8)	No Change
3	Carless Extension, Harwich	Employment	4.5 ha (B1/B2/B8)	Increase of 2.09 ha
5	Oakwood Extension ('Dalau Site')	Employment	7.07 ha (C1)	Change from B1/B2/B8 – increase of 4.5 ha
6	Hartley Gardens, Clacton Gateway	Employment	7 ha (A1-Food/A3/D2) + 2.1 Ha for education (if required)	Increase in 2.1 Ha education aspect
7	Stanton Europark	Employment	2-4 ha (B2/B8)	Previously 3.3 Ha, so relatively unchanged
8	Landswoodpark, Elmstead Market	Employment	1.2 ha (B1/B2/B8)	Decrease of 3.14 ha
9	Land south of Thorpe Road, Weeley	Employment	1 ha (B1/B2/B8)	No Change
10	Tendring Colchester Borders Garden Community	Employment	10-30 ha (B1/B2/B8)	Increase from 10 ha
11	Land South of Long Road, Mistley	Employment	2 ha (B1/B2/B8)	No change
-	EDME Maltings	Employment	0.13 ha	Increase of 0.13 ha

The details in the two preceding tables are for information about the current expectations for development only. They have not been modelled.

The net effect of the residential changes is a reduction in housing numbers for those specific sites of just 11 units. On the employment side, allowing for the variable range in some sites, there is a negligible change overall in the amount of land proposed. However, there is a change of proposed use which sees some B1/B2/B8 land replaced by C1 and education uses. These land uses are considered to have a lower peak hour trip generation than the equivalent amount of B1/B2/B8 land. For both the residential and employment land use changes, there

is not considered to be a significant difference that would materially affect the modelling work completed thus far.

4. Background growth

The background growth refers to sites which have planning permission (which are added to the committed development scenario), and for the local plan scenario only, additional dwellings at smaller sites and windfall sites which are not included within the specific modelled developments.

In order to calculate the growth factors for the committed development scenario and for the local plan development scenario, TEMPro with NTEM version 6.2 data, and NTM AF09 dataset was used. The forecast year of the tested scenario is 2032. The growth assumptions for the two scenarios are listed in Table 6 and in Table 7.

Table 6: Background Growth Assumptions for the committed development scenario

Name	Number of expected dwellings
HLS Large Sites	4,360

Table 7: Background Growth Assumptions for the local plan development scenario

Name	Number of expected dwellings
HLS Large Sites	4,360
Windfall Sites	1,000
Land off Cotswold Road	12
Orchard Works site rear of London Road	12
Land at Coppins Court	60
Land rear of 522-524 St. Johns Road	33
Station Gateway development	60
Former Tendring 100 Waterworks Site	90
Mayflower Primary School	15
Former Delford Factory Site (SATRO)	66
Land at Harwich and Pakerston Football club	45
Land off St. Andrews Road	14
Land at weely Council Offices	24
Old Town Hall site	15
Southcliffe Trailer	15
Station Yard	40
Land at the Farm Kirby Road	47
Land South of Pond Corner	25
Land east of Landmere Road	98
Montana Roundabout	35

For the growth in background jobs for both scenarios, TDC suggested an increase of 142 jobs a year in the district for the years from 2015 to 2033 this is 2,414 expected jobs during the period. These are general background figures and, as such, are separate from and in addition to the jobs identified at specific sites in Table 2.

Collectively, the houses and jobs assumptions for calculating the growth factors for the two scenarios are presented in Table 8.

Table 8: Houses and jobs background growth assumptions

Scenario	Houses	Jobs
Committed development scenario	4,360	2,414
Local plan development scenario	6,066	2,414
Additional background growth in local plan	1,706	0

Table 9 shows the growth factors for the committed and the local plan scenario. For both scenarios, the PM peak factor is slightly larger than the AM peak one. The growth factors for the local plan scenario are marginally larger than those from the committed scenario. The reason is that in the local plan scenario 1,706 more houses are expected to come forward compared to the committed scenario.

Table 9: Tendring Growth

	Committed development scenario		Local plan development scenario	
Year	**AM peak**	**PM peak**	**AM peak**	**PM peak**
2032	1.23	1.24	1.24	1.26

This growth factor is applied to the base year count data for each scenario, and for the local plan development scenario, the trip generation from developments listed in section 3 is then added on top. The derivation of the development trip generation is described in more detail in section 5.

5. Development Trips

5.1 Trip Generation

5.1.1 Trip Rates

For the calculation of the trip generation, trip rates which have been used for local plan assessment purposes across Essex were applied to the development quanta. Using Essex-wide trip rates ensured consistency with other local plans. The trip rates were derived from TRICS and, are expressed in terms of a given unit of development. For residential developments the trip rates are the number of vehicle trips per house, while for the employment developments it is the number of vehicle trips per 100m^2 of gross floor area (GFA).

The trip rates are of different type than the ones used for previous stages of work. Thus, the methodology followed for calculating the trip generation is different in this study. Specifically for employment trip generation the previous work used trip rates detailing vehicle occupants trip generation per job. These rates were then converted into vehicles trips per sqm by applying employment density (jobs/sqm) and average vehicle occupancy. The resulted trip rates were also adjusted to take into account the higher vehicle mode share of people in Tendring due to the little public transport infrastructure presence in the district. For this phase of work, employment development area was converted directly into vehicle trips, using the rates described above. No specific trip rate modification for Tendring was included.

With regards to the residential developments, the new trip rates are summarized in Table 10. As shown in the table, the trip rates are categorized into 5 different groups depending on the geographical location of the development. After liaising with TDC, the “Edge of Town” factors were considered most appropriate for the Tendring district and these numbers were then used for the trip generation.

Table 10: Trip Rates Summary for Residential Developments

Residential	AM peak Departures	AM peak Arrivals	PM peak Departures	PM peak Arrivals
Town Centre	0.091	0.042	0.065	0.091
Edge of Town Centre	0.208	0.096	0.158	0.196
Suburban Area	0.286	0.098	0.138	0.276
Edge of Town	0.333	0.133	0.158	0.330
Neighbourhood Centre	0.326	0.072	0.181	0.362

Regarding the employment developments, since the developments have been modelled in the previous stage of work, it was decided to keep the same assumed land use types amongst the different use classes. However, the new trip rates use different names for the various use classes. To compensate for that, a correspondence was made to link the new names with the old ones and is presented in Table 11.

Table 11: Use Class Connection

Old Use Class Name	New Use Class Name
Food Superstore	A1 Food Superstores
Shopping Centre Local Shops	A3 Restaurants & Cafes
Office	B1(a) General Office

Industrial Estate	B2 General
Warehousing (Self Storage)	B8 General
Retail Park Excluding Food	D2 Cinemas

The new countywide trip rates for the employment developments are presented in Table 12.

Table 12: Trip Rates Summary for Employment Developments

Employment	Geographical Id	AM peak Departures	AM peak Arrivals	PM peak Departures	PM peak Arrivals
A1 Food Superstores	Edge of Town	2.27	2.781	5.775	5.333
A3 Restaurants & Cafes	Edge of Town	4.667	4.778	9.333	9
B1(a) General Office	Edge of Town	0.14	1.476	1.4205	0.071
B2 General	Edge of Town	0.3075	0.4115	0.397	0.1165
B8 General	Edge of Town	0.0675	0.094	0.07	0.0615
D2 Cinemas	Suburban Area	0.035	0.15	0.127	0.138

For the Retail Park Excluding Food use class due to the absence of trip rates for the "Edge of Town" geographical ID, the "Suburban Area" category was selected.

Furthermore, the employment sites that TDC provided were expressed in hectares. To convert the hectares to GFA in order to apply the new trip rates, a plot ratio (i.e the ratio of plot size to GFA) of 0.5 was used. This assumption is based on a TDC document "Tendring Employment Land Review", October 2013[2]. Using this ratio, a 1 hectare plot is converted to 5,000sqm GFA.

5.1.2 Total Trip Generation

After applying the new TRICS trip rates, the total vehicular trip generation for residential and employment developments are shown in Table 13 and Table 14 respectively.

Table 13: Residential Developments' Vehicle Trip Generation

Scenario	Dwellings	Origin AM peak	Destination AM peak	Origin PM peak	Destination PM peak
Local Plan Scenario	5,755	1,916	765	909	1,896

Table 14: Employment Developments' Vehicle Trip Generation

Scenario	Jobs	Origin AM peak	Destination AM peak	Origin PM peak	Destination PM peak
Local Plan Scenario	7,458	421	1,192	1,230	342

[2] http://www.tendringdc.gov.uk/sites/default/files/documents/planning/planning%20policy/Tendring%20Employment%20Land%20Review%202013.pdf

Comparison of the two tables shows that the residential developments generate more trips than the employment ones. For residential developments, the highest number of trips occurs for origin trips during the AM peak when people leave their homes for either commuting or other purposes. Similarly, the PM peak destination produces more trips than the origin PM peak. Regarding the employment developments, the table shows that these sites attract approximately 1,200 trips during the AM peak and produce an almost identical number of origin trips during the PM peak. The distinction between the jobs figures in this table and in Table 8 should be noted; Table 8 details the increases in jobs assumed for the purposes of background growth, which is separate from the job increases included from specific development sites, as identified in Table 14.

5.2 Trip Distribution

5.2.1 Overview

The methodology used to distribute the trips generated by the proposed developments varies by trip purpose. Trips generated by the residential developments were categorised into trips to school or trips elsewhere (commuting and all other trips). For trips to school, the distribution was calculated by finding the nearest school or schools to the development and assuming that the trips would go to that school(s).

The trip distribution for commuting and other trips was derived from the 2011 census journey to work data. This data is representative of commuting trips, and has also been used for other non-commuting trips (e.g. shopping, personal business).

The calculation of education and commuting and other trips is described in more detail in the following subsections.

5.2.2 Commuting and Other Trips

The 2011 census journey to work data provides information about the usual location of home and work. This data is aggregated at different levels, with the finest level of detail provided in the Middle Super Output Areas (MSOA).

Tendring District consists of 18 MSOAs. Two major movements were identified, trip distribution for people who live within the district, and trip distribution for people who work within the district. The former was used to distribute trips generated by the residential development, and the latter for trips generated by the employment development. For trips which had a work or residential location which was outside the district, the likely entry/exit point, in terms of road on the district boundary, was identified. Thus a base pattern of trips for people living or working in the district was established.

However, it was anticipated that the trip distribution will change in the future due to the presence of new residential or employment development within the district. For example, if a sufficiently large employment development was built within the district, then all else being equal, this development would attract more trips to the MSOA in which the development lies, thus adjusting the distribution for trips from residential areas in Tendring.

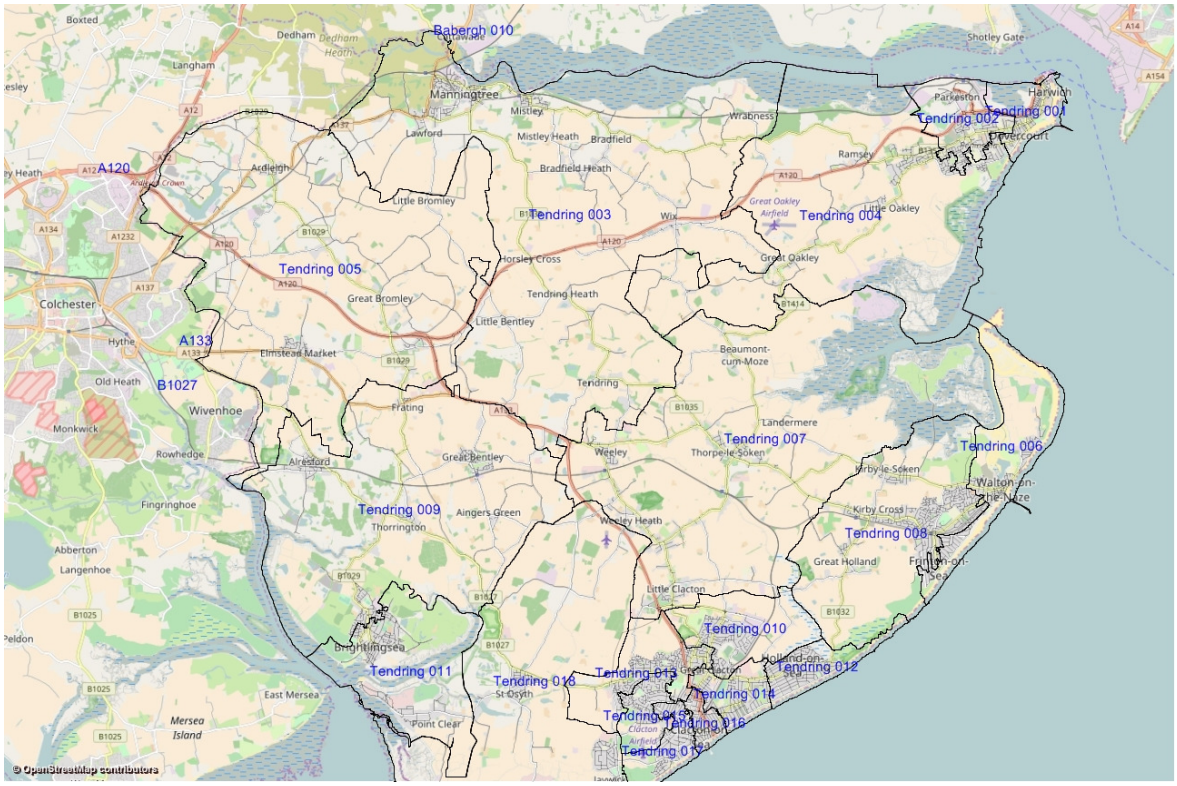
The future trip distribution was therefore adjusted according to future developments. For trips arriving at an employment location from a residential location, the proportion of trips arriving from each MSOA was adjusted according to the increases in housing in the MSOA. So, if new development resulted in the MSOA experiencing a 10% increase in the number of houses, then the proportion of trips arriving at an employment site from that MSOA was increased by 10%. This was done for all MSOAs within the district. The following tables show the census distribution, and the adjusted future distribution, for a selection trips arriving at an employment location:

Table 15: Base Distribution for Trips Arriving at an Employment Site

	Work end				
Home end	Tendring 001	Tendring 002	Tendring 003	Tendring 004	Tendring 005
Babergh 010	0.94%	0.84%	5.83%	0.52%	1.82%
Tendring 001	10.16%	16.95%	2.53%	13.45%	0.68%
Tendring 002	23.70%	20.25%	4.81%	22.59%	1.59%
Tendring 003	4.72%	5.13%	23.35%	3.62%	6.55%
Tendring 004	30.08%	24.65%	5.54%	31.55%	1.76%
Tendring 005	0.63%	0.58%	2.49%	0.86%	8.08%
Tendring 006	0.79%	0.89%	0.94%	1.03%	1.08%
Tendring 007	2.05%	1.52%	2.65%	2.07%	1.59%
Tendring 008	2.44%	1.78%	2.57%	2.76%	0.91%
Tendring 009	1.02%	1.15%	1.92%	1.21%	5.58%
Tendring 010	0.47%	0.94%	0.94%	1.03%	1.20%
Tendring 011	0.87%	0.89%	1.67%	0.34%	3.36%
Tendring 012	0.87%	0.84%	0.69%	1.03%	0.46%
Tendring 013	1.18%	1.05%	1.06%	0.52%	1.37%
Tendring 014	0.55%	0.63%	1.18%	0.69%	1.08%
Tendring 015	0.79%	0.37%	1.39%	0.52%	1.02%
Tendring 016	0.08%	0.42%	0.49%	0.52%	0.68%
Tendring 017	0.79%	0.84%	0.81%	0.34%	0.85%
Tendring 018	0.63%	0.89%	0.90%	0.34%	0.68%
A120	9.13%	10.94%	15.32%	10.17%	30.22%
A133	1.81%	2.77%	6.23%	2.24%	19.75%
A137	6.30%	5.70%	16.71%	2.59%	9.68%
B1027	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

The locations of the MSOAs indicated in the table are summarised in the below Figure 3.

Figure 3: Location of MSOAs



So, for example, the census data showed that of the people working in the MSOA Tendring 001, 30.08% of them came from a residence in Tendring 004. In the 2011 Census, Tendring 004 had 3,904 dwellings. In the local plan development scenario, 315 additional dwellings are expected, an increase of 8%. The 30.08% figure therefore increases to 33.3%. Similar increases occur for other MSOAs with residential development, such that the total no longer adds up to 100%. Therefore, once factored up, the totals are adjusted once more by factoring all the percentages up or down so that they add up to 100%. The resulting trip distribution is below:

Table 16: Adjusted Base Distribution for Trips Arriving at an Employment Site

	Work End				
Home End	Tendring 001	Tendring 002	Tendring 003	Tendring 004	Tendring 005
Babergh 010	0.99%	0.89%	6.77%	0.53%	3.56%
Tendring 001	10.63%	18.03%	2.93%	13.89%	1.33%
Tendring 002	24.80%	21.54%	5.58%	23.32%	3.11%
Tendring 003	5.15%	5.68%	28.24%	3.89%	13.31%
Tendring 004	34.01%	28.33%	6.95%	35.21%	3.72%
Tendring 005	1.42%	1.32%	6.22%	1.92%	33.98%
Tendring 006	0.82%	0.95%	1.09%	1.07%	2.11%
Tendring 007	2.33%	1.76%	3.35%	2.33%	3.39%
Tendring 008	2.55%	1.89%	2.98%	2.85%	1.78%
Tendring 009	1.07%	1.22%	2.22%	1.25%	10.89%
Tendring 010	0.60%	1.22%	1.33%	1.31%	2.85%
Tendring 011	0.93%	0.97%	1.99%	0.36%	6.72%
Tendring 012	0.91%	0.89%	0.80%	1.07%	0.89%
Tendring 013	1.81%	1.63%	1.80%	0.78%	3.91%
Tendring 014	0.58%	0.67%	1.37%	0.71%	2.11%
Tendring 015	0.82%	0.39%	1.61%	0.53%	2.00%
Tendring 016	0.08%	0.45%	0.57%	0.53%	1.33%
Tendring 017	0.82%	0.89%	0.95%	0.36%	1.67%
Tendring 018	0.66%	0.95%	1.04%	0.36%	1.33%
A120	4.78%	5.82%	8.89%	5.25%	0.00%
A133	0.95%	1.48%	3.62%	1.16%	0.00%
A137	3.30%	3.03%	9.70%	1.34%	0.00%
B1027	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

After factoring, the proportion of trips at employment sites in Tendring 001 arriving from Tendring 004 is 34.01% For MSOAs which have no, or relatively little residential development, the proportions decrease, reflecting the fact they will generate relatively fewer trips compared to the MSOAs which have significant development.

Similar adjustments for trips distributed from residential developments were also made, using the change in the number of jobs within an MSOA as the basis of the trip proportion adjustments.

The adjusted trip distributions identify, for each new development trip, which MSOA the trip will go to or come from. It does not distinguish whether that opposite end of the trip is itself a new development, or is part of the existing land uses within the MSOA. Therefore, an assumption has been made, that a proportion of these trips will be going to or coming from a new development within the MSOA, rather than from existing development. The trip would therefore be between two new developments. The proportion has been estimated from the relative size of a development within its MSOA.

For trips leaving a new residential development and distributed to an MSOA using the adjusted census trip distribution, if the MSOA contains one or more employment sites, then the volume of trips assumed to travel to the new development (as opposed to existing development within the MSOA) is based on the ratio of the development's employment to the total employment in the MSOA. Similarly, for trips arriving at a residential development, which have come from a particular MSOA according to the adjusted distribution, the proportion assumed to have arrived from a new employment development within the MSOA, as opposed to existing land use, is also based on the ratio of the development's employment to the total employment in the MSOA (from existing and new development).

Following this calculation, the total trip generation at each development is constrained to the original trip generation totals (calculated before trip distribution was applied).

5.2.3 School Trips

A proportion of trips were assumed to be dedicated to education purposes i.e. escorting pupils to school. To establish the likely proportion of residential trip generation that were education trips, the National Travel Survey was used. This showed that, 50% of AM peak trips are for education purposes and 42% of these education trips were made by car. Therefore, we assumed that 21% of the total trip generation from residential developments would be education trips (the remainder were commuting and other trips). It was assumed that the same number of trips would return to the residential starting point within the AM Peak hour, (i.e. reflecting that parents will drop their children off at school and then return home, all within the morning peak hour). These trips were distributed to the nearest schools (either within or outside the new developments). If more than one school was identified, trips were distributed equally to all schools.

Collectively the generated educational trips for the Local Plan Development Scenario are shown in Table 17. Note that for the Colchester Fringe the total trips are zero, as it is expected that the development in this location will include school provision – meaning that school trips will be internal to the modelled zone.

Table 17: School Trips

Name	Primary School 1	Trips	Primary School 2	Trips	Total
Oakwood Park	Oakwood Park	52			52
Hartley Garden Village	Hartley Meadows 1	56			56
Rouses Farm	Rouses Farm	56			56
Robinson Road	Brightlingsea Infant School	7			7
Land west of Low Road	Chase Lane Primary School and Nursery	22			22
Land south of Council Offices	Weeley St Andrew's CofE Primary School	10	Weeley – South of Thorpe Road	10	20
Land east of Bromley Road, Lawford	Lawford Church of England (Voluntary Aided) Primary School	7	Highfields Primary School	7	14
Colchester Fringe	Elmstead Primary School	0	Hazelmere Junior School	0	0

5.3 Trip Routing

Having established the number of trips between developments and MSOAs, the trips then required assignment to the highway network in order to establish the flows through the key junctions. This process was automated by using strategic highway modelling software to speed up the process. A very simple model of the Tendring highway network was created.

The modelled network was created using an OpenStreetMap dataset[3] representing the road network of the area as links and nodes. It contained details of the characteristics of each road including, amongst others, the speed limit for every link. The network was loaded into the strategic modelling package VISUM, which converted it into a series of links and nodes appropriate for determining route choice. The developments and MSOAs were also added to the model as zones, which would load trips on to the network via zone loaders. The trips were added

[3] www.openstreetmap.org

to the model as a trip matrix. A new link road around the Hartley Meadows, Clacton development was added to the network.

The model determined the most appropriate route for each trip to take, using the link speed limit to identify which route would give the shortest travel time, and assuming that would be the actual route chosen by the trips. The resulting route choice was sense checked and verified through the use of route planning software in both Google Maps and the AA travel planner website[4]. In only a few cases the route determined differed from the route suggested by the route planners. This was rectified by making some minor adjustments to the link speeds in the model. The model was adjusted by increasing or decreasing link speeds appropriately.

The traffic flows through the key junctions were then simply extracted from the assignment model.

[4] http://www.theaa.com/route-planner/index.jsp

6. Junction Modelling

6.1 Key Junctions

To measure the transport impact of the new housing and residential developments within Tendring, the effect of additional traffic at key junctions was assessed by using junction models. The junctions tested have been identified through liaison with ECC, as the key junctions in the district. These are located either in the vicinity of the new developments, or on key corridors within the Tendring area.

Models for each were built using appropriate software. For roundabouts and priority junctions, Junctions 8 software was used (Arcady and Picady respectively). Signalised junctions were tested using LinSig.

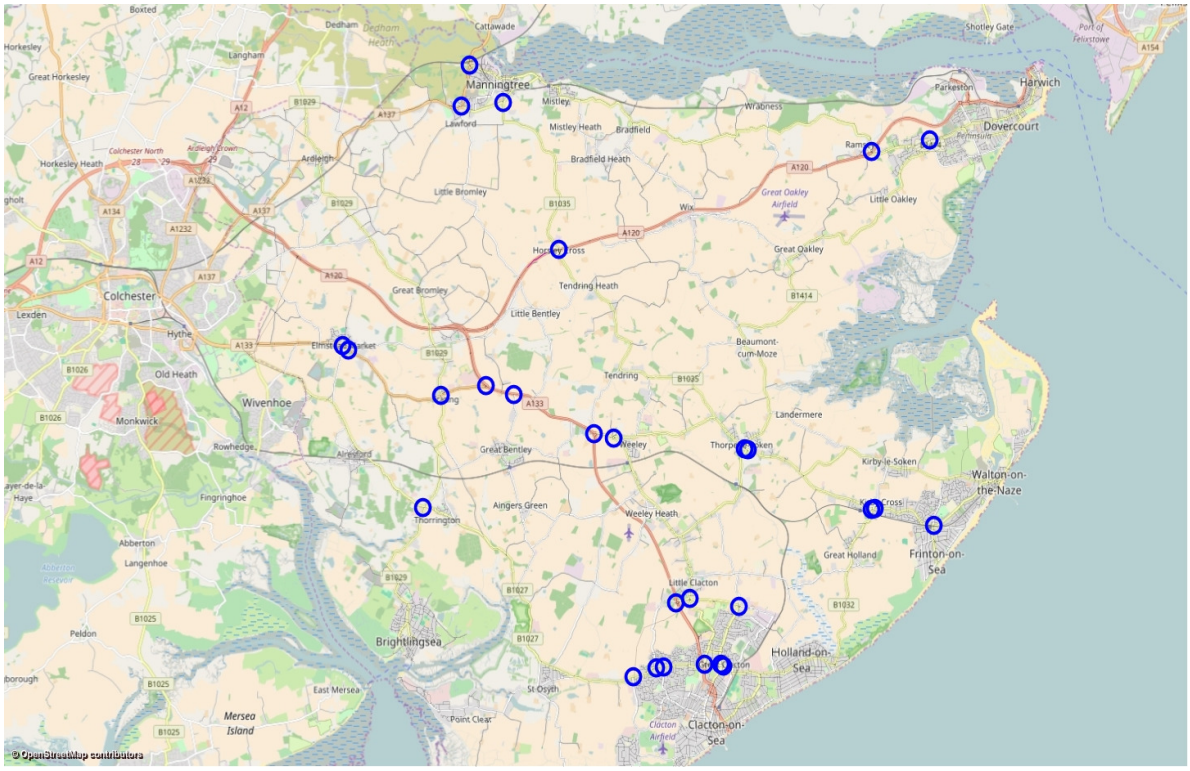
Junction geometries were measured in AutoCAD using high resolution aerial photography scaled against an OS MasterMap background.

For signalised junctions no signal timing data was available, therefore, timings which would best accommodate the traffic flows at the junctions were used.

The demand data produced for the Local Plan Development Scenario was used as an input for the junction models. The final flows for the junction modelling were the sum of the development traffic flows extracted from the assignment model and the base year traffic counts multiplied by the new background growth. The detailed description of the methodology followed for deriving the total flows is explained in the initial report.

The location of the 28 key junctions is depicted in Figure 4.

Figure 4: The 28 Key Junctions



6.2 Traffic Flows

The junction models were tested with the new demand flows and with and without mitigation. The mitigation measures refer to low cost junction improvements.

The effect of additional traffic on junction performance for the Committed Scenario and for the Local Plan Development Scenario is presented in Figure 5 and in Figure 6 respectively. The figure identifies the maximum ratio of flow capacity (RFC) for each junction in either time period. The circles represent the maximum RFC of each of the arms of the tested junctions. The red circles suggest that the junction has at least one arm operating at least 20% over capacity. Overall, all the tested junctions have at least one arm that operate above or close to their capacity.

Figure 5: Committed Scenario Junction impact for non-mitigation measures

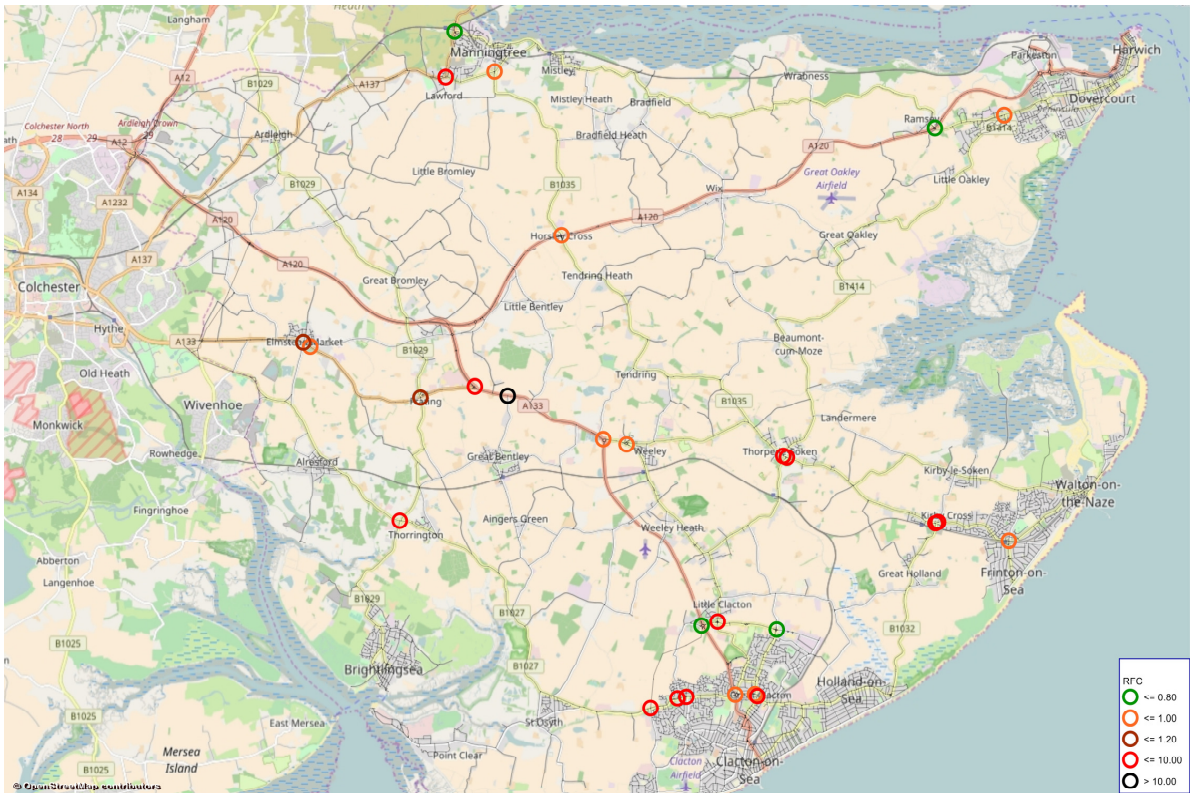
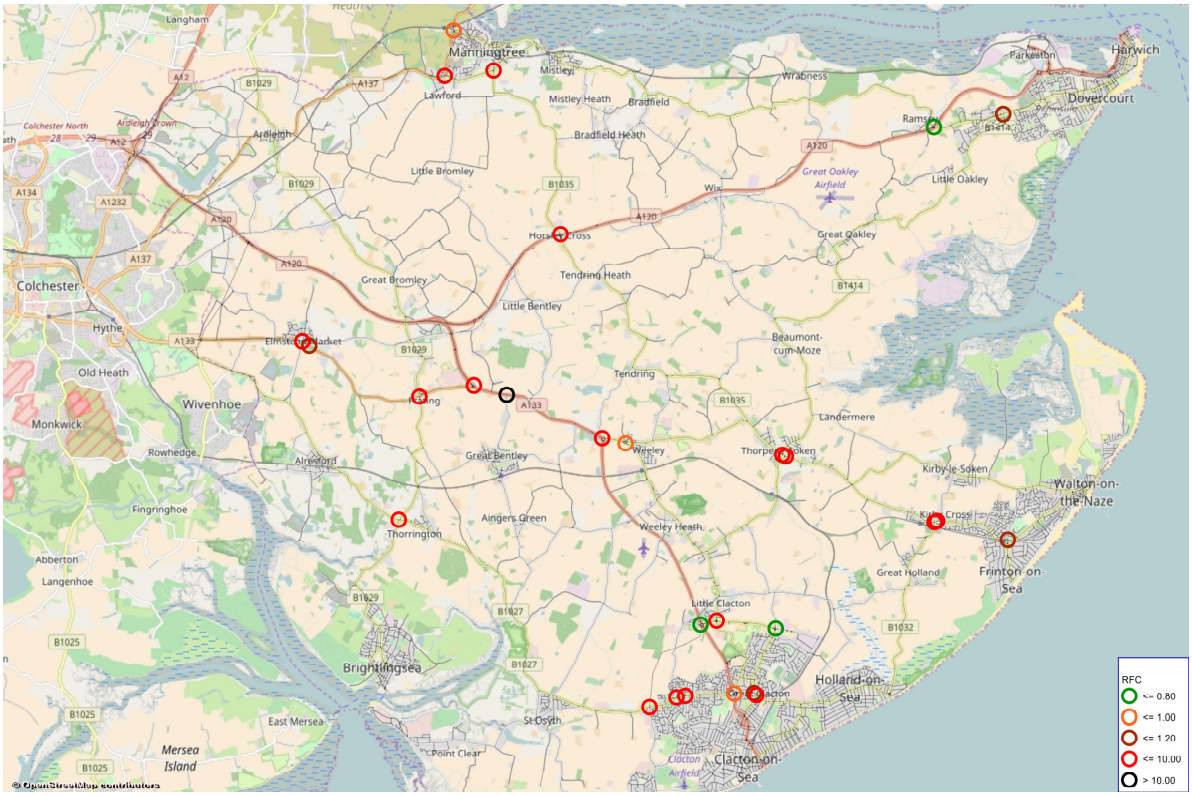


Figure 6: Local Plan Development Scenario Junction impact for non-mitigation measures



The images show that the majority of the key junctions are expected to operate above their theoretical capacity. In the New Preferred Scenario more junctions are labelled as red compared to the Committed Scenario, which can be explained by the higher flows present due to the planned developments.

Collectively, the junction results for the two scenarios are summarized in Table 18. The increased RFC values in the third column of the table ('New Preferred Scenario') reflect the impacts that local plan development has on the key junctions. Within the modelling that has been conducted it is not possible to isolate the impacts of any single development, or attribute the amount of impact at any one junction due to any single development.

Table 18: Summary of Junction Results

	Committed Scenario	New Preferred Scenario
Junction	**Highest RFC with no development**	**Highest RFC before mitigation**
1. A137 Wignall St / A137 Cox's Hill / B1352 Long Rd	1.36	1.69
2. A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hil	0.49	0.59
3. B1352 Ramsey Rd / B1352 Main Rd / Oakley Rd	0.95	1.08
4. A133 Colchester Rd / Church Rd / School Rd	1.17	1.78
5. A133 Clacton Rd / Bromley Rd	0.97	1.19
6. A133 Main Rd / Bromley Rd / Gt Bentley Rd	1.15	1.51
7. A120 to A133 / A133 Main Rd / A133 Colchester Rd	1.37	1.88
8. A133 Colchester Rd / Heckfords Rd	99999	99999

	Committed Scenario	New Preferred Scenario
9. A133 Colchester Rd / Tendring Park Services	0.83	1.31
10. Colchester Rd / Thorpe Rd / Weeley ByPass	0.89	0.97
11. B1414 Landermere Rd / B1033 Abbey St	1.25	1.31
12. B1033 Abbey St / Station Rd	1.68	4.24
13. B1033 Thorpe Rd / B1033 Frinton Rd / B1032 Kirby Rd	1.53	1.56
14. Halstead Rd / B1033 Frinton Rd	1.45	1.49
15. Elm Tree Ave / B1336 Walton Rd / B1033 Frinton Rd	0.99	1.02
16a. B1029 Brightlingsea Rd / B1027 Tenpenny Hill / B1027 Clacton Rd	2.19	2.37
16b. B1029 Brightlingsea Rd / B1027 Tenpenny Hill / B1027 Clacton Rd	1.37	1.62
17. A133 / St Osyth Rd / Progress Way	0.63	0.74
18. Progress Way / London Rd / Centenary Way	1.2	1.41
19. Thorpe Rd / Centenary Way / Stephenson Rd	0.56	0.72
20. B1027 St Johns Rd / Jaywick Ln	1.49	1.86
21. B1027 St Johns Rd / Lt Clacton Rd	1.72	1.95
22. B1027 St Johns Rd / Cloes Ln	1.58	1.64
23. A133 / B1027 St Johns Rd / A133 London Rd	0.82	0.93
24. A120 / B1035 (Horsley Cross)	0.93	1.21
25. B1027 St John's Road / B1369 North road	0.91	1.05
26. B1027 St John's Road / B1027 Valley Road / B1369 Old Road	1.28	1.37
27. B1352 Long Road / B1035 Clacton Road / B1352 New Road / Trinity Road	0.86	5.31
28. A137 Cox's Hill/A137/B1352 Station Road/Cotman Avenue	0.72	0.84

7. Mitigation Measures

7.1 Overview of mitigation work undertaken

After discussion between Jacobs, TDC and ECC, based on the modelled RFC changes as well as local knowledge, ECC suggested that the 16 junctions in Table 19 be prioritised for the investigation of potential mitigation measures.

Table 19 Junctions prioritised for mitigation

Junction Number	Junction Description
2	A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hill
4	A133 Colchester Rd / Church Rd / School Rd
5	A133 Clacton Rd / Bromley Rd
6	A133 Main Rd / Bromley Rd / Gt Bentley Rd
7	A120 to A133 / A133 Main Rd / A133 Colchester Rd
8	A133 Colchester Rd / Heckfords Rd
9	A133 Colchester Rd / Tendring Park Services
12	B1033 Abbey St / Station Rd
17	A133 / St Osyth Rd / Progress Way
20	B1027 St Johns Rd / Jaywick Ln
21	B1027 St Johns Rd / Lt Clacton Rd
22	B1027 St Johns Rd / Cloes Ln
23	A133 / B1027 St Johns Rd / A133 London Rd
25	B1027 St John's Road / B1369 North road
26	B1027 St John's Road / B1027 Valley Road / B1369 Old Road
27	B1352 Long Road / B1035 Clacton Road / B1352 New Road / Trinity Road

7.2 Mitigation by junction

Work was undertaken for each of the junctions listed in Table 19, with an initial focus on schemes which can be delivered within existing limitations, including the existing highway boundary, (slight changes to signal timing, or widening within the existing boundary, for instance) and, where this was not effective, schemes which would necessitate land take beyond the highway boundary. Schemes requiring land take beyond the highway boundary would have uncertainties associated with deliverability, and for a number of reasons may present obstacles which would not be overcome without further subsequent study, but nonetheless provide an indication of the likely scale of measures required to fully mitigate impacts.

Possible mitigation measures for each junction are detailed below.

7.2.1 **Junction 2:** A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hill

The modelling undertaken here indicates that the worst performing link only reaches an RFC of 0.59 in the worst time period, in the preferred development scenario. It is lower than this in the committed development scenario. A value of 0.59 is well within acceptable tolerances, as such it was not deemed necessary to undertake further mitigation work for this junction.

7.2.2 **Junction 4:** A133 Colchester Rd / Church Rd / School Rd

This is currently a priority crossroads. The worst performing arm of the junction has an RFC of 1.17 in the Committed Scenario and 1.79 in the Preferred Development Scenario. Junction modelling undertaken thus far suggests relatively little improvement can be achieved within the existing highway boundary; a possible slight widening on School Road shows no significant improvement to overall junction performance. Therefore, more extensive mitigation was considered, and this was to convert to a signalised junction. This would require the widening of A133 Colchester Road to provide a right turn lane, to prevent blocking back, which will likely fall outside of the current highway boundary. With the widening and signals in place, the worst performing RFC value on any one arm drops to 0.79 in the local plan development scenario, which is well within acceptable levels. The engineering assessment for the proposed mitigation noted that the existing footway to the west of the junction is very narrow and that the land to the north is not highway land. In addition, the location of the bus stops may need to be revised to accommodate the scheme. Estimated design and construction costs are £480k and stats costs are £175k. An outline design drawing for this improvement is detailed in Appendix A with a detailed report in Appendix B and estimated scheme costs in Appendix C.

7.2.3 **Junction 5:** A133 Clacton Rd / Bromley Rd

This is a signalised junction. In the Committed Development scenario the RFC on the worst performing arm is below 1, in the Preferred Development Scenario it is 1.20. By optimising signal timings within the model the RFC can be reduced sufficiently to prevent problems in the committed and preferred scenarios. This could be achieved within the current limitations and so further mitigation work was not deemed necessary. The optimisation reduced the maximum RFC to 0.67 in the Committed Development scenario, and to 0.81 in the Preferred Development scenario.

7.2.4 **Junction 6:** A133 Main Rd / Bromley Rd / Gt Bentley Rd

This is a signalised junction. Its worst performing arm has an RFC of 1.15 in the Committed Development Scenario and 1.51 in the Preferred Development scenario. Optimisation of the signal timings is sufficient to reduce the RFC of the worst performing arm to below 0.9 within the Committed Development scenario– the maximum modelled value here is 0.87 in the PM. In the Preferred Development scenario this is not the case, with the maximum modelled value being 1.17 when only signal timings are changed. The pedestrian stage at the junction is assumed to be required to appear in every cycle. Should the pedestrian stage not be demanded however then the RFC of the worst performing link in the Preferred Development Scenario can be reduced below 0.9. These changes would be within the current limitations, but there is little option here for further mitigation, involving lane alterations, without some form of land take being necessary.

7.2.5 **Junction 7:** A120 to A133 / A133 Main Rd / A133 Colchester Rd

This is a roundabout. The worst performing arm in the Committed Development scenario is 1.37 and in the Preferred Development scenario is 1.88. Modelling work here suggests that, within the existing limitations, if left hand slip lanes are included a significant improvement in RFC can be achieved; however this may overstate the benefit due to limitations within the junction model of accurately reflecting driver usage of the slip road. An alternative possibility, which would require land take outside of the existing highway boundaries, is to convert the junction to a signalised junction. This could reduce the RFC for the worst performing arm to 0.87 in the Committed Development scenario, and 0.90 in the Preferred Development scenario. Outline design drawings for this are included in Appendix A. Whilst this design provides sufficient capacity from a transport perspective, it is understood that there are current issues with overshoot accidents at the roundabout currently. Conversion to a signalised junction may instead lead to increased rear-end shunts, and additional safety measures should be considered, including reduced speed limits on approach to the roundabout. The engineering assessment of the mitigation proposals has indicated potential concerns over the buildability of the design and has instead suggested that dedicated slip lanes for east-west and west-south movements might be more appropriate. An outline design for this alternative option is also in Appendix A. The expected design and construction costs for the signalised conversion are £2.0-3.0M and for the slip lane intervention £1.0-1.5M. The stats cost for both options is expected to be £100K. A detailed report on the proposals is contained in Appendix B and scheme costs for the slip lane intervention option in Appendix C.

7.2.6 **Junction 8:** A133 Colchester Rd / Heckfords Rd

This junction is a priority T, with ghost islands. In peak times the main road saturation flow restricts exiting from the minor road. There is limited scope to improve this without significant work being undertaken, outside of the current highway limitations. Modelling undertaken suggests that a larger signalised junction may work, but significant queueing on the A133 is likely to result (up to 250m per lane, in two lanes). With this caveat it is possible to set signal timings such that the maximum RFC is 0.87 in the Committed Development scenario and 0.88 in the Preferred Development Scenario. An outline design drawing is included in Appendix A. The engineering assessment noted that the highway boundary is extensive and so there should be no issues with widening the verge. The design has been extended significantly to tie in with the existing right turn lane to the west, however there are significant engineering obstacles to overcome with the proposed design and further work would be required to finalise a solution. Expected design and build costs are £1.8M, and stats costs £250K. A detailed write up is contained in Appendix B. Given the significant engineering difficulties with this scheme, only a broad estimate of costs has been made and detailed design and build costs are not available.

7.2.7 **Junction 9:** A133 Colchester Rd / Tendring Park Services

In the Committed Development scenario the worst performing arm on the roundabout here has an RFC of 0.83, in contrast in the Preferred Development scenario it has an RFC of 1.31. Minor work to widen the southern and western arm approaches (within the current highway boundary) reduces the RFC in the Preferred Development scenario to 0.98. Although this is higher than ideal, it should be noted that the impact would be to reduce the length of queue from 227 vehicles to 23 vehicles. An outline design drawing is included in Appendix A. Expected design and build costs are £140K, and stats costs £30K. A detailed write up is contained in Appendix B and costs in Appendix C.

7.2.8 **Junction 12:** B1033 Abbey St / Station Rd

This junction is a priority Y junction. Its worst performing arm has an RFC of 1.68 in the Committed Development Scenario and 4.24 in the Preferred Development Scenario. It is noted that there isn't any significant development in the vicinity of this junction, and the traffic flow increases through the junction are therefore quite modest. However, even though the increases are very small, the congested nature of the junction in the committed development scenario means that the impacts of additional traffic are exponential; only a small amount of additional traffic is required to significantly deteriorate conditions at the junction.

There is a war memorial on the centre island and narrow footpaths, making junction alterations difficult. Mini roundabouts can be added within the existing highway boundaries, but although affecting when/where the highest RFC occurs, they do not result in an overall improvement. With the previous comments concerning the difficulty of altering the road lay out noted, conversion to a signalised junction (requiring land take outside of the current limitations) can reduce the RFC on the worst performing arm to 0.87 in the Committed Development scenario and 0.89 in the Preferred Development Scenario. Doing so would require the war memorial to be moved, although it is noted that there would be significant local opposition to doing so. Given the significant constraints at this location, a junction drawing has not been produced. Expected design and build costs are £620K and stats costs £130K, although again, at this stage, given the complexities at this location detailed design and construction costs are not available at this stage. A detailed engineering report for these proposals is contained in Appendix B.

7.2.9 **Junction 17:** A133 / St Osyth Rd / Progress Way

The maximum RFC value modelled at this junction is 0.74 (AM Preferred Development scenario). This is well within acceptable levels and so no further mitigation work was deemed necessary.

7.2.10 **Junction 20:** B1027 St Johns Rd / Jaywick Ln

This junction is currently a mini roundabout. The worst performing arm has an RFC of 1.49 in the Committed Development scenario, and 1.86 in the Preferred Development scenario. The Preferred Development scenario includes the provision of a new link road linking to the A133/St Osyth Road roundabout to the north east - supporting new development in that area of Clacton. It is this 4 arm arrangement that is modelled and results based on.

The use of a signalised junction was investigated, but the modelled results indicated that this would not be viable in terms of reducing the maximum RFC. The expansion of the existing mini-roundabout to better accommodate the new link road shows the RFC is reduced to a maximum 0.75 in the Committed Development scenario and 0.87 in the Preferred Development scenario. Clearly this will have significant impacts outside of the current highway boundaries. An outline design drawing is included in Appendix A. The engineering assessment indicated that the construction of the proposed roundabout would be feasible, but would require the relocation of the eastbound bus stop. In addition, there are various services running under the road at this point (BT OpenReach, water, UKPN and gas) which would likely all require diversion or protection. Estimated design and construction costs are £770k and expected stats costs are £1.3M. A detailed write up is contained in Appendix B and costs in Appendix C.

7.2.11 **Junction 21:** B1027 St Johns Rd / Lt Clacton Rd

The junction is a priority T junction in a triangle layout, with a mature tree in the centre island. The tree, although not subject to a tree preservation order, is of significant local importance (having been donated on the death of a long standing local MP), and as such there may be local sensitivities to its removal. The junction's worst performing arm currently has an RFC of 1.72 in the Committed Development scenario and 1.95 in the Preferred Development scenario. Installing a signalised junction to the west of the give way triangle while utilising the lane to the east as a give way left slip should be possible within the highway boundaries whilst retaining the mature tree. Doing so would reduce the RFC to below 0.9. No provision is made for a pedestrian stage, as the expected level of pedestrian demand (and hence appropriate timings) is not known. Clearly the inclusion of timings for pedestrians within the signal cycle would reduce junction capacity, and put pressure on its RFC. It is possible that further junction improvements could be achieved if the tree was removed from the junction. Outline design drawings, featuring options with and without the retention of the tree are included in Appendix A. The engineering assessment indicated that there would be difficulties associated with the proposed measures in terms of the swept path for vehicles from St John's road. Further improvements to ameliorate this are possible with the removal of the tree but, as noted, there may be significant opposition to this. Outline design and construction costs (for a junction including the removal of the tree) are £670K, with significant stats costs of £1.9M expected due to the need to move gas, UKPN, water and BT infrastructure. A detailed write up is contained in Appendix B and costs in Appendix C.

7.2.12 **Junction 22:** B1027 St Johns Rd / Cloes Ln

This junction is a mini roundabout, and initial work shows that any widening within the highway boundary would have only a minor impact on the level of RFC. Introduction of a traffic signal junction would necessitate including a 4th arm (the minor road to north) into the junction and adding a pedestrian phase to incorporate the existing crossing on St. Johns Road. Widening to St Johns Road would be required on both sides of the junction in excess of 100m from junction, as well as widening along Cloes Lane to 100m to allow for separation of ahead and turning movements. Even with this work undertaken maximum RFC is 0.96 in the Committed Development scenario and 0.96 in the Preferred Development scenario. An engineering assessment has raised safety concerns with the alignment of opposing traffic lanes and as a result an outline design drawing has not been produced. In addition there are significant stats issues, including an asbestos water main and, intermediate pressure gas mains. Further, the proposals would require removal of mature trees (which are likely to provoke local opposition) and land take affecting the car park of a local pub and shops. There are also high voltage cables which would need to be protected for the duration of the works. Estimated design and construction costs are £2M, with stats costs expected to be £350K. This scheme presents a number of significant engineering challenges which would require further more detailed work to overcome; as such detailed scheme design and construction costs are not available at this stage. A detailed engineering write up is contained in Appendix B.

Junction 23: A133 / B1027 St Johns Rd / A133 London Rd

Alterations to the roundabout layout, within the current highway boundaries are sufficient to bring the RFC on all approaches below 0.9 in both the Committed and Preferred Development scenarios. Currently the worst performing arm has an RFC of 0.93 in the Preferred Development scenario. All arms in the Committed Development scenario are below 0.9. An outline design drawing is included in Appendix A. An engineering assessment for this scheme didn't identify any difficulties with the proposals. The scheme is expected to cost £95K, with no stats costs. A detailed write up is contained in Appendix B and costs in Appendix C.

7.2.13 **Junction 25:** B1027 St John's Road / B1369 North road

This is currently a priority T junction and an initial investigation into the addition of signals indicated that no improvement could be achieved. A slight widening on the North Road (outside of the highway boundary) provides some improvement; with improvement, in the Committed Development scenario the maximum RFC is 0.88 (PM), but in the Preferred Development scenario is 0.99. In order to accommodate this scheme it would be necessary to acquire land to the east of North Road – this is currently open forecourt which is used by pedestrians, but is outside of the highway boundary. It may also be useful to implement keep clear markings or a yellow box to improve egress from North Road. Expected design and build costs for this scheme are £45K, with stats costs of £375K. An outline design is in Appendix A, detailed write up is contained in Appendix B and costs in Appendix C.

7.2.14 **Junction 26:** B1027 St John's Road / B1027 Valley Road / B1369 Old Road

This is a mini roundabout. In the Committed Development scenario the RFC of the worst performing arm is 1.28, and in the Preferred Development scenario is 1.37. There is limited scope for widening of the southbound approach (the worst performing arm) of the junction within the existing highway boundaries. With such work undertaken although improving the junction in the AM this leads to an increase in RFC in the PM. This is due to the increase in opposing traffic flows as a result of improvement to one arm, causing a small additional capacity reduction on other arms. The benefit outweighs the disbenefit in the AM but not in the PM. Converting the junction to a signalised T junction (Old Road being the minor road) reduces the RFC to below 0.9 (maximum 0.86) in the Committed Development scenario, but in the Preferred Development scenario the maximum RFC is 0.95. This would require land take outside of the existing highway boundary. Further, no provision is made for a pedestrian stage in the cycle, as the expected level of pedestrian demand (and hence appropriate timings) is not known. Clearly the inclusion of timings for pedestrians within the signal cycle would reduce junction capacity, and increase RFC values. An outline design drawing for the signalised scheme is in Appendix A. The engineering assessment notes significant difficulties with this scheme. The visibility of the proposed signals from Valley Road and from St John's Road is substandard and the width of the northern arm requires the island to remain (to provide pedestrian access) this in turn requires a wide exit on the arm – which may encourage dangerous driving. On top of this the proposal also causes serious issues for the bus stop. Currently it is in a layby, but with the new alignment the length of the existing bay would be curtailed so as to make it unusable. There is not a suitable alternative location for a bay and there are concerns with the viability of an on carriageway stop. The bus services through the junction are numerous and many use Old Road – so the proposals would introduce a significant risk and delay with regard to the bus services. Estimated design and construction costs are £335k and expected stats costs are £75K. A detailed write up is contained in Appendix B and costs in Appendix C.

7.2.15 **Junction 27:** B1352 Long Road / B1035 Clacton Road / B1352 New Road / Trinity Road

This junction is a priority crossroads and performs well in the Committed Development Scenario – the RFC on all arms is below 0.9. In the Preferred Development scenario the worst performing arm has an RFC of 5.31. Changes to the priority, within the existing highway boundaries provide some improvement, but are insufficient to reduce the RFC on the worst performing arm in the Preferred Development scenario to a reasonable level – such changes only manage to reduce it to 1.69. Conversion to a signalised junction is possible, and reduces the RFC of the worst performing arm to 0.88 in the Preferred Development scenario. No provision has been made for a pedestrian stage in the cycle, as the expected level of pedestrian demand (and hence appropriate timings) is not known. However suitable RFC values at low cycle times suggest adding it may be possible. Conversion to a signalised junction would require realignment of the north/south approaches to remove the junction stagger that is currently present and a give way left slip from Clacton Road (south to west) to be added. An outline design drawing is included in Appendix A. In order to accommodate the turning circles of large vehicles, the engineering assessment has suggested that the stop lines need to be set back which will have an impact on the signal's performance. The assessment has also recommended that the corner of Clacton Road and New Road is built out to slow turning movements which will create an area for signal poles as well as improving safety. Design and build costs are estimated to be £690K and stats costs £2.3M. A detailed write up is contained in Appendix B and costs in Appendix C.

7.3 Junction Mitigation Summary

Table 20 below summarises the mitigation options which provide the best reduction in the RFC of the worst performing arm of each junction.

Table 20 Summary of mitigation outcomes

No.	Junction Description	Worst arm RFC Committed Development	Worst arm RFC Preferred Development	Mitigation Summary	Estimated cost	Worst arm RFC Committed Development, post mitigation	Worst arm RFC Preferred Development post mitigation
2	A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hill	0.49	0.59	None necessary.	None	0.49	0.59
4	A133 Colchester Rd / Church Rd / School Rd	1.17	1.78	Conversion to signalised, requires land take.	Design and construction: £485k. Stats: £175k	0.72	0.79
5	A133 Clacton Rd / Bromley Rd	0.97	1.20	Optimisation of current signal timings.	None	0.67	0.81
6	A133 Main Rd / Bromley Rd / Gt Bentley Rd	1.34	1.51	Optimisation of current signal timings may operate at acceptable RFC subject to pedestrian demand.	None	0.87	0.9 (assuming that the pedestrian stage does not need to be called in every cycle)
7	A120 to A133 / A133 Main Rd / A133 Colchester Rd	1.37	1.88	Conversion to signalised junction, requires land take.	Design and construction:£1M -£3M Stats: £100k	0.87	0.90
8	A133 Colchester Rd / Heckfords Rd	99999	99999	Conversion to signalised junction. Alternatively addition of new slip roads Requires land take.	Design and construction:£1.8 M Stats: £250k	0.9	0.9
9	A133 Colchester Rd / Tendring Park Services	0.83	1.31	Slight widening of two approaches, within current boundary.	Design and construction: £140k. Stats: £30k	0.62	0.98
12	B1033 Abbey St / Station Rd	1.68	4.24	Conversion to signalised, with land take.	Design and construction: £620k. Stats: £130k	0.87	0.88
17	A133 / St Osyth Rd / Progress Way	0.63	0.74	None necessary.	None	0.63	0.74
20	B1027 St Johns Rd / Jaywick Ln	1.49	1.86	Conversion to full roundabout including the addition of 4th arm to connect to A133/St Osyth Road roundabout.	Design and construction: £770k. Stats: £1.3M	0.75	0.87
21	B1027 St Johns Rd / Lt Clacton Rd	1.72	1.95	Conversion to signalised, without pedestrian provision.	Design and construction: £670k. Stats: £1.9M	0.89	0.90
22	B1027 St Johns Rd / Cloes Ln	1.58	1.64	Conversion to signalised, with land take.	Design and construction: £2M. Stats: £350k	0.96	0.96
23	A133 / B1027 St Johns Rd / A133 London Rd	0.82	0.9	Adjustment to road markings, within highway boundary.	Design and construction: £95k. Stats: None.	0.74	0.84
25	B1027 St John's	0.91	1.06	Widening on North Road.	Design and	0.88	0.99

No.	Junction Description	Worst arm RFC Committed Development	Worst arm RFC Preferred Development	Mitigation Summary	Estimated cost	Worst arm RFC Committed Development, post mitigation	Worst arm RFC Preferred Development post mitigation
	Road / B1369 North road			Requires significant work outside of current boundary.	construction: £45k. Stats: £375k		
26	B1027 St John's Road / B1027 Valley Road / B1369 Old Road	1.28	1.37	Conversion to signalised. No provision for pedestrians.	Design and construction: £335k. Stats: £75k	0.86	0.95
27	B1352 Long Road / B1035 Clacton Road / B1352 New Road / Trinity Road	0.86	5.31	Conversion to signalised, within current boundary. Currently no pedestrian provision assumed, but may be possible to allow for this and still maintain acceptable RFCs.	Design and construction: £690k. Stats: £2.3M	0.89	0.88

Appendix A. Outline design drawings

N

Existing ditch on property boundary to be filled to allow for footway surfacing.

Existing section of driveway to be converted to reinforced footway.

Proposed uncontrolled crossing.

Proposed signalised crossing.

Existing bus stop to remain.

Proposed kerb build out to allow space for signal head.

Proposed relocation of existing bus stop .

Existing puffin crossing to be removed with addition of crossing at junction.

COLCHESTER ROAD

CHURCH ROAD

CLACTON ROAD

SCHOOL ROAD

Bescot

Momples Hall

Almesteda

Greenside

Tudor House

Spring Cottage

The Green

Chase House

Parkhouse

Green View

Shelter

Old Forge House

PO

Club

BUS STOP

Notes

1. Do not scale.

Key

- Proposed carriageway
- Proposed footway
- Proposed verge
- Proposed island
- Proposed PCC edging
- Proposed kerb line
- Proposed drop kerb line
- Existing road markings
- Proposed road markings
- Existing service pole
- Proposed tactile paving
- Proposed buff tactile paving
- Proposed bollard

Rev.	Date	Description of revision	Drawn	Checked	Reviewed	Approv'd
A	05/17	Modifications to road markings	BA	PN	PAB	PAB

DRAWING STATUS

FOR INFORMATION

RINGWAY JACOBS integrated expertise

Essex County Council

Mark Rowe, Service Director, Highways
Seax House, Victoria Road South, Chelmsford, CM1 1QH.
Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - COLCHESTER ROAD / CLACTON ROAD / SCHOOL ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
JM	JM	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:500

DRAWING No.
B3553R0P-02-00-SK01

REV.
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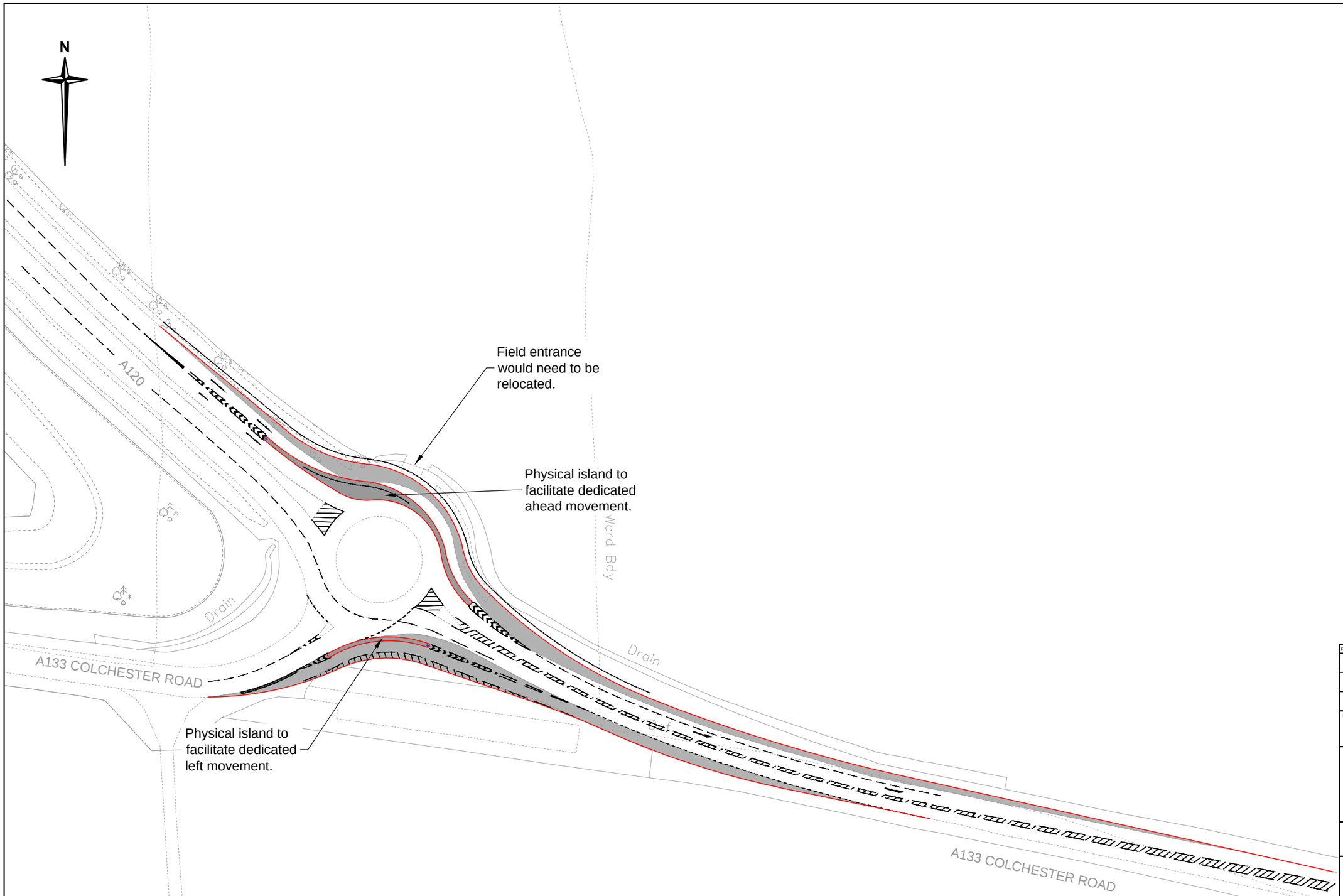

Notes

1. Do not scale.

Key

- Proposed kerbs
- Proposed PCC edging
- Proposed carriageway
- Proposed island
- Proposed bollard
- Proposed VRS
- Proposed road markings

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

FOR INFORMATION

RINGWAY JACOBS Integrated expertise | Essex County Council

Mark Rowe, Service Director, Highways
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Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - A120 / A133 MAIN ROAD / A133 COLCHESTER ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
PN	BA	PAB	PAB	PN
DATE	DATE	DATE	DATE	DATE
APR 17	APR 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
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DRAWING No.
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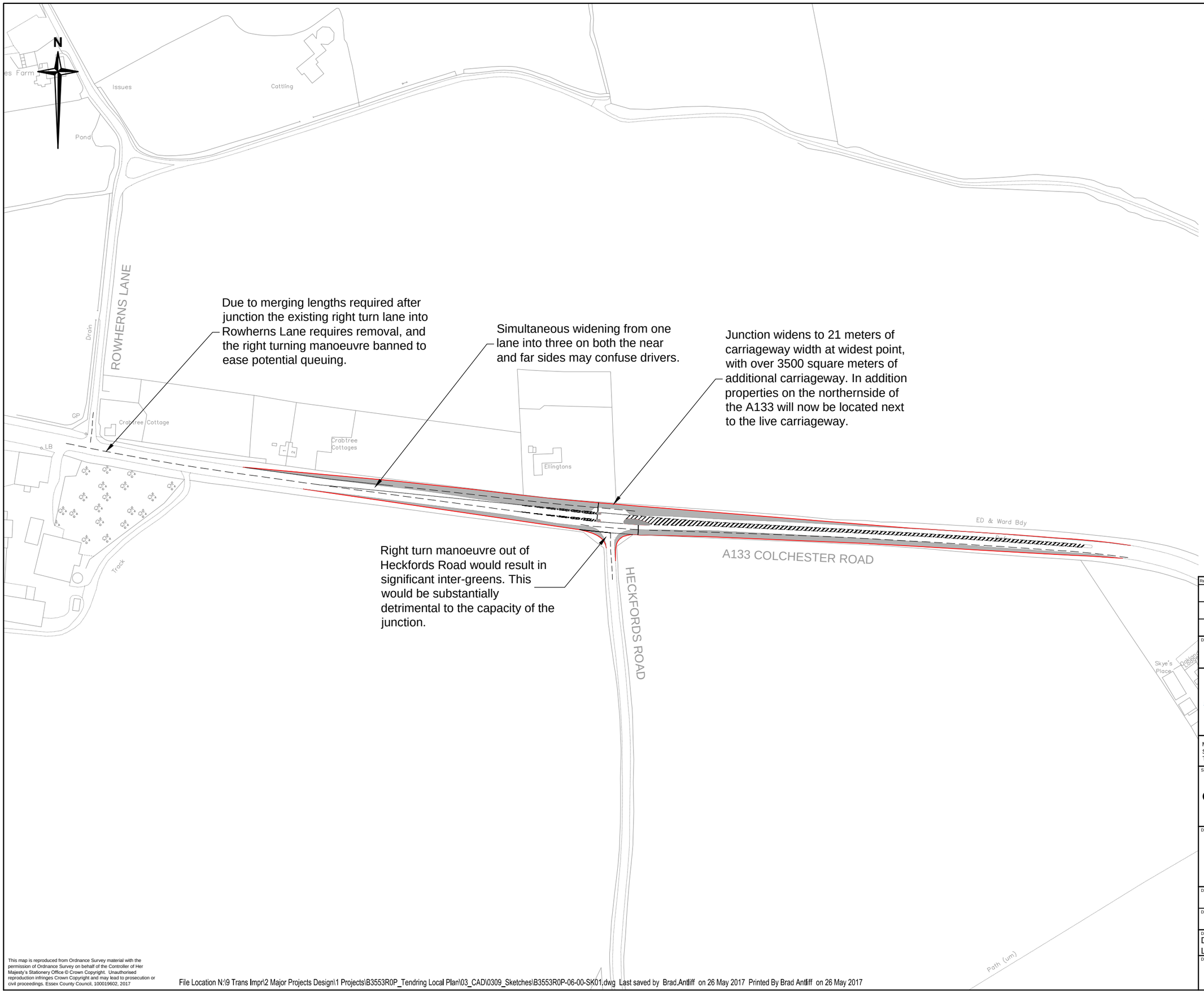

Notes

1. Do not scale.

Key

- Proposed kerbs
- Proposed island
- Proposed carriageway
- Proposed road markings

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

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Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - A133 COLCHESTER ROAD / HECKFORDS ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
BA	BA			
DATE	DATE	DATE	DATE	DATE
APR 17	APR 17			

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
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DRAWING No.
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N

Elizabeth Cottage

A133 COLCHESTER ROAD

Minimal widening on nearside, to facilitate 3 lanes approaching the give way line.

B1033 COLCHESTER ROAD

1.52m RH

Service Area

Minimal widening on nearside, to facilitate 3 lanes approaching the give way line.

Footway width maintained at 2m.

Existing offside hatching removed to increase approach width.

A133

Hotel

Pond

Notes

1. Do not scale.

Key

- Proposed kerbs
- Proposed PCC edging
- Proposed carriageway
- Proposed footway
- Proposed road markings

Rev.	Date	Description of revision	Drawn	Checked	Reviewed	Approved

DRAWING STATUS

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SCHEME TITLE

TENDRING LOCAL PLAN - A133 COLCHESTER ROAD / TENDRING PARK SERVICES

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
BA	BA	PN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:1000

DRAWING No.
B3553R0P-07-00-SK02

REV.
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N

Proposed 2m wide footway.

Existing bus shelter to be removed.

Proposed bus stop and shelter.

Existing driveway to be converted to reinforced footway.

Existing footway alignment to remain.

ST JOHN'S ROAD

FLIXTON CLOSE

JAYWICK LANE

BURGATE CLOSE

SUDBOURNE AVENUE

Ponds

Notes

1. Do not scale.
2. This drawing is to be read in conjunction with all other contract drawings and documents.

Key

- Proposed kerb
- Proposed dropped kerb
- Proposed PCC edging
- Proposed carriageway
- Proposed footway
- Proposed verge
- Proposed island
- Proposed bollard
- Proposed buff tactile paving
- Proposed road markings
- Proposed bus shelter
- Proposed bus stop marking

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

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Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - B1027 ST JOHN'S ROAD / JAYWICK LANE

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
JM	JM	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:1000

DRAWING No.
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REV.
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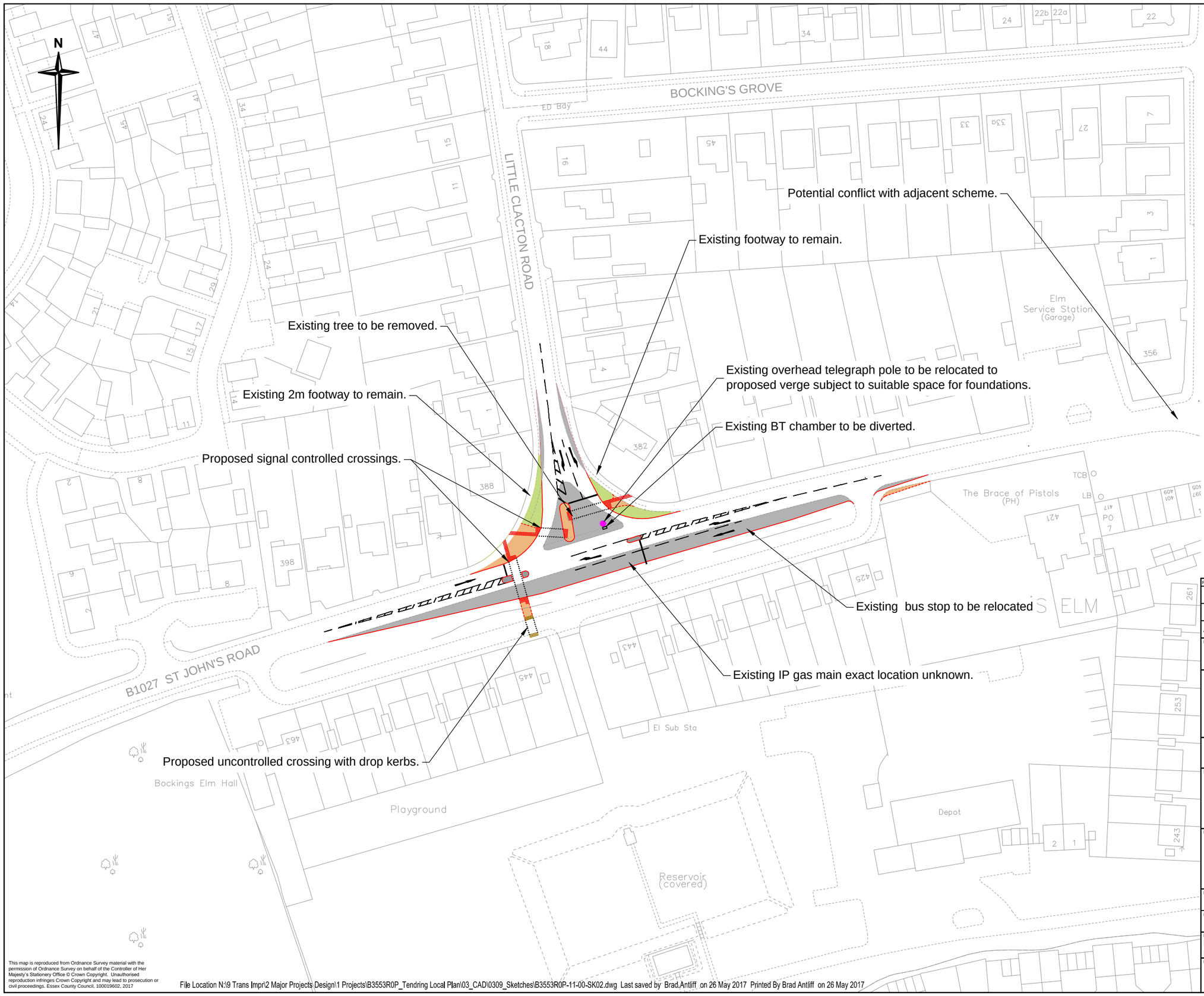

Notes

1. Do not scale.

Key

- Proposed carriageway
- Proposed footway
- Proposed verge
- Proposed PCC edging
- Proposed kerb line
- Proposed road markings
- Existing service pole
- Proposed tactile paving
- Proposed buff tactile paving

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd
A	05/17	Modifications to road markings	BA	PN	PAB	PAB

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SCHEME TITLE

TENDRING LOCAL PLAN - B1027 ST JOHN'S ROAD / LITTLE CLACTON ROAD

DRAWING TITLE

SCHEME OVERVIEW - OPTION B

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
JM	JM	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:1000

DRAWING No.
B3553R0P-11-00-SK02

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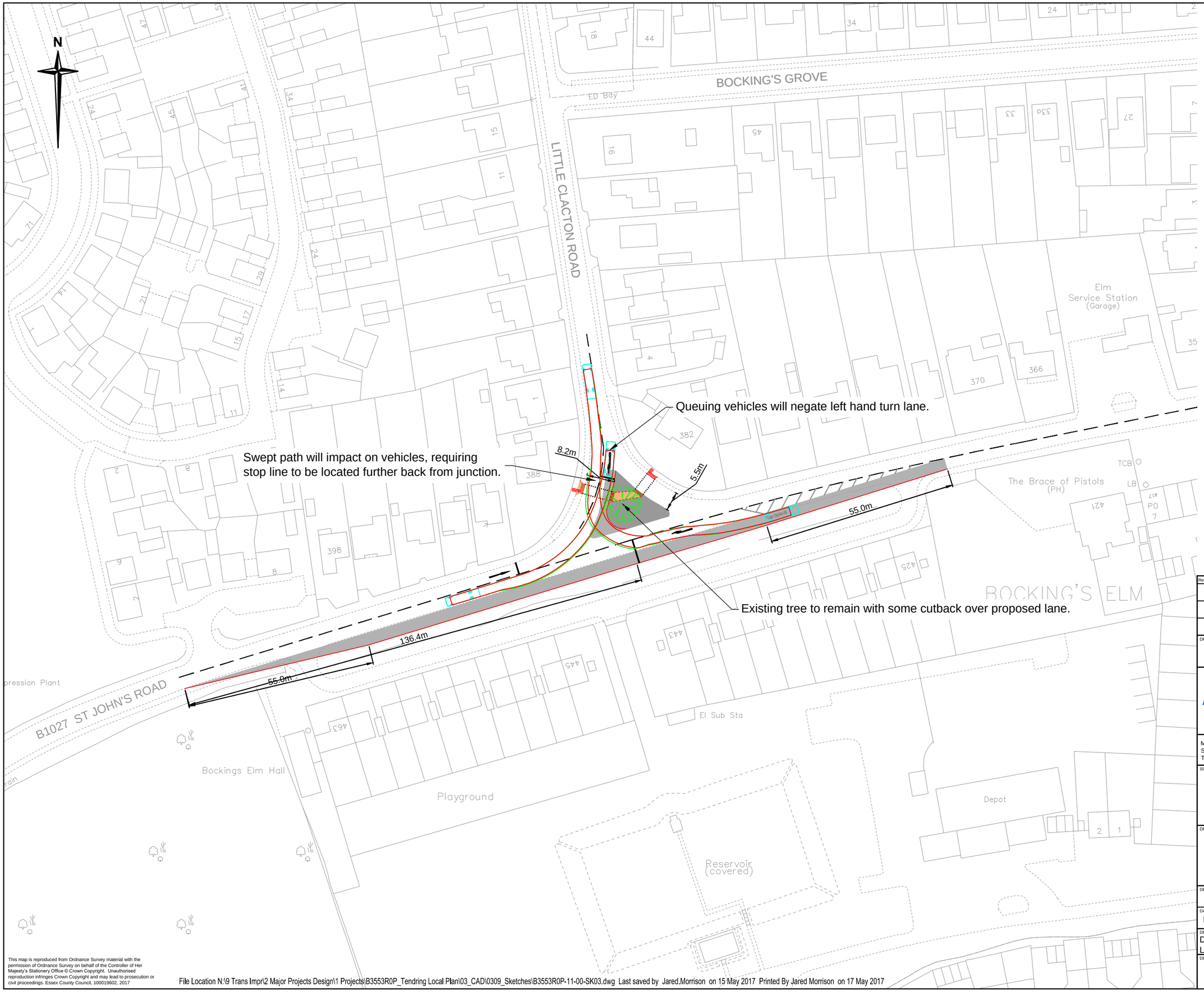

Notes

1. Do not scale.

Key

- Proposed carriageway
- Proposed footway
- Proposed verge
- Proposed PCC edging
- Proposed kerb line
- Proposed road markings

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

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Integrated expertise

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SCHEME TITLE

TENDRING LOCAL PLAN - B1027 ST JOHN'S ROAD / LITTLE CLACTON ROAD

DRAWING TITLE

SCHEME OVERVIEW - OPTION A

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
JM	JM	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:1000

DRAWING No.
B3553R0P-11-00-SK03

REV.
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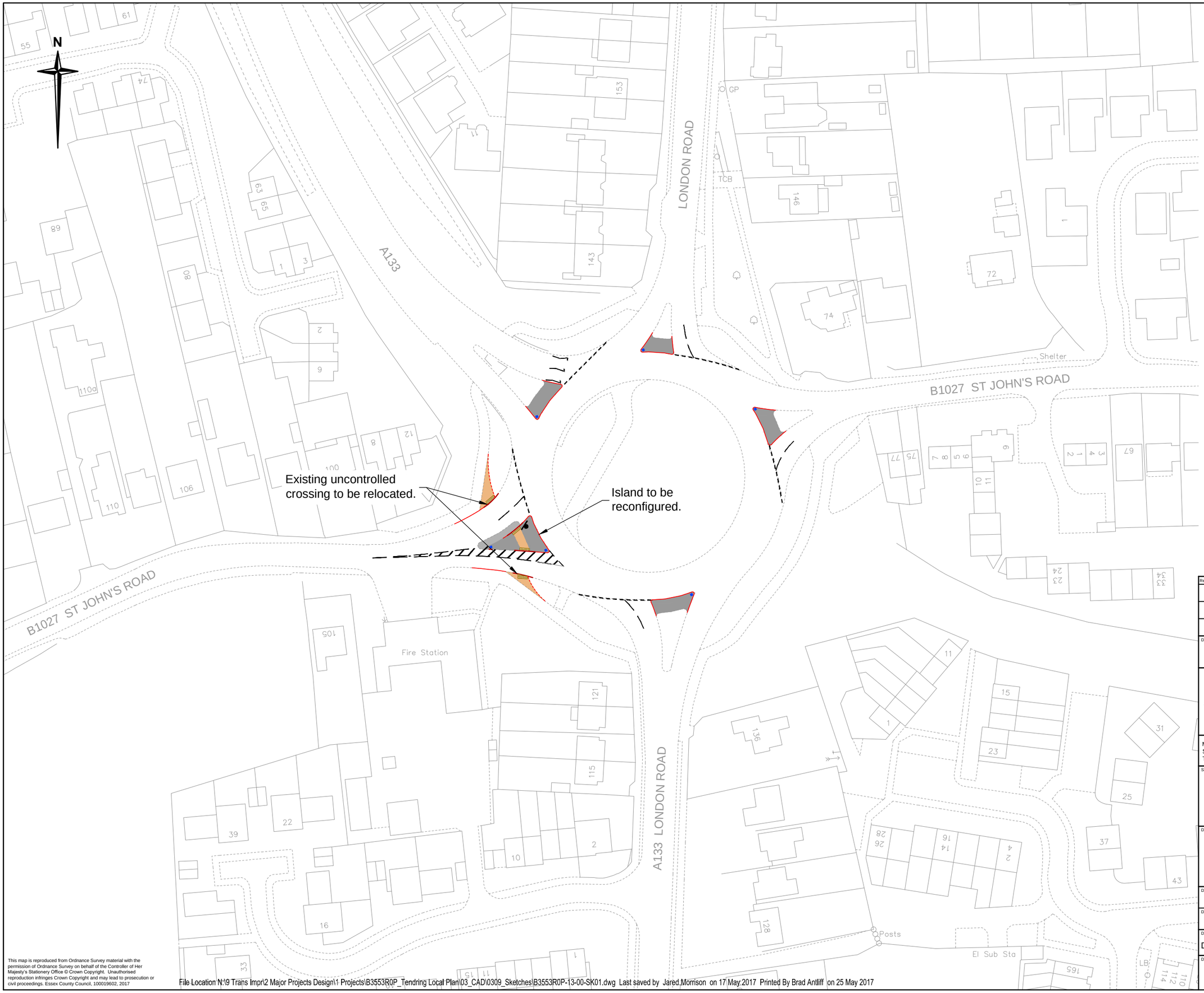

Notes

1. Do not scale.

Key

- Proposed kerb
- Proposed dropped kerb
- Proposed footway widening into existing carriageway
- Proposed island
- Proposed carriageway
- Proposed bollard
- Proposed road markings
- Proposed sign
- Proposed buff coloured blister tactile paving

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

FOR INFORMATION

RINGWAY JACOBS Integrated expertise | Essex County Council

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Seax House, Victoria Road South, Chelmsford, CM1 1QH.
Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN
A133 / B1027 ST JOHN'S RD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
AM	AG/KJH	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.: DIMENSIONS IN METRES

SCALE AT A3 (420x297mm): 1:1000

DRAWING No.: **B3553R0P-13-00-SK01**

REV.: -

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N

B1369 NORTH ROAD

B1027 ST JOHN'S ROAD

Car Park

The Queen's Head Hotel (PH)

The Plough (PH)

Hall

Shelter

GP

PO

Section of reinforced footway to facilitate vehicle access.

Proposed 2.0m wide footway will require sections of private land.

Yellow box proposed as a result of local feedback. However this could cause issues for stacking space at the puffin crossings, to the east and west. Alternatively keep clear markings could be used as a less formal method of control.

See drawing B3553R0P-15-00-SK01 for site 15 St John's Road / Valley Road scheme.

Notes

1. Do not scale.

Key

- Proposed carriageway
- Proposed footway
- Proposed kerb line
- Proposed drop kerb line
- Existing road markings
- Proposed road markings
- Proposed buff tactile paving
- Proposed yellow box marking

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

FOR INFORMATION

RINGWAY JACOBS Integrated expertise

Essex County Council

Mark Rowe, Service Director, Highways
Seax House, Victoria Road South, Chelmsford, CM1 1QH.
Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - ST JOHN'S ROAD / NORTH ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
NC	AG	PN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
MAY 17	MAY 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:500

DRAWING No.
B3553R0P-14-00-SK01

REV.
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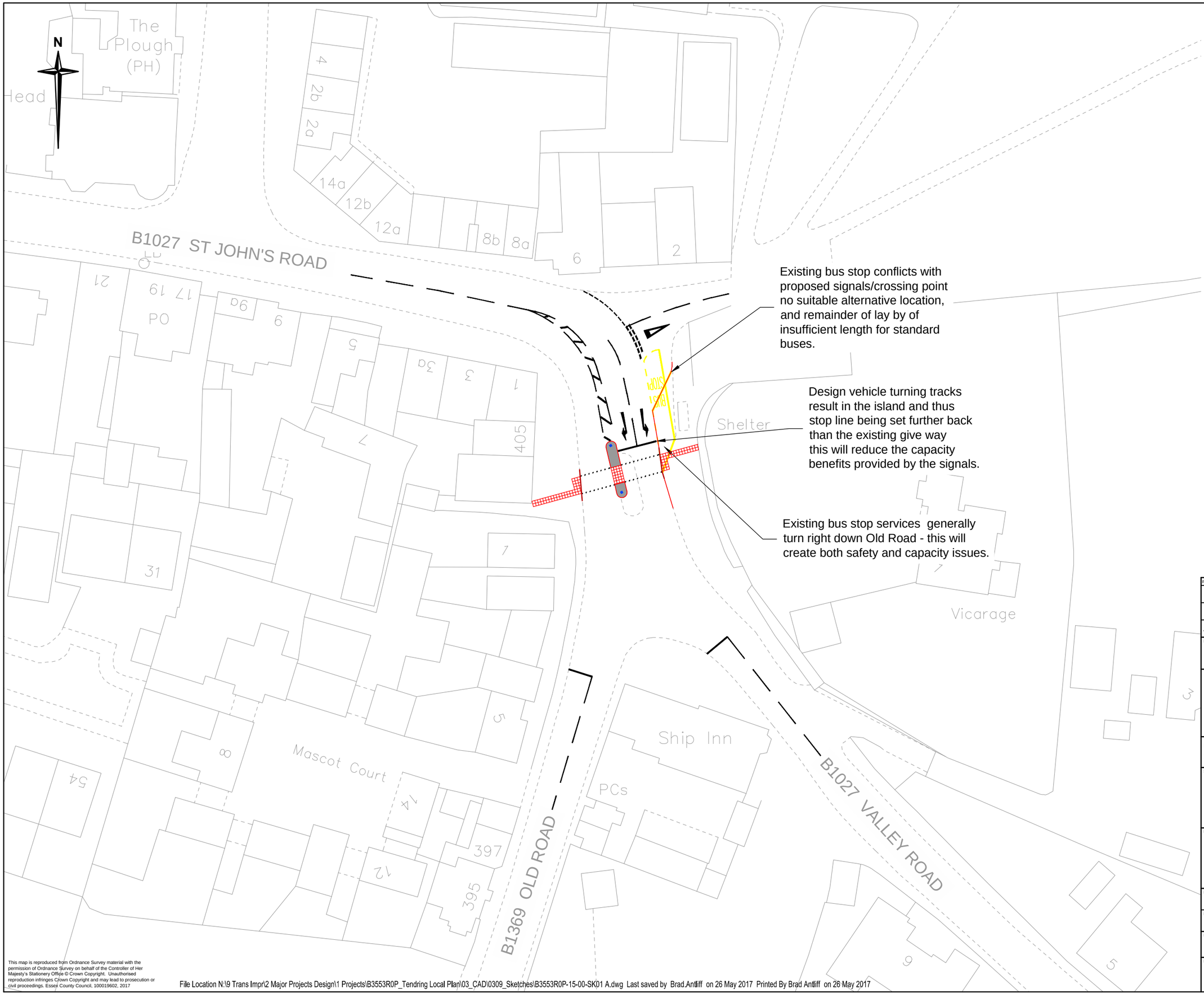

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd
A	07/17	Modifications to tactile paving	JM	PN	PAB	PAB

DRAWING STATUS

FOR INFORMATION

Ringway Jacobs — Integrated expertise

Essex County Council

Mark Rowe, Service Director, Highways
Seax House, Victoria Road South, Chelmsford, CM1 1QH.
Tel: 0345 6037631

SCHEME TITLE

TENDRING LOCAL PLAN - B1027 ST JOHNS ROAD / VALLEY ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
PN	BA	PJN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
APR 17	APR 17	MAY 17	MAY 17	MAY 17

DRAWING UNITS U.N.O.
DIMENSIONS IN MILLIMETRES
LEVELS IN METRES

SCALE AT A3 (420x297mm)
1:500

DRAWING No.
B3553R0P-15-00-SK01

REV.
-

File Location N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\0309_Sketches\B3553R0P-15-00-SK01 A.dwg Last saved by Brad.Antliff on 26 May 2017 Printed By Brad Antliff on 26 May 2017

N

Trinity Bungalow

Cedar Cottage

Tudor Lo

Tilia

Ruperra

Furness Cottage

Allotment Gardens

Pump

Hollyhedge

TRINITY ROAD

NEW ROAD

Footway width maintained at 2m.

Convert existing verge to footway.

Existing directional signs.

Stop line location to accomadate HGV turning movements.

Additional buildout proposed to accommodate traffic signals.

Hatching to aid large right turning vehicle manoeuvres.

Existing telegraph pole may require relocation.

Existing power pole may require relocation.

B1352 LONG ROAD

B1035 CLACTON ROAD

Mistley Manor

Notes

1. Do not scale.

Key

- Proposed kerbs
- Proposed PCC edging
- Proposed carriageway
- Proposed footway
- Proposed island
- Proposed bollard
- Proposed road markings
- Existing service poles

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd

DRAWING STATUS

FOR INFORMATION

RINGWAY JACOBS Integrated expertise

Essex County Council

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SCHEME TITLE

TENDRING LOCAL PLAN - B1352 LONG ROAD / TRINITY ROAD

DRAWING TITLE

SCHEME OVERVIEW

DESIGNED	DRAWN	CHECKED	REVIEWED	APPROVED
BA	BA	PN	PAB	PAB
DATE	DATE	DATE	DATE	DATE
APR 17	APR 17	APR 17	APR 17	APR 17

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Appendix B. Mitigation design detailed report

Document Control Sheet

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1 Introduction

A number of potential highway schemes have been identified under the Tendring Local Plan. Essex Highways has provided engineering support to further investigate, develop and provide high level cost estimates for these potential schemes along with associated general arrangement drawings.

Below is a table detailing the sites to be reviewed as part of the scheme:

Site Number	Site Name	Location	Details of Assessment
2	A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hill	CO12 5EX	No assessment required
4	A133 Colchester Rd / Church Rd / School Rd	CO7 7AT	Full assessment completed
5	A133 Clacton Rd / Bromley Rd	CO7 7AA	No assessment required
6	A133 Main Rd / Bromley Rd / Gt Bentley Rd	CO7 7DJ	No assessment required
7	A120 to A133 / A133 Main Rd / A133 Colchester Rd	CO7 8RT	Full assessment completed
8	A133 Colchester Rd / Heckfords Rd	CO7 8RX	Full assessment completed
9	A133 Colchester Rd / Tendring Park Services	CO16 9AG	Full assessment completed
12	B1033 Abbey St / Station Rd	CO16 0HB	Partial assessment completed
17	A133 / St Osyth Rd / Progress Way	CO16 9NY	No assessment required
20	B1027 St Johns Rd / Jaywick Ln	CO16 8BH	Full assessment completed
21	B1027 St Johns Rd / Lt Clacton Rd	CO16 8EA	Full assessment completed
22	B1027 St Johns Rd / Cloes Ln	CO16 8DS	Partial assessment completed
23	A133 / B1027 St Johns Rd / A133 London Rd	CO16 8WB	Full assessment completed
25	B1027 St John's Road / B1369 North road	CO15 4BS	Full assessment completed
26	B1027 St John's Road / B1027 Valley Road / B1369 Old Road	CO15 4AR	Full assessment completed
27	B1352 Long Road / B1035 Clacton Road / B1352 New Road / Trinity Road	CO11 2HN	Full assessment completed

Table 1 – Site list

2 Scheme Investigations

To further aid understanding of engineering challenges and potential complications a short summary for each site has been produced below.

2.1 Site 2 – A120 Tinker St / B1353 Wrabness Rd / B1352 Church Hill

No engineering assessment required.

2.2 Site 4 – A133 Colchester Road / Church Road / School Road

Drawing number B3553R0P-02-00-SK01 A

2.2.1 Proposal

This rural junction in the centre of the small village of Elmstead Market is a skewed crossroads, with the majority of through traffic travelling from the east and west. The road to the north leads to a residential area and the south towards the village of Alresford and Brightlingsea.

2.2.2 On Site Observations

The site is a wide space but with only a single lane passing east to west. There is open green space to the north of Colchester Road and a large section of road to the south which is unmarked but mostly seems to be used for parking.

There is a bus stop on either side of the road with the eastbound stop also having a shelter. There is an existing puffin crossing to the east of the junction to cross north to south but no other facilities. On the southwest corner of the junction the footpath is very narrow, reducing to less than 1.5m around the corner.

2.2.3 Feasibility and Recommendations

Accommodating this junction would be possible with a number of adjustments to the junction. The existing open carriageway area in front of the shop would need to be paved and built out to provide clear alignment for traffic at the stop line. This would also allow for a pedestrian crossing in this location over the shortest distance possible.

The build out would require the relocation of the westbound bus stop which would clash with the existing puffin crossing, however this crossing could be removed with the introduction of the crossing at the junction.

It would be necessary to build out the kerb on the southwest corner to improve pedestrian access, accommodate signal heads and improve the turning movement for vehicle turning left from School Road.

The widening on the western approach would provide the most difficulty due to existing property boundaries and the presence of a drainage ditch with a number of large trees adjacent.

The widening on this approach and the build out in front of the supermarket are most likely to attract objections locally.

2.2.4 Costs

The scheme works cost including design and construction along with a Risk and Contingency of 20% is estimated at £480k.

There are existing asbestos cement water mains passing under the junction that may be affected by the works. If these are affected the costs could be in the region of £100k although it may be possible to negotiate these as part of a renewal programme for Affinity Water.

The adjustment of the kerb line on the western approach will impact existing BT ducting that appears to be under the footway. This will need to be diverted or protected. The estimated cost for this is £75k.

2.3 Site 5 – A133 Clacton Rd / Bromley Rd

No engineering assessment required.

2.4 Site 6 – A133 Main Rd / Bromley Rd / Great Bentley Rd

No engineering assessment required.

2.5 Site 7 – A120 to A133 / A133 Main Rd / A133 Colchester Rd

Drawing number B3553R0P-05-00-SK01

2.5.1 Proposal

The proposal in this location is for the installation of a signalised T-Junction. This would replace the existing roundabout and would involve widening the southern and eastern approaches to provide capacity and turning lanes.

2.5.2 On Site Observations

The stopping site distance on the A133 northwest approach to the roundabout is 200m. Although of reasonable length, this roundabout is the first give way junction on the connecting main roads when outside of greater London. This has created a well-known potential accident site as drivers are not necessarily expecting the junction and are often travelling at high speeds. On the south western, Colchester Road approach the stopping site distance is limited at 37m due to the bend in the road on approach.

Large verges surround the entries and exits to the roundabout which is all highway owned land. This provides areas for potential widening. There is an existing farm access is located at the north of the roundabout and would likely require relocation to remove this point of conflict from the junction.

2.5.3 *Feasibility and Recommendations*

The recommendation has been reviewed and drawn up. The primary concern with this type of junction is with regarding safety. The currently roundabout has a history of accident problems and this is demonstrated by the presence of a significant length of antiskid, rumble strip bar markings and advanced signage.

The junction is located at the end of the dual carriageway and marks the first loss of priority for a significant distance for many drivers. As a result the presence of the traffic signals would have a similar problems to the existing roundabout. The existing junction is located on a left hand bend meaning that the sight lines are not as good…

One of the key contributors to congestion in this location is the throttling of traffic as the road goes from two lanes to one.

An alternative proposal has been developed that has been considered previously in this location. This would maintain the existing roundabout but provide free flow traffic lanes for traffic travelling west to east and east to south.

This option would also benefit traffic travelling south to west by clearly separating the left turning traffic from the east to give clearer openings in traffic.

Safety would be improved by allowing free flow of traffic from west to east by reducing queuing on the approach.

2.5.4 *Costs*

Due to the size and complexity of both schemes we have only provided outline costing at this stage.

For the signalised junction the cost is estimated between £2m-£3m

For the improved roundabout option the estimate is £1m-£1.5m

The cost of the signalised junction includes additional allowance to account for the complexity of construction in this location and the complex traffic management arrangements that would likely be required on this key strategic route.

2.6 Site 8 – A133 Colchester Rd / Heckfords Rd

Drawing number B3553R0P-06-00-SK01

2.6.1 *Proposal*

Heckfords Road is a small rural road which joins the A133 Colchester Road at a T-junction with no existing traffic management influencing traffic priority. Currently the A133 Colchester Road, which connects the A120 with areas of eastern Tendring such as Clacton and Walton-on-the Naze, experiences high traffic flows. This has the effect of not providing gaps that traffic

entering from Heckford's Road, which comes chiefly from Great Bentley located south of the junction, can utilise to join.

It has been proposed that providing 5 lanes of carriageway and signals at the location of the T-junction will better serve motorists by creating a signal phase that allows traffic to join from Heckford's Road. The effect will be 2 lanes of carriageway in both directions on the A133 at the approach to their stop lines, with an additional right turning lane for traffic to queue before entering into Heckford's Road.

2.6.2 On Site Observations

Whilst on site farm traffic was observed exiting Heckford's Road, this is significant because any turning movement in this location will need to accommodate the additional width associated with agricultural vehicles.

Wide verges exist on both sides of the carriageway and form part of the highway boundary, however there are a number of properties on the north side of the road at the back of the highway boundary.

There are combined power and telegraph poles on the north side of the road on the western approach. These would be likely to need be relocated to accommodate the junction.

The next junction is Rowherns Lane which is a priority junction to the north. This would lie within the extents of the proposed scheme.

There is also evidence of parking on the verge in front of some of the properties.

2.6.3 Feasibility and Recommendations

Due to standards adhered to for merging lengths and tapers, as well as the inclusion of physical islands for signal heads, the carriageway width at its widest point increases to 21m. This includes over 3,500 square meters of additional carriageway to facilitate the junction.

Although the scheme can be fully accommodated within the highway the existing residential properties will be located immediately next to the new carriageway. Currently there is a verge which is clearly in bad condition due to cars frequently using it to exit the carriageway before entering property land. With the proposed design the verge would be incorporated into the additional carriageway space and the process of vehicles turning into and out of the property may become more dangerous.

Right turning movements out of Heckford's Road would result in significant inter-greens due to the increased width of carriageway to cross. At the same time all traffic on the A133 will need to be stopped, greatly affect the capacity of the junction.

Due to the merging length required to return from two lanes to one for traffic travelling west on the A133 after the junction, the existing right turn lane into Rowhern's Lane would need to be banned for safety purposes. There is insufficient space to provide a safe turning pocket as

existing. This could potentially cause an increase in farm traffic negotiating the roundabout to the east (site 7).

To widen the single lane A133 to two lanes and a right turning lane for eastbound traffic, simultaneous widening will need to occur on the near and far sides. This may confuse drivers and would need to be examined in a road safety audit.

The feasibility of the scheme is good with no significant engineering barriers to completing construction. However, given the capital cost of the scheme, further qualification of the benefits is recommended. This is due to concerns that the significant amount of new carriageway may be excessive to allow Heckford's Road traffic to join the A133. Other less invasive schemes should be considered such as banning certain turning movements to change driver habits and increase through flow.

2.6.4 Cost

The cost for building has been broadly estimate at £1.8m due to the extensive works required for the scheme which in its current form is not endorsed by engineers at Essex Highways. In addition to this stats diversion costs for BT and UK Power Networks would cost an additional estimated £250k.

2.7 Site 9 – A133 Colchester Rd / Tendring Park Services

Drawing number B3553R0P-07-00-SK02

2.7.1 Proposal

Tendring Park Services is a well-used roundabout connecting the A133 carry traffic from Colchester and traffic coming west along the A12 to the Clacton bound section of the A133. There is also an eastern arm connecting to the B1033 which continues on to Frinton-on-Sea and Walton on the Naze. Also located at the roundabout are services which consist of fuel pumps, fast food outlets and a hotel.

It has been proposed that to increase the roundabout's capacity, the entry widths of the north west and south arms should be increased. This widening aims to provide three lanes that the vehicles can discharge from for these two arms.

2.7.2 On Site Observations

The exit arms for every arm not associated with the services quickly merges to a single lane, this may influence capacity due to effects of increased discharge onto the roundabout being partially negated by traffic merging down to single lanes upon exit.

Offside hatching on the southern arm of the roundabout can reduced to create some of the additional approach width.

Verges around the proposed arms for widening forms part of the highway boundary and would not require any land purchase to complete the works.

A filter carrier drain along the verge of the northwest approach will need to be removed and relocated as part of the works.

2.7.3 Feasibility and Recommendations

An initial feasibility drawing has been produced for this scheme and the option is achievable.

Widening on the southern approach conflicts with the existing cycleway. The existing 2m width has been maintained by realigning it with the new kerb line.

The extent of the widening is limited, only gaining a few meters of carriageway width at the give way line. A topographical survey is required to further investigate the exact gain due to accuracy limitations of Ordinance Survey mapping utilised.

The offside island on the southern approach can remain unaffected by the widening with all additional carriageway width being taken from the nearside. This also maintains a suitable entry angle for vehicles entering the roundabout.

The feasibility of the scheme is good with no significant engineering barriers to completing construction. However, given the capital cost of the scheme, further qualification of the benefits is recommended. This is due to concerns that due to all exits from the roundabout quickly merging to single lanes, the effect of 3 lane entry widths may be somewhat negated for traffic once having exited the roundabout.

2.7.4 Cost

The cost for building this scheme is approximately £140k, inclusive of construction, design and supervision. In addition to this there will be some required water stats diversions required, estimated at £30k.

2.8 Site 12 – B1033 Abbey St / Station Rd

2.8.1 Proposal

Provide signalisation and realignment of the existing 'Bennett' Delta junction.

2.8.2 On Site Observations

The key observation of the site was the presence of the war memorial in the centre of the junction. The relocation of this would provide significant engineering and political difficulties.

The narrow width of the approach from west was also a concern along with the tight curvature on the approach from the south.

2.8.3 Feasibility and Recommendations

We have not produced a design layout for this option as we do not believe the installation of a signalised drawing to standards is feasible.

Beyond the political difficult of relocating the existing war memorial there are significant land acquisition. In order to accommodate the right turning lane from the west as well as a signal island this would require land take to the south of what is shown as Ivy House.

In order to improve visibility to a suitable level from the southern approach there would also need to be an adjustment to the boundary wall of Ivy House adjacent to Station Road.

The works would involve adjusting the front wall of the garden and moving closer to the Grade II listed property. While this is not an impossible barrier it is recommended that these issues are addressed before any further assessment or design is carried out.

2.8.4 Costs

Due to the adjacent land issues we have not drawn up an option for this scheme. However based on its similarity to the Little Clacton Road scheme it could be priced at approximately £620k for construction, design and supervision.

Furthermore the presence of underground services for BT Openreach and UKPN High Voltage cabling an allowance of a further £130k should be made for protection or diversion of existing utilities equipment.

2.9 Site 17 – A133 / St Osyth Rd / Progress Way

No engineering assessment required.

2.10 Site 20 – B1027 St John's Rd / Jaywick Lane

Drawing number B3553R0P-10-00-SK01

2.10.1 Proposal

The proposal is to convert the existing mini-roundabout into a full roundabout and add an additional arm to the north.

2.10.2 On Site Observations

The site is based adjacent to a field so there are no restrictions to the widening of the road in that direction.

It was noted that there are two bus stops in close vicinity to the mini-roundabout. The one on the western approach of St John's Road has a layby, the second is on Jaywick Lane on the southbound side of the road heading away from the mini-roundabout.

There is good visibility between the eastern and southern arms where there is a clear verge area, on the western side there is a boundary wall that limits visibility slightly.

There is on ground evidence of gas mains, water mains and BT Openreach equipment.

2.10.3 Feasibility and Recommendations

In order to achieve the best alignment it is necessary to move the roundabout to the north, this improves the visibility, pedestrian routes and deflection of vehicles on entry into the roundabout.

2.10.4 Costs

The cost for design and construction for this scheme is estimated at £770k including for a risk and contingency allowance.

The costs do not include for land purchase costs and these would need to be defined in more detail.

The costs of the associated diversion and protection works are considerable at this scheme. BT Openreach and UKPN are estimated at £50k each to move junction boxes and electrical supplies.

The National Grid gas equipment in this location is a medium pressure main that runs along the northern verge of St John's Road. Diversion of this service would incur significant costs and planning in advance.

The existing water mains also run along the verge in this location and are made of Asbestos Concrete. As such the diversion costs are higher than normal due to cost of diverting these. It may be possible to share these costs with the operator if they have planned replacement works in this location.

2.11 Site 21 – B1027 St John's Rd / Little Clacton Rd

Drawing number B3553R0P-11-00-SK02 A and B3553R0P-11-00-SK03

2.11.1 Proposal

Provide signalisation and realignment of the existing 'Bennett' Delta junction. Cut back of the existing island on the west to allow for two way traffic, narrowing of the east side to leave one free flow lane for left turning traffic and widening of St John's Road to the south to accommodate the straight on and right turn lanes.

2.11.2 On Site Observations

The site is located in a residential area on the edge of the town. The junction is what is called a 'Bennett' or Delta junction. Traffic can pass either side of the island in either direction. To the south of the junction is a wide verge (approximately 10m) to a service road and houses behind. The central Island has a footpath, a lamp column and a large tree.

In the verge to the south there was a National Grid service marker denoting the presence of an intermediate pressure gas main. There were also a number of water main manhole covers indicating junction and control points.

These findings are backed up by the Utility records that show the gas main running 2m from the edge of the southern kerb and several water mains running through this location.

2.11.3 Feasibility and Recommendations

The Initial review of the proposed junction showed issues with the turning movement from St John's Road right into Little Clacton Road. The swept path of larger vehicles would mean the stop line on Little Clacton Road would need to be set back further than expected (see drawing SK03). This would impact on the performance of the junction by increasing the time between green signal phases and reducing the efficacy of the free left turn from Little Clacton Road.

It is recommended that a controlled crossing be included in the signal design due to the presence of a small supermarket to the west, however this would be difficult to encompass within the design due to the presence of the tree.

An alternative design has been proposed (see drawing SK02) which would require the removal of the tree. This would prove difficult also as the tree was donated by a long serving local MP and is off some significance despite not having a Tree Preservation Order.

Furthermore the presence of the intermediate pressure main and UKPN High Voltage electrical cabling and asbestos cement water mains would lead to time consuming and expensive diversion works.

2.11.4 Costs

We have costed the alternative option for this scheme at £670k (including design and risk).

On top of these costs the utility diversion costs would be significant. Based on previous experience of similar schemes we have estimated the costs as follows:

National Grid Gas - £1.5m

UKPN High Voltage diversions - £150k

Mains Water and sewage - £250k

BT Openreach - £80k

2.12 Site 22 – B1027 St John's Rd / Cloes Lane

2.12.1 Proposal

The proposed works for this junction involve the conversion of a three arm mini roundabout into a four arm signalised junction.

2.12.2 On Site Observations

The site is currently a three arm mini roundabout with the fourth arm, Woodrows Lane currently a left out only onto St John's Road. There is a parade of shops on the southwest corner with parking in front, to the west of the shops is a pub and car park. There is a puffin crossing opposite the parade of shops.

To the east of the junction there is a wide verge to the south of the junction with grass and trees. There is evidence of a recent trenching works along this verge adjacent to the road, from the inspection covers this would appear to be BT Openreach.

To the south, Cloes Lane, is a wide single carriageway with a bus stop on the east side and a wide footway on the west. This includes an access to the shop front parking on the corner.

2.12.3 Feasibility and Recommendations

The alignment of St John's Road whilst accommodating the left turn lane from the eastern approach and the right turn lane from the west creates significant safety issues. Traffic wishing to travel east to west are travelling directly towards the opposing lane of traffic. It is not possible to fully avoid this based on the existing space.

The widening to the west will create problems. This will impact the parking in front of the parade of shops and the car park for the adjacent pub. There are existing High Voltage cables running under the southern footway along with an asbestos cement water main.

The works would also require the removal of several mature trees to the east of the junction.

Due to the alignment concerns we have not produced a scheme drawing for this proposal. Any correctly designed solution would have a significant impact on residences and businesses.

2.12.4 Costs

As we have not produced a design we are unable to put an accurate price to this scheme. We would broadly estimate the cost to be in the region of £2m with a further £350k required to cover utility service diversions and protection.

2.13 Site 23 – A133 / B1027 St John's Rd / A133 London Rd

Drawing number B3553R0P-13-00-SK01

2.13.1 Proposal

This large roundabout located on the outskirts of Clacton intersects the A133 which brings traffic from the A120 and the B1027 St John's Road which caters for traffic traveling across or into Clacton from St Osyth and Holland-on-Sea. In addition to this there is a fifth northern entry / exit arm of London Road, catering to residential arrears. Located just off the western arm is Clacton's fire station with emergency vehicles needing to join the road on the approach or exit of this arm.

It has been proposed that to improve junction capacity that the existing splitter islands on the arms of the roundabout should be modified. This change would increase the size of the island by incorporating existing hatched road markings between the island and roundabouts centre island. This is intended to move the give way lines forward and increase discharge. In addition to this the western approach width should be increased.

2.13.2 *On Site Observations*

The roundabout is fast moving with vehicles navigating the circulatory carriageway at high speeds.

A shared used footway / cycleway crosses the western arm of the roundabout via an uncontrolled crossing point, making use of the arm's island. Any modifications to the island would need to incorporate the reinstating of this facility.

2.13.3 *Feasibility and Recommendations*

An initial feasibility drawing has been produced with the following recommendations.

All widening of the islands towards the centre island is possible, however this will likely limit vehicle movements to either using the nearside lane to take the first exit off the roundabout or using the offside lane to enter the single lane circulatory carriageway and take later exits. The effect of this may need to further investigated with a road safety audit performed to assure safety is accounted for.

The widening of the western approach arm is possible by converting some of the existing splitter island to carriageway. To maintain a suitable waiting area for pedestrians on the island the shared use footway / cycleway needs to be moved towards the centre of the roundabout. This in turn means the shared used footway / cycleway located along the verge has to be realigned.

The feasibility of the scheme is very good with no significant engineering barriers to completing construction. However, the effect on vehicle movements should be considered from a safety aspect if there are two lane approaches and only a single lane circulatory carriageway, as this may confuse drivers.

2.13.4 *Cost*

The cost for building this scheme is approximately £95k, inclusive of construction, design and supervision. There is no extra provision needed for stats diversion at time of issue.

2.14 Site 25 – B1027 St John's Rd / B1369 North Rd

Drawing number B3553R0P-14-00-SK01

2.14.1 *Proposal*

The scheme put forward to is to widen the approach on North Road towards the junction with St John's Road to provide two lanes for turning in both directions.

2.14.2 *On Site Observations*

The key issue on site is that the existing footway on the east side of the carriageway is a combination of highway land and private land. There is no hard boundary wall but any widening of the road would require the acquisition of private land to accommodate the footway.

There are a number of utilities covers that would indicate services that require diversion or protection.

There are two puffin crossings on St John's Road, both a short distance from the junction on either side. Whilst on site we were approached by a member of the public who observed that traffic queuing at these when on red prevent traffic from turning out of North Road.

2.14.3 Feasibility and Recommendations

The civils works associated with this scheme are relatively straight forward at this junction with only the diversion or protection of services causing issues.

There are significant issues with stats in this location with gas, UKPN, water and BT all affected by the widening on the footway.

The most significant issue would likely be around the water main which is recorded as asbestos cement make up. The controls require to remove this could be excessive.

2.14.4 Costs

The estimated civils costs for this scheme are £45k, however the associated utility diversion or protection costs are likely to dwarf that as follows:

- Gas - £100k
- UKPN - £50k
- Water- £150k
- BT - £75k

2.15 Site 26 – B1027 St John's Rd / B1027 Valley Rd / B1369 Old Rd

Drawing number B3553R0P-15-00-SK01 A

2.15.1 Proposal

The proposal for this site is to convert the existing mini-roundabout into a three arm signalised junction.

2.15.2 On Site Observations

The junction appears to have originally been a priority T-junction converted into a mini-roundabout.

The junction is located east of the junction with North Road where there is a puffin crossing around a tight bend. On the south side of the junction there are narrow footways but these aren't affected by the junction or proposals.

On the northeast side there is a bus stop that serves 10no bus routes, during the day there are approximately nine buses per hour. Eight of these buses turn right at the junction to travel down the B1369 Old Road.

There is an existing island on the north arm with an uncontrolled pedestrian crossing including flush kerbs at both sides of the road.

2.15.3 Feasibility and Recommendations

The proposal for this scheme is achievable within the existing footprint of the junction. However it would be necessary to move the stop line further back to accommodate the pedestrian crossing as well as the vehicle swept path from Valley Road. Because of the existing crossing in this location it would be recommended to include a controlled crossing to provide access to the church and the bus stop.

The location of the stop line reduces the effective length of stacking both for traffic going straight on and for right turning traffic. This could impact on the performance of the puffin crossing to the east and the next junction at North Road.

The location of the stop line is also an issue for the bus stop and bus routes, the bus stop would need to be moved back from the stop line to allow traffic to pass but when these buses wish to turn right down Old Road they would block all traffic travelling from east to west.

There are no logical locations for the relocation of the bus stop due to the proximity to the junctions around it. We believe this issue would hamper the efficacy of any improvements and raise safety concerns for the design.

It is recommended that further consultation is carried out with the bus operators before this scheme is taken forward.

2.15.4 Costs

The cost for design and construction for this scheme is estimated at £335k including for a risk and contingency allowance.

All of the works can be carried out within the highways boundary and there are limited diversion or protection works required. There are existing water mains valves and BT chambers that may require adjustment or protection. The combined estimated costs for these is £75k.

2.16 Site 16 – B1352 Long Rd / B1035 Clacton Rd / B1352 New Rd / Trinity Rd

Drawing number B3553ROP-16-00-SK02

2.16.1 Proposal

This rural junction just south of Manningtree is a skewed crossroads with traffic approaching from the northern and southern arms giving way to vehicles entering from the east and west. Traffic flowing from east to west is local traffic, connecting neighbouring areas of Ardleigh and Mistley. To the north of the junction is Trinity Road, which has a width restriction of 2m. It narrows significantly before providing a one-way single lane access onto the high street. To the south of the junction the road very quickly becomes national speed limit and connects with the A120 at Horsley Cross.

It has been proposed to aid non-priority movements around the current junction that signals should be introduced and a right turn lane provided for eastbound traffic. Furthermore the junction should be slightly realigned to create a straighter path for vehicles travelling across north to south.

The benefits of these junction modifications would be to create a queueing space for right turning vehicles for traffic approaching from Long Road. This therefore increases discharge for this approach when combined with the straight on and left turn lane.

It would also improve the alignment for traffic travelling across the junction from north to south and reduce the delay to those arms not currently given priority at the junction.

2.16.2 On Site Observations

Alignment for the north to south vehicle movements is possible with modifications to the existing island.

Widening for the right turn lane on the eastern approach is possible by widening into existing footway and verge. A new 2m footway can be laid adjacent to the carriageway and tied into the existing footways on the eastern and northern arms.

Overhead high voltage cables and BT cables run across the centre of the junction and would influence construction techniques during the build. Some associated power and telegraph poles will need to be relocated to accommodate widening.

2.16.3 Feasibility and Recommendations

The give way line on the southern approach left turn and stop lines at all other approaches have been set back to accommodate articulated lorry movements. This is true for all vehicle movements apart from entry and exit into Trinity Road which has a width restriction so has been designed to accommodate vehicles only up to the size of heavy goods vehicles.

A buildout of the footway on the corner of Clacton Road and New Road has been included to slow turning traffic by creating a tighter turning radius as well as providing a potential location for traffic signals to provide clearer visibility for approaching traffic.

The feasibility of the scheme is good with no significant engineering barriers to completing construction. However, given the capital cost of the scheme, further qualification of the benefits is recommended. This is due to concerns that the Inter-green periods of the traffic signals combined with conflicting vehicle movements may offset the benefits gained by alleviating non-priority traffic queues.

2.16.4 Cost

The cost for building this scheme is approximately £690k, inclusive of construction, design and supervision.

There are water, gas and UK Power Networks stats diversions that would likely be required. The most significant of these is the diversion of a Local High Pressure Main that runs east-west

along the northern footway. An outline estimate for these works would be in the region of £2.0m but further investigation would be needed to ascertain the depth of this service.

The existing water pressure main would also be impacted with an estimated diversion cost of £150k.UKPN would require a similar cost to divert existing HV cables and an overhead power line.

Appendix C. Scheme cost estimates

Tendring Local Plan
Colchester Road/ Clacton Road / School Road

Associated drawing ref:	B3553R0P-02-00-SK01	**Prepared by:**	JM
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£51,684
Series 200 - Site Clearance		£5,103
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£4,896
Series 600 - Earthworks		£16,849
Series 700 - Pavements		£47,509
Series 1100 - Kerbs, Footways and Paved Areas		£20,260
Series 1200 - Traffic Signs and Road Markings		£153,278
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£10,518
Construction Cost Including RJ Overheads and Profit		£326,230
Design and Supervision Costs		£76,440
Risk Contingency	Estimated at 20%	£80,534
Grand Total		**£483,203**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs.

File Location: N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\Costings\

Tendring Local Plan
A120 / A133 Main Road

Associated drawing ref:	B3553R0P-05-00-SK01	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 30%	£51,684
Series 200 - Site Clearance		£10,523
Series 300 - Fencing		£10,064
Series 400 - Road Restraint Systems		£7,144
Series 500 - Drainage and Service Ducts		£18,720
Series 600 - Earthworks		£81,524
Series 700 - Pavements		£315,741
Series 1100 - Kerbs, Footways and Paved Areas		£29,814
Series 1200 - Traffic Signs and Road Markings		£13,968
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£13,990
Construction Cost Including RJ Overheads and Profit		£685,834
Design and Supervision Costs		£128,897
Risk Contingency	Estimated at 20%	£162,946
Grand Total		**£977,677**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs. Land acquisition is required for this scheme, this cost has not been included in the cost estimate

File Location: N:\9 Trans Impr\2 Major Projects Design\6 Library\Estimating Tools\

Tendring Local Plan
A133 Colchester Road / Tendring Park Services

Associated drawing ref:	B3553R0P-07-00-SK02	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£13,727
Series 200 - Site Clearance		£7,168
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£6,735
Series 600 - Earthworks		£6,469
Series 700 - Pavements		£31,091
Series 1100 - Kerbs, Footways and Paved Areas		£2,795
Series 1200 - Traffic Signs and Road Markings		£3,555
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£10,819
Construction Cost Including RJ Overheads and Profit		£86,643
Design and Supervision Costs		£27,614
Risk Contingency	Estimated at 20%	£22,852
Grand Total		**£137,109**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs.

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Tendring Local Plan
St John's Road / Jaywick Lane

Associated drawing ref:	B3553R0P-10-00-SK01	**Prepared by:**	JM
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£83,085
Series 200 - Site Clearance		£22,929
Series 300 - Fencing		£5,988
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£24,471
Series 600 - Earthworks		£96,874
Series 700 - Pavements		£172,791
Series 1100 - Kerbs, Footways and Paved Areas		£47,398
Series 1200 - Traffic Signs and Road Markings		£8,720
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£21,792
Construction Cost Including RJ Overheads and Profit		£524,433
Design and Supervision Costs		£117,590
Risk Contingency	Estimated at 20%	£128,405
Grand Total		**£770,428**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs. Land acquisition is required for this scheme, this cost has not been included in the cost estimate

File Location: N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\Costings\

Tendring Local Plan
St John's Road / Little Clacton Road

Associated drawing ref:	B3553R0P-11-00-SK02	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£70,315
Series 200 - Site Clearance		£5,926
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£8,382
Series 600 - Earthworks		£37,768
Series 700 - Pavements		£117,799
Series 1100 - Kerbs, Footways and Paved Areas		£21,081
Series 1200 - Traffic Signs and Road Markings		£153,278
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£7,341
Construction Cost Including RJ Overheads and Profit		£443,827
Design and Supervision Costs		£86,854
Risk Contingency	Estimated at 20%	£106,136
Grand Total		**£636,817**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs. Land acquisition is required for this scheme, this cost has not been included in the cost estimate.

File Location: N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\Costings\

Tendring Local Plan
A133 / B1027 St John's Road

Associated drawing ref:	B3553R0P-13-00-SK01	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£9,779
Series 200 - Site Clearance		£4,112
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£0
Series 600 - Earthworks		£8,945
Series 700 - Pavements		£3,987
Series 1100 - Kerbs, Footways and Paved Areas		£13,792
Series 1200 - Traffic Signs and Road Markings		£4,905
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£13,154
Construction Cost Including RJ Overheads and Profit		£61,726
Design and Supervision Costs		£18,193
Risk Contingency	Estimated at 20%	£15,984
Grand Total		**£95,903**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs.

File Location: N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\Costings\

Tendring Local Plan
St John's Road / North Road

Associated drawing ref:	B3553R0P-14-00-SK01	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£7,728
Series 200 - Site Clearance		£1,831
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£3,248
Series 600 - Earthworks		£9,759
Series 700 - Pavements		£15,461
Series 1100 - Kerbs, Footways and Paved Areas		£3,696
Series 1200 - Traffic Signs and Road Markings		£3,338
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£1,306
Construction Cost Including RJ Overheads and Profit		£48,777
Design and Supervision Costs		£14,026
Risk Contingency	Estimated at 20%	£12,560
Grand Total		**£75,363**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs. Land acquisition is required for this scheme, this cost has not been included in the cost estimate.

File Location: N:\9 Trans Impr\2 Major Projects Design\1 Projects\B3553R0P_Tendring Local Plan\03_CAD\Costings\

Tendring Local Plan
St John's Road - Valley Road

Associated drawing ref:	B3553R0P-15-00-SK01	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£35,940
Series 200 - Site Clearance		£152
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£0
Series 600 - Earthworks		£2,657
Series 700 - Pavements		£23,361
Series 1100 - Kerbs, Footways and Paved Areas		£1,120
Series 1200 - Traffic Signs and Road Markings		£151,778
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£634
Construction Cost Including RJ Overheads and Profit		£226,856
Design and Supervision Costs		£52,311
Risk Contingency	Estimated at 20%	£55,833
Grand Total		**£335,000**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs.

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Tendring Local Plan
B1352 Long Road - Clacton Road

Associated drawing ref:	B3553R0P-16-00-SK02	**Prepared by:**	BA
Revision:	1	**Checked by:**	PAB
Date:	May-17	**Reviewed by:**	PN

		Cost
Series 100 - Prelims	Estimated at 20%	£72,442
Series 200 - Site Clearance		£9,821
Series 300 - Fencing		£0
Series 400 - Road Restraint Systems		£0
Series 500 - Drainage and Service Ducts		£12,923
Series 600 - Earthworks		£43,845
Series 700 - Pavements		£107,369
Series 1100 - Kerbs, Footways and Paved Areas		£18,050
Series 1200 - Traffic Signs and Road Markings		£155,542
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		£13,838
Construction Cost Including RJ Overheads and Profit		£457,256
Design and Supervision Costs		£95,628
Risk Contingency	Estimated at 25%	£138,221
Grand Total		**£691,106**

Notes: Stats costs not included. Prelim cost calculated as a percentage of works costs. Risk cost calculated as a percentage of construction, design and supervision costs.

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