



ST MODWEN DEVELOPMENTS

PROPOSED RESIDENTIAL DEVELOPMENT LAND SOUTH OF CHURCH STREET CHURCH GRESLEY

Transport Assessment

October 2013

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1 INTRODUCTION

1.1 Introduction

- 1.1.1 Croft have been commissioned by St Modwen to produce a Transport Assessment to assist the Local Planning Authority's determination of an outline planning application for a residential development on land to the south of Church Street in the Church Gresley area of Derbyshire.
- 1.1.2 The application site is located approximately a 1.5 kilometres south of Swadlincote town centre. The location of the application site is shown within **Plan 1**.
- 1.1.3 The site is currently undeveloped. Further details pertaining to the site's existing use will be provided in Section 2.
- 1.1.4 It is proposed to develop the site with up to 306 residential units (though this Transport Assessment robustly assesses up to 300 units). Vehicular access to the site will be via an extension to Rockcliffe Close and via an emergency access onto Church Street. Further details pertaining to the proposed development will be provided within Section 3 of the Report.
- 1.1.5 Section 4 of the Report considers the aspects of local and national planning policy which are relevant to the development and Section 5 considers the accessibility of the site by non-car modes.
- 1.1.6 Section 6 contains the traffic impact assessment. Section 7 presents details of the Framework Travel Plan and Section 8 contains Report's conclusions.
- 1.1.7 The scope of this Transport Assessment has been discussed and agreed with the Highways Officers at Derbyshire County Council (DCC), the full correspondence is contained within **Appendix 1**.

2 EXISTING CONDITIONS

2.1 Existing Site Information

2.1.1 The application site is located approximately a 1.5 kilometre south of Swadlincote town centre.

2.1.2 The site is currently undeveloped and is bound to the north by the residential properties that front on to Church Street, to the south and west by undeveloped land and by the residential properties that are accessed off Thorpe Downs Road to the east.

2.1.3 The predominant land use in the vicinity of the site is residential with areas of open land.

2.2 Existing Highway Network

2.2.1 Church Street runs in an approximate east-west direction and has an approximate carriageway width of around 7.3 metres in the vicinity of the site and is subject to a 30 mph speed limit.

2.2.2 To the west of the site Church Street becomes Castle Street which provides an arm of the High Cross Bank Road roundabout, which provides vehicular access to the wider highway network including the A444 which provides access to Burton-upon-Trent to the north and Ashby-de-la-Zouch to the south.

2.2.3 To the east, Church Street becomes Common Road until it forms the Common Road/Coppice Side/Bridge Street roundabout. To the north of the roundabout Coppice Side provides vehicular access to Swadlincote town centre, whilst to the east Common Road provides an arm of the A513 Swadlincote Road/Common Road signal controlled junction, which provides access to the eastern areas of Swadlincote and Woodville.

2.2.4 Rockcliffe Close runs in an approximate east-west alignment and has an approximate carriageway width of 7.3 metres and provides the minor arm of the Thorpe Downs Road/Rockcliffe Close priority controlled junction approximately 75 metres east of the application site boundary.

2.2.5 Thorpe Downs Road runs in an approximate north-south alignment, to the south it provides vehicular access to the residential properties whilst to the north it forms the minor arm of the Church Street/Thorpe Downs Road priority controlled. This existing junction arrangement has a ghost-island right-turn facility on the Church Street arm and a flared approach on the Thorpe Downs Road arm. From this junction Church Street links with the wider highway network as stated previously.

2.2.6 An informal access off Church Street currently serves the parking area of St George's CE Primary School. The informal access and parking area lies within the application site boundary.

2.3 Baseline Transport Data

2.3.1 The site is undeveloped and therefore does not generate any vehicle movements.

3 PROPOSED DEVELOPMENT

Development Proposals

3.1.1 It is proposed to develop the site with up to 306 residential units (though this Transport Assessment robustly assesses up to 300 units). The residential development will comprise a mix of house types with final details of these being submitted in a Reserved Matters application.

3.1.2 The proposed Development Framework Plan, which accompanies the Outline planning application is reproduced in **Plan 2**.

3.2 Vehicular Access

3.2.1 The site will be served by an extension to Rockcliffe Close. An emergency access will also be provided off Church Street in the form of an extension to the existing informal access which serves the St George's CE Primary School car park and drop off area.

3.2.2 Rockcliffe Close has an approximate carriageway width of 7.3 metres and 2 metre footways on either side of the carriageway and therefore is of sufficient width to accommodate all of the proposed development traffic.

3.2.3 The proposed site access off Rockcliffe Close is shown on **Plan 3**.

3.2.4 It is proposed that the new emergency access onto Church Street will be formed by improving the existing access and drop off/parking area which currently serves St George's CE Primary School.

3.2.5 The proposed emergency site access and improved school parking/drop off area can be seen at **Plan 4**.

3.2.6 The geometric parameters used for the junction would include a carriageway width of at least 5 metres and an improved pedestrian route into the site and to the school. The junction would also provide Manual for Streets compliant visibility with splays of 2.4 metres by 43 metres.

3.2.7 As such, the vehicular access strategy is appropriate for the purposes of this particular development.

3.3 Pedestrian and Cycle Access

3.3.1 Pedestrian and cycle access into the site will be afforded via the proposed vehicular access points off Church Street and Rockcliffe Close as well as a number of pedestrian/cycle only accesses which will link with existing pedestrian infrastructure located within the vicinity of the site and provide excellent links to nearby amenities.

3.3.2 The internal layout of the site has been designed to provide linkages between the site and the existing rights of way located within the development site. As part of the proposed development the existing rights of way will be diverted and accommodated within the internal layout of the site although their precise route may be adjusted.

4 TRANSPORT PLANNING POLICY

4.1 Introduction

4.1.1 The national policy presented in this document focuses on the National Planning Policy Framework (NPPF) informally known as 'The Framework' which was published in March 2012 and sets out the Government's planning policies for achieving sustainable development.

4.1.2 Local transport planning policy for Church Gresley is taken from the Third Derbyshire Local Transport Plan. This section will briefly outline the pertinent policies relating to the proposed development.

4.2 National Policy

4.2.1 The presumption in favour of sustainable development is a central theme running through the framework and transport planning policies are seen as a key element of delivering sustainable development as well as contributing to wider sustainability and health objectives. To achieve these objectives paragraph 30 which states, when making decisions, local authorities should:-

“Support a pattern of development which, where reasonable to do so, facilitate the use of sustainable modes of transport.”

4.2.2 In addition, paragraph 35 states that to further enhance the opportunities for sustainable development any future developments should be located and designed where practical to:-

- *To accommodate the efficient delivery of goods and supplies.*
- *Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities.*

- *Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones.*
- *Consider the needs of people with disabilities by all modes of transport.*

4.2.3 As will be demonstrated within this Transport Assessment, the proposed development accords with the policy test contained within paragraph 32 of the framework which states that:-

'All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment and that any plans or decisions should take into account the following;

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.'*

4.2.4 The location of the proposed development close to a number of local amenities is in accordance with the guidance contained within paragraph 38 which states that:-

"Key facilities such as primary schools and local shops should be located within walking distance of most properties"

4.2.5 The provision of a Travel Plan as part of the development and the retention of any existing public rights of way are in accordance with the guidance contained within paragraphs 32 and 75 respectively.

4.2.6 It is therefore concluded that as the development is located a short distance from a range of local amenities, is accessible by public transport and has been designed in accordance with the guidance contained within Manual for Streets it is considered that the proposed development accords with the aims and objectives of the Framework.

4.3 Local Policy

Derbyshire Local Transport Plan 3 (2011 – 2026)

4.3.1 The third Derbyshire Transport Plan (LTP) was published in April 2011 and covers the period from 2011 to 2026.

4.3.2 The key principles are set out in the LTP are as follows;

- To adopt sustainable development as the common purpose of our transport strategy; and
- To take holistic approach in all we do, integrating economic, social and environmental needs.

4.3.3 The document proposes the following vision for the plan period;

- At the heart of our vision is a transport system that is both fair and efficient;
- Healthier lifestyles, safer communities, a safeguarded and enhanced natural environment and better access to jobs and services will be the result; and
- To get there, we will improve the choice and accessibility of transport whilst integrating economic, social and environmental needs.

4.3.4 Derbyshire County Council's key priorities and investment priorities for 2011 to 2026 fall under the following headings:

- Well maintained roads and rights of way;
- Efficient transport network management;
- Improving local accessibility and achieving healthier travel habits;
- Better safety and security; and

- A considered approach to new infrastructure.

4.3.5 Under the title 'A considered approach to new infrastructure' the LTP3 states that there should be 'liaison between spatial and transport planning on an on-going basis'. In Appendix B of the LTP3 which is titled Transport and Spatial Planning states that;

"DCC has adopted (December 2013) DfT's Guidance on Transport Assessment (GTA) and therefore will require Transportation Assessments or Statements together with Travel Plans to support Planning Applications following the threshold guidelines shown in Appendix B of the GTA.... Advice is therefore that the highway network should provide capacity that is comparable to the general capacity of the part of the network affected. The County Council has indicated a need to adopt a less restrictive approach to a requirement to achieve a 'nil detriment'. Additionally, the County Council has indicated that there will be circumstances under which, even with a comprehensive package of measures proposed, it may not be possible to fully mitigate the impact of future development".

4.3.6 In addition, Appendix B also presents a set of transport/spatial planning policy statements to guide new developments, the policies relevant to this proposed development are summarised below;

- **TLA1** Encourage planning applications in locations served easily by rail and/or major roads, aiming to reduce congestion on strategic routes and also locally;
- **TLA2** Ensure new developments provide for accessible transport services, such as public transport improvements and links to existing public transport, cycling and pedestrian networks, requiring developer contributions where necessary;
- **TLA3** Encourage developers to provide convenient and secure parking and storage facilities for pedal cycles and powered two wheelers, where appropriate, in new developments, existing public areas;
- **TL4** Good Quality access and parking facilities for cyclists should be incorporated into both residential and commercial development proposals;
- **TL5** Settlements with existing or proposed public transport interchange facilities will be flavoured as locations for new development;

- **TLA6** Developers of any project requiring a Transport Statement or Assessment will be required to demonstrate that their development is readily served by non-motorised modes of travel and incorporates features that reduce the desire to travel;
- **TLA7** Developers of any project requiring a Transport Assessment will be required to submit a detailed Travel Plan as part of the Assessment; and
- **TLA8** Where multiple development proposals are likely to have a significant influence on the local transport network, proportional investment may be required in the necessary improvements to the network.

4.4 Planning Policy Summary

4.4.1 The proposed development is in accordance with national and local policy for the following reasons:

- The proposed development will reduce the need to travel due to it being located in close proximity to a range of services such as schools, retail opportunities and health facilities which are located within a short walk of the site. Further details on the accessibility of the proposed development by non-car modes is provided in Section 5 of this Transport Assessment.
- The site is located in close proximity to a range of public transport opportunities which will facilitate non-car travel to and from the proposed development.
- The site promotes sustainable transport in accordance with the Framework as it facilitates sustainable development and contributes to wider sustainability and health objectives.

5 NON-CAR ACCESSIBILITY OF THE SITE

5.1 Introduction

5.1.1 In order to accord with the aspirations of the National Planning Policy Framework, any new proposals should extend the choice in transport and secure mobility in a way that supports sustainable development.

5.1.2 The presumption in favour of sustainable development is a central theme running through the framework and transport planning policies are seen as a key element of delivering sustainable development as well as contributing to wider sustainability and health objectives. To achieve these objectives paragraph 30 which states when making decisions, local authorities should:-

“Support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.”

5.1.3 One of the core principles of the NPPF is to 'actively manage patterns of growth to make the fullest use of public transport, walking and cycling and focus significant development in locations which are or can be made sustainable'.

5.1.4 New proposals should therefore attempt to influence the mode of travel to the development in terms of gaining a shift in modal split towards non-car modes, thus assisting in meeting the aspirations of current national and local planning policy.

5.1.5 The accessibility of the proposed site has been considered by the following modes of transport:

- Accessibility on foot.
- Accessibility by cycle.
- Accessibility by bus.

5.2 Accessibility on Foot

- 5.2.1 It is important to create a choice of direct, safe and attractive routes between where people live and where they need to travel in their day-to-day life. This philosophy clearly encourages the opportunity to walk whatever the journey purpose and also helps to create more active streets and a more vibrant neighbourhood.
- 5.2.2 The internal highway infrastructure has been designed using the guidance within Manual for Streets 2 and as such ensures that the vehicular speeds through the site will be low and the design of the internal infrastructure will ensure a pedestrian friendly environment with areas of pedestrian priority to ensure safe and efficient movement for pedestrians through the site.
- 5.2.3 It is likely that the primary pedestrian desire lines will be to the north and north-east of the site towards Church Gresley and Swadlincote.
- 5.2.4 A 2 metre wide pedestrian footway is provided on Church Street travelling to the north east and south west of the site. This footway links to the footway provided on Coppice Side which in turn provides a direct route into Swadlincote town centre which provides a wide range of amenities such as shops, banks and pharmacies.
- 5.2.5 To facilitate pedestrian access across Church Street, a Puffin crossing with dropped kerbs and tactile paving is located approximately 5 metres east of the Church Street/School Street junction. An additional crossing point is located on Church Street approximately 10 metres east of the Church Street/Thorpe Downs Road, in the form of a pedestrian refuge with dropped kerbs and associated tactile paving.
- 5.2.6 In addition, pedestrian footways with a minimum width of 2 metres are provided on either side of the Rockcliffe Close carriageway, these footways link with those located on either side of Thorpe Downs Road. To the north, these footways link with the footway located on the southern side of Church Street.

- 5.2.7 Safe pedestrian movement across Thorpe Downs Road is provided for in the form of a pedestrian refuge with associated dropped kerbs and tactile paving approximately 20 metres north of the Thorpe Downs Road/Rockcliffe Drive junction. An additional pedestrian refuge with associated facilities is provided for at the Church Street/Thorpe Downs Road junction.
- 5.2.8 Within the Institution of Highways and Transportation (IHT) document, entitled “Guidelines for Providing for Journeys on Foot”, a distance of 800 metres is identified as the preferred maximum distance for town centres, whilst a distance of 2 kilometres is defined as a preferred maximum for commuting.
- 5.2.9 Walking is the most important mode of travel at the local level and offers the greatest potential to replace short car journeys, particularly those under 2 kilometres.
- 5.2.10 In addition, the DFT National Travel Survey of 2006 confirms that 78% of all trips less than a mile (1.6km) are carried out on foot. As such, **Plan 5** shows the pedestrian catchment for 800 metres and 2 kilometres from the centre of the site and provides an illustrative indication of the areas that can be reached based on a leisurely walk from the site.
- 5.2.11 As can be seen, the 800 metre catchment includes St George’s C of E Primary School, Albert Village Community Primary School, Church Gresley Infant and Nursery School, Pennine Way Junior School and also the Tesco Express convenience store located on Church Street which is located to the north-east of the site.
- 5.2.12 It should also be noted that St George & St Mary Parish Church and The Rising Sun public house are also located within the 800 metre catchment.
- 5.2.13 The 2,000 metre pedestrian catchment illustrates that large areas of Swadlincote including the town centre are within walking distance of the proposed development. The catchment also includes a range of local amenities such as Castle Gresley Post Office, Gresleydale Health Care Centre, Morrison’s and Sainsbury’s foodstores and the Boots Pharmacy.

5.2.14 In addition, Belmont Primary School and Chuckle Bunnies Day Nursery are also included within the 2,000 metre catchment.

5.2.15 As illustrated, the development site benefits from being located within close proximity to a range of local amenities with the largest choice of facilities being located around High Street.

5.2.16 Table 5.1 below, shows the distance from the edge of the site to the local amenities in the vicinity of the site;

Local Amenity	Distance (metres)
St George’s Church of England Primary School	220
Tesco Express	320
The Parish Church of St George and St Mary	450
Maurice Lea Memorial Park	730
Gresley Dale Healthcare Centre	1300
Castle Gresley Post Office	1700

Table 5.1 Distance from Site to Local Facilities

5.2.17 As can be seen in the table above, the site is located within close proximity to a number of useful local amenities including primary services as well as retail and leisure facilities.

5.2.18 It is therefore considered that the existing pedestrian infrastructure will facilitate safe and direct pedestrian linkages between the site and local destinations. It is further considered that sufficient capacity exists to cater for potential increases in future pedestrian movements.

5.3 Access by Cycle

5.3.1 An alternative mode of travel to the site could be achieved by bicycle.

- 5.3.2 A distance of 5 kilometres is generally accepted as a distance where cycling has the potential to replace short car journeys. This distance equates to a journey of around 25 minutes based on a leisurely cycle speed of 12 kilometres per hour and would encompass the whole of Swadlincote and Ashby-de-la-Zouch.
- 5.3.3 National Route 63 is located approximately 400 metres south east of the site, this runs between Burton-upon-Trent and Wisbech, via Leicester and Peterborough.
- 5.3.4 The internal site layout will ensure that vehicular speeds are low and as such this would assist cycle accessibility.
- 5.3.5 The site can, therefore, be considered as being accessible by cycle.

5.4 Access by Bus

- 5.4.1 Bus stops are provided on Church Street, with the nearest stops being within 90 metres of the northern edge of the site.
- 5.4.2 Safe pedestrian access to these bus stops is provided for via the existing pedestrian footways located on Thorpe Downs Road and Church Street itself.
- 5.4.3 A summary of the services available from the bus stops on Church Street are provided in Table 5.2 below.

Service No	Route	Monday – Friday Frequency per hour				Sat	Sun
		AM Peak	Midday	PM Peak	Eve		
8	Burton - Swadlincote – Church Gresley - Ashby	1	1	1	0	1	0
21	Swadlincote – The Gresleys – Burton upon Trent	2	2	2	0	2	0
21E	Swadlincote – The Gresleys – Burton upon Trent	0	0	0	1	0	1

Table 5.2 Existing Bus Services Operation in the Vicinity of the Site

- 5.4.4 As shown in Table 5.2, the stops on Church Street provide up to 3 services per hour, Monday to Saturdays to destinations including Swadlincote, Burton on Trent and Stanton.
- 5.4.5 In order to demonstrate the level of accessibility some example bus journey times from the bus stops in the vicinity of the site are presented in Table 5.3 below;

Destination	Duration
Stanton	5 mins
Swadlincote	12 mins
Burton upon Trent	48 mins

Table 5.3 Example Bus Journey Times

- 5.4.6 The above table demonstrates that bus journeys to Burton upon Trent take approximately 48 minutes whilst bus journeys to the centre of Swadlincote take approximately 12 minutes. This is a good level of service and provides commuter, retail and leisure opportunities from the site.

5.4.7 As such, the existing bus services are ideally placed to cater for the needs of the development's residents and visitors to numerous local and regional destinations in the area.

5.5 Summary

5.5.1 It has been demonstrated that pedestrian and cycle infrastructure in the vicinity of the site is good.

5.5.2 The site is also accessible by public transport, with bus services extending to places such as Swadlincote and Burton-on-Trent.

5.5.3 In light of the above, it is considered the site is highly accessible and will cater for needs of the development's residents and assist in promoting a choice of travel modes other than the private car.

6 TRAFFIC IMPACT ANALYSIS

6.1 Introduction

6.1.1 Having established that the application site is accessible by modes of transport other than the private car and would be in general accordance with land use and transport policies and the Framework which seeks to deliver sustainable development, the following section of the report considers the traffic impact of the development proposals on the local highway network.

6.2 Traffic Survey Data

6.2.1 In order to assess the traffic impact of the proposed development on the local highway network traffic surveys were undertaken at the following junctions on Tuesday 29th November 2012 as agreed with the highways officers at DCC;

- Castle Road/George Street/Church Street roundabout.
- Church Street/Mount Pleasant Road priority controlled junction.
- Church Street/Thorpe Downs Road priority controlled junction.
- Common Road/Coppice Side/Bridge Street roundabout.

6.2.2 The full traffic survey data is contained within **Appendix 2**. The AM and PM peak hours were identified as 0800 to 0900 hours and 1715 to 1815 hours. The AM and PM peak hours are shown within **Figures 1 and 2** in terms of PCU's.

6.3 Growthed Flows

6.3.1 Guidance set out in the document 'Guidance on Transport Assessments' (Department for Transport, 2007) requires an assessment of 5 years after the submission of the planning application. The 2012 surveyed flows have therefore been growthed to the 2013 opening year and the 2020 assessment year using a NTEM adjusted National Road Traffic Model growth factor for Swadlincote.

6.3.2 The resultant growth factors are shown below:

- 2012 to 2013 AM Peak – 1.006
- 2012 to 2013 PM Peak – 1.007
- 2012 to 2020 AM Peak – 1.089
- 2012 to 2020 PM Peak – 1.094

6.3.3 The resultant growthed traffic flows are shown in **Figures 3** and **4** for the 2013 Weekday AM and PM peak periods whilst the 2020 growthed traffic flows are contained in **Figures 5** and **6**.

6.4 Committed Development

6.4.1 Derbyshire County Council have requested that the following committed developments be included within the traffic impact analysis of the local highway network;

- Mixed-use Development – Land south of Cadley Hill Industrial Estate, Swadlincote (09/2012/0743)
- Residential Development at Castleton Park off Swadlincote Lane.

6.4.2 Further details on the committed developments are contained within **Appendix 3**.

Mixed-use Development – Land south of Cadley Hill Industrial Estate, Swadlincote

6.4.3 The Transport Assessment submitted for the above scheme has been obtained from the South Derbyshire Council planning website. The traffic impact section of this document was limited to the proposed site access junction off Burton Road and the Burton Road/Cadley Hill Road roundabout.

6.4.4 With regard to trip distribution, the document makes the following assumptions;

- All Swadlincote traffic will use Cadley Hill Road when travelling to and from the site.
- All south-east traffic (Ashby) and south-west traffic (Tamworth and Lichfield) will travel through the High Cross Bank roundabout.

- The south-west traffic will turn head west, whilst the Ashby traffic will use the A444 and not Church Street.

6.4.5 Due to the above, no development flows for this committed development have been assigned to the highway network used to assess the impact of the proposed development.

Residential Development at Castleton Park off Swadlincote Lane

6.4.6 The Transport Assessment for this consented development is not available on the South Derbyshire Council planning website; therefore, reference has been made to the methodology contained within the Cadley Hill Transport Assessment as this was accepted by the highways officers at DCC.

6.4.7 The Castleton Park site has a planning consent for up to 1,270 units. As of April 2012 there had been 847 completions. Trip generation for these 847 properties would have been included in the November 2012 traffic counts. As such 423 dwellings need to be included as a committed development as these are yet to be completed.

6.4.8 Table 6.1 below, summarises the trip generation for these 423 units using the agreed residential trip rates from the Cadley Hill Transport Assessment.

Peak Hour	Trip Rates		Trip Generation	
	Arr	Dep	Arr	Dep
AM	0.146	0.467	62	198
PM	0.438	0.246	186	104

Table 6.1 Forecast Trip Generation of Committed Castleton Park Development (423 Units)

6.4.9 To assign these committed development flows, reference has again been made to the agreed trip distribution contained within the Transport Assessment for Cadley Hill. Within this document it states that 26% of trips will be to and from Swadlincote and 22% of trips will be to and from Ashby-de-la-Zouch.

- 6.4.10 It has been assumed that no Swadlincote traffic will travel along Church Street, as travelling north along Brunel Way is the quickest and most convenient route to Swadlincote town centre and the employment uses located off Hearthcote Road.
- 6.4.11 For the purposes of this traffic impact analysis it has been assumed that all traffic travelling to and from Ashby-de-la-Zouch will travel along Church Street and Common Road.
- 6.4.12 The resultant Castleton Park committed development flows are displayed in **Figures 7** and **8** for the Weekday AM and PM peak periods.

6.5 Base Flows

- 6.5.1 To calculate the 2013 Base Flows, the committed development flows displayed in Figures 7 and 8 have been added to the 2013 Growthed Flows shown in Figures 3 and 4. The resultant 2013 Base Flows for Weekday AM and PM Peak periods are displayed in **Figures 9** and **10**.
- 6.5.2 The resultant 2020 Base Flows for Weekday AM and PM Peak periods are displayed in **Figures 11** and **12**.

6.6 Proposed Trip Distribution

- 6.6.1 As agreed with the highways officers at DCC, the trip distribution for the proposed development has been derived using the observed traffic movements at the Church Street/Thorpe Downs Road priority junction and then using the existing patterns of traffic flows on the wider highway network.
- 6.6.2 For the purposes of the Traffic Impact Analysis and for robustness, it has been assumed that all development trips will utilise the proposed vehicular access off Rockcliffe Close.
- 6.6.3 The proposed distribution for the AM Peak period is shown in **Figure 13** whilst the proposed distribution for the PM Peak period is shown in **Figure 14**.

6.7 Proposed Trip Generation

6.7.1 As previously stated, it is proposed to develop the site with up to 306 residential units.

6.7.2 In order to forecast the number of trips which 300 dwellings were forecast to generate the TRICS 2013(a) database was analysed. Trip rates were obtained for all developments in the field “Residential – Houses Privately Owned” within the range 100 to 500 residential units. These trip rates have been agreed with the highways officers at DCC and the full TRICS output is contained within **Appendix 4**.

6.7.3 The peak hour trip rates and forecast trip generation are shown within Table 6.2.

Peak Hour	Trip Rates		Trip Generation	
	Arr	Dep	Arr	Dep
AM	0.153	0.421	46	128
PM	0.396	0.238	119	71

Table 6.2 Forecast Trip Generation of Proposed Residential Development

6.7.4 As can be seen from Table 6.2 the residential development is forecast to generate a two-way total of approximately 190 trips in the AM peak hour and 72 trips in the PM peak hour.

6.7.5 In order to assign the traffic forecast to be generated by the proposed development, the trip distribution shown in the Figures 13 and 14 has been utilised.

6.7.6 The resultant proposed residential development flows for the AM Peak are shown in **Figure 15** whilst the proposed residential development flows for the PM Peak are shown in **Figure 16**.

6.8 With Development Flows

6.8.1 In order to calculate the 2013 'With Development' flows, the 2013 Base Flows contained within Figures 9 and 10 were added to the development flows contained within Figures 15 and 16. The resultant 2013 'With Development' flows are contained within **Figures 17 and 18**.

6.8.2 Whilst the resultant 2020 'With Development' Flows are displayed in **Figures 19 and 20** for the Weekday peak periods.

6.9 Capacity Assessments

6.9.1 In order to assess the operation of the junctions, capacity assessments were undertaken at the following list of junctions:-

- Thorpe Downs Road/Rockcliffe Close priority controlled junction.
- Church Street/Thorpe Downs Road priority controlled junction.
- Castle Road/George Street/Church Street roundabout.
- Common Road/Coppice Side/Bridge Street/Church Street roundabout.

Thorpe Downs Road/Rockcliffe Close priority controlled junction

6.9.2 In order to assess the operation of the Thorpe Downs Road/Rockcliffe Close priority controlled junction the PICADY 5 program was utilised. It should be noted that no traffic count information was collected for this junction and although the background traffic flows are relatively low with just 13 dwellings being accessed off Rockcliffe Close, for robustness it has been assumed that there will be 10 arrivals and 10 departures during the peak periods.

6.9.3 Assessments were undertaken using the 2013 and 2020 'With Development' flows, the results of which are summarised within Table 6.3 with the full results contained within **Appendix 5**.

Arm	2013 With Development				2020 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Rockcliffe Close	0.236	0	0.136	0	0.237	0	0.137	0
Thorpe Downs Road Right-turn	0.105	0	0.237	0	0.167	0	0.238	0

Table 6.3 Summary of PICADY Output for Thorpe Downs Road/Rockcliffe Close – 2013 and 2020 ‘With Development’ Scenarios

6.9.4 As can be seen from Table 6.3, the Thorpe Downs Road/Rockcliffe Close priority controlled junction is forecast to operate well within its theoretical capacity in all of the assessment scenarios and can therefore adequately accommodate the traffic forecast to be generated by the proposed development.

Church Street/Thorpe Downs Road priority controlled junction

6.9.5 The operation of the above junction was tested using the PICADY program. Assessments were undertaken initially using the 2013 and 2020 Base and ‘With Development, the results of which are summarised within Tables 6.4 and 6.5 with the full results contained within **Appendix 6**.

Arm	2013 Base				2013 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Thorpe Downs Road Left-Turn	0.079	0	0.067	0	0.177	0	0.130	0
Thorpe Down Road Right-turn	0.207	0	0.158	0	0.427	1	0.306	0
Church Street Right-turn	0.066	0	0.071	0	0.105	0	0.139	0

Table 6.4 Summary of PICADY Output for Church Street/Thorpe Downs Road - 2013 Base and 'With Development' Scenarios

Arm	2020 Base				2020 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Thorpe Downs Road Left-Turn	0.088	0	0.058	0	0.187	0	0.140	0
Thorpe Down Road Right-turn	0.228	0	0.104	0	0.455	1	0.355	1
Church Street Right-turn	0.072	0	0.049	0	0.111	0	0.148	0

Table 6.5 Summary of PICADY Output for Church Street/Thorpe Downs Road – 2020 Base and 'With Development' Scenarios

6.9.6 As can be seen in Tables 6.4 and 6.5 the Church Street/Thorpe Downs Road junction is forecast to operate within its theoretical capacity in the 2013 and 2020 Base scenarios. With the addition of the proposed development traffic, the junction is forecast to operate within its theoretical capacity with minimal increases in the RFC and Mean Max Queue.

6.9.7 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

Castle Street/George Street/Church Street junction

6.9.8 The operation of the above junction was tested using the ARCADY 7 program.

6.9.9 Assessments were undertaken using the 2013 and 2020 Base and 'With Development'; the results of which are summarised within Tables 6.6 and 6.7 with the full results contained within **Appendix 7**.

Arm	2013 Base				2013 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.23	0	0.38	1	0.27	0	0.41	1
Castle Street (s)	0.03	0	0.03	0	0.03	0	0.03	0
Castle Street (w)	0.53	1	0.43	1	0.53	1	0.46	1
George Street	0.11	0	0.13	0	0.11	0	0.13	0

Table 6.6 Summary of ARCADY Output for Castle Street/George Street/Church Street Junction - 2013 Base and 'With Development' Scenarios

Arm	2020 Base				2020 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.25	0	0.42	1	0.29	0	0.44	1
Castle Street (s)	0.03	0	0.04	0	0.03	0	0.04	0
Castle Street (w)	0.56	1	0.47	1	0.59	1	0.50	1
George Street	0.12	0	0.14	0	0.13	0	0.15	0

Table 6.7 Summary of ARCADY Output for Castle Street/George Street/Church Street Junction - 2020 Base and 'With Development' Scenarios

6.9.10 As can be seen in Tables 6.6 and 6.7 the Castle Street/George Street/Church Street junction is forecast to operate within its theoretical capacity in the 2013 and 2020 Base scenarios. Whilst with the addition of the proposed development traffic, the junction is forecast to operate within its theoretical capacity with minimal increases in the RFC and Mean Max Queue.

6.9.11 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

Common Road/Coppice Side/Bridge Street/Church Street roundabout

6.9.12 The operation of the above junction was tested using the ARCADY program.

6.9.13 Assessments have been also undertaken using the 2013 and 2018 Base and 'With Development' flows, the results of which are summarised within Tables 6.8 and 6.9 with the full results contained within **Appendix 8**.

Arm	2013 Base				2013 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.50	1	0.37	1	0.62	2	0.44	1
Coppice Side	0.39	1	0.45	1	0.40	1	0.47	1
Common Road	0.23	0	0.32	0	0.25	0	0.37	1
Bridge Street	0.53	1	0.73	2	0.55	1	0.79	4

Table 6.8 Summary of ARCADY Output for Common Road/Coppice Side/Bridge Street/Church Street Junction - 2013 Base and 'With Development' Scenarios

Arm	2020 Base				2020 With Development			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.55	1	0.42	1	0.67	2	0.49	1
Coppice Side	0.42	1	0.49	1	0.44	1	0.52	1
Common Road	0.26	0	0.36	1	0.28	0	0.42	1
Bridge Street	0.58	1	0.80	4	0.60	1	0.87	6

Table 6.9 Summary of ARCADY Output for Common Road/Coppice Side/Bridge Street/Church Street Junction - 2020 Base and 'With Development' Scenarios

6.9.14 As can be seen in Tables 6.8 and 6.9 the Common Road/Coppice Side/Bridge Street/Church Street junction is forecast to operate within its theoretical capacity in the 2013 and 2020 Base scenarios. With the addition of the proposed development traffic, the junction is forecast to operate within its theoretical capacity with minimal increases in the RFC and Mean Max Queue.

6.9.15 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

6.10 Sensitivity Test

6.10.1 During scoping discussions with DCC, it was requested that a Sensitivity Test be undertaken using 85th percentile trip rates. Trip rates were obtained for all developments in the field “Residential – Houses Privately Owned” within the range 100 to 500 residential units. The full TRICS output is contained within **Appendix 4**.

6.10.2 The peak hour trip rates and forecast trip generation are shown within Table 6.10.

Peak Hour	Trip Rates		Trip Generation	
	Arr	Dep	Arr	Dep
AM	0.243	0.491	73	147
PM	0.495	0.355	149	107

Table 6.10 Forecast Trip Generation of Proposed Residential Development (85th Percentile)

6.10.1 As can be seen from Table 6.10, the Sensitivity Test residential development is forecast to generate a two-way total of approximately 220 trips in the AM peak hour and 256 trips in the PM peak hour.

6.10.2 In order to assign the traffic forecast to be generated by the proposed development, the trip distribution shown in the Figures 13 and 14 has been utilised.

6.10.3 The resultant Sensitivity Test residential development flows for the AM Peak are shown in **Figure 21** whilst the Sensitivity Test residential development flows for the PM Peak are shown in **Figure 22**.

6.10.4 In order to calculate the 2014 Sensitivity Test flows, the 2013 Base Flows contained within Figures 15 and 16 were added to the development flows contained within Figures 21 and 22. The resultant 2014 Sensitivity Test flows are contained within Figures 23 and 24.

6.10.5 Whilst the resultant 2020 Sensitivity Test Flows are contained within **Figures 25 and 26** for the Weekday peak periods.

Thorpe Downs Road/Rockcliffe Close priority controlled junction

6.10.6 In order to assess the operation of the Thorpe Downs Road/Rockcliffe Close priority controlled junction the PICADY 5 program was utilised.

6.10.7 Assessments were undertaken using the 2013 and 2020 Sensitivity Test flows, the results of which are summarised within Table 6.11 with the full results contained within **Appendix 5**.

Arm	2013 Sensitivity Test				2020 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Rockcliffe Close	0.268	0	0.136	0	0.269	0	0.197	0
Thorpe Downs Road Right-turn	0.155	0	0.237	0	0.167	0	0.293	0

Table 6.11 Summary of PICADY Output for Thorpe Downs Road/Rockcliffe Close – 2013 and 2020 Sensitivity Test Scenarios

6.10.8 As can be seen from Table 6.11, the Thorpe Downs Road/Rockcliffe Close priority controlled junction is forecast to operate well within its theoretical capacity in both of the Sensitivity Test scenarios and can therefore adequately accommodate the traffic forecast to be generated by the proposed development.

Church Street/Thorpe Downs Road priority controlled junction

6.10.9 The operation of the above junction was tested using the PICADY program. Assessments were undertaken initially using the 2013 and 2020 Base and Sensitivity Test flows the results of which are summarised within Tables 6.12 and 6.13 with the full results contained within **Appendix 6**.

Arm	2013 Base				2013 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Thorpe Downs Road Left-Turn	0.079	0	0.067	0	0.194	0	0.164	0
Thorpe Down Road Right-turn	0.207	0	0.158	0	0.467	1	0.381	1
Church Street Right-turn	0.066	0	0.071	0	0.128	0	0.155	0

Table 6.12 Summary of PICADY Output for Church Street/Thorpe Downs Road - 2013 Base and Sensitivity Test Flows Scenarios

Arm	2020 Base				2020 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Thorpe Downs Road Left-Turn	0.088	0	0.058	0	0.205	0	0.174	0
Thorpe Down Road Right-turn	0.228	0	0.104	0	0.496	1	0.409	1
Church Street Right-turn	0.072	0	0.049	0	0.134	0	0.165	0

Table 6.13 Summary of PICADY Output for Church Street/Thorpe Downs Road - 2020 Base and Sensitivity Test Scenarios

6.10.10 As can be seen in Tables 6.13 and 6.14 the Church Street/Thorpe Downs Road junction is forecast to operate within its theoretical capacity in both of the Sensitivity Test scenarios with minimal increases in the RFC and Mean Max Queues.

6.10.11 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

Castle Street/George Street/Church Street junction

6.10.12 The operation of the above junction was tested using the ARCADY 7 program.

6.10.13 Assessments were undertaken using the 2013 and 2020 Base and Sensitivity Test flows the results of which are summarised within Tables 6.14 and 6.15 with the full results contained within **Appendix 7**.

Arm	2013 Base				2013 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.23	0	0.38	1	0.28	0	0.42	1
Castle Street (s)	0.03	0	0.03	0	0.03	0	0.03	0
Castle Street (w)	0.53	1	0.43	1	0.57	1	0.47	1
George Street	0.11	0	0.13	0	0.12	0	0.14	0

Table 6.14 Summary of ARCADY Output for Castle Street/George Street/Church Street Junction - 2013 Base and Sensitivity Test Scenarios

Arm	2020 Base				2020 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.25	0	0.42	1	0.30	0	0.45	1
Castle Street (s)	0.03	0	0.04	0	0.03	0	0.04	0
Castle Street (w)	0.56	1	0.47	1	0.61	2	0.51	1
George Street	0.12	0	0.14	0	0.13	0	0.15	0

Table 6.15 Summary of ARCADY Output for Castle Street/George Street/Church Street Junction - 2020 Base and Sensitivity Test Scenarios

6.10.14 As can be seen in Tables 6.14 and 6.15 the Castle Street/George Street/Church Street junction is forecast to operate within its theoretical capacity in the 2013 and 2020 Sensitivity Test Flow scenarios with minimal increases in the RFC and Mean Max Queues.

6.10.15 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

Common Road/Coppice Side/Bridge Street/Church Street roundabout

6.10.16 The operation of the above junction was tested using the ARCADY program.

6.10.17 Assessments have been also undertaken using the 2013 and 2020 Base and Sensitivity Test flows, the results of which are summarised within Tables 6.16 and 6.17 with the full results contained within **Appendix 8**.

Arm	2013 Base				2013 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.50	1	0.37	1	0.62	2	0.48	1
Coppice Side	0.39	1	0.45	1	0.40	1	0.48	1
Common Road	0.23	0	0.32	0	0.25	0	0.38	1
Bridge Street	0.53	1	0.73	2	0.55	1	0.79	4

Table 6.16 Summary of ARCADY Output for Common Road/Coppice Side/Bridge Street/Church Street Junction - 2013 Base and Sensitivity Test Scenarios

Arm	2020 Base				2020 Sensitivity Test			
	AM Peak		PM Peak		AM Peak		PM Peak	
	RFC	Max Q	RFC	Max Q	RFC	Max Q	RFC	Max Q
Church Street	0.55	1	0.42	1	0.69	2	0.52	1
Coppice Side	0.42	1	0.49	1	0.45	1	0.53	1
Common Road	0.26	0	0.36	1	0.29	0	0.43	0
Bridge Street	0.58	1	0.80	4	0.60	2	0.89	7

Table 6.17 Summary of ARCADY Output for Common Road/Coppice Side/Bridge Street/Church Street Junction - 2020 Base and Sensitivity Test Scenarios

6.10.18 As can be seen in Tables 6.16 and 6.17 the Common Road/Coppice Side/Bridge Street/Church Street junction is forecast to operate within its theoretical capacity in the 2013 and 2020 Sensitivity Test Flow scenarios with minimal increases in the RFC and Mean Max Queues.

6.10.19 It is therefore concluded that the proposed development will have a minimal impact on the operation on the junction.

6.11 Capacity Assessment Summary

6.11.1 In summary, the capacity assessments undertaken as part of this traffic impact analysis have demonstrated the following:

- The existing Thorpe Downs Road/Rockcliffe Close junction will have more than sufficient capacity to accommodate the proposed development traffic.
- The Church Street/Thorpe Downs Road junction is forecast to operate within capacity in all of the Base and 'With Development' scenarios.

- The Castle Street/George Street/Church Street junction is forecast to operate within capacity in all of the Base and 'With Development' scenarios.
- Common Road/Coppice Side/Bridge Street/Church Street junction is forecast to operate within capacity in all of the Base and 'With Development' scenarios.

6.11.2 It is therefore concluded that the development proposals will result in a minimal impact on the local highway network and can be accommodated on the network.

7 SMARTER TRAVEL CHOICES VIA TRAVEL PLANS

7.1 Introduction

7.1.1 In order to manage the travel by residents on the new development, the applicant wishes to offer a Travel Plan to encourage travel to the site by non-car modes.

7.2 Travel Planning Guidance

7.2.1 The preparation and adoption of a Travel Plan is an important element of managing the demand for travel to all modern developments. The Department for Transport (DfT) have produced guidance on the preparation of Travel Plans. The document, entitled 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process' was published in August 2009.

7.2.2 The guidance explains how "we often need to meet the demands of population and economic growth whilst simultaneously reducing our impact on the environment" and identifies that "The benefits of increases in sustainable travel, in particular cycling and walking, can extend beyond reduction in CO2 emissions and climate impacts, and include tackling congestion, tackling obesity and health issues, reducing social exclusion and improving quality of life".

7.2.3 The document sets out an overview of the process and delivery of Travel Plans and states that "A travel plan is a long-term management strategy for an occupier or site that seeks to deliver sustainable transport objectives through positive action and is articulated in a document that is regularly reviewed."

7.2.4 The Guidance states that "Travel Plans should involve the development of agreed explicit outcomes linked to an appropriate package of measures aimed at encouraging more sustainable travel, with an emphasis on reducing single occupancy car use..." and;

“A Travel Plan should seek to establish clear outcomes to be achieved in relation to access and set out all the measures to be implemented in detail, including an action plan, timescales, targets and responsibilities for implementation, monitoring and review”.

7.2.5 It is made clear in the document that Travel Plans should focus on achieving the lowest practical level of single occupancy vehicle trips to or from a site and widening the use of other travel modes and assist in the wider aims of encouraging sustainable travel, improving health, reducing congestion, energy consumption and pollution. The Travel Plan, it advises, *“needs to address all the journeys that may be made to and from a site”.*

7.2.6 The guidance also specifies that *“It is important to note that travel planning should be developed as one of the means of delivering an area’s sustainable transport strategy. Travel Planning should feature in the policy framework and implementation programmes of Regional Spatial Strategies and Local Development Frameworks”.*

7.2.7 Further guidance relating specifically to residential Travel Plans is presented in the DfT document entitled *“Making Residential Travel Plans Work”* published in June 2007.

7.2.8 The document states that:

“Travel Planning is one of a range of measures known as smarter choices which have been found to be effective on reducing traffic and improving accessibility in residential areas”.

7.2.9 A Residential Travel Plan is a package of measures designed to reduce car use originating from new housing by supporting alternative forms of transport and reducing the need to travel in the first place. They are an important tool to help deliver accessible, sustainable communities and offer clear benefits to all the parties involved – public, private and the community. They involve meeting the access needs of residents in a new way and require partnerships between developers, local authorities, local communities and new residents.

- 7.2.10 The value of travel plans in reducing car use to workplaces and schools is widely recognised and many local authorities and developers have experience in their design and implementation.
- 7.2.11 However, until recently, little attention has been given to tackling the origins of journeys from people's homes. Now, forward-thinking developers and local authorities are developing packages of smarter choices to both reduce the traffic generated by new housing developments and increasing the travel choices available to residents. These smarter choices are set out in Residential Travel Plans.

7.3 Residential Travel Plan

- 7.3.1 The objective of a Residential Travel Plan is the delivery of the objectives of the NPPF, i.e. to encourage residents to travel to work by public transport, on foot and by bicycle.
- 7.3.2 A Framework Residential Travel Plan has been prepared and is presented in **Appendix 9**.
- 7.3.3 The Framework Residential Travel Plan outlines physical and management measures that are designed to achieve this objective.
- 7.3.4 However, the principle measure will consist of a Residents Travel Pack containing relevant material to promote non-car modes of travel and the provision of certain physical measures.
- 7.3.5 The Travel Pack will contain information to inform residents of the existing long-term strategy for reducing the dependence of residents and visitors on travel by private car.

8 CONCLUSIONS

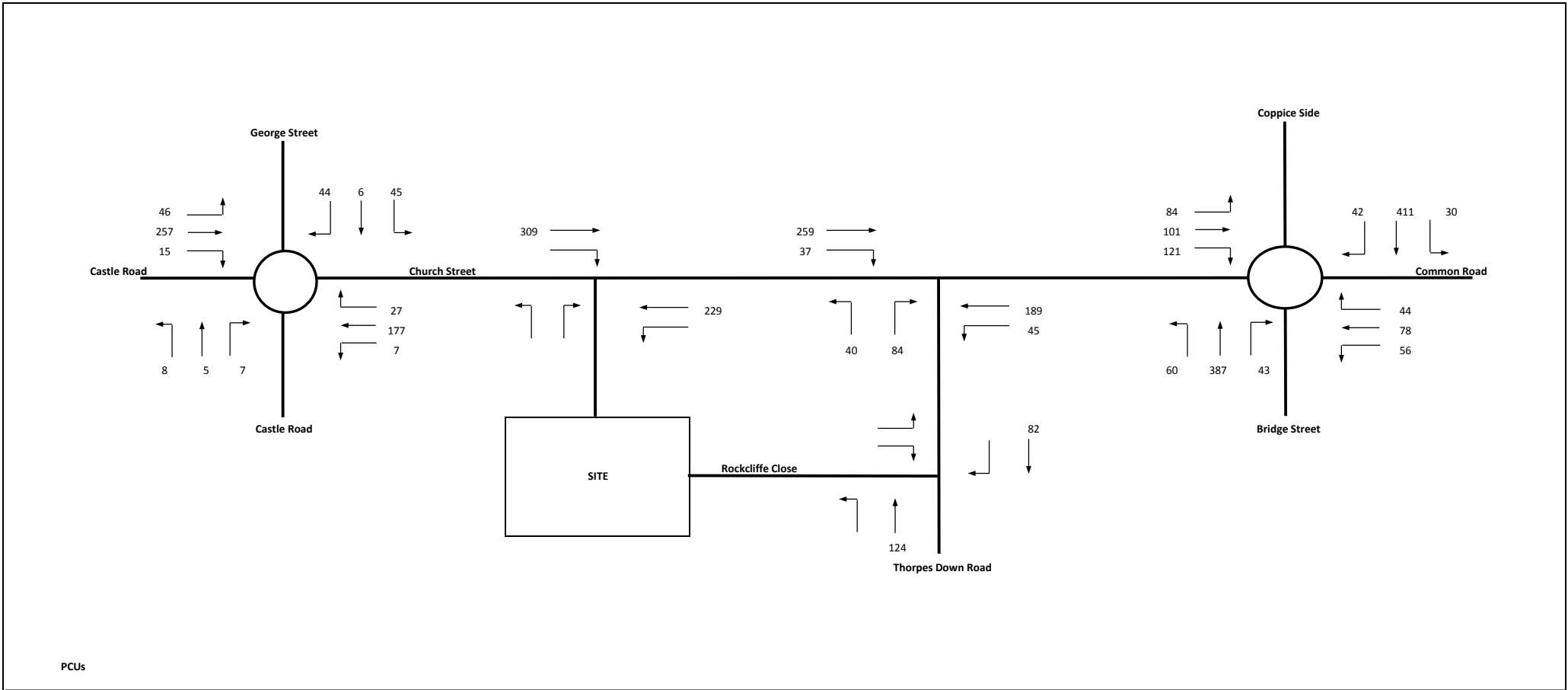
8.1.1 This Report has considered proposals for a residential development on land to the south of Church Street in Church Gresley.

8.1.2 The following conclusions have been drawn with regard to the proposed development:

- The proposed development will be accessed by a safe and efficient vehicular access arrangement.
- The proposed development complies with local and national planning policy.
- The proposed development benefits from being highly accessible on foot with the existing pedestrian footways providing access to a wide of range of services including Swadlincote town centre.
- The proposed development is ideally located to encourage journeys by bus via the bus services available in the vicinity of the site.
- A Framework Travel Plan will be implemented to encourage the use of non-car modes.
- The traffic impact assessment indicate that the proposed development would be able to be accommodated on the local highway network with minor improvements.
- The proposals will have a minimal impact on the local highway network.

8.1.3 In conclusion, the proposals will provide a sustainable development in Transport terms and planning permission should be granted in accordance with the Framework.

FIGURES



PCUs

Figure 1 Weekday AM Peak (0800 to 0900 hours)
2012 Surveyed Flows

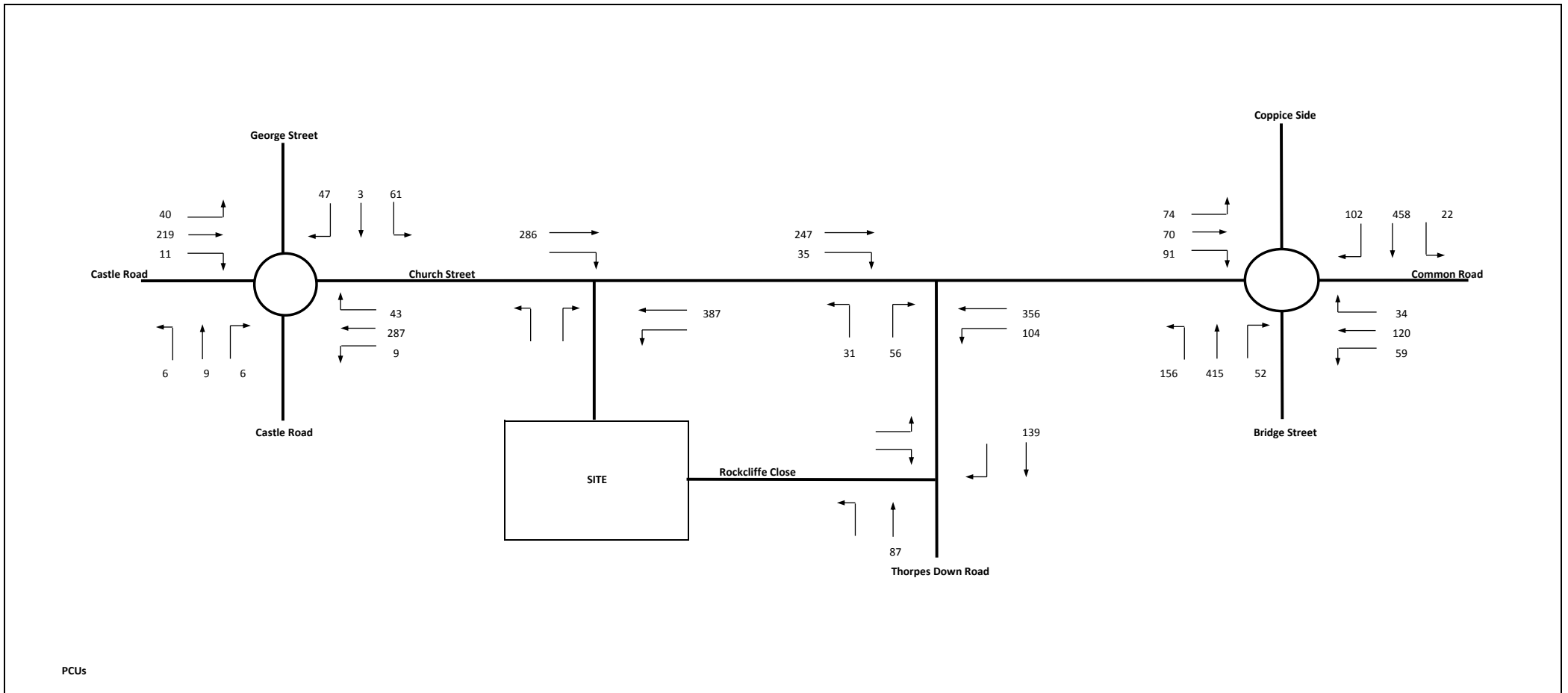
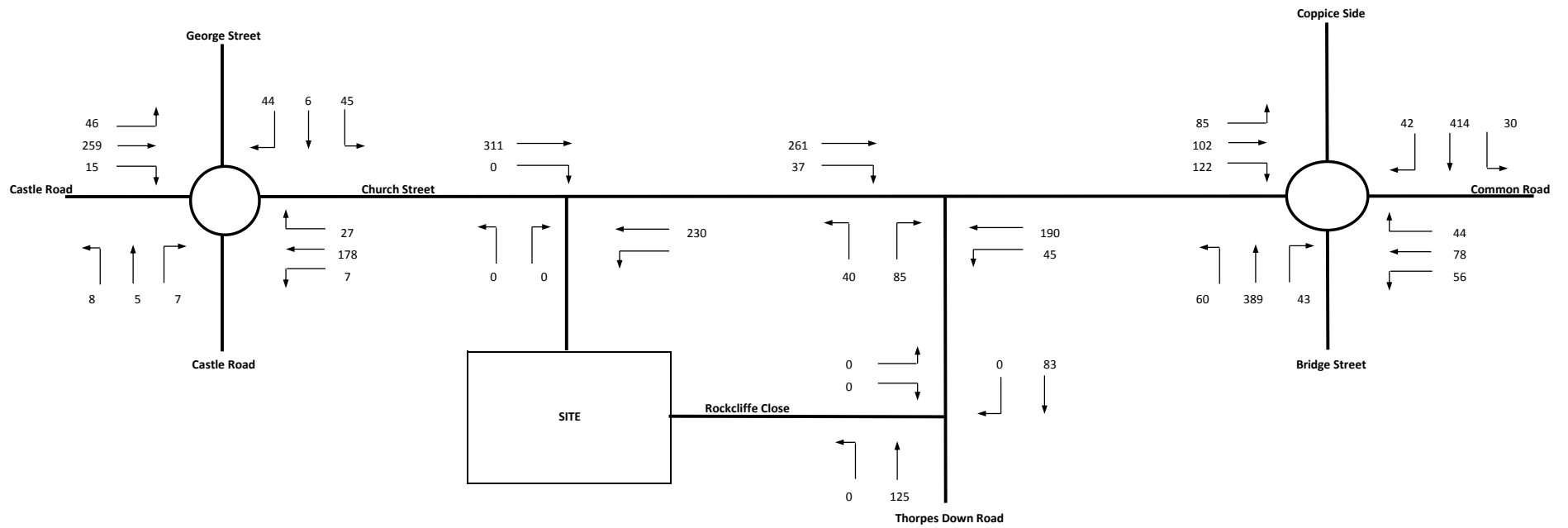
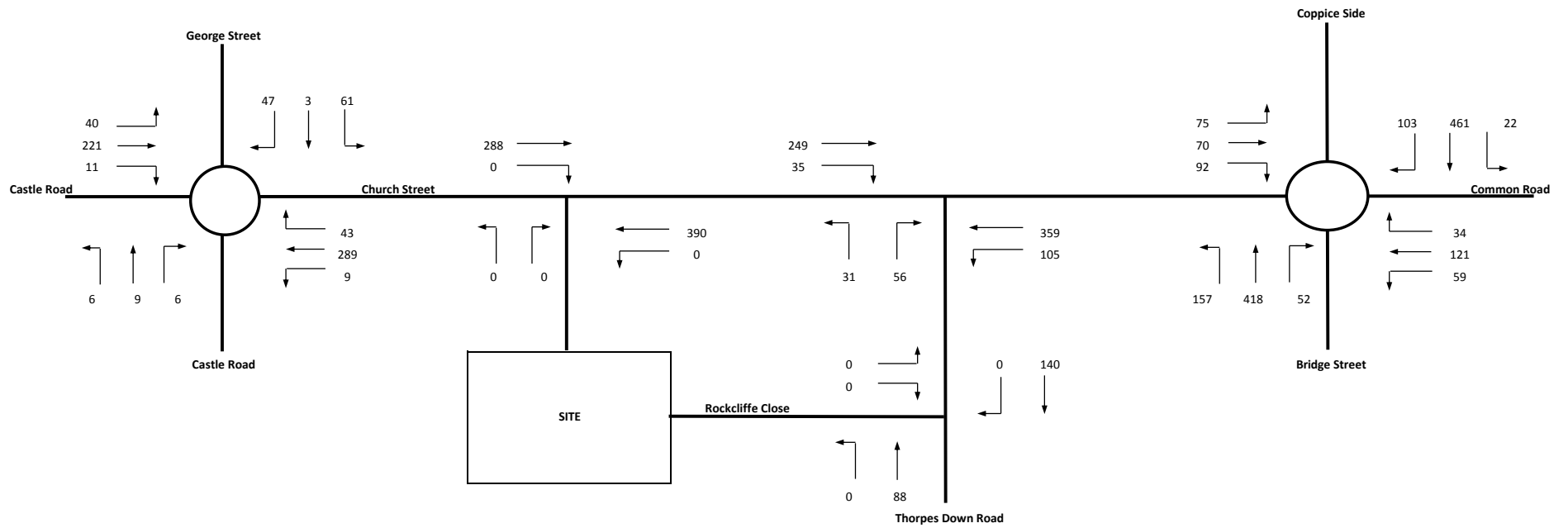


Figure 2 Weekday PM Peak (1715 to 1815 hours)
2012 Surveyed Flows



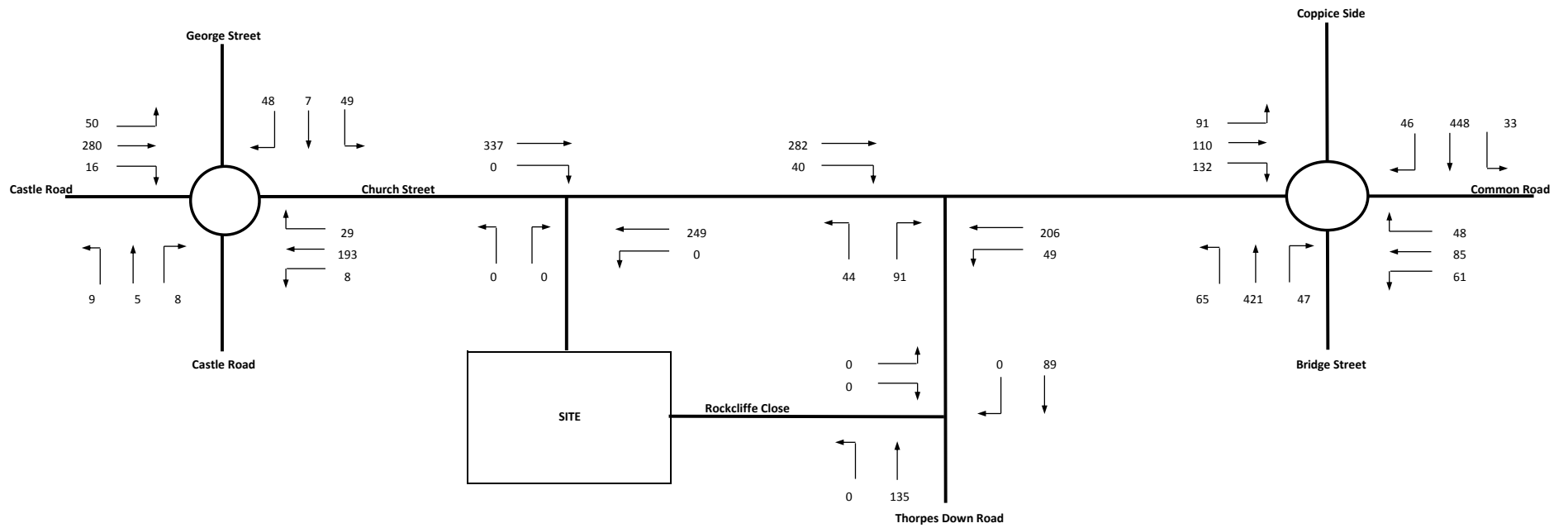
2012 - 2013 NTM Adjusted Growth Factor 1.006

Figure 3 Weekday AM Peak (0800 to 0900 hours)
2013 Growthed Flows



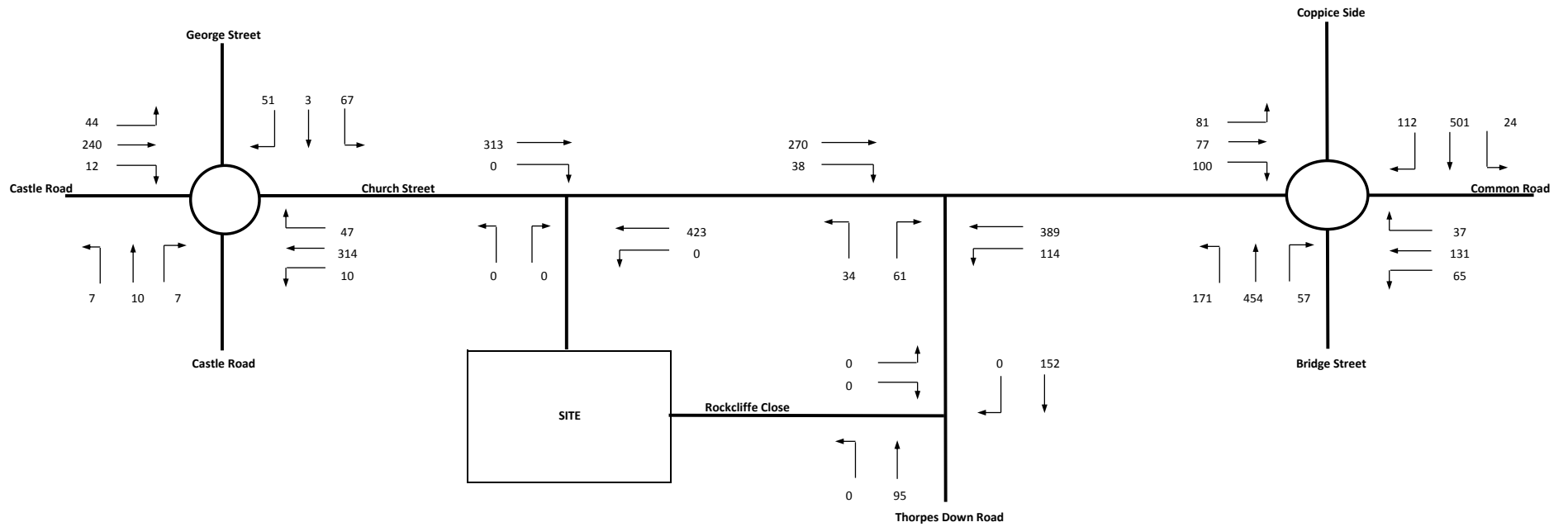
2012 - 2013 NTM Adjusted Growth Factor 1.007

Figure 4 Weekday PM Peak (1715 to 1815 hours)
2018 Growthed Flows



2012 - 2020 NTM Adjusted Growth Factor 1.089

Figure 5 Weekday AM Peak (0800 to 0900 hours)
2020 Growthed Flows



2012 - 2020 NTM Adjusted Growth Factor 1.094

Figure 6 Weekday PM Peak (1715 to 1815 hours)
2020 Growthed Flows

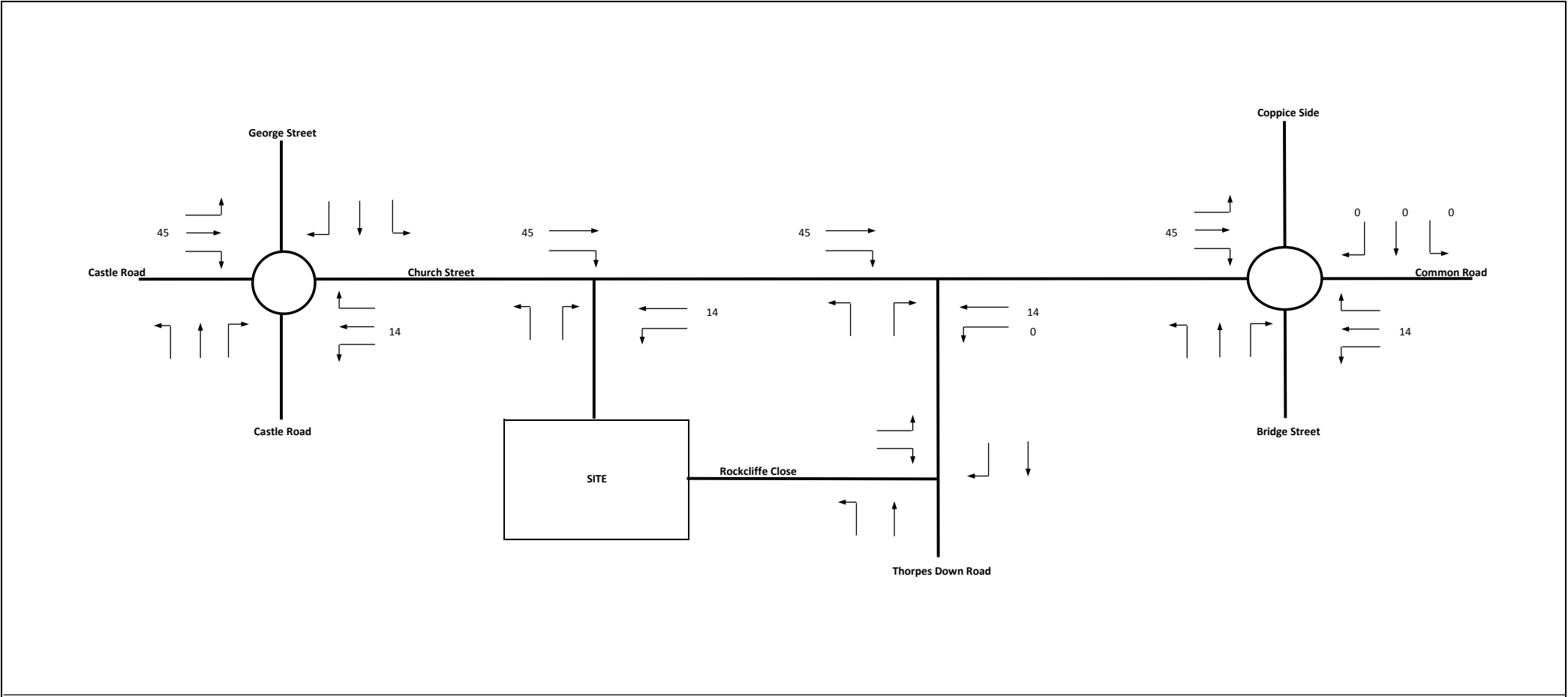


Figure 7 Weekday AM Peak (0800 to 0900 hours)
 Castleton Park Committed Development Flows (423 Units)

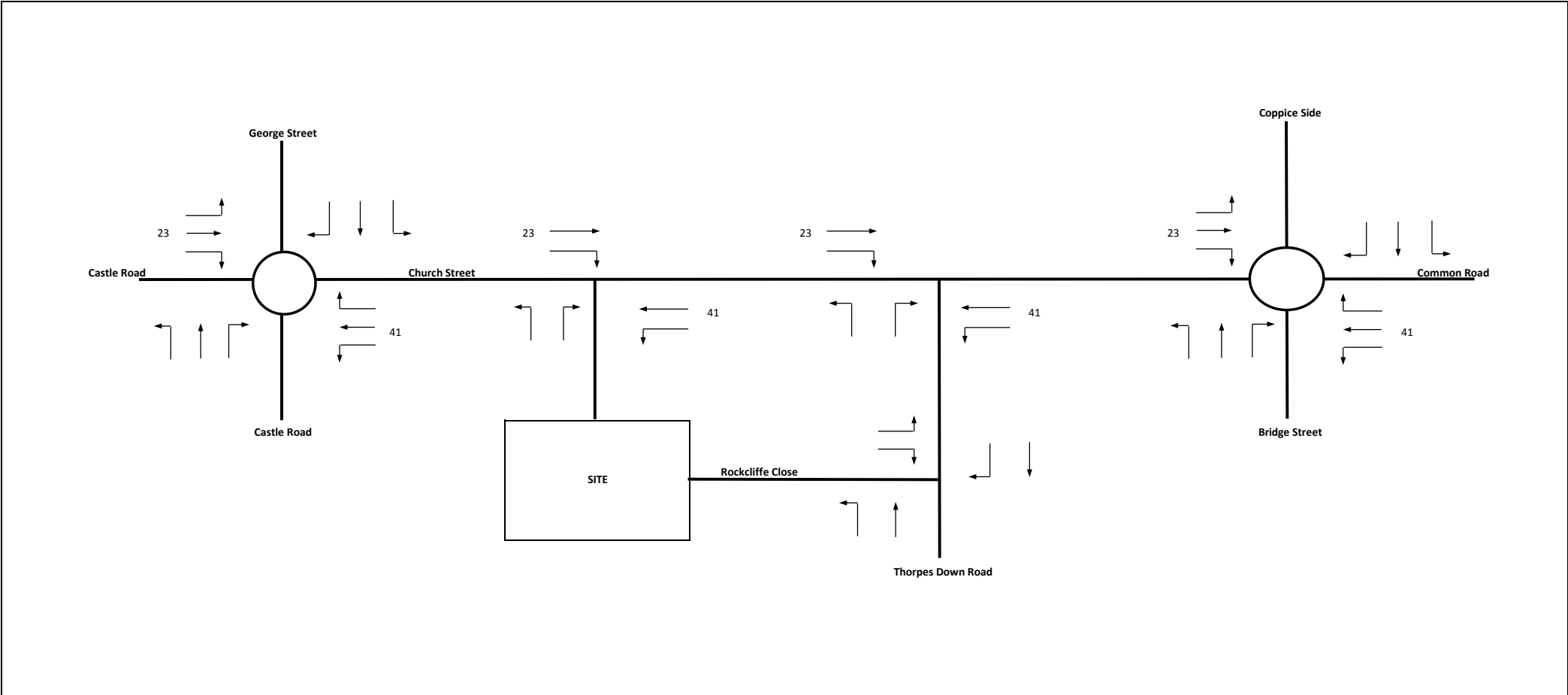


Figure 8 Weekday PM Peak (1715 to 1815 hours)
 Castleton Park Committed Development Flows (423 Units)

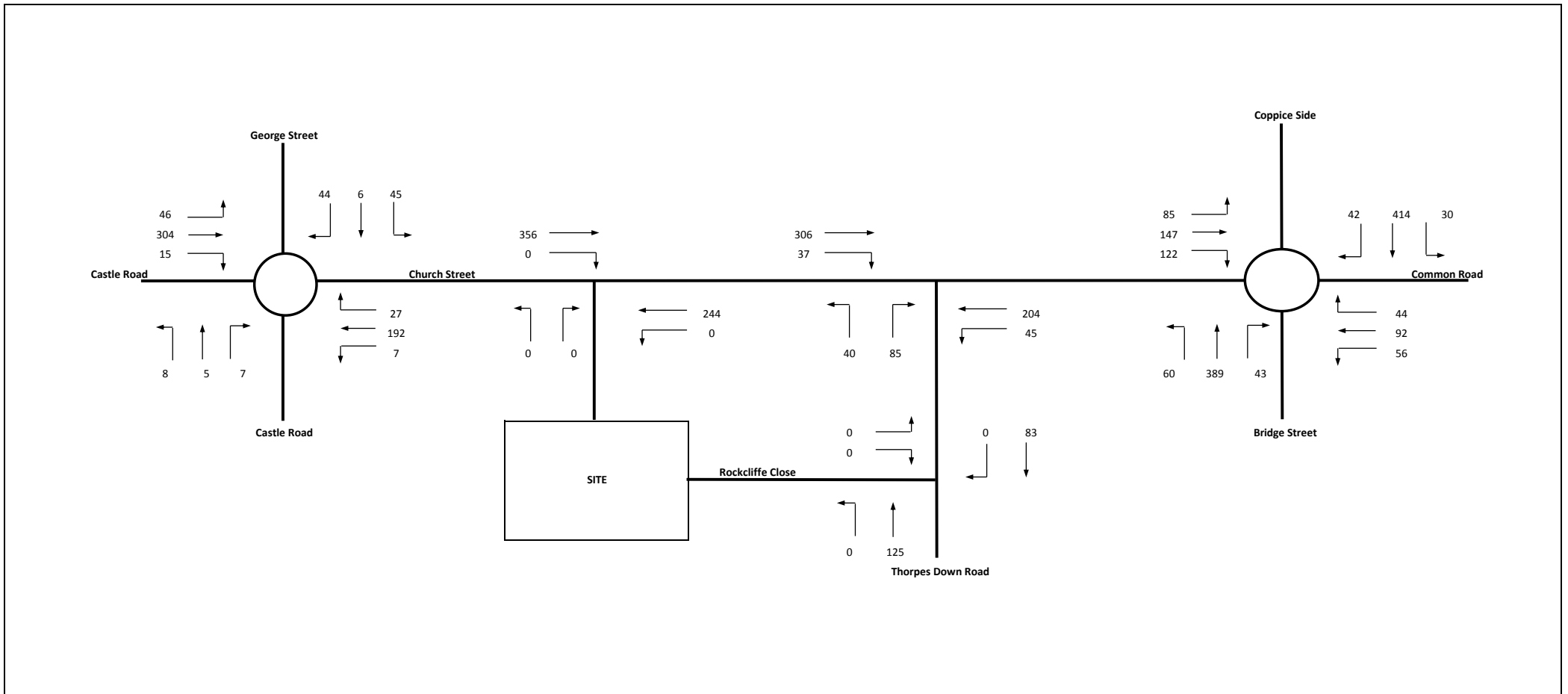


Figure 9 Weekday AM Peak (0800 to 0900 hours)
2013 Base Flows

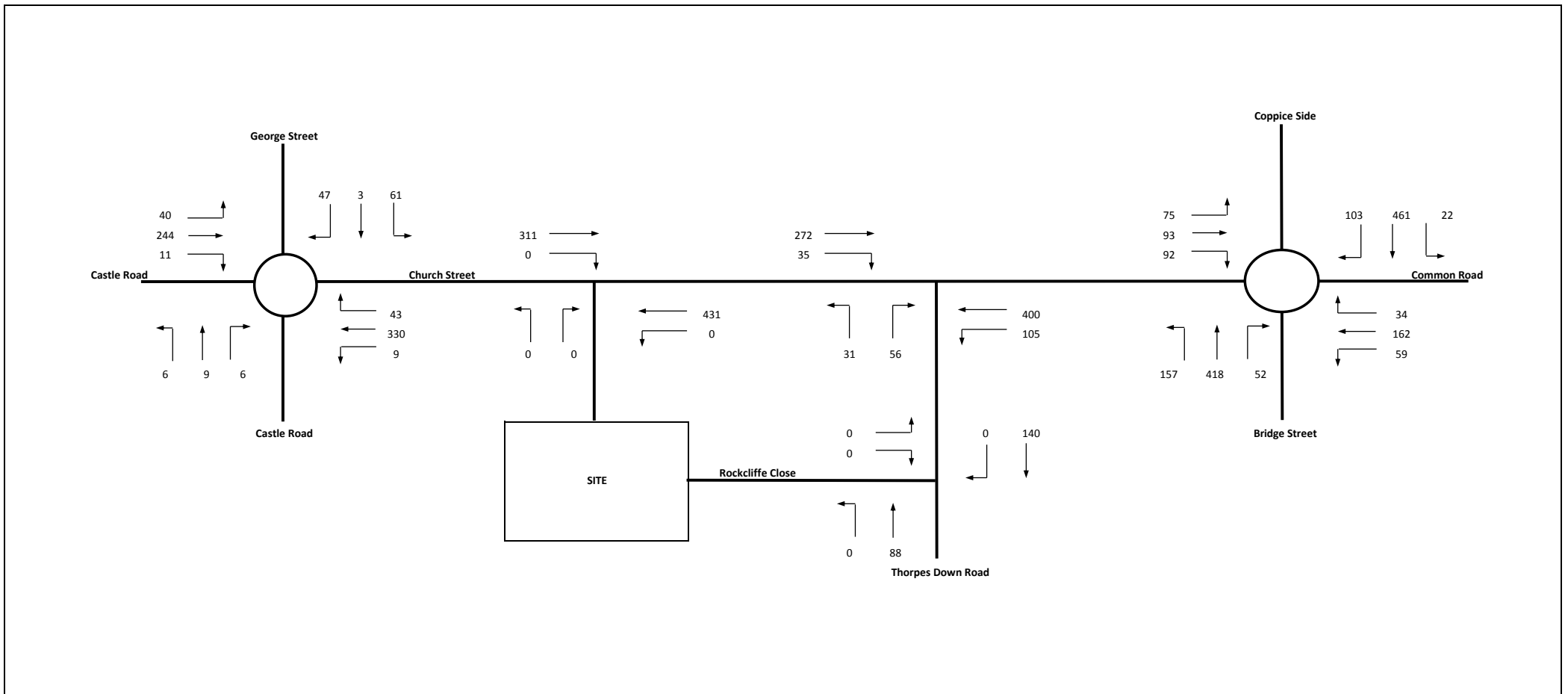


Figure 10 Weekday PM Peak (1715 to 1815 hours)
2013 Base Flows

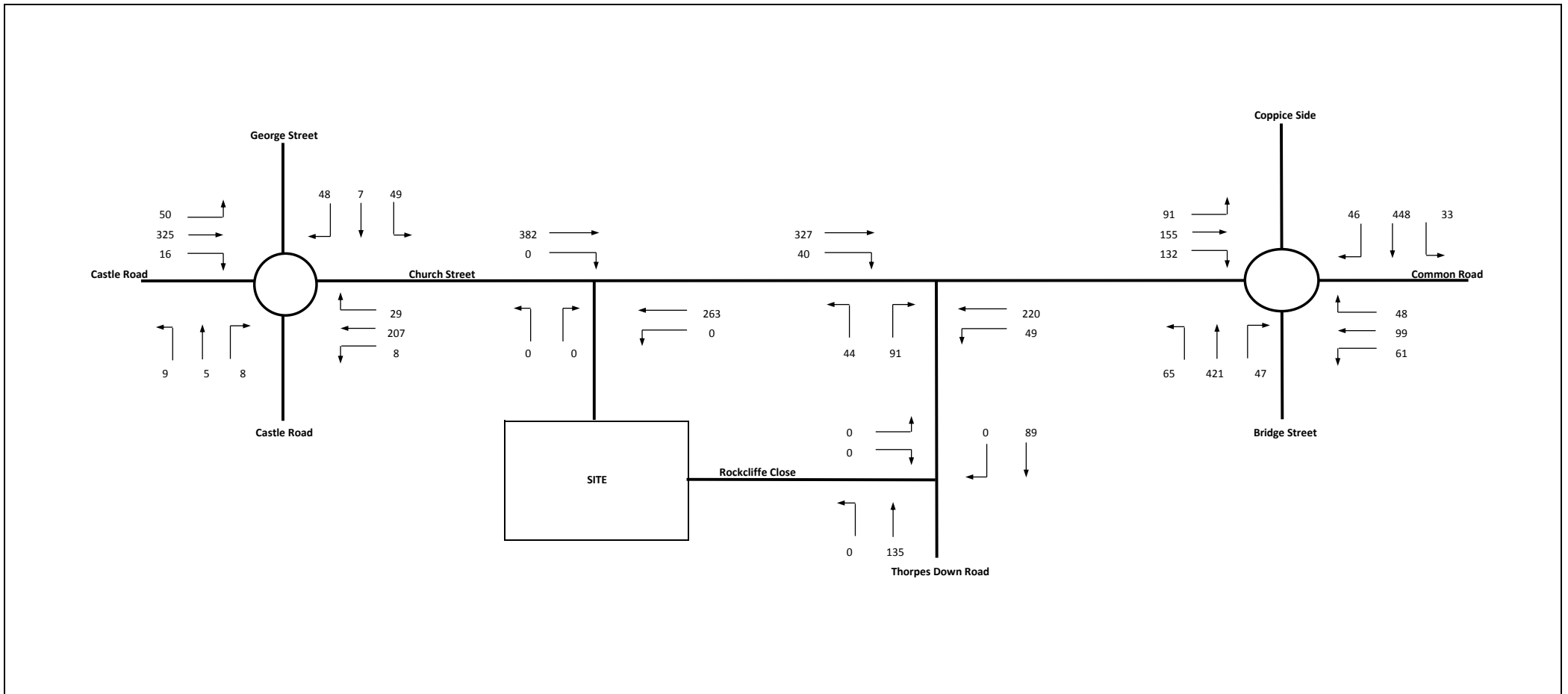


Figure 11 Weekday AM Peak (0800 to 0900 hours)
2020 Base Flows

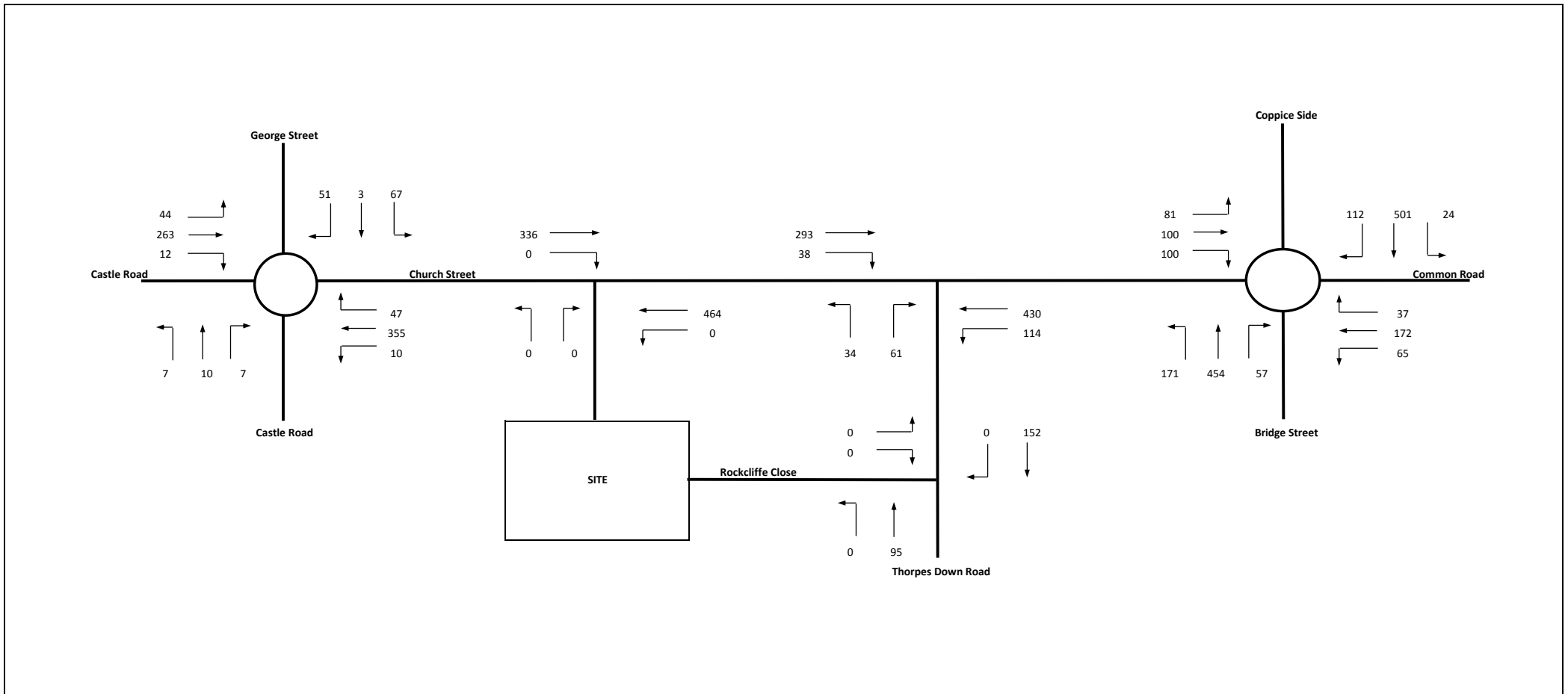


Figure 12 Weekday PM Peak (1715 to 1815 hours)
2020 Base Flows

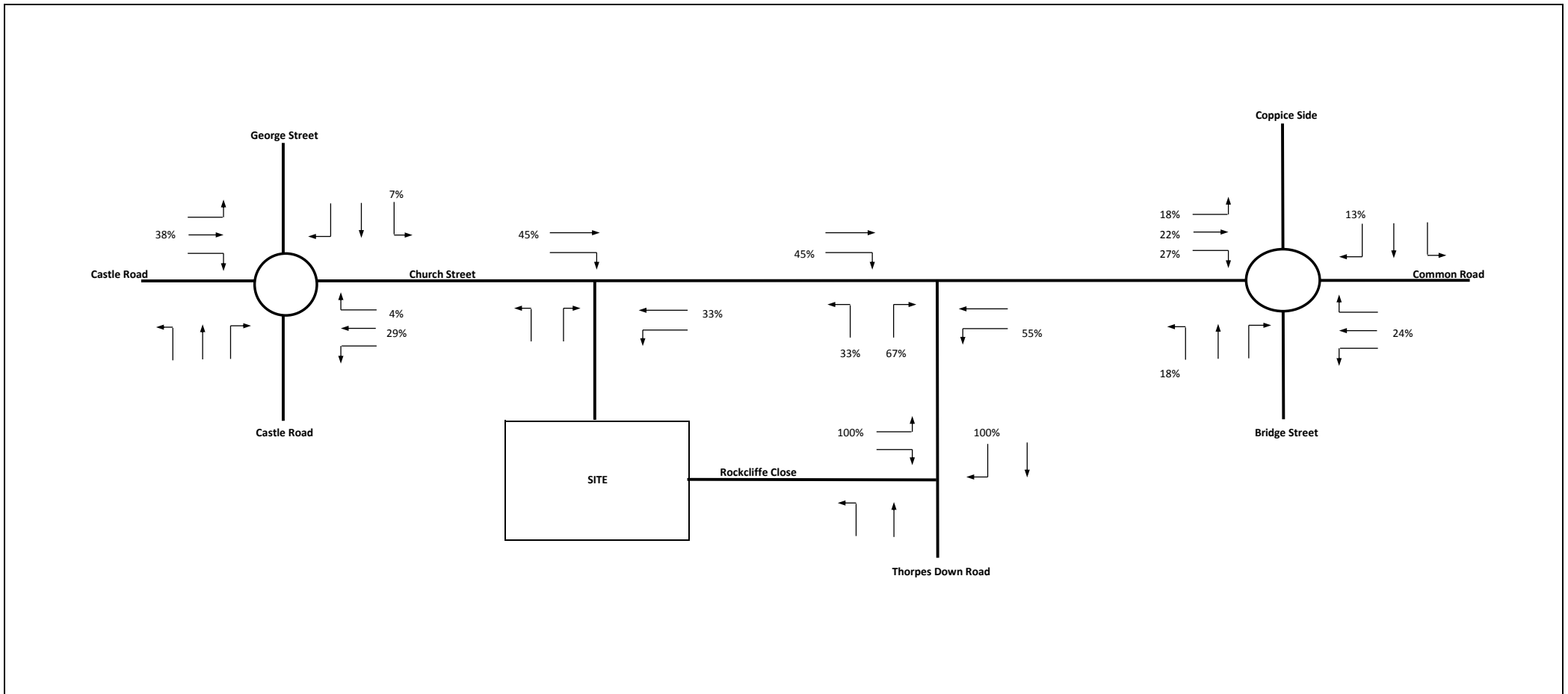


Figure 13 Weekday AM Peak (0800 to 0900 hours)
Proposed Residential Trip Disitribution

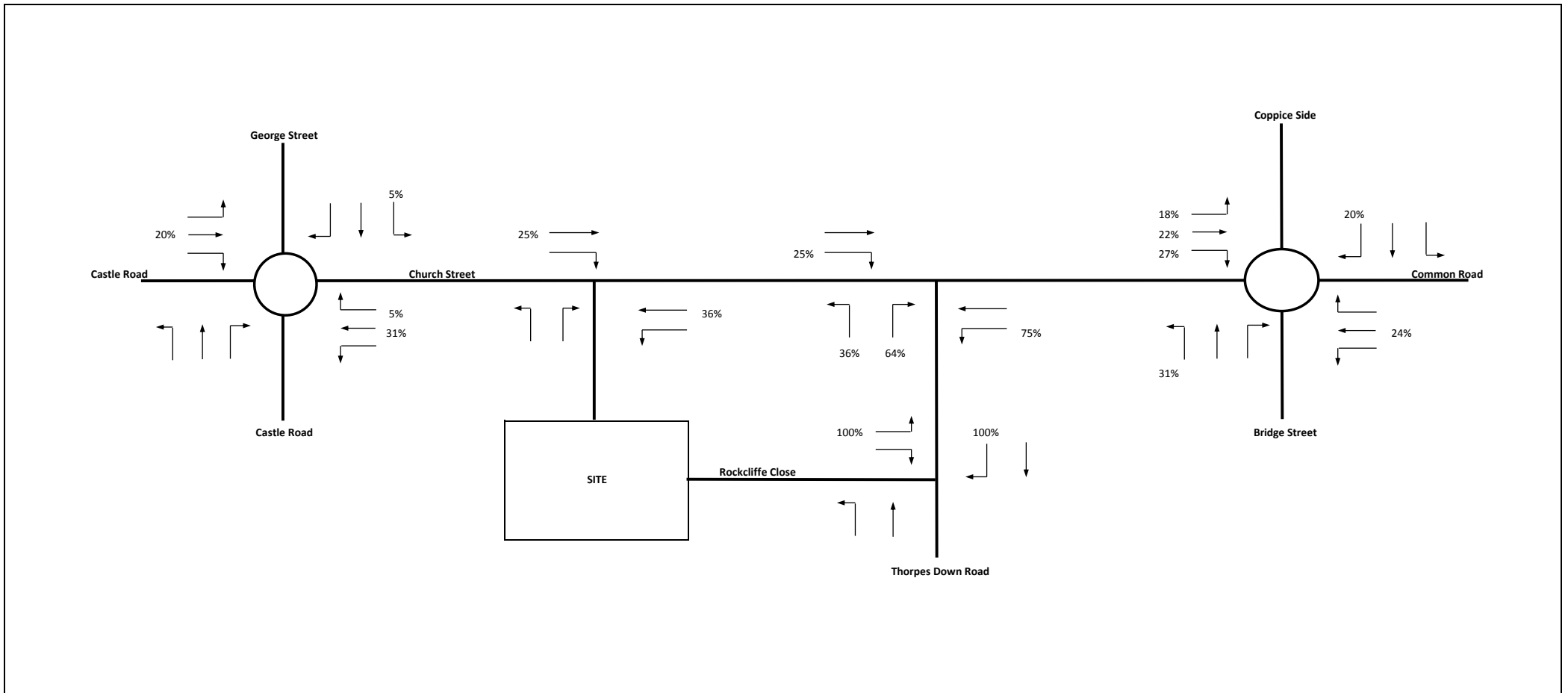


Figure 14 Weekday PM Peak (1715 to 1815 hours)
Proposed Residential Trip Distribution

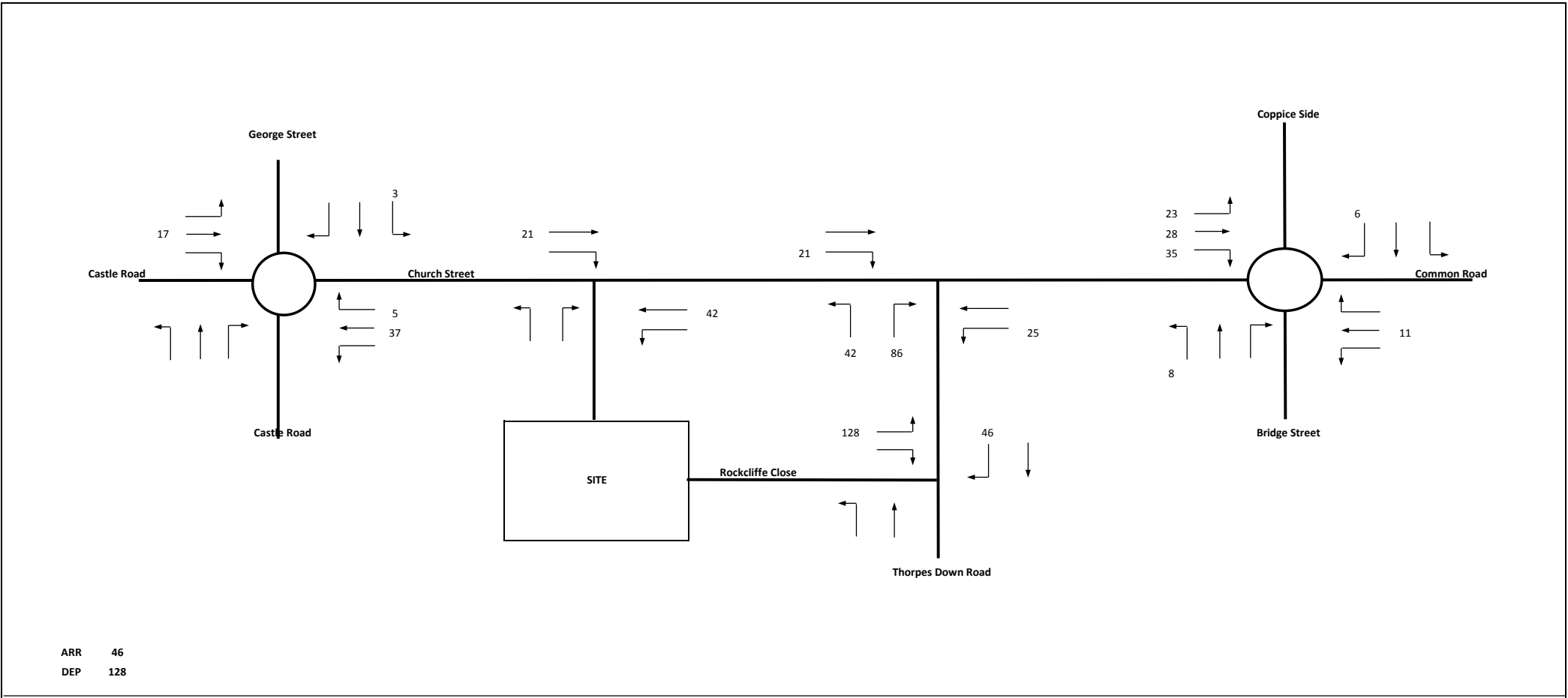


Figure 15 Weekday AM Peak (0800 to 0900 hours)
Proposed Residential Development Flows

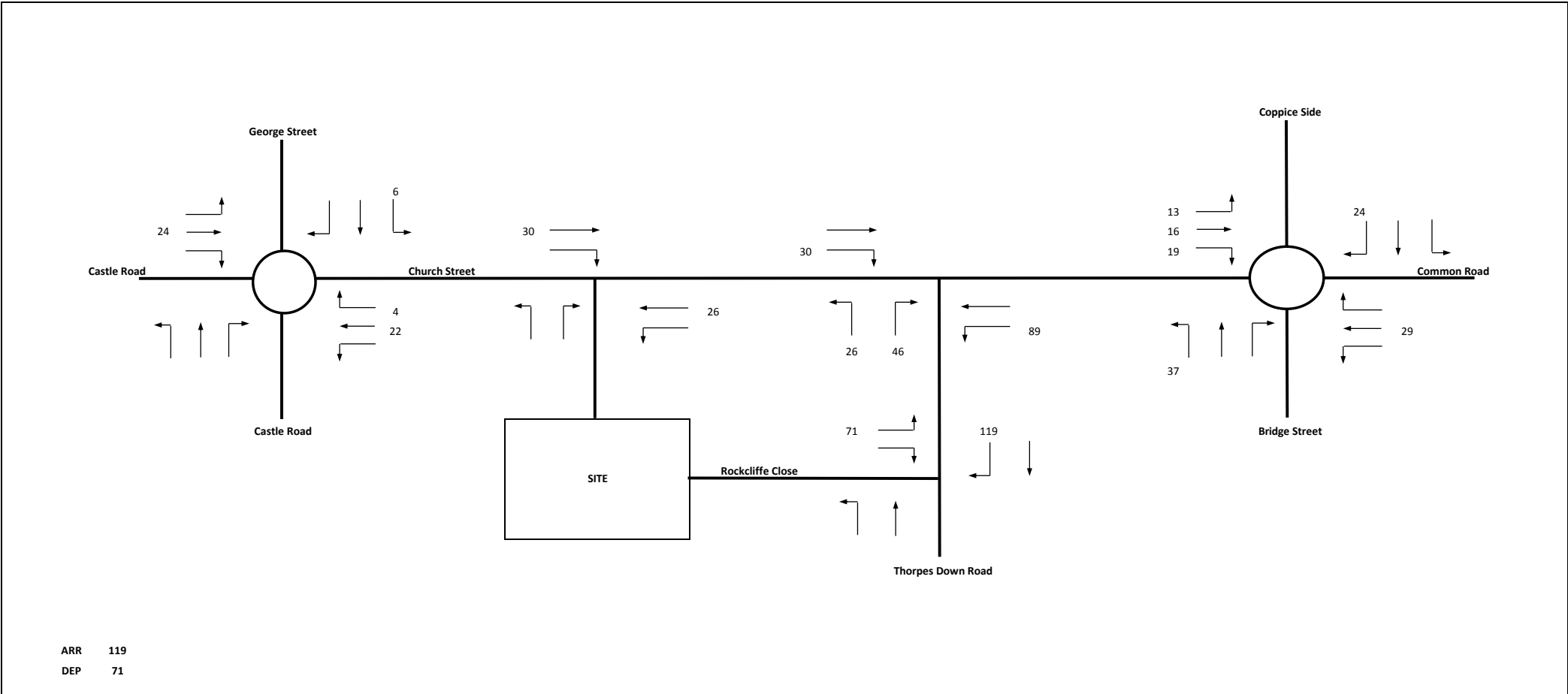


Figure 16 Weekday PM Peak (1715 to 1815 hours)
Proposed Residential Development Flows

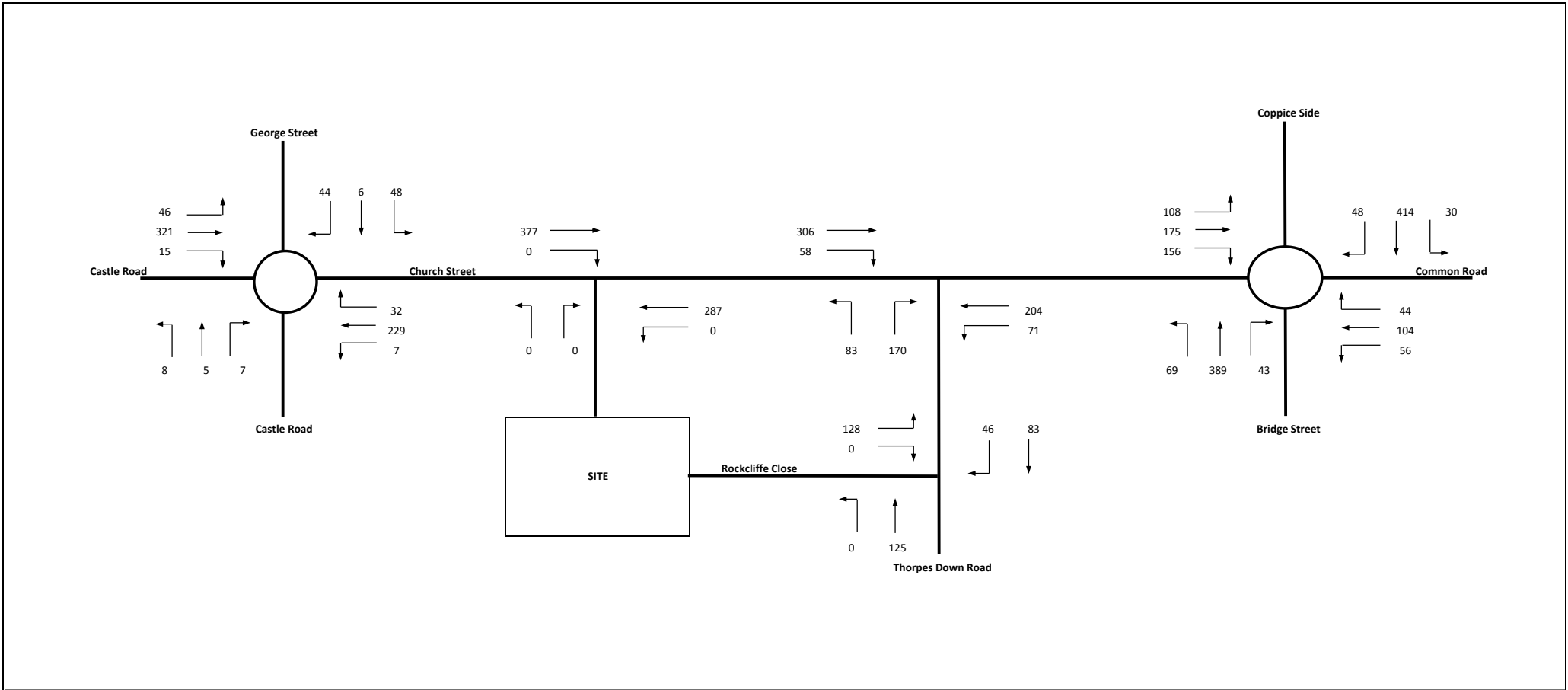


Figure 17 Weekday AM Peak (0800 to 0900 hours) 2013 With Development Flows

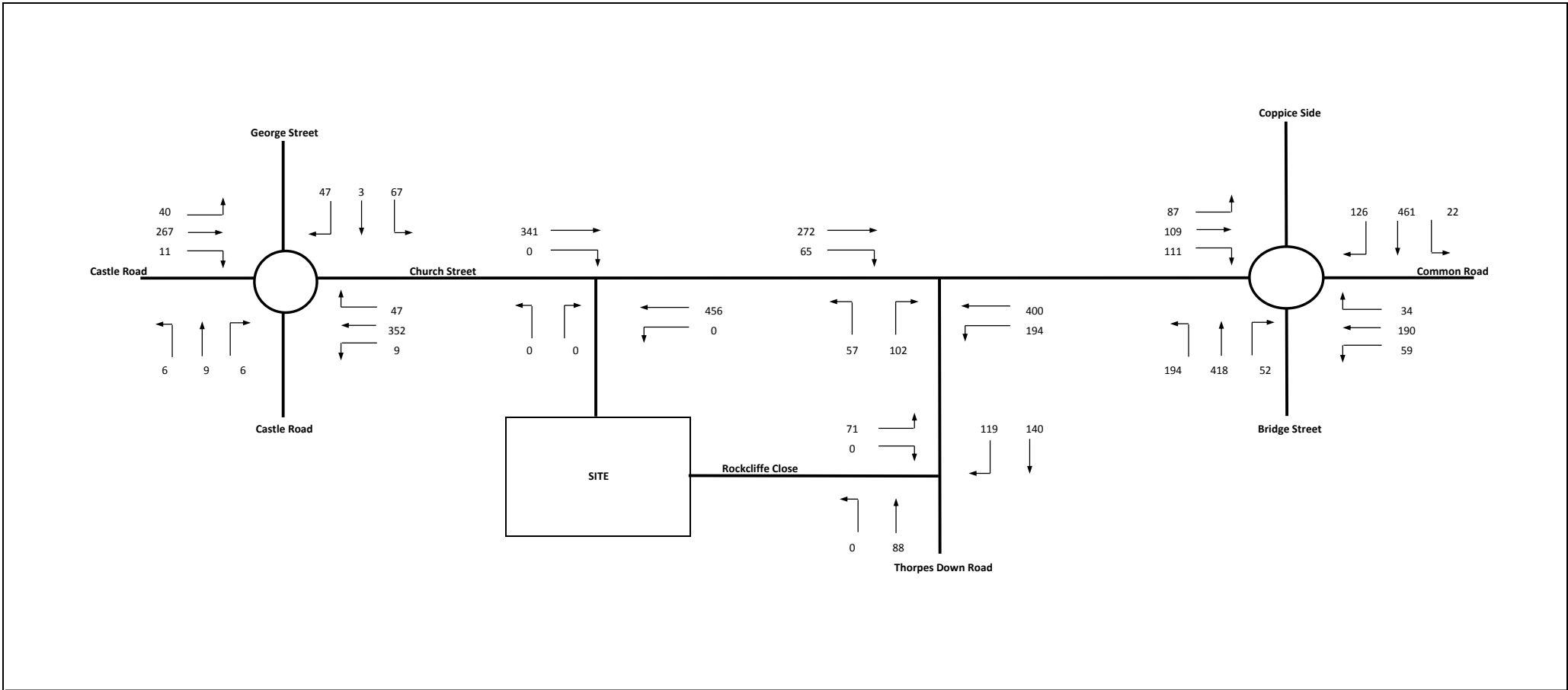


Figure 18 Weekday PM Peak (1715 to 1815 hours)
2013 With Development Flows

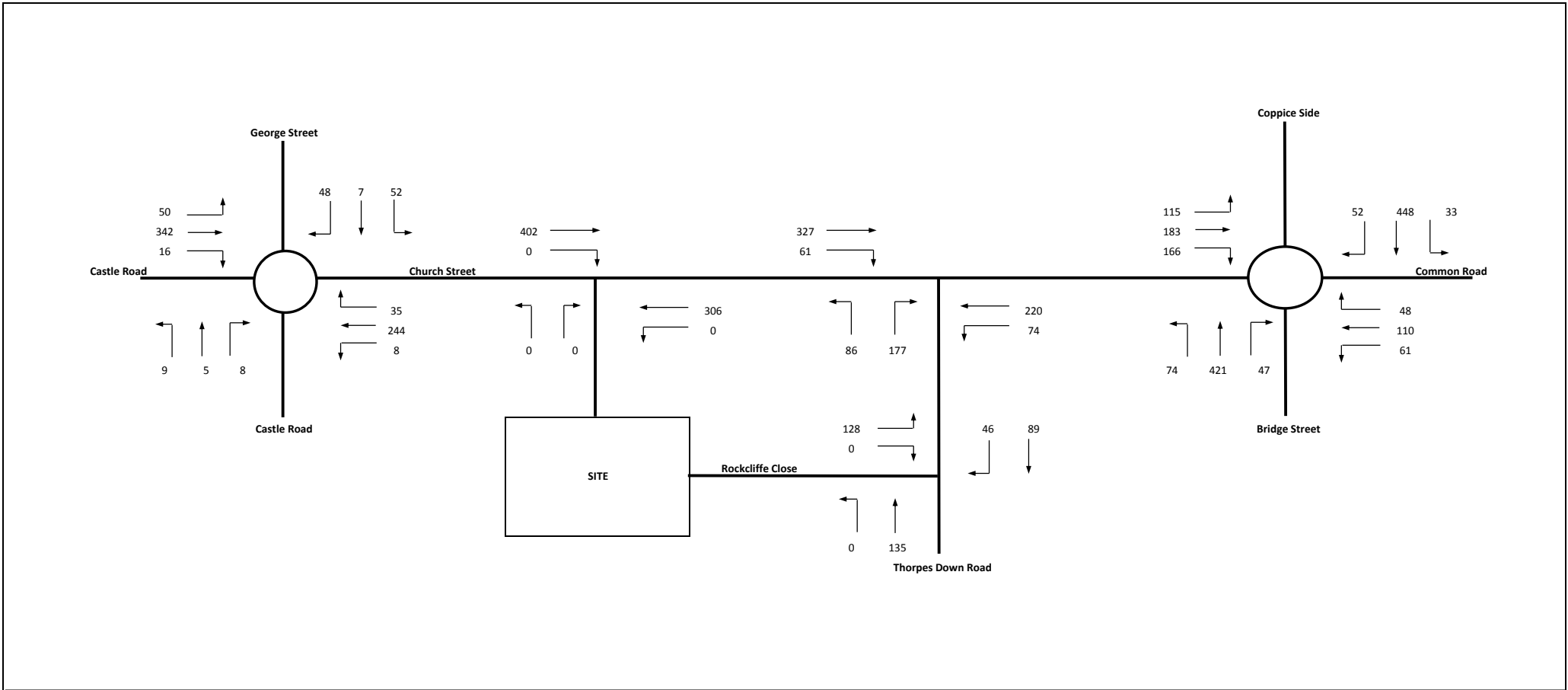


Figure 19 Weekday AM Peak (0800 to 0900 hours) 2020 With Development Flows

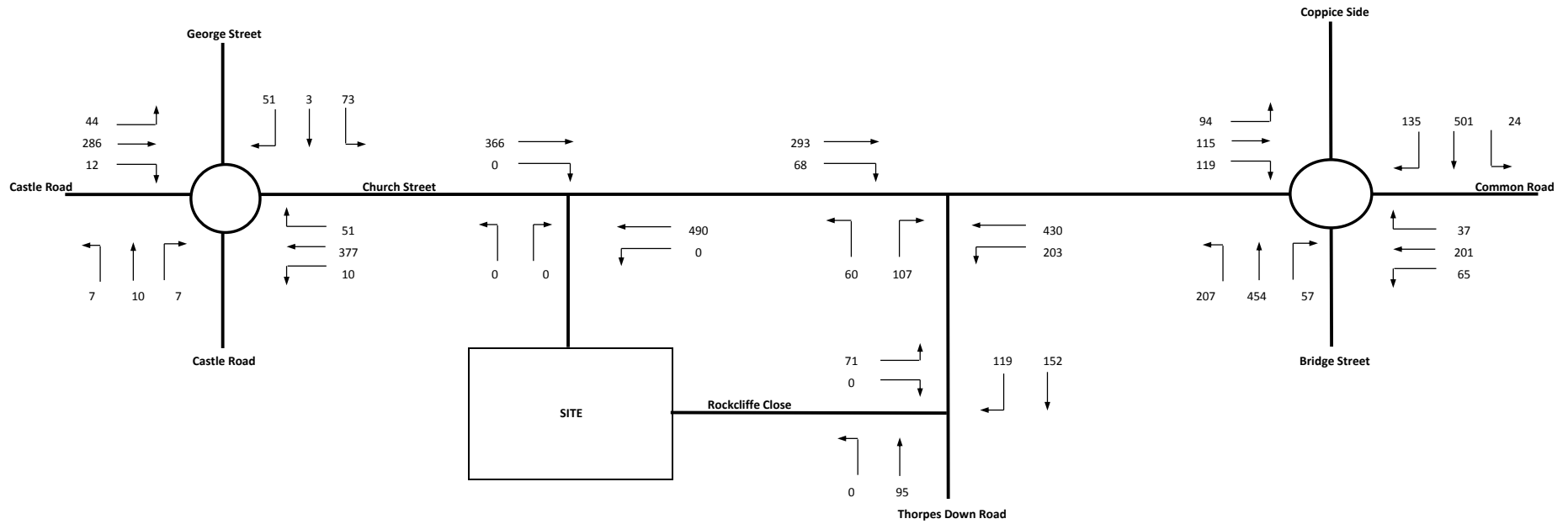


Figure 20 Weekday PM Peak (1715 to 1815 hours)
2020 With Development Flows

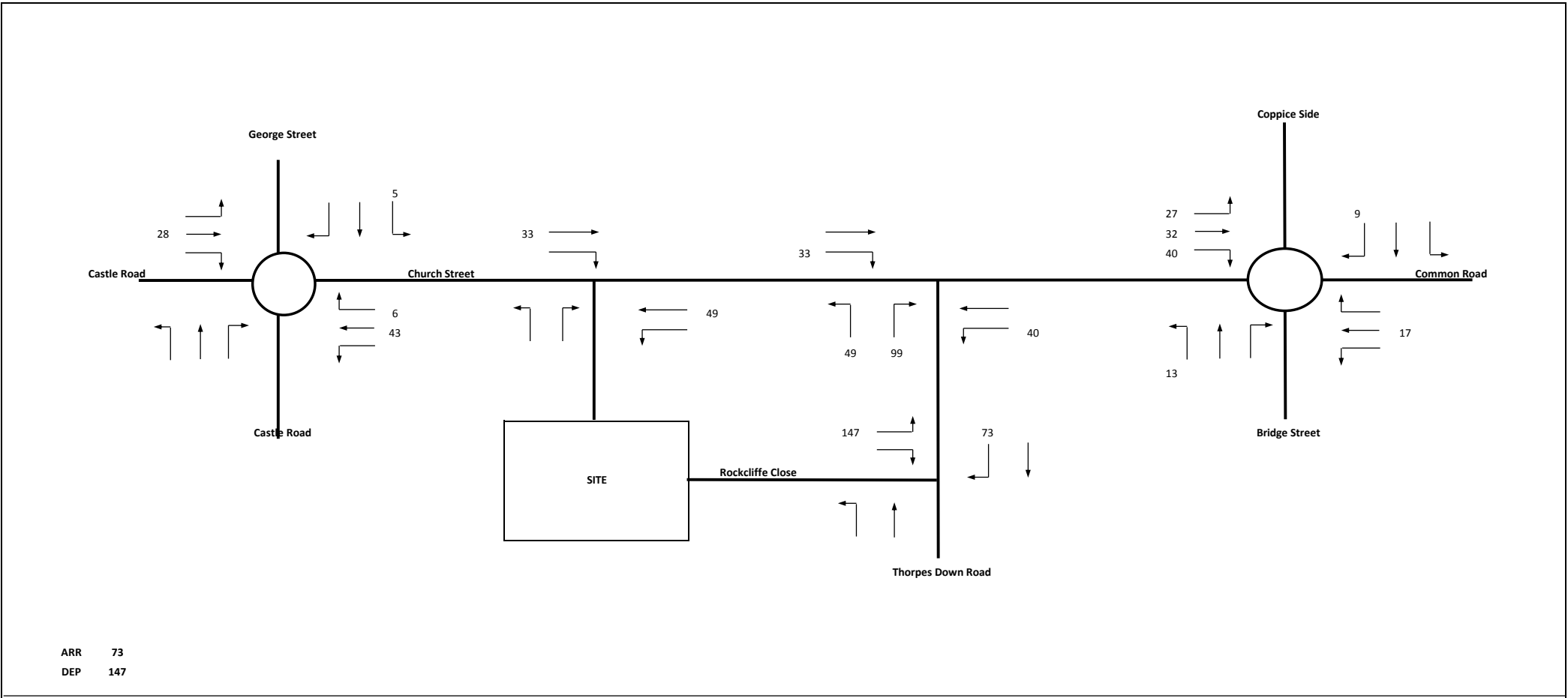


Figure 21 Weekday AM Peak (0800 to 0900 hours)
Proposed Residential Development Flows (Sensitivity Flows)

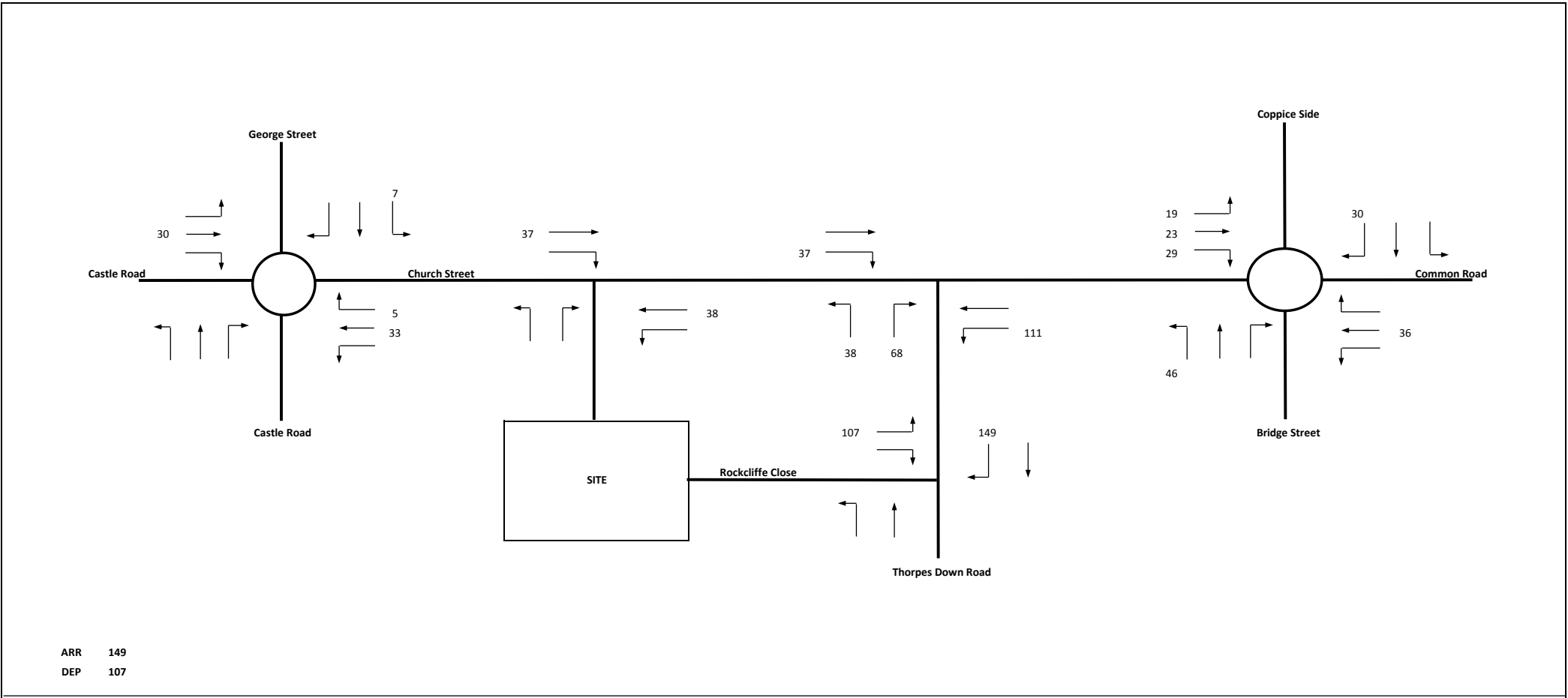


Figure 22 Weekday PM Peak (1715 to 1815 hours)
Proposed Residential Development Flows (Sensitivity Flows)

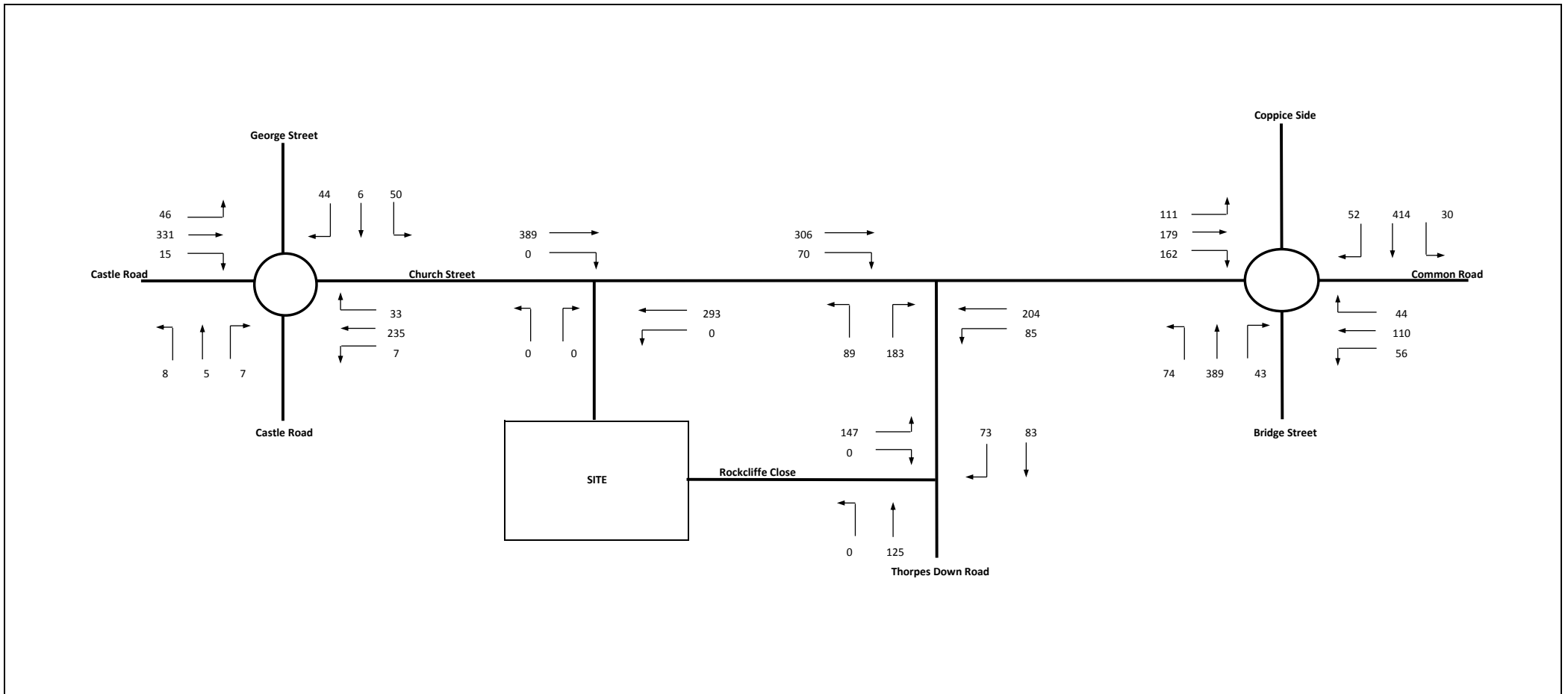


Figure 23 Weekday AM Peak (0800 to 0900 hours)
2013 With Development Flows (Sensitivity Flows)

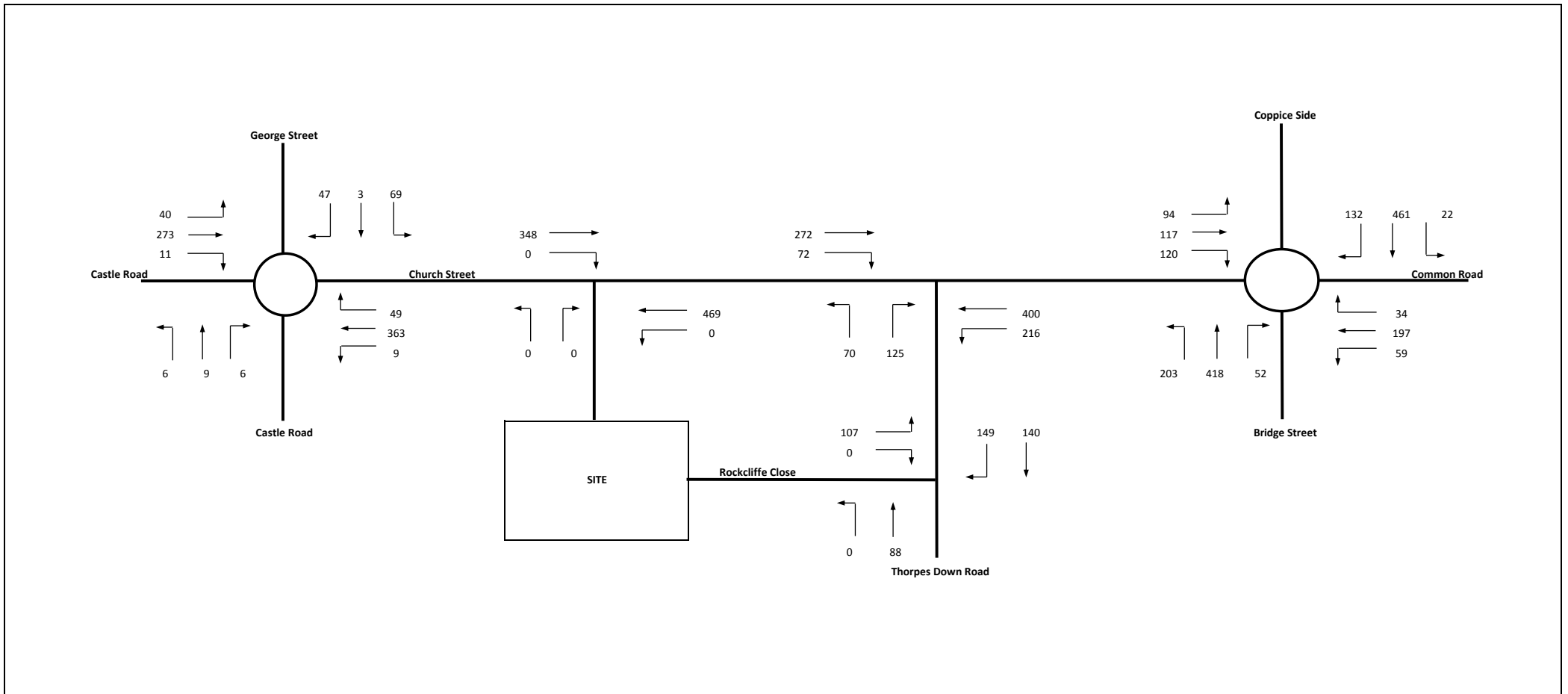


Figure 24 Weekday PM Peak (1715 to 1815 hours)
2013 With Development Flows (Sensitivity Flows)

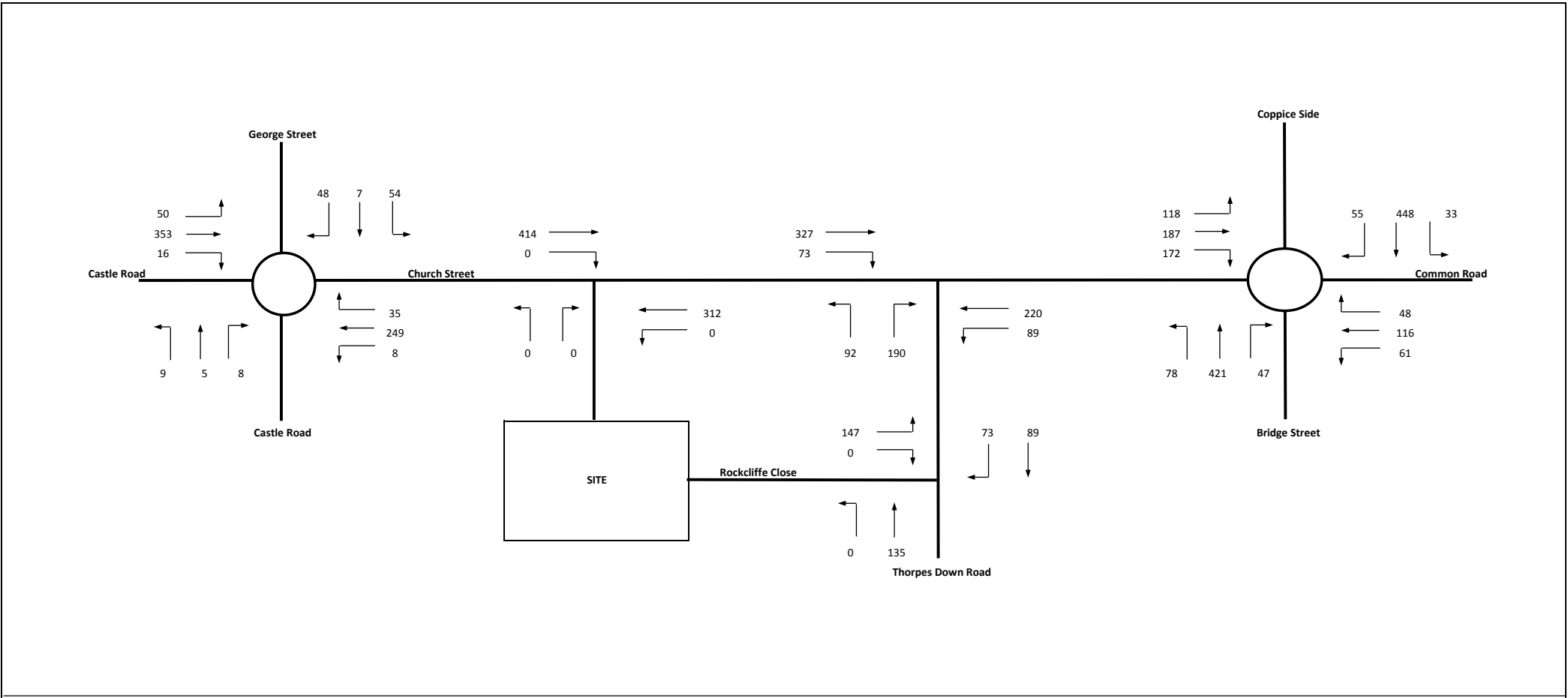


Figure 25 Weekday AM Peak (0800 to 0900 hours)
2020 With Development Flows (Sensitivity Flows)

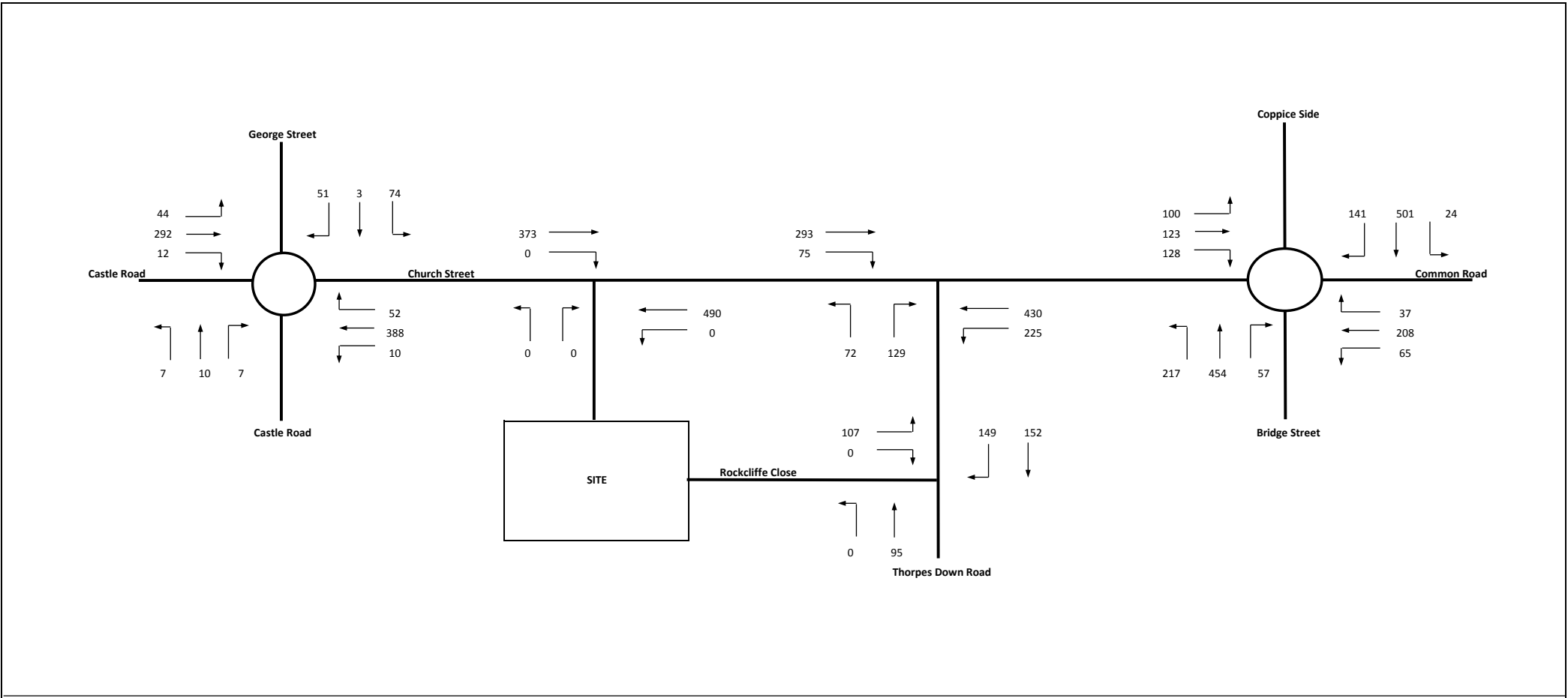


Figure 26 Weekday PM Peak (1715 to 1815 hours)
2020 With Development Flows (Sensitivity Flows)