

eThekwini Central Densification Plan

Bonela Densification Pilot
Project- Business Plan

eThekwini Municipality

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to life*

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Contents

1	Introduction	1
1.1	Aim of the Business Plan.....	1
1.2	Overview of the project concept.....	1
1.3	Project approach.....	1
1.4	Contents of the Business Plan.....	2
2	Project Context	3
2.1	Introduction.....	3
2.2	The central region densification plan.....	3
2.2.1	The eThekweni Densification Vision.....	3
2.2.2	Developing a Framework for densification of the central region.....	3
2.2.3	The Central Land use Framework.....	4
2.2.4	Project Selection.....	4
3	Project concept development	5
3.1	Introduction.....	5
3.2	Bonela Pilot Site.....	5
3.2.1	Location.....	5
3.2.2	Site Description.....	6
4	Project Concept Plan	7
4.1	Development Rationale.....	7
4.2	Pilot site layout plan and design considerations.....	7
5	Planning Motivation	8
5.1	Introduction.....	8
5.2	Alignment with planning strategies.....	8
5.2.1	National Development Plan.....	8
5.2.2	Provincial growth and development strategy.....	8
5.2.3	eThekweni Spatial Development Framework.....	8
5.2.4	Central Spatial Development Plan.....	8
5.2.5	eThekweni Density Strategy.....	9
5.3	Alignment with Densification Framework.....	9
5.4	Desirability of the Development.....	10
5.5	The need for the development.....	10
6	Market assessment	11
6.1	Background.....	11
6.2	Important site characteristics.....	11
6.3	Site assessment.....	11
6.3.1	Local site features and facilities.....	12
6.3.2	Shopping centres supply.....	13
6.3.3	Average property sale price.....	13
6.4	Demand overview: Bonded housing.....	14
6.4.1	Bonded housing demand.....	15
6.4.2	Recommendations.....	15
6.5	Demand overview: Rental housing.....	16
6.5.1	Unit typology profile.....	16
6.5.2	Unit pricing profile.....	17

6.5.3	Rental housing demand.....	17
6.5.4	Recommendations.....	18
6.6	Demand overview: Social housing	19
6.6.1	Unit typology profile	19
6.6.2	Unit pricing profile.....	19
6.6.3	Social Housing Demand.....	20
6.6.4	Recommendations.....	20
7	Environmental assessment	22
7.1	Activity Information	22
7.1.1	Project Description	22
7.1.2	Alternatives.....	22
7.1.3	Activity Description / Legal Framework	22
7.1.4	Activity Position	23
7.1.5	Physical Size of the Activity.....	23
7.1.6	Site Access.....	23
7.1.7	Need and Desirability of the Activity.....	23
7.1.8	Applicable Legislation and Policies	23
7.1.9	Waste, Effluent, Emission and Noise Management.....	24
7.2	Site / Area / Property Description	25
7.2.1	Indicate the General Gradient of the Site	25
7.2.2	Location in Landscape.....	25
7.2.3	Groundcover.....	26
7.2.4	Land Use Character of Surrounding Area	26
7.2.5	Cultural / Historical Features	28
7.3	Key environmental issues	29
7.4	Public Participation Process.....	30
7.5	Conclusions	31
8	Transport Impact Assessment	32
8.1	Site Investigation	32
8.1.1	Candella Road.....	32
8.1.2	Raymond Place	32
8.1.3	Westmeath Avenue	33
8.1.4	Wiggins Road	33
8.2	Traffic Demand Estimation	34
8.2.1	Assessment Years and Hours	34
8.2.2	Traffic Counts	34
8.2.3	Traffic Growth Rates.....	36
8.2.4	Trip Generation by Other Approved Developments	36
8.3	2023 Analysis without Development Generated Traffic	36
8.3.1	Candella Road / Raymond Place Intersection	38
8.3.2	Candella Road / Westmeath Avenue Intersection	39
8.3.3	Candella Road / Wiggins Road Intersection	39
8.4	Existing Pedestrians and Public Transport.....	40
8.5	Existing Road Safety	41
8.6	The Densification Development Proposals	41
8.7	Trip Generation Rates	41
8.8	Trip Generation Calculations.....	41
8.9	Trip Distribution and Traffic Assignment	42
8.9.1	Trip Distribution	42
8.9.2	Trip Assignment.....	42
8.10	Traffic Impact Assessment	45

8.10.1	Candella Road / Raymond Place Intersection	45
8.10.2	Candella Road / Westmeath Avenue Intersection	46
8.10.3	Candella Road / Wiggins Road Intersection	47
8.10.4	Raymond Place / Site Access Intersection.....	48
8.11	Future Road Conditions.....	49
8.11.1	Pedestrians and Public Transport	49
8.11.2	Road Safety	50
8.12	Proposed Road Network Improvements	50
8.13	Conclusions	50
9	Infrastructure Concept	52
9.1	Introduction	52
9.2	Water supply.....	54
9.2.1	Proposed reticulation.....	54
9.3	Wastewater disposal	55
9.4	Stormwater drainage	56
9.4.1	Site description	56
9.4.2	Site impact assessment.....	56
9.4.3	Design proposal.....	56
9.4.4	Mitigation initiatives	57
9.4.5	Solid waste removal	57
10	Project Implementation recommendation	58
10.1	Financing structures	58
10.1.1	Existing options	58
10.1.2	Recommendation	60
10.2	Capital investment cost	61
10.3	Development programme.....	62

Figures

Figure 1: Project Identification and packaging approach

Figure 2: Land Use Framework

Figure 3: Site Location

Figure 4: Extract from Zoning Map

Figure 5: Site layout

Figure 6: Densification Framework

Figure 7: Local facilities

Figure 8: Shopping centre supply

Figure 9: Average property sale price

Figure 10: Unit typology profile

Figure 11: Unit pricing profile

Figure 12: Unit typology profile

Figure 13: Unit pricing profile

Figure 14: Unit typology profile

Figure 15: Unit pricing profile

Figure 16 | View of erf A from Raymond Place

Figure 17 | View of Candella Road and residential area to east

Figure 18 | View of the southern half of the site (erven B and C) on the right (photographer is standing in Raymond place)

Figure 19 | View of erf D, the southernmost part of the site

Figure 20 | Waste dumped and burnt on erven B and C

Figure 21 | The sign prohibiting illegal dumping of waste, with waste underneath, on erf B and C

Figure 22 | View of Candella Road from erf D, showing easy access on the right, and construction waste on the left

Figure 23 | Abandoned container on erf D

Figure 24 | Column reinforcement rebar protruding from excavations, posing a fall- and drowning risk

Figure 25 | Litter and construction waste in one of the excavations on erf D

Figure 26 | Rill erosion on side slopes west of erf D, on the left

Figure 27 | Erosion caused by the lack of vegetative cover and energy dissipating measures north of erf D

Figure 28: Existing Weekday AM & PM Peak Hour Traffic Volumes

Figure 29: 2023 Design Year Peak Hour Traffic Volumes without Development Generated Traffic

Figure 30: Trip Distribution

Figure 31: Trip generation

Figure 32: 2023 Design Year Peak Hour Volumes with Development Generated Volumes

Figure 33: Bonela land infrastructure

Tables

Table 1: Locational Characteristics

Table 2: Proposed zoning

Table 3: Bonela Site Assessment

Table 4: Bonded housing demand

Table 5: Rental housing demand

Table 6: Social housing demand

Table 7 | Listed activities triggered by the proposed development

Table 8 | Table of applicable legislation, policies and guidelines to the proposed Bonela pilot site development

Table 9 | Land uses within 500 m from the proposed Westcliff pilot site

Table 10: Design Year without Development Generated Traffic – Candella Rd / Raymond PI

Table 11: Design Year without Development Generated Traffic – Candella Rd / Westmeath Ave

Table 12: Design Year without Development Generated Traffic – Candella Rd / Wiggins Rd

Table 13: Maximum Potential Trip Generation by Peak Hour

Table 14: Discounted Trip Generation by Peak Hour

Table 15: Design Year with Development Generated Traffic – Candella Rd / Raymond PI

Table 16: Design Year with Development Generated Traffic – Candella Rd / Westmeath Ave

Table 17: Design Year with Development Generated Traffic – Candella Rd / Wiggins Rd

Table 18: Design Year with Development Generated Traffic – Raymond PI / Site Access

Table 19: Bonela- Site A

Table 20: Bonela Site B, C & D

Table 21: Overview of grant funding sources

Table 22: Estimated capital cost

Table 23: Indicative development plan

1 Introduction

Aurecon was appointed by the Development Planning, Environmental and Management Unit within the Development Planning Department of eThekweni Municipality (EM) to undertake the preparation of a Central Densification and Implementation Plan for the urban core, excluding the Inner City LAP. Three Pilot Projects were then identified in Phase 3A of the Implementation Framework of the Densification of eThekweni Central Region.

The overarching goal of the assignment was to provide detailed direction on the location of densification areas, urban design, typology, incentives and scheme controls to enable densification within urban core areas in a more organised way. It aims to specify where densification should take place and address areas under pressure for densification.

The three pilot areas were identified as part of this project to test density targets, determine how to intervene, prescribe motivations for densification, undertake a public process and compile the necessary draft scheme amendments. The central region differs from other corridor and densification studies that have been completed in the city, in the sense that it is largely residential in nature. This required a relook at how densification is approached in the city, and specifically for the central area.

1.1 Aim of the Business Plan

The aim of this business plan is to present a business case for the Bonela Pilot Project. The business plan will present the proposed concept and site plan for the development. The Densification Strategy 2013 seeks to shift the growth trajectory of the city in a more efficient, equitable and sustainable direction, therefore, this business plan will detail how the Bonela Pilot Project will promote the City's vision.

It should be noted that this business plan is based on concept designs and therefore requires that certain assumptions be made. Detailed impact assessments and costings will have to be reviewed once detailed architectural designs have been commissioned by a developer.

1.2 Overview of the project concept

The Bonela Sub-Region's potential for densification in relation to the public transport system is limited by physical factors such as slope. However, after consultations with various eThekweni Departments, public consultation and ground truthing, four vacant sites were identified along Candella Road. A small neighbourhood south of the N3 Highway and East of the Jan Smuts Highway was identified as an area with a high potential for redevelopment.

The proposed development will encompass a high density residential component with different housing typologies. The proposed zoning for the pilot site specifies General Residential 1 and no scheme amendment will be required as the Central Scheme already provides for this zoning.

1.3 Project approach

The approach adopted to identify and package each pilot projects' business case included multiple steps. Overall, the process started as early as the Status Quo phase. The results from the status Quo phase were a detailed regional spatial model that assessed the development potential of the entire area, down to an individual property scale. The model then informed the Densification and Land Use Framework and identified potential sites for densification. These sites were then assessed against a multitude of criteria and ground truthing. The results were then presented to the public and relevant sector departments for further inputs and finalisation. Once the three sites were finalised the project packaging and preparation commenced with this report being the output.

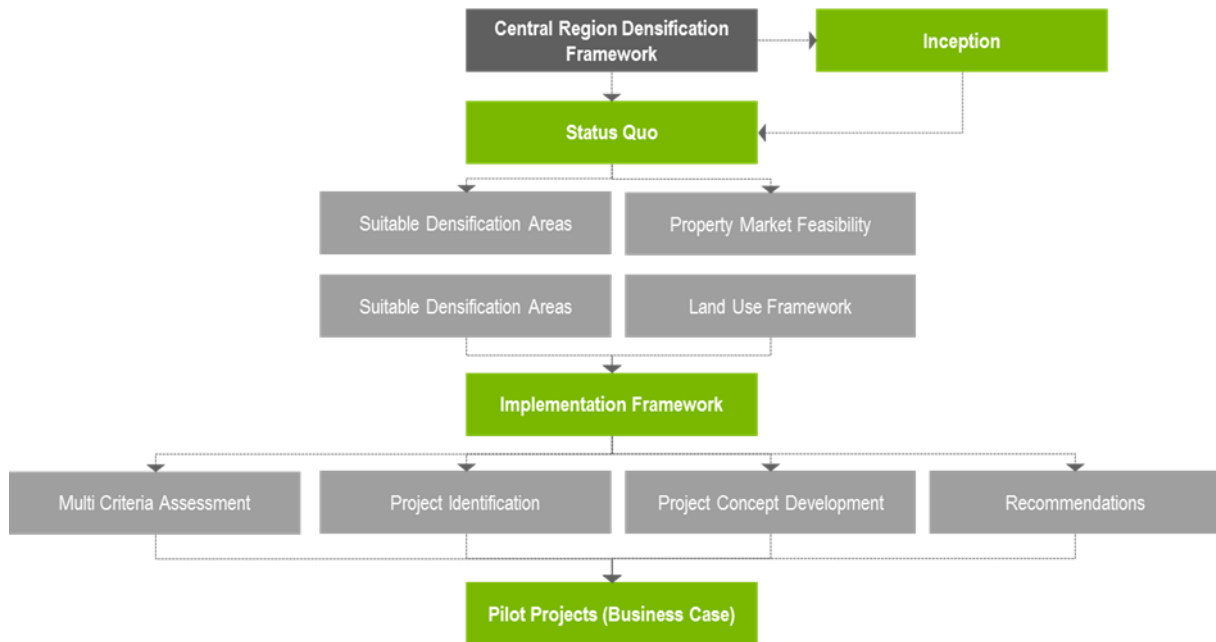


Figure 1: Project Identification and packaging approach

1.4 Contents of the Business Plan

The report comprises the following sections:

- Project context
- Project concept development
- Planning motivation
- Environmental assessment
- Transport and engineering concept
- Budget and development proposals

2 Project Context

2.1 Introduction

The Bonela Pilot Project proposal is based on the Central Densification and Land Use Framework recommendations developed in Phase 2. This section will provide an overview of the Densification and Land Use Framework. For more detail, Phase 2D of the Land Use and Densification Framework may be consulted.

2.2 The central region densification plan

2.2.1 The eThekweni Densification Vision

The vision for eThekweni's densification is based on the consolidation of various structuring elements such as natural features, nodal focus areas, and transportation infrastructure and policy informants. These elements direct the intent and focus of the municipality in terms of future growth and densification. Below is a brief description of these elements;

- The natural elements in the study area are those that need protection from development. These include factors such as the eThekweni DMOSS and slope;
- Nodes are an important element in focusing densification. These nodes have individual characteristics and thus different opportunities for densification. Their impact and reach also differs which in turn influences the extent of densification in the region; and
- The movement of people and goods and the system on which it takes place. Major highways, public transport networks and the IPTN system's impact on densification.

2.2.2 Developing a Framework for densification of the central region

The Central Densification Framework was developed to give guidance in terms of densification locations, parameters such as density (du/ha), building density (appropriate FAR), building heights, preferred type of densification, typical land use mix and appropriate typologies. This was derived from specific densification zones that were identified and ranged from low density areas to very high density areas. A general description and guidelines in terms of location, density, diversity, access and connectivity is provided in the Framework.

- **Very high density areas-** this is a major commercial hub typology which seeks to maximise development density with a commercial focus. This tends to support dense high quality office and international hotel / apartment developments with ground floor retail. Density ratio values are more aspirational for these areas, typically around public transit stations. These ratios are up to 5 on new development parcels, and with a gross FAR for the wider area of around 2.
- **High density areas-** these are typically located in areas marking entry to the city in a key interchange location. These locations will become densely developed for commercial and leisure, cultural or educational purposes, including office, retail, tertiary education, and hospitality uses.
- **Medium to high density areas-** located where potential exists to create a substantial consolidated urban district featuring higher density commercial uses mixed with higher density commercial uses mixed with retail frontages and residential apartments.
- **Medium density areas-** located in suburban areas previously planned for light industrial purposes, a place for mid-scale employment.
- **Low density areas-** These are residential hubs supporting the needs of the existing and future (densified) community. These areas incorporate new / mid-rise apartments and town houses as plot consolidation will allow, and a mix of uses can be accommodated around station areas.

2.2.3 The Central Land use Framework

The Land Use Framework (LUF) sets out to establish the most appropriate development strategy for affected areas. It identifies the range/type of zones appropriate to the study area and sub-regions under consideration. The LUF is a precursor to the formulation of a Planning Scheme. As such it identifies, in broad terms, the nature of the intended zoning categories that will be determined for the scheme.

Westville / Bonela Sub-Region Land Use Framework

The Westville Bonela Sub-Region's potential for densification in relation to the public transport system is limited by physical factors such as slope. This area lends itself to the consolidation of stands and redevelopment of low density single stand residential units to medium density typologies. The Bonela area can potentially accommodate higher densities in strategic, accessible locations. Medium to high density uses should be accommodated.

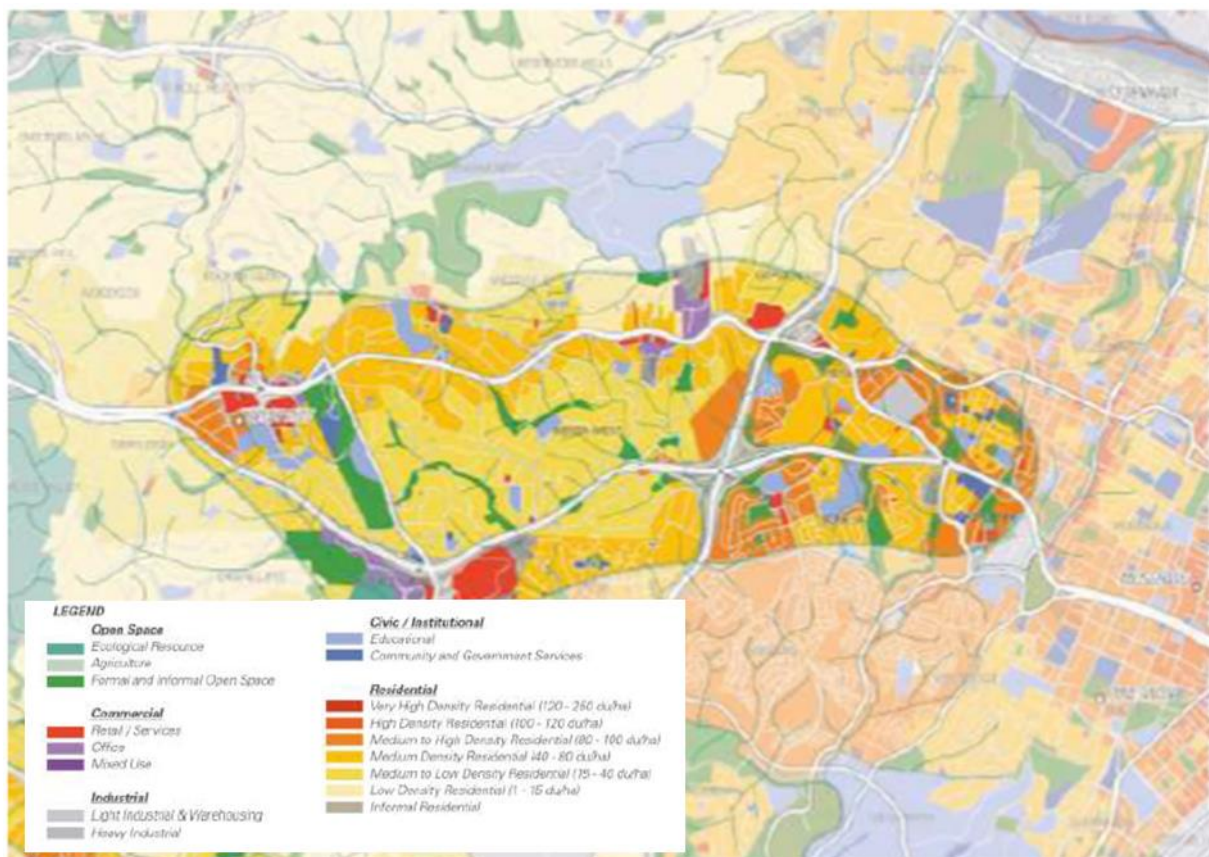


Figure 2: Land Use Framework

2.2.4 Project Selection

A multicriteria analysis was applied in order to prioritise sites and then select the final Bonela pilot project. The pilot site was also reviewed in context of the proposed Densification and Land Use Framework.

3 Project concept development

3.1 Introduction

The Greater Westville local area is generally characterised by medium-high density residential. This section will provide an overview of these selected sites. Evident land uses in the area include social and educational facilities. The local residential market offers opportunity for bonded or affordable rental housing opportunities. This section of the report will provide an overview of the pilot site and the proposed development.

3.2 Bonela Pilot Site

3.2.1 Location

The Bonela site is located inland, west of the Durban CBD in Westville, a residential neighbourhood characterised by lower-middle income households.



Figure 3: Site Location

The site is bounded to the north by high density residential, an educational facility and the N3 highway. To the east and south, the site is bounded by high density residential. Land use activity to the west of the site includes a public open space and residential.



Figure 4: Extract from Zoning Map

3.2.2 Site Description

The site extends at approximately 2ha. It is currently characterised as vacant and enjoys good accessibility to the N3 highway.

The Bonela Pilot site exhibits the following key locational characteristics;

Table 1: Locational Characteristics

Characteristics	Description			
	Site A	Site B	Site C	Site D
Property Description	Remainder of Erf 221, Bonela	Remainder of Erf 223, Bonela	Erf 224, Bonela	Erf 225, Bonela
Title Deed no.	T12803/2007	T30293/2000	-	T5147/2017
Ownership details	Eastvale INV CC	KZN Department of Housing	eThekwini Municipality	Mango Beach INV 10CC
SG Diagram	SG 2546/1999	SG 2548/1999	SG 230/1989	SG 230/1989
Extent of property	1.1821ha	0.1631ha	0.2876ha	0.4015ha
Current Zoning	Special Shopping	Crèche	Petrol Service Station	Special Shopping
Current Land Use	Vacant	Vacant	Vacant	Vacant

4 Project Concept Plan

4.1 Development Rationale

Densification within the Greater Bonela area is supported by different strategic plans of eThekweni. The Bonela pilot project will consist of medium to high residential densities within the area. Bonela is predominantly residential, the proposed development envisages different housing typologies and mixed use nodes located along IPTN feeder routes. The proposed pilot project promotes the development of sustainable communities with public transport as the backbone of this development.

Diversification and consolidation of densities will enhance the current social and economic dynamics within the Bonela area.

4.2 Pilot site layout plan and design considerations

The following parameters are proposed for the Westville/ Bonela pilot site:

ERF 221

- Erf area: 11 874 sqm
- DU allowed (area/90) = 131 units
- DU provided = 104 (52 Ground fl + 52 First Floor)
- Area per Unit = 62 sqm.
- Total area = $104 \times 62 + 10\% \text{ circulation} = 7\,098 \text{ sqm}$
- Building levels = Ground + 1st Floor (2 storeys)

ERF 223 + 224 + 225

- Erf area: 8 547 sqm
- DU allowed (area/90) = 94 units
- DU provided = 64 units
- Area per Unit = 62 sqm.
- Total area = $64 \times 62 + 10\% \text{ circulation} = 4\,465 \text{ sqm}$
- Building levels = Ground + 1st Floor (2 storeys)

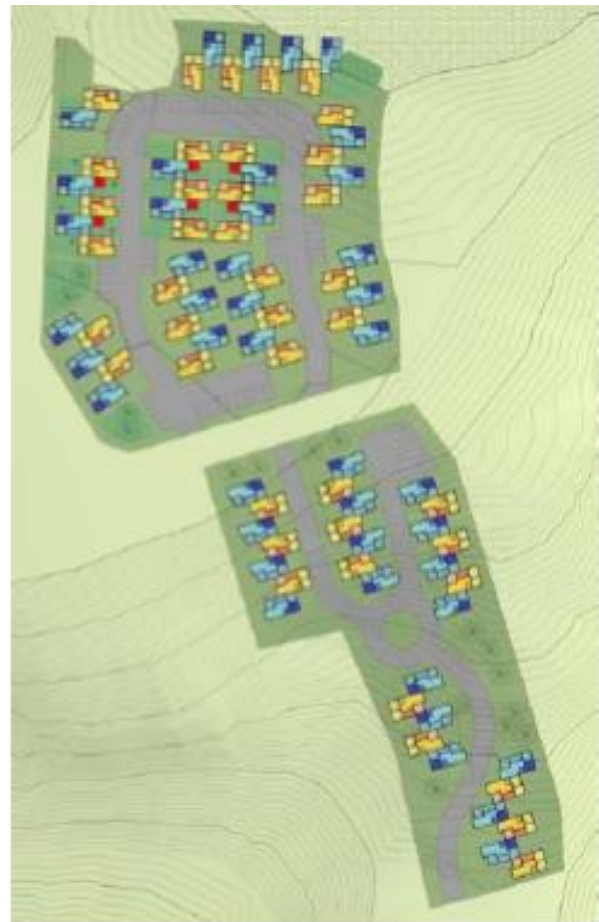


Figure 5: Site layout

5 Planning Motivation

5.1 Introduction

This section of the report provides a planning motivation for the implementation of the proposed Bonela Densification Pilot Project. The project is one of the three pilot projects identified to fulfil the implementation framework for the Central Region Densification.

- The motivation will consist of the following sub-sections;
- Alignment with planning strategies
- Alignment with the Densification Framework
- Desirability of the development
- Need for the development

5.2 Alignment with planning strategies

5.2.1 National Development Plan

The aim of the NDP is to alleviate poverty and inequality. Spatial transformation is therefore one of the critical components of this plan. The NDP supports the principle of densification. Specifically, Chapter 8 of the NDP notes the need for cities to “develop a strategy for densification and resource allocation to promote better located housing and settlements”. The proposed pilot project entrenches the requirements by the NDP requiring cities to implement integration and densification within established transformation zones.

The NDP further proposes the revision of regulations and incentives related to housing and land use management to ensure higher density housing developments along transit routes are prioritised to promote the integration of public transport and housing. The NDP further identifies densification as a vital instrument in reducing the environmental footprint to promote sustainable human settlements.

5.2.2 Provincial growth and development strategy

The PGDS supports the NDP as it aligns with its strategic focus in terms of spatial transformation and the development of sustainable human settlements. The principle of sustainable communities requires spatial integration and densifications of human settlements to enable effective and efficient service delivery. This objective requires eThekweni to concentrate public and private investment in locations selected on the basis of their development potential and are linked to main growth centres. The proposed development aims to promote the “spatial equity” objective of the PGDS.

5.2.3 eThekweni Spatial Development Framework

The EM SDF describes a vision for Central District densification around corridors and nodes. Densification is considered as one of the key strategies contributing to the restructuring of the urban environment in the SDF. The SDF supports densification through infill development on vacant land at higher densities. The pilot project represents the implementation of the strategy of densification by developing a higher density residential area in close proximity to a public transportation corridor.

5.2.4 Central Spatial Development Plan

The SDP has been described as a document that translates the SDF into a ‘more geographically specific development and land use management guideline’. The Central SDP identifies infill and densification as one of the key structuring elements within the region that can be used to reinforce the investment framework. The

SDP highlights the importance of well-located densification areas that will promote more efficient use of existing infrastructure, especially IPTNs.

The SDP supports densification within the Greater Westville area. Densification developments are encouraged in areas of opportunities around important nodes and activity corridors.

The SDP describes characteristics of a well densified development;

- Located along Integrated Rapid Public Transport Network;
- Located within identified Nodes and Corridors;
- With urban densities within the Urban Development Line (UDL) and rural densities without;
- Within available services and close to social facilities; and
- In proximity to economic/employment opportunities.

5.2.5 eThekweni Density Strategy

EThekweni Density Strategy describes urban and rural settlement density as an important characteristic that influences quality and performance, efficiency and sustainability of human settlements. The strategy seeks to identify typical areas within the city that are suitable for densification, these include town centres in proximity to major transport facility. The pilot project has been identified as a density target area that will promote a higher residential density development. This site was identified within IPTN stations, this supports existing planning and development tools of the Municipality that specify the location of densified developments to be along IPTNs.

5.3 Alignment with Densification Framework

According to the Densification Framework, the pilot site falls within the Gateway Zone, which specifies mid to high rise buildings, as shown on the following figure. This zone comprises good accessibility and favourable locality in terms of amenities and other residential locations.

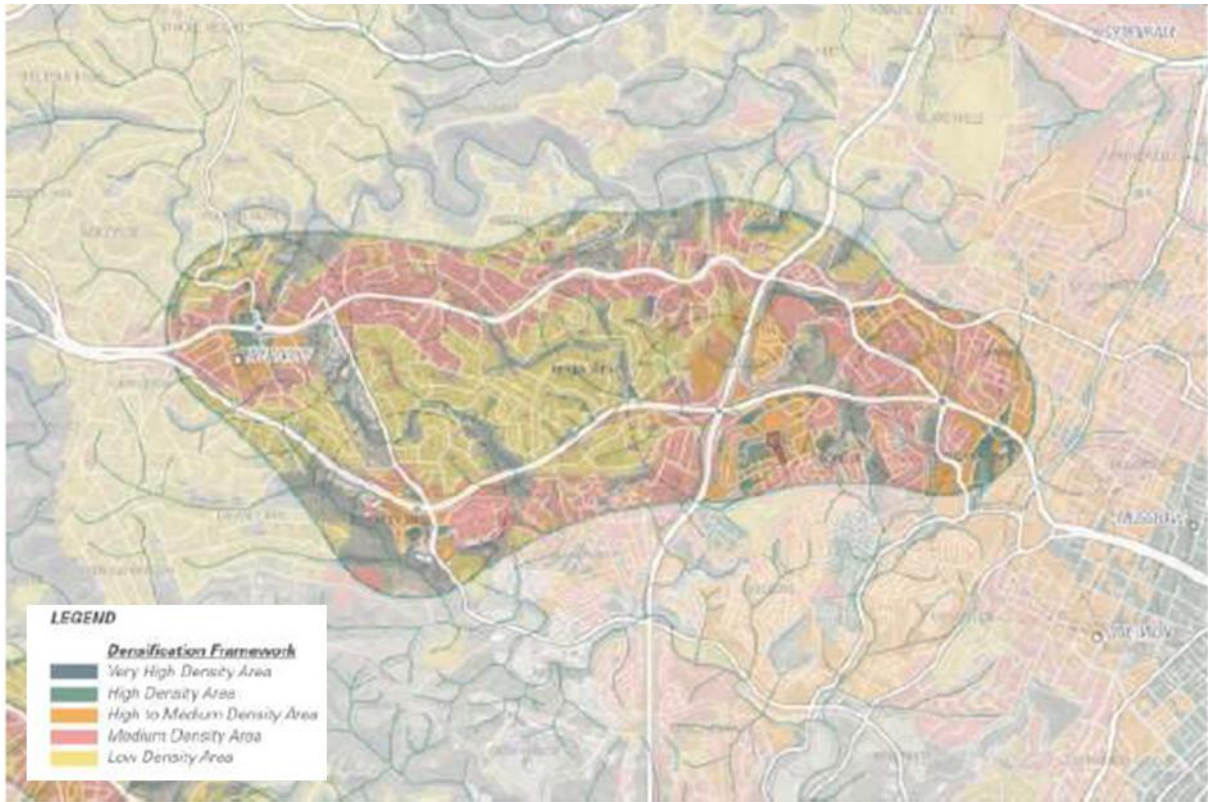


Figure 6: Densification Framework

5.4 Desirability of the Development

The proposed development is located within a priority area for densification in all the City's strategic documents. In particular, the development gives effect to the City's Densification strategy, 2013. Its location within a station site promotes the use of available transport infrastructure and services.

The site has good accessibility, being located south of the N3 highway. It has access to supporting infrastructure such as the road network and bulk services, therefore, optimising public transport infrastructure.

The surrounding residential environment is characterised by lower-middle income households, the development will provide affordable housing opportunities and different typologies to obtain densification, thus giving effect to the City's Strategy.

The Central Scheme provides for the proposed zoning for the site.

5.5 The need for the development

The need for this development was identified through;

1. The municipal need for housing located within strategic areas of the City;
2. The need for an increase in residential densities and prevent new developments that encroach in important DMOSS areas;
3. Through consultation with the community.

EM has identified a need to provide adequate housing for its residents with preference being placed on identifying suitable sites within the demarcated integration zones. Through various consultations with the community it was established that a need for housing exists in the Bonela area.

Table 2: Proposed zoning

Zone	General residential 1
Comment	This is an existing zoning
Statement of intent	To provide, preserve, use land or buildings for:- Higher density on all types of residential accommodation. A wide range of ancillary uses which service the day to day needs of a residential community.
FAR	1.2
Coverage	50%
Height	N/A; Not above a height in MSL on plan [see Zoning Map]
Setback	Building Line: 7.5m Side and rear Space: 4.5m
Permitted	Boarding House Conservation Area Dwelling House Flat/Hotel Institution Lauderette *Laundry Maisonette Multiple Unit Development Private Open Space Public Open Space Retirement Centre
Concent	Base Telecommunications Transmission station Place of Public Worship Special Building Any use authorised in terms of clause 1.14 Any other use authorised in terms of clause 9.7
Prohibited	For full list, refer to central zoning scheme

6 Market assessment

6.1 Background

Market potential is influenced not only by consumer income and expenditure, but in particular also by the characteristics of the retail site/location under consideration. Retail centres and other urban property markets have specific location requirements and given the fact that the development potential of an array of other uses should also be tested, these should also be included in the location assessment exercise.

To this effect, DEMACON Site Evaluation Models © are utilised. These DEMACON models are pragmatic and are based on the assignment of values to various location factors. Firstly, the site is evaluated on a ten-point scale, with ten being the highest. Secondly, weights are attached to these factors, in order of importance (1 to 5, with 5 being the most important).

6.2 Important site characteristics

The Bonela pilot project site is characterised by the following locational attributes

- Location – Bonela
- Total Site Size – 2.3ha
- Current Land Use – Vacant
- Surrounding Land Use
 - Residential
 - Recreational
- Main Roads
 - Candella Road
 - Westmeath Avenue
- Comment – The Bonela pilot site is located in a residential suburb with limited commercial and industrial activity. The residential function of the area is complemented by the supply of essential social services including healthcare and educational facilities. The site is largely internalised with limited direct access to prominent local and regional routes.

6.3 Site assessment

The subsequent table provides an overview of the site assessment in terms of the Bonela site's suitability for residential land use activities.

Table 3: Bonela Site Assessment

Location Factors	Grade 1 - 10	Weight 1-5	Points
Perceived Level of Safety and Security	7	5	35
Area Price Profile	7	4	28
Address Value	7	4	28
LSM Profile	7	5	35
Perceived Quality of Residential Environment	7	4	28
Tempo of Residential Growth	7	5	35

Within direction of Current & Future Growth	7	5	35
Perceived investment value	7	4	28
Access to main roads	6	3	18
Proximity to work place	7	3	21
Proximity to schools	7	4	28
Proximity to retail facilities	7	4	28
Proximity to social amenities	7	3	21
Proximity to public transport	7	3	21
Availability of Land	6	3	18
Total			407
Score			69.0%

6.3.1 Local site features and facilities

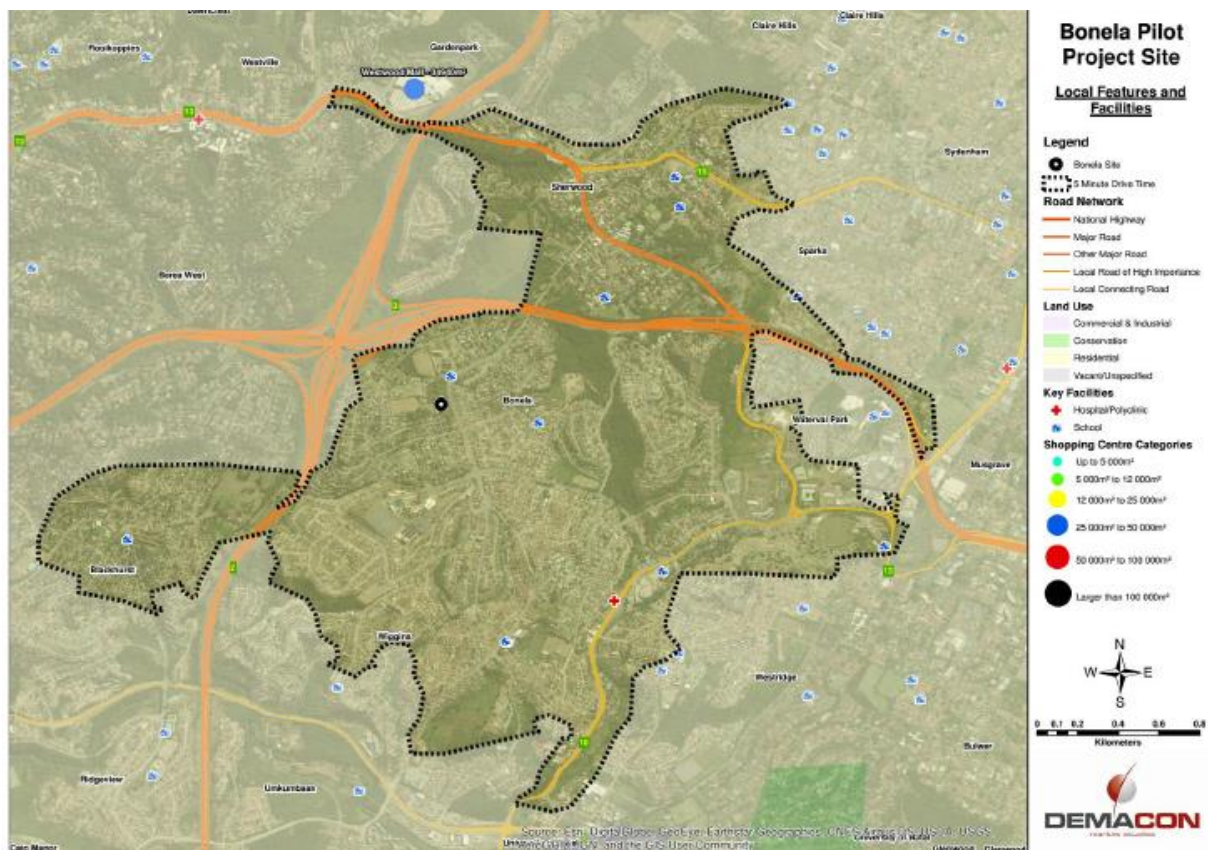


Figure 7: Local facilities

6.3.2 Shopping centres supply

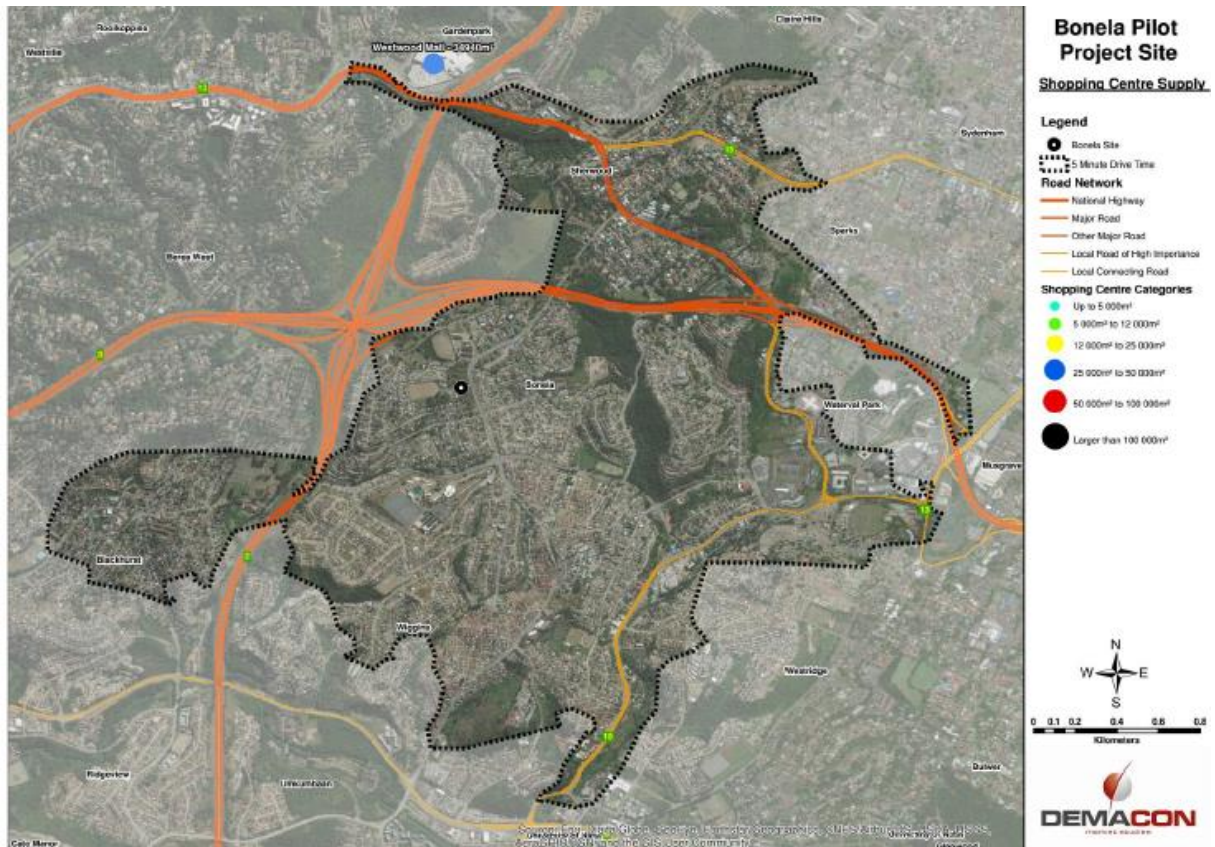


Figure 8: Shopping centre supply

6.3.3 Average property sale price

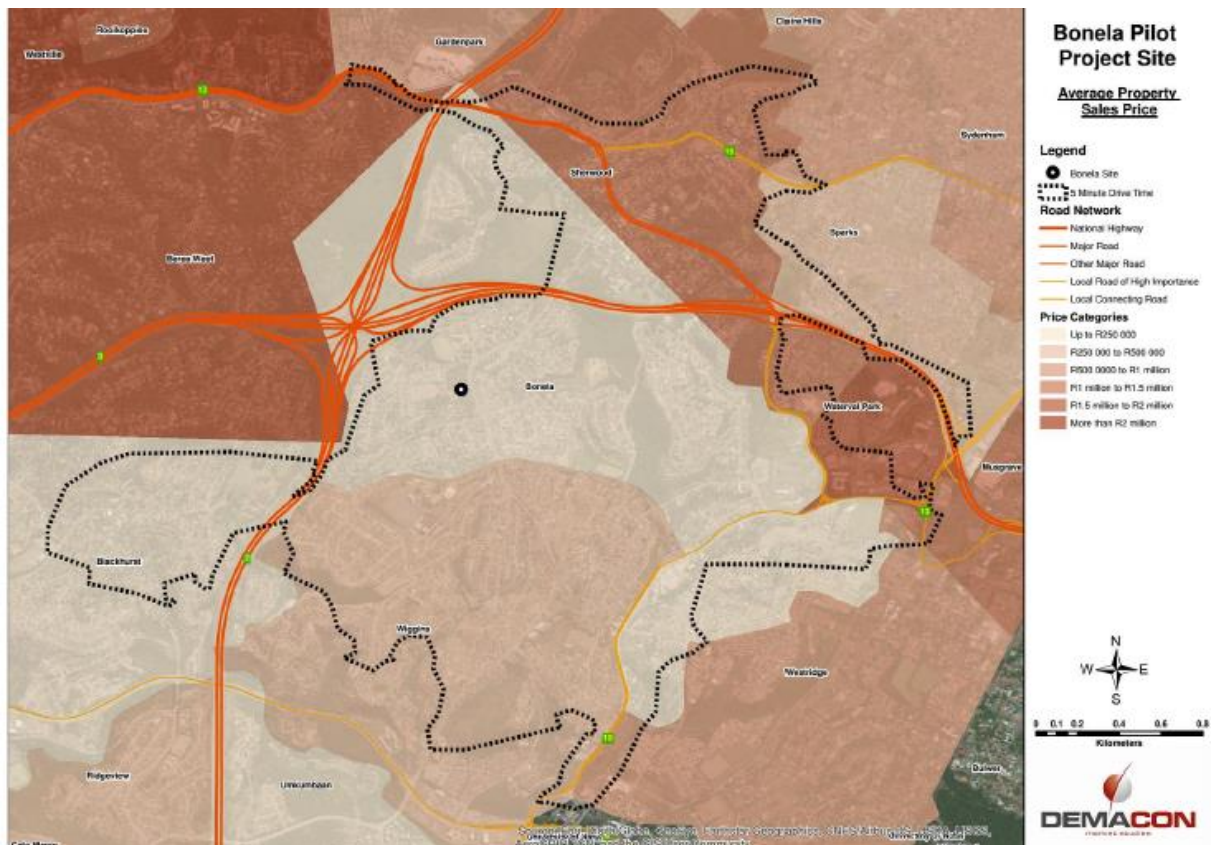


Figure 9: Average property sale price

6.4 Demand overview: Bonded housing

Unit typology profile

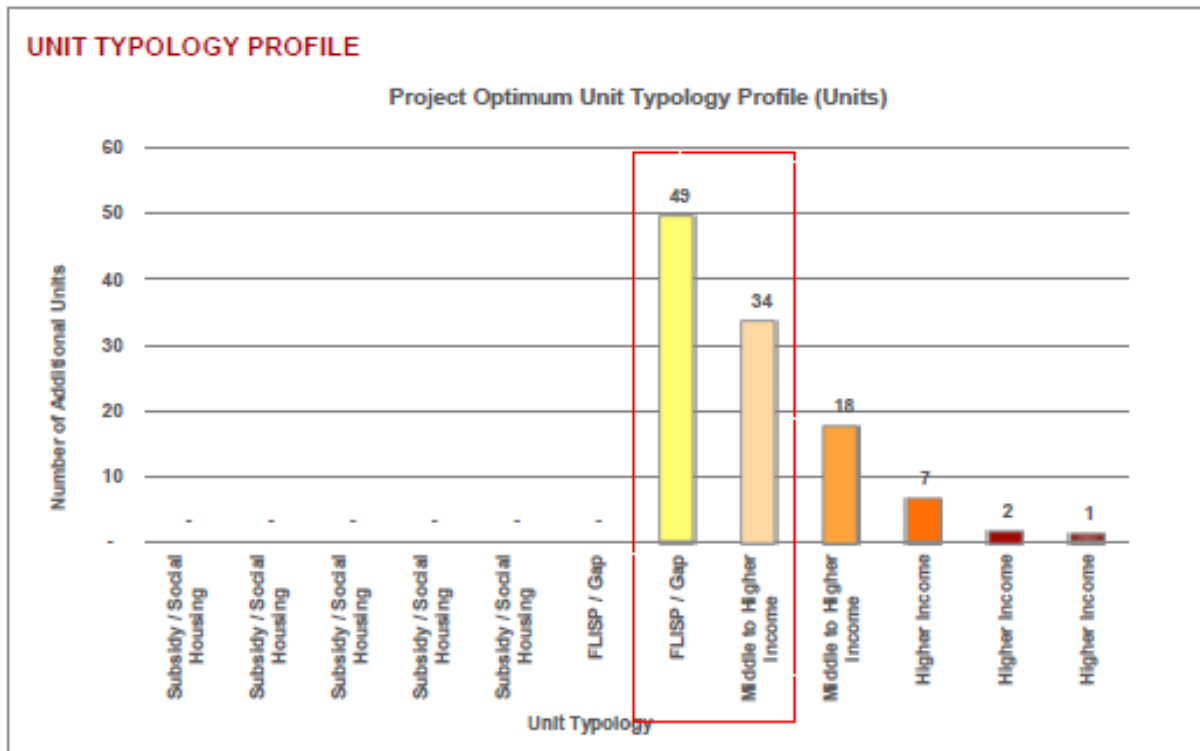


Figure 10: Unit typology profile

Unit pricing profile

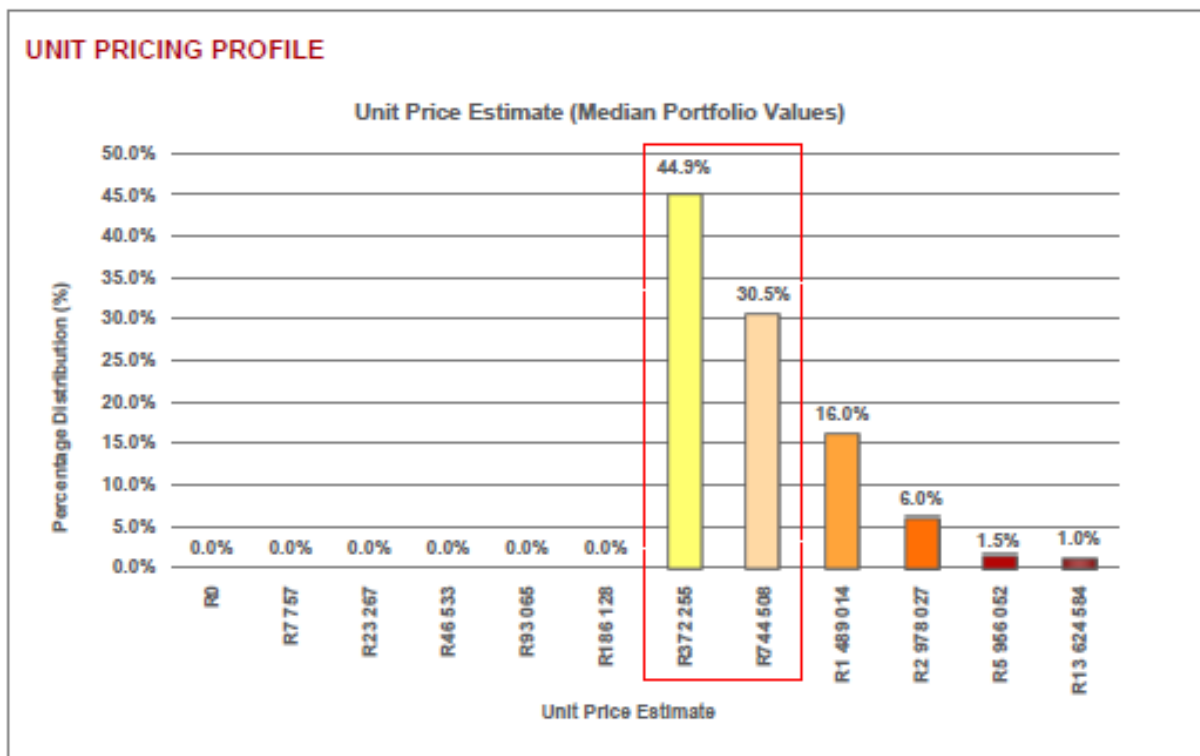


Figure 11: Unit pricing profile

6.4.1 Bonded housing demand

Table 4: Bonded housing demand

Total Market			
Additional HH: base yr + 5yrs			3 958
Annualised Market growth (full housing spectrum)			792
Bonded & Credit linked			31.2%
Bonded & Credit Linked take-up per annum			247
Annual secondary market contribution (units / annum)		Min	68
		Max	136
Total annual Bonded & Credit Linked demand		Min	315
		Max	383
Project Specific			
Project Bonded & Credit Linked Units			110
Forecast market share of total market sales		Min	10%
		Max	20%
Project forecast total annual take-up rate (units / annum)		Min	31
		Max	77
Years to 80% take-up (bonded & credit linked units)		Min	1.4
		Max	3.5
		Avg	2.5
OPME			2018+

6.4.2 Recommendations

In terms of residential demand with particular focus on the bonded housing market, the following recommendations are made for the Bonela pilot project site:

- Core target market:
 - Lower-middle income households
- Potential Size:
 - Demand for 110 bonded units
- Potential configuration:
 - Medium density
 - Three to four Storey walk-up units

- Price Profile
 - R300 000 to R800 000 per dwelling unit
- Phasing
 - Single phase project
- Optimum point of market entry
 - Suggested to be 2018 and beyond

6.5 Demand overview: Rental housing

6.5.1 Unit typology profile

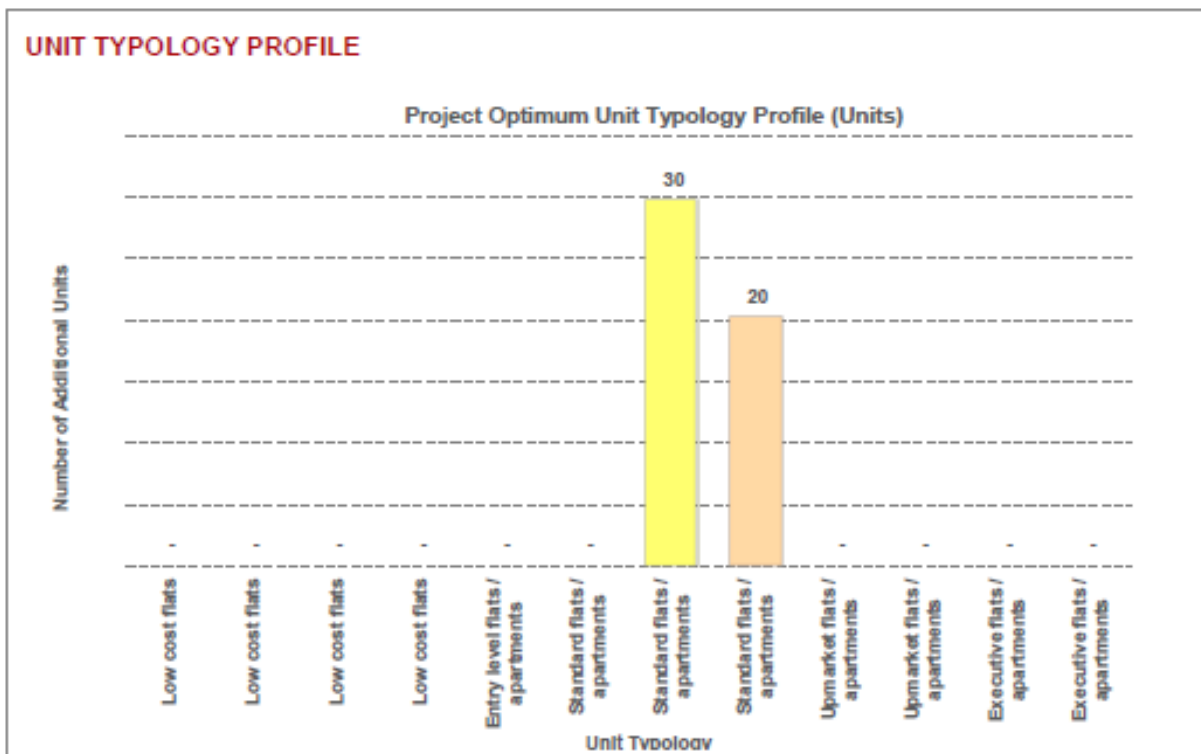


Figure 12: Unit typology profile

6.5.2 Unit pricing profile

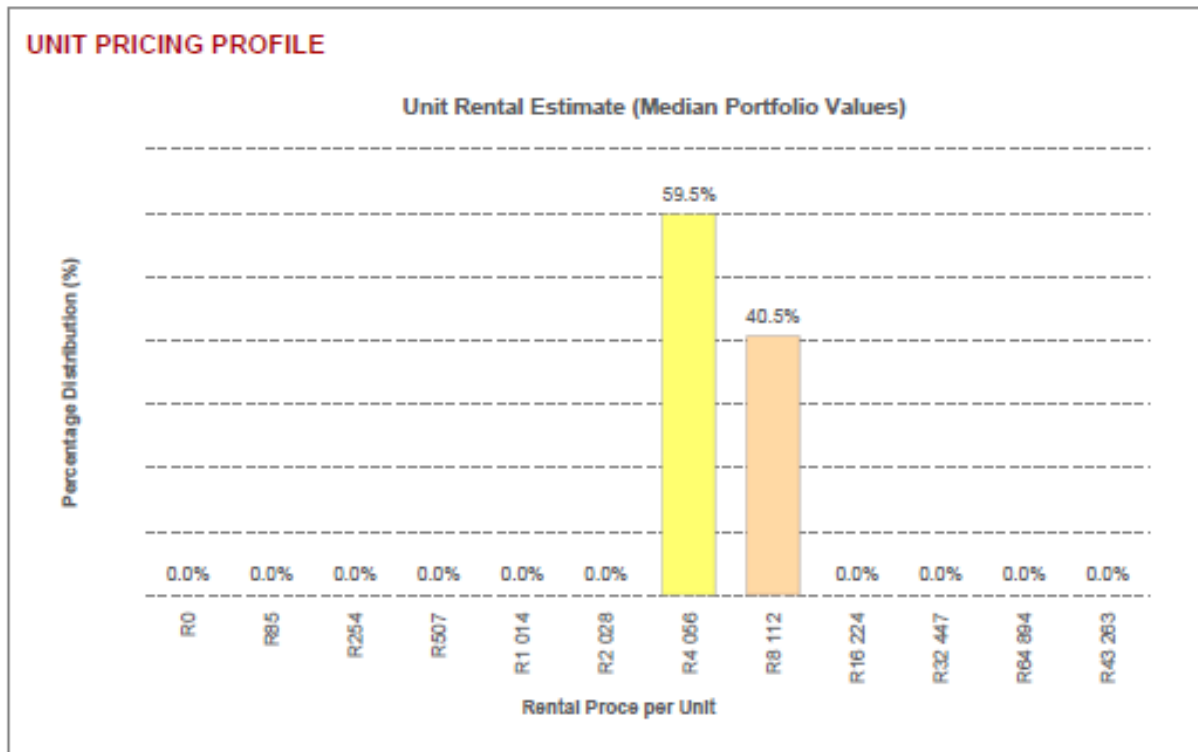


Figure 13: Unit pricing profile

6.5.3 Rental housing demand

Table 5: Rental housing demand

Total Market			
Additional HH: base yr + 5yrs			3 951
Annualised Market growth (full housing spectrum)			790
Entry Level Market Based Rentals			14.1%
Entry Level Market Based Rental demand per annum			111
Annual secondary market contribution (units / annum)		Min	31
		Max	61
Total Entry Level Market Based Rental Housing Take-up		Min	142
		Max	173
Project Specific			
Project Entry Level Market Based Rental Units			50
Forecast market share of total market sales		Min	10%
		Max	20%

Project forecast total annual take-up rate (units / annum)		Min	14
		Max	35
Years to 80% take-up (Rental Housing units)		Min	1.4
		Max	3.5
		Avg	2.5

6.5.4 Recommendations

In terms of residential demand with particular focus on the affordable rental housing market, the following recommendations are made for the Bonela pilot project site:

- Core target market:
 - Lower-middle income households
- Potential Size:
 - Demand for 50 units
- Potential configuration:
 - Medium density
 - Standard flats or apartments
- Rental Price Profile
 - R4 000 to R8 000 per dwelling unit
- Phasing
 - Single phase project
- Optimum point of market entry
 - Suggested to be 2018 and beyond

6.6 Demand overview: Social housing

6.6.1 Unit typology profile

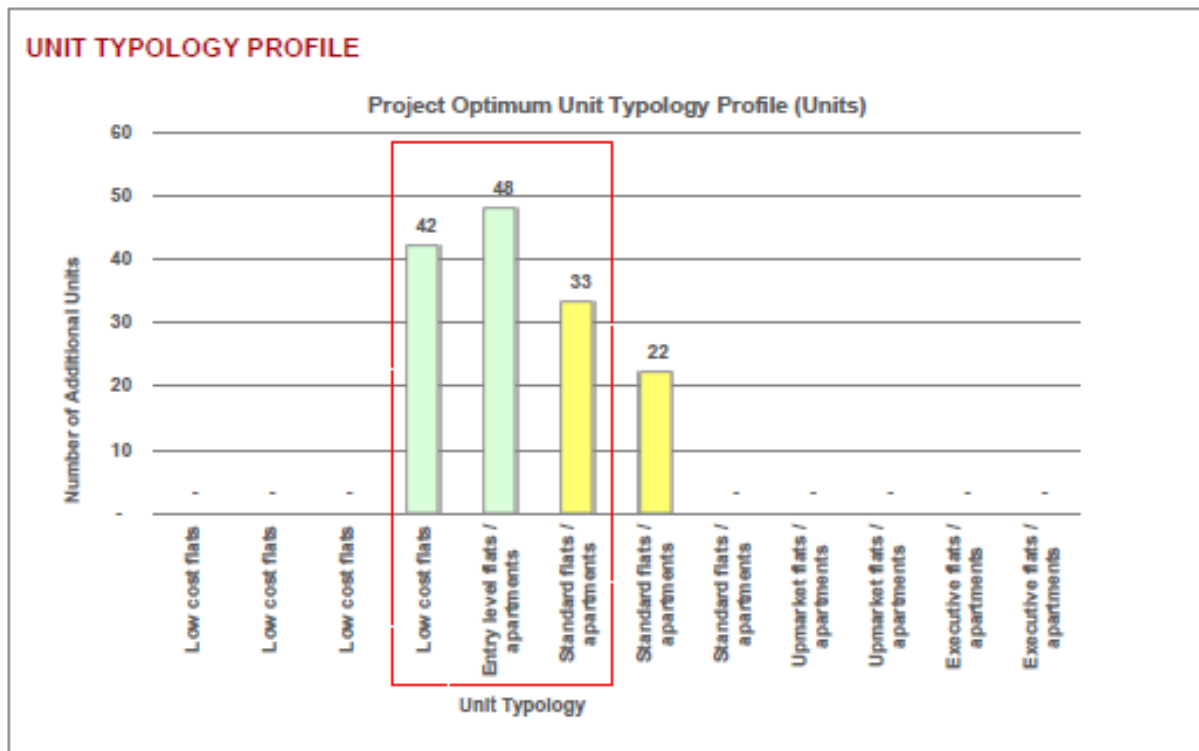


Figure 14: Unit typology profile

6.6.2 Unit pricing profile

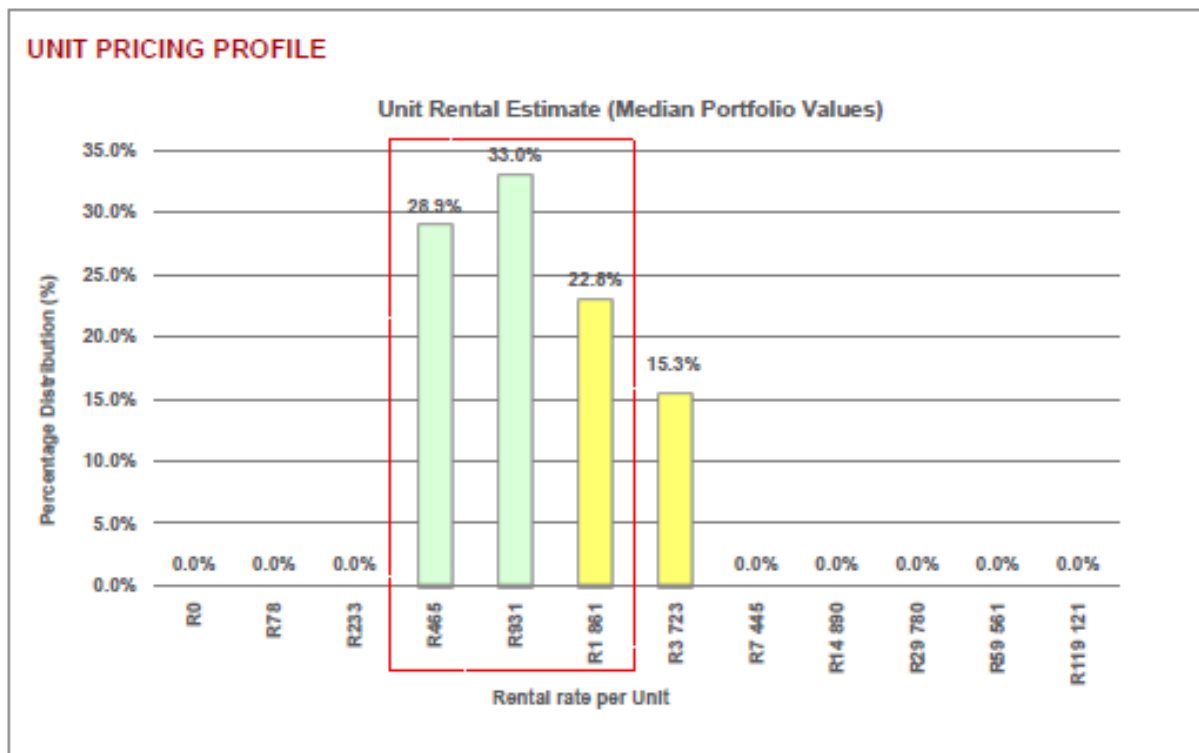


Figure 15: Unit pricing profile

6.6.3 Social Housing Demand

Table 6: Social housing demand

Total Market			
Additional HH: base yr + 5yrs			3 951
Annualised Market growth (full housing spectrum)			790
Social Segment			46.4%
Social Housing demand per annum			367
Annual secondary market contribution (units / annum)		Min	61
		Max	101
Total Social Housing Market take-up		Min	428
		Max	468
Project Specific			
Project Social Housing units			145
Forecast market share of total market sales		Min	10%
		Max	20%
Project forecast total annual take-up rate (units / annum)		Min	43
		Max	94
Years to 80% take-up (Social Housing units)		Min	1.5
		Max	3.4
		Avg	2.5

6.6.4 Recommendations

In terms of residential demand with particular focus on the social housing market, the following recommendations are made for the Bonela pilot project site:

- Core target market:
 - Low income households
- Potential Size:
 - Demand for 145 social units
- Potential configuration:
 - Medium density
 - Three to four Storey walk-up units
- Price Profile
 - R300 000 to R800 000 per dwelling unit
- Phasing
 - Single phase project

- Optimum point of market entry
 - Suggested to be 2018 and beyond

7 Environmental assessment

7.1 Activity Information

7.1.1 Project Description

The proposed development at this site is a high density residential area, complemented by parking, internal access roads, and landscaping. The site could be externally accessed from the eastern side, i.e. from Candella Road, or from the south through Westmeath Avenue. The site consists of four erven, all of which are vacant. The northern half of the site (A) is separated from the southern half (B), (C), and (D) by Raymond Place (**Error! Reference source not found.**). Erven A, B and C were overgrown on the day of the site visit; erf D was cleared, and had column reinforcement rebar protruding from the ground – remnants of an abandoned construction project.

The total project-area is approximately 1.99 hectares.

7.1.2 Alternatives

The Bonela pilot site was evaluated along with various others in the Bonela / Westville sub-region with potential to accommodate high-density residential developments. Other sites were excluded based on various criteria such as accessibility and the availability of the land.

7.1.3 Activity Description / Legal Framework

Table 7 includes the Listed Activities that could be triggered by the proposed development in terms of the Listing Notices of 2014, and as amended in 2017: GN R 983 (Listing Notice 1, requiring a BA), GN R 984 (Listing Notice 2, requiring an EIA), and GN R 985 (Listing Notice 3, requiring a BA).

Table 7 | Listed activities triggered by the proposed development

Activity Number	Description	Project Application
GN R 983, 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	The area proposed for development is approximately 1.99 hectares in size. Vegetation will have to be cleared prior to the commencement of construction.
GN R 985, 12 d. iv.	The clearance of an area of 300 square metres or more of indigenous vegetation within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA.	<p>The project site is located within the <i>KwaZulu-Natal Coastal Belt Grassland</i> Critically Endangered ecosystem.</p> <p>The following must be kept in mind:</p> <p><i>“It is important to note that while the original extent of each listed ecosystem has been mapped, a basic assessment report in terms of the EIA regulations is triggered only in remaining natural habitat within each ecosystem and not in portions of the ecosystem where natural habitat has already been irreversibly lost.”</i> (SANBI, 2011)</p> <p>Therefore, if it can be shown that the ecosystem as it is now has been changed over time, this listed activity will not be triggered. Aerial photography or other appropriate methods can be employed to show whether the natural habitat was indeed destroyed, and that the <i>status quo</i> is not representative thereof.</p>

7.1.4 Activity Position

Latitude (S)			Longitude (E)		
29°	50'	36.84"	30°	57'	43.36"

7.1.5 Physical Size of the Activity

The site is approximately 19 895 m² in extent. Erf A is approximately 11 735 m²; erf B 1 600 m², erf C 2 680 m², and erf D 3 880 m².

7.1.6 Site Access

Does ready access to the site exist?

YES ✓	NO
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7.1.7 Need and Desirability of the Activity

The Strategic Spatial Planning Branch of the DPEMU in the eThekweni Municipality intends to create greater residential density in appropriate locations to ensure sustainable resource use and the creation of sustainable human settlements in response to increasing development pressures. To ensure that densification takes place in the most appropriate locations, the development is proposed within serviced, existing or older suburbs.

7.1.8 Applicable Legislation and Policies

A review of South African legislation, policy, guidelines, strategies and standards that have potential relevance to the proposed development is shown in Table 8.

Table 8 | Table of applicable legislation, policies and guidelines to the proposed Bonela pilot site development

Title of Legislation, Policy or Guideline	Administering Authority	Date
EIA Regulations, 2014 (GN: R 982, 983; 984 and 985) Activities in Listing Notice 1 and 3 are triggered by the Bonela site.	Department of Environmental Affairs	2014, amended in 2017
National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA)	Department of Environmental Affairs	1998
National Water Act, 1998 (Act No.36 of 1998) (NWA) This activity will apply if a WUL is required.	Department of Water Affairs	1998
SANS 10103: The Measurement and Assessment of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication	South African Bureau of Standards	2003
National Building Regulations and SANS 10400	Department of Trade and Industry	2010
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)	South African Heritage Resource Agency	1999
KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008)	Amafa / Heritage KwaZulu-Natal	2008

Title of Legislation, Policy or Guideline	Administering Authority	Date
KwaZulu-Natal Planning and Development Act, 2008 (Act No. 6 of 2008)	KwaZulu-Natal Planning and Development	2011
National Development Plan	National Planning Commission	2011
2035 KwaZulu-Natal Provincial Growth and Development Strategy	Provincial Planning Commission	2016
eThekweni Municipal By-Laws	eThekweni Municipality	
eThekweni Municipality Spatial Development Framework 2017/2018 – 2021/2022	eThekweni Municipality	2017

7.1.9 Waste, Effluent, Emission and Noise Management

Solid Waste Management					
Will the activity produce solid construction waste during the construction/initiation phase?	YES ✓	NO			
If yes, what estimated quantity will be produced per month?	>10 m ³				
Liquid Effluent					
Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO ✓			
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	NO ✓			
If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.					
Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO ✓			
Emissions into the Atmosphere					
Will the activity release emissions into the atmosphere? The emissions expected are associated with the construction phase.	YES ✓	NO			
If yes, is it controlled by any legislation of any sphere of government?	YES	NO ✓			
Generation of Noise					
Will the activity generate noise? The noise expected is associated with the construction phase.	YES ✓	NO			
If yes, is it controlled by any legislation of any sphere of government?	YES	NO ✓			
Water Use					
Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):					
Municipal ✓	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
It is assumed that municipal water will be used at the proposed development. If groundwater abstraction for use in the non-residential areas of the development is considered, a WUL might be required.					

7.2 Site / Area / Property Description

The Bonela pilot site is bordered to the north by Bonela Primary School. Erf A is in the northern half of the site, and is overgrown with dense vegetation (Figure 16).

To the east of the site lies Candella Road and a residential area with some small shops (Figure 17).

Erven B and C are overgrown with dense vegetation as well (Figure 18). Erf D, on the southernmost part of the site, has been cleared of most vegetation, has had excavations done and column reinforcement rebar installed as part of abandoned construction project (Figure 19).

West of the site are residential areas (west of the northern half) and a sports field (west of the southern half).

The site is bordered to the south by Westmeath Avenue and residential areas.



Figure 16 | View of erf A from Raymond Place



Figure 17 | View of Candella Road and residential area to east



Figure 18 | View of the southern half of the site (erven B and C) on the right (photographer is standing in Raymond place)



Figure 19 | View of erf D, the southernmost part of the site

7.2.1 Indicate the General Gradient of the Site

Flat	1:50 – 1:20 ✓	1:20 — 1:15	1:15 — 1:10	1:10 — 1:7.5	1:7.5 — 1:5	Steeper than 1:5
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7.2.2 Location in Landscape

Ridgeline	Plateau	Side-slope of hill/mountain	Closed valley	Open valley	Plain ✓	Undulating plain/low-hills	Dune	Sea-front
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Groundwater, Soil and Geological Stability of the Site

Shallow water table (less than 1.5m deep)	YES	NO ✓
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Dolomite, sinkhole or doline areas	YES	NO ✓
From the Council for Geoscience's Simplified Geology Map (Council for Geoscience, 2003), it appears the area is underlain either by the Dwyka and Ecca Group or Cape Supergroup and Natal Groups. However, the underlying geology of the proposed site will have to be confirmed through a specialist investigation, presumably as part of pre-engineering geotechnical investigations.		
Seasonally wet soils (often close to water bodies)	YES	NO ✓
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓
Dispersive soils (soils that dissolve in water)	YES	NO ✓
Soils with high clay content (clay fraction more than 40%)	YES	NO ✓
Any other unstable soil or geological feature	YES	NO ✓
An area sensitive to erosion	YES ✓	NO
Erf D is sensitive to erosion due to its lack of vegetative cover.		

7.2.3 Groundcover

Natural veld – good condition^E	Natural veld with scattered aliens ^E ✓	Natural veld with heavy alien infestation^E	Veld dominated by alien species^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure ✓ Column reinforcement rebar is present on erf D.	Bare soil ✓ Erf D has been cleared.

7.2.4 Land Use Character of Surrounding Area

The land uses within 500 m of the proposed development are listed in Table 9, according to the DEDTEA BA template.

Table 9 | Land uses within 500 m from the proposed Westcliff pilot site

Land use character			Description
Natural area	YES ✓	NO	Some undeveloped areas are present approximately 50 m to the west, 250 m north, and 500 m northeast of the site.
Low density residential	YES	NO ✓	
Medium density residential	YES ✓	NO	There are medium density residential zones west, south and north of the site.
High density residential	YES ✓	NO	High density residential areas exist approximately 350 m southeast of the site.
Informal residential	YES	NO ✓	
Retail commercial and warehousing	YES ✓	NO	Various retail activities occur west, south and east of the site.
Light industrial	YES	NO ✓	
Medium industrial	YES ✓	NO	Umgeni Water Wiggins Water Works is located approximately 430 m southwest of the site.

Land use character			Description
Heavy industrial	YES	NO ✓	
Power station	YES	NO ✓	
Office/consulting room	YES	NO ✓	
Military or police base/station/compound	YES	NO ✓	
Spoil heap or slimes dam	YES	NO ✓	
Quarry, sand or borrow pit	YES ✓	NO	A borrow pit is located approximately 550 m east of the site.
Dam or reservoir	YES	NO ✓	
Hospital/medical centre	YES	NO ✓	
School/ creche	YES ✓	NO	Two schools are located within 500 m of the site, namely <i>Bonela Primary School</i> directly north of the site, and <i>Bonela Secondary School</i> approximately 380 m west of the site.
Tertiary education facility	YES	NO ✓	
Church	YES ✓	NO	<i>Maha Shakti Chandi Durga Temple, Masjid Umar Farooq Bonela, and Rasool Masjid Madressah & Darul Uloom</i> are located within 500 m of the site.
Old age home	YES	NO ✓	
Sewage treatment plant	YES	NO ✓	
Train station or shunting yard	YES	NO ✓	
Railway line	YES	NO ✓	
Major road (4 lanes or more)	YES ✓	NO	The N3 highway is located north and west of the site, with a major intersection northwest of the site.
Airport	YES	NO ✓	
Harbour	YES	NO ✓	
Sport facilities	YES ✓	NO	A soccer field is located west of the site.
Golf course	YES	NO ✓	
Polo fields	YES	NO ✓	
Filling station	YES	NO ✓	
Landfill or waste treatment site	YES	NO ✓	
Plantation	YES	NO ✓	
Agriculture	YES	NO ✓	
River, stream or wetland	YES	NO ✓	
Nature conservation area	YES	NO ✓	
Mountain, hill or ridge	YES	NO ✓	
Museum	YES	NO ✓	
Historical building	YES	NO ✓	

Land use character			Description
Protected Area	YES	NO ✓	
Graveyard	YES ✓	NO	Mayville Cemetery is located approximately 320 m southeast of the site.
Archaeological site	YES	NO ✓	
Other land uses (describe)	YES	NO ✓	

7.2.5 Cultural / Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?	YES	NO ✓
Will any building or structure older than 60 years be affected in any way?	YES	NO ✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO ✓

In terms of Section 38 of the NHRA, the provincial heritage resources agency, Amafa / Heritage KwaZulu-Natal, must be notified of the proposed development if any of the following conditions apply:

“(1)...any person who intends to undertake a development categorised as–

- a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;**
- b) the construction of a bridge or similar structure exceeding 50 m in length;*
- c) any development or other activity which will change the character of a site—**
 - (i) exceeding 5 000 m² in extent; or**
 - (ii) involving three or more existing erven or subdivisions thereof; or**
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- d) the re-zoning of a site exceeding 10 000 m² in extent; or**
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,*

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”

Sub-section (c) (i) and (d) apply in this case, as the site proposed for development exceeds both areal thresholds specified. Sub-section (a) will also apply if an access road, or pipelines or canals for stormwater management of more than 300 m is to be constructed. Sub-section (c) (ii) applies, as the site consists of four existing erven.

Amafa will then notify the applicant (legislated by a 14-day period) whether an HIA is required.

Palaeontology

The Palaeontological Sensitivity Map provided on the SAHRIS electronic database indicates that the proposed Bonela pilot site lies predominantly an area of low sensitivity. The southern edge of the site falls within a moderately sensitive area (requiring a PDS). Per the communication on areas of “low sensitivity”

discussed in Section **Error! Reference source not found.** (Palaeontology), a PDS is, therefore, required for the entire site.

7.3 Key environmental issues

The following features were noticed during the site visit:

- Waste is dumped and burnt on erven B and C (Figure 20), despite a sign prohibiting it (Figure 21).
- Erf D is not access controlled (Figure 22). It poses a risk to the local community, especially children who walk home from Bonela Primary just north of the site due to construction waste, an empty container (Figure 23), column reinforcement rebar protruding from the ground, water pooling in foundation excavations, and a fill risk presented by the excavations.
- Litter is dumped on erf D.
- There are no erosion mitigating measures on erf D. Consequently, erosion rills have formed on its northern and western side slopes (Figure 26). Runoff from areas of higher elevation runs through the site and further erodes the area due to the lack of vegetative cover (Figure 27).



Figure 20 | Waste dumped and burnt on erven B and C



Figure 21 | The sign prohibiting illegal dumping of waste, with waste underneath, on erf B and C



Figure 22 | View of Candella Road from erf D, showing easy access on the right, and construction waste on the left



Figure 23 | Abandoned container on erf D



Figure 24 | Column reinforcement rebar protruding from excavations, posing a fall- and drowning risk



Figure 25 | Litter and construction waste in one of the excavations on erf D



Figure 26 | Rill erosion on side slopes west of erf D, on the left



Figure 27 | Erosion caused by the lack of vegetative cover and energy dissipating measures north of erf D

7.4 Public Participation Process

The Public Participation Process (PPP) should be guided by Chapter 6 of the NEMA EIA Regulations GN R 982 (2014), Sections 39 to 44. A PPP requires that all information that could reasonably affect the decision of the competent authority (DEDTEA, in this case) to grant or refuse an EA, must be provided to:

- The competent authority;
- Any state department that administers a law relating to the application (e.g. Amafa);
- Any organs of state, which have jurisdictions in respect of the proposed activity (e.g. entities that would need to provide electrical, water, waste removal, or telecommunications services to the proposed developments); and
- All potential Interested and Affected Parties (I&APs), including neighbouring landowners.

All of the abovementioned parties must be given an opportunity of at least 30 calendar days to comment on the proposed development's BA report, by the legislated measures (including newspaper advertisements, site notices, and written notification), as well as any other appropriate measures, to contribute to, or ask questions about the proposed development.

7.5 Conclusions

The required environmental permitting for the establishment of high density residential developments on in Bonela in Central eThekweni was assessed. It was found that:

- A BA would be required for the site, due to the proposed development triggering listed activities in Listing Notices 1 and 3 (GN R 983 and GN R 985).
- The provincial heritage authority, Amafa, would have to be notified of the proposed developments. Amafa might respond with a requirement to conduct an HIA for some or all the sites. A PDS is required for the three pilot sites.
- The site had litter scattered on them, potentially due to poor waste management in these areas, and the fact that the areas are not access controlled. This indicates a need for additional waste management capacity if these areas are to be further densified.
- The site is located close to other residential areas, schools, and places of worship. Therefore, these parties would have to be included in the PPP I&AP database during the BA-process, as they could be affected by the noise and dust caused during construction activities.
- Erf D of the Bonela site poses various safety hazards, made worse by the fact that it can be accessed at any time by anyone, and the fact that Bonela Primary is located just north of the site, from where pupils walk home and pass the site. The establishment of a residential area at this site particularly will likely reduce these safety risks, if all mitigation measures of environmental impacts caused by the developments are implemented.

8 Transport Impact Assessment

8.1 Site Investigation

A description of the road network within the study area most likely to be affected by this proposed development is presented below. During the site visit no adverse road safety or traffic conditions were observed during the respective peak hours.

8.1.1 Candella Road



Candella Road is a 2-lane single carriageway road. There are sidewalks located along this road in both directions in the vicinity of the site for this proposed residential development. There are street lights on the eastern side of this road. There are speed humps located along Candella Road in the vicinity of the site for this proposed residential development. There are no public transport facilities along this road. The speed limit along Candella Road is 60km/h. Candella Road is mostly straight with a sharp horizontal curve in the vicinity of the site. The road has moderate vertical curves in the vicinity of the site.

8.1.2 Raymond Place



Raymond Place is a 2-lane single carriageway road that ends in a cul-de-sac 100m from its intersection with Candella Road. This road is very narrow with 2.7m wide lanes. There are no sidewalks along this road but there are street lights along one the southern side of this road in the vicinity of the proposed site access. No public transport facilities are located along this road. The speed limit along Raymond Place is 40km/h. Raymond Place is straight and relatively flat in the vicinity of the site.

Raymond Place intersects with Candella Road under yield control with Candella Road being the major through road.

8.1.3 Westmeath Avenue



Westmeath Avenue is a 2-lane single carriageway road. There is a sidewalk on the southern side of this road and street lights along the northern side of this road in the vicinity of the proposed site access. No public transport facilities are located along this road. There is a speed hump on this road near its intersection with Candella Road. The speed limit along Westmeath Avenue is 60km/h. Westmeath Avenue has moderate horizontal and vertical curves in the vicinity of the site.

Westmeath Avenue intersects with Candella Road, opposite Eskotene Grove, under stop control with Candella Road being the major through road.

8.1.4 Wiggins Road



Wiggins Road is a 2-lane single carriageway main road. There is a sidewalk along the southern side of this road and street lights along the northern side of this road. Public transport facilities are located along this road. The speed limit along Wiggins Road is 80km/h. Wiggins Road has large horizontal curves and has moderate vertical curves in the vicinity of the site.

Wiggins Road intersects with Candella Road at a signalized intersection with localised widening. The north, east and west approaches have short right turn lanes. The west approach has an additional short shared left and through lane. The east approach has a short slip lane.

8.2 Traffic Demand Estimation

8.2.1 Assessment Years and Hours

For the maximum impact scenario of the proposed social housing residential development, the weekday AM and PM peak hours will be analysed further in this TIA. This will then cover the commuter traffic during the weekday AM and PM peak hours.

The maximum potential trip generation of the proposed residential development during the above peak periods will be less than 1 000 veh/h and therefore a design horizon year of 5 years (2023) needs to be assessed in terms of the eTA Manual for Traffic Impact Assessments and Site Traffic Assessments.

8.2.2 Traffic Counts

The existing traffic volumes on the surrounding road network immediately surrounding the site were obtained from classified traffic counts undertaken by Bala Survey and Research at the following intersections, on Thursday, 8 February 2018:

- Candella Road / Raymond Place
- Candella Road / Westmeath Avenue and Eskotene Grove
- Candella Road / Wiggins Road

The traffic counts were undertaken from 06:00 to 18:00, recording all movements by vehicle type. An analysis of the traffic counts revealed that the weekday AM peak hour on this road network occurred from 06:30 to 07:30 and the weekday PM peak hour occurred from 16:45 to 17:45, both of which are typical peak commuter periods for a weekday commuter morning and afternoon. The results and analysis of the traffic counts are contained in Appendix B to this report. The existing weekday AM and PM peak hour traffic volumes on the surrounding road network are shown on Figure 28 below.

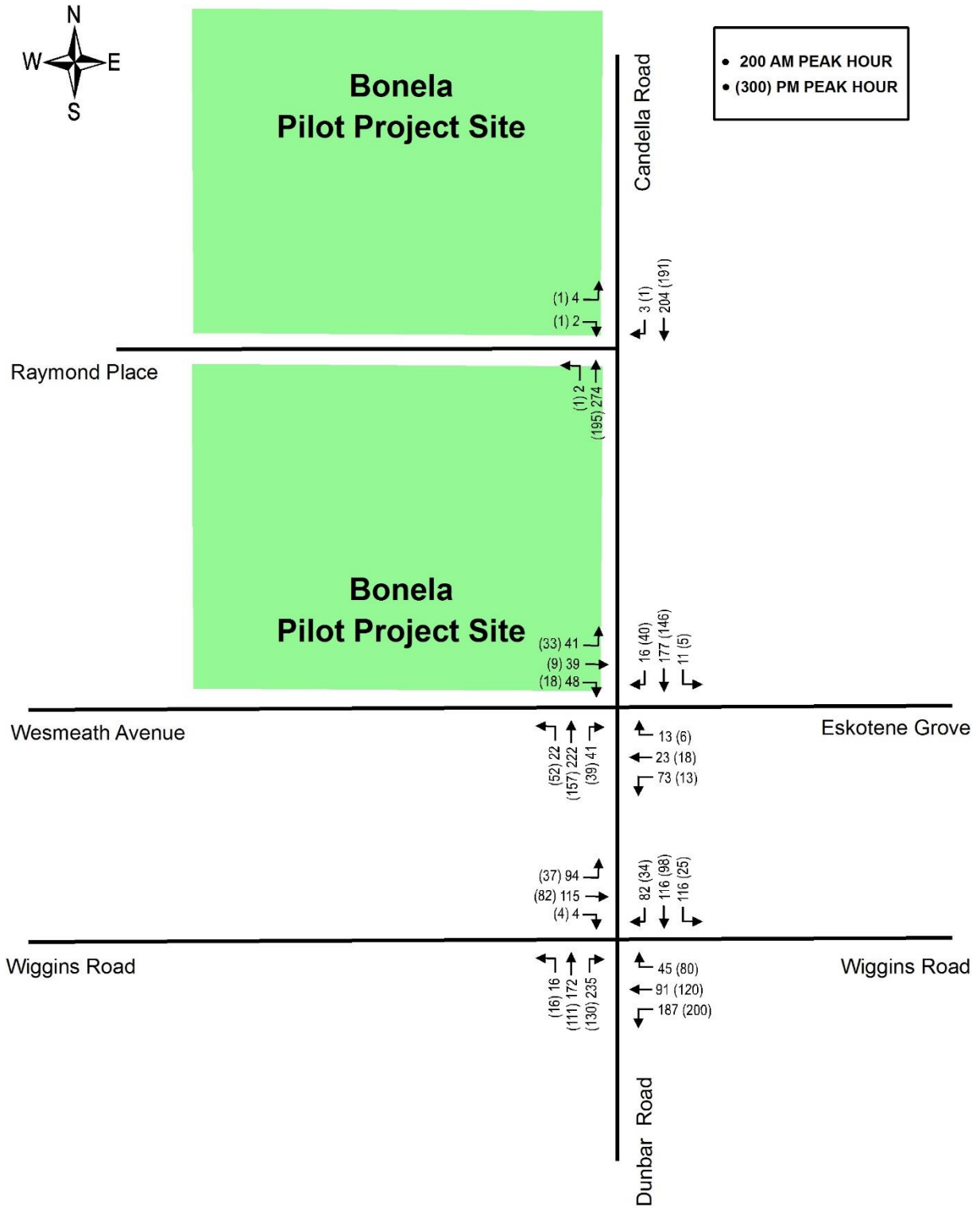


Figure 28: Existing Weekday AM & PM Peak Hour Traffic Volumes

8.2.3 Traffic Growth Rates

In order to assess the 5-year design horizon the existing background peak hour traffic needs to be factored up by a specified growth rate from 2018 to 2023. The Bonela area has the potential to develop further and traffic volumes in this area could therefore increase if more development occurs in the Bonela area in the future.

Consequently, the area is deemed to be at the top end of the average growth rate and hence a 3% per annum growth rate as indicated in the eTA Manual for Traffic Impact Assessments and Site Traffic Assessments is considered reasonable for the roads expected to be affected by the traffic generated by the proposed Bonela pilot residential development.

The existing traffic volumes were thus factored up by a compound growth rate of 3% to a 2023 5-year design horizon.

8.2.4 Trip Generation by Other Approved Developments

There are no known other approved developments in the area that are expected to be developed in the vicinity of the proposed Bonela pilot project site within a similar time frame that could have an impact on the traffic conditions within the study area.

8.3 2023 Analysis without Development Generated Traffic

The SIDRA computer software package was used to analyse the design year traffic conditions with and without development generated traffic at the intersections within the study area. The underlying objective of intersection analysis is to quantify the performance of an intersection with regard to specified traffic volumes and environmental conditions. This traffic operational performance can be measured in terms of 'Level of Service' (LOS). Six levels of service exist, ranging from A to F. LOS A represents the best operating conditions (free-flow conditions and no delay or congestion) whereas LOS F represents the worst, (breakdown conditions with congestion and very high delays). LOS D is deemed the minimum acceptable level of service.

The legend hereafter is used to depict the LOS of each movement at the intersections.



The results of these analyses are presented below with the details contained in Appendix C to transport report.

The 2023 5-year design horizon background traffic is shown in Figure 29 below.

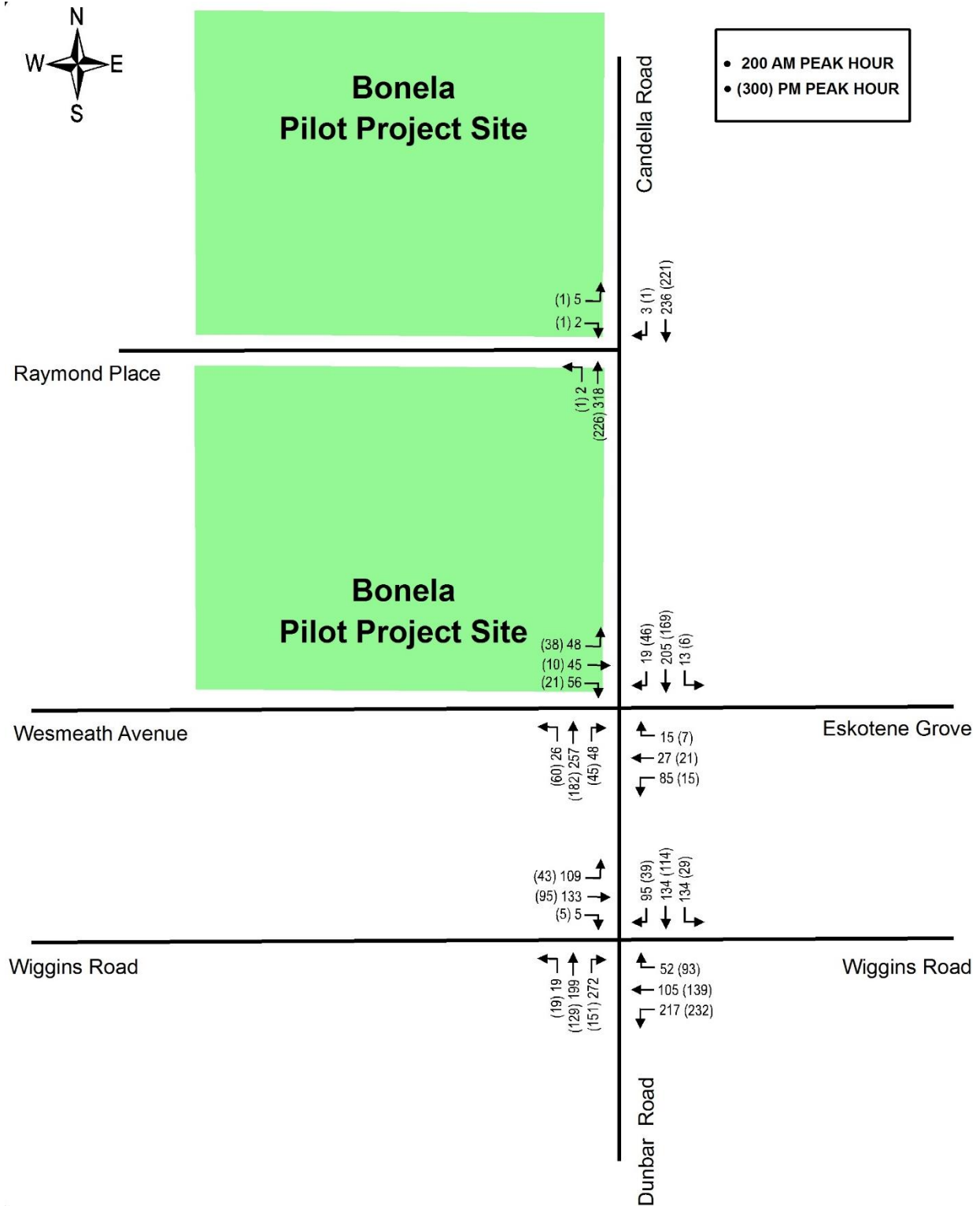


Figure 29: 2023 Design Year Peak Hour Traffic Volumes without Development Generated Traffic

8.3.1 Candella Road / Raymond Place Intersection

The intersection configuration used for this analysis and the Levels of Service (LOS) for the analysis of the forecast 2023 traffic volumes at this intersection are shown in Table 10 hereafter:

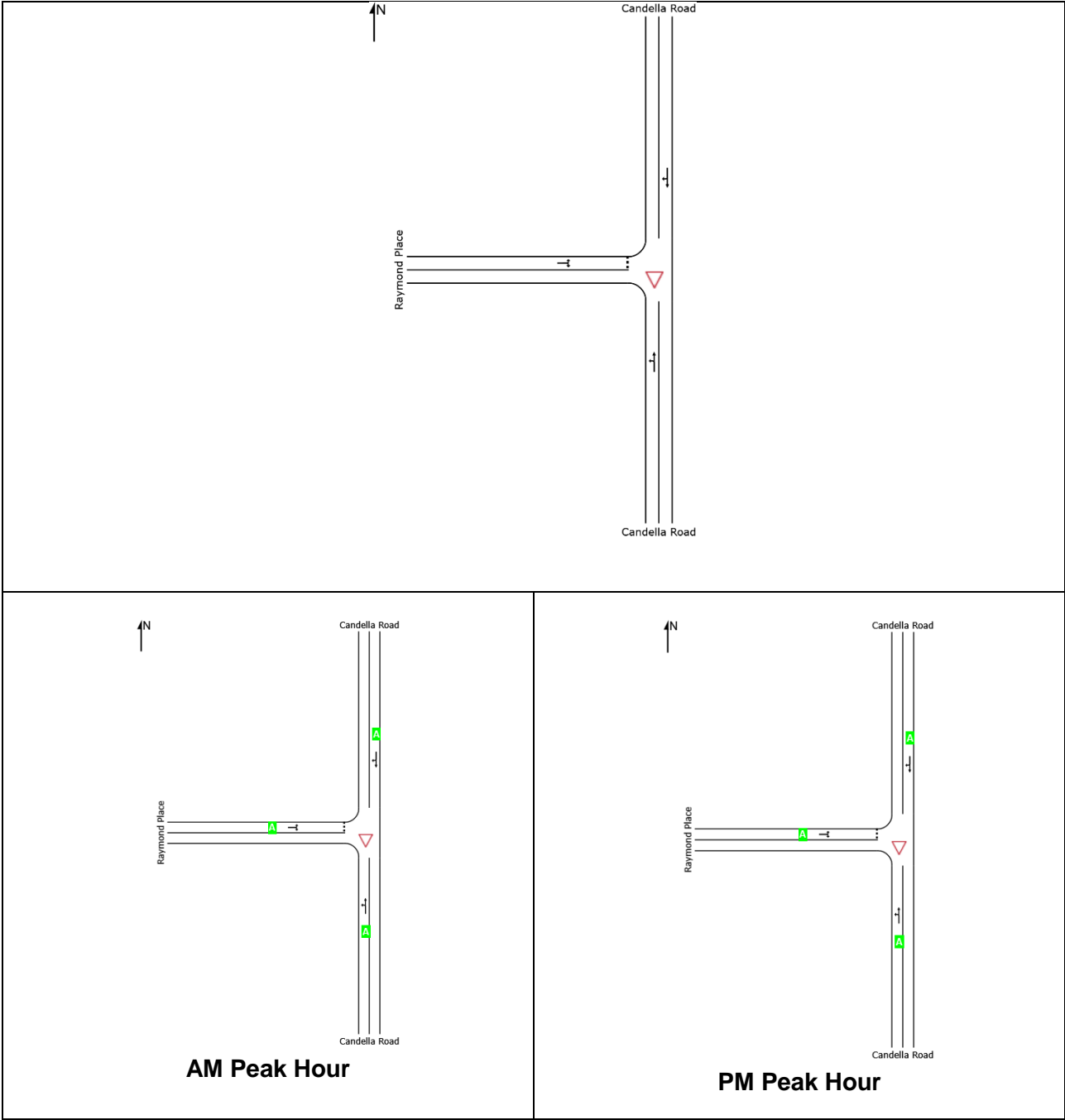


Table 10: Design Year without Development Generated Traffic – Candella Rd / Raymond PI

From the SIDRA results, it is evident that this intersection will operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 0.2 seconds and 0.1 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 0.2 metres and 0.1 metres during the AM and PM peak hours respectively. No upgrades are required at this intersection for the forecast 2023 traffic volumes without any development generated traffic.

8.3.2 Candella Road / Westmeath Avenue Intersection

The intersection configuration used for this analysis and Levels of Service (LOS) for the analysis of the forecast 2023 traffic volumes at this intersection are shown in Table 11 hereafter:

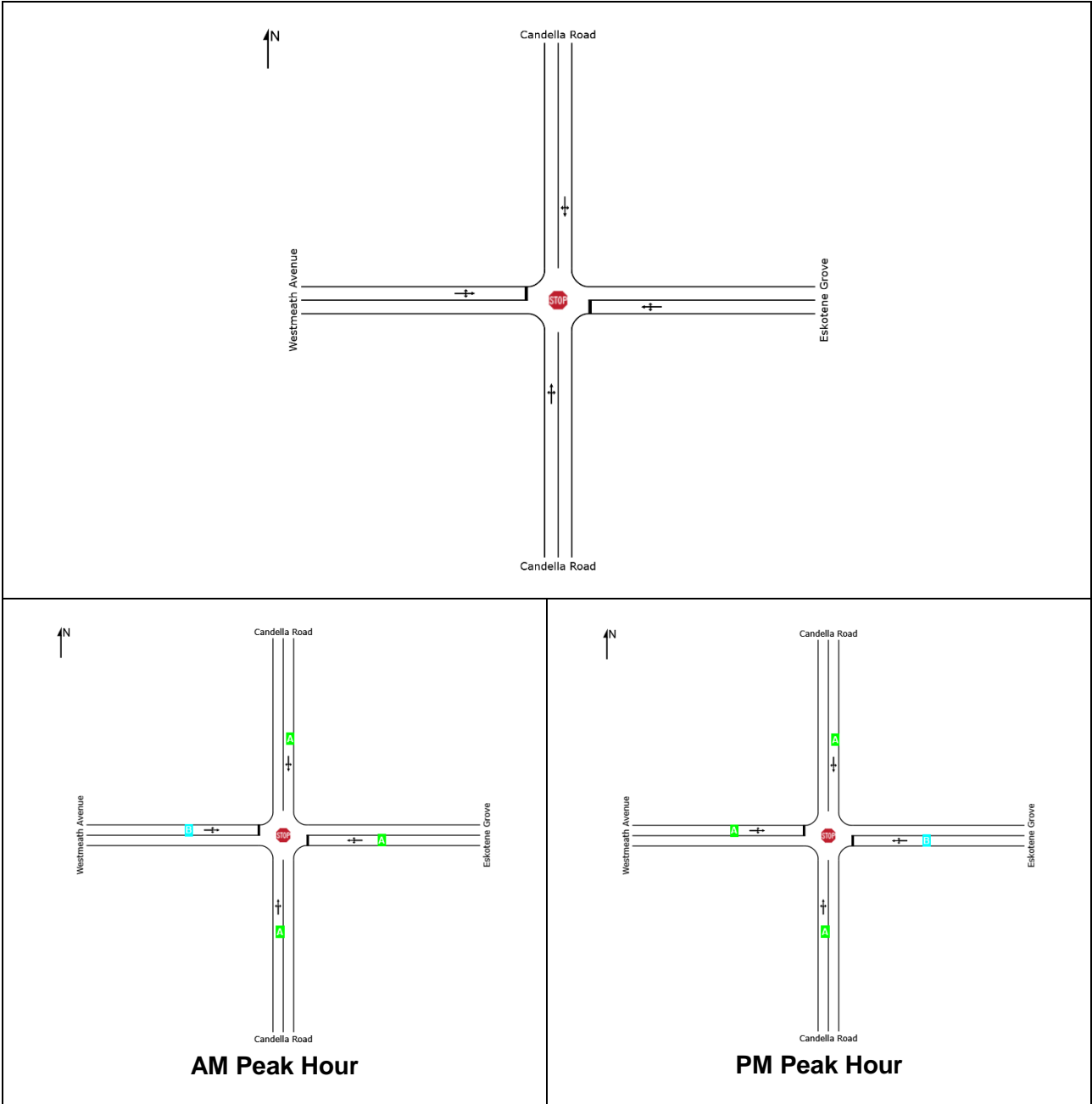


Table 11: Design Year without Development Generated Traffic – Candella Rd / Westmeath Ave

From the SIDRA results, it is evident that this intersection will operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 4.4 seconds and 3.5 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 6.2 metres and 2.8 metres during the AM and PM peak hours respectively. No upgrades are required at this intersection for the forecast 2023 traffic volumes.

8.3.3 Candella Road / Wiggins Road Intersection

The following intersection configuration used for this analysis and Levels of Service (LOS) for the analysis of the forecast 2023 traffic volumes at this intersection are shown in Table 12 hereafter:

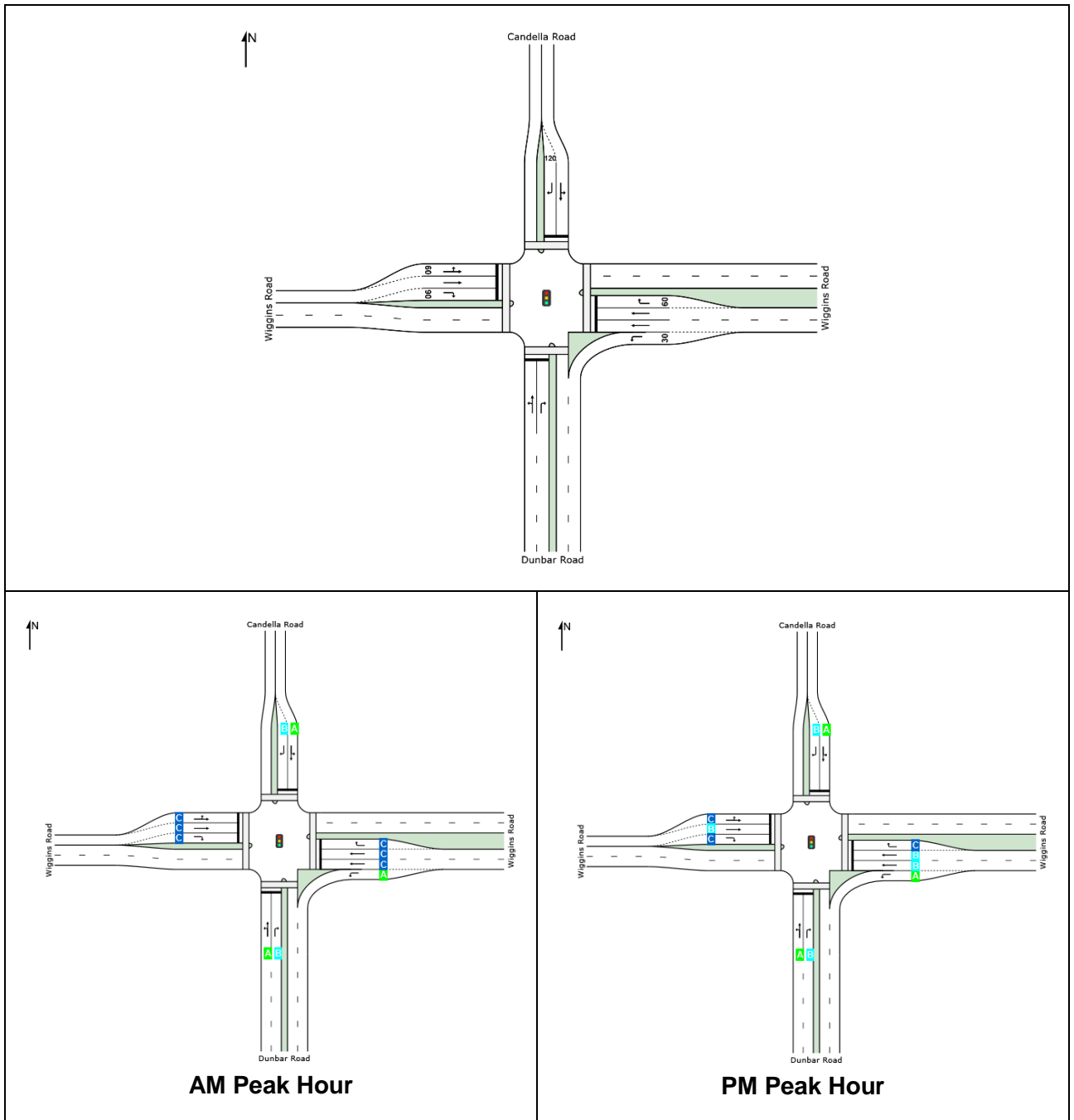


Table 12: Design Year without Development Generated Traffic – Candella Rd / Wiggins Rd

From the SIDRA results, it is evident that this intersection will operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 13.1 seconds and 12.6 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 28.3 metres and 17.8 metres during the AM and PM peak hours respectively. No upgrades are required at this intersection for the forecast 2023 traffic volumes.

8.4 Existing Pedestrians and Public Transport

During the site visit pedestrian activity was observed along Wiggins Road in the vicinity of the site for the proposed residential development.

There are existing public transport facilities along Wiggins Road, however these facilities are 840 metres from the site of the proposed residential development. Taxis were observed along Candella Road and

Wiggins Road in the vicinity of the site. From the results of the traffic counts both Wiggins Road and Candella were confirmed as public transport routes. In Candella Road 12.7% of all the traffic in this road over the 12-hour survey period were buses and minibus taxis. Similarly, in Wiggins Road 33.0% of all the traffic in this road over the 12-hour survey period were buses and minibus taxis

8.5 Existing Road Safety

Sight distance conditions along all the roads in the vicinity of the proposed development are acceptable. However, it was observed that trees on the corner of the Raymond Place and Candella Road intersection do obstruct the shoulder sight distance from Raymond Place in both directions.

Traffic generally travels at acceptable speeds on the surrounding road network in the vicinity of the proposed development.

8.6 The Densification Development Proposals

The Bonela pilot project site is planned to consist of the following residential uses:

- Social Housing: 225 residential units

The main accesses for this proposed residential development is planned to be off Raymond Place to the north and the south.

The proposed development layout and location of accesses in Raymond Place are shown in Appendix A to this report.

8.7 Trip Generation Rates

Based on the intention to develop this site for social housing as described above, the weekday AM and PM peak hour trip generation rates as contained in the eTA Manual for Traffic Impact Assessments and Site Traffic Assessments have been used to calculate the maximum potential traffic that could be generated by this proposed development once the development is complete and occupied.

This manual gives the following peak hour trip generation rates and directional splits for Social Housing:

- Residential Dwelling Units:
 - Weekday AM Peak Hour – 1.3 veh/h two-way per unit with a 25:75 directional split
 - Weekday PM Peak Hour – 1.3 veh/h two-way per unit with a 70:30 directional split

8.8 Trip Generation Calculations

Based on the above trip generation rates, directional splits and the number of social housing units, the maximum potential trip generation for the proposed development, for the weekday AM and PM peak hours, is calculated in Table 13 below:

Land Use	Units	Trip Gen Rate	Total 2- way Trips	AM Peak Hour		PM Peak Hour	
				In	Out	In	Out
Residential Dwelling Units	225	AM: 1.3 trips/unit	293	73	219	205	88
		PM: 1.3 trips/unit	293				
TOTAL				73	219	205	88

Table 13: Maximum Potential Trip Generation by Peak Hour

Discounted Trips

This social housing development will fall under the category of low vehicle ownership and based on this a 40% discount for low vehicle ownership can be applied to the trips generated by the Residential Dwelling Units trip generation rate. The discounted trip generation for the proposed social housing development, for the weekday AM and PM peak hours, is calculated in Table 14 below:

Land Use	Units	Trip Gen Rate	Total 2- way Trips	AM Peak Hour		PM Peak Hour	
				In	Out	In	Out
Residential Dwelling Units	225	AM: 1.3 trips/unit	176	44	132	123	53
		PM: 1.3 trips/unit	176				
TOTAL				44	132	123	53

Table 14: Discounted Trip Generation by Peak Hour

8.9 Trip Distribution and Traffic Assignment

8.9.1 Trip Distribution

The distribution of the traffic generated by the proposed social housing development is expected to be in similar ratios to the distribution of the existing weekday AM and PM peak hour traffic travelling along all the roads and through all the intersections that are being analysed in this assessment. This distribution is also deemed to reflect the location of surrounding business and employment nodes for the residential units. This existing distribution pattern will therefore be used to assign the traffic generated by the proposed social housing development on the surrounding road network.

The distribution patterns for the traffic generated by the proposed social housing development is shown in Figure 4 below.

8.9.2 Trip Assignment

Based on the above distribution pattern, the maximum potential weekday AM and PM peak hour traffic expected to be generated by the proposed social housing development has been assigned onto the surrounding road network as shown in Figure 30 hereafter.

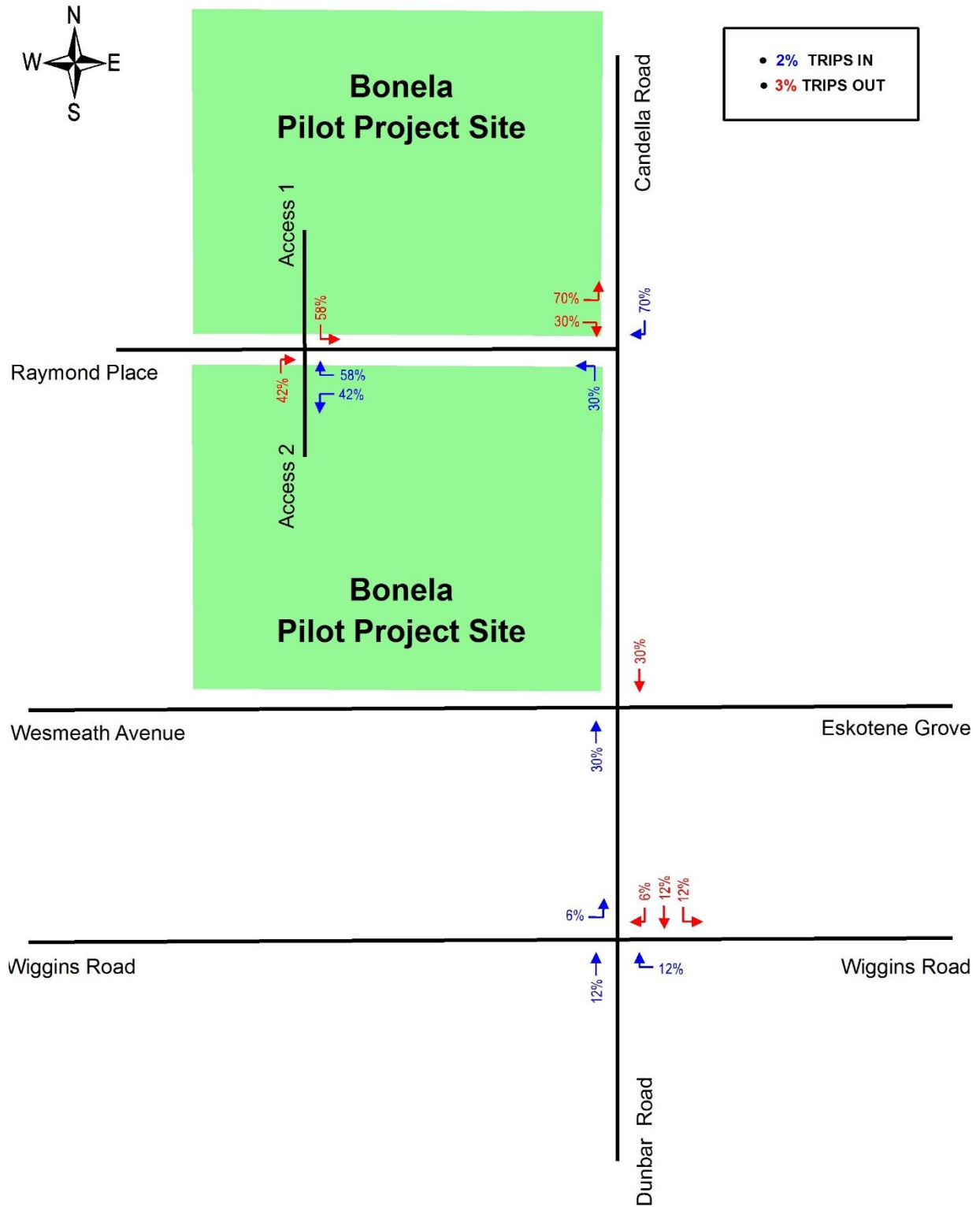


Figure 30: Trip Distribution

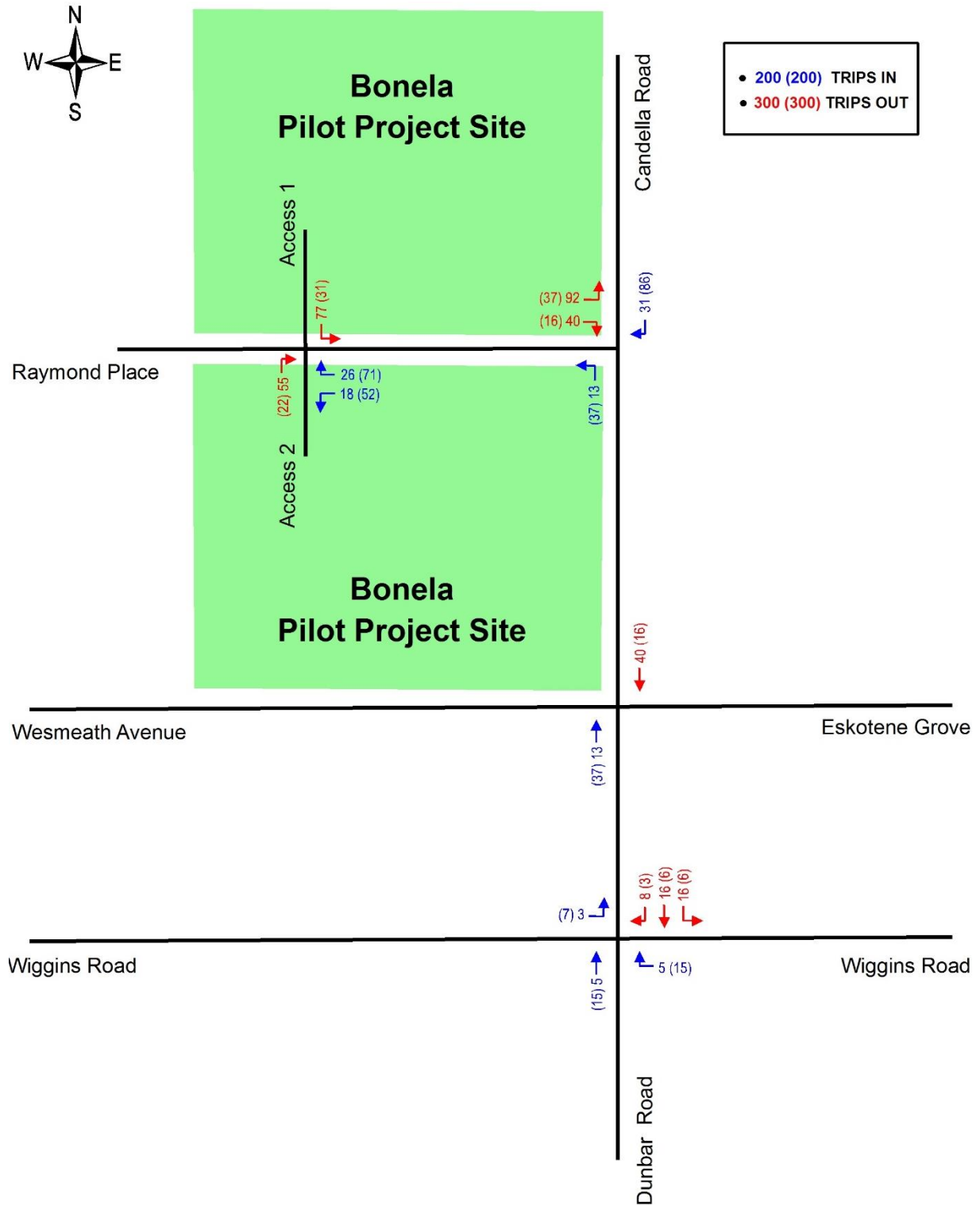


Figure 31: Trip generation

8.10 Traffic Impact Assessment

The following traffic impact assessment has been based on the 2023 Design Year weekday AM and PM peak hour traffic volumes shown in Figure 3 plus the maximum potential weekday AM and PM peak hour traffic expected to be generated by the proposed social housing development shown in Figure 5. The combined 2023 Design Year plus the social housing development generated weekday AM and PM peak hour traffic is shown in Figure 6 below. The results of these combined 2023 Design Year plus the social housing development generated weekday AM and PM peak hour traffic SIDRA analyses of these are contained in Appendix C.

8.10.1 Candella Road / Raymond Place Intersection

The intersection configuration used for this analysis and the Levels of Service (LOS) for the analysis of the forecast 2023 plus the development generated weekday AM and PM peak hour traffic are shown in Table 15 hereafter:

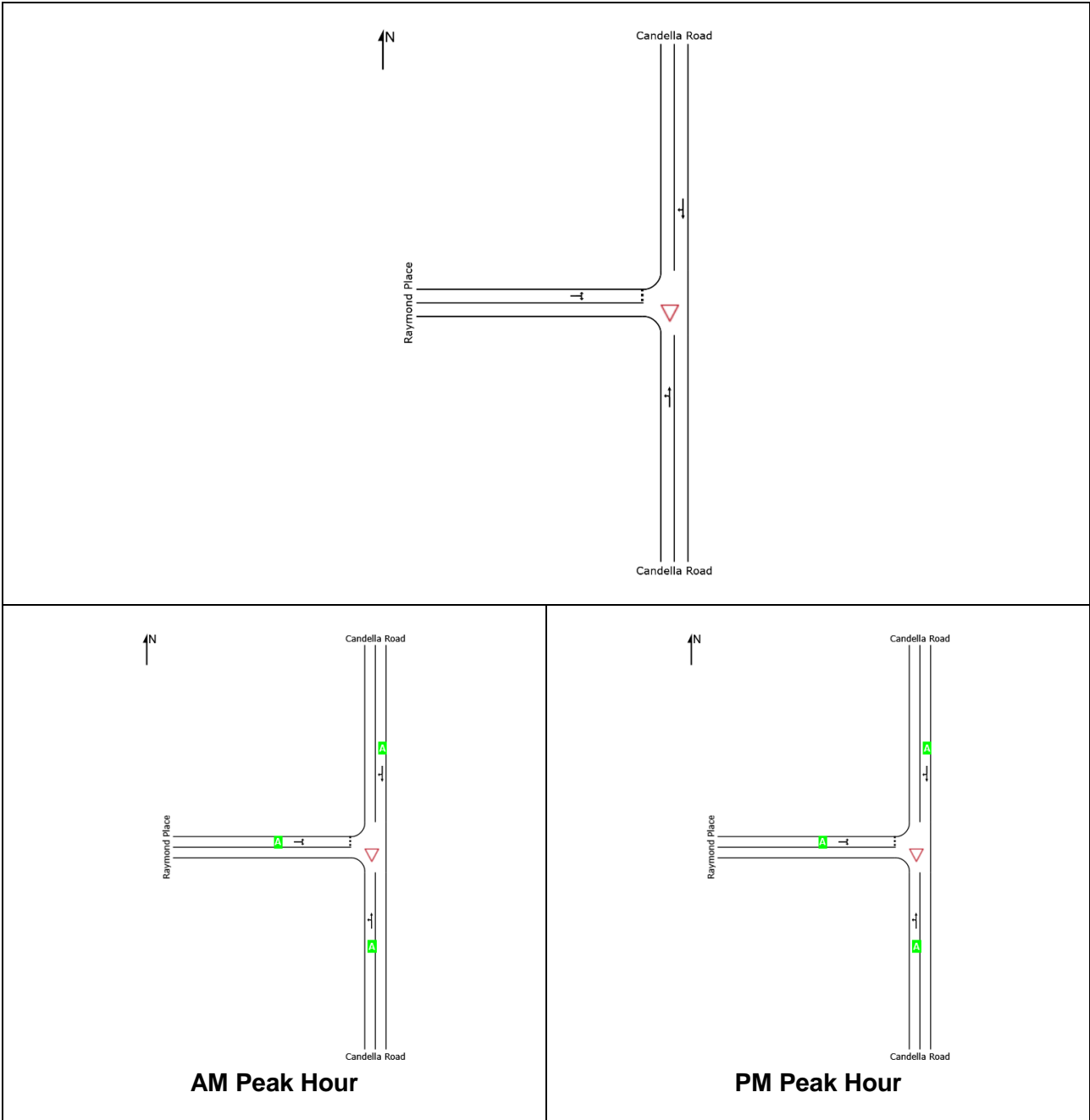


Table 15: Design Year with Development Generated Traffic – Candella Rd / Raymond PI

From the SIDRA results, it is evident that this intersection will still operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 1.9 seconds and 2.0 seconds during the AM and PM peak hours respectively.

The maximum queue lengths will be 3.6 metres and 4.5 metres during the AM and PM peak hours respectively. No upgrades are required to this intersection in order to accommodate the forecast 2023 plus the development generated traffic.

8.10.2 Candella Road / Westmeath Avenue Intersection

The intersection configuration used for this analysis and the Levels of Service (LOS) for the analysis of the forecast 2023 plus the development generated traffic are shown in Table 16 hereafter:

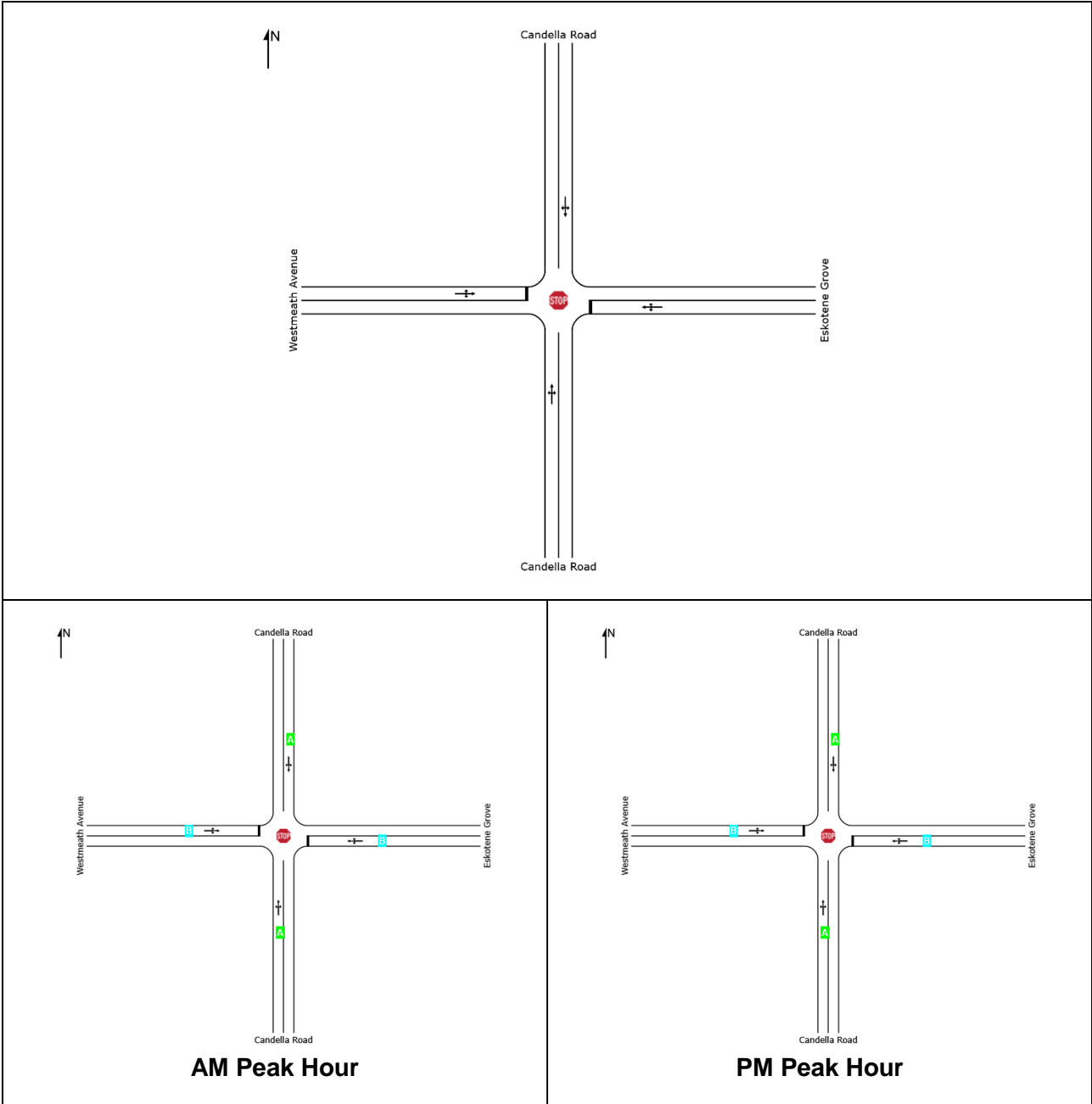


Table 16: Design Year with Development Generated Traffic – Candella Rd / Westmeath Ave

From the SIDRA results, it is evident that this intersection will still operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 4.4 seconds and 3.3 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 6.8 metres and 3.0 metres during the AM and PM peak hours respectively. No upgrades are required to this intersection in order to accommodate the forecast 2023 plus the development generated traffic.

8.10.3 Candella Road / Wiggins Road Intersection

The intersection configuration used for this analysis and the Levels of Service (LOS) for the analysis of the forecast 2023 plus the development generated traffic are shown in Table 17 hereafter:

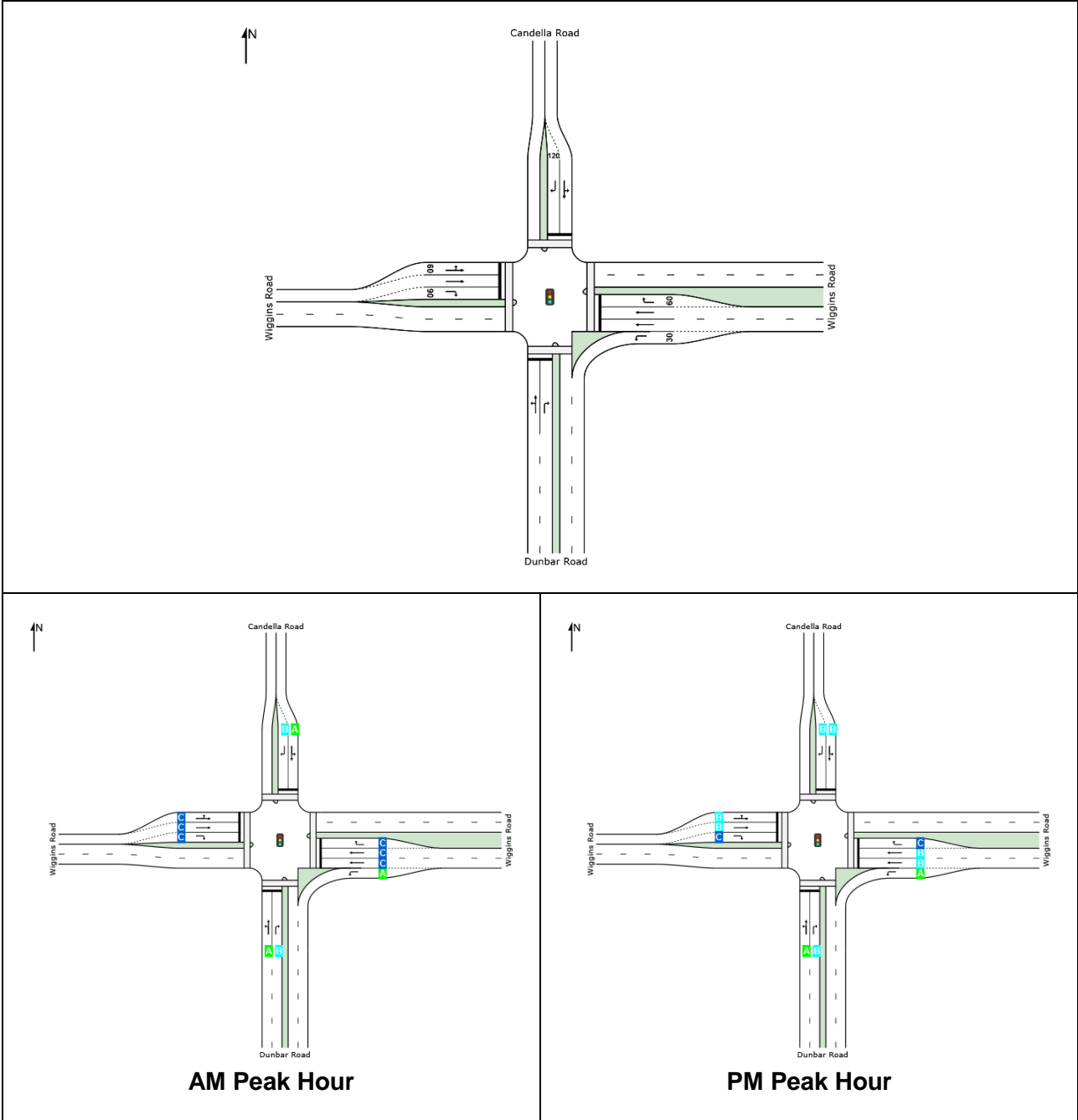


Table 17: Design Year with Development Generated Traffic – Candella Rd / Wiggins Rd

From the SIDRA results, it is evident that this intersection will still operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 13.1 seconds and 12.8 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 28.8 metres and 19.0 metres during the AM and PM peak hours respectively. No upgrades are required to this intersection in order to accommodate the forecast 2023 plus the development generated traffic.

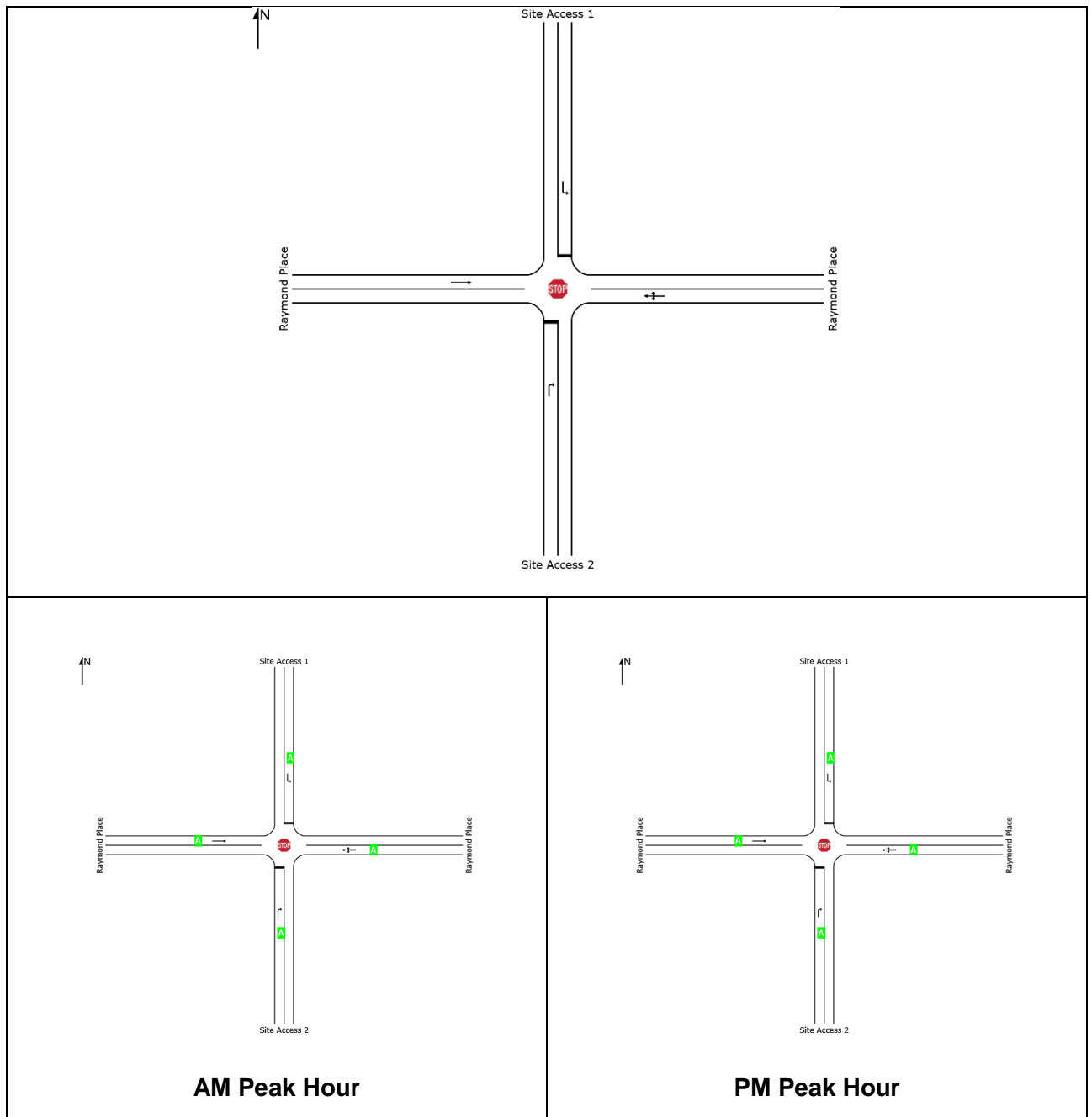


Table 18: Design Year with Development Generated Traffic – Raymond PI / Site Access

From the SIDRA results, it is evident that this proposed site access intersection will operate at good levels of service during the weekday AM and PM peak hours.

The average delays will be 6.9 seconds and 6.1 seconds during the AM and PM peak hours respectively. The maximum queue lengths will be 1.5 metres and 2.1 metres during the AM and PM peak hours respectively. A two-way, 2-lane single carriageway access to the north and south is required to accommodate the forecast 2023 plus the development generated traffic.

8.11 Future Road Conditions

8.11.1 Pedestrians and Public Transport

This development is proposed to fall under the category of low vehicle ownership. Due to this the proposed development is expected to generate pedestrians and public transport passengers. It is expected that these

pedestrians and public transport passengers will make use of the existing sidewalks on Candella Road in the vicinity of the proposed development to walk and to catch public transport.

The eThekweni Transport Authority recommends that public transport facilities must be within a 400 metre walking distance of an origin or a destination. The existing public transport facilities on Wiggins Road are 840 metres from the proposed development, therefore a public transport layby is recommended in both directions of Candella Road at the Raymond Place intersection to cater for future public transport passengers that will be generated by the proposed social housing development.

A sidewalk is also recommended along both the northern and southern edges of Raymond Place from the accesses to the proposed development to the intersection with Candella Road to cater for the pedestrians and public transport passengers that will walk to and from the proposed public transport facilities on Candella Road.

8.11.2 Road Safety

No adverse road safety conditions are expected to occur due to the increase in traffic, pedestrians and public transport passengers generated by the proposed social housing development. Adequate sidewalks for pedestrians are to be provided as described in the section above as well as public transport facilities.

The sight distance conditions are generally good and the traffic calming measures along the roads that were analysed in this TIA further improve road safety conditions.

8.12 Proposed Road Network Improvements

Based on the analyses undertaken for the additional traffic generated by the proposed Bonela Pilot site social housing development, no geometric road network improvements will be required for the 2023 design year as well as the 2023 design year plus the traffic generated by this proposed social housing development. Two-way, 2-lane single carriageway accesses will be sufficient to accommodate the traffic generated both north and south of Raymond Place.

As indicated above, public transport laybys are recommended in Candella Road in both directions downstream of the Raymond Place intersection and sidewalks are also recommended along both edges of Raymond Place from Candella Road to the accesses serving the development in Raymond Place.

8.13 Conclusions

The following conclusions can be drawn and recommendations made from the above traffic impact assessment of the proposed Bonela Pilot site social housing development in Bonela :

- The proposed central densification pilot site is located in Bonela, Westville within the eThekweni Municipality. A total of 225 social housing units are proposed to be developed on the site.
- The 2023 forecast traffic conditions excluding the development generated traffic on the road network surrounding the site is expected to experience acceptable levels of service during the 5-year forecast weekday AM and PM peak hours.
- There are existing public transport facilities along Wiggins Road approximately 840 metres from the proposed site.
- There are existing sidewalks along both sides of Candella Road in the vicinity of the site.
- The road safety conditions on all the roads in the vicinity of the site are acceptable for the function of the road and environment through which they pass. However, it was observed that trees on the corner of the Raymond Place and Candella Road intersection do obstruct the shoulder sight distance from Raymond Place in both directions. There are no known adverse road safety conditions in any of the other roads that have been assessment as part of this TIA. There are speed humps in Candella Road and Westmeath Avenue that assist in slowing traffic speeds down.

- For the purpose of this Traffic Impact Assessment the development of social housing is deemed to be the maximum impact scenario and will be analysed for the proposed uses permitted for the weekday AM and PM peak hours.
- This proposed social housing development falls under the category of low vehicle ownership and therefore a 40% discount for low vehicle ownership was used on the trips generated by the Residential Dwelling Units trip generation rate.
- The eTA Manual for Traffic Impact Assessments and Site Traffic Assessments gives the following peak hour trip generation rates and directional splits for the proposed uses.

Residential Dwelling Units:

- Weekday AM Peak Hour – 1.3 veh/h two-way per unit with a 25:75 directional split
- Weekday PM Peak Hour – 1.3 veh/h two-way per unit with a 70:30 directional split
- The above trip generation rates have been discounted by 40% for low car ownership.
- The proposed development is planned to consist of social housing (225 units).
- Based on the above discounted trip generation rates and directional splits for the proposed social housing development a total of 176 veh/h two-way are expected to be generated during the weekday AM peak hour and 176 veh/h two-way are expected during a weekday PM peak hour.
- The distribution of the traffic generated by the proposed development is expected to be in similar ratios to the distribution of the existing weekday AM and PM peak hour traffic travelling along all the roads and through all of the intersections that are analysed in this TIA.
- Even with the addition of the development generated traffic, none of the intersections that were analysed in this TIA will require any upgrades to accommodate the increase in traffic volumes.
- The development is expected to generate public transport passengers and pedestrians. A public transport layby is recommended in Candella Road in both directions downstream of the Raymond Place intersection to cater for the public transport passengers that will be generated by the proposed social housing development.
- A sidewalk is recommended along both sides of Raymond Place from the accesses in Raymond Place to the proposed development to Candella Road, to cater for the pedestrians and public transport passengers that will walk to the proposed public transport facilities on Candella Road.

The proposed Central Densification Bonela pilot site social housing development can therefore be supported from a traffic and transportation perspective, provided the above recommended road network improvements are implemented.

9 Infrastructure Concept

9.1 Introduction

The following infrastructure components / civil services were considered in the business planning process:

- Water Supply
- Sewer/ Sanitation
- Stormwater
- Solid Waste

The civil services demand estimated for the proposed developments used Municipal Guidelines and the manual for Guidelines for Human Settlement Planning and design, 2000 (Red Book).

The respective municipal departments were consulted to determine if the amount of capacity available will be sufficient to accommodate the required demands.

The information presented provides an indication of the extent of civil infrastructure that will be required to accommodate the new development demands for each location. The findings, recommendations and costs are presented in this section.



Figure 33: Bonela land infrastructure

9.2 Water supply

The existing Bulk water network around Bonela fall under the eThekweni Municipality jurisdiction.

9.2.1 Proposed reticulation

The new proposed development will be able to connect to the existing water network in the area, subject to municipal approval.

As shown in figure 33, the Bonela Site have reticulation networks running on Westmeath Avenue and Candella Road. The water infrastructure within the sites will need to be relocated, subject to council approvals.

To accommodate the new flows the existing lines will need to be upgraded from a 100mm diameter pipelineto 200mm diameter pipeline. Fire flow has been taken into consideration in the design. The extent of the upgrade can be concluded once a comprehensive study and modelling is done on the supply zone.

eThekweni Municipality does not guarantee water pressures, as the onus lies with the individual developers to determine the municipal water pressures existing at road level and design their own on-line booster pumps, to meet their personal or business requirements.

The Guidelines for Human Settlement Planning and Design Manual was used to calculate the total water demands for the proposed development.

The following design criteria were used.

Table 19: Bonela- Site A

New Development -Bonela	
Parameter Constraints	
Residential- Site A	131 Units @700l/u/d
pressure: 2.5-6 bar	
velocity: 0.3-1.2 m/s	
fire: 25	
Ave Demand =700 l/u/d	
Ref	Total
Average demand l/ha/d	0
Area (ha)	0.000
Average Demand (l/s)	1.060
Grouped Average Demand (l/s)	
Peak Factor	4.2
Summer Peak Factor	1
Waterloss Factor	1.25
Peak demand (L/s)	5.57
fire (l/s) moderate risk	
	25
Average + fire demand (L/s)	26.06
Peak	30.57

Table 20: Bonela Site B, C & D

New Development -Bonela	
Parameter Constraints	
Residential- Site B, C, D	94 Units @700l/u/d
pressure: 2.5-6 bar	
velocity: 0.3-1.2 m/s	
fire: 25	
Ave Demand = 700 l/u/d	
Ref	Total
Average demand l/ha/d	0
Area (ha)	0.000
Average Demand (l/s)	0.760
Grouped Average Demand (l/s)	
Peak Factor	4.2
Summer Peak Factor	1
Waterloss Factor	1.25
Peak demand (L/s)	3.99
fire (l/s) moderate risk	25
Average + Fire (L/s)	25.76
Peak	28.99

The proposed connection for Site B, C & D will be of the Westmeath waterline and the proposed connection for Site A will be off the Kilkenny Close waterlines.

9.3 Wastewater disposal

Bulk wastewater infrastructure is in place within the immediate area of the proposed development, as reflected in figure 33.

The proposed internal sewer reticulation for the site and the proposed connection point is shown on figure 33.

The proposed connection for the Bonela sites will be on the 160mm diameter sewer line which run across from Westmeath Avenue and through Sites A, B, C & D.

eThekwini Water and Sanitation Department indicated that a full network analysis will need to be undertaken to determine if the existing infrastructure will be able to carry the additional flows from the proposed developments. Possible upgrades to the existing network might be considered should the existing network be undersized.

The sites fall under the Central zone and as per information received from EWS the design capacity for the Central WWTW is 100MI/day, the current usage is 94MI/day and the spare capacity is 6 MI/day.

The Pinetown site fall under the Western zone and as per information received from EWS the Umbilo WWTW services this area.

The Guidelines for Human Settlement Planning and Design Manual and the eThekwini sewer design Manual was used to calculate the total sewer to be generated.

The following design criteria were used:

- Residential Demand = 500 litres per day per household

- Peak Factor = 4
- Stormwater Infiltration = 15%

Table below outlines the expected sewer demand for the additional new development (once fully developed)

Land Use	Demand (l/ha/day)	Area (ha)	Sewage GAADD (l/day)	Peak Factor	Peak Flow rate (l/s)	Infiltration Rate (15% of PFR)	Design Flow Rate (l/s)	UDF (l/s)
Site A,B,C & D	Total area =	2.3						
Land use split								
Residential A		1.1870	65500.00	4.00	3.03	0.45	3.49	5.23
Residential B,C,D		0.8540	47000.00	4.00	2.18	0.33	2.50	3.75
Sub-Total			112500.0		5.2	0.78	5.99	8.98

9.4 Stormwater drainage

Stormwater management philosophy account for the following:

- Compliance with the eThekweni Municipality stormwater management policy; and
- Sustainable Urban Drainage Systems (SUDS) Guidelines

9.4.1 Site description

The Bonela site is located in a residential suburb with limited commercial and industrial activity. The residential function of the area is complemented by the supply of essential social services including healthcare and educational facilities. The site is largely internalised with limited direct access to prominate local and regional routes.

Currently, the proposed development sites are predominately grassed

9.4.2 Site impact assessment

The proposed developments could have a severe effect on natural storm flows, considering there will be an increase in discharge volumes due to an increase in hard surfaces and decrease in infiltration.

Proper stormwater intervention measures need to be designed to prevent natural damages like localised flooding and soil erosion

9.4.3 Design proposal

The sites have existing stormwater drainage systems available consisting of pipe networks and manholes that provide drainage to roads and sites around the proposed development area.

The drainage system for the new development site will be designed to function with the catch pits/ grid inlets and pipes that will be connected to the existing system at convenient locations.

As shown in figure 33, the site, there are existing stormwater infrastructure on Westmeath Avenue and Candella Road.

The on-site drainage will be designed to cater for the 1 in 10 year recurrence interval storm with provision of attenuation structures to accommodate the 1:50 year storm event.

Drainage along roads and parking areas will be accommodated via catchpits/ grid inlets and a piped network and discharge into strategically located attenuation structures on the site, in line with the Sustainable Urban Drainage Systems (SUDS) Guidelines.

The estimated stormwater pre-development and post-development flows that will be generated as a result of the densification development will be done during the detailed design phase of this project.

Possible upgrades to the existing infrastructure are subject to municipal approvals

9.4.4 Mitigation initiatives

According to the SUDS Guidelines different options for stormwater drainage can be implemented.

Rainwater harvesting is a common system used, where roof top and surface runoff is temporarily stored. The harvested water can be used for sanitation, gardening etc.

9.4.5 Solid waste removal

The site is located in a municipal area and solid waste will be removed by the eThekweni Municipality on a regular schedule using a waste bin system.

The bins for the new development will be removed from a central bin storage area located at convenient positions on the site with a stop and load space for the refuse removal truck.

Provision for recycling of waste on the site must be incorporated into the design of the sites and for the collection of recycled waste by private contractors/operators.

10 Project Implementation recommendation

This section considers various aspects relating to the implementation of the project, including:

- Financing structure;
- Capital investment costs; and
- A development programme.

10.1 Financing structures

10.1.1 Existing options

There are essentially three different options in terms of financing options for the project. The proposed nature of the project will potentially mean that different options may be selected based on the suggested development of each parcels of land on the selected pilot site.

The three-existing option include:

- Public sector development;
- Public private sector development; and
- Private sector development.

National funding sources for housing

The primary source of government grant funding that may be applicable to the project, is the Human Settlement Development Grant (HSDG). The Department of Human Settlements budget also includes funding for various programmes which focus on specific housing needs, such as Restructuring Capital Grant (RCG) funding for Social Housing; the Upgrading of Informal Settlements Programme (UISP); Finance Linked Individual Subsidy Programme (FLISP); and the Integrated Residential Development Programme (IRDP) etc.

In addition to the grant funding provided by the Department of Human Settlements, additional potential sources of funds for various aspects of the project are summarised in the table below. These are grants available to provincial and local government for the construction of infrastructure and top structures, specifically related to human settlements as well as township reindustrialisation and modernisation. Depending on the development model that will be implemented in the project, a combination of these sources of funding could potentially be accessed by the development.

Table 21: Overview of grant funding sources

Grant / Funding Name	Administered by	Purpose of Grant / Funding Programme
Municipal Infrastructure Grant (MIG)	Department of Cooperative Governance and Traditional Affairs	Provision of basic services such as water, sanitation, roads and community lighting.
Human Settlements Development Grant (HSDG)	National Department of Human Settlements	To upgrade informal settlements, either by creating formal housing or by upgrading services to informal settlements.
Neighbourhood Development Partnership Grant (NDPG)	National Treasury	To provide municipalities with technical assistance to develop appropriate project proposals for property developments that include the

		construction or upgrading of community facilities, and to attract private sector funding.
Integrated National Electrification Programme (INEP)	The Department of Energy	To address backlogs and to fund electrical connections and bulk infrastructure for affordable housing.
Integrated Residential Development Program (IRDP)	Department of Human Settlements	For the acquisition of land, servicing of stands, for the development of mixed use developments.
Restructuring Capital Grant (RCG)	Department of Human Settlements (through the Social Housing Regulatory Authority (SHRA))	To contribute towards spatial, social and economic restructuring of South African cities. Provides a contribution to the capital cost of a Social Housing Project, contributing to the delivery of viable, feasible and sustainable Social Housing Projects that provide affordable rental housing to the poor.
Community Residential Units Programme (CRU)	Department of Human Settlements	To facilitate the provision of secure, stable rental tenure for low income housing households.
The institutional Programme	Department of Human Settlements	The Institutional Programme provides capital grants to social housing institutions to construct and manage affordable rental units. The Programme also provides for the sale of units by the social housing institution after at least four years has lapsed.
Housing Impact Fund South Africa (HIFSA)	Old Mutual, Development Bank of South Africa, Eskom Pension Fund	To finance the construction of affordable housing for sale and rent, as well as providing housing loans and rental accommodation for families and students. The fund aims to fill the gap between government provided housing and those who have access to bank finance to purchase their own home.
National Housing Finance Corporation (NHFC)	NHFC under authority of Department of Human Settlements	The NHFC targets low to middle income households to enable them to afford housing finance. As a means of sustaining its funding programs, the NHFC offer housing finance, project facilitation and technical assistance to private and public entities to mobilise finance for affordable housing from sources outside the state in partnership with a broad range of organisations.
Housing Investment Partners (HIP)	Old Mutual (in association with National Housing Finance Corporation)	To improve quality of life and the potential for wealth creation for homeowners through an innovative income linked finance that meet and exceed the needs of the affordable housing market.
Finance Linked Individual Subsidy Program (FLISP)	The Department of Human Settlements	To enable sustainable and affordable first time home ownership to South African citizens and legal permanent residents earning between R3500 and R15000 per month.

Public-private partnership

Joint funding models, where private sector debt or equity is used in addition to public funds may be the best avenue for the development of the project, they represent the greatest potential for the gearing of public funds. Additionally, with private sector involvement, less financial burden is placed on the state, and private sector interest and cooperation from the outset will enable greater sustainability of the project, as private sector development will increase the economic gravity for the project.

An optimal way to make use of public sector funds in conjunction with private sector partners is to set-up an investment fund or trust, to which multiple investors can be party by way of contributing capital. This setup, by way of a fund or trust allows for economies of scale, and may also be able to “gear” or use financial leverage to a better extent than any individual entity could, due to the increased bargaining power that the fund will have. It must be noted that gearing can magnify performance returns in both directions, meaning both losses and income are greater when gearing is employed.

A private sector participation funding model involves a public and private partnership (PPP) that is established in order to achieve common goals and set objectives for the establishment of the development. The model therefore strives to secure the advantages of both the public and private sector. Government as a partner, accelerates approval processes and safeguards public interests by guiding the strategic direction of the construction and operation of the planned facility. Within PPP's, there are a number of different funding models options, each with its own advantages and drawbacks. These private sector participation funding model options share a good deal of similarities with small, but significant variations. Depending on the objectives of the Municipality, or the component of the project being developed and the unique nature of the envisioned development, one of the following models may be considered:

- Design-Build-Finance-Operate (DBFO) Funding Model
- Private Sector Participation Funding Model with Private Sector Equity
- Private Sector Participation Funding Model with Private and Public Sector Equity

Private development

Another option that may be considered by the Municipality, is the commercial funding model. Here the Municipality may sell the development opportunity to a private developer. The commercial funding model is one where the private sector develops and funds it in its entirety without any involvement from the public sector. The private sector will therefore be taking all of the risks, as well as all the rewards. It therefore means that the government has no involvement in the development and that the private sector will be able to develop the facility in order to maximize its returns. This may not be the primary means for development of low-income housing, especially given the need to provide for households earning less than R 3500 a month.

10.1.2 Recommendation

Based on the assessment above the following recommendations are made:

Considering the above assessment, it is then proposed that the selected Bonela Pilot site development should be a private sector development. The following conditions should, however, be adhered to in order to ensure municipal objectives are met:

- Land made available subject to appropriate densities and identified market targeted by the private sector.
- Development should proceed within two years of land being made available for development subject to environmental and land development applications.
- A developer with prior experience in this specific market should be engaged with.
- The successful bidder must propose innovative approaches to accommodating people in the specific market segment.
- Preference given to developers that will also participate in the ongoing management of the development.

It is further recommended that, in order to secure appropriate private sector interest in participating in a development of this nature, the following incentives relating to this specific initiative be considered:

- The making available of the land for the development;

- Provision of appropriate bulk infrastructure to the site boundary (as proposed in engineering services report); and
- The setting up of appropriate mechanism to ensure the processing of environmental, planning and building applications.

Further to this it is recommended that a rates rebate be considered for development of this nature, i.e. new higher density development in priority areas.

All of the above will increase the interest of private sector developers in projects of this nature, i.e. projects with lower returns and generally higher risks attached.

10.2 Capital investment cost

The capital investment cost for the development will be made up of the following basic components:

- Bulk Infrastructure costs
- Internal Infrastructure costs
- Building Costs
- Other Costs (Consultants / T&Cs).

Building construction cost is based on the rates as reflected in the Africa Property and Construction Handbook (AECOM 2017). The rates used are based on the following:

- Bulk Infrastructure costs: Engineering Services Report (where relevant)
- Internal Infrastructure costs: Engineering Services Report
- Building Costs: AECOM 2017.
- Other Costs (Consultants / T&Cs).

The basic per square meter rate used for the construction process include the cost of appropriate building services, e.g. plumbing, electrical, etc., but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and Value Added Tax (VAT).

Table 22: Estimated capital cost

	COMPONENT/ ITEM	DESCRIPTION	AREA/UNIT	UNIT MEASURE	UNIT COST	TOTAL
Land Cost	Other	Not relevant		Number		R -
	Acquisition of Site	Private Land Ownership		1 Number		R 920,000.00
	Acquisition of Site	Private Land Ownership		1 Number		R 590,000.00
	Other	Not relevant		Number		R -
	Sub-Total					R 1,510,000.00
Construction Costs	Residential Units	Includes plumbing and electricity	11,563	m2	6,700	R 77,472,100.00
	Landscaping and Parking	Parking on grade, incl integral landscaping	5,105	m2	500	R 2,552,625.00
	Sub-Total					R 80,024,725.00
Infrastructure Costs	Water Infrastructure	Medium Pressure 160mm	150	m	1,500	R 225,000.00
	Relocation of Existing Water Main	None	155	m	1,000	R 155,000.00
	Sanitation Infrastructure	Sewer pipeline 160mm	50	m	1,500	R 75,000.00
	Relocation of existing sewer	Sewer pipeline 160mm	0	m		R -
	Stormwater Infrastructure	450mm pipe	150	m	2,000	R 300,000.00
	Electricity	Amps @400v: 642A	1			R 564,977.35
	Sub-Total					R 1,319,977.35
	Total (excluding consulting fees)					R 82,854,702.35
Professional Fees	Professional Fees (Survey, Architecture, Engineering, Construction, Legal)	@ 12% of development cost				R 9,942,564.28
	Sub-Total					R 9,942,564.28
	Total Capital Development Cost					R 92,797,266.63

10.3 Development programme

The table below gives an estimate of typical timeframes for the development of the project from project initiation to occupation. The total expected timeframe is 69 months or almost 6 years.

Table 23: Indicative development plan

COMPONENTS/SETS	ESTIMATE
PROJECT INITIATION	
Project Approval / Project Inception	3 months
Confirming availability of land Engaging with potential public / private sector partners Approval of Project by Council Finalise business plan	
Land Assembly	6 months
Confirmation of land availability Securing land for development Council approval	
TENDER PROCESS	6 months
Compile Developer Call for Proposals Issues Call for Proposals to Developers Adjudicate Call for Proposals (Land availability) agreements with Preferred Bidder	
PLANNING AND CONCEPT DESIGN	6 months
Access survey information	2 months
Geotechnical assessment	2 months
Preliminary environmental assessment	To review
Required environmental specialist studies	2 months
Concept design	To review/detail
Bulk infrastructure planning	Review
Engineering service planning	3 months
Traffic Impact Assessment	Completed
ENVIRONMENTAL IMPACT ASSESSMENT	9 months
Prepare basic assessment report (BAR) Submit BAR Acknowledge receipt of BAR Accept BAR Grant / Refuse EIA Notify applicant of decision Applicant notify I&AP of decision Proceed with Land Development application	14 days 30 days 30 - 90 days 2 days 14 days
LAND DEVELOPMENT APPLICATION (REZONING)	9 months
Submit Land Development Application Advisory of commencement of process Notification of registration of application Public notification Public sector comments Consider and make determination Sitting of Tribunal Tribunal approval Notification of decision	7 days 14 days 30 days 60 days (from registration) 60 days 90 days 30 days 21 days
DETAILED DESIGN	6 months
Architectural Design Engineering Services Landscaping Other preparatory work	
BUILDING PLAN APPROVAL	6 months
CONSTRUCTION	18 months
OCCUPATION OF UNITS	

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