# Morley Activity Centre

Morley Activity Centre Servicing Report

E14021

Prepared for City of Bayswater

February 2015



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## Executive Summary

The Morley Activity Centre Structure Plan provides a framework for the redevelopment of the Morley Activity Centre area into a "lively and bustling place for business and shopping serving in the north eastern metropolitan region of Perth' with capacity to accommodate "10,000 people and 10,000 jobs".

Through close liaison with the City of Bayswater and relevant service providers, Cardno has researched and reported on the current capacity of the infrastructure and services within the Morley Activity Centre. Cardno has also provided detailed findings and recommendations regarding the future infrastructure and servicing requirements that are needed to accommodate the redevelopment of the centre as proposed by the Morley Activity Centre Structure Plan. Additionally, Cardno has worked closely with the City and Water Corporation to determine how the City's Local Water Management Strategy can be factored into the plan.

In summary, Cardno's assessment of the Morley Activity Centre in terms of required infrastructure for the MACSP area is as follows:

- The Morley Activity Centre Structure Plan area faces no major shortages in infrastructure and is therefore able to accommodate new development as envisaged in the Morley Activity Centre Structure Plan.
- In the absence of a major public (LG or State) infrastructure program, infrastructure will be rolled out over time in response to new development within the centre.
- It is recommended that a working group between the City of Bayswater and Water Corporation is set up in order to help plan and coordinate precinct development and staging with any Water Corporation trunk infrastructure capital works.
- The City of Bayswater is to oversee the enactment of water conservation methods as outlined in the Water Corporation Water Forever 2009 document and the City of Bayswater's Local Water Management Strategy Section 4.2 Water resource use.
- The City of Bayswater could implement a minimum green star rating requirement for any new developments within the Morley Activity Centre. Minimum energy conservation requirements can help reduce peak electricity demand, increase load diversity and reduce greenhouse gas emissions. These measures may delay to onset of the medium-long term infrastructure requirements.
- Although the National Broadband Network (NBN) has not identified that a rollout is to occur in the Morley Activity Centre is recommend that the City of Bayswater prepares plans for such an event. The City of Bayswater should review NBN's "Best practice guide for councils when initially dealing with NBN Co".

In conclusion, based on advice received by Cardno from the relevant service authorities, there should be no reason from a servicing point of view that the Morley Activity Centre Structure Plan could not be implemented.

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## 1 Background

#### 1.1 Introduction

Cardno was engaged to assist the City of Bayswater (CoB) in preparing an Infrastructure and Servicing Plan for the Morley Activity Centre (MAC) Structure Plan 2014. The purpose of this plan is to assess the current infrastructure and services, the capacity of the existing infrastructure, upgrades required to achieve development goals outlined in the Structure Plan and to address implementation and staging of the required upgrades. The findings and advice presented in this report is based on Cardno's observations, experience from similar projects and responses from the various service provider stakeholders.



(Image Source: Structure Plan Map - MAC Structure Plan page 26)

#### Figure 1-1 Morley Activity Centre Area (Not to Scale)

**Figure 1-1** shows the Morley Activity Centre Structure Plan. For the purpose of this Infrastructure and Servicing Plan the precincts have been broken down further as shown in **Figure 1-2**.



(Image Source: Structure Plan Map - MAC Structure Plan page 27)

Figure 1-2 Morley Activity Centre Infrastructure and Servicing Precincts

Morley Activity Centre			
Precinct Name	Area (ha)	Current Use	
Central Core	45.6	Commercial / POS	
Outer Core North	9.4	Commercial / Community	
Outer Core South	12.4	Commercial / Light Industrial	
Mixed Business East	12.2	Commercial / Light Industrial / POS	
Mixed Business West	8.8	Commercial / Light Industrial	
Civic & Education	12.7	Civic / Education	
Smith Street	33.6	Residential / POS / Education	
Coode Street	28.3	Residential / Commercial / POS	
Broun Avenue	10.5	Residential	
Crimea Street	9.3	Residential	
Collier Road	11.3	Residential	
Walter Road West	14.2	Residential	
Vera Street	11.3	Residential / Education	

Details of the precincts and usage are shown in Table 1-1 below.

#### Table 1-1 Morley Activity Centre Precinct Areas and Use

The precincts, divided further for the purposes of this document, provide a clear distinction in boundaries for assessing infrastructure requirement for the development of the Morley Activity Centre. The precincts have been named according to their use and location. Residential precincts have been given the name of a street contained within the precinct boundary for ease of identification and location.

## 2 Study Area

#### 2.1 Location

The Morley Activity Centre (MAC) is located 7km north-north-east of Perth CBD and is within the City of Bayswater local government area. The MAC is approximately 220 hectares and encompassed by the red boundary line shown in **Figure 2-1Error! Reference source not found.** 



(Image Source: Structure Plan Map - MAC Structure Plan page 27)

#### Figure 2-1 Study Area - Proposed R-Codes

**Figure 2-1** shows the proposed R-Codes within the MAC Structure Plan. The Residential Design Codes of Western Australia ("the R-Codes") provides the basis for the control of residential density throughout Western Australia. This figure was used to estimate the potential increase in dwellings and services demand within the Structure Plan area.

#### 2.2 Existing and Proposed Development

#### 2.2.1 <u>Central Core Precinct</u>

The Central Core precinct has a commercial land use with the main focus of commercial activity being the Galleria Shopping Centre which is owned by Federation Centres. There is also some area in this precinct designated for stormwater detention which also functions as Public Open Space as shown on drawing E14021-001-CI-D-SK6. Refer **Figure 2-2** below for an aerial close-up.



#### Figure 2-2 Central Core Precinct Aerial

Under the MAC Structure Plan the Central Core Precinct will be re-zoned as R-AC (Residential Activity Centre) which is a high residential density code which allows for a variety of residential development with activity centres.

Central Core Precinct			
Zoning	Current Scheme <sup>1</sup> (% of Total Area)	Proposed Structure Plan <sup>2</sup> (% of Total Area)	
Morley City Centre	100%		
R-AC		100%	

#### Table 2-1 Central Core Precinct Zoning

Table 2-1 describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>1</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>2</sup> MAC Structure Plan

#### 2.2.2 Outer Core North Precinct

The Outer Core North precinct is currently used for commercial and community activities. A number of commercial units are situated to the north of Walter Road West while the remainder of the precinct is used by the Morley Sports and Recreation Centre and Pat O'Hara Reserve.



Figure 2-3 Outer Core North Aerial

Under the MAC Structure Plan the Outer Core North Precinct will be re-zoned as R-AC which is a high residential density code which allows for a variety of residential development within activity centres.

Outer Core North Precinct			
Zoning	Current Scheme <sup>3</sup> (% of Total Area)	Proposed Structure Plan <sup>4</sup> (% of Total Area)	
Morley City Centre	100%		
R-AC		100%	

#### Table 2-2 Outer Core North Precinct Zoning

Table 2-2 describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>3</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>4</sup> MAC Structure Plan

#### 2.2.3 Outer Core South Precinct

The Outer Core South precinct currently comprises a mix of light industrial and commercial land uses. Refer **Figure 2-4** below for an aerial close-up.



Figure 2-4 Outer Core South Precinct aerial close up

Under the MAC Structure Plan the Outer Core South Precinct will be re-zoned as R-AC which is a high residential density code which allows for a variety of residential development with activity centres.

Outer Core South Precinct			
Zoning	Current Scheme <sup>5</sup> (% of Total Area)	Proposed Structure Plan <sup>6</sup> (% of Total Area)	
Morley City Centre	100%		
R-AC		100%	

#### Table 2-3 Outer Core South Precinct Zoning

Table 2-3 describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>5</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>6</sup> MAC Structure Plan

#### 2.2.4 <u>Mixed Business East Precinct</u>

The Mixed Business East precinct is currently comprised of commercial and light industrial land uses. A small area is designated Public Open Space. Refer aerial close-up below in **Figure 2-5**.



Figure 2-5 Morley Road East Precinct aerial close up

Under the MAC Structure Plan the Mixed Business East Precinct will be re-zoned as R-AC which is a high residential density code which allows for a variety of residential development with activity centres.

Mixed Business East Precinct			
Zoning	Current Scheme <sup>7</sup> (% of Total Area)	Proposed Structure Plan <sup>8</sup> (% of Total Area)	
Morley City Centre	100%		
R-AC		100%	

#### Table 2-4 Mixed Business East Precinct Zoning

Table 2-4 describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>7</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>8</sup> MAC Structure Plan

#### 2.2.5 Mixed Business West Precinct

The Mixed Business West precinct is currently comprised of commercial and light industrial land uses. Refer **Figure 2-6** below for an aerial close-up.



Figure 2-6 Mixed Business West Precinct aerial close up

Under the MAC Structure Plan the Mixed Business West Precinct will be re-zoned as R-AC which is a high residential density code which allows for a variety of residential development with activity centres.

Mixed Business West Precinct			
Zoning	Current Scheme <sup>9</sup> (% of Total Area)	Proposed Structure Plan <sup>10</sup> (% of Total Area)	
Morley City Centre	100%		
R-AC		100%	

#### Table 2-5 Mixed Business West Precinct Zoning

**Table 2-5** describes the breakdown of the precinct per zone type under the old Town Planning Scheme

 and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>9</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>10</sup> MAC Structure Plan

#### 2.2.6 <u>Civic & Education Precinct</u>

The Civic & Education precinct currently comprises a mix the John Forrest Secondary College and the Garden City Civic Centre which hosts the City of Bayswater local government offices and a Public Library. Refer **Figure 2-7** below for an aerial close-up.



Figure 2-7 Civic & Education Precinct Aerial

Under the MAC Structure Plan the Civic & Education Precinct will experience no change to the zoning of the area.

Civic & Education Precinct			
Zoning Current Scheme <sup>11</sup> (% of Total Area)		Proposed Structure Plan <sup>12</sup> (% of Total Area)	
Public Purpose	84%	84%	
Morley City Centre	16%	16%	

Table 2-6 Civic & Education Precinct Zoning

**Table 2-6** describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>11</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>12</sup> MAC Structure Plan

#### 2.2.7 Smith Street Precinct

The Smith Street precinct currently comprises mainly of residential land use and with public open space, stormwater compensating basins and a primary school. Refer **Figure 2-8** below for an aerial close-up.



Figure 2-8 Smith Street Precinct Aerial

Under the MAC Structure Plan the Smith Street Precinct will experience a general increase in residential development density.

Smith Street Planning Codes			
Zoning	Current Scheme <sup>13</sup> (% of Total Area)	Proposed Structure Plan <sup>14</sup> (% of Total Area)	
R40	100%	49%	
R60		38%	
R100		13%	

#### Table 2-7 Smith Street Precinct Zoning

**Table 2-7** describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>13</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>14</sup> MAC Structure Plan

#### 2.2.8 <u>Coode Street</u>

The Coode Street precinct currently comprises of residential land use including some public open space and one commercial lot at the corner of Walter Road West and Coode Street. Refer **Figure 2-9** below for an aerial close-up.



Figure 2-9 Coode Street Precinct Aerial

Under the MAC Structure Plan the Coode Street Precinct will experience a general increase in residential development density.

Coode Street Planning Codes					
Zoning	Current Scheme <sup>15</sup> (% of Total Area)	Proposed Structure Plan <sup>16</sup> (% of Total Area)			
R25	65%				
R30	10%				
R40	25%	58%			
R60		42%			

#### Table 2-8 Coode Street Precinct Zoning

**Table 2-8** describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>15</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>16</sup> MAC Structure Plan

#### 2.2.9 Broun Avenue

The Broun Avenue precinct currently comprises of residential land use. Refer **Figure 2-10** below for an aerial close-up.



#### Figure 2-10 Broun Avenue Precinct Aerial

Under the MAC Structure Plan the Broun Avenue Precinct will experience a general increase in residential development density.

Broun Avenue Planning Codes					
Zoning Current Scheme <sup>17</sup> (% of Total Area) Proposed Structure Plan <sup>18</sup> (% Total Area)					
R25	100%				
R100		100%			

#### Table 2-9 Broun Avenue Precinct Zoning

**Table 2-9** describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>17</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>18</sup> MAC Structure Plan

#### 2.2.10 Crimea Street Precinct

The Crimea Street precinct currently comprises of residential land use. Refer **Figure 2-11** below for an aerial close-up.



#### Figure 2-11 Crimea Street Precinct Aerial

Under the MAC Structure Plan the Crimea Street Precinct will experience a general increase in residential development density.

Crimea Street Planning Codes					
Zoning	Current Scheme <sup>19</sup> (% of Total Area)	Proposed Structure Plan <sup>20</sup> (% of Total Area)			
R25	93%				
R40	7%				
R60		67%			
R100		33%			

#### Table 2-10 Crimea Street Precinct Zoning

**Table 2-10** describes the breakdown of the precinct per zone type under the old Town Planning Scheme and the new Morley Activity Centre Structure Plan..

<sup>&</sup>lt;sup>19</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>20</sup> MAC Structure Plan

#### 2.2.11 Collier Road Precinct

The Collier Road precinct currently comprises of residential land use. Refer **Figure 2-12** below for an aerial close-up.



#### Figure 2-12 Collier Road Precinct Aerial

Under the MAC Structure Plan the Collier Road Precinct will experience a general increase in residential development density.

Collier Road Planning Codes					
Zoning	Current Scheme <sup>21</sup> (% of Total Area)	Proposed Structure Plan <sup>22</sup> (% of Total Area)			
R60	100%	60%			
R100		18%			
R160		22%			

#### Table 2-11 Collier Road Precinct Zoning

**Table 2-11** describes the breakdown of the precinct per zone type under the old Town Planning Scheme

 and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>21</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>22</sup> MAC Structure Plan

#### 2.2.12 Walter Road West Precinct

The Walter Road West precinct currently comprises of residential land use. Refer **Figure 2-13** below for an aerial close-up.



Figure 2-13 Walter Road West Precinct Aerial

Under the MAC Structure Plan the Walter Road West Precinct will experience a general increase in residential development density.

Walter Road West Planning Codes					
Zoning	Current Scheme <sup>23</sup> (% of Total Area)	Proposed Structure Plan <sup>24</sup> (% of Total Area)			
R40	100%				
R60		64%			
R100		36%			

#### Table 2-12 Walter Road West Precinct Zoning

**Table 2-12** describes the breakdown of the precinct per zone type under the old Town Planning Scheme

 and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>23</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>24</sup> MAC Structure Plan

#### 2.2.13 Vera Street

The Vera Street precinct currently comprises of residential land use and a primary school/kindergarten. Refer **Figure 2-14** below for an aerial close-up.



Figure 2-14 Vera Street Precinct Aerial

Under the MAC Structure Plan the Vera Street Precinct will experience a general increase in residential development density.

	Walter Road West Planning Codes	
Zoning	Current Scheme <sup>25</sup> (% of Total Area)	Proposed Structure Plan <sup>26</sup> (% of Total Area)
R25	100%	
R40		70%
R100		30%

#### Table 2-13 Vera Street Precinct Zoning

**Table 2-13** describes the breakdown of the precinct per zone type under the old Town Planning Scheme

 and the new Morley Activity Centre Structure Plan.

<sup>&</sup>lt;sup>25</sup> Town Planning Scheme 23/24

<sup>&</sup>lt;sup>26</sup> MAC Structure Plan

### 3 Services

#### 3.1 Water & Wastewater

#### 3.1.1 <u>Water</u>

Water Corporation Western Australia is the main service provider regulating the production, storage and distribution of potable water in the area. Water Corporation usually specifies trunk water requirements and reticulation pipe sizes based on their technical manuals DS60 – Water Supply Distribution Manual and DS63 – Water Reticulation Systems up to DN250.

#### 3.1.1.1 Current Infrastructure

The Morley Activity Centre is currently well serviced by Water Corporation infrastructure in all precincts. Drawing E14021-001-CI-D-SK1 in Appendix A shows existing Water Corporation infrastructure of mains pipelines 300mm in diameter and above.

Appendix C contains the East Wanneroo Morley Water Supply Scheme (1998) which shows the planning scheme for the Morley Activity Centre.

#### 3.1.1.2 Service Capacity

The Morley Activity Centre is located in the East Yokine-Morley Water Supply Scheme area. It is difficult to ascertain exactly what capacity the current infrastructure network without full water network modelling carried out by Water Corporation. However, Water Corporation does not foresee any issues with servicing the proposed scheme with potable water at this point in time.

The East Yokine-Morley Water Supply Scheme is located in the Perth and Peel region of the Integrated Water Supply Scheme (IWSS). The IWSS has capacity to supply 255 Gigalitres per year (GL/yr). Current consumption is approximately 250 GL/yr for the Perth and Peel region. Refer **Figure 3-1** 



Figure 3-1 Perth and Peel Water Supply Snapshot

Morley Activity Centre					
Precinct Name	No. of Potential Dwellings	Projected Probable Simultaneous Demand (Ls <sup>-1</sup> )			
Central Core	1063	78.11			
Outer Core North	50	3.64			
Outer Core South	394	28.96			
Mixed Business East	284	24.89			
Mixed Business West	339	20.86			
Civic & Education	N/A	4.40			
Smith Street	1474	30.58			
Coode Street	1058	44.22			
Broun Avenue	657	31.97			
Crimea Street	562	28.49			
Collier Road	670	6.77			
Walter Road West	1189	43.96			
Vera Street	439	22.82			

#### Table 3-1 Projected Probable Simultaneous Demand (Water)

**Table 3-1** describes the projected simultaneous demand for the Morley Activity Centre. The total demand was calculated by estimating the potential total dwelling per precinct based on the R-codes. Once total dwellings were estimated the simultaneous demand could be found using **Table 3-1**– probable simultaneous demand for multiple dwellings from AS3500.1 - plumbing and drainage part 1.

#### 3.1.1.3 Required Infrastructure

Exact water infrastructure upgrades will be determined when full water network modelling is carried out by Water Corporation. Water Corporation has advised that water reticulation planning and modelling will be done after Structure Plan and rezoning is confirmed, effectively at development application phase.

The Water Corporation provided initial advice to Cardno in December 2014. In their advice they offered the following key points.

- a) Water Corporation will upgrade the headworks, pipe equal to or greater than 300mm diameter and pump stations, as and when required. However, headworks charges will be charged to the developer. Minor reticulation works, typically pipework less than 300mm diameter, are to be funded directly by the developer.
- b) All temporary works associated with any development within the Morley Activity Centre is to be funded directly by the developer.
- c) Redevelopment areas within the Morley Activity Centre need to integrate water efficiency technology and design approaches into the area and buildings in line with Water Corporation's 'Water Forever 2009" document. This will require a local water management strategy that includes local scale water balancing and identifying water efficiency measures such as; rainwater reuse, appropriate fittings, irrigation smart systems, planting and soil types and drainage collection and reuse.
- d) Water Corporation advises that a Development Area Plan be commissioned to support development in the Morley Activity Centre and submitted to Water Corporation once the Structure Plan has been finalised. This should include a plan identifying the proposed development, densities and likely staging and timeframe. Accompanying this should be a water management strategy outlining how water efficiencies are to be met along with engineering plans detailing proposed works and estimates. The water efficiency targets are to be determined by the City of Bayswater in consultation with Water Corporation. Water Corporation run a Waterwise Development Program which enables developments that have applied water efficient principles to be recognised and endorsed by Water Corporation.

- e) Water Corp recommends a consolidated approach to the requesting and programming of works to minimise disruptions and maximise cost efficiencies. Water Corporation recommends any reticulation reinforcement or new work should be managed by the City of Bayswater due to the fractured land ownership within the area. It is recommended that a working group between the City of Bayswater and Water Corporation is set up in order to help plan and coordinate precinct development and staging with any Water Corporation trunk infrastructure capital works.
- f) Identification of required infrastructure upgrades requires more detailed water modelling and more specific demand inputs. Water reticulation planning will be done after Structure Plan and rezoning is confirmed.

#### 3.1.2 <u>Wastewater</u>

Water Corporation Western Australia is the state authority regulating the distribution, storage and disposal infrastructure for wastewater in the area.

#### 3.1.2.1 Current Infrastructure

The Morley Activity Centre is currently well serviced by wastewater infrastructure provided by Water Corporation. The Morley Activity Centre area reticulates by gravity main into three separate pumping stations. These catchment boundaries are shown on drawing E14021-001-CI-D-SK1 in Appendix A.

The Pumping Stations then convey wastewater to Pumping Station Creswell Road Bypass Dianella where it ultimately leads to the Beenyup Wastewater Treatment Plant.

#### 3.1.2.2 Service Capacity

**Table 3-2** below shows the current capacity of the Sewer Pumping Stations serving the MAC. Currently there is sufficient capacity in the Pumping Stations to cater for short-medium term growth.

		Wastewater Pumping Station Capacity					
Pumping Station	Sewer Design Flow (Ls¹)	Long Term Pump Rate (Ls <sup>1</sup> )	Capacity (Ls <sup>1</sup> )	Contributing Precincts	Post Development Flow Increase (Ls <sup>1</sup> )	Future Capacity / [Shortfall] (Ls <sup>1</sup> )	
				Central Core	6.51		
				Outer Core North	0.30		
Morley PS 1	18.7	24.9	6.2	Outer Core South	2.41	[7.06]	
				Collier Road	0.91		
			Walter Road West	3.13			
Morley DS 6	42.4	70.0	22.2	Vera Street	1.22	20.65	
woney FS 0	43.4	70.0	<u> </u>	Smith Street	2.33	29.05	
	ley PS 8 34.5 46.4 11.9			Crimea Street	2.04		
				Civic & Education	0.36		
Morley PS 8 34.5 46.4 11.9		11.9	Mixed Business East	2.07	0.66		
				Mixed Business West	1.74		
				Broun Avenue	2.68		
				Coode Street	2.35		

 Table 3-2
 Wastewater Pumping Station Capacity

			Wastewater Reticulation Pipe Capacity				
Pumping Station	Reach	Sewer Design Flow (Ls <sup>1</sup> )	Pipe Size (mm) / Grade (1:X)	Capacity (Ls¹)	Contributing Precincts	Post Development Flow Increase (Ls <sup>1</sup> )	Future Capacity / [Shortfall] (Ls <sup>1</sup> )
					Central Core	6.51	
	10724	24.5	200 / 400	5.5	Outer Core North	0.30	[5 25]
Morley	V 27 34	54.5	3007400	0.0	Collier Road	0.91	[5.55]
PS 1					Walter Road West	3.13	
	C0664	11.3	225 / 200	15.7	Outer Core South	2.41	13.29
Morley	P2061	10 F	290 / 450	67 F	Vera St	1.22	F2 0F
PS 6	R2901	12.5	3607450	57.5	Smith Street	2.33	55.95
					Crimea Street	2.04	
					Civic & Education	0	
Morley PS 8	T2584 19.3	300 / 400	300 / 400 20.7	Mixed Business East	2.07	12.17	
					Mixed Business West	1.74	
					Broun Avenue	2.68	

 Table 3-3
 Wastewater Reticulation Pipe Capacity

**Table 3-3 above** shows the current capacity of the pipe immediately upstream of the connecting Pumping Station. This shows that the current pipe networks are capable of conveying the current design flow with capacity for an increase in flows. The capacity of the pipes is estimated using the maximum allowable flow within the range of grades shown in Table 4.4 of Water Corporation Design Standard SD50 – Design and Construction Requirements for Gravity Sewers DN150 to DN600 shown in Figure 3-2.

PIPE DIA. MINIMU Mm GRAD	MINIMUM GRADE	MAXIMUM GRADE	MAXIMUM DISTANCE BETWEEN	MAXIMUM ALLOWABLE FLOW WITHIN THE RANGE OF GRADES SHOWN BELOW		
	ACCESS CHAMBERS/ MAINTENANC E SHAFTS	FROM	то	L/s		
150	1:200	1:5 (1)	100m		1:100	8
				1:101	1:200	6
				1:201	1:250 (2)	5
225	1:300	1:5 (1)	100m	-	1:200	27
				1:201	1:300	22
				1:301	1:350 (2)	20
300	1:400	1:30	150m	-	1:250	50
				1:251	1:400	40
375	1:450	1:40	150m		1:300	85
				1:301	1:450	70
450	1:500	1:55	150m	-	1:350	125
				1:351	1:500	110
600	1:800	1:80	180m	-	1:400	250
				1:401	1:600	200
				1:601	1:800	180

#### TABLE 4.4

SEWER GRADES

## Figure 3-2 Table 4.4 of DS 50 – Design and Construction Requirements for Gravity Sewers DN 150 to DN 600

#### 3.1.2.3 Future Demand

**Table 3-2** shows the projected flow increase to the sewer pumping stations serving the MAC. These values are calculated using the Water Corporation Design Standard DS50: Table 4.1 - wastewater design flows from residential areas south of latitude 26° south and Table 4.3 - wastewater design flows from other than residential areas. The post development flow increase in column 6 of **Table 3-2** and **Table 3-3** show the future demand as a result of development from each precinct in accordance with the Morley Activity Centre Structure Plan.

#### 3.1.2.4 Required Infrastructure Upgrades

**Table 3-2** identifies that Morley PS 1 (Collier Road) will require an upgrade in the future if it is to service the increase in residential density in the contributing catchments. **Table 3-2** also identifies that there remains 6.2 Ls<sup>-1</sup> of capacity for short term growth. The remaining two Pumping Stations have sufficient capacity to service the increase in flows as a result of increase population density in the contributing catchments. With Morley PS 6 having 29.65 Ls<sup>-1</sup> spare capacity and Morley PS 8 having 0.66 Ls<sup>-1</sup> spare capacity after development.

**Table 3-3** identifies that the reach of pipe immediately upstream of Morley PS1 will require upgrading or duplication in order to convey the additional flows cause by the increased population density in the contributing areas. This will be done by Water Corporation as this is 300mm diameter pipe. These calculations were solely carried out on the single reach upstream from each pumping station. Further investigation will be required at the development stage to discover the impact of additional flows for each reach.

The Water Corporation provided initial advice to Cardno in December 2014. In their advice they offered the following key points:

a) Redevelopment works may be subjected to headworks charges on works within the precincts.

- b) Minor reticulation works, typically pipework less than 300mm diameter, are to be funded by the developer.
- c) Water Corporation will upgrade the headworks, pipe equal to or greater than 300mm diameter and pump stations, as and when required.
- d) Water reticulation planning will be done after Structure Plan and rezoning is confirmed.

#### 3.2 Gas

Cardno consulted ATCO Gas to gain network infrastructure information for the Morley Activity Centre based on the anticipated demand increases provided in **Table 3-4** below.

Refer to drawing E14021-001-CI-D-SK4 in Appendix A for the existing gas infrastructure within the Morley Activity Centre.

#### 3.2.1 <u>Current Infrastructure</u>

ATCO Gas currently supplies the Morley Activity Centre via two gas infrastructure networks; A Medium-Low Pressure (MLP) network has the capacity to serve approximately 4500 residential customers and a Medium Pressure (MP) network which has the capacity to serve approximately 3800 residential customers.

#### 3.2.2 <u>Service Capacity</u>

Correspondence from ATCO Gas advises that the current infrastructure network is at or close to maximum capacity.

MAC Projected Gas Demand					
Network	Precinct Name	No. of Future Dwellings	Total		
	Collier Rd	670			
	Coode St	1058			
	Crimea St	562			
	Mixed Business West	236			
MLP	Outer Core South	473	9246		
	Smith St	1474			
	Vera St	439			
	Walter Rd West	1189			
	Collier Rd	670			
	Broun Ave	657			
MD	Central Core	710	E 400		
IVIP	Outer Core N	473	5433		
	Mixed Business East	236			

#### 3.2.3 Future Demand

#### Table 3-4 MAC Projected Gas Demand

Based on Table 3-4 above, the existing gas networks will not handle the proposed growth without reinforcement. ATCO Gas Australia monitors gas load throughout various sub-networks over time and reinforcement is completed as required to ensure adequate gas is available.

#### 3.2.4 <u>Required Infrastructure</u>

Reinforcement may not be required for many years and by then the modelling results may have changed significantly. As a result it is difficult to determine exactly what infrastructure will be required to meet the demand.

As the Morley Activity Centre develops over time ATCO Gas will respond to the increased demand with investment in the required infrastructure.

#### 3.3 Electricity

Cardno engaged Western Power to carry out a feasibility study for the Morley Activity Centre based on the assumption of a doubling load in the short to medium term and doubling again in the medium to long term.

The Western Power feasibility study is attached in Appendix B of this document. Refer to drawing E14021-001-CI-D-SK2 for existing electrical infrastructure within the Morley Activity Centre.

#### 3.3.1 Current Infrastructure

The Morley Activity Centre is served by the Morley Zone Substation located to the south west of the development area as shown in Drawing E14021-001-CI-D-SK3

The distribution network in the area is 11kV and is serviced by six existing High Voltage (HV) distribution feeders.

#### 3.3.2 Service Capacity

Existing demand on the HV distribution feeder is approximately 28 Mega Volt Ampere (MVA). Western Power's network capacity forecast identifies approximately 15-20 MVA of available substation capacity in the Morley area.

After a recent upgrade load utilisation of the six HV feeder cables is high with approximately only 8 MVA of spare capacity remaining.

#### 3.3.3 Future Demand

Estimated future demand based on the Morley Activity Centre Structure Plan will see a doubling of network load in the short term (i.e. 5 years). This will see demand rise from 28 MVA to 56 MVA.

A further doubling of the network load is expected in the medium to long term (5 – 10+ years) and will see demand rise from 56 MVA to 112 MVA.

#### 3.3.4 <u>Required Infrastructure</u>

#### 3.3.4.1 Short-Medium Term

A doubling of the network load within the Morley Activity Centre area can be achieved with the existing substation capacity taking into account realistic network impacts and load diversity.

Load diversity is a term used to describe how the total load expected to be drawn during a peak period does not equal the sum of all load sources. This is due to different peak periods used by end consumers.

However, the distribution network would require significant augmentation of additional new feeder circuits from the substation to support the load growth.

#### 3.3.4.2 Medium-Long Term

The doubling of the network load in the medium to long term (5 to 10+ years) will require the upgrade of the Morley (MO) substation on Catherine Street and the installation of a new transformer. Alternatively, the increased load could trigger the construction of a new substation. However, a new substation is unlikely as Western Power do not own any more land in the MAC area.

#### 3.3.4.3 Galleria Shopping Centre

The assessment excluded any future developments of the Galleria Shopping Centre as Federation Centres will be responsible for relevant power infrastructure upgrades.

#### 3.4 Telecommunications

#### 3.4.1 Current Infrastructure

The Morley Activity Centre is well serviced by telecommunications infrastructure with optical fibre running in or adjacent to all precincts. This infrastructure is owned by various telecommunications providers including Telstra, Optus and others. Refer drawings E14021-001-CI-D-SK4 in Appendix A for a detailed plan of the fibre optic cable locations.

Mobile network coverage in the area is well serviced with 4g and 4gx covering the entire Morley Activity Centre Area under the Telstra network other network providers may vary.

The National Broadband Network (NBN) rollout has not commenced in this area. There is currently no advice to build NBN-ready dwellings in the area.

#### 3.4.2 Service Capacity

There are currently no constraints on capacity of the fibre optic cable.

#### 3.4.3 Future Demand

Demand for telecommunication will increase with the increase in residential and commercial activity.

#### 3.4.4 <u>Required Infrastructure</u>

Should the developer wish to register the development with Telstra smart communities; this must be done twelve weeks prior to construction.

The infrastructure within the development will be installed by the developer. Telstra can be engaged to install infrastructure within the development at the developer's expense.

Telstra's commercial pit and pipe service will generally not be offered in developments where NBN Co has confirmed agreement to install NBN Co fibre within a development stage.

#### 3.5 Drainage

#### 3.5.1 Current Infrastructure

Stormwater Runoff within the Morley Activity Centre reticulates through the City of Bayswater drainage infrastructure networks and discharges into the Water Corporation system.

The Water Corporation drainage network in the area consists of a number of open drains, pipes and compensating basins.

Drawing E14021-001-CI-D-SK5 in Appendix A shows the current Water Corporation drainage infrastructure in the Morley Activity Centre.

The network generally drains from North-East to South West of the MAC and ultimately discharges into the Bayswater Brook Main Drain as shown on drawing E14021-001-CI-D-SK5 in Appendix A.

#### 3.5.2 <u>Service Capacity</u>

A meeting was attended with Water Corporation on the 12<sup>th</sup> December 2014 and the advice received was that the current drainage system contains sufficient capacity to deal with the increase in residential and commercial density. This is due to the fact that there will be no significant increase to the impervious area within the Morley Activity Centre as a result of this Structure Plan.

Advice was received that Russell Street compensating basin has sufficient space for expansion to deal with any increase in runoff into the future.

#### 3.5.3 Future Demand

As stated previously, as a result of modelling carried out by Water Corporation no additional runoff is expected from the development due to changes within the Structure Plan.



Figure 3-3 Proposed modification to existing drainage system – Morley Activity Centre Local Water Management Strategy March 2014

The City of Bayswater lists the location of potential living stream upgrades in **Figure 3-3** above. The figure is sourced from the Morley Activity Centre Local Water Management Strategy March 2014.

#### 3.5.4 <u>Required Infrastructure</u>

#### 3.5.4.1 Jacobsons Way Open Drain

To achieve a living stream on Jacobsons Way a wider reserve would be required to achieve the same capacity of conveyance. As a result Water Corporation have stated that this option is not feasible.

#### 3.5.4.2 Vera Street Open Drain

To achieve a living stream from the open drain adjacent to Vera Street a wider reserve would be required to achieve the same capacity of conveyance. As a results Water Corporation have stated that this option is not feasible.

#### 3.5.4.3 Collier Road Compensating Basin

Collier Road Compensating Basin cannot be easily removed due to groundwater pumping discharging into the basin.

#### 3.5.4.4 Russell Street Compensation Basin

Landscaping of Russell Street Compensation Basin requires additional storage in Rudloc Reserve and increase culvert sizes between the Russell Street Basin and Rudloc Reserve.

#### 3.5.4.5 Rudloc Road Open Drain

Creation of a living stream from the existing Rudloc Road open drain is feasible particularly if this is coupled with a new compensating basin in Rudloc Reserve.

#### 3.5.4.6 Browns Lake East Branch Drain

Water Corporation advised that the current network is sufficient conveys stormwater runoff and that there were no immediate plans to upgrade Browns Road Each Branch Drain.

#### 3.5.4.7 Nora Hughes Open Drain

Creation of a living stream from the existing Rudloc Road open drain is feasible.

## 4 Upgrades, Implementation and Funding

#### 4.1 Upgrades

#### 4.1.1 <u>Water & Wastewater</u>

#### 4.1.1.1 Water

Exact water infrastructure upgrades will be determined when full water network modelling carried out by Water Corporation. Water reticulation planning and modelling will be done after Structure Plan and rezoning is confirmed effectively at development application phase.

#### 4.1.1.2 Wastewater

Morley Wastewater Pumping Station 1 (Collier Road) will require an upgrade in the future if it is to service the increase in residential density in the contributing catchments. There remains 6.2 Ls<sup>-1</sup> of capacity for short term growth.

Impact on the existing pipe network will need to be assessed on an ongoing basis. Initial investigation shows that the reach immediately upstream of Morley wastewater pumping station 1 will require an upgrade should the contributing catchments be developed fully.

#### 4.1.2 <u>Gas</u>

Upgrades are required to the Gas reticulation networks however at this time it is difficult to assess due to the development being undertaken sometime in the future. Modelling that far into the future cannot be accurate as consumer demand changes with time and as a result the required infrastructure upgrade remains unknown. Atco Gas will respond as capacity is required by installing the necessary infrastructure.

#### 4.1.3 Electricity

It is evident that the Western Power supply is the key constraint to redevelopment in the area and will play the key role in the staging and roll out of the development.

A doubling of the network load in MAC can be achieved with the existing substation capacity taking into account realistic network impacts and load diversity.

However, the distribution network would require significant augmentation of additional new feeder circuits from the substation to support the load growth.

The doubling of the network load in the medium to long term will require a substation upgrade and installation of a new transformer.

Renewable energy sources and technology advance will also factor in the demand required at the time of development.

#### 4.1.4 <u>Telecommunications</u>

Upgrades to the telecommunications network are ongoing and continually changing to meet consumer demand and advancing technologies. As a result it is difficult to determine the exact required infrastructure upgrade at this time.

#### 4.1.5 Drainage

The upgrade of two open drains into living streams is feasible, notably Rudloc Road Open Drain and Nora Hughes Open Drain.

The upgrade of Russell Street compensation basin to a landscaped bio-retention basin may require a new compensation basin in Rudloc Reserve and an upgrade to the pipe network connecting the two. The new compensation basin would only be required should the landscaped bio-retention basin have reduced capacity in comparison with the existing Russell Street compensation basin.

Further stormwater modelling will be required to determine the feasibility and required storage of this option if pursued.

#### 4.2 Funding

#### 4.2.1 <u>Water and Wastewater</u>

- a. Trunk Infrastructure upgrades (i.e. 300mm diameter or larger or Pumping Stations) are to be funded by Water Corporation.
- b. Internal reticulation up to 300m in diameter is to be funded by the developer.

#### 4.2.2 <u>Gas</u>

ATCO Gas policy in essence is that reinforcement due to ongoing natural growth of an area (e.g. infill) is generally funded by ATCO Gas Australia as part of the operation of the network. Where an individual developer is completing a larger development (e.g. greenfield subdivision), then the upgrades would typically be funded by that developer.

#### 4.2.3 <u>Electricity</u>

Natural Load Growth is to be funded by Western Power whereas a block load will be not be funded by Western Power. A block load is one that results in a load increase that exceeds the demonstrated underlying growth trend calculated for each respective substation.

Alternatively, Block Load i.e. Commercial or Mixed Use development is to be funded by Developer Contribution Plan. It is important as part of infill development structure planning *I* coordination processes that the relevant agencies or proponents engage with Western Power to inform specific development requirements and potential developer contribution plans from both a distribution and transmission perspective. Developer contribution plans for new distribution feeder networks requires further investigation between both parties, particularly for new infill and redevelopment areas.

The City of Bayswater has been advised by Wester Power that a number of funding arrangements are available. One option is that the City of Bayswater pay upfront for the infrastructure upgrades identified in section 4.1.3 of this document. The City would then seek to be reimbursed by developers. The challenge facing this approach is that installed infrastructure may not be ideally located for future development.

#### 4.2.4 <u>Telecommunications</u>

Reinforcement due to ongoing natural growth is typically funded by telecommunications companies as part competition to gain customer base in the area.

A developer seeking a smart community (Telstra) in new developments of 100 premises or more, developers will meet the cost of installing fibre-optic ready pit and pipe infrastructure and transfer the ownership of such infrastructure to NBN Co. in exchange for the provision of fibre within that pit and pipe network.

#### 4.2.5 Drainage

The City of Bayswater's Long Term Financial Plan provides for two living stream projects to be undertaken between 2013 and 2023. Further living streams will be considered if developer contributions or State government grants are received.

#### 4.3 Staging

As no service provider has pre-planned infrastructure upgrades no restrictions on staging are apparent.

#### 4.3.1 <u>Water and Wastewater</u>

The upgrades identified in section 4.1.1 of this document are considered Medium Term (5-10 years).

#### 4.3.2 <u>Gas</u>

The upgrades identified in section 4.1.2 of this document are considered Long Term (10+ years).

#### 4.3.3 Electricity

The upgrades identified in section 4.1.3 of this document are considered Medium Term (5-10 years).

#### 4.3.4 <u>Telecommunications</u>

Upgrades to the telecommunication network are ongoing and respond to market forces.

#### 4.3.5 Drainage

The upgrades identified in section 4.1.5 of this document are considered Short Term (0-5 years).

#### 4.4 Recommendations

#### 4.4.1 <u>Water and Wastewater</u>

Water Corp recommends a consolidated approach to the requesting and programming of works to minimise disruptions and maximise cost efficiencies. Water Corporation recommends any reticulation reinforcement or new work should be managed by the City of Bayswater due to the fractured land ownership within the area. It is recommended that a working group between the City of Bayswater and Water Corporation is set up in order to help plan and coordinate precinct development and staging with any Water Corporation trunk infrastructure capital works.

The City of Bayswater is to oversee the enactment of water conservation methods as outlined in the Water Corporation Water Forever 2009 document and the City of Bayswater's Local Water Management Strategy Section 4.2 – Water resource use.

#### 4.4.2 <u>Electricity</u>

Provisions should be considered in design and construction of any new development to reinforce the land use and development restrictions within proximity to zone substation and transmission/distribution lines. Refer to **Table 4-1** for clearance requirements.

Clearance (horizontal and vertical from centre of line)					
Line Voltage Clearance					
Transmission	330kV	35.0m			
	132kV	10.0m			
	66kV	8.0m			
Distribution	<33kV	3.0m			

#### Table 4-1 Horizontal and Vertical Clearance Distance

Analysis of environmental databases in the proximity of the zone substation reveals that there are no:

- Geomorphic wetlands on site
- Threatened Ecological Communities identified
- Threatened priority flora identified
- Threatened priority fauna identified
- 'Bush Forever' sites identified
- Redbook Recommended Conservation Zones identified
- RAMSAR sites identified
- Environmentally Sensitive Areas (for the purposes of the Clearing Regs) identified
- Swan Coastal Plain EPP wetlands identified

There are no extraordinary environmental protections applying to the site nor is there any sensitive land use to concern any future development of or surrounding the zone substation. These findings are a desktop assessment only and a detailed environmental impact assessment should be considered prior to construction.

The City of Bayswater could implement a minimum green star rating requirement for any new developments within the Morley Activity Centre. Minimum energy conservation requirements can help reduce peak electricity demand, increase load diversity and reduce greenhouse gas emissions. These measures may delay to onset of the medium-long term infrastructure requirements.

#### 4.4.3 <u>Telecommunications</u>

Although the National Broadband Network (NBN) has not identified that a rollout is to occur in the Morley Activity Centre is recommend that the City of Bayswater prepares plans for such an event. The City of Bayswater should review the Best practice guide for councils when initially dealing with NBN Co.

## 5 Conclusion

In conclusion; the development goals as outlined in the Morley Activity Structure Plan are not constrained by the provision of adequate infrastructure for water, wastewater, gas, electricity, telecommunications or drainage. Planning and construction of required infrastructure will be met by the associated service provider in response to ongoing new development. The existing drainage infrastructure network does not require reinforcement as a result of the development of the Morley Activity Centre as outlined in the Structure Plan. Therefore, based on advice received by Cardno from the relevant service authorities, there should be no reason from a servicing point of view that the Morley Activity Centre Structure Plan could not be implemented.

Morley Activity Centre Servicing Report	
APPENDIX A EXISTING SERVICE LOCATIONS	





0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

<u>LEGEND</u>	
	SITE BOUNDARY
	MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY
	SEWER CATCHMENT BOUNDARY
S	EXISTING SEWER TRUCK MAIN (DIA300+)
SPM	EXISTING SEWERAGE PRESSURE MAIN
•	EXISTING SEWERAGE PUMPING STATION

# SERVICES NOTES:

- 1. SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
- REFERENCE IS TO BE MADE TO TELSTRA DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD TELSTRA PLAN ENQUIRIES.
- 3. REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
- 4. REFERENCE IS TO BE MADE TO ATCO GAS DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD ATCO GAS PLAN ENQUIRIES.



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	Drawing Number			Revision
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LEGEND	
	SITE BOUNDARY
	MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY
	EXISTING CONTOURS
D	EXISTING WC DRAIN
D	EXISTING WC BAYSWATER BROOK MAIN DRAIN
	EXISTING WC OPEN DRAIN
	EXISTING WC COMPENSATION BASIN (CB)

# SERVICES NOTES:

- 1. SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
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- 3. REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
- 4. REFERENCE IS TO BE MADE TO ATCO GAS DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD ATCO GAS PLAN ENQUIRIES.



#### CITY OF BAYSWATER MORLEY ACTIVITY CENTRE NOT FOR CONSTRUCTION 17.01.2015 A.H.D 1:4000 A1 EXISTING STORMWATER DRAINAGE PLAN E14021-001-CI-D-SK6 Α



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Shaping the Future	Date	SERVILING REPORT				
Cardno (WA) Pty Ltd	23.01.2015		Date 17 01 2015	Datum	Scale	Size
11 Harvest Terrace, P.O. Box 447, West Perth Western Australia 6872 Phone (08) 9273 3888 Fax (08) 9486 8664	23.01.2015	TITLE EXISTING GAS PLAN		А.П.D	1:4000	A I Revision
South West Regional Office Unit 2, 89 Duchess Street, PO Box 713, Busselton Western Australia 6280 Phone (08) 9781 1444 Fax (08) 9752 2471 PR	Date 23.01.2015		E14021	-001-CI-	D-SK5	A

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	SITE BOUNDARY
	MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY
G	EXISTING GAS (MEDIUM PRESSURE)
G	EXISTING GAS (MEDIUM-LOW PRESSURI

## SERVICES NOTES:

- SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
- REFERENCE IS TO BE MADE TO TELSTRA DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD TELSTRA PLAN ENQUIRIES.
- 3. REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
- 4. REFERENCE IS TO BE MADE TO ATCO GAS DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD ATCO GAS PLAN ENQUIRIES.





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<b>Cardno</b>	Designed PH	Date 23.01.2015	Project MORLEY AC
Shaping the Future	Checked NP	Date 23.01.2015	SERVICING R
Cardno (WA) Pty Ltd 11 Harvest Terrace, P.O. Box 447, West Perth Western Australia 6872 Phone (08) 9273 3888 Fax (08) 9486 8664 South Mart Designed Office	Reviewed PR	Date 23.01.2015	Title EXISTING CO
Unit 2, 89 Duchess Street, PO Box 713, Busselton Western Australia 6280 Phone (08) 9781 1444 Fax (08) 9752 2471	Approved PR	Date 23.01.2015	

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SITE BOUNDARY MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY EXISTING COMMS (OPTICAL FIBRE)

# SERVICES NOTES:

- 1. SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
- 2. REFERENCE IS TO BE MADE TO TELSTRA DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD TELSTRA PLAN ENQUIRIES.
- 3. REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
- 4. REFERENCE IS TO BE MADE TO ATCO GAS DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD ATCO GAS PLAN ENQUIRIES.



#### OF BAYSWATER CTIVITY CENTRE NOT FOR CONSTRUCTION REPORT T7.01.2015 Datum Drawing Number 1:4000 A1 OMMS PLAN E14021-001-CI-D-SK4



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	JYY	17.01.2015	CITY OF BAYSWATER	
<b>Cardno</b>	Designed PH	Date 23.01.2015	MORLEY ACTIVITY CENTRE	
Shaping the Future	Checked	Date	SERVILING REPORT	
Cardno (WA) Pty Ltd	NP	23.01.2015		Date Datum Scale Size Size
11 Harvest Terrace, P.O. Box 447, West Perth Western Australia 6872 Phone (08) 9273 3888 Fax (08) 9486 8664		23 01 2015	Title EXISTING POWER PLAN	17.01.2015 А.П.D 1:4000 АТ Drawing Number
South West Regional Office Unit 2:89 Duchess Street: PD Box 713, Busselton Western Australia 6280	Approved	Date 2310 112 013		
Phone (08) 9781 1444 Fax (08) 9752 2471	PR	23.01.2015		L 1402 I-00 I-LI-D-3K3 A

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

L	E	G	E	Ν	D

	SITE BOUNDARY
	MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY
0/H	EXISTING ELECTRIC OVERHEAD (HIGH VOLTAGE)
0/H	EXISTING ELECTRIC OVERHEAD (TRANSMISSION)
——— HV ———	EXISTING ELECTRIC UNDERGROUND (HIGH VOLTAGE)

# SERVICES NOTES:

- SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
- REFERENCE IS TO BE MADE TO TELSTRA DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD TELSTRA PLAN ENQUIRIES.
- REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
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<b>Cardno</b>	Designed PH	Date 23.01.2015	Project MORLEY ACTIVITY CENTRE		
Shaping the Future	Checked	Date 23 01 2015	SERVICING REPORT		
Cardno (WA) Pty Ltd	INF Reviewed	ZJ.VI.ZVIJ Date	Title	Date 17.01.2015 A.H.D I:4000 A1	
Phone (08) 9273 3888 Fax (08) 9486 8664	PR	23.01.2015	EXISTING WATER PLAN	Drawing Number Revision	
Unit 2, 89 Duchess Street, PO Box 713, Busselton Western Australia 6280 Phone (08) 9781 1444 Fax (08) 9752 2471	Approved PR	Date 23.01.2015		E14021-001-CI-D-SK2 A	

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SITE BOUNDARY MORLEY ACTIVITY CENTRE AREA PRECINCT BOUNDARY EXISTING WATER TRUCK MAIN (DIA300+)

# SERVICES NOTES:

- SERVICE LINES ARE APPROXIMATE ONLY AND ARE SHOWN DIAGRAMMATICALLY. CONTACT THE RELEVANT AUTHORITY OR DIAL 1100.
- REFERENCE IS TO BE MADE TO TELSTRA DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD TELSTRA PLAN ENQUIRIES.
- REFERENCE IS TO MADE TO WESTERN POWER SAFETY GUIDELINES AND INFORMATION PROVIDED WITH DB4YD PLAN ENQUIRIES.
- 4. REFERENCE IS TO BE MADE TO ATCO GAS DUTY OF CARE STATEMENT WHICH IS PROVIDED WITH DB4YD ATCO GAS PLAN ENQUIRIES.



Morley Activity Centre Servicing Report

## APPENDIX B WESTERN POWER FEASIBILITY STUDY



# **Project Feasibility Report**

# City of Bayswater Morley Activity Centre Study



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# 1 Development Proposal

## 1.1 Location Details

The proposed Morley Activity Centre development area is located in central Morley adjacent to the 11kV Morley (MO) Zone Substation. Figure 1 below shows the geographical location of the proposed area and surrounding distribution networks.



Figure 1

## 1.2 Development Details

City of Bayswater proposes to rezone the Morley Activity Centre (figure 2) to a dense residential and commercial precinct (excluding Galleria Shopping Centre). The intent is to determine the present loading of the network and investigate the potential to double the present load over the next 5 years, and potentially doubling it again.



Figure 2

## 2 Study

### 2.1 Network load

The distribution network voltage in the area is 11kV.

There are six existing HV distribution feeders which are located within the Morley Activity Centre area;

Circuit	Name
MO358	Galleria
MO370	Coode St West
MO306	Drake St West
MO338	Drake St
MO354	145 Russell St
MO337	355 Walter Rd

The total existing load on the HV distribution feeder networks is approximately 28MVA and cable load utilisation was  $\geq$ 100%.

Western Power completed a distribution asset replacement project at Morley (MO) zone substation in 2014. The 11kV switchboard was replaced and de-rated HV feeder exit cables were upgraded with

larger conductor cables which has resulted in cable load utilisation reducing between 55% and 80% on the distribution network.

## 2.2 Study Results

Western Power's network capacity forecast identifies approximately 15-20MVA of available substation capacity in the Morley area (figure 3).

The load utilisation of the six HV distribution feeder circuits within the Morley Activity Centre is fairly high with approximately only 8MVA of spare capacity remaining.

The proposed doubling of network load in the Morley Activity Centre may be accommodated by substation capacity provided realistic network impacts and diversity are taken into account. However the distribution network will require significant augmentation or a number of new HV feeder circuits from Morley (M) Zone Substation to support the load growth.

A further doubling of the network load will result in a substation upgrade and installation of a new transformer or trigger construction of a new substation site.



Figure 3

## 2.3 Conclusion

Short to medium term load growth is available with costs to be calculated based on application for additional capacity.

Disclaimer:

Please Note: Power systems are dynamic in nature, due to new users and frequent changes in consumer behaviour. As such, Western Power's distribution electricity networks will change over time - this may have a bearing on the amount of reinforcement required to accommodate new developments.

Applicants need to be aware that Western Power's response may become out-of-date, resulting in a significant variation in power infrastructure requirements. To provide a firm connection proposal and cost, a formal application to Western Power will need to be made, in accordance with current connection policies.

Morley Activity Centre Servicing Report

# APPENDIX C

WATER CORPORATION WATER/ WASTEWATER PLANNING SCHEME







E 6007					
20 3179	B. BRADSHAW	P. MANNING	I. SCOTT		
	SCALE 1:5000	5 JANUARY 1997	FILE NO. 0435 - 01	A1	



MAIN FILE : Fig E1\_1.SCH REF FILES : eymbid.brd, 5571.cad, em75up2a.hyd, Boosterz.dgn

#### About Cardno

Cardno is an ASX200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company, listed on the Australian Securities Exchange [ASX:CDD].

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