

APPENDIX E  
AURECON INFRASTRUCTURE SERVICING REPORT

# Arlington

Infrastructure Servicing Report

**Doncaster Developments Ltd**

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# Document control record

Document prepared by:

**Aurecon New Zealand Limited**

Level 2, Iwikau Building  
 93 Cambridge Terrace  
 Christchurch 8013  
 New Zealand

**T** +64 3 366 0821  
**F** +64 3 379 6955  
**E** christchurch@aurecongroup.com  
**W** aurecongroup.com

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<b>Author signature</b>		<b>Approver signature</b>	
<b>Name</b>	J Tucker	<b>Name</b>	R Smith
<b>Title</b>	Senior Civil Engineer	<b>Title</b>	Principal, Land Infrastructure

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# 1 Introduction

## 1.1 General

Doncaster Developments Ltd is pursuing the rezoning of approximately 11.6 hectares of land located west of Rangiora. The land is currently zoned as Rural Residential (Res4a) under the Waimakariri District Council (WDC) Operative Plan but Residential (Res2) zoning is being sought to which may see development of approximately 110 residential lots.

Aurecon has been engaged to investigate the servicing matters relating to the proposed development. This report provides an assessment of the options for providing necessary servicing infrastructure to enable future development of the site. The services investigated include water supply, stormwater drainage, wastewater disposal and power/telephone services.

## 1.2 Description of the Site

### 1.2.1 General

The site is located west of Rangiora township and incorporates five separate titles of land (refer Figure 1). The current land use is predominantly pastureland and an existing residential dwelling and horse stables at the southern portion of the development (266 and 260 Lehmans Road).



Figure 1: Location of site (source GRIP Map)

### 1.2.2 Surrounding land use

The site is bounded to west by rural land and to the north by the Rangiora Racecourse. Two sets of power Transmission Lines run through the property parallel to the southeast boundary of the site, with provision for a future bypass road between the transmission lines (Parrott Road) which will potentially divert traffic from

Lehmans Road to River Road. A portion of this road will provide a connection from the proposed development to Sandown Boulevard the existing residential area east of the site. Lehmans Road is aligned in a north-south direction along the site's western boundary.

### **1.2.3 Access**

The site can be currently accessed from Lehmans Road on the western boundary. It is anticipated that access to the development will be available from a new intersection off Lehmans Road and also from a new connection to Sandown Boulevard to the east via a portion of the existing paper road, Parrot Road, that would be formed as part of the development. Reserve areas which can provide pedestrian and cycle access to the site have been accommodated for through from Payne Court, Helmore Streets and Salisbury Avenue in the adjacent subdivisions.

### **1.2.4 Topography**

The site is relatively flat with a grade (1 in 200) from a north to south east direction from approximately 46 mRL to approximately 44m.

### **1.2.5 Geotechnical Ground Conditions**

Geotechnical investigations previously completed on the site and the residential area east of the site through to West Belt have indicated the soil profile typically consists of topsoil overlying sandy silt, overlying gravel. Based on review of a limited number of test pits excavated on and nearby the site, there are underlying gravel levels 2-4 metres Below Ground Level (BGL). The groundwater is approximately 6 meters BGL. Test pits and infiltration testing which were completed as part of the Westpark subdivision located directly to the south of the site, confirmed a measured infiltration rate of 600-720 mm /hour within the gravel layers. Infiltration testing undertaken during development of the residential areas east of the site indicated significantly higher infiltration rates where clean free draining gravels were encountered. It is anticipated that the ground conditions on the site are consistent with the neighbouring subdivisions and very well suited to a soakage-based stormwater system for the development.

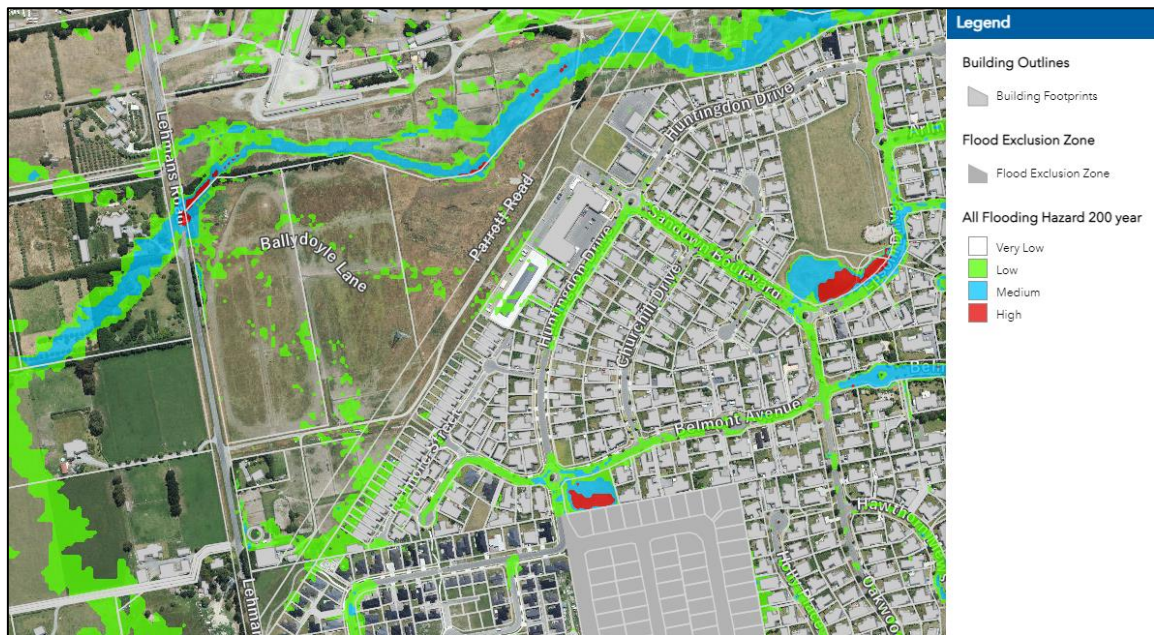
Although no soil strength testing has been undertaken at the site, the limited investigations did not reveal any conditions that would prevent residential development including the presence of weak, organic, or liquefiable subsoils. However, it is recommended that site specific testing be undertaken in accordance with MBIE (2012) guidance as part of the detailed design investigations for the development and prior to building on any allotment.

### **1.2.6 Ashley River Flood Hazard**

The Ashley River is located to the north of the site and flows in a west to east direction. Environment Canterbury (ECan) has undertaken flood modelling work to identify possible breakouts of the Ashley River. The modelling maps illustrates the worst-case scenario from a combination of three different modelling methods including localised flooding, flooding resulting from the Ashley River Breakout and Coastal flooding. The localised flooding relates directly to the rainfall on the ground while the Ashley Breakout flooding includes flow directly from a breach of the stop back plus the localised rainfall which would occur simultaneously. The water depths modelled represent the water depths anticipated for the 200-year Average Recurrence Interval (ARI) for each modelling method. For the Ashley Breakout flooding scenario, a 200 ARI breakout from the Ashley River was modelled in conjunction with a 20 localised rain event.

The classification for the area is Low Hazard (Figure 2) which is summarised as less than 0.3m of water depth with some water egress into sheds and structures with floor levels near or at ground level. It is proposed that any flood risks will be minimised through the construction of sections to achieve minimum the floor levels in accordance with WDC requirements and grading of finished ground to roadways to provide overland flow paths through the site. This approach has been applied successfully to surrounding development in west Rangiora as demonstrated by the flood maps which show flooding is largely confined to roadways and reserve areas of

recent developments south and east of the site. Development of this site will also provide opportunity to address minor residual areas of flood risk to existing properties adjacent the future bypass road (Parrott Road) corridor.



**Figure 2: Flood hazard modelling Waimakariri District Council**

*(source Waimakariri District Natural Hazards Interactive Viewer (arcgis.com))*

## 2 Proposed Earthworks

The proposed works include cut to fill and cut to waste to create the roadways, and to slope the sections towards the roadways. The philosophy adopted in design of the earthworks will minimise the amount of cut and fill required to achieve the desired outcomes relating to urban form, infrastructure servicing and management of potential flood risk.

### 2.1.1 Transmission power lines

There are two existing 220kV power transmission power lines which transverse the south eastern boundary of the site. It is proposed any earthworks operations within the site will be completed in compliance with minimum clearances outlined in the New Zealand Electrical Code of Practice (NZECP 34:2001). The site will be developed with a subdivision layout that will ensure all buildings and structures will comply with minimum setback requirements and overhead lines clearance specified by Transpower. The land under and adjacent immediately the transmission lines can be utilised for compliant land use such as roading, open space and utility areas for stormwater management and conveyance of other services.

## 3 Proposed Infrastructure

### 3.1 Roothing

An internal roading network can be constructed that will be accessed from new intersections on both Lehman's Road on the western boundary of the site and the proposed bypass road (Parrott Road) on the eastern boundary. A mixture of roading hierarchy will be included to meet Councils requirements, It is anticipated that the residential sections which have a road frontage to Lehman's Road will be accessed from roads located within the subdivision, consistent with adjacent Westpark subdivision south of the site. It is also anticipated that

a portion of the proposed bypass road will be constructed to provide linkage to the development from Sandown Boulevard and that extensions to the existing footpaths from Payne Court and Helmore Street will provide pedestrian access the site and any footpaths associated with the bypass road.

### 3.2 Stormwater

The ground conditions beneath the site are well suited to a soakage based stormwater management system with relatively shallow free draining gravels. A stormwater system consisting of a combination of the following measures could be provided to service the proposed residential development:

- Stormwater from hardstand areas from individual properties including roof and driveway areas discharged to ground via individual soakpits for up to the 10% AEP storm event in accordance Building Code E2 Acceptable Solutions.
- Stormwater reticulation servicing the internal roads designed in accordance with the Waimakariri District Council (WDC) Code of Practice (CoP) and treated prior to discharge to ground in accordance with the WDC Global Stormwater Discharge Consent (CRC184601) objectives. A stormwater management area located near the eastern boundary which could include a first flush and retention/infiltration basin to provide the necessary treatment for the initial 90% storm depth (25mm) in accordance with Christchurch City Council Waterways, Wetland and Drainage Guide (CCC WWDG).
- Stormwater runoff greater than the 90% storm depth (25mm) will bypass the first flush basin and enter the stormwater detention basin and soakage infrastructure. The detention basin will be designed to accommodate the stormwater detention volume for any additional flow up to the 2% AEP post-development scenario and will be discharged entirely to ground via a rapid soakage area constructed within the basin.

Table 1 provides indicative areas required for first flush and infiltration basins based on an estimated impervious area of 55% (CCC WWDG Living Zone 2) and assuming all stormwater is conveyed to the stormwater management area. The design infiltration rates have been approximated based testing completed on the adjacent Westpark subdivision located directly south of the site. The final stormwater management system configuration and location would be confirmed following more detailed site specific investigation and design in future stages of development.

	Volume (m <sup>3</sup> )	Basin area (m <sup>2</sup> )	Area (m <sup>2</sup> ) 1:4 batter slopes
First flush basin	1569	1252	1907
Detention /Infiltration basin	4727	2397	3950

**Table 1: Stormwater Management Infrastructure Concept Dimensions**

Secondary flow paths can be provided along roadways throughout the development to intercept and direct overland flow to the proposed stormwater management area as well as to existing roadways and reserve links beyond the development. Although it is intended that the new internal roads will provide the main secondary flow paths through the development, formalising the roadside swale on Lehmans Road will allow any residual flow to be intercepted and conveyed south in a similar approach to the adjacent Westpark development.

An indicative stormwater management plan is attached at Appendix A.

### 3.3 Wastewater

A preliminary assessment of options to service residential development of the site has confirmed that it can be serviced by a gravity wastewater reticulation system extended from existing WDC infrastructure in Sandown Boulevard and/or Pimlico Place. There is the ability to convey wastewater from the whole site to Pimlico Place or up to 73% of the area to Sandown Boulevard.



Although no specific wastewater modelling has been undertaken, the existing network is expected to have sufficient capacity as there is the ability to split flows into different downstream catchments via the Sandown Boulevard – Oakwood Drive line or the Pimlico Place – Huntingdon Drive line. There have also been recent developments downstream of the site that have modified and provided additional reticulation capacity to the network.

Alternatively, if required a new pump station could be provided within the development and the flow diverted south via a new rising main along Lehmans Road to a suitable discharge point to the existing gravity network.

The final preferred configuration would need to be agreed with Council and confirmed by testing in the Rangiora Township wastewater model. However, due to the number of feasible options available, no significant constraints to servicing the site have been identified.

An indicative wastewater servicing plan is attached at Appendix A.

### **3.4 Reticulated water**

The existing residential areas to the east and directly to the south are currently serviced by Rangiora Town Water Supply. Potential points of connection to the existing reticulation exist through extensions from Pimlico Place and Sandown Boulevard through the future bypass road connection through to site.

Although no specific modelling has been undertaken for the water reticulation, extension of the existing network from Helmore Street (100mm Ø uPVC ) and Sandown Boulevard (150mm Ø uPVC) is likely to be sufficient to provide the necessary firefighting and domestic water required for the development of the site. An additional connection to Oxford Road trunk main via the Westpark reticulation or a separate line down Lehmans Road could increase the security of supply by providing a third point of connection, although it is considered unlikely that this will be required to enable development of the site. It is not anticipated that any significant upgrading to the existing reticulation or headworks will be immediately required to service the site with both potable and firefighting water supply.

An indicative water supply reticulation plan is attached at Appendix A.

### **3.5 Power and communications**

The site can be serviced with power and communication through extensions from the surrounding developments. Mainpower and Enable have been contacted to confirm the proposed development can be serviced with power and communications, respectively. A connection application for the development has been submitted and Mainpower have confirmed that network supply has been anticipated for the Plan Change area. Formal confirmation for the provision of power and communications will be supplied once received from both service providers. Further communications will also occur with Transpower in relation setback requirements to the high voltage lines located on the south eastern boundary. Preliminary subdivision and servicing design has been undertaken in accordance with the known required setback and land use restrictions.

## Appendix A: Indicative Servicing Plans

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**Document prepared by**

**Aurecon New Zealand Limited**

Level 2, Iwikau Building  
93 Cambridge Terrace  
Christchurch 8013  
New Zealand

**T** +64 3 366 0821

**F** +64 3 379 6955

**E** [christchurch@aurecongroup.com](mailto:christchurch@aurecongroup.com)

**W** [aurecongroup.com](http://aurecongroup.com)

**aurecon**

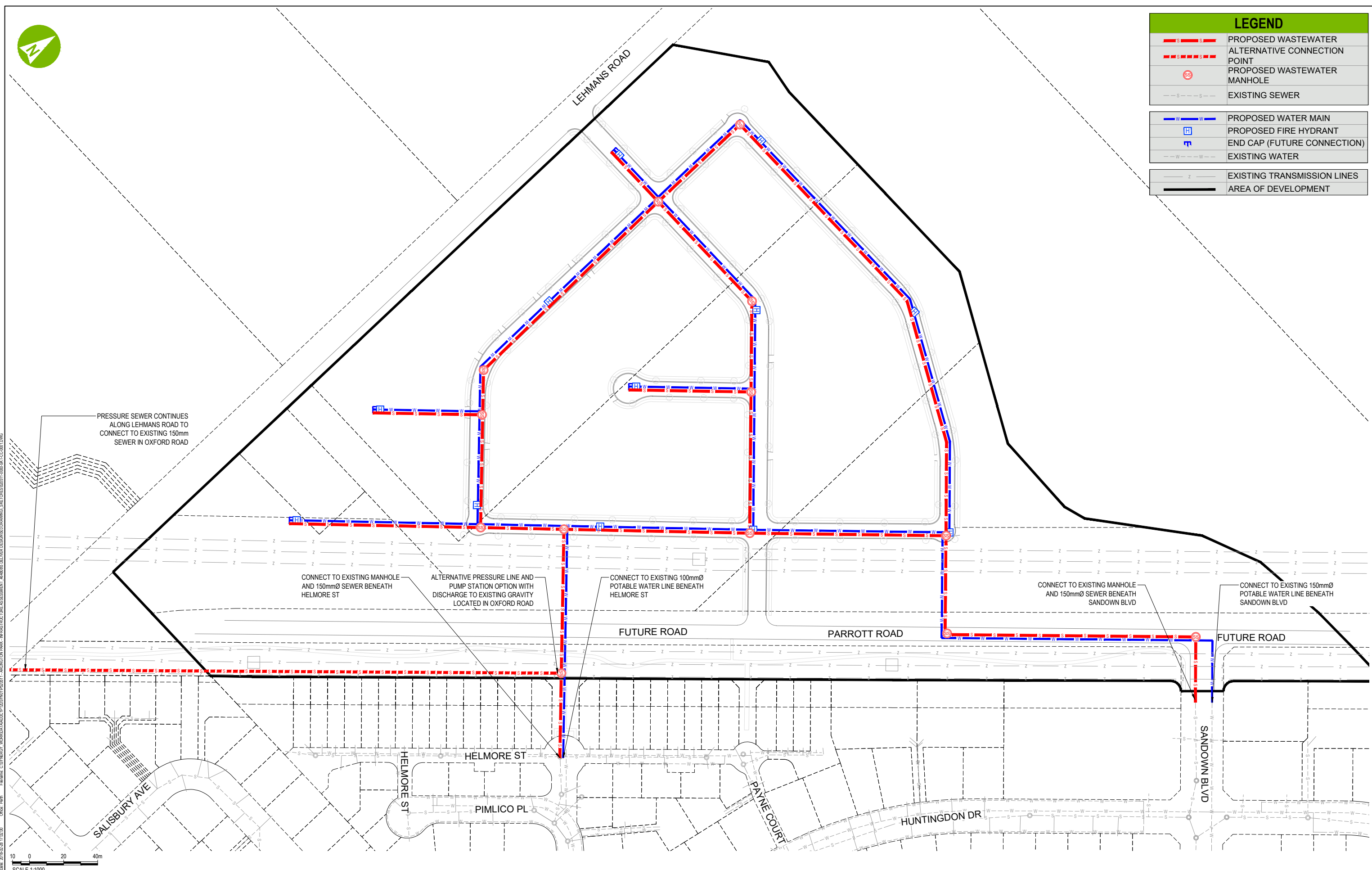
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LEGEND	
	PROPOSED WASTEWATER ALTERNATIVE CONNECTION POINT
	PROPOSED WASTEWATER MANHOLE
	EXISTING SEWER
	PROPOSED WATER MAIN
	PROPOSED FIRE HYDRANT
	END CAP (FUTURE CONNECTION)
	EXISTING WATER
	EXISTING TRANSMISSION LINES
	AREA OF DEVELOPMENT



PRESSURE SEWER CONTINUES ALONG LEHMANS ROAD TO CONNECT TO EXISTING 150mm SEWER IN OXFORD ROAD

CONNECT TO EXISTING MANHOLE AND 150mmØ SEWER BENEATH HELMORE ST

ALTERNATIVE PRESSURE LINE AND PUMP STATION OPTION WITH DISCHARGE TO EXISTING GRAVITY LOCATED IN OXFORD ROAD

CONNECT TO EXISTING 100mmØ POTABLE WATER LINE BENEATH HELMORE ST

CONNECT TO EXISTING MANHOLE AND 150mmØ SEWER BENEATH SANDOWN BLVD

CONNECT TO EXISTING 150mmØ POTABLE WATER LINE BENEATH SANDOWN BLVD

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DRAWN	M. KORAKO
DESIGNED	N. CATTO
REVIEWED	J. TUCKER

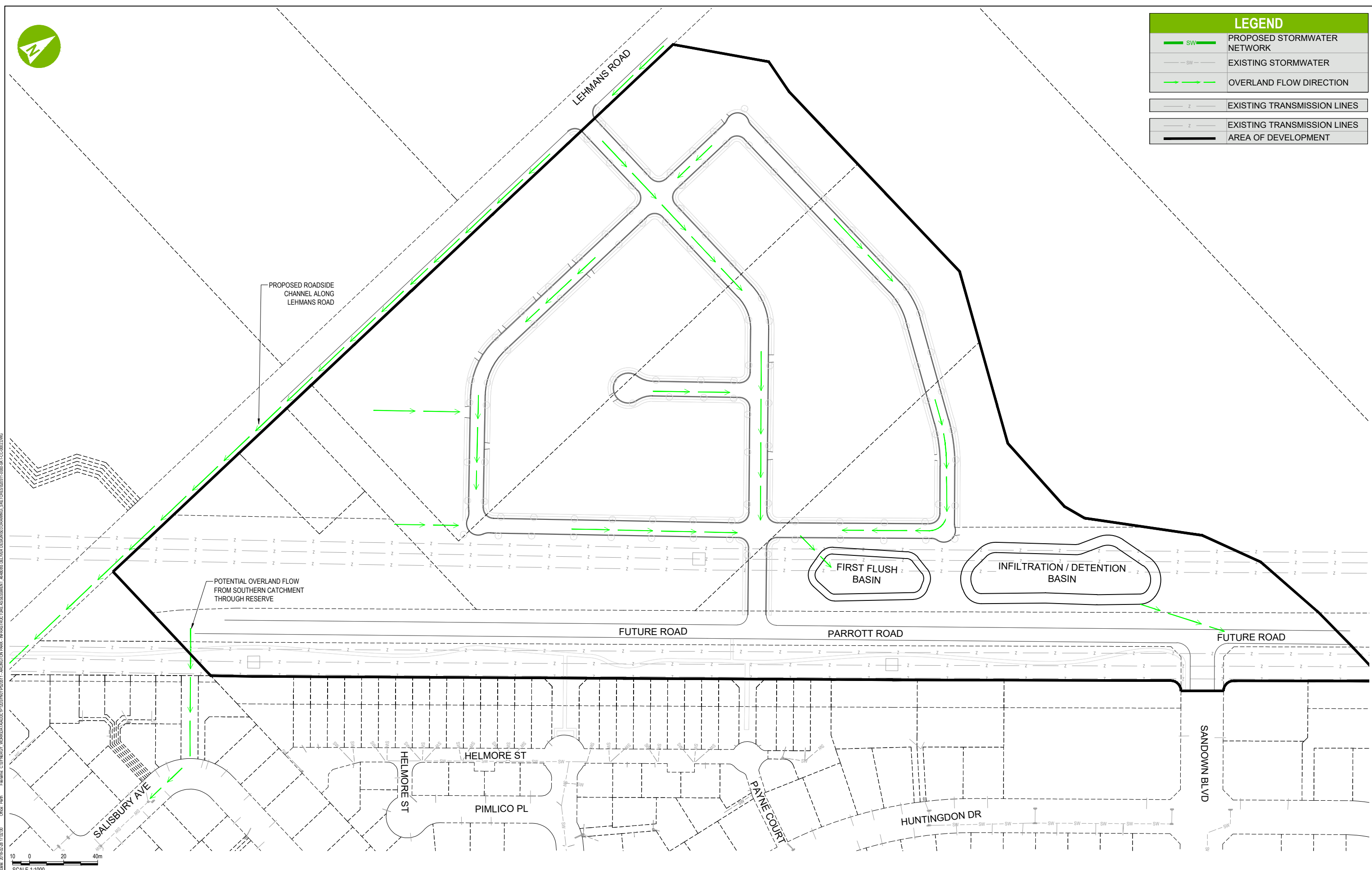
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DRAWING No.	520511
PROJECT No.	0000
AREA	SKT
TYPE	CC
DISC	0001
NUMBER	A
REV	



LEGEND	
	PROPOSED STORMWATER NETWORK
	EXISTING STORMWATER
	OVERLAND FLOW DIRECTION
	EXISTING TRANSMISSION LINES
	EXISTING TRANSMISSION LINES
	AREA OF DEVELOPMENT



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REVIEWED	J. TUCKER

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PROJECT	ARLINGTON PARK				
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