Annexure 6 – Servicing and Infrastructure Report

DREAMTIME LTD

19 June 2013

ENGINEERING AND SERVICING REPORT
Private Plan Change Application

e2 environmental
CONSULTING ENGINEERS

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Private Plan Change Application

Quality Control			
Author	*M Pollock & P Harte*	Client	*Dreamtime Ltd*
Reviewed by	*A Tisch*	Date Issued	*19 June 2013*
Approved by	*A Tisch*	Revision No.	-
Doc Name/Location	*S:\Projects\11034 Park Lane Subdivision\03 Coles Block\Deliverables\Block2 PC App Servicing Rpt\rep130115 DreamtimeRurResPC_FINAL.doc*		

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1 Introduction

The Coles propose to subdivide 20.59ha of land (the block) into approximately 36 rural residential lots. This report describes the servicing requirements.

1.1 Background

The block is zoned Rural Inner Plains. This plan change application seeks to re-zone the block to Living Zone 3.

If the application is successful the development will be constructed over 1 land parcel owned by the Coles. The site will be developed for rural residential purposes, into 36 lots ranging from 2,500m^2 to 10,000m^2.

1.2 Site Description

The block (Lot 4 DP74253) is located on the north east edge of Rolleston's residential area, immediately south of SH1 (see Figure 1).

The block is currently used for farming, predominately in pasture and crops. It slopes from NW to SE with a fall of 4m, at a grade of around 0.5% (1:200).

Figure 1 – Site Plan showing the Coles Proposal in Blue

2 Access

Existing access to the site is currently off Main South Road (SH1). However, once complete, access will be only available through Park Lane Stage 1 and Dreamtime residential block immediately adjacent. Two access points will be constructed connecting Seymour Drive (northern access) and Kendo Drive (southern access).

Internal roading comprises a network of local minor, local intermediate and local major roads. The roads will eventually be vested to Council. Private right-of-ways (ROWs) will serve lots without direct access to public roads.

Cycleways or pedestrian accessways may be included in the Dreamtime proposed plan change, according to the Outline Development Plan Options in Appendix A.

3 Water Supply

3.1 Background and Design

The Rolleston water reticulation is supplied by several bores throughout the town, currently concentrated in the north. The bores are fed from a secure aquifer, and the water requires no treatment. There are currently four operational bores, with a total maximum flow rate of approximately 200 L/s (17,280 m^3/d). The current consented maximum take is 427.4 L/s (36,927 m^3/d)[1], which allows for over three times the current maximum recorded demand of 123 L/s[2]. Therefore capacity exists for the proposed subdivision.

3.2 Distribution Network Modelling

Opus International Consultants Ltd (Opus) were commissioned to complete a water distribution model for the proposed adjacent subdivision and private plan change block, as attached in Appendix B.

In summary, they recommend:

1. A trunk main upgrade and new wells to service the increased water demand from the block.

2. The existing uPVC DN200 on Jones Road is extended to connect into the uPVC DN200 on Park Lane.

3. Discussions between the SDC and the Coles on cost sharing options for new and upsized infrastructure as part of the plan change.

The trunk infrastructure is shown on the plan in Appendix A.

[1] SDC 5 Waters Activity Plan Part 3 January 2012, Table 3-63 Rolleston Water Supply Resource Consent
[2] SDC 5 Waters Activity Plan Part3 January 2012, Section 3.1.12.1 Overview table

4 Wastewater

4.1 Background and Design

The applicant proposes to reticulate all 36 lots (approximately) by gravity to a new pump station at the southeast corner of the site, as shown in Appendix A. The effluent will then be pumped to the existing MH in Levi Road by one of the following options (refer to Overall Sewer Proposal for Coles Options 1, 2 and 3, Appendix A):

1. Option 1: A pump station will connect Dreamtime plan change block to Dreamtime subdivision, to then gravity reticulate to Levi Park subdivision's pump station, connecting into a manhole at Levi Road, or;

2. Option 2: A pump station on the Dreamtime plan change block will connect to the Park Lane Estates gravity system via Lot 50. The Dreamtime subdivision and Levi Park subdivision will be gravity reticulated to a pump station at Levi Road. The pump station in the Dreamtime subdivision block will be abandoned.

4.2 Capacity of the Levi Road Network and Treatment Plant

Design flows from SDC Engineering Code of Practice for Wastewater Drainage are:

- daily average sewer flow (ASF) of 220L per person,
- 3.1 persons per household[3],
- a peak flow coefficient of 2.5,
- wet weather flow coefficient of 2.0.

The design maximum flow (MF) for 36 lots is 1.42 L/s.

SDC's GIS records and discussions with the SDC wastewater assets team[4] confirm that the receiving network has available capacity to service the block[5]. The Strategic Asset Manager Utilities also advised that the treatment plant has capacity to treat the additional wastewater.

[3] Statistics New Zealand 2006 Census Data Quick Stats about Rolleston, Households.
[4] Meeting between A Tisch (e2), R Schulz (Park Lane Estates Ltd), Murray England (SDC Strategic Asset Manager Utilities) & Graham Wild (SDC Clerk of Works / Inspector) at SDC Rolleston June 2012
[5] Daily Operating Capacity (8860m³/day) , Peak Demand (1,988m³/day) - SDC 5 Waters Activity Plan Part 3 January 2012, Section 3.2.4.1 Overview table, Table 3-99 Rolleston Sewerage Scheme

5 Stormwater

5.1 Existing Site Stormwater Management

Existing stormwater management on site is typical of rural land in that all runoff either soaks to ground or runs overland to the nearest available drainage channel. Soils in the area are generally free draining.

The site is bounded by roads which effectively cut off surface runoff from the north and west entering the site.

5.2 Hydrogeology

The soil profile at this site is typically 0.2 to 0.3m of brown topsoil over 1.5 to 2.5m of sandy-silt over well graded gravel in a sandy matrix that extends to an undetermined depth. The infiltration rate was measured[6] at 7,000mm/hr.

A desktop study of well information from ECan GIS indicates that the site is located over an unconfined or semi-confined aquifer. The depth to groundwater is greater than 6m, with wells M36/0155 and M36/0259 located on site indicating a minimum recorded groundwater level of 19m below ground[7].

Infiltration systems are therefore the most appropriate means of stormwater disposal in this type of terrain.

5.3 Stormwater Design

All roofs are proposed to discharge to individual on-site rapid soak holes constructed by future land owners at the Building Consent stage. This is consistent with the rest of the town, where free draining gravels make this the most practical solution. Hardstand areas on lots will also drain to the rapid soak holes, with the remainder draining directly to the road reserve.

As per rule WQL6 of the Natural Resources Regional Plan (NRRP) the system will be designed to ensure that the discharge:

- does not cause stormwater from up to and including a 24 hour duration 2% annual exceedence probability (AEP) rainfall event to enter the living areas of any property;
- does not cause nuisance flooding of any property in a 10% AEP event; does not result in the ponding of stormwater on the ground for more than 48 hours;

[6] Appendix B: e2environmental - Rpt 130214 11034 03 prelim site investigation
[7] Appendix B: ECan Well bore data for M36/0155 and M36/2495

Table 1- Stormwater Treatment Summary

Area	Catchment Type	Drainage System	Disposal Detail
Roofs	Almost completely impervious	Spouting/down pipes	On-site soak pit
Paving on private property	Impervious	Surface runoff	Ground or on site soak pits
Roads, ROWs and driveways	Almost completely impervious	Surface runoff, sumps, pipes	Swales linked to soak pits in road reserve to be vested to SDC

Swales rather than kerb and channel will convey stormwater to road-side sumps. This is to meet SDC rural-residential road requirements[8]. The road-side sumps will be connected to rapid soak holes located in the road reserve, sized based on the contributing area. A stormwater concept plan is included in Appendix A.

The road rapid soak holes are designed according to SDC guidance with allowance for a 66% reduction in infiltration capacity over time. The rapid soak holes have been checked for the 10% AEP 10 minute and 2% AEP 24 hour events. This is to ensure the primary (10% AEP) events can be disposed of without ponding, and that longer duration 2% AEP events do not cause flooding beyond the subdivision boundaries (though there will be some ponding for shorter duration 2% AEP events). A calculation spreadsheet is included in Appendix C.

The rapid soak holes will extend at least 1m into the free-draining gravel layer, which means they will typically be 4m deep. There will be a minimum of 2m depth between the base of the stormwater treatment system and the groundwater.

5.4 Stormwater Discharge Authorisation

National Environmental Standards (NES) Phase 1 Investigation

Geoscience Consulting (NZ) Ltd.'s preliminary environmental site inspection of 7 February 2013 (NES Phase 1) noted two steel above-ground storage tanks (ASTs) on the block[9]. Their combined amount is expected to be less than 4,000L. The ASTs have contained diesel and petrol, and are therefore a potential HAIL activity; A17 – Storage tanks or drums for fuel, chemicals or liquid waste. ECan is currently reviewing the site's category on the Listed Land Use Register (LLUR), with a site audit by the Contaminated Sites Team planned for a later date. ECan also indicated that when/if the tanks are removed or if the land is to be developed, an environmental investigation will be required as per the NES Phase 2 (MfE, 2012)[10].

NRRP

Note that stormwater discharge post development meets rule WQL6 of the NRRP, because it is not actually listed on the LLUR and the volume of petrol / diesel stored or handled does not exceed the 5,000L threshold in Schedule WQL9. Also, as per

[8] Appendix C: Selwyn District Council Plan Change 32 road cross section for Living Zone 3 (rural residential).
[9] Appendix B: Geoscience Preliminary Environmental Site Inspection Report, 7 February 2013.
[10] Appendix B: ECan Site Statement from the LLUR, ENQ15917, 2 April 2013.

rule WQL6 of the NRRP, no treatment of post construction stormwater is required when the depth to groundwater exceeds 6m[11].

Land and Water Regional Plan (LWRP)
The conditions set out in section 5.72 of the proposed Land Water Regional Plan (LWRP) cannot be met since the discharge may be from or onto *potentially contaminated*[12] land.

Consent Requirements
Therefore, according to the relevant rules in the LWRP the *post construction* discharge is not permitted until further site investigations have occurred. If an NES Phase 2 study shows hydrocarbons in the soils are at or below background concentrations, the post construction discharge can become a permitted activity. Otherwise discharge consent is required and some sort of mitigation of the affected soil is required.

All consents will be obtained prior to works commencing onsite.

An erosion and sediment control plan will be prepared in accordance with ECan guidance documents[13] at the time of Engineering Approval for subdivision. This will outline the types of controls to be put in place to minimise the discharge of contaminants to the environment during construction.

[11] There are exceptions based on the type of activity planned and whether the land is contaminated
[12] *Potentially contaminated* means that part of a site where an activity or industry described in the list in Schedule 3 of the LWRP ("A17 - Storage tanks or drums for fuel, chemicals or liquid waste" is listed) is being or has been undertaken on it; this excludes any site where a detailed site investigation has been completed and reported which demonstrates that any contaminants in or on the site are at, or below, background concentrations.
[13] Environment Canterbury Erosion and Sediment Control Guidelines 2007, with updates 2008

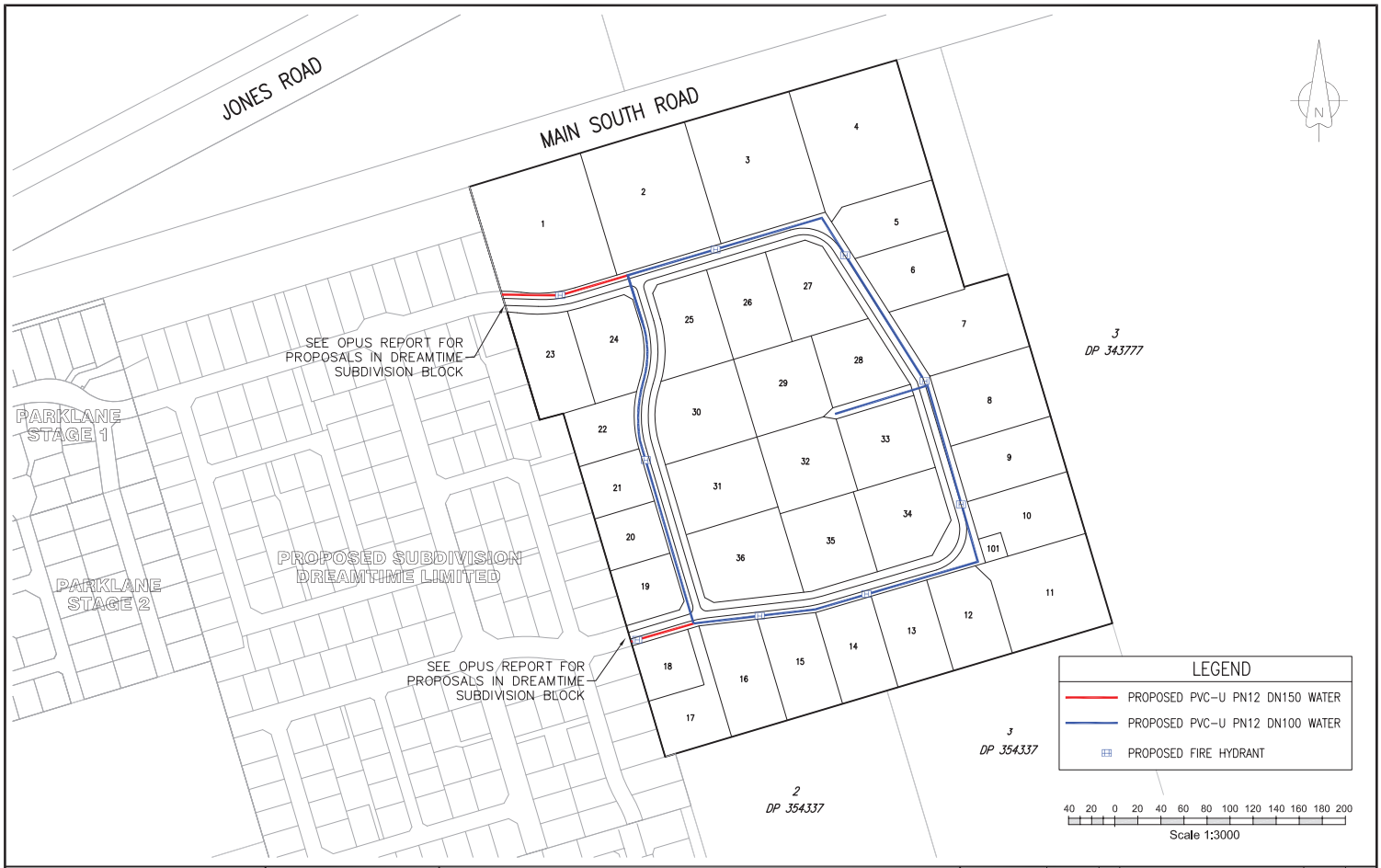
6 Power and Telecommunications

There are existing services in SH1 and from the links in Seymour Place and Kendo Drive (under construction). Orion (electricity) have confirmed that it will be possible for the proposed subdivision to be serviced from the existing reticulation. See correspondence in Appendix D. Enable Ltd (Fibre optic provider) are currently being contacted regarding their servicing; correspondence will be provided once confirmation of reticulation is received.

Appendix A

Drawings

- **Water Proposal**
- **Sewer Proposal and Sewer Options**
- **Stormwater Proposal**



e2environmental CONSULTING ENGINEERS
Level 2,Unit 2/29 Acheron Drive PO Box 31159, Christchurch
P 64 3 358 4955 www.e2environmental.com

Client: DREAMTIME LIMITED

Project: PLAN CHANGE APPLICATION

Title: WATER CONCEPT

Designed	AJT
Drawn	ADF
Checked	AJT
Approved	AJT
Date	JUNE 2013

REV	COMMENTS	DATE	APR
A	FOR APPROVAL	19.6.13	AJT

Scale: 1:3000 (A3)

Sheet: 1 of 1

Drawing No: 11034-03-110

Revision: A

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Client: DREAMTIME LIMITED

Project: PLAN CHANGE APPLICATION

Title: WASTEWATER CONCEPT

Designed	AJT
Drawn	ADF
Checked	AJT
Approved	AJT
Date	JUNE 2013

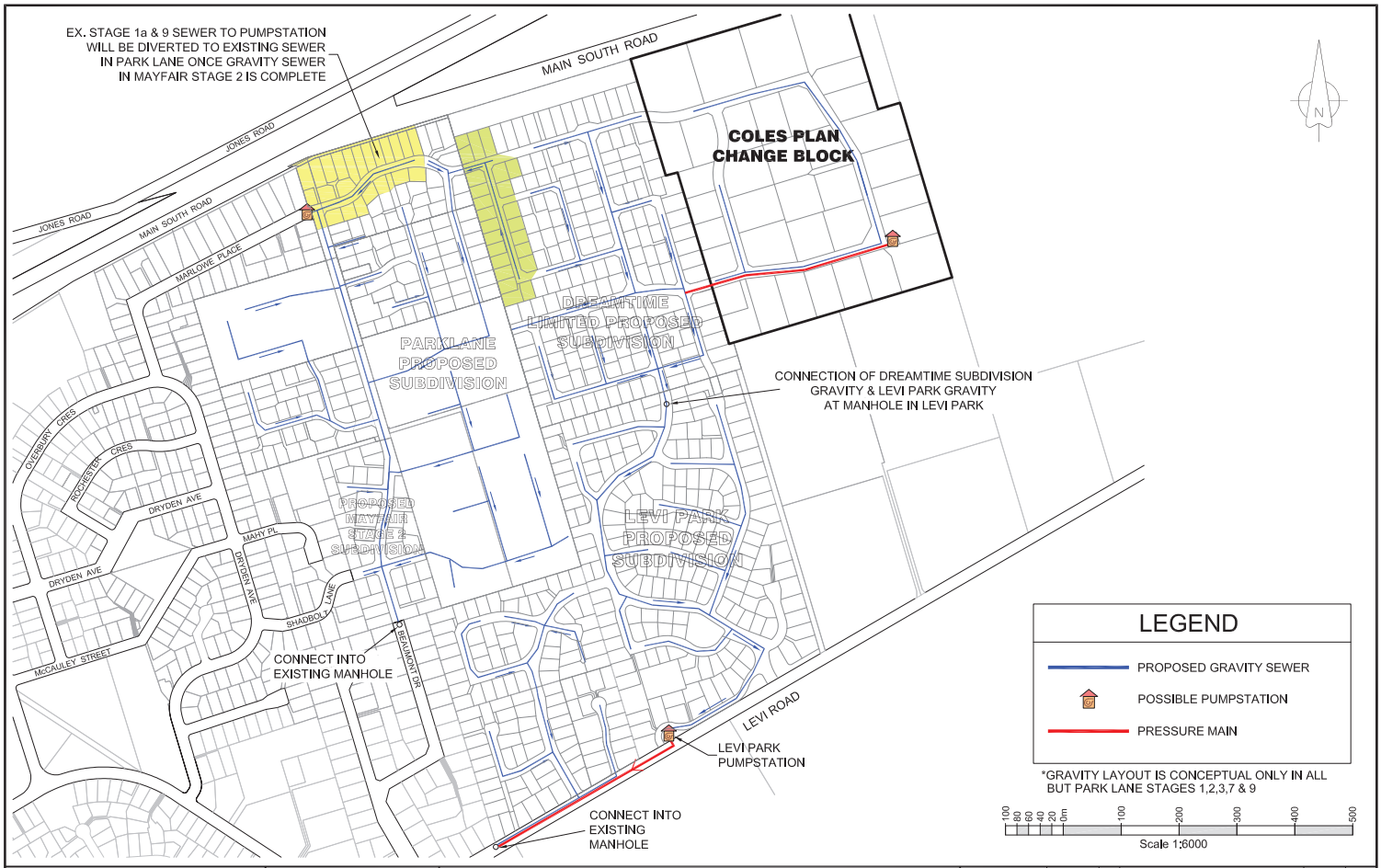
REV	COMMENTS	DATE	APR
A	FOR APPROVAL	19.6.13	AJT

Scale: 1:3000 (A3)

Sheet: 1 of 1

Drawing No: 11034-03-103

Revision: A



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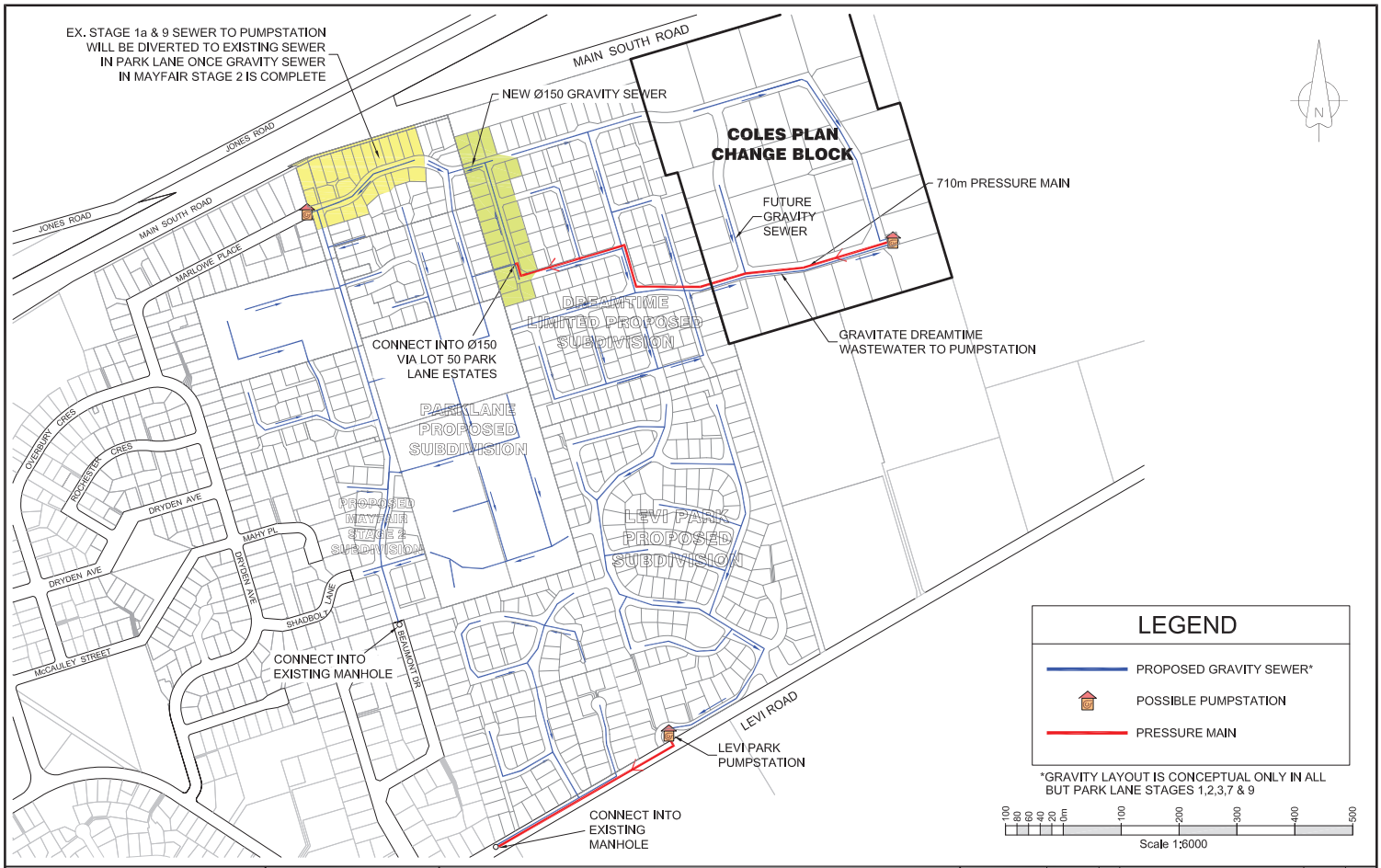
Client: DREAMTIME LIMITED

Project: PLAN CHANGE APPLICATION

Title: SEWER PROPOSAL - OPTION 1
GRAVITY CONNECTION TO LEVI PARK NETWORK

Designed	AJT				
Drawn	ADF		A	FOR APPROVAL	19.6.13 AJT
Checked	AJT		REV	COMMENTS	DATE APR
Approved	AJT		Scale	1:6000 (A3)	Drawing No 11034-03-116 Revision A
Date	JUNE 2013		Sheet	1 of 1	



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Client: DREAMTIME LIMITED

Project: PLAN CHANGE APPLICATION

Title: SEWER PROPOSAL - OPTION 2
PUMPSTATION IN DREAMTIME PLAN CHANGE BLOCK

Designed	AJT				
Drawn	ADF		A	FOR APPROVAL	19.6.13 AJT
Checked	AJT		REV	COMMENTS	DATE APR
Approved	AJT		Scale	1:6000 (A3)	Drawing No 11034-03-117 Revision A
Date	JUNE 2013		Sheet	1 of 1	

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Client: DREAMTIME LIMITED

Project: PLAN CHANGE APPLICATION

Title: STORMWATER CONCEPT

Designed	AJT					
Drawn	ADF		A	FOR APPROVAL	19.6.13	AJT
Checked	AJT		REV	COMMENTS	DATE	APR
Approved	AJT		Scale	1:3000 (A3)	Drawing No	Revision
Date	JUNE 2013		Sheet	1 of 1	11034-03-108	A

Appendix B

Reports

- **Opus Subdivision Water Report**
- **Geoscience Preliminary Environmental Site Inspection**
- **ECan Well Bore Logs**

Opus International Consultants Ltd
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20 Moorhouse Avenue
PO Box 1482, Christchurch Mail Centre, Christchurch 8140
New Zealand

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TO	Peter Harte, Robin Schulz, Murray England
FROM	Dan Johnson
REVIEWED	
DATE	9 Match 2013
FILE	Coles Subdivision Assessment Memo_070313
SUBJECT	Coles Block, Rolleston – Subdivision Assessment

Opus was engaged by E2 Environmental to confirm the potable water main sizes required to service the Coles subdivision and to meet Selwyn District Council's (SDC) levels of service (LOS) and the New Zealand Fire Service (NZFS) firefighting water supplies Code of Practice. The analysis has been carried out in conjunction with SDC to ensure the proposed development is in accordance with SDC's infrastructure planning.

The water main layout for the Coles Block based on the proposed road layout is presented in Figure 1, highlighting the two development types.

Figure 1: Coles Block Subdivision

Coles Subdivision

The Coles subdivision is located to the east of Rolleston, between Main South Road (SH1) and Levi Road. The development allows for 182 lots within the 20ha western site, positioned east of the new Park Lane subdivision and 36 rural lifestyle blocks ranging from 2,500 to 10,000m² situated directly adjacent to the 20ha site. The rural lifestyle block is not part of the current Rolleston Structure Plan (RSP) and not one of the identified outline development plan areas or growth areas, therefore this block will be subject to a plan change.

Demand and leakage values have been assumed to be equivalent to current Rolleston domestic use and losses, as taken from the Rolleston 'Average Day Peak Week' (ADPW) calibrated hydraulic model. For the rural lifestyle block water demand has been factored using land size and Rolleston ADPW demand, and verified against the Aberdeen Road subdivision in Prebbleton which has similar size sections and uses approximately 25m³ per customer/property.

A breakdown of the water demands applied to the Coles subdivision are summarised in Table 1, a leakage rate of 311 Litres/property/day (L/p/d) has been allowed for each property.

Table 1: Coles Subdivision Water Demand

Section	ADPW Demand (m³)	No. of lots
Town	3	182
2,500	10	16
4,000	15	5
5,000	22	6
7,500	25	5
10,000	30	4

SDC Levels of Service

Pipework for the Coles subdivision has been sized to ensure SDC LOS and fire flow demands can be achieved. The development was assessed to ensure pressure was maintained above 310 kPa during peak hour demand, and fire flows of 25L/s were available at 60% of peak demand.

The proposed pipe sizes to meet the LOS are displayed in Figure 2 and assumed that the pipes are PVC-U PN12 DN100 or DN150.

Figure 2: Proposed Pipe sizes and Layout

The minimum pressure experienced during peak hour of the ADPW day is shown in Figure 3. It highlights that across the entire Coles Block the pressure falls below 310kpa during peak demand to approximately 250kpa. The available pressure at the connection point to the Coles Block, off the new DN200 main from Park Lane is <310kpa at peak hour as shown in Figure 4.

Figure 3: Coles Block Minimum Pressure

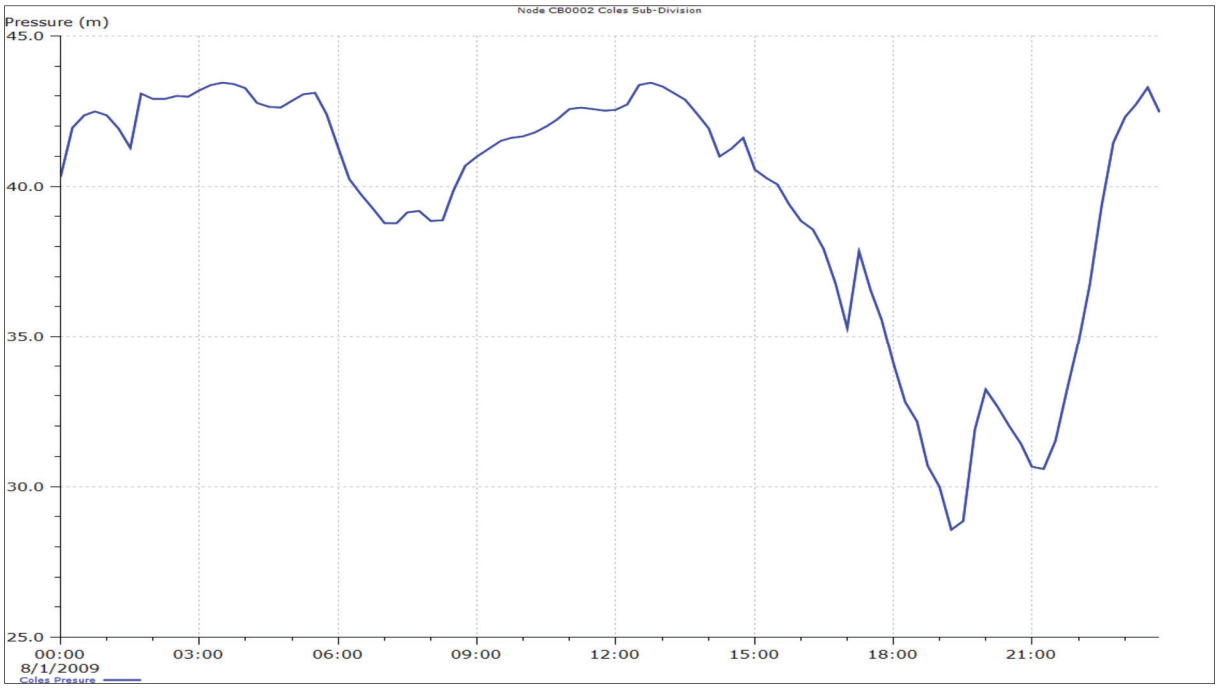

Figure 4: Coles Block Connection Diurnal Pressure

Hydrants were added to the model at 135m spacing and at critical points. The fireflow has been assessed against FW2 (25 L/s) at 60% of peak hour demand (15:30 and 16:30) in accordance with SNZ PAS 4509:2008.

The pressure was located at the critical point (highest elevation/ furthest point), and the available pressure and flow at hydrant CB0042 as shown in Figure 5. The hydrant can provide the 25L/s and 10m residual pressure required.

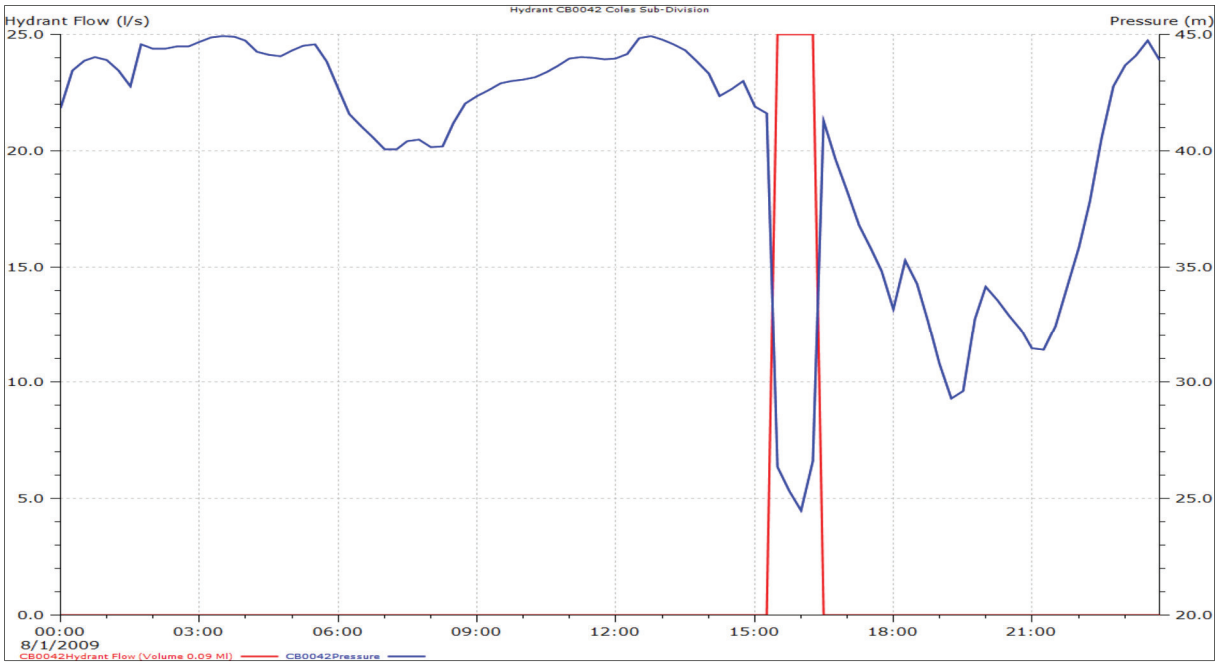

Figure 5: Critical Hydrant Available Flow and Pressure

Growth and Infrastructure Planning

Rolleston is experiencing significant growth which has been further heightened by the Canterbury earthquakes, and the urgent need for residential land to build new homes in the Christchurch region.

Master planning carried out for SDC in 2011 allowed for the full development of the ODPs and known developments that were in the planning process. The Park Lane subdivision was not allowed for in the original master planning, however the development of 332 properties has since been approved. The Coles Block and the remaining undeveloped areas of ODP3 will stress the network to a point where LOS cannot be achieved, as indicated by the available pressure to the Coles Block shown in Figure 4.

To improve LOS to the eastern frame of Rolleston it is recommended that the existing PVC-U DN200 on Jones Road is extended (670m) across the railway line and SH1 to connect into PVC-U DN200 on Park Lane. This will provide further resilience to the Rolleston network, by increasing the number of mains crossing under the railway/SH1. Cost sharing options should be discussed with SDC to agree the appropriate developer contributions to ensure future growth can proceed.

Figure 6 shows the ODP areas and the proposed upgrade to provide additional capacity to ODP 3 and surround area to meet LOS.

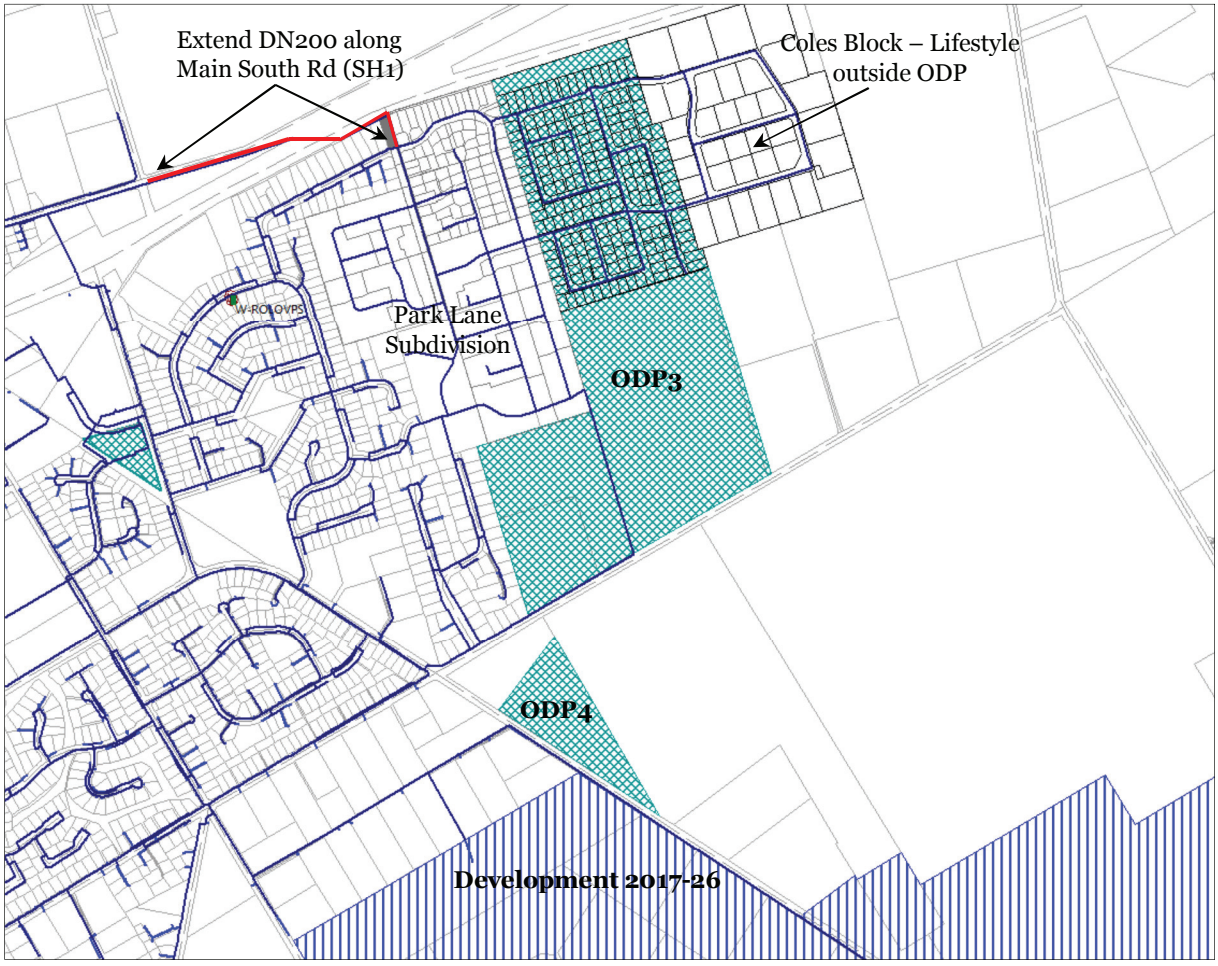

Figure 6: Rolleston Development Stages

Recommendations

Further development of Rolleston east to allow the Coles subdivision plus the remaining 302 properties from ODP3 will require trunk main upgrades and new wells to service the increased water demand. It is recommended that the Coles Block discuss with SDC the appropriate cost sharing options for new/upsizing infrastructure to service the subdivision, particularly in support of any plan change.

It is recommended that SDC revisit the current master planning to include recent subdivisions (incl. Coles Block)/growth areas to determine the infrastructure required to service these developments as well as meet future growth projections. The timing of new wells and trunk mains will need to be identified to ensure that growth can proceed at the current rate.

The Coles rural block will be subject to a plan change, however it is recommended that this be allowed for in the master planning and a better understanding of water demand rates be determined. As Rolleston has universal metering and are billed on use above a fixed rate, it is unlikely that water usage will be to the high levels to that experienced in the Aberdeen Road subdivision. In the early stages of development, it is possible that there will be high water usage as gardens/properties are established.