Appendix B

Infrastructure Report

GW WILFIELD LTD

Wilfield – West Melton

Infrastructure Report

Phase 2 Plan Change
18130-R1

October 2018

DAVIE LOVELL·SMITH

PLANNING SURVEYING ENGINEERING

Shaping the future since 1880

Revision History

Rev Number:	Prepared By:	Description:	Date:
R1	AJEH	Reduce lots to PC Area	24/10/18

Document Control

Action:	Name:	Signed:	Date:
Prepared By	Andy Hall		24/10/18
Reviewed By	Sam Godwin		24/10/18
Approved By	Andy Hall		24/10/18

Contents:

Appendices:

1.0 INTRODUCTION

The proposed Plan Change site is located on the southern urban fringe of West Melton on the south side of West Coast Road (SH 73) and east of Weedons Ross Road. This proposal is a Plan Change to create 71 new residential and rural residential house sites.

The plans also show a future plan change area with an additional 72 lots that are outside of this current application but provide some insight into strategic future infrastructure requirements.

Davie Lovell-Smith (DLS) have held several meetings with Strategic Planners and Infrastructure Engineers at Selwyn District Council (SDC), primarily Murray England with specific regards to servicing the proposal for water supply and sewer. It is the applicant's intention to construct infrastructure that will meet the demands of this project and also compliment the long-term requirements of West Melton. The proposed infrastructure will be integrated into the existing networks and all efforts will be made to ensure that the installations are complimentary to the current assets.

The applicant recognises the strategic approach towards the servicing of West Melton for additional water supply and further reticulation of wastewater back to Rolleston. It is hoped that this proposal provides some impetus to achieving those strategic goals. The applicant accepts that a partnering arrangement with Council will be required to deliver upgraded sewer and water supplies for the proposed plan change and potential other development in West Melton.

All proposed infrastructure will be designed and constructed in compliance with SDC Standards unless otherwise agreed. All infrastructure works will be designed in detail following subdivision consent and referred back to Council engineers for approval prior to any construction being undertaken on site.

All sites will be serviced for sewage, water supply, telecommunications and power. Stormwater will be discharged to ground on-site. All sites will be earthworked to ensure drainage to the street or natural flow paths. All building platforms will be elevated above secondary flow paths and the 1 in 50 year critical storm event. There is no gas reticulation in this development.

The over-riding feature of the proposal will be the retention of existing stormwater flow across the site. Existing drainage features will be retained and the development will be moulded around them. We understand that the applicant has met with the Council drainage engineers and they have agreed that sites do not need to drain to the roads but can instead drain onto neighbouring sites consistent with the natural contour of the land and the pre-development flow paths on the site. The proposed sites are easily large enough to allow this to occur and still provide suitable building platforms.

2.0 SEWER

It is intended that all new sites in the proposed plan change will be serviced by Low Pressure Sewer. A network of pipes will transfer wastewater to the existing Council Pump Station on Silver Peaks Drive.

The sewer demand for the proposal has been calculated using SDC Code of Practice. Please refer to the calculation below for the peak domestic demands.

If we include the current approved sites in Wilfield, the sites in the plan change application and the potential future development, then there will eventually be a total of 332 lots connecting to the existing Silver Peaks pump station.
Average sewer flow
ASF = 332 lots * 220 l/person/day * 2.7 people/lot

ASF = 197 m^3/day
ASF = 2.28 l/s

Peak wet weather flow
P/A ratio = 2.5 Part 6: Wastewater drainage SDC Code of Practice
SPF = 2 Part 6: Wastewater drainage SDC Code of Practice

MF = P/A ratio x SPF x ASF

MF = 2 x 2.5 x 2.28
MF = 11.41 l/s Overall peak flow

The Rising Sewer main from the Pump Station at Silver Peaks Drive to the main sewer Pump Station at Rossington Drive is a 160mm PE. Internal diameter is 136mm. The capacity of that pipe is sufficient to deal with the additional flows produced from the proposed plan change but the pumps at Silver Peaks and Rossington Dr will need to be upgraded.

The Wilfield Rising Sewer calculation below shows a friction unit headloss of 1m per 100m and a velocity of 0.82m/s.

Pipe Hydraulics Using Colebrook-White equation in simplified usage mode							
(water at 15 degrees Celsius (kinematic viscosity 1.141x10-6 m^2/s))							
PROJECT :	Wilfield Rising Sewer				**JOB NO:**	18130	
		Pipe diameter	**136**	mm	D =	*0.136*	*m*
		Gradient - 1 in	**100**		S =	*0.01*	
		Pipe Roughness - ks	**1.5**	mm	ks =	*0.0015*	*m*
			Results for Full Bore Conditions:				
			Velocities	**0.819**	m/s		
			Discharge	**11.90**	litres/sec		
			Discharge	**0.0119**	m^3/sec		

A number of sites will be able to connect to the existing infrastructure located in existing roads. There is an existing 75mm OD common rising sewer located in Ridgeland Way. This pipe has significant capacity and can accommodate a large portion of the proposed development.

An additional connection will need to be made to the pump station via a proposed reserve link into the development area. As shown on the attached plan in Appendix A.

All new sites will be provided with a 40mm OD lateral and boundary connection box in accordance with Council standards.

All public sewer pipes over private land or reserves will be covered by appropriate easements in favour of SDC. The pump station will be located on its own utility lot to be vested in SDC.

West Melton – Rolleston Sewer

The sewer connection from West Melton back to the Pines Treatment Plant is currently at capacity. The restriction in capacity is created by the gravity sewer running from the corner of Wards and Walkers Road, back into Rolleston.

An investigation and review of how this capacity has can be increased has been undertaken in consultation with Council. Connection to the sewer in Hopkins Road overloads the system across Rolleston and is not currently feasible. The only feasible alternative is to extend the existing Rising Sewer all the way to the Pines Treatment Plant. This equates to 5.75km of new rising main.

This option has the added advantage of freeing up capacity in the existing gravity system for other land development in its vicinity or the expansion of facilities such as the prison.

Please refer to the attached sewer calculations in Appendix B.

The existing pipe is PN10. This pressure rating will become a factor in the capacity of the pipe. It is assumed that the permitted normal pressure allowable in this pipe would be 70% of the rating. This reduction in pressure allows for the effects of surge. Therefore the permitted pressure will be 70m of head.

As can be seen in the calculation, the 70m maximum pressure restricts the number of sites to 1276 lots in West Melton. If this number of lots were to be adopted then it would easily accommodate the proposed number of sites in the Plan Change.

Calculations into the pump sizing have been carried out and there are Flygt N-Pumps available for this flow and head.

Council may also like to address the emergency storage of wastewater. It has been detailed in the calculation that 8 hrs of storage amounts to 253m^3.

There are 829 existing sewer connections in West Melton leaving 447 expansion sites that can contribute to the cost of this sewer upgrade. The upgrade cost may amount to the following:

5750m of 225dia rising sewer at $200/m	$1,150,000.00
Pump Upgrades	$50,000.00
Drilling under Rail	$20,000.00
Storage facility	$300,000.00
Sundry	$20,000.00
Contingency	$100,000.00
Design and Approvals	$50,000.00
TOTAL	**$1,690,000.00**
$/Lot (447 lots)	**$3,780.76+gst**

Some consideration should also be given to the capacity that would be made available in the gravity sewer on Walkers Rd. It would be assumed that any new connections into this sewer would pay contributions and that those contributions would be directed to the costs above.

3.0 WATER SUPPLY

The proposed Plan Change amounts to 71 additional lots plus 72 future lots. If we use Chart 1 from the Councils Code of Practice we can determine that the peak water supply flow per site will be approximately 0.12l/s. For the additional 71 lots this amounts to an additional demand of 8.52l/s. For all 143 sites, this amounts to a demand of 17.16l/s. However, there are a number of sites that will have restricted connections and this will bring the demands down to 7.07l/s for the 71 Plan Change Lots and 14.77l/.s for the full 143 lots.

Please refer to the attached calculations and plans in Appendix C for the determination of existing and proposed water demands.

If we use the sewer calculations as the limitation to the future size of West Melton, then the total maximum number of lots able to be serviced is **1276**. Using the Councils Code of Practice we can determine a peak flow of **147.41/s** for this future overall demand.

It is recognised that the current West Melton Water supply is at its limits. Council have been investigating alternative water supplies including:

1. Connection to the Edendale water supply
2. Connection to a bore on Johnson Road
3. Redevelopment of the Wilfield bore
4. Installation of a reservoir

As part of the previous development of the site, Bore M35/6201 in Wilfield was converted from a farm irrigation well to a Council Asset supplying potable water to West Melton. This well has been again redeveloped and made a lot deeper to produce significant additional flows.

Along with the redevelopment of this bore, the Council will also apply for an enlarged permitted take. New abstraction flows are yet to be confirmed but may in itself provide for the additional 7.07l/s required for the Plan Change area and potentially the 14.77l/s required for the overall future expansion.

The bore delivers raw water to Rossington Rd for treatment and then the treated water is piped back to Wilfield. Both pipes are 160mmPE (150mm ID).

If, potentially, the upgraded Wilfield Bore can produce 35l/s, then a new raw water delivery pipe will be required as the unit headloss in the 150mm dia pipe would approximately 1m per 20m and a velocity around 2m/s.

The water demand for Wilfield alone, including for the Plan Change is almost 35l/s. The pipe from Rossington Road, under the highway, to Wilfield, is also 150mm ID. This connection pipe may need to be upsized. Once the pipe reaches the road network in Wilfield it branches off into more 150mm dia pipes. Connection to the Plan Change area will need to be by the existing watermain on Ridgeland Way and also connecting back to Silver Peaks Dr as shown on the concept plan.

Full modelling of the water supply at subdivision consent stage will confirm the extent of the upgrade works.

Council is also progressing with the proposed pipe connection to the Edendale bore. This is hoped to produce an additional 20l/s for the West Melton Community.

An unfortunate reality for West Melton is the unreliability of the bores. In a dry year we could expect bore yeilds to significantly reduce. The expected method of mitigation would be to replace the existing small plastic tank farm with a large and safe reservoir such as a steel sectional tank. Perhaps 1000m^3. Potentially the connection to Johnson Road may not be required if the reservoir is implemented.

The costs for the reservoir and various upgrades would be shared amongst the total future development lots totalling 447 new sites. 143 of these would be from the proposed plan change and that would cover a substantial part of the cost.

Edendale Connection	$1,000,000.00
Reservoir and pump	$600,000.00
Wilfield redevelopment	$200,000.00
Wilfield raw water pipe upgrade	$400,000.00
Sundry	$100,000.00
Contingency	$200,000.00
Design Costs	$150,000.00
TOTAL	**$2,650,000.00**
$ per lot (447 lots)	**$5,928.41+gst**

Cost associated with treated water upgrades within Wilfield or the connection pipes under the Highway will be the responsibility of the applicant.

The water supply will be designed in accordance with SDC specifications and SNZ PAS 4509:2008 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice. The fire fighting water supply classification will be FW2.

All sites will be serviced by meters connected to a minimum 50mm ID submain, laid along the frontage of all new streets. Rear sites will be installed with 25mm pipes up the driveways and connected to water meters at the street boundaries.

All watermain construction will be completed to Council standards. All watermain pipes will be uPVC, with submains and lot connections in PE.

4.0 STORMWATER

As discussed previously, the development will be designed around the retention of existing stormwater flow patterns across the site. Existing drainage features will be retained and the development will be moulded around them. The applicant has met with SDC drainage engineers and they have agreed that future sites do not need to drain to the roads but can instead drain onto neighbouring sites consistent with the natural contour of the land.

Primary stormwater from the site will be discharged to ground. The soakholes on the individual sites will be constructed as part of the Building consent process but the drainage and soakholes associated with the roads will be constructed as part of the subdivision and will be vested in SDC.

Consent or a certificate of compliance for stormwater discharge to ground from the development site will be obtained from Environment Canterbury (ECAN). All consenting from ECAN will be verified by SDC as being suitable for transfer to their ownership if required.

It is expected that all stormwater will be able to be permitted to discharge to ground without treatment with the exception of stormwater discharge during construction. Stormwater discharge during construction will comply with the Environment Canterbury (ECAN) Erosion and Sediment Control Guidelines. Erosion and Sediment Control Management Plans will be compiled for both ECAN and SDC approval.

Road alignments have been directed along the edge of natural drainage swales. The roads will discharge directly to these natural flow patterns. Soakholes will be constructed in the base of the swales. Although not required by ECAN, this methodology will provide a level of stormwater treatment consistent with Low Impact Design.

This sustainable and environmentally sympathetic approach will also give the development a more interesting natural aspect rather than the usual earthworked and uniform contour associated with modern subdivision.

The natural sloping of the land is from northwest to south east. Runoff will be collected and discharged to ground. Secondary flow paths will be within reserves, roads, and lots. Please refer to the attached plan in Appendix D for Secondary Flow Paths.

5.0 POWER / TELECOMMUNICATIONS / STREET LIGHTS

Power and telecommunications will be provided to all sites to utility company and industry standards. All cables will be placed underground and all kiosks will be constructed on separate individual lots. The kiosk sites will be forwarded to Council for approval following the power design.

Street lights will be provided to the roading and reserves to SDC standards. The applicant will also provide a street light style to SDC for approval.

Full appraisals will proceed once Subdivision Consent has been obtained.

6.0 ROADING

The proposed subdivisions will be serviced with a road connection from the existing Wilfield Development. This will involve the extension of Ridgeland Way in its existing formation and the creation of a new road between Lots 275 and 277.

Please refer to Appendix E for the typical cross sections of the proposed roads. Reference should also be made to the Stantec Traffic Report in the application.

No upgrades are intended for any existing intersections or roads.

The new extension of Ridgeland Way will be 18m wide with an 8m carriageway. No specific provision will be made for cyclists. Footpaths will be on one side only. Street lighting will be to SDC standards. Kerb and channel to council standards will be adopted but detailed design may create areas where a rural shoulder is used or perhaps a flush kerb only where stormwater can flow directly to roadside swales. All carriageways will be constructed to SDC standards and will be sealed with asphalt. Some cobbling may be included to indicate a change in road hierarchy and to add visual amenity.

The access lot will be constructed to SDC standards. We note that crossings to individual lots are required however the applicant would like to obtain the right to bond for this portion of the construction in order not to restrict the layout and dwelling position on the created lots.

Provision will be made for future road access to adjacent sites for the purpose of future development. The applicant reserves the right to place point strips across the end of these connections.

7.0 EARTHWORKS AND CLEARING

As discussed previously, the ethos of the development relies on the maintenance of natural land form, and therefore will result in only minor earthworks. The earthworks will generally be restricted to the construction of road subgrades and adjustments to the existing overland drainage network.

Existing levels across the majority of sites will be maintained. Specific depths of excavation and fill are not known at this stage as detailed design has not been undertaken. It is estimated at this stage that the total volume of works will be between 50,000 and 100,000m^3.

All topsoil will be retained and replaced on the land immediately following bulk earthworks to a depth of up to 400mm. All disturbed topsoil will be re-sown with Council specification grass seed mixes. A balance of cut and fill will be maintained on site and removal of material from site will be minimised.

Sediment discharge from the development site will be controlled as per Council requirements. The basis of the sediment control will be the ECAN Guidelines and the discharge during construction will be dealt with in association with the overall discharge consent or certificate of compliance.

All dust created on the site will be controlled by water cart or other such approved methods.

All bulk filling will be compacted in accordance with NZS 4431:1989. All fill testing will be carried out by an independent laboratory.

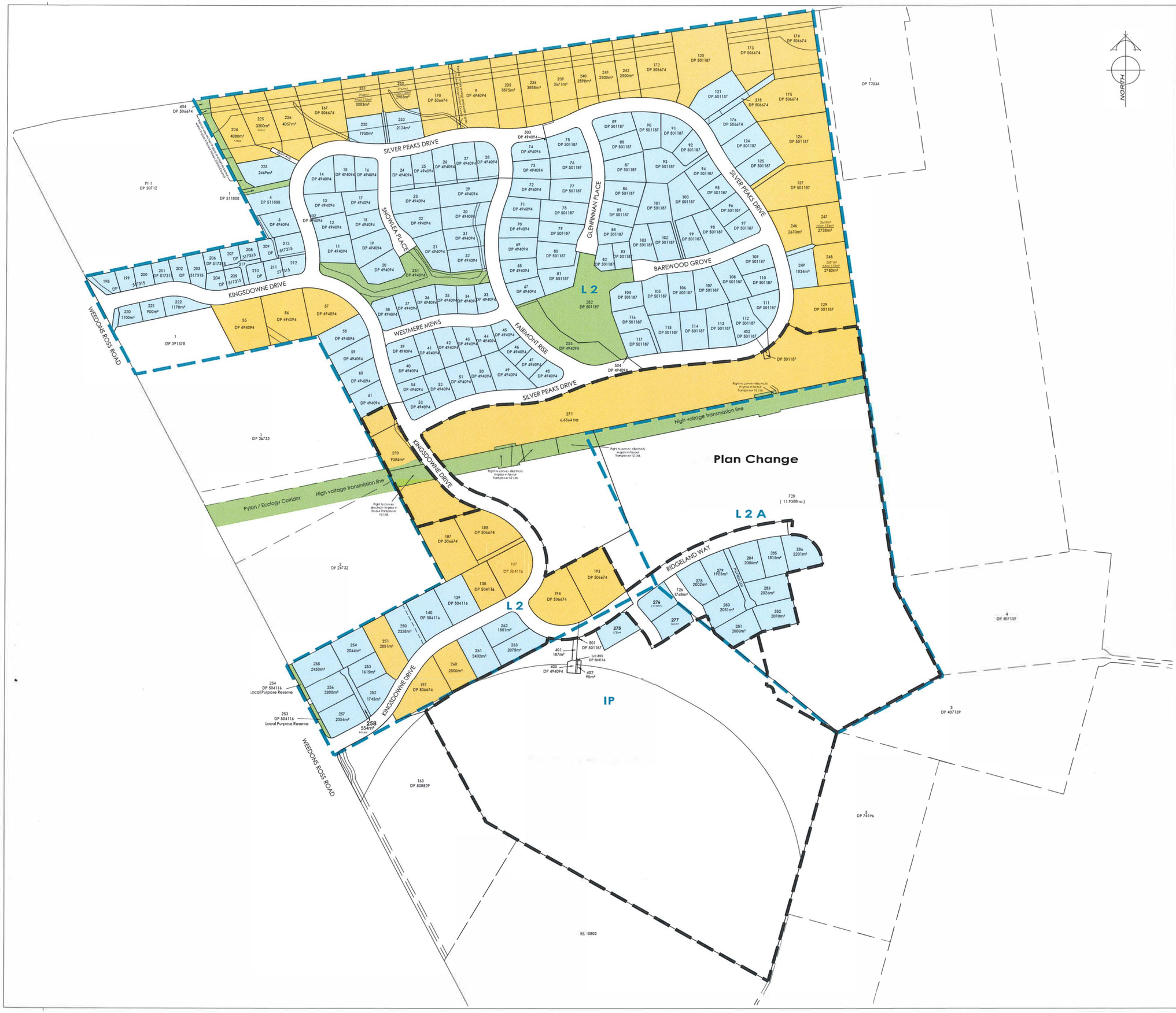
A geotechnical appraisal of the development has been previously presented. This appraisal found the development site as not being susceptible to earthquake and liquefaction damage, and has determined that the land can be considered to be equivalent to the Ministry of Business, Innovation, and Employment (MBIE) Technical Category 1 (TC1). Based on this assessment no land remediation is required, however the site may still not be considered good ground in terms of NZS 3604. Further testing may be required for future building consent applications for foundations.

Andy Hall
Chartered Professional Engineer
Davie Lovell-Smith Ltd

Oct 2018

APPENDIX A

Appendix A – Proposed Development Layout Plan and Engineering Concepts



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.

2) Service easements to be created as required.

3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purposes.

Legend

	Reserve to vest
39 Lots	Restricted Water Supply
152 Lots	Unrestricted Water Supply

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
GW Wilfield Ltd

SHEET TITLE:
Wilfield
Water Connections
June 2018

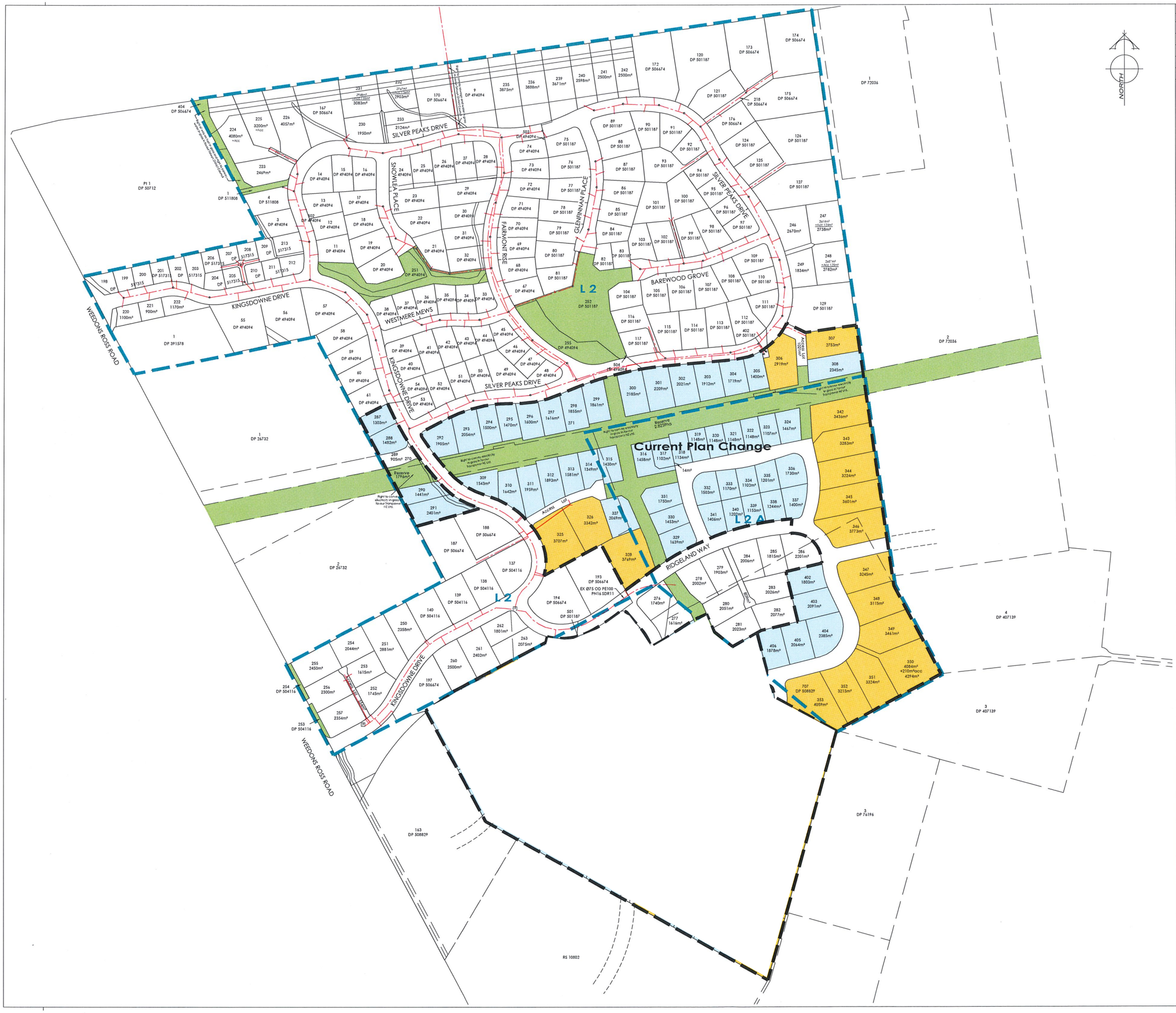
DRAWING STATUS
For Information

SCALE : 1:2500@A1 1:5000@A3 DATE : June 2018

CAD FILE : J:\18130_1\Subcon\C18130_1_Water Connections June.dwg

DRAWING No : **C.18130/1** SHEET No: 1 OF 1

REVISION : **R0**



AMENDMENTS :		
AMENDMENT	DATE	DESCRIPTION

NOTES :

1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2) Service easements to be created as required.
3) This plan has been prepared for information purposes only. No liability is accepted if the plan is used for any other purposes.

Legend

Reserve to vest

Current	Proposed	
17 Lots	11Lots	Restricted Water Supply
54 Lots	61 Lots	Unrestricted Water Supply

Existing Sewer

Replaces 2 Restricted Water Supplies
200 Unrestricted Connections for Future Development

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
GW Wilfield Ltd

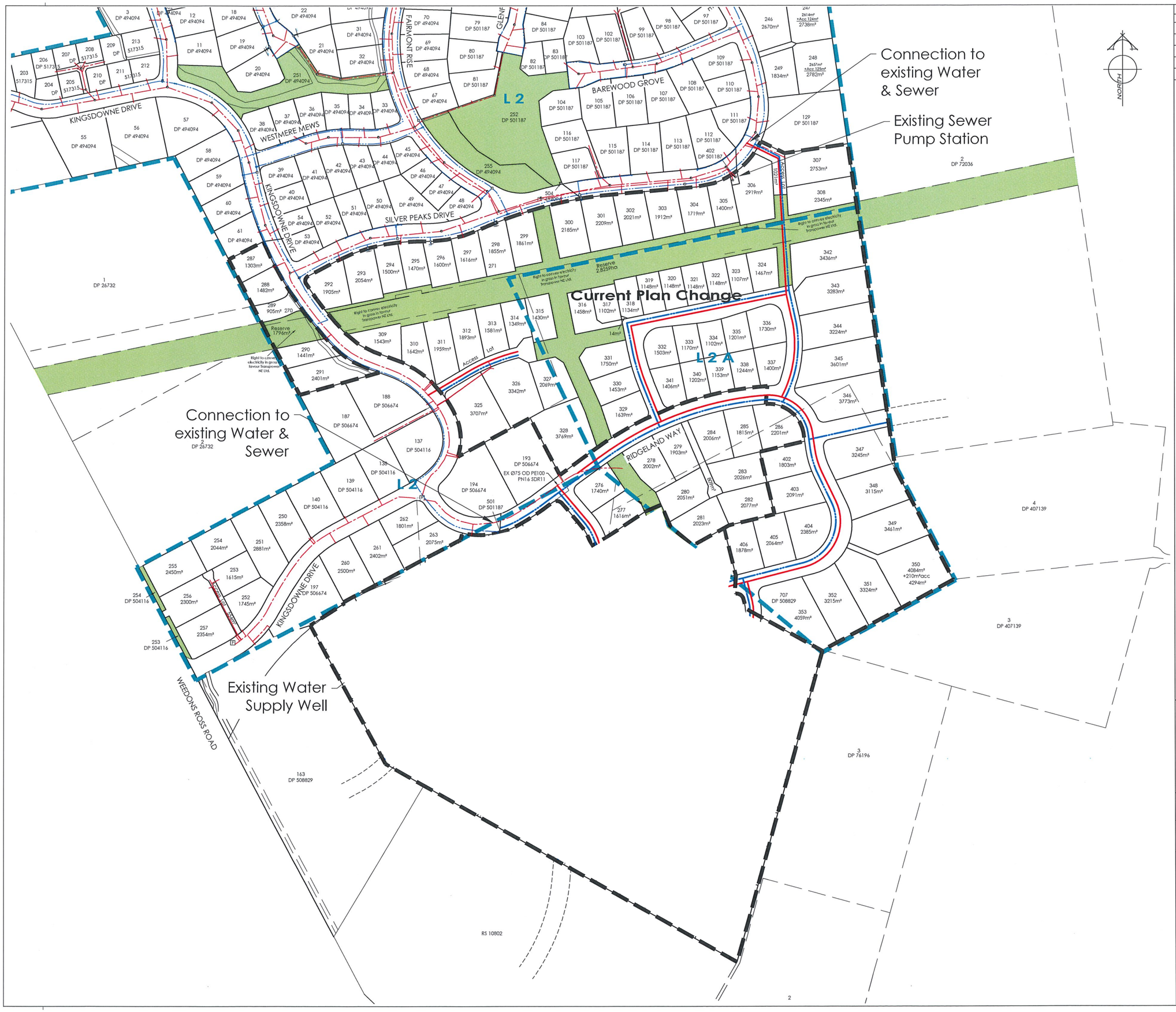
SHEET TITLE:
Wilfield Water Connections August 2018

DRAWING STATUS
For Information

SCALE : 1:2500@A1 1:5000@A3
DATE : August 2018

CAD FILE : J:\18130_1\Subcon\C18130_1_Water Connections August.dwg
REVISION : R0

DRAWING No : **C.18130/1**
SHEET No: 1 OF 1



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2) Service easements to be created as required.
3) This plan has been prepared for information purposes only. No liability is accepted if the plan is used for any other purposes.

Legend

- Proposed Low Pressure Sewer Mains
- Proposed Watermain
- Existing Sewer
- Existing Water

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
GW Wilfield Ltd

SHEET TITLE:
Wilfield Proposed Services

DRAWING STATUS
For Information

SCALE : 1:2000@A1 1:4000@A3 DATE : September 2018

CAD FILE : J:\18130_1\Subcon\C18130_1_Proposed Services.dwg REVISION : R0

DRAWING No : **C.18130/1** SHEET No: 1 OF 1

APPENDIX B

Appendix B – Sewer Calculations

West Melton Sewer Demands

Assumption: West Melton to Connect existing Rising Sewer through to Pines Treatment Plant

Existing homes in West Melton	597	
Undeveloped sites	202	
Future densification of existing sites	50	
Next Phase of Wilfield	**143**	71 plan change lots plus 72 future lots
Commercial (equivalent)	30	
ADDITIONAL FUTURE CONNECTIONS	**254**	Iterative number based on allowable pressure in pipe to Rolleston
TOTAL CONNECTIONS	**1276**	Limit West Melton to this number of sewer connections
Total Conns contributing to upgrade	447	(143+50+254)

MF = ASF x 2.5 x 2

ASF = 220 litres x sites x 2.7 people =	757944	litres/day
	757.94	m³/day
Average Flow over the day =	8.77	l/s
MF =	43.86	l/s

West Melton Rising Main internal dia 225 mm

CALCULATION OF HEAD LOSSES USING COLEBROOK WHITE

West Melton to Pines Sewer Rising Main

Required duty flow **43.86** l/s

System details

Pipe Section	No pipes	Length m	Int Dia mm	Roughness ks, mm	Friction Loss, m	No. of Fittings							velocity m/s	Fittings loss,m	Total loss,m	Cumulative loss,m	Head, mAOD
						Bends,R/D=1			Tees	NRV	BFV	Other					
						90deg	45deg	22.5deg	L/b			Exit					
						0.75	0.3	0.15	0.8	1	0.4	1.5					
1	1	8000	225	0.6	57.682	8	1	1	6	2	1	2	1.10	1.033	58.715	58.715	58.715
2	1	5750	225	0.6	41.459	0	0	0	0	0	0	0	1.10	0.000	41.459	100.173	100.173
TOTAL FRICTION LOSS, m					99.141	TOTAL FITTINGS LOSS,m								1.033	100.173		
													TOTAL SYSTEM LOSSES, m		100.173		

Power requirements: $\frac{q \times h}{102 \times dp \times dm}$ kW = 80 kW

		Non return valve	butter fly valve

dp = pump efficiency (60% - 80%) 0.6-0.8	0.6	
dm = motor efficiency (90% - 94%) 0.9-0.94	0.9	
q = flow (l/s)	43.86	l/s
H = head (m)	100.17	m
Pump Level at West Melton	100.80	m
Outlet Level at Pines Treatment Plant	70.70	m
Static headloss	-30.10	m
Total Headloss	**70.07**	**m**

Max pressure to be 0.7 of PN10 = 70m

Storage required based on 8hrs of ASF = 252648 l

252.648 **m³**

APPENDIX C

Appendix C – Water Supply Calculations and Plans

West Melton Water Demands

Assumption: Water demands required to meet the number of sewer connections

Existing homes in West Melton	597	
Undeveloped sites	202	
Future densification of existing sites	50	
Proposed plan change lots	71	
Next future Phase of Wilfield	72	
Commercial (equivalent)	30	
ADDITIONAL FUTURE CONNECTIONS	254	Based on sewer capacity
TOTAL CONNECTIONS	1276	Limit West Melton to this number due to capacity in sewer

Water Demands

Refer to Chart 1 Part 7 of CoP

Peak flow rate per unrestricted connection =	0.12	l/s/site
Peak flow rate per restricted connection =	0.03472	l/s/site

Potential Maximum Flows:

Wilfield - reconsented	35	l/s
Jacklin	12	l/s
Royston	9	l/s
Elizabeth	9	l/s
Edendale	20	l/s
Johnson	10	l/s
4hr of Reservoir (1M litres)	69	l/s
TOTAL	**164**	**l/s**

Clearly the reliance on the reservoir is very high. The refilling of the reservoir following periods of high demand will require all wells to continue to produce at peak levels.

Assumption: Water demands required to meet the Wilfield Plan Change Only

CURRENT DEMAND			**Total Lots**
Existing homes in West Melton	597		597
Undeveloped sites	202		202
Commercial (equivalent)	30		30
TOTAL CONNECTIONS	829		
Unrestricted Connections	790		
Restricted Connections	39		
Unrestricted flow at 0.12l/s/site	94.80	l/s	
Restricted Flow at 0.03472l/s/site	1.35	l/s	
TOTAL CURRENT DEMAND	**96.15**	**l/s**	

PROPOSED ADDITIONAL DEMAND FROM PLAN CHANGE			
Plan Change Lots	71		71
Unrestricted Connections	54		
Restricted Connections	17		
Unrestricted flow at 0.12l/s/site	6.48	l/s	

Restricted Flow at 0.03472l/s/site	0.59	l/s	
TOTAL PROPOSED ADDITIONAL DEMAND	**7.07**	**l/s**	

PROPOSED ADDITIONAL DEMAND IN WILFIELD			
Next Phase of Wilfield	72		72
Unrestricted Connections	61		
Restricted Connections	11		
Unrestricted flow at 0.12l/s/site	7.32	l/s	
Restricted Flow at 0.03472l/s/site	0.38	l/s	
TOTAL PROPOSED ADDITIONAL DEMAND	**7.70**	**l/s**	

PROPOSED TOTAL DEMAND IN WILFIELD			
Next Phase of Wilfield	332		
Unrestricted Connections	267		
Restricted Connections	65		
Unrestricted flow at 0.12l/s/site	32.04	l/s	
Restricted Flow at 0.03472l/s/site	2.26	l/s	
TOTAL PROPOSED ADDITIONAL DEMAND	**34.30**	**l/s**	

PROPOSED ADDITIONAL DEMAND ELSEWHERE			
Future densification of existing sites	50		50
Future additional sites	254		254
Unrestricted Connections	304		
Restricted Connections	0		
Unrestricted flow at 0.12l/s/site	36.48	l/s	
Restricted Flow at 0.03472l/s/site	0.00	l/s	
TOTAL PROPOSED ADDITIONAL DEMAND	**36.48**	**l/s**	
			1276 lots

Total water demand for West Melton including for the Plan Change	**147.41**	**l/s**

OPTION A: Current Available and Potential Flows:		
Wilfield	26	l/s
Jacklin	12	l/s
Royston	9	l/s
Elizabeth	9	l/s
Edendale	20	l/s
Johnson	0	l/s
4hr of Reservoir (1M litres)	69	l/s
TOTAL	**145**	**l/s**

OPTION B: Current Available and Potential Flows:		
Wilfield - reconsented	35	l/s
Jacklin	12	l/s
Royston	9	l/s
Elizabeth	9	l/s
Edendale	0	l/s

Johnson	0	l/s
4hr of Reservoir (1M litres)	69	l/s
TOTAL	**134**	**l/s**

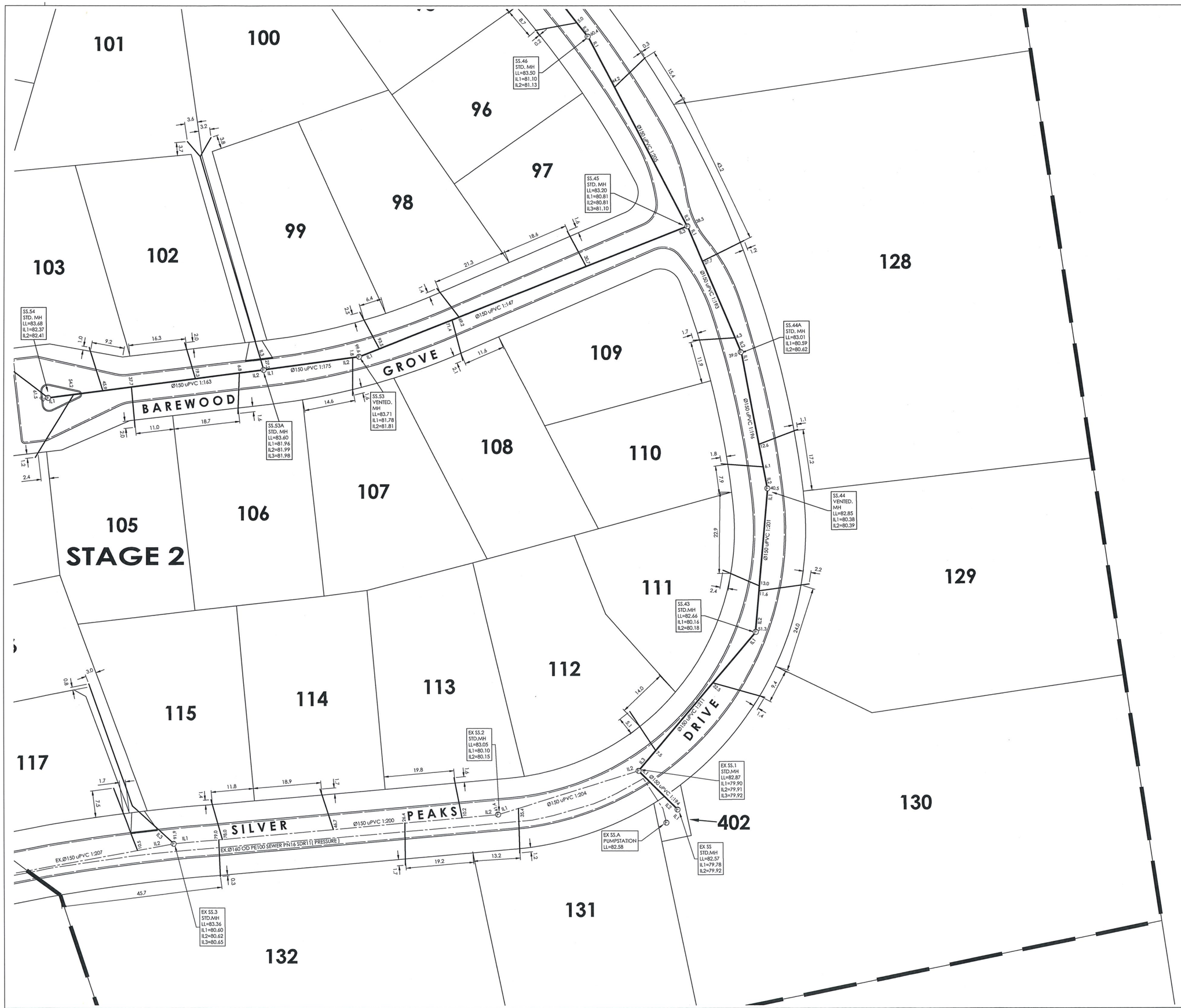
Total water demand for existing plus Plan Change including for the Plan Change	**103.22**	**l/s**

OPTION A: Current Available and Potential Flows:

Wilfield	35	l/s
Jacklin	12	l/s
Royston	9	l/s
Elizabeth	9	l/s
Edendale	20	l/s
Johnson	10	l/s
4hr of Reservoir (1M litres)	9	l/s
TOTAL	**104**	**l/s**

OPTION B: Current Available and Potential Flows:

Wilfield - reconsented	35	l/s
Jacklin	12	l/s
Royston	9	l/s
Elizabeth	9	l/s
Edendale	0	l/s
Johnson	0	l/s
4hr of Reservoir (1M litres)	39	l/s
TOTAL	**104**	**l/s**



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

SERVICES:

- SANITARY SEWER (GRAVITY) — MH — SEWER LATERAL
- EX.SANITARY SEWER (PRESSURE)
- EXISTING SEWER — MH
- KERB & CHANNEL

NOTES:

1) This plan has been prepared for sewer asbuilt purposes only. No liability is accepted if the plan is used for any other purpose.
2) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
3) All sewer laterals are 100mmØ uPVC unless otherwise specified.
4) All as built information has been provided by 43 Below and has not been verified.

Levels in terms of Lyttelton Vertical Datum 1937.

Origin of Levels: UG 32 (B882) RL=55.934
804 Jones Road Rolleston.

GILLMAN WHEELANS
Residential Subdivisions

JOB TITLE:

GW Wilfield Ltd
Stage 2 Wilfield , West Melton

SHEET TITLE:

Sewer Asbuilt

DRAWING STATUS

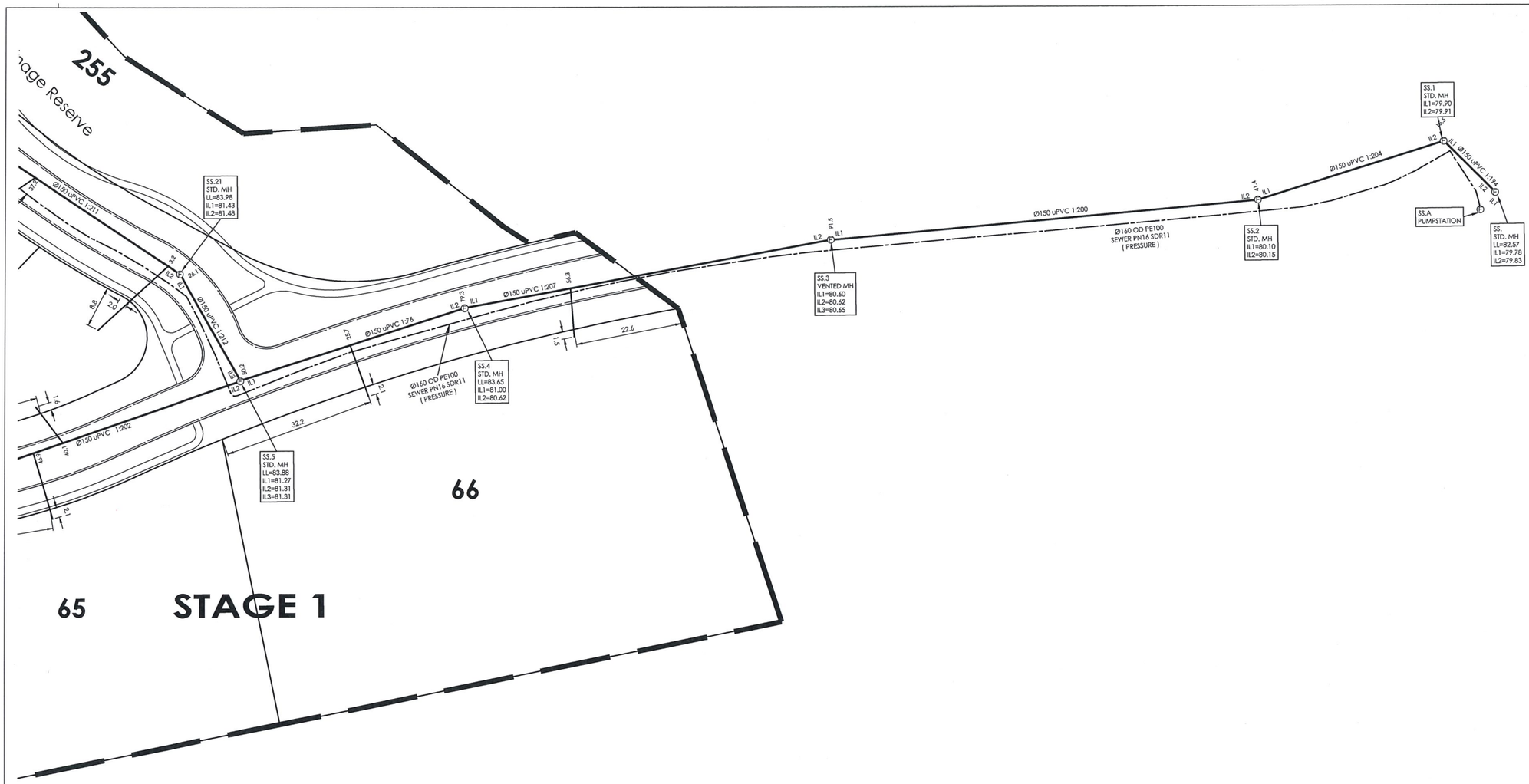
Asbuilt

SCALE : 1:500@A1 1:1000@A3 DATE : August 2016

CAD FILE : J:\18130\Asbuilts\Stage 2\C18130_STG 2 AB_NZTM.dwg REVISION :

DRAWING No : SHEET No:

C18130.AB.SS04 **R0**



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION
R1	2.5.16	LEVELS IN TERMS OF LYTTELTON DATUM 1937

NORTH

SERVICES:

SANITARY SEWER (GRAVITY) — MH — SEWER LATERAL

SANITARY SEWER (PRESSURE)

EXISTING SEWER — MH

KERB & CHANNEL

NOTES:

1) This plan has been prepared for sewer asbuilt purposes only. No liability is accepted if the plan is used for any other purpose.

2) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.

3) All sewer laterals are 100mmØ uPVC unless otherwise specified.

4) All as built information has been provided by 43 Below and has not been verified.

Levels in terms of Lyttelton Vertical Datum 1937.

Origin of Levels: UG 32 (B882) RL=55.934
804 Jones Road Rolleston.

GILLMAN WHEELANS
Residential Subdivisions

JOB TITLE:

GW Wilfield Ltd
Stage 1 Wilfield , West Melton

SHEET TITLE:

Sewer Asbuilt

DRAWING STATUS

Asbuilt

SCALE : 1:500@A1 1:1000@A3

DATE : May 2016

CAD FILE : J:\18130\Asbuilts\Stage 1\C18130_AB NZTM R1.dwg

REVISION : R1

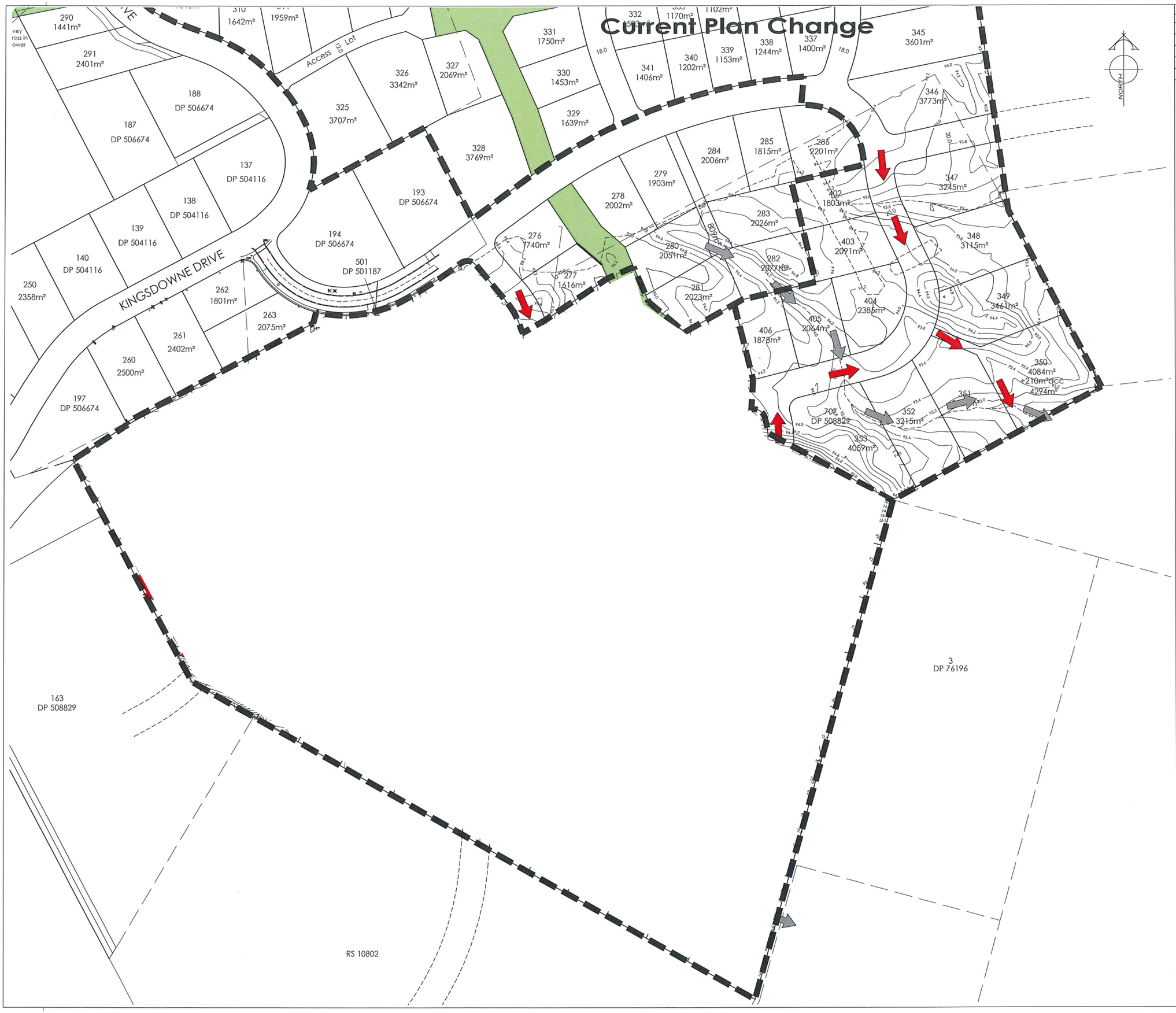
DRAWING No : C18130.AB.SS07

SHEET No:

APPENDIX D

Appendix D – Stormwater Secondary Flow Paths

Current Plan Change



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

LEGEND

PROPOSED FLOW PATHS

NATURAL FLOW PATHS

DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140, New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

GW Wilfield Ltd

SHEET TITLE:

Wilfield
Secondary Flow Paths

DRAWING STATUS

For Information

SCALE : 1:1250@A1
1:2500@A3

DATE : September 2018

CAD FILE : J:\18130_1\Eng\C18130_1_Secondary Flow Paths.dwg

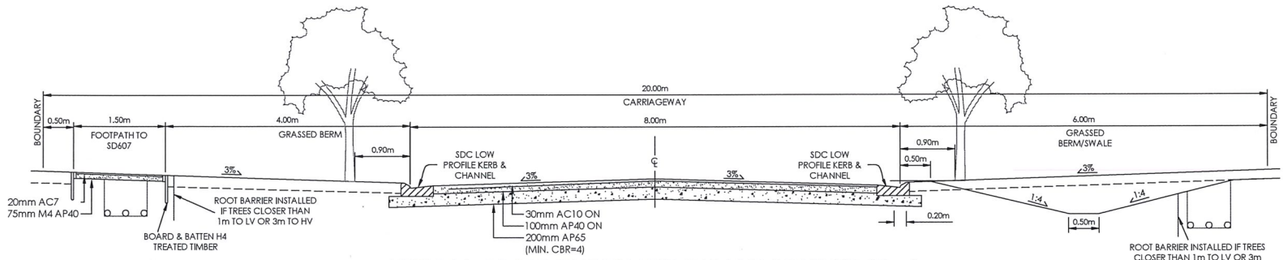
REVISION : R0

DRAWING No : C.18130/1

SHEET No: 1 OF 1

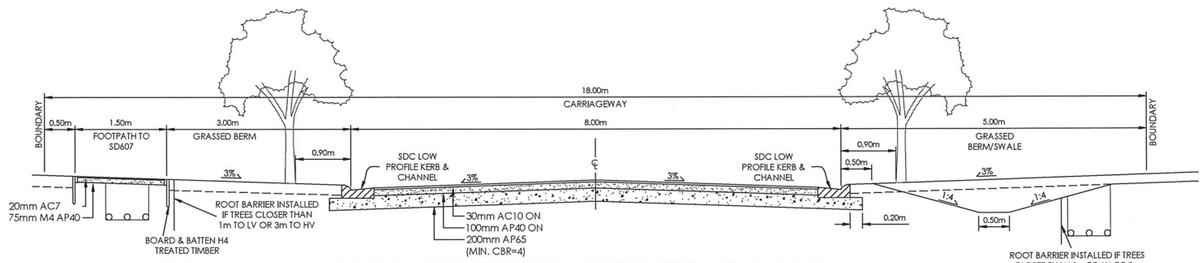
APPENDIX E

Appendix E – Typical Cross Sections of Roads



TYPICAL CROSS SECTION RIDGELAND WAY (20.00m)

SCALES 1:50@A1
1:100@A3



TYPICAL CROSS SECTION WESTMERE MEWS (18.00m)

SCALES 1:50@A1
1:100@A3

NORTH

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
GW Wilfield Ltd

SHEET TITLE:
Wilfield
Typical Road Cross Sections

DRAWING STATUS
For Information

SCALE : As Shown DATE : September 2018

CAD FILE : J:\18130_1\Subcon\C18130_1_Water Connections August.dwg

REVISION :
R0

DRAWING No :
C.18130/1

SHEET No:
1 OF 1