Appendix 5: Engineering Servicing Report

CONIFER GROVE TRUSTEES

14 March 2013

BIRCHES ROAD PRIVATE PLAN CHANGE
Engineering Servicing Report

e2 environmental
CONSULTING ENGINEERS

14 March 2013

CONIFER GROVE TRUSTEES
BIRCHES ROAD PRIVATE PLAN CHANGE

Engineering Servicing Report

Quality Control			
Author	*KC*	Client	*Conifer Grove Trustees*
Reviewed by	*AJT*	Date Issued	*14 March 2013*
Approved by	*AJT*	Revision No.	*1*
Doc Name/Location	*S:\Projects\12040 Birchs Rd Plan Change\Deliverables\PC Report\Rep 121214 Eng for PC App.doc*		

Disclaimer
This report has been prepared solely for the benefit of Conifer Grove Trustees . No liability is accepted by e2environmental or Conifer Grove Trustees if information contained in this report is used by any third party.

© Copyright e2environmental Ltd
All rights are reserved. This publication may not be copied or reproduced in any form without the permission of Conifer Grove Trustees . Permission will only be given within the terms and conditions of the contract with e2environmental and Conifer Grove Trustees . This copyright extends to all forms of storage including any sort of storage retrieval system.

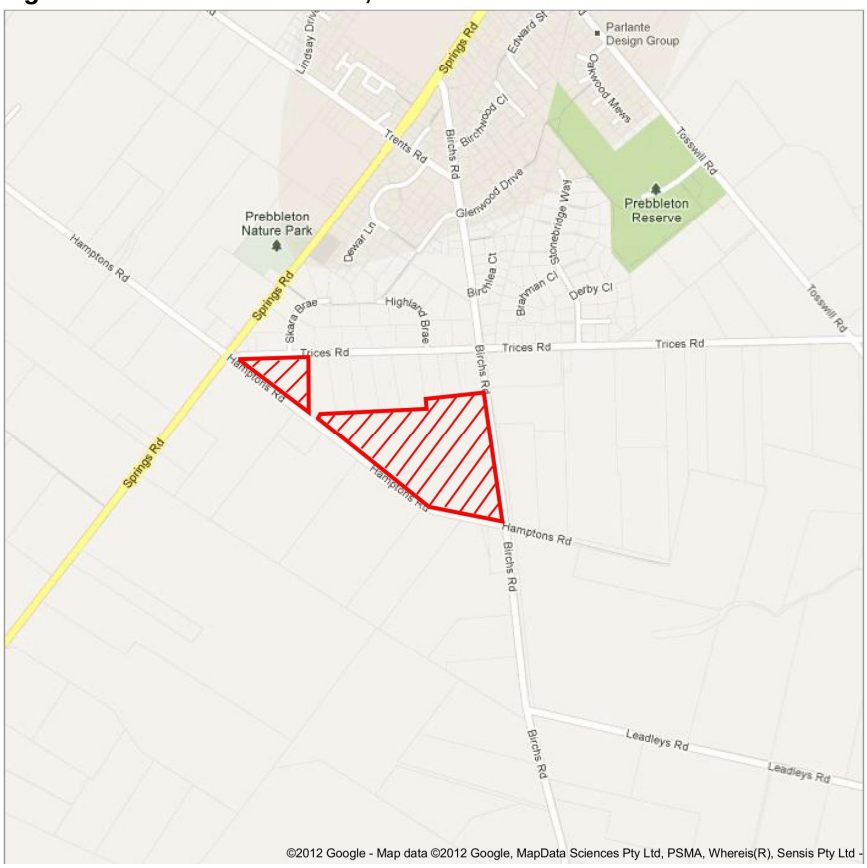
© E2 Environmental Ltd

Table of Contents

1 Introduction

Conifer Grove Trustees Ltd is applying for a plan change in order to subdivide the site at 100 Birchs Road, Prebbleton. This report describes the servicing requirements of the subdivision.

Figure 1 – Site Location Plan, Birchs Road Prebbleton

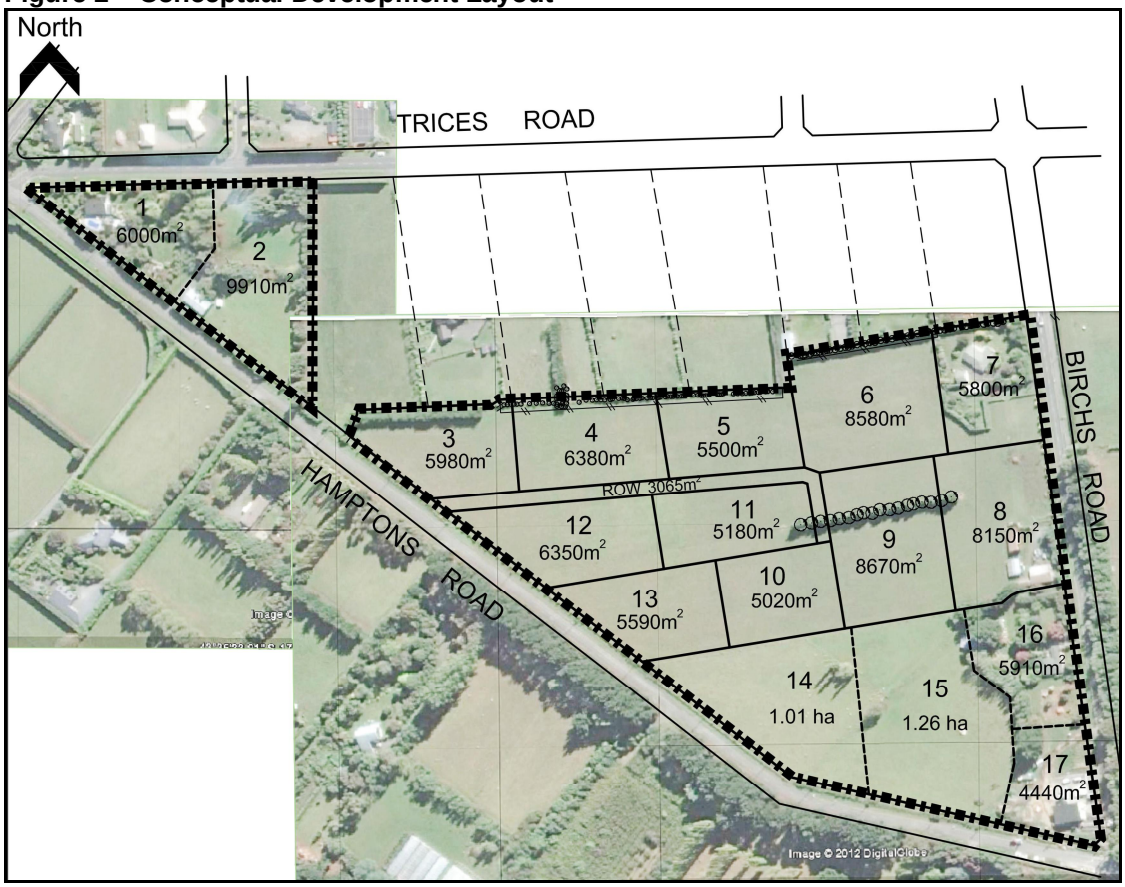


1.1 Background

The proposed subdivision will comprise 17 rural-residential lots ranging in area from 0.45ha to 1.26ha across 3 land parcels. The site is located adjacent to the southern extent of the Prebbleton Township. The Applicant seeks to rezone to rural-residential (L3). The Selwyn District Council (SDC) is currently investigating methods to sustainably manage rural residential activities in this area (Plan Change 32). The conceptual development layout is shown in Figure 2 below.

There are three existing houses on the site, two of which are accessed from Birchs Road, and another accessed from Trices Road. There is also an Orion substation which occupies proposed Lot 17 and is to remain. The block is in pasture and is currently used for grazing livestock.

Figure 2 – Conceptual Development Layout



1.2 Soil Profile

Geotechnical investigations carried out by Geoscience Ltd show that soils within the site generally comprise 300mm topsoil over 400mm silt over sandy gravels to a depth of 3.0m.

This is consistent with the soil profile observed by e2 Environmental[1] Ltd (e2). Test pits also revealed 300mm topsoil over 400mm silt, over sandy gravels to a depth of at least 4.0m. See photos below.

[1] Soakage tests undertaken 1 February 2013

Photo 1 – Test Pit 1

Photo 2 – Test Pit 3

Photo 3 – Gravels

2 Water Supply

2.1 Existing Prebbleton water supply

The Prebbleton Township is supplied from local community groundwater sources which are owned and maintained by SDC (Ecan consent CRC051478). The existing water supply network extends to Trices Road. There is no reticulated water in Hamptons Road and Birchs Road.

Existing reticulation adjacent to the site consists of a 150mm dia water main running along Trices Road then north from Trices Road along Birchs Road and Springs Road.

The existing two houses on Birchs Road are supplied by their own wells. The existing house on Trices Road is connected to the town supply. SDC currently have no policy that requires existing dwellings to connect to the public water supply, however they prefer it[2].

Kris Kaser has confirmed[3] that in SDC's opinion there is sufficient capacity within the existing network to service the proposed subdivision for both water supply and firefighting. We anticipate that modelling of the town water supply network will be required at the subdivision consent stage to confirm this.

2.2 Proposed Water Servicing

A new ring main is proposed. The ring main will connect the existing watermain in Trices Road, then run along Birchs Road and Hamptons Road and reconnect to the Trices Road main at Springs Road. See Appendix A for water supply concept plan. A secondary main will be laid along the length of the proposed ROW.

2.3 Proposed Fire Fighting

For fire fighting purposes the classification for the subdivision will be FW2 (SNZ PAS 4509:2008), based on all properties being residential and unlikely to have domestic fire sprinkler systems. This classification requires a minimum fire flow of 25 L/s supplied by up to 2 hydrants, with a minimum residual pressure of 100kPa.

The concept design for water supply has been based on achieving fire fighting flows and a minimum residual pressure of 200kPa at each house site as required by the SDC Engineering Code of Practice

[2] Phone call by Kathryn Collie (e2) with Kris Kaser (SDC Team Leader Utilities) 15 February 2013
[3] Meeting with Kris Kaser (SDC Team Leader Utilities), Murray England (SDC Asset Manager Utilities), Joanne Golden (SDC Water Services Engineer), Geoff Birss (SDC Asset Engineer Transportation), Andrew Tisch (e2) and Kathryn Collie (e2) 3 December 2012

3 Wastewater

3.1 Existing wastewater disposal

Currently, there is no public wastewater reticulation serving the site. We assume that the existing houses are connected to septic tanks.

The Prebbleton town network exists as far south as Trices Road but because it is relatively shallow it could not be extended to serve the block without significant filling.

3.2 Proposed wastewater servicing

Two options were considered:

1. Low pressure on-site systems pumping to a communal pressure main
2. Gravity discharging to a communal pump station

Vacuum sewer was not considered because it is difficult to economically justify in developments of fewer than 400 lots[4].

Low Pressure
A low pressure system requires individual pump stations on each lot, which pump to the town network via a small diameter, shallow pressure pipe network. We understand that SDC will not accept a fully council owned and operated pressure sewer system; however, public/private schemes are common throughout the district. A public/private scheme would see the Council owning and maintaining the pressure pipe within the road reserve. The pump station and any infrastructure on ROWs and private property would be the responsibility of the property owner(s).

Gravity discharging to a communal pump station
Each lot could gravitate to a common pump station. A gravity network would be considerably more expensive than a low pressure system as pipes are larger diameter and must be laid to grade at greater depths (compared to pressure systems). Given the plan area of the lots a gravity network and pump station would need to be very deep to accommodate the long laterals.

The possible layout of the wastewater network is included in Appendix A.

Design flows have been calculated from the SDC Engineering Code of Practice. The design maximum flow (MF) is 0.58L/s and is based on a daily average sewer flow (ASF) of 220L per person, a population average density of 2.7 persons per lot, a peak flow factor of 2.5 and a wet weather flow factor of 2.0.

[4] Discussions with Matt Sheppard, Three Waters Design Lead working on vacuum sewer at SCIRT

3.3 Assessment of the Options

See Table 1 below for comparison of wastewater servicing options. On this basis the low pressure system is the most appropriate.

Table 1 - Wastewater Options Comparison[5]

Attribute	Sub Attribute	Gravity	Low Pressure
Level of Service	Service at Boundary	Gravity connection to boundary Flush and forget	
	Noise	No noise	Small chance of noise at pump stations, primarily associated with maintenance works
	Private property aesthetics	No above ground assets on private property	Pump station lid visible above ground. Can be included in garden landscaping
	Odour	Generally no odour	Small potential for odour. Odour filter can be installed to eliminate
	Public acceptance	Generally accepted as standard	
Ease of Maintenance and Operation	Ease of operation and repairs	Difficult and expensive to repair deep gravity mains	Pressure mains are shallow, easier and cheaper to repair Pump stations are owned and maintained by the property owner so no SDC input required
	Parts availability	Gravity would be installed as per SDC standards. Parts should be readily available.	Approximately 8,000 low pressure pumping units are being installed throughout Christchurch City as part of the earthquake infrastructure rebuild and potential development of the south west area. Parts should be readily available.
	Number of pump stations	Only one pump station required, however this will be required to be very deep in order to service all lots because of long lateral lengths. Pump owned by SDC	One small pump station required on each lot (total 18). Pumps owner by property owners,
	Finding and fixing flaws	Relatively easy to locate using CCTV, water, blaster, sucker truck Repairs require deep excavations	
	Health and safety	Requires deep	Pressure pipes are

[5] Based on work carried out by SCIRT and New Foundations (Waimakariri District Council)

		excavations, pipes to be laid in centre of the road	shallow, can be laid using trenchless methods. Laid in berm
Disaster Resilience	Earthquake	Ground movement has potential to effect grades. Potential failure at connections to manholes Pipes are laid deeper, difficult to access to repair	Not dependent on grade. Less points of failure (i.e. joints) than gravity. Repairs cheaper, faster as mains shallower
	Flooding	Inundation at manholes possible	No potential for flooding
	Power Outage	Pump station reliant on power. Storage is provided in both pump station and reticulation	System is dependent on power. Pumps provide 24 hours of storage

3.4 Available Capacity in the Network

The Prebbleton sewer pump station is located approximately 500m north of the site at the intersection of Birchs Road and Glenwood Drive. There is a 150mm diameter sewer main that connects to the pump station and extends south along Birchs Road terminating at a manhole outside of 89 Birchs Road. We propose that the sewer rising main from the site will discharge to this manhole.

There are currently 27 lots discharging into the 150 main, giving a calculated maximum flow of 0.93 L/s. With the addition of the 17 proposed lots the maximum flow will be approximately 1.5 L/s. Assuming the pipe has a grade of 1:200 (minimum grade for 150 diameter pipe under the SDC Engineering Code of Practice) the existing main has capacity to take up to 10 L/s. The 150 diameter main therefore has sufficiently capacity to service the proposed subdivision.

SDC[6] have confirmed that there is also sufficient capacity in the treatment plant to take the additional flows. This is based on looking at local infrastructure and making a judgement call. SDC have no sewer models or reporting to support this.

[6] Phone call Kris Kaser (SDC Team Leader Utilities) 15 February 2013

4 Stormwater

4.1 Existing site stormwater management

There is currently no stormwater management on the site. Soils in the area are generally free draining and the majority of stormwater soaks to ground. There are three existing houses on the site. Roof water from the existing house at 100 Birchs Road soaks to ground via soakholes. These soakholes apparently operate effectively[7].

The drain which runs along Hamptons Road adjacent to the site is classified by Council as a 'water race.' The SDC Water Race Bylaw 2008 does not permit any activity that may increase or decrease the supply of water within a water race, so discharge of stormwater into a water race is not allowed. The water race becomes an 'open drain' on the south side of the intersection of Birchs Road and Hamptons Road. Stormwater discharge to an open drain is permitted by the District Plan.

Once the site is developed the water race will still receive overland flow in extreme events[8] as it currently does.

4.2 Historical flooding

A Flood Risk Report has been obtained from Ecan. Ecan have no flood information relating to this site as it is outside of floodplains of major rivers and areas monitored for flooding. The only thing we can conclude from this is to note that as it is not within Ecan's priority floodplain monitoring area it presumably is not in a high risk flood area from river breakouts.

4.3 Groundwater

Groundwater levels have a significant impact on the stormwater disposal options available. We have undertaken a study of groundwater levels in the area to determine the likely highest groundwater levels at the site. We used the following sources:

1. Ecan GIS database and well logs
2. SDC groundwater monitoring points at the community supply wells M36/4795 (Tosswill) and M36/7504 (Central).
3. e2 site investigations
4. Discussion with Ross Taylor (Conifer Grove Trustees)

Ecan GIS Database and Well Logs
A review of well logs within approximately 500m of the site showed that groundwater levels in the area vary significantly. The following well logs contained measured groundwater information.

[7] Email from Ross Taylor (Conifer Grove Trustees) 11 March 2013
[8] Runoff from storms exceeding 2%AEP

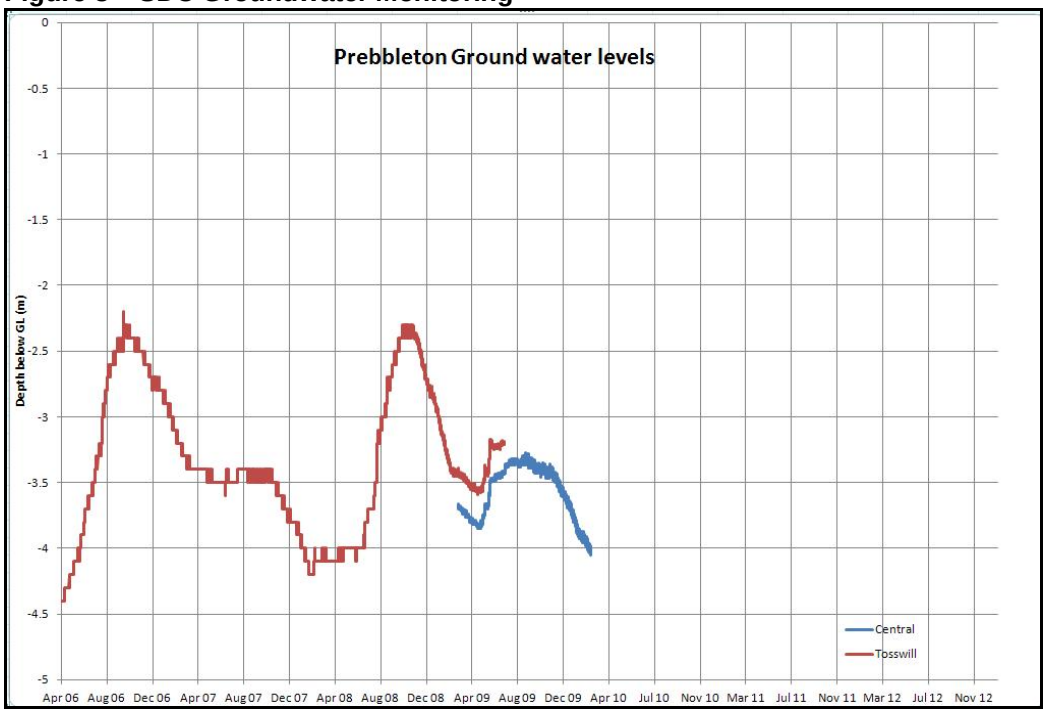
Table 2 – Ecan Well Logs

Well	Location	Highest Measured Groundwater Level (below GL)	Lowest Measured Groundwater Level (below GL)
M36/0248	300 west of site	-3.64	-8.01
M36/0247	100 east of site	-0.5	-4.35
M36/4227	350m north of site	-3.7	-6.6

SDC Groundwater Monitoring Points

SDC monitor groundwater levels at the community supply wells M36/4795 Toswill (Toswill Road) and M36/7504 Central (Springs Road). Figure 3 shows groundwater levels to range between 2.2m and 4.4m below ground at Toswill, and -3.3m and 4.1m below ground at Central[9].

Figure 3 – SDC Groundwater Monitoring



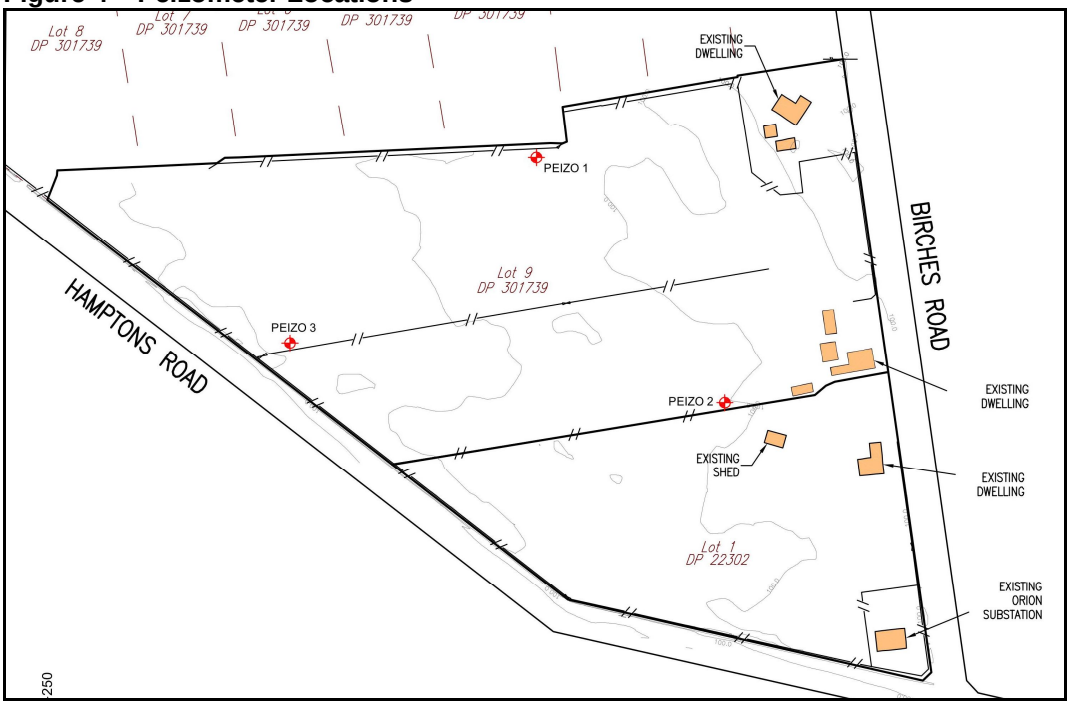
e2 Site Investigations

Three groundwater monitoring piezometer were installed at key locations across the site (1 February 2013). Ross Taylor (Conifer Grove Trustees) lives on site and has agreed to take and record groundwater measurements.

Figure 4 shows piezometer locations. Piezometers have a depth of 3.5 - 4.0m. No water has been observed in the tubes to date.

[9] Supplied by Kris Kaser SDC 24 January 2013

Figure 4 – Peizometer Locations



Discussion with Ross Taylor (Conifer Grove Trustees)
Ross Taylor owns and occupies the property at 100 Birchs Road. The house is supplied for water from a well near the existing house. The groundwater level within the well is currently 5.1m below ground level (11 March 2013). Previous measurements by Ross Taylor show that the groundwater level within the well reaches approximately 4.2m below ground level in winter[10].

Groundwater measurements in the existing well support the ECan well log information and we have assumed a highest groundwater level of 3.7m below ground level for development of the stormwater philosophy for the site. The data collected from the piezometers over the wet months will confirm the shallowest depth to ground water and enable a stormwater management plan to be developed with a high level of confidence.

4.4 Infiltration Potential of the Soil

We undertook three soakage tests on the site at piezometer locations (see Figure 4 above). Test pits confirmed that the site is underlain with free draining gravel. Tests identified that gravels have a soakage rate of 13,000mm/hr at a depth of 2.8m below ground level. Soakage tests have confirmed that underlying soils are suitable for soakage to ground.

4.5 Stormwater Discharge

SDC do not hold a global stormwater discharge consent with Ecan for this area, neither is it in a Stormwater Management Area[11]. As the depth to groundwater is expected to be less than 6m (but deeper than 1m), either a stormwater discharge consent or a treatment system (by soil filtration) as described in NRRP Rule WQL6 clause 3(c) is required. A Compliance Certificate from Ecan is needed in the case of the latter.

[10] Email from Ross Taylor 11 March 2013
[11] Ref to NRRP Rule WQL6 and Proposed Canterbury Land and Water Plan Rule 5.72

4.6 Stormwater concept design

Due to the free-draining gravels at the site, and the lack of a stormwater discharge point, we propose that stormwater from the site is disposed of to ground via soakholes.

Stormwater from the right of way may be collected and pre-treated in roadside soakage swales prior to soaking to ground. Alterative options may also be considered.

SDC requires stormwater from a 2% AEP storm to be attenuated. All soakholes will therefore have capacity to discharge stormwater from a 2% AEP storm event.

Treatment Train

- Roofs to ground via a rapid soakholes on each lot;
- first runoff from the first 25mm rain falling on the hardstand catchment (ROW and contributing entranceways) to be treated by soakage swales;
- treated water and runoff water from storm events up to the 2%AEP to discharge to rapid soakage;
- runoff from events in excess of the2%AEP to runoff via secondary flow paths to Hamptons Road water race.

5 Power and Telecommunications

Orion has confirmed that the proposed development area can be serviced for reticulated power from the existing network. A copy of Orion's letter is included at Appendix D.

Chorus Limited has confirmed that the proposed development area can be serviced for reticulated telecommunications from the existing network. A copy of Chorus' letter is included at Appendix E.

6 Construction

6.1 Earthworks

As the site has a relatively constant grade from west to east, minimal earthworks will be required as follows:

- Cut from the excavation to ROW subgrade and to form roadside swales and soakholes.
- Filling and shaping to grade the lots toward the ROW or existing roads.

A balanced cut/fill operation will be achieved

All earthworks will be undertaken in accordance with NZS4431 – Earth fill for Residential Development.

An erosion and sediment control plan will be prepared in accordance with ECan guidance documents[12] with the engineering drawings. This will outline the types of controls to be put in place to minimise the discharge of contaminants to the environment during construction.

[12] Environment Canterbury Erosion and Sediment Control Guidelines 2007, with updates 2008

Appendix A

Water, Wastewater & Stormwater schematics

TRICES ROAD

EXISTING Ø150 WATERMAIN

SPRINGS ROAD

75AC WATER

50AC WATER

EXISTING HOUSE

EXISTING SHED

Pt RS 3967

Lot 8 DP 301739

Lot 7 DP 301739

Lot 6 DP 301739

Lot 5 DP 301739

Lot 4 DP 301739

Lot 3 DP 301739

Lot 2 DP 301739

Lot 1 DP 301739

EXISTING HOUSE

PROPOSED SECONDARY MAIN

Ø150

Ø100

PROPOSED RIGHT OF WAY

Lot 9 DP 301739

HAMPTONS ROAD

Ø150

BIRCHES ROAD

Ø150

EXISTING SHEDS

EXISTING SHED

EXISTING HOUSE

PROPOSED WATERMAIN

Lot 1 DP 22302

EXISTING ORION SUBSTATION

Ø150

N

LEGEND

- EXISTING WATER
- PROPOSED WATER
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- CONTOUR
- EXISTING BUILDING
- EXISTING FENCE

50 40 30 20 10 0m 50 100 150 200 250

Scale 1:2500

e2environmental CONSULTING ENGINEERS

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

Client: Conifer Grove Trustees

Project: Birches Road Plan Change

Title: Concept Water Supply Layout

Designed	KJC				
Drawn	ADF				
Checked	AJT	REV	COMMENTS	DATE	APR
Approved	AJT	Scale	1:2500 (A3)	Drawing No	12040-01-001
Date	MARCH 2013	Sheet	1 of 1	Revision	A

THIS DESIGN AND DRAWING IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY

TRICES ROAD

SPRINGS ROAD

HAMPTONS ROAD

BIRCHES ROAD

EXISTING HOUSE

EXISTING SHED

Pt RS 3967

Lot 8 DP 301739

Lot 7 DP 301739

Lot 6 DP 301739

Lot 5 DP 301739

Lot 4 DP 301739

Lot 3 DP 301739

Lot 2 DP 301739

Lot 1 DP 301739

EXISTING DWELLING

TREATMENT TRAIN IS CONCEPTUAL ONLY EXACT DETAIL AND LOCATION MAY CHANGE

PROPOSED RIGHT OF WAY

Lot 9 DP 301739

OVERLAND FLOW PATH

EXISTING SHEDS

EXISTING SHED

EXISTING HOUSE

Lot 1 DP 22302

EXISTING WATER RACE

EXISTING ORION SUBSTATION

EXISTING OPEN DRAIN

LEGEND

- PROPOSED TREATMENT SYSTEM
- PROPOSED SOAK HOLE
- OVERLAND FLOW PATH
- EXISTING WATER RACE
- EXISTING BUILDING
- EXISTING FENCE
- CONTOUR

50 40 30 20 10 0m 50 100 150 200 250

Scale 1:2500

e2environmental CONSULTING ENGINEERS

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

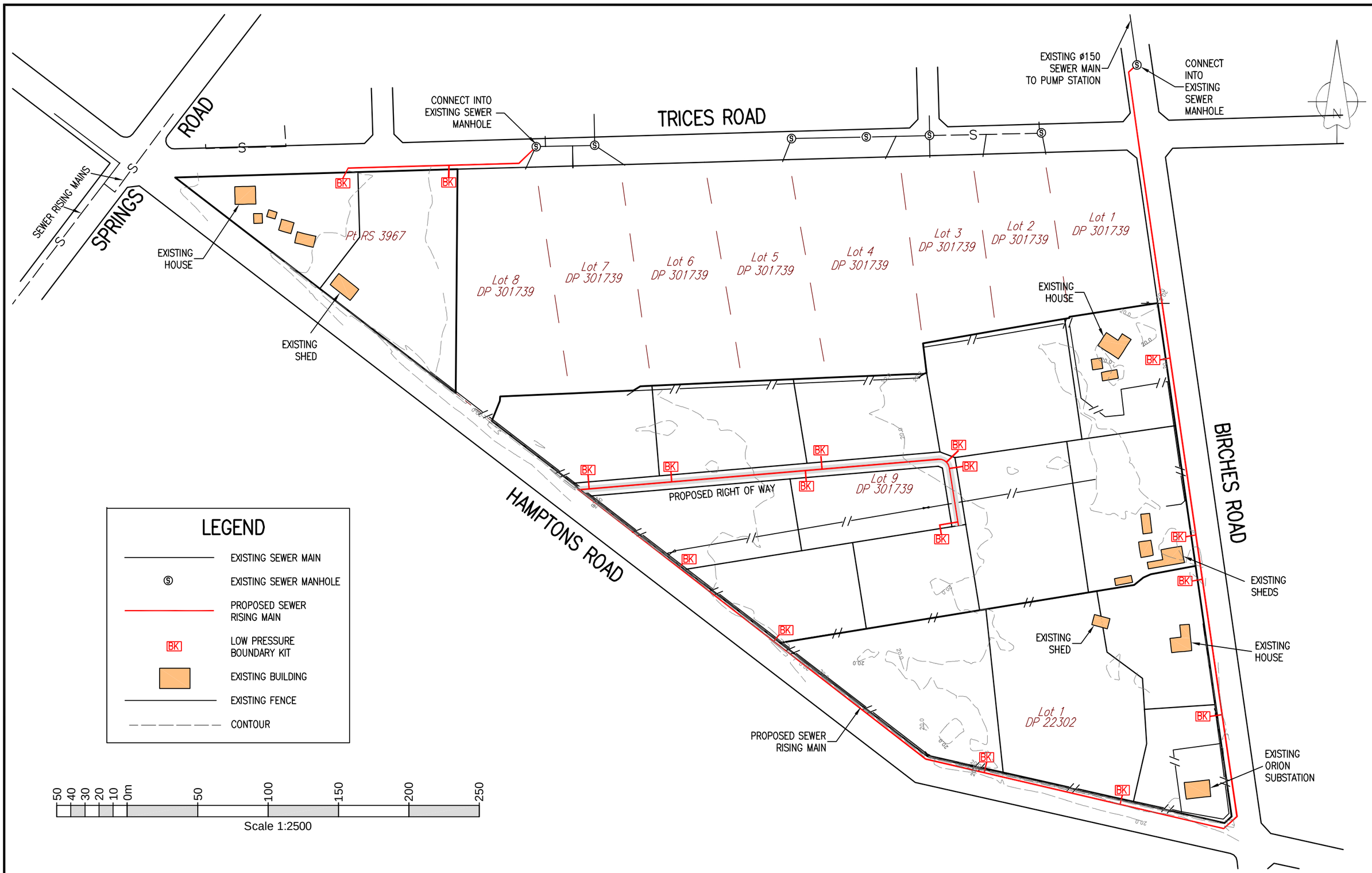
Client: Conifer Grove Trustees

Project: Birches Road Plan Change

Title: Concept Stormwater Layout

Designed	KJC				
Drawn	ADF				
Checked	AJT	REV	COMMENTS	DATE	APR
Approved	AJT	Scale	1:2500 (A3)	Drawing No	12040-01-002
Date	MARCH 2013	Sheet	1 of 1	Revision	A

THIS DESIGN AND DRAWING IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY



LEGEND

- EXISTING SEWER MAIN
- EXISTING SEWER MANHOLE
- PROPOSED SEWER RISING MAIN
- BK — LOW PRESSURE BOUNDARY KIT
- EXISTING BUILDING
- EXISTING FENCE
- CONTOUR

50 40 30 20 10 0m 50 100 150 200 250

Scale 1:2500

e2environmental CONSULTING ENGINEERS

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

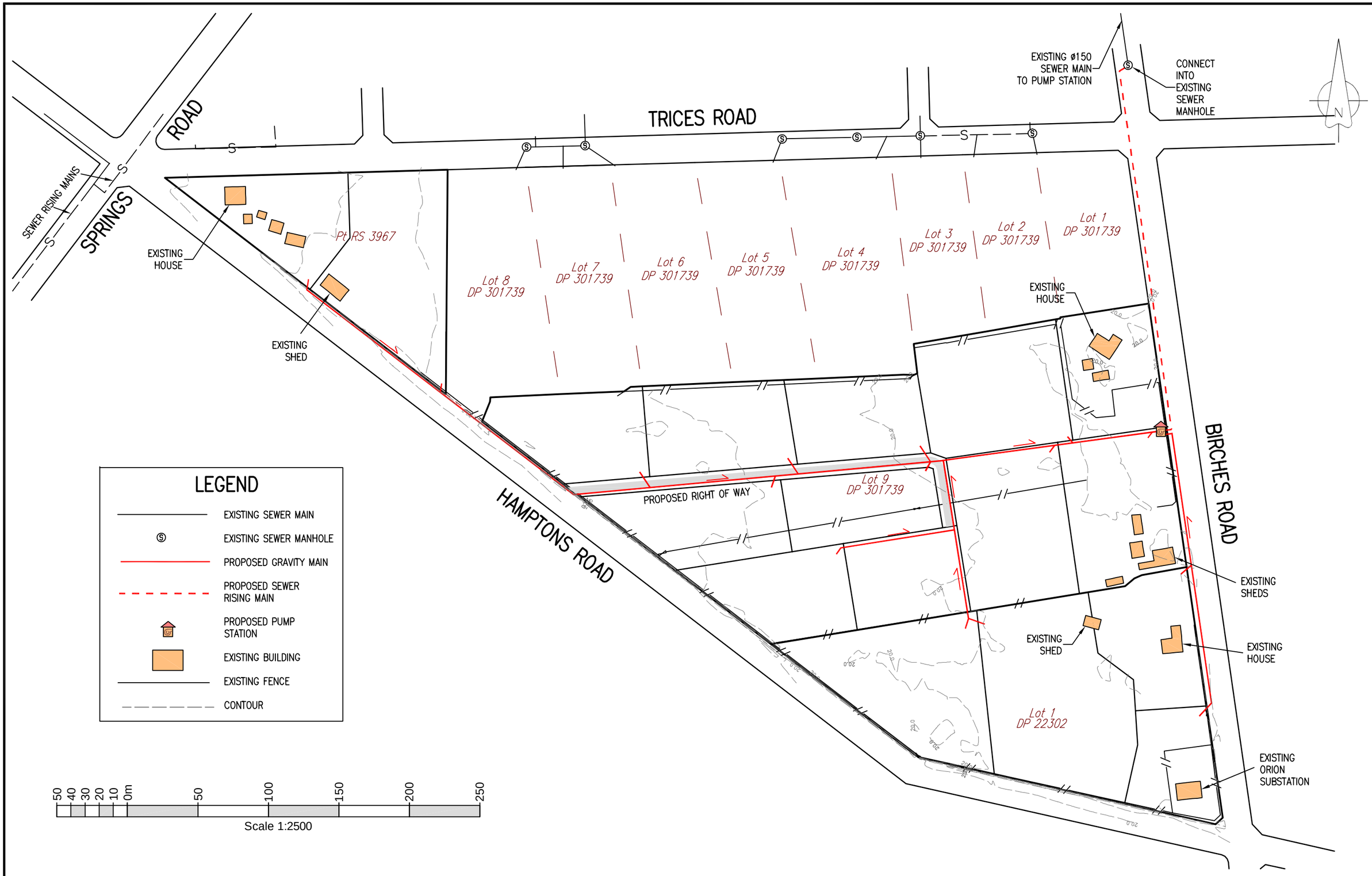
Client: Conifer Grove Trustees

Project: Birches Road Plan Change

Title: Concept Wastewater Layout - Option 1 Low Pressure Sewer On Site Systems Pumping to Communal Pressure Main

Designed	KJC				
Drawn	ADF				
Checked	AJT		REV	COMMENTS	DATE / APR
Approved	AJT		Scale	1:2500 (A3)	Drawing No 12040-01-004 Revision A
Date	MARCH 2013		Sheet	1 of 1	

THIS DESIGN AND DRAWING IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY



LEGEND

- EXISTING SEWER MAIN
- EXISTING SEWER MANHOLE
- PROPOSED GRAVITY MAIN
- PROPOSED SEWER RISING MAIN
- PROPOSED PUMP STATION
- EXISTING BUILDING
- EXISTING FENCE
- CONTOUR

50 40 30 20 10 0m 50 100 150 200 250

Scale 1:2500

e2environmental CONSULTING ENGINEERS

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

Client: Conifer Grove Trustees

Project: Birches Road Plan Change

Title: Concept Wastewater Layout - Option 2
Gravity Discharging to a Communal Pump Station

Designed	KJC
Drawn	ADF
Checked	AJT
Approved	AJT
Date	MARCH 2013
Scale	1:2500 (A3)
Sheet	1 of 1
Drawing No	12040-01-003
Revision	A

REV	COMMENTS	DATE	APR

THIS DESIGN AND DRAWING IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY

Appendix B

ECan flood risk assessment

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

58 Kilmore Street
PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

17 December 2012

E2 Environmental
Unit 2, 29 Acheron Drive
Riccarton
Christchurch 8041
Attn: Kathryn Collie

Dear Kathryn

FLOOD RISK – PT RS 3967, LOT 9 DP 301739 & LOT 1 DP 22302 – HAMPTONS ROAD, PREBBLETON

The property is located outside the recorded floodplains of the major rivers and areas recorded as flood ponding areas. This assessment is based on historical flood information and floodplain studies held by Environment Canterbury.

The property is also outside of areas that Environment Canterbury and previously the North Canterbury Catchment Board has generally monitored following local rainfall events. The only photograph which shows the property following is No. **826** (enclosed) taken on 24 August 1986 following a rainfall event where 81.3 mm was recorded at Lincoln in the 72 hours to 9 am on 23 August 1986. The return period of this rainfall is estimated at 2 – 5 years.

Antecedent conditions at the time were relatively wet due to rainfall earlier in the month. Note that the photographs were taken at least 24 hours after the rainfall event and therefore may not show flooding at its peak.

Environment Canterbury staff have not inspected the property in response to this request and have insufficient information to comment on any potential risk of flooding by runoff from adjoining land or water-races or drains. Other possible sources of information would be local knowledge or the Selwyn District Council.

Yours Sincerely

Nick Griffiths

HAZARD ANALYST

Our Ref: HAZA/FLD/ASS/CHC/12611
Your Ref:
Contact: Nick Griffiths

24/08/1986

826. Halswell area. Trices Road lower right. Ellesmere Road on left. (West)

Appendix C

Ecan Well Logs

Bore or Well No: M36/5677
Well Name:
Owner: CRAIGIE, LW

Environment Canterbury
Your regional council

Street of Well: 144 BIRCHS ROAD
Locality: PREBBLETON
NZGM Grid Reference: M36:7049-3466 QAR 4
NZGM X-Y: 2470490 - 5734660
Location Description:
ECan Monitoring:
Well Status: Active (exist, present)

File No: CO6C/14875
Allocation Zone: Selwyn-Waimakariri
Uses: Domestic and Stockwater

Drill Date: 03 Oct 1998
Well Depth: 12.00m -GL
Initial Water Depth: -3.20m -MP
Diameter: 100mm

Water Level Count: 0
Strata Layers: 8
Aquifer Tests: 0
Isotope Data: 0
Yield/Drawdown Tests: 1

Measuring Point Ait: 17.72m MSD QAR 4
GL Around Well: 0.00m -MP
MP Description: GROUND LEVEL

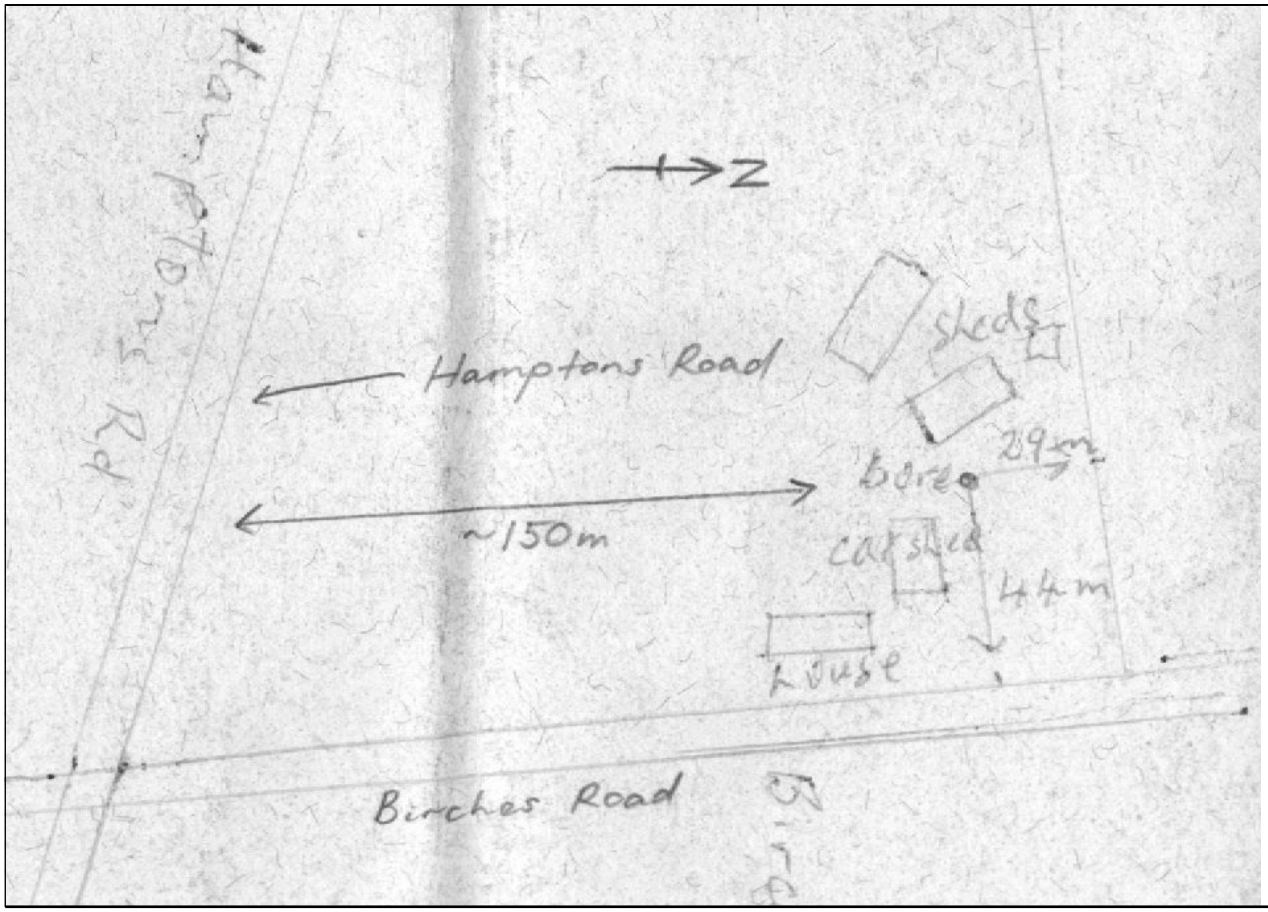
Highest GW Level:
Lowest GW Level:
First Reading:
Last Reading:

Driller: Smiths Welldrilling
Drilling Method: Rotary Rig
Casing Material: STEEL
Pump Type:
Yield: 2 l/s
Drawdown: 0 m
Specific Capacity: 11.50 l/s/m

Calc. Min. GWL: -4.80m -MP
Last Updated: 23 Dec 1998
Last Field Check:

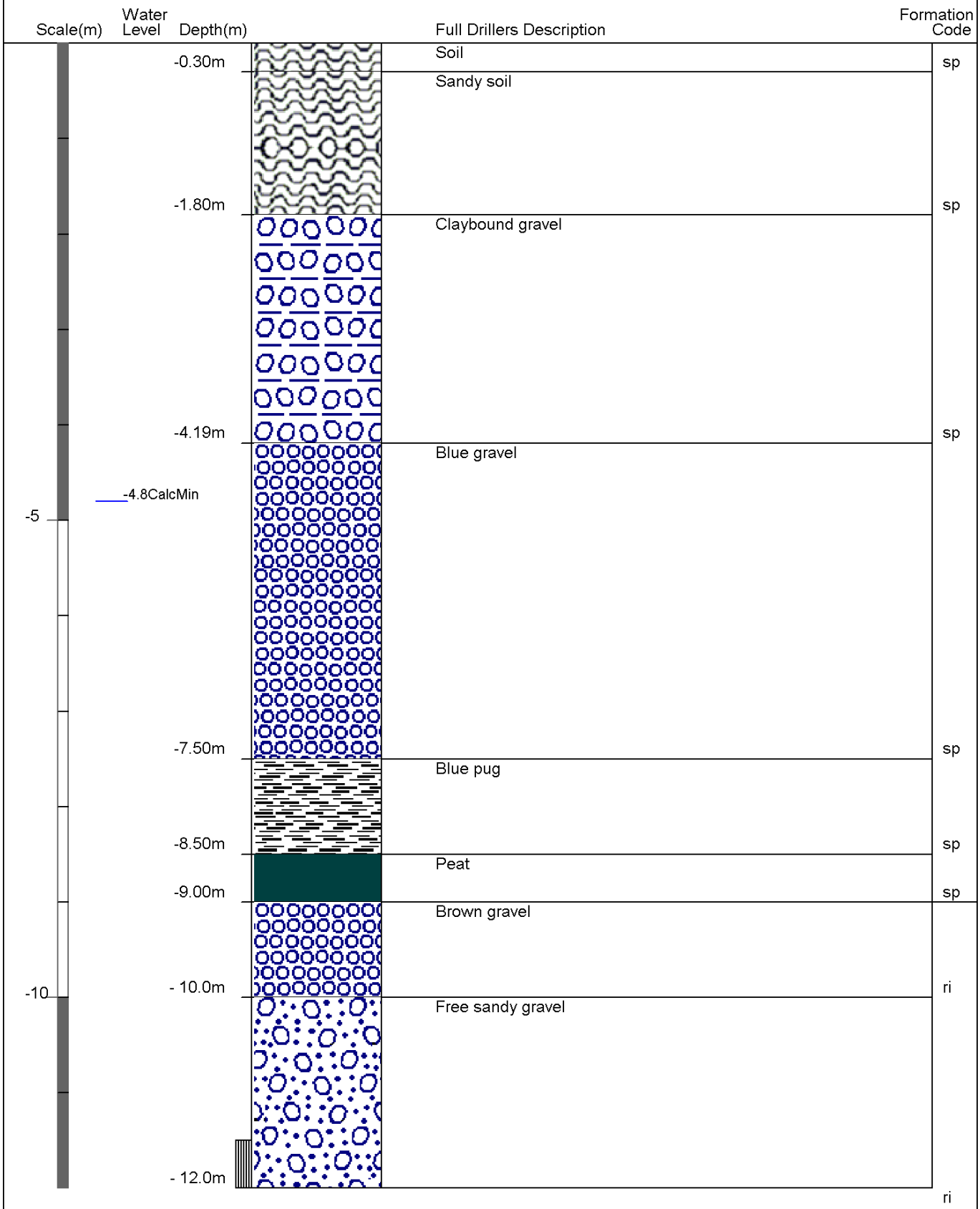
Screens:
Screen Type: Stainless steel
Top GL: 11.50m
Bottom GL: 12.00m

Aquifer Type:
Aquifer Name: Riccarton Gravel


N
Hamptons Road
sheds
bore
29m
~150m
carshed
44m
house
Birches Road

Borelog for well M36/5677

Gridref: M36:7049-3466 Accuracy : 4 (1=best, 4=worst)
Ground Level Altitude : 18 +MSD
Driller : Smiths Welldrilling
Drill Method : Rotary Rig
Drill Depth : -12m Drill Date : 3/10/1998



Bore or Well No: M36/7645
Well Name:
Owner: Mr & Mrs DH & D Collings

Environment Canterbury
Your regional council

Street of Well: 379 Trices Road
Locality: Prebbleton
NZGM Grid Reference: M36:7021-3490 QAR 4
NZGM X-Y: 2470210 - 5734900
Location Description:
ECan Monitoring:
Well Status: Active (exist, present)

File No: CO6C/21593
Allocation Zone: Selwyn-Waimakariri
Uses: Domestic Supply

Drill Date: 22 May 2004
Well Depth: 24.00m -GL
Initial Water Depth: -5.80m -MP
Diameter: 150mm

Water Level Count: 0
Strata Layers: 4
Aquifer Tests: 0
Isotope Data: 0
Yield/Drawdown Tests: 1

Measuring Point Ait: 19.33m MSD QAR 4
GL Around Well: -0.30m -MP
MP Description: ToC

Highest GW Level:
Lowest GW Level:
First Reading:
Last Reading:

Driller: East Coast Drilling
Drilling Method: Rotary Rig
Casing Material: STEEL
Pump Type:
Yield: 2 l/s
Drawdown: 1 m
Specific Capacity: 1.36 l/s/m

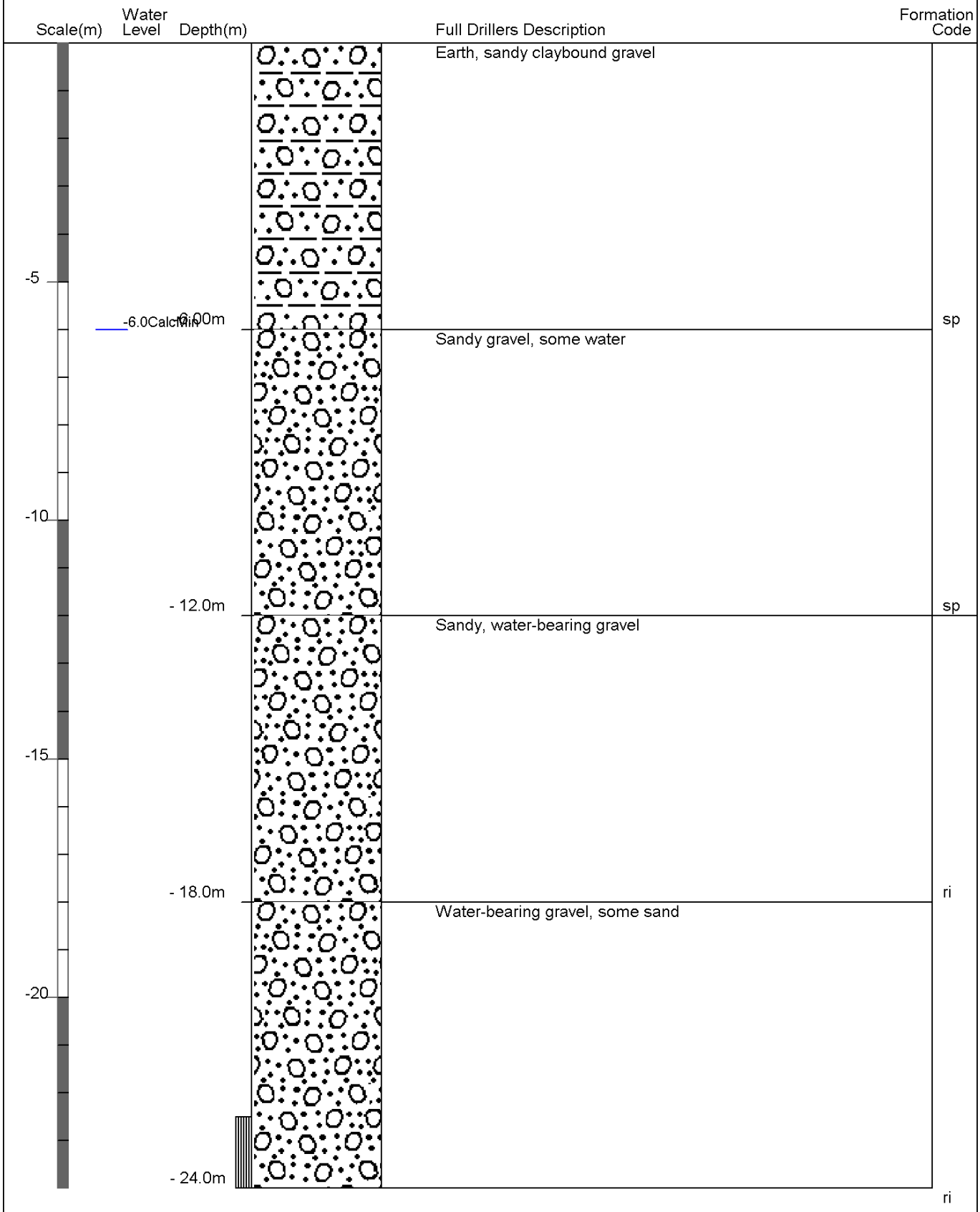
Calc. Min. GWL: -6.30m -MP
Last Updated: 22 Jul 2004
Last Field Check:

Screens:
Screen Type: Stainless steel
Top GL: 22.50m
Bottom GL: 24.00m

Aquifer Type:
Aquifer Name: Riccarton Gravel

Borelog for well M36/7645

Gridref: M36:7021-3490 Accuracy : 4 (1=high, 5=low)
Ground Level Altitude : 19 +MSD
Driller : East Coast Drilling
Drill Method : Rotary Rig
Drill Depth : -24m Drill Date : 22/05/2004



Bore or Well No: M36/7579
Well Name:
Owner: Mr PR & Mrs P Ellingford

Environment Canterbury
Your regional council

Street of Well: 86 Birchs Road
Locality: Prebbleton
NZGM Grid Reference: M36:7044-3493 QAR 4
NZGM X-Y: 2470440 - 5734930
Location Description:
ECan Monitoring:
Well Status: Active (exist, present)

File No: CO6C/21417
Allocation Zone: Selwyn-Waimakariri
Uses: Domestic and Stockwater

Drill Date: 05 Mar 2004
Well Depth: 12.00m -GL
Initial Water Depth: -6.30m -MP
Diameter: 150mm

Water Level Count: 0
Strata Layers: 4
Aquifer Tests: 0
Isotope Data: 0
Yield/Drawdown Tests: 0

Measuring Point Ait: 18.38m MSD QAR 4
GL Around Well: -0.30m -MP
MP Description: ToC

Highest GW Level:
Lowest GW Level:
First Reading:
Last Reading:

Driller: Smiths Welldrilling
Drilling Method: Rotary Rig
Casing Material: STEEL
Pump Type:
Yield:
Drawdown:
Specific Capacity:

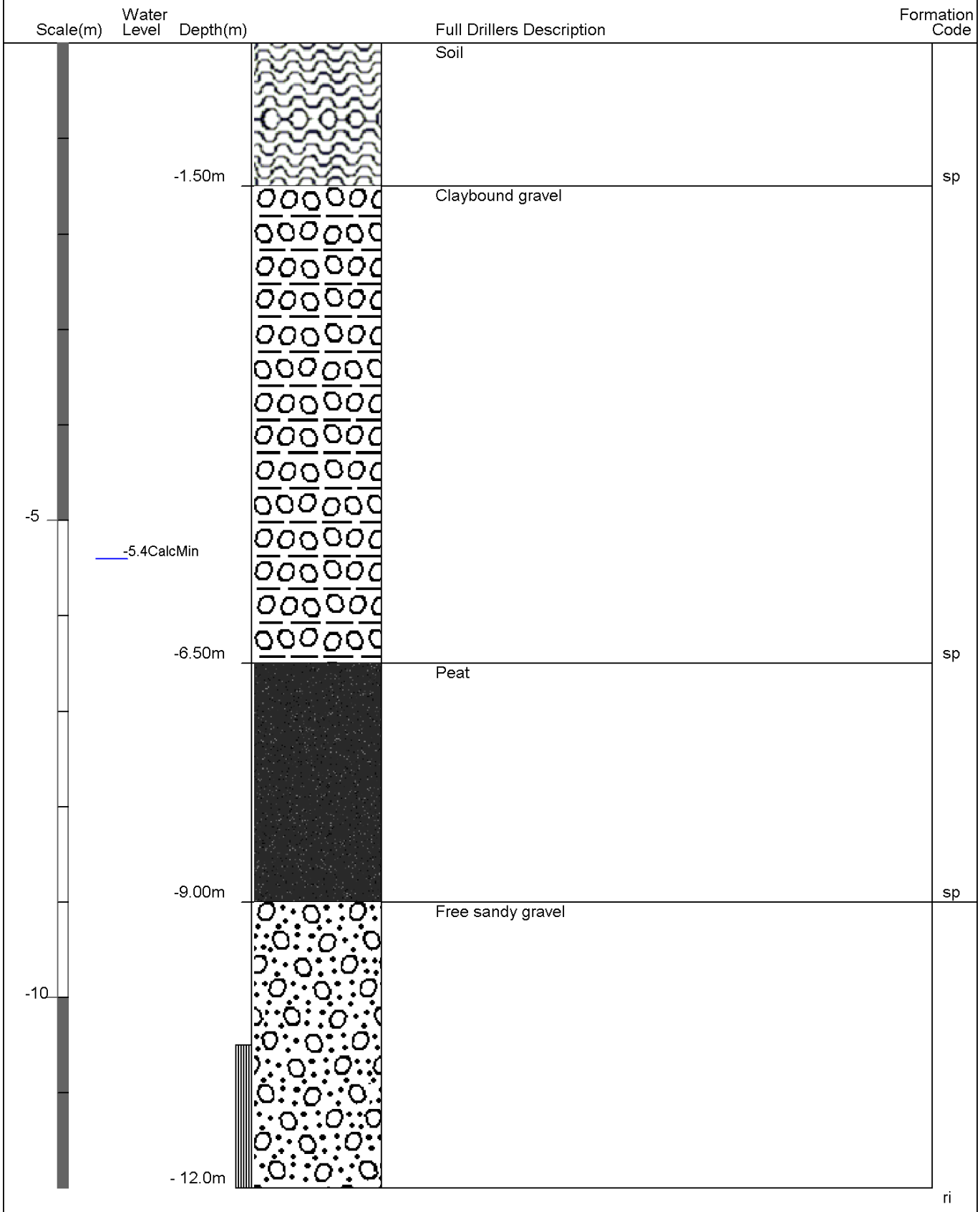
Calc. Min. GWL: -5.70m -MP
Last Updated: 22 Jul 2004
Last Field Check:

Screens:
Screen Type: Stainless steel
Top GL: 10.50m
Bottom GL: 12.00m

Aquifer Type:
Aquifer Name: Riccarton Gravel

Borelog for well M36/7579

Gridref: M36:7044-3493 Accuracy : 4 (1=high, 5=low)
Ground Level Altitude : 19 +MSD
Driller : Smiths Welldrilling
Drill Method : Rotary Rig
Drill Depth : -12m Drill Date : 5/03/2004



Appendix D

Orion confirmation letter

18-Dec-2012

Ms Kathryn Collie
e2environmental
Unit 2, 29 Acheron Drive
Riccarton
Christchurch

kathryn.collie@e2environmental.com

ES175271

Dear Madam,

Proposed sub-division connection to the Orion network.
Lot 9 DP301739 Hamptons Rd (100 Birches Rd)
Prebbleton

I refer to your letter and the above named property. I have investigated your request and comment as follows:

1. There are no specific connections available for this sub-division; however,
2. the subdivision could connect to Orion's existing underground 11kV network in Birches road. There will be costs associated in providing the connection(s). These costs will be the responsibility of the property owner, not Orion.
3. This type of work would be a typical design-build project. If you decide to proceed; have your designer forward their proposal to Orion for approval. Orion will then forward Terms and Conditions for acceptance.
4. The Terms and Conditions presented to the applicant will encompass Orion's policies and practices current at that time.

Please don't hesitate to contact me on (03) 03 363 9534 if you have any questions, or email me at Craig.Marshall@oriongroup.co.nz.

Yours faithfully

Craig Marshall
Contract Manager

Appendix E

Chorus confirmation letter

The Subdivision Group
55 Shands Road, Hornby 8042
P O Box 1374, Christchurch 8140
Telephone: (03) 339 3402
Facsimile: (03) 338 0133
Email: tsg@chorus.co.nz

Chorus

Chorus Ref: ISL20038
Your Ref:

4 February 2013

The Developer
c/- e2 Environmental Ltd
Unit 2 29 Acheron Drive
P O Box 31159
Christchurch

Attention: **Kathryn Collie**

RE: Subdivision: ISL:Birchs & Hamptons Rds, Christchurch-18 lot subdivision

(Subdivision Location: Birchs Road & Hamptons Road Christchurch)

Dear Sir / Madam

Thank you for letter and scheme plan for the above subdivision.

Chorus can extend its Network to provide connections for this development.

Important information about premises wiring.

Please Note that premises wiring is the responsibility of the homeowner. Any new homes built in the subdivision should be installed with telecommunications cabling that complies with the Telecommunications Carriers' Forum's Premises Wiring Code. Information about this code and wiring requirements is available on our website at www.chorus.co.nz/wiring

If the developer wishes to reticulate the subdivision and install connection pillars on the boundaries prior to selling sections, then they will need to commit to a Chorus Subdivision Reticulation Contract and pay the required subdivision fees. The charge for Chorus to provide reticulation for this subdivision of 18 lots/units is $37,260.00 (G.S.T inclusive). This charge comprises a contribution toward Chorus' total costs of extending its network and infrastructure to the lots in the supplied plan, including the cost of Network design, supply of telecommunication specific materials and supervision of installation. This quote is valid for 3 months from the date of this letter.

The above will assume that the Developer, or his nominated contractor will supply and reinstate trenches and install Chorus plant at their cost within the subdivided area and along the frontage of the subdivision.

In any areas where Chorus Network does not end up in public road reserve vested to the Local Council, the subdivider is to ensure that a legal easement is registered over the route and Network in favour of Chorus New Zealand Limited. The easement should provide for an "easement in gross for Telecommunications purposes". Chorus has standard forms for easement transfer where an easement is being granted to Chorus as part of the requirements associated with the depositing of a subdivisional plan.

Please let me know in due course if a Reticulation Contract is required.

Yours faithfully

Nuncy Maposa

Sub Division Specialist