# Appendix G

# Civil Design Advice Memorandum and Erosion and Sediment Control Plan

# DESIGN ADVICE MEMO

## CIVIL

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| | |
|---|---|
| Memo No | **C01** |
| Job Name | **Rolleston Pak'nSave** |
| Job No | **211268/C/1** |
| Date | **3 December 2021** |
| To | **Foodstuffs (South Island) Limited** |
| Email | **Rebecca.Parish@foodstuffs-si.co.nz** |
| Attention | **Rebecca Parish** |

Signature **Keegan Brogden**

## Introduction

### Introduction

Foodstuffs (South Island) Ltd propose to establish and operate a Pak'nSave supermarket and offices at 157 Levi Road, Rolleston.

This memo is a desktop assessment of civil engineering matters related to the proposed development to support the resource consent application to Selwyn District Council (SDC)

This memo discusses the following:

- Existing site
- Proposed finished floor and site levels
- Earthworks cut and fill volumes
- Stormwater management
- 1:200 flood
- Sewer Infrastructure
- Erosion & Sediment Control

## Existing Site

Refer to SK1 attached to this memo, for an overview of the site.

SK1 shows:

- Existing site overview.
- Area of existing site proposed to be developed.
- Natural slope.

The total area of the site is 7.18 Ha

The portion of the to be developed is 4.18Ha

The existing site is a greenfield site which is predominantly grass farmland with tree shelter belts.

There is also a private residence and sheds on site which will be demolished.

Other than a brief drive-by in Oct 2021, no site visit has been completed by the civil designer.

The proposed developed portion of the site is bounded by:

- NW Levi Road
- SW Lincoln Rolleston Rd
- NE lifestyle block and farmland
- SE Farmland which will be available for future development.

The natural fall of the site is from Northeast to Southwest. For the extent of the site proposed to be developed there is an approximately 2m fall from a highpoint in the North to the low point in the South identified on SK1.

The low point is at Lincoln Rolleston Road. If ever required, this is the point of exit of stormwater secondary flow generated from the proposed developed portion of the site.

Refer to Whiterock Consulting Ltd memo for discussion of site conditions expected. A summary of Whiterock's assessment relevant to civil design is as follows:

- Expected soil types are shallow topsoil over sand
- The depth to free draining gravels is approximately 1.5-3m below ground level
- The depth to the seasonal water table is greater than 8m below existing ground level.

**Finished Floor and Site Levels.**

Refer to SK2 for preliminary finished floor and site levels based on existing LIDAR levels. A full topographical survey is yet to be completed.

SDC do not have a minimum required minimum floor level for this site, and it is not identified as being within the current ECan defined or SDC recorded flood sites.

Preliminary site levels are designed to provide Building Code compliant stepdowns (level differences between FFL and outside surfaces for cladding protection), level thresholds and grades that are also safe for customer trolleys while still providing surface drainage. Sumps and channels where required for surface runoff drainage will also be located to minimise the impact on trolley manoeuvring for the PAK'nSAVE customers.

The impact of the modelled 1:200 flood level and the impact on the current proposed design levels is discussed in section 6 of this memo.

The preliminary finished floor level (FFL) for the new building is FFL 48.20.

### Earthworks Cut and Fill

Refer SK3 for an assessment of the earthworks cut & fill volumes is based on LIDAR levels and preliminary finished site levels.

The cut and fill volumes are based on the preliminary site levels of SK2

Assumptions used in assessing initial cut & fill volumes for the development are as follows:

- Estimated 250mm deep topsoil (based on estimates from surrounding subdivision works)
- Cut depth below proposed finished surface levels
    - Trafficked asphalt & pavements 350mm
    - Buildings 350mm
- Soak pits max 6m below ground level
- An allowance has also been made for:
    - Building foundation beams
    - Drainage pipework
    - A landscaped earth bund is proposed along the eastern boundary

After removal of the topsoil, areas of the site will require further cut & fill to obtain the required subgrade levels beneath pavement and building. The area shown in blue on SK3 shows where additional fill is required to build up to the required subgrade level.

It is possible that some of the material cut from the site is suitable for reuse in beneath future pavements so not necessarily removed from site. This will be confirmed by geotechnical engineers during detailed design.

The estimated earthworks volumes are:

- Total cut 15100 m³
- Total fill 15700 m³
- Net fill 600m³

### Stormwater Management

Refer to SK4 for a preliminary assessment of stormwater catchments and disposal locations.

Below are the design parameters to be used for stormwater treatment and disposal for this site.

The design requirements for the stormwater treatment system are as follows:

- Flow based treatment system ("Stormwater 360 Stormfilters") treatment flow: 10 mm/hr (as per SDC Engineering Code of Practice).

Soakpits will be designed to contain and discharge flow from all events including and up to the 2% AEP (1:50 year, 24 hour event, without impacting on the building or neighbouring sites.

As this site will have rapid soakage the critical duration is expected around 1 hour or less.

Surface water from rarer rain events (greater than 1:50) will discharge overland to Lincoln-Rolleston Road without detrimentally affecting neighbouring private properties.

Three soak pits are proposed all located within landscape areas:

- A large soakpit (Soakpit A) is proposed to be in the Northwest corner of the site. This soakpit will dispose of:
    - Approximately 7300m³ of the supermarket roof stormwater
    - Approximately 10150m³ of hardstand stormwater
- Soakpit B is proposed in the South corner of the site. This soakpit will dispose of:
    - Approximately 10250m³ of hardstand stormwater
- Soakpit C is proposed in the East corner of the site. This soakpit will dispose of:
    - Approximately 1500m³ of the remaining supermarket roof stormwater
    - Approximately 3550m³ of hardstand stormwater

SE of the proposed development kerb & channel (location shown in orange on SK1) will restrict secondary flow into the undeveloped portion of the site, directing it instead toward Lincoln Rolleston Road.

### 1:200 Flood Event

Refer to SK4 showing ECan 1:200-year event flood modelling through the site, as modelled by Environment Canterbury (ECan)

Modelling shows that during the 1:200-year flood, stormwater from Beaumont Drive cuts across Levi Road and into the proposed PAK'nSAVE site.

The extent of flooding shown in green and yellow on SK5 is based on existing site levels.

After site development it is anticipated the 1:200 flood can be directed further Southwest on Levi Road, to enter the site at the proposed landscaped area in the west corner. The altered route of this flow is shown in the light red highlighting on SK5.

Strictly the New Zealand Building Code requires the FFL of any building with an adjacent carpark adjacent, to have 500mm freeboard above a 1:50 year secondary flow event (not the 1:200-year event). This significant amount of freeboard is to prevent water damage to buildings from wave action from vehicles driving through the flooded areas.

Considering the extent of currently modelled flooding relative to the position of the proposed PAK'nSAVE building, the western end the market is 220mm higher than max ponding.

About halfway down the SW face of the proposed building the proposed FFL is 630mm higher than current modelled 1:200 flood event. (This ignores altered site levels post development)

The Northwest corner of the building is then the most critical area to consider regarding the 1:200-year flood potential risk to the building.

The anticipated risk though to the supermarket building and operations due to 1:200-year flooding is considered low for the following reasons:

- Ponded areas will be a fair distance from the building after development due to the relocated location of the secondary flow. This is especially true if by design the flood flow path can be moved to the large, landscaped area instead of flowing into the site directly opposite Beaumont Drive as it does currently.
- Flow velocity of 1:200 flood event is expected to be very low given the flat terrain
- Flooding affects only two of five vehicle accesses to the site (The southwest access to Levi Road & West access to Lincoln Rolleston Rd). The other accesses will still be available during the event
- Affected accesses and ponded carparks could be temporarily closed to prevent vehicle access, and resultant wave action
- Flooding temporarily puts out of action only approximately 35 of the 485 proposed carparks (7%).

Further coordination with ECan & SDC will be completed during the design process, regarding maintaining secondary flow paths, and suitability of the proposed building level due to the 1:200-year flood risk at the site

### Existing Sewer Services

Refer to SK6 showing SDC sewer infrastructure in the surrounding roads

There is a 300mmØ rising sewer main in Lincoln Rolleston Road. This is not available for use by the supermarket.

There is deep (approx. 3.5m below ground level) gravity sewer in Levi Road.

However, Levi Road is also the high point of the site. Despite existing pipework being deep, a private sewer pump station will be required from the site to discharge into this available sewer network.

Disposing all of the site sewer via gravity to the council system in Levi Road would require raising the building floor level significantly (approximately 1.2 m above currently proposed FFL) which unless required for other reasons would not be practical.

Unless as part of Rolleston greater area development, SDC provide deep sewer gravity infrastructure in Lincoln Rolleston Road (at the south, lower end of the proposed development) a sewer pumpstation will be required from this site.

### Erosion and Sediment Control

Refer to SK7 for an Erosion and Sediment Control Plan (ESCP) for the proposed development.

It is a living document showing main items to be considered further during design, and adapted as necessary during construction phase of the project.

The ESCP is developed under the guidance of the Environment Canterbury Erosion and Sediment Control Guidelines 2007 and Selwyn District Council Engineering Code of Practice.

During construction the contractor will be required to take all necessary steps to control erosion and sediment runoff and minimise related damage or environmental deterioration to surrounding properties and the receiving environment.

Sediment risks to be controlled include:

- Dust
- Transporting material off site
- Runoff water containing sediment flowing across the boundary
- Silt build-up in new soakpits during construction

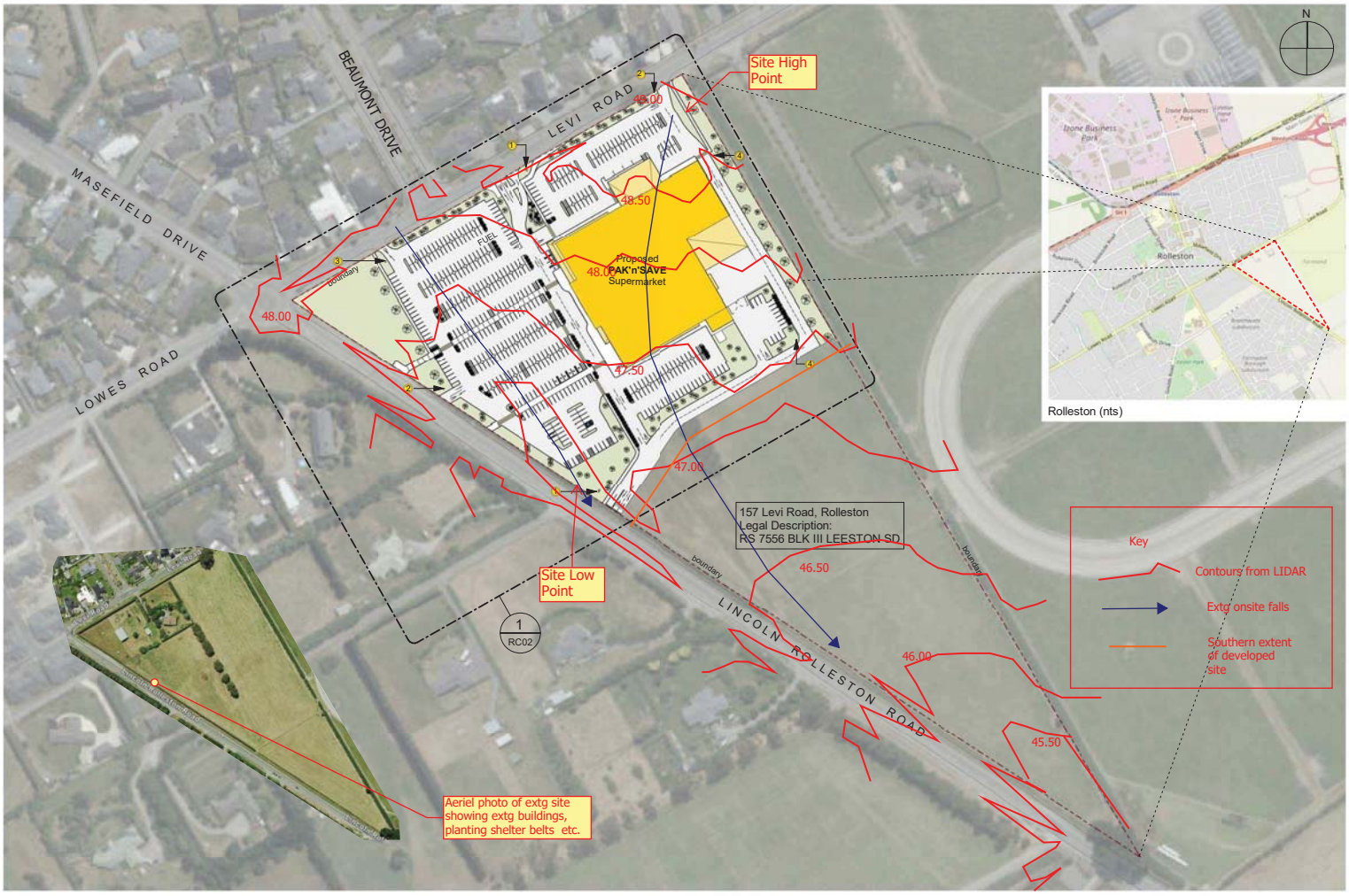
Minimum considerations include:

- Silt fences at downstream ends of the site to prevent flow of sediment across the site boundary
- Stabilised exit(s) to remove soil from truck tyres, secured loads, and dampening to supress dust during transit.
- Protection of all sumps and drainage inlets with an appropriate filter system to protect soak pits from silt
- Dust suppression by covering & dampening stockpiles and exposed soil
- Minimising the time excavations are open.
- Onsite fuelling and spill management (providing bunding, recording, staff training)
- Regular inspections and maintenance of the sediment control systems during the works, for extended periods when no work is being carried out, and when heavy rain occurs outside normal working hours

Due to the scale of the proposed development and the natural grade of the site a temporary retention pond is likely required to capture silt laden stormwater runoff at the very bottom of the site.

The retention pond would trap silt at the surface with the stormwater runoff discharging to the permeable ground below.

Possible locations for a main sediment basin are shown on SK7, within either the developed or undeveloped portion of the site. During design the preferred locations and sizes for these devices, if they are needed, will be determined.




Powell Fenwick

Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Site Overview & grades
Sheet Number: SK1 Rev2

Date : 02 Dec 2021
Scale : 1:2000 @ A3
Drawn : KGB

FOODSTUFFS South Island

50mm (A3) page scale

McCOY WIXON ARCHITECTS

RC01 rev.


**SITE INFO:**

157 Levi Road
Rolleston, Selwyn District, Canterbury

Legal Description:
RS 7556 BLK III LEESTON SD

| | |
|---|---|
| Building footprint area | 7,232m² |
| Mezzanine | 876m² |
| TOTAL | 8,108m² |
| Site Area | 71,831m² |
| Site Coverage | 11.3% |

**PROPOSED CARPARKING NUMBERS:**

| | |
|---|---|
| Carparks | 485 |
| Click & Collect | 8 |
| Accessible Carparks | 10 |
| Staff Carparks | 14 |
| TOTAL | 517 |

**PROPOSED CYCLE PARK NUMBERS:**

| | |
|---|---|
| Cycle parks | 10 |
| Staff Cycle parks | 14 |

**SITE FENCES:**
During construction site fences are to comply with NZBC F5/AS1 Construction and Demolition Hazards

KEY

- 47.50 Extg Contours (from LIDAR)
- x 47.50 Future Site levels
- Future Sumps
- Surface Falls
- Ridge & Valley Lines

Powell Fenwick

Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Preliminary Finished Site Levels and FFL
Sheet Number: SK2 Rev1

Date : 02 Dec 2021
Scale : 1:1000 @ A3
Drawn : KGB

FOODSTUFFS South Island

50mm (A3) page scale

McCOY WIXON ARCHITECTS

RC02 rev.


Cut /Fill Assessment

Covers area of new hardstand (Parking & Building)

Topsoil assumed to be 250mm across the site

Subgrade 350mm below final surface levels

Area shown in blue requires new fill to subgrade level after topsoil removal

The remainder of site is cut to subgrade level after topsoil is removed

Some cut material below topsoil may be suitable for reuse in fill areas below pavement

Some topsoil will be reused on site

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| | |
|---|---|
| **CUT** | |
| -Topsoil | 8400m³ |
| -Further Cut to subgrade RL | 4900m³ |
| -Soakpits Cut | 1800m³ |
| **-TOTAL CUT** | **15100m³** |
| **FILL** | |
| -To subgrade RL | 4000m³ |
| -To to underside of Slab | 1100m³ |
| -To Pavement Subgrade | 8400m³ |
| -Soakpit Fill | 1800m³ |
| -To landscaping | 400m³ |
| **-TOTAL FILL** | **15700m³** |
| **NET CUT/FILL** | **600m³** (Fill) |

Powell Fenwick

Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Cut Fill Assessment
Sheet Number: SK3 Rev1

Date : 02 Dec 2021
Scale : 1:1000 @ A3
Drawn : KGB

FOODSTUFFS South Island

50mm (A3) page scale

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RC02 rev.


**SITE INFO:**

157 Levi Road
Rolleston, Selwyn District, Canterbury

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RS 7556 BLK III LEESTON SD

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| Staff Carparks | 14 |
| TOTAL | 517 |

KEY

Proposed soakpit location

Roof Fall

Catchments to soakpits

Powell Fenwick

Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Preliminary catchments to Soakpits
Sheet Number: SK4 Rev2

Date : 12 Dec 2021
Scale : 1:1000 @ A3
Drawn : KGB

FOODSTUFFS South Island

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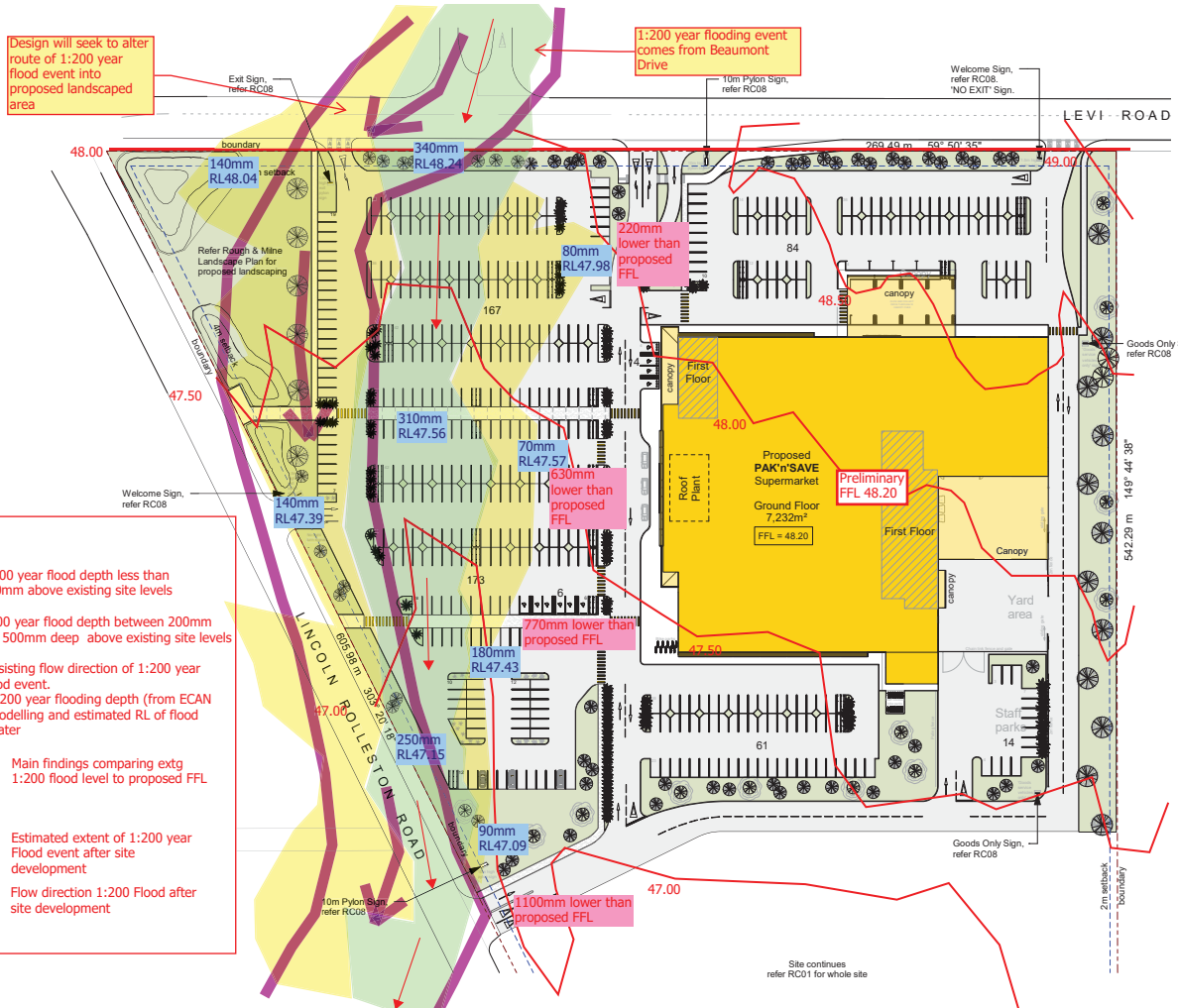
McCOY WIXON ARCHITECTS

RC02 rev.




KEY

1:200 year flood depth less than 200mm above existing site levels

1:200 year flood depth between 200mm and 500mm deep above existing site levels

Exisisting flow direction of 1:200 year flood event.

230mm RL47.50 — 1:200 year flooding depth (from ECAN modelling and estimated RL of flood water

530mm lower than proposed FFL — Main findings comparing extg 1:200 flood level to proposed FFL

Estimated extent of 1:200 year Flood event after site development

Flow direction 1:200 Flood after site development

Depth of flooding from ECan GIS

Excerpt from ECAN Flooding map 1:200 year events

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Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : 1:200 year Flood Assessment
Sheet Number: SK5 Rev2

Date : 02 Dec 2021
Scale : 1:1000 @ A3
Drawn : KGB

FOODSTUFFS South Island

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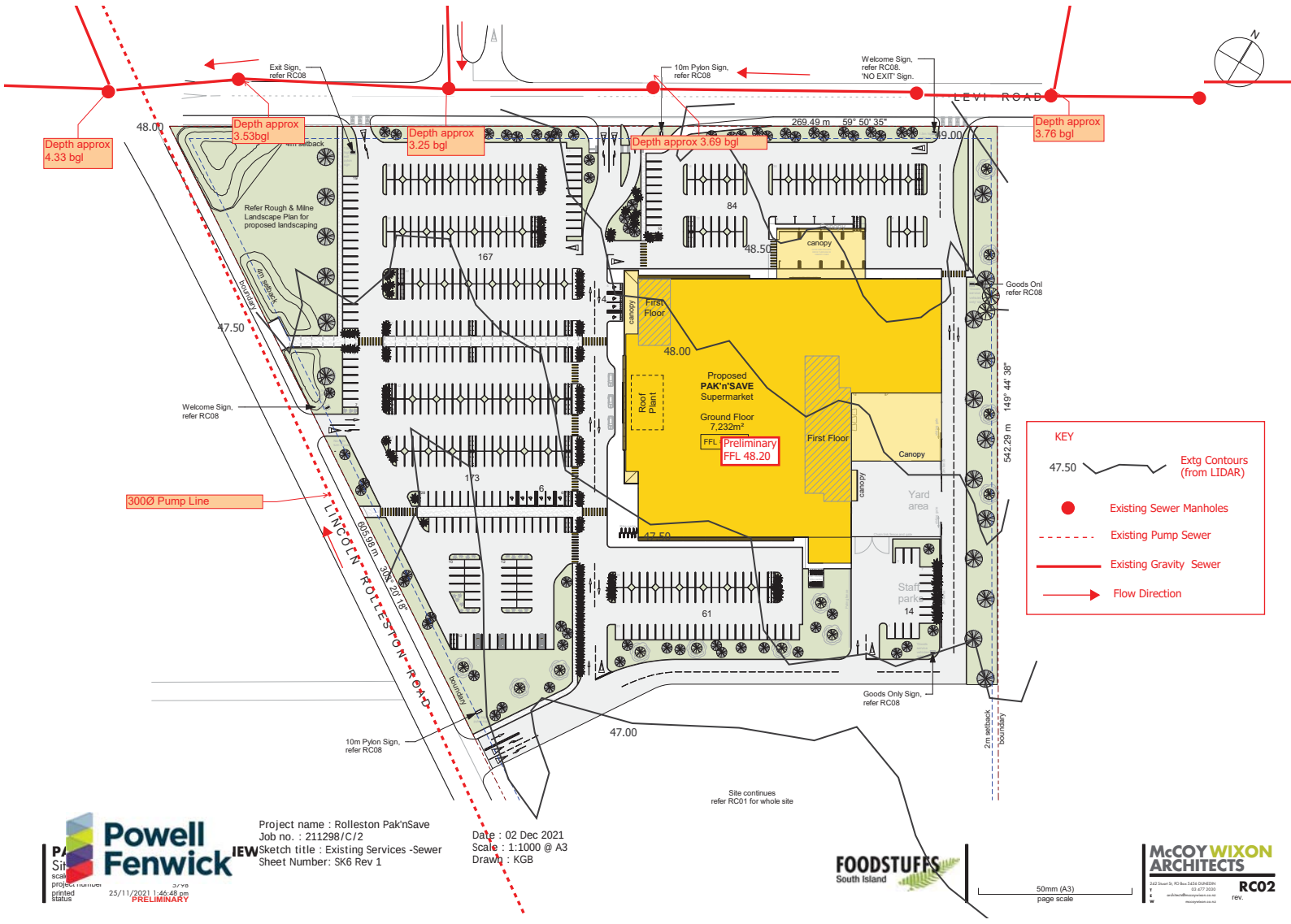
McCOY WIXON ARCHITECTS

RC02 rev.

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Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Existing Services -Sewer
Sheet Number: SK6 Rev 1

Date : 02 Dec 2021
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PRELIMINARY

FOODSTUFFS South Island

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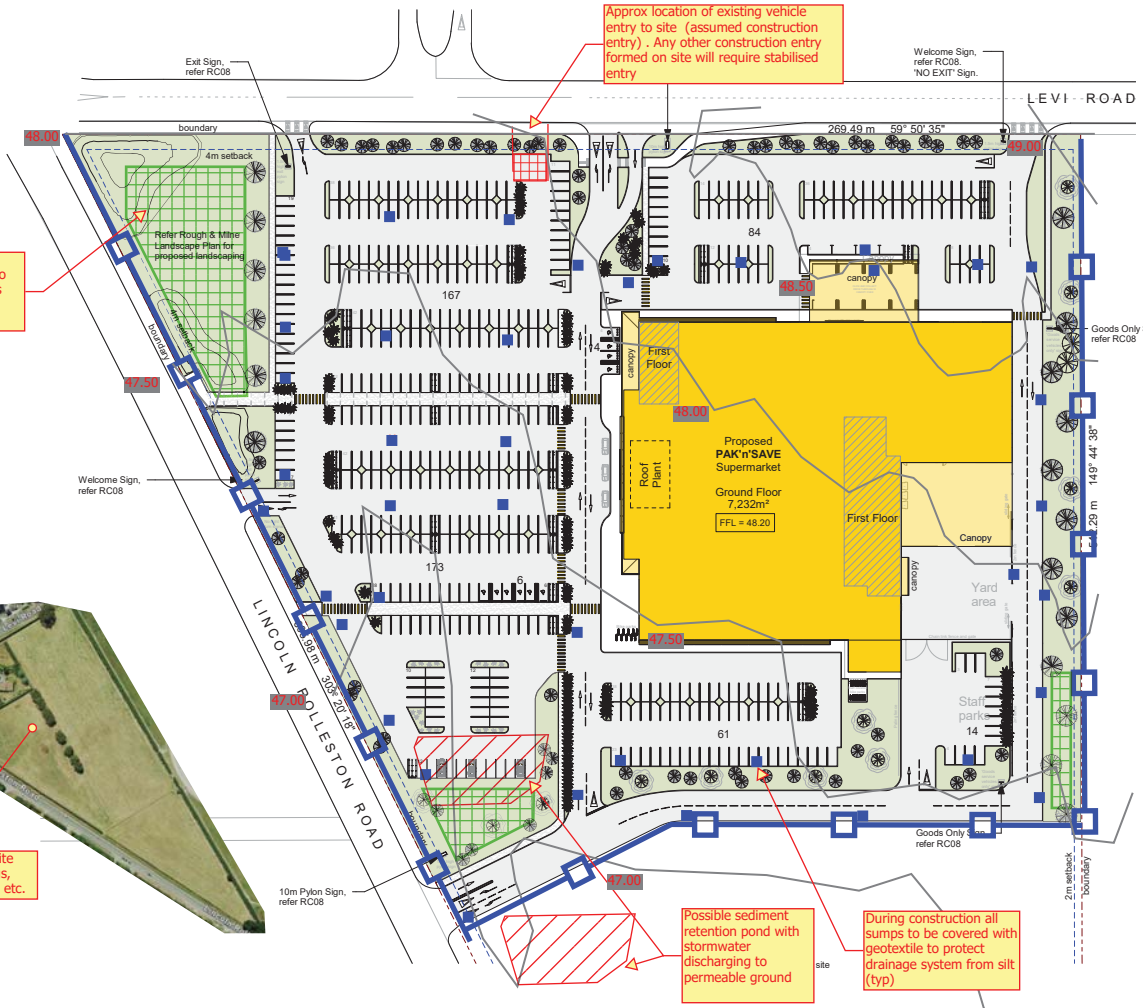
McCOY WIXON ARCHITECTS

RC02
rev.




**SITE INFO:**

157 Levi Road
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Legal Description:
RS 7556 BLK III LEESTON SD

All inlets, sumps , etc to be protected with appropriate filter system during construction to protect soakpits and stormwater filter systems

Site Area 71,831m²
Site Coverage 11.3%

Erosion & sediment control measures to comply with "Environment Canterbury Erosion & Sediment Control Guidelines for Small Sites"

Provide dust control measures including
-dampening any excavated surface covering stockpiles as required
-dampening loaded vehicles if required to minimise material loss during transit

**SITE FENCES:**
During construction site fences are to comply with NZBC F5/AS1 Construction and Demolition Hazards

Contractor to allow to clean up roads

Contractor to manage chemical spills/ contamination during works and manage on-site vehicle fueling

Key

- Silt Fence (on downstream side of site )
- Stabilised entry
- Sumps with sump protection ( Bidim A29 filter fabric)
- Soakpits
- 47.00 Extg site contours

Powell Fenwick

Project name : Rolleston Pak'nSave
Job no. : 211298/C/2
Sketch title : Erosion & Sediment Control Plan
Sheet Number: SK7

Date : 02 Dec 2021
Scale : 1:1000 @ A3
Drawn : KGB

FOODSTUFFS South Island

50mm (A3) page scale

McCOY WIXON ARCHITECTS

RC02 rev.