

Civil Design Report Development Application (DA)

St Mary's Rugby League Club

6 May 2016

131142 – P

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**Structural
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1.0 Introduction

This Civil Design Report has been prepared by Taylor Thomson Whitting Pty Ltd (TTW) on behalf of St Mary's Rugby League Club. It forms part of the Development Application (DA) for the proposed Hotel at the existing St Mary's Rugby League Club located on Forrester Road.

2.0 Proposed Development

The proposed development is located on the existing St Mary's Rugby League Club site on Forrester Road (see Figure 1). The site is bound by Cumberland Plain Woodlands (CPW) to the east and north east, Boronia Road to the south and Forrester Road to the west and north west. Ropes Creek runs north through the CPW and is subject to flooding. The clubs stadium is located centrally on the site with the existing club building to the south. There is a training field to the east and a recently completed commercial development to the north. Site access is provided from both Forrester and Boronia Road.



Figure 1 – St Mary's Rugby League Club location plan

The proposed hotel development is located to the south east of the site (see Figure 2) within a portion of the existing carpark area. There is a gentle fall north across the site towards an existing dam located to the north of the existing stadium.



Figure 2 –Hotel Location Plan

The proposed development includes a hotel block and an extension of the existing carpark (see Figure 3). Access will be provided by existing entrances off Boronia Road and Forrester Road.

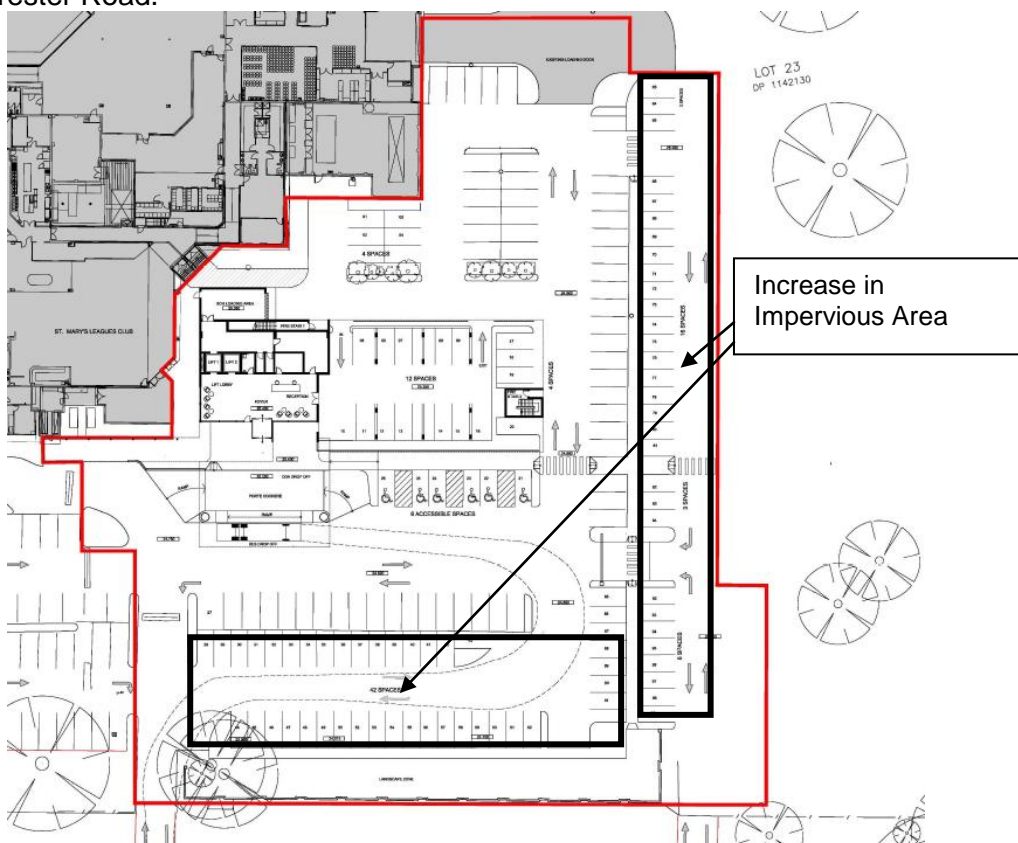


Figure 3 –Hotel Site Plan

3.0 Stormwater

3.1 Flooding

The stormwater drainage design is influenced by the Ropes Creek flood plain. The north of the St Mary's Rugby League Club site sits within the 1 in 100 year average recurrence interval (ARI) flood plain (see Figure 4). A Flood Impact Assessment (FIA) was produced by Worley Parsons in September 2012. This identified the 100 year ARI flood level adjacent to the proposed development as 24.90m AHD.

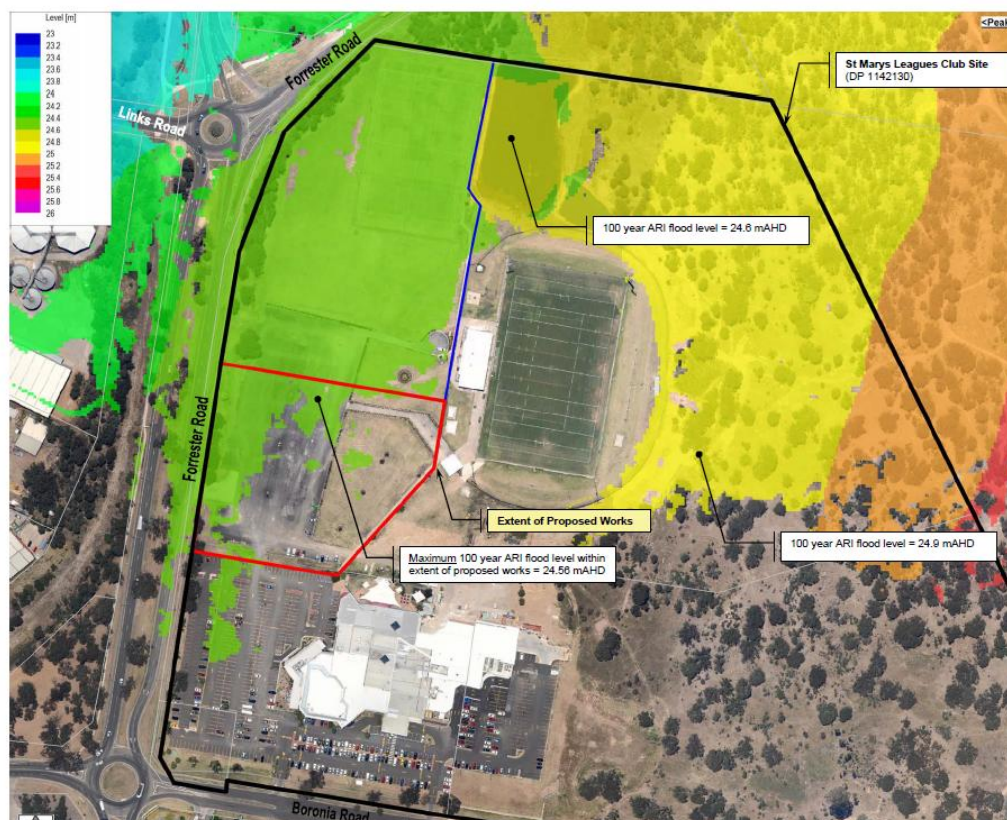


Figure 4 – 100 year ARI Flood Extents (Worley Parsons FIA, September 2012)

The proposed development will have a negligible impact on the 100 year ARI flood plain. All proposed habitable finished floor levels (FFL's) will be located a minimum of 500mm above the 100 year ARI flood level. This is consistent with requirements for new commercial developments contained in Penrith City Council's 2014 Development Control Plan (DCP) (see Figure 5).

6. Industrial/Commercial - New Development

- a) Floor levels shall be at least 0.5m above the 1:100 ARI flood or the buildings shall be flood-proofed to a least 0.5m above the 1:100 ARI flood.
- b) Flood safe access and emergency egress shall be provided to all new developments.

Figure 5 – Flood Planning Levels, Penrith City Council DCP (2014)

3.2 Local Overland Flow Paths

In addition to the downstream flooding identified in the Worley Parson FIA report local overland flow paths have been identified by Council (see Figure 6). As shown in Figure 6 one of these passes adjacent to the proposed development site. A minimum of 150mm freeboard will be provided to the local overland flow paths.

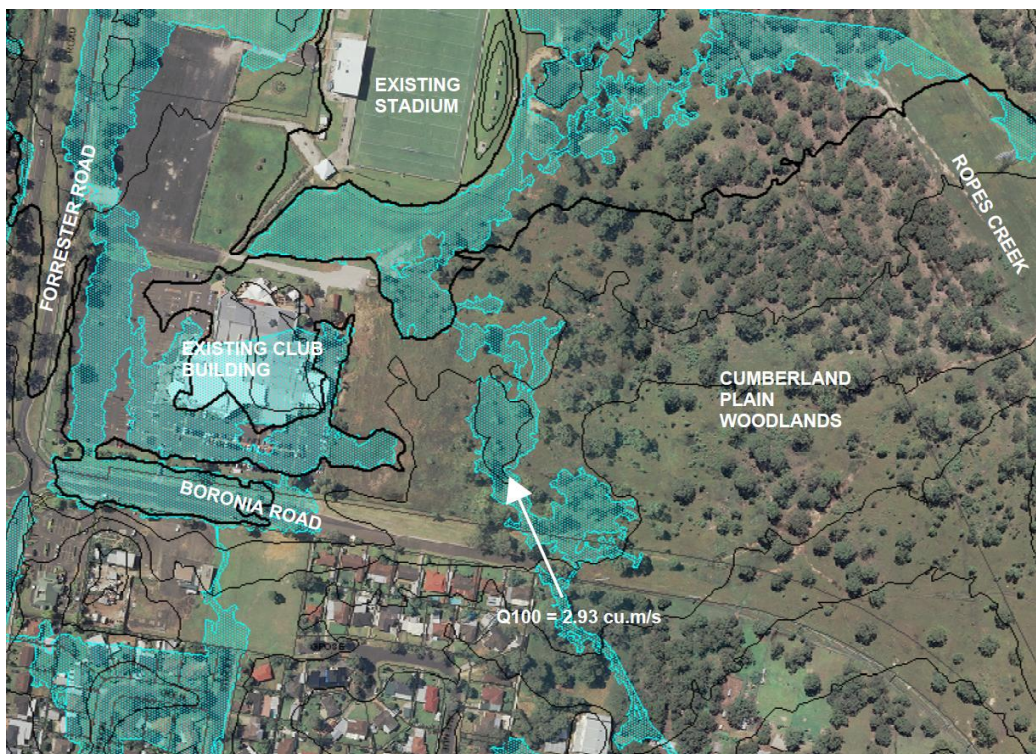


Figure 6 – Local Overland Flow Paths

An external catchment located to the south of the proposed development site with a time of concentration of approximately 22.2minutes, provides a peak flowrate of 2.95 m³/sec for the 100yr ARI storm event. A catchment plan indicating the extent of this catchment is included below (see Figure 7).



Figure 3 – External and Internal Catchment Plan

To assess the current overland flow scenario, a one-dimensional hydraulic model was set up to assess the pre-development flood levels using HEC-RAS software. A terrain model of the existing surface within the proposed development site boundary was prepared in 12d using detailed survey and previously designed levels for the eastern training field. Twelve cross-sections were used to model the overland flow path from Boronia Road north through the site to the limit of development works via the existing overland flow route. These sections and the extent of 100yr ARI pre-development flooding are shown in Figure 7 below.



Figure 7 – Local Overland Flow Path

As can be seen above the existing flood extent does not encroach into the proposed hotel location.

3.3 Stormwater Drainage

The site has an existing gravity stormwater drainage network which outfalls to the dam to the north of the site (see Figure 1). The stormwater drainage will be designed to maintain the existing level of protection for the site. It will consist of a minor and major system, providing the following minimum levels of protection as required by Penrith City Councils DCP.

New Drainage Design

- a) Any new piped drainage system shall be designed to control minor stormwater flows under normal operating conditions for an ARI of 5 years.
- b) Any new drainage system shall be designed to control major stormwater flows under normal operating conditions for an ARI of 100 years.

Figure 6 – Stormwater design criteria, Penrith City Council DCP (2014)

The current site generally falls in north to north-easterly direction towards the existing football ground. The proposed development will only result in a small increase in impervious area due to the location of the proposed hotel building being within the existing carpark. The proposed site is part of the catchment that falls towards the dam located to the north of the club. Based on the previous developments within the club, we understand that Penrith City Council does not require on-site detention (OSD) for catchments draining to the dam.

Water quality treatment will be provided from swales located directly behind a broken kerb.

4.0 Pavement Design

The pavement design will match the existing asphalt surfacing found elsewhere at the St Mary's Rugby League Club site. The car parking areas will be designed for light vehicles and occasional medium to heavy service vehicles. Any required truck turning areas will be a concrete pavement to cater for the increased axle loads and repetitive turning movements anticipated in these locations.

Upgrades are proposed to two accesses fronting Boronia Road. The concrete driveways will be designed in accordance with Penrith City Council requirements.

5.0 Proposed Site Levels

The proposed site levels are dictated by a number of constraints;

- Flood plain
- Local overland flow paths
- Existing perimeter site levels
- Vehicular and pedestrian access

The proposed finished floor level (FFL) of the hotel building is 25.40m AHD.

The flood plain and local overland flow paths have been discussed in the stormwater section of this report. The maximum 100 year ARI flood level adjacent to the proposed work is 24.90m AHD. The proposed FFL's indicated above will provide a minimum of 500mm freeboard above 24.90m as required in Council's DCP.

6.0 Sediment and Erosion Control

Soil and erosion control is to be provided during construction. Controls are to be in line with the Managing Urban Stormwater: Soils and Construction 2004, produced by Landcom. A soil and erosion control plan is included in Appendix B – Soil and Erosion Control Plan.

7.0 Conclusion

The proposed works included in this DA submission are consistent with Penrith City Councils DCP and current industry best practice. TTW recommend that the civil design and stormwater system as documented on the DA drawings be adopted for the development.

Prepared by:
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ERIN HOGAN
Engineer








PAUL YANNOULATOS
Technical Director

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Appendix A

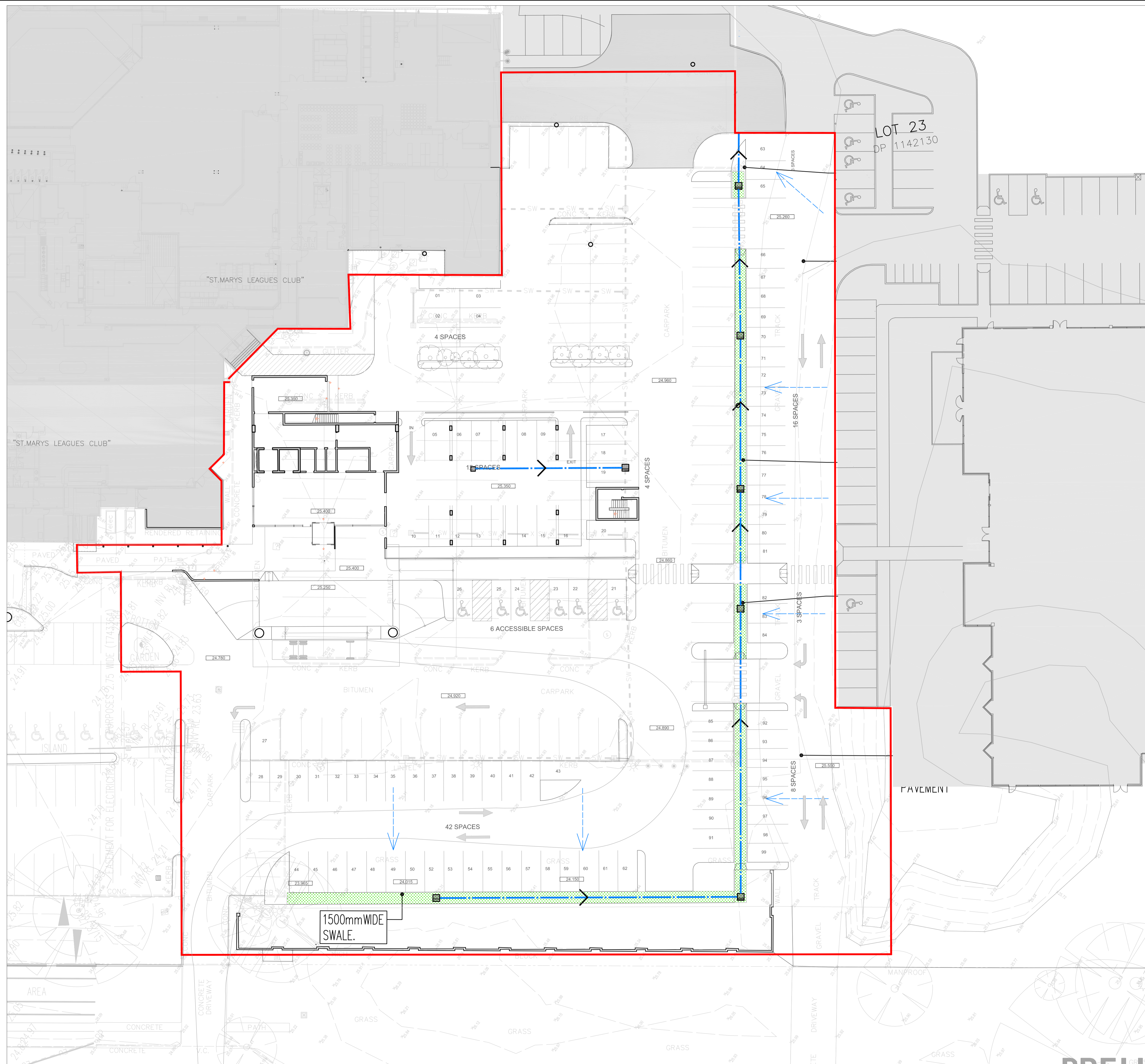
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-  Proposed kerb
-  Proposed stormwater pit, flow direction and line
-  Existing stormwater pipe
-  Existing stormwater pipe to be removed
-  Swale

STORMWATER DRAINAGE NOTES

- 1 Stormwater Design Criteria :
 - (A) Average recurrence interval -
 - 1:100 years for roof drainage to first external pit
 - 1:20 years for paved and landscaped areas
 - (B) Rainfall intensities -
 - Time of concentration: 5 minutes
 - 1:100 years = 219 mm/hr
 - 1:5 years = 126 mm/hr
 - (C) Runoff coefficients -

Roof areas:	C ₁₀₀ = 1
Roads and paved areas:	C _s = 0.86
Landscaped areas:	C _s = 0.33
2. Pipes 300 dia and larger to be reinforced concrete glass "2" approved spigot and socket with rubber ring joints U.N.O.
3. Pipes up to 300 dia shall be sewer grade uPVC with solvent welded joints.
4. Equivalent strength VCP or FRP pipes may be used subject to approval.
5. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
6. Where subsal drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
7. Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
8. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
9. Care is to be taken with levels of stormwater lines. Grades shown are not to be reduced without approval.
10. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
11. Subsoil drains to be slotted flexible uPVC U.N.O.



P3	ISSUE FOR DA	EH	JH	06.05.16
P2	ISSUE FOR DA	EH	JH	29.04.16
P1	ISSUE FOR CO-ORDINATION	TM	JW	16.07.13
Rev	Description	Eng	Draft	Date

Project
ST MARY'S LEAGUES CLUB

Sheet Subject
STORMWATER PLAN

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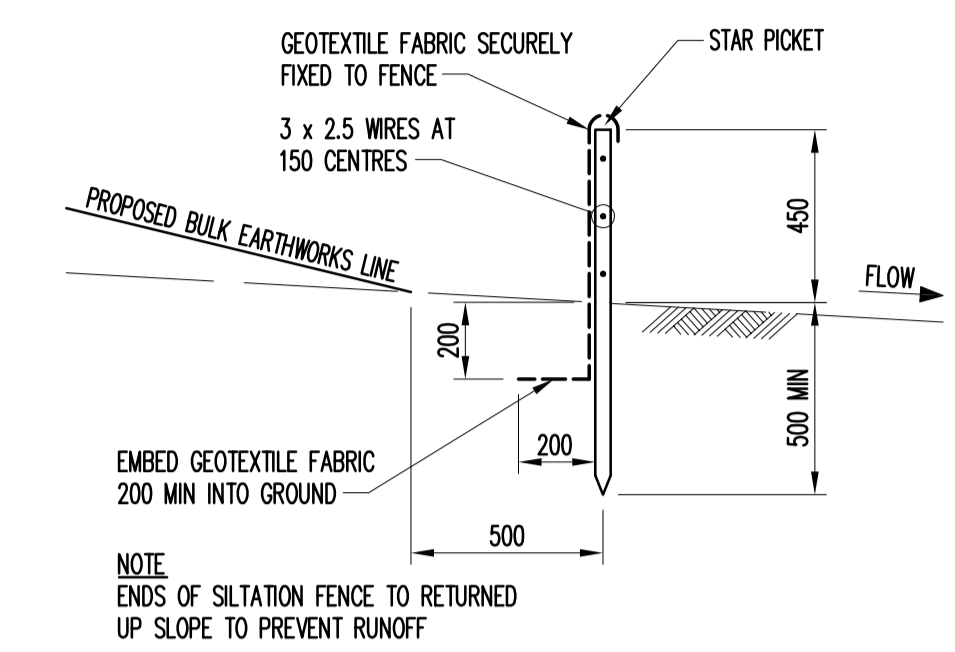
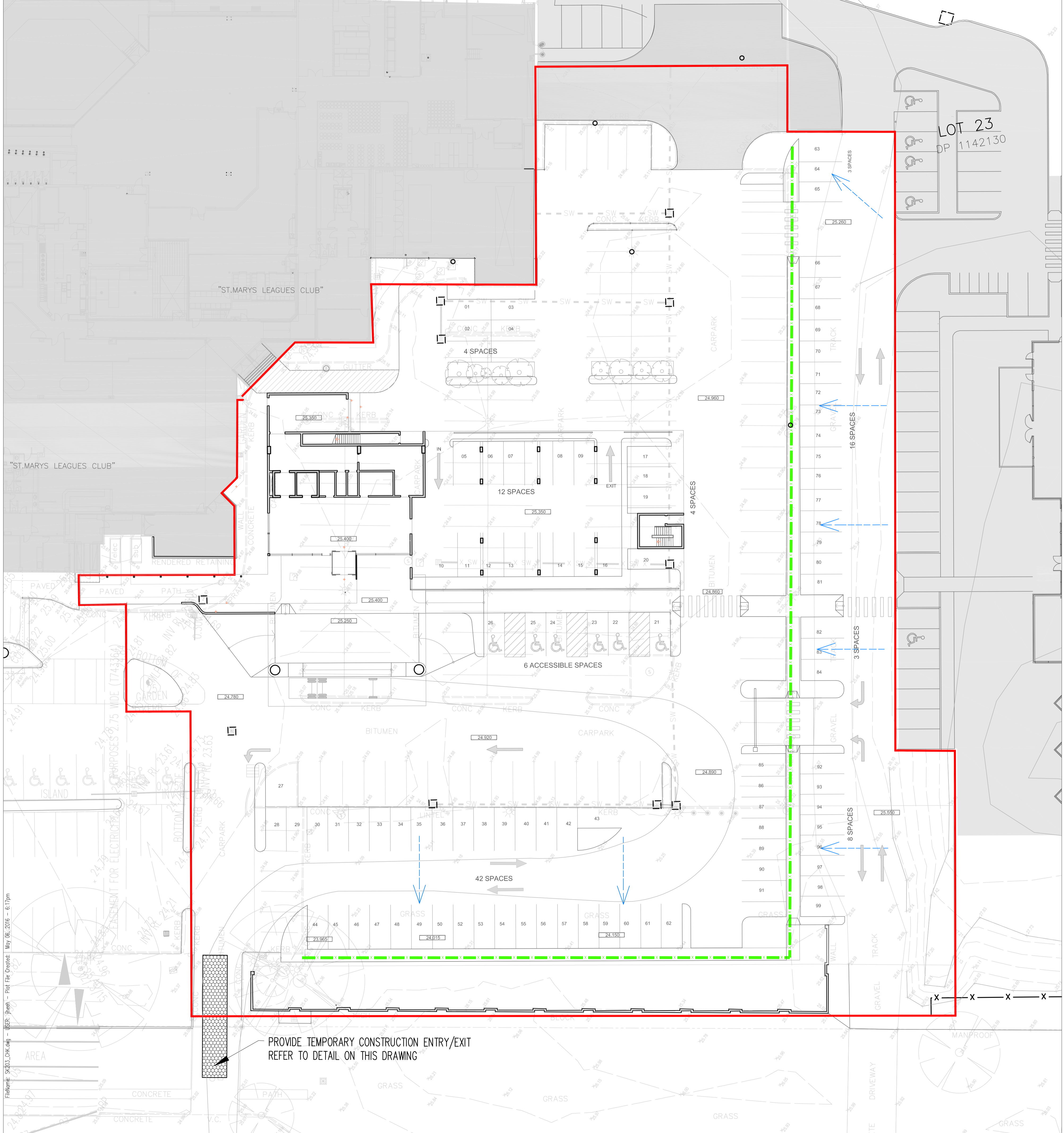
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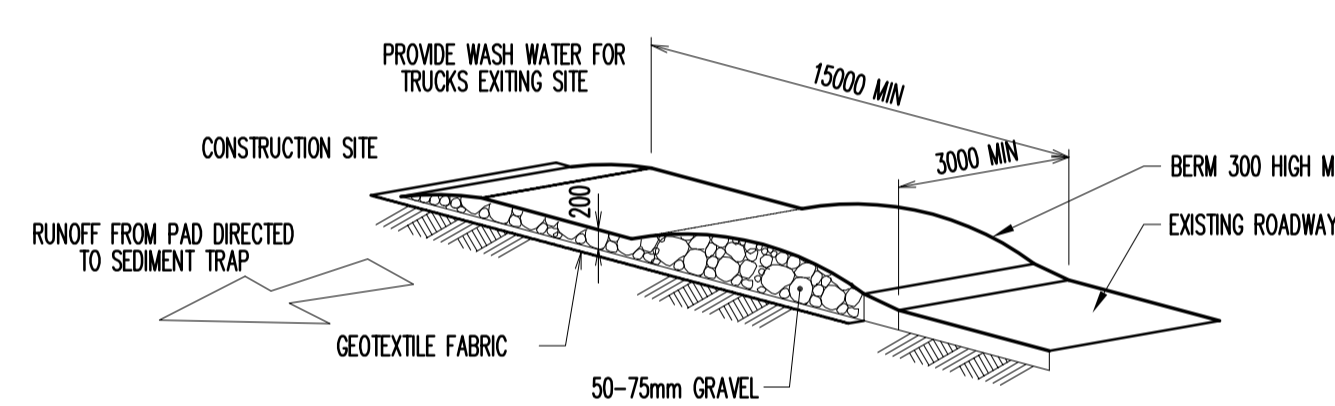
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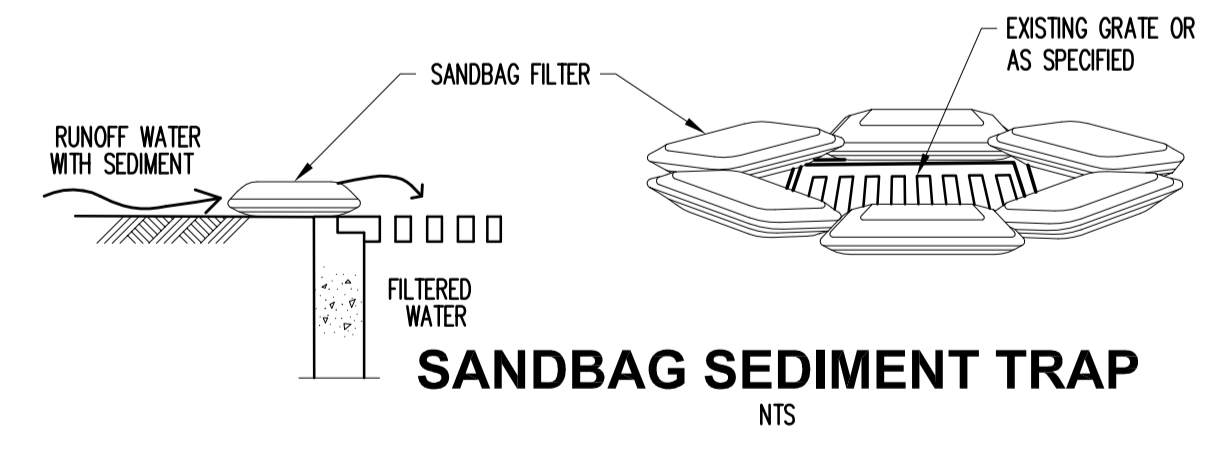
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TEMPORARY CONSTRUCTION EXIT
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SANDBAG SEDIMENT TRAP
NTS

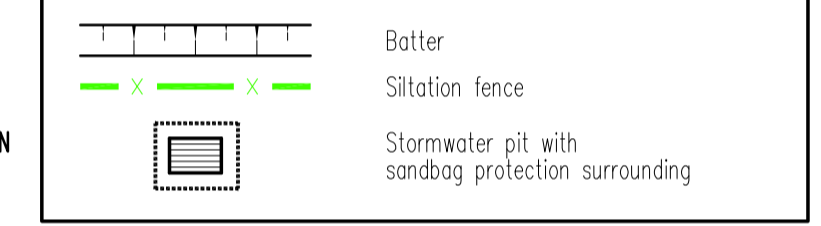
EROSION AND SEDIMENT CONTROL NOTES

- All work shall be generally carried out in accordance with
 - Local authority requirements,
 - EPA - Pollution control manual for urban stormwater,
 - Department of conservation and land management manual- "Urban Erosion & Sediment Control".
- Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may require to be modified. Variation to these details may require to be approved by the relevant authorities. The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
- Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
- When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
- Minimise the area of site being disturbed at any one time.
- Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
- All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
- Control water from upstream of the site such that it does not enter the disturbed site.
- All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
- All vehicles leaving the site shall be cleaned and inspected before leaving.
- Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
- Clean out all erosion and sediment control devices after each storm event.

SEQUENCE OF WORKS

- Prior to commencement of excavation the following soil management devices must be installed.
 - Construct silt fences below the site and across all potential runoff sites.
 - Construct temporary construction entry/exit and divert runoff to suitable control systems.
 - Provide sandbag sediment traps upstream of existing pits.
- Construct geotextile filter pit surround around all proposed pits as they are constructed.
- On completion of pavement provide sand bag kerb inlet sediment traps around pits.

EROSION AND SEDIMENT CONTROL LEGEND



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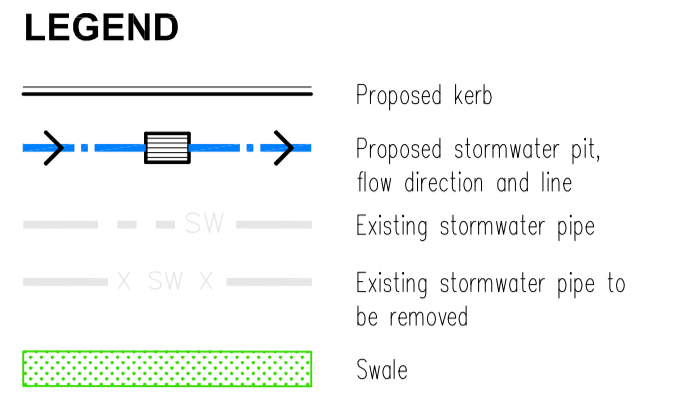
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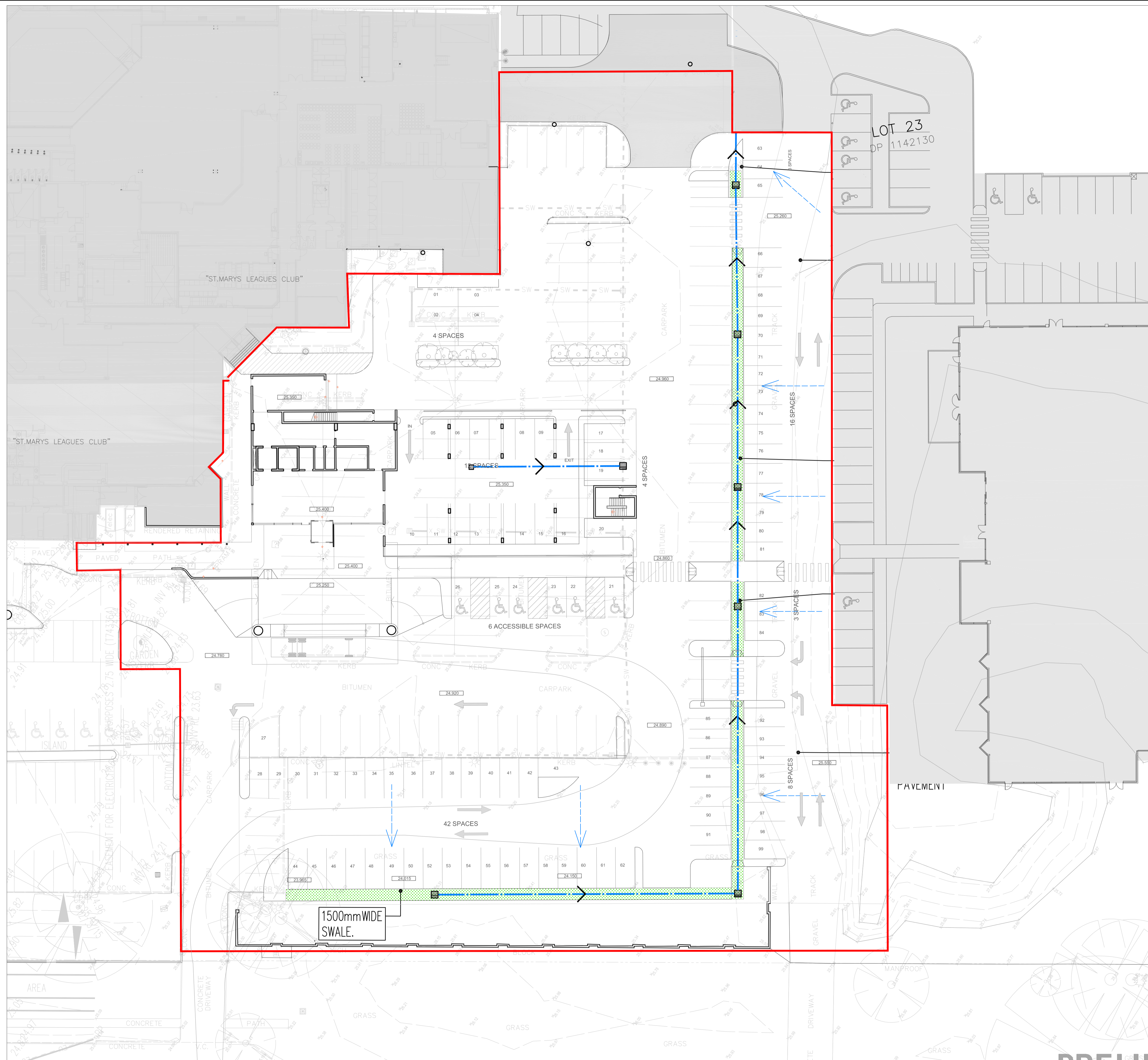
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 Version: 1, Version Date: 08/06/2016



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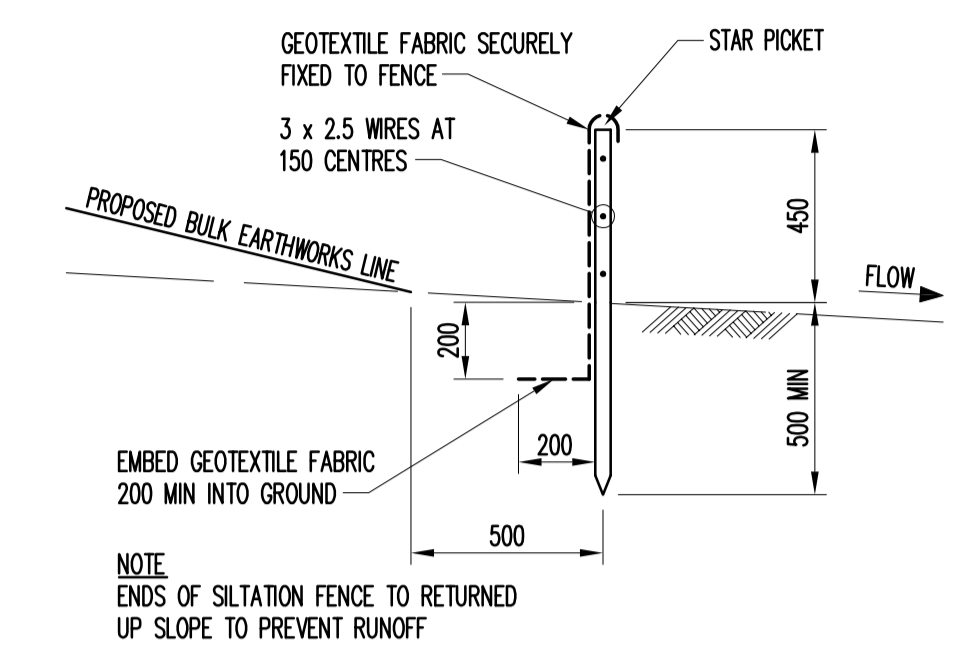
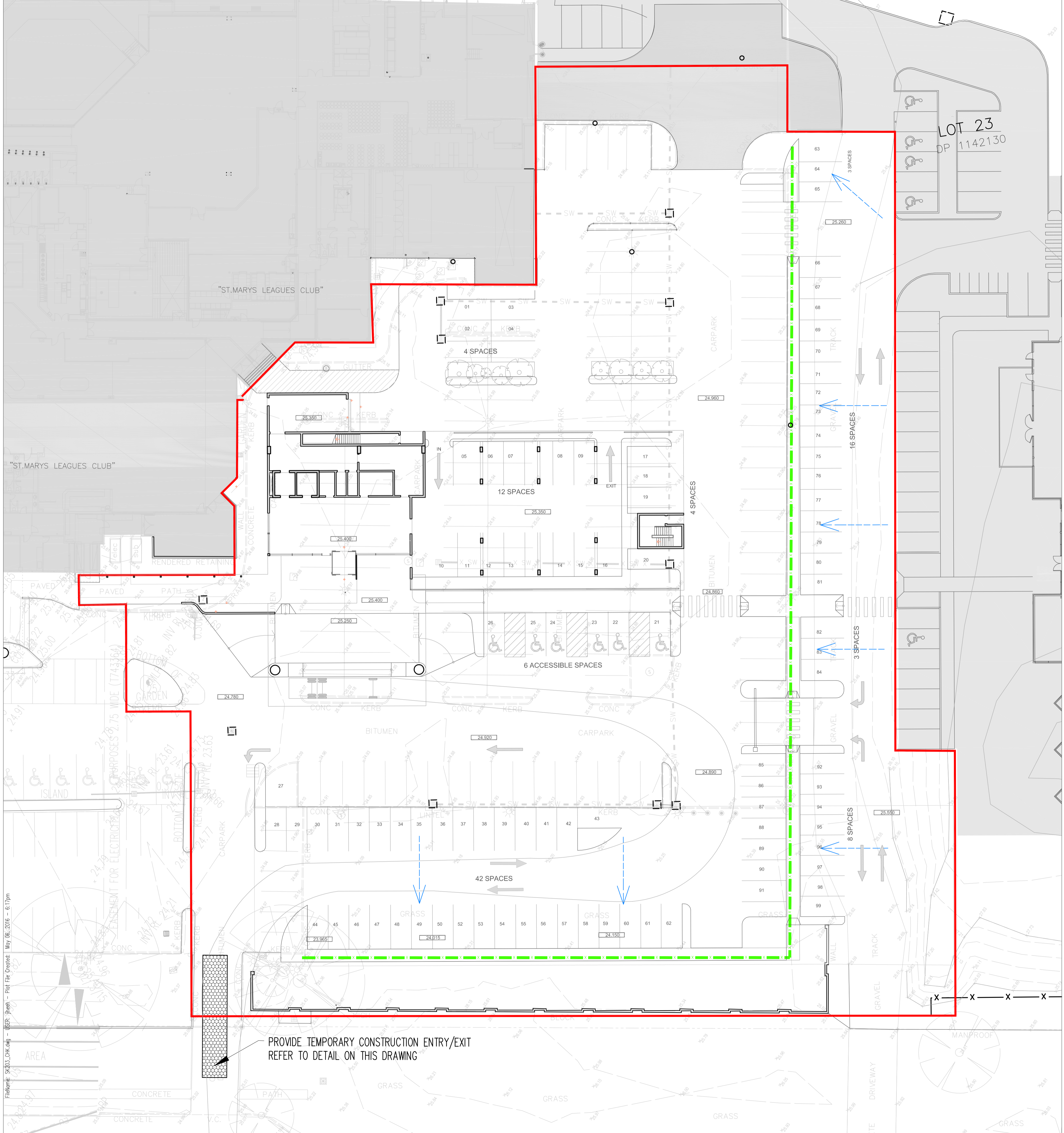
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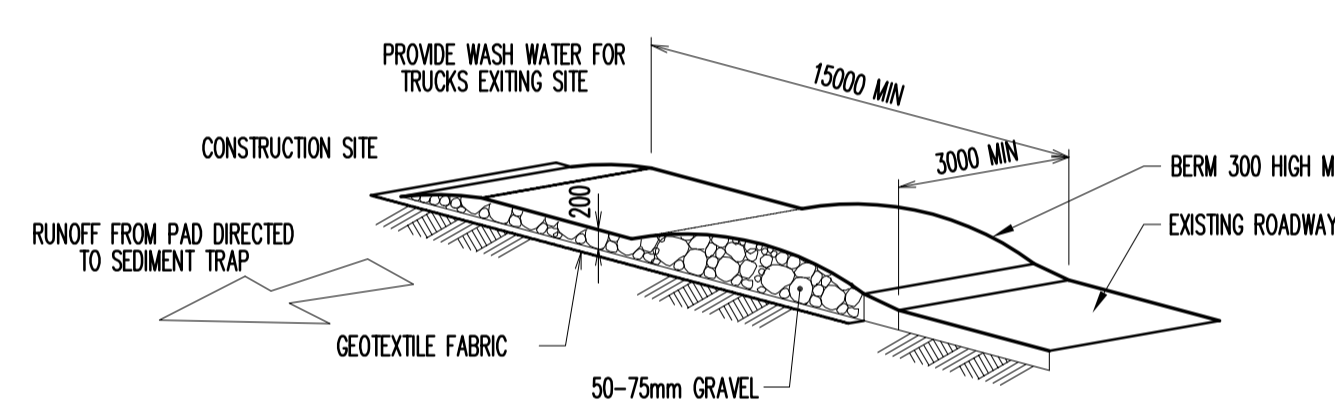
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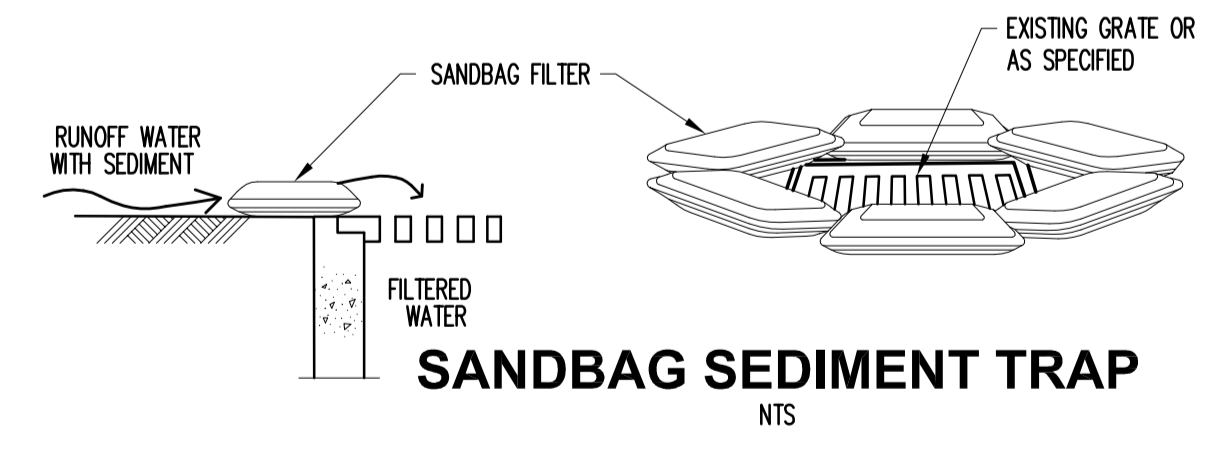
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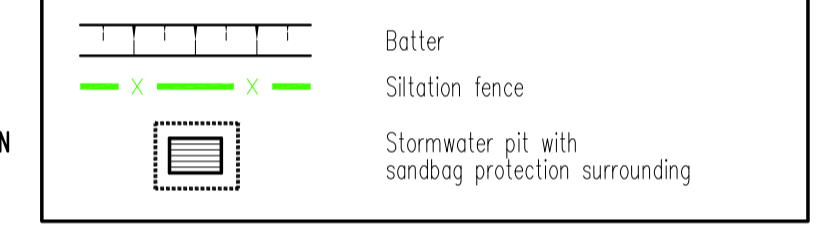
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