New primary school in Edmondson Park

Buchan Avenue, Edmondson Park NSW 2174

CIVIL ENGINEERING: STATE SIGNIFICANT DEVELOPMENT APPLICATION DESIGN REPORT

PREPARED FOR
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Ref: S210040-CR01
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Civil Engineering Schematic Design Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
23.04.21	1	Draft	J. Gilligan	J. Gilligan
26.04.21	2	Final	J. Gilligan	J. Gilligan
29.04.21	3	Final – Minor Amendments	J. Gilligan	J. Gilligan
14.05.21	4	Final – Minor Amendments	J. Gilligan	J. Gilligan
18.05.21	5	Final – Minor Amendments	J. Gilligan	J. Gilligan
24.05.21	6	Final – Minor Amendments	J. Gilligan	J. Gilligan

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Executive Summary

This report has been prepared to accompany a State Significant Development Application for the development of a new primary school in Edmondson Park, located at Buchan Avenue, Edmondson Park (the site). The legal description of the site is Lot 1 and Lot 2 in DP 1257105. The site comprises a rectangular lot with an area of approximately two hectares.

This State Significant Development Application seeks approval for a new core 35 primary school accommodating 1,012 students *and a **coldshell** 40 place pre-school at the site. The works comprise:*

- Site preparation and excavation;
- Land use for the purpose of a new primary school and pre-school;
- Construction of new buildings including:
    - A three storey building on the western portion of the site primarily addressing Faulkner Way comprising 36 homebases, 4 special support unit teaching spaces, staff room, administration office at the ground floor and library at the first floor addressing the corner of Buchan Avenue and Faulkner Way, and student amenities;
    - A single storey **coldshell** preschool building for educational programs for children the year before they commence kindergarten, accommodating 40 places. The pre-school building will be connected at the southern end of the three storey building; and
    - A single storey building on the eastern portion of the site comprising a communal hall, out of school hours care facility, 8 homebases and covered outdoor learning area.
- Landscaping and public domains works including tree planting, a sports court and creation of various assembly, play and learning zones;
- A drop-off and pick-up zone, and bus zone on Buchan Avenue;
- An at-grade staff carpark in the southern part of the site with ingress and egress provided off Faulkner Way at the south-west corner of the site;
- Primary pedestrian entrance from Buchan Avenue and an additional entrance on Faulkner Way for the ground floor support unit; and
- Other ancillary infrastructure and utilities works and digital signage.

The purpose of this report is to identify and describe the civil engineering design elements required for the proposed development and to respond to Secretary's Environmental Assessment Requirements (SEARs) issued on 10th December 2020.

Specifically, the Schematic Design seeks development consent for the construction and operation of the new primary school in Edmondson Park, a multi-level, educational facility designed to accommodate pre-school and primary school Educational Facilities for Education NSW (the project).

On 9th November 2020, the NSW Government re-announced the delivery and associated funding for the new primary school in Edmondson Park.

The Minister for Planning, or their delegate, is the consent authority for the Schematic Deign with an application to be lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the SEARs issued for the project. Specifically, this report has been prepared to respond to the following SEARs:

SEARs	Report Section

16. Stormwater Drainage
Provide:
- A preliminary stormwater management plan for the development that:
  ○ Is prepared by a suitably qualified person in consultation with Council and any other relevant drainage authority.
  ○ Details the proposed drainage design for the site including on-site detention facilities, water quality measures and the nominated discharge point.
  ○ Demonstrates compliance with Council or other drainage authority requirements.
- Stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties.
 	
Where drainage infrastructure works are required that would be handed over to Council, provide full hydraulic details and detailed plans and specifications of proposed works that have been prepared in consultation with Council and comply with Council's relevant standards.
<u>Relevant Policies and Guidelines</u>
Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013)
	Refer Section 6.1 and 6.2

17. Flooding - Identify any flood risk on-site in consultation with Council and having regard to the most recent flood studies for the project area and the potential effects of climate change, sea level rise and an increase in rainfall intensity. - Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions to mitigate flood risk where required. <u>Relevant Policies and Guidelines</u> NSW Floodplain Development Manual (DIPNR, 2005)	Refer Section 2.7
18. Soil and Water Provide: - An assessment of potential impacts on surface and groundwater (quality and quantity), soil, related infrastructure, and watercourse(s) where relevant. - Details of measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust, and fine particles. - An assessment of salinity and acid sulphate soil impacts, including a Salinity Management Plan and / or Acid Sulphate Soils Management Plan, where relevant.	Refer Section 3 Note: Groundwater, Salinity and Acid Sulphate Soils are to be addressed by the project Environmental Consultant.

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1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Richard Crookes Constructions to prepare the Civil Engineering design and documentation in support of a SSDA submission to DPIE for the proposed new primary school in Edmondson Park, in the suburb of Edmondson Park within the Liverpool City Council Local Government Area (LGA).

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Sediment and Soil Erosion Control
- Stormwater Management (Quantity and Quality)

In addition, some commentary has also been provided on bulk earthworks and pavements which will be further developed in the following stages of the project.

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

- Design Standards as provided by Liverpool City Council regarding On-site Stormwater Detention (OSD) and water quality.
- Detailed site survey plan provided by TSS Total Surveying Solutions dated 25th March 2021.
- Edmondson Park South Part 3A Project Plan Application (Stage 1) Water Cycle Management Plan prepared by J. Wyndham Prince (August 2010)
- Edmondson Park Town Centre North Water Cycle Management Strategy Report prepared by J. Wyndham Prince (August 2018)
- Engineering Design Report, Buchan Avenue, Edmondson Park prepared by SMEC (May 2018)

1.3 Design Criteria & Methodology

Our Civil Engineering advice is based on review of the relevant documents and reports provided to date. Our investigations included the following.

- Discussions with Council regarding flooding, stormwater, On-site Stormwater Detention (OSD) and Stormwater Quality.
- Review of all Council's Masterplan Reports provided for the precinct.
- Review of engineering design documents provided by Landcom for the Buchan Avenue extension, South and East Roads and associated precinct earthworks.
- Review of Flood Report prepared by Storm dated June 2014.

The civil engineering design considers the Educational Facilities Standards and Guidelines as well as Local Government / Council requirements appropriate to the development site.

2. Existing Site Conditions

2.1 Subject Site

The new primary school in Edmondson Park is to be in the suburb of Edmondson Park within the Liverpool City Council Local Government Area (LGA). The site is located at the corner of Buchan Avenue and Faulkner Way and legally described as Lot 1 and Lot 2 in Deposited Plan (DP) 1257105. It has an area of approximately two hectares (ha) and is bound by the Buchan Avenue to the north, Faulkner Way to the west, a proposed new road to the south and vacant land to the east.

A proposed new primary school is to be in the western portion of the site as shown in Figure 2.

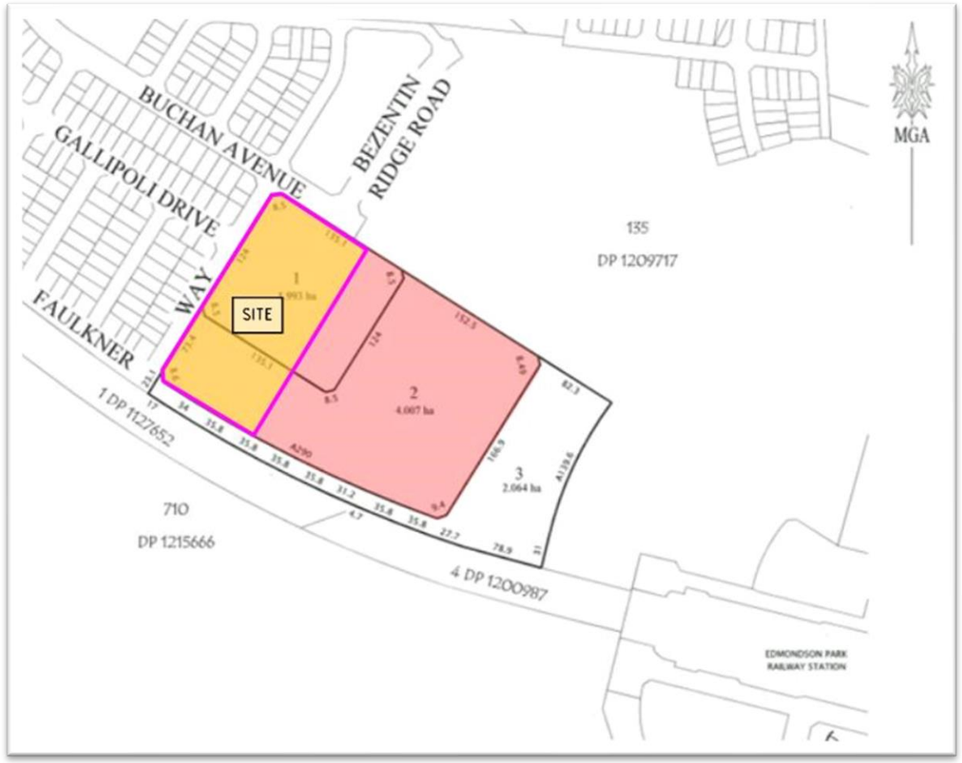

Figure 1 – Existing Lot Boundaries

Figure 2 – Development Location

2.2 Proposed Development

This State Significant Development Application seeks approval for a new core 35 primary school accommodating 1,012 students *and a **coldshell** 40 place pre-school at the site. The works comprise:*

- Site preparation and excavation;
- Land use for the purpose of a new primary school and pre-school;
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- Other ancillary infrastructure and utilities works and digital signage.

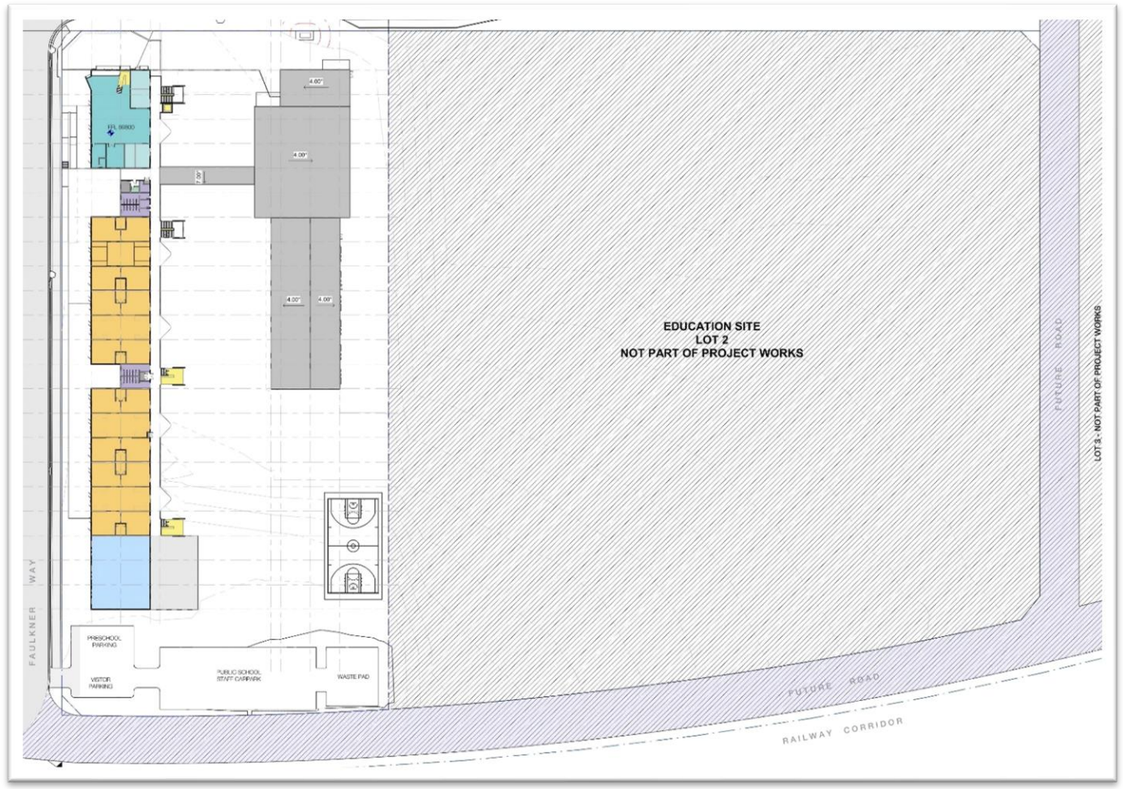


Figure 3 – Proposed Development Layout (TKD Architects, 2021)

2.3 Site Topography

Levels in the south portion of the site are approx. RL 72.00m AHD at a ridge near the existing rail line. They then fall to a depression in the north west to approx. RL 59.50m AHD at an approximate grade of 8%. This corresponds to approximately 12.5m difference in elevation.

2.4 Contamination and Geotechnical Conditions

2.4.1 Geotechnical

A design CBR 3% has been considered for the purposes of new pavement design. Based on review of the Geotechnical Report prepared by JK Geotechnics, very low CBR values (1% and 2.5%) were identified on site indicating that subgrade improvement works will be necessary to achieve a minimum CBR 3%. Further advice will be sought prior to the Crown Certificate from the project Geotechnical Engineer with regards to subgrade improvement methodologies appropriate for this development site.

The anticipated maximum temporary and permanent batter slope angles have been nominated below subject to further review by the Project Geotechnical Engineer.

Table 1 – Batter Slopes

Unit	Temporary	Permanent
Engineered Fill / Natural Soil	1.5H: 1V	2H: 1V

2.4.2 Contamination

A detailed Environmental Site Assessment has been undertaken by JBS&G for Precinct 9 School Site, Buchan Avenue, Edmondson Park NSW dated 13 May 2021 (60756/137,554 (Rev A). Findings in the Environmental Site assessment indicate that the site is suitable for residential with accessible soil land uses, including gardens and accessible soil, day care centre, pre-school, primary and secondary school and park, recreational open space, playing fields without the preparation of a RAP.

2.5 Existing Infrastructure

Northrop has undertaken a preliminary investigation of existing infrastructure in the vicinity of the proposed development site. Our assessment has been based on limited survey information as well as publicly available information from Liverpool City Council, and Design Information from Landcom.

2.5.1 Existing stormwater infrastructure

2.6 Stormwater Infrastructure

There is no legal discharge point of discharge as a piped connection available for the existing development. All flows currently drain as sheet flow over land towards an existing natural watercourse to the east. It is noted that as part of the Buchan Avenue extension works, Landcom will be providing a connection point for the site capable of conveying the 1 in 100-year ARI flows to a regional detention basin with water quality treatment functions. This infrastructure is currently under construction.

2.7 Flooding

In 2014, *FloodMit* was engaged by *Liverpool City Council* to conduct a flood study, *Design for the Modification of Creeks in Edmondson Park,* to assess the impacts of the creek modifications which were proposed in *Storm's* 2013 drawings, *Modification of Creeks in Edmondson Park, Concept Design.*

The PMF levels for the developed scenario are shown in the figure below. The approximate site boundary is marked in the lower left corner of the figure, showing that the PMF does not extend within the site boundary and therefore the site is unaffected by flooding from Maxwell's creek.

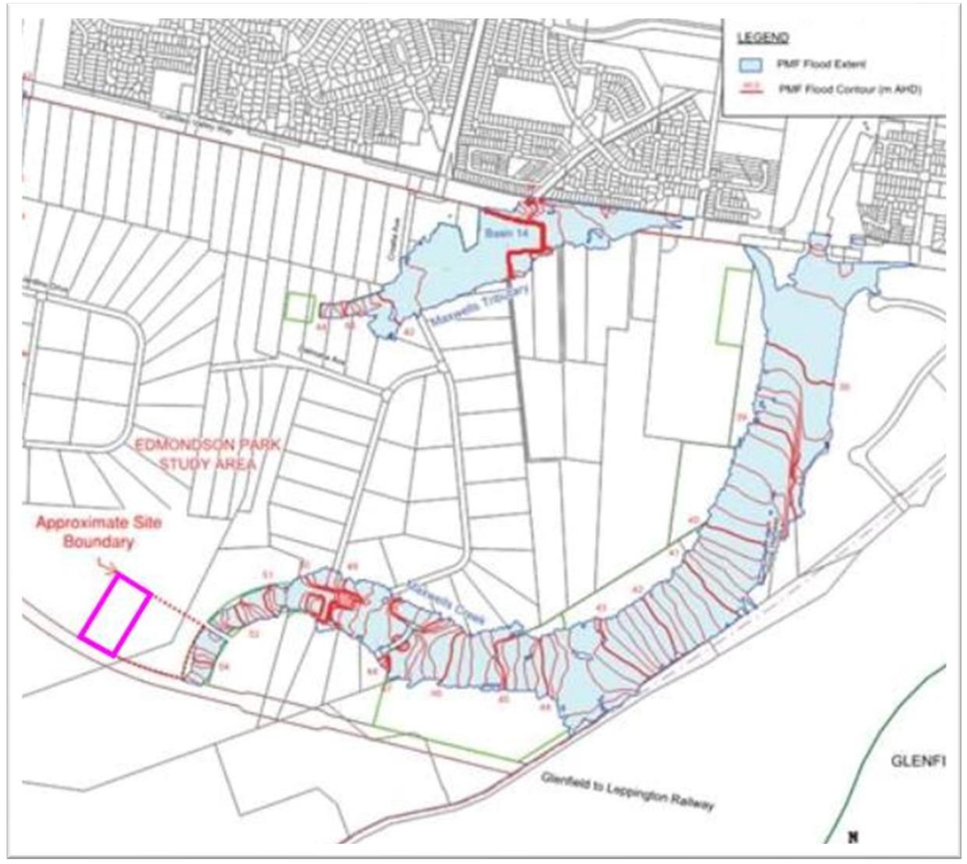


Figure 4 – PMF Flood Extents (FloodMit, 2014).

Furthermore, a qualitative review of *SMEC's Engineering Design Report for Buchan Avenue, Edmondson Park* was undertaken to assess the likelihood of flooding along the north and west boundaries of the site. The site is unlikely to be flood affected along these boundaries as Faulkner Way and Buchan Avenue convey flows away from the site.

The above information is consistent with the Planning Certificate which states that the site is not subjected to flood related controls.

3. Sediment and Soil Erosion Control

3.1 Sediment and Erosion Control

The objectives of the erosion and sediment control for the development site will be to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Liverpool City Council's requirements prior to discharge.

As part of the works, the erosion and sedimentation control will need to be provided during the construction phase of the development in accordance with Liverpool City Council's requirements and the NSW Department of Housing Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book) - prior to any earthworks commencing on site.

3.1.1 Sediment Basin

A temporary sediment basin has been designed to capture site runoff during construction and has been located towards the north eastern side of the site, in the lowest point. The construction of the basin will be undertaken in stages to enable maximum runoff capture assisted by diversion swales and direct runoff to the basin.

Calculations to determine the concept design basin size have been based on available geotechnical information regarding soil types and using the Soils and Construction Volume 1 Manual.

To ensure the sediment basin is working effectively it will be maintained throughout the construction works. Maintenance includes ensuring adequate settlement times or flocculation and pumping of clean water to reach the minimum storage volume at the lower level of the settling zone. The settling zone will be identified by pegs to clearly show the level at which design storage capacity is available.

The pumped water from the sediment basin can be reused for dust control during construction.

Overflow weirs are to be provided to control overflows for rainfall events more than the design criteria which caters for a storm event up to and including the 1% AEP storm event.

The concept sediment basin sizing is summarised in the table below. Detailed sediment basin sizing, configuration and location shall form part of the Construction Certificate application.

The sediment basin has been located for future conversion into the permanent water quality basin.

Table 2 – Sediment Basin Volumes

Total Disturbed Area	2.3	Settling zone volume	281m^3
Soil Texture Group	F	Sediment storage volume	141 m^3
Design rainfall depth (days)	5	Total Basin Volume	422m^3
Design rainfall depth (percentile)	80		
x-day, y-percentile rainfall event	24.4		
CV	0.5		

3.1.2 Sediment and Erosion Control Measures

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the engineering drawings and the "Blue Book". The measures are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing, and techniques. These measures may include:

- A temporary site security/safety fence is to be constructed around the site, the site office area, and the proposed sediment basin.
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles.
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas.
- Placement of hay bales or mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits; and
- The construction of a temporary sediment basin as noted above.
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydro mulching on formation.

Figure 5 – Sediment Fence

4. Bulk Earthworks

Based on the proposed building layout, preliminary bulk earthworks calculations have been undertaken for the site with consideration to the following Bulk Earthworks set downs:

Table 3 – Earthworks Set downs

Asphalt Pavement (Carpark)	550mm
Modular Buildings	750mm
Conventional Buildings	300mm
Hardscape (Footpaths)	250mm
Landscape (Planting Areas)	150mm
Landscape (Turfed Areas)	75mm
Games Court	250mm

With consideration to the above the following preliminary bulk earthworks cut and fill volumes have been established.

Table 4 – Earthworks Volumes

Cut	831m^3
Fill	42,865m^3
Balance	42,034m^3 (Import)

Based on outcomes of preliminary surface modelling, 42,034m^3 of fill material is required to be imported to site to establish bulk earthworks platforms for the proposed development.

Earthworks volumes are to be further refined as the design documentation is developed in the later stages of the project.

4.1 Construction Sequencing

The sequence of work for the bulk earthworks will generally include:

- Provision of site establishment erosion and sediment control measures typically outlined in this report's section Erosion & Sediment Control.
- Clearing of vegetation from the proposed development site and either removal or mulching.
- Stripping and stockpiling of topsoil suitable for reuse.
- Inspection of exposed natural material to ensure conformity with design assumptions and requirements.
- Placement of cut to fill layers not greater than 200mm in thickness and compacted to not less than 98% Standard Maximum Dry Density (SMDD) in accordance with the geotechnical report; and
- Spread topsoil to a maximum depth of 200mm and hydroseed or hydro mulch disturbed areas.

5. Pavements

For the purposes of the concept design, with consideration to traffic loading specified in the Educational Facilities Guidelines and Standards (5 x 10^5 ESAs) and an assumed CBR 3%, a proposed flexible pavement profile may be as follows:

- 40mm AC10 Wearing Course (Polymer Modified)
- 150mm DGB20 Base Course Material compacted to 98% MMDD
- 330mm DGS40 Subbase Material compacted to 98% MMDD
- Existing Subgrade compacted to 100% SMDD

Should the existing subgrade achieve less than CBR 3%, ground improvement may be required such as lime stabilisation or replacement with a select fill layer such as crushed sandstone, subject to further discussion with the project Geotechnical Engineer.

6. Stormwater Management Strategy

6.1 Stormwater Quantity Management

6.1.1 Stormwater Drainage

Northrop has performed a desktop investigation to determine a conceptual stormwater management strategy for the proposed development scenario, and the requirements for the development. This has relied on Liverpool City Council's current stormwater management requirements and previous correspondence provided by Landcom.

Previous advice from Landcom indicated that On Site Stormwater Detention is not required for the proposed development. We have previously been advised that this element is catered for as part of the regional stormwater detention strategy down-stream of the proposed development site.

At present, this regional stormwater infrastructure has not been constructed. It is critical that the construction programme for the new primary school in Edmondson Park is considered with respect to this infrastructure being provided, to avoid installing interim measures for Onsite stormwater detention and water quality purposes that may become redundant in the future.

Based on the precinct masterplan, Buchan Avenue is to extend along the northern extent of the site. Landcom have provided preliminary design plans for the Buchan Avenue upgrade which shows a new stormwater connection for the school. The legal point of site stormwater discharge would be at the north-eastern corner on Buchan Avenue upgrade extension, which discharges into the creek. Similar to the items above, it is critical that the construction programme of the Buchan Avenue upgrade works is considered to avoid temporary connections to the creek.

From review of advice provided by Landcom, it is understood that the legal point of discharge / stormwater infrastructure in Buchan Avenue will be complete prior to operation of the project commencing and sized to cater for flows generated from the proposed development site up to the 1 in 100-year ARI storm event in a combination of the pit and pipe network and overland flow in the road reserve. This suggests that the local drainage system (in-ground pit and pipe network) within the site should be sized accordingly to direct all flows to the connection point in Buchan Avenue.

Based on the advice provided by Landcom, the proposed method of stormwater drainage will not impact on downstream properties.

6.1.2 Proposed System

A 12d drainage Model for the proposed site is to be developed utilising the following methodology:

- The site pit and pipe network will be designed to discharge directly to existing infrastructure in Buchan Avenue.
- An indicative pit and pipe network will be developed for the proposed siteworks (refer civil engineering plans for details).
- Tailwater conditions will be based on the Hydraulic Grade Line of the proposed stormwater drainage infrastructure in Buchan Avenue.
- Part of the roof catchment from the new buildings is to drain directly to rainwater harvesting tank for the 1:100-year storm event which then overflows to the piped network.
- Designs for roof drainage shall be undertaken as either conventional or siphonic drainage by a certified Hydraulic Engineer during the detail design stage of the works.
- For the purposes of modelling, the rainwater tanks are to be considered full during simulation.
- All paved areas are to be collected within grated pits and drains.
- 20yr and 100yr ARI events are to be considered for all standard durations; and
- For the major system (100yr ARI storm event), a conservative blockage factor of 30% will be applied to all stormwater pits.

6.2 Stormwater Quality Management

Northrop has designed a water quality treatment system for the proposed development subject to confirmation from Landcom on the construction of downstream regional detention / raingardens.

The stormwater management system has been designed to comply with Liverpool City Council's Water Sensitive Urban Design Policy. Council's policy requires improved water quality of the stormwater flow from the developed site prior to discharge into the authority's drainage system.

Council also requires the removal of target pollutants from the site during the construction phase as vehicles that may enter of exit could generate various pollutants such as silt, oil and grease. These target pollutants can be identified into five major groups of stormwater pollutants:

- Gross Pollutants
- Coarse, medium, and fine sediments
- Oil and grease
- Heavy Metals and
- Nutrients

6.2.1 Water Quality Objectives

In accordance with Liverpool City Council's Water Sensitive Urban Design Policy, we note the following targets have been set in relation to stormwater quality

Table 5 – Pollutant Reduction Targets

Reduction in annual average suspended solids (SS) export load	85%
Reduction in annual average total phosphorus (TP) export load	65%
Reduction in annual average total nitrogen (TN) export load	45%
Reduction in annual average gross pollutants (GP) export load	90%

To demonstrate compliance with Liverpool City Council's Water Sensitive Urban Design requirements, treatment removal loads will be analysed from pre-to post development scenarios using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) for the main building works.

Model development and results will be provided in subsequent reports and documentation for further review incorporating a combination of various treatment devices as described below.

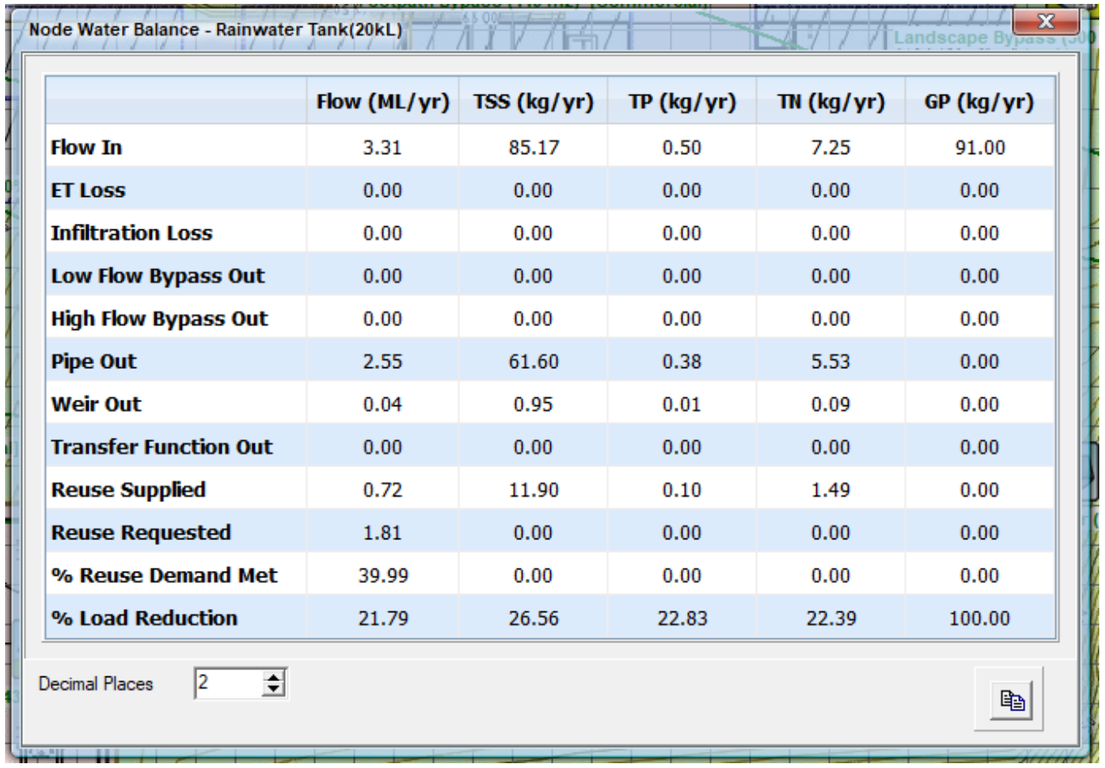
6.2.2 Proposed Treatments

Possible stormwater quality treatment devices such as StormFilter Cartridges, Ocean Guard Pit Inserts and Rainwater Tanks are discussed below.

6.2.2.1 Rainwater Tank

Currently a 20 kL Rainwater Tank is proposed for this development subject to further review with the project Hydraulic Engineer.

The rainwater collected could be utilised for flushing of the 22 toilets in the buildings at a rate of 0.1kL / toilet / day, and for irrigation of approximately 2,500m2 of landscaping at a rate of 0.4kL / year / m^2.



	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	3.31	85.17	0.50	7.25	91.00
ET Loss	0.00	0.00	0.00	0.00	0.00
Infiltration Loss	0.00	0.00	0.00	0.00	0.00
Low Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
High Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
Pipe Out	2.55	61.60	0.38	5.53	0.00
Weir Out	0.04	0.95	0.01	0.09	0.00
Transfer Function Out	0.00	0.00	0.00	0.00	0.00
Reuse Supplied	0.72	11.90	0.10	1.49	0.00
Reuse Requested	1.81	0.00	0.00	0.00	0.00
% Reuse Demand Met	39.99	0.00	0.00	0.00	0.00
% Load Reduction	21.79	26.56	22.83	22.39	100.00

Figure 6 – Node Water Balance Results

6.2.2.2 Stormfilter Cartridges

Filtration cartridges in the form of Stormfilters are to be provided as an end of line treatment device to treat stormwater runoff from the proposed development. The Stormfilter system targets a full range of pollutants including total suspended solids, soluble heavy metals, oil and grease and total nutrients. Each cartridge has a treatable flow rate of 1~1.6L/s and is designed to capture and treat the first flush volume of a rainfall event.

In developing the MUSIC model for the proposed works, an offline 15 x 690mm cartridge system by Ocean Protect has been proposed as an end of line treatment prior to discharge. The position of the Stormfilter units have been proposed to maximise flows and allow easy access for maintenance.

6.2.2.3 *Ocean Guard Pit Inserts*

Surface Inlet Pits within the development area have been designed to be provided with Ocean Guard Pit Inserts including oil absorbent media. The pit inserts will sit beneath the stormwater pit grates and will collect gross pollutants and larger sediments prior to treatment by the Stormfilter cartridges.

Figure 7 – Stormfilter Cartridge System (Left), Stormwater Pit Litter Basket Insert (Right)

6.2.3 Water Quality Modelling – MUSIC Model, Parameters and Methodology

A water quality modelling tool, MUSIC was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC Models the total amount of gross pollutants and nutrients produced within various types of catchments. It allows the user to simulate the removal rates expected with implementing removal filters to reduce the increased gross pollutant and nutrient levels created by the proposed development.

The following methodology and parameters were incorporated in the MUSIC Modelling

- The MUSIC model was created to assess the effectiveness of water quality nodes which are to be constructed as part of the proposed development
- In accordance with Council's requirements MUSIC link and standard nodes have been used in the model.
- A Music Model was established to represent the post-developed site. From architectural plans, the site was then categorized into the following areas
    - Roof
    - Road
    - Hardstand
    - Landscape

A treatment train was designed to incorporate a series of treatment nodes including a Rainwater Tank, Stormfilter Cartridges, Ocean Guard Pit Inserts The effectiveness of the proposed treatments is summarised below.

6.2.4 Results

The following results were achieved in the model

Table 6 – Ocean Guard MUSIC Input Parameters (upstream of Stormfilter)

Pollutant	Post-Development with no WSUD measures (kg/yr.)	Post-Development with WSUD measures (kg/yr.)	Removal Rate (%)	Target Removal Rate (%)
Suspended Solids (mg/L)	1140	171	85	85.4
Phosphorus (mg/L)	2.41	0.832	65.5	65
Nitrogen (mg/L)	20.5	10	51.2	49.4
Gross Pollutants (kg/ML)	207	3.76	98.2	95.6

Results of the MUSIC analysis indicate that the proposed treatment train consisting of a 20kL Rainwater Tank, 15 x Stormfilter Cartridges and 35 x Ocean Guard Pit Inserts generally satisfies Council's statutory requirements for target pollutant removal rates.

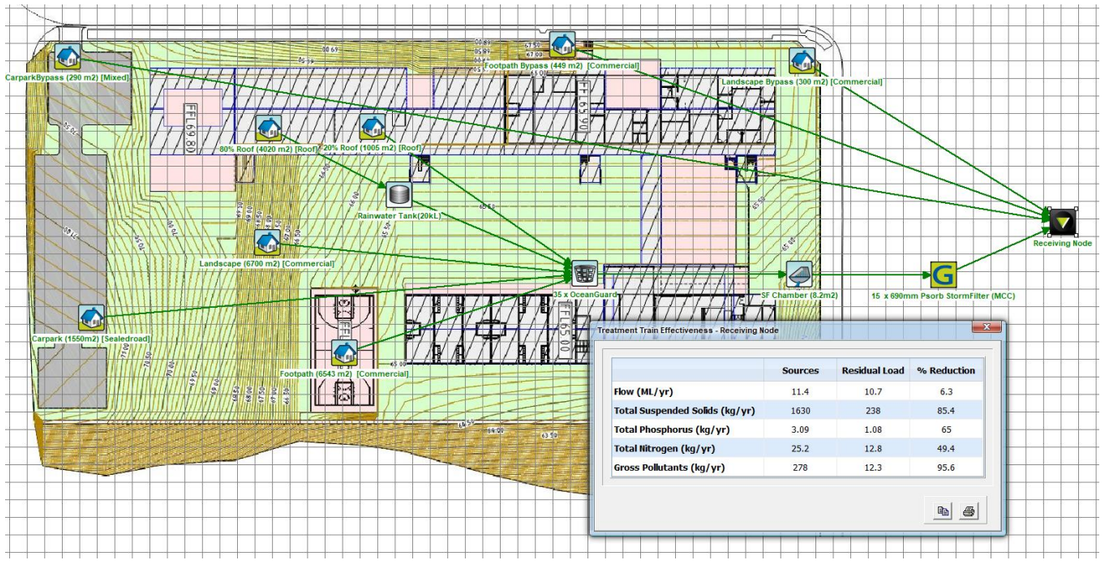


Figure 8 – MUSIC Model and Results

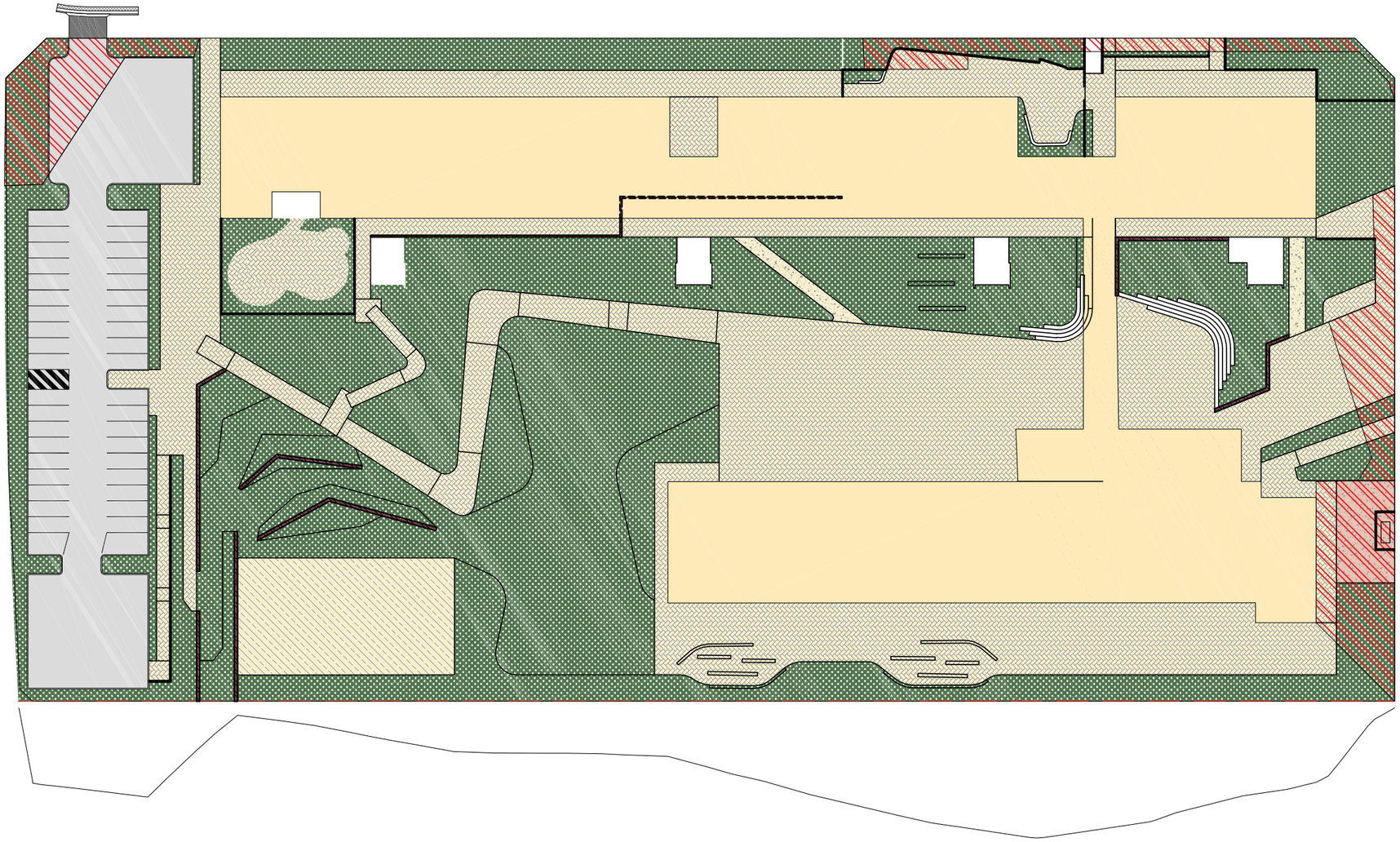
Appendix A – MUSIC Catchment Plan

FAULKNER WAY

FAULKNER WAY

FUTURE ROAD

BUCHAN AVENUE



LEGEND

- CARPARK - 1550m2
- HARDSTAND AREA - 6543 m3
- ROOF - 5026 m2
- LANDSCAPE - 6700 m2
- CARPARK BYPASS - 290 m2 (50% IMPERVIOUS)
- FOOTPATH BYPASS - 449 m2
- LANDSCAPE BYPASS - 300 m2

Appendix B – Engineering Plans

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

LOCALITY PLAN

SOURCE: GOOGLEMAPS (2021)

CIVIL DRAWING SCHEDULE

DRAWING No.	DRAWING TITLE
0101	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
0111	SPECIFICATION NOTES - SHEET 01
0112	SPECIFICATION NOTES - SHEET 02
0121	GENERAL ARRANAGEMENT PLAN
0201	SEDIMENT AND SOIL EROSION CONTROL PLAN
0211	SEDIMENT AND SOIL EROSION CONTROL DETAILS
0301	BULK EARTHWORKS CUT TO FILL PLAN
0401	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
0402	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02
0421	STORMWATER LONGITUDINAL SECTIONS - SHEET 01
0422	STORMWATER LONGITUDINAL SECTIONS - SHEET 02
0423	STORMWATER LONGITUDINAL SECTIONS - SHEET 03
0424	STORMWATER LONGITUDINAL SECTIONS - SHEET 04
0425	STORMWATER LONGITUDINAL SECTIONS - SHEET 05
0426	STORMWATER LONGITUDINAL SECTIONS - SHEET 06
0427	STORMWATER LONGITUDINAL SECTIONS - SHEET 07
0701	DETAIL SHEET 01
0702	DETAIL SHEET 02
0703	DETAIL SHEET 03
0704	DETAIL SHEET 04
0705	DETAIL SHEET 05

DRAWN: J.O DESIGNED: T. BUGAEV JOB MANAGER: J. GILLIGAN VERIFIER: .

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR SSDA	CP		JG	18.05.21

CLIENT
RICHARD CROOKES CONSTRUCTIONS
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PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

JOB NUMBER 210040
DRAWING NUMBER 0101
REVISION A
DRAWING SHEET SIZE = A1

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW.
IF CONFLICT ARISE, LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE.

ACCESS AND SAFETY

1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
2. THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.
3. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
4. WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE SITE.
5. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS.

TREE PROTECTION

1. REFER TO LANDSCAPE / ARCHITECTS PLAN FOR TREES TO BE RETAINED AND PROTECTED.
2. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY;
   - 2.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE.
   - 2.2. ENSURING THAT NOTHING IS NAILED TO ANY PART OF THE TREE.
   - 2.3. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY. COUNCILS AND/OR INDEPENDENT ARBORISTS TO BE CONSULTED WHERE TREE ROOTS ARE TO BE REMOVED AND/OR CUT.

SEDIMENT AND SOIL EROSION

1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN, OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE GOOD PAYMENT OF ALL FEES.
2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
3. THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
4. THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE;
   - 5.1 CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.
   - 5.2 INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
   - 5.3 INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.
6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.
8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM . ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

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EXISTING SERVICES

1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
3. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AT THE CONTRACTORS EXPENSE.
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED AND MAINTAINED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

EARTHWORKS

1. AT THE COMMENCEMENT OF FILLING OPERATIONS FOR BULK EARTHWORKS A GEOTECHNICAL ENGINEER IS TO VISIT THE SITE & CONFIRM THE SUITABILITY OF THE METHODOLOGY OF ACHIEVING THE REQUIRED COMPACTION REQUIREMENTS.
2. STRIP TOPSOIL, VEGETABLE MATTER AND RUBBLE TO EXPOSE NATURALLY OCCURRING MATERIAL AND STOCKPILE ON SITE AS DIRECTED BY THE SUPERINTENDENT.
3. WHERE FILLING IS REQUIRED TO ACHIEVE DESIGN SUBGRADE, PROOF ROLL EXPOSED NATURAL SURFACE WITH A MINIMUM OF TEN PASSES OF A VIBRATING ROLLER (MINIMUM STATIC WEIGHT OF 10 TONNES) IN THE PRESENCE OF THE SUPERINTENDENT.
4. THE CONTRACTOR IS TO ALLOW FOR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO PROVIDE ADVICE AND CERTIFICATION OF ANY WORKS ASSOCIATED WITH TREATING OR MANAGING UNSUITABLE GROUND CONDITIONS THROUGHOUT THE CONTRACT (e.g. STABILITY OF EXCAVATIONS, POOR SUBGRADE, etc).
5. ALL SOFT, WET OR UNSUITABLE MATERIAL IS TO BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH APPROVED MATERIAL SATISFYING THE REQUIREMENTS BELOW.
6. PROVIDE CERTIFICATES VERIFYING THE QUALITY OF IMPORTED MATERIAL FOR THE SUPERINTENDENTS APPROVAL.
7. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200mm THICK LAYERS (LOOSE) AND COMPACTED AT OPTIMUM MOISTURE CONTENT (+ OR – 2%) TO ACHIEVE A DRY DENSITY DETERMINED IN ACCORDANCE WITH AS1289.2.1.1, AS1289.5.7.1 AND AS1289.5.8.8 OF NOT LESS THAN THE FOLLOWING STANDARD MINIMUM DRY DENSITY;

LOCATION	COMPACTION REQUIREMENT
LANDSCAPED AREAS	98% SMDD
ROADS	100% SMDD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)
PAVED AREAS	100% SMDD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)

8. TESTING OF THE SUBGRADE FOR BUILDINGS SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY.
9. ALLOW THE FOLLOWING COMPACTION TESTING BY N.A.T.A. REGISTERED LABORATORY FOR PLATFORMS AND FILL LAYERS IN ACCORDANCE WITH THE LATEST VERSION OF AS3798. (MINIMUM 3 TESTS PER LAYER) OR 1 TEST PER MATERIAL TYPE PER 2500sq.m OR 1 TEST.
10. WHERE TEST RESULTS ARE BELOW THE SPECIFIED COMPACTION, RECOMPACT AND RETEST UNTIL SPECIFIED COMPACTION STANDARDS ARE ACHIEVED, OTHERWISE SUBGRADE REPLACEMENT IS REQUIRED IF COMPACTION STANDARDS ARE NOT ACHIEVED.
11. ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND U.N.O. NO ADDITIONAL PAYMENTS WILL BE MADE FOR EXCAVATION IN WET OR HARD GROUND.
12. WHERE THERE IS INSUFFICIENT EXCAVATED MATERIAL SUITABLE FOR FILLING OR SUBGRADE REPLACEMENT, THE CONTRACTOR IS TO ALLOW TO IMPORT FILL. IMPORTED FILL SHALL COMPLY WITH THE FOLLOWING;
   - 12.1. BE OF VIRGIN EXCAVATED NATURAL MATERIAL OR
   - 12.2. CONTRACTOR TO PROVIDE EVIDENCE IMPORT IS SUITABLE USE
   - 12.3. PLASTICITY INDEX BETWEEN 2–15% AND CBR > 8
   - 12.4. FREE FROM ORGANIC AND PERISHABLE MATTER
   - 12.5. MAXIMUM SIZE 50mm, PASSING 75 MICRON SIEVE (<25%)

EARTHWORKS (cont)

13. THE CONTRACTOR SHALL PROGRAM THE EARTHWORKS OPERATION SO THAT THE WORKING AREAS ARE ADEQUATELY DRAINED DURING THE PERIOD OF CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS, ROLLERS MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED AT THEIR COST.
14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE AND MAINTAIN THE INTEGRITY OF ALL SERVICES, CONDUITS AND PIPES DURING CONSTRUCTION, SPECIFICALLY DURING THE BACKFILLING AND COMPACTION PROCEDURE. ANY AND ALL DAMAGE TO NEW OR EXISTING SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST.
15. TESTING OF THE SUBGRADE SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY AT THE CONTRACTORS EXPENSE.

DEEP EXCAVATIONS

16. PRIOR TO THE COMMENCEMENT OF EXCAVATION WORKS GREATER THAN 1.5m IN DEPTH, THE CONTRACTOR SHALL OBTAIN THE SERVICES OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO DETERMINE THE STABILITY OF A NATURAL MATERIAL AND BENCHING REQUIREMENTS.
17. THE CONTRACTOR MUST PROVIDE THE SUPERINTENDENT AND OR THE DESIGN ENGINEER WITH A COPY OF THE GEOTECHNICAL ENGINEERS REPORT.
18. THE CONTRACTOR IS TO PROVIDE SAFETY BARRIERS / FENCING IN ACCORDANCE WITH OH&S AND REGULATORY AUTHORITY REQUIREMENTS.

SERVICE TRENCHES

19. SAWCUT EXISTING SURFACES PRIOR TO EXCAVATION. BACKFILL ALL TRENCHES UNDER EXISTING ROADS, PAVEMENTS AND PATHS WITH STABILISED SAND 5% CEMENT OR DGS40 MATERIAL (5% CEMENT) COMPACTED IN 200mm THICK LAYERS TO 98% MMDD TO UNDERSIDE OF PAVEMENT.
20. BACKFILL ALL TRENCHES NOT UNDER ROADS, PAVEMENTS, PATHS AND BUILDINGS WITH APPROVED EXCAVATED OR IMPORTED MATERIAL COMPACTED TO 95% SMDD.

SITEWORKS

1. ALL WORKS TO BE IN ACCORDANCE WITH RELEVANT LOCAL COUNCIL / REGULATORY AUTHORITIES REQUIREMENTS, ALL SPECIFICATIONS AND AUSTRALIAN STANDARDS. CONFLICTS BETWEEN SAID DOCUMENTS SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION.
2. THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES DURING CONSTRUCTION IN ACCORDANCE WITH ALL REGULATORY AUTHORITIES, INCLUSIVE OF LOCAL COUNCIL REGULATIONS AND REQUIREMENTS.
3. THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED PRIOR TO COMMENCEMENT OF WORKS.
4. RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT ON COMPLETION OF WORKS. WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO LANDSCAPE ARCHITECT AND / OR ARCHITECT DOCUMENTATION.
5. ON COMPLETION OF ANY TRENCHING WORKS, ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED AREAS AND ROAD PAVEMENTS.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF WORKS.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ONSITE PRIOR TO LODGMENT OF TENDER AND ONSITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED.
8. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
9. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
10. WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
11. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
12. ALL CIVIL ENGINEERING DESIGN HAS BEEN DOCUMENTED UNDER THE ASSUMPTION THAT ALL NECESSARY SITE CONTAMINATION REMEDIATION WORKS HAVE BEEN SATISFACTORILY COMPLETED (IF APPLICABLE) AND THAT THE SITE IS NOT AFFECTED BY ANY SOIL STRATA OR GROUNDWATER TABLE CONTAMINATION.

STORMWATER DRAINAGE

1. ALL PIPES SHALL BE CLASS 2 RUBBER-RING JOINTED U.N.O. WHERE uPVC PIPES HAVE BEEN SPECIFIED, THE FOLLOWING CLASS PIPEWORK IS TO BE ADOPTED U.N.O. Ø100mm OR LESS TO BE CLASS 'SN10' AND ABOVE Ø100mm TO BE CLASS 'SN8'.
2. uPVC STORMWATER LINES PASSING UNDER FLOOR SLABS TO BE CONCRETE ENCASED.
3. PIPES EQUAL TO THAT OF THE STEEL REINFORCED CONCRETE PIPE CLASS SPECIFIED ON THE DRAWINGS MAY BE USED SUBJECT TO APPROVAL FROM THE SUPERINTENDENT.
4. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
5. COVERS
   - 5.1. USE HOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS.
   - 5.2. ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT.
   - 5.3. ALL COVERS AND GRATES TO BE FITTED WITH POSITIVE COVER LIFTING KEYS
   - 5.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES. CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS.
   - 5.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B' ELSEWHERE.
   - 5.6. ALL GRATED TRENCH DRAINS SHOULD BE 'CLASS D' CAST IRON WITHIN VEHICULAR PAVEMENTS AND CLASS 'B' HEEL SAFE WITHIN PEDESTRIAN PAVEMENTS.
6. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING PURPOSE MADE FITTINGS OR STORMWATER PITS.
7. ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
8. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDER AND MADE NEAT.
9. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
10. U.N.O. MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
11. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN 50mm CONCRETE BED (OR 75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK.
12. BEDDING SHALL BE U.N.O TYPE HS2 UNDER ROADS AND H2 UNDER GENERAL AREAS IN ACCORDANCE WITH CURRENT RELEVANT INDUSTRY STANDARDS AND GUIDELINES.
13. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
14. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.

SUBSOIL DRAINAGE

15. Ø100mm SUBSOIL DRAINAGE LINES WITH NON-WOVEN GEOTEXTILE FILTER SOCK SURROUND SHALL BE CONNECTED TO A STORMWATER DRAINAGE PIT (AT MIN 1% LONGITUDINAL GRADE) AND PROVIDED IN THE FOLLOWING LOCATIONS;
   - 15.1. THE HIGH SIDE OF PROPOSED TRAFFICKED PAVEMENT AREAS.
   - 15.2. ALL PLANTER AND TREE BEDS PROPOSED ADJACENT TO PAVEMENT AREAS.
   - 15.3. BEHIND RETAINING WALLS (IN ACCORDANCE WITH RETAINING WALL DETAILS).
   - 15.4. ALL OTHER AREAS SHOWN ON DRAWINGS.
   - 15.5. CONTRACTOR IS TO MAKE ALLOWANCE IN BOTH TENDER AND CONSTRUCTION COSTING TO ALLOW FOR SUBSURFACE DRAINAGE BEHIND ALL RETAINING WALLS / ABOVE LOCATIONS AND TO MAKE CONNECTION TO STORMWATER SYSTEM.
16. WHERE SUBSOIL DRAINAGE PASSES BENEATH BUILDINGS / PAVED AREAS AND/OR PAVEMENTS. CONTRACTOR TO ENSURE Ø100mm CLASS 'SN10' uPVC DRAINAGE LINE IS USED AND THAT PROPRIETARY FITTINGS ARE USED TO RECONNECT SUBSOIL DRAINAGE LINE.
17. THE CONTRACTOR SHALL INSTALL INSPECTION OPENINGS / CLEAROUTS TO ALL SUBSOIL DRAINAGE LINES AND DOWNPIPE LINES AS SPECIFIED ON DRAWINGS AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AT MAXIMUM 30m CENTRE AND AT ALL UPSTREAM ENDPOINTS.
18. PROVIDE 3.0m LENGTH OF Ø100 SUBSOIL DRAINAGE LINE WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC TO THE UPSTREAM SIDE OF STORMWATER PITS, LAID IN STORMWATER PIPE TRENCHES AND CONNECTED TO DRAINAGE PIT.
19. IN AREAS WHERE DUMPED / HAND PLACED ROCK IS USED AS A MEANS OF SCOUR PROTECTION, CONTRACTOR IS TO EXCAVATE A MINIMUM OF 100mm FROM PROPOSED SURFACE, LEVEL AND COMPACT SUBGRADE AS SPECIFIED. ROCK TO THEN BE PLACED ON GEOTEXTILE FILTER FABRIC.

PRECAST STORMWATER PITS

1. THE USE OF PRE-CAST STORMWATER DRAINAGE PITS IS NOT ACCEPTED WITHOUT CONFIRMATION BETWEEN NORTHROP ENGINEERS AND THE CONTRACTOR REGARDING QUALITY CONTROL AND CERTIFICATION OF FINISHES.
2. REFER MANUFACTURERS SPECIFICATIONS FOR INSTALLATION GUIDELINES.
3. PRECAST PIT TO BE PLACED ON MINIMUM 150mm THICK CONCRETE PAD AND BED MINIMUM 50mm WHILST CONCRETE IS STILL PARTIALLY WET.
4. ENSURE PENETRATION IS CORED THROUGH PIT FACE TO ALLOW CONNECTION.
5. ENSURE A SMOOTH SEALED FINISH AT PIPE CONNECTIONS BY HAND APPLYING CONCRETE AROUND THE PIPE ON THE INTERNAL FACE OF THE PIT TO FILL IN ANY VOIDS CREATED WHEN PENETRATION FOR THE PIPE WAS CORED.
6. ENSURE A SEALED FINISH AT PIPE CONNECTIONS BY HAND-APPLYING MINIMUM 150mm THICK CONCRETE AROUND PIPE AT THE EXTERNAL FACE OF THE PIT. ENSURE CONCRETE DOES NOT AFFECT THE INTEGRITY OF THE SUBSOIL DRAINAGE CONNECTED TO THE PIT.
7. ENSURE PIPEWORK DOES NOT PROTRUDE INTO THE BEYOND THE WALL. PIPEWORK IS TO FINISH FLUSH WITH INTERNAL WALL (UNLESS OTHERWISE NOTED OR DETAILED).
8. ENSURE THE OUTLET PIPE IS CONNECTED AT THE INVERT LEVEL OF THE PIT TO DRAIN. ALTERNATIVELY FILL THE BASE OF THE PIT WITH MASS CONCRETE (MIN 50mm THICK) OR APPROVED GROUTING COMPOUND (LESS THAN 50mm THICK) TO DRAIN.
9. PROVIDE CONCRETE BENCHING TO SIDES OF PIT TO SUIT PIPE DIAMETER. HEIGHT TO MATCH MINIMUM 1/3 PIPE DIAMETER.

RAINWATER REUSE

1. PROVIDE RAINWATER RE-USE SYSTEM TO SUPPLY WATER FOR IRRIGATION.
2. GUTTER GUARD TO BE INSTALLED ON ALL EAVES GUTTERS.
3. PRESSURE PUMP / TAP TO BE PROVIDED FOR THE REUSE OF CAPTURED TANK WATER.
4. A PERMANENT SIGN IS TO BE LOCATED IN THE VICINITY OF THE TANK STATING THE WATER IS "NON POTABLE WATER" WITH APPROPRIATE HAZARD IDENTIFICATION.
5. ALL RAINWATER SERVICES SHALL BE CLEARLY LABELLED "NON POTABLE WATER" WITH APPROPRIATE HAZARD IDENTIFICATION.
6. PIPEWORK USED FOR RAINWATER SERVICES SHALL BE COLOURED LILAC IN ACCORDANCE WITH AS1345.
7. ALL VALVES AND APERTURES SHALL BE CLEARLY AND PERMANENTLY LABELLED WITH SAFETY SIGNS TO COMPLY WITH AS1319.
8. AN AIR GAP OR RPZD TO ENSURE BACKFLOW PREVENTION (IF MAINS 'TOP UP' / BYPASS UTILISED)
9. RAINWATER TANK RETICULATION SYSTEM AND MAINS WATER BYPASS ARRANGEMENT TO BE INSTALLED IN ACCORDANCE WITH AS/NZS 3500.1.2-2003 AND THE NSW CODE OF PRACTICE – PLUMBING AND DRAINAGE.
10. A FIRST FLUSH FILTRATION DEVICE IS TO BYPASS THE FIRST 1mm OF RAINWATER.

SIGNAGE AND LINEMARKING

1. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH AUSTRALIAN STANDARDS 1742 / RMS STANDARDS AND SPECIFICATIONS.
2. LINE MARKING AND PAINT SHALL BE IN ACCORDANCE WITH AS1742.3 AND RMS STANDARDS.
3. PAINT SHALL BE TYPE 3 CLASS 'A' AND THE COLOUR SHALL BE WHITE AND NOT SUBJECT TO DISCOLOURATION BY BITUMEN FROM ROAD SURFACE. ALL PAINT TO BE APPLIED BY MECHANICAL SPRAYER.
4. LINE MARKING SHALL BE SPOTTED OUT AND APPROVED PRIOR TO SPRAYING.
5. PAINT SHALL BE APPLIED AT A WET THICKNESS OF BETWEEN 0.35mm AND 0.40mm.
6. CARPARK LINEMARKING TO BE 80mm WIDE.

LANDSCAPING

1. REFER TO DRAWINGS BY OTHERS FOR DETAILS OF PROPOSED LANDSCAPING TREATMENT.
2. ALL DISTURBED SURFACE TO BE TEMPORARILY STABILISED WITH HYDROMULCH UPON COMPLETION OF WORKS. A 500mm STRIP OF TURF (CT2 COUCH) IS TO BE PLACED BEHIND ALL NEW KERB AND GUTTER / ROLL KERB.

PAVEMENTS

1. ALL PAVEMENT MATERIALS SHALL COMPLY WITH CURRENT RMS SPECIFICATIONS. PROVIDE MECHANICAL ANALYSIS FOR EACH BATCH OF PAVEMENT MATERIAL TO ENSURE CONFORMITY.
2. COMPACTION STANDARDS

BASE	98% MODIFIED MAXIMUM DRY DENSITY
SUBBASE	98% MODIFIED MAXIMUM DRY DENSITY
SUBGRADE	100% STANDARD MAXIMUM DRY DENSITY

3. THE CONTRACTOR SHALL CONFIRM THE DESIGN CBR WITH A MINIMUM OF 3 TESTS TAKEN AT SUBGRADE LEVEL. WHERE DISCREPANCY IS FOUND, CONTACT THE DESIGN ENGINEER.
4. ALLOW FOR COMPACTION TESTING BY A N.A.T.A. REGISTERED LABORATORY FOR BASE LAYER, SUBBASE LAYER AND SUBGRADE LAYER IN ACCORDANCE WITH THE LATEST VERSION OF AS3798 FOR PAVEMENTS (MINIMUM 2 TESTS PER LAYER). ALLOW FOR AT LEAST TWO SUCCESSFUL COMPACTION TESTS IN EACH LAYER.
5. MATCH NEW PAVEMENTS NEATLY AND FLUSH WITH EXISTING
6. AFTER BASE IS APPROVED, SWEEP CLEAN AND PRIME AT NOMINAL RATE OF 1.0L PER 1.0 sq.m.
7. PAVEMENT HOLD POINTS
   - 7.1. SUB-GRADE PROOF ROLL PRIOR TO SET-UP AND FORM FOR CONCRETE POUR.
   - 7.2. INSPECTION OF FORMWORK / STEEL PRIOR TO CONCRETE POUR.
   - 7.3. SUBMISSION OF SUB-GRADE AND BASE DENSITY TESTS.

ASPHALTIC CONCRETE

1. GENERAL
   - 1.1. ALL ASPHALTIC CONCRETE (AC) WORK TO BE PREPARED AND CARRIED OUT IN ACCORDANCE WITH GOOD ASPHALTIC PAVING PRACTICE AS DESCRIBED IN AS2150-2005 "ASPHALT (HOT-MIXED) PAVING – GUIDE TO GOOD PRACTICE" AND CURRENT RMS SPECIFICATIONS.
2. PAVEMENT PREPARATION
   - 2.1. THE FINISHED PAVEMENT SURFACE TO BE SEALED SHALL BE WITHIN +/- 2% OF THE OPTIMUM AND BROOMED BEFORE COMMENCEMENT OF WORK TO ENSURE COMPLETE REMOVAL OF ALL SUPERFICIAL FOREIGN MATTER.
   - 2.2. PRIME ALL SURFACES TO BE SEALED. ALLOW PRIME TO SETTLE FOR A MINIMUM OF 3 DAYS BEFORE APPLYING TACK COAT AND ASPHALT.
   - 2.3. SWEEP PRIMED SURFACES BEFORE APPLYING TACK COAT.
   - 2.4. ALL DEPRESSIONS OR UNEVEN AREAS ARE TO BE TACK-COATED AND BROUGHT UP TO GENERAL LEVEL OF PAVEMENT WITH ASPHALTIC CONCRETE BEFORE LAYING OF MAIN COURSE.
   - 2.5. ALL DEFECTS IN THE BASE COURSE INCLUDING CRACKS, SURFACE DEFORMATION AND THE LI

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW.
IF CONFLICT ARISE, LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE.

ENGINEERING CERTIFICATION

1. TO CERTIFY THE CONSTRUCTED CIVIL WORKS, A QUALIFIED EXPERIENCED ENGINEER IS TO VISIT THE SITE TO OBSERVE CONSTRUCTION TECHNIQUES AND VARIOUS ELEMENTS THAT MAY BE CONCEALED WHEN THE WORKS ARE COMPLETE.

2. THIS SPECIFICATION ALLOWS FOR CERTIFICATION OF WORKS CONTROLLED BY A PRIVATE CERTIFIER FOR LAND DEVELOPMENT WORKS. THIS SPECIFICATION DOES NOT COVER CERTIFICATION REQUIREMENTS FOR AUTHORITIES SUCH AS COUNCIL, RMS OR OFFICE OF WATER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND PROVIDE ALL PROJECT SPECIFIC CONSTRUCTION COMPLIANCE (WORKS AS EXECUTED) INFORMATION TO THE SATISFACTION OF THE STAKEHOLDER / AUTHORITY. DISCREPANCIES BETWEEN THIS SPECIFICATION AND SPECIFICATIONS OF OTHER EXTERNAL STAKEHOLDERS / AUTHORITIES IS TO BE REPORTED TO THE SUPERINTENDENT FOR CLARIFICATION.

3. THE CONTRACTOR IS TO AGREE WITH THE ENGINEER AN APPROPRIATE SITE VISIT SCHEDULE AND FEE ARRANGEMENT PRIOR TO COMMENCEMENT OF THE WORKS. THE CONTRACTOR SHALL ENSURE THAT THE ENGINEER CAN SAFELY ACCESS ALL CIVIL ELEMENTS TO BE REVIEWED. SITE VISITS ARE CONDUCTED DURING NORMAL BUSINESS HOURS. WE REQUIRE TWO (2) WORKING DAY NOTICE FOR ANY SITE VISIT.

4. TO PROVIDE CERTIFICATION THE ENGINEER MUST VISIT THE SITE TO OBSERVE.
   - 4.1. PAVEMENTS
     - 4.1.1. POOR SUBGRADE CONDITIONS
     - 4.1.2. PROOF ROLLING OF SUB-GRADE
     - 4.1.3. PLACEMENT OF SUB-BASE COURSE, BASE COURSE AND WEARING COURSE.
     - 4.1.4. PLACEMENT OF STEEL REINFORCEMENT , DOWELS AND JOINT CRADLES PRIOR TO POURING OF CONCRETE
   - 4.2. EARTHWORKS
     - 4.2.1. TOPSOIL STRIP
     - 4.2.2. EARTHWORKS BATTER
     - 4.2.3. FILLING
   - 4.3. STORMWATER DRAINAGE
     - 4.3.1. DRAINAGE TRENCHES PRIOR TO BACKFILLING
     - 4.3.2. LEGAL POINT OF CONNECTION PRIOR TO BACKFILLING
     - 4.3.3. ANY OTHER DRAINAGE STRUCTURE THAT MAY BE CONCEALED DURING THE COURSE OF THE WORKS
   - 4.4. CONCRETE STRUCTURES
     - 4.4.1. PLACEMENT OF ANY STEEL REINFORCEMENT PRIOR TO CONSTRUCTION.

5. THE CONTRACTOR SHALL PROVIDE SURVEYED LEVELS, PREPARED BY A QUALIFIED SURVEYOR FOR SUBGRADE, SUB-BASE COURSE, BASE COURSE AND WEARING COURSE.

6. THE CONTRACTOR SHALL PROVIDE WORKS AS EXECUTED (WAE) DOCUMENTATION PREPARED BY A QUALIFIED PRACTICING SURVEYOR. THE WAE DRAWINGS SHALL CLEARLY SHOW, STORMWATER GRATE/ COVER LEVELS, STORMWATER PIT INVERT LEVELS AND CORRESPONDING INVERT LEVELS OF ANY INCOMING OR OUTGOING PIPES, DIAMETER OF ALL PIPES, DIMENSIONS AND VOLUME OF ON-SITE DETENTION FACILITIES, INVERT LEVELS OF ORIFICE PLATES, OVERFLOW WEIRS, BASE OF TANK FINISHED LEVELS OF PAVEMENTS. THE WAE SHALL SHOW WHERE THE SIZE OR ALIGNMENT OF CIVIL ENGINEERING ELEMENTS WHEN THEY DEVIATE FROM THE DESIGN DOCUMENTATION.

7. THE WAE DRAWINGS SHALL BE STAMPED WITH THE FOLLOWING STATEMENT "THESE WAE DRAWINGS HAVE BEEN PREPARED BY [COMPANY NAME] AND ARE A TRUE AND ACCURATE REPRESENTATION OF THE CONSTRUCTED WORKS". EACH DRAWING SHALL BE SIGNED AND DATED BY THE SURVEYOR WHO PREPARED THE DRAWINGS.

THESE WAE DRAWINGS HAVE BEEN PREPARED BY [COMPANY NAME] AND ARE A TRUE AND ACCURATE REPRESENTATION OF THE CONSTRUCTED WORKS.

SIGNED..... DATE.....

NAME.....

POSITION.....

8. WAE SHALL BE PROVIDED IN BOTH AUTOCAD AND PDF FORMAT. NORTHROP CONSULTING ENGINEERS WILL PROVIDE ENGINEERING PLANS TO THE CONTRACTOR IN AUTOCAD FORMAT TO AID PREPARATION OF WAE DOCUMENTATION.

9. CONTRACTOR IS TO UNDERTAKE A CCTV INSPECTION OF ALL STORMWATER DRAINAGE PIPELINES AND PROVIDE TO THE ENGINEER FOR APPROVAL.

10. THE CONTRACTOR SHALL PROVIDE ALL RELEVANT TEST CERTIFICATES PROGRESSIVELY THROUGHOUT THE DURATION OF THE WORKS. ALL TEST CERTIFICATES SHALL BE PREPARED BY A NATA REGISTERED LABORATORY. TEST CERTIFICATES ARE REQUIRED FOR PROOF ROLLING, SUBGRADE COMPACTION, COMPACTION OF PAVEMENT LAYERS, COMPACTION OF FILLING OPERATIONS, CONCRETE SLUMP TEST, AND CONCRETE STRENGTH TESTS. THE CONTRACT SHALL PROVIDE ALL RELEVANT VALIDATIONS BY A GEOTECHNICAL ENGINEER FOR ALL IMPORTED FILL

11. EACH TEST CERTIFICATE WILL NOMINATE THE DATE AND TIME OF THE TEST AND PROVIDE A LOCATION OF WHERE THE TEST SAMPLE WAS TAKEN FROM.

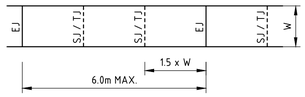
12. THE CONTRACTOR SHALL ARRANGE FOR THE ENGINEER TO CONDUCT A FINAL VISIT TO REVIEW OF THE CONSTRUCTED WORKS. THIS WILL REVIEW WILL NOT TAKE PLACE UNTIL THE WAE DOCUMENTATION AND RELEVANT TEST CERTIFICATES HAVE BEEN RECEIVED.

13. IF DEFECTIVE OR INCOMPLETE WORK IS FOUND DURING THE FINAL INSPECTION ANOTHER INSPECTION MAY BE REQUIRED AT THE CONTRACTORS EXPENSE TO VERIFY THE RECTIFICATION WORKS HAVE BEEN COMPLETED.

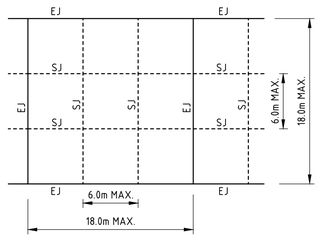
VERIFIER: .
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

PAVEMENT JOINTS

1. PROVIDE 10mm ABLEFLEX BETWEEN NEW CONCRETE WORKS AND EXISTING STRUCTURES.
2. LOCAL AUTHORITY REQUIREMENTS SHALL TAKE PRECEDENCE WITHIN THE PUBLIC ROAD RESERVE.
3. DOWELS TO BE PLACED ON PROPRIETARY CRADLES TO ENSURE CORRECT SPACING AND ALIGNMENT.
4. PEDESTRIAN PAVEMENTS
   ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS.
5. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 6.0m CENTRES.
6. WEAKENED PLANE JOINTS (SAWN OR TOOL JOINTS) ARE TO BE LOCATED AT A MAX. SPACING OF 1.5m x WIDTH OF THE PAVEMENT.
7. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
8. TYPICAL PEDESTRIAN PAVEMENT JOINT DETAIL



9. VEHICULAR PAVEMENTS
   ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS.
10. TIED KEYED CONSTRUCTION JOINTS SHOULD GENERALLY BE LOCATED LONGITUDINALLY AT A MAX. OF 6.0m CENTRES.
11. SAWN JOINTS SHOULD GENERALLY BE LOCATED LATERALLY AT A MAX. OF 6.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX. 18.0m CENTRES.
12. TYPICAL VEHICULAR PAVEMENT JOINT DETAIL.



13. KERB EXPANSION JOINTS SHALL BE FORMED FROM 10mm ABLEFLEX FOR FULL DEPTH OF SECTION.
14. KERB EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, TANGENT POINTS OF CURVES / CORNERS AND AT 12m MAX CENTRES.
15. KERB TOOLED JOINTS TO BE MIN 3mm WIDE AND LOCATED AT MAX 3m CENTRES.
16. INTEGRAL KERB JOINTS SHALL MATCH THE LOCATION OF PAVEMENT JOINTS.

CONCRETE SEALING

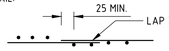
1. THE CURING PROCESS FOR NEW CONCRETE IS TO INCORPORATE THE FOLLOWING ASPECTS, GENERALLY AS ORDERED;
   - 1.1. SPRAY CURING COMPOUND
   - 1.2. SAWCUT JOINTS AS LOCATED AND SPECIFIED AS SOON AS CURING PERMITS.
   - 1.3. COVER NEW PAVING WITH HESSIAN AND BLACK PLASTIC SHEETS TAPED AT JOINTS ON COMPLETION OF SAWCUTTING. NOTE COVERING IS TO EXTENT MIN 5m BEYOND PAVEMENT BEING CURED. OVER ADJOINING (EXISTING) PAVEMENT AREAS, MAINTAIN CURING AS SPECIFIED.

CONCRETE PAVEMENTS

1. THIS SECTION REFERS TO CIVIL CONCRETE WORKS AND DOES NOT INCLUDE STRUCTURAL ELEMENTS SUCH AS BUILDINGS, BELOW GROUND STRUCTURES OR RETAINING WALLS.
2. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
3. CONCRETE QUALITY AND REINFORCING COVER
   ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	CONCRETE STRENGTH f'c (MPa)	SPECIFIED SLUMP	NOMINAL AGGREGATE SIZE	MAX. 56 DAY DRYING SHRINKAGE	COVER (mm)
KERBS AND PATHS	25	60	20	650microns	TOP 40
PITS AND VEHICULAR PAVEMENTS	32	80	20	650microns	TOP 40

4. CONCRETE PROPERTIES SHALL BE VARIED FROM NORMAL CLASS AS FOLLOWS
   - 4.1. MINIMUM CEMENT CONTENT 250 kg/m³
   - 4.2. MAXIMUM 56 DAY SHRINKAGE STRAIN = AS NOMINATED ABOVE
   - 4.3. PRIOR TO COMMENCEMENT CONCRETE SUPPLIER TO PROVIDE DRYING SHRINKAGE TEST RESULTS FROM PRODUCTION ASSESSMENT AS EVIDENCE THAT SPECIFIED DRYING SHRINKAGE LIMITS CAN BE ACHIEVED USING NORMAL MIX DESIGN.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS. PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL.
7. PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379. TEST CYLINDERS ARE TO BE KEPT ON SITE.
8. ALL COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE CIVIL ENGINEER FOR REVIEW.
9. ALL CONCRETE IS TO BE CONTINUOUSLY CURED FOR A MINIMUM PERIOD OF 10 DAYS AFTER PLACING . CURING TO COMMENCE IMMEDIATELY AFTER FINISHING. SPRAY ON CURING COMPOUNDS TO COMPLY WITH AS3799.
10. PLACE CONCRETE CONTINUOUSLY BETWEEN CONSTRUCTION JOINTS SHOWN ON PLAN. DO NOT BREAK OR INTERRUPT SUCCESSIVE POURS SUCH THAT COLD JOINTS OCCUR. ANY REVISIONS OR ADDITIONS TO CONSTRUCTION JOINTS SHOWN ON PLAN REQUIRE APPROVAL FROM THE CIVIL ENGINEER.
11. FALLS IN SLAB AS SHOWN ON PLAN MAINTAIN MINIMUM SLAB THICKNESS AS SHOWN.
12. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY THE DESIGN ENGINEER.
13. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS.
14. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:

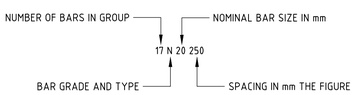


FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS1304.

15. POLYETHYLENE SHEET SHALL BE PLACED BELOW ALL CONCRETE PAVEMENTS.
16. ALL PENETRATIONS TO HAVE 2/N12 TRIMMER BARS TOP AND BOTTOM TO EACH FACE U.N.O. EXTEND TRIMMERS 700 BEYOND PENETRATION. MAINTAIN 40mm COVER TOP AND BOTTOM.
17. FORMWORK CLASS SHALL BE IN ACCORDANCE WITH AS3600.
18. SURFACE FINISHES:

ELEMENT	FORMWORK CLASS
STORMWATER PIT	OFF FORM
PAVEMENTS	MACHINE FLOAT / BROOM FINISH
KERBS	STEEL FLOAT / TROWEL

19. REINFORCEMENT SYMBOLS:
    - N DENOTES GRADE 450 N BARS TO AS1302 GRADE N
    - R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS1302
    - SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS1304



CONCRETE

1. CARRY OUT ALL CONCRETE WORK IN ACCORDANCE WITH AS3600 AND NATSPEC CONCRETE STANDARDS.
2. CONCRETE PROPERTIES AND COVER TO REINFORCING:

ELEMENT	CONCRETE STRENGTH f'c (MPa)	MAX. 56 DAY DRYING SHRINKAGE	COVER (mm)	
SLABS ON GROUND	32	650microns	TOP 40	BTM 40
TANK LID	40	700microns	TOP 40	BTM 40

   MAXIMUM AGGREGATE SIZE = 20mm U.N.O.
   SLUMP DURING PLACING = 75mm
   EXPOSURE CLASSIFICATION = B1
   NO ADMIXTURES SHALL BE USED IN CONCRETE MIX UNLESS APPROVED BY STRUCTURAL ENGINEER IN WRITING.
3. CONCRETE PROPERTIES FOR SLABS AND BEAMS SHALL BE VARIED FROM NORMAL CLASS AS FOLLOWS:
   - MINIMUM CEMENT CONTENT 250kg/cu.m.
   - PRIOR TO COMMENCEMENT CONCRETE SUPPLIER TO PROVIDE DRYING SHRINKAGE TEST

   RESULTS FROM PRODUCTION ASSESSMENT AS EVIDENCE THAT SPECIFIED DRYING SHRINKAGE LIMITS CAN BE ACHIEVED USING NORMAL MIX DESIGN.
4. SUBMIT FOR APPROVAL THE FOLLOWING TO THE STRUCTURAL ENGINEER:
   - CURING PROCEDURE (PVA MEMBRANES NOT PERMITTED)
   - STRIPPING PROCEDURE
   - DETAILS AND LOCATION OF CAST IN SERVICES
   - CONDUITS, PENETRATIONS AND CONSTRUCTION JOINT LOCATIONS
5. ALL CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNISED TESTING LAB AND SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER.
6. ALL COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW.
7. PROJECT CONTROL TESTING SHALL BE CARRIED OUT ON ALL CONCRETE IN ACCORDANCE WITH AS1379. TEST CYLINDERS ARE TO BE KEPT ON SITE.
8. ALL CONCRETE IS TO BE CONTINUOUSLY CURED FOR A MINIMUM PERIOD OF 10 DAYS AFTER PLACING. CURING TO COMMENCE IMMEDIATELY AFTER FINISHING. SPRAY ON CURING COMPOUNDS TO COMPLY WITH AS3799.
9. FOR TENDER PURPOSES ASSUME MINIMUM STRIPPING TIMES AND EXTENT OF BACK PROPPING AS PER AS3610-1995 SECTION 5.0 AND AS PER GENERAL NOTES FOR FORMWORK AND PROPPING.
10. FORMWORK FINISH CLASSIFICATION TO AS3600:

ELEMENT	CLASS
- INGROUND FOOTINGS	5
- RETAINING WALLS	5 EARTH FACE
- RETAINING WALLS	3 EXPOSED FACE
- COLUMNS	2
- BEAMS AND SLABS	2

11. SURFACE FINISHES:
    - COLUMNS AND WALLS OFF FORM
12. COMPACT ALL CONCRETE INCLUDING FOOTINGS AND SLABS, USING MECHANICAL VIBRATORS.
13. PLACE CONCRETE CONTINUOUSLY BETWEEN CONSTRUCTION JOINTS SHOWN ON PLAN. DO NOT BREAK OR INTERRUPT SUCCESSIVE POURS SUCH THAT COLD JOINTS OCCUR. ANY REVISIONS OR ADDITIONS TO CONSTRUCTION JOINTS SHOWN ON PLAN REQUIRE APPROVAL FROM THE STRUCTURAL ENGINEER.
14. CONCRETE PROFILES:
    - BEAM DEPTHS ARE WRITTEN FIRST AND INCLUDE THE SLAB THICKNESS.
    - SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
    - NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN SHOWN IN THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
    - PROVIDE DRIP GROOVES AT ALL EXPOSED EDGES, CHAMFERS, DRIP GROOVES, REGLETS ETC TO BE TO ARCHITECTS DETAILS.
15. ALL PENETRATIONS TO HAVE 2-N16 TRIMMER BARS TOP AND BOTTOM TO EACH FACE U.N.O. EXTEND TRIMMERS 600 BEYOND PENETRATION.
16. SETDOWNS OR FALLS IN FLOOR SURFACES ARE NOT PERMITTED UNLESS SHOWN ON DRAWINGS. MAINTAIN MINIMUM SLAB THICKNESS SHOWN ON PLAN WHERE FALLS OCCUR.

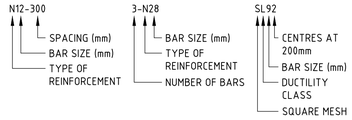
CONCRETE (cont)

17. REINFORCEMENT GRADE AND NOTATION:

SYMBOL	BAR SHAPE	STRENGTH GRADE (MPa)	DUCTILITY CLASS	TO COMPLY WITH AUST. STANDARD
N	DEFORMED RIB BAR	500	NORMAL	AS4671
R	PLAIN ROUND BAR	250	NORMAL	AS4671
RL	RECTANGULAR MESH OF DEFORMED RIB BAR	500	LOW	AS4671
SL	SQUARE MESH OF DEFORMED RIB BAR	500	LOW	AS4671
L-TM	TRENCH MESH	500	LOW	AS4671

   ALL REINFORCING BARS SHALL BE GRADE D500N TO AS4671 AND ALL MESH SHALL BE GRADE 500L TO AS4671 U.N.O. CLASS L REINFORCEMENT SHALL NOT BE USED U.N.O.

   REINFORCEMENT LABELS:



18. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY, AND NOT NECESSARILY IN TRUE PROJECTION. BARS SHOWN ARE INDICATIVE ONLY AND LENGTHS MAY VARY. BEAM ELEVATIONS TAKE PRECEDENCE OVER SECTIONS. SLAB PLANS TAKE PRECEDENCE OVER SECTIONS. REFER TO SECTIONS FOR EXTRA BARS THAT MAY BE REQUIRED.
19. USE ONLY ALL PLASTIC OR CONCRETE CHAIRS AT EXTERNAL SURFACES.
20. SITE BENDING OF REINFORCEMENT BARS SHALL BE DONE WITHOUT HEATING USING A RE-BENDING TOOL. THE BARS SHALL BE RE-BENT AGAINST A FLAT SURFACE OR A PIN WITH A DIAMETER NOT LESS THAN THE MINIMUM PIN SIZE PRESCRIBED IN AS3600-2001.
21. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN ON THE STRUCTURAL DRAWINGS OR IN POSITIONS OTHERWISE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER. LAPS SHALL BE IN ACCORDANCE WITH AS3600 SECTION 13 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR.
22. FOR LAPS IN MESH REFER TO SLAB ON GROUND NOTES.
23. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE STRUCTURAL ENGINEER
24. AT EXTERNALLY EXPOSED SURFACES NO METALLIC ITEMS INCLUDING FORM BOLTS, FORM SPACERS, METALLIC BAR CHAIRS AND TIE WIRE ARE TO BE PLACED IN THE COVER ZONE.
25. ALL REINFORCEMENT, ANCHOR BOLTS AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION AND INSPECTED BY THE STRUCTURAL ENGINEER PRIOR TO PLACING CONCRETE.
26. HOLD DOWN BOLTS SHALL BE HOT DIPPED GALVANISED.
27. U.N.O, ALL MASONRY ANCHORS INTO CONCRETE SHALL BE RAMSET TRUBOLTS (LONGEST VERSION) OR APPROVED EQUIVALENT. BOLTS SHALL BE GALVANISED WHERE THEY ARE ADJOINING NON FERROUS OR PREPAINTED MEMBERS. PROVIDE STAINLESS STEEL BOLTS FOR ALL EXTERNAL CONDITIONS, OR WHERE EXPOSED TO THE WEATHER.

3D INFORMATION DISCLAIMER

THE 12D DESIGN FILE SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO USE IN THE CONSTRUCTION WORKS.

HARDCOPY/PDF PLANS AND DOCUMENTS TAKE PRECEDENCE OVER THE SUPPLIED ELECTRONIC INFORMATION AND ANY INCONSISTENCIES SHOULD IMMEDIATELY BE REPORTED TO NORTHROP CONSULTING ENGINEERS FOR VERIFICATION PRIOR TO USE BY THE CONTRACTOR.

NORTHROP CONSULTING ENGINEERS TAKES NO RESPONSIBILITY FOR USE OF NON-VERIFIED 3D DESIGN INFORMATION USED IN THE WORKS.

THE USE OF THE 3D MODEL INFORMATION SHALL CONSTITUTE ACKNOWLEDGMENT AND ACCEPTANCE OF THE ABOVE STATEMENTS BY THE RECIPIENT.

SAFETY IN DESIGN

THE FOLLOWING ITEMS HAVE BEEN IDENTIFIED AS SAFETY RISKS

S01 ELECTRICAL OVERHEAD

SEDIMENT BASIN MANAGEMENT

1. PRIOR TO ANY FORECAST WEATHER EVENT, LIKELY TO RESULT IN SEDIMENT LADEN RUNOFF ON THE SITE, ANY EXISTING DETENTION BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE.
2. ANY SEDIMENT LADEN WATER CAPTURED ON-SITE MUST BE TREATED TO ENSURE IT WILL ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES PRIOR TO ITS RELEASE FROM SITE. A SAMPLE OF THE RELEASED TREATED WATER MUST BE KEPT ON-SITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED.
3. NO ALUMINIUM BASED PRODUCTS MAY BE USED TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) ON-SITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT MUST HAVE DEMONSTRATED ABILITY TO USE SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO ANY APPROVAL.
4. THE CHEMICAL/AGENT (FLOCCULATING/COAGULANTS) USED IN TYPE D AND TYPE F BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS < 50mg/L, TURBIDITY < 60 NTU, 6.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
5. ALL MANUFACTURERS INSTRUCTIONS MUST BE FOLLOWED FOR THE USE OF ANY CHEMICALS/AGENTS USED ON-SITE, EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER.
6. SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) MUST BE PLACED SUCH THAT WATER ENTERING THE BASINS/SEDIMENT TRAP MIXES WITH THE CHEMICALS/AGENTS AND IS CARRIED INTO THE BASIN/TRAP.
7. ANY BASIN MUST BE DEWATERD AS SOON AS PRACTICAL, ONCE WATER CAPTURED IN THE BASIN ACHIEVES COUNCIL'S WATER QUALITY OBJECTIVES.
8. INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENT AND/OR WEEKLY. ENSURE THAT ALL SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL. ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES.

SEDIMENT BASIN SIZING

CONSTRAINT	VALUE
TOTAL DISTURBED AREA	2.3
SOIL TEXTURE GROUP	F
DESIGN RAINFALL DEPTH (DAYS)	5
DESIGN RAINFALL DEPTH (PERCENTILE)	80
X-DAY, Y-PERCENTILE RAINFALL EVENT	24.4
Cv	0.5
SETTLING ZONE VOLUME	281m³
SEDIMENT STORAGE VOLUME	141m³
TOTAL BASIN VOLUME	422m³

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ARCHITECT: TKDArchitects Tanner Kibble Denton
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NORTHROP
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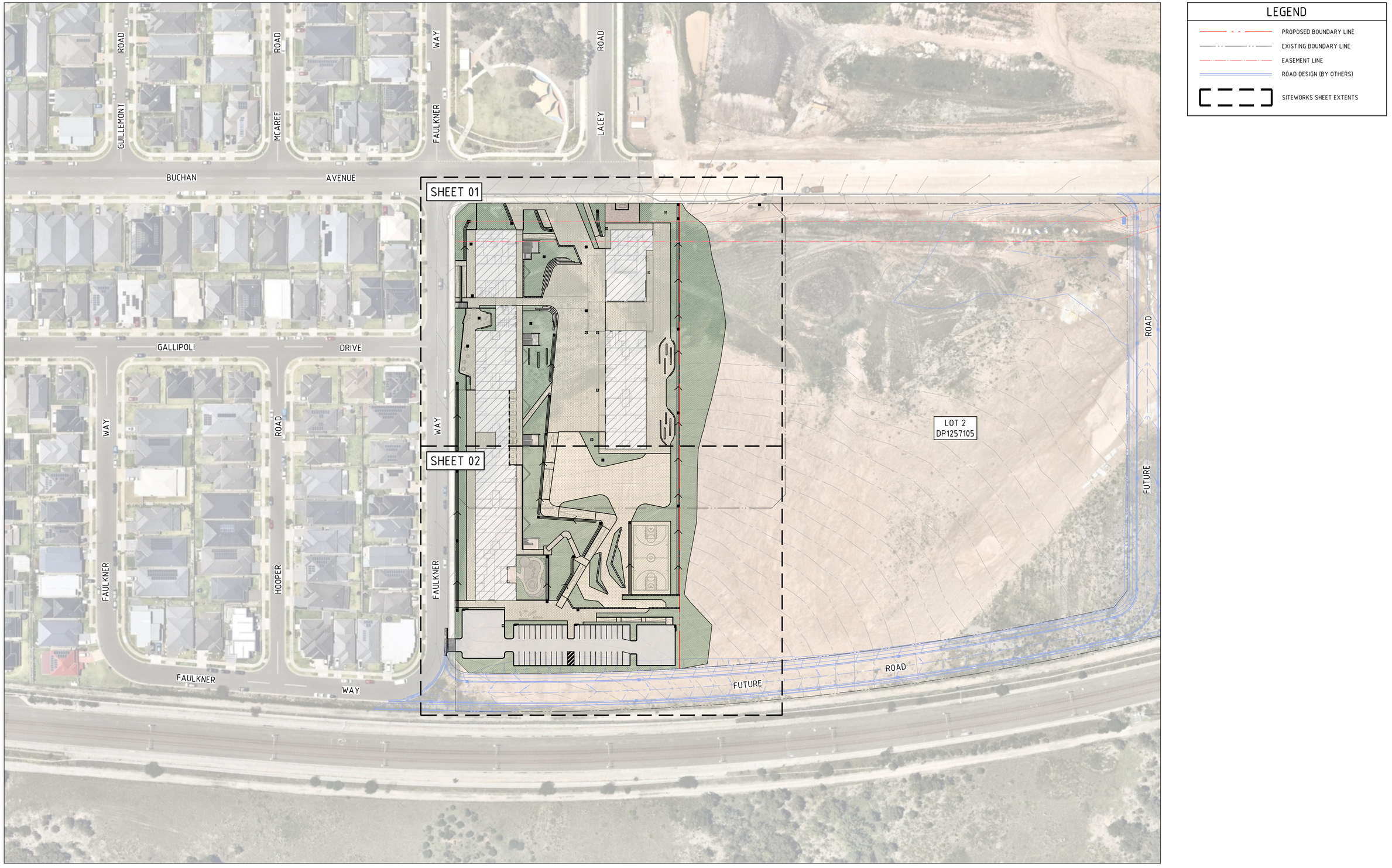
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT: NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE: CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
SPECIFICATION NOTES - SHEET 02

JOB NUMBER: 210040
DRAWING NUMBER: 0112
REVISION: A
DRAWING SHEET SIZE = A1



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- ROAD DESIGN (BY OTHERS)
- SITEWORKS SHEET EXTENTS

DRAWN: J. O
DESIGNED: T. BUGAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: .

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SCALE 1:800@A1 0 10 20 30 40m

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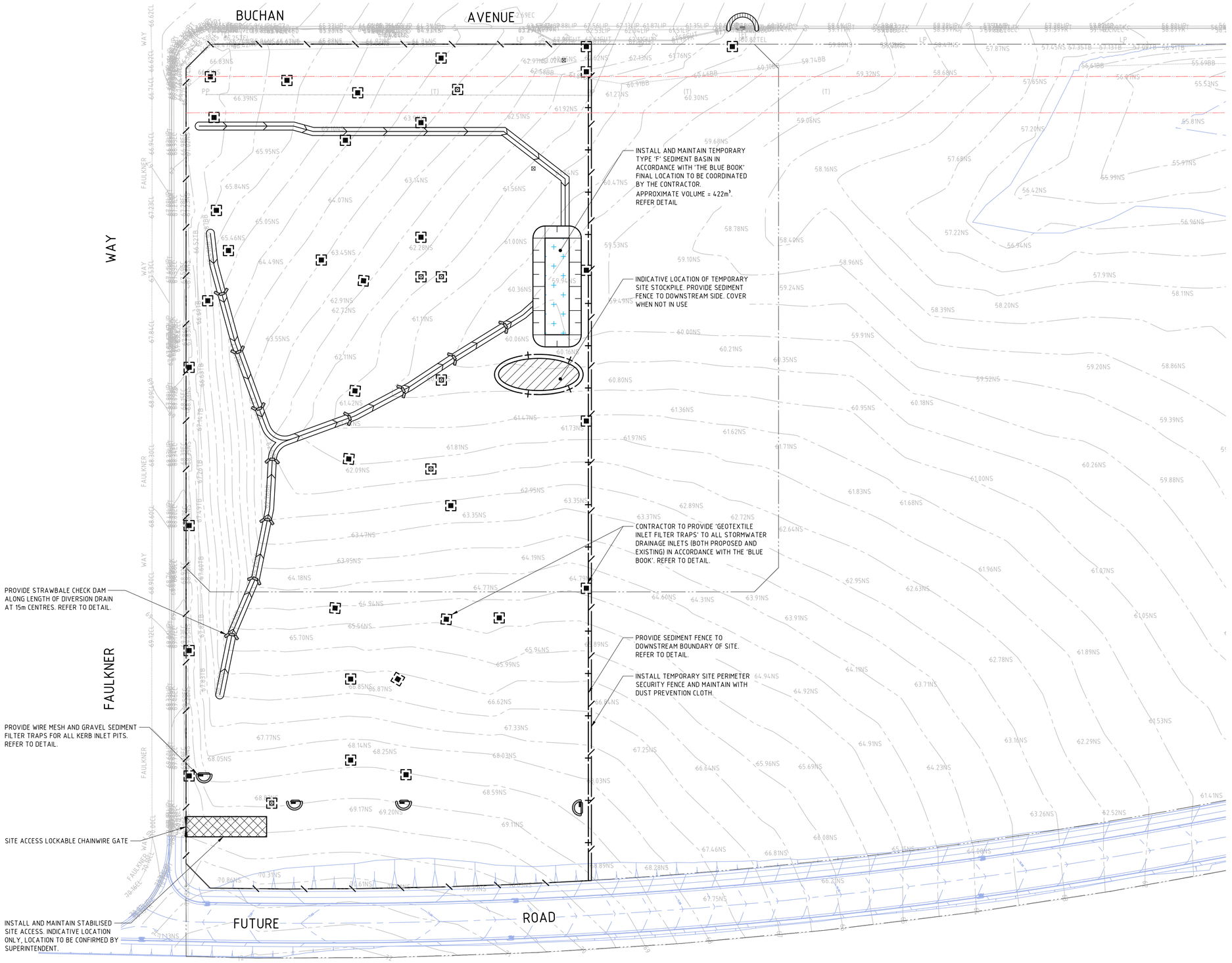
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

GENERAL ARRANAGEMENT PLAN

JOB NUMBER 210040
DRAWING NUMBER 0121
REVISION A
DRAWING SHEET SIZE = A1



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- EXISTING CONTOURS
- SEDIMENT FENCE
- SECURITY FENCE
- WIRE MESH AND GRAVEL SEDIMENT FILTER
- STRAW BALE CHECK DAM
- DROP INLET SEDIMENT TRAP
- DRAINAGE SWALE
- STABILISED SITE ACCESS
- STOCKPILE
- SEDIMENT BASIN

LEGEND

1. REFER SPECIFICATIONS NOTES FOR SEDIMENT AND SOIL EROSION CONTROL GENERAL REQUIREMENTS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3. ALL SEDIMENT AND SOIL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE 'BLUE BOOK'. CONTRACTOR TO ENSURE THESE MEASURES ARE IN PLACE AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION WORKS.
4. CONTRACTOR TO PROVIDE 'WIRE MESH AND GRAVEL SEDIMENT FILTER' TO ALL PAVED / ROAD AREAS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
5. CONTRACTOR TO PROVIDE 'GEOTEXTILE INLET FILTER TRAPS' TO ALL STORMWATER DRAINAGE INLETS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: -

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ARCHITECT
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PROJECT
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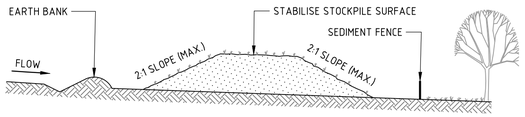
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

SEDIMENT AND SOIL EROSION CONTROL PLAN

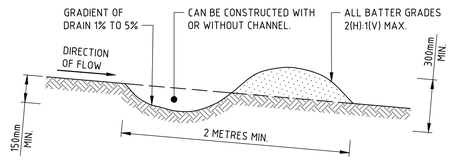
JOB NUMBER 210040
DRAWING NUMBER 0201
REVISION A
DRAWING SHEET SIZE = A1



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILE

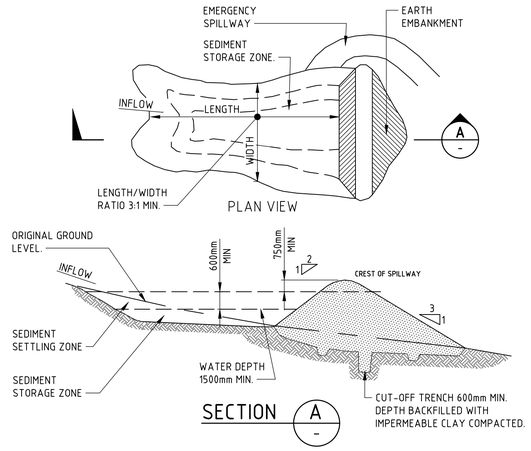


CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

NOTE: ONLY TO BE USED AS TEMPORARY BANK
WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

DRAINAGE SWALE

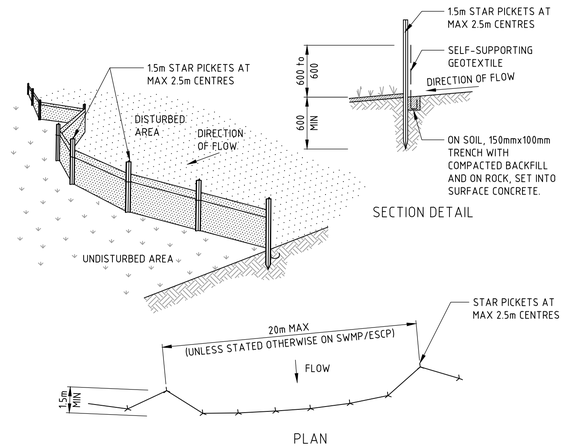


CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT-OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTRELINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

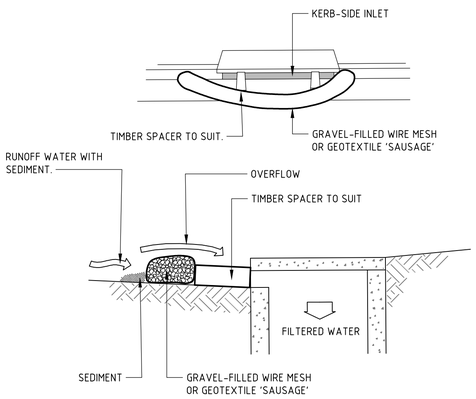
SEDIMENT BASIN



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

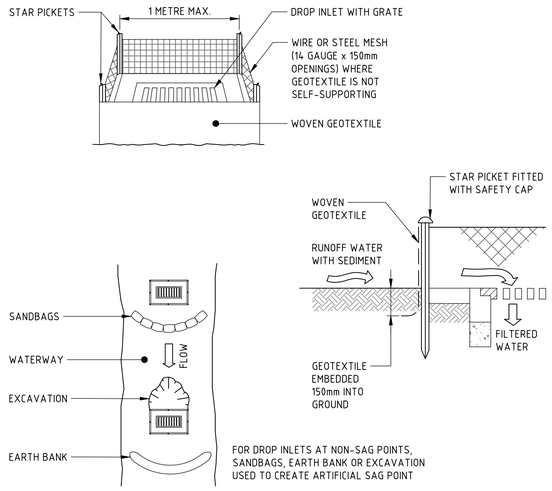


NOTE:THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

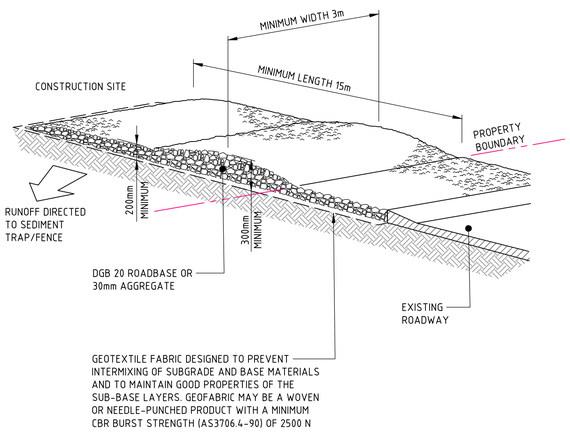
WIRE MESH AND GRAVEL SEDIMENT FILTER



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER TRAPS



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: -

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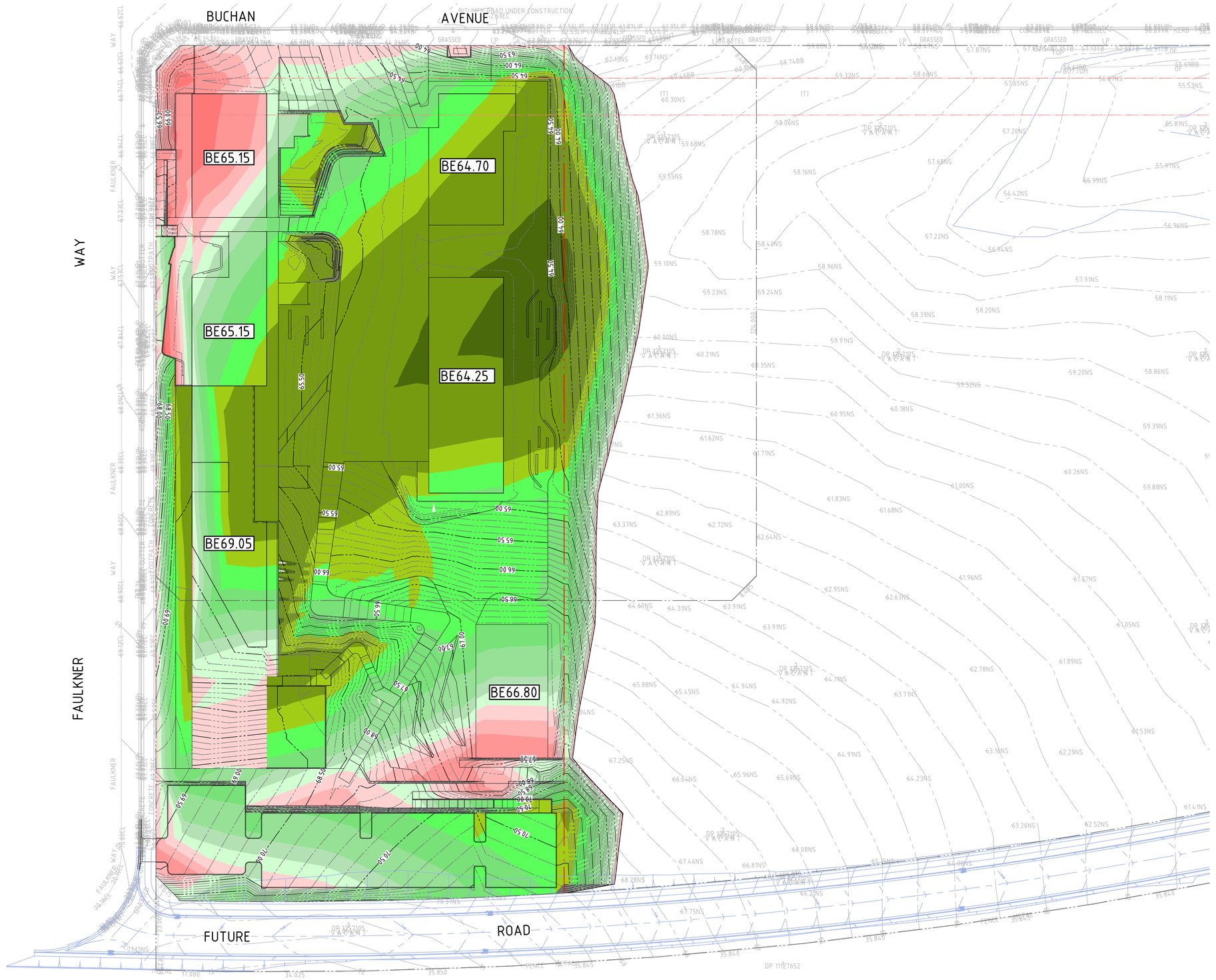
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

SEDIMENT AND SOIL EROSION CONTROL DETAILS

JOB NUMBER **210040**
DRAWING NUMBER **0211**
REVISION **A**
DRAWING SHEET SIZE = A1



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- PROPOSED BUILDING FOOTPRINT
- BEXX.XX — BULK EARTHWORKS PAD LEVEL
- XX.XX — CONTOURS
- XX.XX — EXISTING CONTOURS

DEPTH OF CUT

	- 5.00m TO - 4.00m
	- 4.00m TO - 2.5m
	- 2.50m TO - 2.00m
	- 2.00m TO - 1.50m
	- 1.50m TO - 1.00m
	- 1.00m TO - 0.50m
	- 0.50m TO - 0.25m
	- 0.25m TO - 0.00m

DEPTH OF FILL

	0.00m TO 0.25m
	0.25m TO 0.50m
	0.50m TO 1.00m
	1.00m TO 1.50m
	1.50m TO 2.00m
	2.00m TO 2.50m
	2.50m TO 4.00m
	4.00m TO 5.00m

GENERAL NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
2. CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).
3. NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
4. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE. CONTRACTOR IS TO ALLOW FOR REMOVAL OF ALL EXCESS MATERIAL GENERATED BY THE WORKS.
5. THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
6. BULK EARTHWORKS ARE BASED ON THE FOLLOWING DEPTHS FROM FINISHED SURFACE LEVELS;
   - 6.1. ASPHALT PAVEMENT (CARPARK) 550mm
   - 6.2. MODULAR BUILDINGS SLAB 750mm
   - 6.3. HALL SLAB 300mm
   - 6.4. HARDSCAPE (FOOTPATHS) 250mm
   - 6.5. LANDSCAPE PLANTING AREA 150mm
   - 6.6. LANDSCAPE TURFED AREA 75mm
   - 6.7. GAMES COURT AREA 250mm
7. APPROXIMATE BULK EARTHWORK VALUES AS FOLLOWS;
   - 7.1. CUT -1,109 cu.m
   - 7.2. FILL 38,726 cu.m
   - 7.3. BALANCE 37,618 cu.m (IMPORT)
   - 7.4. NOTE: NO SITE STRIPPING HAS BEEN ALLOWED FOR.
   - 7.5. TEMPORARY BATTERS BEYOND SITE BOUNDARY HAS BEEN EXCLUDED FROM BULK EARTHWORK VALUES.

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: -

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SCALE 1:500@ A1
0 5 10 15 20 25m

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PROJECT
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BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

BULK EARTHWORKS CUT TO FILL PLAN

JOB NUMBER **210040**

DRAWING NUMBER	REVISION
0301	A

DRAWING SHEET SIZE = A1

BUCHAN AVENUE

FAULKNER WAY

PROPOSED SUBSTATION

PROPOSED STORMFILTER CARTRIDGES CHAMBER (14x690mmCARTRIDGES)

PROPOSED SURCHARGE PIT. DESIGN SUBJECT TO COUNCILS APPROVAL

PROPOSED 20kL RAINWATER TANK

FFL65.90

FFL65.00

FFL65.90

FFL65.00

FOR CONTINUATION REFER TO SHEET 02

LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- PROPOSED KERB
- EXISTING KERB
- FUTURE DESIGN (BY OTHERS)
- SAWCUT AND PAVEMENT INFILL
- eXX — EXISTING KERB 'TYPE AS BELOW'
- KO — KERB ONLY
- KG — KERB AND GUTTER
- VC — VEHICULAR CROSSING
- RW — RETAINING WALL
- FFLXX.XX — FINISHED FLOOR LEVEL
- FSLXX.XX — FINISHED SURFACE LEVEL
- XX.XX — CONTOURS
- EXISTING CONTOURS
- DRAINAGE SWALE
- GRATED INLET PIT (NEW / EXTG)
- KERB INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
- GTD — GRATED TRENCH DRAIN
- STORMWATER PIPE
- RWT — RAINWATER HARVESTING TANK
- DRIVEWAY PAVEMENT
- CARPARK PAVEMENT - TYPE 1
- PLAYING COURT PAVEMENT - TYPE 2
- FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT)
- FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT)
- PLAYGROUND TURF (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)
- SUBSTATION SLAB
- LANDSCAPING (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)

DRAWN: J. O DESIGNED: T. BUGAEV JOB MANAGER: J. GILLIGAN VERIFIER: -

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A	ISSUED FOR SSDA	CP		JG	18.05.21

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SCALE 1:250@ A1 — 0 2 4 6 8 10 12m

NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01

JOB NUMBER 210040
DRAWING NUMBER 0401
REVISION A
DRAWING SHEET SIZE = A1

FOR CONTINUATION REFER TO SHEET 01

FAULKNER WAY

FFL69.80

FSL67.00

FUTURE ROAD

LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- PROPOSED KERB
- EXISTING KERB
- FUTURE DESIGN (BY OTHERS)
- SAWCUT AND PAVEMENT INFILL
- eXX — EXISTING KERB 'TYPE AS BELOW'
- KO — KERB ONLY
- KG — KERB AND GUTTER
- VC — VEHICULAR CROSSING
- RW — RETAINING WALL
- FFLXX.XX — FINISHED FLOOR LEVEL
- FSLXX.XX — FINISHED SURFACE LEVEL
- XX.XX — CONTOURS
- EXISTING CONTOURS
- DRAINAGE SWALE
- GRATED INLET PIT (NEW / EXTG)
- KERB INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
- GTD — GRATED TRENCH DRAIN
- STORMWATER PIPE
- RWT — RAINWATER HARVESTING TANK
- DRIVEWAY PAVEMENT
- CARPARK PAVEMENT - TYPE 1
- PLAYING COURT PAVEMENT - TYPE 2
- FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT)
- FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT)
- PLAYGROUND TURF (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)
- SUBSTATION SLAB
- LANDSCAPING (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)

DRAWN: J. O
DESIGNED: T. BUGAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: -

FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR CONSTRUCTION	CP	SH	SRF	11.10.18

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SCALE 1:250@A1 (0 2 4 6 8 10 12m)

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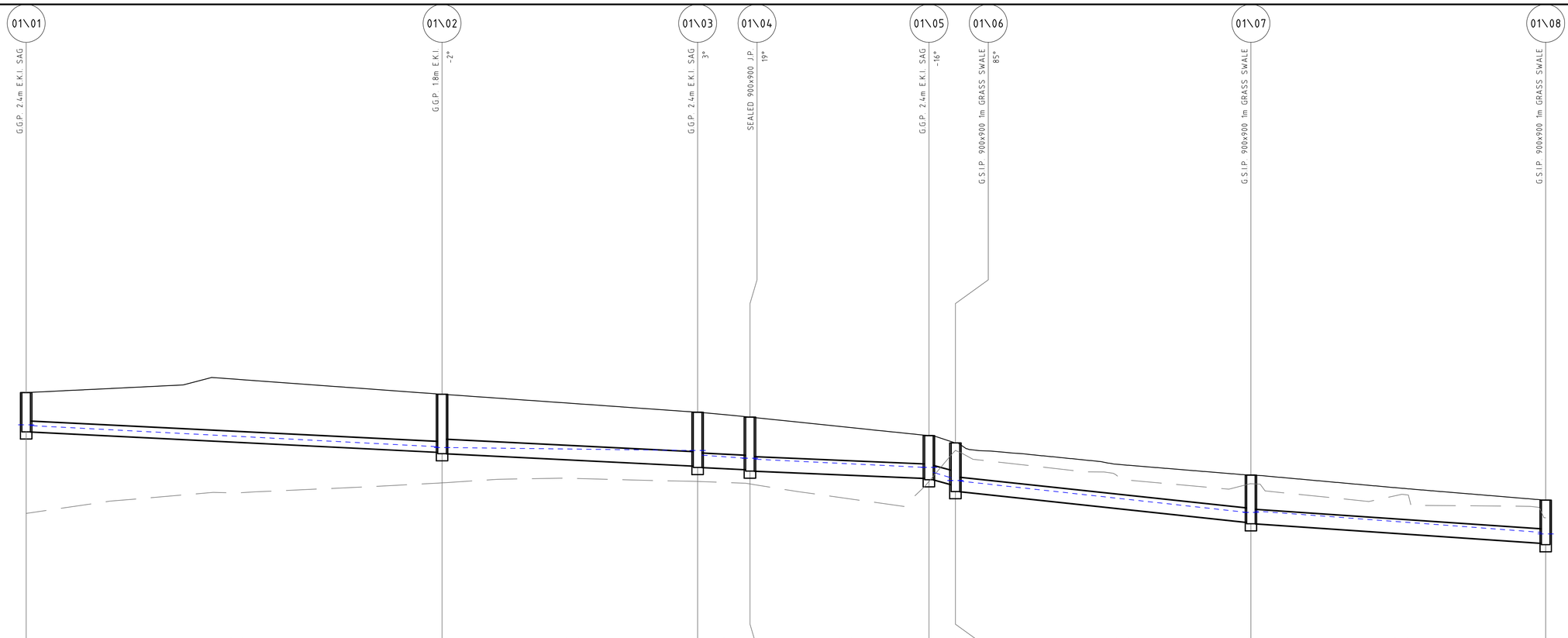
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

JOB NUMBER 210040
DRAWING NUMBER DAC04.02
REVISION A
DRAWING SHEET SIZE = A1



PIPE CLASS		UPVC	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC
PIPE GRADE (%)		1.0%	1.0%	1.0%	0.9%	5.4%	2.1%	1.4%
PIPE SIZE (mm)		225	300	300	300	300	300	300
MINIMUM COVER (m)		0.60	0.83	0.81	0.60	0.60	0.60	0.61
Vf - FULL PIPE VELOCITY (m/s)		Vf=0.99	Vf=0.88	Vf=1.23	Vf=1.24	Vf=2.11	Vf=1.91	Vf=1.77
Q - PIPE FLOW (L/s)		Q=23	Q=42	Q=80	Q=78	Q=113	Q=113	Q=114
DATUM RL		62.0						
H.G.L. (1% AEP)	70.197 70.181	69.736 69.719	69.719	69.657 69.657	69.559	69.494 69.494	69.474	69.301 69.301	69.197	69.081 69.024	69.014	68.354 68.354	68.383	67.933 67.933
FINISHED SURFACE	70.876	70.841		70.461		70.360		69.970		69.815		69.139		68.612
NATURAL SURFACE	68.332	68.975		69.005		68.952		69.007		69.657		68.958		68.239
PIPE INVERT LEVEL	70.049	69.620	69.590	69.330	69.300	69.254	69.224	69.071	69.041	68.939	68.791	68.144	68.114	67.704
DEPTH TO INVERT	0.827	1.220	1.250	1.131	1.161	1.105	1.135	0.899	0.929	0.877	1.024	0.994	1.024	0.908
CO-ORDINATED SETOUT	E301579.894 N6239426.861	E301543.016 N6239450.480		E301519.868 N6239464.205		E301515.378 N6239467.365		E301503.880 N6239482.274		E301501.631 N6239483.923		E301518.100 N6239510.324		E301534.543 N6239536.651
CHAINAGE	0.000	43.793		70.706		76.219		95.063		97.853		128.970		160.009

LINE 01

DRAWN: J.O
DESIGNED: T.BUGAEV
JOB MANAGER: J.GILLIGAN
VERIFIER: .

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR SSDA	CP		JG	18.05.21

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SCALE 1:250@A1 0 2 4 6 8 10 12m
SCALE 1:50@A1 0.0 0.5 1.0 1.5 2.0 2.5m

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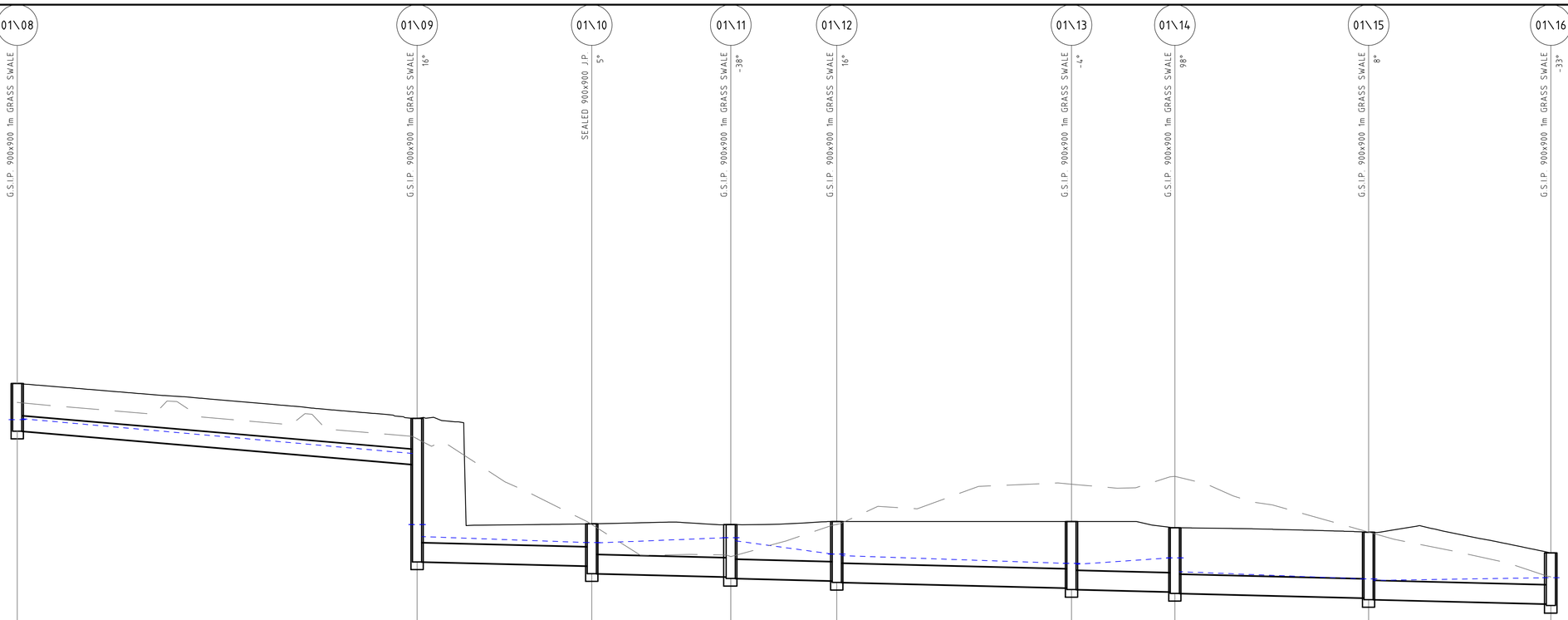
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
STORMWATER LONGITUDINAL SECTIONS - SHEET 01

JOB NUMBER 210040
DRAWING NUMBER 0421
REVISION A
DRAWING SHEET SIZE = A1



PIPE CLASS	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC	
PIPE GRADE (%)	1.7%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	
PIPE SIZE (mm)	300	375	375	375	375	375	375	375	
MINIMUM COVER (m)	0.60	0.35	0.60	0.68	0.81	0.89	0.91	0.64	
Vf - FULL PIPE VELOCITY (m/s)	Vf=1.96	Vf=1.16	Vf=1.04	Vf=1.04	Vf=1.08	Vf=1.11	Vf=1.13	Vf=1.32	
Q - PIPE FLOW (L/s)	Q=110	Q=115	Q=113	Q=115	Q=120	Q=122	Q=124	Q=132	
DATUM RL	59.0								
H.G.L. (1% AEP)	67.933 67.919	67.236 65.840	65.604	65.487 65.487	65.480	65.582 65.582	65.521	65.261 65.261	65.230
FINISHED SURFACE	68.612	67.924		65.855		65.841		65.900	
NATURAL SURFACE	68.239	67.525		65.840		65.212		65.843	
PIPE INVERT LEVEL	67.704 67.674	67.019 65.106		65.025 64.875		64.812 64.782		64.734 64.704	
DEPTH TO INVERT	0.908 0.938	0.905 2.818		0.830 0.979		1.029 1.059		1.166 1.196	
CO-ORDINATED SETOUT	E301534.543 N6239536.651	E301555.365 N6239569.956		E301568.029 N6239581.544		E301578.999 N6239589.401		E301581.740 N6239599.434	
CHAINAGE	160.009	199.304		216.472		230.131		240.549	

H.G.L. (1% AEP)									
FINISHED SURFACE									
NATURAL SURFACE									
PIPE INVERT LEVEL									
DEPTH TO INVERT									
CO-ORDINATED SETOUT	E301593.463 N6239619.299	E301598.042 N6239628.361		E301613.691 N6239617.528		E301626.966 N6239605.606			
CHAINAGE	263.616	273.774		292.812		310.726			

LINE 01

DESIGNED: T.BUGAEV
DRAWN: J.O
JOB MANAGER: J.GILLIGAN
VERIFIER: .

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SCALE 1:250@A1
SCALE 1:50@A1
0 2 4 6 8 10 12m
0.0 0.5 1.0 1.5 2.0 2.5m

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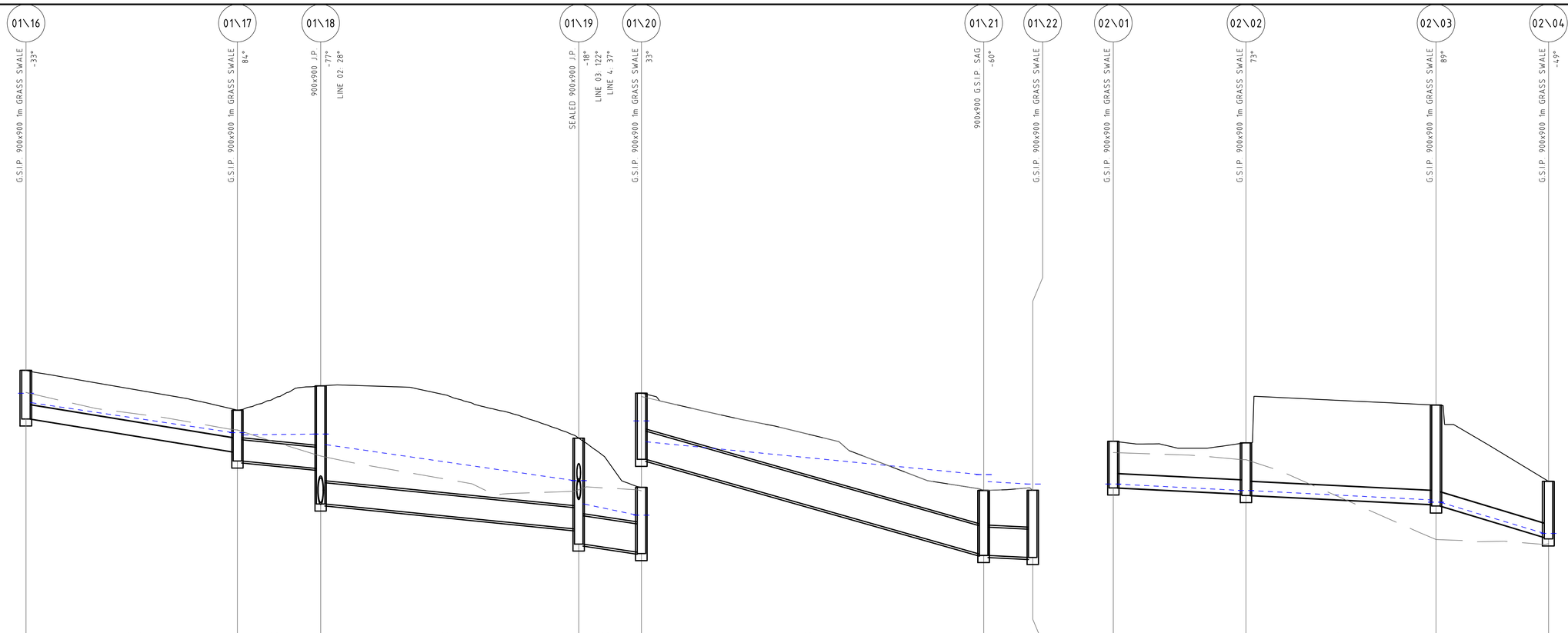
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
STORMWATER LONGITUDINAL SECTIONS - SHEET 02

JOB NUMBER 210040
DRAWING NUMBER 0422
REVISION A
DRAWING SHEET SIZE = A1



	01\16 – 01\17	01\17 – 01\18	01\18 – 01\19	01\19 – 01\20	01\20 – 01\21	01\21 – 01\22
PIPE CLASS	UPVC	RRJ2	RRJ2	RRJ2	RRJ2	RRJ2
PIPE GRADE (%)	3.3%	2.0%	2.0%	3.0%	5.7%	1.0%
PIPE SIZE (mm)	300	450	450	600	600	600
MINIMUM COVER (m)	0.60	0.60	1.50	0.75	0.60	0.74
Vf - FULL PIPE VELOCITY (m/s)	Vf=2.35	Vf=1.90	Vf=2.58	Vf=2.78	Vf=2.73	Vf=1.02
Q - PIPE FLOW (L/s)	Q=146	Q=162	Q=408	Q=766	Q=771	Q=290

	01\16	01\17	01\18	01\19	01\20	01\21	01\22
DATUM RL	56.0				54.0		
H.G.L. (1% AEP)	64.796 64.796 64.599	63.961 63.961 63.913	63.931 63.931 63.709	62.943 62.943 62.451	62.210 62.210 61.767	61.072 61.072 60.921	60.870 60.870 60.870
FINISHED SURFACE	65.283	64.437	64.953	63.845	62.799	60.734	60.738
NATURAL SURFACE	64.812	64.017	63.466	62.750	62.726	60.734	60.738
PIPE INVERT LEVEL	64.281 64.251	63.550 63.360	63.201 62.447	61.918 61.597	61.424 61.394	59.385 59.355	59.312 59.312
DEPTH TO INVERT	1.002 1.032	0.886 1.077	1.752 2.506	1.927 2.248	1.375 1.405	1.350 1.380	1.426 1.426
CO-ORDINATED SETOUT	E301626.966 N6239605.606	E301649.094 N6239601.951	E301648.388 N6239593.162	E301674.611 N6239585.356	E301681.194 N6239585.253	E301711.955 N6239566.071	E301716.515 N6239568.582
CHAINAGE	310.726	333.156	341.985	369.363	376.014	412.323	417.529

LINE 01

	02\01 – 02\02	02\02 – 02\03	02\03 – 02\04
PIPE CLASS	UPVC	UPVC	UPVC
PIPE GRADE (%)	1.0%	1.0%	6.0%
PIPE SIZE (mm)	300	300	300
MINIMUM COVER (m)	0.60	0.82	0.94
Vf - FULL PIPE VELOCITY (m/s)	Vf=0.81	Vf=1.07	Vf=2.16
Q - PIPE FLOW (L/s)	Q=12	Q=23	Q=34

	02\01	02\02	02\03	02\04
DATUM RL	61.0			
H.G.L. (1% AEP)	67.871 67.868	67.733 67.733 67.731	67.533 67.484 67.483	66.822 66.822
FINISHED SURFACE	68.777	68.744	69.546	67.927
NATURAL SURFACE	68.538	68.386	66.693	66.602
PIPE INVERT LEVEL	67.788	67.656 67.626	67.434 67.404	66.737
DEPTH TO INVERT	0.989	1.088 1.118	2.112 2.142	1.190
CO-ORDINATED SETOUT	E301547.369 N6239455.532	E301537.820 N6239465.847	E301548.245 N6239483.099	E301558.289 N6239476.852
CHAINAGE	-100.937	-86.862	-66.705	-54.767

LINE 02

VERIFIER: .
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR SSDA	CP		JG	18.05.21

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SCALE 1:250@ A1 0 2 4 6 8 10 12m
SCALE 1:50@ A1 0.0 0.5 1.0 1.5 2.0 2.5m

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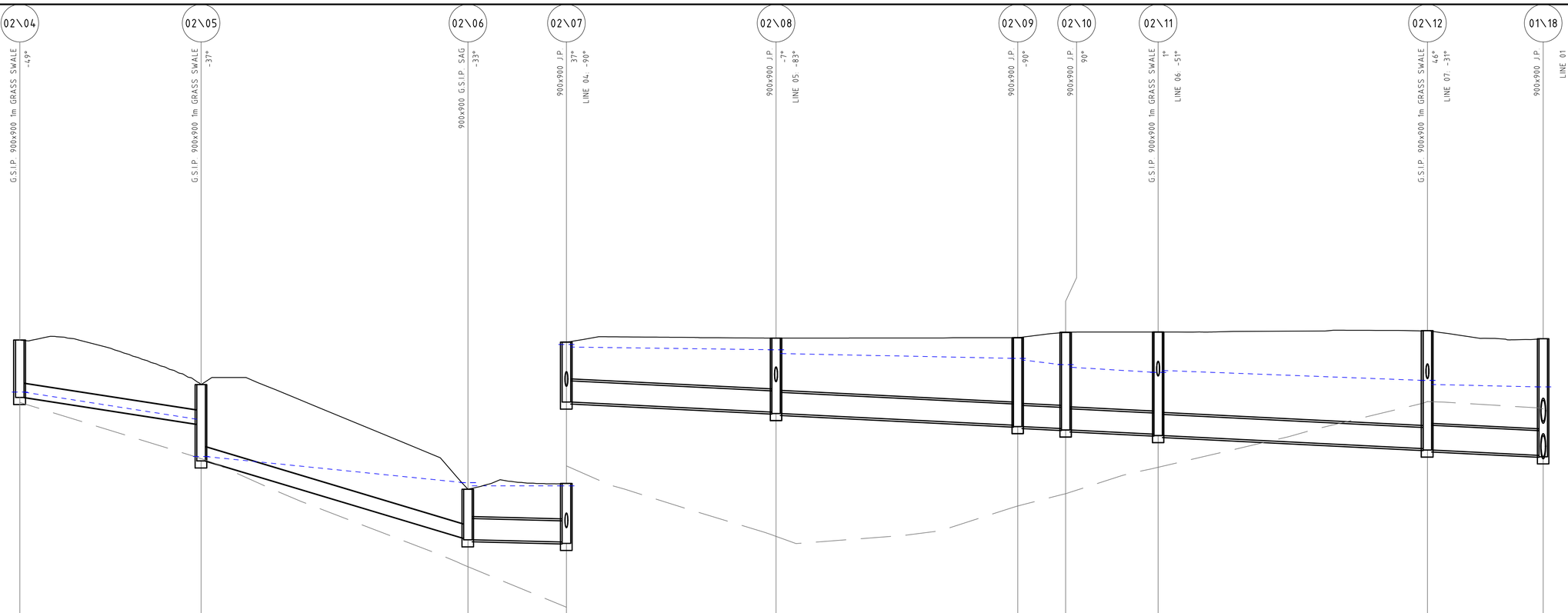
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE,
EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

STORMWATER LONGITUDINAL SECTIONS - SHEET 03

JOB NUMBER 210040
DRAWING NUMBER 0423
REVISION A
DRAWING SHEET SIZE = A1



PIPE CLASS	UPVC	UPVC	RRJ2	RRJ2	RRJ2	RRJ2	RRJ2	RRJ2	RRJ2	RRJ2	
PIPE GRADE (%)	3.1%	6.0%	0.5%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
PIPE SIZE (mm)	300	300	450	450	450	450	450	450	450	525	
MINIMUM COVER (m)	0.60	0.83	0.60	0.79	1.11	1.40	1.58	1.71	1.85		
Vf - FULL PIPE VELOCITY (m/s)	Vf=1.94	Vf=1.59	Vf=1.03	Vf=1.41	Vf=1.32	Vf=1.34	Vf=1.47	Vf=1.56	Vf=1.48		
Q - PIPE FLOW (L/s)	Q=46	Q=49	Q=104	Q=158	Q=174	Q=195	Q=197	Q=222	Q=245		
DATUM RL	58.0			55.0							
H.G.L. (1% AEP)	66.822 66.822 66.820	66.245 65.454 65.454	64.900 64.900 64.832	64.831 64.831 64.777	64.720 64.720 64.639	64.537 64.537 64.504	64.403 64.403 64.349	64.241 64.241 64.280	64.069 64.069 63.983	63.931 63.931 63.709	
FINISHED SURFACE	67.927	66.980	64.760	64.882	64.967	64.974	65.089	65.096	65.126	64.953	
NATURAL SURFACE	66.602	65.409	63.116	62.255	60.760	61.405	61.666	62.226	63.620	63.466	
PIPE INVERT LEVEL	66.737 66.707	66.138 65.362	63.717 63.687	63.640 63.610	63.396 63.366	63.119 63.089	63.047 63.017	62.928 62.898	62.621 62.591	62.477 62.447	
DEPTH TO INVERT	1.190 1.220	0.842 1.618	1.043 1.073	1.242 1.272	1.570 1.600	1.855 1.885	2.042 2.072	2.168 2.198	2.505 2.535	2.476 2.506	
CO-ORDINATED SETOUT	E301558.289 N6239476.852	E301576.388 N6239483.084	E301592.274 N6239506.428	E301592.918 N6239516.770	E301606.819 N6239534.121	E301620.417 N6239555.856	E301636.098 N6239558.540	E301621.283 N6239566.868	E301636.350 N6239590.995	E301648.388 N6239593.162	
CHAINAGE	-54.767	-35.537	-7.230	3.218	25.453	51.092	56.176	65.987	94.556	106.838	

VERIFIER: -
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

LINE 02

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A	ISSUED FOR SSDA	CP		JG	18.05.21

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0 2 4 6 8 10 12m
0.0 0.5 1.0 1.5 2.0 2.5m

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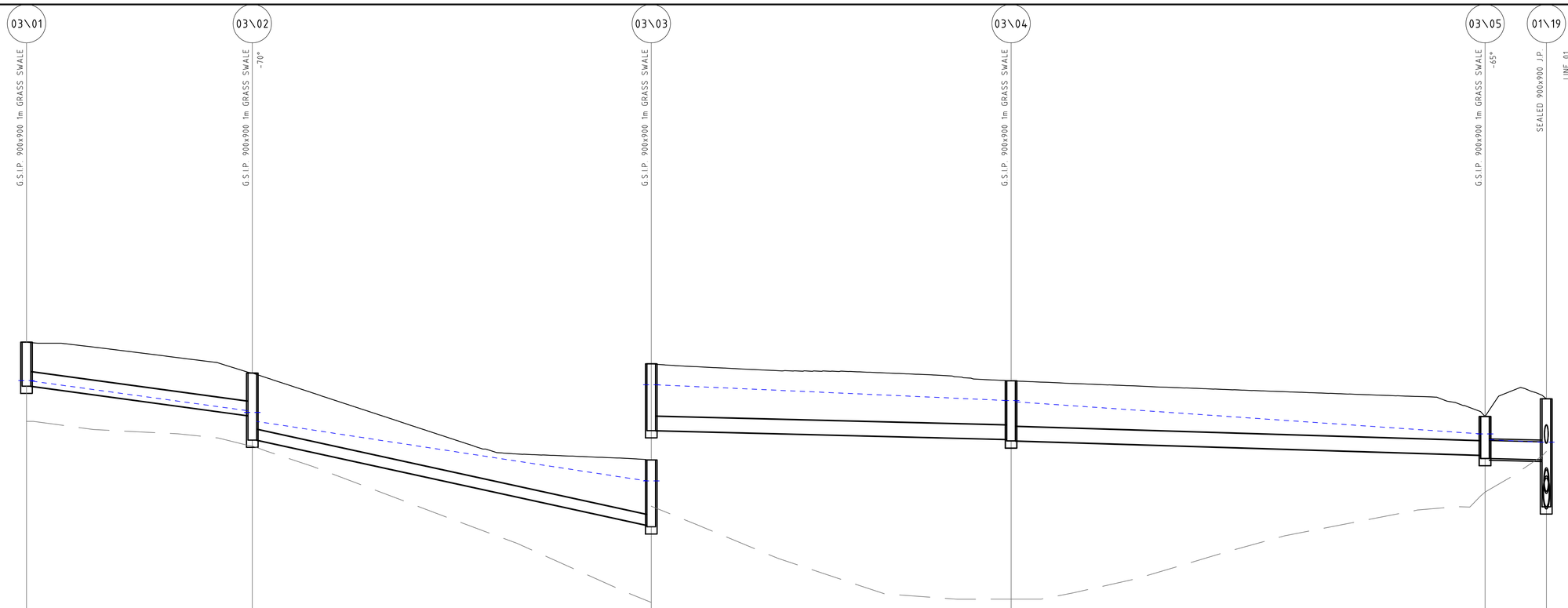
DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
STORMWATER LONGITUDINAL SECTIONS - SHEET 04

JOB NUMBER 210040
DRAWING NUMBER 0424
REVISION A
DRAWING SHEET SIZE = A1



PIPE CLASS	UPVC	UPVC	UPVC	UPVC	UPVC	RRJ2
PIPE GRADE (%)	2.7%	4.4%	0.5%	0.6%	0.5%	
PIPE SIZE (mm)	300	225	300	300	375	
MINIMUM COVER (m)	0.60	0.60	0.92	0.60	0.60	
Vf - FULL PIPE VELOCITY (m/s)	Vf=1.63	Vf=1.88	Vf=1.30	Vf=1.56	Vf=1.29	
Q - PIPE FLOW (L/s)	Q=36	Q=74	Q=92	Q=110	Q=129	
DATUM RL	57.0		55.0			
H.G.L. (1% AEP)	66.223 66.216	65.596 65.562 65.374	64.136 64.136 64.136	63.809 63.809 63.782	63.115 63.115 62.993	62.943 62.943 62.451
FINISHED SURFACE	67.023	66.380	64.573	64.219	63.477	63.845
NATURAL SURFACE	65.375	64.863	61.609	59.677	61.904	62.750
PIPE INVERT LEVEL	66.108	65.492 64.985	63.212 63.182	62.999 62.969	62.671 62.602	62.575 61.597
DEPTH TO INVERT	0.915	0.888 1.396	1.361 1.391	1.220 1.250	0.806 0.875	1.270 2.248
CO-ORDINATED SETOUT	E301586.999 N6239476.076	E301609.957 N6239471.195	E301631.944 N6239506.407	E301651.777 N6239538.162	E301677.874 N6239579.961	E301674.611 N6239585.356
CHAINAGE	-58.325	-34.826	6.686	44.127	93.445	99.823

LINE 03

VERIFIER: .
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

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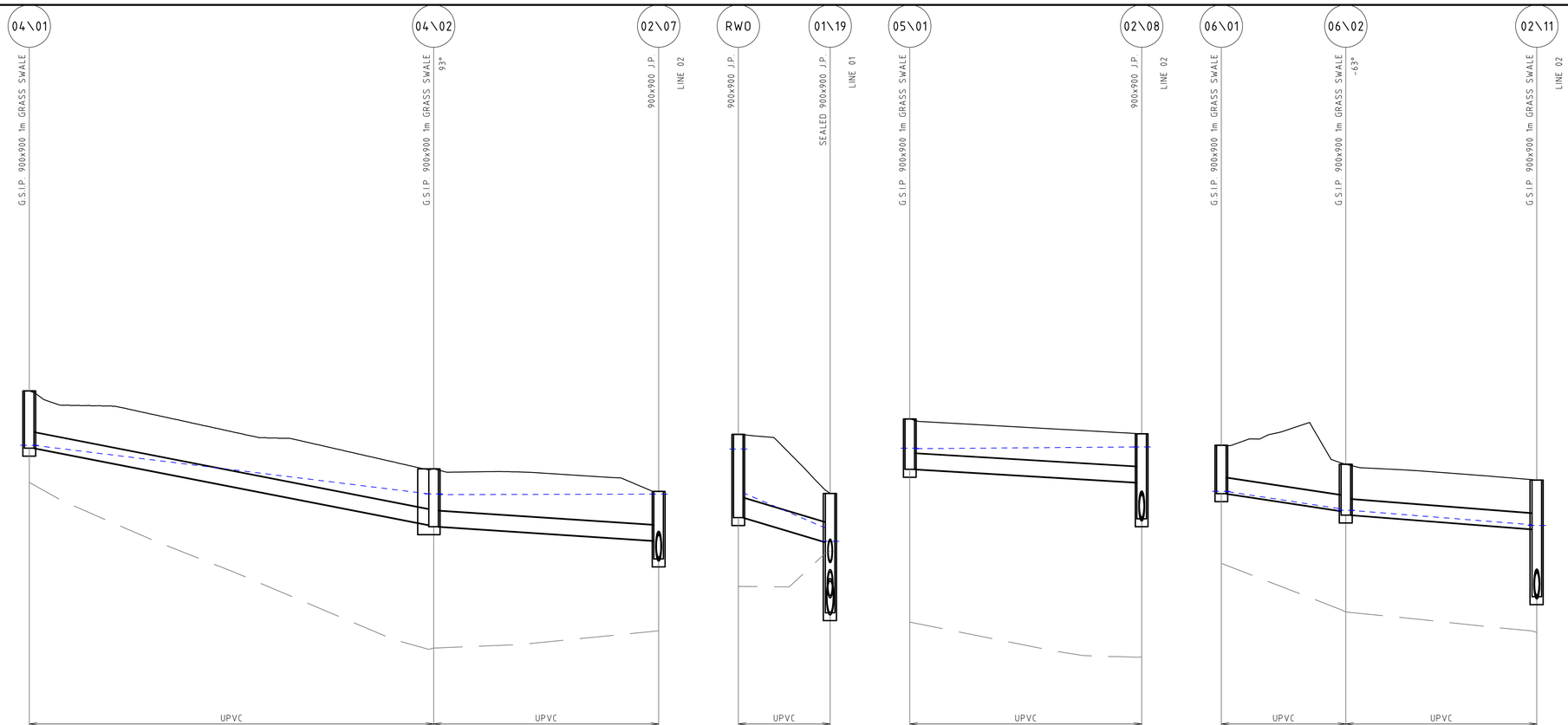
SCALE 1:250@A1
SCALE 1:50@A1
0 2 4 6 8 10 12m
0.0 0.5 1.0 1.5 2.0 2.5m

NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
STORMWATER LONGITUDINAL SECTIONS - SHEET 05

JOB NUMBER 210040
DRAWING NUMBER 0425
REVISION A
DRAWING SHEET SIZE = A1



LINE 04

	04\01 – 04\02	04\02 – 02\07
PIPE CLASS	UPVC	UPVC
PIPE GRADE (%)	3.9%	1.3%
PIPE SIZE (mm)	300	300
MINIMUM COVER (m)	0.60	0.62
Vf - FULL PIPE VELOCITY (m/s)	Vf=1.24	Vf=1.21
Q - PIPE FLOW (L/s)	Q=14	Q=50

DATUM RL 57.0

	04\01	04\02	02\07
H.G.L. (1% AEP)	65.751 65.750	64.836 64.836 64.821	64.831 64.831 64.777
FINISHED SURFACE	66.775	65.307	64.882
NATURAL SURFACE	65.054	61.931	62.255
PIPE INVERT LEVEL	65.696	64.246 64.216	63.950 63.610
DEPTH TO INVERT	1.079	1.061 1.091	0.932 1.272
CO-ORDINATED SETOUT	E301554.426 N6239500.077	E301576.414 N6239530.056	E301592.918 N6239516.770
CHAINAGE	-38.078	-0.000	21.187

LINE 4

	RWO – 01\19
PIPE CLASS	UPVC
PIPE GRADE (%)	6.0%
PIPE SIZE (mm)	375
MINIMUM COVER (m)	0.60
Vf - FULL PIPE VELOCITY (m/s)	Vf=3.44
Q - PIPE FLOW (L/s)	Q=338

DATUM RL 56.0

	RWO	01\19
H.G.L. (1% AEP)	64.680 63.857	63.193 62.943 62.451
FINISHED SURFACE	64.958	63.845
NATURAL SURFACE	62.092	62.750
PIPE INVERT LEVEL	63.389	62.924 61.597
DEPTH TO INVERT	1.569	0.920 2.248
CO-ORDINATED SETOUT	E301667.721 N6239580.293	E301674.611 N6239585.356
CHAINAGE	0.000	8.647

LINE 05

	05\01 – 02\08
PIPE CLASS	UPVC
PIPE GRADE (%)	1.2%
PIPE SIZE (mm)	300
MINIMUM COVER (m)	0.60
Vf - FULL PIPE VELOCITY (m/s)	Vf=0.87
Q - PIPE FLOW (L/s)	Q=26

DATUM RL 56.0

	05\01	02\08
H.G.L. (1% AEP)	64.696 64.687	64.720 64.720 64.639
FINISHED SURFACE	65.248	64.967
NATURAL SURFACE	61.420	60.760
PIPE INVERT LEVEL	64.299	64.049 63.366
DEPTH TO INVERT	0.949	0.918 1.600
CO-ORDINATED SETOUT	E301587.022 N6239543.328	E301606.819 N6239534.121
CHAINAGE	0.000	21.837

LINE 06

	06\01 – 06\02	06\02 – 02\11
PIPE CLASS	UPVC	UPVC
PIPE GRADE (%)	3.0%	1.6%
PIPE SIZE (mm)	300	300
MINIMUM COVER (m)	0.60	0.60
Vf - FULL PIPE VELOCITY (m/s)	Vf=1.12	Vf=1.20
Q - PIPE FLOW (L/s)	Q=7	Q=20

DATUM RL 57.0

	06\01	06\02	02\11
H.G.L. (1% AEP)	64.883 64.882	64.553 64.527 64.525	64.253 64.241 64.280
FINISHED SURFACE	65.751	65.394	65.096
NATURAL SURFACE	63.527	62.610	62.226
PIPE INVERT LEVEL	64.840	64.512 64.436	64.169 62.898
DEPTH TO INVERT	0.911	0.882 0.958	0.927 2.198
CO-ORDINATED SETOUT	E301597.318 N6239575.184	E301603.468 N6239565.259	E301621.283 N6239566.868
CHAINAGE	-11.776	-0.053	17.931

VERIFIER: .
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR SSDA	CP		JG	18.05.21

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ARCHITECT
TKDArchitects
Tanner Kibble Denton
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SCALE 1:250@ A1 0 2 4 6 8 10 12m
SCALE 1:50@ A1 0.0 0.5 1.0 1.5 2.0 2.5m

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PROJECT
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EDMONDSON PARK

BUCHAN AVENUE,
EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
- SCHEMATIC DESIGN

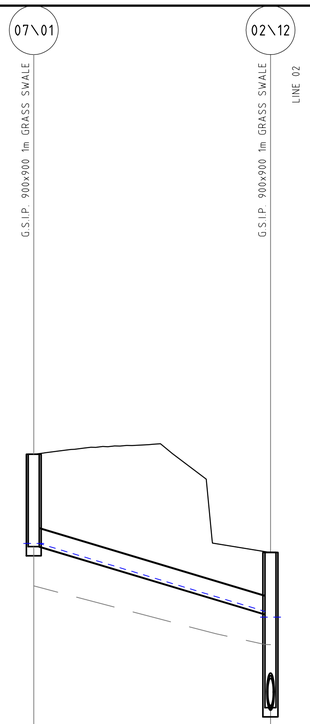
STORMWATER LONGITUDINAL
SECTIONS - SHEET 06

JOB NUMBER
210040

DRAWING NUMBER
0426

REVISION
A

DRAWING SHEET SIZE = A1



PIPE CLASS		UPVC	
PIPE GRADE (%)		6.0%	
PIPE SIZE (mm)		300	
MINIMUM COVER (m)		0.60	
Vf - FULL PIPE VELOCITY (m/s)		Vf=1.77	
Q - PIPE FLOW (L/s)		Q=14	
DATUM RL		57.0	
H.G.L. (1% AEP)	65.272 65.271		64.163 64.069 63.983
FINISHED SURFACE	66.727		65.126
NATURAL SURFACE	64.579		63.620
PIPE INVERT LEVEL	65.220		64.114 62.591
DEPTH TO INVERT	1.507		1.012 2.535
CO-ORDINATED SETOUT	E301618.122 N6239597.224		E301636.350 N6239590.995
CHAINAGE	0.000		19.325

LINE 07

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: .

NOT FOR CONSTRUCTION

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0.0 0.5 1.0 1.5 2.0 2.5m

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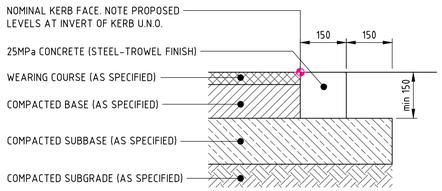
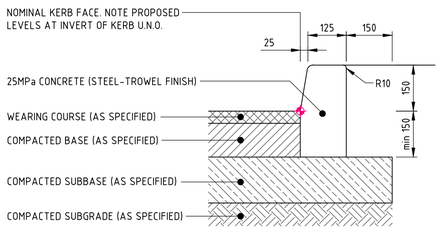
DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
STORMWATER LONGITUDINAL SECTIONS - SHEET 07

JOB NUMBER 210040
DRAWING NUMBER 0427
REVISION A
DRAWING SHEET SIZE = A1



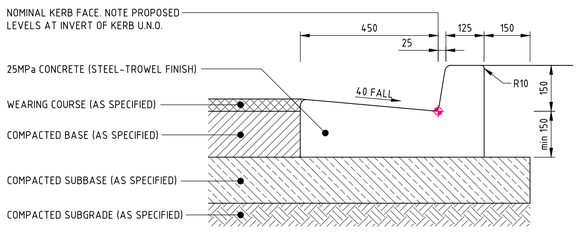
FLUSH KERB 'FK'

EXPANSION JOINTS @ MAX 12m CTRS / TOOL JOINTS @ MAX 3m CTRS
ALL RADII TO BE 5mm U.N.O.



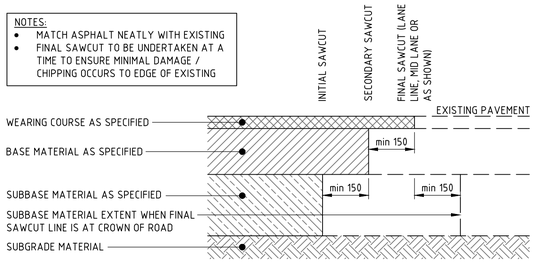
KERB ONLY 'KO'

EXPANSION JOINTS @ MAX 12m CTRS / TOOL JOINTS @ MAX 3m CTRS
ALL RADII TO BE 20mm U.N.O.

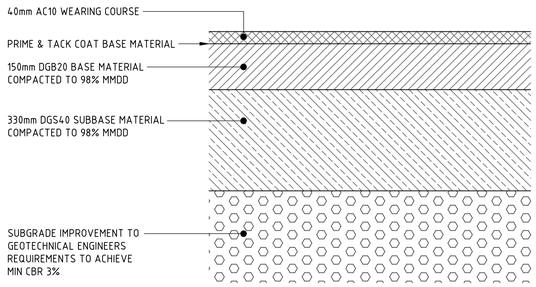


KERB & GUTTER 'KG'

EXPANSION JOINTS @ MAX 12m CTRS / TOOL JOINTS @ MAX 3m CTRS
ALL RADII TO BE 20mm U.N.O.

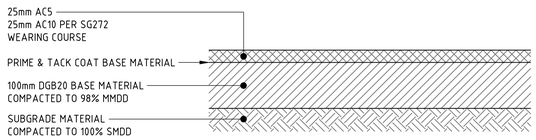


PAVEMENT INTERFACE 'INT'



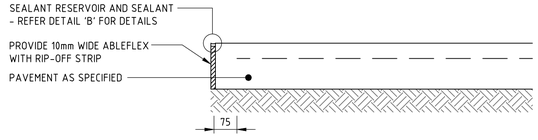
PAVEMENT TYPE '1'

MIN CBR 3% (CONTRACTOR TO CONFIRM ONSITE) DESIGN
LOADING IN ACCORDANCE WITH 'EFSG' SPECIFICATIONS



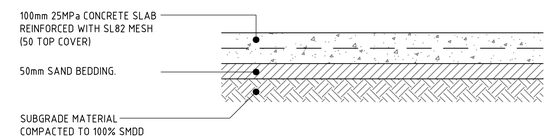
PAVEMENT TYPE '2'

MIN CBR 3% (CONTRACTOR TO CONFIRM ONSITE) DESIGN
LOADING IN ACCORDANCE WITH 'EFSG' SPECIFICATIONS



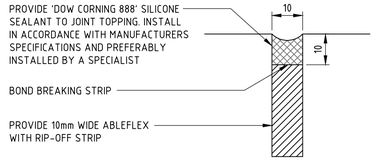
ISOLATION JOINT 'IJ'

- PROVIDE JOINT BETWEEN ALL NEW CONCRETE AND EXISTING STRUCTURES
- JOINT TO BE USED AGAINST ALL WALLS, FOOTINGS, COLUMNS, BACK OF KERB, SERVICE PITS, DRAINAGE PITS AND ALL SLAB PENETRATIONS



PAVEMENT TYPE '3'

MIN CBR 3% (CONTRACTOR TO CONFIRM ONSITE).
CONTRACTOR TO ALLOW FOR JOINTS - REFER JOINT DETAILS



DETAIL 'B'

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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PROJECT
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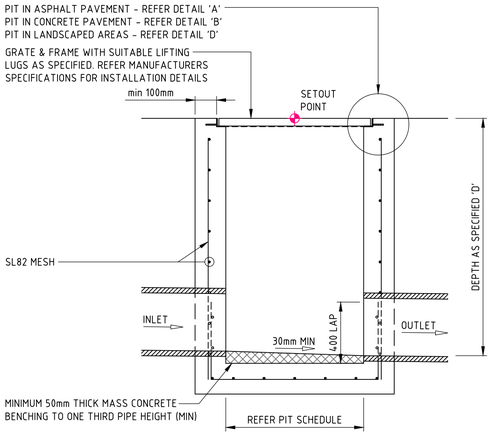
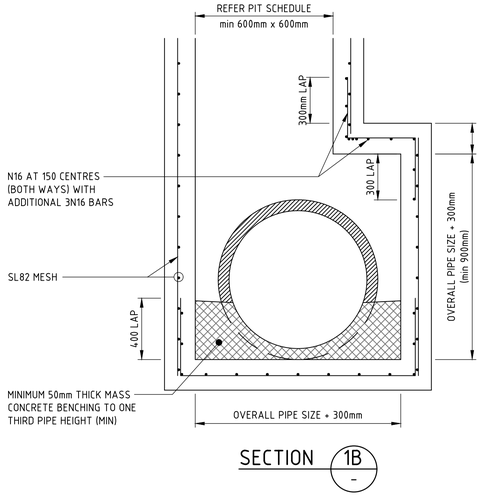
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
DETAIL SHEET 01

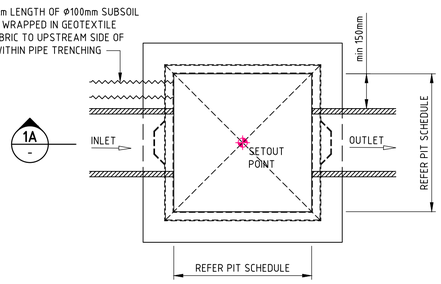
JOB NUMBER **210040**
DRAWING NUMBER **0701**
REVISION **A**
DRAWING SHEET SIZE = A1



SECTION 1A

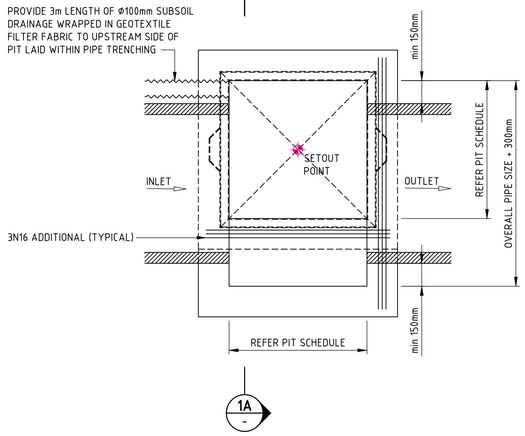


SECTION 1B



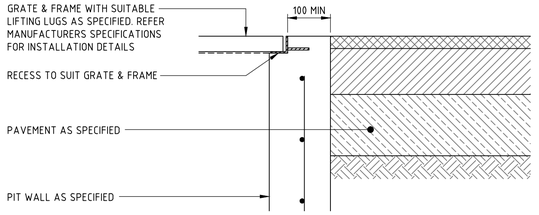
PLAN
SURFACE INLET 'SIP' / JUNCTION PIT 'JP'

PIT STRUCTURE TO BE 200mm THICK UNLESS SHOWN OTHERWISE. DRILL AND EPOXY PLASTIC PROPRIETARY STEP IRONS IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND MANUFACTURERS SPECIFICATIONS (PITS > 1000mm DEPTH).
REFER PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT

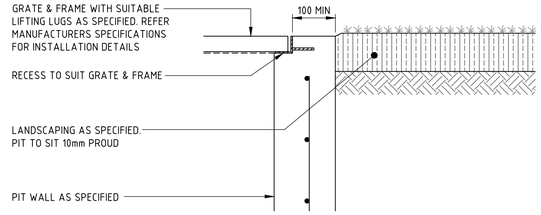


PLAN
DRAINAGE PIT - EXTENDED CHAMBER

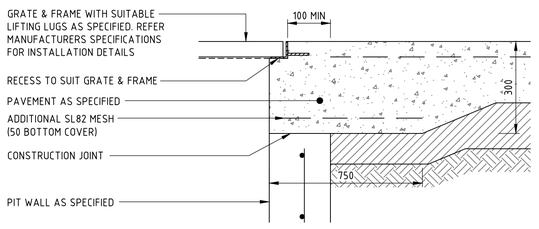
PIT STRUCTURE TO BE 200mm THICK UNLESS SHOWN OTHERWISE. DRILL AND EPOXY PLASTIC PROPRIETARY STEP IRONS IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND MANUFACTURERS SPECIFICATIONS (PITS > 1000mm DEPTH).
REFER PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT



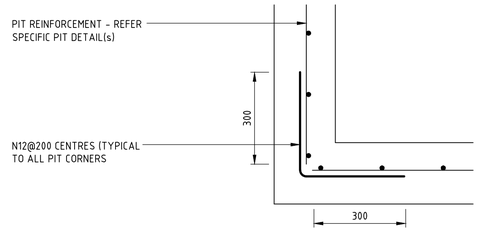
PIT INTERFACE - DETAIL 'A'



PIT INTERFACE - DETAIL 'D'



PIT INTERFACE - DETAIL 'B'



PIT INTERFACE (PLAN VIEW)- DETAIL 'F'
APPLICABLE TO ALL STORMWATER DRAINAGE STRUCTURES

VERIFIER: .
JOB MANAGER: J. GILLIGAN
DESIGNED: T. BUGAEV
DRAWN: J. O

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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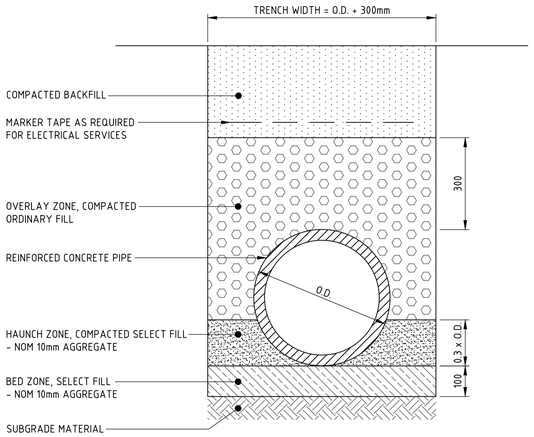
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

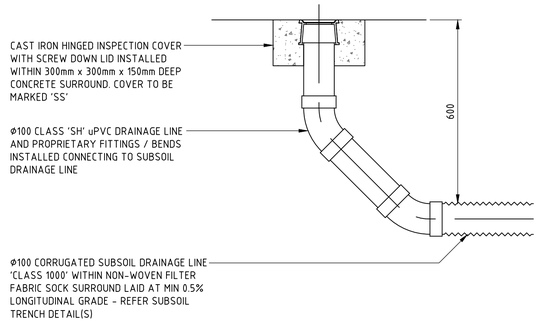
DETAIL SHEET 02

JOB NUMBER **210040**
DRAWING NUMBER **0702**
REVISION **A**
DRAWING SHEET SIZE = A1



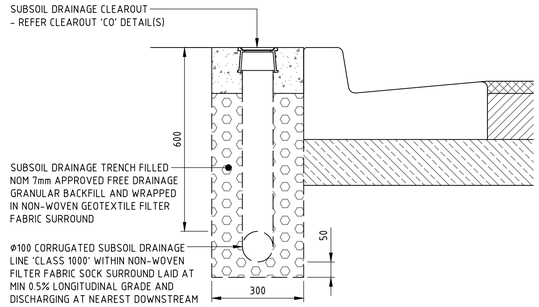
TYPICAL PIPE TRENCH - GENERAL AREAS

1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING COMPACTION. ENSURE MINIMUM 300mm CLEARANCE BETWEEN, WHEN USING MULTIPLE PIPES TO ACHIEVE ADEQUATE COMPACTION.
2. MINIMUM PIPE COVER NOT UNDER ROADS TO BE 300mm U.N.O.
3. THE CONTRACTOR SHALL ENSURE THAT SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
4. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS;
   - 4.1. TRENCHES UNDER PAVED AREAS / BUILDING - 100% SMDD
   - 4.2. TRENCHES NOT UNDER PAVEMENTS - 95% SMDD



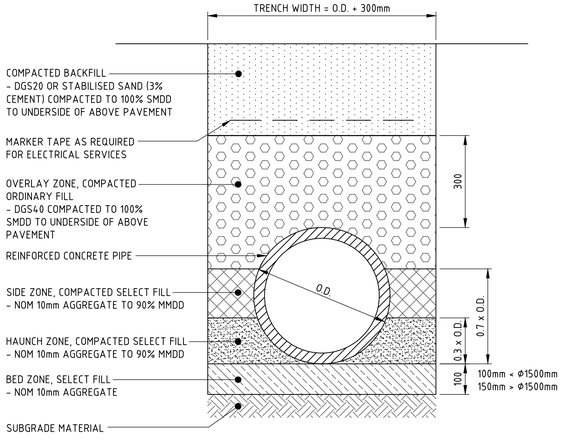
SUBSOIL DRAINAGE CLEAROUT 'CO'

CLEAROUT TO BE INSTALLED AT UPSTREAM POINTS ALONG SUBSOIL DRAINAGE LINES @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



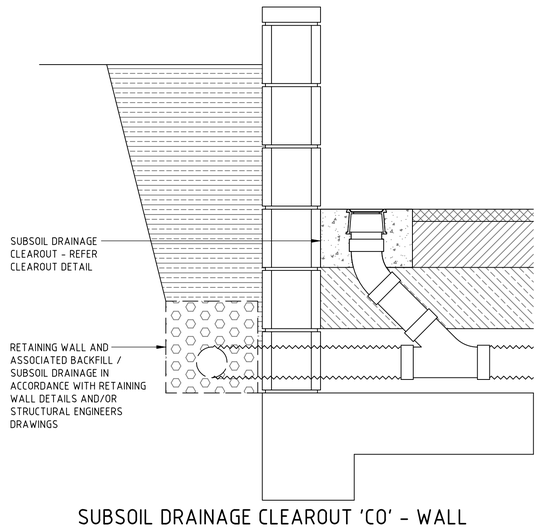
SUBSOIL DRAINAGE TRENCH 'SSD'

CLEAROUT TO BE INSTALLED @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



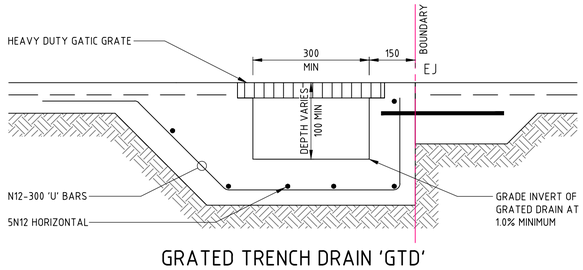
TYPICAL PIPE TRENCH - UNDER ROADS

1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING COMPACTION. ENSURE MINIMUM 300mm CLEARANCE BETWEEN, WHEN USING MULTIPLE PIPES TO ACHIEVE ADEQUATE COMPACTION.
2. MINIMUM PIPE COVER UNDER ROADS TO BE 600mm U.N.O. FOR CLASS '2' PIPES.
3. THE CONTRACTOR SHALL ENSURE THAT SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
4. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS;
   - 4.1. TRENCHES UNDER PAVED AREAS / BUILDING - 100% SMDD



SUBSOIL DRAINAGE CLEAROUT 'CO' - WALL

CLEAROUT TO BE INSTALLED AT INTERMEDIATE POINTS ALONG SUBSOIL DRAINAGE LINES @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



GRATED TRENCH DRAIN 'GTD'

GRATED TRENCH DRAIN TO HAVE MINIMUM 150mm CLEARANCE AND 1% LONGITUDINAL FALL.
GRATE CLASS TO BE CLASS 'B' HEELSAFE IN PEDESTRIAN AREAS AND CLASS 'D' IN TRAFFICKED AREAS UNLESS NOTED OTHERWISE ON PLAN

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: .

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR SSDA	CP		JG	18.05.21

CLIENT
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ARCHITECT
TKDArchitects Tanner Kibble Denton

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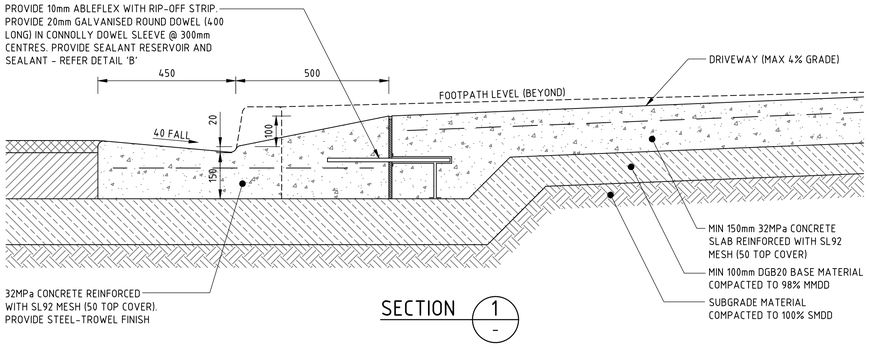
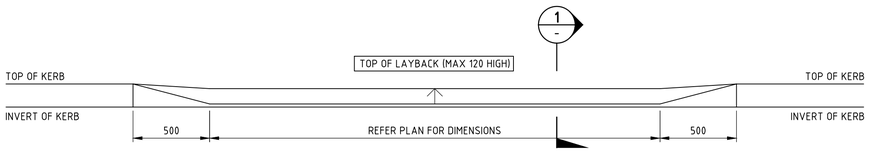
PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
DETAIL SHEET 03

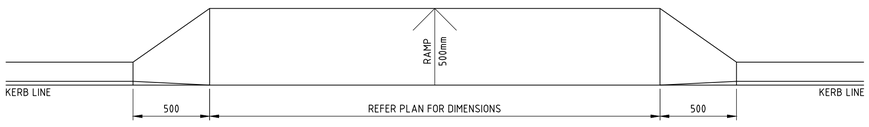
JOB NUMBER **210040**
DRAWING NUMBER **0703**
REVISION **A**
DRAWING SHEET SIZE = A1



SECTION 1 / -



ELEVATION



PLAN
VEHICLE CROSSING 'VC'
ALL RADII TO BE 20mm U.N.O.

DESIGNED: T. BUGAEV
DRAWN: J. O
JOB MANAGER: J. GILLIGAN
VERIFIER: .

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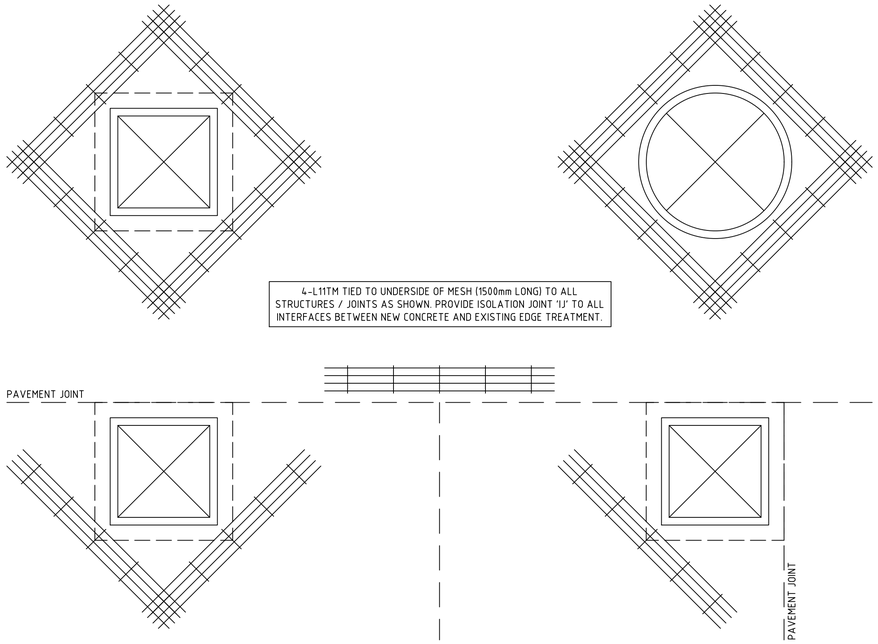
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

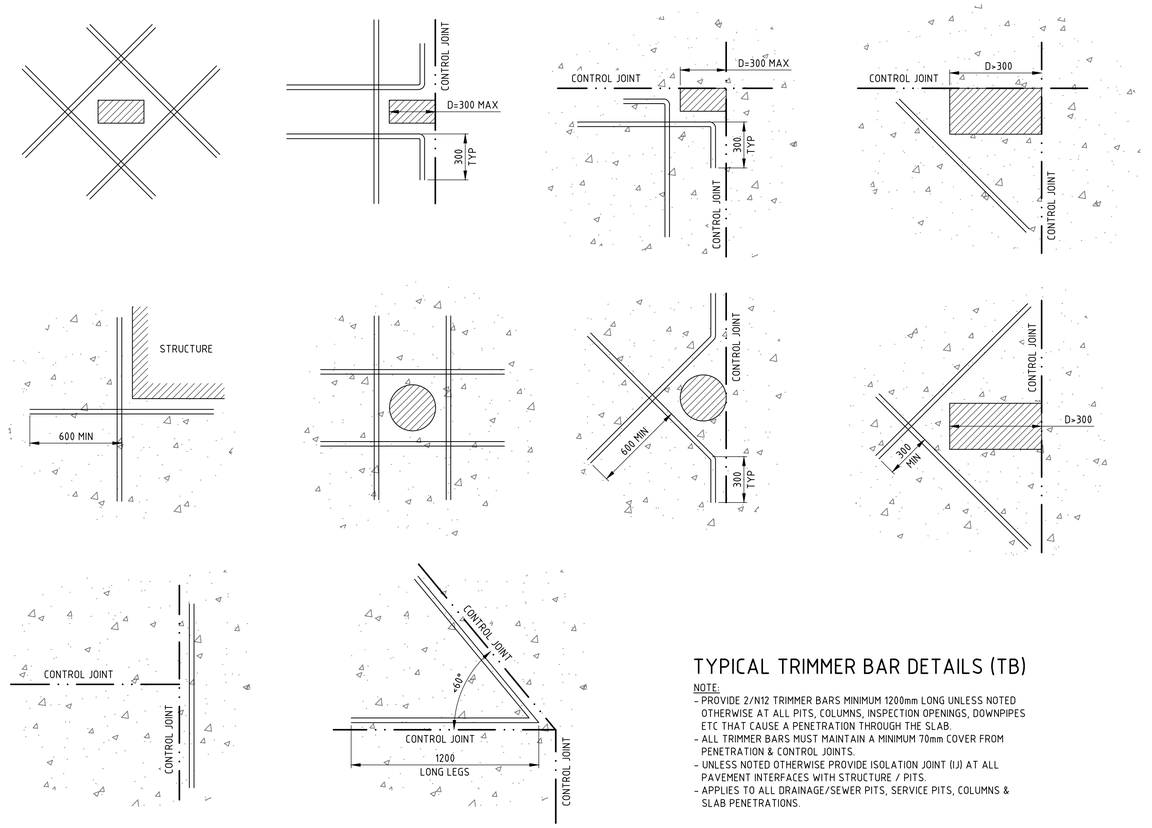
DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
DETAIL SHEET 04

JOB NUMBER **210040**
DRAWING NUMBER **0704**
REVISION **A**
DRAWING SHEET SIZE = A1



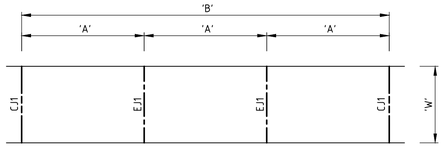
TRIMMER BAR ARRANGEMENTS 'TB'

THE ABOVE SHOWN DESIGN INTENT APPLIES TO ALL DRAINAGE / SEWER PITS, SERVICE PITS, COLUMNS AND SLAB PENETRATIONS



TYPICAL TRIMMER BAR DETAILS (TB)

NOTE:
- PROVIDE 2/N12 TRIMMER BARS MINIMUM 1200mm LONG UNLESS NOTED OTHERWISE AT ALL PITS, COLUMNS, INSPECTION OPENINGS, DOWNPIPES ETC THAT CAUSE A PENETRATION THROUGH THE SLAB.
- ALL TRIMMER BARS MUST MAINTAIN A MINIMUM 70mm COVER FROM PENETRATION & CONTROL JOINTS.
- UNLESS NOTED OTHERWISE PROVIDE ISOLATION JOINT (IJ) AT ALL PAVEMENT INTERFACES WITH STRUCTURE / PITS.
- APPLIES TO ALL DRAINAGE/SEWER PITS, SERVICE PITS, COLUMNS & SLAB PENETRATIONS.



FOOTPATH/CYCLEWAY PAVEMENT TYPICAL JOINT LAYOUT

PAVEMENT JOINT SPACING

'W'	1.2m	2.4m
'A'	2.0m	3.5m
'B'	6.0m	10.5m

DESIGNED: T BUGAEV
DRAWN: J O
JOB MANAGER: J GILLIGAN
VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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PROJECT
NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

DETAIL SHEET 05

JOB NUMBER **210040**
DRAWING NUMBER **0705**
REVISION **A**
DRAWING SHEET SIZE = A1

Appendix C – MUSIC Link Report

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MUSIC-*link* Report

Project Details		Company Details	
Project:	210040	**Company:**	Northrop Consulting Engineers
Report Export Date:	18/05/2021	**Contact:**	Aline Carvalhaes
Catchment Name:	21.05.18 - MUSIC	**Address:**	L2/3 Horwood Place
Catchment Area:	2.085ha	**Phone:**	02 9156 3206
Impervious Area*:	65.73%	**Email:**	acarvalhaes@northrop.com.au
Rainfall Station:	67035 LIVERPOOL(WHITLAM		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1967 - 31/12/1976 11:54:00 PM		
Mean Annual Rainfall:	857mm		
Evapotranspiration:	1171mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	Liverpool Clay Soil		
Scenario:	Liverpool Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness

Node: Receiving Node	Reduction
Flow	6.32%
TSS	85.4%
TP	65%
TN	49.4%
GP	95.6%

Treatment Nodes

Node Type	Number
Sedimentation Basin Node	1
Rain Water Tank Node	1
Generic Node	1
GPT Node	1

Source Nodes

Node Type	Number
Urban Source Node	8

Comments

The parameters outside of the expected range are from a proprietary device.

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Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
GPT	35 x OceanGuard	Hi-flow bypass rate (cum/sec)	None	99	0.7
Rain	Rainwater Tank(20kL)	% Reuse Demand Met	None	None	39.98
Receiving	Receiving Node	% Load Reduction	None	None	6.32
Receiving	Receiving Node	GP % Load Reduction	90	None	95.6
Receiving	Receiving Node	TN % Load Reduction	45	None	49.4
Receiving	Receiving Node	TP % Load Reduction	65	None	65
Receiving	Receiving Node	TSS % Load Reduction	85	None	85.4
Sedimentation	SF Chamber (8.2m2)	% Reuse Demand Met	None	None	0
Sedimentation	SF Chamber (8.2m2)	Exfiltration Rate (mm/hr)	0	0	0
Sedimentation	SF Chamber (8.2m2)	Extended detention depth (m)	0.25	1	0.77
Sedimentation	SF Chamber (8.2m2)	High Flow Bypass Out (ML/yr)	None	None	0
Urban	20% Roof (1005 m2)	Area Impervious (ha)	None	None	0.1
Urban	20% Roof (1005 m2)	Area Pervious (ha)	None	None	0
Urban	20% Roof (1005 m2)	Total Area (ha)	None	None	0.1
Urban	80% Roof (4020 m2)	Area Impervious (ha)	None	None	0.402
Urban	80% Roof (4020 m2)	Area Pervious (ha)	None	None	0
Urban	80% Roof (4020 m2)	Total Area (ha)	None	None	0.402
Urban	Carpark (1550m2)	Area Impervious (ha)	None	None	0.155
Urban	Carpark (1550m2)	Area Pervious (ha)	None	None	0
Urban	Carpark (1550m2)	Total Area (ha)	None	None	0.155
Urban	CarparkBypass (290 m2)	Area Impervious (ha)	None	None	0.014
Urban	CarparkBypass (290 m2)	Area Pervious (ha)	None	None	0.014
Urban	CarparkBypass (290 m2)	Total Area (ha)	None	None	0.029
Urban	Footpath (6543 m2)	Area Impervious (ha)	None	None	0.654
Urban	Footpath (6543 m2)	Area Pervious (ha)	None	None	0
Urban	Footpath (6543 m2)	Total Area (ha)	None	None	0.654
Urban	Footpath Bypass (449 m2)	Area Impervious (ha)	None	None	0.045
Urban	Footpath Bypass (449 m2)	Area Pervious (ha)	None	None	0
Urban	Footpath Bypass (449 m2)	Total Area (ha)	None	None	0.045
Urban	Landscape (6700 m2)	Area Impervious (ha)	None	None	0
Urban	Landscape (6700 m2)	Area Pervious (ha)	None	None	0.67
Urban	Landscape (6700 m2)	Total Area (ha)	None	None	0.67
Urban	Landscape Bypass (300 m2)	Area Impervious (ha)	None	None	0
Urban	Landscape Bypass (300 m2)	Area Pervious (ha)	None	None	0.03
Urban	Landscape Bypass (300 m2)	Total Area (ha)	None	None	0.03

Only certain parameters are reported when they pass validation

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Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Sedimentation	SF Chamber (8.2m2)	Notional Detention Time (hrs)	8	12	0.0695
Sedimentation	SF Chamber (8.2m2)	Total Nitrogen - k (m/yr)	500	500	1
Sedimentation	SF Chamber (8.2m2)	Total Phosphorus - k (m/yr)	6000	6000	1
Sedimentation	SF Chamber (8.2m2)	Total Suspended Solids - k (m/yr)	8000	8000	1

Only certain parameters are reported when they pass validation