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Stormwater Management Report

DHL Horsley Park
813 Wallgrove Road, Eastern Creek NSW
Development Application

February 2022 | Prepared for DHL | Revision A

Commercial in Confidence

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Executive Summary

Orion Consulting has been engaged by DHL to prepare Civil Engineering Plans and an accompanying Stormwater Management Report to support the Development Application for an industrial development located at 813 Wallgrove Road, Eastern Creek, NSW.

This report outlines the site-specific strategy for managing the stormwater quantity and quality to achieve the requirements and targets set out in the Fairfield City Council Development Control Plan, DHL Base Building Specification, and Green Star Specification. This report is to be read in conjunction with the complementary Civil Engineering Design Plans, Set No. 01, as prepared by Orion Consulting for the proposed development.

This report demonstrates that the proposed development meets and is consistent with the stormwater management requirements as generally identified by the Independent Planning Commission, Application No. SSD 5248 and the associated endorsed documents prepared to support the development application prepared by Orion Consulting for Gazcorp Pty Ltd (Orion Ref: 19-0108). This DA encompasses 14 industrial lots at 813-913 Wallgrove Road, Horsley Park, including the subject site of this report. Particular attention has been given to ensuring the modelling and catchment assessments undertaken generally reflect the existing conditions on-site and are also consistent with the reporting by Orion Consulting (19-0108 - 2020).

Glossary of Terms

As compiled from the NSW Government Floodplain Development Manual 2005 unless otherwise noted.

Annual Exceedance Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m3/s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500 m3/s or larger event occurring in any one year (see ARI).
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.
Average Recurrence Interval (ARI)	The long term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event. **A note on terminology:** The following conversion table as extracted from Australian Rainfall and Runoff 2019, book1, chapter 2 section 2.5.5 below provides a guide to convert ARI to AEP. ARI terminology is noted as being generally the accepted terminology under Australian Rainfall and Runoff 1987 guidelines whiles AEP terminology is noted as being the accepted terminology under Australian Rainfall and Runoff 2016 - 2019 guidelines and onwards.

Frequency Descriptor	EY	AEP (%)	AEP (1 in x)	ARI
Very Frequent	12			
	6	99.75	1.002	0.17
	4	98.17	1.02	0.25
	3	95.02	1.05	0.33
	2	86.47	1.16	0.5
	1	63.21	1.58	1
Frequent	0.69	50	2	1.44
	0.5	39.35	2.54	2
	0.22	20	5	4.48
	0.2	18.13	5.52	5
	0.11	10	10	9.49
Rare	0.05	5	20	19.5
	0.02	2	50	49.5
	0.01	1	100	99.5
Very Rare	0.005	0.5	200	199.5
	0.002	0.2	500	499.5
	0.001	0.1	1000	999.5
Extreme	0.0005	0.05	2000	1999.5
	0.0002	0.02	5000	4999.5
			↓	
			PMP/ PMP Flood	

Bio-retention System	A well-vegetated, retention cell or pond designed to enhance water filtration through a specially prepared sub-surface sand filter. Bio-retention cells may be incorporated into grass or vegetated swales or may be a stand-alone treatment system. The system incorporates vegetation with medium-term stormwater retention and sub-surface filtration/infiltration. Also known as bio-filtration systems or biofilters. (QDUM 2013)
Bypass Flow	That portion of the flow on a road or in a channel which is not collected by a gully inlet or field inlet, and which is redirected out of the system or to another inlet in the system. (QDUM 2013)
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
Consent Authority	The Council, Government agency or person having the function to determine a development application for land use under the EP&A Act. The consent authority is most often the Council, however legislation or an EPI may specify a Minister or public authority (other than a Council), or the Director General of DIPNR, as having the function to determine an application.
Detention Basin	A large, open, free draining basin that temporarily detains collected stormwater runoff. These basins are normally maintained in a dry condition between storm events. (QDUM 2013)
Development	Is defined in Part 4 of the Environmental Planning and Assessment Act (EP&A Act). infill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development. new development: refers to development of a completely different nature to that associated with the former land use. For example, the urban subdivision of an area previously used for rural purposes. New developments involve rezoning and typically require major extensions of existing urban services, such as roads, water supply, sewerage and electric power. redevelopment: refers to rebuilding in an area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major extensions to urban services.
Disaster Plan (DISPLAN)	A step by step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of connected emergency operations, with the object of ensuring the coordinated response by all agencies having responsibilities and functions in emergencies.
Discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m3/s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
Effective Warning Time	The time available after receiving advice of an impending flood and before the floodwaters prevent appropriate flood response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
Emergency Management	A range of measures to manage risks to communities and the environment. In the flood context it may include measures to prevent, prepare for, respond to and recover from flooding.
Extended Detention	A stormwater detention basin or tank designed to drain over a period of days rather than hours to enhance its pollution retention and solar treatment while minimising the adverse effects of coincident flooding downstream of the basin. (QDUM 2013)
Flash Flooding	Flooding which is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. Often defined as flooding which peaks within six hours of the causative rain.

Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
Flood Awareness	Flood awareness is an appreciation of the likely effects of flooding and a knowledge of the relevant flood warning, response and evacuation procedures.
Flood Education	Flood education seeks to provide information to raise awareness of the flood problem so as to enable individuals to understand how to manage themselves and their property in response to flood warnings and in a flood event. It invokes a state of flood readiness.
Flood Fringe Areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
Flood Liable Land	Is synonymous with flood prone land (i.e. land susceptible to flooding by the probable maximum flood (PMF) event). Note that the term flood liable land covers the whole of the floodplain, not just that part below the flood planning level (see flood planning area).
Flood Mitigation Standard	The average recurrence interval of the flood, selected as part of the floodplain risk management process that forms the basis for physical works to modify the impacts of flooding.
Flood Plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at State, Division and local levels. Local flood plans are prepared under the leadership of the State Emergency Service. flood planning area The area of land below the flood planning level and thus subject to flood related development controls. The concept of flood planning area generally supersedes the “flood liable land” concept in the 1986 Manual.
Flood Planning Levels (FPLs)	FPL’s are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the “standard flood event” in the 1986 manual.
Flood Prone Land	Is land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with flood liable land.
Flood Proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding, to reduce or eliminate flood damages.
Flood Readiness	Flood readiness is an ability to react within the effective warning time.
Flood Risk	Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below. existing flood risk: the risk a community is exposed to as a result of its location on the floodplain. future flood risk: the risk a community may be exposed to as a result of new development on the floodplain. continuing flood risk: the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.
Flood Storage Areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas.
Floodplain	Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land.

Floodplain Risk Management Options	The measures that might be feasible for the management of a particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
Floodplain Risk Management Plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.
Floodway Areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flows, or a significant increase in flood levels.
Freeboard	Freeboard provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. Freeboard is included in the flood planning level.
GPTs	Trash rack and/or sediment collection sump usually located at or near the end of a stormwater pipe. (QDUM 2013 in part)
Grass Swale	Shallow, low-gradient, grass-lined overland flow path used primarily for stormwater treatment. (QDUM 2013)
Habitable Room	in a residential situation: a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. in an industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.
Hazard	A source of potential harm or a situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community. Definitions of high and low hazard categories are provided in the Manual.
Hydraulics	Term given to the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.
Hydrograph	A graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.
Hydrology	Term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
Intensity-Frequency-Duration Data (IFD)	Basic rainfall data used in the calculation of rainfall runoff rates. (QDUM 2013)
Local Overland Flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam. local drainage Are smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.
Mainstream Flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
Major Design Storm	The rainfall event for the AEP chosen for the design of the Major Drainage System. (QDUM 2013)
Major Drainage System	That part of the overall drainage system which conveys flows greater than those conveyed by the Minor Drainage System and up to and including flows from the Major Design Storm. (QDUM 2013)
Major Overland Flow Path	An overland flow path that drains water from more than one property, has no suitable flow bypass, and has a water depth in excess of 75mm during the major design storms; or is an overland flow path recognised as significant by the local government. (QDUM 2013)
Manning's Roughness Coefficient	A measure of the surface roughness of a conduit or channel to be applied in the Manning's equation. (QDUM 2013)

Mathematical/Computer Models (TUFLOW, WBNM)	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
Minor Design Storm	The rainfall event for the AEP chosen for the design of the Minor Drainage System. (QDUM 2013)
Minor Drainage System	That part of the overall drainage system which controls flows from the Minor Design Storm e.g. kerbs and channels, inlets, underground drainage etc. for the purpose of providing pedestrian safety and convenience, and vehicle access. (QDUM 2013)
Minor, Moderate and Major Flooding	Both the State Emergency Service and the Bureau of Meteorology use the following definitions in flood warnings to give a general indication of the types of problems expected with a flood: minor flooding: causes inconvenience such as closing of minor roads and the submergence of low level bridges. The lower limit of this class of flooding on the reference gauge is the initial flood level at which landholders and townspeople begin to be flooded. moderate flooding: low-lying areas are inundated requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered. major flooding: appreciable urban areas are flooded and/or extensive rural areas are flooded. Properties, villages and towns can be isolated.
Modification Measures	Measures that modify either the flood, the property or the response to flooding. Examples are indicated in Table 2.1 with further discussion in the Manual.
Peak Discharge	The maximum discharge occurring during a flood event.
Probability	A statistical measure of the expected chance of flooding (see AEP).
Probable Maximum Flood (PMF)	The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, and where applicable, snow melt, coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study.
Probable Maximum Precipitation (PMP)	The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to PMF estimation.
Risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.
Runoff	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
Stage	Equivalent to “water level”. Both are measured with reference to a specified datum.
Stage Hydrograph	A graph that shows how the water level at a particular location changes with time during a flood. It must be referenced to a particular datum.
Survey Plan	A plan prepared by a registered surveyor.
Water Sensitive Urban Design (WSUD)	A set of design elements and on-ground solutions that aim to minimise impacts on the water cycle from the built urban environment. It offers a simplified and integrated approach to land and water planning by dealing with the urban water cycle in a decentralised manner consistent with natural hydrological and ecological processes. (QDUM 2013)

Water Surface Profile	A graph showing the flood stage at any given location along a watercourse at a particular time.

1 Introduction

1.1 Site Description

The proposed industrial development is located within Fairfield City Council (LGA) and comprises of approximately 5.67Ha in area with site extents as shown in Figure 1 below. Existing boundary extents are shown in red in the figure below, with new boundaries and lots as part of Application SSD 5248 shown in black.

Figure 1 - DHL Horsley Park - 813 Wallgrove Road, Eastern Creek (Imagery courtesy of NearMaps ©)

The site is bordered by WaterNSW Supply Pipeline Easement to the North, vacant Lot 13E to the East, new Road No. 01 to the south, and vacant Lot 10 to the West. The site is currently operated for livestock farming.

The subject site is zoned in IN1 General Industrial and is comprised of Lots 11, 12 and 13W.

1.2 Objectives

The purpose of this stormwater management report is to outline and address any potential stormwater impacts from the proposed development submission in accordance with the Stormwater Management Report prepared by Orion Consulting (19-0108) and endorsed by the State Significant Development Application approval SSD 5248.

The key stormwater management objectives for the development include the following:

- To direct stormwater runoff to Council's drainage system without adversely impacting on adjoining downstream properties.
- To ensure the efficient and effective planning, management and maintenance of Council's existing and future stormwater systems and reduce environmental and property damage.
- To ensure that through the use of On-Site Detention (OSD), stormwater discharge is controlled to match pre-development flows from the site, thereby ensuring the development does not increase the risk of downstream flooding, erosion of unstable waterways or a reduction of the capacity of Council's drainage network.
- Reduce the water demand utilising rainwater harvesting by enabling the use of non-potable water for toilet flushing, irrigation, and other non-potable uses.
- Mitigate the impacts of development on stormwater quality by meeting minimum target reduction rates for total suspended solids, total phosphorous and gross pollutants.
- Minimise the potential impacts of development and other associated activities on the aesthetic, recreational and ecological values of our local creeks.

1.3 Study Methodology

The study methodology is divided into two distinct components; water quantity assessment, which includes the design and layout of on-site stormwater detention (OSD) tanks, and water quality assessment, which includes the design and integration of stormwater treatment systems.

The water quantity assessment was completed using DRAINS as recommended in Fairfield's Stormwater Management Policy, September 2017, Section 4.5.1.1.

1.3.1 Water Quantity Methodology

- Development of overall catchment plans encompassing the whole study area with clear structure for a suitable rainfall-runoff-routing hydrologic model.
- Review and consider the catchments against the reporting prepared by Orion Consulting (Ref: 19-0108, 2020) to ensure consistency in modelling.
- Development of a DRAINS rainfall-runoff-storage hydrology model to run the 5, 15, 30, 60, 180, 360, and 540-minute duration storms for the 5- and 100-year ARI. It is noted that ARR2016 design methodologies and rainfall data have been adopted to reflect the most up to date rainfall data.
- Development of a civil bulk earthworks model of the site to inform site grades and levels.
- Development of a stormwater OSD design to provide detention storage to match pre-development flows from the site and to account for offset bypass areas in the catchments. The Permissible Site Discharge

(PSD) requirement for each lot was taken from the Calibre Consulting Stormwater Concept Plan report, V3, 2015.

1.3.2 Water Quality Methodology

- Development of a detailed catchment plan encompassing a breakdown of proposed land use by sub-catchment
- Development of a MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Model for assessment of percentage reduction target requirements for isolation of critical design requirements.

2 Adopted Information

2.1 Lot 5 Wallgrove Road Concept Design – Modification

The Lot 5 Wallgrove Road Concept Design and accompanying Stormwater Management Report (Ref: 19-0108) was prepared by Orion Consulting for Gazcorp Pty. Ltd., dated 16th December 2020. This report included existing and proposed catchments plans and covers stormwater quality and quantity management issues for the existing lot.

2.2 Stormwater Concept Plan, Calibre Consulting, Ref. X122584-01C V3, 2015

Referenced by Lot 5 Wallgrove Road Concept Design – Modification by Orion Consulting, the Stormwater Concept Plan report was prepared by Calibre Consulting for Gazcorp Pty Ltd, dated 16th April 2015, to support the State Significant Development Application. The report included existing and proposed catchment plans, prepared by Brown Smart Consulting, 2013, and covers stormwater quality and quantity management issues.

2.3 Survey Data

Survey data utilised was prepared by Orion Consulting for use within the Lot 5 Wallgrove Road Concept Design. This information has been adopted to maintain continuity and consistency between development applications.

2.3.1 Aerial Imagery

Historical and recent aerial imagery of the site was obtained through NearMap for documentation purposes.

2.3.2 Cadastral Data

Cadastral data of the surrounding lot boundaries was obtained through NSW LRS Spatial Information Exchange 'Clip & Ship' data service.

3 Water Quantity Design

3.1 Catchment Delineation

3.1.1 Pre-Development

The catchment hydrology was defined using DRAINS modelling software. The pre-development catchment area was defined based on the proposed site boundary, with existing flows travelling to Reedy Creek, and is consistent with the overall Pre-Developed Scenario Catchment Plan prepared by Orion Consulting (19-0108) (Figure 2).

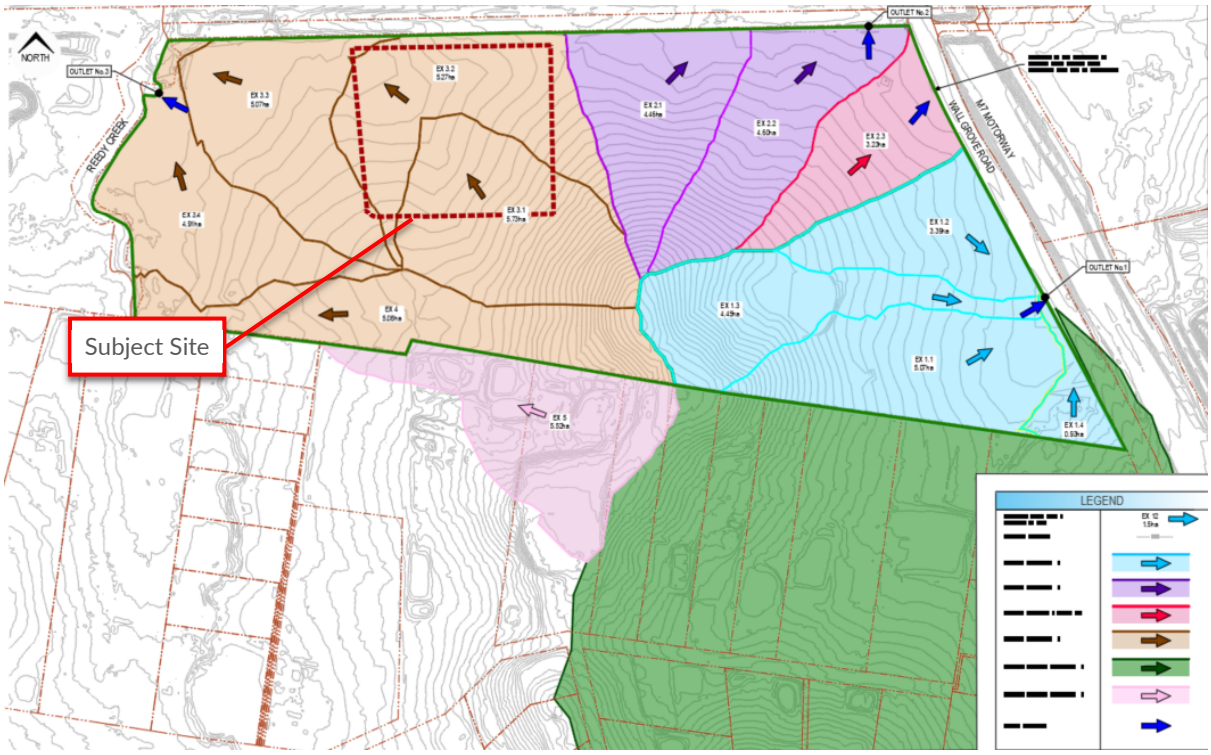


Figure 2 - Pre-Developed Scenario Catchment Plan by Orion Consulting Ref: 19-0108, Dated: 2020

3.1.2 Post-Development

The development is comprised of an industrial warehouse with associated carparking, hardstand, and landscaping. In order to manage post-developed flows from the site, an OSD tank is proposed. The post development catchment areas have been defined and delineated for the site as shown in Figure 3. The arrangement of the post development catchments is generally consistent with those proposed by Orion Consulting (19-0108).

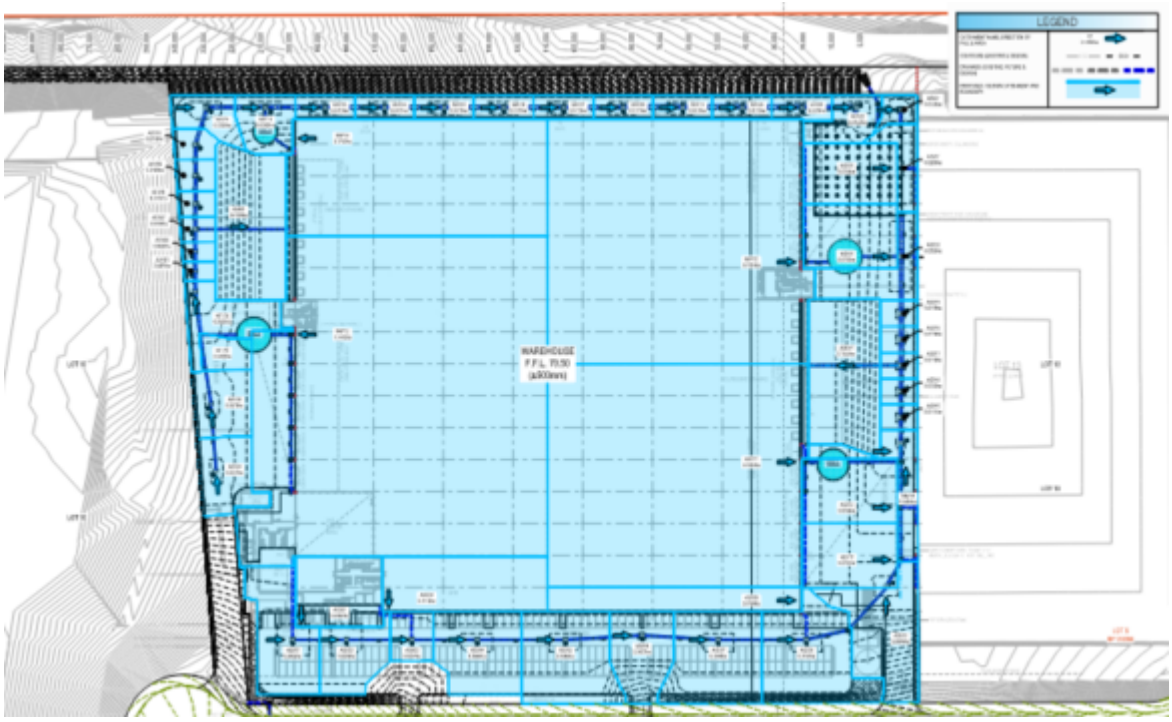


Figure 3 - Post-Developed Scenario Catchment Plan

3.2 DRAINS Modelling Parameters

3.2.1 Hydrological Model

The parameters utilised for the hydrological modelling in DRAINS are shown in Table 1 below:

Table 1 - Hydrological Model Input

Parameter	Input
Soil Type	4.0
Paved (impervious) area depression storage	1.0mm
Supplementary area depression storage	1.0mm
Grassed (pervious) area depression storage	5.0mm
Antecedent moisture conditions for all ARIs	4.0mm
Sag Pit blockage factor (major systems)	50%
On-grade pit blockage factor	30%
Inlet pit capacity	Max 100L/s for on-grade pits
Minimum pit freeboard	150mm

3.2.2 Rainfall Data

ARR2016 Rainfall data for the proposed development was extracted from the Bureau of Meteorology website using csv. files and was imported into DRAINS.

3.3 On-Site Detention Stormwater Tank Design

The stormwater quantity management strategy consists of one OSD tank to attenuate flows up to and including the 100-year ARI storm event and was placed strategically to minimise site bypass. It is also generally consistent with OSD locations assumed by Orion Consulting for the overall Lot 5 works (19-0108).

The OSD tank location is shown in Figure 4 below and can be found in full in Appendix A.

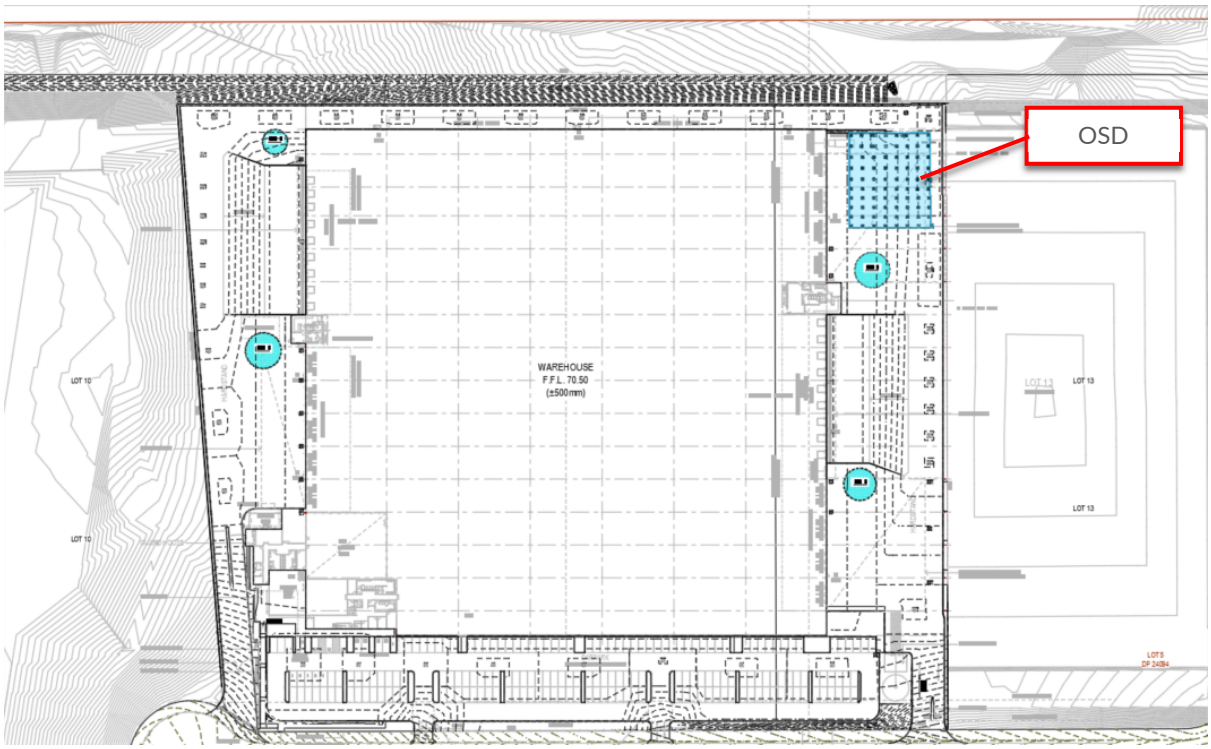


Figure 4 - OSD Tank Location

3.4 On-Site Stormwater Detention Performance

The performance of the OSD tank in controlling post-development flows has been analysed using DRAINS, Council's preferred software package as recommended in Fairfield's Stormwater Management Policy, September 2017, Section 4.5.1.1.

To maintain consistency between the previously endorsed Stormwater Concept Plan report that was prepared by Calibre Consulting, 2015, for the site and the updated concept report by Orion Consulting (19-0108), the Permissible Site Discharge (PSD) requirement adopted for this study was taken from Table 2.6 from Calibre's report.

DRAINS has been used to make our assessment to ensure that through the use of OSD, stormwater discharge is controlled to match pre-development flows. The OSD performance has been measured for the 5 and 100-year ARI duration events of 5min – 540min, to ensure compliance with the 'no net negative' design proposed.

The on-site detention performance has been shown comparatively with pre-development flows in Tables 2-5, with OSD volumes listed in Tables 6-7 for the 5 and 100-year ARI.

The results show that the OSD tanks are able to attenuate the post-development peak flows to match the existing conditions and also achieve site discharge of lower than 140 litres per second per hectare for the major 100-year ARI 9-hour storm event in accordance with the requirements of the State Significant Development 5248 Development Consent clause C48.

Table 2 - On-Site Detention Performance for 5-year storm events

Storm Duration	5-year ARI			
(min)	Pre-Dev (m^3/s)	Post-Bypass (m^3/s)	Post-OSD (m^3/s)	Total Post-Dev (m^3/s)
5	0.967	0.087	0.125	0.212
15	1.466	0.111	0.164	0.275
30	1.379	0.102	0.179	0.281
60	1.010	0.082	0.186	0.268
90	0.878	0.065	0.187	0.252
120	0.832	0.061	0.185	0.246
540	0.290	0.023	0.155	0.178

Table 3 - On-Site Detention 5-year ARI PSD Values

5-Year PSD Achieved ($m^3/s/ha$)	5-Year Calibre's PSD Achieved ($m^3/s/ha$)	5-Year Orion PSD Achieved (19-0108) ($m^3/s/ha$)
0.050	0.100	0.100

Table 4 - On-Site Detention Performance for 100-year storm events

Storm Duration	100-year ARI			
(min)	Pre-Dev (m^3/s)	Post-Bypass (m^3/s)	Post-OSD (m^3/s)	Total Post-Dev (m^3/s)
5	2.650	0.210	0.155	0.365
15	2.975	0.219	0.212	0.431
30	2.425	0.179	0.242	0.421
60	1.778	0.131	0.259	0.390
90	1.610	0.119	0.263	0.382
120	1.623	0.119	0.264	0.383
540	0.601	0.045	0.245	0.290

Table 5 - On-Site Detention 100-year ARI PSD Values

100-Year PSD Achieved ($m^3/s/ha$)	100-Year Calibre's PSD Achieved ($m^3/s/ha$)	100-Year Orion PSD Achieved (19-0108) ($m^3/s/ha$)
0.076	0.200	0.100

Table 6 On-Site Detention 5-year ARI SSR Values

5-Year SSR Achieved (m^3/ha)	5-Year Calibre's SSR Achieved (m^3/ha)	5-Year Orion SSR Achieved (19-0108) (m^3/ha)
185	232	196

Table 7 On-Site Detention 100-year ARI SSR Values

100-Year SSR Achieved (m^3/ha)	100-Year Calibre's SSR Achieved (m^3/ha)	100-Year Orion SSR Achieved (19-0108) (m^3/ha)
405	345	311

4 Water Quality Controls

The water quality or water sensitive urban design strategy for the proposed development has been determined through the adoption and implementation of a MUSIC model. MUSIC is an industry standard modelling tool to design and size water quality controls subject to a number of water quality assessment criteria.

4.1 Assessment Metrics

The Fairfield City Stormwater Management Policy (SMP) Section 6.2, Table 7, identifies the following industrial development stormwater quality improvement targets:

- Total Suspended Solids (TSS) 80%
- Total Phosphorus (TP) 55%
- Total Nitrogen (TN) 40%
- Gross Pollutants (GP) 90%

For this study, erbas™ (Erbas & Associates Pty. Ltd.) has provided Green Star Design Specifications on behalf of DHL for design compliance. The target reduction rates are as follows, and are higher than those listed by Fairfield City Council and include the treatment of hydrocarbons and free oils:

- Total Suspended Solids (TSS) 80%
- Total Phosphorus (TP) 60%
- Total Nitrogen (TN) 45%
- Gross Pollutants (GP) 90%
- Total Petroleum Hydrocarbons 90%
- Free Oils 90%

4.2 Treatment Train Strategy

The following water quality control assets are proposed for implementation:

i. Ocean Protect OceanGuard pit inserts (or approved equivalent) - for removal of gross pollutants, total suspended solids and attached pollutants
ii. Ocean Protect StormFilter Cartridge system (or approved equivalent) - for removal of fine and coarse sediments and nutrients from the system.
iii. Rainwater tanks - required primarily to meet the minimum 40% water demand reduction target per lot in accordance with Fairfield's Stormwater Management Policy, Section 5.2, and to satisfy minimum requirements of 3,000L per 100m^2 of roof area of the development.

4.2.1 Catchment Delineation

The post-developed scenario catchment delineation that was adopted for the hydrological modelling is shown in Appendix A.

4.2.2 Catchment Areas Summary

The table below summarise the primary sub-catchment areas and breakdown of land use:

Table 8 - MUSIC Sub-Catchment Summary

	Catchment (ha)
Roof to Rainwater Tanks (100% Imp)	2.995
Roof to Trunk Drainage (100% Imp)	0.558
Hardstand & Parking (100% Imp)	1.599
Landscape (100% Perv)	0.120
Bypass Hardstand & Parking (100% Imp)	0.115
Bypass Landscape (100% Perv)	0.299
Total Developed Area	5.686

4.2.3 Model Layout

The figure below shows the MUSIC model layout and breakdown and can be reviewed in full in the provided modelling file (.sqz).

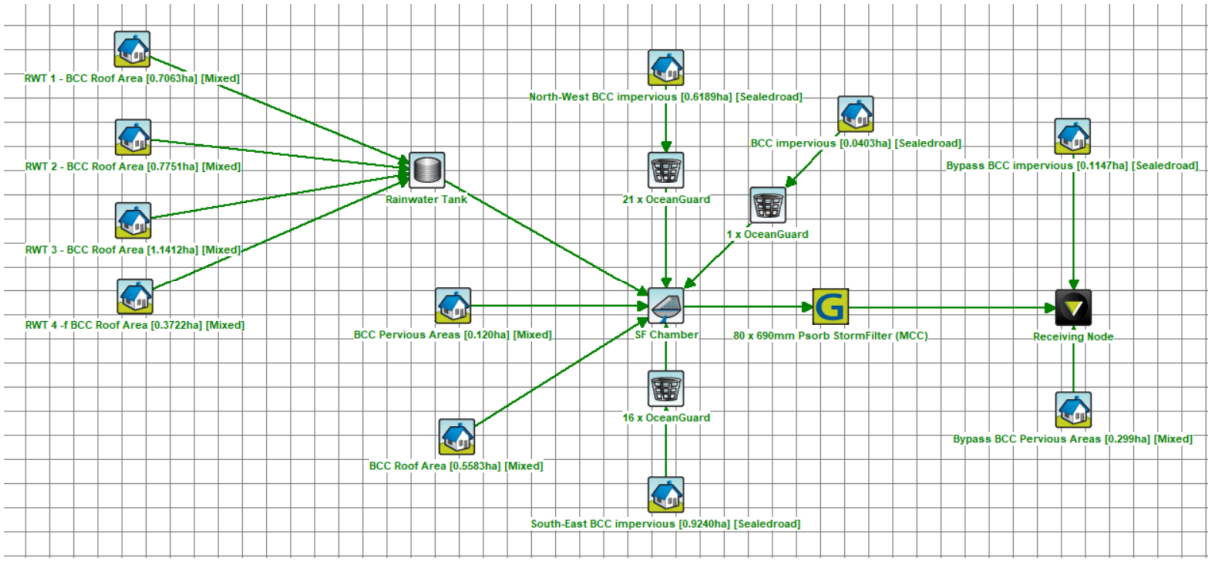


Figure 5 - MUSIC Model Layout

4.3 MUSIC Modelling Results

The table below summarises post-developed scenario source and residual pollutant loads as well as the percentage reduction results.

Table 9 - Treatment Train Effectiveness

	Sources	Residual Load	% Reduction	% Target
TSS (kg/year)	5120	759	85.2	80.0
TP (kg/year)	11.5	3.73	67.6	60.0
TN (kg/year)	88.2	47.1	46.6	45.0

Gross Pollutants (kg/year)	1000	21.9	97.8	90.0

The above table demonstrates percentage reduction targets are achieved with the proposed treatment train and water quality management strategy.

Due to current limitations in MUSIC software, hydrocarbons and free oils are unable to be modelled. In order to address this target reduction in the Green Star Requirements, it is proposed to implement an oil baffle within the StormFilter Chambers to capture the required pollutants.

5 Summary

The report demonstrates that the proposed stormwater management strategies reduces post-development peak flows to pre-development conditions in accordance with SSDA endorsed documents and councils' requirements. The report also demonstrates compliance with erbas™ Green Star water quality targets and maintains consistency with Orion Consulting's Lot 5 Wallgrove Road Concept Design – Modification (19-0108) and Calibre Consulting Stormwater Concept Plan (2015).

It is our position that this integrated water cycle management strategy is suitable to support the development proposal.

A summary of key findings are provided below:

i. The modelling and site assessments provides generally consistent results with the Orion 2020, Calibre 2015, and Brown 2013 documentation.

ii. The water quantity strategy proposes one on-site detention tank to reduce post development flows for site catchments

iii. The proposed water quality treatment train comprising of rainwater tanks, pit inserts, and tertiary control cartridge filtration systems meets the post-development percentage reduction targets as outlined Green Star Design Specification for the development.

We note that the modelling and reporting of this strategy is concept in nature for the purpose of development application and is subject to further review and refinement at detailed design / construction certificate stage.

6 References

Australian Rainfall and Runoff: A Guide to Flood Estimation, Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), Commonwealth of Australia (Geoscience Australia) 2019

WSUD Developer Handbook: MUSIC modelling and design guide DRAFT 2019

Fairfield City Council Citywide Development Control Plan 2013

Fairfield City Council Stormwater Management Policy September 2017

Queensland Urban Drainage Design Manual, Third Edition, Queensland Government Department of Energy and Water Supply 2013

Using MUSIC in Sydney Drinking Water Catchment, WaterNSW 2019

Stormwater Concept Plan, Calibre Consulting, Ref. X122584-01C, Issue C, April 2015

Stormwater Management Report, DA for 14 Industrial Lots, Lot 5 in DP 24094, 813-913 Wallgrove Road, Horsley Park, Orion Consulting, Ref. 19-0108, Revision 02, December 2020

Appendix A– Civil Engineering Plans

Prepared by:

Orion Consulting

CONSULT AUSTRALIA
Member Firm

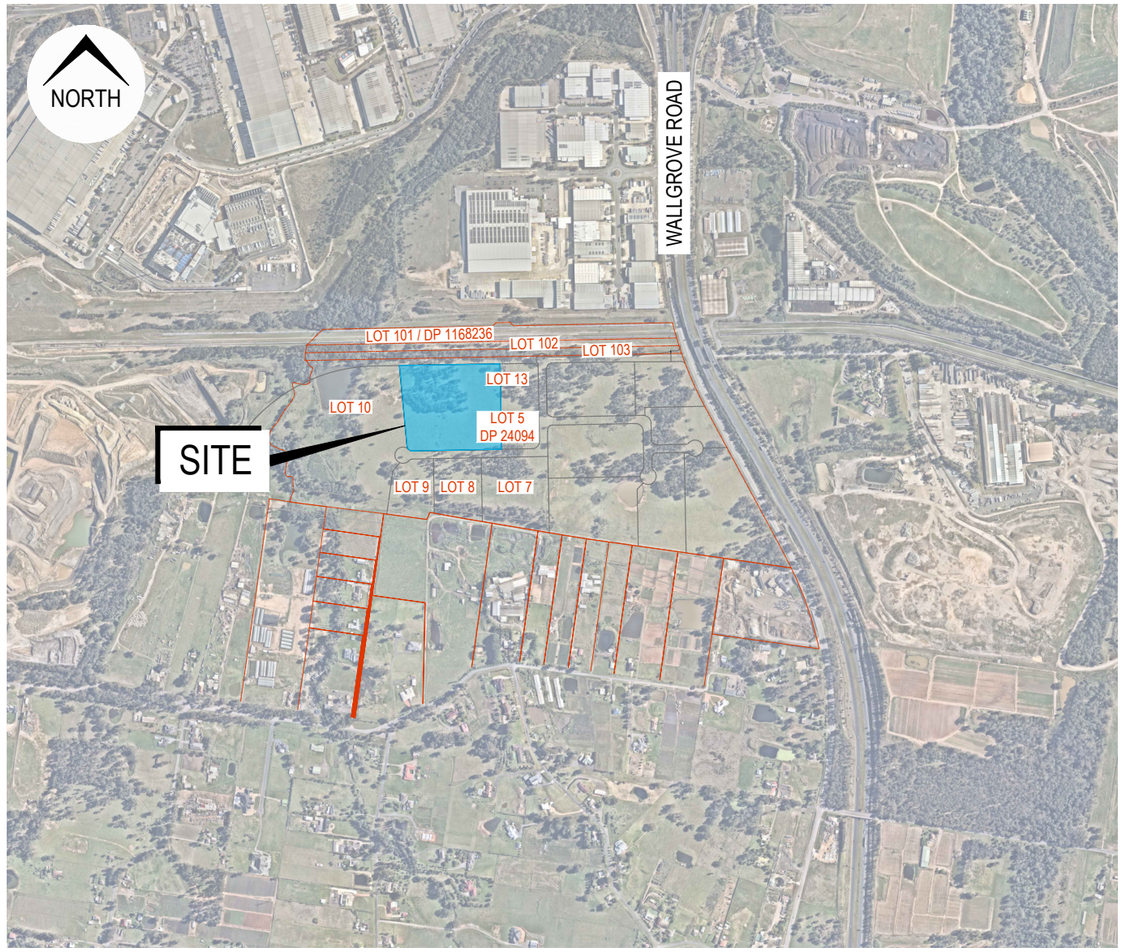
Prepared for:

DHL

LGA:

FairfieldCity
Celebrating diversity

DA: _____



LOT 5, D.P. 24094

SITE / LOCATION (Image courtesy of Nearmap 23.06.2020)

PLAN INDEX		
No.	PLAN	REV
PRELIMINARIES		
DA 000	COVER SHEET	B
DA 001	GENERAL NOTES & LEGEND	B
DA 002	GENERAL LAYOUT PLAN	A
DA 003	EXISTING SURVEY PLAN	A
DA 004	COMBINED SERVICES PLAN	A
DA 010	BULK EARTHWORKS CUT/FILL PLAN	B
DA 011	BULK EARTHWORKS SITE SECTIONS SHEET 01 OF 03	A
DA 012	BULK EARTHWORKS SITE SECTIONS SHEET 02 OF 03	A
DA 013	BULK EARTHWORKS SITE SECTIONS SHEET 03 OF 03	A
SEDIMENT & EROSION CONTROL		
DA 100	SEDIMENT & EROSION CONTROL PLAN	A
DA 101	SEDIMENT & EROSION CONTROL NOTES & DETAILS	A
ENGINEERING		
DA 200	ENGINEERING PLAN SHEET 01 OF 05	C
DA 201	ENGINEERING PLAN SHEET 02 OF 05	C
DA 202	ENGINEERING PLAN SHEET 03 OF 05	C
DA 203	ENGINEERING PLAN SHEET 04 OF 05	C
DA 204	ENGINEERING PLAN SHEET 05 OF 05	A
DA 300	TYPICAL SITE SECTIONS SHEET 01 OF 02	A
DA 301	TYPICAL SITE SECTIONS SHEET 02 OF 02	A
STORMWATER DRAINAGE		
DA 400	STORMWATER CATCHMENT PLAN	B
DA 401	MUSIC CATCHMENT PLAN	B
DA 405	WATER QUALITY DETAILS SHEET 01 OF 02	A
DA 406	WATER QUALITY DETAILS SHEET 02 OF 02	A
DA 407	TAIL-OUT DRAIN SECTIONS	A
DA 410	STORMWATER DRAINAGE LONG SECTIONS SHEET 01 OF 03	A
DA 411	STORMWATER DRAINAGE LONG SECTIONS SHEET 02 OF 03	A
DA 412	STORMWATER DRAINAGE LONG SECTIONS SHEET 03 OF 03	A

DHL HORSLEY PARK

813 WALLGROVE ROAD, EASTERN CREEK, NSW

ISSUED FOR DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Project No. 21-0262 Set No. 01 Milestone DA Plan 000 Revision B

GENERAL NOTES

1) ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL'S STANDARDS AND SPECIFICATIONS AS DIRECTED BY THE COUNCIL ENGINEER.

2) LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).

3) CO-ORDINATES ARE TO GEOCENTRIC DATUM OF AUSTRALIA (GDA2020) CO-ORDINATE SYSTEM (ZONE 56).

4) ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, CHAINAGES, STATIONS AND CO-ORDINATES ARE EXPRESSED IN METRES.

5) THE CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORKS WITHIN ADJACENT LANDS WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER AND LANDOWNER.

6) ALL FILLING TO BE COMPACTED TO A MINIMUM 95% OF THE STANDARD MAXIMUM DRY DENSITY AS TESTED IN ACCORDANCE WITH E1.1 OF AS1289 - 2014.

7) FILL MATERIAL TO BE APPROVED BY THE CONSTRUCTION ENGINEER. SURPLUS EXCAVATED MATERIAL TO BE PLACED WHERE DIRECTED BY THE ENGINEER.

8) ALL NEW WORKS TO MAKE SMOOTH JUNCTION WITH EXISTING CONDITIONS.

9) MINIMUM 25mm APPROVED GRANULAR BEDDING TO BE PROVIDED UNDER ALL CONCRETE.

10) ALL CONCRETE WORKS TO BE CONSTRUCTED TO GRADE N20 CONCRETE U.N.O.

11) ALL DISTURBED TURFED AREAS AND BATTERS TO BE TOPSOILED, TURFED OR SPRAY GRASSED AS SHOWN ON THE DRAWINGS.

12) MEASUREMENTS SHALL BE TAKEN FROM THE FIGURED DIMENSIONS AND ARE NOT TO BE SCALED FROM THE DRAWINGS.

13) PROVISION FOR TRAFFIC CONTROL DURING CONSTRUCTION TO BE IN ACCORDANCE WITH AS1742.3 - 2009.

14) EROSION AND SEDIMENT CONTROLS ARE TO BE IMPLEMENTED IN ACCORDANCE WITH E.P.A. REQUIREMENTS.

15) EXISTING SERVICES TO BE UNDISTURBED UNLESS NOTED OTHERWISE.

16) CONTRACTOR IS TO CLEAR SITE BY REMOVING ALL SURPLUS SPOIL, RUBBISH, ETC.

GENERAL DRAINAGE NOTES

1) STORMWATER DESIGN CRITERIA:
   1:100YR ARI MAJOR SYSTEM
   1:5YR ARI MINOR SYSTEM

2) ALL LOCATIONS, ORIENTATION AND LEVELS SHALL BE VERIFIED ON SITE BEFORE COMMENCING ANY WORK. REFER DISCREPANCIES TO THE ENGINEER. DO NOT OBTAIN DIMENSIONS FROM SCALING. EXISTING SURFACE LEVELS ON THE DRAWINGS ARE INDICATIVE ONLY.

3) DRAINAGE LINES ON PLANS ARE DIAGRAMMATIC ONLY AND PIPE CENTRELINES SHALL ENTER AND EXIT PITS AT THE CENTRE OF THE RESPECTIVE PIT WALLS.

4) ANY PERMITS FOR DIVERSION WORKS REQUIRED DURING CONSTRUCTION SHALL BE OBTAINED PRIOR TO CONSTRUCTION WORKS BY THE CONTRACTOR FROM THE COUNCIL.

5) EXISTING STORMWATER PIPES OR CULVERTS THAT ARE IDENTIFIED TO BE ABANDONED SHALL BE REMOVED WITH APPROPRIATE TREATMENT AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS

6) DURING CONSTRUCTION ANY EXCAVATIONS SHALL BE SECURELY SHORED AND BENCHED TO PREVENT THE SIDES OF THE EXCAVATION FROM COLLAPSING. ALL TRENCHES SHALL BE SHORED OR BENCHED TO COMPLY WITH THE NSW CONSTRUCTION SAFETY ACT.

7) ALL PIPES ARE TO BE STEEL REINFORCED SPUN CONCRETE UNLESS NOTED OTHERWISE. ALL CONCRETE PIPES SHALL HAVE HS3 TYPE INSTALLATION.

8) ALL NEW LONGITUDINAL DRAINAGE TRENCHES SHALL BE BACKFILLED IN THE SIDE, OVERLAY AND BACKFILL ZONES AND SELECT MATERIAL ZONE OF PAVEMENT WITH TYPE SO MATERIAL AS SPECIFIED IN COUNCIL SPECIFICATION.

9) PIPES ≤300 mm DIA. ARE NOT TO CONTAIN PVC OR TO BE B.E.P CERTIFIED uPVC PIPES IN ACCORDANCE WITH SUSTAIN ERBAS GREEN STAR DESIGN SPECIFICATION: CIVIL FOR DHL WALLGROVE, DATED 19-11-2021.

10) CONCRETE PIPE CLASSES HAVE BEEN DETERMINED BASED ON TYPE HS3 SUPPORT, FINISHED SURFACE LEVEL AND TRENCH OR EMBANKMENT CONDITION INSTALLATION TO AS3725 AND SPECIFICATION UNLESS OTHERWISE NOTED.

11) CONCRETE PIPES ARE TO BE RUBBER RING JOINTED SPIGOT AND SOCKET TYPE UNLESS NOTED OTHERWISE. THERMAL ENVIRONMENT CONDITION OF TABLE 3.1 OF AS/NZS 4058:2007 APPLIES. MINIMUM COVER FOR REINFORCEMENT IS 10 mm.

12) MINIMUM COVER TO ALL NEW PIPES TO BE 300 mm BELOW THE UNDERSIDE OF THE SELECTED MATERIAL ZONE UNLESS STATED OTHERWISE.

13) CONNECTION BETWEEN PIPES AND STRUCTURES TO BE UNDERTAKEN IN ACCORDANCE WITH COUNCIL SPECIFICATION AND STANDARD DRAWINGS UNLESS NOTED OTHERWISE.

14) PIPE LENGTHS PROVIDED IN DRAINAGE LONG SECTIONS ARE CALCULATED FROM PIT REFERENCE POINT TO PIT REFERENCE POINT.

SIGNAGE AND LINE MARKING

1) TO ELIMINATE EXCESSIVE GLARE FROM THE SURFACE OF A SIGN IT SHOULD BE TURNED APPROXIMATELY 5° AWAY FROM THE NORMAL TO THE HEADLIGHT BEAM / LINE OF SIGHT.

2) ALL SIGNAGE TO BE CLEAR OF ALL VEGETATION AND OBSTRUCTIONS.

3) SIGNS TO BE INSTALLED IN ACCORDANCE WITH AS1742.

4) THE LOCATION OF ALL EXISTING SIGNS TO BE CONFIRMED PRIOR TO COMMENCING WORK. ENSURE ADOPTED METHOD OF CONSTRUCTION WILL AVOID DAMAGE TO ALL SERVICES.

5) ALL EXISTING LINE MARKING EFFECTED BY THE NEW WORKS AND NOT OTHERWISE CONFLICTING WITH NEW LINE MARKING IS TO BE REINSTATED.

SURVEY SET OUT INFORMATION NOTES:

1) ALL SITE SET OUT AND CONTROL POINTS ARE TO BE CERTIFIED BY A REGISTERED SURVEYOR.

2) THE INFORMATION DETAILED ON THE CERTIFIED CONSTRUCTION CERTIFICATE PLANS TAKES PRECEDENCE OVER ALL ELECTRONIC INFORMATION PROVIDED. THE ORDER OF PRIORITY FOR USE OF ALL INFORMATION PROVIDED IS AS FOLLOWS:
   a. CERTIFIED CONSTRUCTION CERTIFICATE DRAWINGS
   b. 2D DRAFTING BASE (ELECTRONIC FILE)
   c. 3D DTM (ELECTRONIC FILE)

3) ANY DISCREPANCY BETWEEN ANY OF THE INFORMATION CONTAINED WITHIN THESE FILES IS TO BE BROUGHT TO THE ATTENTION OF THE SUPERINTENDENT PRIOR TO CONSTRUCTION WHO WILL SEEK CLARIFICATION AND ISSUE INSTRUCTIONS ON THE APPROPRIATE COURSE OF ACTION.

4) ORION CONSULTING ACCEPTS NO RESPONSIBILITY FOR ANY SURVEY OR BOUNDARY INFORMATION. ALL SURVEY AND BOUNDARY INFORMATION SHOULD BE CONFIRMED BY A REGISTERED SURVEYOR PRIOR TO CONSTRUCTION.

EARTHWORKS NOTES

REFER GEOTECH REPORT PREPARED BY *DOUGLAS PARTNERS, REF No. 99735.00, DATED APRIL 2021*

1) EARTHWORKS ARE TO BE CARRIED OUT TO THE SATISFACTION OF THE COUNCIL. UNSUITABLE MATERIALS ARE TO BE REMOVED FROM ROADS AND LOTS PRIOR TO FILLING. THE CONTRACTOR IS TO ARRANGE AND MAKE AVAILABLE COMPACTION TESTING RESULTS FOR ALL AREAS THAT CONTAIN FILL IN EXCESS OF 200mm.

2) COMPACTION OF EARTHWORKS SHALL CONTINUE UNTIL A DRY DENSITY RATIO OF 95% FOR SITE FILLING AND 100% FOR ROAD PAVEMENT SUBGRADES HAS BEEN ACHIEVED IN ACCORDANCE WITH TEST METHOD AS1289.5.3.1 OR AS.1289.5.1.1. THE CONTROL TESTING OF EARTHWORKS SHALL BE IN ACCORDANCE WITH THE GUIDELINES IN AS3798 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'. WHERE IT IS PROPOSED TO USE TEST METHOD AS1289.5.8.1 TO DETERMINE THE FIELD DENSITY, A SAND REPLACEMENT METHOD SHALL BE USED TO CONFIRM THE RESULTS.

3) THE SUITABLE QUALIFIED GEOTECHNICAL ENGINEER, SHALL HAVE A LEVEL 2 RESPONSIBILITY FOR ALL FILLING AS DEFINED IN APPENDIX B AS3798 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS', AND AT THE END OF THE WORKS SHALL CONFIRM THE EARTHWORKS COMPLY WITH THE REQUIREMENTS OF THE SPECIFICATION AND DRAWINGS BY WRITTEN NOTIFICATION.

4) IN AREAS TO BE FILLED WHERE THE SLOPE OF THE NATURAL SURFACE EXCEEDS 1(V):4(H), BENCHES ARE TO BE CUT TO PREVENT SLIPPING OF THE PLACED FILL MATERIAL AS REQUIRED BY THE COUNCIL.

5) ALL BATTERS ARE TO BE SCARIFIED TO A DEPTH OF 50mm TO ASSIST WITH ADHESION OF TOP SOIL TO BATTER FACE.

6) PROVIDE MINIMUM 150mm AND MAXIMUM 300mm TOPSOIL DEPTH ON FOOTPATHS, FILLED AREAS AND ALL OTHER AREAS DISTURBED DURING CONSTRUCTION. TOPSOILED AREAS TO BE STABILISED WITH APPROVED VEGETATION A MAXIMUM OF 14 DAYS AFTER TOPSOILING AND ARE TO BE WATERED TO ENSURE GERMINATION.

7) THE CONTRACTOR SHALL CONTROL SEDIMENTATION, EROSION AND POLLUTION DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT EDITION OF 'MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION' PRODUCED BY LANDCOM.

8) FOOTWAY AREA TO BE FULLY TURFED WITH COUCH GRASS, AND SHALL BE MAINTAINED AND REPLACED AS REQUIRED DURING THE CONSTRUCTION MAINTENANCE PERIOD, IN ACCORDANCE WITH CONDITION.

9) THE CONTRACTOR SHALL PROVIDE ALL LEVEL 1 TESTING INCLUDING SITE CLASS TO AS2970 FOR ALL LOTS. CLASS 'P' NOT ACCEPTABLE.

LEGEND

	EXISTING	PROPOSED	FUTURE
UTILITY - ELECTRICITY, GAS, SEWER, WATER, TELECOMS, NBN, OPTIC FIBRE	E, G, S, W, T, NBN, OF	E, G, S, W, T, NBN, OF	E, G, S, W, T, NBN, OF
CONTOUR LINE & LABEL		20.0	
LOT NUMBER & BOUNDARY	LOT #	LOT #	LOT #
APPROXIMATE LIMIT OF WORKS			
BUILDING / ENVELOPE			
ROAD, NUMBER, CONTROL LINE, CHAINAGE & CHAINAGE MARK	CH # ROAD	CH # ROAD	CH # ROAD
COUNCIL STANDARD KERB & GUTTER		K&G	
COUNCIL STANDARD DISH CROSSING		DC	
EDGE OF BITUMEN		EOB	
COUNCIL STANDARD CONCRETE FOOTPATH & KERB RAMP			
STORMWATER DRAINAGE PIPE AND STRUCTURE			
STORMWATER uPVC DRAINAGE PIPE AND STUB			
STORMWATER RCP DRAINAGE PIPE AND STUB			
TEMPORARY STORMWATER DRAINAGE PIPE			
EASEMENT (REFER LEGEND)	(A) (B) (C)	(A) (B) (C)	
SUBSOIL DRAIN		SS SS	
DIVERSION SWALE			
RETAINING WALL		RW1	
BATTER			
TREE - TO BE RETAINED OR TO BE REMOVED			

SURVEY PROVIDED BY ORION CONSULTING: (DATED 27/10/2021)
COORDINATES: GDA2020 DATUM: A.H.D.
REFERENCE No: 19-0108

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, LOCATE AND AVOID DAMAGE TO THEM AS SPECIFIED BY EACH UTILITIES EXCAVATION GUIDE LINES/STANDARDS.

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Rev	Drawn	Design	Check	Appd.	Date	Revision Description
B	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale:

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: GENERAL NOTES & LEGEND

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	001	B

NORTH

REFER TO DRAWING No.200

REFER TO DRAWING No.202

PROPOSED RECESSED DOCK

WAREHOUSE
F.F.L. 70.50
(±500mm)

REFER TO DRAWING No.201

REFER TO DRAWING No.203

PROPOSED RECESSED DOCK

LOT 10

LOT 13

PROPOSED CARPARK

ROAD 01

K&G

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Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale: 0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting

ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: GENERAL LAYOUT PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	002	A

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NORTH

WAREHOUSE
F.F.L. 70.50
(±500mm)

LOT 10

LOT 13

ROAD 01

LEGEND

EXISTING ELECTRICITY	E E
EXISTING GAS	G G
EXISTING SEWER	S S
EXISTING WATER	W W
EXISTING TELECOMS	T T
EXISTING NBN	NBN NBN
EXISTING OPTIC FIBRE	OF OF
EXISTING TREES	
EXISTING CONTOURS	60.0

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For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: EXISTING SURVEY PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	003	A

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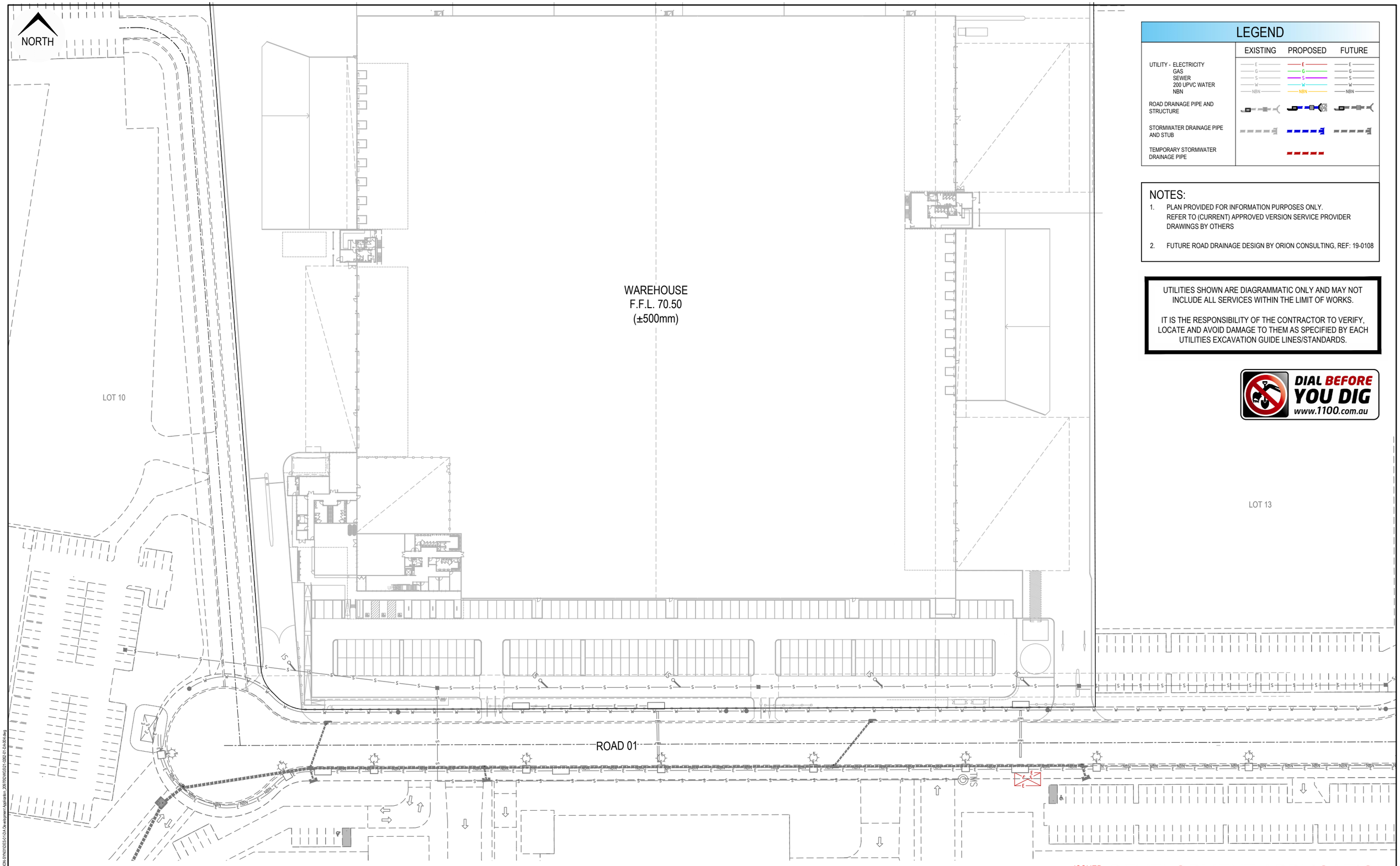

LEGEND

	EXISTING	PROPOSED	FUTURE
UTILITY - ELECTRICITY GAS SEWER 200 UPVC WATER NBN	E G S W NBN	E G S W NBN	E G S W NBN
ROAD DRAINAGE PIPE AND STRUCTURE			
STORMWATER DRAINAGE PIPE AND STUB			
TEMPORARY STORMWATER DRAINAGE PIPE			

NOTES:

1. PLAN PROVIDED FOR INFORMATION PURPOSES ONLY.
   REFER TO (CURRENT) APPROVED VERSION SERVICE PROVIDER DRAWINGS BY OTHERS
2. FUTURE ROAD DRAINAGE DESIGN BY ORION CONSULTING, REF: 19-0108

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

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A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
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SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting
JAS-ANZ
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
COMBINED SERVICES PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	004	A

Plotted:Monday, 30 March 2020 2:57:46 PM File Name:C:\1.Jobs\dwt\DRGN\SYN01\DES\01-10A Development Application_20970DWGS\21-0262-01-10A-004.dwg

REFER TO DRG. No. DA-011 FOR CONTINUATION

NORTH

REFER TO DWG 407 FOR TAIL-OUT DRAIN LONG SECTION

LOT 10

LOT 13

LOT 5
DP 2409

ROAD 01

LEGEND

APPROXIMATE EXTENT OF FILL	0.0 - 0.5m	
	0.5 - 1.0m	
	1.0 - 1.5m	
	1.5 - 2.0m	
	2.0 - 2.5m	
	> 2.5m	
APPROXIMATE EXTENT OF CUT	0.0 - 0.5m	
	0.5 - 1.0m	
	1.0 - 1.5m	
	1.5 - 2.0m	
	2.0 - 2.5m	
	> 2.5m	

VOLUMES

CUT - 10,900m³
FILL - 13,670m³

BALANCE - (IMPORT) 2,770m³

NOTE:
- BULK EARTHWORKS QUANTITIES MEASURED AS SOLID VOLUMES, NO BULKING FACTOR HAS BEEN APPLIED
- EARTHWORKS QUANTITIES ARE BASED ON ASSUMED PAD, CARPARK AND HARDSTAND PAVEMENT DEPTH OF 300mm
- NO ALLOWANCE MADE FOR OSD TANK, RAINWATER TANKS, FOOTINGS, OR SERVICE TRENCHING
- NO ALLOWANCE FOR BACKFILLING BEHIND RETAINING WALLS
- NO ALLOWANCE FOR SOIL REPLACEMENT FOR TAIL-OUT DRAIN

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

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Rev	Drawn	Design	Check	Appd.	Date	Revision Description
B	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: BULK EARTHWORKS CUT/FILL PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	010	B

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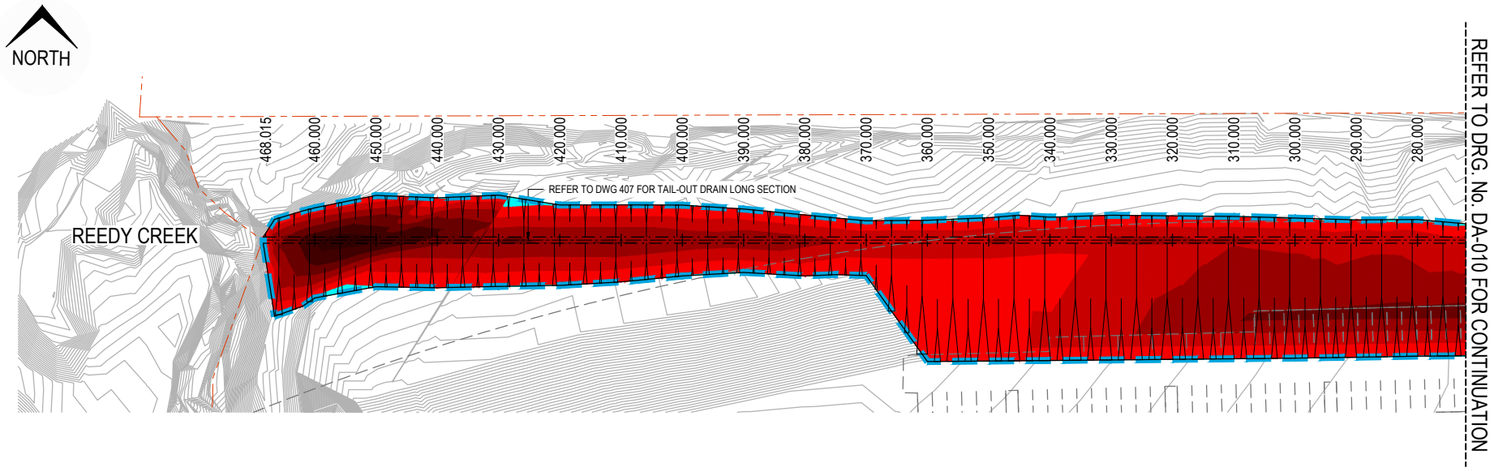
NORTH



UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, LOCATE AND AVOID DAMAGE TO THEM AS SPECIFIED BY EACH UTILITIES EXCAVATION GUIDE LINES/STANDARDS.

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LEGEND

APPROXIMATE EXTENT OF FILL	0.0 - 0.5m
	0.5 - 1.0m
	1.0 - 1.5m
	1.5 - 2.0m
	2.0 - 2.5m
	> 2.5m
APPROXIMATE EXTENT OF CUT	0.0 - 0.5m
	0.5 - 1.0m
	1.0 - 1.5m
	1.5 - 2.0m
	2.0 - 2.5m
	> 2.5m

DATUM R.L. 60.00

CHAINAGE	EXISTING LEVEL	BULK LEVEL
00.00	63.16	
10.00	63.85	
20.00	64.61	
30.00	69.09	69.66
40.00	70.02	69.32
50.00	70.07	68.98
60.00	70.13	68.90
70.00	70.15	70.20
80.00	70.15	70.20
90.00	70.04	70.20
100.00	70.03	70.20
110.00	70.02	70.20
120.00	70.01	70.20
130.00	69.99	70.20
140.00	69.99	70.20
150.00	69.99	70.20
160.00	70.00	70.20
170.00	70.05	70.20
180.00	70.01	70.20
190.00	69.99	70.20
200.00	69.99	70.20
210.00	70.00	70.20
220.00	70.00	70.20
230.00	70.00	70.20
240.00	70.00	70.15
250.00	70.00	70.05
260.00	70.03	69.85
270.00	70.13	69.58
280.00	70.21	
290.00	70.22	
300.00	70.21	

BULK SECTION A/010
SCALE 1:500 (H)
SCALE 1:100 (V)

ISSUED FOR DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
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SCALE 1:500 (A1) SCALE 1:1000 (A3)
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

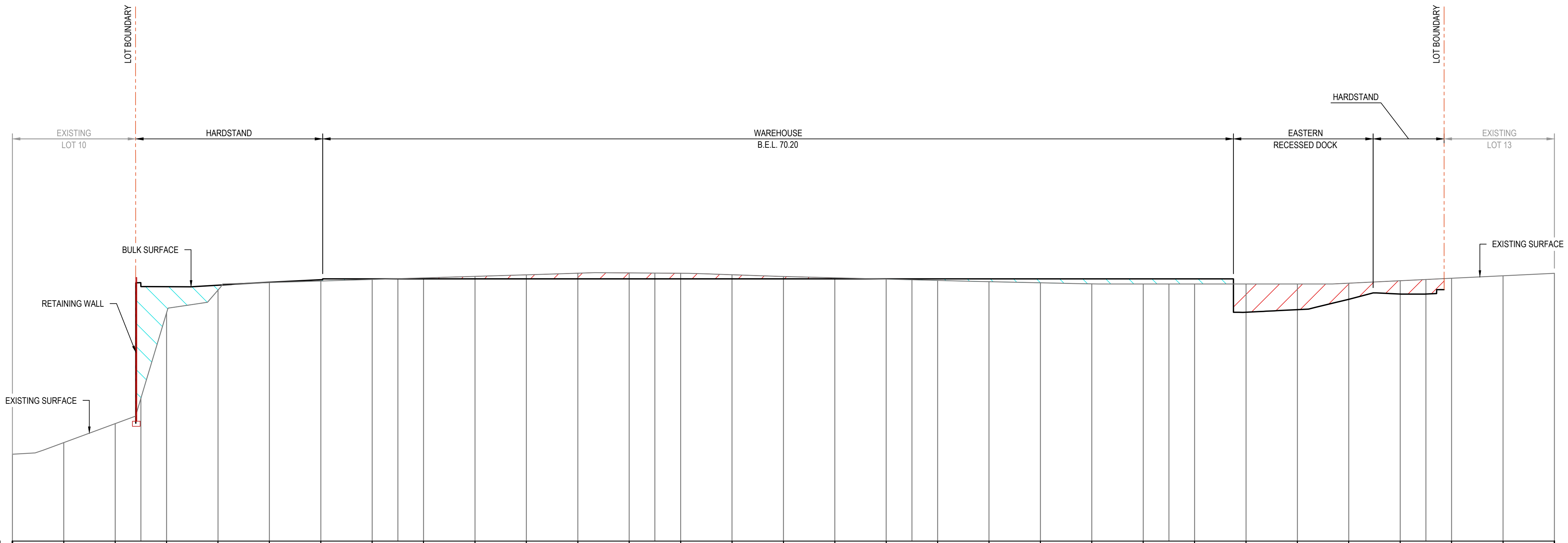
For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
BULK EARTHWORKS SITE SECTIONS
SHEET 01 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	011	A



DATUM R.L. 60.00

BULK LEVEL				69.90	69.95	70.07	70.17	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	68.90	69.00	69.41	69.61			
EXISTING LEVEL	63.38	63.83	64.57	68.88	69.76	70.06	70.12	70.18	70.24	70.30	70.35	70.42	70.43	70.42	70.36	70.29	70.24	70.19	70.14	70.09	70.05	70.00	70.00	70.00	70.00	70.00	70.03	70.13	70.22	70.32	70.42
CHAINAGE	00.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00	230.00	240.00	250.00	260.00	270.00	280.00	290.00	300.00

BULK SECTION (B / 010)
SCALE 1:500 (H)
SCALE 1:100 (V)

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NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
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SCALE 1:100 (A1) SCALE 1:200 (A3)

For: DHL

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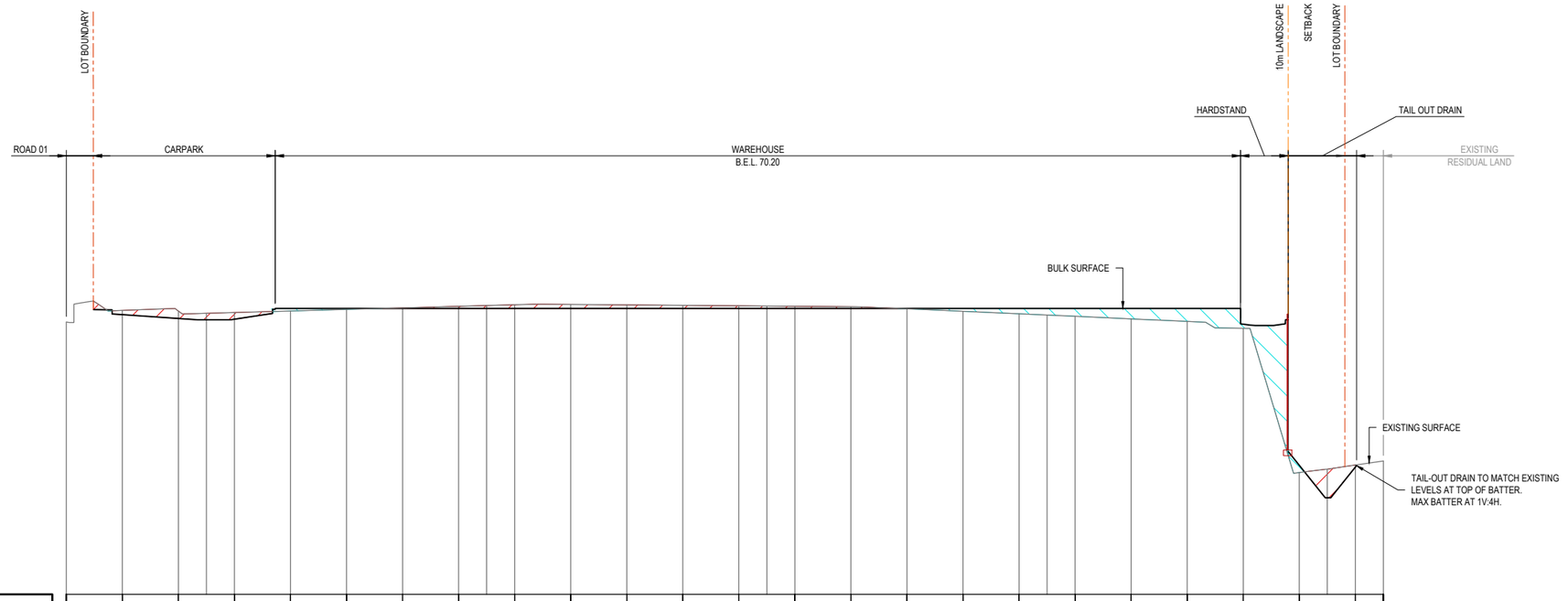
Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
BULK EARTHWORKS SITE SECTIONS
SHEET 02 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	012	A



DATUM R.L. 60.00

BULK LEVEL		69.98	69.84	69.82	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	69.64	64.60	64.54		
EXISTING LEVEL	69.71	70.13	70.10	70.05	70.11	70.16	70.22	70.28	70.33	70.34	70.33	70.31	70.29	70.28	70.26	70.19	70.10	70.01	69.92	69.83	69.74	69.49	64.34	64.61	64.76		
CHAINAGE	00.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00	230.00	235.00		

BULK SECTION C
SCALE 1:500 (H)
SCALE 1:100 (V)
010

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
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SCALE 1:500 (A1) SCALE 1:1000 (A3)
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SCALE 1:100 (A1) SCALE 1:200 (A3)

For: DHL

By:
Orion Consulting
JAS-ANZ
SUSTAINABLE
WWW.JAS-ANZ.ORG/REGISTER
ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

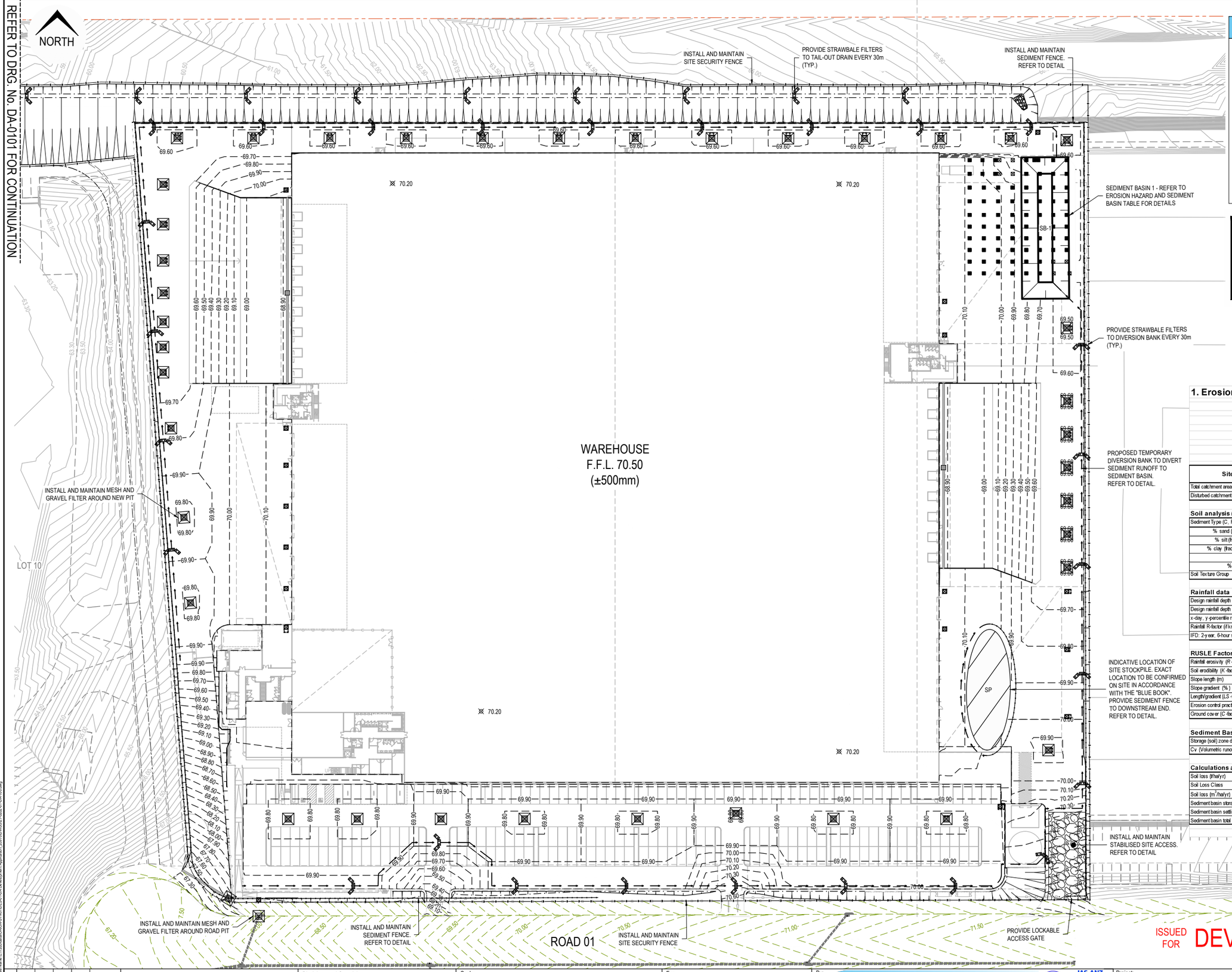
Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
BULK EARTHWORKS SITE SECTIONS
SHEET 03 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	013	A

REFER TO DRG. No. DA-0101 FOR CONTINUATION

NORTH



LEGEND

CONTOURS	55.0 — 60.0
STABILISED SITE ACCESS	
POSSIBLE STOCKPILE LOCATION	
SITE SECURITY FENCE	B — B — B
SEDIMENT FENCE	
CATCH DRAIN / DIVERSION SWALE	
PIT INLET FILTER (GEOTEXTILE OR MESH & GRAVEL)	
STRAW / HAY BALE FILTER	

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

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1. Erosion Hazard and Sediment Basins

Site Name: DHL Horsley Park

Site Location: 813 Wallgrove Road, Eastern Creek, NSW

Precinct/Stage:

Other Details: Soil Hydrologic Group C

Site area	Sub-catchment or Name of Structure: 1	Notes
Total catchment area (ha)	5.272	
Disturbed catchment area (ha)	5.272	

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	D	From Appendix C (if known)
% sand (fraction 0.02 to 2.00 mm)		Enter the percentage of each soil fraction. E.g. enter 10 for 10%
% silt (fraction 0.002 to 0.02 mm)		
% clay (fraction finer than 0.002 mm)		
Dispersion percentage		E.g. enter 10 for dispersion of 10%
% of whole soil dispersible		See Section 6.3.3(e). Auto-calculated
Soil Texture Group	D	Automatic calculation from above

Rainfall data

Design rainfall depth (no of days)	5	See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25.
Design rainfall depth (percentile)	75	
x-day , y-percentile rainfall event (mm)	19	
Rainfall R-factor (if known)		Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)	8.31	

RUSLE Factors

Rainfall erosivity (*R*-factor)	1630	Auto-filled from above
Soil erodibility (*K*-factor)	0.038	RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	300	
Slope gradient (%)	0.5	
Length/gradient (*LS*-factor)	0.13	
Erosion control practice (*P*-factor)	1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3	
Ground cover (*C*-factor)	1 | 1 | 1 | 1 | 1 | 1	

Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)

Storage (soil) zone design (no of months)	2	Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.25	See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	10	
Soil Loss Class	1	See Table 4.2, page 4-13
Soil loss (m^3/ha/yr)	8	Conversion to cubic metres
Sediment basin storage (soil) volume (m^3)	7	See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m^3)	250	See Sections 6.3.4(i) for calculations
Sediment basin total volume (m^3)	257	

NB: for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale: 0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

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Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: SEDIMENT & EROSION CONTROL PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	100	A

Plotted:Monday, 30 March 2020 2:57:45 PM File Name:C:\1Jobs\Jobs\0ROHL-SYD\1021\DES-01-DA-Development Application_2097\DWG\021-0262-01-DA-100.dwg

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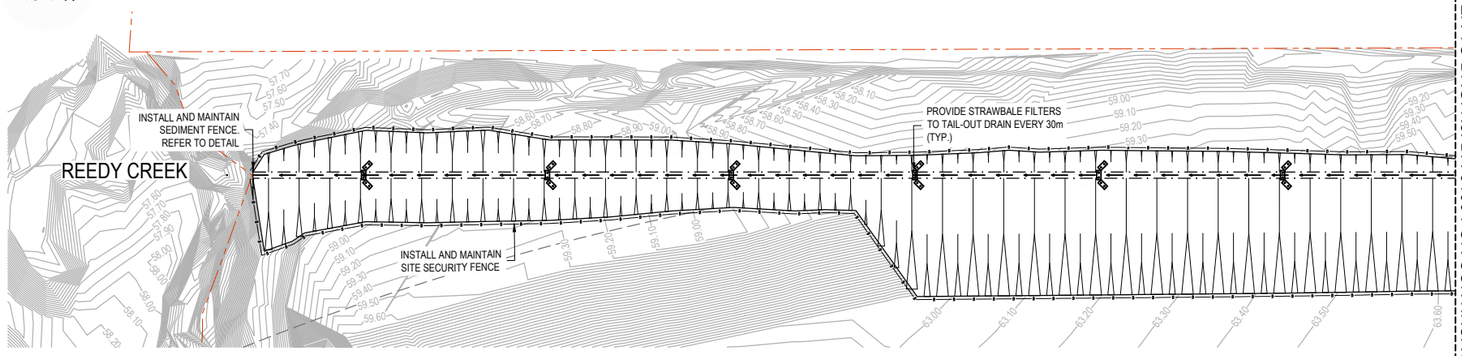
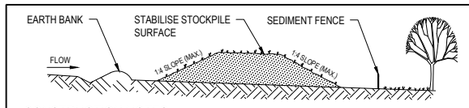


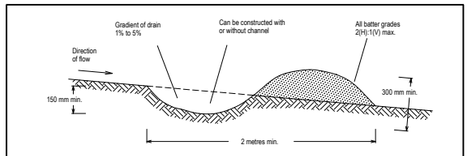
REFER TO DRG. No. DA-0100 FOR CONTINUATION



CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES 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 2 METRES IN HEIGHT.
4. ALL STOCKPILES ARE TO BE LOCATED AND PLACED IN ACCORDANCE WITH THE CONTRACTOR'S EROSION AND SEDIMENT CONTROL PLAN.
5. WHERE STOCKPILES ARE TEMPORARY (<14 DAYS) NO STABILISATION IS REQUIRED. REVIEW THE ADEQUACY OF SEDIMENT CONTROLS IF RAINFALL IS PREDICTED.
6. WHERE STOCKPILES ARE TEMPORARY (<14 DAYS) THE FOLLOWING ADDITIONAL CONTROLS ARE REQUIRED:
   -MAXIMUM BATTER SLOPE REDUCED TO 1:4
   -CONSTRUCT A CONTOUR DRAIN ON THE LOW SIDE OF THE STOCKPILE, AND DISCHARGING THROUGH A STRAW BALE OR 200mm HIGH GRAVEL DAM
   -ESTABLISH GRASS COVER TO SURFACE OF STOCKPILE WITHIN 14 DAYS, USING HYDROMULCH WITH A 75:25 MIX OF SEASONAL AND PERMANENT GRASS SEEDS, AND A STRAW MULCH THICKNESS OF NO LESS THAN 5mm.
7. 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 2 METRES DOWNSLOPE.

STOCKPILES SD 4-1

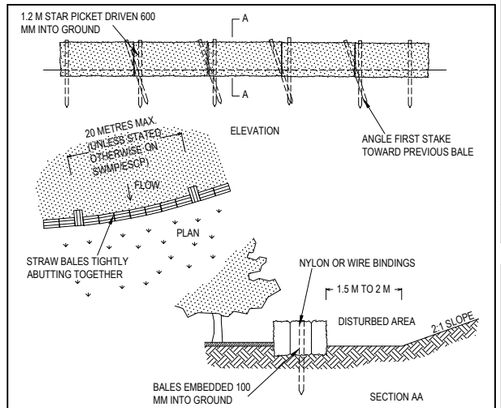


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent 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.

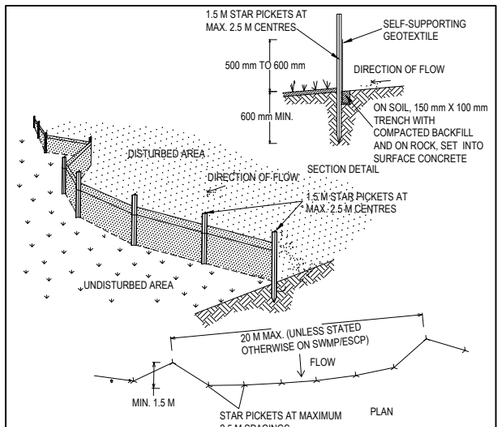
EARTH BANK (LOW FLOW) SD 5-5



CONSTRUCTION NOTES:

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75 mm TO 100 mm AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE.DRIVE THEM 600 mm INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

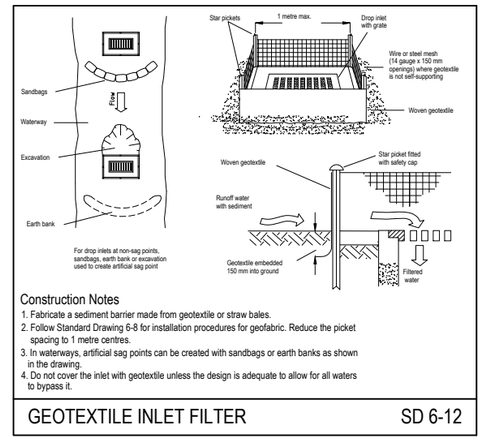
STRAW BALE FILTER SD 6-7



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 2.5m 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.

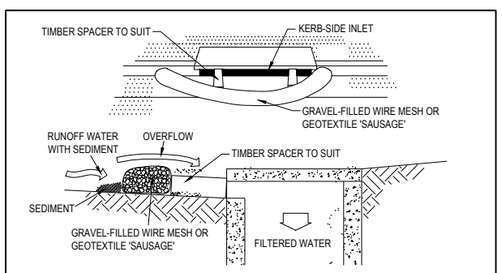
SEDIMENT FENCE SD 6-8



Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-8 for installation procedures for 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 SD 6-12

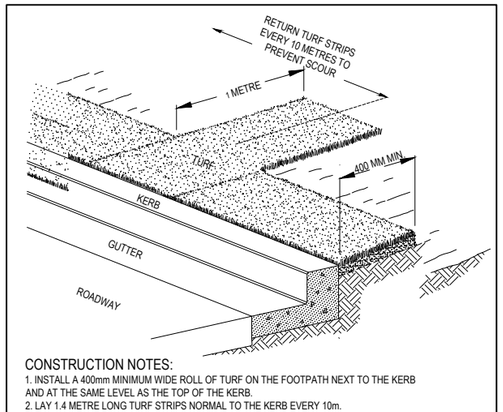


NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

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.

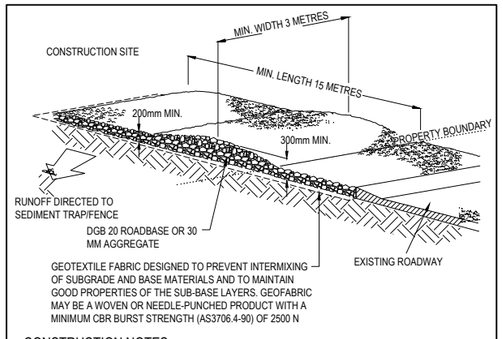
MESH AND GRAVEL INLET FILTER SD 6-11



CONSTRUCTION NOTES:

1. INSTALL A 400mm MINIMUM WIDE ROLL OF TURF ON THE FOOTPATH NEXT TO THE KERB AND AT THE SAME LEVEL AS THE TOP OF THE KERB.
2. LAY 1.4 METRE LONG TURF STRIPS NORMAL TO THE KERB EVERY 10m.
3. REHABILITATE DISTURBED SOIL BEHIND THE TURF STRIP FOLLOWING THE ESCP/SWMP.

KERBSIDE TURF STRIP SD 6-13



GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS. GEOFABRIC MAY BE A WOVEN OR NEEDLE-PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N

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 3m 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 SD 6-14

GENERAL NOTES:

ALL EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING REVEGETATION AND STORAGE OF SOIL AND TOPSOIL, SHALL BE IMPLEMENTED TO THE REQUIREMENTS OF THE "ENVIRONMENT PROTECTION AUTHORITY" AND "DEPT OF LAND AND WATER CONSERVATION". MEASURES OUTLINED IN THE SEDIMENT & EROSION CONTROL PLAN MUST BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING AND AFTER THE CONSTRUCTION WORKS.

TOPSOIL FROM ALL AREAS TO BE DISTURBED SHALL BE STOCKPILED AND LATER RESPREAD TO AID REVEGETATION IN THOSE AREAS.

ALL DRAINAGE WORKS SHALL BE CONSTRUCTED AND STABILIZED AS EARLY AS POSSIBLE DURING DEVELOPMENT.

ALL TAIL-OUT DRAINS SHALL BE GRASSED AND TRAPEZOIDAL IN SECTION. STRAW BALES SHALL BE PLACED AS A SEDIMENT CONTROL DEVICE WHERE REQUIRED.

VEHICULAR TRAFFIC SHALL BE CONTROLLED DURING DEVELOPMENT CONFINING ACCESS WHERE POSSIBLE TO PROPOSED OR EXISTING ROAD ALIGNMENTS. AREAS TO BE LEFT UNDISTURBED SHALL BE MARKED OFF.

DISTURBANCE OF VEGETATION SHALL BE LIMITED TO FILL AREAS, ROADWAYS AND DRAINAGE LINES. NO LOT GRADING SHALL BE CARRIED OUT IN UNDISTURBED AREAS WITHOUT CONSULTATION WITH COUNCIL'S ENGINEER.

ALL DISTURBED AREAS SHALL BE REVEGETATED WITHIN 14 WORKING DAYS FROM THE CONCLUSION OF LAND SHAPING.

MINIMISE DUST BY WATERING WHEN REQUIRED.

STOCKPILE NOTES:

SPOIL AND TOPSOIL STOCKPILES SHALL BE LOCATED AWAY FROM DRAINAGE LINES AND AREAS WHERE WATER MAY CONCENTRATE.

IF STOCKPILES ARE TO BE IN PLACE FOR LONGER THAN 14 DAYS THEN THEY SHALL BE STABILIZED BY COVERING WITH A MULCH OR WITH TEMPORARY

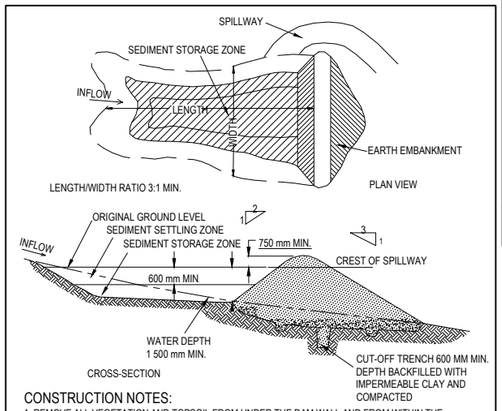
FOLLOWING CONSTRUCTION, TOPSOIL SHALL BE RESPREAD TO A MINIMUM DEPTH OF 100mm ON THE BARE SOIL SURFACES AND REVEGETATE.

ALL STOCKPILES TO BE (MAX) 2m HIGH AND PROTECTED WITH SILT FENCE.

SEDIMENTATION CONTROL DEVICES:

ALL STRAW BALES SHALL BE BOUND WITH WIRE. STRAW BALES SHALL BE PLACED END TO END IN A SINGLE ROW AND EMBEDDED INTO THE SOIL TO A DEPTH OF 100mm. EACH BALE SHALL BE SECURELY ANCHORED WITH TWO STEEL STAKES DRIVEN 450mm INTO THE GROUND AND LOCATED ON THE BALE CENTRE LINE.

SILT FENCES SHALL BE CONSTRUCTED BY STRETCHING A FILTER FABRIC (PROPEX OR SIMILAR) BETWEEN POSTS AT 2m (3m MAX) CENTRES. FABRIC SHALL BE BURIED 150mm ALONG ITS LOWER EDGE.



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 500 MM DEEP AND 1,200 MM 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 100 MM TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100 MM TO 150 MM LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY. 8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

EARTH BASIN - WET (APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY) SD 6-4

SPECIAL NOTES:

LOCATION AND EXTENT OF SOIL AND WATER MANAGEMENT DEVICES IS DIAGRAMMATIC ONLY AND THE ACTUAL REQUIREMENTS SHALL BE CONFIRMED ON SITE.

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE GUIDELINES SET OUT IN "MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION " - 4TH EDITION AND THE ACCOMPANYING ROAD AND DRAINAGE PLANS.

CONFORMITY WITH THIS PLAN SHALL IN NO WAY REDUCE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT AGAINST WATER DAMAGE DURING THE COURSE OF THE CONTRACT.

MANAGEMENT DEVICES SHALL BE MAINTAINED ON A REGULAR BASIS. WHERE CLEANING IS REQUIRED, THE SEDIMENT SHALL BE REMOVED TO A POINT NOMINATED BY THE ENGINEER.

PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS, AND AFTER THE ROAD CENTRELINES HAVE BEEN PEGGED AND/OR PERMANENTLY MARKED, THE SITE MUST BE INSPECTED BY COUNCIL'S REPRESENTATIVE AND THE APPLICANT'S REPRESENTATIVE TO IDENTIFY AND APPROPRIATELY

a) THE TREES TO BE RETAINED.
b) ALL TREES TO BE LEFT UNDISTURBED AND TO BE CORDONED OFF.

NO TREES SHALL BE REMOVED WITHOUT COUNCIL'S CLEARANCE.

MANAGEMENT DEVICES TO REMAIN UNTIL THE END OF THE MAINTENANCE PERIOD.

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale: 0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: SEDIMENT & EROSION CONTROL NOTES & DETAILS

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	101	A

Plotted:Monday, 30 March 2020 2:57:45 PM File Name:C:\Jobs\Jobs\ORION-SYNY\10ES\01-DA Development Application_20\07DWG\21-0262-01-DA-101.dwg

LEGEND

INDICATIVE DOWNPIPE LOCATION	DP
RETAINING WALL	
PROPOSED GUARD RAIL SAFETY BARRIER	
TOP OF RETAINING WALL LEVEL	TOW RL 44.00
BOTTOM OF RETAINING WALL LEVEL	BOW RL 43.00
DRAINAGE SWALE	
OCEANGUARD. REFER TO DRAWING No.406 FOR DETAILS	

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, LOCATE AND AVOID DAMAGE TO THEM AS SPECIFIED BY EACH UTILITIES EXCAVATION GUIDE LINES/STANDARDS.

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REFER TO DRG. No. DA-204 FOR CONTINUATION

NORTH

TAIL OUT DRAIN TO REEDY CREEK

TOW70.11
BOW62.98

BOW64.92
TOW70.10

RL69.97 RL69.95 RL69.85 RL69.92 RL69.98 RL69.96 RL69.99 RL69.19 RL70.07 RL70.42 RL70.49 RL69.91

A01/11 A01/12 A01/13 A01/14 A01/15 A01/16 A01/17 A01/10 A01/09 A01/08 A01/07 A01/06 A01/05 A01/04 A01/03 A03/01 A04/01 A05/06 A05/05

Ø900 Ø1050 Ø525 Ø375 Ø450

RWT 4

RWT 3

PROVIDE MIN 115kL RAINWATER TANK IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL STORMWATER MANAGEMENT POLICY SECTION 5.4

RECESSED DOCK AWNING & MAIN WAREHOUSE ROOF DOWNPIPES TO RUN AT HIGH LEVEL TO PIT A03/01

RECESSED DOCK AWNING DOWNPIPE TO RUN AT HIGH LEVEL TO PIT A05/06

PROVIDE MIN 375kL RAINWATER TANK IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL STORMWATER MANAGEMENT POLICY SECTION 5.4

A 300

WAREHOUSE
F.F.L. 70.50
(±500mm)

LOT 10

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
C	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
B	DL	DL			02-02-22	ISSUED FOR INFORMATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale: 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25
SCALE 1:250 (A1) SCALE 1:500 (A3)

For: DHL

By: Orion Consulting
JAS-ANZ
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: ENGINEERING PLAN
SHEET 01 OF 05

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	200	C

Plotted:Monday, 30 March 2020 2:57:46 PM File Name:C:\1Jobs\dwg\ORION-SYNO\DES\01\0A Development Application_20070\DWGS\21-0262-01-0A-200.dwg

LEGEND

INDICATIVE DOWNPIPE LOCATION	DP
RETAINING WALL	
PROPOSED GUARD RAIL SAFETY BARRIER	
TOP OF RETAINING WALL LEVEL	TOW RL 44.00
BOTTOM OF RETAINING WALL LEVEL	BOW RL 43.00
DRAINAGE SWALE	
OCEANGUARD. REFER TO DRAWING No.406 FOR DETAILS	

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NORTH

WAREHOUSE
F.F.L. 70.50
(±500mm)

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
C	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
B	DL	DL			02-02-22	ISSUED FOR INFORMATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale:
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25
SCALE 1:250 (A1) SCALE 1:500 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: ENGINEERING PLAN
SHEET 02 OF 05

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	201	C

Plotted:Monday, 30 March 2020 2:57:46 PM File Name:C:\1365data\ORION SYNYD\DES\01.0 DA Development Application_20970\DWGS\21-0262-01-DA-201.dwg

NORTH

TAIL OUT DRAIN TO REEDY CREEK

RL65.52

DISCHARGE OUTLET AND HEADWALL.
IL66.000

PROVIDE MIN. 36.0m BREAK IN KERB TO ALLOW FOR EMERGENCY OVERFLOW. TBC IN DETAILED DESIGN STAGE.

TOW70.00
BOW67.53

TOW70.08
BOW69.78

WAREHOUSE
F.F.L. 70.50
(±500mm)

PROVIDE MIN 240kL RAINWATER TANK IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL STORMWATER MANAGEMENT POLICY SECTION 5.4. RAINWATER TANK TO BE PLUMBED TO TOILETS AND IRRIGATION.

RWT 2

RECESSED DOCK AWNING DOWNPIPE TO RUN AT HIGH LEVEL TO PIT A07/02

LOT 13

LEGEND

INDICATIVE DOWNPIPE LOCATION	DP
RETAINING WALL	
PROPOSED GUARD RAIL SAFETY BARRIER	
TOP OF RETAINING WALL LEVEL	TOW RL 44.00
BOTTOM OF RETAINING WALL LEVEL	BOW RL 43.00
DRAINAGE SWALE	
OCEANGUARD. REFER TO DRAWING No.406 FOR DETAILS	

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C	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
B	DL	DL			02-02-22	ISSUED FOR INFORMATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

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SCALE 1:250 (A1)
SCALE 1:500 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
ENGINEERING PLAN
SHEET 03 OF 05

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	202	C

NORTH

WAREHOUSE
F.F.L. 70.50
(±500mm)

PROVIDE MIN. 215kL RAINWATER TANK IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL STORMWATER MANAGEMENT POLICY SECTION 5.4

RWT 1

RETAINING WALL TO TAPER TO KERB

RETAINING WALL TO TAPER TO ROAD 01 VERGE

1:3 (MAX) BATTER SLOPE

VEHICLE LAY BACK TO BE IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL'S STANDARD DRAWING S-1

FUTURE ROAD DRAINAGE DESIGN BY ORION CONSULTING REF: 19-0108

ROAD 01

LOT 13

LEGEND

INDICATIVE DOWNPIPE LOCATION	DP
RETAINING WALL	
PROPOSED GUARD RAIL SAFETY BARRIER	
TOP OF RETAINING WALL LEVEL	TOW RL 44.00
BOTTOM OF RETAINING WALL LEVEL	BOW RL 43.00
DRAINAGE SWALE	
OCEANGUARD. REFER TO DRAWING No.406 FOR DETAILS	

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C	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
B	DL	DL			02-02-22	ISSUED FOR INFORMATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

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SCALE 1:250 (A1) SCALE 1:500 (A3)

For: DHL

By: Orion Consulting
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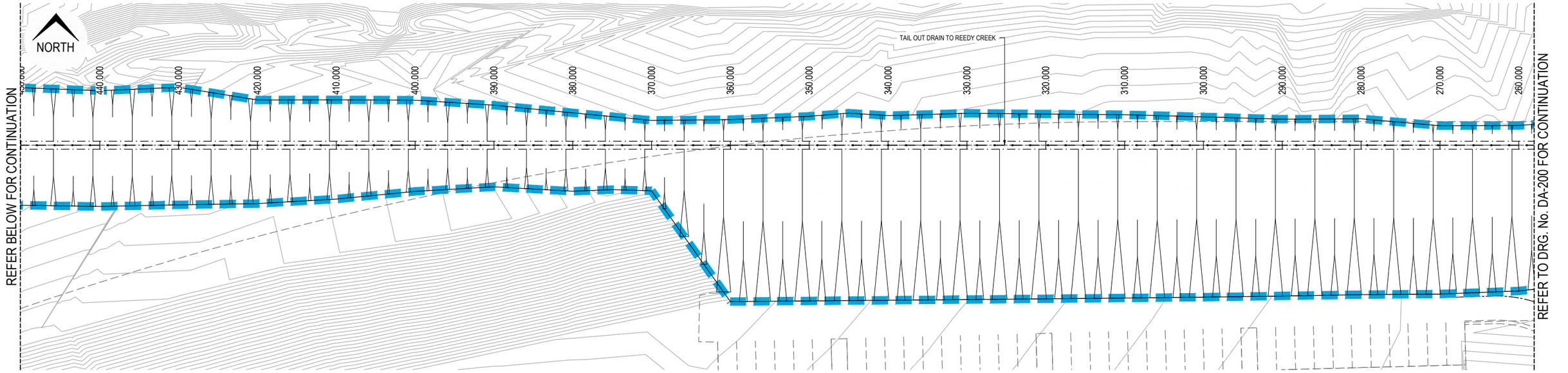
JAS-ANZ

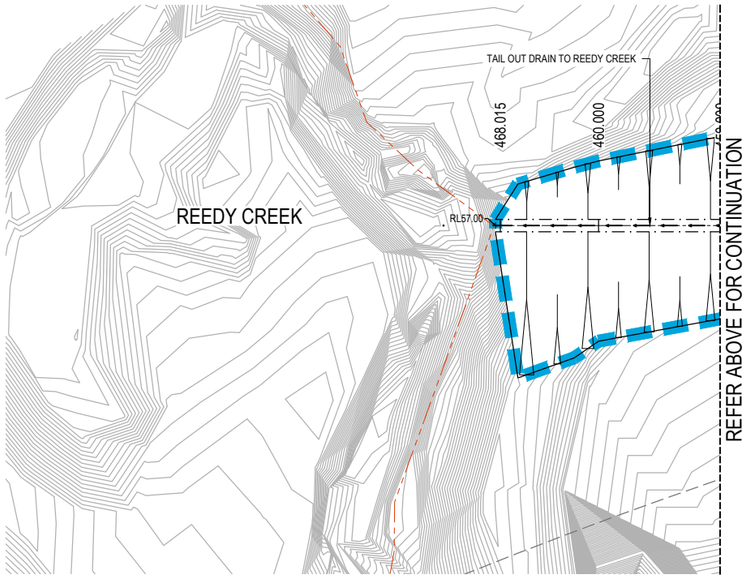
Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: ENGINEERING PLAN
SHEET 04 OF 05

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	203	C

Plotted:Monday, 30 March 2020 2:57:46 PM File Name:C:\1Jobs\dwg\DHDN\SYD\21DS01\10A Development Application_20970DWGS21-0262-01-10A-203.dwg





LEGEND

INDICATIVE DOWNPIPE LOCATION	
RETAINING WALL	
PROPOSED GUARD RAIL SAFETY BARRIER	
TOP OF RETAINING WALL LEVEL	TOW RL 44.00
BOTTOM OF RETAINING WALL LEVEL	BOW RL 43.00
DRAINAGE SWALE	
OCEANGUARD. REFER TO DRAWING No.406 FOR DETAILS	

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A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

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SCALE 1:250 (A1) SCALE 1:500 (A3)

For: DHL

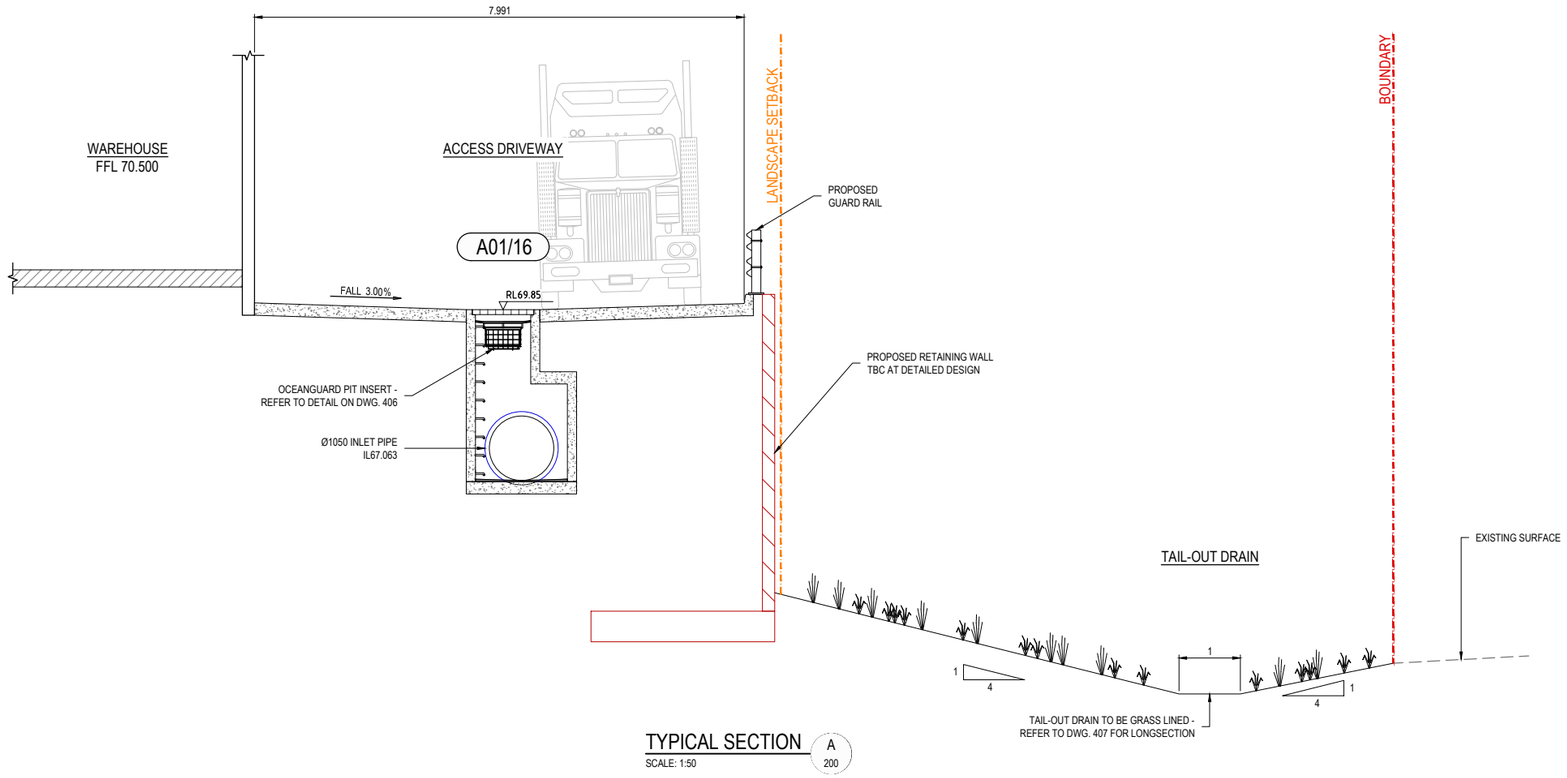
By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: ENGINEERING PLAN
SHEET 05 OF 05

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	204	A

Plotted:Monday, 30 March 2020 2:47:46 PM File Name:C:\JobData\ORION-SYNX\TDES\21-0DA-Development Application_2097\D\WCS\21-0262-21-0-A-204.dwg



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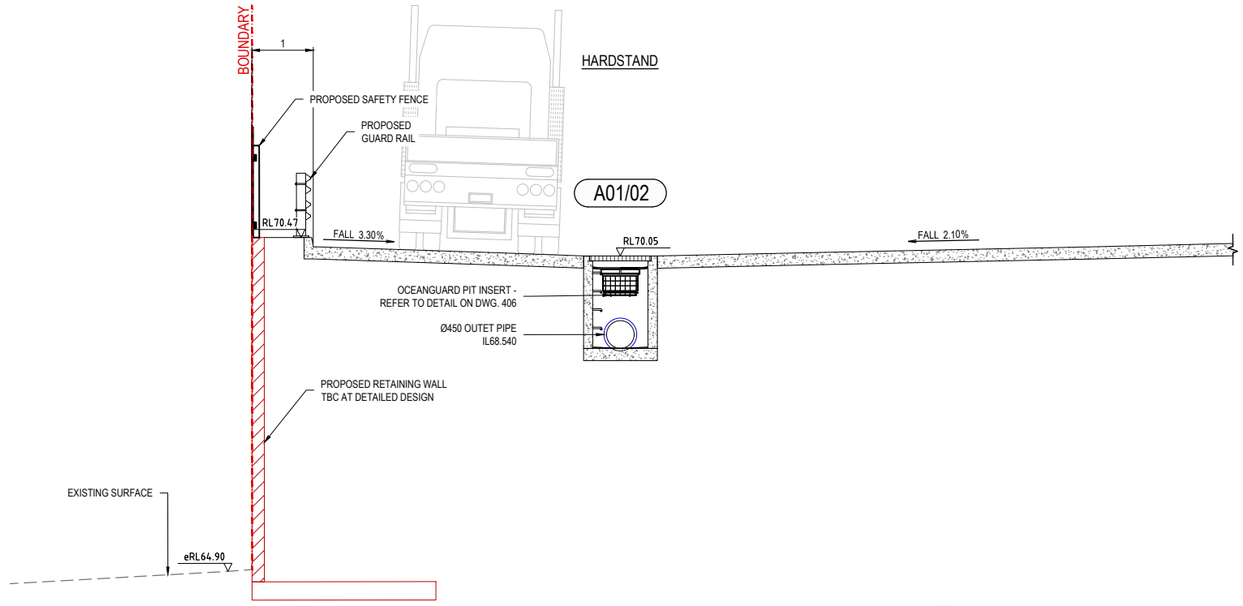

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ISSUED FOR **DEVELOPMENT APPLICATION**
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Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
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SCALE 1:50 (A1) SCALE 1:100 (A3)

For: DHL

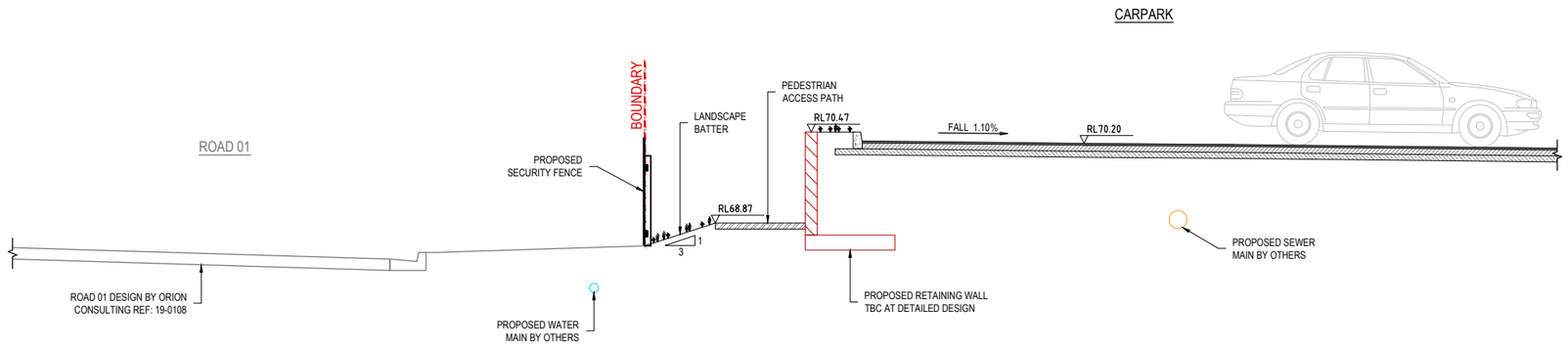
By: Orion Consulting
ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

JAS-ANZ SUSTAINABLE WWW.JAS-ANZ.ORG/REGISTER

Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
TYPICAL SITE SECTIONS
SHEET 02 OF 02

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	300	A



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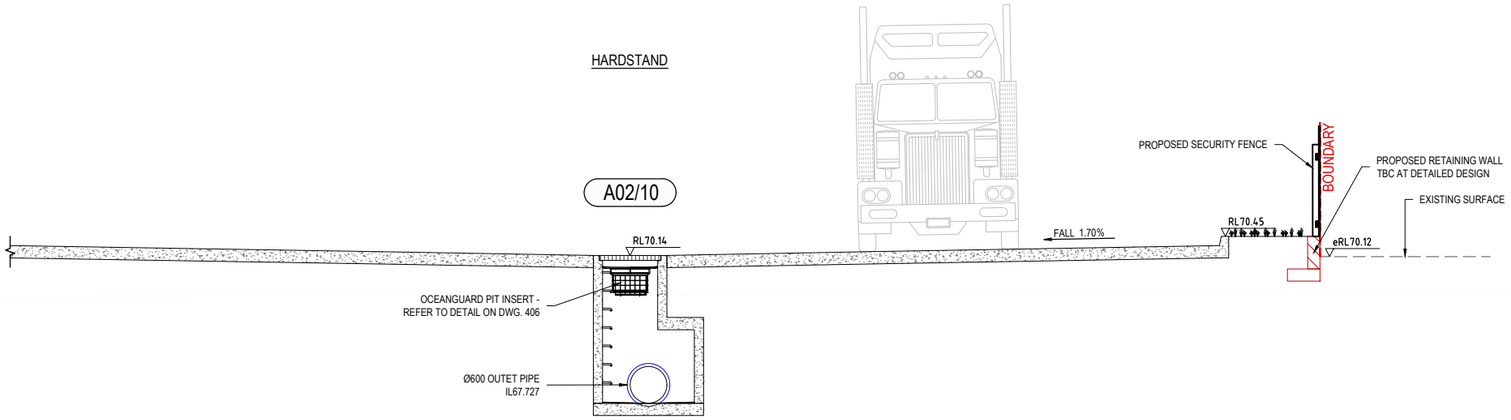

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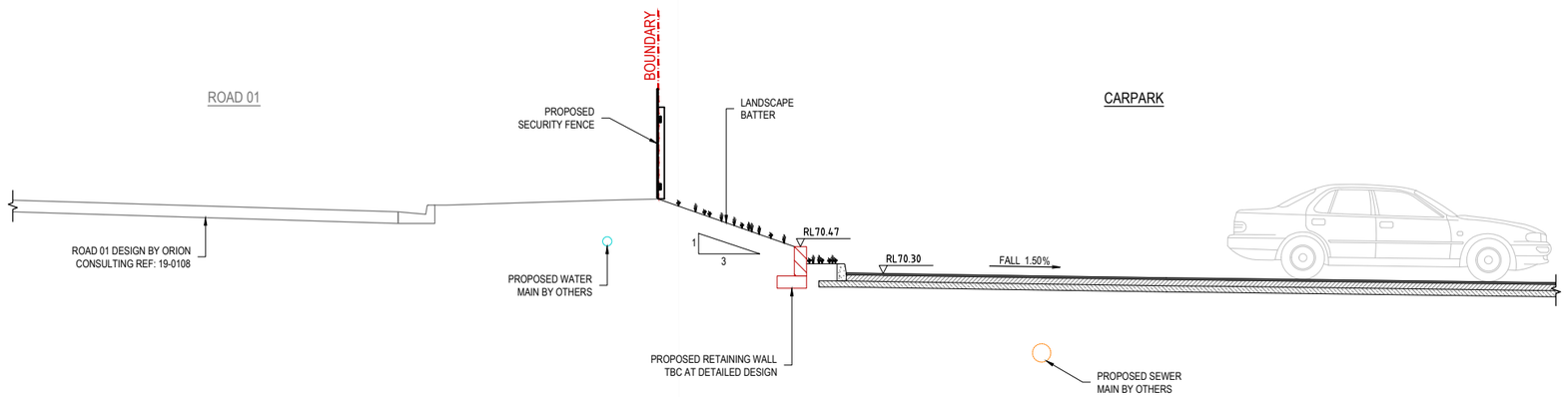

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NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

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SCALE 1:50 (A1) SCALE 1:100 (A3)

For: DHL

By: Orion Consulting
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Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: TYPICAL SITE SECTIONS
SHEET 01 OF 02

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	301	A

NORTH

LEGEND

CATCHMENT NAME, DIRECTION OF FALL & AREA	1/1 0.1760ha
CONTOURS (EXISTING & DESIGN)	10.0 — -20.0-
DRAINAGE (EXISTING, FUTURE & DESIGN)	
PROPOSED / DESIGN CATCHMENT AND BOUNDARY	
PROPOSED / DESIGN BYPASS AND BOUNDARY	

BYPASS TO REEDY CREEK 0.2647ha

A01/10 0.0155ha
A01/09 0.0149ha
A01/08 0.0115ha
A01/07 0.0109ha
A01/06 0.0080ha
A01/05 0.0076ha
A01/04 0.0520ha
A01/03 0.0208ha
A01/02 0.0476ha
A01/01 0.0517ha
A01/11 0.0324ha
A01/12 0.0392ha
A01/13 0.0173ha
A01/14 0.0173ha
A01/15 0.0173ha
A01/16 0.0173ha
A01/17 0.0173ha
A01/18 0.0173ha
A01/19 0.0173ha
A01/20 0.0173ha
A01/21 0.0179ha
A01/22 0.0344ha
A06/01 0.0133ha
A10/01 0.0269ha
A02/20 0.0704ha
A02/20 0.0529ha
A02/20 0.0750ha
A02/19 0.0119ha
A02/18 0.0119ha
A02/17 0.0119ha
A02/16 0.0120ha
A02/15 0.0111ha
A08/01 0.1303ha
A02/14 0.0484ha
A02/12 0.0758ha
A02/11 0.0751ha
A02/10 0.0999ha
A04/01 0.1308ha
RWT 4
RWT 4 0.3722ha
RWT 3
RWT 3 1.1412ha
RWT 2
RWT 2 0.7751ha
RWT 1
RWT 1 0.7063ha
WAREHOUSE
F.F.L. 70.50
(±500mm)
A02/03 0.1113ha
A02/01 0.0748ha
A02/08 0.0759ha
B01/01 0.0809ha
A02/01 0.0862ha
A02/02 0.0539ha
A02/03 0.0257ha
A02/04 0.0846ha
A02/05 0.1046ha
A02/06 0.0631ha
A02/07 0.1045ha
A02/08 0.1157ha
BYPASS TO ROAD 01 0.0702ha
K&G
ROAD 01
LOT 10
LOT 13

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
B	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale: 0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: STORMWATER CATCHMENT PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	400	B

Plotted:Monday, 30 March 2020 2:57:46 PM File Name:C:\1Jobs\dwg\ORION SYD\21\DES\01\0A Development Application\ 210702WDS21-0262-01-0A-400.dwg

NORTH

LEGEND

CATCHMENT WAREHOUSE ROOF TO RAINWATER TANK	AREA: 2.995ha
CATCHMENT WAREHOUSE ROOF TO TRUNK DRAINAGE	AREA: 0.558ha
CATCHMENT IMPERVIOUS	AREA: 1.599ha
CATCHMENT PERVIOUS	AREA: 0.120ha
CATCHMENT BYPASS IMPERVIOUS	AREA: 0.115ha
CATCHMENT BYPASS PERVIOUS	AREA: 0.299ha

RWT 4
RWT 3
RWT 2
RWT 1

WAREHOUSE
F.F.L. 70.50
(±500mm)

LOT 10
LOT 13
ROAD 01

5.00%

ISSUED FOR DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
B	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION
A	DL	DL	MM		27-01-22	50% DA PROGRESS ISSUE

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1)
SCALE 1:1000 (A3)

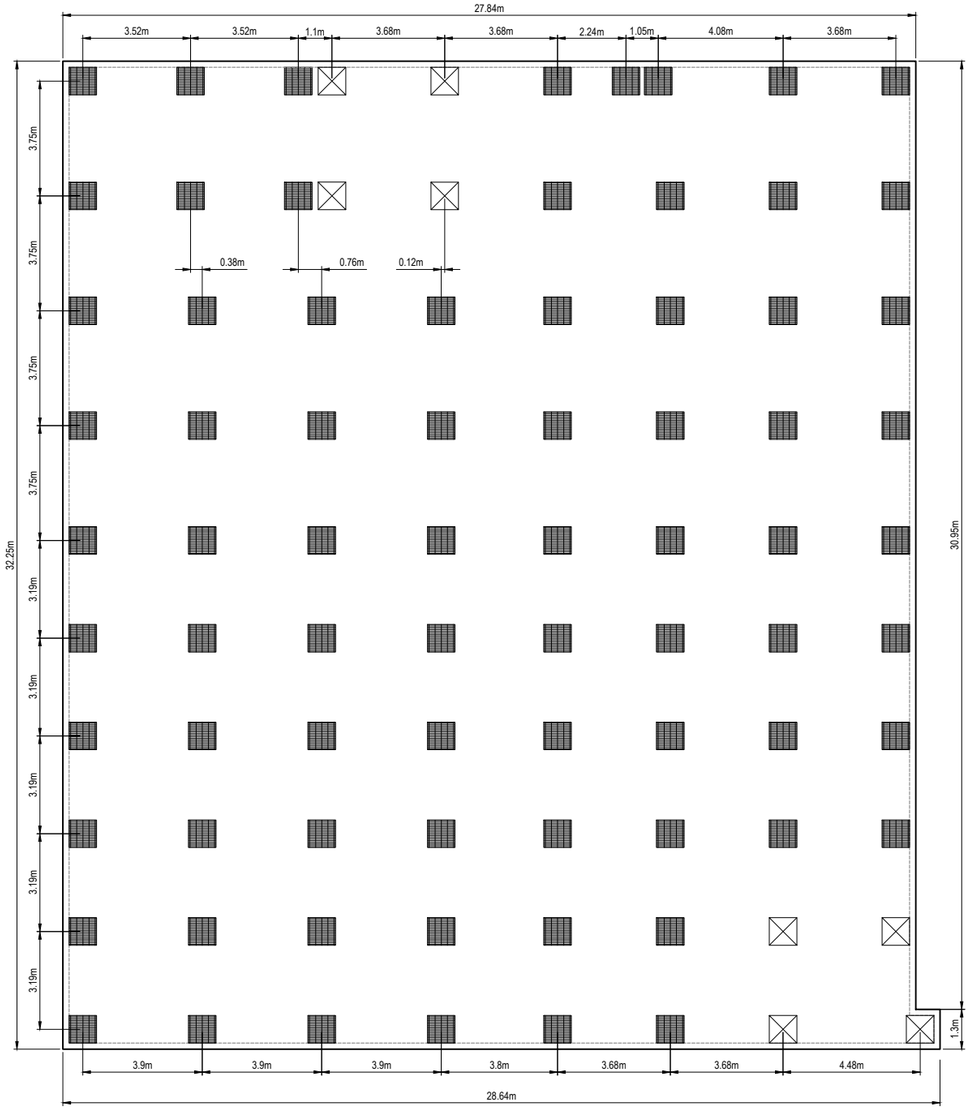
For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

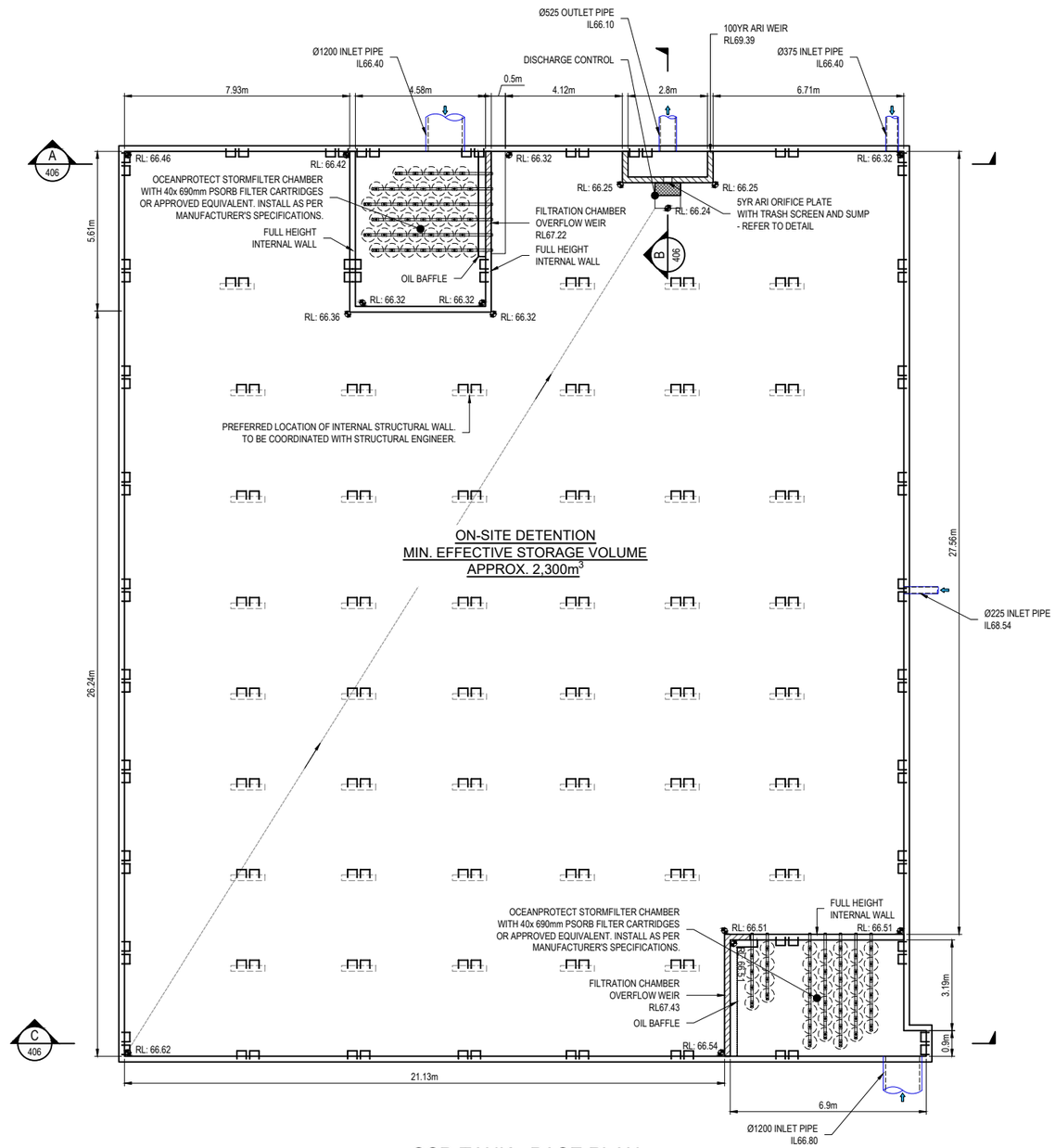
Title: MUSIC CATCHMENT PLAN

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	401	B



OSD TANK - ROOF PLAN

SCALE 1:100



OSD TANK - BASE PLAN

SCALE 1:100

ISSUED FOR **DEVELOPMENT APPLICATION**

NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale: 0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

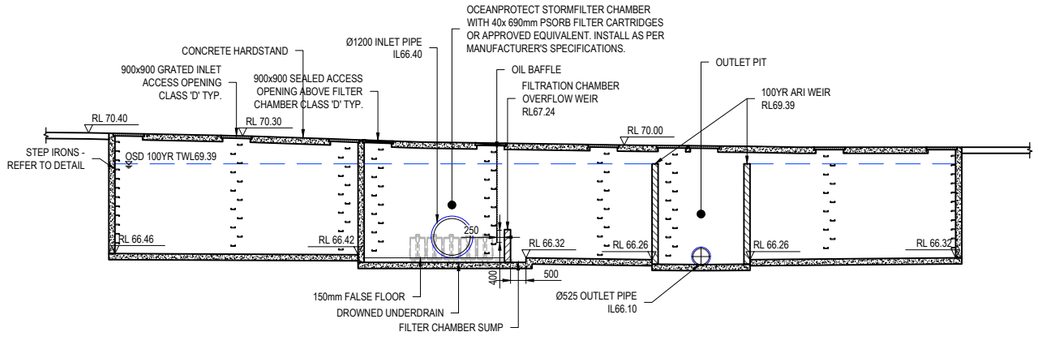
For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: WATER QUALITY DETAILS
SHEET 01 OF 02

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	405	A



OSD SECTION A

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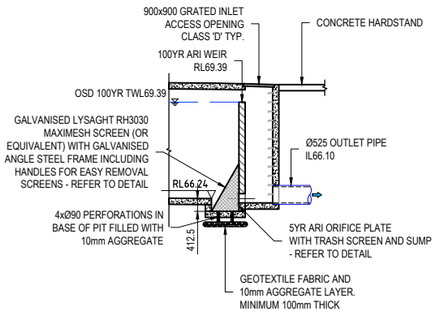
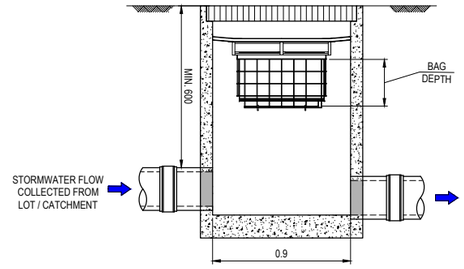


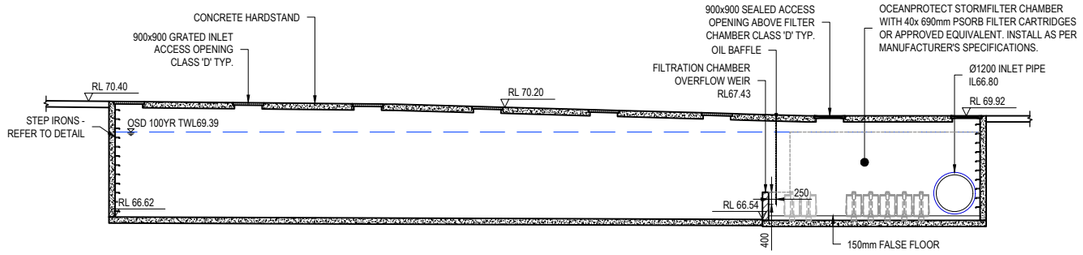
OSD SECTION B

SCALE: 1:100 405



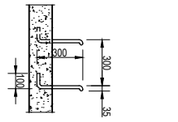
OCEANGUARD CONFIGURATION

SCALE 1:20

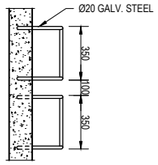


OSD SECTION C

SCALE: 1:100 405



ELEVATION

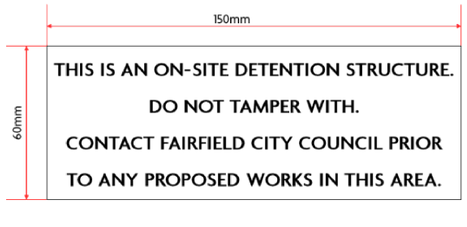


PLAN

STEP IRONS DETAILS

N.T.S

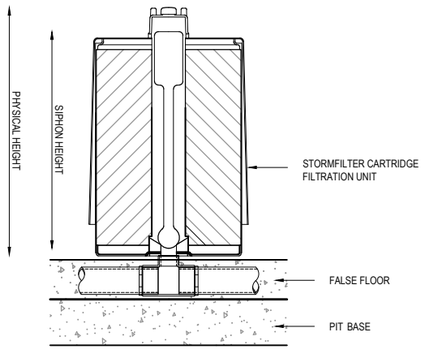
STEP IRONS SHALL BE STAGGERED AT 300 CENTRES



OSD SIGNAGE

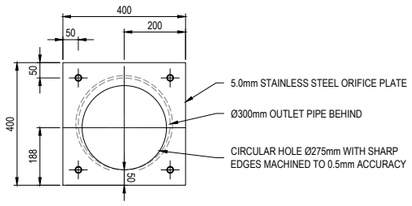
N.T.S

STANDARD ON-SITE DETENTION MARKER PLATES TO BE FIXED ON ALL OSD TANKS IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL STORMWATER MANAGEMENT POLICY 2017



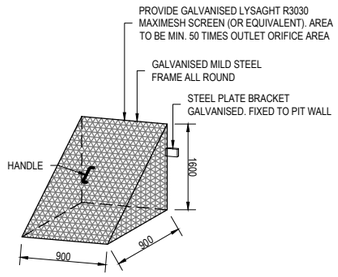
STORMFILTER CARTRIDGE DETAIL

SCALE: N.T.S.



ORIFICE PLATE

SCALE: 1:10



TYPICAL TRASH SCREEN

N.T.S

ISSUED FOR **DEVELOPMENT APPLICATION**

NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
0 1 2 3 4 5 6 7 8 9 10 — SCALE 1:100 (A1) — SCALE 1:200 (A3)
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 — SCALE 1:20 (A1) — SCALE 1:40 (A3)
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 — SCALE 1:10 (A1) — SCALE 1:20 (A3)

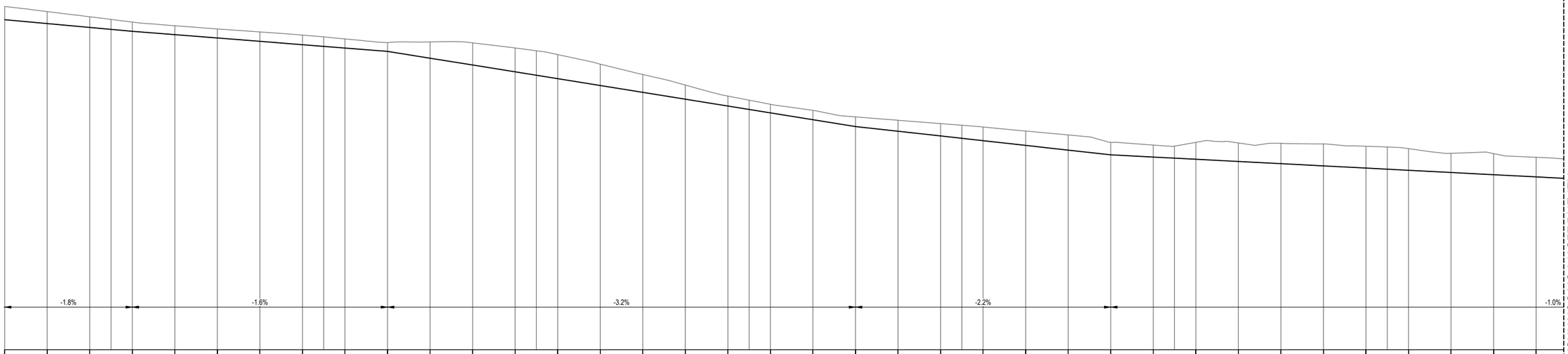
For: DHL

By: Orion Consulting
ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: WATER QUALITY DETAILS
SHEET 02 OF 02

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	405	A



DATUM R.L. 50.00

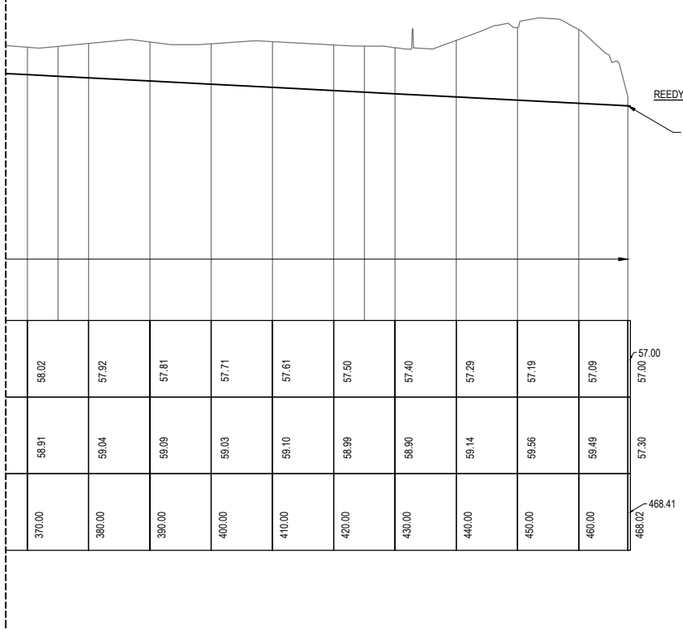
DESIGN LEVEL	65.52	65.34	65.15	64.97	64.81	64.66	64.50	64.34	64.19	64.03	63.71	63.39	63.06	62.74	62.42	62.10	61.78	61.46	61.14	60.82	60.49	60.27	60.05	59.83	59.61	59.38	59.16	59.06	58.96	58.85	58.75	58.64	58.54	58.44	58.33	58.23	58.13
EXISTING LEVEL	66.14	65.90	65.65	65.41	65.23	65.08	64.94	64.79	64.61	64.44	64.47	64.43	64.19	63.88	63.43	62.94	62.44	61.93	61.54	61.25	60.95	60.79	60.63	60.47	60.28	60.10	59.75	59.62	59.75	59.72	59.70	59.68	59.57	59.45	59.24	59.22	59.05
CHAINAGE	00.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00	230.00	240.00	250.00	260.00	270.00	280.00	290.00	300.00	310.00	320.00	330.00	340.00	350.00	360.00

REFER BELOW FOR CONTINUATION

TAIL-OUT DRAIN LONG-SECTION

SCALE 1:500 (H)
SCALE 1:100 (V)

REFER ABOVE FOR CONTINUATION



58.02	57.92	57.81	57.71	57.61	57.50	57.40	57.29	57.19	57.09	57.00
58.91	59.04	59.09	59.03	59.10	58.99	58.90	59.14	59.56	59.49	57.30
370.00	380.00	390.00	400.00	410.00	420.00	430.00	440.00	450.00	460.00	468.02

UTILITIES SHOWN ARE DIAGRAMMATIC ONLY AND MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, LOCATE AND AVOID DAMAGE TO THEM AS SPECIFIED BY EACH UTILITIES EXCAVATION GUIDE LINES/STANDARDS.

DIAL BEFORE YOU DIG www.1100.com.au

ISSUED FOR **DEVELOPMENT APPLICATION**
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

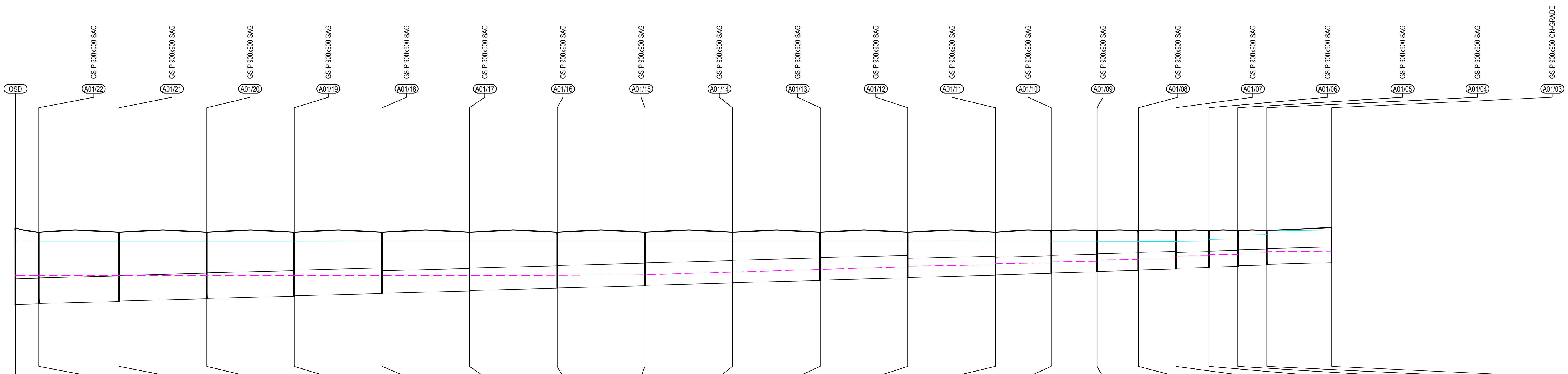
Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: TAIL-OUT DRAIN SECTIONS

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	407	A

LEGEND

PROPOSED PIPE	(thin solid line)
FINISHED DESIGN SURFACE LEVEL	(thick solid line)
100 YEAR HGL LEVEL	(cyan line)
5 YEAR HGL LEVEL	(magenta dashed line)



DATUM RL 60.0

From	To	DISCHARGE (cu.m/sec)	VELOCITY (m/s)	PIPE DETAILS	SLOPE/GRADE	HGL (100 YR ARI)	DEPTH TO INVERT	INVERT LEVEL	FINISHED SURFACE	CHAINAGE	Length
OSD	A01/22	0.834	0.74	1200Ø Class 2 RRJ	0.5%	69.389 / 69.389	3.642 / 3.423	66.398 / 66.427	70.040 / 69.850	0.000 / 5.550	5.550
A01/22	A01/21	0.851	0.75	1200Ø Class 2 RRJ	0.5%	69.391 / 69.390	3.403 / 3.307	66.447 / 66.543	69.850	24.711	19.161
A01/21	A01/20	0.874	0.77	1200Ø Class 2 RRJ	0.5%	69.390 / 69.390	3.287 / 3.182	66.563 / 66.668	69.850	45.612	20.900
A01/20	A01/19	0.889	0.79	1200Ø Class 2 RRJ	0.5%	69.391 / 69.390	3.162 / 3.057	66.688 / 66.793	69.850	66.461	20.849
A01/19	A01/18	0.905	0.80	1200Ø Class 2 RRJ	0.5%	69.390 / 69.389	3.037 / 2.932	66.813 / 66.918	69.850	87.449	20.988
A01/18	A01/17	0.920	1.02	1050Ø Class 2 RRJ	0.5%	69.389 / 69.389	2.912 / 2.807	66.938 / 67.043	69.850	108.261	20.812
A01/17	A01/16	0.926	1.03	1050Ø Class 2 RRJ	0.5%	69.389 / 69.388	2.787 / 2.682	67.063 / 67.168	69.850	129.212	20.951
A01/16	A01/15	0.934	1.04	1050Ø Class 2 RRJ	0.5%	69.388 / 69.388	2.662 / 2.557	67.188 / 67.293	69.850	150.111	20.900
A01/15	A01/14	0.931	1.04	1050Ø Class 2 RRJ	0.5%	69.388 / 69.387	2.537 / 2.432	67.313 / 67.418	69.850	171.012	20.900
A01/14	A01/13	0.932	1.04	1050Ø Class 2 RRJ	0.5%	69.387 / 69.387	2.412 / 2.307	67.438 / 67.543	69.850	191.911	20.900
A01/13	A01/12	0.954	1.06	1050Ø Class 2 RRJ	0.5%	69.387 / 69.387	2.287 / 2.183	67.563 / 67.667	69.850	212.811	20.900
A01/12	A01/11	0.730	1.15	900Ø Class 2 RRJ	0.5%	69.387 / 69.381	2.163 / 2.059	67.687 / 67.791	69.850	233.711	20.900
A01/11	A01/10	0.728	1.36	825Ø Class 2 RRJ	0.5%	69.381 / 69.383	2.039 / 2.039	67.811 / 67.881	69.920	247.045	13.334
A01/10	A01/09	0.724	1.35	825Ø Class 2 RRJ	0.5%	69.391 / 69.392	2.019 / 1.965	67.901 / 67.955	69.920	257.942	10.897
A01/09	A01/08	0.721	1.35	825Ø Class 2 RRJ	0.5%	69.397 / 69.397	1.945 / 1.895	67.975 / 68.025	69.920	267.840	9.897
A01/08	A01/07	0.720	1.35	825Ø Class 2 RRJ	0.5%	69.403 / 69.404	1.875 / 1.830	68.045 / 68.090	69.920	276.743	8.903
A01/07	A01/06	0.715	1.62	750Ø Class 2 RRJ	0.5%	69.412 / 69.424	1.800 / 1.760	68.120 / 68.160	69.920	284.643	7.900
A01/06	A01/05	0.716	1.62	750Ø Class 2 RRJ	0.5%	69.503 / 69.526	1.740 / 1.705	68.180 / 68.215	69.920	291.543	6.900
A01/05	A01/04	0.719	1.63	750Ø Class 2 RRJ	0.5%	69.707 / 69.728	1.675 / 1.640	68.245 / 68.280	69.920	298.443	6.900
A01/04	A01/03	0.699	1.58	750Ø Class 2 RRJ	0.5%	69.902 / 69.947	1.610 / 1.684	68.310 / 68.387	70.070	313.885	15.442

DRAINAGE LONGITUNDINAL SECTION FOR LINE A01

SCALES: HORIZONTAL 1:500 VERTICAL 1:100

ISSUED FOR DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

For: DHL

By: Orion Consulting
ABN:25 604 069 981 PO Box:7936, BAULKHAM HILLS NSW 2153 T:(02) 8660 0035 E:info@orionconsulting.com.au

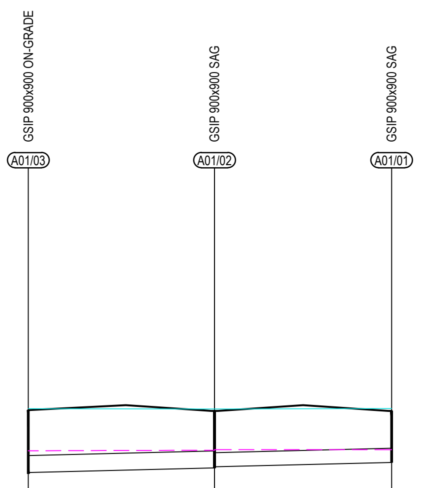
Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
STORMWATER DRAINAGE
LONG SECTIONS
SHEET 01 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	410	A

LEGEND

PROPOSED PIPE	
FINISHED DESIGN SURFACE LEVEL	
100 YEAR HGL LEVEL	
5 YEAR HGL LEVEL	



	A01/03 – A01/02	A01/02 – A01/01
DISCHARGE (cu.m/sec)	0.102	0.057
VELOCITY (m/s)	0.64	0.52
PIPE DETAILS	450Ø Class 2 RRJ	375Ø Class 2 RRJ
SLOPE/GRADE	0.5%	0.5%

DATUM RL 60.0

	A01/03		A01/02 (in)	A01/02 (out)		A01/01
HGL (100 YR ARI)	70.107		70.101	70.101		70.101 / 70.104
DEPTH TO INVERT	1.654		1.510	1.480		1.363
INVERT LEVEL	68.417		68.540	68.570		68.687
FINISHED SURFACE	70.070		70.050			70.050
CHAINAGE	313.885	24.650	338.535		23.447	361.981

DRAINAGE LONGITUNDINAL SECTION FOR LINE A01

SCALES: HORIZONTAL 1:500 VERTICAL 1:100

ISSUED FOR DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

For:

By: Orion Consulting

ABN:25 604 069 981 **PO Box:**7936, BAULKHAM HILLS NSW 2153 **T:**(02) 8660 0035 **E:**info@orionconsulting.com.au

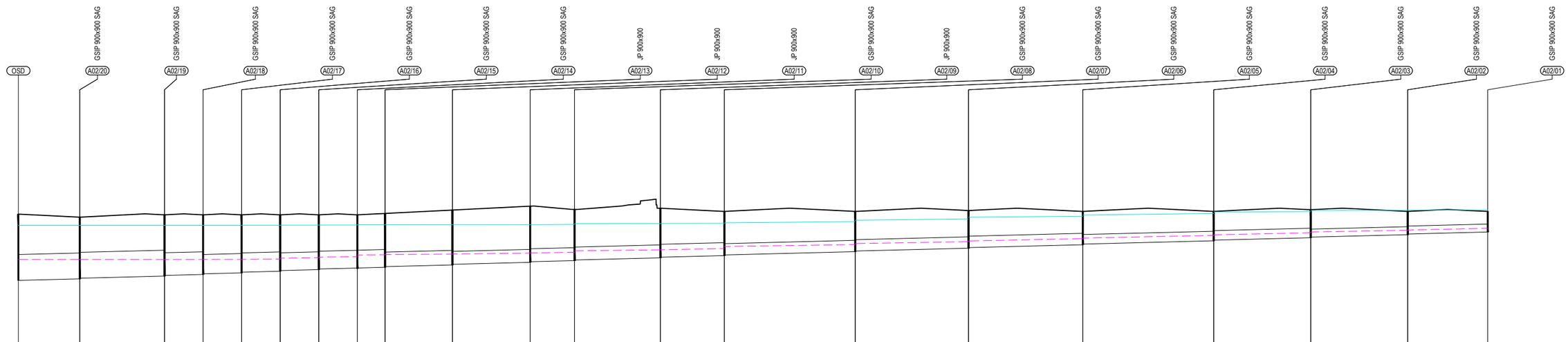
Project:
DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title:
STORMWATER DRAINAGE
LONG SECTIONS
SHEET 02 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	411	A

LEGEND

PROPOSED PIPE	
FINISHED DESIGN SURFACE LEVEL	
100 YEAR HGL LEVEL	
5 YEAR HGL LEVEL	



DISCHARGE (cu.m/sec)	1.427	0.970	0.963	0.956	0.915	0.911	0.904	0.880	0.512	0.473	0.436	0.385	0.385	0.300	0.255	0.227	0.182	0.162	0.125	0.101
VELOCITY (m/s)	1.26	0.86	1.07	1.06	1.44	1.70	1.69	1.65	1.43	1.67	1.54	1.36	1.36	1.39	1.18	1.05	1.15	1.02	1.14	0.91
PIPE DETAILS	1200Ø Class 2 RRJ	1200Ø Class 2 RRJ	1050Ø Class 2 RRJ	900Ø Class 2 RRJ	900Ø Class 2 RRJ	825Ø Class 2 RRJ	825Ø Class 2 RRJ	825Ø Class 2 RRJ	675Ø Class 2 RRJ	600Ø Class 2 RRJ	600Ø Class 2 RRJ	600Ø Class 2 RRJ	600Ø Class 2 RRJ	525Ø Class 2 RRJ	525Ø Class 2 RRJ	525Ø Class 2 RRJ	450Ø Class 2 RRJ	450Ø Class 2 RRJ	375Ø Class 2 RRJ	375Ø Class 2 RRJ
SLOPE/GRADE	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
DATUM RL 60.0																				
HGL (100 YR ARI)	69.389	69.389 / 69.390	69.390 / 69.390	69.390 / 69.391	69.391 / 69.392	69.393 / 69.398	69.399 / 69.401	69.403 / 69.414	69.415 / 69.417	69.421 / 69.423	69.420 / 69.420	69.430 / 69.470	69.475 / 69.477	69.482 / 69.506	69.564 / 69.630	69.691 / 69.770	69.817 / 69.876	69.948 / 70.015	70.039 / 70.087	70.098 / 70.109	70.118 / 70.148
DEPTH TO INVERT	3.125	2.913 / 2.883	2.892 / 2.862	2.816 / 2.786	2.740 / 2.710	2.664 / 2.660	2.614 / 2.584	2.538 / 2.508	2.536 / 2.506	2.586 / 2.556	2.647 / 2.617	2.413 / 2.383	2.338 / 2.309	2.087 / 2.057	1.902 / 1.872	1.778 / 1.748	1.573 / 1.543	1.389 / 1.359	1.324 / 1.294	1.100 / 1.070	0.975
INVERT LEVEL	66.795	66.857 / 66.897	66.997 / 67.027	67.073 / 67.103	67.149 / 67.179	67.225 / 67.255	67.301 / 67.331	67.377 / 67.381	67.414 / 67.444	67.523 / 67.553	67.645 / 67.675	67.727 / 67.757	67.858 / 67.888	67.963 / 67.993	68.148 / 68.178	68.312 / 68.342	68.477 / 68.507	68.661 / 68.691	68.806 / 68.836	68.950 / 68.980	69.075
FINISHED SURFACE	69.920	69.780 / 69.890	69.890 / 69.890	69.890 / 69.890	69.890 / 69.890	69.890 / 69.890	69.890 / 69.890	69.890 / 69.950	70.120 / 70.300	70.140 / 70.200	70.200 / 70.050	70.050 / 70.050	70.050 / 70.050	70.050 / 70.050	70.050 / 70.090	70.090 / 70.050	70.050 / 70.050	70.050 / 70.130	70.130 / 70.050	70.050 / 70.050	70.050
CHAINAGE	0.000	14.494 / 14.494	20.001 / 34.495	9.099 / 43.594	9.101 / 52.695	9.099 / 61.794	9.100 / 70.895	9.100 / 79.995	6.555 / 86.550	15.899 / 102.449	18.343 / 120.792	10.461 / 131.253	20.269 / 151.522	15.100 / 166.622	30.900 / 197.522	26.727 / 224.249	26.963 / 251.212	30.899 / 282.111	22.900 / 305.011	22.880 / 327.891	18.899 / 346.790

DRAINAGE LONGITUNDINAL SECTION FOR LINE A02

SCALES: HORIZONTAL 1:500 VERTICAL 1:100

ISSUED FOR **DEVELOPMENT APPLICATION**

NOT FOR CONSTRUCTION

Rev	Drawn	Design	Check	Appd.	Date	Revision Description
A	DL	DL	MM	MM	11-02-22	ISSUED FOR DEVELOPMENT APPLICATION

Scale:
0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)
0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100 (A1) SCALE 1:200 (A3)

For: DHL

By: Orion Consulting
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Project: DHL HORSLEY PARK
813 WALLGROVE ROAD,
EASTERN CREEK, NSW

Title: STORMWATER DRAINAGE
LONG SECTIONS
SHEET 03 OF 03

Project No.	Set No.	Milestone	Plan	Revision
21-0262	01	DA	412	A