Westmead Catholic Education Campus
State Significant Development

2 Darcy Road
Westmead NSW

Water Management Plan Information

WATER MANAGEMENT PLAN INFORMATION
(IN RELATION TO ABOVE-GROUND BUILDING DRAINAGE)

DEVELOPMENT AUTHORITY: Parramatta City Council

SITE ADDRESS: 2 Darcy Road Westmead

DEVELOPMENT GUIDELINES: Parramatta City Council - Parramatta Development Control Plan 2011 - Part 3.3.6 Water Sensitive Urban Design

UNDERGROUND DRAINAGE: Refer to proposed drainage plans prepared by Northrop Engineers

INTRODUCTION

This report supports a State Significant Development Application for the Westmead Catholic Community (WCC) at 2 Darcy Road, Westmead.
The WCC project seeks to meet the needs of the growing population within the region by providing upgraded school facilities for Mother Teresa and Sacred Heart Primary Schools, as well as a new Parish church. WCC is a collaboration between the Catholic Education Diocese of Parramatta (CEDP), the Diocese of Parramatta (DoP), the Sisters of Mercy and the Marist Brothers Province of Australia.

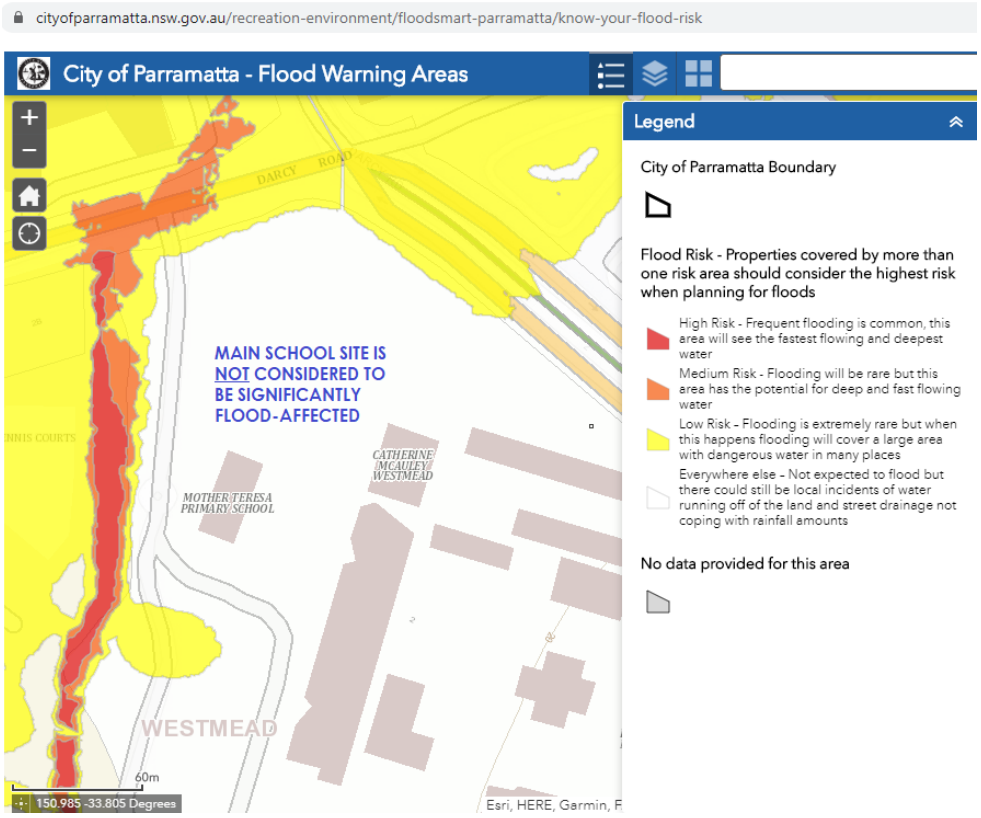
As the proposal is for the purposes of alterations and additions to an existing school and has a capital investment value in excess of $20 million, it is a State Significant Development (SSD) for the purposes of the *Environmental Planning and Assessment Act 1979* (the Act). The Parish church is also SSD under clause 8(2)(a) of *State Environmental Planning Policy (State and Regional Development) 2011* as it forms part of the proposal which comprises a single, integrated development with significant functional links between education and church uses.

EXISTING SITE CHARACTERISTICS

- Site area = Exceeding 100,000m2
- Incorporating existing Catholic School buildings for Parramatta Marist High School, Catherine McAuley Girls High School & Mother Theresa Primary School
- Located near the intersection of Darcy Road, Mons Road and Institute Road Westmead (on south side of Darcy Road).
- Survey plan prepared by Vince Morgan Surveyors – Plan No. 16147-T15 Sheets 1 to 7 - dated 21.10.19 indicates Australian Height Datum (AHD) site surface contours ranging from about RL20.60 down to about RL19.40 in the vicinity of the proposed K6 building and proposed Parish Church. The average site slope on this portion of the property is observed to be about 0.8%, which presents a fairly level existing ground surface, with an increasing gradient on the north side, as the land slopes down to Darcy Road.

LOCAL FLOODING EFFECTS

Based on the Parramatta City Council's online mapping portal at https://www.cityofparramatta.nsw.gov.au/recreation-environment/floodsmart-parramatta/know-your-flood-risk
the subject property in the vicinity of proposed works is NOT considered to be significantly affected by flooding.



EXISTING STREET DRAINAGE

Based on available survey and street view information, it was observed that existing underground street drainage currently connects to a number of pits near the school entry road intersecting with Darcy Road (see photograph below).

PROPOSED CONNECTION

It is understood that proposed stormwater drainage is to be directed from the outlet of an underground detention tank to the existing pipe system draining the entry road, as documented on the civil engineering drainage drawings prepared by Northrop.

ON-SITE DETENTION STORAGE

It is understood that a proposed underground detention tank is to be installed on the north side of the proposed Parish Church, as documented on the civil engineering drainage drawings prepared by Northrop.

STORMWATER QUALITY

It is understood that stormwater quality improvement measures are to be installed in conjunction with the stormwater detention tank as documented on the civil engineering drainage drawings prepared by Northrop.

RAINWATER STORAGE

Rainwater storage requirements for new residential dwellings are typically provided to satisfy State Environmental Policy Building Sustainability Index (BASIX) assessment requirements, but this determination is not applicable to schools or commercial developments (which are not residential).

Reference is made to the Parramatta City Council Development Control Plan 2011 - Part 3.3.6 Water Sensitive Urban Design, which indicates rainwater storage should be considered for implementation on allotment scale developments. Water efficient fixtures and fittings are also recommended to reduce drawoff from the public water supply system. The selection of these items should meet the requirements of the Water Efficiency Labelling and Standards (WELS) scheme.

A water balancing calculation based on historical rainfall data in Sydney was adopted to estimate that - A 10m3 rainwater tank collecting a Parish Church roof catchment of 1592m2 would be capable of providing 45% of non-potable demand to irrigate a landscaped area of 1000m2 (see the following extract calculation summary).

WATER REUSE TANK CALCULATION (based on Bureau of Meteorology rainfall records over 20 years = 7305 days from 1983 - 2002)

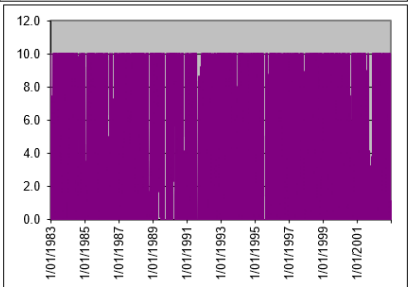
Proportion of TOTAL rainfall runoff volume drained :
66 % of drained runoff overflows from tank
34 % of drained runoff captured for reuse

20yr Runoff Coefficient = **0.945** based on **100** % impervious proportion of drained area
Area drained to tank = **1592** m2 (= **1** % of **110000** m2 site)
Irrigation demand = **4.30** mm/day = 30.10 mm/week for summer/spring (Sep-Feb)
2.15 mm/day = 15.05 mm/week for winter/autumn (Mar-Aug)
Irrigation area = **1000** m2 (= **1** % of 110000 m2 site)
Any additional demand = **0** m3/day (e.g. laundry, toilets, car washing for NON-POTABLE USE ONLY)
Tank Storage = **10** m3 (Initial storage taken as **0** m3 at start of year)
Non-potable water demand = 23499.5 m3 over 7305 days
Water from main needed for 4024 days out of 7305 days = 55 % of the time (water is drawn from the mains supply)
Water drawn from main = 12984.6 m3 or kL Rate of water reuse = 45 % of the time (the rainwater tank has sufficient water for reuse)
Water reused from tank = 10514.9 m3 over 7305 days
Rate of water reuse = 45 % of non-potable demand supplied by tank storage
Runoff from all storms = 33137.8 m3 (Non-potable demand is 71 % of this volume)

Max overflow volume in a day = 321.0 m3
Storms usually peak between 2pm & 6pm due to daily heating of the earth's surface by the sun, which is a maximum during the afternoon (see www.bom.gov.au/weather/nsw/sewws/about.shtml)
Mean overflow rate for a 4 hour duration = 22 L/s

(A) Date	(B) Sydney Airport Rainfall mm	(C) Runoff to tank m3	(D) Water Demand m3	(E) Change in storage m3	(F) Residual Tank Storage m3	(G) Overflow from Tank m3	(H) Days to fill from main	(I) Water from main m3
					0.0			
1-Jan-83	1.8	2.7	4.3	-1.6	0.0	0.0	1	1.6
2-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
3-Jan-83	19.3	29.0	4.3	24.7	10.0	14.7	0	0.0
4-Jan-83	0.2	0.3	4.3	-4.0	6.0	0.0	0	0.0
5-Jan-83	0	0.0	4.3	-4.3	1.7	0.0	0	0.0
6-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
7-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
8-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
9-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
10-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
11-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
12-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
13-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
14-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
15-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
16-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
17-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
18-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
19-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3
20-Jan-83	0	0.0	4.3	-4.3	0.0	0.0	1	4.3

CALCULATION NOTES
(A) = date
(B) = rainfall
(C) = runoff coeff * (B) / 1000 * area drained to tank
(D) = seasonal irrigation demand / 1000 * irrigation area + any additional non-potable demand
(E) = (C) - (D)
(F) = tank capacity if ["previous (F)" storage + (E) change in storage] exceeds capacity
(F) = 0 empty tank if ["previous (F)" storage + (E) change in storage] < 0
(F) = ["previous (F)" storage + (E) change in storage] if capacity is sufficient to store
(G) = overflow difference if ["previous (F)" storage + (E) change in storage] exceeds capacity
(G) = 0 overflow if ["previous (F)" storage + (E) change in storage] is within capacity
(H) = 1 if (F) = 0 no water stored in tank
(I) = positive (E) change in storage if (H) > 1
(I) = 0 no mains drawoff if (H) = 0 tank storage sufficient



An additional water balancing calculation based on historical rainfall data in Sydney was adopted to estimate that

- A 40m3 stormwater tank collecting a K6 Building roof catchment of 3372m2 would be capable of providing 43% of non-potable demand to irrigate a landscaped area of 3000m2 (see the following extract calculation summary).

WATER REUSE TANK CALCULATION (based on Bureau of Meteorology rainfall records over 20 years = 7305 days from 1983 - 2002)

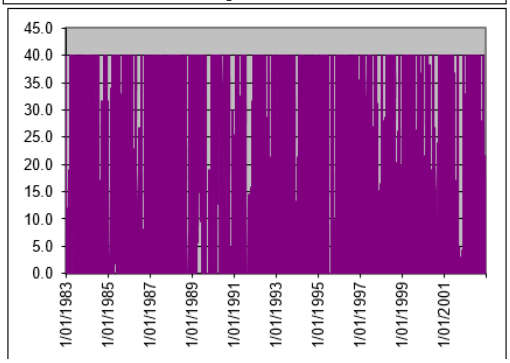
Proportion of TOTAL rainfall runoff volume drained :
54 % of drained runoff overflows from tank
46 % of drained runoff captured for reuse

20yr Runoff Coefficient = **0.945** based on **100** % impervious proportion of drained area
Area drained to tank = **3372** m2 (= 3 % of **110000** m2 site)
Irrigation demand = **4.30** mm/day = 30.10 mm/week for summer/spring (Sep-Feb)
2.15 mm/day = 15.05 mm/week for winter/autumn (Mar-Aug)
Irrigation area = **3000** m2 (= 3 % of 110000 m2 site)
Any additional demand = **0** m3/day (e.g. laundry, toilets, car washing for NON-POTABLE USE ONLY)
Tank Storage = **40** m3 (Initial storage taken as **0** m3 at start of year)
Non-potable water demand = 70498.5 m3 over 7305 days
Water from main needed for 4125 days out of 7305 days = 56 % of the time (water is drawn from the mains supply)
Water drawn from main = 40053.2 m3 or kL Rate of water reuse = 44 % of the time (the rainwater tank has sufficient water for reuse)
Water reused from tank = 30445.3 m3 over 7305 days
Rate of water reuse = 43 % of non-potable demand supplied by tank storage
Runoff from all storms = 70189.0 m3 (Non-potable demand is 100 % of this volume)

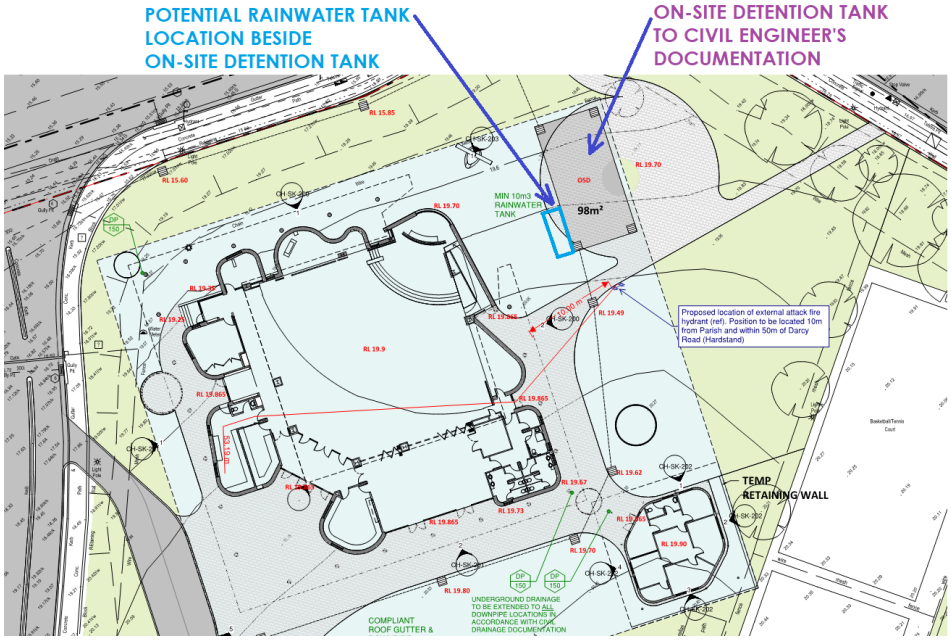
Max overflow volume in a day = 676.0 m3
Storms usually peak between 2pm & 6pm due to daily heating of the earth's surface by the sun, which is a maximum during the afternoon (see www.bom.gov.au/weather/nsw/sewwa/about.shtml)
Mean overflow rate for a 4 hour duration = 47 L/s

CALCULATION NOTES
(A) = date
(B) = rainfall
(C) = runoff coeff * (B) / 1000 * area drained to tank
(D) = seasonal irrigation demand / 1000 * irrigation area + any additional non-potable demand
(E) = (C) - (D)
(F) = tank capacity if ["previous (F)" storage + (E) change in storage] exceeds capacity
(F) = 0 empty tank if ["previous (F)" storage + (E) change in storage] < 0
(F) = ["previous (F)" storage + (E) change in storage] if capacity is sufficient to store
(G) = overflow difference if ["previous (F)" storage + (E) change in storage] exceeds capacity
(G) = 0 overflow if ["previous (F)" storage + (E) change in storage] is within capacity
(H) = 1 if (F) = 0 no water stored in tank
(I) = positive (E) change in storage if (H) > 1
(I) = 0 no mains drawoff if (H) = 0 tank storage sufficient

(A) Date	(B) Sydney Airport Rainfall mm	(C) Runoff to tank m3	(D) Water Demand m3	(E) Change in storage m3	(F) Residual Tank Storage m3	(G) Overflow from Tank m3	(H) Days to fill from main	(I) Water from main m3
					0.0			
1-Jan-83	1.8	5.7	12.9	-7.2	0.0	0.0	1	7.2
2-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
3-Jan-83	19.3	61.5	12.9	48.6	40.0	8.6	0	0.0
4-Jan-83	0.2	0.6	12.9	-12.3	27.7	0.0	0	0.0
5-Jan-83	0	0.0	12.9	-12.9	14.8	0.0	0	0.0
6-Jan-83	0	0.0	12.9	-12.9	1.9	0.0	0	0.0
7-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
8-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
9-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
10-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
11-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
12-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
13-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
14-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
15-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
16-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
17-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
18-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
19-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9
20-Jan-83	0	0.0	12.9	-12.9	0.0	0.0	1	12.9



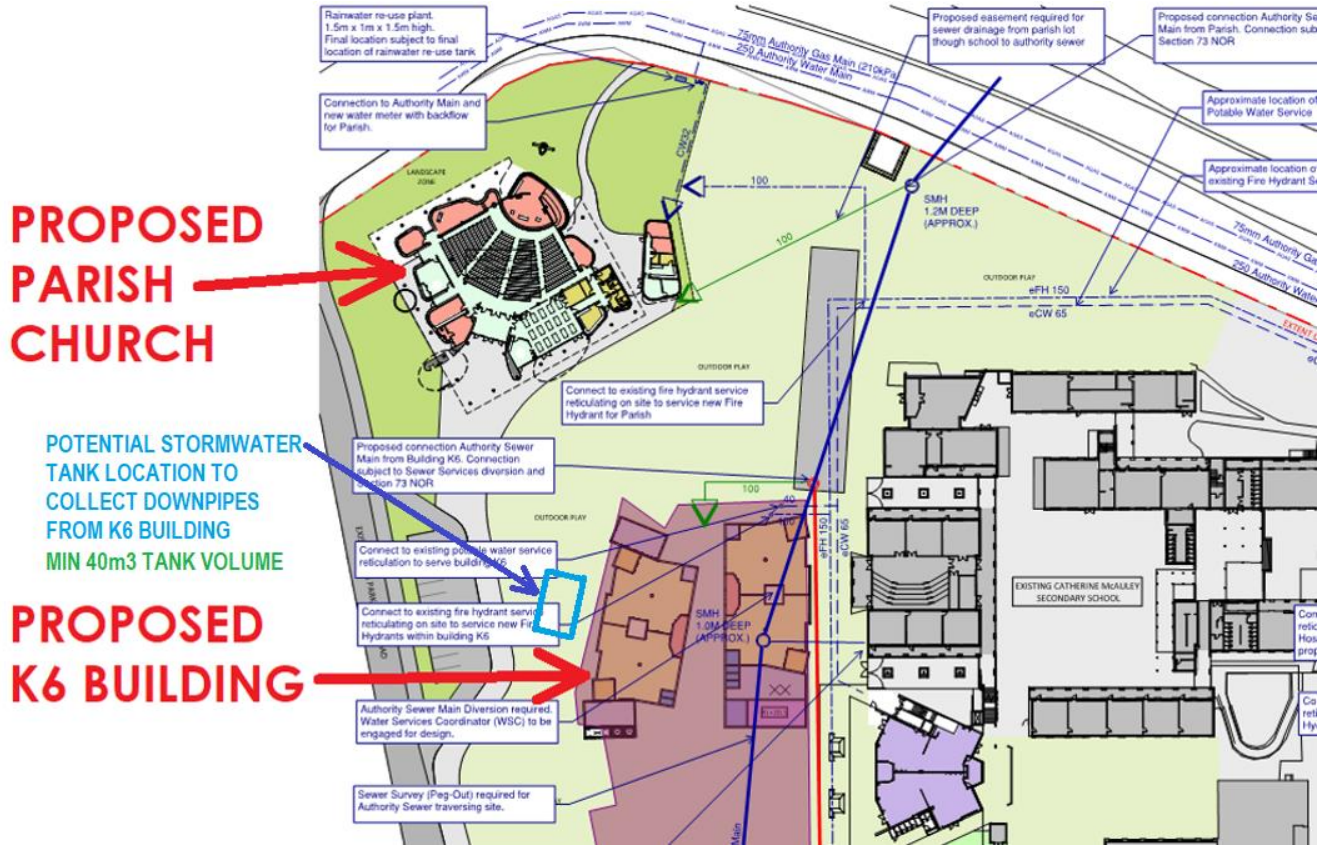
The suggested location for the 10m3 rainwater tank is beside the detention tank on the north side of the proposed Parish Church structure, where it can collect downpipe drainage from the church roof.
Refer to the indicative plan below. North is in the "up" direction.
Refer to latest architectural set for current layout.



The proposed rainwater storage of 10m3 is intended to collect "clean" roof runoff from the downpipes of the Parish Church for the purpose of landscape irrigation. The additional stormwater storage of 40m3 is intended to collect "dirty" roof runoff from the upper surface of the K6 Building for landscape irrigation. Associated filtration measures are necessarily more significant for stormwater reuse (instead of just rainwater reuse), since pedestrian traffic on the K6 roof slab can generate litter and other debris linked to pedestrian movement and dirt from shoes, etc. Non-potable supply could also be considered to fill toilet cisterns for flushing purposes (in addition to irrigation demand).

Irrigation water can be applied by a timer-controlled automatic sprinkler system or manually applied by maintenance personnel on the school grounds using hoses connected to rainwater tap locations. The landscaping contractor is anticipated to recommend suitable precipitation rates for selected plant species in particular planter locations, and rainwater is to be supplied at a suitable flowrate and pressure. In the situation where the rainwater tank is empty (during drought periods), water can be drawn from the public street main supply.

The indicative preliminary site plan below shows the relative location of proposed building structures with conceptual notes. North is in the "up" direction. Refer to latest architectural set for current layout.



TEMPORARY EROSION & SEDIMENT CONTROL MEASURES

During the construction works the management of soil and water movement requiring erosion and sediment control is anticipated to be undertaken in accordance with the Landcom publication *Soils and Construction: Managing Urban Stormwater 4th Edition, March 2004* (also known as "the Blue Book"). Expected temporary construction measures to be undertaken include:
- Sediment fencing on the low side of earthmoving operations
- A gravel layer at the construction vehicle access point into the area of works
- Regular monitoring of soil movement characteristics and cleaning of sediment deposits as required during construction
- Security fencing around the area of construction works

Reference should be made to the civil engineering drainage drawings prepared by Northrop.

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