

ThaQuarry Pty Ltd & ACN 114 843 453 Pty Ltd

Light Horse Business Centre: Environmental Assessment Report

September 2011

Modification 3

For and on behalf of ThaQuarry Pty Ltd and ACN 114 843 453 Pty Ltd,
the undersigned certifies that the information contained within this report
is neither false nor misleading

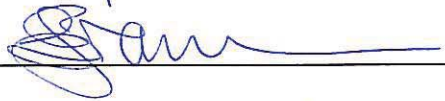
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CHAPTER 1 – PROJECT MODIFICATION OVERVIEW

1.1 Waste Management Strategy

Light Horse Business Centre proposes a waste management strategy for the construction and operational phases of the Project which has been developed in accordance with the following waste policies and procedures:

- waste management hierarchy established under the Waste Avoidance and Resource Recovery Act 2001 i.e. avoidance – resource recovery - disposal;
- NSW Waste Avoidance and Resource Recovery Strategy 2007, which emphasizes a life cycle approach to waste and identifies the following key areas:
 - preventing and avoiding waste;
 - increasing recovery and use of secondary materials;
 - reducing toxicity in products and materials; and
 - reducing litter and illegal dumping;
- Environmental Guidelines: Solid Waste Landfills;
- Waste Classification Guidelines;
- POEO Act 1997; and
- Protection of the Environmental Operations (Waste) Regulation 2005.

The specific waste management procedures to be implemented are summarised below.

1.2 PROJECT APPROVAL

Project Approval was granted by the Minister on 22nd November 2009.

1.3 PROJECT CONDITIONS

Project Conditions as modified are at Appendix A.

1.4 BACKGROUND TO THE PROJECT AND ITS MODIFICATION

The Project will include the development and operation of a Resource Recovery Facility (RRF) and a general solid waste (non-putrescible) landfill. The RRF will include a Materials Processing Centre (MPC) and Waste Transfer Station (WTS). In summary, the following activities are proposed:

- capacity to receive up to two million tonnes (t) of waste per annum, including inert and solid wastes from construction and demolition (C&D), commercial and industrial (C&I) waste streams complying with acceptable waste for general solid waste (non-putrescible) facilities and green waste clean ups;
- on-site waste processing including sorting, screening, sieving, crushing, grinding, shredding and/or chipping, and composting of green waste;
- recycling of an estimated 65-80% of incoming waste (1.3 to 1.6 million tonnes per annum (mtpa), based on maximum capacity intake) e.g. to produce road base, aggregate, landscaping soil, bedding sand, mulch, wood chip, green waste compost and asphalt derived products for land application;
- testing and on-site storage/stockpiling of finished products prior to resale from stockpiles, predominantly to the building, construction and landscaping sectors and potentially the domestic market;
- transport of an estimated 20-35% of incoming waste (0.4 to 0.7 mtpa, based on maximum capacity intake) to the landfill proposed within the quarry void, comprising incoming materials which are unsuitable or uneconomical for recovery and recycling (for example, contaminated soils, asbestos waste and loads that cannot physically be sorted);
- quarantine and transfer of unacceptable wastes to an appropriate off-site facility for disposal;
- construction and operation of associated infrastructure, plant and equipment, including upgrade of the internal road network and reshaping of earthen amenity berms;
- the use of the existing site access via Old Wallgrove Road; and
- retention and conservation of a significant area in the north-west corner of the site, incorporating a remnant endangered ecological community (EEC) of Cumberland Plain Woodland (CPW).

The Project was declared a project to which Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) applies and for which approval of the NSW Minister for Planning was required.

A Ministerial Consent dated 22nd November 2009 has issued and the Proponent now seeks a variation of that Approval together with such Conditions as may be relevant or necessary to give effect to them.

This Environmental Assessment has been prepared in accordance with the requirements of the EP&A Act, the Environmental Planning and Assessment Regulation 2000.

This EA describes the Project Modification, environmental implications associated with key aspects of the Modifications and identifies mitigation and management measures to minimise potential impacts.

1.5 SITE FEATURES

The site including the surface area of the quarry is 52.4Ha and comprises two land parcels, identified as Lots 1 and 4 in Deposited Plan 1145808.

References to the “site” in this document refers to four parcels of land in their entirety and separated the “proposed area of operations” which refers to a subset of the total site (of the 4 titles) that is to be developed for this Project and including the quarry pit and RRF areas.

Since the date of the Approval a boundary realignment and subdivision has been registered by the Land and Property Management Authority and the Lots 1 and 4 DP 1145808 now wholly represent the Project area.

The quarry pit occupies the north-eastern portion of the site. It is an open cut elliptical void approximately 430 x 700 metres (m) and up to 150 m in depth, with stepped walls and an estimated volume of 11 million cubic metres.

The side slopes are steep at approximately 75 to 80° and are intersected by flat benches approximately seven to eight metres in width. There is a spiralling access road approximately 20 m in width around the pit edge which descends to the quarry floor. Steep banked stockpiles of excavated quarry overburden material up to 30 m in height are located to the north, east and west of the quarry pit.

1.6 CONSTRUCTION OVERVIEW

The Project will require the construction of civil type infrastructure and will be conducted in the following stages:

Stage 1 – Preconstruction;

Stage 2a – Construction;

Stage 2 b – Construction of Leachate Management System and Conveyor and Chute; and

Stage 3 – Commissioning.

1.6.1 Stage 1 – Preconstruction

The preconstruction stage finalises engineering designs, establishes critical services and prepares the land site for construction purposes. This is more particularly described in the Site Environmental

Management Plan – Stage 1 Construction phase which has been submitted to the Department of Planning.

This involves:

- establishment of essential services such as power (off-take from existing transmission lines), water (pipelines for “raw” and potable water), sewerage and telecommunications;
- construction of the OSD basins;
- pumping water out of the base of the pit;
- quarry pit maintenance works and wall stabilisation for safety;
- establishment and laying of site drainage works and piping;
- upgrade of internal roads, land re-profiling and bulk earthworks.

1.6.2 Stage 2a – General Construction

The general construction stage involves the excavation of foundations and footings, placement of reinforced concrete and the erection of various structures. The key activities include:

- excavation of free digging waste rock materials for major footings, foundations and permanent service lines (e.g. trenches);
- placement of reinforced concrete; and
- construction and refurbishing of site buildings.

1.6.3 Stage 2b – Construction.

The specific construction stage involves the following key activities:

- construction of leachate treatment plant and water storage tanks;
- construction of drainage layers and herringbone pipe works in the base of the pit;
- construction of an in-pit leachate sump and riser; and
- construction of the conveyor and chute;
- fencing; and
- extensions of amenity berms.

1.6.4 Stage 3 – Commissioning

The commissioning stage involves testing and commissioning equipment and plant and training operations personnel. This will involve:

- pre-commissioning, involving alignment and clearance checks on the mechanical equipment, electrical testing and instrumentation checks;
- service and process commissioning, involving ordering and testing of plant and equipment; and
- training of operations personnel involving site induction, occupational health and safety training and operational procedures training.

The site layout was planned to minimise potential environmental impacts during construction and operations whilst meeting the feasibility and practicality requirements of the operation.

Construction works for the Project will be in accordance with relevant industry standards and good practice.

1.7 PROJECT MODIFICATIONS

The Proponent seeks the following Modifications to the Project.

Proposed Modification 1	
Change levels of fill pad in Area D	It is proposed that the final landform levels of the fill pad at Area D be changed from the levels shown in Hyder Consulting Pty Ltd plan DA001-A dated 28 April 2009, to the levels shown in LandPartners Consultants plan 72757_Area D dated 2 February 2011.
Reason for Amendment	To achieve gradients to ensure that stormwater runoff is consistent with SEPP 59 – Employment Lands Precinct Plan (Stage 3).
	To achieve interfaces at the boundaries with neighbouring landowners conducive to the orderly and proper development of the area, and
	To achieve levels consistent with the projected levels of the precinct road to be built by the neighbouring developer across its land and to the eastern boundary of Lot 2 DP 1145808.
Key Environmental Issues	Surface water runoff in the area is directed to the north-west by the contours of the land, in accordance with the Precinct Plan.
	At the conclusion of bulk earthworks associated with the current Project and until the time of any future development, vehicular access to the area D will be restricted which will allow the area to regrass.
	Revegetation of the area will be in accordance with the Landscape and Vegetation Management Plan of the site, returning the area to its prefilled grassed state.
Reference is made to the Plan 72757_Area D is in Appendix B.	

Proposed Modification 2	
Stormwater Drainage	It is proposed that the final landform levels shown in Hyder Consulting Pty Ltd plans DA001 and DA020 dated 28 April 2009 be replaced with LandPartners plan 72757.000.
Reason for Amendment	The Hyder drawings were created in circumstances to deal with drainage of land in Lot 2 DP 1145808 outside of the currently approved Project area which is Lot 1 DP 1145808. The OSD basins shown on the Hyder drawings have volume capacities in excess of the requirements and are shown in locations unsuitable and unnecessary for the current approved Project.
	The Hyder drawings designed OSDs with no regard to the Project's stormwater runoff requirements, and the capacity needed to retain such runoff.
	The Hyder drawings proposed earthworks that are not relevant to the operation of the Project.
	The Hyder drawings were prepared before the conservation area had been properly mapped.
	The Hyder drawings do not accurately depict the size and location of the western berm.
	The Hyder drawings show a proposed OSD located on the western side of Archbold Road to which Council had objected.
Key Environmental Issues	Stormwater basins have been constructed to the capacity required for the operational area, and are situated to the eastern side of the Archbold Road reserve.
	Until future industrial development in the area under separate approval, vehicular access to the western section will be restricted and any disturbed areas will be allowed to regrass.
Reference is made to the Plan 72757.000 in Appendix E and Marten and Associates Stormwater Report in Appendix C.	

Proposed Modification 3	
Construction of Weighbridge Office	It is proposed that an office for the weighbridge operator be constructed inside the existing shed around the weighbridge.
Reason for Amendment	The weighbridge operator will need protection from the elements.
	The weighbridge operator will need access to computer equipment to process incoming vehicle weights and in order to satisfy the requirements under the Protection of the Environment Operations Act.
Key Environmental Issues	There are not expected to be any Environmental effects.
Reference is made to Appendix K.	

Proposed Modification 4	
Construction of Amenity Buildings at the MPC building and the Spotter Stations	It is proposed that amenity buildings for toilets and lunch rooms be built adjacent the MPC building and the Spotter Stations.
Reason for Amendment	A lunch room and sufficient toilet facilities for the workers on site had been provided in the earlier plans. Those plans were modified by the postponement of construction of certain areas under Modification 1 of the Project.
	Locating separate lunch room near the MPC building and Spotter Stations will mean that the workers don't have to walk or drive to another area on the site.
	Locating toilet facilities for the workers in the MPC and Spotter Stations will mean that workers will not have to walk to a further toilet, and therefore be away from their station.
Key Environmental Issues	Stormwater runoff from the roofs will be collected in poly tanks.
	Toilets will be connected to septic system already established for other toilet facilities.
	Toilet flushes and running water will be from collected rainwater on site.
Reference is made to Appendix F	

Proposed Modification 5	
Construction of an Administration office	It is proposed that an office be built on site, providing a location for the performance of administrative tasks.
Reason for Amendment	A smaller administration office is proposed than that which was postponed by Modification 1, to provide office facilities until the larger administration building can be built.
Key Environmental Issues	Stormwater runoff from the additional roofs will be collected in poly tanks.
	Toilets will be connected to septic system already established for other toilet facilities on site.
	Toilet flushes and running water will be from collected rainwater on site.
Reference is made to Appendix J	

Proposed Modification 6	
Construction of Amenity Buildings at the Tarp Stand Area	It is proposed that additions be built onto the building called the 'Tarp Stand Area' to provide for the amenities of the staff working in that location.
Reason for Amendment	With the workshop postponed by Modification 1,

	the Tarp Stand Area will provide some temporary workshop facilities, and the staff working in that area will need amenity facilities.
Key Environmental Issues	Stormwater runoff from the additional roofs will be collected in poly tanks.
	Toilets will be connected to septic system already established for other toilet facilities on site.
	Toilet flushes and running water will be from collected rainwater on site.
Reference is made to Appendix L	

1.8 KEY ENVIRONMENTAL CONSIDERATIONS IN RELATION TO THE PROJECT MODIFICATIONS

The Proponent has identified the following key Environmental considerations which may arise from implementation of the Modifications.

1.8.1 Surface Water Management

Surface Water for the Project has been assessed by Storm Consulting (November 2008) in accordance with the Landcom (2004) Managing Urban Stormwater-Soils and Construction (the “Blue Book”); Blacktown City Council (BCC) (2005a) Eastern Creek Precinct Plan; and BCC (2005b) Stormwater Quality Control Policy. Surface Water for the Project has been reassessed in light of modifications and included in Martens and Associates Report attached in Appendix C.

Surface stormwater runoff generated on-site will be categorised as either “clean” or “dirty”. Clean stormwater runoff will be generated from building roofs (workshop, MPC/WTS, administration building and weighbridge shed), roads, car parks and other hardstand areas, pit walls, haul road and capped areas within the landfill.

Captured rainwater from building roofs will be used to help meet toilet flushing and wheel wash needs.

Recycled stormwater captured in the OSD basins will be used for dust suppression and irrigation i.e. sprinklers and water carts, and that captured in the stormwater pond (in pit and surface) will also be used in water carts.

1.8.2 Leachate Management

Leachate management strategies relate mainly to leachate produced in the landfill. Other than leachate produced in the landfill, a small quantity of leachate is expected to be produced from the

green waste areas from rainwater which has percolated through the waste, and from the floor of the MPC from water used for dust suppression.

It is expected that the proposed modifications would not affect the leachate production and management requirements associated with the Project.

1.8.3 Traffic and Transport

The Project will generate light, medium and heavy vehicle traffic on the surrounding road network associated with deliveries of waste loads, dispatch of recycled products, service and maintenance activities, and some light vehicle traffic generated by staff, visitors and subcontractors.

Vehicle access for the Project is only permitted through the Old Wallgrove Road (i.e. Wallgrove Road and Quarry Road) intersections, the existing roadway constructed within the Registered ROW between Old Wallgrove Road and the site boundary and the existing haulage road which runs along the southern side of the quarry wall.

Internal roads for the Project are in accordance with the Site Plan in Appendix 1 of the Project Conditions annexed in Appendix A hereof.

It is expected that the proposed modifications would not affect the traffic and transport management of the Project.

1.8.4 Visual Amenity

There are no receivers with elevated views of the site. The visual character of the locality is variable with the site surrounded by urban areas of Minchinbury to the north and Erskine Park to the south-west, industrial development including Hanson Asphalt Batching Works to the south-east, and transport and utilities infrastructure including the M4 Motorway and an associated landscaped buffer adjacent to the north.

The Hanson site to the south-east of the quarry pit is the only receiver which can experience uninterrupted views across the area where the majority of operations are to be focussed. The other receptors views of the site are shielded by existing Cumberland Plain Woodland along to northern boundary and 10 metre high earthen amenity berms designed along the north, south and western boundary of the operations area.

None of the proposed modifications is expected to impact visual amenity of the Project.

1.8.5 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during

quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by any of the modifications.

It is expected that the proposed modifications would not affect the landscape and vegetation management of the Project.

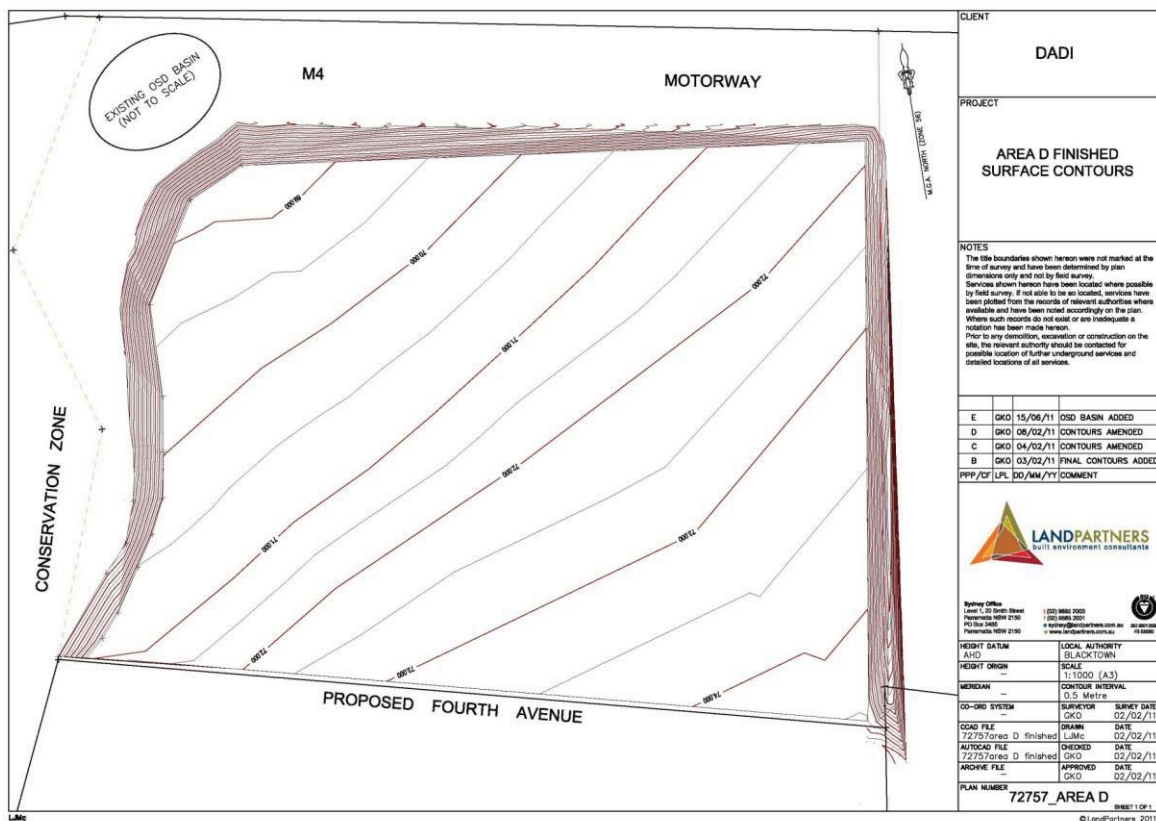
CHAPTER 2 – MODIFICATION 1

2.1 Modification Details

It is proposed that the final landform levels of the fill pad at Area D be changed from the levels shown in Hyder Consulting Pty Ltd plan DA001 dated 28 April 2009, to the levels shown in LandPartners Consultants plan 72757_AREA D dated 2 February 2011.

Area D shown marked in Figure 2.1 (below).

Figure 2.1: Area D



2.2 Area D

The Hyder Consulting report entitled “Bulk Earthworks and Site Detention Storage” dated May 2009 (“Hyder Report”) calculated cut and fill volumes, identified areas for placement of fill, and proposed land levels and catchment basins to achieve appropriate surface water drainage flows. The Hyder Report was a preliminary report, and *did not have regard to onsite stormwater detention capacity* which would be required by the operational area of the Project. It proposed only hypothetical finished land levels in fill areas consistent with stormwater directional flow.

The following conditions have changed since the preparation of the Hyder Report:

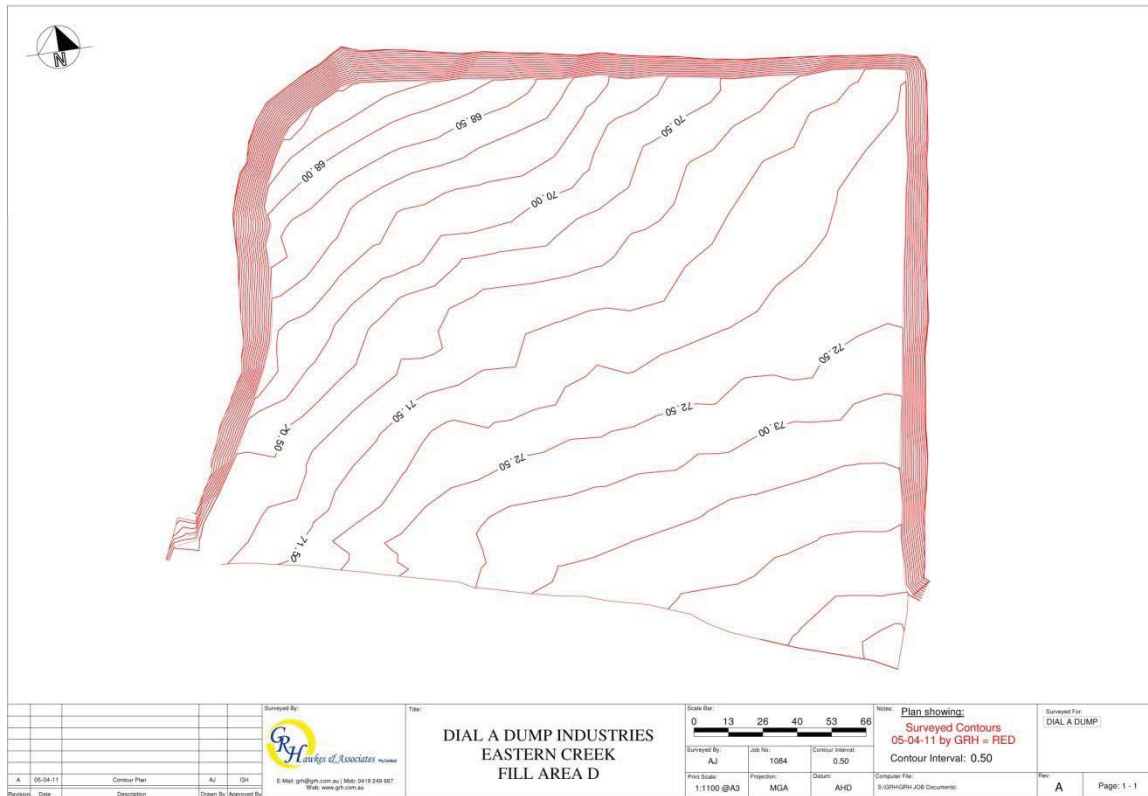
- The Proponent does not propose to complete, and has not carried out, the entire cut and fill operations proposed in the Hyder Report, particularly in the western section. Only those bulk earthworks necessary to and directly related to the approved Project have been carried out;
- Neighbouring landowner Sumy Pty Ltd (“Sumy”), owner of Lot 9 in DP 241859, has obtained development approval for its land adjacent to the fill Area D, and has contracted its purchase and development to Australand contingent upon achieving agreed levels at the interface of the land. Australand does not want to purchase the property, if there are additional expenses associated with extreme differences in land levels with the neighbouring land, being the Proponent’s Area D;
- The Conservation Area has received an identifiable boundary which did not exist at the time of the Hyder Report; and
- It has been agreed that the Project may manage its own onsite stormwater, consistent with the required outcomes required in the Blacktown Council Precinct Plan.

Area D has been filled to the levels shown in Figure 2.2 (below).

Bulk earthworks have taken place redistributing fill from the construction area to fill Area D. The fill has been compacted to level 1 compaction standards, as to have done otherwise would have compromised drainage.

The advantages and disadvantages of Modification 1 were considered by the Proponent and these are set out below:

Figure 2.2: Area D filled levels



2.2.1 Advantages

a) Enabling Development of Adjoining Land and Cooperating with Adjoining Landowners

The Proponent has held extensive discussions with neighbouring landowner, Sumy. The DA approved by Blacktown Council for the neighbouring Sumy land includes land levels 4 metres higher than those proposed by Hyder in Area D.

The proposed land levels the subject of this modification application will achieve a more consistent interface with the land owned by Sumy.

It has been made known to the Proponent that achieving this more consistent interface is a pre-condition for Sumy’s contractual relationship with the proposed developer of the Sumy land, Australand.

b) Enabling Future Development of Precinct Plan Infrastructure

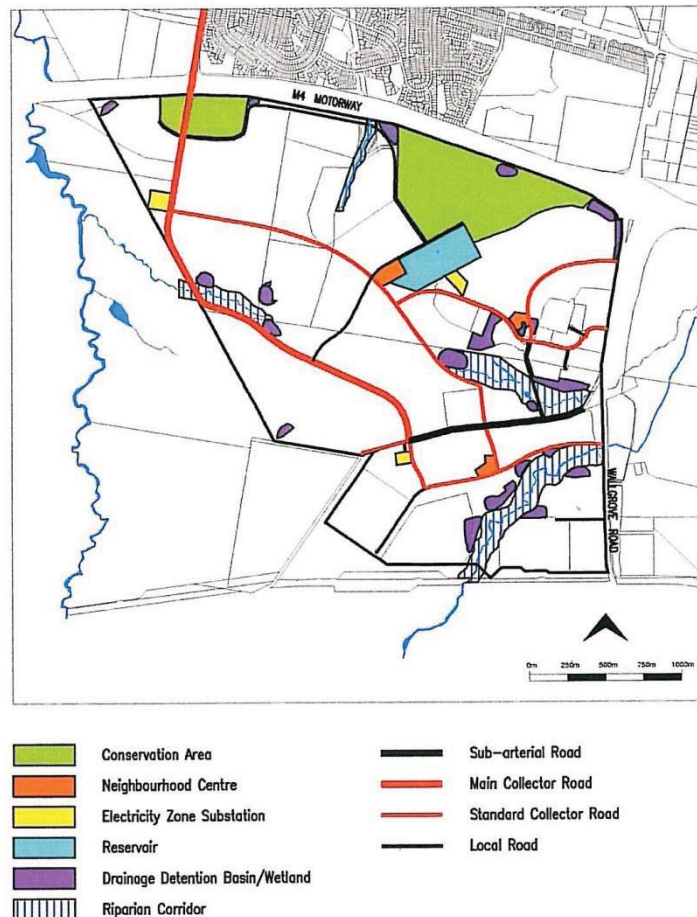
The Blacktown Council Precinct Plan provides for the construction of a Precinct Road and a regional stormwater detention basin in and around Area D.

Because the proposed land levels provide extra fill in the area, when the Precinct Road is later designed and constructed, some of the fill from Area D can be used instead of having to bring in fill from offsite.

Modification 1 also removes the detention basin from Area D, which is consistent with the Precinct Plan which proposes a regional detention basin to the north of the Precinct Road. The ideal position for the detention basin is as close to the stormwater outlets that drain the water from the area to the north, under the M4 Motorway. The plan showing the proposed location of the Precinct Road and the detention basin is extracted from the Precinct Plan and shown below in Figure 2.3.

The Proponent has commissioned AT&L Civil Engineers to provide an assessment on the impact of the proposed land levels on the infrastructure proposed in the Precinct Plan. That assessment is contained in Appendix D.

Figure 2.3: Precinct Plan



- c) Enabling the use of all fill material from site earthworks, without having to move any offsite.

2.2.2 Disadvantages

- a) Increased vehicular movement in the area during construction, because of increase in amount of fill material brought into the area.

2.3 Key Environmental Issues Relating to Modification 1

2.3.1 Surface Water Management

The Proponent has commissioned Marten and Associates Consulting Engineers to review the modification of the land levels in Area D (“Martens’ Report”). The report can be found in Appendix C.

Prior to the Project, Area D was a grassed paddock. Once Area D is filled, there is no formal use or development proposed for Area D. The area shall revegetate with grass. Martens’ Report assessed that there would be no hydrological change from the pre-development situation. The area will drain to the existing sediment pond because of the contoured landform.

Compaction in Area D will limit any sediment runoff or erosion, which will be further reduced once the area is revegetated. The steeper batters on the north of Area D will not increase the flow of stormwater any more than the flow from any other batters around the site. Because no additional stormwater is being diverted into the area from what already flowed over the area prior to construction, it is not necessary to increase the size of the existing stormwater pond to the north-west of the area. Nor will any increase in flow down the batters will not affect the capacity of the pond.

An internal road, Fourth Avenue, runs to the south of Area D. Stormwater runoff from Fourth Avenue will be retained by dish drains along the road, and none of this runoff will enter Area D. Fourth Avenue is at a higher contour level than Area D, so there will be no pooling between Fourth Avenue and Area D.

2.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

2.3.3 Traffic and Transport

Once filling is complete in Area D, there will be no vehicular access to the area, and the area will be allowed to grass over.

No access to the RRF is proposed to occur from the future Precinct Road that will be built around Area D.

Access to any future development in Area D, from the Precinct Road, can be designed from the south-western corner or the north-eastern corner. Any driveways or local roads can be designed at that time of future development, and the extra fill in the area should assist with those future works.

2.3.4 Visual Amenity

There is an amenity berm south of Area D, which restricts the view of any observers across the area where the majority of operations are to be focussed. Area D is located outside of the operational area, to the north of the amenity berm and to the south of the M4 Motorway.

The landscaped buffer adjacent to the M4 Motorway will be maintained.

Area D will be revegetated with grass, and will have a minimal visual impact on the residents of Minchinbury.

Consistent levels with neighbouring property should ultimately lead to uniform building heights in any future development, including consistent heights of any visual barriers built at that time.

2.3.5 Flora and Fauna

Area D will be revegetated with grass after the area has been filled, in accordance with the Project Landscape and Vegetation Management Plan.

After compaction, the Proponent will consider lightly ripping the surface of Area D to assist with the seeding of grass. The Proponent is conscious of not causing the area to become saturated with water, or causing erosion of the surface.

Revegetation will be a priority, as established grass will assist with stabilisation of the surface soil and prevent erosion.

CHAPTER 3 – MODIFICATION 2

3.1 Modification Details

It is proposed that the final landform levels shown in Hyder Consulting Pty Ltd plans DA001 and DA020 dated 28 April 2009 be replaced with LandPartners Plan 72757.000 entitled “Lot 2 in DP 1145805 Eastern Creek”.

LandPartners Plan 72757.000 can be seen in Appendix E.

3.2 Stormwater Drainage

The Hyder Consulting report entitled “Bulk Earthworks and Site Detention Storage” dated May 2009 (“Hyder Report”) calculated cut and fill volumes, identified areas for placement of fill, and proposed land levels and catchment basins to achieve appropriate surface water drainage flows for the future development of the area. The Hyder Report was a preliminary report, and *did not have regard to onsite stormwater detention capacity* which would be required by the operational area of the Project. It proposed only hypothetical finished land levels in fill areas consistent with stormwater directional flow for any future development of the western area.

The following conditions have changed since the preparation of the Hyder Report:

- The Proponent does not propose to complete, and has not carried out, the entire cut and fill operations proposed in the Hyder Report, particularly in the western section. Only those bulk earthworks necessary to and directly related to the approved Project have been carried out;
- The Conservation Area has received an identifiable boundary which did not exist at the time of the Hyder Report;
- An easement has been established for drainage and access, being the precinct road corridor to the south of the Conservation Area; and
- It has been agreed that the Project may manage its own onsite stormwater, consistent with the required outcomes in the Blacktown Council Precinct Plan.

Surface stormwater runoff generated on-site will be categorised as either “clean” or “dirty”. Clean stormwater runoff will be generated from building roofs (workshop, MPC/WTS, administration building and weighbridge shed), roads, car parks and other hardstand areas, material stockpile area, pit walls, haul road and capped areas within the landfill. Dirty water will comprise stormwater that has come into contact with mixed wastes, green and timber wastes and uncapped landfill. The dirty runoff will be collected separately from clean stormwater and will be treated as leachate.

Captured rainwater from building roofs (in tanks) will be used to help meet toilet flushing and wheel wash needs.

Stormwater runoff from the operational area will be directed to either the northern or southern GPT for treatment and retention in the northern or southern OSD basin, respectively, located to the west of the western berm (see design in Appendix M). Runoff from the operational area will be conveyed via a combination of major and minor drainage systems, including:

- An underground piped system with stormwater pits located along roadways, designed to convey 1 in 20 year flows with surcharge, and with provision for overland flow along roads; and
- Stormwater detention and pollution control structures including the proposed OSD basins adjacent to Archbold Road and the in-pit basin in the quarry.

The GPTs used onsite are the Rocla CDS Unit, and the information is provided in Appendix G.

Water uses for the Project will include:

- Water spray and sprinkler systems located at material stockpiles and unloading areas (estimated average application 30kL/day), for dust suppression and irrigation of landscaped area;
- Dust suppression via water carts and site dump truck on-board reservoirs (estimated average application 80kL/day);
- Wheel wash top up (estimated average use 1kL/day);
- Building internal uses and potable uses (estimated average 1.2kL per day, based on 49 staff onsite in any one day, each using 5L of potable water, and flushing toilets); and
- Fire fighting water (static on-site storage of 10kL required).

Water balance modelling indicates that overall water demands vary between 36.2ML/year in a dry year, to 33.7ML/year in a wet year. Potential water supplied from the aforementioned storages range between 28.6ML/year (dry year – equivalent to 79% of overall demands) and 33.2ML/year (wet year – equivalent to 99% of overall demands). Shortfall in supplies will need to be sourced from mains water supplies.

Discharge points for site are to be maintained or will remain unaffected by site development. No stormwater will be directed to new discharge points, including bushland areas, and therefore will not adversely affect these areas.

Water Sensitive Urban Design measures are incorporated into the stormwater system where practical. These include:

- Grass swales around parts of the site near embankments and low-traffic areas; and
- Wetland vegetation at the OSD basins;

both of which once established are less susceptible to damage or unexpected sediment loads from site activities.

The Dam Safety Committee has confirmed that the OSD basins in the western section are not prescribed, because of their size, location, and that they are not built above ground, see Appendix I.

Monitoring of the surface water discharge levels will occur at the OSD basins, in accordance with the Site Environmental Monitoring Plan.

There will be no adverse effect demonstrated by this modification on water collection or water quality.

The advantages and disadvantages of Modification 2 were considered by the Proponent and these are set out below:

3.2.1 Advantages

- a) LandPartners Plan 72757.000 provides a comprehensive design of the final construction for this Project. The construction does not propose a design in preparation for any future development, just for the requirements of this Project.
- b) LandPartners Plan 72757.000 consolidates a number of different plans, being Plan 72757_Area D, the mapping of the conservation area, the location of the OSDs, the position of the GPTs and swales, the berms and local roads, and the areas left available for the construction of a future Precinct Road.

3.2.2 Disadvantages

- a) Further work would have to be performed in the future, if and when the area to the west of the Project operational area is developed.

3.3 Key Environmental Issues Relating to Modification 2

3.3.1 Surface Water Management

The Proponent has commissioned Marten and Associates Consulting Engineers to review the Site Surface Water Management Plan prepared by Storm Consulting dated November 2008, in light of changes to the proposed bulk earthworks, including the earthworks and OSD basins in the western section of the Site. The Martens' Report can be found in Appendix C.

Prior to the Project, the western section was a grassed paddock. The western section contains the OSD basins that service the operational area. There are no further earthworks proposed in this area, and no formal land use proposed. The area that has been disturbed during the building of the OSD basins will revegetate with grass, and the OSD basins will be planted out as wetlands.

Martens' Report assessed that there would be no hydrological change from the pre-development situation in the western area. No OSDs are required for the western section itself, so the OSDs only need the capacity to service the operational area. The runoff from the western section does not run into the OSDs, but flows in the directions that it flowed pre-development. If the western section is developed in the future, an OSD is likely to be required to service that area.

3.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project. Leachate generated in the quarry pit is contained by the proposed liner and the existing hydrology of the pit. Leachate generated in the operational area is limited to the greenwaste area, and to the floor of the MPC due to water used for dust suppression. Water from the greenwaste area is contained with concrete bunds, and the sloping floor of the greenwaste area directs all water generated in that area to a sump and closed circuit leachate management system. Similarly, the leachate generated in the MPC is contained by grated concrete pits and the exits and entrances to the building, and all leachate is collected in a sump which discharges down a pipe into the quarry pit.

3.3.3 Traffic and Transport

Once the construction of the OSDs is complete, there will generally be no vehicular access to the western section. It is not expected that this modification will affect the traffic and transport management of the Project.

This modification makes allowances for the future precinct road that was not factored into the Hyder drawings. The precinct road has not yet been designed, but the design for the construction of the road is anticipated to involve further earthworks around the northern OSD.

3.3.4 Visual Amenity

It is not expected that this modification will affect the visual amenity. Surrounding neighbours and suburbs will not be able to view the operational area.

The berm between the operational area and the western section was proposed to be reduced before vegetation, but the Proponent does not propose to reduce the berm. The berm will be vegetated in its current form.

3.3.5 Flora and Fauna

The western section will be revegetated with grass after construction in the area has completed, in accordance with the Project Landscape and Vegetation Management Plan.

Revegetation will be a priority, as established grass will assist with stabilisation of the surface soil and prevent erosion.

The berm between the operational area and the western section will be vegetated in accordance with the Project Landscape and Vegetation Management Plan.

The northern swale does not encroach into the Conservation Area.

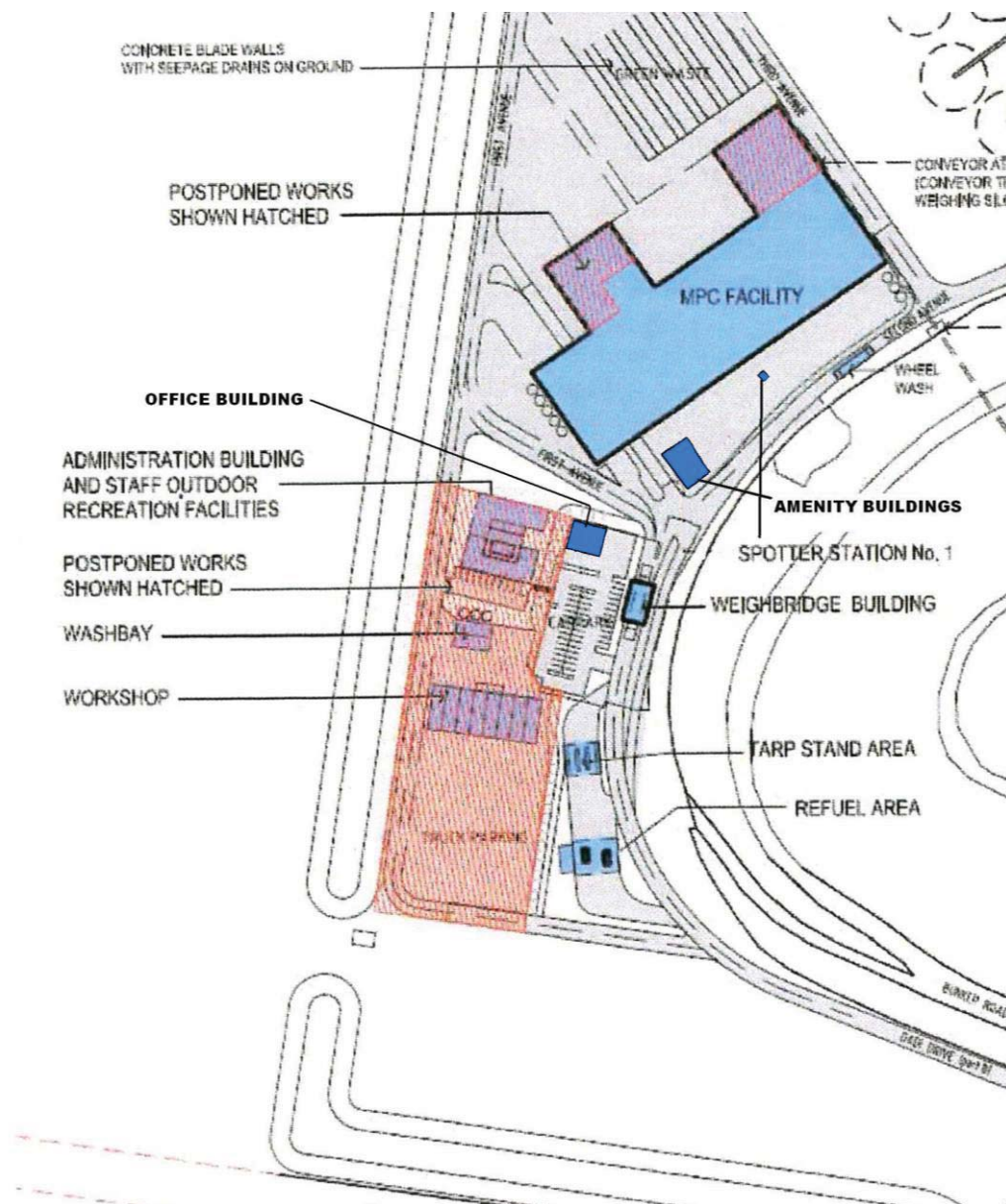
CHAPTER 4 – MODIFICATION 3

4.1 Modification Details

It is proposed that an office for the weighbridge operator be constructed inside the existing shed around the weighbridge.

The weighbridge building is marked in Figure 4.1 (below).

Figure 4.1: Site Plan



4.2 Weighbridge Office

All incoming vehicles will be directed over the weighbridge for weighing. The classification of the loads will be recorded at the weighbridge. Classification will be based on advice from the carrier, inspection of the carrier's documentation prepared in accordance with the DECCW (2008) Waste Classification Guidelines, and verification of this information by visual inspection using the weighbridge camera.

The weighbridge operator will need access to computer equipment to process incoming vehicles.

The weighbridge operator, although located at the first checkpoint inside the shed surrounding the weighbridge, will be exposed to the elements due to the shed being open-ended. For the weighbridge operator's occupation health and safety, they should have access to an enclosed office.

The weighbridge office will be mounted 1,300mm off the slab, to be level with the weighbridge to reduce the risk of falling or tripping. The dimensions of the weighbridge office will be 12,100mm(l) x 3,000mm(w) x 2,800mm(h). A verandah extends the length by 3,600mm, which is where the drivers will stand and speak to the weighbridge operator through a window.

A plan of the office relative to the weighbridges is attached in Appendix K.

4.3 Key Environmental Issues Relating to Modification 3

4.3.1 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project, because the office will be located inside an existing building footprint. The runoff from the weighbridge shed roof has already been included in all calculations of the surface water management of the Project.

4.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

4.3.3 Traffic and Transport

It is not expected that this modification will affect the traffic and transport associated with the Project. All vehicles were already being directed over the weighbridge, and the first checkpoint was already situated at the weighbridge. The office will not be positioned to restrict any vehicular access.

4.3.4 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project. The weighbridge office will be located inside an existing building, being the weighbridge shed. The weighbridge shed is located within the operational area, which is screened by appropriate amenity berms.

4.3.5 Flora and Fauna

It is not expected that this modification will affect the flora and fauna of the Project, since the weighbridge office will be located inside an existing building footprint.

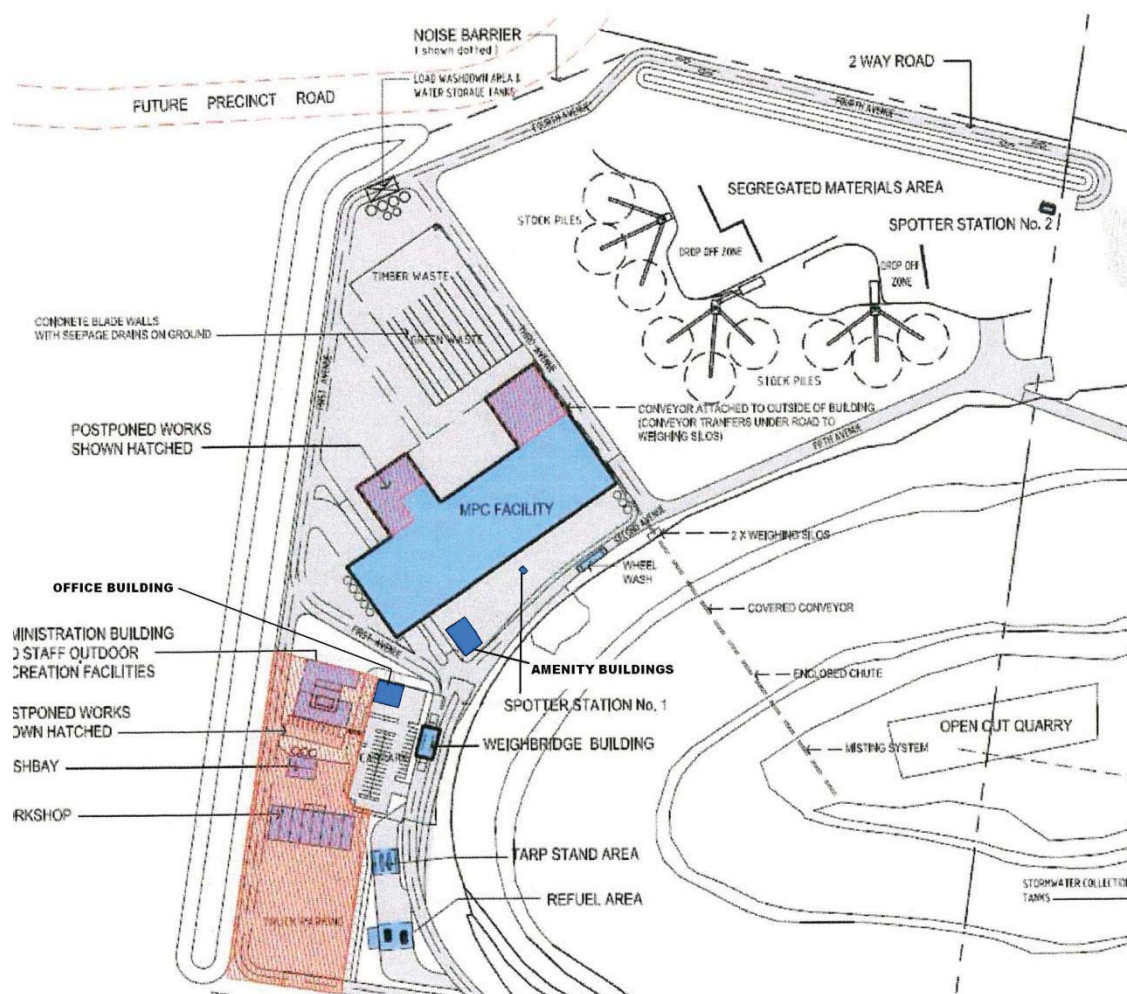
CHAPTER 5 – MODIFICATION 4

5.1 Modification Details

It is proposed that amenity buildings for toilets and lunch rooms be built adjacent to the MPC building and the Spotter Stations.

The buildings are shown in Figure 5.1 (below).

Figure 5.1: Site Plan



5.2 Amenity Buildings

Provision for lunch rooms and sufficient toilet facilities for the workers in the MPC were originally provided for, but the construction of these facilities were postponed under Modification 1 of the Project. Since construction of these facilities has been postponed, along with other facilities, consideration had to be given to providing staff with appropriate amenities.

The provision of lunch rooms close to the MPC and the Spotter Stations will enable the workers to take their breaks closer to their work area, and not be walking around site. Similarly, having sufficient toilet facilities at the MPC and the Spotter Stations will eliminate the workers' need to walk long distances to other toilet facilities, and thereby reducing their time away from their station.

Drawings are attached in Appendix F.

A combined lunch room and bathroom will be located at the Spotter Stations, located near the entrance to the MPC and near the segregated materials area.

Another amenities building, including lunchrooms and toilets, will be located out the front of the MPC building.

5.3 Key Environmental Issues Relating to Modification 4

5.3.1 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project. The extra roof space is minimal (less than 0.02ha). All runoff from the roof area will be contained in tanks. Stormwater calculations were already prepared on the basis that this area was impervious. This modification will not change that assumption.

5.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

5.3.3 Traffic and Transport

It is not expected that this modification will affect the traffic and transport associated with the Project. No vehicle movement should occur near the amenity buildings.

The Spotter Station is located beside the entrance to the MPC, so that spotters can check incoming vehicles and direct traffic. Vehicles will be moving on either side of the Spotter Station, moving in and out of the MPC, along routes already determined.

5.3.4 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project. All new buildings will be located within the operational area, which is screened by appropriate amenity berms. The external colour of the buildings will match the colour of the MPC.

5.3.5 Flora and Fauna

It is not expected that this modification will affect the flora and fauna of the Project, since all building will be constructed on the concrete slab that the MPC is built on.

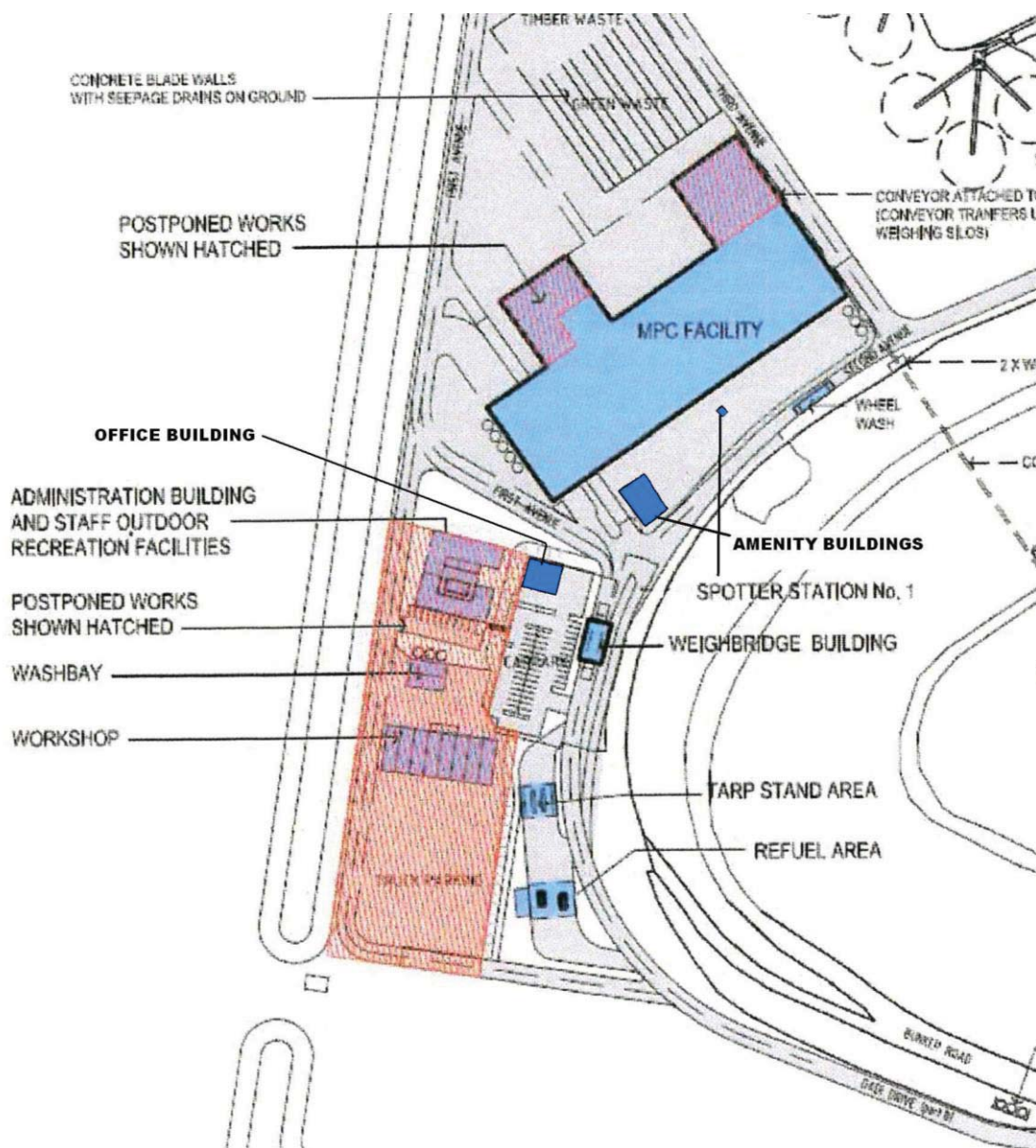
CHAPTER 6 – MODIFICATION 5

6.1 Modification Details

It is proposed that an office be built to the north of car park area, since the construction of the main Administration Building has been delayed.

The buildings are shown in Figure 6.1 (below).

Figure 5.1: Site Plan



6.2 Office

There is currently no administration office, since the construction of the main Administration Building has been delayed.

A drawing is attached in Appendix H.

6.3 Key Environmental Issues Relating to Modification 5

6.3.1 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project. The extra roof space is minimal (less than 0.02ha). All runoff from the roof area will be contained in tanks. Stormwater calculations were already prepared on the basis that this area was impervious. This modification will not change that assumption.

6.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

6.3.3 Traffic and Transport

It is not expected that this modification will affect the traffic and transport associated with the Project. No vehicle movement should occur near the office building.

6.3.4 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project. The office will be located within the operational area, which is screened by appropriate amenity berms. The external colour of the building will match the colour of the MPC.

6.3.5 Flora and Fauna

It is not expected that this modification will affect the flora and fauna of the Project, since the office building will be constructed on the concrete slab.

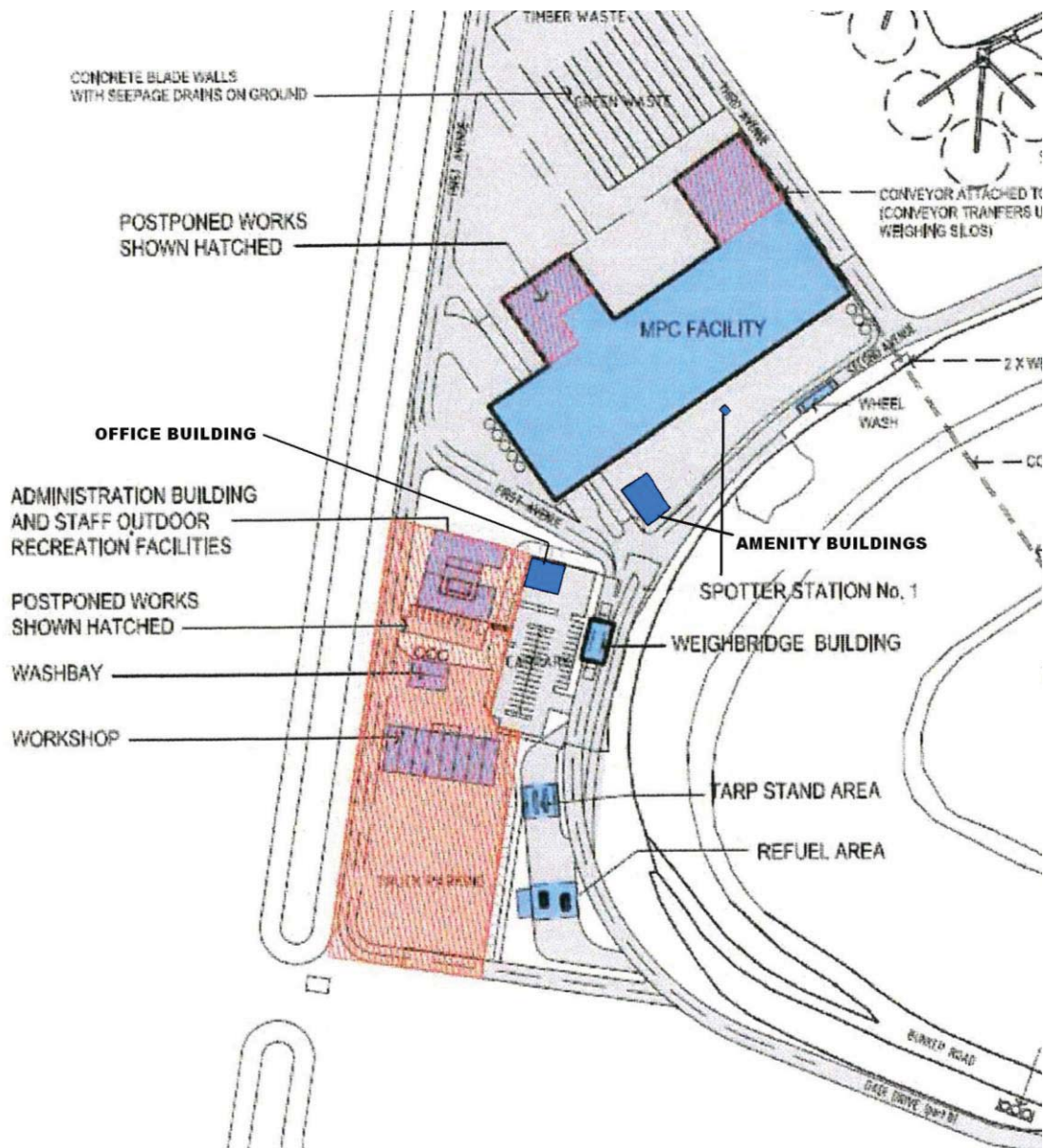
CHAPTER 7 – MODIFICATION 6

7.1 Modification Details

It is proposed that additions be built onto the building called the 'Tarp Stand Area' to provide for the amenities of the staff working in that location.

The Tarp Stand Area is shown in Figure 7.1 (below).

Figure 5.1: Site Plan



7.2 Office

There are currently no toilet facilities at the Tarp Stand Area, no lunch room, and insufficient storage space. Since the construction of the main Workshop Building has been delayed, the Tarp Stand Area will be utilised for temporary workshop facilities.

A drawing is attached in Appendix L.

7.3 Key Environmental Issues Relating to Modification 6

7.3.1 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project. The extra roof space is minimal. All runoff from the roof area will be contained in tanks. Stormwater calculations were already prepared on the basis that this area was impervious. This modification will not change that assumption.

7.3.2 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

7.3.3 Traffic and Transport

It is not expected that this modification will affect the traffic and transport associated with the Project. The additions to the Tarp Stand Area are largely within the existing footprint of the building.

7.3.4 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project. The office will be located within the operational area, which is screened by appropriate amenity berms. The external colour of the building will match the colour of the MPC.

7.3.5 Flora and Fauna

It is not expected that this modification will affect the flora and fauna of the Project, since the office building will be constructed on the concrete slab.

CHAPTER 8 – CONCLUSION

Each of the proposed modifications are justified, based on the needs they meet and consolidation they provide.

8.1 Modification 1

Modification 1, being the change of the level of the land in fill pad named 'Area D', provides a more consistent interface between the Proponent's land and the land of the neighbour. This will assist with the development of the area, the building of the Precinct Road between the two parcels of land, and ensure that the Proponent's neighbour meets its precondition required by the developer-purchaser of the land.

The Proponent benefitted financially from being able to increase the amount of fill being moved into Area D from bulk earthworks undertaken during the Project, instead of having to pay to dispose of it offsite. The extra fill will also assist in the future building of infrastructure in the area, in that the fill can be utilised instead of having to bring more fill in when the base of the Precinct Road is constructed.

8.2 Modification 2

Replacing the Hyder drawing, as proposed by Modification 2, will consolidate a number of plans and circumstances that had developed since the Hyder drawings were made. The conservation area has now been mapped, so should be included in a consolidated plan. The requirements for the capacity of the OSDs has also been calculated since the Hyder drawing, so the OSD sizes accurately reflect the requirements of the Project, rather than making allowances for some future development that cannot be foreseen.

The Proponent no longer proposes to perform the earthworks on the western berm, or the preparation of the western section for future development. These earthworks are not required as part of the Project, and if not performed, will provide the Proponent with an immediate cost saving.

8.3 Modification 3

Modification 3 involves the construction of an office in the weighbridge building. The weighbridge operator needs to enter incoming loads into a computer system, which must be available at the weighbridge when vehicles are weighed, for efficiency. Occupational health and safety issues are also addressed by the provision of an enclosed building within the weighbridge area, for protection

from the elements, protection from vehicles, and the elimination of having to climb up and down from the weighbridge because of the office is raised to that level.

8.4 Modification 4

Efficiency is further improved through the implementation of Modification 4, along with addressing other occupational health and safety issues for the staff employed in the MPC building and the Spotter Stations. Appropriate facilities will be provided for the staff to take their breaks, and toilets will be readily available close to the MPC. Previously, excess foot traffic was created by the need of those staff members to walk across the operational area to amenity buildings located away from the area. Efficiency will be increased because the Proponent will save the time that the staff would have taken to walk to distant toilet facilities, and the needs of staff are better met by having appropriate lunch room facilities located nearby.

8.5 Modification 5

An administration office is required, for effective management and administration of the operations. Since the suspension of the construction of the main Administration Building, there has been no provision for a site office. This building will function as the site office until the Administration Building can be built, and then use of this site office can be restricted to the operational managers.

8.6 Modification 6

The Tarp Stand Area will be utilised as a temporary workshop facility until the Workshop Building is constructed. The Tarp Stand Area does not provide for any toilet facilities or lunch room facilities for staff working in that area. The additions to the Tarp Stand Area are largely within the footprint of the building.

APPENDIX A

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 4.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

The Hon Kristina Keneally MP
Minister for Planning

Sydney

2009

SCHEDULE 1

Application No: ~~06_0239~~ **06_0139**

Proponent: ThaQuarry Pty Ltd & ACN114 843 453 Pty Ltd

Approval Authority: Minister for Planning

Land: ~~Lot 10 DP 241859, Lot W DP 419612, Lot 1 DP 400697
& Lot 2 DP 262213~~ **Lot 1 and 4 DP 1145808**

Project: Eastern Creek Waste Project

Modification 1 - marked in red

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DEFINITIONS

BCA Construction	Building Code of Australia The demolition of buildings or works, carrying out of works and erection of buildings covered by this approval
Council	Blacktown City Council
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DECCW Department	Department of Environment, Climate Change and Water Department of Planning
Director-General	Director-General of the Department (or delegate)
DWE	The former Department of Water and Energy, now Office of Water (within DECCW)
EA	Environmental assessment titled <i>Light Horse Business Centre</i> dated December 2008, the associated response to issues raised in submissions, dated 6 April 2009 and Preferred Project Report dated 26 June 2009.
EPA	Environmental Protection Authority of DECCW
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning & Assessment Regulation 2000</i>
EPL	Environmental Protection Licence
Evening	The period from 6pm to 10pm
Incident	An incident causing or threatening material harm to the environment, and/or an exceedance of the limits or performance criteria in this approval
Land	In general, the definition of land is consistent with the definition in the EP&A Act.
Material harm to the environment	Harm to the environment is material if it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning
Mitigation	Activities associated with reducing the impacts of the project
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
Non-Putrescible Waste	As defined by Schedule 2 of the <i>POEO Regulation</i>
Operations	Operations are triggered by the receipt of waste on site
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Putrescible Waste	As defined by Schedule 2 of the <i>POEO Regulation</i>
Precinct Plan	State Environmental Planning Policy No: 59 - Central Western Sydney Economic and Employment Lands - Employment Lands Precinct Plan - Eastern Creek Precinct dated 14 December 2005
Precinct Plan Road	As detailed in Section 10 of the Precinct Plan, in particular Figure 30 – Local Road Pattern.
Precinct Plan Stormwater Scheme	As detailed in Section 5 of the Precinct Plan, in particular Figure 11 – Stormwater Management Plan.
Project	The development described in the EA, which includes the continued use of unauthorised works on site
Proponent	ThaQuarry Pty Ltd & ACN114 843 453 Pty Ltd, or their successors
Reasonable	Reasonable relates to the application of judgment in arriving at a decision, taking into account: mitigation benefits, costs of mitigation versus benefits provided, community views, and the nature and extent of potential improvements.
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment
Remediation	Activities associated with partially or fully repairing or rehabilitating the impacts of the project or controlling the environmental consequences of this impact
Feasible	Feasible relates to engineering considerations and what is practical to build
Site	The land referred to in Schedule 1
Statement of Commitments	The Proponent's Statement of Commitments in the EA and Statement of Commitments in Response to Submissions dated 6 April 2009
VENM	Virgin Excavated Natural Material, as defined in the <i>Protection of the Environment Operations Act 1997</i>

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or decommissioning of the project.

Terms of Approval

2. The Proponent shall carry out the project generally in accordance with the:
 - a) EA;
 - b) Statement of Commitments;
 - c) site plan and building elevation drawings at Appendix 1;
 - d) **Modification application 06_0239 Mod 1 with supporting document titled *Light Horse Business Centre, Environmental Assessment Report: Project Modification* prepared by Light Horse Business Centre, dated August 2010 and Additional Information, dated 6.9.2010 and 13.9.2010; and**
 - e) conditions of this approval.
3. If there is any inconsistency between the above, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
 - a) any reports, plans, strategies, programs or correspondence that are submitted in accordance with this approval; and
 - b) the implementation of any actions or measures contained in these reports, plans, strategies, programs or correspondence.

Limits on Approval

5. The Proponent shall not receive more than 2 million tonnes of materials at the site per calendar year.
6. Nothing in this approval gives affect to or approves those works being undertaken, structures or buildings, on the site, in the area currently leased to Hanson (see Figure 1.2 in the EA).

Dispute Resolution

7. In the event that a dispute arises between the Proponent and Council or a public authority, other than the Department, in relation to the reasonableness of any requirements proposed by Council or a public authority arising from the conditions of this approval, the matter can be referred by either party to the Director-General for resolution.

Note: If the dispute cannot be resolved in 28 days, the Director-General will refer the matter to an Independent Dispute Resolution Process (see Appendix 5).

Structural Adequacy

8. Prior to the commencement of operations the Proponent shall obtain and provide copies of all necessary building certificate(s) from Council to the Director-General, for the following works:
 - a) The weighbridge and associated infrastructure.
9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structure are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

- 9a **Construction works associated with the weighing silos, and conveyor and chute system shall be:**
 - a) **the subject of appropriate certification from a qualified geotechnical and civil engineers; and**
 - b) **in accordance with the relevant Australian Standards.**

- 9a No temporary structures such as demountable sheds or shipping containers are to be used as a substitute for any approved permanent structure. This does not prevent the use of demountable structures on site during construction.

Demolition

10. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601:2001: The Demolition of Structures*, or its latest version.

Utilities

11. Prior to the construction of any utility works, the Proponent shall obtain the relevant approvals from service providers and Council, including, but not limited to a Section 73 Compliance Certificate from Sydney Water.

Protection of Public Infrastructure

12. The Proponent shall:
- a) prepare a dilapidation report of the public infrastructure in the vicinity of the site (including roads, gutters, footpaths), in consultation with Council, and submit a copy of this report to the Department prior to the commencement of construction;
 - b) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
 - c) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Operation of Plant and Equipment

13. The Proponent shall ensure that all plant and equipment used on the site is:
- a) maintained in a proper and efficient condition; and
 - b) operated in a proper and efficient manner.

Staged Submission of Documents

14. With the approval of the Director-General, the Proponent may submit to the Director-General for approval any plan, strategy, study, or program required by this consent on a progressive basis.

Consultation & Approval Requirements

15. Where this approval requires the Proponent to prepare a plan, strategy, study, or program in consultation with a specified agency, the Proponent shall:
- a) provide a draft of the plan, strategy, study, or program to the relevant agency for comment/endorsement; and
 - b) amend the draft to take account of the comments provided by the agency, if any.
16. Where this approval requires the Proponent to submit a plan, strategy, study, or program to the Director-General or an agency for approval, the Proponent is required to obtain written approval from the Director-General or agency.

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

WASTE

Limits on Input

1. The Proponent shall not:
 - a) landfill more than 700,000 tonnes of non-putrescible waste per calendar year;
 - b) receive or landfill putrescible waste on site;
 - c) stockpile more than 50 tonnes of tyres on site at any one time;
 - d) stockpile more than 20,000 tonnes of green waste on site at any one time.
 - e) receive waste on site that is contaminated by chemicals and/ or pathogens that will not be rendered harmless by the process or that may constitute a health or environmental risk, including clinical and related waste and diseased carcasses; and
 - f) receive waste on site containing contaminants classified as hazardous waste, restricted waste (other than asbestos) or liquid waste under the POEO Act.

Waste Acceptance and Screening

2. The Proponent shall:
 - a) implement suitable procedures to:
 - ensure that the site does not accept wastes that are prohibited; and
 - screen incoming waste loads;
 - b) install suitable signs at the entry to the site, indicating the types of waste that are permitted to be accepted and those wastes that are prohibited; and
 - c) ensure that:
 - all waste sludges and wastes that are controlled under a tracking system have all the appropriate documentation prior to acceptance at the site;
 - staff receive adequate training in order to be able to recognise and handle hazardous or other unapproved wastes; and
 - Procedures and training requirements are integrated into the Environmental Management Strategy for the Project (See Schedule 5 condition 1).
3. The Proponent shall:
 - a) implement procedures to identify and handle asbestos waste. These procedures should be in accordance with National Occupational Health and Commission (Safe Work Australia's) Code of Practice & Guidance Notes for the Management & Control of Asbestos in WorkPlaces, relative guidelines and legislation from Workcover NSW and the POEO Regulation; and
 - b) integrate these procedures into the Environmental Management Strategy for the Project (See Schedule 5 condition 1).

3a The Proponent shall ensure that at no time is asbestos waste (as defined in the POEO Act) permitted to be placed in the conveyor/chute system for conveyance to the base of the landfill.

Limits on Outputs

4. Except for the following, the Proponent shall dispose of all outputs produced from the waste processing and/or resource recovery facility on site to the landfill:
 - a) Recyclables extracted and delivered off-site for resource recovery purposes;
 - b) Putrescible waste extracted from the input waste stream and lawfully disposed of off-site;
 - c) Restricted waste and hazardous waste extracted from the input waste stream and lawfully disposed of off-site; and
 - d) Output waste derived materials approved for use under the *Protection of the Environment Operations Act, 1997* and Regulation.

Monitoring

5. Within 12 months of the commencement of operations, the Proponent shall prepare and implement a **Waste Monitoring Program** for the Project. This Program must:
 - a) be prepared in consultation with DECCW;
 - b) be prepared to the satisfaction of the Director-General; and
 - c) include a suitable program to monitor the:
 - quantity, type and source of waste received on site; and
 - quantity, type and quality of the outputs produced by the site.

LANDFILL CONSTRUCTION AND OPERATION

6. Prior to the commencement of operations, the Proponent shall install a floor and wall landfill liner within the former quarry void (below the weathered zone) unless otherwise agreed to by the Director-General. The specifications of the landfill liner shall be developed in consultation with DECC and submitted to the Director-General for approval prior to construction commencing.

Note: the purpose of the landfill liner is to prevent the risk of potential leachate migration from the quarry void into groundwater aquifers. The Director-General will only vary the requirement for a ground and wall liner if additional groundwater investigations (specified by DECCW) reveal an alternative solution to prevent the risk of leachate migration can be achieved.

7. Prior to the commencement of operations the Proponent shall implement all slope stabilisation and risk control measures detailed in the 'Geotechnical Quarry Slope Stability Assessment' report prepared by Jeffery and Katauskas Pty Ltd dated 17 March 2008. The results from any survey monitoring or inclinometers installed at the north face landslip area should be included in the Annual Environmental Review requirements outlined in Schedule 5 condition 3.
8. The Proponent shall prepare and implement a **Landfill Plan** for the Project to manage the disposal of material into the void to ensure a suitable level of compaction occurs. The Plan must:
 - a) be to the satisfaction of the Director-General;
 - b) be submitted within 12 months of commencing operations;
 - c) be submitted every 3 years during the life of the operation (coinciding with the independent environmental audit required at Schedule 4, condition 4); and
 - d) be submitted 12 months prior to the closure of the landfill;
 - e) be conducted by a suitably qualified, experienced, and independent engineer (or other relevant expert) whose appointment has been endorsed by the Director-General;
 - f) detail the proposed disposal methodology to achieve a suitable level of compaction;
 - g) include a criteria or level of compaction target for the landfill, with the view to types of uses post-land filling of the void;
 - h) outline a process to monitor the performance of the disposal methodology, compaction and settling rates; and
 - i) contingency measures should the rates not be achieved; and
 - j) procedures for reporting the components of this Plan.
9. The Proponent shall:
 - a) minimise the exposed or cleared areas at the landfill;
 - b) fill the landfill cell in a systematic manner in accordance with the Landfill Plan in Schedule 3 condition 8, that maximises compaction rates;
 - c) cover all exposed landfilled waste with at least 150mm of VENM (or a suitable alternative) at the end of daily waste disposal and compaction activities or with intermediate cover comprising at least a 300mm thick layer of VENM if the resultant covered surface is to be left exposed for more than 90 days.

Leachate Management System

10. Prior to the commencement of construction of the leachate management system, the Proponent must submit a report to the Director-General for approval that is prepared in consultation with DECCW and Sydney Water, providing design details of the proposed leachate collection, conveyance, extraction, storage, treatment and disposal systems for all aspects of the proposal's operations (landfill and materials processing centre / resource recovery facility), including but not limited to:
 - a) a construction quality assurance (CQA) plan for the collection, conveyance and storage measures of leachate including details of the leachate barrier system proposed for any surface areas used for the direct impoundment of leachate;
 - b) details of the proposed leachate pre-treatment system, including its capacity;
 - c) a program for the installation and commissioning of the systems; and
 - d) details of the Proponent's proposed trade waste agreement with Sydney Water Corporation.
11. No waste may be received until the Proponent has constructed the proposed leachate collection system and the leachate treatment plant and has secured a trade waste agreement with Sydney Water Corporation for the disposal of treated leachate.

Windrow Management

12. The Proponent shall manage windrow composting operations in accordance with:
- AS 4454-2003: Composts, Soil Conditioners and Mulches, Appendix N;
 - Best practice guidelines for Composting Systems;
 - the most protective level of measures set out in the Environmental Guidelines for Composting & Related Organics Processing Facilities; or
 - other practices approved by the DECCW/EPA.

Litter Control

13. The Proponent shall:
- Implement suitable measures to prevent the unnecessary proliferation of litter both on and off site; and
 - Inspect and clear the site and surrounding area, of litter on a daily basis.

Pest, Vermin, Feral Animal & Noxious Weed Management

14. The Proponent shall:
- Implement suitable measures to manage pests, vermin, feral animals and declared noxious weeds on site and identify those measures in the Environmental Management Strategy for the Project (See Schedule 5 condition 1)
 - Inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin, feral animals or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard, or cause the loss of amenity in the surrounding area; and
 - Perform ongoing monitoring of weed infestation on and adjoining the site.

Security, Hazards & Risks

15. The Proponent shall:
- prevent unauthorised entry to the site; and
 - install and maintain a perimeter stock fence and lockable security gates on site.
16. The Proponent shall:
- Prepare an **Emergency & Fire Response Plan** for the site to the satisfaction of NSW Fire Brigade, which should include but not be limited to mitigation measures, and include the number of days material can be stored on site, prior to construction commencing and the plan being implemented;
 - implement suitable measures to minimise the risk of fire on site;
 - extinguish any fires on site promptly;
 - maintain adequate fire-fighting capacity on site; and
 - detail emergency evacuation procedures
- 16a The Proponent shall prepare detailed design plans for the conveyor/chute system. These plans shall:
- be prepared by a suitably qualified engineer in consultation with the DECCW;
 - be submitted to the Director-General for approval prior to the commencement of construction;
 - include the dimensions and gradients of the conveyor and chute;
 - include a fully enclosed conveyor/chute system;
 - include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry;
 - incorporate fine mist sprays at the discharge end of the chute to minimise dust; and
 - incorporate maintenance access points.
- 16b The Proponent shall prepare a Conveyor and Chute System Maintenance and Management Plan. The Plan shall:
- be submitted to the Director-General for approval prior to the commencement of operation;
 - include a maintenance schedule;
 - detail contingency measures in the event that the system breaks down, or is not coping with the intended quantities of waste; and
 - detail contingency measures to remove asbestos waste from the system should it be detected.

SOIL, WATER AND LEACHATE MANAGEMENT

Discharge Limits

17. Except as may be expressly provided in an EPL for the project, the Proponent shall comply with Section 120 of the POEO Act.
18. Except as may be expressly provided in an EPL for the project, the Proponent shall discharge wastewater, including treated wastewater, to sewer, in accordance with a Trade Waste Agreement with Sydney Water.
19. The Proponent shall design and construct the sewer to the satisfaction of the Director-General, to a sufficient size and depth, so as to not preclude the orderly development of Lots 9 and 11 in DP 241859, or the construction of the Precinct Plan Road that will eventually traverse Lot 10 DP 241859.

Bunding

20. The Proponent shall store all chemicals, fuels and oils used on site in appropriately banded areas, with impervious flooring and sufficient capacity to contain 110% of the largest container stored within the bund. These bunds shall be designed and installed in accordance with the requirements of all relevant Australian Standards, and/or DECCW's *Storing and Handling Liquids: Environmental Protection* manual.

Soil, Water and Leachate Management Plan

21. The Proponent shall prepare and implement a **Soil, Water and Leachate Management Plan** for the site to the satisfaction of the Director-General. This plan must:
 - a) be submitted to the Director-General for approval prior to construction;
 - b) be prepared by a suitably qualified and experienced expert;
 - c) be prepared in consultation with the DECCW and Council; and
 - d) include:
 - a site water balance;
 - an erosion and sediment control plan;
 - a stormwater management scheme;
 - a surface water, groundwater and leachate monitoring program; and
 - a surface water, groundwater and leachate response plan.
22. The site water balance must:
 - a) include details of all water extracted, transferred, used and/or discharged by the development;
 - b) identify the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;
 - c) describe the measures that would be implemented to minimise water use on site.
23. The erosion and sediment control plan must:
 - a) be consistent with the requirements in the latest version of *Managing Urban Stormwater: Soils and Construction* (Landcom);
 - b) identify the activities on site that could cause soil erosion and generate sediment; and
 - c) describe what measures would be implemented to:
 - minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures; and
 - maintain these structures over time.
24. The stormwater management scheme must:
 - a) be consistent with the guidance in the latest version of *Managing Urban Stormwater: Council Handbook* (DEC); and
 - b) include the detailed plans for the proposed surface water management system.
25. Should a Precinct Plan Stormwater Scheme be initiated by Council, the Proponent shall commit to that scheme and provide a development contribution to Council toward the implementation of that scheme (see below). The Precinct Plan Stormwater Scheme (as it relates to the Project) must:
 - a) be prepared in consultation with DECCW and Council and be submitted to the Director-General for approval prior to the commencement of construction of the Precinct Plan Stormwater Scheme works;
 - b) be consistent with the guidance in the latest version of *Managing Urban Stormwater: Council Handbook* (DECCW); and
 - c) include detailed plans of the Precinct Plan Stormwater Scheme as it relates to the Project.

26. Within three years of this approval, or when a Section 94 Contributions Plan that covers the site is made, whichever is sooner, the Proponent shall contribute toward the acquisition, design and construction of the Precinct Plan Stormwater Scheme. If a Section 94 Contributions Plan does not exist, the Proponent shall enter into a Voluntary Planning Agreement and/or works in kind deed of agreement with Council for those development contributions at that time. If a Section 94 Contributions Plan is not in place, the development contribution amount shall:
- be calculated by Council, (by apportioning the cost of the Precinct Plan Stormwater Scheme amongst the Precinct Plan landowners in the relevant catchments), and be to the satisfaction of the Director General;
 - be calculated in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*; and
 - be independently verified by a quantity surveyor whose appointment has been approved by the Director-General.

The development contribution toward the Precinct Plan Stormwater Scheme should be calculated in accordance with developable areas (52.41 ha) detailed in at Appendix 3 and exclude the quarry void itself initially. Development Contributions toward the Precinct Plan Stormwater Scheme are payable for the quarry void area (22.602 ha) at least 12 months prior to the completion of landfilling.

27. The surface water, groundwater, and leachate monitoring program must:
- be generally consistent with the guidance in benchmark techniques 4, 5, 6, 7 and 8 of Appendix A of the DECCW's *Environmental Guidelines for Solid Waste Landfills* (1996, or the relevant sections of the latest version of the guideline); and
 - include:
 - baseline data;
 - details of the proposed monitoring network; and
 - the parameters for testing and respective trigger levels for action under the surface water, groundwater and leachate response plan (see below).
28. The surface water, groundwater and leachate response plan must:
- include a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and
 - describe the array of measures that could be implemented to respond to any surface or groundwater contamination that may be caused by the development.

AIR, ODOUR AND GREENHOUSE GAS

Air Quality Impact Assessment Criteria

29. The Proponent shall ensure that dust generated by the development does not cause additional exceedances of the criteria listed in Tables 1 to 3 at any residence on, or on more than 25 percent of, any privately owned land.

Table 1: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 2: Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 3: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Offensive Odour

30. The Proponent shall not cause or permit the emission of offensive odours from the site, as defined under Section 129 of the POEO Act.
31. If the Independent Environmental Audit (see Condition 7 of Schedule 5) recommends that the green waste area (see plan in Appendix 1) be enclosed to reduce the odour impacts of the project, then the Proponent shall enclose the area to the satisfaction of the Director-General within the timeframe specified by the Director-General.
- 31a **The Proponent shall ensure that each green waste bay has an individual cover and aerobic equipment fitted to reduce odour and the generation of leachate.**

Dust

32. The Proponent shall implement all reasonable and feasible measures to minimise the dust generated by the project.
33. The Proponent shall seal all internal haul roads within the operational area of the project (see Operational Area at Appendix 3), with the exception of haul roads within the quarry void itself.
34. Prior to the commencement of operations, the Proponent shall ensure that water sprays or appropriate dust suppression measures identified in the EA are implemented within the site to provide effective dust suppression to all dust generating activities, including but not limited to dust generated by:
 - a) crushing, screening and/or sorting operations;
 - b) vehicles moving on unpaved surfaces; and
 - c) the unloading of dry waste material.
35. During construction, the Proponent shall ensure that:
 - a) all trucks entering or leaving the site with loads have their loads covered; and
 - b) the trucks associated with the project do not track dirt onto the public road network.

Greenhouse Gas Emissions

36. The Proponent shall implement all reasonable and feasible measures to minimise:
 - a) energy use on site; and
 - b) the scope 1, 2 and 3 greenhouse gas emissions produced on site, to the satisfaction of the Director-General.

Air Quality, Odour and Greenhouse Gas Management Plan

37. The Proponent shall prepare and implement an **Air Quality, Odour and Green House Gas Management Plan** for the project to the satisfaction of the Director-General. This plan must:
 - a) be prepared in consultation with DECCW by a suitably qualified, experienced and independent expert whose appointment has been endorsed by the Director-General, and submitted to the Director-General for approval within 3 months of the date of this approval;
 - b) describe in detail the measures that would be implemented on site to control the odour and air quality impacts of the project, and to ensure that these controls remain effective over time;
 - c) identify triggers for remedial action;
 - d) include a program for monitoring the air quality and odour impacts of the project including a real-time dust monitor to measure dust emissions during operation;
 - e) Identify the number and location of continuous monitoring points for fine particulates (PM10) during each stage of works, ensuring sufficient representation of the relevant sensitive receptors at each stage of the proposed works;
 - f) Include development and identification of PM10 concentration trigger levels at which:
 - Dust management actions must be taken, and specification of the relevant actions; and
 - Works at the site must cease.
 - g) Include a program for monitoring subsurface gas, surface gas emission, and gas accumulation in general accordance with the guidance in sections 15-18 of Appendix A of the DEC's Environmental Guidelines for Solid Waste Landfills; and
 - h) Include a protocol for remediating uncontrolled landfill gas emissions.

NOISE

Noise Impact Assessment Criteria

38. The Proponent shall ensure that noise from the project does not exceed the noise limits in Table 4.

Table 4: Noise Impact Assessment Criteria

Location	Day LA _{eq} (15 minute) dB(A)
All Affected Receivers	36

Notes:

a) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the LA_{eq} (15 minute) noise limits. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

b) The noise emission limits identified apply under meteorological conditions of:

Wind speed up to 3m/s at 10 metres above ground level; or

Temperature inversion conditions of up to 3oC/100m and wind speed up to 2m/s at 10 metres above the ground.

Hours of Operation

39. The Proponent shall comply with the restrictions in Table 5.

Table 5: Construction and Operation Hours for the Project

Activity	Day	Time
Construction	Monday – Friday	7:00am to 6:00pm
	Saturday	8:00am to 4:00pm
	Sunday and Public Holidays	Nil
Operation	Monday – Friday	7:00am to 6:00pm
	Saturday, Sunday and Public Holidays	8:00am to 4:00pm

- 39a Operating hours of the conveyor and chute system are to be restricted to the facility's operational hours as defined in condition 39 of Schedule 3.

Monitoring

40. The Proponent shall prepare and implement a Noise Monitoring Program for the development, in consultation with DECCW, and to the satisfaction of the Director-General. This program must be submitted to the Director-General for approval prior to commencement of operations, and include a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this approval.

METROLOGICAL MONITORING

41. For the life of the Project, the Proponent shall ensure that there is a suitable meteorological station in the vicinity of the site that complies with the requirements in the latest version of *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

TRAFFIC, TRANSPORT & ACCESS

Access

42. Access to the Project from Archbold Road is not permitted.
43. Access to the Project shall be via Old Wallgrove Road or Wonderland Drive, via the public Precinct Plan Road network, wherever a public road is available.

44. To facilitate both the construction of the sewer that will service the Project and the Precinct Plan Road that will eventually traverse Lot 10 DP241859, the Proponent shall grant access in favour of the owners of Lots 9 and 11 in DP241859, across Lot 10 DP 241859.

Precinct Plan Roads

45. Within five years from the date of this approval or when an adjoining land owner is building a precinct road to a common boundary (whichever is sooner), the Proponent shall design and construct, to the satisfaction of Council, those parts of the Precinct Plan Road network that ultimately fall within the operational area of the facility (See Appendix 3). These precinct roads shall be dedicated to council, at no charge, to form part of the public road network.
46. When a Precinct Plan road is constructed, the Proponent shall design and construct any new vehicular connections to the Precinct Plan Road, to the satisfaction of Council.

Internal Roads and Parking

47. The Proponent shall:
- a) ensure that all internal site paved, trafficable or parking areas on site complies with *AS2890.1 and/or AS2890.2* or their latest versions; and
 - b) construct at least 50 parking spaces for employees and visitors with at least 2% of those spaces provided for disabled drivers, clearly marked and signposted.
48. The Proponent shall ensure that vehicles associated with the project do not park or queue on the public road network at any time.

Local and Regional Road Network Contributions

49. Within three years of the date of this approval, or when a Section 94 Contributions Plan that covers the site is made, whichever is sooner, the Proponent shall contribute toward the acquisition, design and construction of the Precinct Plan Road known as the 'Quarry / Link Road' (between Old Wallgrove Road and Wonderland Drive).

Any contribution made by the Proponent under this condition shall be calculated by and made to Council and be to the satisfaction of the Director-General. The Director-General's consideration of an appropriate level of contribution shall consider:

- a) the level of contribution made by all other landowners within the Eastern Creek Precinct Plan landowners;
 - b) the level of contribution against the Land Acquisition (Just Terms Compensation) Act 1991;
 - c) any independent verification from a quantity surveyor on the cost of the works, whose appointment has been approved by the Director-General; and
 - d) the level of contribution against the entire operational area of the project (see Appendix 3).
50. Within 6 months of this approval, the Proponent shall enter into a planning agreement with the Minister, in accordance with Division 6 of Part 4 of the EP&A Act, and the terms of the offer made to the Department on 24 June 2009 by the Proponent which must include the matters set out in Appendix 2.
51. The Proponent shall contribute a maximum of \$7,860,450 payable to the Minister for Planning in accordance with the payment schedule in detailed in Appendix 2 of this approval, for the provision of regional infrastructure within the broader Western Sydney Employment Hub, including, but not limited to:
- a) the upgrade of Old Wallgrove Road;
 - b) the upgrade of Archbold Road;
 - c) signalisation of intersections along Old Wallgrove; and
 - d) the upgrade of the intersection of Wallgrove and Old Wallgrove Road

Transport Code of Conduct

52. The Proponent shall prepare and implement a Transport Code of Conduct for the development to the satisfaction of the Director-General. This protocol must:
- a) be submitted to the Director-General for approval prior to the commencement of operations;
 - b) be prepared in consultation with the RTA and Blacktown Council; and
 - c) describe the measures that would be implemented to:
 - minimise the impacts of the development on the local and regional road network, including traffic noise.

VISUAL AMENITY

Lighting

53. The Proponent shall ensure that the lighting associated with the project:
- complies with the latest version of *AS 4282(INT) - Control of Obtrusive Effects of Outdoor Lighting*; and
 - is mounted, screened and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.

Amenity Berms

54. The Proponent shall prepare design details for the visual screens, impervious barriers and amenity berms being implemented for the facility, having regard to adjoining landowners. This design detail must be submitted to the Director-General for approval prior to the commencement of construction or regrading of the amenity berms, visual screens or impervious barriers.
55. Prior to the commencement of operations, the Proponent shall:
- construct and maintain, for the duration of the operations, amenity berms, impervious barriers and visual screens around the perimeter of the operational area (as detailed in the EA, the sit plan at Appendix 1 and Schedule 3, Condition 53 above);
 - retain the existing amenity berm to the north east of the quarry void at the perimeter;
 - vegetate the berms in accordance with the Landscape and Vegetation Management Plan at Schedule 3, condition 59;
 - maintain the height of the amenity berms at no less than 10 metres; and
 - conduct all earth works required to reshape the amenity berms on site, without impacting on adjoining landowners.
56. No stockpile on site should exceed the height of the berms, impervious barriers or visual screens.

Signage and Fencing

57. The Proponent shall not install any signage or fencing on site without the written approval of the Director-General. In seeking this approval the Proponent shall:
- submit detailed plans of the proposed signage or fencing, which have been prepared in consultation with Council; and
 - demonstrate that the proposed signage or fencing is consistent with the relevant requirements from Council.

FLORA AND FAUNA MANAGEMENT

58. The Proponent shall not disturb those areas identified as Conservation Areas in the Precinct Plan and identified and mapped in the EA.
59. The Proponent must comply with Clean up notices issued by the Environment Protection Authority to the Proponent in relation to creek rehabilitation and reinstatement work within Lot 2 DP 262213.

Landscape and Vegetation Management Plan

60. The Proponent shall prepare and implement a **Landscape and Vegetation Management Plan** for the project to the satisfaction of the Director-General. This plan must:
- be prepared in consultation with DWE and Council and be submitted to the Director-General for approval within 3 months of this approval;
 - be prepared in accordance with *DWE's Guidelines for Controlled Activities – Vegetation Management Plans*; and
 - include:
 - a Landscape Plan for the project, which identifies screen plantings to minimise visual impacts, particularly on the amenity berms;
 - detailed plans and procedures to:
 - restore and maintain the waterways and riparian zones of the Ropes Creek Tributary on the site;
 - manage weeds in the vicinity of the riparian zones;
 - integrate works into the proposed landscaping for the rest of the site;
 - manage impacts on fauna; and
 - monitor the performance of the proposed restoration works.
 - Provide details on how those areas identified as Conservation Areas in the Precinct Plan shall be actively managed for conservation purposes including;

- improving the quality of the vegetation in these areas
- measure to control pests vermin, and noxious weeds; and
- measures to control access.

HERITAGE

61. The Proponent shall not disturb those areas identified as High Sensitivity in McDonald 2005.
62. The Proponent shall prepare and implement an **Aboriginal Heritage Management Plan**, in consultation with the DECCW, and to the satisfaction of the Director-General. The Plan must:
 - a) be submitted to the Director-General for approval prior to the commencement of construction;
 - b) be prepared by a suitably qualified archaeologist;
 - c) be consistent with the management principles defined in McDonald 2005;
 - d) include a strategy for the salvage and long term management of salvaged objects;
 - e) include procedures for topsoil stripping and sub-surface excavation works in areas of moderate sensitivity and supervision by a qualified archaeologist;
 - f) identify procedures to be followed should previously unidentified objects be uncovered or additional impacts to sites be identified;
 - g) measures to protect Aboriginal heritage values of those areas marked high sensitivity in McDonald 2005; and
 - h) include a procedure for continued consultation with Aboriginal stakeholders.

SCHEDULE 4 REHABILITATION AND CLOSURE

Final Landform

1. The final landform for the landfill shall generally be in accordance with the plan at Appendix 4. All earth works required to reach this final landform shall be conducted on site, without impacting on adjoining landowners.

Rehabilitation / Closure Plan

2. Upon cessation of landfilling, the Proponent shall decommission the landfill and rehabilitate the site. The Proponent shall prepare and implement a **Rehabilitation and Closure Plan**. This plan must:
 - a) Be prepared in consultation with DECCW, and Council
 - b) Be prepared by a suitably qualified and experienced expert;
 - c) Be submitted to the Director-General for approval within 3 years of commencement of operations;
 - d) Define the objectives and criteria for rehabilitation and closure;
 - e) Investigate options for the future use of the site;
 - f) Describe the measures that would be implemented to achieve the specified objectives and criteria for the rehabilitation and closure;
 - g) Calculate the cost of implementing these measures; and
 - h) Describe how the performance of these measures would be monitored over time.

**SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING & AUDITING**

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. The Strategy must:
 - a) be submitted to the Director-General for approval prior to the commencement of construction;
 - b) provide the strategic framework for environmental management of the project;
 - c) identify the statutory approvals that apply to the project;
 - d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
 - e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the project;
 - respond to any non-compliance; and
 - respond to emergencies;
 - f) include:
 - copies of the various strategies, plans and programs that are required under the conditions of this approval once they have been approved; and
 - a clear plan depicting all the monitoring currently being carried out within the project area.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - a) detailed baseline data;
 - b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
 - c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - d) a program to monitor and report on the:
 - impacts and environmental performance of the project;
 - effectiveness of any management measures (see c above);
 - e) a contingency plan to manage any unpredicted impacts and their consequences;
 - f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - h) a protocol for periodic review of the plan.

Annual Review

3. By the end of December 2010, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:
 - a) describe the works that were carried out in the past year, and the works that are proposed to be carried out over the next year;
 - b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years; and
 - the relevant predictions in the EA;

- c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- d) identify any trends in the monitoring data over the life of the project;
- e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
- f) describe what measure will be implemented over the next year to improve the environmental performance of the project.

Revision of Strategies, Plans & Programs

4. Within 3 months of the submission of an:
- a) audit under condition 7 of schedule 5;
 - b) incident report under condition 5 of schedule 5; and
 - c) annual review under condition 3 of schedule 5,
- the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

REPORTING

Incident

5. The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Regular

6. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Director-General.

INDEPENDENT ENVIRONMENTAL AUDIT

7. Within 6 months of the commencement of operation, and every 2 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
- a) be conducted by suitably qualified, experienced and independent team of experts (including an odour expert), whose appointment has been endorsed by the Director-General;
 - b) include consultation with the relevant agencies;
 - c) include a full odour audit of the project, taking into consideration the relevant technical guidelines and any odour complaints made since the previous audit;
 - d) assess the environmental performance of the project and assess whether it is complying with the relevant requirements in this approval and any relevant EPL (including any assessment, plan or program required under these approvals);
 - e) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate; and
 - f) recommend measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Director-General.

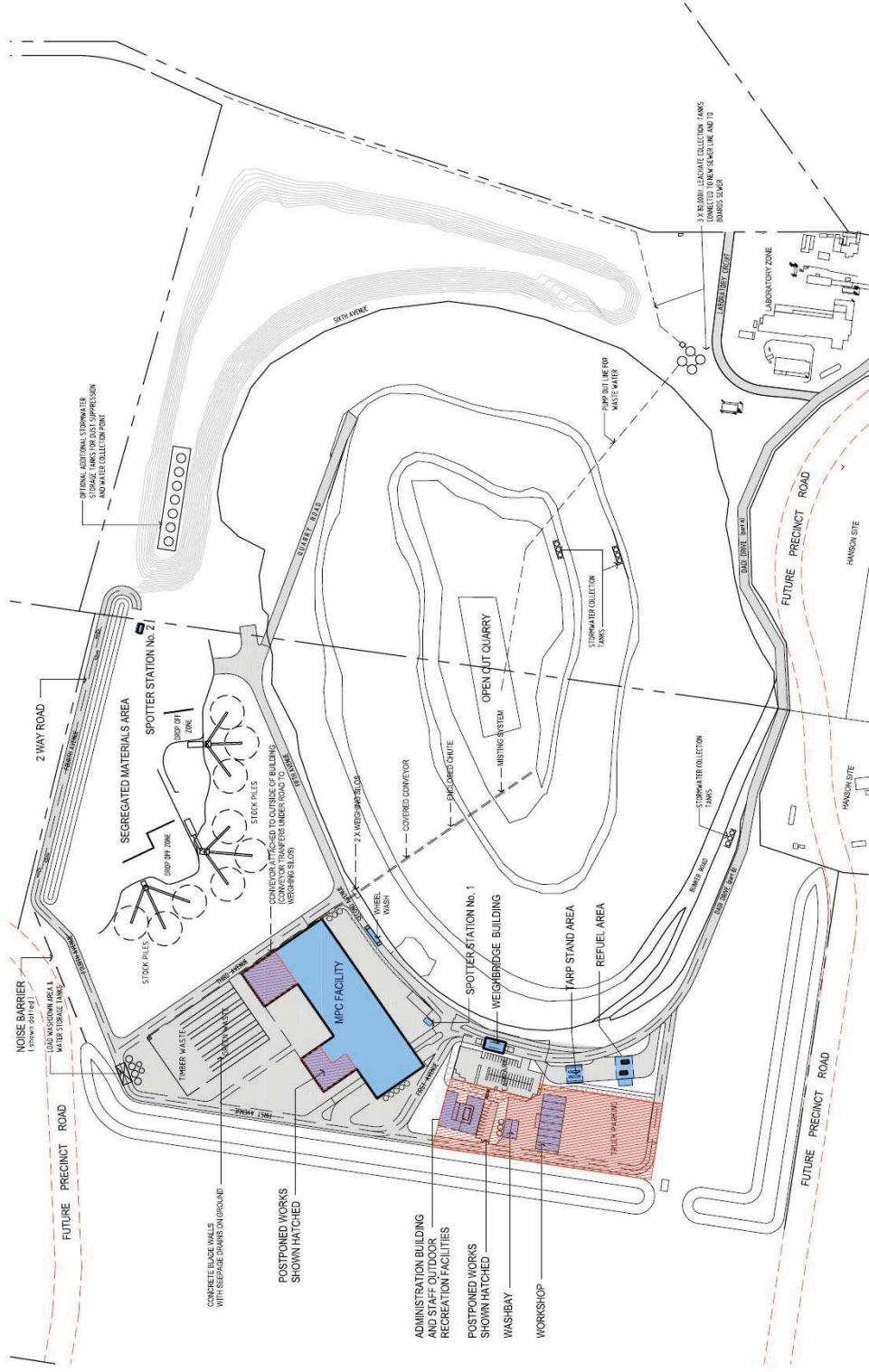
8. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

9. From the end of 2009, the Proponent shall make the following information publicly available on its website:
- a) a copy of all current statutory approvals;
 - b) a copy of the current environmental management strategy and associated plans and programs;

- c) a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;
- d) a complaints register, which is to be updated on a monthly basis;
- e) a copy of any Annual Reviews (over the last 5 years);
- f) a copy of any Independent Environmental Audit, and the Proponent's response to the recommendations in any audit; and
- g) any other matter required by the Director-General.

APPENDIX 1 - SITE PLAN & BUILDING ELEVATIONS



LIGHT HORSE BUSINESS CENTRE
DADI - MATERIALS PROCESSING FACILITY
DIAL A DUMP INDUSTRIES
OLD WALGROVE ROAD, EASTERN CREEK, NSW

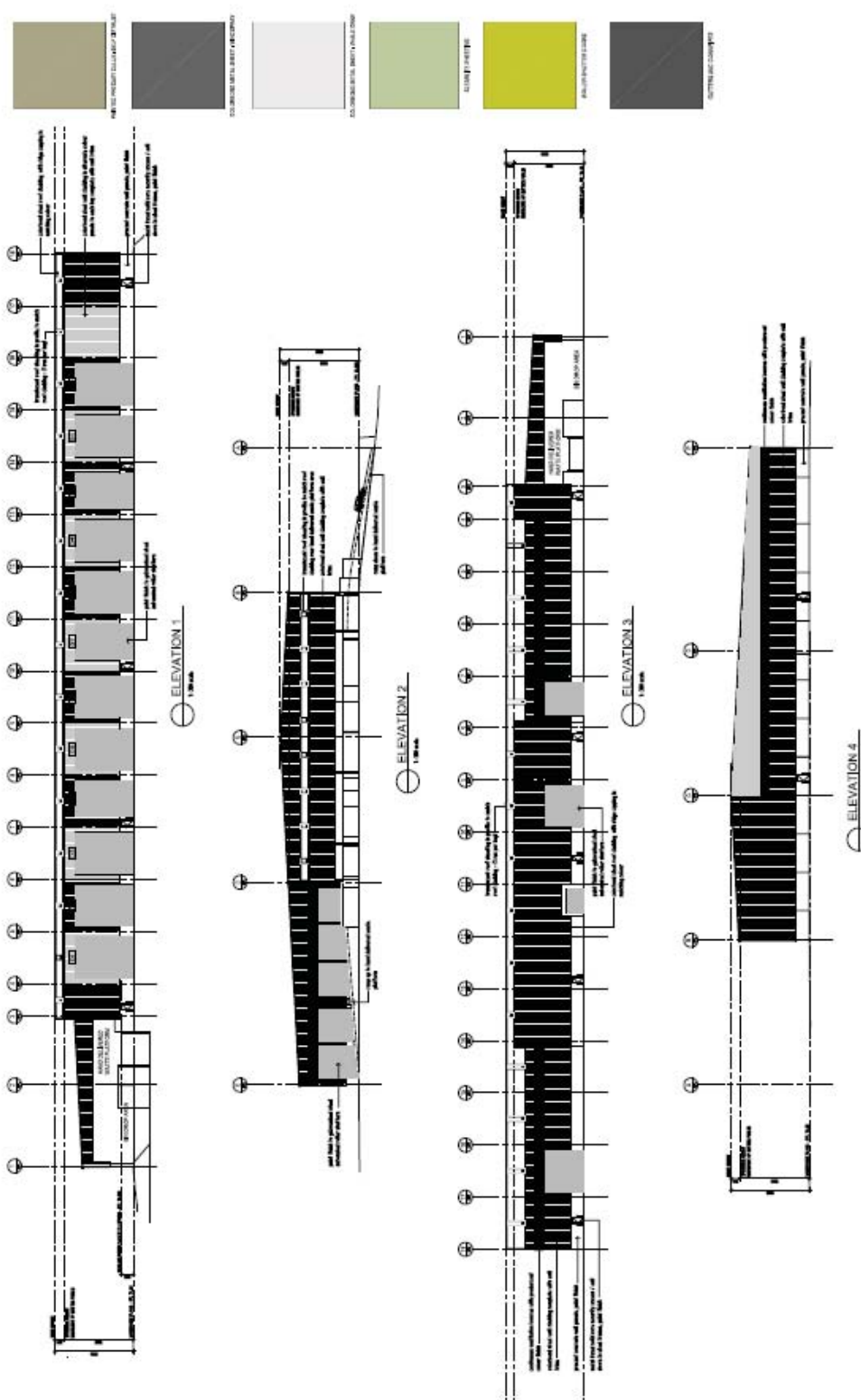
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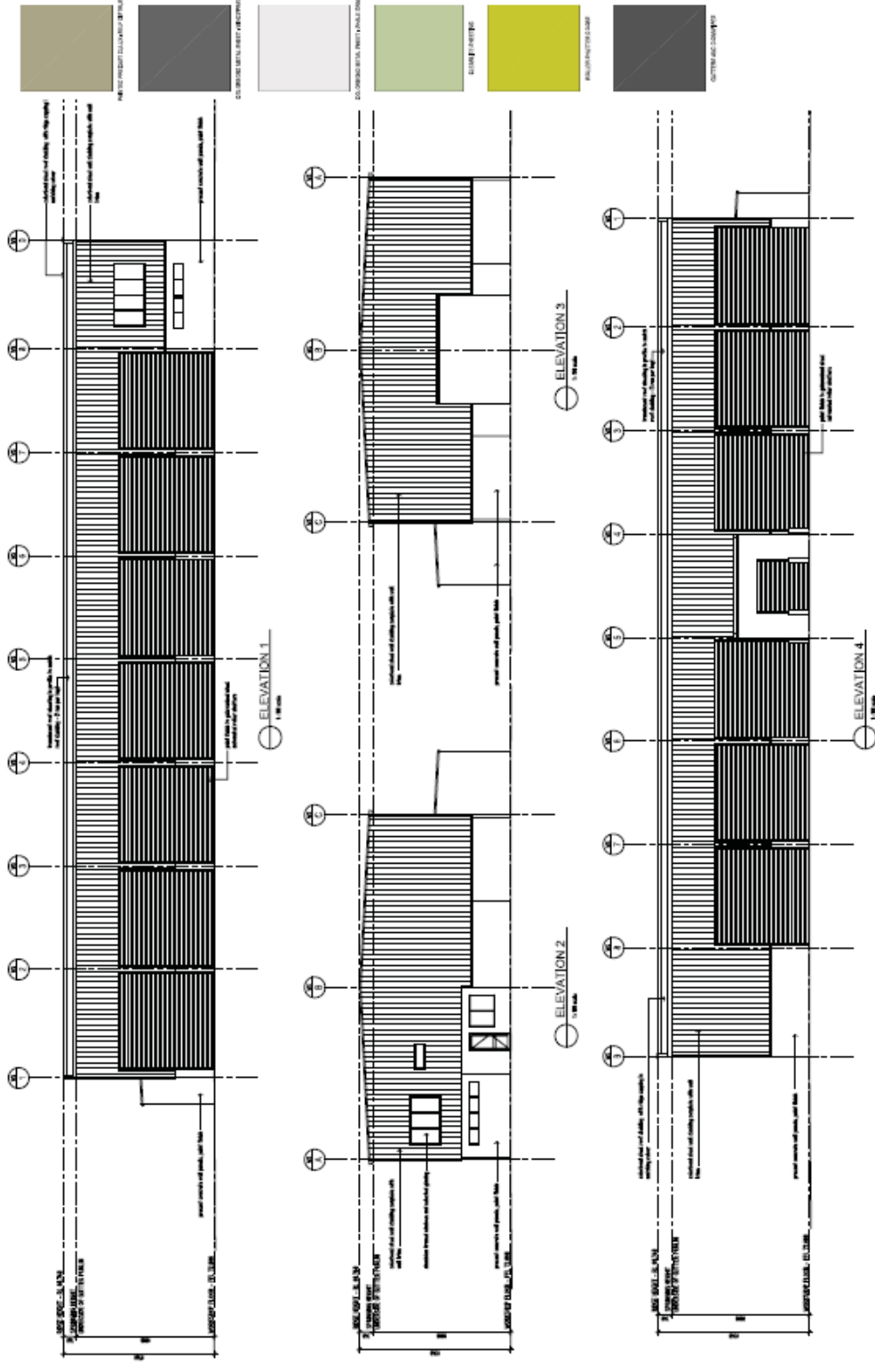
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 nominated architect - David McDonald NSW ARB - 7197

SITE LAYOUT PLAN
OVERALL SITE
 090507/DLEP-MP A 101 - 8 / A

MARCH 2010
 1:3000 scale



<p>PROJECT: LIGHT HORSE BUSINESS CENTRE ARCHITECTURAL ARCHITECTURE CONSULTANTS 1/111 BARBERS ROAD, SYDNEY NSW 1588 PH: 02 9550 1111 FAX: 02 9550 1111</p>		<p>CLIENT: DIALA DUMP 1111 BARBERS ROAD, SYDNEY NSW 1588 PH: 02 9550 1111 FAX: 02 9550 1111</p>		<p>PROJECT F-APPC FACILITY ELEVATIONS DRAWING NO: F-APPC-01 DATE: 15/01/2011 SCALE: 1:50 SHEET: 1 OF 1</p>	
<p>PROJECT: LIGHT HORSE BUSINESS CENTRE ARCHITECTURAL ARCHITECTURE CONSULTANTS 1/111 BARBERS ROAD, SYDNEY NSW 1588 PH: 02 9550 1111 FAX: 02 9550 1111</p>		<p>CLIENT: DIALA DUMP 1111 BARBERS ROAD, SYDNEY NSW 1588 PH: 02 9550 1111 FAX: 02 9550 1111</p>		<p>PROJECT F-APPC FACILITY ELEVATIONS DRAWING NO: F-APPC-01 DATE: 15/01/2011 SCALE: 1:50 SHEET: 1 OF 1</p>	



		LIGHT HORSE BUSINESS CENTRE P.O. BOX 1040 MARKET VILLAGE 22 BALDWIN ROAD, BERRIGAMOO, NSW 2574 PH 02 4343 1111 FAX 02 4343 1111 WWW.LIGHTHORSECENTRE.COM.AU		architectural architectural 10/11/2014 10:00 AM 10/11/2014 10:00 AM 10/11/2014 10:00 AM	WORKSHOP BUILDING LIGHT HORSE BUSINESS CENTRE OLD BALDWIN ROAD BERRIGAMOO, NSW	PROJECT G - WORKSHOP BUILDING ELEVATION 10/11/2014 10:00 AM 10/11/2014 10:00 AM 10/11/2014 10:00 AM
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APPENDIX 2: GENERAL TERMS FOR THE PLANNING AGREEMENT

Under section 93I of the Environmental Planning and Assessment Act 1979 (**Act**), the Proponent offers to enter into a planning agreement with the Minister for Planning within 6 months of the date of any approval of application 06_0139 (Eastern Creek Waste Project).

The agreement will provide that:

1. The Proponent contribute a maximum of \$7,860,450 payable to the Minister for Planning in accordance with the payment schedule in table 1 below, for the provision of regional infrastructure within the broader Western Sydney Employment Hub (**the Contribution**) in relation to Lot 10 DP 241859, Lot W DP 419612, Lot 1 DP 400697 & Lot 2 DP 262213 under the Eastern Creek Waste Project Approval, shown as proposed Lot 1 and 4 on the proposed plan of subdivision at Appendix 3. The contribution is made on the basis of the indicative land areas shown in the table below at the rate of \$150,000 per hectare. The final contribution made by the Proponent shall reflect the actual areas (hectares) in each category, as identified by a registered surveyor and also shown on the proposed Plan of subdivision for the new Lots 1 and 4.
2. If a special infrastructure contribution (**SIC**) is determined under section 94EE of the Act (or 116O of the amended Act) that covers the land which is the subject of the Eastern Creek Waste Project Approval:
 - o prior to the Proponent making the Contribution, the Proponent will pay the value of the SIC as if it had applied to the Eastern Creek Waste Project subject to the maximum amount being \$7,860,450; or
 - o after the Proponent makes the Contribution and the value of the Contribution is more than the SIC, the Proponent will be entitled to a credit for that difference in amount.
3. With the agreement of the Minister for Planning (or her delegate), the Proponent may provide regional infrastructure within the Western Sydney Employment Hub in relation to Lot 10 DP 241859, Lot W DP 419612, Lot 1 DP 400697 & Lot 2 DP 262213 under the Eastern Creek Waste Project Approval or dedicate land for the provision of this infrastructure, and obtain a credit against the Contribution.

The value of the credit shall be determined by an independent person, and

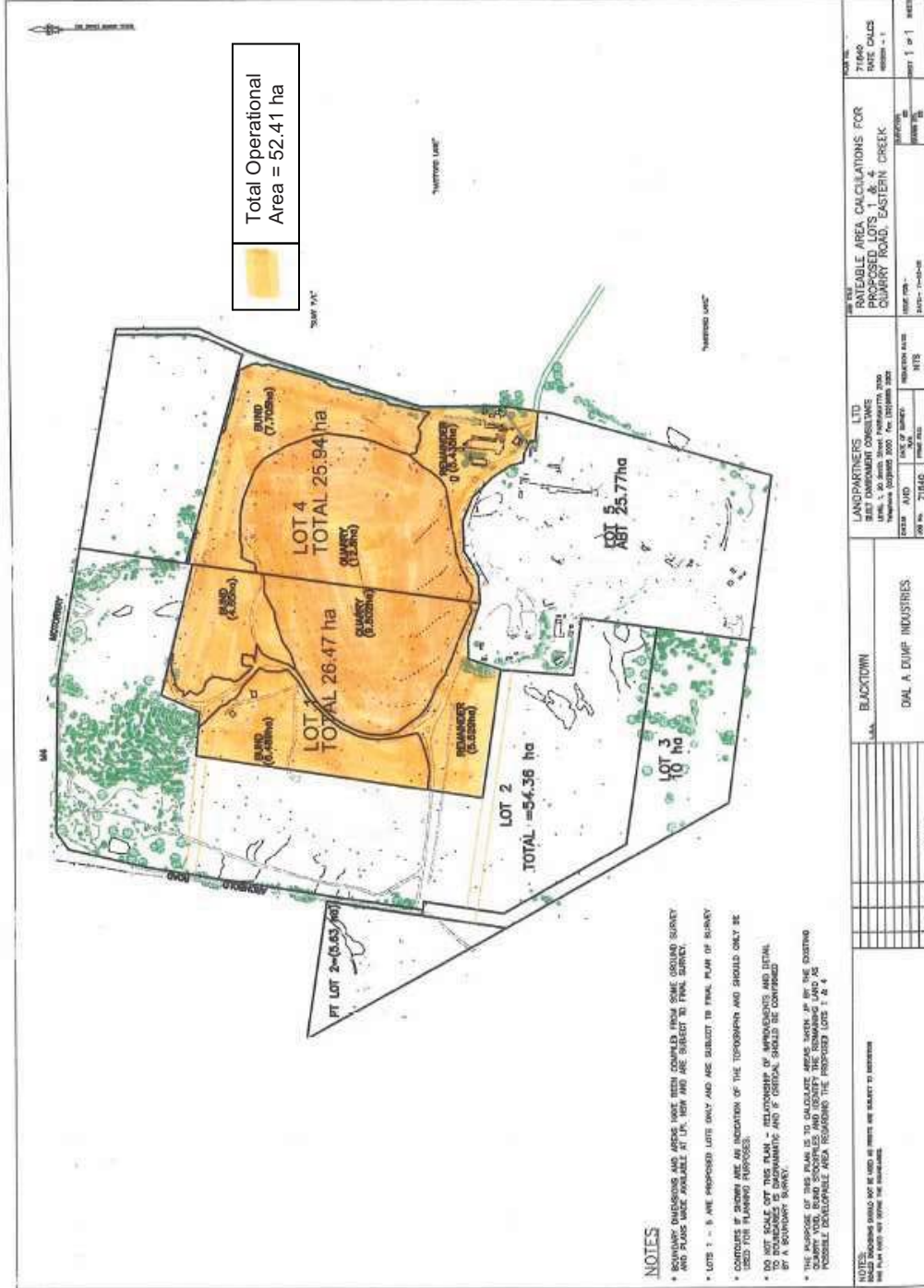
- in relation to the provision of regional infrastructure works, be based on the cost of providing the works; and
- in relation to the dedication of land for the provision of regional infrastructure works, be calculated in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* as if a compulsory acquisition had occurred.

4. The Proponent will provide suitable security for the Contribution once the planning agreement is entered into.

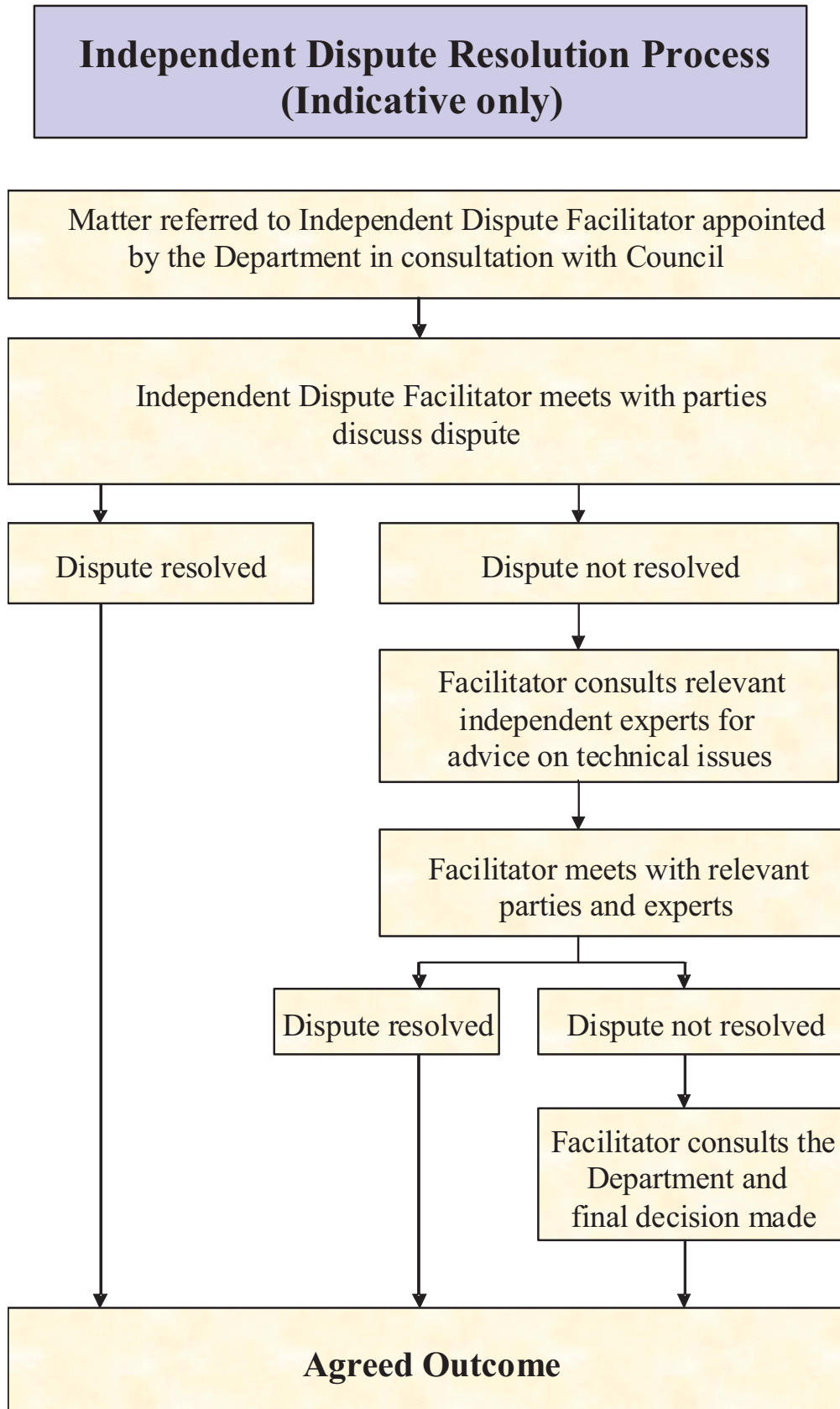
Table 1: Regional Contributions Schedule

Land Area	Total Regional Contributions
Total Operational Area 52.41 ha Refer to Plan at Appendix 3	\$7,860,450
Key Operational Area (Excludes the quarry void & north eastern bund) 22.103 ha Refer to Plan at Appendix 3	\$3,315,450 10% payable on approval being Issued 15% Opening of Operation. 25% 1 st Anniversary of Operation 25% 2 nd Anniversary of Operation 25% 3 rd Anniversary of Operation
Quarry Void and North eastern bund area 52.41Ha less Operational area of 22.103Ha = 30.3 Ha Refer to Plan at Appendix 3	\$4,545,000 Payable annually at \$227,250 per annum commencing 2 nd Anniversary of Operation. Any unpaid balance is to be paid in full (pro rate to the land utilised) by the Proponent at the time when a Construction Consent is issued for a building construction unconnected with the current uses on any of the nominated areas.

APPENDIX 3 Contribution Area



APPENDIX 5:
Independent Dispute resolution Process



APPENDIX B

APPENDIX C

Dial A Dump Industries Pty Ltd

Consolidated Stormwater Management Plan

Light Horse Business Park, Eastern
Creek, NSW



ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



P1103002JR01V05
October 2011

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All enquiries regarding this project are to be directed to the Project Manager.

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1 Introduction

1.1 Overview

Martens and Associates has been commissioned by Dial-A-Dump Industries (the client) to prepare a consolidated Stormwater Management Plan for the site.

1.2 Scope

This document shall:

- Reassess stormwater quantity controls through modelling of constructed OSD basins to determine their adequacy to achieve site objectives.
- Reassess stormwater quality outcomes achieved by the proposed treatment train, including the OSD basins, to confirm their adequacy and compliance with Blacktown City Council policy.
- Document the final design stormwater solution for the site.

1.3 Site Areas

1.3.1 Fill Pad – ‘Area D’

‘Area D’ lies to the north of the quarry pit and is bound by a conservation area to the west, the M4 motorway to the north and a vacant future industrial lot to the east. Prior to recent works, the area was a grassed paddock. It has since been filled and no formal use is proposed. The area shall revegetate with grass.

1.3.2 Operational Area

The operational area includes hardstand area and buildings and is located directly west of the quarry pit. The area is bound by the conservation area and Area D to the north, a large earth bund and OSD basins beyond to the west (see Section 1.3.3) and cleared grasslands to the south.

Within this area, waste is to be processed for recycling or disposal to landfill.

Design layout of the operational area is provided in previously submitted Storm Consulting documentation. Final layout plan is reproduced in Attachment A.

Processing of waste within the MPC building will ensure that waste does not come into contact with stormwater.

To the extent that water may be used within the MPC building, basal grates ensure that drainage is wholly captured within the building, with excess overflow being directed to the leachate collection system.

Processing of green waste will take place in the designated green waste area at the northwestern corner of the operational area. This area is concreted and equipped with a sump, submersible (float switch activated) pump and co-located collection tanks. Concrete berms at the entrance and exit points to a height of 30cm ensure that the bunded concrete green waste area is capable of containing stormwater from a 12 hour, 1 in 100 year storm event. In the event that the pump failed, the area has been designed and equipped with overflow pipes directing surplus leachate to the in-pit leachate collection system. All runoff from the green waste area is either recycled or discharged to the quarry pit thence trade waste sewer connection.

The greater part of the operational area will drain to the northern GPT and thereafter to the northern bioremediation basin, wetland and OSD pond. The remainder will drain towards the southern GPT and southern OSD, or to the quarry and be captured by the in-pit stormwater collection pond.

Sediment control will be provided by the use of GPTs (CDS units) and open swales, bioremediation basin and wetlands constructed within OSDs.

1.3.3 Western Section

This area lies to the west of the operational area, and contains the OSD basins servicing the operational area. There is no formal landuse proposed and the area shall be allowed to regrass.

1.4 Past Documentation

Previously prepared stormwater documentation and its relevance to this management plan is summarised as follows:

- LandPartners, 2011 'Area D Finished Surface Contours'

Provides proposed finished contours for 'Area D'. As no formal use of the areas is proposed at this stage, no OSD is required.

The Precinct plan adopted by Blacktown City Council foreshadows the construction of a regional detention basin at or near the north eastern corner of the Conservation area.

Currently a temporary sediment pond occupies this area and, in the future when Area D is developed, that future application will address details of the permanent stormwater detention facility.

- Storm Consulting, 2008 'Site Surface Water Management Plan'

This document (Attachment C) addresses the main waste processing area and details drainage requirements and, now superseded, water quality controls and OSD measures.

OSD and water quality modelling by Storm (2008) has been superseded by Martens and Associates (2011) modelling.

- Storm Consulting, 2009 'Light Horse Business Centre Pavement Setout and Drainage Plans'

We understand these plans have been prepared on the basis of more detailed modelling of site hydrology and are relied on for catchment details.

- G R Hawkes and Associates (2010) 'Volume Capacity Southern Basin' and 'Volume Capacity North Basin'.

We understand these plans provide the most accurate survey of the existing north and south basin. These plans (Attachment B) are relied on to determine 'as built' basin volumes for DRAINS hydraulic modelling.

- NSW Dam Safety Committee Advice (2010)

The Landowner has obtained confirmation from the NSW Dam Safety Committee that the OSDs in the position and at the volumes as shown are not prescribed structures. This advice is provided as Attachment D.

2 Southern Riparian Zone

2.1 Overview

Site Image Landscape Architects Pty Ltd was commissioned by the client to prepare a Riparian Zone Management Plan covering the areas located in Lot 3 DP 1145808. This area, as part of SEPP 59, has been dedicated to conservation. It contains an intermittent watercourse which runs the length of this boundary.

At the time of inspection by Site Image, this creek was found to be highly affected by erosion and sedimentation. Riparian vegetation was limited and mainly consisted of noxious weeds. An unauthorized diversion trench had been temporarily constructed to divert overflow waters from neighbouring sedimentation dams while creek works were carried out.

2.2 Reinstatement of Riparian Zone

The following management plan has been approved by DECCW and DoP and works have subsequently been carried out at the site.

- Sediment and erosion control measures were installed as required. Trees requiring protection during works identified.
- Fill material and sediment within the watercourse was removed and used to fill the diversion trench and reinstate the ground level in that area.
- The watercourse was reinstated to reflect its original channel form.
- Channel was lined with rocks and gravel to address future scouring and erosion.
- Topsoil was replaced utilising material stockpiled onsite.
- The banks, restored watercourse and other areas affected by restoration works were revegetated by spray seeding of suitable native grasses. This extends 10m either side of the creek from the creek centreline.
- Regular weed control is being undertaken.

The Precinct Plan stipulates a 40 metre buffer from top of bank on each side of a scheduled watercourse. The riparian zone abutting the

unnamed tributary to Ropes Creek is located in Lot 3 DP 1145808. This is not a project area, and no development works are proposed for this area. It is currently vacant and not cultivated.

The Precinct Plan stipulates a 10 metre set back from the Upper Angus Creek area. This riparian area is located on neighbouring land to Lot 4 DP 1145808 owned by Sumy Pty Ltd and similarly no works or development is proposed for this area.

3 Surface Water Quantity

3.1 Overview

This section provides results of hydraulic modelling of constructed basins. It assesses the existing structures adequacy to reduce post-development discharges to equal or less than pre-development discharges for the 2, 10 and 100 year ARI storms. It provides the final stormwater quantity solution for the development.

We note that hydraulic modelling results reported in this document supersedes results provided in Storm (2008) assessment. Requirements are detailed in Sections 3.3 to 3.8.

Subsequent to the submission of a previous version of this report (Version 4 dated 22.09.2011), Blacktown Council advised they required changes to input parameters in the DRAINS model. While the original input parameters are considered adequate and appropriate it was agreed, in subsequent consultation with Council, that remodelling using updated initial and continuing loss inputs would be completed.

3.2 General OSD Requirements

3.2.1 Operational Area

OSD is required for the proposed Operational Area which is subject to change in landuse resulting in an increase in impervious area.

3.2.2 'Area D and the Western Section'

OSD is not required for 'Area D' and the 'Western Section'. On completion of construction, these areas will regrass and therefore will not change hydrologically from the pre-development situation. Area D and the remainder of the western section therefore do not require OSD at this stage. Ultimately, it is assumed these areas shall undergo development for industrial/commercial purposes at which stage OSD shall be provided in accordance with preliminary requirements.

3.3 Modelling

DRAINS modelling was used to analyse site hydrology and confirm that existing OSD structures satisfy water quantity objectives outlines in Section 3.1. Input parameters were varied between modelling detailed in Version 4 of this report and the now reported figures by increasing initial and continuing losses for the pre-development model and for the undeveloped 'bund' catchments to 15 mm and 2.5 mm/hr

respectively. It is noted that Council's original requested initial loss of 25 mm was considered unacceptable and, in consultation with Council, it was agreed 15 mm would be used for modelling purposes.

3.4 Catchment Areas

The pre-development and post-development catchment areas used in DRAINS modelling are summarised in Table 1 and shown in Attachment E.

Table 1: DRAINS catchment summary

DRAINS Scenario	Catchment ID	Area (ha)	% Impervious	% Pervious	Existing Receiving Basin
Pre-Development	North Catchment	10.67	0	100	NA
	South Catchment	8.68	0	100	NA
Total		19.35			
Post-Development	North Stockpile Cat	4.27	100	0	
	North Operational Cat	3.90	100	0	North Basin
	North OSD Bund	2.17	0	100	
	South Operational Cat	5.63	100	0	South Basin
	South OSD Bund	3.47	0	100	
Total		19.44			

3.5 DRAINS Results

Results of pre- and post-development DRAINS modelling for 1 in 2, 10 and 100 year ARI storms are summarised in Table 2 (north OSD basin) and Table 3 (south OSD basin). Storm durations of 25 minutes to 9 hours (540 minutes) are assessed.

Table 2: North OSD Basin - Summary of DRAINS results (total flows) for 25-540 minute duration storm flows for design storm events

Duration (mins)	Q ₂			Q ₁₀			Q ₁₀₀		
	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)
25	0.51	0.46	-0.05	1.31	0.57	-0.74	2.64	1.47	-1.17
30	0.57	0.45	-0.12	1.48	0.58	-0.90	2.83	1.60	-1.23
60	0.97	0.51	-0.46	1.91	0.65	-1.26	3.13	2.40	-0.73
90	1.13	0.52	-0.61	1.99	0.66	-1.33	3.09	2.52	-0.57
120	1.03	0.51	-0.52	2.03	0.66	-1.37	3.20	2.66	-0.54
180	0.76	0.49	-0.27	1.59	0.64	-0.95	2.56	1.62	-0.94
270	0.96	0.49	-0.47	1.59	0.64	-0.95	2.26	1.82	-0.44
360	0.82	0.48	-0.34	1.23	0.63	-0.6	1.74	1.47	-0.27
540	0.72	0.47	-0.25	1.08	0.61	-0.47	1.53	1.22	-0.31

Table 3: South OSD Basin - Summary of DRAINS results (total flows) for 25-540 minute duration storm flows for design storm events

Duration (mins)	Q ₂			Q ₁₀			Q ₁₀₀		
	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)	Pre-development peak flow (m ³ /s)	Developed peak flow (m ³ /s)	Difference (m ³ /s)
25	0.45	0.25	-0.20	1.15	0.38	-0.77	2.31	1.02	-1.29
30	0.50	0.25	-0.25	1.27	0.39	-0.88	2.40	1.19	-1.21
60	0.82	0.31	-0.51	1.62	0.45	-1.17	2.61	1.84	-0.77
90	0.96	0.33	-0.63	1.69	0.47	-1.22	2.62	1.94	-0.68
120	0.88	0.32	-0.56	1.74	0.47	-1.27	2.68	2.06	-0.62
180	0.64	0.30	-0.34	1.36	0.45	-0.91	2.12	1.20	-0.92
270	0.79	0.31	-0.48	1.32	0.45	-0.87	1.87	1.50	-0.37
360	0.67	0.31	-0.36	1.00	0.46	-0.54	1.42	1.24	-0.18
540	0.58	0.34	-0.24	0.88	0.47	-0.41	1.25	1.17	-0.08

Results demonstrate existing OSD basins provide a reduction in downslope storm flows from post-development to pre-development for all storm durations modelled for the 2, 10 and 100 year ARI events. OSD basins therefore achieve objectives set in Section 3.1 for stormwater quantity.

3.6 OSD Storage Capacities

Stage storage relationships were determined for the OSD basins based on G R Hawkes and Associates (2010) survey (Attachment B). The

capacities from G R Hawkes are summarised in Table 4 with allowance for 500 kL permanent pool volume in the northern basin and 1000 kL in the southern - of which 500 kL is to be constructed in addition to volumes surveyed.

Table 4: OSD Capacity Details

Basin	Level (mAHD)	Measured Area (m ²)	GR Hawkes Volume ¹
North Basin	52.0	227	0
	52.9	800	500 ²
	53.0	1018	545
	54.0	1415	1763
	55.0	1830	3384
	55.5	2012	4349
South Basin	59.15	1040	1000 ²
	60.0	1687	2257 ²
	60.5	1857	3142 ²
	61.0	2025	4115 ²

Note: ¹ Volume based on survey provided by G R Hawkes and Associates with ²assumed increase of 500 kL for Southern Basin; 500kL / 1000 kL of permanent pool volume is provided below outlet invert of the Northern and Southern basins respectively.

Based on Table 4, the required OSD volumes of the North Basin and South Basin were determined to be 2.9 ML (3.4 ML including retained 0.5 ML) and 2.6 ML (3.1 ML including retained 1.0 ML) respectively at the invert of the outlet weir.

3.7 Outlet Structures

Table 5 provides details of the outlet structures modelling in DRAINS and required for the OSD basins to achieve adequate retention of flow.

Table 5: OSD Outlet Details

Basin	Low Level Outlet			Weir Data	
	Type	Diameter (mm)	Centre Elevation (mAHD)	Crest Length (m)	Crest Level (mAHD)
North Basin	Orifice	500	53.2	10	55.0
South Basin	Orifice	475	59.4	10	60.5

3.8 Conclusion

DRAINS modelling undertaken by Martens and Associates (2011) concluded that OSD basins as recommended are adequate (with appropriate outlets) to provide a reduction in downslope storm flows from post-development to pre-development for both the 'north' and 'south' catchments.

4 Water Quality Management

4.1 Overview

Water quality MUSIC modelling of the operational area has been previously undertaken by Storm Consulting (2008). Due to modification to OSD basin/wetland configuration, Blacktown City Council have requested in recent correspondence (August 12, 2011) that this modelling be reassessed.

Subsequent to the assessment as completed in Version 4 of this report Council has requested further modifications and amendments to the submitted MUSIC model. These requests and responses are discussed below.

4.2 Blacktown City Council Water Quality Submission

BCC requested a number of model changes, responses to which are provided below:

- Re-use volumes assumed in modelling are 110 kL/day drawn from the two basins. This figure has been determined in consultation with the site operator (annual site usage of 40 ML) and is assigned in the model as 60 kL/day and 50 kL/day from the North and South basins respectively. This estimate is based on existing comparable operators and anticipated site processes and takes into account periods when usage will be lower due to rainfall etc.

For the purposes of modelling it is assumed that the usage is evenly spread through the year as this is the simplest means to enter this parameter to MUSIC. The figure of 110 kL/day reflects 40 ML/year spread across the year, it is acknowledged that on some days a greater amount shall be used and on others a lesser amount.

- Modify treatment of OSD capacity in wetland treatment nodes – BCC considers that inclusion of the extended detention depth (OSD) in the MUSIC model shall result in over estimation of pollutant removal. Analysis of DRAINS inflow / outflow hydrographs indicates that the inclusion of the OSD volume shall result in detention of water for periods comparable to that modelled by MUSIC using input parameters relied on. The inclusion of this as a component of the model is therefore considered reasonable.

Notwithstanding Martens' position that inclusion is appropriate, remodelling without this parameter shows that the change to the final treatment train efficiency is less than 1 % for nutrients (i.e. resolution of reporting) and at most 1 % for suspended solids (northern wetland). To satisfy Council's request amended modelling has assumed a nominal 0.25 m extended detention depth.

- Impervious percentage – the areas of the site to be used for stockpiling aggregates was treated differently between the water quality and water quantity assessment in Version 4 of this report. The stockpiles were considered pervious for the frequent lower intensity water quality storms and impervious for the higher intensity rarer OSD events.

While this rationale is considered sound and reasonable, for the purposes of conservatism and to address Council's request, the stockpile area shall be treated as impervious in this revision of the assessment.

- Rainfall - Runoff and catchment generation rates – the modelling has been updated to reflect BCC requested input parameters.

4.3 Blacktown City Council Water Quality Objectives

Blacktown City Council's *Stormwater Quality Control Policy (2005)* water quality objectives are adopted as the site's water quality objectives. The following pollutant reduction objectives are set out for comparing the post-development untreated versus treated scenarios:

- 90% reduction in gross pollutants;
- 80% reduction in suspended solids; and
- 45% reduction in nitrogen and phosphorus.

4.4 Treatment Train

The proposed water quality treatment train for the site is:

1. Rainwater Tanks -

Water balance modelling undertaken by Storm (2008) calculated that 40kL of tank capacity is required to capture roofwater runoff for reuse in toilet flushing and other site uses not addressed by stormwater harvested from OSD basins.

2. Gross Pollutant Traps (GPT) -

Tank overflow, surface runoff from the remaining operational areas and parts of the site draining west are directed through gross pollutant traps (GPTs).

3. Bioremediation Area

In addition to the GPTs and water quality wetlands already constructed on-site (basins not 'fitted out' as wetlands at this stage) it is required that a bioremediation basin be constructed to further treat runoff in the northern catchment.

The required basin shall have the following specifications:

- Filter area: 450 m²
- Extended Detention Area: 450 m²
- Extended detention depth : 400 mm
- Filter Depth: 500 mm
- Filter media permeability: 200 mm/hour for specification and 100 mm/hr ultimate (as used in modelling to reflect blockage of media over time)
- Constructed with a system of underdrains discharging into the OSD basin / wetland system.

4. Water Quality Wetland

GPT discharge is directed to one of 2 wetlands to be used for OSD and stormwater treatment/reuse ('OSD North' and 'OSD South'). As earlier outlined Dial-a-dump confirms an annual average daily flow of 110 kL/day of water is required for site uses (we assume water is preferentially drawn from the northern basin). This volume is in excess of water used from roof water tanks.

The southern basin is to be deepened at the western side to provide an additional 500 kL of storage capacity below the current invert. The design basin capacity therefore shall be increased to 1000 kL below the outlet invert to maximise the stored water for re-use during dry periods. The northern basin shall remain as built (other than inlet / outlet structures and wetland planting).

4.5 Modelling Methodology

The treatment train efficiency of the trains leading to the outlets of the north and south basins was assessed using MUSIC V5.

4.6 Model Inputs

MUSIC model inputs were sourced as follows:

- A 6-minute daily time step climate file was used for the revised MUSIC modelling. This file was supplied by Blacktown City Council.
- Rainfall – Runoff parameters as provided by Council.
- OSD volumes are based on G R Hawkes and Associates (2010) survey (Attachment B) as amended by this report.

4.7 MUSIC Results

MUSIC model results are provided in Table 6 with catchments and MUSIC model layout provided in Figure 1 (Attachment F).

Table 6: Treatment train pollutant reduction rates modelled in MUSIC.

Parameter	Northern Basin (%)	Southern Basin (%)
Total Suspended Solids	87.3	84.0
Total Phosphorous	69.8	73.2
Total Nitrogen	45.3	45.0
Gross Pollutants	100	100

4.8 Conclusion

Pollutant reductions achieved project water quality objectives (Section 4.3) and therefore Blacktown City Council's requirements demonstrating that the proposed treatment train is adequate for the treatment of site runoff to an appropriate standard.

5 Conclusion

5.1 Water Quantity

DRAINS modelling undertaken by Martens and Associates (2011) confirms OSD basins specified are adequate to achieve post-development storm flows less than pre-development flows for all events required by Blacktown City Council.

5.2 Water Quality

Outcomes from MUSIC modelling confirm that water quality pollutant reduction rates achieved by the proposed treatment train and are in accordance with relevant local policy and are therefore adequate.

5.3 Water Quality Monitoring

Council's Stormwater Quality Control Policy (2005) has now been superseded and quarterly testing is unlikely to demonstrate compliance with Council policy requirements.

Accordingly, it will be necessary to monitor storm events to determine the overall pollutant load reductions. A monitoring and testing program will be implemented to the satisfaction of OEH that tests a certain agreed number of storms at the inlet to the treatment train and at the discharge point.

6 References

LandPartners (2011) *'Area D Finished Surface Contours'*

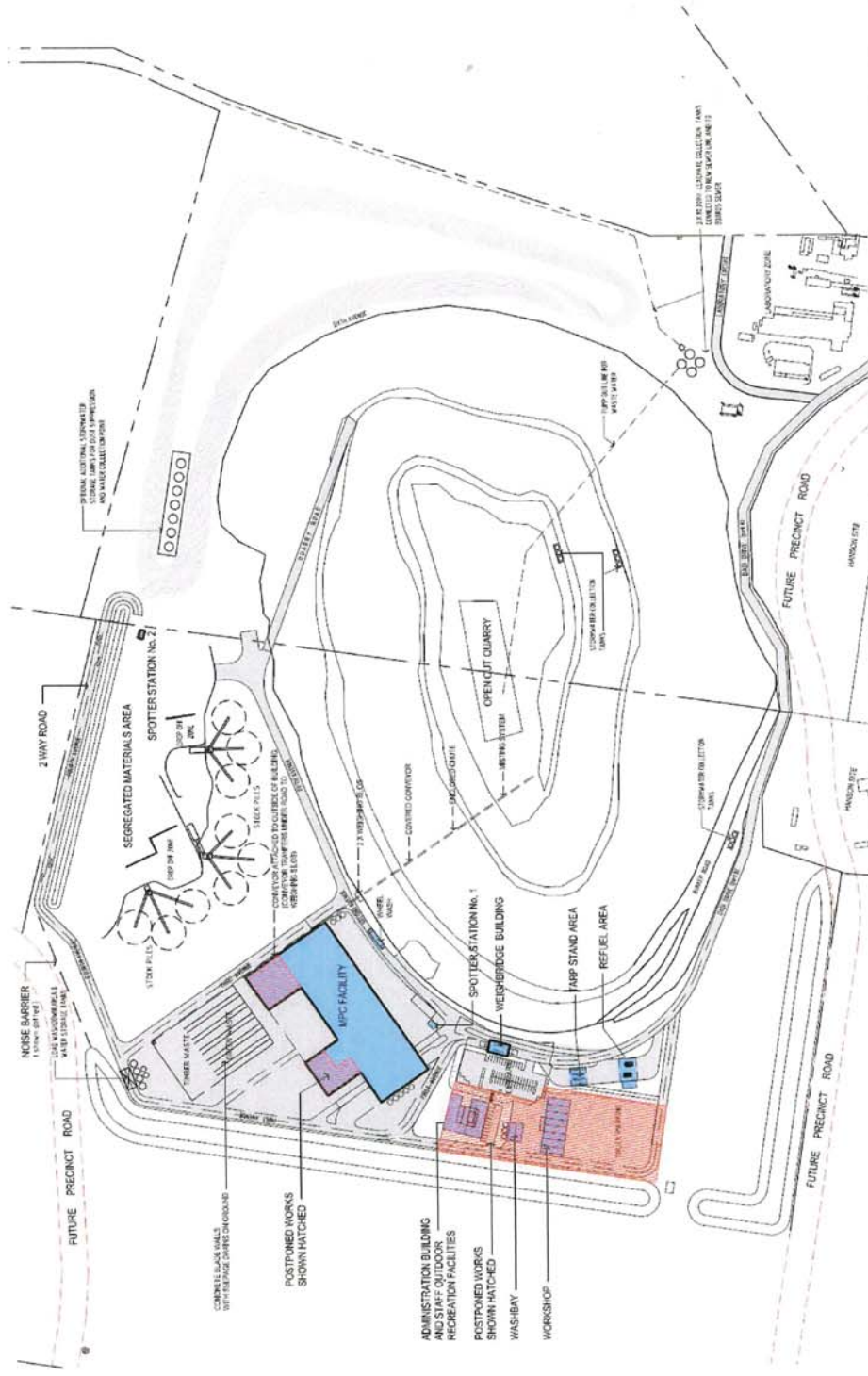
Storm Consulting Pty Ltd (2008) *'Site Surface Water Management Plan'*

Storm Consulting Pty Ltd (2009) *'Light Horse Business Centre Pavement Setout and Drainage Plans'*

G R Hawkes and Associates (2010) *'Volume Capacity Southern Basin'*
and *'Volume Capacity North Basin'*

7 Attachment A – Operational Area Layout (Storm Consulting, 2009)

APPENDIX 1 - SITE PLAN & BUILDING ELEVATIONS



LIGHT HORSE BUSINESS CENTRE
DADI - MATERIALS PROCESSING FACILITY
DIAL A DUMP INDUSTRIES
 OLD WALGROVE ROAD, EASTERN CREEK, NSW

DIAL A DUMP
 KEEPING AUSTRALIA CLEAN

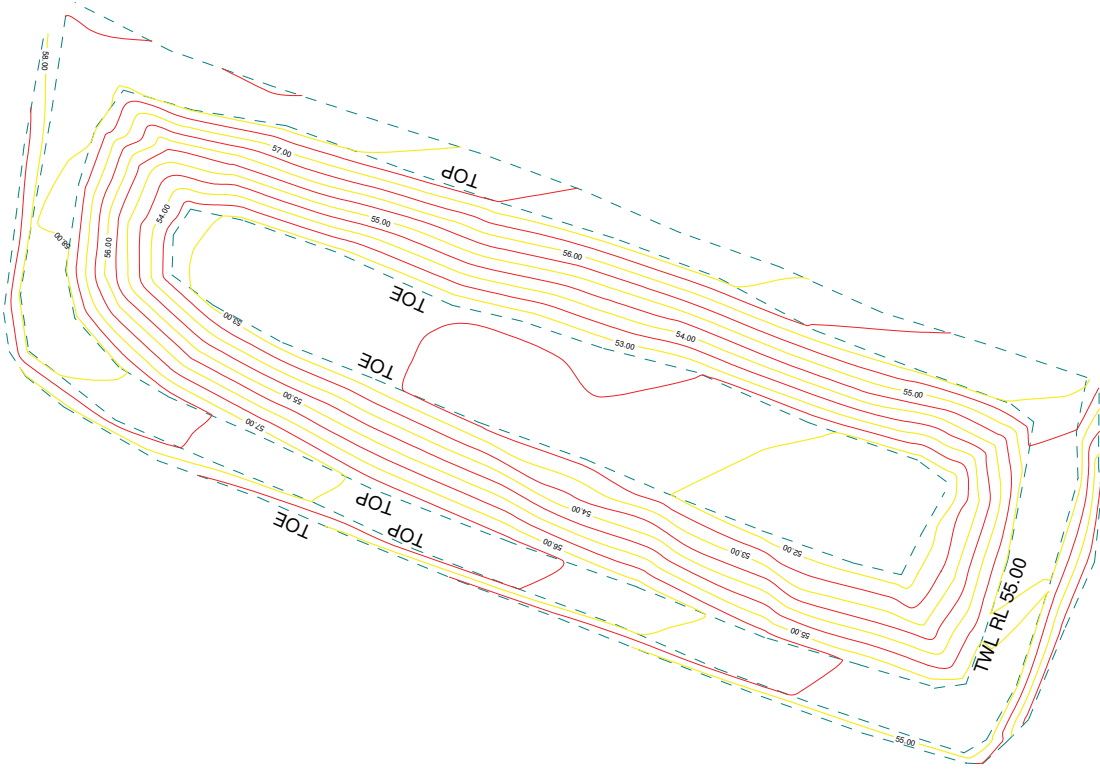
AXIS architectural

2 / 107 Cowalla Street, Cowalla, NSW 2280
 P + 61 6523 7668 • E dadi@axisarchitect.com.au
 residential architect - David McDonald NSW ABN 57991

SITE LAYOUT PLAN
OVERALL SITE
 090507/DIEP-MP A 101 - 8 / A

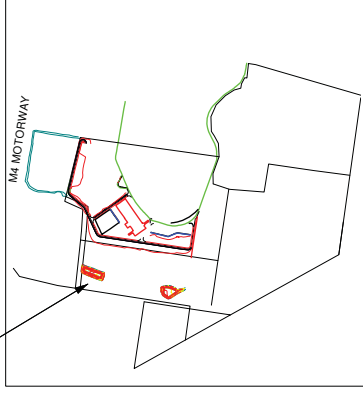
MARCU 2010
 13000 1011P

**8 Attachment B – G R Hawkes and Associates (2010) OSD
Basin Survey**



VOLUMES:	
===== Cut to Fill Ratio:	0.000
===== Cut:	0.0 (cubic metres)
===== Fill:	3492.8 (cubic metres)
===== Net:	3492.8 (cubic metres) [fill]
===== Litres	3,492,800L

NORTH BASIN



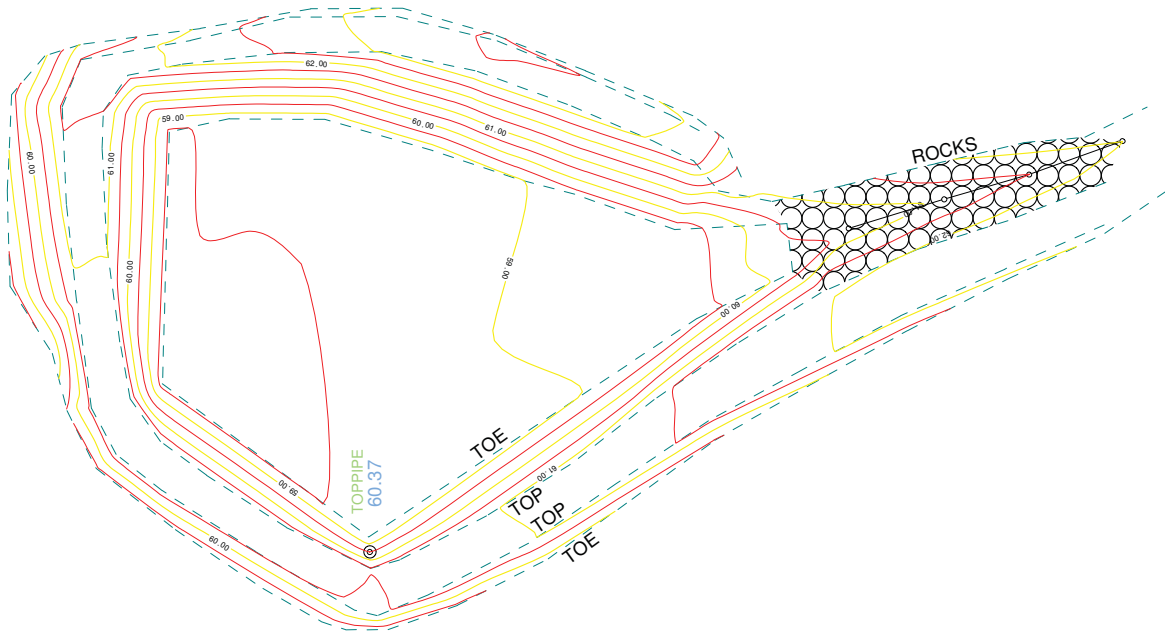
Revision	Date	Description	Drawn By	Approved By
B	13/07/11	Amendments: Volume	AJ	GH
A	1/09/10	Detail Survey	PE	GH



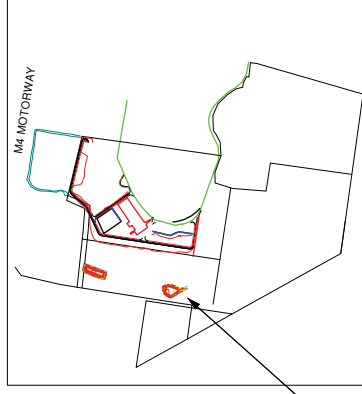
GRH Landmarks & Associates Pty Limited
 E-Mail: grh@grh.com.au | Mob: 0419 249 667
 Web: www.grh.com.au

Title:
VOLUME CAPACITY NORTH BASIN
DIAL A DUMP
LIGHT HORSE BUSINESS CENTRE
EASTERN CREEK

Scale Bar:	0 3 6 9 12 15 30
Notes:	#Volume was calculated to Top of Water Level = RL 55.00
Surveyed By:	AJ
Job No:	1084
Projection:	MGA
Datum:	AHD
Print Scale:	1: 500 @ A3



VOLUMES:	
Cut to Fill Ratio:	0.000
Cut:	0.0 (cubic metres)
Fill:	2575.5 (cubic metres)
Net:	2575.5 (cubic metres) [fill]
Liters	2,575,500L



SOUTH BASIN

<p>VOLUME CAPACITY SOUTH BASIN DIAL A DUMP LIGHT HORSE BUSINESS CENTRE EASTERN CREEK</p>		<p>Scale Bar: 0 3 6 9 12 15 30</p> <p>Surveyed By: PE Job No: 1084 Contour Interval: 0.50 Projection: MGA Datum: AHD</p>	<p>Notes: #Volume was calculated to top of outlet pipe. #Volume is approximate only. #Top of basin was approximated due to the water in the basin at time of survey.</p>	<p>Surveyed For: DIAL A DUMP KEEPING AUSTRALIA CLEAN</p>															
<p>Title:</p>		<p>Surveyed By:</p>	<p>Computer File: S:\GRH\GRH_JOB Documents</p>	<p>Rev: B</p>															
<table border="1"> <tr> <th>Revision</th> <th>Date</th> <th>Description</th> <th>Drawn By</th> <th>Approved By</th> </tr> <tr> <td>B</td> <td>13/07/11</td> <td>Amendments: Information Removed</td> <td>AJ</td> <td>GH</td> </tr> <tr> <td>A</td> <td>1/09/10</td> <td>Detail Survey</td> <td>PE</td> <td>GH</td> </tr> </table>	Revision	Date	Description	Drawn By	Approved By	B	13/07/11	Amendments: Information Removed	AJ	GH	A	1/09/10	Detail Survey	PE	GH				
Revision	Date	Description	Drawn By	Approved By															
B	13/07/11	Amendments: Information Removed	AJ	GH															
A	1/09/10	Detail Survey	PE	GH															
<p>Logo: GRH <i>Lovings & Associates Pty Limited</i> E-Mail: grh@grh.com.au Mob: 0419 249 667 Web: www.grh.com.au</p>					<p>Page: 1 - 1</p>														

**9 Attachment C – Site Surface Water Management Plan
(Storm Consulting, 2008)**

Site Surface Water Management Plan

Report Prepared for:
Alexandria Landfill Pty Ltd

November 2008
Project No. 717

Prepared by:
STORM CONSULTING PTY LTD

_ANALYSIS
_CONSENSUS
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Document Verification

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Document title	Surface Water Management Report	Project number 717
Description	Light Horse Waste Facility – Surface Water Assessment	
Client Contact	Chris Biggs, DADI	

	Name	Signature	Issue:	Date
Prepared by	Georgia de Biasi / Nicola Lo		A	15/12/07
Checked by	Brad Farr / Nicola Lo		B	07/02/08
Issued by	Georgia de Biasi		C	27/3/08
			D	24/11/08
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Rene Bakeri					27/3/08	PDF		
Chris Biggs (DADI)							24/11/08	PDF

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EXECUTIVE SUMMARY

This Surface Water Management report was prepared as part of the Environmental Assessment for the Light Horse Business Centre which is proposed to include the construction and operation of a resource recovery facility and a landfill facility. It was revised following a request for further information. The Project site is located at Eastern Creek in western Sydney and comprises four separate parcels of land, identified as Lot 2 DP 262213, Lot 1 DP 400697, Lot W DP 419612, and Lot 10, DP 241859. Storm has prepared a Surface Water Management Plan (SWMP) taking into account Blacktown City Council's stormwater management objectives and also the Director-General's Requirements for the Project.

The SWMP addresses erosion and sediment control, water quantity and water quality.

In summary, the proposed stormwater management system includes:

- ☞ Each building should have its own rainwater tank (min. 10kL volume) to harvest roof water for reuse on site, including for toilet flushing and wheel wash top up;
- ☞ Runoff generated from the Materials Processing Centre and green waste area are to be diverted to sewer and managed accordingly;
- ☞ Stormwater runoff from the other operational areas of the site will be treated through a gross pollutant trap prior to discharge to a combined on-site detention (OSD) basin with wetland treatment for water quality
- ☞ Additional volume is allowed in the OSD / treatment basin for irrigation water storage; drawdown would occur regularly for irrigation and dust suppression.
- ☞ The proposed OSD storage requirements for the operational area is 370m³/Ha (5500m³ based on 14.8ha impervious area) and has been designed to manage peak flows up to the 1 in 100yr ARI storm event.
- ☞ A sprinkler system is proposed to be located along the berms and utilised for both dust suppression and irrigation purposes.
- ☞ Stormwater runoff control within the quarry pit is to be used to assist in reducing leachate volumes. A collection basin is proposed which can be drawn down following storm events for reuse for dust suppression by water carts.

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1.0 INTRODUCTION

1.1. Background

This is a revised report commissioned by Alexandria Landfill Pty Ltd to provide additional information to that supplied in STORM_CONSULTING's *Site Surface Water Management Plan* dated February 2008.

ThaQuarry Pty Ltd and ACN 114 843 453 Pty Ltd seek project approval for the construction and operation of resource recovery facility (including a materials processing centre (MPC) and waste transfer station (WTS)), and a Class 2 inert and solid waste landfill at Eastern Creek, in Sydney's west. Project approval is sought under Part 3A of the *Environmental Planning and Assessment Act, 1979*. The application process is to be managed on behalf of both parties by ThaQuarry Pty Ltd under the project name Light Horse Business Centre.

STORM_CONSULTING was commissioned by Environmental Resources Management Australia Pty Ltd (ERM) on behalf of the proponent to prepare a site Surface Water Management Plan for the Project, as part of the overall Environmental Assessment. This report has been revised to include additional information and amended data following a request for additional information from Blacktown City Council.

The site's location is shown in Figure 1-1. It is within the Blacktown City Council (BCC) Local Government Area. The Pioneer Quarry previously operated at the site. It has now reached the end of its economic life and all quarrying activities at the site ceased in September 2006, though the quarry void remains.

State Environmental Planning Policy No 59 – Central Western Sydney Economic and Employment Area (SEPP 59) applies to a number of landholdings in western Sydney, including the Project site, which lies within the Eastern Creek Precinct of the SEPP 59 lands.



Figure 1-1: Site Location

1.2. Development Overview

For the purposes of this assessment, the area of operations has been divided into two areas, termed the operational area and the quarry area. The operational area is depicted in Figure 1-2 and will be bounded by berms to the north, west and south, and by the quarry pit to the east. It will incorporate the following features:

- ☒ Access and internal roads;
- ☒ Car and truck parking areas;
- ☒ Administration and workshop buildings;
- ☒ Weighbridge and associated building;
- ☒ Materials Processing Centre (MPC) and Waste Transfer Station (WTS);
- ☒ Green waste processing/stockpile area; and
- ☒ Drop-off zone and materials stockpile areas.

The quarry area refers to the existing quarry pit, which is the main feature of the site. It is proposed to become a licensed class 2 inert and solid waste landfill.

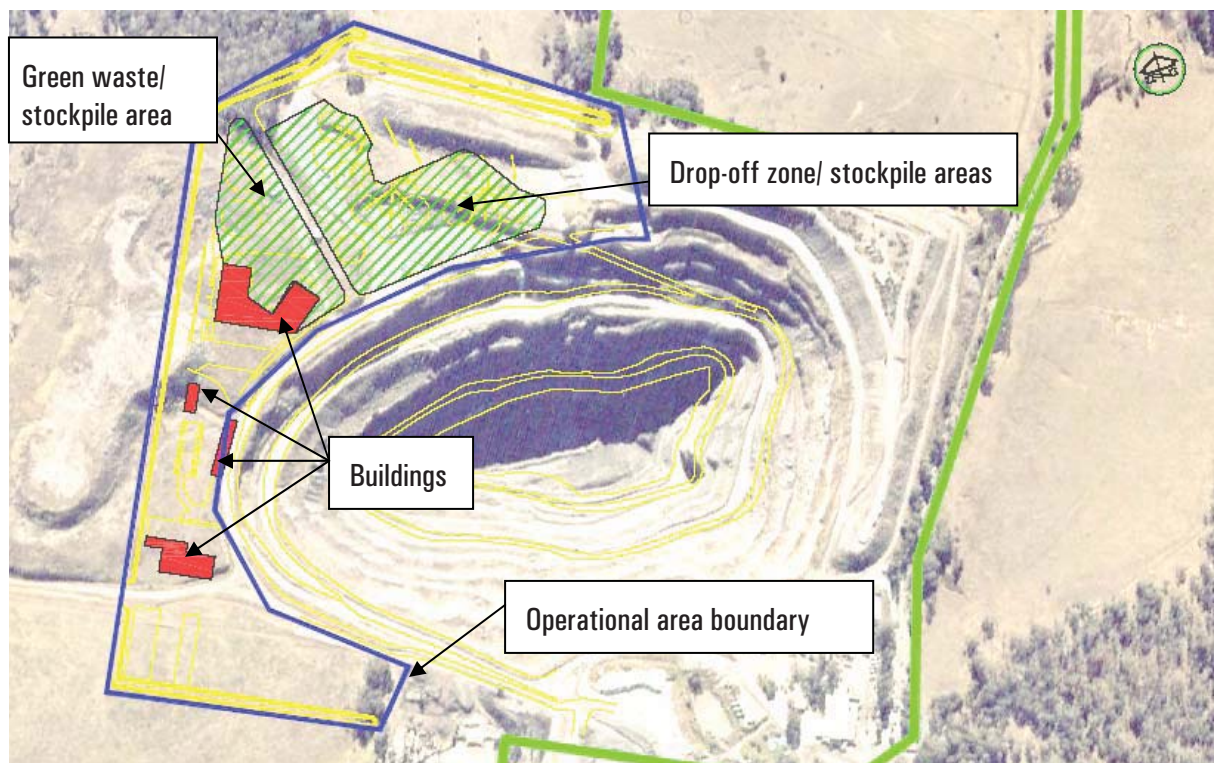


Figure 1-2. Site layout

1.3. Project Scope

STORM's scope of works for this surface water assessment report included:

- ☒ Preparation of site catchment plans and justification for any proposed redistribution between catchment areas, as defined in the Precinct Plan;
- ☒ Development of a concept stormwater drainage plan, including provision of water sensitive urban design (WSUD) elements where possible;
- ☒ Preparation of a soil and water management plan in accordance with Landcom's (2004) *Managing Urban Stormwater- Soils and Construction – "The Blue Book"*;

- ☞ Stormwater detention calculations to determine relevant details of basins and drainage works;
- ☞ Water balance/ water management for wet, dry and average years, including water requirements (quantity, quality and sources) and proposed stormwater and wastewater disposal, including type, volumes, proposed treatment and management methods and reuse options;
- ☞ Identification of the quantity and physico-chemical properties of potential water pollutants and the risks they pose;
- ☞ Review of flood reports;
- ☞ Preparation of a Surface Water Assessment Report.

1.4. Planning Controls and Policy Objectives

1.4.1. Director-General's Requirements

The Director-General's (DG's) requirements issued on 22 June 2006 require a detailed assessment of specified key issues. In this report STORM addresses the DG's requirements for surface water, which are included in the Soil and Water category of Key Issues. These include:

- ☞ Surface water impacts;
- ☞ Stormwater management, including detailed consideration of any potential offsite drainage and flooding impacts;
- ☞ Erosion and sediment control;
- ☞ Salinity, in the context of site surface water management.

Other items identified in the DG's requirements (including groundwater, soil contamination, and other aspects of salinity at the site) are beyond the scope of this report and have been addressed in the Environmental Assessment Report prepared by ERM (2008).

Where necessary, STORM has consulted with Blacktown City Council with respect to regulatory requirements.

1.4.2. Eastern Creek Precinct Plan

The *Eastern Creek Precinct Plan – Stage 3* has been prepared in accordance with the provisions of SEPP 59 for land identified as Release Area 3 within the Eastern Creek Precinct (inclusive of the Project site). The draft Precinct Plan was adopted by Council on 7 December 2005, and came into force on 14 December 2005. It outlines the provisions relating to development of the Stage 3 Release Area, to ensure the SEPP aims are met.

This report aims to ensure the Project meets the relevant Environmental, Urban Amenity, Engineering and Economic objectives as set out in Section 5.5 of the Precinct Plan.

1.4.3. Other Relevant Documents

Other documents considered in the preparation of this report include:

- ☞ Institution of Engineers (2000) *Australian Rainfall and Runoff*;
- ☞ Blacktown City Council (2005) *Engineering Guide for Development*;
- ☞ Landcom (2004) *Managing Urban Stormwater: Soils and Construction Volume 1*, 4th Edition and Volume 2B – Waste Landfills (currently available as a draft for consultation only);
- ☞ Blacktown City Council (2005) *Stormwater Quality Control Policy PO1100*;
- ☞ SMEC (2004) *SEPP59 Landholder Group Eastern Creek Precinct Plan Stormwater Management Strategy*.

2.0 SITE DESCRIPTION

2.1. Location and Land Use

The site (refer Figure 2-1) covers an area of approximately 122ha and comprises 4 lots:

- ☞ Lot 2, DP262213
- ☞ Lot 10, DP241856
- ☞ Lot 1, DP400697
- ☞ Lot W, DP419612

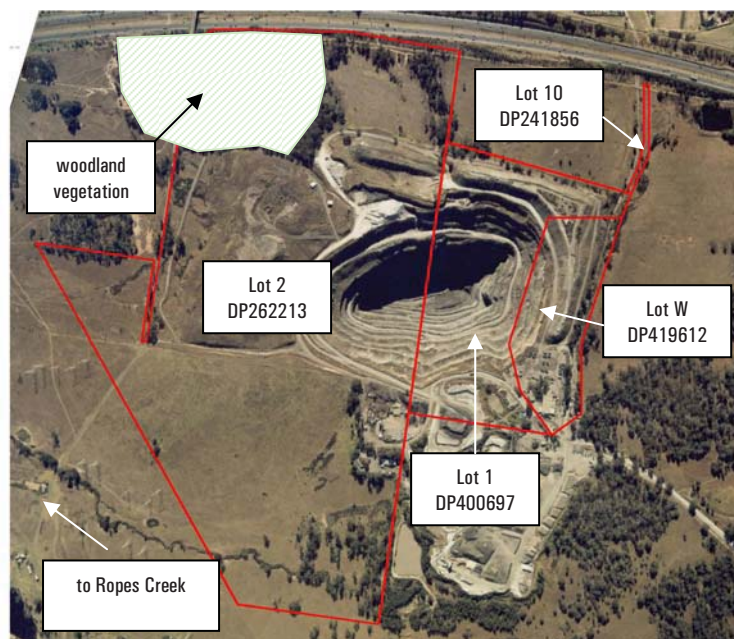


Figure 2-1: Site Boundaries

It is noted that the development footprint as assessed for this report will be restricted to the central portion of the site, as indicated on Figure 1-2.

The site is largely cleared of vegetation and is generally undeveloped beyond the existing quarry pit with associated overburden stockpiles. It is bounded by the M4 motorway to the north, a tributary of Ropes Creek to the south, Archbold Road to the west and open paddocks and the Hanson Asphalt Batching Plant and Hanson yard ('Hanson site') to the east.

In the area proposed for development, a low ridge divides the northern and north-western portions of the site. Native vegetation is largely limited to sparse trees in the north east, far south and west of the site, in addition to an area of remnant woodland in the north west of the site.

2.2. Catchments, Hydrology and Drainage

General overland flow direction across the site is to the north-west and ultimately reaches Ropes Creek approximately 1km west of the site. Ropes Creek flows northwards and is located along the western boundary of the Precinct with a total catchment area of approximately 127Ha. There is an ephemeral drainage line in the northern portion of the site that flows west towards Ropes Creek. To the south of the quarry and beyond the extents of the proposed site operations, overland drainage is generally south to south-west towards a tributary of Ropes Creek.

The site surface water drainage network is characterised by wide, flat and generally poorly defined drainage lines, which is fairly typical of drainage in western Sydney, where low topographic relief and meandering drainage lines dominate the natural landscape.

The Eastern Creek Precinct comprises nine major catchments as identified in Figure 10 of Council's Employment Lands Precinct Plan (2005), with the site located across four of the main catchments (refer Figure 2-2 and Table 2-1):

- ☒ Catchment 1: Quarry Catchment;
- ☒ Catchment 2: Quarry North Catchment;
- ☒ Catchment 3: Upper Angus Creek Catchment; and
- ☒ Catchment 6: Ropes Creek Tributary Catchment.

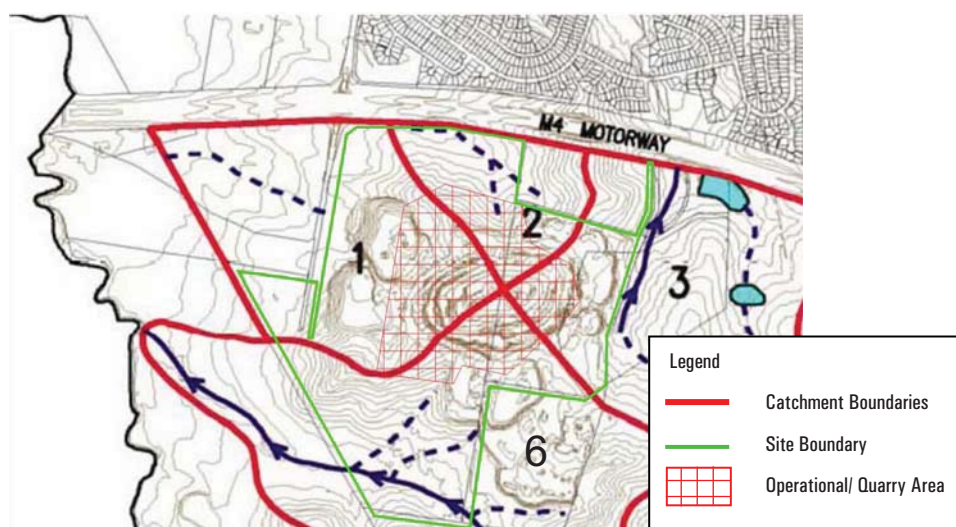


Figure 2-2: Catchment Areas (source: BCC, 2005)

Quarry Catchment (sub-catchment Ropes Creek)

The Quarry Catchment is located within the northwest corner of the Employment Lands Precinct, immediately south of the M4 Motorway. The total catchment area is approximately 72Ha, and drains to Ropes Creek via the existing contours on the site. A large portion of the current catchment runoff is reduced due to the presence of the quarry.

The site area that falls within the boundaries of the Quarry Catchment is approximately 41Ha (including part of the quarry).

Quarry North Catchment

The Quarry North Catchment is approximately 28Ha and is located immediately south of the M4 and east of the Quarry Catchment. The quarry void would intercept a large portion of the runoff from this catchment. Stormwater from this catchment drains through culverts located under the M4, to the area north of the M4.

The area of the Quarry North Catchment included within the site boundaries is approximately 19Ha.

Upper Angus Creek Catchment

The Upper Angus Creek Catchment is located in the northern section of the Precinct and has an area of 89Ha and drains northwards beneath the M4 Motorway.

The site area that lies in the Upper Angus Creek Catchment is 16Ha. It consists primarily of the quarry, whilst the remaining area is not subject to any development proposed under this DA.

Ropes Creek Tributary Catchment

Ropes Creek Tributary flows from east to west. There is a small farm dam located near the top of its catchment. Some signs of erosion are present near the dam.

The site area that falls within the Ropes Creek Tributary Catchment comprises quarry and undeveloped lands of approximately 44Ha.

Table 2-1: Site Catchment

Catchment Number	Catchment Name	Site Area in Catchment (Ha)	Total Catchment Area (ha) ¹
1	Quarry Catchment	41	72
2	Quarry North Catchment	19	28
3	Upper Angus Creek Catchment	17.6	89
6	Ropes Creek Tributary Catchment	44	127
	TOTAL	121.6	316

¹ Source: Blacktown City Council Eastern Creek Precinct Plan 2005

For the purposes of modelling for this surface water assessment, the development area has been divided into two catchment areas. It has been assumed that the remaining site area will retain its current characteristics (pre-development state). The two developable areas comprise:

- 1) Operational area of the resource recovery facility (RRF), 14.8ha
- 2) Quarry area, approximately 26.5Ha.

Surface water flows from these developed areas will be managed to discharge towards the west to the Quarry catchment. This is discussed further in Section 3.5.



3.0 SURFACE WATER MANAGEMENT

3.1. Background

Part of the analysis required for successful development of the Resource Recovery Facility (RRF) and Landfill Facility includes planning of surface water management for the site. As water is both an input and output (waste product) of site activities, site planning needs to adopt an integrated approach to water management.

The key issues concerning site surface water management comprise:

- ☒ Segregation and management of 'clean' (water from operational areas) and 'dirty' runoff (i.e. leachate, or water that has come into contact with mixed wastes, green and timber wastes and uncovered landfilled wastes);
- ☒ Erosion and sediment control including protection of the drainage system from sediment influx;
- ☒ Quarry pit/haul road water management;
- ☒ Water quality control; and
- ☒ Provision of adequate on-site detention for the proposed operations.

Additionally, the *Precinct Plan* and *Engineering Guide to Development* require that pipe sizes be based on a 20 year ARI design flow and that the major drainage system be designed to safely convey the critical 100 year event under normal operating conditions.

Surface runoff generated on-site will fall into two categories

- 1) 'clean' (not leachate) – available for reuse (following roof water collection in rainwater tanks or runoff from clean operational areas which may require treatment for sediment only), and
- 2) 'dirty' (leachate) – generated from the base of the landfill, green waste areas and run off that has come into contact with mixed wastes, green and timber wastes and uncovered landfilled wastes.

Given the recent and impending changes to climate (including pronounced drought conditions), it is intended that the site remains as independent as possible of external water sources, and that the potential for off-site impacts to local receiving waters is minimised. The site layout for stormwater management is presented in Appendix A.

3.2. Soil and Water Management

Appendix A contains the Soil and Water Management Plan.

3.2.1. General

Site soil and water management will be required throughout the life of the project. The SWMP will adhere to the following principles:

- ☒ It is proposed to direct all operational area (hardstand clean) surface runoff (excluding water managed within the quarry pit) towards the Quarry catchment;
- ☒ Sediment-laden stormwater from the materials stockpile area will be directed through permanent sediment capture sumps or mini-basins along surface drainage to intercept sediment prior to reduce sediment 'slugs' reaching the GPT. Site grading is to be used to direct sediment-laden drainage away from hardstand areas;
- ☒ The MPC work floor and green waste area is to be diverted to sewer;

- ☒ Truck access to and from the unsealed areas are to be stable and designed to prevent influx of run-on and escape of untreated flows where possible;
- ☒ Runoff from site operational areas (as defined in Section 3.3) is to be directed through treatment devices (sediment traps and low-flow wetland treatment) and OSD for reuse prior to release to the site's drainage network. Overland flow paths for flows in excess of the design event are to follow natural drainage lines to the west of the site;
- ☒ Treatment devices around the site would provide sediment capture, gross pollutants where necessary, and must also be capable of capturing oil and fuel spills. Proprietary devices such as CDS, Humeceptor or similar can be selected and designed in consultation with the manufacturer to accommodate the required treatment;
- ☒ The treatment devices proposed for soil and water management are:
 - ☒ Small sediment sumps or mini-basins along swales to trap sediment 'slugs' if entrained in stormwater flow;
 - ☒ Sediment traps, e.g. proprietary gross pollutant trap (GPT) (CDS, Humeceptor or similar) or baffled settlement tank capable of retaining gross pollutants, sediment, oils and grease;
 - ☒ Within OSD basin: allowance for wet storage component, as a low-flow wetland for low-flow water quality treatment to remove fine suspended sediments as well as nutrients.
- ☒ Energy dissipation in the OSD basin settling basin for pre-treatment before entry to the OSD basin will provide further attenuation and capture of sediment that may reach the detention basin.

3.2.2. Stockpile and green waste areas

Sediment controls installed within the materials stockpile area will be maintained to prevent clogging and to prevent excessive sediment and nutrients entering the drainage system. These controls are to include:

- ☒ Small sediment sumps or mini-basins along swales to trap sediment 'slugs' if entrained in stormwater flow;
- ☒ Treatment through a GPT or baffled sediment settlement underground tank at the drainage outlet of these two areas,
- ☒ Protection of drains within these areas using:
 - vehicle exclusion,
 - stabilisation or lining of drains,
 - check-devices such as sediment sumps or mini-basins approximately every 50 metres to attenuate flows and encourage sediment dropout.
- ☒ Regular maintenance of drains and sediment traps to reduce loads within the system.

Runoff within the MPC work floor/ green waste collection area is to be managed as described in Section 3.2.

The green waste area, MPC floor, and materials stockpile area are graded away from the quarry to reduce the risk of overflows entering the quarry/landfill area.

3.3. Operational Areas

Surface runoff from the operational area will be managed separately from runoff generated in the quarry pit and haul road. Sources of stormwater runoff from the operational area include:

- ☒ Building roofs – workshop, MPC/ WTS, administration building and weighbridge shed – clean;
- ☒ Roads, car parks and other hardstand areas – clean, containing sediment;
- ☒ MPC work floor/ green waste stockpiles – dirty (to be directed to sewer);

☞ Materials stockpiles / drop off zones– clean, containing sediment.

Runoff collected from the clean or sediment-only areas will be reused on site, for uses including building internal uses (toilet flushing), wheel wash facility, dust suppression (*via* water carts) and irrigation/dust suppression from sprinkler systems around the site. (A water balance which utilises runoff generated on-site and estimated demands for the above uses have been developed and are discussed in Section 5.0.)

Drainage from the MPC work floor/green waste area is to remain in a ‘closed loop’ system with connections only to sewer. Drainage from this area is not considered in detail in this report.

Run off from other areas of the MPC/ WTS and stockpile/drop-off zones is considered to be “clean operational waters” but runoff from these areas will be subject to treatment (sediment removal) prior to reuse. Clean runoff from roofs will be collected in rainwater tanks for reuse on-site. Runoff from other parts of the operational area (e.g. roads, open areas away from stockpiles and buildings) will also be considered clean runoff and suitable for treatment and reuse on-site. This water may be directed to the OSD basin or storage tanks on-site (location to be determined), subject to satisfactory water quality.

Stormwater runoff will be conveyed by a combination of major and minor drainage systems, as shown in Appendix A, including:

- ☞ An underground piped system with provision for overland flow in swales and along roads;
- ☞ Stormwater detention and pollution control structures, and
- ☞ The natural drainage systems including creeks and overland flow.

BCC requirements are that piped networks are designed to convey 1 in 20 year flows without surcharge. Drainage overflows (greater than 1 in 100yr flows) from both these areas will be discharged away from the quarry pit via overland flow paths. Alternatively if required, overflows will be treated and sent to sewer (at an increased capacity if required).

Vehicle entry points for MPC work floor, green waste and materials stockpile / drop-off areas are to be located to minimise uncontrolled runoff and sediment release outside these areas.

Overland flow paths around the site are to remain stable in 100 year critical flows.

3.4. Quarry Pit / Landfill

The in pit haul road will be graded towards the quarry wall. The haul road will be graded towards the quarry wall and will follow a dish drain along the length of the road to a sediment basin proposed for the base of the quarry. Small check dams (e.g. sand bags or aggregate material approx 50mm diameter) located along the dish drain will assist in controlling flow velocities and erosion. At the base of the haul road, a temporary settlement sump is to be installed (e.g. concrete tank or temporary basin lined with geotextile and rock that can be moved as required) to slow down flows and to allow sediment to drop out prior to diversion to a clean area for pumping out (during initial 10m lift) or diversion to the in-pit basin (later stages of landfill management)

A storage basin will be required in the quarry pit to collect clean runoff from quarry walls, haul road and capped landfill areas. This basin is to be progressively relocated throughout landfilling, however no basin is proposed for the first 10m landfill lift.

Runoff collected from these areas will be suitable for reuse if it has not come into contact with waste, and it is expected that the water carts will be able to draw from the sediment basin and reuse this water for dust suppression on haul roads.

3.4.1. Quarry Pit Storage Basin

Managing Urban Stormwater: Soils and Construction, Vol 2B (Waste Landfills) (NSW DECC, Draft, 2007) acknowledges that stormwater from the areas of the landfill that have daily, intermediate or final cover applied can be directed to the sediment basin/s for treatment, rather than managing this water as leachate. Only stormwater which has come into contact with waste or other leachate needs to be managed as leachate, therefore water could be transported out of the pit basin for dust suppression, stockpile watering and similar on site activities within the site's operational area outside of the pit.

1) Initial Stage

The proposed stormwater basin in the quarry will not be placed at the first 10 metres of lift. During the initial stages where the first 10 metres of landfill lift is placed, stormwater influx to the landfilling areas is to be minimised using a sump and high rated pump to capture water from the sides of the quarry. All water falling on the landfill area itself is to be treated as leachate during the first 10m lift.

2) Later Stages

Due to the proposed landfill location being within the existing quarry pit, sediment control *per se* of the landfill area is not essential as the risk of environmental damage from sedimentation is low within the quarry pit itself. Rather, the primary aim of a collection basin within the quarry pit is to assist in controlling the volume of stormwater runoff that comes into contact with waste or the active landfill area (hence minimising leachate generation). Reuse of this water was also reviewed in a water balance model (Section 5.4.1) for its ability to meet demand for dust suppression, to maximise reuse potential.

Volume 2B of the 'Blue Book' for Waste Landfills (draft for consultation only) states that sediment basins and water storages should not be located on landfilled areas. However, the unavoidable constraint of being within the quarry pit, and the need to manage runoff effectively within the pit, necessitates the use of temporary stormwater controls and storage within the quarry pit.

The use of suitable grading and bunding and inclusion of a leachate trench to separate leachate from stormwater from capped areas within the landfill is also necessary to minimise surface water flows into active landfill areas. Erosion across capped areas and sediment influx into any temporary storage at capped areas must also be accommodated.

Forward planning for the location and size of the basin is important for effective runoff and sediment control. Its location should be determined at the development of each landfill lift, taking into account that a sealed basin area is necessary to prevent infiltration, and that it is not possible to excavate through capping and back into landfilled materials. Initial shaping or grading of capped/covered areas is necessary to allow for a suitable placement for the basin to create a catchment with a low point designed into the intermediate capped areas, to drain away from the active tip face / daily cover areas and allows placement of a liner for a basin without disturbing existing capped material.

3) Basin Sizing

Basin calculations were undertaken in accordance with the Blue Book for the quarry pit (26.5Ha).

The maximum total basin volume based on the total quarry pit footprint (including settling zone and sediment zone) that may be required is approximately 4,362.5m³ which equates to 165m³ per hectare of catchment area, which may include quarry walls that drain into the pit. Assumptions and spreadsheets used for sediment basin sizing including rainfall percentiles are presented in Appendix B and include the use of 5-day, 80th percentile rainfall and 2-month sediment accumulation.

Table 3-1 presents the basin data.

Table 3-1. Quarry pit basin information

Detail	Basin Option 1
Volume per hectare runoff capture (m ³ /ha)	165
Size (m ³) – for 26.5ha area quarry footprint	4,362
Rainfall – overflows downstream (landfill protection)	5-day, 80 th percentile (16.5mm)
Dust suppression uses - % demand met at full basin size	Refer Table 5-5

Sediment influx can be reduced by including a controlled, stabilised inlet to the basin and installing and maintaining effective erosion controls around the haul road outlet and around the boundary of the basin.

A series of basins may be installed to capture flows from sub-catchments of the quarry depending on available space within the quarry. The sub-basins will need to meet minimum storage requirements of 165m³/Ha of catchment draining to each basin.

Based on the basin sizing assumptions used, drawdown of water within the basin would need to occur within 5 days of a storm event occurring, to follow the basin design requirements and also to minimise the time that water is stored at the landfill area.

Water collected in the basin should be used initially for in-pit dust control or other uses requiring water in the pit area. Basin(s) may be drawn down by the water carts for dust suppression purposes or used in dump truck on-board reservoirs.

3.5. Flooding

A review of SMEC's *Eastern Creek Precinct Plan Stormwater Management Strategy (2004) – Appendix B Hydraulic Analyses* was undertaken to inform the flooding assessment. Within the site boundaries, there is only one distinct overland flow path identified, which is in the Quarry North catchment. Flows in other catchment areas are not affected by the proposed activities.

Peak flows from the site into to the Quarry catchment drainage will be detained in OSD storage (refer to Section 4.0) to match pre-development flow levels. No drainage is proposed to be directed to the Quarry North catchment. No changes to the existing flooding regime are anticipated.

3.6. Proposed Changes to Catchment Drainage

The catchment boundaries in the Eastern Creek Precinct area as set out in BCC's Precinct Plan are based on old topographic boundaries which have been extensively modified since the construction of the quarry. Drainage in the remaining portion of the modified Quarry catchment (west) has been modified due to the presence of large overburden banks that act to redirect and prevent smaller flows from draining easily through the Quarry catchment area to Ropes Creek.

The change in catchment boundaries during site operations was assessed using site plans and proposed operational catchment areas. BCC has advised that all site flows may be directed west to the Quarry catchment. A RAFTS hydrological model was used to assess catchment flows as a result of the proposed drainage design at the site (see Chapter 4).

4.0 ON-SITE DETENTION (OSD)

4.1. Background

A series of regional detention basins are proposed in BCC's Eastern Creek *Precinct Plan*. One of these regional detention basins is proposed to be located at the site, within the Quarry North Catchment adjacent to the northern site boundary and the M4 Motorway. Another is proposed to the west of the site towards Ropes Creek.

Discussions with Council indicated that these regional basins were still subject to investigation therefore site basin(s) would be required for any proposed development in the interim.

This section presents the results of site specific OSD modelling.

4.2. Methodology

An XP-RAFTS computer model was generated to replicate pre- and post-development flows for the operational area which is subject to change in land-use following construction for the proposed operational area, to calculate OSD volume requirements. This was based on the assumption that the remaining site area will not change form or characteristics from the pre-development situation, and hence, any flows generated in these areas will remain the same as for the pre-development scenario.

Council guidelines require post-development peak flows to match pre-development peak flows up to the 100yr storm events. The model was run for the 2 year and 100 year ARI storm event to derive the required OSD volumes.

XP-RAFTS software allows the user to optimise OSD volume requirements with the use of a storage node receiving flows from the subject catchment. A two-stage discharge (2yr and 100yr) was modelled to check preliminary discharge calculations for peak flow hydrographs.

4.3. Assumptions

The operational area (including berms) was modelled in XP-RAFTS and incorporated an area of 14.8Ha. The operational area was divided into two separate catchments to reduce the total anticipated basin size. Basin 1 catchment is the northern section of the operational area with a modelled area of 10.03ha. Basin 2 catchment occupies the southern section of the operational area with a modelled area of 4.74ha.

The catchments were considered to be 100% pervious in the pre-development model and 100% impervious post-development. These assumptions would result in conservative estimates for flow and OSD storage requirements.

Other XP-RAFTS modelling assumptions are documented in Table 4-1.

Table 4-1: RAFTS modelling criteria for on-site detention determination

Parameter	Pre-development	Post-development
Initial Loss/Continuing Loss (assumes wet antecedent conditions and is a conservative approach)	15mm/3mm	5mm/1mm
Roughness value across site	0.04	0.02
Proportion impervious (%)	0	100

4.4. Results

Peak flows from the site operational areas were calculated using RAFTS for the predevelopment and post-development scenarios. This was used to calculate the required OSD storage volume to prevent downstream hydraulic impacts as a result of site development and allow matching of pre- and post-development flows off site. Table 4.4 shows the results of peak flow modelling.

Table 4-2: Results for OSD modelling

Catchment	ARI	Pre-development Peak Flows (m ³ /s)	Post-development Peak Flows without detention (m ³ /s)	Post-development Peak Flows with detention (m ³ /s)	Required OSD Storage Volume (m ³)
Basin 1 Catchment	100 yr	1.156	5.277	1.110	3,900
	2yr	0.416	2.643	0.403	
Basin 2 Catchment	100yr	0.605	2.511	0.621	1,600
	2yr	0.215	1.249	0.206	

Staged discharge was initially determined using the orifice equation to estimate an orifice outlet diameter, then modelled in several iterations to ensure that pre-development and post-development flows and hydrographs were as close as possible for the 2 year and 100 year ARI. Charts showing pre- and post-development hydrographs and basin hydrographs are presented in Appendix C.

4.5. Discussion

Based on the OSD modelling results presented in Table 4-2, an OSD basin storage volume of 5,500m³ is required for the proposed operational area. The quarry area itself will not require detention storage and following final completion and capping of the landfill, drainage from the area is to be diverted around detention storages. In the event that there is a change in impervious area, an OSD volume of 370m³/Ha may be adopted based on the modelling in this report.

4.6. Dam Safety Committee requirements

The New South Wales Dam Safety Committee (DSC) *Risk Management Policy Framework for Dam Safety* (2006) was reviewed for requirements and criteria for risk assessment.

Among other goals, the DSC states that its mission is to develop and implement effective policies and procedures for regulation of dam safety. In general, dam safety is initially determined through a risk assessment that uses the probability of failure per dam in one year (with probabilities ranging from 10^{-7} to 10^{-3}) and the number of fatalities that would occur as a result of dam failure. An appropriate dam safety assessment would need to be undertaken at the relevant detailed design stage for the OSD basin.

For this site, the proposed OSD basin sizes are $3,900\text{m}^3$ and $1,600\text{m}^3$, smaller than several of the existing dams at the Eastern Creek Precinct. Generally basins will be constructed so that maximum water levels will be at most 1 metre above existing downstream ground levels, overland flow travels across rural land towards Ropes Creek.

Flows from either basin could be classed as “slow and shallow” in relation to overland flow paths, non-defined drainage lines allowing flow dispersion, and relatively long overland flow paths over un-occupied land to the nearest defined drainage line.

Moreover, STORM notes that the intended construction of a much larger regional detention basin in the vicinity of the proposed OSD basins. The larger OSD basin may present higher risks than that proposed for this site for the operations phase of the development, and will also require scrutiny particularly as the structure is intended to be in place through the long term.

In a Probable Maximum Flood the dam will have already overtopped from a smaller 1:100 event as part of its design. In a PMF event, the volume of catchment flows from further up the catchment beyond the site are likely to be having a greater impact at this point in the catchment, in which the contribution of any (unlikely) dam failure would be negligible.

As a result, these factors are likely to contribute to a negligible risk.

5.0 WATER CYCLE MANAGEMENT

5.1. Water Balance Methodology and Concept

A daily water balance analysis was used to determine the feasibility of the proposed rain and stormwater harvesting scheme and in particular the effects of various storage sizes for stormwater harvesting along with changes to demand. The water balance utilised flows generated using a simple runoff calculation using historical rainfall data, analysed for various rainfall patterns including dry, mean and wet rainfall years.

The purpose for modelling dry, mean and wet years was to assess the performance of various tank sizes given the changes to rainfall patterns. It is noted that with the potential effects of climate change and the current trend of dry rainfall patterns, the need to consider lower annual rainfalls for rain and stormwater harvesting reuse schemes is becoming more and more necessary. In addition, any excess stormwater produced (especially during wet season periods) need to be considered for the management of on-site surface waters.

A concept diagram for the proposed re-use scheme on site is shown in Figure 5-1 below.

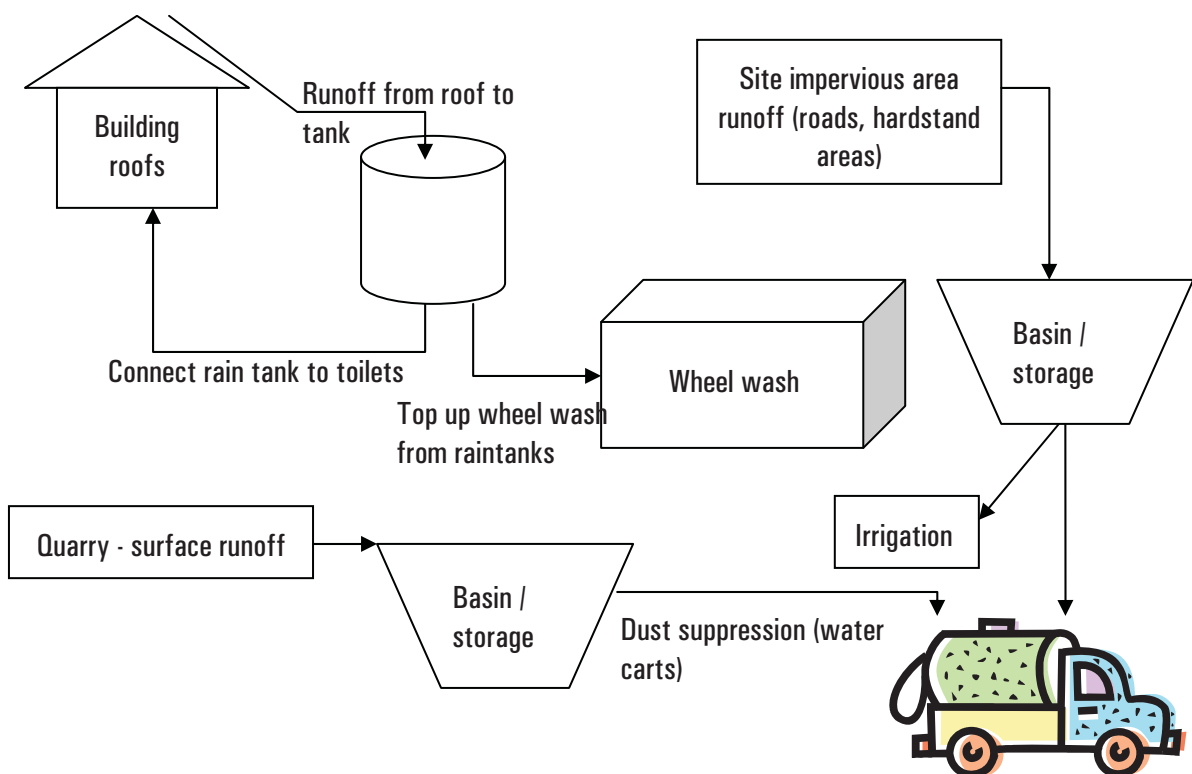


Figure 5-1: On-site water reuse concept

5.2. Modelling Inputs

5.2.1. Rainfall

Data from St Clair (BOM station #67102) was used in this analysis. Seventeen years of daily rainfall data (1985 – 2002) was assessed to determine a dry, median and wet rainfall sequence for use in the water balance model.

The following dry, median and wet year rainfalls were derived, and compared against long term averages for Prospect.

Table 5-1: Rainfall Records

	Annual Rainfall (mm)	
	Modelled average rainfall and years	Prospect (long term average)
Dry	553 (1994 / 1995 / 2001 / 2002)	562
Median	851 (1987 / 1989 / 1991)	831
Wet	1104 (1986 / 1987 / 1988 / 1989 / 1990)	1183

Note: median rainfall at St Clair is below Sydney Observatory's average of 1162mm/yr.

5.2.2. Harvestable areas

The proposed roof and stormwater reuse scheme can harvest runoff from the operational area catchment, comprising the areas identified in Table 5-2. This is conservative (under-estimates area available) and excludes the proposed green waste area.

Table 5-2: Harvestable Areas

Precinct	Area (Ha)	Initial loss (mm)
Building roofs	0.6	1
Remaining Site Operational Area	13.1	5
Quarry	26.5	10

5.2.3. Water demands

The demands for harvested water for reuse includes toilet flushing, dust suppression, sprinklers (irrigation) and the wheel wash. Estimated water demands used in the water balance model are presented in Table 5-3 below.

Table 5-3: Modelled Demands

	Annual Demand (ML/yr)			Modelling Assumptions
	Dry years	Mean years	Wet years	
Toilets	0.4	0.4	0.4	34 staff on-site x 6 flushes/day x 4.5L/flush
Dust suppression	25.8	24.1	24.0	Average application = 80kL/day (assumes no application if daily rainfall exceeds 2mm)
Sprinklers (irrigation)	9.7	9.1	9.0	Average application = 30kL/day (assumes no application if daily rainfall exceeds 2mm)
Wheel wash	0.3	0.3	0.3	Water use = 25kL/month
TOTAL	36.2	33.9	33.7	

5.3. Results - Catchment runoff

Based on harvesting stormwater from 13.1ha operational catchment area, calculations undertaken by STORM for a dry, median and wet year sequence provide the runoff volumes shown in Table 5-4. The actual runoff that can be harvested for reuse will not be the entire volume generated due to losses from the system from overflows, and is dependent on storage behaviour (i.e. if the storage volume reaches 100% capacity, overflows will occur rather than further collection). The performance of varying storage volumes is presented in Section 5.4.

Table 5-4: Potential Runoff Generation

Rainfall Scenario	Potential Runoff Generated (ML/yr)		
	Dry	Median	Wet
Building Roofs	3.0	4.7	6.2
Quarry	39.1	71.2	124.9
Remaining Site Operational Area	44.9	73.2	236.8
TOTAL	87.0	149.1	367.9

5.4. Storage sizing

The water balance model was set up to determine the amount of runoff generated from the catchment under the various rainfall scenarios, with the aim of assessing the performance of various storage sizes.

5.4.1. Raintanks and building roofs

Figure 5-2 demonstrates the results of capturing roof runoff from buildings and reusing it for internal uses (toilet flushing i.e. 0.9kL/day) and topping up of the wheel wash facility (1kL/day).

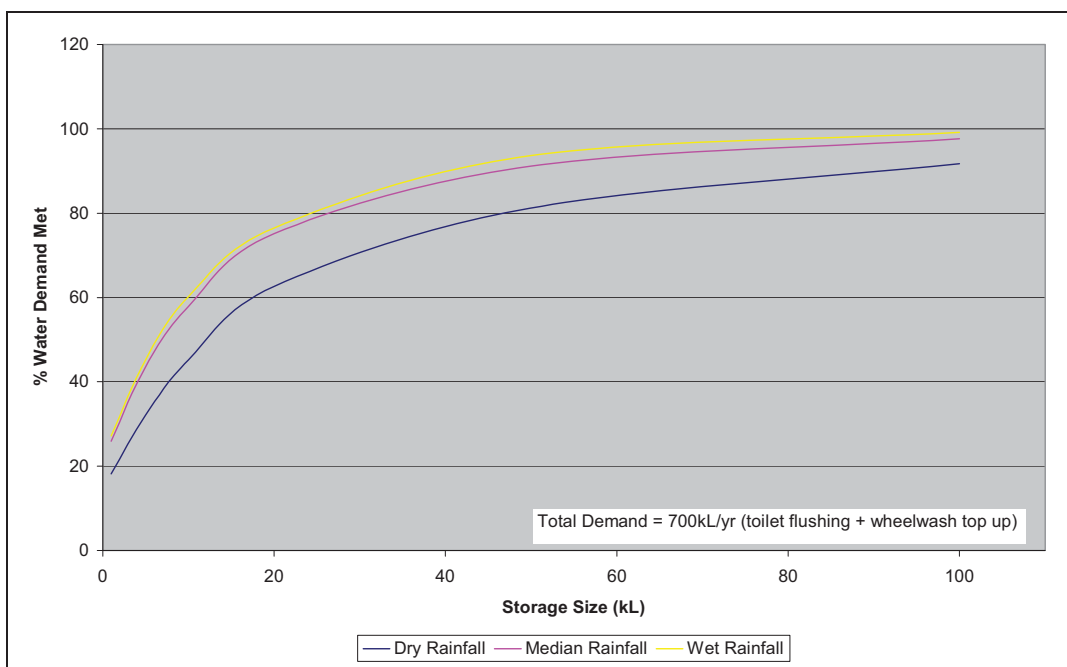


Figure 5-2: Roofwater reuse for toilet flushing + wheelwash

Based on Figure 5-2, overall tank storage volumes of up to 40kL would meet over 75% of the site’s toilet flushing and wheel wash demands for the dry, median and wet rainfall scenarios e.g. a 40kL storage volume would meet 88% of the 700kL demand under median rainfall conditions. It is recommended that each of the four buildings on-site install a 10kL tank (minimum) to maximise potential roof runoff collection for reuse.

5.4.2. Surface runoff from operational area

There is opportunity to collect surface runoff from the internal roads/hardstand areas and remaining site operational area. Runoff from these areas may be directed towards the OSD basins which are proposed to include a storage component and be drawn down for reuse on site following storm events. A water balance was prepared for the water demand scenario of:

- ☞ Dust suppression for watering carts + truck on-board reservoirs (40kL/day) and spray mists / sprinkler system for irrigation or dust suppression (30kL/day).

Note: it is assumed that the water quality will be of adequate standard for reuse and will not pose a risk to human or environmental health.

It was assumed that on days where daily rainfall exceeds 2mm there is no demand for dust suppression.

A range of reuse storage volumes (within the OSD basin, as additional storage to OSD volume) under dry, median and wet rainfall scenarios were modelled.

Figure 5-3 shows the volume of rainwater supplied for a range of storage volumes under a dry, median and wet rainfall scenario. Figure 5-4 shows potential water supply and percent water demand met for dust suppression and sprinkler irrigation on site. As storage volume increases, the ability of the storage supply to meet demand will increase.

Current indicative basin size in the site drawings (Appendices A & B) allows for approximately 1000kL from Basins 1 and 2 combined, which would meet approximately 55% of the assumed water demand for dust suppression and irrigation combined. If required the storage volume could be increased at the detailed design stage.

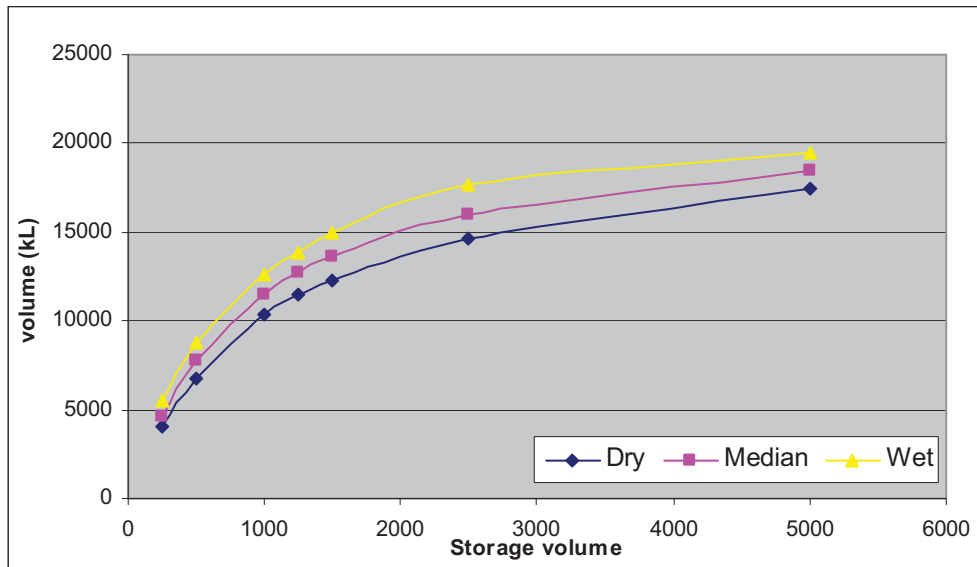


Figure 5-3. Rainwater volume supplied based on storage volume, kL/yr

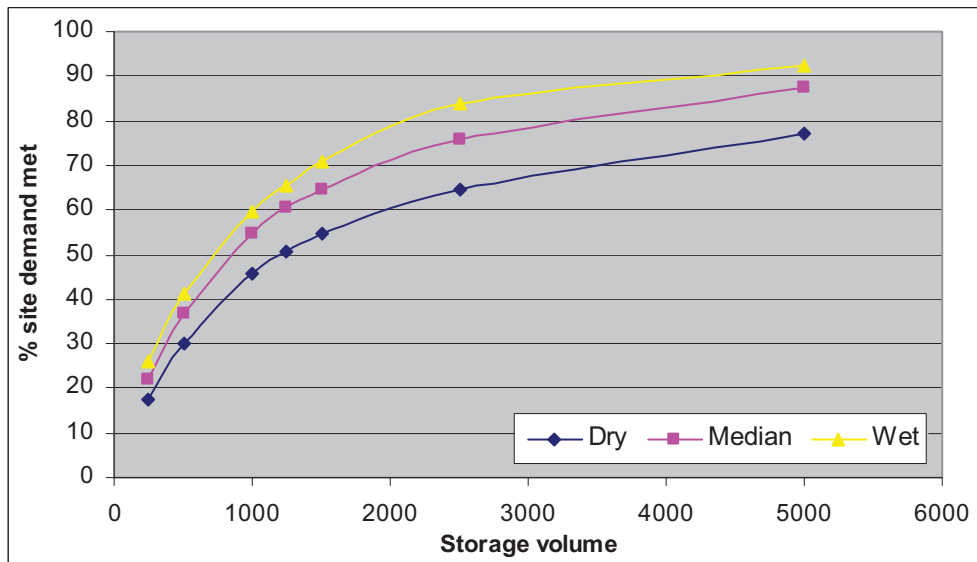


Figure 5-4. Percent water demand met annually, dust suppression and irrigation only

5.4.3. Surface runoff from quarry

Captured runoff in the quarry basin will be used for dust suppression via water carts. The available water volume for reuse from the basin will vary depending on rainfall and the stage of landfill operation, as the basin size is intended to increase in proportion to the capped landfill catchment area and runoff from quarry walls as required.

The modelled volume of reuse for dust suppression per day was 40kL/day.

Table 5-5 shows the per cent demand met from a basin sized to capture runoff from the 26.5ha quarry area. In practice the basin size may vary in relation to the area of capped landfill that is its catchment (at a rate of 165m³/ha). For this reason it was modelled separately to the storage options within the OSD basin.

Runoff collected from these areas will be suitable for reuse such as dust suppression if it has not come into contact with waste.

Table 5-5. Quarry basin reuse - % demand met

Rainfall scenario	Basin (4,362m ³)	
	Total water demand ML/yr	% water demand met
Dry	12.97	72%
Median	12.07	87%
Wet	12.13	91%

5.5. Summary of Storage Volumes

The following recommended storage volumes are based on the analysis above:

- ☞ Each building should have its own rainwater tank (min. 10kL volume) to harvest roof water runoff for reuse including toilet flushing and wheel wash top up;
- ☞ The OSD storage proposed for the operational area is of sufficient volume (min. 370m³/Ha) to contain the 1 in 2 year storm event 1 in 100yr storm event and by use of additional depth in the basin (nominal 0.5m in indicative basin sizes supplied) to act as storage for reuse on-site. It is anticipated that drawdown will occur regularly for dust suppression (water carts and sprinkler) and irrigation.
- ☞ The proposed sediment basin in the quarry has been sized using the Blue Book (approx. 165m³/Ha) and can be drawn down following storm events for dust suppression (water carts).

6.0 WATER QUALITY

6.1. Water Quality Management

The stormwater management controls for the site including water quality management measures are presented in Appendix A.

6.1.1. Pollutant Treatment Priorities

Table 1 in BCC's Stormwater Quality Control Policy (2005) presents treatment priorities for a range of pollutants generated from various land uses. The proposed development is deemed industrial and as such the pollutant treatment priorities are identified in Table 6-1, based on Table 1 in the Policy. The Policy also states that for developments on sites greater than 5Ha, the pollution treatment methods selected must treat all pollutants cited with emphasis on the first three priority pollutants.

Table 6-1 Pollutant Treatment Priorities for Industrial Areas

Development Type	Litter (Gross Pollutants)	Coarse Sediment	Nutrients	Fine Sediment	Hydrocarbons, Motor Spirit, Oil & Grease
Industrial	3	4	5	1	2

Table 6-2 outlines the pollutant retention criteria for development sites, based on Table 2 in BCC's (2005) Stormwater Quality Control Policy. MUSIC modelling (refer to Section 6.2) was undertaken to assess the effectiveness of the proposed treatment system based on the information in this table.

Table 6-2 Pollutant Retention Criteria

Pollutant	Description	Retention Criteria for Development Sites
Fine Sediment	Contaminant particles 0.1mm diameter or less	50% of the total annual load
Hydrocarbons, Motor Spirit, Oil & Grease		Whichever is greater: 1. 90% of the total annual load; or 2. Total discharge from site of TPH ¹ < 10mg/L at all times.
Litter (gross pollutants)	Trash litter and vegetation larger than 5mm	90% of the total annual load
Coarse sediment	Contaminant particles between 0.1mm and 5mm diameter	80% of the total annual load
Nutrients	Total phosphorus and total nitrogen	45% of the total annual load for each nutrient

Notes: 1. TPH – Total petroleum hydrocarbons

Table 6-3 is based on Table 3 in BCC's (2005) Stormwater Quality Control Policy and outlines the qualitative operational objectives for new developments, and how the proposed Stormwater Management Plan meets these objectives.

Table 6-3. Water Quality Management Objectives

Pollutant/Issue	Management Objectives	SMP addresses objectives
1. Runoff volumes and flow rates	Impervious areas are not to be directly connected to the stormwater drainage system unless uncontrolled property runoff needs to be constrained	OSD to be utilized to address runoff from site developed areas including road drainage and other paved areas.
2. Stormwater quality	Reuse of stormwater for non-potable uses maximised	Yes (addressed in Section 5.0)
	Vegetated flow paths or similar are to be used to connect impervious areas to the stormwater system	<p>A vegetated wetland (end of line system) in each OSD basin will be used to treat stormwater runoff prior to discharge to the environment.</p> <p>Where feasible in detailed design, rock-lined or grass swales adjacent to berms will direct site operational area runoff to treatment/OSD basin.</p> <p>Sediment/Gross pollutant traps and low-flow treatment through wetland (as wet storage component of OSD basin) to be utilized for operational areas</p>
	Use of stormwater infiltration 'at source' where soil types allow.	Infiltration will occur for smaller storm events ARIs. Soil types on site (heavy clays) inhibit use of infiltration for larger ARIs. Site use not conducive to stormwater infiltration as WQ control.
3. Riparian vegetation and aquatic habitat	<p>Protect and maintain (i.e. no demonstrated adverse impact on) natural drainage features ¹. All natural (or modified) drainage channels within the site that possess either:</p> <ul style="list-style-type: none"> • base flow • defined bed and/or banks • locally occurring native riparian vegetation <p>are to be protected and maintained.</p>	<p>Drainage paths within site catchments are poorly defined with no base flow. Nil to very little native riparian vegetation is present at drainage paths within site.</p> <p>There are no modifications proposed for existing riparian vegetation and aquatic habitat at drainage paths in the Quarry North</p>

	'Natural channel designs' should be adopted in lieu of floodways in areas in areas where there is no natural (or unmodified) channel.	and Quarry site catchments
4. Flow	Natural flow paths, discharge points and runoff volumes from the site should not be altered. Frequency of bank-full flows should not increase as a result of development. Generally, no increase in the 2-yr and 100-yr ARI peak flows.	Key discharge points for site are to be maintained or will remain unaffected by site development. OSD is proposed to maintain peak discharges at pre-development levels. Staged discharge modelling undertaken for 2yr & 100 yr events
5. Amenity	Multiple uses of stormwater facilities to the degree compatible with other management objectives.	OSD aligns with requirements for onsite detention in Eastern Creek Precinct. Site OSD needs could be integrated with regional detention basin in future following assessment. No clashes with other management objectives Stormwater harvesting and reuse to reduce potable water demands and peak runoff volumes.
6. Natural bushland	No demonstrated adverse impact from stormwater into urban bushland area.	No stormwater to be directed to new discharge points including bushland areas. Stormwater from site operational areas is directed through sediment trap, wetland and OSD prior to release at existing discharge points.
Notes: 1. Wetlands, watercourses and riparian corridors.		

6.1.2. Maintenance and Monitoring

The developer will be responsible for the maintenance of the proposed stormwater controls. A maintenance plan will be developed during the detailed design phase. In general, the maintenance plan should allow for:

- ☞ Regular visual inspection of the stormwater treatment measures, for example on a monthly basis and after rain events;
- ☞ OSD Basin and GPT cleaning program – more frequently as site settles from development and then based on results of regular visual inspections. Cleaning generally to consist of:
 - ☞ Sediment and weed removal from the OSD basin and its associated sediment control/stilling basin, and
 - ☞ checking integrity of in-pit stormwater basin, plus sediment removal

- ☞ (Optional) water sampling of OSD basin and in-pit stormwater collection basin, e.g. on a quarterly basis for the first year of the basin's operation as each basin is developed, then 6-monthly in following years, to ensure reused/released water is of suitable quality for end-use, e.g. in irrigation equipment (if necessary can refer to ANZECC guidelines and relevant NSW guidance;

A maintenance and monitoring check-sheet should be developed that allows for the data entry, location of stormwater management device on site (e.g. based on a map with numbered locations), type of inspection (visual, water sampling, etc), outcome (e.g. all clear, device needs cleaning), actions taken, and any follow up required.

Site salinity management with reference to water collected within the quarry pit is addressed in Section 6.3.

The quality of the water released (if any) should be in accordance with the site's Environment Protection Licence. Typically the licence will only permit discharge once the water in storage has been tested to ensure it complies with specified water quality standards for discharge. Sampling requirements may include total suspended solids (TSS), Electrical conductivity, Turbidity, Ammonia, Biochemical Oxygen Demand (BOD), Total Nitrogen and Total Phosphorus.

6.2. MUSIC modelling

6.2.1. Methodology

The MUSIC model was chosen to model water quality. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km² and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to determine if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

Only the site operational area and quarry area were modelled as these undergo the greatest change in land use. The post-development model was used to compare the pollutant loads generated from the proposed development with, and without treatment controls.

The pollutant retention criteria set out in BCC's Stormwater Policy were used as a basis for assessing the effectiveness of the selected treatment trains.

The layout of the MUSIC model is presented in Appendix D.

6.2.2. Assumptions

Rainfall

Rainfall data was obtained from the Bureau of Meteorology (BOM) for Prospect Dam (BOM station #67109) the closest station to the site with continuous rainfall data. Meteorological data from 1984 - 2004 (slightly above average rainfall conditions) was used in the model in an attempt to replicate climatic conditions typical of the site.

The MUSIC User Manual (CRCCH, 2004) suggests that the time-step should not be greater than the time of concentration of the smallest sub catchment, but consideration should also be given to the smallest detention time of treatment nodes in the system. To accurately model the performance of the treatment nodes, a daily time step was chosen.

Soil Properties

Various parameters are required to be entered in MUSIC regarding soil properties. The soil profile of the existing site is fairly uniform and soil parameters were set to default Sydney values throughout the modelling.

Event Mean Concentrations

The default MUSIC Event Mean Concentration (EMC) values have been adjusted to reflect more recent data available by Duncan (2004) for specific land uses such as roads, roofs and urban areas. The parameter concentrations adopted are shown in Table 6-4.

Table 6-4: MUSIC Modelling EMCs

Land Use ¹	EMC (mg/L)		
	TSS	TP	TN
Roofs	20	0.13	2
Other site areas	270	0.5	2.2

¹ Fletcher, T., Duncan, H., Poelsma, P. & Lloyd, S. (CRC, 2004)

Proposed Treatment Method

Treatment measures modelled include gross pollutant traps, treatment through a wetland system and inclusion of stormwater runoff reuse.

6.2.3. Results

The results of the post-development model are shown in Table 6-5. The reduction rate is expressed as a percentage and compares the post-development pollutant loads **without** treatment versus post-development loads **with** treatment. When a positive reduction percentage is achieved there is a net decrease in pollutant loads as a result of development. The development can then be considered to have a beneficial effect. However, if a negative reduction percentage occurs then there is an increase in pollutant loads in that particular post-development scenario.

Table 6-5: Flow and Pollutant Load Reductions

Parameter	A	B	Reduction % (A-B)/A
	Post-Development Results (without treatment controls)	Post-Development Results (with treatment controls)	
Flow (ML/yr)	64.80	42.7	34.1
Total Suspended Solids (kg/yr)	15600.00	770	95.1
Total Phosphorus (kg/yr)	29.70	6.33	78.7

Total Nitrogen (kg/yr)	141.00	69.4	50.8
Gross Pollutants (kg/yr)	2100.00	0	100

The model results (Table 6-5) indicate that pollutant load reductions for Total Suspended Solids, Total Phosphorus and Total Nitrogen will meet BCC's Stormwater Quality Control Policy (2005).

The detention storage for the proposed wetland can be wholly contained within the basin in addition to OSD. Site drawings in Appendix A show the indicative cross section for OSD-wetland configuration with provision for storage and reuse.

6.2.4. Discussion

Based on the water quality modelling undertaken, measures including gross pollutant traps, treatment through a wetland system and stormwater runoff reuse will enable stormwater discharged from the site to be treated to a standard that meets water quality objectives as set out by Council.

It is considered that other pollutants such as hydrocarbons are not expected to cause any significant impacts on site under every day operations. Under extreme circumstances (e.g. a petrochemical spill during refuelling), operational management plans will be in place which identify strategies for remediation. Selection of a suitable GPT will allow some oils and grease to be retained.

Other measures (under the Environmental Management Plan) would include a covered and bunded area being provided for any refuelling (and materials storage) facilities on the site. Bunds should be capable of containing the full storage volume of the container plus an additional 10%.

6.3. Salinity

There is presently no visible indication of salinity at the ground surface around the site. The *Precinct Plan* suggests that adverse impacts on salinity would be expected if the groundwater level were to be raised significantly over a period of time. In this way, contributing factors may include prolonged flooding, removal of deep-rooted vegetation, over-irrigation, disruption of natural drainage lines, stormwater infiltration and leaky pipes. Some areas of the site may be more susceptible to developing soil salinity problems due to their geology.

The pit is likely to have contributed to some extent to lowering the groundwater table in the vicinity of the site by creating a groundwater 'sink' (IGGC) and this may result in the possibility that saline drainage from sub-soils and bedrock will reach the quarry pit and walls and contribute to saline runoff collected in the pit.

Please refer to the IGGC report for more information about salinity in groundwater and saline groundwater impacts.

6.3.1. Site Water Management for Salinity

Water quality in the proposed temporary sedimentation basin located on progressively capped areas of the landfill within the pit is to be assessed as per monitoring requirements. If salinity or TDS results for water quality in the basin proves too saline for site irrigation or related surface uses, its use is to be restricted to suitable areas of the site, e.g. dust suppression within and around the quarry pit.

In general, the Department of Primary Industries (Agriculture) recommend that acceptable salinity levels for pasture (assuming that any irrigated areas at the site will primarily be turf) are in the order of 2200 μ S/cm before growth begins to be affected.

Potential impacts on salinity will be managed in the following ways:

- ☞ Modifications to existing site vegetation are kept to a minimum. Most site development is to occur on existing disturbed or cleared areas adjacent to the quarry pit;
- ☞ Minimise additions to groundwater table by avoiding waterlogged areas and over-irrigation; and
- ☞ The proposed OSD basin serving the proposed development, at a depth of approximately 3m below existing ground surface, is not likely to intercept potentially saline groundwater.

7.0 SUMMARY

7.1. Summary of Stormwater Management Measures

Water on site is to be managed according to the goals and methods outlined in Table 7.1 and takes into account site needs and BCC requirements. The general layout for site surface water management is presented in Appendix A.

Table 7-1: Stormwater Management

Stormwater Management Measure	Management goal	Methods
Site Stormwater Drainage System	Piped and open drainage structures to convey the major and minor storm events (1 in 100 year and 1 in 20 year respectively) to storage and reuse facilities or off-site as required, via on-site treatment and/or detention facilities where necessary.	<p>All clean or sediment-only surface runoff to be directed to two detention basins in the Quarry catchment, <i>via</i> constructed drainage. See Section 3.1.1 for definitions of clean and dirty runoff.</p> <p>Piped networks will be designed to convey 1 in 20 year flows without surcharge. The MPC work floor/green waste stockpile area is to be directed to sewer. Drainage overflows (greater than 1 in 100yr flows) from both these areas is directed away from the quarry pit via overland flow paths.</p> <p>Vehicle entry points for MPC work floor / green waste and materials stockpile & drop-off areas to be located to minimise uncontrolled runoff and sediment release outside these areas.</p> <p>Overland flow paths around the site are to remain stable in 100 year critical flows.</p>
On-site Detention	On-site detention is required to match post-development flows with pre-development flows.	OSD is required to match post-development flows with pre-development flows from the developed operational area (14.8Ha). The remaining site area flows will not be detained as there will be no change in land use in these areas. The required OSD volume to contain 1 in 100 year flows from the 14.8Ha surface operational area is 5500m ³ .
Stormwater Management	Minimise generation of leachate and contaminated runoff	<p>All clean surface runoff to be diverted to two OSD basins (operational area flows) or an in-pit basin (quarry area flows).</p> <p>Surface run-on to and from or sediment-generating operational areas at the surface, and to the quarry pit, is to be minimised through the use of diversion bunds and site grading. This will include grading the site such that all surface runoff up to the 100 year (or design) event is directed away from quarry pit.</p> <p>Drainage from the MPC work floor/green waste area is to be connected to sewer.</p> <p>Runoff from the stockpile/drop-off area is to be managed as clean surface stormwater, with additional sediment control.</p> <p>The MPC work floor/green waste area will be bunded to</p>

		prevent stormwater entering the area.
Water Quality and Reuse	Treat, store and reuse runoff on site where possible	<p>Any runoff water coming into contact with waste as defined in Section 3.1 is to be treated as leachate.</p> <p>Reuse purposes include:</p> <ol style="list-style-type: none"> 1. toilets and other building internal uses 2. outdoor uses including dust suppression, stockpile management, irrigation. <p>See Chapter 5, Water Cycle Management for further discussion.</p> <p>Water management practices for incidental waste storage (e.g. office waste storage areas, 240L 'Otto' bins), vehicle wash down areas and materials storage areas to follow Appendix D in BCC <i>Stormwater Quality Control Policy</i>.</p>
Reduce mains water demand.	<p>Roof water is to be captured in rainwater tanks for reuse on site.</p> <p>A network of water storages will be located on site to provide water supply to the facility as determined by the water balance model and site demands.</p>	<p>Harvested roof water to be used in buildings for appropriate end-uses (e.g. toilet flushing and localised irrigation). Roof water will also be used to top up the wheel wash.</p> <p>Stormwater harvested from the OSD basin would be used for dust suppression, irrigation around the berms, stockpile management and other non-potable water uses.</p> <p>Water from proposed quarry pit detention basin installed after the initial 10m lift to be reused for dust suppression, in water carts on haul roads or in dump truck on-board reservoirs.</p> <p>See Chapter 5, Water Cycle Management</p>
Site Monitoring	Monitor water quality and drainage systems	<p>Periodic checking and maintenance of site drainage and water quality controls to be undertaken to reduce likelihood of drain blockage and overflows.</p> <p>To ensure water quality is suitable for equipment used in irrigation or stockpile spraying/management, monitoring of water quality may take place by sampling from the site OSD basin, and if necessary from the proposed in-pit basin.</p>

8.0 REFERENCES

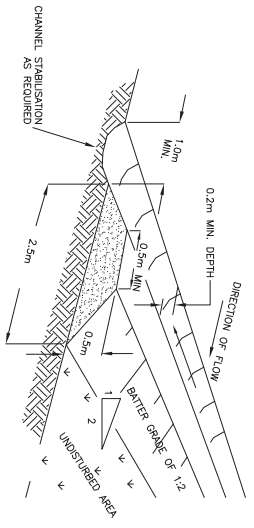
- ☞ Blacktown City Council (2005) Eastern Creek Precinct Plan – Stage 3
- ☞ Blacktown City Council (2005) Engineering Guide for Development
- ☞ Blacktown City Council (2005) Stormwater Quality Control Policy PO1100
- ☞ Institution of Engineers (2000) Australian Rainfall and Runoff
- ☞ Landcom (2004) Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition
- ☞ NSW DECC (2007) Managing Urban Stormwater: Soils and Construction Volume 2B – Waste Landfills (currently available as a draft for consultation only)
- ☞ SMEC (2004) SEPP59 Landholder Group Eastern Creek Precinct Plan Stormwater Management Strategy

APPENDIX A

Surface Water Management Plan



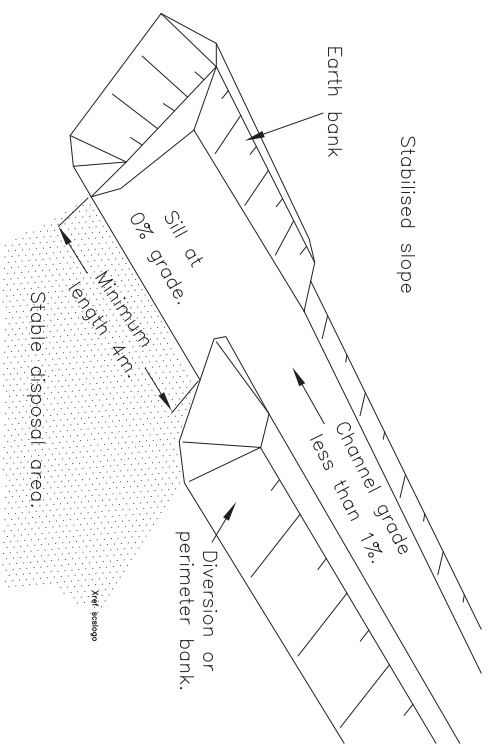
STORM CONSULTING



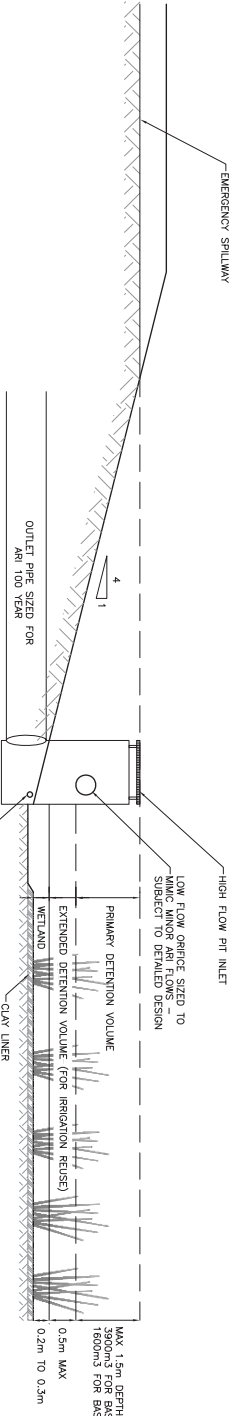
EARTH BANK DETAIL
NIS

EARTH BANK CONSTRUCTION NOTES

1. CONSTRUCT AT A GRADIENT BETWEEN 1 AND 5%
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD BUILD THE BANKS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS. NOT V-SHAPED.
4. BUILD THE BANKS AS PROPERLY CONNECTED TO PREVENT FAILURE
5. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITH 10 DAYS OF CONSTRUCTION.
6. WHERE DISCHARGING TO ERODIBLE LANDS, ENSURE THEY OUTLET THROUGH A PROPERLY CONSTRUCTED LEVEL SPREADER.
7. WHERE POSSIBLE, ENSURE THEY DISCHARGE WATERS ONTO EITHER STABILISED OR UNDISTURBED DISPOSAL SITES WITH THE SAME SUBDRAINAGE AREA FROM WHICH THE WATER ORIGINATED.
8. APPROVAL SITES WITH THE SAME SUBDRAINAGE INTO OTHER SUBDRAINAGES.



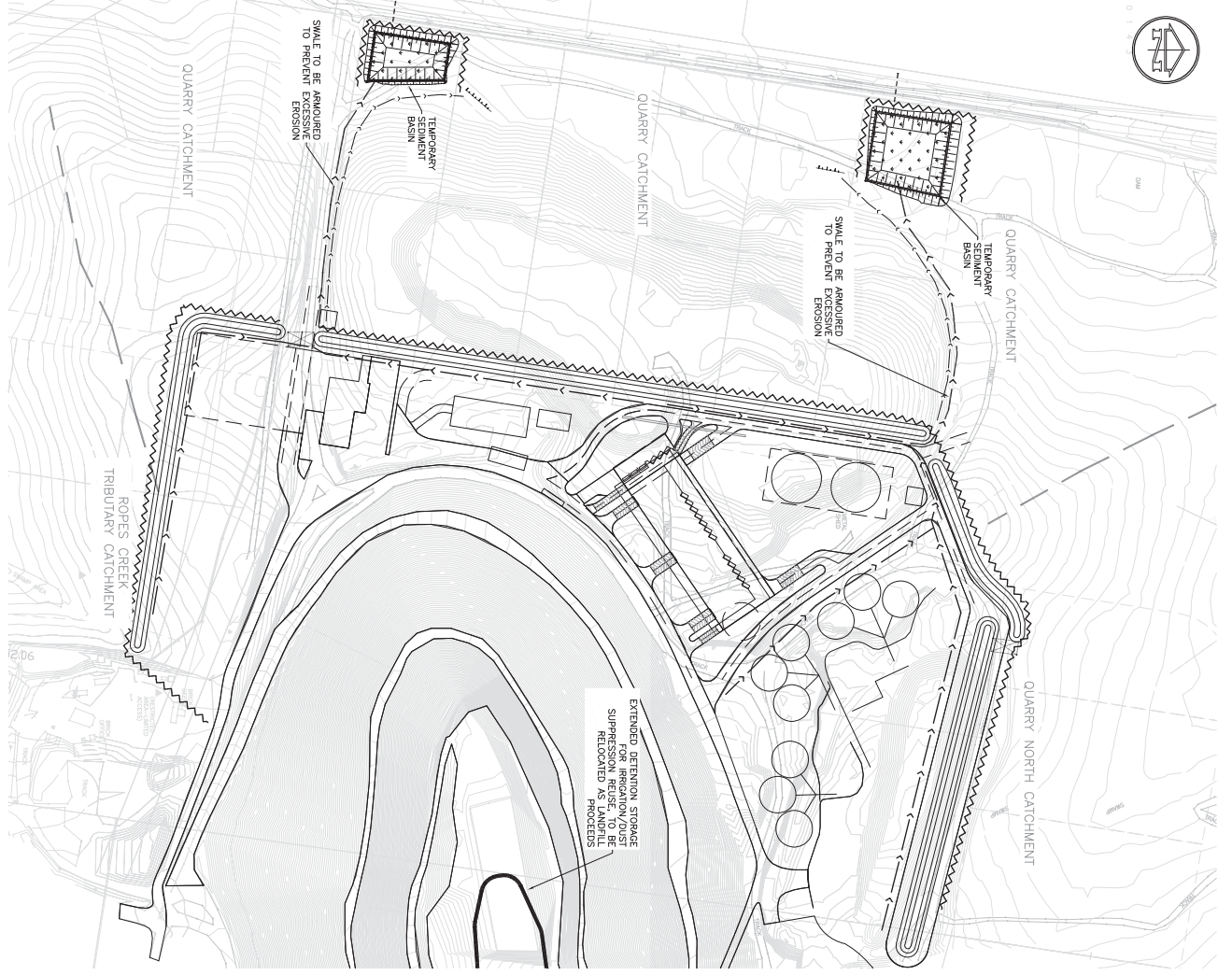
LEVEL SPREADER
NOT TO SCALE



SCHEMATIC OF DETENTION BASIN AND
STAGED DISCHARGE OUTLET
SCALE 1:50

- NOTES
1. STAGED DISCHARGE TO BE DESIGNED TO MATCH PRE AND POST DEVELOPMENT CATCHMENT FLOWS FOR MAJOR AND MINOR ARI RAINFALL EVENTS UP TO 100 YEAR.
 2. EXTENDED DETENTION VOLUME TO EXCEED FOR UP TO 100 YEAR ARI.
 3. FINAL WATER BALANCE AND REUSE REQUIREMENTS - SUBJECT TO DETAILED DESIGN AND PLANTING REQUIREMENTS - SUBJECT TO DETAILED DESIGN AND PLANTING SUBJECT TO DETAILED DESIGN.
 4. WETLAND DESIGN AND PLANTING SUBJECT TO DETAILED DESIGN.

ISSUE	REVISION	BY	CKD	DATE	ISSUE	REVISION	BY	CKD	DATE	DOCUMENT PURPOSE	COORD. DESIGN	DATE	DESIGNED BY	CHECKED BY	SCALE AS SHOWN	CENT	PROJECT	DRAWING NO.	SHEET
										199 CLIENT APPROVAL FOR THE PRELIMINARY DESIGN OF THE STORMWATER MANAGEMENT PLAN		2008 NOV 2008			AS SHOWN	Stormwater Management Plan	Light Horse Business Centre	2	3



GENERAL REQUIREMENTS

THE FOLLOWING SOIL AND WATER MANAGEMENT PLAN (SWMP) HAS BEEN DEVELOPED IN ACCORDANCE WITH THE NSW WATER MANAGEMENT ACT 2005 AND THE NSW WATER MANAGEMENT REGULATIONS 2005. THE SWMP IS A PRELIMINARY PLAN AND IS SUBJECT TO REVISION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS.

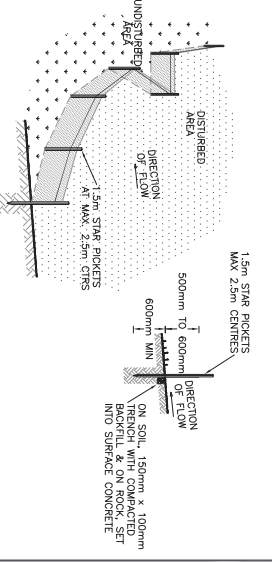
- SITE ESTABLISHMENT**
- PRIOR TO THE COMMENCEMENT OF EARTHWORKS ON THE SITE THE FOLLOWING SHALL BE UNDERTAKEN AS A MINIMUM:
1. ERECT SAFETY FENCING WITH SIGNAGE CLEARLY INDICATING THAT THE SITE IS A CONSTRUCTION ZONE AND ACCESS IS RESTRICTED AS DETAILED NECESSARY.
 2. ERECT CONCRETED VISIBLE BARRIER SEDIMENT CONTROL STRUCTURES NOT SHOWN AT THIS SCALE AND TO PROHIBIT UNNECESSARY SITE DISTURBANCE.
 3. INSTALL STABILISED SITE ACCESS IN ACCORDANCE WITH DRAWING SWP-14 AT EACH ENTRY AND EXIT TO THE SITE AND TO PROHIBIT TRAFFIC FROM OVERLYING SEDIMENT.
 4. INSTALL SEDIMENT AND EROSION CONTROL DEVICES IN ACCORDANCE WITH THE REQUIREMENTS OF THE BLUE BOOK.

- CONSTRUCTION**
5. TOPSOIL FROM ALL AREAS TO BE DISTURBED, SHALL BE STRIPPED PRIOR TO CONSTRUCTION AND STOCKPILED IN A DESIGNATED AREA. TOPSOIL SHALL BE STOCKPILED IN WINDROWS OUTSIDE OF MAJOR FLOW AREAS.
 6. POSSIBLE DURING DEVELOPMENT.
 7. ALL TAIL-OUT DRAINS SHALL BE GRAVELLED AND TRAPEZOIDAL IN SECTION. TYPICAL BATTERS SHALL BE 1:1. ALL DRAINAGE AREAS SHALL BE REVEGETATED AS SOON AS THE RELEVANT WORKS ARE COMPLETED. TOPSOIL SHALL BE AMPLORATED AND COMPOSTED TO LANDSCAPE RELEVANT SPECIFICATIONS. SHALL WHERE SHOWN, TO PREVENT WATER FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE. IF THE LOCATION OF INLET FILTERS ARE NOT SHOWN ON THE PLAN THEIR LOCATION SHALL BE AT THE DISCRETION OF THE SUPERVISOR.
- STOCKPILES**
10. SPOIL AND TOPSOIL STOCKPILES SHALL BE LOCATED NO CLOSER THAN 2m TO STOCKPILES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
 11. STOCKPILES ARE TO BE IN PLACE FOR LONGER THAN 10 DAYS THEN THEY SHALL BE STRIPPED BY COVERING WITH MULCH OR WITH HERBICIDE VEGETATION. HAVE BATTER SLOPES NO STEEPER THAN 1 IN 2. AN EARTH BANK SHALL BE INSTALLED ALONG THE DOWN-SLOPE SIDE ON ANY STOCKPILE.

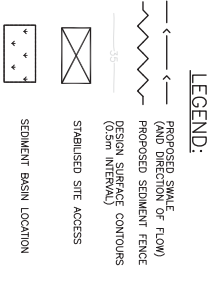
- MAINTENANCE**
13. ALL SEDIMENT BASINS AND TRAPS SHALL BE CLEANED WHEN THE STRUCTURES ARE MAINTENANCE PERIOD AND DISPOSED OF IN A MANNER THAT PREVENTS FURTHER POLLUTION OF THE SITE.
 14. TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES WILL BE REMOVED UNTIL THE CONTRACTOR WILL INSPECT THE SITE AT LEAST WEEKLY OR AFTER ANY STORM EVENT AND WILL DRAINS OPERATE PROPERLY AND TO ERECT ANY NECESSARY REPAIRS THAT DRAINS OPERATE PROPERLY AND TO ERECT ANY NECESSARY REPAIRS.
 15. REMOVE SPILLED SAND OR OTHER MATERIALS FROM HAZARD AREAS (E.G. LANDS CLOSER THAN FIVE METRES FROM AREAS OF LIKELY CONCENTRATED OR HIGH FLOW). REMOVE TAGGED SEDIMENT WHENEVER LESS THAN DESIGN CAPACITY REMAINS WITHIN THE STRUCTURE.

- SEQUENCE OF WORKS:**
1. CONSTRUCT EARTHWORKS MANAGEMENT MEASURES AS DETAILED.
 2. CONSTRUCT DRAINAGE STRUCTURES
 3. CONSTRUCT FENCES AND REMOVE MANAGEMENT DEVICES.
 4. CONSTRUCT SEDIMENT BASINS AND CONSTRUCT AS OSD BASINS AS PER DETAILED DESIGN.
 5. CLEAN SEDIMENT BASINS AND CONSTRUCT AS OSD BASINS AS PER DETAILED DESIGN.
- OTHER:**
1. SEDIMENT BASINS TO BE CONSTRUCTED AT COMMENCEMENT OF PROJECT AND USED AS SEDIMENT BASINS UNTIL CONSTRUCTION OF OPERATIONAL AREA IS COMPLETE.
 2. SEDIMENT BASINS TO BE COVERED TO OSD AT THE COMPLETION OF CONSTRUCTION.
 3. MAIN BUNDLES AROUND SITE TO BE FORMED AT COMMENCEMENT OF EARTHWORKS.
 4. ALL SITE SEDIMENT AND EROSION CONTROL MEASURES TO BE REVIEWED AS EARTHWORKS PROCEED.

LAND USE	LIMITATIONS	COMMENTS
CONSTRUCTION AREAS	DISTURBANCE SHALL NOT EXCEED 10 METRES FROM THE EDGE OF ANY ESSENTIAL ENGINEERING ACTIVITY AS SHOWN ON THE PLAN	ALL SITE WORKERS SHALL WEAR CLEARLY RECOGNISABLE HIGH VIZ VESTS AND IDENTIFIED WITH BARRIER FENCING (UPLOUSE) AND SEDIMENT FENCING (DOWNSLOPE) OR SIMILAR MATERIALS
ACCESS AREAS	LIMITED TO A MAXIMUM WIDTH OF TEN (10) METRES	THE SITE MANAGER WILL DETERMINE AND MARK BOUNDARIES THAT WHERE APPROPRIATE, ARE MARKED WITH OR SIMILAR MATERIALS.



- SEDIMENT FENCE CONSTRUCTION NOTES**
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE BOUNDARIES 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 PREVENT OVERFLOW OF THE TRENCH.
 2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM DRAINAGE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY DANGER-SUPPORTING GEOTEXILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXILE SPECIFICALLY PRODUCED FOR CONSTRUCTION OF SEDIMENT FENCES.
 3. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
 4. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXILE.



ISSUE	REVISION	BY	CKD	DATE	ISSUE	REVISION	BY	CKD	DATE
A									

DEVELOPMENT PROPOSED	CONSD DESIGN	SCALE: 1:2000	CENT
198 CLIENT ADDRESS: 1000 BIRCHWOOD RD, BIRCHWOOD NSW 2315	DATE: NOV 2008	198 CLIENT ADDRESS: 1000 BIRCHWOOD RD, BIRCHWOOD NSW 2315	198 CLIENT ADDRESS: 1000 BIRCHWOOD RD, BIRCHWOOD NSW 2315
DATE: NOV 2008	DESIGNED BY	CHECKED BY	DATE: NOV 2008
DATE: NOV 2008	DATE: NOV 2008	DATE: NOV 2008	DATE: NOV 2008

PROJECT NAME	PROJECT NO.	PROJECT DATE
STORMWATER MANAGEMENT PLAN	EROSION AND SEDIMENT CONTROL PLAN	EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.	PROJECT DATE
P03	3 OF 3

APPENDIX B

Blue Book calculations

SWMP Commentary, Detailed Calculations

Note: These "Detailed Calculation" spreadsheets relate only to high erosion hazard lands as identified in figure 4.6 or where the designer chooses to use the RUSLE to size sediment basins. The "Standard Calculation" spreadsheets should be used on low erosion hazard lands as identified by figure 4.6 and where the designer chooses not to run the RUSLE in calculations.

1. Site Data Sheet

Site Name: Light Horse Business Centre

Site Location: Blacktown City Council

Precinct: Eastern Creek

Description of Site: Quarry pit, steep walls w likely low sediment yield now, require clean water run-on capture from intermediate capped landfill area & wall runoff where nec to reduce leachate generation

Site area	Site						Remarks
Total catchment area (ha)	26.5						
Disturbed catchment area (ha)	26.5						

Soil analysis

% sand (fraction 0.02 to 2.00 mm)	10						Soil texture should be assessed through mechanical dispersion only. Dispersing agents (e.g. Calgon) should not be used
% silt (fraction 0.002 to 0.02 mm)	20						
% clay (fraction finer than 0.002 mm)	70						
Dispersion percentage	30.0						E.g. enter 10 for dispersion of 10%
% of whole soil dispersible	24						See Section 6.3.3(e)
Soil Texture Group	D						See Section 6.3.3(c), (d) and (e)

Rainfall data

Design rainfall depth (days)	5						See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	80						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	25						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	10.1						See IFD chart for the site

RUSLE Factors

Rainfall erosivity (<i>R</i> -factor)	2250						Automatic calculation from above data
Soil erodibility (<i>K</i> -factor)	0.038						RUSLE data can be obtained from Appendixes A, B and C
Slope length (m)	100						
Slope gradient (%)	5						
Length/gradient (<i>LS</i> -factor)	1.35						
Erosion control practice (<i>P</i> -factor)	1.3	1.3	1.3	1.3	1.3	1.3	
Ground cover (<i>C</i> -factor)	1	1	1	1	1	1	

Calculations

Soil loss (t/ha/yr)	150						
Soil Loss Class	1						See Section 4.4.2(b)
Soil loss (m ³ /ha/yr)	115						
Sediment basin storage volume, m ³	520						See Sections 6.3.4(i) and 6.3.5 (e)

SWMP Commentary, Detailed Calculations

2. Storm Flow Calculations

Peak flow is given by the Rational Formula:

$$Q_y = 0.00278 \times C_{10} \times F_y \times I_{y,tc} \times A$$

- where:
- Q_y is peak flow rate (m³/sec) of average recurrence interval (ARI) of "Y" years
 - C_{10} is the runoff coefficient (dimensionless) for ARI of 10 years. Rural runoff coefficients are given in Volume 2, figure 5 of Pilgrim (1998), while urban runoff coefficients are given in Volume 1, Book VIII, figure 1.13 of Pilgrim (1998) and construction runoff coefficients are given in Appendix F
 - F_y is a frequency factor for "Y" years. Rural values are given in Volume 1, Book IV, Table 1.1 of Pilgrim (1998) while urban coefficients are given in Volume 1, Book VIII, Table 1.6 of Pilgrim (1998)
 - A is the catchment area in hectares (ha)
 - $I_{y,tc}$ is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration (t_c) = $0.76 \times (A/100)^{0.38}$ hrs (Volume 1, Book IV of Pilgrim, 1998)

Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent.

Peak flow calculations, 1

Site	A (ha)	tc (mins)	Rainfall intensity, I, mm/hr						C_{10}
			1 _{yr,tc}	5 _{yr,tc}	10 _{yr,tc}	20 _{yr,tc}	50 _{yr,tc}	100 _{yr,tc}	
	26.5	28	36.2	60	68	78	91	101	0.85

Peak flow calculations, 2

ARI (yrs)	Frequency factor (F_y)	Peak flows						Comment
		(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	5 (m ³ /s)	(m ³ /s)	
1 yr,tc	0.8	1.813						Page B-11 DCC Eng guidelines for development
5 yr,tc	0.95	3.569						
10 yr,tc	1	4.258						
20 yr,tc	1.05	5.129						
50 yr,tc	1.15	6.553						
100 yr,tc	1.2	7.589						

SWMP Commentary, Detailed Calculations

4. Volume of Sediment Basins, *Type D* and *Type F* Soils

Basin volume = settling zone volume + sediment storage zone volume

Settling Zone Volume

The settling zone volume for *Type F* and *Type D* soils is calculated to provide capacity to contain all runoff expected from up to the y-percentile rainfall event. The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle and can be determined by the following equation:

$$V = 10 \times C_v \times A \times R_{x\text{-day, } y\text{-}\%ile} \text{ (m}^3\text{)}$$

where:

10 = a unit conversion factor

C_v = the volumetric runoff coefficient defined as that portion of rainfall that runs off as stormwater over the x-day period

$R_{x\text{-day, } y\text{-}\%ile}$ = is the x-day total rainfall depth (mm) that is not exceeded in y percent of rainfall events. (See Sections 6.3.4(d), (e), (f), (g) and (h)).

A = total catchment area (ha)

Sediment Storage Zone Volume

In the detailed calculation on Soil Loss Classes 1 to 4 lands, the sediment storage zone can be taken as 50 percent of the settling zone capacity. Alternately designers can design the zone to store the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(ii)). However, on Soil Loss Classes 5, 6 and 7 lands, the zone must contain the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(iii)).

Place an "X" in the box below to show the sediment storage zone design parameters used here

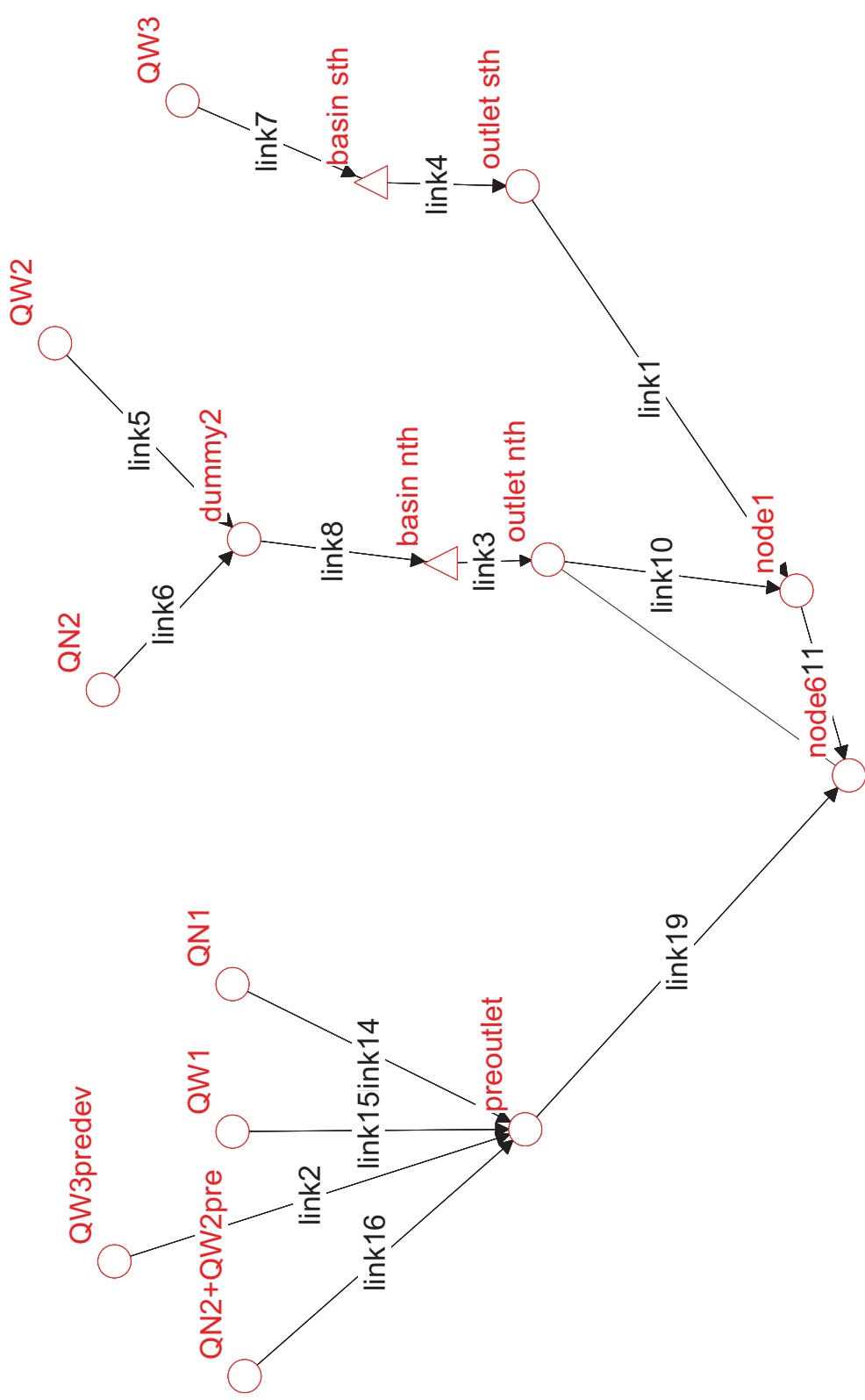
	50% of settling zone capacity,
X	2 months soil loss calculated by RUSLE

Total Basin Volume

Site	C_v	$R_{x\text{-day, } y\text{-}\%ile}$	Total catchment area (ha)	Settling zone volume (m ³)	Sediment storage volume (m ³)	Total basin volume (m ³)
	0.58	25	26.5	3842.5	520	4362.5

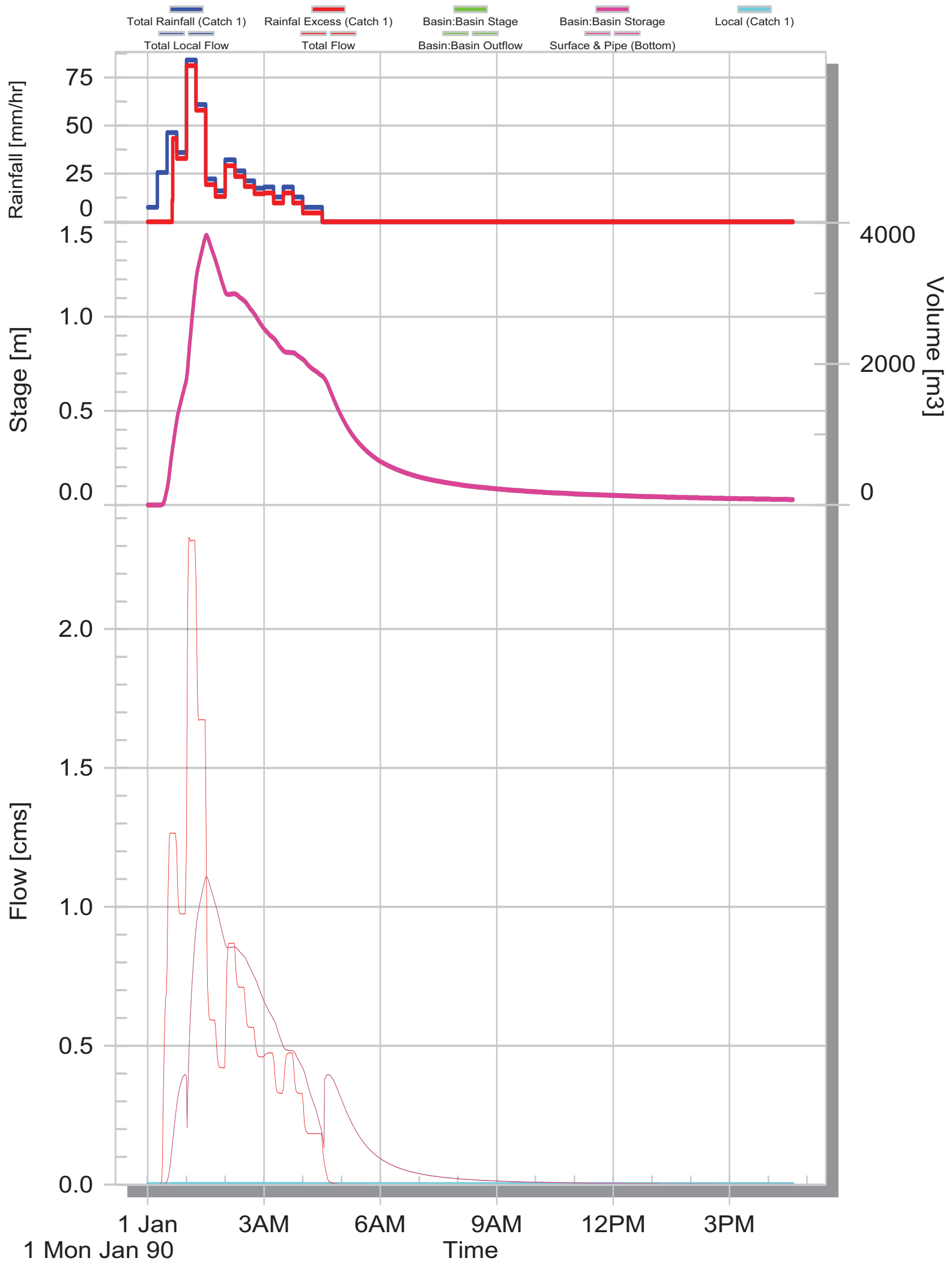
APPENDIX C

Model outcomes – RAFTS



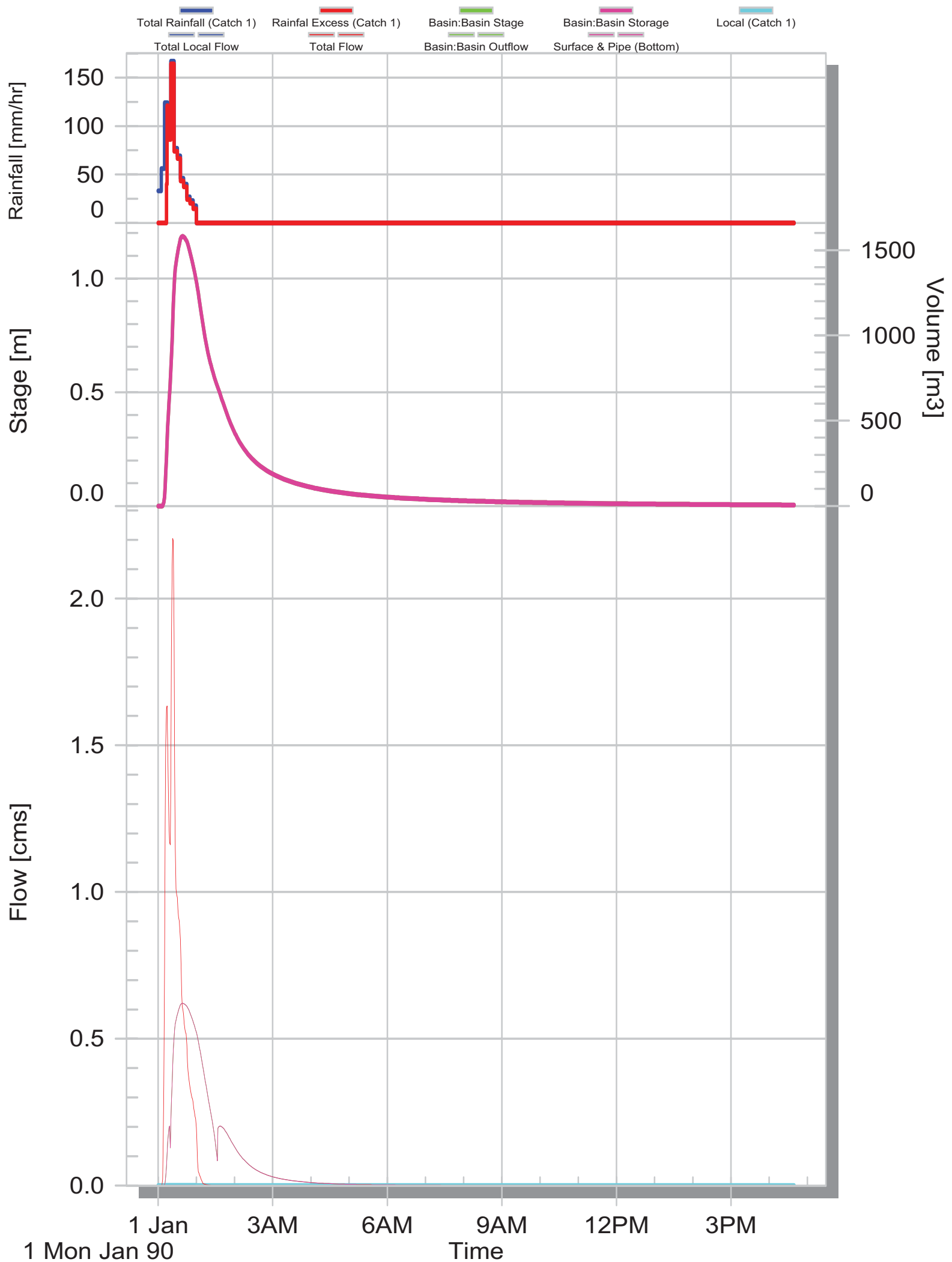
basin 1

Max - Basin:Basin Stage[1.434] Basin:Basin Storage[3825.2] Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[2.331]



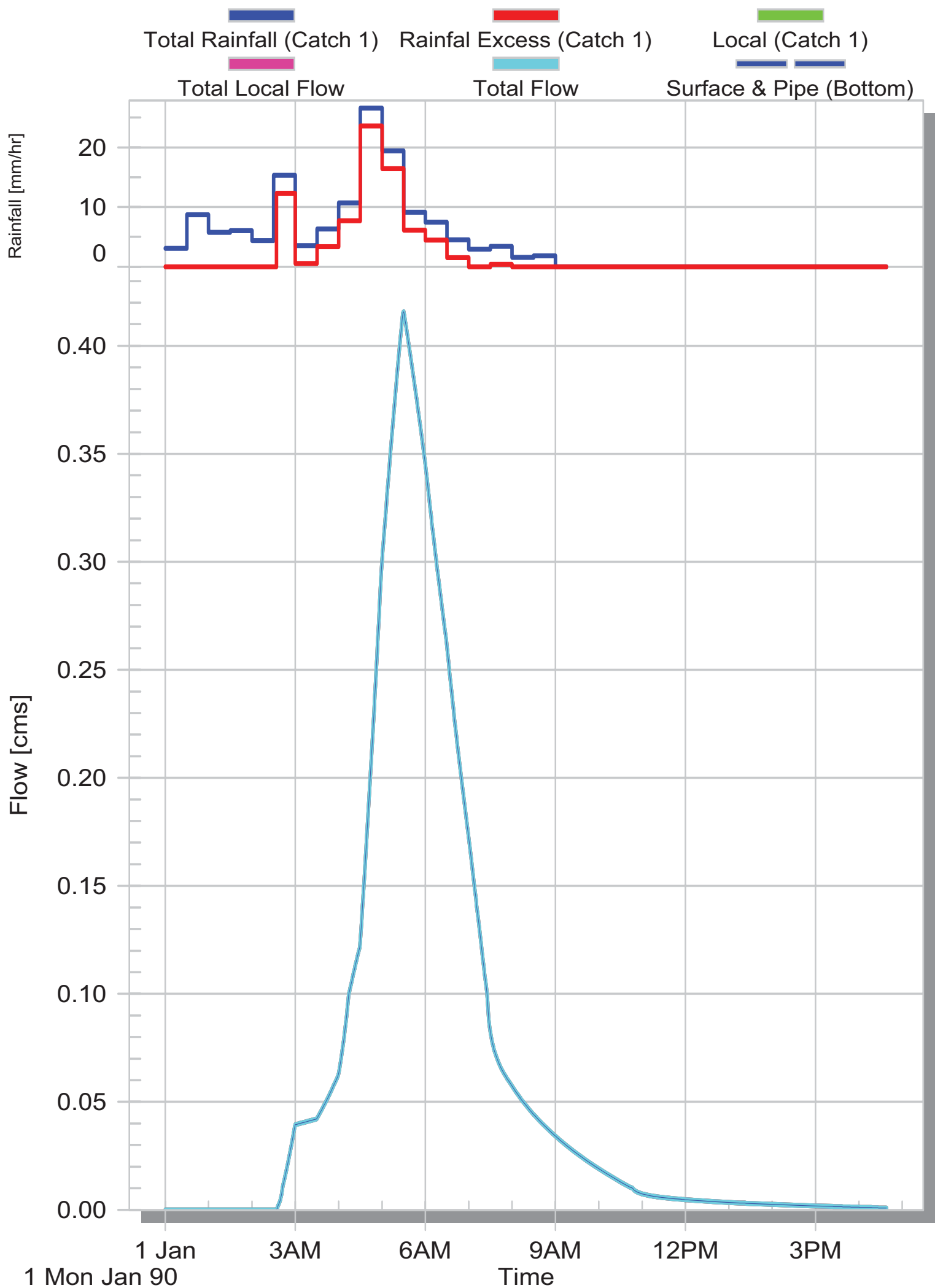
basin 2

Max - Basin:Basin Stage[1.186] Basin:Basin Storage[1580.7] Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[2.205]



Basin 1 catchment pre-dev 2-yr

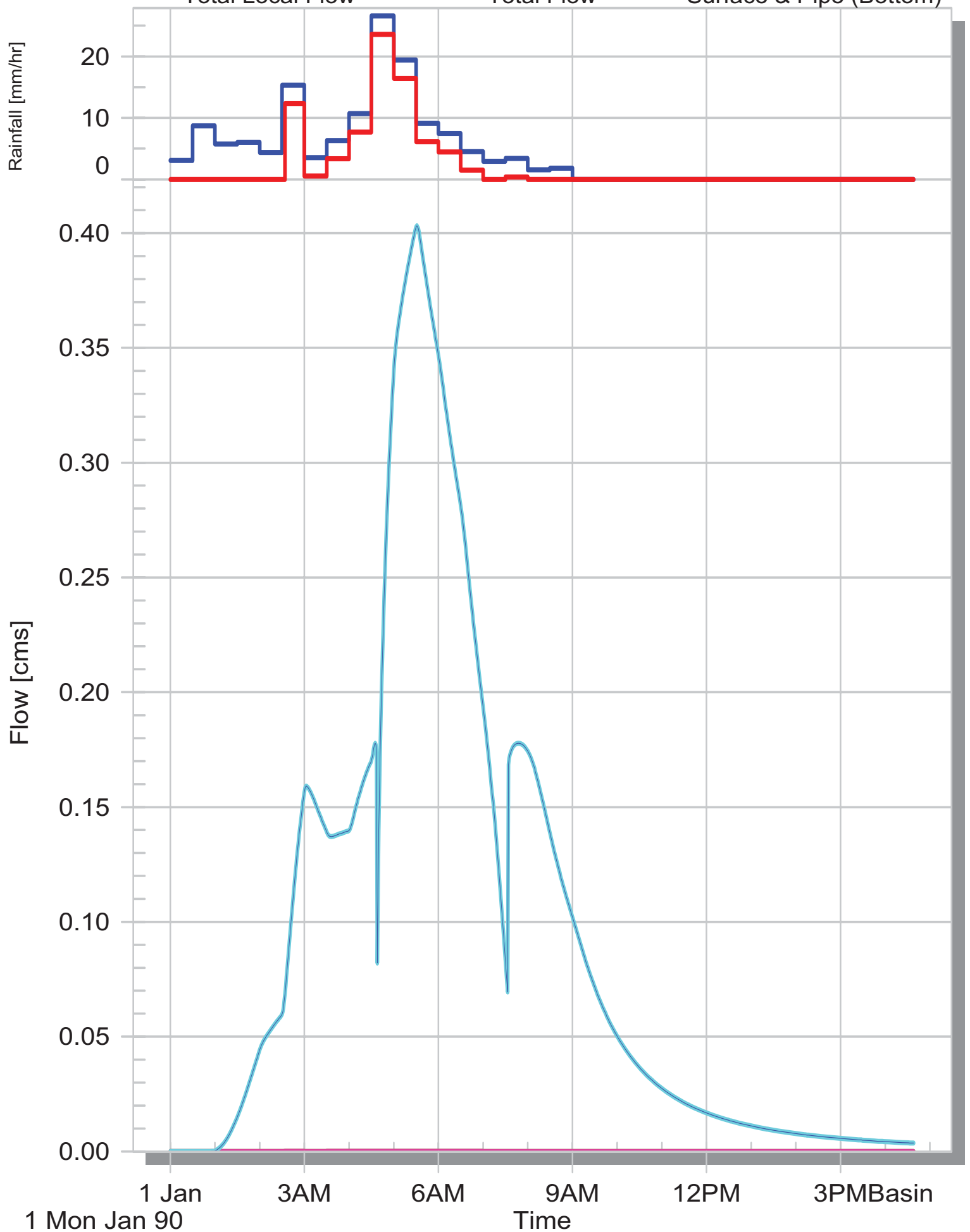
Max - Local (Catch 1)[0.416] Total Local Flow[0.416] Total Flow[0.416]



Basin 1 catchment postdev 2-yr

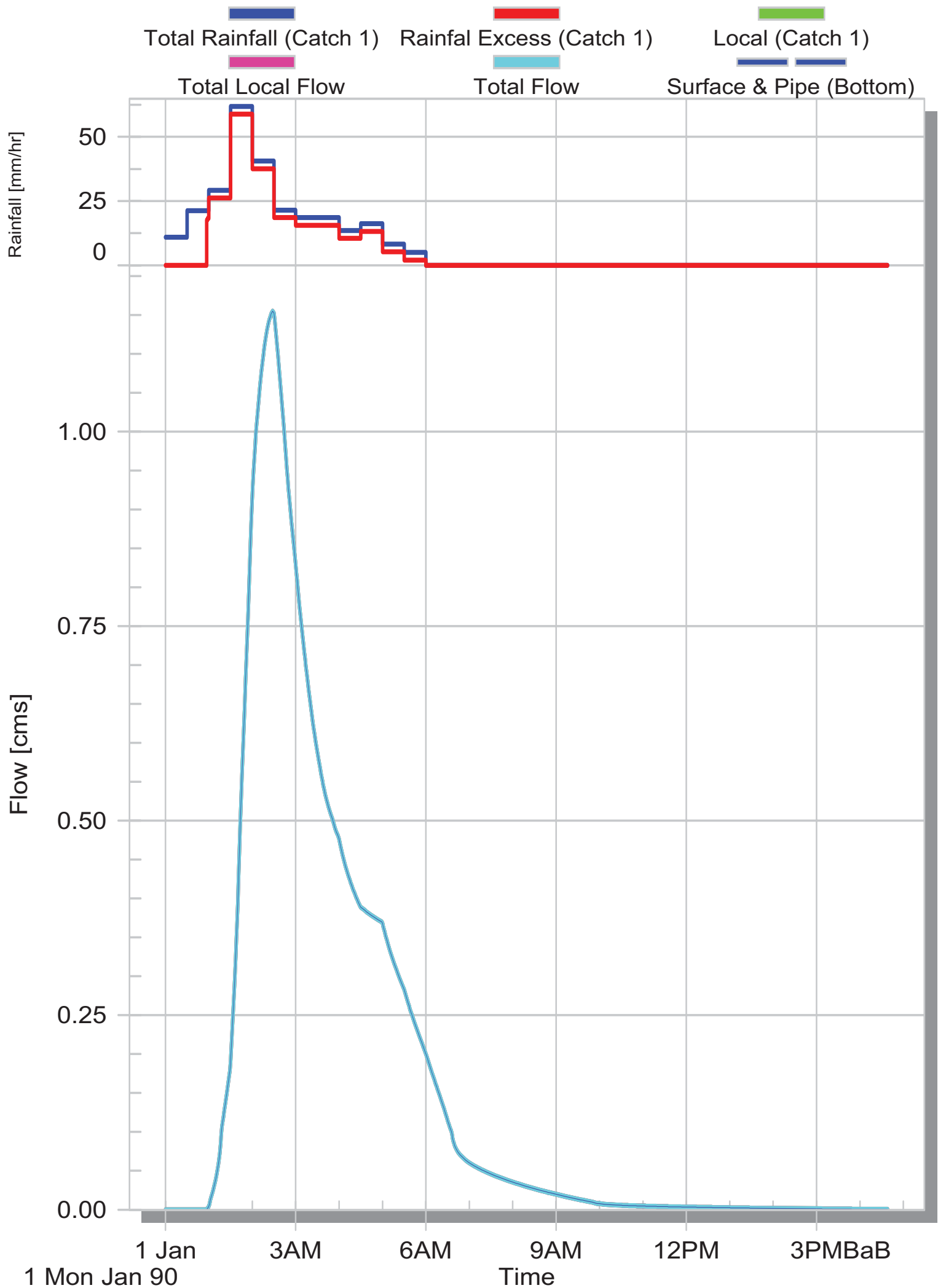
Max - Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[0.403]

Total Rainfall (Catch 1) Rainfal Excess (Catch 1) Local (Catch 1)
Total Local Flow Total Flow Surface & Pipe (Bottom)



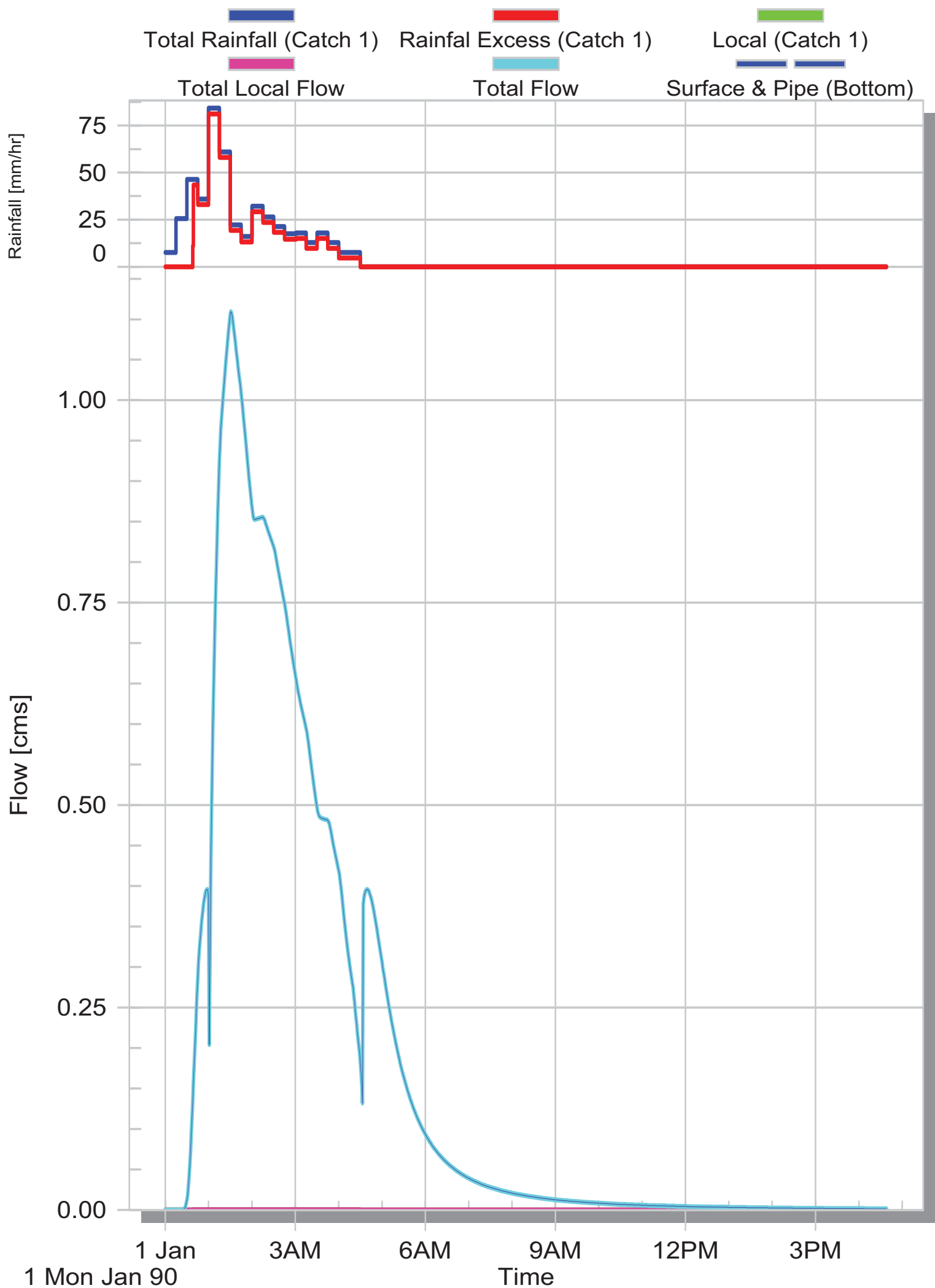
Basin 1 predev catchment 100-yr

Max - Local (Catch 1)[1.156] Total Local Flow[1.156] Total Flow[1.156]



Basin 1 catchment postdev 100-yr

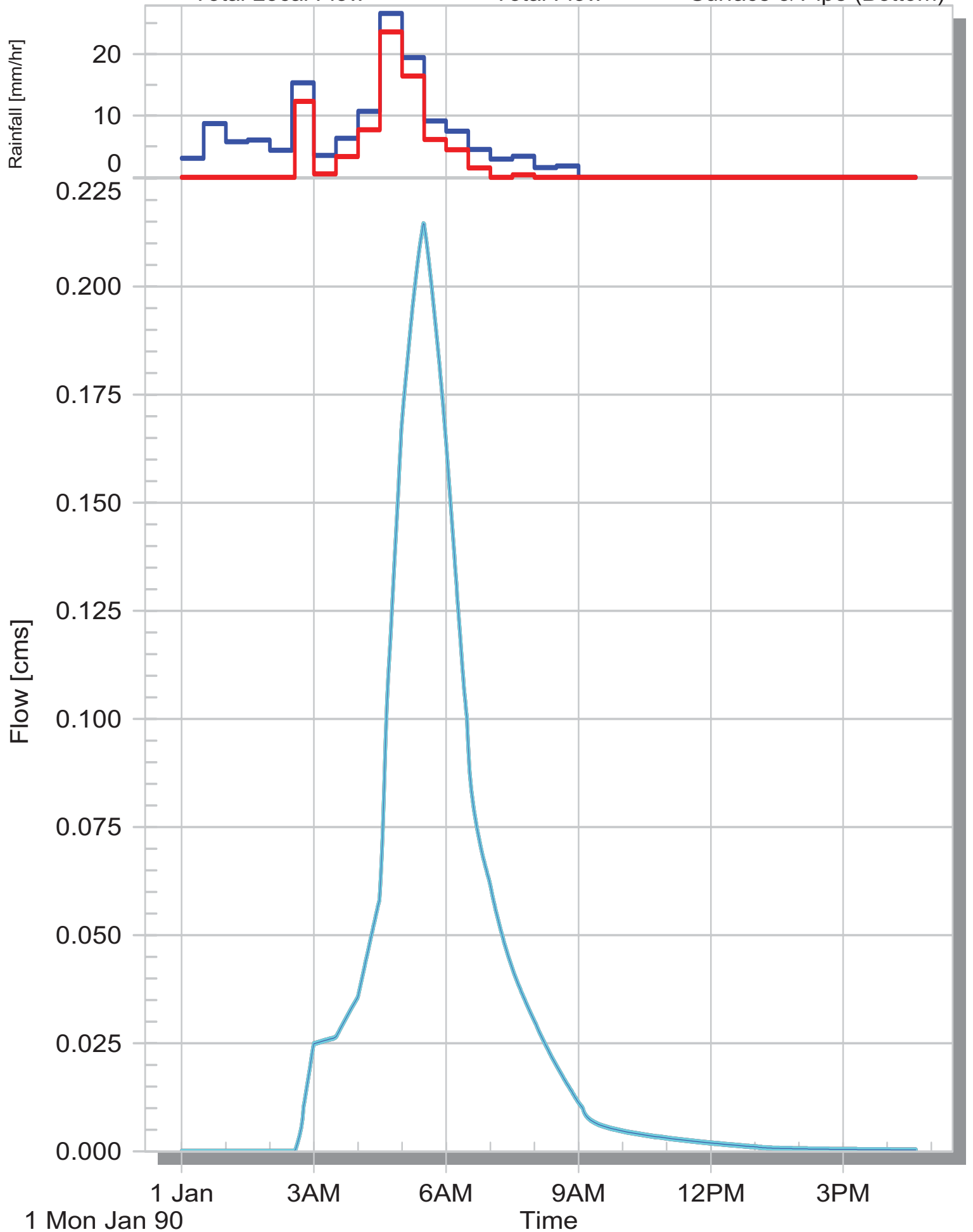
Max - Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[1.110]



Basin 2 catchment predev, 2-yr

Max - Local (Catch 1)[0.215] Total Local Flow[0.215] Total Flow[0.215]

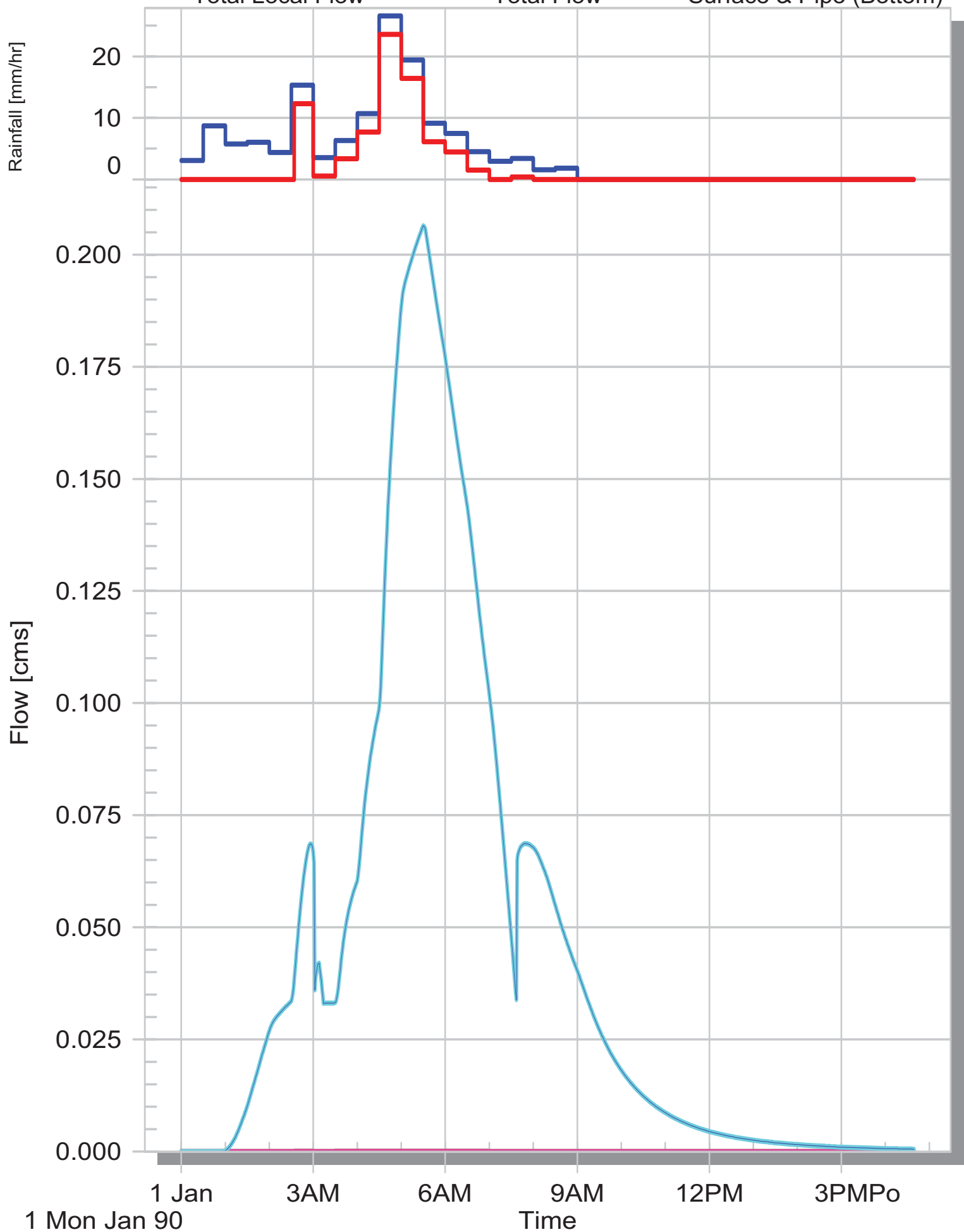
Total Rainfall (Catch 1) Rainfal Excess (Catch 1) Local (Catch 1)
Total Local Flow Total Flow Surface & Pipe (Bottom)



Basin 2 catchment postdev, 2-yr

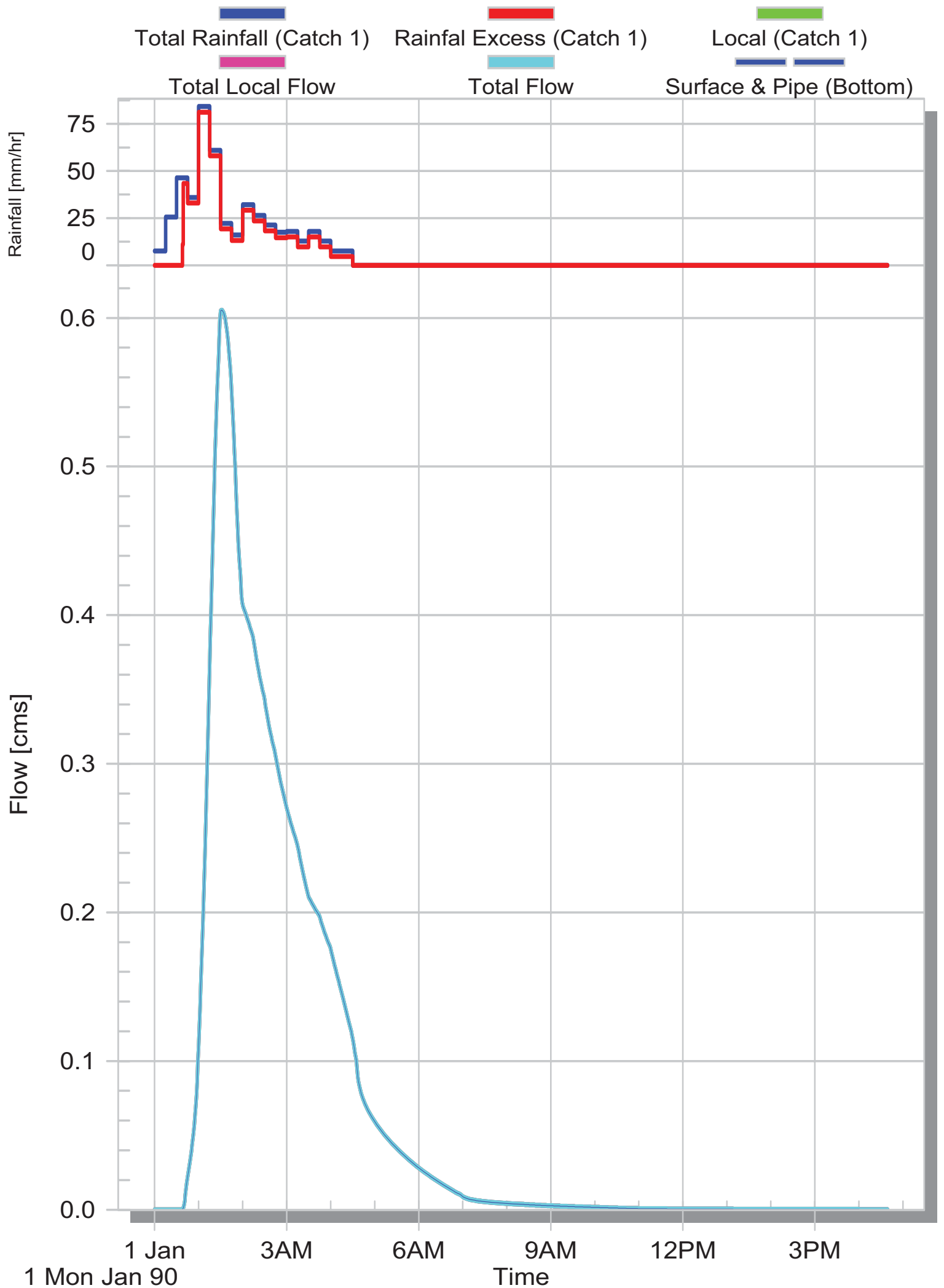
Max - Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[0.206]

Total Rainfall (Catch 1) Rainfal Excess (Catch 1) Local (Catch 1)
Total Local Flow Total Flow Surface & Pipe (Bottom)



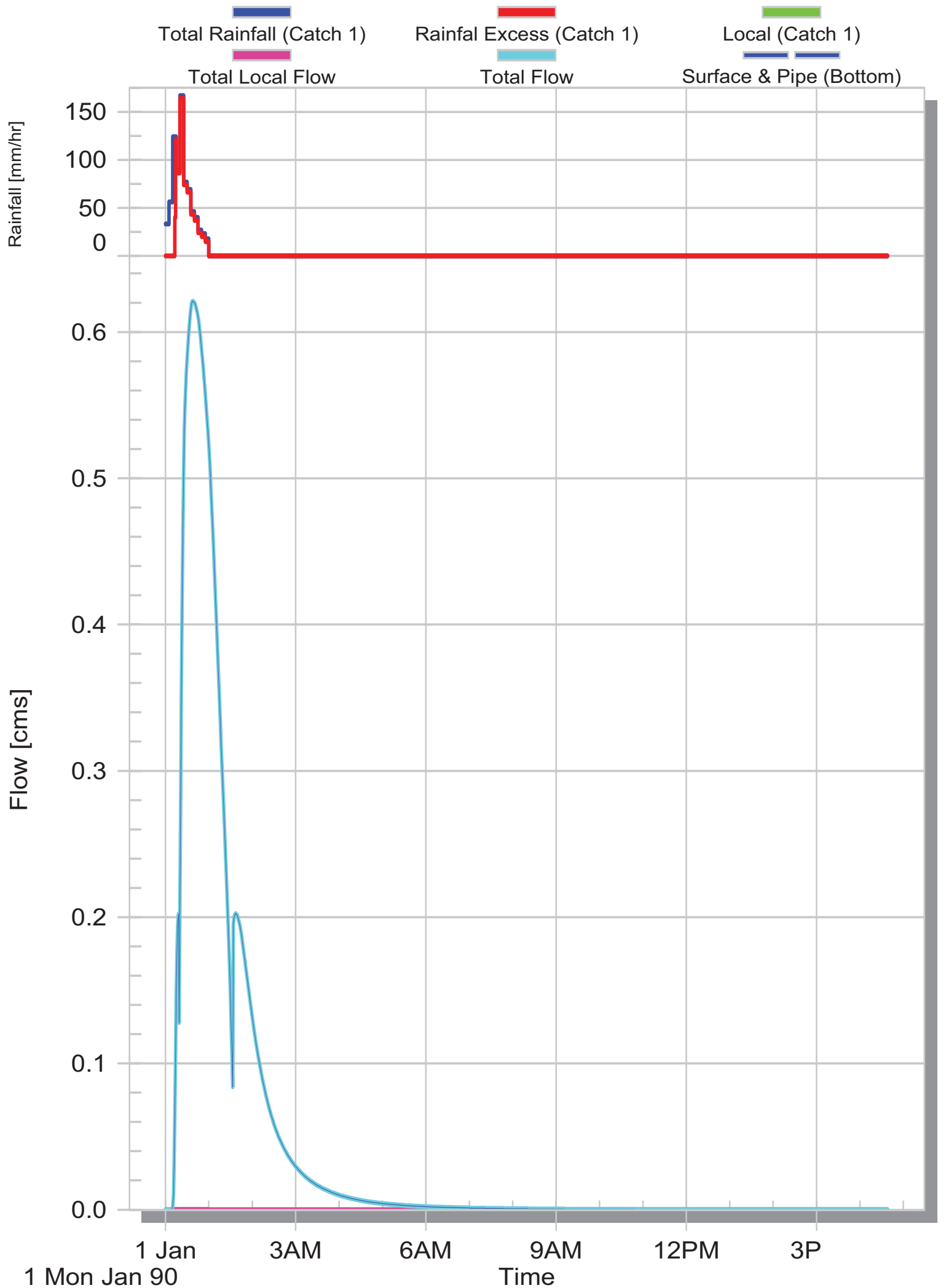
Basin 2 catchment predev 100-yr

Max - Local (Catch 1)[0.605] Total Local Flow[0.605] Total Flow[0.605]



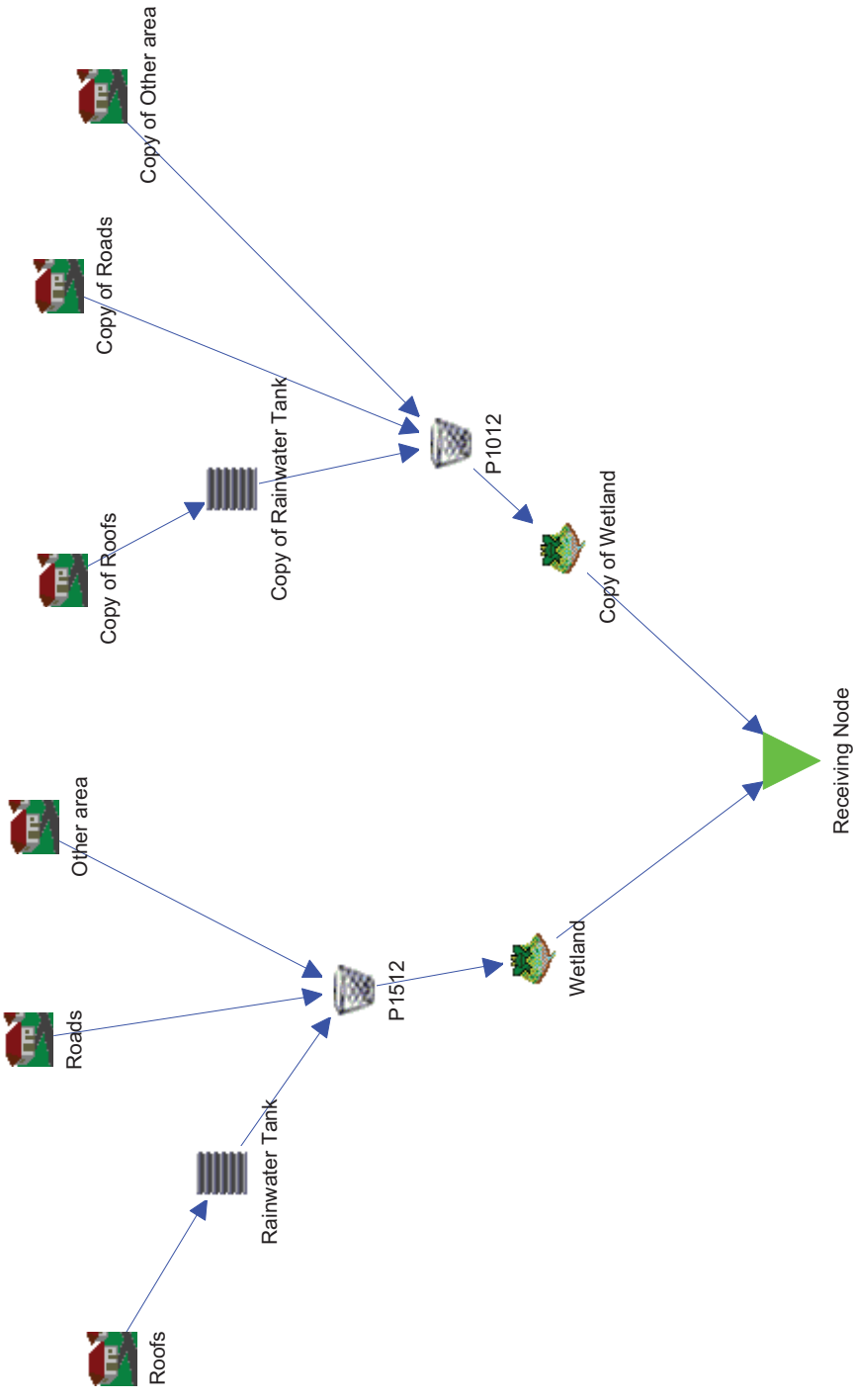
Basin 2 catchment postdev 100-yr

Max - Local (Catch 1)[0.000] Total Local Flow[0.000] Total Flow[0.621]



APPENDIX D

Model – MUSIC layout



**10 Attachment D – NSW Dam Safety Committee Advice
(2010)**

Megan Bowling

From: Charles Navaratne <charles@damsafety.nsw.gov.au>
Sent: Thursday, 16 June 2011 1:02 PM
To: Jacqueline Brauman
Subject: RE: D1 Form

Hi Jackie,

As per your data, the OSD's are located below ground level.
Hence DSC would not prescribe them.

Regards

Charles Navaratne
Small Dams Engineer
NSW Dams Safety Committee
Level 3, 10 Valentine Av.
Parramatta NSW 2150

Phone 02-98957848
Fax 02-98957354

From: Jacqueline Brauman [<mailto:JacquelineBrauman@dadi.com.au>]
Sent: Thursday, 16 June 2011 12:29 PM
To: charles@damsafety.nsw.gov.au
Subject: FW: D1 Form

Hi Charles,

Further to our telephone conversation earlier this morning about OSD sizes at Eastern Creek, I have attached a D1 form and drawings for each OSD.

I have also attached the Blacktown Council's Concept Masterplan with crosses marking the OSD locations. The natural slope is to the west.

I would be pleased if you could advise immediately whether the OSDs need to be prescribed.

Thanks for your help.

Regards,

Jacqueline Brauman | Solicitor
Dial A Dump Industries | Keeping Australia Clean | 32 Burrows Road Alexandria NSW 2015
Contact | **P:** (02) 9519-9999 | **F:** (02) 9516-5559 | **W:** www.dadi.com.au

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From: Charles Navaratne [<mailto:charles@damsafety.nsw.gov.au>]
Sent: Tuesday, 30 March 2010 3:05 PM
To: Steve Baxter
Subject: RE: D1 Form

Hi Steve,

11 Attachment E – DRAINS Catchment Plan



KEY:

CATCHMENT ID
(AREA #) (HHA)

PRE DEVELOPMENT CATCHMENT
IDENTIFICATION AND AREA

CATCHMENT BOUNDARY

CATCHMENT BOUNDARY

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martens
 807 NSW Road
 Homebush, NSW 1588
 Phone: (02) 9476 9999
 Email: info@martens.com.au
 Internet: http://www.martens.com.au

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 Hydraulic - Wastewater Engineers

CLIENT
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 All measurements in mm unless otherwise specified.

TITLE
PRE DEVELOPMENT CATCHMENT PLAN - LIGHT HORSE BUSINESS PARK, EASTERN CREEK, NSW

PROJECT NUMBER
 PH0802009V3

DESIGNED: SL
 DRAWN: SL
 REVIEWED: AN

DATE: 19/07/2011
 DATE: 20/09/2011
 DATE: 21/09/2011

REV.	DESCRIPTION	DATE	ISSUED
1	ATTACHMENT OF CONSOLIDATED STORMWATER MANAGEMENT PLAN	19/07/2011	SL
2	FINAL CONSOLIDATED STORMWATER MANAGEMENT PLAN	20/09/2011	AN
3	AMENDED FINAL CONSOLIDATED STORMWATER MANAGEMENT PLAN	21/09/2011	AN

PAGE BAR SCALE
 0 30 60 90 120 150
 METRES
 UNITS - METRES
 SCALE - 1:1500 @ A1 1:3000 @ A3

CATCHMENT NORTH (A)
 10.67 HA

CATCHMENT SOUTH (A)
 8.68 HA





1.4 HA ADDITIONAL CATCHMENT

0.4 HA REDUCTION IN CATCHMENT

NORTH STOCKPILE CAT
(AREA = 4.27 HA)

NORTH OPERATIONAL CAT
(AREA = 3.90HA)

NORTH OSD CAT
(AREA = 2.17 HA)

BYPASS CATCHMENT

UNCHANGED BY

DEVELOPMENT

SOUTH OSD CAT
(AREA = 3.47HA)

SOUTH OPERATIONAL CAT
(AREA = 5.63HA)

0.06 HA ADDITIONAL CATCHMENT

KEY:

- CATCHMENT ID (AREA = ##HA)
- POST DEVELOPMENT CATCHMENT IDENTIFICATION AND AREA
- CATCHMENT BOUNDARY
- ADDITIONAL CATCHMENT AREA
- REDUCTION IN CATCHMENT AREA

MARTENS & ASSOCIATES PTY LTD
Sustainable Solutions
 Environmental - Geotechnical - Civil
 Hydraulic - Wastewater Engineers

807 NSW 2007
 Phone: (02) 9476 9999
 Email: info@martens.com.au
 Internet: http://www.martens.com.au

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TITLE: OSD CATCHMENT PLAN - LIGHT HORSE BUSINESS PARK, EASTERN CREEK, NSW

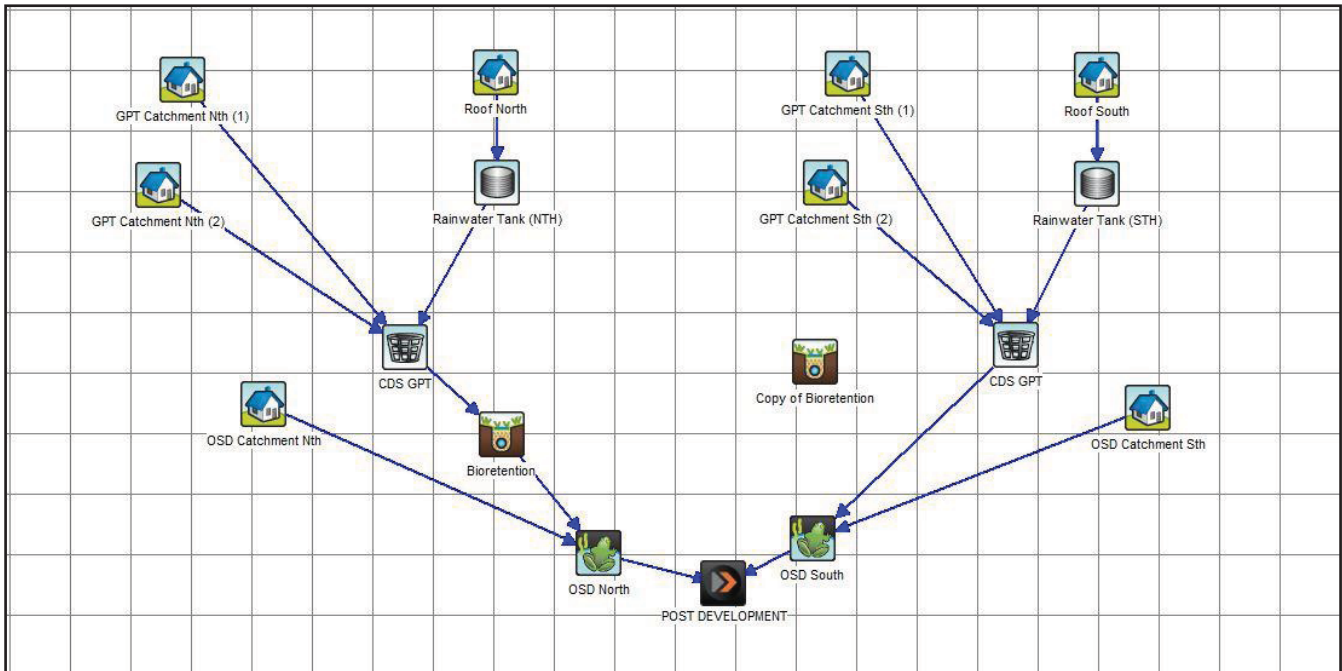
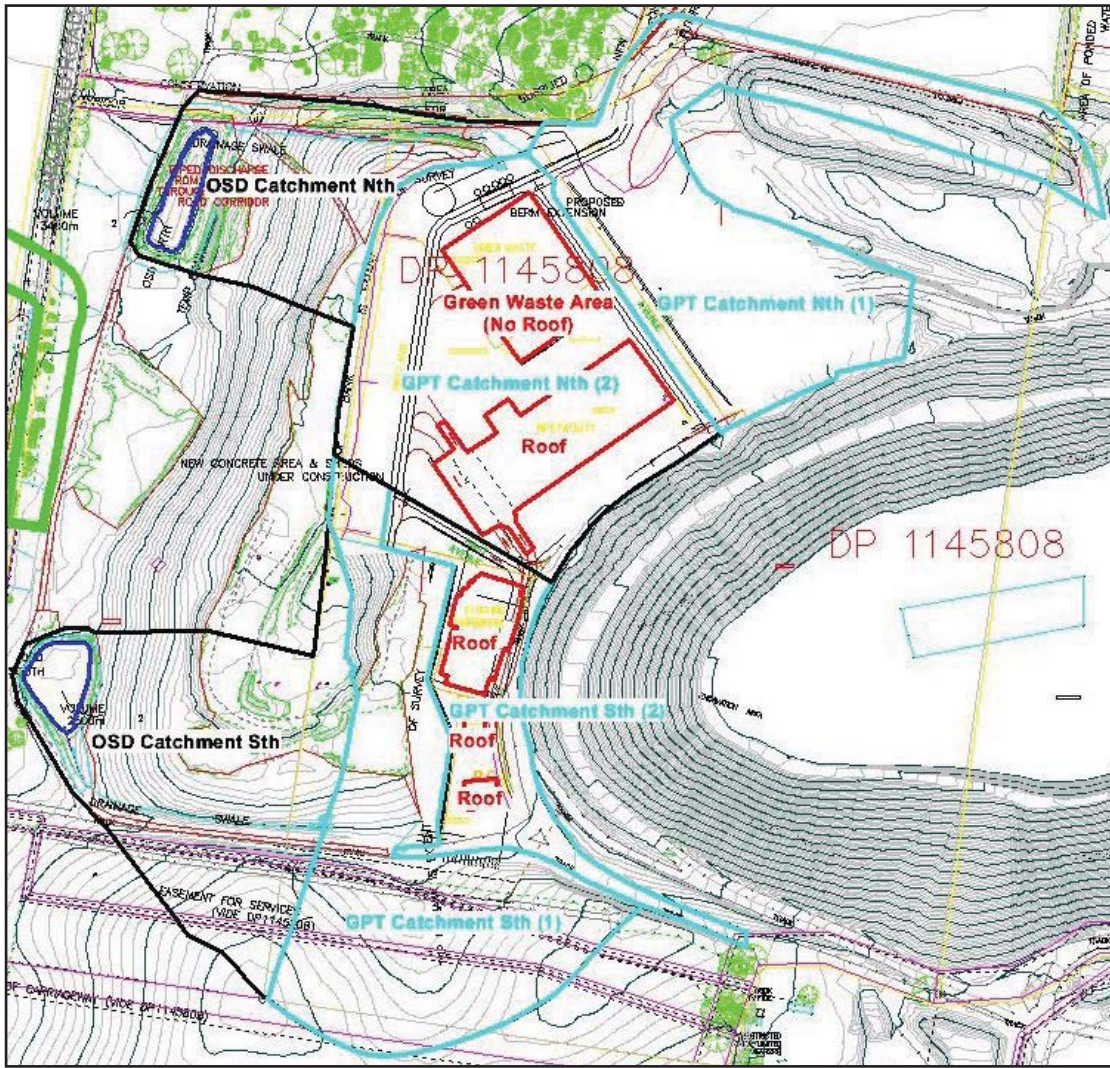
DESIGNED:	SL
DRAWN:	SL
REVIEWED:	AN

SHEET:	2
OF 2 SHEETS	
PAPER SIZE:	A1/A3

REV:	DESCRIPTION	DATE	ISSUED
1	ATTACHMENT OF CONSOLIDATED STORMWATER MANAGEMENT PLAN	19/07/2011	SL
2	FINAL CONSOLIDATED STORMWATER MANAGEMENT PLAN	22/09/2011	AN
3	AMENDED FINAL CONSOLIDATED STORMWATER MANAGEMENT PLAN	21/09/2011	AN

PAGE BAR SCALE
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 METRES
 UNITS - METRES
 SCALE - 1:500 @ A1 1:300 @ A3

12 Attachment F – MUSIC Model Layout



Martens & Associates Pty Ltd ABN 85 070 240 890

Environment | Water | Wastewater | Geotechnical | Civil | Management

Drawn: MLB
 Approved: AN
 Date: 26.10.2011
 Scale: NA

MUSIC Model Catchments and Layout

FIGURE 1

Job No: P1103002

APPENDIX D

**AT & L**

ABN 96 130 882 405
Suite 702, 6A Glen Street
Milsons Point NSW 2060
Ph 02 8920 2466
Fax 02 9922 5102
info@atl.net.au
www.atl.net.au

20 June 2011

Dial A Dump Industries

32 Burrows Road
Alexandria NSW 2015

Your Ref:

Our Ref: L001-ATL 110618

Direct phone:

Attention **Jacqueline Brauman**

Dear Jacqueline

Further to your request AT&L have reviewed the as constructed earthworks levels of the northern pad which has been overfilled compared to the projected levels earlier indicated in the Hyder Consulting drawings in MP06_0139. We understand you have now lodged a S75W to the Department for this modification and through this process, Blacktown Council has made the following comment;

One significant change is the proposed general raising of levels along the M4 Motorway frontage. This has the potential to impact on the design of the proposed road along the M4 Motorway and a proposed stormwater detention basin to be provided under a s94 Contributions Plan and proposed in Council's adopted Precinct Plan for the Western Sydney Employment Lands. Details of how the proposed changes in fill height would impact on these proposed infrastructure items should be provided to Council to review prior to a determination being made.

We have reviewed the potential design impact and can make the following points;

1. The Hyder design levels were projections based upon the amount of material to be moved within the site during bulk earthworks to achieve sufficient flat compacted space for the construction of the project facilities (MPC)
2. The instructions upon which Hyder's projections were based made provision for the compaction of the moved fill material so as to avoid the necessity for later repetition of this work.
3. The Hyder design levels for the area to the north of the project allowed for considerable cross fall within the pad which ultimately would have been additionally filled (and compacted) to suit the future industrial use of that area.
4. The filling which has taken place in this area in excess of the level projected by Hyder has provided a near level pad which will minimise the future filling required in point 3
5. The Precinct Plan provides for the construction of a local Collector Road abutting the eastern boundary of the Conservation Area and then in an east west direction parallel with the M4 Motorway to connect to the adjoining land owned by Sumy Pty Ltd. This future road can be adequately accommodated and designed to suit the as constructed levels
6. The Precinct Plan foreshadows the future construction of a regional stormwater detention basin at or near the north eastern corner of the conservation area. The landowner has currently constructed a temporary sediment collection pond in this area during bulk earthworks. Any future basin could be located in this general area clear of the pad, future road and retained vegetation

7. Retaining walls will be required and would be located on the industrial lots, not within the future road reserve
8. Potentially a retaining wall along the M4 boundary may be required. RTA may allow the minor filling over the boundary to achieve this.
9. Stormwater management within the road reserve can be easily accommodated

In addition we have provided a typical section and plan, SKC12-P2, showing the relative level difference and width requirements of the proposed road. It also shows the potential retaining walls along with the filling that would have been required in the future to accommodate the industrial type industries that are expected.

We have undertaken a concept review of the design and in our professional opinion the future road and stormwater can be easily accommodated irrespective of the current as constructed levels of the northern pad. There are constraints which will need to be resolved during detail design although these constraints would have also needed to be resolved based on the approved Hyder Consulting Design.

We are currently meeting with Council regularly on a number of projects and would be happy to discuss this issue further should you wish.

Should you have any questions, please don't hesitate to contact the undersigned.

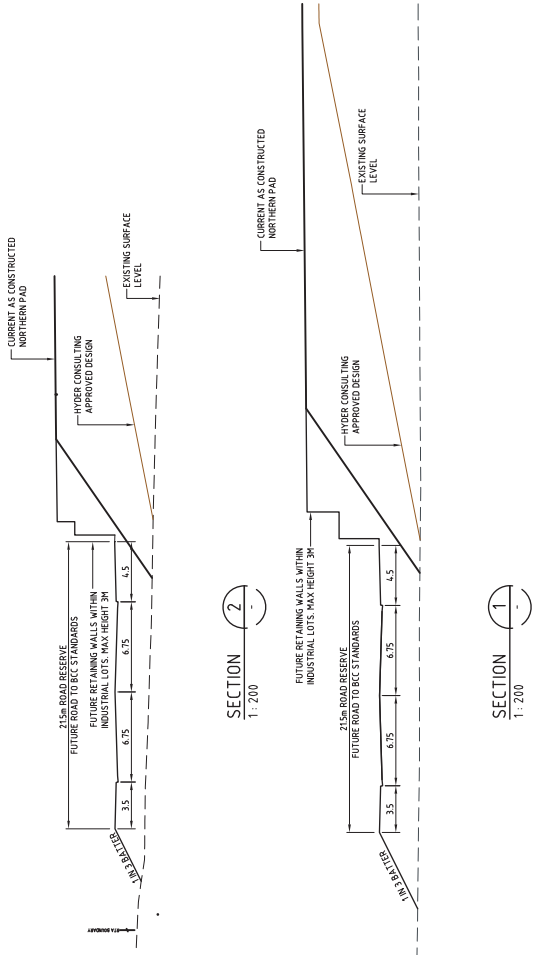
Yours sincerely



Anthony McLandsborough
Director – Civil Engineering
0433 973 423

AT & L

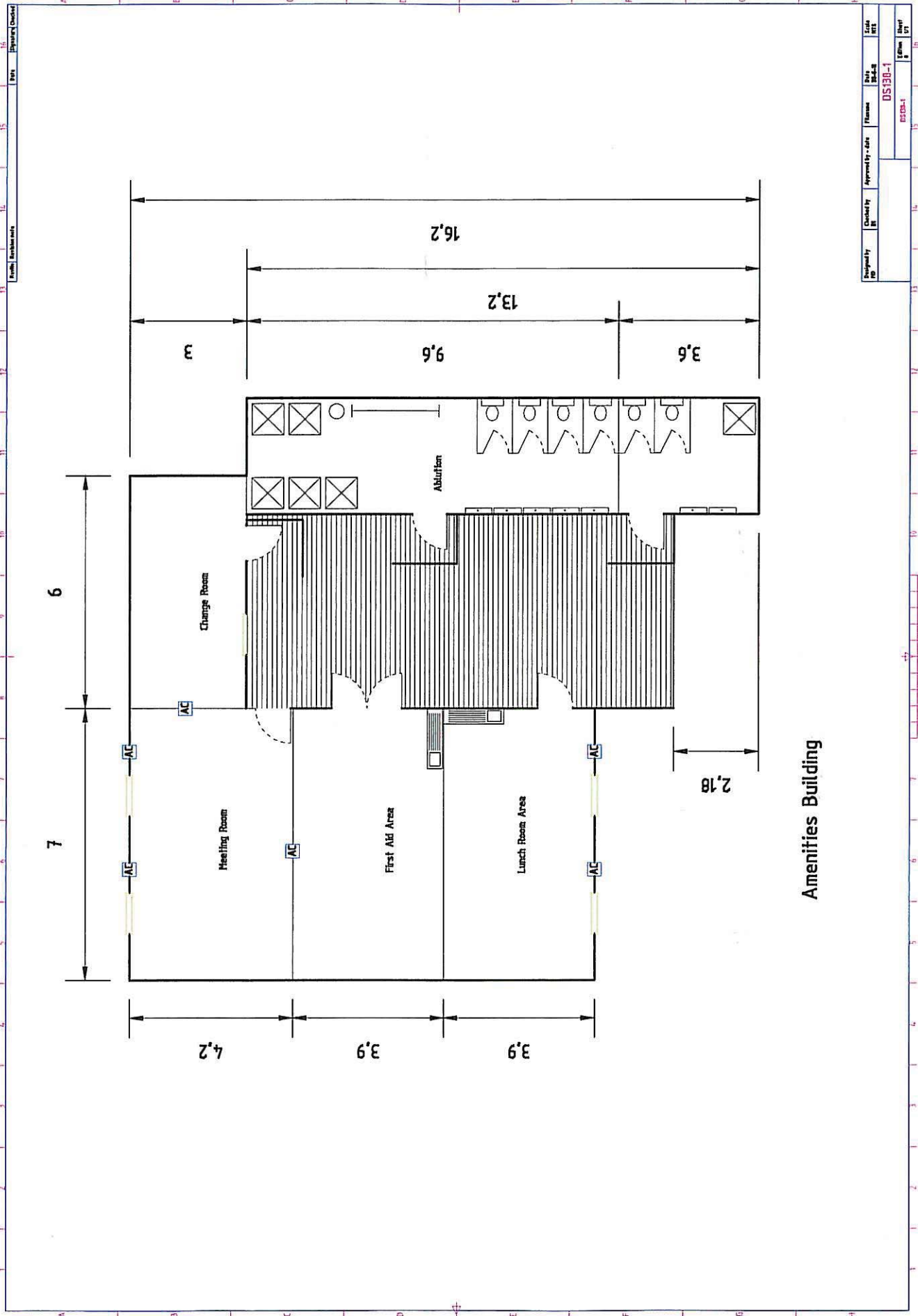
Enc AT&L 10-16 SKC12-P2



CMH Engineers and Project Managers Suite 7/20-24th Street Maitland NSW 2320 ABN 96 130 892 2005 Tel: 02 8920 2466 Fax: 02 8922 5102 www.at&l.com.au info@at&l.com.au	PRELIMINARY ONLY NOT TO BE USED FOR CONSTRUCTION		Project No. SKC12	Issue P2
	Project DIAL A DUMP EASTERN CREEK		Title NORTHERN PAD FUTURE ROAD CONCEPT SHEET 1	
Client DIAL A DUMP	Drawn 1:1000 @ A1 1:500 @ A3 1:200 @ A1 1:400 @ A3	TS AMC	File F:\104-C-Dial A Dump\Draws\CMH\Sketches\SKC12.dwg	
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P2 ISSUE FOR INFORMATION P1 ISSUE FOR INFORMATION Issue	Description	Date 22-06-17 20-06-17	Name on Issue	

APPENDIX E

APPENDIX F



Amenities Building

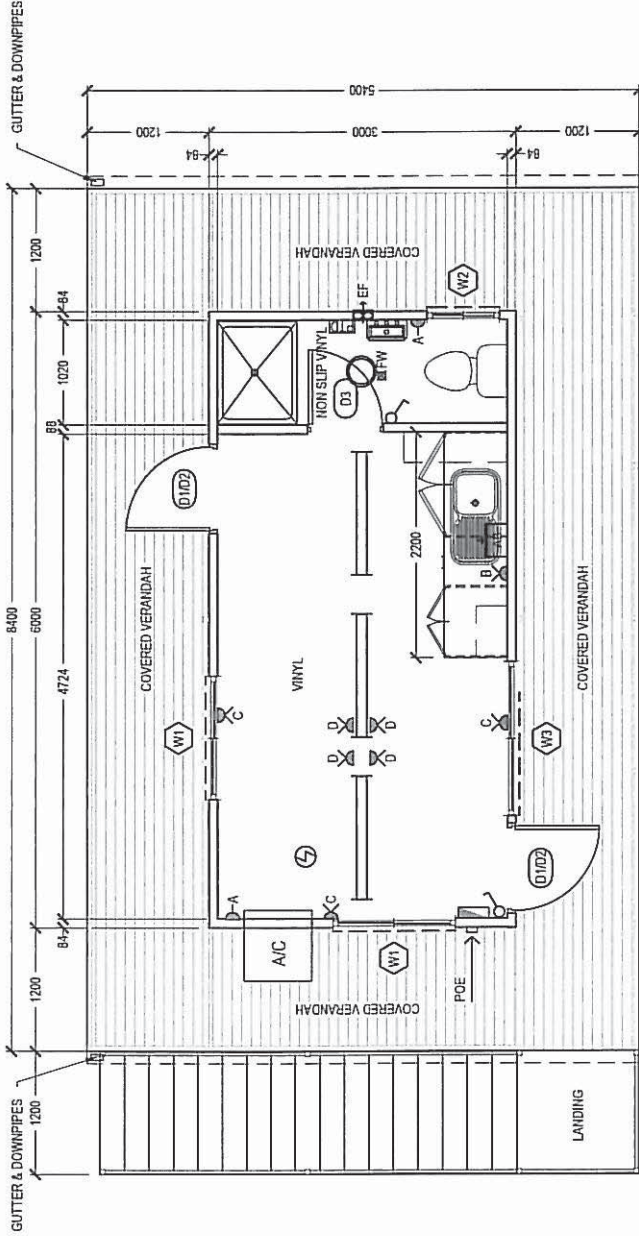
Designed by 10	Checked by 11	Approved by - date 12	Revision 13	Scale 14	Sheet 15
			DS/30-1		

LEGEND

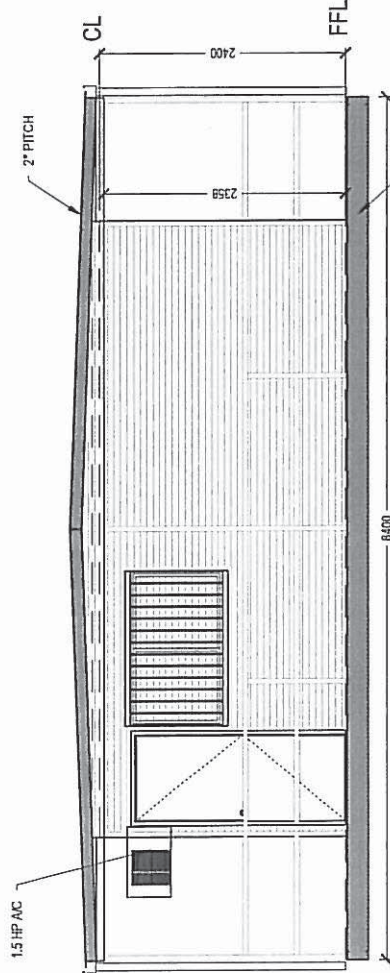
KEY	DESCRIPTION	HEIGHT	QTY
W1	1500h x 1800w ALUMINIUM WINDOW WITH SLIDING SASH, DOUBLE GLAZED GLASS & GALVANISED SECURITY BARS	600 AFL	2
W2	300h x 700w ALUMINIUM WINDOW WITH SLIDING SASH, OBSCURE GLASS & GALVANISED SECURITY BARS	1900 AFL	1
W3	800h x 1500w ALUMINIUM WINDOW WITH SLIDING SASH, DOUBLE GLAZED GLASS & GALVANISED SECURITY BARS	1000 AFL	1
D1	2040h x 820w COLORBOND METAL CLAD PRE HUNG DOOR CAV STANDARD ENTRANCE SET, SELF CLOSURE & 2040h x 830w GALVANISED SECURITY GRILL DOOR WITH PAD LATCH	FFL	2
D3	2040h x 720w INTERNAL HOLLOW CORE DOOR FITTED WITH PRIVATE SET	FFL	1
ØFRW	FLOOR WASTE.	FFL	1

GPO AND POWER

MK	ELECTRICAL FIXTURES	HEIGHT	QTY
D-A	SINGLE GPO - 10AMP	1550 AFL	2
KB	DOUBLE GPO - 10AMP	1300 AFL	1
KC	DOUBLE GPO - 10AMP	300 AFL	2
KD	DOUBLE GPO - 10AMP	FFL	4
□	2 X 36 W FLUORO LIGHT DIFF	CFL	3
○	OYSTER LIGHT	CFL	1
▭	CIRCUIT BREAKER BOARD	1700 AFL	1
POE	ELECTRICAL SUPPLY POINT OF ENTRY	1800 AFL	1
⚡	LIGHT SWITCH	1300 AFL	2
⚙	EXHAUST FAN	1900 AFL	1
⚙	STAINLESS STEEL BASIN FITTED WITH HOT/COLD FLICK MIXER TAP.	600 AFL	1
A/C	1.5 HP WALL MOUNTED REVERSE CYCLE TECO A/C	1700 AFL	1
⚡	HARD WIRED SMOKE DETECTOR	CL	1
Ⓜ	PAPER TOWEL DISPENSER	1300 AFL	1
AB	2.5Ll ZIP AUTO BOIL UNIT	1050 AFL	1



FLOOR PLAN



ELEVATION

FOR APPROVAL

DATE:	20.01.2011	TITLE:	G.A. OF SPOTTER	PROJECT:	6.0 x 3.0
DRAWN BY:	PR		STATION BUILDING WITH COVERED VERANDAH		STEEL BUILDING
CHECKED BY:	ARTH		DRAWING NUMBER: MS-101990-41		BUILDING NUMBER:
SCALE:	1:50		QUOTATION NUMBER: 101990		REV: 02
					SHEET A3

CLIENT:
GMW URBAN

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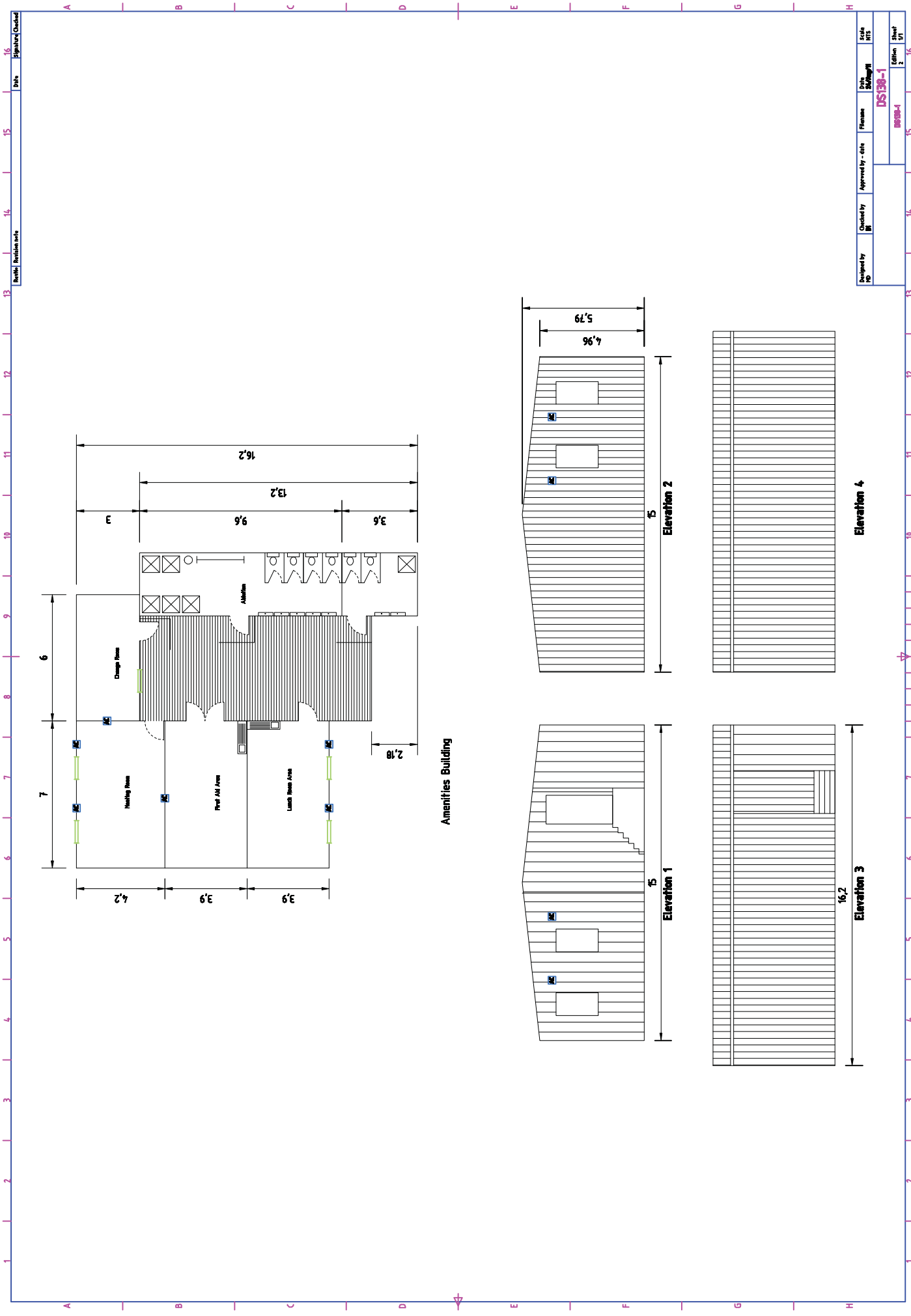
No.	DESCRIPTION	DATE
A	FOR CONSTRUCTION	20.01.2011
02	FOR APPROVAL	20.05.2011

CLIENT APPROVAL

SIGNATURE: _____
 NAME: _____
 DATE: _____

146 GILBA ROAD
 GIRRAWEE
 2145
 TEL: 9636 4445
 FAX: 9636 4454





Revised	Revision note	Date	Signature	Checked
16				

Designed by	Checked by	Approval - date	Filename	Scale	Area	Sheet
12	11		08/08-4	DS130-1	2	11

APPENDIX G



CDS® Unit Gross Pollutant Traps



WATER QUALITY



The leading stormwater pollutant trap



Characteristics of the CDS® Unit

- Non-blocking functionality
- 95% capture of gross pollutants >1mm
- 95% sediment capture >200µm
- Captures organics and oils
- Captures adsorbed toxics and nutrients
- Can treat any pipe or multiple pipes
- Various sump sizes available
- Customised bypass requirements
- Underground - small footprint
- Easy installation
- No moving parts
- Lowest life cycle costs
- More water treated than comparable treatment designs
- Pollutants stored in the sump, not the screens



Applications

- Subdivisions and roads
- Residential, commercial and industrial developments
- Carparks and shopping centres
- Pre-treatment for wetlands
- Pre-treatment for reuse applications
- Pipes, channels, culverts and creeks

Other CDS® models are available for non-stormwater applications involving high flow solids/liquids separation, such as industrial processes and sewer overflows.

High performance GPTs using patented
CDS® indirect screening technology

Selecting a CDS® Unit

The size and type of CDS® GPT required depends on catchment area, flows, pollution loads, performance requirements, maintenance method, hydraulic limitations and site constraints.

Visit the Rocla website (www.rocla.com.au) or email solutions@rocla.com.au for a sizing request. Details submitted with this form provide all the information needed to calculate the size of device most applicable for the site.

CDS® Unit Models

CDS Unit No	Construction Material	Catchment Area (ha)
CDS0506	in-line polymer	< 1 ha
CDS0708	in-line concrete	< 2 ha
CDS0708M	in-line concrete	< 4 ha
CDS1009	pre-cast concrete	2-8 ha
CDS1012	pre-cast concrete	4-12 ha
CDS1015	pre-cast concrete	6-15 ha
CDS1512	pre-cast concrete	8-20 ha
CDS2018	pre-cast concrete	15-45 ha
CDS2028	pre-cast concrete	30-75 ha
CDS3018	pre-cast concrete	40-100 ha
CDS3024	pre-cast concrete	60-150 ha
CDS3030	pre-cast concrete	80-200 ha

How Stormwater Pollutant Traps Rate

The CDS® GPT is rated the most effective stormwater pollution trap in every independent comparison.

On-Line Devices	POOR
Off-Line Devices	GOOD
Off-Line Non-Blocking Devices	BETTER
Off-Line Non-Blocking Devices with Double Off-Line Storage (CDS)	BEST

Independent studies show that no GPT rates higher than the CDS® GPT on performance and pollution retention.

Complete design service

Rocla offers a complete design service for CDS® products that takes into account the catchment's characteristics, pollution load, hydraulic site constraints and opportunities, system capacities, velocity, backwater, as well as the location of services and access for cleaning. Hydraulic reports are available on request and are automatically carried out for larger units.

Diversion chamber

Precast diversion chambers can be manufactured to suit most typical installations, or chambers can be tailored to meet the hydraulic limitations of the site.

The diversion chamber has the capacity to cater for the highest possible flow in the stormwater system. The chamber is configured on the assumption that the CDS® unit has not been maintained and there is no flow passing through the unit.

A weir is located within the diversion chamber to create a driving head and direct the majority of flows into the CDS® GPT.

Diversion chamber options

- Precast diversion chambers
- Semi-precast diversion chambers
- Customised designs for multiple pipes, drops and bends
- In-situ channel designs
- Fixed or collapsible weirs
- Any flow capacity
- No flooding

The CDS® GPT and diversion chamber design depends on the system capacity and site constraints. Rocla will design the most suitable CDS® GPT configuration to meet project requirements.

Maintaining CDS® GPTs

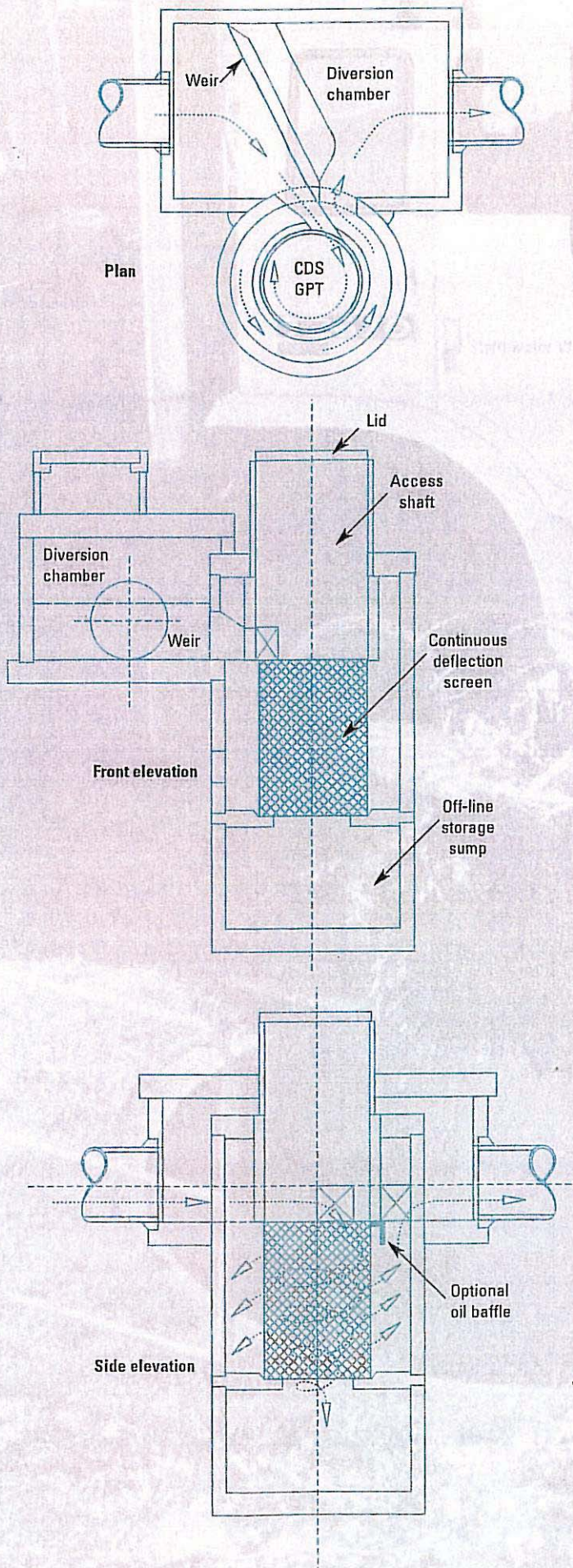
CDS® units have the lowest life-cycle costs due to their non-blocking functionality, large off-line storage and multiple cleaning options.

There are 3 methods of emptying CDS® GPTs:

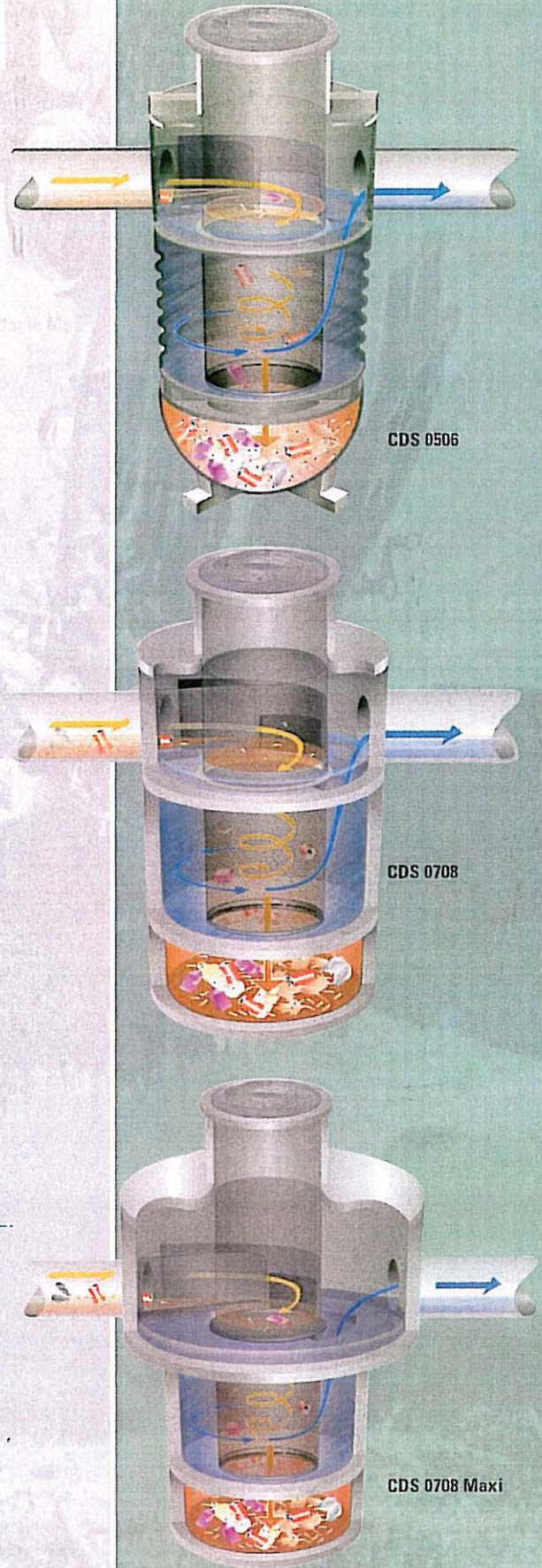
- Removable basket
- Material grab
- Suction method

With no requirement to unblock screens, confined space entry is minimised. Large off-line sump volumes (up to 10m³ available) also minimise cleaning frequency, reducing maintenance costs and hence life-cycle costs over the next 50 years.

Off-line CDS® Unit Operating Principle

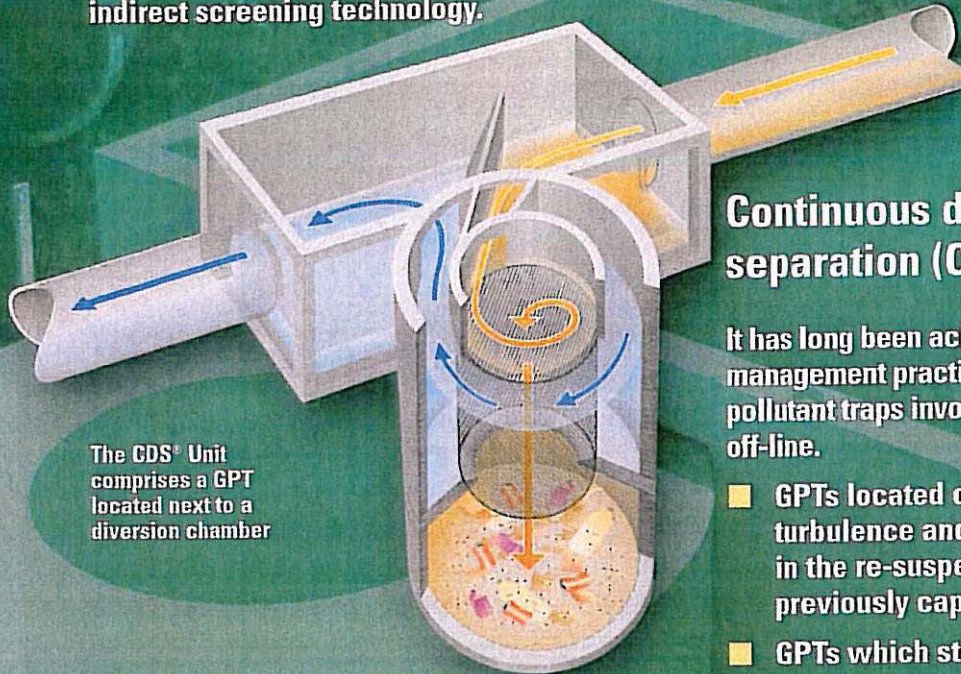


Compact in-line GPTs for smaller catchments



Patented screening technology

GDS® gross pollutant traps (GPTs) are designed to capture and retain gross pollutants, litter, grit, sediments and associated oils, utilising patented CDS® indirect screening technology.



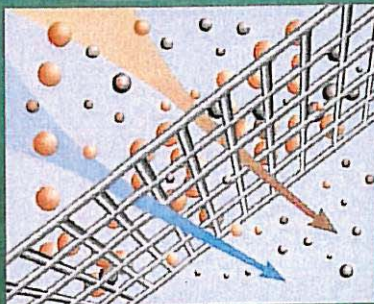
The CDS® Unit comprises a GPT located next to a diversion chamber

Continuous deflective separation (CDS)

It has long been acknowledged that best management practice for stormwater pollutant traps involves locating the devices off-line.

- GPTs located on-line suffer badly from turbulence and eddies, often resulting in the re-suspension and loss of previously captured pollutants.
- GPTs which store pollution in the screening area suffer decreasing screen area and therefore decreasing flow rates, as they fill up.
- GPTs which function by direct filtration have a treatable flow rate decay that is proportional to the percentage of screen blockage.
- GPTs that utilise a vortex only, without a screen, cannot guarantee neutrally buoyant pollution removal.

Only CDS® units combine the advantages of being off-line, having non-blocking functionality, vortex forces and storing pollution outside the screening area. For these reasons, no other device is "equivalent" to a CDS® Unit.



Direct screening



Indirect screening (CDS)

The only off-line GPT with non-blocking screens and storage outside the screening area



CDS® Unit Gross Pollutant Traps

For further information on CDS® products
and solutions

Call Rocla on
131 004

For an information kit email
solutions@rocla.com.au

Or visit our website
www.waterquality.rocla.com.au

- Sydney
- Dapto
- Dubbo
- Newcastle
- Glen Innes
- Grafton
- Canberra
- Melbourne
- Avoca
- Traralgon
- Wodonga
- Brisbane
- Toowoomba
- Mackay
- Cairns
- Adelaide
- Perth



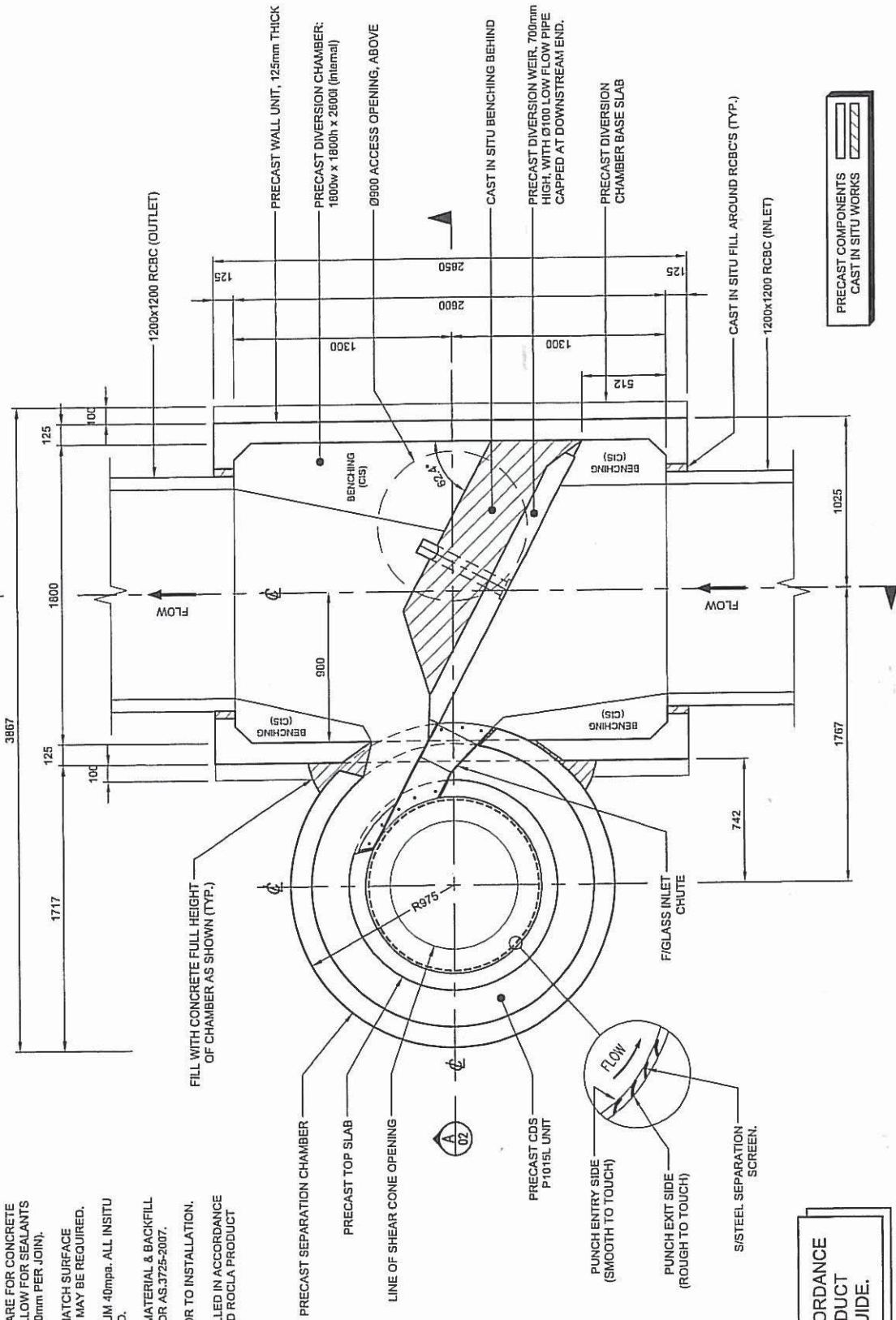
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INSTALLATION IN ACCORDANCE WITH ROCLA PRODUCT INSTALLATION GUIDE.

REV No.	RWQ 09278
JOB No.	
SHEET	1 OF 3
SCALE	1:25 (A3)
D	210595/01

LIGHT HORSE BUSINESS CENTRE, SOUTH GPT
ROCLA CDS P1015L GPT
HORIZONTAL LAYOUT

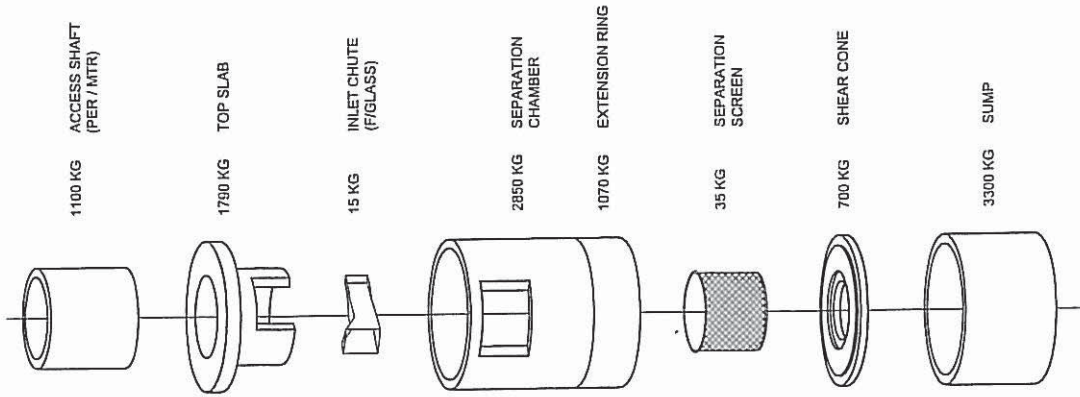


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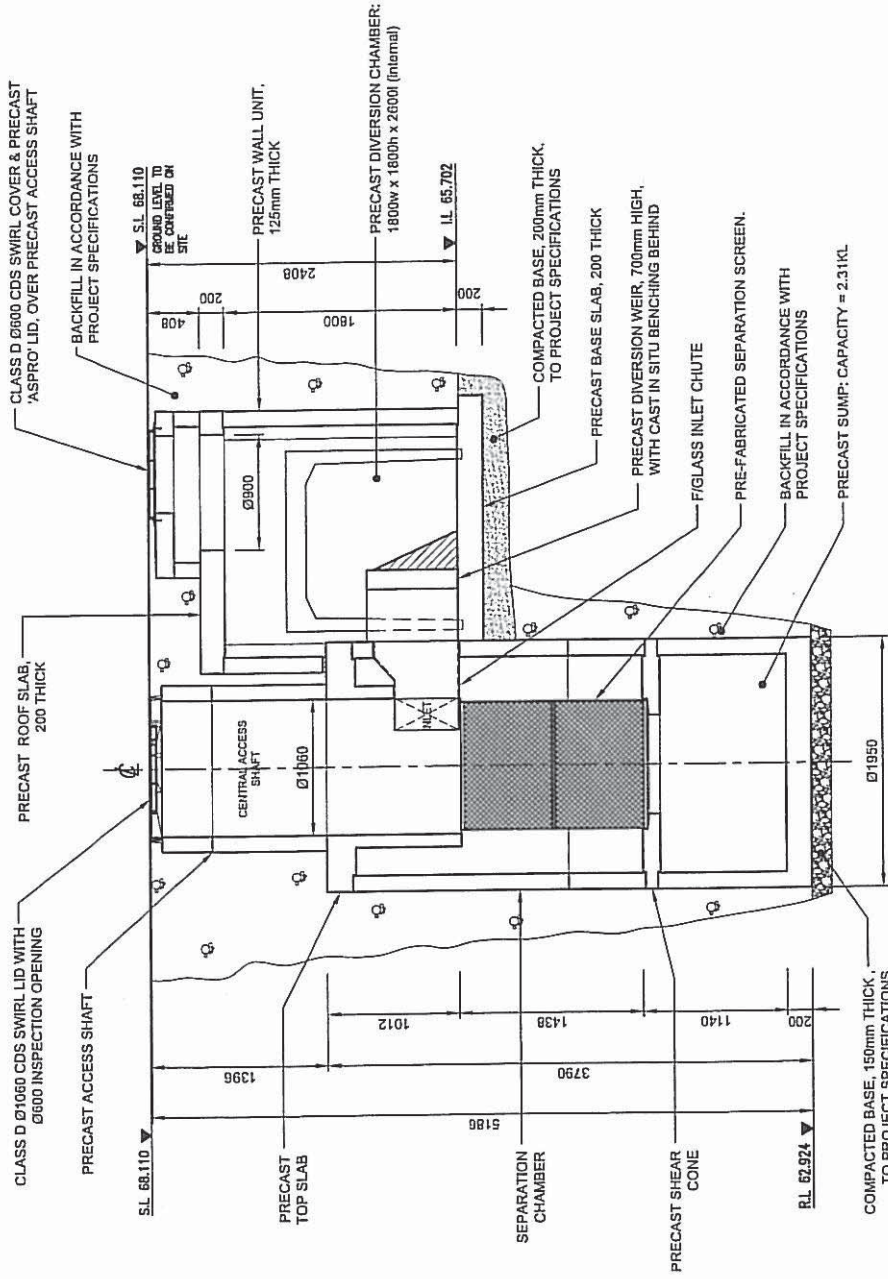
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A	DRC		MR	ISSUED FOR PROPOSAL	25.09.09

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CDS UNIT ASSEMBLY



PRECAST COMPONENTS CAST IN SITU WORKS

RWD No.	RWQ 09278
JOB No.	
SHEET	2 OF 3
SCALE	1:40 (A3)
D	210595/02

LIGHT HORSE BUSINESS CENTRE, SOUTH GPT
ROCLA CDS P1015L GPT
VERTICAL SECTION A

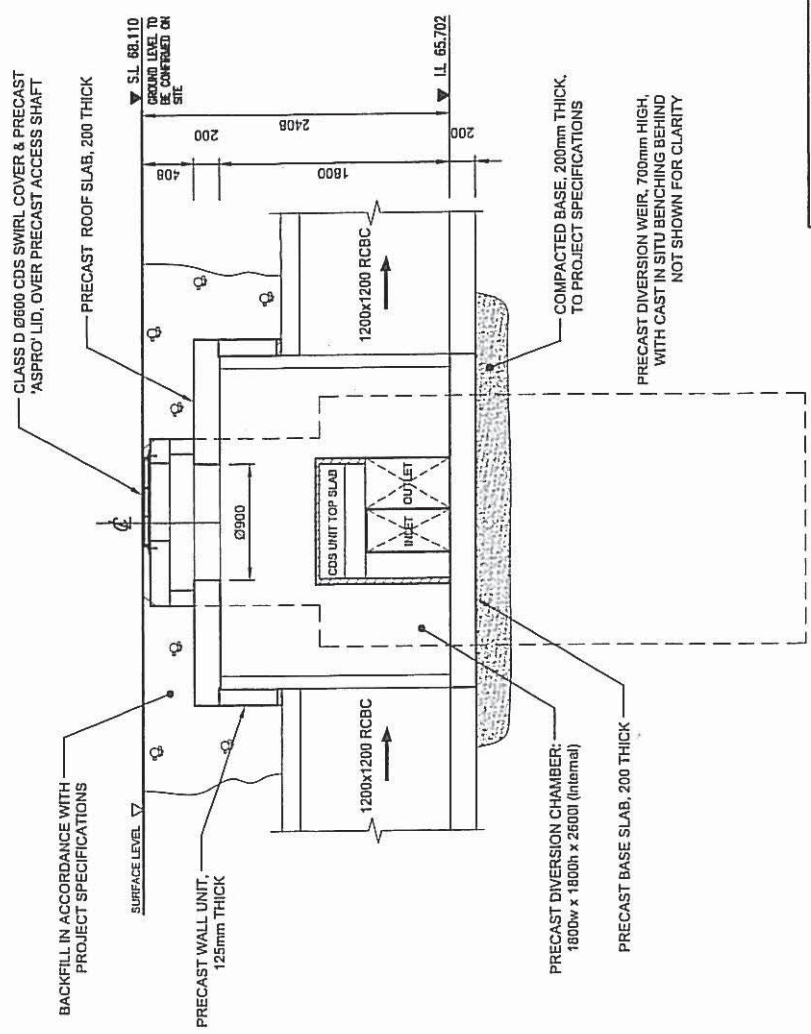


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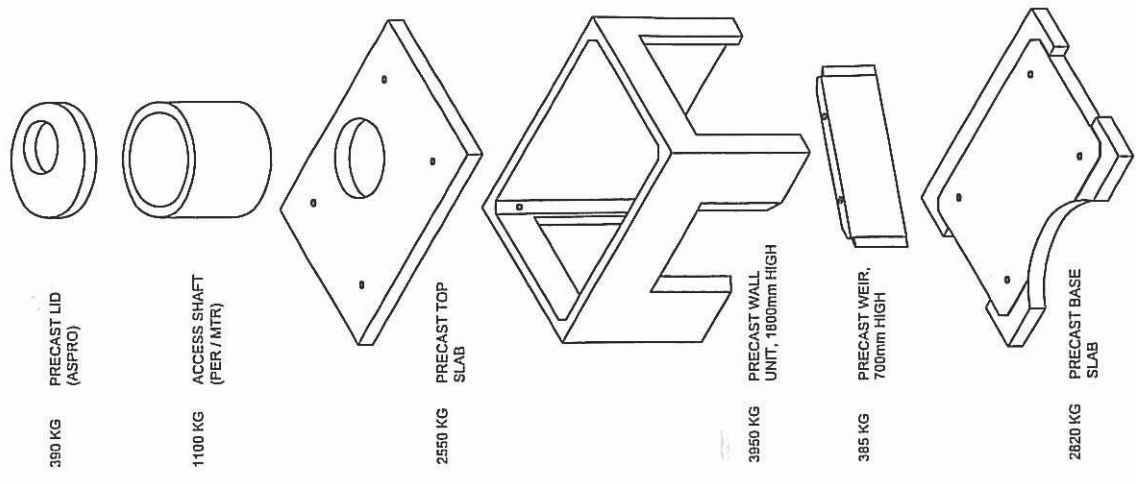
SECTION B-01

PRECAST COMPONENTS CAST IN SITU WORKS

INSTALLATION IN ACCORDANCE WITH ROCLA PRODUCT INSTALLATION GUIDE.

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DIVERSION CHAMBER ASSEMBLY

RWO No.	RWQ 09278
JOB No.	
SHEET	3 OF 3
SCALE	1:40 (A3)
D	210595/03

LIGHT HORSE BUSINESS
 CENTRE, SOUTH GPT
 ROCLA CDS P1015L GPT
 VERTICAL SECTION B



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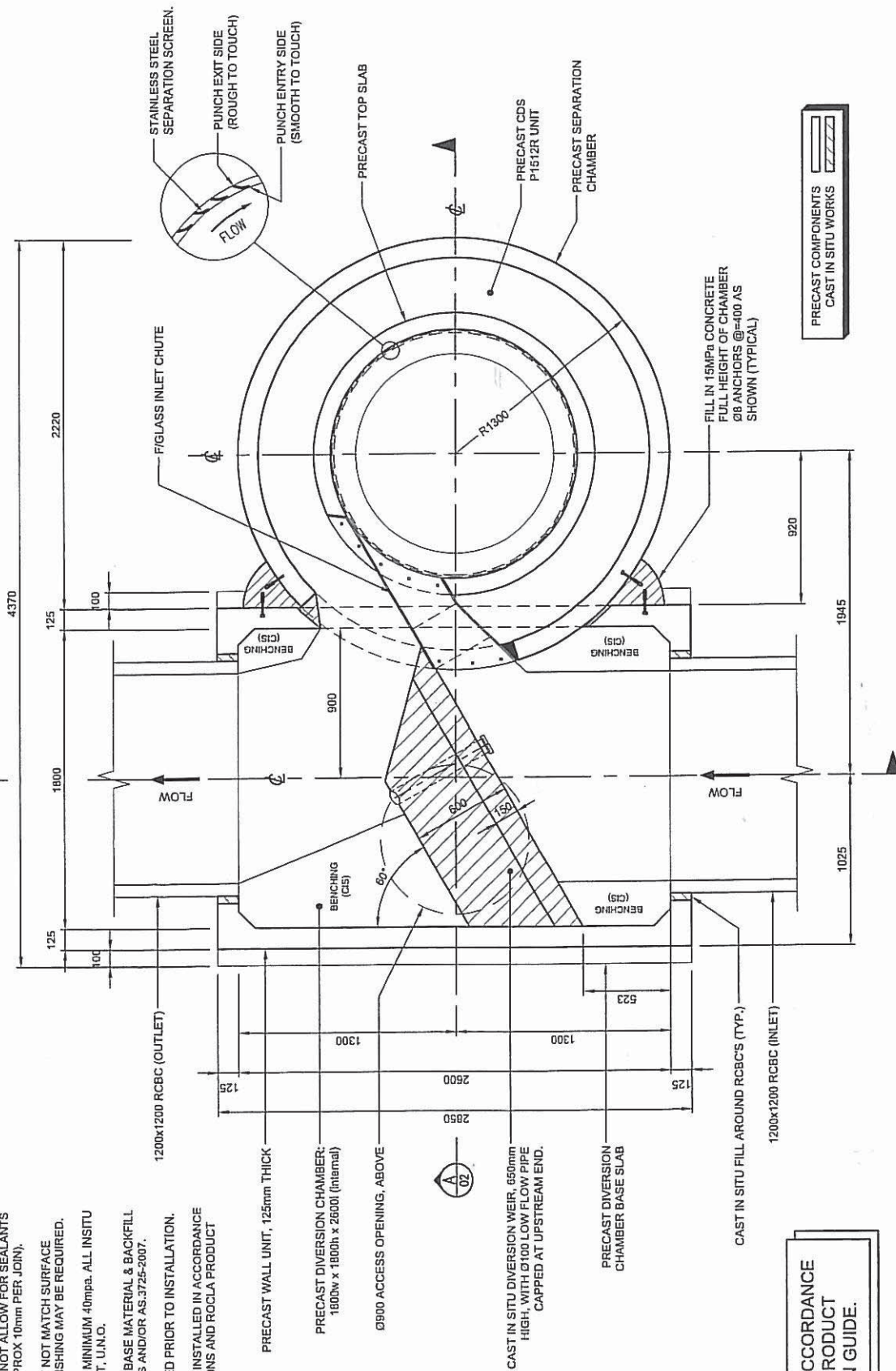
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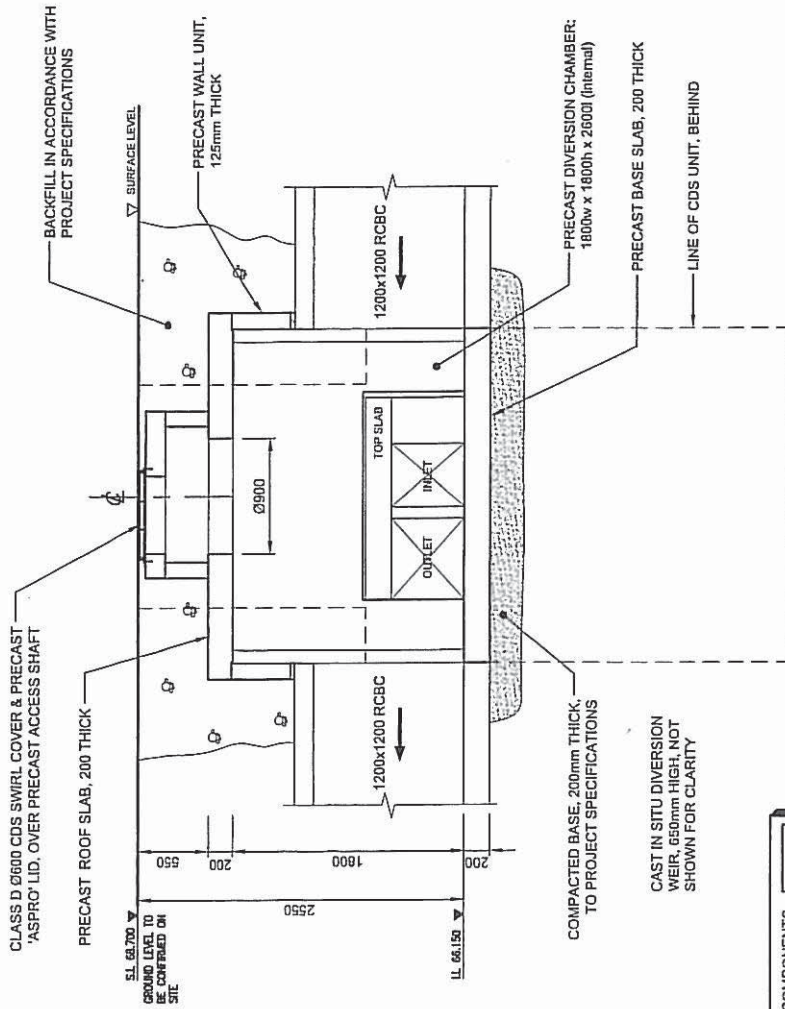
LIGHT HORSE BUSINESS CENTRE, NORTH GPT
ROCLA CDS P1512R GPT
HORIZONTAL LAYOUT



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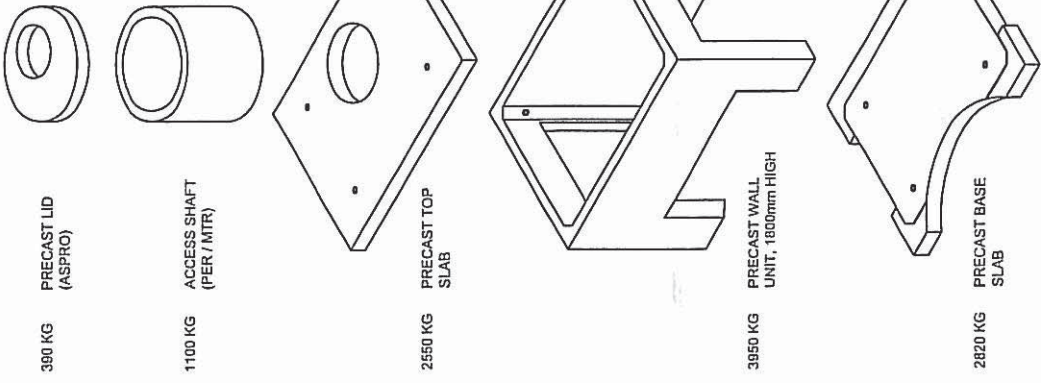
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PRECAST COMPONENTS
CAST IN SITU WORKS

INSTALLATION IN ACCORDANCE WITH ROCLA PRODUCT INSTALLATION GUIDE.

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DIVERSION CHAMBER ASSEMBLY

RWQ No.	RWQ 09278
JOB No.	
SHEET	3 OF 3
SCALE	1:40 (A3)
D	210594/03

LIGHT HORSE BUSINESS
CENTRE, NORTH GPT
ROCLA CDS P1512R GPT
VERTICAL SECTION B

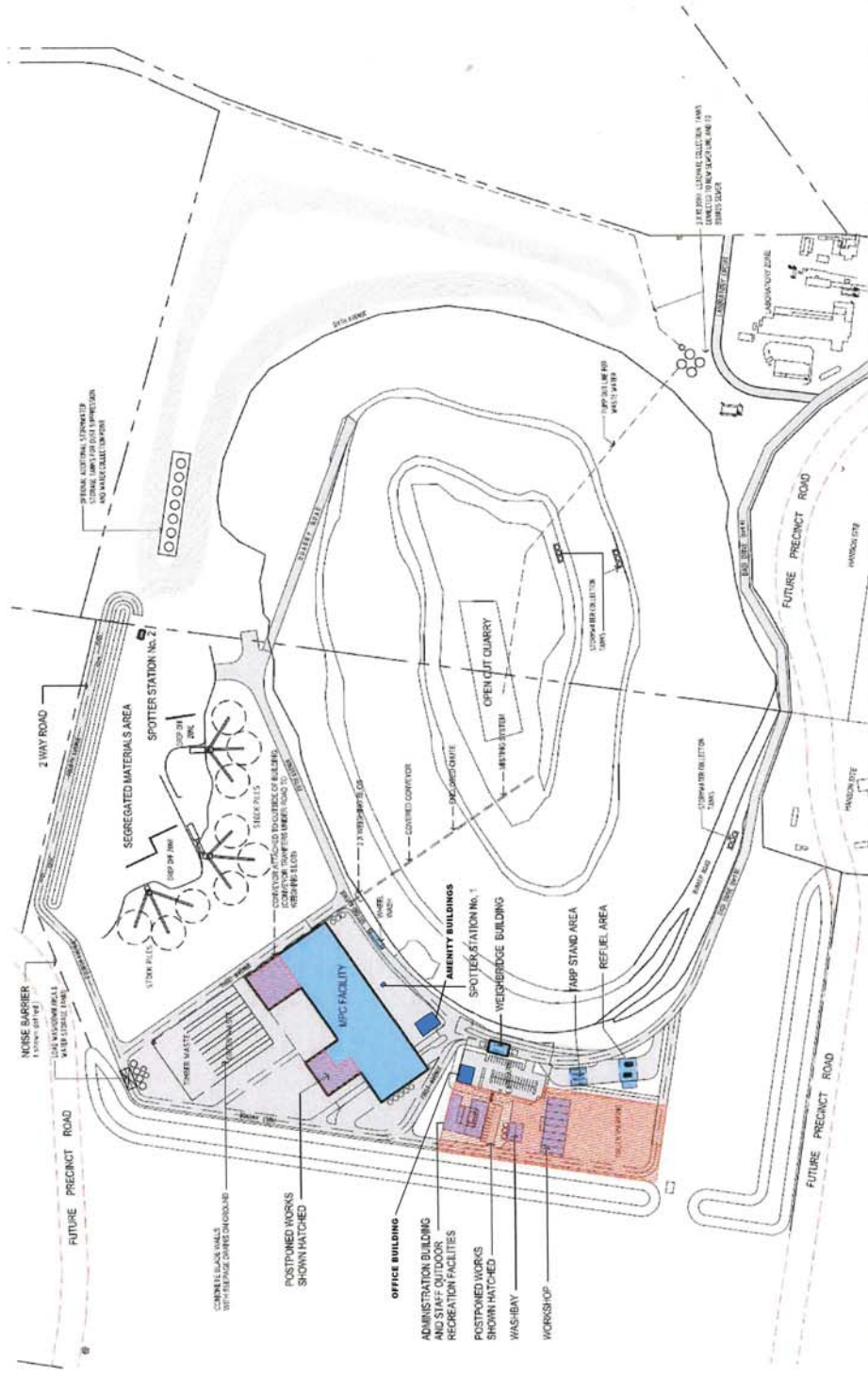


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APPENDIX H

APPENDIX 1 - SITE PLAN & BUILDING ELEVATIONS



LIGHT HORSE BUSINESS CENTRE
DADI - MATERIALS PROCESSING FACILITY
DIAL A DUMP INDUSTRIES
 OLD WALGROVE ROAD, EASTERN CREEK, NSW

DIAL A DUMP
 KEEPING AUSTRALIA CLEAN

AXIS architectural

2 / 107 Cowalla Street, Cowalla, NSW 2280
 P + 61 2 622 7668 • e dadi@axisarchitect.com.au
 residential architect - David McDonald NSW ABN 57991

SITE LAYOUT PLAN
OVERALL SITE
 090507/DIEP-MP A 101 - 8 / A

MARCH 2010
 1:5000 scale

APPENDIX I

Jacqueline Brauman

From: Charles Navaratne [charles@damsafety.nsw.gov.au]
Sent: Thursday, 16 June 2011 1:02 PM
To: Jacqueline Brauman
Subject: RE: D1 Form

Hi Jackie,

As per your data, the OSD's are located below ground level.
Hence DSC would not prescribe them.

Regards

Charles Navaratne
Small Dams Engineer
NSW Dams Safety Committee
Level 3, 10 Valentine Av.
Parramatta NSW 2150

Phone 02-98957848
Fax 02-98957354

From: Jacqueline Brauman [mailto:JacquelineBrauman@dadi.com.au]
Sent: Thursday, 16 June 2011 12:29 PM
To: charles@damsafety.nsw.gov.au
Subject: FW: D1 Form

Hi Charles,

Further to our telephone conversation earlier this morning about OSD sizes at Eastern Creek, I have attached a D1 form and drawings for each OSD.

I have also attached the Blacktown Council's Concept Masterplan with crosses marking the OSD locations. The natural slope is to the west.

I would be pleased if you could advise immediately whether the OSDs need to be prescribed.

Thanks for your help.

Regards,

Jacqueline Brauman | Solicitor
Dial A Dump Industries | Keeping Australia Clean | 32 Burrows Road Alexandria NSW 2015
Contact | P: (02) 9519-9999 | F: (02) 9516-5559 | W: www.dadi.com.au

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From: Charles Navaratne [mailto:charles@damsafety.nsw.gov.au]
Sent: Tuesday, 30 March 2010 3:05 PM
To: Steve Baxter
Subject: RE: D1 Form

Hi Steve,

Thanks for the D1 Form & the drawings forwarded regarding Proposed OSD's at Quarry Road off Old Wallgrove Road, Eastern Creek.

According to the data submitted the 1.8ML OSD's store water below ground level and no Population at Risk (PAR) involved.

Therefore we are not going to prescribe the OSD's.

Regards

Charles Navaratne
Small Dams Engineer
NSW Dams Safety Committee
Level 3, 10 Valentine Av.
Parramatta NSW 2150

Phone 02-98957848

Fax 02-98957354

From: Steve Baxter [<mailto:SteveBaxter@dadi.com.au>]

Sent: Tuesday, 30 March 2010 2:22 PM

To: charles@damsafety.nsw.gov.au

Subject: D1 Form

Hi Charles

Please find attached the revised D1 form, Please note the additional information requested on our phone call earlier today

As mentioned it is our intention to obtain a letter from the DSC re our works that it does not need to be prescribed

Thanks in advance

Steve

Steven Baxter

M: 0429 293 909 P: 02 9519 9999

Dial A Dump Industries | Keeping Australia Clean | 32 Burrows Road Alexandria NSW 2015

Contact | F: (02) 9516-5559

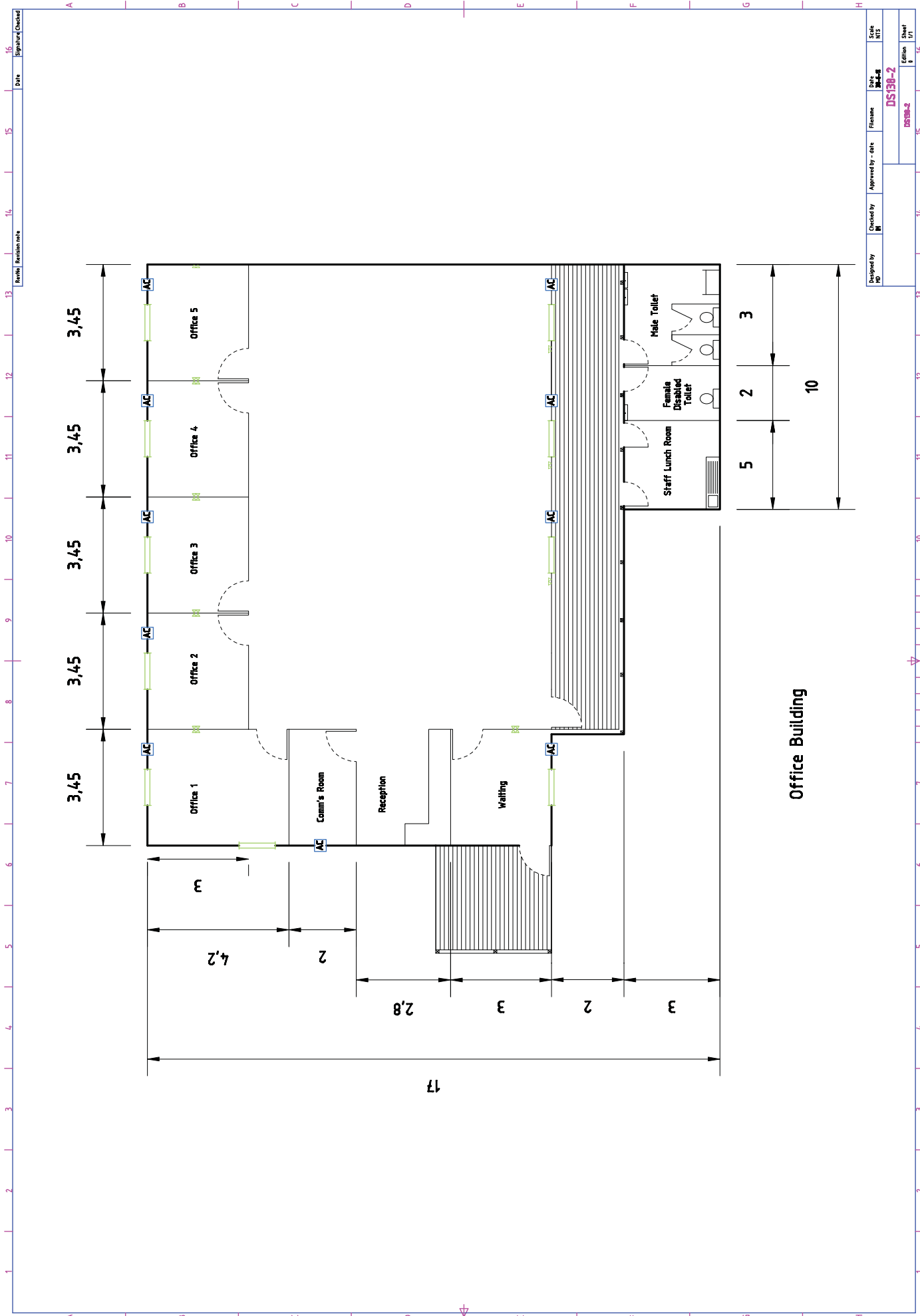
E: stevebaxter@dadi.com.au | W: www.dadi.com.au

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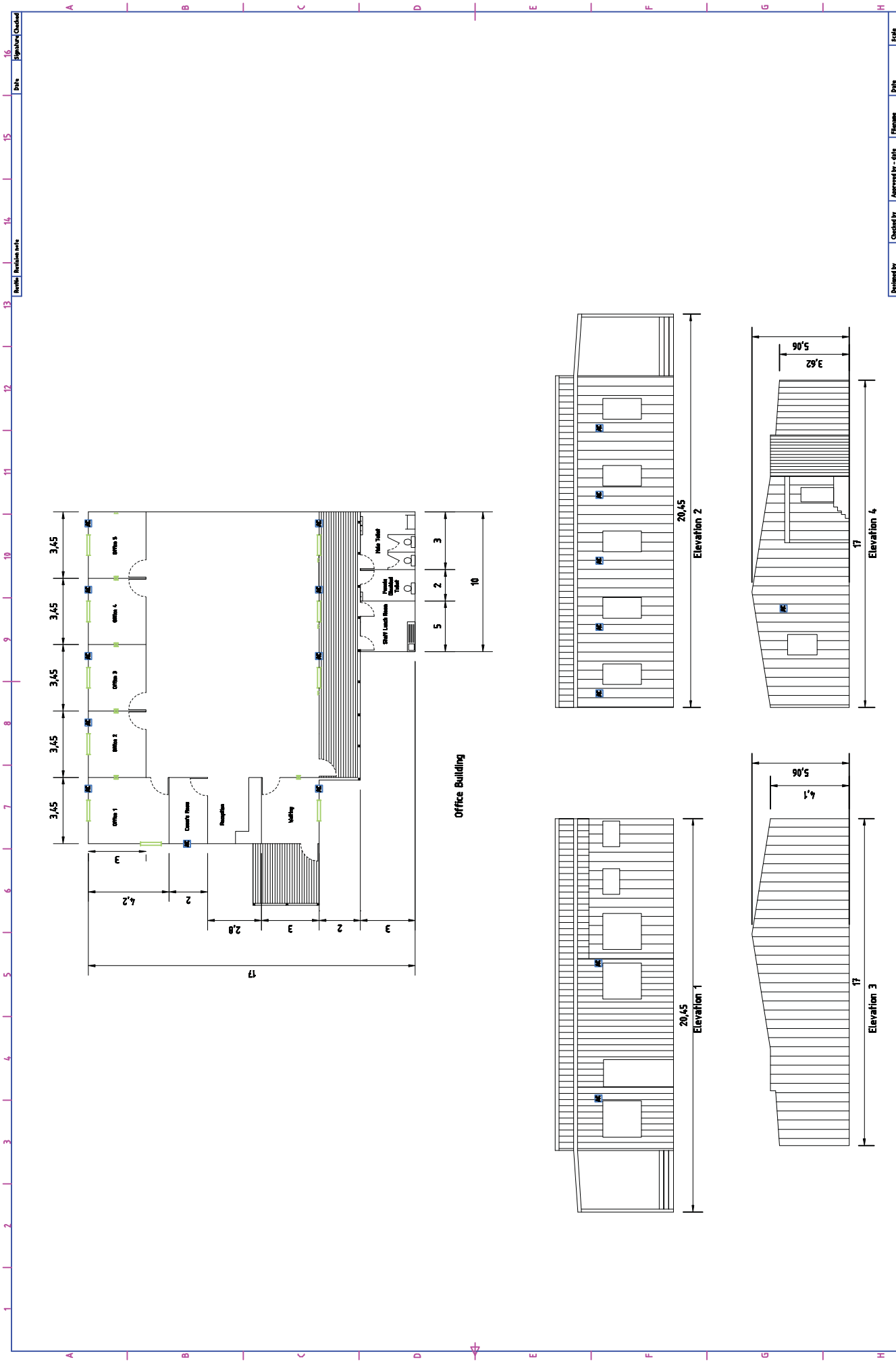
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APPENDIX J



Rev#	Revision/Checked	Date	Signature/Checked
16			
15			
14			
13			

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			DS138-2			

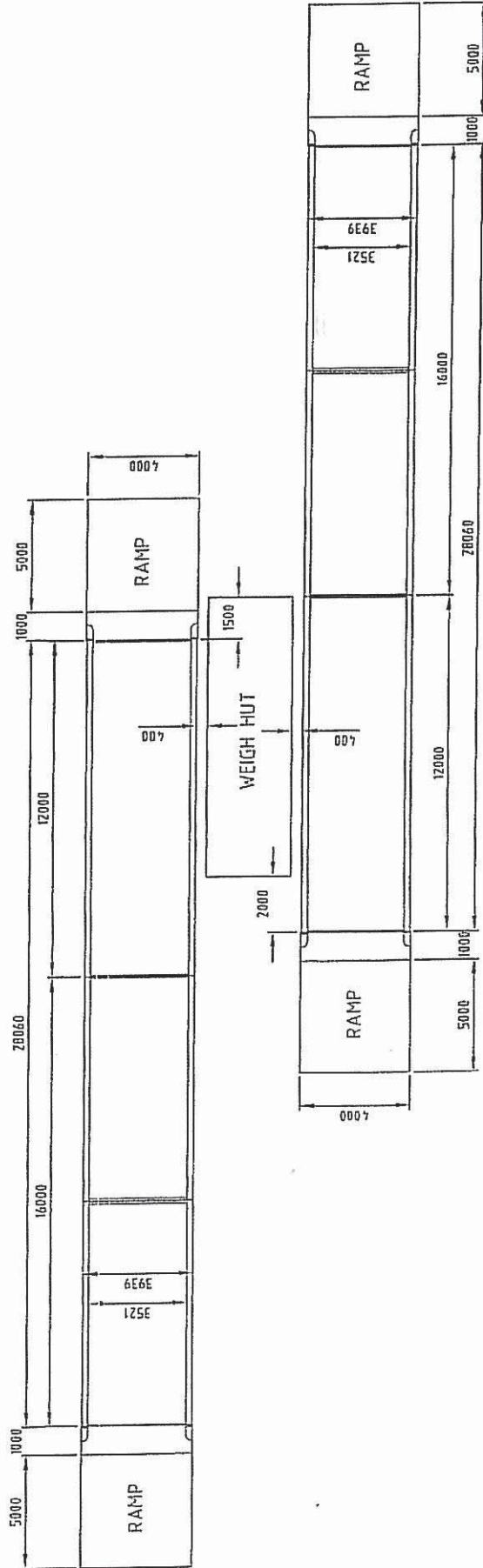


Rev#	Revision note	Date	Signature/Checked
16			
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Prepared by	Checked by	Approval by - date	Planner	Scale	Sheet
DS	DS		DS	1:10	01
Project Name				DS	02
Project No.				DS	03
Revision				DS	04
Edition				DS	05
Sheet				DS	06

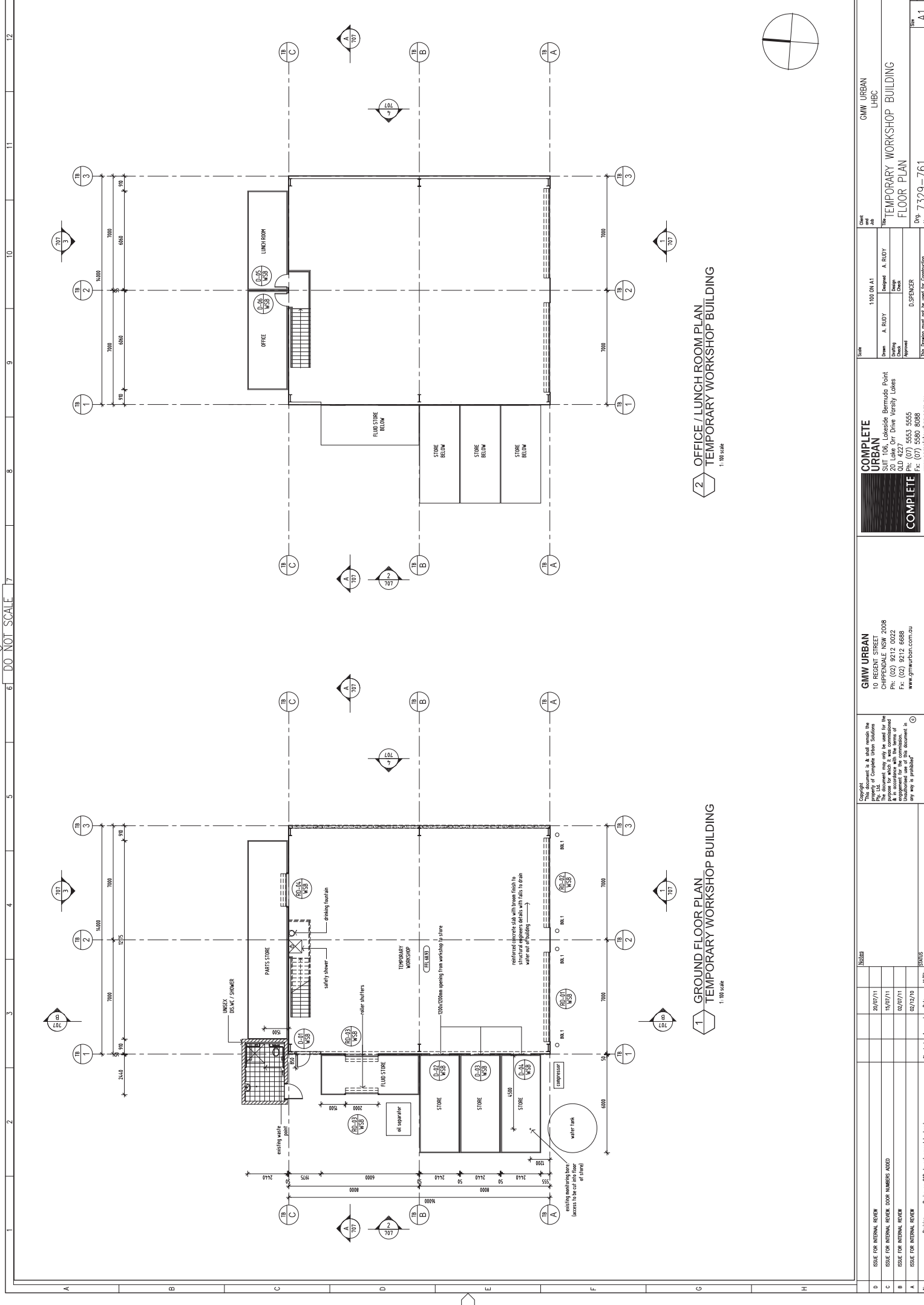
APPENDIX K

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TITLE:		DRAWING No.	
ABOVE GROUND - RAMPED		A3-36A-063-1	
2 x 16+12=28mx3.5m WEIGHBRIDGES		REV. No.	
		SHEET 1 OF 1	

APPENDIX L



1 GROUND FLOOR PLAN
TEMPORARY WORKSHOP BUILDING
 1:50 SCALE

2 OFFICE / LUNCH ROOM PLAN
TEMPORARY WORKSHOP BUILDING
 1:100 SCALE

Revision - Revises an O/E or not consented by hand

NO.	DATE	APPROVED	STATUS
D	20/07/11		
C	15/07/11		
B	02/07/11		
A	02/12/10		

FILE NAME: _____

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 www.gmwurban.com.au

COMPLETE URBAN
 20 Lake Orr Drive Varsity Lakes QLD 4227
 Ph: (07) 5653 5555
 Fax: (07) 5680 8088
 www.completeurban.com.au

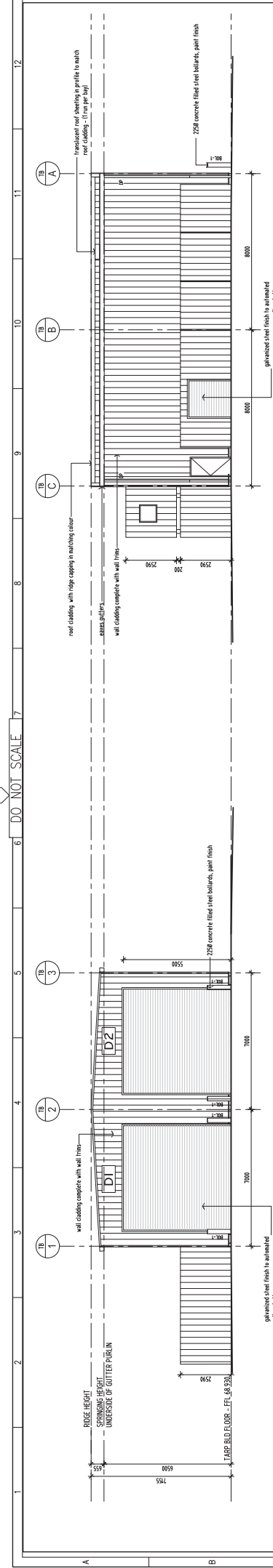
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Drawn	A. RUDY
Checked	D. SPENCER
Design	D. SPENCER
Check	D. SPENCER
Approved	D. SPENCER

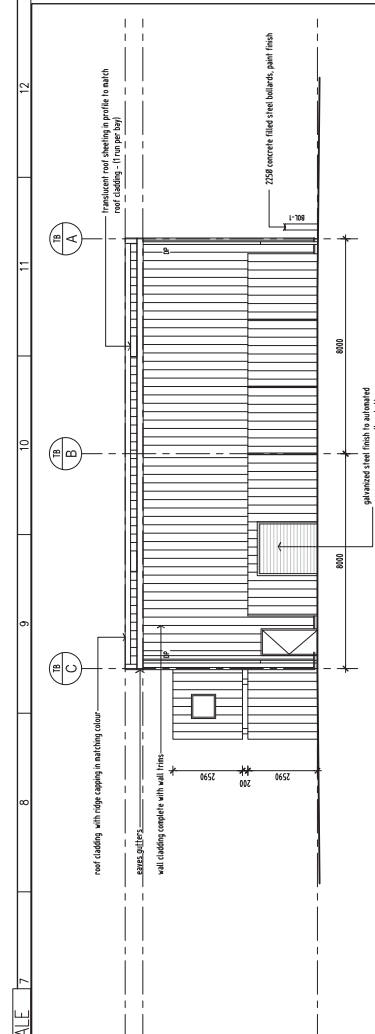
The drawings must not be used for construction unless signed and stamped as approved.

Client: GMW URBAN LHC
 File: TEMPORARY WORKSHOP BUILDING FLOOR PLAN
 Draw No: 7329-761

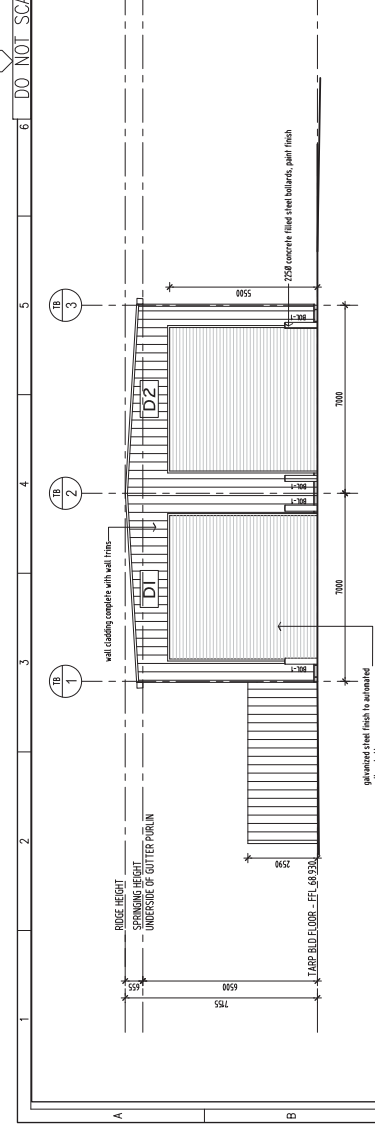




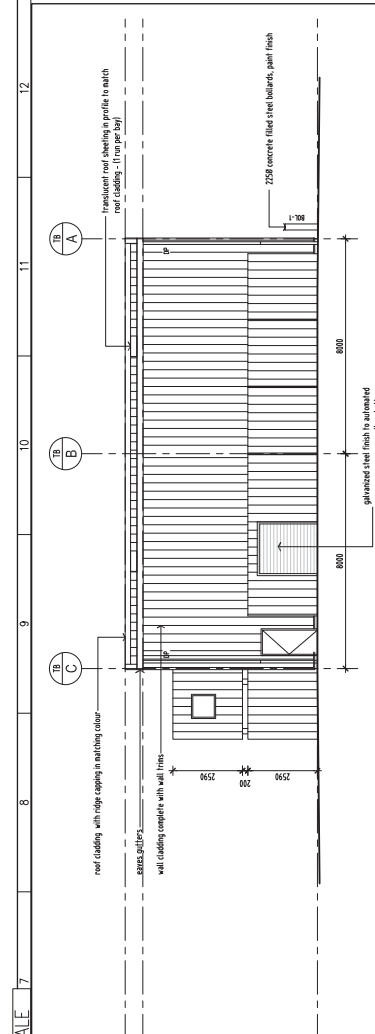
1
706
ELEVATION 1
TEMPORARY WORKSHOP BUILDING
1:100 scale



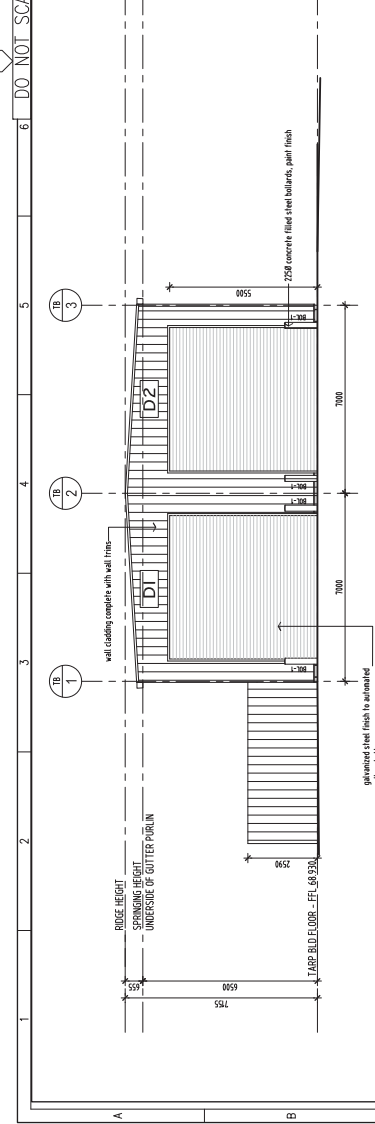
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706
ELEVATION 2
TEMPORARY WORKSHOP BUILDING
1:100 scale



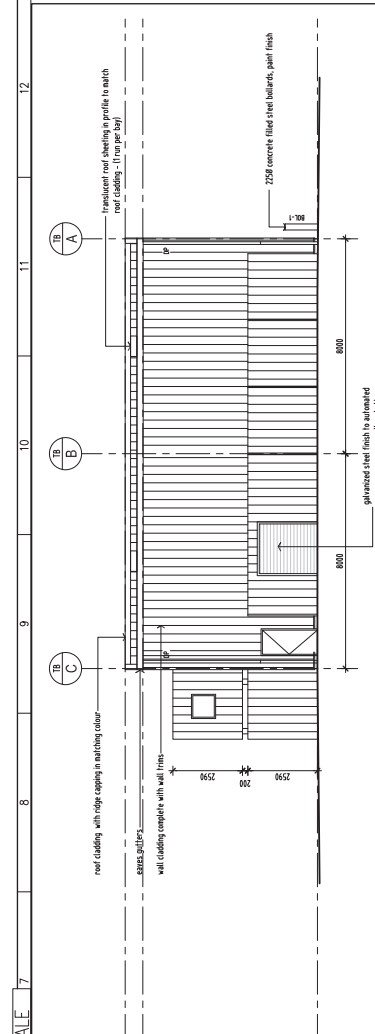
3
706
ELEVATION 3
TEMPORARY WORKSHOP BUILDING
1:100 scale



4
706
ELEVATION 4
TEMPORARY WORKSHOP BUILDING
1:100 scale



5
706
SECTION - A-A
TEMPORARY WORKSHOP BUILDING
1:100 scale



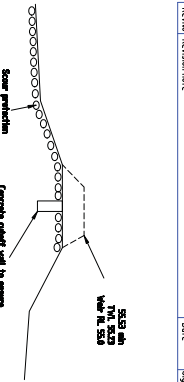
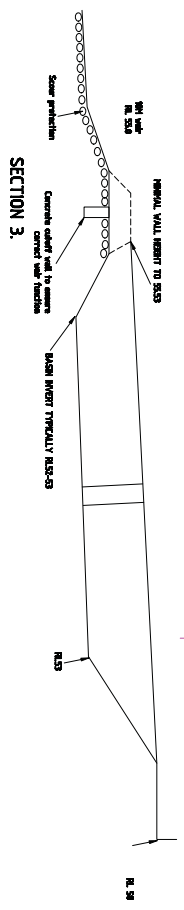
6
706
SECTION - B-B
TEMPORARY WORKSHOP BUILDING
1:100 scale

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<p>ISSUE FOR INTERNAL REVIEW</p>	<p>20/07/11</p>	<p>Checked</p>	<p>Date</p>
<p>ISSUE FOR INTERNAL REVIEW</p>	<p>02/12/10</p>	<p>Approved</p>	<p>Date</p>
<p>Revised -</p>	<p>Revised on CAD do not amend by hand</p>	<p>CAD File Name:</p>	<p>PROJECT NO:</p>

APPENDIX M

LEGEND

- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- STORMWATER PIT AND PILE

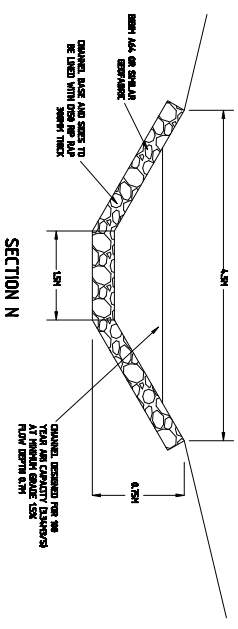
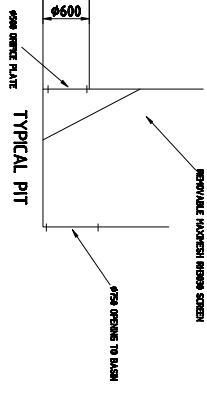
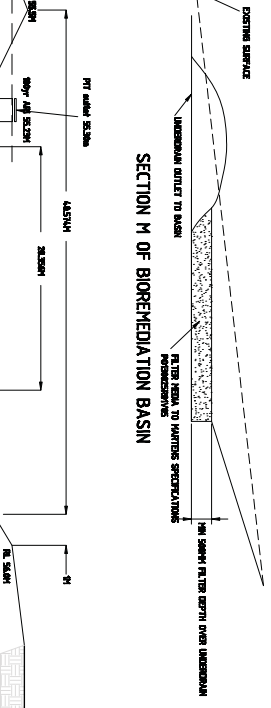
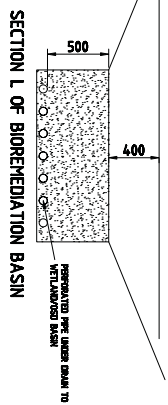
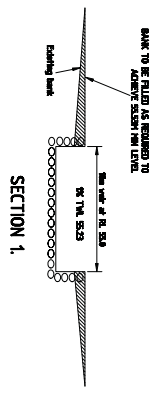
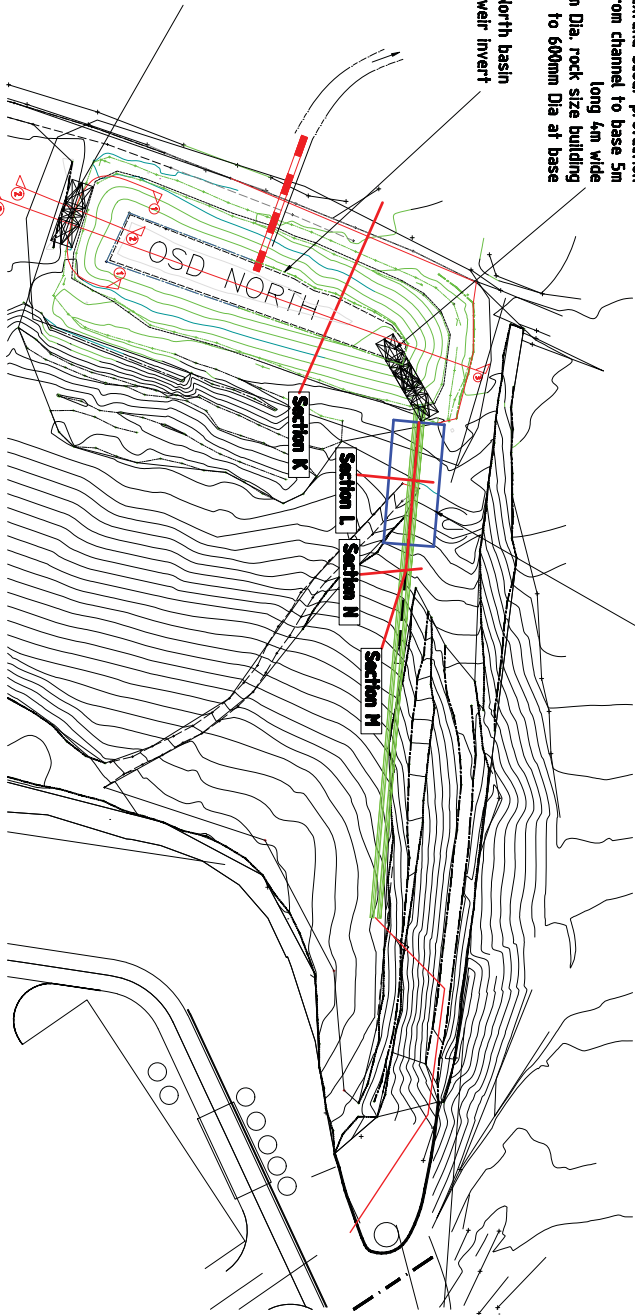


450m² Bio remediation basin. Vegetation to landscape architect specification.

Extend scour protection from channel to base 5m long 4m wide 300mm Dia. rock size building to 600mm Dia at base

North basin volume 3389m³ to weir invert

10m spillway operates in 10YR based on Hartsis modelling rip rap scour protection as per channel



SECTION K

SECTION N

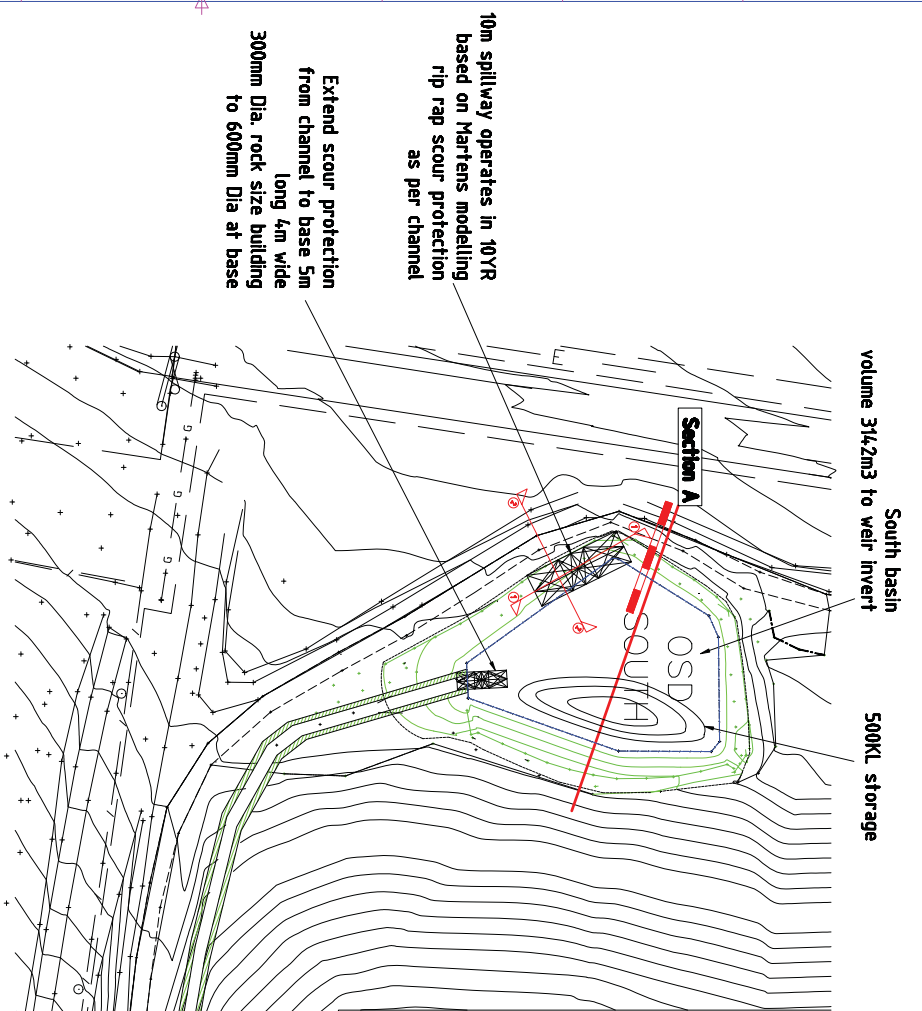
SECTION L OF BIOREMEDIATION BASIN

SECTION 1

SECTION 2

Designed by	Checked by	Approved by - date	Filename	Date	Scale
HD	M	27/11/11			NTS

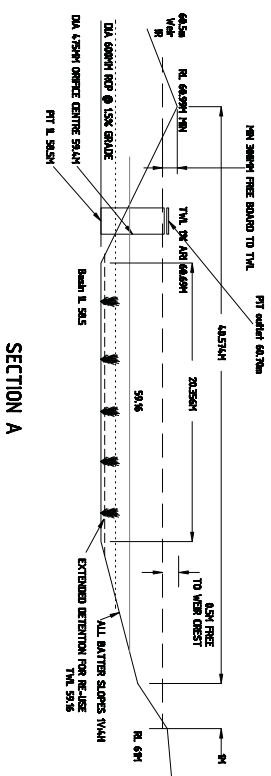
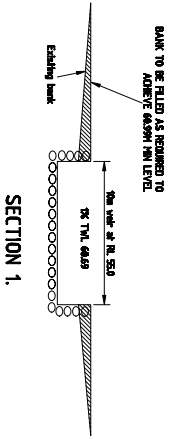
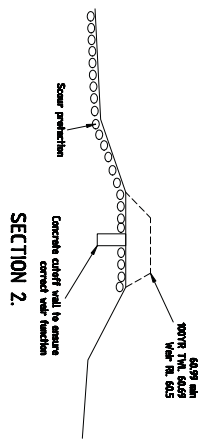
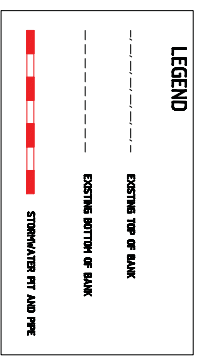
Definition Basin North Plan and Details					
DMS15_1					
Section	Sheet				
	1/1				



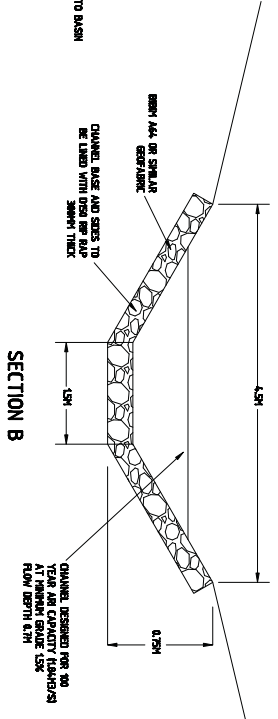
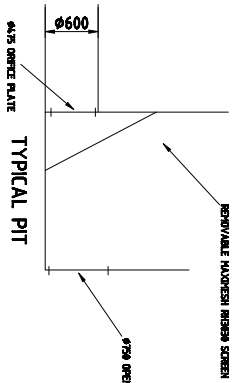
South basin
volume 3142m³ to weir invert
500KL storage

10m spillway operates in 10YR based on Martens modelling rip rap scour protection as per channel

Extend scour protection from channel to base 5m long 4m wide 300mm Dia. rock size building to 600mm Dia at base



SECTION A



SECTION B

Designed by	Checked by	Approved by	Date	Scale
HD	H	GH	27-8-11	NTS
Definition Basin South Plan and Details				
DSK15.2				
Section			Sheet	
			1/1	