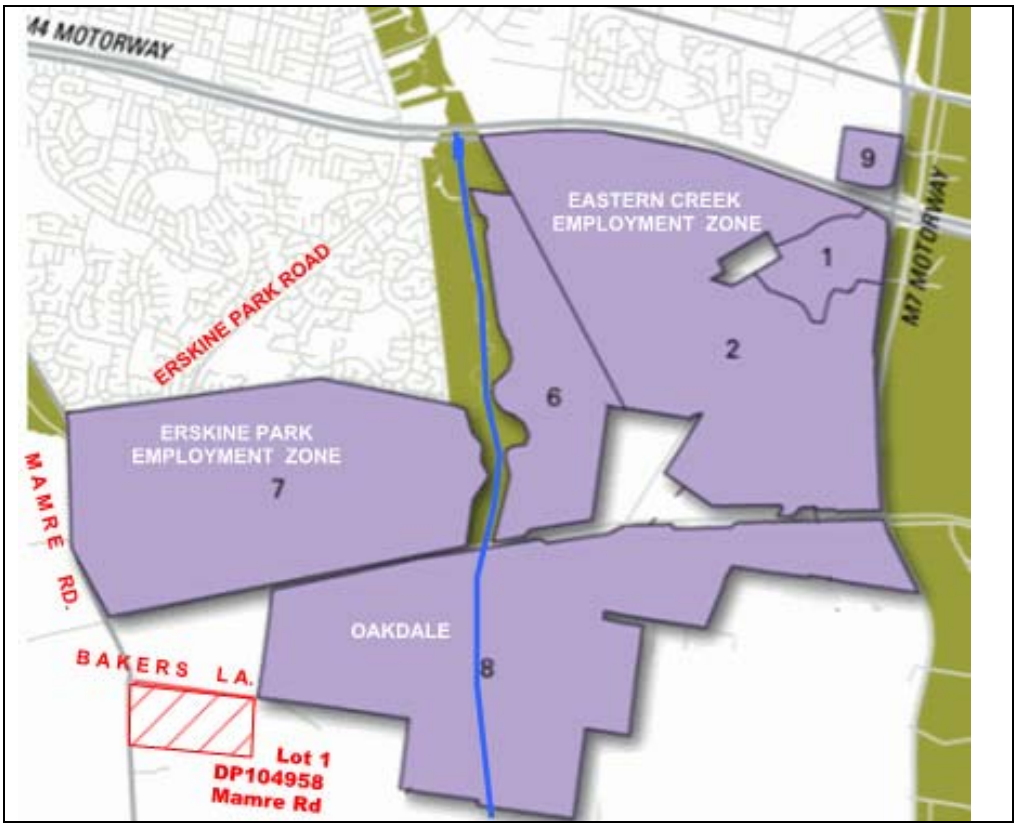
STORMWATER MANAGEMENT PLAN
LOGOS Kemps Creek Logistics Project
Mamre Rd, Kemps Creek

Prepared for LOGOS Property Group



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Dated: September, 2010

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A1 INTRODUCITON

Buckton Lysenko has been engaged by Logos Property to prepare a Stormwater Management Plan in support the proposed development to accommodate a transport company and a grocery distribution center.

The site has an area of 50 hectares and measures approximately 1000m by 500m and is predominately rural. It is bounded by Mamre Road, Bakers Lane and private properties to the east and south.

Existing ground levels vary between approximately RL 42 m to RL 86. Several dams exist on the site; a drainage line / creek run from the eastern boundary through a dam northwards.

A rough ridge line runs along the centre and southeast of the site with RL of up to 86m. It slopes down towards the northeast and southwest with the lowest RL of 42m on the southwest boundary. The western portion of the site drains under Mamre Road, and into South Creek. The eastern portion of the site drains under Bakers Lane and into a tributary of South Creek.

There are no visible signs of land degradation such as erosion.

The Stormwater Management Plan covers the hydraulic design of site stormwater drainage system including gross pollutant traps, rainwater tanks, grassed swales and bio retention trenches. The drainage is verified with DRAINS with respect to the hydraulic performance and MUSIC to validate the performance of the various environmental elements.

A2 PLANNING POLICIES

Council's Stormwater Quality Control Policy (Penrith DCP 2006) sets the water quality discharge standards for new developments and methodology for demonstrating that the standards are met. Tables 1, 2 and 3 have been extracted from the DCP

Table 1 - Modeling Water Quality Impacts of New Developments

Total Development Area	Modeling Approach	Description
Small (5 ha to 10 ha)	Level 1 Average Annual Storm Load	*This prediction level estimates the average annual pollution loads for stormwater, commonly expressed in kilograms of pollutant exported per year. These relatively simple modeling techniques, which may relate to land use, annual rainfall, catchment runoff characteristics and average pollutant concentrations to estimate the actual pollutant load.*
Medium (10 ha to 50 ha)	Level 2 Actual Event Load	*This level assesses the pollutant loads from a storm event or on a daily basis. These models use daily or event runoff, which is then used to calculate pollutant loads.*
Large (> 50 ha)	Level 2 or 3 Actual Distribution of Concentrations & Load within Events. (On-site calibration)	*This level estimates actual pollutant concentrations and loads, as a function of time, within each storm event. This form of modeling uses relatively short duration rainfall data (eg, 5-60 mins) and complex modeling of runoff characteristics from pervious and impervious areas to generate pollutographs, which indicate variations in pollutant concentration over time.*

Table 2 – Pollutant Retention Criteria

Pollutant	Description	Retention Criteria
Litter	All anthropogenic material (cans, bottles, wrapping etc)	70% of material ≥ 5 mm diameter
Coarse Sediment	Course sand (≥0.5mm)	80% of the load for particles ≤ 0.5 mm dia.
Nutrients	Total Phosphorus &* Total Nitrogen	45% retention of the load for each
Fine Particulates	fine sand (<0.5mm)	50% of the load for particles ≤ 0.1mm dia.
Free Oil & Grease	Free floating viscous liquids ≥ 150 µm that do not emulsify in aqueous solutions	90% of the load with no visible discharges
Free Oil & Grease	Free floating viscous liquids ≥ 150 µm that do not emulsify in aqueous solutions	90% of the load with no visible discharges

Table 3 – Average Annual Pollutant Loading Rates (Suitable for Use in Western Sydney in the Absence of Site Specific Information)

Land Use	Runoff Coeff (CV)	Course Sediment (KGS/HA/AN)	Fine Particulates (KGS/HA/ AN)	Total Phosphorus (KGS/HA/ AN)	Total Nitrogen (KGS/ HA/AN)	Organic Matter (M3/HA/AN)	Litter (M3/HA/AN
Natural	0.15	15	-	0.03	0.54	0.09	-
Pre-Development	0.2	90	-	0.16	1.26	0.05	0.01
Residential	0.35	500	45	0.8	4.8	0.25	0.05
Commercial	0.5	900	100	1.6	8.1	0.2	0.45
Industrial	0.52	950	110	1.7	9.5	0.2	0.35

A3 POLLUTANT GENERATION

The size of the total development parcel is larger than 5Ha, accordingly, Council's Water Quality Policy and the Precinct Plan requires that performance modelling be undertaken using a computer model such as MUSIC. This relates to Level 2 modeling and requires daily or event runoff to calculate pollutant loads. The MUSIC computer model produced by the Cooperative Research Centre for Catchment Hydrology (CRCCH) has been used to model the total pollutants generated from the developed site and the likely performance standards of the treatments proposed.

The rainfall / runoff parameters and source pollution concentration parameters were adopted from the BCC Draft MUSIC Modeling Guidelines. Otherwise project specific or default parameters within the MUSIC model were adopted. The pre development land use type Source Node selected is intended to reflect an agricultural context. The rainfall information used for the model run was the 6 minute time step data for Sydney-Observatory Hill for the Reference Year of 1959. This reference point rainfall is greater than would occur at Kemps Creek and would therefore lead to a conservative result.

Music Model inputs:

Selection of meteorological data – rainfall and evaporation inputs – (Continuous simulation for the Reference Year with 6 minute time step to allow for the small scale treatment processes)
Soil properties calibration
Pollution generation characteristics of source nodes

Table 4 details the pollutant loads generated for the site.

Table 4 Pollutants Generated – Predevelopment - Agricultural Land-use

Flow (ML/yr)	36.8
Total Suspended Solids (kg/yr)	777
Total Phosphorus (kg/yr)	8.1
Total Nitrogen (kg/yr)	68
Gross Pollutants (kg/yr)	176

A4 PROPOSED WATER QUALITY CONTROL TREATMENT TRAIN

The most effective treatment train for water quality control comprises at source grass swales, Detention Tanks and GPT's for primary treatment to remove solid gross pollutants (larger than 5mm) and hydrocarbons. This is followed by secondary treatment measures such as buffer strips and vegetated swales to remove coarse sediment then tertiary treatment, using bio-retention systems or wetlands to remove fine sediments, hydrocarbons and nutrients.

The warehouse development proposed for this site is intensive with limited locations for pollutant treatment facilities. Never-the-less a treatment train is proposed as follows:

- Grass swales where topography allows to pickup runoff from roads and car parks
- Primary / Secondary Treatment – Two Ecosol RSF 4000 GPTs and detention tanks
- Tertiary treatment – Bio-retention system.

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The site sub-catchments were considered as component types for the purposes of MUSIC modeling. Those component types are:

- Roof Area
- Hardstand, road pavement and footpath areas
- Minor other impervious area
- Landscape areas – pervious areas

It is proposed to provide the following treatment processes within the water quality treatment train in the development:

- Grass swales
- Stormwater harvesting for rainwater capture and re-use i.e. quantity reductions.
- Detention tank and Ecosol (GPT's) to capture solids i.e. quality improvements.
- Bio-retention swale to remove remaining fine sediment and hydrocarbons.

Stormwater harvesting will have first call on some one-half of the stormwater from each warehouse roof. All stormwater from pavements / hardstand areas shall mostly pass through the detention tank and GPT's to remove gross pollutants. Areas capable of draining to the proposed bio-retention swales do so. A portion of the roof water captured in rainwater tanks may be reused in toilet flushing, washing down pavements etc and irrigation of the site's landscape areas.

A4.1 STORMWATER HARVESTING & REUSE

It is proposed to capture rainwater in storage tanks. The tanks shall be filled by the connection of warehouse roof water downpipes. This involves runoff from a minimum catchment of approximately 2,500 sqm per warehouse. With such catchments, it will take only 2 mm of rain to completely fill the tanks.

With regard to first flush devices on rainwater collection, it is noted that there are no products available for the first flush treatment of downpipes of 150dia or larger. All the downpipes connected to the rainwater tanks will be of 225 dia meaning that there is no first flush system available for use. It is proposed to install a screen over the inlet of the rainwater tank to remove large particle matter.

The inclusion of rainwater tanks will reduce the frequency of peak discharge from the site for the small storm events that stormwater quality systems are normally designed for and provide water for toilet flushing purposes, reducing the demand on mains water.

The model parameters for the rainwater tanks and reuse are included in the MUSIC model.

A4.2 GROSS POLLUTANT TRAPS

It is proposed to install an Ecosol unit in the stormwater system in each catchment. These are required to help remove 80 % of the Total Suspended Solids (TSS) from the annual discharge. All the roof area runoff has been routed through the GPTs. The GPTs also remove the solid litter and oils that may be flushed into the stormwater pipe network.

A4.3 BIO-RETENTION FILTER

These pollutant filter facilities consist of permeable soil, sand and gravel layers some 1010 mm in overall depth which trap sediments and the attached nutrients, metals and other soluble pollutants as they seep through the layers to underlying subsoil drainage lines located at the bottom of the filter media containing trenches. The bio-retention filter is primarily targeting flows up to the 3 month discharge, however runoff up to approximately the 1 year event is to be routed through the facility.

The pollutant removal parameters used in the modelling of the Bio-retention filter are based on the default values found in MUSIC.

The catchments delivering runoff to the Bio-retention filter comprises the southern part of the site (approximately 60 per cent of the site), together with the relatively small area immediately adjacent to the facility. The roofs make up approximately 63 percent of the combined roof and trafficked hardstand area that is served by the Bio-retention filter. With respect to the roof area, approximately 47 percent of that area is directed towards the rainwater harvesting storage tanks. Having regard to the high proportion of roof area, and recognising that Suspended Solid wash-off from roofs during storm events is only of the order of 7.5 percent of that from trafficked hardstand areas, (BCC Draft Music Modelling Guidelines), a filter area has been selected that represents 1.0 percent of the total impervious area served by the

Bioretention filter. It is proposed to install a Bio-retention filter of 1,800m^2 for Metcash and 2,500m^2 for DHL.

The bio-retention filter functions include:

- Water quality improvements.
- Reduction in stormwater peak discharges though storage effects, the increase in time of concentration to the pit locations and by requiring the runoff to pass over pervious areas.

Table 5: Bio-Retention Basin Design Parameters

Parameter	Value
Extended Detention Depth (m)	0.1
Filter Area (m^2)	1,800 & 2500
Filter Depth (m)	0.5
Mean Filter Particle Diameter (mm)	0.5
Saturated Hydraulic Conductivity (mm/hr)	150

A4.4 TREATMENT TRAIN PERFORMANCE

MUSIC has been used to simulate the performance of the stormwater quality treatment train proposed for the development. A continuous simulation approach has been adopted and the 3 month ARI peak discharges are used as the treatable design flows for most of the facilities modelled. Such flows can carry in excess of 90% of the annual pollutant loads discharged from a catchment.

A 6 minute simulation time step has been used and a Reference year design approach adopted.

Based on the Treatment train proposed MUSIC modelled the likely performance for the removal of the target pollutants as follows:

Table - 6: Pollutant Loads and Likely Reductions

Mamre Rd. (DHL)	Sources Loads	Residual Load	Reduction (%)	Target Value (%)
Flow (ML/yr)	352	310	12.0	
Total Suspended Solids (kg/yr)	59,250	3,240	94.5	80
Total Phosphorus (kg/yr)	135	29	78.3	45
Total Nitrogen (kg/yr)	1,089	473	56.6	45
Gross Pollutants (kg/yr)	7,996	0.0	100.0	90
Bakers La. (DHL)	**Sources Loads**	**Residual Load**	**Reduction (%)**	**Target Value (%)**
Flow (ML/yr)	227	197	13.4	
Total Suspended Solids (kg/yr)	37,830	2,870	92.4	80
Total Phosphorus (kg/yr)	82	20	75.1	45
Total Nitrogen (kg/yr)	703	340	51.6	45
Gross Pollutants (kg/yr)	5,236	0	100.0	90

The above table shows that the treatment train proposed can meet the requirements of Council's Water Quality Control Policy .

The MUSIC model does not explicitly address hydrocarbons in its analysis. It is however anticipated that, with the proposed treatment train, the objective of 90 percent removal will substantially be realised. Annexure B shows a diagram of the MUSIC model layout of the proposed treatment train.

A5 ANALYSIS OF UPSTREAM CATCHMENTS

The site is located towards the top of a ridge line within the South Creek catchments. Under existing conditions some of the runoff from adjacent areas would pass through the site. The minor upstream catchment has been intercepted and diverted around the development. (Refer Annexure "C" PRE- DEVELOPMENT CATCHMENT PLAN)

Surface flows from the minor upstream catchment converge near the North Eastern corner of the site. These flows are intercepted and conveyed via a pipe to the north-eastern corner, then allowed to flow in an open swale to the existing site discharge point on Bakers Lane. This pipe/swale system will convey the 100 year storm flows around the new development.

Development of the site in the manner proposed within this report is expected to meet and generally exceed Penrith City Council's objectives and performance criteria for water.

The proposed design makes use of Best Management Practices as well as high quality proprietary equipment. The treatment train proposal reduces peak flows while improving water quality. The proposed design is sympathetic to the industrial nature of the overall development area and should lend itself to relatively minimal maintenance requirements.

A6 STORMWATER DRAINAGE SYSTEM

Generally stormwater runoff generated from the roof and surface areas is collected via a pit and pipe system which has been designed to a minimum 1 in 20 year ARI standard. The site pavement grading allows for runoff in excess of the pipe capacity or pipe blockage to be directed to the OSD in the low points at Bakers Lane and Mamre Road.

The OSD discharge is then treated through a GPT and discharges to the Bio-filtration system. The two OSD storages have been designed such that the post development discharges do not exceed the state of nature flows.

Pre-development flows were determined for all recurrence intervals up to 100 years after determining the natural flow paths and time of concentration (Refer Annexure C and B). The calculated flows were:-

Table - 7: Pre-Development Flows & Critical Storm Durations

ARI (yrs)	Critical Storm (hrs)	Metcash (m^3/s)	Critical Storm (hrs)	DHL (m^3/s)
5	2	3.82	2	3.44
10	2	4.45	2	4.25
20	2	5.29	1	5.37
50	1	6.12	1	6.42
100	1	7.01	1	7.51

The internal drainage system provides for 1,100m^3 of rainwater storage for Metcash and 600m^3 for DHL. This storage is distributed across the site in underground tanks. The larger storage provided for Metcash is to feed the cooling towers required for their cool rooms and freezers. The reduction of storm flows due to water harvesting was not considered in the design of detention or piping.

The internal drainage design for DHL and Metcash meets and in some areas exceeds the flows generated by the 20 year storm. Detail DRAINS calculations are contained in Annexure D and the resultant element sizes in Annexure E

The following table summarises the calculated flows at each discharge point and the subsequent basin storages required to achieve this.

Table - 8: Pre / Post Development Discharge & Basin Volumes

	Metcash			DHL		
ARI (yrs)	PSD (m^3/s)	Discharge (m^3/s)	Basin Storage (m^3)	PSD (m^3/s)	Discharge (m^3/s)	Basin Storage (m^3)
5	3.82	3.38	690	3.44	3.55	2,100
10	4.45	3.58	1,190	4.25	3.73	2,750
20	5.29	4.45	1,700	5.37	4.82	3,400
50	6.12	5.15	2,005	6.42	5.79	4,000
100	7.01	5.85	2,250	7.51	7.15	4,250

ARI Average Recurrence Interval , PSD Permissible site discharge

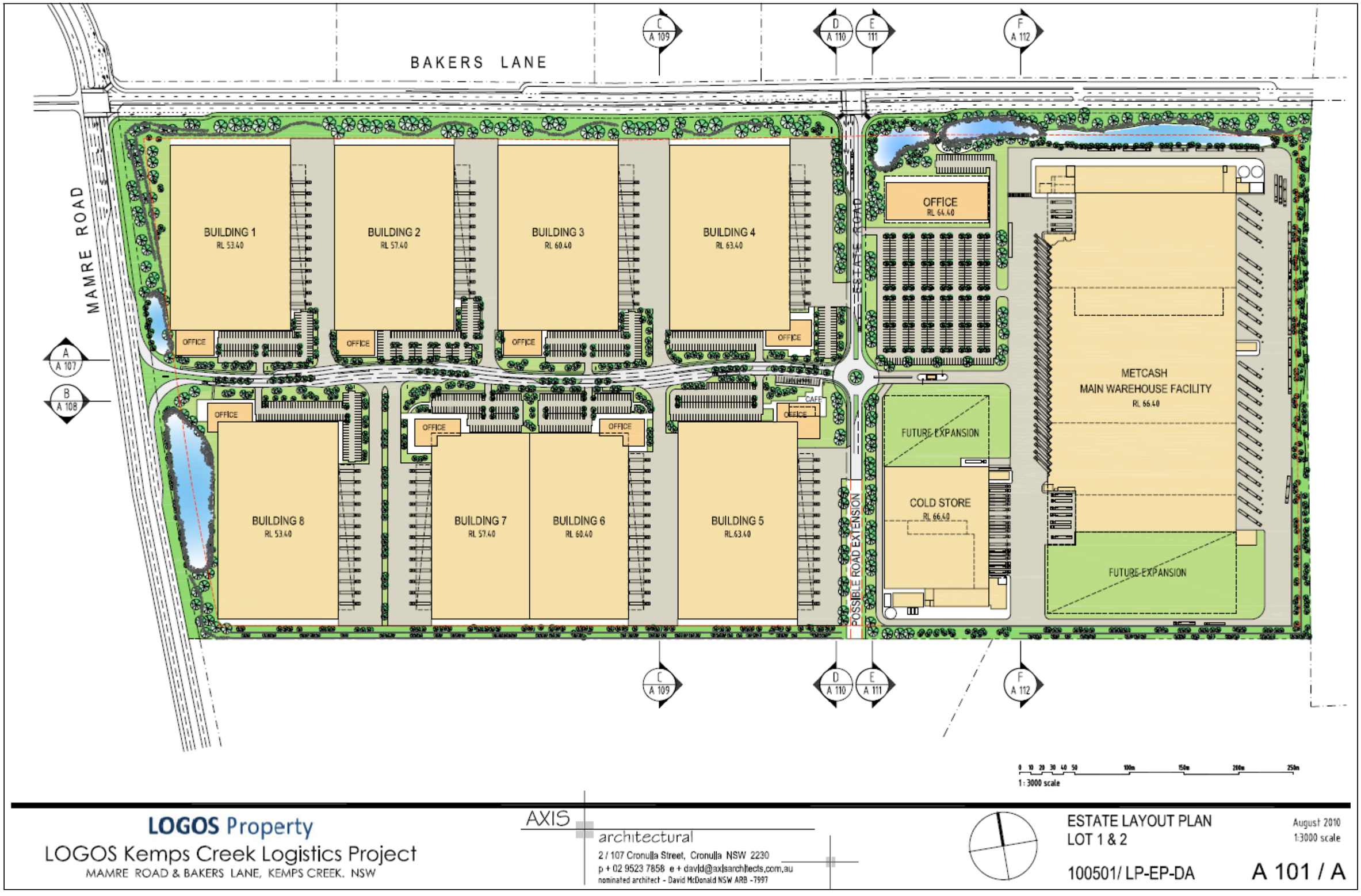
Road drainage in Bakers Lane and Mamre Road was designed for a 1 in 20 year ARI
To meet current standards the two existing culverts in Mamre Road are to be replaced with a 600 and 1500 diameter pipes and the one in Bakers Lane will be replaced with a 1800 diameter pipe.

As this site is located at the top of the catchment it is not subject to flooding.

There are no adverse drainage impacts from this development on the neighboring properties as relative to the current state there is up to 15% reduction in stormwater flows.

ANNEXURE "A"

SITE LAYOUT PLAN



LOGOS Property

LOGOS Kemps Creek Logistics Project

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nominated architect - David McDonald NSW ARB -7997

ESTATE LAYOUT PLAN
LOT 1 & 2

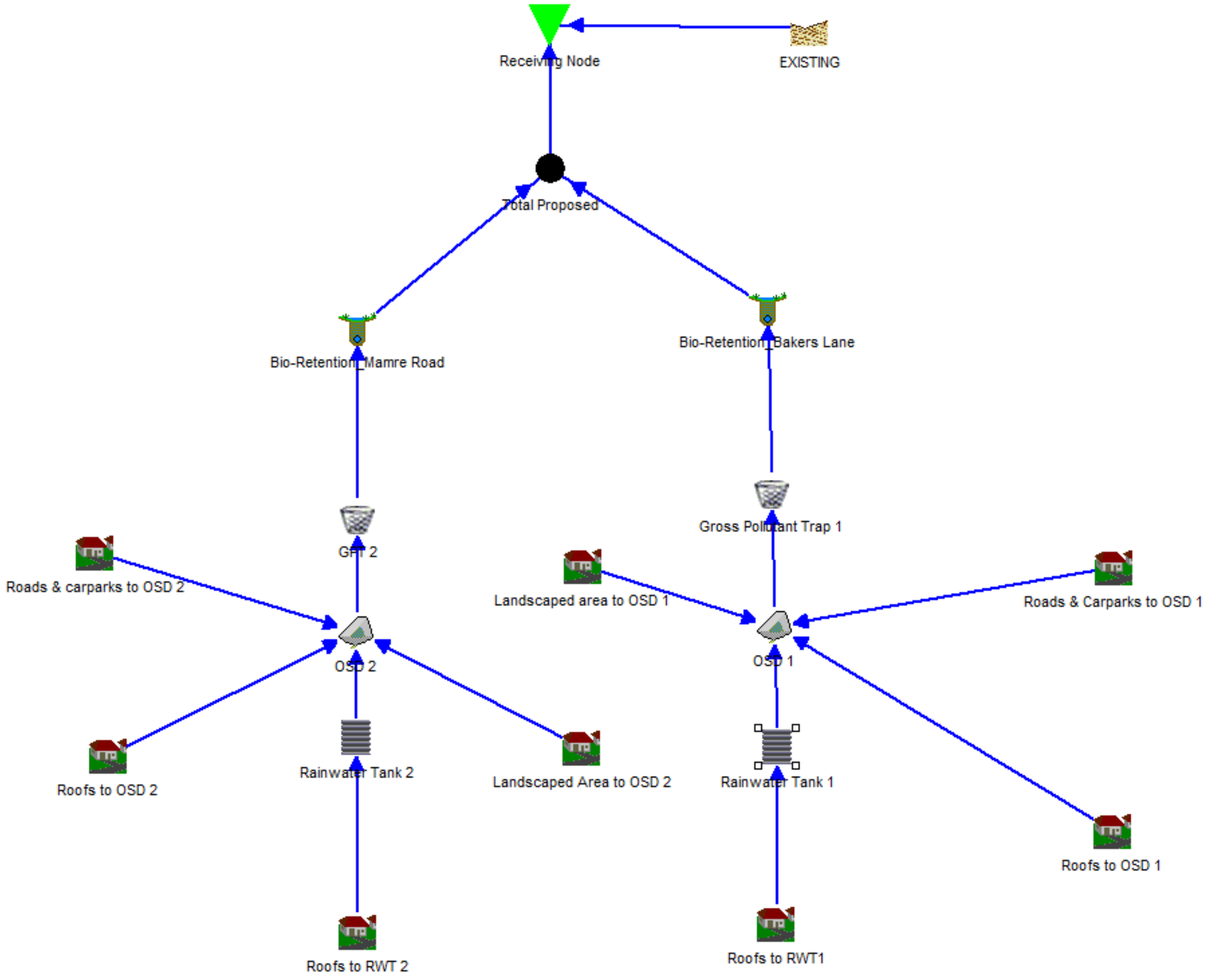
August 2010
1:3000 scale

100501/ LP-EP-DA

A 101 / A

ANNEXURE "B"

MUSIC Models


Receiving Node
EXISTING
Total Proposed
Bio-Retention_Mamre Road
Bio-Retention_Bakers Lane
GPT 2
Gross Pollutant Trap 1
Roads & carparks to OSD 2
Landscaped area to OSD 1
Roads & Carparks to OSD 1
OSD 2
OSD 1
Roofs to OSD 2
Rainwater Tank 2
Landscaped Area to OSD 2
Rainwater Tank 1
Roofs to OSD 1
Roofs to RWT 2
Roofs to RWT1

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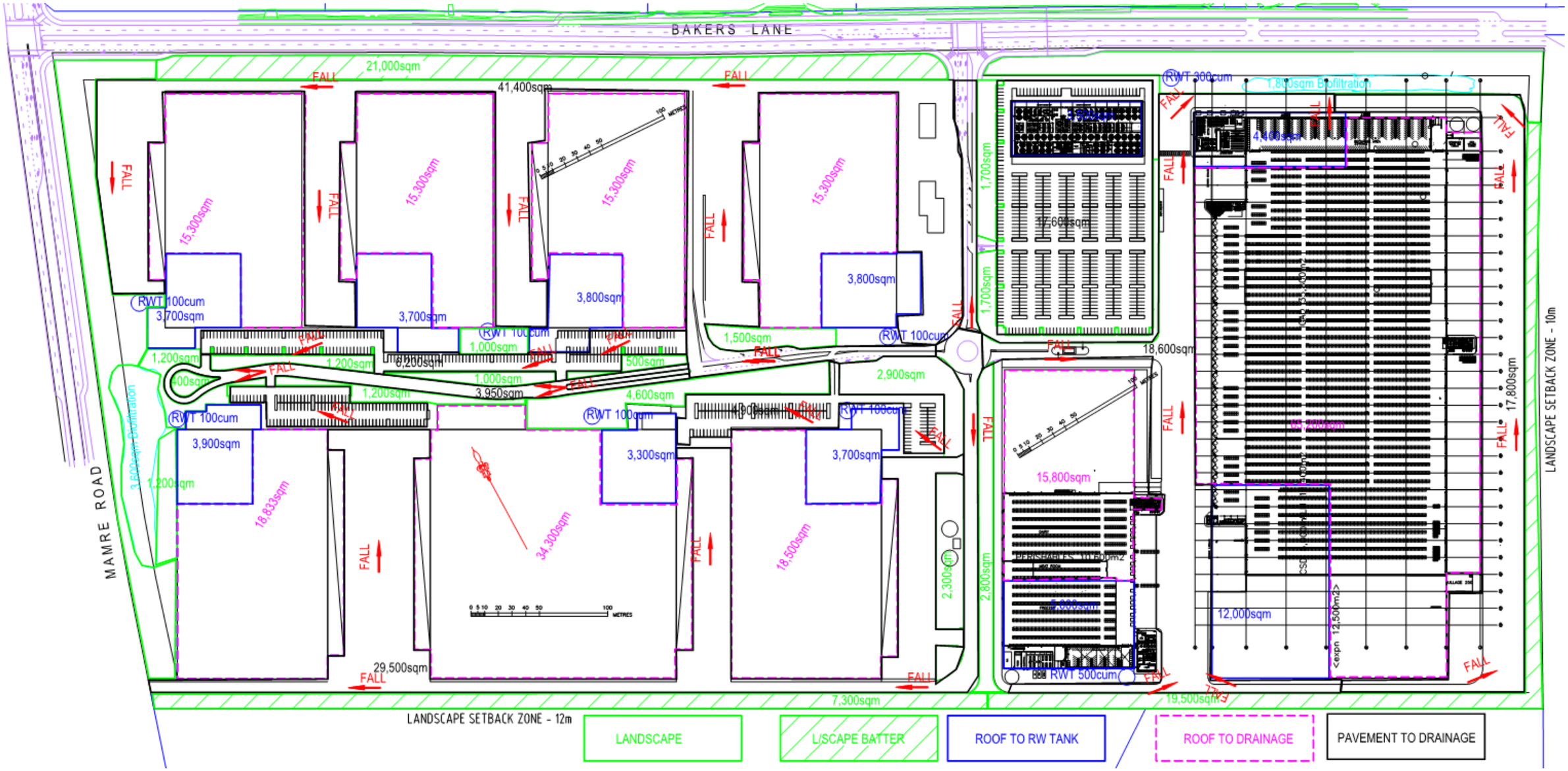

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Bakers Lane Catchment

Inflows

Roofs to RWT		Roofs to OSD 1		Hard Stand to OSD 1		Landscape to OSD 1		Total Load
Flow (ML/yr)	34.5	Flow (ML/yr)	109	Flow (ML/yr)	72.8	Flow (ML/yr)	11.1	227.4
Total Suspended Solids (kg/yr)	1.20E+03	Total Suspended Solids (kg/yr)	3.40E+03	Total Suspended Solids (kg/yr)	3.19E+04	Total Suspended Solids (kg/yr)	1.33E+03	37830
Total Phosphorus (kg/yr)	6.68	Total Phosphorus (kg/yr)	19.1	Total Phosphorus (kg/yr)	52.4	Total Phosphorus (kg/yr)	3.4	81.58
Total Nitrogen (kg/yr)	103	Total Nitrogen (kg/yr)	351	Total Nitrogen (kg/yr)	219	Total Nitrogen (kg/yr)	29.7	702.7
Gross Pollutants (kg/yr)	8.36E+02	Gross Pollutants (kg/yr)	2.64E+03	Gross Pollutants (kg/yr)	1.76E+03	Gross Pollutants (kg/yr)	0	5236

Outflows

RWT 1				
Flow (ML/yr)	34.5	15.1	56.2	
Total Suspended Solids (kg/yr)	1.20E+03	457	61.8	
Total Phosphorus (kg/yr)	6.68	2.74	59.1	
Total Nitrogen (kg/yr)	103	43.9	57.6	
Gross Pollutants (kg/yr)	836	0	100	

OSD				Treatment train removal up to this point
Flow (ML/yr)	208	208	0	8.53122252
Total Suspended Solids (kg/yr)	3.71E+04	9.93E+03	73.3	73.7509913
Total Phosphorus (kg/yr)	77.7	38.7	50.2	52.5619024
Total Nitrogen (kg/yr)	644	556	13.7	20.8766188
Gross Pollutants (kg/yr)	4.41E+03	0	100	100

GPT				Treatment train removal up to this point
Flow (ML/yr)	208	208	0	8.53122252
Total Suspended Solids (kg/yr)	9.93E+03	2.25E+03	77.3	94.0523394
Total Phosphorus (kg/yr)	38.7	28.6	26	64.9423878
Total Nitrogen (kg/yr)	556	492	11.4	29.9843461
Gross Pollutants (kg/yr)	0	0	0	100

Bio retention 1				Treatment train removal up to this point
Flow (ML/yr)	208	197	5.2	13.3685136
Total Suspended Solids (kg/yr)	2.25E+03	2.87E+03	-27.6	92.4134285
Total Phosphorus (kg/yr)	28.6	20.3	29	75.1164501
Total Nitrogen (kg/yr)	492	340	31	51.6151985
Gross Pollutants (kg/yr)	0	0	0	100

Parameters

Catchments:		
Roof to RWT	2.56	ha
Roof to OSD	8.1	ha
Hardstand area to OSD	5.4	ha
Landscape area to OSD	2.41	ha
RWT volume	800	m3
Usage for toilet flushing	2.9	KL/d
Usage for irrigation	30	ML/a
Area	400	m2
Depth above overflow pipe	0.5	m
Overflow pipe D	450	mm
OSD		
V	4800	m3
Depth	2	m3
Area	2400	m2
Orifice D	900	mm
GPT		
Ecosol RSF 4000		
Qmax	750	l/s
Removal rates:		
TSS	91%	
TP	30%	
TN	13%	
Oils	97%	
GP	95%	
Bioretention		
Total Area	1800	m2
Detention depth above	0.5	m
Seepage loss	1	mm/hr
Filter area	1500	m2
Filter depth	1	m
Filter median diameter	0.2	mm
Saturated Hydraulic condactivity	10	mm/hr
Overflow weir	10	m

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Birkenhead Point
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Mamre Rd Catchment

Inflows

Roofs to RWT		Roofs to OSD 1		Hard Stand to OSD 1		Landscape to OSD 1		Total Load
Flow (ML/yr)	34.9	Flow (ML/yr)	179	Flow (ML/yr)	116	Flow (ML/yr)	22.4	352.3
Total Suspended Solids (kg/yr)	1.11E+03	Total Suspended Solids (kg/yr)	6.06E+03	Total Suspended Solids (kg/yr)	4.97E+04	Total Suspended Solids (kg/yr)	2.38E+03	59250
Total Phosphorus (kg/yr)	17.4	Total Phosphorus (kg/yr)	32.3	Total Phosphorus (kg/yr)	78.7	Total Phosphorus (kg/yr)	6.87	135.27
Total Nitrogen (kg/yr)	113	Total Nitrogen (kg/yr)	548	Total Nitrogen (kg/yr)	370	Total Nitrogen (kg/yr)	57.7	1088.7
Gross Pollutants (kg/yr)	8.46E+02	Gross Pollutants (kg/yr)	4.34E+03	Gross Pollutants (kg/yr)	2.81E+03	Gross Pollutants (kg/yr)	0	7996

Outflows

RWT 1				
Flow (ML/yr)	34.9	13.7	60.9	
Total Suspended Solids (kg/yr)	1.11E+03	418	62.2	
Total Phosphorus (kg/yr)	17.4	6.46	63	
Total Nitrogen (kg/yr)	113	42.1	62.9	
Gross Pollutants (kg/yr)	846	0	100	

OSD				Treatment train removal up to this point
Flow (ML/yr)	331	331	0	6.0459835
Total Suspended Solids (kg/yr)	5.86E+04	1.71E+04	70.8	71.139241
Total Phosphorus (kg/yr)	124	64	48.5	52.687218
Total Nitrogen (kg/yr)	1.02E+03	876	13.9	19.537063
Gross Pollutants (kg/yr)	7.14E+03	0	100	100

GPT				Treatment train removal up to this point
Flow (ML/yr)	331	331	0	6.0459835
Total Suspended Solids (kg/yr)	1.71E+04	1.70E+03	90	97.130802
Total Phosphorus (kg/yr)	64	45	29.7	66.7332
Total Nitrogen (kg/yr)	876	759	13.4	30.283825
Gross Pollutants (kg/yr)	0	0	0	100

Bio retention 1				Treatment train removal up to this point
Flow (ML/yr)	331	310	6.4	12.006812
Total Suspended Solids (kg/yr)	1.70E+03	3.24E+03	-90.3	94.531646
Total Phosphorus (kg/yr)	45	29.4	34.6	78.265691
Total Nitrogen (kg/yr)	759	473	37.7	56.553688
Gross Pollutants (kg/yr)	0	0	0	100

Parameters

Catchments:		
Roof to RWT	2.59	ha
Roof to OSD	13.2835	ha
Hardstand area to OSD	8.595	ha
Landscape area to OSD	4.89	ha
RWT volume	600	m3
Usage for toilet flushing	4.6	KL/d
Usage for irrigation	60.87	ML/a
Area	300	m2
Depth above overflow pipe	0.5	m
Overflow pipe D	750	mm
OSD		
V	7200	m3
Depth	2	m3
Area	3600	m2
Orifice D	1100	mm
GPT		
Ecosol RSF 4000		
Qmax	750	l/s
Removal rates:		
TSS	91%	
TP	30%	
TN	13%	
Oils	97%	
GP	95%	
Bioretention		
Total Area	3600	m2
Detention depth above	0.5	m
Seepage loss	1	mm/hr
Filter area	3000	m2
Filter depth	1	m
Filter median diameter	0.2	mm
Saturated Hydraulic condactivity	10	mm/hr
Overflow weir	10	m

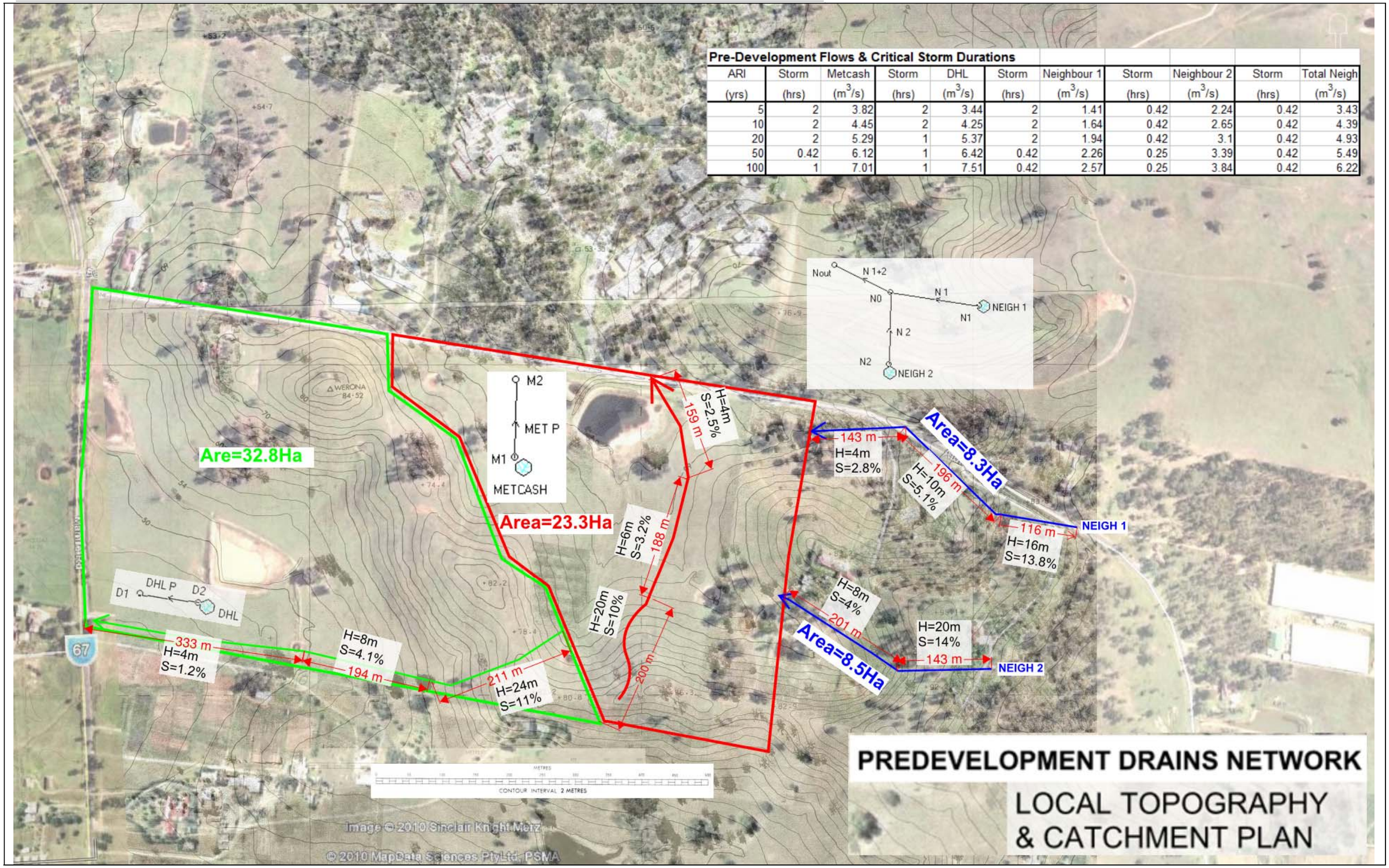
ANNEXURE "C"

Pre-Development Catchment Plan

Suite 407, Henry Lawson Business Centre
Birkenhead Point
Roseby Street, Drummoyne NSW 2047

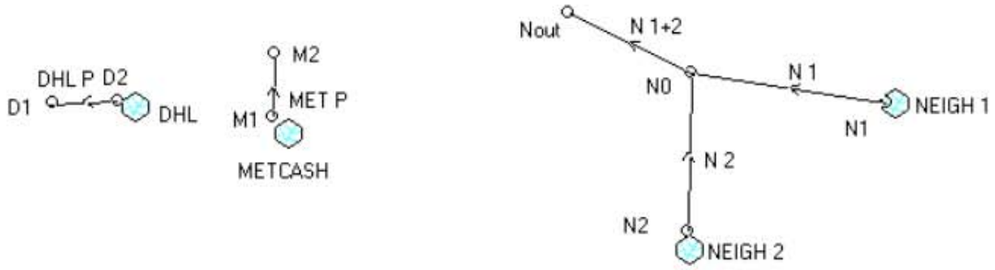
Pre-Development Flows & Critical Storm Durations

ARI	Storm	Metcash	Storm	DHL	Storm	Neighbour 1	Storm	Neighbour 2	Storm	Total Neigh
(yrs)	(hrs)	(m^3/s)	(hrs)	(m^3/s)	(hrs)	(m^3/s)	(hrs)	(m^3/s)	(hrs)	(m^3/s)
5	2	3.82	2	3.44	2	1.41	0.42	2.24	0.42	3.43
10	2	4.45	2	4.25	2	1.64	0.42	2.65	0.42	4.39
20	2	5.29	1	5.37	2	1.94	0.42	3.1	0.42	4.93
50	0.42	6.12	1	6.42	0.42	2.26	0.25	3.39	0.42	5.49
100	1	7.01	1	7.51	0.42	2.57	0.25	3.84	0.42	6.22



ANNEXURE "D"

DRAINS MODELS



DRAINS results prepared 20 August, 2010 from Version 2010.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfa Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N2	3.31		3.102				
N0	3.04		0				
Nout	2.98		0				
N1	3.04		1.943				
M1	5.08		5.292				
M2	5.02		0				
D2	6.08		5.377				
D1	6.02		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
NEIGH 2	3.102	0	3.102	0	6	0	AR&R 20 year, 25 minutes storm, average 82 mm/h, Zone 1
NEIGH 1	1.943	0	1.943	0	14	0	AR&R 20 year, 2 hours storm, average 33.5 mm/h, Zone 1
METCASH	5.292	0	5.292	0	15	0	AR&R 20 year, 2 hours storm, average 33.5 mm/h, Zone 1
DHL	5.377	0	5.377	0	28	0	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.00 impervious + 73.0 pervious = 73.0 total ha)

Storm	Total Rainf cu.m	Total Runo cu.m (Run	Impervious cu.m (Run	Pervious Runoff cu.m (Runoff %)
AR&R 20 y	19355.6	10484.44 (	0.00 (0.0%	10484.44 (54.2%)
AR&R 20 y	24955.33	14323.16 (	0.00 (0.0%	14323.16 (57.4%)
AR&R 20 y	37250.4	21772.72 (	0.00 (0.0%	21772.72 (58.4%)
AR&R 20 y	48936.8	27949.08 (	0.00 (0.0%	27949.08 (57.1%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
N 2	3.102	1.7	3.313	3.039	AR&R 20 year, 25 minutes storm, average 82 mm/h, Zone 1
N 1+2	4.931	2.6	3.039	2.979	AR&R 20 year, 25 minutes storm, average 82 mm/h, Zone 1
N 1	1.943	1.1	3.043	3.039	AR&R 20 year, 2 hours storm, average 33.5 mm/h, Zone 1
MET P	5.292	2.7	5.075	5.016	AR&R 20 year, 2 hours storm, average 33.5 mm/h, Zone 1
DHL P	5.377	2.7	6.082	6.022	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

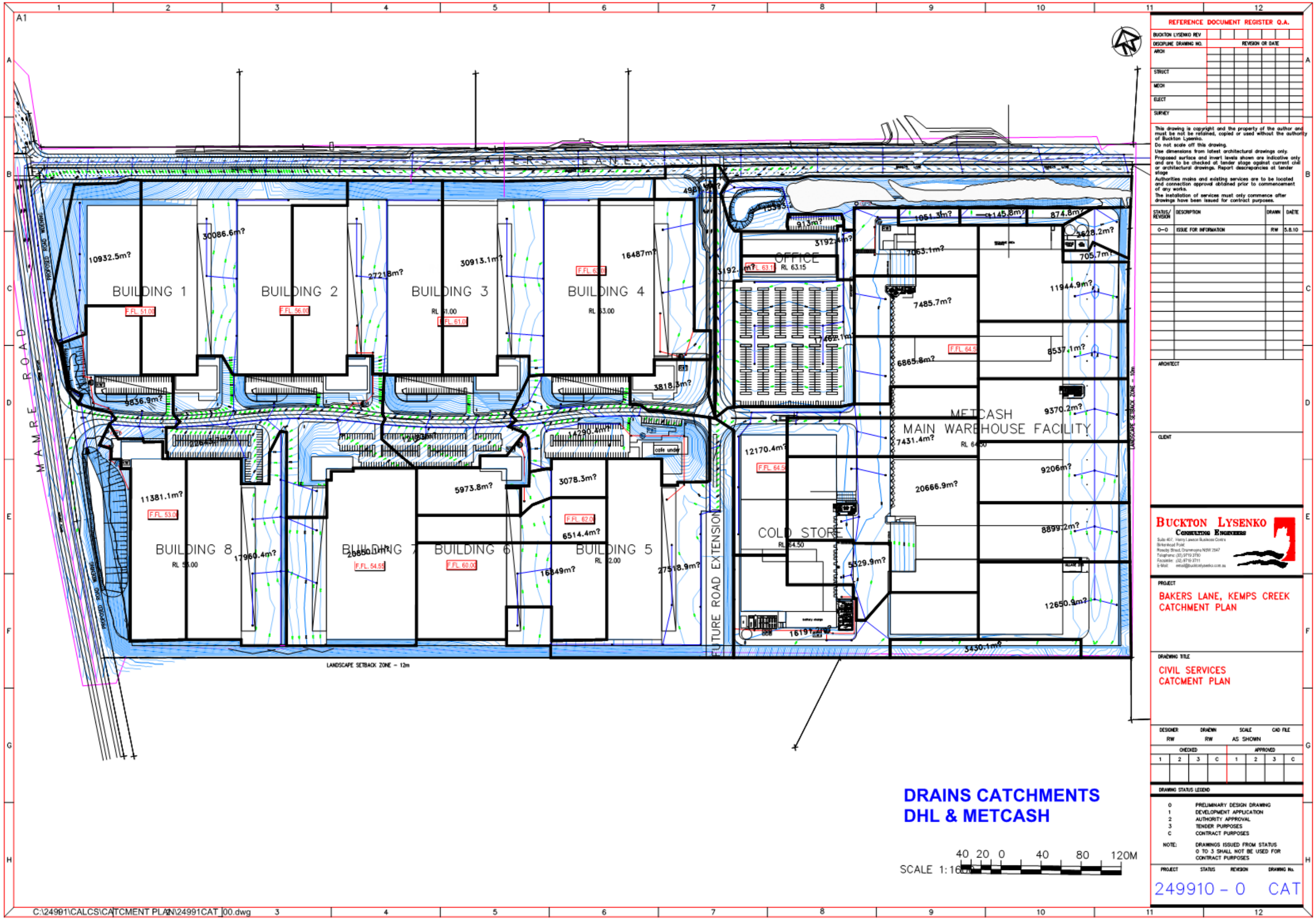
CONTINUITY CHECK for AR&R 20 year, 2 hours storm, average 33.5 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Ch (cu.m)	Difference %
N2	3366.37	3366.37	0	0
N0	6511.49	6511.04	0	0
Nout	6511.04	6511.04	0	0
N1	3145.12	3145.12	0	0
M1	8932.86	8932.86	0	0
M2	8932.86	8932.86	0	0
D2	12504.73	12504.73	0	0
D1	12504.73	12504.73	0	0

Pre-Development Flows & Critical Storm Durations

ARI (yrs)	Storm (hrs)	Metcash (m^3/s)	Storm (hrs)	DHL (m^3/s)	Storm (hrs)	Neighbour 1 (m^3/s)	Storm (hrs)	Neighbour 2 (m^3/s)	Storm (hrs)	Total Neigh (m^3/s)
5	2	3.82	2	3.44	2	1.41	0.42	2.24	0.42	3.43
10	2	4.45	2	4.25	2	1.64	0.42	2.65	0.42	4.39
20	2	5.29	1	5.37	2	1.94	0.42	3.1	0.42	4.93
50	0.42	6.12	1	6.42	0.42	2.26	0.25	3.39	0.42	5.49
100	1	7.01	1	7.51	0.42	2.57	0.25	3.84	0.42	6.22

PREDEVELOPMENT MODEL & FLOWS


A1
BAKERS LANE
MAMRE ROAD
FUTURE ROAD EXTENSION
LANDSCAPE SETBACK ZONE - 10m
LANDSCAPE SETBACK ZONE - 12m
BUILDING 1
F.F.L. 51.00
BUILDING 2
F.F.L. 56.00
BUILDING 3
RL 61.00
F.F.L. 61.00
BUILDING 4
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F.F.L. 63.00
BUILDING 8
RL 53.00
F.F.L. 53.0
BUILDING 7
F.F.L. 54.55
BUILDING 6
F.F.L. 60.00
BUILDING 5
RL 62.00
F.F.L. 62.0
OFFICE
RL 63.15
F.F.L. 63.1
COLD STORE
RL 64.50
METCASH
MAIN WAREHOUSE FACILITY
RL 64.50
F.F.L. 64.5
cafe under
10932.5m?
30086.6m?
27218m?
30913.1m?
16487m?
9836.9m?
3818.5m?
11381.1m?
5973.8m?
3078.3m?
6514.4m?
17960.4m?
16849m?
27518.9m?
913m?
3192.4m?
1740.1m?
1051.3m?
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7485.7m?
6865.8m?
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5329.9m?
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874.8m?
705.7m?
11944.9m?
8537.1m?
9370.2m?
9206m?
8899.2m?
12650.9m?
40 20 0 40 80 120M
SCALE 1:16
DRAINS CATCHMENTS
DHL & METCASH
REFERENCE DOCUMENT REGISTER Q.A.
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The installation of services must only commence after drawings have been issued for contract purposes.
STATUS/ REVISION
DESCRIPTION
DRAWN
DATE
0—0
ISSUE FOR INFORMATION
RW
5.8.10
ARCHITECT
CLIENT
BUCKTON LYSENKO
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PROJECT
BAKERS LANE, KEMPS CREEK
CATCHMENT PLAN
DRAWING TITLE
CIVIL SERVICES
CATCMENT PLAN
DESIGNER
DRAWN
SCALE
CAD FILE
RW
RW
AS SHOWN
CHECKED
APPROVED
1 2 3 C 1 2 3 C
DRAWING STATUS LEGEND
0 PRELIMINARY DESIGN DRAWING
1 DEVELOPMENT APPLICATION
2 AUTHORITY APPROVAL
3 TENDER PURPOSES
C CONTRACT PURPOSES
NOTE: DRAWINGS ISSUED FROM STATUS 0 TO 3 SHALL NOT BE USED FOR CONTRACT PURPOSES
PROJECT
STATUS
REVISION
DRAWING No.
249910 – 0 CAT
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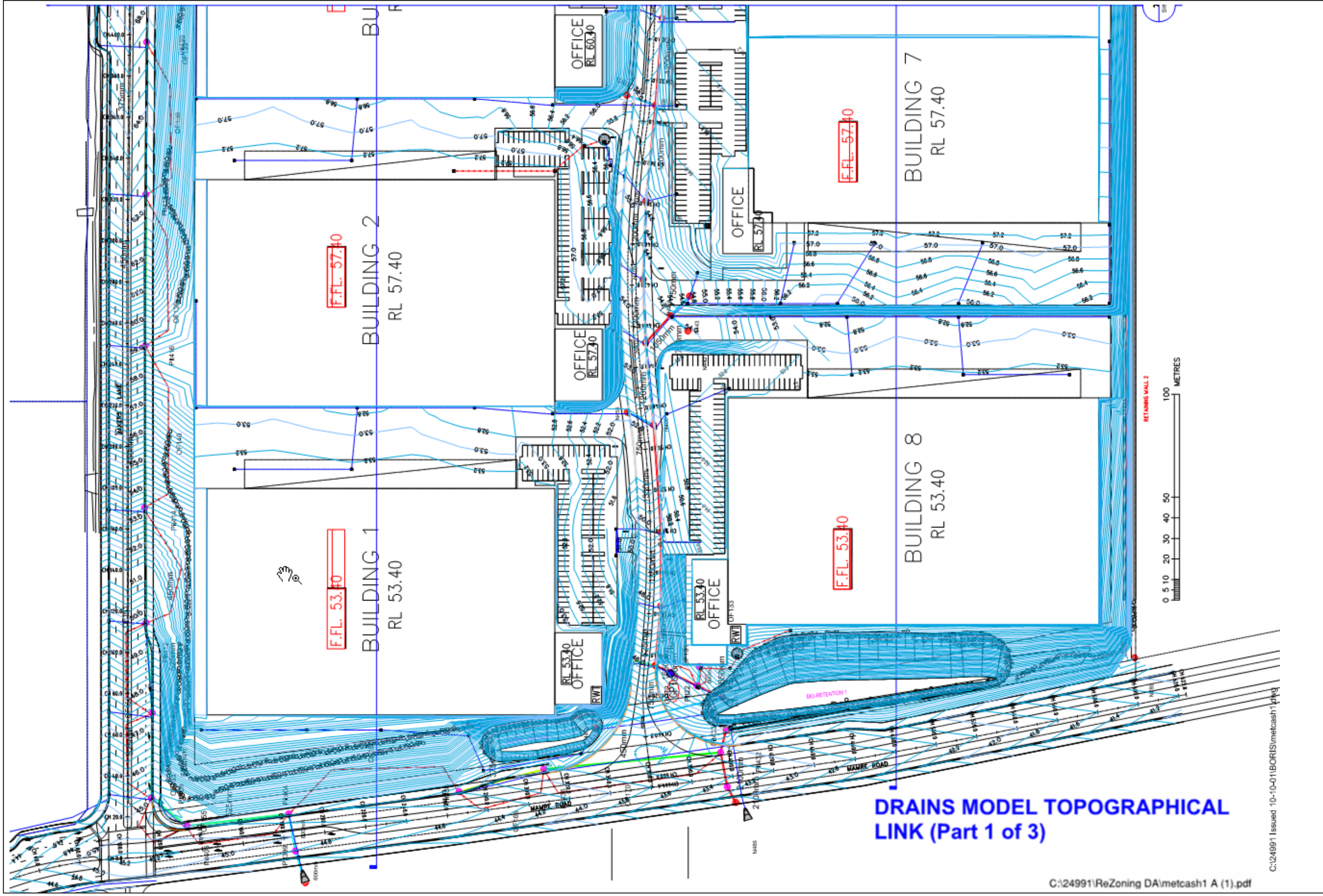

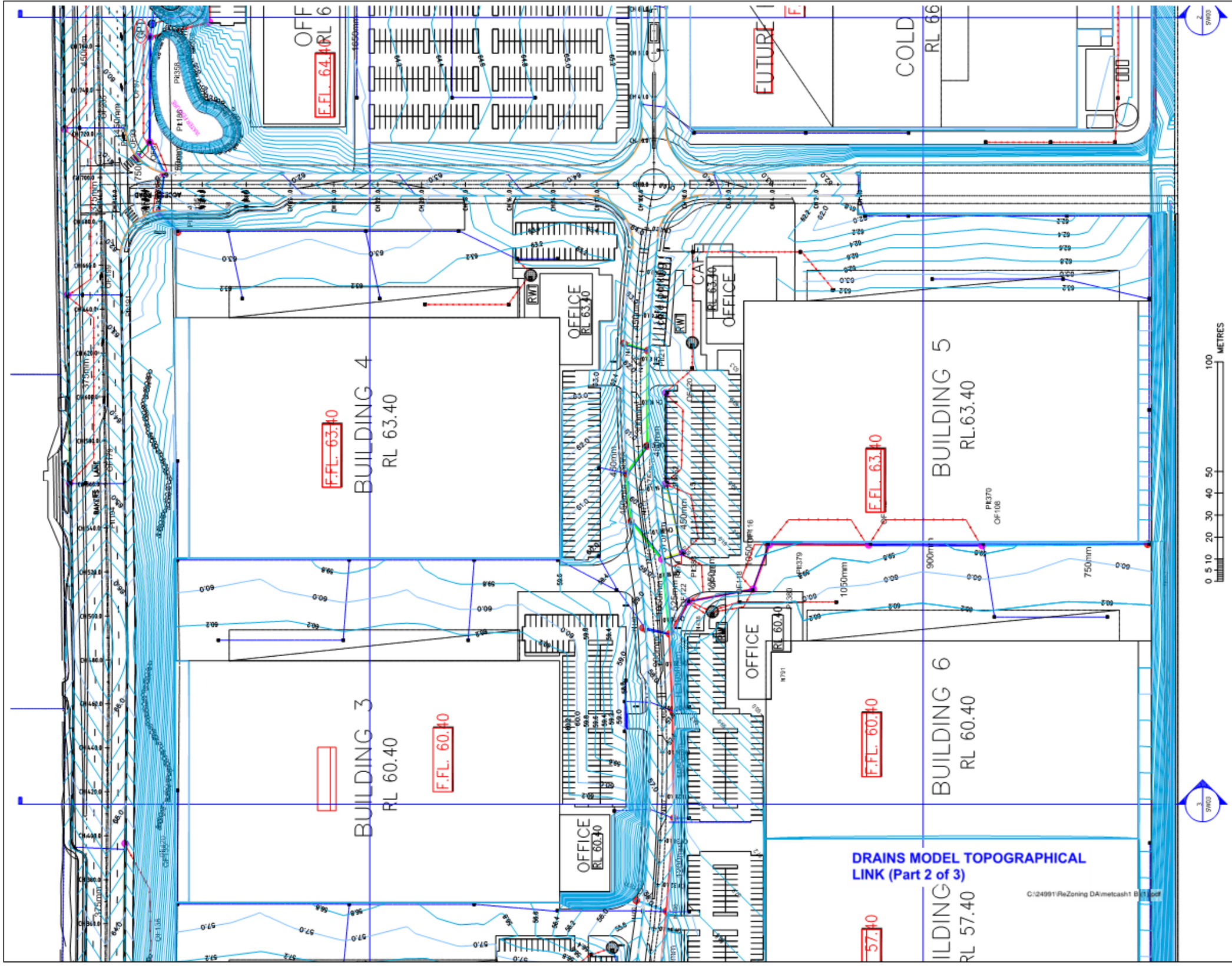
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RL 60.40
OFFICE
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CAFE
RL 63.40
FUTURE
COLD
RL 66
RWT
RWT
METRES
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DRAINS MODEL TOPOGRAPHICAL
LINK (Part 2 of 3)
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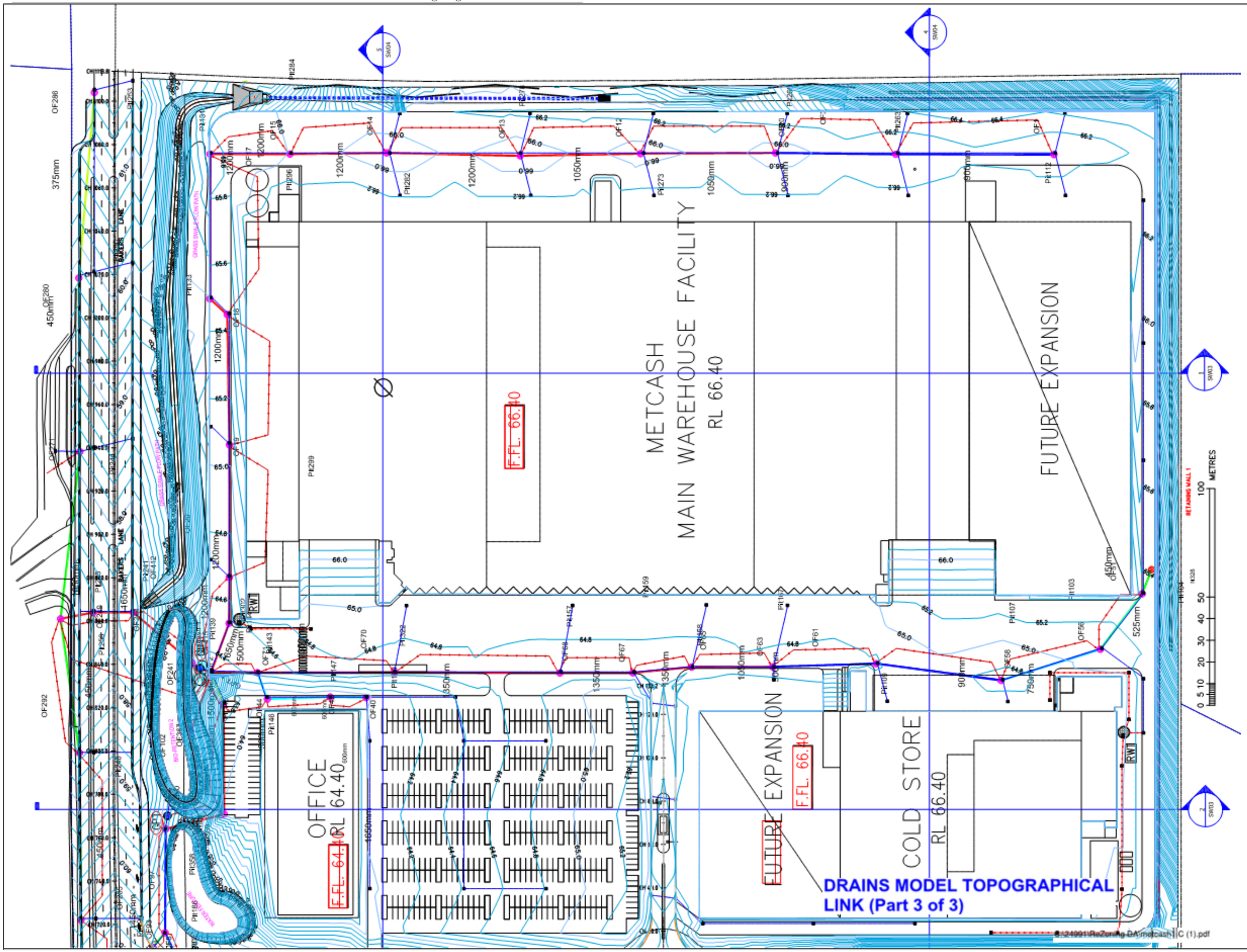

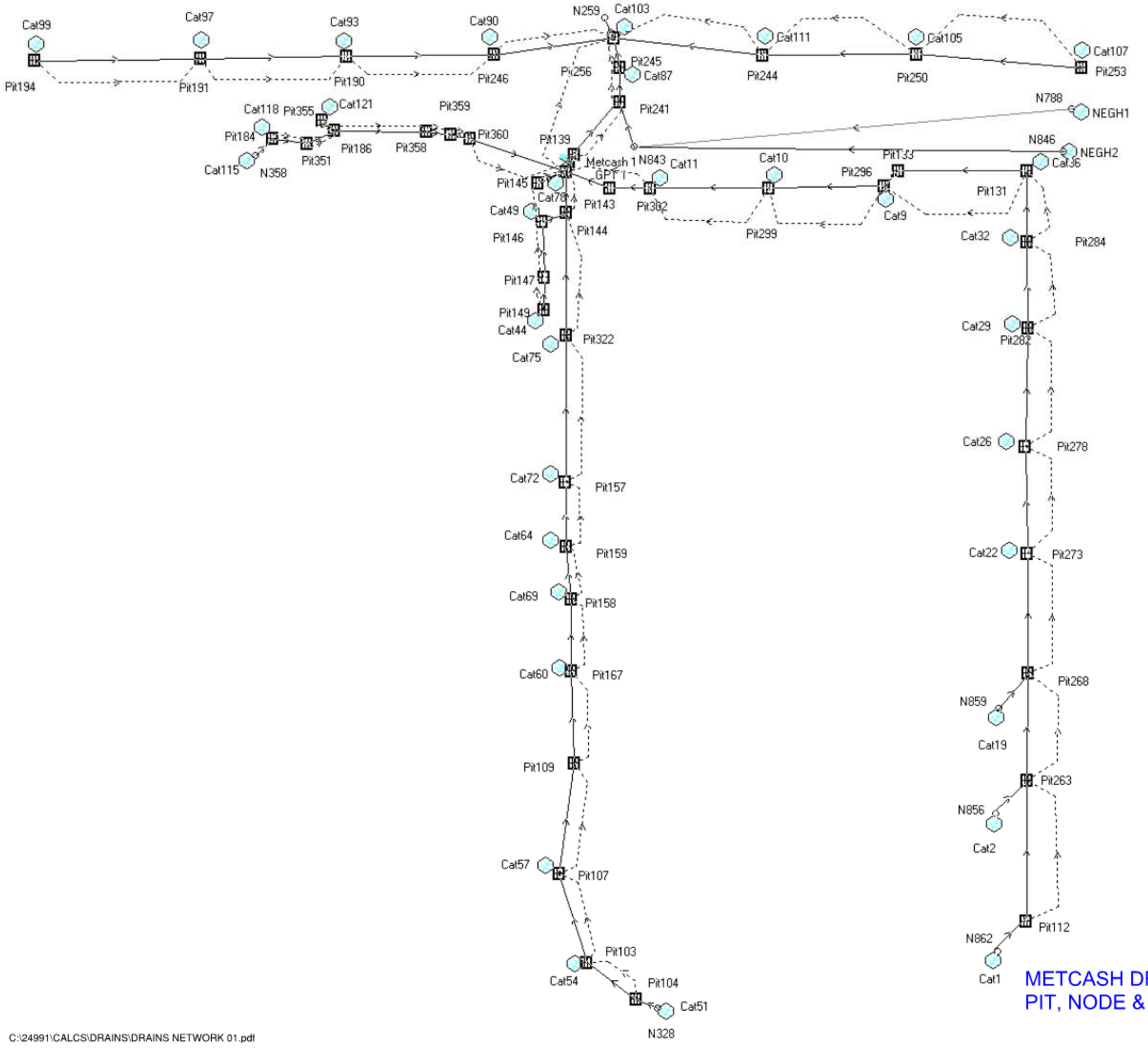

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METCASH DRAINS NETWORK
PIT, NODE & CATCHMENT NUMBERING

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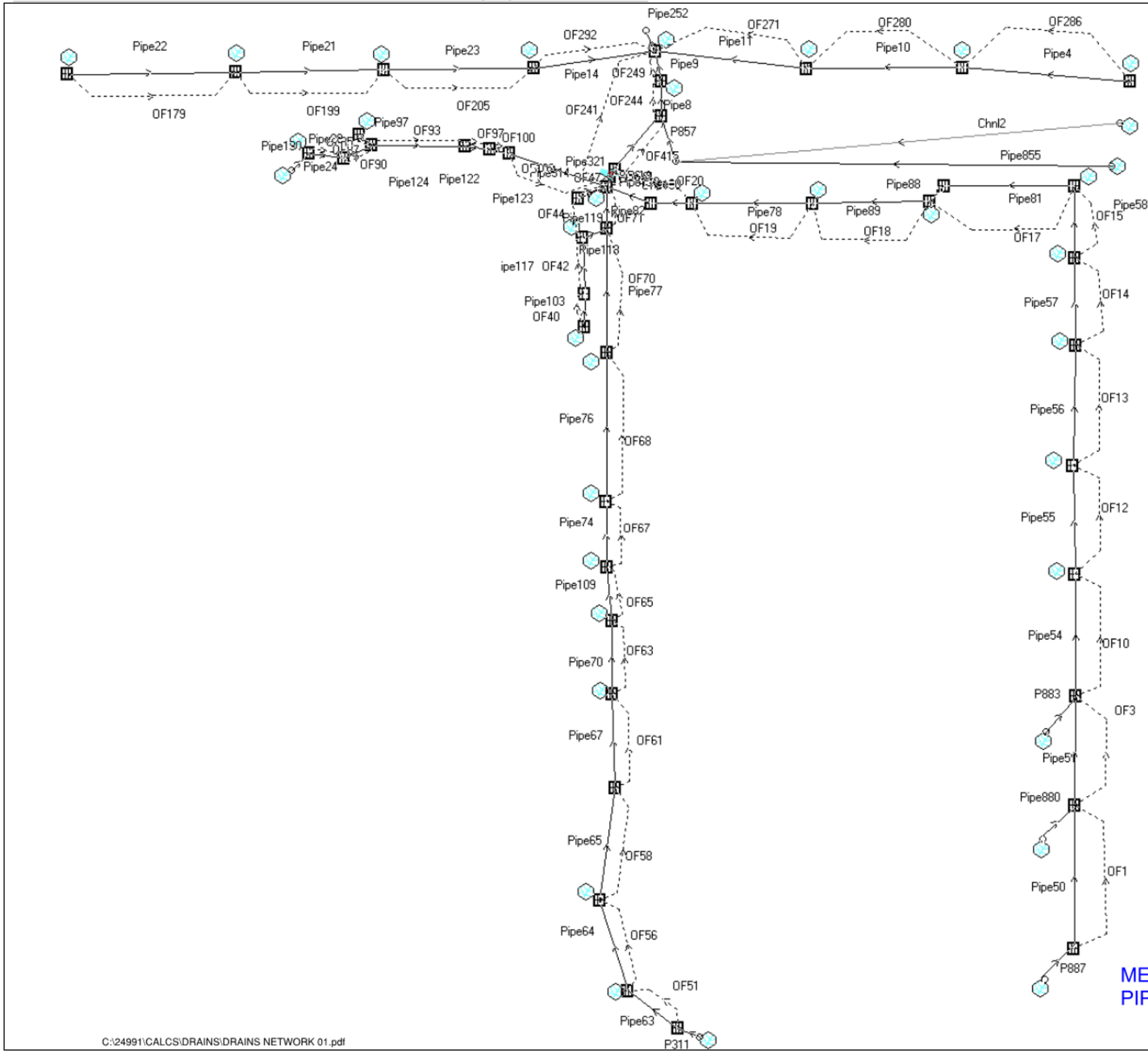
Roseby Street, Drummoyne NSW 2047



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METCASH DRAINS NETWORK
PIPE & OVERFLOW NUMBERING

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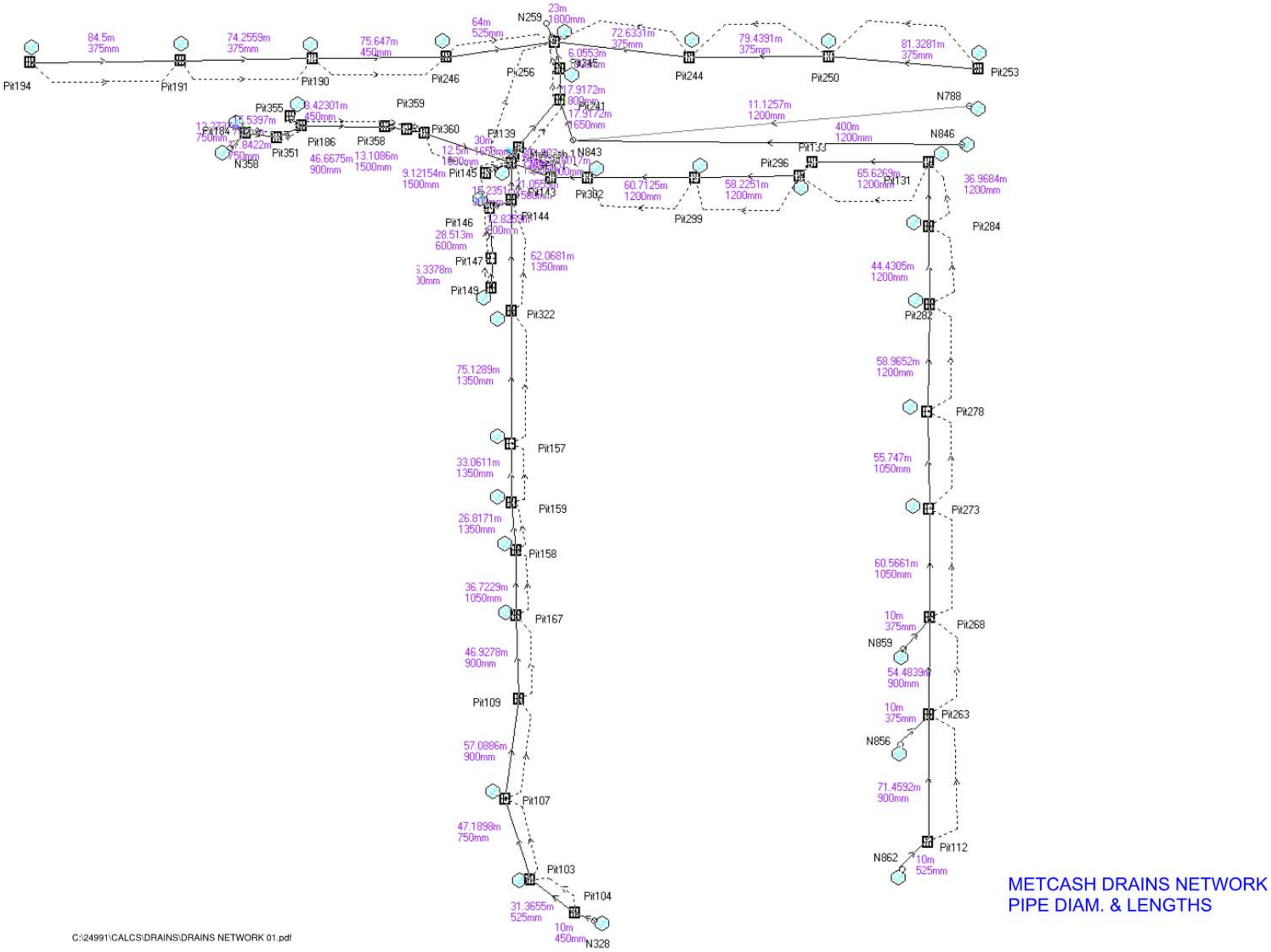

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METCASH DRAINS NETWORK
PIPE DIAM. & LENGTHS

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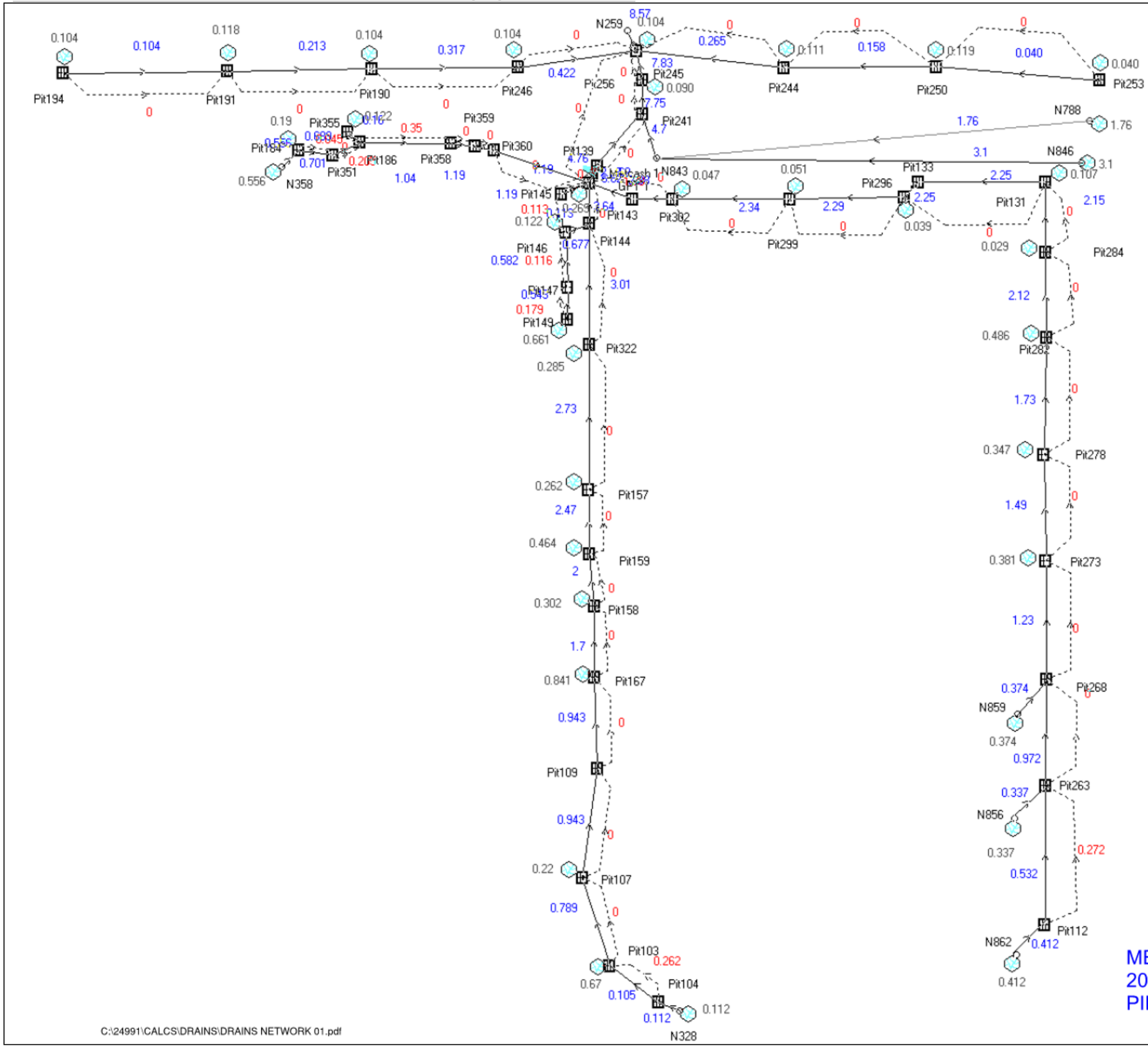
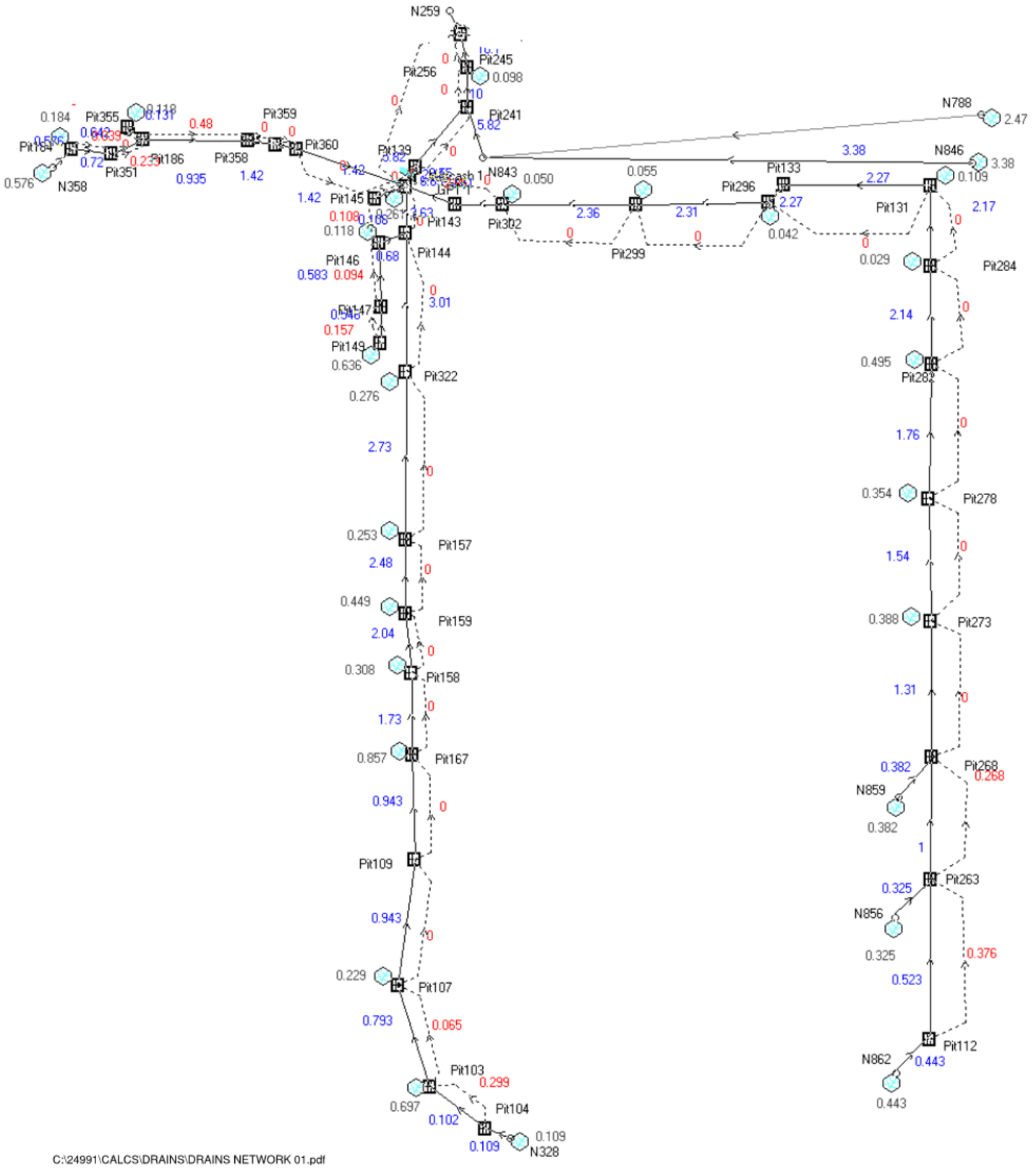


METCASH DRAINS NETWORK
20Yr PEAK FLOWS FOR INTERNAL PIPE DESIGN



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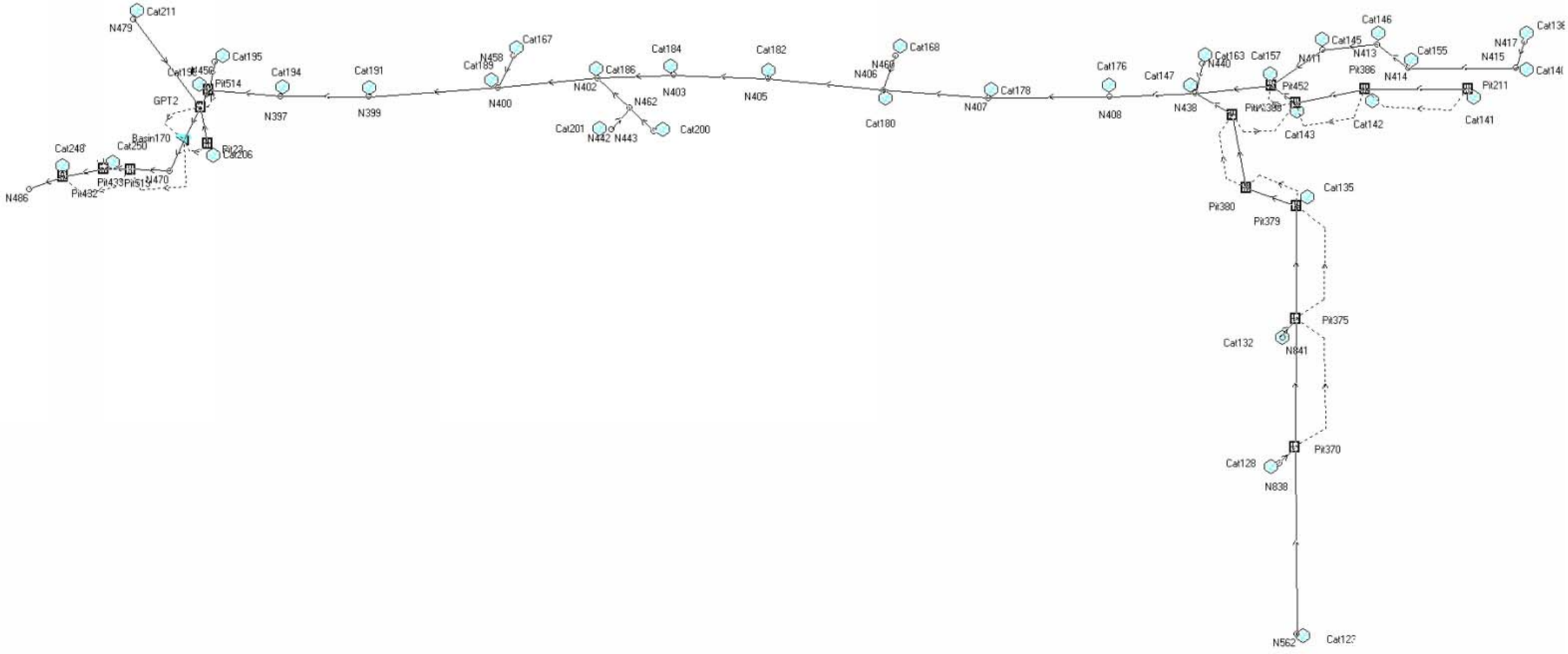
METCASH DRAINS NETWORK
100Yr -1Hr STORM
PEAK FLOWS FOR INTERNAL BASIN DESIGN



DHL DRAINS NETWORK
PIT, NODE & CATCHMENT NUMBERING

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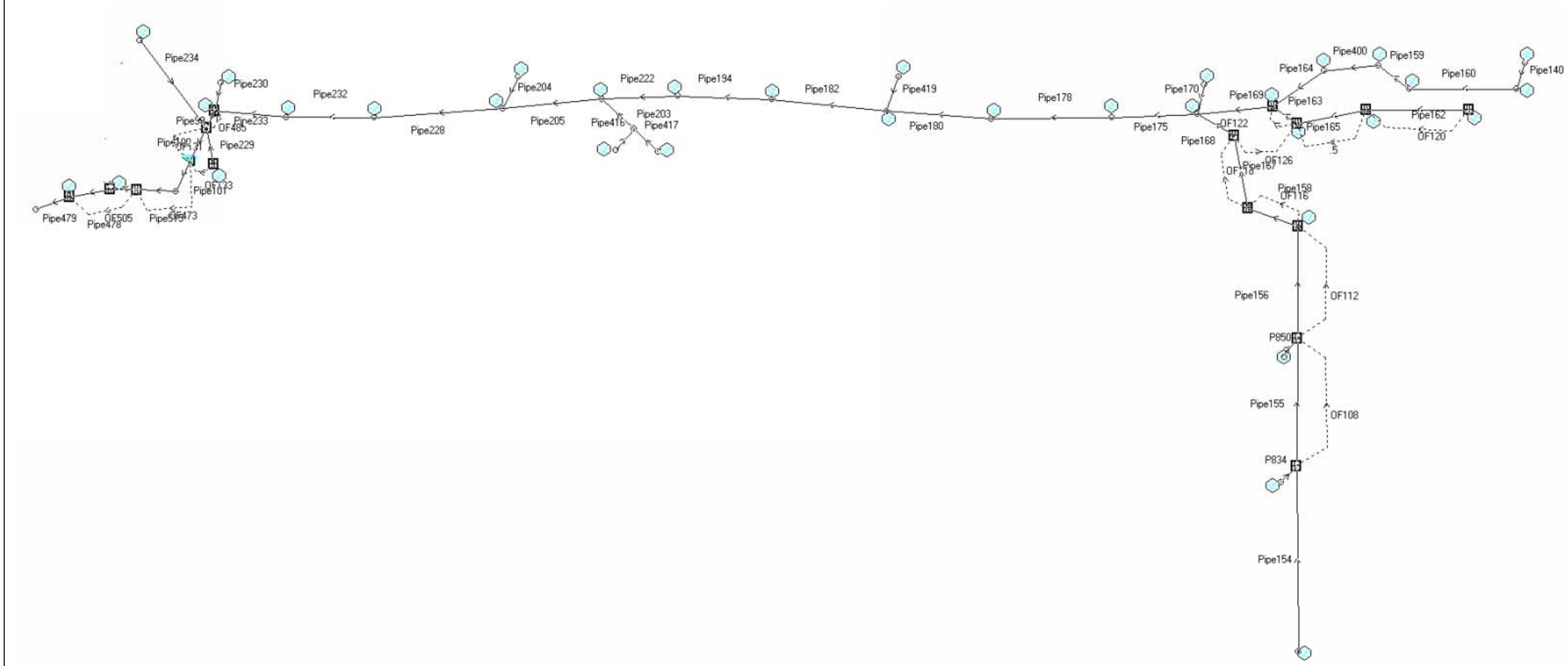

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PIPE & OVERFLOW NUMBERING

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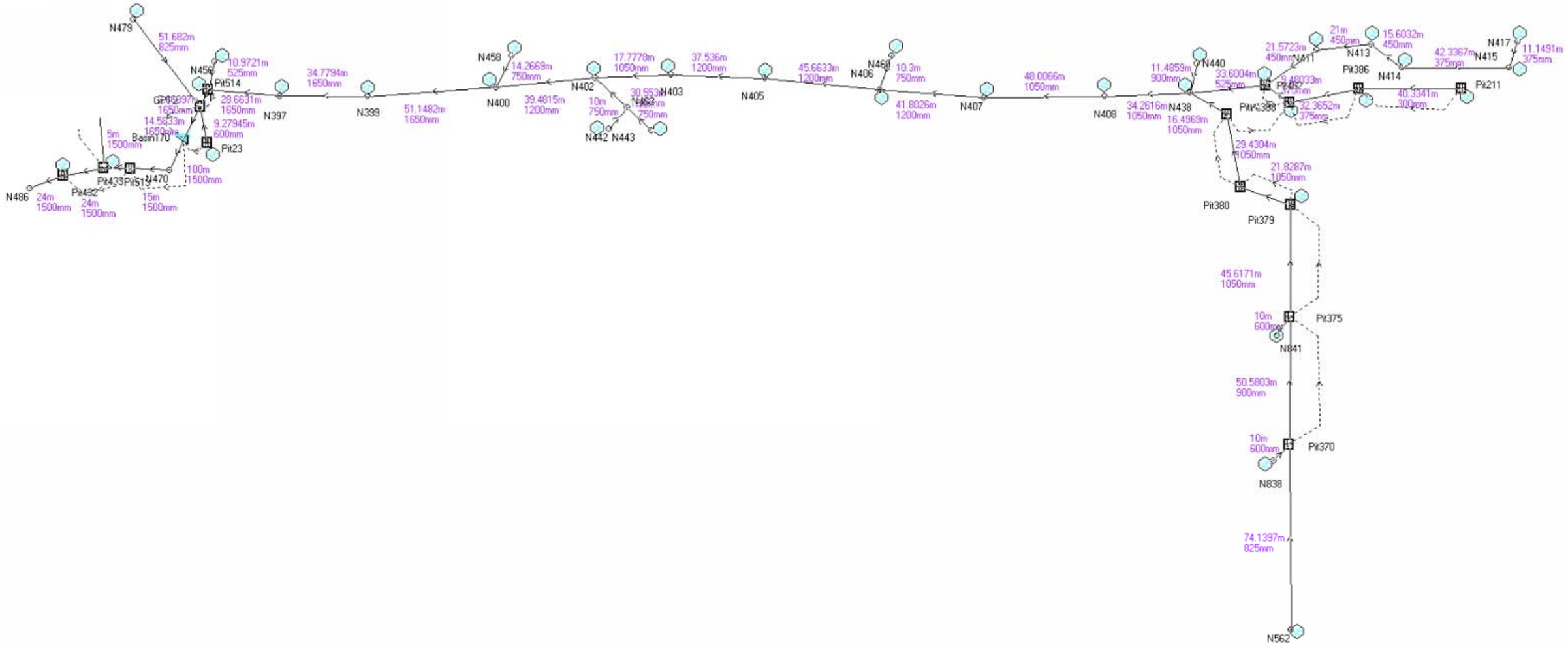
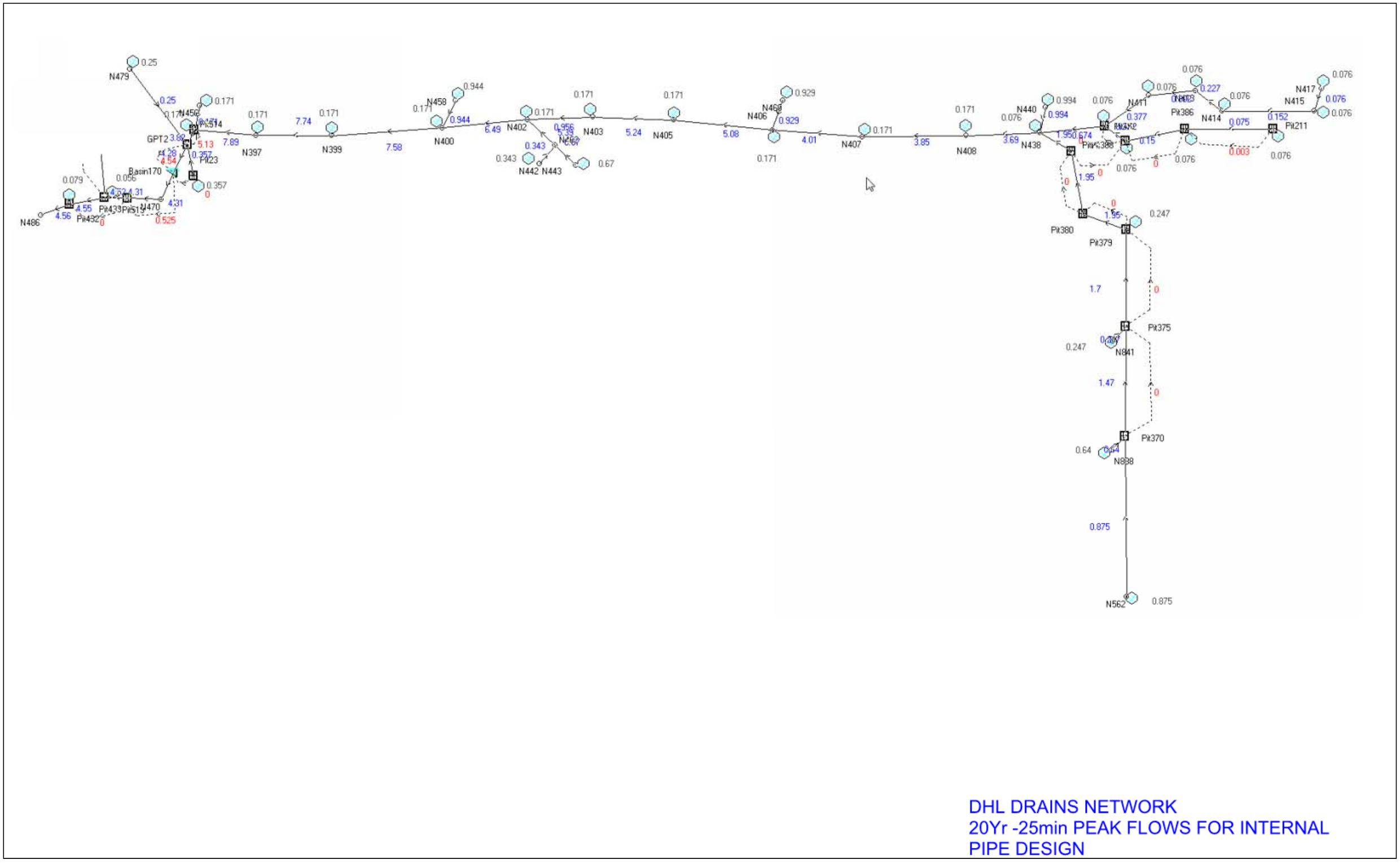


DHL DRAINS NETWORK
PIPE DIAM. & LENGTHS



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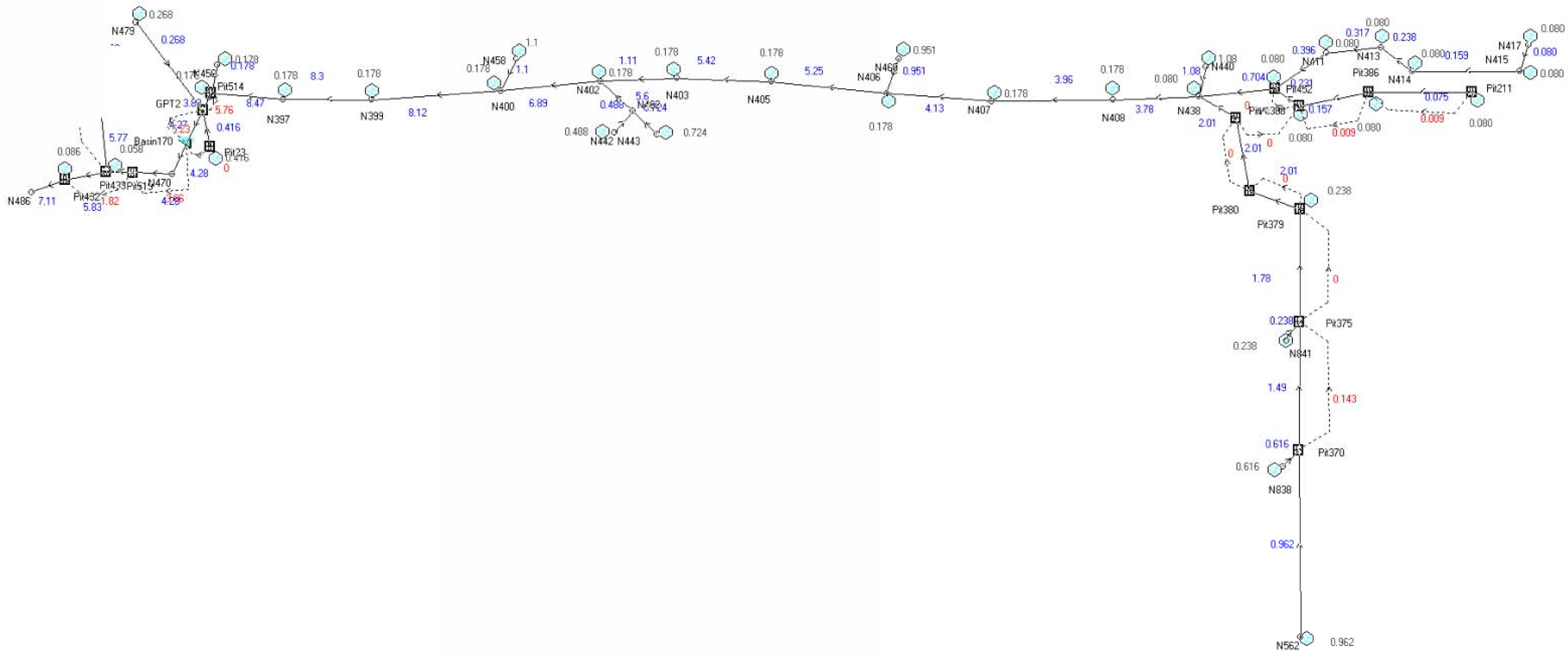
20Yr -25min PEAK FLOWS FOR INTERNAL PIPE DESIGN



DHL DRAINS NETWORK
100Yr -1Hr STORM
PEAK FLOWS FOR INTERNAL BASIN DESIGN

PIT / NODE DETAILS Version 9

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Pit23	Sag	DUMMY	UNLIM	15	2.1	46	0.3	0	0	-1124.53	6196433	No	22	1 x Ku
GPT2	Sag	DUMMY	UNLIM	15	5.8	45	0.3	0	0	-1127.29	6196447	No	23	1 x Ku
N470	Node					45		0		-1139.66	6196421		1269	
Pit519	Sag	DUMMY	UNLIM	10	0.6	43	0.2	0	0	-1155.67	6196422	No	5.69E+08	1 x Ku
Pit433	OnGrade	DUMMY	UNLIM		0.5	43		0	0	-1166.26	6196422	No	1430	1 x Ku
Pit432	OnGrade	DUMMY	UNLIM		0.3	42.9		0	0	-1182.95	6196419	No	1429	1 x Ku
N486	Node					42.9		0		-1196.45	6196414		1303	
Pit145	OnGrade	Standard E	Grated 600 x 600		3.7	62.5		0	0.5	-395.857	6196663	No	144	1 x Ku
GPT 1	OnGrade	Standard E	Grated 1500 x 1500		1.9	62.4		0	0.5	-381.468	6196669	No	138	1 x Ku
Pit139	Sag	DUMMY	UNLIM	20	0	57	0.3	0	0	-376.873	6196677	No	139	QUDM
Pit241	Sag	DUMMY	UNLIM	15	1.3	57.25	0.2	0	0	-353.619	6196705	No	240	1 x Ku
Pit256	Sag	DUMMY	UNLIM	15	0.3	57.15	0.2	0	0	-353.642	6196723	No	255	1 x Ku
Pit245	Sag	DUMMY	UNLIM	15	0.8	57.1	0.5	0	0	-356.641	6196738	No	244	1 x Ku
N259	Node					55		0		-361.489	6196748		510	
Pit149	OnGrade	Standard E	Grated 900 x 900		2.7	62.7		0	0.5	-393.028	6196597	No	148	1 x Ku
Pit147	Sag	Standard E	Grated 600	2	0.7	62.55	0.1	0	0.5	-392.71	6196614	No	146	1 x Ku
Pit146	Sag	Standard E	Grated 900	2	1.9	62.55	0.1	0	0.5	-393.685	6196643	No	145	1 x Ku
Pit144	OnGrade	Standard E	Grated 900 x 900		0.5	62.5		0	0.5	-381.469	6196647	No	143	1 x Ku
Pit194	Sag	DUMMY	UNLIM	15	5.7	64.4	0.2	0	0	-657.303	6196726	No	193	1 x Ku
Pit191	Sag	DUMMY	UNLIM	15	3.5	62.4	0.2	0	0	-571.24	6196727	No	190	1 x Ku
Pit190	OnGrade	DUMMY	UNLIM		1.1	60.45		0	0	-495.612	6196729	No	189	1 x Ku
Pit246	Sag	DUMMY	UNLIM	15	0.9	58.35	0.2	0	0	-418.56	6196729	No	245	1 x Ku
Pit253	Sag	DUMMY	UNLIM	15	5.9	61.6	0.2	0	0	-113.612	6196723	No	252	1 x Ku
Pit250	Sag	DUMMY	UNLIM	15	2.2	58.8	0.2	0	0	-199.323	6196730	No	827	1 x Ku
Pit244	Sag	DUMMY	UNLIM	15	1.2	58.2	0.2	0	0	-279.482	6196729	No	243	1 x Ku
N328	Node					63.5		0		-333.916	6196234		798	
Pit104	OnGrade	Standard E	Grated 1200 x 1200		1	63.4		0	0.5	-345.102	6196239	No	103	1 x Ku
Pit103	Sag	DUMMY	UNLIM	10	2.6	63.22	0.3	0	0	-370.708	6196258	No	102	1 x Ku
Pit107	Sag	DUMMY	UNLIM	10	0.9	62.9	0.3	0	0	-385.104	6196304	No	106	1 x Ku
Pit109	Sag	DUMMY	UNLIM	10	0.3	62.7	0.2	0	0	-377.354	6196362	No	108	1 x Ku
Pit167	Sag	DUMMY	UNLIM	10	1.2	62.7	0.3	0	0	-378.791	6196409	No	166	1 x Ku
Pit158	Sag	DUMMY	UNLIM	15	0	62.75	0.3	0	0	-378.923	6196447	No	157	1 x Ku
Pit159	Sag	DUMMY	UNLIM	15	0.9	62.75	0.3	0	0	-381.582	6196474	No	158	1 x Ku
Pit157	Sag	DUMMY	UNLIM	15	0.7	62.75	0.3	0	0	-381.662	6196508	No	156	1 x Ku
Pit322	Sag	Standard E	Grated 120	3	0.7	62.7	0.2	0	0	-381.362	6196584	No	760	1 x Ku
N358	Node					62.5		0		-542.571	6196677		918	
Pit184	Sag	Sutherland	Kerb inlet \	3	3	62	0.15	0	0.5	-533.912	6196686	No	183	1 x Ku
Pit351	Sag	DUMMY	UNLIM	15	3.2	60.95	0.3	0	0	-515.829	6196683	No	935	1 x Ku
Pit186	Sag	DUMMY	UNLIM	15	3.2	60.7	0.3	0	0	-501.543	6196690	No	185	1 x Ku
Pit358	Sag	DUMMY	UNLIM	15	0	60.7	0.3	0	0	-453.649	6196690	No	958	1 x Ku
Pit359	Sag	DUMMY	UNLIM	15	0.2	60.7	0.3	0	0	-441.095	6196688	No	959	1 x Ku
Pit360	Sag	DUMMY	UNLIM	15	0.3	60.7	0.3	0	0	-431.471	6196686	No	960	1 x Ku
Pit355	Sag	DUMMY	UNLIM	15	2.7	60.95	0.3	0	0	-508.27	6196696	No	941	1 x Ku
N410	Node							0		78.341	6195676		1054	
N417	Node					62.4		0		-593.317	6196474		1061	
N415	Node					62.38		0		-596.588	6196463		1059	
N414	Node					60.7		0		-640.094	6196463		1058	
N413	Node					60.4		0		-652.715	6196472		1057	
N411	Node					59.6		0		-674.659	6196470		1055	
Pit452	Sag	Standard E	Grated 900	3	1.3	59	0.15	0	0	-695.364	6196456	No	1612	1 x Ku
N438	Node					58.1		0		-725.849	6196453		1137	
N408	Node					57.2		0		-760.681	6196451		1052	
N407	Node					55.8		0		-809.531	6196451		1051	
N406	Node					54.6		0		-851.925	6196454		1050	
N405	Node					53.3		0		-898.302	6196459		1049	
N403	Node					52.3		0		-936.446	6196460		1047	
N402	Node					51.2		0		-967.264	6196459		1046	
N400	Node					49.5		0		-1007.21	6196455		1044	
N399	Node					47.5		0		-1059.29	6196451		1042	
N397	Node					46		0		-1095.11	6196451		1040	
Pit514	Sag	DUMMY	UNLIM	15	0.9	45.1	0.3	0	0	-1123.91	6196454	No	4.97E+08	1 x Ku
Pit211	OnGrade	Standard E	Grated 900 x 900		4.1	60.2		0	0.5	-615.811	6196454	No	210	1 x Ku
Pit386	OnGrade	Standard E	Grated 900 x 900		2.7	59.7		0	0.5	-657.417	6196454	No	1118	1 x Ku
Pit388	Sag	Standard E	Grated 900	15	1.3	59.1	0.15	0	0.5	-685.476	6196449	No	1120	1 x Ku
N440	Node					58.1		0		-723.095	6196465		1142	
N442	Node					52		0		-961.536	6196438		1150	
N462	Node					51.8		0		-954.14	6196447		1209	
N443	Node					52.2		0		-944.578	6196437		1151	
N456	Node					46.1		0		-1121.6	6196466		1167	
N458	Node					49.9		0		-1001.01	6196468		1170	
N460	Node					54.6		0		-846.979	6196468		1174	
N479	Node					43.8		0		-1154.36	6196483		1287	
Pit420	OnGrade	DUMMY	UNLIM		4.9	64.62		0	0	-821.141	6196701	No	1368	1 x Ku
Pit418	OnGrade	DUMMY	UNLIM		1.5	63.19		0	0	-895.211	6196702	No	1366	1 x Ku
Pit416	OnGrade	DUMMY	UNLIM		1.1	58.97		0	0	-968.671	6196702	No	1364	1 x Ku
Pit414	OnGrade	DUMMY	UNLIM		0.9	53.13		0	0	-1047.35	6196702	No	1362	1 x Ku
Pit412	OnGrade	DUMMY	UNLIM		0.3	49.68		0	0	-1103.31	6196701	No	1360	1 x Ku
Pit409	OnGrade	DUMMY	UNLIM		0.2	47.23		0	0	-1147.06	6196698	No	1357	1 x Ku
Pit408	Sag	DUMMY	UNLIM	10	3.8	45.09	0.2	0	0	-1188.44	6196699	No	1356	1 x Ku
Pit406	Sag	DUMMY	UNLIM	5	1.4	44.88	0.2	0	0	-1202.01	6196681	No	1354	1 x Ku
Pit404	OnGrade	DUMMY	UNLIM		1.4	44.78		0	0	-1196.2	6196632	No	1348	1 x Ku
Pit399	OnGrade	DUMMY	UNLIM		0.4	44.78		0	0.5	-1214.11	6196629	No	1295	1 x Ku
N483	Node					44.6		0		-1229.58	6196624		1297	
Pit438	OnGrade	DUMMY	UNLIM		5.9	44.42		0	0	-1185.39	6196549	No	1435	1 x Ku
Pit436	OnGrade	DUMMY	UNLIM		1.7	43.9		0	0	-1174.4	6196508	No	1433	1 x Ku
N562	Node					60		0		-684.99	6196235		19694831	
Pit370	Sag	DUMMY	UNLIM	15	2.8	59.3	0.3	0	0	-685.647	6196310	No	989	1 x Ku
Pit375	Sag	DUMMY	UNLIM	15	0.1	59.3	0.2	0	0.5	-685.364	6196362	No	1002	1 x Ku
Pit379	Sag	DUMMY	UNLIM	15	1.9	59.15	0.2	0	0.5	-685.129	6196407	No	1030	1 x Ku
Pit380	Sag	DUMMY	UNLIM	15	1.4	59.2	0.2	0	0.5	-705.478	6196415	No	1031	1 x Ku
Pit74	OnGrade	DUMMY	UNLIM		0.6	59.15		0	0.5	-711.093	6196444	No	73	1 x Ku
N788	Node					60		0		-118.702	6196701		4.21E+08	
N843	Node					57.4		0		-346.197	6196682		6.17E+08	
N838	Node					60		0		-692.25	6196304		6.12E+08	
N841	Node					60		0		-690.868	6196354		6.15E+08	
N846	Node					59.7		0		-123.003	6196679		6.17E+08	
N856	Node					64.2		0		-158.265	6196335		6.77E+08	
Pit263	Sag	Standard E	Grated 900	4	1.2	64.15	0.2	0	0.5	-142.213	6196352	No	584	QUDM
Pit268	Sag	DUMMY	UNLIM	4	0	64.1	0.2	0	0	-141.54	6196408	No	589	QUDM
Pit273	Sag	DUMMY	UNLIM	10	0.8	64.1	0.2	0	0	-141.877	6196470	No	594	1 x Ku
Pit278	OnGrade	DUMMY	UNLIM		0.8	64.05		0	0.5	-142.887	6196526	No	602	1 x Ku
Pit282	Sag	DUMMY	UNLIM	4	1.2	64.05	0.2	0	0.5	-141.54	6196588	No	610	1 x Ku
Pit284	Sag	DUMMY	UNLIM	15	0.2	64.05	0.3	0	0.5	-142.082	6196632	No	620	1 x Ku
Pit131	Sag	Standard E	Grated 120	3	1.7	63.95	0.2	0	0.5	-142.084	6196669	No	130	1 x Ku
Pit133	OnGrade	Standard E	Grated 1200 x 1200		0.7	63.55		0	0.5	-208.933	6196669	No	132	1 x Ku
Pit296	OnGrade	Standard E	Grated 1200 x 1200		0.7	63.55		0	0.5	-216.165	6196661	No	637	1 x Ku
Pit299	OnGrade	Standard E	Grated 1200 x 1200		0.3	63.1		0	0.5	-276.319	6196660	No	641	1 x Ku
Pit302	OnGrade	Standard E	Grated 1200 x 1200		0.3	63.1		0	0.5	-337.481	6196660	No	650	1 x Ku

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Pit143	OnGrade	Standard E	Grated 1200 x 1200		1.3	62.7		0	0.5	-358.711	6196660	No	142	1 x Ku				
N859	Node					64.2		0		-156.715	6196390		6.77E+08					
N862	Node					64.6		0		-157.49	6196264		6.78E+08					
Pit112	Sag	Standard E	Grated 90C	4	0	64.15	0.2	0	0.5	-142.319	6196279	No	111	QUDM				
DETENTION BASIN DETAILS																		
Name	Elev	Surf. Area	Init Vol. (cu	Outlet Typ	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Leng	id			
Basin170	40.88	2	0	Culvert	0.5					-1134.02	6196434	No			4.51E+08			
	41.1	6																
	41.5	6																
	42.4	6																
	42.5	3000																
	43	3000																
	43.5	3000																
	44	3000																
	44.5	3000																
Metcash 1	53.2	1	0	Culvert	0.5					-379.608	6196674	No			1.71E+08			
	58	5																
	58.05	5																
	58.1	1500																
	58.8	1500																
	59.3	1500																
	59.5	1500																
	59.6	1500																
SUB-CATCHMENT DETAILS																		
Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor
Cat206	Pit23	1.138	95	5	0	15	5	0										0
Cat250	Pit433	0.15	80	20	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat248	Pit432	0.2063	80	20	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat78	GPT 1	0.7063	95	5	0	10	5	0										0
Cat87	Pit256	0.228	85	15	0	0	0	0	70	70	-1	1	1	-1	0.013	0.2	-1	0
Cat103	Pit245	0.263	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat44	Pit149	1.7462	95	5	0	0	0	0	200	200	-1	1	1	-1	0.013	0.1	-1	0
Cat49	Pit146	0.3192	95	5	0	10	5	0										0
Cat99	Pit194	0.263	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat97	Pit191	0.298	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat93	Pit190	0.263	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat90	Pit246	0.263	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat107	Pit253	0.1	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat105	Pit250	0.3	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat111	Pit244	0.28	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat51	N328	0.343	80	20	0	0	0	0	200	200	-1	1	1	-1	0.013	0.2	-1	0
Cat54	Pit103	1.6191	90	10	0	6	8	0										0
Cat57	Pit107	0.533	90	10	0	6	8	0										0
Cat60	Pit167	2.0667	95	5	0	7	5	0										0
Cat69	Pit158	0.7431	95	5	0	7	5	0										0
Cat64	Pit159	1.217	95	5	0	10	5	0										0
Cat72	Pit157	0.6866	95	5	0	10	5	0										0
Cat75	Pit322	0.7486	95	5	0	10	5	0										0
Cat115	N358	1.648	95	5	0	0	0	0	250	250	-1	0.5	1	-1	0.013	0.2	-1	0
Cat118	Pit184	0.4982	95	5	0	10	5	0										0
Cat121	Pit355	0.3192	95	5	0	10	5	0										0
Cat136	N417	0.181	95	5	0	6	5	0										0
Cat140	N415	0.181	95	5	0	6	5	0										0
Cat155	N414	0.181	95	5	0	6	5	0										0
Cat146	N413	0.181	95	5	0	6	5	0										0
Cat145	N411	0.181	95	5	0	6	5	0										0
Cat157	Pit452	0.181	95	5	0	6	5	0										0
Cat147	N438	0.181	95	5	0	6	5	0										0
Cat176	N408	0.406	95	5	0	6	5	0										0
Cat178	N407	0.406	95	5	0	6	5	0										0
Cat180	N406	0.406	95	5	0	6	5	0										0
Cat182	N405	0.406	95	5	0	6	5	0										0
Cat184	N403	0.406	95	5	0	6	5	0										0
Cat186	N402	0.406	95	5	0	6	5	0										0
Cat189	N400	0.406	95	5	0	6	5	0										0
Cat191	N399	0.406	95	5	0	6	5	0										0
Cat194	N397	0.406	95	5	0	6	5	0										0
Cat196	Pit514	0.406	95	5	0	6	5	0										0
Cat141	Pit211	0.181	95	5	0	6	5	0										0
Cat142	Pit386	0.181	95	5	0	6	5	0										0
Cat143	Pit388	0.181	95	5	0	6	5	0										0
Cat163	N440	3.0913	95	5	0	0	0	0	300	300	-1	0.5	1	-1	0.013	0.2	-1	0
Cat201	N442	1.796	95	5	0	15	0	0	290	290	-1	0.5	1	-1	0.013	0.2	-1	0
Cat200	N443	2.085	95	5	0	0	0	0	300	400	-1	0.5	1	-1	0.013	0.2	-1	0
Cat195	N456	0.406	95	5	0	6	5	0										0
Cat167	N458	3.0086	95	5	0	15	5	0										0
Cat168	N460	2.7218	95	5	0	0	0	0	240	240	-1	0.5	1	-1	0.013	0.2	-1	0
Cat211	N479	1.09	60	40	0	0	0	0	262	290	-1	0.5	1	-1	0.013	0.2	-1	0
Cat214	Pit420	0.3325	85	15	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat217	Pit418	0.2475	50	50	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat220	Pit416	0.2475	50	50	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat222	Pit414	0.264	50	50	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat230	Pit412	0.1815	60	40	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat227	Pit409	0.1575	60	40	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat233	Pit408	0.14	60	40	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat237	Pit406	0.075	80	20	0	0	0	0	90	90	-1	2.2	2.2	-1	0.013	0.2	-1	0
Cat242	Pit404	0.075	80	20	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat244	Pit399	0.075	80	20	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat246	Pit438	0.13	80	20	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat247	Pit436	0.075	80	20	0	0	0	0	90	90	-1	1	1	-1	0.013	0.2	-1	0
Cat123	N562	2.7519	95	5	0	5	0	0	368	250	0	3	3	0	0.013	0.2	0	0
Cat135	Pit379	0.6514	100	0	0	5	0	0	150	0	0	3	0	0	0.013	0	0	0
NEGH1	N788	8.2	0	100	0	0	14	0										0
Cat128	N838	1.6849	100	0	0	5	0	0	150	0	0	3	0	0	0.013	0	0	0
Cat132	N841	0.6514	100	0	0	5	0	0	150	0	0	3	0	0	0.013	0	0	0
NEGH2	N846	8.74	0	100	0	0	6	0										0
Cat2	N856	0.8899	95	5	0	0	0	0	140	100	-1	0.5	1	-1	0.013	0.2	-1	0
Cat22	Pit273	0.937	95	5	0	7	5	0										0
Cat26	Pit278	0.8537	95	5	0	7	5	0										0
Cat29	Pit282	1.1945	95	5	0	7	5	0										0
Cat32	Pit284	0.0706	95	5	0	7	5	0										0
Cat36	Pit131	0.2628	95	5	0	7	5	0										0
Cat9	Pit296	0.0874	100	0	0	5	0	0										0
Cat10	Pit299	0.1145	100	0	0	5	0	0										0
Cat11	Pit302	0.1051	100	0	0	5	0	0										0
Cat19	N859	0.9206	95	5	0	7	5	0										0
Cat1	N862	1.265	95	5	0	5	5	0	130	100	-1	0.5	1	-1	0.013	0.2	-1	0

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PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	RI (m)	Chg (m)	RL (m)
Pipe229	Pit23	GPT2	9.27945	42.66	42.567	1	Concrete, I	600	600	0.015	New	1	Pit23	0				
Pipe100	GPT2	Basin170	14.5833	42.544	42.5	0.3	Concrete, I	1650	1676	0.015	NewFixed	1	GPT2	0				
Pipe101	Basin170	N470	100	40.88	40.68	0.2	Concrete, I	1500	1524	0.015	NewFixed	1	Basin170	0				
Pipe515	N470	Pit519	15	40.68	40.635	0.3	Concrete, I	1500	1524	0.015	New	1	N470	0				
P784	Pit519	Pit433	5	40.635	40.62	0.3	Concrete, I	1500	1524	0.015	New	1	Pit519	0				
Pipe478	Pit433	Pit432	24	40.62	40.548	0.3	Concrete, I	1500	1524	0.015	New	1	Pit433	0				
Pipe479	Pit432	N486	24	40.548	40.5	0.2	Concrete, I	1500	1524	0.015	New	1	Pit432	0				
Pipe119	Pit145	GPT 1	15.2351	61.52	60	9.98	Concrete, I	300	300	0.015	New	1	Pit145	0				
Pipe120	GPT 1	Metcash 1	5.1329	58.126	58.1	0.51	Concrete, I	1500	1524	0.015	NewFixed	1	GPT 1	0				
P661	Metcash 1	Pit139	30	53.3	53.15	0.5	Concrete, I	900	900	0.015	NewFixed	1	Metcash 1	0				
Pipe321	Pit139	Pit241	30	53.155	53.005	0.5	Concrete, I	1650	1676	0.015	New	1	Pit139	0				
Pipe8	Pit241	Pit256	17.9172	53.005	52.915	0.5	Concrete, I	1800	1800	0.015	New	1	Pit241	0				
Pipe9	Pit256	Pit245	6.0553	52.915	52.885	0.5	Concrete, I	1800	1800	0.015	NewFixed	1	Pit256	0				
Pipe252	Pit245	N259	23	53	52.885	0.5	Concrete, I	1800	1800	0.015	NewFixed	1	Pit245	0				
Pipe103	Pit149	Pit147	16.3378	60.7	60.618	0.5	Concrete, I	600	600	0.015	New	1	Pit149	0				
Pipe117	Pit147	Pit146	28.513	60.6	60.457	0.5	Concrete, I	600	600	0.015	New	1	Pit147	0				
Pipe118	Pit146	Pit144	12.8259	60.44	60.376	0.5	Concrete, I	600	600	0.015	New	1	Pit146	0				
Pipe82	Pit144	GPT 1	21.0559	58.74	58.635	0.5	Concrete, I	1500	1524	0.015	New	1	Pit144	0				
Pipe22	Pit194	Pit191	84.5	63.4	61.4	2.37	Concrete, I	375	375	0.015	New	1	Pit194	0				
Pipe21	Pit191	Pit190	74.2559	61.4	59.4	2.69	Concrete, I	375	375	0.015	New	1	Pit191	0				
Pipe23	Pit190	Pit246	75.647	59.4	57.2	2.91	Concrete, I	450	450	0.015	New	1	Pit190	0				
Pipe14	Pit246	Pit245	64	57.2	56	1.88	Concrete, I	525	525	0.015	New	1	Pit246	0				
Pipe4	Pit253	Pit250	81.3281	60.2	57.09	3.82	Concrete, I	375	375	0.015	New	1	Pit253	0				
Pipe10	Pit250	Pit244	79.4391	57.194	56.5	0.87	Concrete, I	375	375	0.015	New	1	Pit250	0				
Pipe11	Pit244	Pit245	72.6331	56.426	55.7	1	Concrete, I	375	375	0.015	New	1	Pit244	0				
P311	N328	Pit104	10	61.05	61	0.5	Concrete, I	450	450	0.015	New	1	N328	0				
Pipe63	Pit104	Pit103	31.3655	61	60.843	0.5	Concrete, I	525	525	0.015	New	1	Pit104	0				
Pipe64	Pit103	Pit107	47.1898	60.82	60.584	0.5	Concrete, I	750	750	0.015	New	1	Pit103	0				
Pipe65	Pit107	Pit109	57.0886	60.56	60.275	0.5	Concrete, I	900	900	0.015	New	1	Pit107	0				
Pipe67	Pit109	Pit167	46.9278	60.26	60.025	0.5	Concrete, I	900	900	0.015	New	1	Pit109	0				
Pipe70	Pit167	Pit158	36.7229	60.01	59.826	0.5	Concrete, I	1050	1070	0.015	New	1	Pit167	0				
Pipe109	Pit158	Pit159	26.8171	59.81	59.676	0.5	Concrete, I	1350	1370	0.015	New	1	Pit158	0				
Pipe74	Pit159	Pit157	33.0611	59.66	59.495	0.5	Concrete, I	1350	1370	0.015	New	1	Pit159	0				
Pipe76	Pit157	Pit322	75.1289	59.47	59.094	0.5	Concrete, I	1350	1370	0.015	New	1	Pit157	0				
Pipe77	Pit322	Pit144	62.0681	59.07	58.76	0.5	Concrete, I	1350	1370	0.015	New	1	Pit322	0				
Pipe130	N358	Pit184	12.2737	58.873	58.812	0.5	Concrete, I	750	750	0.015	New	1	N358	0				
Pipe24	Pit184	Pit351	17.8422	58.812	58.723	0.5	Concrete, I	750	750	0.015	New	1	Pit184	0				
Pipe98	Pit351	Pit186	15.5397	58.723	58.645	0.5	Concrete, I	750	750	0.015	New	1	Pit351	0				
Pipe124	Pit186	Pit358	46.6675	58.645	58.412	0.5	Concrete, I	900	900	0.015	New	1	Pit186	0				
Pipe122	Pit358	Pit359	13.1086	58.412	58.346	0.5	Concrete, I	1500	1524	0.015	New	1	Pit358	0				
Pipe123	Pit359	Pit360	9.12154	58.346	58.3	0.5	Concrete, I	1500	1524	0.015	New	1	Pit359	0				
Pipe314	Pit360	GPT 1	12.5	58.263	58.2	0.5	Concrete, I	1500	1500	0.015	New	1	Pit360	0				
Pipe97	Pit355	Pit186	8.42301	59.55	59.508	0.5	Concrete, I	450	450	0.015	New	1	Pit355	0				
Pipe140	N417	N415	11.1491	60.96	60.904	0.5	Concrete, I	375	375	0.015	New	1	N417	0				
Pipe160	N415	N414	42.3367	60.904	59.333	3.71	Concrete, I	375	375	0.015	New	1	N415	0				
Pipe159	N414	N413	15.6032	59.333	58.841	3.15	Concrete, I	450	450	0.015	New	1	N414	0				
Pipe400	N413	N411	21	58.841	58.18	3.15	Concrete, I	450	450	0.015	New	1	N413	0				
Pipe164	N411	Pit452	21.5723	58.18	57.5	3.15	Concrete, I	450	450	0.015	New	1	N411	0				
Pipe169	Pit452	N438	33.6004	57.5	55.758	5.18	Concrete, I	525	525	0.015	New	1	Pit452	0				
Pipe175	N438	N408	34.2616	55.758	54.836	2.69	Concrete, I	1050	1070	0.015	New	1	N438	0				
Pipe178	N408	N407	48.0066	54.836	53.636	2.5	Concrete, I	1050	1070	0.015	New	1	N408	0				
Pipe180	N407	N406	41.8026	53.636	52.8	2	Concrete, I	1200	1200	0.015	New	1	N407	0				
Pipe182	N406	N405	45.6633	52.78	51	3.9	Concrete, I	1200	1200	0.015	New	1	N406	0				
Pipe194	N405	N403	37.536	50.98	50.2	2.08	Concrete, I	1200	1200	0.015	New	1	N405	0				
Pipe203	N403	N402	30.553	50.18	49.1	3.53	Concrete, I	1200	1200	0.015	New	1	N403	0				
Pipe205	N402	N400	39.4815	49.08	47.4	4.26	Concrete, I	1200	1200	0.015	New	1	N402	0				
Pipe228	N400	N399	51.1482	45.895	43.696	4.3	Concrete, I	1650	1676	0.015	New	1	N400	0				
Pipe232	N399	N397	34.7794	43.696	42.653	3	Concrete, I	1650	1676	0.015	New	1	N399	0				
Pipe233	N397	Pit514	28.6631	42.653	42.567	0.3	Concrete, I	1650	1676	0.015	New	1	N397	0				
Pipe99	Pit514	GPT2	7.66897	42.567	42.544	0.3	Concrete, I	1650	1676	0.015	New	1	Pit514	0				
Pipe162	Pit211	Pit386	40.3341	59.5	59.097	1	Concrete, I	300	300	0.015	New	1	Pit211	0				
Pipe165	Pit386	Pit388	32.3652	58.324	58	1	Concrete, I	375	375	0.015	New	1	Pit386	0				
Pipe163	Pit388	Pit452	9.48033	58	57.95	0.53	Concrete, I	375	375	0.015	New	1	Pit388	0				
Pipe170	N440	N438	11.4859	56.6	56.485	1	Concrete, I	900	900	0.015	New	1	N440	0				
Pipe416	N442	N462	10	49.6	49.5	1	Concrete, I	750	750	0.015	New	1	N442	0				
Pipe222	N462	N402	17.7778	49.456	49.1	2	Concrete, I	1050	1070	0.015	New	1	N462	0				
Pipe417	N443	N462	10	49.6	49.5	1	Concrete, I	750	750	0.015	New	1	N443	0				
Pipe230	N456	Pit514	10.9721	42.622	42.567	0.5	Concrete, I	525	525	0.015	New	1	N456	0				
Pipe204	N458	N400	14.2669	48.55	48.407	1	Concrete, I	750	750	0.015	New	1	N458	0				
Pipe419	N460	N406	10.3	52.9	52.849	0.5	Concrete, I	750	750	0.015	New	1	N460	0				
Pipe234	N479	GPT2	51.682	42.808	42.55	0.5	Concrete, I	825	825	0.015	New	1	N479	0				
Pipe27	Pit420	Pit418	71.1531	63.6	62.2	1.97	Concrete, I	375	375	0.015	New	1	Pit420	0				
Pipe29	Pit418	Pit416	71.8971	62	57.8	5.84	Concrete, I	375	375	0.015	New	1	Pit418	0				
Pipe31	Pit416	Pit414	78.2448	57.78	52	7.39	Concrete, I	375	375	0.015	New	1	Pit416	0				
Pipe38	Pit414	Pit412	53.4989	51.98	48.55	6.41	Concrete, I	375	375	0.015	New	1	Pit414	0				
Pipe35	Pit412	Pit409	44.7028	48.5	46	5.59	Concrete, I	450	450	0.015	New	1	Pit412	0				
Pipe36	Pit409	Pit408	39.3063	45.98	43.96	5.14	Concrete, I	525	525	0.015	New	1	Pit409	0				
Pipe37	Pit408	Pit406	21.5137	43.94	43.75	0.88	Concrete, I	600	600	0.015	New	1	Pit408	0				
Pipe236	Pit406	Pit404	48.9937	43.73	43.485	0.5	Concrete, I	600	600	0.015	New	1	Pit406	0				
Pipe472	Pit404	Pit399	20	43.47	43.37	0.5	Concrete, I	600	600	0.015	New	1	Pit404	0				
Pipe473	Pit399	N483	5	43.35	43.325	0.5	Concrete, I	600	600	0.015	New	1	Pit399	0				
Pipe239	Pit438	Pit436	41.1301	42.911	42.5	1	Concrete, I	375	375	0.015	New	1	Pit438	0				
Pipe474	Pit436	Pit433	97	42.499	41.5	1.03	Concrete, I	375	375	0.015	New	1	Pit436	0				
Pipe154	N562	Pit370	74.1397	58	57.629	0.5	Concrete, I	825	825	0.015	New	1	N562	0				
Pipe155	Pit370	Pit375	50.5803	56.66	56.407	0.5	Concrete, I	900	900	0.015	New	1	Pit370	0				
Pipe156	Pit375	Pit379	45.6171	56.407	56.179	0.5	Concrete, I	1050	1050	0.015	New	1	Pit375	0				
Pipe158	Pit379	Pit380	21.8287	56.179	56.07	0.5	Concrete, I	1050	1050	0.015	New	1	Pit379	0				
Pipe167	Pit380	Pit74	29.4304	56.07	55.923	0.5	Concrete, I	1050	1050	0.015	New	1	Pit380	0				
Pipe168	Pit74	N438	16.4969	55.923	55.758	1	Concrete, I	1050	1070	0.015	New	1	Pit74	0				
P857	N843	Pit241	17.9172	53.095	53.005	0.5	Concrete, I	1650	1676	0.015	New	1	N843	0				
P834	N838	Pit370	10	58	57.629	3.71	Concrete, I	600	600	0.015	New	1	N838	0				
P850	N841	Pit375	10	58	57.629	3.71	Concrete, I	600	600	0.015	New	1	N841	0				
Pipe855	N846	N843	400	55.095	53.095	0.5	Concrete, I	1200	1200	0.015	New	1	N846	0				
Pipe880	N856	Pit263	10	60.55	60.5	0.5	Concrete, I	375	375	0.015	New	1	N856	0				
Pipe51	Pit263	Pit268	54.4839	60.27	59.998	0.5	Concrete, I	900	900	0.015	New	1	Pit263	0				
Pipe54	Pit268	Pit273	60.5661	59.98	59.677	0.5	Concrete, I	1050	1070	0.015	New	1	Pit268	0				
Pipe55	Pit273	Pit278	55.747	59.66	59.381	0.5	Concrete, I	1050	1070	0.015	New	1	Pit273	0				
Pipe56	Pit278	Pit282	58.9652	59.36	59.065	0.5	Concrete, I	1200	1200	0.015	New	1	Pit278	0				
Pipe57	Pit282	Pit284	44.4305	59.04	58.929	0.25	Concrete, I	1200	1200	0.015	New	1	Pit282	0				
Pipe58	Pit284	Pit131	36.9684	58.929	58.837	0.25	Concrete, I	1200	1200	0.015	New	1	Pit284	0				
Pipe81	Pit131	Pit133	65.6269	58.837	58.673	0.25	Concrete, I	1200	1200	0.015	New	1	Pit131	0				
Pipe88	Pit133	Pit296	11.1257	58.673	58.645	0.25	Concrete, I	1200	1200	0.015	New	1	Pit133	0				
Pipe89	Pit296	Pit299	58.2251	58.645	58.499	0.25	Concrete, I	1200	1200	0.015	New	1	Pit296	0				
Pipe78	Pit299	Pit302	60.7125	58.499	58.347	0.25	Concrete, I	1200	1200	0.015	New	1	Pit299	0				
Pipe79	Pit302	Pit143	20.8883	58.347	58.295	0.25	Concrete, I	1200	1200	0.015	New	1	Pit302	0				
Pipe80	Pit143	GPT 1	23.8017	58.295	58.235	0.25	Concrete, I	1200	1200	0.015	New	1	Pit143	0				
P883	N859	Pit268	10	60.55	60.5	0.5	Concrete, I	375	375	0.015	New	1	N859	0				
P887	N862	Pit112	10	60.55	60.5	0.5	Concrete, I	525	525	0.015	New	1	N862	0				
Pipe50	Pit112	Pit263	71.4592	60.65	60.293	0.5	Concrete, I	900	900	0.015	New	1	Pit112	0				

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DRAINS DATA DHL & METCASH

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	etc	etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed
Chnl2	N788	N843	Prismatic	260	58.05	57.4	0.25	3.5	5	5	0.15	3.5	No

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major (m)	Safe Depth Minor (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF133	Pit23	Basin170	2				Dummy us	0.2	0.05	0.6	1	0	1352
OF131	GPT2	Basin170	0.3				Dummy us	0.2	0.05	0.6	1	0	1350
OF473	Basin170	Pit519	0.2	43.25	6	1.7	Dummy us	0.2	0.05	0.6	1	0	4.52E+08
OF505	Pit519	Pit432	0.2				Dummy us	0.2	0.05	0.6	1	0	5.73E+08
OF47	Pit145	GPT 1	2				Dummy us	0.2	0.05	0.6	1	0	682
OF241	GPT 1	Pit245	0.502				Dummy us	0.2	0.05	0.6	1	0	1576
OF318	Metcash 1	Pit139	0.1	58.7	2	1.7	Dummy us	0.2	0.05	0.6	1	0	2.48E+08
OF415	Pit139	Pit241	1				Dummy us	0.2	0.05	0.6	1	0	4.14E+08
OF244	Pit241	Pit256	0.5				Dummy us	0.2	0.05	0.6	1	0	1579
OF249	Pit256	Pit245	0.5				Dummy us	0.2	0.05	0.6	1	0	1583
OF40	Pit149	Pit147	2				Dummy us	0.2	0.05	0.6	1	0	674
OF42	Pit147	Pit146	2				Dummy us	0.2	0.05	0.6	1	0	676
OF44	Pit146	Pit145	2				Dummy us	0.2	0.05	0.6	1	0	678
OF71	Pit144	GPT 1	2				Dummy us	0.2	0.05	0.6	1	0	743
OF179	Pit194	Pit191	1.5				Dummy us	0.2	0.05	0.6	1	0	1474
OF199	Pit191	Pit190	1.5				Dummy us	0.2	0.05	0.6	1	0	1494
OF205	Pit190	Pit246	1.5				Dummy us	0.2	0.05	0.6	1	0	1500
OF292	Pit246	Pit245	1.5				Dummy us	0.2	0.05	0.6	1	0	8519057
OF286	Pit253	Pit250	1				Dummy us	0.2	0.05	0.6	1	0	8519051
OF280	Pit250	Pit244	1				Dummy us	0.2	0.05	0.6	1	0	8519045
OF271	Pit244	Pit245	1				Dummy us	0.2	0.05	0.6	1	0	8519036
OF51	Pit104	Pit103	0.7				Dummy us	0.2	0.05	0.6	1	0	694
OF56	Pit103	Pit107	0.8				Dummy us	0.2	0.05	0.6	1	0	705
OF58	Pit107	Pit109	1				Dummy us	0.2	0.05	0.6	1	0	709
OF61	Pit109	Pit167	0.8				Dummy us	0.2	0.05	0.6	1	0	715
OF63	Pit167	Pit158	0.5				Dummy us	0.2	0.05	0.6	1	0	728
OF65	Pit158	Pit159	0.255				Dummy us	0.2	0.05	0.6	1	0	731
OF67	Pit159	Pit157	0.5				Dummy us	0.2	0.05	0.6	1	0	739
OF68	Pit157	Pit322	1.25				Dummy us	0.2	0.05	0.6	1	0	740
OF70	Pit322	Pit144	1				Dummy us	0.2	0.05	0.6	1	0	742
OF85	Pit184	Pit351	3				Dummy us	0.2	0.05	0.6	1	0	927
OF90	Pit351	Pit186	3				Dummy us	0.2	0.05	0.6	1	0	950
OF93	Pit186	Pit358	7				Dummy us	0.2	0.05	0.6	1	0	956
OF97	Pit358	Pit359	5				Dummy us	0.2	0.05	0.6	1	0	970
OF100	Pit359	Pit360	5				Dummy us	0.2	0.05	0.6	1	0	974
OF102	Pit360	Metcash 1	3				Dummy us	0.2	0.05	0.6	1	0	977
OF87	Pit355	Pit186	3				Dummy us	0.2	0.05	0.6	1	0	947
OF485	Pit514	GPT2	0.3				Dummy us	0.2	0.05	0.6	1	0	5.03E+08
OF120	Pit211	Pit386	0.6				Dummy us	0.2	0.05	0.6	1	0	1083
0.5	Pit386	Pit388	2				Dummy us	0.2	0.05	0.6	1	0	1084
OF122	Pit388	Pit452	2				Dummy us	0.2	0.05	0.6	1	0	1085
OF135	Pit420	Pit418	0.55				Dummy us	0.2	0.05	0.6	1	0	1381
OF138	Pit418	Pit416	0.5				Dummy us	0.2	0.05	0.6	1	0	1383
OF139	Pit416	Pit414	0.5				Dummy us	0.2	0.05	0.6	1	0	1384
OF140	Pit414	Pit412	0.5				Dummy us	0.2	0.05	0.6	1	0	1385
OF163	Pit412	Pit409	0.6				Dummy us	0.2	0.05	0.6	1	0	1415
OF150	Pit409	Pit408	0.6				Dummy us	0.2	0.05	0.6	1	0	1396
OF153	Pit408	Pit406	0.8				Dummy us	0.2	0.05	0.6	1	0	1399
OF155	Pit406	Pit404	1.5				Dummy us	0.2	0.05	0.6	1	0	1401
OF157	Pit404	Pit438	1.5				Dummy us	0.2	0.05	0.6	1	0	1403
OF168	Pit438	Pit436	0.8				Dummy us	0.2	0.05	0.6	1	0	1464
OF170	Pit436	Pit433	2				Dummy us	0.2	0.05	0.6	1	0	1466
OF108	Pit370	Pit375	0.5				Dummy us	0.2	0.05	0.6	1	0	998
OF112	Pit375	Pit379	5				Dummy us	0.2	0.05	0.6	1	0	1006
OF116	Pit379	Pit380	2				Dummy us	0.2	0.05	0.6	1	0	1018
OF118	Pit380	Pit74	0.5				Dummy us	0.2	0.05	0.6	1	0	1037
OF126	Pit74	Pit388	5				Dummy us	0.2	0.05	0.6	1	0	1089
OF3	Pit263	Pit268	1				Dummy us	0.2	0.05	0.6	1	0	515
OF10	Pit268	Pit273	1				Dummy us	0.2	0.05	0.6	1	0	523
OF12	Pit273	Pit278	1.2				Dummy us	0.2	0.05	0.6	1	0	525
OF13	Pit278	Pit282	0.6				Dummy us	0.2	0.05	0.6	1	0	526
OF14	Pit282	Pit284	0.6				Dummy us	0.2	0.05	0.6	1	0	527
OF15	Pit284	Pit131	0.6				Dummy us	0.2	0.05	0.6	1	0	528
OF17	Pit131	Pit296	1				Dummy us	0.2	0.05	0.6	1	0	530
OF18	Pit296	Pit299	1				Dummy us	0.2	0.05	0.6	1	0	531
OF19	Pit299	Pit302	1				Dummy us	0.2	0.05	0.6	1	0	532
OF20	Pit302	GPT 1	5				Dummy us	0.2	0.05	0.6	1	0	533
OF1	Pit112	Pit263	1.1				Dummy us	0.2	0.05	0.6	1	0	514

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DRAINS DATA DHL & METCASH

DRAINS results prepared 25 August, 2010 from Version 2010.08											
PIT / NODE DETAILS				Version 8							
Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint				
Pit23	45.6	46	0.416	0	0.4	0	None				
GPT2	45.3	45.3	5.764	15	-0.3	5.232	Outlet System				
N470	43.24		0								
Pit519	43.2	43.2	3.663	10	-0.2	1.823	Outlet System				
Pit433	42.9		0.058		0.1		None				
Pit432	42.53		1.862		0.37		None				
N486	41.82		0								
Pit145	62.26		0.108		0.24	0	None				
GPT 1	60.95		0.261		1.45	0	None				
Pit139	57.25	57.05	2.855	1.8	-0.25	0	Outlet System				
Pit241	57.17	57.25	0	0	0.08	0	None				
Pit256	55.95	57.15	0.098	0	1.2	0	None				
Pit245	55.69	57.1	0.114	0	1.41		None				
N259	54.45		0								
Pit149	62.7		0.636		0	0.157	Outlet System				
Pit147	62.19	62.65	0.157	2	0.36	0.094	None				
Pit146	61.77	62.65	0.203	2	0.78	0.108	None				
Pit144	61.12		0		1.38	0	None				
Pit194	64.08	64.4	0.114	0	0.32	0	None				
Pit191	62.46	62.46	0.129	2.5	-0.06	0	Outlet System				
Pit190	60.08		0.114		0.37	0	None				
Pit246	57.91	58.35	0.114	0	0.44	0	None				
Pit253	60.54	61.6	0.043	0	1.06	0	None				
Pit250	58.88	58.88	0.13	3.7	-0.08	0	Outlet System				
Pit244	58.05	58.2	0.121	0	0.15	0	None				
N328	63.42		0.109								
Pit104	63.4		0		0	0.299	Outlet System				
Pit103	63.52	63.52	0.959	10	-0.3	0.065	Outlet System				
Pit107	63	62.9	0.26	0	-0.1	0	Outlet System				
Pit109	62.74	62.7	0	0	-0.04	0	Outlet System				
Pit167	62.56	62.7	0.857	0	0.14	0	None				
Pit158	62.15	62.75	0.308	0	0.6	0	None				
Pit159	62.1	62.75	0.449	0	0.65	0	None				
Pit157	61.88	62.75	0.253	0	0.87	0	None				
Pit322	61.51	62.7	0.276	0	1.19	0	None				
N358	61.81		0.576								
Pit184	61.77	62.15	0.184	3	0.23	0.039	None				
Pit351	61.25	61.25	0.039	15	-0.3	0.233	Outlet System				
Pit186	61	61	0.233	15	-0.3	0.48	Outlet System				
Pit358	60.95	60.7	0.48	0	-0.25	0	Outlet System				
Pit359	60.95	60.7	0	0	-0.25	0	Outlet System				
Pit360	60.95	60.7	0	0	-0.25	0	Outlet System				
Pit355	61.09	61.1	0.118	5.3	-0.14	0	Outlet System				
N417	61.2		0.08								
N415	61.1		0.08								
N414	59.72		0.08								
N413	59.58		0.08								
N411	59.23		0.08								
Pit452	58.69	59.01	0.08	0.1	0.31		None				
N438	56.69		0.08								
N408	55.91		0.178								
N407	54.51		0.178								
N406	53.58		0.178								
N405	52.36		0.178								
N403	51.06		0.178								
N402	50.05		0.178								
N400	46.71		0.178								
N399	46.06		0.178								
N397	45.71		0.178								
Pit514	45.4	45.4	0.178	15	-0.3	5.764	Outlet System				
Pit211	60.2		0.08		0	0.009	Outlet System				
Pit386	59.7		0.087		0	0.009	Outlet System				
Pit388	59.15	59.19	0.08	6.2	-0.05	0	Outlet System				
N440	57.14		1.076								
N442	50.05		0.488								
N462	50.05		0								
N443	50.08		0.724								
N456	45.44		0.178								
N458	49.26		1.099								
N460	53.7		0.951								
N479	45.34		0.268								
Pit420	64.4		0.144		0.22	0	None				
Pit418	62.68		0.081		0.51	0	None				
Pit416	58.57		0.081		0.4	0	None				
Pit414	53.13		0.087		0	0.003	Outlet System				
Pit412	49.04		0.065		0.64	0	None				
Pit409	46.45		0.056		0.78	0	None				

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Pit408	45.29	45.29	0.046	10	-0.2	0.262	Outlet System				
Pit406	45.08	45.08	0.289	5	-0.2	0.039	Outlet System				
Pit404	44.51		0.06		0.27	0	None				
Pit399	44.06		0.029		0.72		None				
N483	43.81		0								
Pit438	43.35		0.051		1.07	0	None				
Pit436	42.98		0.029		0.92	0	None				
N562	60.04		0.962								
Pit370	59.6	59.6	0	15	-0.3	0.143	Outlet System				
Pit375	58.55	59.31	0.143	0.2	0.75	0	None				
Pit379	58.29	59.16	0.238	0.3	0.86	0	None				
Pit380	57.64	59.2	0	0	1.56	0	None				
Pit74	57.08		0		2.07	0	None				
N788	59.09		2.466								
N843	57.26		0								
N838	59.74		0.616								
N841	58.56		0.238								
N846	61.14		3.379								
N856	64.8		0.325								
Pit263	64.35	64.35	0.376	4	-0.2	0.268	Outlet System				
Pit268	64.27	64.1	0.268	0	-0.17	0	Outlet System				
Pit273	64.17	64.1	0.388	0	-0.07	0	Outlet System				
Pit278	63.94		0.354		0.11	0	None				
Pit282	63.72	64.05	0.495	0	0.33	0	None				
Pit284	63.32	64.05	0.029	0.1	0.73	0	None				
Pit131	63.13	63.96	0.109	0.1	0.82	0	None				
Pit133	62.49		0		1.06		None				
Pit296	62.3		0.042		1.25	0	None				
Pit299	61.88		0.055		1.22	0	None				
Pit302	61.53		0.05		1.57	0	None				
Pit143	61.37		0		1.33		None				
N859	64.87		0.382								
N862	64.49		0.443								
Pit112	64.35	64.35	0	4	-0.2	0.376	Outlet System				
SUB-CATCHMENT DETAILS											
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm				
	Flow Q	Max Q	Max Q	Tc	Tc	Tc					
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)					
Cat206	0.416	0.392	0.024	15	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat250	0.058	0.054	0.006	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat248	0.086	0.079	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat78	0.261	0.246	0.015	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat87	0.098	0.093	0.008	4.89	25.19	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat103	0.114	0.107	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat44	0.636	0.624	0.018	9.17	31.2	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat49	0.118	0.111	0.007	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat99	0.114	0.107	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat97	0.129	0.121	0.011	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat93	0.114	0.107	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat90	0.114	0.107	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat107	0.043	0.041	0.004	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat105	0.13	0.122	0.011	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat111	0.121	0.114	0.01	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat51	0.109	0.103	0.01	9.17	47.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat54	0.697	0.642	0.055	6	8	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat57	0.229	0.211	0.018	6	8	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat60	0.857	0.813	0.044	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat69	0.308	0.292	0.016	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat64	0.449	0.424	0.026	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat72	0.253	0.239	0.015	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat75	0.276	0.26	0.016	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat115	0.576	0.569	0.011	12.91	54.07	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat118	0.184	0.173	0.011	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat121	0.118	0.111	0.007	10	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat136	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat140	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat155	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat146	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat145	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat157	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat147	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat176	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat178	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat180	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat182	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat184	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat186	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat189	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat191	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat194	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat196	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				
Cat141	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1				

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Cat142	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat143	0.08	0.076	0.004	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat163	1.076	1.065	0.018	14.4	60.32	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat201	0.488	0.48	0.011	29.11	59.1	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat200	0.724	0.718	0.01	14.4	71.68	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat195	0.178	0.17	0.009	6	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat167	1.099	1.035	0.064	15	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat168	0.951	0.941	0.018	12.6	52.76	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat211	0.268	0.238	0.053	13.28	59.1	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat214	0.144	0.135	0.012	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat217	0.081	0.059	0.031	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat220	0.081	0.059	0.031	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat222	0.087	0.063	0.033	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat230	0.065	0.052	0.018	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat227	0.056	0.045	0.016	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat233	0.046	0.038	0.012	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat237	0.031	0.029	0.004	4.48	23.12	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat242	0.029	0.027	0.003	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat244	0.029	0.027	0.003	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat246	0.051	0.047	0.006	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat247	0.029	0.027	0.003	5.68	29.29	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat123	0.962	0.948	0.024	14.51	38.89	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat135	0.238	0.238	0	10.55	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
NEGH1	2.466	0	2.466	0	14	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat128	0.616	0.616	0	10.55	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat132	0.238	0.238	0	10.55	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
NEGH2	3.379	0	3.379	0	6	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat2	0.325	0.319	0.009	9.12	31.2	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat22	0.388	0.368	0.02	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat26	0.354	0.336	0.018	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat29	0.495	0.47	0.025	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat32	0.029	0.028	0.001	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat36	0.109	0.103	0.006	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat9	0.042	0.042	0	5	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat10	0.055	0.055	0	5	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat11	0.05	0.05	0	5	0	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat19	0.382	0.362	0.02	7	5	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Cat1	0.443	0.436	0.012	13.72	36.2	0	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1

Outflow Volumes for Total Catchment (47.6 impervious + 20.8 pervious = 68.4 total ha)

Storm	Total Rainf	Total Runo	Impervious	Pervious Runoff
	cu.m	cu.m (Run	cu.m (Run	cu.m (Runoff %)
AR&R 5 ye	26606.24	21412.67 (	18048.56 (	3364.11 (41.6%)
AR&R 10 y	30094.45	24865.15 (	20477.28 (	4387.87 (48.0%)
AR&R 20 y	34882.2	29613.43 (	23810.88 (	5802.54 (54.8%)
AR&R 50 y	40353.93	35009.33 (	27620.58 (	7388.75 (60.3%)
AR&R 100	45141.68	39781.22 (	30954.30 (	8826.91 (64.4%)

PIPE DETAILS

Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)	
Pipe229	0.416	1.5	45.364	45.3	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe100	4.289	2.4	44.213	43.77	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1
Pipe101	4.301	2.4	43.515	43.243	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1
Pipe515	4.301	2.4	43.243	43.2	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1
P784	5.772	3.2	42.935	42.903	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe478	5.825	3.2	42.688	42.528	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe479	7.105	4.2	42.319	41.825	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe119	0.108	3.6	61.654	60.949	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe120	6.626	3.6	59.677	59.602	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
P661	3.551	5.6	58.115	57.252	AR&R 20 year, 1 hour storm, average 51 mm/h, Zone 1
Pipe321	5.825	2.6	57.252	57.17	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe8	10.036	3.9	56.131	55.952	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe9	10.124	4	55.75	55.688	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe252	10.9	4.6	54.957	54.455	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe103	0.548	1.9	62.317	62.19	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe117	0.583	2.1	62.058	61.773	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe118	0.68	2.4	61.291	61.117	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe82	3.629	2	61.016	60.949	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe22	0.114	2.1	63.585	62.462	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe21	0.22	2	61.774	60.08	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe23	0.332	2.1	59.847	57.912	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe14	0.446	2.6	57.719	56.384	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe4	0.043	2.1	60.292	58.884	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe10	0.162	1.5	58.703	58.045	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe11	0.26	2.4	57.719	56.045	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
P311	0.109	0.7	63.421	63.4	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe63	0.102	0.5	63.402	63.52	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe64	0.793	1.8	63.223	63.003	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe65	0.943	1.5	62.919	62.738	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe67	0.943	1.5	62.706	62.558	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1
Pipe70	1.732	1.9	62.325	62.149	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1

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Pipe109	2.036	1.4	62.149	62.101	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe74	2.48	1.7	61.969	61.882	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe76	2.731	1.9	61.753	61.512	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe77	3.008	2	61.357	61.117	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe130	0.576	1.3	61.814	61.771	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe24	0.72	1.6	61.364	61.25	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe98	0.688	1.6	61.052	61	AR&R 50 year, 1 hour storm, average 59 mm/h, Zone 1	
Pipe124	0.951	1.5	60.969	60.95	AR&R 50 year, 1 hour storm, average 59 mm/h, Zone 1	
Pipe122	1.415	0.8	60.95	60.95	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe123	1.415	0.8	60.95	60.95	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe314	1.415	0.8	60.949	60.949	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe97	0.153	1	61.028	61	AR&R 50 year, 1 hour storm, average 59 mm/h, Zone 1	
Pipe140	0.08	1.3	61.199	61.109	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe160	0.159	2.7	61.1	59.722	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe159	0.238	1.6	59.722	59.578	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe400	0.317	2	59.578	59.235	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe164	0.396	2.5	59.235	58.685	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe169	0.704	3.3	58.022	56.69	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe175	3.78	4.5	56.69	55.912	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe178	3.957	4.5	55.912	54.649	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe180	4.132	4.7	54.506	53.67	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe182	5.248	6.5	53.585	52.362	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe194	5.424	4.9	52.362	51.346	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe203	5.6	6.3	51.065	50.054	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe205	6.886	7	50.054	48.374	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe228	8.124	7.6	46.709	46.065	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe232	8.299	3.8	46.065	45.713	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe233	8.474	3.8	45.713	45.4	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe99	3.869	1.8	45.338	45.3	AR&R 10 year, 1 hour storm, average 44 mm/h, Zone 1	
Pipe162	0.075	1.1	59.988	59.7	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe165	0.157	1.4	59.453	59.147	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe163	0.231	2.1	58.885	58.685	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe170	1.076	2.7	57.141	57.026	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe416	0.488	1.7	50.054	50.054	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe222	1.114	2.2	50.054	50.054	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe417	0.724	2.4	50.084	50.054	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe230	0.178	0.8	45.435	45.4	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe204	1.099	2.8	49.262	49.042	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe419	0.951	2.2	53.699	53.585	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe234	0.268	0.5	45.335	45.3	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe27	0.144	2.1	63.823	62.685	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe29	0.225	3.6	62.209	58.572	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe31	0.306	4.1	58.02	53.13	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe38	0.39	3.5	52.577	49.043	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe35	0.455	4.1	48.8	46.453	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe36	0.512	4.2	46.271	45.29	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe37	0.404	1.4	45.137	45.08	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe236	0.488	1.7	44.892	44.514	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe472	0.529	1.9	44.257	44.061	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe473	0.55	2.2	43.978	43.809	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe239	0.051	1.2	43.061	42.981	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe474	0.08	0.7	42.969	42.903	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe154	0.962	1.8	60.044	59.6	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe155	1.488	2.3	58.929	58.545	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe156	1.777	2.1	58.535	58.291	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe158	2.007	2.3	57.788	57.639	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe167	2.007	2.3	57.283	57.082	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe168	2.007	2.4	56.93	56.69	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
P857	5.825	2.6	57.258	57.17	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
P834	0.616	2.2	59.736	59.6	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
P850	0.238	0.9	58.564	58.545	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe855	3.379	3	61.141	57.258	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe880	0.325	2.9	64.8	64.35	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe51	1.005	1.6	64.315	64.265	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe54	1.311	1.5	64.265	64.168	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe55	1.544	1.7	64.086	63.938	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe56	1.758	1.6	63.857	63.719	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe57	2.14	1.9	63.498	63.323	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe58	2.167	1.9	63.278	63.128	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe81	2.267	2	62.782	62.488	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe88	2.267	2	62.353	62.303	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe89	2.308	2	62.155	61.885	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe78	2.36	2.1	61.827	61.533	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe79	2.409	2.1	61.473	61.367	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe80	2.409	2.1	61.068	60.949	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
P883	0.382	3.5	64.866	64.265	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
P887	0.443	2	64.489	64.35	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
Pipe50	0.523	0.8	64.35	64.35	AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	
CHANNEL DETAILS						
Name	Max Q	Max V	Chainage	Max	Due to Storm	
	(cu.m/s)	(m/s)	(m)	HGL (m)		
Chnl2	2.466	1.5			AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1	

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OVERFLOW ROUTE DETAILS											
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm			
OF133	0	0	0.362	0	0	0	0				
OF131	5.232	5.232	0.362	0.145	0.21	39.61	1.44	AR&R 100 year, 1 hour storm, average 66 m			
OF473	3.663	3.663	0.362	0.124	0.16	36.76	1.29	AR&R 100 year, 1 hour storm, average 66 m			
OF505	1.823	1.823	0.362	0.093	0.1	32.49	1.03	AR&R 100 year, 1 hour storm, average 66 m			
OF47	0	0	0.362	0	0	0	0				
OF241	0	0	0.362	0	0	0	0				
OF318	2.855	2.855	0.362	0.111	0.13	34.98	1.2	AR&R 100 year, 1 hour storm, average 66 m			
OF415	0	0	0.362	0	0	0	0				
OF244	0	0	0.362	0	0	0	0				
OF249	0	0	0.362	0	0	0	0				
OF40	0.157	0.157	0.362	0.036	0.02	15.74	0.52	AR&R 100 year, 1 hour storm, average 66 m			
OF42	0.094	0.094	0.362	0.03	0.01	13.53	0.44	AR&R 100 year, 1 hour storm, average 66 m			
OF44	0.108	0.108	0.362	0.031	0.01	14.16	0.46	AR&R 100 year, 1 hour storm, average 66 m			
OF71	0	0	0.362	0	0	0	0				
OF179	0	0	0.362	0	0	0	0				
OF199	0	0	0.362	0	0	0	0				
OF205	0	0	0.362	0	0	0	0				
OF292	0	0	0.362	0	0	0	0				
OF286	0	0	0.362	0	0	0	0				
OF280	0	0	0.362	0	0	0	0				
OF271	0	0	0.362	0	0	0	0				
OF51	0.299	0.299	0.362	0.046	0.03	19.52	0.62	AR&R 100 year, 1 hour storm, average 66 m			
OF56	0.065	0.065	0.362	0.025	0.01	11.96	0.41	AR&R 100 year, 1 hour storm, average 66 m			
OF58	0	0	0.362	0	0	0	0				
OF61	0	0	0.362	0	0	0	0				
OF63	0	0	0.362	0	0	0	0				
OF65	0	0	0.362	0	0	0	0				
OF67	0	0	0.362	0	0	0	0				
OF68	0	0	0.362	0	0	0	0				
OF70	0	0	0.362	0	0	0	0				
OF85	0.039	0.039	0.362	0.021	0.01	10.38	0.35	AR&R 100 year, 1 hour storm, average 66 m			
OF90	0.233	0.233	0.362	0.042	0.02	17.94	0.58	AR&R 100 year, 1 hour storm, average 66 m			
OF93	0.48	0.48	0.362	0.056	0.04	23.3	0.68	AR&R 100 year, 1 hour storm, average 66 m			
OF97	0	0	0.362	0	0	0	0				
OF100	0	0	0.362	0	0	0	0				
OF102	0	0	0.362	0	0	0	0				
OF87	0	0	0.362	0	0	0	0				
OF485	5.764	5.764	0.362	0.151	0.22	40.44	1.49	AR&R 100 year, 1 hour storm, average 66 m			
OF120	0.009	0.009	0.362	0.012	0	5.8	0.25	AR&R 100 year, 1 hour storm, average 66 m			
0.5	0.009	0.009	0.362	0.012	0	6.23	0.24	AR&R 100 year, 1 hour storm, average 66 m			
OF122	0	0	0.362	0	0	0	0				
OF135	0	0	0.362	0	0	0	0				
OF138	0	0	0.362	0	0	0	0				
OF139	0	0	0.362	0	0	0	0				
OF140	0.003	0.003	0.362	0.007	0	3.65	0.2	AR&R 100 year, 1 hour storm, average 66 m			
OF163	0	0	0.362	0	0	0	0				
OF150	0	0	0.362	0	0	0	0				
OF153	0.262	0.262	0.362	0.044	0.03	18.89	0.58	AR&R 100 year, 1 hour storm, average 66 m			
OF155	0.039	0.039	0.362	0.021	0.01	10.38	0.36	AR&R 100 year, 1 hour storm, average 66 m			
OF157	0	0	0.362	0	0	0	0				
OF168	0	0	0.362	0	0	0	0				
OF170	0	0	0.362	0	0	0	0				
OF108	0.143	0.143	0.362	0.035	0.02	15.42	0.5	AR&R 100 year, 1 hour storm, average 66 m			
OF112	0	0	0.362	0	0	0	0				
OF116	0	0	0.362	0	0	0	0				
OF118	0	0	0.362	0	0	0	0				
OF126	0	0	0.362	0	0	0	0				
OF3	0.268	0.268	0.362	0.044	0.03	18.89	0.59	AR&R 100 year, 1 hour storm, average 66 m			
OF10	0	0	0.362	0	0	0	0				
OF12	0	0	0.362	0	0	0	0				
OF13	0	0	0.362	0	0	0	0				
OF14	0	0	0.362	0	0	0	0				
OF15	0	0	0.362	0	0	0	0				
OF17	0	0	0.362	0	0	0	0				
OF18	0	0	0.362	0	0	0	0				
OF19	0	0	0.362	0	0	0	0				
OF20	0	0	0.362	0	0	0	0				
OF1	0.376	0.376	0.362	0.051	0.03	21.41	0.64	AR&R 100 year, 1 hour storm, average 66 m			
DETENTION BASIN DETAILS											
Name	Max WL	MaxVol	Max Q	Max Q	Max Q						
			Total	Low Level	High Level						
Basin170	43.76	4006.6	7.964	4.301	3.663						
Metcash 1	59.59	2334.4	6.406	3.551	2.855						
CONTINUITY CHECK for AR&R 100 year, 1 hour storm, average 66 mm/h, Zone 1											
Node	Inflow	Outflow	Storage Ch	Difference							
	(cu.m)	(cu.m)	(cu.m)	%							
Pit23	727.08	727.08	0	0							

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GPT2	17150.08	17151.38	0	0							
Basin170	17151.37	17149.76	0.61	0							
N470	13590.09	13570.58	0	0.1							
Pit519	17130.24	17111.5	0	0.1							
Pit433	16588.38	16586.32	0	0							
Pit432	17448.38	17448.03	0	0							
N486	17448.03	17448.03	0	0							
Pit145	33.55	33.55	0	0							
GPT 1	12665.96	12663.67	0	0							
Metcash 1	12663.67	12662.15	0.97	0							
Pit139	12662.12	12683.18	0	-0.2							
Pit241	19898.26	19899.88	0	0							
Pit256	20040.22	20044.78	0	0							
Pit245	21294.57	21293.77	0	0							
N259	21293.77	21293.77	0	0							
Pit149	1114.72	1114.72	0	0							
Pit147	1114.72	1114.81	0	0							
Pit146	1318.77	1318.67	0	0							
Pit144	6316.3	6315.53	0	0							
Pit194	161.91	161.89	0	0							
Pit191	345.35	345.33	0	0							
Pit190	507.24	507.26	0	0							
Pit246	669.17	669.32	0	0							
Pit253	61.56	61.53	0	0.1							
Pit250	246.22	246.19	0	0							
Pit244	418.57	418.56	0	0							
N328	206.5	206.5	0	0							
Pit104	206.5	206.67	0	-0.1							
Pit103	1223	1223.23	0	0							
Pit107	1557.8	1556.7	0	0.1							
Pit109	1556.7	1555.28	0	0.1							
Pit167	2875.71	2874.33	0	0							
Pit158	3349.14	3345.98	0	0.1							
Pit159	4123.56	4120.05	0	0.1							
Pit157	4558.72	4555.56	0	0.1							
Pit322	5033.83	5031.18	0	0.1							
N358	1051.18	1051.18	0	0							
Pit184	1369.48	1369.71	0	0							
Pit351	1369.71	1369.96	0	0							
Pit186	1573.92	1574.7	0	0							
Pit358	1574.7	1575.94	0	-0.1							
Pit359	1575.94	1576.72	0	0							
Pit360	1576.72	1577.41	0	0							
Pit355	203.94	203.96	0	0							
N410	0	0	0	0							
N417	115.64	115.64	0	0							
N415	231.29	231.29	0	0							
N414	346.93	346.93	0	0							
N413	462.57	462.57	0	0							
N411	578.21	578.26	0	0							
Pit452	1040.74	1040.85	0	0							
N438	6837.28	6837.27	0	0							
N408	7096.67	7096.68	0	0							
N407	7356.08	7356.08	0	0							
N406	9351.66	9351.65	0	0							
N405	9611.05	9611.06	0	0							
N403	9870.46	9870.45	0	0							
N402	12604.24	12604.26	0	0							
N400	14785.86	14785.9	0	0							
N399	15045.29	15045.29	0	0							
N397	15304.67	15303.25	0	0							
Pit514	15822.03	15821.47	0	0							
Pit211	115.64	115.61	0	0							
Pit386	231.25	231.21	0	0							
Pit388	346.86	346.84	0	0							
N440	1971.34	1971.34	0	0							
N442	1145.37	1145.37	0	0							
N462	2474.42	2474.42	0	0							
N443	1329.05	1329.05	0	0							
N456	259.4	259.4	0	0							
N458	1922.23	1922.23	0	0							
N460	1736.18	1736.18	0	0							
N479	601.52	601.52	0	0							
Pit420	204.7	204.7	0	0							
Pit418	337.23	337.11	0	0							
Pit416	469.64	469.68	0	0							
Pit414	611.04	611.06	0	0							
Pit412	712.4	712.49	0	0							
Pit409	800.43	800.43	0	0							
Pit408	878.46	878.46	0	0							
Pit406	923.78	923.79	0	0							
Pit404	969.06	968.92	0	0							
Pit399	1014.2	1014.2	0	0							

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N483	1014.2	1014.2	0	0							
Pit438	78.48	78.48	0	0							
Pit436	123.75	123.75	0	0							
N562	1756.26	1756.26	0	0							
Pit370	2851.45	2851.66	0	0							
Pit375	3275.07	3278.17	0	-0.1							
Pit379	3701.58	3701.86	0	0							
Pit380	3701.86	3704.69	0	-0.1							
Pit74	3704.69	3709.45	0	-0.1							
N788	3483.42	3483.42	0	0							
N843	7222.82	7215.09	0	0.1							
N838	1095.18	1095.18	0	0							
N841	423.41	423.41	0	0							
N846	3739.39	3739.39	0	0							
N856	568.1	568.1	0	0							
Pit263	1376.98	1378.39	0	-0.1							
Pit268	1966.57	1967.94	0	-0.1							
Pit273	2566.6	2567.57	0	0							
Pit278	3113	3113.67	0	0							
Pit282	3876.84	3876.88	0	0							
Pit284	3921.96	3920.86	0	0							
Pit131	4088.78	4087.96	0	0							
Pit133	4087.96	4087.68	0	0							
Pit296	4144.49	4144.5	0	0							
Pit299	4218.93	4219.2	0	0							
Pit302	4287.54	4287.8	0	0							
Pit143	4287.8	4288.2	0	0							
N859	588.18	588.18	0	0							
N862	807.4	807.4	0	0							
Pit112	807.4	808.88	0	-0.2							
Run Log for PITT LOSS QUDM1 run at 07:02:11 on 25/8/2010											
Upwelling occurred at Pit514, Pit408, Pit370, Pit351, Pit186, Pit112, Pit104, GPT2											
Freeboard was inadequate at more than 20 pits.											
The maximum flow exceeded the safe value in the following overflow routes: OF505, OF485, OF473, OF318, OF131, OF93, OF1											

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ANNEXURE "E"

DESIGN OUTCOME

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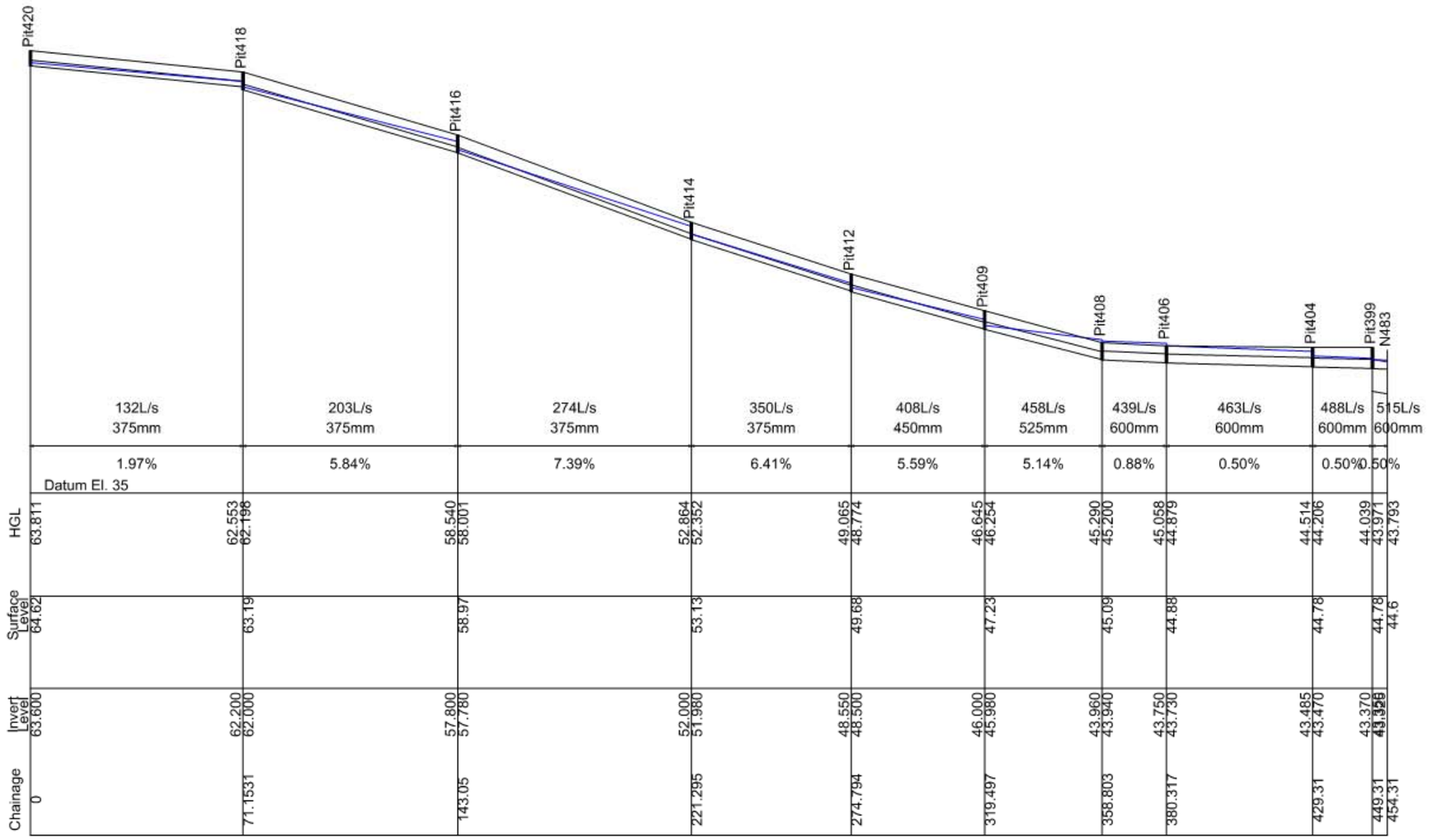

ROAD DRAINAGE
Bakers La & Mamre Rd

0 5 10 20 30 40 50 100 METRES

Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 1 of 9)

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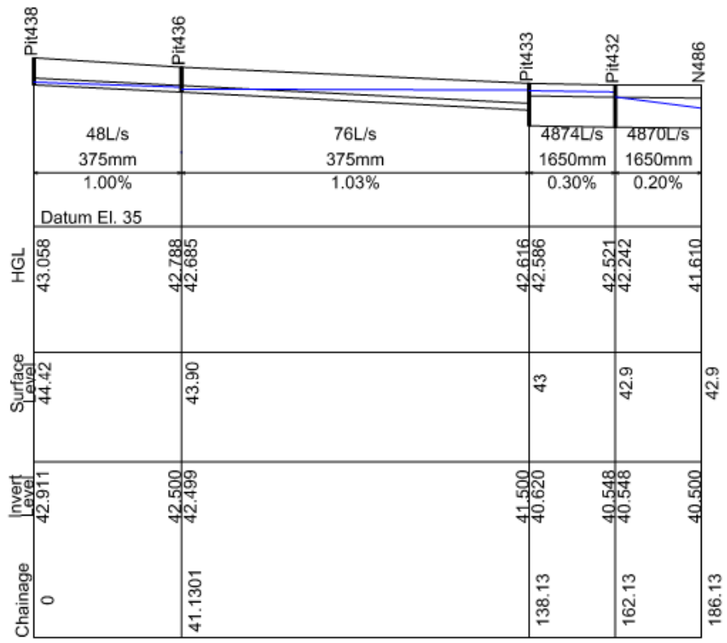
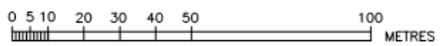


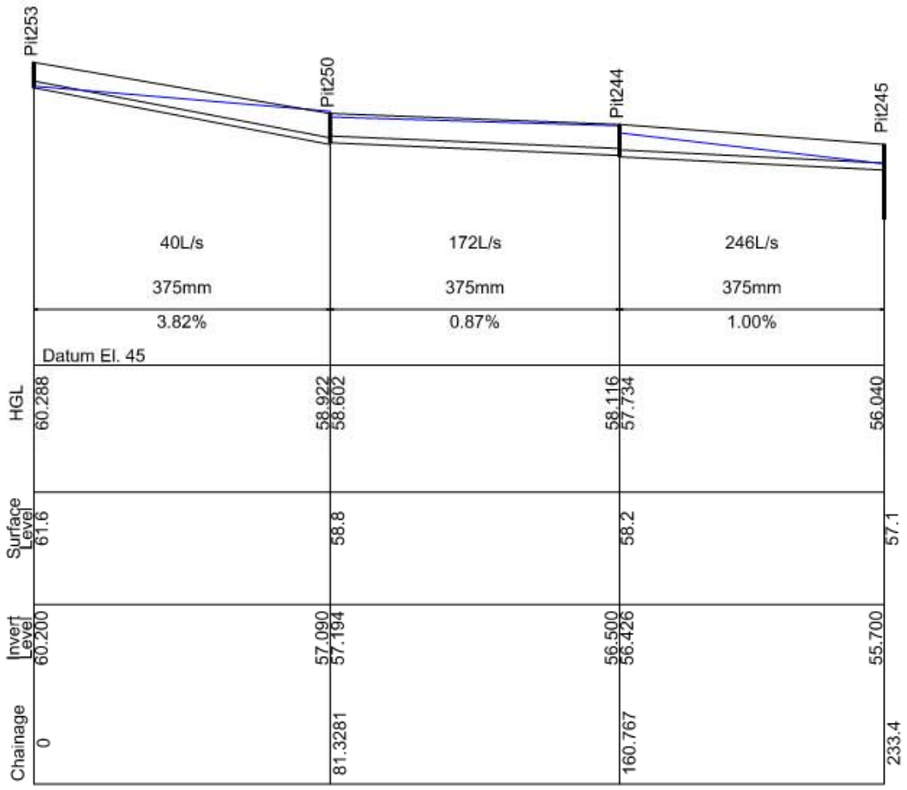
ROAD DRAINAGE
Mamre Rd



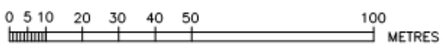
Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 2 of 9)

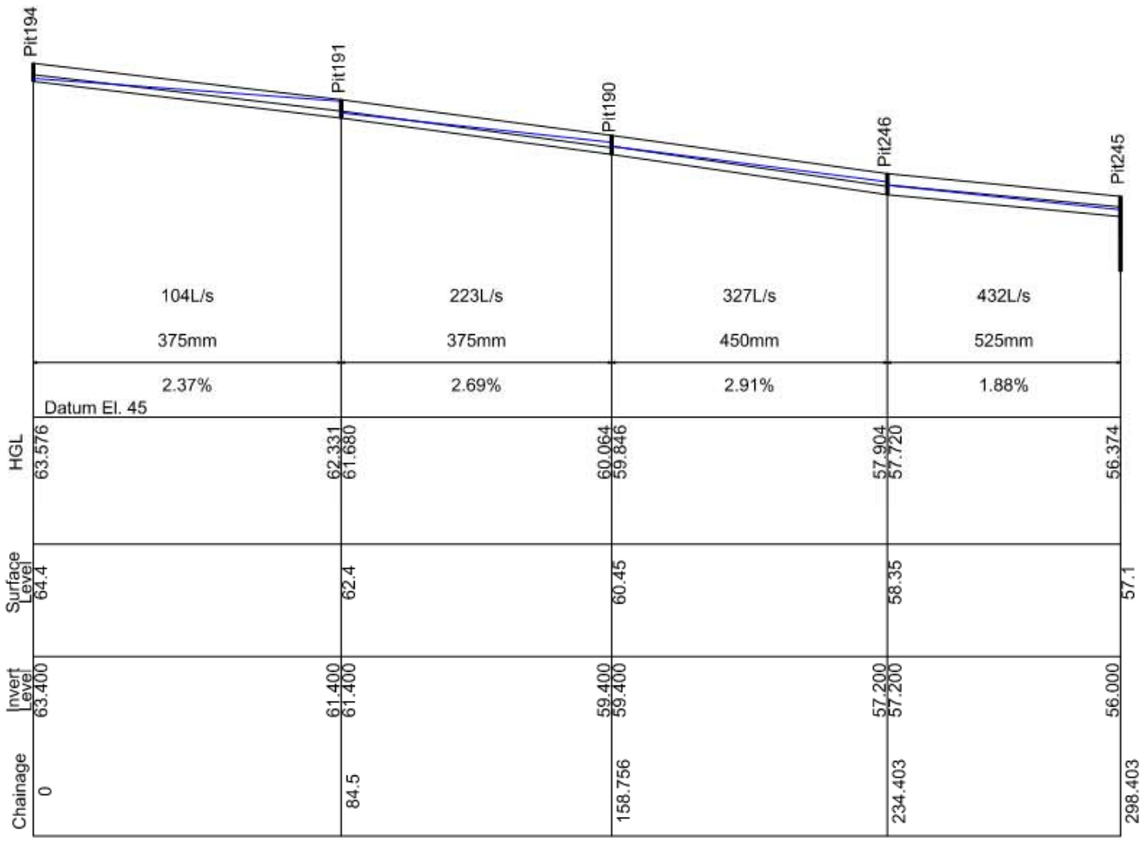


ROAD DRAINAGE
Barkers La



Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5



ROAD DRAINAGE
Barkers La

PIPE SIZE & GRADINGS
(Part 3 of 9)

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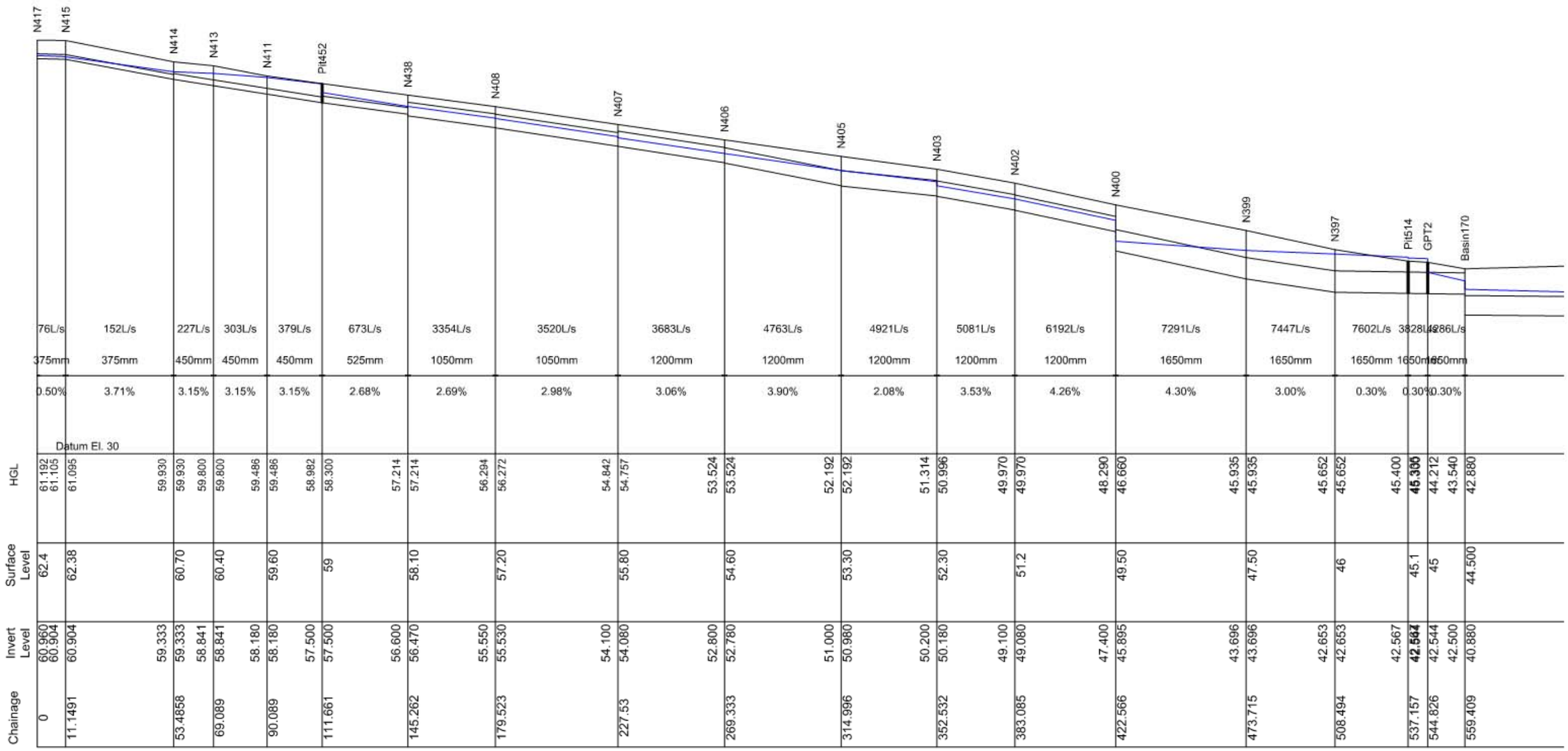
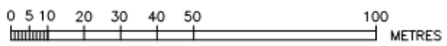


Chainage	Invert Level	Surface Level	HGL
0	60.960	62.4	61.192
	60.904		61.105
11.1491	60.904	62.38	61.095
	59.333		59.930
53.4858	59.333	60.70	59.930
	58.841		59.800
69.089	58.841	60.40	59.800
	58.180		59.486
90.089	58.180	59.60	59.486
	57.500		58.982
111.661	57.500	59	58.300
	56.600		57.214
145.262	56.470	58.10	57.214
	55.550		56.294
179.523	55.530	57.20	56.272
	54.100		54.842
227.53	54.080	55.80	54.757
	52.800		53.524
269.333	52.780	54.60	53.524
	51.000		52.192
314.996	50.980	53.30	52.192
	50.200		51.314
352.532	50.180	52.30	50.996
	49.100		49.970
383.085	49.080	51.2	49.970
	47.400		48.290
422.566	45.895	49.50	46.660
	43.696		45.935
473.715	43.696	47.50	45.935
	42.653		45.652
508.494	42.653	46	45.652
	42.567		45.400
537.157	42.564	45.1	45.385
544.826	42.544	45	44.212
	42.500		43.540
559.409	40.880	44.500	42.880

DHL SITE DRAINAGE
N417 Basin 170



Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 4 of 9)

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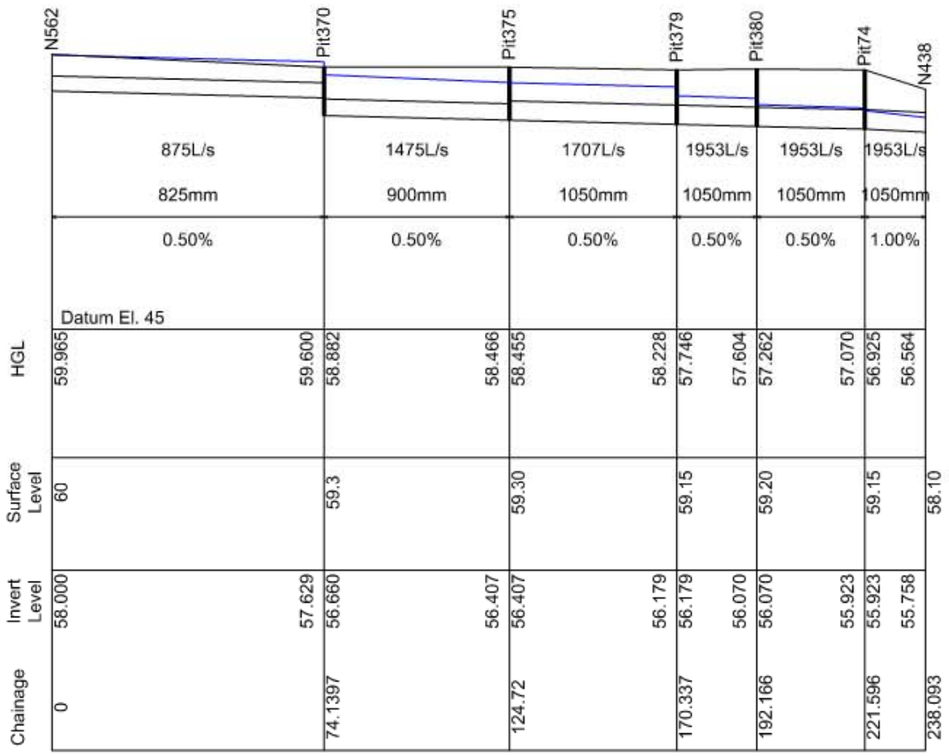
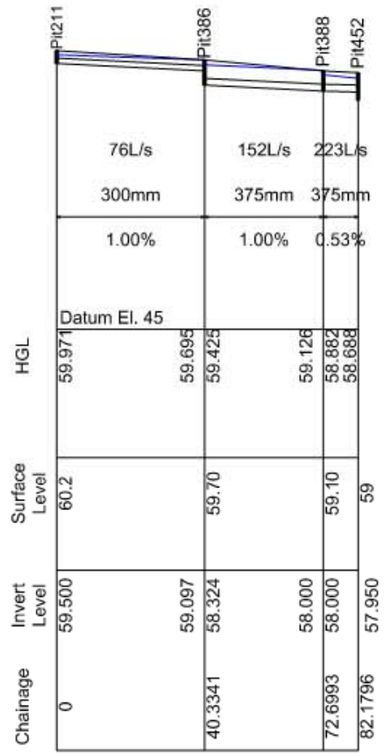
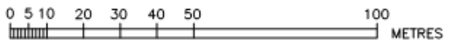


DHL SITE DRAINAGE
N562-N438



DHL SITE DRAINAGE
Pit211-Pit452



Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 5 of 9)

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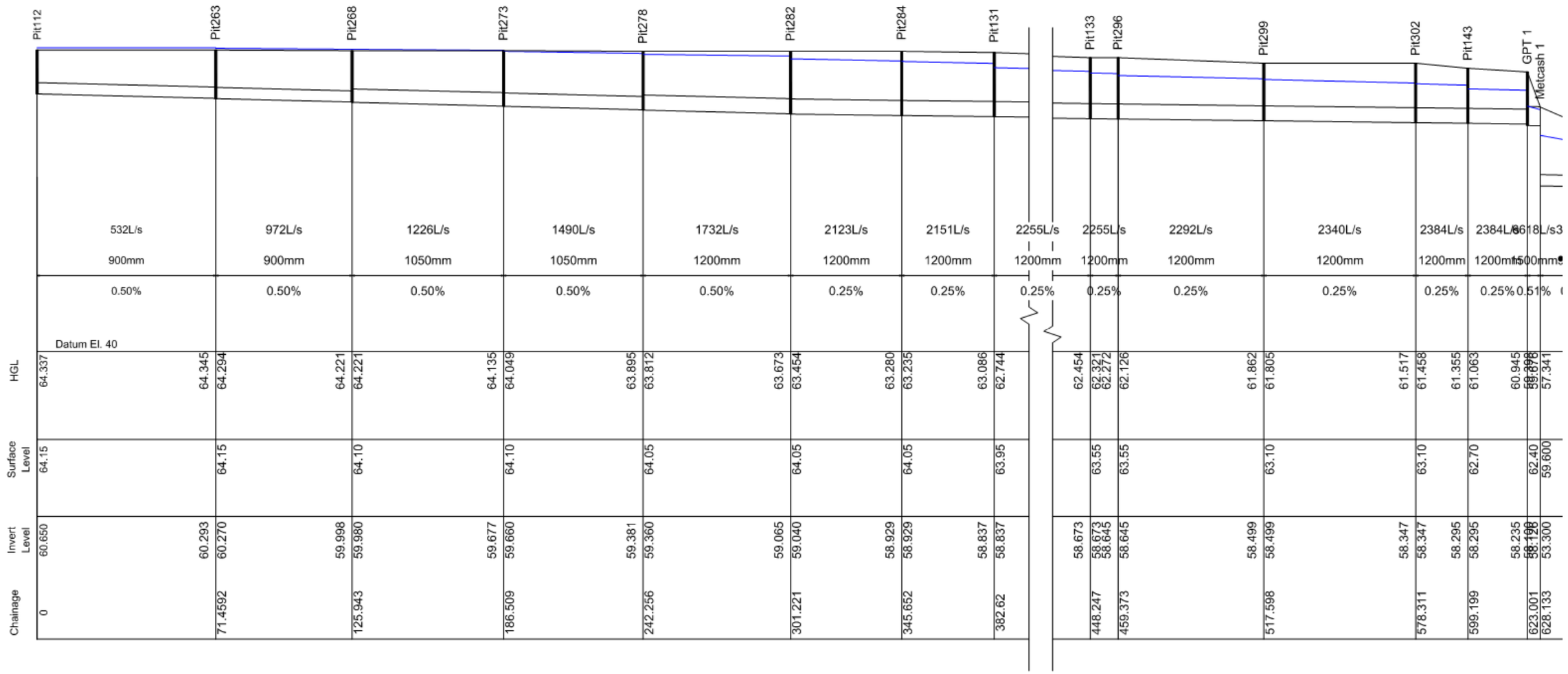

METCASH SITE DRAINAGE
Pit112 - GPT

Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 6 of 9)

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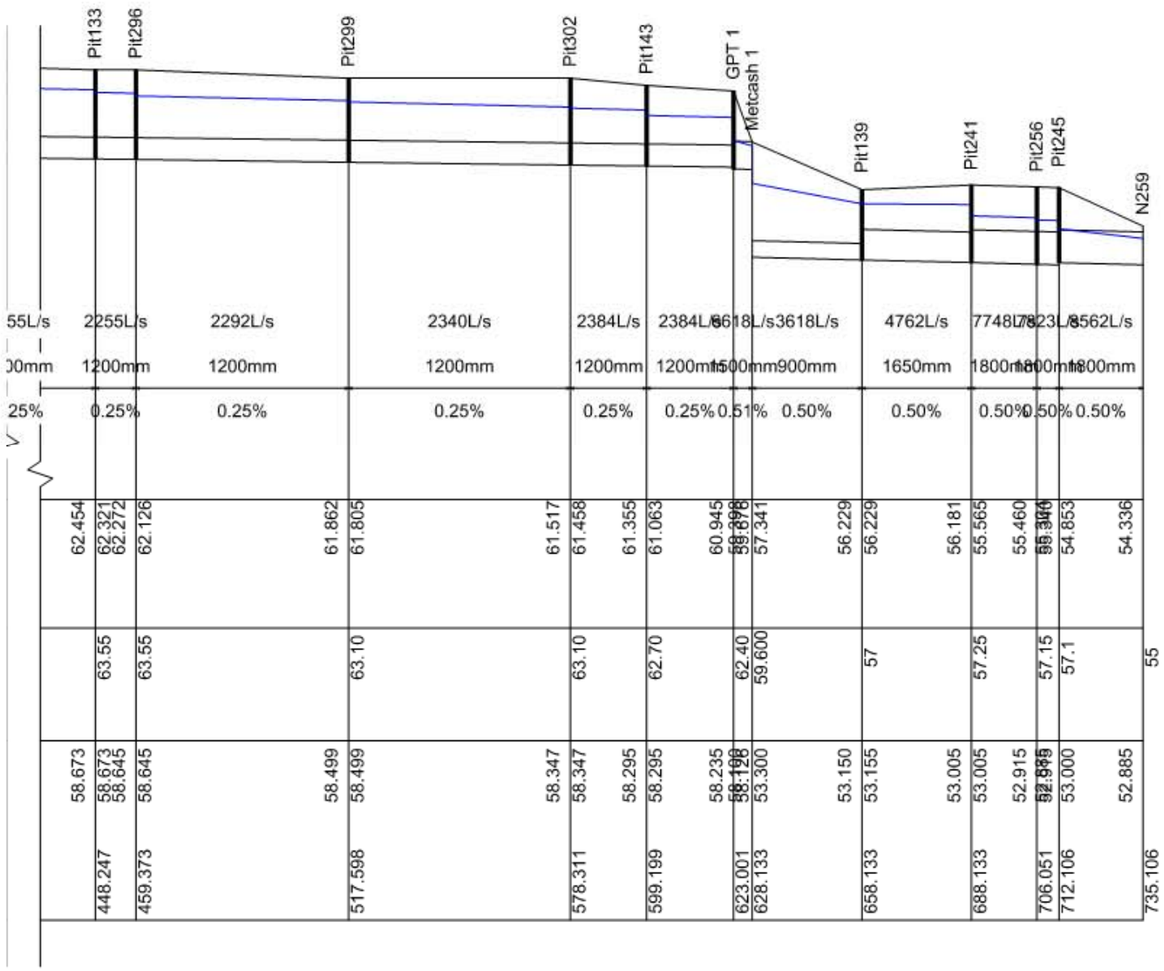

METCASH SITE DRAINAGE
GPT - N259

0 5 10 20 30 40 50 100 METRES

Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 7 of 9)

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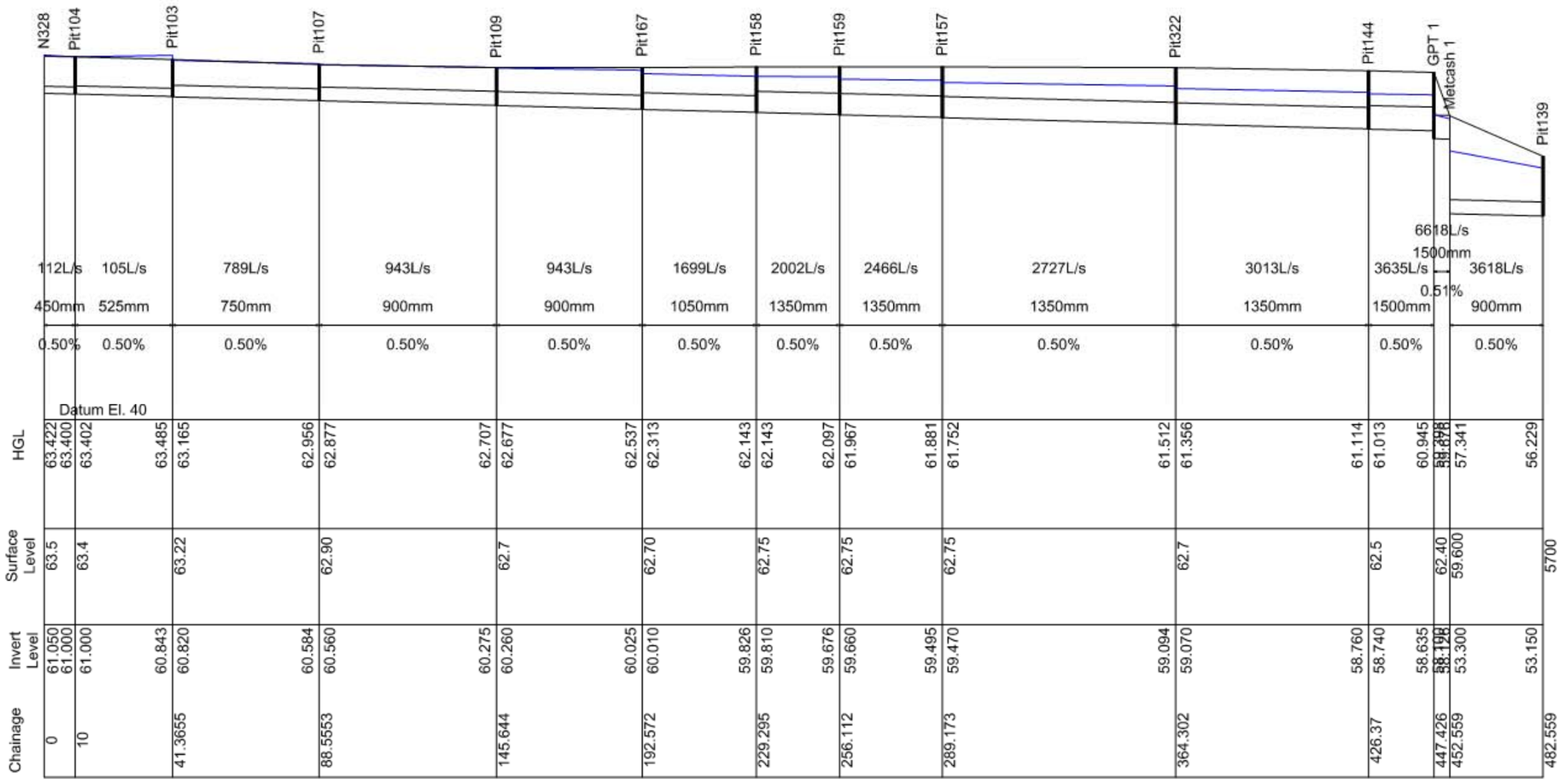

METCASH SITE DRAINAGE
N328-Pit139

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Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 8 of 9)

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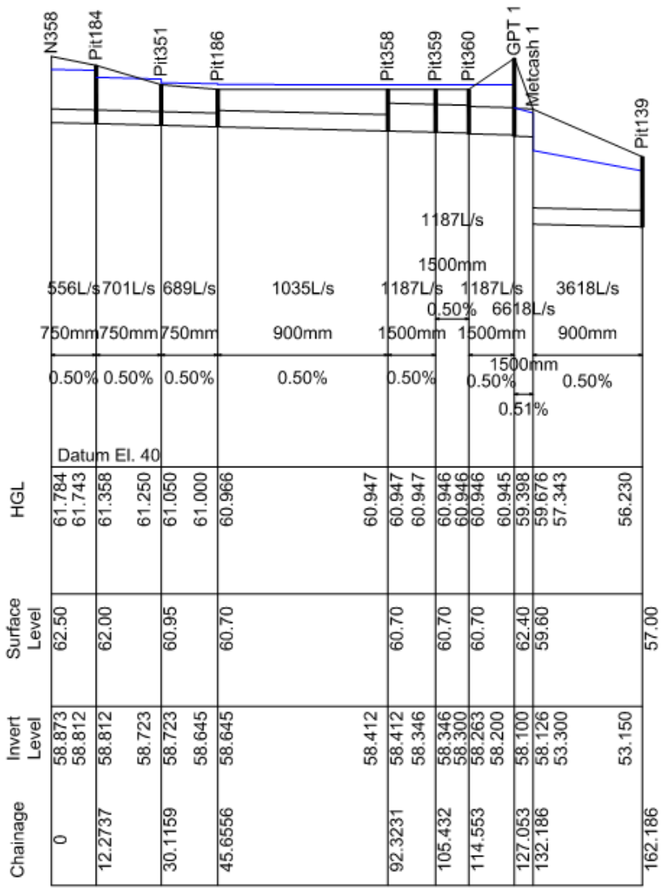
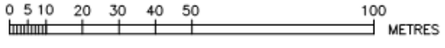


METCASH SITE DRAINAGE
N358-Pit139



Scale 1: 1,500 (on A3)

Scale (H:V) = 1:5

PIPE SIZE & GRADINGS
(Part 9 of 9)

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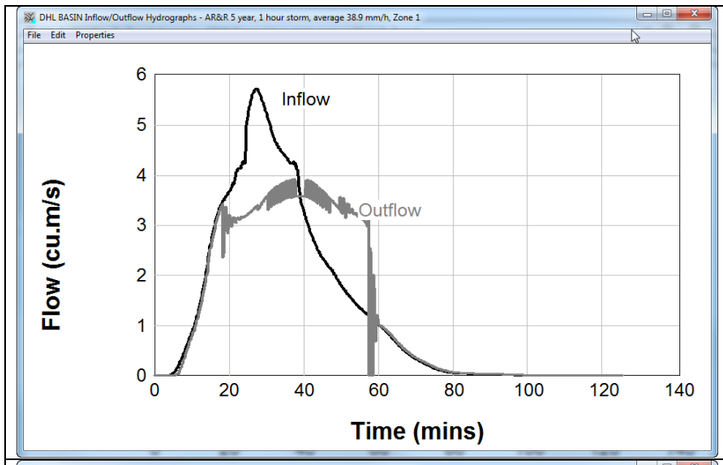
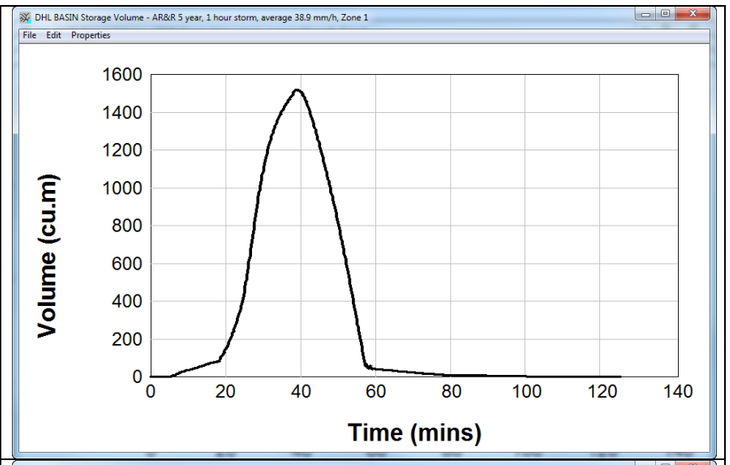
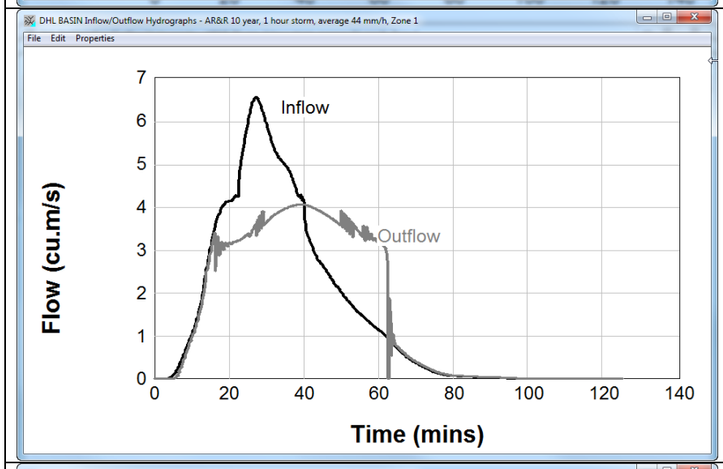
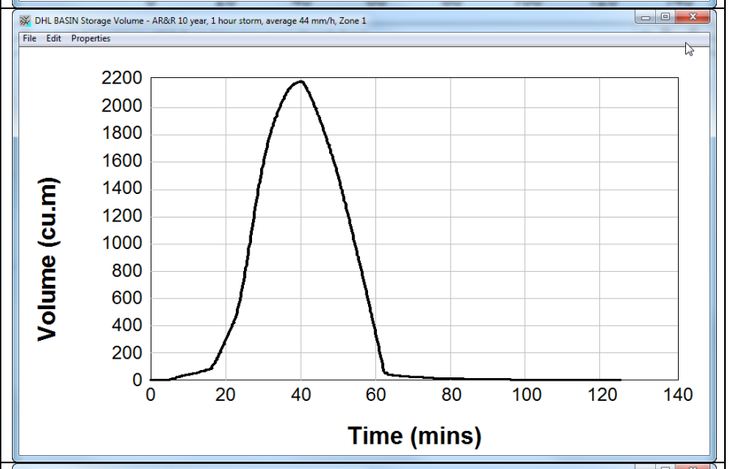
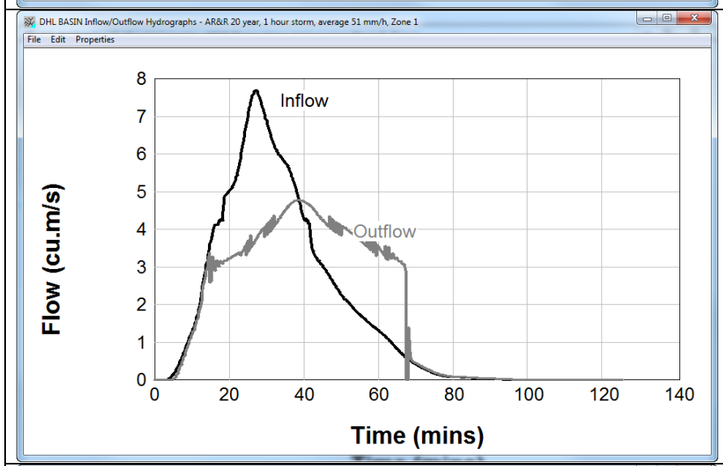
DHL BASIN PERFORMANCE FOR ALL STORMS – Inflow / Outflow Hydrographs & Storage Volumes

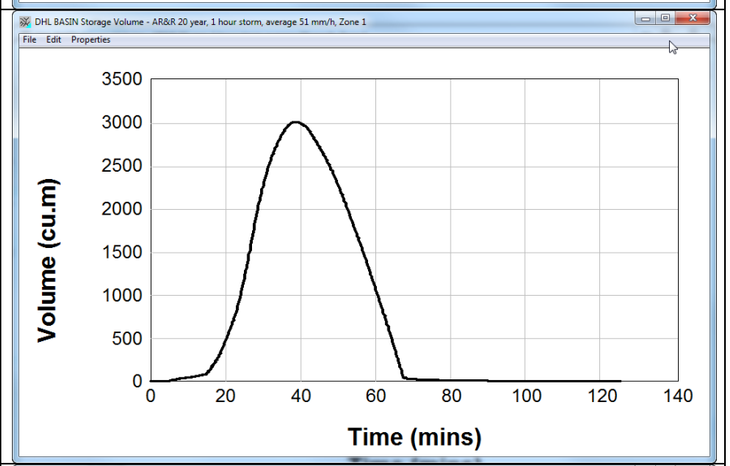


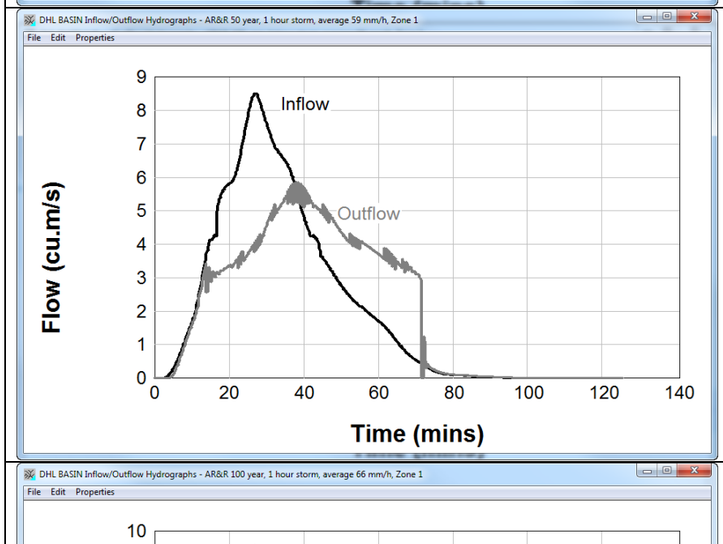


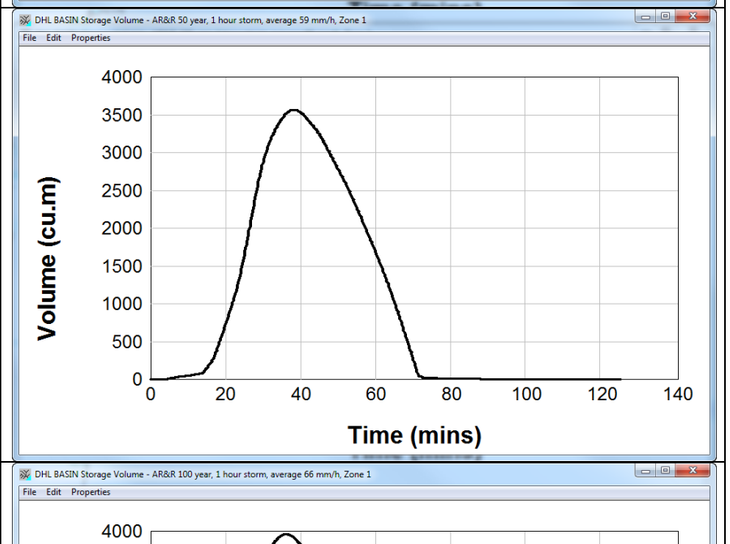


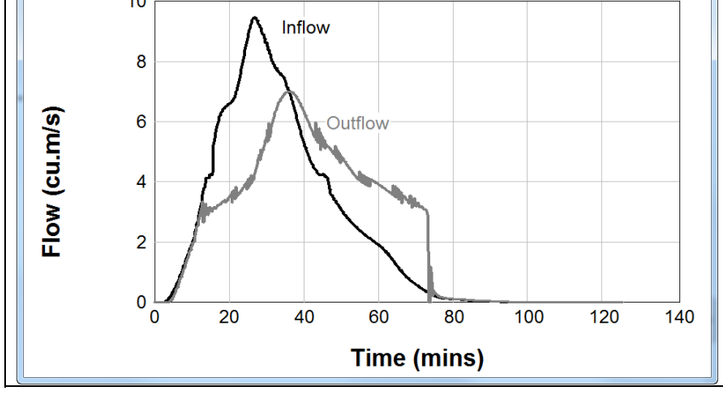


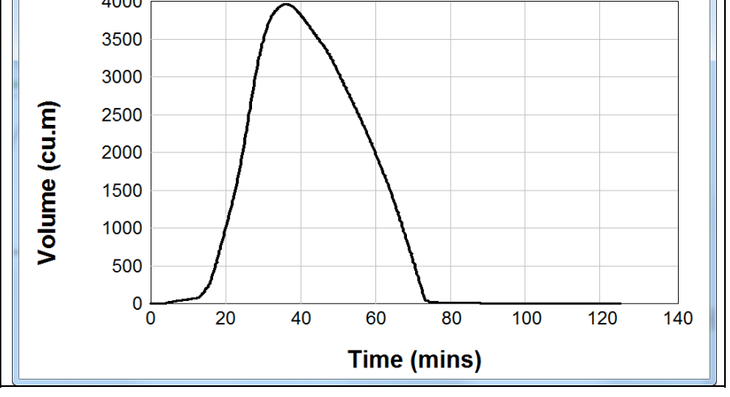












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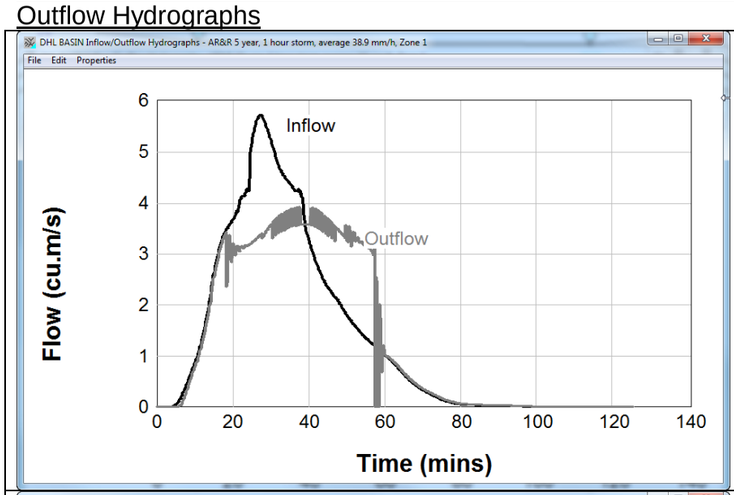
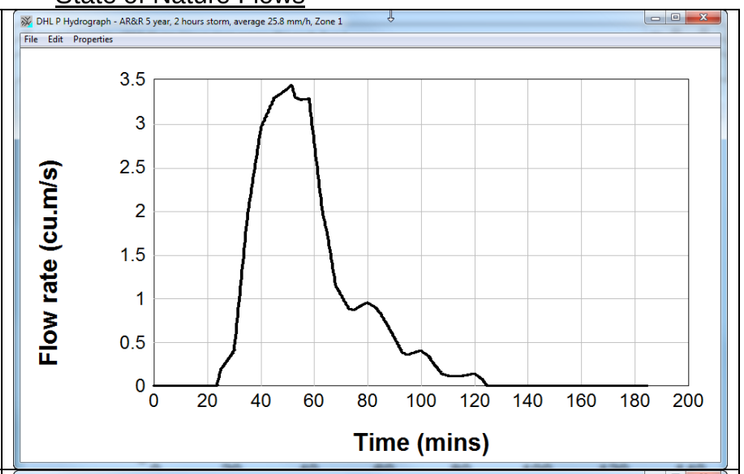
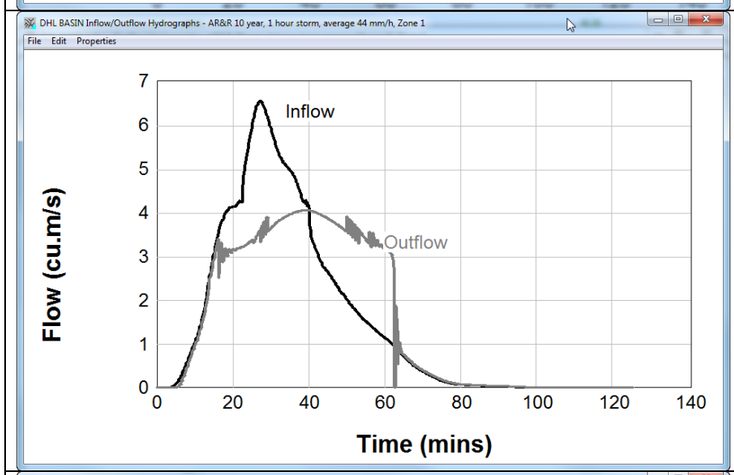
DHL BASIN PERFORMANCE RELATIVE TO STATE OF NATURE FOR ALL STORMS –

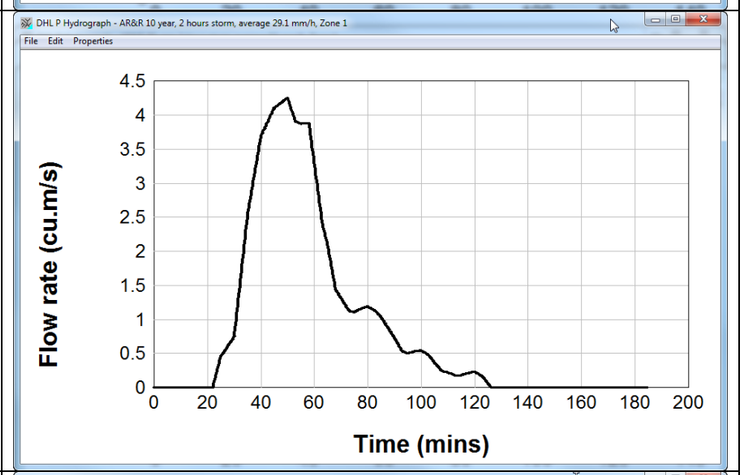
Outflow Hydrographs

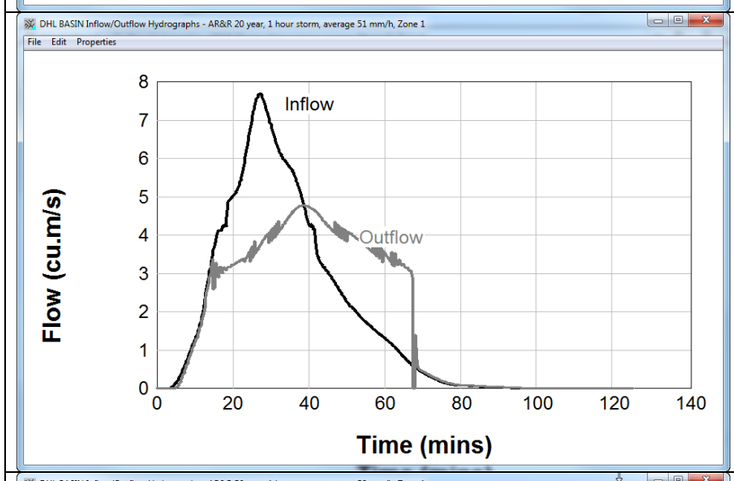
State of Nature Flows

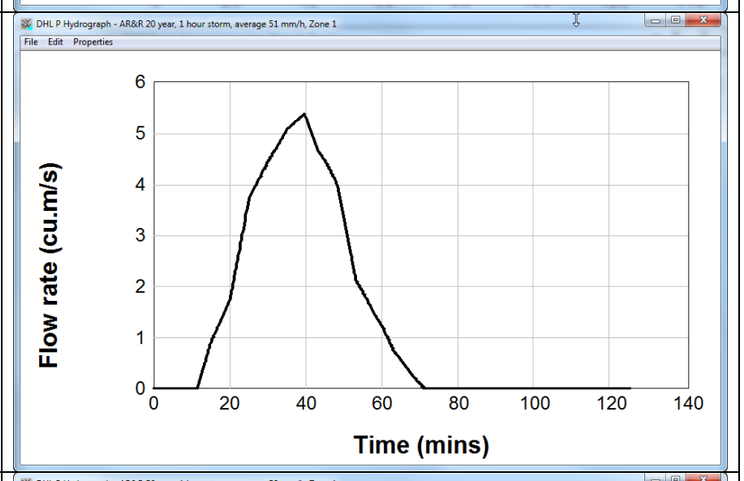


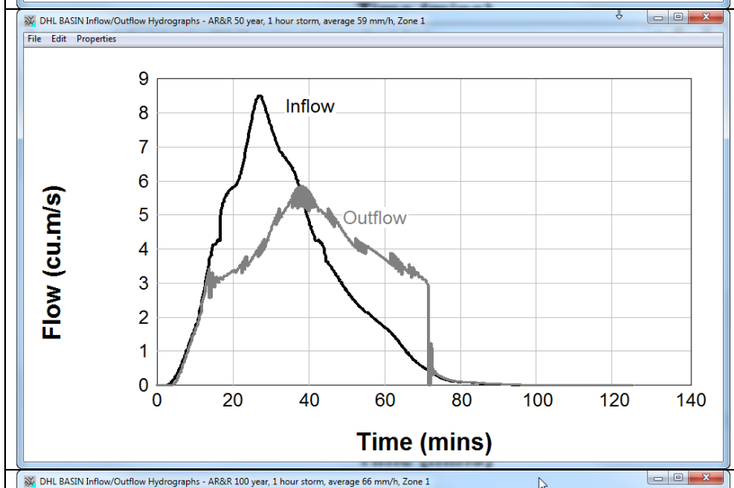


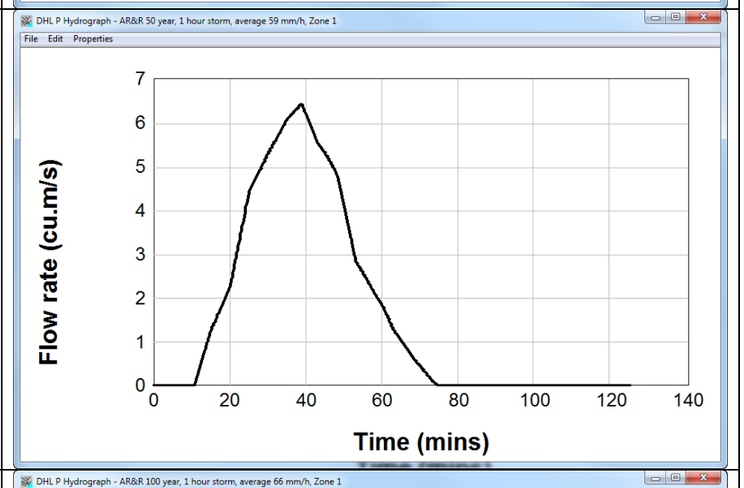


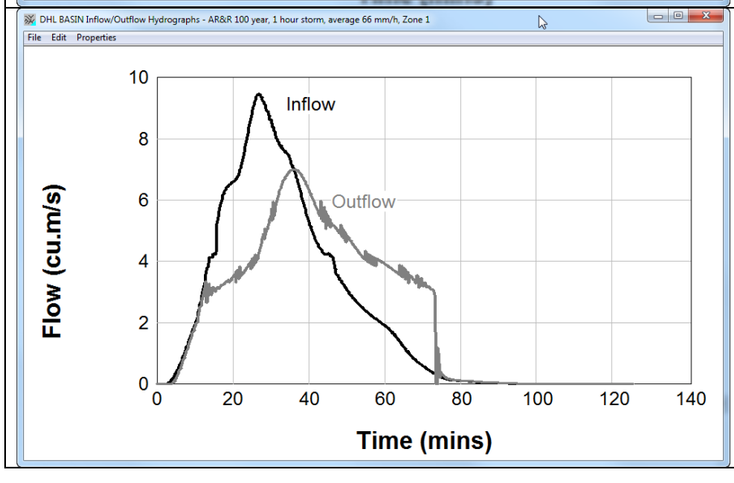


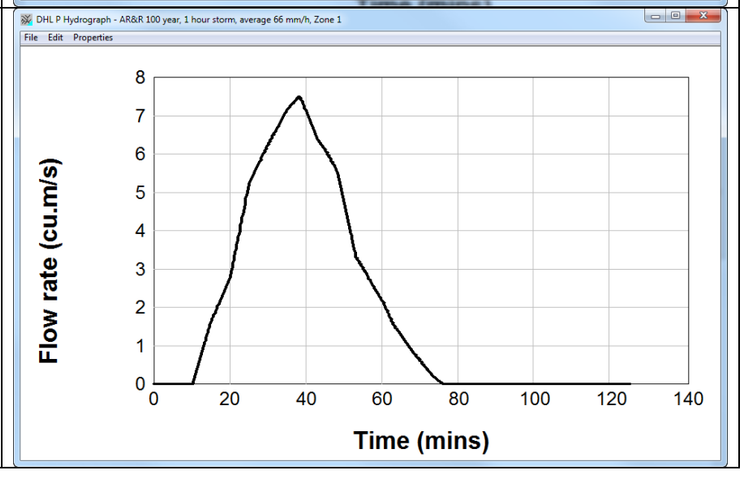












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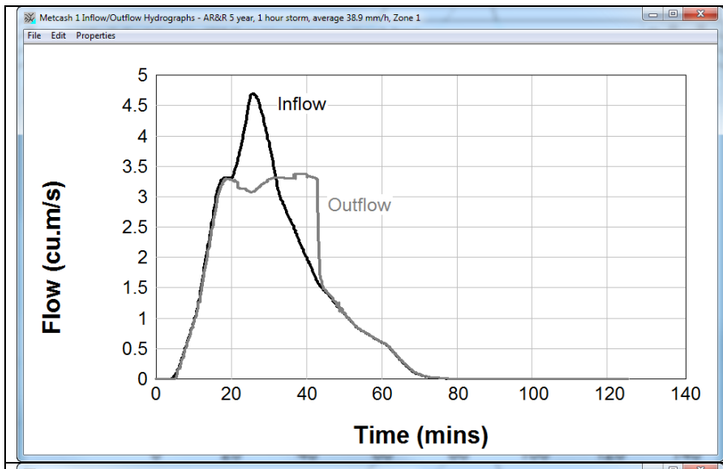
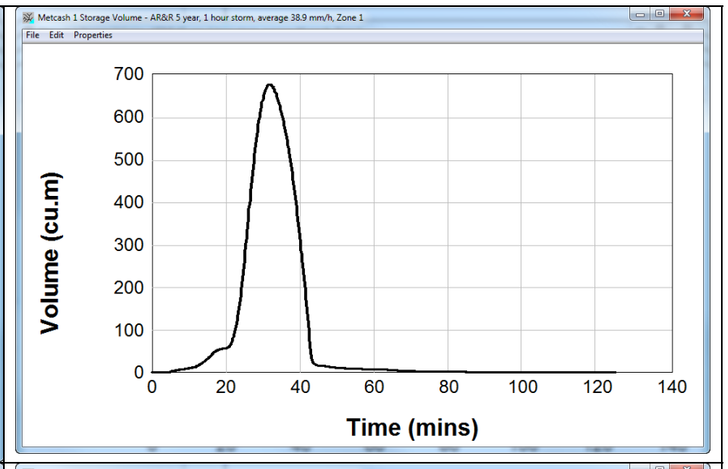
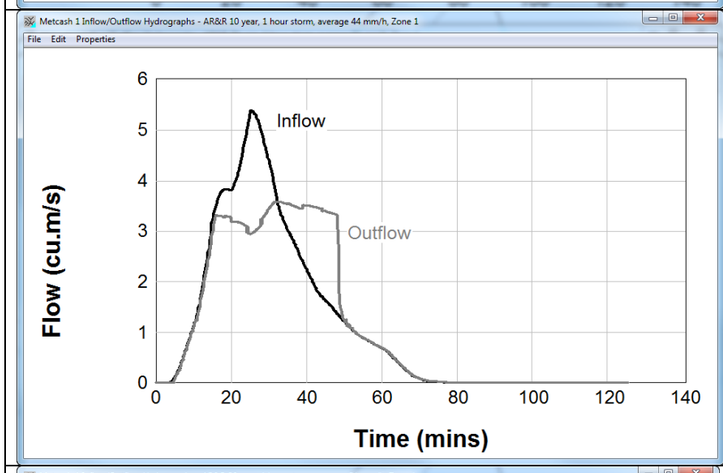
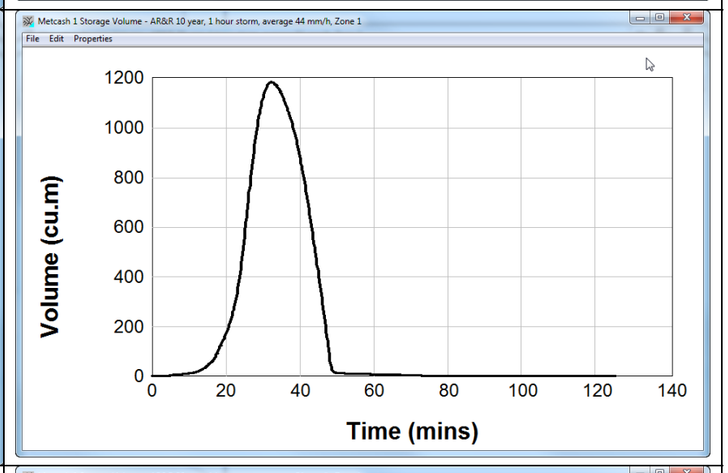
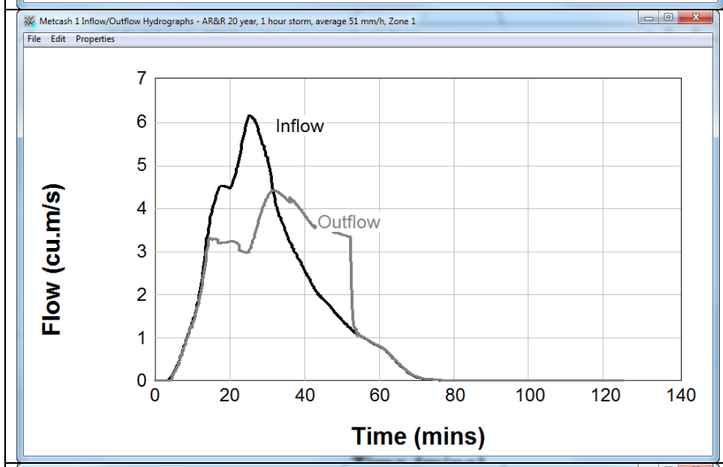
METCASH BASIN PERFORMANCE FOR ALL STORMS – Inflow / Outflow Hydrographs & Storage Volumes

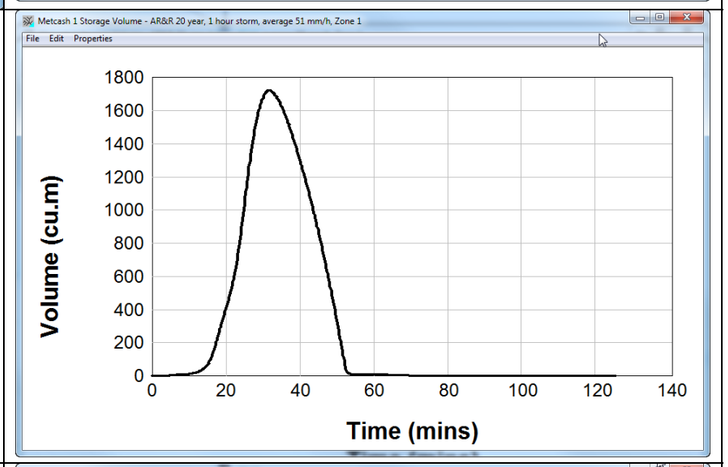


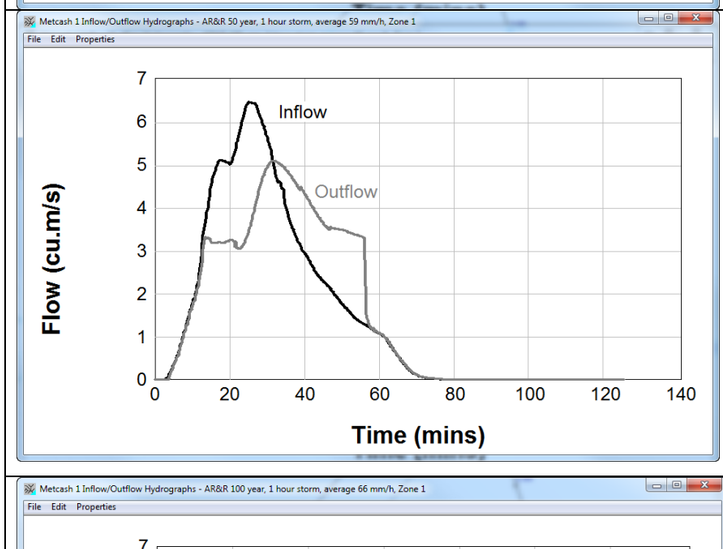


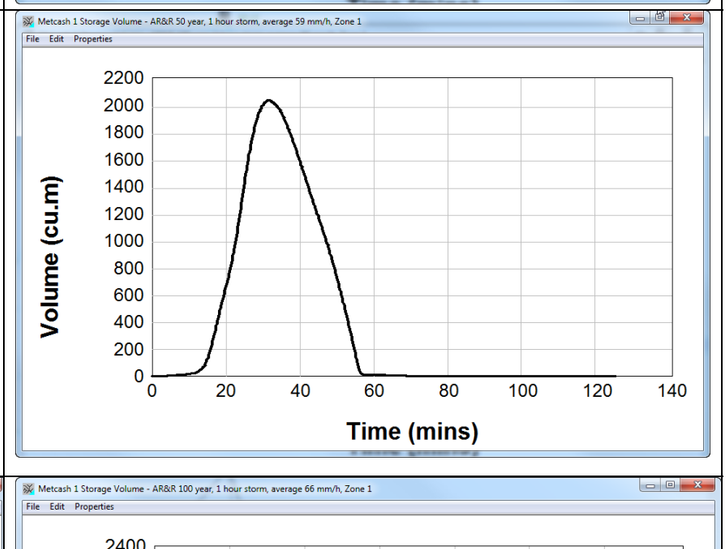


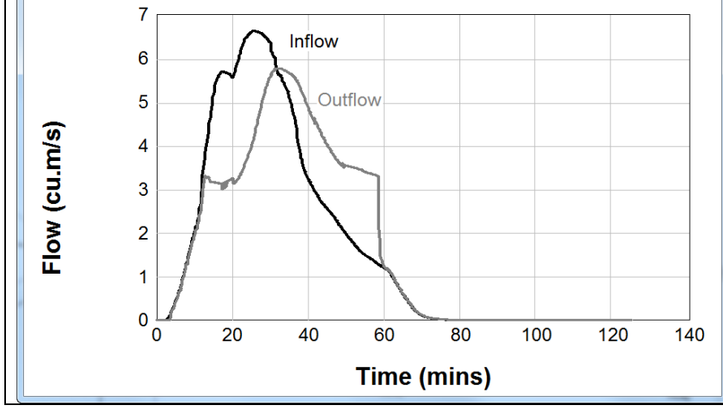


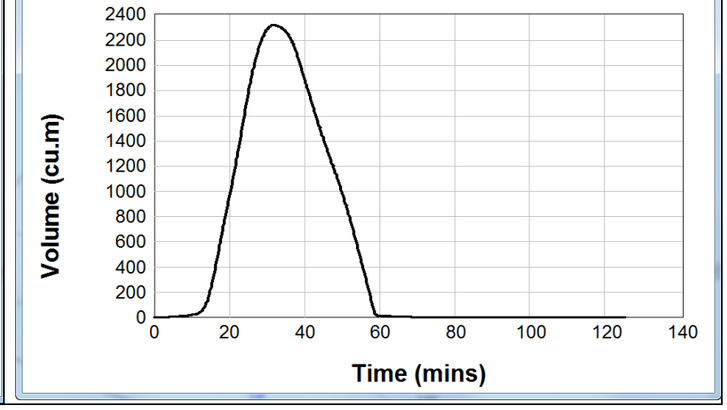












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DHL BASIN PERFORMANCE RELATIVE TO STATE OF NATURE, FOR ALL STORMS –

Outflow Hydrographs	State of Nature Flows