Dubbo Base Hospital Redevelopment
Stage 1 & 2
Review of Environmental Factors
Dubbo, NSW
External Works Project
Stormwater Management Plan

Prepared for:	Health Infrastructure NSW
By:	Enstruct Group
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Rainfall Table – Dubbo

Calculations

Existing Catchment Analysis
Development Catchment Analysis
On-Site Detention Analysis

Drawings

4363-CIV-SI-100-01	General Arrangement Plan Sheet 1 of 4
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4363-CIV-SI-100-11	Sediment & Erosion Control Plan & Details Sheet 1 of 4
4363-CIV-SI-100-12	Sediment & Erosion Control Plan & Details Sheet 2 of 4
4363-CIV-SI-100-13	Sediment & Erosion Control Plan & Details Sheet 3 of 4
4363-CIV-SI-100-14	Sediment & Erosion Control Plan & Details Sheet 4 of 4
4363-CIV-SI-100-40	Civil Details Sheet 1 of 2
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1.0 Introduction

Enstruct have been engaged by Health Infrastructure NSW to complete the detailed civil engineering design works for the external works redevelopment of the Dubbo Base Hospital. The works include construction of a new car park, a new link road and associated infrastructure.

This Stormwater Management Plan discusses the proposed stormwater drainage design for the site including the on-site detention requirements and stormwater discharge from the site.

The report also discusses sediment and erosion control for the site.

2.0 Development Description & Previous Reports

The proposed development discussed in this report is the enabling works required for the redevelopment of the Dubbo Base Hospital

In order to progress the development of the hospital in line with the Dubbo Base Hospital master plan there is a requirement to create additional car parking on the site to cater for the additional users associated with the Stage 1and 2 development on the site. The reorganising of the existing car park area to create a more efficient car parking arrangement also lends itself to the redevelopment of the existing car park which is currently in need of repair.

The master plan also calls for the development of a circulation route around the site. To formalise this route a new link road will be constructed between the new car park and the existing road to the west of the existing maintenance buildings.

The development of the new car parking area and the new link road will also require the redevelopment of the existing stormwater drainage system along the east side of the site. This drainage design will also make allowance for the proposed stage 1 development of the hospital.

Previous reports and investigations have been utilised in the preparation of this report and these reports are listed below:

- Dubbo Base Hospital Preliminary Schematic Design/Concept Design Report, Revision V2.0 dated 2nd November 2010.
- Geotechnical Investigation – Dubbo Base Hospital Redevelopment, Myall Street, Dubbo by Douglas Partners, Project 72811 dated April 2012.
- Dubbo Base Hospital Redevelopment Project – Structural & Civil Engineering – Site Engineering Analysis Conditions and Risk Analysis Report by Enstruct, Project 4363, Revision B dated April 2012.
- Dubbo Base Hospital Redevelopment Project – Structural & Civil Engineering – Site Massing Option Assessment Report by Enstruct, Project 4363, revision B dated April 2012.
- Dubbo Base Hospital survey information by Imrie, Astley & Associates. Job number 11-232, drawing revision 3 dated March 2012.

3.0 Site Description & Catchment Analysis

The site discussed in this report is described as Lot 12 in DP 1159243. The site is located to the North of Myall Street in Dubbo, NSW.

The site is bound by Myall Street to the South, the Railway corridor to the west, Muller Street and Moran Drive and Fitzhill Parade to the North and residential development to the east.

The site has a total area of 13.4Ha and currently contains the existing hospital campus. The current campus consists of a number of buildings ranging in size and position, car parking areas, circulation roads, a helicopter pad and landscaping areas.

The current site topography falls from the north east corner of the site to the southern and western boundaries. The fall of the site varies considerably with the eastern side of the site relatively flat and the western side being much steeper, falling towards the rail corridor.

Investigation of the current site topography and existing site drainage infrastructure suggests that the site has been divided into two separate catchment areas. The eastern side of the site draining south towards Myall Street and the western side of the site draining towards the existing council drainage channel on the opposite side of the rail corridor.

Initial catchment assessment has been summarised below. This assessment has been used as a base line for the stormwater drainage design for the proposed development.

Sub-catchment Name	Catchment Area (ha)	Percentage Impermeable (%)
East	4.3	60
West	9.1	40
Total	13.4	46

Existing Site Catchment Summary

4.0 Flood Analysis

During the course of the design of the sites concept stormwater drainage design an assessment into the impact of flooding on the site was undertaken. Reference was made to the Dubbo City Council Flood Prone Areas report G2.2 with the results summarised in the table below.

Location	FSRL (1 in 100 Year Flood)	FPL (1 in 100 year flood + 500mm)	PMF
Erskine Street	R.L. 262.30	262.8	266.0
River Street	R.L. 262.0	262.5	265.7

Flood Levels from Council Report

The lowest site level obtained from the site survey indicates that at the North West corner of the site the existing site levels are R.L. 265.0. This indicates that this corner of the site will be flood affected during a PMF flood event however the proposed development of the site will occur at a considerably higher level as the site falls considerably to the west of the site.

The levels on the site in the areas where development is proposed are in the vicinity of R.L. 278.00 which is fully 12 meters above the PMF levels associated with the site.

No works are proposed in the areas of the site which could be potentially affected by the flood plain and as such, provided the discharge flows from the development are not increased, no adverse effects will be caused by the development on the existing flood levels up or down stream of the site.

5.0 Stormwater Drainage

5.1 Rainfall Data

Dubbo City Council has adopted a standard rainfall chart for use within the council area. Copy of this chart is included in the Appendix to this report. This chart was prepared by the Bureau of Meteorology based on accumulated rainfall data for the area. This rainfall data has been used in the design of the stormwater drainage on this project.

5.2 Catchments & Runoff

As discussed in the site description section above the rainfall catchment for the site is subdivided into two separate sub-catchments. The proposed development for the early works will affect both catchments with the proposed car park and allowance for the stage 1 building draining to Myall Street and the new link road draining to the rail corridor.

To ensure that the development does not have a negative impact on the existing downstream drainage post development flows for the site have been attenuated to the 5 year predevelopment flows.

5.3 Existing Infrastructure

5.3.1 Myall Street

The downstream drainage system located under Myall Street is owned and maintained by Dubbo City Council.

The current council drainage system below Myall Street consists of a 450mm diameter concrete pipe under the southern side of the street. The pipe is then assumed to drain down toward the Macquarie River to the West of the site.

During initial discussions with council it was confirmed that the existing drainage infrastructure had a design capacity to cater for the 10 year design storm flows of the total catchment however the current drainage system does not have the capacity to cater for the existing catchment flows and downstream surcharging is a common problem.

To assist in the alleviation of pressure on the existing council stormwater drainage system the current site discharge flows have been calculated and the proposed stormwater drainage for the development designed to ensure that the post development discharge flows will be reduced.

5.3.2 Rail Corridor

The drainage channel located to the west of the current rail corridor is owned and maintained by Dubbo City Council.

The channel currently drains to the north towards wetlands east of Fitzroy Street.

The channel is currently in a state of disrepair and is overgrown with vegetation. The relatively flat grade of the channel, its unsurfaced state and the current state of vegetation has caused drainage issues within the channel which is currently retaining water in a number of locations.

The channel section size would suggest that if repaired the channel would have sufficient capacity to cater for the existing flows which are conveyed through it.

The proposed development drainage system has been designed so that the new link road will utilise the existing site detention basin to attenuate the post development flows so as not to exceed that of the predevelopment flows.

5.4 Point of Discharge

Two points of discharge are proposed for the development.

The main area of the car park and the allowance for the Stage 1 and 2 development of the hospital have been designed to discharge stormwater flows to the existing council stormwater drainage system below Myall Street.

The top section of the car park and the new link road has been designed to discharge stormwater flows to the existing rail corridor drainage channel.

The Myall Street system will connect to the existing site connection point at the entrance to the site.

The rail corridor system will discharge from the existing site detention basin as overland flow down the slope, under the rail corridor and into the stormwater channel.

Both discharge points will be located downstream of stormwater attenuation devices which will ensure that the post development discharge flows are less than the predevelopment flows and as such assist in the alleviation of pressure on the existing council stormwater drainage assets.

5.5 Stormwater Drainage Assessment

5.5.1 Myall Street System

The current site drainage system discharging to Myall Street drains an approximate catchment area of 4.30Ha. The catchment consists of up to 60% impermeable surface and 40% landscaped area. The impermeable area consists of the main site car parking area, the front of house buildings and the original hospital buildings fronting Myall Street.

The system connects to council's external system at two locations, one at the hospital main entrance and one further west along Myall Street.

The proposed early works development will not affect the connection to the west and as such assessment of this system will not be included as part of this report. The area under investigation accounts for 80% of the total catchment area.

The system connecting at the hospital main entrance consists of a single main line which runs north below the main hospital entrance road. Building drainage lines are connected to this main line at a number of locations and these connections must be retained during the development of the early works.

The development of the car park results in the removal of the existing car park drainage system. This system will be replaced by the new proposed system. This system will also make allowance for the future connection of the Stage 1 and 2 works. This means that the pipe sizes and levels are designed to allow for a direct connection of the proposed development to the system.

The current drainage system has capacity to convey the 10 year rainfall event flows however the development system has the capacity to convey the 20 year design flows. The additional underground piped flows are attenuated by a stormwater detention tank adjacent to the pump room near the site entrance.

Flows in excess of the design flows will be conveyed within the road corridor as overland flow towards Myall Street.

The catchment assessment of the Myall Street drainage system is summarised in the table below. This assessment has been undertaken using Rational Method.

Catchment Type	Catchment Area (Ha)	Time of Concentration (mins)	5 Year Design Flows (m^3/s)	100 Year Design Flows (m^3/s)
Car Park	0.695	5	0.192	0.695
Buildings	1.520	6	0.390	0.866
Road	0.150	5	0.041	0.092
Landscape	0.965	20	0.047	0.113
Total	3.33		0.670	1.766

Existing Myall Street Catchment Assessment

These flows will be adopted as the permissible site discharge values for the new system. All flows in addition to these flows will be attenuated on site.

5.5.2 Rail Corridor System

The current site drainage system discharging to Rail Corridor drains an approximate catchment area of 9.10Ha. The catchment consists of up to 40% impermeable surface and 60% vegetated area. The impermeable area consists of the remainder of the site buildings and the rear circulation road.

The system connects to the council's drainage channel at a number of points. The current drainage systems discharge via headwalls along the embankment on the western side of the site and run as overland flow to the rail corridor. The water is then conveyed below the corridor by a number of culverts which discharge to the drainage channel.

The area affected by the early works project is located at the northern end of the site and as such will be the only area discussed in this report. The area under consideration accounts for 25% of the total catchment area.

There is an existing detention basin located on site at the foot of the embankment. The proposed system for the early works draining to the rail corridor will discharge into this basin. The basin will be upsized to cater for the additional volume requirements and this sizing will be discussed later in this report.

The in ground drainage system will have capacity to convey design flows up to and including the 20 year design flows. Flows in excess of this will be conveyed through the site as overland flow discharging down the embankment towards the drainage corridor.

The catchment assessment of the rail corridor drainage system is summarised in the table below. Again this assessment has been undertaken using Rational Method.

Catchment Type	Catchment Area (Ha)	Time of Concentration (mins)	5 Year Design Flows (m^3/s)	100 Year Design Flows (m^3/s)
Car Park	-	5		
Buildings	0.228	6	0.0585	0.130
Road	0.682	5	0.1750	0.389
Landscape	1.365	20	0.0540	0.160
Total	2.275		0.2880	0.519

Existing Rail Corridor Catchment Assessment

5.6 On-Site Detention

5.6.1 Myall Street Detention

The on-site detention requirement for the development has been set to ensure that the post development discharge flows from the catchment will be restricted to the discharge flow rate created during a 5 year design storm in the pre development case.

This restriction will result in a significant reduction in the discharge flows from the site in the post developed case. The on-site detention will restrict the in ground drainage discharge flows from the site to 0.67m³/s for all event up to and including the 20 year design storm.

The in ground storm water drainage system will be designed to cater for design storm runoff up to and including the 20 year design storm. During events greater than this the runoff in excess of the 20 year design flows will run as overland flow within the road corridor to Myall Street.

Catchment Type	Catchment Area (Ha)	5 Year Design Flows (m³/s)	10 Year Design Flows (m³/s)	20 Year Design Flows (m³/s)	50 Year Design Flows (m³/s)	100 Year Design Flows (m³/s)
Car Park	0.710	0.196	0.238	0.296	0.380	0.436
Buildings	1.091	0.280	0.341	0.424	0.546	0.621
Road	0.433	0.119	0.145	0.181	0.232	0.266
Landscape	1.096	0.054	0.065	0.081	0.108	0.128
Total	3.33	0.649	0.789	0.982	1.266	1.451

Proposed Myall Street Catchment Assessment

Design ARI (Years)	Discharge Flows (m³/s)	
	Allowable	Actual Flows
5	0.670	0.649
10	0.670	0.789
20	0.670	0.982

Myall Street Post Development Discharge Flows Summary

A mass-curve analysis has been undertaken to derive the required storage volume for the catchment. Calculations showing this analysis are included in the Appendix of this report and the findings are summarised in the table below.

Design ARI (Years)	OSD Volume Required (m³)
5	13.06
10	59.30
20	**123.30**

Myall Street On Site Detention Requirement Summary

The result of the mass-curve analysis indicates a storage requirement of 125m³ will be required for the catchment. This storage volume will be provided within an underground tank on the lower extent of the catchment.

Flows from the tank will be restricted using an orifice plate and overflow system with the orifice restricting the design storm discharge flows to the permissible site

discharge whilst the overflow weir will provide an allowance for the discharge of flows in excess of the design flows.

The orifice plate will be sized during the detailed design stage of the project when the tank dimensions are finalised,

5.6.2 Rail Corridor Detention

In a similar manner to the Myall Street catchment the on-site detention requirement for the development has been set to ensure that the post development discharge flows from the catchment will be restricted to the discharge flow rate created during a 5 year design storm in the pre development case.

The on-site detention will restrict the in ground drainage discharge flows from the site to 0.29m³/s for all event up to and including the 20 year design storm.

Catchment Type	Catchment Area (Ha)	5 Year Design Flows (m³/s)	10 Year Design Flows (m³/s)	20 Year Design Flows (m³/s)	50 Year Design Flows (m³/s)	100 Year Design Flows (m³/s)
Car Park	-	-	-	-	-	-
Buildings	0.228	0.0585	0.0713	0.0886	0.1140	0.1298
Road	0.857	0.2198	0.2678	0.3329	0.4285	0.4880
Landscape	1.190	0.0477	0.0573	0.0709	0.1169	0.1393
Total	2.275	0.3260	0.3964	0.4924	0.6594	0.7571

Proposed Rail Corridor Catchment Assessment

Design ARI (Years)	Discharge Flows (m³/s)	
	Allowable	Actual Flows
5	0.288	0.326
10	0.288	0.492
20	0.288	0.660

Rail Corridor Post Development Discharge Flows Summary

As for the Myall catchment analysis a mass-curve analysis has been undertaken to assess the on-site detention requirements for the catchment.

Design ARI (Years)	OSD Volume Required (m³)
5	38.95
10	66.95
20	**113.85**

Rail Corridor On Site Detention Requirement Summary

The result of the mass-curve analysis indicates a storage requirement of 115m³ will be required for the catchment. This storage volume will be provided by extending the extent of the existing detention basin on the embankment of the site. This extension will be created by using earthworks from the car park regrading works.

Flows from the basin will be restricted using an orifice plate and overflow system with the orifice restricting the design storm discharge flows to the permissible site discharge whilst the overflow weir will provide an allowance for the discharge of flows in excess of the design flows.

The orifice plate will be sized during the detailed design stage of the project when the basin dimensions are finalised.

6.0 Sediment & Erosion Control

Erosion and sediment controls will be provided during the construction phase in accordance with Council guidelines. An Erosion and Sedimentation Control Plan has been prepared, and is included in the Appendix to this report. The plan includes measures such as sediment fences at the downstream edges of all disturbed areas, filters at all existing pits collecting stormwater runoff from disturbed areas, and a truck shaker tray at each point of access to the work area. A Sedimentation basin has been provided, sized in accordance with the guidelines in the "Blue Book" - Managing Urban Stormwater - Soils and Construction (NSW Department of Housing 1998).

Final details of Erosion and Sediment Control measures will be documented in the drawings to be prepared for the final certification documents. The final drawings will take into account the site works staging including the preferred site access points, site shed locations and temporary stockpile locations. These details will be prepared in conjunction with the selected contractor, to ensure that the selected measures are practical and will be well maintained.

Appendix - Civil Design Information

Dubbo Intensity Frequency Data

DURATION	1 Year	2 years	5 years	10 years	20 years	50 years	100 years
5Mins	66.7	87.5	116	134	159	193	221
6Mins	62	81.3	108	125	148	180	205
10Mins	50.5	66.2	87.6	102	120	146	166
20Mins	37	48.4	63.9	73.9	87.3	106	121
30Mins	29.9	39.1	51.7	59.7	70.4	85.3	97.4
1Hr	19.8	25.9	34.1	39.3	46.3	56	63.8
2Hrs	12.5	16.3	21.3	24.4	28.7	34.6	39.3
3Hrs	9.41	12.2	15.9	18.2	21.3	25.6	29
6Hrs	5.74	7.43	9.56	10.9	12.7	15.2	17.2
12Hrs	3.49	4.51	5.78	6.57	7.65	9.13	10.3
24Hrs	2.09	2.72	3.51	4.02	4.7	5.63	6.37
48Hrs	1.21	1.59	2.09	2.41	2.84	3.44	3.91
72Hrs	0.85	1.12	1.48	1.72	2.03	2.47	2.81

To import into excel:

1: Save the file as a .csv (comma separated values) file. (e.g. myifdtable.csv)
2: Open excel and import the saved myifdtable.csv file.
3: Remove these comments.

Format is:

DURATION	ARI for 1 Y	2 years	5 years	10 years	20 years	50 years	100 years

Existing Catchment Analysis

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	1.52	ha

Design Flow Rate = 0.86556 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Car Park
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.019	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	100	years

Design Rainfall Intensity 221 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area 0.695 ha

Design Flow Rate = 0.42665 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Landscape
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	100	years

Design Rainfall Intensity 121 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.35

Design Flow Rate

Catchment Area	0.965	ha

Design Flow Rate = 0.11295 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	100	years

Design Rainfall Intensity 221 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area 0.15 ha

Design Flow Rate = 0.09208 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	1.52	ha

Design Flow Rate = 0.475 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Car Park
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.019	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	10	years

Design Rainfall Intensity 134 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.695	ha

Design Flow Rate = 0.23283 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Landscape
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	10	years

Design Rainfall Intensity 73.9 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.29

Design Flow Rate

Catchment Area	1.075	ha

Design Flow Rate = 0.06404 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	10	years

Design Rainfall Intensity 134 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.15	ha

Design Flow Rate = 0.05025 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	1.52	ha

Design Flow Rate = 0.38988 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Car Park
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.019	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	5	years

Design Rainfall Intensity 116 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.695	ha

Design Flow Rate = 0.19147 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Landscape
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	5	years

Design Rainfall Intensity 63.9 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.28

Design Flow Rate

Catchment Area	0.965	ha

Design Flow Rate = 0.04722 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -5 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	5	years

Design Rainfall Intensity 116 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.15	ha

Design Flow Rate = 0.04133 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.228	ha

Design Flow Rate = 0.07125 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Land
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 30 min

Rainfall Intensity

Duration	30	mins
Design Storm	10	years

Design Rainfall Intensity 59.7 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.29

Design Flow Rate

Catchment Area	1.365	ha

Design Flow Rate = 0.06569 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.682	ha

Design Flow Rate = 0.21313 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 100 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.228	ha

Design Flow Rate = 0.12983 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Land
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	100	years

Design Rainfall Intensity 121 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.35

Design Flow Rate

Catchment Area	1.365	ha

Design Flow Rate = 0.15976 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 100 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A / 360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.682	ha

Design Flow Rate = 0.38836 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Building
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.228	ha

Design Flow Rate = 0.05848 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Land
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 30 min

Rainfall Intensity

Duration	30	mins
Design Storm	5	years

Design Rainfall Intensity 51.7 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.28

Design Flow Rate

Catchment Area	1.365	ha

Design Flow Rate = 0.05404 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Road
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area 0.682 ha

Design Flow Rate = 0.17493 m³/s

Proposed Catchment Analysis

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	1.091	ha

Design Flow Rate = 0.27984 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Car Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	100	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	5	years

Design Rainfall Intensity 116 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.71	ha

Design Flow Rate = 0.19561 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 5 Year Landscape Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	5	years

Design Rainfall Intensity 63.9 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.28

Design Flow Rate

Catchment Area	1.096	ha

Design Flow Rate = 0.05363 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -5 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	5	years

Design Rainfall Intensity 116 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.433	ha

Design Flow Rate = 0.11929 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	1.091	ha

Design Flow Rate = 0.34094 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Car Park Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	100	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	10	years

Design Rainfall Intensity 134 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.71	ha

Design Flow Rate = 0.23785 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 10 Year Landscape Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	10	years

Design Rainfall Intensity 73.9 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.29

Design Flow Rate

Catchment Area	1.096	ha

Design Flow Rate = 0.06529 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -10 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	10	years

Design Rainfall Intensity 134 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.433	ha

Design Flow Rate = 0.14506 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 20 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	20	years

Design Rainfall Intensity 148 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.95

Design Flow Rate

Catchment Area 1.091 ha

Design Flow Rate = 0.42385 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 20 Year Car Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	100	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

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Duration	5	mins
Design Storm	20	years

Design Rainfall Intensity 159 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.95

Design Flow Rate

Catchment Area	0.71	ha

Design Flow Rate = 0.29634 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 20 Year Landscape Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	20	years

Design Rainfall Intensity 87.3 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.30

Design Flow Rate

Catchment Area	1.096	ha

Design Flow Rate = 0.08098 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -20 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	20	years

Design Rainfall Intensity 159 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.95

Design Flow Rate

Catchment Area	0.433	ha

Design Flow Rate = 0.18072 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 50 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	50	years

Design Rainfall Intensity 180 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	1.091	ha

Design Flow Rate = 0.5455 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 50 Year Car Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	100	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

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Duration	5	mins
Design Storm	50	years

Design Rainfall Intensity 193 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.71	ha

Design Flow Rate = 0.38064 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 50 Year Landscape Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	50	years

Design Rainfall Intensity 106 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.33

Design Flow Rate

Catchment Area	1.096	ha

Design Flow Rate = 0.10769 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -50 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	50	years

Design Rainfall Intensity 193 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.433	ha

Design Flow Rate = 0.23214 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	1.091	ha

Design Flow Rate = 0.62126 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Car Park Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	100	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

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Duration	5	mins
Design Storm	100	years

Design Rainfall Intensity 221 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.71	ha

Design Flow Rate = 0.43586 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment - 100 Year Landscape Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	100	years

Design Rainfall Intensity 121 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.35

Design Flow Rate

Catchment Area	1.096	ha

Design Flow Rate = 0.12828 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital - Myall Catchment -100 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	120	m
Slope:	0.01	m/m

Time of Concentration: 5 min

Rainfall Intensity

Duration	5	mins
Design Storm	100	years

Design Rainfall Intensity 221 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.433	ha

Design Flow Rate = 0.26581 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area 0.228 ha

Design Flow Rate = 0.05848 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Land Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 30 min

Rainfall Intensity

Duration	30	mins
Design Storm	5	years

Design Rainfall Intensity 51.7 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity: 39.3 mm/hr
Fraction Impervious: 0 %

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.28

Design Flow Rate

Catchment Area 1.19 ha

Design Flow Rate = 0.04711 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 5 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	5	years

Design Rainfall Intensity 108 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.86

Design Flow Rate

Catchment Area	0.857	ha

Design Flow Rate = 0.21982 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.228	ha

Design Flow Rate = 0.07125 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Land Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 30 min

Rainfall Intensity

Duration	30	mins
Design Storm	10	years

Design Rainfall Intensity 59.7 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.29

Design Flow Rate

Catchment Area	1.19	ha

Design Flow Rate = 0.05727 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 10 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	10	years

Design Rainfall Intensity 125 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.90

Design Flow Rate

Catchment Area	0.857	ha

Design Flow Rate = 0.26781 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 20 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	20	years

Design Rainfall Intensity 148 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity: 39.3 mm/hr
Fraction Impervious: 100 %

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.95

Design Flow Rate

Catchment Area 0.228 ha

Design Flow Rate = 0.08858 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 20 Year Land Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 30 min

Rainfall Intensity

Duration	30	mins
Design Storm	20	years

Design Rainfall Intensity 70.4 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.30

Design Flow Rate

Catchment Area	1.19	ha

Design Flow Rate = 0.07091 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 20 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	20	years

Design Rainfall Intensity 148 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 0.95

Design Flow Rate

Catchment Area	0.857	ha

Design Flow Rate = 0.33294 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 50 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	50	years

Design Rainfall Intensity 180 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.228	ha

Design Flow Rate = 0.114 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 50 Year Land Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	50	years

Design Rainfall Intensity 106 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	0	%

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.33

Design Flow Rate

Catchment Area	1.19	ha

Design Flow Rate = 0.11693 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 50 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A / 360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	50	years

Design Rainfall Intensity 180 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%
Pervious area runoff coefficient:	0.29019	
C10 =	0.9	

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area	0.857	ha

Design Flow Rate = 0.4285 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 100 Year Building Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area 0.228 ha

Design Flow Rate = 0.12983 m³/s

Rainfall Discharge Analysis

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 100 Year Land Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Sparse Vegitation	
Roughness Coefficient:	0.130	
Flow Path Length:	220	m
Slope:	0.02	m/m

Time of Concentration: 20 min

Rainfall Intensity

Duration	20	mins
Design Storm	100	years

Design Rainfall Intensity 121 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity: 39.3 mm/hr
Fraction Impervious: 0 %

Pervious area runoff coefficient: 0.29019

C10 = 0.29019

ARI (years)	Fy	Cy
1	0.80	0.23
2	0.85	0.25
5	0.95	0.28
10	1.00	0.29
20	1.05	0.30
50	1.15	0.33
100	1.20	0.35

Design Coeffiecient: 0.35

Design Flow Rate

Catchment Area 1.19 ha

Design Flow Rate = 0.13928 m³/s

Rainfall Discharge Analysis

enstruct

Project Number	4363
Project Title	Dubbo Hospital -Rail Corridor Catchment - 100 Year Road Post Dev
Date	28-May-12

Note: Design Calcs undertaken adopting AR&R design process.

Using Rational Method:

$$Q = C.I.A/360$$

where:
Q = Design Flowrate (m³/s)
C = Dimensionless runoff coefficient
I = Rainfall Intensity (mm/hr)
A = Catchment Area (ha)

Time of Concentration

Predominant Surface Type:	Concrete or Asphalt	
Roughness Coefficient:	0.013	
Flow Path Length:	220	m
Slope:	0.01	m/m

Time of Concentration: 6 min

Rainfall Intensity

Duration	6	mins
Design Storm	100	years

Design Rainfall Intensity 205 mm/hr

Runoff Coefficient

10 Year, 1 Hour Intensity:	39.3	mm/hr
Fraction Impervious:	100	%

Pervious area runoff coefficient: 0.29019

C10 = 0.9

ARI (years)	Fy	Cy
1	0.80	0.72
2	0.85	0.77
5	0.95	0.86
10	1.00	0.90
20	1.05	0.95
50	1.15	1.00
100	1.20	1.00

Design Coeffiecient: 1.00

Design Flow Rate

Catchment Area 0.857 ha

Design Flow Rate = 0.48801 m³/s

On Site Detention Analysis

OSD Calculation

Permisible Discharge

Area 3.33 ha

Permissible Discharge 0.6700 **m3/s**

OSD Design

Design ARI 20 Years

Time of Concentration min	Actual Intensity mm/hr	Cy	Actual Discharge m3/s	Discharge Volume m3	Allowable Discharge m3/s	Allowable Volume m3	OSD Volume m3
5	159	0.735	1.0810	324.30	0.6700	201.00	123.30
6	148	0.735	1.0062	362.24	0.6700	241.20	121.04
10	120	0.735	0.8159	489.51	0.6700	402.00	87.51
20	87.3	0.735	0.5935	712.24	0.6700	804.00	-91.76
30	70.4	0.735	0.4786	861.54	0.6700	1206.00	-344.46
60	46.3	0.735	0.3148	1133.22	0.6700	2412.00	-1278.78
120	28.7	0.735	0.1951	1404.89	0.6700	4824.00	-3419.11
180	21.3	0.735	0.1448	1563.98	0.6700	7236.00	-5672.02
360	12.7	0.735	0.0863	1865.03	0.6700	14472.00	-12606.97
720	7.65	0.735	0.0520	2246.85	0.6700	28944.00	-26697.15
1440	4.7	0.735	0.0320	2760.84	0.6700	57888.00	-55127.16
2880	2.84	0.735	0.0193	3336.50	0.6700	115776.00	-112439.50
4320	2.03	0.735	0.0138	3577.34	0.6700	173664.00	-170086.66

Max Volume **123.30** m3

OSD Calculation

Permisible Discharge

Area 2.275 ha

Permissible Discharge 0.2880 **m3/s**

OSD Design

Design ARI 20 Years

Time of Concentration min	Actual Intensity mm/hr	Cy	Actual Discharge m3/s	Discharge Volume m3	Allowable Discharge m3/s	Allowable Volume m3	OSD Volume m3
5	159	0.63	0.6330	189.91	0.2880	86.40	103.51
6	148	0.63	0.5892	212.12	0.2880	103.68	108.44
10	120	0.63	0.4778	286.65	0.2880	172.80	113.85
20	87.3	0.63	0.3476	417.08	0.2880	345.60	71.48
30	70.4	0.63	0.2803	504.50	0.2880	518.40	-13.90
60	46.3	0.63	0.1843	663.59	0.2880	1036.80	-373.21
120	28.7	0.63	0.1143	822.69	0.2880	2073.60	-1250.91
180	21.3	0.63	0.0848	915.85	0.2880	3110.40	-2194.55
360	12.7	0.63	0.0506	1092.14	0.2880	6220.80	-5128.66
720	7.65	0.63	0.0305	1315.72	0.2880	12441.60	-11125.88
1440	4.7	0.63	0.0187	1616.71	0.2880	24883.20	-23266.49
2880	2.84	0.63	0.0113	1953.81	0.2880	49766.40	-47812.59
4320	2.03	0.63	0.0081	2094.84	0.2880	74649.60	-72554.76

Max Volume **113.85** m3

Civil Drawings

FOR GENERAL NOTES REFER TO DRAWING CIV-SI-001-00

EARTH WORKS TAKEN FROM CAR PARK RE-GRADING WORKS.

EARTHWORKS EXTENSION TO EXISTING BASIN VOLUME: 115M³

CONNECTION TO EXISTING STORMWATER DRAINAGE LINE.

CONNECTION TO EXISTING STORMWATER DRAINAGE LINE.

LEGEND

- PROPOSED ROAD CENTRELINE
- PROPOSED FOOTPATH
- PROPOSED BACK OF KERB
- PROPOSED INVERT OF KERB
- PROPOSED LIP OF KERB
- PROPOSED KERB RAMP
- KO — PROPOSED KERB ONLY
- K&G — PROPOSED KERB AND GUTTER
- DD — PROPOSED DISH DRAIN
- SW — SW — PROPOSED STORMWATER PIPE
- PROPOSED SWALE
- PROPOSED KERB INLET PIT
- PROPOSED V-SHAPED SURFACE INLET PIT
- 0.5% — PROPOSED GRADE
- PL???? — PROPOSED SURFACE LEVEL

GENERAL ARRANGEMENT PLAN
SCALE 1:200

GENERAL NOTES:

1. REFER TO CIV-SI-000.01 FOR GENERAL NOTES.
2. REFER TO CIV-SI-100.20 FOR ROAD DESIGN LONGSECTIONS.
3. REFER TO CIV-SI-100.30 FOR STORMWATER DRAINAGE DESIGN LONGSECTIONS.

NOTES
1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK. ENSTRUCT SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS AND DRAWINGS.

Rev	Description	By	Date
01	ISSUED FOR APPROVAL	IH	08.06.12
02	ISSUED FOR TENDER	IH	20.06.12
03	ISSUED FOR TENDER	IH	28.06.12
04	ISSUED FOR APPROVAL	IH	05.07.12

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Client

NSW GOVERNMENT Health Infrastructure
NSW GOVERNMENT Health Western NSW Local Health District

Project No.
4363

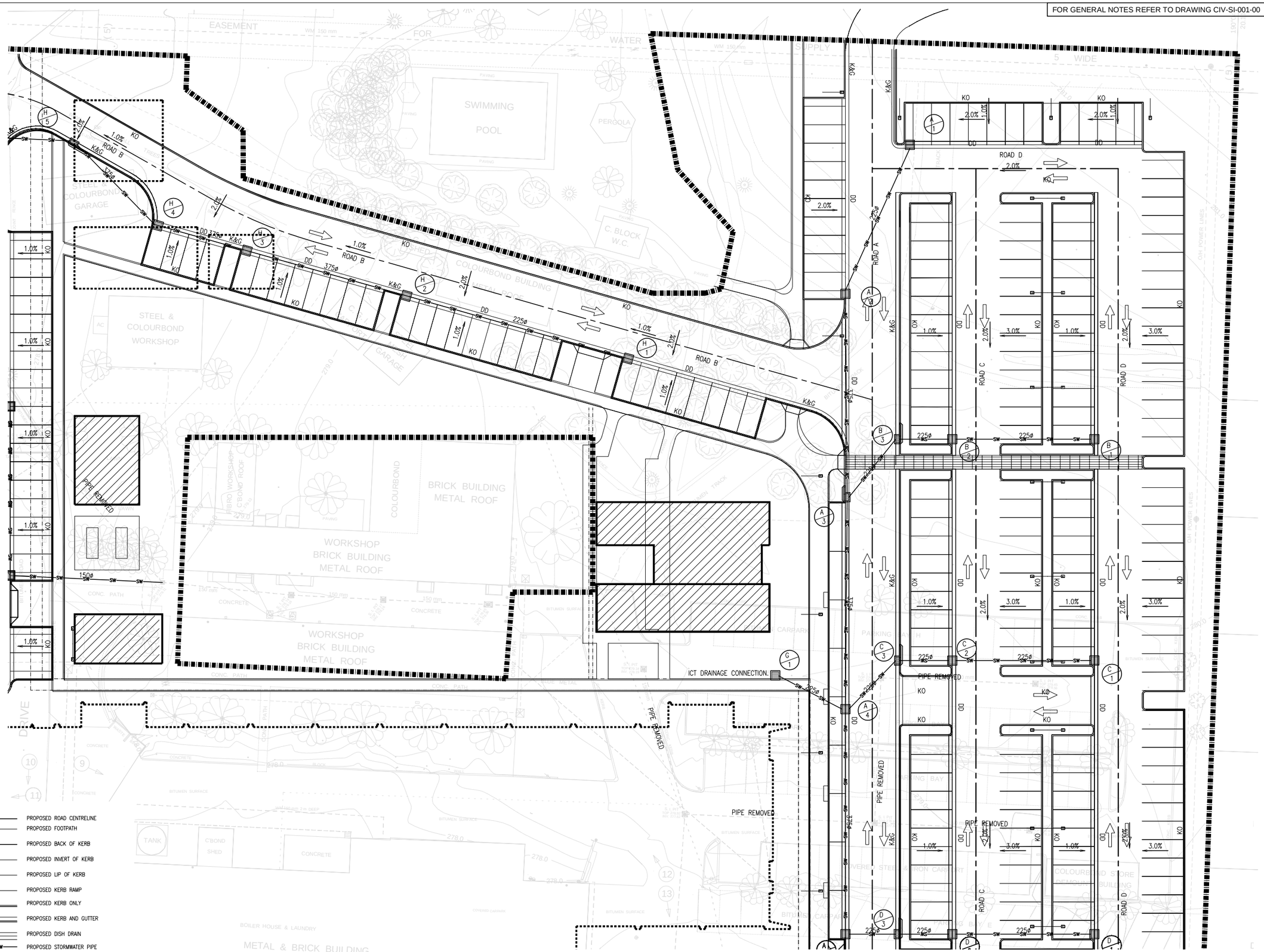
Project
DUBBO BASE HOSPITAL
REDEVELOPMENT STAGE 1 / 2
MYALL STREET, DUBBO NSW

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 1 OF 4

Document Control Status:
TENDER

A1 DRAWING SHEET	Drawn: I.H.
Co-ordinated: I.H.	Scale: 1:200
Project Engineer: I.H.	Date: 14/06/2012
Project Director: T.B.B.	Revision: 04
Drawing Number: CIV-SI-100-01	North:

FOR GENERAL NOTES REFER TO DRAWING CIV-SI-001-00



LEGEND

- PROPOSED ROAD CENTRELINE
- PROPOSED FOOTPATH
- PROPOSED BACK OF KERB
- PROPOSED INVERT OF KERB
- PROPOSED LIP OF KERB
- PROPOSED KERB RAMP
- KO — PROPOSED KERB ONLY
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- PROPOSED SWALE
- PROPOSED KERB INLET PIT
- PROPOSED V-SHAPED SURFACE INLET PIT
- 0.5% — PROPOSED GRADE
- PL???? — PROPOSED SURFACE LEVEL

GENERAL ARRANGEMENT PLAN
SCALE 1:200

GENERAL NOTES:

1. REFER TO CIV-SI-000.01 FOR GENERAL NOTES.
2. REFER TO CIV-SI-100.20 FOR ROAD DESIGN LONGSECTIONS.
3. REFER TO CIV-SI-100.30 FOR STORMWATER DRAINAGE DESIGN LONGSECTIONS.

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Rev	Description	By	Date
01	ISSUED FOR APPROVAL	IH	08.06.12
02	ISSUED FOR TENDER	IH	20.06.12
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04	ISSUED FOR APPROVAL	IH	05.07.12

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NCC & ACCESSIBILITY
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Client

NSW GOVERNMENT Health Infrastructure
NSW GOVERNMENT Health Western NSW Local Health District

Project No.
4363

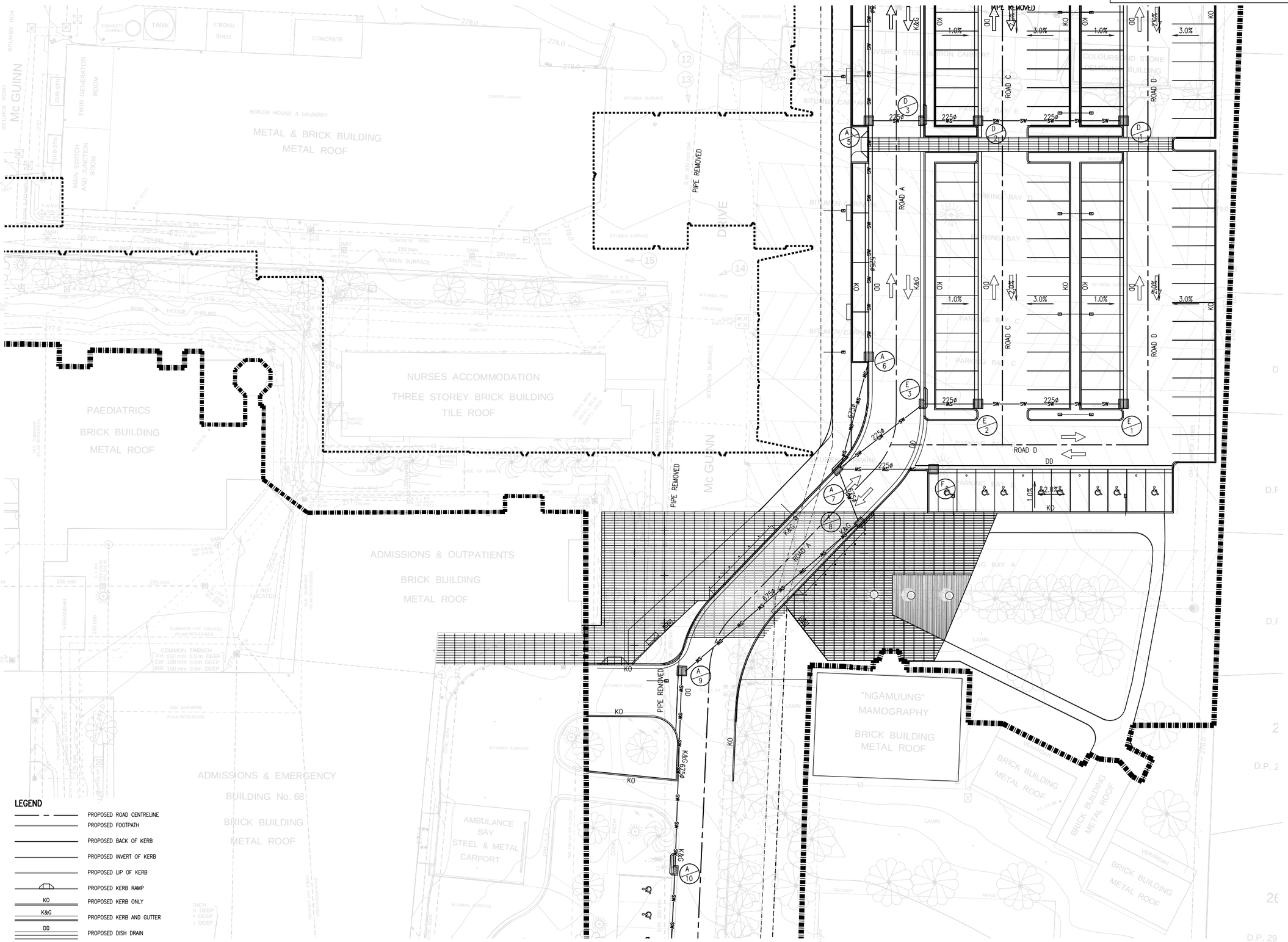
Project
DUBBO BASE HOSPITAL
REDEVELOPMENT STAGE 1 / 2
MYALL STREET, DUBBO NSW

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 2 OF 4

Document Control Status:
TENDER

A1 DRAWING SHEET	Drawn: I.H.
Co-ordinated: I.H.	Scale: 1:200
Project Engineer: I.H.	Date: 14/06/2012
Project Director: T.B.B.	Revision: 04
Drawing Number: CIV-SI-100-02	North:

FOR GENERAL NOTES REFER TO DRAWING CIV-SI-001-00



LEGEND

- PROPOSED ROAD CENTRELINE
- PROPOSED FOOTPATH
- PROPOSED BACK OF KERB
- PROPOSED INVERT OF KERB
- PROPOSED LIP OF KERB
- PROPOSED KERB RAMP
- KO — PROPOSED KERB ONLY
- K&G — PROPOSED KERB AND GUTTER
- DD — PROPOSED DISH DRAIN
- SW SW — PROPOSED STORMWATER PIPE
- PROPOSED SWALE
- PROPOSED KERB INLET PIT
- PROPOSED V-SHAPED SURFACE INLET PIT
- 0.5% — PROPOSED GRADE
- PL???? — PROPOSED SURFACE LEVEL

GENERAL ARRANGEMENT PLAN
SCALE 1:250

GENERAL NOTES:

1. REFER TO CIV-SI-000.01 FOR GENERAL NOTES.
2. REFER TO CIV-SI-100.20 FOR ROAD DESIGN LONGSECTIONS.
3. REFER TO CIV-SI-100.30 FOR STORMWATER DRAINAGE DESIGN LONGSECTIONS.

NOTES
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Project No.
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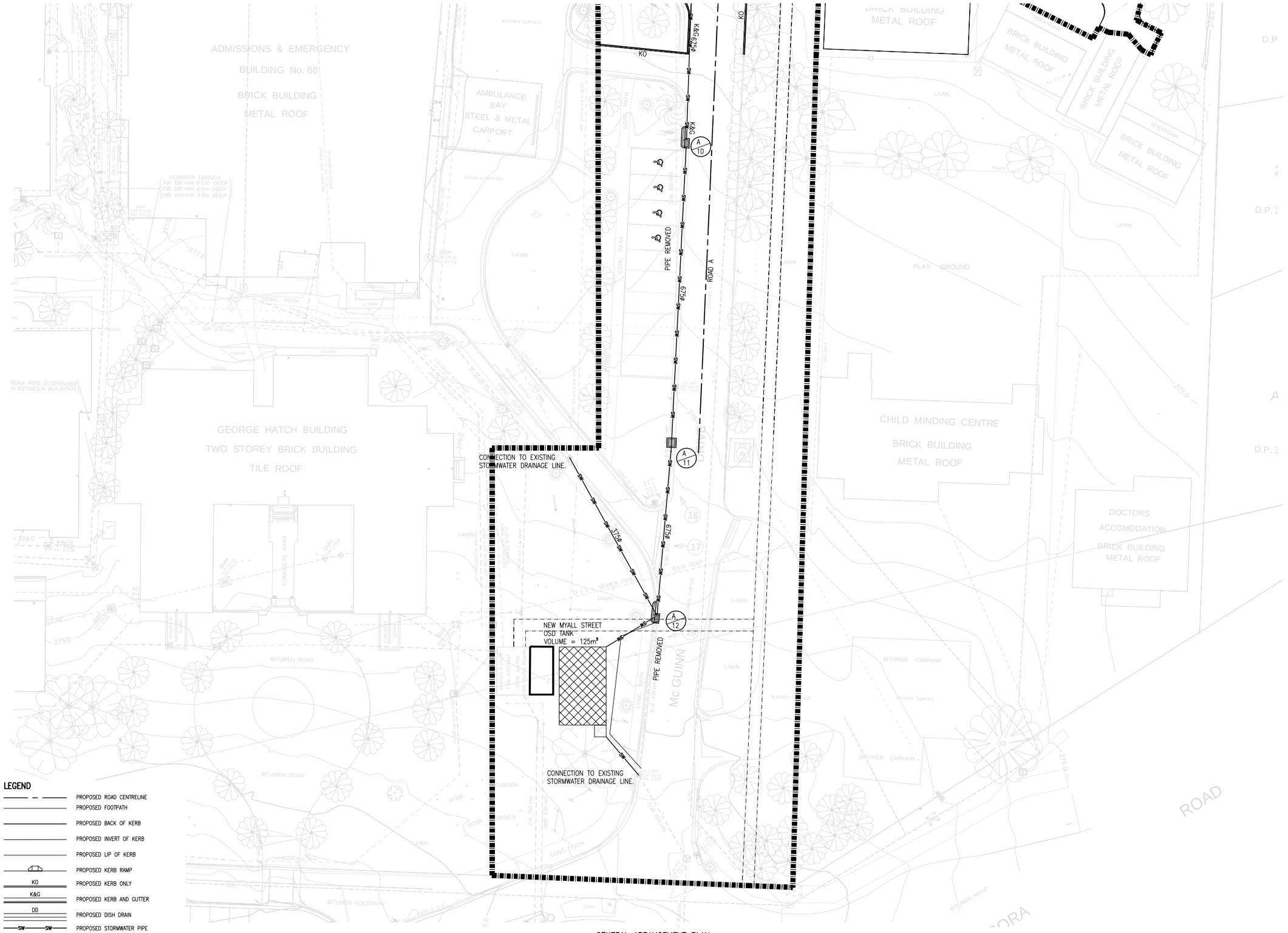
Project
DUBBO BASE HOSPITAL
REDEVELOPMENT STAGE 1 / 2
MYALL STREET, DUBBO NSW

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 3 OF 4

Document Control Status:
TENDER

A1 DRAWING SHEET	
Co-ordinated: I.H.	Drawn: I.H.
Project Engineer: I.H.	Scale: 1:200
Project Director: T.B.B.	Date: 14/06/2012
Drawing Number: CIV-SI-100-03	Revision: 04
	North:

FOR GENERAL NOTES REFER TO DRAWING CIV-SI-001-00



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GENERAL ARRANGEMENT PLAN
SCALE 1:200

GENERAL NOTES:

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2. REFER TO CIV-SI-100.20 FOR ROAD DESIGN LONGSECTIONS.
3. REFER TO CIV-SI-100.30 FOR STORMWATER DRAINAGE DESIGN LONGSECTIONS.
4. REFER TO CIV-SI-100.45 FOR DETENTION TANK DETAILS.

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SHEET 4 OF 4

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TENDER

A1 DRAWING SHEET	Drawn: I.H.
Co-ordinated: I.H.	Scale: 1:200
Project Engineer: I.H.	Date: 14/06/2012
Project Director: T.B.B.	Revision: 04
Drawing Number: CIV-SI-100-04	North: