Our Ref: 59914010-L002
Contact: Jolyon Peart

5th November 2014

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 9, The Forum
203 Pacific Highway
St Leonards New South Wales 2065
PO Box 19
St Leonards New South Wales 1590
Australia

Telephone: 02 9496 7700
Facsimile: 02 9439 5170
International: +61 2 9496 7700

Web: www.cardno.com.au

The Manager
Scentre Group Design
GPO Box 4004
SYDNEY NSW 2001

Attention: Mr Jade Hudson

Dear Jade,

MODIFICATION TO DA 2008/1742 – BROOKVALE CREEK WATERWAY IMPACT STATEMENT ADDENDUM

Stormwater works approved under DA2008/1742 include upgrades to various sections of the drainage network throughout Warringah Mall and the construction of two additional 3.3 m (W) x 1.8 m (H) culverts beside the existing 4 x 2.8 m (W) x 1.8 m (H) culverts under Condamine Street. A Section 96 application is being submitted to accommodate proposed changes to the Brookvale Creek flood conveyance system, specifically:

- Increases to the capacity of the existing culverts at Condamine Street, through modification works, rather than constructing additional culverts;
- Realignment of the proposed drainage network is proposed through the existing Bing Lee premises;
- Changes to local drainage in the vicinity of Myers;
- A floodgate in the Woolworths access road to block overland flow from the east through to the Woolworths loading dock;
- Raising of the existing wall by 0.4m at the upstream boundary north of the access road to the Woolworths loading dock;
- Transfer beams in the open section Pit B1 to the proposed twin box culverts at Cross Street roundabout; and
- Connection of the new Green Street's stormwater drains to the existing stormwater drain by a single 1350mm diameter pipe.

This addendum has been prepared to update the Waterways Impact Statement submitted in January 2011 and the addendum of 18th August 2014 with the updated hydraulic modelling results and to discuss any additional impacts on Brookvale Creek as a result of the proposed works listed above.

1. CHANGES TO THE PROPOSED WORKS OF DA 2008/1742

1.1 Brookvale Creek

The stabilisation works of Brookvale Creek have been included in the detailed design. The geometry, slope and alignment of the channel are the same as what was proposed in the DA2008/1742 drawings.

1.2 Drainage System Augmentation

The design of the drainage system augmentation has been evolving in response to outcomes of the physical modelling undertaken by WRL and various constraints that have been informed by civil, structural and geotechnical investigations. These drainage works are within Warringah Mall and these modifications would not affect the physical properties of Brookvale Creek.

However the change in hydraulic behaviour resulting from the updates to the design could have minor effects to the flood behaviour upstream and downstream of Warringah Mall. The current detailed design of the drainage system augmentation has been included in the hydraulic modelling reported herein and in short includes the following modifications to the design approved by DA1742:

Green Street Inlet

The latest configuration is in a similar location and has a substantial reserve capacity to deal with any blockage of the side inlet and/or the grates.

Re-alignment of Additional Culverts

Further consideration was given to the interaction of the proposed works with other services and the feasibility of relocating services at the southern end of Green Street and traffic management during construction. This led to a decision to realign the additional stormwater culverts through the current Bing Lee premises.

The re-aligned layout of the proposed stormwater culverts is given in Drawing W4548-300 series and W4548-300 series.

The modified Stormwater DA scheme which has been assessed is based on the re-alignment of the proposed stormwater culverts and the modified layouts of Chamber C6 (directly upstream of Condamine Street) described below.

Further Refinements

Based on a review of the number of flood barriers required to achieve the required freeboard during Stage 1, which would not be required under Stage 2, further refinement of the Stage 1 works was undertaken. These refinements included:

- Raising the level of the parapet wall beside the access road on the upstream side of Warringah Mall by 0.4 m to confine overflows over the parapet wall to the east of the access road flood barrier;
- Including the access road flood barrier in Stage 1 rather than Stage 2 as previously proposed;
- Including the transfer beams which span the open chamber southeast of the Cross Street roundabout in the hydraulic model;
- Connecting the new Green Street culverts temporarily to the existing culvert at the southern end

of Green Street by installing a temporary 1350 mm diameter RCP connection; and

- Upgrading conduits which convey Myer roof runoff to the drainage system, namely replacing 525 mm diameter pipes with 750 mm diameter pipes, and replacing 450 mm diameter or smaller pipes with 525 mm diameter pipes.

1.3 Condamine Street (Chamber C6)

The proposed culvert modification involves increasing the hydraulic capacity of the existing crossing under Condamine Street by lowering the base of the two central RCBCs by one metre, and constructing a matching 1 m deep channel through the apron slab at the culvert outfall. The section of the floor of Chamber C6 (immediately upstream of the Condamine St crossing) will also be lowered to match the proposed lowered invert level. The existing gabion/rock wall at the culvert outfall will be retained and no modification works to the pool and surrounding banks of the existing GPT would be required.

Stormwater works approved under DA2008/1742 included earthworks to the banks surrounding the GPT, and the removal of vegetation, to allow for access to install the new culverts next to the existing culverts. The proposed Section 96 modification does not require earthworks to the banks or removal of vegetation adjacent to the culvert outfall. This reduces the disturbance to the Brookvale Creek waterway and the riparian corridor in comparison to what was approved under DA2008/1742.

Drawings of the culvert alterations are CAR-060139 through CAR-060141 and CAR-110126 and are included in **Appendix A**.

2. ASSESSMENT OF IMPACTS

2.1 Physical Impact

As a result of the changes to the proposed works outlined above there would be no physical modifications to Brookvale Creek upstream of Warringah Mall in comparison to the approved DA drawings and a reduced (positive) physical impact to Brookvale Creek downstream of Warringah Mall with fewer disturbances to the existing GPT and Brookvale Creek.

2.2 Impact on 100 yr ARI Flood Levels

The **xpswmm2D** hydraulic floodplain model assembled for the *Warringah Mall Flood Impact Assessment* (Cardno, 2009a) was updated to reflect the current detailed design and Section 96 modifications. All assumptions within the model remain unchanged except for those outlined in the letter issued by Cardno in relation to the Section 96 (Cardno, 2014).

The impact on flood levels has been assessed for the 100 year ARI floods using the updated model and the estimated flood levels are tabulated in **Appendix B**. A summary of 100 year ARI flood levels (for the 100 year ARI event with 50% blockage of key inlets) is included in **Table 1**.

It is concluded from the results given in **Table 1** that the 100 year ARI flood levels in Brookvale Creek upstream of Warringah Mall would generally remain the same or would be decreased by up to 0.16 m when compared to the results from DA2008/1742. In a small number of locations levels would increase by up to 0.06m. Downstream of Condamine Street the 100 year ARI flood levels (at the reference locations) may increase locally by 0.02 m. It is concluded that there is no significant

impact of the proposed Section 96 works on 100 year ARI flood levels in Brookvale Creek and decreases to flood levels are likely in some locations.

Table 1: Summary of Estimated 100 yr ARI Flood Levels (with 50% Blockage)

Point No.	Location	DA2008/1742 (12/06/13) (a) (m)	S96 15 Oct 2014 (b) (m)	Difference (m) (b)-(a)
P123	75 Old Pittwater Road	14.66	14.65	-0.01
P124	33 Cross Street	12.67	12.67	0
P125	29 Cross Street	12.27	12.27	0
P126	10 Cross Street	12.02	12.02	0
P127	8 Cross Street	11.81	11.80	-0.01
P128	25 Cross Street	12.44	12.33	-0.11
P129	29 Cross Street	12.49	12.38	-0.11
P130	25 Cross Street	12.42	12.26	-0.16
P131	25 Cross Street	12.02	12.03	0.01
P132	23 Cross Street	12.03	12.03	0
P133	21 Cross Street	11.93	11.93	0
P134	19 Cross Street	11.11	11.13	0.02
P137	Old Pittwater Road	12.69	12.67	-0.02
P138	Old Pittwater Road	12.91	12.91	0
P139	Old Pittwater Road	13.04	13.04	0
P140	Old Pittwater Road	13.14	13.14	0
P141	Old Pittwater Road	12.20	12.19	-0.01
P142	Brookvale Creek	11.86	11.91	0.05
P143	Brookvale Creek	11.86	11.92	0.06
P144	Brookvale Creek	11.94	11.93	-0.01
P145	Brookvale Creek	12.04	12.07	0.03
P146	Brookvale Creek	12.15	12.17	0.02
P147	Brookvale Creek	12.42	12.27	-0.15
P148	Brookvale Creek	12.50	12.39	-0.11
P149	Brookvale Creek	12.59	12.50	-0.09
P150	Brookvale Creek	12.67	12.60	-0.07
P151	Brookvale Creek	12.67	12.61	-0.06
P152	Brookvale Creek	12.90	12.86	-0.04
P153	Brookvale Creek	12.98	12.95	-0.03
P154	Brookvale Creek	13.06	13.03	-0.03
P155	Harrison Property	11.89	11.92	0.03
P156	Harrison Property	11.97	11.98	0.01
P157	Harrison Property	12.33	12.24	-0.09

Point No.	Location	DA2008/1742 (12/06/13) (a) (m)	S96 15 Oct 2014 (b) (m)	Difference (m) (b)-(a)
P158	Harrison Property	12.54	12.46	-0.08
P159	Harrison Property	12.61	12.52	-0.09
P160	Harrison Property	12.71	12.64	-0.07
P161	Harrison Property	12.96	12.96	0
P162	Harrison Property	13.64	13.64	0
P163	Harrison Property	12.68	12.61	-0.07
P204	Manly Golf Course	5.79	5.80	0.01
P205	Manly Golf Course	5.21	5.22	0.01
P206	Manly Golf Course	4.20	4.22	0.02
P207	Manly Golf Course	3.73	3.73	0
P208	Manly Golf Course	3.40	3.41	0.01
P209	Manly Golf Course	3.40	3.40	0
P210	Manly Golf Course	3.36	3.36	0
P211	Manly Golf Course	2.93	2.93	0
P212	Manly Golf Course	2.75	2.75	0
P213	Manly Golf Course	2.71	2.71	0
P214	Manly Golf Course	2.71	2.71	0
P215	Manly Golf Course	2.74	2.74	0
P216	Manly Golf Course	2.71	2.71	0

*Refer to **Appendix B** for a full list of the flood levels and differences for all reference points for 100 year ARI events*

2.3 Impact on 100 year ARI Flood Velocities

Based on the approach adopted in the 2011 Waterway Impact Statement for Brookvale Creek, the impact of the proposed works on 2 year, 5 year, 20 year and 100 year ARIs flood velocities in Brookvale Creek was also assessed. Flood velocity difference plots for the 2 year, 5 year, 20 year and 100 year ARIs are included in **Appendix C.**

Upstream of Warringah Mall

The velocity plots presented in **Figures 1** to **4** show the differences in peak velocities estimated under future conditions based on DA2008/1742 and the proposed Section 96 works in comparison with the peak velocities estimated under existing conditions. It is evident that the local increases in velocity are contained within the proposed creek works upstream of Warringah Mall. The impact of the velocity on the stability of Brookvale Creek will be managed by the selection of suitable materials in the design as discussed in the In-stream Works Schedule, to be prepared as part of the Controlled Activities Approval.

Figures 9 and 10 show the differences in peak velocities estimated under future conditions based on DA2008/1742 and the proposed Section 96 works in comparison with the peak velocities estimated under DA2008/1742 only. It is evident that the updated drainage design lowers the velocity in Brookvale Creek by up to 0.2m/s in comparison to DA2008/1742 conditions, having a positive impact of flow behaviour in terms of stream stability. No changes to the model parameters or geometry have been made upstream of Warringah Mall.

Therefore, although the results show an increase in velocity when compared to the existing conditions, the proposed Section 96 modifications actually result in a decrease in the predicted velocities when compared to the existing DA (DA2008/1742). As a result no additional water stability measures are required from those currently proposed under DA2008/1742.

Downstream of Condamine Street

Figures 5 to **8** show the differences in peak velocities estimated under future conditions based on DA2008/1742 and the proposed Section 96 works in comparison with the peak velocities estimated under existing conditions. It is shown that there is a reduction in stream velocity throughout the GPT and localised increases in velocity in the rock lined section of Brookvale Creek adjacent to the GPT trash rack. The variation in velocity incrementally increases from the 2 year ARI up to the 100 year ARI. The increase in velocity estimated in the adjacent creek channel would not cause adverse impact because of the high scour resistance provided existing rock lining.

Further discussion of the existing waterway stability in this location has been undertaken previously (refer Cardno 2009b).

Figures 11 and **12** show that there is generally a decrease in velocity downstream of Condamine Street when comparing the Section 96 proposal to the works approved under DA2008/1742. No impact is predicted directly downstream of the Condamine Street culverts and minor variations in velocity of +/- 1 m/s are very localised for the outlet of the existing GPT.

Similarly to the reach upstream of Warringah Mall, although the results show an increase in velocity when compared to the existing conditions, the proposed Section 96 modifications actually result in a decrease in the predicted velocities when compared to the design under DA2008/1742. As a result no additional water stability measures are required from those currently proposed under DA2008/1742.

3. CONCLUSION

It is concluded that the modifications to the Warringah Mall Drainage Upgrade (DA 2008/1742) proposed under the Section 96 application will have:

- a positive impact on flood behaviour upstream of Warringah Mall by lowering flood levels and flood velocities when compared with the existing design under DA 2008/1742;
- a negligible impact on flood levels downstream of the existing GPT when compared with the existing design under DA 2008/1742, which is located downstream of Condamine Street;
- an increase in flood velocities in some locations when compared to the existing conditions, but generally not by more than those impacts accommodated in the design under DA 2008/1742;
- a decrease in flood velocities at most locations when compared with the existing design under DA 2008/1742

- minor local impacts on flood velocities in the vicinity of the existing GPT with local increases adjacent to the GPT trash rack, which will be managed by the existing rock lining, and;
- beneficial reduction in the extent of works and associated loss of vegetation in the vicinity of the existing GPT which would have otherwise occurred under DA2008/1742.

If you wish to discuss any of the above then please contact the undersigned on 9469 7700.

Yours faithfully

Jolyon Peart
Environmental Scientist
for **Cardno**

Emma Maratea
Senior Environmental Engineer

References

Cardno (2008) "Warringah Mall Flood Impact Assessment", prepared for AMP Capital Investors and Westfield Design & Construction, December.

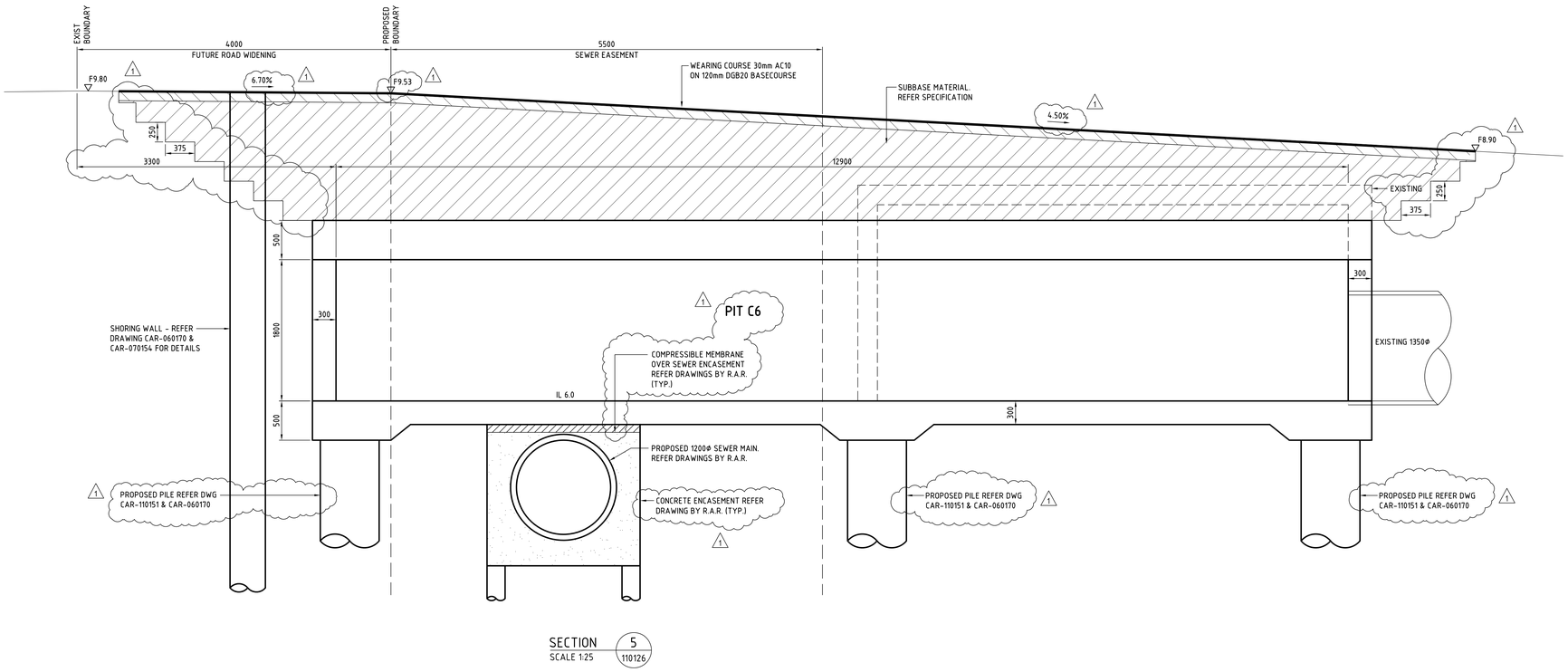
Cardno (2009a) "Warringah Mall Flood Impact Assessment, Addendum", prepared for AMP Capital Investors and Westfield Design & Construction, January.

Cardno (2009b) "Brookvale Creek, Bank Stability Assessment, Condamine Street to Kentwell Road", prepared for AMP Capital Investors and Westfield Design & Construction, August.

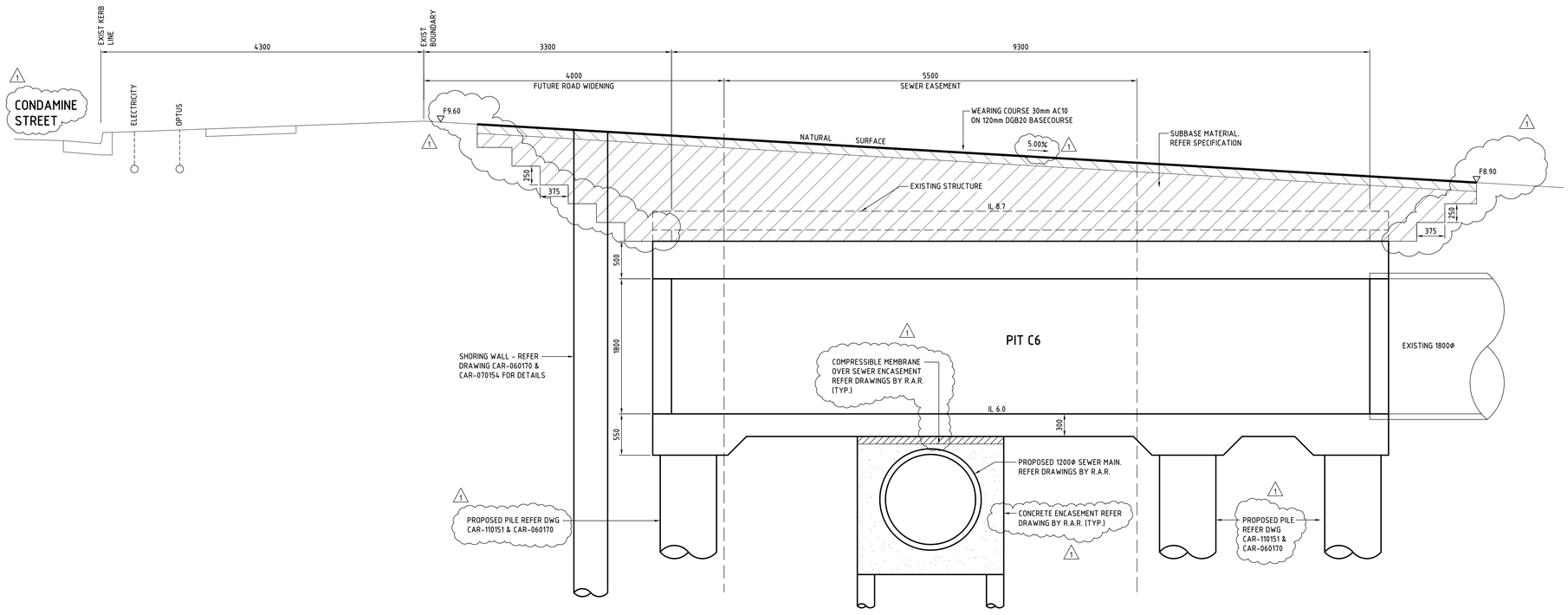
Cardno (2014) "Stormwater Management Deferred Commencement Condition No. 1 DA2008/1742 at Warringah Mall – Section 96 Application", prepared for Scentre Group Design, 14 August 2014

APPENDIX A

DESIGN DRAWINGS



SECTION 5
SCALE 1:25
110126

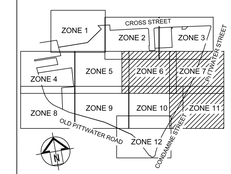


SECTION 6
SCALE 1:25
110126

NOTES:
REFER DWG CAR-110151 FOR
STRUCTURAL DETAILS

Rev	Date	By	Chk	Description
E	31/03/2014	LC	DNA	ISSUE FOR CONSTRUCTION
C	20/07/2014	GV	DNA	70% COSTING PACKAGE REVISED - BING LEE
B	31/01/2014	DH	DNA	70% COSTING PACKAGE REVISED
A	28/11/2013	DH	DNA	70% COSTING PACKAGE

Key Plan



General Note
ALL DIMENSIONS TO BE CHECKED ON SITE. WRITTEN DIMENSIONS ONLY TO BE USED. REFER TO ALL DETAIL DRAWINGS, STRUCTURAL, MECHANICAL & SERVICES DRAWINGS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES TO THE SUPERINTENDENT BEFORE PROCEEDING WITH THE WORKS.
COPYRIGHT OF THE DESIGN SHOWN HEREON IS CLAIMED BY WESTFIELD DESIGN & CONSTRUCTION. WRITTEN AUTHORITY IS REQUIRED FOR ANY REPRODUCTION.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au
CARDNO JOB:
89914004

AMP CAPITAL
Level 16, 50 Bridge Street, SYDNEY, NSW. 2000
Phone: (02) 9257200

SCENTRE GROUP
Owner and Operator of Westfield in Australia and New Zealand

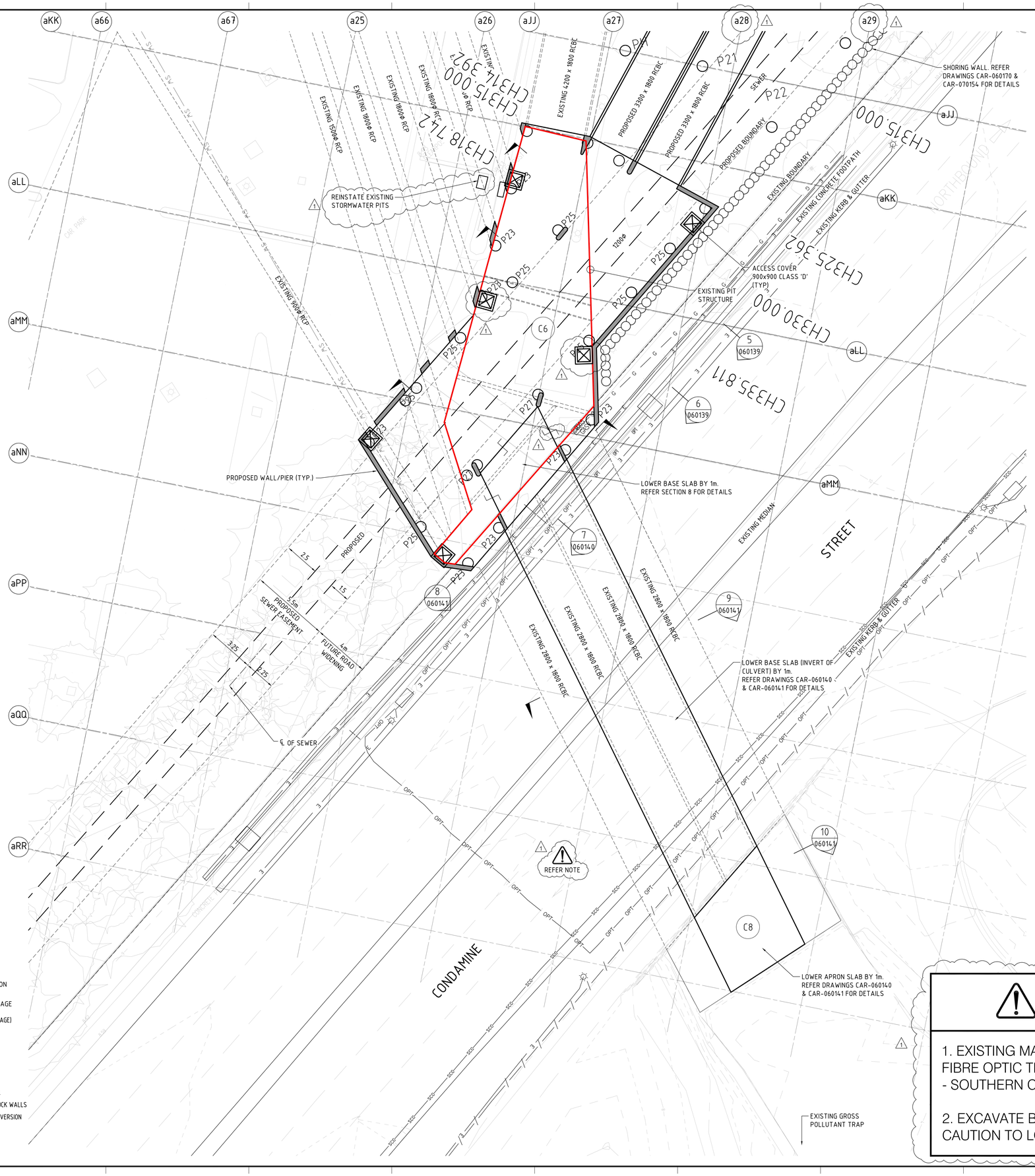
Westfield
WARRINGAH

Scentre Design & Construction Pty Limited
85 Castlereagh Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9028 8500
GPO Box 4004 Sydney NSW 2001

Title:
WARRINGAH STORMWATER AUGMENTATION
CULVERT STAGE 2

TYPICAL SECTIONS 5 & 6

Drawing Scale	Scale Bar 1:1	
1:25	0 500 1000 1500	
Drawn By: DH	CAD Filename: CAR-060139(1).DWG	Plot Date: 31/10/2014 3:24pm
Project No.: D11753	Drawing No.: CAR-060139	Revision: 1



LEGEND

EXISTING

- BOX CULVERT (2800 x 1800 RCBC)
- STORMWATER DRAINAGE PIPE (EXISTING 600ø)
- BOUNDARY
- ELECTRICITY (HIGH VOLTAGE) (E)
- ELECTRICITY (LOW VOLTAGE) (E)
- GAS (G)
- WATER (W)
- OPTIC FIBER (OF)
- SEWER (S)
- STORMWATER DRAINAGE (SWD)
- SOUTHERN CROSS CONDUIT (SCC)
- TELSTRA (T)
- FIRE SERVICES (F)
- UNKNOWN SERVICES
- EXISTING SUBSOIL DRAIN
- FENCE (1)

PROPOSED

- BOX CULVERT
- STORMWATER DRAINAGE PIPE
- SEWER (PROPOSED ø SEWER)
- LONGITUDINAL SECTION REFERENCE (A1)
- STORMWATER DRAINAGE
- ELECTRICITY (HIGH VOLTAGE)
- ELECTRICITY PIT
- SUBSOIL DRAIN (SS) (1)
- SHORING WALL
- PROPOSED CONCRETE WALL
- TEMPORARY DIVERSION BLOCK WALLS
- DEMOLISHED TEMPORARY DIVERSION BLOCK WALLS
- EXTENT OF WORKS

NOTES:

1. REFER TO GEOTECHNICAL REPORT PROPOSED CULVERT MODIFICATION CONDAMINE STREET BY DOUGLAS PARTNERS DATED FEB 2014.
2. REFER TO DRAWING CAR-110151 FOR STRUCTURAL DETAILS.
3. REFER TO DRAWINGS CAR-110130 TO 110139 FOR SUGGESTED CONSTRUCTION STAGING SEQUENCING.

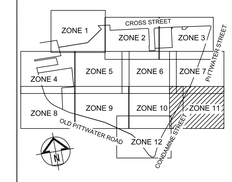
CAUTION DANGER

1. EXISTING MAJOR UNDERGROUND OPTUS FIBRE OPTIC TELECOMMUNICATIONS CABLE - SOUTHERN CROSS CABLES.

2. EXCAVATE BY HAND WITH EXTREME CAUTION TO LOCATE PRIOR TO ANY WORKS

Rev	Date	By	Chk	Description
E	31/03/2014	LC	ONA	ISSUE FOR CONSTRUCTION
C	09/07/2014	GV	ONA	70% COSTING PACKAGE REVISED - BING LEE
B	23/01/2014	DH	ONA	70% COSTING PACKAGE REVISED
A	28/11/2013	LB	ONA	70% COSTING PACKAGE

Key Plan



General Note

ALL DIMENSIONS TO BE CHECKED ON SITE. WRITTEN DIMENSIONS ONLY TO BE USED. REFER TO ALL DETAIL DRAWINGS, STRUCTURAL, MECHANICAL & SERVICES DRAWINGS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES TO THE ARCHITECT. DO NOT SCALE FROM DRAWINGS.
COPYRIGHT OF THE DESIGN SHOWN HEREON IS RETAINED BY WESTFIELD DESIGN & CONSTRUCTION. WRITTEN AUTHORITY IS REQUIRED FOR ANY REPRODUCTION.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

CARDNO JOB:
89914004

AMP CAPITAL
Level 16, 50 Bridge Street, SYDNEY, NSW. 2000
Phone: (02) 9257200

SCENTRE GROUP
Owner and Operator of Westfield in Australia and New Zealand

Westfield
WARRINGAH

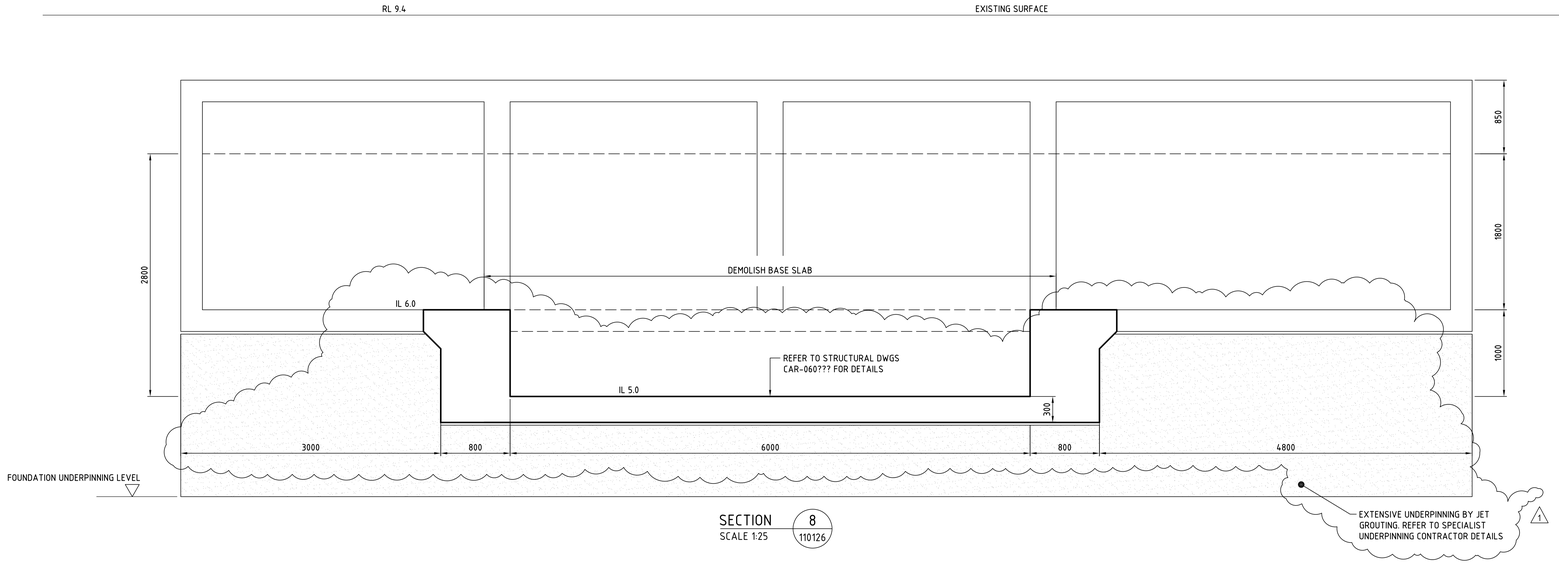
Scentre Design & Construction Pty Limited
85 Castlereagh Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9028 8500
GPO Box 4004 Sydney NSW 2001

Title:
WARRINGAH STORMWATER AUGMENTATION
CULVERT STAGE 2

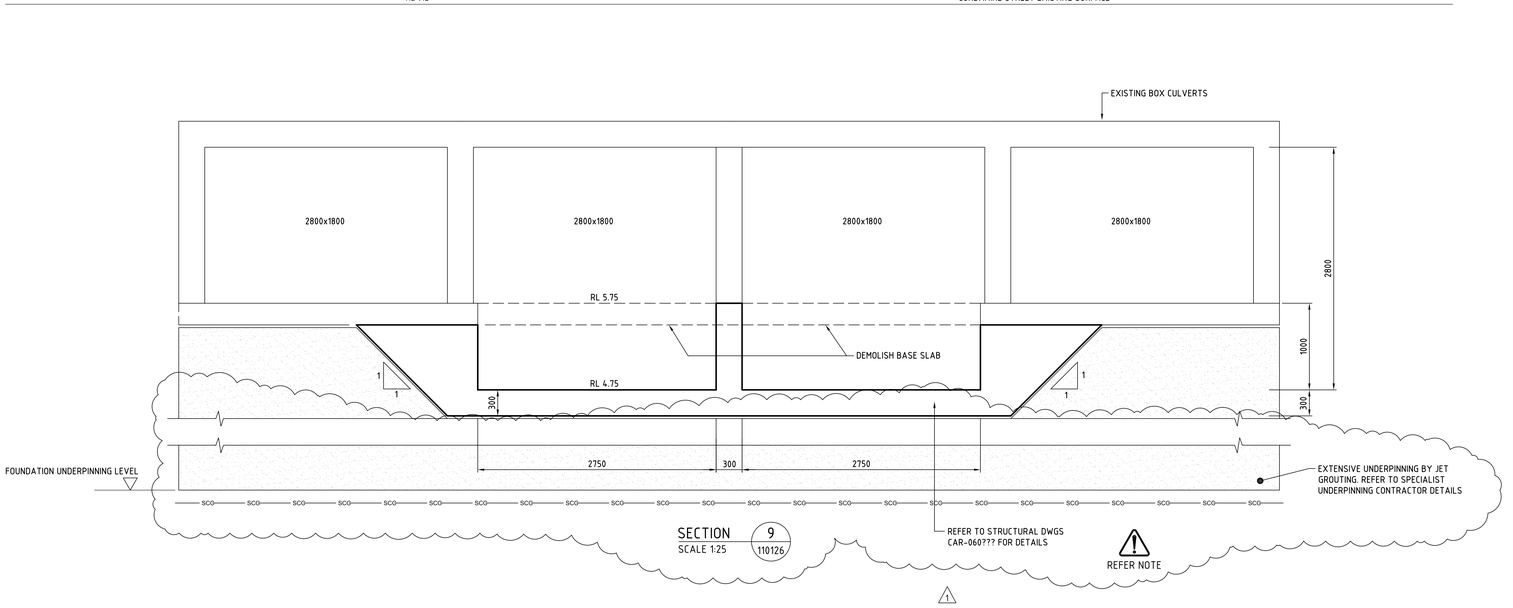
DETAIL PIT C6

Drawing Scale	Scale Bar 1:1	
1:100	0 1 2 3 4 5	
Drawn By	CAD Filename	Plot Date
LDB	CAR-110126(1).DWG	31/10/2014 4:09pm
Project No.	Drawing No.	Revision
D11753	CAR-110126	1

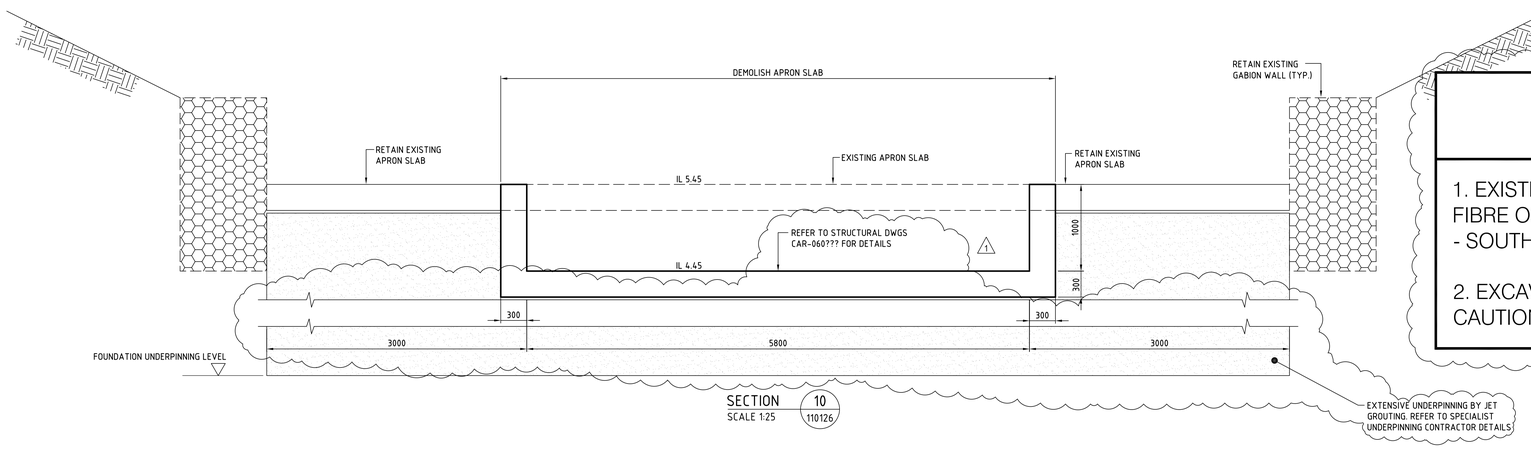
\\CARDNO.CORP\GLOBAL\AU\NSW\DIRECTORYSTRUCTURE\PROJECTS\89914\FY14\100L_WARRINGAH MALL STAGE 1 & 2\004 STAGE 2 CULVERT\DRAWINGS\BUILD\DRAWINGS\CAR-110126.DWG



SECTION 8
SCALE 1:25 110126



SECTION 9
SCALE 1:25 110126



SECTION 10
SCALE 1:25 110126

CAUTION DANGER

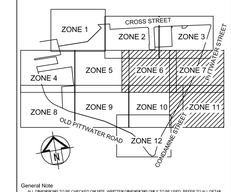
1. EXISTING MAJOR UNDERGROUND OPTUS FIBRE OPTIC TELECOMMUNICATIONS CABLE - SOUTHERN CROSS CABLES.

2. EXCAVATE BY HAND WITH EXTREME CAUTION TO LOCATE PRIOR TO ANY WORKS

NOTE:
REFER DWG CAR-110151 FOR STRUCTURAL DETAILS

Rev	Date	By	Chk	Description
E	31/03/2014	LC	DNA	ISSUE FOR CONSTRUCTION
C	30/07/2014	GV	DNA	70% COSTING PACKAGE REVISED - BING LEE
B	31/01/2014	DH	DNA	70% COSTING PACKAGE REVISED
A	28/11/2013	DH	DNA	70% COSTING PACKAGE

Key Plan



General Note
ALL DIMENSIONS TO BE CHECKED ON SITE. WRITTEN DIMENSIONS ONLY TO BE USED. REFER TO ALL DETAIL DRAWINGS, STRUCTURAL, MECHANICAL & SERVICES DRAWINGS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES TO THE ARCHITECT. DO NOT SCALE FROM DRAWINGS.
COPYRIGHT OF THE DESIGNS SHOWN HEREIN IS RETAINED BY WESTFIELD DESIGN & CONSTRUCTION. WRITTEN AUTHORITY IS REQUIRED FOR ANY REPRODUCTION.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

CARDNO JOB:
89914004

AMP CAPITAL
Level 16, 50 Bridge Street, SYDNEY, NSW. 2000
Phone: (02) 9257200

SCENTRE GROUP
Owner and Operator of Westfield in Australia and New Zealand

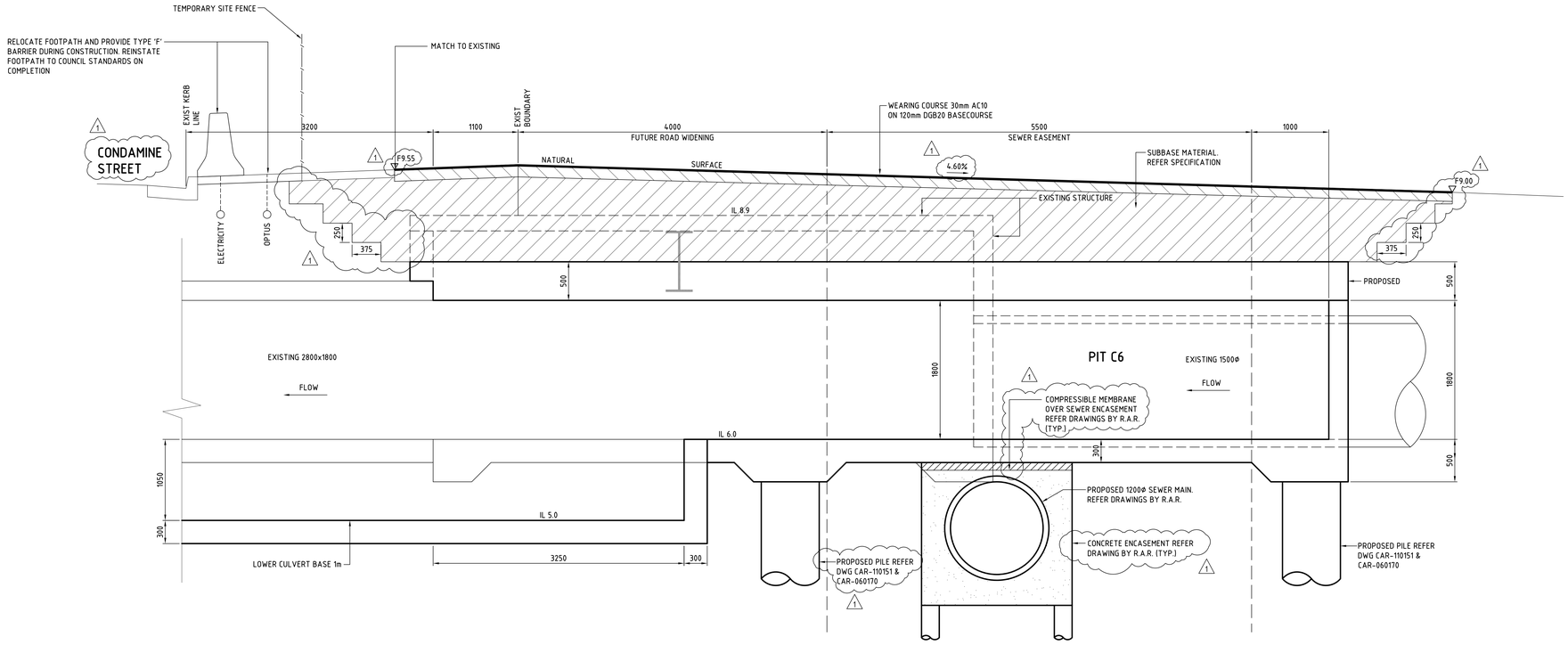
Westfield
WARRINGAH

Scentre Design & Construction Pty Limited
85 Castlereagh Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9028 8500
GPO Box 4004 Sydney NSW 2001

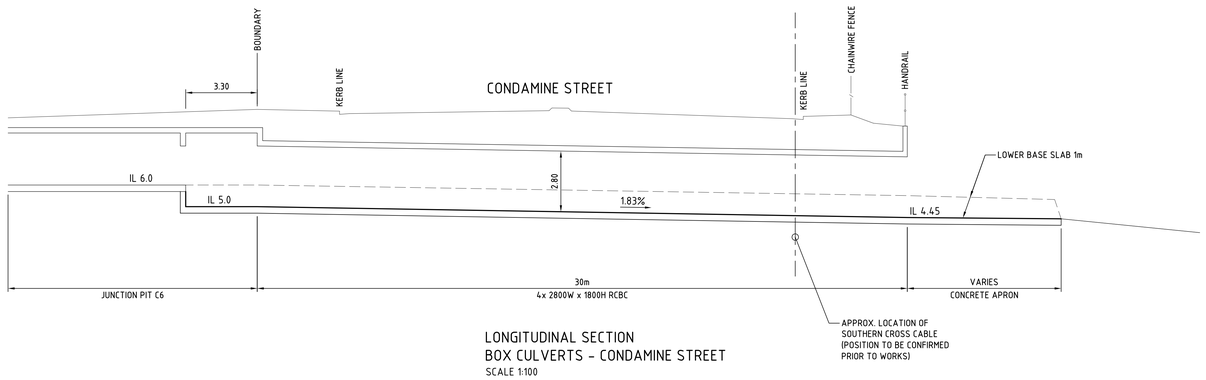
Title:
WARRINGAH STORMWATER AUGMENTATION
CULVERT STAGE 2

TYPICAL SECTIONS 8, 9 & 10

Drawing Scale	Scale Bar 1:1	
1:25	0 500 1000 1500	
Drawn By	CAD Filename	Plot Date
DH	CAR-060141[1].DWG	31/10/2014 3:29pm
Project No.	Drawing No.	Revision
D11753	CAR-060141	1



SECTION 7
SCALE 1:25
110126



LONGITUDINAL SECTION
BOX CULVERTS - CONDAMINE STREET
SCALE 1:100

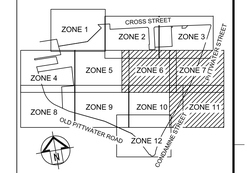
NOTES:
REFER DWG CAR-110151 FOR STRUCTURAL DETAILS

0 500 1000 1500
1:25

0 2 3 4 6 10
1:100

Rev	Date	By	Chk	Description
1	31/10/2014	LC	DNA	ISSUE FOR CONSTRUCTION
D	14/09/2014	GV	DNA	RE-ISSUED FOR COSTING - RING LEE
C	31/07/2014	GV	DNA	70% COSTING PACKAGE REVISED - RING LEE
B	31/01/2014	DH	DNA	70% COSTING PACKAGE REVISED
A	28/11/2013	DH	DNA	70% COSTING PACKAGE

Key Plan



General Note
ALL DIMENSIONS TO BE CHECKED ON SITE. WRITTEN DIMENSIONS ONLY TO BE USED. REFER TO ALL DETAIL DRAWINGS, STRUCTURAL, MECHANICAL & SERVICES DRAWINGS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES TO THE SUPERINTENDENT BEFORE PROCEEDING.
COPYRIGHT OF THE DESIGN SHOWN HEREIN IS RETAINED BY WESTFIELD DESIGN & CONSTRUCTION. WRITTEN AUTHORITY IS REQUIRED FOR ANY REPRODUCTION.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au
CARDNO JOB:
89914004

AMP CAPITAL
Level 16, 50 Bridge Street, SYDNEY, NSW. 2000
Phone: (02) 9257200

SCENTRE GROUP
Owner and Operator of Westfield in Australia and New Zealand

Westfield
WARRINGAH

Scentre Design & Construction Pty Limited
85 Castlereagh Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9028 8500
GPO Box 4004 Sydney NSW 2001

Title:
WARRINGAH STORMWATER AUGMENTATION
CULVERT STAGE 2

TYPICAL SECTION 7 & LONGITUDINAL SECTION
BOX CULVERTS CONDAMINE STREET

Drawing Scale	Scale Bar 1:1	
AS SHOWN		
Drawn By	CAD Filename	Plot Date
DH	CAR-060140[1].DWG	31/10/2014 3:26pm
Project No.	Drawing No.	Revision
D11753	CAR-060140	1

\\CARDNO.CORP\GLOBAL\AU\NSW\DIRECTORYSTRUCTURE\PROJECTS\899\FY14\004_WARRINGAH MALL STAGE 1 & 2\004 STAGE 2 CULVERT\DRAWINGS\BUILT\DRAWINGS\CAR-060140.DWG

DATE PLOTTED: 5 November 2014 8:54 AM BY : LYLAC CHAU

DA 2008 / 1742

Cardno

CONCEPT DRAINAGE AUGMENTATION WORKS

WARRINGAH MALL, BROOKVALE

SECTION 96 APPLICATION

DRAWING SCHEDULE

W4548-400 COVER SHEET, GENERAL NOTES AND DRAWING SCHEDULE

W4548-401 GENERAL ARRANGEMENT PLAN MASTERPLAN
W4548-402 GENERAL ARRANGEMENT PLAN MASTERPLAN WITH AERIAL OVERLAY

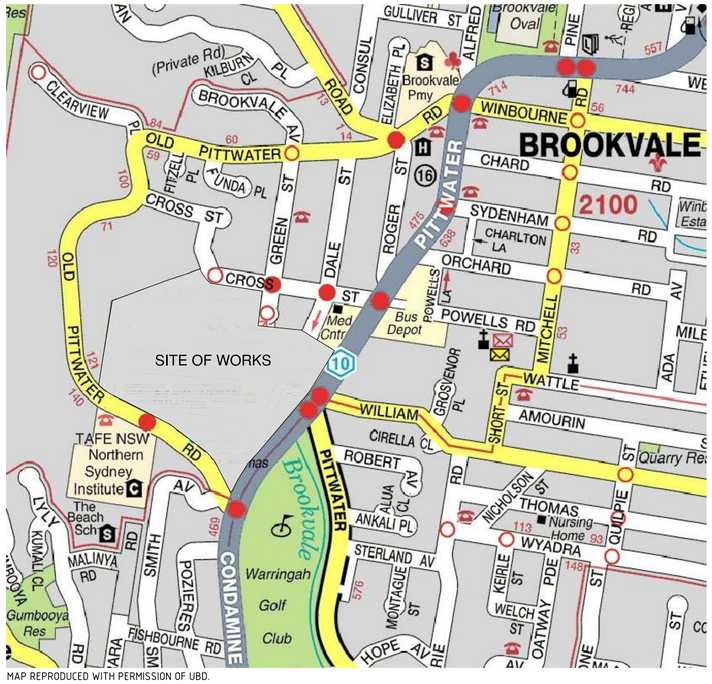
W4548-411 DETAIL ARRANGEMENT PLAN CROSS STREET & BROOKVALE CREEK DETAILS
W4548-412 DETAIL ARRANGEMENT PLAN DALE STREET ROUNDABOUT
W4548-413 DETAIL ARRANGEMENT PLAN PITTWATER ROAD
W4548-414 DETAIL ARRANGEMENT PLAN CONDAMINE STREET GPT

W4548-420 DETAIL ARRANGEMENT PLAN GENERAL ARRANGEMENT PLAN
W4548-421 DETAIL ARRANGEMENT PLAN CROSS STREET & BROOKVALE CREEK
W4548-422 DETAIL ARRANGEMENT PLAN WOOLWORTHS LOADING DOCKS WORKS
W4548-423 DETAIL ARRANGEMENT PLAN STARFISH CARPARK
W4548-424 DETAIL ARRANGEMENT PLAN CROSS AND GREEN STREETS
W4548-425 DETAIL ARRANGEMENT PLAN CROSS AND GREEN STREETS SECTIONS
W4548-426 DETAIL ARRANGEMENT PLAN CROSS STREET ROUNDABOUT PLAN
W4548-427 DETAIL ARRANGEMENT PLAN CROSS STREET ROUNDABOUT DETAILS
W4548-428 DETAIL ARRANGEMENT PLAN TARGET ENTRY - CONCRETE PLANTER BOX
W4548-429 DETAIL ARRANGEMENT PLAN DAVID JONES LOADING DOCK WORKS

W4548-430 STORMWATER LONGSECTIONS - SHEET 1 of 2
W4548-431 STORMWATER LONGSECTIONS - SHEET 2 of 2

W4548-435 BUILDING DEMOLITION PLAN

W4548-440 EROSION & SEDIMENT CONTROL PLAN SHEET 1 OF 6
W4548-441 EROSION & SEDIMENT CONTROL PLAN SHEET 2 OF 6
W4548-442 EROSION & SEDIMENT CONTROL PLAN SHEET 3 OF 6
W4548-443 EROSION & SEDIMENT CONTROL PLAN SHEET 4 OF 6
W4548-444 EROSION & SEDIMENT CONTROL PLAN SHEET 5 OF 6
W4548-445 EROSION & SEDIMENT CONTROL PLAN SHEET 6 OF 6
W4548-446 EROSION & SEDIMENT CONTROL DETAILS



MAP REPRODUCED WITH PERMISSION OF UBD.
COPYRIGHT UNIVERSAL PUBLISHERS PTY LTD DG01/05

LOCALITY PLAN
NOT TO SCALE

GENERAL NOTES

CG1. THE INFORMATION CONTAINED ON THESE DRAWINGS IS FOR CIVIL ENGINEERING PURPOSES ONLY. ALL DISCREPANCIES WITH OTHER CONSULTANTS DOCUMENTATION THAT COULD RESULT IN CHANGES TO THE CIVIL ENGINEERING DETAILS SHALL BE REFERRED TO THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

CG2. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS FOR THESE WORKS AND/OR AS DIRECTED BY THE SUPERINTENDENT.

CG3. THE CONTRACTOR SHALL LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND PROTECT AND MAKE ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE AND/OR ADJUST IF NECESSARY. INFORMATION GIVEN ON THE DRAWINGS IN RESPECT TO SERVICES IS FOR GUIDANCE ONLY IS NOT GUARANTEED COMPLETE NOR CORRECT.

CG4. CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT THE PERMISSION OF THE OWNER AND SUPERINTENDENT.

CG5. CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES AND DEBRIS, ETC. TO THE EXTENT SPECIFIED.

CG6. ALL SITE REGRADING AREAS SHALL BE FINALLY GRADED TO THE SATISFACTION OF THE SUPERINTENDENT.

CG7. SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED OR REMOVED FROM SITE.

CG8. ALL NEW WORKS SHALL MAKE A SMOOTH JUNCTION WITH EXISTING.

CG9. ANY QUANTITIES GIVEN ARE FOR GUIDANCE ONLY.

CG10. PLANS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL PLANS BY WESTFIELD AND LANDSCAPING PLANS BY DEM

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 207 205

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

COVER SHEET, GENERAL NOTES AND DRAWING SCHEDULE

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	NTS	A1

Drawing Number: W4548-400
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: \\cardno.corp\global\AUNSW\Directory\Structure\Projects\4499\FY13\NA4991313Z_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\W4548-400(3).dwg

DATE PLOTTED: 5 November 2014 10:38 AM BY : LYLAC CHAU

XREFs: X-Services; X-Drainage; X-Survey; X-Architect; X-GRP-A1-SHT; X-SYD-A1.dgp

CAD FILE: \\cardno.corp\global\AU\NSW\Directory\Structure\Projects\499\PY13\NA499131132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\W4548-401(3).dwg

NORTH

CROSS STREET

BROOKVALE CREEK

CONSTRUCT HUMP

AUGMENT EXISTING PARAPET WALL

NO ACCESS ONTO HARRISONS PROPERTY

EXCAVATE UNDER EXISTING PIERED ROAD TO REMOVE OBSTRUCTIONS / INCREASE HYDRAULIC CAPACITY

FLOOD BARRIER/SHUTTER

GRATED INLET

CONNECT GRATED INLET INTO EXISTING OPEN DRAIN

EXISTING OPEN DRAIN TO DISCHARGE IN RCBCs

2 x 3.6W x 1.5H RCBCs

CURVED CHAMBER TO STREAMLINE FLOWS AROUND BEND

GRATED INLET SIZED FOR 50% BLOCKAGE. 10m x 7.2m

EXIST HV ELECT PIT

2 x 3.6W x 1.5H RCBC LOCATED TO NORTH OF EXISTING RCBC

GREEN STREET

DALE STREET

PITTWATER ROAD

REGRADE PAVEMENT TO DIRECT STORM FLOWS TO GRATED INLET

EXISTING 1.2W x 0.9H RCBC

FLOOD BARRIER/SHUTTER

EXISTING 2000w x 2000h

Ø900 RCP CLASS '3'

NEW 2 x Ø675 RCP

FLOOD WALL

REGRADE PAVEMENT TO DIRECT STORM FLOWS TO GRATED INLET

LARGE CAPACITY GRATED INLET (SIZED FOR 50% BLOCKAGE)

EXIST Ø1050

EXIST Ø1050

STARFISH CARPARK

EXIST. 1200Ø SEWER MAIN

EXIST. 450Ø SEWER MAIN

EXISTING FLOW MIXING CHAMBER

EXIST. 1200Ø SEWER MAIN

ELECTRICAL SUBSTATION TO BE RELOCATED

REGRADED TO MIN RL 8.90

EXIST 9000

EXIST 3 x 1.5 RCBC

EXIST 3 x 1.8 RCBC

EXIST 4.2 x 1.8 RCBC

EXIST RAMP TO CARPARK

EXIST 1350Ø RCP

EXIST 1800Ø

EXIST 1500Ø

EXIST 1350Ø

EXIST 1200Ø

EXIST 1050Ø

EXIST 900Ø

JUNCTION CHAMBER WITH LARGE CAPACITY GRATED INLET (SIZED FOR 50% BLOCKAGE)

DISCHARGE Ø1350 RCP INTO 3.3W x1.8H RCBC

CURVED CHAMBER TO STREAMLINE FLOWS AROUND BEND

VEGETATION TO REMAIN

HCF

DEMOLITION OF EXISTING HCF & GODFATHERS BUILDING REQUIRED BY OTHERS

2 x 3.3W x 1.8H RCBC

LOWER BASE OF TWO CENTRAL CULVERTS 1m

EXISTING 4 x 2.8W x 1.8H RCBC

CONDAMINE STREET

PITTWATER ROAD

EXISTING GPT

LOWER CENTRAL SECTION OF CONCRETE APRON / HEADWALL

PROPOSED RAISED THRESHHOLD (NOM. + 100mm)

OLD PITTWATER ROAD

SHEET 421

SHEET 422

SHEET 423

SHEET 424

SHEET 412

SHEET 413

SHEET 414

SHEET 429

SHEET 428

ZONE A

ZONE B

ZONE C

NOTE:
LOCATION AND LEVEL OF ALL SERVICES TO BE CONFIRMED ON SITE

LEGEND

- EXISTING STORMWATER TO REMAIN
- EXISTING STORMWATER TO BE REMOVED
- PROPOSED STORMWATER (RCP)
- PROPOSED STORMWATER (RCBC)
- PROPOSED HIGH CAPACITY INLET
- APPROXIMATE AREAS OF REGRADING
- APPROXIMATE AREA OF CHANNEL REGRADING
- BOUNDARY
- A1 LONGSECTION REFERENCE
- E ELECTRICITY
- G GAS
- T OPTICAL FIBRE
- O OPTUS
- S SEWER
- T TELSTRA
- W WATER

20 10 0 20 40 60 80 100
SCALE OF METRES (1:1000 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

GENERAL ARRANGEMENT PLAN
MASTERPLAN

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	1:1000	A1

Drawing Number: W4548-401

Revision: 3

DATE PLOTTED: 5 November 2014 8:59 AM BY : LYLAC CHAU



XREFs: X-Services; X-Drainage; X-Survey; X-Architect; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\FY13\NA499131\32_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\20130410 Urban Drafting Folder\DrW4548-402(3).dwg

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

GENERAL ARRANGEMENT PLAN
MASTERPLAN WITH AERIAL OVERLAY

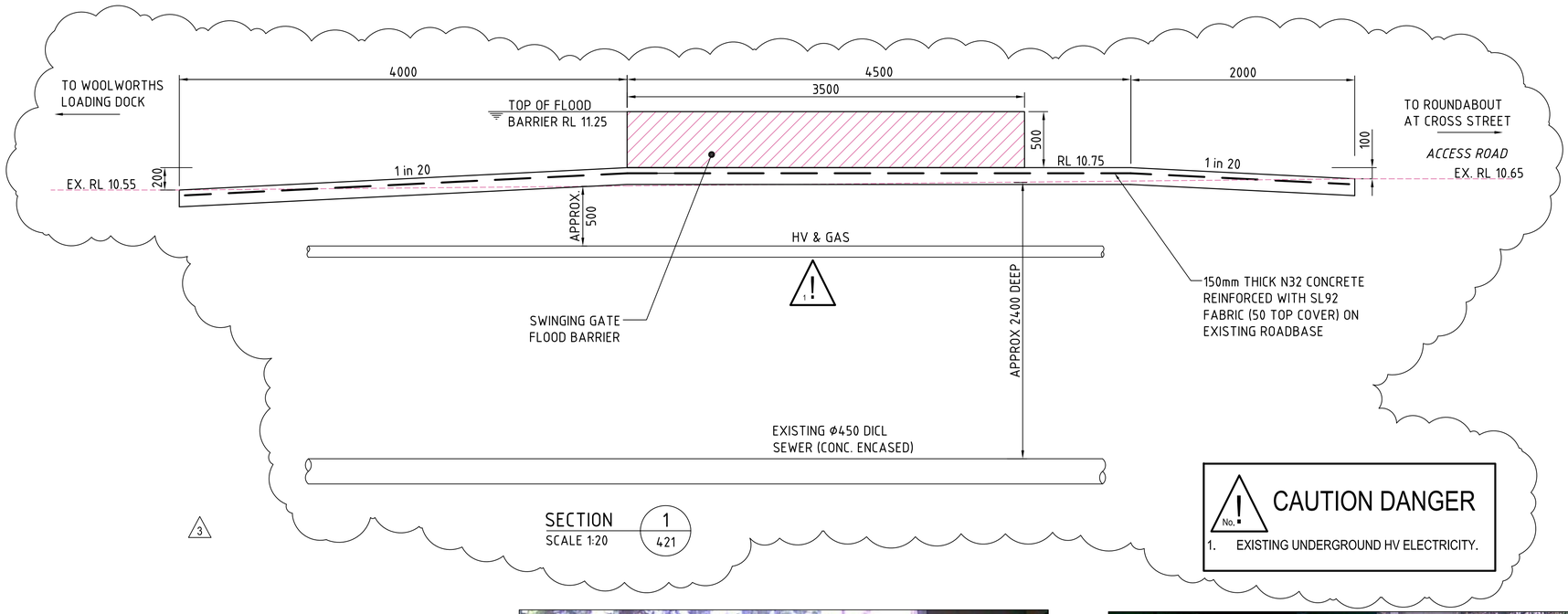
Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	1:1000	A1

Drawing Number: W4548-402
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

DATE PLOTTED: 5 November 2014 9:00 AM BY : LYLAC CHAU

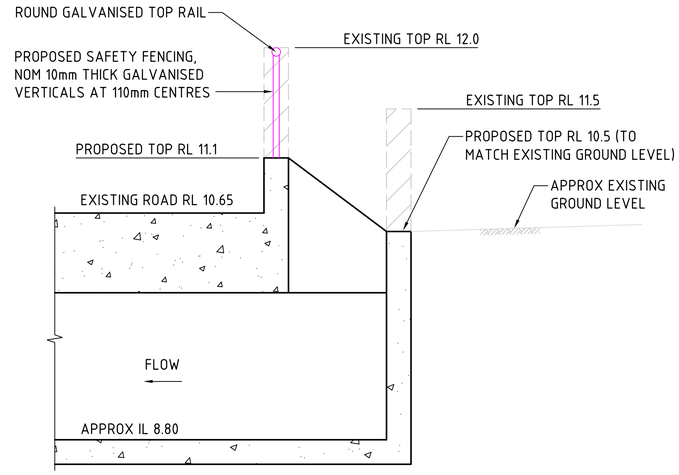


SECTION 1
SCALE 1:20
421

3

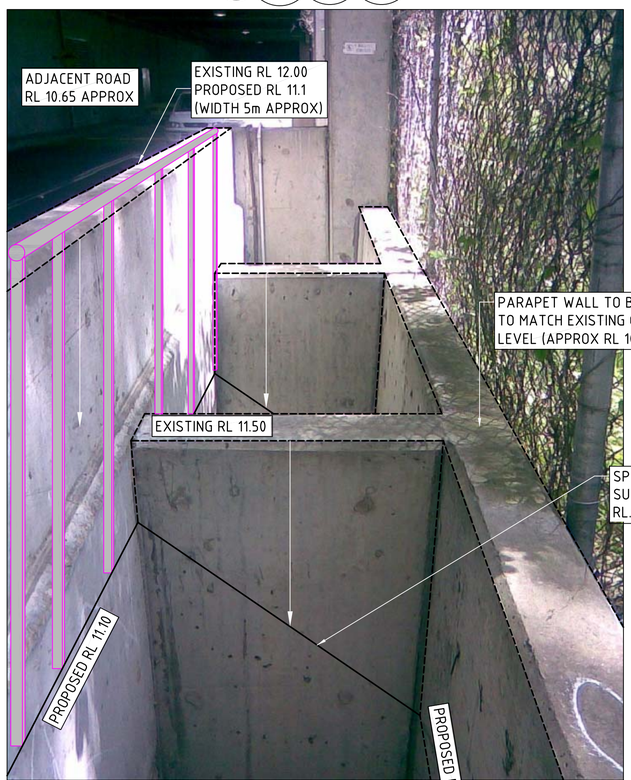
CAUTION DANGER

No. 1. EXISTING UNDERGROUND HV ELECTRICITY.



SECTION 2
SCALE 1:25
421





PARAPET WALL AUGMENTATION
NOT TO SCALE

0.5 0.25 0 0.5 1.0 1.5 2.0 2.5
SCALE OF METRES (1:25 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7900 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS STREET & BROOKVALE CREEK DETAILS

Status: PRELIMINARY

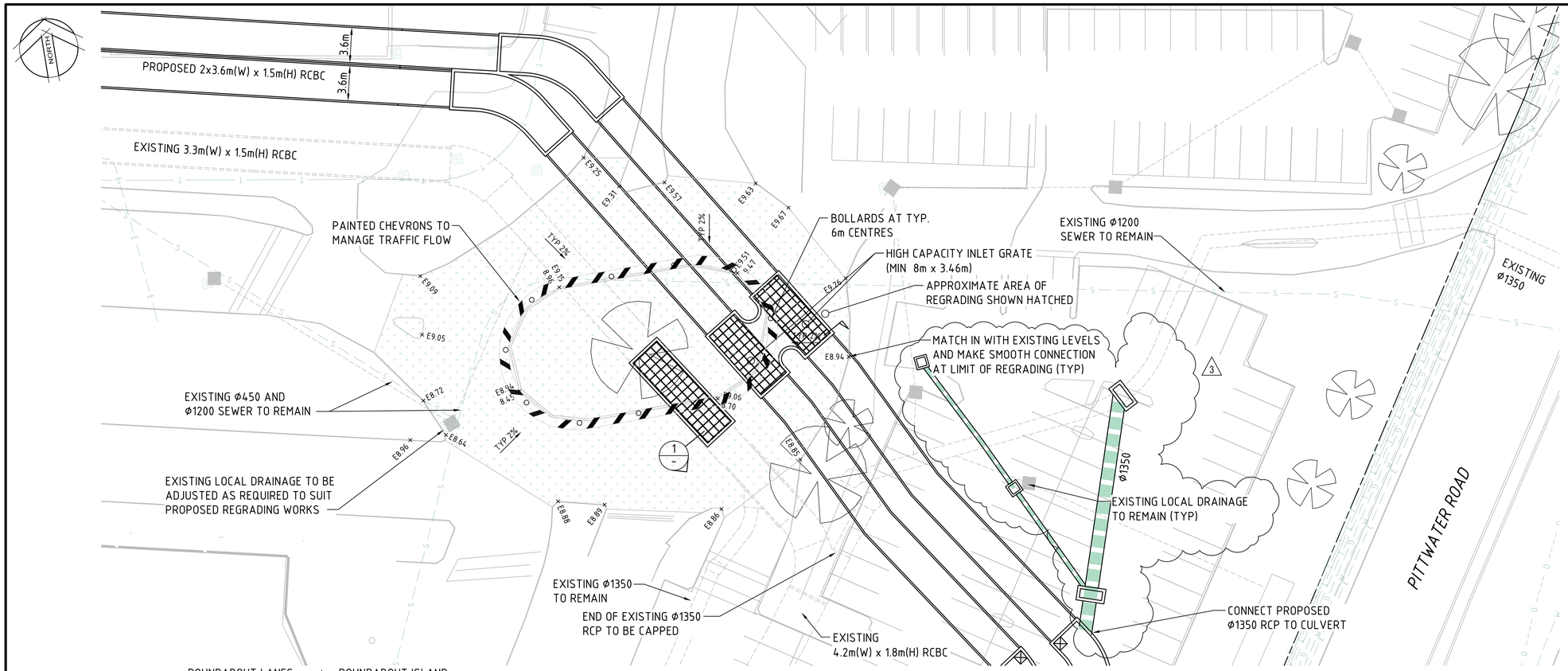
Date	Datum	Scale	Size
18/11/2013	AHD	1:25	A1

Drawing Number: W4548-411
Revision: 3

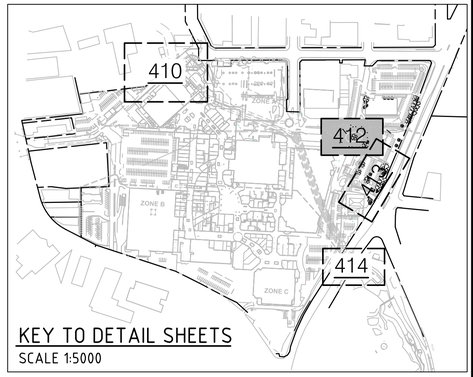
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Architect; X-Services; X-Survey; X-Drainage; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4499\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-411(3).dwg

DATE PLOTTED: 5 November 2014 9:01 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



KEY TO DETAIL SHEETS
SCALE 1:5000

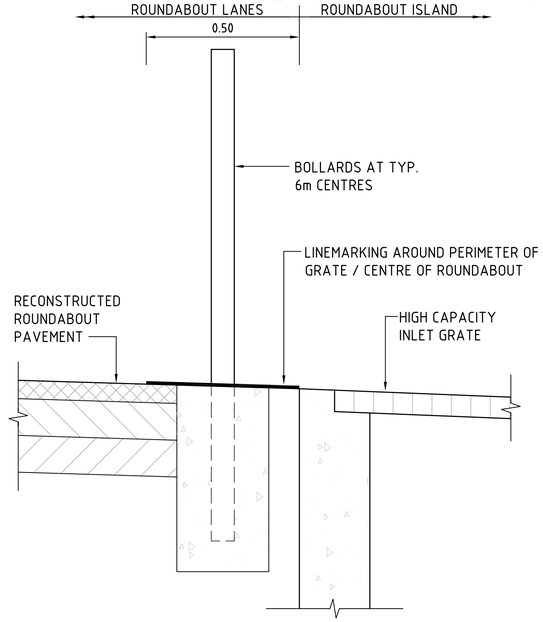
LEGEND

EXISTING
- EXISTING CULVERTS
- × E10.87 EXISTING SPOT LEVEL
- EXISTING LOCAL DRAINAGE

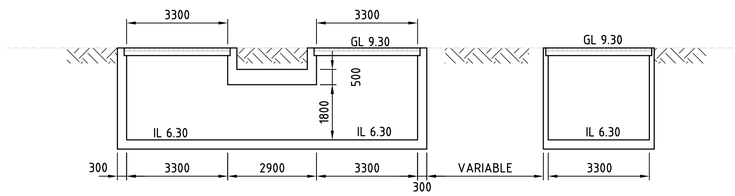
PROPOSED
- STORMWATER PIPE
- CULVERTS
- × 11.00 PROPOSED SPOT LEVEL
- ○ PROPOSED BOLLARD
- APPROXIMATE AREA OF REGRADE
- HIGH CAPACITY GRATE

SERVICES
- E ELECTRICITY
- G GAS
- T OPTICAL FIBRE
- O OPTUS
- S SEWER
- T TELSTRA
- W WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY



TYPICAL ROUNDABOUT EDGE TREATMENT
DETAIL 1 / -
SCALE 1:10



SECTION 1 / -
SCALE 1:100

200 100 0 200 400 600 800 1000
SCALE OF MILLIMETRES (1:10 BEFORE REDUCTION)
2 1 0 2 4 6 8 10
SCALE OF METRES (1:100 BEFORE REDUCTION)
5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
DALE STREET ROUNDABOUT

Status: PRELIMINARY

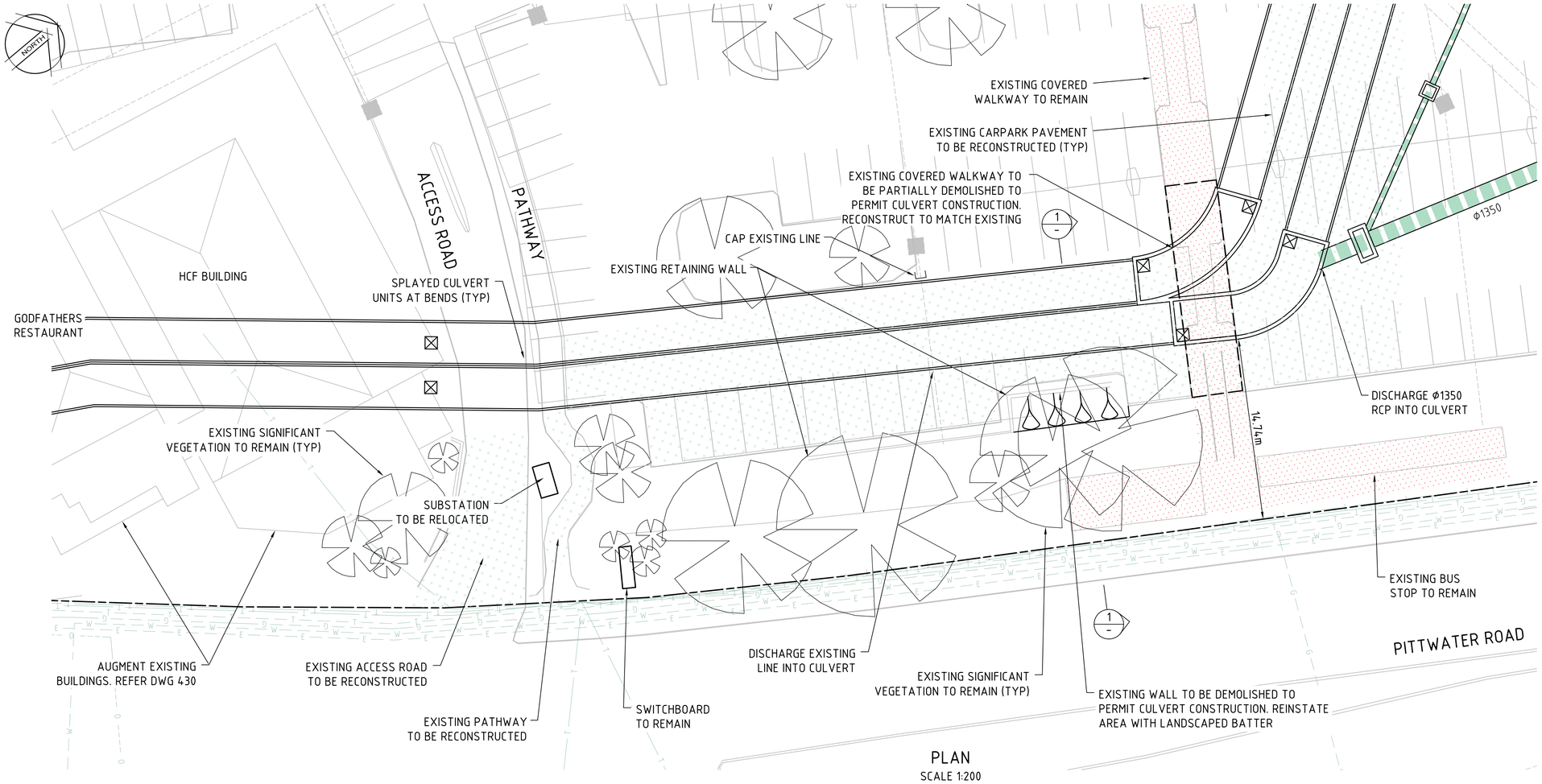
Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-412
Revision: 3

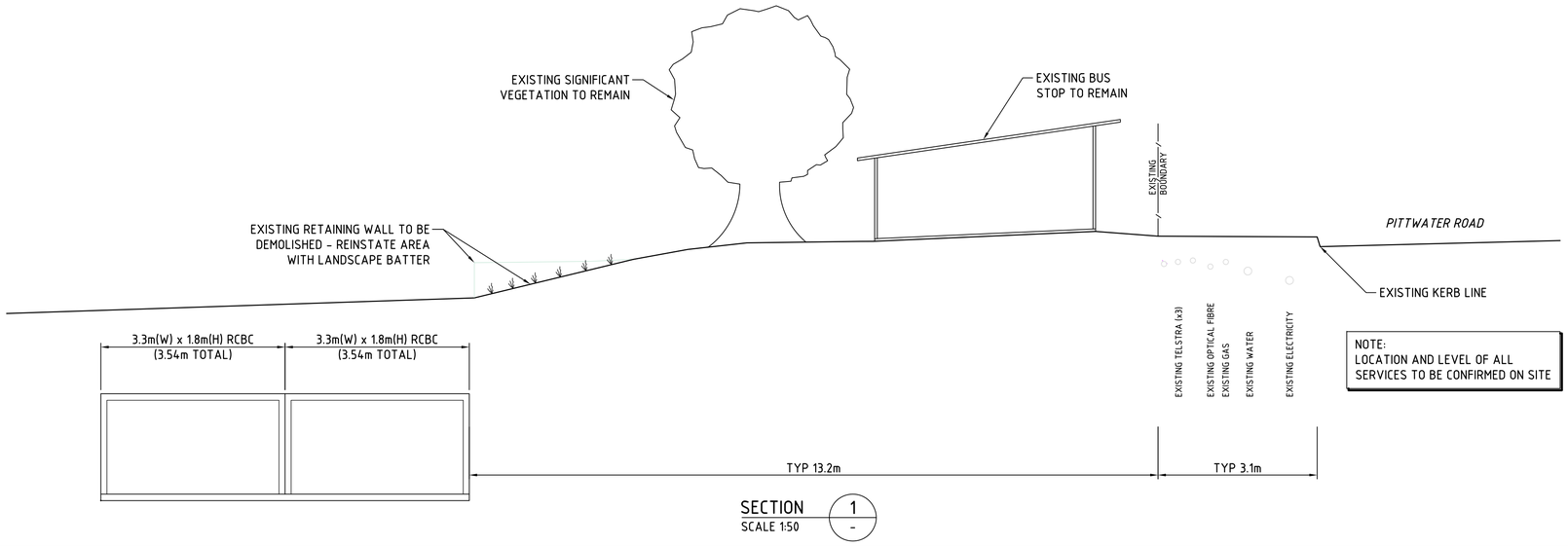
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Survey; X-Architect; X-Services; X-Drainage; X-GRP-A1-SHT; X-SYD-A1-Logo; X-Typical Sections
CAD FILE: N:\Projects\4999FY13\NA\49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-412(3).dwg

DATE PLOTTED: 5 November 2014 9:02 AM BY : LYLAC CHAU

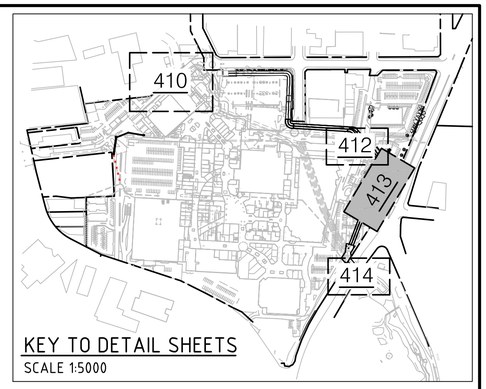


PLAN
SCALE 1:200



SECTION 1 / SCALE 1:50

NOTE:
LOCATION AND LEVEL OF ALL SERVICES TO BE CONFIRMED ON SITE



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

- BOUNDARY
- PROPOSED CULVERTS
- APPROXIMATE AREA OF RECONSTRUCTION
- EXISTING BUS STOP AND COVERED WALKWAY

SERVICES

- E — ELECTRICITY
- HV — HIGH VOLTAGE ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 207 205

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
PITTWATER ROAD

Status: PRELIMINARY

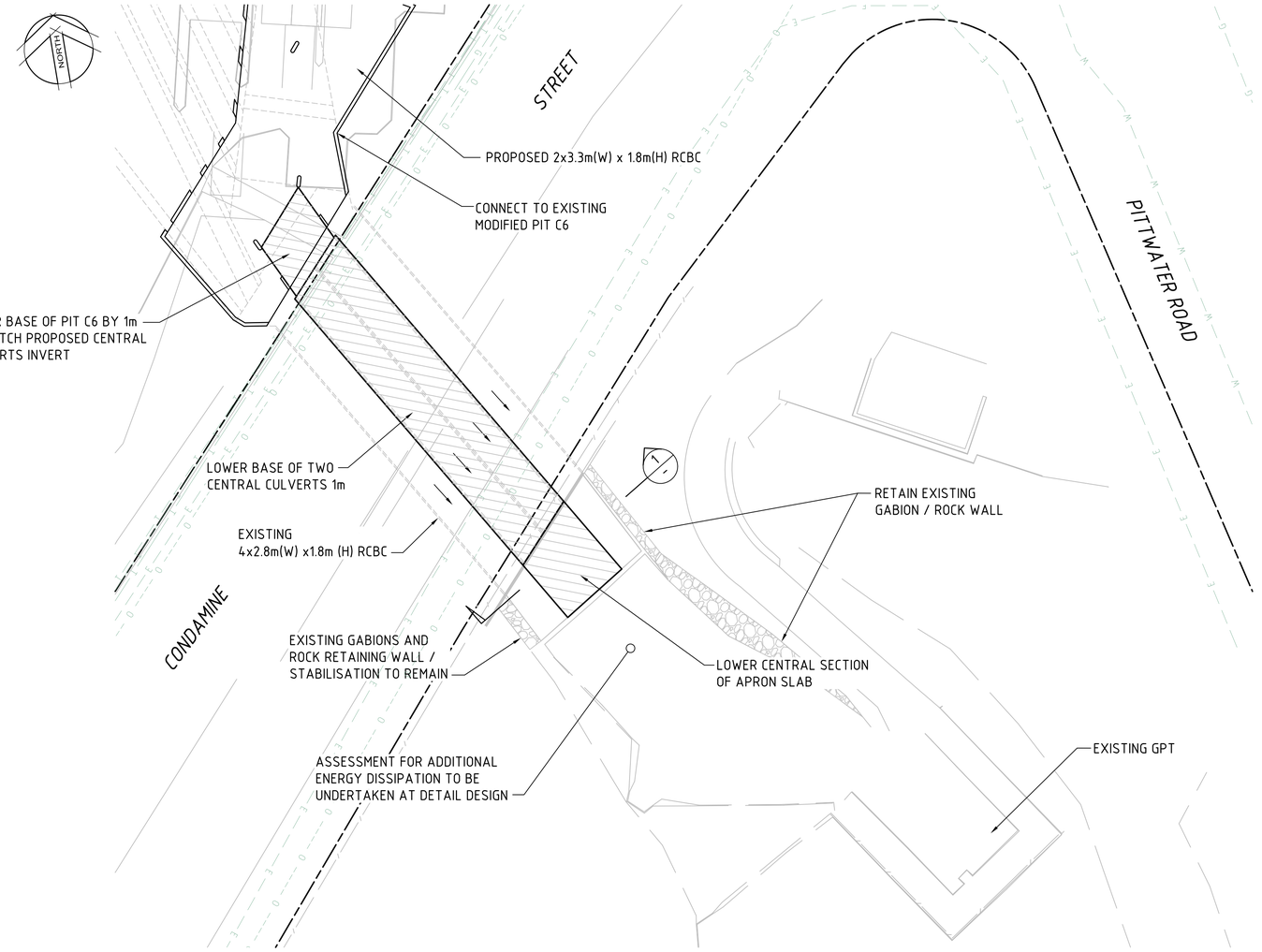
Date	Datum	Scale	Size
18/11/2013	AHD	1:50	A1

Drawing Number: W4548-413
Revision: 3

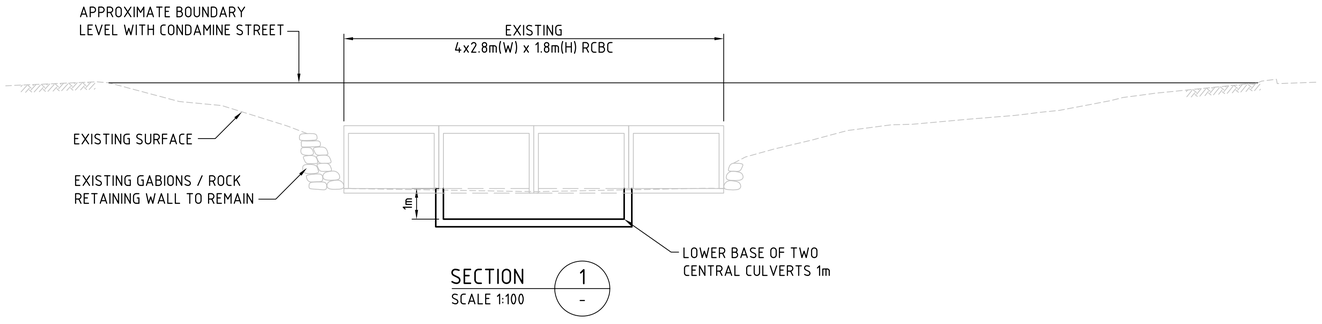
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREF's: X-Services; X-Architect; X-Drainage; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\PY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-413(3).dwg

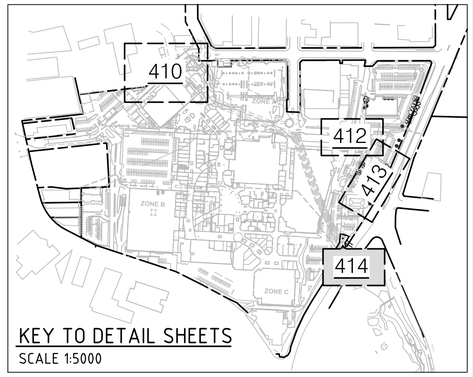
DATE PLOTTED: 5 November 2014 9:04 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



SECTION 1 / -
SCALE 1:100



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

EXISTING

- EXISTING APRON
- EXISTING ROCK WALL
- EXISTING CULVERTS
- BOUNDARY

PROPOSED

- PROPOSED APRON
- PROPOSED ROCK WALL
- PROPOSED ACCESS TRACK
- PROPOSED CULVERTS

SERVICES

- E — ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE
INDICATIVE ONLY

2 1 0 2 4 6 8 10
SCALE OF METRES (1:100 BEFORE REDUCTION)

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 207 205

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CONDAMINE STREET GPT

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-414
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREF's: X-Services; X-Architect; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\FY13\NA49991312_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013.04.10 Urban Drafting Folder\DrW4548-414(3).dwg

DATE PLOTTED: 5 November 2014 9:05 AM BY : LYLAC CHAU

XREFs: X-Services; X-Drainage; X-Survey; X-Architect; X-Carpark; X-Architect_New; X-GRP-A1-SHT; X-SYD-A1-Logo

CAD FILE: N:\Projects\4999\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-420(5).dwg

NORTH

FL 11.09

FL 10.88

FL 9.40

FL 9.40

FL 9.39

CROSS STREET

BROOKVALE CREEK

CROSS STREET

GREEN STREET

FL 9.25

DALE STREET

PITTWATER ROAD

FL 9.45

FL DRY

FL 10.06

FFL 10.69

FL 9.76

FFL 10.70

A1

A2

A3

5

Ø1350 RCP

FL 10.88

FL 9.67

FFL 9.94

FFL 10.34

FFL 10.50

FL 10.94

FFL 10.16

FL 9.27

FFL 9.99

FFL 10.10

FFL 10.02

FL 9.23

FL 9.18

FFL 10.01

FL 9.15

OLD PITTWATER ROAD

CONDAMINE STREET

PITTWATER ROAD

FFL 10.00

3

NOTE:
LOCATION AND LEVEL OF ALL SERVICES TO BE CONFIRMED ON SITE

LEGEND

- EXISTING STORMWATER TO REMAIN
- EXISTING STORMWATER TO BE REMOVED
- PROPOSED STORMWATER (RCP)
- PROPOSED STORMWATER (RCBC)
- PROPOSED HIGH CAPACITY INLET
- APPROXIMATE AREAS OF REGRADING
- APPROXIMATE AREA OF CHANNEL REGRADING
- PROPOSED STAGE 1 BUILDING WORKS
- FFL 10.50 FINISHED FLOOR LEVEL (m AHD)
- FL 10.17 100 YEAR ARI FLOOD LEVEL (m AHD)
- BOUNDARY
- E ELECTRICITY
- G GAS
- T OPTICAL FIBRE
- O OPTUS
- S SEWER
- T TELSTRA
- W WATER

20 10 0 20 40 60 80 100

SCALE OF METRES (1:1000 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
5	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
4	15/10/2014	FLOOD LEVELS AMENDED	JT	DNA
3	13/08/2014	FLOOD LEVELS REVISED	GV	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield

Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future

ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	GV	13/08/2014
Checked	DNA	13/08/2014
Designed	DNA	18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
GENERAL ARRANGEMENT PLAN

Status: PRELIMINARY

Date	Datum	Scale	Size
12/08/2014	AHD	1:1000	A1

Drawing Number: W4548-420

Revision: 5

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

DATE PLOTTED: 5 November 2014 9:06 AM BY : LYLAC CHAU

HANSON

HARRISONS
NO ACCESS ONTO PROPERTY

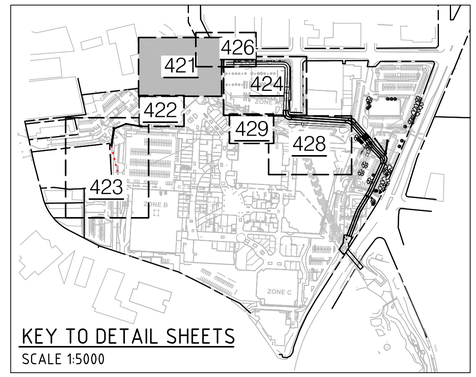
BROOKVALE CREEK

ACCESS ROAD

MEDIAN

BOOM GATE ARM TO LOWER ONCE LEVEL IN BROOKVALE CREEK REACHES PRE-DETERMINED LEVEL. SIGNAGE TO BE INSTALLED AT APPROPRIATE LOCATIONS

CROSS STREET ROUNDABOUT



KEY TO DETAIL SHEETS
SCALE 1:5000

EXISTING PARAPET WALL TO BE AUGMENTED. REFER DETAIL A

EXCAVATE UNDER EXISTING PIERED ROAD TO REMOVE OBSTRUCTIONS / INCREASE HYDRAULIC CAPACITY

NO ACCESS ONTO ADJOINING PROPERTY

EXISTING PARAPET TO REMAIN

INSTALL 4 DEFENDER STEEL SUPER HEAVY DUTY BOLLARDS. REFER DETAIL B BELOW

EXISTING SPEED HUMP TO BE REMOVED

BROOKVALE CREEK OVERFLOW AREA

EXISTING WOOLWORTHS BREAKOUT AREA

EXISTING DOORS TO BE REPLACED WITH WATER-TIGHT FLOOD DOORS (PS DOORS PEDESTRIAN FLOOD DOOR OR SIMILAR)

CONSTRUCT FLOOD BARRIER (SWINGING GATES) AS PART OF STAGE 1 WORKS

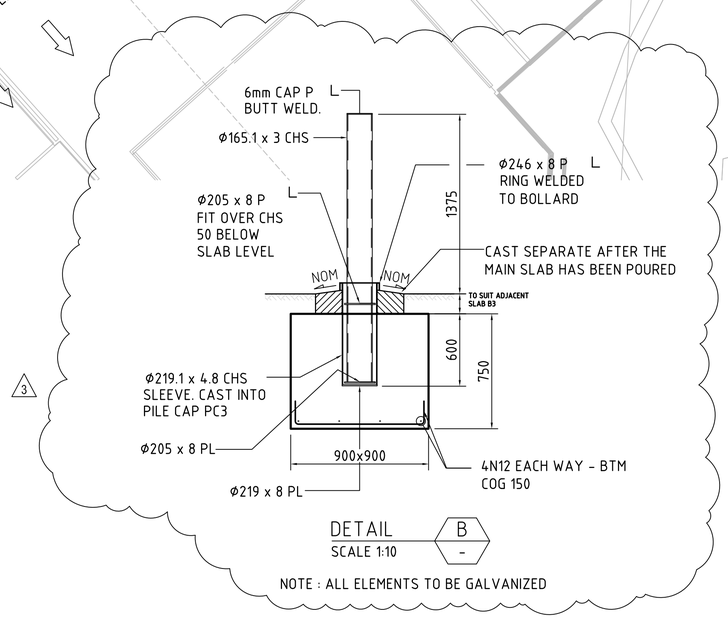
EXISTING SEWER MANHOLE

APPROXIMATE EXTENT OF CULVERTS UNDER MALL

PROVIDE BOOM GATE AT LOADING DOCK. ARM TO LOWER ONCE WATER LEVEL IN BROOKVALE CREEK REACHES PRE-DETERMINED LEVEL. SIGNAGE TO BE INSTALLED AT APPROPRIATE LOCATIONS

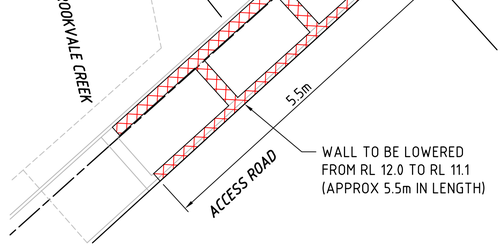
APPROX 100m

PLAN
SCALE 1:150



DETAIL B
SCALE 1:10

NOTE : ALL ELEMENTS TO BE GALVANIZED



DETAIL A
SCALE 1:50

LEGEND

WALL TO BE LOWERED

FLOOD BARRIER

BOOM GATE ARM

DIRECTION OF FLOW

SERVICES

- E — ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

SCALE OF METRES (1:100 BEFORE REDUCTION)
2 1 0 2 4 6 8 10

SCALE OF METRES (1:150 BEFORE REDUCTION)
3 0 5 10 15

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH
Date	18/11/2013
Checked	DNA
Date	18/11/2013
Designed	DNA
Date	18/11/2013
Verified	
Date	
Approved	
Date	

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS STREET & BROOKVALE CREEK

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-421
Revision: 3

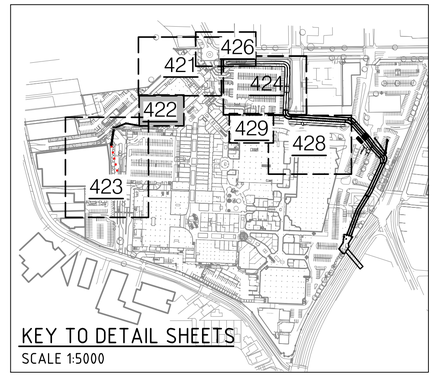
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Architect; X-Services; X-Survey; X-Drainage; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\PY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01+Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-421(3).dwg

DATE PLOTTED: 5 November 2014 9:09 AM BY : LYLAC CHAU



PLAN
SCALE 1:100



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

EXISTING

× E10.87 EXISTING LEVEL

EXISTING LOCAL DRAINAGE

PROPOSED

× 11.00 PROPOSED LEVEL

× FL 10.03 100 YEAR ARI FLOOD LEVEL (m AHD)

3

PROPOSED WATER-TIGHT FLOOD DOOR

SERVICES

E ELECTRICITY

G GAS

T OPTICAL FIBRE

O OPTUS

S SEWER

T TELSTRA

W WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

0 2000 4000 6000 8000 10000mm
SCALE 1:100

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7900 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	DH	18/11/2013
Checked	DNA	18/11/2013
Designed	DNA	18/11/2013
Verified		
Approved		

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
WOOLWORTHS LOADING DOCKS WORKS

Status: PRELIMINARY

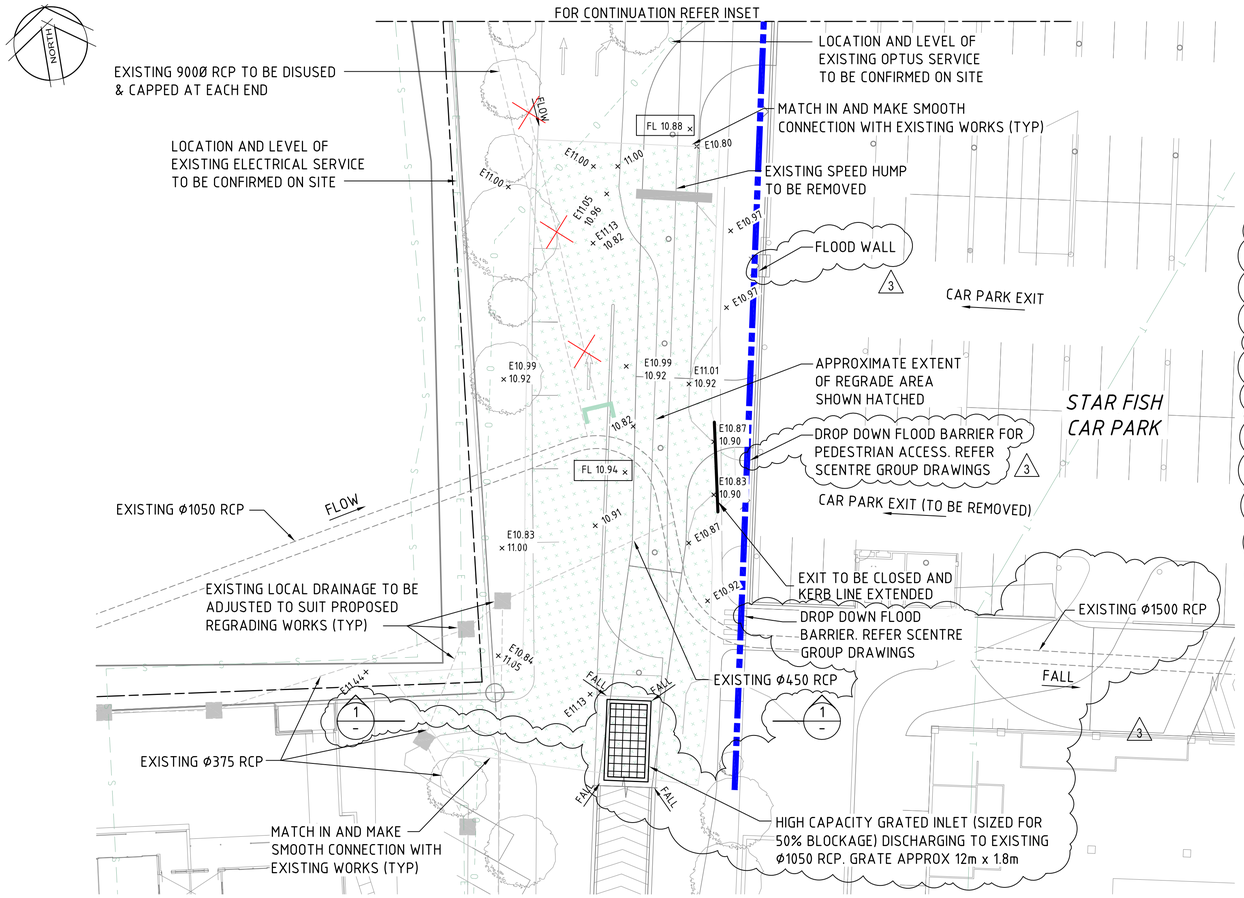
Date	Datum	Scale	Size
18/11/2013	AHD	1:100	A1

Drawing Number: W4548-422
Revision: 3

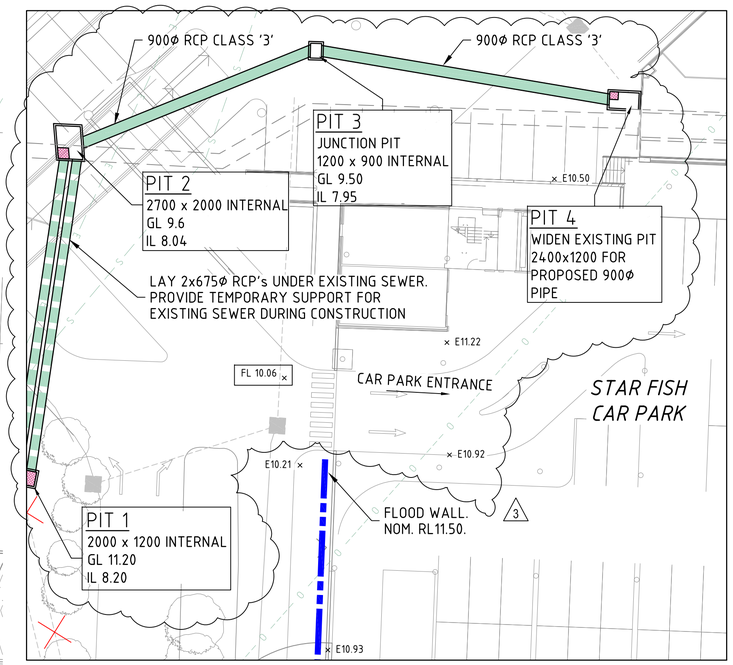
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Drainage; X-Survey; X-Architect; X-Carpark; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4599\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-422(3).dwg

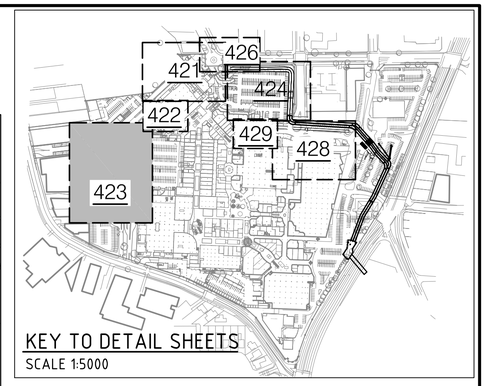
DATE PLOTTED: 5 November 2014 9:10 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



INSET
SCALE 1:250



LEGEND

EXISTING

- × E10.87 — EXISTING LEVEL
- EXISTING LOCAL DRAINAGE

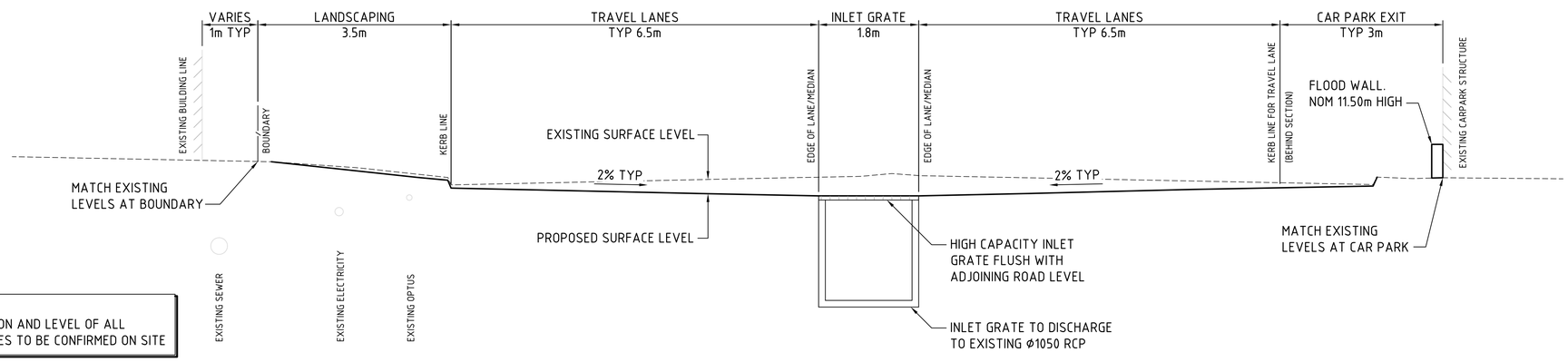
PROPOSED

- × 11.00 — PROPOSED LEVEL
- PROPOSED BOLLARD
- × FL 10.03 — 100 YEAR ARI FLOOD LEVEL (m AHD)
- APPROXIMATE AREA OF REGRADE
- PROPOSED HIGH CAPACITY GRATE
- PROPOSED RAISED THRESHOLD
- PROPOSED FLOOD WALL
- PROPOSED FLOOD BARRIER/SHUTTER

SERVICES

- E — ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY



NOTE:
LOCATION AND LEVEL OF ALL SERVICES TO BE CONFIRMED ON SITE

SECTION 1 / -
SCALE 1:50

NOTE:
ALL PEDESTRIAN ACCESS POINTS AND OPENINGS TO THE CARPARK ADJACENT TO OVERLAND FLOW PATHS AND DRAINAGE PITS LOCATED IN THE CARPARK ARE TO BE PROTECTED FROM FLOOD WATER INUNDATION AND MUST BE WATER TIGHT TO ACHIEVE MINIMUM 300mm FREEBOARD TO THE PROPOSED FLOOD LEVELS. DRAINAGE PITS IN THE CARPARK MAY REQUIRE ONE-WAY VALVES TO PREVENT CARPARK FLOOD INUNDATION DUE TO BACKWATER AFFECTS TO THE INTER-CONNECTED STORMWATER DRAINAGE SYSTEM UNDERNEATH WARRINGAH MALL.

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
STARFISH CARPARK

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-423
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Survey; X-Carpark; X-Architect_New; X-Drainage; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4599\FY13\NA4991313Z_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrNW4548-423(3).dwg

DATE PLOTTED: 5 November 2014 9:11 AM BY : LYLAC CHAU

NORTH

TIE IN EXTENDED WALL INTO PROPOSED MOUND

1/425

0.2m FROM PROJECTED BOUNDARY LINE TO OUTSIDE FACE OF CULVERT

CROSS STREET

EXISTING KERB LINE

× FL 9.45 × FL 9.45 × FL 9.45

REFER TO STAGE 1 LANDSCAPE PLAN FOR DETAILS ON PROPOSED LANDSCAPING

PROVIDE SPLAYED UNITS TO STREAMLINE FLOWS AROUND BEND

× FL 10.85

TOW 11.35

TOW 11.10

PROPOSED 2x 3.6W x 1.5H RCBCs

TOW 10.75

EXISTING KERB LINE

EXISTING KERB LINE

1/425

CULVERTS PARALLEL TO PROJECTED BOUNDARY LINE

EXISTING PIT TO BE RECONSTRUCTED TO SUIT PROPOSED WORKS

FLOOD WALL TO TOP OF WALL LEVELS AS NOTED TO PREVENT WATER FROM ENTERING CARPARK (TYP)

OUTSIDE FACE OF CULVERT ALIGNED WITH OUTSIDE EDGE OF MULTI-STOREY CARPARK (ALONG CROSS STREET)

2/425

2/425

0.5m FROM BOUNDARY TO OUTSIDE FACE OF CULVERT

EXTEND WALL TO RL 11.35

EXISTING SERVICES (GAS, TELSTRA, WATER) TO REMAIN

EXISTING OPEN CHANNEL TO DISCHARGE INTO PROPOSED CULVERTS AND TO BE CLEARED OF DEBRIS

TOW 10.75

EXISTING PIT TO BE RECONSTRUCTED OVER PROPOSED CULVERT

OUTSIDE FACE OF CULVERT ALIGNED WITH OUTSIDE EDGE OF RAMP ABOVE (ALONG GREEN STREET)

FALL

A/425

GREEN STREET

× FL 9.42

PROPOSED 'PALMTREE' CARPARK

3/425

3/425

FUTURE ALLOWANCE FOR HIGH CAPACITY INLET GRATE APPROX 10m x 7.2m. CONDTRUCT WITH SEALED LID AS PART OF STAGE 1 WORKS.

EXISTING SAG POINT RL 8.56

FALL

APPROX 0.5m FROM BOUNDARY TO OUTSIDE FACE OF CULVERT

EXISTING LOCAL DRAINAGE TO REMAIN

4/425

4/425

EXISTING Φ1350 RCP TO REMAIN

EXISTING Φ450 SEWER TO REMAIN

DISCHARGE EXISTING Φ375 RCP INTO CULVERT

× FL 9.42

EXISTING HIGH-VOLTAGE ELECTRICAL PIT TO REMAIN

EXISTING 3.3W x 1.8H RCBC TO REMAIN

PROPOSED 2x 3.6W x 1.5H RCBCs

2X3.6WX1.5H RCBC

CAP EXISTING Φ450 RCP

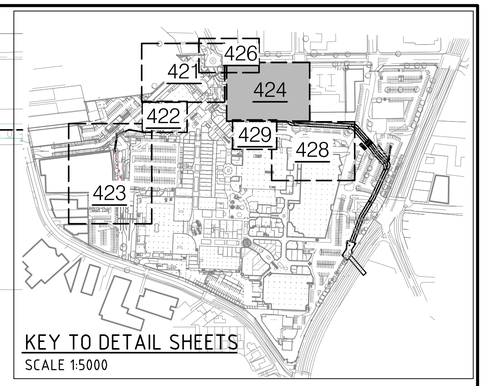
EXISTING 2x 3.3W x 1.8H RCBCs TO REMAIN

EXISTING 3.3W x 1.5H RCBC TO REMAIN

× FL DRY

EXISTING ROUNDABOUT TO BE RECONSTRUCTED

PLAN
SCALE 1:250



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

EXISTING

- EXISTING CULVERTS
- EXISTING LOCAL DRAINAGE
- EXISTING TREES

PROPOSED

- CULVERTS
- HIGH CAPACITY GRATE
- LANDSCAPING
- × TOW 10.75 TOP OF WALL LEVEL
- × FL 10.03 100 YEAR ARI FLOOD LEVEL (m AHD)

SERVICES

- E ELECTRICITY
- G GAS
- T OPTICAL FIBRE
- O OPTUS
- S SEWER
- T TELSTRA
- W WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 207 205

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS AND GREEN STREETS

Status: PRELIMINARY

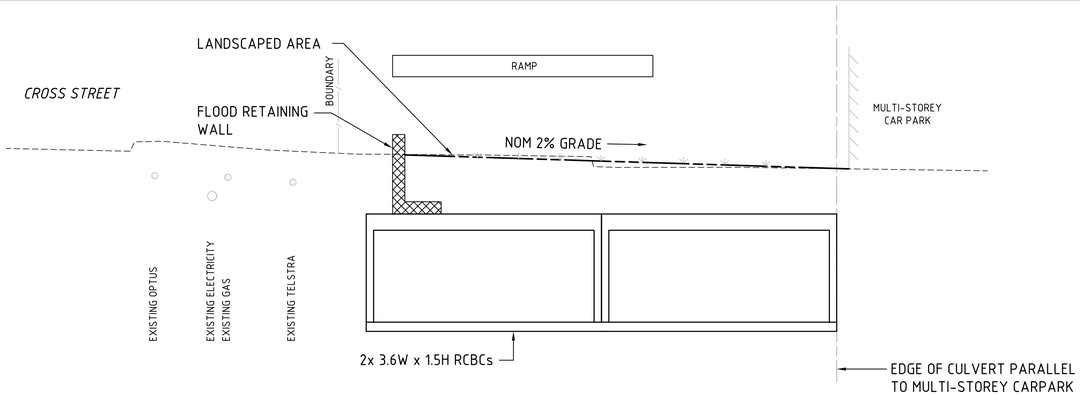
Date	Datum	Scale	Size
18/11/2013	AHD	1:250	A1

Drawing Number: W4548-424
Revision: 3

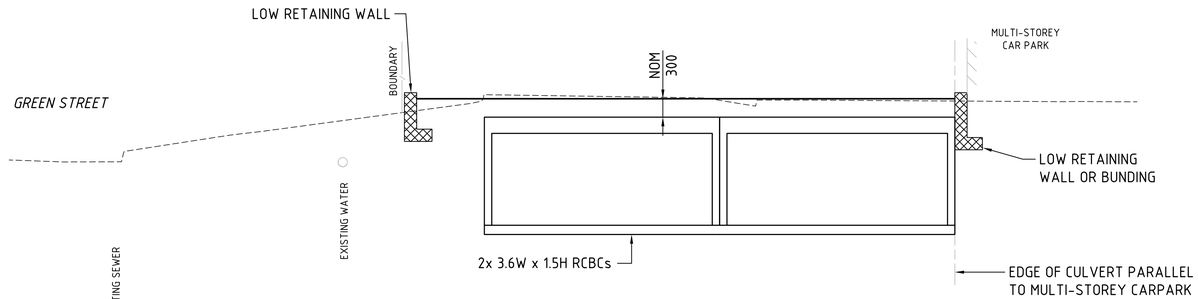
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Drainage; X-Carpark; X-Survey; X-Architect_New; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4599\FY13\NA499193132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-424(3).dwg

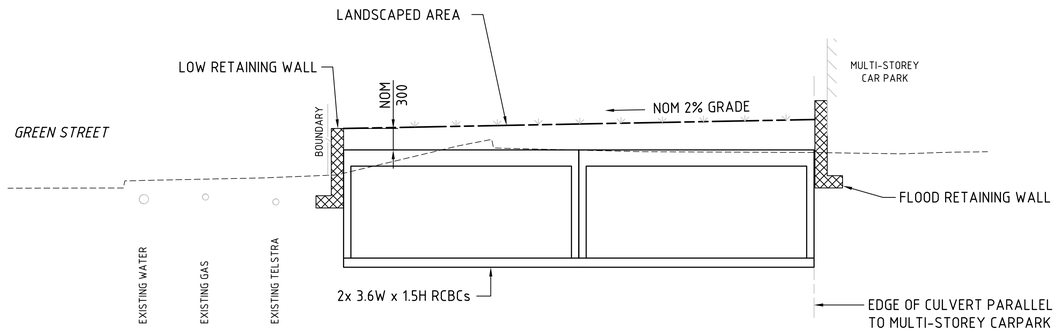
DATE PLOTTED: 5 November 2014 9:12 AM BY : LYLAC CHAU



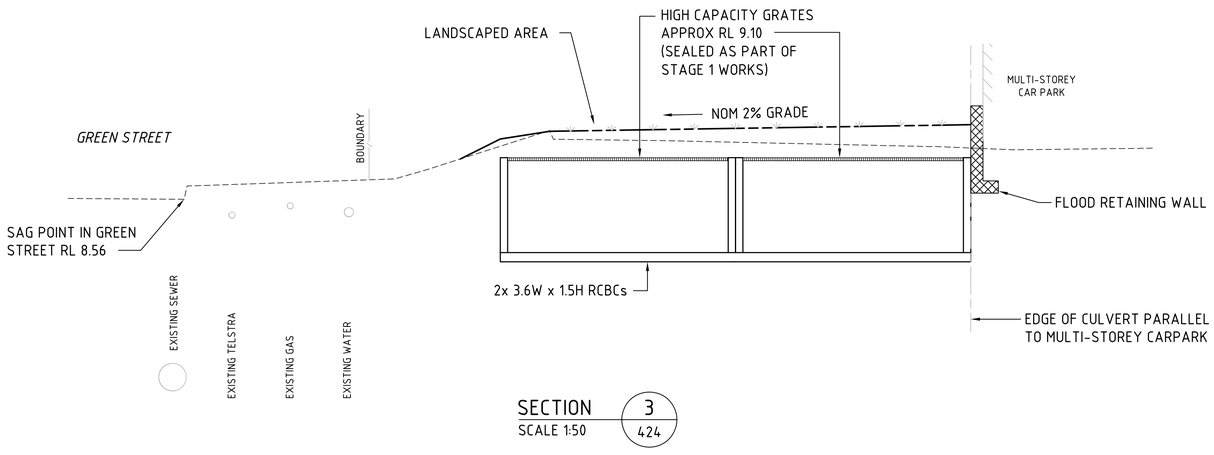
SECTION 1 / 424
SCALE 1:50



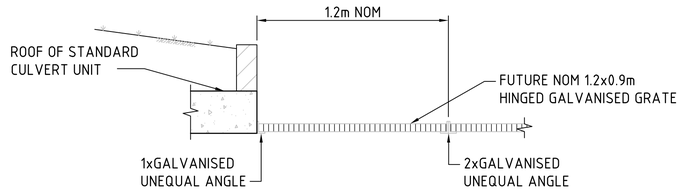
SECTION 4 / 424
SCALE 1:50



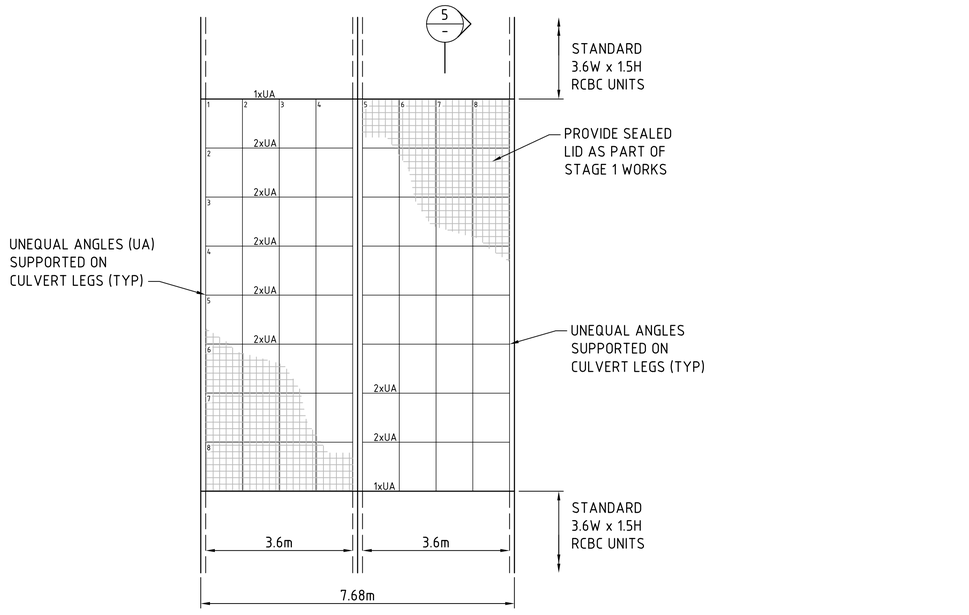
SECTION 2 / 424
SCALE 1:50



SECTION 3 / 424
SCALE 1:50



SECTION 5 / -
NOT TO SCALE



DETAIL A / 424
SCALE 1:75

1.5 1 0.5 0 1.5 3 4.5 6 7.5
SCALE OF METRES (1:75 BEFORE REDUCTION)

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS AND GREEN STREETS SECTIONS

Status			
PRELIMINARY			
Date 18/11/2013	Datum AHD	Scale AS SHOWN	Size A1
Drawing Number W4548-425			Revision 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4998\PY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-425(3).dwg

DATE PLOTTED: 5 November 2014 9:14 AM BY : LYLAC CHAU

NORTH

CONSTRUCT HUMP
TOP RL10.90

EINV 10.77
ELIP 10.81

EINV 10.92
ELIP 10.96

FACE OF KERB

CONSTRUCT PIT TO COLLECT FLOWS PRIOR TO HUMP. DISCHARGE VIA Φ375 RCP TO EXISTING PIT

RESTORE ROAD PAVEMENT

RETAIN EXISTING PIT

ACCESS ROAD

EINV 10.57
ELIP 10.61

TK 10.74
LK 10.63

RECONSTRUCT KERB AND FOOTPATH IN THIS AREA TO SUIT PROPOSED HUMP. MAX. FOOTPATH GRADE 5% (1 IN 20)

NOM. 50mm STEP

LOCALLY REGRADE IN THIS AREA TO ACHIEVE FINISHED LEVELS NO HIGHER THAN RL10.60. STABILISE AFTER REGRADING

PROVIDE RAILING TO DISCOURAGE USE OF HUMP AS PEDESTRIAN CROSSING (TYP)

CONSTRUCT PIT WITH LINTEL TO COLLECT FLOWS. DISCHARGE VIA Φ375 RCP TO CREEK. TRANSITION KERB DOWN AT EACH SIDE OF LINTEL.

APPROX EXTENT OF REGRADING. MAKE SMOOTH CONNECTION WITH EXISTING

FLOW

FALL 1 IN 25

FACE OF KERB

REPLACE EXISTING DOORS WITH WATER TIGHT FLOOD DOORS (PS DOORS PEDESTRIAN FLOOD DOOR OR SIMILAR)

EXISTING BUILDING

TK 10.93
LK 10.82

W5-10A

25 km/h

W8-2A

PROVIDE PIANO KET ROAD MARKINGS BOTHSIDES

TK 10.66
LK 10.55

PLAN
SCALE 1:100

CROSS STREET

EXISTING PAVEMENT AND ROUNDABOUT TO REMAIN

W5-104

W8-24

25 km/h

300 WIDE HEAVY DUTY GRATED DRAIN NOM 25m IN LENGTH

BOLLARDS TO PROVIDE VEHICLE/PEDESTRIAN SEPARATION. ALLOW APPROPRIATE ACCESS OPPOSITE PEDESTRIAN REFUGE.

ELIP 10.76
EINV 10.72

NOM. 50mm STEP BEHIND GRATES

WALL TO TIE INTO UNDERSIDE OF RAMP

REGRADE FOOTPATH AREA BEHIND GRATES TOWARDS OPEN CHANNEL

DISCHARGE GRATED DRAIN TO OPEN CHANNEL VIA Φ900 RCP (IL 8.90)

NEW BRIDGE OVER OPEN CHANNEL

CONSTRUCT CLEAR OF EXISTING SEWER

EINV 10.74
ELIP 10.78

OPEN CHANNEL
IL 8.0m APPROX.

PROVIDE RAILING TO EDGE OF OPEN CHANNEL

PROPOSED CULVERTS. REFER DRAWING 316

EXTEND TOP OF FLOOD WALL TO RL 11.35

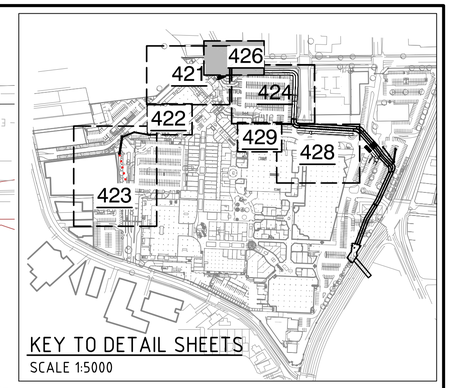
CAR PARK ACCESS ROAD

CAR PARK

APPROX EXTENT OF REGRADING

APPROX EXTENT OF REGRADING. MAKE SMOOTH CONNECTION WITH EXISTING

NOTE:
WITH THE EXCEPTION OF THE WORKS SHOWN ON THIS PLAN, THE EXISTING ROAD PAVEMENT AND ROUNDABOUT IS TO BE RETAINED. PAVEMENT REINSTATEMENT, UNO IS TO MATCH EXISTING LEVELS



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

EXISTING

- BOUNDARY
- × E10.87 — EXISTING LEVEL
- ELIP 10.76 — EXISTING KERB LIP LEVEL
- ELIP 10.76 — EXISTING KERB INVERT LEVEL
- EXISTING STORMWATER PIT
- EXISTING LOCAL DRAINAGE

PROPOSED

- × 11.00 — PROPOSED LEVEL
- × FL 11.09 — 100 YEAR ARI FLOOD LEVEL (m AHD)
- PROPOSED GRATED INLET
- PROPOSED STORMWATER PIT AND PIPE
- PROPOSED RAILING
- APPROXIMATE AREA OF REGRADE/WORKS
- TK 10.61 / LK 10.55 — PROPOSED TOP OF KERB LEVEL / PROPOSED LIP OF KERB LEVEL

SERVICES

- E — ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

2 1 0 2 4 6 8 10
SCALE OF METRES (1:100 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	DH	18/11/2013
Checked	DNA	18/11/2013
Designed	DNA	18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS STREET ROUNDABOUT PLAN

Status: PRELIMINARY

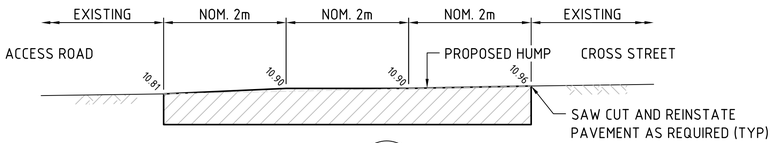
Date	Datum	Scale	Size
18/11/2013	AHD	1:100	A1

Drawing Number: W4548-426
Revision: 3

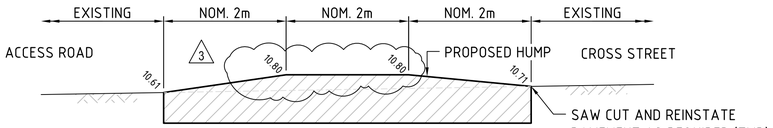
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Drainage; X_Additional Detail Cross St RAB; X-Architect_New; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4991FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01+Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DW4548-426(3).dwg

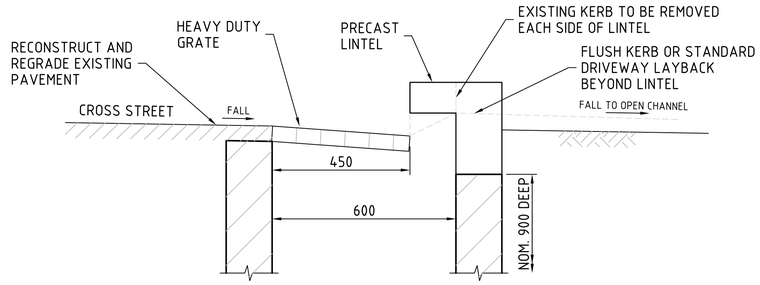
DATE PLOTTED: 5 November 2014 9:15 AM BY : LYLAC CHAU



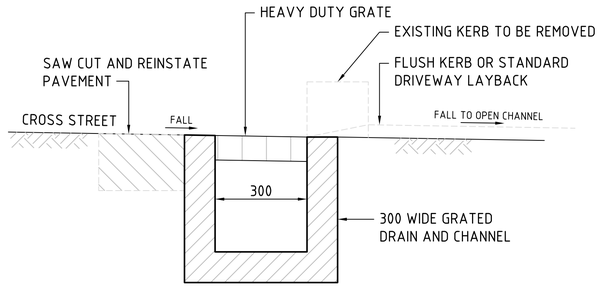
SECTION 1
SCALE 1:50
426



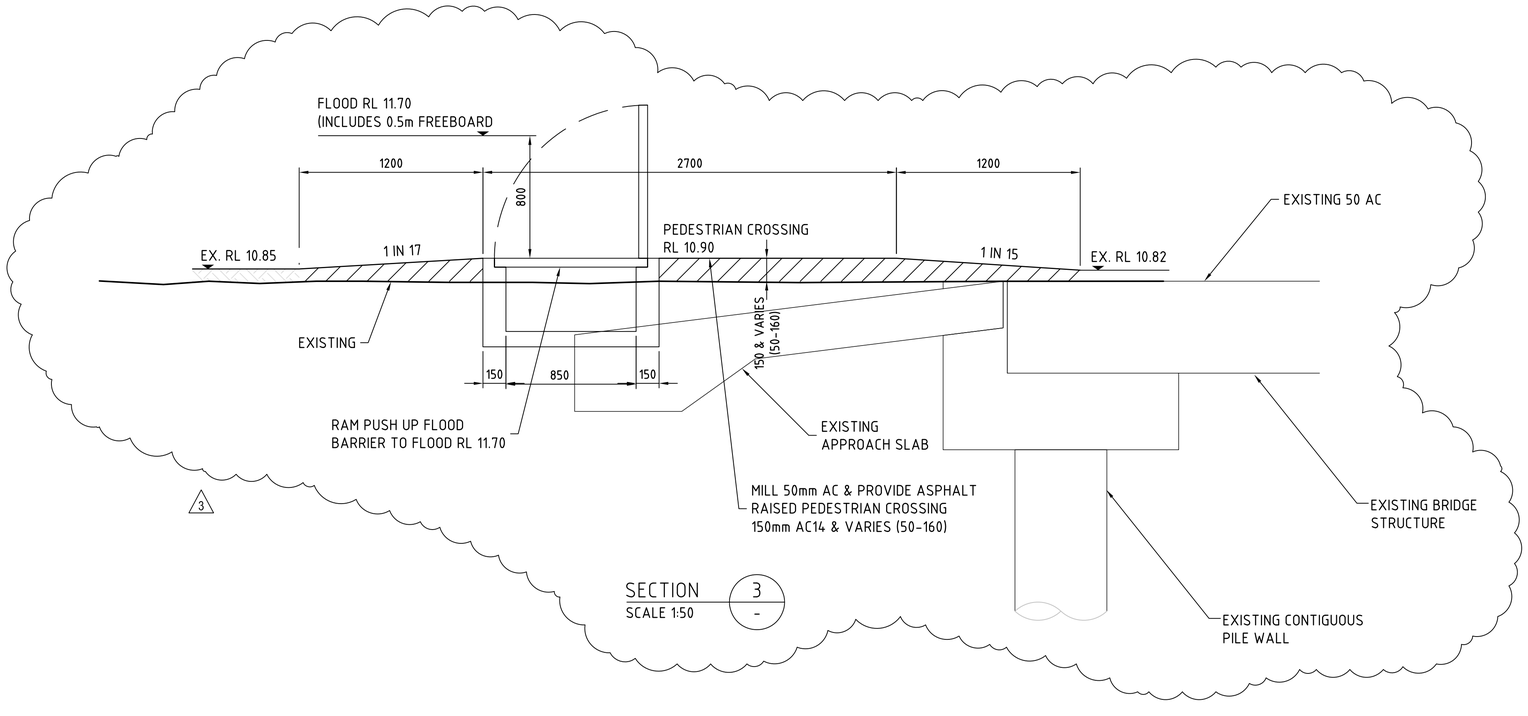
SECTION 2
SCALE 1:50
426



SECTION 6
SCALE 1:10
426



SECTION 5
SCALE 1:10
426



SECTION 3
SCALE 1:50
-

200 100 0 200 400 600 800 1000
SCALE 1:10

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	DH	18/11/2013
Checked	DNA	18/11/2013
Designed	DNA	18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
CROSS STREET ROUNDABOUT DETAILS

Status: PRELIMINARY

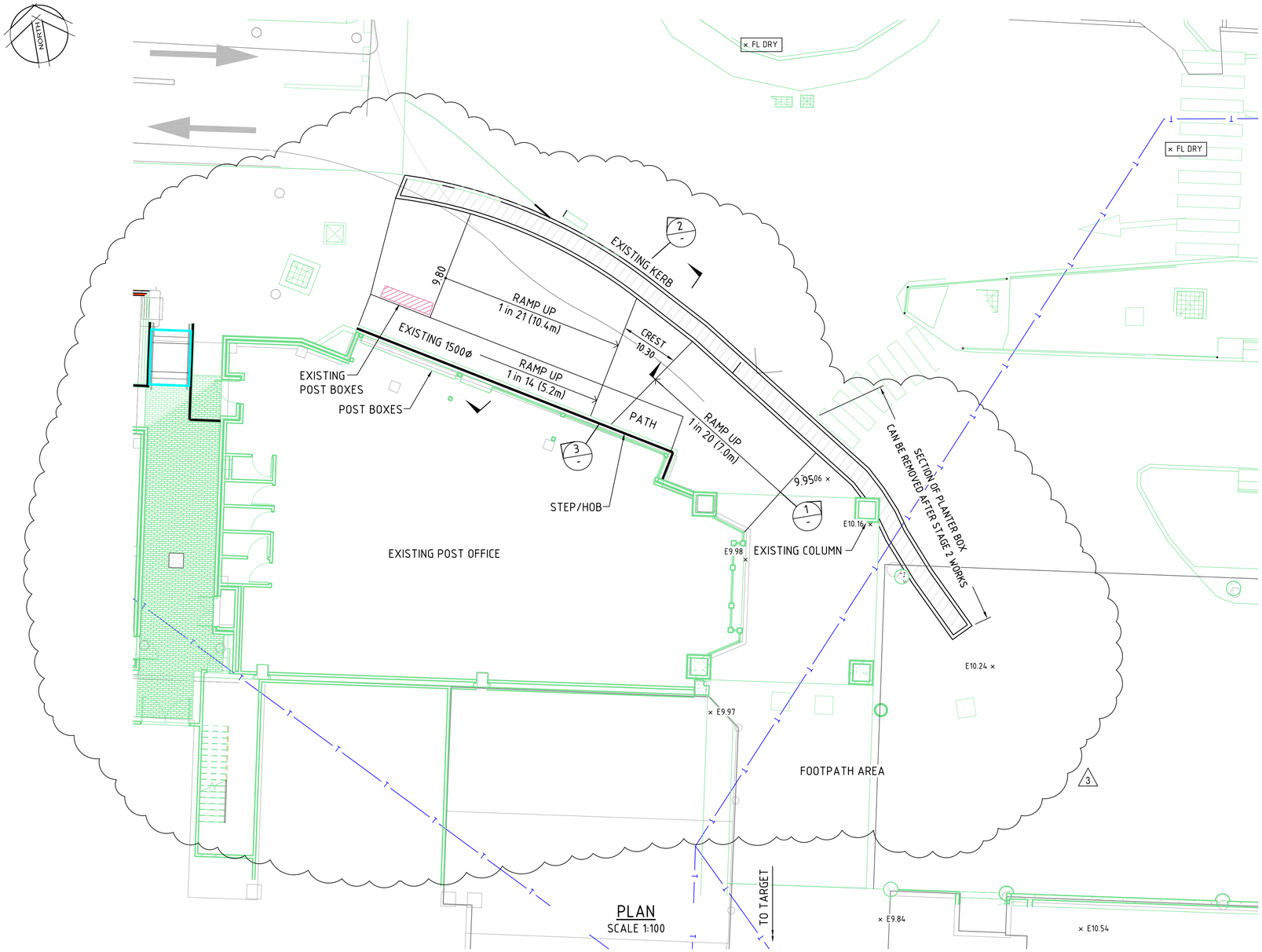
Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-427
Revision: 3

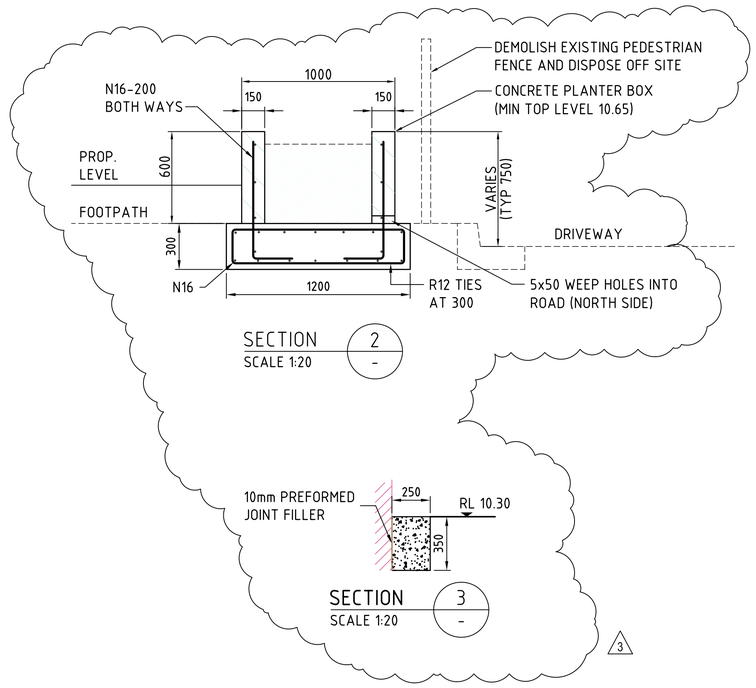
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

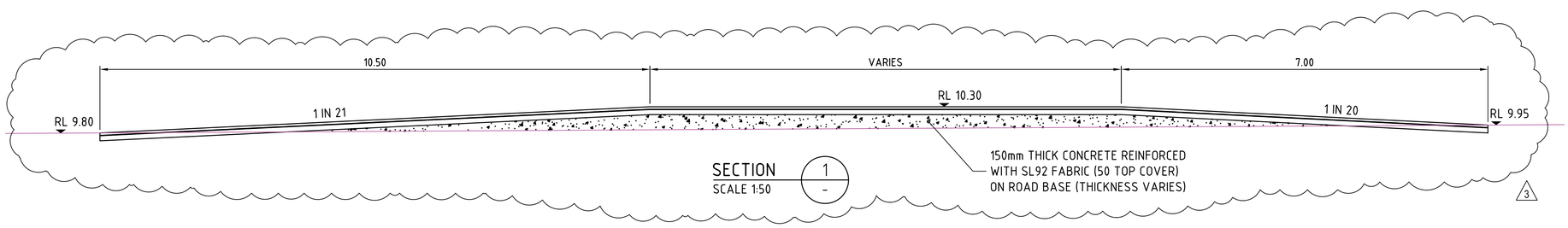
XREFs: X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4999\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-427(3).dwg

DATE PLOTTED: 5 November 2014 9:16 AM BY : LYLAC CHAU



PLAN
SCALE 1:100





LEGEND

EXISTING

× E10.24	EXISTING LEVEL
× FL 11.09	100 YEAR ARI FLOOD LEVEL (m AHD)

0 500 1000 1500 2000mm
SCALE 1:20

0 1 2 3 4 5m
SCALE 1:50

0 2000 4000 6000 8000 10000mm
SCALE 1:100

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7900 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	DH	18/11/2013
Checked	DNA	18/11/2013
Designed	DNA	18/11/2013
Verified		
Approved		

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
TARGET ENTRY - CONCRETE PLANTER BOX

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

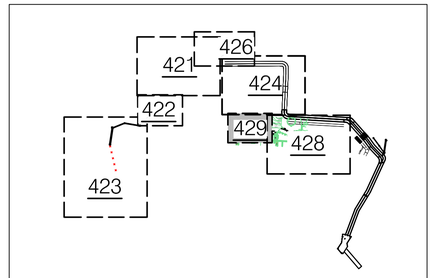
Drawing Number: W4548-428
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Drainage; X-Survey; X-Carpark; X-Architect_New; X-GRP-A1-SHT; X-SYD-A1-Logo; WR-Floor Plan - 202_GR Aust Post Loading Proposed - JH
CAD FILE: N:\Projects\4499\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-428(3).dwg

DATE PLOTTED: 5 November 2014 9:19 AM BY : LYLAC CHAU





KEY TO DETAIL SHEETS
SCALE 1:5000

REPLACE EXISTING DOORS WITH WATER-TIGHT FLOOD DOORS (PS DOORS PEDESTRIAN FLOOD DOOR OR SIMILAR)

× E10.50

× E10.45

SUBSTATION

FLOOD WALL TO RL10.30

× E10.00

× E9.50

3

× FL 9.70

× E9.00

LOADING DOCK

× E10.00

REPLACE EXISTING DOORS WITH WATER-TIGHT FLOOD DOORS (PS DOORS PEDESTRIAN FLOOD DOOR OR SIMILAR)

× E9.20

× E10.00

FLOOD BARRIER/SHUTTER TO RL 10.30

DAVID JONES

REPLACE EXISTING DOOR WITH WATER-TIGHT FLOOD DOORS (PS DOORS PEDESTRIAN FLOOD DOOR OR SIMILAR)

REMOVE PARKING SPACES

ACCESS ROAD

RETAIN PARKING SPACES

FLOOD WALL

RETURN WALL

EXISTING STAIRS DOWN

× E9.40

× NOM E7.40

× E9.55

× E9.91

FLOOD WALL TO RL10.30

10.30 LANDING

SUBSTATION

EXISTING DOOR

RAISE HOB AROUND LOW LEVEL STAIRS TO MIN RL 10.30

ADD NOM. 5 x 150mm RISER STEPS TO EXISTING LOW LEVEL DOOR. TOP LANDING MIN RL 10.30.

PLAN
SCALE 1:100

LEGEND

EXISTING

× E10.87 EXISTING LEVEL

EXISTING LOCAL DRAINAGE

PROPOSED

× 11.00 PROPOSED LEVEL

× FL 10.03 100 YEAR ARI FLOOD LEVEL (m AHD)

PROPOSED FLOOD BARRIER/SHUTTER

PROPOSED WATER-TIGHT FLOOD DOOR

SERVICES

E ELECTRICITY

G GAS

T OPTICAL FIBRE

O OPTUS

S SEWER

T TELSTRA

W WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

0 2000 4000 6000 8000 10000mm
SCALE 1:100

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

DETAIL ARRANGEMENT PLAN
DAVID JONES LOADING DOCK WORKS

Status: PRELIMINARY

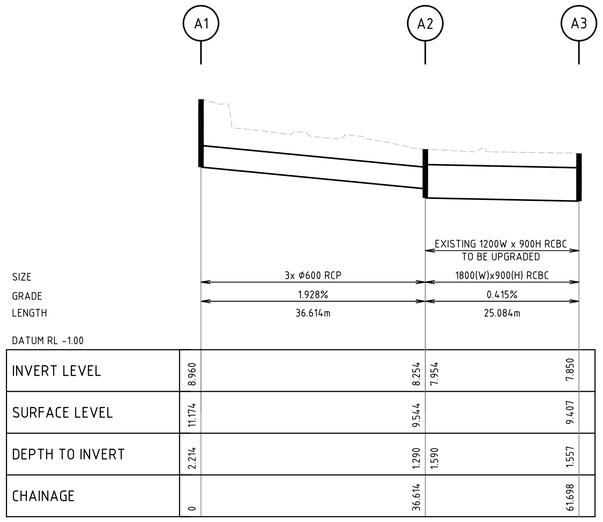
Date	Datum	Scale	Size
18/11/2013	AHD	1:100	A1

Drawing Number: W4548-429
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

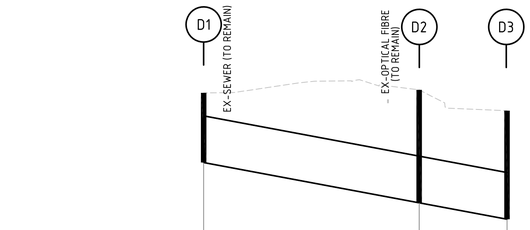
XREFs: X-Services; X-Drainage; X-Survey; X-Carpark; X-Architect_New; X-GRIP-A1-SHT; X-SYD-A1-Logo; WR-Floor Plan - 202_GR Aust Post Loading Proposed - JH
CAD FILE: N:\Projects\4599\FY13\NA4599131\32_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-429(3).dwg

DATE PLOTTED: 5 November 2014 9:20 AM BY : LYLAC CHAU



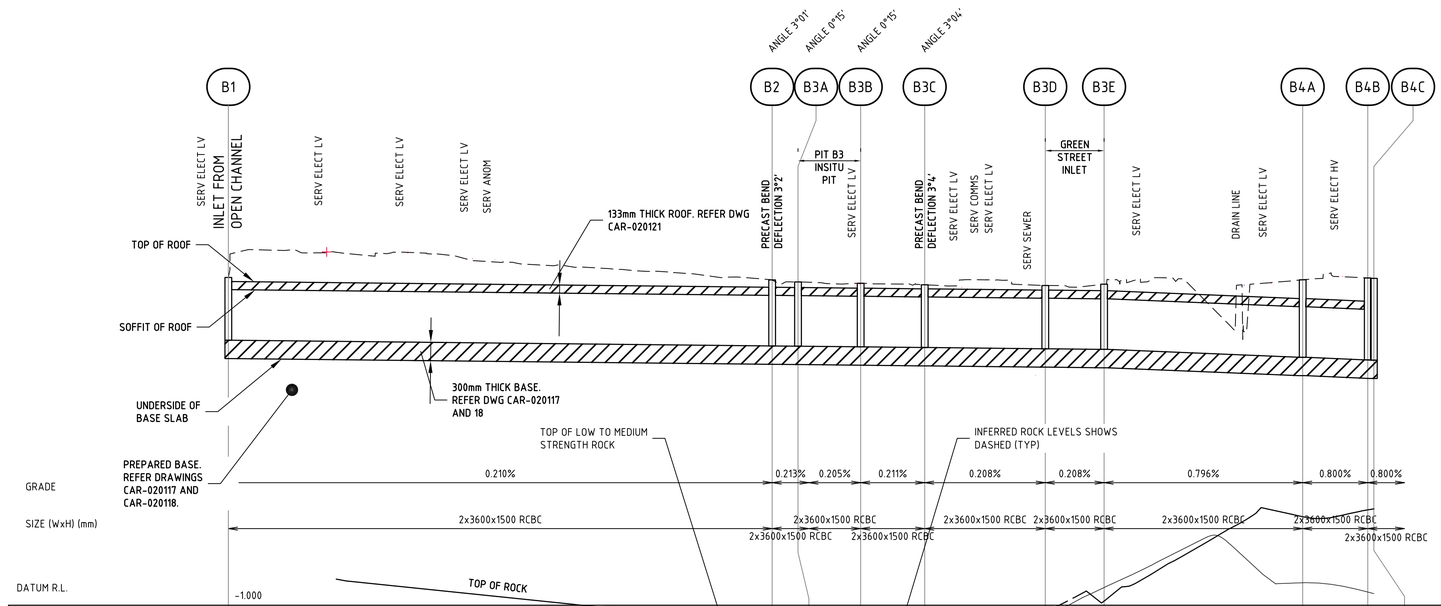
INVERT LEVEL	8.960	8.254	7.954	7.850
SURFACE LEVEL	11.174	9.544		9.407
DEPTH TO INVERT	2.214	1.290	1.590	1.557
CHAINAGE	0	36.614		61.698

LONGITUDINAL SECTION PIT A1-A3
SCALE 1:500(H) 1:100(V)



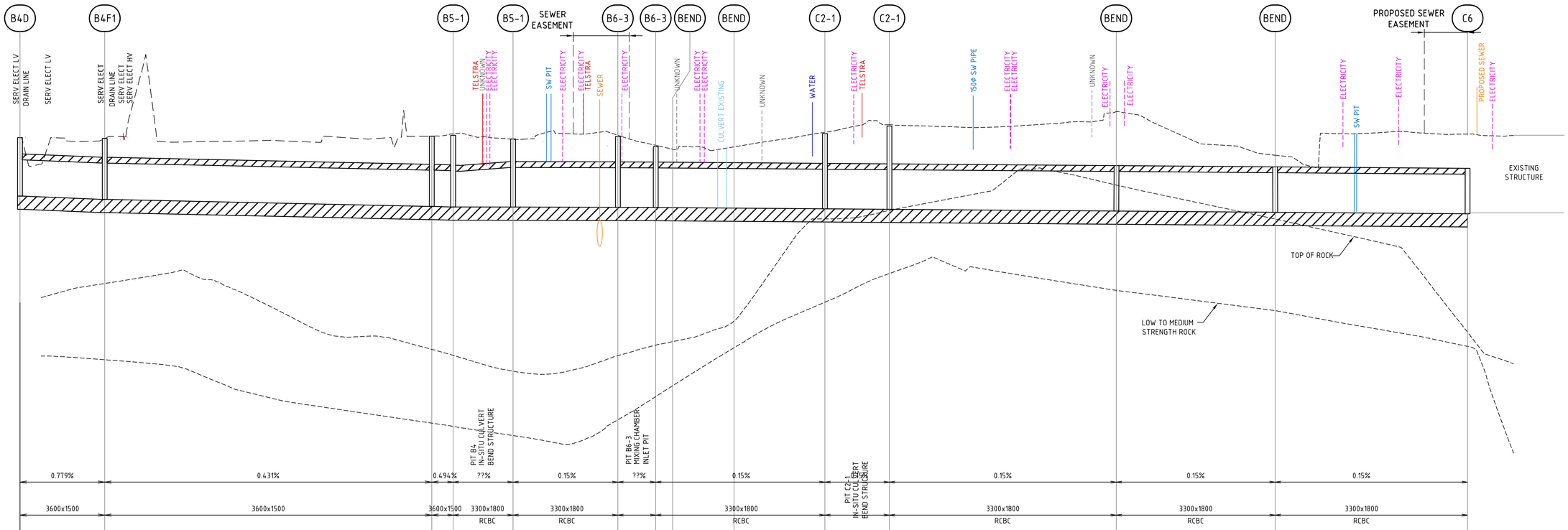
INVERT LEVEL	8.150	6.836		6.300
SURFACE LEVEL	10.424	10.524		9.844
DEPTH TO INVERT	2.274	3.688		3.544
CHAINAGE	0	35.189		49.529

LONGITUDINAL SECTION PIT D1-D3
SCALE 1:500(H) 1:100(V)



| | | | |

DATE PLOTTED: 5 November 2014 9:21 AM BY : LYLAC CHAU



| | | |

DATE PLOTTED: 5 November 2014 9:22 AM BY : LYLAC CHAU



PLAN
SCALE 1:100

LEGEND

- BOUNDARY
- PROPOSED CULVERTS
- BUILDING FOOTPRINT
- BUILDING TO BE DEMOLISHED

SERVICES

- E — ELECTRICITY
- HV — HIGH VOLTAGE ELECTRICITY
- G — GAS
- T — OPTICAL FIBRE
- O — OPTUS
- S — SEWER
- T — TELSTRA
- W — WATER

NOTE: ALL SERVICE LOCATIONS ARE INDICATIVE ONLY

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

		Date
Drawn	DH	18/11/2013
Checked	DNA	18/11/2013
Designed	DNA	18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

BUILDING DEMOLITION PLAN

Status: PRELIMINARY

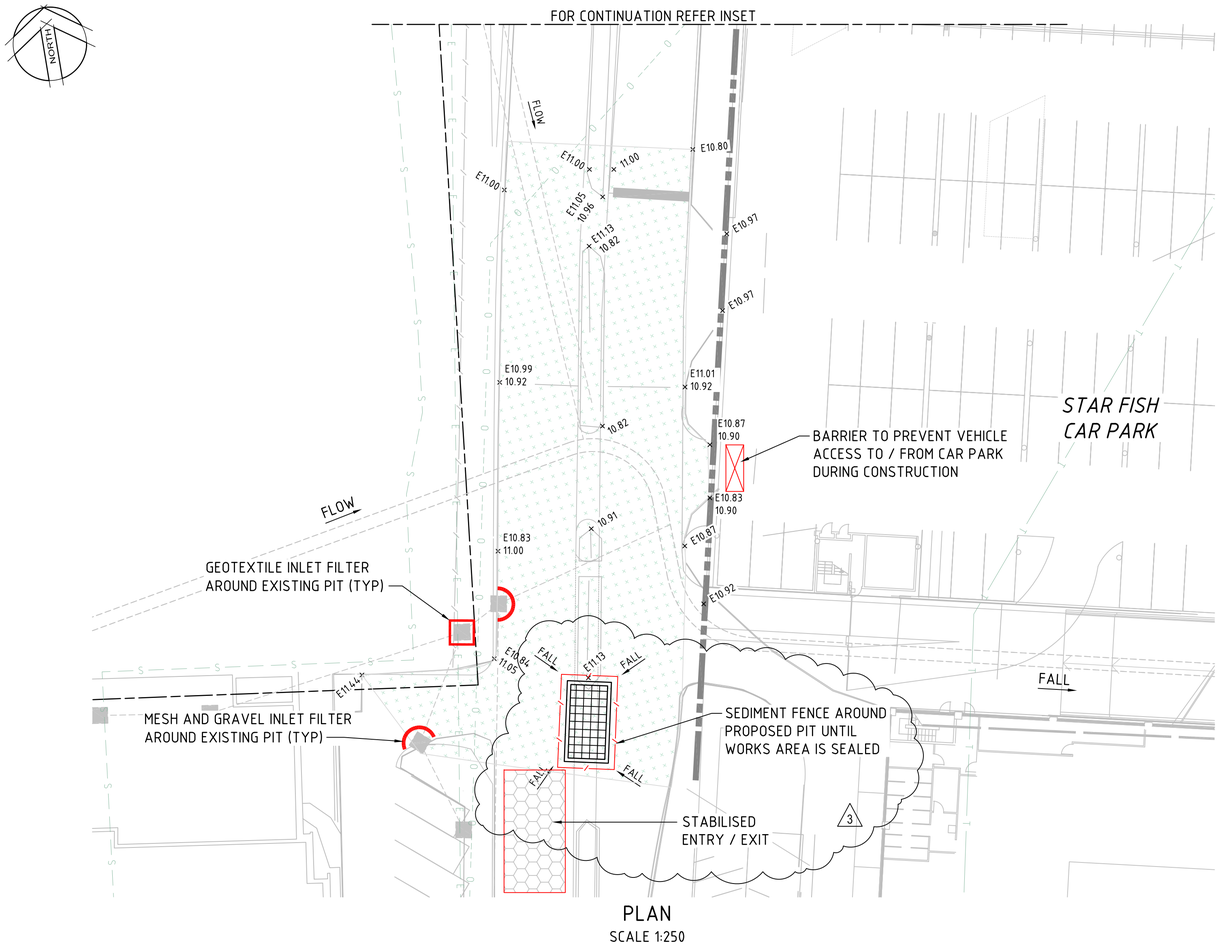
Date	Datum	Scale	Size
18/11/2013	AHD	1:50	A1

Drawing Number: W4548-435
Revision: 3

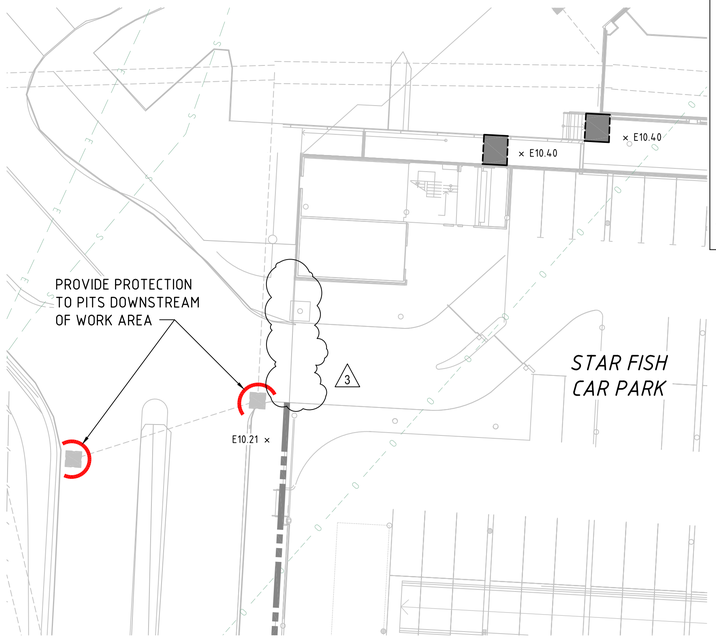
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Architect; X-Drainage; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\495\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-435(3).dwg

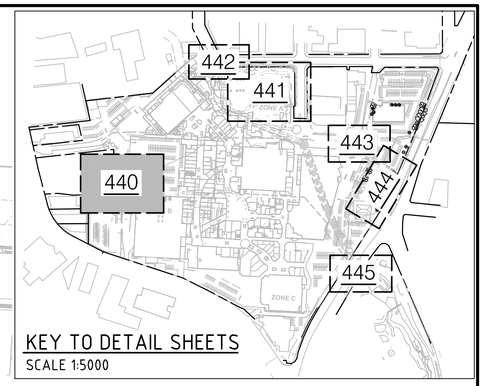
DATE PLOTTED: 5 November 2014 9:23 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



INSET
SCALE 1:250



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

- × E10.87 — EXISTING LEVEL
- EXISTING LOCAL DRAINAGE
- APPROXIMATE AREA OF REGRADE
- MESH AND GRAVEL INLET FILTER
- GEOTEXTILE INLET FILTER
- SEDIMENT FENCE AROUND PROPOSED PIT
- STABILISED ENTRY / EXIT
- BARRIER

NOTE
LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL PLAN SHEET 1 OF 6

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	1:250	A1

Drawing Number: W4548-440
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Architect; X-Survey; X-Carpark; X-GRP-A1-SHT; X-SYD-A1-logo
CAD FILE: N:\Projects\4599\FY13\NA4991313Z_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-440(3).dwg

DATE PLOTTED: 5 November 2014 9:24 AM BY : LYLAC CHAU



CROSS STREET

EXISTING KERB LINE

EXISTING KERB LINE

EXISTING KERB LINE

GEOTEXTILE INLET FILTER
AROUND EXISTING PITS (TYP)

PROPOSED
'PALMTREE'
CARPARK

PROVIDE SILT FENCE
AROUND PERIMETER
OF WORKS

FALL

GREEN STREET

FALL

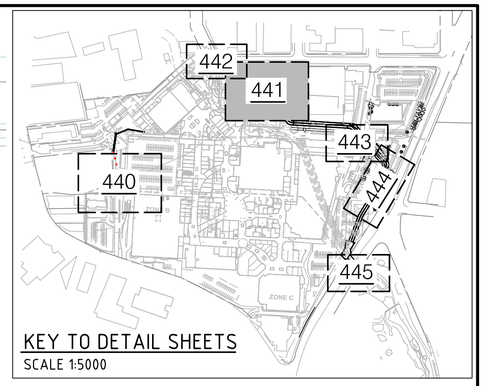
MESH AND GRAVEL INLET
FILTER AROUND EXISTING PITS

3

MESH AND GRAVEL PROTECTION ACROSS
EXISTING ROUNDABOUT LEG TO PREVENT
SEDIMENT WASHING FROM CONSTRUCTION SITE

GEOTEXTILE INLET FILTER
AROUND EXISTING PITS (TYP)

PLAN
SCALE 1:250



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

× E10.87	EXISTING LEVEL
	EXISTING LOCAL DRAINAGE
	MESH AND GRAVEL INLET FILTER
	GEOTEXTILE INLET FILTER
	SILT FENCE

NOTE
1. LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE
2. LOCATION OF STABILISED ENTRY/EXIT TO BE CONFIRMED ON SITE

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL PLAN SHEET 2 OF 6

Status: PRELIMINARY

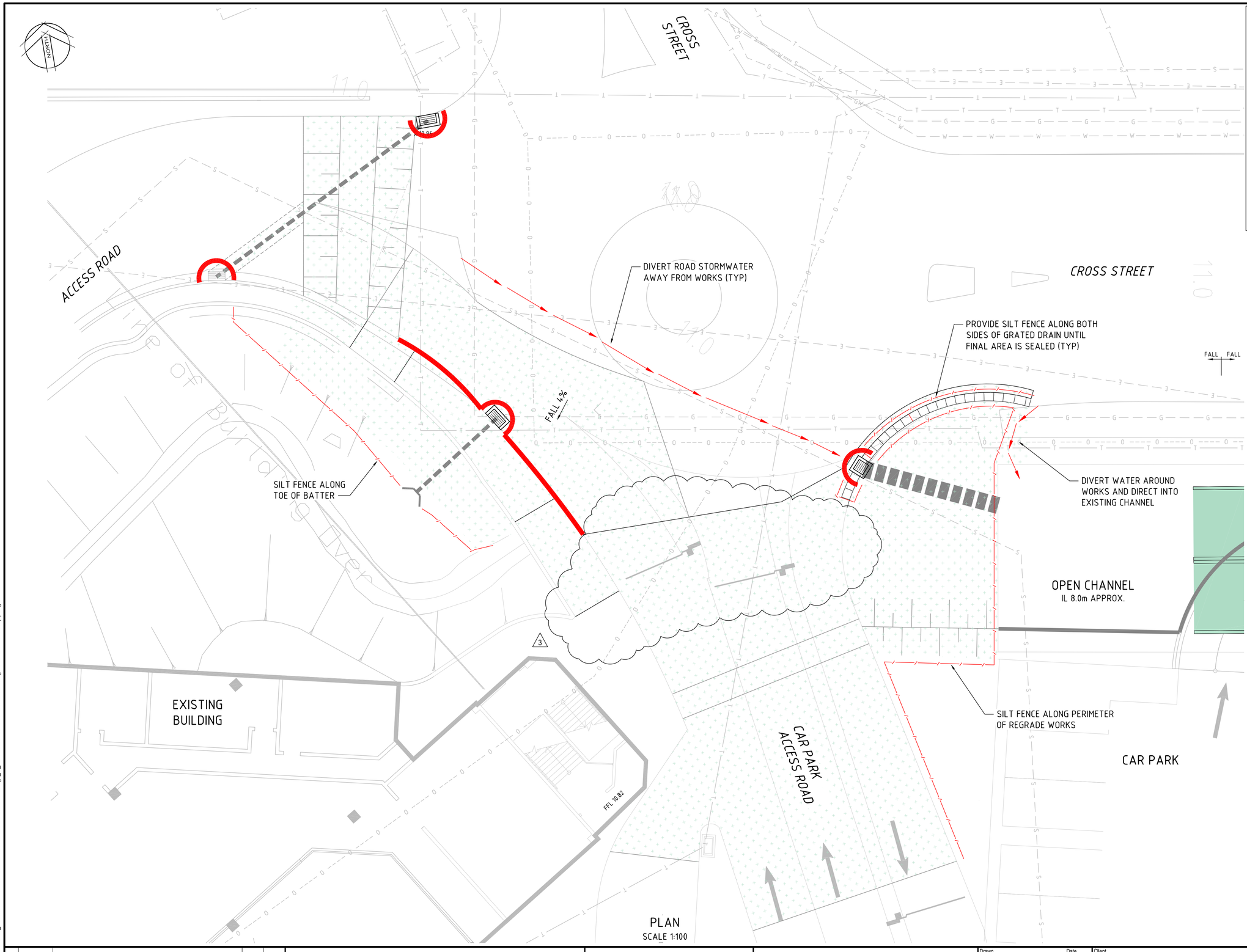
Date	Datum	Scale	Size
18/11/2013	AHD	1:250	A1

Drawing Number: W4548-441
Revision: 3

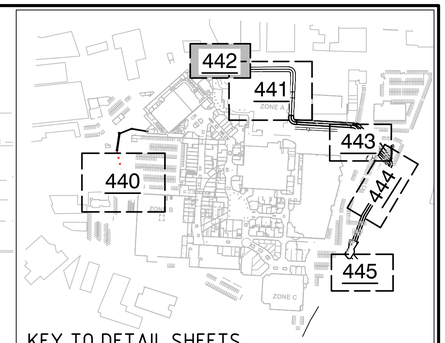
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Drainage; X-Carpark; X-Survey; X-Architect; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4998\FY13\NA\49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-fin\2013 04 10 Urban Drafting Folder\DrW4548-441(3).dwg

DATE PLOTTED: 5 November 2014 9:25 AM BY : LYLAC CHAU



PLAN
SCALE 1:100



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

- × E10.87 — EXISTING LEVEL
- EXISTING LOCAL DRAINAGE
- APPROXIMATE AREA OF REGRADE
- MESH AND GRAVEL INLET FILTER
- GEOTEXTILE INLET FILTER
- SILT FENCE
- DIVERSION OF CLEAN STORMWATER

NOTE

1. LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE
2. LOCATION OF STABILISED ENTRY/EXIT TO BE CONFIRMED ON SITE

2 1 0 2 4 6 8 10
SCALE OF METRES (1:100 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield
Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno
Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5570
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL PLAN SHEET 3 OF 6

Status: PRELIMINARY

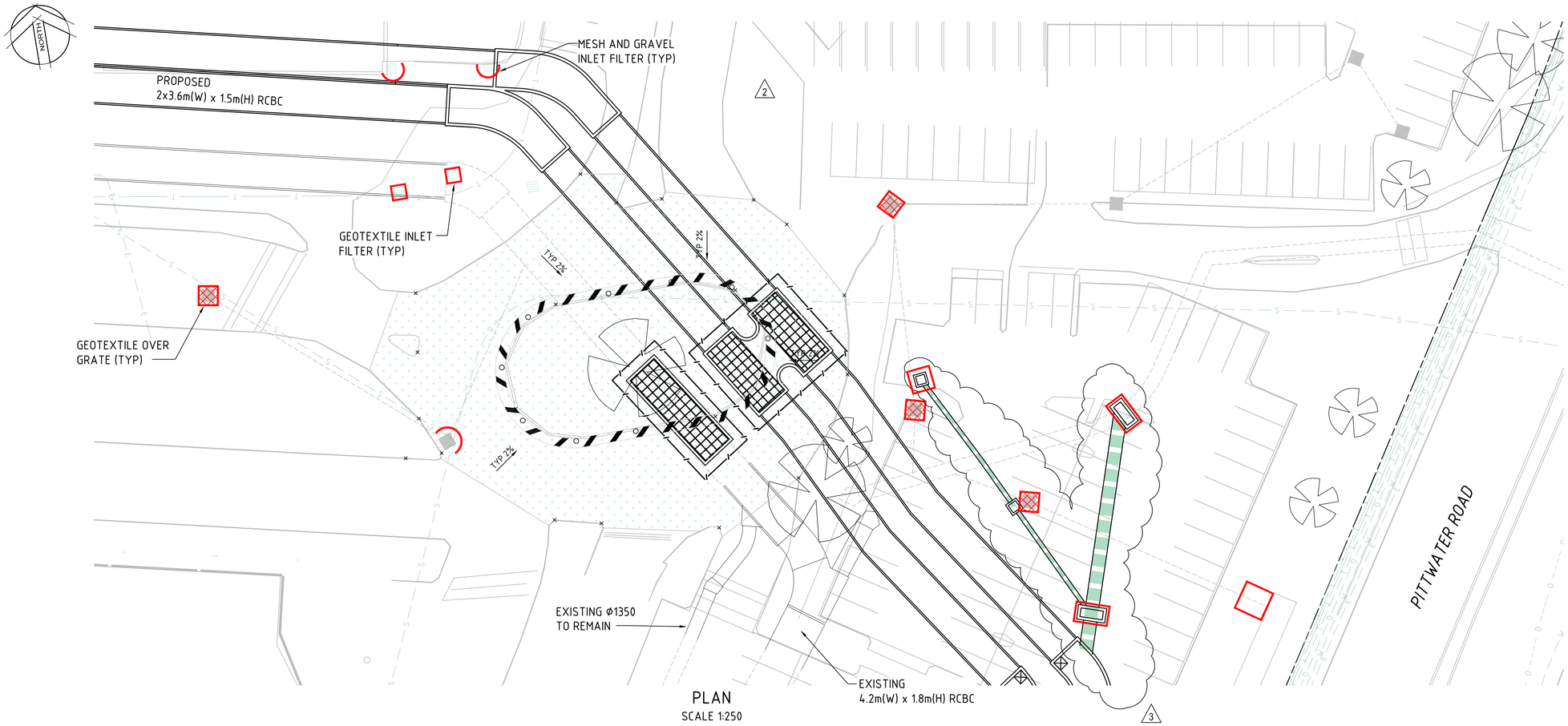
Date	Datum	Scale	Size
18/11/2013	AHD	1:100	A1

Drawing Number: W4548-442
Revision: 3

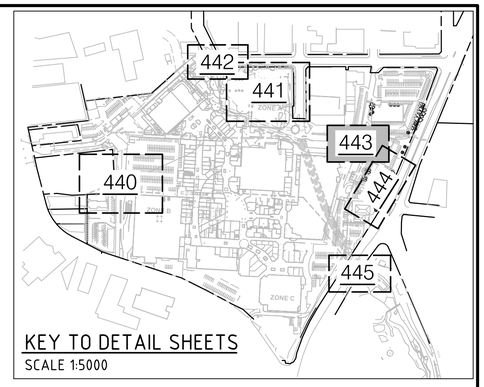
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Survey; X-Services; X-Drainage; X-Architect; X_Additional Detail Cross Sl RAB; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4999\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-442(3).dwg

DATE PLOTTED: 5 November 2014 9:26 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



KEY TO DETAIL SHEETS
SCALE 1:5000

LEGEND

- EXISTING LOCAL DRAINAGE
- APPROXIMATE AREA OF REGRADE
- MESH AND GRAVEL INLET FILTER
- GEOTEXTILE INLET FILTER
- GEOTEXTILE FILTER OVER INLET GRATE
- SEDIMENT FENCE AROUND PIT

NOTE

1. LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE
2. LOCATION OF STABILISED ENTRY/EXIT TO BE CONFIRMED ON SITE

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL PLAN SHEET 4 OF 6

Status: PRELIMINARY

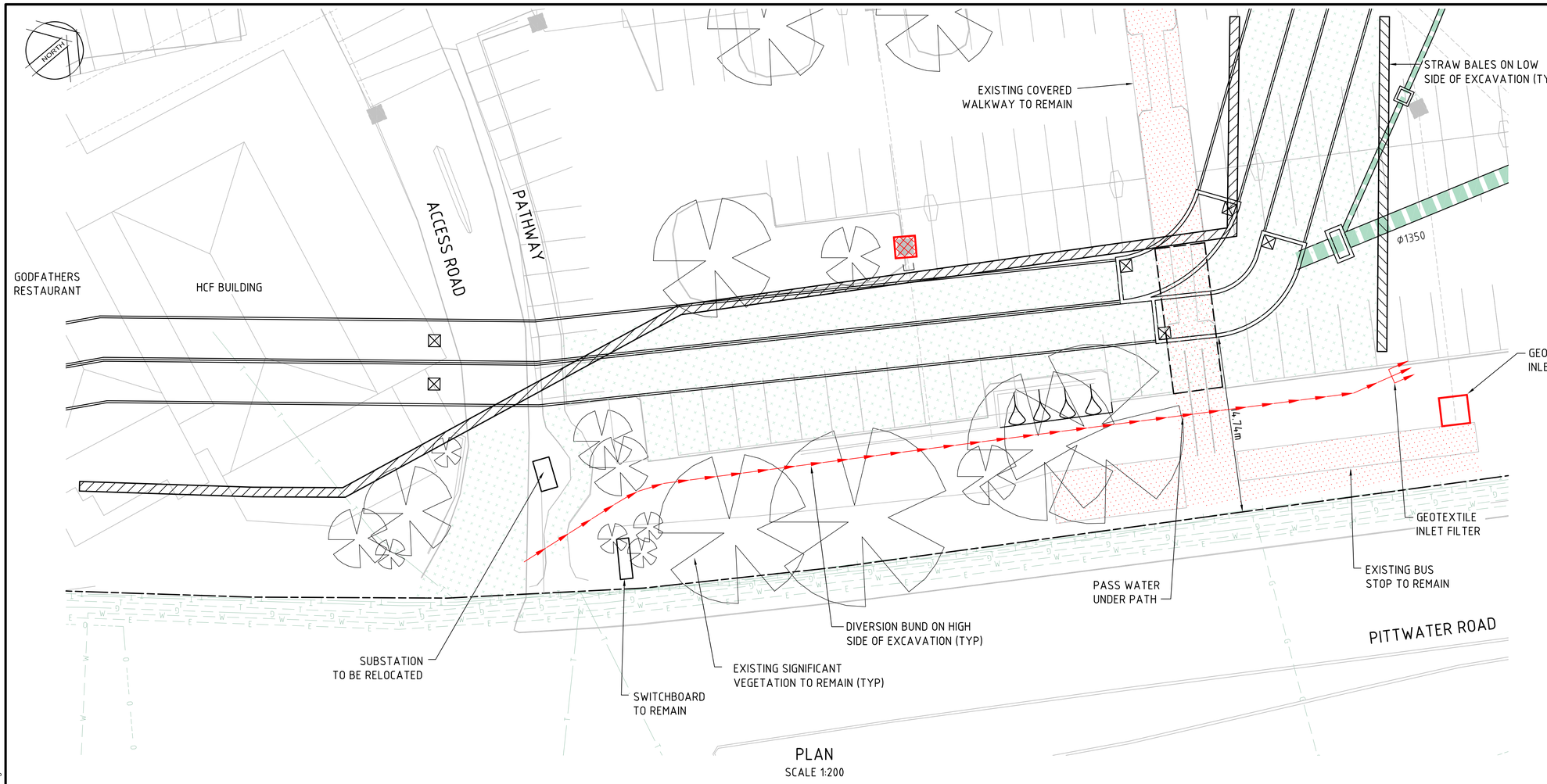
Date	Datum	Scale	Size
18/11/2013	AHD	1:250	A1

Drawing Number: W4548-443
Revision: 3

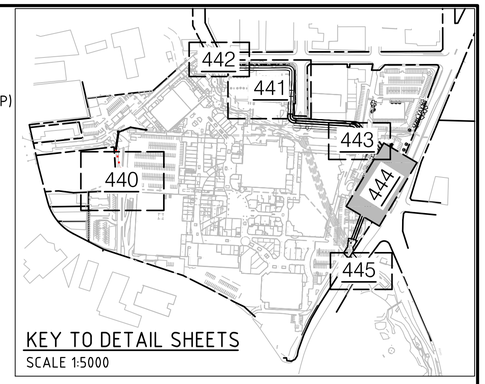
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Survey; X-Architect; X-Services; X-Drainage; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\20130410 Urban Drafting Folder\DrW4548-443(3).dwg

DATE PLOTTED: 5 November 2014 9:27 AM BY : LYLAC CHAU



PLAN
SCALE 1:200



LEGEND

- × E10.87 — EXISTING LEVEL
- EXISTING LOCAL DRAINAGE
- APPROXIMATE AREA OF REGRADE
- GEOTEXTILE INLET FILTER
- GEOTEXTILE FILTER OVER INLET GRATE
- DIVERSION BUND
- LEVEL SPREADER
- STRAW BALES

NOTE

1. LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE
2. LOCATION OF STABILISED ENTRY/EXIT TO BE CONFIRMED ON SITE

1 0.5 0 1 2 3 4 5
SCALE OF METRES (1:50 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

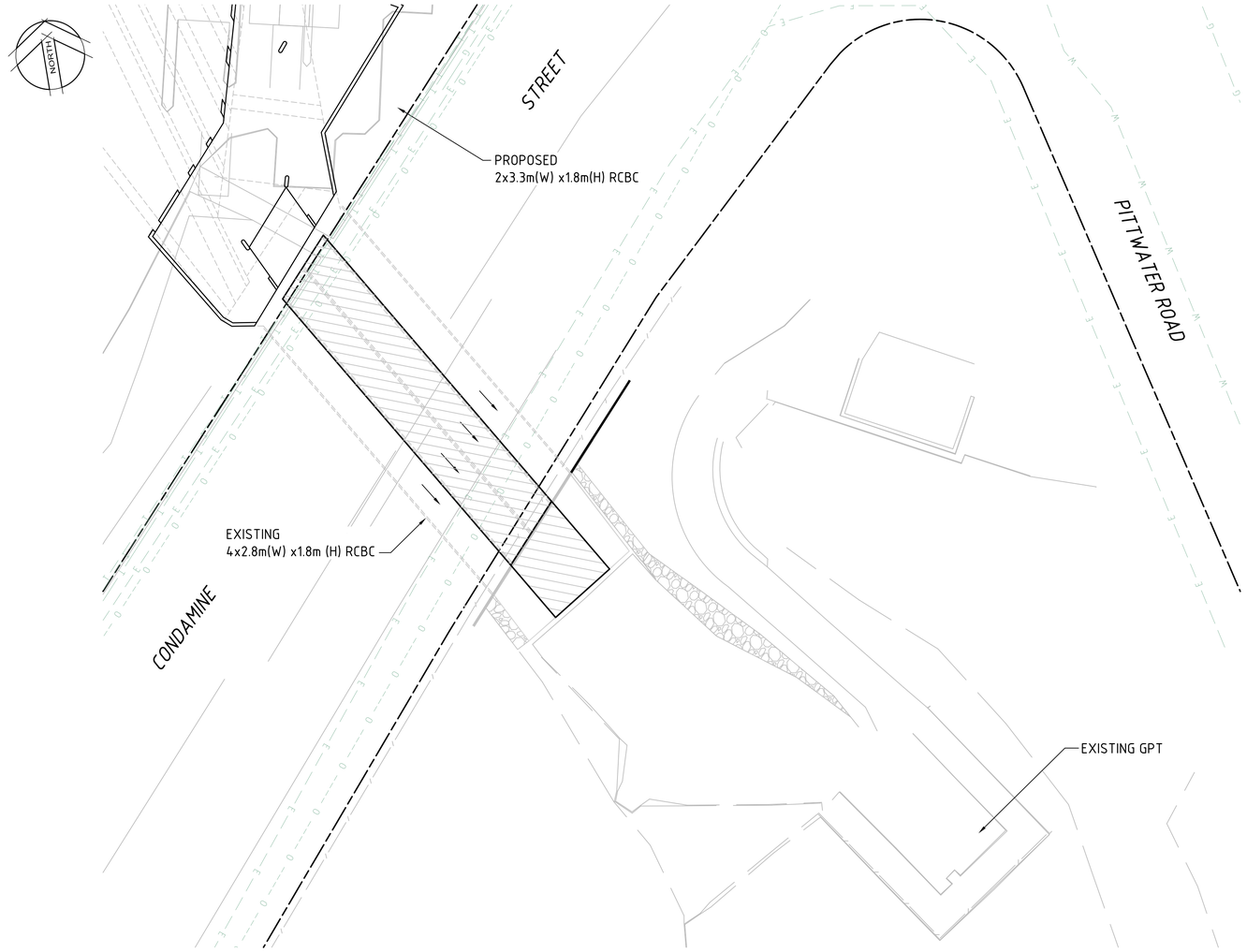
EROSION & SEDIMENT CONTROL PLAN SHEET 5 OF 6

Status			
PRELIMINARY			
Date 18/11/2013	Datum AHD	Scale 1:50	Size A1
Drawing Number W4548-444			Revision 3

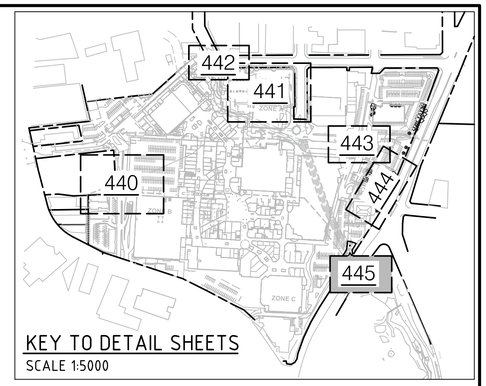
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Architect; X-Drainage; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\FY13\NA\49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-tw\2013 04 10 Urban Drafting Folder\Dr\W4548-444(3).dwg

DATE PLOTTED: 5 November 2014 9:29 AM BY : LYLAC CHAU



PLAN
SCALE 1:250



EROSION AND SEDIMENT CONTROL MEASURES TO BE IMPLEMENTED TO SUIT THE ADOPTED WORK METHOD FOR THE CONDAMINE STREET CROSSING TO THE SATISFACTION OF RMS

NOTE
1. LOCATION OF STOCKPILES TO BE CONFIRMED ON SITE
2. LOCATION OF STABILISED ENTRY/EXIT TO BE CONFIRMED ON SITE

5 2.5 0 5 10 15 20 25
SCALE OF METRES (1:250 BEFORE REDUCTION)

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty Limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL PLAN SHEET 6 OF 6

Status: PRELIMINARY

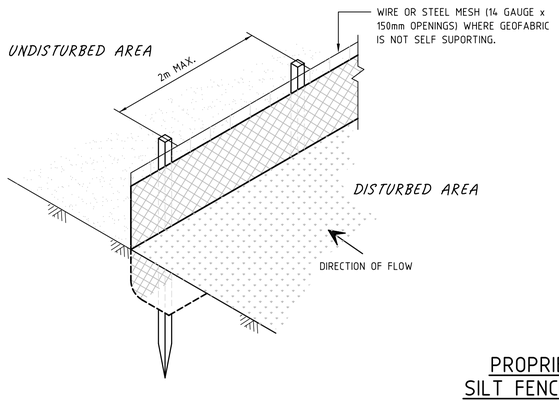
Date	Datum	Scale	Size
18/11/2013	AHD	1:250	A1

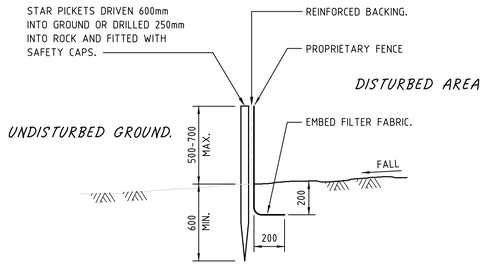
Drawing Number: W4548-445
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Services; X-Architect; X-Drainage; X-Survey; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\499\FY13\NA49913132_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-445(3).dwg

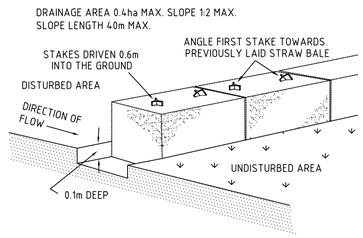
DATE PLOTTED: 5 November 2014 9:30 AM BY : LYLAC CHAU





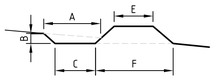
PROPRIETARY SILT FENCE DETAIL

NOT TO SCALE

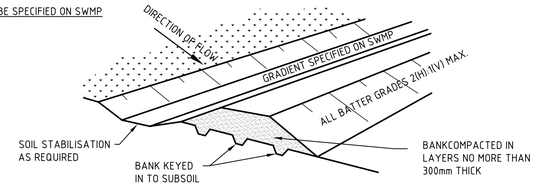


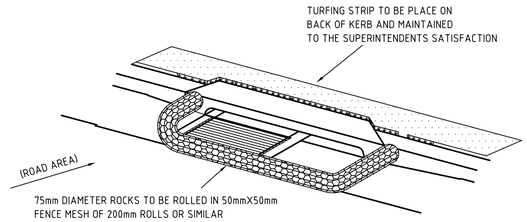
STRAW BALE SEDIMENT FILTER

NOT TO SCALE



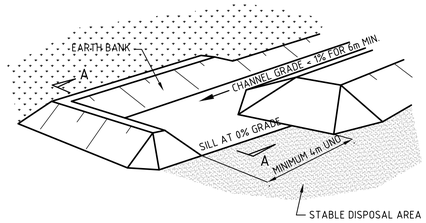
DIMENSIONS TO BE SPECIFIED ON SWMP

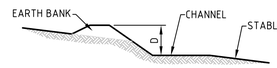




DETAIL OF MESH AND GRAVEL INLET SEDIMENT TRAP

NOT TO SCALE

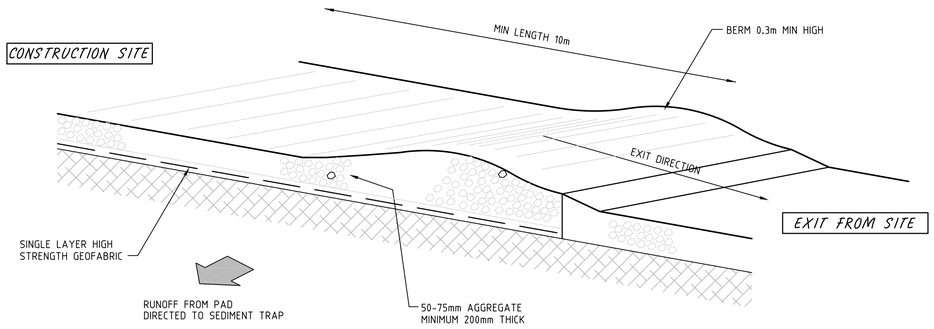




SECTION A-A

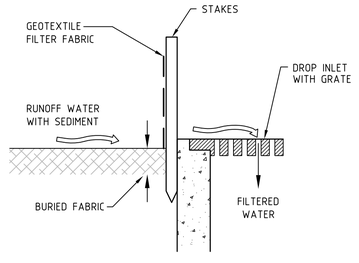
DIVERSION BUND & LEVEL SPREADER

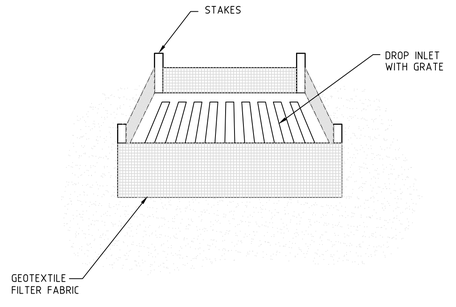
NOT TO SCALE



TEMPORARY CONSTRUCTION VEHICLE EXIT

NOT TO SCALE





GOETEXTILE FILTER SEDIMENT TRAP

NOT TO SCALE

Rev	Date	Description	Drawn	Appr.
3	5/11/2014	FLOOD BARRIERS UPDATED	LLC	DNA
2	30/07/2014	CULVERT AMENDED THOUGH BING LEE	DH	DNA
1	20/11/2013	PRELIMINARY	DH	DNA

Westfield Design & Construction Pty limited
100 William Street, Sydney NSW 2011
Phone (02) 9358 7000 Fax (02) 9358 7373
GPO Box 4004 Sydney NSW 2001
ABN 000 267 285

© Cardno Limited All Rights Reserved.
This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

Cardno Shaping the Future
ABN: 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St Leonards NSW Australia 2065
Phone (+61 2) 9496 7700 Fax (+61 2) 9439 5170
Email: Sydney@cardno.com.au Web: www.cardno.com.au

Drawn	DH	Date 18/11/2013
Checked	DNA	Date 18/11/2013
Designed	DNA	Date 18/11/2013
Verified		Date
Approved		Date

Client: WESTFIELD DESIGN & CONSTRUCTION

WARRINGAH MALL
CONCEPT DRAINAGE AUGMENTATION WORKS

EROSION & SEDIMENT CONTROL DETAILS

Status: PRELIMINARY

Date	Datum	Scale	Size
18/11/2013	AHD	AS SHOWN	A1

Drawing Number: W4548-446

Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

XREFs: X-Survey; X-Services; X-Drainage; X-Architect; X_Additional Detail Cross St RAB; X-GRP-A1-SHT; X-SYD-A1-Logo
CAD FILE: N:\Projects\4599\FY13\NA4599131\32_WARRINGAH MALL FLOODING AND DRAINAGE\01-Package_1_Data\Data-In\2013 04 10 Urban Drafting Folder\DrW4548-446(3).dwg

APPENDIX B

100 YEAR ARI FLOOD LEVELS


P97
P113
P114
P98
P99
P100
P101
P102
P154
P115
P103
P116
P123
P162
P153
P104
P105
P106
P107
P108
P109
P110
P117
P152
P118
P124
P119
P111
P112
P161
P151
P150
P120
P160
P149
P125
P129
P121
P122
P159
P137
P148
P128
P136
P163
P130
P131
P158
P132
P126
P147
P157
P146
P138
P139
P141
P133
P127
P145
P140
P156
P144
P134
P143
P167
P155
P142
P168
P166
P165
P175
P169
P176
P164
P174
P177
P171
P178
P179
P173
P190
P172
P181
P192
P195
P182
P196
P197
P183
P193
P201
P184
P185

Table A.5 Updated Comparison of Updated Stormwater DA with Existing Conditions (xpswmmV10)

| | | | Existing Conditions | | | | | | | | FSR revised 21 Jan 2014 Updated Stormwater DA with Brookvale Creek Design | | | | | | | | FSR revised 21 Jan 2014 | | | | | | | | New Stormwater DA 1742 (Stage2) Updated Stormwater DA with Brookvale Creek Design Model updated 22 Sep 2014 run 14Oct14 | | | | | | | | New Stormwater DA 1742 (Stage2) Model updated 22 Sep 2014 run 14Oct14 | | | | | | | | New Stormwater DA 1741 (Stage1) 1 x 1.35mdia pipe Updated Stormwater DA with Brookvale Creek Design Model updated 22 Sep 2014 run 14Oct14 | | | | | | | | New Stormwater DA 1741 (Stage1) 1 x 1.35mdia pipe Model updated 22 Sep 2014 run 14Oct14 | | | | | | | |
|---|---|---

| | | |

Table A.5 Updated Comparison of Updated Stormwater DA with Existing Conditions (xpswmmV10)

			Existing Conditions						Updated Stormwater DA								Updated Stormwater DA with Brookvale Creek Design							
									FSR revised						FSR revised		New Stormwater DA 1742 (Stage2)				New Stormwater DA 1742 (Stage2)			
									18 June 2013						18 June 2013		22 Sep 2014				22 Sep 2014			
			100yr 1.5h ARI 50% Blockage			100yr 1.5h ARI 0% Blockage				100yr 1.5h ARI DA 50% Blockage					100yr 1.5h ARI DA 0% Blockage			100yr 1.5h ARI DA 50% Blockage				100yr 1.5h ARI DA 0% Blockage			
Survey Point	Floor Level (mAHD)	Street Address	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Max FL (m AHD)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Max FL (m AHD)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Max FL (m AHD)
			(a)			(b)			(b)-(a)		(ba)			(ba)-(a)	(ba)-(aa)	(bb)			(bb)-(b)	(bb)-(ab)		(bi)			(bi)-(a)	(bi)-(aa)	(bj)			(bj)-(b)	(bj)-(ab)	
P1	19.43	15 Clearview Place	20.46	109	103	20.46	109	103	0	20.46	20.46	109	103	0	0	20.46	109	103	0	0	20.46	20.46	109	103	0	0	20.45	108	102	-1	-1	20.46
P2	19.40	15 Clearview Place	20.35	115	95	20.35	115	95	0	20.35	20.35	115	95	0	0	20.35	115	95	0	0	20.35	20.35	115	95	0	0	20.34	114	94	-1	-1	20.35
P3	20.23	14 Clearview Place	19.88	69	0	19.88	69	0	0	19.88	19.88	69	0	0	0	19.88	69	0	0	0	19.88	19.88	69	0	0	0	19.88	69	0	0	0	19.88
P4	19.23	Unit 11/16-18 Clearview Place	19.10	9	0	19.10	9	0	0	19.10	19.10	9	0	0	0	19.09	8	0	-1	-1	19.10	19.10	9	0	0	0	19.09	8	0	-1	-1	19.10
P5	19.25	Unit 10B/16-18 Clearview Place	19.10	2	0	19.10	2	0	0	19.10	19.10	2	0	0	0	19.09	1	0	-1	-1	19.10	19.10	2	0	0	0	19.10	2	0	0	0	19.10
P6	19.30	Unit 10/16-18 Clearview Place	19.27	7	0	19.27	7	0	0	19.27	19.27	7	0	0	0	19.27	7	0	0	0	19.27	19.27	7	0	0	0	19.27	7	0	0	0	19.27
P7	19.30	Unit 9/16-18 Clearview Place	19.38	11	8	19.38	11	8	0	19.38	19.38	11	8	0	0	19.38	11	8	0	0	19.38	19.38	11	8	0	0	19.38	11	8	0	0	19.38
P8	19.30	Unit 8/16-18 Clearview Place	19.35	11	5	19.35	11	5	0	19.35	19.35	11	5	0	0	19.35	11	5	0	0	19.35	19.35	11	5	0	0	19.35	11	5	0	0	19.35
P9	19.26	Unit 7A/16-18 Clearview Place	19.33	10	7	19.33	10	7	0	19.33	19.33	10	7	0	0	19.33	10	7	0	0	19.33	19.33	10	7	0	0	19.33	10	7	0	0	19.33
P10	19.26	Unit 7/16-18 Clearview Place	19.31	10	5	19.31	10	5	0	19.31	19.31	10	5	0	0	19.31	10	5	0	0	19.31	19.31	10	5	0	0	19.31	10	5	0	0	19.31
P11	19.26	Unit 6/16-18 Clearview Place	19.30	4	4	19.30	4	4	0	19.30	19.30	4	4	0	0	19.30	4	4	0	0	19.30	19.30	4	4	0	0	19.30	4	4	0	0	19.30
P12	19.28	Unit 5/16-18 Clearview Place	19.30	12	2	19.30	12	2	0	19.30	19.30	12	2	0	0	19.30	12	2	0	0	19.30	19.30	12	2	0	0	19.30	12	2	0	0	19.30
P13	19.29	Unit 4/16-18 Clearview Place	19.29	10	0	19.29	10	0	0	19.29	19.29	10	0	0	0	19.29	10	0	0	0	19.29	19.29	10	0	0	0	19.29	10	0	0	0	19.29
P14	19.26	Unit 3/16-18 Clearview Place	19.29	43	3	19.29	43	3	0	19.29	19.29	43	3	0	0	19.29	43	3	0	0	19.29	19.29	43	3	0	0	19.29	43	3	0	0	19.29
P15	19.27	Unit 2/16-18 Clearview Place	19.27	68	0	19.27	68	0	0	19.27	19.27	68	0	0	0	19.27	68	0	0	0	19.27	19.27	68	0	0	0	19.27	68	0	0	0	19.27
P16	19.23	Unit 12/16-18 Clearview Place	19.31	18	8	19.31	18	8	0	19.31	19.31	18	8	0	0	19.31	18	8	0	0	19.31	19.31	18	8	0	0	19.31	18	8	0	0	19.31
P17	19.27	Unit 13/16-18 Clearview Place	19.30	6	3	19.30	6	3	0	19.30	19.30	6	3	0	0	19.30	6	3	0	0	19.30	19.30	6	3	0	0	19.30	6	3	0	0	19.30
P18	19.25	Unit 13/16-18 Clearview Place	19.08	8	0	19.08	8	0	0	19.08	19.08	8	0	0	0	19.08	8	0	0	0	19.08	19.08	8	0	0	0	19.08	8	0	0	0	19.08
P19	19.26	Unit 12/16-18 Clearview Place	19.16		0	19.16		0	0	19.16	19.16		0	0	0	19.16		0	0	0	19.16	19.16		0	0	0	19.16		0	0	0	19.16
P20	19.26	Unit 1 / 16-18 Clearview Place	19.02	18	0	19.02	18	0	0	19.02	19.02	18	0	0	0	19.02	18	0	0	0	19.02	19.02	18	0	0	0	19.02	18	0	0	0	19.02
P21	16.51	Unit 1 / 16-18 Clearview Place	18.92	251	241	18.92	251	241	0	18.92	18.92	251	241	0	0	18.92	251	241	0	0	18.92	18.92	251	241	0	0	18.92	251	241	0	0	18.92
P22	17.35	19 Clearview Place	18.25	106	90	18.25	106	90	0	18.25	18.25	106	90	0	0	18.24	105	89	-1	0	18.25	18.24	105	89	-1	-1	18.24	105	89	-1	0	18.24
P23	18.21	19 Clearview Place	18.25	137	4	18.25	137	4	0	18.25	18.25	137	4	0	0	18.24	136	3	-1	-1	18.25	18.24	136	3	-1	-1	18.24	136	3	-1	-1	18.24
P24	17.04	Unit 1/20 Clearview Place	18.25	124	121	18.24	123	120	-1	18.25	18.24	123	120	-1	-1	18.24	123	120	0	0	18.24	18.24	123	120	-1	-1	18.24	123	120	0	0	18.24
P25	16.69	21 Clearview Place	18.21	161	152	18.21	161	152	0	18.21	18.21	161	152	0	0	18.21	161	152	0	0	18.21	18.21	161	152	0	0	18.20	160	151	-1	-1	18.21
P26	17.06	Unit 2/20 Clearview Place	17.98	93	92	17.98	93	92	0	17.98	17.98	93	92	0	0	17.98	93	92	0	0	17.98	17.98	93	92	0	0	17.98	93	92	0	0	17.98
P27	18.21	19 Clearview Place	18.73	59	52	18.72	58	51	-1	18.73	18.73	59	52	0	0	18.72	58	51	0	0	18.73	18.73	59	52	0	0	18.73	59	52	1	1	18.73
P28	16.62	Unit 5/22 Clearview Place	17.60	108	98	17.60	108	98	0	17.60	17.60	108	98	0	0	17.60	108	98	0	0	17.60	17.60	108	98	0	0	17.60	108	98	0	0	17.60
P29	16.58	Unit 4/22 Clearview Place	17.58	104	100	17.58	104	100	0	17.58	17.58	104	100	0	0	17.58	104	100	0	0	17.58	17.58	104	100	0	0	17.58	104	100	0	0	17.58
P30	16.55	Unit 3/22 Clearview Place	17.58	108	103	17.57	107	102	-1	17.58	17.57	107	102	-1	0	17.57	107	102	0	0	17.57	17.57	107	102	-1	0	17.57	107	102	0	0	17.57
P31	16.63	21 Clearview Place	17.14	53	51	17.14	53	51	0	17.14	17.14	53	51	0	0	17.14	53	51	0	0	17.14	17.14	53	51	0	0	17.14	53	51	0	0	17.14
P33	16.30	21 Clearview Place	17.14	84	84	17.14	84	84	0	17.14	17.14	84	84	0	0	17.14	84	84	0	0	17.14	17.15	85	85	1	1	17.14	84	84	0	0	17.15
P34	19.04	21 Clearview Place	18.06	36	0	18.06	36	0	0	18.06	18.06	36	0	0	0	18.06	36	0	0	0	18.06	18.06	36	0	0	0	18.06	36	0	0	0	18.06
P35	16.67	close to 20 Clearview Place	17.13	93	46	17.13	93	46	0	17.13	17.13	93	46	0	0	17.13	93	46	0	0	17.13	17.14	94	47	1	1	17.14	94	47	1	1	17.14
P36	16.67	close to 20 Clearview Place	17.13	123	46	17.13	123	46	0	17.13	17.13	123	46	0	0	17.13	123	46	0	0	17.13	17.14	124	47	1	1	17.14	124	47	1	1	17.14
P37	15.83	close to 20 Clearview Place	17.13	140	130	17.13	140	130	0	17.13	17.13	140	130	0	0	17.13	140	130	0	0	17.13	17.14	141	131	1	1	17.14	141	131	1	1	17.14
P38	16.25	Unit 2 / 22 Clearview Place	17.40	120	115	17.40	120	115	0	17.40	17.40	120	115	0	0	17.40	120	115	0	0	17.40	17.40	120	115	0	0	17.39	119	114	-1	-1	17.40
P39	16.57	Unit 1 / 22 Clearview Place	17.17	69	60	17.16	68	59	-1	17.17	17.16	68	59	-1	-1	17.16	68	59	0	0	17.16	17.16	68	59	-1	-1	17.16	68	59	0	0	17.16
P40	16.81	Clearview Place	17.20	40	39	17.20	40	39	0	17.20	17.20	40	39	0	0	17.19	39	38	-1	-1	17.20	17.20	40	39	0	0	17.19	39	38	-1	-1	17.20
P41	16.90	Unit 1/84-85A Old Pittwater Road	16.83	8	0	16.83	8	0	0	16.83	16.83	8	0	0	0	16.83	8	0	0	0	16.83	16.83	8	0	0	0	16.83	8	0	0	0	16.83
P42	17.17	82B Old Pittwater Road	16.98	2	0	16.98	2	0	0	16.98	16.98	2	0	0	0	16.98	2	0	0	0	16.98	16.98	2	0	0	0	16.98	2	0	0	0	16.98
P43	16.65	Clearview Place	16.84	24	19	16.83	23	18	-1	16.84	16.83	23	18	-1	-1	16.83	23	18	0	0	16.83	16.83	23	18	-1	-1	16.83	23	18	0	0	16.83
P44	16.52	22A Clearview Place	17.02	60	50	17.02	60	50	0	17.02	17.02	60	50	0	0	17.02	60	50	0	0	17.02	17.02	60	50	0	0	17.02	60	50	0	0	17.02
P45	17.01	22 Clearview Place	16.88	15	0	16.88	15	0	0	16.88	16.88	15	0	0	0	16.87	14	0	-1	-1	16.88	16.88	15	0	0	0	16.87	14	0	-1	-1	16.88
P48	15.98	22B Clearview Place	16.84	102	86	16.84	102	86	0	16.84	16.84	102	86	0	0	16.84	102	86	0	0	16.84	16.84	102	86	0	0	16.84	102	86	0	0	16.84
P50	16.21	98 Clearview Place	16.84	81	63	16.84	81	63	0	16.84	16.84	81	63	0	0	16.83	80	62	-1	0	16.84	16.83	80	62	-1	-1	16.83	80	62	-1	0	16.83
P51	19.94	Old Pittwater Road	15.84	1	0	15.84	1	0	0	15.84	15.84	1	0	0	0	15.84	1	0	0	0	15.84	15.84	1	0	0	0	15.84	1	0	0	0	15.84
P52	16.5	Old Pittwater Road	15.80	4	0	15.80	4	0	0	15.80	15.80	4	0	0	0	15.80	4	0	0	0	15.80	15.80	4	0	0	0	15.80	4	0	0	0	15.80
P53	16.45	Old Pittwater Road	15.53		0	15.53		0	0	15.53	15.53		0	0	0	15.53		0	0	0	15.53	15.53		0	0	0	15.53		0	0	0	15.53
P54	14.97	Old Pittwater Road	15.52	77	55	15.52	77	55	0	15.52	15.52	77	55	0	0	15.52	77	55	0	0	15.52	15.52	77	55	0	0	15.52	77	55	0	0	15.52
P55	14.93	Old Pittwater Road	15.25	39	32	15.25	39	32	0	15.25	15.25	39	32	0	0	15.25	39	32	0	0	15.25	15.25	39	32	0	0	15.25	39	32	0	0	15.25
P56	14.94	Old Pittwater Road	15.14	35	20	15.14	35	20	0	15.14	15.14	35	20	0	0	15.14	35	20	0	0	15.14	15.14	35	20	0	0	15.14	35	20	0	0	15.14
P57	14.93	Old Pittwater Road	15.14	36	21	15.14	36	21	0	15.14	15.14	36	21	0	0	15.14	36	21	0	0	15.14	15.14	36	21	0	0	15.14	36	21	0	0	15.14
P58	14.93	Old Pittwater Road	15.14	29	21	15.14	29	21	0	15.14	15.14	29	21	0	0	15.14	29	21	0	0	15.14	15.14	29	21	0	0	15.14	29	21	0	0	15.14
P59	14.94	Old Pittwater Road	15.14	29	20	15.14	29	20	0	15.14	15.14	29	20	0	0	15.14	29	20	0	0	15.14	15.14	29	20	0	0	15.14	29	20	0	0	15.14
P60	14.94	Old Pittwater Road	15.14	36	20	15.14	36	20	0	15.14	15.14	36	20	0	0	15.14	36	20	0	0	15.14	15.14	36	20	0	0	15.14	36	20	0	0	15.14
P61	14.96	Old Pittwater Road	15.14	34	18	15.14	34	18	0	15.14	15.14	34	18	0	0	15.14	34	18	0	0	15.14	15.14	34	18	0	0	15.14	34	18	0	0	15.14
P62	14.94	Old Pittwater Road	15.14	32	20	15.14	32	20	0	15.14	15.14	32	20	0	0	15.14	32	20	0	0	15.14	15.14	32	20	0	0	15.14	32	20	0	0	15.14
P63	14.95	Old Pittwater Road	15.14	32	19	15.14	32	19	0	15.14	15.14	32	19	0	0	15.14	32	19	0	0	15.14	15.14	32	19	0	0	15.14	32	19	0	0	15.14
P64	14.89	Suit2/98 Old Pittwater Road	15.14	41	25	15.14	41	25	0	15.14	15.14	41	25	0	0	15.14	41	25	0	0	15.14	15.14	41	25	0	0	15.14	41	25	0	0	15.14
P65	14.89	Suit2/98 Old Pittwater Road	15.14	42	25	15.14	42	25	0	15.14	15.14	42	25	0	0	15.14	42	25	0	0	15.14	15.14	42	25	0	0	15.14	42	25	0	0	15.14
P66	14.91	Suit1/98 Old Pittwater Road	15.14	43	23	15.14	43	23	0	15.14	15.14	43	23	0	0	15.14	43	23	0	0	15.14	15.14	43	23	0	0	15.14	43	23	0	0	15.14
P67	14.91	Suit1/98 Old Pittwater Road	15.14	37	23	15.14	37	23	0	15.14	15.14	37	23	0	0	15.14	37	23	0	0	15.14	15.14	37	23	0	0	15.14	37	23	0	0	15.14
P69	16.45	Unit 2/100 Old Pittwater Road	15.08	0	0	15.08	0	0	0	15.08	15.08	0	0	0	0	15.08	0	0	0	0	15.08	15.08		0	0	0	15.08		0	0	0	15.08
P71	16.41	Unit 2/100 Old Pittwater Road	15.08	10	0	15.08	10	0	0	15.08	15.08	10	0	0	0	15.08	10	0	0	0	15.08	15.08	10	0	0	0	15.08	10	0	0	0	15.08
P72	17.48	Unit 1/100 Old Pittwater Road	15.05		0	15.05		0	0	15.05	15.04		0	-1	-1	15.04		0	-1	-1	15.04	15.04		0	-1	-1	15.04		0	-1	-1	15.04
P73	14.74	98 Old Pittwater Road	15.14	61	40	15.14	61	40	0	15.14	15.14	61	40	0	0	15.14	61	40	0	0	15.14	15.14	61	40	0	0	15.14	61	40	0	0	15.14
P74	14.72	98 Old Pittwater Road	15.14	51	42	15.14	51	42	0	15.14	15.14	51	42	0	0	15.14	51	42	0	0	15.14	15.14	51	42	0	0	15.14	51	42	0	0	15.14
P75	14.71	98 Old Pittwater Road	15.14	61	43	15.14	61	43	0	15.14	15.14	61	43	0	0	15.14	61	43	0	0	15.14	15.14	61	43	0	0	15.14	61	43	0	0	15.14
P76	14.73	98 Old Pittwater Road	15.14	57	41	15.14	57	41	0	15.14	15.14	57	41	0	0	15.14	57	41	0	0	15.14	15.14	57	41	0	0	15.14	57	41	0	0	15.14
P77	14.75	98 Old Pittwater Road	15.14	53	39	15.14	53	39	0	15.14	15.14	53	39	0	0	15.14	53	39	0	0	15.14	15.14	53	39	0	0	15.14	53	39	0	0	15.14
P78	14.75	98 Old Pittwater Road	15.14	58	39	15.14	58	39	0	15.14	15.14	58	39	0	0	15.14	58	39	0	0	15.14	15.14	58	39	0	0	15.14	58	39	0	0	15.14
P79	14.76	98 Old Pittwater Road	15.85	119	109	15.85	119	109	0	15.85	15.85	119	109	0	0	15.85	119	109	0	0	15.85	15.86	120	110	1	1	15.86	120	110	1	1	15.86
P80	14.75	98 Old Pittwater Road	15.74	109	99	15.74	109	99	0	15.74	15.74	109	99	0	0	15.74	109	99	0	0	15.74	15.73	108	98	-1	-1	15.73	108	98	-1	-1	15.73
P81	14.75	98 Old Pittwater Road	15.63	98	88	15.63	98	88	0	15.63	15.63	98	88	0	0	15.63	98	88	0	0	15.63	15.63	98	88	0	0	15.63	98	88	0	0	15.63
P82	14.74	98 Old Pittwater Road	15.41	77	67	15.41	77	67	0	15.41	15.41	77	67	0	-1	15.41	77	67	0	-1	15.41	15.42	78	68	1	0	15.42	78	68	1	0	15.42
P83	14.73	98 Old Pittwater Road	15.30	67	57	15.30	67	57	0	15.30	15.30	67	57	0	0	15.30	67	57	0	0	15.30	15.30	67	57	0	0	15.30	67	57	0	0	15.30
P85	14.72	Suite 8/98 Old Pittwater Road	14.97	35	24	14.97	35	24	0	14.97	14.97	35	25	0	0	14.97	35	25	0	0	14.97	14.97	35	25	0	0	14.97	35	25	0	0	14.97
P86	14.72	Suite 9/98 Old Pittwater Road	14.92	37	20	14.92	37	20	0	14.92	14.92	37	20	0	0	14.92	37	20	0	0	14.92	14.92	37	20	0	0	14.92	37	20	0	0	14.92
P87	14.68	Suite 10/98 Old Pittwater Road	14.91	30	23	14.91	30	23	0	14.91	14.91	30	23	0	0	14.91	30	23	0	0	14.91	14.91	30	23	0	0	14.91	30	23	0	0	14.91
P88	14.70	Suite 11/98 Old Pittwater Road	14.87	24	17	14.87	24	17	0	14.87	14.87	24	17	0	0	14.87	24	17	0	0	14.87	14.87	24	17	0	0	14.87	24	17	0	0	14.87
P89	14.71	Suite 12/98 Old Pittwater Road	14.85	33	14	14.85	33	14	0	14.85	14.85	33	14	0	0	14.85	33	14	0	0	14.85	14.86	34	15	1	1	14.86	34	15	1	1	14.86
P90	14.71	Suite 13/98 Old Pittwater Road	14.83	38	12	14.83	38	12	0	14.83	14.83	38	12	0	0	14.83	38	12	0	0	14.83	14.83	38	12	0	0	14.83	38	12	0	0	14.83
P91	14.71	Suite 14/98 Old Pittwater Road	14.82	32	11	14.82	32	11	0	14.82	14.82	32	11	0	0	14.82	32	11	0	0	14.82	14.82	32	11	0	0	14.82	32	11	0	0	14.82
P92	14.68	Suite 15/98 Old Pittwater Road	14.80	31	12	14.80	31	12	0	14.80	14.80	31	12	0	0	14.80	31	12	0	0	14.80	14.80	31	12	0	0	14.80	31	12	0	0	14.80
P93	14.68	Suite 16/98 Old Pittwater Road	14.80	34	12	14.80	34	12	0	14.80	14.80	34	12	0	0	14.80	34	12	0	0	14.80	14.80	34	12	0	0	14.80	34	12	0	0	14.80
P94	14.68	Suite 17/98 Old Pittwater Road	14.79	36	11	14.79	36	11	0	14.79	14.79	36	11	0	0	14.79	36	11	0	0	14.79	14.79	36	11	0	0	14.79	36	11	0	0	14.79
P95	14.69	Suite 18/98 Old Pittwater Road	14.79	34	10	14.79	34	10	0	14.79	14.79	34	10	0	0	14.79	34	10	0	0	14.79	14.79	34	10	0	0	14.79	34	10	0	0	14.79
P96	14.70	Suite 19/98 Old Pittwater Road	14.78	27	8	14.78	27	8	0	14.78	14.78	27	8	0	0	14.78	27	8	0	0	14.78	14.78	27	8	0	0	14.78	27	8	0	0	14.78
P97	16.63	65 Cross Street	15.09	44	0	15.09	44	0	0	15.09	15.09	44	0	0	0	15.09	44	0	0	0	15.09	15.09	44	0	0	0	15.09	44	0	0	0	15.09
P98	13.47	65 Cross Street	13.55	20	8	13.55	20	8	0	13.55	13.55	20	8	0	0	13.55	20	8	0	0	13.55	13.55	20	8	0	0	13.55	20	8	0	0	13.55
P99	14.10	38A Cross Street	13.54	38	0	13.54	38	0	0	13.54	13.54	38	0	0	0	13.54	38	0	0	0	13.54	13.54	38	0	0	0	13.54	38	0	0	0	13.54
P100	14.23	38B Cross Street	13.54	47	0	13.54	47	0	0

			Existing Conditions			Updated Stormwater DA												Updated Stormwater DA with Brookvale Creek Design									
						18 June 2013								18 June 2013								22 Sep 2014								22 Sep 2014					
			100yr 1.5h ARI 50% Blockage			100yr 1.5h ARI 0% Blockage					100yr 1.5h ARI DA 50% Blockage							100yr 1.5h ARI DA 0% Blockage							100yr 1.5h ARI DA 50% Blockage							100yr 1.5h ARI DA 0% Blockage					
Survey Point	Floor Level (mAHD)	Street Address	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Max FL (m AHD)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Max FL (m AHD)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Flood Level (mAHD)	Depth over Ground (cm)	Depth over Floor (cm)	Diff (cm)	Diff (cm)	Max FL (m AHD)
			(a)			**(b)**			**(b)-(a)**		**(ba)**			**(ba)-(a)**	**(ba)-(aa)**	**(bb)**			**(bb)-(b)**	**(bb)-(ab)**		**(bi)**			**(bi)-(a)**	**(bi)-(aa)**	**(bj)**			**(bj)-(b)**	**(bj)-(ab)**	
P304	10.87	2 Dale St	10.95	9	8	10.95	9	8	0	10.95	10.95	9	8	0	0	10.95	9	8	0	0	10.95	10.95	9	8	0	0	10.95	9	8	0	0	10.95
P305	10.08	26 Green St	10.15	91	7	10.13	89	5	-2	10.15	9.60	36	0	-55	-57	9.61	37	0	-52	-58	9.61	9.48	24	0	-67	-69	9.48	24	0	-65	-71	9.48
P306	10.65	24 Green St	10.15	50	0	10.13	48	0	-2	10.15	9.80	15	0	-35	-37	9.80	15	0	-33	-39	9.80	9.81	16	0	-34	-36	9.80	15	0	-33	-39	9.81
P307	11.55	20 Green St	10.27	14	0	10.27	14	0	0	10.27	10.27	14	0	0	0	10.27	14	0	0	0	10.27	10.27	14	0	0	0	10.27	14	0	0	0	10.27
221		DJ Loading Dock	10.24	*104*		10.28	*108*		4	10.28	9.71	*51*		-53	-22	9.73	*53*		-55	-51	9.73	9.67	*47*		-57	-26	9.68	*48*		-60	-56	9.68
222		DJ Loading Dock	10.21	*111*		10.23	*113*		2	10.23	9.71	*61*		-50	-22	9.73	*63*		-50	-49	9.73	9.67	*57*		-54	-26	9.68	*58*		-55	-54	9.68
401		Bus Depot Sucatchment east of Pittwater Rd	11.07			11.07			0	11.07	11.04			-3	-3	11.05			-2	-2	11.05	11.04			-3	-3	11.04			-3	-3	11.04
402		Bus Depot Sucatchment east of Pittwater Rd	11.06			11.06			0	11.06	11.04			-2	-2	11.04			-2	-2	11.04	11.03			-3	-3	11.03			-3	-3	11.03
403		Bus Depot Sucatchment east of Pittwater Rd	11.06			11.06			0	11.06	11.04			-2	-2	11.04			-2	-2	11.04	11.03			-3	-3	11.03			-3	-3	11.03
404		Bus Depot Sucatchment east of Pittwater Rd	11.06			11.06			0	11.06	11.04			-2	-2	11.04			-2	-2	11.04	11.03			-3	-3	11.03			-3	-3	11.03
501		Anchor Car Park	9.53	*62*		9.53	*62*		0	9.53	9.53	*62*		0	0	9.53	*62*		0	0	9.53	9.53	*62*		0	0	9.53	*62*		0	0	9.53
502		Anchor Car Park	9.53	*64*		9.53	*64*		0	9.53	9.53	*64*		0	0	9.53	*64*		0	0	9.53	9.53	*64*		0	0	9.53	*64*		0	0	9.53
503		Anchor Car Park	9.53	*66*		9.53	*66*		0	9.53	9.53	*66*		0	0	9.53	*66*		0	0	9.53	9.53	*66*		0	0	9.53	*66*		0	0	9.53
504		Anchor Car Park	9.53	*60*		9.53	*60*		0	9.53	9.53	*60*		0	0	9.53	*60*		0	0	9.53	9.53	*60*		0	0	9.53	*60*		0	0	9.53
505		Anchor Car Park / Coles Loading Dock	9.53	*71*		9.53	*71*		0	9.53	9.53	*71*		0	0	9.53	*71*		0	0	9.53	9.53	*71*		0	0	9.53	*71*		0	0	9.53

N
W E
S

Water Level Difference (cm)

- >20
- 16 to 20
- 12 to 16
- 8 to 12
- 4 to 8
- 1 to 4
- -1 to -4
- -4 to -8
- -8 to -12
- - 12 to -16
- -16 to -20
- <-20

0 50 100
metres

Cardno

89914004
October 2014

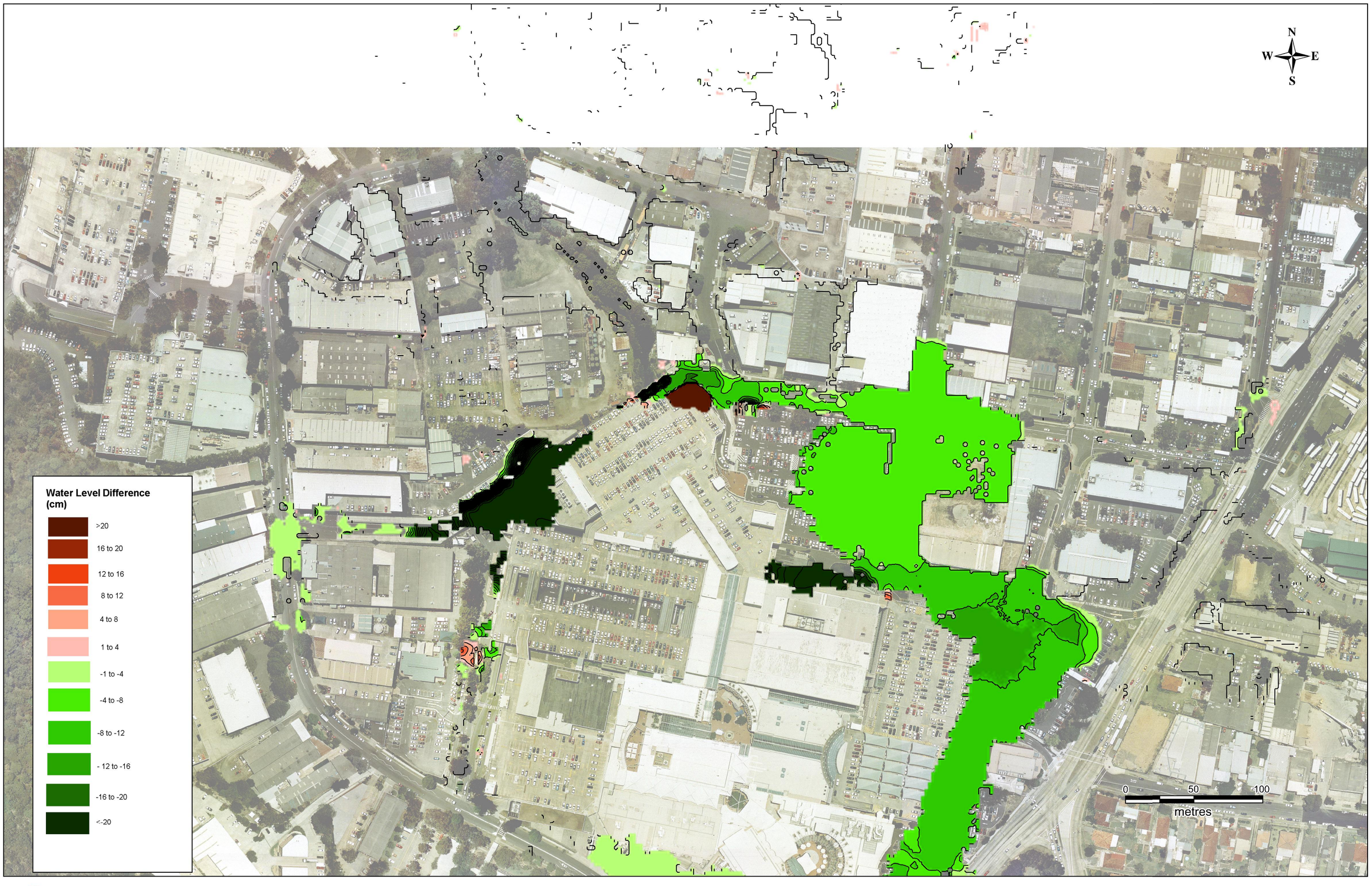
FIGURE 3 - SHEET 1
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 1-DA1741-0% BLOCKAGE- LESS EXISTING -0% BLOCKAGE



Cardno

89914004
October 2014

FIGURE 3 - SHEET 2
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 1- DA1741-0% BLOCKAGE- LESS EXISTING -0% BLOCKAGE



Cardno

89914004
October 2014

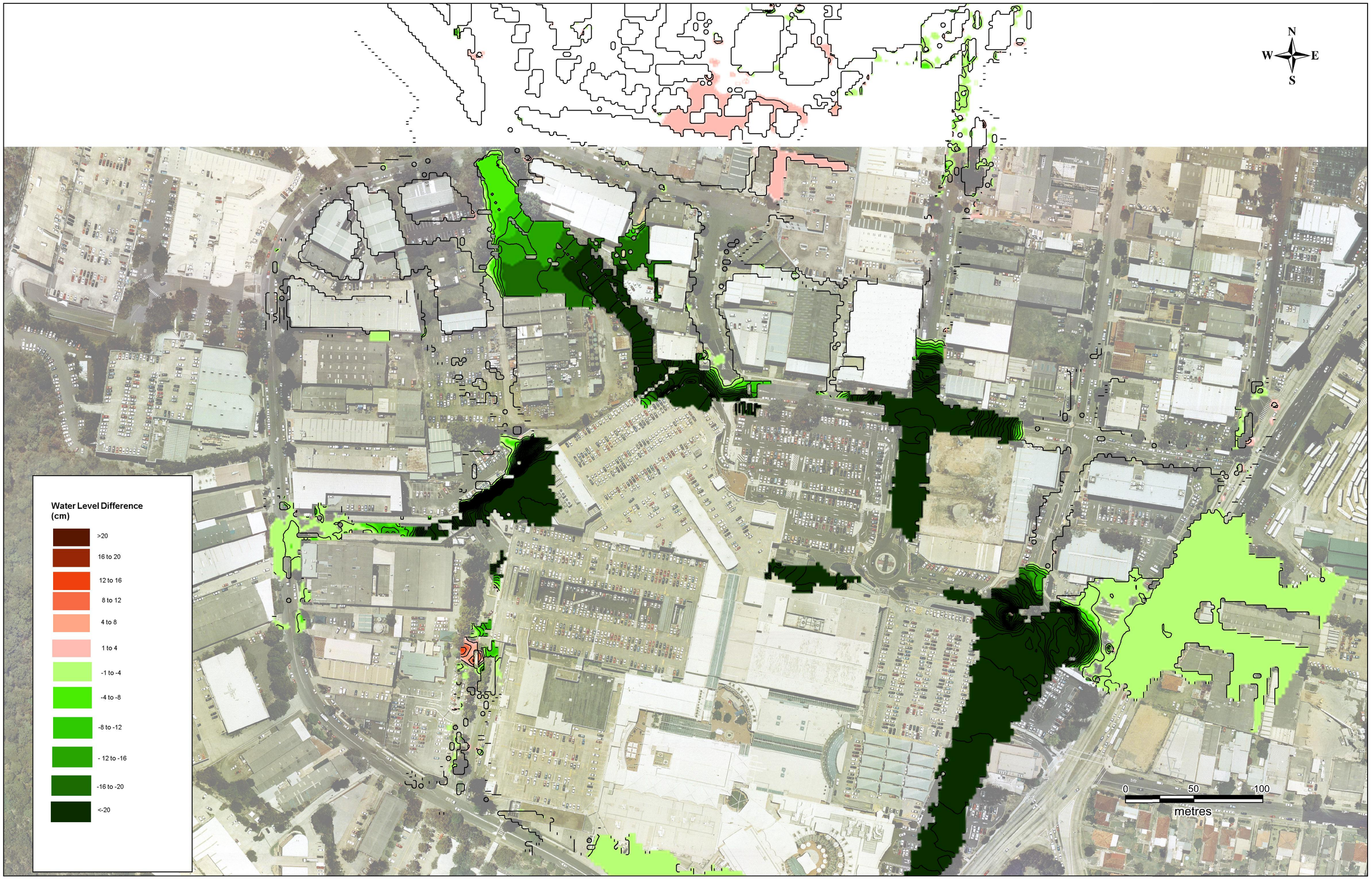
FIGURE 4 - SHEET 1
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 1-DA1741-50% BLOCKAGE- LESS EXISTING -50% BLOCKAGE



Cardno

89914004
October 2014

FIGURE 4 - SHEET 2
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 1- DA1741-50% BLOCKAGE- LESS EXISTING -50% BLOCKAGE



Cardno

89914004
October 2014

FIGURE 5 - SHEET 1
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 2-DA1742-0% BLOCKAGE- LESS EXISTING -0% BLOCKAGE



Cardno

89914004
October 2014

FIGURE 5 - SHEET 2
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 2- DA1742-0% BLOCKAGE- LESS EXISTING -0% BLOCKAGE

N
W E
S

Water Level Difference (cm)

- >20
- 16 to 20
- 12 to 16
- 8 to 12
- 4 to 8
- 1 to 4
- -1 to -4
- -4 to -8
- -8 to -12
- - 12 to -16
- -16 to -20
- <-20

0 50 100
metres

Cardno

89914004
October 2014

FIGURE 6 - SHEET 1
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 2-DA1742-50% BLOCKAGE- LESS EXISTING -50% BLOCKAGE



Cardno

89914004
October 2014

FIGURE 6 - SHEET 2
WATER LEVEL DIFFERENCES-100YR ARI
STAGE 2- DA1742-50% BLOCKAGE- LESS EXISTING -50% BLOCKAGE

APPENDIX C

FLOOD VELOCITY DIFFERENCE PLOTS

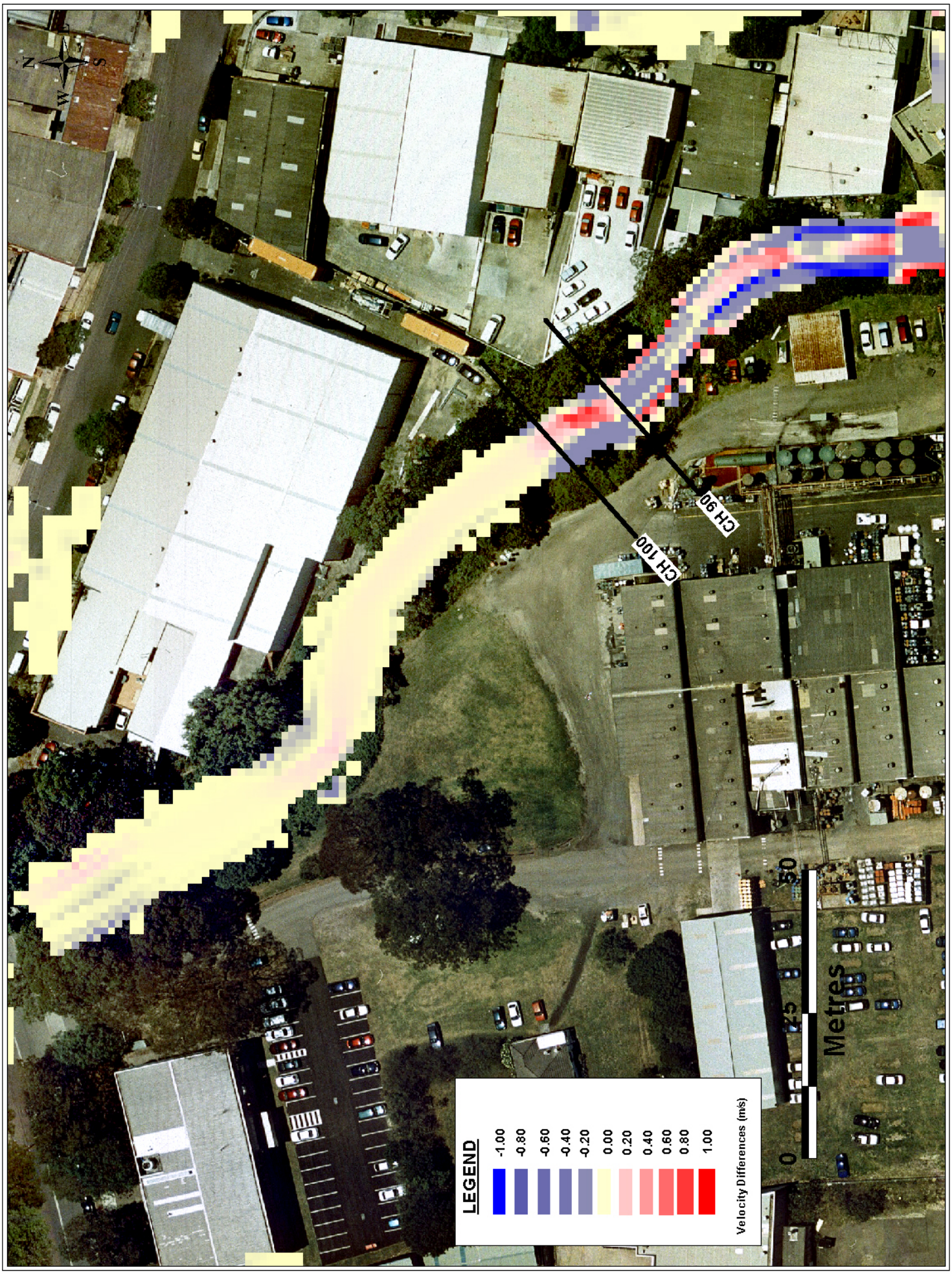


Figure 1 - 2yr ARI - Flood Velocity Differences (Stage2_Less_Existing)



Figure 12- 100yr ARI - Flood Velocity Differences (Stage2_Less_Stormwater DA)

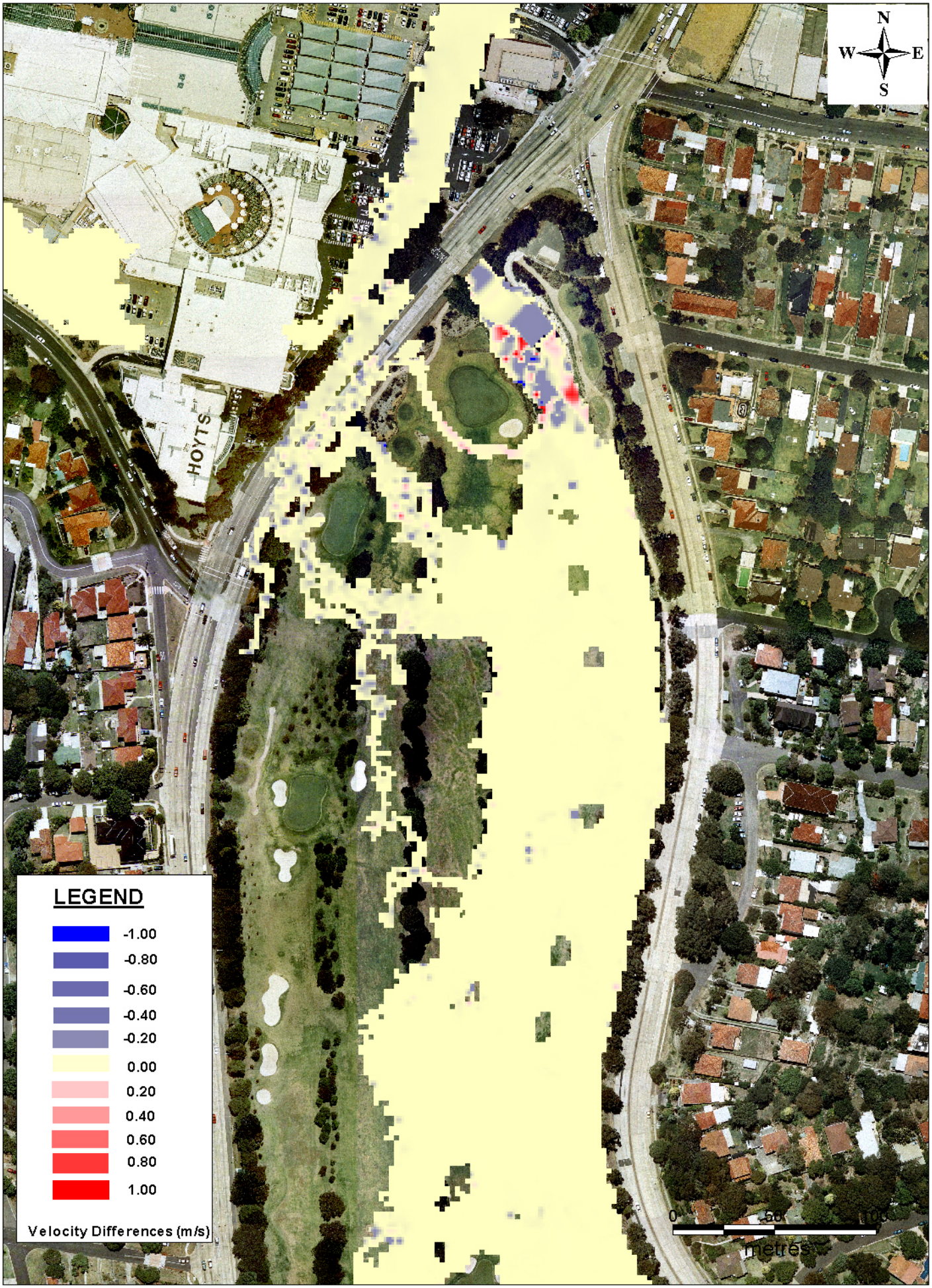


Figure 11- 20yr ARI - Flood Velocity Differences (Stage2_Less_Stormwater DA)

Cardno

89914004
October 2014



Figure 10 - 100yr ARI - Flood Velocity Differences (Stage2_Less_Stormwater DA)



Figure 9 - 20yr ARI - Flood Velocity Differences (Stage2_Less_Stormwater DA)

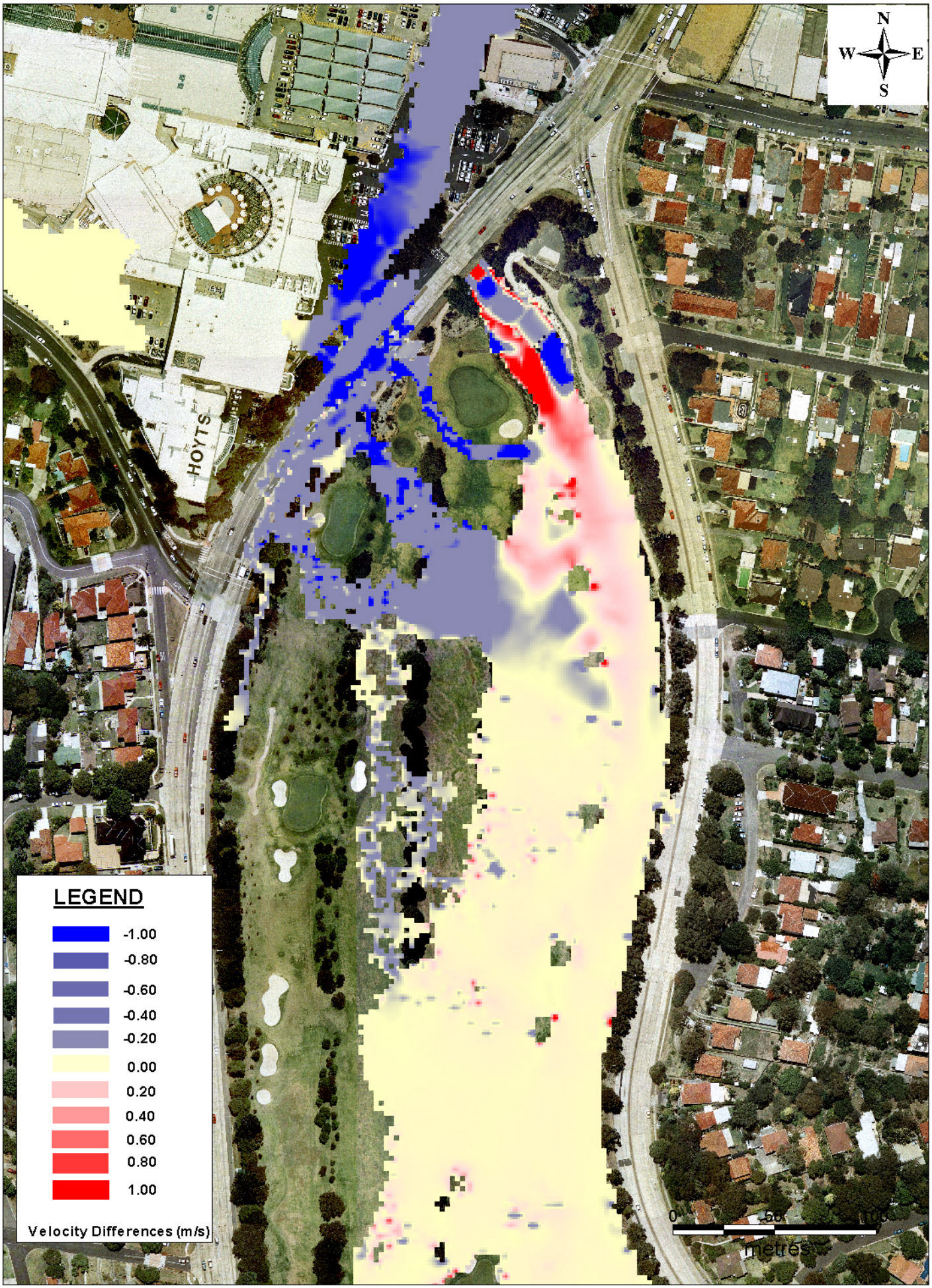


Figure 8 - 100yr ARI - Flood Velocity Differences (Stage2_Less_Existing)

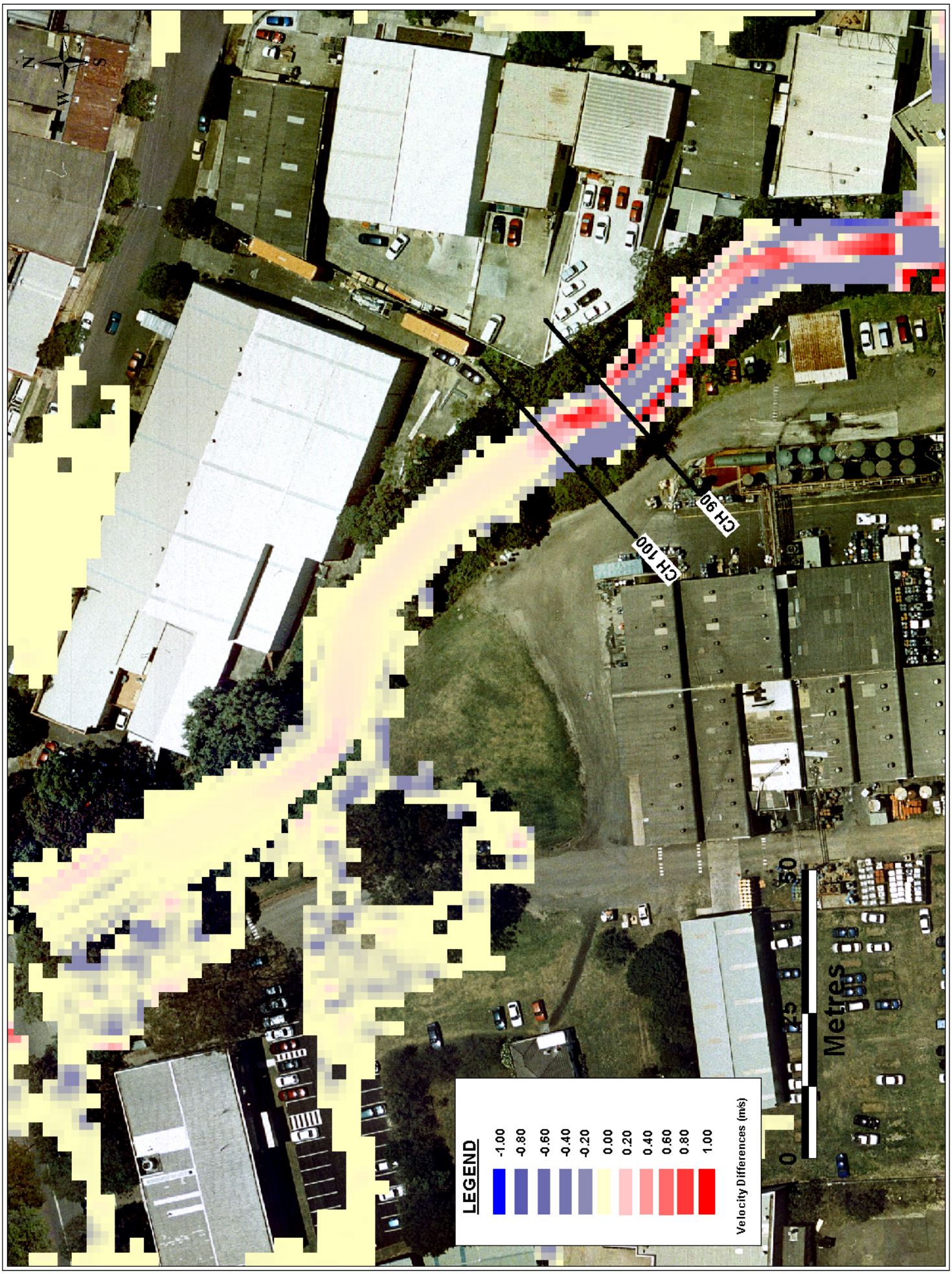


Figure 2 - 5yr ARI - Flood Velocity Differences (Stage2_Less_Existing)



Figure 3 - 20yr ARI - Flood Velocity Differences (Stage2_Less_Existing)

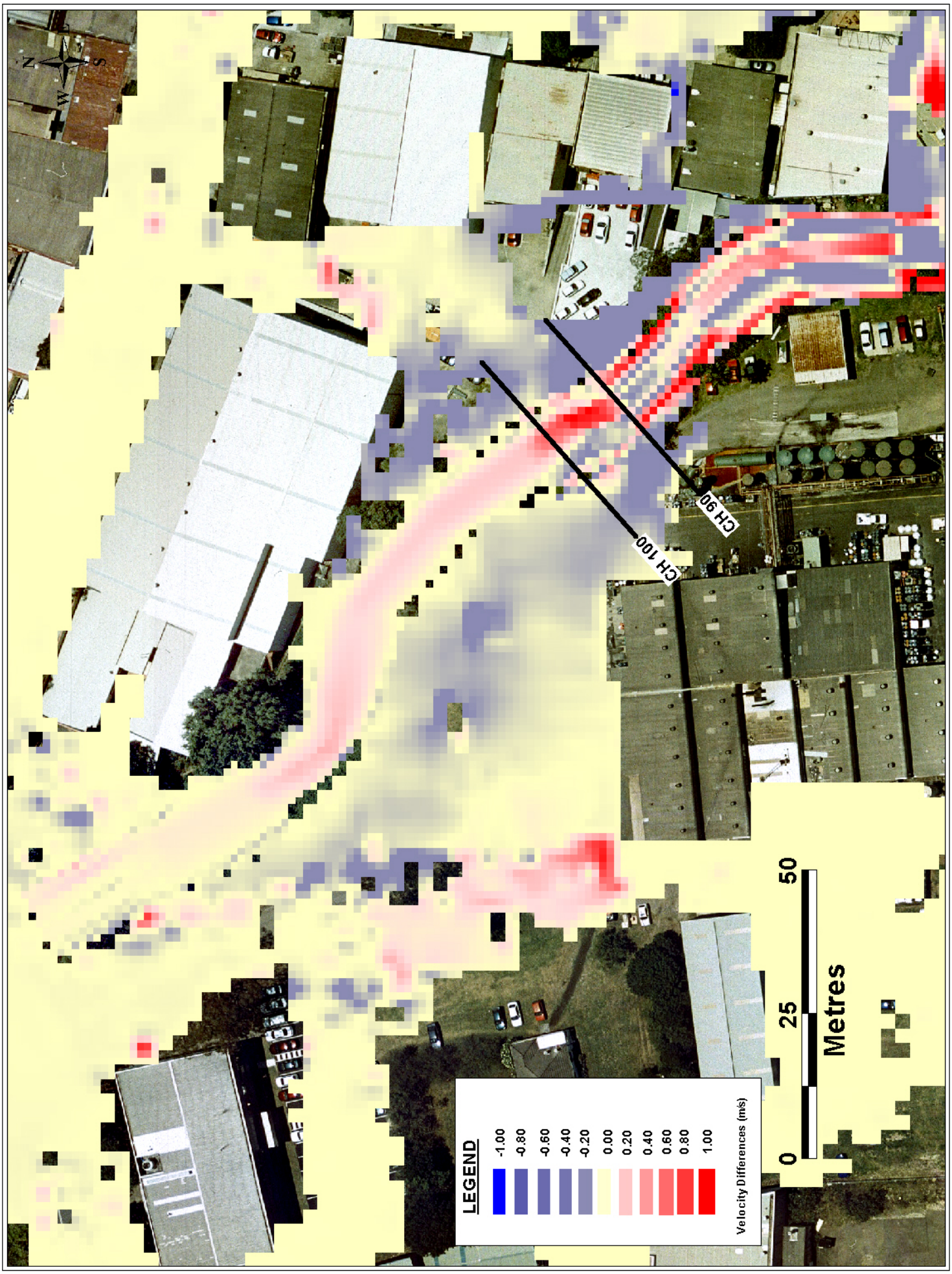


Figure 4 - 100yr ARI - Flood Velocity Differences (Stage2_Less_Existing)

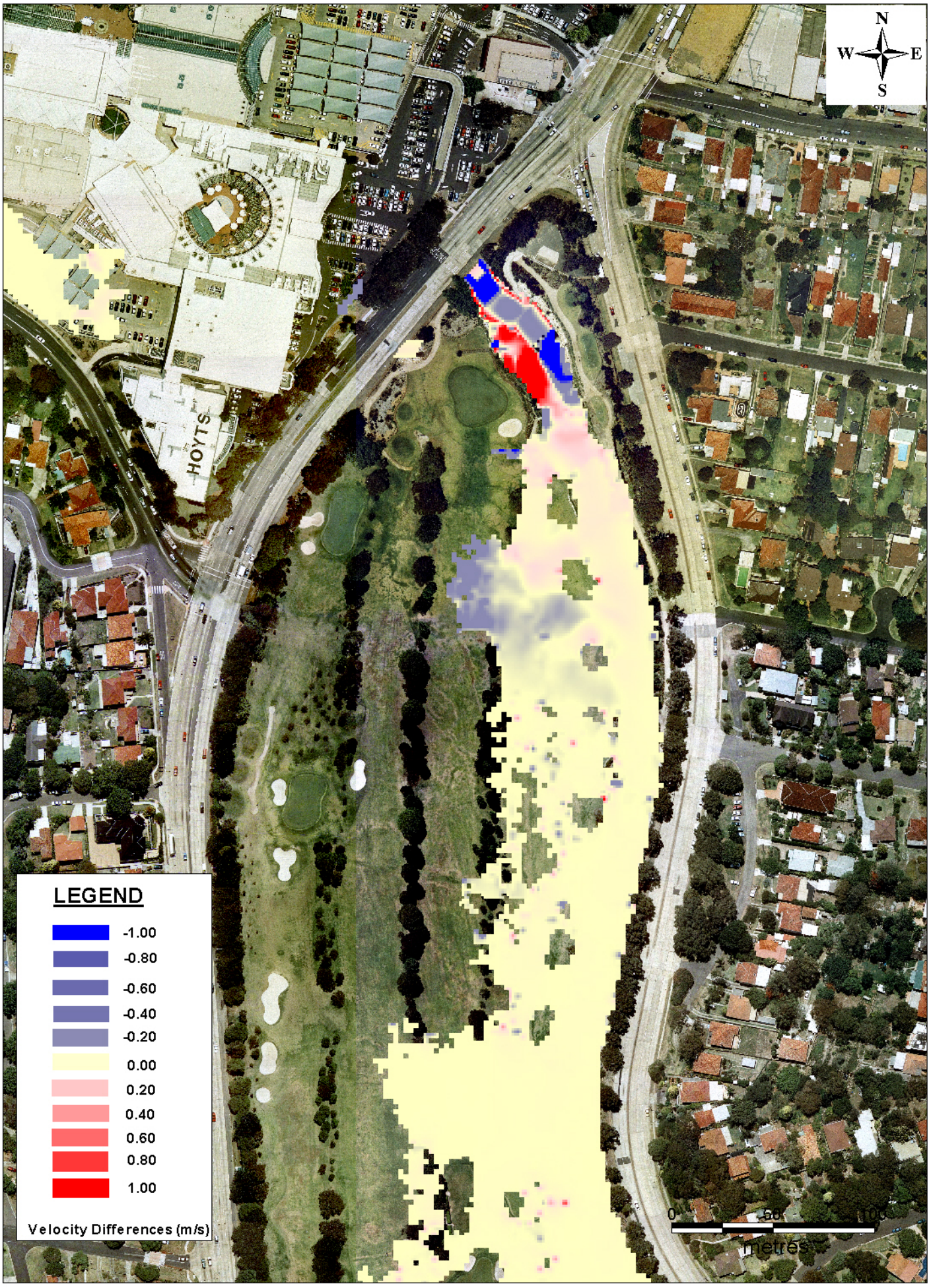


Figure 5 - 2yr ARI - Flood Velocity Differences (Stage2_Less_Existing)

Cardno

89914004
October 2014

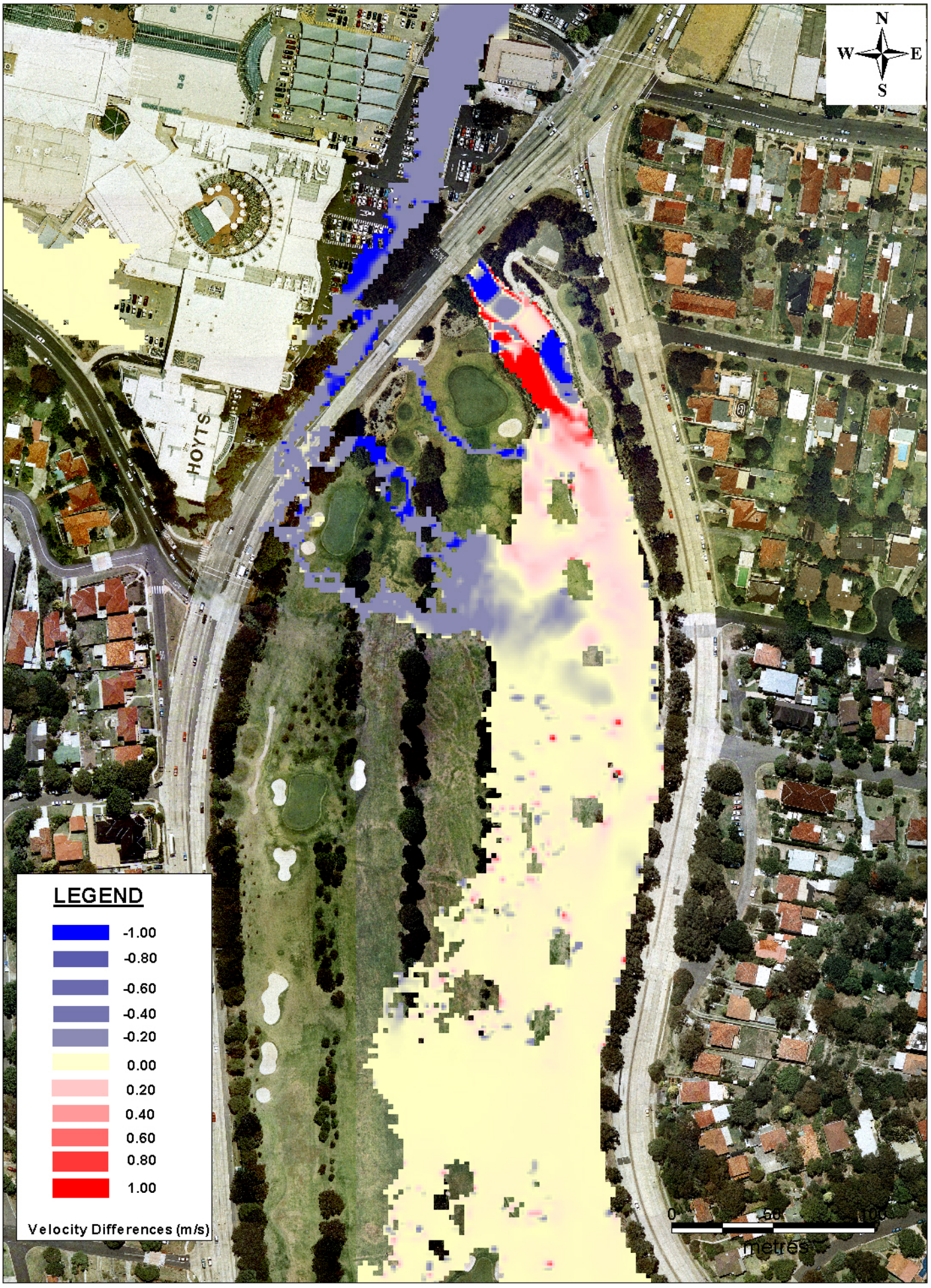


Figure 6 - 5yr ARI - Flood Velocity Differences (Stage2_Less_Existing)

Cardno

89914004
October 2014

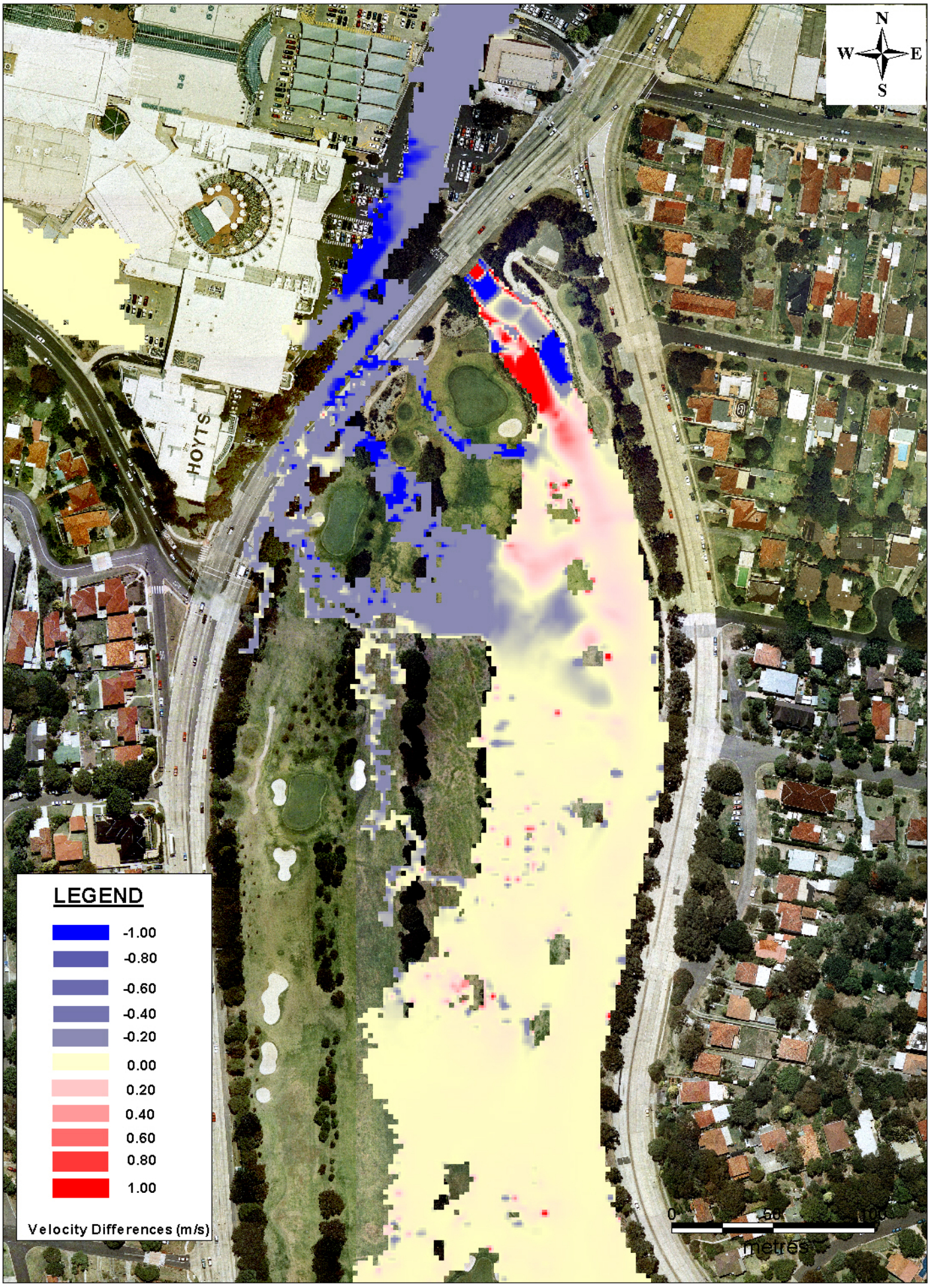


Figure 7 - 20yr ARI - Flood Velocity Differences (Stage2_Less_Existing)