OAKDALE CENTRAL
LOTS 1C, 2B, 3A AND 3B
CIVIL WORKS PACKAGE

DRAWING LIST

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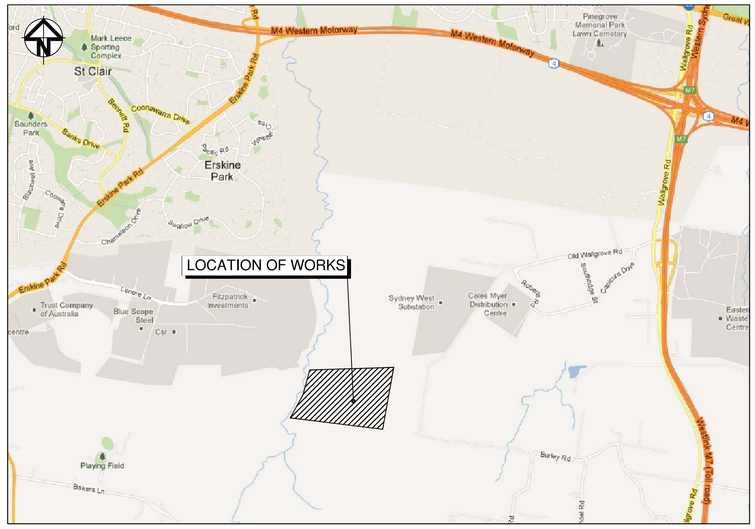
C358	TYPICAL SECTIONS
C359	TYPICAL BRIDGE CROSSING SECTION
C360	TEMPORARY INTERSECTION LAYOUT
C361	LAND ACQUISITION PLAN



LOCALITY PLAN
NTS

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL — NOT TO BE USED FOR CONSTRUCTION — A1

Scales	NTS	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid		Approved	

File: C001.dwg

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: COVER SHEET AND LOCALITY PLAN

Drawing No.	Project No.	Issue
C001	13-143	B

KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF25 MPa U.N.O.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 95% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :-
   EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.

   EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB AND GUTTER WITH 100mm DIA HOLE.

   EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

PROPOSED WORKS LEGEND

PROPOSED

- ● F62.25 — FINISHED SURFACE LEVEL
- ● E70.15 — EXISTING SURFACE LEVEL
- ● TW70.6 — TOP OF WALL LEVEL
- ⏷ BW70.6 — BOTTOM OF WALL LEVEL
- 60.0 — PROPOSED CONTOUR
- K&G — KERB AND GUTTER
- IKO — INTEGRAL KERB
- IK&G — INTEGRAL KERB AND GUTTER
- MK — MOUNTABLE KERB
- KO — KERB ONLY
- DD — DISH DRAIN
- A1 — STORMWATER PIT, LINE & NUMBER
- FP — SUBSOIL PIPE (100DIA AT MIN 0.5% FALL)WITH FLUSHING POINT AT MAX 30m CENTRES
- 1 / 4 — BATTER SLOPE
- RETAINING WALL
- GUARD FENCE
- FENCE LINE

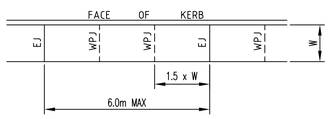
SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO AT & L.
3. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
4. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
5. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE, WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
6. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
7. ASPHALTIC CONCRETE SHALL CONFORM TO R.T.A. SPECIFICATION R116.
8. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.T.A. FORM 3051 (UNBOUND), R.T.A. FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 OF BASECOURSE MATERIAL PLACED.
9. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.T.A. FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 OF SUB-BASE COURSE MATERIAL PLACED.
10. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN 19) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH R.T.A. FORM 3051 AND 3051.1 WILL BE CONSIDERED, SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF AT & L.
11. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
12. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

JOINTING NOTES

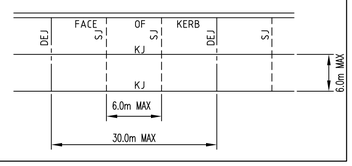
PEDESTRIAN PAVEMENT JOINTS

1. ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS. (U.N.O)
2. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 6.0m CENTRES.
3. WEAKENED PLANE JOINTS ARE TO BE LOCATED AT A MAX. SPACING OF 1.5 x WIDTH OF THE PAVEMENT.
4. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
5. PEDESTRIAN PAVEMENT JOINT DETAIL.



VEHICULAR PAVEMENT JOINTS

6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS. (U.N.O)
6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS SHOWN ON DRAWINGS.
7. KEYED CONSTRUCTION JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 6.0m CENTRES
8. SAWN JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 6.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX 30.0m CENTRES
9. VEHICULAR PAVEMENT JOINT DETAIL.



STORMWATER DRAINAGE NOTES

1. STORMWATER DESIGN CRITERIA:
   (A) AVERAGE RECURRENCE INTERVAL:
   1:100 YEARS ROOFED AREAS TO SURCHARGE PIT
   1:5 YEARS EXTERNAL PAVEMENTS
   (B) RAINFALL INTENSITIES:
   TIME OF CONCENTRATION: 5 MINUTES
   1:100 YEARS= 219 mm/hr
   1:5 YEARS= 134 mm/hr
   (C) RUNOFF COEFFICIENTS:
   ROOF AREAS: C_{100} =1.0
   EXTERNAL PAVEMENTS: C_5 =1.0
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS1 SUPPORT IN ACCORDANCE WITH AS 3725 (1989) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (1998) AND AS/NZS 3500 3.2 (1998).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY AT & L.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
14. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

BULK EARTHWORKS NOTES

1. ORIGIN OF LEVELS: REFER SURVEY NOTES
2. STRIP ALL TOPSOIL/ORGANIC MATERIAL FROM CONSTRUCTION AREA AND REMOVE FROM SITE OR STOCK PILE AS DIRECTED BY SUPERINTENDENT.
3. EXCAVATED MATERIAL TO BE USED AS STRUCTURAL FILL PROVIDED THE PLACEMENT MOISTURE CONTENT OF THE MATERIAL IS +/- 2% OF THE OPTIMUM MOISTURE CONTENT.
4. COMPACT FILL AREAS AND SUBGRADE TO NOT LESS THAN:

LOCATION	STANDARD DRY DENSITY (AS 1289 E 5.1.1)
UNDER BUILDING SLABS ON GROUND	98%
UNDER ROADS AND CARPARKS	98%
LANDSCAPED AREAS UNLESS NOTED OTHERWISE	98%

5. FOR NON COHESIVE MATERIAL, COMPACT TO 75% DENSITY INDEX.
6. BEFORE PLACING FILL, PROOF ROLL EXPOSED SUBGRADE WITH AN 8 TONNE (MIN) DEADWEIGHT SMOOTH DRUM VIBRATORY ROLLER TO DETECT THEN REMOVE SOFT SPOTS (AREAS WITH MORE THAN 2mm MOVEMENT UNDER ROLLER).
7. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN :-
   (A) 1 TEST PER 200m^3 OF FILL PLACED PER 300 LAYER OF FILL.
   (B) 3 TESTS PER VISIT
   (C) 1 TEST PER 1000m^2 OF EXPOSED SUBGRADE
   TESTING SHALL BE "LEVEL 1" TESTING IN ACCORDANCE WITH AS 3798 (1996).
8. FILLING TO BE PLACED AND COMPACTED IN MAXIMUM 150mm LAYERS
9. NO FILLING SHALL TAKE PLACE TO EXPOSE SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF AT & L AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED.

CONCRETE NOTES

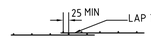
1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY
   ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 F'c MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE	32	60	20
KERBS, PATHS, AND PITS	25	80	20

   - CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
   - PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.
3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY AT & L.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.T.A. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS 1302 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS 1302
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS 1304

   NUMBER OF BARS IN GROUP — BAR GRADE AND TYPE
   17 N 20 250
   NOMINAL BAR SIZE IN mm — SPACING IN mm

   THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERANCE NUMBER FOR FABRIC TO AS 1304.
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAS BEEN COMPILED VIA WAE
SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. AT & L DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT AT & L.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   a. LOCAL AUTHORITY REQUIREMENTS
   b. EPA REQUIREMENTS
   c. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   (A) INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
   (B) CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
   (C) INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
   (D) INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
   (E) UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

EROSION CONTROL

7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
8. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

SEDIMENT CONTROL

9. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
10. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
11. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
12. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
   (A) PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
   (B) ENSURING THAT NOTHING IS NAILED TO THEM
   (C) PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
      (I) ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
      (II) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
      (III) CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales: NTS
Height Datum: AHD
Grid:
Drawn: VC
Designed: VC
Checked: MM
Approved:

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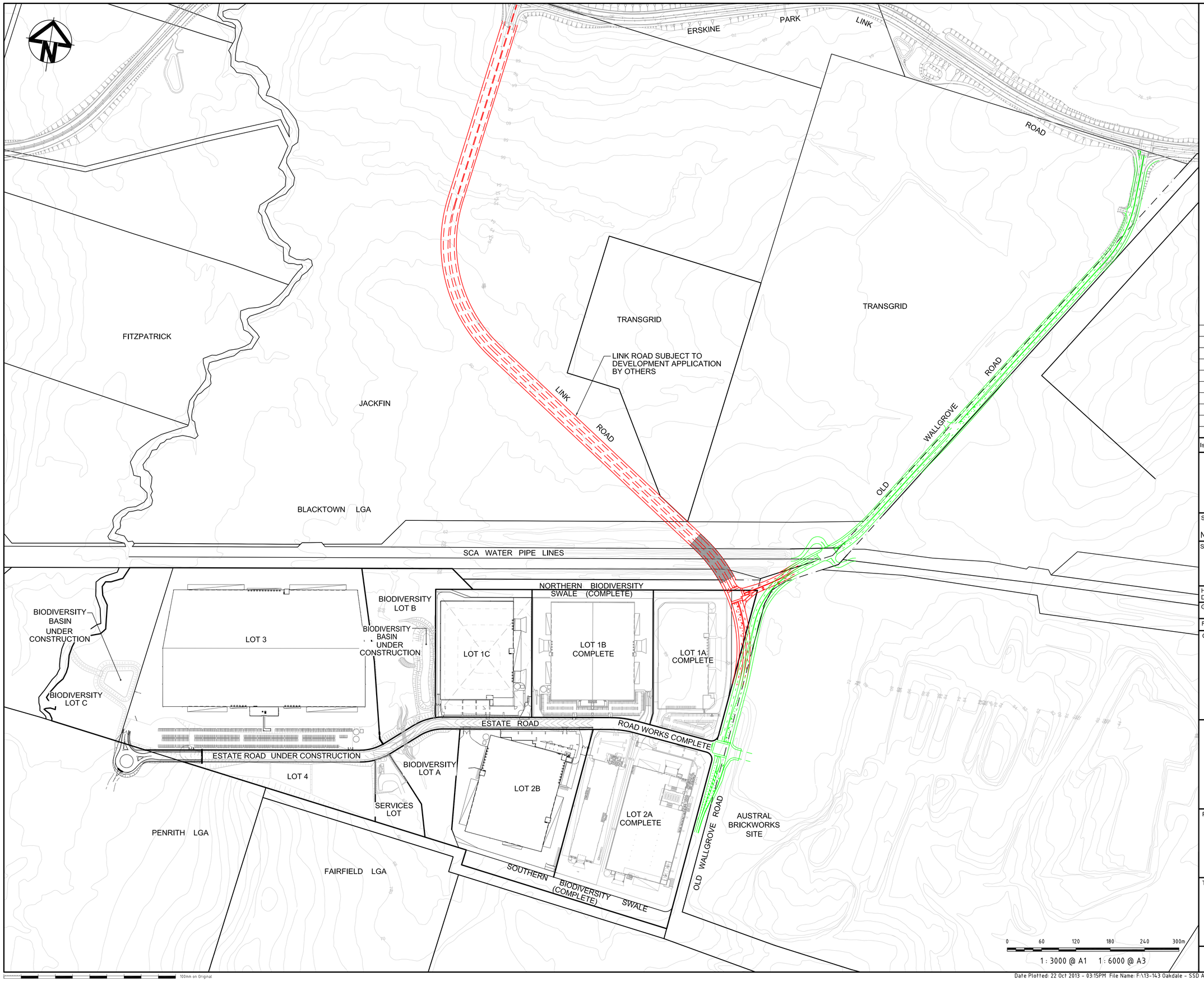
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title: NOTES AND LEGENDS

Drawing No.	Project No.	Issue
C002	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales	1 : 3000 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	
File:	C003.dwg		

Client: Goodman

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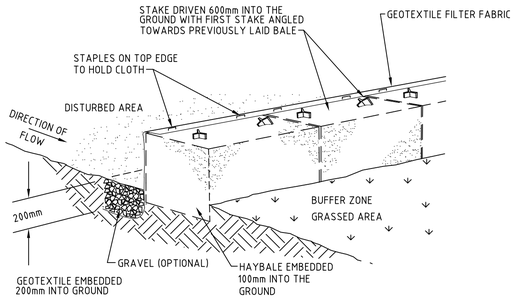
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

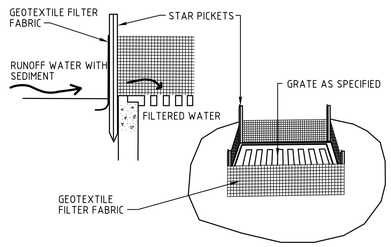
Title
OAKDALE GENERAL ARRANGEMENT

Drawing No.	Project No.	Issue
C003	13-143	B

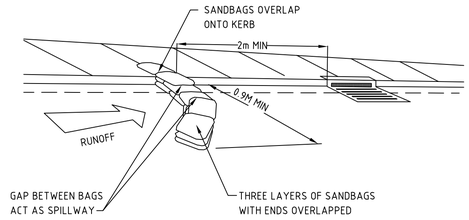
100mm on Original



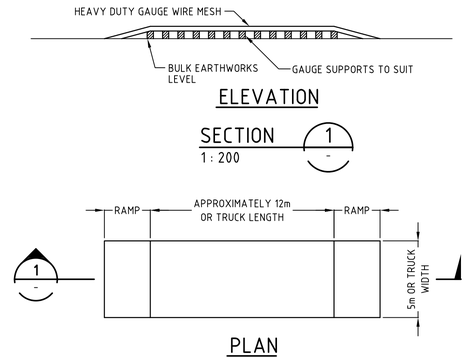
HAYBALE AND GEOTEXTILE SEDIMENT FILTER
NTS



GEOTEXTILE FILTER PIT SURROUND
NTS

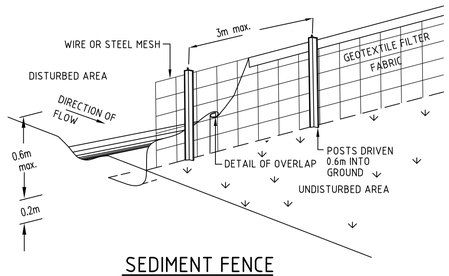


SANDBAG SEDIMENT TRAP FOR KERB INLET ON GRADE
NTS

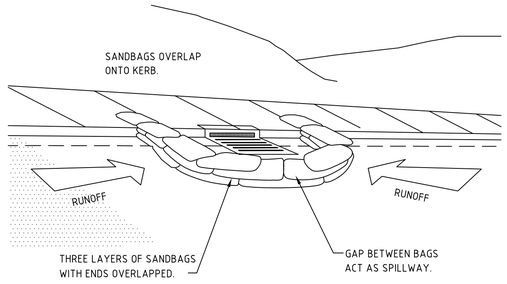


TEMPORARY CONSTRUCTION EXIT
SCALE 1:200

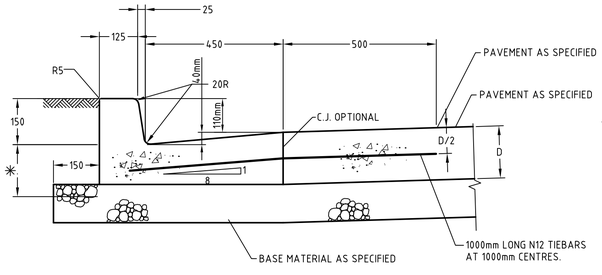
THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. THIS MAY REQUIRE REPAIR AND OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.



SEDIMENT FENCE
NTS

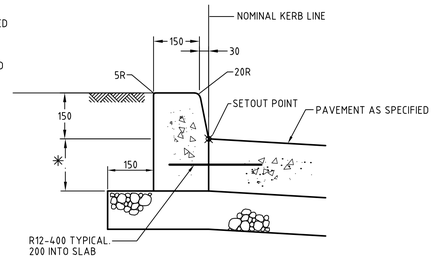


SANDBAG SEDIMENT TRAP FOR KERB INLET AT LOWPOINT
NTS



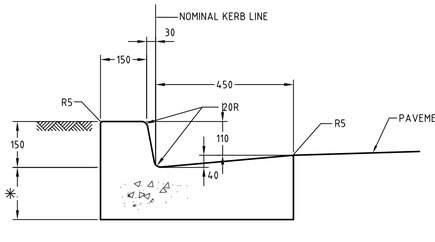
INTEGRAL KERB AND GUTTER (IK&G)
SCALE 1:10

✳ TO SUIT PAVEMENT DEPTH MIN. 150mm



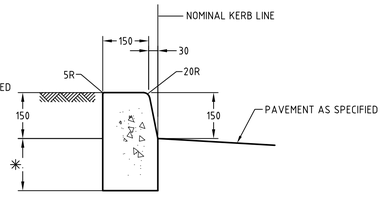
INTEGRAL KERB ONLY (IKO)
SCALE 1:10

✳ TO SUIT PAVEMENT DEPTH MIN. 150mm



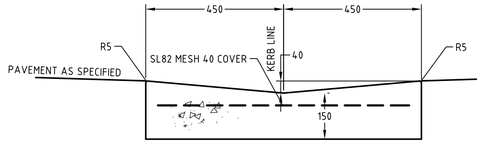
KERB AND GUTTER (K&G)
SCALE 1:10

✳ TO SUIT PAVEMENT DEPTH MIN. 150mm



KERB ONLY (KO)
SCALE 1:10

✳ TO SUIT PAVEMENT DEPTH MIN. 150mm



DISH DRAIN (DD)
SCALE 1:10

0 100 200 400 600 800 1000mm

1 : 10 @ A1 1 : 20 @ A3

0 5 10 15 20m

1 : 200 @ A1 1 : 400 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales: AS SHOWN

Drawn FX | Designed FX | Checked MM | Approved

Height Datum: AHD

Grid:

File: C004.dwg

Client: Goodman

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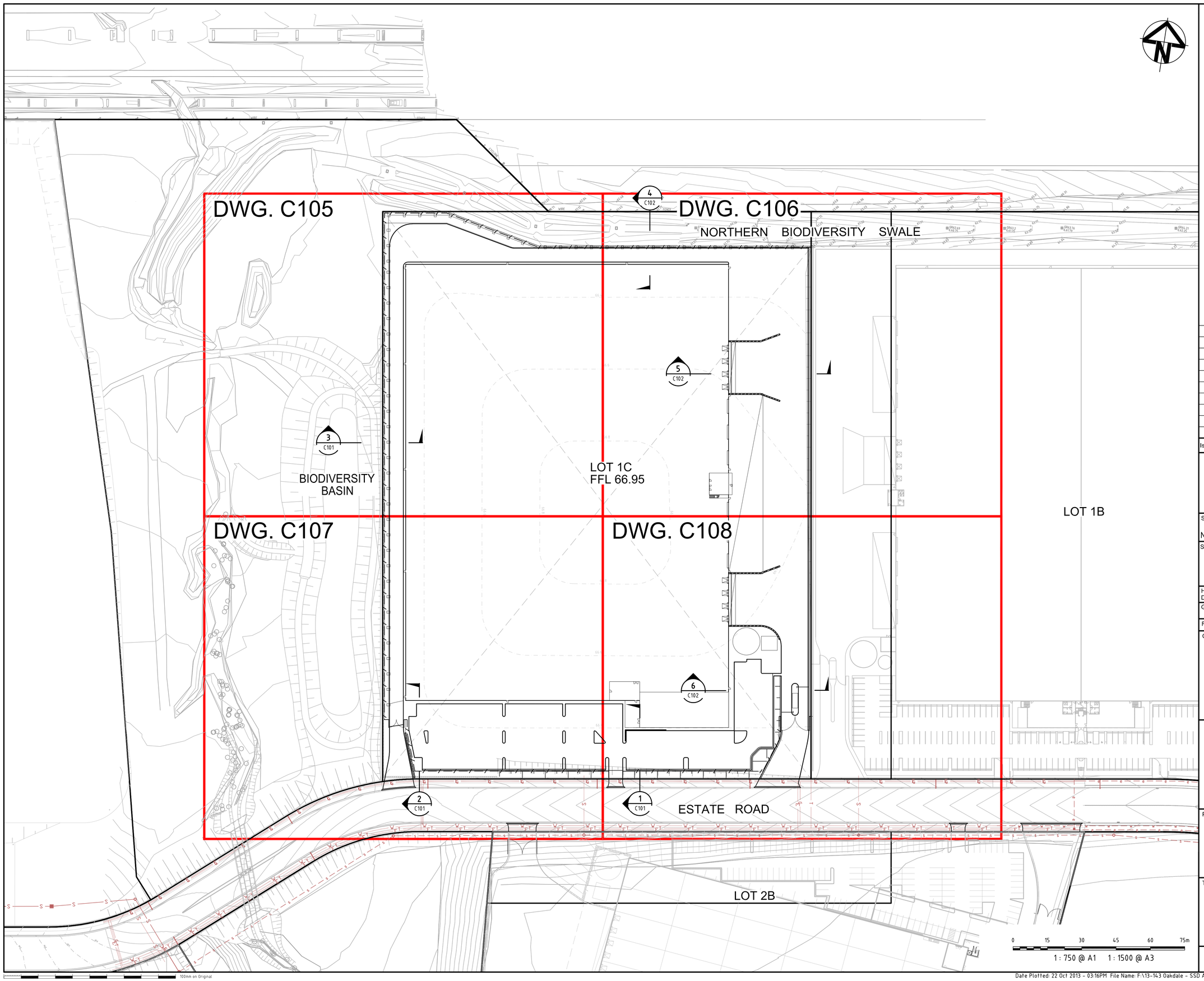
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: SEDIMENTATION, EROSION AND STANDARD DETAILS

Drawing No.	Project No.	Issue
C004	13-143	B

100mm on Original

Date Plotted: 22 Oct 2013 - 03:16PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C004.dwg V1



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 750 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid		Approved	

File: C100.dwg

Client: Goodman

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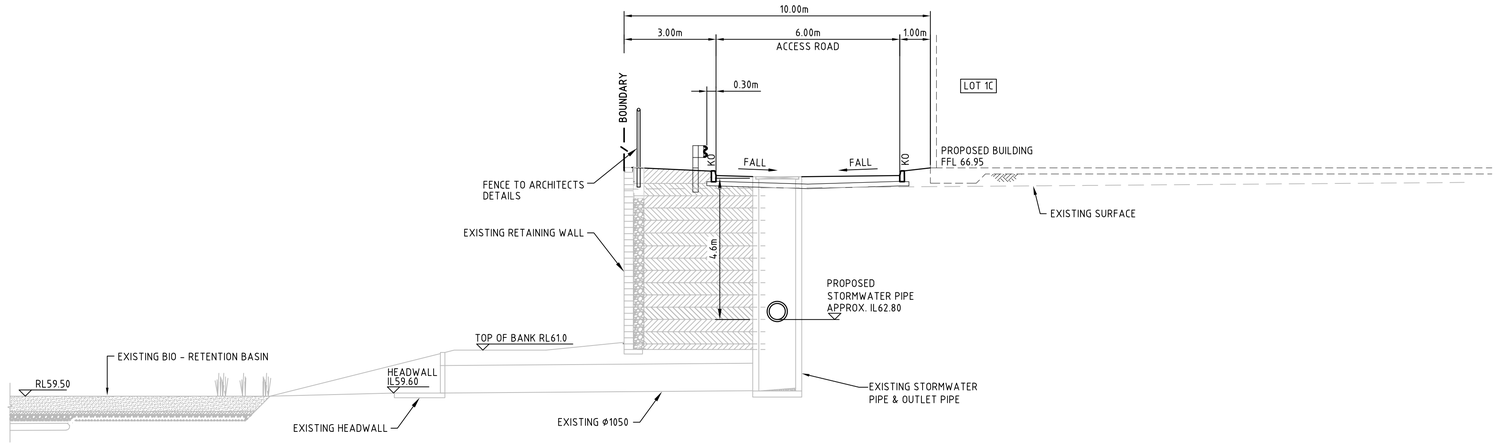
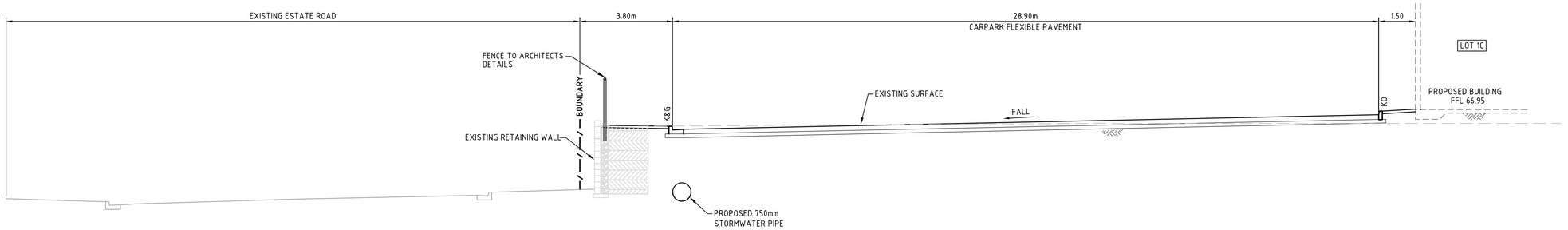
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C
GENERAL ARRANGEMENT

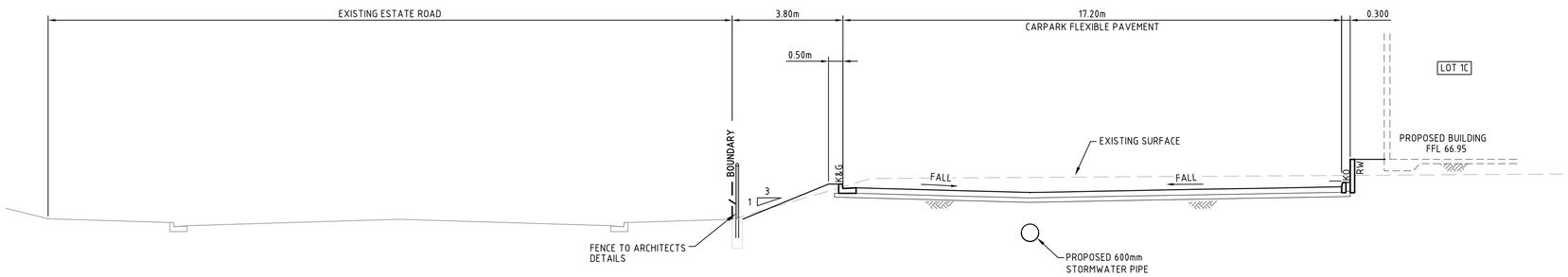
Drawing No.	Project No.	Issue
C100	13-143	B



SECTION 3
1 : 100 C100



SECTION 2
1 : 100 C100



SECTION 1
1 : 100 C100

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales: 1 : 100 @ A1

Drawn: VC
Designed: VC
Checked: MM
Approved:

Height Datum: AHD
Grid:

File: C101.dwg

Client: Goodman

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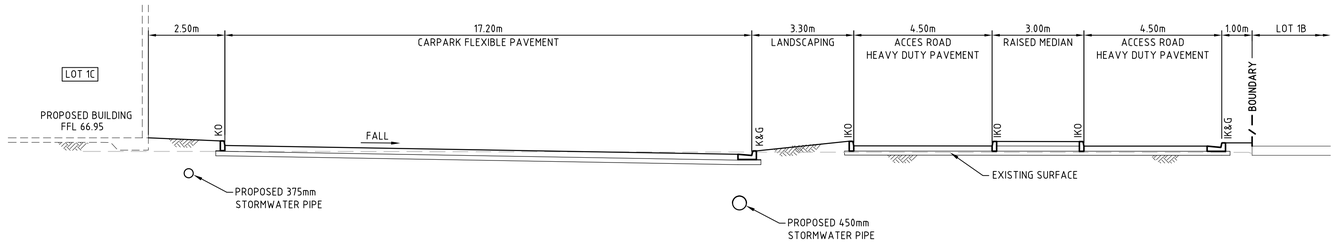
Project:
OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

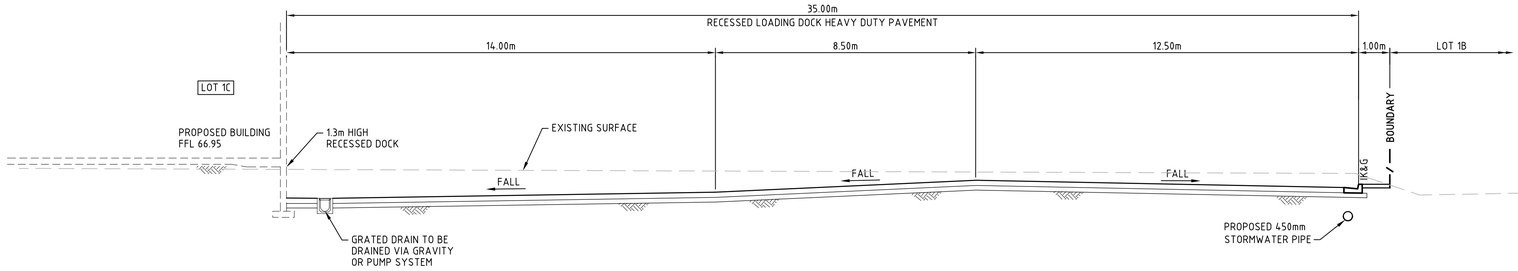
Title:
LOT 1C TYPICAL SECTIONS SHEET 1

Drawing No.	Project No.	Issue
C101	13-143	B

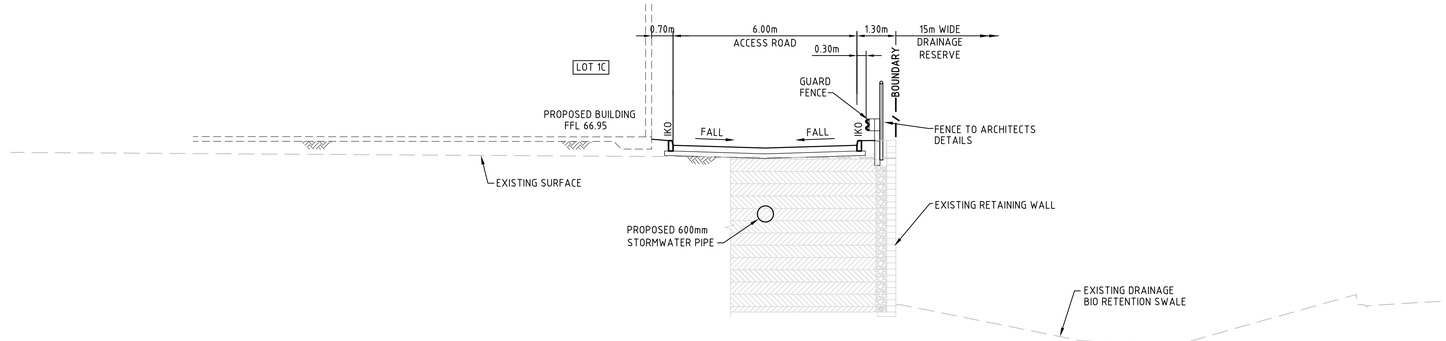
100mm on Original



SECTION 6
1 : 100 C100



SECTION 5
1 : 100 C100



SECTION 4
1 : 100 C100

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION — A1

Scales: 1 : 100 @ A1
Drawn: VC
Designed: VC
Height Datum: AHD
Checked: MM
Grid:
Approved:

File: C102.dwg

Client: Goodman

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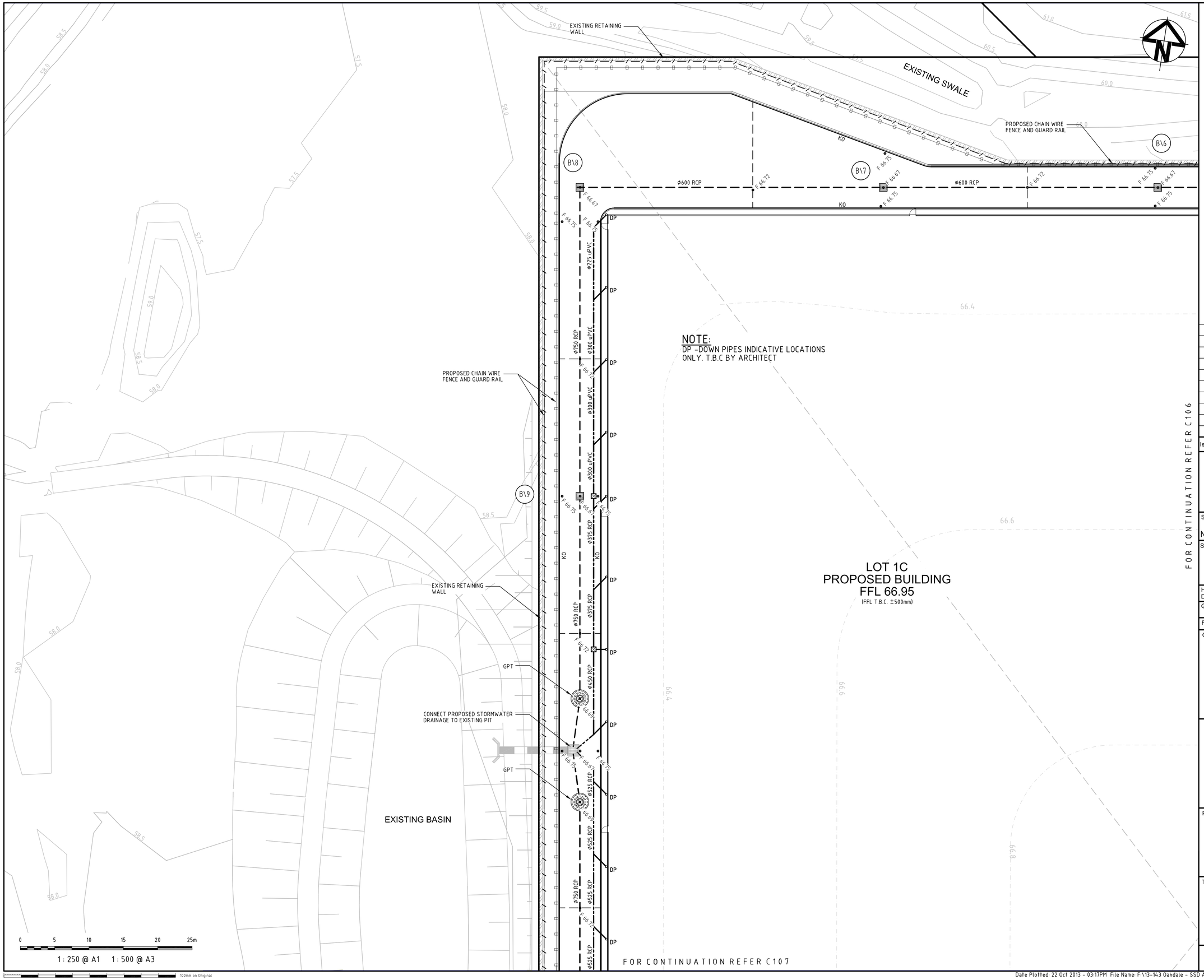
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C TYPICAL
SECTIONS
SHEET 2

Drawing No.	Project No.	Issue
C102	13-143	B

100mm on Original



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid		Approved	

File: C105.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 1

Drawing No.	Project No.	Issue
C105	13-143	B

EXISTING SWALE

EXISTING RETAINING WALL

INV 60.89

INV 60.89

B\5

B\4

B\3

B\2

B\1

ø600 RCP

F 66.72

KO

2.5%

F 66.75

F 66.67

6.00

F 66.75

KO

2.5%

ø600 RCP

F 66.72

ø375 RCP

F 66.60

ø525 RCP

F 65.82

65.60

DP

F 66.95

ø300 uPVC

DP

ø300 uPVC

DP

ø300 uPVC

DP

ø225 uPVC

DP

F 66.95

RETAINING WALL

F 66.73

F 65.70

ø375 RCP

F 65.84

F 65.82

65.67

DP

14.00

8.50

12.50

1.0%

4.6%

1.5%

250 GRATED DRAIN

ø225 uPVC

F 65.70

F 65.84

RETAINING WALL

F 66.65

5.5%

F 66.23

F 66.95

1.4%

DP

ø300 uPVC

DP

ø300 uPVC

DP

ø450 RCP

F 65.57

65.75

DP

ø225 uPVC

DP

15.00

20.00

2.0%

3.2%

ø225 uPVC

DP

F 66.07

F 65.90

3.5%

ø450 RCP

IK&G

F 66.08

F 65.76

F 66.07

F 65.85

F 66.07

F 65.85

F 66.54

F 66.37

F 66.32

F 66.49

F 66.46

F 66.49

F 66.56

F 66.56

F 66.73

F 66.73

DP

F 65.87

F 65.87

F 66.34

F 65.36

F 66.73

DP

F 65.43

DP

F 65.87

F 65.36

F 66.43

F 65.43

F 66.73

DP

DP

DP

DP

DP

DP

DP

DP

F 66.43

F 66.43

F 66.73

F 66.73

66.4

66.6

66.8

66.4

66.6

66.4

66.2

66.0

66.8

66.6

66.4

66.2

66.8

66.6

66.4

66.2

66.6

66.8

8.99

9.99

66.4

66.2

FOR CONTINUATION REFER C105

FOR CONTINUATION REFER C108

LOT 1C
PROPOSED BUILDING
FFL 66.95
(FFL T.B.C. ±500mm)

LOT 1B

NOTE:
DP -DOWN PIPES INDICATIVE LOCATIONS ONLY. T.B.C BY ARCHITECT

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales: 1 : 250 @ A1

Drawn: VC

Designed: VC

Height Datum: AHD

Checked: MM

Grid:

Approved:

File: C106.dwg

Client: Goodman

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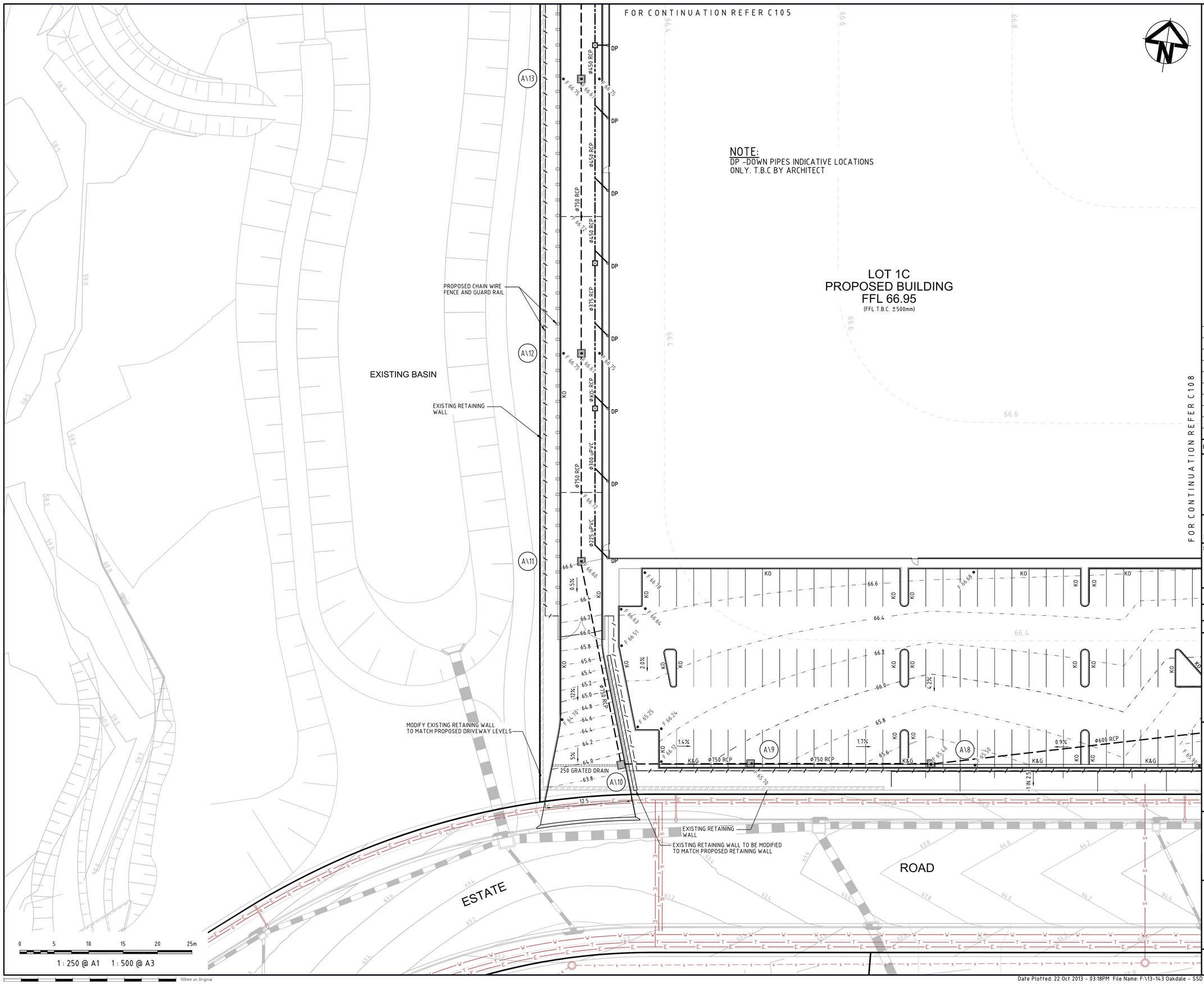
Project:
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title:
LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 2

Drawing No.	Project No.	Issue
C106	13-143	B

FOR CONTINUATION REFER C105



FOR CONTINUATION REFER C108

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn VC
		Designed VC
Height Datum	AHD	Checked MM
Grid	MGA	Approved

File: C107.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 3

Drawing No.	Project No.	Issue
C107	13-143	B

100mm on Original

Date Plotted: 22 Oct 2013 - 03:18PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C107.dwg V1

FOR CONTINUATION REFER C106

FOR CONTINUATION REFER C107

NOTE:
DP -DOWN PIPES INDICATIVE LOCATIONS ONLY. T.B.C BY ARCHITECT

LOT 1C
PROPOSED BUILDING
FFL 66.95
(FFL T.B.C. ±500mm)

LOT 1B

RETAINING WALL
RETAINING WALL
RETAINING WALL (MAX. HEIGHT 0.6m)
PAD LEVEL RL66.80
CREST
1m OVERFLOW SLOT
250 GRATED DRAIN
250 GRATED DRAIN
ESTATE
ROAD

0 5 10 15 20 25m
1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales 1 : 250 @ A1
Height Datum AHD
Grid MGA

Drawn VC
Designed VC
Checked MM
Approved

File: C108.dwg

Client
Goodman

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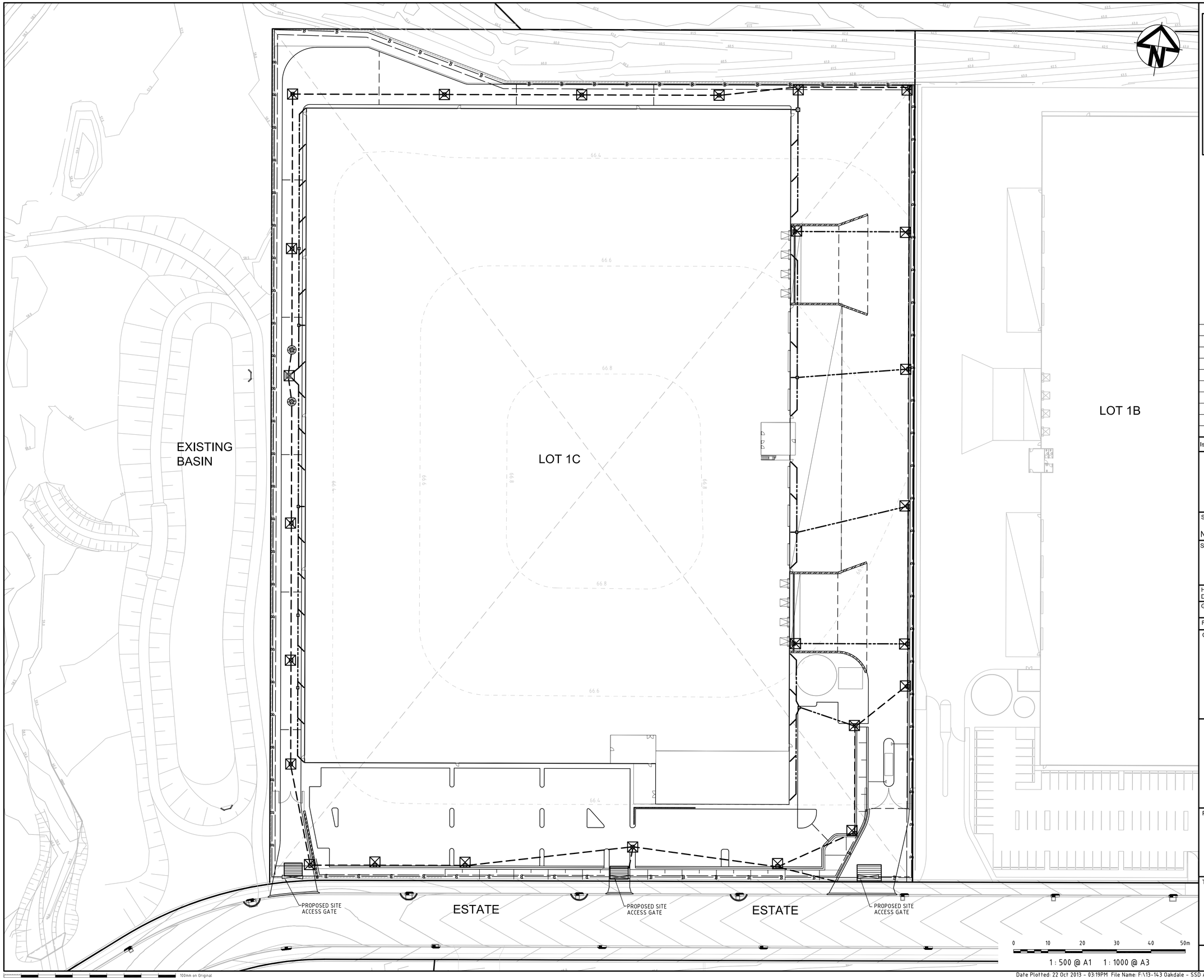
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 4

Drawing No.	Project No.	Issue
C108	13-143	B



LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- B BARRIER FENCE
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales	1 : 500 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C110.dwg

Client: Goodman

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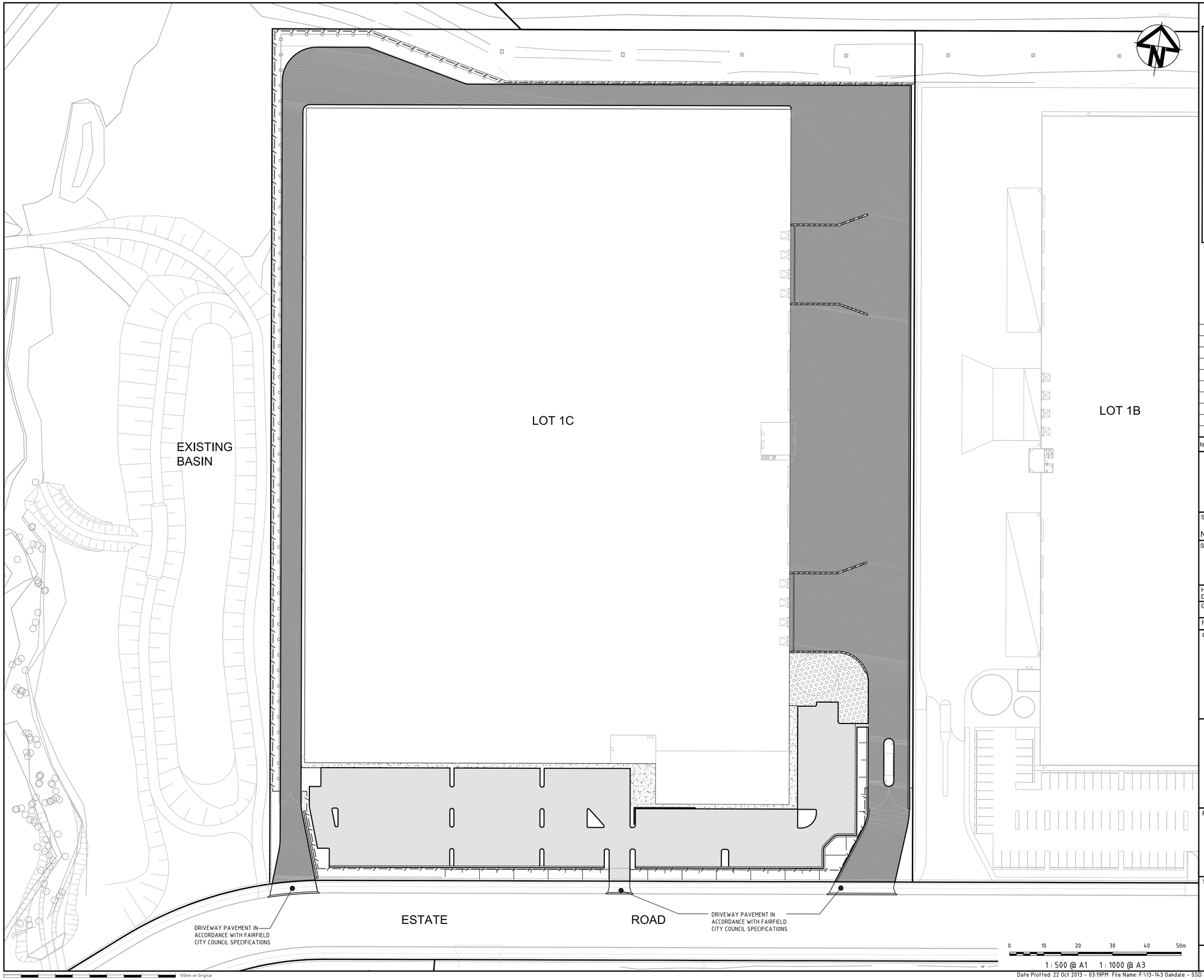
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title
LOT 1C SEDIMENTATION AND EROSION CONTROL PLAN

Drawing No.	Project No.	Issue
C110	13-143	B

100mm on Original

Date Plotted: 22 Oct 2013 - 03:19PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C110.dwg V1



PAVEMENT LEGEND

- HEAVY DUTY RIGID PAVEMENT
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- FOOTPATH PAVEMENT

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales	1 : 500 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C111.dwg

Client: Goodman

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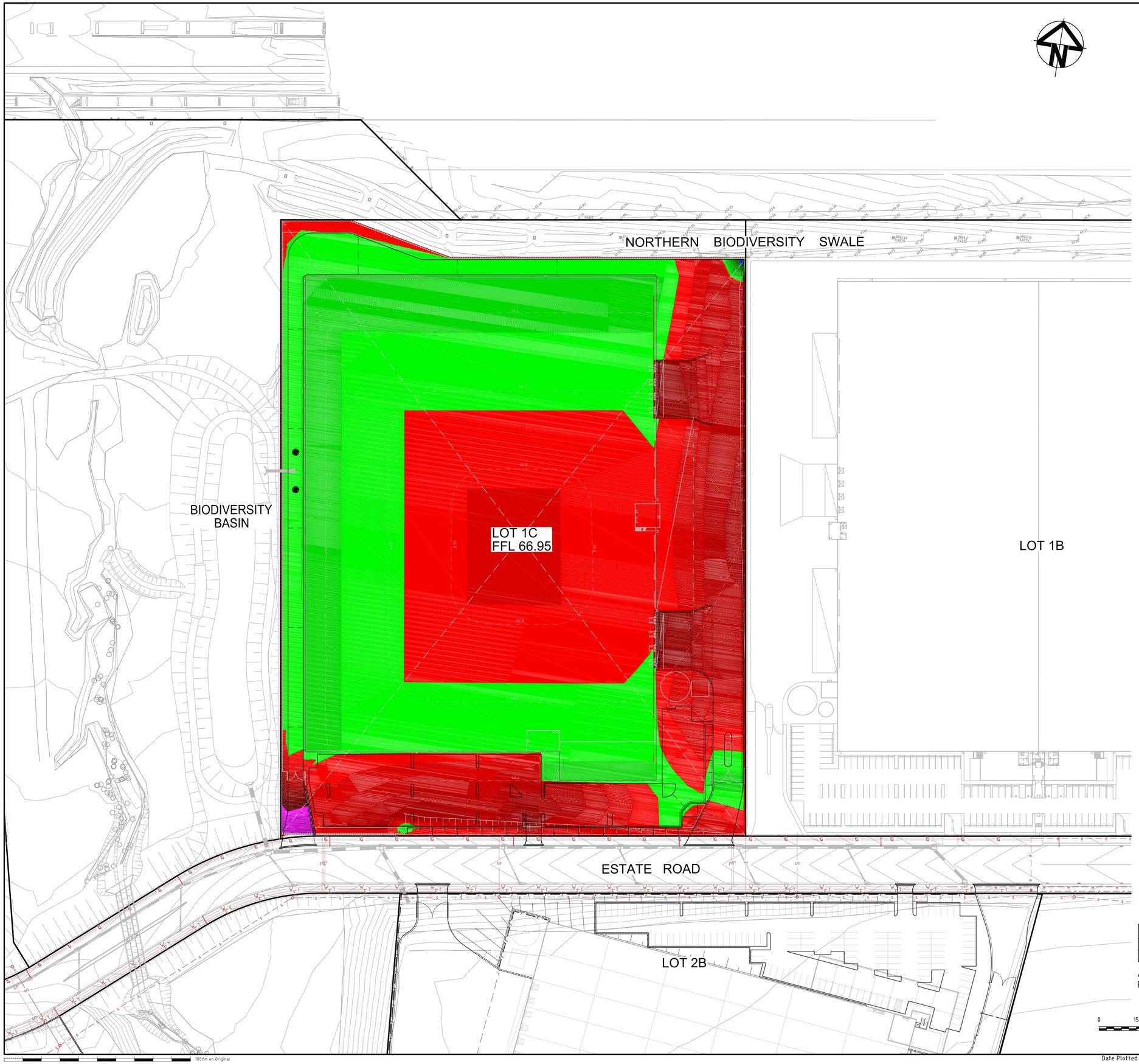
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C PAVEMENT PLAN

Drawing No.	Project No.	Issue
C111	13-143	B

100mm on Original



BULK EARTHWORKS DEPTH LEGEND

LOWER VALUE (m)		UPPER VALUE (m)	COLOUR
-3.4	to	-3.2	
-3.2	to	-3.0	
-3.0	to	-2.8	
-2.8	to	-2.6	
-2.6	to	-2.4	
-2.4	to	-2.2	
-2.2	to	-2.0	
-2.0	to	-1.8	
-1.8	to	-1.6	
-1.6	to	-1.4	
-1.4	to	-1.2	
-1.2	to	-1.0	
-1.0	to	-0.8	
-0.8	to	-0.6	
-0.6	to	-0.4	
-0.4	to	-0.2	
-0.2	to	0.0	
0.0	to	0.2	
0.2	to	0.4	
0.4	to	0.6	
0.6	to	0.8	
0.8	to	1.0	
1.0	to	1.2	
1.2	to	1.4	
1.4	to	1.6	
1.6	to	1.8	
1.8	to	2.0	
2.0	to	2.2	
2.2	to	2.4	
2.4	to	2.6	
2.6	to	2.8	
2.8	to	3.0	
3.0	to	3.2	
3.2	to	3.4	
3.4	to	3.6	
3.6	to	3.8	
3.8	to	4.0	

TOTAL CUT/FILL

TOTAL:	CUT	7529m³
	FILL	3232m³
	BALANCE	4296m³

ASSUMED ON LOT
PAVEMENT DEPTH = 300mm

0 15 30 45 60 75m

1 : 750 @ A1 1 : 1500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 750 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C115.dwg

Client: Goodman

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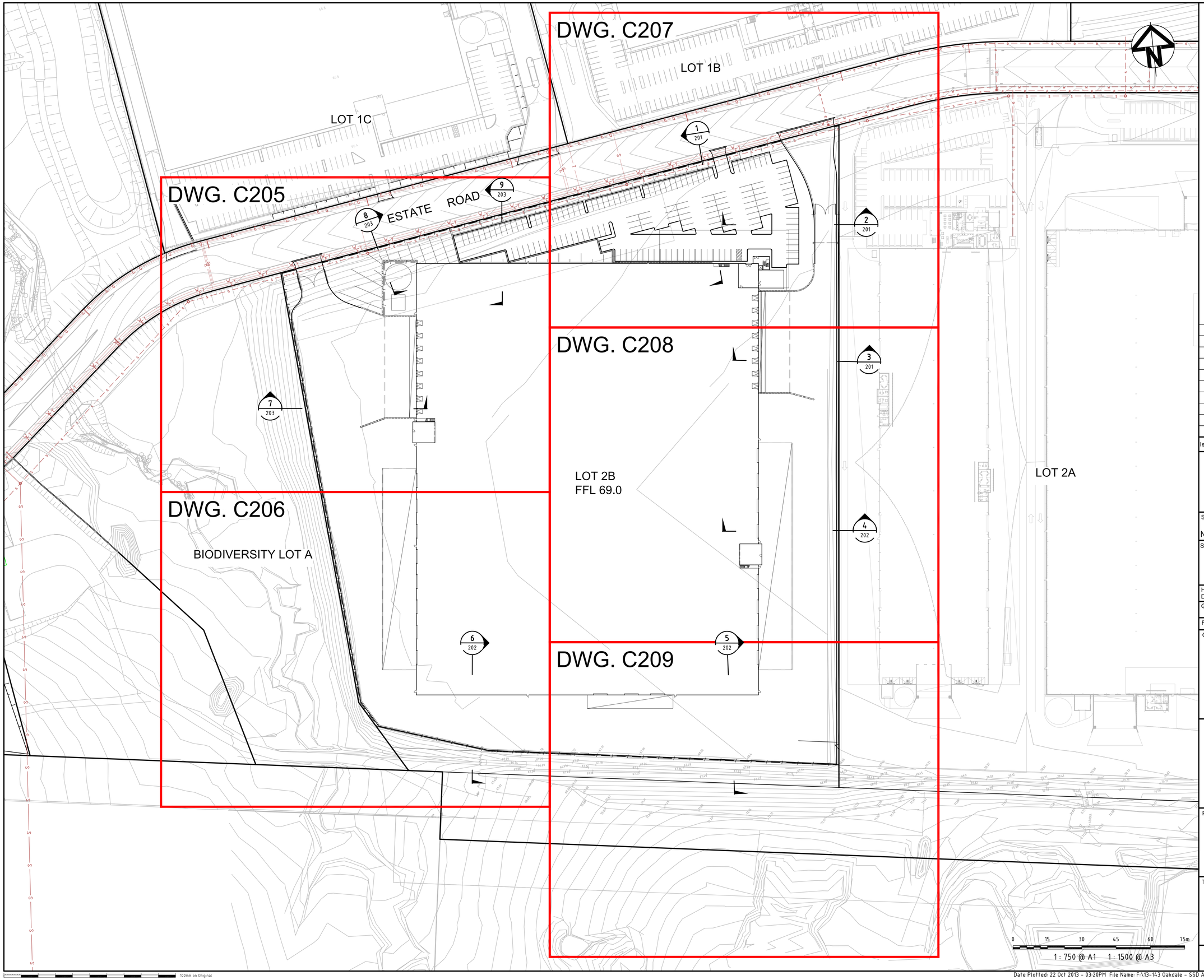
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 1C CUT/FILL PLAN

Drawing No.	Project No.	Issue
C115	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 750 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C200.dwg

Client: Goodman

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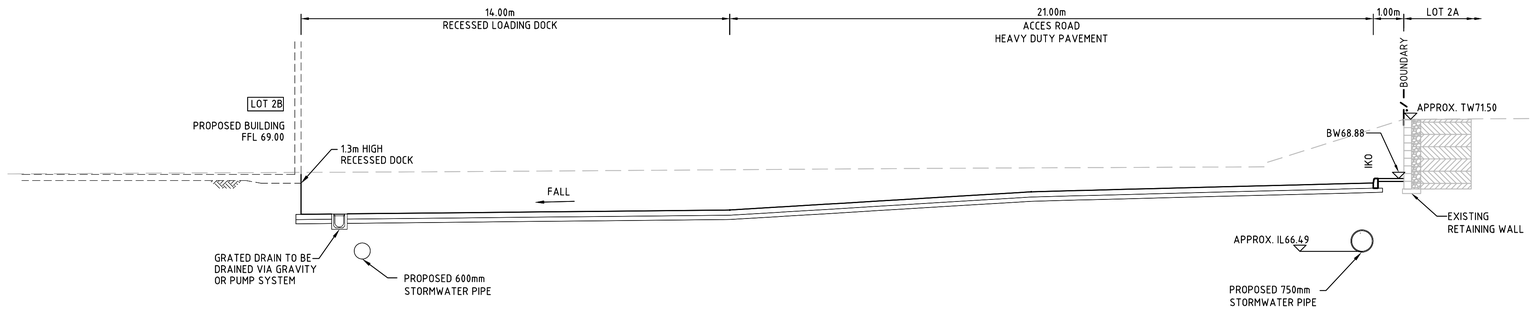
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B
GENERAL ARRANGEMENT

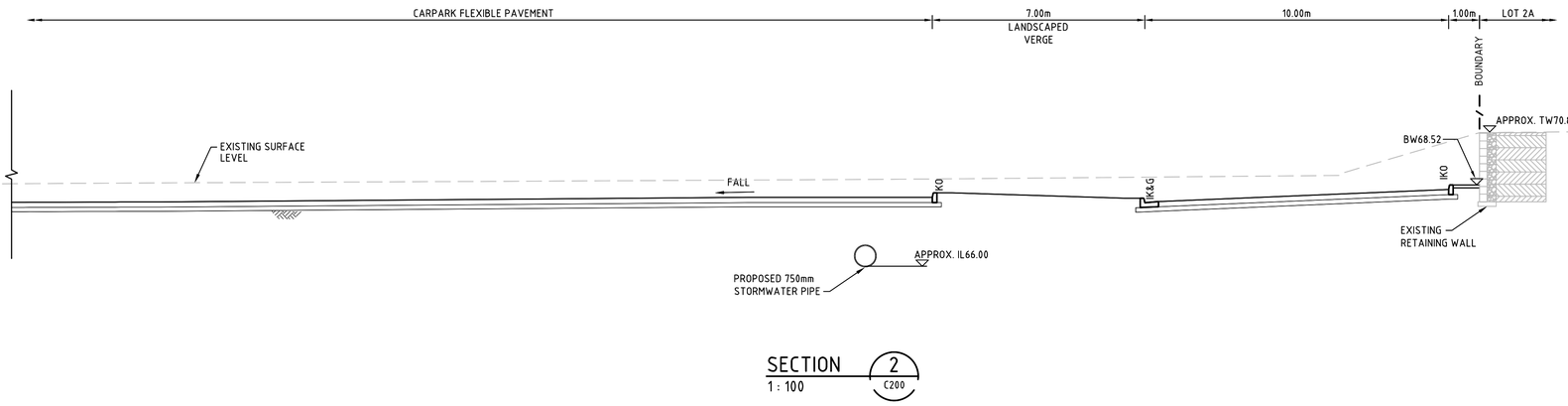
Drawing No.	Project No.	Issue
C200	13-143	B

100mm on Original

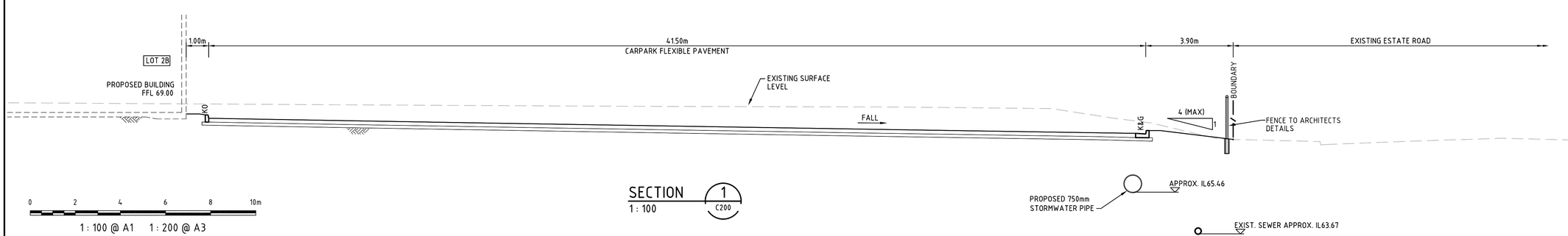
Date Plotted: 22 Oct 2013 - 03:20PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C200.dwg V1



SECTION 3
1 : 100 C200



SECTION 2
1 : 100 C200



SECTION 1
1 : 100 C200

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION — A1

Scales	1 : 100 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C201.dwg

Client: Goodman

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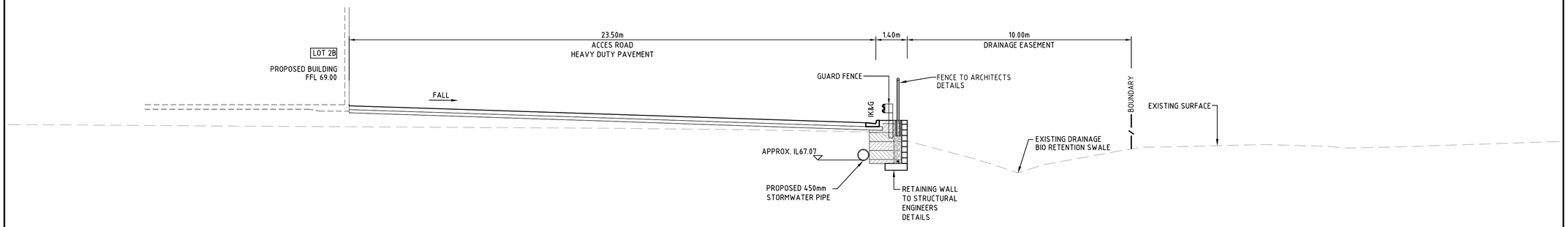
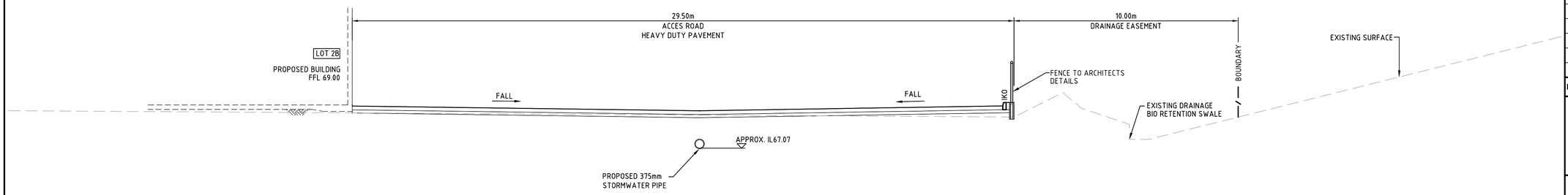
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B TYPICAL
SECTIONS
SHEET 1

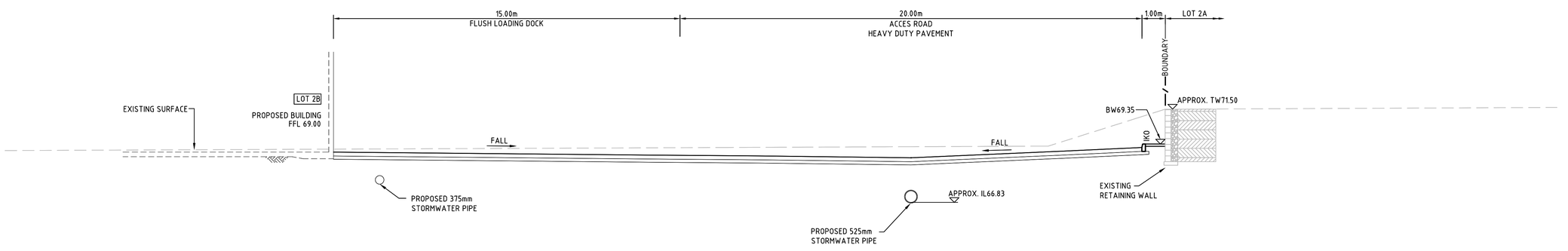
Drawing No.	Project No.	Issue
C201	13-143	B



SECTION 6
1 : 100 C200



SECTION 5
1 : 100 C200



SECTION 4
1 : 100 C200

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 100 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C202.dwg

Client: Goodman

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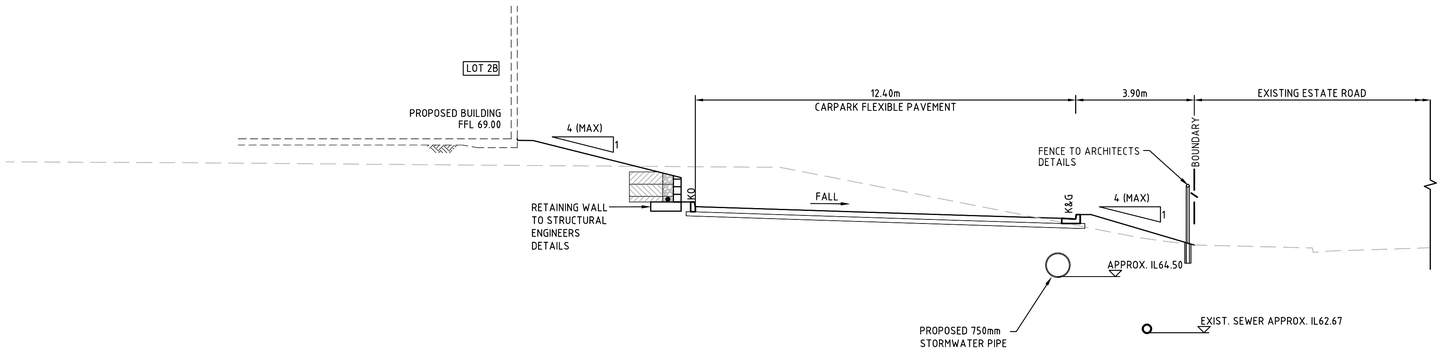
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

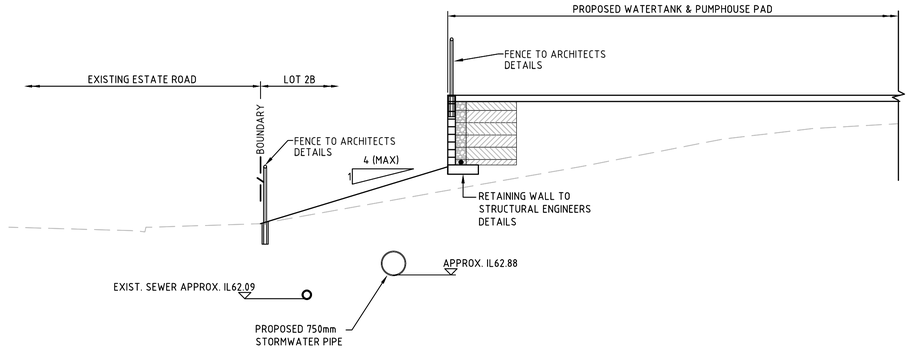
Title
LOT 2B TYPICAL
SECTIONS
SHEET 2

Drawing No.	Project No.	Issue
C202	13-143	B

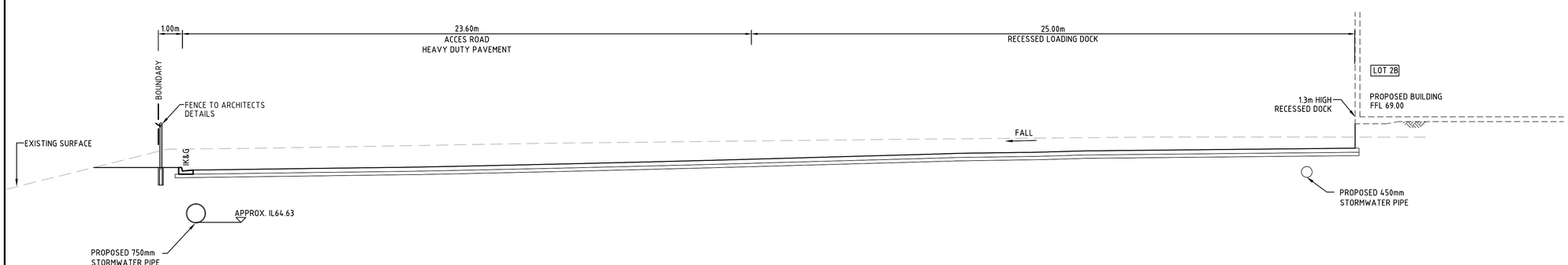
100mm on Original



SECTION 9
1 : 100 C200



SECTION 8
1 : 100 C200



SECTION 7
1 : 100 C200

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 100 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C203.dwg

Client: Goodman

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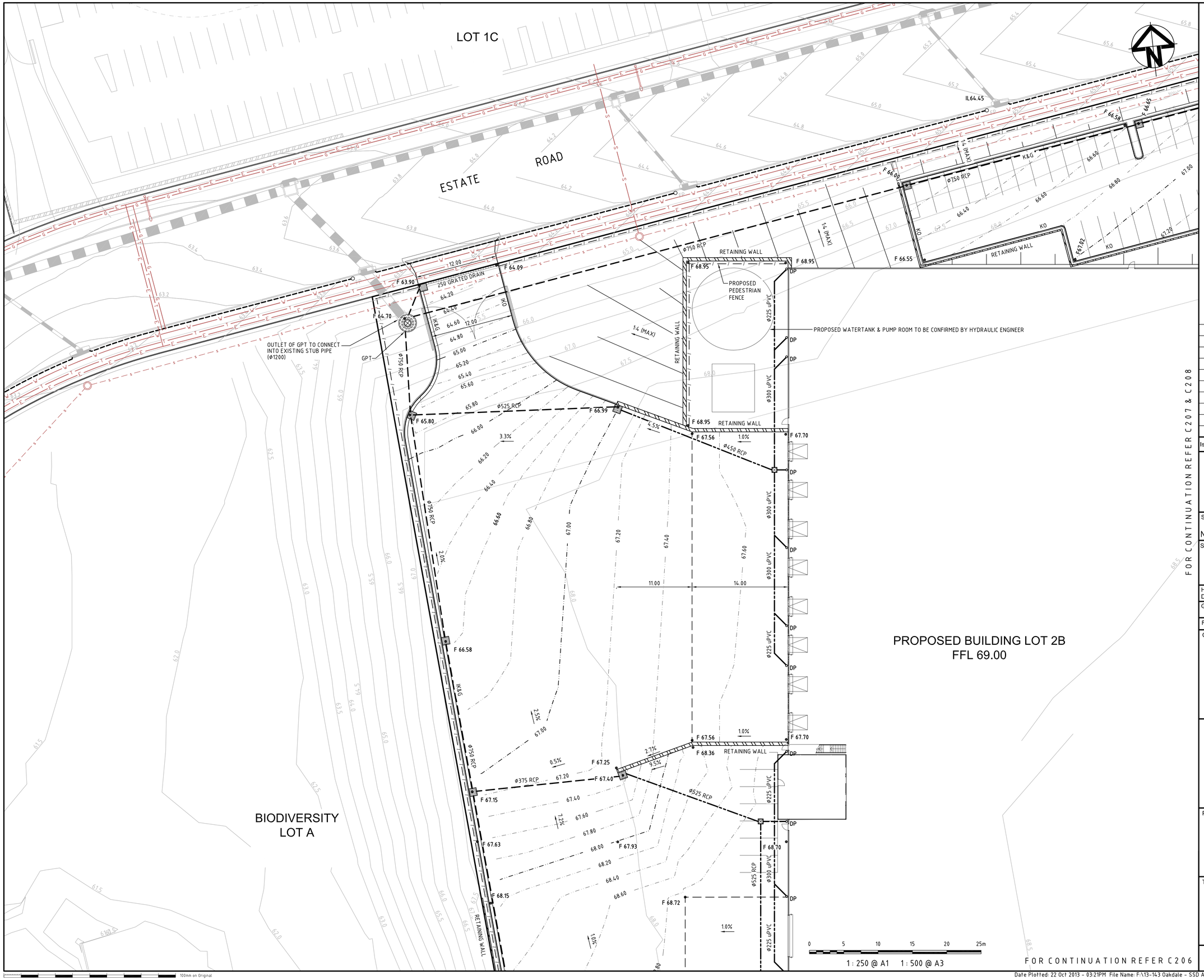
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B TYPICAL
SECTIONS
SHEET 3

Drawing No.	Project No.	Issue
C203	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 250 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	
File:	C205.dwg		

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 1

Drawing No.	Project No.	Issue
C205	13-143	B

100mm on Original

Date Plotted: 22 Oct 2013 - 03:21PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C205.dwg V1

FOR CONTINUATION REFER C205

BIODIVERSITY
LOT A

PROPOSED BUILDING LOT 2B
FFL 69.00

EXISTING SOUTHERN BIO SWALE

F 68.58
Φ600 RCP
F 68.50
69.60
1.4%
IK&G
Φ600 RCP
RETAINING WALL
F 68.70
68.80
15.00
DP
Φ225 uPVC
Φ300 uPVC
Φ450 RCP
1.0%
F 68.52
69.80
0.6%
Φ525 RCP
IK&G
1.0%
F 68.62
0.5%
F 68.74
F 68.72
Φ300 uPVC
Φ225 uPVC
68.80
68.60
3.5%
1.3%
IK&G
68.40
Φ450 RCP
68.20
F 68.08
Φ450 RCP
68.40
F 68.38
RETAINING WALL
10.00

0 5 10 15 20 25m
1 : 250 @ A1 1 : 500 @ A3

FOR CONTINUATION REFER C208 & C209

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C206.dwg

Client: Goodman

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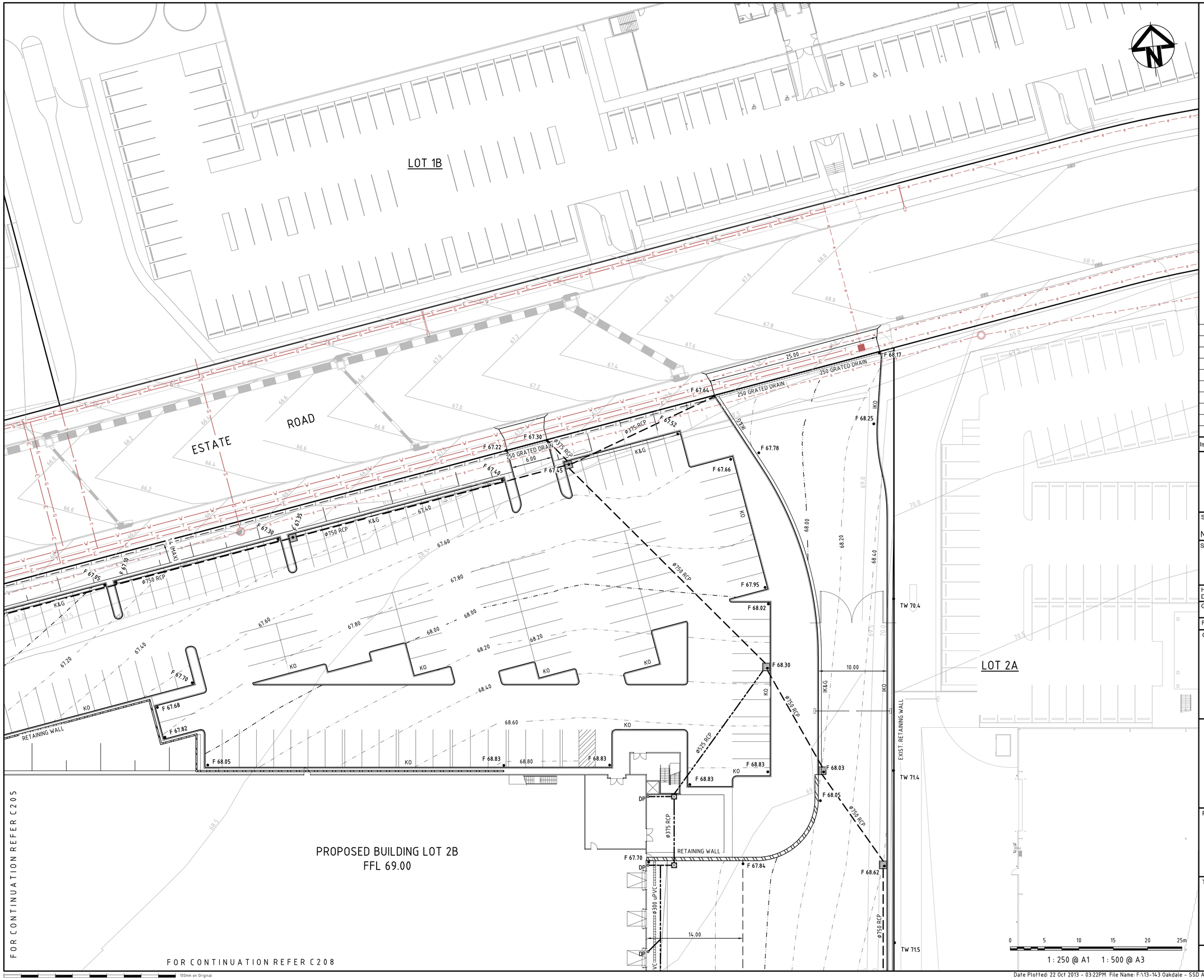
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 2

Drawing No.	Project No.	Issue
C206	13-143	B

100mm on Original



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 250 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	
File:	C207.dwg		

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 3

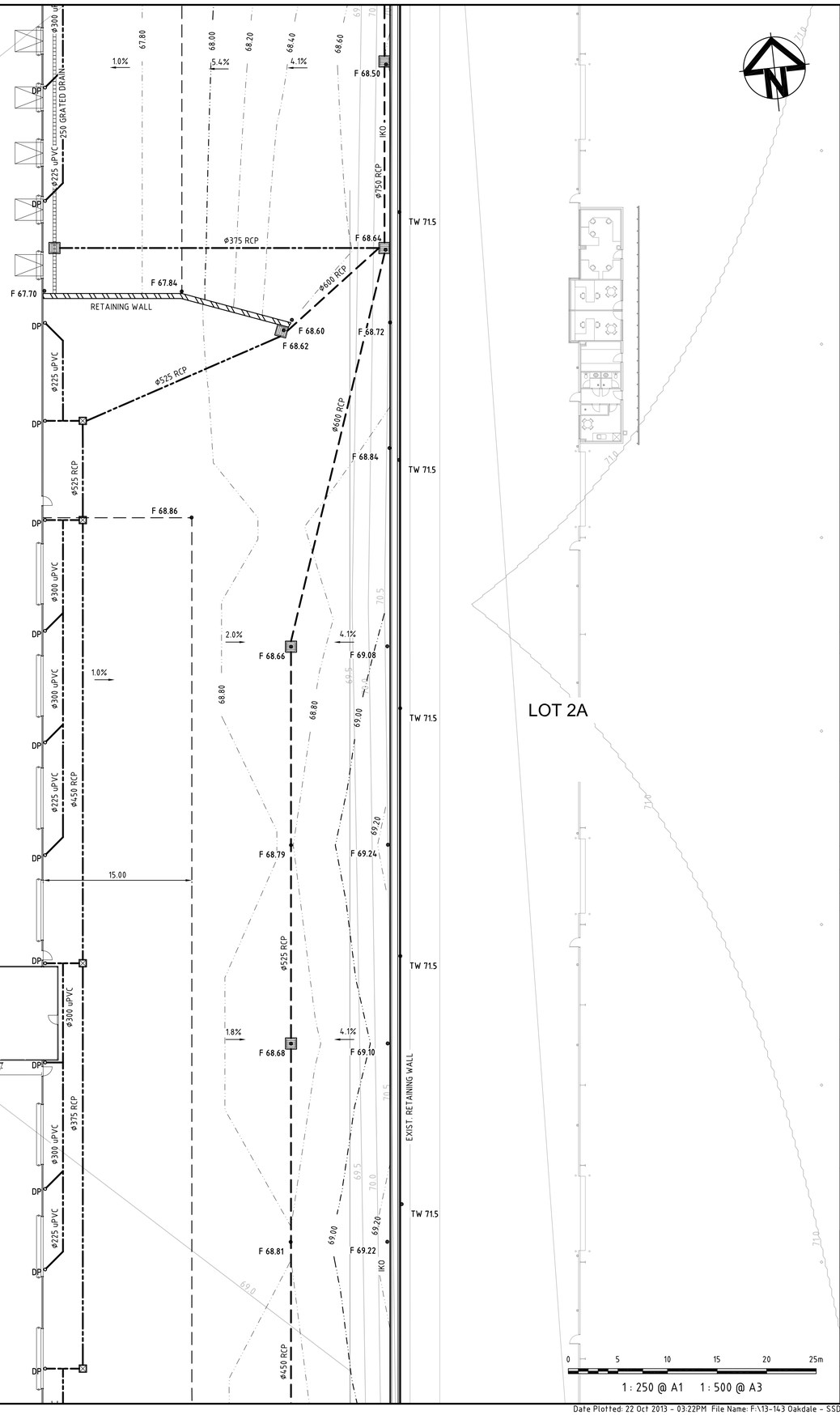
Drawing No.	Project No.	Issue
C207	13-143	B

100mm on Original

FOR CONTINUATION REFER C205

FOR CONTINUATION REFER C207

PROPOSED BUILDING LOT 2B
FFL 69.00



LOT 2A

FOR CONTINUATION REFER C206

FOR CONTINUATION REFER C209

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

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		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C208.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 4

Drawing No.	Project No.	Issue
C208	13-143	B

FOR CONTINUATION REFER C208

FOR CONTINUATION REFER C206

PROPOSED BUILDING LOT 2B
FFL 69.00

LOT 2A

EXISTING SOUTHERN BIO SWALE

RETAINING WALL

EXIST. RETAINING WALL

FUTURE RAMP ACCESS TO LOT 2A

IK&G

IKO

DP

Φ300 uPVC

Φ225 uPVC

Φ375 RCP

F 68.60 F 68.78 F 68.62 F 68.80 F 68.64 F 68.82

F 67.56 F 68.70 F 68.81 F 68.95 F 69.00 F 69.05 F 68.86 F 68.70 F 69.12 F 68.90 F 69.00 F 69.40 F 69.20 F 69.25

TW 71.5 TW 71.3 E 70.15 TW 70.6 TW 70.5

1.0% 2.3% 2.2% 2.0% 1.5% 2.7% 1.6% 4.1%

10.00

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C209.dwg

Client: Goodman

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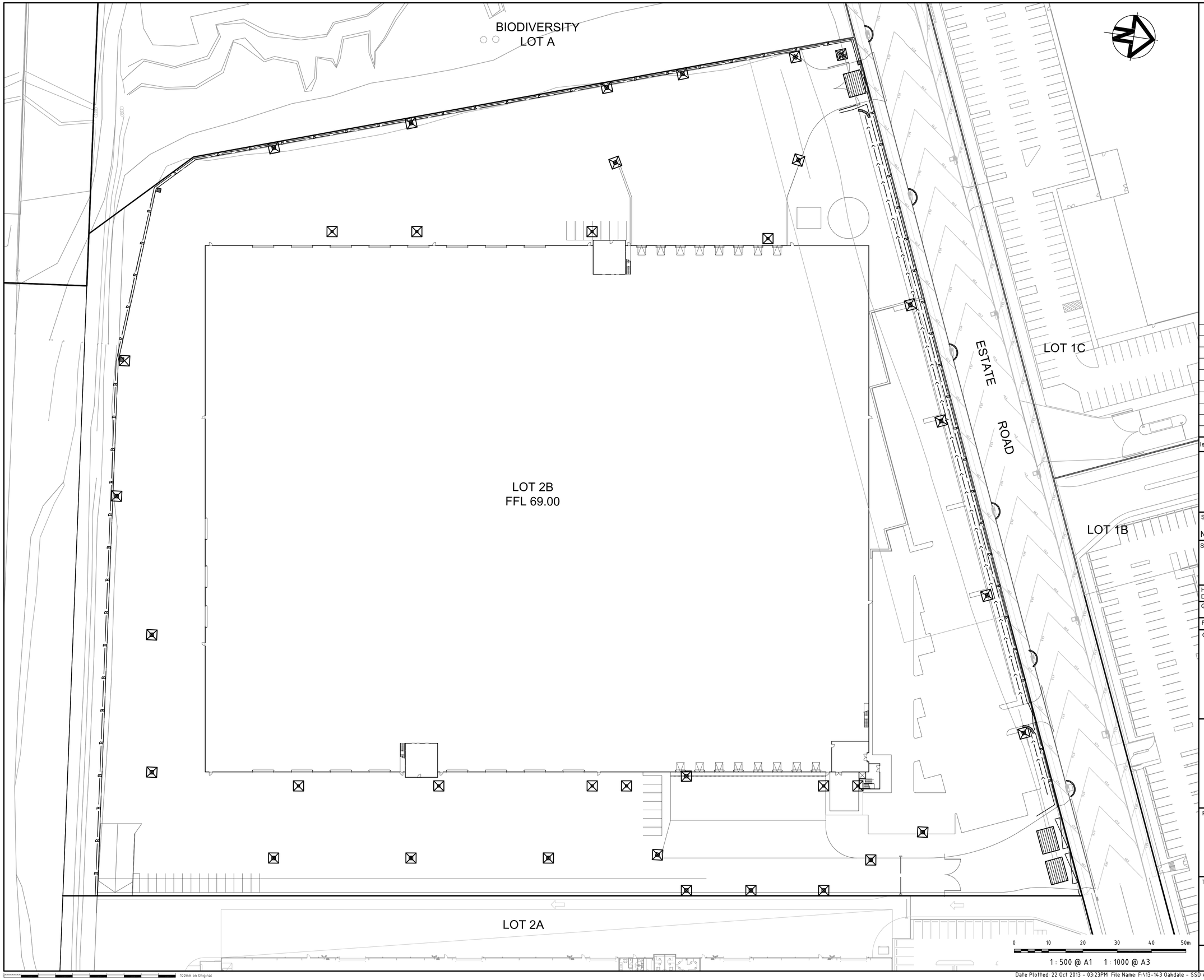
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 5

Drawing No.	Project No.	Issue
C209	13-143	B



LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 500 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C211.dwg

Client: Goodman

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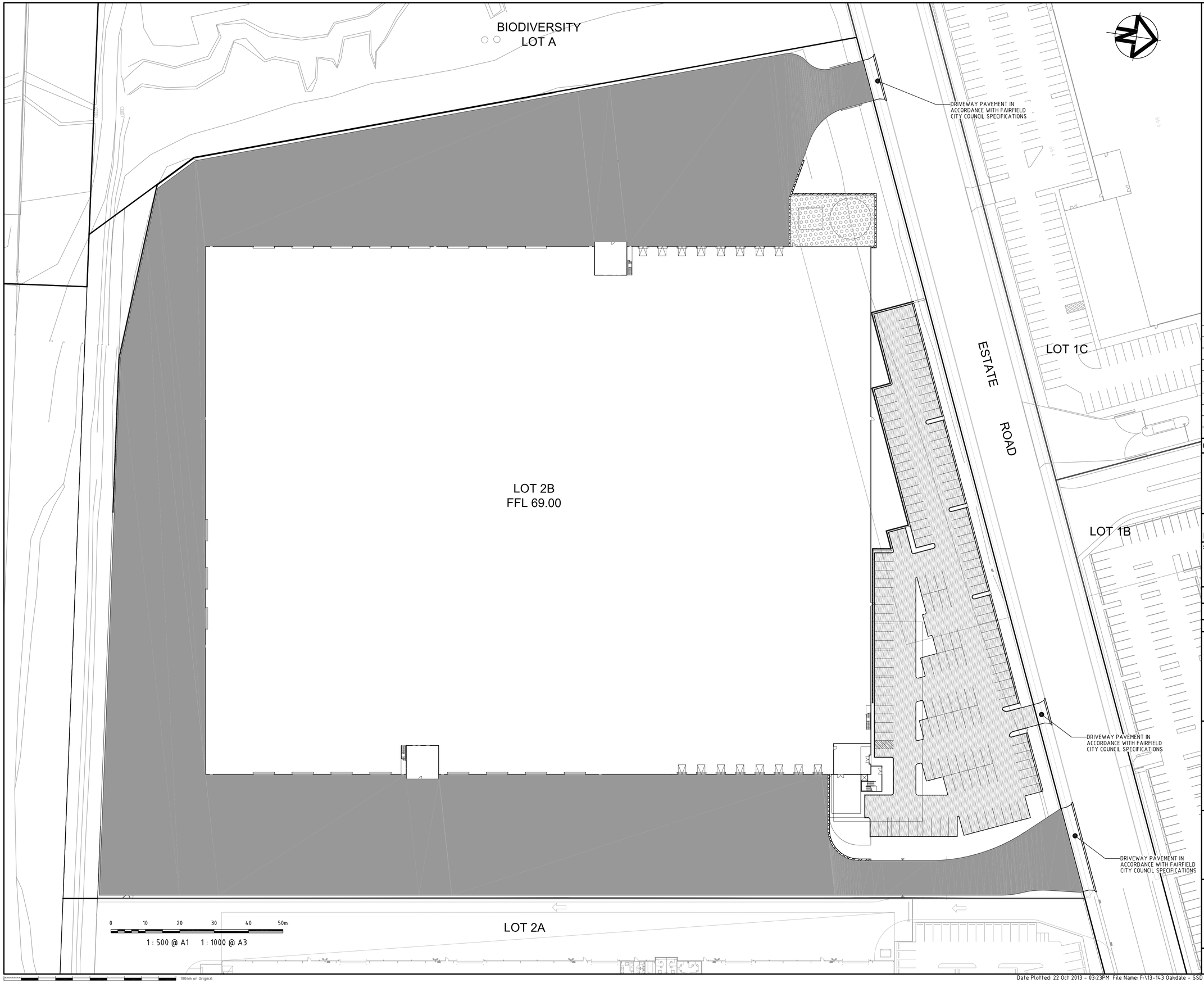
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 2B SEDIMENTATION AND EROSION CONTROL PLAN

Drawing No.	Project No.	Issue
C211	13-143	B

100mm on Original

Date Plotted: 22 Oct 2013 - 03:23PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C211.dwg V1



PAVEMENT LEGEND

- HEAVY DUTY RIGID PAVEMENT
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- FOOTPATH PAVEMENT

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION — A1

Scales	1 : 500 @ A1	Drawn	VC
		Designed	VC
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C212.dwg

Client: Goodman

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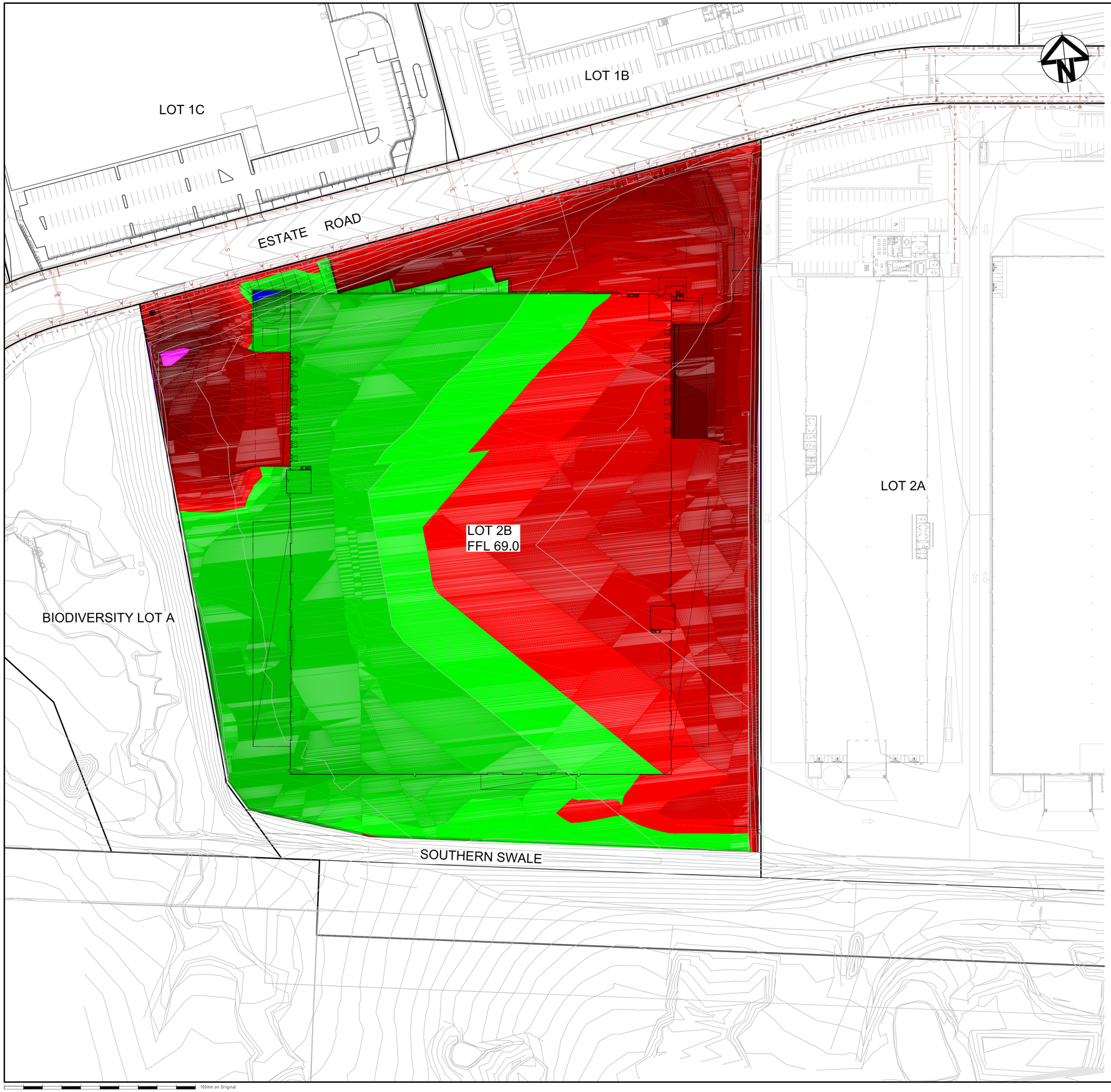
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title
LOT 2B PAVEMENT PLAN

Drawing No.	Project No.	Issue
C212	13-143	B

100mm on Original



BULK EARTHWORKS DEPTH LEGEND

LOWER VALUE (m)		UPPER VALUE (m)	COLOUR
-3.4	to	-3.2	
-3.2	to	-3.0	
-3.0	to	-2.8	
-2.8	to	-2.6	
-2.6	to	-2.4	
-2.4	to	-2.2	
-2.2	to	-2.0	
-2.0	to	-1.8	
-1.8	to	-1.6	
-1.6	to	-1.4	
-1.4	to	-1.2	
-1.2	to	-1.0	
-1.0	to	-0.8	
-0.8	to	-0.6	
-0.6	to	-0.4	
-0.4	to	-0.2	
-0.2	to	0.0	
0.0	to	0.2	
0.2	to	0.4	
0.4	to	0.6	
0.6	to	0.8	
0.8	to	1.0	
1.0	to	1.2	
1.2	to	1.4	
1.4	to	1.6	
1.6	to	1.8	
1.8	to	2.0	
2.0	to	2.2	
2.2	to	2.4	
2.4	to	2.6	
2.6	to	2.8	
2.8	to	3.0	
3.0	to	3.2	
3.2	to	3.4	
3.4	to	3.6	
3.6	to	3.8	
3.8	to	4.0	

TOTAL CUT/FILL

TOTAL: CUT	18291m³
FILL	9442m³
REMOVAL BALANCE	8849m³

ASSUMED ON LOT PAVEMENT DEPTH = 300mm

0 15 30 45 60 75m

1 : 750 @ A1 1 : 1500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 750 @ A1	Drawn VC	
		Designed VC	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C215.dwg

Client: Goodman

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 2B CUT/FILL PLAN

Drawing No.	Project No.	Issue
C215	13-143	B

DWG. C305

DWG. C306

DWG. C307

DWG. C308

DWG. C309

DWG. C310

DWG. C311

DWG. C312

LOT 3

BIODIVERSITY BASIN

6 C302

7 C303

8 C303

9 C303

5 C302

4 C302

10 C303

11 C304

3 C301

2 C301

1 C301

0 20 40 60 80 100m

1 : 1000 @ A1 1 : 2000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales: 1 : 1000 @ A1

Drawn: FX
Designed: FX
Height Datum: AHD
Checked: MM
Grid: MGA
Approved:

File: C300.dwg

Client: Goodman

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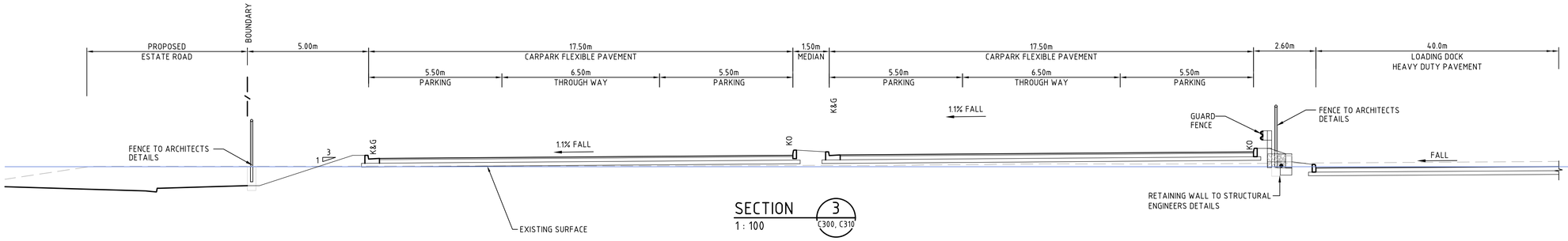
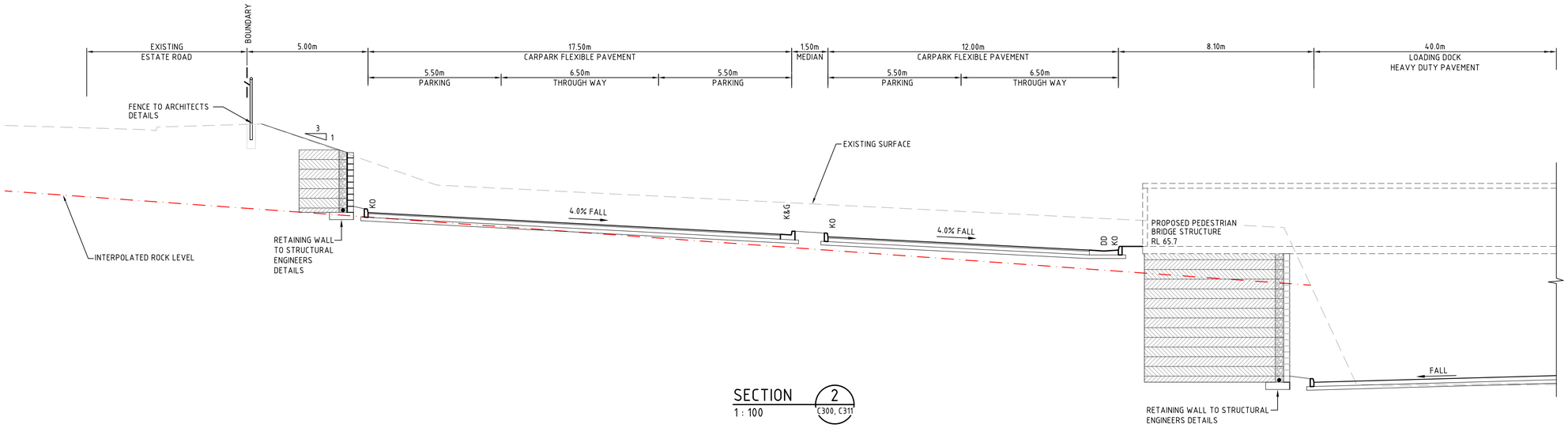
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3
GENERAL ARRANGEMENT

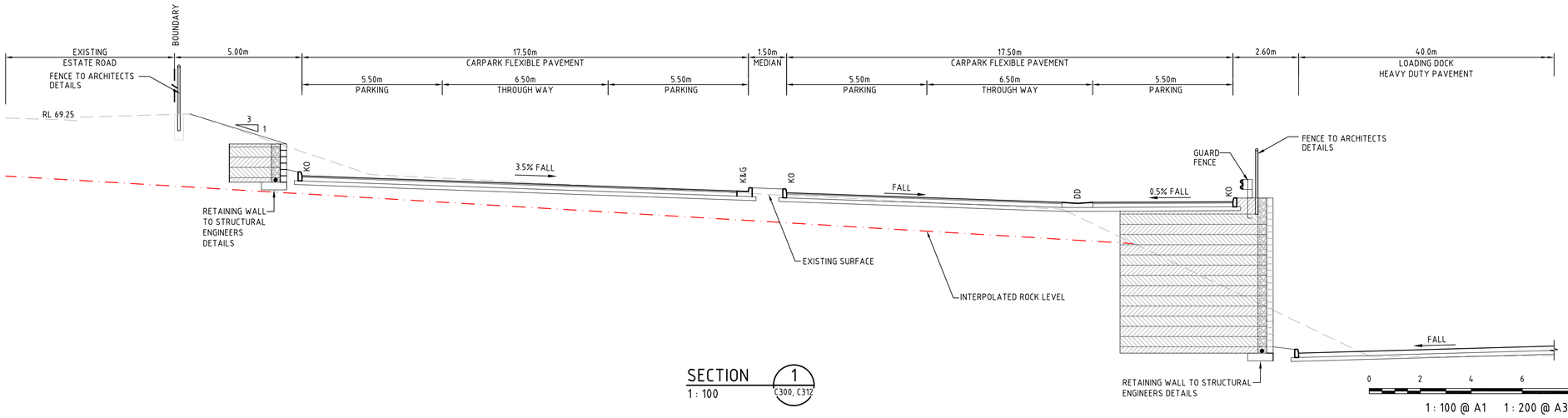
Drawing No.	Project No.	Issue
C300	13-143	B



SECTION 3
1 : 100
C300, C310



SECTION 2
1 : 100
C300, C311



SECTION 1
1 : 100
C300, C312

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 100 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C301.dwg

Client: Goodman

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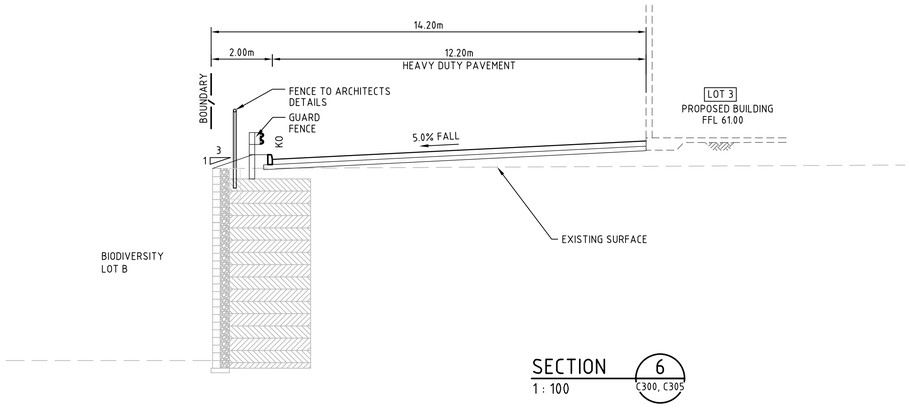
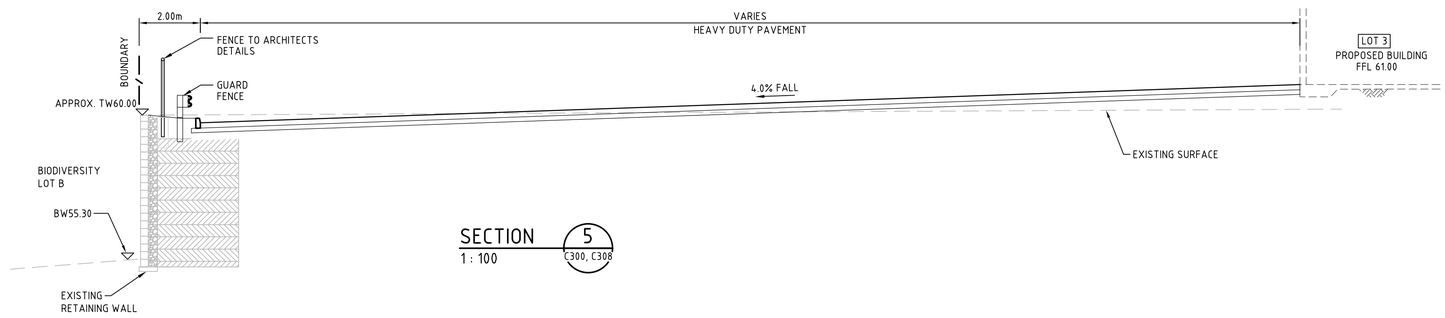
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 TYPICAL SECTIONS SHEET 1

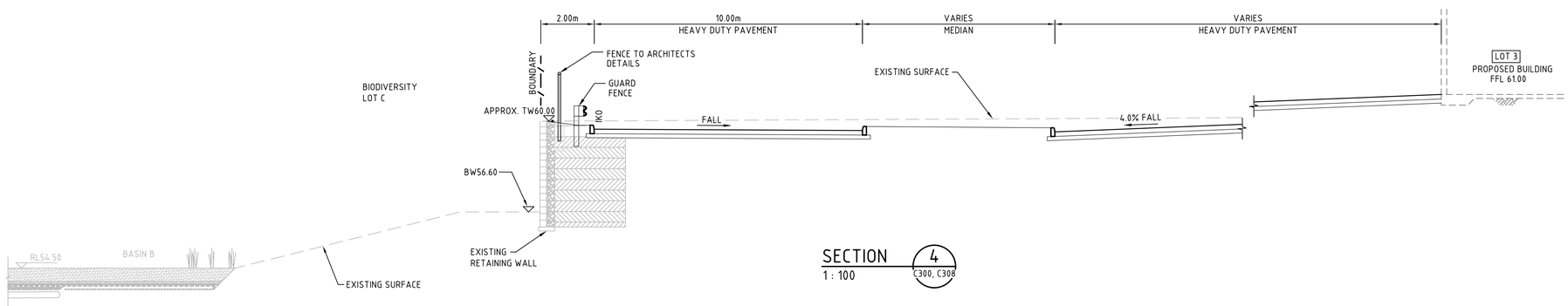
Drawing No.	Project No.	Issue
C301	13-143	B



SECTION 6
1 : 100
C300, C305



SECTION 5
1 : 100
C300, C308



SECTION 4
1 : 100
C300, C308

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 100 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C302.dwg

Client: Goodman

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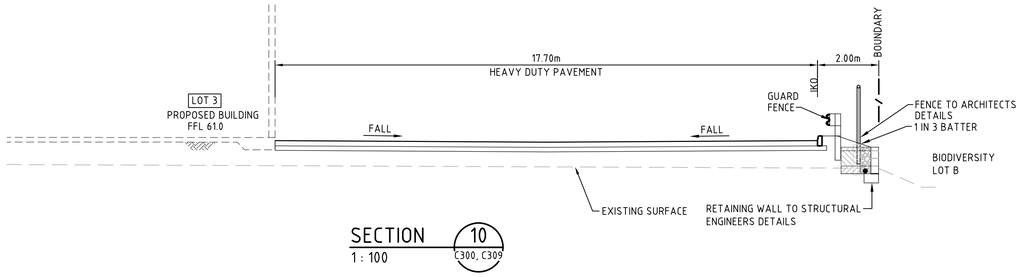
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

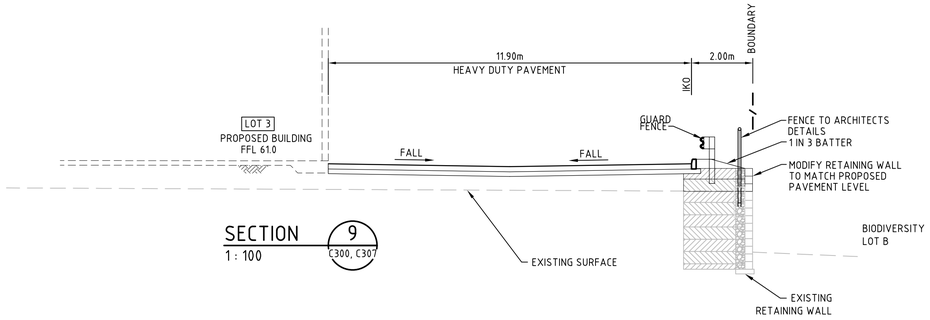
Title
LOT 3 TYPICAL
SECTIONS
SHEET 2

Drawing No.	Project No.	Issue
C302	13-143	B

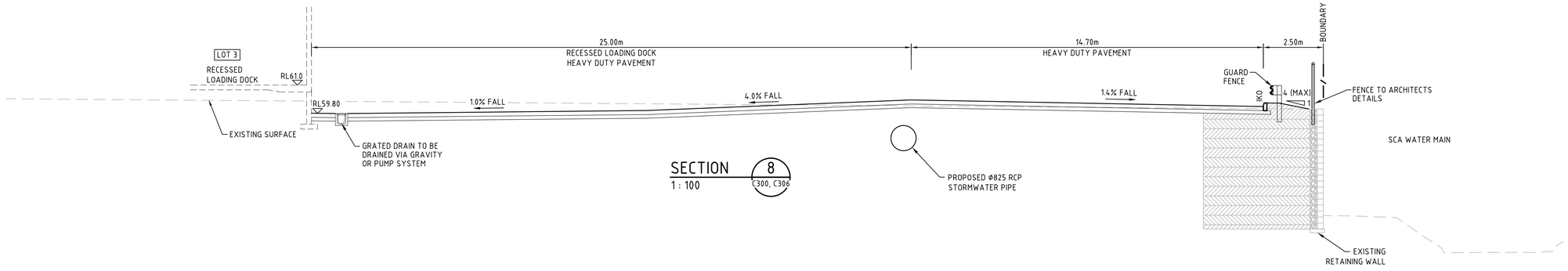
100mm on Original



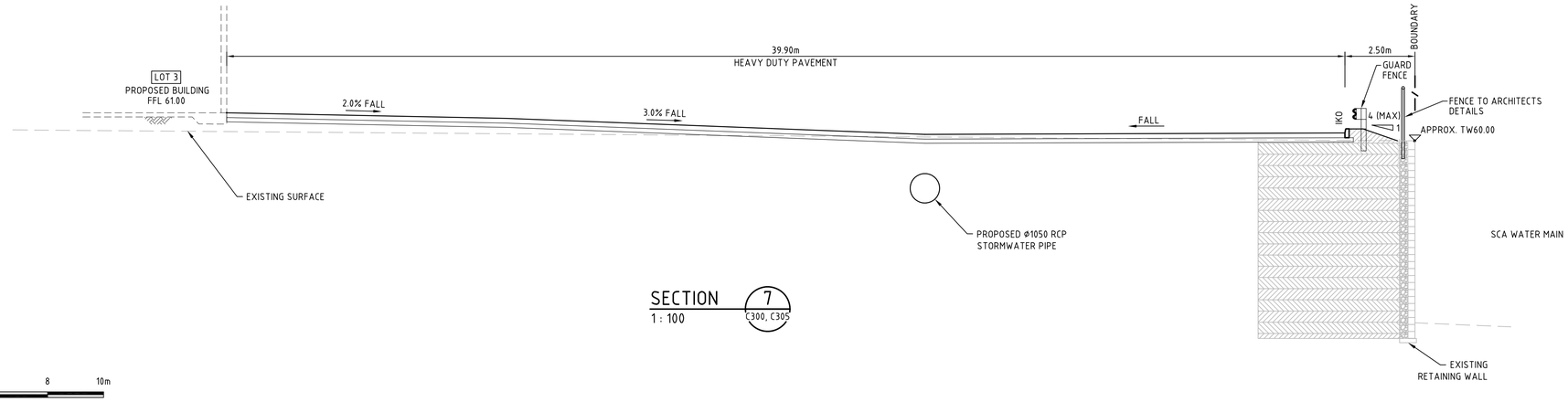
SECTION 10
1 : 100 C300, C309



SECTION 9
1 : 100 C300, C307



SECTION 8
1 : 100 C300, C306



SECTION 7
1 : 100 C300, C305

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 100 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C303.dwg

Client: Goodman

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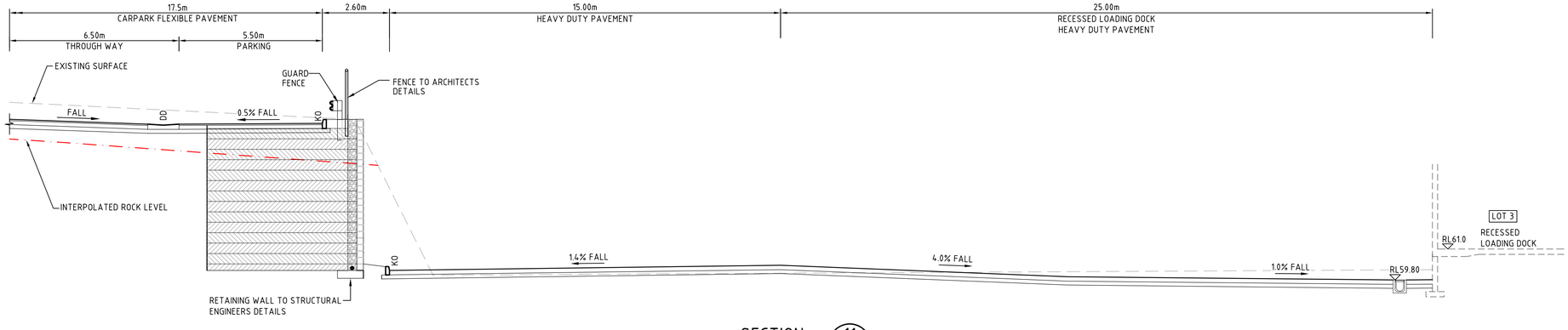
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 TYPICAL
SECTIONS
SHEET 3

Drawing No.	Project No.	Issue
C303	13-143	B



SECTION 11
1 : 100
C300, C312

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales: 1 : 100 @ A1

Drawn: FX
Designed: FX
Checked: MM
Approved:

Height Datum: AHD
Grid: MGA

File: C304.dwg

Client: Goodman

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Project
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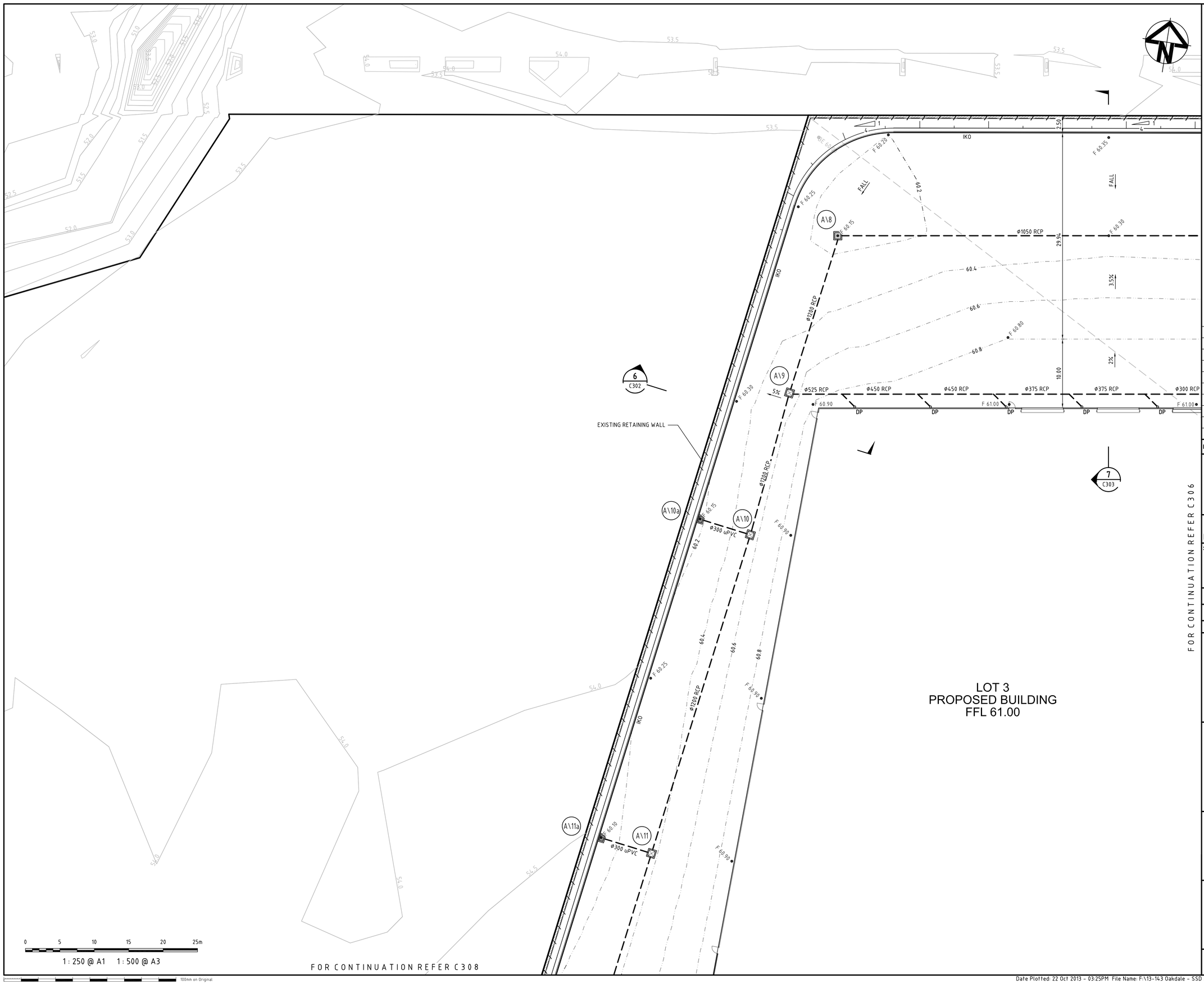
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 TYPICAL
SECTIONS
SHEET 4

Drawing No.	Project No.	Issue
C304	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 250 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C305.dwg

Client: Goodman

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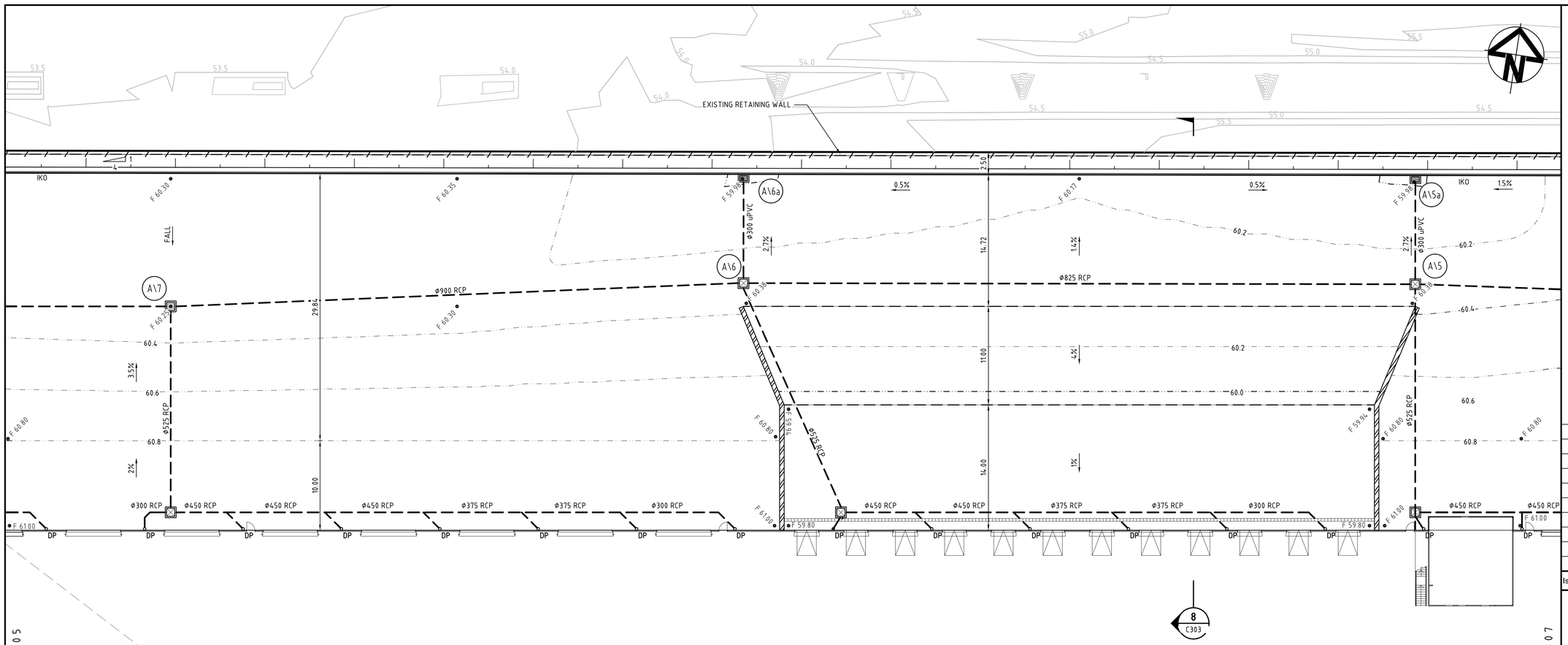
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title: LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 1

Drawing No.	Project No.	Issue
C305	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 250 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C306.dwg

Client: Goodman

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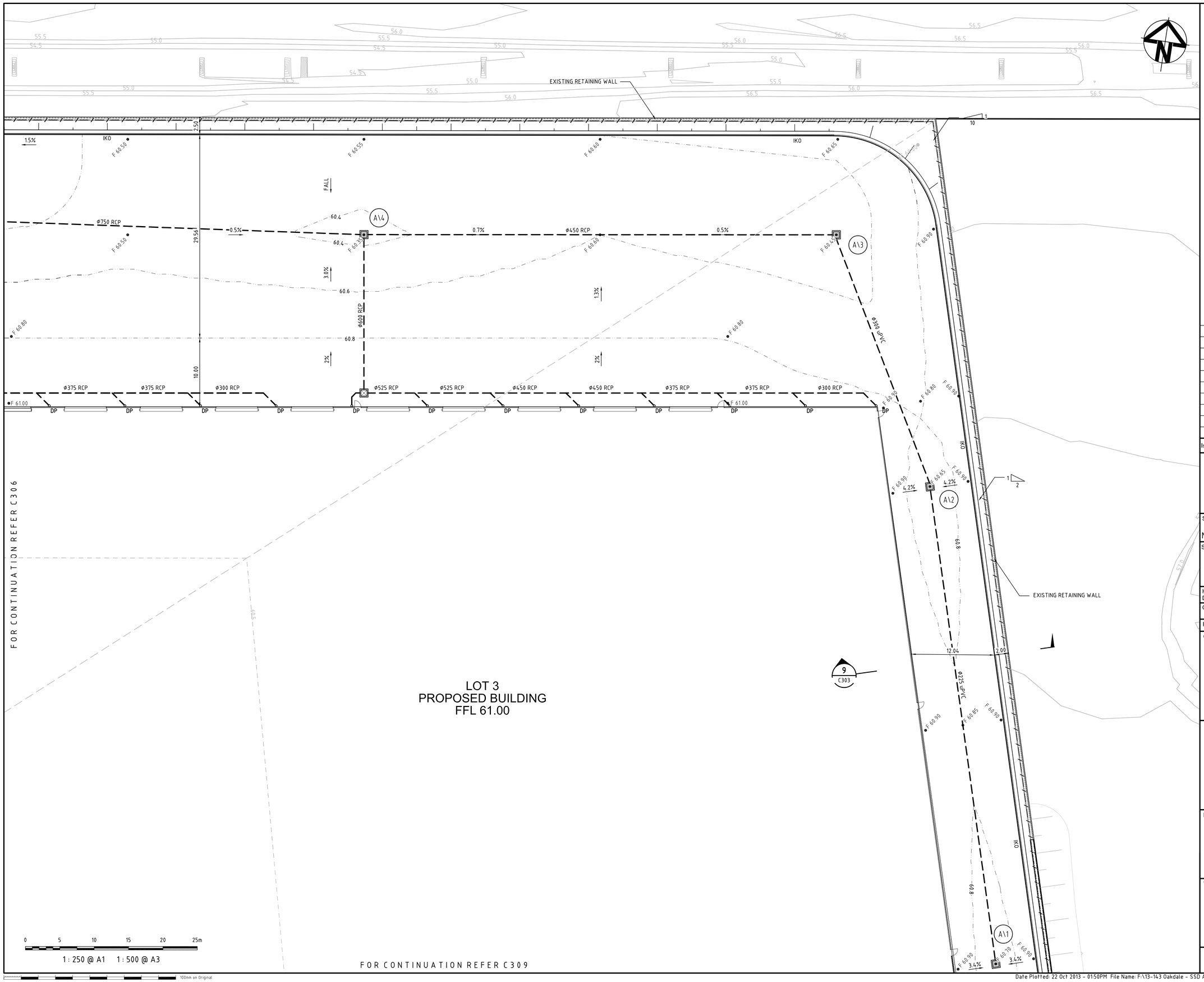
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 2

Drawing No.	Project No.	Issue
C306	13-143	B

100mm on Original



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 250 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C307.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 3

Drawing No.	Project No.	Issue
C307	13-143	B

FOR CONTINUATION REFER C305

EXISTING RETAINING WALL

PROPOSED BIO-RETENTION BASIN 'B'

LOT 3
PROPOSED BUILDING
FFL 61.00

FOR CONTINUATION REFER C310

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales: 1 : 250 @ A1

Drawn: FX
Designed: FX
Checked: MM
Approved:

Height Datum: AHD
Grid: MGA

File: C308.dwg

Client: Goodman

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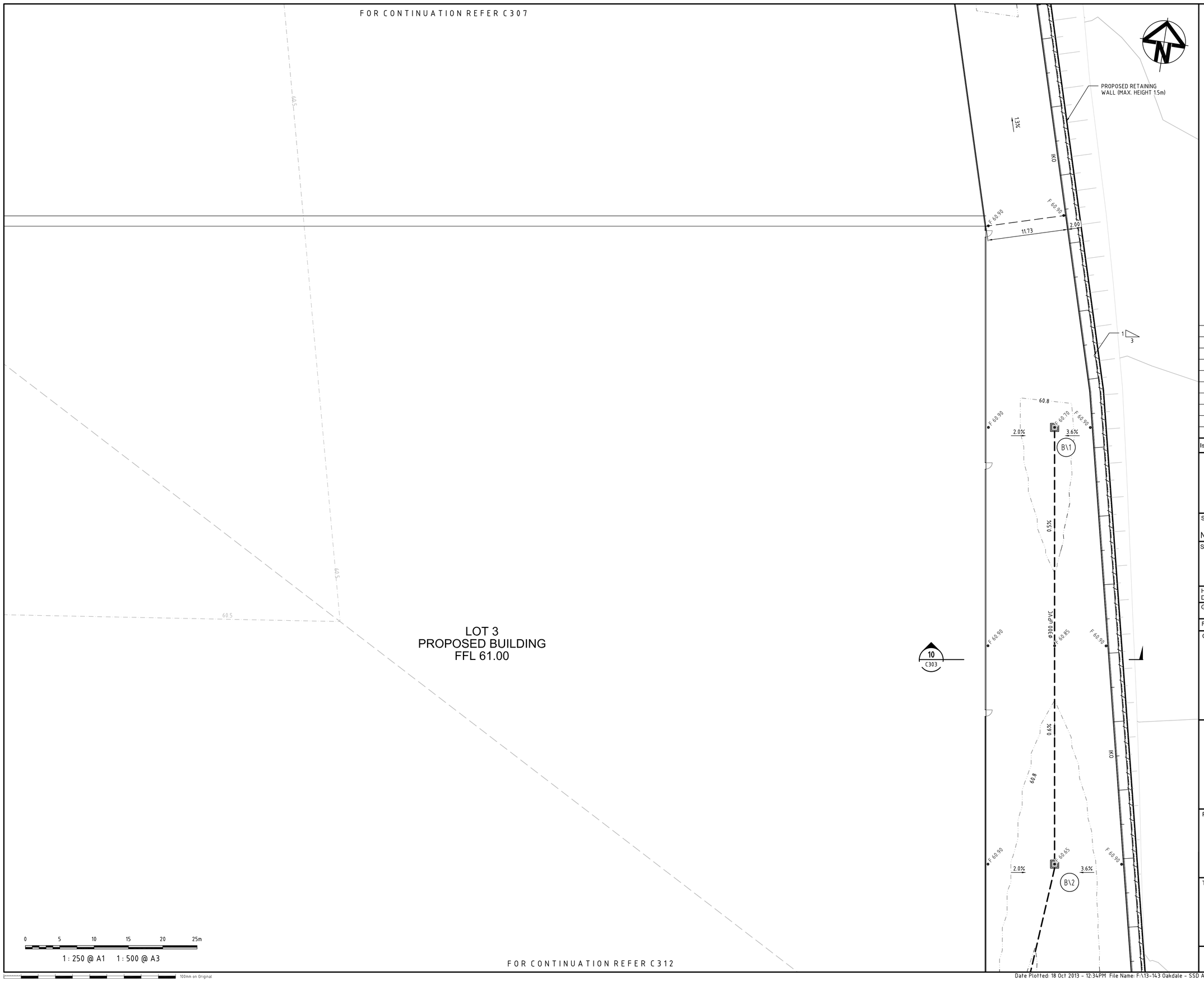
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SITEWORKS AND
STORMWATER DRAINAGE
PLAN
SHEET 4

Drawing No.	Project No.	Issue
C308	13-143	B

FOR CONTINUATION REFER C307



0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

FOR CONTINUATION REFER C312

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C309.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 5

Drawing No.	Project No.	Issue
C309	13-143	B

100mm on Original

FOR CONTINUATION REFER C308

FOR CONTINUATION REFER C311

EXISTING RETAINING WALL

PROPOSED RETAINING WALL (MAX. HEIGHT 6.2m)

PROPOSED KERB INLET OVER EXISTING 750ø RCP

EXISTING PIPE TO REMAIN

CONNECT PROPOSED PIPE TO EXISTING PIT

CONNECT PROPOSED PIPE TO EXISTING STORMWATER PIT

EXISTING PIT TO BE MADE REDUNDANT

EXISTING PIPE TO BE MADE REDUNDANT

PROVIDE 900mm MEDIAN SLOT (TYP.)

EXISTING PIT TO BE MADE REDUNDANT

EXISTING PIPE TO BE MADE REDUNDANT

CONNECT PROPOSED ø525 TO EXISTING PIT
EXISTING DOWNSTREAM PIPE TO BE MADE REDUNDANT

EXISTING TURN HEAD TO BE MADE REDUNDANT

PROPOSED BOUNDARY

FUTURE EXTENSION TO ROUNDABOUT

PROPOSED
ESTATE ROAD (CL01)
EXTENSION

LIMIT OF WORK

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION — A1

Scales	1 : 250 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C310.dwg

Client: Goodman

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Fax: 02 9460 8413
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info@atl.net.au

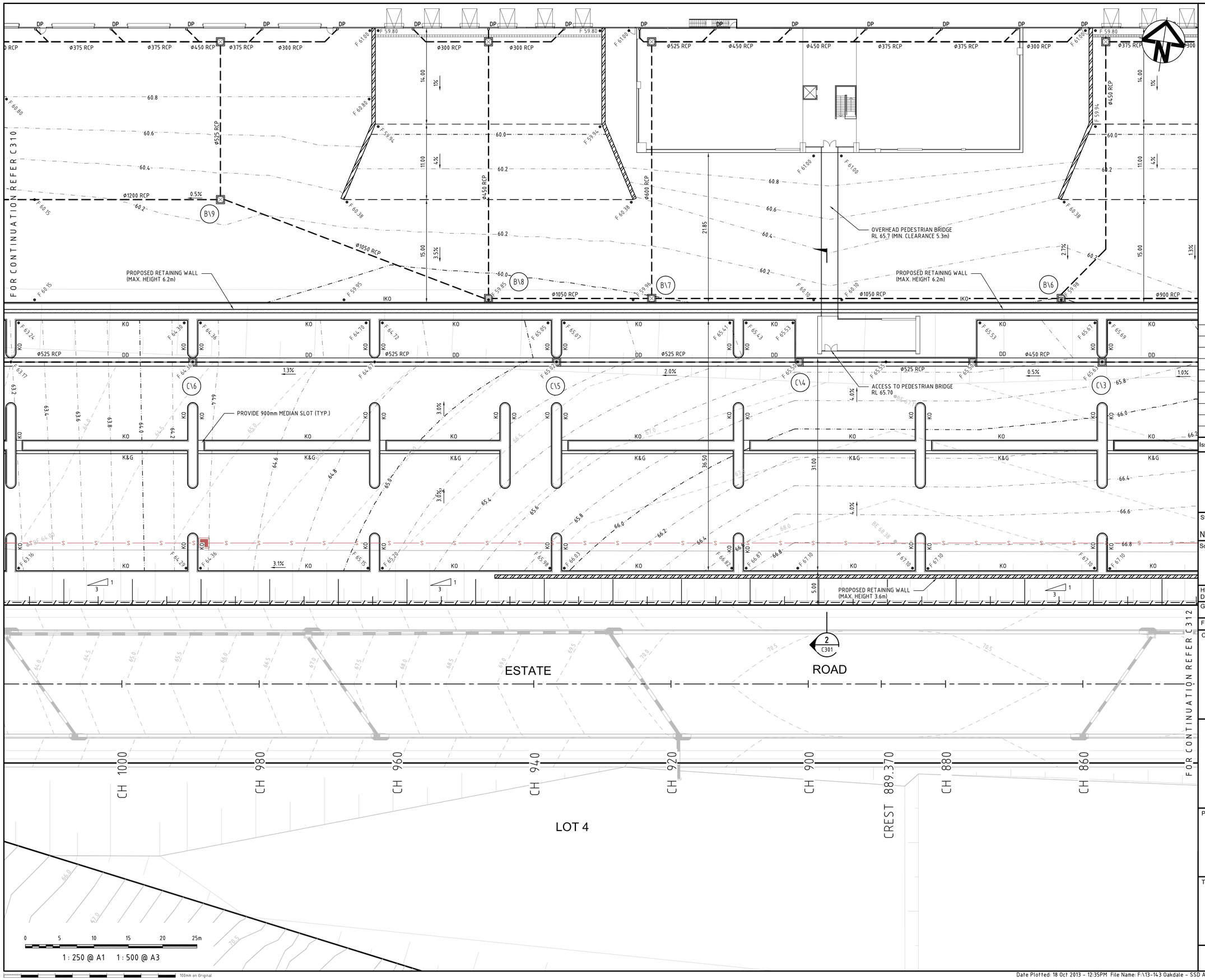
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title: LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN
SHEET 6

Drawing No.	Project No.	Issue
C310	13-143	B

0 5 10 15 20 25m
1 : 250 @ A1 1 : 500 @ A3

100mm on Original



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C311.dwg

Client: Goodman

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 7

Drawing No.	Project No.	Issue
C311	13-143	B

100mm on Original

FOR CONTINUATION REFER C309

FOR CONTINUATION REFER C311

PROPOSED RETAINING WALL (MAX. HEIGHT 6.2m)

PROPOSED RETAINING WALL (MAX. HEIGHT 3.6m)

PROVIDE 900mm MEDIAN SLOT (TYP.)

ESTATE

ROAD

LOT 4

CH 840 CH 820 CH 800 CH 780 CH 760 CH 740 CH 720 CT 710.148 CH 700 CH 680

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 250 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C312.dwg

Client: Goodman

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 8

Drawing No.	Project No.	Issue
C312	13-143	B

100mm on Original

FOR CONTINUATION REFER C308

FOR CONTINUATION REFER C311

EXISTING RETAINING WALL

PROPOSED KERB INLET OVER EXISTING 750ø RCP

CONNECT PROPOSED PIPE TO EXISTING PIT

CONNECT PROPOSED PIPE TO EXISTING STORMWATER PIT

EXISTING PIPE TO REMAIN

EXISTING PIT TO BE MADE REDUNDANT

EXISTING PIPE TO BE MADE REDUNDANT

PROPOSED RETAINING WALL (MAX. HEIGHT 6.2m)

PROVIDE 900mm MEDIAN SLOT (TYP.)

EXISTING PIT TO BE MADE REDUNDANT

EXISTING PIPE TO BE MADE REDUNDANT

CONNECT PROPOSED ø525 TO EXISTING PIT
EXISTING DOWNSTREAM PIPE TO BE MADE REDUNDANT

EXISTING TURN HEAD TO BE MADE REDUNDANT

PROPOSED BOUNDARY

FUTURE EXTENSION TO ROUNDABOUT

LIMIT OF WORK

PROPOSED ESTATE ROAD (CL01) EXTENSION

CH 0.0 CH 20 CH 40 CT 62.237 CH 60

CH 1140 CH 1120 TC 1109.151 CH 1100 CH 1080 CH 1060 CH 1040 CH 1020

CH 1172 CH 1165.911 CH 1160.911

INTERIM TURNING HEAD PAVEMENT
(SET DOWN 70mm BELOW PROPOSED SURFACE LEVEL)
7mm THICKNESS PRIME SEAL ON
250mm THICKNESS DGB20 SUBBASE (PLACED IN 2 LAYERS) ON
500mm THICKNESS SELECT SANDSTONE FILL MIN.
CBR = 35% (PLACED IN 3 LAYERS)

NOTE: IF SUBGRADE CBR > 5% THEN BOTTOM 200mm LAYER OF SELECT SANDSTONE FILL CAN BE REPLACED WITH SELECT FILL CBR = 5% MIN.

ROAD PAVEMENT
35mm THICKNESS AC14 320 ON
35mm THICKNESS AC14 320 ON
7mm THICKNESS PRIME SEAL ON
250mm THICKNESS DGB20 SUBBASE (PLACED IN 2 LAYERS) ON
500mm THICKNESS SELECT SANDSTONE FILL MIN.
CBR = 35% (PLACED IN 3 LAYERS)

NOTE: IF SUBGRADE CBR > 5% THEN BOTTOM 200mm LAYER OF SELECT SANDSTONE FILL CAN BE REPLACED WITH SELECT FILL CBR = 5% MIN.

0 5 10 15 20 25m
1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Scales: 1 : 250 @ A1

Drawn: FX
Designed: FX
Checked: MM
Approved:

Height Datum: AHD
Grid: MGA

File: C313.dwg

Client: Goodman

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 INTERIM TURNING HEAD PLAN

Drawing No.	Project No.	Issue
C313	13-143	B

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- ACCESS GATES

SCA WATER MAIN

BIO DIVERSITY
LOT C

LOT 3

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 500 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C315.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN
SHEET 1

Drawing No.	Project No.	Issue
C315	13-143	B

SCA WATER MAIN

BARBED WIRE

LOT 3

BIO DIVERSITY
LOT B

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- ACCESS GATES

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 500 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C316.dwg

Client: Goodman

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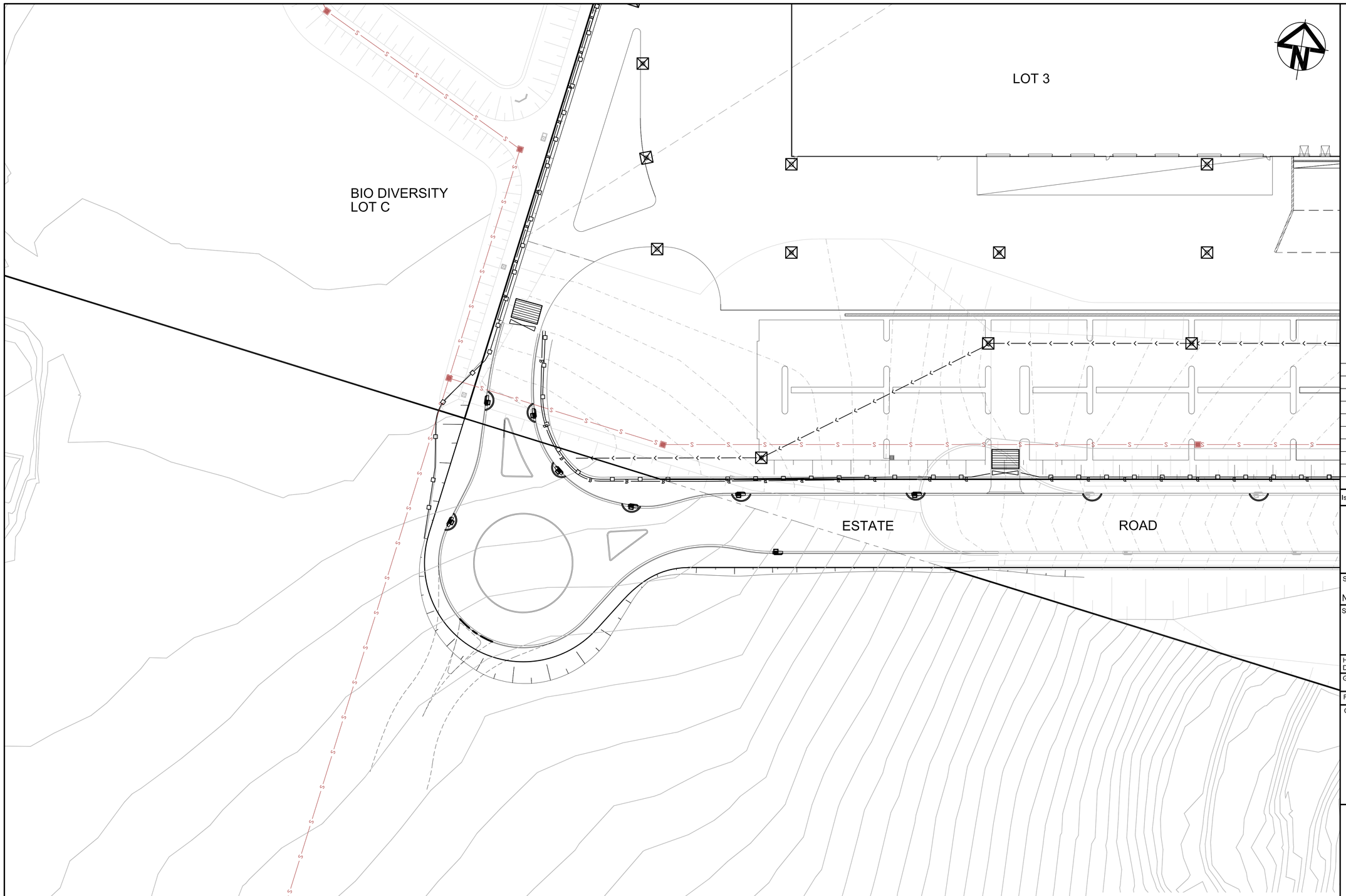
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN
SHEET 2

Drawing No.	Project No.	Issue
C316	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 500 @ A1	Drawn FX
		Designed FX
Height Datum	AHD	Checked MM
Grid	MGA	Approved

File: C317.dwg

Client: Goodman

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN
SHEET 3

Drawing No.	Project No.	Issue
C317	13-143	B

100mm on Original

Date Plotted: 18 Oct 2013 - 12:37PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C317.dwg V1

LOT 3

BIO DIVERSITY
LOT B

ESTATE ROAD

LOT 4

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- B — BARRIER FENCE
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- ACCESS GATES

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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Status: FOR APPROVAL
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A1

Scales	1 : 500 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C318.dwg

Client: Goodman

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Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN
SHEET 4

Drawing No.	Project No.	Issue
C318	13-143	B

Date Plotted: 18 Oct 2013 - 12:38PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C318.dwg V1

PAVEMENT LEGEND

- HEAVY DUTY RIGID PAVEMENT
- ESTATE ROAD PAVEMENT
- ASPHALT PAVEMENT
- FOOTPATH PAVEMENT

SCA WATER MAIN

BIO DIVERSITY
LOT C

LOT 3

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales	1 : 500 @ A1	Drawn FX
		Designed FX
Height Datum	AHD	Checked MM
Grid	MGA	Approved

File: C320.dwg

Client: Goodman

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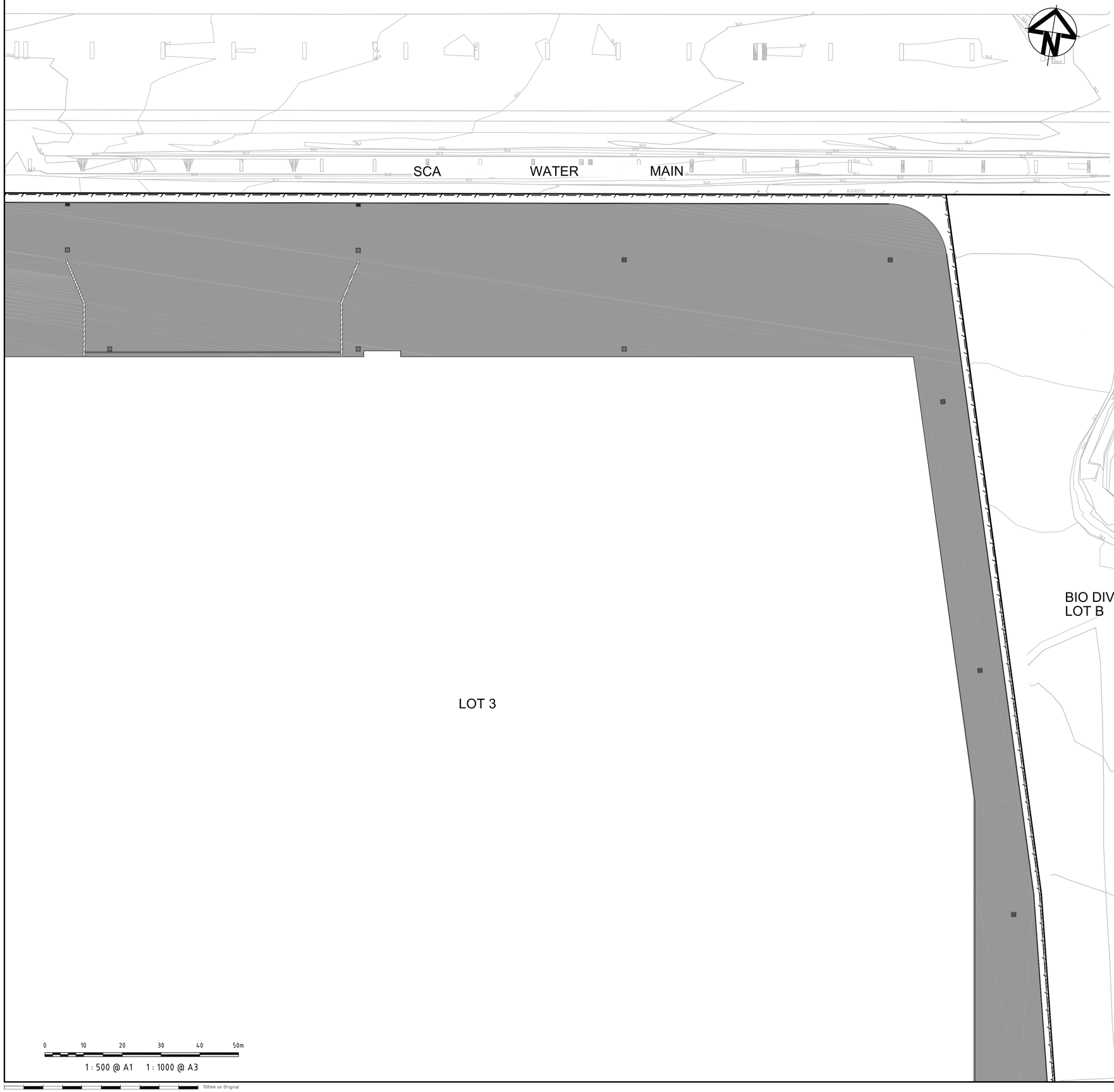
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 PAVEMENT PLAN SHEET 1

Drawing No.	Project No.	Issue
C320	13-143	B



PAVEMENT LEGEND

- HEAVY DUTY RIGID PAVEMENT
- ESTATE ROAD PAVEMENT
- ASPHALT PAVEMENT
- FOOTPATH PAVEMENT

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 500 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C321.dwg

Client: Goodman

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Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 PAVEMENT
PLAN
SHEET 2

Drawing No.	Project No.	Issue
C321	13-143	B

PAVEMENT LEGEND

- HEAVY DUTY RIGID PAVEMENT
- ESTATE ROAD PAVEMENT
- ASPHALT PAVEMENT
- FOOTPATH PAVEMENT

BIO DIVERSITY
LOT C

LOT 3

ESTATE

LIMIT OF WORK

ROAD

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 500 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C322.dwg

Client: Goodman

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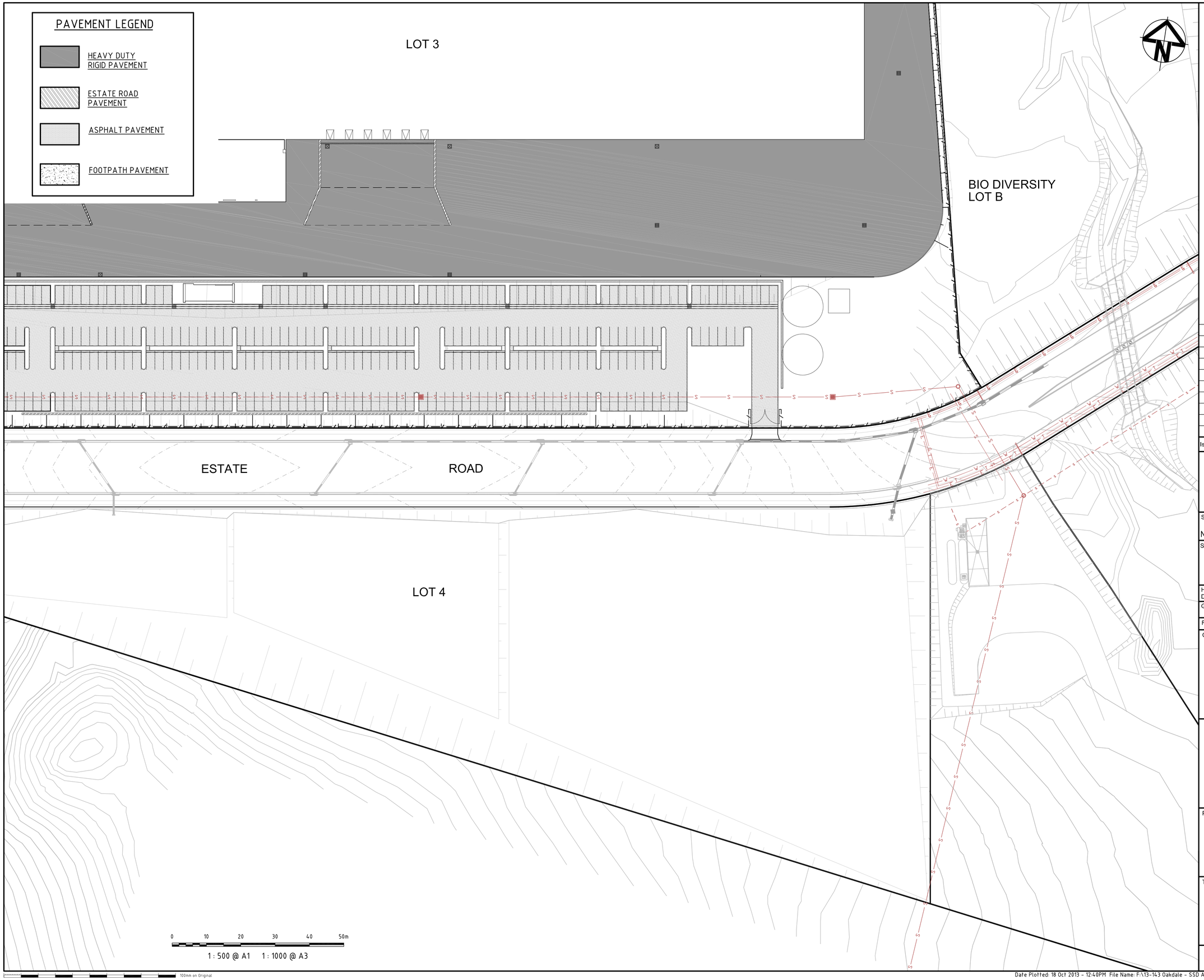
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 PAVEMENT
PLAN
SHEET 3

Drawing No.	Project No.	Issue
C322	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 500 @ A1	Drawn FX	
		Designed FX	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C323.dwg

Client: Goodman

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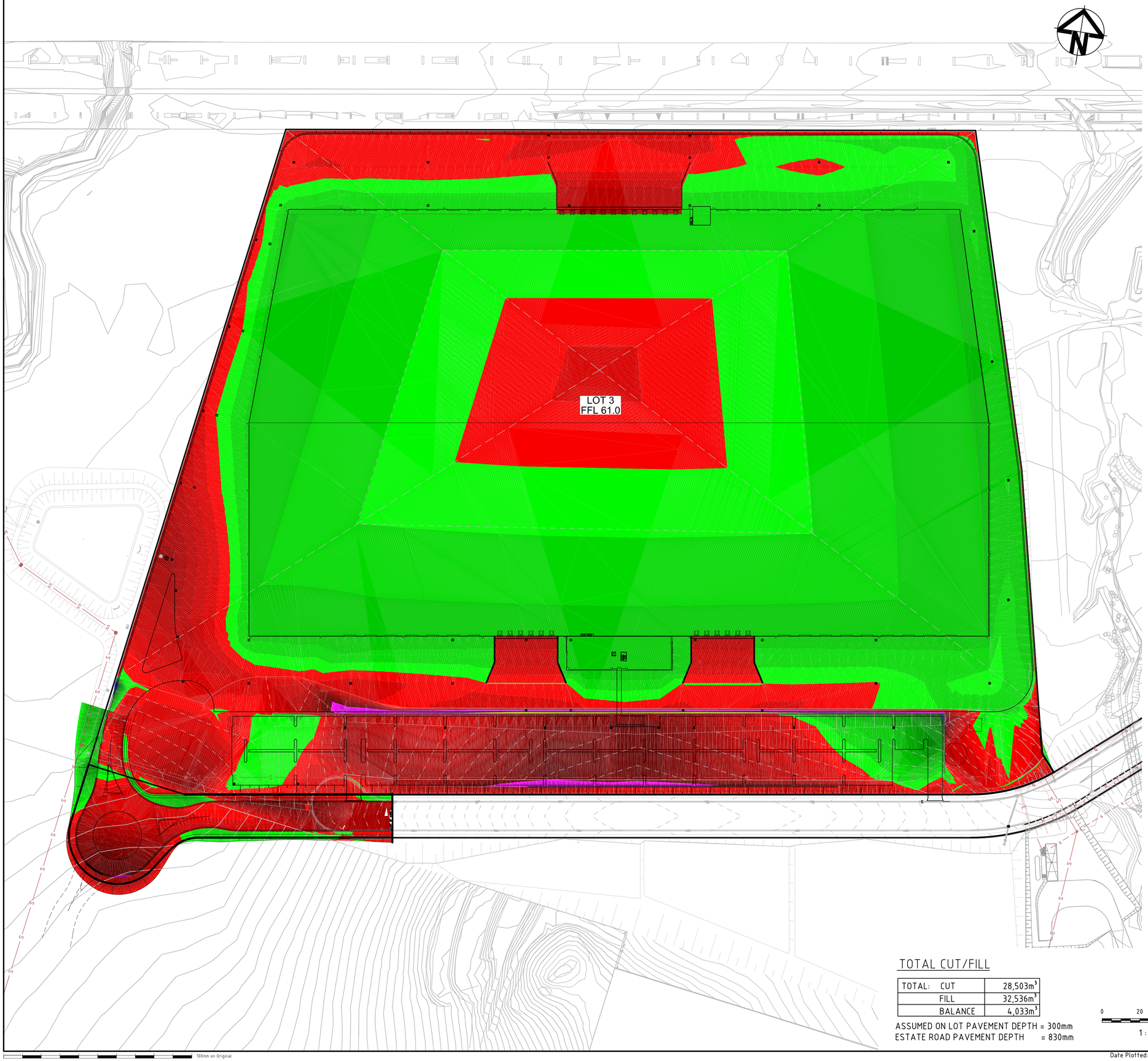
Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LOT 3 PAVEMENT
PLAN
SHEET 4

Drawing No.	Project No.	Issue
C323	13-143	B

100mm on Original



BULK EARTHWORKS DEPTH LEGEND

LOWER VALUE (m)		UPPER VALUE (m)	COLOUR
-7.0	to	-5.8	
-5.8	to	-5.6	
-5.6	to	-5.4	
-5.4	to	-5.2	
-5.2	to	-5.0	
-5.0	to	-4.8	
-4.8	to	-4.6	
-4.6	to	-4.4	
-4.4	to	-4.2	
-4.2	to	-4.0	
-4.0	to	-3.8	
-3.8	to	-3.6	
-3.6	to	-3.4	
-3.4	to	-3.2	
-3.2	to	-3.0	
-3.0	to	-2.8	
-2.8	to	-2.6	
-2.6	to	-2.4	
-2.4	to	-2.2	
-2.2	to	-2.0	
-2.0	to	-1.8	
-1.8	to	-1.6	
-1.6	to	-1.4	
-1.4	to	-1.2	
-1.2	to	-1.0	
-1.0	to	-0.8	
-0.8	to	-0.6	
-0.6	to	-0.4	
-0.4	to	-0.2	
-0.2	to	0.0	
0.0	to	0.2	
0.2	to	0.4	
0.4	to	0.6	
0.6	to	0.8	
0.8	to	1.0	
1.0	to	1.2	
1.2	to	1.4	
1.4	to	1.6	
1.6	to	1.8	
1.8	to	2.0	
2.0	to	2.2	
2.2	to	2.4	

TOTAL CUT/FILL

TOTAL: CUT	28,503m³
FILL	32,536m³
BALANCE	4,033m³

ASSUMED ON LOT PAVEMENT DEPTH = 300mm
ESTATE ROAD PAVEMENT DEPTH = 830mm

0 20 40 60 80 100m

1 : 1000 @ A1 1 : 2000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

Scales	1 : 1000 @ A1	Drawn	FX
		Designed	FX
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	

File: C325.dwg

Client: Goodman

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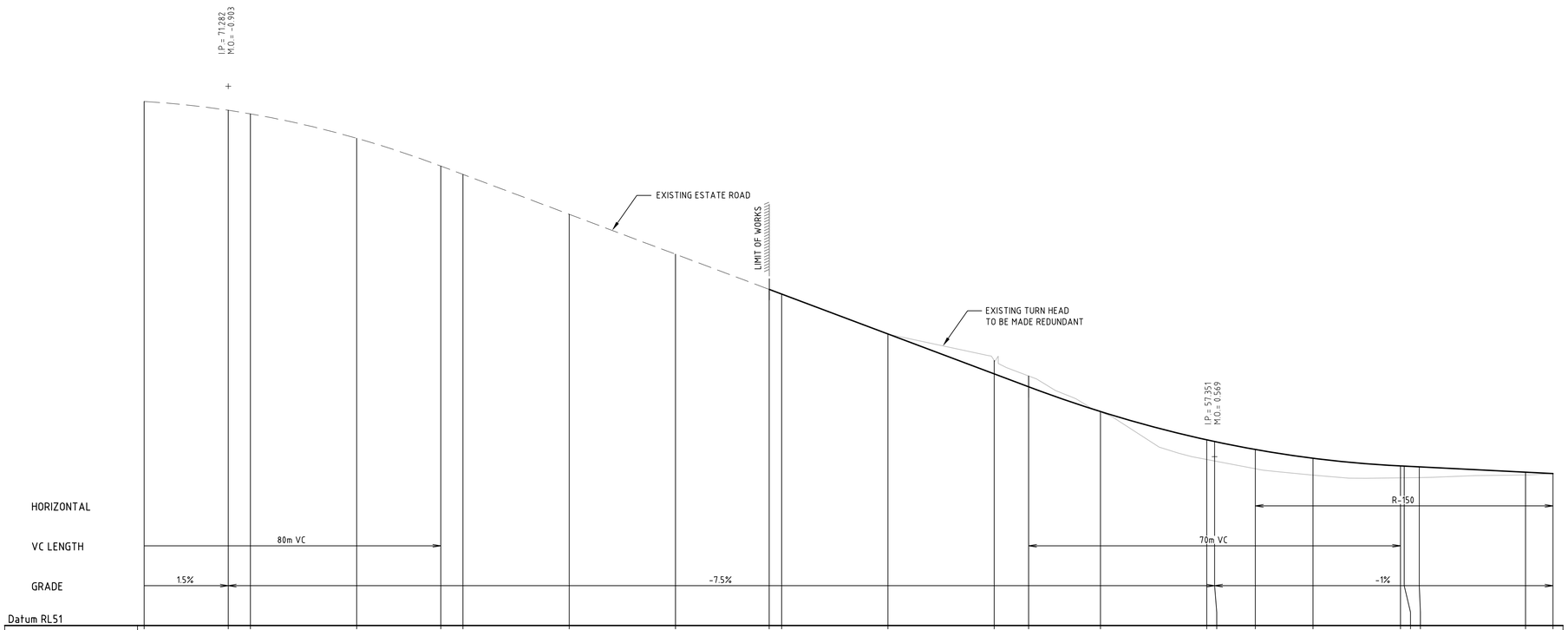
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: LOT 3 CUT/FILL PLAN

Drawing No.	Project No.	Issue
C325	13-143	B



PROPOSED SURFACE LEVEL	70.710	70.379	70.244	69.327	68.280	67.968	66.467	64.966	63.642	63.465	61.964	60.464	59.978	59.048	57.984	57.921	57.622	57.292	57.002	56.995	56.967	56.767	56.715
EXISTING SURFACE LEVEL	70.710	70.378	70.244	69.326	68.279	67.966	66.464	64.962	63.354	63.460	61.959	60.969	60.386	59.033	57.245	57.188	56.896	56.657	56.552	56.555	56.565	56.662	56.715
CHAINAGE	900.000	915.832	920.000	940.000	955.832	960.000	980.000	1000.000	1017.650 TP	1020.000	1040.000	1060.000	1066.475	1080.000	1100.000	1101.475	1109.151 TP	1120.000	1136.475	1137.162	1140.000	1160.000	1165.172

ESTATE ROAD ROUNDABOUT LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

1 : 100 @ A1 1 : 200 @ A3

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
A	ISSUED FOR CLIENT REVIEW	11-10-13

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A1

Scales: 1 : 500 @ A1, 1 : 100 @ A1

Drawn: FX
Designed: FX
Checked: MM
Approved:

Height Datum: AHD
Grid: MGA

File: C330.dwg

Client: Goodman

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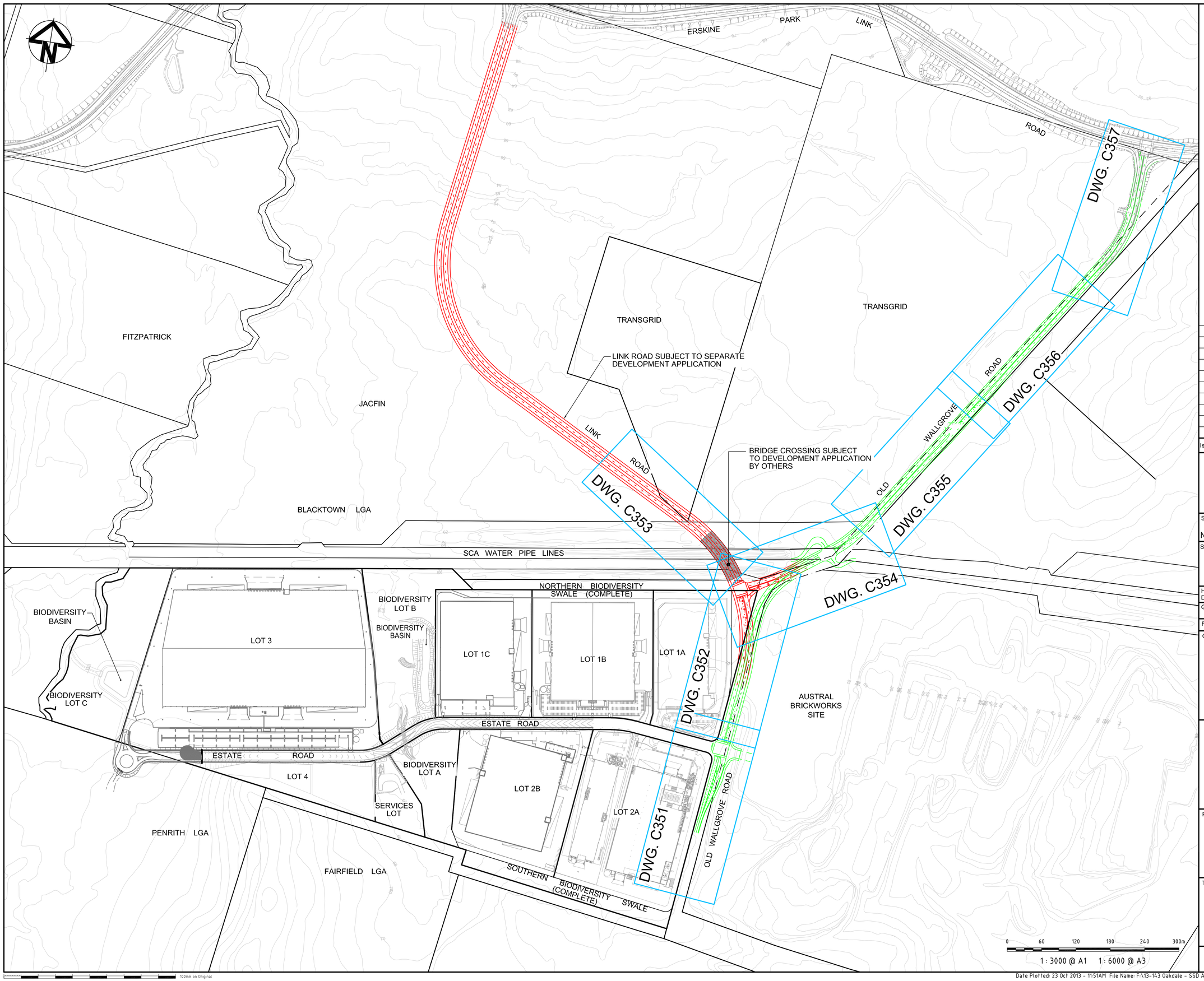
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title: ESTATE ROAD LONGITUDINAL SECTION

Drawing No.	Project No.	Issue
C330	13-143	B



Issue	Description	Date
B	STATE SIGNIFICANT DEVELOPMENT APPLICATION	21-10-13
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A1

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		Designed MM	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

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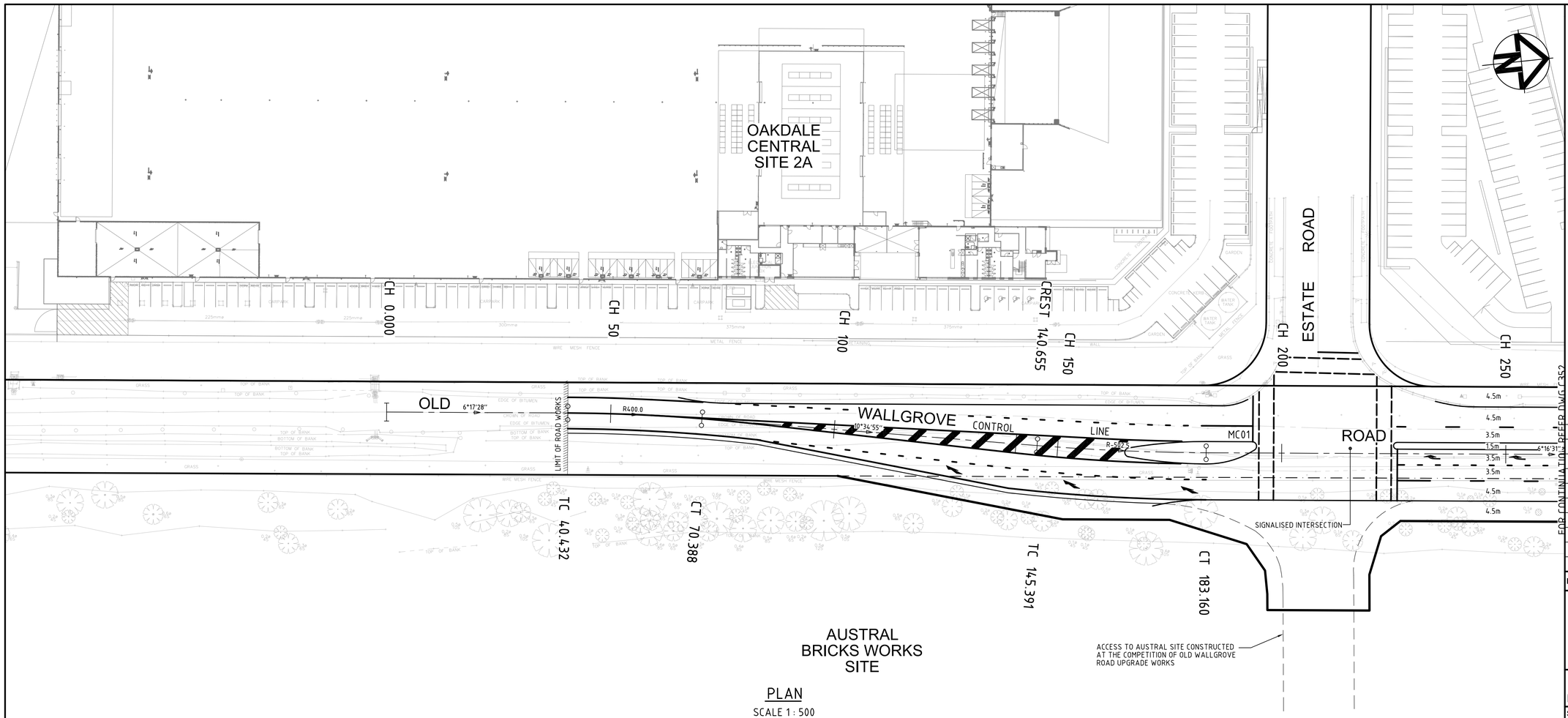
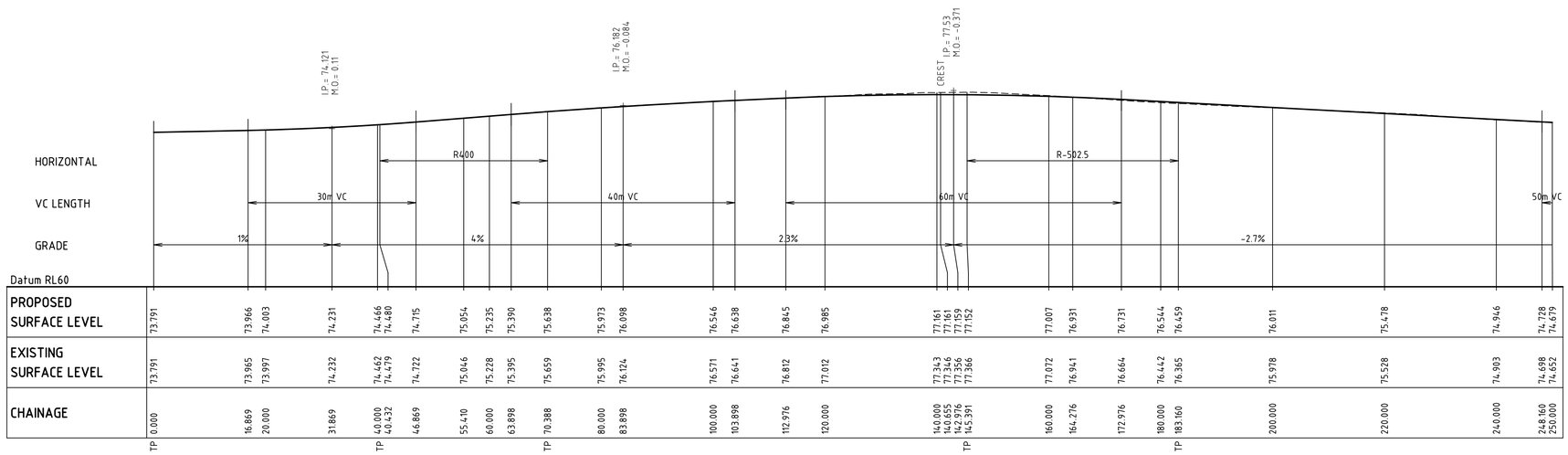
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES LOTS 1C, 2B, 3A, 3B

Title
OLD WALLGROVE ROAD UPGRADE GENERAL ARRANGEMENT PLAN

Drawing No.	Project No.	Issue
C350	13-143	B



PLAN
SCALE 1 : 500



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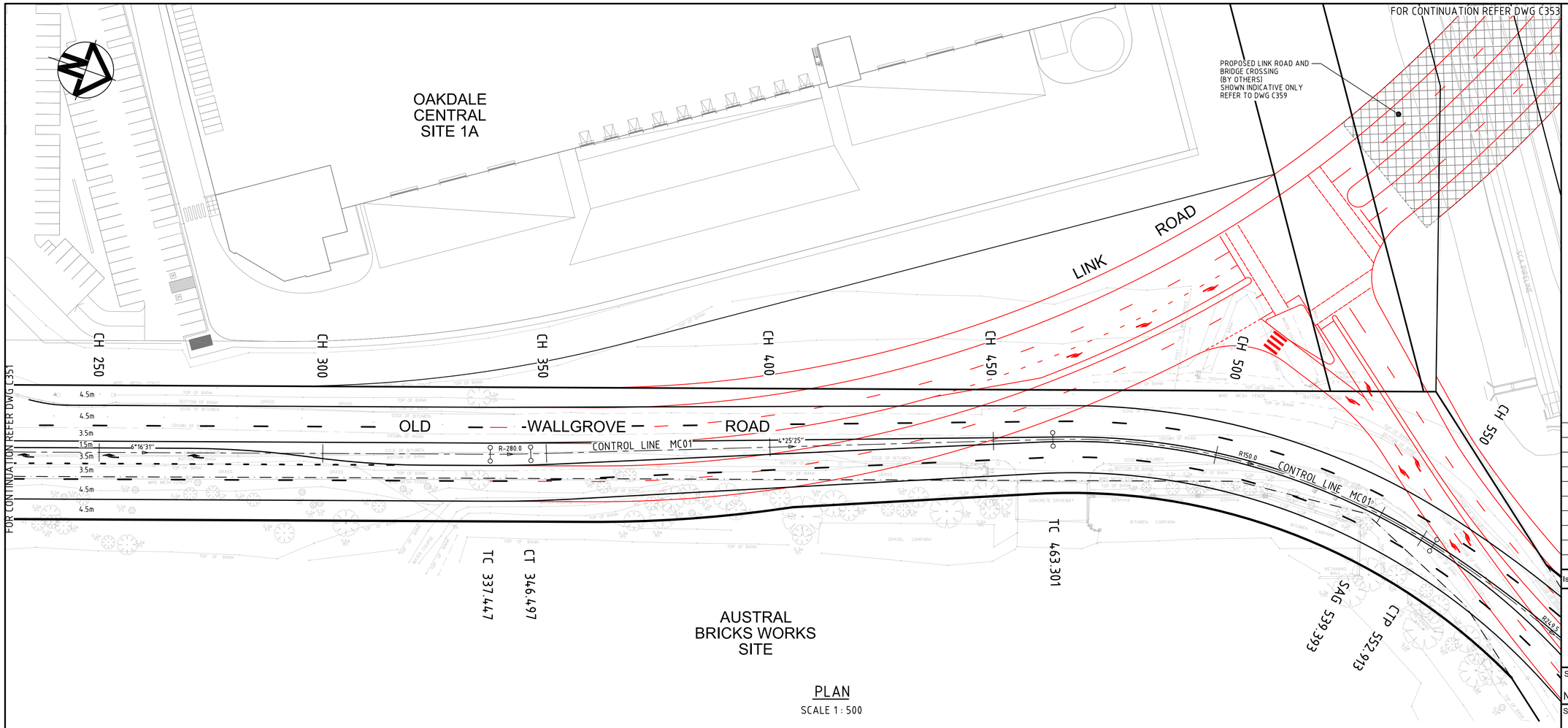

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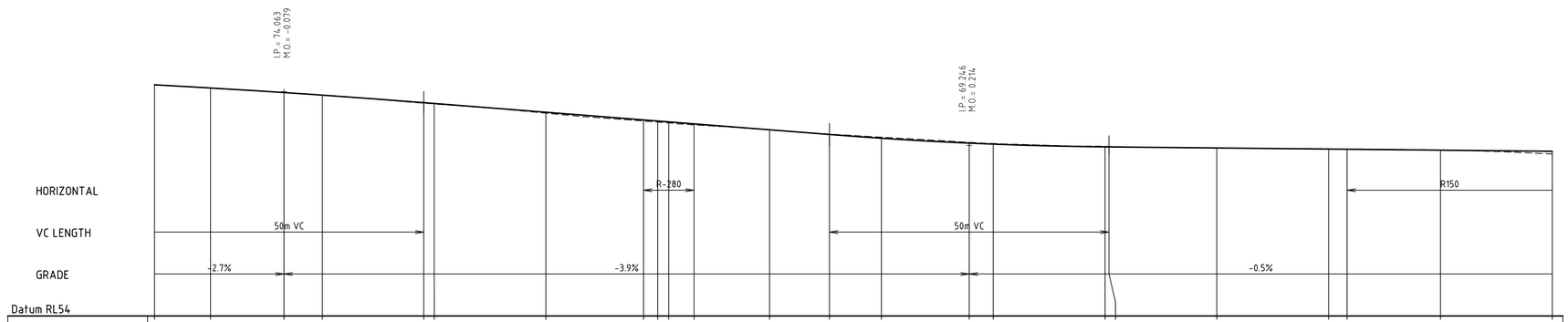

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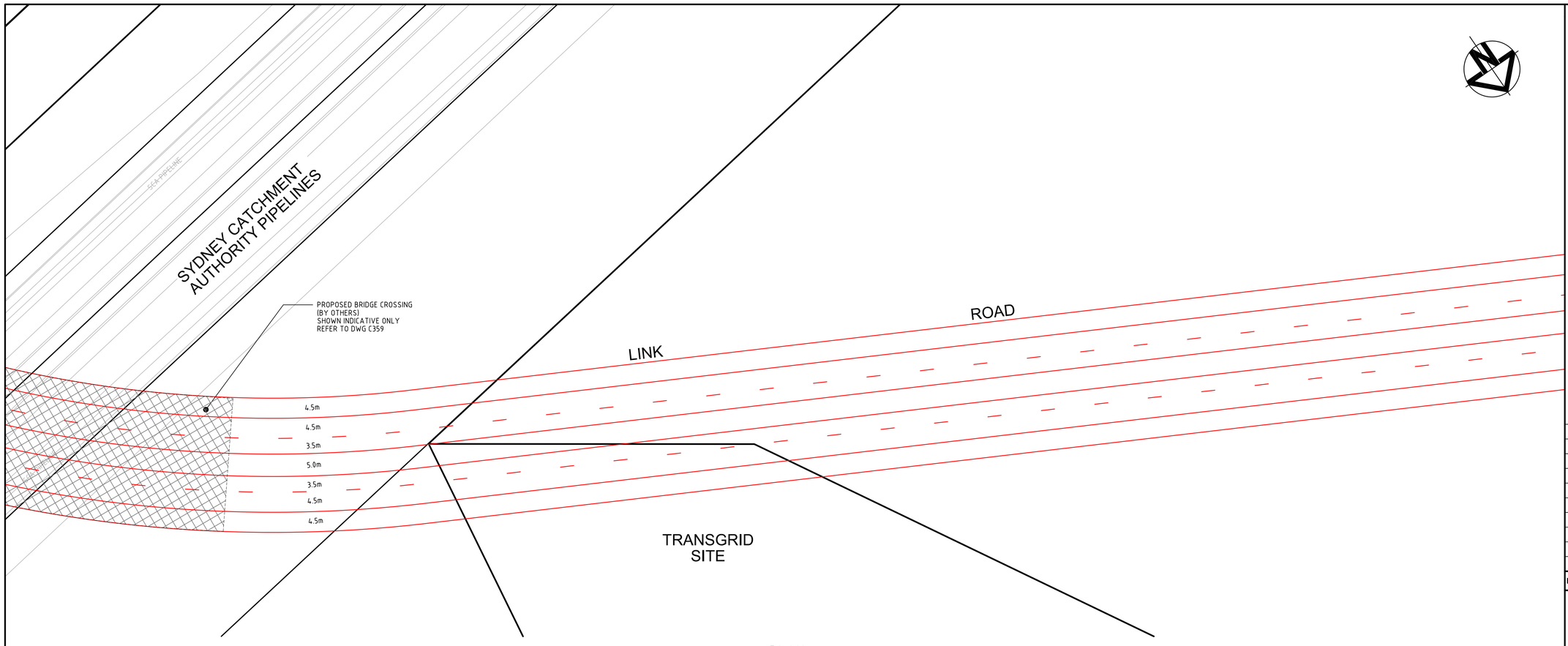

PLAN

SCALE 1 : 500

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Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
LINK ROAD
PLAN
SHEET 3

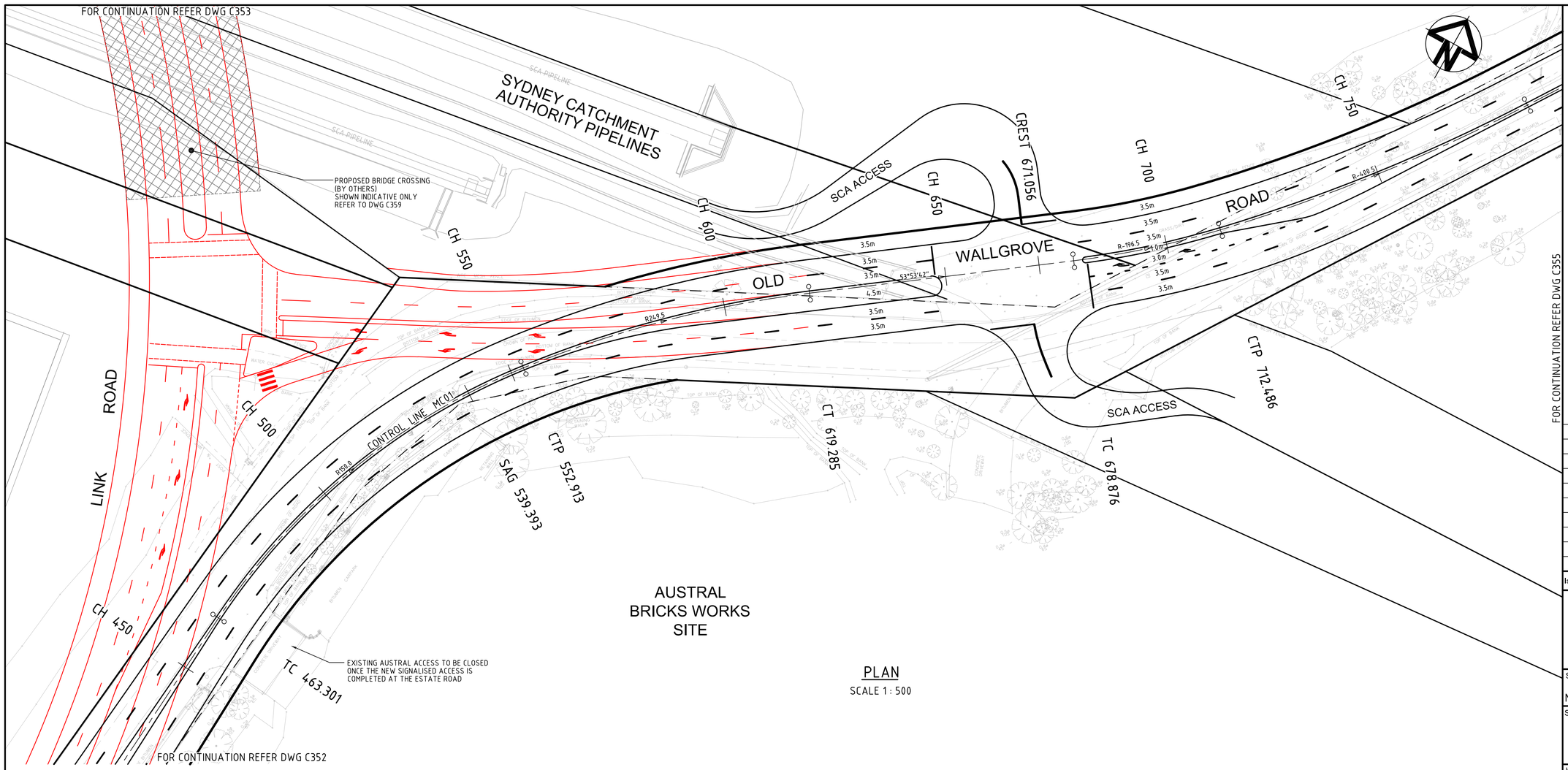
Drawing No.	Project No.	Issue
C353	13-143	B

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Date Plotted: 23 Oct 2013 - 12:44PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C353.dwg V1



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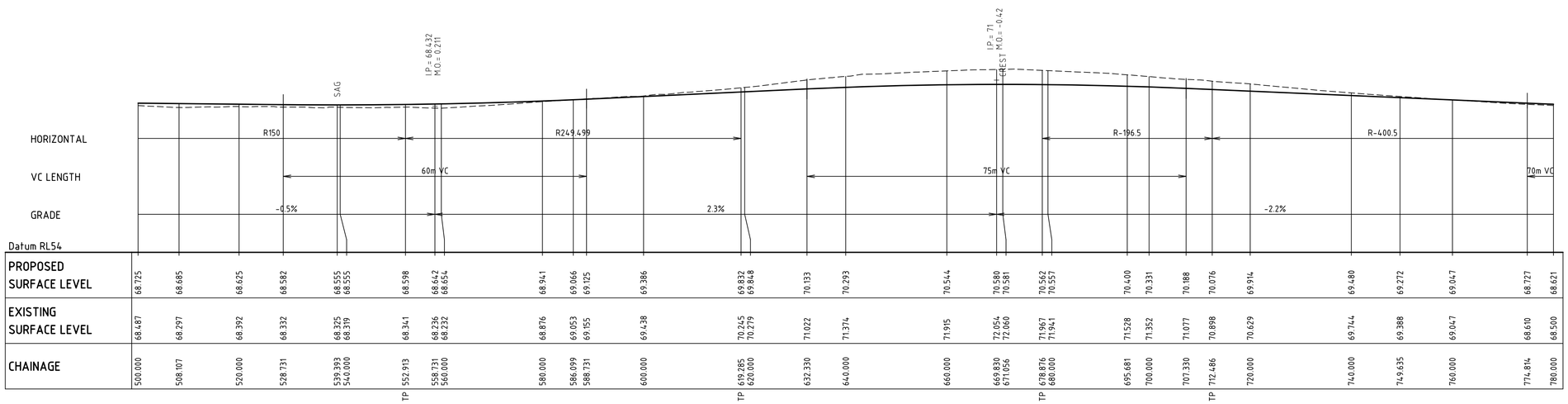

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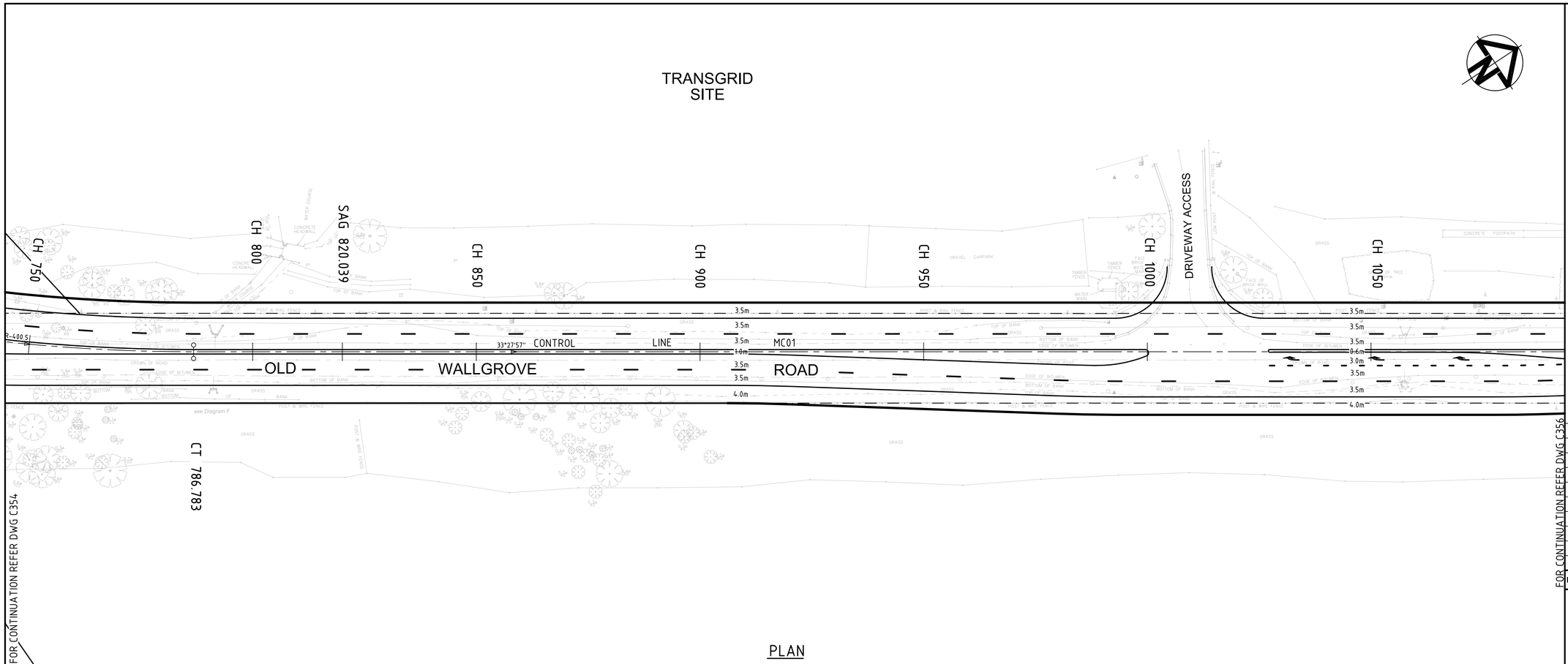

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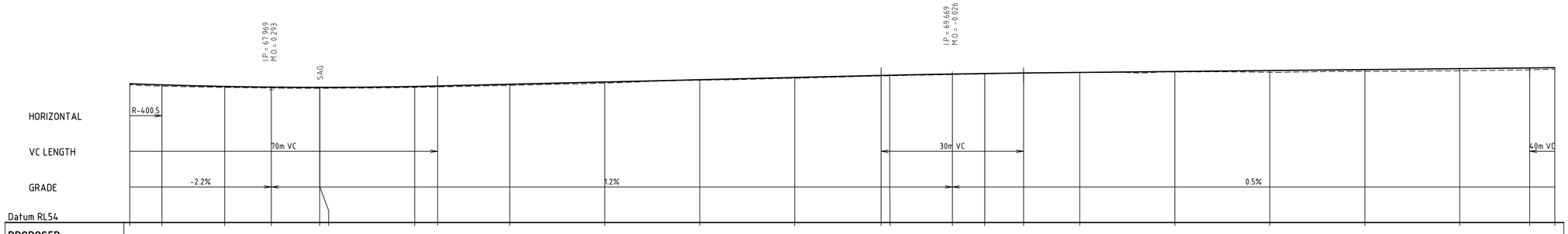
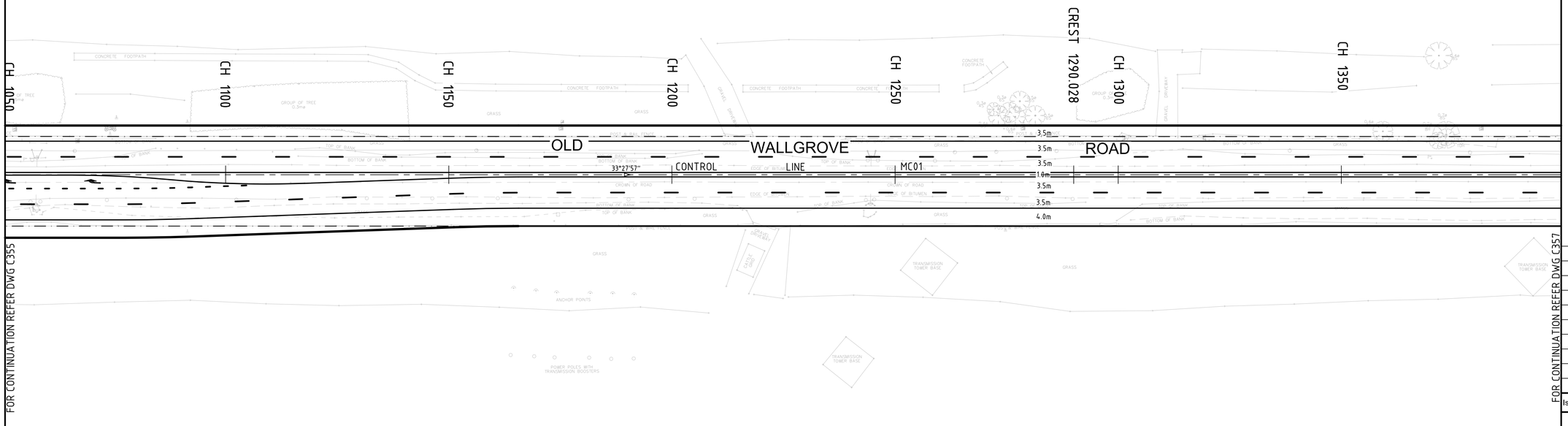


| | | |

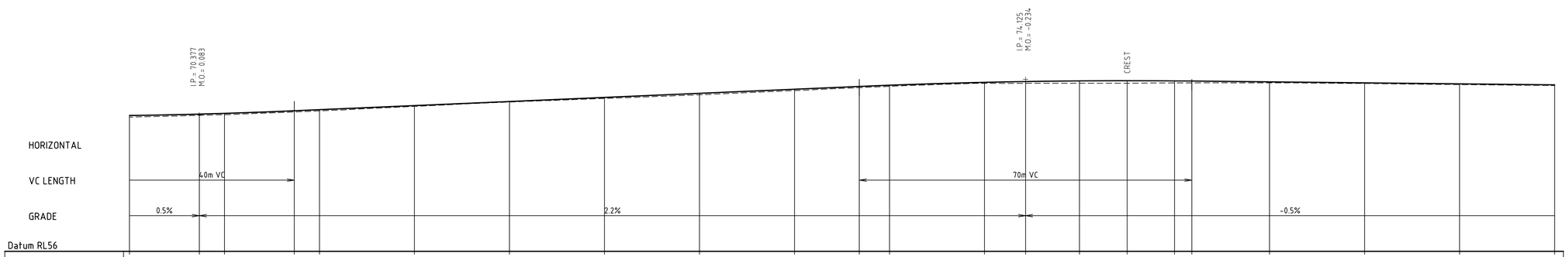
TRANSGRID
SITE



FOR CONTINUATION REFER DWG C355

FOR CONTINUATION REFER DWG C357

PLAN
SCALE 1 : 500



Datum RL56

PROPOSED SURFACE LEVEL	70.310	70.460	70.536	70.808	70.922	71.353	71.784	72.215	72.646	73.077	73.371	73.500	73.806	73.891	73.959	73.978	73.959	73.943	73.858	73.754	73.650	73.546
EXISTING SURFACE LEVEL	70.148	70.329	70.400	70.683	70.801	71.273	71.728	72.110	72.494	72.939	73.245	73.381	73.706	73.705	73.713	73.714	73.751	73.758	73.753	73.690	73.571	73.467
CHAINAGE	1080.000	1094.706	1100.000	1114.706	1120.000	1140.000	1160.000	1180.000	1200.000	1220.000	1233.640	1240.000	1260.000	1268.640	1280.000	1290.028	1300.000	1303.640	1320.000	1340.000	1360.000	1380.000

CONTROL LINE MC01 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:250 VERT.

0 5 10 15 20 25m
1 : 250 @ A1 1 : 500 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

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A1

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		Designed	MM
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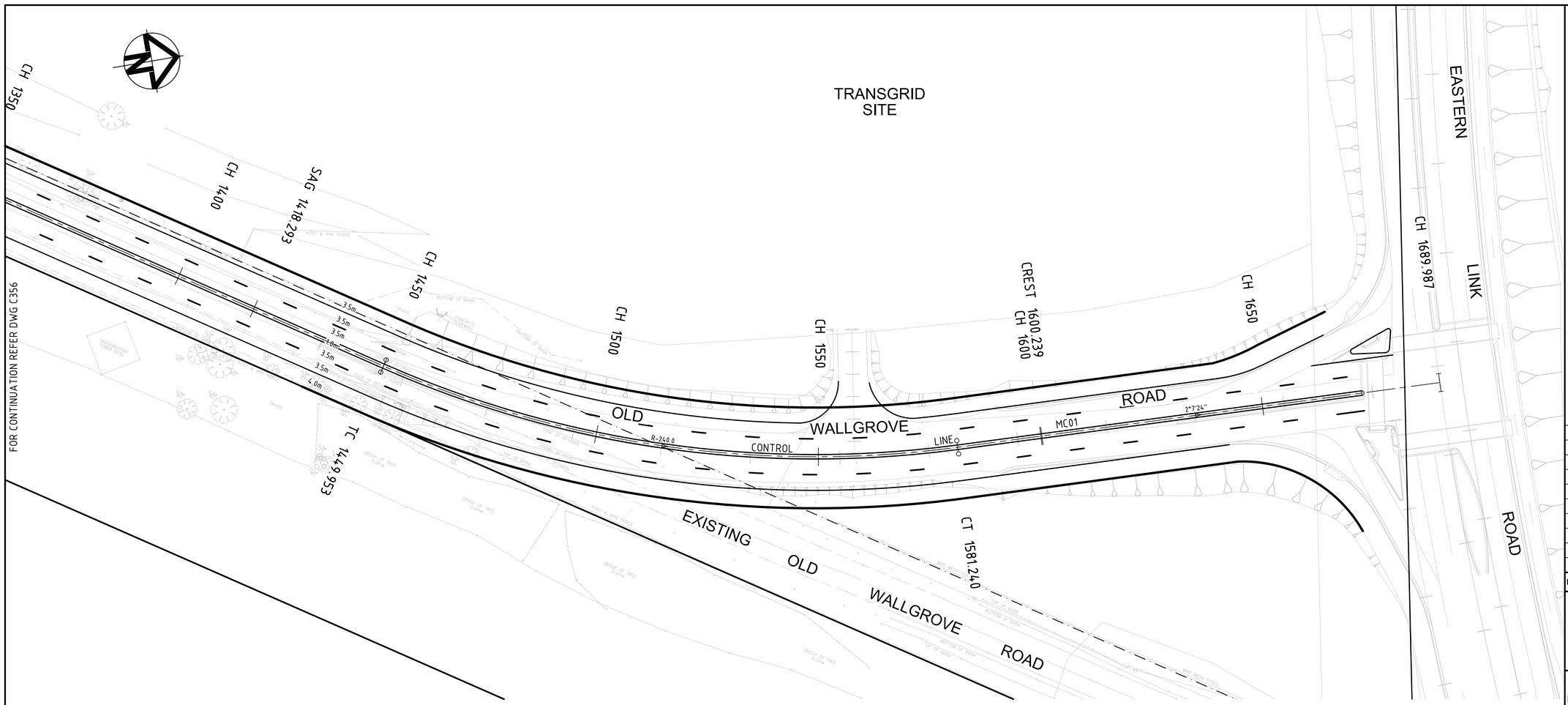
Project
OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

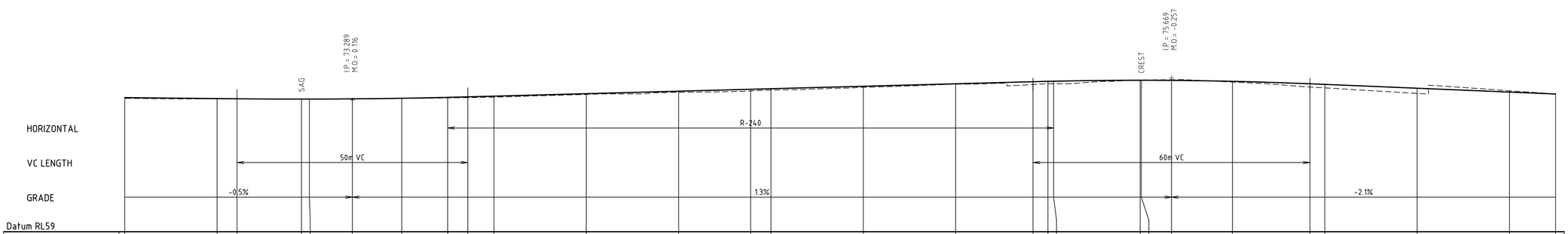
Title
OLD WALLGROVE ROAD (MC01) PLAN AND LONGITUDINAL SECTION
SHEET 6

Drawing No.	Project No.	Issue
C356	13-143	B

Date Plotted: 23 Oct 2013 - 12:44PM File Name: F:\13-143 Oakdale - SSD Application\Drgs\Civil\Final\Lots 1C 2B 3A 3B\C356.dwg V1



PLAN
SCALE 1 : 500



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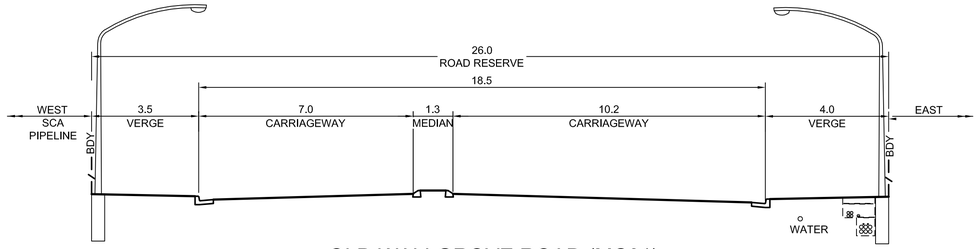
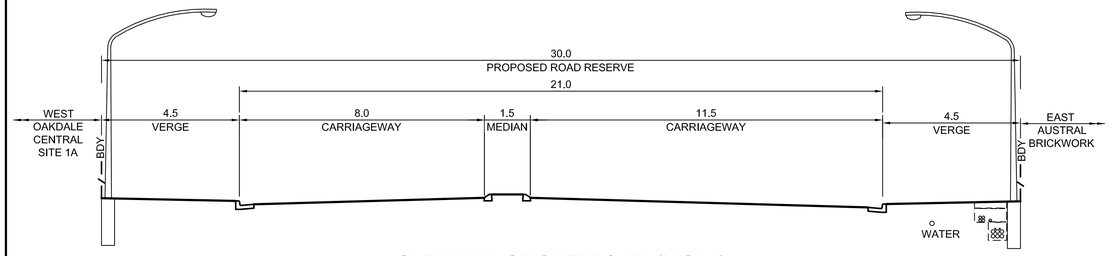


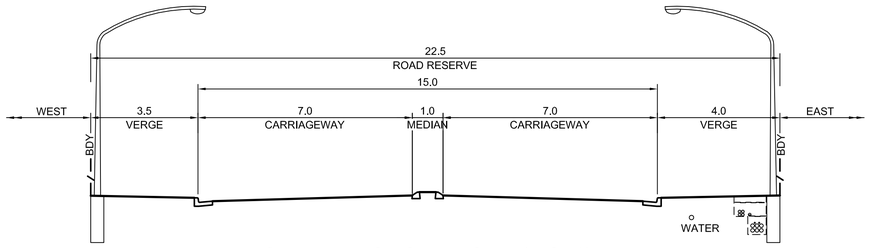
OLD WALLGROVE ROAD (MC01)
TYPICAL SECTION (CH680 - CH710)

SCALE 1:100



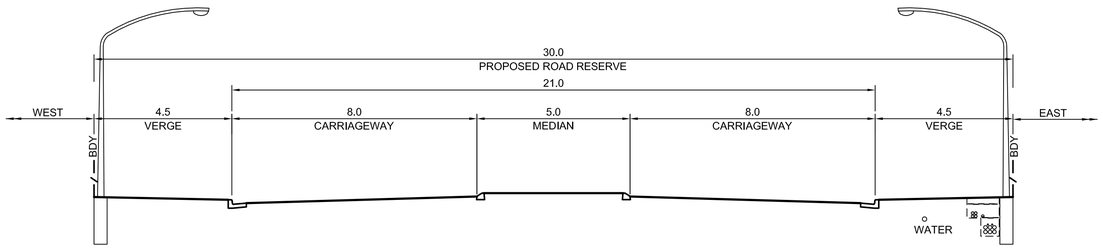
OLD WALLGROVE ROAD (MC01)
TYPICAL SECTION (CH220 - CH270)

SCALE 1:100



OLD WALLGROVE ROAD (MC01)
TYPICAL SECTION

SCALE 1:100



LINK ROAD
TYPICAL SECTION

SCALE 1:100

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

100mm on Original

Issue	Description	Date
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A1

Scales	1 : 100 @ A1	Drawn TS	
		Designed MM	
Height Datum	AHD	Checked MM	
Grid	MGA	Approved	

File: C358.dwg

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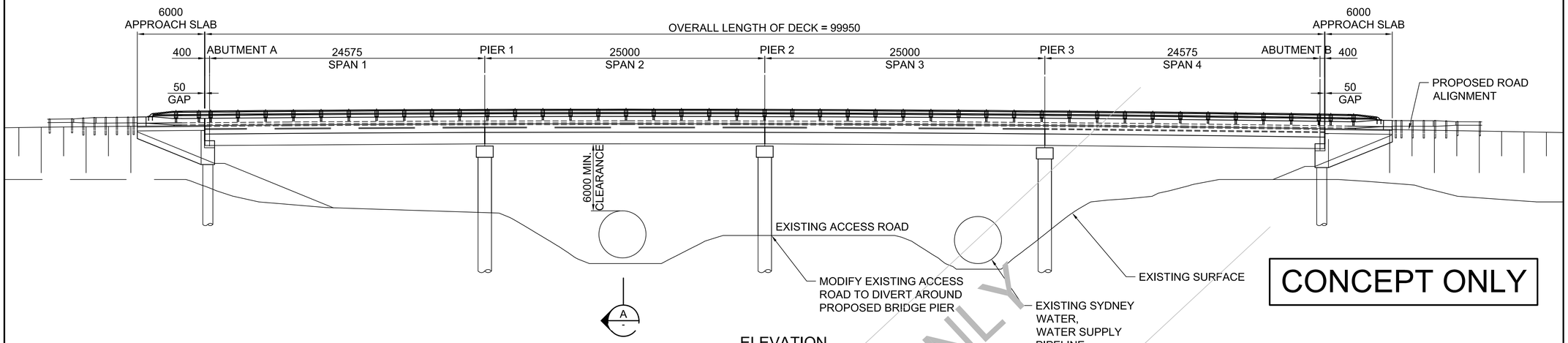
Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title: TYPICAL SECTIONS

Drawing No.	Project No.	Issue
C358	13-143	B

FROM MINCHINBURY

TO OLD WALLGROVE ROAD

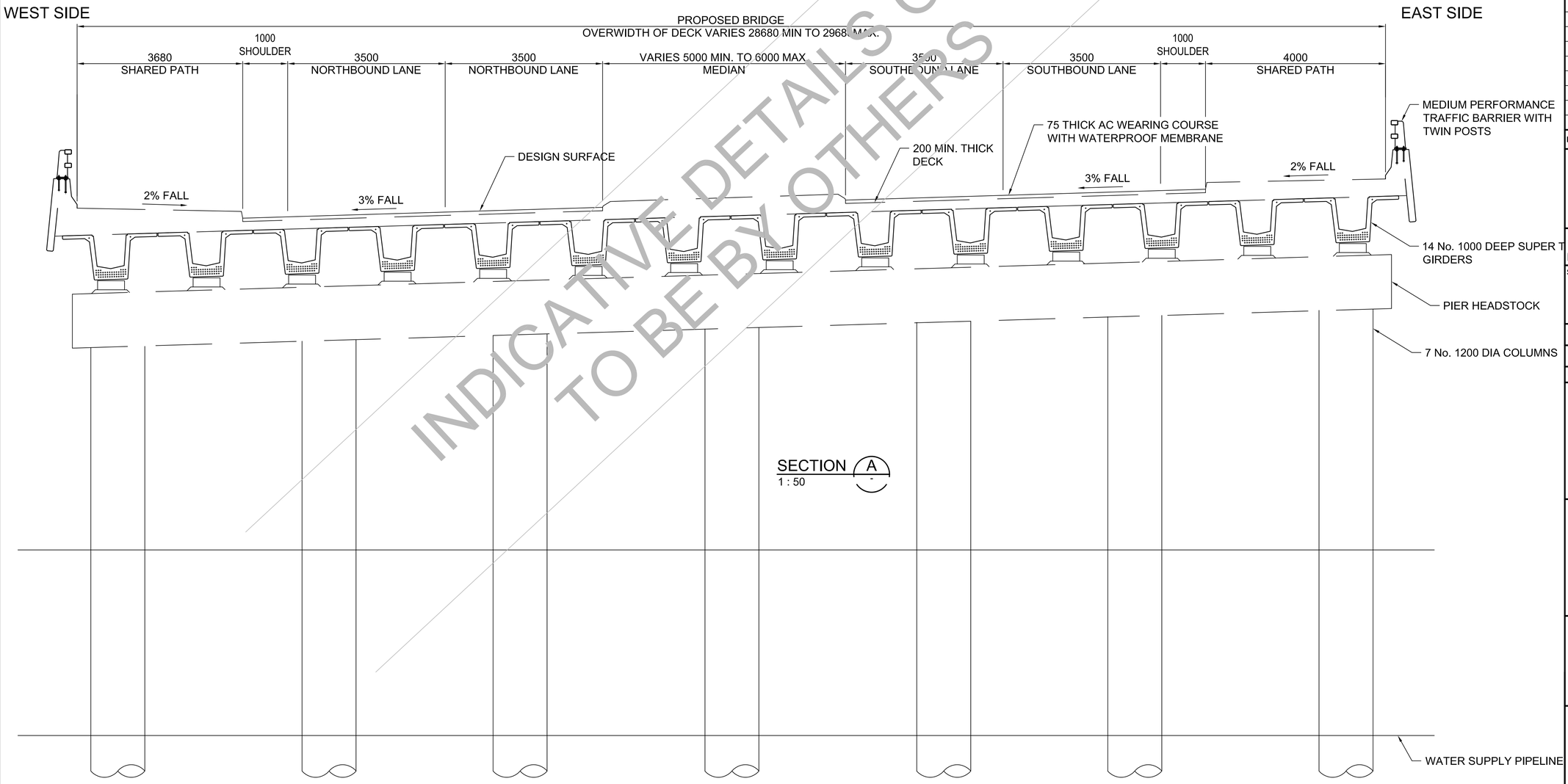


ELEVATION
SCALE 1:200

CONCEPT ONLY

WEST SIDE

EAST SIDE



SECTION A
1 : 50

0 1 2 3 4 5m
1 : 50 @ A1 1 : 100 @ A3

0 5 10 15 20m
1 : 200 @ A1 1 : 400 @ A3

INDICATIVE DETAILS ONLY
TO BE BY OTHERS

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A1

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		Designed	MM
Height Datum	AHD	Checked	MM
Grid	MGA	Approved	
File:	C359.dwg		

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Project
OAKDALE CENTRAL
INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title
TYPICAL
BRIDGE CROSSING
SECTION

Drawing No.	Project No.	Issue
C359	13-143	B

100mm on Original

	LAND OWNER	APPROX. LAND TAKE AREA (m²)
	TRANSGRID	2076
	SYDNEY CATCHMENT AUTHORITY	1980
	AUSTRAL BRICKS	3967

TRANSGRID

PROPOSED LINK ROAD

ERSKIN PARK LINK ROAD

TRANSGRID

OLD WALLGROVE ROAD

ELECTRICAL TRANSMISSION TOWER

EXISTING BOUNDARY

ELECTRICAL TRANSMISSION TOWER

PROPOSED BOUNDARY

EXISTING BOUNDARY

PROPOSED BOUNDARY

SYDNEY CATCHMENT AUTHORITY

PROPOSED BOUNDARY

TRANSGRID

LOT 1B

LOT 1A

ESTATE ROAD

PROPOSED BOUNDARY

AUSTRAL BRICKWORKS SITE

LOT 2A

OLD WALLGROVE ROAD

SYDNEY CATCHMENT AUTHORITY

0 50 100 150 200m

1 : 2000 @ A1

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A1

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Checked: MM
Approved:

Height Datum: AHD
Grid: MGA

File: C360.dwg

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Project: OAKDALE CENTRAL INDUSTRIAL FACILITIES
LOTS 1C, 2B, 3A, 3B

Title: LAND ACQUISITION PLAN

Drawing No.	Project No.	Issue
C360	13-143	B

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Oakdale Central Development

Lot 1C, 2B, 3A and 3B State Significance Development Application

State Significance Development Application - Civil Design Report

Author: Andrew Tweedie

Approver: Anthony McLandsborough

Report no: 13-143-R001 Revision: 03 Date: October 2013

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This report is based upon a desktop review and relies upon information supplied by utility providers and Council. To the extent that the report incorporates such material, AT&L takes no responsibility for any loss or damage caused by any error or omission arising from reliance on it.

Please note that utility providers reserve the right to change their decision in relation to network deployment within the development without prior notice. Additionally it is our experience that utility providers will not reserve capacity. For this reason, they operate on a first come first serve basis.

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Figure 1 Locality Plan

APPENDIX

Appendix A – Architectural Site Plans
Appendix B – List of AT&L – Civil Works & Erosion and Sediment Control Drawings
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Appendix F – PSM Earthworks Specification
Appendix G – PSM Road Pavement Design
Appendix H – GHD Project Approval Soil and Water Management Plan
Appendix I – GHD Project Approval Stormwater Management Plan

1 Executive Summary

On 2 January 2009, the Minister for Planning approved a Concept Plan and concurrent Stage 1 Project Approval Application from Goodman Limited (Goodman) to establish the Oakdale Industrial Estate. The Estate is located on a 61 hectare site, adjacent to the Sydney Water Pipeline in the Western Sydney Employment Area (WSEA) and would be developed for warehouse, distribution and freight logistics purposes.

The 61 hectare industrial estate forms part of the Erskine Park Employment Area, which was created in 1993 as a key employment area for Western Sydney. The Erskine Park Employment Area now forms part of the Western Sydney Employment Hub, which is identified in the Metropolitan Plan for Sydney 2036 ("the Metropolitan Plan") as a key centre for employment growth over the next 25 years.

Existing Concept Approval MP08_065

The initial Concept Approval (MP 08_065) was subsequently modified with the combined concept and development approval allowing for-

- Overall the subdivision, as modified, created:
  - 8 development lots;
  - 3 environmental/recreation lots (total area ~10.5ha);
  - 3 road corridor lots; and
  - 1 services lot.
- 8 industrial buildings with a combined gross floor area of 150,000m², and associated infrastructure;
  - Upgrade of a 0.5km section of Old Wallgrove Road from the Sydney Catchment Authority (SCA) crossing to the estate entry road to facilitate access to the revised estate entry location
  - Bulk earthworks
  - The construction of the required Oakdale Central Estate Road in 3 Stages (refer Goodman dwg OAK S75w Sk02(b))

Existing Project Approval MP08_66

The DHL Logistics Hub (Buildings 1A & 2A) Major Project (MP 08_0066) was also approved on 2 January 2009. The DHL Logistics Hub Project Approval has been modified 3 times and the current modified approval includes the following:

- Subdivision of the site ;
- Upgrade of Old Wallgrove Road;
- Construction of a 260m long portion of the new estate road to facilitate access to Lot 1A and 2A; (aka Estate Road Stage 1, CH 0-Ch 260) Erection of Warehouses 1 (Lot 1A), 2 and 3 (Site 2A);
- Construction of the required Estate Road Ropes Creek Crossing
- Bulk Earthworks across the whole of Oakdale Central;
- Provision of infrastructure and services for Oakdale Central; and
- Construction of two warehouses and associated infrastructure.

After gaining the above DOP approvals the following has been undertaken by Goodman:

- Goodman sought and obtained all the relevant approvals, and had the upgrade of Old Wallgrove Road (included as part of Stage 2 works) constructed;
- Goodman sought and obtained all the relevant approvals, and had the first section of the Estate Road (now known as Millner Avenue) constructed, including other estate infrastructure (temporary sewer pumping station, lead-in and estate water, power, swales etc) (included as part of Stage 2 works); and
- Goodman sought and obtained all the relevant approvals, and had the earthworks associated with Stage 1 completed.

S75W Mod 5 (Stages 3 and 4)

Since the construction of Stages 1 and 2, Goodman applied for a modification to the Concept Plan Approval and also a modification to the Project Approval. The Project Approval related to those works generally described as Stages 3 and 4 (also known as Modification No. 5, Mod 5).

The s75W Mod 5 encompasses the planned phase of civil works on the Oakdale Central site known as INFRASTRUCTURE SEPERABLE PORTIONS 1, 2 &3 which includes:

- the proposed stage 2 extension of the Estate Road from Ch 260 to approx Ch 685) aka Estate Road Stage 2)
- the proposed construction of a new stormwater biodiversity basin immediately west of building lot 1c
- proposed associated cut to fill and imported filling bulk earthworks to construct the estate road extension road and basin and to raise lot 1c to marry to the same earthworks pad level as lot 1b
- proposed new keystone earth retaining walls to the perimeter of building lot 1c.
- the widening of lot 1c by approx 20m further west.

It should be noted the modification to the DOP approvals did not include approval for the documented stormwater biodiversity basin as mentioned above. Approval for the construction of the basin is subject to a separate application under Part 4 of the EP&A Act.

In addition to the above DOP modification approvals, the following has or will be undertaken:

- Goodman has lodged a separate application to Fairfield City Council (FCC) under Part 4 of the EP&A Act for the construction approval of the stormwater basin and associated outlets;

- Goodman has lodged with FCC plans and documents for the required Construction Certificate for the works associated with Stages 3 and 4 and will appoint FCC as certifier for the works;

Lots 3A, 3B and 4 and Estate Road CH 685 to 1040 and Bio-retention Basin Development Application

This development application encompasses the planned phase of civil works on the Oakdale Central site known as Lots 3 and Lot 4 which included:

- the proposed stage 3 extension of the Estate Road from Ch 685 to approx Ch 1040) aka Estate Road Stage 3
- proposed associated cut to fill and importing bulk earthworks to construct the estate road and pad levels for Lots 3 and 4
- the proposed construction of a new stormwater biodiversity / detention basin immediately west of building lot 3B
- proposed associated cut to fill and imported filling bulk earthworks to construct the estate road extension road and basin
- proposed new keystone earth retaining walls to the perimeter of building lot 3A and 3B

The purpose of this Development Application Civil Design Report

This development application encompasses the planned phase of civil works on Lots 1C, 2B, 3A and 3B and which includes:

- the proposed civil works associated with Lots 1C, 2B, 3A and 3B which includes
    - road works and proposed site levels including loading dock
    - the proposed extension of the Estate Road and roundabout to service the south west corner of Lots 3A and 3B
    - the upgrade options for the Old Wallgrove Road and the intersection of Old Wallgrove Road and Wallgrove Road
    - stormwater drainage including on site detention requirements
    - pavement plans
    - typical site and road sections
    - service coordination plans

2 Introduction

2.1 Scope of Report

Summary

This report generally discusses the design philosophy behind the following components of the design within each of the lots 1C, 2B, 3A and 3B:

- Civil design
- Stormwater Management
    - On Site Detention (OSD)
    - Piped and Overland Flows
    - Water Sensitive Urban Design (WSUD)
- Sedimentation and Erosion Control
- Road geometry and pavement

The proposed site plan covering the entire Oakdale Central development along with the proposed Lot 1C, 2B, 3A and 3B layouts are attached within Appendix A.

This report should be read in conjunction with the following AT&L 13-143 drawings dated October 2013:

C001 – C004 Rev A

C100 – C111 Rev A

C115 Rev A

C200 – C212 Rev A

C215 Rev A

C300 – C325 Rev A

C330 Rev A

C350 – C359 Rev A

A copy of these drawings is provided in Appendix B.

Additionally, the following associated reports should also be read in conjunction with this report:

- Oakdale Concept Plan – Water Sensitive Urban Design Strategy dated September 2010 prepared by GHD;

- Oakdale Stage 1 Ropes Creek Flood Study, Addendum (May 2013) prepared by GHD
- Oakdale Stage 1 Ropes Creek Flood Study, Addendum (July 2013) prepared by GHD

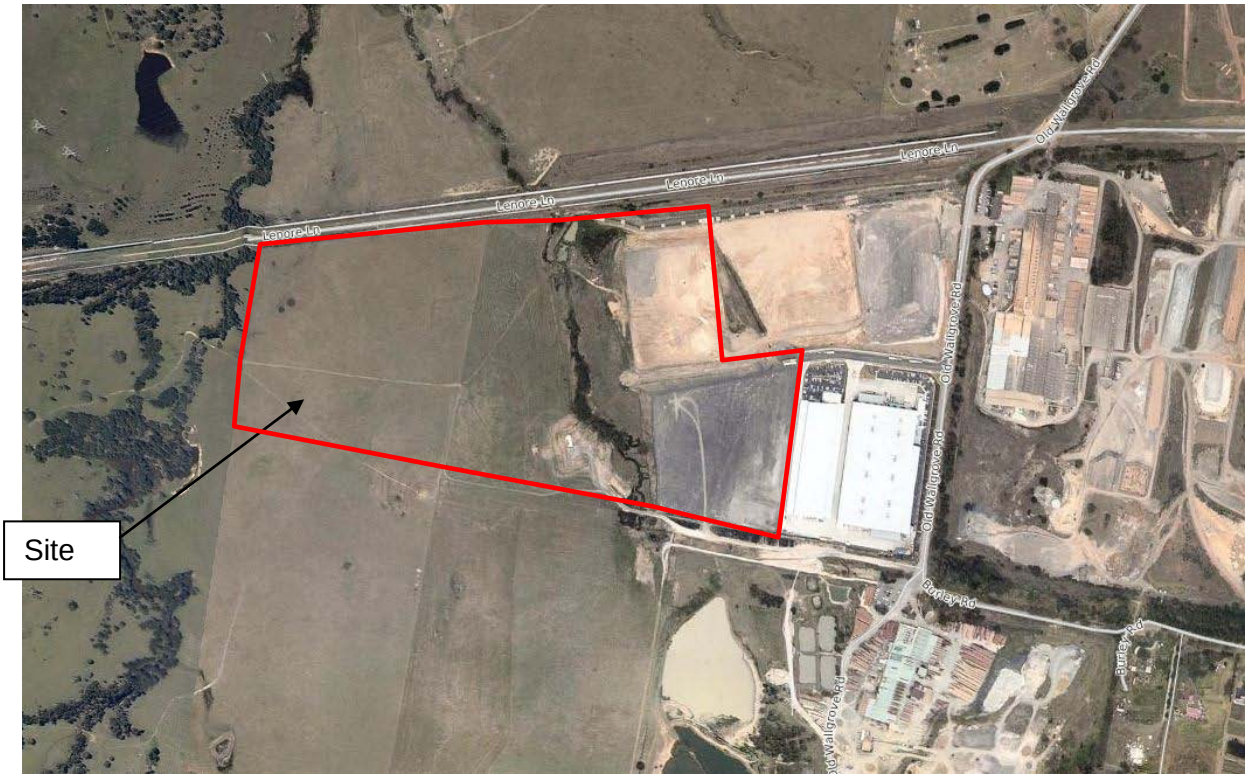


Figure 1 Locality Plan

3 Stormwater Management

3.1 The Site (Lots 1C, 2B, 3A and 3B)

The stormwater catchment associated with each Lot is

- Lot 1C = 46,417m^2 (4.6417Ha)
- Lot 2B = 60,010m^2 (6.001 Ha)
- Lots 3A and 3B = 155,900m^2 (15.59ha)

A development area schedule for each lot is shown in Appendix A.

The site is located in the Fairfield City Council Local Government area and is bound by the future Chandos Parkway Road Corridor to the south, Northern Bio-Swale to the north and Ropes Creek to the east. The Site forms part of the Oakdale Central Precinct Concept Plan Approval (08_0065).

3.2 Council & Precinct Requirements & Recommendations

As part of the MoP Concept and Project Approvals obtained for the site to date, GHD prepared a precinct wide stormwater management strategy which forms the basis of the stormwater management design proposed for the site. Refer Oakdale Concept Plan – Water Sensitive Urban Design Strategy dated September 2010 and Addendum (July 2013) within Appendix E.

A summary of Council and GHD requirements and recommendations adopted is listed below:

- OSD of 250 m^3/ha of developable site area. OSD will have restricted outlet sizes based on a permissible site discharge of 140L/s/ha.
- OSD to mitigate post development flows to pre-developed flows for peak Average Reoccurrence Interval (ARI) events.
- WSUD to achieve target reductions:
    - 85% Total Suspended Solids (TSS)
    - 65% Total Phosphorus (TP)
    - 45% Total Nitrogen (TN)
    - 90% Gross Pollutants (GP)
- Finished Floor Levels (FFL) to have minimum 300mm freeboard to 100 year overland flows.

Rainwater tanks are desirable for re-use for irrigation, toilet and other non-potable water uses. No set guidelines are provided.

3.3 Stormwater Management

DRAINs modelling software has been used to calculate the Hydraulic Grade Line (HGL) of the stormwater pipes. DRAINs data files and output results are attached in Appendix C.

MUSIC modelling software has been used to evaluate pollutant loads from each developed lot. MUSIC data files and output results are attached in Appendix D.

3.3.1 Hydrology

- Pipe drainage shall be designed to accommodate the 20-year ARI storm event.
- The combined piped and overland flow paths shall be designed to accommodate the 100-year ARI storm event.
- Where trapped low points are unavoidable and potential for flooding private property is a concern, an overland flowpath capable of carrying the total 100-year ARI storm event shall be provided. Alternatively the

pipe and inlet system may be upgrade to accommodate the 100 year ARI storm event.

- Rainfall intensities shall be as per the Intensity-Frequency-Duration table in accordance with the Australian Rainfall and Runoff (AR&R) volume 2.
- Times of concentration for each subcatchment shall be determined using the kinematic wave equation.
- Runoff coefficients shall be calculated in accordance with AR&R. The fraction impervious shall be determined from analysis of the subcatchments.
- Flow width in gutter shall not exceed 2.5m for the minor design storm event.
- Velocity depth ratios shall not exceed 0.4 for all storms up to and including the 100 year ARI event.
- Blockage factors of 20% and 50% shall be adopted for pits on grade and at sags respectively.

3.3.2 Hydraulics

- A hydraulic grade line HGL design method shall be adopted for all road pipe drainage design. The HGL shall be shown on all drainage long sections.
- The minimum pipe size shall be 375 diameter RCP.
- The minimum pipe grade shall be 0.5%.
- All pipes shall be Rubber Ring Jointed uno.
- The minimum cover over pipes shall be 450mm in grassed areas and 600mm within carriageways.
- Where minimum cover cannot be achieved due to physical constraints the pipe class shall be suitably increased.
- All trafficable shall be Reinforced Concrete Pipes or Fibre Reinforced Cement equivalent.
- The pipe friction coefficients to adopted shall be:

Materials	Mannings – n	Colebrook-White – k	Min. Pipe Class
RCP	0.012	0.3	3
FRC	0.01	0.15	3

Table 1 – Pipe Details

- All pipes classes shall be designed for the ultimate service loads and where applicable, constructions loads will be designed for.
- Pipes discharging to the overland flow path shall adopt a minimum tailwater level equivalent to respective overland flow level.
- Pit Loss coefficients shall be calculated in accordance with Missouri Charts.
- A minimum 150mm freeboard shall be maintained between pit HGL and pit surface levels.
- Overland flowpaths shall maintain a minimum of 300mm freeboard to all habitable floor levels.
- Pits deeper than 1.2m shall contain step irons at 300 mm centres.

3.3.3 Catchments

A Stormwater Catchment Plan for each Lot and the overall site is shown in Appendix B. As indicated all stormwater runoff from Lots 1C and 2B drain directly into the bio-retention basin west of Lot 1C. The total catchment area draining towards the bio-retention basin west of Lot 1C equates to 21.9Ha.

All stormwater runoff from Lots 3A and 3B drain into the bio-retention basin west of Lot 3A and 3B. The total catchment area draining towards the bio-retention basin west of Lots 3A and 3B equates to 16.45Ha

3.3.4 On-Site Detention (OSD)

As discussed in Section 3.2, OSD is required within the development to mitigate post developed flows to pre-developed flow rates for peak Average Recurrence Intervals (ARIs).

A summary of the OSD requirements for each lot is as follows:

Lot 1C

All stormwater runoff from Lot 1C will drain into the adjacent bio-retention basin to the west of the lot. This basin has been designed and sized to take into account the OSD required within Lot 1C so no further OSD is required for this lot.

The OSD within the basin has been designed to generally achieve the following outcomes:

- OSD = 250m^3/Ha equating to minimum combined OSD volume of 4,939m^3
- Post developed peak flows to be mitigated to pre-developed peak flows for all storm events between and including the 5 and 100 year events.

Results

The bio-retention basin west of Lot 1C achieves mitigation of peak flows for all storm events between and inclusive of the 5 year to 100 year ARI for all flows. (*See table 2*)

- Actual Minimum combined OSD volume = 3,611m^3 (Capacity of the basin from extended detention RL 59.8 to Weir of basin RL 60.8 AHD) + 1,457m^3 (OSD within Lot 2A) = **5,068**m^3

	5 YR ARI (m^3/s)		100 YR ARI (m^3/s)	
Duration	Existing	Developed	Existing	Developed
Peak	2.52	2.16	5.33	4.89

Table 2 - Pre-Post Developed Flows from Bio-Retention Basin West of Lot 1C

Lot 2B

All stormwater runoff from Lot 2B will drain into the Estate Road stormwater network to ultimately drain into the bio-retention basin west of the Lot 1C. This basin has been designed and sized to take into account the OSD required within Lot 2B so no further OSD is required for this lot:

The results of the DRAINs modelling for the basin which Lot 2B drains into is indicated above in the Lot 1C results.

Lot 3A and 3B

All stormwater runoff from Lots 3A and 3B will drain into the bio-retention basin to the west of Lots 3A and 3B. This basin has been designed and sized to take into account the OSD required within both lots so no OSD is required within each individual lot.

The OSD within the basin has been designed to generally achieve the following outcomes:

- OSD = 250m^3/Ha equating to minimum combined OSD volume of 4,112.5m^3 (excluding part Lot 4 which will need to have separate OSD within the Lot DA)
- Post developed peak flows to be mitigated to pre-developed peak flows for all storm events between and including the 5 and 100 year events

The bio-retention basin to the west of Lots 3A and 3B is intended to capture and meet the WSUD water quality needs of the following sub-catchments:

- The Estate Road from Ch 890 to Ch 1040
- The proposed lots 3A and 3B and western portion of Lot 4

Building lot 4 is modelled with individual OSD to capture stormwater within the bounds of the lot, prior to discharging into the road network and

ultimately towards the new WSUD bio-retention basin west of Lot 3A and 3B.

The construction of OSD in lot 4 will be subject to future DAs for any proposed development of this lot.

The individual Lot has been modelled with a base flow equal to the PSD of 140 L/s/Ha. This is considered conservative as the shorter duration minor storms will likely have significantly lower discharge.

Results

The results of the drains model indicate the following targets are achieved:

The bio-retention basin west of Lots 3A and 3B achieves mitigation of peak flows for all storm events between and inclusive of the 5 year to 100 year ARI for all flows. (*See table 3*)

- Actual Minimum combined OSD volume = **4,350**m^3 (Capacity of the basin from extended detention RL 54.8 to Weir of basin RL 56.45. Note: separate OSD basins/tanks will be required within Lot 4 to detain the runoff to meet the PSD rates of 140L/s/Ha.

	5 YR ARI (m^3/s)		100 YR ARI (m^3/s)	
Duration	Existing	Developed	Existing	Developed
Peak	2.63	1.61	4.74	2.50

Table 3 - Pre-Post Developed Flows from Bio-Retention Basin West of Lot 3A – 3B

3.3.5 Overland Flows

Overland flows within the access roads, carparks and hardstanding areas have been designed to be safely conveyed within the road carriageway.

GHD carried out a flood study as part of the *Oakdale Concept Plan – Water Sensitive Urban Design Strategy Dated September 2010*. This report and the associated design drawings were used to determine the upstream catchments and flows entering into “the site”.

The 100 year ARI flood level determined by GHD adjacent to the proposed basin west of Lot 1C and basin west of Lots 3A and 3B have been adopted as the tailwater levels for the hydraulic modelling of the basin and stormwater network for all Lots.

3.3.6 Water Sensitive Urban Design (WSUD)

Water Sensitive Urban Design encompasses all aspects of urban water cycle management, including water supply, wastewater and stormwater management. WSUD is intended to minimise the impacts of development upon the water cycle and achieve more sustainable forms of urban development.

The WSUD strategy, MUSIC Model and subsequent WSUD designs prepared by AT & L are based upon the GHD Project Approval WSUD Strategy Report found in Appendix E.

Lot 1C

Stormwater quality treatment for Lot 1C will ultimately provided by the proposed bio-retention basin to the west of Lot 1C. The bio-retention basin will be constructed during a previous stage of the overall Oakdale Central development. To this extent, no additional Stormwater Quality Improvements Devices (SQIDs) are proposed within Lot 1C.

Lot 2B

Stormwater quality treatment for Lot 2B will ultimately provided by the proposed bio-retention basin to the west of Lot 1C. The bio-retention basin will be constructed during a previous stage of the overall Oakdale Central development. To this extent, no additional Stormwater Quality Improvements Devices (SQIDs) are proposed within Lot 2B.

Lots 3A and 3B

Stormwater quality treatment for Lots 3A and 3B will ultimately provided by the proposed bio-retention basin to the west of Lots 3A and 3B. The bio-retention basin will be constructed during a previous stage of the overall Oakdale Central development. To this extent, no additional Stormwater Quality Improvements Devices (SQIDs) are proposed within Lots 3A and 3B.

WSUD Modelling – MUSIC Model

The MUSIC Model for Urban Stormwater Improvement Conceptualisation (MUSIC, Version 5.00.10) was used to evaluate pollutant loads from each of the proposed lots for Post-development (treated) conditions based on the proposed site development.

A conceptual view of the MUSIC model used in this report can be found in Appendix D.

Base MUSIC Model

GHD provided a base MUSIC model, which was inclusive of an additional catchment and water quality treatment device for the adjacent property of Austral Brickworks. The information provided and details of the Austral Brickworks catchment and sediment basin were retained for use in the preparation of the MUSIC model provided in this report.

Climate Change

Pluviograph data (6 minute rainfall intensity and evopotranspiration) for Horsley Park (Station 067119) was use in the MUSIC model.

Catchment Areas and MUSIC Parameters

All building lot catchment areas were assumed to be between 70% and 80% roofed. Of the non-roofed areas, 80% of this area was assumed to be impervious. To provide a more accurate model, separate catchment nodes were created to simulate the roofed area and non-roofed areas for each lot.

MUSIC model input parameters for these catchments including rainfall-runoff, base flow concentration and stormflow concentration parameters were selected as per the Draft MUSIC Modelling Guidelines for New South Wales. The parameters used for the various catchment areas can be seen in tables 3, 4, 5 and 6.

Rainfall-Runoff Parameters

Parameter	Unit	Figure
Rainfall Threshold	mm/day	1.40
Soil Storage Capacity	Mm	170
Initial Storage	% of Capacity	30
Field Capacity	Mm	70
Infiltration Capacity Coefficient	a	210.0
Infiltration Capacity Coefficient	b	4.7
Initial Depth (Ground Water)	mm	10
Daily Recharge Rate	%	50.00
Daily Baseflow Rate	%	5.00
Daily Seepage Rate	%	0.00

Table 4 – Rainfall-Runoff Parameters – All Catchment Areas

Base Flow/Stormflow Concentration Parameters – Impervious (Roofed) Areas

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	0.000	0.000	1.300	0.320

Phosphorus	0.000	0.000	-0.890	0.250
Nitrogen	0.000	0.000	0.300	0.190

Table 5 – Base Flow/Stormflow Concentration Parameters – Impervious (Roofed) Areas

Base Flow/Stormflow Concentration Parameters – Pervious Areas

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	1.200	0.170	2.150	0.320
Phosphorus	-0.850	0.190	-0.600	0.250
Nitrogen	0.110	0.120	0.300	0.190

Table 6 – Base Flow/Stormflow Concentration Parameters – Pervious Areas

Base Flow/Stormflow Concentration Parameters – Road

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	1.200	0.170	2.430	0.320
Phosphorus	-0.850	0.190	-0.300	0.250
Nitrogen	0.110	0.120	0.340	0.190

Table 7 – Base Flow/Stormflow Concentration Parameters – Road

Parameters used for the Bio-retention basin were based off guidelines provided by FAWB – Stormwater Biofiltration Systems – Version 1, 2009, and were modified accordingly. Parameters used to model the bioretention basin are shown in the table 7 below.

Parameter	Unit	Figure
Extended Detention Depth	m	0.30
Surface Area	m2	2000
Filter Area	m2	1900
Unlined Filter Media Perimeter	M	0.01
Saturated Hydraulic Conductivity	mm/hour	180
Filter Depth	m	0.50
TN Content of Filter Media	mg/kg	900
Orthophosphate Content of Filter Media	mg/kg	30.0
Exfiltration Rate	mm/hour	0.00
Base Lined	-	Yes
Vegetation Properties	-	Effective Nutrient Removal Plants
Overflow Weir Width	m	10.00
Underdrain Present	-	Yes
Submerged Zone	-	No

Table 8 – Bioretention Basin Parameters

Results

Stormwater quality treatment for Lots 1C and 2B will ultimately be provided by the proposed WSUD biodiversity basin west of Lot 1C.

Stormwater quality treatment for Lots 3A and 3B will ultimately be provided by the proposed WSUD biodiversity basin west of Lots 3A and 3B.

MUSIC modellings results presented as mean annual loads at the receiving node indicate that adopted target reductions are achieved, as shown in Table 8 and 9.

Pollutant	Sources (Kg/yr)	Residual Load (Kg/yr)	Reduction (%)	Target Reduction (%)
Total Suspended Solids	24,600	3,390	86.2	85

Total Phosphorus	56.5	14.9	73.6	65
Total Nitrogen	562	271	51.9	45
Gross Pollutants	7,980	37.6	99.5	90

Table 9 – Pollutant Loads – Combined Basin West of Lot 1C

Pollutant	Sources (Kg/yr)	Residual Load (Kg/yr)	Reduction (%)	Target Reduction (%)
Total Suspended Solids	24,600	3,390	86.3	85
Total Phosphorus	56.5	14.9	75.7	65
Total Nitrogen	562	271	55.1	45
Gross Pollutants	7,980	37.6	99.5	90

Table 10 – Pollutant Loads – Combined Basin West of Lots 3A and 3B

4 Sedimentation and Erosion Control

4.1 Current Project Approval Sedimentation Plans

The Current Project Approved Sediment and Erosion and Control plans prepared by GHD are appended to this report in Appendix H.

New sediment and erosion control measures are proposed in clause 4.2 below.

4.2 Sedimentation and Erosion Control (Construction)

Soil and Water Management Plans (SWMP) has been prepared in accordance with the NSW Department of Housing Publication titled: Managing Urban Stormwater- Soils and Construction (2004) for each of the three lots. Refer to AT&L drawings C110 for Lot 1C, C211 for Lot 2B and C315-C318 for Lots 3A and 3B SWMP's. These plans are within Appendix B.

The SWMP attempts to minimise the impact of sedimentation due to construction works by the following methods:

- Diversion of "clean" water away from the disturbed areas and discharge via suitable scour protection.
- Provision of hay bale type flow diverters to catch drainage and divert to "clean" water drains.
- Diversion of sediment-laden water into temporary sediment control basins to capture the design storm volume and undertake flocculation (if required).
- Provision of construction traffic shaker grids and wash-down to prevent vehicles carrying soils beyond the site.
- Provision of catch drains to carry sediment-laden water to sediment basins.
- Provision of silt fences to filter and retain sediments at source.
- Where future construction and building works are not proposed, the rapid stabilisation of disturbed and exposed ground surfaces with hydro-seeding.

4.2.1 Conclusion

The erosion control measures proposed for the site will comply with the requirements of Fairfield City Council and The Department of Environment, Climate Change and Water (DECC).

The proposed SWMP will ensure that the best management practice is applied to the development site in controlling and minimising the negative impacts of soil erosion.

5 Services

Services including sewer, water, power, telecommunication and gas can be made available to “the site”.

Internal reticulation will be coordinated at the Construction Certificate (CC) stage of works.

6 Retaining Walls

6.1 Retaining Walls

Austral brickwork or other similar mock stone face look retaining walls are proposed to the front of Lots 1C, 2B and 3A/3B as detailed on the Civil drawings. Similar such walls have already been built on lot 2A.

The proposed retaining walls will be built to the manufacturers (i.e. Boral or other) design guideline requirements or a Structural Engineers design requirements.

7 Road Design

7.1 Old Wallgrove Road Upgrade Works

Within this Development Application submission the option of upgrading of Old Wallgrove Road and the intersection of Old Wallgrove Road and Wallgrove Road needs to be explored. This is to increase the capacity of the existing road networks to handle additional vehicles associated with the proposed development of the entire Oakdale Central Precinct.

All proposed upgrade works plus alignment options of Old Wallgrove Road drawings are shown within the Civil Engineering Drawings within Appendix B. All road design has generally been designed to meet Ausroads requirements and Australian Standards to accommodate B-Double truck movements.

7.2 Horizontal and Vertical Geometry

The Estate Road extension and roundabout has generally been designed to meet Austroads requirements and Australian Standards to accommodate B-Double truck movements. As the estate road extension and roundabout falls within Fairfield City Council and Penrith Council land, approval will need to be granted by both Councils. Preliminary discussions with both Councils have indicated if the road and roundabout are designed to Austroads standards it should comply with both standards.

The loading docks within each lot have generally been designed in accordance with AS 2890.1, Fairfield City Council specifications and the DHL Generic Base Building Specification

7.3 Pavement

Pavement will be designed based on the requirements of Austroads Pavement Design Guide – A Guide to the Structural Design of Road Pavements. An Estate Road Pavement design has been undertaken by PSM, a copy of which is provided in Appendix G.

8 Conclusion

The relevant requirements as set out in Councils Guidelines and GHD's Precinct wide Water Sensitive Urban Design Strategy are demonstrated to be generally achieved in the AT&L Civil engineering design drawings and supporting reports.

Appendix A

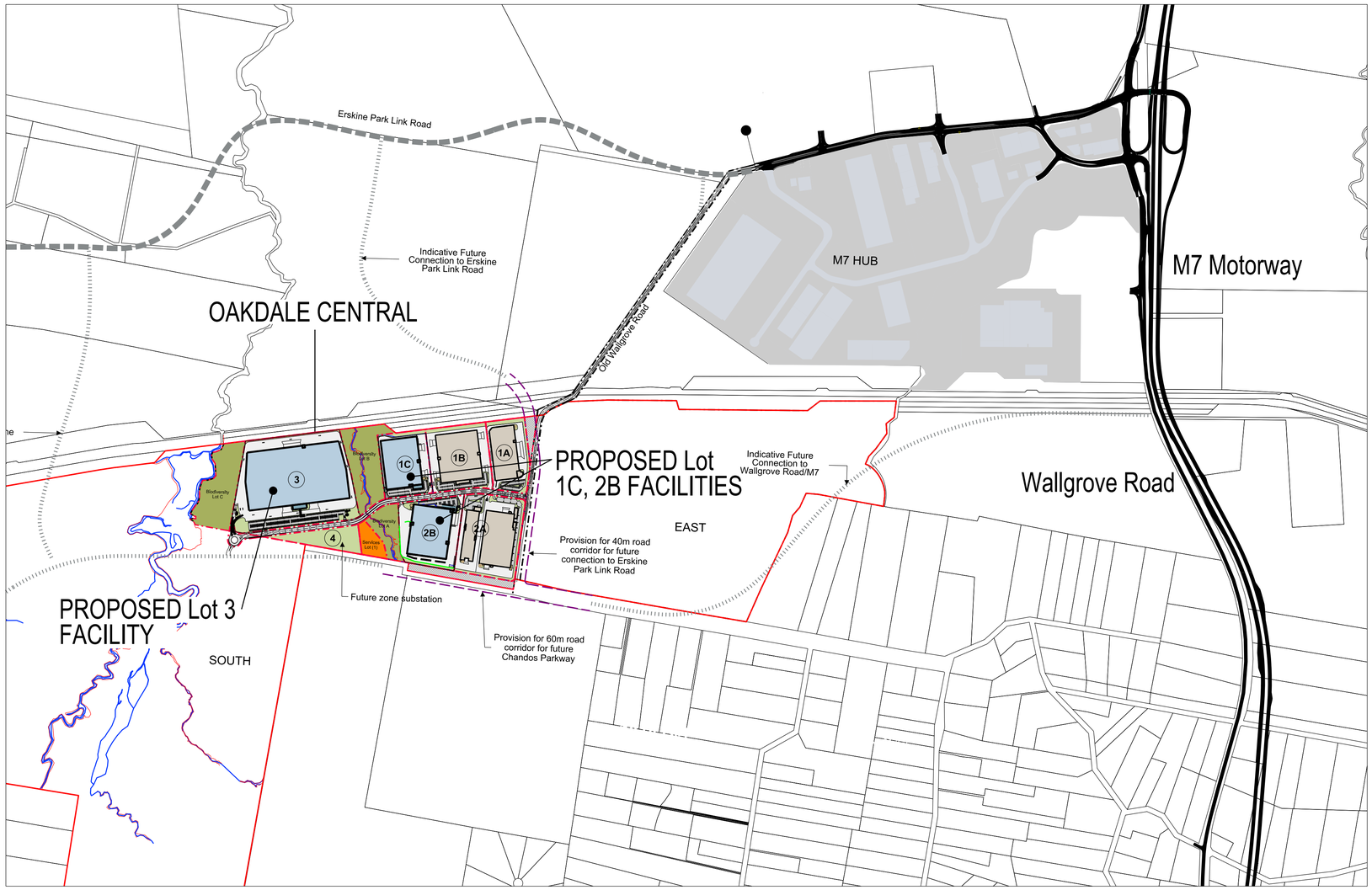
Architectural Site Plans

PROPOSED INDUSTRIAL FACILITIES

LOT 1C, 2B, 3A, 3B
OAKDALE CENTRAL
Old Wallgrove Road HORSLEY PARK, NSW 2175

Drawing List

DA-01	Cover Sheet & Title Page
DA-02	Estate Masterplan
1C DA-10	Site Plan / Floor Plan
1C DA-11	Roof Plan
1C DA-12	Office Plans
1C DA-13	Dock Office Plan
1C DA-14	Elevations
1C DA-15	Sections
2B DA-20	Site Plan / Floor Plan
2B DA-21	Roof Plan
2B DA-22	Office Plans
2B DA-23	Dock Office Plan
2B DA-24	Elevations
2B DA-25	Sections
2B DA-26	Staging Plan
3 DA-30	Site Plan / Floor Plan
3 DA-31	Roof Plan
3 DA-32	Office Plan - Ground Floor
3 DA-33	Office Plan - Level 1
3 DA-34	Dock Office Plan
3 DA-35	Elevations / Section
3 DA-36	Elevations



SBA ARCHITECTS

Oakdale CENTRAL Proposed Industrial Facilities - Lot 1C, 2B, and 3 **Cover Sheet / Location Plan**

Horsley Park

Not To Scale

27 Sept 2013

OAK DA 01 (C)

Goodman

Ropes
Creek

Oakdale
WEST
Lot 1
DP 120679

Biodiversity
Lot C

3

Biodiversity
Lot B

1C

1B
(Approved)

1A
(Approved)
MOD 4

OLD WALLGROVE ROAD

Oakdale
EAST
Lot 1
DP 843901

Biodiversity
Lot A

2B

2A
(As-built)
MOD1-3

4

Services
Lot (1)

Oakdale
SOUTH
Lot 82
DP 75204

Estate road extension approved
under S75W Modification to
PA#1 - (08_0066 MOD 5)

SBA ARCHITECTS

Oakdale CENTRAL Proposed Industrial Facilities - Lot 1C, 2B, and 3

Horsley Park

Estate Masterplan

0 50 250

1:2500 @ A1
1:5000 @ A3

09 Oct 2013

OAK DA 02 (E)

Goodman

1000 6000 1000 186955 3765

Existing fence
Existing retaining wall
Roll over bay

1000
35000
20442
25000
25000
141185
25000
20443
1000
6000
2970

15m Wide Drainage Swale (existing)

RW
FNC-1
RW
RW

Hardstand

15m Awning Over

Provisional Parking

3m Awning Over
3m Awning Over

RSD RSD RSD RSD RSD RSD

Recessed Docks (4)
Recessed Docks (4)

Dock Office (2 Levels) 190 sqm

11260 Grid

Industrial Facility
Warehouse 26,700 sqm
FFL 66.95 (+/- 500mm)

Office (1 Level) 600 sqm

W/H Amenities

Carparking - 158 Spaces

Driveway

Ramp Driveway

Swing Security Gate

RW FNC-1 RW

4500 4500

Boom Gates
Gatehouse
Swing Security Gate
Boom Gates

Pump Room
Sprinkler Tank

Truck Entry / Exit

FNC-2

Sliding Gate

Car Entry / Exit

FNC-2
FNC-2

Estate Road (Milner Avenue)

FNC-1 Chainwire Fencing
FNC-2 Palisade Fencing
RW Retaining Wall

Development Area Schedule

Site Area	46,417 sqm
Warehouse	26,700 sqm
Office (1 level)	600 sqm
Dock Office (2 levels)	190 sqm
Gatehouse	15 sqm
Total Building Area	27,505 sqm
Awning	1,300 sqm
Site Cover (exc. awning)	59 %
Floor Space Ratio	0.59 : 1
Hardstand Area	9,455 sqm
Light Duty Area	4,210 sqm
Carparking	158
Provisional Carparking	11

SBA ARCHITECTS

Oakdale CENTRAL
Horsley Park

Proposed Industrial Facility - Lot 1C

Site Plan / Floor Plan

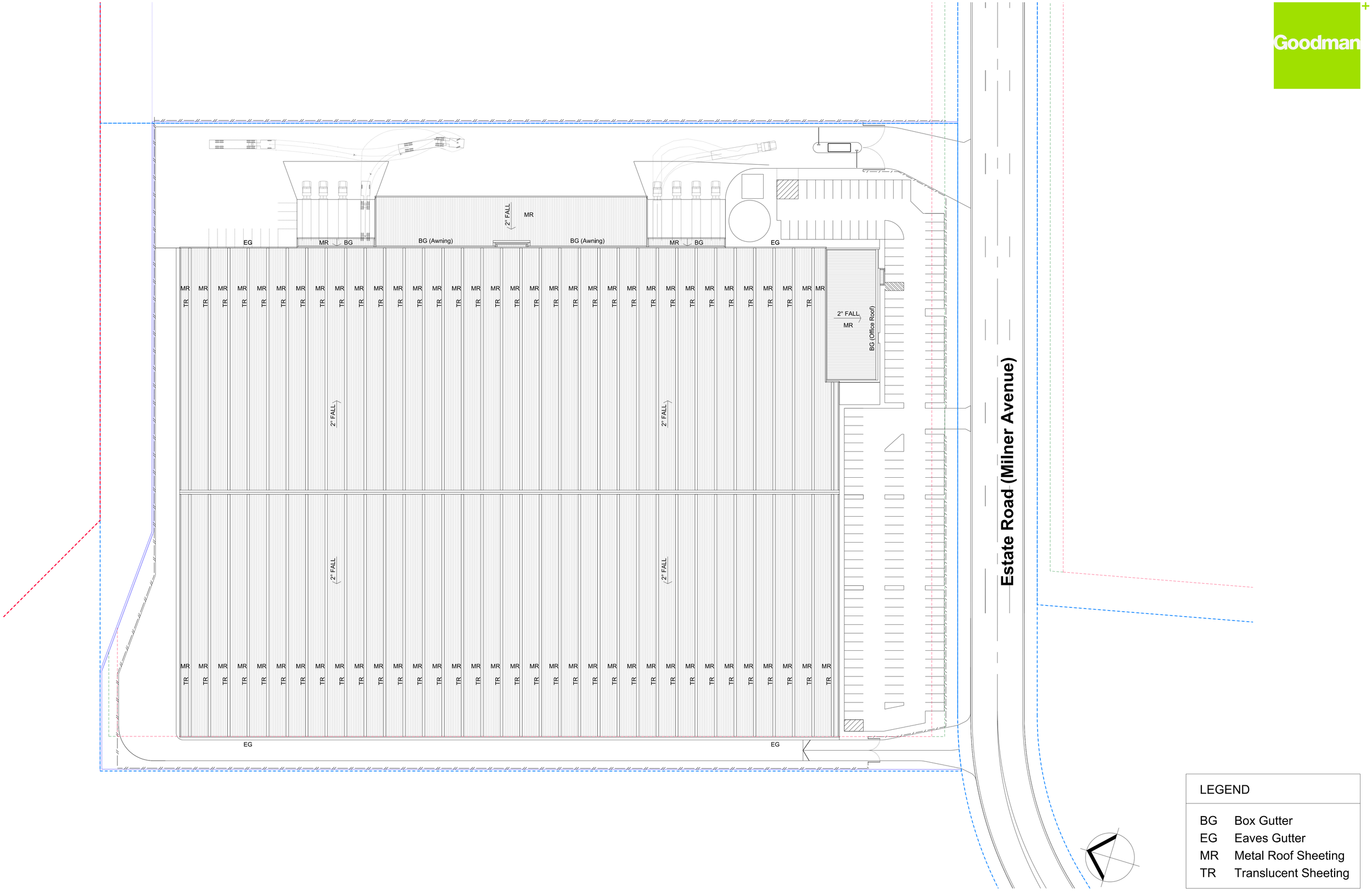
0 10 50

1:500 @ A1
1:1000 @ A3

09 Oct 2013

OAK 1C DA 10 (G)

Goodman



LEGEND	
BG	Box Gutter
EG	Eaves Gutter
MR	Metal Roof Sheeting
TR	Translucent Sheeting

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 1C

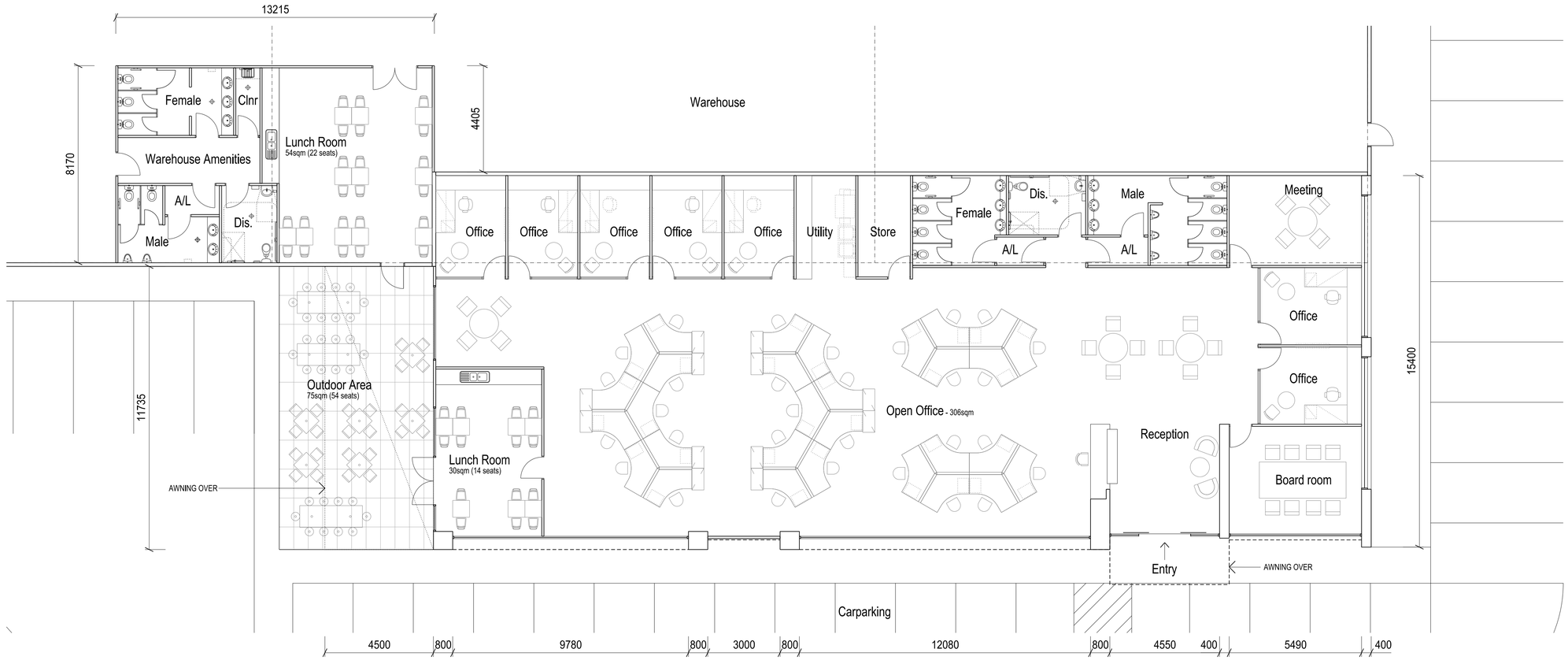
Roof Plan

0 10 50

1:500 @ A1
1:1000 @ A3

August 2013

OAK 1C DA 11 (B)



SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 1C

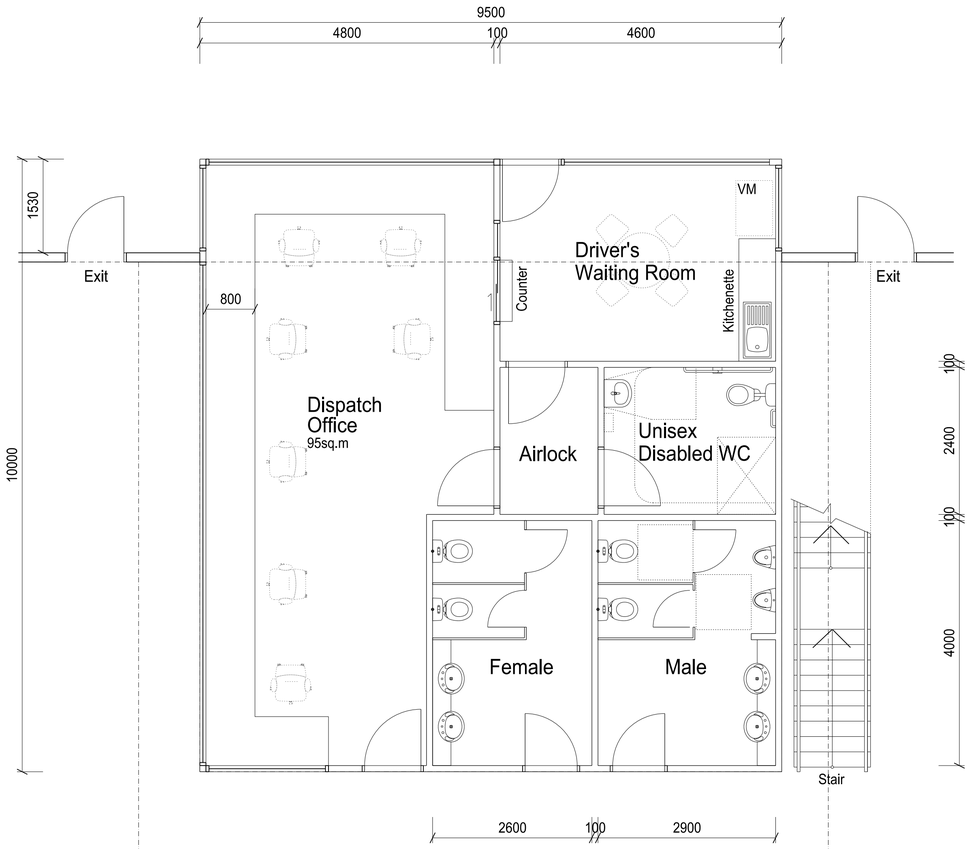
Office Plan

0 2 10

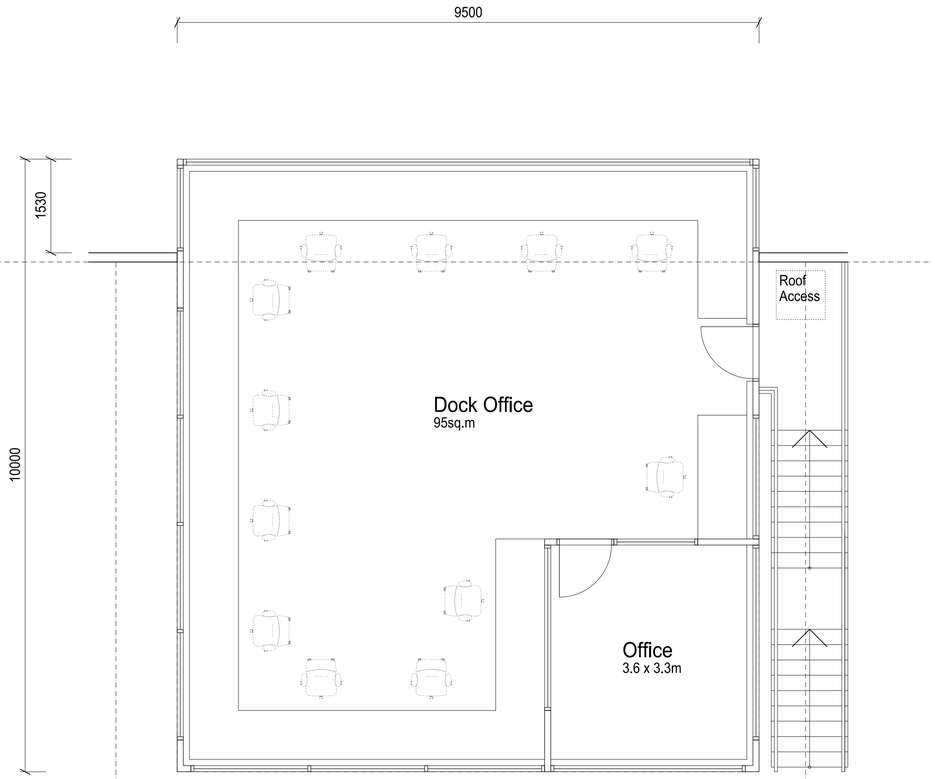
1:100 @ A1
1:200 @ A3

27 Sept 2013

OAK 1C DA 12 (B)



01 Ground Floor Plan



02 First Floor Plan

SBA ARCHITECTS

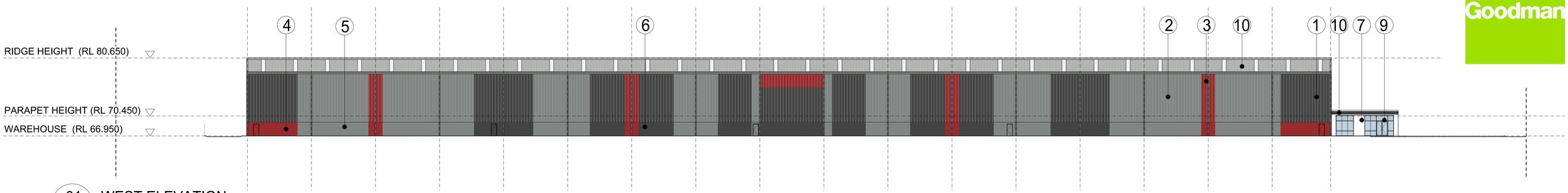
Oakdale CENTRAL — Proposed Industrial Facility - Lot 1C — **Dock Office Plans**

Horsley Park

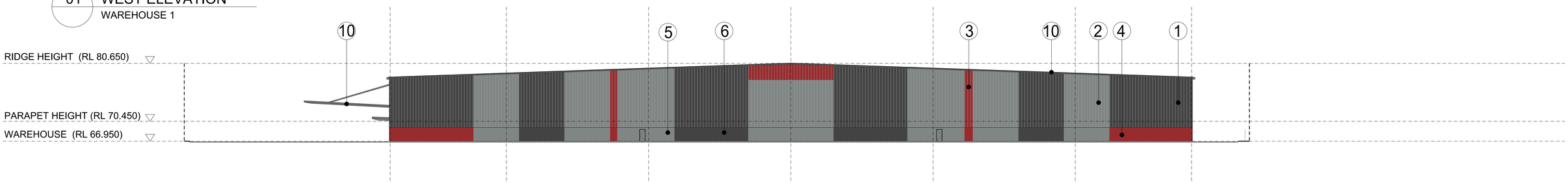
1:50 @ A1
1:100 @ A3

27 Sept 2013

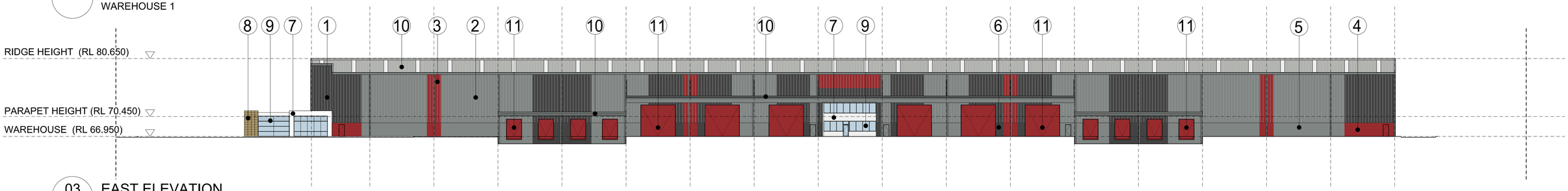
OAK 1C DA 13 (B)



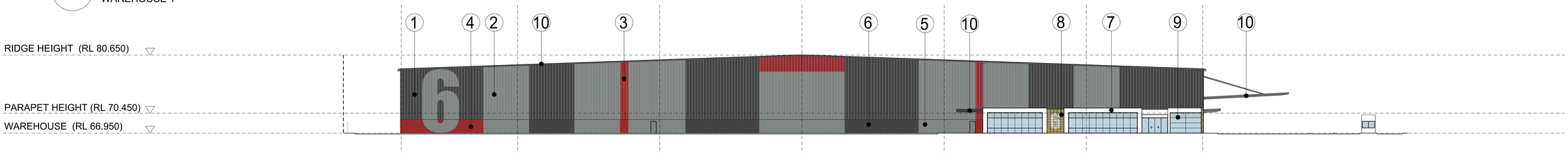
01 WEST ELEVATION
WAREHOUSE 1



02 NORTH ELEVATION
WAREHOUSE 1



03 EAST ELEVATION
WAREHOUSE 1



04 SOUTH ELEVATION
WAREHOUSE 1

Indicative External Finishes Legend

1	Profiled Metal Wall Cladding Colorbond 'Monument'	4	Precast Concrete Dado Panel Paint Finish 'Flame Red Gloss Alphatec'	7	Alpolic Panel or similar	10	Profiled Metal Roofing
2	Profiled Metal Wall Cladding Colorbond 'Windspray'	5	Precast Concrete Dado Panel Paint Finish 'Windspray'	8	Terracade Facade System 'Tennant XP Linear'	11	Metal Roller Shutter Door
3	Profiled Metal Wall Cladding Colorbond 'Flame Red Gloss Alphatec'	6	Precast Concrete Dado Panel Paint Finish 'Monument'	9	Aluminum Framed Glazing System		

SBA ARCHITECTS

Oakdale CENTRAL
Horsley Park

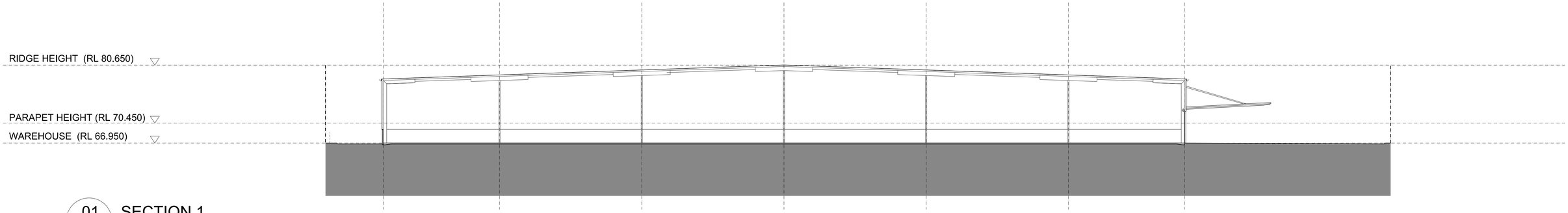
Proposed Industrial Facility - Lot 1C

Elevations

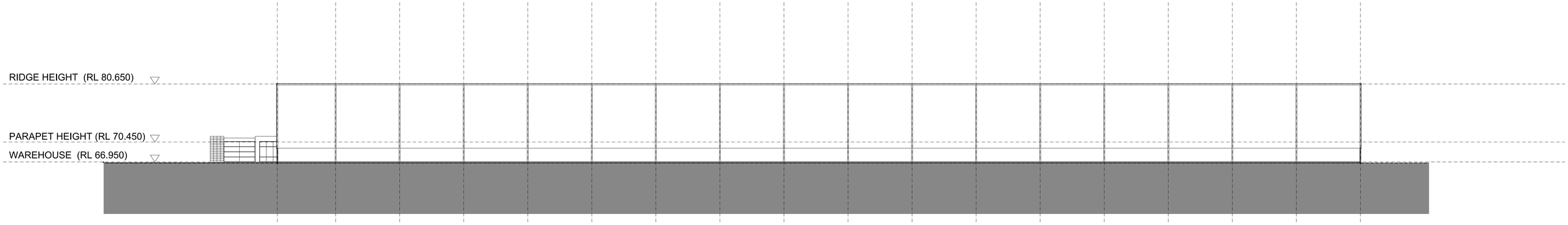
0 7 35

1:350 @ A1
1:700 @ A3
27 Sept 2013

OAK 1C DA 14 (B)



01 SECTION 1
WAREHOUSE 1



02 SECTION 2
WAREHOUSE 1

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 1C

Sections

1:350 @ A1
1:700 @ A3

27 Sept 2013

OAK 1C DA 15 (B)

193400

Swing Security Gate

Boom Gates

Existing fence

Existing retaining wall

Provisional Parking (14)

Truck Entry / Exit

Gatehouse

Provisional Parking (7)

Hardstand

15m Awning Over

13000

29935

10000

1000

35000

Ramp STAGE 2

FNC-2

3m Awning Over

Office Entry

Recessed Docks (8)

RSD

Dock Office 1 (2 Levels) 190 sqm

Sliding Gate

W/H Amenities

11300 GRID

Car Entry / Exit

Office Over (1 Level) 1,000 sqm

25418

Extension STAGE 3

25568

Carparking - 154 Spaces

Industrial Facility STAGE 1

Warehouse

29,480 sqm

FFL 69.00 (+/- 500mm)

RW

153410

FNC-1

Estate Road (Milner Avenue)

Dock Office 2 (2 Levels) 190 sqm

Recessed Docks (8)

Sprinkler Tank

Pump Room

Provisional Parking (7)

24900

1000

Hardstand

23910

10000

Truck Entry / Exit

FNC-1 Chainwire Fencing

FNC-2 Palisade Fencing

RW Retaining Wall

Development Area Schedule

Site Area	60,010 sqm
Warehouse	29,480 sqm
Stage 3	2,050 sqm
Office (1 level)	1,000 sqm
Office entry	100 sqm
Dock Office 1 (2 levels)	190 sqm
Dock Office 2 (2 levels)	190 sqm
Gatehouse	15 sqm
Total Building Area	33,025 sqm
Awning	3,365 sqm
Site Cover (exc. awning)	55 %
Floor Space Ratio	0.55 : 1
Hardstand Area	20,175 sqm
Light Duty Area	3,541 sqm
Carparking	154
Provisional Carparking	28

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 2B

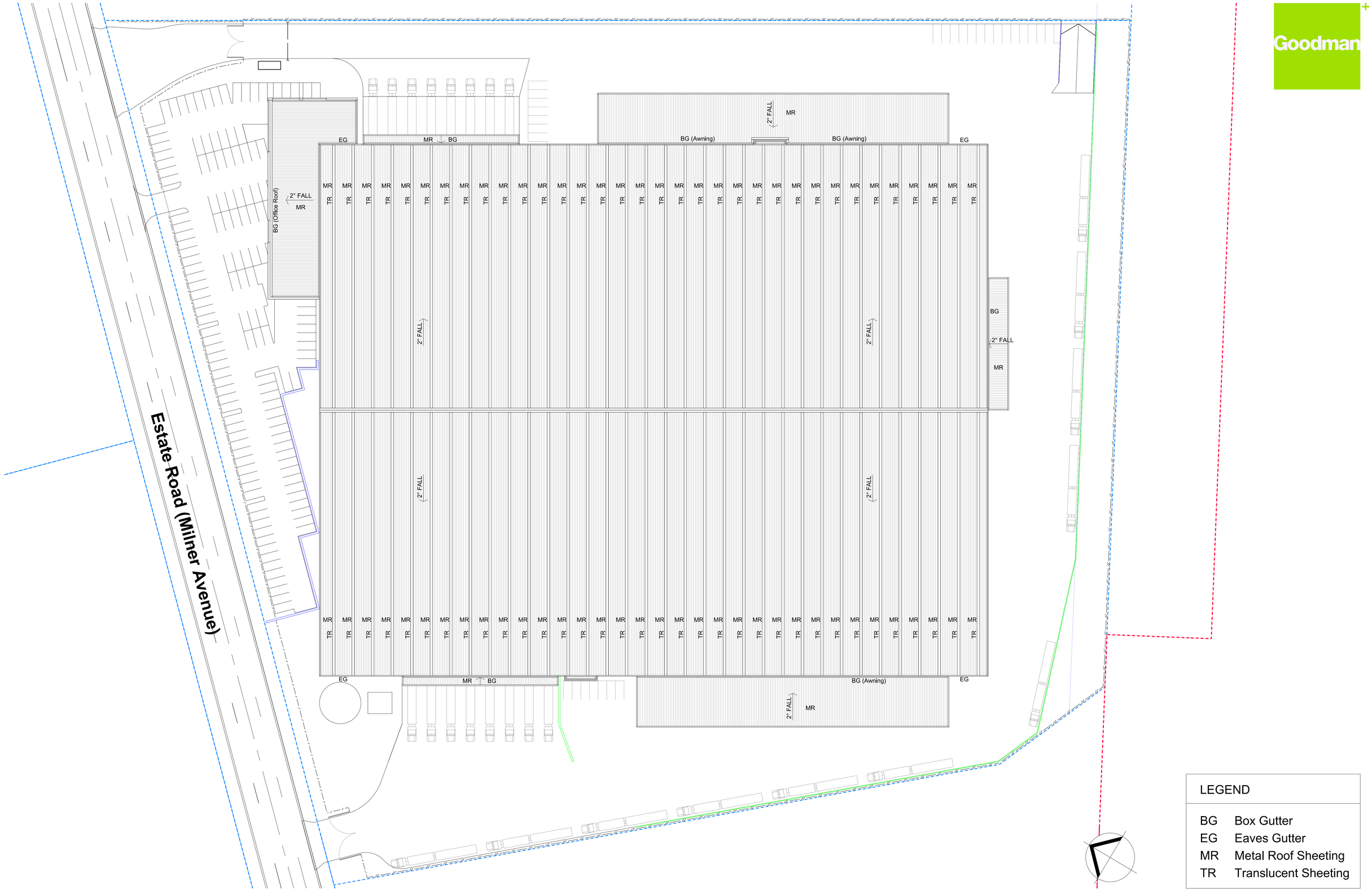
Site Plan / Floor Plan

1:500 @ A1
1:1000 @ A3

0 10 50

09 Oct 2013

OAK 2B DA 20 (E)



LEGEND	
BG	Box Gutter
EG	Eaves Gutter
MR	Metal Roof Sheeting
TR	Translucent Sheeting

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 2B

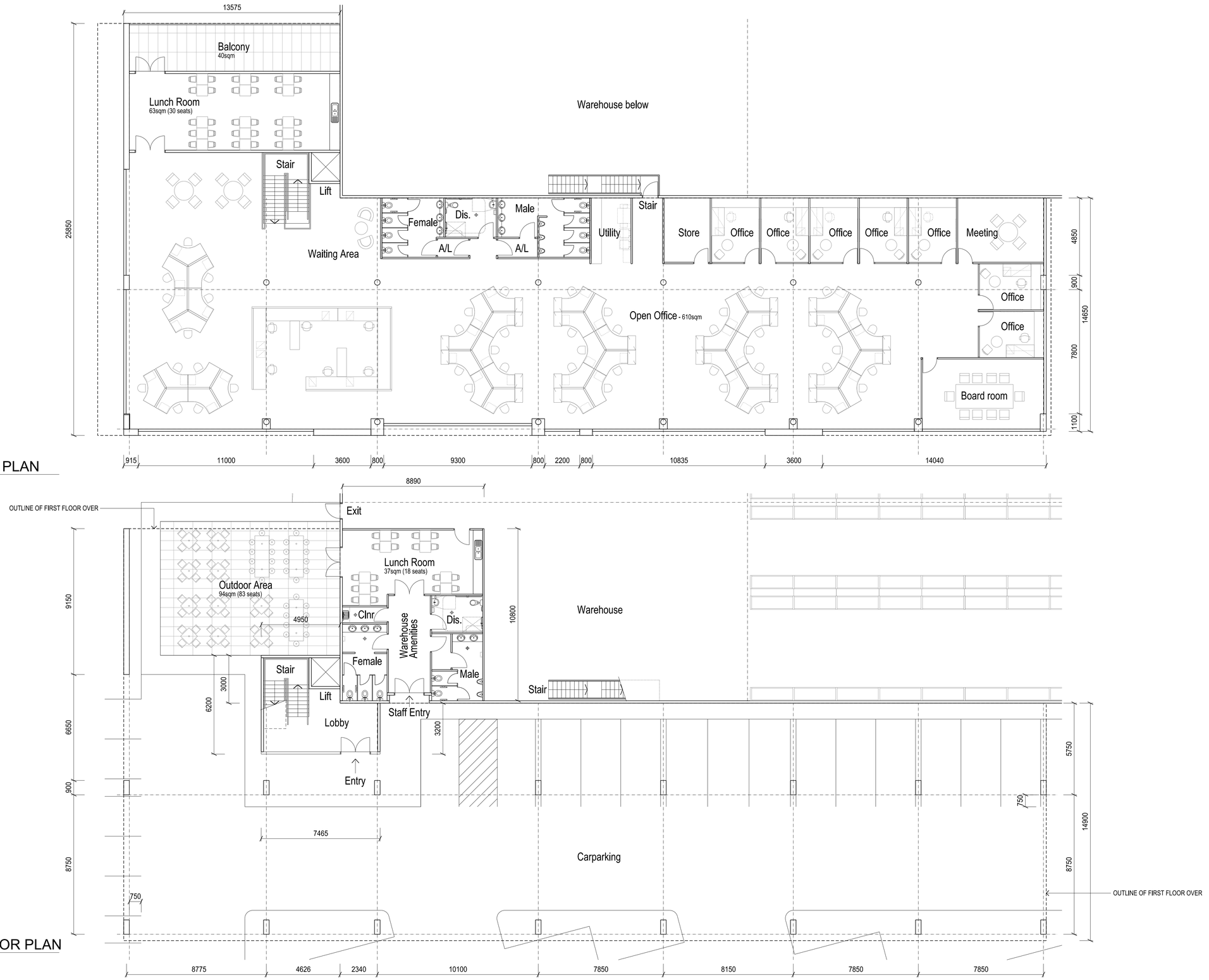
Roof Plan

0 10 50

1:500 @ A1
1:1000 @ A3

27 Sept 2013

OAK 2B DA 21 (B)



02 FIRST FLOOR PLAN
OFFICE

01 GROUND FLOOR PLAN
OFFICE ENTRY

SBA ARCHITECTS

Oakdale CENTRAL
Horsley Park

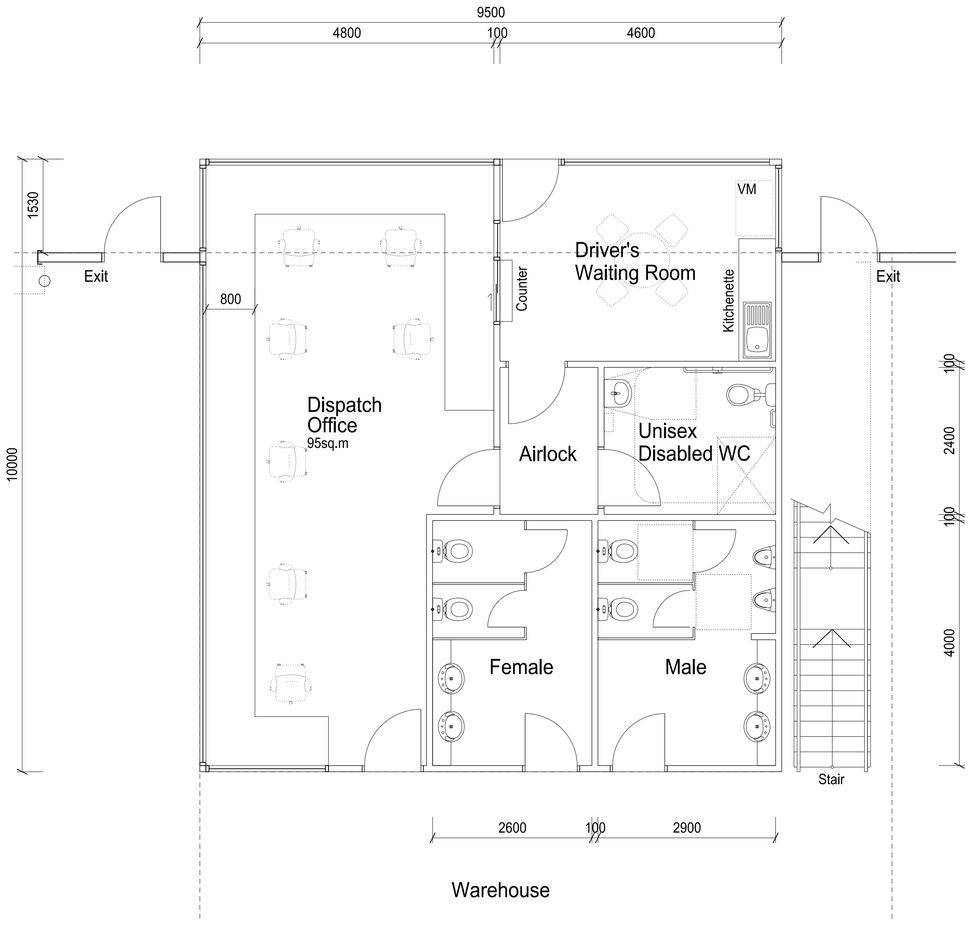
Proposed Industrial Facility - Lot 2B

Office Plan

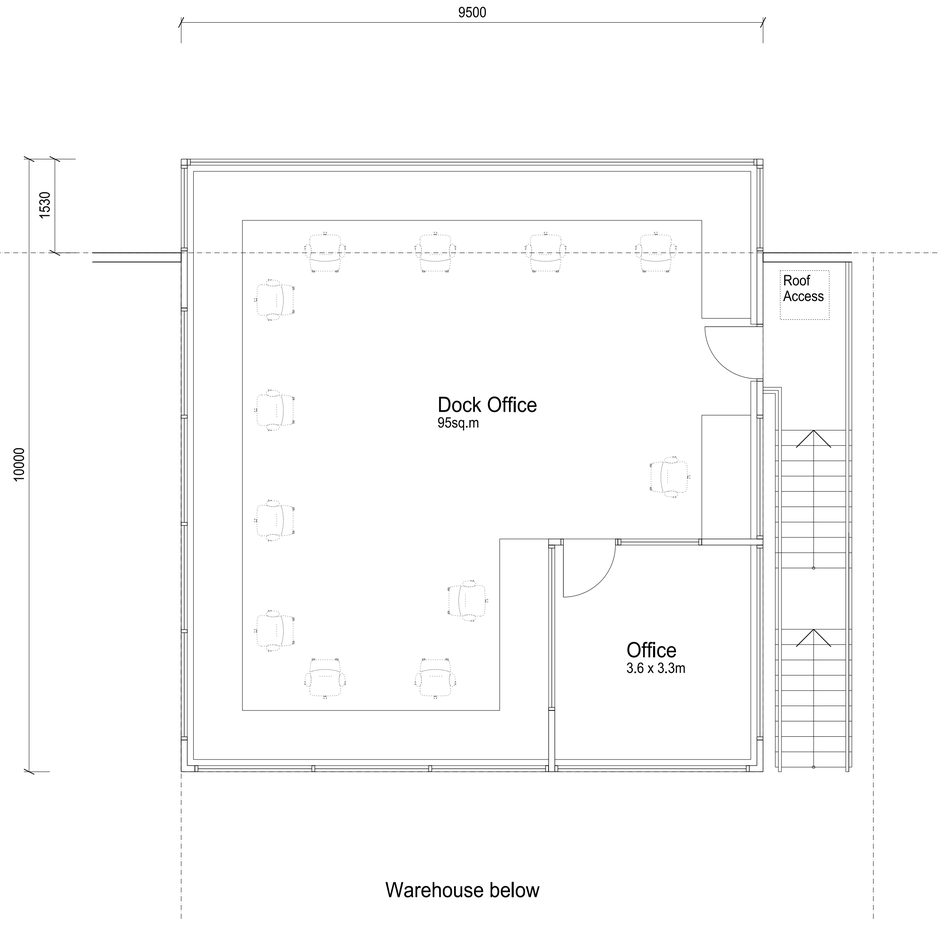
0 2.5 12.5

1:125 @ A1
1:250 @ A3
27 Sept 2013

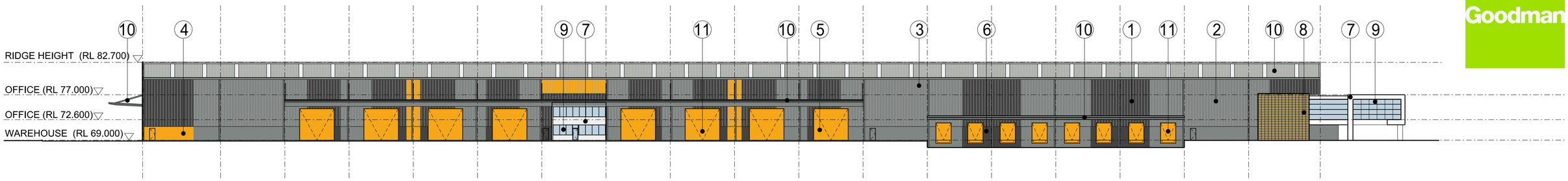
OAK 2B DA 22 (B)



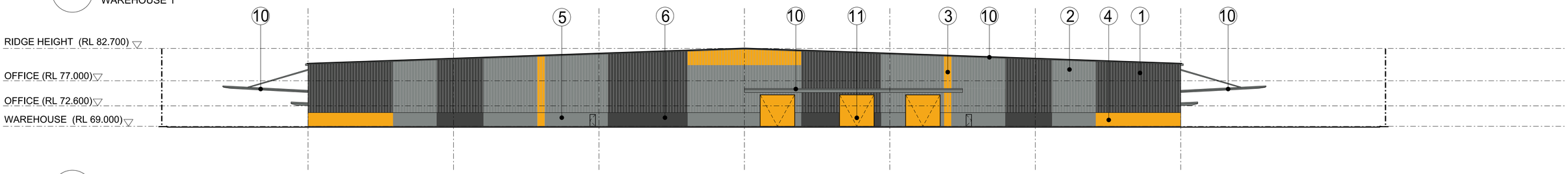
01 Ground Floor Plan



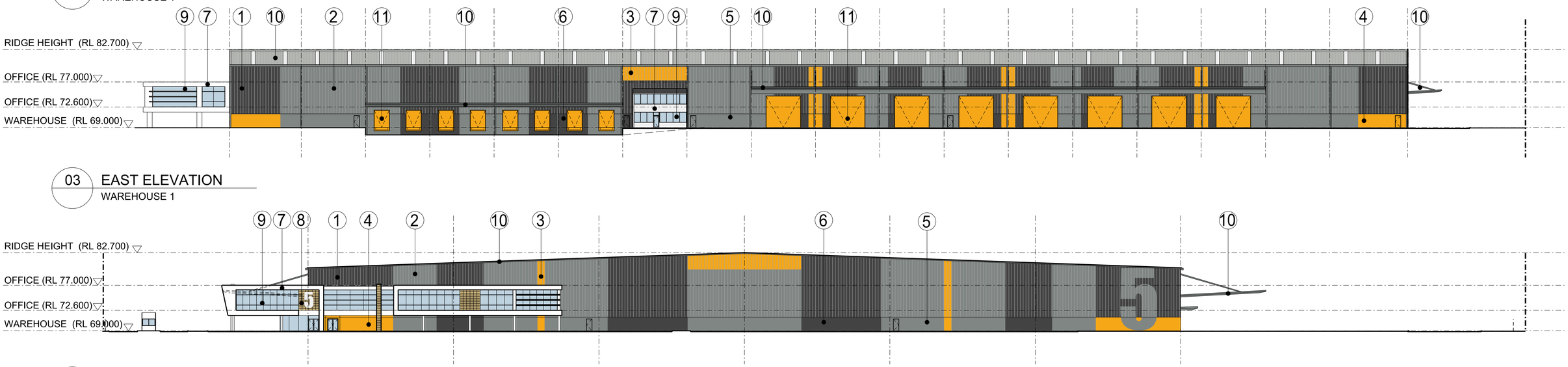
02 First Floor Plan



01 WEST ELEVATION
WAREHOUSE 1



02 SOUTH ELEVATION
WAREHOUSE 1



03 EAST ELEVATION
WAREHOUSE 1

04 NORTH ELEVATION
WAREHOUSE 1

Indicative External Finishes Legend

1	Profiled Metal Wall Cladding Colorbond 'Monument'	4	Precast Concrete Dado Panel Paint Finish 'Yellow Gold Gloss Alphatec'	7	Alpolic Panel or similar	10	Profiled Metal Roofing
2	Profiled Metal Wall Cladding Colorbond 'Windspray'	5	Precast Concrete Dado Panel Paint Finish 'Windspray'	8	Terracade Facade System 'Tennant XP Linear'	11	Metal Roller Shutter Door
3	Profiled Metal Wall Cladding Colorbond 'Yellow Gold Gloss Alphatec'	6	Precast Concrete Dado Panel Paint Finish 'Monument'	9	Aluminum Framed Glazing System		

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 2B

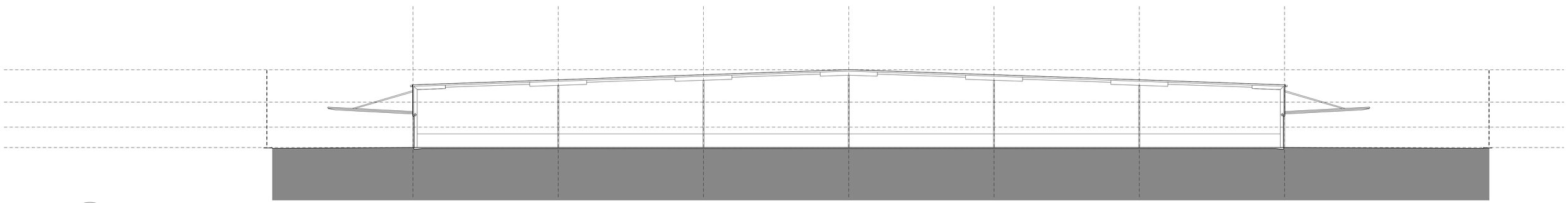
Elevations

0 7 35

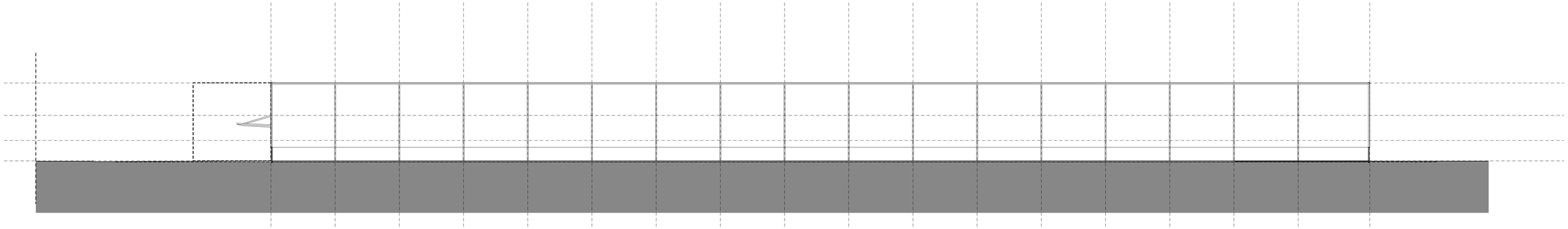
1:350 @ A1
1:700 @ A3

27 Sept 2013

OAK 2B DA 24 (B)



01 SECTION 1
WAREHOUSE 1



02 SECTION 2
WAREHOUSE 1

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 2B

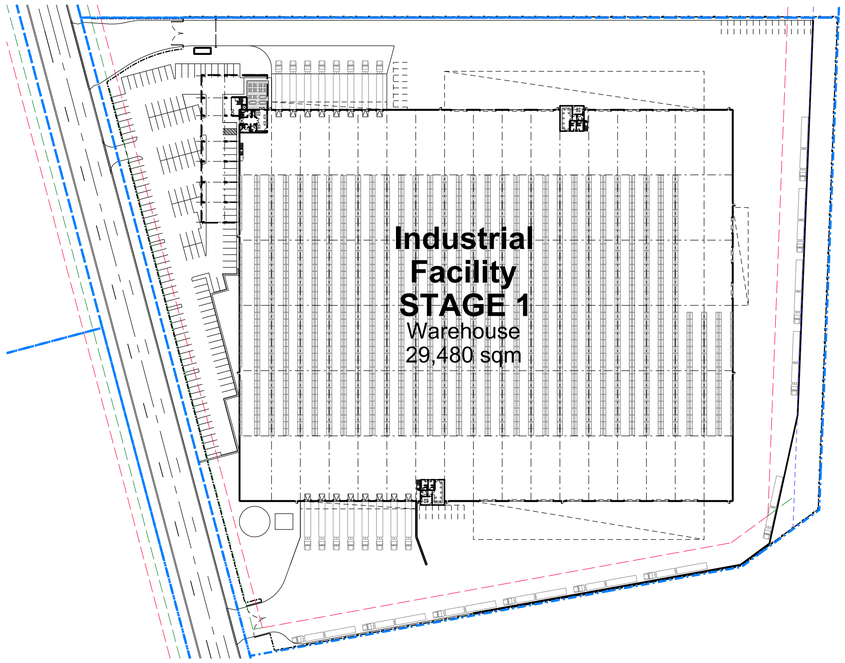
Sections

0 7 35

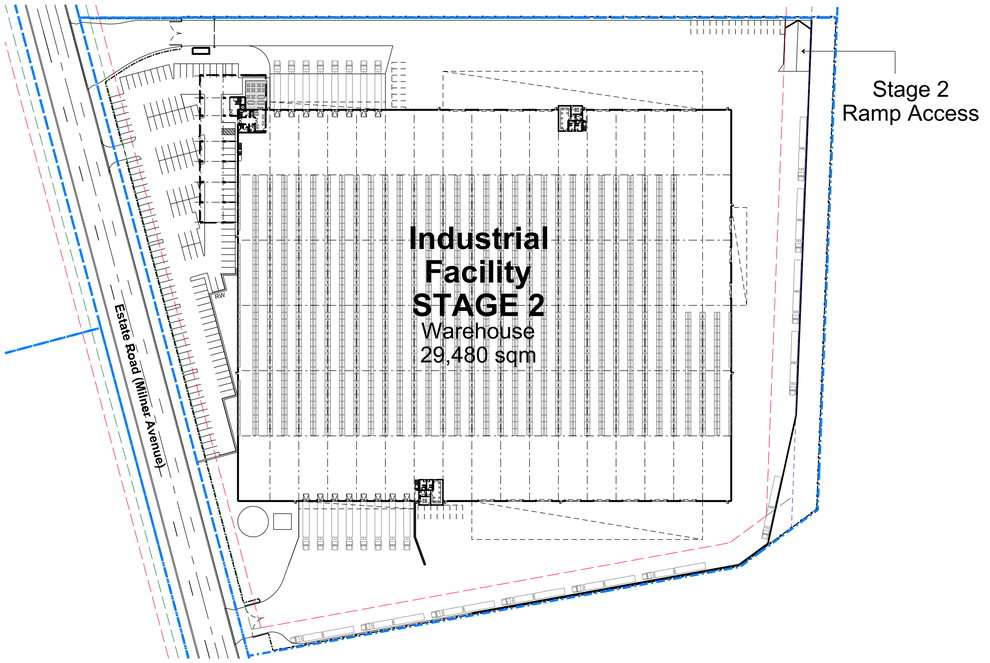
1:350 @ A1
1:700 @ A3

27 Sept 2013

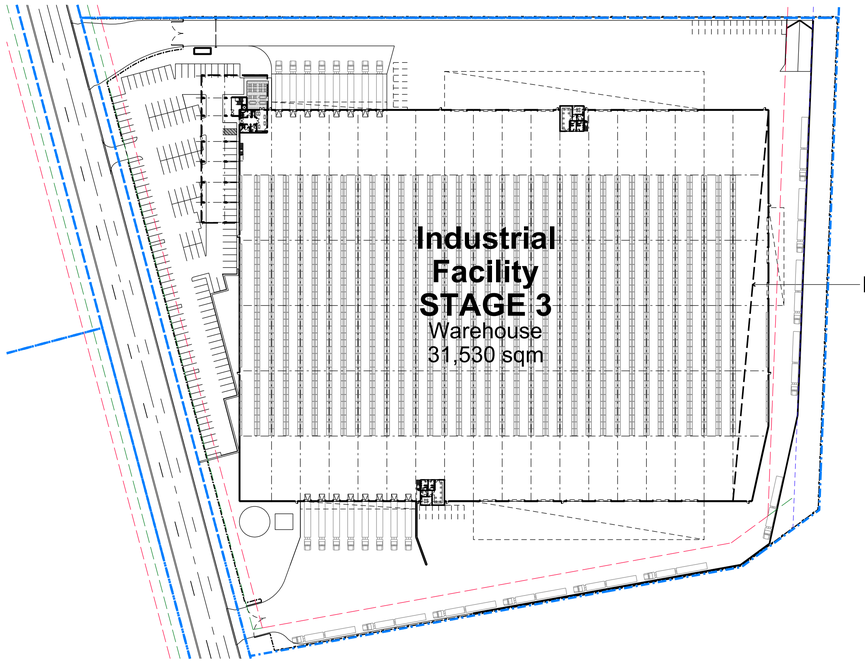
OAK 2B DA 25 (B)



Stage 1



Stage 2



Stage 3

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

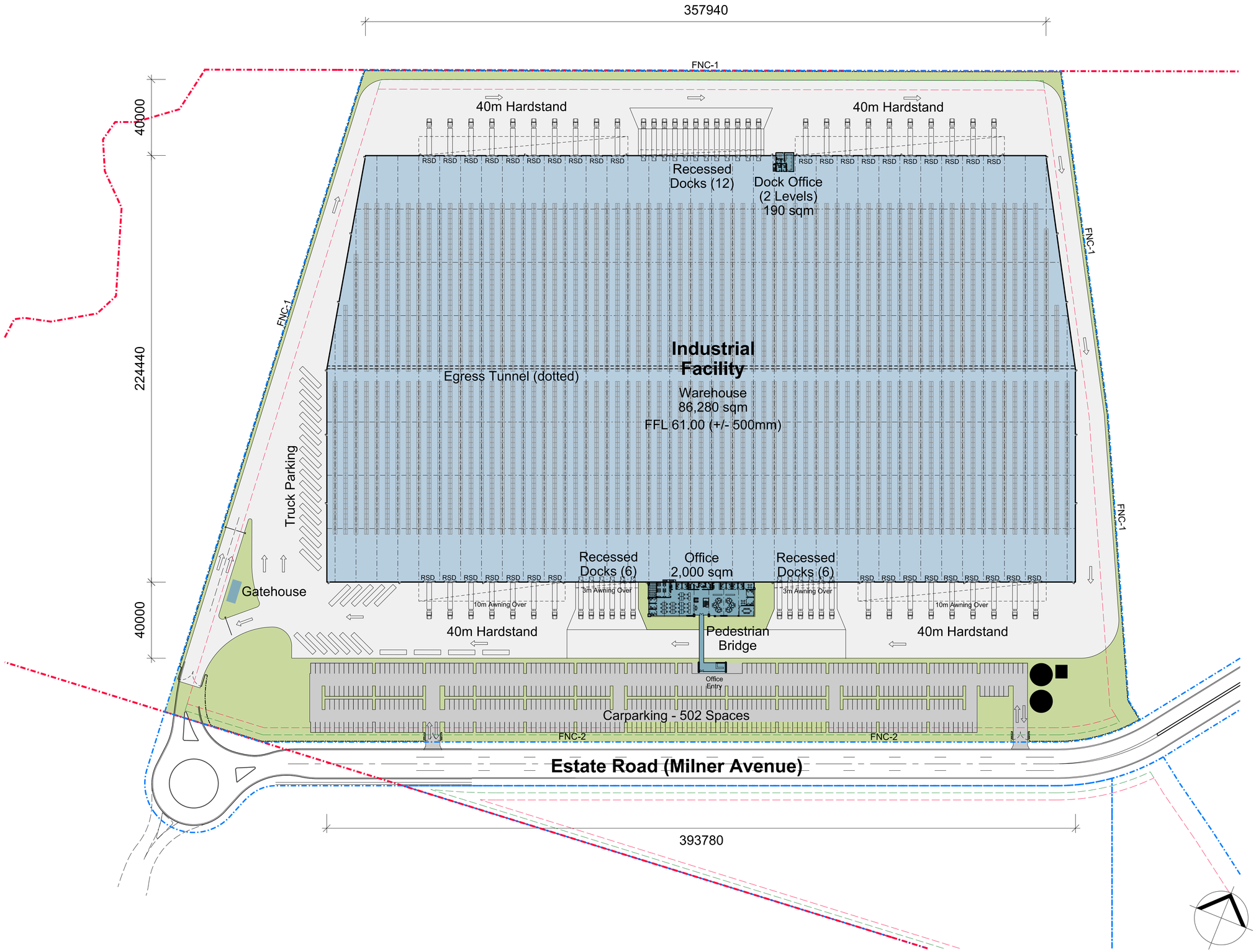
Proposed Industrial Facility - Lot 2B

Staging Plan

1:1250 @ A1
1:2500 @ A3

27 Sept 2013

OAK 2B DA 26 (A)



FNC-1 Chainwire Fencing

FNC-2 Palisade Fencing

RW Retaining Wall

Development Area Schedule

Total Lot 3 Site Area	155,900	sqm
Warehouse	86,280	sqm
Office	2,000	sqm
Dock Office	190	sqm
Total Building Area	88,470	sqm
Site Cover (exc. awning)	56	%
Floor Space Ratio	0.56	: 1
Total Hardstand Area	43,415	sqm
Total Light Duty Area	12,774	sqm
Carparking	502	

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 3

Site Plan / Floor Plan

1:1000 @ A1
1:2000 @ A3

09 Oct 2013

OAK 3 DA 30 (D)

Goodman

EG
BG (Awning)
MR
2° FALL
TR
7° FALL

LEGEND

BG	Box Gutter
EG	Eaves Gutter
MR	Metal Roof Sheeting
TR	Translucent Sheeting

SBA ARCHITECTS

Oakdale CENTRAL

Horsley Park

Proposed Industrial Facility - Lot 3

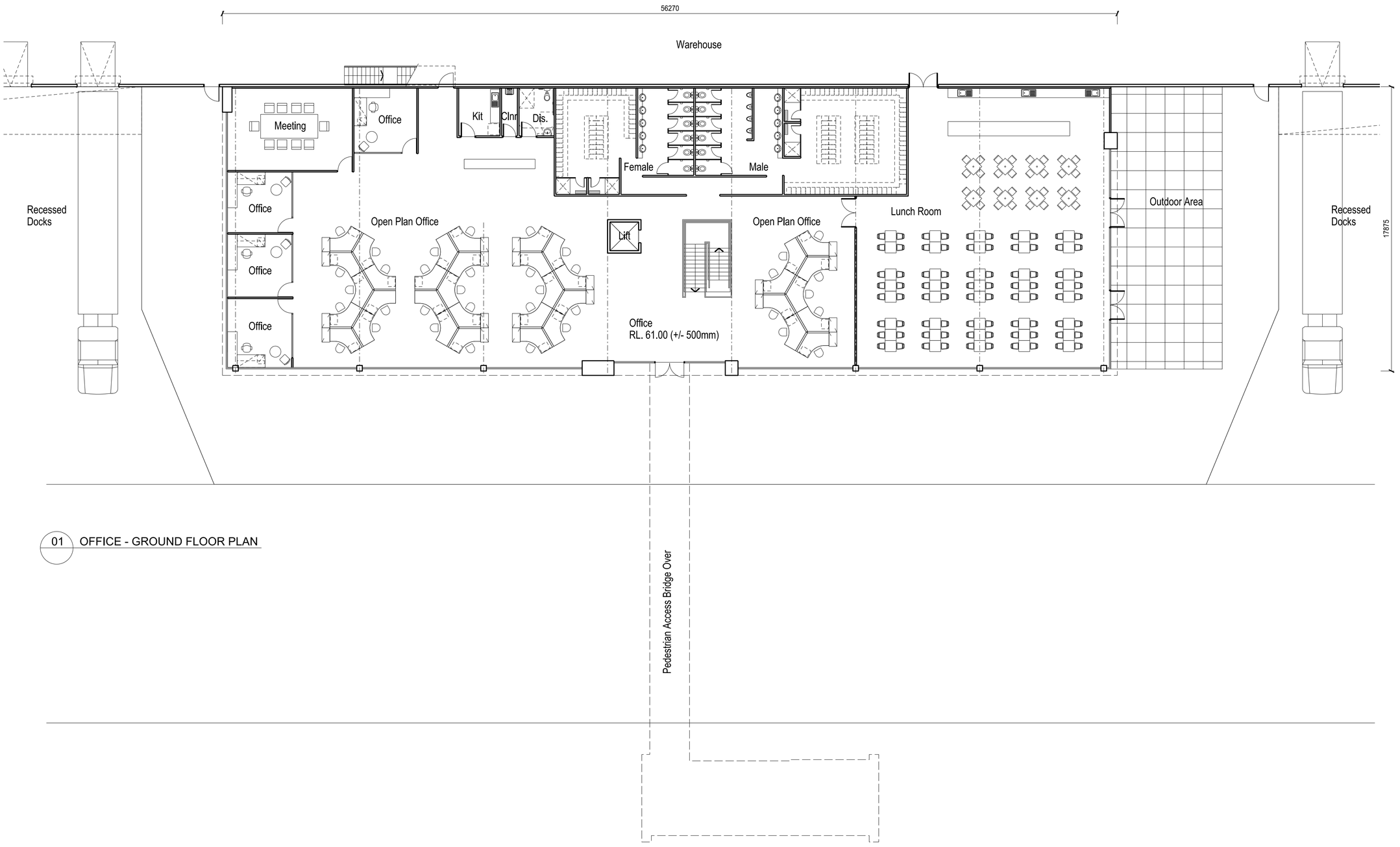
Roof Plan

1:1000 @ A1
1:2000 @ A3

0 20 100

27 Sept 2013

OAK 3 DA 31 (A)



01 OFFICE - GROUND FLOOR PLAN

Goodman

SBA ARCHITECTS

Oakdale CENTRAL | Proposed Industrial Facility - Lot 3 | **Office Plan - Ground Floor**

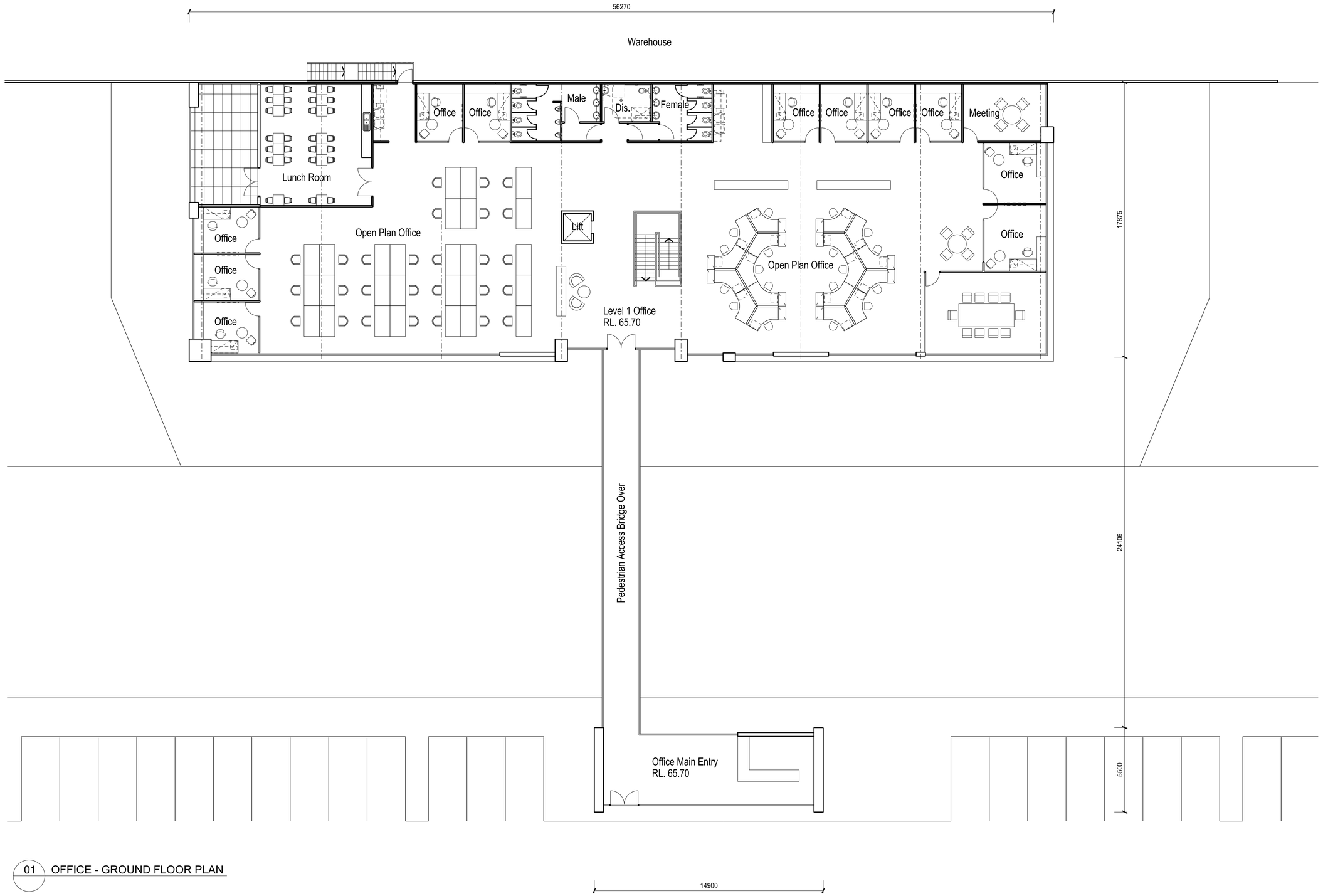
Horsley Park

0 2.5 12.5

1:125 @ A1
1:250 @ A3

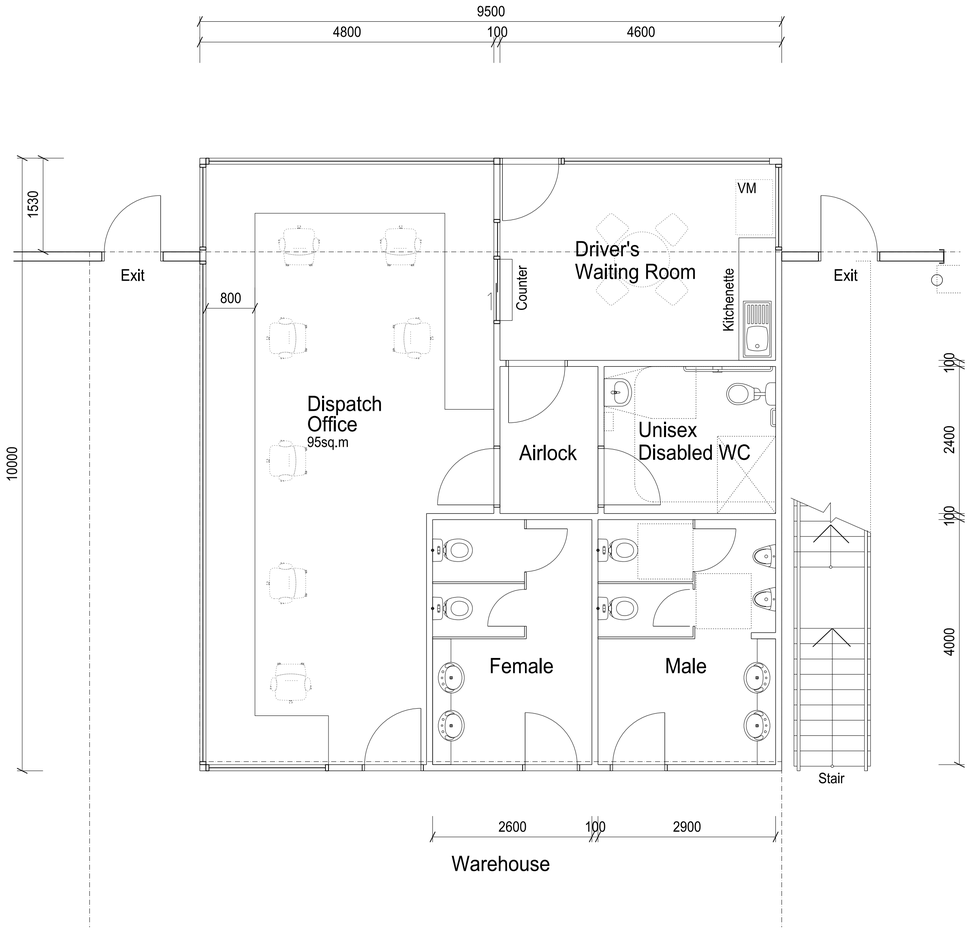
09 Oct 2013

OAK 3 DA 32 (B)

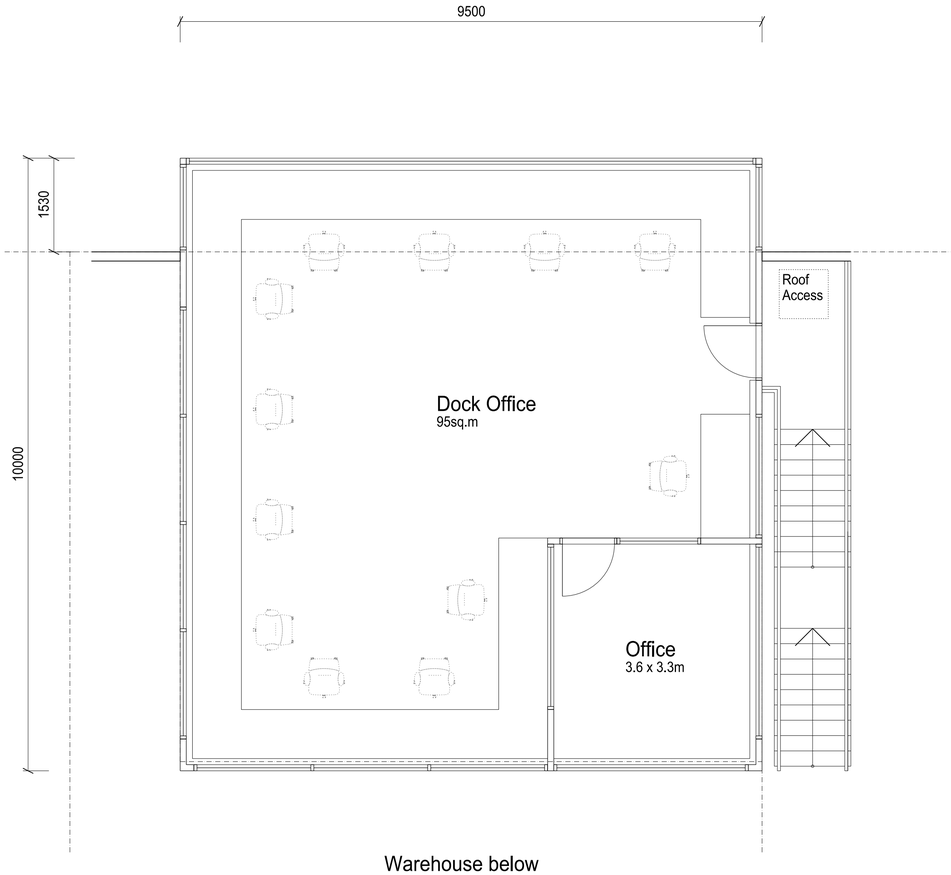


01 OFFICE - GROUND FLOOR PLAN

SBA ARCHITECTS	Oakdale CENTRAL Horsley Park	Proposed Industrial Facility - Lot 3	**Office Plan - Level 1** 0 2.5 12.5	1:125 @ A1 1:250 @ A3 09 Oct 2013	OAK 3 DA 33 (B)



01 Ground Floor Plan
TYPICAL



02 First Floor Plan
TYPICAL

SBA ARCHITECTS

Oakdale CENTRAL
Horsley Park

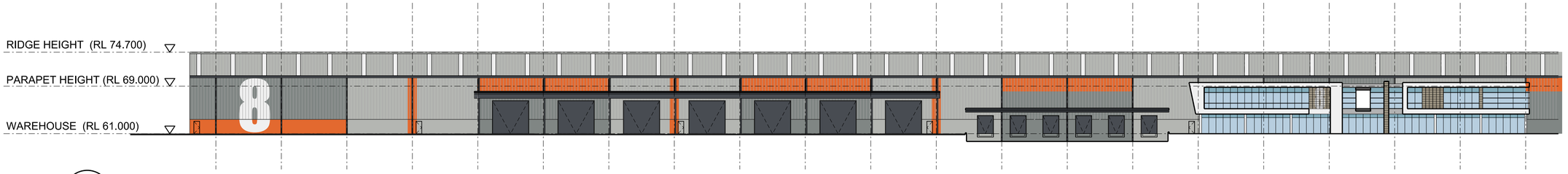
Proposed Industrial Facility - Lot 3

Dock Office Plans

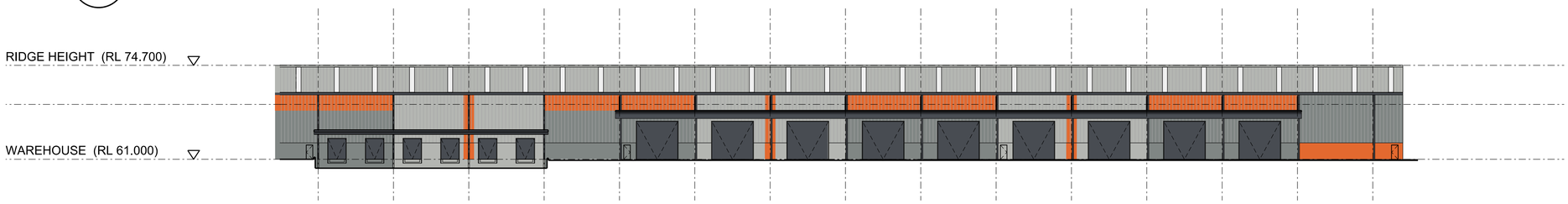
0 1 5

1:50 @ A1
1:100 @ A3
27 Sept 2013

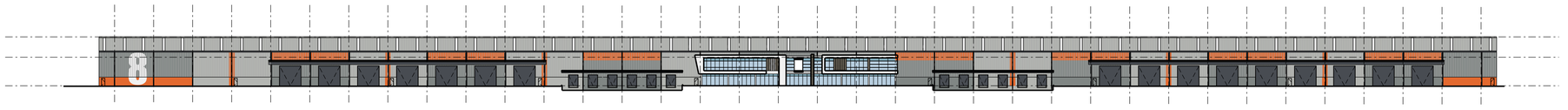
OAK 3 DA 34 (A)



01 SOUTH ELEVATION
PART WAREHOUSE

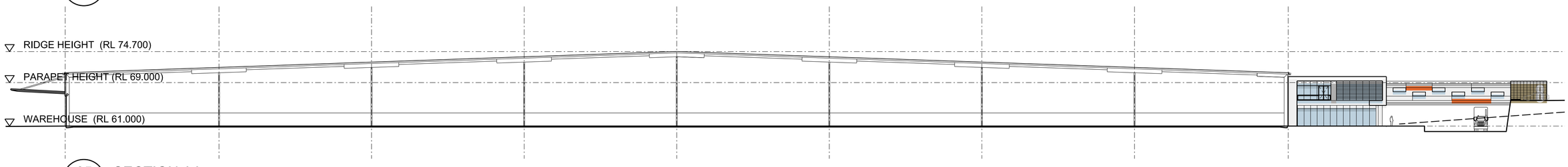


02 SOUTH ELEVATION
PART WAREHOUSE



03 SOUTH ELEVATION
OVERALL WAREHOUSE

04 WEST ELEVATION
OVERALL WAREHOUSE



05 SECTION AA
OVERALL WAREHOUSE

Indicative External Finishes Legend

1. Profiled Metal Wall Cladding Colorbond 'Shale Grey'
2. Profiled Metal Wall Cladding Colorbond 'Windspray'
3. Profiled Metal Wall Cladding Colorbond 'Orange X15 Alphatec'
4. Precast Concrete Dado Panel Paint Finish 'Orange X15 Alphatec'
5. Precast Concrete Dado Panel Paint Finish 'Windspray'
6. Precast Concrete Dado Panel Paint Finish 'Shale Grey'
7. Alpolic Panel or similar
8. Terracade Facade System 'Tennant XP Linear'
9. Aluminum Framed Glazing System
10. Profiled Metal Roofing
11. Metal Roller Shutter Door

SBA ARCHITECTS

Oakdale CENTRAL — Proposed Industrial Facility - Lot 3 — **Elevations**

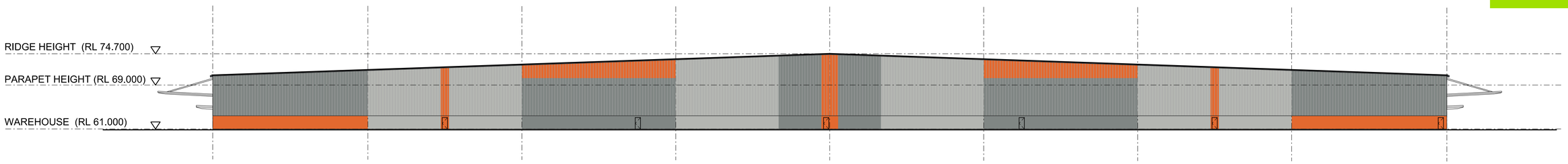
Horsley Park

0 15 75

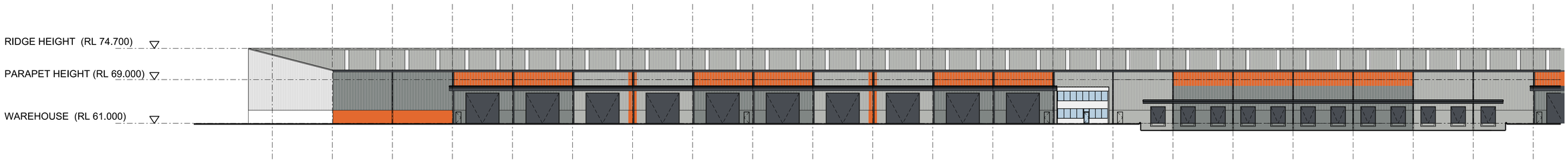
1:375 @ A1
1:750 @ A3

09 Oct 2013

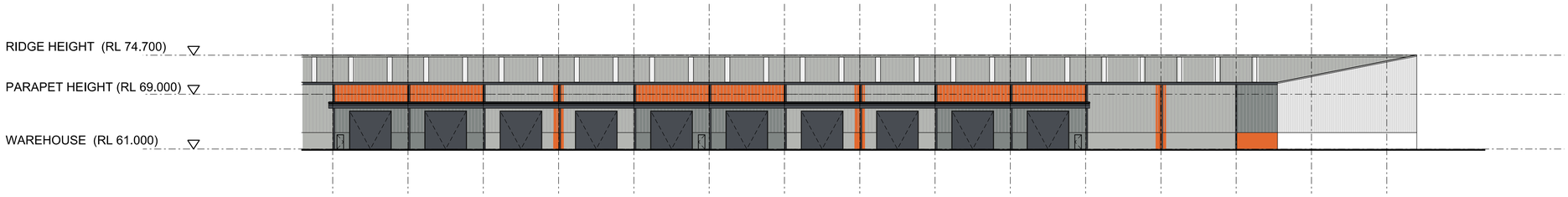
OAK 3 DA 35 (B)



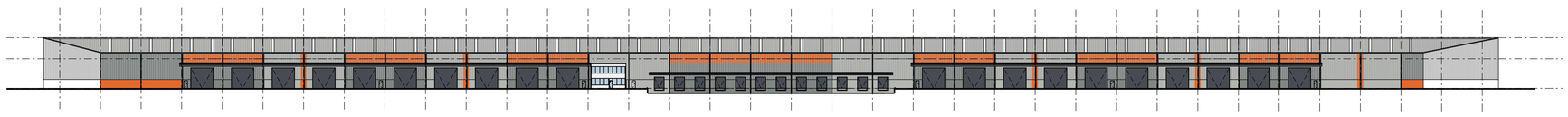
01 EAST ELEVATION
OVERALL WAREHOUSE



02 NORTH ELEVATION
PART WAREHOUSE



03 NORTH ELEVATION
PART WAREHOUSE



04 NORTH ELEVATION
OVERALL WAREHOUSE

Indicative External Finishes Legend

1. Profiled Metal Wall Cladding Colorbond 'Shale Grey'
2. Profiled Metal Wall Cladding Colorbond 'Windspray'
3. Profiled Metal Wall Cladding Colorbond 'Orange X15 Alphatec'
4. Precast Concrete Dado Panel Paint Finish 'Orange X15 Alphatec'
5. Precast Concrete Dado Panel Paint Finish 'Windspray'
6. Precast Concrete Dado Panel Paint Finish 'Shale Grey'
7. Alpolic Panel or similar
8. Terracade Facade System 'Tennant XP Linear'
9. Aluminum Framed Glazing System
10. Profiled Metal Roofing
11. Metal Roller Shutter Door

SBA ARCHITECTS

Oakdale CENTRAL — Proposed Industrial Facility - Lot 3 — **Elevations**

Horsley Park

0 15 75

1:750 @ A1
1:1500 @ A3

09 Oct 2013

OAK 3 DA 36 (B)

Appendix B

AT&L – List of Civil Works & Erosion and Sediment Control Drawings

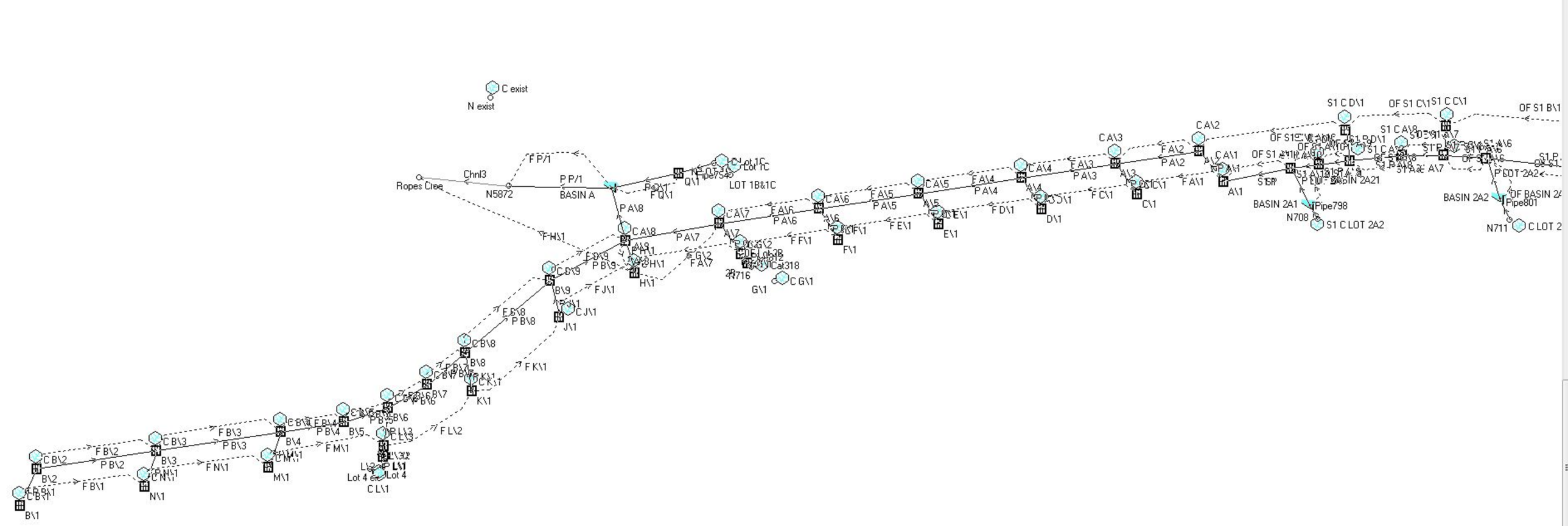
Document Details

Document Number	Rev	Document Title
C001	A	COVER SHEET AND LOCALITY PLAN
C002	A	NOTES AND LEGENDS
C003	A	OAKDALE GENERAL ARRANGEMENT
C004	A	SEDIMENT, EROSION AND STANDARD DETAILS
C100	A	LOT 1C GENERAL ARRANGEMENT
C101	A	LOT 1C TYPICAL SECTIONS SHEET 1
C102	A	LOT 1C TYPICAL SECTIONS SHEET 2
C105	A	LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
C106	A	LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
C107	A	LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 3
C108	A	LOT 1C SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 4
C110	A	LOT 1C SEDIMENTATION AND EROSION CONTROL PLAN
C111	A	LOT 1C PAVEMENT PLAN
C115	A	LOT 1C CUT/FILL PLAN
C200	A	LOT 2B GENERAL ARRANGEMENT
C201	A	LOT 2B TYPICAL SECTIONS SHEET 1
C202	A	LOT 2B TYPICAL SECTIONS SHEET 2
C203	A	LOT 2B TYPICAL SECTIONS SHEET 3
C205	A	LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
C206	A	LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
C207	A	LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 3
C208	A	LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 4
C209	A	LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 5
C211	A	LOT 2B SEDIMENTATION AND EROSION CONTROL PLAN
C212	A	LOT 2B PAVEMENT PLAN
C215	A	LOT 2B CUT/FILL PLAN
C300	A	LOT 3 GENERAL ARRANGEMENT
C301	A	LOT 3 TYPICAL SECTIONS SHEET 1
C302	A	LOT 3 TYPICAL SECTIONS SHEET 2
C303	A	LOT 3 TYPICAL SECTIONS SHEET 3
C304	A	LOT 3 TYPICAL SECTIONS SHEET 4
C305	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
C306	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
C307	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 3
C308	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 4
C309	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 5
C310	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 6
C311	A	LOT3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 7

C312	A	LOT 3 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 8
C315	A	LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN SHEET 1
C316	A	LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN SHEET 2
C317	A	LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN SHEET 3
C318	A	LOT 3 SEDIMENTATION AND EROSION CONTROL PLAN SHEET 4
C320	A	LOT 3 PAVEMENT PLAN SHEET 1
C321	A	LOT 3 PAVEMENT PLAN SHEET 2
C322	A	LOT 3 PAVEMENT PLAN SHEET 3
C323	A	LOT 3 PAVEMENT PLAN SHEET 4
C325	A	LOT 3 CUT/FILL PLAN
C330	A	ESTATE ROAD LONGITUDINAL SECTION
C350	A	OLD WALLGROVE ROAD UPGRADE GENERAL ARRANGEMENT PLAN
C351	A	OLD WALLGROVE ROAD (MC01) PLAN AND LONGITUDINAL SHEET 1
C352	A	OLD WALLGROVE ROAD (MC01) PLAN AND LONGITUDINAL SHEET 2
C353	A	LINK ROAD (MC01) PLAN AND LONGITUDINAL SHEET 3
C354	A	OLD WALLGROVE ROAD (MC02) PLAN AND LONGITUDINAL SHEET 4
C355	A	OLD WALLGROVE ROAD (MC02) PLAN AND LONGITUDINAL SHEET 5
C356	A	OLD WALLGROVE ROAD (MC02) PLAN AND LONGITUDINAL SHEET 6
C357	A	OLD WALLGROVE ROAD (MC02) PLAN AND LONGITUDINAL SHEET 7
C358	A	TYPICAL SECTIONS
C359	A	TYPICAL BRIDGE CROSSING

Appendix C

DRAINs Model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F P/1
LOT 1B&1C
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C D\9
F D\9
P B\9
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N708
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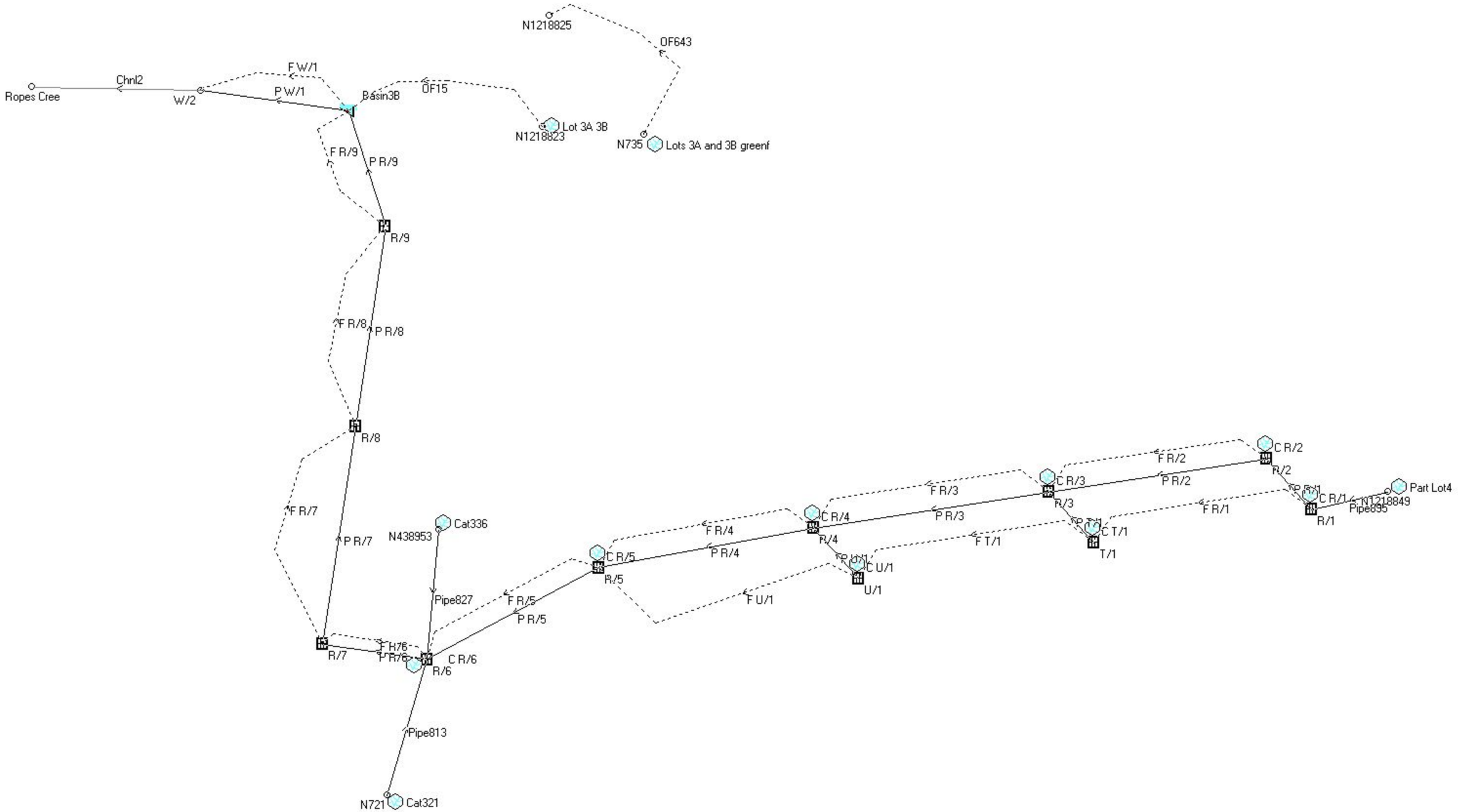
BASIN 2A2
Pipe801
N711
C LOT 2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OF15
Lot 3A 3B
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Lots 3A and 3B greenf
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Pipe827
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U/1
FR/3
PR/3
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CR/2
R/2
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Part Lot4
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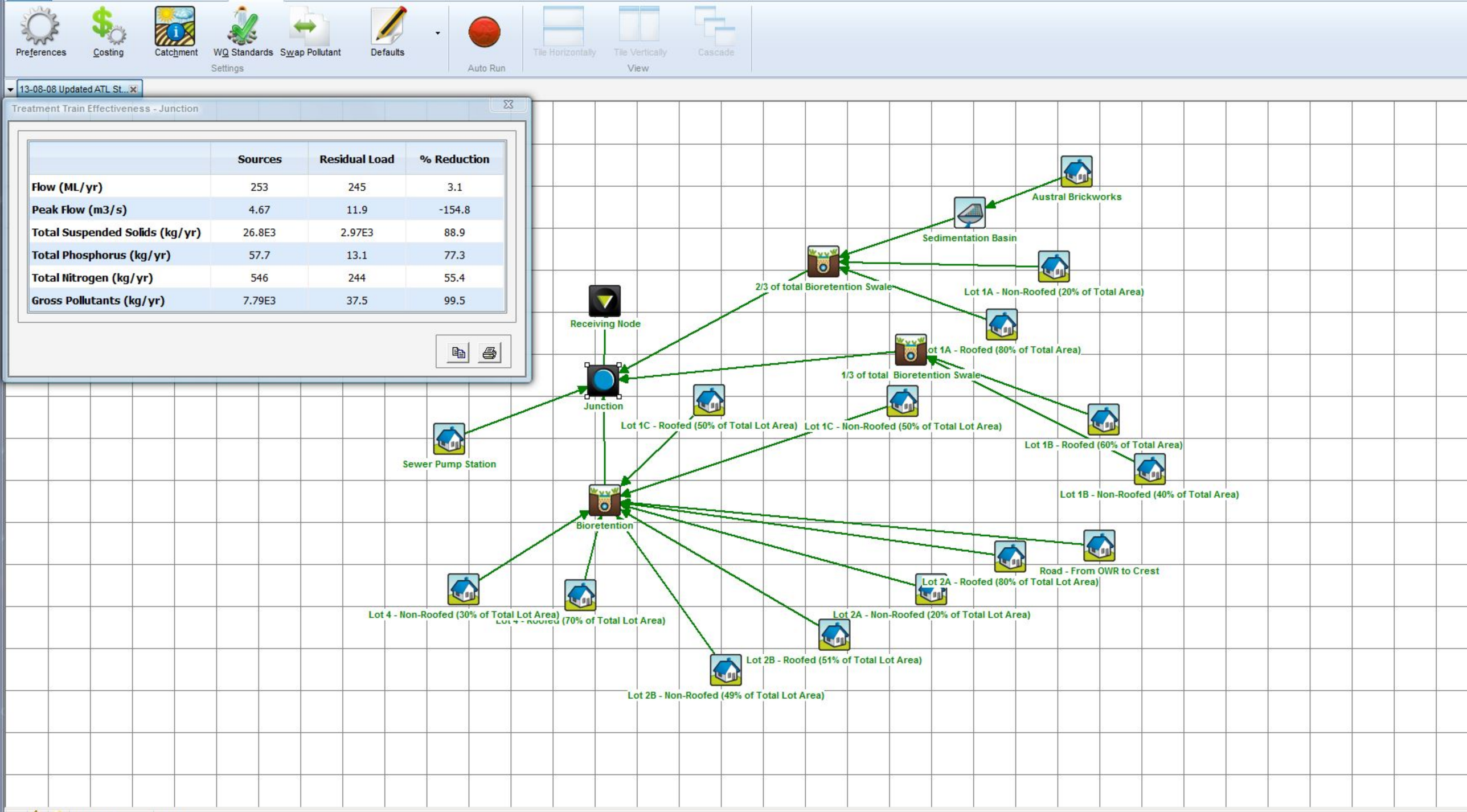
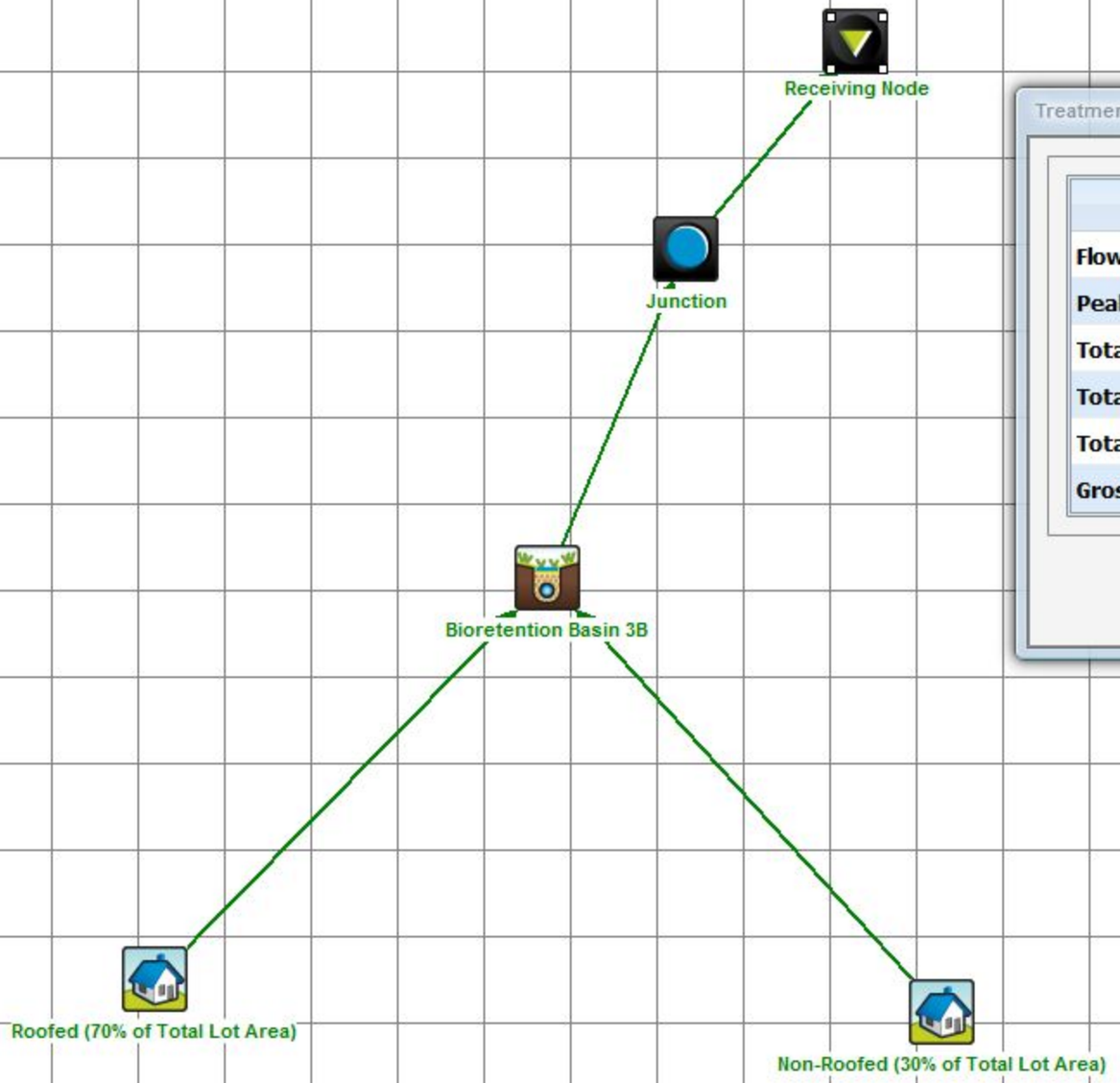
Cat321

Appendix D

MUSIC Model & Results


Preferences
Costing
Catchment
WQ Standards
Swap Pollutant
Defaults
Settings
Auto Run
Tile Horizontally
Tile Vertically
Cascade
View
13-08-08 Updated ATL St...
Treatment Train Effectiveness - Junction
Sources
Residual Load
% Reduction
Flow (ML/yr) 253 245 3.1
Peak Flow (m3/s) 4.67 11.9 -154.8
Total Suspended Solids (kg/yr) 26.8E3 2.97E3 88.9
Total Phosphorus (kg/yr) 57.7 13.1 77.3
Total Nitrogen (kg/yr) 546 244 55.4
Gross Pollutants (kg/yr) 7.79E3 37.5 99.5
Austral Brickworks
Sedimentation Basin
2/3 of total Bioretention Swale
Lot 1A - Non-Roofed (20% of Total Area)
Receiving Node
ot 1A - Roofed (80% of Total Area)
1/3 of total Bioretention Swale
Junction
Lot 1C - Roofed (50% of Total Lot Area)
Lot 1C - Non-Roofed (50% of Total Lot Area)
Lot 1B - Roofed (60% of Total Area)
Sewer Pump Station
Lot 1B - Non-Roofed (40% of Total Area)
Bioretention
Road - From OWR to Crest
Lot 2A - Roofed (80% of Total Lot Area)
Lot 4 - Non-Roofed (30% of Total Lot Area)
Lot 2A - Non-Roofed (20% of Total Lot Area)
Lot 2B - Roofed (51% of Total Lot Area)
Lot 2B - Non-Roofed (49% of Total Lot Area)



Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	96.1	91.5	4.8
Peak Flow (m3/s)	3.68	4.17	-13.3
Total Suspended Solids (kg/yr)	6.49E3	885	86.3
Total Phosphorus (kg/yr)	18.1	4.40	75.7
Total Nitrogen (kg/yr)	210	94.1	55.1
Gross Pollutants (kg/yr)	2.87E3	0.00	100.0

Appendix E

GHD – WSUD Strategy Report and Flood Study

CLIENTS | PEOPLE | PERFORMANCE

Goodman International Limited

Oakdale Concept Plan

Water Sensitive Urban Design Strategy

September 2010

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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B Ropes Creek Flood Modelling Results
C On-site Hydrological Modelling Results
D MUSIC Modelling Inputs and Model Network
E WSUD Strategy Plan

1. Introduction

1.1 General

Goodman International Ltd (Goodman) is preparing a concept plan for the Oakdale development in accordance with the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979*.

For the purposes of the concept plan, the development site has been divided into the following 'precincts':

- Central Precinct – comprising Lot 2 DP 120673;
- South Precinct – comprising that part of Lot 82 DP 752041 east of Ropes Creek and Lot 87 DP 752041;
- West Precinct – comprising Lot 1 DP 120673 and that part of Lot 82 DP 752041 west of Ropes Creek; and
- East Precinct – comprising Lot 1 DP 843901, which is the site of an existing Austral Bricks quarry and brickmaking plant.

The location of the proposed development site is shown in Figure 1.

In terms of staging, it is likely that the Central Precinct would be developed first, and is therefore referred to in this report as 'Stage 1'. Indicative staging from Stage 1 would likely progress to the South Precinct ('Stage 2'), then the West Precinct ('Stage 3'), and finally the East Precinct ('Stage 4'). It is noted that the existing Austral quarry/brickmaking plant is planned to continue operating in accordance with existing approvals for the foreseeable future, and would only be developed following the cessation of quarrying/brickmaking and rehabilitation of the site.

The site forms part of the precinct known as the Western Sydney Employment Hub and is located within two local government areas being:

- Penrith City Council area; and
- Fairfield City Council.

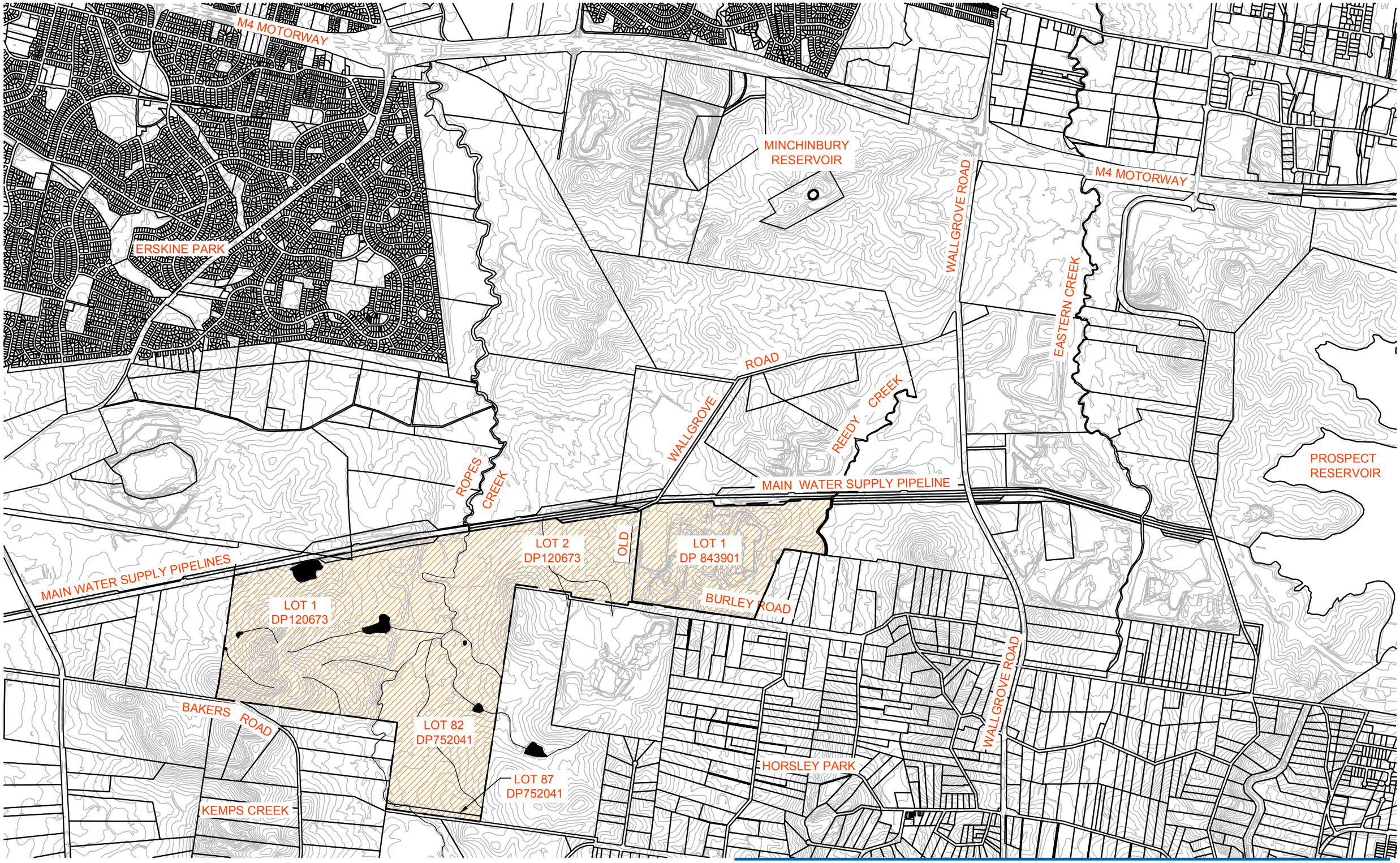
1.2 Scope

GHD has been engaged by Goodman to prepare a Water Sensitive Urban Design Strategy (WSUD) for Stages 1-3 of the proposed development site (herein know as "the site"). It should be noted that similar stormwater management principles developed for the Stage 1-3 area are proposed to be adopted for Stage 4.

This report assesses opportunities, constraints and principles for managing the surface water in terms of stormwater quantity and quality, flooding and the water cycle at the site. Specific topics addressed include:

- Statutory and authority requirements;
- The description of the existing hydrological environment;

- Potential impacts of the proposal with respect to stormwater quantity and quality and flooding;
- Proposals for mitigation of potential adverse impacts of the proposed development on surface water management; and
- Recommendations for ongoing maintenance of surface water management infrastructure at the site.



LEGEND

PROPOSED DEVELOPMENT SITE

PROPOSED DEVELOPMENT SITE BOUNDRY

N

0 250 500 750m

SCALE 1:25000 AT ORIGINAL SIZE

GHD CLIENTS | PEOPLE | PERFORMANCE

GOODMAN INTERNATIONAL LTD
OAKDALE CONCEPT PLAN

SITE LOCALITY PLAN

job no. | 21-15101
rev no. | B

scale | 1:25000 for A3 date | DECEMBER 2007

Figure 1

Level 6, 20 Smith St Parramatta NSW 1740 Australia PO Box 788 Parramatta NSW 2124 **T** 61 2 8898 8800 **F** 61 2 8898 8810 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Plot Date: 10 December, 2007 - 7:48 PM Cad File No: G:\21\15101\CADD\Drawings\21-15101-WSUD_FIG001.dwg

The detailed scope of work for the study was defined as follows:

- Compile a local hydrologic model (using RAFTS hydrologic modelling software) for the site, representing existing and developed conditions. This will allow the assessment of site discharges and formulation of a flood management strategy on account of increased impervious areas due to the development footprint;
- Compile an associated hydraulic model (TUFLOW hydraulic modelling software) in order to assess the existing flood extents on the site for the 5% and 1% Average Exceedance Probability (AEP) events and the Probable Maximum Flood (PMF) event. Flood peak input to the model would be provided by a second hydrologic model (using RAFTS hydrologic modelling software) for the Ropes Creek catchment upstream of the Sydney Water Main Water Supply Pipeline;
- Compile a stormwater quality model (MUSIC water quality modelling software) for the site representing existing and developed conditions. This will allow the assessment of pollutant loads and formulation/assessment of a water quality management strategy on account of the development; and
- Develop a concept Water Sensitive Urban Design Strategy for the site.

1.3 Water Sensitive Urban Design (WSUD)

WSUD encompasses all aspects of urban water cycle management, including water supply, wastewater and stormwater management. WSUD is a multi-disciplinary approach that promotes opportunities for linking water infrastructure, landscape design and the urban built form, to minimise the impacts of development upon the water cycle and achieve more sustainable forms of urban development.

1.4 Statutory and Authority Requirements

1.4.1 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the Department of Environment and Climate Change and is the primary legislative tool for regulating pollution control and waste disposal in NSW. The objectives of the POEO Act are:

- To protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development;
- To provide increased opportunities for public involvement and participation in environment protection;
- To ensure that the community has access to relevant and meaningful information about pollution;
- To reduce risks to human health and prevent the degradation of the environment;
- To rationalise, simplify and strengthen the regulatory framework for environment protection;

- To improve the efficiency of administration of the environment protection legislation; and
- To assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

In order to ensure that potential development impacts on surface water are managed in accordance with the objectives of the POEO Act, this report identifies mitigation measures that would need to be implemented during the construction and operational phases of the development.

1.4.2 Penrith and Fairfield City Council

Council's objectives for stormwater drainage for their cities are twofold:

- To provide an urban stormwater system which minimises possible inundation to the built environment; and
- To minimise the discharge of pollutants into receiving waters during the construction and operational phases of the project.

The following On-Site Detention (OSD) guidelines are specified by each of the Council's:

- Penrith City Council (PCC) – OSD storage of 280 m3/ha and a Permissible Site Discharge (PSD) of 120 L/s/ha. PCC indicated that site specific hydrologic modelling will be required to demonstrate how post-development flows are to be reduced to pre-development levels; and
- Fairfield City Council (FCC) – FCC defer to the requirements of the Upper Parramatta River Catchment Trust (UPRCT). That is OSD storage of 480 m3/ha and a PSD of 80 L/s/ha.

There are no specific requirements set out in the Penrith and Fairfield City Council design guidelines with respect to water quality targets and flood planning levels (FPL), however other councils in Western Sydney require the following:

- Water quality targets as outlined in 'Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures – A review and Gap Analysis' (CRC 2004); and
- Flood planning levels of 1% AEP flood level with 300 mm freeboard for industrial and commercial areas.

2. Existing Conditions

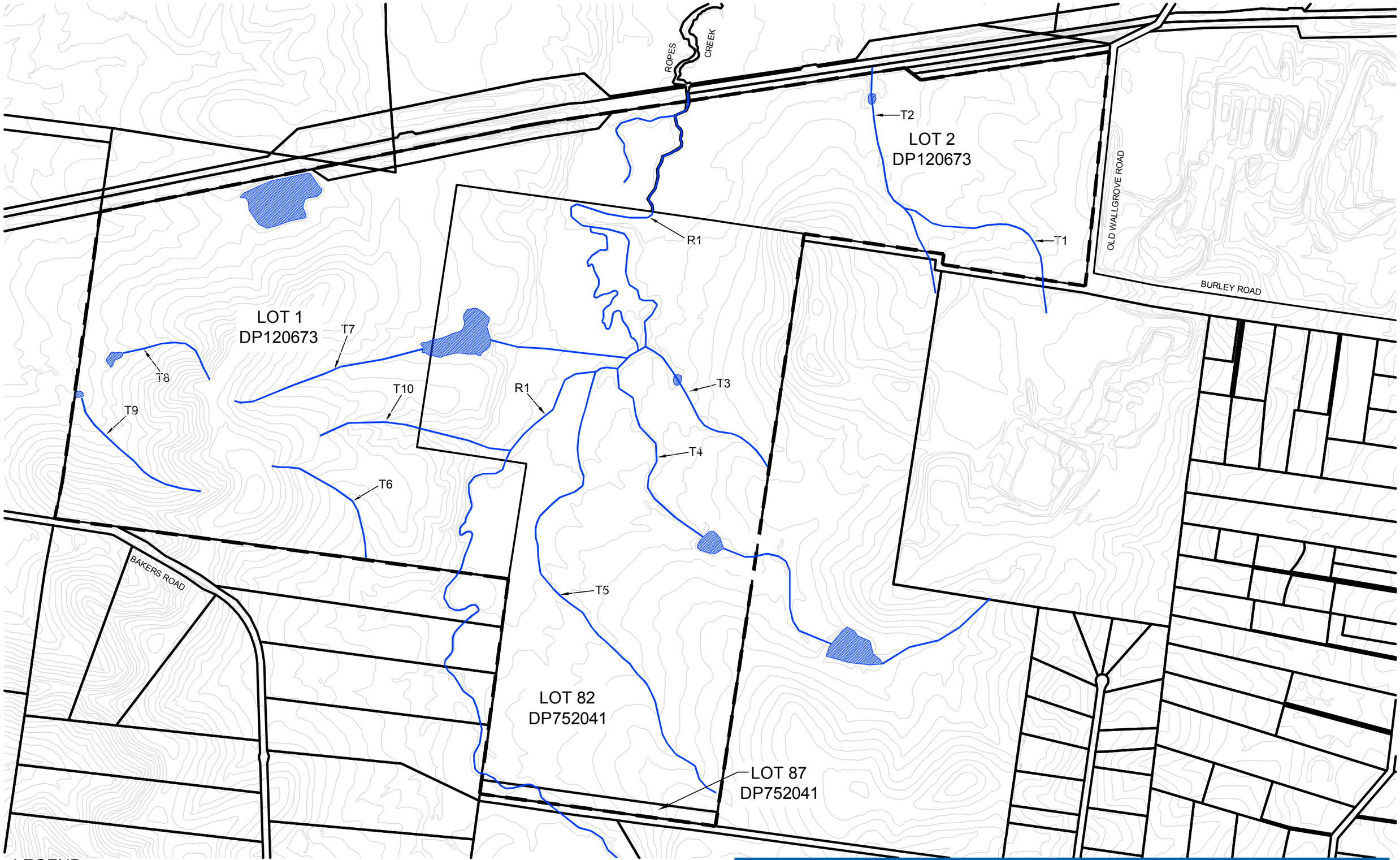
2.1 Topography and Existing Drainage

The Stage 1-3 area is presently undeveloped and comprises grazing land. It is predominantly pervious at present other than one existing house. The lowest area of the site is at Reduced Level (RL) 55m Australian Height Datum (AHD) and highest point at RL 94m AHD. The slope of the site varies between 1% and 25%. The eastern half of the site (predominantly Lot 2 of DP 120673 and Lot 82 of DP 752041) has the flattest with grades of 1-15%, while the western half of the site (predominantly within Lot 1 of DP 120673) has steeper natural surface grades that are in the range of 5-25%.

Ropes Creek drains the site on a north-south alignment. A number of tributaries confluences with Ropes Creek within the Stage 1-3 boundary. Some of these tributaries originate on the site while others convey stormwater run-off from areas upstream, through the site.

There are several other watercourses that originate on the site that drain westward through private property towards Kemps Creek.

Refer Figure 2 for the locations of the various watercourses on the site.



LEGEND

- EXISTING DAMS
- LOT BOUNDRY
- SITE BOUNDRY
- T5 EXISTING WATERCOURSE & LABEL

GN

0 100 200 300m
SCALE 1:10000 AT ORIGINAL SIZE

GHD CLIENTS | PEOPLE | PERFORMANCE

GOODMAN INTERNATIONAL LTD
OAKDALE CONCEPT PLAN
EXISTING DRAINAGE

job no. 21-15101
rev no. B

Figure 2

scale | 1:10000 for A3 date | DECEMBER 2007

Level 6, 20 Smith St Parramatta NSW 1740 Australia PO Box 788 Parramatta NSW 2124 T 61 2 8898 8800 F 61 2 8898 8810 E sydmail@ghd.com.au W www.ghd.com.au

Plot Date: 10 December, 2007 - 7:52 PM Cad File No: G:\21\15101\CADD\Drawings\ 21-15101-WSUD-FIG02.dwg

2.2 Climate and Rainfall

The site experiences Sydney's sub-tropical climate with rainfall predominantly occurring in summer and autumn. The nearest operational daily rainfall station is located at Horsley Park (BOM Stn 067119), which started recording data in 1997. A longer-term monitoring station exists at Badgerys Creek (BOM Stn 067068) with data from 1936 to 1996. The mean annual rainfall using the combination of data from the two stations is 779 mm for the period 1936 to date.

Figure 3 below shows the mean monthly rainfall and number of rain days recorded at the Badgerys Creek daily rainfall station, which is considered representative of conditions at the site. The figure shows elevated monthly rainfalls in the months of January to March, with the least rainfall being recorded in July to September. The mean number of rain days varies between approximately 4 and 9 days per month.

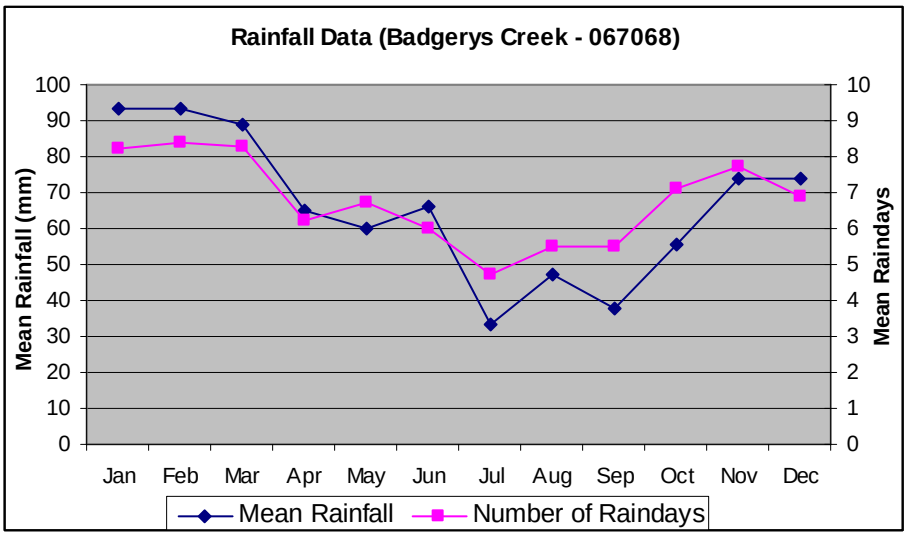


Figure 3 - Monthly Rainfall

The likelihood of rainfall occurring in any month throughout the year would support utilisation of WSUD vegetated systems such as swales, bio-retention and wetlands to manage stormwater. Furthermore, the mild seasonal variability would indicate that rainwater collection via rainwater tanks could be viable. A separate detailed water balance analysis has been conducted (GHD, December 2007) that investigates water reuse options.

3. Opportunities and Constraints

3.1 Topography

The topography is important when planning stormwater management facilities. Stormwater management facilities such as detention basins and quality management facilities should preferably be located in flatter areas to minimise the volume of earthworks, and maximise the treatment area.

Steeper slopes (greater than 5 to 10%) are generally not suitable for WSUD facilities such as bio-retention filtration and wetland systems. Flow attenuation via vegetated swales and bio-retention systems are less desirable in steeper areas due to excessive flow velocities, reduced detention times and potential scouring. In addition, detention basins are difficult to configure, particularly when located off-channel.

The eastern half of the Stage 1-3 development area (eastern side of Ropes Creek) comprises the flatter parts of the site and would be suitable for such stormwater management facilities as swales and precinct scale detention basins. Parts of the western half of the Stage 1-3 development area (western side of Ropes Creek) are considerably steeper and filtration systems are not considered practical.

3.2 Climate and Rainfall

The high likelihood of rainfall occurring in any month throughout the year would support utilisation of appropriate WSUD systems such as swales (at selected locations) and wetlands to manage stormwater quality. Furthermore water re-use via roof collection using rainwater tanks may be considered viable.

3.3 Riparian Corridors

The Department of Water and Energy (DWE) administers the *Water Management Act 2000 (WMA)* All waterways subject to approval under this act require a setback from the top of the banks, according to the category of creek. These setbacks form a constraint to the limits of development. A separate riparian assessment has been conducted (GHD December 2007) and a riparian strategy for the site developed. The stormwater management practices proposed for the site and as documented in this report are consistent with the proposed riparian strategy.

3.4 Stormwater

3.4.1 General

Development results in increased impermeable surfaces (roofs, driveways, roads, pavements etc.), which affect the hydrological cycle. This 'hardening' of the surfaces results in reduced infiltration of rainfall to the soil and more rainfall becoming runoff. If not managed effectively, key impacts could include:

- Impacts to the water balance, (including groundwater recharge);

- Stormwater pollution (by pollutant entrainment in runoff) discharged to receiving environments;
- Increased stormwater peak flows leading to increased flood risk and erosion (on-site and off-site); and
- Construction phase impacts, such as pollution, erosion and sedimentation.

3.4.2 Water Balance

If adequate water management strategies are not adopted in terms of the water balance, the proposed development could:

- Reduce rainfall infiltration to the soil resulting in decreased groundwater recharge;
- Increase stormwater runoff volumes, which could impact downstream sensitive habitats in terms of flushing regimes (frequency, volume and rate), water quality, and wetting cycles;
- Lead to increased recharge due to removal of vegetation, over-irrigation, and structural leakages; and
- Impact groundwater flow due to site compaction, fill, landform reshaping and underground structures.

3.4.3 Stormwater Quality

Stormwater quality discharging from the site would need to be adequately managed, to address:

- Increased runoff volume during regular rainfall events, which would more readily entrain and mobilise pollutants and increase pollutant loads to the receiving environments. The type of development and associated activities, may introduce differing pollutant profiles. For example vehicular traffic could increase hydrocarbon introduction. In general, typical pollutants include litter, sediment, suspended solids, nutrients, hydrocarbons and toxicants;
- Increased runoff flow rates could lead to erosion and sedimentation. If not adequately managed this material could discharge off site;
- Contamination from waste streams on the site, which may enter the drainage system and groundwater; and
- During construction there is a significant risk of increased stormwater pollution. Increased sedimentation on account of landform disturbances and accidental spills on unbunded areas of the site could discharge to the receiving environment. Clearing and earthmoving activities have the potential to impact on surface water quality in the vicinity of the site, especially during high rainfall events. The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:
  - Earthworks undertaken immediately prior to rainfall periods;

- Work areas that have not been stabilised, and clearing of land in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Bulk earthworks and construction of pavements;
- Washing of construction machinery;
- Works within drainage paths, including depressions;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals; and
- Maintenance of plant and equipment.

3.5 Other Constraints

3.5.1 Site Soil Characteristics

Douglas Partners (May 2007) has conducted a preliminary geotechnical assessment of the site although no site-specific soil testing/test pitting has been conducted at this point in time. The soil landscape at the site is described below.

Bannerman and Hazelton (1990) describe three soil landscapes across the development site:

- **South Creek Soil Landscape** – a fluvial soil landscape developed in floodplains, valley flats (slopes <5% and local relief <10 m) and drainage depressions with incised channels. The South Creek soils within the site are developed on alluvium derived from Wianamatta Group shales and are often very deep-layered sediments over bedrock or relict soils. Landscape limitations include flood hazard, waterlogging (seasonal or localised), permanently high water tables (localised) and high erosion hazard.
- **Blacktown Soil Landscape** – a residual soil landscape developed on a landscape typically comprising gently undulating rises with local relief to 30 m and slopes usually less than 5% on Wianamatta Group shales and Hawkesbury shales. The Blacktown soils are shallow to moderately deep (<1 m), red and brown podsolic soils on crests, upper slopes and well-drained areas. Deep (1.5 m – 3 m) yellow podsolic soils are located on lower areas and in areas of poor drainage. These soils are derived from weathering of the underlying (typically shaly) bedrock and are highly plastic, moderately reactive, of low soil fertility, poor soil drainage, localized salinity or sodicity and moderate erodibility.
- **Luddenham Soil Landscape** – an erosional soil landscape developed on undulating to rolling hills with local relief of 50 m to 80 m and slopes of 10% to 20% on Wianamatta Group shales, often associated with resistant sandstone bands. The Luddenham soils are shallow (<1 m), dark podsolic soils or massive earthy clays on crests; moderately deep (0.7 m to 1.5 m) yellow podsolic soils and prairie soils on lower slopes and drainage lines. The soils have highly plastic subsoils of moderately reactivity and low to moderate shrink-swell potential, low to moderate soil fertility and moderate erodibility.

The majority of the site consists of the Blacktown Soil Landscape. The higher areas of the site in the west consist of the Luddenham Soil Landscape and Ropes Creek and the land immediately adjacent consists of the South Creek Soil Landscape.

3.5.2 Salinity

Douglas Partners report that very saline soils along poorly drained sections of Ropes Creek and tributary gullies is expected. Elsewhere, it is anticipated that most of the site will be classified as non or slightly saline with a scattering of moderately saline areas.

4. Analysis

4.1 Concept Plan

A Concept Plan showing a preliminary lot layout for the site including internal roads is provided in Appendix A. The Concept Plan also indicates the proposed first 3 Stages of development. Stage 4 is the area of land occupied by the existing Austral brickworks and quarry.

The analysis conducted as part of this study and outlined in the following sections is based on the Concept Plan.

4.2 Summary of Analysis Undertaken

Numerical modelling was carried out for the flood assessment and to assist in the development of the WSUD strategy. In particular, the modelling was carried out to determine:

- Existing condition flood peaks and flood levels for Ropes Creek within the Stage 1-3 development area for a range of design storm events (using RAFTS hydrologic model and TUFLOW hydraulic model);
- Appropriate volumes of stormwater detention throughout the precinct which reduced post development flood peaks to existing condition flood peak levels (using the RAFTS model);
- Simulated stormwater runoff quantity and quality for the developed scenario (using the MUSIC water quality model); and
- Appropriate strategies for stormwater quality management throughout the Stage 1-3 site area, which achieved the targeted pollution load export requirements (using MUSIC).

All modelling should be considered as preliminary and would need to be updated at later stages with more detailed studies, when more detailed information on landform, development footprints, and road configurations are known.

4.3 Ropes Creek Flooding

4.3.1 Past Relevant Studies

In February 1991, Willing & Partners completed “South Creek Floodplain Management Study” report for the then Department of Water Resources. The purpose of this report was to develop a floodplain management plan for the South Creek catchment in accordance with the NSW Government’s Floodplain Development Manual. As part of this study, flood simulation of a portion of Ropes Creek was carried out. However the extent of modelling did not cover the entire proposed Stage 1-3 site area. Although the Main Water Supply Lines are identified on the channel long sections it is not clear as to whether the pipelines were included in the hydraulic model to determine their effect on flood levels. The flood levels downstream of the Stage 1-3 development site have

been used to set the downstream boundary conditions for the modelling carried out by GHD as part of this study.

4.3.2 Flood Simulation

Peak flows for Ropes Creek were simulated using the RAFTS hydrological model.

Compilation of the model included:

- Catchment discretisation;
- Hydrological parameter determination;
- Intensity-Duration-Frequency determination for generating storm rainfall events; and
- The RAFTS model was simulated for a range of design storms (5% AEP, 1% AEP and PMF) and durations ranging from 45 minutes to 9 hours. Simulations were undertaken for the existing conditions.

Key parameters assumed in the RAFTS modelling are provided in Table 1, in accordance with the Australian Rainfall and Runoff (IEAust, 2000)

Table 1 Key RAFTS modelling parameters for Flood Assessment

	Pervious	Impervious
Initial loss (mm)	15	2
Continuing loss (mm/hr)	2.5	0

A digital terrain model was developed using Airborne Laser Scanning survey of the area provided by Penrith City Council. The accuracy of the survey cannot be confirmed at this stage, although the survey is not considered as accurate as a detailed field survey.

Hydraulic modelling was conducted using TUFLOW and the flood extents corresponding to each event modelled was mapped. Detail survey of the Sydney Water Main Water Supply Pipelines was conducted so that they could be incorporated into the model to determine their impact on flood levels.

The flood extent maps for existing conditions and detailed modelling results are presented in Appendix B. It is noted that the flood maps include the existing farm dams located on some of the Ropes Creek tributaries. It is proposed to remove these farm dams. The farm dams do not have dedicated spillways and as such, overflow discharges in an uncontrolled manner. It is noted that on the Ropes Creek tributary T4 (refer Figure 2) the flow path separates. This is due to the existing farm dam impeding flow and causing water to find an alternate flow path towards Ropes Creek rather then via the existing defined watercourse. When the farm dam is removed the flow path will follow the defined watercourse rather then take alternate flow paths. As such, the alternate flow path is unlikely to impose a restriction to development. This will need to be confirmed during the detail design phase when detailed flood modelling is

conducted using a detailed field topographical survey as the base digital terrain model, and the proposed earthworks in the affected area are included. Further hydraulic modelling should be conducted during the detail design phase utilising a detailed topographical survey as a digital terrain model and incorporating the final earthworks levels.

4.4 On-Site Flooding

Existing and developed flood peaks and stormwater detention requirements were simulated using the RAFTS hydrological model.

Compilation of the model included:

- Local catchment discretisation based on the Concept Plan;
- Hydrological parameter determination; and
- Configuration of storm rainfall events.

The RAFTS model was simulated for the 1% AEP event and durations ranging from 25 minutes to 9 hours. Simulations were undertaken for three scenarios, namely:

- Existing (undeveloped) conditions;
- Developed conditions based on the Concept Plan. For the developed condition individual allotments were modelled as between 60% and 85% impervious depending on the individual sub-catchment characteristics; and
- Developed conditions based on the Concept Plan with detention storage provided on a precinct scale, rather than on-lot OSD. It is noted that on-lot OSD could be provided in lieu of precinct style detention storage. The increase in impervious area on account of the development will increase runoff peaks from the site.

It is noted that roof run-off is proposed to be captured and re-used on the individual lots for non-potable water uses. Overflow from the roofwater collection tanks is proposed to be collected and utilised for the Regional Roofwater Harvesting Scheme whereby such run-off is directed to Prospect Reservoir. Although some detention benefit may be derived, this has not been included in the RAFTS modelling.

The stage discharge was modified until post-development flows match pre-development flows at the three site discharge locations. The resultant storage and PSD is as follows:

- OSD: 250 m^3/ha; and
- PSD: 140 l/s/ha.

The resultant peak flows are listed in Table 2. From Table 2 it is noted that:

- The post development flows are significantly higher due to the large areas of hardstand; and
- The increased flood peaks are effectively reduced to pre-developed conditions through the provision of stormwater detention (this is discussed further in Section 6.5).

Table 2 Stage 1-3 Peak Flows, 1% AEP event

Catchment	Existing Condition (m^3/s)	Post Condition with No Detention (m^3/s)	Post Condition with Detention (m^3/s)
A1	4.1	13.2	3.7
A3	2.6	8.8	2.4
A5	1.7	4.7	1.3
A6	3.8	8.4	2.2
A7a	2.4	4.8	1.3
A7b	2.6	4.9	1.3
A8	2.5	7.2	2.0
A9	2.9	7.5	2.0
A10	3.1	5.9	1.5
A11a	5.0	8.0	2.1
A11b	2.1	4.6	1.2
A12a	1.1	2.1	0.5
A12b	1.6	2.5	0.7
A13	1.3	2.1	0.6
A14a	1.6	4.4	1.2
A14b	1.0	1.6	0.5
A15 & A16	11.7	25.3	7.0
A17	1.1	1.7	0.5
Total site outlet	33.3	49.1	23.6

The detailed modelling results and catchment plan are presented in Appendix C.

It is noted that the required detention volume and PSD differs slightly to the PCC guidelines. The calculated detention storage volume and PSD is much lower than the FCC guidelines, which are the same as the UPRCT guidelines. The UPRCT guidelines are not considered relevant for a green fields site such as Oakdale as they were developed to address existing drainage system capacity constraints in the built out areas of the Parramatta River catchment.

4.5 Stormwater Quality Modelling

A MUSIC model was configured for the Stage 1-3 area incorporating the proposed water quality control facilities as outlined in Section 6 of this report and as shown in the WSUD strategy plan in Appendix E.

The model was analysed for two scenarios, with and without water quality control facilities included.

In undertaking the MUSIC modelling, the following key parameters were used:

- Pollution generation parameters and treatment efficiencies for stormwater management facilities as recommended in the MUSIC User Guide (April 2005) and the Western Sydney Growth Centres – Stormwater Guidance for Precinct Planning (DEC, Nov 2006);
- Simulations were undertaken using the Badgerys Creek (BOM Stn 067068) rainfall data for an average rainfall year; and
- Simulations were undertaken using the Badgerys Creek (Stn 67068) mean evaporation data for the available period, 1968 to 1984.

Roofwater runoff was not accounted for in the stormwater quality model. It is assumed that roofwater run-off is collected and either re-used on each lot or diverted to the Regional Roofwater Harvesting Scheme.

The results are shown in Table 3, Table 4 and Table 5. The results show a decrease in total suspended solids, phosphorous, nitrogen and gross pollutants at the three site discharge locations. Table 6 gives a summary of the entire site. The decrease in pollutant loads meet the stormwater quality objectives as outlined in the Western Sydney Growth Centres – Stormwater Guidance for Precinct Planning (DEC, Nov 2006), that is:

- Total suspended solids: 85% reduction;
- Total phosphorus: 65% reduction;
- Total nitrogen: 45% reduction; and
- Gross pollutants: 90% reduction.

The model network and inputs summary is presented in Appendix D.

Table 3 Pollutant Loads – Ropes Creek

	Source	Residual Load	% Reduction
Total SS (kg/yr)	69,100	3,320	95.2
Phosphorus (kg/yr)	113	28.4	75.0
Nitrogen (kg/yr)	844	457	45.9
Gross Pollutants (kg/yr)	12,300	0 (approx)	99.9% (approx)

Table 4 Pollutant Loads – Ropes Creek Tributary

	Source	Residual Load	% Reduction
Total SS (kg/yr)	19,300	680	96.5
Phosphorus (kg/yr)	35.1	6.38	81.8
Nitrogen (kg/yr)	241	102	57.8
Gross Pollutants (kg/yr)	3,410	0 (approx)	99.9% (approx)

Table 5 Pollutant Loads – Western Discharge Point

	Source	Residual Load	% Reduction
Total SS (kg/yr)	18,700	244	98.7
Phosphorus (kg/yr)	33.4	4.89	85.2
Nitrogen (kg/yr)	230	106	53.9
Gross Pollutants (kg/yr)	3,630	0 (approx)	99.9% (approx)

Table 6 Pollutant Loads – Entire Site

	Source	Residual Load	% Reduction
Total SS (kg/yr)	107,000	4,240	96.0
Phosphorus (kg/yr)	182	39.6	78.2
Nitrogen (kg/yr)	1,310	665	49.5
Gross Pollutants (kg/yr)	19,300	0 (approx)	99.9% (approx)

5. Principles for Management

5.1 General

A number of measures can be implemented to effectively manage and mitigate the impacts of development on stormwater as follows:

- Water balance impacts
  - Provision of stormwater retention on the site;
  - Rainwater harvesting;
  - Management and monitoring of onsite activities (irrigation) and infrastructure (leaks);
- Stormwater quality (contaminated runoff and pollution entering the stormwater system) impacts
  - Treatment of stormwater targeting pollutants using WSUD and treatment train approaches;
  - Construction Phases Impacts;
    - Soil and Water Management planning for construction activities;
    - Implementation of erosion and sediment control strategies;
    - Ongoing monitoring and maintenance of erosion and sediment control strategies
- Flooding and flood risk impacts
  - On-site or precinct level detention strategies;
  - Flood planning levels; and
  - Flood evacuation strategies.

5.2 Water Balance

The impacts on the water balance at the site can be mitigated and managed by:

- Provision of stormwater retention strategies. These can be provided in the form of swales (vegetated and/or bio-retention swales), rain gardens, retention water bodies and wetlands. Some devices may need to be lined to prevent percolation to groundwater or in areas of high salinity. Infiltration-based strategies may not be suitable in some areas due to high groundwater levels or potential groundwater contamination impacts and rock at shallow depths. This will need to be confirmed in the detail design phase when detailed land-capability and geotechnical field investigations have been completed;
- In general, water reuse by capturing roof rainwater is desirable. Roof water would require adequate first flush treatments and can be directed to a single or a number of holding tanks for re-use for toilet flushing, irrigation of landscaped areas or other on-lot non-potable water uses; and

5.3 Stormwater Quality

Stormwater quality and pollution can be effectively managed and mitigated by providing suitable WSUD strategies. These typically comprise both structural and procedural mitigation measures. Strategies should preferably aim at “source control”.

Structural measures have a direct, measurable effect on water quality, while procedural measures (for example improved maintenance) would play an important role in mitigation and would reduce the pollutant load on the structural mitigation measures. This would effectively manage water quality and reduce the maintenance requirements for the structural measures.

Specific strategies can include:

- Orientation of roads to traverse across contours, providing slopes with grades of 4% or less where possible, to promote the provision of treatment measures into the streetscape;
- Preserve and restore (where practicable) existing elements of the natural topography;
- Manage the quality and quantity of stormwater at or near the source; and
- Provide primary stormwater treatment measures, which target litter, gross pollutants and coarse sediments and secondary treatment measures, which target sediment, nutrients and bacteria.

Construction phase water quality impacts can be managed by implementation of a Construction Phase Soil and Water Management Plan detailing stormwater management strategies in accordance with Landcom Soil and Construction, Managing Urban Stormwater (Landcom, 2004). These would include amongst others:

- General site practices and responsibilities;
- Material management practices;
- Stockpile practices;
- Topsoil practices; and
- Erosion control practices (earth sediment basins, straw bales, sediment fences, turbidity barriers, stabilised site accesses, diversions and catch drains).

Monitoring should be undertaken to ensure that stormwater quality management measures are working effectively. Monitoring would rely primarily on visual inspections and targeted sampling. Visual inspections should be undertaken of sediment traps, pits, diversion, Gross Pollutant Traps (GPT), catch drains and all stormwater conveyance structures. A general indication of frequencies for inspections is provided in Table 7.

Table 7 Sample Monitoring Program

Sample location	Collection mechanism	Frequency first six months	Frequency normal operation
Sediment Traps	Visual Inspection	Every runoff event	First runoff event of any month
Inlet Pits	Visual Inspection	Every runoff event	First runoff event of any month
Trunk Drainage Channels	Visual Inspection	Every runoff event	First runoff event of any month
Overland Flow Paths	Visual Inspection	Every runoff event	First runoff event of any month
Trafficable Areas (during construction)	Visual Inspection	Every month	
Bunded areas (during construction)	Visual Inspection	Every runoff event	
Other works areas, potentially contaminating stormwater (during construction)	Visual Inspection and system operation testing	Every month	

Notes:

1. Runoff event must be sufficient;
2. Inspect after 24 hour retention period (ie 24 hrs after runoff event);
3. For every inspection, date, time and ambient weather conditions would be recorded.

5.4 Flooding and Flood Risk

Increased peak flows on account of increased impervious areas can be managed by providing stormwater detention on the site. As this proposed development is an industrial sub-division, the impervious areas are significantly more than for residential areas. Stormwater detention could be provided as either precinct style detention or On-Site Detention (OSD) as follows:

- Larger development scale basin; and/or
- Smaller on-lot detention systems such as above ground storage in carparks or in-ground tanks.

Development and land-use in flood prone areas should be in accordance with the NSW Floodplain Management Manual. In the context of the NSW Floodplain Development Manual (April 2005) all areas inundated during a PMF are termed “flood liable”. This

land would need to be assessed as part of a “merit approach” to development, for managing flood risk, after definition of flood hazard.

A key tool in the management of flood risk is the Flood Planning Levels (FPL), which ensure that development is located in areas where it would not have significant adverse impacts on flooding nor on personal safety (identified by the flood hazard). The FPL is often based on the 100-year ARI flood extent plus a freeboard (often 500mm). Thus development floor levels are located outside of the 100-year ARI flood extent and at an elevation above the 100-year ARI flood level plus a suitable freeboard. In addition, provision for flood evacuation for events up to and including the PMF must be provided.

6. Proposed Water Sensitive Urban Design Strategy

6.1 General

The proposed WSUD Strategy Plan is provided in Appendix E.

It is proposed to manage stormwater using a number of facilities based on WSUD principles and as outlined in general in Section 5. The facilities include:

- Provision of suitable riparian zones to maintain and enhance the ecological value of the existing watercourses;
- Provision of bio-retention swales at major overland flow routes and bio-retention basins or wetlands to remove pollutants from the stormwater run-off;
- Provision of on-lot stormwater treatment facilities including vegetated systems, infiltration systems and structural facilities (gross-pollution traps);
- Provision of either precinct style stormwater detention facilities or OSD provided for each precinct/lot before discharge to the receiving waters;
- Where possible separation of road and lot drainage systems until stormwater run-off from both areas have been treated;
- Roofwater run-off harvesting, and re-use for toilet flushing, irrigation purposes and other on-lot non-potable water uses to minimise potable water use on the site and to mitigate the potential increase in run-off volumes;
- Provision of blackwater treatment and recycling of treated water for non-potable water uses on each site. This will further reduce potable water demands and minimise the amount of effluent to be disposed of off-site;
- Connection of the site to the proposed Regional Roofwater Harvesting Scheme to return “clean” run-off to the potable water supply system;
- Flood risk management using Flood Planning Levels and provision of adequate flood evacuation routes; and
- Construction phase water management principles that would include Soil and Water Management planning for construction, implementation of erosion and sediment control strategies and ongoing monitoring and maintenance of erosion and sediment control strategies.

In general, the proposed WSUD strategy was developed in accordance with the Concept Plan. Any changes to the Concept Plan would inherently need to be reflected in the WSUD strategy.

6.2 Site Discharge Points

It is proposed that the site discharge points would be located at various places as shown on the strategy plan (Appendix E) corresponding to existing drainage lines. Stormwater quality measures are provided using a “treatment train” approach with control measures incorporated at the source and throughout the drainage path to the

discharge points. Existing peak flow conditions are maintained at all site discharge locations via the use of stormwater detention facilities.

6.3 Water Balance

It is proposed that all allotments will incorporate roofwater run-off collection tanks. The captured roofwater run-off is to be re-used on each allotment for non-potable water uses. Overflow from the tanks would go to the proposed Regional Roofwater Harvesting Scheme rather then to the site stormwater system. A separate detailed water balance analysis has been undertaken with a number of scenarios modelled including blackwater recycling. The reader is referred to the separate detailed water balance report for the results of the analysis (GHD, December 2007). A diagrammatic representation of the proposed scheme is included in Appendix E.

6.4 Stormwater Quality Management

It is proposed to manage stormwater quality by:

- Provision of GPT's and other structural measures, for example bunding and oil/ water separation systems before discharge to any OSD systems or site drainage infrastructure;
- Provision of rainwater tanks on each site;
- Provision of bio-retention swales where appropriate;
- Provision of bio-retention basins (to be lined in areas of high salinity potential); and
- Provision of GPT's, oil/water separation systems and/or bio-retention systems at road drainage system discharge points;
- Where it is considered impractical to treat water on a precinct basis, for example lots that are immediately adjacent to existing watercourses, then on-lot treatment measures will be incorporated such as bio-retention basins.

The areas that are to be set aside for water quality treatment facilities on the site are sufficient in size to accommodate the necessary stormwater quality control features.

Construction phase water quality impacts would be managed by implementation of a Construction Phase Sediment and Erosion Control Plan detailing stormwater management strategies in accordance with Landcom Soil and Construction, Managing Urban Stormwater (Landcom, 2004). Strategies would include amongst others general site practices and responsibilities, material management practices, stockpile practices, topsoil practices and erosion control strategies such as earth sediment basins, straw bales, sediment fences, turbidity barriers, stabilised site accesses, diversions and catch drains.

6.5 Stormwater Quantity Management

It is proposed that all on-lot stormwater be routed to either the individual OSD systems or to precinct style detention systems, depending on the local topography of the sub-catchment (refer WSUD Strategy Plan in Appendix E). The precinct style detention

systems would be combined with the proposed bio-retention basins. Such precinct style water quantity and quality controls are proposed to be “off-line” of any Category 1 or 2 watercourses.

Post-development site discharge would be limited to the pre-development site discharge for a range of storm events.

The required detention storages are provided in Section 4.4 and the results indicate how the provision of detention storage will limit post-development flows to pre-development levels.

6.6 On- Site Flooding and Flood Risk

Flood levels for Ropes Creek and its tributaries have been determined and the associated flood extents maps are included in Appendix B. All building floor levels would be located above the 1% AEP flood level plus a freeboard of 300mm. For flooding associated with discharges on internal roads, it is proposed to limit the overland flows and associated flow velocities and depths. This would be achieved through a detailed design of the subsurface stormwater infrastructure in order to contain overland flow in the roadway. For areas of the Stage 1-3 area below the PMF level a flood evacuation strategy will be developed. Elevated areas on either side of Ropes Creek would provide suitable evacuation muster areas.

It is proposed to relocate tributary T1 as shown on Figure 2 to the southern boundary of the Stage 1 area. This tributary has a small natural catchment originating upstream of the site boundaries. Preliminary hydrologic modelling of the 1% AEP event peak flows has been conducted for the associated catchment. A preliminary trapezoidal channel size has been determined that will convey the 1% AEP peak flows and allow for a suitable freeboard. The preliminary channel dimensions are 12m wide, 1m deep with 1v:4h side slopes. Detailed hydraulic modelling will need to be conducted as part of the Stage 1 detailed design process to confirm the channel size.

6.7 Ongoing Monitoring

Monitoring will be undertaken to ensure that stormwater quality management measures are working effectively. Monitoring would rely primarily on visual inspections and targeted water sampling. Visual inspections should be undertaken of sediment traps, pits, diversion, GPTs, catch drains and all stormwater conveyance structures. A sample monitoring program is provided in Table 7 (Refer Section 5.3).

7. Conclusion

A WSUD strategy has been developed that mitigates the potential impacts of the development of the Oakdale such as:

- Impacts to the water balance;
- Stormwater quality impacts;
- Increased stormwater peak flows and flood risk; and
- Construction phases impacts;

The proposed WSUD strategy incorporates the following measures to manage and mitigate the impacts of the proposed development;

- Stormwater treatment facilities such as GPT's, bio-retention swales and bio-retention basins;
- Either precinct style stormwater detention or OSD systems;
- Roofwater run-off collection and re-use for non-potable water uses;
- Blackwater recycling;
- Flood risk management using flood planning levels and flood evacuation; and
- Construction phase management provisions which include implementation of erosion and sediment control strategies.

Numerical modelling was undertaken to support the proposed WSUD strategy plan. The results of the simulations show that the stormwater management strategy would effectively mitigate the impacts of development at the site and the stormwater quality and quantity targets can be met.

8. References

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- XP Software, XP-RAFTS User's Manual, Version 6.11
- NSW Government, Floodplain Development Manual, 2005.

Appendix A

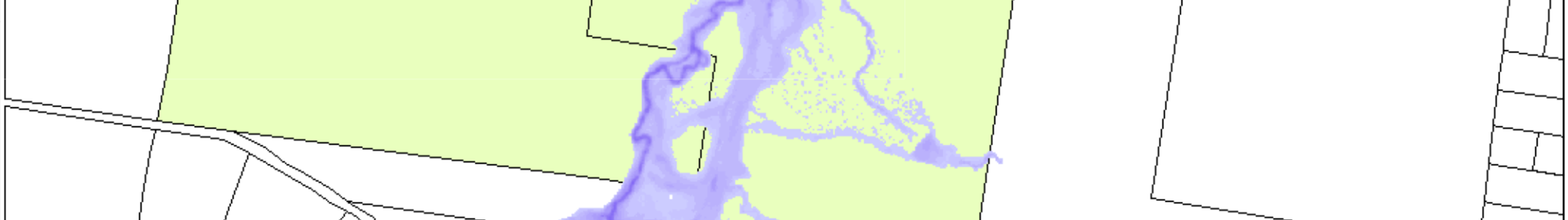
Oakdale Concept Plan

Appendix B

Ropes Creek Flood Modelling Results

Flood extent mapping

Flood Depths (m)



Oakdale Site

1:14,000 for A3

0 55 110 220 330 440

Metres

GDA_1994_MGA_Zone_56

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GOODMAN INTERNATIONAL
OAKDALE

20-year ARI Event Flood Map

job no. | 21-15101
rev no. | REVA

date | June 2007

Gis File No: G:\Projects\21\15101\CADD\GIS\ArcMap\20yr_FloodExtents.mxd

10 Bond Street Sydney NSW 2000 Australia **T** 61 2 9239 7100 **F** 61 2 9239 7190 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Flood Depths (m)

0.05 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
5.00 - 5.25
5.25 - 5.50
5.50 - 5.75
5.75 - 6.00
6.00 - 6.25

Oakdale Site

1:14,000 for A3

0 55 110 220 330 440

Metres

GDA_1994_MGA_Zone_56

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Gis File No: G:\Projects\21\15101\CADD\GIS\ArcMap\100yr_FloodExtents.mxd

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OAKDALE

100-year ARI Event Flood Map

job no. | 21-15101
rev no. | REVA

date | June 2007

10 Bond Street Sydney NSW 2000 Australia **T** 61 2 9239 7100 **F** 61 2 9239 7190 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Flood Depths (m)

0.05 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.25
2.25 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
5.00 - 5.25
5.25 - 5.50
5.50 - 5.75
5.75 - 6.00
6.00 - 6.25

Oakdale Site

1:14,000 for A3

0 55 110 220 330 440

Metres

GDA_1994_MGA_Zone_56

© notices

O

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GOODMAN INTERNATIONAL
OAKDALE

PMF Flood Map

job no. | 21-15101
rev no. | REVA

date | June 2007

Gis File No: G:\Projects\21\15101\CADD\GIS\ArcMap\PMF_FloodExtents.mxd

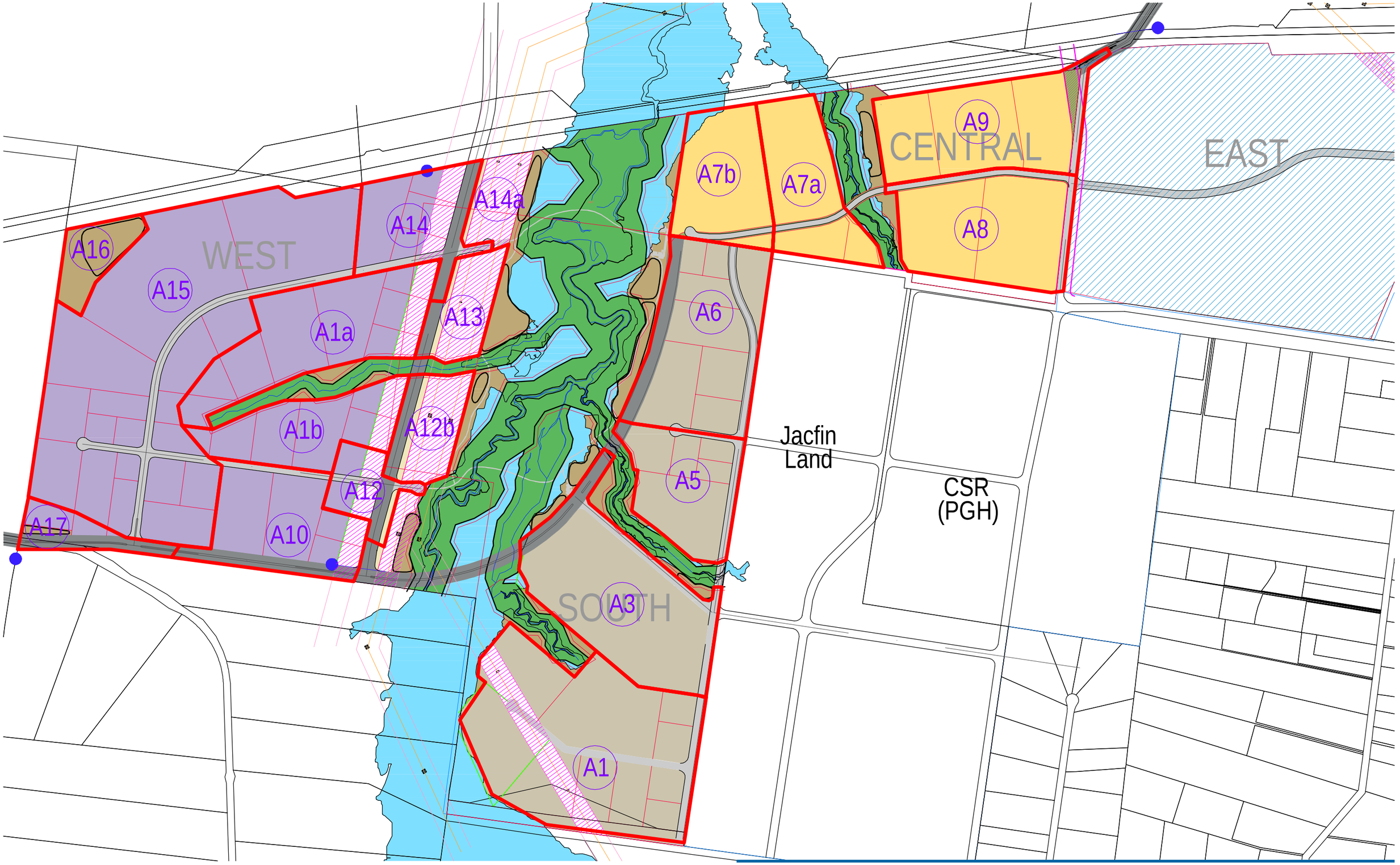
10 Bond Street Sydney NSW 2000 Australia **T** 61 2 9239 7100 **F** 61 2 9239 7190 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Appendix C

On-site Hydrological Modelling Results

Rafts output files

Catchment Plan



GHD CLIENTS | PEOPLE | PERFORMANCE

GOODMAN INTERNATIONAL LTD
OAKDALE CONCEPT PLAN

CATCHMENT AREA PLAN

scale | 1:10000 for A3 date | SEP. 2010

job no. | 21-15101
rev no. | B

Figure 100

10 Bond Street, Sydney NSW 2000 Australia **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Plot Date: 02 September, 2010 - 5:46 PM Cad File No: G:\21\15101\CADD\Drawings\ 21-15101-WSUD_FIG100.dwg

Hydrology Modelling - RAFTS MODEL

RAFTS-2000 model is used to simulate runoff hydrographs at defined points in the catchment. This model is suitable for application on catchments ranging from rural to fully urbanised. The model is capable of analysing catchments comprising natural waterways, formalised channels, pipes, retarding basins and combinations of these.

The existing catchments are rural (0% impervious) and will be urbanised (approximately 60 -85% impervious). The catchment was divided into sub-catchments, determined by topography, landuse and creek configuration. A split catchment option was utilized in the modeling. The first sub-catchment portion was taken as pervious and the second impervious (100% impervious).

Sub-catchment link flow lag times were calculated using standard hydraulic formula (velocity in the creek) applicable to open channel and/or closed conduit system. Correct runoff simulation is highly dependent on an accurate estimate of impervious area percentages for each sub-catchment.

The Initial/Continuing loss rate approach to estimate excess rainfall for the catchment was adopted. In the absence of historical flood flows, conservative model parameters were assumed.

The adopted conservative values were;

	Pervious	**Impervious**
Initial loss(mm)	**15.0**	**2.5**
Continuing loss(mm/hr)	**2.0**	**0**

Durations of 25 minutes to 9 hours were used for various ARIs of 2, 5, 10, 20 and 100 years and PMF. Details of sub-catchment input data is given in the attached Table. Historical flood flows were not available to calibrate the RAFTS model. The model was run for the following scenarios:

- Existing - All sub-catchments within Oakdale Industrial Estate were assumed as 100 % pervious
- Proposed - Assumed impervious area percentages is around 65% to 85%.
- Proposed with OSD - In order to maintain the existing flow conditions, trial and error approach was used to estimate the maximum Permissible Site Discharge (PSD) and minimum storage requirements for retarding basins.

A list of the model input data files and the extracted summary output for the existing, proposed and proposed with OSD follow. For details of the model, refer to the RAFTS User Manual.

Table C1

Oakdale Industrial Estate - Subcatchment Details for Rafts Model

Subcatch. Node Label	Total Area (ha)	Percentage of Impervious Area	Pervious Area (ha)	Impervious Area (ha)	Slope (%)	Lag (mins)	100 ARI Flow Existing m^3/s	Critical Duration	100 ARI Flow Proposed	Critical Duration	100 ARI Flow With OSD OSD- 250 m^3/ha PSD = 140 l/s/ha	Critical Duration
A1	29.12	85	4.37	24.75	1.96%	2	4.1	2hr	13.2	1.5 hr	3.7	4.5 hr
A3	19.37	85	2.91	16.46	2.15%	2	2.6	2hr	8.8	90 min	2.4	4.5 hr
A5	10.05	85	1.51	8.54	2.20%	1	1.7	2hr	4.7	25 min	1.3	4.5 hr
A6	17.26	85	2.59	14.67	4.76%	1	3.8	2hr	8.4	25 min	2.2	2 hr
A7a	9.98	85	1.50	8.48	4.35%	1	2.4	2hr	4.8	25 min	1.3	2 hr
A7b	9.76	85	1.46	8.30	5.83%	1	2.6	2hr	4.9	25 min	1.3	2 hr
A8	15.4	85	2.31	13.09	2.39%	1	2.5	2hr	7.2	25 min	2	4.5 hr
A9	15.59	85	2.34	13.25	3.26%	1	2.9	2hr	7.5	25 min	2	4.5 hr
A10	11.81	85	1.77	10.04	6.15%	1	3.1	2hr	5.9	25 min	1.5	2 hr
A11a	15.83	85	2.37	13.46	11.52%	1	5	2hr	8	25 min	2.1	2 hr
A11b	9.48	85	1.42	8.06	3.72%	1	2.1	2hr	4.6	25 min	1.2	2 hr
A12a	4.09	85	0.61	3.48	4.17%	1	1.1	2hr	2.1	25 min	0.5	2 hr
A12b	5.65	60	2.26	3.39	5.00%	1	1.6	2hr	2.5	1.5 hr	0.7	2 hr
A13	5.03	60	2.01	3.02	3.64%	1	1.3	2hr	2.1	1.5 hr	0.6	4.5 hr
A14a	9.21	85	1.38	7.83	2.42%	1	1.6	2hr	4.4	25 min	1.2	4.5 hr
A14b	3.61	60	1.44	2.17	4.09%	1	1	2hr	1.6	1.5 hr	0.5	2 hr
A15	51.21	85	7.68	43.53	7.18%	1	10.9	2hr	24.1	25 min	-	
A16	3.77	0	3.77	0.00	2.58%	1000	11.7	2 hr	25.3	25 min	7	4.5 hr
A17	3.56	85	0.53	3.03	8.10%	0	1.1	2 hr	1.7	1.5 hr	0.5	2 hr
Outlet	-	-	-	-	-	-	33.3	2hr	49.1	1.5 hr	23.6	2 hr
Total Area	**249.78**		**44.24**	**205.54**								

Subcatchment divisions and equivalent slopes are based on contour survey.

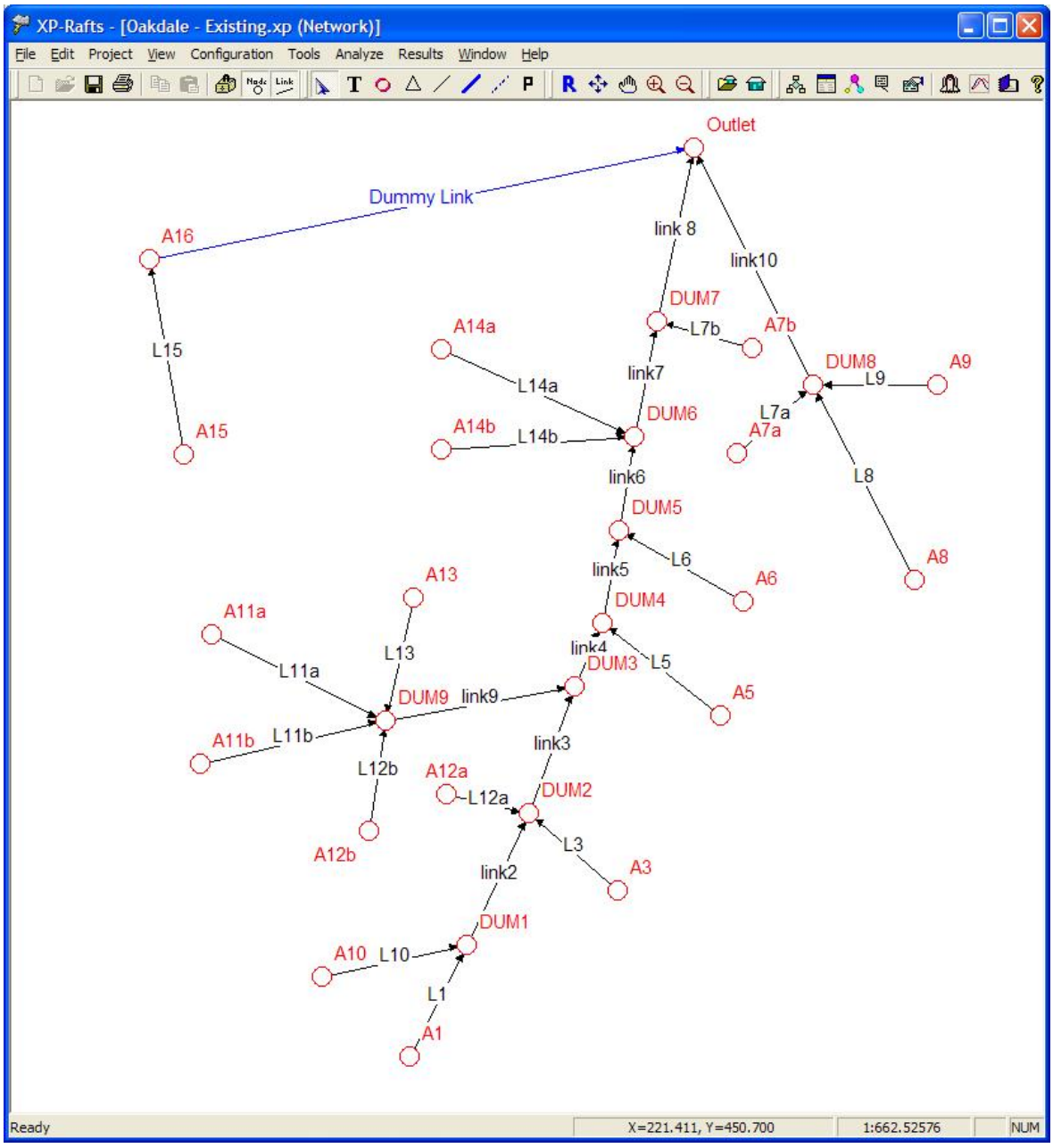
Lag time = length of connecting channel (node to node) / Flow velocity (say 1 to 2 m/s)

Table C2

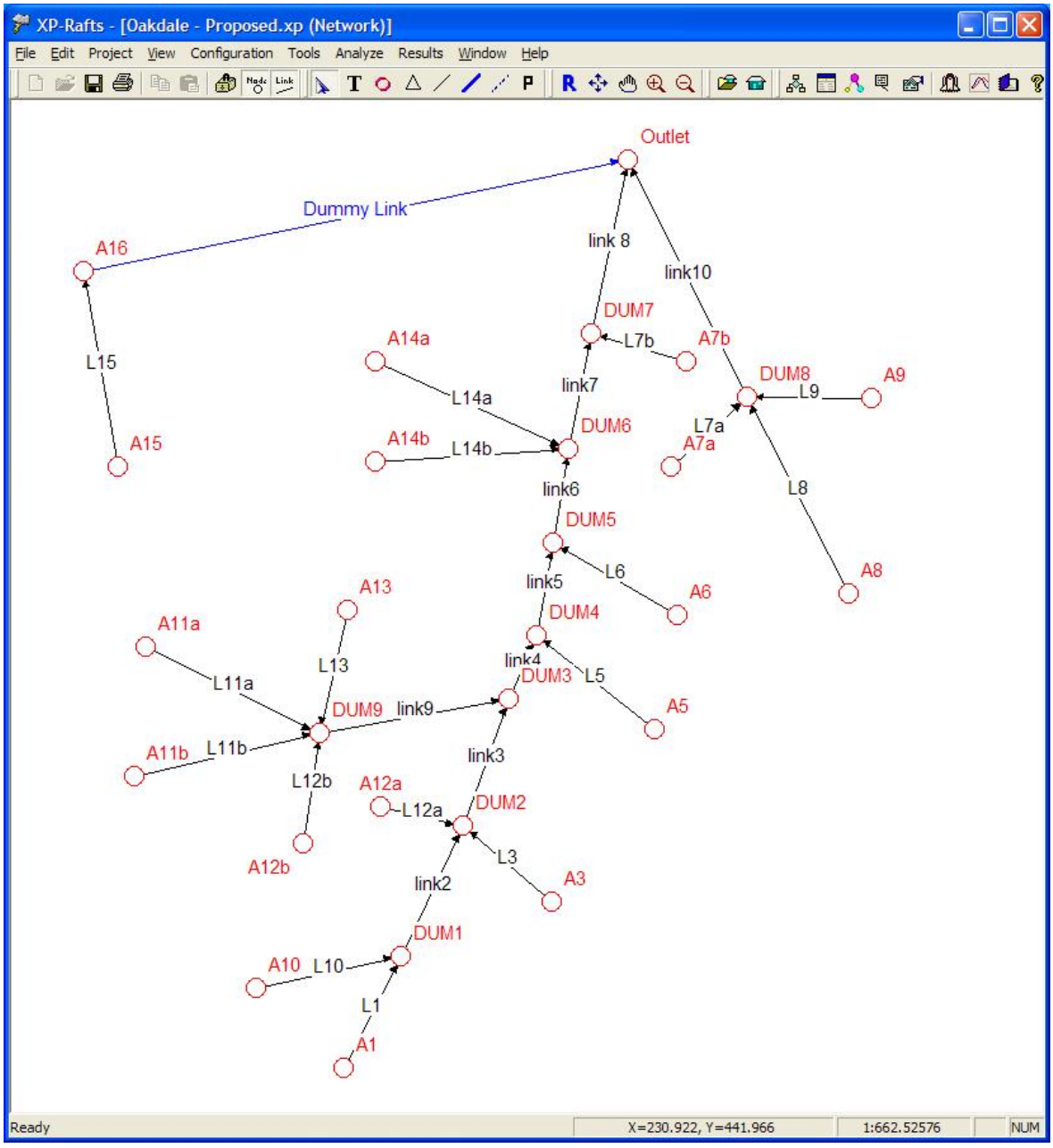
Oakdale Industrial Estate - OSD calculation for Rafts Model

OSD	**280**	**m^3/ha**	**250**			
PSD	**120**	**l/s/ha**	**140**			
Subcatch. Node Label	**Total Area**	**Retading/ Wetland Nodes**	**OSD 280**	**PSD 120**	**OSD 250**	**PSD 140**
	(ha)		**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**
A1	29.12		8154	3.494	7280	4.077
A3	19.37		5424	2.324	4843	2.712
A5	10.05		2814	1.206	2513	1.407
A6	17.26		4833	2.071	4315	2.416
A7a	9.98		2794	1.198	2495	1.397
A7b	9.76		2733	1.171	2440	1.366
A8	14.7		4116	1.764	3675	2.058
A8	15.4		4312	1.848	3850	2.156
A9	15.59		4365	1.871	3898	2.183
A11a	15.83		4432	1.900	3958	2.216
A11b	9.48		2654	1.138	2370	1.327
A12a	4.09		1145	0.491	1023	0.573
A12b	5.65		1582	0.678	1413	0.791
A13	5.03		1408	0.604	1258	0.704
A14a	9.21		2579	1.105	2303	1.289
A14b	3.61		1011	0.433	903	0.505
A15	51.21		14339	6.145	12803	7.169
A16	3.77		1056	0.452	943	0.528
A17	3.56		997	0.427	890	0.498
	253.42		**70958**	**30.410**	**63355**	**35.479**

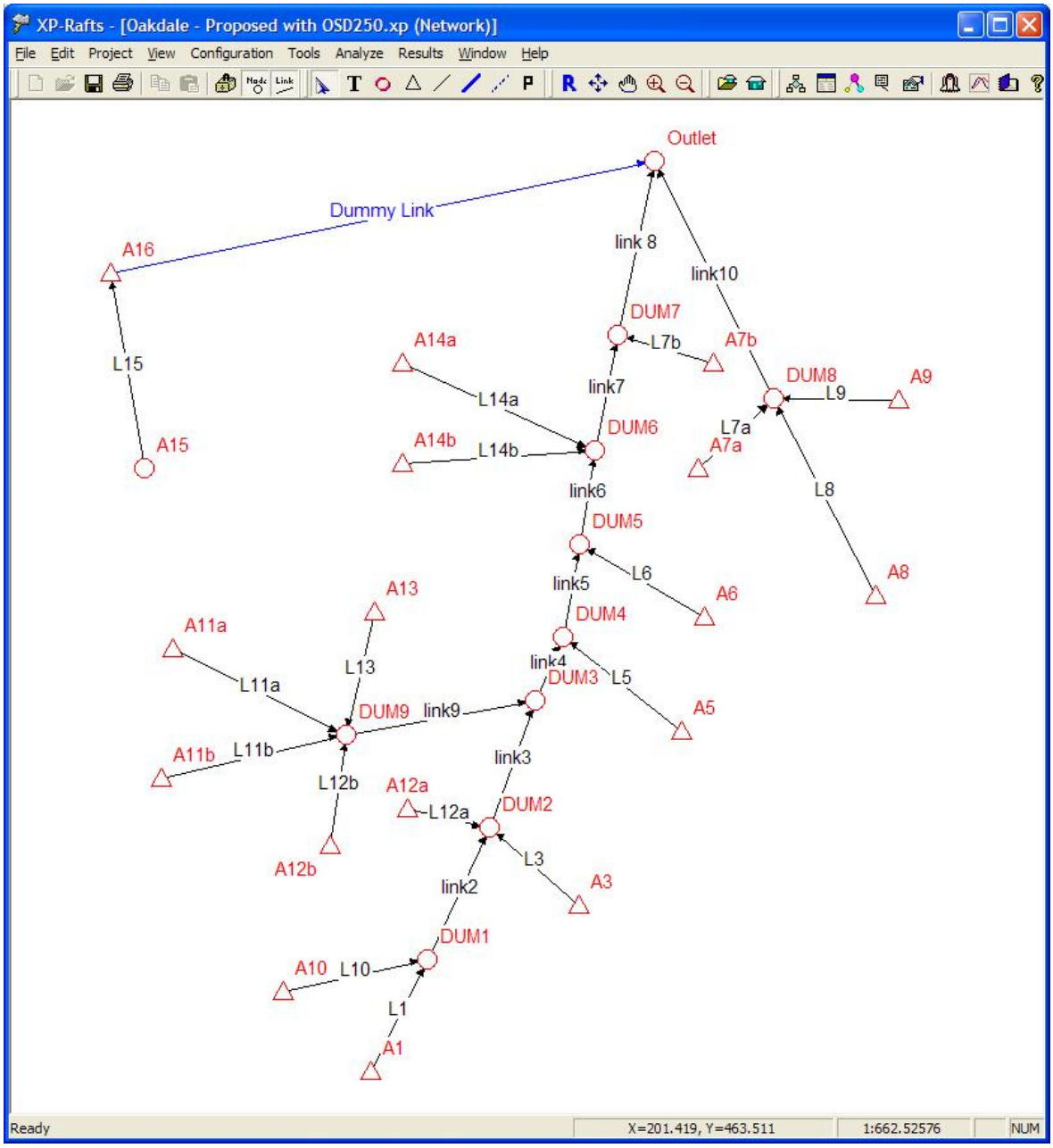
RAFTS Model Network for the Existing Conditions



RAFTS Model Network for the Proposed Conditions



RAFTS Model Network for the Proposed Conditions with OSD



##

Oakdale Site - Existing

##

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Catch. Area #2 (ha)	Slope #1 (%)	Slope #2 (%)	% Impervious #1 (%)	% Impervious #2 (%)	Pern #1	Pern #2	B #1	B #2	Link No.
A1	29.120	0.000	1.960	0.000	5.000	0.000	.045	0.00	.1323	0.000	1.000
A10	11.810	0.000	6.150	0.000	5.000	0.000	.045	0.00	.0468	0.000	2.000
DUM1	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.001
A3	19.370	0.000	1.910	0.000	2.150	0.000	.045	0.00	.1224	0.000	3.000
A12a	4.090	0.000	4.170	0.000	5.000	0.000	.045	0.00	.0327	0.000	4.000
DUM2	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.002
A11b	9.480	0.000	3.720	0.000	5.000	0.000	.045	0.00	.0536	0.000	5.000
A12b	5.650	0.000	5.000	0.000	5.000	0.000	.045	0.00	.0353	0.000	6.000
A13	5.030	0.000	3.640	0.000	5.000	0.000	.045	0.00	.0390	0.000	7.000
A11a	15.830	0.000	11.52	0.000	5.000	0.000	.045	0.00	.0398	0.000	8.000
DUM9	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	5.001
DUM3	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.003
A5	10.050	0.000	2.200	0.000	5.000	0.000	.045	0.00	.0718	0.000	9.000
DUM4	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.004
A6	17.260	0.000	4.760	0.000	5.000	0.000	.045	0.00	.0647	0.000	10.00
DUM5	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.005
A14b	3.610	0.000	4.090	0.000	5.000	0.000	.045	0.00	.0309	0.000	11.00
A14a	9.210	0.000	2.420	0.000	5.000	0.000	.045	0.00	.0654	0.000	12.00
DUM6	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.006
A7b	9.760	0.000	5.830	0.000	5.000	0.000	.045	0.00	.0435	0.000	13.00
DUM7	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.007
A8	15.400	0.000	2.390	0.000	5.000	0.000	.045	0.00	.0860	0.000	14.00
A9	15.590	0.000	3.260	0.000	5.000	0.000	.045	0.00	.0742	0.000	15.00
A7a	9.980	0.000	4.350	0.000	5.000	0.000	.045	0.00	.0509	0.000	16.00
DUM8	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	14.00
A15	51.210	0.000	7.180	0.000	5.000	0.000	.045	0.00	.0928	0.000	17.00
A16	3.770	0.000	2.530	0.000	5.000	0.000	.045	0.00	.0402	0.000	17.00
Outlet	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.008

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	106.91	15.00	0.000	2.000	0.000	28.980	0.000	2.123	26.00	2.000
A10	106.91	15.00	0.000	2.000	0.000	28.980	0.000	2.247	25.00	1.000
DUM1	106.91	15.00	0.000	2.000	0.000	28.980	0.000	4.294	27.00	6.000
A3	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.315	26.00	2.000
A12a	106.91	15.00	0.000	2.000	0.000	28.980	0.000	0.7936	25.00	1.000
DUM2	106.91	15.00	0.000	2.000	0.000	28.980	0.000	6.120	32.00	4.000
A11b	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.474	26.00	1.000
A12b	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.128	25.00	1.000
A13	106.91	15.00	0.000	2.000	0.000	28.980	0.000	0.8881	25.00	1.000
A11a	106.91	15.00	0.000	2.000	0.000	28.980	0.000	3.585	22.00	1.000
DUM9	106.91	15.00	0.000	2.000	0.000	28.980	0.000	6.916	25.00	5.000
DUM3	106.91	15.00	0.000	2.000	0.000	28.980	0.000	12.495	31.00	1.000
A5	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.107	26.00	1.000
DUM4	106.91	15.00	0.000	2.000	0.000	28.980	0.000	13.573	32.00	1.000
A6	106.91	15.00	0.000	2.000	0.000	28.980	0.000	2.642	26.00	1.000
DUM5	106.91	15.00	0.000	2.000	0.000	28.980	0.000	15.845	33.00	2.000
A14b	106.91	15.00	0.000	2.000	0.000	28.980	0.000	0.7162	25.00	1.000
A14a	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.111	26.00	1.000
DUM6	106.91	15.00	0.000	2.000	0.000	28.980	0.000	17.195	35.00	2.000
A7b	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.882	25.00	1.000
DUM7	106.91	15.00	0.000	2.000	0.000	28.980	0.000	18.114	36.00	8.000
A8	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.558	26.00	1.000
A9	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.991	26.00	1.000
A7a	106.91	15.00	0.000	2.000	0.000	28.980	0.000	1.674	25.00	1.000
DUM8	106.91	15.00	0.000	2.000	0.000	28.980	0.000	5.221	27.00	6.000
A15	106.91	15.00	0.000	2.000	0.000	28.980	0.000	7.463	26.00	1.000
A16	106.91	15.00	0.000	2.000	0.000	28.980	0.000	8.055	27.00	1000.
Outlet	106.91	15.00	0.000	2.000	0.000	28.980	0.000	22.159	42.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 45.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	77.485	15.00	0.000	2.000	0.000	41.981	0.000	3.303	46.00	2.000
A10	77.485	15.00	0.000	2.000	0.000	41.981	0.000	2.480	31.00	1.000
DUM1	77.485	15.00	0.000	2.000	0.000	41.981	0.000	5.141	41.00	6.000
A3	77.485	15.00	0.000	2.000	0.000	41.981	0.000	2.175	46.00	2.000
A12a	77.485	15.00	0.000	2.000	0.000	41.981	0.000	0.8839	31.00	1.000
DUM2	77.485	15.00	0.000	2.000	0.000	41.981	0.000	7.874	44.00	4.000
A11b	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.776	35.00	1.000
A12b	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.232	31.00	1.000
A13	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.019	32.00	1.000
A11a	77.485	15.00	0.000	2.000	0.000	41.981	0.000	3.676	29.00	1.000
DUM9	77.485	15.00	0.000	2.000	0.000	41.981	0.000	7.558	32.00	5.000
DUM3	77.485	15.00	0.000	2.000	0.000	41.981	0.000	14.400	42.00	1.000
A5	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.536	41.00	1.000
DUM4	77.485	15.00	0.000	2.000	0.000	41.981	0.000	15.926	43.00	1.000
A6	77.485	15.00	0.000	2.000	0.000	41.981	0.000	3.157	36.00	1.000
DUM5	77.485	15.00	0.000	2.000	0.000	41.981	0.000	18.832	43.00	2.000
A14b	77.485	15.00	0.000	2.000	0.000	41.981	0.000	0.7869	31.00	1.000
A14a	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.486	40.00	1.000
DUM6	77.485	15.00	0.000	2.000	0.000	41.981	0.000	20.782	44.00	2.000
A7b	77.485	15.00	0.000	2.000	0.000	41.981	0.000	2.088	31.00	1.000
DUM7	77.485	15.00	0.000	2.000	0.000	41.981	0.000	22.167	45.00	8.000
A8	77.485	15.00	0.000	2.000	0.000	41.981	0.000	2.281	41.00	1.000
A9	77.485	15.00	0.000	2.000	0.000	41.981	0.000	2.587	40.00	1.000
A7a	77.485	15.00	0.000	2.000	0.000	41.981	0.000	1.953	33.00	1.000
DUM8	77.485	15.00	0.000	2.000	0.000	41.981	0.000	6.636	40.00	6.000
A15	77.485	15.00	0.000	2.000	0.000	41.981	0.000	9.230	36.00	1.000
A16	77.485	15.00	0.000	2.000	0.000	41.981	0.000	9.930	37.00	1000.
Outlet	77.485	15.00	0.000	2.000	0.000	41.981	0.000	28.266	51.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	65.606	15.00	0.000	2.000	0.000	49.040	0.000	3.708	51.00	2.000
A10	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.834	35.00	1.000
DUM1	65.606	15.00	0.000	2.000	0.000	49.040	0.000	5.684	40.00	6.000
A3	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.414	53.00	2.000
A12a	65.606	15.00	0.000	2.000	0.000	49.040	0.000	1.012	33.00	1.000
DUM2	65.606	15.00	0.000	2.000	0.000	49.040	0.000	8.659	46.00	4.000
A11b	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.012	36.00	1.000
A12b	65.606	15.00	0.000	2.000	0.000	49.040	0.000	1.406	33.00	1.000
A13	65.606	15.00	0.000	2.000	0.000	49.040	0.000	1.162	35.00	1.000
A11a	65.606	15.00	0.000	2.000	0.000	49.040	0.000	4.343	31.00	1.000
DUM9	65.606	15.00	0.000	2.000	0.000	49.040	0.000	8.635	34.00	5.000
DUM3	65.606	15.00	0.000	2.000	0.000	49.040	0.000	16.237	42.00	1.000
A5	65.606	15.00	0.000	2.000	0.000	49.040	0.000	1.689	44.00	1.000
DUM4	65.606	15.00	0.000	2.000	0.000	49.040	0.000	17.920	43.00	1.000
A6	65.606	15.00	0.000	2.000	0.000	49.040	0.000	3.538	37.00	1.000
DUM5	65.606	15.00	0.000	2.000	0.000	49.040	0.000	21.250	44.00	2.000
A14b	65.606	15.00	0.000	2.000	0.000	49.040	0.000	0.9015	33.00	1.000
A14a	65.606	15.00	0.000	2.000	0.000	49.040	0.000	1.632	41.00	1.000
DUM6	65.606	15.00	0.000	2.000	0.000	49.040	0.000	23.474	45.00	2.000
A7b	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.367	34.00	1.000
DUM7	65.606	15.00	0.000	2.000	0.000	49.040	0.000	25.059	47.00	8.000
A8	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.494	45.00	1.000
A9	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.825	41.00	1.000
A7a	65.606	15.00	0.000	2.000	0.000	49.040	0.000	2.196	36.00	1.000
DUM8	65.606	15.00	0.000	2.000	0.000	49.040	0.000	7.288	41.00	6.000
A15	65.606	15.00	0.000	2.000	0.000	49.040	0.000	10.238	38.00	1.000
A16	65.606	15.00	0.000	2.000	0.000	49.040	0.000	11.023	39.00	1000.
Outlet	65.606	15.00	0.000	2.000	0.000	49.040	0.000	31.747	54.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 90.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	51.341	15.00	0.000	2.000	0.000	59.445	0.000	3.850	58.00	2.000
A10	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.881	35.00	1.000
DUM1	51.341	15.00	0.000	2.000	0.000	59.445	0.000	5.683	41.00	6.000
A3	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.498	59.00	2.000
A12a	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.048	33.00	1.000
DUM2	51.341	15.00	0.000	2.000	0.000	59.445	0.000	8.610	47.00	4.000
A11b	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.990	38.00	1.000
A12b	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.452	33.00	1.000
A13	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.170	36.00	1.000
A11a	51.341	15.00	0.000	2.000	0.000	59.445	0.000	4.780	31.00	1.000
DUM9	51.341	15.00	0.000	2.000	0.000	59.445	0.000	9.076	33.00	5.000
DUM3	51.341	15.00	0.000	2.000	0.000	59.445	0.000	16.530	43.00	1.000
A5	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.696	45.00	1.000
DUM4	51.341	15.00	0.000	2.000	0.000	59.445	0.000	18.213	44.00	1.000
A6	51.341	15.00	0.000	2.000	0.000	59.445	0.000	3.544	40.00	1.000
DUM5	51.341	15.00	0.000	2.000	0.000	59.445	0.000	21.594	45.00	2.000
A14b	51.341	15.00	0.000	2.000	0.000	59.445	0.000	0.9425	33.00	1.000
A14a	51.341	15.00	0.000	2.000	0.000	59.445	0.000	1.638	43.00	1.000
DUM6	51.341	15.00	0.000	2.000	0.000	59.445	0.000	23.835	46.00	2.000
A7b	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.433	34.00	1.000
DUM7	51.341	15.00	0.000	2.000	0.000	59.445	0.000	25.436	48.00	8.000
A8	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.467	46.00	1.000
A9	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.812	43.00	1.000
A7a	51.341	15.00	0.000	2.000	0.000	59.445	0.000	2.202	37.00	1.000
DUM8	51.341	15.00	0.000	2.000	0.000	59.445	0.000	7.268	42.00	6.000
A15	51.341	15.00	0.000	2.000	0.000	59.445	0.000	10.247	40.00	1.000
A16	51.341	15.00	0.000	2.000	0.000	59.445	0.000	11.032	41.00	1000.
Outlet	51.341	15.00	0.000	2.000	0.000	59.445	0.000	32.120	56.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 120.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	42.988	15.00	0.000	2.000	0.000	67.644	0.000	4.072	65.00	2.000
A10	42.988	15.00	0.000	2.000	0.000	67.644	0.000	3.088	43.00	1.000
DUM1	42.988	15.00	0.000	2.000	0.000	67.644	0.000	6.083	47.00	6.000
A3	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.631	66.00	2.000
A12a	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.125	41.00	1.000
DUM2	42.988	15.00	0.000	2.000	0.000	67.644	0.000	9.093	53.00	4.000
A11b	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.141	45.00	1.000
A12b	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.576	41.00	1.000
A13	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.253	44.00	1.000
A11a	42.988	15.00	0.000	2.000	0.000	67.644	0.000	5.003	41.00	1.000
DUM9	42.988	15.00	0.000	2.000	0.000	67.644	0.000	9.837	42.00	5.000
DUM3	42.988	15.00	0.000	2.000	0.000	67.644	0.000	17.582	52.00	1.000
A5	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.723	51.00	1.000
DUM4	42.988	15.00	0.000	2.000	0.000	67.644	0.000	19.304	52.00	1.000
A6	42.988	15.00	0.000	2.000	0.000	67.644	0.000	3.766	46.00	1.000
DUM5	42.988	15.00	0.000	2.000	0.000	67.644	0.000	22.720	53.00	2.000
A14b	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.015	41.00	1.000
A14a	42.988	15.00	0.000	2.000	0.000	67.644	0.000	1.684	49.00	1.000
DUM6	42.988	15.00	0.000	2.000	0.000	67.644	0.000	24.940	55.00	2.000
A7b	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.605	42.00	1.000
DUM7	42.988	15.00	0.000	2.000	0.000	67.644	0.000	26.451	57.00	8.000
A8	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.525	54.00	1.000
A9	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.921	49.00	1.000
A7a	42.988	15.00	0.000	2.000	0.000	67.644	0.000	2.363	45.00	1.000
DUM8	42.988	15.00	0.000	2.000	0.000	67.644	0.000	7.629	48.00	6.000
A15	42.988	15.00	0.000	2.000	0.000	67.644	0.000	10.878	46.00	1.000
A16	42.988	15.00	0.000	2.000	0.000	67.644	0.000	11.718	47.00	1000.
Outlet	42.988	15.00	0.000	2.000	0.000	67.644	0.000	33.313	63.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 180.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	33.376	15.00	0.000	2.000	0.000	79.895	0.000	3.601	76.00	2.000
A10	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.416	46.00	1.000
DUM1	33.376	15.00	0.000	2.000	0.000	79.895	0.000	4.998	77.00	6.000
A3	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.359	76.00	2.000
A12a	33.376	15.00	0.000	2.000	0.000	79.895	0.000	0.8634	46.00	1.000
DUM2	33.376	15.00	0.000	2.000	0.000	79.895	0.000	7.756	82.00	4.000
A11b	33.376	15.00	0.000	2.000	0.000	79.895	0.000	1.617	49.00	1.000
A12b	33.376	15.00	0.000	2.000	0.000	79.895	0.000	1.205	46.00	1.000
A13	33.376	15.00	0.000	2.000	0.000	79.895	0.000	0.9703	46.00	1.000
A11a	33.376	15.00	0.000	2.000	0.000	79.895	0.000	3.686	45.00	1.000
DUM9	33.376	15.00	0.000	2.000	0.000	79.895	0.000	7.431	47.00	5.000
DUM3	33.376	15.00	0.000	2.000	0.000	79.895	0.000	13.462	56.00	1.000
A5	33.376	15.00	0.000	2.000	0.000	79.895	0.000	1.374	58.00	1.000
DUM4	33.376	15.00	0.000	2.000	0.000	79.895	0.000	14.830	57.00	1.000
A6	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.893	50.00	1.000
DUM5	33.376	15.00	0.000	2.000	0.000	79.895	0.000	17.523	58.00	2.000
A14b	33.376	15.00	0.000	2.000	0.000	79.895	0.000	0.7690	46.00	1.000
A14a	33.376	15.00	0.000	2.000	0.000	79.895	0.000	1.325	56.00	1.000
DUM6	33.376	15.00	0.000	2.000	0.000	79.895	0.000	19.299	60.00	2.000
A7b	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.043	46.00	1.000
DUM7	33.376	15.00	0.000	2.000	0.000	79.895	0.000	20.589	61.00	8.000
A8	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.058	66.00	1.000
A9	33.376	15.00	0.000	2.000	0.000	79.895	0.000	2.291	54.00	1.000
A7a	33.376	15.00	0.000	2.000	0.000	79.895	0.000	1.818	47.00	1.000
DUM8	33.376	15.00	0.000	2.000	0.000	79.895	0.000	5.928	54.00	6.000
A15	33.376	15.00	0.000	2.000	0.000	79.895	0.000	8.312	50.00	1.000
A16	33.376	15.00	0.000	2.000	0.000	79.895	0.000	8.961	51.00	1000.
Outlet	33.376	15.00	0.000	2.000	0.000	79.895	0.000	26.208	67.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 270.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	25.882	15.00	0.000	2.000	0.000	93.769	0.000	3.833	91.00	2.000
A10	25.882	15.00	0.000	2.000	0.000	93.769	0.000	2.241	79.00	1.000
DUM1	25.882	15.00	0.000	2.000	0.000	93.769	0.000	5.811	92.00	6.000
A3	25.882	15.00	0.000	2.000	0.000	93.769	0.000	2.478	93.00	2.000
A12a	25.882	15.00	0.000	2.000	0.000	93.769	0.000	0.7856	79.00	1.000
DUM2	25.882	15.00	0.000	2.000	0.000	93.769	0.000	8.796	97.00	4.000
A11b	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.697	85.00	1.000
A12b	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.094	78.00	1.000
A13	25.882	15.00	0.000	2.000	0.000	93.769	0.000	0.9339	81.00	1.000
A11a	25.882	15.00	0.000	2.000	0.000	93.769	0.000	3.223	76.00	1.000
DUM9	25.882	15.00	0.000	2.000	0.000	93.769	0.000	6.831	79.00	5.000
DUM3	25.882	15.00	0.000	2.000	0.000	93.769	0.000	14.840	96.00	1.000
A5	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.662	90.00	1.000
DUM4	25.882	15.00	0.000	2.000	0.000	93.769	0.000	16.326	97.00	1.000
A6	25.882	15.00	0.000	2.000	0.000	93.769	0.000	3.071	86.00	1.000
DUM5	25.882	15.00	0.000	2.000	0.000	93.769	0.000	19.128	92.00	2.000
A14b	25.882	15.00	0.000	2.000	0.000	93.769	0.000	0.6964	78.00	1.000
A14a	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.563	90.00	1.000
DUM6	25.882	15.00	0.000	2.000	0.000	93.769	0.000	21.179	93.00	2.000
A7b	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.860	78.00	1.000
DUM7	25.882	15.00	0.000	2.000	0.000	93.769	0.000	22.659	94.00	8.000
A8	25.882	15.00	0.000	2.000	0.000	93.769	0.000	2.470	90.00	1.000
A9	25.882	15.00	0.000	2.000	0.000	93.769	0.000	2.665	90.00	1.000
A7a	25.882	15.00	0.000	2.000	0.000	93.769	0.000	1.817	83.00	1.000
DUM8	25.882	15.00	0.000	2.000	0.000	93.769	0.000	6.897	91.00	6.000
A15	25.882	15.00	0.000	2.000	0.000	93.769	0.000	9.022	87.00	1.000
A16	25.882	15.00	0.000	2.000	0.000	93.769	0.000	9.691	88.00	1000.
Outlet	25.882	15.00	0.000	2.000	0.000	93.769	0.000	28.982	100.0	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 360.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	21.614	15.00	0.000	2.000	0.000	104.62	0.000	3.595	138.0	2.000
A10	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.888	120.0	1.000
DUM1	21.614	15.00	0.000	2.000	0.000	104.62	0.000	5.124	123.0	6.000
A3	21.614	15.00	0.000	2.000	0.000	104.62	0.000	2.365	138.0	2.000
A12a	21.614	15.00	0.000	2.000	0.000	104.62	0.000	0.6552	120.0	1.000
DUM2	21.614	15.00	0.000	2.000	0.000	104.62	0.000	7.968	129.0	4.000
A11b	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.465	120.0	1.000
A12b	21.614	15.00	0.000	2.000	0.000	104.62	0.000	0.9080	120.0	1.000
A13	21.614	15.00	0.000	2.000	0.000	104.62	0.000	0.7963	120.0	1.000
A11a	21.614	15.00	0.000	2.000	0.000	104.62	0.000	2.561	120.0	1.000
DUM9	21.614	15.00	0.000	2.000	0.000	104.62	0.000	5.730	121.0	5.000
DUM3	21.614	15.00	0.000	2.000	0.000	104.62	0.000	13.186	127.0	1.000
A5	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.418	121.0	1.000
DUM4	21.614	15.00	0.000	2.000	0.000	104.62	0.000	14.581	128.0	1.000
A6	21.614	15.00	0.000	2.000	0.000	104.62	0.000	2.649	120.0	1.000
DUM5	21.614	15.00	0.000	2.000	0.000	104.62	0.000	17.032	129.0	2.000
A14b	21.614	15.00	0.000	2.000	0.000	104.62	0.000	0.5794	120.0	1.000
A14a	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.337	121.0	1.000
DUM6	21.614	15.00	0.000	2.000	0.000	104.62	0.000	18.767	131.0	2.000
A7b	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.562	120.0	1.000
DUM7	21.614	15.00	0.000	2.000	0.000	104.62	0.000	20.034	132.0	8.000
A8	21.614	15.00	0.000	2.000	0.000	104.62	0.000	2.133	122.0	1.000
A9	21.614	15.00	0.000	2.000	0.000	104.62	0.000	2.293	121.0	1.000
A7a	21.614	15.00	0.000	2.000	0.000	104.62	0.000	1.565	120.0	1.000
DUM8	21.614	15.00	0.000	2.000	0.000	104.62	0.000	5.981	122.0	6.000
A15	21.614	15.00	0.000	2.000	0.000	104.62	0.000	7.815	120.0	1.000
A16	21.614	15.00	0.000	2.000	0.000	104.62	0.000	8.399	121.0	1000.
Outlet	21.614	15.00	0.000	2.000	0.000	104.62	0.000	25.457	140.0	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 540.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 249.86
TOTAL OF SECOND SUB-AREAS (ha) = 0.00
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	16.780	15.00	0.000	2.000	0.000	120.28	0.000	3.294	324.0	2.000
A10	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.642	300.0	1.000
DUM1	16.780	15.00	0.000	2.000	0.000	120.28	0.000	4.624	311.0	6.000
A3	16.780	15.00	0.000	2.000	0.000	120.28	0.000	2.179	324.0	2.000
A12a	16.780	15.00	0.000	2.000	0.000	120.28	0.000	0.5707	300.0	1.000
DUM2	16.780	15.00	0.000	2.000	0.000	120.28	0.000	7.240	319.0	4.000
A11b	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.265	301.0	1.000
A12b	16.780	15.00	0.000	2.000	0.000	120.28	0.000	0.7902	300.0	1.000
A13	16.780	15.00	0.000	2.000	0.000	120.28	0.000	0.6902	300.0	1.000
A11a	16.780	15.00	0.000	2.000	0.000	120.28	0.000	2.240	300.0	1.000
DUM9	16.780	15.00	0.000	2.000	0.000	120.28	0.000	4.982	301.0	5.000
DUM3	16.780	15.00	0.000	2.000	0.000	120.28	0.000	11.815	309.0	1.000
A5	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.232	307.0	1.000
DUM4	16.780	15.00	0.000	2.000	0.000	120.28	0.000	13.044	310.0	1.000
A6	16.780	15.00	0.000	2.000	0.000	120.28	0.000	2.295	301.0	1.000
DUM5	16.780	15.00	0.000	2.000	0.000	120.28	0.000	15.231	309.0	2.000
A14b	16.780	15.00	0.000	2.000	0.000	120.28	0.000	0.5057	300.0	1.000
A14a	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.153	304.0	1.000
DUM6	16.780	15.00	0.000	2.000	0.000	120.28	0.000	16.809	311.0	2.000
A7b	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.357	300.0	1.000
DUM7	16.780	15.00	0.000	2.000	0.000	120.28	0.000	17.987	313.0	8.000
A8	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.857	308.0	1.000
A9	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.986	301.0	1.000
A7a	16.780	15.00	0.000	2.000	0.000	120.28	0.000	1.351	301.0	1.000
DUM8	16.780	15.00	0.000	2.000	0.000	120.28	0.000	5.170	302.0	6.000
A15	16.780	15.00	0.000	2.000	0.000	120.28	0.000	6.721	301.0	1.000
A16	16.780	15.00	0.000	2.000	0.000	120.28	0.000	7.225	302.0	1000.
Outlet	16.780	15.00	0.000	2.000	0.000	120.28	0.000	22.910	321.0	0.000

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Oakdale Site - Proposed

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ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area (ha) #1	#2	Slope (%) #1	#2	% Impervious (%) #1	#2	Pern #1	#2	B #1	#2	Link No.
A1	4.370	24.750	1.960	1.960	5.000	100.0	.035	.025	.0408	.0113	1.000
A10	1.770	10.040	6.150	6.150	5.000	100.0	.035	.025	.0144	.0040	2.000
DUM1	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.001
A3	2.910	16.460	1.910	2.150	2.150	100.0	.035	.025	.0377	.0087	3.000
A12a	0.6100	3.480	4.170	4.170	5.000	100.0	.035	.025	.0100	.0028	4.000
DUM2	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.002
A11b	1.420	8.060	3.720	3.720	5.000	100.0	.035	.025	.0165	.0046	5.000
A12b	2.260	3.390	5.000	5.000	5.000	100.0	.035	.025	.0181	.0025	6.000
A13	2.010	3.020	3.640	3.640	5.000	100.0	.035	.025	.0200	.0028	7.000
A11a	2.370	13.460	11.52	11.52	5.000	100.0	.035	.025	.0123	.0034	8.000
DUM9	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	5.001
DUM3	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.003
A5	1.510	8.540	2.200	2.200	5.000	100.0	.035	.025	.0221	.0061	9.000
DUM4	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.004
A6	2.590	14.670	4.760	4.760	5.000	100.0	.035	.025	.0199	.0055	10.00
DUM5	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.005
A14b	1.440	2.170	4.090	4.090	5.000	100.0	.035	.025	.0159	.0022	11.00
A14a	1.380	7.830	2.420	2.420	5.000	100.0	.035	.025	.0201	.0056	12.00
DUM6	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.006
A7b	1.460	8.300	5.830	5.830	5.000	100.0	.035	.025	.0134	.0037	13.00
DUM7	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.007
A8	2.310	13.090	2.390	2.390	5.000	100.0	.035	.025	.0265	.0073	14.00
A9	2.340	13.250	3.260	3.260	5.000	100.0	.035	.025	.0229	.0063	15.00
A7a	1.500	8.480	4.350	4.350	5.000	100.0	.035	.025	.0157	.0043	16.00
DUM8	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	14.00
A15	7.680	43.530	7.180	7.180	5.000	100.0	.035	.025	.0286	.0079	17.00
A16	3.770	0.000	2.530	0.000	5.000	0.000	.035	0.00	.0332	0.000	17.00
Outlet	.00001	0.000	1.000	0.000	0.000	0.000	.060	0.00	.0001	0.000	1.008

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	106.91	15.00	22.00	2.000	0.000	28.980	22.547	12.095	15.00	2.000
A10	106.91	15.00	22.00	2.000	0.000	28.980	22.547	5.904	14.00	1.000
DUM1	106.91	15.00	0.000	2.000	0.000	28.980	0.000	16.479	17.00	6.000
A3	106.91	15.00	22.00	2.000	0.000	28.980	22.547	8.677	15.00	2.000
A12a	106.91	15.00	22.00	2.000	0.000	28.980	22.547	2.071	14.00	1.000
DUM2	106.91	15.00	0.000	2.000	0.000	28.980	0.000	20.153	23.00	4.000
A11b	106.91	15.00	22.00	2.000	0.000	28.980	22.547	4.564	15.00	1.000
A12b	106.91	15.00	22.00	2.000	0.000	28.980	22.547	2.220	14.00	1.000
A13	106.91	15.00	22.00	2.000	0.000	28.980	22.547	1.947	14.00	1.000
A11a	106.91	15.00	22.00	2.000	0.000	28.980	22.547	8.030	14.00	1.000
DUM9	106.91	15.00	0.000	2.000	0.000	28.980	0.000	16.682	15.00	5.000
DUM3	106.91	15.00	0.000	2.000	0.000	28.980	0.000	26.666	21.00	1.000
A5	106.91	15.00	22.00	2.000	0.000	28.980	22.547	4.727	15.00	1.000
DUM4	106.91	15.00	0.000	2.000	0.000	28.980	0.000	28.323	22.00	1.000
A6	106.91	15.00	22.00	2.000	0.000	28.980	22.547	8.372	15.00	1.000
DUM5	106.91	15.00	0.000	2.000	0.000	28.980	0.000	31.200	23.00	2.000
A14b	106.91	15.00	22.00	2.000	0.000	28.980	22.547	1.435	14.00	1.000
A14a	106.91	15.00	22.00	2.000	0.000	28.980	22.547	4.378	15.00	1.000
DUM6	106.91	15.00	0.000	2.000	0.000	28.980	0.000	33.310	25.00	2.000
A7b	106.91	15.00	22.00	2.000	0.000	28.980	22.547	4.894	14.00	1.000
DUM7	106.91	15.00	0.000	2.000	0.000	28.980	0.000	34.464	27.00	8.000
A8	106.91	15.00	22.00	2.000	0.000	28.980	22.547	7.161	15.00	1.000
A9	106.91	15.00	22.00	2.000	0.000	28.980	22.547	7.481	15.00	1.000
A7a	106.91	15.00	22.00	2.000	0.000	28.980	22.547	4.840	14.00	1.000
DUM8	106.91	15.00	0.000	2.000	0.000	28.980	0.000	19.438	16.00	6.000
A15	106.91	15.00	22.00	2.000	0.000	28.980	22.547	24.752	15.00	1.000
A16	106.91	15.00	0.000	2.000	0.000	28.980	0.000	25.268	16.00	1000.
Outlet	106.91	15.00	0.000	2.000	0.000	28.980	0.000	37.607	34.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 45.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	77.485	15.00	22.00	2.000	0.000	41.981	36.114	8.969	20.00	2.000
A10	77.485	15.00	22.00	2.000	0.000	41.981	36.114	4.044	17.00	1.000
DUM1	77.485	15.00	0.000	2.000	0.000	41.981	0.000	12.607	21.00	6.000
A3	77.485	15.00	22.00	2.000	0.000	41.981	36.114	5.948	19.00	2.000
A12a	77.485	15.00	22.00	2.000	0.000	41.981	36.114	1.437	17.00	1.000
DUM2	77.485	15.00	0.000	2.000	0.000	41.981	0.000	16.987	27.00	4.000
A11b	77.485	15.00	22.00	2.000	0.000	41.981	36.114	3.137	18.00	1.000
A12b	77.485	15.00	22.00	2.000	0.000	41.981	36.114	1.688	20.00	1.000
A13	77.485	15.00	22.00	2.000	0.000	41.981	36.114	1.406	20.00	1.000
A11a	77.485	15.00	22.00	2.000	0.000	41.981	36.114	5.697	17.00	1.000
DUM9	77.485	15.00	0.000	2.000	0.000	41.981	0.000	11.596	18.00	5.000
DUM3	77.485	15.00	0.000	2.000	0.000	41.981	0.000	24.472	32.00	1.000
A5	77.485	15.00	22.00	2.000	0.000	41.981	36.114	3.168	19.00	1.000
DUM4	77.485	15.00	0.000	2.000	0.000	41.981	0.000	26.379	33.00	1.000
A6	77.485	15.00	22.00	2.000	0.000	41.981	36.114	5.628	18.00	1.000
DUM5	77.485	15.00	0.000	2.000	0.000	41.981	0.000	29.549	33.00	2.000
A14b	77.485	15.00	22.00	2.000	0.000	41.981	36.114	1.047	20.00	1.000
A14a	77.485	15.00	22.00	2.000	0.000	41.981	36.114	2.943	18.00	1.000
DUM6	77.485	15.00	0.000	2.000	0.000	41.981	0.000	31.668	35.00	2.000
A7b	77.485	15.00	22.00	2.000	0.000	41.981	36.114	3.344	17.00	1.000
DUM7	77.485	15.00	0.000	2.000	0.000	41.981	0.000	33.137	37.00	8.000
A8	77.485	15.00	22.00	2.000	0.000	41.981	36.114	4.857	19.00	1.000
A9	77.485	15.00	22.00	2.000	0.000	41.981	36.114	4.998	18.00	1.000
A7a	77.485	15.00	22.00	2.000	0.000	41.981	36.114	3.296	18.00	1.000
DUM8	77.485	15.00	0.000	2.000	0.000	41.981	0.000	12.960	19.00	6.000
A15	77.485	15.00	22.00	2.000	0.000	41.981	36.114	16.723	18.00	1.000
A16	77.485	15.00	0.000	2.000	0.000	41.981	0.000	17.087	19.00	1000.
Outlet	77.485	15.00	0.000	2.000	0.000	41.981	0.000	38.776	45.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	65.606	15.00	22.00	2.000	0.000	49.040	43.606	12.280	25.00	2.000
A10	65.606	15.00	22.00	2.000	0.000	49.040	43.606	5.332	24.00	1.000
DUM1	65.606	15.00	0.000	2.000	0.000	49.040	0.000	17.202	26.00	6.000
A3	65.606	15.00	22.00	2.000	0.000	49.040	43.606	8.174	25.00	2.000
A12a	65.606	15.00	22.00	2.000	0.000	49.040	43.606	1.849	25.00	1.000
DUM2	65.606	15.00	0.000	2.000	0.000	49.040	0.000	22.287	32.00	4.000
A11b	65.606	15.00	22.00	2.000	0.000	49.040	43.606	4.185	25.00	1.000
A12b	65.606	15.00	22.00	2.000	0.000	49.040	43.606	2.256	25.00	1.000
A13	65.606	15.00	22.00	2.000	0.000	49.040	43.606	1.939	25.00	1.000
A11a	65.606	15.00	22.00	2.000	0.000	49.040	43.606	7.309	25.00	1.000
DUM9	65.606	15.00	0.000	2.000	0.000	49.040	0.000	15.689	26.00	5.000
DUM3	65.606	15.00	0.000	2.000	0.000	49.040	0.000	30.837	36.00	1.000
A5	65.606	15.00	22.00	2.000	0.000	49.040	43.606	4.340	25.00	1.000
DUM4	65.606	15.00	0.000	2.000	0.000	49.040	0.000	32.770	37.00	1.000
A6	65.606	15.00	22.00	2.000	0.000	49.040	43.606	7.656	25.00	1.000
DUM5	65.606	15.00	0.000	2.000	0.000	49.040	0.000	35.596	38.00	2.000
A14b	65.606	15.00	22.00	2.000	0.000	49.040	43.606	1.425	25.00	1.000
A14a	65.606	15.00	22.00	2.000	0.000	49.040	43.606	3.999	25.00	1.000
DUM6	65.606	15.00	0.000	2.000	0.000	49.040	0.000	37.499	40.00	2.000
A7b	65.606	15.00	22.00	2.000	0.000	49.040	43.606	4.409	25.00	1.000
DUM7	65.606	15.00	0.000	2.000	0.000	49.040	0.000	39.057	37.00	8.000
A8	65.606	15.00	22.00	2.000	0.000	49.040	43.606	6.625	25.00	1.000
A9	65.606	15.00	22.00	2.000	0.000	49.040	43.606	6.834	25.00	1.000
A7a	65.606	15.00	22.00	2.000	0.000	49.040	43.606	4.443	25.00	1.000
DUM8	65.606	15.00	0.000	2.000	0.000	49.040	0.000	17.903	26.00	6.000
A15	65.606	15.00	22.00	2.000	0.000	49.040	43.606	22.683	25.00	1.000
A16	65.606	15.00	0.000	2.000	0.000	49.040	0.000	23.370	26.00	1000.
Outlet	65.606	15.00	0.000	2.000	0.000	49.040	0.000	45.276	45.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 90.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	51.341	15.00	22.00	2.000	0.000	59.445	55.011	13.181	30.00	2.000
A10	51.341	15.00	22.00	2.000	0.000	59.445	55.011	5.693	28.00	1.000
DUM1	51.341	15.00	0.000	2.000	0.000	59.445	0.000	18.319	31.00	6.000
A3	51.341	15.00	22.00	2.000	0.000	59.445	55.011	8.779	30.00	2.000
A12a	51.341	15.00	22.00	2.000	0.000	59.445	55.011	1.978	28.00	1.000
DUM2	51.341	15.00	0.000	2.000	0.000	59.445	0.000	22.019	37.00	4.000
A11b	51.341	15.00	22.00	2.000	0.000	59.445	55.011	4.512	29.00	1.000
A12b	51.341	15.00	22.00	2.000	0.000	59.445	55.011	2.467	30.00	1.000
A13	51.341	15.00	22.00	2.000	0.000	59.445	55.011	2.136	30.00	1.000
A11a	51.341	15.00	22.00	2.000	0.000	59.445	55.011	7.741	28.00	1.000
DUM9	51.341	15.00	0.000	2.000	0.000	59.445	0.000	16.826	31.00	5.000
DUM3	51.341	15.00	0.000	2.000	0.000	59.445	0.000	36.202	36.00	1.000
A5	51.341	15.00	22.00	2.000	0.000	59.445	55.011	4.671	30.00	1.000
DUM4	51.341	15.00	0.000	2.000	0.000	59.445	0.000	37.770	37.00	1.000
A6	51.341	15.00	22.00	2.000	0.000	59.445	55.011	8.193	30.00	1.000
DUM5	51.341	15.00	0.000	2.000	0.000	59.445	0.000	40.452	38.00	2.000
A14b	51.341	15.00	22.00	2.000	0.000	59.445	55.011	1.582	30.00	1.000
A14a	51.341	15.00	22.00	2.000	0.000	59.445	55.011	4.298	30.00	1.000
DUM6	51.341	15.00	0.000	2.000	0.000	59.445	0.000	42.471	40.00	2.000
A7b	51.341	15.00	22.00	2.000	0.000	59.445	55.011	4.702	28.00	1.000
DUM7	51.341	15.00	0.000	2.000	0.000	59.445	0.000	43.821	42.00	8.000
A8	51.341	15.00	22.00	2.000	0.000	59.445	55.011	7.150	30.00	1.000
A9	51.341	15.00	22.00	2.000	0.000	59.445	55.011	7.319	30.00	1.000
A7a	51.341	15.00	22.00	2.000	0.000	59.445	55.011	4.773	29.00	1.000
DUM8	51.341	15.00	0.000	2.000	0.000	59.445	0.000	19.217	31.00	6.000
A15	51.341	15.00	22.00	2.000	0.000	59.445	55.011	24.288	29.00	1.000
A16	51.341	15.00	0.000	2.000	0.000	59.445	0.000	25.132	30.00	1000.
Outlet	51.341	15.00	0.000	2.000	0.000	59.445	0.000	49.091	50.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 120.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	42.988	15.00	22.00	2.000	0.000	67.644	63.977	12.359	35.00	2.000
A10	42.988	15.00	22.00	2.000	0.000	67.644	63.977	5.405	33.00	1.000
DUM1	42.988	15.00	0.000	2.000	0.000	67.644	0.000	17.273	37.00	6.000
A3	42.988	15.00	22.00	2.000	0.000	67.644	63.977	8.274	35.00	2.000
A12a	42.988	15.00	22.00	2.000	0.000	67.644	63.977	1.884	33.00	1.000
DUM2	42.988	15.00	0.000	2.000	0.000	67.644	0.000	24.304	42.00	4.000
A11b	42.988	15.00	22.00	2.000	0.000	67.644	63.977	4.218	34.00	1.000
A12b	42.988	15.00	22.00	2.000	0.000	67.644	63.977	2.236	35.00	1.000
A13	42.988	15.00	22.00	2.000	0.000	67.644	63.977	1.918	35.00	1.000
A11a	42.988	15.00	22.00	2.000	0.000	67.644	63.977	7.316	33.00	1.000
DUM9	42.988	15.00	0.000	2.000	0.000	67.644	0.000	15.620	36.00	5.000
DUM3	42.988	15.00	0.000	2.000	0.000	67.644	0.000	36.673	46.00	1.000
A5	42.988	15.00	22.00	2.000	0.000	67.644	63.977	4.396	35.00	1.000
DUM4	42.988	15.00	0.000	2.000	0.000	67.644	0.000	38.257	47.00	1.000
A6	42.988	15.00	22.00	2.000	0.000	67.644	63.977	7.750	34.00	1.000
DUM5	42.988	15.00	0.000	2.000	0.000	67.644	0.000	40.508	48.00	2.000
A14b	42.988	15.00	22.00	2.000	0.000	67.644	63.977	1.411	35.00	1.000
A14a	42.988	15.00	22.00	2.000	0.000	67.644	63.977	4.048	35.00	1.000
DUM6	42.988	15.00	0.000	2.000	0.000	67.644	0.000	42.050	50.00	2.000
A7b	42.988	15.00	22.00	2.000	0.000	67.644	63.977	4.464	33.00	1.000
DUM7	42.988	15.00	0.000	2.000	0.000	67.644	0.000	43.056	52.00	8.000
A8	42.988	15.00	22.00	2.000	0.000	67.644	63.977	6.718	35.00	1.000
A9	42.988	15.00	22.00	2.000	0.000	67.644	63.977	6.901	34.00	1.000
A7a	42.988	15.00	22.00	2.000	0.000	67.644	63.977	4.451	34.00	1.000
DUM8	42.988	15.00	0.000	2.000	0.000	67.644	0.000	18.033	36.00	6.000
A15	42.988	15.00	22.00	2.000	0.000	67.644	63.977	22.866	34.00	1.000
A16	42.988	15.00	0.000	2.000	0.000	67.644	0.000	23.480	35.00	1000.
Outlet	42.988	15.00	0.000	2.000	0.000	67.644	0.000	47.383	60.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 180.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	33.376	15.00	22.00	2.000	0.000	79.895	78.128	7.181	45.00	2.000
A10	33.376	15.00	22.00	2.000	0.000	79.895	78.128	3.061	45.00	1.000
DUM1	33.376	15.00	0.000	2.000	0.000	79.895	0.000	10.197	46.00	6.000
A3	33.376	15.00	22.00	2.000	0.000	79.895	78.128	4.756	45.00	2.000
A12a	33.376	15.00	22.00	2.000	0.000	79.895	78.128	1.060	45.00	1.000
DUM2	33.376	15.00	0.000	2.000	0.000	79.895	0.000	15.625	46.00	4.000
A11b	33.376	15.00	22.00	2.000	0.000	79.895	78.128	2.447	45.00	1.000
A12b	33.376	15.00	22.00	2.000	0.000	79.895	78.128	1.446	45.00	1.000
A13	33.376	15.00	22.00	2.000	0.000	79.895	78.128	1.278	45.00	1.000
A11a	33.376	15.00	22.00	2.000	0.000	79.895	78.128	4.106	44.00	1.000
DUM9	33.376	15.00	0.000	2.000	0.000	79.895	0.000	9.277	46.00	5.000
DUM3	33.376	15.00	0.000	2.000	0.000	79.895	0.000	24.884	50.00	1.000
A5	33.376	15.00	22.00	2.000	0.000	79.895	78.128	2.551	45.00	1.000
DUM4	33.376	15.00	0.000	2.000	0.000	79.895	0.000	26.044	49.00	1.000
A6	33.376	15.00	22.00	2.000	0.000	79.895	78.128	4.457	45.00	1.000
DUM5	33.376	15.00	0.000	2.000	0.000	79.895	0.000	28.090	48.00	2.000
A14b	33.376	15.00	22.00	2.000	0.000	79.895	78.128	0.9218	45.00	1.000
A14a	33.376	15.00	22.00	2.000	0.000	79.895	78.128	2.351	45.00	1.000
DUM6	33.376	15.00	0.000	2.000	0.000	79.895	0.000	29.667	50.00	2.000
A7b	33.376	15.00	22.00	2.000	0.000	79.895	78.128	2.529	45.00	1.000
DUM7	33.376	15.00	0.000	2.000	0.000	79.895	0.000	30.717	52.00	8.000
A8	33.376	15.00	22.00	2.000	0.000	79.895	78.128	3.913	45.00	1.000
A9	33.376	15.00	22.00	2.000	0.000	79.895	78.128	4.001	45.00	1.000
A7a	33.376	15.00	22.00	2.000	0.000	79.895	78.128	2.581	45.00	1.000
DUM8	33.376	15.00	0.000	2.000	0.000	79.895	0.000	10.495	46.00	6.000
A15	33.376	15.00	22.00	2.000	0.000	79.895	78.128	13.216	45.00	1.000
A16	33.376	15.00	0.000	2.000	0.000	79.895	0.000	13.985	46.00	1000.
Outlet	33.376	15.00	0.000	2.000	0.000	79.895	0.000	35.088	60.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 270.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	25.882	15.00	22.00	2.000	0.000	93.769	94.471	6.425	75.00	2.000
A10	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.702	75.00	1.000
DUM1	25.882	15.00	0.000	2.000	0.000	93.769	0.000	9.099	76.00	6.000
A3	25.882	15.00	22.00	2.000	0.000	93.769	94.471	4.261	75.00	2.000
A12a	25.882	15.00	22.00	2.000	0.000	93.769	94.471	0.9370	75.00	1.000
DUM2	25.882	15.00	0.000	2.000	0.000	93.769	0.000	14.038	76.00	4.000
A11b	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.157	75.00	1.000
A12b	25.882	15.00	22.00	2.000	0.000	93.769	94.471	1.272	75.00	1.000
A13	25.882	15.00	22.00	2.000	0.000	93.769	94.471	1.115	75.00	1.000
A11a	25.882	15.00	22.00	2.000	0.000	93.769	94.471	3.631	75.00	1.000
DUM9	25.882	15.00	0.000	2.000	0.000	93.769	0.000	8.175	76.00	5.000
DUM3	25.882	15.00	0.000	2.000	0.000	93.769	0.000	22.209	81.00	1.000
A5	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.258	75.00	1.000
DUM4	25.882	15.00	0.000	2.000	0.000	93.769	0.000	23.923	82.00	1.000
A6	25.882	15.00	22.00	2.000	0.000	93.769	94.471	3.934	75.00	1.000
DUM5	25.882	15.00	0.000	2.000	0.000	93.769	0.000	26.853	83.00	2.000
A14b	25.882	15.00	22.00	2.000	0.000	93.769	94.471	0.8075	75.00	1.000
A14a	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.076	75.00	1.000
DUM6	25.882	15.00	0.000	2.000	0.000	93.769	0.000	29.050	84.00	2.000
A7b	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.234	75.00	1.000
DUM7	25.882	15.00	0.000	2.000	0.000	93.769	0.000	30.688	86.00	8.000
A8	25.882	15.00	22.00	2.000	0.000	93.769	94.471	3.456	75.00	1.000
A9	25.882	15.00	22.00	2.000	0.000	93.769	94.471	3.531	75.00	1.000
A7a	25.882	15.00	22.00	2.000	0.000	93.769	94.471	2.276	75.00	1.000
DUM8	25.882	15.00	0.000	2.000	0.000	93.769	0.000	9.263	76.00	6.000
A15	25.882	15.00	22.00	2.000	0.000	93.769	94.471	11.648	75.00	1.000
A16	25.882	15.00	0.000	2.000	0.000	93.769	0.000	12.352	76.00	1000.
Outlet	25.882	15.00	0.000	2.000	0.000	93.769	0.000	37.585	94.00	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 360.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	21.614	15.00	22.00	2.000	0.000	104.62	107.69	4.835	120.0	2.000
A10	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.972	120.0	1.000
DUM1	21.614	15.00	0.000	2.000	0.000	104.62	0.000	6.803	121.0	6.000
A3	21.614	15.00	22.00	2.000	0.000	104.62	107.69	3.214	120.0	2.000
A12a	21.614	15.00	22.00	2.000	0.000	104.62	107.69	0.6830	120.0	1.000
DUM2	21.614	15.00	0.000	2.000	0.000	104.62	0.000	10.653	121.0	4.000
A11b	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.583	120.0	1.000
A12b	21.614	15.00	22.00	2.000	0.000	104.62	107.69	0.9355	120.0	1.000
A13	21.614	15.00	22.00	2.000	0.000	104.62	107.69	0.8325	120.0	1.000
A11a	21.614	15.00	22.00	2.000	0.000	104.62	107.69	2.643	114.0	1.000
DUM9	21.614	15.00	0.000	2.000	0.000	104.62	0.000	5.994	121.0	5.000
DUM3	21.614	15.00	0.000	2.000	0.000	104.62	0.000	16.647	125.0	1.000
A5	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.676	120.0	1.000
DUM4	21.614	15.00	0.000	2.000	0.000	104.62	0.000	18.231	121.0	1.000
A6	21.614	15.00	22.00	2.000	0.000	104.62	107.69	2.882	120.0	1.000
DUM5	21.614	15.00	0.000	2.000	0.000	104.62	0.000	21.089	121.0	2.000
A14b	21.614	15.00	22.00	2.000	0.000	104.62	107.69	0.5977	120.0	1.000
A14a	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.537	120.0	1.000
DUM6	21.614	15.00	0.000	2.000	0.000	104.62	0.000	23.165	121.0	2.000
A7b	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.630	120.0	1.000
DUM7	21.614	15.00	0.000	2.000	0.000	104.62	0.000	24.724	121.0	8.000
A8	21.614	15.00	22.00	2.000	0.000	104.62	107.69	2.567	120.0	1.000
A9	21.614	15.00	22.00	2.000	0.000	104.62	107.69	2.602	120.0	1.000
A7a	21.614	15.00	22.00	2.000	0.000	104.62	107.69	1.666	120.0	1.000
DUM8	21.614	15.00	0.000	2.000	0.000	104.62	0.000	6.836	121.0	6.000
A15	21.614	15.00	22.00	2.000	0.000	104.62	107.69	8.551	120.0	1.000
A16	21.614	15.00	0.000	2.000	0.000	104.62	0.000	9.153	120.0	1000.
Outlet	21.614	15.00	0.000	2.000	0.000	104.62	0.000	31.462	127.0	0.000

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 540.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2 (mm)	Cont. Loss #1 (mm/h)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Excess Rain #2 (mm)	Peak Inflow (m^3/s)	Time to Peak	Link Lag mins
A1	16.780	15.00	22.00	2.000	0.000	120.28	129.02	4.243	300.0	2.000
A10	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.734	300.0	1.000
DUM1	16.780	15.00	0.000	2.000	0.000	120.28	0.000	5.971	301.0	6.000
A3	16.780	15.00	22.00	2.000	0.000	120.28	129.02	2.815	300.0	2.000
A12a	16.780	15.00	22.00	2.000	0.000	120.28	129.02	0.6004	300.0	1.000
DUM2	16.780	15.00	0.000	2.000	0.000	120.28	0.000	9.341	301.0	4.000
A11b	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.391	300.0	1.000
A12b	16.780	15.00	22.00	2.000	0.000	120.28	129.02	0.8213	300.0	1.000
A13	16.780	15.00	22.00	2.000	0.000	120.28	129.02	0.7304	300.0	1.000
A11a	16.780	15.00	22.00	2.000	0.000	120.28	129.02	2.324	298.0	1.000
DUM9	16.780	15.00	0.000	2.000	0.000	120.28	0.000	5.267	301.0	5.000
DUM3	16.780	15.00	0.000	2.000	0.000	120.28	0.000	14.607	305.0	1.000
A5	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.472	300.0	1.000
DUM4	16.780	15.00	0.000	2.000	0.000	120.28	0.000	15.989	301.0	1.000
A6	16.780	15.00	22.00	2.000	0.000	120.28	129.02	2.533	300.0	1.000
DUM5	16.780	15.00	0.000	2.000	0.000	120.28	0.000	18.494	301.0	2.000
A14b	16.780	15.00	22.00	2.000	0.000	120.28	129.02	0.5247	300.0	1.000
A14a	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.350	300.0	1.000
DUM6	16.780	15.00	0.000	2.000	0.000	120.28	0.000	20.308	301.0	2.000
A7b	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.433	300.0	1.000
DUM7	16.780	15.00	0.000	2.000	0.000	120.28	0.000	21.667	301.0	8.000
A8	16.780	15.00	22.00	2.000	0.000	120.28	129.02	2.255	300.0	1.000
A9	16.780	15.00	22.00	2.000	0.000	120.28	129.02	2.287	300.0	1.000
A7a	16.780	15.00	22.00	2.000	0.000	120.28	129.02	1.465	300.0	1.000
DUM8	16.780	15.00	0.000	2.000	0.000	120.28	0.000	6.006	301.0	6.000
A15	16.780	15.00	22.00	2.000	0.000	120.28	129.02	7.516	300.0	1.000
A16	16.780	15.00	0.000	2.000	0.000	120.28	0.000	8.040	300.0	1000.
Outlet	16.780	15.00	0.000	2.000	0.000	120.28	0.000	27.585	307.0	0.000

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Oakdale Site – Proposed OSD

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ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	15.00	12.09	28.00	2.393	6828.4	0.0000	4274.1	0.5871
A10	14.00	5.903	27.00	1.069	2767.2	0.0000	1910.7	0.6470
A3	15.00	8.676	27.00	1.587	4545.2	0.0000	2834.2	0.5852
A12a	14.00	2.070	26.00	.3724	961.60	0.0000	664.78	0.6498
A11b	15.00	4.564	27.00	.8471	2229.1	0.0000	1512.9	0.6383
A12b	14.00	2.219	27.00	.5026	1410.0	0.0000	897.83	0.6354
A13	14.00	1.946	28.00	.4375	1266.4	0.0000	781.87	0.6215
A11a	14.00	8.030	26.00	1.462	3719.1	0.0000	2611.6	0.6598
A5	15.00	4.727	27.00	.8663	2366.3	0.0000	1547.2	0.6157
A6	15.00	8.371	27.00	1.536	4047.3	0.0000	2744.7	0.6361
A14b	14.00	1.435	27.00	.3249	909.73	0.0000	580.96	0.6434
A14a	15.00	4.377	27.00	.8022	2168.4	0.0000	1433.3	0.6224
A7b	14.00	4.894	26.00	.8870	2290.8	0.0000	1584.3	0.6493
A8	15.00	7.161	27.00	1.315	3621.0	0.0000	2349.4	0.6102
A9	15.00	7.481	27.00	1.362	3661.5	0.0000	2432.2	0.6240
A7a	14.00	4.840	27.00	.8974	2346.3	0.0000	1602.7	0.6424
A16	16.00	25.27	28.00	4.799	13115.7	0.0000	8572.0	0.6236

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 45.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	20.00	8.969	43.00	3.202	10756.4	0.0000	5717.5	0.7854
A10	17.00	4.044	41.00	1.359	4364.6	0.0000	2428.8	0.8225
A3	19.00	5.948	42.00	2.120	7149.0	0.0000	3787.4	0.7820
A12a	17.00	1.437	41.00	.4700	1512.3	0.0000	839.12	0.8203
A11b	18.00	3.136	41.00	1.083	3500.0	0.0000	1934.4	0.8162
A12b	20.00	1.687	42.00	.6503	2172.0	0.0000	1161.7	0.8222
A13	20.00	1.406	42.00	.5739	1938.4	0.0000	1025.6	0.8153
A11a	17.00	5.696	41.00	1.832	5850.4	0.0000	3272.3	0.8268
A5	19.00	3.167	42.00	1.130	3710.0	0.0000	2019.3	0.8035
A6	18.00	5.627	41.00	1.968	6373.0	0.0000	3515.5	0.8147
A14b	20.00	1.047	42.00	.4166	1386.8	0.0000	745.02	0.8250
A14a	18.00	2.943	42.00	1.040	3399.7	0.0000	1859.1	0.8073
A7b	17.00	3.344	41.00	1.125	3609.7	0.0000	2010.1	0.8238
A8	19.00	4.857	42.00	1.723	5678.3	0.0000	3077.3	0.7993
A9	18.00	4.998	42.00	1.765	5765.0	0.0000	3152.8	0.8088
A7a	18.00	3.296	41.00	1.144	3690.4	0.0000	2044.3	0.8194
A16	19.00	17.09	43.00	6.223	20475.3	0.0000	11114.5	0.8086

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	25.00	12.28	46.00	3.459	12911.1	0.0000	6177.7	0.8486
A10	24.00	5.332	42.00	1.467	5245.2	0.0000	2622.1	0.8880
A3	25.00	8.174	46.00	2.294	8592.5	0.0000	4096.7	0.8459
A12a	25.00	1.849	42.00	.5077	1816.0	0.0000	906.40	0.8860
A11b	25.00	4.185	43.00	1.169	4208.1	0.0000	2089.2	0.8815
A12b	25.00	2.256	45.00	.7040	2589.0	0.0000	1257.5	0.8900
A13	25.00	1.938	46.00	.6205	2304.6	0.0000	1108.7	0.8813
A11a	25.00	7.308	41.00	1.977	7025.7	0.0000	3532.0	0.8924
A5	25.00	4.339	45.00	1.223	4465.0	0.0000	2184.5	0.8693
A6	25.00	7.656	43.00	2.127	7663.8	0.0000	3799.2	0.8805
A14b	25.00	1.424	45.00	.4515	1655.0	0.0000	807.35	0.8941
A14a	25.00	3.999	44.00	1.125	4091.9	0.0000	2010.7	0.8731
A7b	25.00	4.409	42.00	1.213	4332.7	0.0000	2168.2	0.8886
A8	25.00	6.625	45.00	1.863	6832.9	0.0000	3326.8	0.8641
A9	25.00	6.834	44.00	1.904	6919.4	0.0000	3400.7	0.8724
A7a	25.00	4.443	43.00	1.235	4432.4	0.0000	2205.9	0.8841
A16	26.00	23.37	46.00	6.732	24590.5	0.0000	12022.9	0.8746

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 90.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	30.00	13.18	47.00	3.452	16202.0	0.0000	6165.3	0.8469
A10	28.00	5.692	43.00	1.467	6571.3	0.0000	2621.1	0.8876
A3	30.00	8.778	47.00	2.283	10762.8	0.0000	4077.6	0.8420
A12a	28.00	1.978	42.00	.5081	2276.6	0.0000	907.11	0.8867
A11b	29.00	4.511	44.00	1.168	5271.9	0.0000	2086.6	0.8804
A12b	30.00	2.467	45.00	.7034	3207.7	0.0000	1256.5	0.8892
A13	30.00	2.135	46.00	.6193	2855.6	0.0000	1106.6	0.8796
A11a	28.00	7.741	42.00	1.980	8809.9	0.0000	3537.1	0.8937
A5	30.00	4.671	46.00	1.220	5594.5	0.0000	2180.0	0.8675
A6	30.00	8.192	43.00	2.127	9609.2	0.0000	3799.9	0.8806
A14b	30.00	1.581	46.00	.4510	2050.5	0.0000	806.38	0.8930
A14a	30.00	4.297	45.00	1.123	5126.5	0.0000	2007.1	0.8715
A7b	28.00	4.701	42.00	1.214	5433.2	0.0000	2169.5	0.8891
A8	30.00	7.150	46.00	1.858	8561.2	0.0000	3319.2	0.8621
A9	30.00	7.319	45.00	1.902	8670.9	0.0000	3396.9	0.8715
A7a	29.00	4.772	43.00	1.234	5553.2	0.0000	2204.3	0.8835
A16	30.00	25.13	46.00	6.725	30737.7	0.0000	12010.8	0.8738

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 120.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	35.00	12.36	49.00	3.563	18780.7	0.0000	6362.1	0.8739
A10	33.00	5.405	47.00	1.545	7619.8	0.0000	2760.8	0.9349
A3	35.00	8.273	49.00	2.362	12494.1	0.0000	4218.6	0.8711
A12a	33.00	1.883	47.00	.5365	2638.1	0.0000	957.77	0.9362
A11b	34.00	4.218	47.00	1.225	6116.8	0.0000	2188.2	0.9233
A12b	35.00	2.235	49.00	.7277	3698.2	0.0000	1300.0	0.9200
A13	35.00	1.918	51.00	.6360	3292.9	0.0000	1136.4	0.9033
A11a	33.00	7.315	46.00	2.093	10205.9	0.0000	3738.3	0.9445
A5	35.00	4.395	48.00	1.268	6485.7	0.0000	2265.7	0.9016
A6	34.00	7.749	47.00	2.232	11133.1	0.0000	3986.5	0.9239
A14b	35.00	1.410	50.00	.4652	2363.7	0.0000	831.75	0.9211
A14a	35.00	4.048	48.00	1.169	5943.6	0.0000	2090.0	0.9075
A7b	33.00	4.464	47.00	1.277	6295.4	0.0000	2282.3	0.9354
A8	35.00	6.718	48.00	1.937	9936.9	0.0000	3459.0	0.8984
A9	34.00	6.900	48.00	1.989	10058.8	0.0000	3552.8	0.9115
A7a	34.00	4.451	47.00	1.295	6438.1	0.0000	2313.4	0.9272
A16	35.00	23.48	49.00	6.983	35578.7	0.0000	12472.2	0.9073

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 180.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	45.00	7.181	78.00	3.214	22811.7	0.0000	5739.5	0.7884
A10	45.00	3.061	76.00	1.324	9254.6	0.0000	2366.9	0.8015
A3	45.00	4.755	77.00	2.139	15175.6	0.0000	3819.9	0.7888
A12a	45.00	1.060	76.00	.4582	3205.0	0.0000	818.06	0.7997
A11b	45.00	2.447	77.00	1.061	7430.1	0.0000	1895.2	0.7997
A12b	45.00	1.446	77.00	.6305	4453.7	0.0000	1126.3	0.7971
A13	45.00	1.278	77.00	.5604	3967.4	0.0000	1001.4	0.7960
A11a	44.00	4.106	76.00	1.781	12406.5	0.0000	3181.3	0.8038
A5	45.00	2.550	77.00	1.120	7879.9	0.0000	2001.0	0.7962
A6	45.00	4.457	77.00	1.929	13524.2	0.0000	3446.6	0.7988
A14b	45.00	.9218	77.00	.4035	2845.6	0.0000	721.47	0.7990
A14a	45.00	2.350	77.00	1.027	7220.9	0.0000	1836.2	0.7973
A7b	45.00	2.529	76.00	1.095	7647.1	0.0000	1956.5	0.8019
A8	45.00	3.913	77.00	1.713	12067.3	0.0000	3059.1	0.7946
A9	45.00	4.001	77.00	1.739	12218.5	0.0000	3106.2	0.7969
A7a	45.00	2.580	77.00	1.118	7823.1	0.0000	1997.0	0.8004
A16	46.00	13.98	78.00	6.129	43144.2	0.0000	10946.3	0.7963

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 270.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	75.00	6.424	92.00	3.656	27476.4	0.0000	6528.5	0.8968
A10	75.00	2.702	91.00	1.533	11140.1	0.0000	2739.7	0.9278
A3	75.00	4.261	92.00	2.430	18274.7	0.0000	4340.9	0.8963
A12a	75.00	.9370	91.00	.5313	3859.0	0.0000	948.62	0.9273
A11b	75.00	2.156	91.00	1.224	8943.4	0.0000	2187.6	0.9230
A12b	75.00	1.272	91.00	.7226	5320.3	0.0000	1290.8	0.9135
A13	75.00	1.114	92.00	.6388	4738.8	0.0000	1141.5	0.9074
A11a	75.00	3.631	91.00	2.065	14935.6	0.0000	3689.7	0.9322
A5	75.00	2.257	92.00	1.285	9483.5	0.0000	2295.5	0.9135
A6	75.00	3.933	91.00	2.227	16281.6	0.0000	3978.7	0.9221
A14b	75.00	.8075	92.00	.4627	3400.3	0.0000	827.35	0.9162
A14a	75.00	2.076	92.00	1.181	8690.3	0.0000	2110.5	0.9164
A7b	75.00	2.233	91.00	1.268	9207.6	0.0000	2266.0	0.9287
A8	75.00	3.455	92.00	1.962	14529.8	0.0000	3503.7	0.9100
A9	75.00	3.531	92.00	2.000	14709.2	0.0000	3571.4	0.9162
A7a	75.00	2.275	91.00	1.292	9416.0	0.0000	2307.7	0.9249
A16	76.00	12.35	93.00	7.038	51846.6	0.0000	12569.1	0.9144

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 360.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	120.0	4.835	129.0	3.332	31220.5	0.0000	5950.9	0.8174
A10	120.0	1.972	123.0	1.383	12661.2	0.0000	2472.2	0.8372
A3	120.0	3.213	130.0	2.208	20768.0	0.0000	3943.6	0.8143
A12a	120.0	.6830	123.0	.4790	4384.2	0.0000	855.17	0.8359
A11b	120.0	1.582	124.0	1.106	10163.1	0.0000	1975.7	0.8336
A12b	120.0	.9355	130.0	.6533	6014.7	0.0000	1166.9	0.8259
A13	120.0	.8325	132.0	.5791	5354.5	0.0000	1034.9	0.8226
A11a	114.0	2.643	123.0	1.861	16968.6	0.0000	3325.5	0.8402
A5	120.0	1.676	126.0	1.162	10773.4	0.0000	2076.9	0.8265
A6	120.0	2.882	124.0	2.011	18504.3	0.0000	3593.2	0.8327
A14b	120.0	.5977	130.0	.4182	3843.2	0.0000	747.79	0.8281
A14a	120.0	1.536	125.0	1.068	9872.9	0.0000	1908.1	0.8285
A7b	120.0	1.629	123.0	1.144	10462.7	0.0000	2044.1	0.8377
A8	120.0	2.452	126.0	1.697	15769.4	0.0000	3031.6	0.8249
A9	120.0	2.360	125.0	1.641	15159.3	0.0000	2931.1	0.8292
A7a	120.0	1.666	124.0	1.166	10699.2	0.0000	2083.1	0.8349
A16	120.0	9.153	128.0	6.357	58836.5	0.0000	11353.0	0.8259

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 540.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 44.24
TOTAL OF SECOND SUB-AREAS (ha) = 205.62
TOTAL OF ALL SUB-AREAS (ha) = 249.86

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m^3/s)	Time to Peak	Peak Outflow (m^3/s)	Total Inflow (m^3)	Basin Vol. Avail	Basin Vol. Used	Basin Stage Used
A1	120.0	4.835	129.0	3.332	31220.5	0.0000	5950.9	0.8174
A10	120.0	1.972	123.0	1.383	12661.2	0.0000	2472.2	0.8372
A3	120.0	3.213	130.0	2.208	20768.0	0.0000	3943.6	0.8143
A12a	120.0	.6830	123.0	.4790	4384.2	0.0000	855.17	0.8359
A11b	120.0	1.582	124.0	1.106	10163.1	0.0000	1975.7	0.8336
A12b	120.0	.9355	130.0	.6533	6014.7	0.0000	1166.9	0.8259
A13	120.0	.8325	132.0	.5791	5354.5	0.0000	1034.9	0.8226
A11a	114.0	2.643	123.0	1.861	16968.6	0.0000	3325.5	0.8402
A5	120.0	1.676	126.0	1.162	10773.4	0.0000	2076.9	0.8265
A6	120.0	2.882	124.0	2.011	18504.3	0.0000	3593.2	0.8327
A14b	120.0	.5977	130.0	.4182	3843.2	0.0000	747.79	0.8281
A14a	120.0	1.536	125.0	1.068	9872.9	0.0000	1908.1	0.8285
A7b	120.0	1.629	123.0	1.144	10462.7	0.0000	2044.1	0.8377
A8	120.0	2.567	126.0	1.776	16509.8	0.0000	3172.6	0.8240
A9	120.0	2.601	125.0	1.808	16713.7	0.0000	3228.9	0.8284
A7a	120.0	1.666	124.0	1.166	10699.2	0.0000	2083.1	0.8349
A16	120.0	9.153	128.0	6.357	58836.5	0.0000	11353.0	0.8259

Appendix D

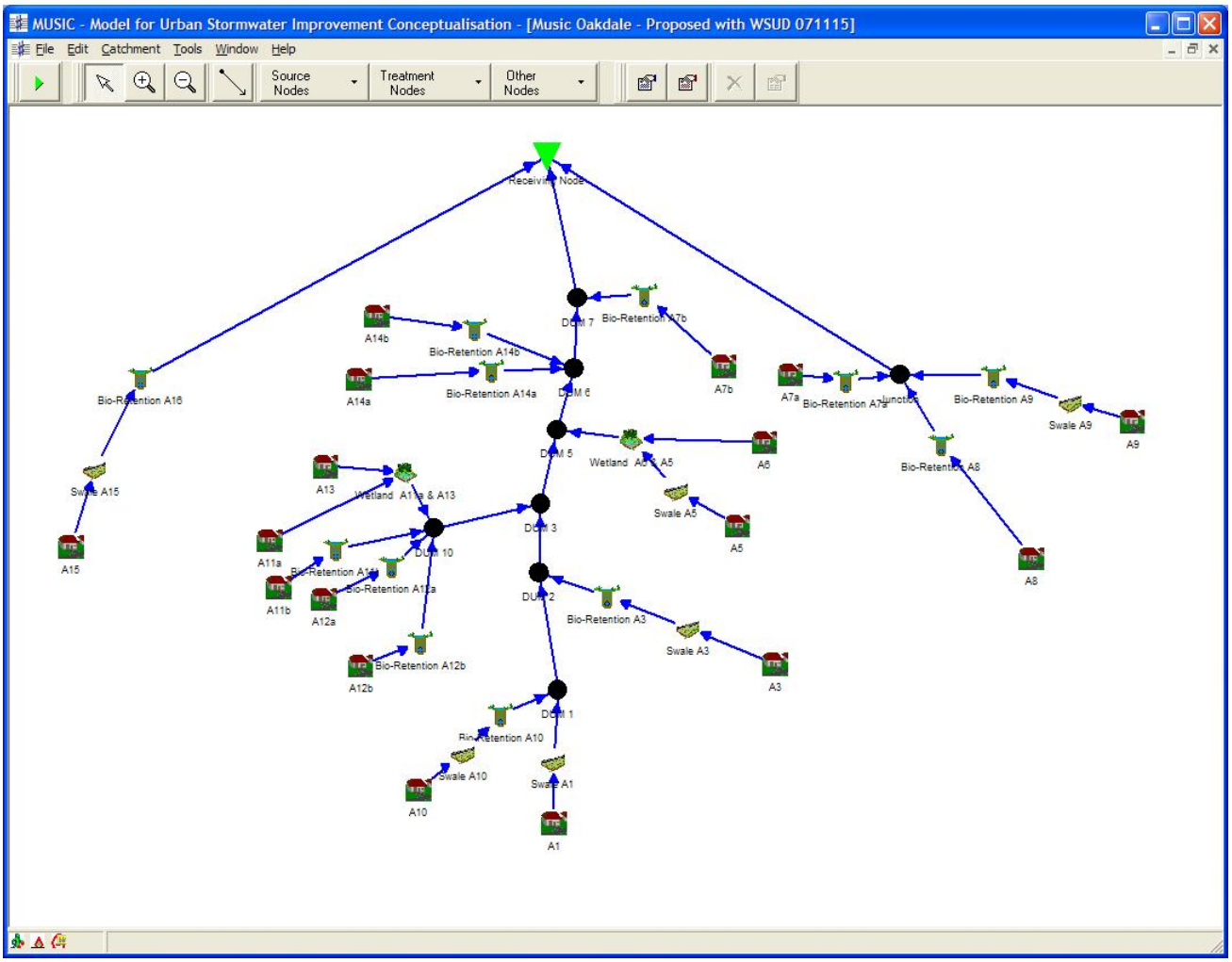
MUSIC Modelling Inputs and Model Network

Table
Oakdale Industrial Estate

Refer Figures for node,sub-catchment area, impervious area and catchment slope details

Subcatch. Node Label	Total Area (ha)	Lot Area (ha)	Roof Area (ha)	MUSIC Model Catch Area (ha)	% of Impervious	Bio-Retention Surface area 0.02 m^2	Bio-Retention Filter area 0.017 m^2	Wetland Area 0.05 m^2	Required Storage Volume m^3	Land Area Required m^2	Vegetated Swale Length m
A1	29.12	26.8	16.08	13.04	60				7280		600
A3	19.37	15.88	9.528	9.842	70	1968	1673		4843	**8400**	450
A5	10.05	8.71	5.226	4.824	70	965	820	2412	2513	**5800**	60
A6	17.26	13.808	8.2848	8.9752	70	1795	1526	4488	4315	**8000**	
A7a	9.98	7.984	4.7904	5.1896	70	1038	882		2495	**5800**	
A7b	9.76	7.808	4.6848	5.0752	70	1015	863		2440	**4900**	
A8	15.4	12.32	7.392	8.008	70	1602	1361		3850	**7700**	400
A9	15.59	12.472	7.4832	8.1068	70	1621	1378		3898	**7800**	
A10	11.81	10.14	6.084	5.726	70	1145	973		2953	**5100**	50
A11a	15.83	15.83	9.498	6.332	70			3166	3958	**8100**	
A11b	9.48	9.48	5.688	3.792	70	758	645		2370	**4800**	
A12a	4.09	2.5	1.5	2.59	70	518	440		1023	**2800**	
A12b	5.65	0	0	5.65	50	1130	961		1413	**3900**	
A13	5.03	0	0	5.03	50			2515	1258	**2800**	
A14a	9.21	6.57	3.942	5.268	70	1054	896		2303	**4200**	320
A14b	3.61	0	0	3.61	50	722	614		903	**1700**	
A15	51.21	47.57	28.542	22.668	70	4534	3854	11334	12803	**17000**	100
A16	3.77	3.77			0						
A17	3.56	1.44	0.864	2.696	70	539	458		890	**3000**	
Total Area	**249.78**	**203.08**	**119.59**	**126.42**		**20404**	**17344**	**23915**		**101800**	**1980**

MUSIC Model Configuration - Proposed with WSUD



Appendix E

WSUD Strategy Plan

Water Sensitive Urban Design Strategy Plan

Integrated Water Cycle Management Diagram

M7 Hub

M7 MOTORWAY

Mamre Road

HORSLEY PARK

Structure Plan Area

Oakdale Site Boundary

Bio-Retention Swale

Bio-Retention Basin

Pipe System

Site Based Bio-Retention and OSD

Channel

0 200 1000

design+

Oakdale

Eastern Creek

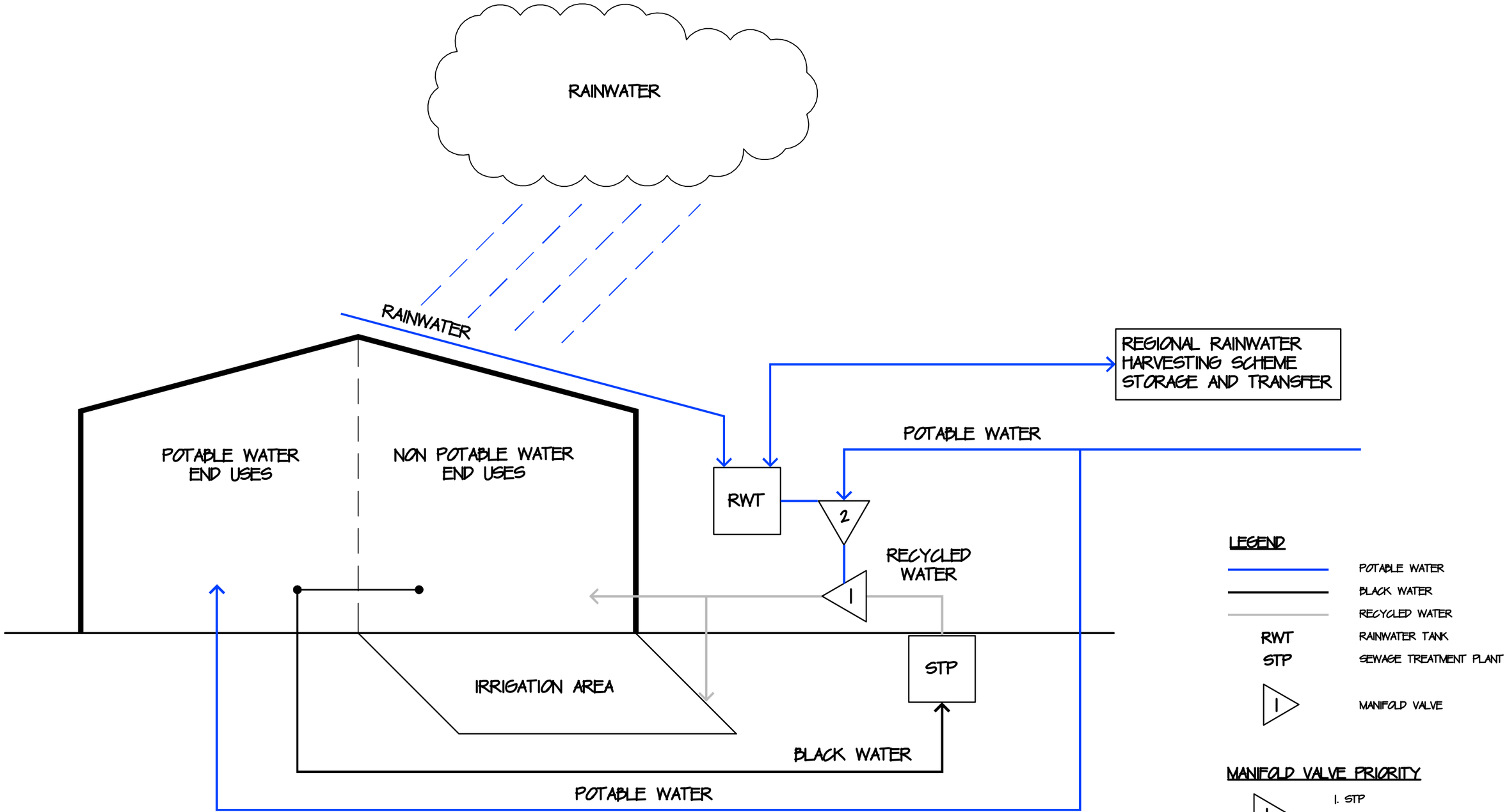
Design Masterplan

0 200 1000

1:10000 @ A1
1:20000 @ A3

4 Sep 07 AL

SP SK36 (D)



LEGEND

- POTABLE WATER
- BLACK WATER
- RECYCLED WATER
- RWT — RAINWATER TANK
- STP — SEWAGE TREATMENT PLANT
- 1 — MANIFOLD VALVE

MANIFOLD VALVE PRIORITY

1
1. STP
2. RWT

2
2. RWT
3. POTABLE WATER

GHD CLIENTS | PEOPLE | PERFORMANCE

GOODMAN INTERNATIONAL LTD
OAKDALE CONCEPT PLAN
PROPOSED SERVICING STRATEGY (LOT SCALE)
scale | NTS for A3 date | DECEMBER 2007

job no. | 21-15101
rev no. | B

Figure 03

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Plot Date: 10 December, 2007 - 7:43 PM Cad File No: G:\21\15101\CADD\Drawings\21-15101-SK006-SEWERFIG3.dwg

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Working Draft 1	C McDougall					14/6/07
Working Draft 2	C McDougall	R Berg	On File	C McDougall	On file	10/07/07
Working Draft 3	C McDougall	R Berg	On File	C McDougall	On file	19/07/07
Rev 0	C McDougall	R Berg	On File	C McDougall	On File	10/12/07
Rev 1	C McDougall	C. McDougall	On File	C McDougall	On File	08/05/08
Rev 2	F. Carrozza	F.Carrozza	On File	C.McDougall	On File	02/09/10
Rev 3	F. Carrozza	F.Carrozza	On File	C.McDougall	On File	10/09/10

Appendix F

PSM Earthworks Specification

Appendix G

PSM Road Pavement Design

Appendix H

GHD Project Approval Soil and Water Management Plan

CLIENTS | PEOPLE | PERFORMANCE

Goodman International Ltd

Oakdale Central (East)

Estate Works and DHL Project Application No. 1

Soil and Water Management Plan

September 2010

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Appendices

A Erosion and Sediment Control Plans

1. Introduction

The Soil and Water Management Plan (SWMP) outlines how soil and water issues are to be identified, planned, managed and monitored during the construction period. The SWMP addresses erosion, sedimentation, water pollution, fuel and chemical storage management and outlines measures to minimise adverse impact on the riparian environment.

This Soil and Water Management Plan relates to the staged construction of the bulk earthworks associated with the Oakdale Central (East) Precinct Estate Works including Pads 1A and 2A (DHL).

This Soil and Water Management Plan shall be read in conjunction with the Erosion and Sediment Control Plan (ESCP) included in Appendix A.

The plan should be updated by the Contractor and incorporated into the Contractor's Environmental Management Plan (CEMP).

2. Purpose and Objectives

The primary purpose of the SWMP is to integrate management processes in order to minimise erosion, control movement of sediments and other contaminants and limit the impact of construction activities on the aquatic and riparian environments adjacent to and downstream of the works.

The key objectives of the plan are:

- Identification of activities that may contribute to erosion, sedimentation and water quality impacts;
- Minimisation of adverse water quality and sedimentation impacts by the construction operations on the riparian environment adjacent to and downstream of the works through the implementation of industry best management practices; and
- Provision of organised, integrated and systematic processes that effectively manage erosion, sedimentation and water quality during the term of the project.

3. Reference Documents

The following documents shall be referred to and complied with during the bulk earthworks associated with the Central (East) Precinct Estate Works including Pads 1A and 2A (DHL):

- NSW Department of Housing: Managing Urban Stormwater: Soils and Construction (2004) (Blue Book)
- NSW Department of Conservation and Land Management: Urban Erosion and Sediment Control (1992) Hunt, J.S. (ed.)
- Fairfield City Council Works Specification
- ANZECC (2000): Water Quality Guidelines
- EPA Bunding and Spill Management Guidelines
- AS/NZS5667-1998: Water Quality Sampling Guidelines
- AS1940-2004: The Storage and Handling of Flammable and Combustible Liquids.
- AS2430-2004: Classification of Hazardous Areas
- AS3773-1990: Bulk Solids Containers
- AS3780-1994: The Storage and Handling of Corrosive Substances
- AS4084-1993: Steel Storage Racking
- AS4332-2004: The Storage and Handling of Gases In Cylinders
- AS4452-1997: The Storage and Handling of Toxic Substances

4. Project Issues

4.1 Sources of Pollution

The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods;
- Work areas that have not been stabilised;
- Extraction of construction water from waterways during low rainfall periods;
- Clearing of vegetation and the methods adopted, particularly in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Bulk earthworks and construction of pavements;
- Works within drainage paths, including depressions and waterways;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals;
- Maintenance of plant and equipment;
- Ineffective implementation of erosion and sediment control measures;
- Inadequate maintenance of environmental control measures; and
- Time taken for the rehabilitation/ revegetation of disturbed areas.

4.2 Potential Impacts

The major potential impacts on the riparian environment relate to erosion of disturbed areas or stockpiles and sediment transportation. Potential adverse impacts from erosion and sediment transportation can include:

- Loss of topsoil;
- Increased water turbidity;
- Decreased levels of dissolved oxygen;
- Changed salinity levels;
- Changed pH levels;
- Smothering of stream beds and aquatic vegetation;
- Reduction in aquatic habitat diversity;
- Increased maintenance costs; and
- Decrease in waterway capacity leading to increased flood levels and durations.

Furthermore there is potential for contamination from the storage, transfer and use of oils, fuels, fertilisers and chemicals with impacts that can include:

- Discharge of toxic substances to waterways leading to death of flora and fauna; and
- Increased nutrient levels leading to algal growth.

Infiltration from spillage of oils, fuels and chemicals can lead to groundwater pollution.

The extraction of construction water from waterways during periods of low rainfall can lead to reductions in environmental flow.

5. General Erosion and Sedimentation Control Strategy

The clearing of vegetation leaves the land surface susceptible to increased erosion. The eroded particles can be transported off site and into natural waterways causing siltation, loss of hydraulic capacity and environmental stress. The ESCP aims to minimise the extent of erosion of the site, restrict movement of soil particles and mitigate the impacts of the works on the riparian environment.

Before bulk earthwork operations commence the appropriate soil and water management measures are to be implemented as detailed in the ESCP. New sediment basins, an existing sediment basin and other erosion control measures as detailed on the ESCP make up the sediment and erosion control measures required for the management of the soil and water associated with the Oakdale Central East precinct. The construction of the bulk earthworks are to be staged, therefore so are the implementation of the soil and water management measure as detailed on the ESCP.

Stage 1 of the proposed strategy for soil and water management associated with the Oakdale Central (East) Precinct Estate Works including Pads 1A and 2A utilises the existing sediment basin within the Central Precinct. This basin currently treats stormwater discharge from the existing Austral Brickworks located on the eastern side of Old Wallgrove Road. This sediment basin will be modified and then utilised to capture sediment associated with the proposed earthworks required for Pad 1A and Pad 3 (part there of).

A new sedimentation basin will be utilised to capture sediment from Pad 2A and Pad 4 (part there of) will also be constructed as detailed on the ESCP.

Ultimately the stormwater run-off from the Austral Brickworks will need to be considered in the Central Precinct stormwater management strategy. In the interim, during earthworks operations, the stormwater run-off from the Austral Brickworks will drain to a new sedimentation basin (refer ESCP). This interim arrangement will need to be maintained until the permanent stormwater management strategy is in place.

Stage 2 of the proposed strategy for soil and water management associated with the Oakdale Central (East) precinct will utilise the embankment formation works of the proposed bio-retention basin as a sediment basin for the bulk earthwork associated with Pad 3 (part there of), Pad 4 (part there of) and Pad 5, as detailed on the ESCP. This stage of the works will also include the decommissioning of sediment basins utilised in Stage 1.

Completed batters, pipeline excavation extents and access road verges will be topsoiled and seeded as soon as the earthworks operations have been completed in accordance with the ESCP.

6. Construction Methodology

The following construction methodology will be followed to minimise the risk of erosion and sediment export from the site:

- Install silt fencing;
- Install straw bale sediment traps across existing drainage paths;
- Construct sediment basins;
- Install all other erosion and sediment controls as indicated on the ESCP;
- Strip and stockpile topsoil;
- Carry out bulk earthworks;
- Decommission sediment basins and divert flows;
- Topsoil and rehabilitate bulk earthworks areas immediately on completion of works; and
- Remove silt fence and straw bales only when disturbed areas have been fully stabilised.

7. Site Inspection and Maintenance

7.1 Site Inspection and Maintenance Requirements

The ESCP outlines the erosion and sediment control measures that are required to be in place for the bulk earthworks associated with Oakdale Central (East) Precinct Estate works and Pads 1A and 2A. As such, the inspection and maintenance requirements outlined in this section will need to be carried out as long as either earthworks or quarrying is being conducted and all areas re-established.

The Contractor's site Superintendent will inspect the site after every rainfall event and at least weekly, and will:

- Inspect and assess the effectiveness of the ESCP and identify any inadequacies that may arise during normal work activities or from a revised construction methodology. Construct additional erosion and sediment control works as necessary to ensure the desired protection is given to downstream lands and waterways;
- Ensure that drains operate properly and to effect any repairs;
- Remove spilled sand or other materials from hazard areas, including lands closer than 5 metres from areas of likely concentrated or high velocity flows especially waterways and paved areas;
- Remove trapped sediment whenever less than design capacity remains within the structure;
- Ensure rehabilitated lands have effectively reduced the erosion hazard and to initiate upgrading or repair as appropriate;
- Maintain erosion and sediment control measures in a fully functioning condition until all construction activity is completed and the site has been rehabilitated; and
- Remove temporary soil conservation structures as the last activity in the rehabilitation program.

7.2 Inspection and Auditing

The CEMP shall detail the ESCP inspection and auditing procedures to be implemented on the project.

To ensure effective implementation of the soil and water controls and management procedures, the CEMP shall include an Inspection and Test Plan for management of the soil and water controls.

8. Environmental Control

The Contractor shall implement the following in order to minimise the impact of the works on the riparian ecosystems in the vicinity of the project.

- Measures that minimise the impacts of the clearing of vegetation;
- Measures to minimise the area of disturbed ground that is exposed to erosion and that retain vegetation until earthworks operations require its removal;
- Measures that ensure that topsoil is correctly stored and reused;
- Measures to ensure that erosion minimisation and sediment controls works are installed prior to commencement of construction and that these controls are adequate for the continued protection of the waterways;
- Measures to ensure that diversion drains are routinely installed so as to minimise erosion, sedimentation and water quality impacts;
- Measures to encourage prompt topsoiling and revegetation of completed works areas; and
- Measures to locate compounds, access tracks, stockpile sites, temporary work areas and stage work so as to minimise erosion, sedimentation and water quality impacts.

9. Protection of Vegetation

Native vegetation shall be protected during the course of the project through the implementation of Best Management Practices, which shall include but shall not be limited to:

- Educating project staff in the importance of environmentally sensitive work practices;
- Clearly defining the limit of permitted clearing on the work site through the use of distinctive markings, flagging tape and iridescent webbing;
- Avoiding disturbance of vegetated areas until immediately prior to commencement of that phase or element of the works;
- Locating site facilities, compounds and material storage areas away from sensitive areas;
- Restricting vehicular movements to specific access points and routes;
- Routine maintenance of vegetation protection measures; and
- Prompt rehabilitation and revegetation of disturbed areas following completion of work elements or phases.

10. Topsoil Management

Topsoil shall be protected, stockpiled and reused through the implementation of Best Management Practices, which shall include but shall not be limited to:

- Deferring topsoil stripping until work areas are required and conditions are suitable;
- Identifying weed-infested topsoil prior to stripping and stockpiling separately;
- Stripping and respreading topsoil at an ideal moisture content;
- Preventing the mixing of topsoil and subsoil;
- Using low stockpile mounds to minimise organic stress and decay;
- Locating stockpiles away from drainage paths and flood-prone areas
- Using stormwater diversion drains and temporary vegetation to protect stockpiles from water and wind erosion;
- Minimising or preventing traffic loads on stockpiled materials;
- Routinely maintaining erosion minimisation works;
- Progressive respreading of topsoil to minimise storage time; and
- Prompt revegetation of topsoil.

11. Materials Handling, Transfer and Storage

The CEMP shall include method statements and procedures for all activities that involve the handling, transfer and storage of materials including operational by-products, plant wash-down, fine particulates/dust and waste.

Materials storage areas shall not be located within 50 metres of any drainage path, waterway or flood-prone land.

Materials storage procedures shall comply with any EPA and Workcover requirements and relevant Australian Standards, including the current issues of:

- AS1940 The Storage and Handling of Flammable and Combustible Liquids.
- AS2430 Classification of Hazardous Areas
- AS3773 Bulk Solids Containers
- AS3780 The Storage and Handling of Corrosive Substances
- AS4084 Steel Storage Racking
- AS4332 The Storage and Handling of Gases In Cylinders
- AS4452 The Storage and Handling of Toxic Substances

Materials Safety Data Sheets for all chemicals stored on-site shall be kept at the site office, made available to the staff who manage the storage of materials and be readily available to site personnel.

The CEMP shall contain procedures for the management of curing compounds and bitumen tacking to ensure that runoff containing these products is prevented from entering any drainage path or waterway. It shall also contain precautions to be taken during paving operations to minimise wash-off from bitumen following rain.

Storage areas for fuels, oils and other liquid chemicals shall be surrounded by impervious bund walls. The retained volume shall be no less than 120% of the volume of the largest container within the bunded area. There shall be no pipes and valves in the bund. The storage area shall slope to one corner to allow for clean up.

Chemical drums shall not be left open either inside or outside of bunded areas.

A copy of the EPA Bunding and Spill Management Guidelines shall be kept at the project site office, made available to the staff that manage the storage of materials and routinely implemented.

Old drums used as temporary works markers shall not contain chemical or hydrocarbon residues.

11.1 Transfer, Refuelling and Maintenance

The transfer, the refuelling/maintenance of equipment, the mixing of cutting oil with bitumen or any other activity that may result in a spillage of any fuel, oil or chemical shall not be permitted within 20 metres of

any drainage path or waterway.

A responsible person shall remain present to observe all transfer, refuelling and maintenance operations.

In the event that equipment, plant or vehicles require refuelling or maintenance and cannot be moved away from a drainage path or waterway, a temporary bund or spillage trays shall be used to contain all potential contaminants.

All equipment, plant and vehicles shall be routinely maintained to prevent leakage from tanks, hoses and sumps.

11.2 Emergency Action Plan

The Contractor shall develop an Emergency Action Plan to deal with uncontrolled spillage or discharge of fuels, oils and chemicals. The plan shall include response procedures aimed at protecting the soils and water, that:

- Contain and control environmental emergency incidents;
- Safeguard people on-site and off-site;
- Protect drainage paths and waterways;
- Minimise damage to the environment and property;
- Identify appropriate disposal techniques for contaminated soils and water; and
- Facilitate remediation of the environment.

Contingency plans shall be prepared for implementation in the event of a major spill or discharge.

Adequate quantities of suitable containment and clean-up materials shall be maintained within easy and quick access. Containment and clean-up materials storage areas shall be clearly sign-posted and shall include materials usage instructions. Used materials shall be promptly replaced.

12. Rehabilitation and Revegetation

All disturbed areas and batters shall be restored and revegetated as quickly as possible to reduce protect against erosion, to minimise sediment transportation and to limit ongoing impacts on water quality.

All disturbed areas shall be rehabilitated and revegetated in accordance with the drawings and the Specification.

Rehabilitation and revegetation shall be undertaken immediately the disturbed work areas are no longer required for construction purposes. Temporary vegetation shall be used where areas will remain open but inactive for any prolonged period.

13. Site Management, Responsibility and Resources

13.1 Site Management Plan

A project specific Site Management Plan shall be developed by the Contractor, which shall allocate responsibilities and the resources necessary to implement the environmental controls and procedures. It shall include a flow chart that clearly presents the chain of responsibility for implementing the erosion, sedimentation and pollution controls.

13.2 Allocation of Responsibilities

Responsibility for the implementation of the various controls should be covered in the CEMP and its referenced documents.

13.3 Allocation of Resources

Resources and materials shall be allocated to enable the timely implementation of the ESCP, reduce impacts and protect the environment. Resources and materials shall also be allocated for the routine and emergency maintenance of environmental protection works.

13.4 Induction and Environmental Awareness Training

13.4.1 Site Induction

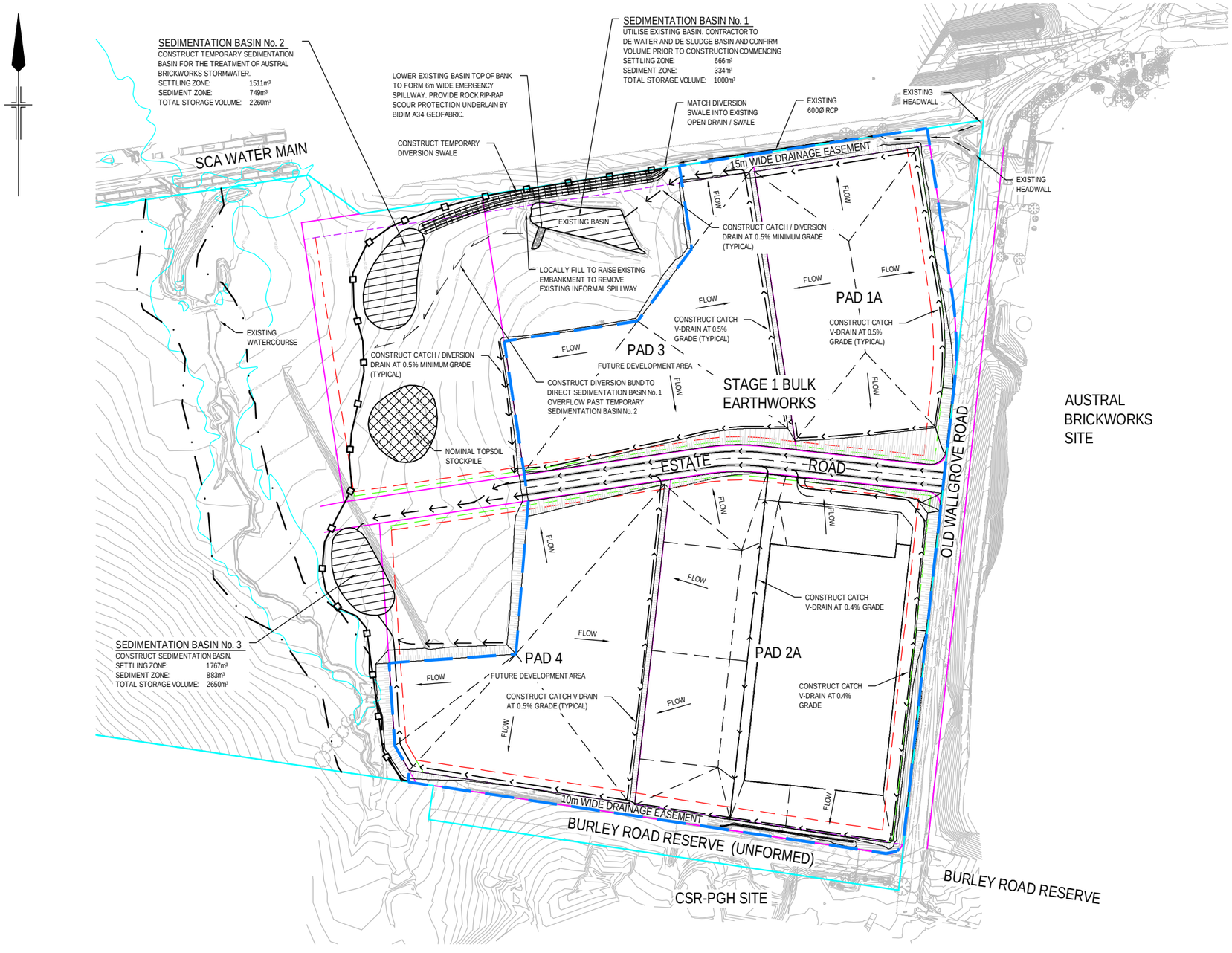
Environmental matters shall be highlighted in the site induction for all personnel including subcontractors. The site induction shall include issues relating to erosion minimisation, sediment control and water quality. Staff shall be made aware of their responsibilities under relevant environmental legislation.

13.4.2 Toolbox Meetings

Informal training on erosion, sedimentation and water quality issues shall be undertaken during toolbox meetings with site personnel.

Appendix A

Erosion and Sediment Control Plans



LEGEND

- PROPOSED SEDIMENT "SILT" FENCE
- EARTH CATCH / DIVERSION DRAIN
- EARTH CATCH V-DRAIN
- EARTH DIVERSION BUND
- EARTH DIVERSION SWALE
- AUSTRAL BRICKWORKS STORMWATER FLOW
- LIMIT OF BULK EARTHWORKS - STAGE 1
- SEDIMENTATION BASIN
- NOMINAL TOPSOIL STOCKPILE
- PROPOSED LOT BOUNDARY
- PROPOSED LANDSCAPE SETBACK LINE
- PROPOSED BUILDING SETBACK LINE
- PROPOSED EASEMENT
- CORE RIPARIAN ZONE

PLAN
SCALE 1:2000

EROSION & SEDIMENTATION CONTROL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SOIL AND WATER MANAGEMENT PLAN.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH THE DEPARTMENT OF HOUSING MANAGING URBAN STORMWATER EDITION 2004 AND FAIRFIELD CITY COUNCIL SPECIFICATIONS. WHERE DISCREPANCY OCCURS BETWEEN THESE TWO, COUNCIL DCP12 WILL TAKE PRECEDENCE.
3. WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   1 INSTALL ALL SILT FENCING.
   2 CONSTRUCT BASIN.
   3 CONSTRUCT CATCH DRAINS, DIVERSION DRAINS AND STRAW BALES.
   4 INSTALL OTHER EROSION AND SEDIMENT CONTROLS.
   5 STRIP AND STOCKPILE TOPSOIL AND CARRY OUT BULK EARTHWORKS
   6 TOPSOIL AND REHABILITATE BULK EARTHWORK AREAS IMMEDIATELY UPON COMPLETION.
   7 UNDERTAKE REMAINING SITE WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS.
   8 REHABILITATE THE REMAINING SITE.
   9 REMOVE SOIL AND WATER MANAGEMENT WORKS ONCE UPSTREAM SURFACES ARE STABILISED TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.
4. THIS ORDER MAY BE CHANGED SUBJECT TO FIELD CONDITIONS BUT ANY SUCH CHANGE MUST ACHIEVE ALL ENVIRONMENTAL AND CONSTRUCTION GOALS.
5. CONTROLS AFFECTED BY WORKS ARE TO BE RE-ESTABLISHED PRIOR TO THE COMPLETION OF EACH DAYS WORK.
6. THE CONTRACTOR SHhes ALL PROVIDE SHAKER GRIDS AT ALL SITE ACCESS / EGRESS POINTS.
7. STRIP TOPSOIL OVER THE SITE TO AN AVERAGE DEPTH OF 150mm UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT. TOP SOIL STOCKPILES SHALL NOT EXCEED 2m IN HEIGHT AND BATTER SLOPES TO BE 3H:1V MAXIMUM.
8. THE CONTRACTOR IS TO STABILISE TOPSOIL STOCKPILES AND ALL DISTURBED AREAS AS SOON AS THEY REACH FINAL LEVELS. STABILISATION TO BE BY HYDROSEEDING OR OTHER METHOD APPROVED BY SUPERINTENDENT AND COUNCIL ENGINEER. ALL SEEDED AREAS TO BE WATERED TWICE WEEKLY UNTIL GRASS IS ESTABLISHED OR COVERED WITH BITUMEN HAY MULCH.
   A RECOMMENDED LIST OF PLANT SPECIES FOR TEMPORARY COVER IS:
   - JAPANESE MILLET 25kg/ha (SPRING)
   - OATS (RYECORN) 25kg/ha (SUMMER)
   - JAPANESE MILLET 10kg/ha (AUTUMN)
   - OATS (RYECORN) 30kg/ha (WINTER)
   GYPSUM AND MULTIGROW/ ENRICH FERTILISER AT RATES TO BE DETERMINED BY SUBSOIL AND TOPSOIL TESTING.
   PERMANENT GRASSING TO BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
9. WHERE SURFACE SLOPES ARE STEEPER THAN 6H:1V BITUMEN STRAW MULCH SHALL BE APPLIED AFTER SEEDING AT THE FOLLOWING RATES, OR AS DIRECTED.
   - MULCH 0.5kg/m²
   - BITUMEN EMULSION 0.25 l/m² (50% WATER, 50% SLOW BREAKING ANIONIC EMULSION MIX).
10. TOPSOIL SHALL BE RE SPREAD AND STABILISED AS SOON AS POSSIBLE. DISTURBED AREAS SHALL BE LEFT WITH A SCARIFIED SURFACE TO ENCOURAGE WATER INFILTRATION AND ASSIST KEYING IN TOPSOIL.
11. DUST CONTROL MEASURES SHALL BE IMPLEMENTED CONTINUOUSLY DURING CONSTRUCTION WORKS TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.
12. THE CONTRACTOR SHALL TEMPORARILY REHABILITATE ANY DISTURBED AREAS WITHIN 20 DAYS. WHERE FINAL SHAPING HAS OCCURRED THE CONTRACTOR SHALL PROVIDE FINAL REHABILITATION WITHIN 10 DAYS.
13. DURING EARTHWORKS, TEMPORARY DIVERSION BANKS SHOULD BE CONSTRUCTED TO LIMIT SLOPE LENGTH, WHERE POSSIBLE, IN ACCORDANCE WITH THE FOLLOWING:

    RECOMMENDED MAXIMUM SPACING BETWEEN CROSS BANKS ON ALL ROADS.

SLOPE	MAXIMUM SPACING (m)
0 TO 1%	150
1 TO 3%	100
3 TO 5%	70
5 TO 10%	50
10 TO 17%	16

14. ALL STORMWATER PITS TO BE COVERED OR DROP INLET SEDIMENT TRAPS SHALL BE PROVIDED. KERB INLET TRAPS ARE TO BE INSTALLED AFTER COMPLETION OF PAVING.
15. TEMPORARY KERB INLET SEDIMENT TRAPS TO BE PROVIDED TO ALL EXISTING KERB INLETS IN THE VICINITY OF THE WORKS DURING CONSTRUCTION.
16. SEDIMENT TRAPS AND BASINS ARE TO BE MAINTAINED SUCH THAT:
    (A) SEDIMENT IS REMOVED SUCH THAT NO LESS THAN 70% OF THE DESIGN CAPACITY REMAINS AT ANY ONE TIME.
    (B) MATERIALS ARE REPLACED OR REPAIRED AS REQUIRED TO ENSURE SERVICEABILITY OF BOTH THE ELEMENT AND THE TRAP OR BASIN.
17. PERMANENT DRAINAGE STRUCTURES INCLUDING: PIPES, PITS ARE TO BE HANDED OVER IN A CLEAN CONDITION AT THE COMPLETION OF THE CONTRACT MAINTENANCE PERIOD.
18. FOLLOWING COMPLETION AND RESTORATION OF SITE: REMOVE ALL MATERIALS AND FILL DIVERSION DRAINS, WATERWAYS, SEDIMENT TRAPS, AND SEDIMENT BASINS AND COMPACT IN ACCORDANCE WITH THE SPECIFICATION TO MATCH FINAL LEVELS OF THE WORKS. PROVIDE 100mm TOPSOIL AND HYDROSEED.
19. ACCESS POINT TO ALLOW MACHINE ENTRY / EXIT ARE TO INCLUDE A ROUNDED DIVERSION BANK 0.3m HIGH WITH 10H:1V BATTERS TO DIVERT RUNOFF TO SEDIMENT FENCES EITHER SIDE OF ENTRY.
20. WHERE FLOCCULATION OF BASINS IS REQUIRED UNLESS OTHERWISE SPECIFIED THE RECOMMENDED INITIAL DOSING IS 0.32KG OF GYPSUM PER CUBIC METRES OF BASIN VOLUME. THE CONTRACTOR MAY VARY THIS RATE SUBJECT TO TESTING OF PREVIOUS WATER SAMPLES AND THE ACHIEVEMENTS OF THE REQUIRED WATER QUALITY STANDARDS. FLOCCULATION TO TAKE PLACE WITHIN 48 HOURS OF AN EVENT.
21. THE CONTRACTOR SHALL MAINTAIN A LOG BOOK DETAILING
    - RECORDS OF ALL RAINFALL
    - CONDITION OF SOIL AND WATER MANAGEMENT STRUCTURES
    - ANY APPLICATION OF FLOCCULATING AGENTS TO SEDIMENT BASIN
    - VOLUMES OF ALL WATER DISCHARGED FROM SEDIMENT BASINS - ANY ADDITIONAL REMEDIAL WORKS REQUIRED
    THE LOG BOOK SHALL BE MAINTAINED ON A WEEKLY BASIS AND BE MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. THE ORIGINAL LOG BOOK SHALL BE ISSUED TO THE PROJECT MANAGER AT THE COMPLETION OF THE WORKS.
22. THE CONTRACTOR SHALL AT ALL TIMES RESTRICT CONSTRUCTION EQUIPMENT MOVEMENT TO THE ESSENTIAL CONSTRUCTION AREAS. THE CONTRACTOR SHALL NOT EXTEND LAND DISTURBANCE BEYOND 2m FROM THE EDGE OF ANY ESSENTIAL CONSTRUCTION ACTIVITY.

APPROVAL

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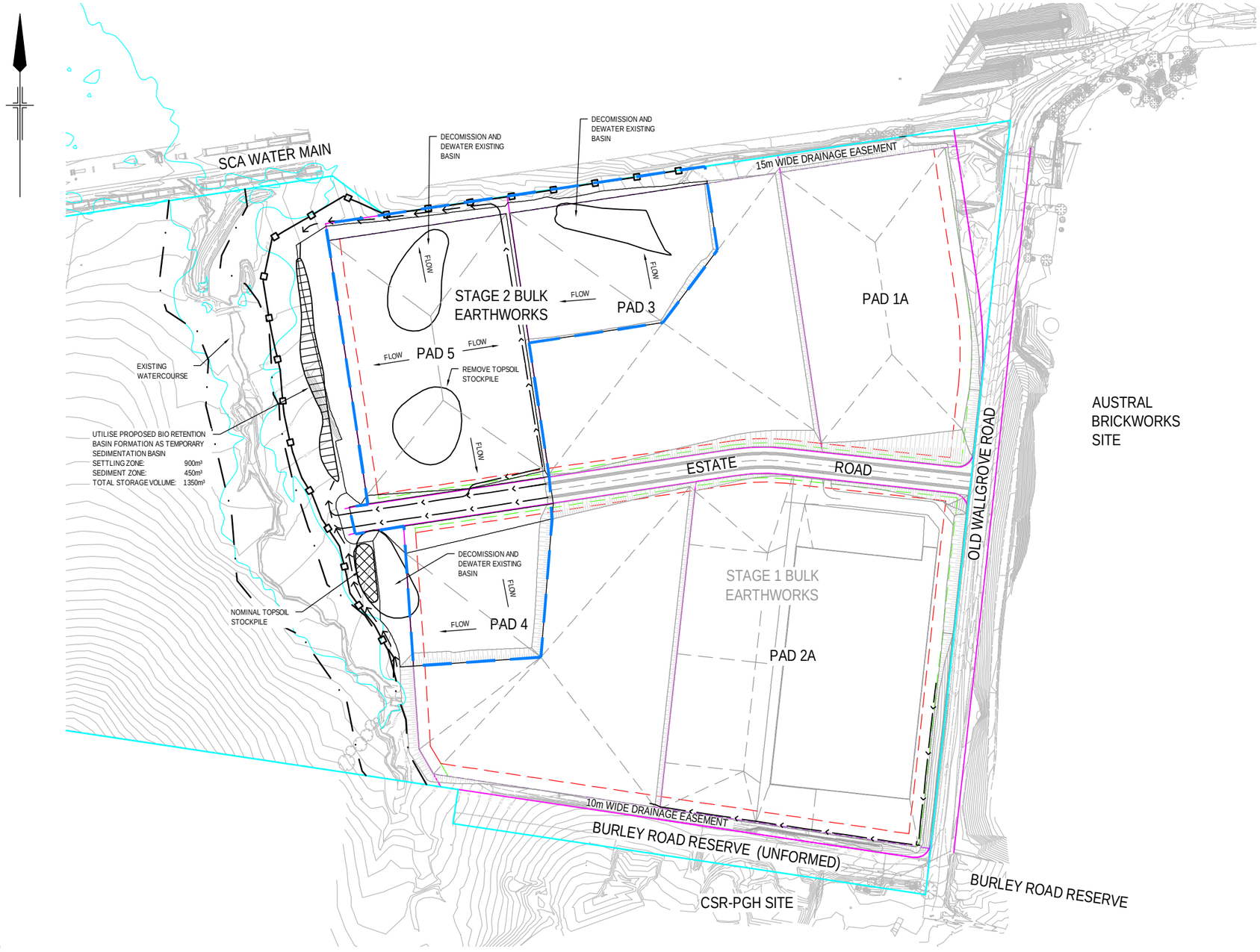
Client GOODMAN INTERNATIONAL
Project OAKDALE CENTRAL PRECINCT EAST - STAGE 1
Title BULK EARTHWORKS - SEDIMENTATION AND EROSION CONTROL PLAN - STAGE 1

Original Size A1
Drawing No: 21-19628-SK001
Rev: B

Plot Date: 2 September 2010 - 5:33 PM Plotted by: Jee M Soo/Sydney/GHD/AU Cad File No: G:\21\19628\CADD\Drawings\21-19628-SK001.dwg



EROSION & SEDIMENTATION CONTROL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SOIL AND WATER MANAGEMENT PLAN.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH THE DEPARTMENT OF HOUSING MANAGING URBAN STORMWATER EDITION 2004 AND FAIRFIELD CITY COUNCIL SPECIFICATIONS. WHERE DISCREPANCY OCCURS BETWEEN THESE TWO, COUNCIL DCP12 WILL TAKE PRECEDENCE.
3. WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   1 INSTALL ALL SILT FENCING.
   2 CONSTRUCT BASIN.
   3 CONSTRUCT CATCH DRAINS, DIVERSION DRAINS AND STRAW BALES.
   4 INSTALL OTHER EROSION AND SEDIMENT CONTROLS.
   5 DECOMMISSION AND DEWATER EXISTING SEDIMENTATION BASINS.
   6 STRIP AND STOCKPILE TOPSOIL AND CARRY OUT BULK EARTHWORKS
   7 TOPSOIL AND REHABILITATE BULK EARTHWORK AREAS IMMEDIATELY UPON COMPLETION.
   8 UNDERTAKE REMAINING SITE WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS.
   9 REHABILITATE THE REMAINING SITE.
   10 REMOVE SOIL AND WATER MANAGEMENT WORKS ONCE UPSTREAM SURFACES ARE STABILISED TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.
4. THIS ORDER MAY BE CHANGED SUBJECT TO FIELD CONDITIONS BUT ANY SUCH CHANGE MUST ACHIEVE ALL ENVIRONMENTAL AND CONSTRUCTION GOALS.
5. CONTROLS AFFECTED BY WORKS ARE TO BE RE-ESTABLISHED PRIOR TO THE COMPLETION OF EACH DAYS WORK.
6. THE CONTRACTOR SHlhes ALL PROVIDE SHAKER GRIDS AT ALL SITE ACCESS / EGRESS POINTS.
7. STRIP TOPSOIL OVER THE SITE TO AN AVERAGE DEPTH OF 150mm UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT. TOP SOIL STOCKPILES SHALL NOT EXCEED 2m IN HEIGHT AND BATTER SLOPES TO BE 3H:1V MAXIMUM.
8. THE CONTRACTOR IS TO STABILISE TOPSOIL STOCKPILES AND ALL DISTURBED AREAS AS SOON AS THEY REACH FINAL LEVELS. STABILISATION TO BE BY HYDROSEEDING OR OTHER METHOD APPROVED BY SUPERINTENDENT AND COUNCIL ENGINEER. ALL SEEDED AREAS TO BE WATERED TWICE WEEKLY UNTIL GRASS IS ESTABLISHED OR COVERED WITH BITUMEN HAY MULCH.
   A RECOMMENDED LIST OF PLANT SPECIES FOR TEMPORARY COVER IS:
   - JAPANESE MILLET 25kg/ha (SPRING)
   - OATS (RYECORN) 25kg/ha (SUMMER)
   - JAPANESE MILLET 10kg/ha (AUTUMN)
   - OATS (RYECORN) 30kg/ha (WINTER)
   GYPSUM AND MULTIGROW/ ENRICH FERTILISER AT RATES TO BE DETERMINED BY SUBSOIL AND TOPSOIL TESTING.
   PERMANENT GRASSING TO BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
9. WHERE SURFACE SLOPES ARE STEEPER THAN 6H:1V BITUMEN STRAW MULCH SHALL BE APPLIED AFTER SEEDING AT THE FOLLOWING RATES, OR AS DIRECTED.
   - MULCH 0.5kg/m²
   - BITUMEN EMULSION 0.25 l/m² (50% WATER, 50% SLOW BREAKING ANIONIC EMULSION MIX).
10. TOPSOIL SHALL BE RE SPREAD AND STABILISED AS SOON AS POSSIBLE. DISTURBED AREAS SHALL BE LEFT WITH A SCARIFIED SURFACE TO ENCOURAGE WATER INFILTRATION AND ASSIST KEYING IN TOPSOIL.
11. DUST CONTROL MEASURES SHALL BE IMPLEMENTED CONTINUOUSLY DURING CONSTRUCTION WORKS TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.
12. THE CONTRACTOR SHALL TEMPORARILY REHABILITATE ANY DISTURBED AREAS WITHIN 20 DAYS. WHERE FINAL SHAPING HAS OCCURRED THE CONTRACTOR SHALL PROVIDE FINAL REHABILITATION WITHIN 10 DAYS.
13. DURING EARTHWORKS, TEMPORARY DIVERSION BANKS SHOULD BE CONSTRUCTED TO LIMIT SLOPE LENGTH, WHERE POSSIBLE, IN ACCORDANCE WITH THE FOLLOWING:

    RECOMMENDED MAXIMUM SPACING BETWEEN CROSS BANKS ON ALL ROADS.

SLOPE	MAXIMUM SPACING (m)
0 TO 1%	150
1 TO 3%	100
3 TO 5%	70
5 TO 10%	50
10 TO 17%	16

14. ALL STORMWATER PITS TO BE COVERED OR DROP INLET SEDIMENT TRAPS SHALL BE PROVIDED. KERB INLET TRAPS ARE TO BE INSTALLED AFTER COMPLETION OF PAVING.
15. TEMPORARY KERB INLET SEDIMENT TRAPS TO BE PROVIDED TO ALL EXISTING KERB INLETS IN THE VICINITY OF THE WORKS DURING CONSTRUCTION.
16. SEDIMENT TRAPS AND BASINS ARE TO BE MAINTAINED SUCH THAT:
    (A) SEDIMENT IS REMOVED SUCH THAT NO LESS THAN 70% OF THE DESIGN CAPACITY REMAINS AT ANY ONE TIME.
    (B) MATERIALS ARE REPLACED OR REPAIRED AS REQUIRED TO ENSURE SERVICEABILITY OF BOTH THE ELEMENT AND THE TRAP OR BASIN.
17. PERMANENT DRAINAGE STRUCTURES INCLUDING: PIPES, PITS ARE TO BE HANDED OVER IN A CLEAN CONDITION AT THE COMPLETION OF THE CONTRACT MAINTENANCE PERIOD.
18. FOLLOWING COMPLETION AND RESTORATION OF SITE: REMOVE ALL MATERIALS AND FILL DIVERSION DRAINS, WATERWAYS, SEDIMENT TRAPS, AND SEDIMENT BASINS AND COMPACT IN ACCORDANCE WITH THE SPECIFICATION TO MATCH FINAL LEVELS OF THE WORKS. PROVIDE 100mm TOPSOIL AND HYDROSEED.
19. ACCESS POINT TO ALLOW MACHINE ENTRY / EXIT ARE TO INCLUDE A ROUNDED DIVERSION BANK 0.3m HIGH WITH 10H:1V BATTERS TO DIVERT RUNOFF TO SEDIMENT FENCES EITHER SIDE OF ENTRY.
20. WHERE FLOCCULATION OF BASINS IS REQUIRED UNLESS OTHERWISE SPECIFIED THE RECOMMENDED INITIAL DOSING IS 0.32KG OF GYPSUM PER CUBIC METRES OF BASIN VOLUME. THE CONTRACTOR MAY VARY THIS RATE SUBJECT TO TESTING OF PREVIOUS WATER SAMPLES AND THE ACHIEVEMENTS OF THE REQUIRED WATER QUALITY STANDARDS. FLOCCULATION TO TAKE PLACE WITHIN 48 HOURS OF AN EVENT.
21. THE CONTRACTOR SHALL MAINTAIN A LOG BOOK DETAILING
    - RECORDS OF ALL RAINFALL
    - CONDITION OF SOIL AND WATER MANAGEMENT STRUCTURES
    - ANY APPLICATION OF FLOCCULATING AGENTS TO SEDIMENT BASIN
    - VOLUMES OF ALL WATER DISCHARGED FROM SEDIMENT BASINS - ANY ADDITIONAL REMEDIAL WORKS REQUIRED
    THE LOG BOOK SHALL BE MAINTAINED ON A WEEKLY BASIS AND BE MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. THE ORIGINAL LOG BOOK SHALL BE ISSUED TO THE PROJECT MANAGER AT THE COMPLETION OF THE WORKS.
22. THE CONTRACTOR SHALL AT ALL TIMES RESTRICT CONSTRUCTION EQUIPMENT MOVEMENT TO THE ESSENTIAL CONSTRUCTION AREAS. THE CONTRACTOR SHALL NOT EXTEND LAND DISTURBANCE BEYOND 2m FROM THE EDGE OF ANY ESSENTIAL CONSTRUCTION ACTIVITY.

LEGEND

- PROPOSED SEDIMENT "SILT" FENCE
- EARTH CATCH / DIVERSION DRAIN
- EARTH CATCH V-DRAIN
- EARTH DIVERSION BUND
- EARTH DIVERSION SWALE
- AUSTRAL BRICKWORKS STORMWATER FLOW
- LIMIT OF BULK EARTHWORKS - STAGE 2
- SEDIMENTATION BASIN
- NOMINAL TOPSOIL STOCKPILE
- PROPOSED LOT BOUNDARY
- PROPOSED LANDSCAPE SETBACK LINE
- PROPOSED BUILDING SETBACK LINE
- PROPOSED EASEMENT
- CORE RIPARIAN ZONE

PLAN
SCALE 1:2000

APPROVAL

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Project: OAKDALE CENTRAL PRECINCT EAST - STAGE 2
Title: BULK EARTHWORKS - SEDIMENTATION AND EROSION CONTROL PLAN - STAGE 2

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Rev: B

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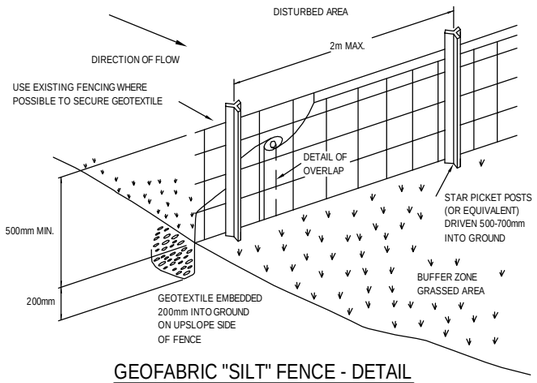

GEOFABRIC "SILT" FENCE - DETAIL

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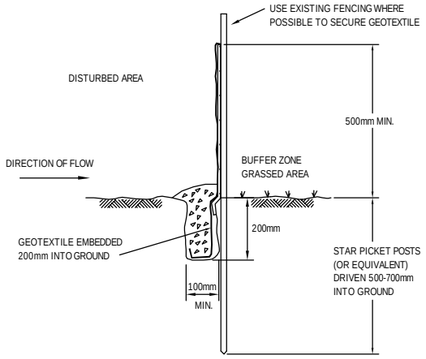

GEOFABRIC "SILT" FENCE - TYPICAL SECTION

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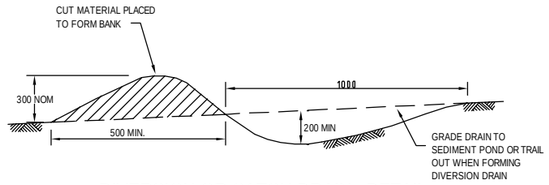

DIVERSION OR CATCH DRAIN - DETAIL

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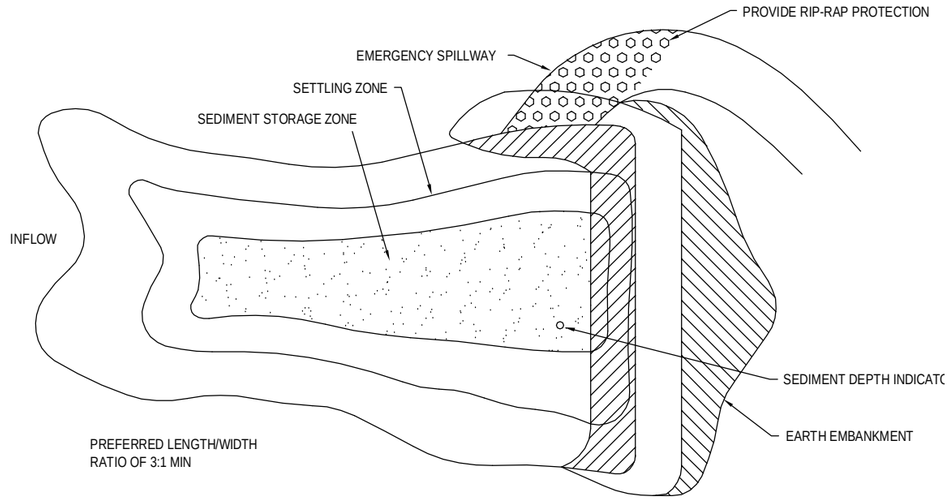
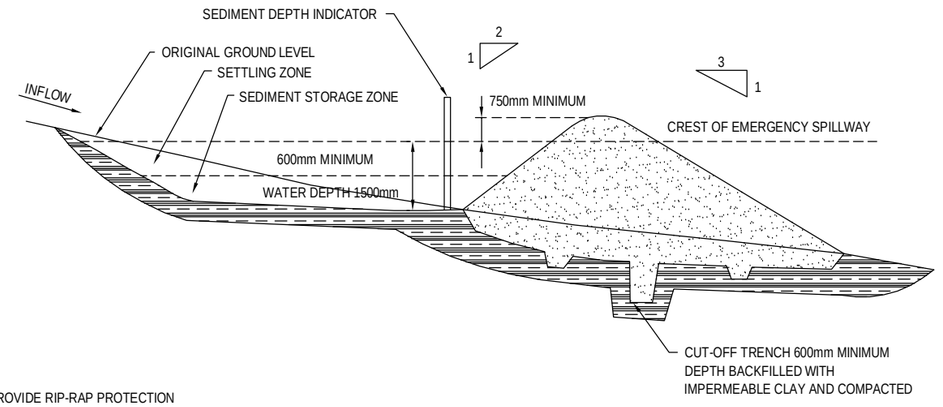


TYPICAL TEMPORARY EARTH BASIN (PLAN)

NTS

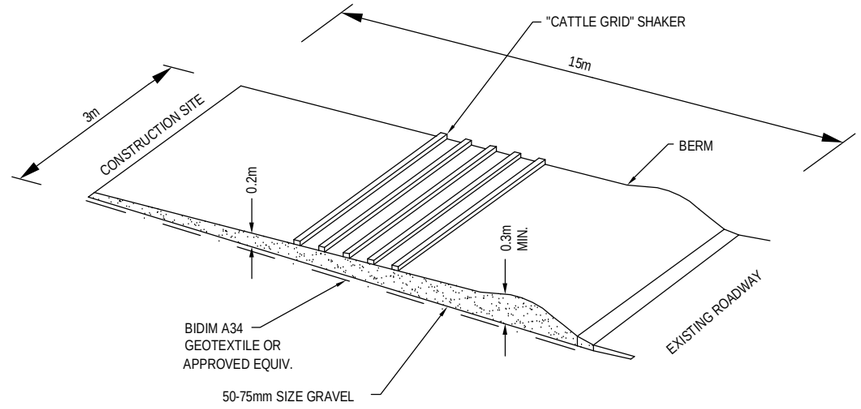
OPERATIONAL POLICY FOR BASIN

1. SETTLING ZONE SHOULD BE PUMPED OUT WITHIN 5 DAYS FOLLOWING RAINFALL EVENT.
2. PUMPING OF SETTLED WATER SHOULD BE:
   (a) FIRSTLY RE-USE FOR PROCESS WATER IF DEMAND EXISTS
   (b) SECONDLY RE-USE FOR ONSITE DUST SUPPRESSION
   (c) LASTLY DISPOSE TO STORMWATER IF WATER QUALITY APPROPRIATE
3. FLOCCULATION SHOULD BE USED WHERE EXTENDED SETTLING IS LIKELY TO FAIL.
4. FOR CONSTRUCTION NOTES REFER TO THE DEPARTMENT OF HOUSING MANAGING URBAN STORMWATER HANDBOOK EDITION 2004 DETAIL SD6-4.



TYPICAL TEMPORARY EARTH BASIN (SECTION)

NTS



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Date			
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Client GOODMAN INTERNATIONAL
Project OAKDALE CENTRAL PRECINCT EAST - STAGE 1
Title BULK EARTHWORKS
EROSION AND SEDIMENT CONTROL DETAILS

Original Size A1 Drawing No: 21-19628-SK003 Rev: A

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GHD Pty Ltd ABN 39 008 488 373

133 Castlereagh St Sydney NSW 2000

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Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Rev 1	F. Carrozza	F. Carrozza	* On File	C McDougall	* On File	28/5/10
Rev 2	F. Carrozza	F. Carrozza	* On File	C McDougall	* On File	02/09/10
Rev 3	F. Carrozza	F. Carrozza	* On File	C McDougall	* On File	10/09/10

Appendix I

GHD Project Approval Stormwater Management Plan

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09 September 2010

Goodman International
Level 10 60 Castlereagh Street
Sydney NSW 2000

Our ref: 21/16225/135599
Your ref:

Attn: Adrian Tesoriero

Dear Adrian

Central Project Application No. 1 - Estate Works & DHL
Stormwater Management Strategy

1 Introduction

This letter report has been prepared as an addendum to the Water Sensitive Urban Design (WSUD) Strategy report prepared by GHD (GHD, December 2007). This addendum specifically considers the works proposed under Project Application Number One, which involves the development of Buildings 1A and 2A (DHL) of the Central Precinct.

The stormwater management strategy described herein relates to Buildings 1A and 2A of the Central Precinct development area.

Figure 1 provides a diagrammatic representation of the proposed stormwater management strategy for Buildings 1A and 2A referred to in the following sections.

2 Stormwater Quantity

Stormwater detention will be provided for each building via on site detention (OSD).

From the preliminary hydrologic modelling performed as part of the Oakdale WSUD Strategy report (GHD, December 2007) it was found a volume of approximately 250 m^3/ha is required for stormwater detention with a permissible site discharge (PSD) of 140L/s/ha for the 100-year Average Recurrence Interval (ARI) event. This configuration has been adopted for this addendum.

The final design will be completed in accordance with Fairfield City Council Guidelines whereby other ARI events will need to be modelled to show the post-development flow rates are maintained at pre-development levels for various ARI events.

The Austral Brickworks to the east of Old Wallgrove Road from an external catchment that flows in the northeast corner of the Central Precinct. The Brickworks may be redeveloped in the future and it has been assumed that stormwater detention will be provided east of Old Wallgrove Road. Hence no stormwater detention is being provided for the Brickworks in the Central Precinct area.

Table 1 Approximate Detention Parameters (100-year ARI Event)

Location	OSD (m^3)	PSD (l/s)
Lot 1A	878	491
Lots 2A	1,743	977

3 Flooding

The flood study carried out as part of the Oakdale WSUD Strategy Report (GHD, December 2007) has been reviewed and updated using detailed field survey. The detailed field survey is considered more accurate than the airborne laser survey date used previously. An updated 100-year Average Recurrence Interval (ARI) flood extents map for the Central Precinct (East) is attached to this report.

4 Stormwater Quality

Stormwater quality treatment for Buildings 1A and 2A will ultimately be provided by the proposed bio-retention basin and bi-swale along the northern perimeter of the precinct. The basin and bio-swale have been sized to meet the objectives outlined in the WSUD Strategy Report for the ultimate configuration, that is, the entire Central (East) Precinct. Buildings 1A and 2A will initially be serviced by the bio-swale as it will be constructed as part of the first stages of development. The bio-retention basin will be constructed as further stages of development proceed..

The WSUD strategy for Central (East) Precinct which includes Buildings 1A and 2A has been modelled using MUSIC software. The results of the analysis are summarised in Table 2.

Table 2 Water Quality Modelling Results

Pollutant	Sources	Residual Load	Reduction	Required Reduction
Total Suspended Solids (kg/yr)	40,600	5070	87.5 %	85 %
Total Phosphorus (kg/yr)	66.3	20.3	69.3%	65 %
Total Nitrogen (kg/yr)	494	270	45.4 %	45 %
Gross Pollutants (kg/yr)	7,240	0 (approx)	99 % (approx)	90 %

5 Open Channels

5.1 Southern Channel

A channel will be required on the northern side of Burley Road (which is unmade in this area) to intercept stormwater runoff from the CSR-PGH Brickworks to the watercourse that runs through the Central Precinct. Fairfield City Council requires a velocity in the channel of less than 2 m/s. Preliminary hydraulic calculations indicate a channel width of 10 metres will be required (depth 1m, base 2m, 1:4 side slopes, 1.5% longitudinal grade).

5.2 Northern Channel

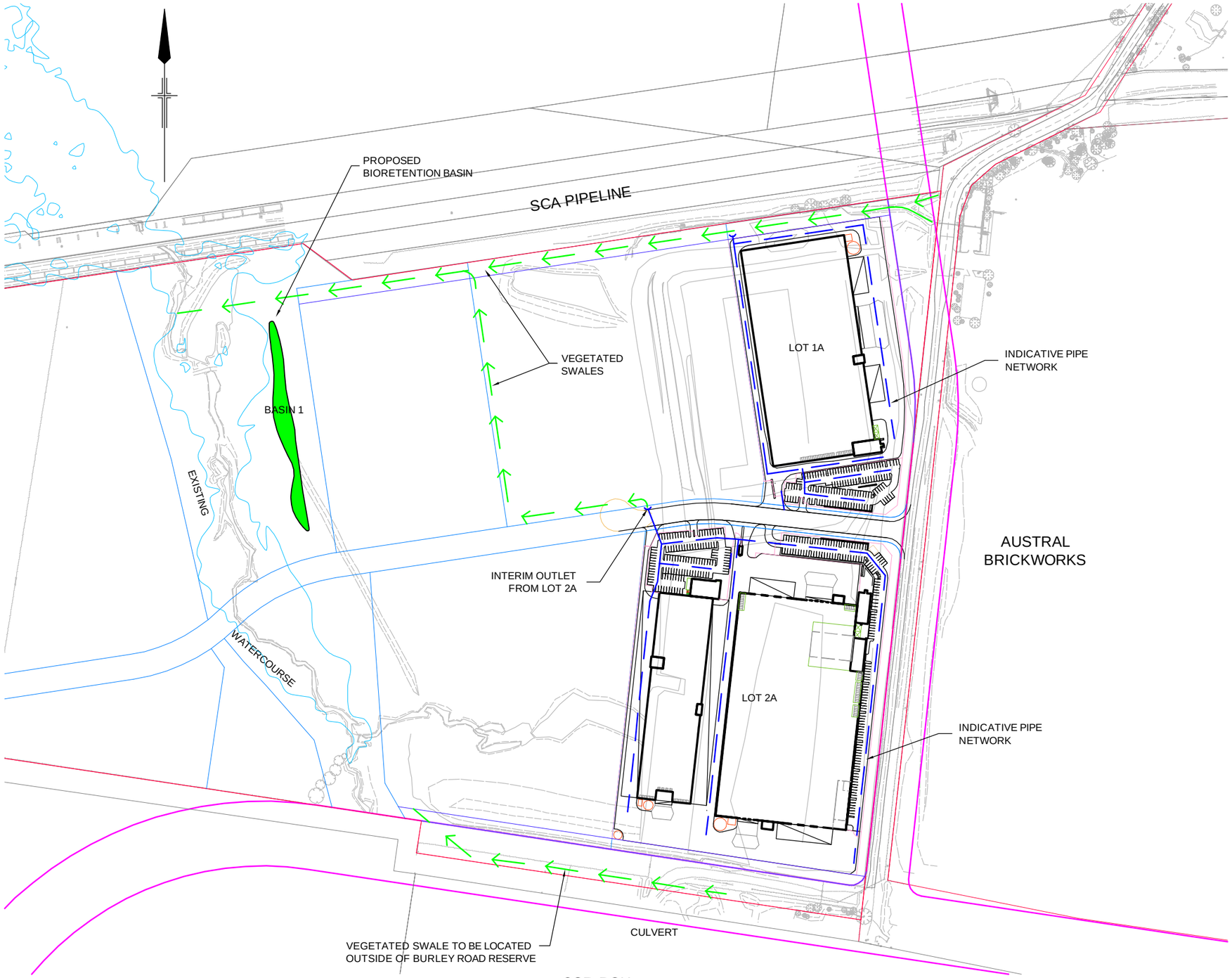
A channel running adjacent to the proposed Link Road is indicated on Figure 1. This has been sized to convey the 100-year ARI storms from the northern allotments as well as the external Austral Brickworks catchment mentioned in Section 2. The channel has a 1.1% longitudinal grade, 1.4 side slopes and a 2m base. The minimum depth of the channel is 1.2m.

Yours faithfully
GHD Pty Ltd

per

Frank Carrozza
Senior Civil Engineer
02 8898 8886

Attachment: Figure 1 - Stormwater Management Strategy
100-yr Flood Extents Map



CSR-PGH

DRAFT

0 40 80 120m
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ESTATE WORKS & DHL
STORMWATER STRATEGY
scale | 1:4000 for A3 date | SEP 2010

job no. | 21-16225
rev no. | G

Figure 1

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Flood Depths (m)

0.05 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
5.00 - 5.25
5.25 - 5.50
5.50 - 5.75
5.75 - 6.00
6.00 - 6.25

Oakdale Site

1:14,000 for A3

0 55 110 220 330 440

Metres

GDA_1994_MGA_Zone_56

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OAKDALE

100-year ARI Event Flood Map

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rev no. | REVB

date | January 2008

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Oakdale Central Development

Regional Link Roads

Old Wallgrove Road Upgrade - Road Design Report

Author: Dane Segail

Approver: Anthony McLandsborough

Report no: R002 **Revision:** 01 **Date:** October 2013

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Document registration

Document title	Old Wallgrove Road Upgrade - Road Design Report
Document file name	13-143-R002-00-Old Wallgrove Road Road Design Statement
Section	Civil Engineering
Document author	Dane Segail

Finalisation signatures

The design described in this report is considered to have been finalised.

Signature		**Date**
Dane Segail Civil Engineer (Author)		23/10/13
Mark Marsic Lead Designer (Road)		23/10/13
Anthony McLandsborough Director		23/10/13

Notes: The finalisation signatures shown above do not provide evidence of approval to the design. Approval signatures are shown on the title sheet of the design plans.

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1 Scope

1.1 Purpose of Design Report

The purpose of this Design Report is to:

- Describe the Project Scope and Background;
- Define the Project's objectives;
- Describe those documents which make up the Design and subsequent Application;
- Describe the Design Inputs;
- Describe the Design parameters and why they were selected;
- Describe the Road Scape Allocation and how guidelines are met;
- Describe the Road Typical Cross Sections and how standards are met;
- Describe Horizontal Curves and Alignments and how standards are met;
- Describe the Geometric Design and how constraints and standards are met; and
- Describe the Design Finalisation Process.

This Design Report describes ***why things were done.*** What was done is shown on the plans. The objectives of this Design Report are to provide the reasons for design decisions.

1.2 Context/Background

The section of Old Wallgrove Road (OWR) between the recently completed Erskine Park Link Road and the Oakdale Estate, is best categorised as a rural road at best, comprising of a variable width pavement from 7 to 8m with flush shoulders and table drains. This section of road is approximately 1600m in length. The road is unlit and is in a poor condition with numerous pavement failures along the stretch of road.

Existing features of Old Wallgrove Road (post temporary upgrade as described below) are:

- Total length of road 1600m.
- Single carriageway variable width, average of 7m, widening at access points to circa 8m.
- Unformed shoulders - Stormwater freely drains to surrounding verge.
- Flexible pavement with flush seal.

- Significant pavement cracking and potholing.
- Sign posted speed limit - 70kph.
- Sight distance satisfactory apart from the area directly south of the SCA crossing.

As part of the Concept Approval for the Oakdale Estate, a section of Old Wallgrove Road was to be temporarily upgraded to provide additional road width to cater for additional heavy traffic. These works were completed in 2011. Since the completion of these roadworks, the pavement has deteriorated and potholes have developed, calling for a need to rehabilitate Old Wallgrove Road.

In addition, Goodman proposes to develop the remainder of the Oakdale Estate, which necessitates consideration of the required road connection.

The Oakdale Estate is located within the Fairfield City Council Local Government area and is bound by the future Chandos Parkway Road Corridor to the south, the Sydney Catchment Authority pipeline to the north, Old Wallgrove Road to the East, and Ropes Creek to the West. The Site forms part of the Oakdale Central Precinct Concept Plan Approval (08_0065) and is approximately 61.2ha in area.

The Concept Approval approved the developed of:

- Overall the subdivision, as modified, created:
    - 15 lot subdivision (total area ~ 45.8ha).
    - 7 industrial buildings.
    - Recreation and biodiversity land (total area ~ 10.1ha)
    - Road construction and upgrades
    - Infrastructure
- Upgrade of a 1.6km section of Old Wallgrove Road to provide a 7m wide road to provide B-Double access to the Estate, between the Estate Road entry location and a point on Old Wallgrove Road located outside the Coles Myer Distribution Centre (Note: These works have been completed). Refer to Appendix A for copies of GHD Design Drawings.
- Bulk earthworks

Much of the first half of the Estate is built, with the first leg of the Estate Road built, and the first two industrial buildings built and occupied. The remaining infrastructure is either under construction, or pending Development Approval from Fairfield City Council.

In order to complete the development of the Estate and as a means of providing for the additional heavy traffic generated by the Estate, RMS have requested that a permanent upgrade solution of Old Wallgrove Road, south of the Sydney Catchment Authority pipeline, be developed and implemented.

AT&L have been commissioned to develop and design the proposed permanent upgrade solution of Old Wallgrove Road (the section south of the Sydney Catchment

Authority pipeline), which will ultimately support further development south of the pipeline.

1.3 Project Objectives

1.3.1 Project Specific Objectives

The project specific objectives for the design are:

- Upgrade Old Wallgrove Road to increase the traffic capacity, as outlined in the Traffic Impact Assessment prepared by Traffix.
- Rehabilitate or replace existing pavement.
- Ensure the upgraded road can operate at the intended design of 80kph and posted speed of 70kph.
- Match in with newly constructed/future regional link roads.
- Significantly improve the sight distance in the area directly south of the SCA crossing.
- Provide formal road shoulders – implementation of kerb and gutter/stormwater system.
- Construct under live traffic conditions.
- Provide adequate Street lighting.
- Provide adequate road verges.

1.3.2 Common Objectives

The project will also meet the following objectives that are common to road design projects:

- Develop a cost-effective solution.
- Provide appropriate levels of safety for road users.
- Minimise land acquisition.
- Minimise disruption to adjacent property owners, particularly to Transgrid.

1.4 Road Design Scope and Deliverables

1.4.1 Type and Stage of Design

The design stage is ‘Concept’.

Note: Pending Approval of the ‘Concept’ design, detailed design drawings will be prepared suitable for Construction. The purpose of supplying the ‘Concept’ drawings is to obtain Approval from the relevant authorities.

1.4.2 Deliverables

The following documentation has been prepared to accompany the State Significant Development Application:

- Digital drawings including:
    - Plan layouts.
    - Longitudinal sections.
    - Typical cross sections.
- Design report

2 Design Input

2.1 Locality

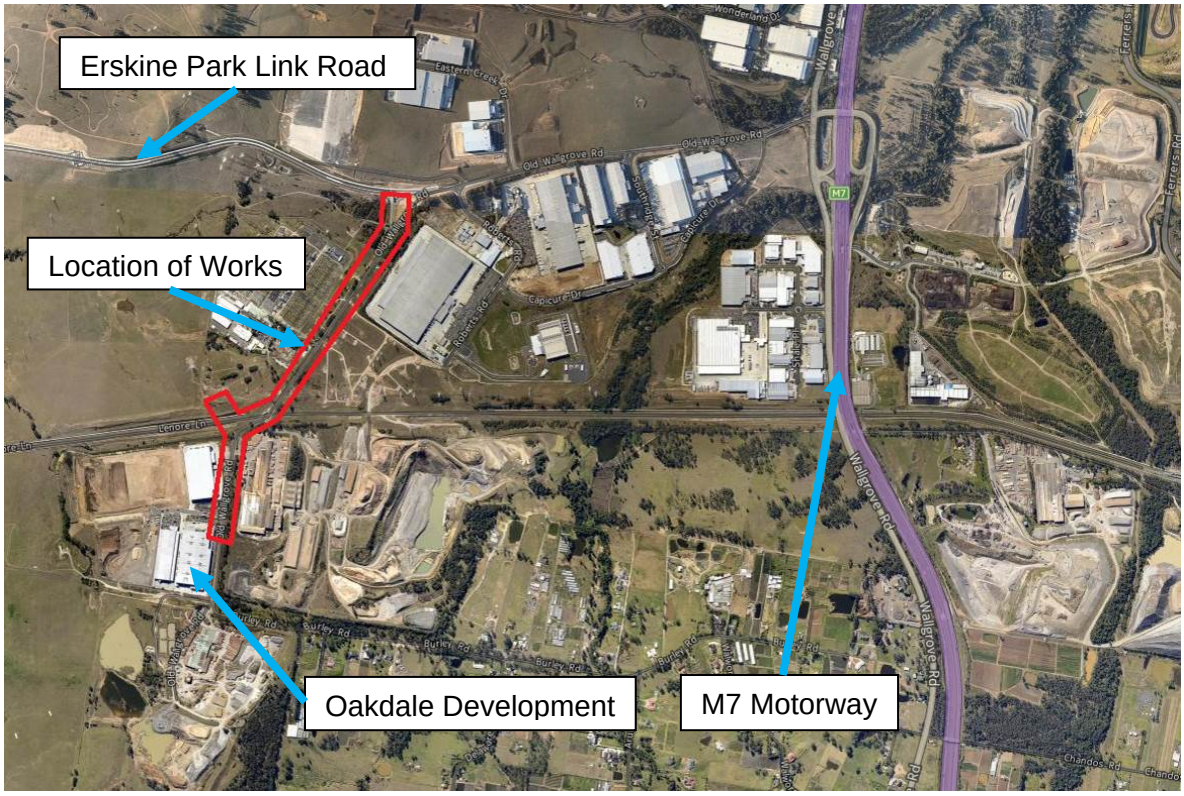


Figure 1 - Locality Sketch

2.2 Photographs of the Site

	Photo of Old Wallgrove Road prior to widening works completed in 2011
	Photo of Old Wallgrove Road prior to widening works completed in 2011

	Photo of Old Wallgrove Road showing pavement failure and potholing after widening works completed in 2011
	Photo of Old Wallgrove Road, located at approx. Ch475 (MC01) looking North

	Photo of Old Wallgrove Road and existing access to SCA pipeline, located at approx. Ch150 (MC02) looking South
	Photo of Old Wallgrove Road and existing access to SCA pipeline, located at approx. Ch250 (MC02) looking South
	Photo of Old Wallgrove Road and existing access to SCA pipeline, located at approx. Ch550 (MC02) facing Transgrid

	Photo of Old Wallgrove Road and existing access to SCA pipeline, located at approx. Ch850 (MC02) facing South.
	Photo of Old Wallgrove Road and existing access to SCA pipeline, located at approx. Ch850 (MC02) facing North.

2.3 Utility Information

The entire length of OWR has been surveyed to identify all boundary information, extent of existing pavement, drainage systems, fence lines and all service information. Potholing has been undertaken to understand and identify the exact location and size of buried services. Survey has also identified the overhead electrical services.

Services identified:

- Endeavour Energy overhead 132kV electrical.
- Transgrid Energy overhead 132kV Electrical.
- Endeavour Energy buried 11kV.

- Telstra.
- Water.
- Gas.

As part of the works, the existing Telstra and Endeavour Energy 11kV buried transmission/power cables will need to be relocated to suit the new cross section of the road.

Additionally to the existing services, new street lighting and water is proposed for the length of the project.

2.4 Community and Political Consultation

Community consultation of a localised nature will be carried out for those residences/business adjacent to Old Wallgrove Road who may be affected by the construction or the adjusted geometric alignment. This will include:

- Pre-construction advice regarding construction work and staging.
- Monitoring of local residences/business during construction.

Other consultation specifically for the site:

- Liaison with Blacktown City Council and Fairfield City Council.
- Liaison with RMS.
- Route information signage (including VMS) usage covering all construction stages.
- Correspondence with identified transport organisations.
- Sydney Catchment Authority (SCA); SCA has provided 'In Principal' support of the proposed upgrade works to Old Wallgrove Road. Evidence can be provided upon request.
- Transgrid: Transgrid has provided 'In Principal' support of the proposed upgrade works to Old Wallgrove Road. Evidence can be provided upon request.
- Endeavour Energy; Endeavour Energy has provided 'In Principal' support of the proposed upgrade works to Old Wallgrove Road. Evidence can be provided upon request.

3 Design Planning

3.1 Design Values

The design parameters used are listed below, in order of priority:

1. Austroads Guidelines.
2. Published RMS Supplements to Austroad Guidelines.
3. Australian Standards referenced in the Austroads Guidelines.
4. Published RMS Supplements to Australian Standards.

3.2 Variations from Original Design Constraints

Transgrid is a major property owner affected by the works. Lengthy negotiations have taken place over the last 12 months to understand what impact any widening of the existing 20.117m road reserve into their property would have.

Originally, the road reserve was proposed to be 25.7m which suggested a widening of some 5.5m into Transgrid lands. Due to the proximity of the existing overhead structural electrical towers, the widening to this extent was not satisfactory to Transgrid. As such, the width of the overall reserve has been reduced to cater for this constraint. The proposed overall reserve within this area is now 22.5m.

3.3 Road Function

Old Wallgrove Road is currently the only means of road access to the Oakdale Central Development, Austral Brickworks and the CSR Site. A large percentage of vehicles that travel on this section of road are heavy vehicles, including B-Doubles and semi-trailers.

The section of Old Wallgrove Road under consideration for upgrade, acts as a link between local Council Roads and other regional/state roads. By definition (as shown in section 3.4.1 below), Old Wallgrove Road would be categorised as a regional road.

3.4 Road Hierarchy and Classification

3.4.1 Current Road Classification

The section of Old Wallgrove Road proposed to be upgraded is currently not listed within the RMS 'Schedule of Classified Roads and Unclassified Regional Roads' (August 2013). It is stated that 'Local Roads are unclassified roads and therefore are not included in the Schedule'. Thus, it should be deemed that this section of Old Wallgrove Road is currently classified as a local road, with different sections of the road under the control of both Blacktown City Council and Fairfield City Council.

3.4.2 Proposed Road Classification

It is proposed that this section of Old Wallgrove Road be classified as a 'Regional Road'.

As per the RMS 'Schedule of Classified Roads and Unclassified Regional Roads' (August 2013), 'a Regional Road' perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Due to their network significance RMS provides financial assistance to councils for the management of their Regional Roads. The Regional Road category comprises two sub-categories: those Regional Roads that are classified pursuant to the Roads Act 1993, and those Regional Roads that are unclassified.'

As this section of Old Wallgrove Road will form a connection between the Erskine Park Link Road, the proposed future Chandos Parkway, the North-South Link Road and the Oakdale Estate Road (Millner Ave), it is proposed to classify Old Wallgrove Road as a 'Regional Road'. Old Wallgrove Road will as per the above definition, 'perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads'.

3.5 Road Control

3.5.1 Current Control

At present, Old Wallgrove Road is controlled by local Council. The road is controlled by:

- Blacktown Council CH200-CH1225 of MC02.
- Fairfield Council MC01, and CH0-CH200 of MC02.

3.5.2 Proposed Control

To coincide with classifying Old Wallgrove Road as a 'Regional Road', it is proposed that Roads and Maritime Services take control from local Council.

3.6 Speed

The existing posted speed limit along Old Wallgrove Road is 70 kph.

The design speed for the upgraded Old Wallgrove Road section is 80 kph. It should be noted that Old Wallgrove Road will be signposted at 70kph.

Traffic modelling will specifically look at each of the intersections and tie ins that is affected by the proposed works.

3.7 Minimum Curve Radius

The minimum curve radius is governed by the proposed design speed. The minimum curve radius will be based on a design speed of 80kph and will be designed to conform to the relevant design standards, where possible.

If required, superelevation will be used if smaller curve radii are required.

Final minimum curve radii will be determined during the detailed design stage.

3.8 Design Vehicles

Design Parameter	Design Vehicle	Purpose
Design Heavy Vehicle	B-Double	Turning Path
Design Light Vehicle	Car	Stopping Site Distance

Table 1 - Design Vehicles

The choice of design heavy vehicle was influenced by the current high level of heavy vehicle usage of this section of Old Wallgrove Road, connecting the various industrial developments with Sydney's nearby motorways.

There is potential for an increase in these heavy vehicle movements within this section of Old Wallgrove Road due to the additional regional industrial developments, which would utilise Old Wallgrove Road as an access road.

4 Cross Section

4.1 Road Scape Allocation

Design Parameter	Minimum value adopted in the current design	Maximum value adopted in the current design	Within guideline limits	Outside guideline limits	Reason for use of values that are outside guideline limits
Left carriageway (MC01)	8.0m	11.5m	Y	N	N/A
Right carriageway (MC01)	8.0m	8.0m	Y	N	N/A
Median (MC01)	1.5m	5.0m	Y	N	N/A
Right Verge (MC01)	4.5m	4.5m	Y	N	N/A
Left Verge (MC01)	4.5m	4.5m	Y	N	N/A
Left carriageway (MC02)	7.0m	7.0m	Y	N	N/A
Right carriageway (MC02)	7.0m	10.0m	Y	N	N/A
Median (MC02)	1.0m	4.0m	Y	N	N/A
Right Verge (MC02)	4.0m	4.0m	Y	N	N/A
Left Verge (MC02)	3.5m	3.5m	Y	N	N/A

Table 2 - Road Scape Allocation

4.2 Typical Cross Sections

Please refer to AT&L's Civil Drawings, using the relevant chainages shown below, to locate where these typical sections apply.

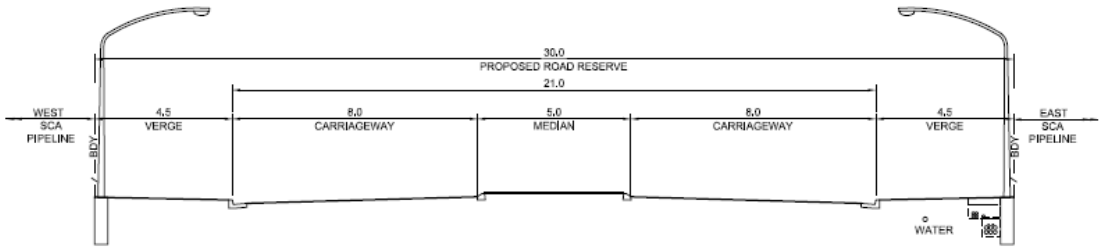


Figure 2 - Old Wallgrove Road (MC01) - Typical Section CH550-CH700

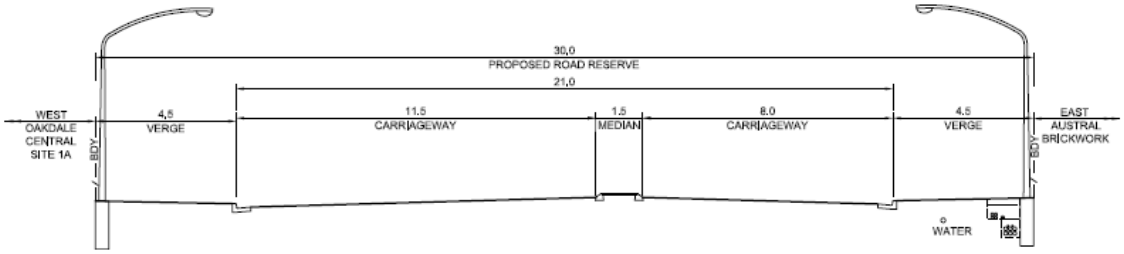


Figure 3 - Old Wallgrove Road (MC01) - Typical Section CH450-CH484

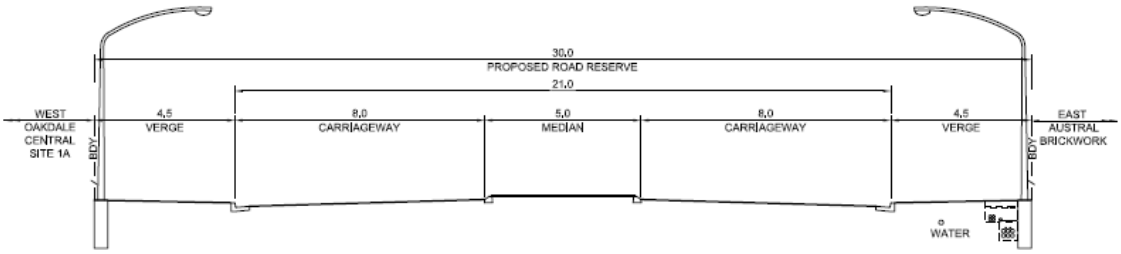


Figure 4 - Old Wallgrove Road (MC01) - Typical Section CH323-CH426.93

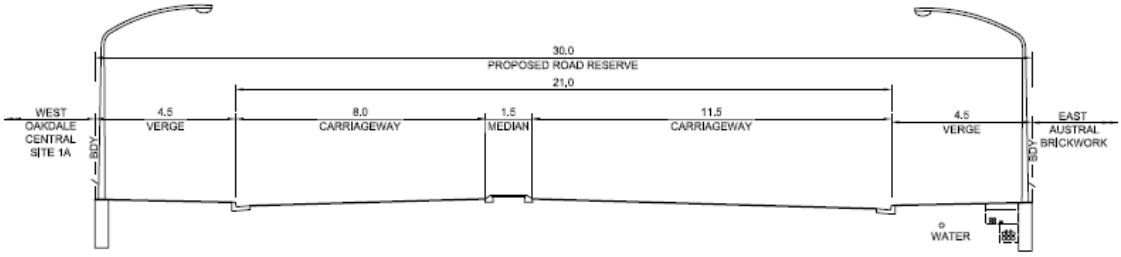


Figure 5 - Old Wallgrove Road (MC01) - Typical Section CH250-CH270

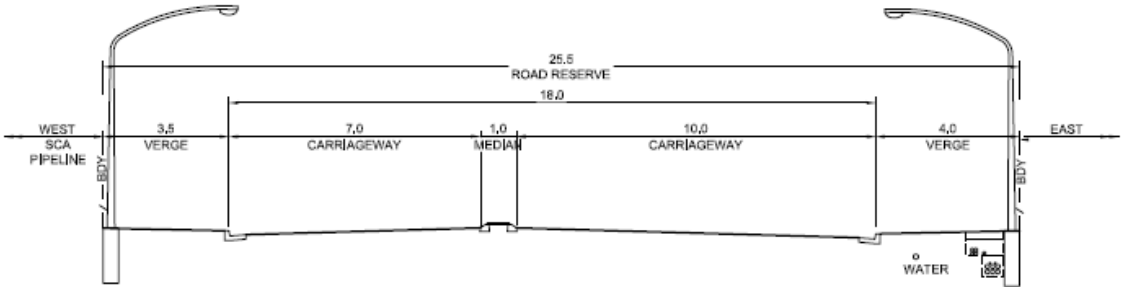


Figure 6 - Old Wallgrove Road (MC02) - Typical Section CH216-CH250

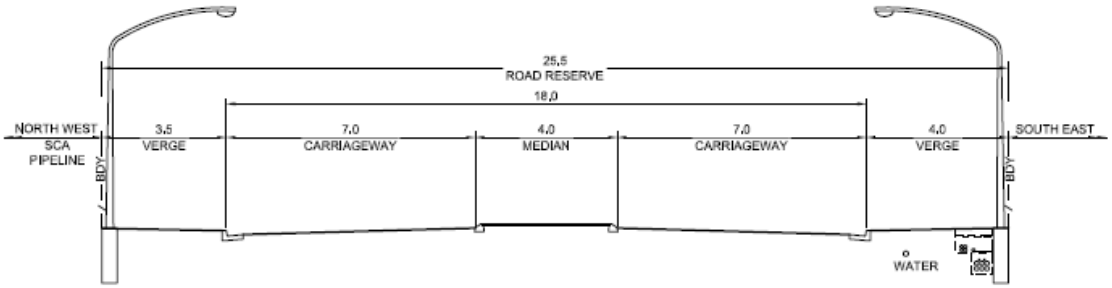


Figure 7 - Old Wallgrove Road (MC02) - Typical Section CH141-CH175

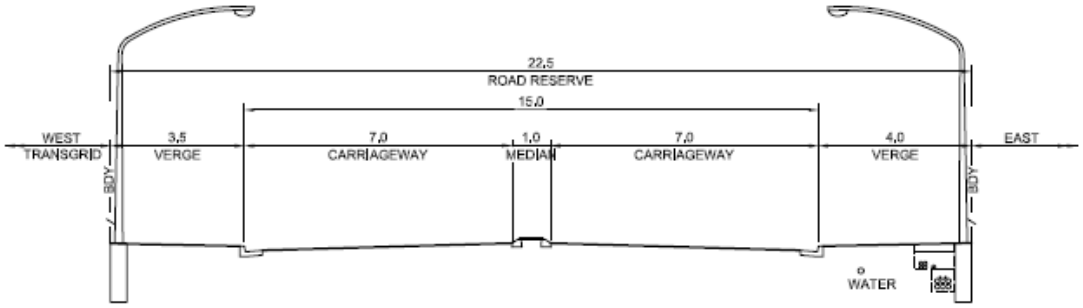


Figure 8 - Old Wallgrove Road (MC02) - Typical Section

4.2.1 Lane types and comment

The existing single carriageway, with 2 x 3.5m-4.3m wide lanes, will be changed to a dual carriageway, each with 2 x 3.5m wide lanes. In certain sections, lanes increase in width to a maximum of 4.5m to account for heavy vehicle turning requirements.

As part of the change to a dual carriageway, a central median will be constructed to delineate the carriageways.

4.2.2 Median type and comment

The proposed concrete median will vary in width, from a minimum of 1.0m to a maximum of 5.0m.

The median will be of a concrete type, with scope to provide landscaping elements in those sections of median where widths are greater.

The table below is taken from the RMS Supplement to the Austroads design guidelines. The table describes the minimum median widths, depending on the median function. With reference to the proposed design, all medians widths are above the minimum width criteria.

Median function	Minimum width (m)
Adjacent to a Right Turn Bay	0.5
Separate traffic flows with a rigid (concrete) safety barrier (1) (2)	1.6
Shelter a small sign	1.2
Shelter dual 200mm and single 300mm lantern display	1.5
Shelter dual 300mm lantern display	1.8
Shelter pedestrians (provision for Tactile Ground Surface Indicators) and traffic signals	2.5
Shelter pedestrians, two stage signalled pedestrian mid-block	4.0
Shelter turning vehicles and traffic signals (excluding width of adjacent lane)	2.4
Shelter crossing vehicles	7.0

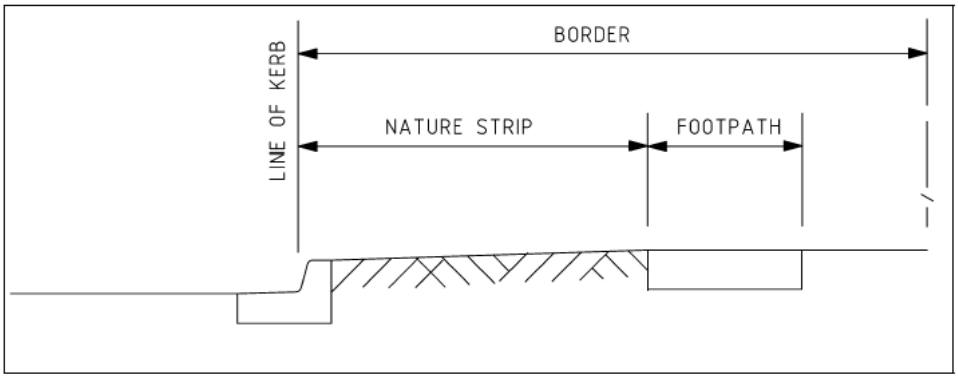
Table 4.14a: Urban Median Widths

Figure 9 - RMS Supplement to the Austroads Design Guidelines - Median Width

4.2.3 Allocation of road space for utilities, pedestrians and bicycles

A sufficiently wide verge has been allowed. The verge along MC01 is 4.5m wide along both sides of the proposed road upgrade, while the verge along MC02 has a verge width of 3.5 on the western side and a verge width of 4.0m on the eastern side. The verge in all areas is wide enough to include the proposed pedestrian/cycle paths and for the inclusion of all proposed services.

As per the Austroads Design Guidelines, the verge width is referred as a ‘Border’. The ‘Border’ is described in the figure below:



Source: VicRoads (2002b).

Figure 10 – Austroads Design Guidelines - Border Diagram

The wording below is taken from the RMS Supplement to the Austroads design guidelines. The wording describes the desirable verge, or border widths and the reason by which these widths have been selected. With reference to the proposed design, all verge or border widths are above the minimum width criteria.

Urban Border

Paragraph 1
Delete "The urban border usually comprises two parts, a path for pedestrians and the nature strip. The elements of the urban border are shown on Figure 4.37. The main functions of the border are:"
and replace with:
"The urban border usually comprises the area from the face of kerb to the road boundary. Desirably the footway should be at least 3.0m wide and desirably 3.5m wide in order to contain the footpath for pedestrians and space for public utilities. Any residual road reserve should be allocated to the footway to provide additional space for landscaping and driveways. The elements of the urban border are shown on Figure 4.37. If kerbed footways are not provided then sufficient verge width should be available to enable pedestrians to walk clear of the road carriageway, e.g. lanes and shoulders. The main functions of the urban border are:" at start of paragraph.

Figure 11 - RMS Supplement to Austroad Design Guidelines - Border or Verge Widths

4.2.4 Allocation of road space for landscaping

Minimal landscaping works can occur within the verges where no pedestrian/cycle paths are constructed. Further, other than turfing, planting will be limited in those sections of the verge which contain underground services.

In addition, those wider sections of the roads central median could be designed to include landscaping.

4.2.5 Cut and fill batter slopes

The proposed upgrade of Old Wallgrove Road has been designed to generally maintain the existing vertical grade of the road, thus minimal/no alteration to the existing batters is anticipated. Any changes to the final pavement levels which require a batter back to the surrounding existing surface levels, will batter back to the road surface at a nominal 2:1 (or 3:1 where possible) slope.

The table below summarises the desirable and maximum batter slopes, as per the Austroad Design Guidelines.

Table 4.12: Typical design batter slopes

	Cut		Fill	
	Desirable	Maximum	Desirable	Maximum
Earth batter	3:1	2:1	6:1	4:1 (2)
Rock batter	0.5:1	0.25:1 (1)	–	–
Median	10:1	6:1 (2)	10:1	6:1 (2)

Figure 12 - Austroad Design Guidelines - Batter Slopes

The wording below is taken from the RMS Supplement to the Austroads design guidelines, and describes how the wording in the above table is modified to suit RMS guidelines. With reference to the proposed design, proposed batter slopes are within RMS guidelines.

Batters

Paragraph 4
Delete "desirable" after "Slopes flatter than the" and before "maximum (Table 4.12) should be used where possible"

Figure 13 - RMS Supplement to Austroads Guidelines - Batter Slopes

4.2.6 Crossfall/adverse crossfall

Nominal crossfall along the proposed upgrade of Old Wallgrove Road will generally be at 3.0%.

Superelevation lengths with be at 7.0% maximum, which suit the proposed curve radii.

5 Geometric Design

5.1 Utilities

Utility locations were determined using Dial Before You Dig information, ground survey data and underground service potholing.

5.2 Relationship and Proximity to Electrical Infrastructure

Both Transgrid and Endeavour require the following clearances to exiting services where possible:

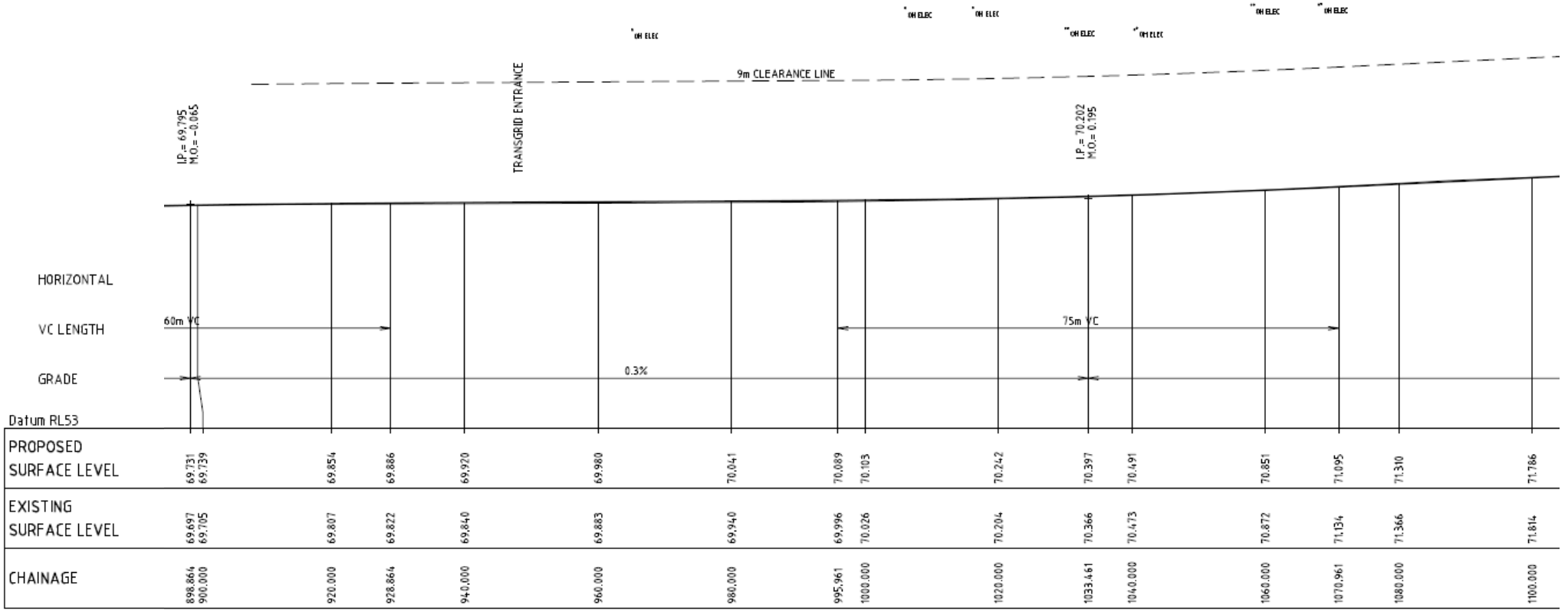
Item	Desirable Clearance	Minimum Clearance
Existing structural Stanchions (Horizontal Clearance)	30m	15m
Overhead 132kV (Vertical Clearance)		9m
Overhead 11kV (Vertical Clearance)		6m

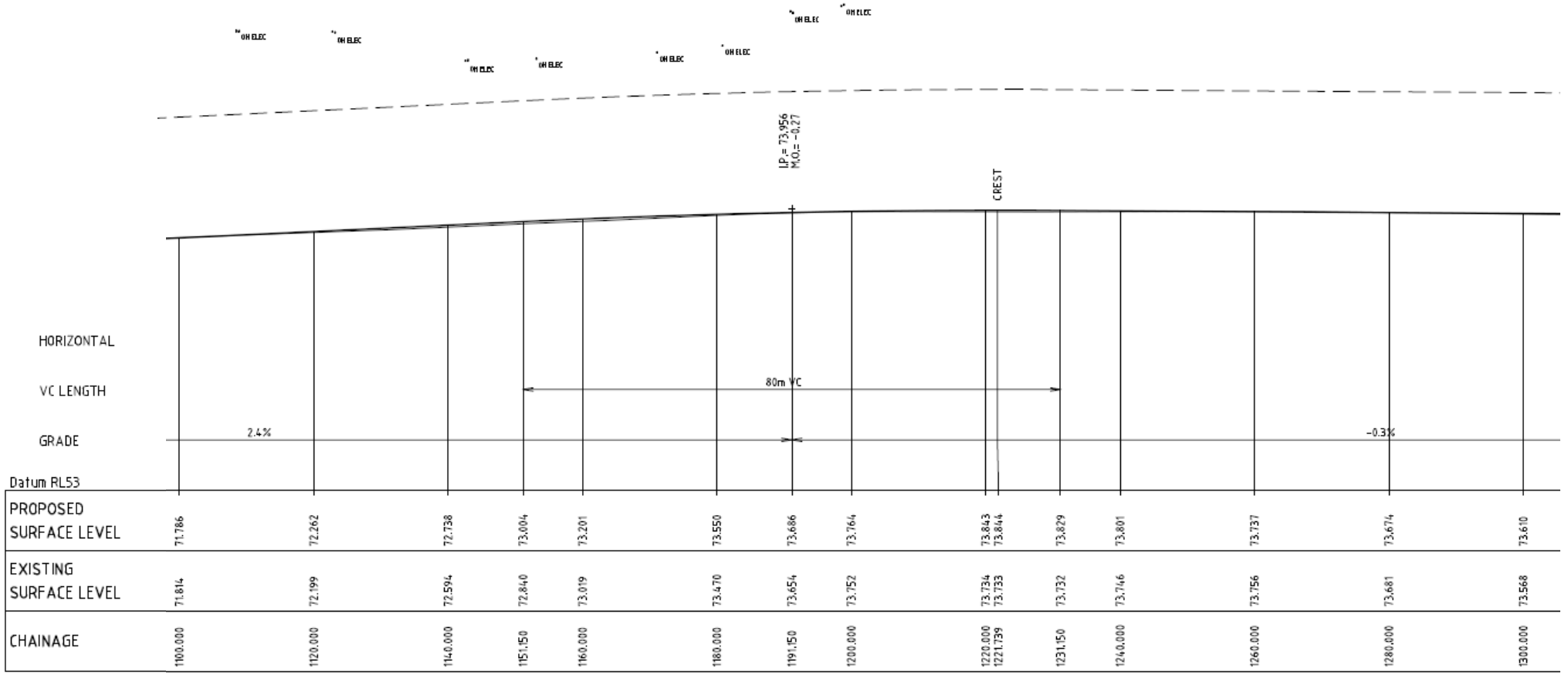
Table 3 - Electrical Horizontal and Vertical Clearances

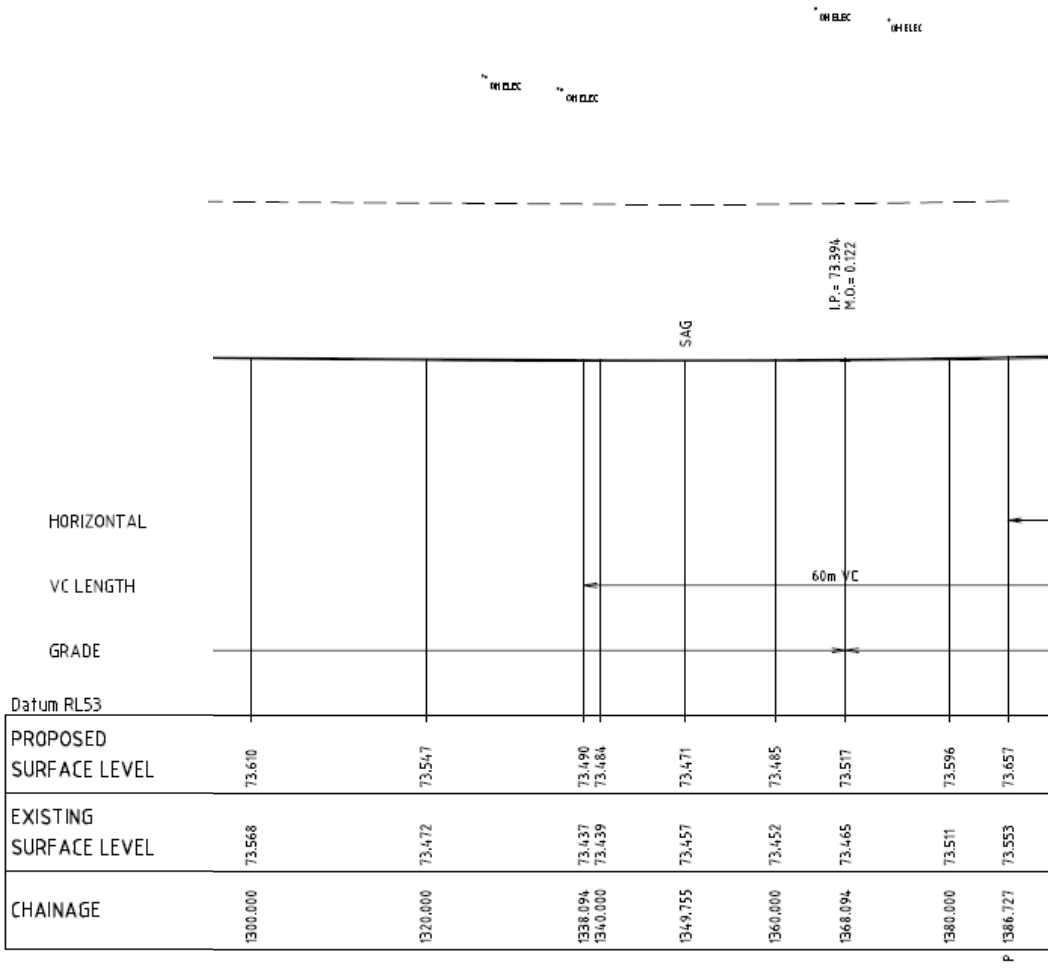
It should be noted that many of the existing Transgrid structure lattice towers are located with horizontal clearances less than 15m. The boundary within the section of the proposed upgrade to Old Wallgrove Road adjacent to the Transgrid infrastructure is currently designed with no change, so that current clearances to the Transgrid infrastructure are maintained, despite the existing non-conformity. Refer to AT&L's for horizontal locality of Transgrid structures and proximity to the proposed road alignment.

With respect to vertical clearances, the vertical alignment of the proposed upgrade is generally the same as the existing Old Wallgrove Road alignment. Thus, any existing vertical clearances to cables will be retained and shall stay within permissible heights. As noted in Table 3 above, the minimum vertical clearance is 9m. The figure below, highlights a section of the proposed long section, showing the road surface level, the 9m vertical clearance to overhead electrical, and shows the vertical location of the overhead cables. It should be noted that all overhead electrical cables are above the 9m clearance line.

Figure 14 - Proposed Old Wallgrove Road Upgrade Longsection with 9m Electrical Clearance and Overhead Electrical Cables Shown




OH ELEC
IP = 73.956
M.O. = -0.27
CREST
HORIZONTAL
VC LENGTH
80m VC
GRADE
2.4%
-0.3%
Datum RL53
PROPOSED SURFACE LEVEL
71.786 72.262 72.738 73.004 73.201 73.550 73.686 73.764 73.843 73.844 73.829 73.801 73.737 73.674 73.610
EXISTING SURFACE LEVEL
71.814 72.199 72.594 72.840 73.019 73.470 73.654 73.752 73.734 73.733 73.732 73.746 73.756 73.681 73.568
CHAINAGE
1100.000 1120.000 1140.000 1151.150 1160.000 1180.000 1191.150 1200.000 1220.000 1221.739 1231.150 1240.000 1260.000 1280.000 1300.000


OH ELEC
OH ELEC
OH ELEC
OH ELEC
I.P. = 73.394
M.O. = 0.122
SAG
HORIZONTAL
VC LENGTH
60m VC
GRADE
Datum RL53
PROPOSED SURFACE LEVEL
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73.547
73.490
73.484
73.471
73.485
73.517
73.596
73.657
EXISTING SURFACE LEVEL
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73.472
73.437
73.439
73.457
73.452
73.465
73.511
73.553
CHAINAGE
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1320.000
1338.094
1340.000
1349.755
1360.000
1368.094
1380.000
1386.727

5.3 Site Issues

5.3.1 Geotechnical

No geotechnical investigations have been undertaken at this stage. These works are to be undertaken at detailed design stage. It is expected boreholes and test-pits will be undertaken at regular intervals along the road. The investigation would identify the CBR of the existing subgrade, existing pavement depth and composition, ability to reuse the existing pavement, advice on a proposed pavement design etc.

5.3.2 Pavement Design

A final pavement design for both the rigid and flexible pavement areas for the project is pending, subject to further analysis of the geotechnical data and a final decision on the preferred construction methodology and staging

Our suggested pavement as below:

- Asphalt wearing course on,
- Granular or bound base on,
- Select Material Zone on,
- Subgrade improvements when required.

Final pavement designs will be prepared in accordance and in consultation with RMS and RMS guidelines/specifications.

5.4 Property Acquisitions and Adjustments

The following property acquisitions have been identified (Refer to the Drawing C361):

Land Owner	**Approximate Area of Land to Be Acquired (m2)**
Transgrid	2,076
Sydney Catchment Authority	1,980
Austral Brickworks	3,987

Note: These areas are preliminary and are subject to confirmation during the detail design stage.

5.5 Horizontal Curves and Alignment

5.5.1 Horizontal Sight Distance

The horizontal alignment will remain similar to existing, retaining the currently acceptable sight distance, with the addition of an extra width adjacent to the current roadway within the central median. Any proposal for planting of the median will need to be assessed for sight distance requirements, particularly on the inside of horizontal curves.

At present, horizontal sight distance on Old Wallgrove Road is not optimal at the crossing of the SCA pipeline. As part of the proposed upgrade of Old Wallgrove Road, horizontal sight distance at the SCA Crossing will be improved by the works. Horizontal sight distances will be checked to comply with the RMS Supplement to the Austroad Guidelines, with reference to section 5.4.

5.5.2 Superelevation Transitions

The majority of the works in relatively straight with no horizontal curves apart from the SCA crossing where minimum radii are used and maximum superelevation is expect to be used.

5.5.3 Lane Widening

No lane widening is required on this section of the works, although this will be determined at the detailed design stage and in accordance with the design guides.

5.6 Vertical Alignment

5.6.1 Vertical Sight Distance/Stopping Distance

Vertical stopping sight distance along the works currently complies with design guidelines, due largely to the flat grades and long straights. Where the vertical alignment has been amended in the current concept design to enable reshaping of the superelevation transition areas, vertical stopping sight distance requirements have been achieved.

As per Austroads Design Guidelines, section 5.3, stopping sight distance is calculated based on the following equation:

$$SSD = \frac{R_T V}{3.6} + \frac{V^2}{254(d + 0.01a)}$$

R_T = reaction time (sec)
V = operating speed (km/h)
d = coefficient of deceleration (longitudinal friction factor)
a = longitudinal grade (%, + for upgrades and - for downgrades).

Figure 15 - Stopping Sight Distance Calculation

It should be noted that the during the detailed design phase, stopping site distance will be check for compliance with the above calculation to ensure that the minimum required stopping sight distance is achieved throughout the road length. The current design meets the required stopping site distance criteria.

5.7 Tie In

5.7.1 Erskine Park Link Road (EPLR)

The recently completed EPLR made allowance for the future upgrade of OWR. Only minimal works are required to enable the tie-in to the intersection.

5.7.2 SCA Pipeline

It is proposed to provide adequate access to and from OWR at the SCA crossing. Through discussions with SCA, they identified their requirements and a provision has been made to satisfy SCA. Further consultation is required to ensure SCA are satisfied.

If required, the access point to the SCA pipeline could be signalised if required.

5.7.3 Transgrid Site Entry

Local widening has been provided at the Transgrid entrance to enable a right turn lane for traffic entering the site. The design of the intersection is such that, if required in the future, the intersection could be signalised.

5.8 Stormwater Management

5.8.1 Design Information

The majority of the existing stormwater system will remain operational, with alterations to pit inlet levels and locations to accommodate the proposed finished surface levels or revised median width. New drainage lines will only be constructed where the carriageway pavement is to be shifted above an existing longitudinal drainage line.

Details of existing invert levels and pipe condition will be required prior to the detail design stage. As a means of obtaining this information, detailed survey has been undertaken, which has provided pit invert levels and pipe information.

5.8.2 Hydrological Investigation

A hydrological investigation will be undertaken as part of the project, to determine the flooding effects from the works, primarily from upstream Creek catchments.

5.8.3 Cross Drainage

The existing cross drainage will be upgraded to cater for the design storm. Longitudinal drainage will be directly connected to this cross drainage to minimise additional discharge points to the existing creek system.

5.9 Traffic Management, Staging

Generally, it is proposed to construct the works in two separate stages, maintaining the existing carriageway and constructing two of the new lanes and then switching the traffic and constructing the final two lanes. Confirmation of this general traffic management and construction staging arrangement will be confirmed during the detailed designs stage.

Prior to construction, a detailed Traffic Management Plan will be prepared in accordance with the relevant RMS Traffic Management Guidelines, and will be submitted to the RMS Traffic Management Department for compliance and signoff, prior to the commencement of any works.

6 Finalisation

Once DA approval is granted, the following is required:

- Constructability Review.
- Road Safety Audit.
- Detailed Design including:
    - Civil Design.
    - Stormwater Design.
    - Geotechnical Investigation.
    - Pavement Design.
    - Electrical Design.
    - Water Relocation design.
- Detailed Cost Estimation.
- Design reviews.
- Submission to RMS and commencement of the WAD process.

7 Conclusion

The design to date has been prepared for inclusion in the development application giving due consideration to the existing stake holders, physical features on site, design constraints and relevant design guidelines.

It is concluded the design could be further advanced through to a Detailed Design/Construction documentation level, as further design will ensure with certainty that there will be no major unknown constraints.

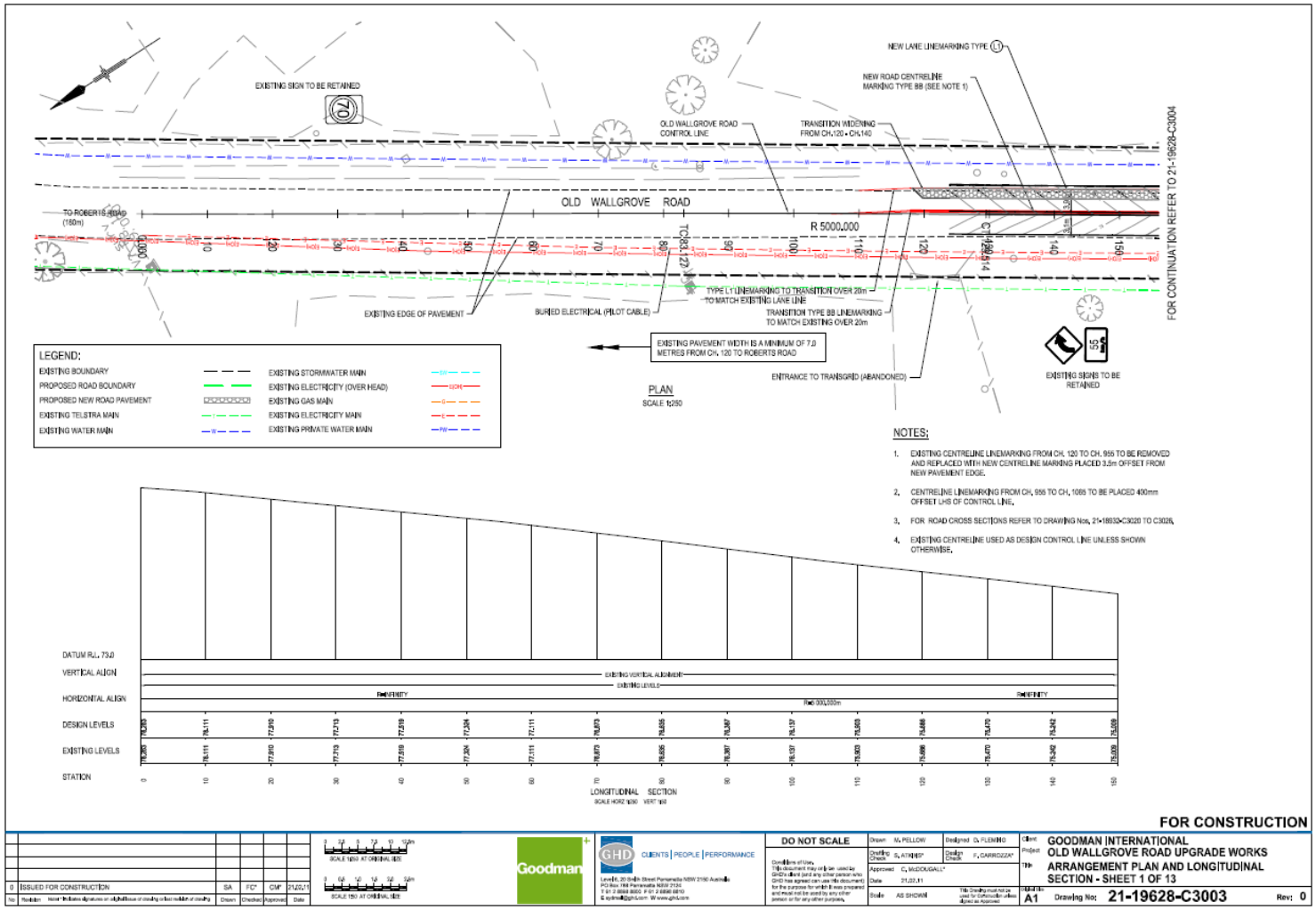
Once complete, the road will operate at the intended design speed, safely and efficiently as a regional road.

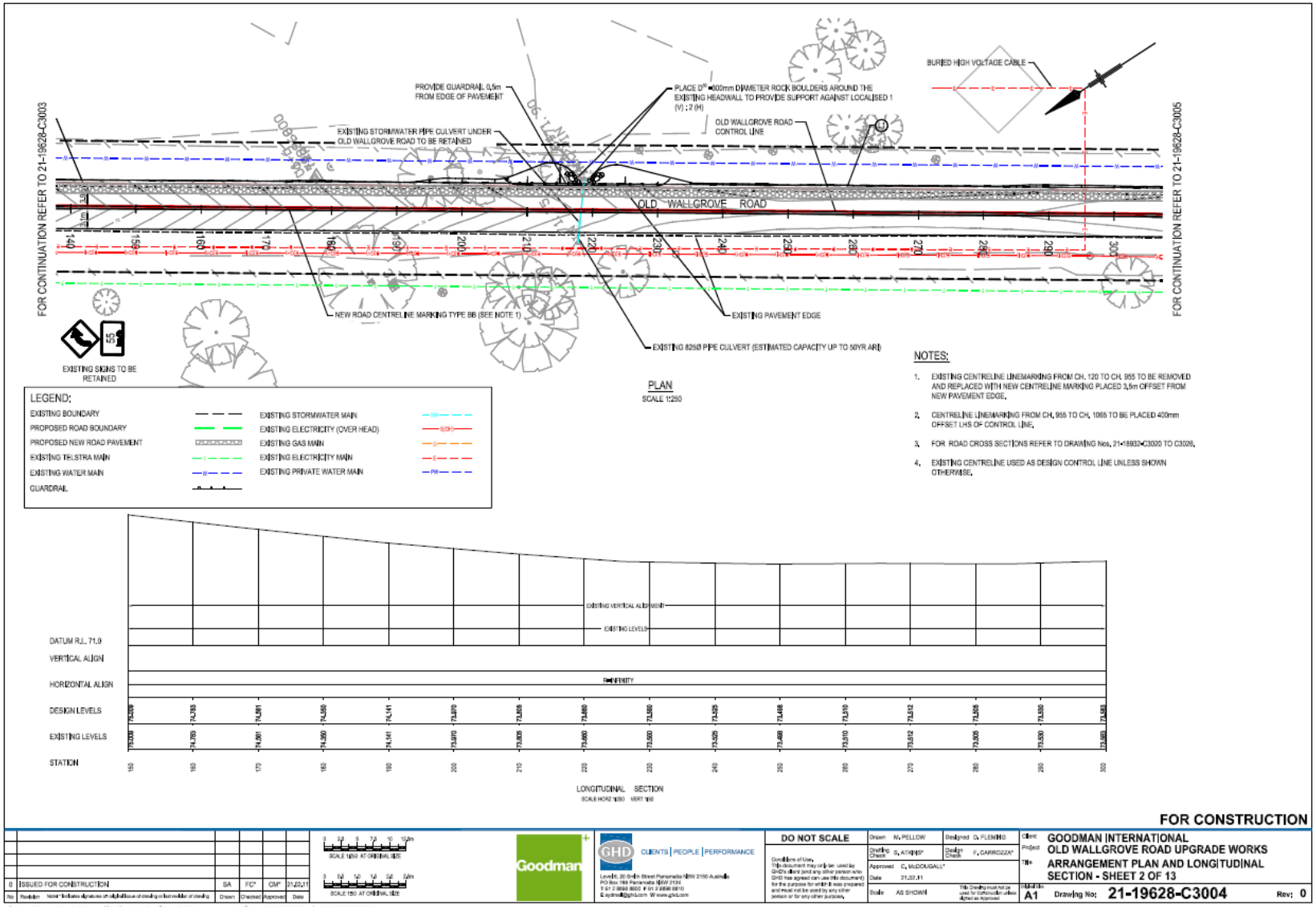
The design is generally in accordance with the relevant RMS and Austroad Design Guidelines. Upon approval, detailed design shall be completed to comply with the relevant standards and to the satisfaction of RMS, as well as any conditions of the approval.

Currently, Old Wallgrove Road acts as a link road between the local Council controlled roads and other regional/state roads controlled by RMS. Future developments within the area will further utilise Old Wallgrove Road as a link road, providing access to additional local roads and other regional/state roads within the area. Thus, it is AT&L's considered opinion that the section of Old Wallgrove Road described herein, should be classified as a Regional Road, and therefore be controlled by RMS.

8 Appendices

8.1 Appendix A – GHD OWR Upgrade Drawings (Works Completed)




FOR CONTINUATION REFER TO 21-19628-C3003
FOR CONTINUATION REFER TO 21-19628-C3005
PROVIDE GUARDRAIL 0.5m FROM EDGE OF PAVEMENT
PLACE D= 600mm DIAMETER ROCK BOULDERS AROUND THE EXISTING HEADWALL TO PROVIDE SUPPORT AGAINST LOCALISED 1 (V) : 2 (H)
BURIED HIGH VOLTAGE CABLE
EXISTING STORMWATER PIPE CULVERT UNDER OLD WALLGROVE ROAD TO BE RETAINED
OLD WALLGROVE ROAD CONTROL LINE
OLD WALLGROVE ROAD
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
EXISTING PAVEMENT EDGE
EXISTING 825ϕ PIPE CULVERT (ESTIMATED CAPACITY UP TO 50YR ARI)
EXISTING SIGNS TO BE RETAINED
PLAN
SCALE 1:250
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 TO CH. 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH. 955 TO CH. 1055 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos. 21-19628-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
GUARDRAIL
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 71.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 2 OF 13
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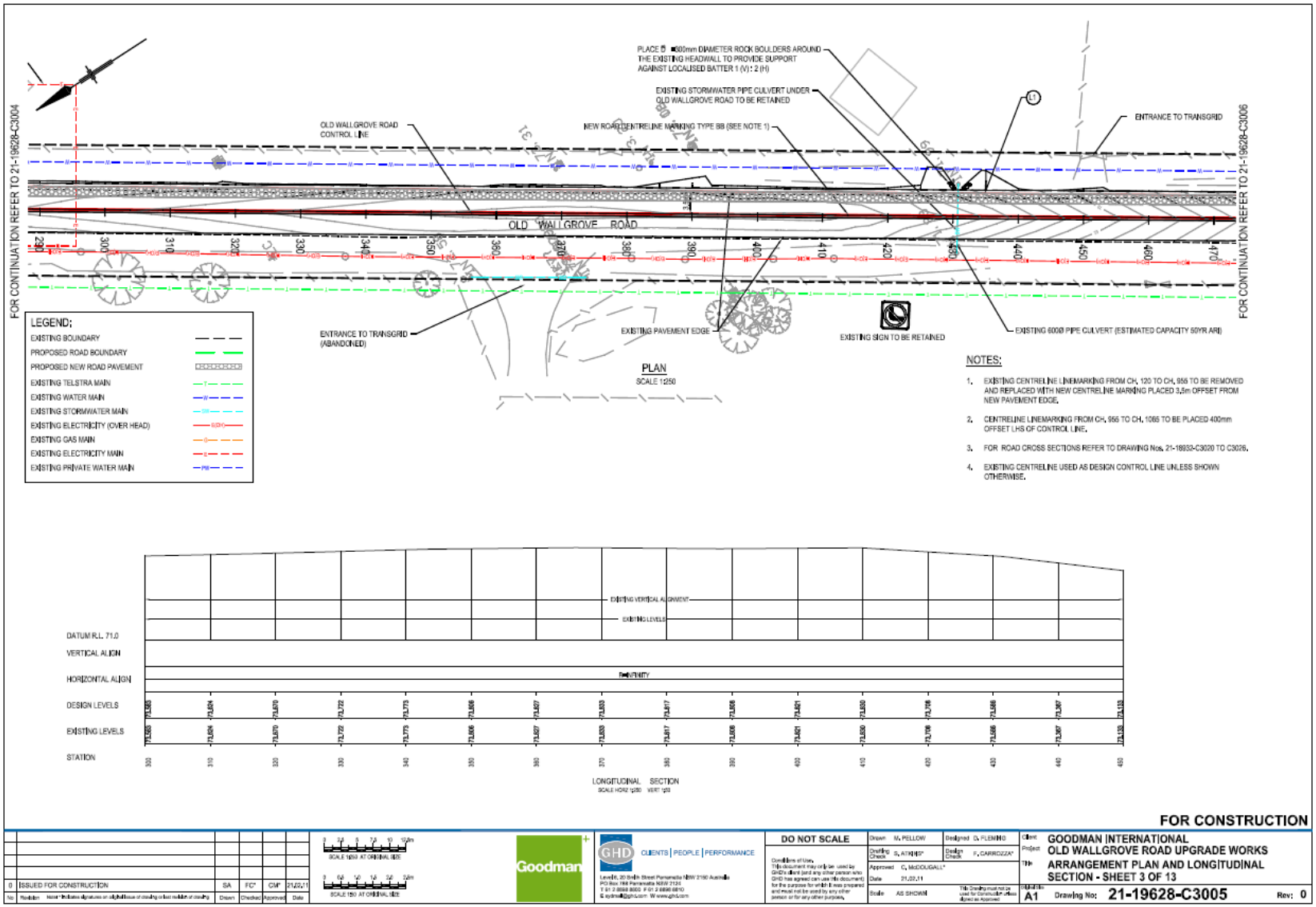
Rev: 0


PLACE ■600mm DIAMETER ROCK BOULDERS AROUND THE EXISTING HEADWALL TO PROVIDE SUPPORT AGAINST LOCALISED BATTER 1 (V) : 2 (H)
EXISTING STORMWATER PIPE CULVERT UNDER OLD WALLGROVE ROAD TO BE RETAINED
OLD WALLGROVE ROAD CONTROL LINE
NEW ROAD CENTRELINE MARKING TYPE 9B (SEE NOTE 1)
ENTRANCE TO TRANSGRID
FOR CONTINUATION REFER TO 21-19628-C3004
FOR CONTINUATION REFER TO 21-19628-C3006
OLD WALLGROVE ROAD
ENTRANCE TO TRANSGRID (ABANDONED)
EXISTING PAVEMENT EDGE
EXISTING SIGN TO BE RETAINED
EXISTING 600Ø PIPE CULVERT (ESTIMATED CAPACITY 50YR ARI)
PLAN
SCALE 1:250
LEGEND;
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 TO CH. 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH. 955 TO CH. 1065 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos. 21-19932-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 71.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
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ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 3 OF 13
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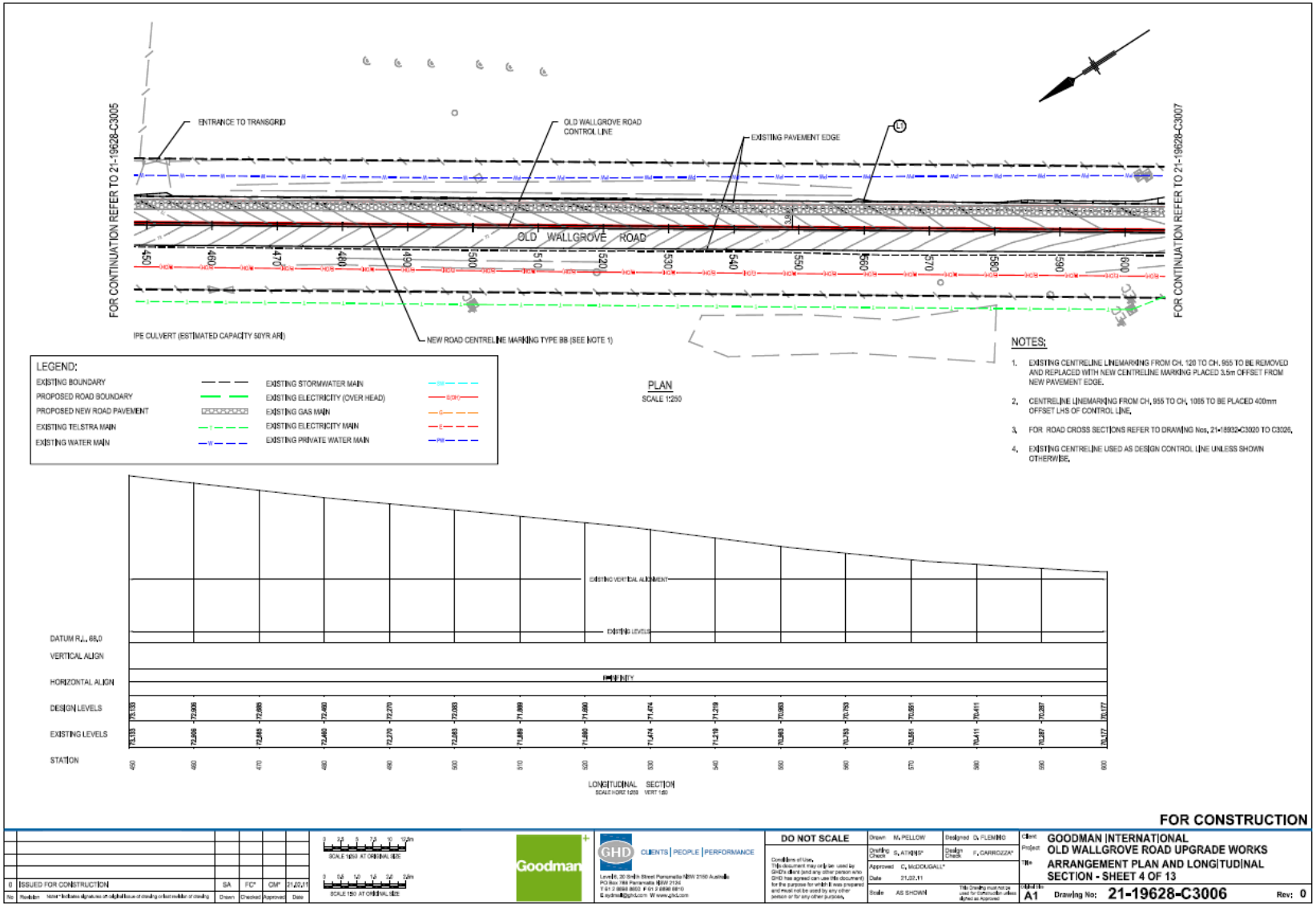
Rev: 0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OLD WALLGROVE ROAD CONTROL LINE
EXISTING PAVEMENT EDGE
OLD WALLGROVE ROAD
FOR CONTINUATION REFER TO 21-19628-C3005
FOR CONTINUATION REFER TO 21-19628-C3007
IPE CULVERT (ESTIMATED CAPACITY 50YR ARI)
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
PLAN
SCALE 1:250
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 TO CH. 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH. 955 TO CH. 1085 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos. 21-19932-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 68.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
ISSUED FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 4 OF 13
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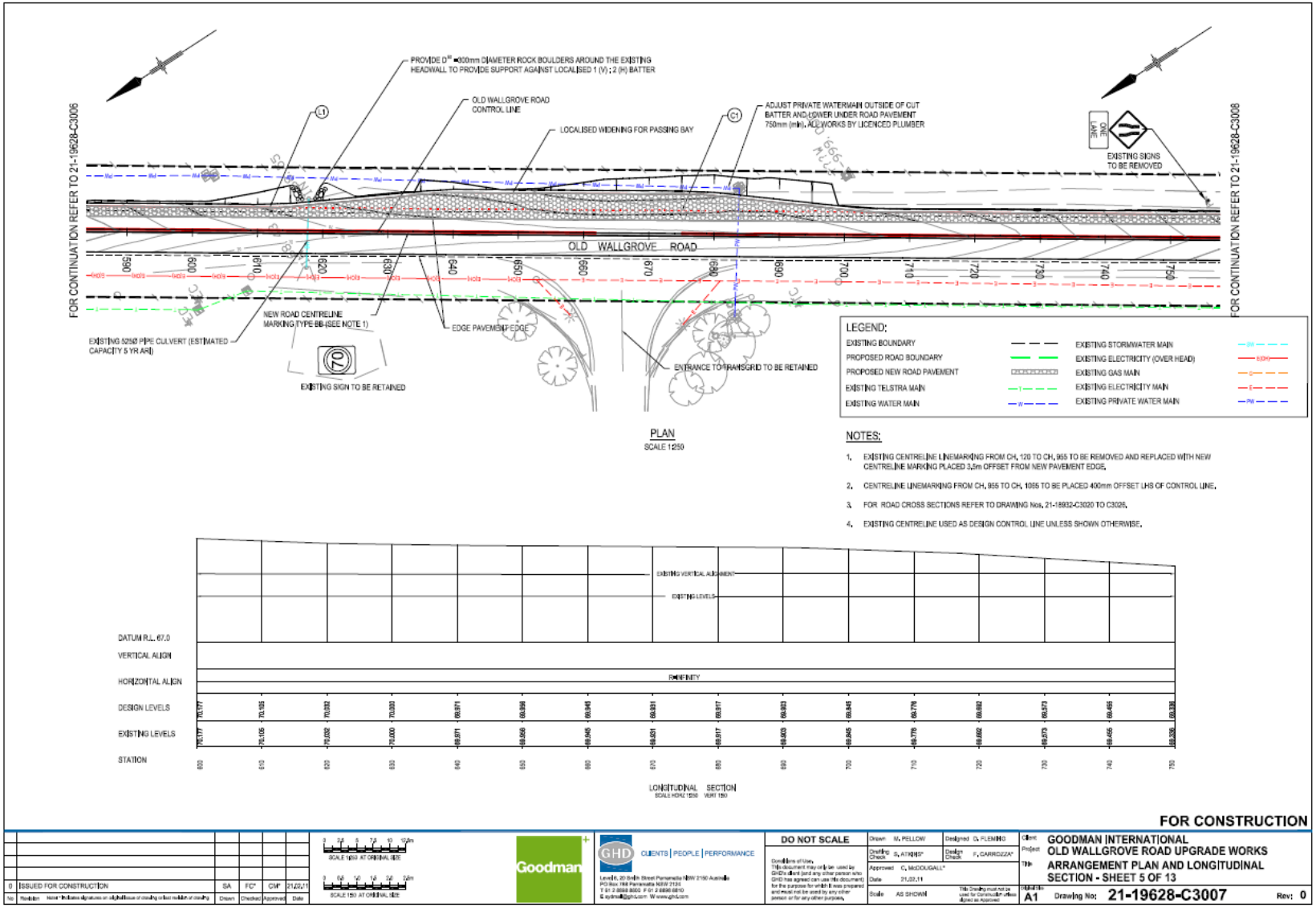
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OLD WALLGROVE ROAD CONTROL LINE
LOCALISED WIDENING FOR PASSING BAY
ADJUST PRIVATE WATERMAIN OUTSIDE OF CUT BATTER AND LOWER UNDER ROAD PAVEMENT 750mm (min). ADJ WORKS BY LICENCED PLUMBER
EXISTING SIGNS TO BE REMOVED
FOR CONTINUATION REFER TO 21-19628-C3006
FOR CONTINUATION REFER TO 21-19628-C3008
OLD WALLGROVE ROAD
NEW ROAD CENTRELINE MARKING (TYPE BB (SEE NOTE 1)
EDGE PAVEMENT EDGE
EXISTING 825Ø PIPE CULVERT (ESTIMATED CAPACITY 5 YR ARI)
EXISTING SIGN TO BE RETAINED
ENTRANCE TO FARMSGRID TO BE RETAINED
PLAN
SCALE 1:250
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH, 120 TO CH, 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH, 955 TO CH, 1085 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos, 21-19932-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 67.0
VERTICAL ALIGN
HORIZONTAL ALIGN
TANGENTIAL
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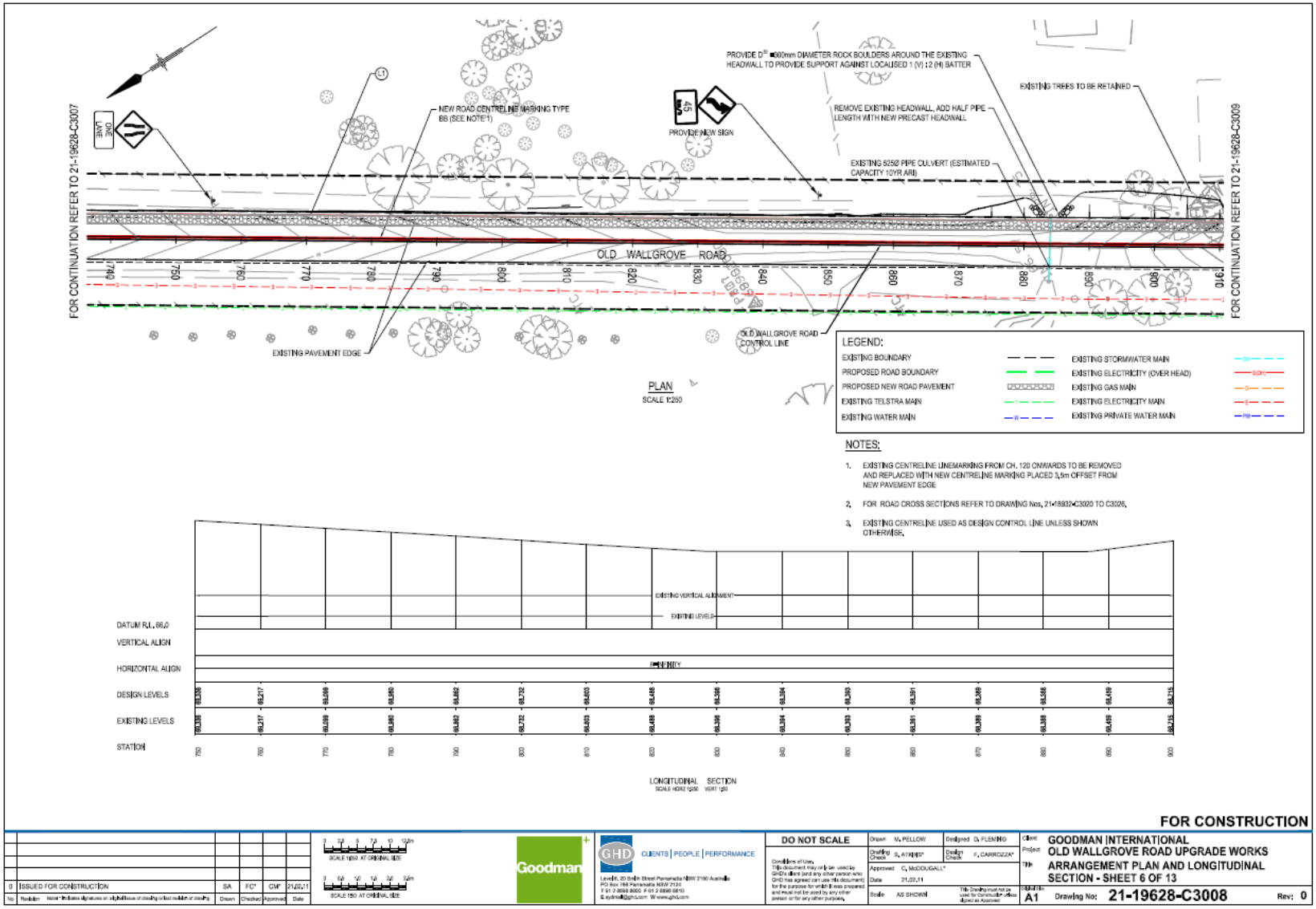
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
SCALE HORZ 1:250 VERT 1:50
FOR CONSTRUCTION
0 ISSUED FOR CONSTRUCTION SA FC* CM* 21.03.11
SCALE 1:250 AT ORIGINAL SIZE
SCALE 1:50 AT ORIGINAL SIZE
Goodman
GHD CLIENTS | PEOPLE | PERFORMANCE
DO NOT SCALE
Drawn M. PELLOW
Designed G. FLEMING
Drafting Check S. ATKINS*
Design Check F. CARROZZA*
Approved C. McDOUGALL*
Date 21.03.11
Scale AS SHOWN
A1
Client GOODMAN INTERNATIONAL
Project OLD WALLGROVE ROAD UPGRADE WORKS
Title ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 5 OF 13
Drawing No: 21-19628-C3007
Rev: 0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EXISTING TREES TO BE RETAINED
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
PROVIDE NEW SIGN
REMOVE EXISTING HEADWALL, ADD HALF PIPE LENGTH WITH NEW PRECAST HEADWALL
EXISTING 825Ø PIPE CULVERT (ESTIMATED CAPACITY 10YR ARI)
FOR CONTINUATION REFER TO 21-19628-C3007
FOR CONTINUATION REFER TO 21-19628-C3009
OLD WALLGROVE ROAD
EXISTING PAVEMENT EDGE
OLD WALLGROVE ROAD CONTROL LINE
PLAN
SCALE 1:250
LEGEND:
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PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 ONWARDS TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE
2. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos, 21-19628-C3020 TO C3026.
3. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 66.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
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OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 6 OF 13
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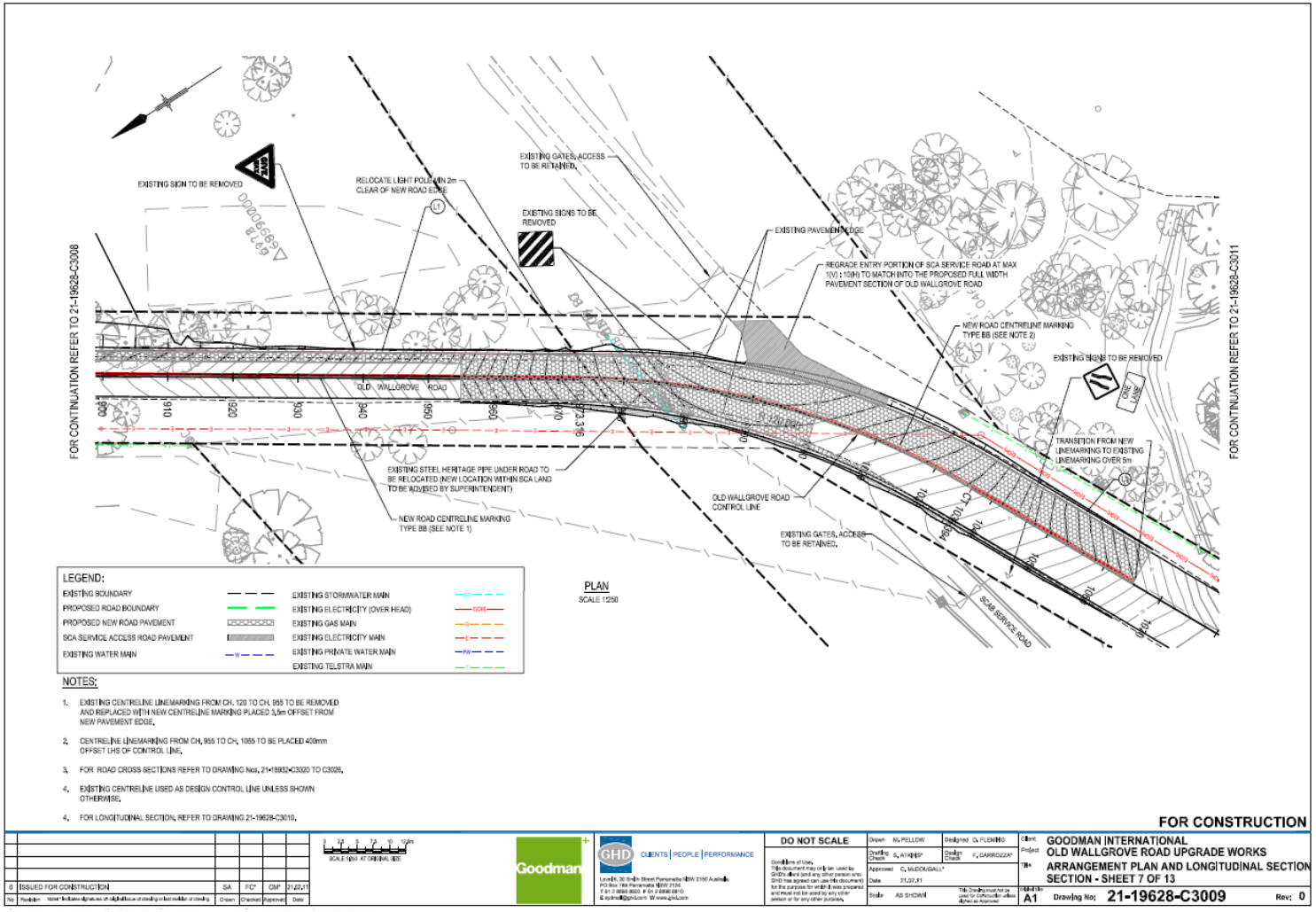
EXISTING SIGN TO BE REMOVED
RELOCATE LIGHT POLE MIN 2m CLEAR OF NEW ROAD EDGE
EXISTING GATES, ACCESS TO BE RETAINED.
EXISTING SIGNS TO BE REMOVED
EXISTING PAVEMENT EDGE
REGRADE ENTRY PORTION OF SCA SERVICE ROAD AT MAX 1(V) : 10(H) TO MATCH INTO THE PROPOSED FULL WIDTH PAVEMENT SECTION OF OLD WALLGROVE ROAD
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 2)
EXISTING SIGNS TO BE REMOVED
ONE LANE
TRANSITION FROM NEW LINEMARKING TO EXISTING LINEMARKING OVER 5m
FOR CONTINUATION REFER TO 21-19628-C3008
FOR CONTINUATION REFER TO 21-19628-C3011
OLD WALLGROVE ROAD
EXISTING STEEL HERITAGE PIPE UNDER ROAD TO BE RELOCATED (NEW LOCATION WITHIN SCA LAND TO BE ADVISED BY SUPERINTENDENT)
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
OLD WALLGROVE ROAD CONTROL LINE
EXISTING GATES, ACCESS TO BE RETAINED.
SCA SERVICE ROAD
PLAN
SCALE 1:250
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
SCA SERVICE ACCESS ROAD PAVEMENT
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
EXISTING TELSTRA MAIN
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 TO CH. 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH. 955 TO CH. 1085 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos. 21-19628-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
4. FOR LONGITUDINAL SECTION, REFER TO DRAWING 21-19628-C3010.
FOR CONSTRUCTION
0 ISSUED FOR CONSTRUCTION SA FC* CM* 21.07.11
DO NOT SCALE
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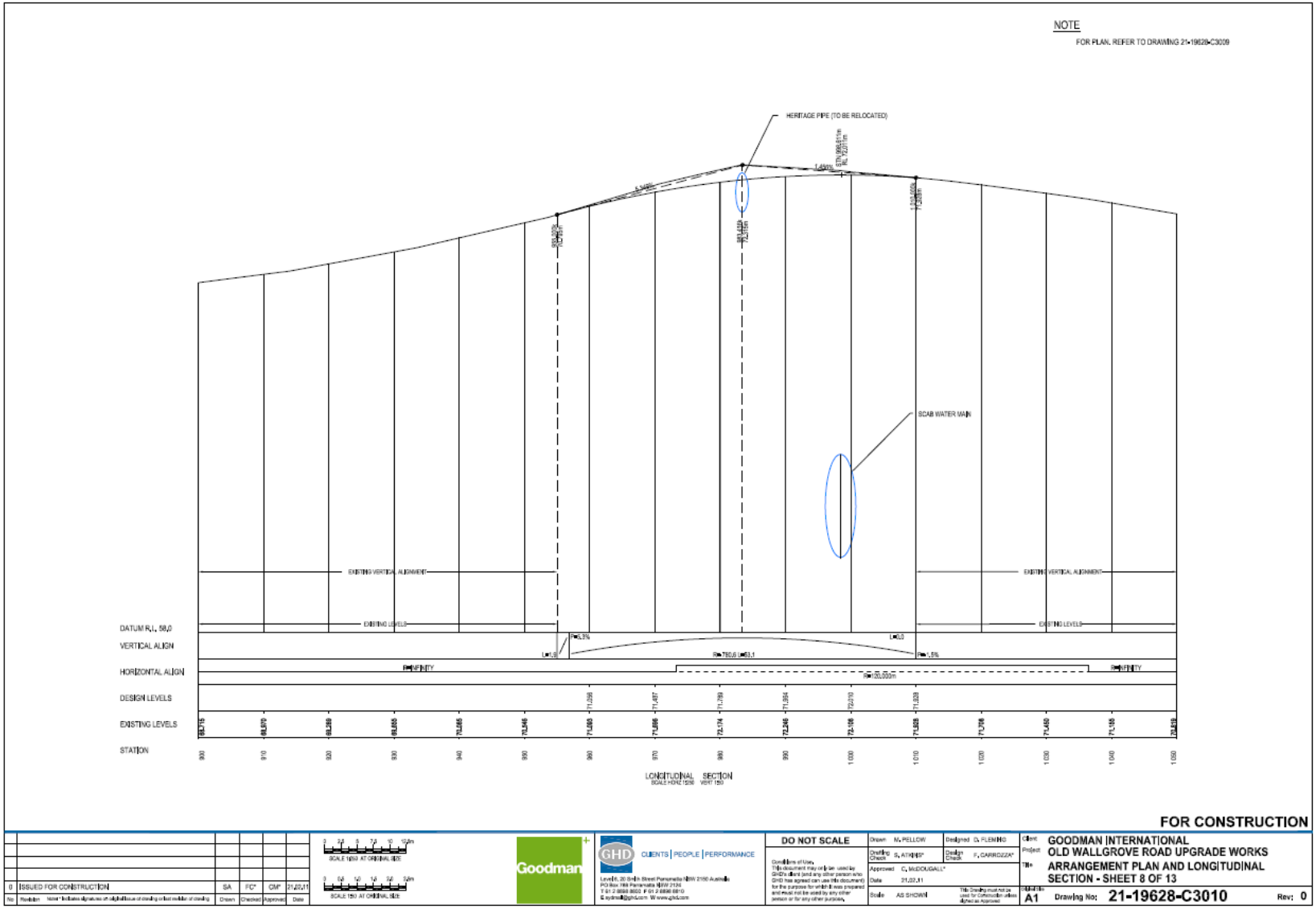
GHD CLIENTS | PEOPLE | PERFORMANCE
Drawn M. PELLOW
Designed G. FLEMING
Drafting Check S. ATKINS*
Design Check F. CARROZZA*
Approved C. McDOUGALL*
Date 21.07.11
Scale AS SHOWN
Original size A1
Client GOODMAN INTERNATIONAL
Project OLD WALLGROVE ROAD UPGRADE WORKS
Title ARRANGEMENT PLAN AND LONGITUDINAL SECTION SECTION - SHEET 7 OF 13
Drawing No: 21-19628-C3009
Rev: 0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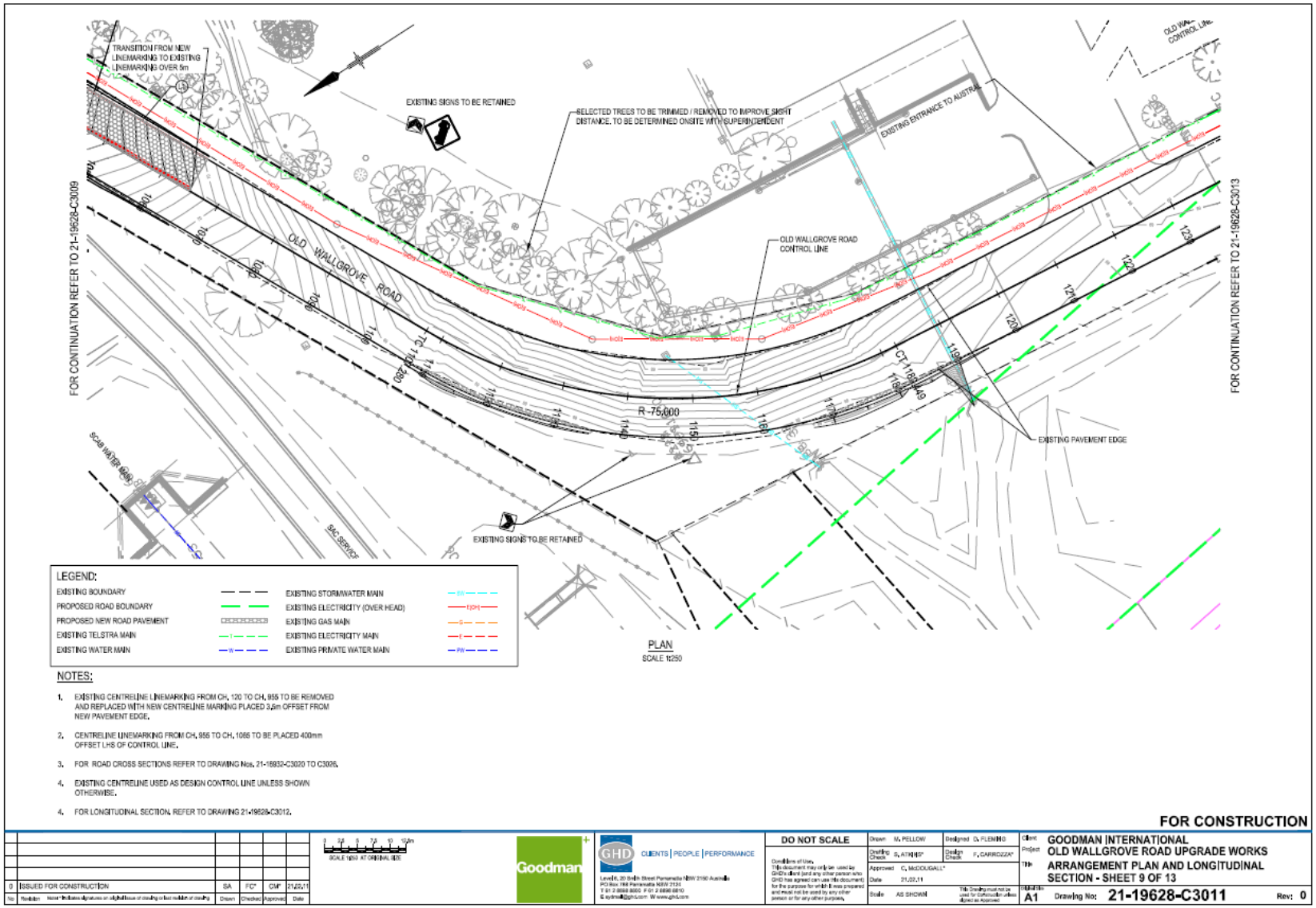
FOR PLAN, REFER TO DRAWING 21-19628-C3009
HERITAGE PIPE (TO BE RELOCATED)
SCAB WATER MAIN
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 58.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 8 OF 13
Drawing No: 21-19628-C3010
Rev: 0


TRANSITION FROM NEW LINEMARKING TO EXISTING LINEMARKING OVER 5m
EXISTING SIGNS TO BE RETAINED
SELECTED TREES TO BE TRIMMED / REMOVED TO IMPROVE SIGHT DISTANCE. TO BE DETERMINED ONSITE WITH SUPERINTENDENT
EXISTING ENTRANCE TO AUSTRAL
OLD WALLGROVE ROAD CONTROL LINE
OLD WALLGROVE ROAD
FOR CONTINUATION REFER TO 21-19628-C3009
FOR CONTINUATION REFER TO 21-19628-C3013
R -75.000
EXISTING PAVEMENT EDGE
EXISTING SIGNS TO BE RETAINED
SCAB WATER MAIN
SAG SERVICE
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
PLAN
SCALE 1:250
NOTES:
1. EXISTING CENTRELINE LINEMARKING FROM CH. 120 TO CH. 955 TO BE REMOVED AND REPLACED WITH NEW CENTRELINE MARKING PLACED 3.5m OFFSET FROM NEW PAVEMENT EDGE.
2. CENTRELINE LINEMARKING FROM CH. 955 TO CH. 1066 TO BE PLACED 400mm OFFSET LHS OF CONTROL LINE.
3. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos. 21-19632-C3020 TO C3026.
4. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
4. FOR LONGITUDINAL SECTION, REFER TO DRAWING 21-19628-C3012.
FOR CONSTRUCTION
0 ISSUED FOR CONSTRUCTION SA FC* CMF 21.03.11
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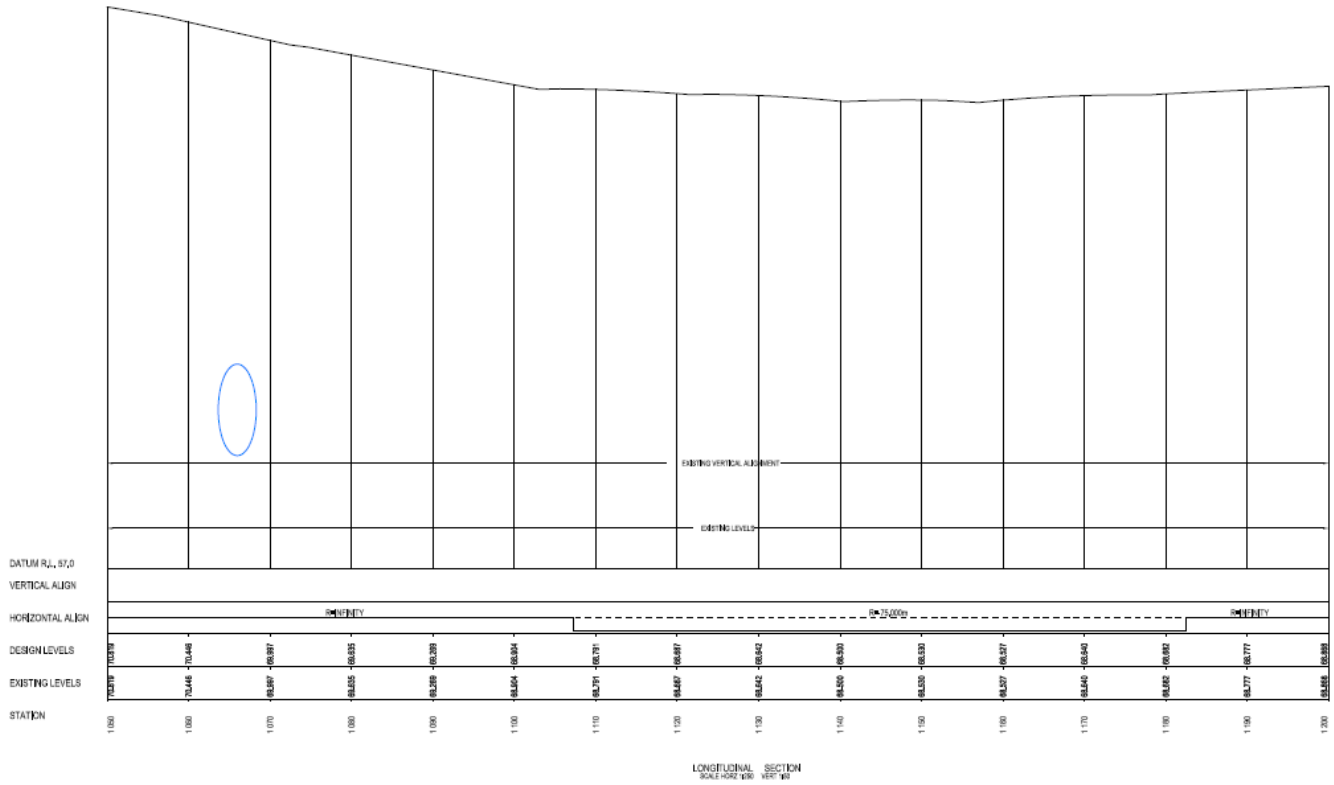
Drawn M. PELLOW
Designed D. FLEMING
Drafting Check S. ATKINS*
Design Check F. CARROZZA*
Approved C. McDOUGALL*
Date 21.03.11
Scale AS SHOWN
Client GOODMAN INTERNATIONAL
Project OLD WALLGROVE ROAD UPGRADE WORKS
Title ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 9 OF 13
Original Size A1
Drawing No: 21-19628-C3011
Rev: 0

NOTE

FOR PLAN, REFER TO DRAWING 21•19628•C3011



LONGITUDINAL SECTION

SCALE HORZ 1:250 VERT 1:50

FOR CONSTRUCTION

No	Revision	Drawn	Checked	Approved	Date
0	ISSUED FOR CONSTRUCTION	SA	FC*	CMT	21/05/11

SCALE 1:250 AT ORIGINAL SIZE

SCALE 1:50 AT ORIGINAL SIZE

Goodman

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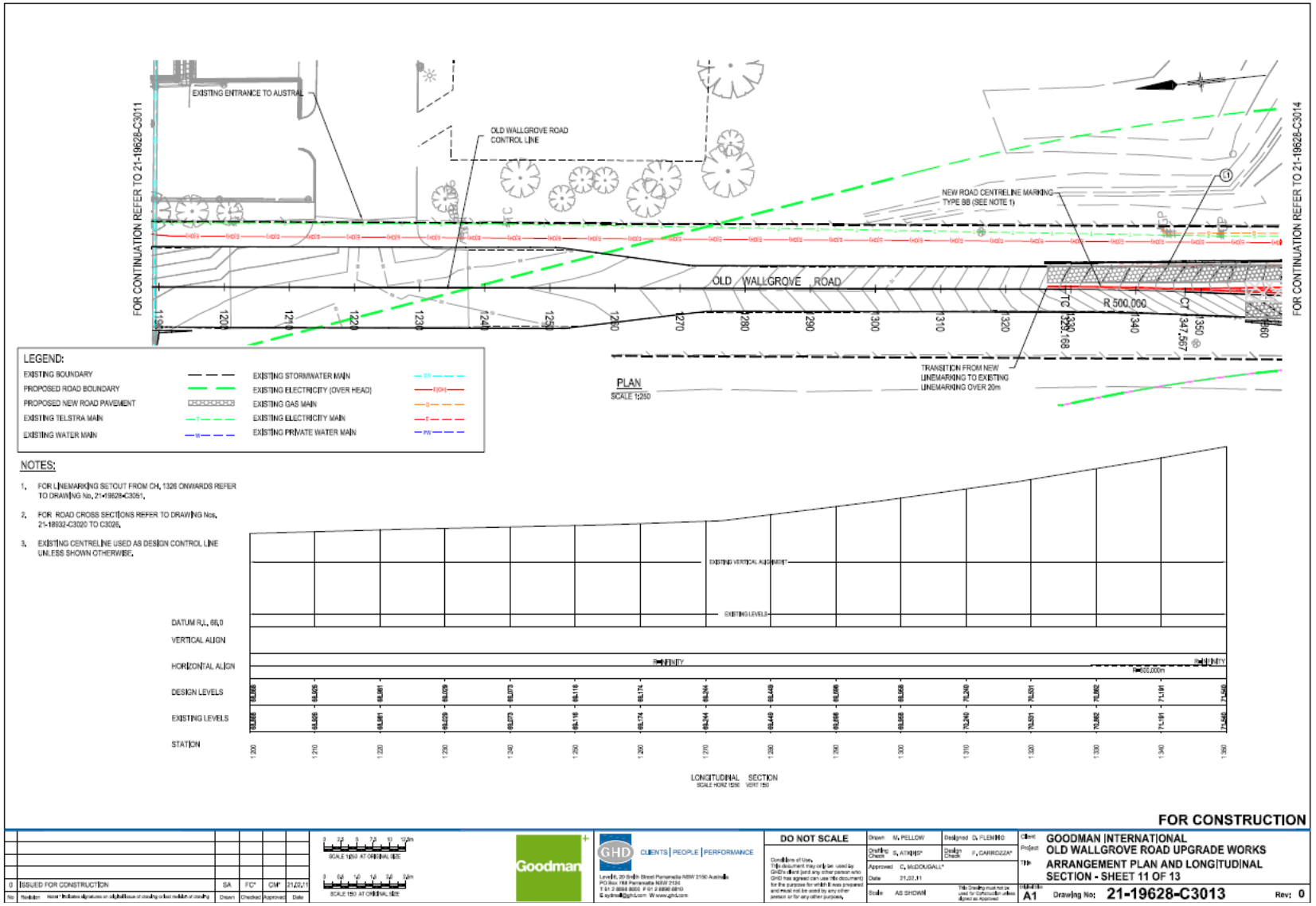
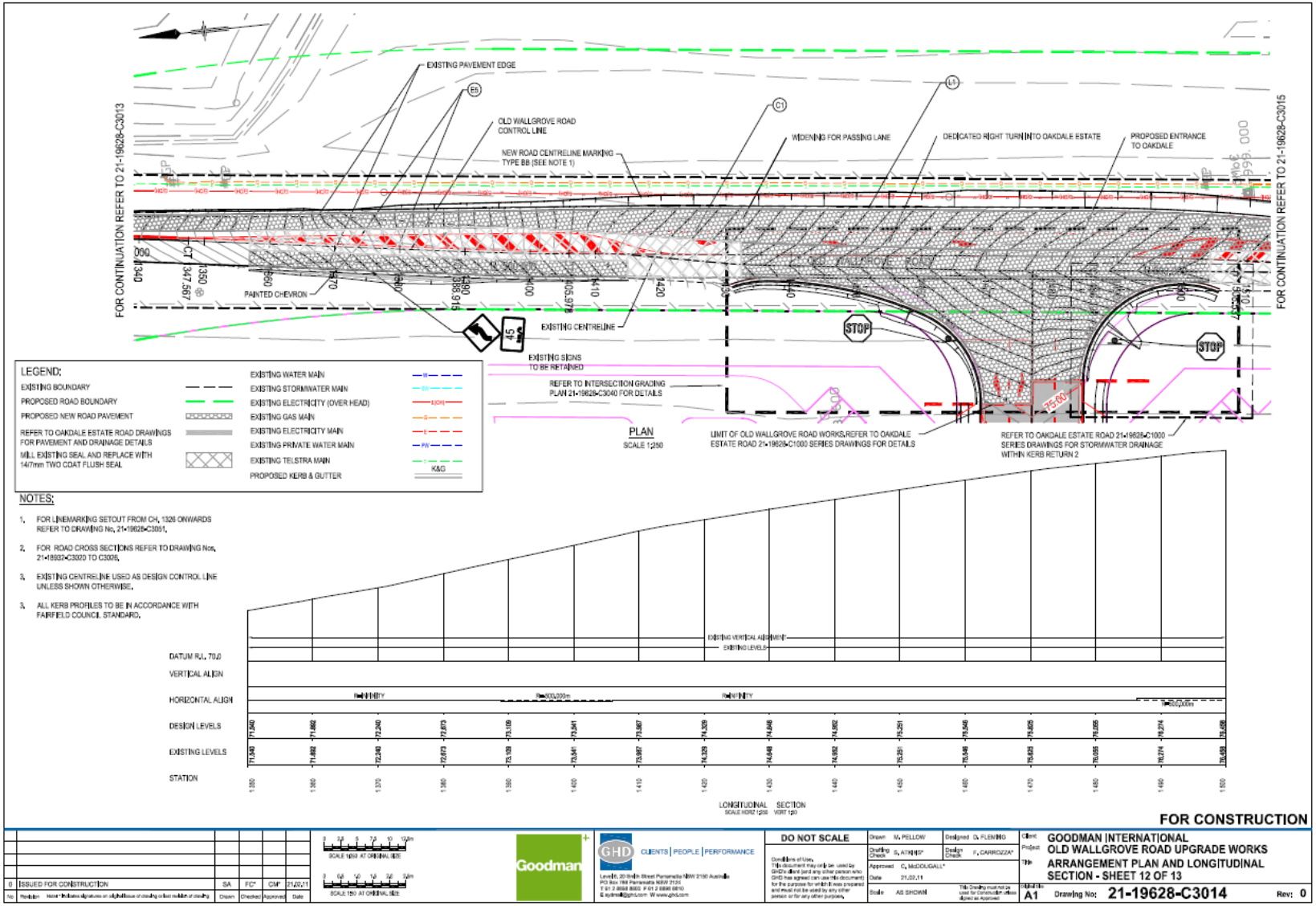
Drawn	M. PELLOW	Designed	D. FLEMING
Drafting Check	S. ATKINS*	Design Check	F. CARROZZA*
Approved	C. McDOUGALL*		
Date	21.05.11		
Scale	AS SHOWN		

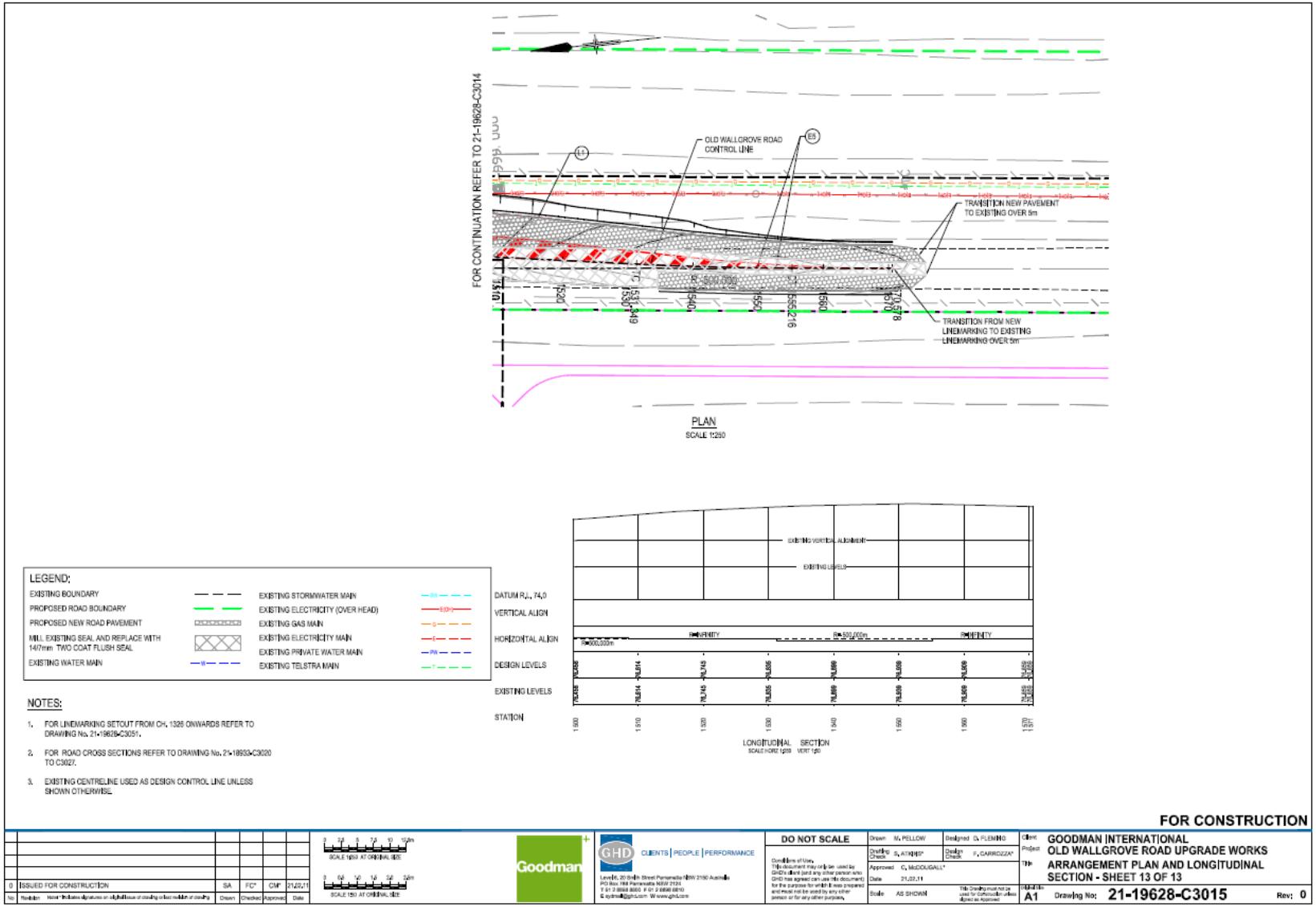
This Drawing must not be used for Construction unless signed as Approved

Client: GOODMAN INTERNATIONAL
Project: OLD WALLGROVE ROAD UPGRADE WORKS
Title: ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 10 OF 13

Original Size: A1
Drawing No: 21-19628-C3012
Rev: 0


EXISTING ENTRANCE TO AUSTRAL
OLD WALLGROVE ROAD CONTROL LINE
FOR CONTINUATION REFER TO 21-19628-C3011
FOR CONTINUATION REFER TO 21-19628-C3014
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
OLD WALLGROVE ROAD
R 500.000
TRANSITION FROM NEW LINEMARKING TO EXISTING LINEMARKING OVER 20m
PLAN
SCALE 1:250
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
EXISTING TELSTRA MAIN
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
NOTES:
1. FOR LINEMARKING SETOUT FROM CH, 1326 ONWARDS REFER TO DRAWING No, 21-19628-C3051.
2. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos, 21-18932-C3020 TO C3025.
3. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
EXISTING VERTICAL ALIGNMENT
EXISTING LEVELS
DATUM R.L. 66.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
ISSUED FOR CONSTRUCTION
DO NOT SCALE
GHD CLIENTS | PEOPLE | PERFORMANCE
Goodman
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 11 OF 13
Drawing No: 21-19628-C3013
Rev: 0


EXISTING PAVEMENT EDGE
OLD WALLGROVE ROAD CONTROL LINE
NEW ROAD CENTRELINE MARKING TYPE BB (SEE NOTE 1)
WIDENING FOR PASSING LANE
DEDICATED RIGHT TURN INTO OAKDALE ESTATE
PROPOSED ENTRANCE TO OAKDALE
FOR CONTINUATION REFER TO 21-19628-C3013
FOR CONTINUATION REFER TO 21-19628-C3015
PAINTED CHEVRON
EXISTING CENTRELINE
EXISTING SIGNS TO BE RETAINED
REFER TO INTERSECTION GRADING PLAN 21-19628-C3040 FOR DETAILS
STOP
PLAN
SCALE 1:250
LIMIT OF OLD WALLGROVE ROAD WORKS REFER TO OAKDALE ESTATE ROAD 21-19628-C1000 SERIES DRAWINGS FOR DETAILS
REFER TO OAKDALE ESTATE ROAD 21-19628-C1000 SERIES DRAWINGS FOR STORMWATER DRAINAGE WITHIN KERB RETURN 2
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
REFER TO OAKDALE ESTATE ROAD DRAWINGS FOR PAVEMENT AND DRAINAGE DETAILS
MILL EXISTING SEAL AND REPLACE WITH 14/7mm TWO COAT FLUSH SEAL
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
EXISTING TELSTRA MAIN
PROPOSED KERB & GUTTER
K&G
NOTES:
1. FOR LINEMARKING SETOUT FROM CH, 1326 ONWARDS REFER TO DRAWING No, 21-19628-C3051.
2. FOR ROAD CROSS SECTIONS REFER TO DRAWING Nos, 21-19628-C3020 TO C3026.
3. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
4. ALL KERB PROFILES TO BE IN ACCORDANCE WITH FAIRFIELD COUNCIL STANDARD.
DATUM R.L. 70.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 12 OF 13
A1
21-19628-C3014
Rev: 0


FOR CONTINUATION REFER TO 21-19628-C3014
OLD WALLGROVE ROAD
CONTROL LINE
TRANSITION NEW PAVEMENT
TO EXISTING OVER 5m
TRANSITION FROM NEW
LINEMARKING TO EXISTING
LINEMARKING OVER 5m
PLAN
SCALE 1:250
LEGEND:
EXISTING BOUNDARY
PROPOSED ROAD BOUNDARY
PROPOSED NEW ROAD PAVEMENT
MILL EXISTING SEAL AND REPLACE WITH
14/7mm TWO COAT FLUSH SEAL
EXISTING WATER MAIN
EXISTING STORMWATER MAIN
EXISTING ELECTRICITY (OVER HEAD)
EXISTING GAS MAIN
EXISTING ELECTRICITY MAIN
EXISTING PRIVATE WATER MAIN
EXISTING TELSTRA MAIN
NOTES:
1. FOR LINEMARKING SETOUT FROM CH. 1328 ONWARDS REFER TO DRAWING No. 21-19628-C3051.
2. FOR ROAD CROSS SECTIONS REFER TO DRAWING No. 21-19933-C3020 TO C3027.
3. EXISTING CENTRELINE USED AS DESIGN CONTROL LINE UNLESS SHOWN OTHERWISE.
DATUM R.L. 74.0
VERTICAL ALIGN
HORIZONTAL ALIGN
DESIGN LEVELS
EXISTING LEVELS
STATION
LONGITUDINAL SECTION
FOR CONSTRUCTION
DO NOT SCALE
GOODMAN INTERNATIONAL
OLD WALLGROVE ROAD UPGRADE WORKS
ARRANGEMENT PLAN AND LONGITUDINAL SECTION - SHEET 13 OF 13
Drawing No: 21-19628-C3015
Rev: 0