

9 February 2017

**STAGES 4 & 7 OF HUAPAI TRIANGLE SUB
PRECINCT B, HUAPAI**

GEOTECHNICAL COMPLETION REPORT

CABRA DEVELOPMENTS LIMITED

Ref: 2015_1127AG Rev: 0

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1. INTRODUCTION

In accordance with our instructions, this Geotechnical Completion Report has been prepared for Cabra Developments Limited as part of the documentation to be submitted to Auckland Council following earthworks to form Stages 4 & 7 of the residential development at Huapai Triangle Sub Precinct B, Huapai. Construction of this residential subdivision has been undertaken in accordance with the Auckland Council Resource Consent numbers SLC-63594 and REG-63595 and Engineering Approval letter referenced ENG-2015-473 dated 10 February 2016 for the original engineering plans, and Engineering Approval letter referenced ENG-486 dated 18 July 2016 for Variation A of the Engineering Plans. Specific structures constructed during the civil works to create the subdivision include timber pole retaining walls and segmental block retaining walls.

This report contains our Suitability Statement, specific comments related to items raised in the Resource Consent, relevant test data and the Cato Bolam Consultants Limited as-built plan set as provided in Appendix B.

This report covers the construction period late November 2015 to January 2017 and is intended to be used for certification purposes for new lots (listed below) created from Lot 1 of DP 318693, Lot 2 of DP 318693, Lot 2 of DP 137997 and Lot 4 of DP 435299 as follows:

- Stage 4; 22 new residential lots numbered 39 to 57 being standard residential lots, lots 202 to 204 being superlots;
- Stage 7; 10 new residential lots numbered 85 to 93 being standard residential lots, and superlot 205;
- 2 new roads named Nellie Drive and Vinistra Road, with extensions to Dida Park Drive and Papa Orchard Drive;

These stages of the Huapai Triangle Sub Precinct B residential development are located off Nobilo and Station Roads. As can be seen from the as-built plans, 10 of the lots have been affected by filling as part of the earthworks operations to a maximum depth of approximately 1.5 metres.

2. PROJECT BACKGROUND

The geotechnical investigations and design were undertaken by CMW, presented in our report entitled Geotechnical Investigation Report, Cnr Station Road and Nobilo Road, Huapai, referenced 2015_1127AB Rev.2 dated 24 August 2015. This document included the earthworks specification which was used as part of the quality assurance testing carried out for the earthworks for all stages of the subdivision.

The conclusions and recommendations within that document have been reviewed in preparation of this report.

A previous Geotechnical Completion Report for previous subdivision stages 1A and 3 has been prepared by this consultancy, referenced 2015_1127AE Rev.0 dated 24 November 2016.

3. DESCRIPTION OF EARTHWORKS

Works on these stages of the development were undertaken in conjunction with surrounding future stages areas.

Earthworks subcontractor Bob Hick Earthmoving Limited mobilised to site at the end of November 2015 to begin topsoil stripping operations and muckout of the north western gully area across lots 7 to 14 to be used as a temporary silt pond. Subsoil drainage was installed within the base of the gully muckout as part of these works and temporarily outlet to the paddocks within the neighbouring property.

Muck out of the permanent stormwater detention device directly east of the eastern gully took place at around the same time with fills placed to form the pond clay liner. CMW undertook regular testing of the liner to confirm compaction and air voids of the fill in accordance with the specifications.

Muckout of the larger western gully was undertaken throughout January 2016, which included subsoil drainage installed within the gully base and outlet temporarily into the silt retention pond at the southern end of the site.

Cut to fill operations started in early December 2015 with the placement of fill along the north western gully across lots 201 to 14 with site won material being cut from the south eastern gully across future stages in lots 86 to 203. Fill operations extended across lots 1 to 6 from mid December 2015 onwards with earthworks operations concentrating on conditioning the central ridge.

Fill operations extended across the northern side of lot 201 towards the end of December 2015 with several lots at finished level. Contractors started placing topsoil across lots 7 and 8 and focussed on undercutting the reserve area (lot 500) to required levels for placement of compacted topsoil. Subsoil drainage previously placed within the north western gully was brought through to beneath the reserve area and up beneath Road 1 to tap areas of seepage and help maintain drainage within the reserve area long term.

Contractors moved onto topsoil stripping along the western side of the site and continued backfilling lot 500 with topsoil compacted in layers. Operations progressed towards the muck out of the south eastern gully across future stages in lots 98 to 107 with the deepest cut depth extending to approximately 7 metres below the finished level.

Timber pole retaining wall construction began at the start of February 2016 with contractors starting drilling operations along in lots 44 and 43. Timber pole retaining wall construction operations continued progressively across the site until May 2016.

By mid February 2016, service lines were being laid during which backfilled trenches were tested by CMW to confirm compaction. By the end of February earthworks operations slowed down due to weather conditions deteriorating. Trimming of roads across the western portion of the site began in early March 2016 with undercuts occurring along portions of Roads 1, 2 and 3, backfilled with engineered fill. These works continued throughout March 2016.

By mid March 2016 topsoil operations resumed across the central gully with most of the lots having reached finished level. Minor earthworks were also being undertaken on in lots 16 to 25 to reach finished levels. Combined service ducting and lot connections were completed progressively across the initial stages during this time.

Earthworks operations resumed on the eastern side of the site across in lots 98 to 105 at the start of April 2016. By mid April, the permanent stormwater detention device was topsoiled with geotextile and boulders being placed before and after the stormwater pipework. Earth fill operations came to an end towards the end of April and the stormwater detention device completed.

All roads across site were lime stabilised at the start of May 2016 and subsequently trimmed to subgrade and metalled. Timber pole retaining wall construction continued during this time with CMW doing regular inspections confirmed all construction aspects of the retaining walls being built across site.

Gravity wall construction began start of July 2016 with construction of walls extending until the end of November 2016. Completion of Stages 4 and 7 areas including pavement construction, footpaths, street lights, raingardens, planting, fencing/balustrades etc. were completed between November 2016 and January 2017.

4. GEOTECHNICAL QUALITY CONTROL

4.1. Site Observations

During the earthworks site visits were typically undertaken several times each week to assess compliance with NZS 4431 and specific design recommendations and specifications.

Site visits were carried out to observe and confirm compliance relating to:

- Adequate topsoil stripping;
- Fill areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been removed;
- Excavation and backfilling of sewer and stormwater trenches;
- Construction of cantilever pole retaining walls including ground conditions, pile size, spacing and depth; and
- Construction of segmental block walls including foundation and retained soil ground conditions, block and grid placement, hardfill compaction and drainage; and
- Placement and compaction of engineered fills.

4.2. Compaction Control

Compaction of engineered earth fills was controlled by undrained shear strength measured by hand held shear vane calibrated using the NZGS 2001 method and by air voids as defined by NZS4402.

The criteria for undrained shear strength were a minimum single value of 110 kPa and minimum average of any 10 consecutive tests of 140 kPa.

The criteria for air voids were a maximum single value of 12% and maximum average of any 10 consecutive tests of 10%.

Vane shear strength, water content and in situ density tests were carried out on all areas of the engineered filling to at least the frequency required by the project specification.

These tests showed on some occasions that the required compaction standards were not being achieved and to the best of our knowledge the failing areas of fill were re-worked as necessary. Subsequent testing confirmed compliance with the specification.

5. EVALUATION OF COMPLETED EARTHWORKS

5.1. Retaining Walls

Several cantilever pole retaining walls and segmental block retaining walls have been constructed in the locations shown on the appended Final Contour & Retaining Wall As Built Plans.

These walls reach a maximum height of approximately 1.3 metres and were designed and observed by this consultancy. A copy of the Producer Statement – Construction Review is provided in Appendix E.

Descriptions of the building and earthworks restrictions within the vicinity of this wall are contained in the Suitability Statement in Appendix A. The Retaining Wall Specific Design Plans appended depict these restrictions for each lot affected.

Outlets for the rear drainage for the walls terminate within lot boundaries. These drainage outlets are required to be connected to the private drainage for the affected lots as part of construction of the dwellings. Lots affected by drainage outlet locations are designated on the appended GCR Summary Table.

5.2. Land Stability and Erosion Control

On all steep land, surface stability can be compromised by indiscriminate disposal of stormwater onto the ground surface and/ or by removal of vegetation.

Building and landscape designers must ensure that all runoff from solid surfaces is directed into the stormwater system. It is also important that care is paid to the disposal of stormwater during construction so that concentrated discharges (e.g. from unconnected spouting) are not directed towards steep ground. This is particularly important for lots 56, 57, 85, 86, 203 and 205 adjacent to the existing stormwater utility where steeper slopes are present.

Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. The roots of an established vegetation cover can serve to bind the surface soils while the foliage can reduce rain infiltration and soil saturation, resulting in better resistance to erosion and shallow slumping.

5.3. Fill Induced Settlement

On the basis of the limited depth of fills and the period of time elapsed since placement of the fills as part of the earthworks, we are satisfied that fill induced settlement does not pose a significant hazard to NZS 3604 type building development.

5.4. Service Line Trenches

As part of the civil works, stormwater services were trenched throughout the development as shown on the appended Stormwater Reticulation As-built Plans.

Stormwater trenches in key locations contained a punched draincoil to facilitate draining of any groundwater seepages within the trench bedding. These draincoils are connected to the downstream stormwater manholes. This drainage has been installed as a precautionary measure that is not considered to be necessary for private connections.

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from pipe inverts will require engineering input. The Auckland Council drawing referenced SW22 provided in Appendix B extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision depicts their requirements for stormwater pipes. The majority of lots are known to have service trenches within the lot boundaries as shown on the appended Drainage Zone of Influence Plans.

Resulting restrictions are presented in the Suitability Statement below, together with a table of the affected lots.

5.5. Road Subgrades

Penetration resistance testing was carried out on the road subgrades during construction and the results of this testing were forwarded to Cato Bolam Consultants Limited for pavement remedial design. Where soft ground with low equivalent CBR values was identified it was generally undercut and geogrid and geotextile cloth was installed. All road subgrade areas were subsequently lime/ cement stabilised to achieve appropriate CBR values.

Benkelman Beam testing of the base course was carried out by Roadtest Limited on each road and those results were also forwarded to Cato Bolam Consultants.

5.6. Design of Shallow Foundations

5.6.1. Bearing Capacity

Once bulk earthworks and top-soiling of the building platforms had been completed, our staff drilled hand auger boreholes on platforms in natural ground to determine representative finished ground conditions and hence evaluate likely foundation options for future building development. Our assessments of bearing capacity for the design of shallow foundations on each building platform are contained in the appended Suitability Statement.

At current subgrade levels all lots have been assessed as having a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads.

If higher geotechnical ultimate bearing capacities are required, further specific site investigation and design of foundations should be carried out prior to Building Consent application.

5.6.2. Foundation Settlements

At the bearing pressures specified above and subject to the design requirements for soil expansiveness provided below, differential settlement of shallow foundations for buildings designed in accordance with NZS 3604 (including the 600mm subfloor fill depth limit) should be within code limits.

5.6.3. Soil Expansiveness Classification

17 sets of soil tests were carried out on samples taken from likely foundation level across the entire subdivision as part of the completion fieldwork.

Testing was carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test 2.2 and 2.6 and were used in conjunction with visual-tactile assessment of the site soils to determine expansive site Classes as defined in AS 2870, "Residential Slabs and Footings – Construction". All test results are appended.

On this basis we have assessed the AS 2870 Site Class for all lots these stages of the development to be H2 (high). Details of foundation options for this Class are contained in the appended Suitability Statement.

In recent years in Auckland, there have been examples of concrete floors and/ or foundations that have been poured on dry, desiccated subgrades in summer months on expansive soils and have Foundation contractors need to be made aware of this issue and the need to maintain appropriate moisture contents in the footings and building platform subgrade between the time of excavation and the pouring of concrete.

Remedial actions that may be appropriate include platform protection with a hard fill layer, pouring of a blinding layer of concrete in footing bases and soaking of the building platform with sprinklers for an extended period.

Home owners need to be aware that the planting of high water demand plants where their roots may extend close to footings can also cause settlement damage.

5.7. Topsoil Depths

Topsoil depths have been checked by the drilling of a borehole in the approximate centre of the building platform on each lot. The results are considered indicative for each lot, but may be subject to variations. Topsoil depths are between 150 and 300mm on these stages of the development.

Site specific findings are contained in the appended GCR Summary Table (Appendix A). However, it is possible that further levelling works have been undertaken since our investigations and accordingly, we strongly recommend that lot purchasers complete their own checks of topsoil depths.

6. CLOSURE

The appended Statement of Professional Opinion is provided to the Auckland Council and Cabra Developments Limited for their purposes alone on the express condition that it will not be relied upon by any other person. It is important that prospective purchasers satisfy themselves as to any specific conditions pertaining to their particular land interest.

Although regular site visits have been undertaken for observation, for providing guidance and instruction and for testing purposes, the geotechnical services scope did not include full time site presence. To this end, our appended Suitability Statement also relies on the Contractors' work practices and assumes that when we have not been present to observe the work, it has been completed to high standards and in accordance with the drawings, instructions and consent conditions provided to them.

Similarly it assumes that all as-built information and other details provided to the Client and/or CMW by other members of the project team are accurate and correct in all respects.

**For and on behalf of
CMW Geosciences (NZ) Limited**

Prepared by:



Greg Snook

Project Engineering Geologist

Reviewed and Approved by:



Richard Knowles

Principal Geotechnical Engineer CPEng

Appendix A

Statement of Professional Opinion as to the Suitability of Land for Building Development

STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, R.J. Knowles, of CMW Geosciences (NZ) Limited, Auckland, hereby confirm that:

1. As a Chartered Professional Engineer experienced in the field of geotechnical engineering, I am a Geo-professional as defined in Section 1.2.2 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stages 4 and 7 of the Huapai Triangle Sub Precinct B Development.
2. The extent of preliminary investigations carried out to date are described in our Geotechnical Investigation Report referenced 2015_1127AB Rev.2, dated 24 August 2015. The conclusions and recommendations of that document have been re-evaluated in the preparation of this report. The results of all tests carried out are also appended.
3. In my professional opinion, not to be construed as a guarantee, I consider that:
 - (a) The earth fills shown on the appended Cato Bolam Consultants Cut Fill As-built Plans have been placed in compliance with NZS 4431, the Auckland Council Code of Practice for Subdivision and Land Development and related documents.
 - (b) The completed earthworks give due regard to land slope and foundation stability considerations on the building platform areas.
 - (c) **Specific Design Zone (Retaining Walls) areas** have been applied on lots 39 to 53, 202 and 204 for the protection of the function of the retaining walls. No building construction and no earthworks (i.e. cut or fills of any depth) should take place within the designated **Specific Design Zone (Retaining Walls) areas** unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. The endorsement will need to consider the stability implications of the earthworks and building proposals on the retaining walls so that the walls are neither overloaded nor undermined. The extents of these areas are depicted on the appended Retaining Wall Specific Design Plans.
 - (d) The retaining wall drainage outlets on Lots 40, 45, 50, 51 and 202 inclusive must be connected to the private drainage systems as part of construction of residential dwellings in their respective lots. Locations are depicted on the appended Final Contour & Retaining Wall As-built Plans.
 - (e) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on the building platforms for all lots.

If for any reason higher geotechnical bearing capacities are required, further specific site investigation and design of foundations should be carried out prior to Building Consent application.
 - (f) The expansive site Class for all lots has been assessed as AS2870 Class H2 (high). We recommend that building designers note on the Building Consent drawings the need to maintain appropriate moisture levels across building subgrades and in footing excavations (as described in Section 5.6.3 of the Geotechnical Completion Report) for reference by foundation contractors.

- (g) The backfilling and compaction of the storm water trenches on this subdivision has been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

However, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific design and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and trench backfill. This influence line is depicted on the appended Drainage Zone of Influence Plans. A copy of drawing SW22 extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision this document is provided in Appendix B for clarification.

Restrictions are depicted on the appended Cato Bolam Drainage Zone of Influence Plan. Affected lots are 39 to 45, 48 to 55, 87 to 93, 202 and 204 inclusive.

- (h) Subject to the geotechnical limitations, restrictions and recommendations contained in clauses 3(c), 3(d), 3(e), 3(f) and 3(g) above:
- (i) The filled and natural ground is generally suitable for residential buildings constructed in accordance with NZS 3604 and the requirements of AS2870 for the appropriate expansive soil class.
- (ii) Where shallow foundations are appropriate, design may be carried out in accordance with AS 2870 (Class H2) or alternately, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer.

4. Road subgrades have been formed with appropriate regard for slope stability and settlement risks.

The following table summarises the conditions on each of each residential lots.

**For and on behalf of
CMW Geosciences (NZ) Limited**



Richard Knowles

Principal Geotechnical Engineer, CPEng

GCR SUMMARY TABLE

Condition	Specific Design Zone (retaining)	Retaining Wall Drainage Outlets Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(c)	3(e)	3(f)	3(g)	3(h)	
Lot number						
39	●		300	H2	●	250
40	●	●	300	H2	●	300
41	●		300	H2	●	250
42	●		300	H2	●	200
43	●		300	H2	●	250
44	●		300	H2	●	250
45	●	●	300	H2	●	300
46	●		300	H2		300
47	●		300	H2		300
48	●		300	H2	●	250
49	●		300	H2	●	250
50	●	●	300	H2	●	300
51	●	●	300	H2	●	250
52	●		300	H2	●	200
53	●		300	H2	●	300
54			300	H2	●	250
55			300	H2	●	250
56			300	H2		250
57			300	H2		300
85			300	H2		300
86			300	H2		200

Condition	Specific Design Zone (retaining)	Retaining Wall Drainage Outlets Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(c)	3(e)	3(f)	3(g)	3(h)	
Lot number						
87			300	H2	●	250
88			300	H2	●	250
89			300	H2	●	250
90			300	H2	●	200
91			300	H2	●	300
92			300	H2	●	200
93			300	H2	●	200
202	●	●	300	H2	●	200
203			300	H2		250
204	●		300	H2	●	200
205			300	H2		300

Appendix B

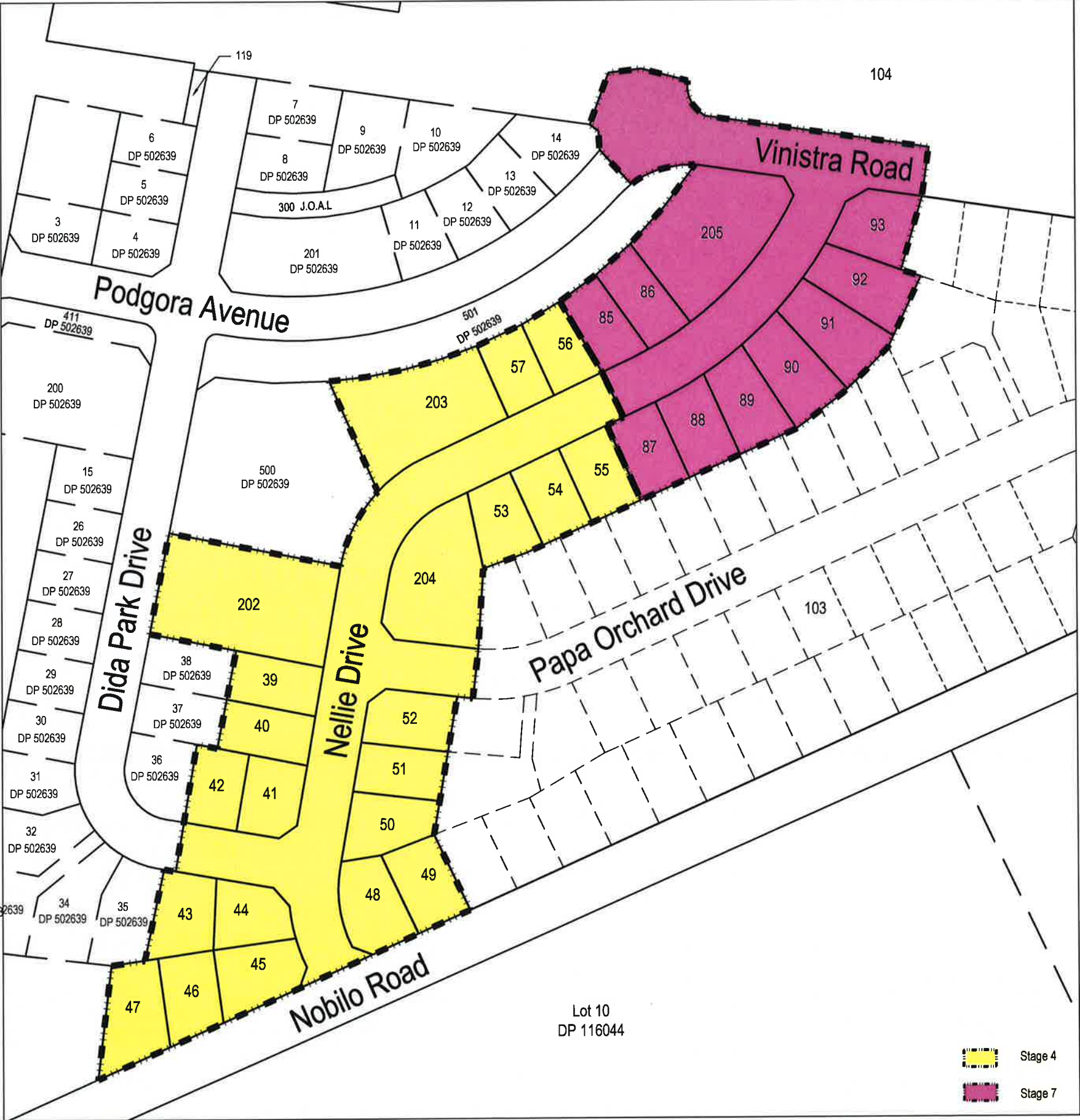
Cato Bolam Consultants As-built Drawings and Detail Drawings

Title	Reference No.	Date	Revision
COVER SHEET	32522-E00	DEC 2016	-
FINAL CONTOUR & RETAINING WALL AS BUILT PLANS (3 SHEETS)	32522-E623 TO E625	DEC 2016	-
CUT FILL AS BUILT PLANS (3 SHEETS)	32522-E626 TO E628	DEC 2016	-
ROAD AS BUILT PLANS (3 SHEETS)	32522-E629 TO E631	DEC 2016	-
WASTEWATER RETICULATION AS BUILT PLANS (3 SHEETS)	32522-E632 TO E634	DEC 2016	-
STORMWATER RETICULATION AS BUILT PLANS (6 SHEETS)	32522-E635 TO E640	DEC 2016	-
WATER RETICULATION AS BUILT PLANS (3 SHEETS)	32522-E641 TO E643	DEC 2016	-
RETAINING WALL SPECIFIC DESIGN PLAN	32522-E644	DEC 2016	-
DRAINAGE ZONE OF INFLUENCE PLAN	32522-E645	DEC 2016	-
AUCKLAND COUNCIL STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS	SW22	SEP 2013	1

Cabra Developments Ltd Huapai Triangle Sub - Precinct B Asbuilt Plans Stage 4 & 7 Huapai

As Built Plan Set

E00	Cover Sheet
E623	Final Contours - Sheet 1 of 3
E624	Final Contours - Sheet 2 of 3
E625	Final Contours - Sheet 3 of 3
E626	Cut Fill - Sheet 1 of 3
E627	Cut Fill - Sheet 2 of 3
E628	Cut Fill - Sheet 3 of 3
E629	Roading - Sheet 1 of 3
E630	Roading - Sheet 1 of 3
E631	Roading - Sheet 1 of 3
E632	Waste Water Reticulation - Sheet 1 of 3
E633	Waste Water Reticulation - Sheet 2 of 3
E634	Waste Water Reticulation - Sheet 3 of 3
E635	Stormwater Reticulation - Sheet 1 of 6
E636	Stormwater Reticulation - Sheet 2 of 6
E637	Stormwater Reticulation - Sheet 3 of 6
E638	Stormwater Reticulation - Sheet 4 of 6
E639	Stormwater Reticulation - Sheet 5 of 6
E640	Stormwater Reticulation - Sheet 6 of 6
E641	Water Reticulation - Sheet 1 of 3
E642	Water Reticulation - Sheet 2 of 3
E643	Water Reticulation - Sheet 3 of 3
E644	Retaining Wall Specific design Plan
E645	Drainage Zone of Influence Plan



LOCATION DIAGRAM

CATO BOLAM
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SURVEYORS

PLANNERS

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As Built Plans - January 2017

NOTES

- Contours are finished ground levels as surveyed
- at 20/12/2016. Contour interval of 0.5m
- Levels are in terms of LINZ Datum 1946.
- Coordinates are in terms of NZTM.
- Retaining wall drain outlets to be connected at house construction stage.
- All retaining walls over 1.0m high have a pool style fence above the wall.

As Built Earthworks Legend

- As built Contour (1m interval)
- As built Contour (0.5m interval)
- As built Timber Pole Retaining Wall (Poles not shown to scale)
- Concrete Keystone Retaining Wall
- Retaining Wall Height
- Extent of Stage 4 & 7 As Built works



I certify that these As-built Plans are an accurate record of the works undertaken and that:
The Coordinates (X, Y) are in terms of NZTM on NZGD(2000), and are within $\pm 50\text{mm}$.
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum) and are within $\pm 25\text{mm}$.

Signed:
Licensed Cadastral Surveyor
Date: 1/12/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

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This plan and accompanying report(s) have been prepared for the purpose of obtaining a resource consent only and for no other purpose. Use of this plan and/or the information on it for any other purpose is at the user's risk.



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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:1000	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E623 - E625	E623
DIRECTORY		JOB NO
Z:\32522\Aeod		32522

SLC 67086

DRAWING TITLE

Final Contour & Retaining Wall
As Built Plan
Sheet 1 of 3

CLIENT

Cabra Development Ltd
Huapapai Triangle Sub Precinct B
Stage 4 & 7
Huapapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/2016
DESIGNED	KM	09/2014
DRAWN	BJ	12/2016
CHECKED	BM	12/2016
APPROVED	TM	12/2016

I certify that these As-built Plans are an accurate record of the works undertaken and that:
The Coordinates (X,Y) are in terms of NZTM on NZGD(2000), and are within ± 50mm.
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

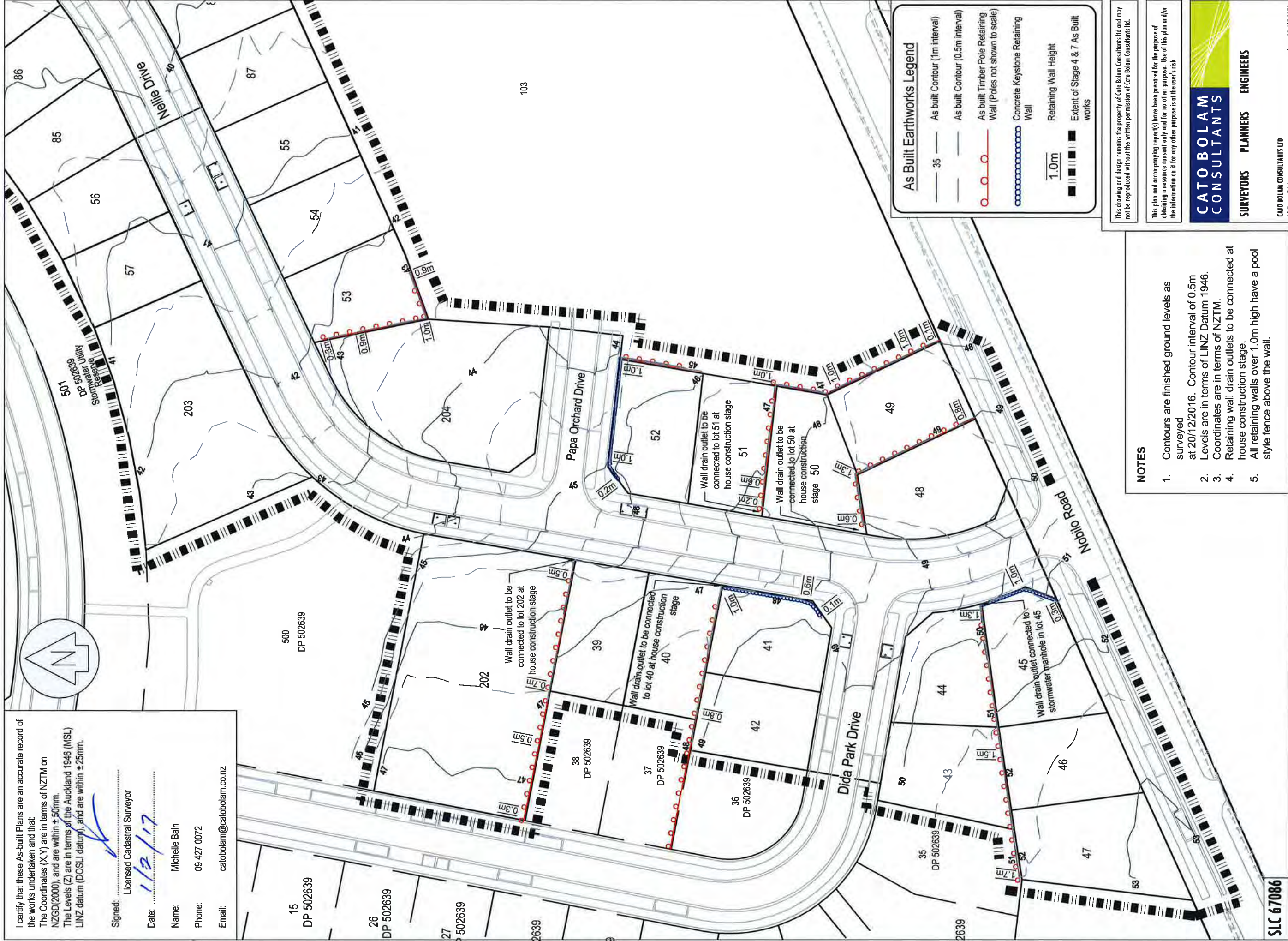
Signed:
Licensed Cadastral Surveyor

Date: 1/2/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz



As Built Earthworks Legend

- 35 — As built Contour (1m interval)
- — As built Contour (0.5m interval)
- — As built Contour (0.5m interval)
- — As built Timber Pole Retaining Wall (Poles not shown to scale)
- — Concrete Keystone Retaining Wall
- — Retaining Wall Height
- — Extent of Stage 4 & 7 As Built works

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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:750	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E623 - E625	E624
DIRECTORY		JOB NO
Z:\32522\Acad		32522

NOTES

- Contours are finished ground levels as surveyed
- at 20/12/2016. Contour interval of 0.5m
- Levels are in terms of LINZ Datum 1946.
- Coordinates are in terms of NZTM.
- Retaining wall drain outlets to be connected at house construction stage.
- All retaining walls over 1.0m high have a pool style fence above the wall.

CLIENT

Cabra Development Ltd
Huapapai Triangle Sub Precinct B
Stage 4 & 7
Huapapai

DRAWING TITLE

Final Contour & Retaining Wall
As Built Plan
Sheet 2 of 3

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/2016
DESIGNED	KM	09/2014
DRAWN	BJ	12/2016
CHECKED	BM	12/2016
APPROVED	TM	12/2016

I certify that these As-built Plans are an accurate record of the works undertaken and that:
The Coordinates (X,Y) are in terms of NZTM on NZGD(2000), and are within ± 50mm.
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed: _____
Licensed Cadastral Surveyor

Date: 1/12/17

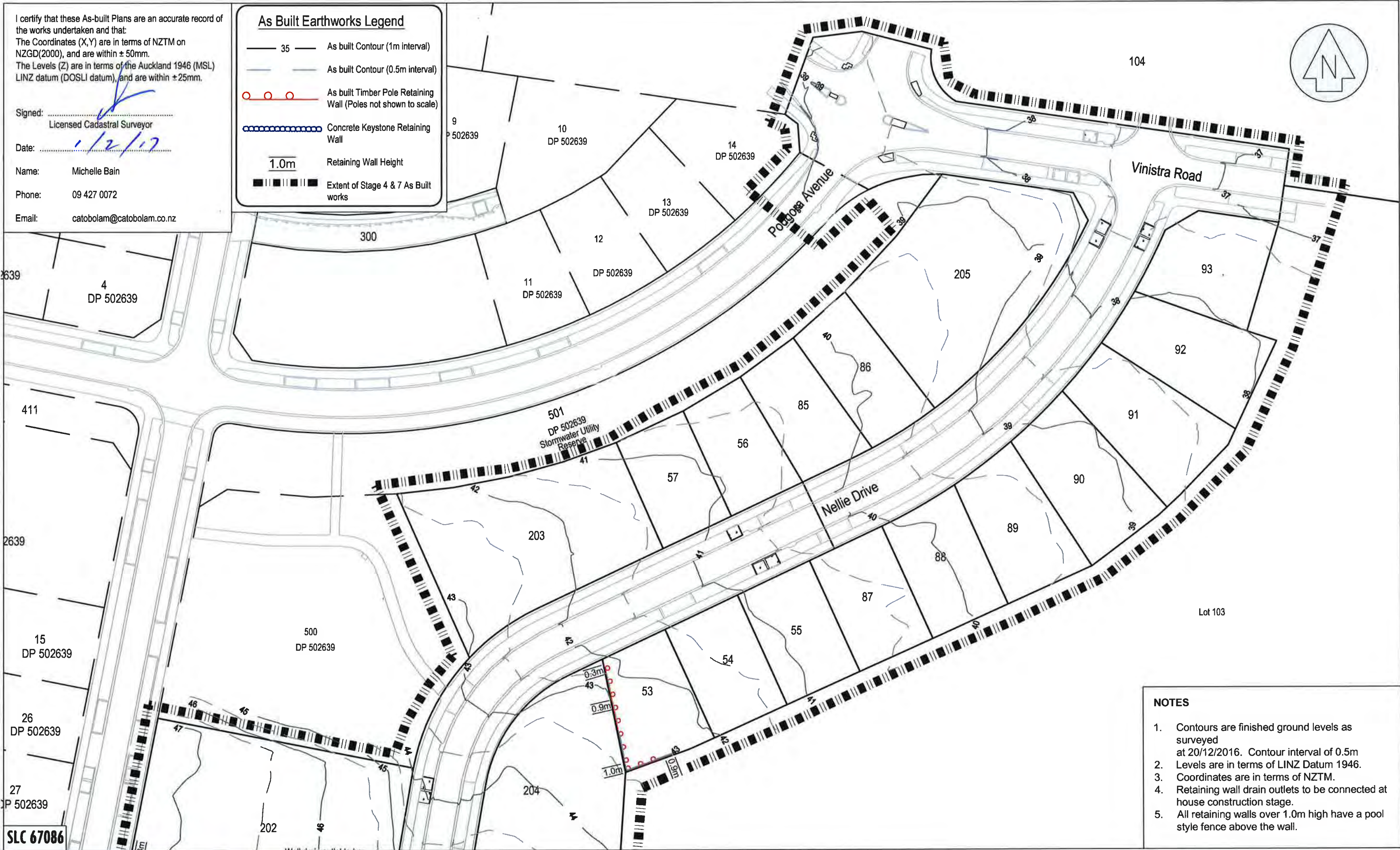
Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

As Built Earthworks Legend

- 35 As built Contour (1m interval)
- As built Contour (0.5m interval)
- As built Timber Pole Retaining Wall (Poles not shown to scale)
- Concrete Keystone Retaining Wall
- 1.0m Retaining Wall Height
- Extent of Stage 4 & 7 As Built works



NOTES

- Contours are finished ground levels as surveyed at 20/12/2016. Contour interval of 0.5m
- Levels are in terms of LINZ Datum 1946.
- Coordinates are in terms of NZTM.
- Retaining wall drain outlets to be connected at house construction stage.
- All retaining walls over 1.0m high have a pool style fence above the wall.

CATO BOLAM
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REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/2016
DESIGNED	KM	09/2014
DRAWN	BJ	12/2016
CHECKED	BM	12/2016
APPROVED	TM	12/2016

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CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai


DRAWING TITLE

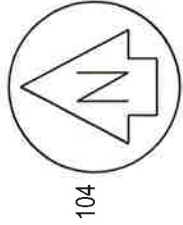
Final Contour & Retaining Wall
As Built Plan
Sheet 3 of 3

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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:750	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E623 - E625	E625
DIRECTORY		JOB NO
Z:\32522\Acad		32522

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The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed:  Licensed Cadastral Surveyor
Date: 12/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz



Cut to Fill Legend

- 0 Contour
- Cut Contours & Area
- Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- Subsoil Drainage & depth (m)

NOTES
GENERAL
1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the original ground level, plus undercuts, excluding road subgrade undercuts, to finished ground level as surveyed on 20/12/16.

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ORIGINAL SCALE	1:1000	ORIGINAL SIZE	A3	REVISION NO	
DATE	20/12/16	CAD REFERENCE	32522 E626 - E628	SHEET NO	E626
DIRECTORY	Z:\32522 Acad			JOB NO	32522

Cut Fill
As Built Plan
Sheet 1 of 3

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

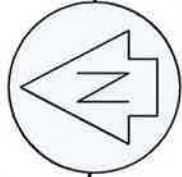
SLC67086

Lot 10
DP 116044


NOTES

GENERAL

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Signed: 
Licensed Cadastral Surveyor
Date: 12/1/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

Cut to Fill Legend

- 0 — 0 Contour
- 1.0 — Cut Contours & Area
- 1.0 — Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- Subsoil Drainage & depth (m)

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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:750	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E626 - E627	E627
DIRECTORY		JOB NO
Z:\32522\Acad		32522

CLIENT

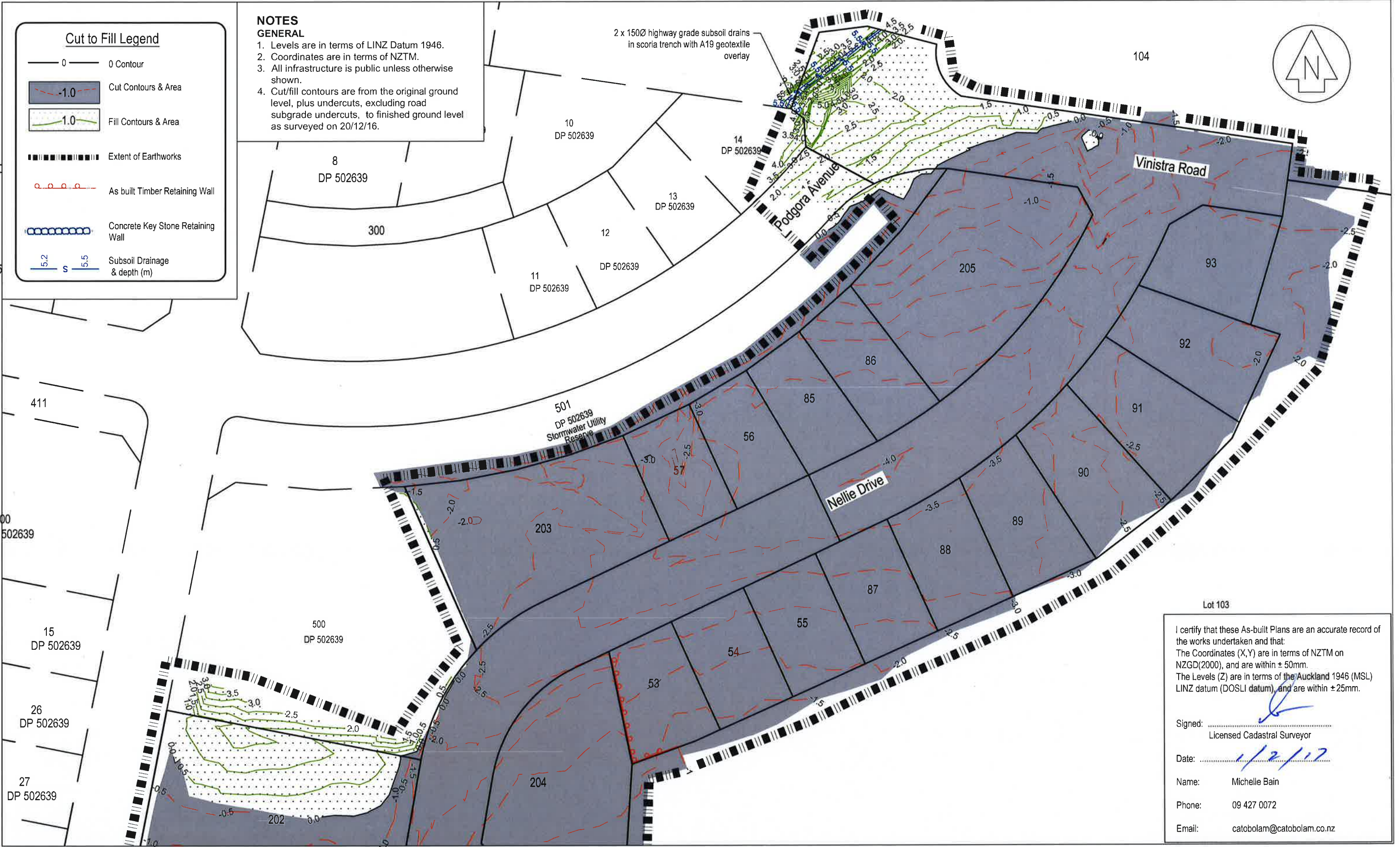
Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

Lot 10
DP 116044

SLC67086

Cut Fill
As Built Plan
Sheet 2 of 3



Cut to Fill Legend

0

0 Contour

-1.0

Cut Contours & Area

1.0

Fill Contours & Area

Extent of Earthworks

As built Timber Retaining Wall

Concrete Key Stone Retaining Wall

5.2 5.5

Subsoil Drainage & depth (m)

- NOTES**
GENERAL
1. Levels are in terms of LINZ Datum 1946.
 2. Coordinates are in terms of NZTM.
 3. All infrastructure is public unless otherwise shown.
 4. Cut/fill contours are from the original ground level, plus undercuts, excluding road subgrade undercuts, to finished ground level as surveyed on 20/12/16.

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Signed: _____
Licensed Cadastral Surveyor

Date: 1/2/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

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Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE

Cut Fill
As Built Plan
Sheet 3 of 3

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E626 - E628	E628
DIRECTORY	IMAGE FILE	JOB NO
Z:\32522\Acad		32522

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.

Pavement Formation

Road - New
Subgrade - Stabilised with 14kg/m² lime and 6kg/m² cement to a depth of 300mm
Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm hotmix on grade 4 chipseal membrane

Nobilo Road Northern Shoulder
Subgrade - Clay
Subbase - 400mm Gap 65 (500mm wide)
Basecourse - 100mm TNZ AP40 (500mm wide)
Seal - 30mm hotmix on grade 4 chipseal membrane (500mm wide)

Kerb & channel
machine laid low profile mountable kerb

Parking Bays

Subgrade - lime stabilised with 14kg/m² to a depth of 300mm
175mm 20MPa exposed aggregate concrete with 4kg/m² black oxide, one layer of 665 mesh on 100mm GAP65 subbase

Road Footpaths

1.8m wide, 125mm 20MPa concrete on 30mm AP25 bedding

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Licensed Cadastral Surveyor

Date: 1/12/17

Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

Refer to diagram 1
for Details

Diagram 1 Scale 1:500

SLC 67086

Roading As Built Legend

- Roads 2,3,4 & 7
- Street Lights Cree XSP1 IP66 T3 IPD 'F', module 2 LED with 8m pole and 1m arm.
- Nobilo Road
- Streetlights Cree XSP1 IP66 T2-BLS IPD 'H', module 2 LED with 5m pole.
- Tree pit stormwater device (1.8mØ manhole riser with scoria base and draincoil outlet to downstream manhole)
- Concrete Footpath / Vehicle Crossing
- Cesspits (Semi recessed)
- Exposed Concrete Parking Bay
- Subgrade undercut and replaced with engineered clay fill.
- Under channel drains
- Pohukawa (Vinistra Road)
- Tolara (Nobilo Road)
- Titoki (Dida Park Drive)
- Magnolia (Nellie Drive)
- Rain Garden

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE

Roading
As Built Plan
Sheet 1 of 3

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:1000	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E679- E631	E629
DIRECTORY		JOB NO
Z:\32522\Acad		32522

NOTES

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Pavement Formation

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Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm hotmix on grade 4 chipseal membrane

Nobilo Road Northern Shoulder
Subgrade - Clay
Subbase - 400mm Gap 65 (500mm wide)
Basecourse - 100mm TNZ AP40 (500mm wide)
Seal - 30mm hotmix on grade 4 chipseal membrane (500mm wide)

Kerb & channel

machine laid low profile mountable kerb

Parking Bays

Subgrade - lime stabilised with 14kg/m² to a depth of 300mm
175mm 20MPa exposed aggregate concrete with 4kg/m² black oxide, one layer of 665 mesh on 100mm GAP65 subbase

Road Footpaths

1.8m wide, 125mm 20MPa concrete on 30mm AP25 bedding

Roading As Built Legend

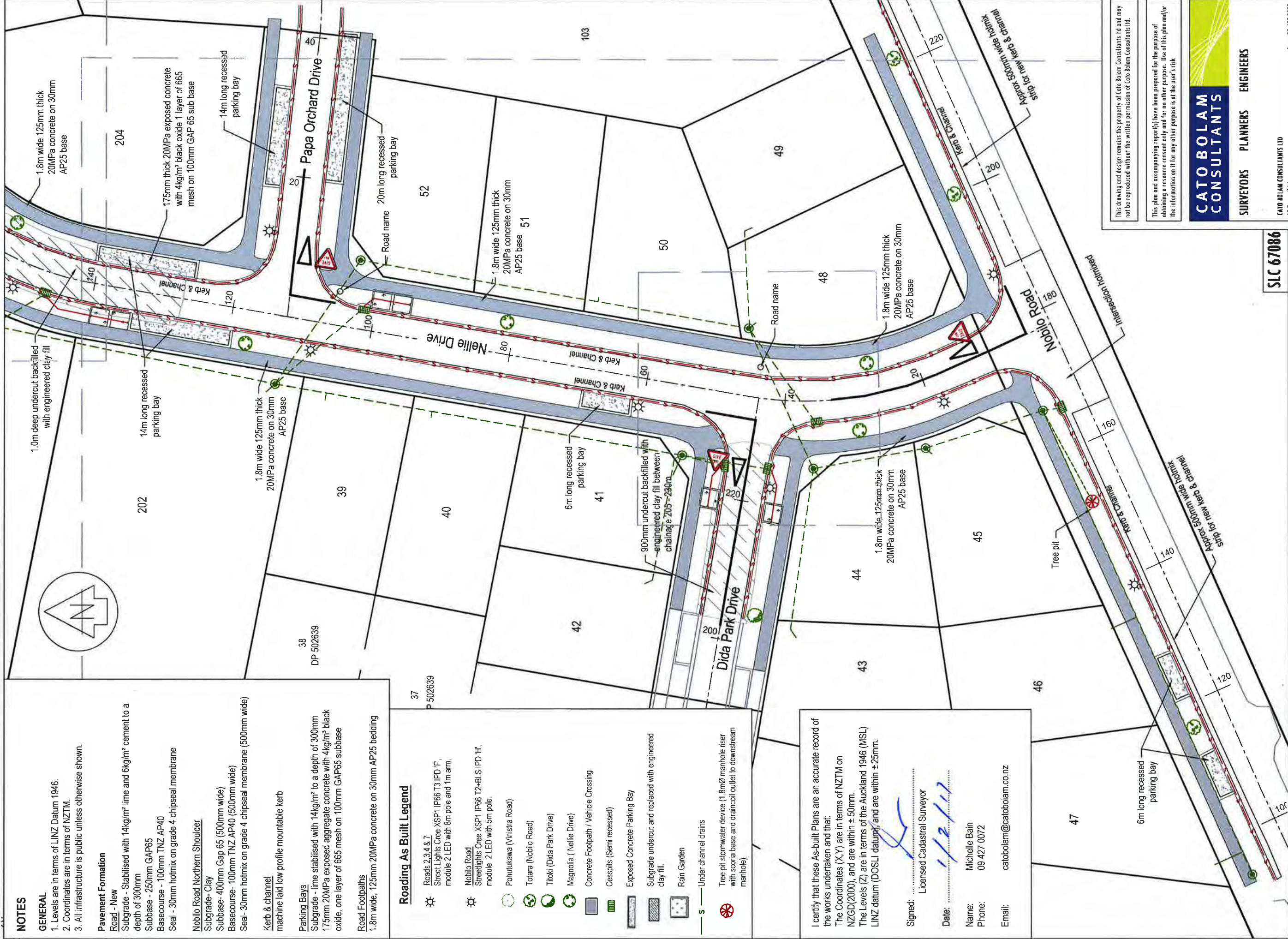
- ⚙ Roads 2,3,4 & 7
Street Lights Cree XSP1 IP66 T3 IPD 'F', module 2 LED with 8m pole and 1m arm.
- ⚙ Nobilo Road
Streetlights Cree XSP1 IP66 T2+BL5 IPD 'H', module 2 LED with 5m pole.
- ⦿ Pohutukawa (Vinistra Road)
- 🌳 Totara (Nobilo Road)
- 🌳 Titoki (Dida Park Drive)
- 🌳 Magnolia (Nellie Drive)
- 🚶 Concrete Footpath / Vehicle Crossing
- 🚽 Cesspits (Semi recessed)
- 🚶 Exposed Concrete Parking Bay
- 🚶 Subgrade undercut and replaced with engineered clay fill.
- 🌳 Rain Garden
- S — Under channel drains
- 🚰 Tree pit stormwater device (1.8mØ manhole riser with scoria base and draincoil outlet to downstream manhole)

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Signed: _____
Licensed Cadastral Surveyor

Date: 1/2/17

Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz



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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E629- E631	E630
DIRECTORY		JOB NO
Z:\32522\Acad		32522

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE

Roading
As Built Plan
Sheet 2 of 3

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

NOTES

GENERAL

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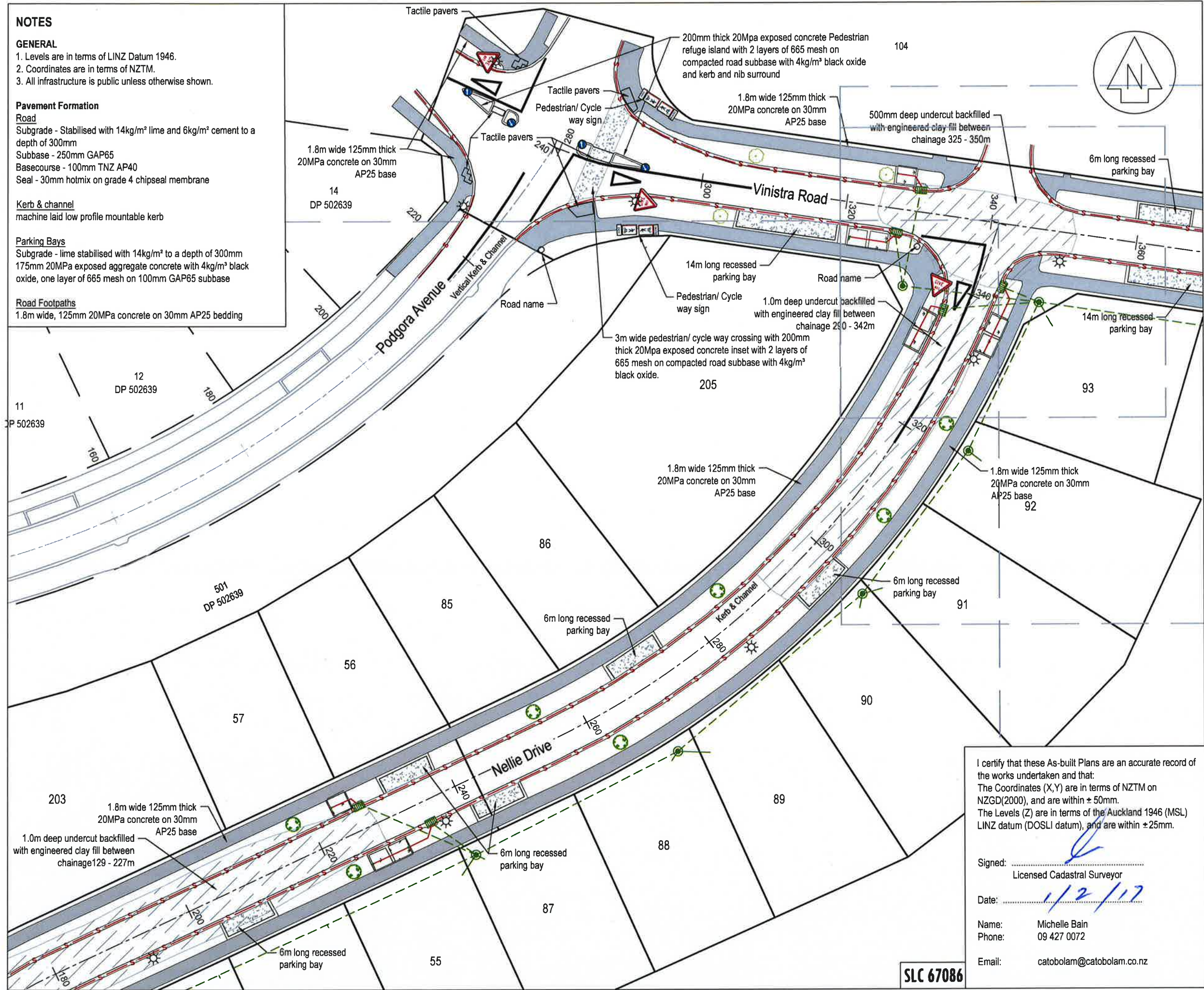
Pavement Formation

Road
Subgrade - Stabilised with 14kg/m² lime and 6kg/m² cement to a depth of 300mm
Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm hotmix on grade 4 chipseal membrane

Kerb & channel
machine laid low profile mountable kerb

Parking Bays
Subgrade - lime stabilised with 14kg/m² to a depth of 300mm
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Road Footpaths
1.8m wide, 125mm 20MPa concrete on 30mm AP25 bedding



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Roading As Built Legend

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Street Lights Cree XSP1 IP66 T3 IPD 'F', module 2 LED with 8m pole and 1m arm.
- Nobilo Road
Streetlights Cree XSP1 IP66 T2+BLS IPD 'H', module 2 LED with 5m pole.
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- Magnolia (Nellie Drive)
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- Cesspits (Semi recessed)
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- Subgrade undercut and replaced with engineered clay fill.
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- Under channel drains
- Tree pit stormwater device (1.8mØ manhole riser with scoria base and draincoil outlet to downstream manhole)

REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

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fax 09-426 7331
email catobolam@catobolam.co.nz

CLIENT **Cabra Development Ltd**
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE
Roading
As Built Plan
Sheet 3 of 3

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 20/12/16	CAD REFERENCE 32522 E629- E631	SHEET NO E631
DIRECTORY Z:\32522\Acad		JOB NO 32522

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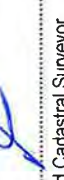
Signed:
Licensed Cadastral Surveyor

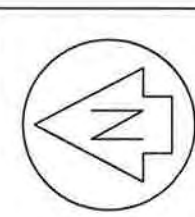
Date:

Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

SLC 67086

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Signed:  Licensed Cadastral Surveyor
Date: 1/12/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz



- NOTE
1. Levels are in terms of LINZ Datum.
 2. Coordinates are in terms of NZTM.
 3. All pipework is PE100 PN16 with SAP7 bedding.
 4. Depth of lines are approximately 0.6m below finished ground level.
 5. Pipe sizes shown are outside diameter (50,63,75,90,110mm)

Asbuilt Legend

- Existing
- 75mm PWC Sewer
 - 110mm PWC Sewer
 - Isolation Valve
 - Flushing Point
 - Boundary Kit
- New - Constructed under SLC 67086 Stage 4 & 7
- 75mm PWC Sewer
 - 110mm PWC Sewer
 - Isolation Valve
 - Flushing Point
 - Boundary Kit

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DRAWING TITLE

**Wastewater Reticulation
As Built Plan
Sheet 1 of 3**

CLIENT

**Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai**

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:1000	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E632-E634	E632
DIRECTORY	JOB NO	
Z:\32522\Acad		32522

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Signed:
Licensed Cadastral Surveyor

Date: 1/12/17

Name: Michelle Bain

Phone: 09 427 0072

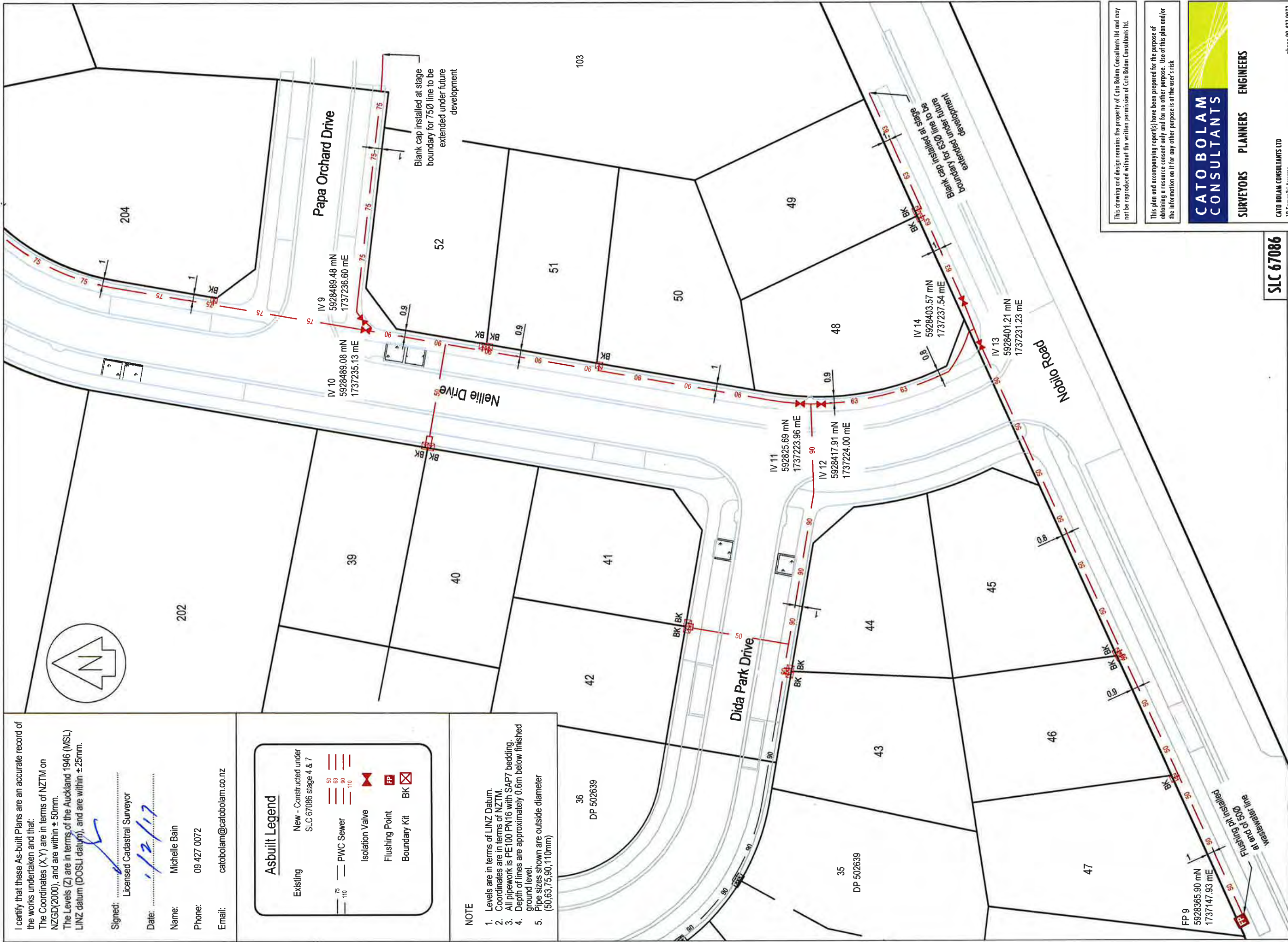
Email: catobolam@catobolam.co.nz

Asbuilt Legend

Existing	New - Constructed under SLC 67086 stage 4 & 7
75	50
110	63
	90
	110
	PWC Sewer
	Isolation Valve
	Flushing Point
	Boundary Kit
	BK

NOTE

1. Levels are in terms of LINZ Datum.
2. Coordinates are in terms of NZTM.
3. All pipework is PE100 PN16 with SAP7 bedding.
4. Depth of lines are approximately 0.6m below finished ground level.
5. Pipe sizes shown are outside diameter (50,63,75,90,110mm)



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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E632-E634	E633
DIRECTORY		JOB NO
Z:\32522\kard		32522

SLC 67086

DRAWING TITLE

Wastewater Reticulation As Built Plan Sheet 2 of 3

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/16
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Signed: _____
Licensed Cadastral Surveyor

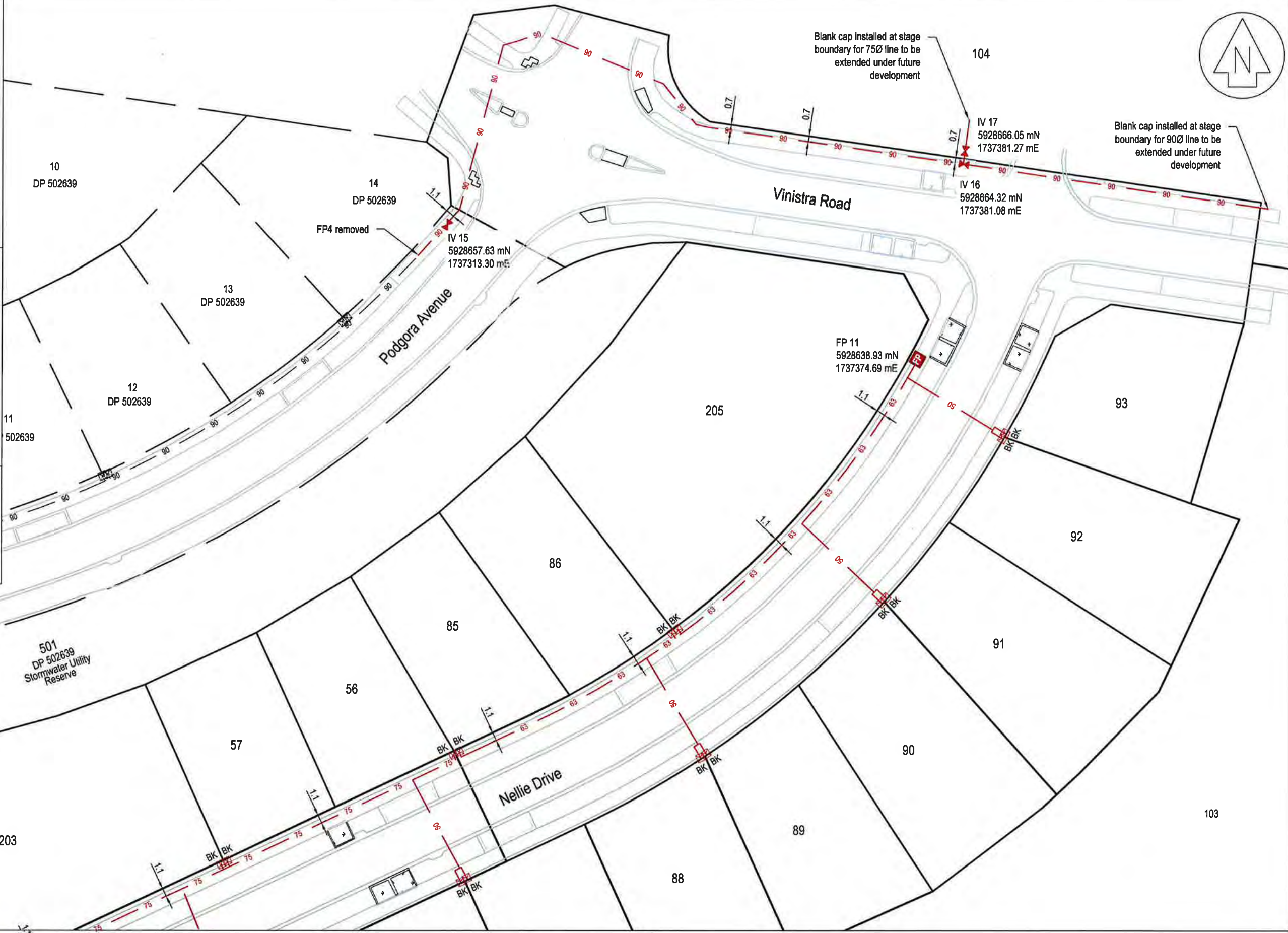
Date: 1/2/17

Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

Asbuilt Legend

- Existing New - Constructed under SLC 67086 stage 4 & 7
- 75 PWC Sewer 60 63 90 110
- Isolation Valve
- Flushing Point
- Boundary Kit

- NOTE
1. Levels are in terms of LINZ Datum.
 2. Coordinates are in terms of NZTM.
 3. All pipework is PE100 PN16 with SAP7 bedding.
 4. Depth of lines are approximately 0.6m below finished ground level.
 5. Pipe sizes shown are outside diameter (50,63,75,90,110mm)



CATOBOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

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REVISION/DESCRIPTIONS	NAME	DATE
SURVEYED	BJ	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

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CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE

Wastewater Reticulation
As Built Plan
Sheet 3 of 3

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 20/12/16	CAD REFERENCE 32522 E632-E634	SHEET NO E634
DIRECTORY Z:\32522\Acad		JOB NO 32522

I certify that these As-built Plans are an accurate record of the works undertaken and that:
The Coordinates (X,Y) are in terms of NZTM on NZGD(2000), and are within ± 50mm.
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

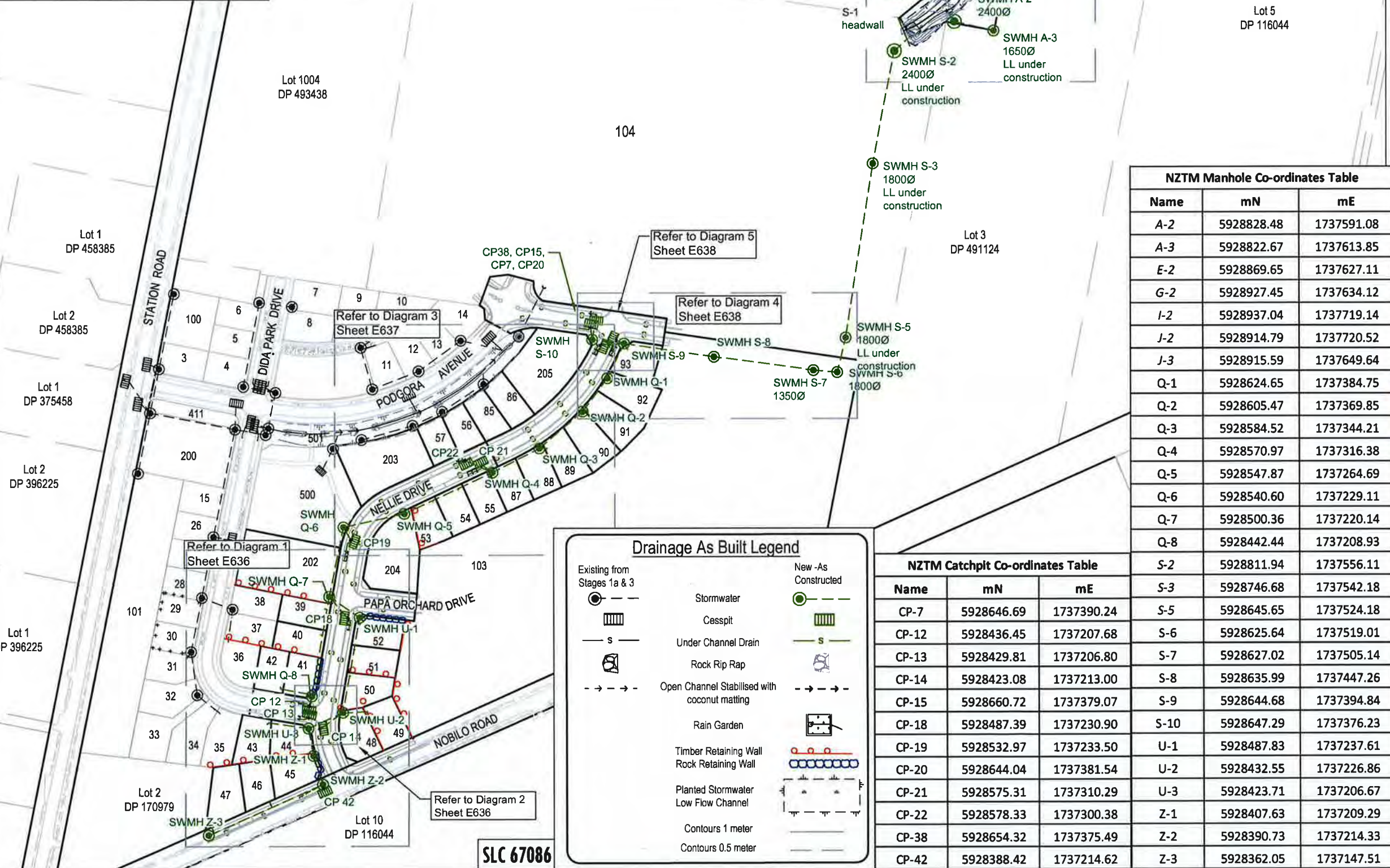
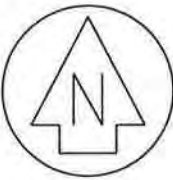
Signed: _____
Licensed Cadastral Surveyor

Date: 1/2/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz



Drainage As Built Legend

Existing from Stages 1a & 3	New - As Constructed

NZTM Manhole Co-ordinates Table

Name	mN	mE
A-2	5928828.48	1737591.08
A-3	5928822.67	1737613.85
E-2	5928869.65	1737627.11
G-2	5928927.45	1737634.12
I-2	5928937.04	1737719.14
J-2	5928914.79	1737720.52
J-3	5928915.59	1737649.64
Q-1	5928624.65	1737384.75
Q-2	5928605.47	1737369.85
Q-3	5928584.52	1737344.21
Q-4	5928570.97	1737316.38
Q-5	5928547.87	1737264.69
Q-6	5928540.60	1737229.11
Q-7	5928500.36	1737220.14
Q-8	5928442.44	1737208.93
S-2	5928811.94	1737556.11
S-3	5928746.68	1737542.18
S-5	5928645.65	1737524.18
S-6	5928625.64	1737519.01
S-7	5928627.02	1737505.14
S-8	5928635.99	1737447.26
S-9	5928644.68	1737394.84
S-10	5928647.29	1737376.23
U-1	5928487.83	1737237.61
U-2	5928432.55	1737226.86
U-3	5928423.71	1737206.67
Z-1	5928407.63	1737209.29
Z-2	5928390.73	1737214.33
Z-3	5928362.05	1737147.51

NZTM Catchpit Co-ordinates Table

Name	mN	mE
CP-7	5928646.69	1737390.24
CP-12	5928436.45	1737207.68
CP-13	5928429.81	1737206.80
CP-14	5928423.08	1737213.00
CP-15	5928660.72	1737379.07
CP-18	5928487.39	1737230.90
CP-19	5928532.97	1737233.50
CP-20	5928644.04	1737381.54
CP-21	5928575.31	1737310.29
CP-22	5928578.33	1737300.38
CP-38	5928654.32	1737375.49
CP-42	5928388.42	1737214.62

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NOTES

GENERAL

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2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.

STORMWATER

1. All pipes are Class 4 reinforced concrete rubber ring jointed (RCRRJ), unless otherwise shown.
2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
2. Bedding is H2 type unless otherwise stated.
3. All catchpits are 675mm x 450mm steel grate lids semi recessed unless otherwise shown.
4. All lot connections are 100Ø uPVC SEH-C unless otherwise stated.
5. All 150Ø pipes are uPVC SEH-C SN16.
6. Wall drain outlets to be connected to private drainage at building consent stage.

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CLIENT Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stages 4 & 7
Huapai

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 1 of 6

ORIGINAL SCALE 1:2500	ORIGINAL SIZE A3	REVISION NO
DATE 23/1/2017	CAD REFERENCE 32522 E635-E640	SHEET NO E635
DIRECTORY Z:\32522\ACAD		JOB NO 32522

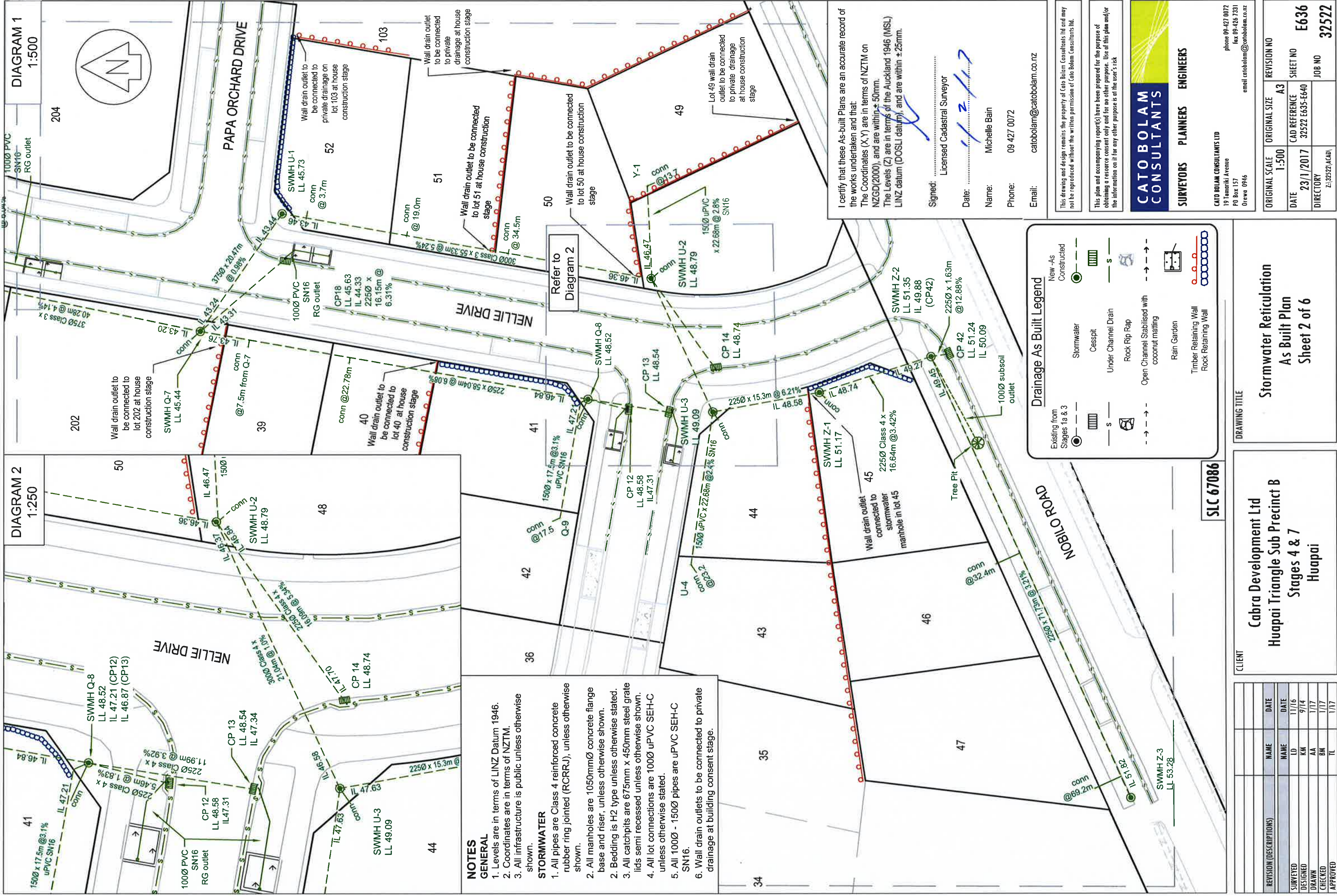
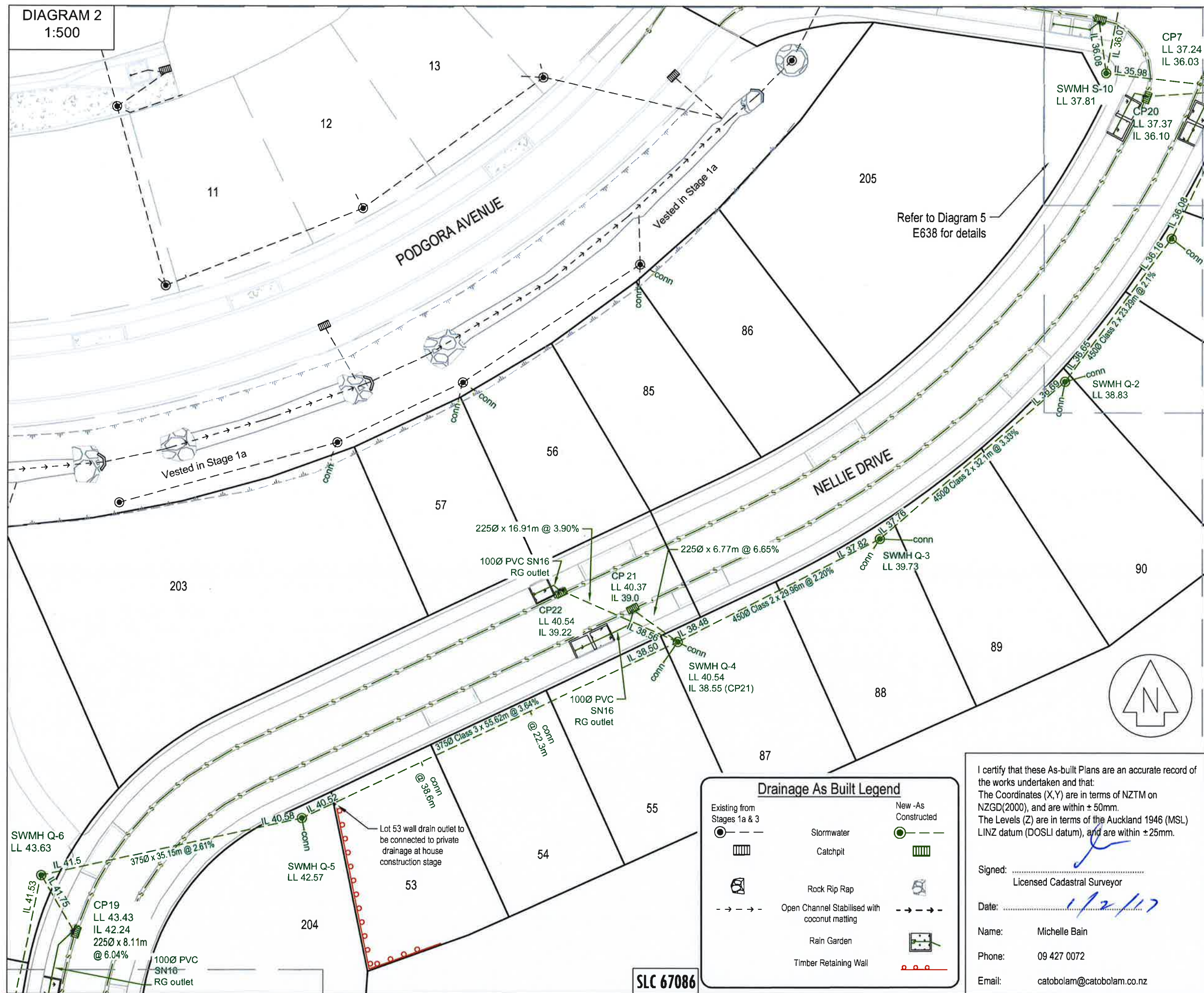


DIAGRAM 2
1:500



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6. Wall drain outlets to be connected to private drainage at building consent stage.

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	11/16
DESIGNED	KM	9/14
DRAWN	AA	1/17
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CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stages 4 & 7
Huapai

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 3 of 6

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 23/1/2017	CAD REFERENCE 32522 E635-E640	SHEET NO E637
DIRECTORY Z:\32522\ACAD		JOB NO 32522

Drainage As Built Legend

Existing from Stages 1a & 3	New - As Constructed
Stormwater	Stormwater
Catchpit	Catchpit
Rock Rip Rap	Rock Rip Rap
Open Channel Stabilised with coconut matting	Open Channel Stabilised with coconut matting
Rain Garden	Rain Garden
Timber Retaining Wall	Timber Retaining Wall

I certify that these As-built Plans are an accurate record of the works undertaken and that:
The Coordinates (X,Y) are in terms of NZTM on NZGD(2000), and are within ± 50mm.
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed:
Licensed Cadastral Surveyor

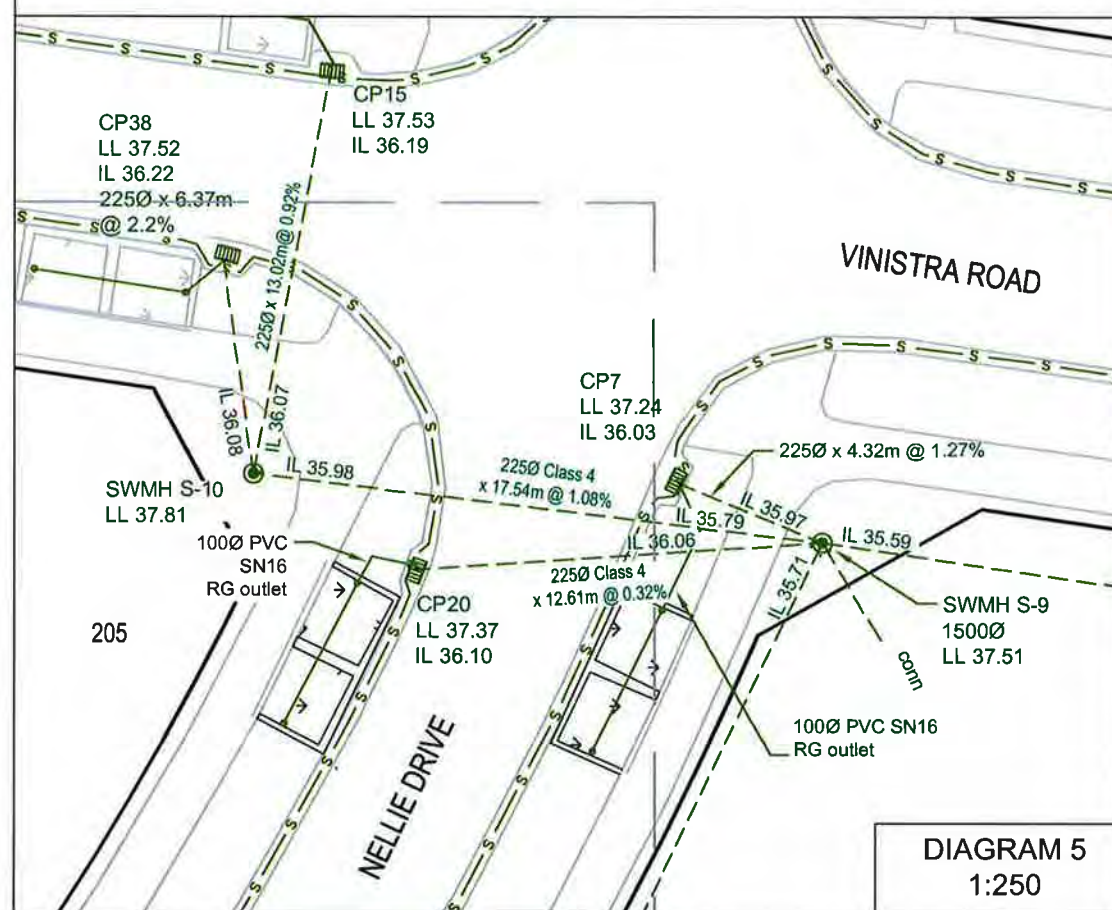
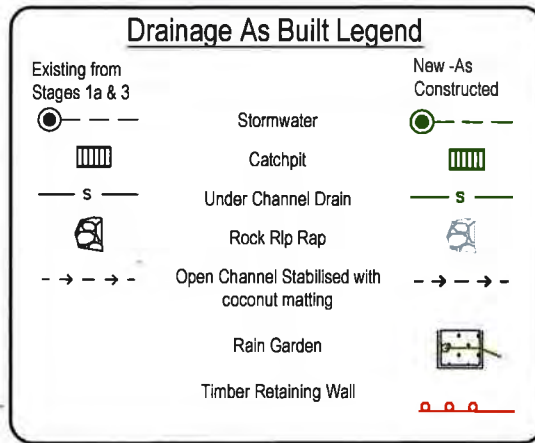
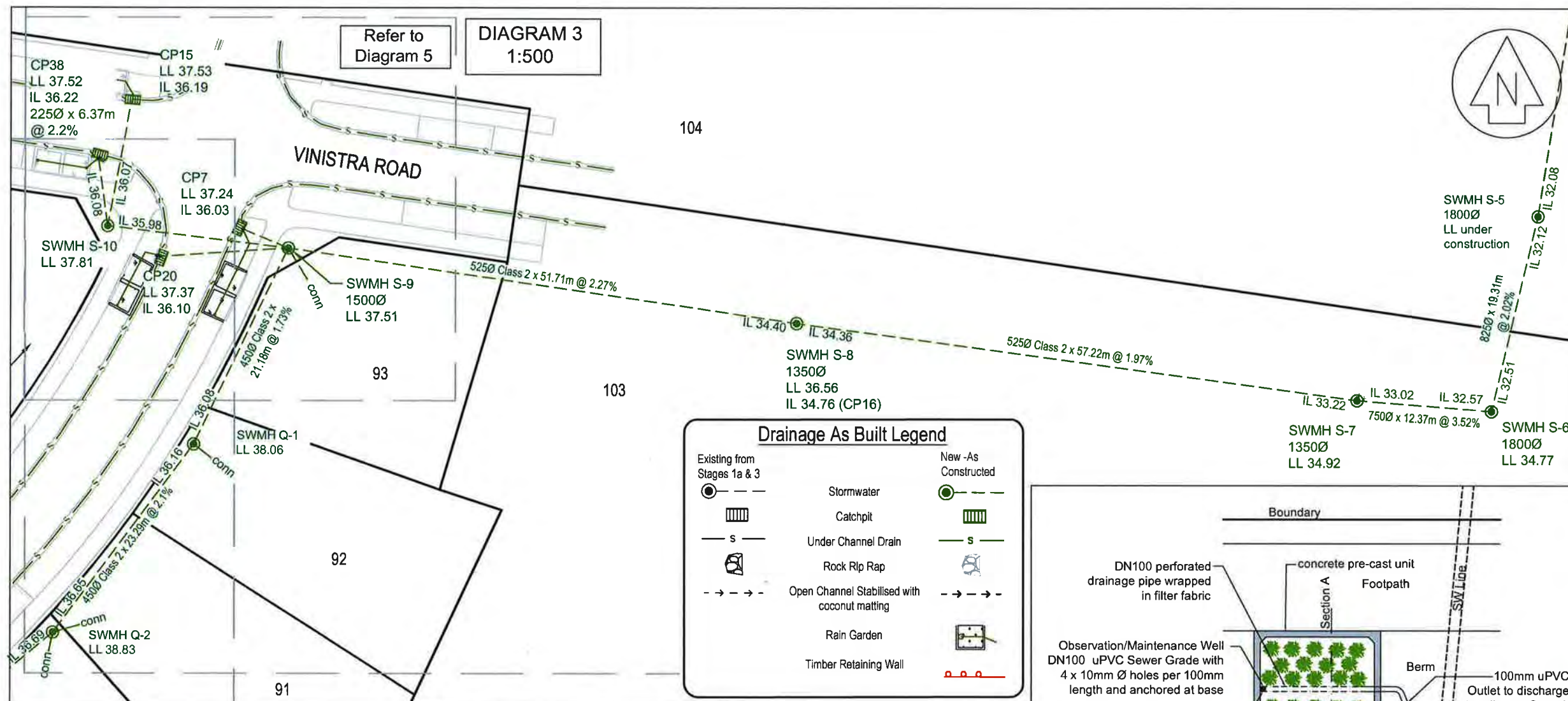
Date: 1/2/17

Name: Michelle Bain

Phone: 09 427 0072

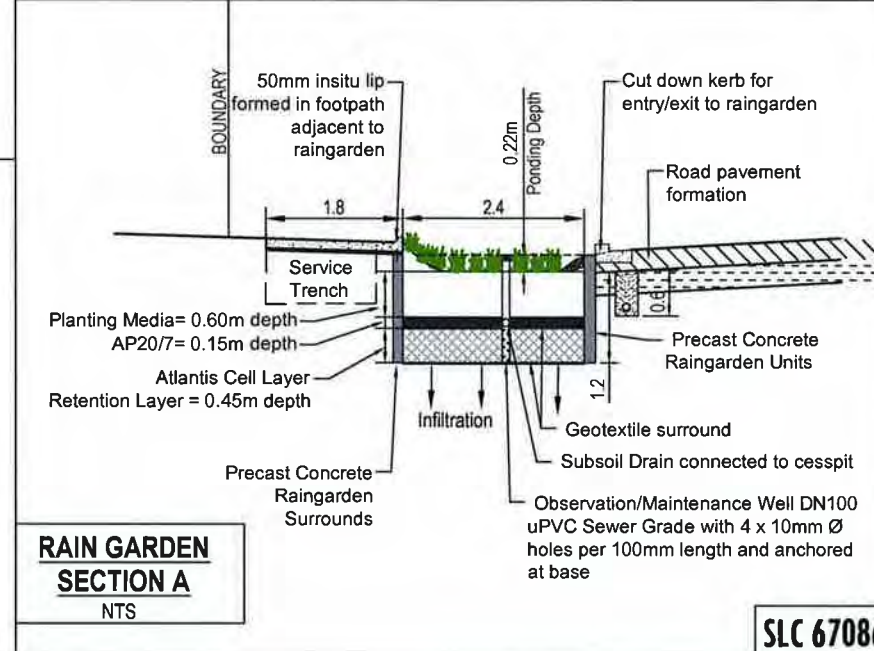
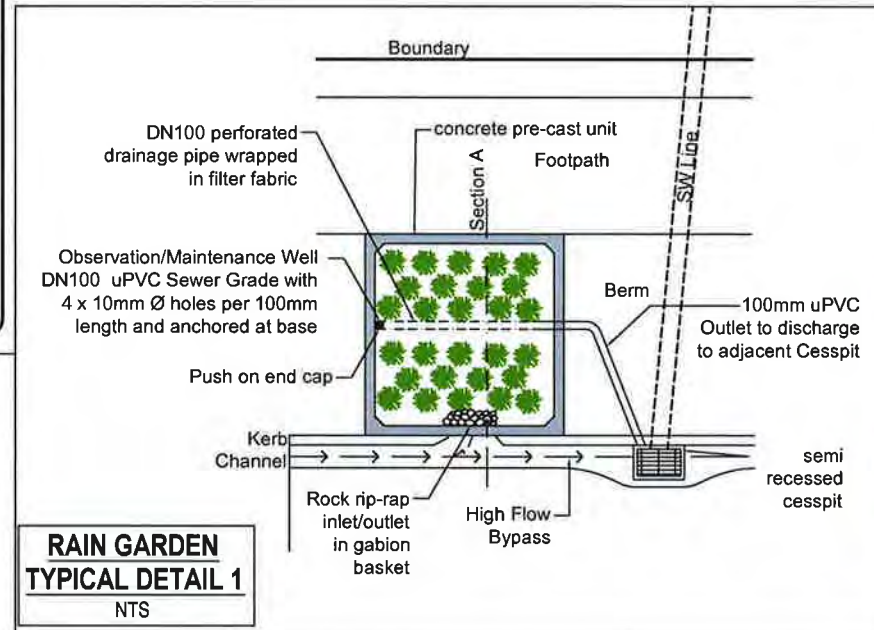
Email: catobolam@catobolam.co.nz

SLC 67086



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Signed: *[Signature]*
Licensed Cadastral Surveyor
Date: 1/2/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz



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- NOTES**
- GENERAL**
1. Levels are in terms of LINZ Datum 1946.
 2. Coordinates are in terms of NZTM.
 3. All infrastructure is public unless otherwise shown.
- STORMWATER**
1. All pipes are Class 4 reinforced concrete rubber ring jointed (RCRRJ), unless otherwise shown.
 2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
 2. Bedding is H2 type unless otherwise stated.
 3. All catchpits are 675mm x 450mm steel grate lids semi recessed unless otherwise shown.
 4. All lot connections are 100Ø uPVC SEH-C unless otherwise stated.
 5. All 100Ø & 150Ø pipes are uPVC SEH-C SN16.
 6. Wall drain outlets to be connected to private drainage at building consent stage.

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	11/16
DESIGNED	KM	9/14
DRAWN	AA	1/17
CHECKED	BM	1/17
APPROVED	TL	1/17

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SURVEYORS PLANNERS ENGINEERS

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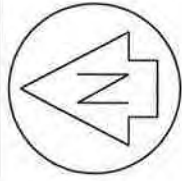
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CLIENT Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stages 4 & 7
Huapai

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 4 of 6

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 23/1/2017	CAD REFERENCE 32522 E635-E640	SHEET NO E638
DIRECTORY Z:\32522\ACAD		JOB NO 32522

SLC 67086



Refer to Diagram 7 Sheet E640

Lot 6
DP 116044

G-1 headwall &
rock rip-rap outlet
IL 24.38 to G-2

Refer to Diagram 6 Sheet E640

SWMH G-2
IL 24.76 to
G-1
LL under
construction

SWMH J-3
1800Ø
LL under
construction
IL 24.54 to J-4

Dry Attenuation
Basin A

SWMH J-2
2400Ø
LL under
construction

J-4 headwall
& rock rip-rap inlet

Lot 2
DP 502602

Rock rip-rap outlet
(1.6m l x 3.8m w x 150mmØ
stone to a depth of 300mm)

E-1 headwall
& rock rip-rap outlet

SWMH E-2
1200Ø
LL under
construction

Rock rip-rap outlet
(3.8m l x 3.2m w x 150mmØ
stone to a depth of 300mm)

SWMH S-2
2400Ø
LL under
construction
IL 25.64
IL 25.64

A-1 headwall
& rock rip-rap
outlet
IL 24.96 to A-2

SWMH A-3
1650Ø
LL under
construction

SWMH A-2
2400Ø
LL under
construction
IL 24.94 to A-1

S-1 headwall
& rock rip-rap
outlet

Lot 3
DP 491124

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Signed:
Licensed Cadastral Surveyor
Date: 1/12/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz

NOTES

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 6. Wall drain outlets to be connected to private drainage at building consent stage.

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ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:1000	A3	
DATE	CAD REFERENCE	SHEET NO
23/1/2017	32522 E635-E640	E639
DIRECTORY		JOB NO
Z:\32522\ACAD\		32522

Drainage As Built Legend

Existing from Stages 1a & 3

Stormwater

Cesspit

Under Channel Drain

Rock Rip Rap

Open Channel Stabilised with geotextile cloth & coconut matting

Rain Garden

Timber Retaining Wall

Rock Retaining Wall

Planted Stormwater Low Flow Channel

Contours 1 meter

Contours 0.5 meter

New - As Constructed

Stormwater

Cesspit

Under Channel Drain

Rock Rip Rap

Open Channel Stabilised with geotextile cloth & coconut matting

Rain Garden

Timber Retaining Wall

Rock Retaining Wall

Planted Stormwater Low Flow Channel

Contours 1 meter

Contours 0.5 meter

DRAWING TITLE

Stormwater Reticulation
As Built Plan
Sheet 5 of 6

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stages 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	11/16
DESIGNED	KM	9/14
DRAWN	AA	1/17
CHECKED	BM	1/17
APPROVED	TL	1/17

SLC 67086



Email: catobolam@catobolam.co.nz

Lot 3
DP 491124

Rock rip-rap outlet
(9.0m long x 4.1m w x 150mmØ
stone to a depth of 600mm)

Refer to
Diagram 7
for detail
down this line.

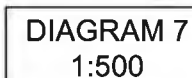
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	NAME	DATE
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DESIGNED	KM	9/14
DRAWN	AA	1/17
CHECKED	BM	1/17
APPROVED	TL	1/17

phone 09-427 0072
fax 09-426 7331
catobolam.co.nz

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 6 of 6

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 23/1/2017	CAD REFERENCE 32522 E635-E640	SHEET NO E640
DIRECTORY Z:\32522\ACAD		JOB NO 32522





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Construction

Water Reticulation Legend

Existing	200	New - constructed under SLC 67086 stage 4 & 7	32	63	125
		Watermain (Ø)			
		Blank Cap			
		Sluice Valve			
		Peet Valve			
		Tapping bands for lot connections			
		Fire Hydrant			

NOTES

GENERAL

- Coordinates are in terms of NZTM 2000.

WATER RETICULATION

- Cover for water reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
- Watermain 125, 180 & 225 OD - PE100 PN12.5
- All ridemains 63 OD - PE80 PN12.5
- Stainless Steel bolts and nuts used for flanged connections.
- Metallic Detector Tape provided above all watermains and ridemains
- All 32mm OD Connections on right of ways are private

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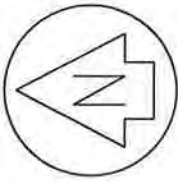
Signed:  Licensed Cadastral Surveyor

Date: 12/1/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz



104

Blank cap installed on stage boundary for line to be extended under future development

Vinistra Road

Refer to diagram 3 on sheet E643 205

Podgora Avenue

501 DP 502639 Stormwater Utility Reserve

Nellie Drive

Refer to diagram 1 for details

500 DP 502639

Dida Park Drive

500 DP 502639

Papa Orchard Drive

202

39

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14 DP 502639

13 DP 502639

12 DP 502639

11 DP 502639

10 DP 502639

9 DP 502639

8 DP 502639

7 DP 502639

6 DP 502639

5 DP 502639

4 DP 502639

3 DP 502639

2 DP 502639

1 DP 502639

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DP 502639

DP 502639

DP 502639

Diagram 1 Scale 1:500

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ORIGINAL SCALE 1:1000 ORIGINAL SIZE A3 REVISION NO

DATE 20/12/16 CAD REFERENCE 32522 E641 - E643 SHEET NO E641

DIRECTORY Z:\32522\Acad JOB NO 32522

DRAWING TITLE

Water Reticulation
As Built Plan
Sheet 1 of 3

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

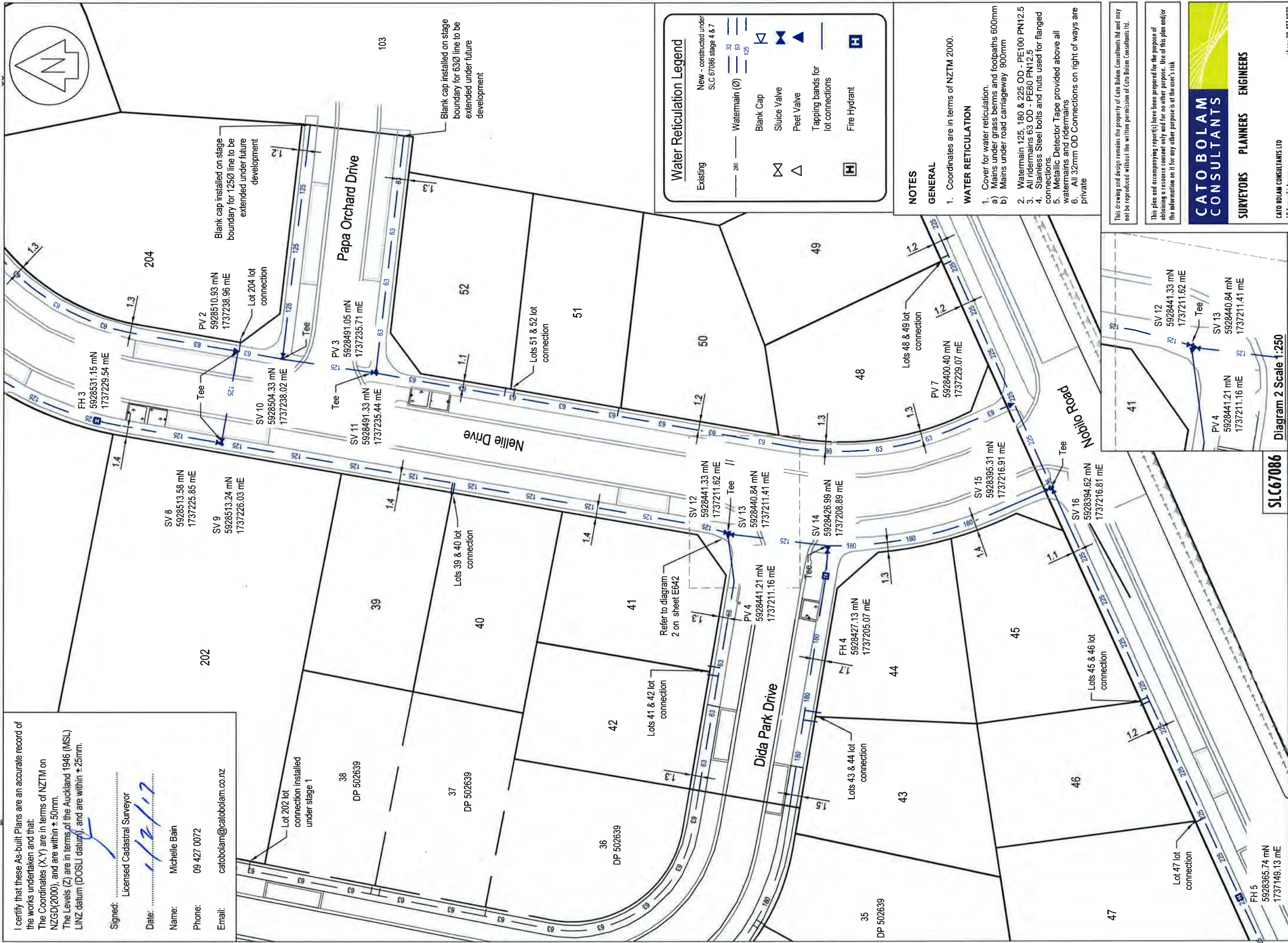
Lot 10
DP 116044

SLC67086

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	12/1/16
DESIGNED	KM	09/1/16
DRAWN	BJ	12/1/16
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Date: 1/2/17
Name: Michelle Bain
Phone: 09 427 0072
Email: catobolam@catobolam.co.nz



Water Reticulation Legend

Existing

New - constructed under SLC 67086 stage 4 & 7

Watermain (Ø)

Blank Cap

Sluice Valve

Peet Valve

Tapping bands for lot connections

Fire Hydrant

- NOTES
- GENERAL
1. Coordinates are in terms of NZTM 2000.
- WATER RETICULATION
1. Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm
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3. All ridemains 63 OD - PE80 PN12.5
4. Stainless Steel bolts and nuts used for flanged connections.
5. Metallic Detector Tape provided above all watermains and ridemains
6. All 32mm OD Connections on right of ways are private

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ORIGINAL SCALE	1:500	ORIGINAL SIZE	A3	REVISION NO	
DATE	20/12/16	CAD REFERENCE	32522 E641 - E643	SHEET NO	E642
DIRECTORY	Z:\32522\Acad			JOB NO	32522

Water Reticulation
As Built Plan
Sheet 2 of 3

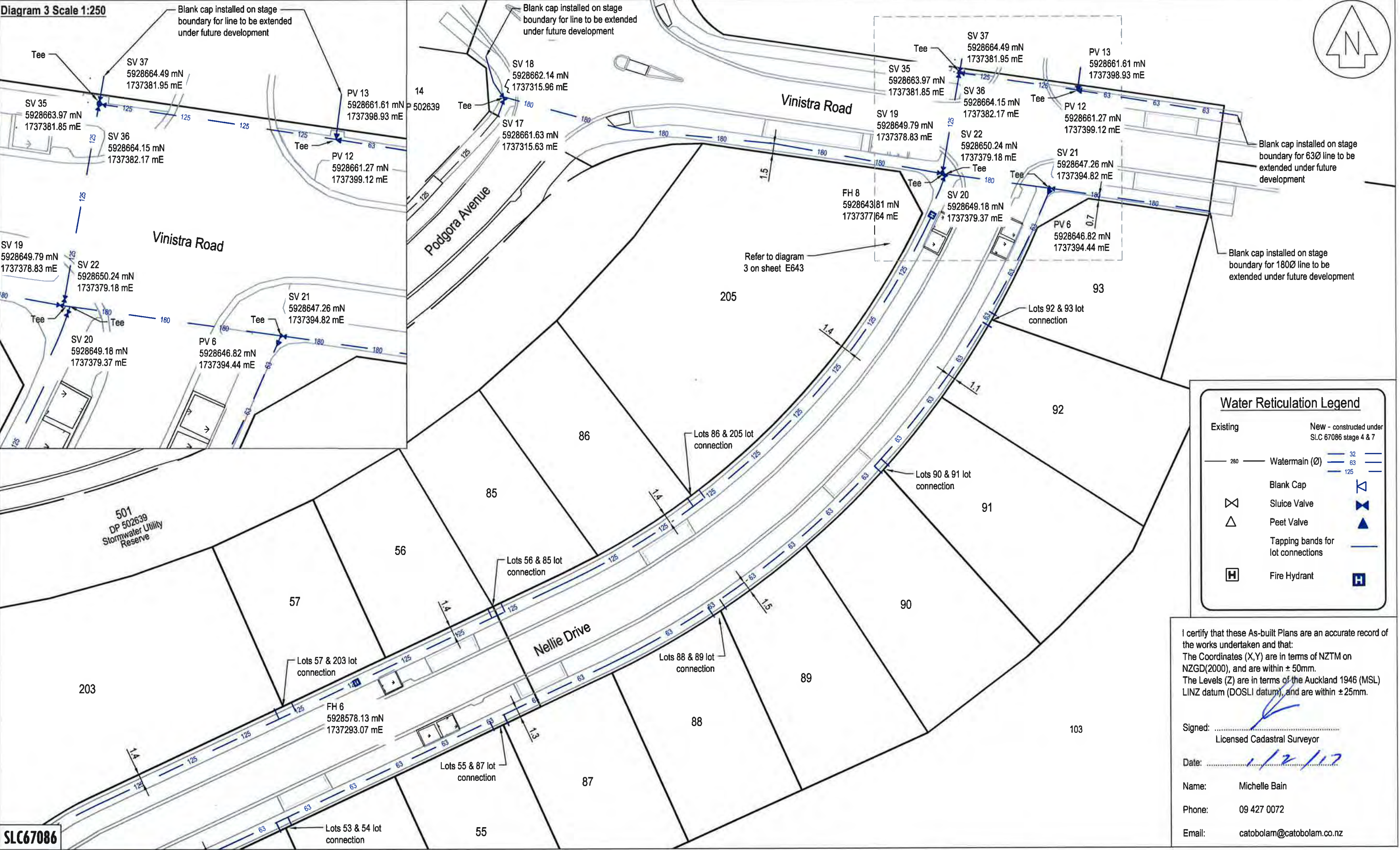
Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

SLC67086

Diagram 2 Scale 1:250

Diagram 3 Scale 1:250



SLC67086

CATOBOLAM
CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

CATO BOLAM CONSULTANTS LTD
19 Tamariki Avenue
PO Box 157
Orewa 0946

phone 09-427 0072
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email catobolam@catobolam.co.nz

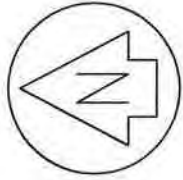
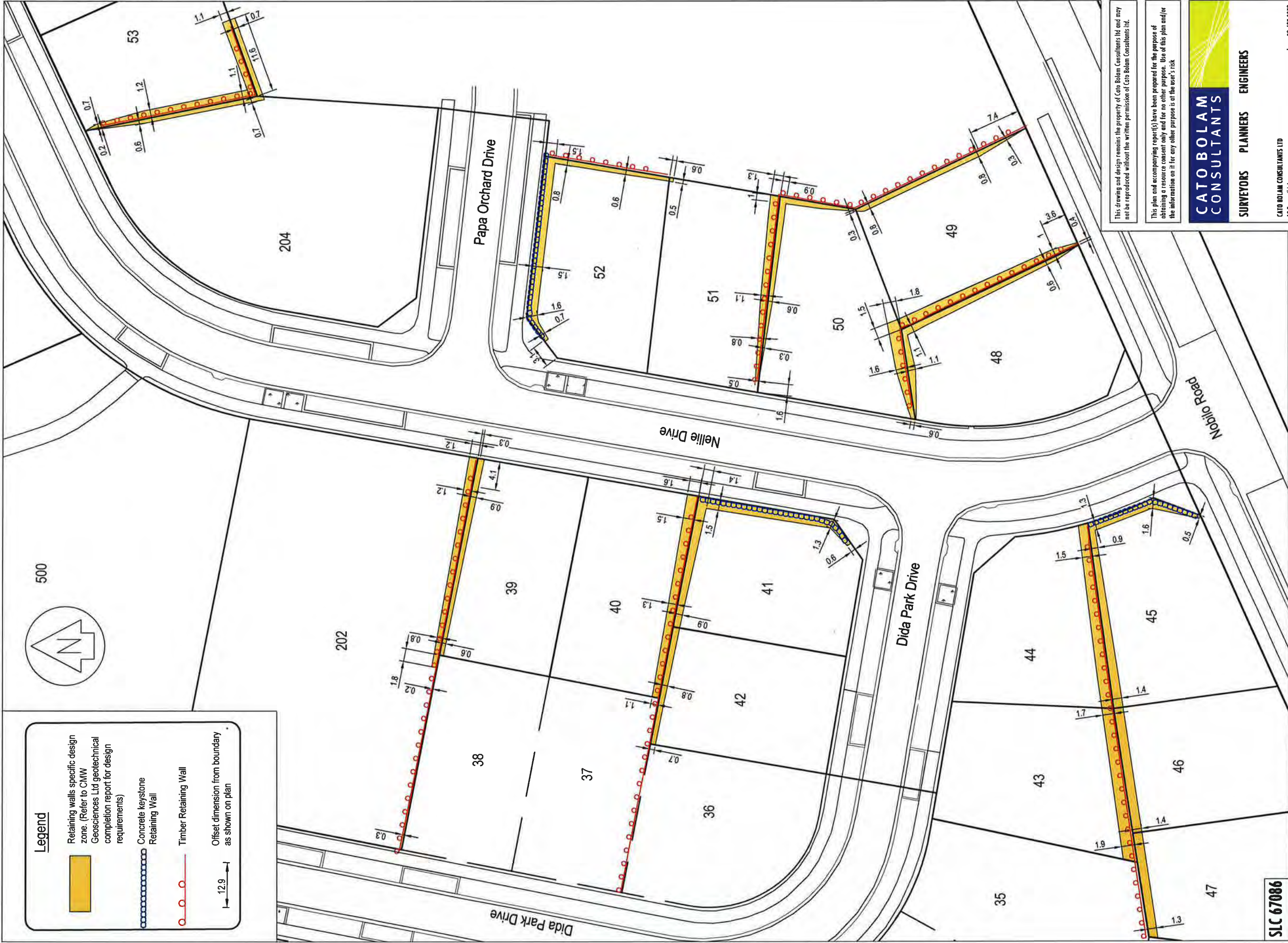
REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	12/16
DESIGNED	KM	09/14
DRAWN	BJ	12/16
CHECKED	BM	12/16
APPROVED	YL	12/16

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CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE
Water Reticulation
As Built Plan
Sheet 3 of 3

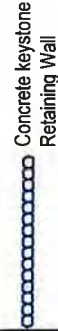
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1:500	A3	
DATE	CAD REFERENCE	SHEET NO
20/12/16	32522 E641 - E643	E643
DIRECTORY		JOB NO
Z:\32522\Acad		32522



500

Legend

Retaining walls specific design zone. (Refer to CMW Geosciences Ltd geotechnical completion report for design requirements)

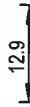


Concrete keystone Retaining Wall



Timber Retaining Wall

Offset dimension from boundary as shown on plan



12.9

SLC 67086

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SURVEYORS **PLANNERS** **ENGINEERS**

CATO BOLAM CONSULTANTS LTD
19 Tamariki Avenue
PO Box 157
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DRAWING TITLE

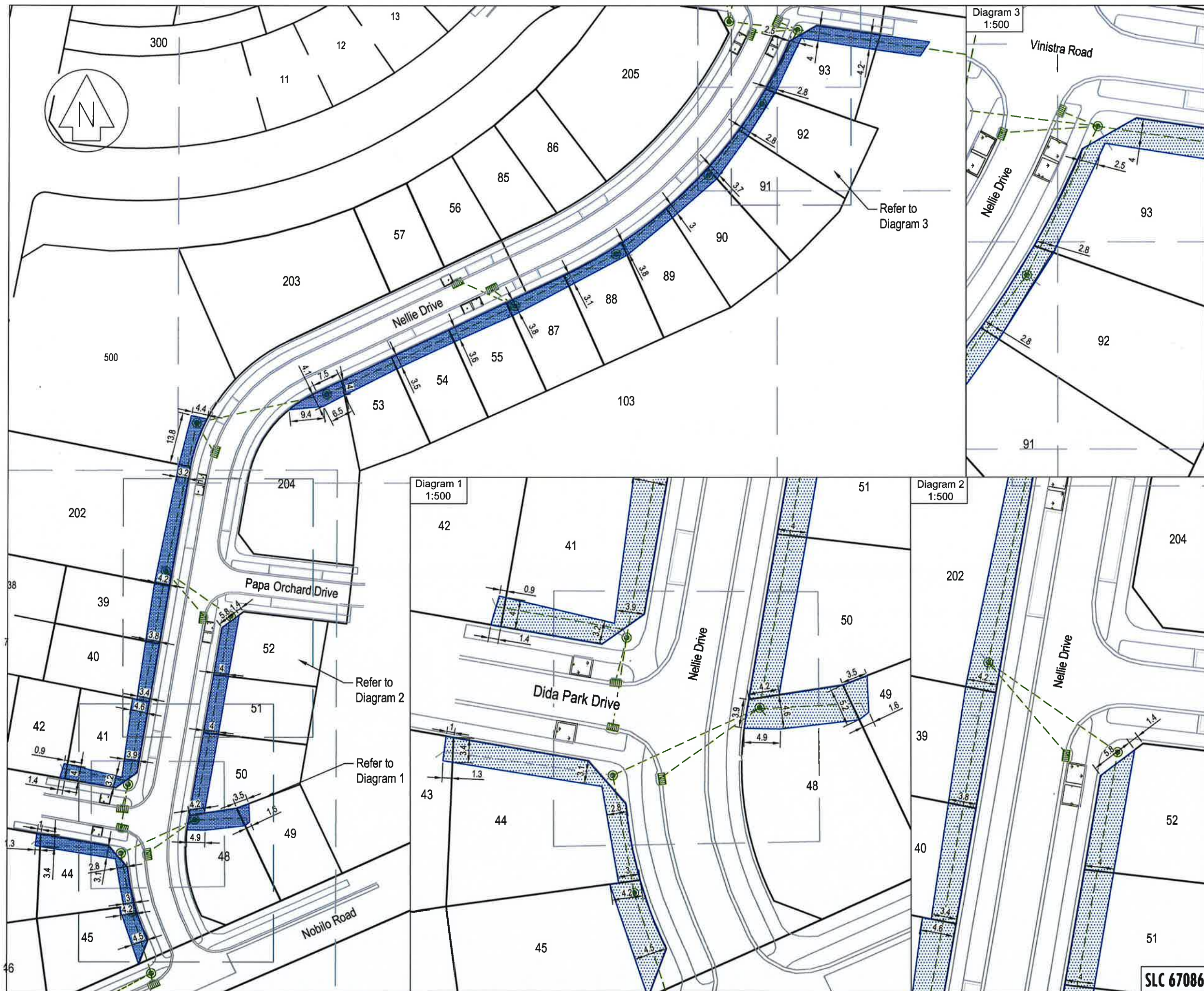
Retaining Wall
Specific Design Plan

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	BJ	12/2016
DESIGNED	KM	09/2014
DRAWN	AA	12/2016
CHECKED	BM	12/2016
APPROVED	TM	12/2016

ORIGINAL SCALE	1:500	ORIGINAL SIZE	A3	REVISION NO	
DATE	20/12/16	CAD REFERENCE	32522 E644	SHEET NO	E644
DIRECTORY	Z:\32522\Acad			JOB NO	32522



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As Built Earthworks Legend

- As built Contour (1m interval)
- As built Contour (0.5m interval)
- Pipeline 45° Zone of Influence Area from invert
- Cesspits
- Stormwater
- Offset dimension from boundary as shown on plan

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	LD	11/16
DESIGNED	KM	09/14
DRAWN	AA	12/16
CHECKED	BM	12/16
APPROVED	TL	12/16

CATO BOLAM CONSULTANTS

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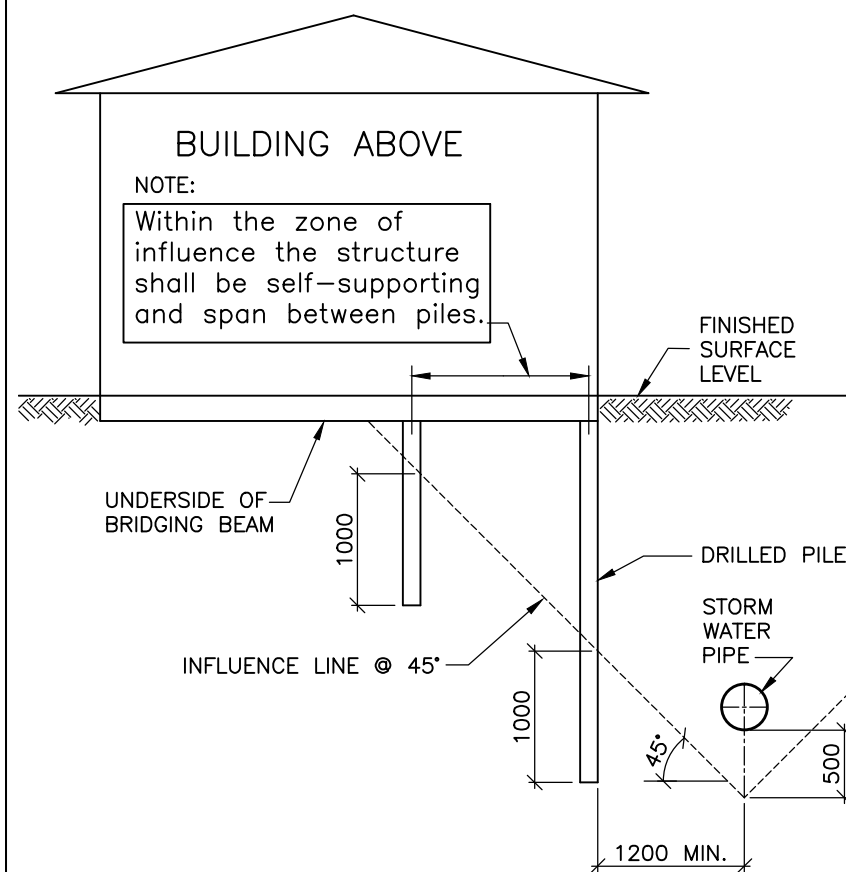
email catobolam@catobolam.co.nz

CLIENT Cabra Development Ltd
Huapai Triangle Sub Precinct B
Stage 4 & 7
Huapai

DRAWING TITLE
Drainage Zone of Influence Plan

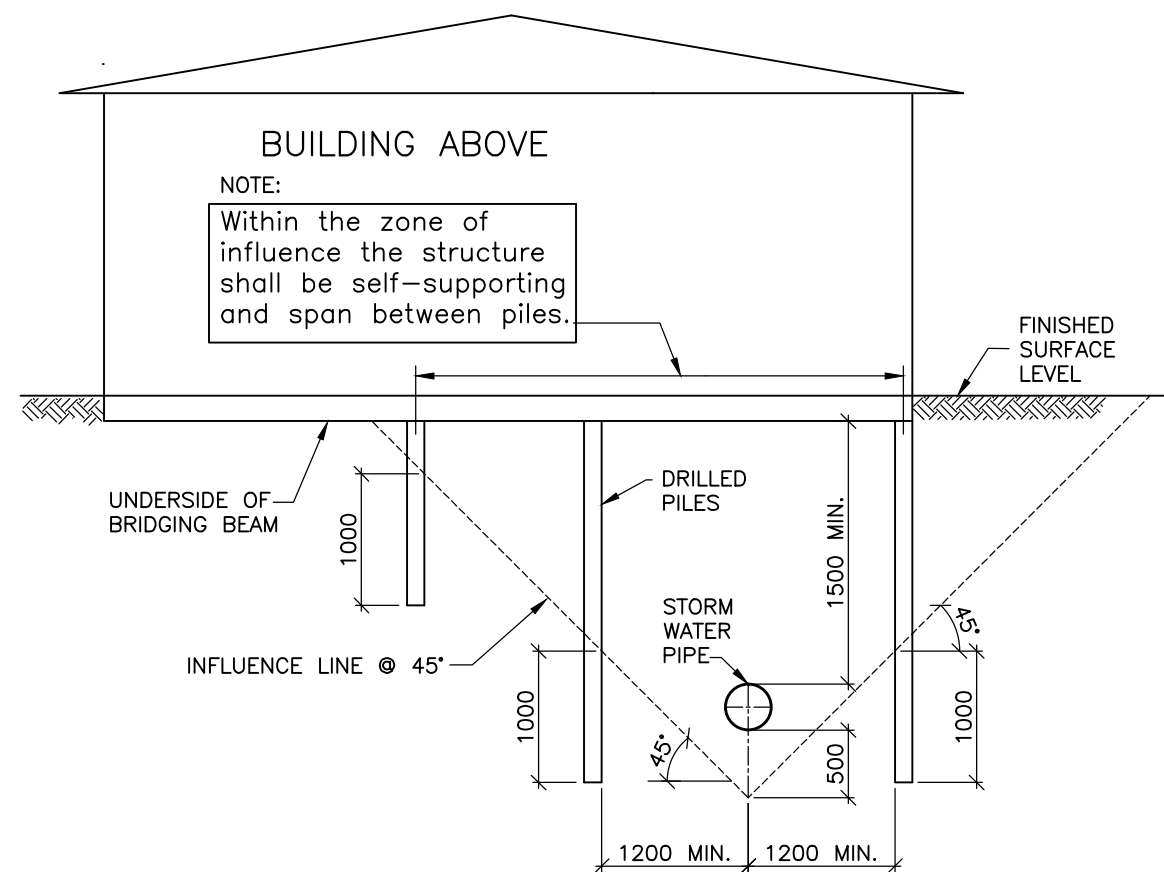
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DATE 20/12/16	CAD REFERENCE 32522 E643	SHEET NO E645
DIRECTORY Z:\32522\Acad		JOB NO 32522

SLC 67086



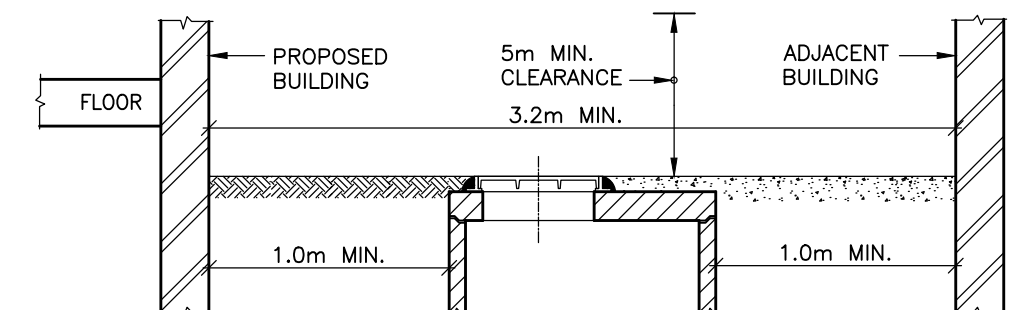
"BUILD CLOSE" NOTES:

1. Specific approval is required from Auckland Council if building adjacent to pipes, larger than 375mm internal diameter, or greater than 3.0m of depth.
2. Building to be outside all overland flow paths and floodplains.
3. Pile constructed to a depth of 1.0m below influence line.
4. Outside zone of influence, normal foundation requirements apply.



"BUILD OVER" NOTES:

1. Applies to stormwater pipes 375mm nominal diameter or less.
2. Bridging over pipes larger than 375mm nominal diameter is NOT allowed under any circumstances.
3. Pile constructed to a depth of 1.0m below influence line.
4. Outside zone of influence, normal foundation requirements apply.
5. Bridging is NOT allowed over pipes where clear vertical separation distance from top of pipe to underside of bridging beam is less than 1.5m



MANHOLE CONSTRUCTION CLEARANCE

NOTES

1. The information on this page is intended to show examples of typical scenarios and should be used for general guidance purposes only. Significant variations on a site by site basis are to be expected and it is in no way implied that meeting any of the above will guarantee approval.
2. Requirements for foundation design etc apply to both sides of pipe.
3. No driven piles are permitted within 10m of brick Stormwater Structures, or within 5m of all other Stormwater Structures.
4. Specific approval is required from Auckland Council for driven piles in partially drilled holes, within the 5m/10m zone.
5. Piles that may be required to resist horizontal forces will require specific design.
6. Pile/Footing location point must be below 45° "Zone of Influence".
7. All Manholes shall have 24 hours unobstructed access.
8. Manholes in basements, or where sufficient clearance is unavailable, are not permitted.
9. All pipe buildovers will require approval by Auckland Council.
10. Refer to section 4.3.21 for pipe buildover requirements.

STORMWATER ENGINEERING
STANDARD DETAILS

ISSUE/REVISION: 1
DATE: 30 September 2013
CAD FILE: AC-STD-SW22

AUCKLAND COUNCIL

STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS

MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OR OVER PIPES

ENVIRONMENTAL-SW

ORIGINAL
SCALE: AS NOTED



Sht 1 OF 1 Shts	DRAWING No. ACSD	REV
	SW22	A3

Appendix C

Laboratory Test Data

Report No: 16 0144 00
Page: 1 of 2**DETERMINATION OF THE LIQUID LIMIT & LINEAR SHRINKAGE
TEST METHOD NZS 4402 : 1986 TEST 2.2 & 2.6**

Job:	Station Road	Sample origin:	As below
Date of order:	15.6.16	Sample Description:	-
Sample method:	Hand Auger	Date:	13 & 14/06/16
Sample By:	RHD		

Test Details :

Test performed on :	whole soil
History :	Natural

Sample No.	Location	Depth (m)	Liquid Limit	Linear Shrinkage	Natural Water Content (%)
E228A	Lot 38	0.4m - 0.6m	104	23	48.3
E229A	Lot 36	0.4m - 0.6m	91	23	44.3
E230A	Lot 69	0.4m - 0.6m	71	19	31.7
E231A	Lot 50	0.4m - 0.6m	82	19	35.9
E232A	Lot 32	0.4m - 0.6m	79	21	43.8
E234A	Lot 115	0.4m - 0.6m	86	22	38.2
E235A	Lot 64	0.4m - 0.6m	63	18	29.3
E236A	Lot 78	0.4m - 0.6m	66	17	29.5
E237A	Lot 203	0.4m - 0.6m	85	21	45.5

Comments :

Tested By:	EC	Date :	17,18,19/06/16
Calculated By :	EC	Date :	23.06.16
Checked By :	EC	Date :	27.06.16

Report No: 16 0144 00
Page: 2 of 2**DETERMINATION OF THE LIQUID LIMIT & LINEAR SHRINKAGE
TEST METHOD NZS 4402 : 1986 TEST 2.2 & 2.6**

Job:	Station Road	Sample origin:	As below
Date of order:	-	Sample Description:	-
Sample method:	-	Date:	15.06.16
Sample By:	RHD/JMJ		

Test Details :

Test performed on :	whole soil
History :	Natural

Sample No.	Location	Depth (m)	Liquid Limit	Linear Shrinkage	Natural Water Content (%)
945 D	LOT 108	0.4m - 0.6m	93	21	38.5
946 D	LOT 100/102	0.4m - 0.6m	98	22	40.3
947 D	LOT 20	0.4m - 0.6m	97	22	56.4
948 D	LOT 205	0.4m - 0.6m	73	17	42.6
949 D	LOT 26	0.4m - 0.6m	117	21	39.1
950 D	LOT 87	0.4m - 0.6m	69	18	36.9
951 D	LOT 43	0.4m - 0.6m	88	20	45.8
952 D	LOT 95	0.4m - 0.6m	89	21	48.7

Comments :

Tested By:	MC	Date :	20/22/23/24/25.06.16
Calculated By :	MC	Date :	27.06.16
Checked By :	EC	Date :	27.06.16

Appendix D

Field Test Data

LF11 Rev 1 Field Density NDM Soil Report

CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Client: Cabra Developments Ltd
Project: Corner Station Road and Nobilo Road
Location: Huapai
Project No: 2015_1127
Report No: 2015_1127LAA Rev.0
Issue Date: 20/05/2016

Test Methods:
NZS 4407.3.1:1991
NZS 4407.4.2.1:1991
NZS 4407.4.2.2:1991

Notes:
Solid Density: Assumed (2.7 t/m³)

Endorsement:



Authorised Signatory:  Date: 20/05/16

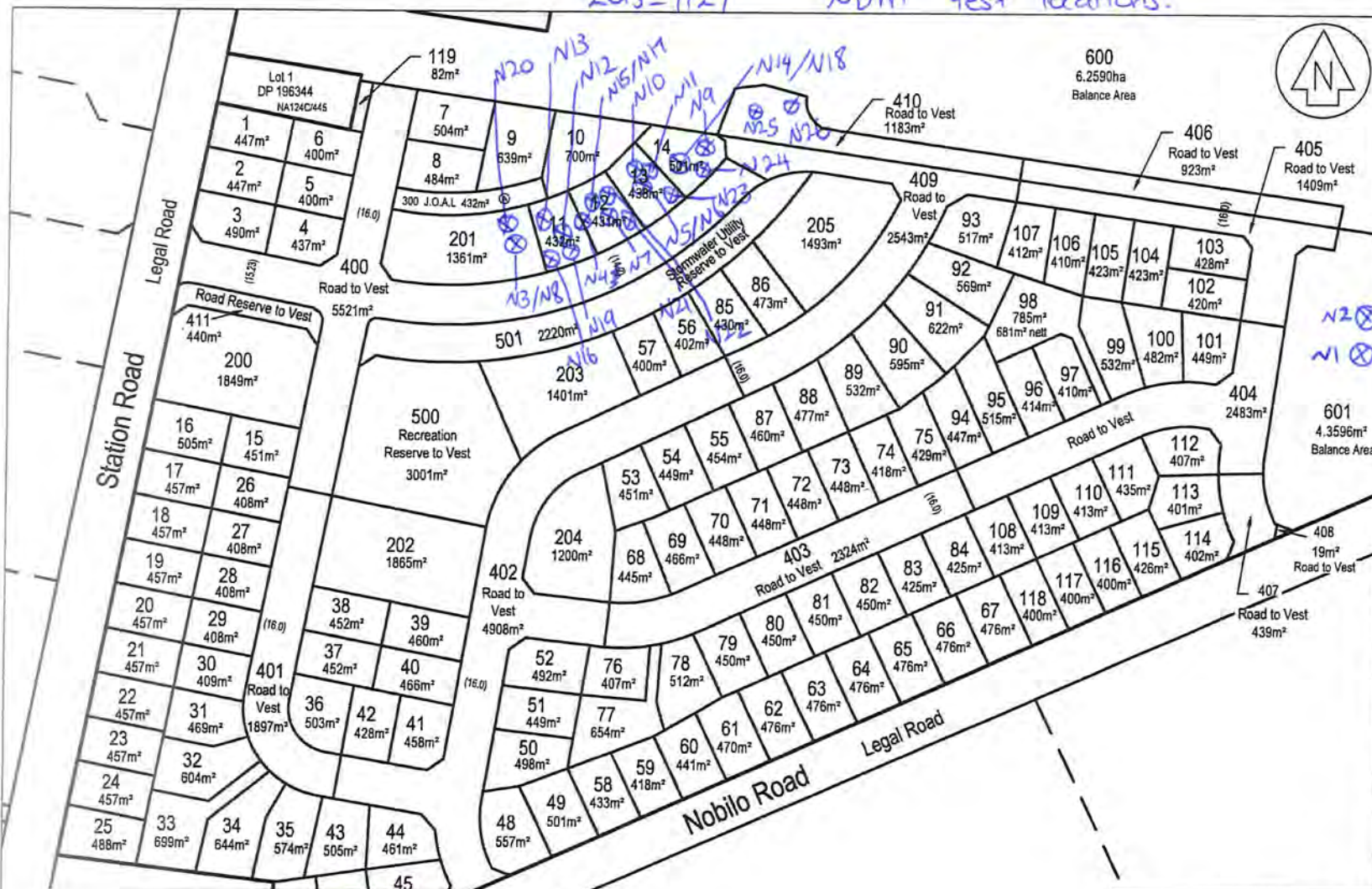
Date Sampled	Sample No.	Test Location	Soil Description & Sample Details Undisturbed/Compacted/ Unknown	In-situ Vane Shear Strengths					Field and Laboratory Testing Data							Comments	
				Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³)	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Oven Water Content (%)	Solid Density (t/m³)	Oven Dry Density (t/m³)		Calculated Air Voids (%)
27/11/2015	N1	Temp silt pond (off-site)	CLAY	131	136	127	119	128	1.8136	1.3114	38.3	1.10	35.4	2.7	1.34	3.0	
	N2	Temp silt pond (off-site)	CLAY	110	116	115	131	118	1.8072	1.3181	37.1	2.16	37.9	2.7	1.32	1.8	
7/12/2015	N3	Lot 13	CLAY	>209	179	>209	194	>198	1.8073	1.3052	38.5	1.34	34.8	2.7	1.34	3.7	
	N4	Lot 11/12 Boundary	CLAY	>209	UTP	>209	>209	>209	1.8122	1.3265	36.6	2.20	32.6	2.7	1.36	4.8	
	N5	Lot 201	CLAY	>209	>209	>209	>209	>209	1.8382	1.3782	33.4	2.86	33.3	2.7	1.38	3.0	
	N6	Lot 13	CLAY	187	164	197	182	183	1.8366	1.3562	35.4	1.63	37.6	2.7	1.34	0.4	
8/12/2015	N7	Lot 12	CLAY	164	UTP	146	187	>177	1.9166	1.4781	29.71	1.31	31.5	2.7	1.46	0.1	
	N8	Lot 201	CLAY	194	164	>209	187	>189	1.8748	1.3611	37.7	-1.90	24.8	2.7	1.50	7.1	
9/12/2015	N9	Lot 14	CLAY	122	110	164	187	146	1.7992	1.2933	39.1	1.39	40.5	2.7	1.28	0.7	
	N10	Lot 13 North	CLAY	194	119	142	176	158	1.7974	1.3098	37.2	2.63	39.1	2.7	1.30	1.6	
	N11	Lot 11 North	CLAY	127	194	140	149	153	1.8396	1.3550	35.7	1.27	33.0	2.7	1.38	3.1	
	N12	Lot 13 South	CLAY	105	187	127	140	140									
	N13	Lot 11	CLAY	118	131	137	163	137									
	N14	Lot 14	CLAY	172	UTP	149	127	>164	1.8416	1.3629	35.1	1.55	35.7	2.7	1.36	1.3	
10/12/2015	N15	Lot 12	CLAY	131	105	149	145	133									Retest of N9
	N16	Lot 11	CLAY	131	>209	>209	199	>187	1.8173	1.3465	35.0	2.94	32.7	2.7	1.36	4.5	Retest of N12
	N17	Lot 12	CLAY	140	127	149	142	140	1.8063	1.3118	37.7	1.85	37.8	2.7	1.32	1.9	Retest of N13
	N18	Lot 14	CLAY	UTP	UTP	UTP	164	>198	1.8208	1.3387	36.0	2.10	28.9	2.7	1.42	6.8	Retest of N15
	N19	Lot 11	CLAY	UTP	>209	UTP	164	>198	1.8578	1.4246	30.4	3.82	29.8	2.7	1.44	4.3	
	N20	Lot 201 East	CLAY	UTP	UTP	182	202	>201	1.9082	1.4248	33.9	1.22	34.0	2.7	1.42	-1.2	
14/12/2015	N21	Lot 12	CLAY	206	164	164	185	180	1.7416	1.2966	34.3	7.38	36.9	2.7	1.28	6.0	
	N22	Lot 12	CLAY	206	164	164	185	180	1.8291	1.3718	33.3	3.36	35.1	2.7	1.36	2.3	
	N23	Lot 13	CLAY	170	188	206	182	187	1.8341	1.3328	37.6	0.40	34.8	2.7	1.36	2.3	
	N24	Lot 14 South	CLAY	>209	>209	203	>209	>208	1.7932	1.3023	37.7	2.56	36.6	2.7	1.32	3.3	
	N25	North of Lot 14	CLAY	UTP	>209	149	145	>178	1.8615	1.4409	29.2	4.48	29.1	2.7	1.44	4.6	
	N26	North of Lot 14	CLAY	67	82	157	82	97	1.7887	1.2918	38.5	2.35	34.5	2.7	1.34	4.9	

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Created By: AP
Checked By: AP

Date: 30/11/2015
Date: 15/03/2016

205-1127 NDM test locations.



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AUCKLAND COUNCIL Rodney Section
COMPRISED IN CT NA810/90 1.0000ha
 73233 4.1016ha
 73234 4.2206ha
 710970 4.3615ha
 710971 6.4696ha

TOTAL AREA 20.1533ha
 LEVELS ARE IN TERMS OF LANDS AND SURVEY DATUM, AREAS AND MEASUREMENTS ARE SUBJECT TO SURVEY.

SCHEDULE OF EASEMENTS GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	GRANTEE
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA	①	LOT 300	CHORUS NEW ZEALAND LTD
RIGHT TO CONVEY ELECTRICITY			VECTOR LTD
RIGHT TO CONVEY GAS			VECTOR GAS LTD

R1: Lots 411 & 200 amended	LS	02.16
REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED		
DESIGNED	JM	17/15
DRAWN	LS	01.16
CHECKED		
APPROVED		

CATO BOLAM CONSULTANTS
 SURVEYORS PLANNERS ENGINEERS
 CATO BOLAM CONSULTANTS LTD
 19 Tamaki Avenue
 PO Box 157
 Drua 0946
 phone 01-427 5072
 fax 01-426 7331
 email cato@catobolam.co.nz

CLIENT
CABRA DEVELOPMENTS LTD
CNR STATION ROAD AND NOBIL ROAD, HUAPAI

TITLE
LOTS 1 - 119, 200 - 205, 300, 400 - 411, 500 - 501, 600, 601 BEING SUBDIVISION OF LOTS 1 & 2 DP 318693, LOT 2 DP 137997 & LOTS 2 & 3 DP 491124

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO	R1
1 : 1500	A3		
DATE	CAD REFERENCE	SHEET NO	514
JAN 2016	32522 514.dwg		
DIRECTORY		JOB NO	32522
2 (22522) (A3) (Drawing-Title)			

SCHEDULE OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY RIGHT TO CONVEY TELECOMMUNICATIONS COMPUTER MEDIA ELECTRICITY & GAS	①	LOT 300	LOT 201

Amalgamation Conditions
 That Lot 300 be held as to 2 undivided half shares by the owners of Lots 9-10 hereon and individual Certificates of Title be issued in accordance therewith.
 That Lot 119 be transferred to the owners of Lot 1 DP 196344 and that one Certificate of Title be issued in accordance therewith.





LF10 Rev 4 Soil Core Sample Density Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project: Corner Station Road and Nobilo Road
Project No: 2015_1127
Location: Huapai
Report No: 2015_1127LAB Rev.0
Report Date: 20/05/2016
Client: Cabra Developments Limited
Client Address: 19 Tamaraki Avenue PO Box 197 Orewa
Client Reference: 32522

Test Methods:
NZS 4402:1986 5.1.3
NZS 4402:1986 2.1

Notes:
Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff



Date Sampled	Sample No.	Test Location			Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data					Comments
		Easting	Northing	RL/Details		Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Bulk Density (t/m ³)	Dry Density (t/m ³)	Water Content (%)	Solid Density (t/m ³)	Calculated Air Voids (%)	
3/12/2015	C1	Temp silt pond (off-site)			CLAY	127	149	112	119	127	1.82	1.36	34.5	2.7	3.3	

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Created By: AP

Date: 14/12/2015

Checked By: CS

Date: 20/05/2016

Authorised Signatory:

Date: 20/05/2016

Page: 1 of 1

2015-1127 Core test locations



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AUCKLAND COUNCIL Rodney Section	
COMPRISED IN CT	NA81D/90
73233	1.0000ha
73234	4.1016ha
710970	4.2206ha
710971	4.3615ha
	6.4696ha

TOTAL AREA 20.1533ha
LEVELS ARE IN TERMS OF LANDS AND SURVEY DATUM, AREAS AND MEASUREMENTS ARE SUBJECT TO SURVEY.

SCHEDULE OF EASEMENTS GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	GRANTEE
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA	A	LOT 300	CHORUS NEW ZEALAND LTD
RIGHT TO CONVEY ELECTRICITY			VECTOR LTD
RIGHT TO CONVEY GAS			VECTOR GAS LTD

REVISION (DESCRIPTIONS)	LS	02.16
	NAME	DATE
	NAME	DATE
SURVEYED		
DESIGNED	KM	17/75
DRAWN	LS	01.16
CHECKED		
APPROVED		

CATO BOLAM CONSULTANTS

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email cato@catobolam.co.nz

CLIENT
CABRA DEVELOPMENTS LTD
CNR STATION ROAD AND
NOBIL ROAD, HUAPAI

TITLE
LOTS 1 - 119, 200 - 205, 300,
400 - 411, 500 - 501, 600, 601 BEING
SUBDIVISION OF LOTS 1 & 2
DP 318693, LOT 2 DP 137997 &
LOTS 2 & 3 DP 491124

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1 : 1500	A3	R1
DATE	CAD REFERENCE	SHEET NO
JAN 2016	32522 S14.dwg	S14
DIRECTORY	JOB NO	32522
2:2522:14:40		
(Drawings-Revision 4)		

SCHEDULE OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY RIGHT TO CONVEY TELECOMMUNICATIONS COMPUTER MEDIA ELECTRICITY & GAS	A	LOT 300	LOT 201

Amalgamation Conditions

That Lot 300 be held as to 2 undivided half shares by the owners of Lots 9-10 hereon and individual Certificates of Title be issued in accordance therewith.

That Lot 119 be transferred to the owners of Lot 1 DP 196344 and that one Certificate of Title be issued in accordance therewith.



LF11 Rev 2 Field Density NDM Soil Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project: Corner Station Road and Nobilo Road
Project No: 2015_1127
Location: Huapai
Report No: 2015_1127LAC Rev.0
Report Date: 20/05/2016
Client: Cabra Developments Limited
Client Address:
Client Reference:

Test Methods: NZS 4407.3.1:1991
NZS 4407.4.2.1:1991
NZS4407.4.2.2:1991

Notes: Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff

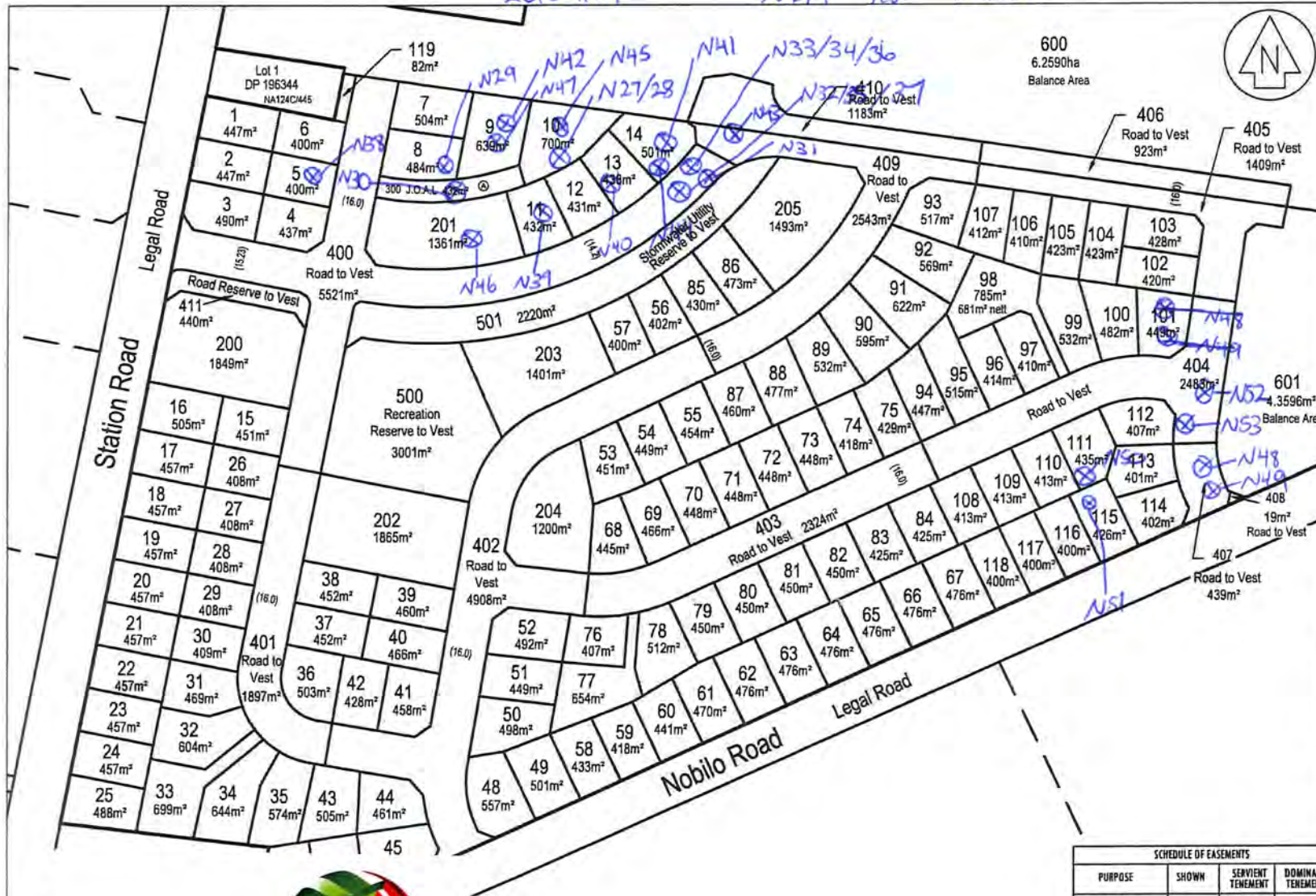


Date Sampled	Sample No.	Test Location	Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
				Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m ³)	Oven Dry Density (t/m ³)	Calculated Air Voids (%)	
16/12/2015	N27	Lot 10	CLAY	151	146	151	145	148	1.7876	1.2928	38.3	2.53	300	33.3	2.7	1.34	5.7	
	N28	Lot 10	CLAY	151	146	151	145	148	1.7980	1.2898	39.4	1.30	300	38.8	2.7	1.30	1.7	
	N29	Lot 8	CLAY	140	146	164	131	145	1.8371	1.3080	40.4	-1.47	300	37.0	2.7	1.34	0.71	
	N30	Lot 4 North	CLAY	131	145	149	146	143	1.8079	1.2996	38.4	1.80	300	33.7	2.7	1.36	4.3	
18/12/2015	N31	Road by Lot 145	CLAY	149	145	164	140	150	1.8258	1.3310	37.2	1.12	300	33.6	2.7	1.36	3.5	
	N32	Road by Lot 145	CLAY	131	149	140	172	148	1.8059	1.2851	40.5	0.21	300	33.8	2.7	1.34	4.4	
	N33	Road by Lot 145	CLAY	149	100	131	115	124										VSS ONLY
	N34	Road by Lot 145	CLAY	127	131	134	149	135										VSS ONLY
	N35	Road by Lot 145	CLAY	103	127	118	139	122										VSS ONLY
21/12/2015	N36	Lot 145	CLAY	>191	>191	UTP	150	>180	1.775	1.295	37.0	3.9	300	40.2	2.7	1.26	2.2	Restest for N33
	N37	Lot 13	CLAY	>191	>191	>191	170	>185	1.809	1.360	33.0	4.6	300	35.2	2.7	1.34	3.3	Restest for N34/N35
	N38	Lot 5	CLAY	>191	>191	>191	>191	>191	1.799	1.312	37.1	2.58	300	33.4	2.7	1.34	5.0	
23/12/2015	N39	Lot 11	CLAY	>191	>191	>191	161	>183	1.836	1.348	36.1	1.2	300	33.7	2.7	1.38	2.9	
	N40	Lot 13	CLAY	>191	161	170	>191	>178	1.906	1.446	31.8	0.37	300	32.0	2.7	1.44	0.3	
	N41	Lot 14	CLAY	150	>191	161	163	>166	1.825	1.331	37.1	1.17	300	34.0	2.7	1.36	3.3	
	N42	Lot 9	CLAY	>191	>191	>191	>191	>191	1.789	1.302	38.1	2.05	300	35.2	2.7	1.32	4.4	
30/12/2015	N43	Lot 14	CLAY	152	177	>191	173	>173	1.828	1.314	39.1	-0.17	300	40.3	2.7	1.30	-0.76	
	N44	Lot 14	CLAY	>191	>191	>191	>191	>191	1.839	1.359	35.0	1.56	300	28.9	2.7	1.42	5.9	
	N45	Lot 10	CLAY	158	177	>191	162	>172	1.794	1.323	35.7	3.71	300	33.6	2.7	1.34	5.2	
	N46	Lot 9	CLAY	>191	>191	>191	>191	>191	1.832	1.383	32.5	3.70	300	28.1	2.7	1.42	6.8	
	N47	Lot 201	CLAY	167	>191	188	>191	<184	1.749	1.302	36.3	5.78	300	32.2	2.7	1.32	8.4	
18/01/2016	N48	Lot 101	CLAY	UTP	>209	>209	>209	>209	1.8681	1.3967	33.7	1.03	300	32.7	2.7	1.40	1.8	
	N49	Lot 101	CLAY	UTP	167	176	178	>183	1.8092	1.3077	38.4	1.31	300	34.0	2.7	1.36	4.1	
	N50	Lot 103	CLAY	UTP	>209	142	>209	>192	1.8123	1.3078	38.6	1.00	300	34.8	2.7	1.34	3.4	
	N51	Lot 103	CLAY	194	148	140	>209	>173	1.7737	1.2774	38.9	2.95	300	37.0	2.7	1.30	4.1	
21/01/2016	N52	Lot 101	CLAY	>209	157	>209	UTP	>196	1.8839	1.4552	29.5	3.14	300	34.8	2.7	1.40	-0.4	
26/01/2016	N53	Lot 99	CLAY	UTP	UTP	>209	UTP	>209	1.7681	1.2976	36.3	4.78	300	33.0	2.7	1.32	6.9	

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Checked By: AP
Authorised Signatory:  Date: 17/12/2015
Date: 16/02/2016
Date: 20/05/2016

2015-1127 NDM test location



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AUCKLAND COUNCIL Rodney Section	
COMPRISED IN CT	NA81D/90
73233	4.1016ha
73234	4.2206ha
710970	4.3615ha
710971	6.4696ha

TOTAL AREA 20.1533ha
LEVELS ARE IN TERMS OF LANDS AND SURVEY DATUM, AREAS AND MEASUREMENTS ARE SUBJECT TO SURVEY.

SCHEDULE OF EASEMENTS GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	GRANTEE
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA	A	LOT 300	CHORUS NEW ZEALAND LTD
RIGHT TO CONVEY ELECTRICITY			VECTOR LTD
RIGHT TO CONVEY GAS			VECTOR GAS LTD

RT Lots 411 & 200 amended	LS	02/16
REVISION (DESCRIPTION)	NAME	DATE
	NAME	DATE
SURVEYED		
DESIGNED	JRM	17/15
DRAWN	LS	01/16
CHECKED		
APPROVED		

CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

CATO BOLAM CONSULTANTS LTD
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Dunedin 9106

phone 03-437 0572
fax 03-434 7331
email cato.bolam@catobolam.co.nz

CLIENT
CABRA DEVELOPMENTS LTD
CNR STATION ROAD AND
NOBIL ROAD, HUAPAI

TITLE
LOTS 1 - 119, 200 - 205, 300,
400 - 411, 500 - 501, 600, 601 BEING
SUBDIVISION OF LOTS 1 & 2
DP 318693, LOT 2 DP 137997 &
LOTS 2 & 3 DP 491124

ORIGINAL SCALE 1 : 1500	ORIGINAL SIZE A3	REVISION NO R1
DATE JAN 2016	CAD REFERENCE 32522 S14.dwg	SHEET NO S14
DIRECTORY 21252531(ACAD) Drawing-Revision A1		JOB NO 32522

Amalgamation Conditions

That Lot 300 be held as to 2 undivided half shares by the owners of Lots 9-10 hereon and individual Certificates of Title be issued in accordance therewith.

That Lot 119 be transferred to the owners of Lot 1 DP 196344 and that one Certificate of Title be issued in accordance therewith.



LF11 Rev 2 Field Density NDM Soil Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project: Corner Station Road and Nobilo Road
Project No: 2015_1127
Location: Huapai
Report No: 2015_1127LAD Rev.0
Report Date: 20/05/2016
Client: Cabra Developments Limited
Client Address:
Client Reference:

Test Methods: NZS 4407.3.1:1991
NZS 4407.4.2.1:1991
NZS4407.4.2.2:1991

Notes: Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff



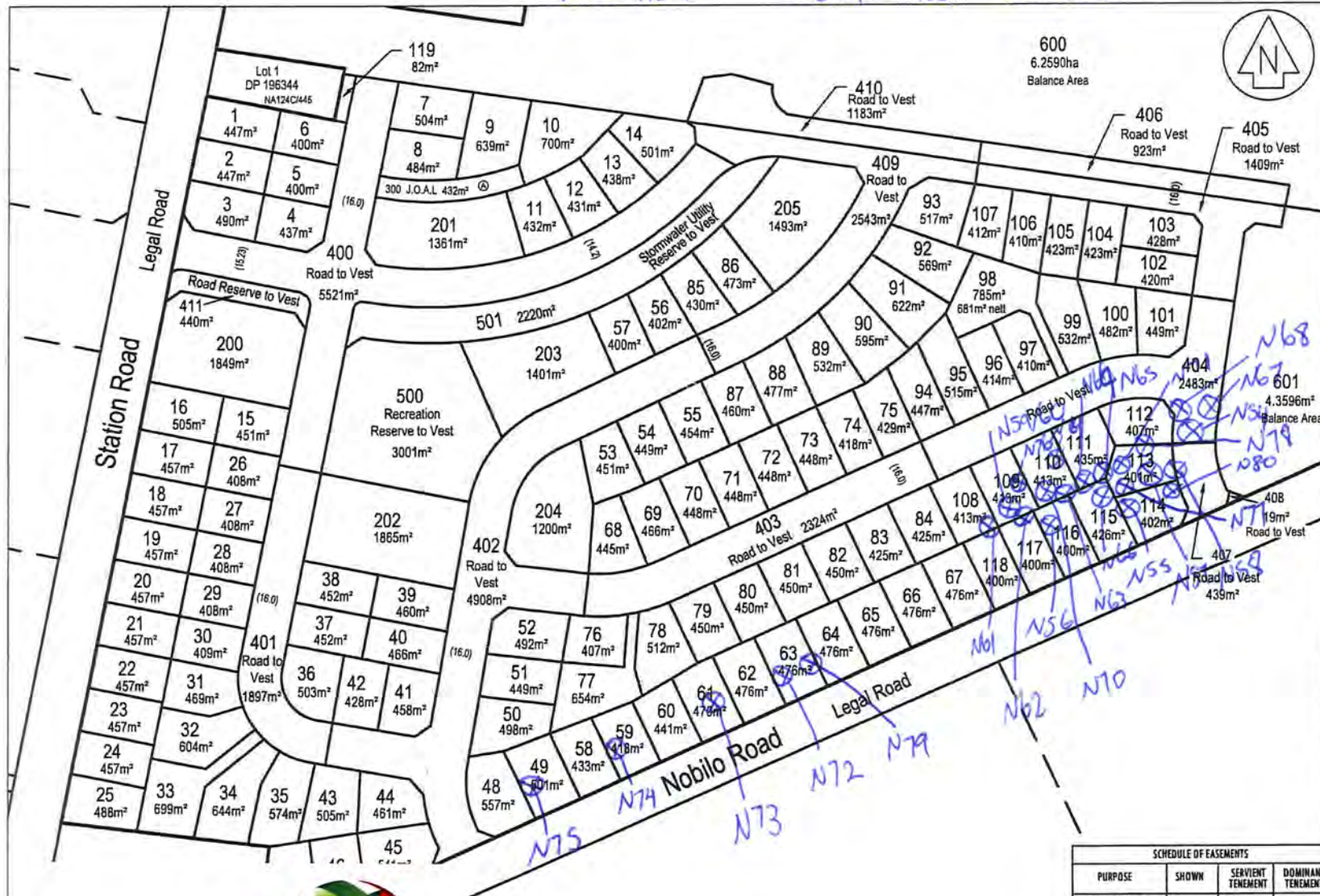
Date Sampled	Sample No.	Test Location			Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
		Easting	Northing	RL/Details		Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m ³)	Oven Dry Density (t/m ³)	Calculated Air Voids (%)	
26/01/2016	N54	Lot 103			CLAY	187	UTP	>209	133	>185	1.7829	1.3114	35.9	4.18	300	32.4	2.7	1.34	6.5	
	N55	Lot 108 East			CLAY	164	UTP	194	>209	>194	1.8405	1.4074	30.8	4.47	300	30.4	2.7	1.42	4.8	
	N56	Lot 84			CLAY	187	164	146	169	167	1.8140	1.3109	38.4	1.03	300	32.7	2.7	1.36	4.7	
29/01/2016	N57	Lot 83			CLAY	164	176	UTP	166	>179										
	N58	Lot 67			CLAY	160	140	164	182	162										
	N59	Lot 103			CLAY	105	115	146	127	123										
	N60	Lot 103			CLAY	97	131	140	119	122										
2/02/2016	N61	Lot 84			CLAY	164	131	149	157	150	1.8777	1.4311	31.2	2.24	300	28.4	2.7	1.46	4.3	Retest of N57
	N62	Lot 108			CLAY	UTP	UTP	UTP	UTP	>209	1.8772	1.4109	33.1	1.01	300	30.0	2.7	1.44	3.2	Retest of N58
	N63	Lot 103			CLAY	>209	>209	>209	>209	>209	1.8028	1.3502	33.5	4.63	300	39.6	2.7	1.30	1.1	Retest of N59
	N64	Lot 104			CLAY	>209	>209	>209	>209	>209	1.8155	1.3774	31.8	5.07	300	27.0	2.7	1.42	8.5	Retest of N60
	N65	Lot 100			CLAY	UTP	UTP	UTP	UTP	>209	1.7337	1.3439	29.0	11.16	300	28.7	2.7	1.34	11.0	
3/02/2016	N66	Road by Lot 103			CLAY	>209	194	190	>209	>201	1.8122	1.3929	30.1	6.39	300	30.8	2.7	1.38	6.0	
	N67	Lot 100			CLAY	UTP	>209	UTP	UTP	>209	1.8195	1.3983	30.1	6.00	300	32.6	2.7	1.38	4.4	
4/02/2016	N68	Lot 100			CLAY	167	164	146	143	155	1.8714	1.4188	31.9	2.09	300	33.6	2.7	1.40	1.1	Retest of N65
9/02/2016	N69	Lot 84			CLAY	169	155	191	177	173	1.8642	1.3867	34.4	0.78	300	30.7	2.7	1.42	3.4	
	N70	Lot 103			CLAY	>198	162	>198	172	>183	1.8164	1.3540	34.1	3.51	300	36.8	2.7	1.32	1.9	
	N71	Lot 99			CLAY	155	140	153	137	146	1.8785	1.3817	36.0	-0.96	300	30.6	2.7	1.44	2.7	
	N72	Lot 62			CLAY	155	157	143	167	156	1.7895	1.2985	37.8	2.70	300	37.8	2.7	1.30	2.8	
	N73	Lot 60			CLAY	UTP	UTP	UTP	UTP	>198	1.9072	1.4790	29.0	2.31	300	28.6	2.7	1.48	2.7	
	N74	Lot 58			CLAY	UTP	UTP	UTP	UTP	>198	1.9063	1.4495	31.5	0.52	300	25.4	2.7	1.52	5.1	
	N75	Lot 48			CLAY	UTP	UTP	177	>198	>193	1.8502	1.3514	36.9	-0.04	300	33.3	2.7	1.38	2.4	
11/02/2016	N76	Lot 83			CLAY	>198	184	>198	177	>189	1.8494	1.3368	38.3	-0.89	300	35.3	2.7	1.36	1.1	
	N77	Lot 108			CLAY	155	UTP	181	164	>175	1.8021	1.3169	36.8	2.60	300	37.4	2.7	1.32	2.4	
	N78	Lot 103			CLAY	>198	>198	155	171	>181	1.8489	1.3751	34.5	1.59	300	30.2	2.7	1.42	4.5	
	N79	Lot 63			CLAY	UTP	UTP	UTP	UTP	>198	1.8818	1.4178	32.7	0.99	300	28.0	2.7	1.48	4.4	
15/02/2016	N80	Lot 57			CLAY	169	171	129	162	158	1.7983	1.2933	39.0	1.49	300	37.0	2.7	1.32	2.8	

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Date: 27/01/2016
Date: 20/05/2016
Date: 20/05/2016

2015-1127

NDM test locations



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AUCKLAND COUNCIL Rodney Section			
COMPRISED IN CT	NA81D/90	1.0000ha	
73233	4.1016ha		
73234	4.2206ha		
710970	4.3615ha		
710971	6.4696ha		

TOTAL AREA 20.1533ha
LEVELS ARE IN TERMS OF LANDS AND SURVEY DATUM, AREAS AND MEASUREMENTS ARE SUBJECT TO SURVEY.

SCHEDULE OF EASEMENTS GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	GRANTEE
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA			CHORUS NEW ZEALAND LTD
RIGHT TO CONVEY ELECTRICITY	④	LOT 300	VECTOR LTD
RIGHT TO CONVEY GAS			VECTOR GAS LTD

RT Lots 411 & 200 amended	LS	02.16
REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED		
DESIGNED	KM	17/15
DRAWN	LS	01.16
CHECKED		
APPROVED		

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CLIENT
CABRA DEVELOPMENTS LTD
CNR STATION ROAD AND
NOBILLO ROAD, HUAPAI

TITLE
LOTS 1 - 119, 200 - 205, 300,
400 - 411, 500 - 501, 600, 601 BEING
SUBDIVISION OF LOTS 1 & 2
DP 318693, LOT 2 DP 137997 &
LOTS 2 & 3 DP 491124

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO	
1 : 1500	A3		R1
DATE	CAD REFERENCE	SHEET NO	
JAN 2016	32522 514.dwg		S14
DIRECTORY	JOB NO		
3132522514.dwg			32522

Amalgamation Conditions

That Lot 300 be held as to 2 undivided half shares by the owners of Lots 9-10 hereon and individual Certificates of Title be issued in accordance therewith.

That Lot 119 be transferred to the owners of Lot 1 DP 196344 and that one Certificate of Title be issued in accordance therewith.



LF11 Rev 2 Field Density NDM Soil Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project: Corner Station Road and Nobilo Road
Project No: 2015_1127
Location: Huapai
Report No: 2015_1127LAE Rev.0
Report Date: 20/05/2016
Client: Cabra Developments Limited
Client Address:
Client Reference:

Test Methods:
NZS 4407.3.1:1991
NZS 4407.4.2.1:1991
NZS4407.4.2.2:1991

Notes:
Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff



Date Sampled	Sample No.	Test Location			Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
		Easting	Northing	RL/Details		Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m ³)	Oven Dry Density (t/m ³)	Calculated Air Voids (%)	
16/02/2016	N81	Lot 57			CLAY	169	171	129	162	158	1.8349	1.3055	40.6	-1.41	300	37.1	2.7	1.34	0.8	
	N82	Lot 103			CLAY	UTP	UTP	UTP	137	>183	1.8284	1.3365	36.8	1.20	300	34.5	2.7	1.36	2.7	
24/02/2016	N83	North Western Area			CLAY	183	176	>197	186	>186	1.8517	1.3704	35.1	1.01	300	31.9	2.7	1.40	3.2	
25/02/2016	N84	North Western Area			CLAY	161	167	162	157	158	1.8028	1.3663	31.9	5.65	300	37.3	2.7	1.32	2.4	
	N85	North Western Area			CLAY	175	166	181	159	168	1.8199	1.3196	37.9	0.98	300	37.6	2.7	1.32	1.3	
14/03/2016	N86	South of lot 203			CLAY	>198	>198	>198	>198	>198	1.8070	1.3328	35.6	3.11	300	33.0	2.7	1.36	4.9	
15/03/2016	N87	Lot 10			CLAY	184	186	>198	>198	>192										
17/03/2016	N88	Lot 103			CLAY	>198	195	175	158	>182	1.8470	1.4211	30.1	4.61	300	30.5	2.7	1.42	4.4	
	N89	Lot 12			CLAY	161	184	>198	>198	>185	1.8215	1.3623	30.2	2.60	300	31.5	2.7	1.38	5.1	
	N90	Lot 18			CLAY	UTP	UTP	UTP	UTP	>198	1.7990	1.3510	33.1	5.07	150	31.9	2.7	1.36	6.0	
29/03/2016	N91	Lot 118			CLAY	141	186	184	150	165	1.7833	1.3183	35.3	4.57	300	35.3	2.7	1.32	4.7	
	N92	Lot 117			CLAY	>198	>198	>198	UTP	>198	1.7966	1.3149	36.6	3.03	300	44.5	2.7	1.24	-1.4	
31/03/2016	N93	Road 3 undercut fill			CLAY	UTP	UTP	UTP	UTP	>198	1.8895	1.4120	33.8	-0.15	250	30.6	2.7	1.44	2.2	
5/04/2016	N94	Lot 118 South			CLAY	155	158	181	186	170	1.8283	1.3659	33.9	3.07	300	34.1	2.7	1.36	3.0	
	N95	Lot 118 North			CLAY	158	153	147	147	151	1.8006	1.3234	36.1	3.16	300	38.6	2.7	1.30	1.7	Retest of N92
	N96	Lot 107			CLAY	>198	>198	UTP	UTP	>198	1.7802	1.3105	35.8	4.39	300	32.4	2.7	1.34	5.6	
	N97	Road 3 undercut fill			CLAY	144	147	155	161	152	1.8811	1.3829	36.0	-1.15	300	33.3	2.7	1.42	0.7	
	N98	Road 3 undercut fill			CLAY	144	155	161	153	153	1.8464	1.3414	37.7	-0.30	300	33.1	2.7	1.38	2.7	
	N99	Lot 21			CLAY	>198	195	175	158	>182										
6/04/2016	N100	Road 1 Undercut Fill			CLAY	UTP	UTP	>198	>198	>198	1.8964	1.4263	33.0	0.06	250	30.1	2.7	1.46	2.1	
14/04/2016	N101	Swale Drain West			CLAY	161	155	186	195	174	1.8598	1.4125	31.7	2.86	250	33.9	2.7	1.38	1.5	
	N102	Swale Drain East			CLAY	153	161	147	141	151	1.7790	1.3219	34.6	5.23	250	33.9	2.7	1.32	5.7	
	N103	Road 2 undercut Fill East			CLAY	155	161	186	198	175	1.8118	1.3148	37.8	1.50	300	33.5	2.7	1.36	4.3	
	N104	Road 2 undercut Fill East			CLAY	158	164	172	198	173	1.8788	1.4022	34.0	0.30	300	34.4	2.7	1.40	0.2	
	N105	Road 2 Undercut Fill West			CLAY	>198	>198	>198	>198	>198	1.8315	1.3279	37.9	0.34	300	32.7	2.7	1.38	3.8	
27/04/2016	N106	Lot 103			CLAY	>198	>198	>198	>198	>198	1.8647	1.3916	34.0	1.05	300	31.7	2.7	1.42	2.7	
	N107	Lot 105			CLAY	155	175	>198	>198	>182	1.8616	1.3657	36.3	-0.28	300	31.6	2.7	1.42	2.9	

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Authorised Signatory: 

Date: 17/02/2016
Date: 20/05/2016
Date: 20/05/2016

Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No:	2015_11271AF Rev 0	Auckland Laboratory CMW Geosciences (NZ) Limited Building C, 9 Piermark Drive, Rosedale, NZ 0632 PO Box 300206, Albany, Auckland, NZ 0752 Phone: +64 (09) 4144 632
Project Name:	Corner Station and Mobile Road	
Project Location:	Huapai	
Project Number:	2015_1127	
Test Date:	22/03/2016	
Client:	Calvin Developments Ltd	Testing Location Selected By: CMW Field Staff
Client Address:	PO Box 197 Orewa 0946	
Client Reference:		

Test No.	1		2		3		4		5	
Test Location	Road 3		Road 3		Road 3		Road 3		Road 3	
Chainage & Offset	220/LHS		200/RHS		180/LHS		160/RHS		140/LHS	
Material & Layer:	CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	5	10	2	4	4	8	2	4	3	6
100 - 200	3	6	2	4	3	6	2	4	1	2
200 - 300	3	6	3	6	2	4	1	2	1	2
300 - 400	2	4	2	4	4	8	2	4	1	2
400 - 500	3	6	3	6	4	8	1	2	1	2
500 - 600	3	6	5	10	6	13	1	2	1	2
600 - 700	2	4	6	13	7	15	2	4	1	2
700 - 800	4	8	8	18	8	18	3	6	1	2
800 - 900	4	8	8	18	8	18	3	6	2	4
900 - 1000										

Test No.	6		7		8		9		10	
Test Location	Road 3		Road 3		Road 3		Road 3		Road 3	
Chainage & Offset	120/RHS		100/LHS		80/RHS		60/LHS		40/RHS	
Material & Layer:	CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	1	2	5	10	7	15	4	8	6	13
100 - 200	1	2	3	6	6	13	4	8	3	6
200 - 300	1	2	3	6	4	8	3	6	3	6
300 - 400	2	4	4	8	3	6	3	6	3	6
400 - 500	2	4	3	6	3	6	3	6	3	6
500 - 600	2	4	4	8	1	2	3	6	4	8
600 - 700	3	6	5	10	2	4	2	4	3	6
700 - 800	3	6	6	13	4	8	2	4	4	8
800 - 900	6	13	7	15	3	6	3	6	4	8
900 - 1000										

Prepared by: AP

Date: 12/04/2016

Checked by: *JmJ*

Date: 18/4/2016

Authorised Signatory: *Jack Myerell-Johnson*

Date: 19/4/2016

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*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127IAF Rev.0
Project Name: Corner Station and Mobile Road
Project Location: Huapai
Project Number: 2015_1127
Test Date: 22/03/2016
Client: Cabre Developments Ltd
Client Address: PO Box 197 Oranui 0946
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	11		12		13		14		15	
Test Location	Road 3		Road 3		Road 5		Road 5		Road 5	
Chainage & Offset	20/LHS		0/LHS		20/LHS		40/RHS		60/LHS	
Material & Layer:	CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	5	10	5	10	8	18	9	20	4	8
100 - 200	3	6	3	6	6	13	5	10	2	4
200 - 300	3	6	3	6	4	8	4	8	1	2
300 - 400	5	10	5	10	5	10	4	8	2	4
400 - 500	3	6	3	6	5	10	3	6	2	4
500 - 600	5	10	5	10	4	8	6	13	2	4
600 - 700	5	10	6	13	3	6	6	13	2	4
700 - 800	6	13	5	10	3	6	8	18	2	4
800 - 900	5	10	6	13	5	10	9	20	2	4
900 - 1000										

Test No.	16		17		18		19		20	
Test Location	Road 1		Road 1		Road 1		Road 1		Road 1	
Chainage & Offset	20/LHS		40/RHS		60/LHS		80/RHS		100/LHS	
Material & Layer:	CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	6	13	4	8	6	13	7	15	7	15
100 - 200	4	8	4	8	4	8	4	8	7	15
200 - 300	6	13	5	10	3	6	3	6	5	10
300 - 400	6	13	4	8	4	8	4	8	7	15
400 - 500	5	10	3	6	5	10	4	8	7	15
500 - 600	6	13	3	6	5	10	3	6	5	10
600 - 700	5	10	3	6	6	13	4	8	5	10
700 - 800	5	10	2	4	7	15	4	8	6	13
800 - 900	6	13	2	4	6	13	6	13	9	20
900 - 1000										

Prepared by: AP

Date: 12/04/2016

Checked by: JMS

Date: 18/4/2016

Authorised Signatory: *Joel Myer-Johnson*

Date: 19/4/2016

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*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

Page 2 of 3

Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127IAF Rev.0
Project Name: Corner Station and Hobble Road
Project Location: Huapai
Project Number: 2015_1127
Test Date: 22/03/2016
Client: Cobra Development Ltd
Client Address: PO Box 197 Orewa 0946
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing locations Selected By: CMW Field Staff



Test No.	21		22		23		24		25	
Test Location	Road 1		Road 1		Road 1		Road 1		Road 1	
Chainage & Offset	120/RHS		140/LHS		160/RHS		180/LHS		200/RHS	
Material & Layer:	CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade		CLAY/Subgrade	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	3	6	3	6	4	8	6	13
100 - 200	3	6	3	6	3	6	3	6	3	6
200 - 300	4	8	2	4	2	4	2	4	3	6
300 - 400	3	6	3	6	2	4	2	4	3	6
400 - 500	3	6	1	2	1	2	2	4	2	4
500 - 600	2	4	2	4	1	2	2	4	2	4
600 - 700	3	6	3	6	2	4	3	6	3	6
700 - 800	4	8	3	6	3	6	2	4	2	4
800 - 900	6	13	4	8	3	6	3	6	2	4
900 - 1000										
Test No.	26		27		28		29		30	
Test Location										
Chainage & Offset										
Material & Layer:										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Prepared by: AP

Checked by: Jms

Authorised Signatory: *John Myrland-Jensen*

Date: 12/04/2016

Date: 18/4/2016

Date: 19/4/2016

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*Equivalent CBR values calculated using AUSTRROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

LF14 Rev.5 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127LAG Rev.0
Project Name: Station Road
Project Location: Corner of Station and Nobilo Road
Project Number: 2015_1127
Test Date: 4/05/2016
Client: CABRA Developments
Client Address:
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	1		2		3		4		5	
Test Location	Road 6		Road 6		Road 6		Road 6		Road 6	
Chainage & Offset	CH0 L		CH10 R		CH30 L		CH50 R		CH70 L	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	3	6	3	6	4	8	9	20
100 - 200	5	10	3	6	3	6	2	4	11	20+
200 - 300	3	6	2	4	3	6	3	6	10	20+
300 - 400	3	6	2	4	3	6	7	15	9	20
400 - 500	4	8	3	6	2	4	4	8	9	20
500 - 600	3	6	3	6	4	8	3	6	7	15
600 - 700	4	8	3	6	4	8	3	6	5	10
700 - 800	4	8	3	6	3	6	3	6	5	10
800 - 900	4	8	2	4	3	6	3	6	3	6
900 - 1000										
Test No.	6		7		8		9		10	
Test Location	Road 6		Road 6		Road 6		Road 4		Road 4	
Chainage & Offset	CH90 R		CH110 L		CH130 R		CH274 R		CH264 R	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	2	4	2	4	4	8	4	8
100 - 200	4	8	2	4	3	6	3	6	3	6
200 - 300	3	6	2	4	2	4	3	6	2	4
300 - 400	4	8	3	6	4	8	4	8	4	8
400 - 500	3	6	3	6	3	6	3	6	4	8
500 - 600	3	6	6	13	3	6	4	8	4	8
600 - 700	4	8	8	18	3	6	UTP		3	6
700 - 800	4	8	11	20+	4	8			3	6
800 - 900	3	6	10	20+	7	15			2	4
900 - 1000										

Prepared by: CS
Checked by: JMI
Authorised Signatory: *Jack Myer*

Date: 17/05/2016
Date: 17/05/2016
Date: 17/05/2016

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Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127/AG Rev.0
Project Name: Station Road
Project Location: Corner of Station and Noble Road
Project Number: 2015_1127
Test Date: 4/05/2016
Client: CABRA Developments
Client Address:
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	21		22		23		24		25	
Test Location	Road 4		Road 4		Road 4		Road 4		Road 7	
Chainage & Offset	CH54 L		CH34 R		CH14 L		CH0 R		CH200 L	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	3	6	4	8	2	4	4	8	4	8
100 - 200	4	8	4	8	4	8	3	6	3	6
200 - 300	4	8	3	6	3	6	4	8	5	10
300 - 400	3	6	2	4	4	8	3	6	4	8
400 - 500	2	4	3	6	2	4	2	4	3	6
500 - 600	2	4	2	4	3	6	2	4	2	4
600 - 700	2	4	2	4	2	4	3	6	4	8
700 - 800	2	4	2	4	5	10	3	6	4	8
800 - 900	2	4	2	4	4	8	3	6	3	6
900 - 1000										
Test No.	26		27		28		29		30	
Test Location	Road 7		Road 7		Road 7		Road 7		Road 7	
Chainage & Offset	CH220 R		CH240 L		CH250 R		CH280 L		CH300 R	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	4	8	6	13	5	10	3	6
100 - 200	3	6	5	10	6	13	3	6	3	6
200 - 300	2	4	5	10	4	8	3	6	3	6
300 - 400	4	8	5	10	6	13	3	6	3	6
400 - 500	5	10	4	8	7	15	3	6	4	8
500 - 600	3	6	7	15	5	10	3	6	2	4
600 - 700	3	6	6	13	4	8	3	6	2	4
700 - 800	3	6	6	13	5	10	3	6	3	6
800 - 900	3	6	7	15	4	8	2	4	3	6
900 - 1000										

Prepared by: CS
Checked by: JMI
Authorised Signatory: *Jack Myatt-John*
Date: 17/05/2016
Date: 17/05/2016
Date: 17/05/2016

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Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive
Soils.

LF14 Rev.5 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127/AG Rev.D
Project Name: Station Road
Project Location: Corner of Station and Noble Road
Project Number: 2015_1127
Test Date: 4/05/2016
Client: CABRA Developments
Client Address:
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	31		32		33		34		35	
Test Location	Road 7		Road 7		Road 7		Road 7		Road 7	
Chainage & Offset	CH320 L		CH340 R		CH360 L		CH380 R		CH400 L	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	2	4	2	4	1	2	2	4	3	6
100 - 200	3	6	2	4	2	4	1	2	3	6
200 - 300	2	4	2	4	2	4	2	4	2	4
300 - 400	2	4	2	4	2	4	2	4	3	6
400 - 500	2	4	2	4	2	4	2	4	2	4
500 - 600	2	4	1	2	2	4	2	4	4	8
600 - 700	2	4	2	4	1	2	2	4	2	4
700 - 800	3	6	2	4	2	4	2	4	3	6
800 - 900	2	4	1	2	2	4	2	4	2	4
900 - 1000										
Test No.	36		37		38		39		40	
Test Location	Road 7		Road 7		Road 7		Road 2		Road 2	
Chainage & Offset	CH420 R		CH440 L		CH460 R		CH345 R		CH340 L	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	3	6	2	4	3	6	5	10	3	6
100 - 200	3	6	2	4	3	6	4	8	2	4
200 - 300	3	6	2	4	4	8	4	8	3	6
300 - 400	3	6	3	6	4	8	3	6	2	4
400 - 500	3	6	4	8	4	8	4	8	3	6
500 - 600	3	6	5	10	3	6	3	6	1	2
600 - 700	3	6	7	15	4	8	2	4	2	4
700 - 800	2	4	9	20	3	6	2	4	2	4
800 - 900	2	4	9	20	3	6	3	6	2	4
900 - 1000										

Prepared by: CS
Checked by: JMJ
Authorised Signatory: *Jack Myerell-Jones*

Date: 17/05/2016
Date: 17/05/2016
Date: 17/05/2016

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*Equivalent CBR values calculated using AUSTRROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127LAG Rev.0
Project Name: Station Road
Project Location: Corner of Station and Noble Road
Project Number: 2015_1127
Test Date: 4/05/2016
Client: CABRA Developments
Client Address:
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ D632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	41		42		43		44		45	
Test Location	Road 2		Road 2		Road 2		Road 2		Road 2	
Chainage & Offset	CH320 R		CH300 L		CH280 R		CH260 L		CH243 R	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	3	6	3	6	4	8	3	6	3	6
100 - 200	4	8	3	6	3	6	3	6	3	6
200 - 300	3	6	3	6	3	6	3	6	2	4
300 - 400	3	6	2	4	4	8	3	6	2	4
400 - 500	3	6	2	4	3	6	5	10	3	6
500 - 600	2	4	2	4	2	4	7	15	1	2
600 - 700	2	4	1	2	2	4	8	18	2	4
700 - 800	1	2	1	2	2	4	11	20+	3	6
800 - 900	2	4	2	4	2	4	11	20+	2	4
900 - 1000										
Test No.	46		47		48		49		50	
Test Location	Road 2		Road 2		Road 2		Road 2		Road 2	
Chainage & Offset	CH220 L		CH200 R		CH180 L		CH160 R		CH140 L	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	4	8	4	8	6	13	4	8
100 - 200	3	6	3	6	4	8	5	10	3	6
200 - 300	3	6	2	4	4	8	4	8	3	6
300 - 400	3	6	3	6	4	8	3	6	3	6
400 - 500	1	2	3	6	3	6	5	10	4	8
500 - 600	1	2	3	6	2	4	3	6	2	4
600 - 700	1	2	2	4	2	4	3	6	2	4
700 - 800	2	4	2	4	2	4	3	6	2	4
800 - 900	2	4	2	4	1	2	2	4	2	4
900 - 1000										

Prepared by: CS
Checked by: JMJ
Authorised Signatory: *Jack Myrland*
Date: 17/05/2016
Date: 17/05/2016
Date: 17/05/2016

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*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

LF14 Rev.5 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: test 6.5.2: 1988

Report No: 2015_1127/AG Rev.0
Project Name: Station Road
Project Location: Corner of Station and Noble Road
Project Number: 2015_1127
Test Date: 4/05/2016
Client: CABRA Developments
Client Address:
Client Reference:

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff



Test No.	51		52		53		54		55	
Test Location	Road 2		Road 2		Road 2		Road 2		Road 2	
Chainage & Offset	CH120 R		CH100 L		CH80 R		CH60 L		CH40 R	
Material & Layer:	Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay		Subgrade / Clay	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	4	8	4	8	4	8	4	8
100 - 200	4	8	3	6	3	6	4	8	4	8
200 - 300	3	6	3	6	2	4	4	8	3	6
300 - 400	2	4	3	6	3	6	3	6	5	10
400 - 500	3	6	3	6	4	8	4	8	3	6
500 - 600	2	4	4	8	3	6	4	8	6	13
600 - 700	2	4	3	6	4	8	6	13	3	6
700 - 800	3	6	3	6	6	13	9	20	7	15
800 - 900	2	4	3	6	3	6	5	10	4	8
900 - 1000										
Test No.	56									
Test Location	Road 2									
Chainage & Offset	CH20 L									
Material & Layer:	Subgrade / Clay									
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8								
100 - 200	2	4								
200 - 300	4	8								
300 - 400	4	8								
400 - 500	5	10								
500 - 600	4	8								
600 - 700	4	8								
700 - 800	4	8								
800 - 900	4	8								
900 - 1000										

Prepared by: CS Date: 17/05/2016
Checked by: JMJ Date: 17/05/2016
Authorised Signatory: *Jack Myer-Hill* Date: 17/5/2016

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*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils.

LF12 Rev. 5 Aggregate Field Density NDM - Backscatter Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

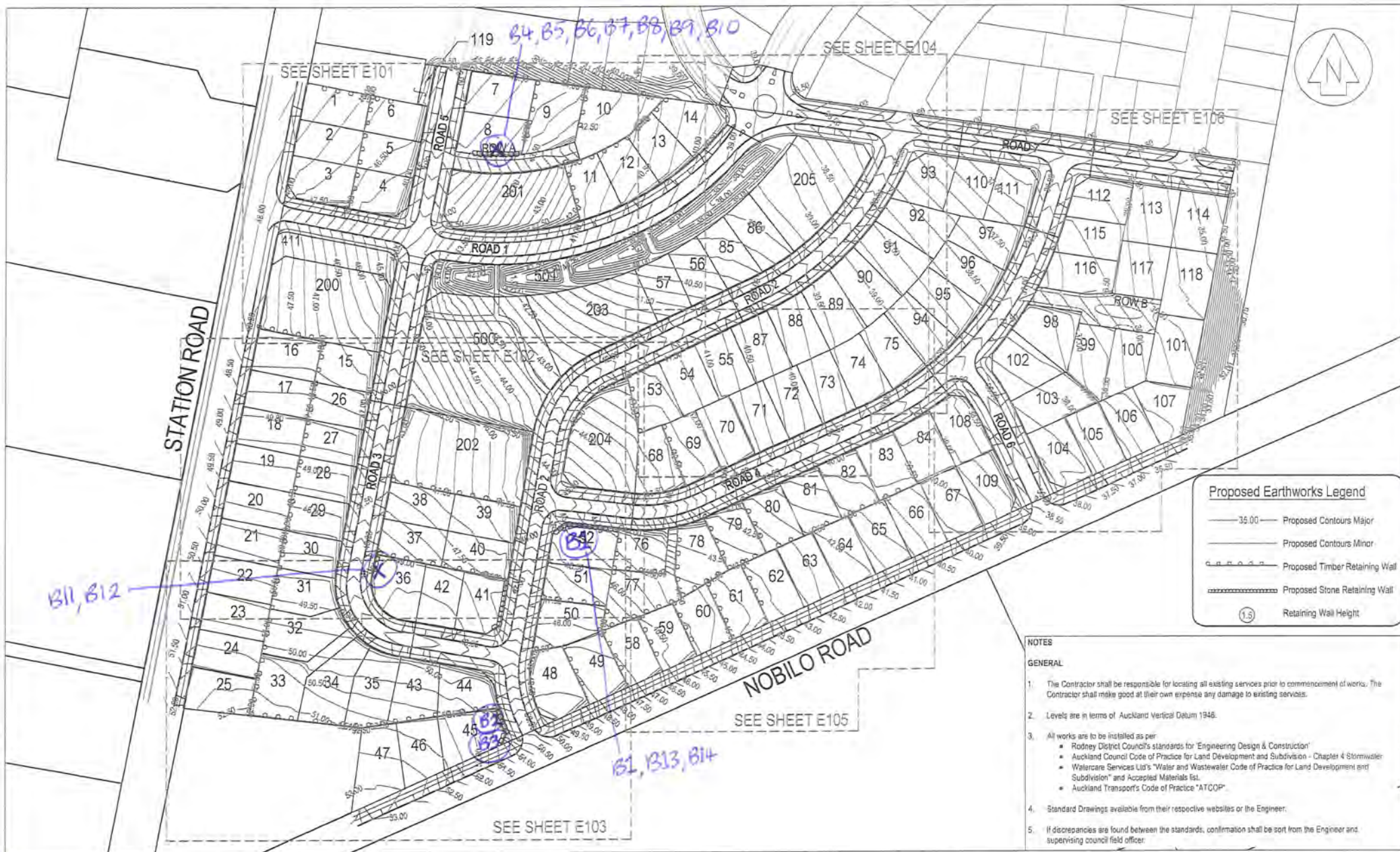
Project: Cnr Station Road and Nobilo Road
Project No: 2015_1127
Location: Huapai
Report No: 2015_1127LAH Rev.0
Report Date: 23/11/2016
Client: Cabra Developments Ltd
Client Address: PO Box 197, Orewa
Client Reference:

Test Methods: NZS 4407.3.1:2015
NZS 4407.4.3:2015
Notes: Testing Locations Selected By: CMW Field Staff
Measurements marked * are not accredited and are outside the laboratory's scope of accreditation

Date Sampled	Sample No.	Test Location Details	Material Details						Field and Testing Data					Comments
			Material	Quarry	Material Data Source	OMC* (%)	MDD* (t/m ³)	SD* (t/m ³)	Gauge Wet Density (t/m ³)	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Compaction (%) *	Calculated Total Voids (%) *	
12/07/2016	B1	Keystone Wall - Lot 52	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.4630	2.3647	4.2	103.3	12	
	B2	Keystone Wall - Lot 45	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.4498	2.3624	3.7	103.2	13	
	B3	Keystone Wall - Lot 45	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.3608	2.2931	2.9	100.1	15	
22/07/2016	B4	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.1633	2.0591	5.1	89.9	24	
	B5	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.1446	2.0515	4.5	89.6	24	
	B6	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.2112	2.1065	5.0	92.0	22	
	B7	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.2012	2.0885	5.4	91.2	23	
	B8	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.2274	2.1032	5.9	91.8	22	
27/07/2016	B9	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.1322	1.9905	7.1	89.9	26	
	B10	Keystone Wall - Lot 8	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.1094	2.0151	4.7	88.0	25	
5/08/2016	B11	Keystone Wall - Lot 36	Manarc MR-9	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.1092	1.9671	7.2	85.9	27	
	B12	Keystone Wall - Lot 36	Manarc MR-9	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.2190	2.0690	7.2	90.3	23	
3/11/2016	B13	Keystone Wall - Lot 52	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.3090	2.1759	6.1	94.6	19	
	B14	Keystone Wall - Lot 52	GAP 40	Whangaripo	Winstone Aggregates	3.9	2.29	2.7	2.3311	2.1893	6.5	95.2	19	

This report should only be reproduced in full.

Created By: TG Date: 23/11/2016
Checked By: TG Date: 24/11/2016
Authorised Signatory:  Date: 24/11/2016



CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

CATO BOLAM CONSULTANTS LTD
19 Tamaki Avenue
PO Box 157
Dunedin 9104
phone 04-437 8072
fax 04-438 7331
email catobolam@catobolam.co.nz

R3 AMENDED FOR 1m KEYSTONE WALLS	KM	08/15
R2 AMENDED FOR REVISED LAYOUT	KM	10/14
R1 LEVELS AMENDED, BATTERS ADDED	KM	10/14
REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	NAME	DATE
DESIGNED	KM	10/14
DRAWN	KM	10/14
CHECKED		
APPROVED		

FOR ENGINEERING CONSENT

This plan and accompanying reports have been prepared for the purpose of obtaining a resource consent only and for no other purpose. Use of this plan outside the information on it for any other purpose is at the user's risk.

CLIENT

CABRA DEVELOPMENTS LTD
CNR STATION ROAD AND
NOBILLO ROAD, HUAPAI

DRAWING TITLE

PROPOSED CONTOURS
Sheet 1 of 7

This drawing and design remains the property of Cato Bolam Consultants Ltd and may not be reproduced without the written permission of Cato Bolam Consultants Ltd.

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO	R3
1:1500	A3		
DATE	CAD REFERENCE	SHEET NO	E100
1/10/2014	32522 E100 Cont p. dwg		
DIRECTORY	JOB NO		32522
4/22/2014/ACAD			

2015_1127_LAH

Cnr Station Road and Nobilo Road

pg. 2 of 2

Appendix E

Producer Statements

23 November 2016

Ref: 2015_1127AF Rev.0

Cabra Developments Limited
PO Box 197
Orewa 0946

Attention: Duncan Unsworth

RE: CERTIFICATION FOR THE CONSTRUCTION OF ALL TIMBER POLE RETAINING WALLS AND KEYSTONE WALLS AT THE CORNER OF STATION AND NOBILO ROAD, HUAPAI - ABA-1022803 & SLC-67086

CMW Geosciences (NZ) Limited (CMW) have visited the above site, legally described as Lot 1 DP 318693, Lot 2 DP 318693 & Lot 2 DP 137997 between February and August 2016 to observe the ground conditions and construction details relating to the construction of timber pole retaining walls and segmental block retaining walls as part of the subdivision development.

Our work has included review of the following documents and drawings:

- Conditions of Auckland Council Building Consent referenced ABA-1022803 and issued 19 February 2016;
- Conditions of Auckland Council Resource Consent referenced SLC-67086;
- Proposed Contour Plan prepared by Cato Bolam Consultants, referenced Job No. 32522 Sheet No. E100 Rev No. R5 and dated 01 October 2014;
- Geotechnical Investigation Report prepared by CMW, referenced 2015_1127AB Rev.2 and dated 24 August 2015;
- Technical Memorandum for Retaining Wall Pipe Crossings prepared by CMW, referenced 2015_1127AD Rev.0 and dated 30 October 2015.

Our observations and testing for the timber walls included;

- Assessment of soil strengths in the exposed pile foundation excavations and retained soils;
- Construction observations for timber pole retaining walls including:
 - Pile Size;
 - Pile Depth;
 - Timber pole size, treatment stamps and placement;
 - Drainage materials and installation, including outlet locations;
 - Lagging construction;
 - Bridging details for bridging of drainage installed during the subdivision works.

Our inspections also took into account pole layout at boundaries in accordance with our design details for the walls to be structurally discontinued at the boundary of each lot in the future if required. Where groundwater was observed within the piles holes, contractors were advised to pump water out before pouring concrete.

Measured vane shear strengths within the pile hole bases and in the sides were generally in excess of 60kPa as assumed in the design.

Our observations and testing for the keystone walls incorporated:

- Assessment of soil strengths of the exposed foundation excavations and retained soils;
- Drainage installation including outlet locations;
- Geogrid reinforcement placement (type, length, vertical spacing and tension);
- Hardfill compaction.

Our construction observations also included additional geogrid placement for service crossings in accordance with our design details.

On the basis of our observations and testing, we consider that the construction of the timber pole retaining walls and keystone walls across the subdivision have been undertaken in accordance with the approved documentation described above and are in accordance with the requirements and/or recommendations of both the Geotechnical Investigation Report and the technical memorandum prepared by CMW.

Copies of the PS3 documentation from the contractors who constructed the respective walls, together with a PS3 for the balustrades installed above the walls will be provided with the application for CCC (Code Compliance Certificate) together with copies of the consent notices covering discharge of retaining wall drainage onto respective lots.

For and on behalf of
CMW Geosciences NZ Ltd



Richard Knowles

Principal Geotechnical Engineer, CPEng

Attachments: Producer Statement - Construction Review

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: R.J.KNOWLES of CMW GEOSCIENCES (NZ) LIMITED
 (Construction Review Firm)

TO: CABRA DEVELOPMENTS LIMITED
 (Owner/Developer)

TO BE SUPPLIED TO: AUCKLAND COUNCIL
 (Building Consent Authority)

IN RESPECT OF: CONSTRUCTION OF TIMBER POLE RETAINING WALLS & KEYSTONE WALLS
 (Description of Building Work)

AT: CORNER OF STATION ROAD & NOBILO ROAD, HUAPAI
 (Address)

LOT 1 & 2 DP 318693 (lot 1 & 2) and 137997 (lot2) SO
 (Address)

..... CMW GEOSCIENCES (NZ) LIMITED has been engaged by CABRA DEVELOPMENTS LIMITED
 (Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer

or ☒ other REFER TO ATTACHED DOCUMENT REFERENCED 2015_1127AF REV.0 DATED 23 NOVEMBER 2016. services
 (Extent of Engagement)

in respect of clause(s) B1, B2 of the Building Code for the building work described in

documents relating to Building Consent No. ABA-1022803 & RESOURCE CONSENT SLC-67086
 and those relating to

Building Consent Amendment(s) Nos. N/A issued during the

course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variations(s) No. N/A (copies attached)

or by the attached Schedule ☐ have been issued during the course of the works.

On by the basis of ☒ this ☐ these review(s) and information supplied by the contractor during the course of the works and on behalf of the firm undertaking this Construction Review, I believe on reasonable grounds that ☐ All ☒ Part only of the building works have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1, B2 of the Building Code.

I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, R.J.KNOWLES am: ☒ CPEng No. 160049 (AUCKLAND COUNCIL AUTHOR #2342)
 (Name of Construction Review Professional)

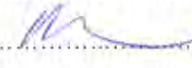
☐ Reg Arch No.

I am a Member of: ☒ IPENZ ☐ NZIA and hold the following qualifications: BE(CIVIL), CPEng

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

The Construction Review Firm is a member of ACENZ: ☐

SIGNED BY R.J.KNOWLES ON BEHALF OF CMW GEOSCIENCES (NZ) LIMITED

Date: 24/11/16 Signature: 

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000.*

This form is to accompany Forms 6 or 8 of the Building (Form) Regulations 2004 for the issue of a Code Compliance Certificate.

B.03.VI SIXTH SCHEDULE PRODUCER STATEMENT

ISSUED BY: OPIE CONTRACTORS LTD ("The Contractor")

TO: Cabra Developments Ltd ("The Principal")

FOR: Auckland Council (Rodney)
(Territorial Authority or any authorised agent of the Territorial Authority)

IN RESPECT OF: ^{KG}
~~Earthworks, Retaining Walls, Roading, Drainage, Water and Services~~

AT: 118 Lot Residential Development, Cnr of Station Road and Nobilo Road, Huapai

Opie Contractors Ltd ("The Contractor") has contracted to Cabra Developments Ltd (Principal) to carry out and complete certain contract works in accordance with relevant the New Zealand Building Codes in conformity with regulations and by-laws of the local authority upon whose jurisdiction the site is located and in accordance with any Act and/or Code of Practice.

I ^{Ricky Giddy} a duly authorised representative of Opie Contractors Ltd ("The Contractor")
believe on reasonable grounds that Opie Contractors Ltd (The Contractor) has carried out and completed

ALL	PART ONLY	(Delete as applicable)
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as specified in the attached drawings and/or technical information provided for the contract works.

Separable Portion 1	Separable Portion 2	Separable Portion 3	Separable Portion 4
---------------------	---------------------	---------------------	---------------------

CONTRACTOR: Opie Contractors Ltd
P.O. Box 174, Silverdale 0944

TELEPHONE: 09 426 9781

FACSIMILE: 09 426 6896

E-MAIL: rick@opie.co.nz

SIGNATURE

Ricky Giddy

NAME

Ricky Giddy

DESIGNATION

Dated this *24* day of *November* 20 *16*

27
Q

CERTIFICATION OF SEDIMENT & EROSION CONTROL DEVICES

ISSUED BY: **Bob Hick Earthmoving Limited** ("The Sub-Contractor")

TO: **Opie Contractors Limited** (The Head- Contractor)

FOR: **Auckland Council (Rodney)**
(Territorial Authority or any authorised agent of the Territorial Authority)

IN RESPECT OF: **Earthworks and Timber Retaining Walls**

AT: **118 Lot Residential Development, Cnr of Station Road and Nobilo Road, Huapai**

Bob Hick Earthmoving Limited ("The Sub-Contractor") has contracted **Opie Contractors Limited** (The Head- Contractor) to carry out and complete certain contract works in accordance with the relevant New Zealand Building Codes in conformity with regulations and by-laws of the local authority upon whose jurisdiction the site is located and in accordance with any Act and/or Code of Practice.

I, Robert Hick, a duly authorised representative of **Bob Hick Earthmoving Limited** ("The Sub-Contractor") believe on reasonable grounds that **Bob Hick Earthmoving Limited** ("The Sub-Contractor") has constructed sediment and erosion control devices as specified in the attached drawings and/or technical information provided for in the contract works and the local authority upon whose jurisdiction the site is located

CONTRACTOR: **Bob Hick Earthmoving Ltd**
P.O. Box 208, Albany 0755

TELEPHONE: **09 4129126**

FACSIMILE: **09 4129471**

E-MAIL: **bobhick@xtra.co.nz**


SIGNATURE

Robert C Hick
NAME

Director
DESIGNATION

Dated this 14th day of November 2016

PRODUCER STATEMENT

ISSUED BY: **Bob Hick Earthmoving Limited** ("The Sub-Contractor")

TO: **Opie Contractors Limited** (The Head- Contractor)

FOR: **Auckland Council (Rodney)**
(Territorial Authority or any authorised agent of the Territorial Authority)

IN RESPECT OF: **Earthworks and Timber Retaining Walls**

AT: **118 Lot Residential Development, Cnr of Station Road and Nobilo Road, Huapai**

Bob Hick Earthmoving Limited ("The Sub-Contractor") has contracted to **Opie Contractors Limited** (The Head- Contractor) to carry out and complete certain earthworks and construction of timber retaining walls in accordance with relevant the New Zealand Building Codes in conformity with regulations and by-laws of the local authority upon whose jurisdiction the site is located and in accordance with any Act and/or Code of Practice.

I, Robert Hick, a duly authorised representative of **Bob Hick Earthmoving Limited** ("The Sub-Contractor") believe on reasonable grounds that **Bob Hick Earthmoving Limited** ("The Sub-Contractor") has carried out and completed earthworks and timber retaining wall construction as specified in the attached drawings and/or technical information provided for the contract works for Separable Portion 1 and Separable Portion 2.

CONTRACTOR: **Bob Hick Earthmoving Ltd**
P.O. Box 208, Albany 0755

TELEPHONE: **09 4129126**

FACSIMILE: **09 4129471**

E-MAIL: **bobhick@xtra.co.nz**


SIGNATURE

Robert C Hick
NAME

Director
DESIGNATION

Dated this 14th day of November 2016

Producer statement construction (PS3) General construction work



All sections of this form must be completed

TO BE COMPLETED BY THE PERSON WHO HAS UNDERTAKEN THE BUILDING WORK

Author name:

WILLIAM CAGE

Building consent
No:

ABA-1022803

Author company:

CAGE CONSTRUCTION LTD

Author
Registration No:

N/A

Description of
building work:

KEYSTONE RETAINING WALLS &
ASSOCIATED WORKS

Legal description:

LOT 1 DP 318693 LOT 2 DP 318693 LOT 2 DP 137797

Site address:

95 STATION RD HEIAPAI LOT 2 DP 318693 NOBILLO RD

NZBC clauses:
(circle as applicable)

B1	B2	C1	C2	C3	C4	D1	D2	E1	E2	E3	F1
F2	F3	F4	F5	F6	F7	F8	G1	G2	G3	G4	G5
G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	H1	

I have sighted the above building consent and read the attached conditions of consent and confirm that I have undertaken the building work described above in accordance with the consented plans and specifications.

I understand that Council will rely upon this producer statement, for the purposes of establishing compliance with the above building consent.

Signature:

W. Cage

Date:

24-11-2016

Tradesperson's contact details:

Address:

4 WATERFRONT RD MANGERE BRIDGE Postcode: 2022

Business:

RETAINING WALL
CONSTRUCTION

Fax:

Mobile:

021-3777-58

Email:

blockheadz & extra-co. nz

COUNCIL USE ONLY

☐ Central ☐ Henderson ☐ Manukau ☐ Orewa ☐ Papakura ☐ Pukekohe ☐ Takapuna

Received by:

Register
checked:

YES

NO

Signature:

Registration
current:

YES

NO

Producer statement accepted as establishing compliance with the consented plans:

YES

NO

Producer statement construction (PS3) General construction work



All sections of this form must be completed

TO BE COMPLETED BY THE PERSON WHO HAS UNDERTAKEN THE BUILDING WORK

Author name: Ray HERBERT Building consent No:

Author company: NORTH HARBOUR FENCING Author Registration No:

Description of building work: SUPPLY & INSTALL FENCING TO TIMBER & KEYSTONE RETAINING WALLS

Performance standard for maintenance and inspection, if applicable ☒ N/A

Legal description:

Site address: STATION RD, HUAPEI

NZBC clauses: (select as applicable)

B1	B2	C1	C2	C3	C4	C5	C6	D1	D2	E1	E2	E3
F1	F2	F3	F4	F5	F6	F7	F8	G1	G2	G3	G4	G5
G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	H1		

I have sighted the above building consent and read the attached conditions of consent and confirm that I have undertaken the building work described above in accordance with the consented plans and specifications.

I understand that Council will rely upon this producer statement, for the purposes of establishing compliance with the above building consent.

Signature: [Signature] Date: 23/11/16

Tradesperson's contact details:

Address: 51A FOUNDER RD, SILVERDALE Postcode: 0932

Business: 09 443 8692 Fax: /

Mobile: 027 289 5846 Email: ray@nhfencing.co.nz

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☐ Accepted in support of inspection ☐ Accepted instead of inspection

Register checked: Council ☐ LBP ☐ N/A ☐

Name: Date:

Producer statement accepted as establishing compliance with the consented plans: YES ☐ NO ☐

Producer statements are accepted solely at Auckland Council's discretion; please refer to the Producer Statement Policy which can be found on Councils website for further details

<http://www.aucklandcouncil.govt.nz/EN/ratesbuildingproperty/consents/Consent%20documents/ac2301producerstatementpolicy.pdf>