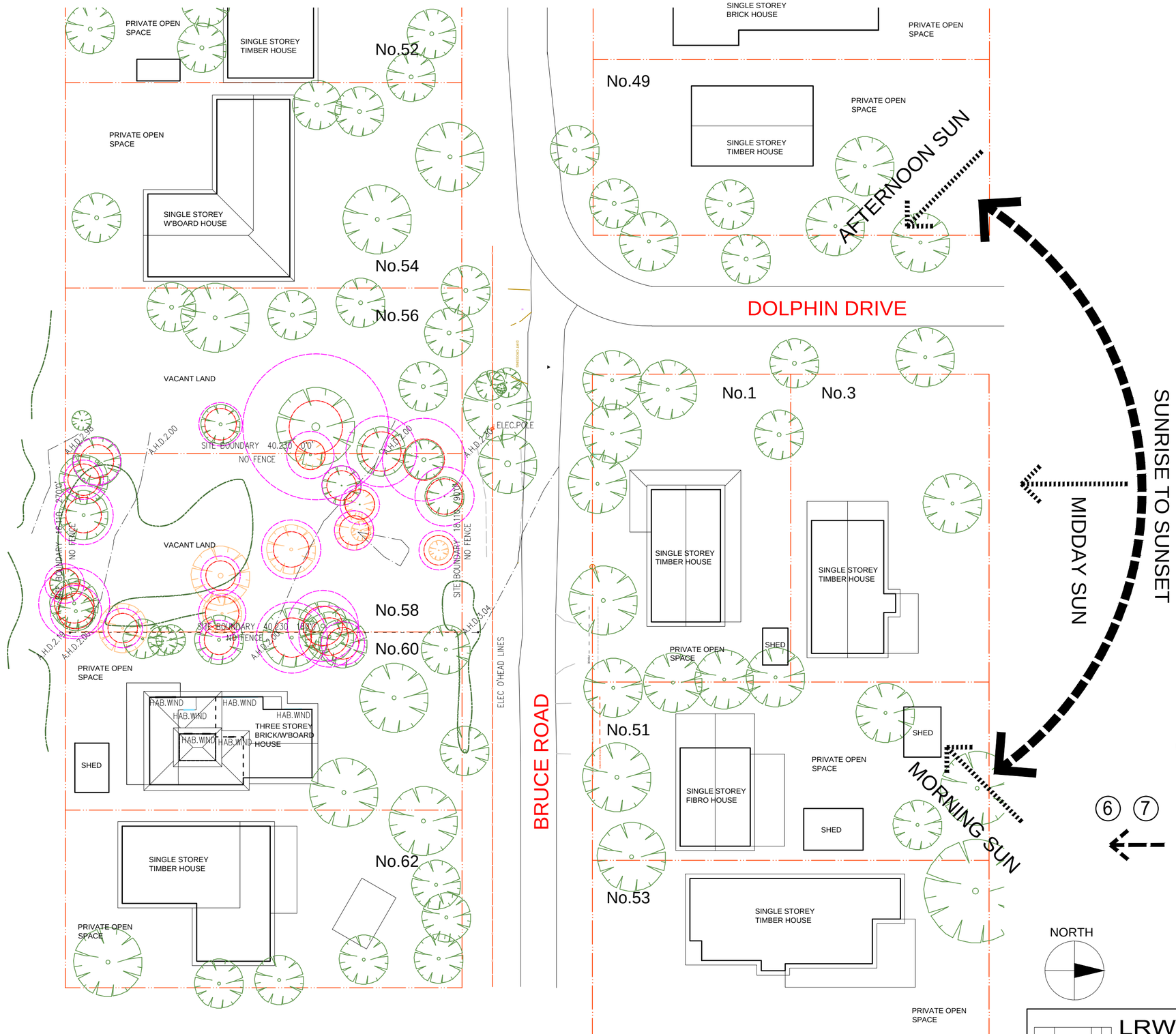

NEIGHBORHOOD CHARACTER

THE AREA IS DEFINED BY HOLIDAY HOMES BUILT HAPHAZARDLY OVER TIME SINCE THE ESTATE COMMENCING IN THE 1960's.

THE HOUSING STOCK IS MOSTLY SINGLE STOREY FIBRO-CLAD OR WEATHERBOARD OR TIMBER HOMES WITH LOW PITCHED METAL ROOFING. THESE HOMES ARE MODEST IN SIZE WITH FREE STANDING SHED-GARAGES OR CARPORTS UNCULTIVATED GARDENS.
MORE RECENT DWELLINGS ARE A MIX OF SINGLE AND TWO STOREY HOMES IN SIMILAR STYLE TO THE OLDER ONES WITH ATTACHED GARAGES.

THERE ARE A FEW MODERN CONTEMPORARY URBAN STYLE BRICK WITH TILED ROOF EXAMPLES, BUT THESE ARE THE EXCEPTION AND DETRACT FROM THE BEACH-HOLIDAY HOUSE STYLE CONSISTENT WITH THE AREA

NARROW STREETS WITH NATIVE VEGETATION LINED NATURE STRIPS AND NO FOOTPATHS DOMINATE THE AREA

NOTES

1. 1.6KM TO COGHLAN ROAD AND PHILLIP ISLAND GOLF CLUB
2. 3.2KM TO COWES MAIN STREET SHOPPING AREA
3. 100M TO SILVERLEAVES DRIVE
4. 150M TO BEACH
5. 100M TO WALKING TRAIL AND CONSERVATION HILL RESERVE
6. 1.3KM TO COWES-RHYLL ROAD
7. 1.3KM TO RHYLL WETLAND BIRD SANCTUARY AND WALKING TRACKS

TOWN PLANNING ISSUE

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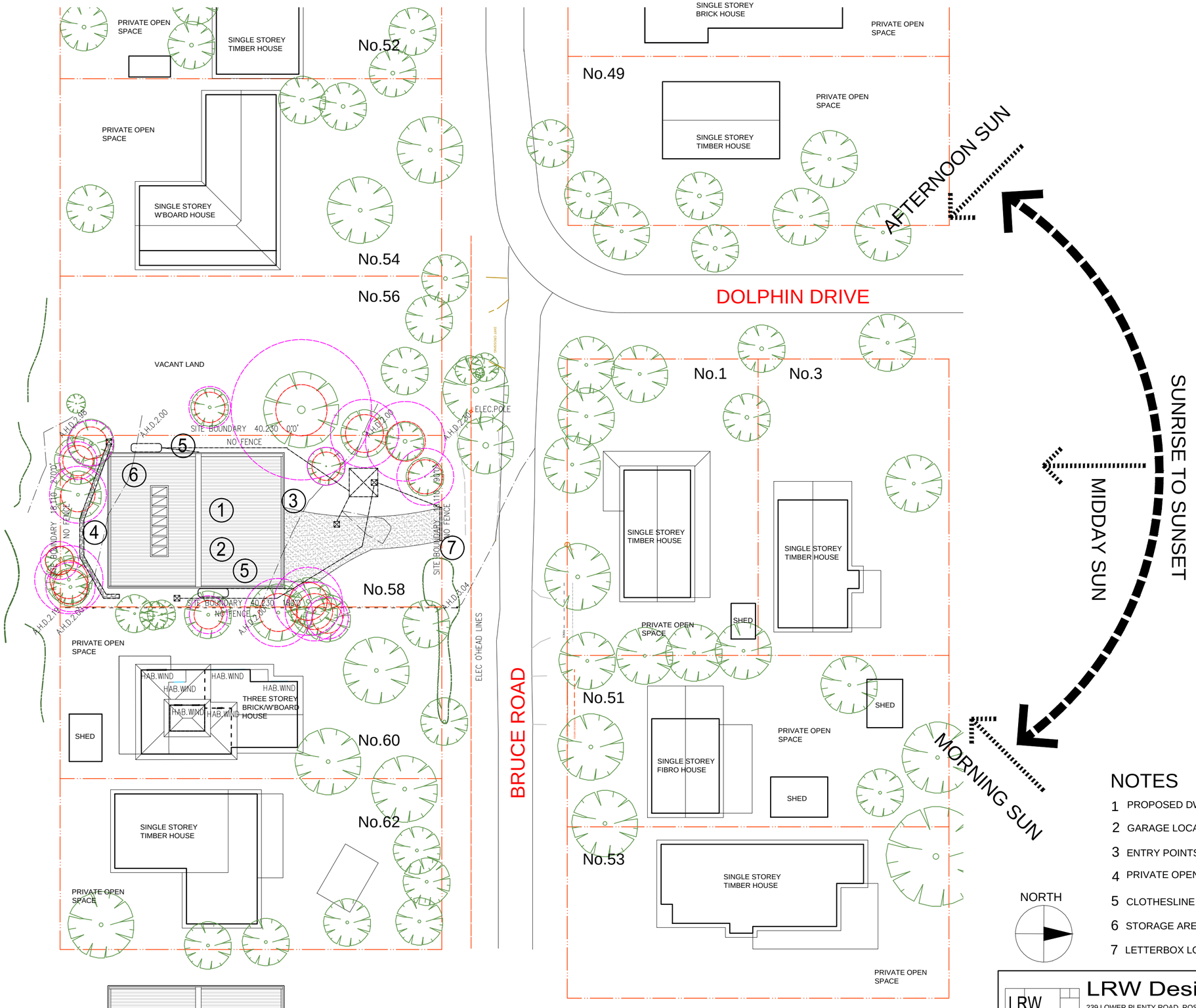
BUILDING DESIGN
TOWN PLANNING
DOCUMENTATION

PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:300@A2
DATE: AUG 2020
PROJECT 19.024

EXISTING CONDITIONS
SITE ANALYSIS

TP01c



NOTES

1. PROPOSED DWELLING
2. GARAGE LOCATIONS
3. ENTRY POINTS
4. PRIVATE OPEN SPACES
5. CLOTHESLINE LOCATION
6. STORAGE AREA
7. LETTERBOX LOCATION

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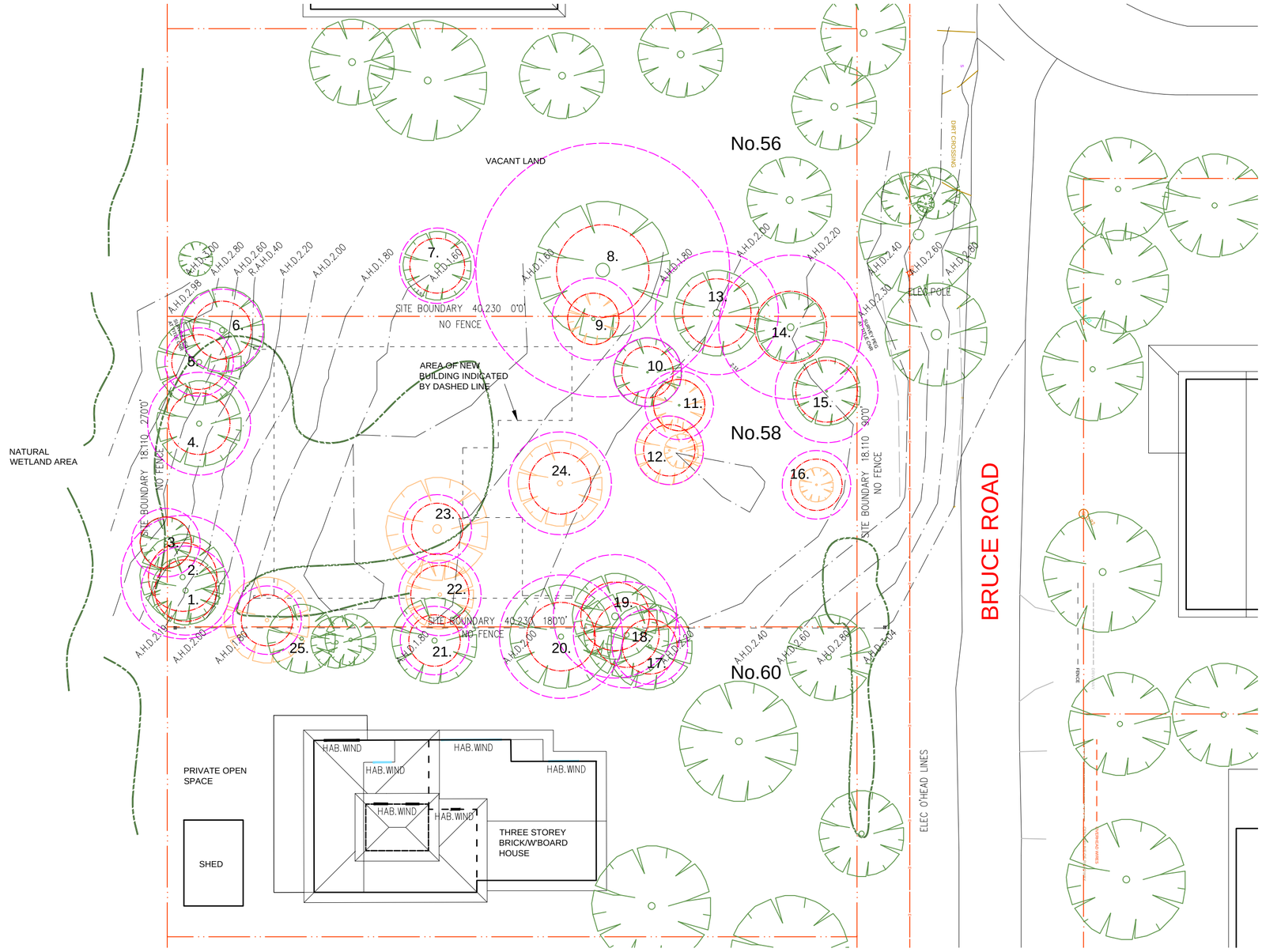
PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:300@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
DESIGN RESPONSE

TP02c



GENERAL NOTES

THE SITE HAS BEEN DESIGNATED WITH A FLOOD LEVEL OF 2.3 A.H.D. BY MELBOURNE WATER.

NOTE: ALL R.L'S INDICATED ARE TO A.H.D. REFER TO THE SITE SURVEYORS FEATURES AND LEVELS SURVEY

EXISTING TREE TO BE REMOVED
9, 11, 12, 16, 22, 23 & 24

EXISTING TREE TO REMAIN

STRUCTURAL ROOT ZONE AS NOMINATED IN THE ARBORISTS REPORT INDICATED

TREE PROTECTION ZONE AS NOMINATED IN THE ARBORISTS REPORT INDICATED

NOTES

TREE NUMBER CORRESPOND WITH THE ARBORISTS REPORT

HATCHING INDICATES SITE CUT AREAS REQUIRED FOR NEW CONSTRUCTION

TOWN PLANNING ISSUE

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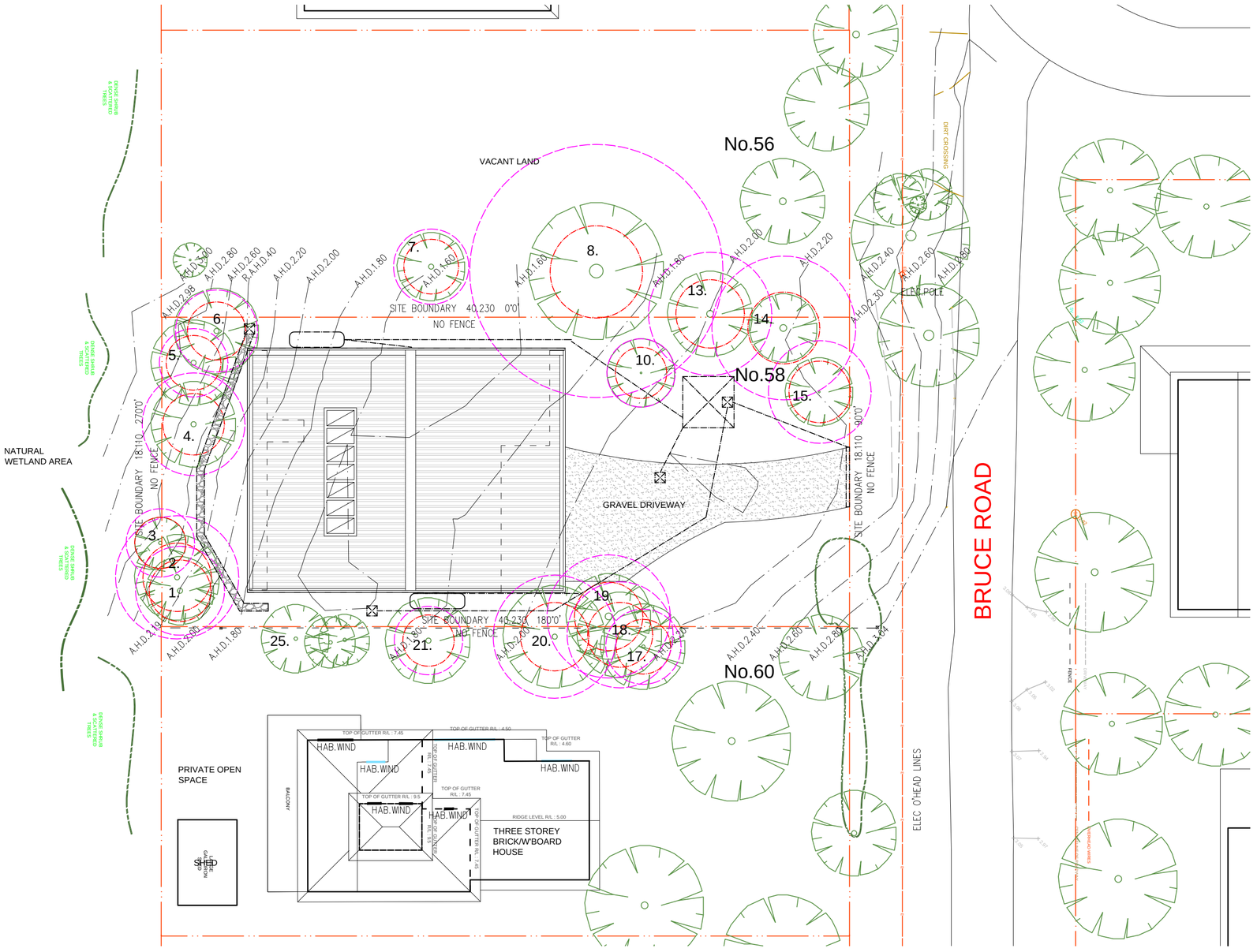
PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:200@A2
DATE: AUG 2020
PROJECT 19.024

EXISTING CONDITIONS
SITE PLAN

TP03c



WATER STORAGE

ABOVE GROUND WATER TANK CONSTRUCTED OF CONCRETE OR METAL. MUST BE READILY IDENTIFIABLE FROM THE BUILDING OR APPROPRIATE IDENTIFICATION SIGNAGE TO THE SATISFACTION OF THE CFA MUST BE PROVIDED

ALL FIXED ABOVE-GROUND WATER PIPES AND FITTINGS REQUIRED FOR FIREFIGHTING PURPOSES SHALL BE CORROSION RESISTANT METAL.

THE OUTLET OF THE WATER TANK SHALL BE LOCATED ADJOINING THE EXISTING ACCESS AND BE UNOBSTRUCTED

DEFENDABLE SPACE

GRASS MUST BE SHORT CROPPED AND MAINTAINED DURING THE DECLARED FIRE DANGER PERIOD

ALL LEAVES AND VEGETATION DEBRIS MUST BE REMOVED AT REGULAR INTERVALS DURING THE DECLARED FIRE DANGER PERIOD

WITHIN 10 METRES OF A BUILDING, FLAMMABLE OBJECTS MUST NOT BE LOCATED CLOSE TO THE VULNERABLE PARTS OF THE BUILDING

PLANTS GREATER THAN 10 CENTIMETRES IN HEIGHT MUST NOT BE PLACED WITHIN 3 METRES OF A WINDOW OR GLASS FEATURE OF THE BUILDING

SHRUBS MUST NOT BE LOCATED UNDER THE CANOPY OF TREES

INDIVIDUAL AND CLUMPS OF SHRUBS MUST NOT EXCEED 5 SQUARE METRES IN AREA AND MUST BE SEPARATED BY AT LEAST 5 METRES

TREES MUST NOT OVERHANG OR TOUCH ANY ELEMENTS OF THE BUILDING

TREE CANOPIES MUST BE SEPARATED BY AT LEAST 5 METRES EXCEPT FOR TREES 14 AND 15 IN THE NORTH WESTERN CORNER OF THE SITE WHICH MAY BE RETAINED WITH 2 METRES CANOPY SEPARATION, TREE BRANCHES MUST BE A MINIMUM OF 2 METRES ABOVE GROUND LEVEL.

NOTES

TREE NUMBER CORRESPOND WITH THE ARBORISTS REPORT

SITE LEVELS ARE SHOWN TO A.H.D REFER TO THE LAND SURVEYORS PLAN

EXISTING TREE TO REMAIN

STRUCTURAL ROOT ZONE AS NOMINATED IN THE ARBORISTS REPORT INDICATED

TREE PROTECTION ZONE AS NOMINATED IN THE ARBORISTS REPORT INDICATED

DWELLING FLOOR AREAS

LOWER FLOOR AREA	71.7 SQM
UPPER FLOOR AREA	209.4 SQM
GARAGE AREA	152.7 SQM
TERRACE AREA	36.2 SQM
TOTAL AREA	470.0 SQM

SITE COVERAGE AREA

SITE AREA	727 SQM
BUILDING AREA	265 SQM
SITE COVERAGE	36%

HARD SURFACE AREA

SITE AREA	727 SQM
BUILDING AREA	265 SQM
SITE COVERAGE	36%

TOWN PLANNING ISSUE

NORTH

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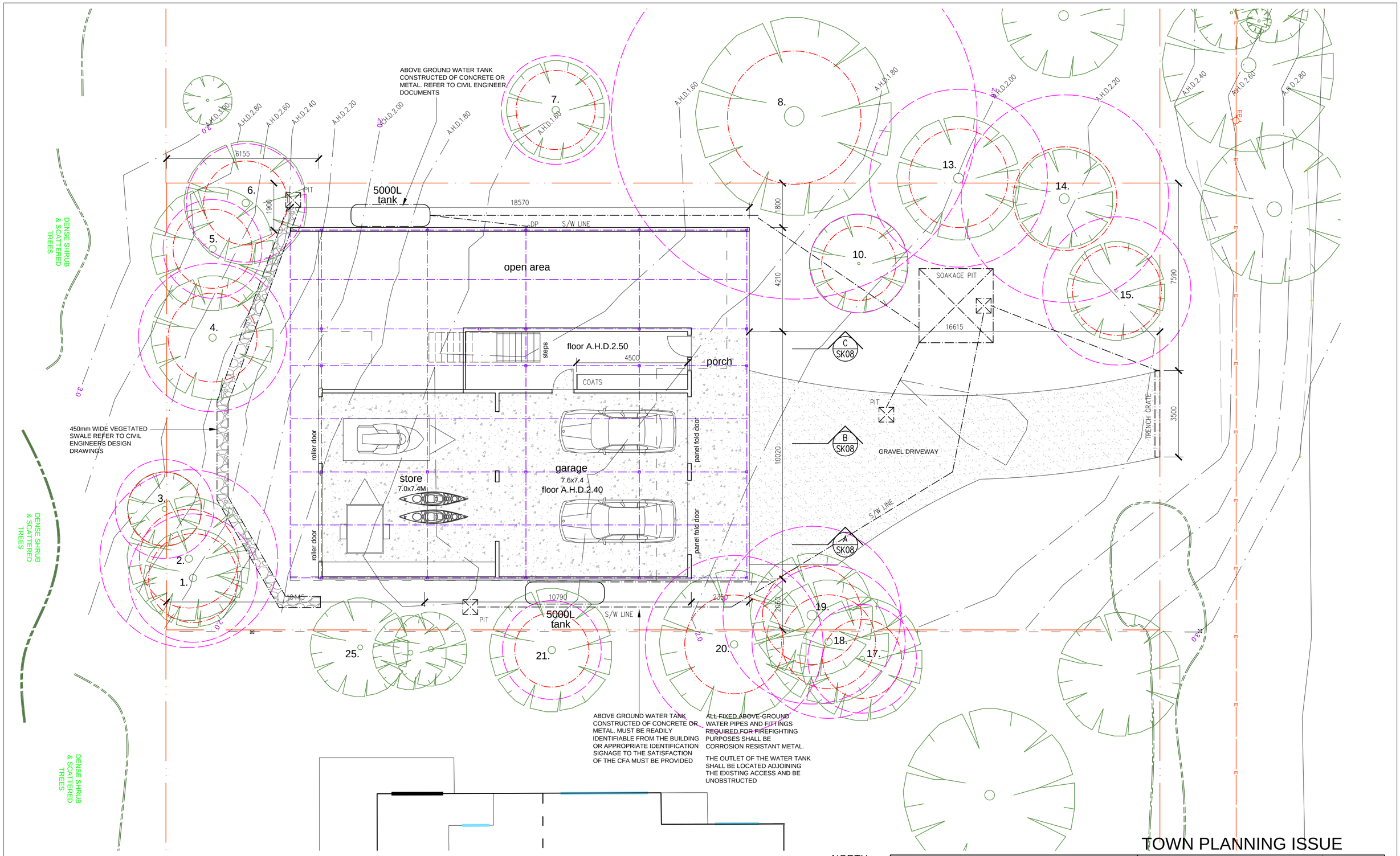
BUILDING DESIGN
TOWN PLANNING
DOCUMENTATION

PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:200@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
SITE PLAN

TP04c



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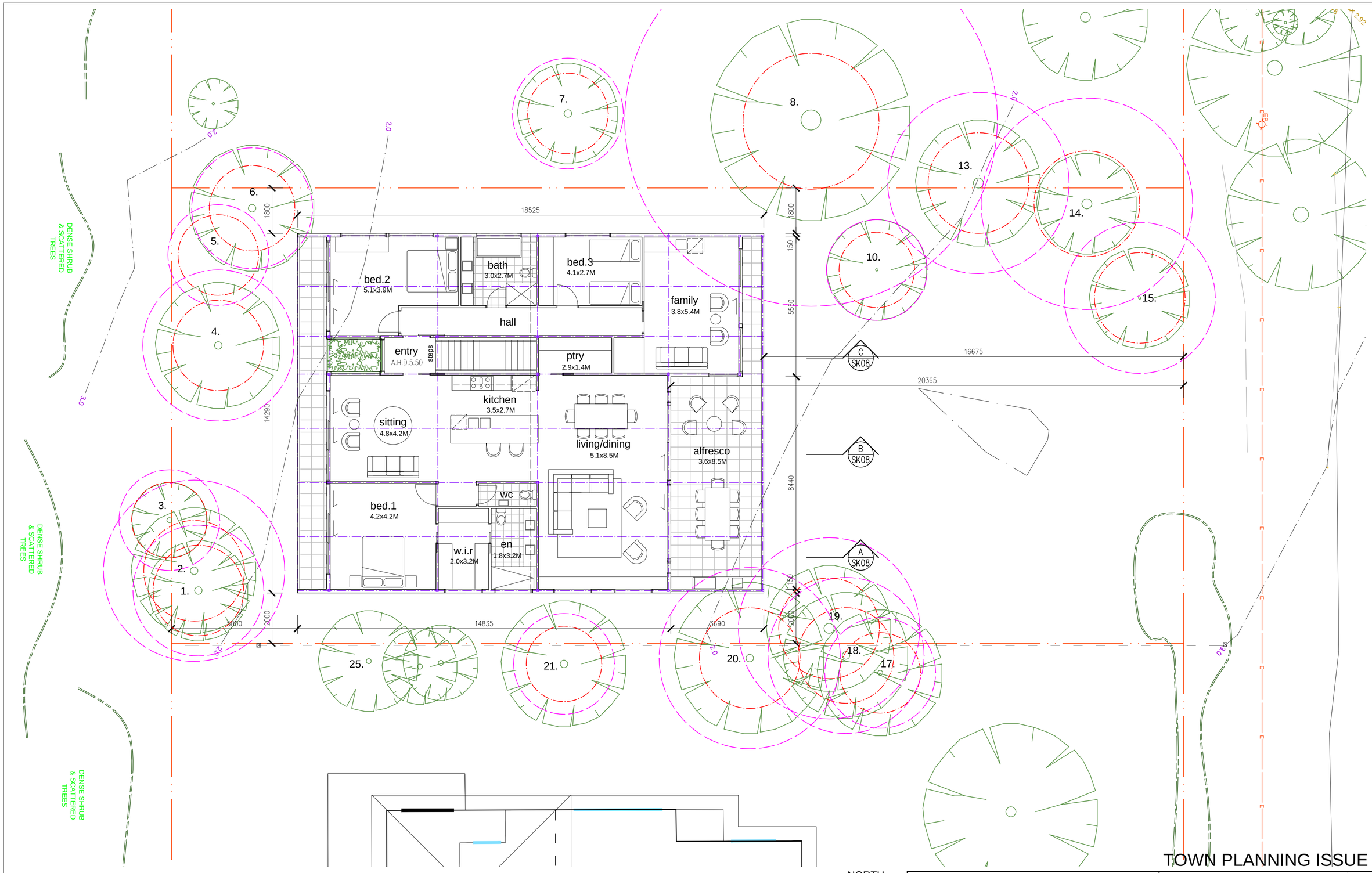
DOCUMENTATION

PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

PROPOSED WORKS
LOWER FLOOR PLAN

SCALE 1:100@A2
DATE: AUG 2020
PROJECT 19.024

TP05c



NORTH

TOWN PLANNING ISSUE

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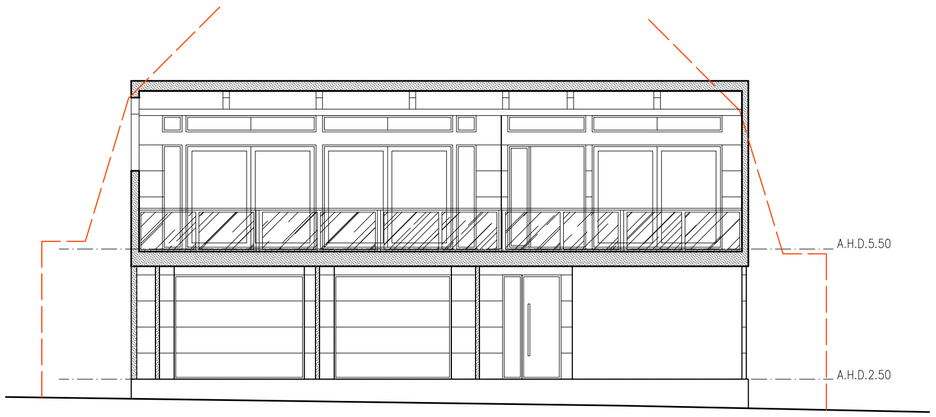
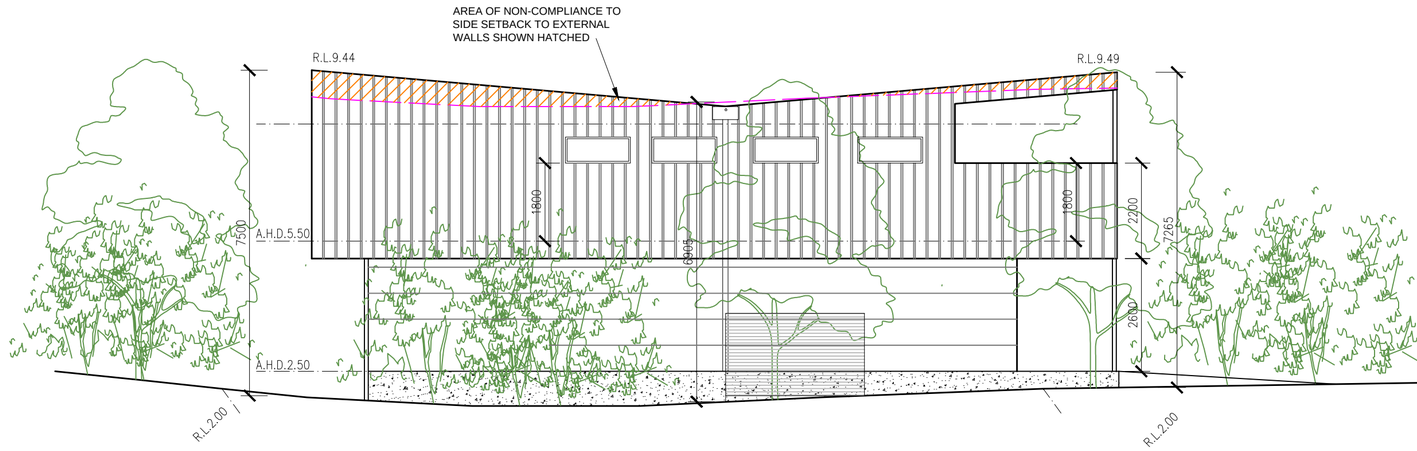
PROPOSED DWELLING 58 BRUCE ROAD, SILVERLEAVES	SCALE 1:100@A2 DATE: AUG 2020 PROJECT 19.024
PROPOSED WORKS UPPER FLOOR PLAN	TP06c



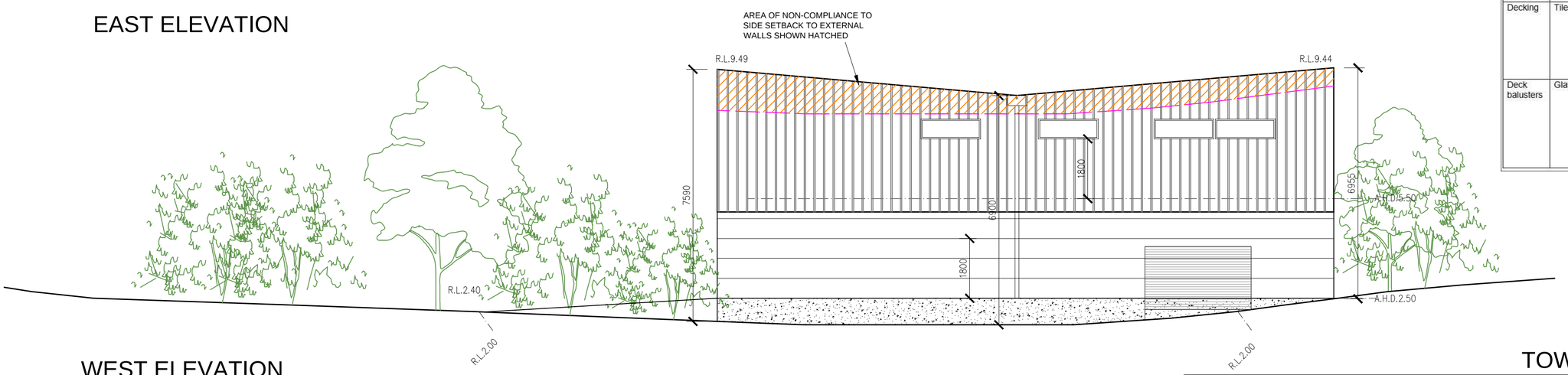
NORTH ELEVATION



SOUTH ELEVATION



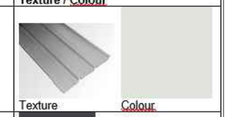
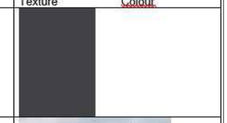
EAST ELEVATION



WEST ELEVATION

External Finishes Schedule

19.024 58 Bruce Road, Silverleaves

Area	Material	Finish	Texture / Colour
Roofing	Metal roofing	Tray deck Colorbond Shale Grey Colour A	 Texture Colour
Cappings Flashings and Downpipe	Metal	Colorbond Monument Colour B	
External walls	Metal sheeting	Colorbond Matt Colour C	
External walls	Hardies Matrix cladding	Painted finish Dulux Grey Milton Moon Colour D	 Texture Colour
External walls	Loxo cladding	Render finish Dulux Grey Milton Moon Colour D	 Texture Colour
Window Frames	Aluminium	Powdercoated Charcoal	
Garage doors	Metal	Face metal Shale Grey	
Driveway	Concrete	Gravel	
Decking	Tiles	Concrete look	
Deck balusters	Glass	Clear glass	

TOWN PLANNING ISSUE

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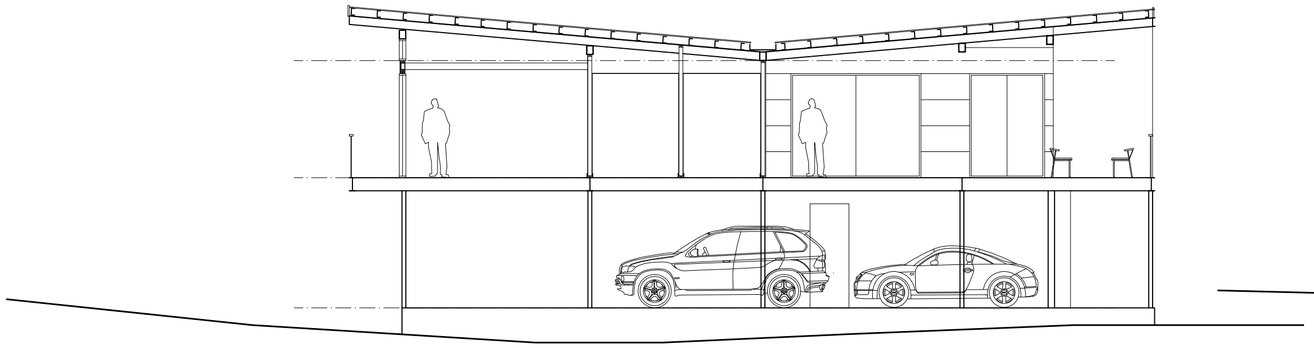
DOCUMENTATION

PROPOSED RESIDENCE
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:100@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
ELEVATIONS

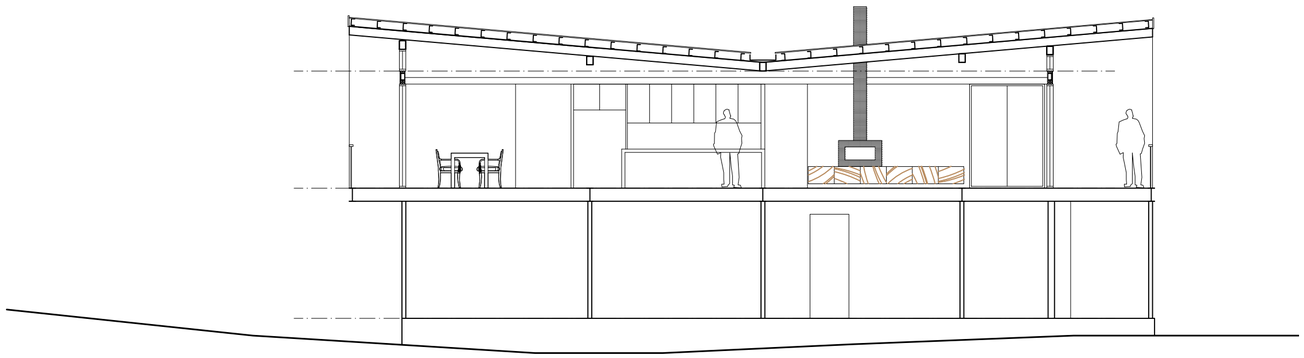
TP07c



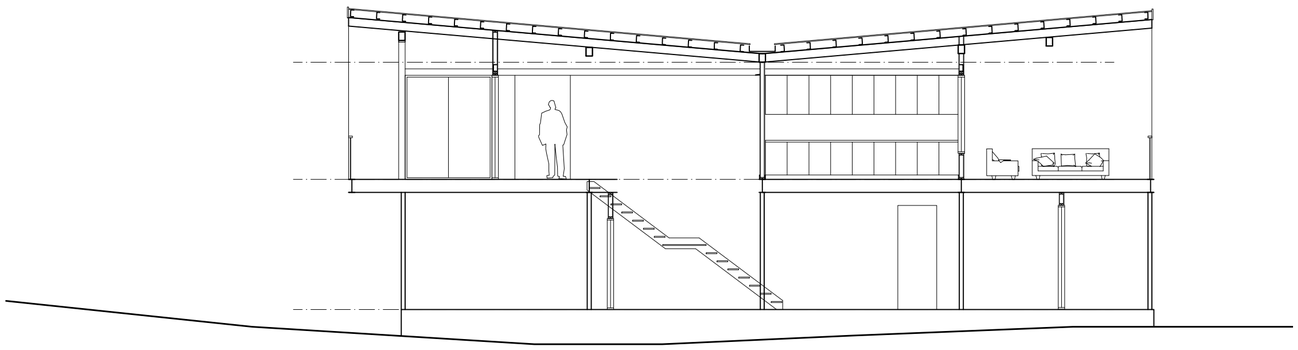
SECTION A



SOUTH ELEVATION
1:200 showing
adjoining properties



SECTION B



SECTION C

TOWN PLANNING ISSUE

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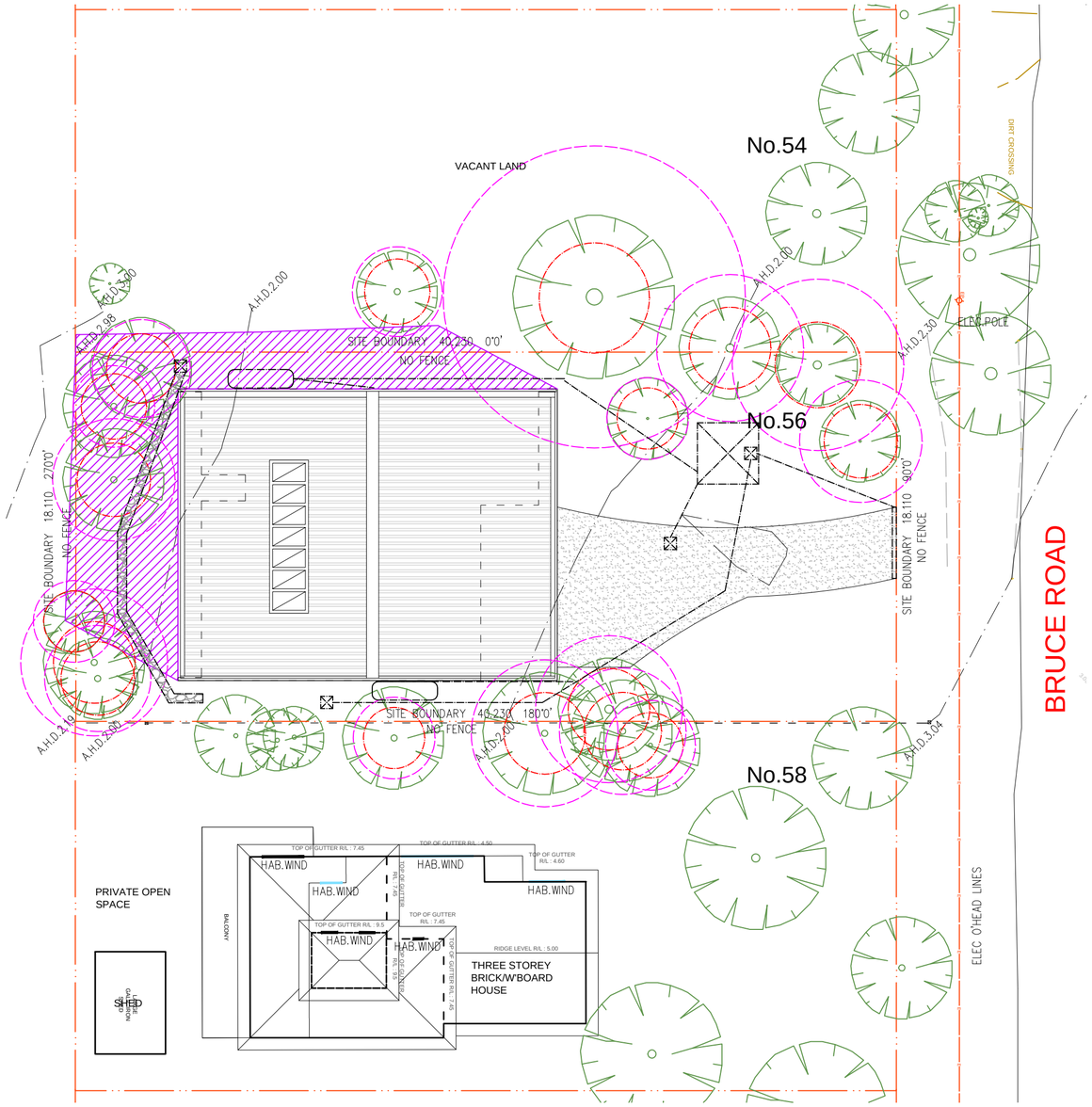
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:100@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
SECTIONS A - C

TP08c

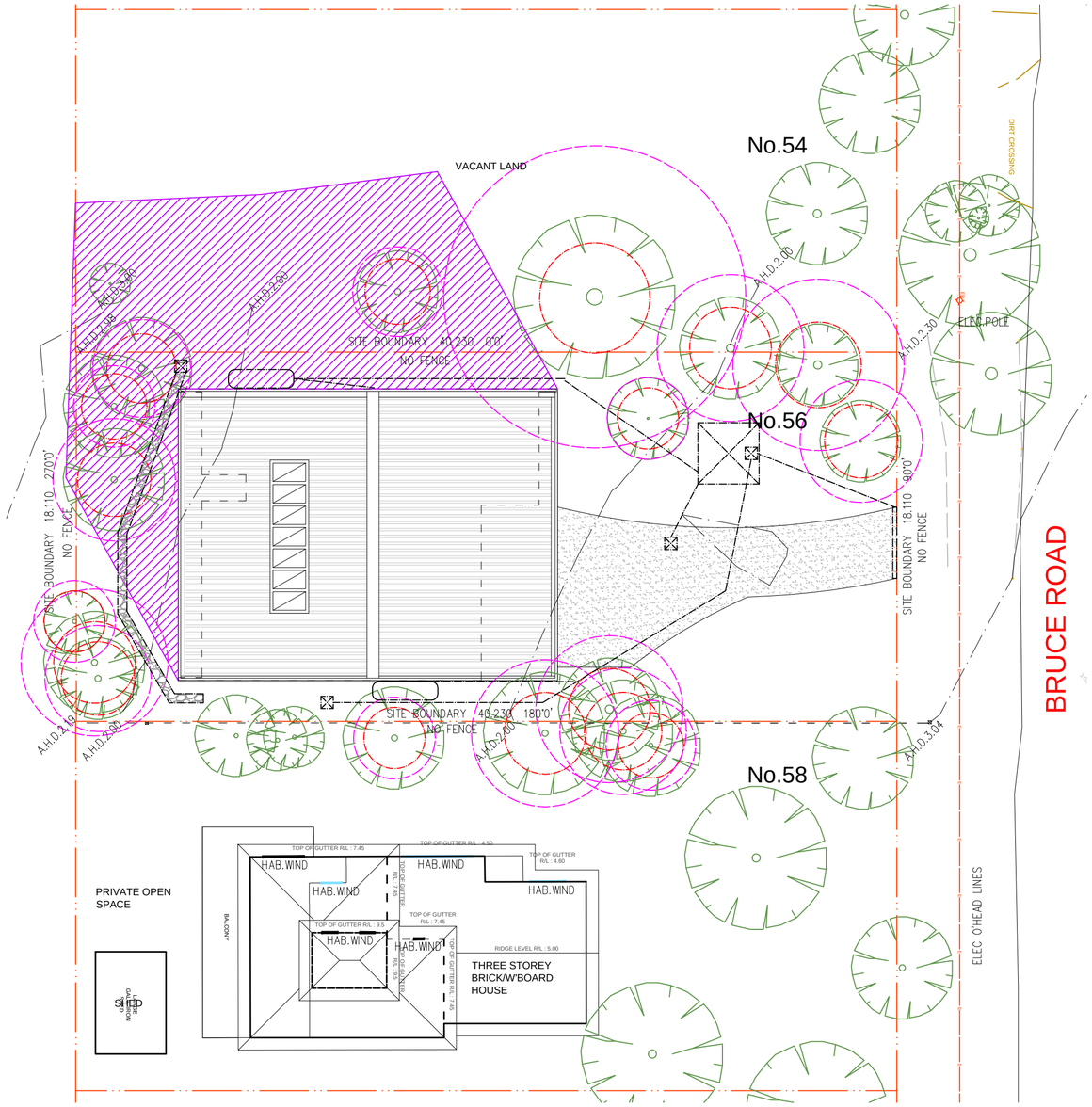


11.00AM

EXISTING FENCE SHADOW

PROPOSED SHADOW

Shadows taken as at September 22nd



9.00AM

EXISTING FENCE SHADOW

PROPOSED SHADOW

Shadows taken as at September 22nd

TOWN PLANNING ISSUE

NORTH

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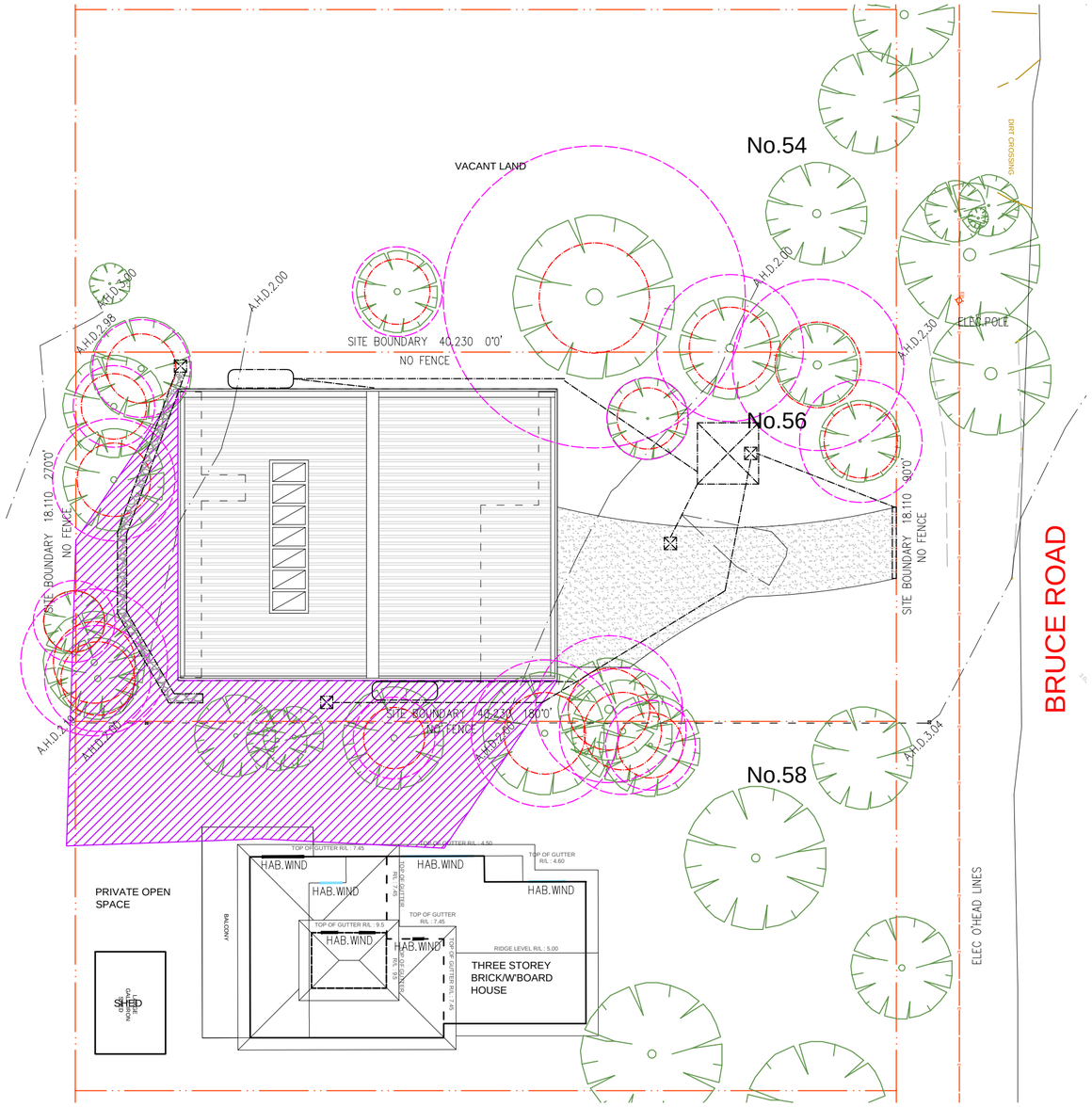
PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:200@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
SHADOW DIAGRAMS 9am & 11am

TP09c

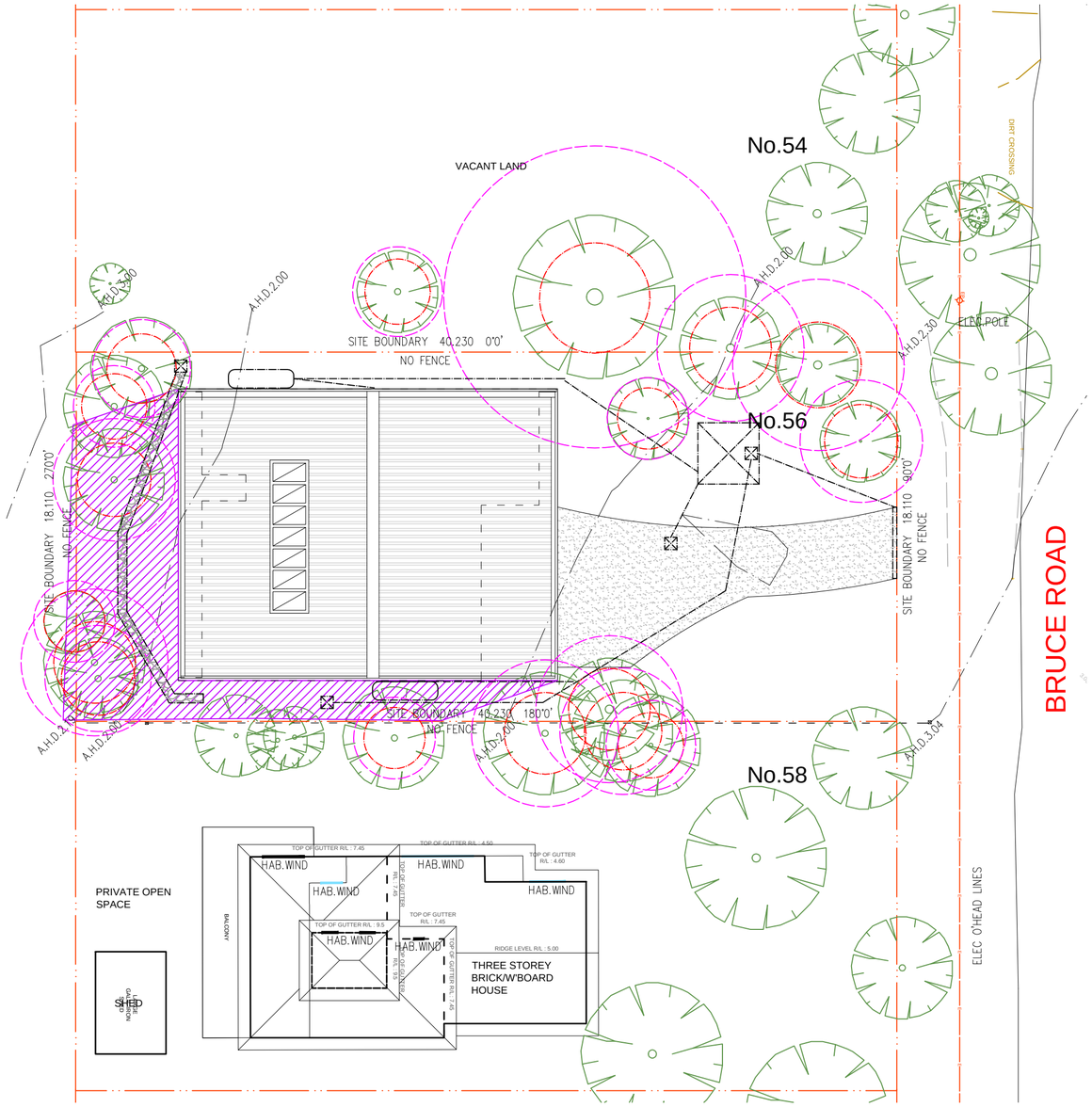


3.00PM

EXISTING FENCE SHADOW

PROPOSED SHADOW

Shadows taken as at September 22nd



1.00PM

EXISTING FENCE SHADOW

PROPOSED SHADOW

Shadows taken as at September 22nd

NORTH

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PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:200@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
SHADOW DIAGRAMS 1pm & 3pm

TP10c

BUSHFIRE ATTACK LEVEL – 29

1. SARKING –
SARKING, WHERE USED FOR BUSHFIRE PROTECTION SHALL BE:
a: NON COMBUSTIBLE OR
b: BREATHER TYPE SARKING COMPLYING WITH AS.4200.1 AND WITH A FLAMMABILITY INDEX OF NOT MORE THAN 5 AND SARKED ON THE OUTSIDE OF THE FRAME, OR
c: AN INSULATION MATERIAL CONFORMING TO THE AUSTRALIAN STANDARD FOR THAT MATERIAL.

2. SUBFLOOR SUPPORTS
THIS STANDARD DOES NOT PROVIDE CONSTRUCTION REQUIREMENTS FOR SUBFLOOR SUPPORTS WHERE THE SUBFLOOR SPACE IS ENCLOSED WITH –
a: A WALL THAT COMPLIES WITH THE REQUIREMENTS FOR AN EXTERNAL WALL BELOW; OR
b: A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION RESISTANT STEEL, BRONZE OR ALUMINIUM: OR
c: A COMBINATION OF ITEMS a) AND b) ABOVE
WHERE SUBFLOOR SPACE IS UNENCLOSED, THE SUPPORT POSTS, COLUMNS, STUMPS, PIERS AND POLES SHALL BE –
a: OF NON–COMBUSTIBLE MATERIAL: OR
b: OF BUSHFIRE–RESITING MATERIAL (refer to the table in AS.3959–2009); OR
c: A COMBINATION OF ITEMS i) AND ii) ABOVE.

3. ELEVATED FLOORS
1) ENCLOSED SUB FLOOR SPACE
THE STANDARD DOES NOT PROVIDE CONSTRUCTION REQUIREMENTS FOR ELEVATED FLOORS, INCLUDING BEARERS, JOISTS AND FLOORING, WHERE THE SUBFLOOR SPACE IS ENCLOSED WITH –
a: A WALL THAT COMPLIES WITH THE REQUIREMENTS FOR AN EXTERNAL WALL BELOW; OR
b: A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION RESISTANT STEEL, BRONZE OR ALUMINIUM: OR
c: A COMBINATION OF ITEMS a) AND b) ABOVE
WHERE SUBFLOOR SPACE IS UNENCLOSED, THE SUPPORT POSTS, COLUMNS, STUMPS, PIERS AND POLES SHALL BE –
a: OF NON–COMBUSTIBLE MATERIAL: OR
b: OF BUSHFIRE–RESITING MATERIAL (refer to the table in AS.3959–2009); OR
c: A COMBINATION OF ITEMS i) AND ii) ABOVE.

1) UNENCLOSED SUB FLOOR SPACE
WHERE THE SUBFLOOR SPACE IS UNENCLOSED, THE BEARERS, JOISTS, AND FLOORING, LESS THAN 400mm ABOVE FINISHED GROUND LEVEL, SHALL BE ONE OF THE FOLLOWING –
i) MATERIALS THAT COMPLY WITH THE FOLLOWING:
a) BEARERS AND JOISTS SHALL BE –
i)OF NON–COMBUSTIBLE MATERIAL: OR
ii) OF BUSHFIRE–RESITING MATERIAL (refer to the table in AS.3959–2009); OR
iii) A COMBINATION OF ITEMS i) AND ii) ABOVE.
THE FLOORING SHALL BE –
i)OF NON–COMBUSTIBLE MATERIAL: OR
ii) OF BUSHFIRE–RESITING MATERIAL (refer to the table in AS.3959–2009); OR
iii) TIMBER (OTHER THAN BUSHFIRE–RESISTING TIMBER) PARTICLEBOARD OR PLYWOOD FLOORING WHERE THE UNDERSIDE IS LINED WITH SARKING–TYPE MATERIAL OR MINERAL WOOL INSULATION; OR
iii) A COMBINATION OF ITEMS i) AND ii) ABOVE.

2) A SYSTEM COMPLYING WITH AS 1530.8.1
THIS STANDARD DOES NOT PROVIDE CONSTRUCTION REQUIREMENTS FOR ELEMENTS OF ELEVATED FLOORS, INCLUDING BEARERS, JOISTS AND FLOORING, IF THE UNDERSIDE OF THE ELEMENT IS 400mm OR MORE ABOVE FINISHED GROUND LEVEL.

4. EXTERNAL WALLS
1–WALLS. THE EXPOSED COMPONENTS OF AN EXTERNAL WALL THAT ARE LESS THAN 400mm FROM THE GROUND OR LESS THAN 400mm ABOVE DECKS, CARPORT ROOFS, AWNINGS AND SIMILAR ELEMENTS OR FITTINGS HAVING AN ANGLE LESS THAN 18 DEGREES TO THE HORIZONTAL AND EXTENDING MORE THAN 110mm IN WIDTH FROM THE WALL SHALL BE:

a) NON–COMBUSTIBLE MATERIAL SUCH AS CAVITY BRICK, MASONRY VENEER WALLS WITH AN OUTER LEAF OF CLAY, CONCRETE, CALCIUM SILICATE OR NATURAL STONE, PRECAST OR IN–SITU WALLS OF CONCRETE OR AERATED CONCRETE OR EARTH WALLING INCLUDING MUD BRICK; OR
b) CLADDING THAT IS FIXED EXTERNALLY TO A TIMBER–FRAMED OR A STEEL–FRAMED WALL AND IS–
i) NON–COMBUSTIBLE MATERIAL; OR
ii) FIBRE–CEMENT A MINIMUM OF 6mm IN THICKNESS; OR
iii) BUSHFIRE–RESISTING TIMBER (refer to table in AS.3959–2009); OR
iv) A TIMBER SPECIES AS SPECIFIED IA APPENDIX E OF THE STANDARD; OR
v) A COMBINATION OF ANY OF ITEMS i), ii), iii) OR iv) ABOVE; OR
d) A COMBINATION OF ANY ITEMS a), b) OR c) ABOVE.

2–JOINTS. ALL JOINTS IN THE EXTERNAL SURFACE OF WALLS SHALL BE COVERED, SEALED, OVERLAPPED, BACKED OR BUTT JOINTED TO PREVENT GAPS GREATER THAN 3mm

3–VENTS AND WEEPHOLES. VENTS AND WEEPHOLES IN EXTERNAL WALLS SHALL BE SCREENED WITH A MESH WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION–RESISTANT STEEL, BRONZE OR ALUMINIUM, EXCEPT WHERE THE VENTS AND WEEPHOLES HAVE AN APERTURE LESS THAN 3mm

5. EXTERNAL WINDOWS AND DOORS
1–WINDOWS. WINDOW ASSEMBLIES SHALL COMPLY WITH ONE OF THE FOLLOWING:
a) THE SHALL BE COMPLETELY PROTECTED BY A BUSHFIRE SHUTTER THAT COMPLIES WITH NOTE 1; OR
b) THEY SHALL BE COMPLETELY PROTECTED EXTERNALLY BY SCREENS THAT COMPLY WITH NOTE 2 OR
c) THEY SHALL COMPLY WITH THE FOLLOWING;
i) FOR WINDOW ASSEMBLIES LESS THAN 400mm FROM THE GROUND OR LESS THAN 400mm ABOVE DECKS, CARPORT ROOFS, AWNINGS AND SIMILAR ELEMENTS OR FITTINGS HAVING AN ANGLE LESS THAN 18 DEGREES TO THE HORIZONTAL AND EXTENDING MORE THAN 110mm IB WIDTH FROM THE WINDOW FRAME, WINDOW FRAMES AND WINDOW JOINERY SHALL BE MADE FROM:
A) BUSHFIRE RESISTING TIMBER (refer to the table in AS.3959–2009); or
B) A TIMBER SPECIES AS SPECIFIED IN APPENDIX E OF THE STANDARD; OR
C) METAL; OR
D) METAL–REINFORCED PVC–U. THE REINFORCING MEMBERS SHALL BE MADE FROM ALUMINIUM, STAINLESS STEEL, OR CORROSION–RESISTANT STEEL AND THE FRAME AND SASH SHALL SATISFY THE DESIGN LOAD, PERFORMANCE AND STRUCTURAL STRENGTH OF THE MEMBER.

ii) EXTERNALLY FITTED HARDWARE THAT SUPPORTS THE SASH IN ITS FUNCTIONS OF OPENING AND CLOSING SHALL BE METAL.
iii) WHERE GLAZING IS LESS THAN 400mm FROM THE GROUND OR LESS THAN 400mm ABOVE DECKS AND SIMILAR ELEMENTS OR FITTINGS HAVING AN ANGLE LESS THAN 18 DEGREES TO THE HORIZONTAL AND EXTENDING MORE THAN 110mm IN WIDTH FROM THE WINDOW FRAME, THE GLAZING SHALL BE GRADE A SAFETY GLASS MINIMUM 4mm THICKNESS.

iv) WHERE GLAZING IS OTHER THAN THAT SPECIFIED IN ITEMS iii) ABOVE, ANNEALED GLASS MAY BE USED.

v) THE OPENABLE PORTIONS OF WINDOWS SHALL BE SCREENED INTERNALLY OR EXTERNALLY WITH SCREENS THAT COMPLY WITH NOTE 2 BELOW.

2) SCREENS– SCREENING OF THE OPENABLE PORTIONS OF ALL WINDOWS IS REQUIRED IN ALL BAL'S TO PREVENT THE ENTRY OF EMBERS TO THE BUILDING WHEN THE WINDOW IS OPEN. SCREENING OF THE OPENABLE AND FIXED PORTIONS OF SOME WINDOWS IS REQUIRED IN SOME BAL'S TO REDUCE THE EFFECTS OF RADIANT HEAT ON SOME TYPES OF GLASS.

3) DOORS– SIDE HUNG EXTERNAL DOORS (INCLUDING FRENCH DOORS, PANEL FOLD AND BIFOLD DOORS)

SIDE HUNG EXTERNAL DOORS, INCLUDING FRENCH DOORS, SHALL COMPLY WITH ONE OF THE FOLLOWING:

(A) DOORS AND DOOR FRAMES SHALL BE PROTECTED BY BUSHFIRE SHUTTERS THAT COMPLY WITH NOTE 1; OR

(B) DOORS AND DOOR FRAMES SHALL BE PROTECTED EXTERNALLY BY SCREENS THAT COMPLY WITH NOTE 2; OR

(C) DOORS AND DOOR FRAMES SHALL COMPLY WITH THE FOLLOWING

(i) DOORS SHALL BE–

(A) NON COMBUSTIBLE; OR

(B) A SOLID TIMBER, LAMINATED TIMBER OR RECONSTITUTED TIMBER DOOR, HAVING A MINIMUM THICKNESS OF 35MM FOR THE FIRST 400MM ABOVE THE THRESHOLD; OR

(C) A DOOR, INCLUDING A HOLLOW CORE DOOR, WITH A NON–COMBUSTIBLE KICK PLATE ON THE OUTSIDE FOR THE FIRST 400MM ABOVE THE THRESHOLD; OR

(D) A DOOR, INCLUDING A HOLLOW CORE DOOR, PROTECTED EXTERNALLY BY A SCREEN THAT COMPLIES WITH CLAUSE NOTE 2 BELOW; OR

(E) A FULLY FRAMED GLAZED DOOR, WHERE THE FRAMING IS MADE FROM MATERIALS SPECIFIED FOR BUSHFIRE SHUTTERS (SEE NOTE 2 BELOW), OR FROM A TIMBER SPECIES AS SPECIFIED AT THE END OF THIS DOCUMENT.

(ii) WHERE DOORS INCORPORATE GLAZING, THE GLAZING SHALL COMPLY WITH THE GLAZING REQUIREMENTS FOR WINDOWS.

(iii) DOORS SHALL BE TIGHT–FITTING TO THE DOOR FRAME AND TO AN ABUTTING DOOR, IF APPLICABLE.

(iv) WHERE ANY PART OF THE DOOR FRAME IS LESS THAN 400MM FROM THE GROUND OR LESS THAN 400MM ABOVE DECKS, CARPORT ROOFS, AWNINGS AND SIMILAR ELEMENTS OR FITTINGS HAVING AND ANGLE LESS THAN 18 DEGREES TO THE HORIZONTAL AND EXTENDING MORE THAN 110MM IN WIDTH FROM THE DOOR, THAT PART OF THE DOOR FRAME SHALL BE MADE FROM:

(A) BUSHFIRE–RESISTING TIMBER (REFER TO THE TABLE AT THE END OF THIS DOCUMENT); OR

(B) A TIMBER SPECIES AS SPECIFIED IN APPENDIX E OF THE STANDARD; OR
(C) METAL; OR
(D) METAL–REINFORCED PVC–U. THE REINFORCING MEMBERS SHALL BE ADE FROM ALUMINUM, STAINLESS STEEL, OR CORROSION–RESISTANT STEEL AND THE DOOR ASSEMBLY SHALL SATISFY THE DESIGN LOAD, PERFORMANCE AND STRUCTURAL STRENGTH OF THE MEMBER.

(v) WEATHER STRIPS, DRAUGHT EXCLUDERS OR DRAUGHT SEALS SHALL BE INSTALLED AT THE BASE OF THE SIDE–HUNG EXTERNAL DOORS.

(D) SLIDING DOORS

SLIDING DOORS SHALL COMPLY WITH ONE OF THE FOLLOWING:

(A) DOORS AND DOOR FRAMES SHALL BE PROTECTED BY BUSHFIRE SHUTTERS THAT COMPLY WITH NOTE 1; OR

(B) DOORS AND DOOR FRAMES SHALL BE PROTECTED EXTERNALLY BY SCREENS THAT COMPLY WITH NOTE 2; OR

(C) THEY SHALL COMPLY WITH THE FOLLOWING:

(i) ANY GLAZING INCORPORATED IN SLIDING DOORS SHALL BE GRADE A SAFETY GLASS COMPLYING WITH AS 1288

(ii) BOTH THE DOOR FRAME SUPPORTING THE SLIDING DOOR AND THE FRAMING SURROUNDING ANY GLAZING SHALL BE MADE FROM:

(A) BUSHFIRE–RESISTING TIMBER (refer to the table in AS.3959–2009); AT THE END OF THIS DOCUMENT); OR

(B) A TIMBER SPECIES AS SPECIFIED IN APPENDIX E OF THE STANDARD; OR

(C) METAL; OR

(D) METAL–REINFORCED PVC–U. THE REINFORCING MEMBERS SHALL BE MADE FROM ALUMINUM, STAINLESS STEEL, OR CORROSION–RESISTANT STEEL AND THE FRAME AND THE SASH SHALL SATISFY THE DESIGN LOAD, PERFORMANCE AND STRUCTURAL STRENGTH OD THE MEMBER.

(iii) THERE IS NO REQUIREMENT TO SCREEN THE OPENABLE PART OF THE SLIDING DOOR. HOWEVER, IF SCREENED, THE SCREENS SHALL COMPLY WITH NOTE 2.

(iv) SLIDING DOORS SHALL BE TIGHT FITTING IN THE FRAMES.

(E) GARAGE DOORS

THE FOLLOWING APPLY TO VEHICLE ACCRESS DOORS:

THE LOWER PORTION OF A VEHICLE ACCESS DOOR THAT IS WITHIN 400MM OF THE GROUND WHEN THE DOOR IS CLOSED SHALL BE MADE FROM–

(i) NON–COMBUSTIBLE MATERIAL; OR

(ii) BUSHFIRE–RESISTING TIMBER (REFER TO THE TABLE AT THE END OF THIS DOCUMENT); OR

(iii) A TIMBER SPECIES AS SPECIFIED IN APPENDIX E OF THE STANDARD; OR

(iv) FIBRE CEMENT SHEET, A MINIMUM OF 6MM IN THICKNESS; OR

(v) A COMBINATION OF ANY OF ITEMS (i), (ii), (iii), OR (iv) ABOVE.

(B) PANEL LIFT, TILT DOORS OR SIDE–HUNG DOORS SHALL BE FITTED WITH SUITABLE WEATHER STRIPS, DRAUGHT EXCLUDERS, DRAUGHT SEALS OR GUIDE TRACKS, AS APPROPRIATE TO THE DOOR TYPE, WITH A MAXIMUM GAP NO GREATER THAN 3 MM.

(C) ROLLER DOORS SHALL HAVE GUIDE TRACKS WITH A MAXIMUM GAP NO GREATER THAN 3MM AND SHALL BE FITTED WITH A NYLON BRUSH THAT IS IN CONTACT WITH THE DOOR.

(D) VEHICLE ACCESS DOORS SHALL NOT INCLUDE VENTILATION SLOTS.

8. ROOFS –
TILES ROOFS SHALL BE FULLY SARKED. THE SARKING SHALL–
a: BE FULLY SARKED, EXCEPT THAT FOIL–BACKED INSULATION BLANKETS MAY BE INSTALLED OVER THE BATTENS: AND
b: HAVE ANY GAPS GREATER THAN 3mm (such as under corrugations or ribs of roof sheet and between roof components) SEALED AT THE FASCIA OR WALL LINE AND AT VALLEYS, HIPS AND RIDGES BY –
i) A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION–RESISTANT STEEL, BRONZE OR ALUMINIUM OR
ii) MINERAL WOOL: OR
iii) OTHER NON–COMBUSTIBLE MATERIAL: OR
iv) A COMBINATION OF ANY OF ITEMS i), ii) OR iii)

9. ROOF PENETRATIONS –
a: ROOF PENETRATIONS, INCLUDING ROOF LIGHTS, ROOF VENTILATORS, ROOF MOUNTED EVAPORATIVE COOLING UNITS, AERIALS, VENT PIPES AND SUPPORTS FOR SOLAR COLLECTORS, SHALL BE ADEQUATELY SEALED AT THE ROOF TO PREVENT GAPS GREATER THAN 3mm. THE MATERIAL USED TO SEAL THE PENETRATION SHALL BE NON–COMBUSTIBLE.
b: OPENINGS IN VENTED ROOF LIGHTS, ROOF VENTILATORS OR VENT PIPES SHALL BE FITTED WITH EMBER GUARDS MADE FROM A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OR CORROSION–RESISTANT STEEL , BRONZE OR ALUMINIUM.
THIS REQUIREMENT DOES NOT APPLY TO THE EXHAUST FLUES OF HEATING OR COOKING DEVICES WITH CLOSED COMBUSTION CHAMBERS. IN THE CASE OF GAS APPLIANCE FLUES, EMBER GUARDS SHALL NOT BE FITTED.

ROOFS –
THE FOLLOWING APPLIES TO ALL TYPES OF ROOFS AND ROOFING SYSTEMS:
a: ROOF TILES, ROOF SHEETS AND ROOF–COVERING ACCESSORIES ARE TO BE NON–COMBUSTIBLE.
b: THE ROOF/WALL JUNCTION IS TO BE SEALED TO PREVENT OPENINGS GREATER THAN 3mm, EITHER BY USE OF FASCIA AND EAVES LININGS OR BY SEALING BETWEEN THE TOP OF THE WALL AND THE UNDERSIDE OF THE ROOF AND BETWEEN THE RAFTERS AT THE LINE OF WALL.
c: ROOF VENTILATION OPENINGS, SUCH AS GABLE AND ROOF VENTS, ARE TO BE FITTED WITH EMBER GUARDS MADE OF NON–COMBUSTIBLE MATERIAL OR A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION–RESISTANT, BRONZE OR ALUMINIUM.

WATER STORAGE

ABOVE GROUND WATER TANK CONSTRUCTED OF CONCRETE OR METAL. MUST BE READILY IDENTIFIABLE FROM THE BUILDING OR APPROPRIATE IDENTIFICATION SIGNAGE TO THE SATISFACTION OF THE CFA MUST BE PROVIDED

ALL FIXED ABOVE-GROUND WATER PIPES AND FITTINGS REQUIRED FOR FIREFIGHTING PURPOSES SHALL BE CORROSION RESISTANT METAL.

THE OUTLET OF THE WATER TANK SHALL BE LOCATED ADJOINING THE EXISTING ACCESS AND BE UNOBSTRUCTED

DEFENDABLE SPACE

GRASS MUST BE SHORT CROPPED AND MAINTAINED DURING THE DECLARED FIRE DANGER PERIOD

ALL LEAVES AND VEGETATION DEBRIS MUST BE REMOVED AT REGULAR INTERVALS DURING THE DECLARED FIRE DANGER PERIOD

WITHIN 10 METRES OF A BUILDING, FLAMMABLE OBJECTS MUST NOT BE LOCATED CLOSE TO THE VULNERABLE PARTS OF THE BUILDING

PLANTS GREATER THAN 10 CENTIMETRES IN HEIGHT MUST NOT BE PLACED WITHIN 3 METRES OF A WINDOW OR GLASS FEATURE OF THE BUILDING

SHRUBS MUST NOT BE LOCATED UNDER THE CANOPY OF TREES

INDIVIDUAL AND CLUMPS OF SHRUBS MUST NOT EXCEED 5 SQUARE METRES IN AREA AND MUST BE SEPARATED BY AT LEAST 5 METRES

TREES MUST NOT OVERHANG OR TOUCH ANY ELEMENTS OF THE BUILDING

TREE CANOPIES MUST BE SEPARATED BY AT LEAST 5 METRES EXCEPT FOR TREES 14 AND 15 IN THE NORTH WESTERN CORNER OF THE SITE WHICH MAY BE RETAINED WITH 2 METRES CANOPY SEPARATION, TREE BRANCHES MUST BE A MINIMUM OF 2 METRES ABOVE GROUND LEVEL.

TOWN PLANNING ISSUE

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BUILDING DESIGN
TOWN PLANNING
DOCUMENTATION

PROPOSED DWELLING
58 BRUCE ROAD, SILVERLEAVES

SCALE 1:300@A2
DATE: AUG 2020
PROJECT 19.024

PROPOSED WORKS
BUSHFIRE NOTES

TP11c

Treed environs

BUSHFIRE MANAGEMENT ASSESSMENT

58 BRUCE ROAD
SILVERLEAVES

NEW DWELLING

Prepared on behalf of

LISE & CAL LAHTEENMAA

August 2019

Summary of Conclusions

The permit application is for an extension to an existing dwelling within an existing settlement.

The application has been assessed under pathway 1 or Clause 53.02-3 of the planning scheme.

Development at BAL 29 with appropriate onsite defendable space is proposed.

Static water supply and access (to water supply or outlet) will meet planning scheme requirements.

Version	Date	Details
0	1st August 2019	Date of assessment
1	15 August 2019	Client version
2	20 August 2019	Planning version
3		
4		

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Information to clients:

This bushfire management assessment and the included bushfire management statement have been prepared to inform the planning permit application for the subject property. The information contained in this report is dependent on:

- Site and adjoining conditions on the date of assessment. Changes to site or adjoining management may affect the assessed construction level or BAL rating.
- Development plans prepared by others. Changes to development plans including location may affect the development requirements.
- Vegetation on or adjoining the site has been assessed in accordance with section 2 of AS 3959 – 2009 (including amendments 1, 2 & 3) with clarification as required by reference to Country Fire Authority Land Use Planning FSG LUP 0003 Assessing vegetation in a Bushfire Management Overlay
- Construction level has been determined on the basis of the vegetation assessment and slope under the assessed vegetation having regard to Table 2 and Table 3 of clause 53.02 of the planning scheme. As the site is within a Bushfire Management Overlay the construction level cannot be determined under AS 3959 and a separate BAL assessment will not be required for the issue of a building permit.

Please Note: The construction standard of buildings and the management of the surrounding area as discussed in this document do not guarantee survival of the buildings or the occupants. You are strongly encouraged to develop and practice a bushfire survival plan. Information and assistance including a template for a Bushfire Survival Plan is provided as part of the 'Fire Ready Kit' available through the CFA website at https://www.cfa.vic.gov.au/plan-prepare/fire-ready-kit or through your local CFA office.

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1 Introduction and BMO requirements

The subject property is covered by a Bushfire Management Overlay (BMO) under the Planning Scheme and a permit is required under this overlay for certain developments or subdivision of the land. The site zone and overlay provisions and property details are shown in section 2.

The purpose of this report is to enable informed decisions to be made concerning bushfire implications regarding the proposed development of the site having regard to The BMO (Clause 44.06) and Bushfire Planning (Clause 53.02) of the planning scheme.

Bushfire Planning sets out a number of Objectives and Approved or Alternate measures that will meet the objectives. An application will need to meet various objectives depending on the pathway set out below.

1.1 Application Pathways

An application under the BMO must be assessed under Clause 53.02-1 unless the application meets all of the requirements specified in an applicable schedule to that clause.

Clause 53.02-1 Application sets out two pathways for meeting objectives.

1.1.1 Pathway One (Clause 53.02-3)

This pathway applies to development of a single dwelling on an existing lot zoned Neighbourhood Residential Zone, General Residential Zone, Residential Growth Zone, Urban Growth Zone, Low Density Residential Zone, Township Zone or Rural Living Zone. Clause 53.02-3 Dwellings in existing settlements applies. Alternate measures cannot be included in the application.

1.1.2 Pathway Two (Clause 53.02-4)

This pathway applies to all other building and works applications including applications that do not meet all the approved measures under clause 53.02-3. This pathway has two alternatives. For development an application must meet objectives of clauses 53.02-4.1 to 4.3 both inclusive. A subdivision application must meet the objectives of Clause 53.02-4.4. This clause cross references to other provisions in clause 53.02-4.

Development must meet all the relevant objectives. An objective can be met by meeting the approved measures or, if appropriate, through alternative measures including Unspecified Alternative Measurers.

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1.2 Application requirements

Application requirements vary depending on the pathway of an individual application. A Bushfire hazard site assessment and a Bushfire management statement are required for a Pathway One application. A Bushfire hazard site assessment, a Bushfire hazard Landscape assessment and a Bushfire management statement are required for a Pathway Two application.

1.2.1 Bushfire hazard site assessment

The Bushfire hazard site assessment provides information on the vegetation type and slope of land under the vegetation. Vegetation is classified in accordance with AS 3959:2009 Construction of buildings in bushfire prone areas. CFA Fire Services Guideline Land Use Planning FSG LUP 0003 Assessing vegetation in a Bushfire Management Overlay provides additional guidance on classifying vegetation. Assessment is required within 150 m of development. Slope under classified vegetation is recorded in 5 degree ranges.

1.2.2 Bushfire hazard landscape assessment

The Bushfire hazard Landscape assessment provides information on bushfire hazards in the surrounding landscape. Landscape assessment characterises the landscape into one of 4 broader bushfire landscape categories.

1.2.3 Bushfire management statement

The Bushfire management statement shows how the proposed development has responded to the bushfire hazard site and landscape assessment (if required) and documents how approved measures and justifies any alternate measures that have been applied in the proposed development and shows how the proposed development responds to the decision guidelines.

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2 Property description and planning controls

2.1 Property location and details

Address	58 Bruce Road Silverleaves
Directory	Melways 734 K2
Description	Lot 241 LP63263
Municipality	Bass Coast Shire Council
Lot area	729 m2

2.2 Planning controls

From planning property report DELWP (2018)

Planning Scheme	Bass Coast Planning Scheme
Zone	Township Zone
Overlays and other controls	Bushfire Management Overlay (No schedule) Vegetation Protection Overlay Schedule 2

2.3 Bushfire Assessment

Proposed development	New dwelling.
Asessment pathway	Pathway 1
Assessment by	Jeff Latter
Assessment date	August 2019

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3 Bushfire Hazard Site assessment

A bushfire hazard site assessment documents the bushfire hazard on or within 150 metres of a development site by assessing and categorising vegetation types and slopes under classified vegetation in accordance with AS 3959-2009 Construction of buildings in bushfire prone areas (Standards Australia 2009).

3.1 Classified vegetation

Vegetation on and within 150 metres of the site has been was classified in accordance with AS 3959-2009. The classified areas of vegetation are shown on Map 1 and described in the following table. Section 7 provides photographic records.

3.2 Slope

The slope under the classified vegetation is relative to the development site.

3.3 Bushfire Hazard Site Assessment Table

The following Table shows the vegetation and slope surrounding the proposed development.

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Direction	NORTH	EAST	SOUTH	WEST
Classified Vegetation within the 150 m assessment area	Low Threat ✓	Low Threat ✓	Low Threat ☐	Low Threat ✓
	Modified ✓	Modified ✓	Modified ☐	Modified ✓
	Forest ☐	Forest ☐	Forest ☐	Forest ☐
	Woodland ✓	Woodland ✓	Woodland ☐	Woodland ☐
	Scrub (tall) ☐	Scrub (tall) ☐	Scrub (tall) ✓	Scrub (tall) ☐
	Shrubland (short)☐	Shrubland (short)☐	Shrubland (short)✓	Shrubland (short)☐
	Mallee ☐	Mallee ☐	Mallee ☐	Mallee ☐
	Rainforest ☐	Rainforest ☐	Rainforest ☐	Rainforest ☐
	Grassland ☐	Grassland ☐	Grassland ☐	Grassland ☐
Slope under classified vegetation (DS = Down Slope)	Upslope / Flat ✓	Upslope / Flat ✓	Upslope / Flat ✓	Upslope / Flat ✓
	0 to 5° DS ☐	0 to 5° DS ☐	0 to 5° DS ☐	0 to 5° DS ☐
	5 to 10° DS ☐	5 to 10° DS ☐	5 to 10° DS ☐	5 to 10° DS ✓
	10 to 15° DS ☐	10 to 15° DS ☐	10 to 15° DS ☐	10 to 15° DS ☐
	15 to 20° DS ☐	15 to 20° DS ☐	15 to 20° DS ☐	15 to 20° DS ☐
	>20° DS ☐	>20° DS ☐	>20° DS ☐	>20° DS ☐
Distance (m) to Classifiable Vegetation	Adjoining Low then Woodland adjoining coast	Adjoining Modified then Woodland	9.5 metres to small area of Scrub then Shrubland out to mangroves	Adjoining Modified

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4 Bushfire Management Statement

The permit application is for an extension to an existing dwelling. The proposed development has been assessed as Pathway One as discussed on page 6. This bushfire management statement shows how the development responds to the bushfire hazard site assessment and applies the objectives and approved measures in Clause 53.02 – 1.1 to 1.3.

4.1 Approved measure AM 1.1

A building is sited to ensure the site best achieves the following:

- *The maximum separation distance between the building and the bushfire hazard.*
- *The building is in close proximity to a public road.*
- *Access can be provided to the building for emergency service vehicles.*

The proposed new dwelling is approximately 17 metres into the property from Bruce Road. The extension is towards the bushfire hazard but is reasonable due the need for a garage/workshop and access at the front of the property. Access is available to emergency services direct from Bruce Road.

4.2 Approved measure AM 1.2

A building provides the defendable space in accordance with Table 1 Columns A, B, C, D or E and Table 6 to Clause 53.02-5. Adjoining land may be included as defendable space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defendable space.

- *A building is constructed to the bushfire attack level:*
- *That corresponds to the defendable space provided in accordance with Table 1 to Clause 53.02-5, or The next lower bushfire attack level that corresponds to the defendable space provided in accordance with Table 1 to Clause 53.02-5 where all of the following apply:*
  A private bushfire shelter (a Class 10c building within the meaning of the Building Regulations 2006) is constructed on the same land as the dwelling.
  A minimum bushfire attack level of BAL12.5 is provided in all circumstances.

The proposed dwelling will extend to approximately 5.1 metres from the rear boundary providing in excess of 9 metres setback from the adjoining vegetation. The construction of the dwelling will require the removal of Scrub on the site and link to the existing fire break. The predominate adjoining vegetation is Shrubland extending out to mangroves. There are two narrow fingers of scrub on the edge of the sand ridge at the rear of the property. The scrub areas are small and narrow and will not significantly increase the fire risk. The adjoining vegetation has been assessed as shrubland and defendable space on this basis has been provided. The firebreak along the rear of the property has been present for a long period of time. Defendable space for development at BAL 29 is available on the subject site and on the existing firebreak. There is reasonable belief that the firebreak will continue to be maintained to the seasonal condition during the Fire Danger Period and hence defendable space to the site boundary is appropriate.

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4.3 Approved measure AM 1.3

A building is provided with:

- *A static water supply for fire fighting and property protection purposes specified in Table 4 to Clause 53.02-5. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for fire fighting water supplies.*
- *Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5.*

A static water supply of 5,000 litres will be provided with an outlet for the resident. The rear of the dwelling is less than 120 metres from the fire hydrant located outside 45 (to the west) and 57 (to the east) Bruce Road.

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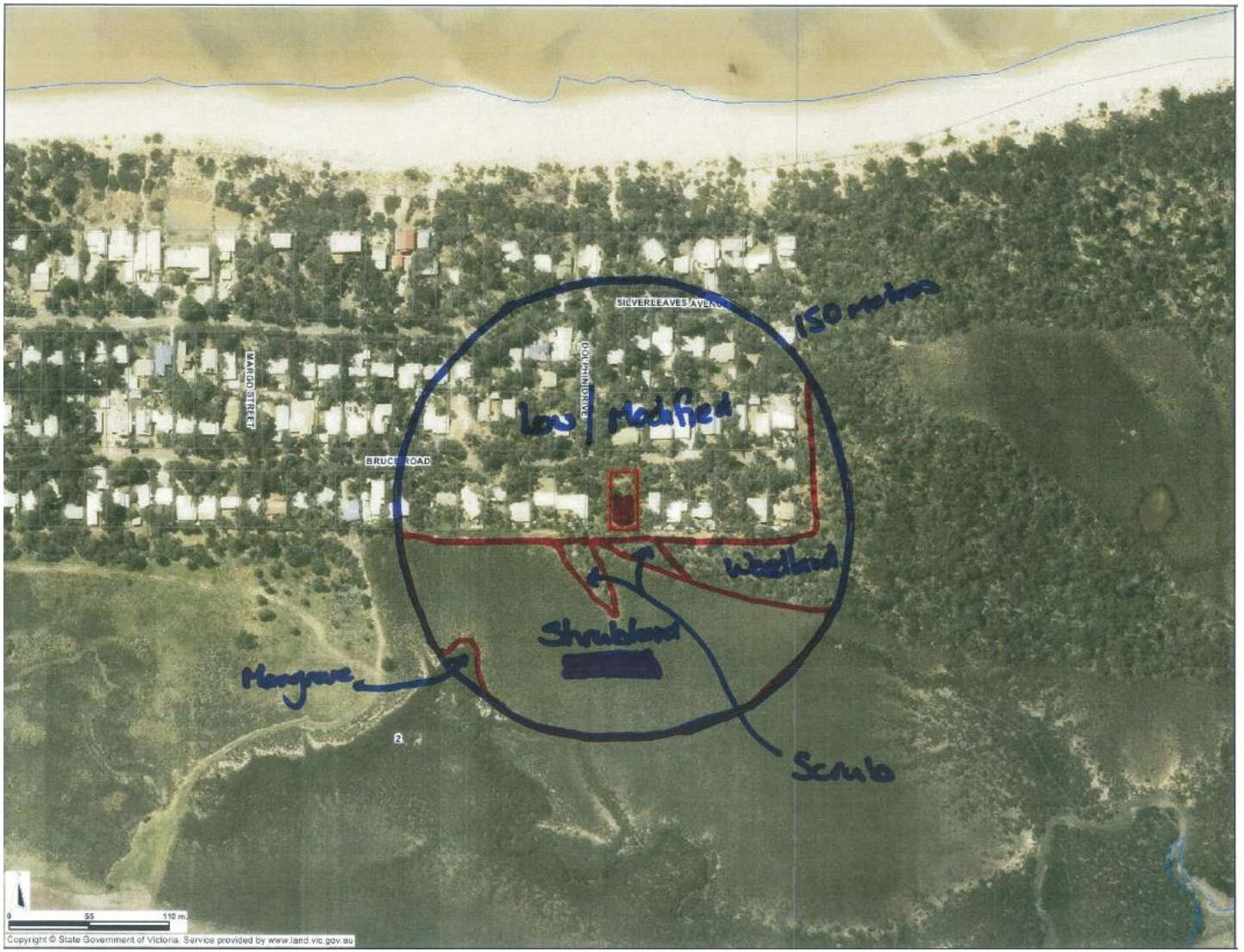
5 Site Plans



Map 1: Vegetation Classification Plan with aerial photograph

Red circle is 150 metres from the dwelling.
Vegetation classification LOW - Low Risk, MOD – Modified, Woodland, Scrub and Shrubland

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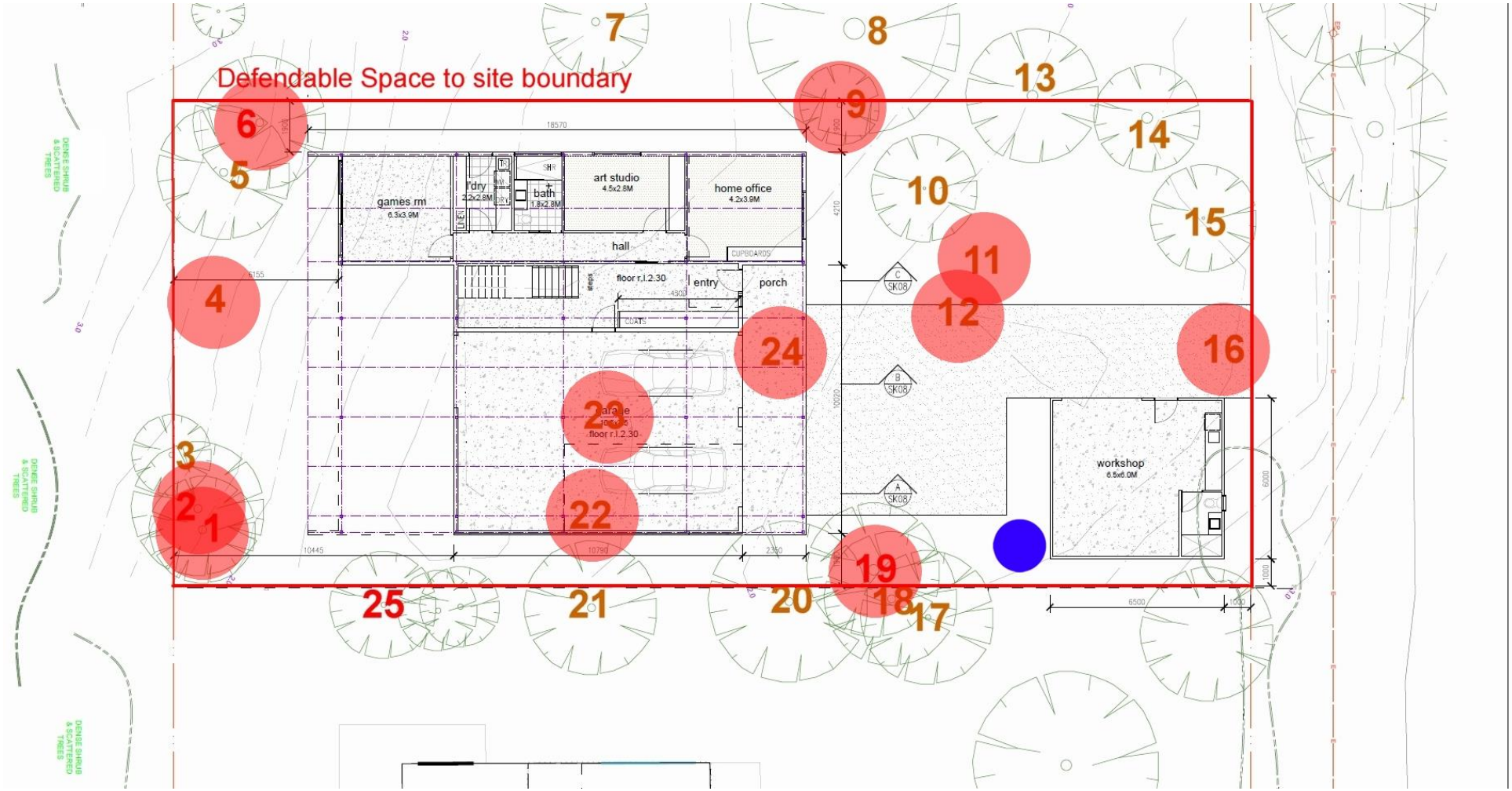

Map 2: Bushfire Management Plan 24072018

Red line is defendable space to property boundary
Blue circle is water storage of 5,000 litres with an outlet for the resident
Construction standard is BAL 29

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Schedule to Map 2 Bushfire Management Plan

Construction standard

The dwelling shall be constructed in the location shown and to the Construction Standard of BAL 29.

Defendable space

The defendable space comprising the whole of the land in the site must be managed in accordance with the following requirements during the fire danger period:

- *Grass must be short cropped and maintained during the declared fire danger period.*
- *All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.*
- *Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.*
- *Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.*
- *Shrubs must not be located under the canopy of trees.*
- *Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres.*
- *Trees must not overhang or touch any elements of the building.*
- *Tree canopies must be separated by at least of 5 metres except for Trees 14 and 15 in the north western corner of the site which may be retained with 2 metres canopy separation, Tree branches must be a minimum of 2 metres above ground level.*

Water storage

The water supply shown on this plan must be in accordance with the following requirements:

- *Store a minimum of 5,000 litres of water dedicated for firefighting purposes.*
- *Be constructed above ground of concrete or metal.*
- *Be readily identifiable from the building or appropriate identification signage to the satisfaction of CFA must be provided.*
- *All fixed above-ground water pipes and fittings required for firefighting purposes shall be corrosion resistant metal.*
- *The outlet of the water tank shall be located adjoining the existing access and be unobstructed.*

Access

Access for firefighting shown on this plan shall be to the following requirements:
NO access requirements are proposed.

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6 References

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CFA (2014) Fire Services Guideline Land Use Planning FSG LUP 006 Tank Connections Explained, Bushfire Management Overlay. Viewed online https://www.cfa.vic.gov.au/documents/20143/69511/FSG006-LUP-BMO-Water-Tank-Connections-Outlet-Pipe-Work-aug14.pdf/60cd506d-c469-eff6-1921-25b0544e2460

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DELWP (2018) Clause 44.06 Bushfire Management Overlay. Viewed online http://planningschemes.dpcd.vic.gov.au/schemes/vpps/44_06.pdf

DELWP (2018) Clause 53.02 Bushfire Planning. Viewed online http://planningschemes.dpcd.vic.gov.au/schemes/vpps/53_02.pdf

DELWP (2018) Planning property report. Viewed online http://services.land.vic.gov.au/maps/pmo.jsp

Standards Australia (2009) AS 3959‑2009 Construction of buildings in bushfire-prone areas, Standards Australia, North Sydney, New South Wales.

CFA	Country Fire Authority
DELWP	Department of Environment Land Water and Planning
DPCD	Department of Planning and Community Development

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7 Photographic record













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WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

58 Bruce Road, Silverleaves Coastal Hazard Vulnerability Assessment

LRW Design

11 February 2020



Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
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11 February 2020

Lee Rattray-Wood
Director
LRW Design
239 Lower Plenty Rd, Rosanna
Via email lee@lrwdesign.com.au

Dear Lee

58 Bruce Road, Silverleaves

Please find our CHVA report for 58 Bruce Rd, Silverleaves attached. The latest ground floor plans have been assessed (provided to Water Technology on the 11th of February 2020).

Yours sincerely,

Michael Miloshis
Project Scientist

Michael.Miloshis@watertech.com.au

WATER TECHNOLOGY PTY LTD

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GLOSSARY AND DEFINITIONS

TABLE 1-1 GLOSSARY

AHD	Australian Height Datum. 0 m AHD approximately corresponds to mean sea level.
AEP	Annual Exceedance Probability: The measure of the likelihood (expressed as a probability) of an event equalling or exceeding a given magnitude in any given year.
ARI	Average Recurrence Interval: The average or expected value of the periods between exceedances of a given event magnitude.
Astronomical tide	Water level variations due to the combined effects of the Earth's rotation, the Moon's orbit around the Earth and the Earth's orbit around the Sun.
Exceedance probability	The probability of an extreme event occurring at least once during a prescribed period of assessment is given by the exceedance probability. The probability of a 1 in 100-year event (1% AEP) occurring during the first 25 years is 22%, during the first 50 years the probability is 39% and over a 100-year asset life the probability is 63%.
HAT	Highest Astronomical Tide: the highest water level that can occur due to the effects of the astronomical tide in isolation from meteorological effects.
MHHW	Mean Higher High Water: the mean of the higher of the two daily high waters over a long period of time. When only one high water occurs on a day this is taken as the higher high water.
MHWS	Mean High Water Springs: the height of MHWS is the average, throughout a year when the average maximum declination of the moon is 23.5°, of the heights of two successive high waters during those periods of 24 hours when the range of the tide is greatest. Used when semi-diurnal tides are present.
MSL	Mean Sea Level: the long-term average level of the sea surface.
Significant wave height	The average of the highest one third of all waves.
Storm surge	The meteorological component of the coastal water level variations associated with atmospheric pressure fluctuations and wind setup.
Storm tide	Coastal water level produced by the combination of astronomical and meteorological (storm surge) ocean water level forcing.
Tuffs	Soft and porous rock formation formed by the compaction of volcanic ash.

1 INTRODUCTION

Water Technology was engaged by Lee Rattray-Wood (LRW) Design to undertake a Coastal Hazard Vulnerability Assessment (CHVA) to define the extent of existing coastal hazards and potential future coastal hazards associated with climate change and sea level rise at the site of the proposed redevelopment at 58 Bruce Road, Silverleaves. Specifically, the assessment will address risks associated with the land subject to inundation overlay.

The assessment has been undertaken in accordance with the following advisory documentation and information:

- *The Victorian Coastal Strategy (VCC, 2014)*
- *DELWP (2018) Marine and Coastal Act.*
- *Derivation of Revised Victorian Sea-Level Planning Allowances Using the Projections of the Fifth Assessment Report of the IPCC (Hunter, 2014)*
- *The Effect of Climate Change on Extreme Sea Levels along Victoria's Coast (CSIRO, 2009)*
- *How to Consider Sea level Rise along the Victorian Coast (DSE, 2008)*
- *The Victorian Coastal Hazards Guide (DSE, 2012)*
- *Planning Practice Note 53: Managing Coastal hazards and the Coastal Impacts of Climate Change (*DELWP*, 2015)*
- *Guidelines for Coastal Management Authorities: Assessing Development in Relation to Sea Level Rise (DSE, 2012)*
- *Planning for Sea Level Rise: Guidelines, Port Phillip and Westernport Region (Melbourne Water, 2017)*
- *State Planning Policy Framework, Amendment VC148 Clause 13.01*

1.1 Site Details

The location of the proposed property development of 58 Bruce Road Silverleaves, is shown in Figure 1-1. The property is approximately 250 m from the Western Port shoreline to the north, and 250 m from Rhyll estuary channel to the south, shown in Figure 1-2 LiDAR survey of the subject site indicates that the land slopes down from the south to the north, then rises back up, forming a slight depression within the middle of the site. Surface elevations vary between 3.25 and 1.75 m AHD, as indicated in Figure 1-1.

The plan depicting the development is shown in Figure 1-3, which comprises a proposed dwelling and workshop (outbuilding). According to the plan, the ground floor of the dwelling is proposed as a non-habitable area.

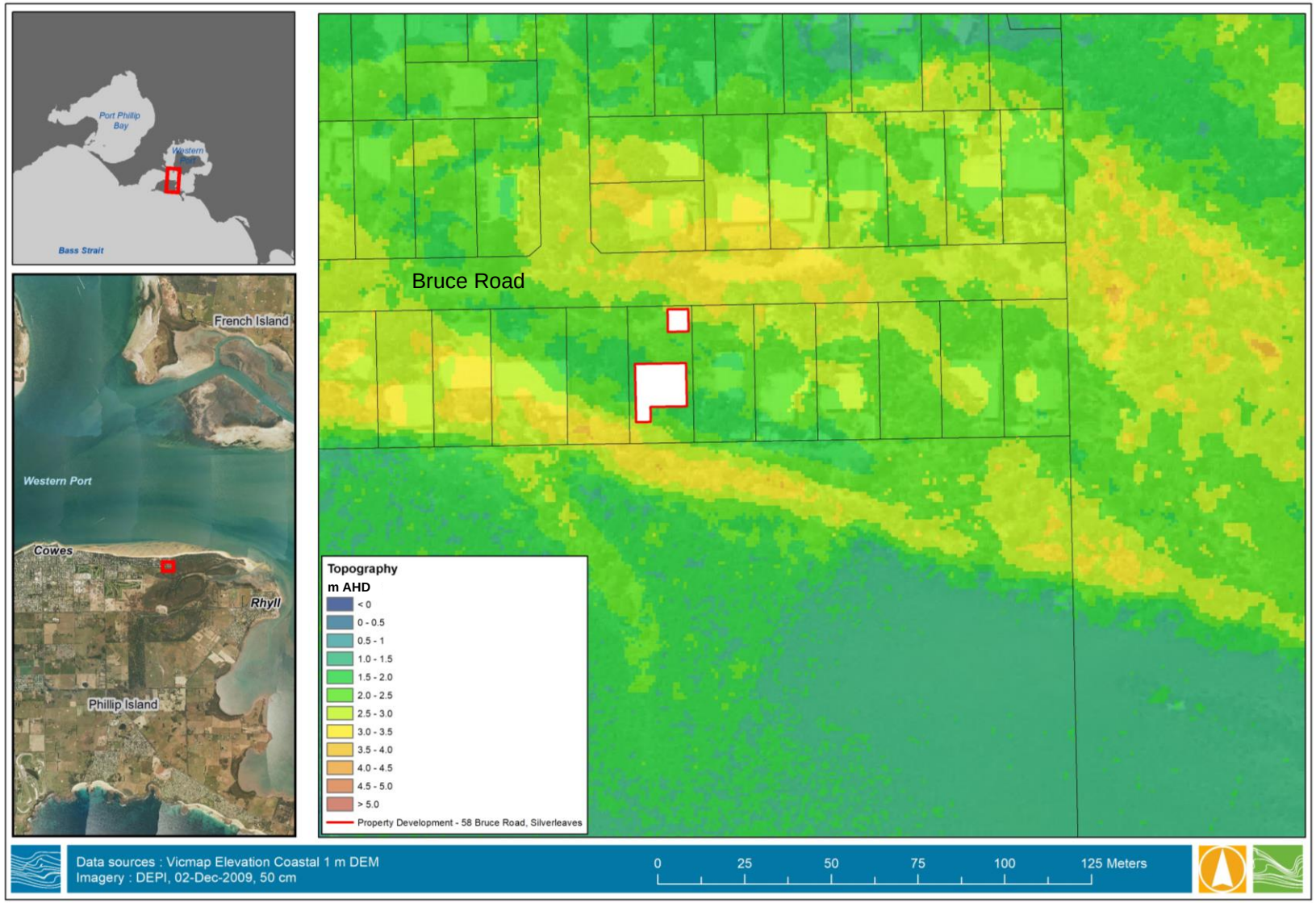

FIGURE 1-1 SITE LOCALITY PLAN

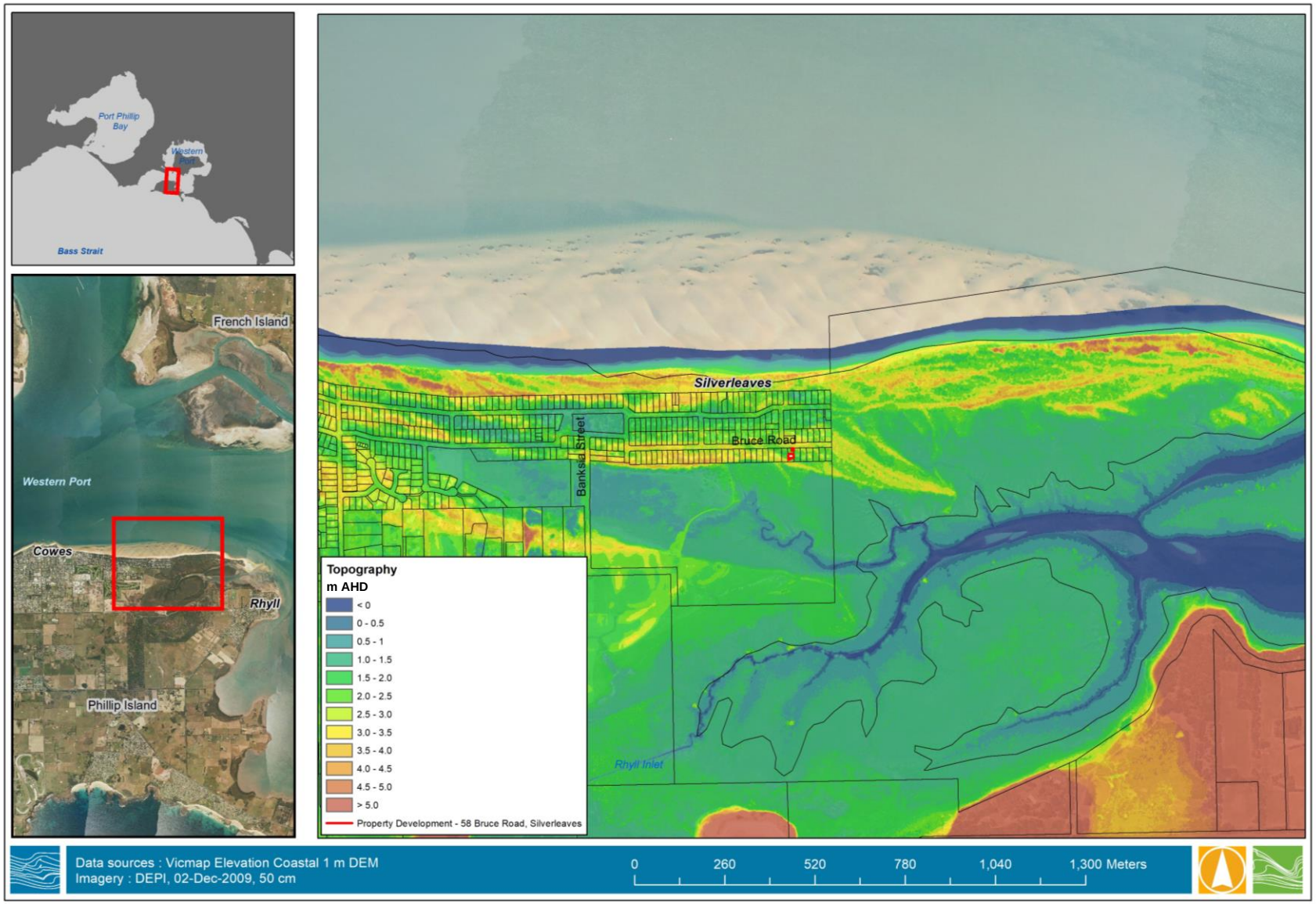

FIGURE 1-2 TOPOGRAPHIC MAP OF SURROUNDING AREAS

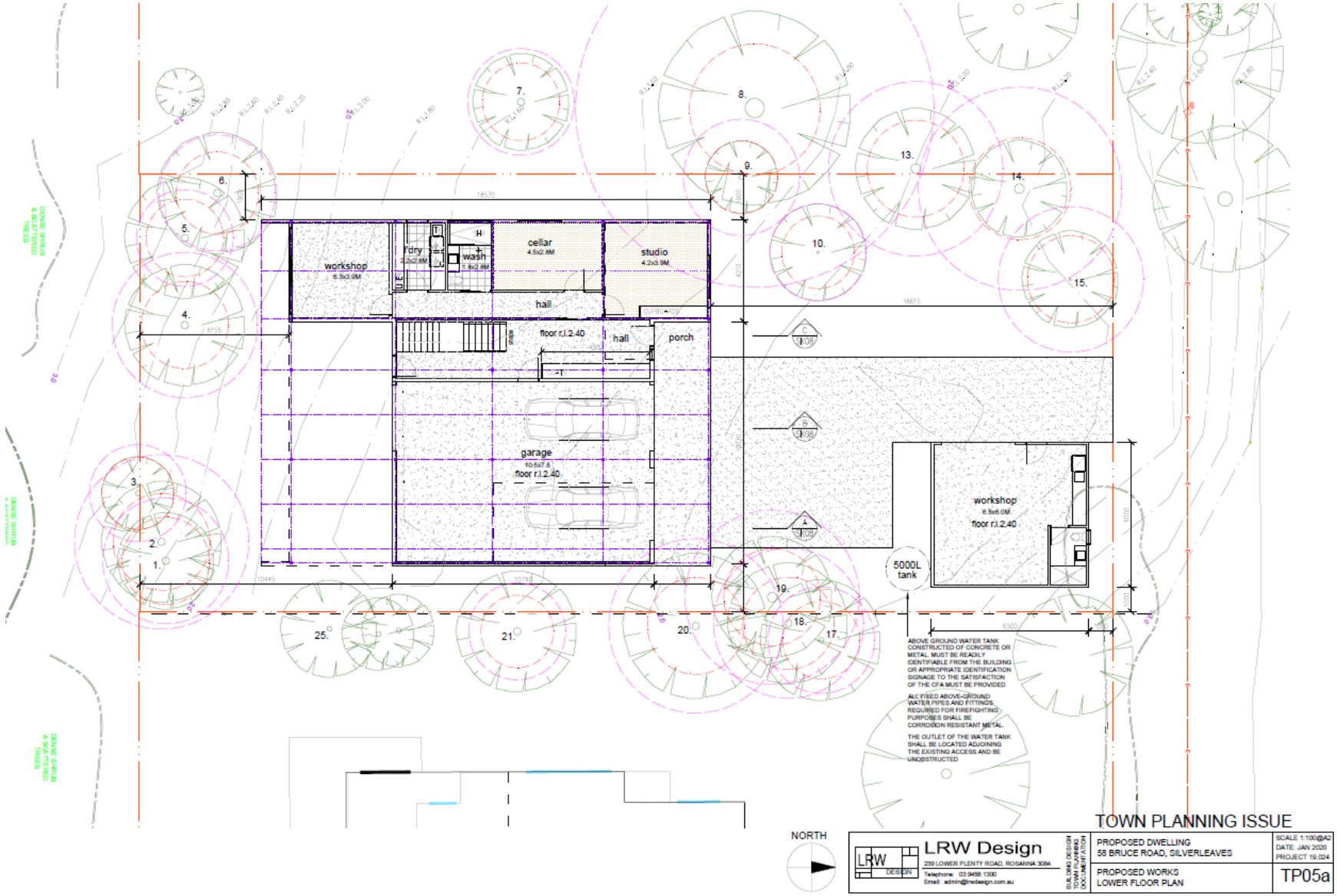

FIGURE 1-3 PROPOSED WORKS – LOWER FLOOR PLAN. MAIN DWELLING FINISHED FLOOR LEVEL OF 2.5 M.

2 GEOMORPHOLOGY AND COASTAL PROCESSES

To provide context to the coastal hazard vulnerability assessment, and inform the risks posed by sea level rise to the property, the underlying coastal processes and geography at the site have been reviewed.

2.1 Geological Formation

Four main phases are recognised in the development of Western Port during the Quaternary period (the most recent geological era) (Marsden and Mallet, 1975).

- Port Phillip and Western Port sunklands were initiated by downfaulting in the Quaternary. Western Port sunkland is bounded by pronounced fault scarps of the South Gippsland Highlands and Mornington Peninsula. Within the Western Port sunkland, minor faulting forms the uplifted blocks of present-day Phillip Island and French Island.
- Extensive fluvial and lacustrine deposition took place within the Western Port sunkland during high sea level phases associated with interglacial periods in the Pleistocene.
- During the last glacial phase and sea level fall, Western Port emerged and the streams draining the sunkland incised deep valleys within Western Port before extending out onto the emerged plain of Bass Strait.
- Approximately 18,000 years ago, the last glacial phase came to an end and sea levels rose rapidly during the early Holocene. Western Port was submerged starting approximately 10,000 years ago. Local sea levels reached their maximum approximately 1.5m higher than present in the mid-Holocene around 7,000 years ago. The eastern entrance to Western Port at San Remo is presumed to have opened during this phase. A possible combination of climate change and hydro-isostasy resulted in a local sea level fall to approximately present-day sea level 3,000 years ago.

The mid-Holocene coastline was generally sandy with low dues and bluffs located behind the present-day mangrove fringed, salt marsh terrace shorelines. These shorelines are very vulnerable to any disturbances/changes to the vegetation that stabilises them. Where mangrove fringes have been disturbed historically in Westernport Bay, the salt marsh terrace has become exposed to wave action and erosion has rapidly taken place.

2.2 Cowes Embayment and Rhyll Inlet

Approximately 7,000 years ago local sea levels most probably reached a maximum of around 1.5 m higher than present. During this time, the area between Cowes and Rhyll formed as an open embayment backed by sections of wave steepened cliffed coastline where the initial mid-Holocene shoreline intersected the outcroppings of Older Volcanics basalt. The likely configuration of this mid-Holocene shoreline can be interpreted from close examination of LiDAR survey as illustrated in Figure 2-1.

Sand from the sea floor has been transported through the western entrance of Western Port during and since the Holocene marine transgression helping to form the sandy beaches of Phillip Islands northern shorelines (Bird, 1993). Rapid sediment supply coupled with the fall in sea levels most likely initiated the development of a succession of easterly prograding sand spits extending from the Older Volcanics basalt headland at Erehwon Point. A corresponding succession of tidal inlets developed behind these spits and marine influence was gradually reduced within the embayment. The earliest spit (Spit 1), trends more south-easterly than the subsequent spits, and is approximately 3 km long. A series of small, parallel ridges emanate from the inside edge of the spit oriented in a south-south easterly direction. It is speculated that these ridges are remnants of sand bar features caused by wave action across a sub-tidal sand sheet similar to that which exists on the present-day Cowes Bank (Marsden and Mallet, 1975).

Present day Rhyll inlet is a tidal inlet largely enclosed by the eastwardly prograding sand spit which terminates as a complex of recurves at Observation Point. The earlier Cowes Embayment has been extensively filled by both marine and alluvial deposition and the open waterway area within present day Rhyll Inlet is limited to a small number of tidal channels. The shoreline of Rhyll Inlet is colonised by extensive stands of mangroves and associated saltmarsh fringe. Rhyll Inlet is backed to the south by bluffs which sweep out to successive partly cliffed promontories of weathered basalt and tuffs.

2.3 Contemporary Coastal Processes

Significant changes to the contemporary spit landform and shoreline position have been identified previously by Bird (1987). Two major areas of rapid change evident from aerial photographs taken in 1947 and 2013 were:

- The infilling of a small embayment at Silverleaves that cut through Spit 3 and into Spit 2, which has subsequently been filled with sand and now supports residential development.
- An easterly extension of the spit at Observation Point, with dense mature vegetation now present.

Further comparisons of historic photographs of the area undertaken by Water Technology (2013) have revealed the significance of backshore sand lobes with decadal scale variability. It is considered that numerous sediment sources and transport processes possibly combine to cause the high degree of observed shoreline variability over timescales ranging from 5 to 50+ years.

The likely configuration of this mid-Holocene shoreline can be interpreted from close examination of LiDAR survey as illustrated in Figure 2-1. The proposed residential dwelling is located towards the end of Spit 2.

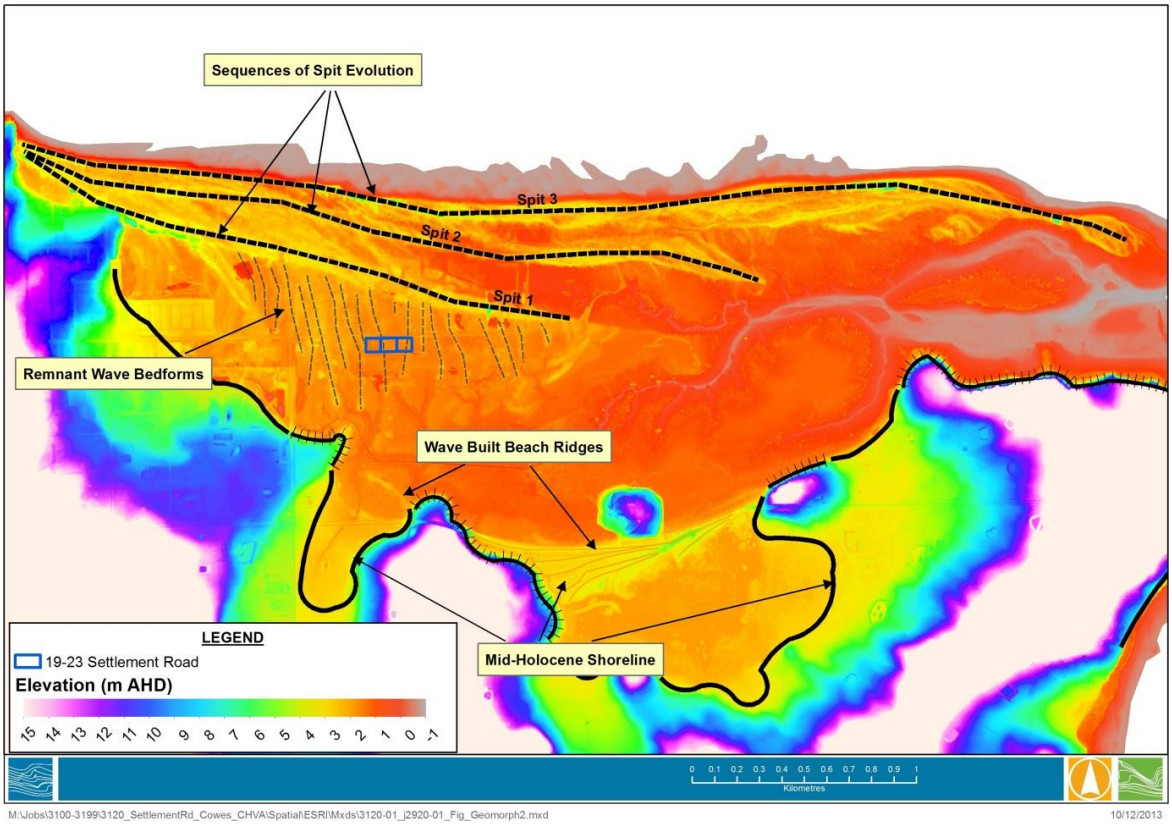

FIGURE 2-1 GEOMORPHIC CONTEXT OF STUDY AREA

3 REGIONAL EXPOSURE ASSESSMENT

The following assessment identifies the magnitude and frequency of the main oceanographic processes impacting the site under existing conditions and with 2040, 2070, and 2100 climate change predictions applied.

3.1 Mean Sea Level

Table 3-1 provides a summary of relevant global mean sea level rise scenarios for planning. Estimates of sea level rise by Hunter (2014), incorporating the IPCC 2014 A1F1 climate change scenario, predict an increase in the mean sea level of 0.8 m by 2100. This scenario is considered to meet the minimum sea level rise scenario for planning as per the Victorian Coastal Strategy (VCC, 2014).

Practice Note 53 from the Department of Planning and Community Development (DPCD, 2012) also notes the following amendment to the State Planning Policy Framework:

"*In planning for possible sea level rise, an increase of 0.2 metres over current 1 in 100-year flood levels by 2040 may be used for new development in close proximity to existing development (urban infill)*".

3.2 Astronomical Tides

Astronomical tide refers to the rise and fall of the sea surface due to gravitational attraction between Earth, Moon and Sun. Water level variations in coastal areas due to the astronomical tide can be reliably predicted provided a reasonable length of continuous water level observations is available.

Tidal plane information from Stony Point (Western Port 60710) was adopted for this study, as it is the closest gauge listed in the Australian National Tide Tables (Australian Hydrographic Office, 2019). Stony Point is considered to provide a reasonable approximation of tidal planes at Rhyll Inlet. The Mean High Water Springs (MHWS) with the applied sea level rise scenarios for 2040, 2070 and 2100 which have been derived from Hunter (2014) are shown below in Table 3-1. The predicted MHWS extents are illustrated in Figure 3-1. The property lies above the existing, 2040, 2070 and 2100 predicted MHWS level.

This indicates that the site is not directly impacted by the existing nor projected MHWS based on water levels, with approximately 20 m distance between the property boundary to the 2100 MHWS inundation to the south.

TABLE 3-1 ESTIMATE OF MEAN HIGH WATER SPRINGS WITH SEA LEVEL RISE SCENARIOS (VCC, 2014 & HUNTER, 2014) (ANTT, 2019)

m AHD	Existing	2040	2070	2100
Global Mean Sea Level Rise (m)	-	0.20	0.47	0.82
Mean High Water Springs (MHWS)	1.2	1.4	1.7	2.0

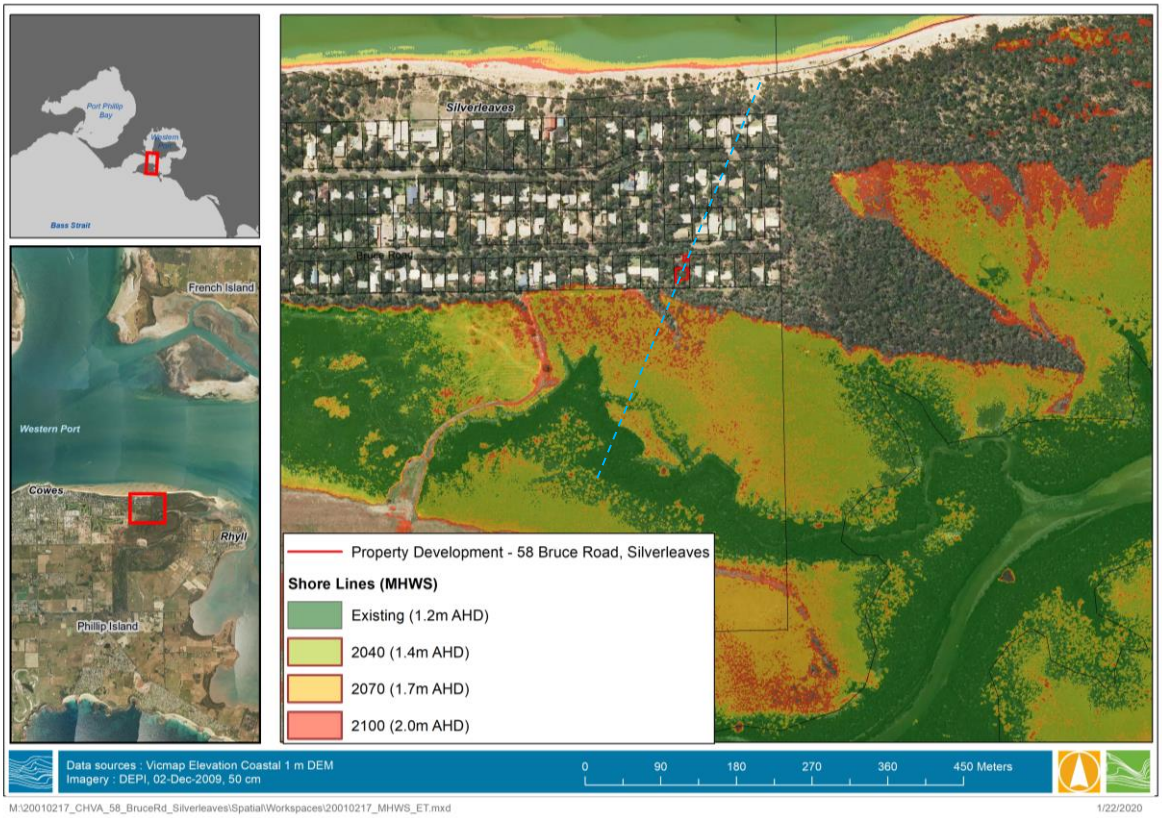

FIGURE 3-1 PREDICTED MHWS EXTENT AT THE SITE FOR SEA LEVEL RISE IN 2040, 2070, AND 2100 (USING THE 2020 DEM). CROSS-SECTION USED IN FIGURE 3.3 IS DRAWN IN LIGHT BLUE

3.3 Storm Tides

The term storm tide refers to coastal water levels produced by the combination of astronomical and meteorological sea level forcing. The meteorological component of the storm tide is commonly referred to as storm surge and collectively describes the variation in coastal water levels in response to atmospheric pressure fluctuations and wind setup.

Melbourne Water refers to 100-year flood levels (1% Annual Exceedance Probability - AEP), which are required for planning in the Port Phillip and Western Port regions (Melbourne Water, 2017). These flood levels are based on the Intergovernmental Panel on Climate Change (IPCC) Scenario 2, with consideration for the uncertainty associated with sea level rise predictions (Melbourne Water, 2017), and some small allowance for wave action.

The existing and predicted 1% AEP flood levels provided by Melbourne Water are shown in Table 3-2 and are illustrated in Figure 3-2 below. The 2070 projection has been interpolated by adding the predicted sea level rise of 0.47 m to the existing storm tide level.

A cross-sectional profile of the 1% AEP storm tide level is shown in Figure 3-3. This shows that the MHWS line is located at approximately 250 m away from the development. The proposed building footprint is above the existing MHWS level (1.2 m AHD) but lies below existing and future 1% AEP storm tide levels. The site is not hydraulically connected the estuary due to land, vegetation, and property boundaries between the site and Rhyll Estuary. Therefore, inundation of the area is not accurately represented by the elevation map alone. Water Technology conducted advanced 2d modelling of Western Port. This model has considered bed friction affecting the flow momentum over vegetated areas and is a better representation of inundation due to storm tides (Water Technology, 2013).

TABLE 3-2 1% AEP STORM TIDE LEVELS INCORPORATING MEAN SEA LEVEL RISE SCENARIOS

	Existing	2040	2070	2100
Silverleaves 1% AEP Storm Tide (m AHD)	2.1 *(1.9*)*	2.3 *(2.1*)*	2.6 *(2.4*)*	2.9 *(2.7*)*

** Excluding Melbourne Water's allowance for wave setup since site is located within sheltered estuary (see Section 3.4)*

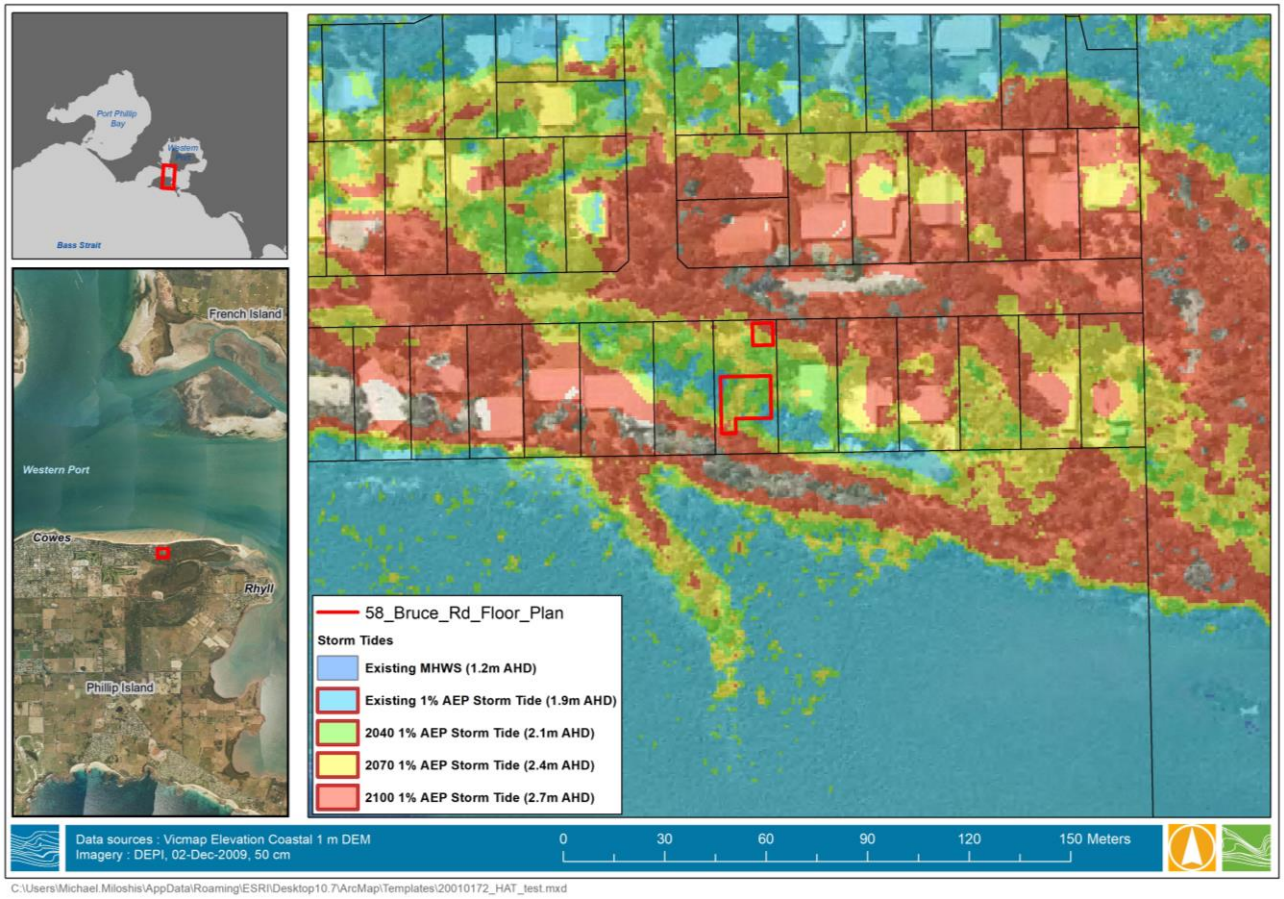

FIGURE 3-2 1% AEP STORM TIDE LEVEL INUNDATION EXTENT

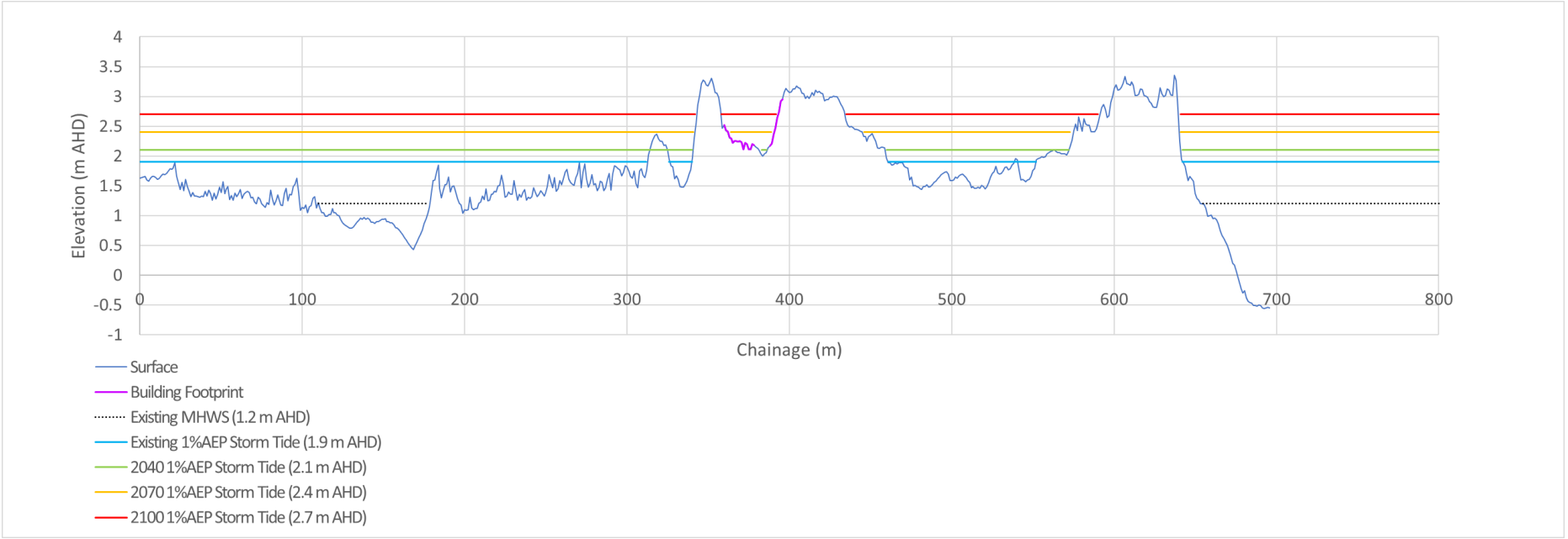

FIGURE 3-3 CROSS SECTIONAL PROFILE AND 1% AEP STORM TIDE LEVEL

The Water Technology (2013) modelling results indicate that the site is not impacted by a 1% AEP storm tide in addition to the sea level rise for the year 2040, as illustrated below in Figure 3-4.

The site is impacted by a 1% AEP storm tide for the years 2070 and 2100. See Figure 3-5 and Figure 3-6. Inundation is modelled to reach approximately 2.4 m AHD in 2070, which may reach the Finished Floor Level (FFL) of the dwelling. Modelling of the 2100 1% AEP storm tide indicates that the dwelling would be inundated by approximately 300 mm.



FIGURE 3-4 2040 SEA LEVEL RISE + 1% AEP STORM TIDE (LEVEL = 2.1 M AHD) (MODELLED WATER TECHNOLOGY 2013)



FIGURE 3-5 2070 SEA LEVEL RISE + 1% AEP STORM TIDE (MODELLED WATER TECHNOLOGY 2013)

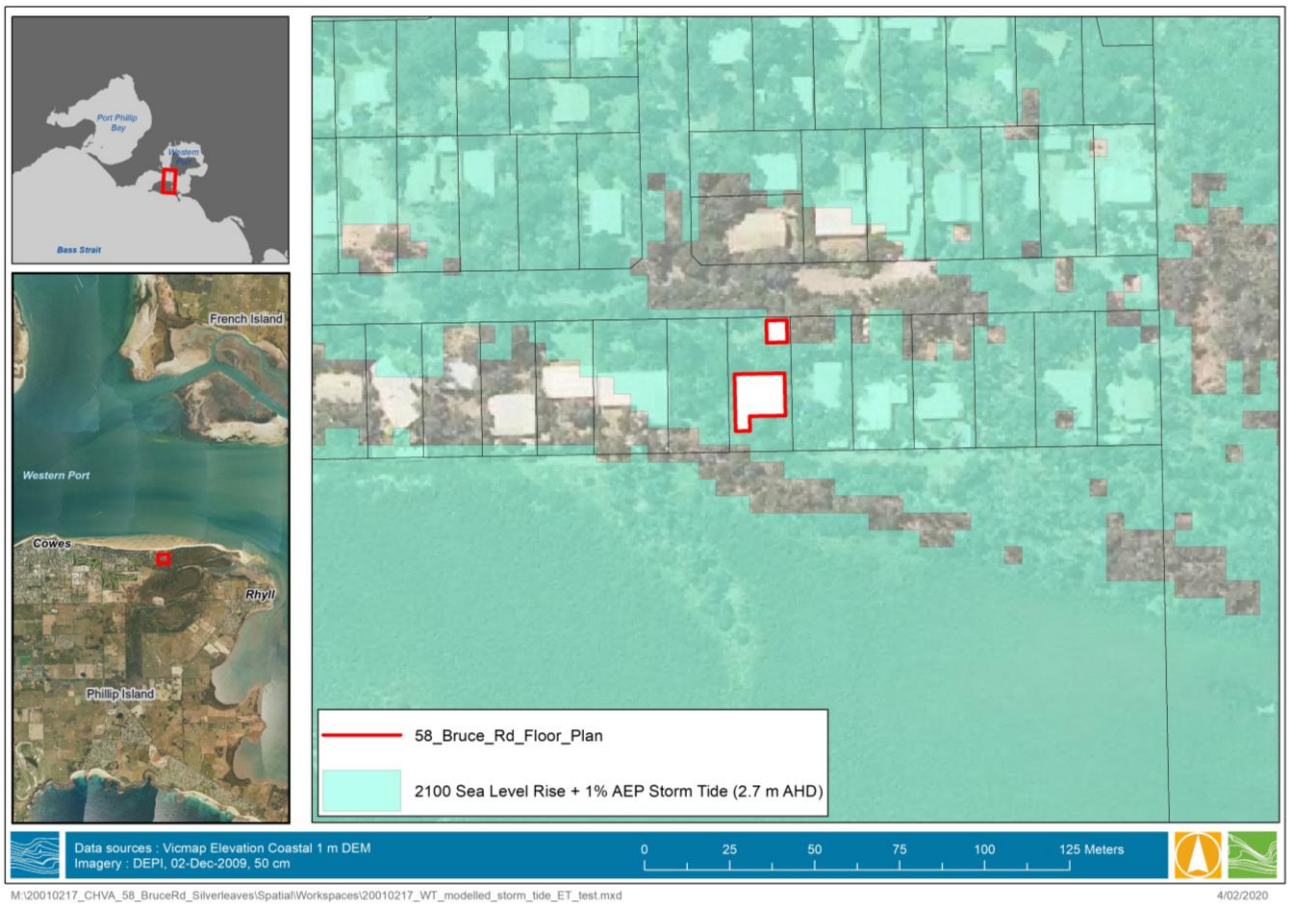

FIGURE 3-6 2100 SEA LEVEL RISE + 1% AEP STORM TIDE (MODELLED WATER TECHNOLOGY 2013)

3.4 Waves

The study area coastline is not exposed to an energetic wave climate and the action of waves is not expected to be significant in the assessment of coastal hazard risks to the property. Therefore, wave setup is negligible at this site.

4 COASTAL HAZARD RISK ASSESSMENT

4.1 Overview

Risk Management is the term applied to a logical and systematic method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating the risks associated with any activity, function or process in a way that will enable organisations to minimise losses and maximise opportunities (Standards Australia, 2009). Risk is identified as the product of the likelihood and consequence of an event impacting on an asset or objective.

RISK PROFILES HAVE BEEN DEVELOPED BY ASSIGNING SCORES TO THE CONSEQUENCE OF EACH RELEVANT COASTAL HAZARD AND THE LIKELIHOOD OF THIS COASTAL HAZARD IMPACTING THE SITE OVER A RANGE OF RELEVANT TIMEFRAMES THIS CENTURY. THE RISK PROFILE IS DETERMINED BY APPLYING THE SCORES TO A RISK MATRIX SUCH AS THE ONE SHOWN IN

Table A-3 Appendix A. The risk profile assists with the identification and analysis of priority risks for subsequent decision making and planning.

Table A-1 within Appendix A displays a description and semi-quantitative score that has been assigned to the range of coastal hazard likelihoods.

Table A-2 within Appendix A displays a description and semi-quantitative score that has been assigned to the range of coastal hazard consequences.

Table A-3 and Table A-4 within Appendix A display the resulting risk matrix and risk profile definitions respectively.

4.2 Coastal Inundation Hazard

The likelihood and consequence of the coastal inundation hazards impacting the site has been assessed based on the review of the storm tide levels and existing topography. Risk ratings for the coastal inundation hazard and justifications are provided below.

- The site is not directly impacted by the existing or 2040 1% AEP storm tide levels based on 2d hydrodynamic modelling.
- The site is shown to be impacted by a 1% AEP storm tide in addition to the sea level rise by the year 2070.
- Without protection the proposed dwelling may experience storm tide flooding by 2070.
- Finished floor levels of 2.4 m AHD have been proposed (Figure 1-3). This provides 0.3m freeboard above the 2040 Melbourne Water 1% AEP storm tide level. In this case adopted planning horizon is to 2040 as per Melbourne Water guidelines for urban infill in residential developed areas (Melbourne Water, 2017).

TABLE 4-1 COASTAL INUNDATION RISK ASSESSMENT RESULTS FOR THE PROPOSED PROPERTY DEVELOPMENT

Coastal Hazard	Specific Impact	Timeline	Likelihood	Consequence	Risk Rank
Coastal Inundation	Inundation of the site or its access by elevated storm tide and additional elevated water levels associated with wave action on the coastline.	Existing	Rare	Minor	**Low**
		2040	Rare	Minor	**Low**
		2070	Possible	Minor	**Medium**
		2100	Likely	Moderate	**Medium**

4.3 Long-Term Coastal Recession

THE LIKELIHOOD AND CONSEQUENCE OF LONG-TERM COASTAL RECESSION HAZARDS AT THE SITE HAS BEEN ASSESSED BASED ON THE REVIEW OF THE COASTAL AND OCEANOGRAPHIC PROCESSES EXPECTED TO IMPACT THE PROPERTY THIS CENTURY. THE KEY JUSTIFICATIONS FOR THE RISK RATINGS ASSIGNED FOR THIS HAZARD IN

Table 4-2 are provided below:

- By 2070, the MHWS tidal plane extent within Rhyll Inlet could potentially extend within close proximity to the site. This could potentially expose the site to hazards associated with an evolving shoreline of Rhyll Inlet at this location.
- The inundation extents associated with the MHWS tidal plane is expected to extend to the southern sand dune boundary of the site. Areas within the MHWS tidal plane extents could be expected to develop into muddy intertidal areas and shorelines.
- Very significant changes to the spit alignment and configuration remain a potential consequence of sea level rise by the end of the century. The impact of these potential changes on the coastal hazard risk profile at the site are not able to be predicted within any confidence but are considered to increase the underlying coastal hazard risk profile of the site.

TABLE 4-2 LONG TERM COASTAL RECESSION RISK ASSESSMENT RESULTS FOR THE PROPOSED PROPERTY DEVELOPMENT

Coastal Hazard	Specific Impact	Timeline	Likelihood	Consequence	Risk Rank
Long-term Coastal Recession	A sustained and progressive erosive recession of the high tide water mark on the coastline that impinges upon the site or its access and may expose the site to more frequent and significant coastal inundation.	Existing	Unlikely	Minor	**Low**
		2040	Unlikely	Minor	**Low**
		2070	Possible	Moderate	**Medium**
		2100	Likely	Moderate	**Medium**

4.4 Short-Term Beach Erosion

The likelihood and consequence of short-term erosion hazards impacting the site have been based on the review of the coastal and oceanographic processes expected in the study area this century. The key justifications for the risk ratings assigned for this hazard in Table 4-3 are provided below.

- Wave events are not likely to impact the site.
- The dune system may be affected by large storm tide events, although these will not be accompanied with significant wave heights due to the distance up Rhyll Estuary.

TABLE 4-3 SHORT TERM COASTAL EROSION RISK ASSESSMENT RESULTS FOR THE PROPOSED PROPERTY DEVELOPMENT

Coastal Hazard	Specific Impact	Timeline	Likelihood	Consequence	Risk Rank
Coastal Erosion	Short term beach erosion. Dynamic, short term recession or breach of the dune or barrier system by wave action and elevated water levels that impacts the site and may expose the site to potentially more significant coastal inundation.	Existing	Rare	Insignificant	**Low**
		2040	Unlikely	Minor	**Low**
		2070	Possible	Minor	**Medium**
		2100	Likely	Moderate	**Medium**

5 MITIGATION OPTIONS

There is a wide array of potential mitigation options that can be employed in response to climate change and sea level rise risks to coastal infrastructure and assets.

The National Committee on Coastal and Ocean Engineering (Engineers Australia, 2012) endorses a simple set of three broad strategic options for mitigating the impact of sea level rise as presented by the IPCC (1996). These options are considered to provide a basic framework for the assessment of potential mitigation strategies for the site if and when they are required.

The three broad strategic options are retreat, accommodate and protect. These broad strategic options have been used to provide the suggested pathways listed in Table 5-1 to adapting to the coastal hazard risks identified at the site and in the general vicinity.

It is noted that the ground floor is proposed as a non-habitable area.

TABLE 5-1 SUGGESTED CLIMATE CHANGE ADAPTION PATHWAYS

Planning Horizon	Suggested Response Strategy	Suggested Mitigation Measures
Existing	Accommodate	• Ensure that FFLs of the proposed dwelling are 0.3 m above the 2040 1% AEP Storm Tide level of 2.1 m AHD to allow for freeboard to non-habitable levels as per Melbourne Water (2017) • Ensure that FFLs of the proposed workshop (outbuilding) are 0.3 m above the 2040 1% AEP Storm Tide level of 2.1 m AHD. • Design of the structures should consider potential flooding of the ground floor levels to specification that is resilient to 0.3m of inundation.
2040	Accommodate	• Ensure that FFLs of the proposed dwelling are 0.3 m above the 2040 1% AEP Storm Tide level of 2.1 m AHD to allow for freeboard to non-habitable levels as per Melbourne Water (2017) • Ensure that FFLs of the proposed workshop (outbuilding) are 0.3 m above the 2040 1% AEP Storm Tide level of 2.1 m AHD. • Design of the structures should consider potential flooding of the ground floor levels to specification that is resilient to 0.3m of inundation.
2070	Accommodate/ Protect	• Protection structures may be required in the event of erosion of the wider Silverleaves area.

Planning Horizon	Suggested Response Strategy	Suggested Mitigation Measures
2100	Protect	• Protection structures may be required in the event of erosion of the wider Silverleaves area. • Towards the end of the century, roads connecting Silverleaves to the surrounding area may need to be raised to ensure continued access/egress during flood events.

6 CONCLUSION

The main conclusions relating to the coastal hazard vulnerability assessment of the proposed property development are considered as follows:

- The site is not directly impacted by the existing nor projected MHWS based on water levels, with 20 m between the property boundary to the 2100 MHWS inundation to the southwest.
- The site is not impacted by a 1% AEP storm tide in addition to the sea level rise, to the year 2040. The structure was designed with 300 m of freeboard to accommodate uncertainty in the modelling
- The site is shown to be impacted by a 1% AEP storm tide in addition to the sea level rise for the years 2070 and 2100.
- According to the plan, the ground floor of the proposed dwelling is non-habitable.
- Design of the structures should consider potential flooding of the ground floor levels to specification that is resilient to 0.3 m of inundation.
- A finished floor level 0.3 m above the 2040 1% AEP storm tide level (2.1 m AHD excluding wave setup) is recommended to account for freeboard.
- It is recommended that the finished floor levels of the workshop (outbuilding) are at least 0.3 m above the 1% AEP Storm Tide level of 2.1 m.

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8 DEFINITIONS AND DISCLAIMERS

The information contained in this report is subject to the disclaimers and definitions below.

1. The area referred to in this report at the development “site” or “property” is the land that Water Technology believes most closely represents the location identified by the client. The identification has been done in good faith and in accordance with information given to Water Technology by the client.

2. No warranty is made as to the accuracy or liability of any studies, estimates, calculations, opinions, conclusions, recommendations (which may change without notice) or other information contained in this report, and to the maximum extent permitted by law, Water Technology disclaims all liability and responsibility for any direct or indirect loss or damage which may be suffered by any recipient of other person relying on anything contained in or omitted from this report.

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4. The information provided represents the best estimates based on currently available information described. This information is subject to change as new information becomes available and as further studies area carried out.

APPENDIX A
RISK ASSESSMENT DEFINITIONS



TABLE A-1 LIKELIHOOD RANKING

Likelihood Level	Description	Annual Exceedance Probability
1 – Rare	Recurrent events are unlikely to occur more than once per century. Single events are not expected to occur but are possible.	< 1%
2 – Unlikely	Recurrent events are expected to occur only 1-2 times per century. Single events are unlikely.	1-10%
3 – Possible	Recurrent events are expected to occur every decade or so. Single events are less likely than not.	10 – 50%
4 – Likely	Recurrent events are expected several times each decade. Single event more likely to occur than not	50 - 90%
5 – Almost Certain	Recurrent events expected to happen several times per year. Single event highly likely.	> 90% probability

TABLE A-2 CONSEQUENCE RANKING

Consequence Level	Social	Economic	Environment
5 – Catastrophic	Loss of life and serious injury. Large long-term or permanent loss of services, employment wellbeing, finances or culture (e.g. > 75% of community affected), no suitable alternative sites exist.	Permanent loss or damage to property, plant and equipment	Permanent loss of flora or fauna (no chance of recovery) with national impact.
4 – Major	Serious injury. Medium-term disruption to services, employment wellbeing, finances or culture (e.g. < 50% of community affected), very limited suitable alternative sites exist.	Permanent loss or damage to property, plant and equipment	Long term loss of flora and fauna (limited change of recovery) with regional impact.
3 – Moderate	Minor injury. Major short-term or minor long-term disruption to services, employment wellbeing, finances or culture (e.g. < 25% of community affected), limited suitable alternative sites exist.	Significant loss or damage to property, plant and equipment	Medium term loss of flora and fauna (recovery likely) with regional impact.
2 – Minor	Small to medium disruption to services, employment wellbeing, finances or culture (e.g. < 10% of community affected), many suitable alternative sites exist.	Loss or damage to property, plant and equipment	Short term loss of flora and fauna (strong recovery) with local impact.
1 – Insignificant	Minimal short-term inconveniences to services, employment wellbeing, finances or culture (e.g. < 5% of community affected), many alternative sites exist.	Minor loss or damage to property, plant and equipment	Negligible to no loss of flora and fauna (strong recovery) with local impact.

TABLE A-3 RISK ASSESSMENT MATRIX

Likelihood	Consequence				
	1 – Insignificant	2 – Minor	3 – Moderate	4 – Major	5 – Catastrophic
5 – Almost Certain	**Medium**	**Medium**	**High**	**Catastrophic**	**Catastrophic**
4 – Likely	**Medium**	**Medium**	**Medium**	**High**	**Catastrophic**
3 – Possible	**Low**	**Medium**	**Medium**	**Medium**	**High**
2 – Unlikely	**Low**	**Low**	**Medium**	**Medium**	**Medium**
1 – Rare	**Low**	**Low**	**Low**	**Medium**	**Medium**

TABLE A-4 RISK PROFILE DEFINITIONS

Risk Profile	Definition
Low	Tolerable risk. A level of risk that is low and manageable without intervention.
Medium	A level to risk that may require intervention to mitigate.
High	A level of risk requiring significant intervention to mitigate.

Melbourne

15 Business Park Drive
Notting Hill VIC 3168
Telephone (03) 8526 0800
Fax (03) 9558 9365

Brisbane

Level 3, 43 Peel Street
South Brisbane QLD 4101
Telephone (07) 3105 1460
Fax (07) 3846 5144

Adelaide

1/198 Greenhill Road
Eastwood SA 5063
Telephone (08) 8378 8000
Fax (08) 8357 8988

Perth

Ground Floor
430 Roberts Road
Subiaco WA 6008
Telephone 08 6555 0105

Geelong

PO Box 436
Geelong VIC 3220
Telephone 0458 015 664

Gippsland

154 Macleod Street
Bairnsdale VIC 3875
Telephone (03) 5152 5833

Wangaratta

First Floor, 40 Rowan Street
Wangaratta VIC 3677
Telephone (03) 5721 2650

Wimmera

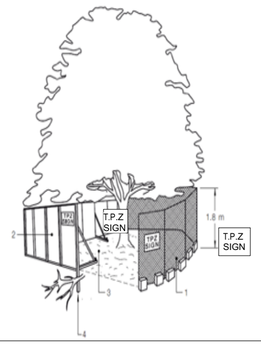
PO Box 584
Stawell VIC 3380
Telephone 0438 510 240

www.watertech.com.au

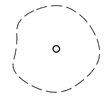
info@watertech.com.au

Tree Protection Zone and Structural Root Zone

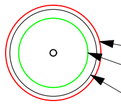
Australian Standard 4970 – 2009.
Detail No 1



LEGEND
1)Chain wire mesh panels with shade cloth (if required) attached,held in place with concrete feet
2)Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3) Mulch installation across surface of TPZ (at the discretion of the project Arborist). No excavation, construction activity, grade changes, surface treatment or storage materials of any kind are to be permitted within the TPZ.
4) Bracing is permissible within the TPZ . Installation of supports should avoid damaging roots

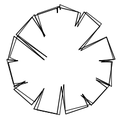


Existing tree removed



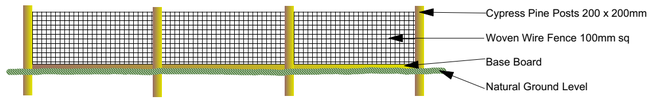
Existing tree Retained

Tree Protection Fence

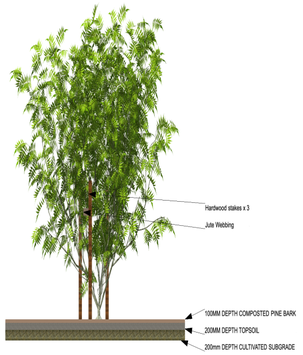


Existing neighbouring shrub / tree Retained

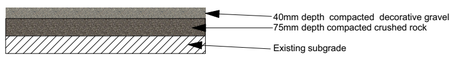
Fence Detail 1.100



Planting Detail N.T.S



Gravel Detail N.T.S



LANDSCAPE NOTES

No building works or facilities are to be located within the designated landscape zones
Ensure all Gravel & garden bed areas enclosed by a 100mm x 5mm Mild Steel Edging
pegged at 1200mm c/c and with 2mm freeboard to prevent mulch migration and garden bed dispruption.

All Topsoils and Mulches to conform to current Australian standards are to be approved by site supervisor before delivery to site.

All soils to be weed and lump free , to be friable and easily screeded.
Prior to planting ensure garden beds are cultivated to a depth of 250mm ensuring the subsoil is disrupted to allow for free drainage.
Throughout all cultivation work care must be taken to protect existing tree roots, do not cultivate in the Structural Root Zone of any tree as shown on this plan
Add a minimum of 100mm depth topsoil to all garden beds, topsoil should be formulated as a Native Planting Mix.

Mulches must be 19mm Hammer Milled Pine Bark, fully composted, weed and pathogen free.
Add 75mm depth of mulch to all garden and planting beds

Plants to be supplied in the following pot sizes.

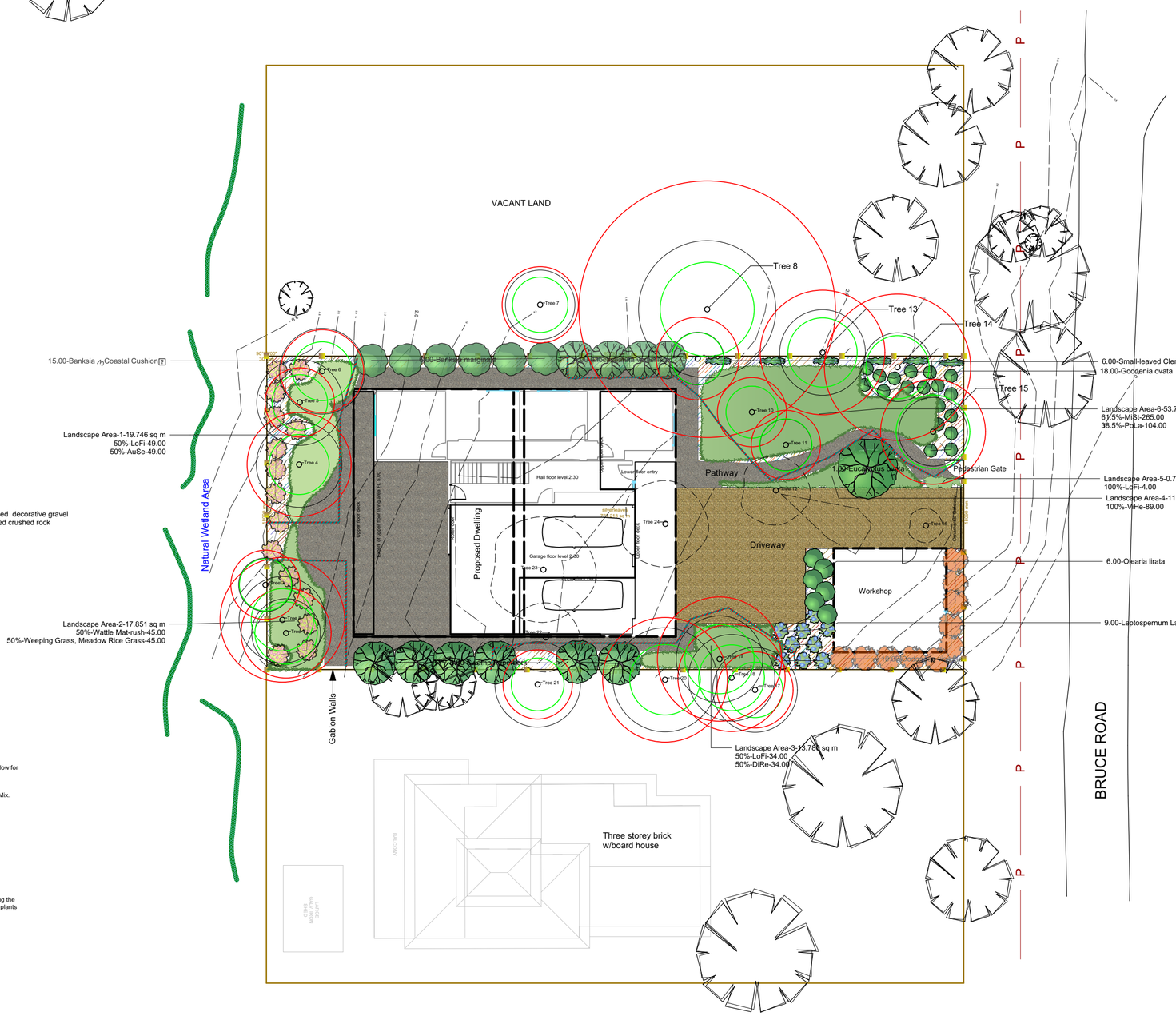
Canopy Trees	40 litre containers
Shrubs	200mm pots
Grasses and ground covers	140mm pots
Masses planting Zones	75mm pots

Plants must be supplied through an accredited Nursery, be true to type, in good health, disease free and in the containers nominated above. All root bound plant material must be rejected.

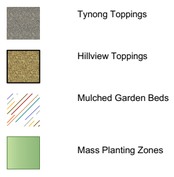
The plants in this Landscape Plan are selected from the list Titled Indigenous Plants Of Bass Coast Shire using the Defined area Coastal Plains Complex. Do not substitute plants without consulting this document and ensuring plants are appropriate for the zone.

Irrigate all planted areas until vigorous growth and establishment is observed.
Once plant material is established irrigation can be terminated and the landscape should be self sustaining.

All landscape works to be undertaken by experienced and qualified proffesional landscapers



Surfacing Key



Plant List

Images	ID	Qty	Common Name	Botanical Name	Scheduled Size	Mature Height	Mature Spread	Remarks
Trees								
	AlVe	4	Drooping She-oak	Allocasuarina verticillata	400mm pots	6m	6 - 10m	
	EuOv	1	Swamp Gum	Eucalyptus ovata	400mm pots	8m	5m	
	MeEr	6	Swamp Paperbark	Melaleuca ericifolia	400mm pots	5m	4m	
Shrubs								
	BaMa	6	Silver Banksia	Banksia marginata	200mm pots	3000mm	2500mm	
	Bu Spi	15	Banksia ⅓Coastal Cushion 7	Banksia spinulosa	200mm pots	2500mm	1.2 - 2.0m	
	DiRe	34	"Spreading Flax Lily, Blueberry Lily, Blue Flax Lily"	Dianella revoluta	75mm pots	0.75 - 0.9m	0.3 - 0.6m	
	Do Vis	10	Giant Hop Bush	Dodonaea viscosa	200mm pots	1800mm	1200mm	
	GoOv	18	Hop Goodenia	Goodenia ovata	140mm pots	0.75 - 0.90m	0.3 - 0.6m	
	P 04	9	Woolly Tea Tree	Leptospernum Lanigerum	140mm pots	1200mm	850mm	
	OlLi	6	Snow Daisy-bush	Olearia lirata	140mm pots	1200mm	2000mm	
Ground Covers								
	AuSe	36	Fibrous Spear-grass	Austrostipa semibarbata	75mm pots	0.30 - 0.45m	0.3 - 0.6m	
	LoFi	96	Wattle Mat-rush	Lomandra filiformis	75mm pots	0.0 - 0.3m	0.0 - 0.3m	
	ViHe	73	Native Violet	Viola hederacea	75mm pots	0.0 - 0.3m	1.2 - 2.0m	
Grasses								
	MiSt	287	Weeping Grass, Meadow Rice Grass	Microlaena stipoides	75mm pots	0.6 - 0.75m	0.6 - 0.9m	
	PoLa	104	Tussock Grass	Poa labillardieri	75mm pots	0.75 - 0.9m	0.6 - 0.9m	
Climbers								
	ClMi	6	Small-leaved Clematis	Clematis microphylla	140mm pots	1.5 - 3m	0.9 - 1.2m	
Aquatic Plants								
Perennials								
Ferns								
Total		**711**						

Landscape Area - Mass Planting with Images

Image	Area Name	Percent	Qty	Latin Name	Common Name	Scheduled Size	Rate/Spacing	Comments
	Landscape Area-1		49	49 Lomandra filiformis	Wattle Mat-rush		5 Plants/sq m	
			49	49 Austrostipa semibarbata	Fibrous Spear-grass		5 Plants/sq m	
	Landscape Area-2		109	109 Lomandra filiformis	Wattle Mat-rush		5 Plants/sq m	
			109	109 Microlaena stipoides	Weeping Grass, Meadow Rice G		5 Plants/sq m	
	Landscape Area-1		49	49 Lomandra filiformis	Wattle Mat-rush		5 Plants/sq m	
			49	49 Viola hederacea	"Spreading Flax Lily, Blueberry		5 Plants/sq m	
	Landscape Area-6		109	109 Viola hederacea	Native Violet		5 Plants/sq m	
	Landscape Area-5		109	109 Lomandra filiformis	Wattle Mat-rush		5 Plants/sq m	
	Landscape Area-4		54.5	54.5 Microlaena stipoides	Weeping Grass, Meadow Rice G		5 Plants/sq m	
			54.5	54.5 Olearia lirata	Tussock Grass		5 Plants/sq m	

LANDSCAPE PLAN
PROPOSED DWELLING

58 BRUCE RD , SILVERLEAVES
VICTORIA 3922

MORRIS OUTSIDE

ISSUED FOR PLANNING BASS COAST SHIRE COUNCIL
APPLICATION NUMBER 190293

SCALE 1.200 @ A2Paper size 11.12.19

PLAN LA/01/SLVS01/PP2019

RICHARD MORRIS MORRIS OUTSIDE PL TEL 0397101616

Treed environs

ARBORICULTURAL ASSESSMENT & REPORT

58 BRUCE ROAD SILVERLEAVES

Prepared for

LISE & CAL LAHTEENMAA

by

Treed environs

August 2019

Revised February 2020

TERRASTYLIS PTY LTD ACN 080 282 506 ATF The Holly Patch Trust ABN 68 452 276 207 Tas TREED ENVIRONS
10 MEADOWVIEW LANE EMERALD VIC 3782 jeff@treedenvirons.com.au Phone 0419 899 446

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1 Introduction and purpose

The purpose of this report is to enable informed decisions to be made concerning tree retention on or adjacent to the subject site. This report sets out, for each tree assessed, the:

- Physical parameters, height, canopy spread and trunk diameter.
- Health, architecture and condition.
- Life stage, and
- Significance to the local area including the ownership or location of the tree.

These elements are combined to create the Integrated Tree Rating (ITR) for each tree. The ITR comes in four levels – Low, Fair, Moderate and Exceptional – and forms the basis of determining the amount of effort and resources that should be put into retaining a tree.

2 Australian Standard

This report has been prepared having regard to AS 4970 2009 – Protection of trees on development sites. Terms used in this report are used consistently with definitions of terms in AS 4970.

3 Assessment process

Jeff Latter, B. Forest Science (Melb.), TRAQ (ISA), MISA, M Arb Australia, M VTIO Principal Consultant Terrastylis Pty Ltd, inspected the site on 1st August 2019.

Inspection was carried out from the ground and no sampling or boring was undertaken. Unless otherwise specified only trees over 5.0 metres in height, excluding weed species, were assessed.

Inspection was undertaken in accordance with the Visual Tree Assessment method developed by Mattheck and Breloar.

Tree numbers are shown on plans prepared by LRW Design. If an assessed tree was not shown on the plan, the tree position has been marked on the plan. The position of these marked trees is only indicative and reflects the relative distribution of trees rather than their absolute position. The amended plan forms part of this report and is the basis of all consideration. Photographs of the trees are also included in this report.

4 Planning and regulatory controls

Approval may be required prior to removal of vegetation and in particular trees. The most common controls are overlay controls in planning schemes but there are a range of other controls that may apply in certain circumstances including Local Laws and other legislation including the Flora and Fauna Guarantee Act (on public land including roads). An online check of the planning controls has been undertaken and this has revealed that the site is zoned Township Zone and is included in Vegetation Protection Overlay schedule 2 that affect vegetation. Various exemptions apply under clause 52.12 and a permit may not be required to remove some trees or vegetation.

The assessment of trees has taken into account the overlay provisions.

5 Trees removed from site

There are no signs that suggest that trees have been removed from the site within the previous 12 months.

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6 Existing site conditions

The site is a regularly shaped vacant lot.

The new dwelling and workshop are proposed to be constructed on the site in accordance with plans prepared by LRW Design.

25 trees on or adjoining the subject site were assessed in the preparation of this report.

Table 1: Tree assessment data

Tree No	Species	Character	Health	Architecture	Condition	Life Stage	Significance	DBH (mm)	Height (m)	Canopy Spread (m)	Integrated Tree Rating
1	Leptospermum laevigatum	I	P	P	VP	M	N	220	4	4	L
2	Acacia longifolia	I	F	VP	VP	M	N	300	5	4	L
3	Bursaria spinosa	I	F	F	F	M	N	100	4	4	F
4	Leptospermum laevigatum	I	F	F	F	M	N	250	5	4	F
5	Bursaria spinosa	I	F	F	F	M	N	170	4	4	F
6	Leptospermum laevigatum	I	F	VP	VP	M	N	200	3	5	L
7	Bursaria spinosa	I	F	F	F	M	N	180	5	5	F
8	Eucalyptus robusta	A	F	F	F	M	N	620	12	12	F
9	Bursaria spinosa	I	F	F	F	M	N	150	5	3	F
10	Bursaria spinosa	I	F	F	F	M	N	100	5	3	F
11	Bursaria spinosa	I	F	F	F	M	N	100	5	3	F
12	Bursaria spinosa	I	F	F	F	M	N	100	5	3	F
13	Leptospermum laevigatum	I	F	VP	VP	M	N	300	4	6	L
14	Leptospermum laevigatum	I	F	F	F	M	N	350	6	2	F
15	Leptospermum laevigatum	I	F	F	F	M	N	250	5	3	F
16	Bursaria spinosa	I	F	F	F	M	N	150	6	3	F
17	Hakea species	A	F	F	F	M	N	180	5	6	F
18	Leptospermum laevigatum	I	F	F	F	M	N	260	6	3	F
19	Leptospermum laevigatum	I	F	P	P	M	N	300	5	3	L
20	Eucalyptus globulus	A	F	F	F	M	N	300	10	5	F
21	Agonis flexuosa	A	F	F	F	M	N	160	6	5	F
22	Bursaria spinosa	I	F	F	F	M	N	200	7	3	F
23	Bursaria spinosa	I	F	F	F	M	N	100	4	2	F
24	Leptospermum laevigatum	I	F	P	P	M	N	250	4	7	L
25	Bursaria spinosa	I	F	F	F	M	N	100	5	2	F

Table 1: Tree assessment data

The meaning of the categories shown in the tables is defined in Appendix 1. For convenience the Diameter at Beast Height (DBH) and Integrated Tree Rating have been shown in the above table. These characteristics have been determined in accordance with the definitions.

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7 Integrated Tree Rating

The Integrated Tree Rating is a result of analysis of all assessed characteristics for a tree and its location. Accordingly assessed trees not on the subject property may be rated higher than equivalent trees on the subject site. This weighting ensures that due regard is had to trees adjoining the site.

General recommendations for each rating are:

EXCEPTIONAL: Exceptional trees should be retained and protected.

MODERATE: It is desirable and recommended that Moderate trees be retained and protected due to their high significance and the difficulty in providing adequate replacement landscaping.

FAIR: Fair trees are suitable for retention but due to significance, condition, relatively small size or young age have relatively little value or can readily be replaced with similar value trees. These trees can be retained when clear of development or removed and replaced to achieve a better development outcome.

LOW: Trees rated Low have little if any value. Some of these trees may be unstable or pose higher than acceptable levels of risk. There is little reason to retain these trees.

For each tree rated greater than Low, the Structural Root and Tree Protection Zones (radii about centre of tree at ground level) have been determined. These, together with canopy impacts, form the basis for determining the limit of approach/minimum distance development must be from each tree to enable its retention and ensure that the tree will remain viable. If design has been undertaken the design setback from each tree is compared with the Structural Root and Tree Protection Zones and comments made on whether the setback is adequate for retention of the tree.

These elements should meet local government requirements regarding arborists or arboricultural consultants' reports.

8 Development Impacts

The potential impact of the proposed development is considered in this section. The impact is only considered in detail for trees with ITR of Exceptional, Moderate or Fair. This section considers the proposed development plan. If, on the other hand, the tree assessment is being prepared prior to development plan preparation provides set back distances to guide potential development.

8.1 Above ground impacts

The above ground impacts of a proposed development are usually readily assessable. Providing works are located outside the drip line then the impact will be minimal. Care must be taken during demolition and excavation to ensure that trees are not damaged by equipment. Particular attention must be placed on protecting the trunk and major branches from unintentional damage. Trunk protection may be required if work is being undertaken in very close proximity to a tree.

Pruning of the tree canopy is generally acceptable providing the pruning is undertaken by competent personnel and in accordance with the Australian Standard (AS 4373-2007 Pruning of amenity trees). Providing the pruning does not disfigure the tree it may be appropriate to remove up to 20% of the leaf area. Table 2 shows the radius, from the centre of the trunk, at which leaf area will be reduced by 20% if the pruning is done on one side of the tree only. This radius is based on the average canopy spread and should only be used as a guide.

8.2 Below ground impacts

The potential for impact on the elements of the tree below the ground will depend on the distribution of the tree root system.

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Tree roots carry out two main functions:

a) **Structural roots.** The structural roots are actively involved in supporting the above ground sections of the tree in a generally upright position.

b) **Absorber roots.** The absorber roots are active, in association with fungi (mycorrhiza), in absorbing water and nutrients from the ground.

Whilst a tree only has one set of roots, the root areas can be considered to carry out these two functions independently.

The structural root radius and tree protection zone can be defined by the trunk diameter. The extent of disturbance a tree can tolerate depends on both the nature of the tree and the disturbance. The Australian Standard (AS 4970) defines a Tree Protection Zone (TPZ) based on trunk diameter. The standard allows encroachment up to 10% of the TPZ area providing additional root area is protected. The SRZ, TPZ and radius at which 10% of root area is lost (Limit of Approach LOA) is shown in table 2.

8.3 Indirect impacts

There may be additional impacts on the trees, other than the direct impacts discussed above. Care must be taken to ensure that soil compaction is minimised in the vicinity of any trees being retained. Indirect impacts may be caused through changes to drainage or maintenance requirements. The location of services has not been shown on the plans and it has been assumed that services will be installed well clear of retained trees. Retained trees should be managed in accordance with the attached guidelines (Appendix 3).

8.4 Preliminary assessment

The preliminary assessment in the following table is a basic comparison of the setback distance to the tree canopy and tree root radii. It does not consider the distribution of the canopy or extent of works. These issues can significantly alter the extent of impact. Where required, these more detailed assessment is undertaken, and more detailed consideration is given as part of Section 9 Conclusion and Recommendations.

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Table 2: Preliminary assessment of development impacts (refer to 8.4 above)

Tree No	Distance to proposed works	Structural root radius (m)	Tree protection zone radius (m)	Radius (10% TPZ loss)	Canopy radius (m)	Radius (20% canopy loss)	Preliminary assessment of above ground impacts	Preliminary assessment of below ground impacts
1	3.8	1.8	2.6	1.8	2.0	1.0	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
2	4.1	2.0	3.6	2.4	2.0	1.0	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
3	5.0	1.5	2.0	1.5	2.0	1.0	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
4	3.2	1.8	3.0	2.0	2.0	1.0	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
5	3.1	1.6	2.0	1.6	2.0	1.0	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
6	2.0	1.7	2.4	1.7	2.5	1.3	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
7	4.8	1.6	2.2	1.6	2.5	1.3	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
8	5.1	2.7	7.4	5.0	6.0	3.0	Development is within the canopy area and depending on workspace requirements is within acceptable limits for maintaining tree health and vigour	Development is outside the structural root radius and within acceptable limits for maintaining tree stability, health and vigour with appropriate compensating area
9	2.3	1.5	2.0	1.5	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
10	4.4	1.5	2.0	1.5	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
11	2.3	1.5	2.0	1.5	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.

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Table 2: Preliminary assessment of development impacts (refer to 8.4 above)

Tree No	Distance to proposed works	Structural root radius (m)	Tree protection zone radius (m)	Radius (10% TPZ loss)	Canopy radius (m)	Radius (20% canopy loss)	Preliminary assessment of above ground impacts	Preliminary assessment of below ground impacts
12	0.0	1.5	2.0	1.5	1.5	0.8	Tree is within development footprint and tree will need to be Removed for development to proceed.	Tree is within development footprint and will need to be Removed for development to proceed.
13	7.7	2.0	3.6	2.4	3.0	1.5	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
14	7.0	2.1	4.2	2.9	1.0	0.5	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
15	7.4	1.8	3.0	2.0	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
16	2.0	1.5	2.0	1.5	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
17	3.8	1.6	2.2	1.6	3.0	1.5	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
18	3.1	1.9	3.1	2.1	1.5	0.8	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.
19	2.0	2.0	3.6	2.4	1.5	0.8	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
20	2.5	2.0	3.6	2.4	2.5	1.3	Development is outside the canopy area.	Development is outside the structural root radius and within acceptable limits for maintaining tree stability, health and vigour with appropriate compensating area
21	2.8	1.5	2.0	1.5	2.5	1.3	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.

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Table 2: Preliminary assessment of development impacts (refer to 8.4 above)

Tree No	Distance to proposed works	Structural root radius (m)	Tree protection zone radius (m)	Radius (10% TPZ loss)	Canopy radius (m)	Radius (20% canopy loss)	Preliminary assessment of above ground impacts	Preliminary assessment of below ground impacts
22	0.0	1.7	2.4	1.7	1.5	0.8	Tree is within development footprint and tree will need to be Removed for development to proceed.	Tree is within development footprint and will need to be Removed for development to proceed.
23	0.0	1.5	2.0	1.5	1.0	0.5	Tree is within development footprint and tree will need to be Removed for development to proceed.	Tree is within development footprint and will need to be Removed for development to proceed.
24	0.0	1.8	3.0	2.0	3.5	1.8	Tree of Low ITR, impact not assessed.	Tree of Low ITR, impact not assessed.
25	2.6	1.5	2.0	1.5	1.0	0.5	Development is outside the canopy area.	Development is outside both the SRR and TRPZ.

Table 2: Impact on roots and canopy

Note: The Structural Root Zone and Tree Protection Zone have been calculated in accordance with AS 4970-2009. The Radius (10% TPZ loss) is the radius of modified TPZ (AS 4970) at which 10% of TPZ will be lost with development on one side only.

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9 Conclusion and recommendations

No Exceptional or Moderate Trees were identified.

Trees 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 20, 21, 22, 23 & 25 have a Fair rating. The proposed development is well clear of Trees 3, 4, 5, 7, 8, 10, 13, 14, 15, 17, 18, 20, 21 & 25 and these trees are to be protected from damage and if located on the subject site are to be retained. Trees 9, 11, 12, 16, 22 & 23 are proposed to be removed as these trees are located within or immediately adjoining the development footprint or are required to be removed to meet defendable space requirements.

Trees 1, 2, 6, 13, 19 & 24 have a Low rating. Trees 1, 2, 6, 19 & 24 on the subject site are proposed to be removed. Tree 13 on the adjoining property will not be significantly affected by the proposed development.

Landscaping should include establishment of indigenous canopy trees when canopy separation distance in defendable space can be met.

Should you require any additional information please contact me on 0419899446.

Yours faithfully,



Jeff Latter B Forest Science (Melb), TRAQ (ISA)

Principal Consultant.

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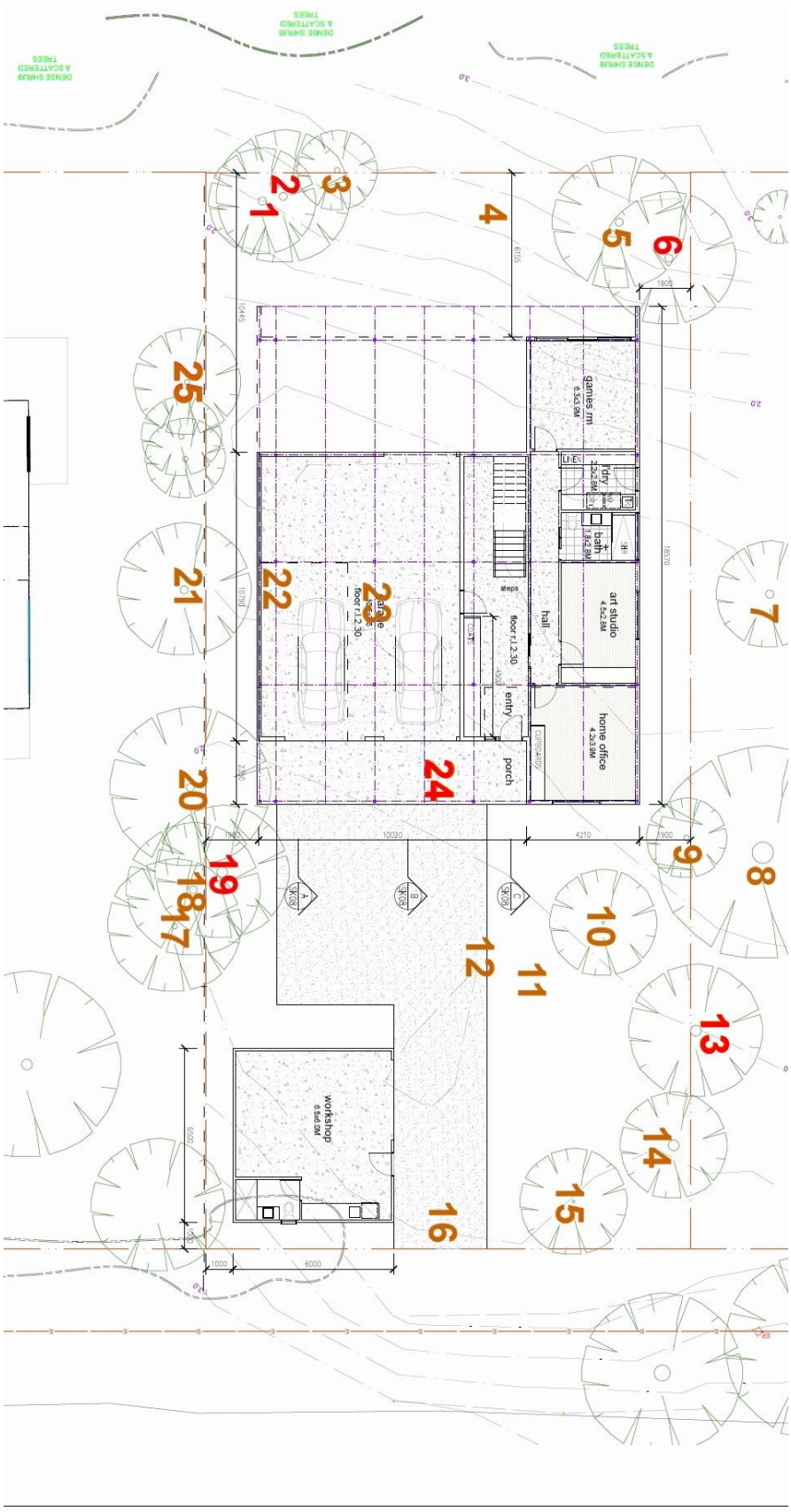
10 Site Plan



Site Plan

Colour legend: Blue – Moderate, Brown – Fair & Red Low retention rating

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11 Photographs



Trees 1 & 2



Tree 3



Tree 2 split



Tree 4

© Terrastylis Pty Ltd 2019



Tree 5 & 6



Tree 7 & 8



Tree 13



Tree 14 & 15

© Terrastylis Pty Ltd 2019



Tree 16



Tree 21 & 22



Trees 17, 18, 19 & 20



Tree 23

© Terrastylis Pty Ltd 2019



Tree 25

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Appendix 1 - Explanation of terms

Species Character

The tree character provides information on the species of tree. For weeds reference is made to leaflets prepared by various municipalities, as well as "Environmental Weeds: A Field Guide for SE Australia", by Kate Blood. Weeds may be Exotic **XW,** Australian **AW,** or Victorian Weeds **VW**.

Character	Description
Indigenous	Grows or expected to grow naturally in the subject area. May be remnant or planted. These species are considered Indigenous to Knox in regard to the SLO2 control.
Australian	Originated in Australia but not in Victoria.
Victorian	Originated in Victoria but not in the subject area.
E**X**otic	Originated outside Australia.
Weed	A plant that has naturalised in the region surrounding the subject site and has become a pest or is considered to have potential to become a pest.

Health

Categorises the health and growth potential of a tree.

Category	Description
Excellent	Canopy intact with significantly above average leaf shape, size and colour. Insect or disease damage less than 5% of leaf area. Epicormic growth make up virtually none of the canopy. Growth rate significantly above average for type, location and age of tree. High tip extension and leaf size. No appreciable tip dieback or canopy decline. Bud burst significantly early and leaf retention significantly late in season for deciduous trees. Dead wood comprises less than 10% of branch structure. Strong wound wood development (if wounds apparent). Growth not restricted by trees or structures.
Good	Canopy intact with above average leaf shape, size and colour. Insect or disease damage less than 10% of leaf area. Epicormic growths make up less than 10% of canopy. Growth rate above average for type, location and age of tree. Good tip extension and leaf size. No appreciable tip dieback or canopy decline. Bud burst early and leaf retention late in season for deciduous trees. Dead wood comprises less than 20% of branch structure. Moderate wound wood development. Minor interference to growth by adjoining trees or structures.
Fair	Canopy relatively intact with average leaf shape, size and colour. Insect or disease damage less than 20% of leaf area. Localised leaf discolouration may be present. Epicormics make up less than 20% of canopy. Growth rate average for type, location and age of tree. Average tip extension and leaf size. Localised tip dieback or canopy decline. Bud burst average and leaf retention average in season for deciduous trees. Dead wood comprises less than 30% of branch structure. Average wound wood development. Minor interference to growth by adjoining trees or structures.
Poor	Canopy partly intact with less than average leaf shape, size and colour. Insect or disease damage more than 30% of leaf area. Leaf discolouration may be present across the canopy. Epicormic growths make up a significant proportion of canopy. Growth rate below average for type, location and age of tree. Low tip extension and leaf size. Widespread tip dieback or canopy decline. Bud burst late and leaf drop early in season for deciduous trees. Dead wood comprises more than 30% of branch structure. Low wound wood development. Significant interference to growth by adjoining trees or structures.

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Category	Description
Very **P**oor	Canopy incomplete with significantly less than average leaf shape, size and colour. Insect or disease damage significantly more than 30% of leaf area. Leaf discolouration may be present across the entire canopy. Epicormic growths make up the majority of canopy. Growth rate significantly below average for type, location and age of tree. Major canopy decline and dieback. Bud burst very late and leaf drop very early in season for deciduous trees. Dead wood comprises more than 30% of branch structure. Almost no wound wood development. Major interference to growth from adjoining trees or structures. Dead

Architecture

Categorises the form and structure of the buttress, trunk and main branches of the tree and the presence of decay and other defects

Category	Description
Excellent	Canopy exceptionally well-shaped and balanced. Tree structure is sound with no forks, defects or decay in the trunk or major branches. Buttress free of decay and defects and well developed for type, location and age of tree. No apparent root damage. Minor branches free of forks or defects.
Good	Canopy well shaped and balanced. Tree structure is sound with no forks, defects or decay in the trunk or major branches. Buttress free of decay and defects and well developed for type, location and age of tree. No apparent root damage. Localised defects in minor branches.
Fair	Canopy of average shape and balance. Trunk may be slightly leaning and canopy irregular in shape. Minor defects in tree structure with isolated forks, defects or decay in the trunk or major branches. Forks appear stable and are not significantly flared. Buttress free of decay and defects and with average development for type, location and age of tree. Minor root damage apparent outside structural root zone. Small defects in minor branches.
Poor	Canopy of less than average shape and balance. Trunk may be significantly leaning and canopy very irregular in shape. Major defects in tree structure with forks, defects or decay in the trunk or major branches. Forks may not be stable and may be flared. Branches may be crossed, rubbing or over extended. Buttress with minor decay and defects, and with below average development for type, location and age of tree. Root damage apparent outside with possibility of damage within the structural root zone. Major defects in minor branches.
Very **P**oor	Canopy of well below average shape and balance. Trunk may be strongly leaning and canopy very irregular in shape, with gaps or holes. Extensive defects in tree structure with forks, defects or decay in the trunk or major branches. Forks not stable and may be cracked or exceedingly flared. Branches may be crossed, rubbing or over extended. Buttress with major decay and defects and with well below average developed for type, location and age of tree. Major root damage apparent, including damage to structural root zone. Major defects in minor branches.

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Condition

The assessed condition of a tree is effectively the lowest rating for Health or Architecture of that tree. To be of "Excellent" condition a tree must have excellent Health and Architecture. A tree with a poor Health rating and a poor Architecture rating has a "Very Poor" condition rating. The following table shows the condition for each Health and Architecture rating.

Health or Architecture	**E**xcellent	**G**ood	**F**air	**P**oor	**V**ery **P**oor
Excellent	**E**xcellent	**G**ood	**F**air	**P**oor	**V**ery **P**oor
Good	**G**ood	**G**ood	**F**air	**P**oor	**V**ery **P**oor
Fair	**F**air	**F**air	**F**air	**P**oor	**V**ery **P**oor
Poor	**P**oor	**P**oor	**P**oor	**V**ery **P**oor	**V**ery **P**oor
Very **P**oor	**V**ery **P**oor	**V**ery **P**oor	**V**ery **P**oor	**V**ery **P**oor	**V**ery **P**oor

Condition Category	**Description**
Excellent	An exceptional specimen for its species, age and location.
Good	An above average specimen for its species, age and location.
Fair	An average specimen for its species, age and location.
Poor	A below average specimen for its species, age and location.
Very **P**oor	A well below average specimen for its species, age and location.

Life Stage

Stage	**Description**
Establishing	A recent germinant or transplanted tree that has not fully established.
Growth	An established tree that is rapidly growing and has not reached 50% of final expected canopy size for the species and location. Typically characterised by strong apical control and a pointed crown.
Mature	A tree that has reached at least 50% of it expected final canopy size for the species and location, and with canopy volume increasing. Typically characterised by the reduction in apical control and the rounding of the crown.
Senescent	A tree that has reached final canopy size for species and location, and with the canopy volume declining. Typically characterised by a rounded crown with holes. May contain new emergent growth in the lower canopy.

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Significance

Reference should be made to National Trust of Australia (Victoria) criteria in Appendix 2.

Level	Description
Municipal	On a register or considered suitable to be on a register at the municipal level.
Streetscape	Of high value to the local area or streetscape. The value will generally be due to the landscape or amenity role of the tree.
Property	Of high value to adjoining properties. The value will generally be due to the landscape or amenity role of the tree.
Not **S**ignificant	Not of high value at the adjoining property level.

Glossary / Notes

Tree Protection Zone:	The estimated root zone calculated in accordance with AS 4970 - 2009.
Structural Root Zone:	As defined in AS 4970 being "the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area." The Structural Root Radius is the radius which defines the Structural Root Zone.
Diameter at Breast Height	As defined in AS 4970 being "the nominal trunk diameter at 1.4 m above ground level determined from the circumference of the trunk divided by pi (π)". Appendix A of AS 4970 provides additional guidance as to defining the DBH and provides a formula for determining the DBH for multi-trunk trees.
Measurements:	As far as practicable the diameter, height and canopy spread of assessed trees are measured. Diameter is measured by means of a diameter tape. Canopy is measured with a tape measure. Height is measured with a range finder. Diameter is measured to the closest 10 mm; height and canopy are measured to the metre and are likely to be within 10% of actual. When access is not available for measurement, the dimension is visually estimated.

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Appendix 2 - National Trusts of Australia (TrustTrees) criteria for significant trees

The following criteria are adapted from the NTA (TrustTrees) criteria for inclusion on the TrustTrees Significant Tree Register. The criteria must be adapted to determine significance at a local, sub municipal, or neighbourhood level.

Horticultural

1. Horticultural or genetic value
2. Important source of seed or propagating stock
3. Particularly resistant to disease or exposure
4. Species or variety that is rare or of a very localised distribution
5. Particularly old or venerable
6. Remnant native vegetation
7. Outstanding for its height, trunk circumference or canopy spread
8. An outstanding example of the species

Social

9. Unique location or context
10. Contribution to landscape
11. Associated with Aboriginal activities
12. Important landmark
13. Spiritual and religious associations
14. Contemporary association with the community

Historic

15. Forms part of an historic park, garden or town
16. Commemorates an occasion e.g. memorial or ceremonial plantings such as Avenue of Honour
17. Associated with an important event
18. Associated with an important person, group or institution

Aesthetic

19. A really great looking tree
20. Exhibits curious growth form or unusual physical features whether naturally occurring, resulting from natural events or human intervention
21. Is a better than an average example of its species, or in its particular location

Refer to
http://www.trusttrees.org.au/static/TrustTrees/pdf/Tree%20Protection%20in%20Australia_National%20Trusts%20of%20Australia.pdf

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Appendix 3 - Guidelines for Protection of Trees on Construction Sites ©

To preserve mature trees within a construction site, some precautions must be taken to ensure that the trunk, limbs or root system of the tree are not excessively damaged. The root system of a tree is the most vital and the most delicate part of the plant, and the most easily damaged.

The root system extends far from the trunk, often beyond the drip line of the tree. The fine absorbing roots - those that collect water and nourishment for the tree - are located primarily within the top 200 - 300 mm of the soil. The roots and the soil in this surface layer must be protected from injury.

Any encroachment, disturbance, or compaction of the soil around the tree will damage or destroy the fine nutrient absorbing roots. Physical injury caused by cutting or crushing, chemical injury caused by direct poisoning or changes to soil conditions, such as changes to pH by addition of cement/lime/concrete products, and changes to water regimes by inundation or dehydration can result in the death of the tree. Injuries caused during construction projects may not become fully apparent for several years after the completion of the project but can ultimately kill the tree.

The following guidelines are standards recommended for the protection of trees. These guidelines should be incorporated in construction contracts, and the details made available to all parties involved with work on the site, including equipment operators. Guidelines should be developed specifically for each site to ensure the maximum level of protection.

22. **Value your trees**
    Trees are living objects, which require a restricted range of environmental conditions for the tree to thrive. Construction sites can often change the environmental conditions of a site to the extent where tree survival in unlikely or the tree will have no amenity value. As retained healthy and vigorous trees have substantial value, it is imperative that trees be considered at each stage of the development cycle, from planning, construction through to landscaping.
23. **Trees are not posts**
    Nothing whatsoever should be attached to any tree including temporary services, wires, nails, screws or any other fixing device.
24. **Protection Barrier**
    A protection barrier shall be installed around the tree or trees to be preserved. This may also include trees on adjoining properties where these trees are within close proximity to the construction site. The barrier shall be constructed of durable fencing material, such as plastic construction fencing, or chainmesh fencing. The barrier shall be placed as far from the base of the tree(s) as possible, preferably extending past the drip line. The fencing shall be maintained in good repair throughout the duration of the project, and shall not be removed, relocated, or encroached upon without approval of Terrastylis.
25. **Mulching**
    A layer of mulch to a depth of 75 millimetres should be placed over all root systems (not only the Tree Protection Zones) of all trees that are to be retained, to assist with moisture retention and reduce the impact of soil compaction. Mulch material should be either thoroughly composted material or consist of primarily of wood chips. Mulches containing high levels of uncomposted leaf material can cause problems due to nitrogen deficiency.
26. **Services**
    Avoid trenching wherever possible. If trenching is to occur, use the one trench for as many services as possible and retain any large roots (greater than 40 millimetres in diameter) which grow across the trench. Boring should be undertaken at least in the vicinity of trees to be retained. Damaged roots should be pruned cleanly and the cut ends sprayed with a root hormone solution before covering. If there is risk of fungal disease, then the roots should also be treated with a fungicide. As far as practicable, trenches should be refilled with material excavated from the trench. This material should be placed back into the trench to match the existing layers in the soil. The fill material should be compacted, as far as practicable, to the same compaction levels as the surrounding soil.

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27. **Storage of Materials**
    Materials or supplies of any kind are not to be stored within the protection barriers. Concrete and cement materials, block, stone, sand and soil shall not be placed within the drip line of the tree.
28. **Fuel Storage**
    Fuel storage shall NOT be permitted within 50 metres of any tree to be preserved. Refuelling, servicing and maintenance of equipment and machinery shall NOT be permitted within 50 metres of protected trees.
29. **Debris and Waste Materials**
    Debris and waste from construction or other activities shall NOT be permitted within protected areas. Wash-down of concrete or cement handling equipment, in particular, shall NOT be permitted within 50 metres of protected trees.
30. **Level Changes**
    Changes to surface levels can be particularly damaging to trees. Even as little as 50 millimetres of fill can cause the death of a tree. Lowering the grade can destroy major portions of a root system. Level changes should be approved by Terrastylis before construction begins, and precautions taken to mitigate potential injuries.
31. **Damages**
    Any damages or injuries should be reported to Terrastylis as soon as possible. Severed roots shall be pruned cleanly to healthy tissue, using proper pruning tools. Broken branches or limbs shall be pruned in accordance with the Australian Standard 4373 - 2007.
32. **Preventive Measures**
    Before construction begins, pruning of the tree canopies and branches should be done at the direction of Terrastylis to remove any dead or broken branches, and to provide the necessary clearances for the construction equipment.
33. **Watering**
    Supplementary watering should be provided to all trees during dry periods, during and after the construction process. The dry period for Melbourne should be considered to be at least from 1st December to 30th April of each year. Approximately 25 millimetres of water, including rainfall (if any), should be provided each week. Disturbed trees may require supplementary water far in excess of this amount. Water should be provided by means of infrequent (weekly) deep soaking rather than frequent light applications.
34. **Monitoring**
    Terrastylis should monitor trees on at least a monthly basis

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Appendix 4 - Terms of engagement

The Client

1. The Client is the person listed on the cover of the report and includes agents and consultants acting on behalf of the client.

Payments

2. The client is responsible for payment of fees for the preparation of the report either in accordance with our standard schedule of rates or a prior written quote. Payment in full is required prior to a report being finalised.

Reports

3. The report is copyright to Terrastylis Pty Ltd.
4. The Client will be provided, unless expressly requested otherwise, with a draft report to correct errors in fact, assumptions or interpretations made by Terrastylis Pty Ltd. Draft reports are the exclusive property of Terrastylis Pty Ltd and may not be used for any other purpose nor shall the draft reports be distributed to any other persons whatsoever. Draft reports and any copies made there from shall be returned to Terrastylis upon request and any electronic copies deleted from computers and files.
5. Upon payment of the invoice the report will be finalised. The client will be licensed to use the final report for the sole purpose for which it was commissioned. This includes reproducing the report, but only in its entirety, for submission to authorities and other consultants. The making of partial reports or publication by any means whatsoever is prohibited without prior written approval from Terrastylis Pty Ltd.
6. Loss, removal or alteration of any part of the report will invalidate the entire report.
7. The use of this report or publication by anyone other than the client is strictly prohibited.

Information

8. Terrastylis Pty Ltd has taken care to obtain all information from sources believed to be reliable and all data has been verified as far as practicable. Terrastylis Pty Ltd does not guarantee or warrant, nor will it be held responsible for, information supplied by others.
9. Unless otherwise specified, information in this report covers only those items that were examined and reflects the condition of those items at the time of the inspection. The inspection is limited to visual examination of accessible components without boring, excavation or probing. There is no warranty or guarantee, expressed or implied, that the problems or deficiencies of the plants or property in question may not arise in the future.
10. Any legal description provided to Terrastylis is assumed to be correct. Any titles and ownerships to any property are assumed to be correct. No responsibility is assumed for matters legal in character. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.
11. The report and any values expressed therein are the opinion of Terrastylis Pty Ltd and the fee charged for the preparation of this report is in no way contingent upon the reporting of a specified value or the occurrence of a subsequent event.
12. Sketches, diagrams, graphs and photographs in the report, are intended as visual aids, and are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

Additional services

13. Terrastylis Pty Ltd shall not give, or be required to give, evidence or to attend court, tribunal or panel by reason of the preparation of this report. Such evidence or attendance shall be subject to new contractual arrangements, including payment of additional fee(s) for such services.
14. Terrastylis Pty Ltd shall not carry out any of the works or monitor any of the activities required in the report simply by the preparation of this report. Such work or monitoring shall be subject to new contractual arrangements, including payment of additional fee(s) for such services.

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