



Proposed Assistance Dogs
Australia National Training
Centre

Lot 23 DP 239091

No.8 Austin Place, Orchard Hills

Bushfire Assessment

15 December 2017

1. Background

This Bushfire Assessment, prepared pursuant to Section 79BA of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act 1979), has been prepared for the proposed new Assistance Dogs Australia Training Facility (also comprising ancillary accommodation). This facility is located at 8 Austin Place, Orchard Hills (Penrith LGA).

The proposal, is difficult to define from a definition perspective as it relates to Bushfire legislation, however we have taken the view that the proposal is largely a 'Special Fire Protection Purpose', most closely aligned to the provisions of Clause 46(d) of the Rural Fires Regulation 2013 (refer below).

46 Additional special fire protection purposes for which bush fire safety authority required

For the purposes of paragraph (i) of the definition of special fire protection purpose in section 100B (6) of the Act, the following purposes are prescribed:

- (a) a manufactured home estate (within the meaning of [State Environmental Planning Policy No 36—Manufactured Home Estates](#)), comprising two or more caravans or manufactured homes, used for the purpose of casual or permanent accommodation (but not tourist accommodation),
- (b) a sheltered workshop, or other workplace, established solely for the purpose of employing persons with disabilities,
- (c) a respite care centre, or similar centre, that accommodates persons with a physical or mental disability or provides respite for carers of such persons,
- (d) student or staff accommodation associated with a school, university or other educational establishment,
- (e) a community bush fire refuge approved by the Commissioner.

Accordingly, a Bushfire Safety Authority, pursuant to Section 100B of the Rural Fires Act 1997 is required.

The kennel and administration component (building E) has been determined to be 'other development' pursuant to PFBP and not a Special Fire Protection Purpose. An assessment against PFBP has nevertheless been undertaken against all aspects of the proposal as also required by PFBP.

The proponent and land owner is Assistance Dogs Australia (ADA).

This assessment was prepared by Adam Smith, Director Planit Consulting. Contact 0266745001 or adams@planitconsulting.com.au for further information or clarification.

1.1 Purpose of the assessment

The development would be located within bushfire prone land. Section 79BA (Consultation and development consent – certain bushfire prone land) of the NSW Environmental Planning and Assessment Act 1979 requires consent authorities to be satisfied that the development conforms to the specification and requirements of the NSW Rural Fire Service's document Planning for Bushfire Protection 2006 (PBP 2006). As such, the purpose of this report is to demonstrate compliance with this document, particularly in relation to access, water and services, emergency planning and landscaping/vegetation management.

Note: The development does constitute a special fire protection purpose development as defined by Section 100B of the Rural Fires Act 1997. The development therefore requires a Bushfire Safety Authority from the Rural Fire Service (RFS).

1.2 Description of the proposed development and Planning Proposal

The primary purpose of the Assistance Dogs Australia Facility is to train assistance dogs. The proposal also includes a number of ancillary items needed to facilitate this proposal including:

- Caretakers Dwelling
- Guest Accommodation
- Office Administration Space; and
- Cafe and small conference spaces

The proposal seeks consent for an 'animal boarding or training establishment' and 'dwelling house' under the Penrith Local Environmental Plan 2010 all other items are considered ancillary and subservient to the prior use.

The nature of the training process also requires that short term accommodation facilities are provided onsite. This short term accommodation is only used during the 'pairing' process when the dogs are paired with the person they are to assist. The short term accommodation is only used for this purpose and is not made available to unrelated members of the public. The use of the short term accommodation serves the dominate purpose being the training and boarding of animals and as such is an ancillary land use.

2. Bushfire Risk Assessment

2.1 General Site Description

The site has until recently been used for the purposes of a residential tourist accommodation facility comprising multiple buildings for housing for mentally handicapped adults.

The site is legally described as Lot 23 DP 239091 and more commonly referred to as No. 8 Austin Place, Orchard Hills (Figure1 – Aerial Photograph). The site is located approximately 55 km west of Sydney and 10km south east of the city of Penrith. The subject property has a total area of 2.2 hectares and is currently improved by 4 separate buildings to the south. Access to the site is provided via Austin Place. To the north of the site is a vegetation corridor along M4 Western Motorway. To the east, west and south of the site are rural zoned lands. Properties to the east and west of the site contain residential dwellings as depicted in Figure 2 with the closest dwelling being 15m to the western boundary.

The site slopes from south to north and the northern portion of the site includes some fragmented vegetation. This vegetation is not mapped; however it appears to form part of a riparian strip of vegetation and therefore has some environmental value.



Figure 1 - Aerial Photograph – Source: Planning Viewer Beta



Figure 2 - Aerial Photograph – Source: Planning Viewer Beta

The site is zoned RU4 - Primary Production Small Lots pursuant to the Penrith Local Environmental Plan 2010 (See Figure 3).



Figure 3 - Zoning – Source: Planning Viewer Beta

2.2 Mapped Site Constraints

Bushfire

Pursuant to Council's mapping, the northern portion of the site has been nominated as containing Category 1 bushfire prone vegetation. The southern and eastern parts of the site are also mapped as being within the bushfire prone zone.



Figure 4 - Bushfire prone land – Source - Penrith City Council LGA -Bush Fire Prone Land Map

Scenic Protection Land

The site has been mapped as having special scenic values (Figure 5).



Figure 5 - Scenic Protection land– Source: Planning Viewer Beta

Services

A review of available mapping indicates that electrical and reticulated water are located within proximity to the site. This preliminary review has not identified reticulated sewer services being available close to the site.

2.3 Predominant Vegetation Class Formation

In accordance with the methodology specified in PBP 2006, the predominant vegetation classes surrounding the development are (Figure 6 below):

-) North – woodland
-) West – maintained grazing and gardens
-) East – maintained grazing
-) South – maintained grazing





Figure 6 Vegetation

2.4 Effective Slope

In accordance with the methodology specified in PBP 2006, the "effective slopes" surrounding the development are:

-) North – Downslope (0° to 5°)
-) West – Flat (0°)
-) East – Flat (0°)
-) South – >0 to 5° upslope

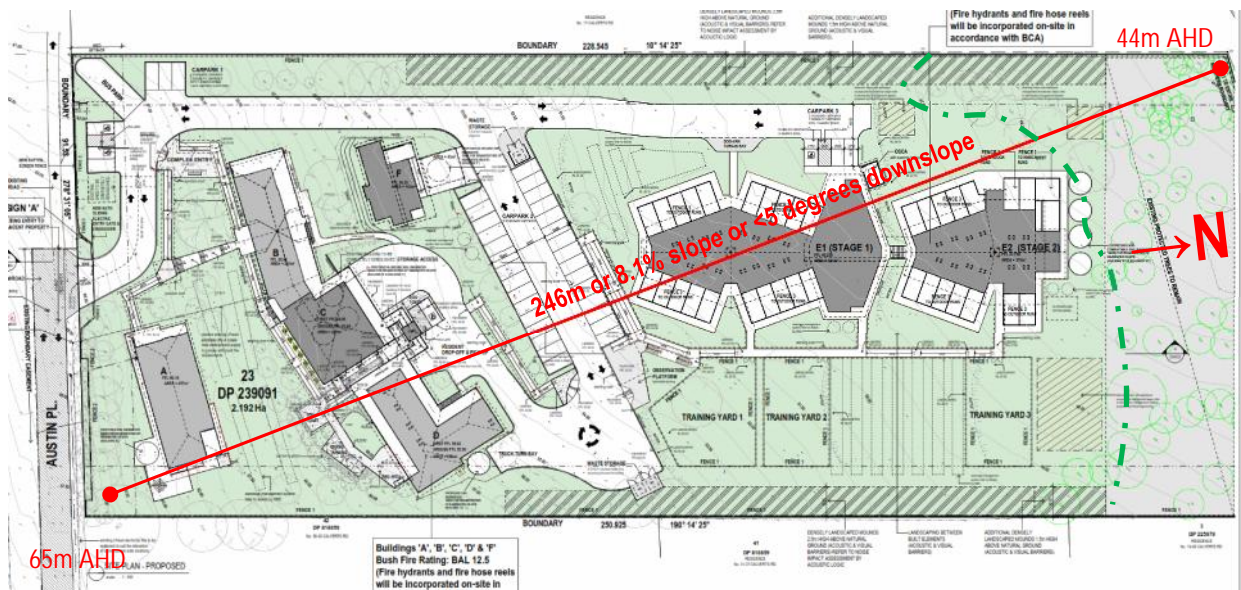


Figure 7 Effective Slope

2.5 Fire Weather Area class

The proposed development is within the Penrith Local Government Area (LGA). For the purposes of PBP 2006, the Penrith LGA has a FDI rating of 100.

3. Proposed Bushfire Protection Provisions

The proposed development, by deduction, comprises a 'special fire protection purpose' development. This designation is however only applied to the residential and primary office components and not the kennels themselves. The kennel building itself is not subject to the SFPP requirements. Therefore, the planning controls specified in 4.3.6 of PBP 2006 ("PBP and other development") apply to this element of the proposed development, whereas Buildings A, B, C, D & F are considered to be SFPP.

3.1 Landscaping / Vegetation Management

A minimum 9 metre bushfire asset protection zone (APZ) to the vegetation (to remain) to the north is proposed (refer plans in Appendix A). This measurement is taken from the north eastern corner of building E to the vegetation opposite. This APZ broadens out significantly along the northern edge of building E.

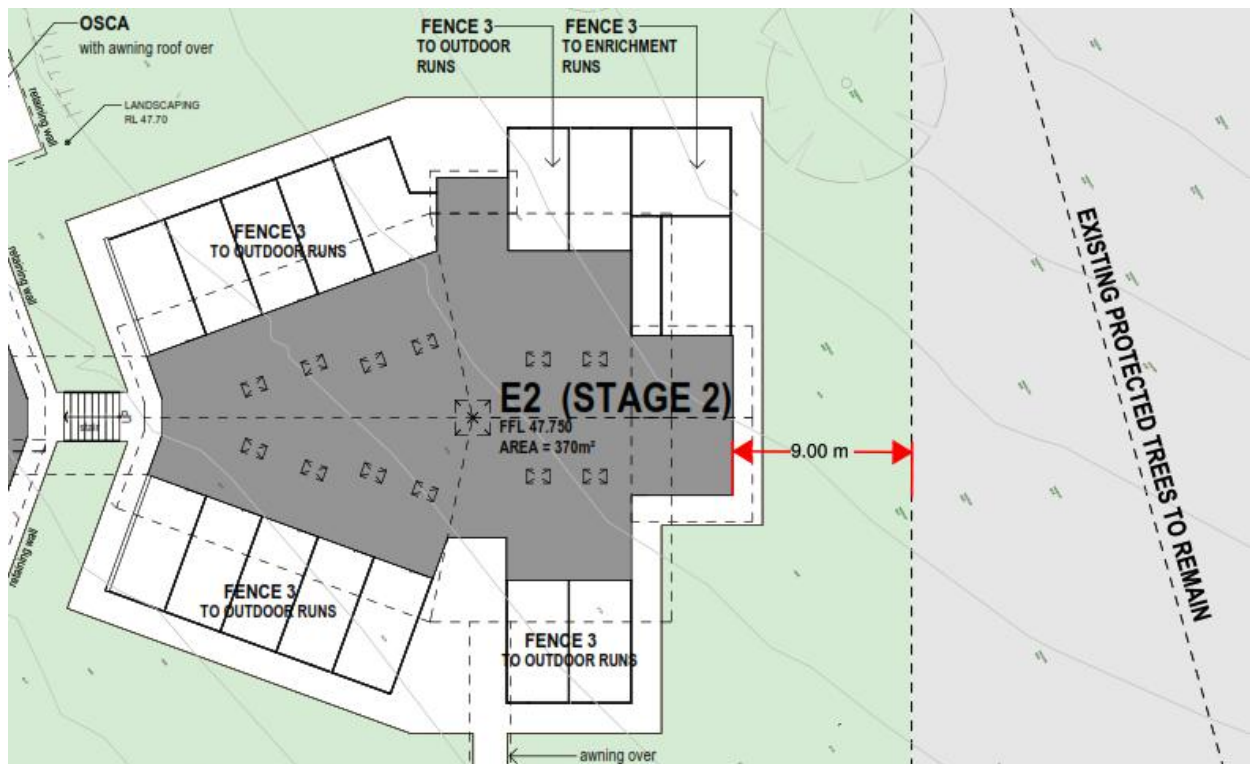


Figure 8 Minimum APZ to north

The APZ is to surround the buildings that house office staff and impounded animals. The APZ is to be maintained as described in PBP 2006 and the RFS document Standards for Asset Protection Zones, i.e.:

-) The APZ is to provide a tree canopy of less than 15% and should be located greater than two metres from any part of the building.
-) Ground fuels such as fallen leaves, twigs (less than 6 millimetres in diameter) and bark shall be removed on a regular basis.

To the east, west, south and north, the grass shall be kept cut short at all times.

Highly combustible landscaping within the facility shall be minimal and conform to the following:

-) Grass areas shall be kept green and short.
-) Trees shall have their lower limbs removed up to a height of two metres above the ground level.
-) Vegetation for landscaping shall be selected on the basis of the following attributes:
 - o relatively high moisture content within leaves
 - o lack of volatile oil content in leaves
 - o high mineral content in leaves
 - o relatively large leaves (as opposed to fine leaves)
-) Organic mulch should be avoided with preference to non-flammable material e.g. scoria, pebbles, recycled crushed bricks.
-) There is no continuous path from the unmanaged hazard to the buildings.

The APZ can be fully accommodated within the property and outside the forested area (refer to excerpt above in Figure 8).

3.2 Construction Standards

The kennels and administration component contained in building E will need to be constructed in compliance with Section 3 and 7 (BAL 29) Australian Standard AS3959-2009 'Construction of buildings in bush fire prone areas' and section A3.7 Addendum A3.7 Appendix 3 of 'Planning for Bushfire Protection'.

This recommendation is supported by the Flamesol BAL calculator as provided in Appendix B.

The proposed accommodation components are separated by a distance of greater than 10m with the kennel building and are also separated by a distance of at least 124m from the vegetation risk. Nevertheless, the site slopes up towards the accommodation buildings and therefore calculations support a BAL 12.5 construction standard for all remaining buildings (Buildings A, B, C, D & F).

This recommendation is supported by the Flamesol BAL calculator as provided in Appendix B.

3.3 Water supply

Water is supplied to the development via an existing reticulated supply along Austin Place. An existing hydrant is also located in Austin Place. The site will be serviced by on-site fire hose reels and fire hydrants to protect the buildings in accordance with BCA requirements.

The proponents will need to test the velocity of this water supply to determine whether it can be used for firefighting. It may be that an onsite supply is also required with appropriate booster pumps to meet relevant standards.

All aboveground pipes external to the buildings shall be metal, including and up to taps.

3.4 Electricity and Gas

Power to the site is via existing overhead powerlines situated on Austin Place. This area is free of bushfire hazard and hence no underground supply is considered necessary.

There are no gas services proposed that we are aware of.

3.5 Access

The proposed animal shelter would be adjacent to, and accessed from Austin Place, Orchard Hills, which in turn is accessible from Calverts Road.

Calverts Road currently complies with PBP 2006 as:

-) It is a two-wheel drive and all-weather, sealed road
-) It is two-way, allowing traffic to pass in opposite direction
-) It does not contain low capacity bridges or traffic management devices that could adversely affect fire truck access
-) It has cross falls not exceeding three degrees and grades less than 15 degrees
-) It does not contain significant curves
-) It has vertical clearances greater than four metres above the carriageway.

The private road accessible from Austin Place will need to be upgraded to comply with PFBP, although it does not appear as though there is any constraint to this occurring and such works would be minor.

A turning head is available in Austin Place.

The private road from Austin Place and the turning area is only 181m in length.

3.6 Emergency and Evacuation Planning

Prior to use and occupation of the facility, a Bushfire Emergency Plan shall be prepared consistent with the RFS's A Guide to Developing a Bushfire Evacuation Plan. This shall detail, where relevant:

-) roles and responsibilities of staff
-) if and when evacuation is to occur
-) transportation arrangements
-) refuge locations
-) maintenance of bushfire asset protection zones as described in Section 3.1 above
-) animal welfare.

Copies of the Plan shall be supplied to the Penrith Bush Fire Management Committee (BFMC), the RFS District Office, and the Penrith Local Emergency Management Officer.

4. Summary of Protection Provisions and Conformity with PBP 2006

Under Section 4.3.6 of PBP 2006, applications for developments that are not residential / rural residential subdivisions, SFPPs or residential infill should:

-) note the range of available bush fire protection measures
-) satisfy the aim and objectives of PBP
-) consider any matters listed for the specific purpose
-) Propose an appropriate combination of bushfire protection measures, with evidence that the intent of each measure (with reference to the relevant tables in section 4.1.3 and 4.2.7) is satisfied.

With respect to both the Kennels building and the accommodation and administration wings (SFPP), the proposal complies within PBP 2006 as demonstrated in Table 1 below.

Table 1 Summary of protection provisions and conformity with PBP 2006.

Proposed Measure	Bushfire Protection	Aim and Objective satisfied	Compliance with PBP 2006
9 metres APZ to the woodland. Landscaping and vegetation management as described in Section 3.1.		<ul style="list-style-type: none">) "afford occupants of any building adequate protection from exposure to a bushfire") "provide for a defensible space to be located around buildings.") "provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.") "provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in asset protection zone." 	<p>Yes, proposal complies.</p> <ul style="list-style-type: none">) The proposed APZs are appropriate for non-residential buildings or special fire protection purpose developments) The APZ can be maintained wholly within the boundaries of the development site.) The APZ specifications as described in Section 3.1 are in accordance with the requirements of the NSW RFS's Standards for Asset Protection Zones.) The APZ is located on lands with a slope less than 18 degrees.
<p>Water supply – existing from reticulated water supply along BTU road. Hydrant will located adjacent to proposed development.</p> <p>All above ground water pipes external to the building shall be metal including and up to taps.</p> <p>Electricity – Existing overhead lines along Calverts Road. This area is free of bushfire risk (as mapped) and no further underground supply is considered necessary.</p>		<ul style="list-style-type: none">) "ensure that utility services are adequate to meet the needs of firefighters" 	<p>Yes, proposal complies with the standards outlined in section 4.1.3 under "Services – water, electricity and gas".</p>

Proposed Measure	Bushfire Protection	Aim and Objective satisfied	Compliance with PBP 2006
Access – Calverts Road and Austin Place existing. No changes proposed. Property access road would be a minimum of 6.0 metres wide, with ability to turn to permit fire truck access into and out of the facility. The length of the access way is less than 200m and as such conflicts are expected to be minimal.) “ensure that safe operational access and egress for emergency service personnel and residents is available”	Yes, the proposal complies
Bushfire Emergency Management Plan) “afford occupants of any building adequate protection from exposure to a bushfire”	Yes, the proposal complies. Prior to use and occupation of the facility, a Bushfire Emergency Plan shall be prepared consistent with the RFS’s A Guide to Developing a Bushfire Evacuation Plan, with details and notification specified in Section 3.6 of this report
Construction standard) n/a	BAL 29 to the kennel building and BAL 12.5 for all other structures.

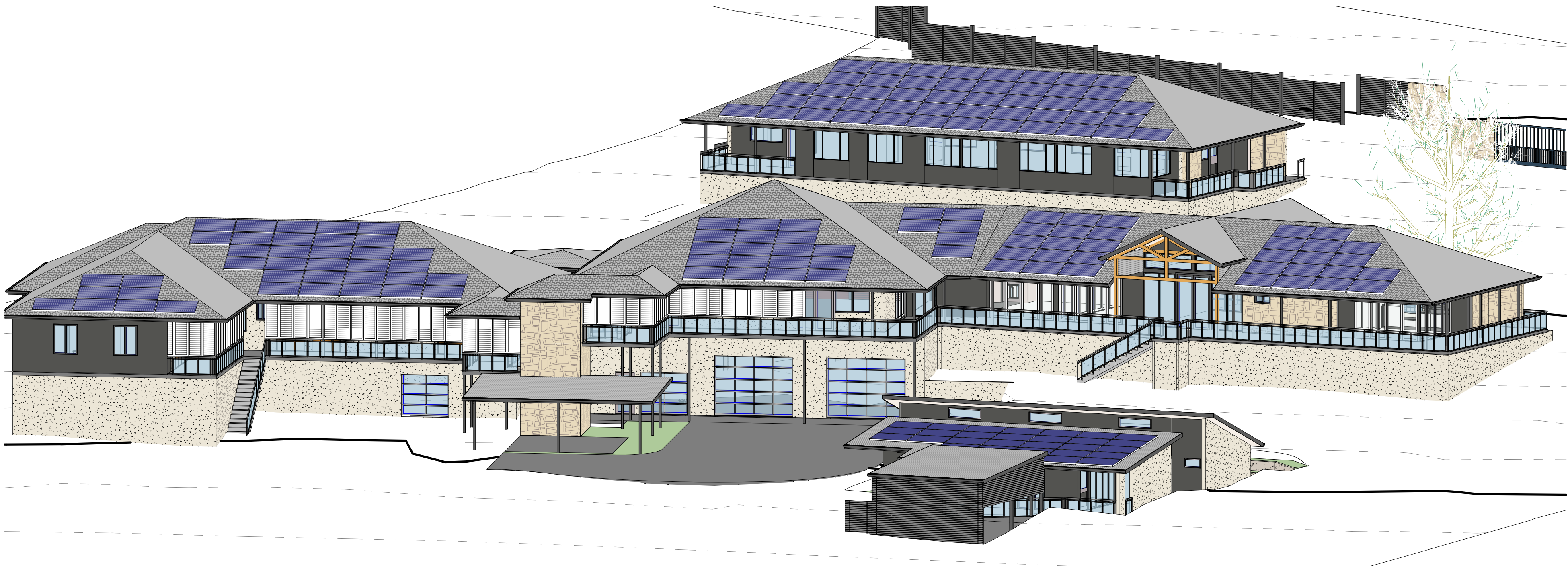
5. Conclusion

The bushfire protection provision proposed for the Assistance Dogs Australia (ADA) Animal Training Centre conform to the relevant requirements of PBP 2006 as specified in Section 4.3.6(f) for "other developments" and also for the accommodation aspects which are considered to be a Special Fire Protection Purpose.

With regard to Section 79BA of the Environmental Planning and Assessment Act 1979 and 100B of the Rural Fires Act, 1997 the proposed development is considered appropriate for consent.

Appendix A

Plans of the proposed development



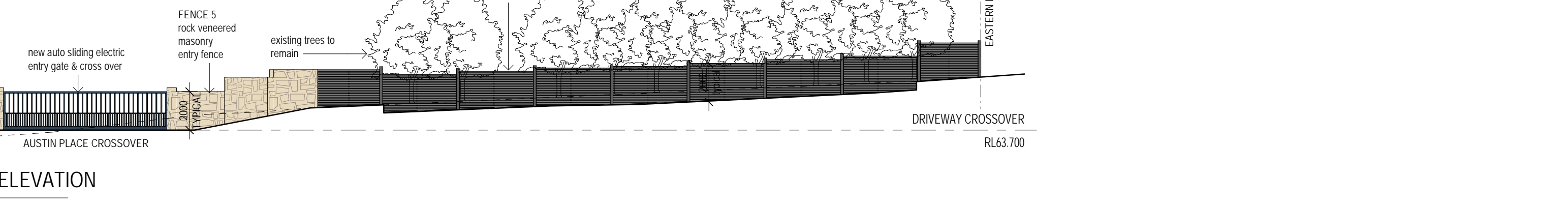
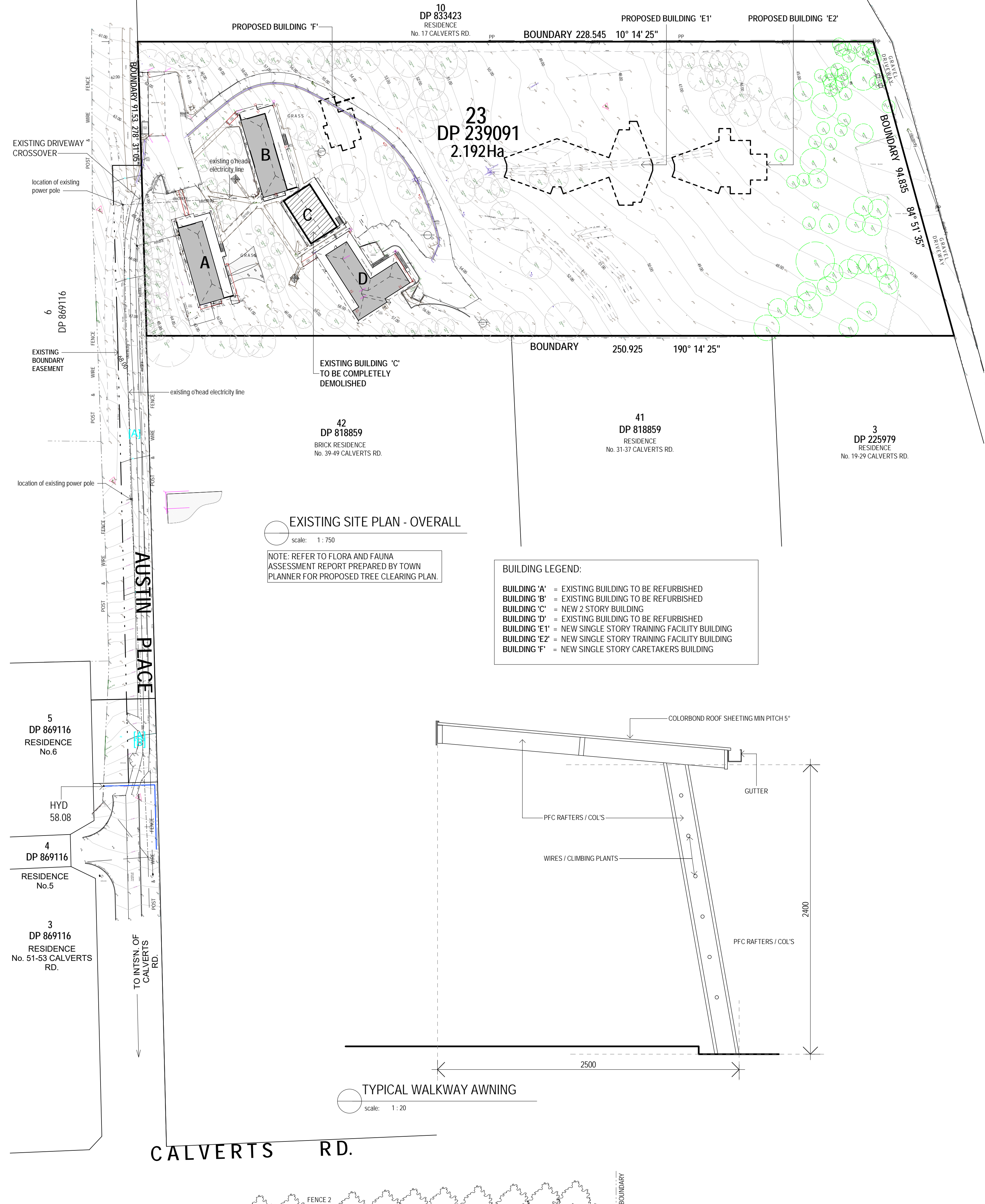
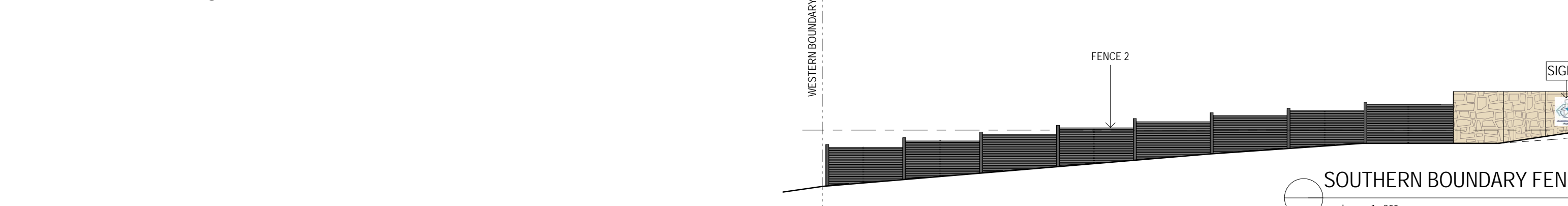
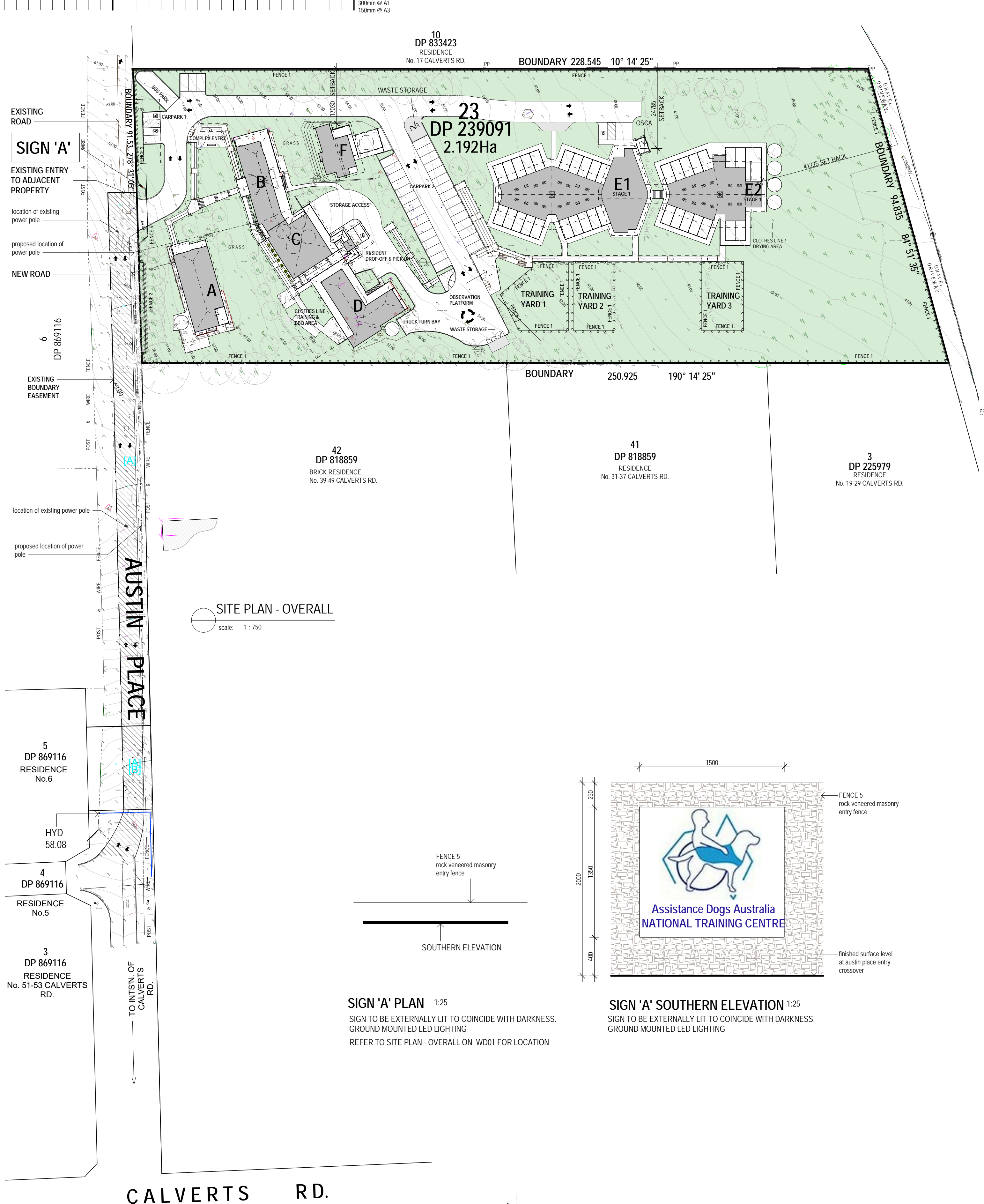
NATIONAL TRAINING CENTRE REDEVELOPMENT

8 AUSTIN PLACE, ORCHARD HILLS, NSW 2748

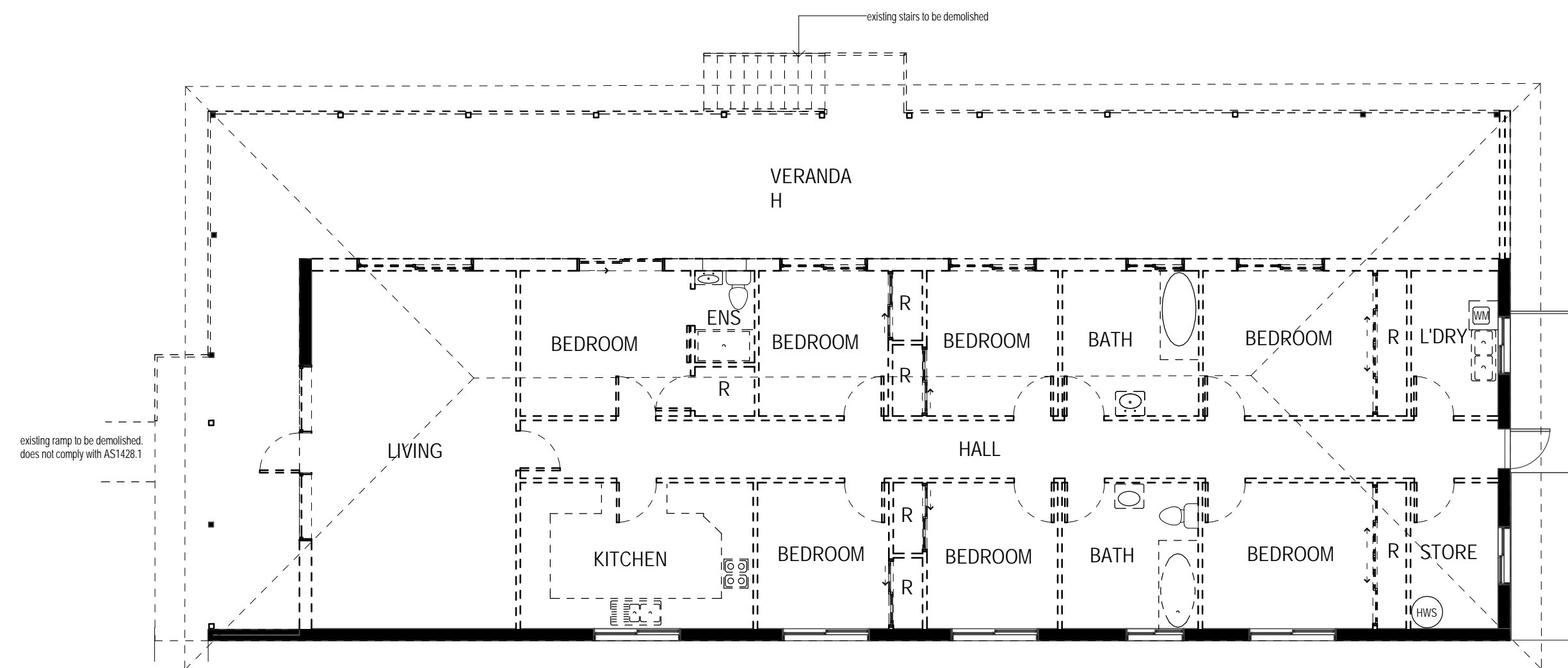
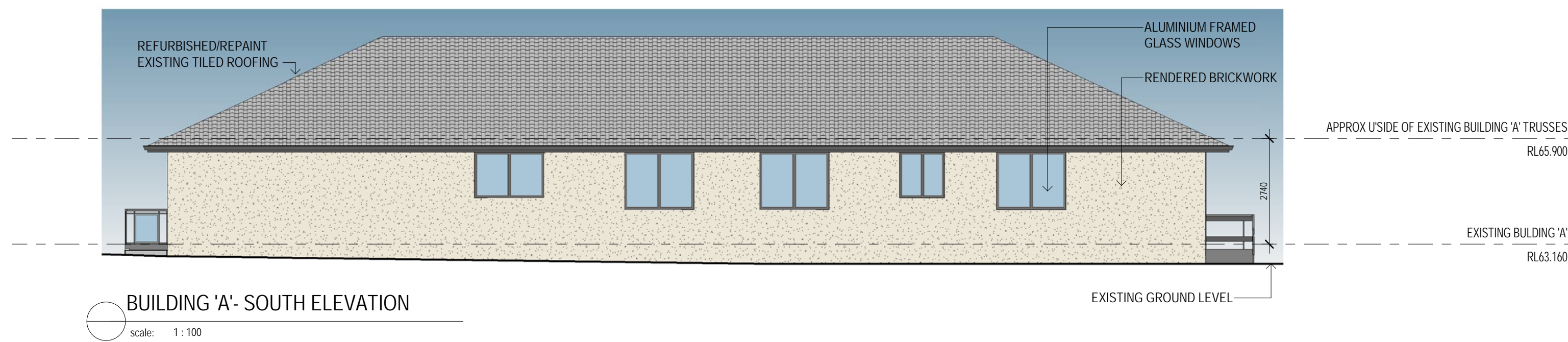
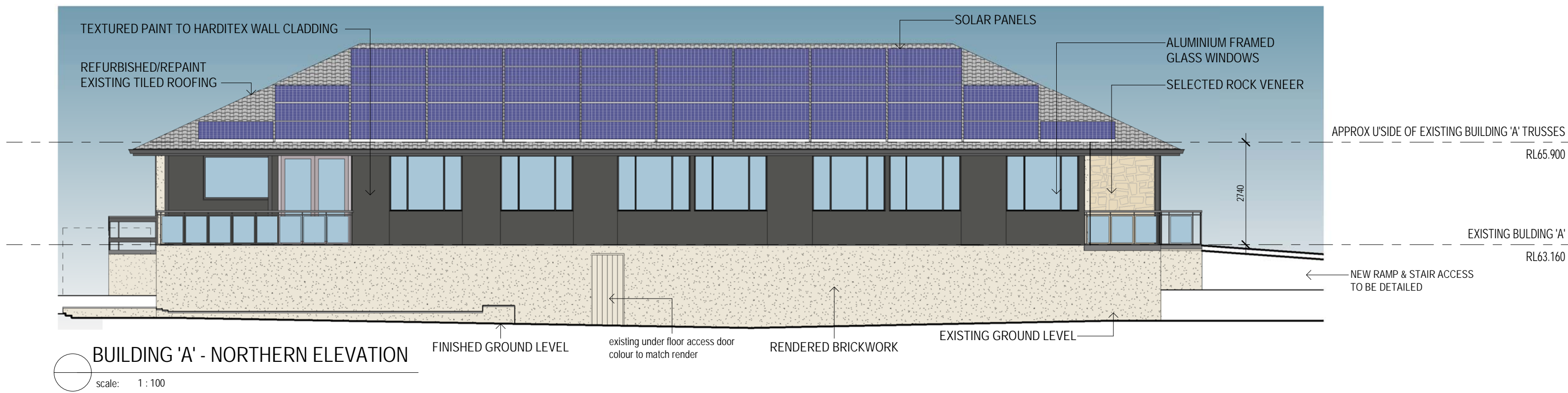
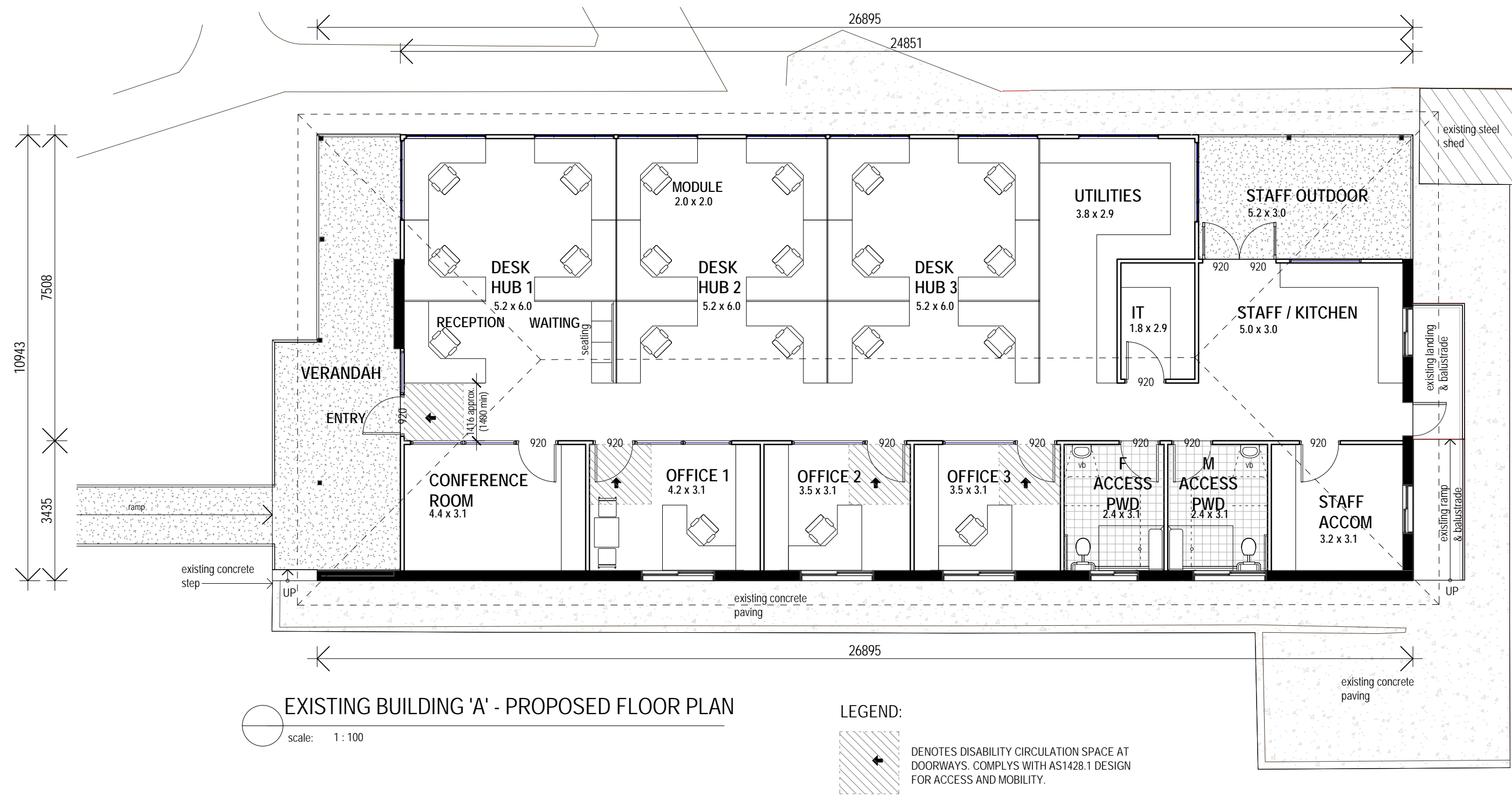
ARCHITECTURAL DRAWING LIST

DRAWING No	DRAWING NAME
DA00	ARCHITECTURAL DRAWING LIST
DA01	SITE PLAN - OVERALL
DA02	SITE PLAN - PROPOSED
DA03	BUILDING 'A' - PROPOSED DESIGN
DA04	BUILDING 'B' - PROPOSED DESIGN
DA05	BUILDING 'C' - PROPOSED DESIGN
DA06	BUILDING 'C' - PROPOSED DESIGN
DA07	BUILDING 'D' - PROPOSED FLOOR PLAN
DA08	BUILDING 'D' - ELEVATIONS
DA09	BUILDING 'E1' - PROPOSED FLOOR PLAN
DA10	BUILDING 'E1' - ELEVATIONS
DA11	BUILDING 'E2' - PROPOSED FLOOR PLAN
DA12	BUILDING 'E2' - ELEVATIONS
DA13	BUILDING 'F' - PROPOSED DESIGN









DEMOLITION LEGEND:

- EXISTING WALLS & VERANDAH POSTS TO BE RETAINED
- WALLS TO BE DEMOLISHED COMPLETELY OR MODIFIED FOR NEW WINDOW OPENING REFER TO DEMOLITION NOTES FOR DETAILS.
- MISCELLANEOUS ELEMENTS TO BE DEMOLISHED.

COLOUR / FINISHES SCHEDULE

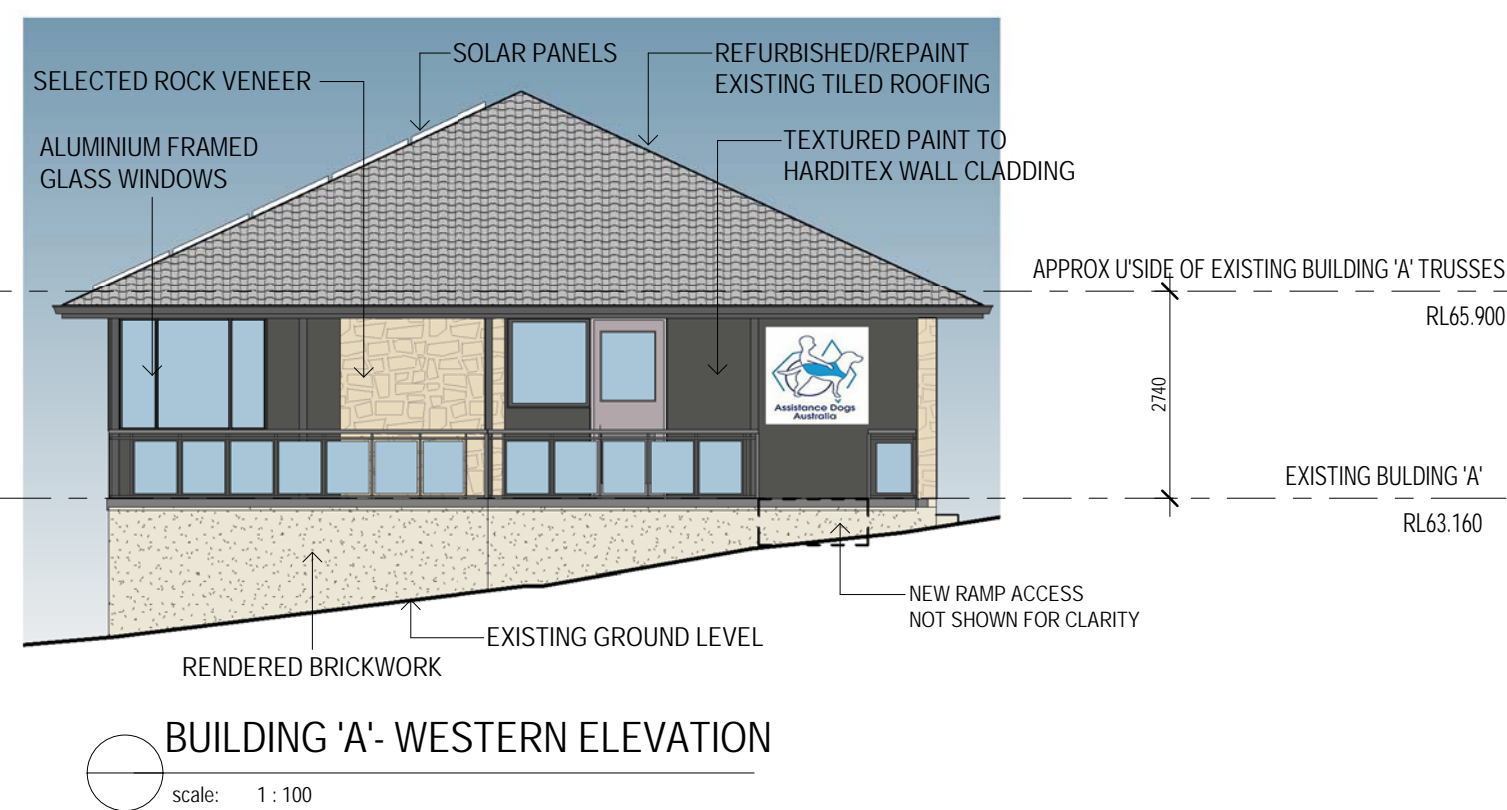
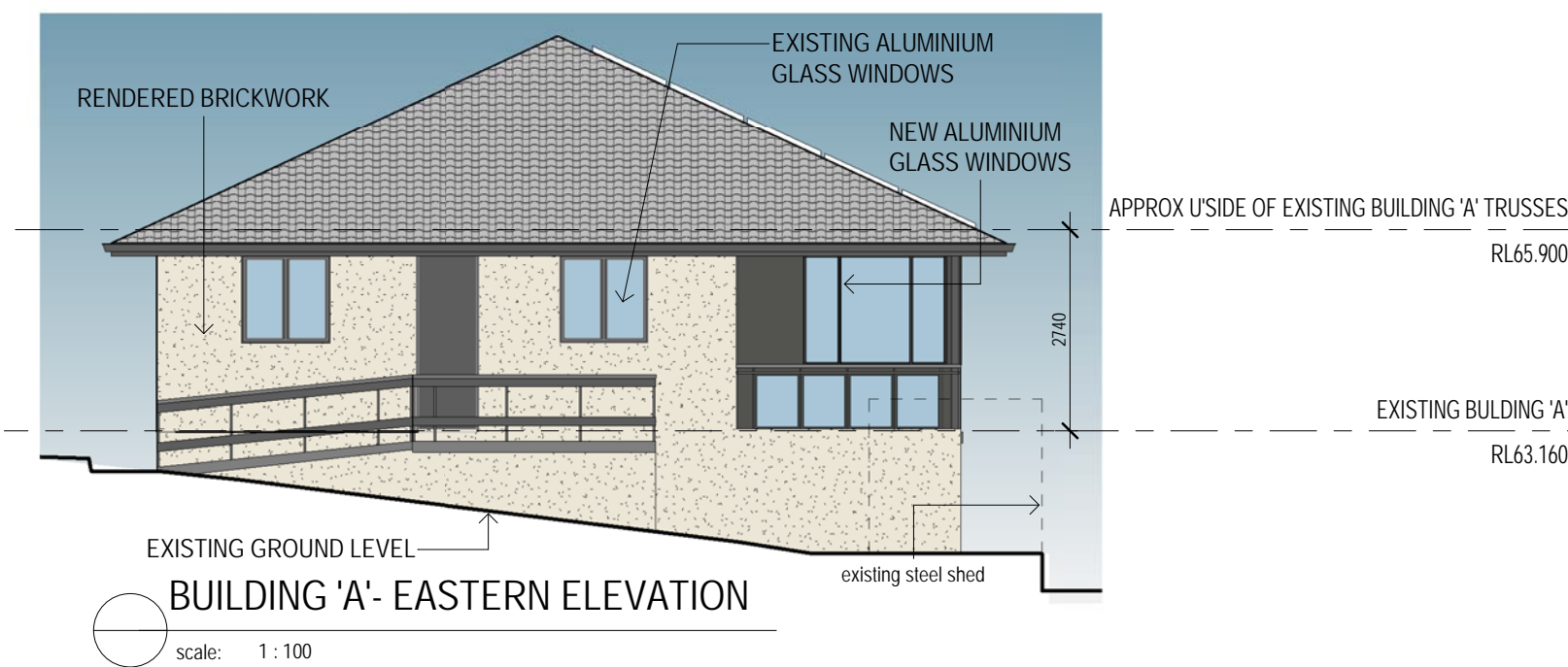
COLORBOND IRONSTONE: GUTTERS
- EXISTING POSTS & WINDOW FRAMES TO MATCH COLOUR
- TEXTURED PAINT TO NEW HARDITEX CLAD WALLS

COLORBOND WINDSPRAY: METAL SHEET ROOFING
- EXISTING & NEW TILE ROOFS TO MATCH COLOUR

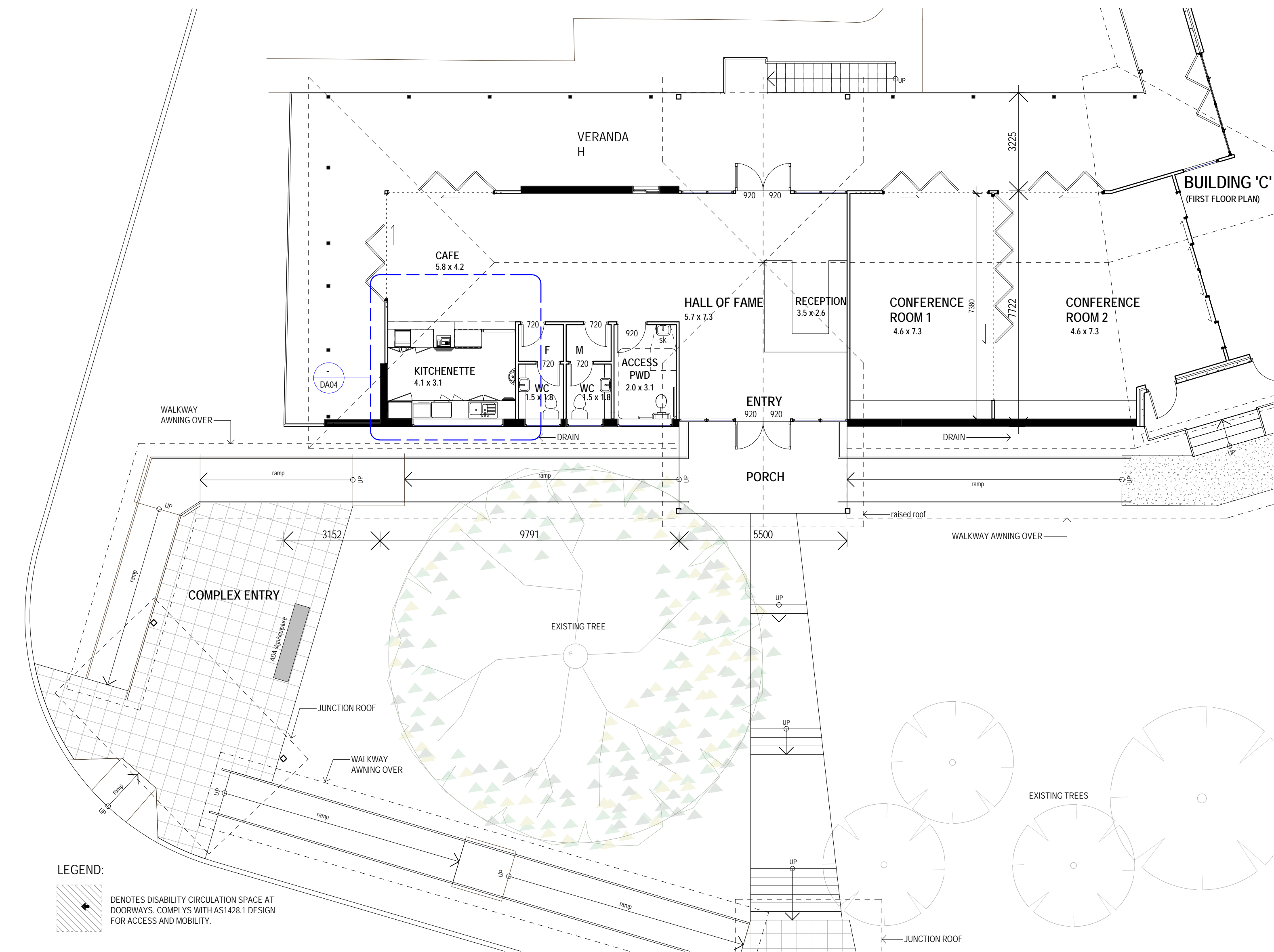
DULUX VIVID WHITE: RENDERED WALLS

DULUX PEPLUM QUARTER: BATTEN SCREENS & LOUVRE SCREENS

SELECTED ROCK VENEER



EXTERNAL COVERED WALKWAYS
NOT SHOWN ON ELEVATIONS FOR CLARITY



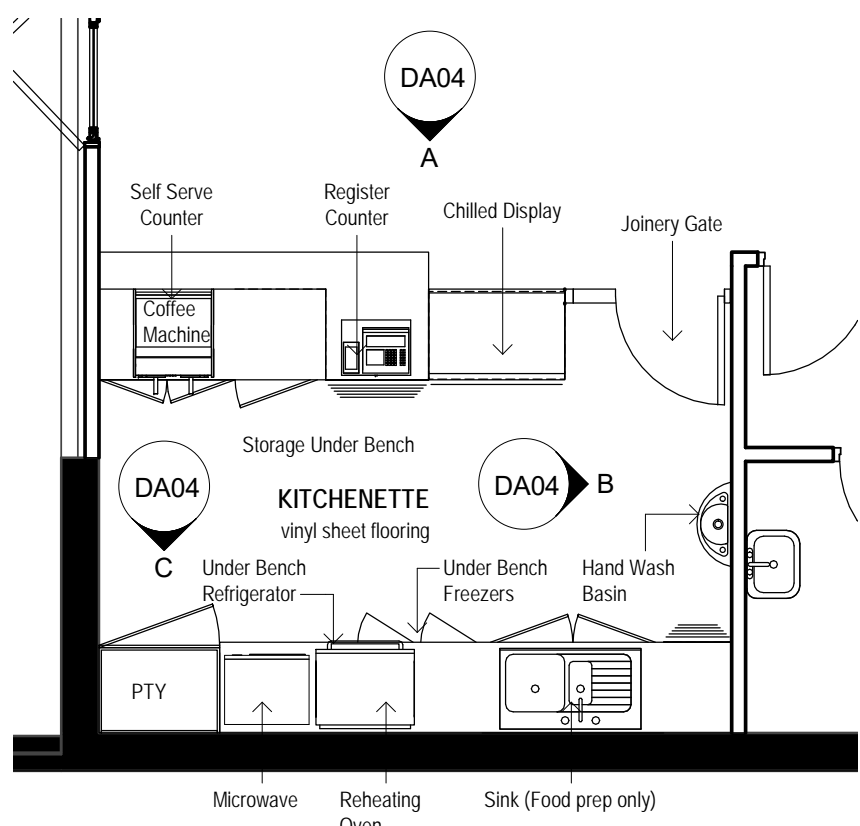
EXISTING BUILDING 'B' - PROPOSED FLOOR PLAN

scale: 1:100

Cold Foods stored in Fridge	Foods stored in Chilled Display Unit	Cold Foods stored in Freezer	Non-Perishable Foods stored in Pantry
Cheeses	Cakes	pre-packaged pies and sausage rolls	Sugar
Sliced meats	Croissants	Bread	Coffee
Butter	Various breads (banana, raisin)	Ice Cream	Tea bags
Milk	Muffins		Cereals
Water	Donuts		Unopened sauces
Soft drinks	Pre-packaged sandwiches		Salt and Pepper
Juices	Pre-packaged pies and sausage rolls		Unopened soft drinks
Sauces, mayonnaise	Pre-packaged wraps		Chocolate Mixture (for hot chocolates)
Tomatoes	Juices		
Cakes	Yoghurt		
Yoghurt			
Pre-packaged sandwiches			
Pre-packaged pies and sausage rolls			
Pre-packaged wraps			

DELIVERIES: A staff member will be present at time of deliveries to ensure that the goods are correct and food is transferred directly to the correct method of storage.
FOOD PREPARATION: Food will be prepared at time of ordering eg. Sandwiches. Sandwiches will be served fresh or toasted in a sandwich press. Heated foods will be warmed in a microwave oven, eg. sausage rolls and croissants. A selection of hot beverages eg. Coffee, hot chocolate and tea will be available for purchase. Cold beverages will be available for purchase eg. bottles of water, soft drink and flavoured milk. A "self-serve counter" will be available for napkins, sugar sachets and plastic cutlery to be collected.

CAFE / KITCHENETTE DETAIL



BUILDING 'B' - KITCHENETTE

scale: 1:50

ELEVATION A

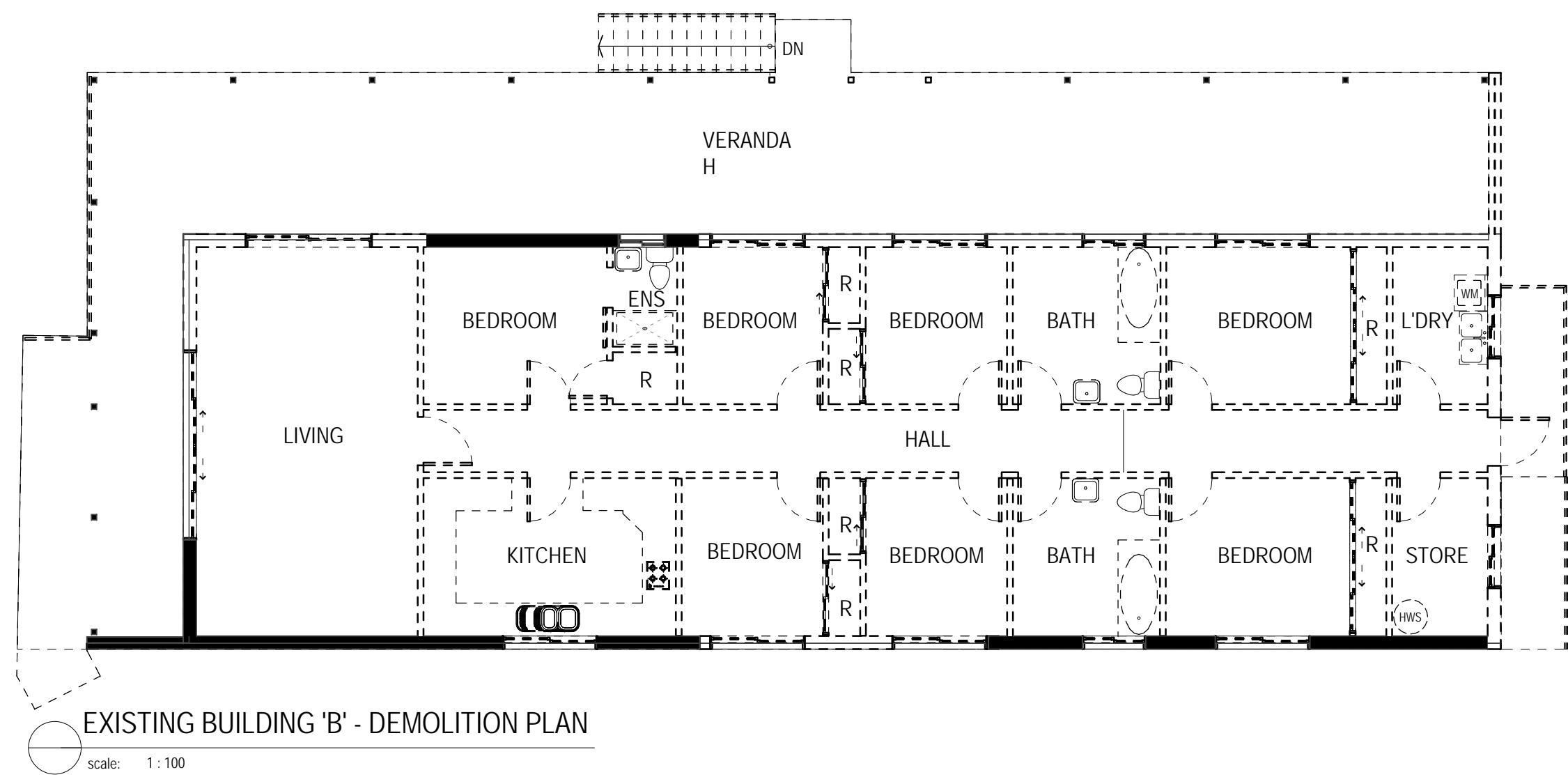
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ELEVATION B

scale: 1:50

ELEVATION C

scale: 1:50



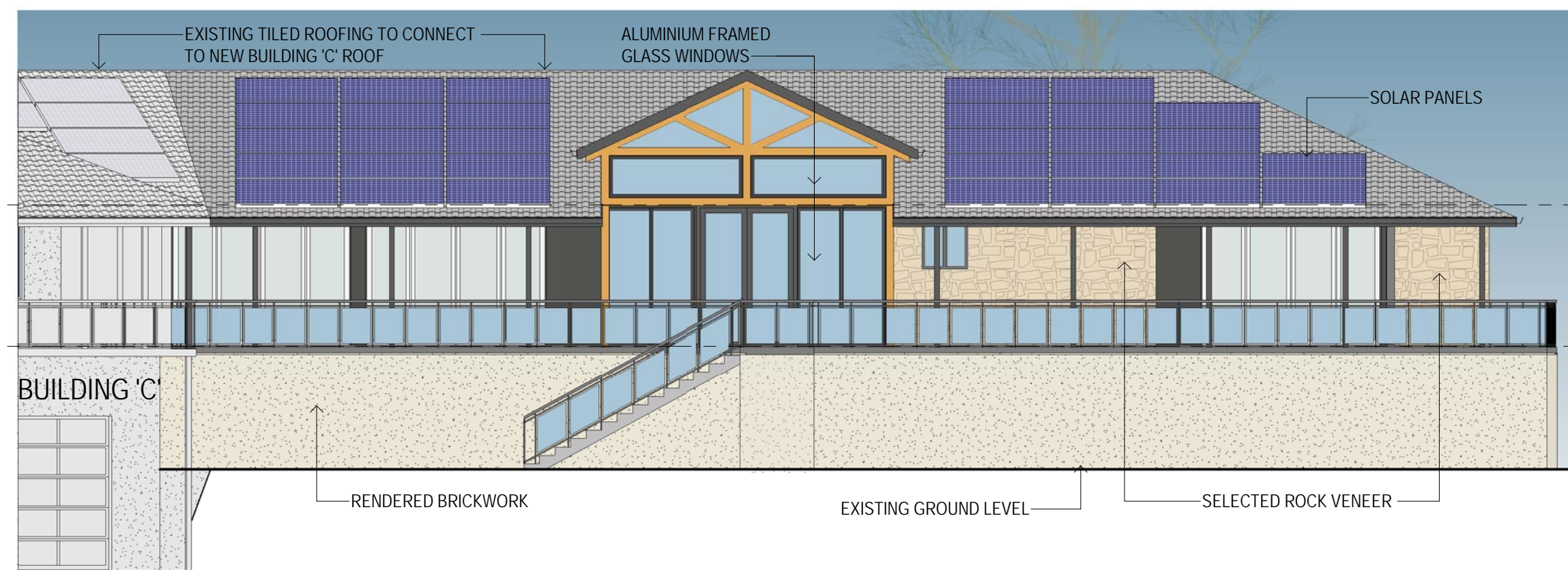
EXISTING BUILDING 'B' - DEMOLITION PLAN

scale: 1:100



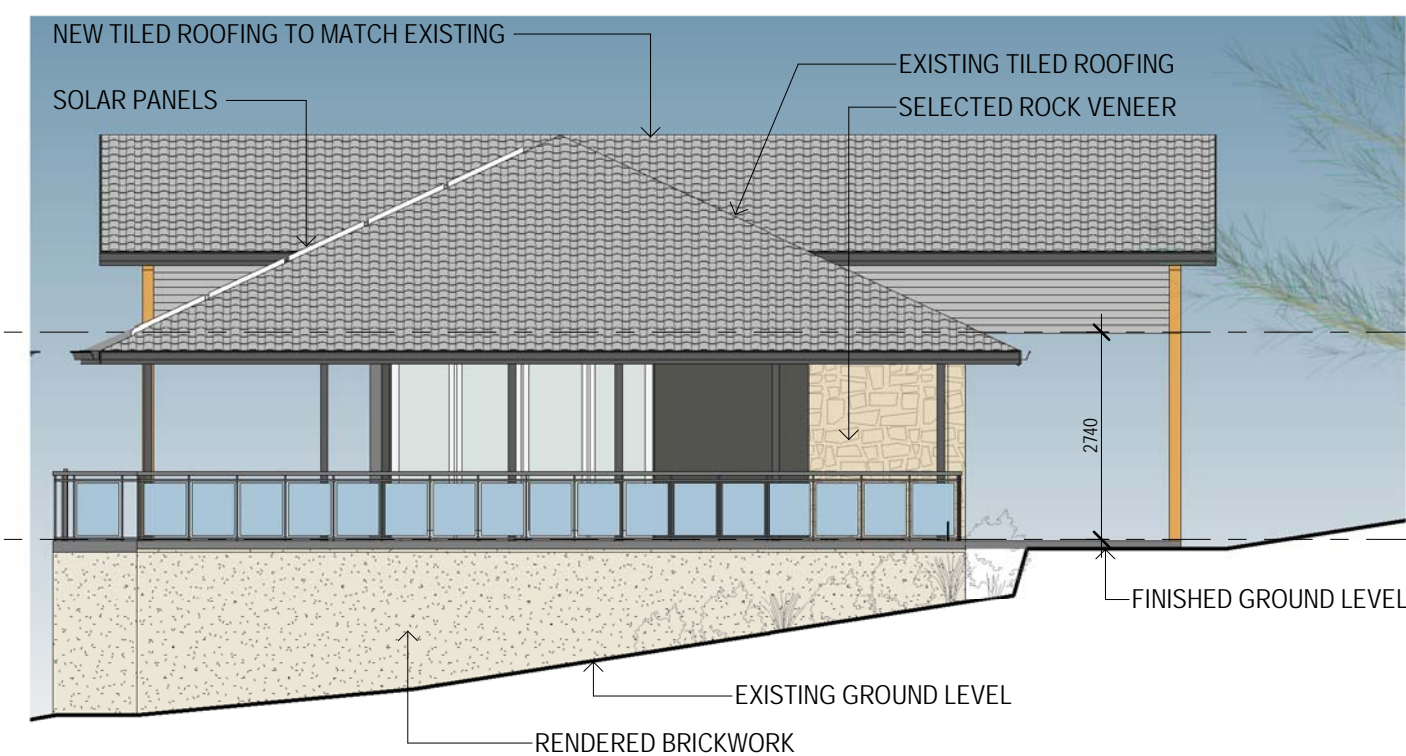
BUILDING 'B' - SOUTHERN ELEVATION

scale: 1:100



BUILDING 'B' - NORTHERN ELEVATION

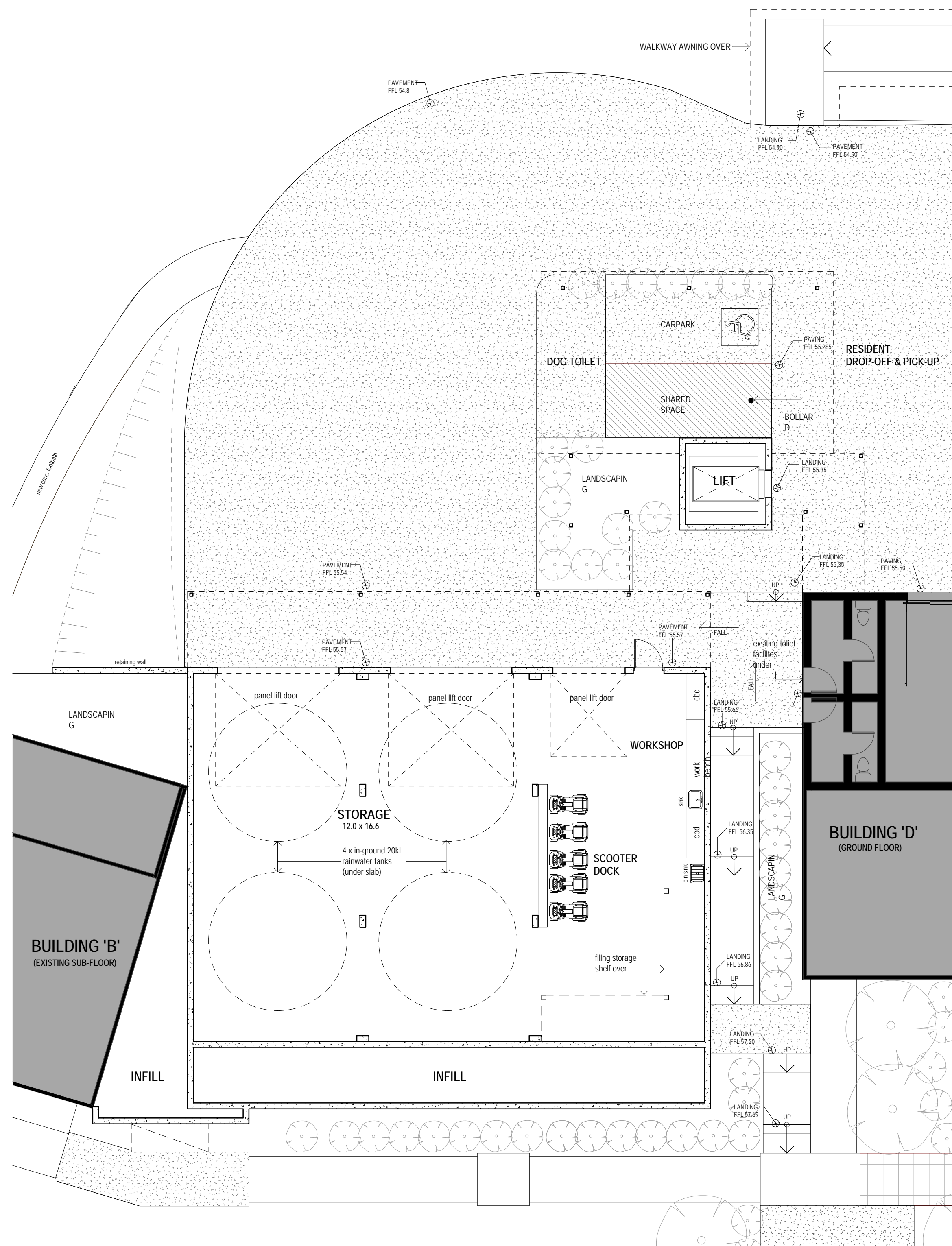
scale: 1:100



BUILDING 'B' - WESTERN ELEVATION

scale: 1:100

EXTERNAL COVERED WALKWAYS
NOT SHOWN ON ELEVATIONS FOR CLARITY

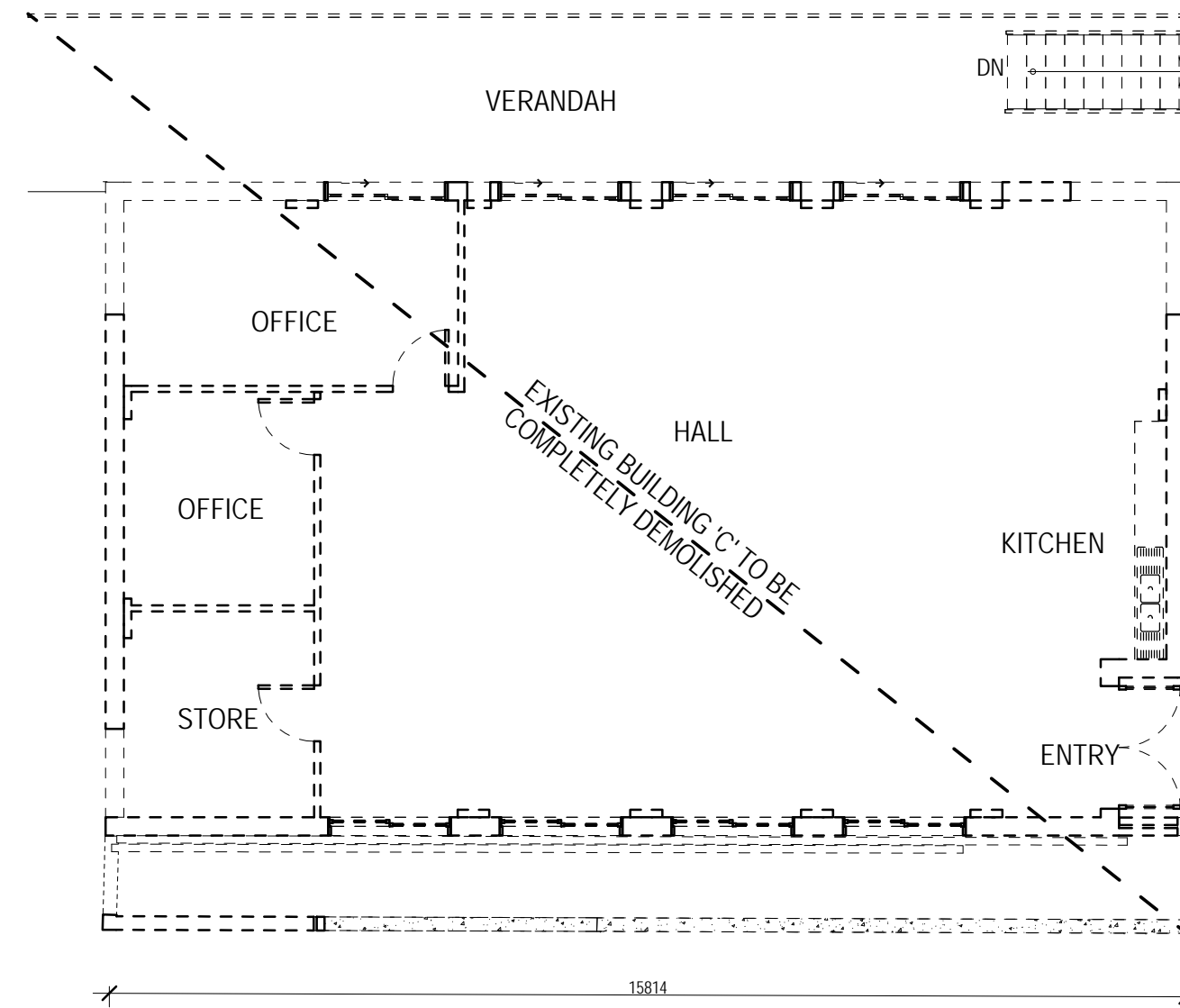


NEW BUILDING 'C' - GROUND FLOOR PLAN

scale: 1 : 100

LEGEND:

← DENOTES DISABILITY CIRCULATION SPACE AT DOORWAYS. COMPLIES WITH AS1428.1 DESIGN FOR ACCESS AND MOBILITY.

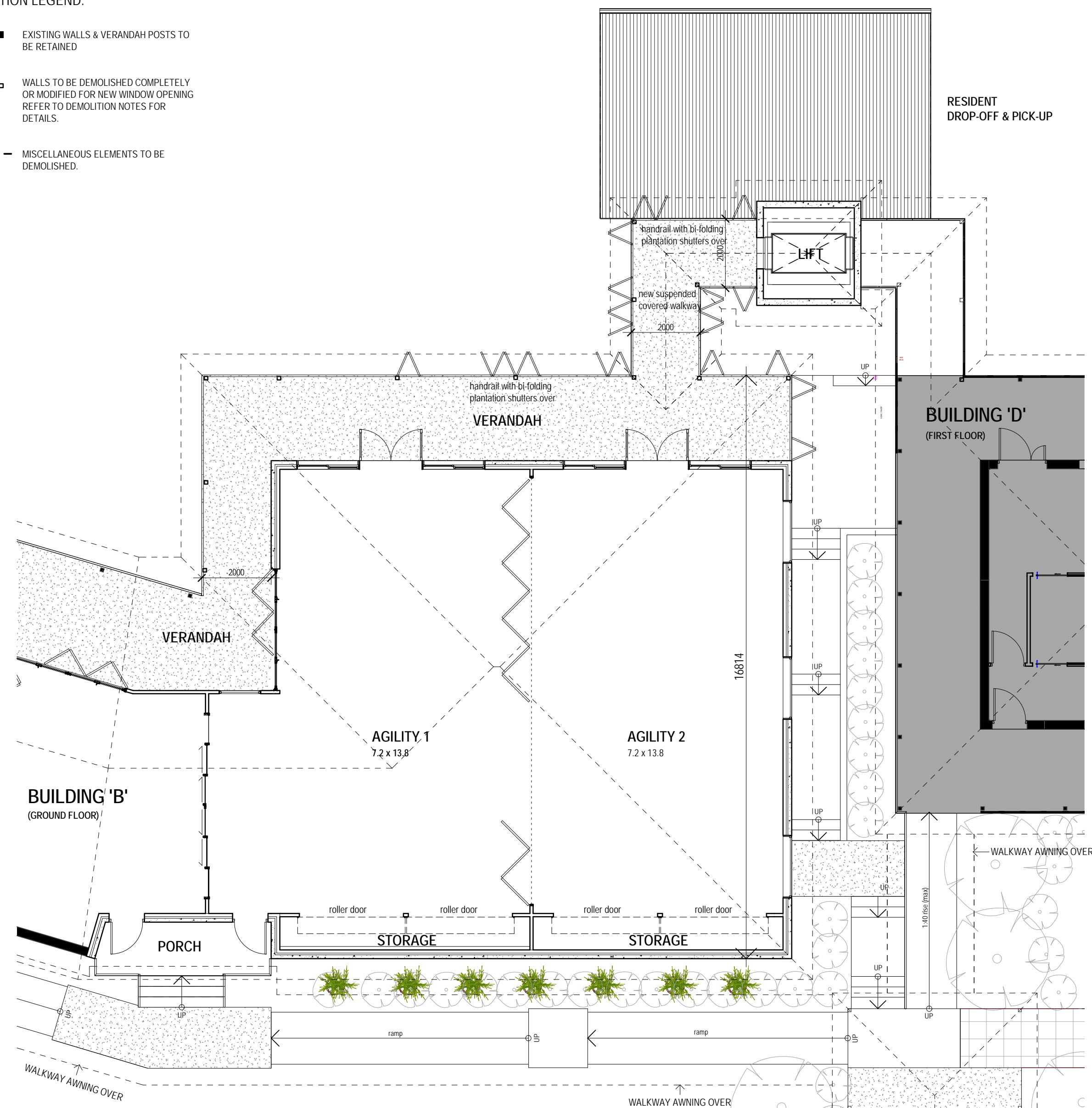


EXISTING BUILDING 'C' - DEMOLITION PLAN

scale: 1 : 100

DEMOLITION LEGEND:

- EXISTING WALLS & VERANDAH POSTS TO BE RETAINED
- WALLS TO BE DEMOLISHED COMPLETELY OR MODIFIED FOR NEW WINDOW OPENING
REFER TO DEMOLITION NOTES FOR DETAILS.
- MISCELLANEOUS ELEMENTS TO BE DEMOLISHED.



NEW BUILDING 'C' - FIRST FLOOR PLAN

scale: 1 : 100

Therian Pty Ltd
10/75 Waterway Drive, Coomera QLD, Australia 4209
TEL: (07) 5657-6777 EMAIL: info@therian.com.au
FAX: (07) 5657-6788 WEB: www.therian.com.au



DESIGN NOT BE AMENDED WITHOUT REFERENCE TO DESIGN MANAGER

REV	DATE	AMENDMENT	APPROVE
A	04/06/17	FOR DA APPROVAL	GB
B	20/12/17	AMENDEMENTS TO ADDRESS COUNCIL'S R.F.I	GB

CLIENT



996 Old Princes Hwy, Sydney NSW 2233
PH: 1800 688 364 FAX: 02 9699 1171
www.assistedogs.org.au

FOR PROJECT ENQUIRIES: DESIGNER:

REFER: **GAVIN BIGGS** PH: (07) 5657 677.

CONSULTANT

NOTES:
Do not scale the drawings - use figured dimensions taken from the drawings.
Verify all dimensions on site prior to commencement of any construction.
Refer any discrepancies to Therian Pty Ltd for resolution.
All work shall comply with the current edition of the National Construction Code (NCC) - Building Code of Australia (BCA) - Volume 1, relevant Australian Standards, Local Authority requirements and manufacturers installation specifications.
Comply with the Workplace Health & Safety requirements for the State/Territory in which the work is to be performed.



PROJECT:

NATIONAL TRAINING CENTRE REDEVELOPMENT

ADDRESS

8 AUSTIN PLACE, ORCHARD HILLS, NSW 2748

DESCRIPTION:

BUILDING 'C' - PROPOSED DESIGN

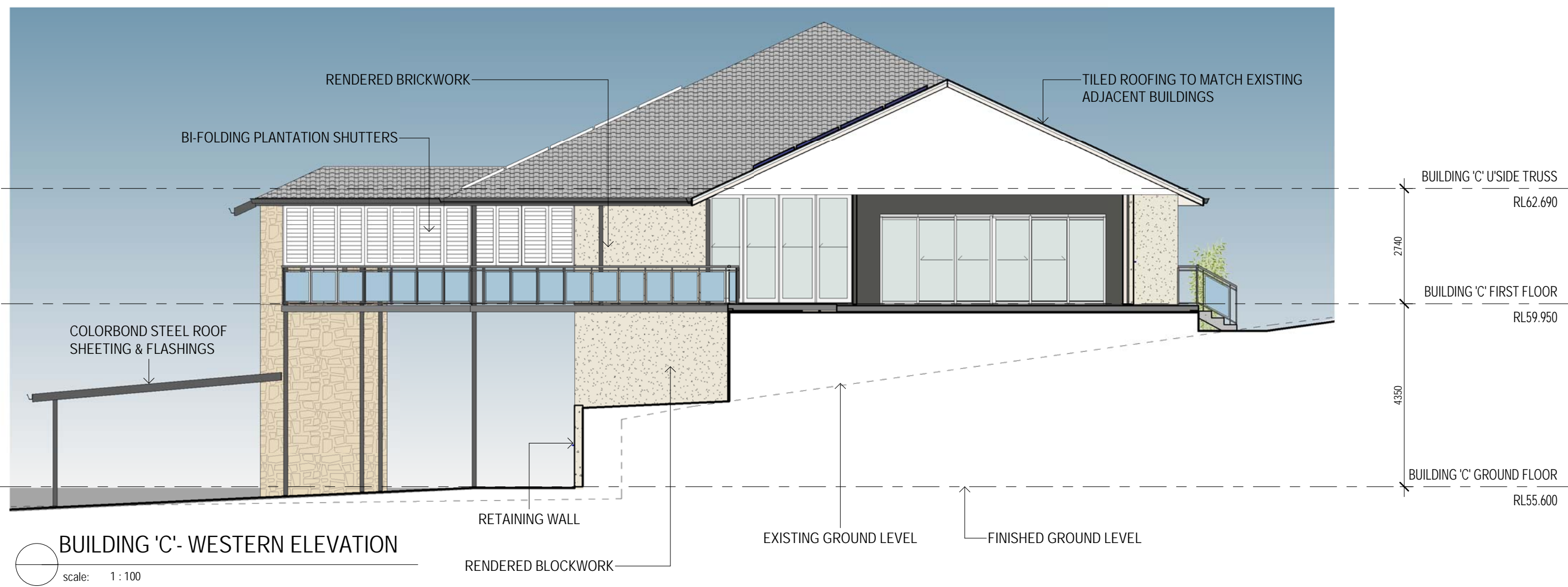
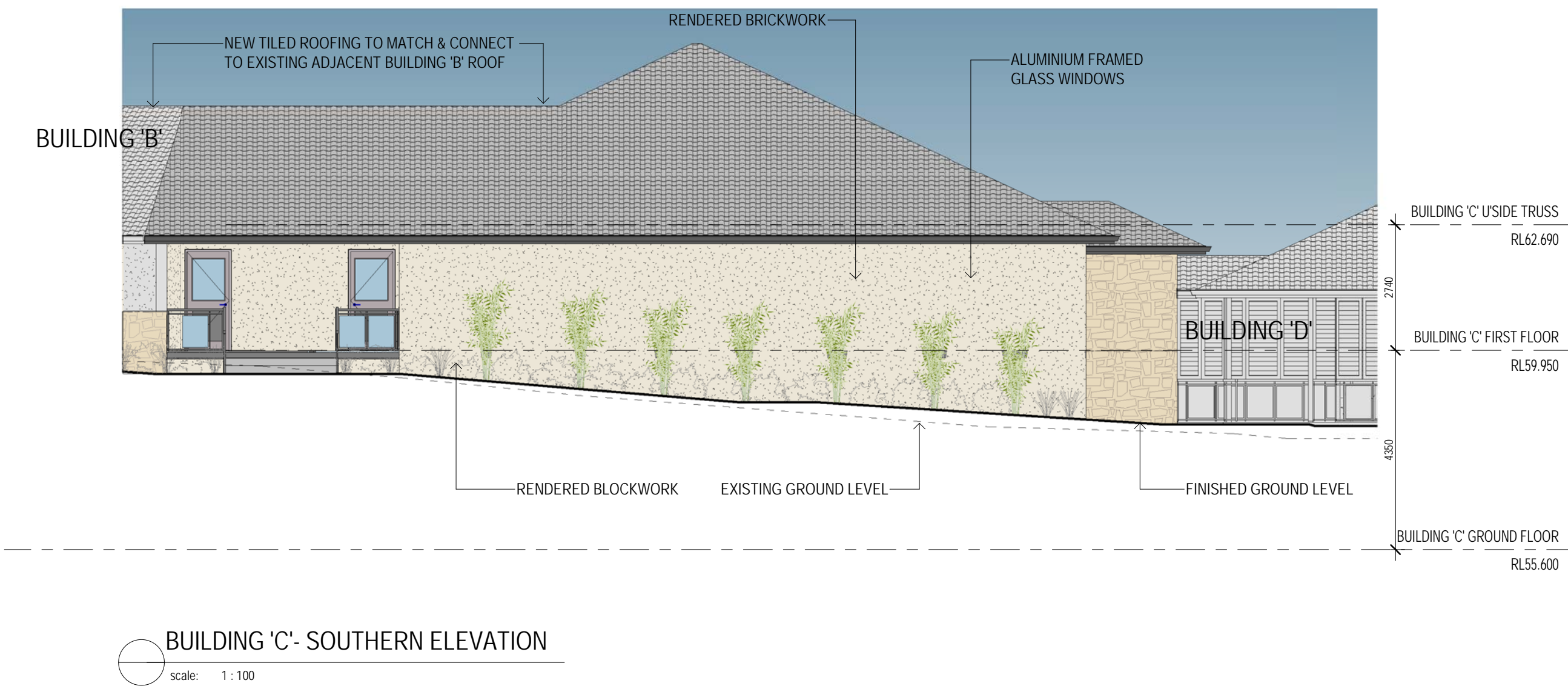
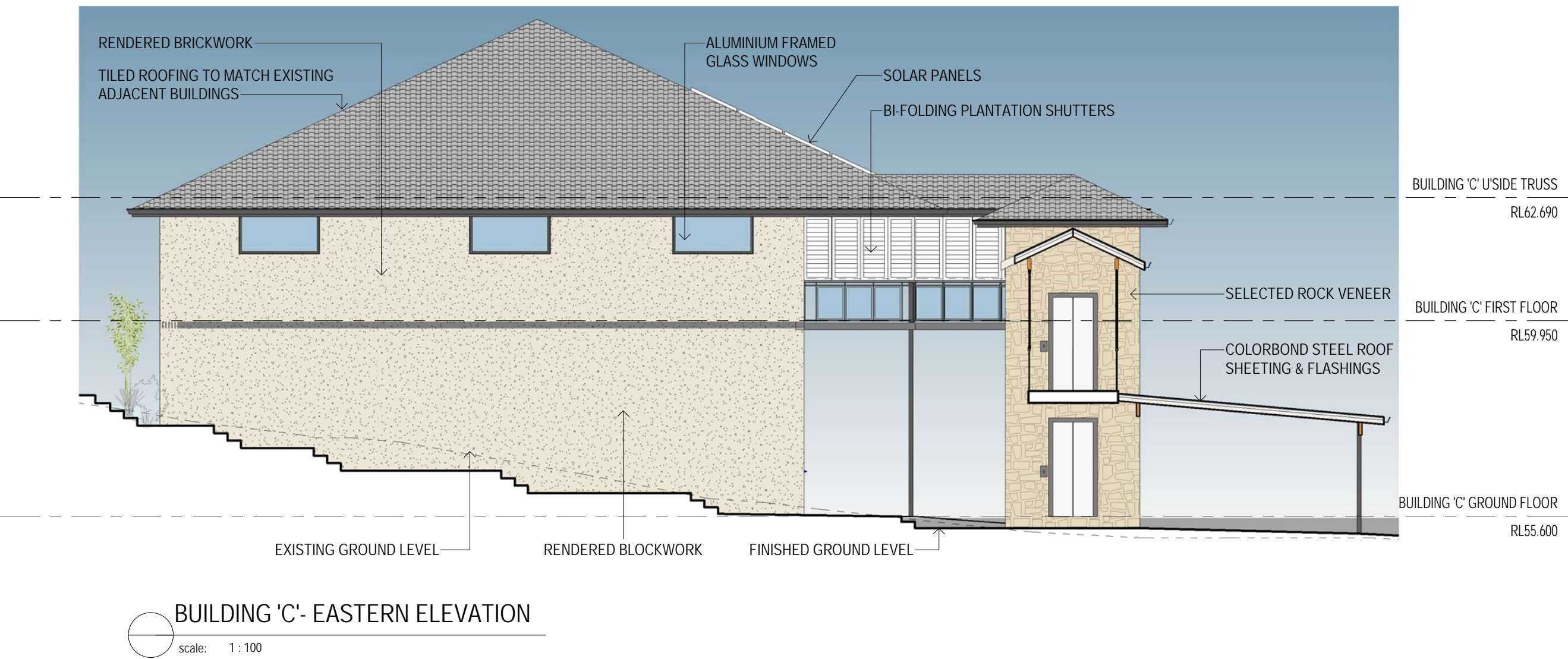
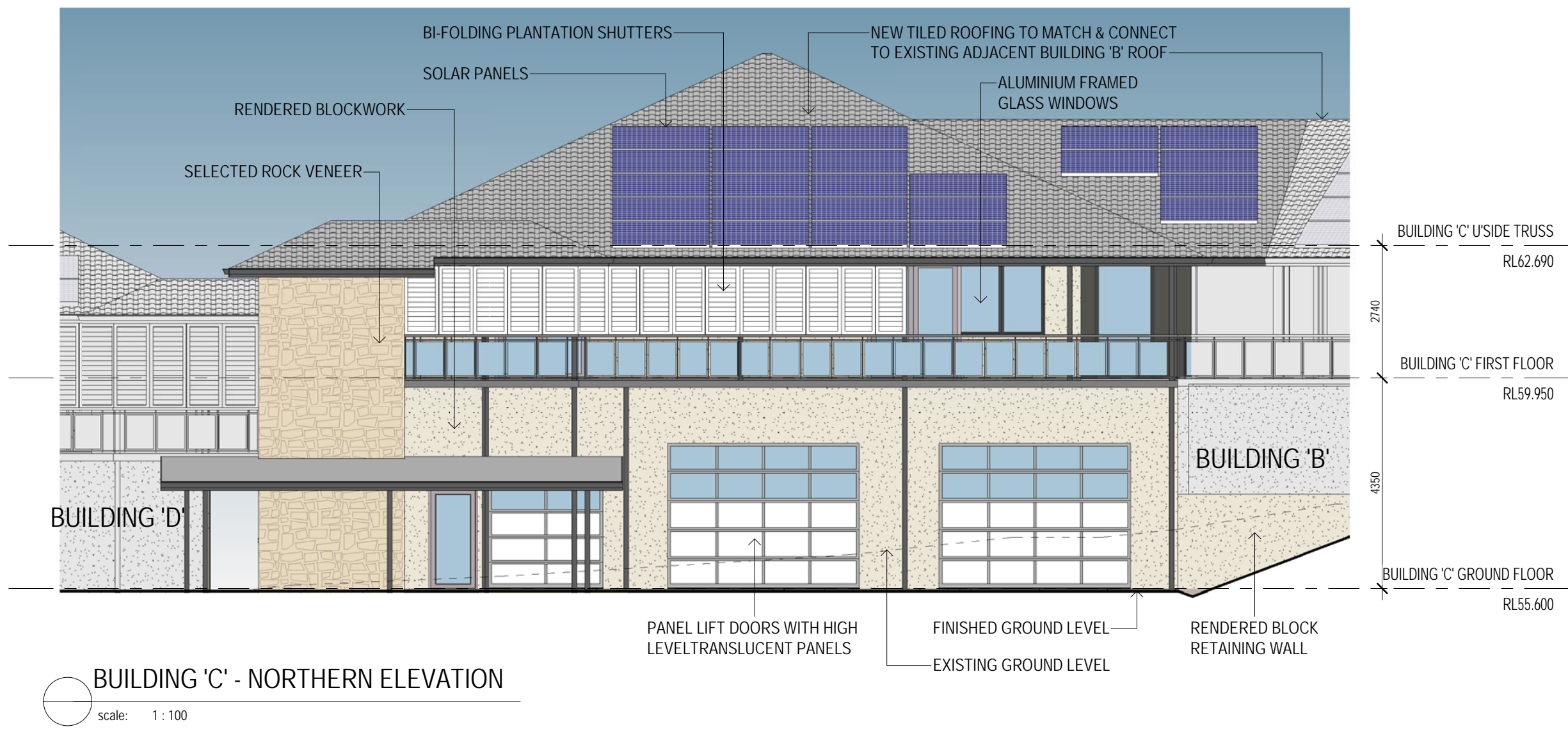
PROJECT No. _____

A013

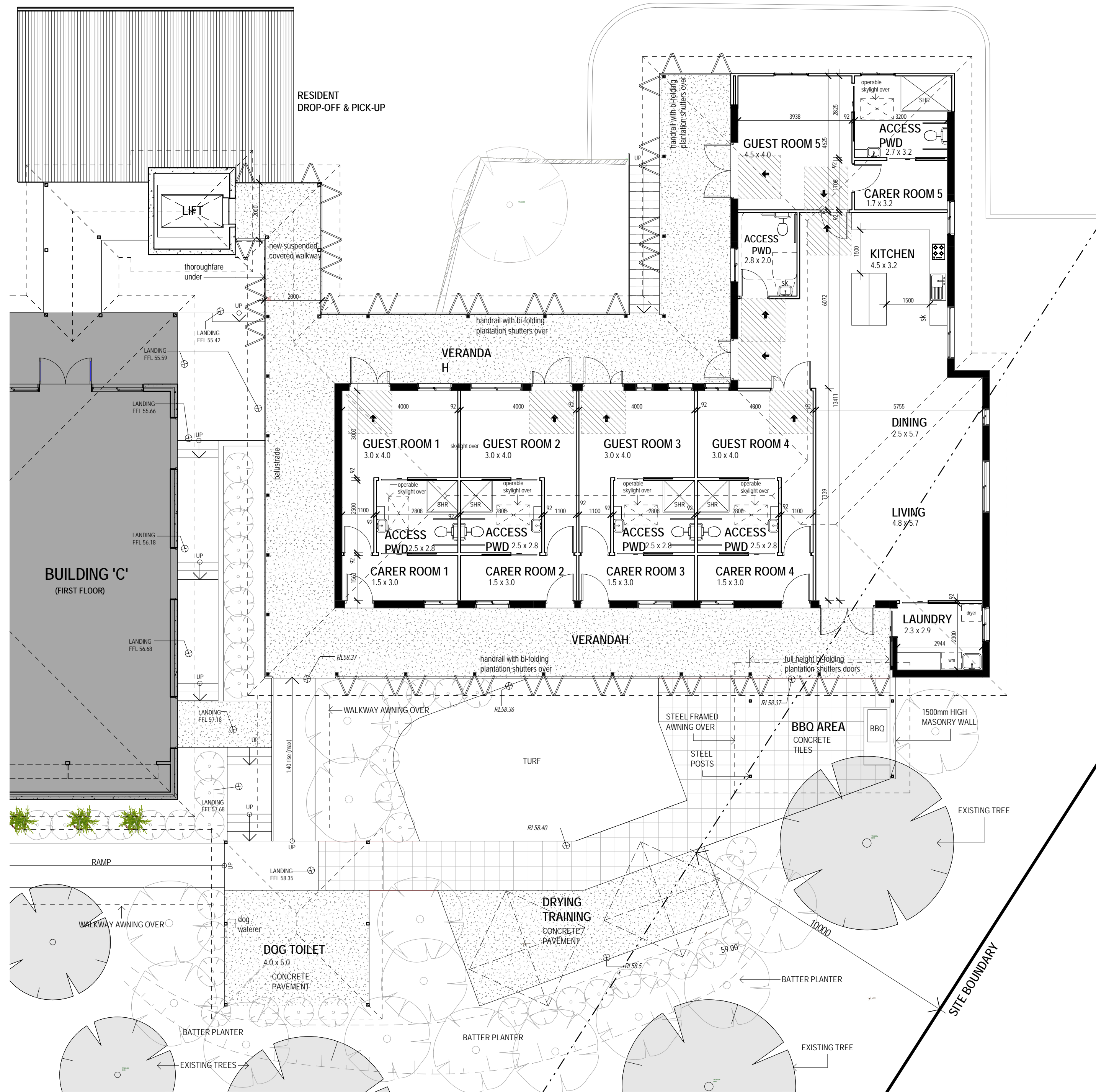
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DWG SCALE
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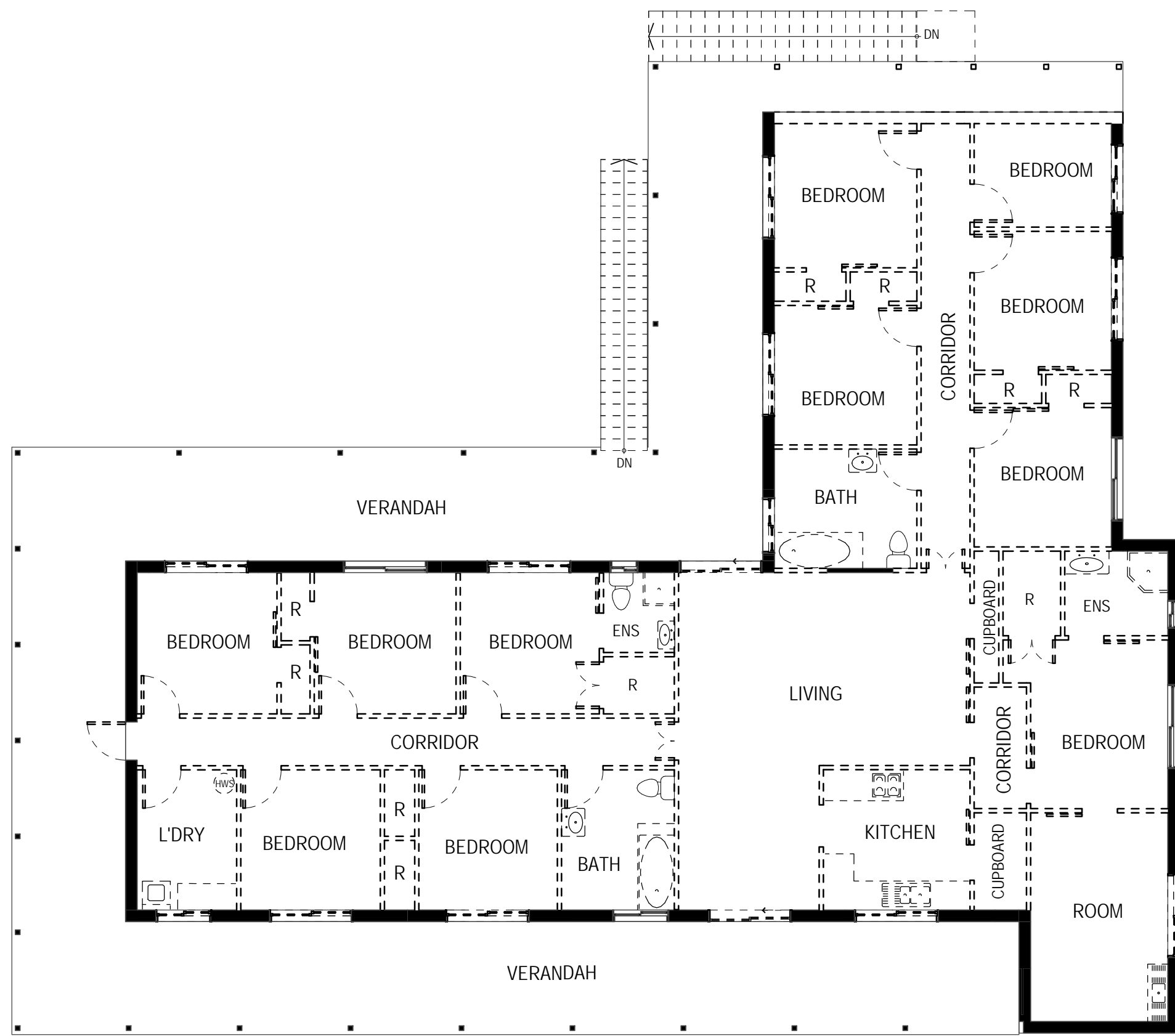
TH DRAWING



EXTERNAL COVERED WALKWAYS
NOT SHOWN ON ELEVATIONS FOR CLARITY

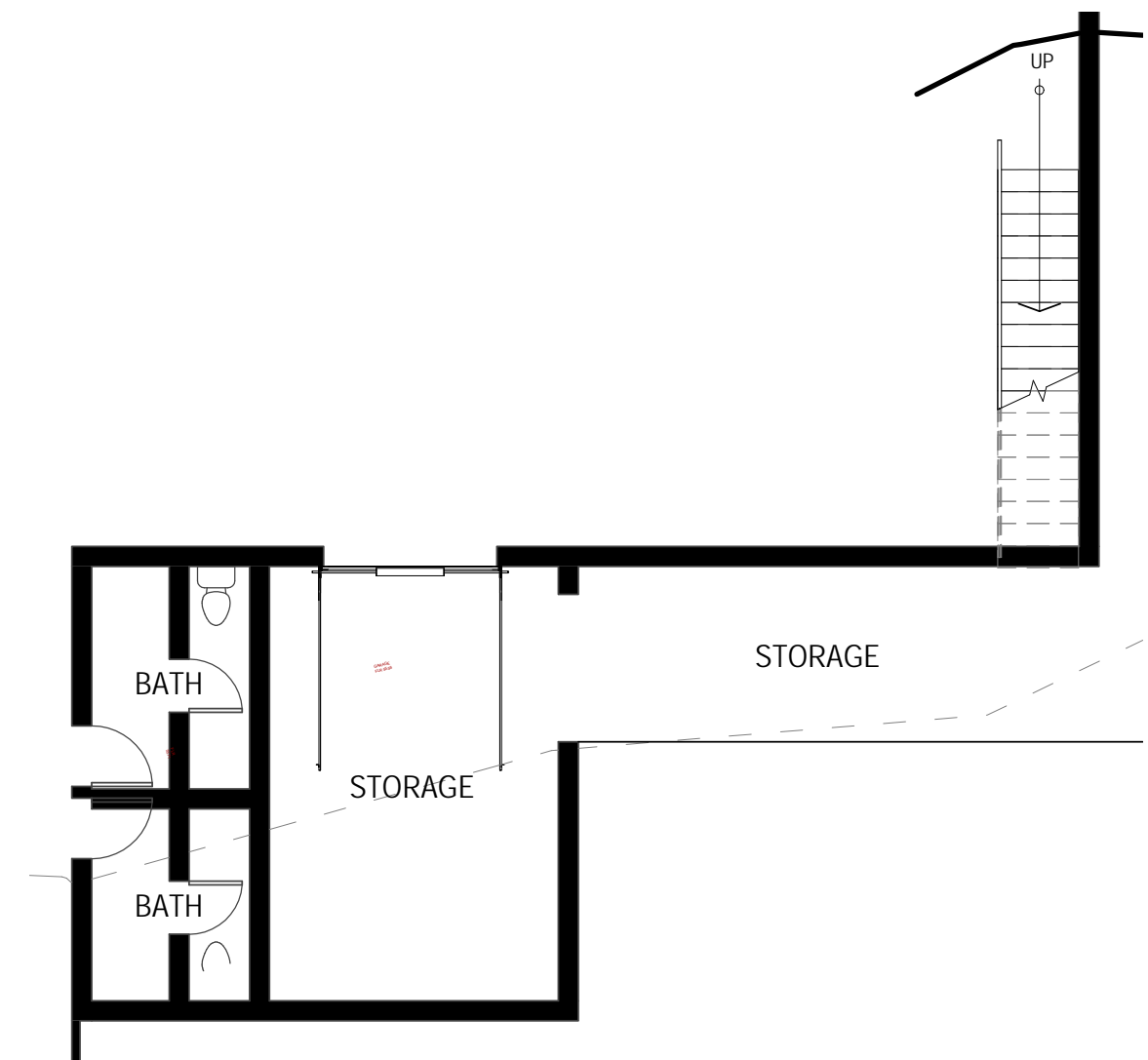


EXISTING BUILDING 'D' - PROPOSED FIRST FLOOR PLAN
scale: 1:100

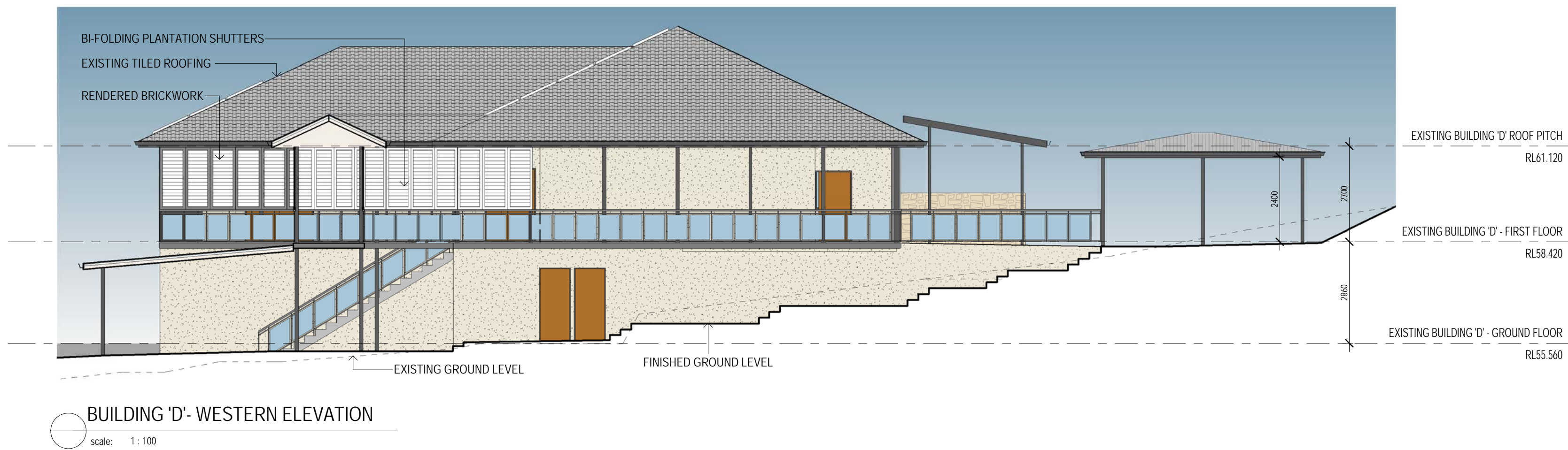
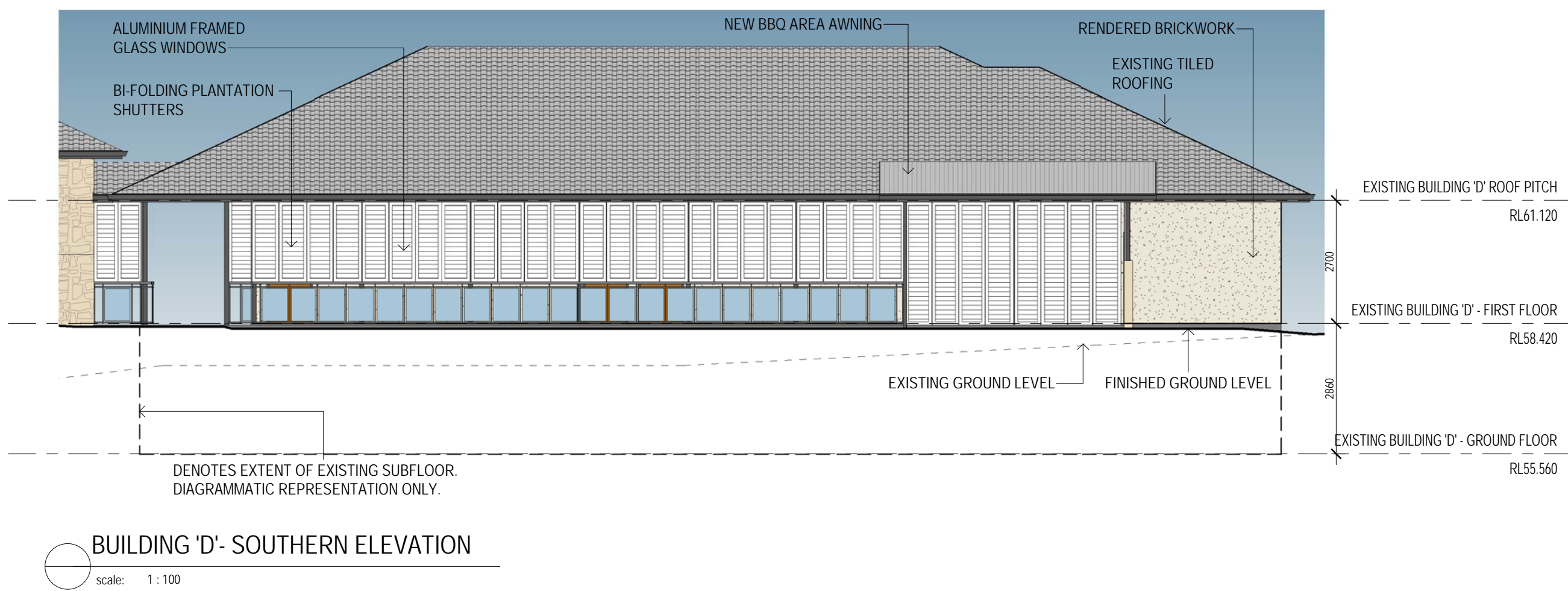
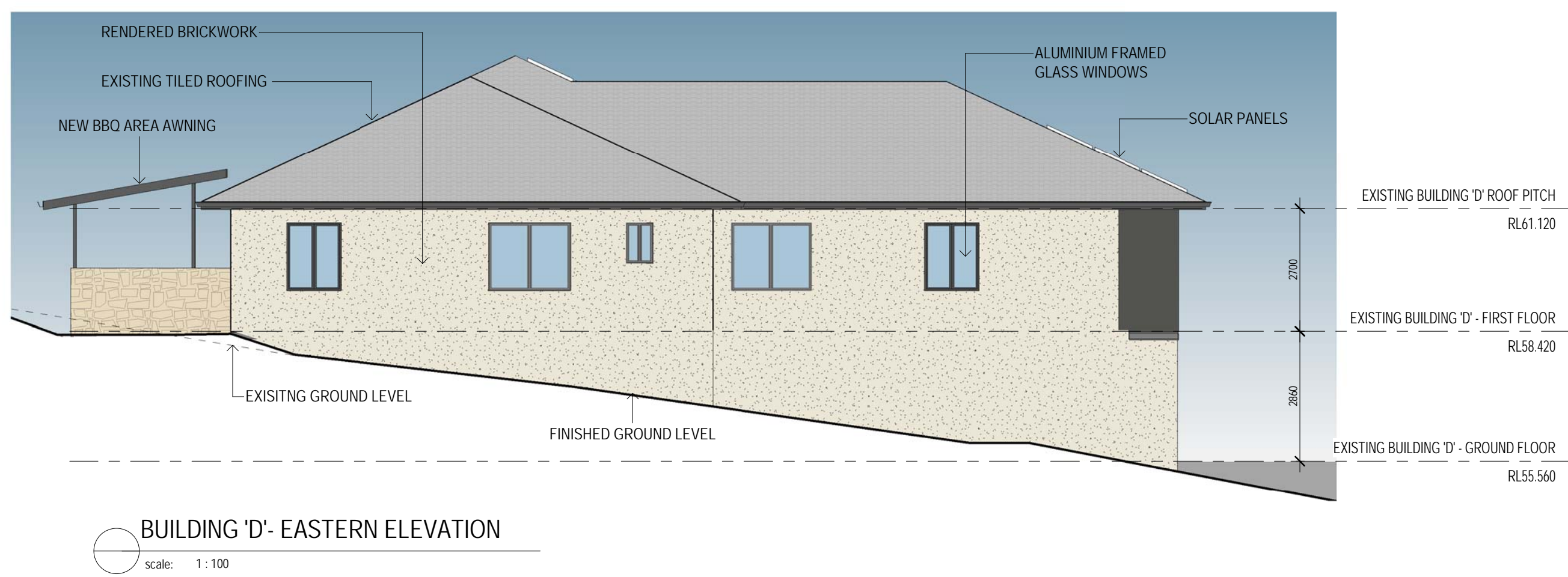
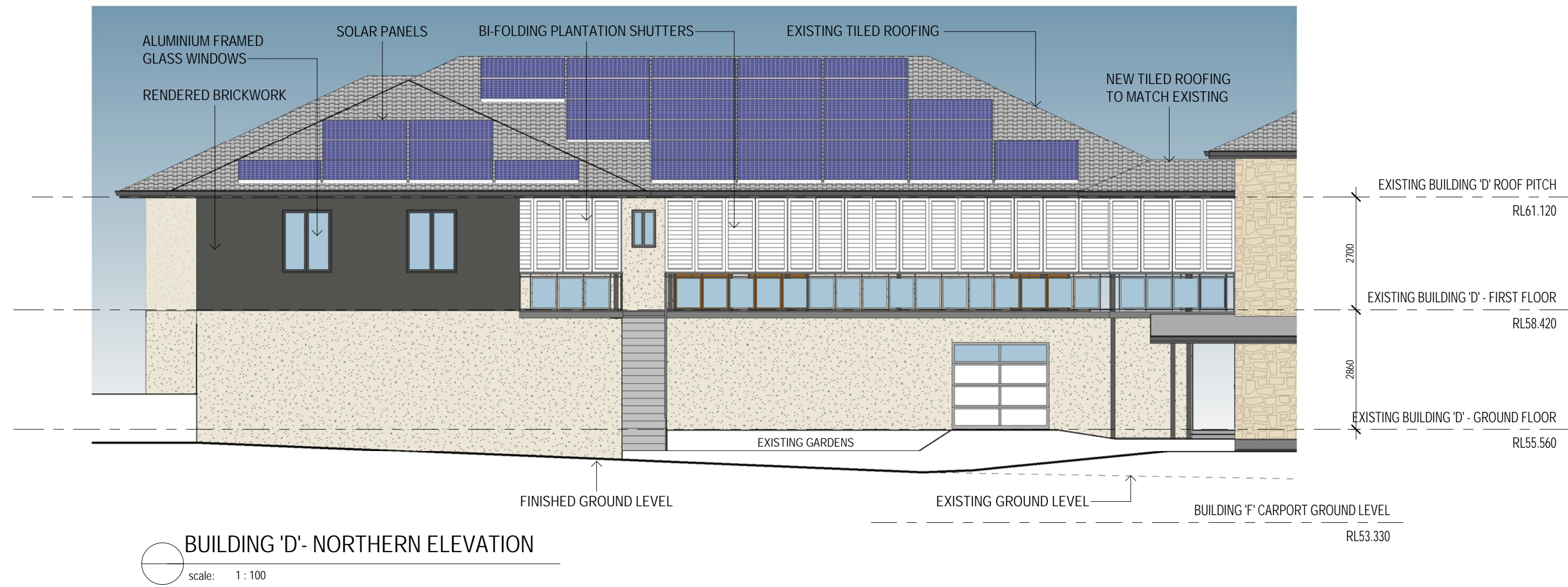


EXISTING BUILDING 'D' - DEMOLITION FIRST FLOOR PLAN
scale: 1:100

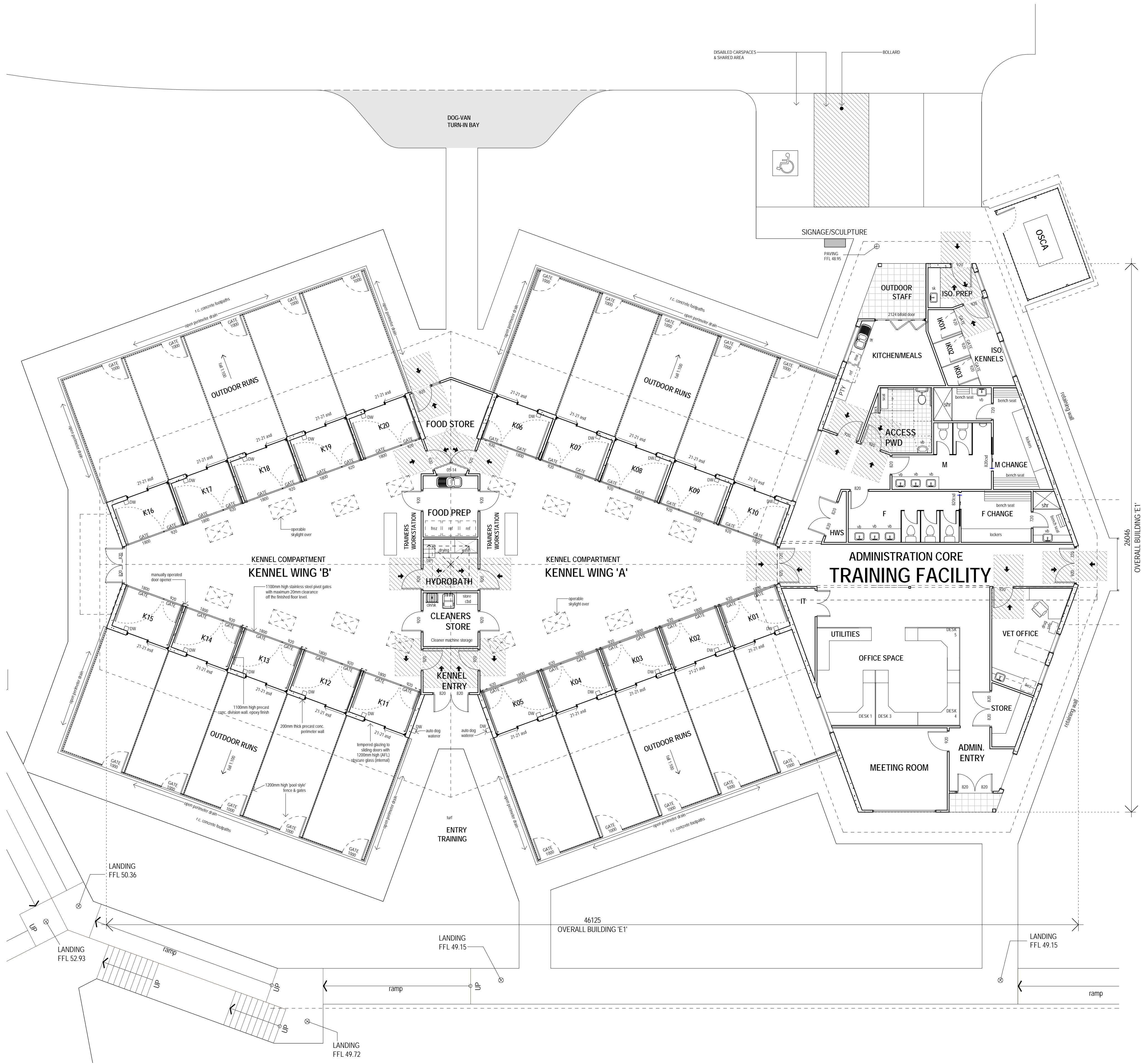
- DEMOLITION LEGEND:
- EXISTING WALLS & VERANDAH POSTS TO BE RETAINED
 - WALLS TO BE DEMOLISHED COMPLETELY OR MODIFIED FOR NEW WINDOW OPENING REFER TO DEMOLITION NOTES FOR DETAILS.
 - MISCELLANEOUS ELEMENTS TO BE DEMOLISHED.



EXISTING BUILDING 'D' - PROPOSED GROUND FLOOR PLAN
scale: 1:100

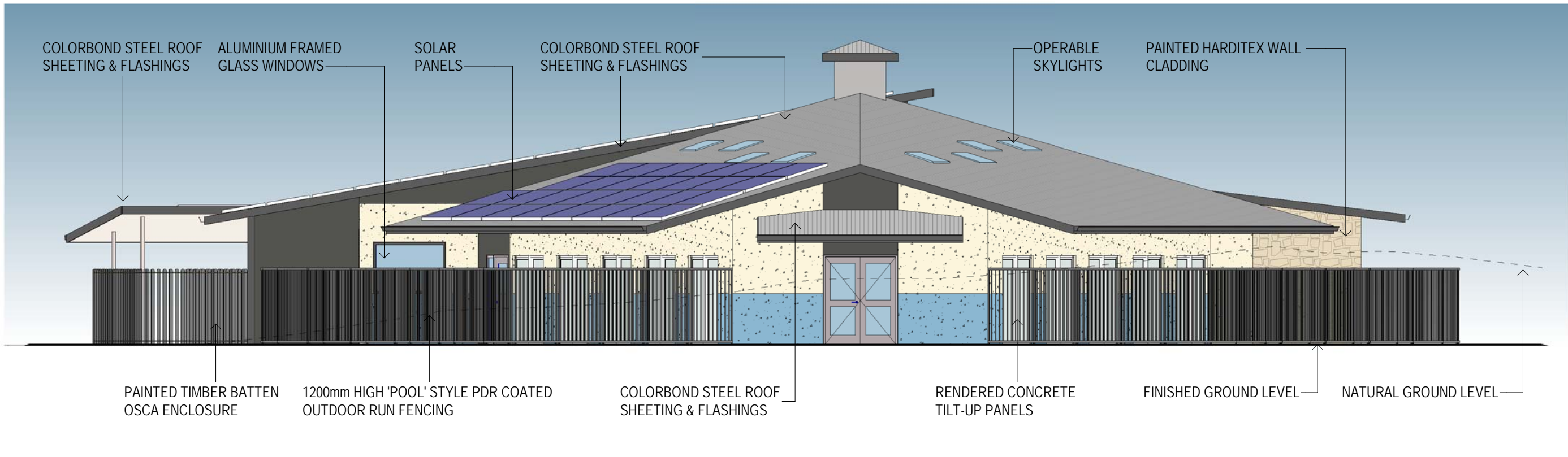


EXTERNAL COVERED WALKWAYS
NOT SHOWN ON ELEVATIONS FOR CLARITY

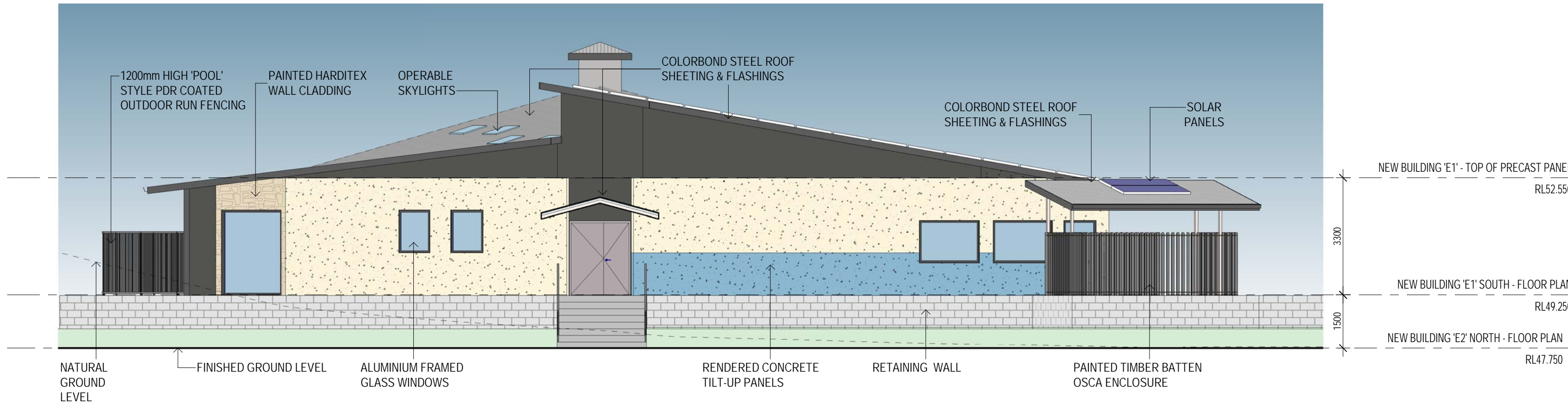


LEGEND:
DENOTES DISABILITY CIRCULATION SPACE AT DOORWAYS, COMPLYS WITH AS1428.1 DESIGN FOR ACCESS AND MOBILITY.

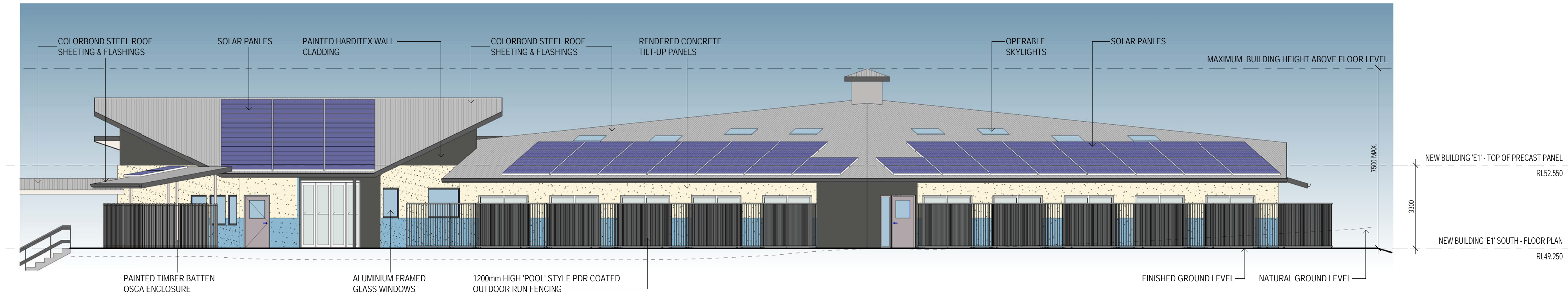
NEW TRAINING FACILITY BUILDING 'E1' - FLOOR PLAN
scale: 1 : 100



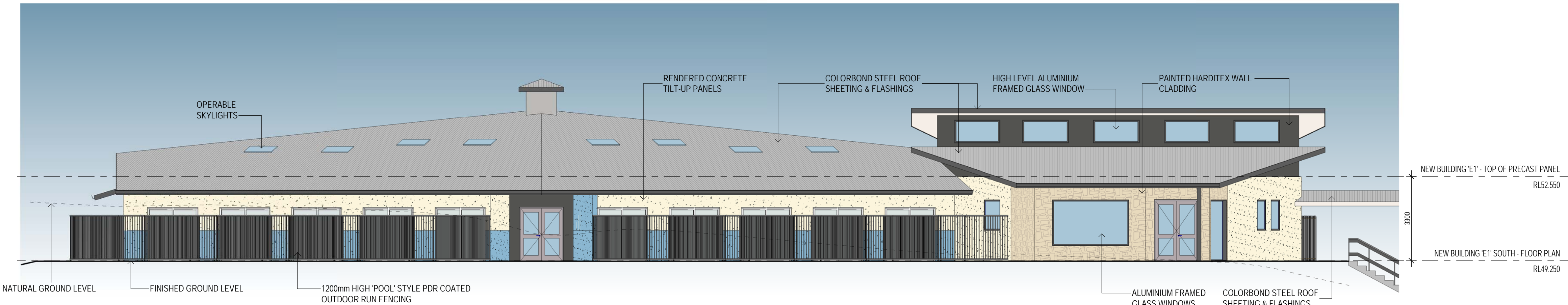
TRAINING FACILITY BUILDING 'E1' - SOUTHERN ELEVATION
scale: 1 : 100



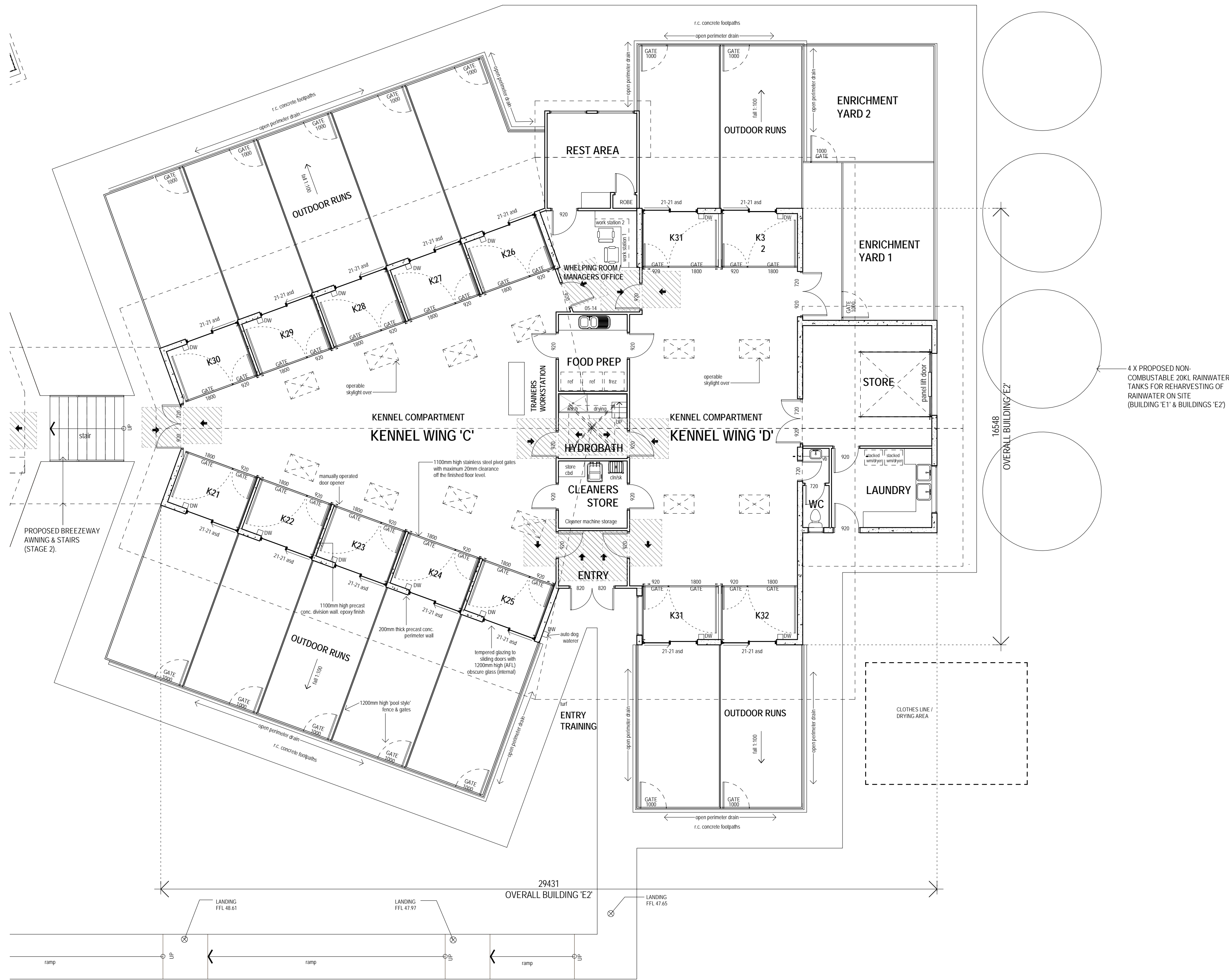
TRAINING FACILITY BUILDING 'E1' - NORTHERN ELEVATION
scale: 1 : 100



TRAINING FACILITY BUILDING 'E1' - WESTERN ELEVATION
scale: 1 : 100



TRAINING FACILITY BUILDING 'E1' - EASTERN ELEVATION
scale: 1 : 100

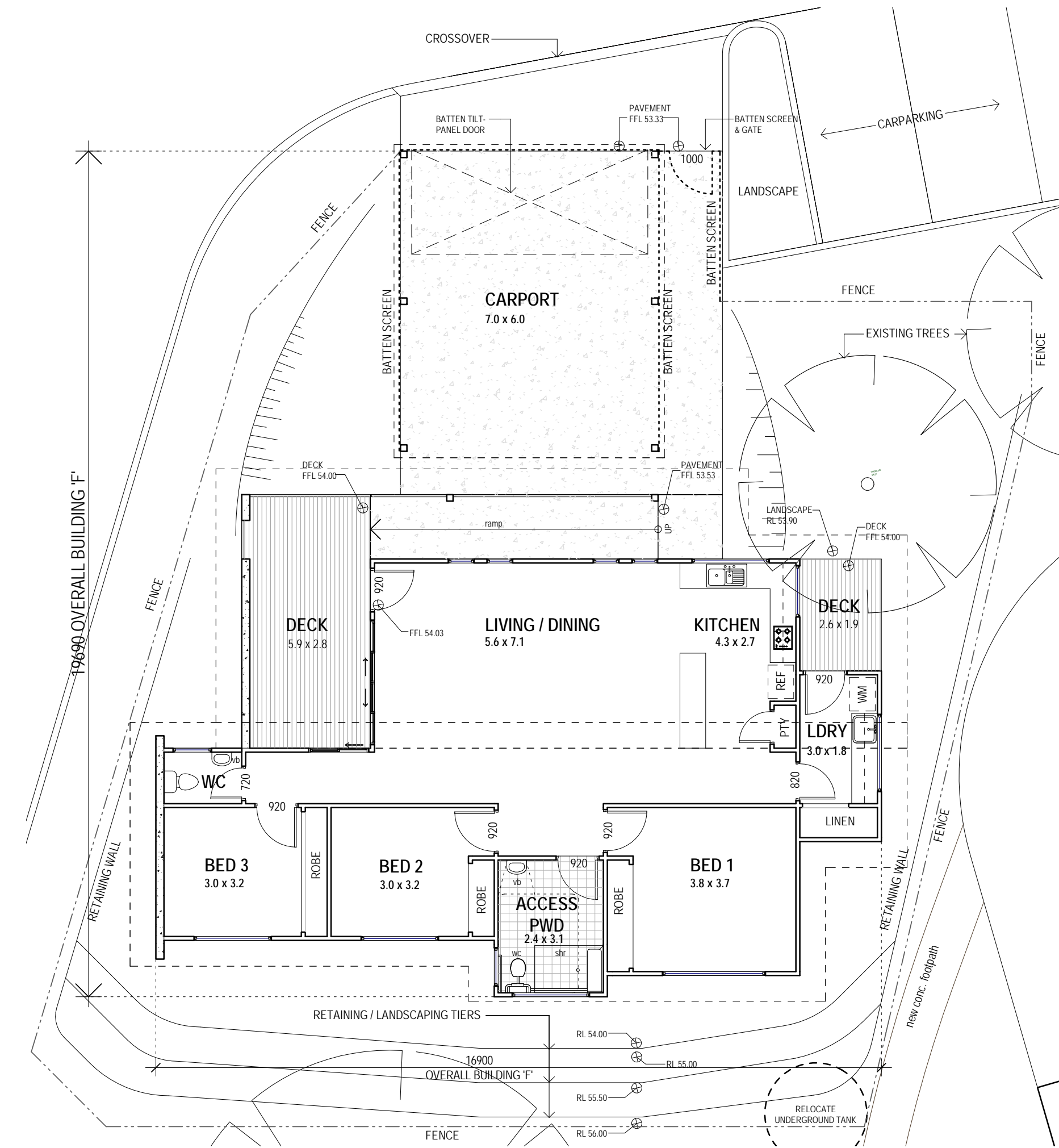


NEW TRAINING FACILITY BUILDING 'E2' - FLOOR PLAN
scale: 1 : 100

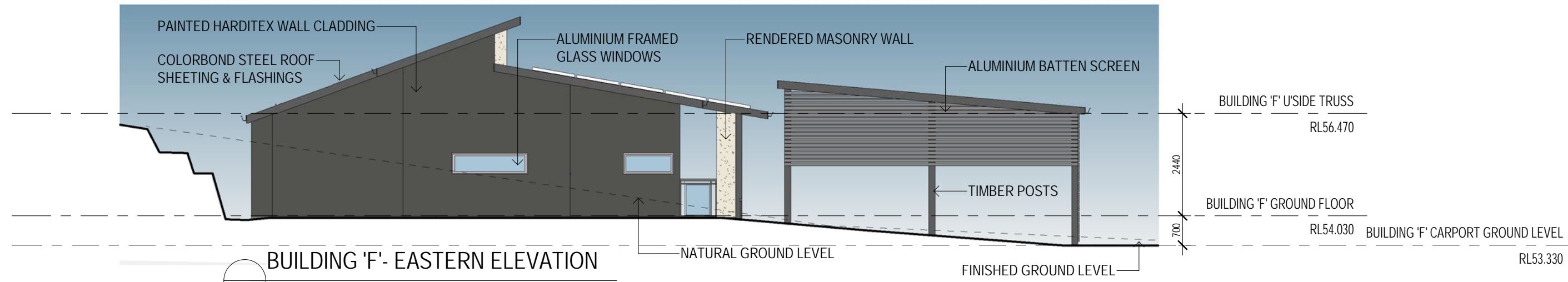
LEGEND:

Denotes disability circulation space at doorways. Complies with AS1428.1 Design for Access and Mobility.

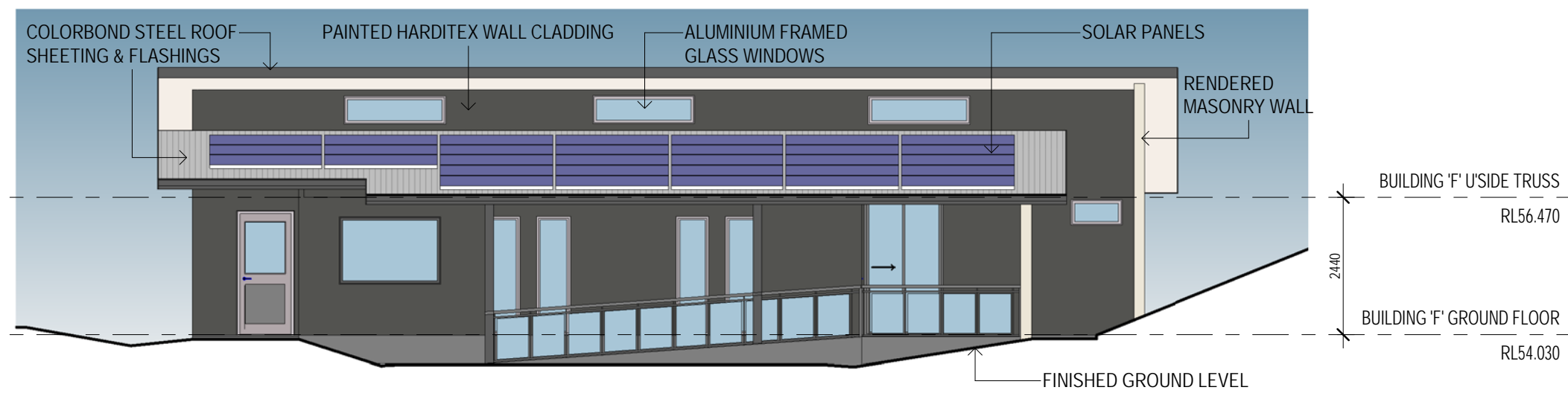




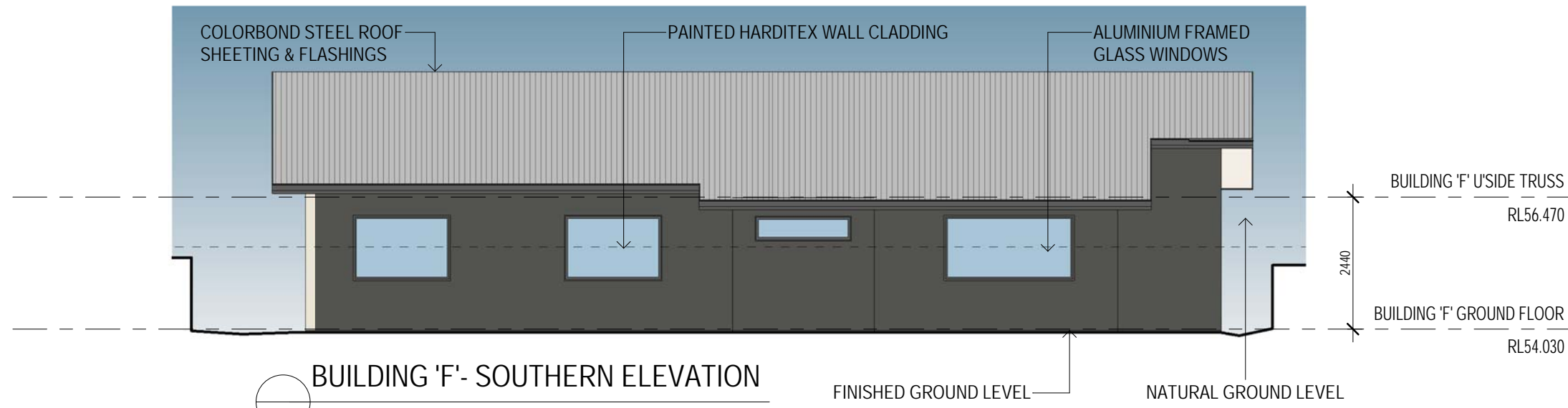
NEW BUILDING 'F' - GROUND FLOOR
scale: 1 : 100



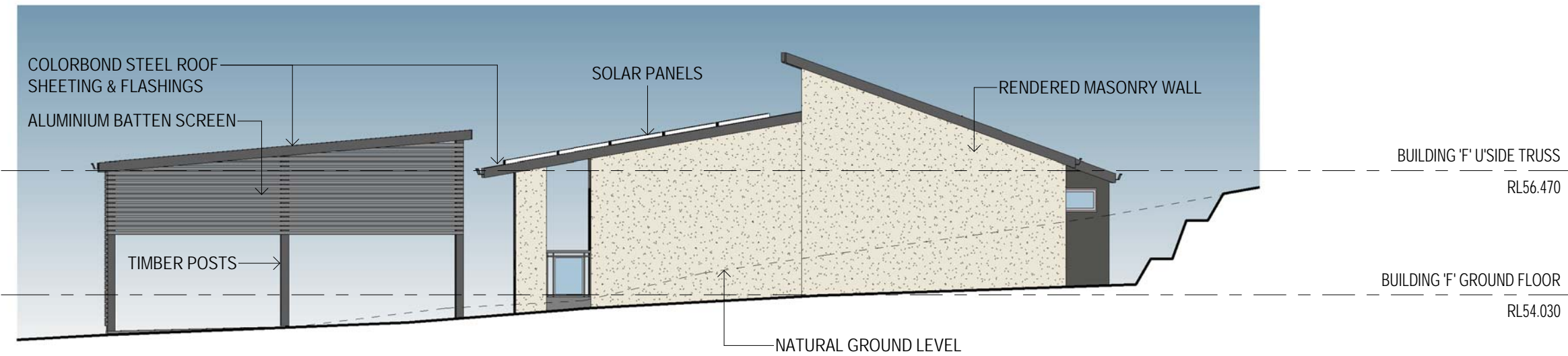
BUILDING 'F' - EASTERN ELEVATION



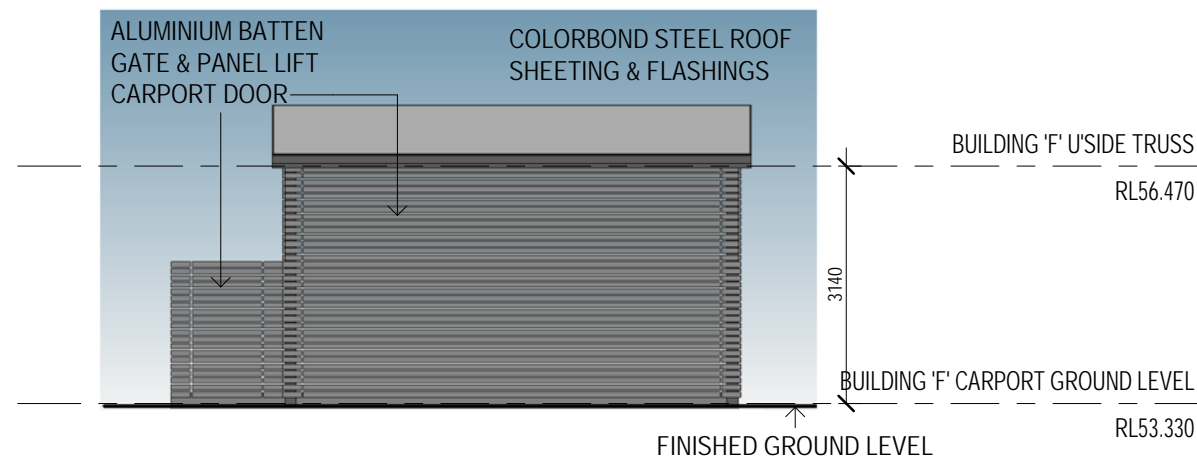
BUILDING 'F' - NORTHERN ELEVATION



BUILDING 'F' - SOUTHERN ELEVATION



BUILDING 'F' - WESTERN ELEVATION



CARPORT - NORTHERN ELEVATION

EXTERNAL COVERED WALKWAYS
NOT SHOWN ON ELEVATIONS FOR CLARITY

REV	DATE	AMENDMENT	APPROVED
A	19/06/17	FOR DA APPROVAL	CB
B	20/12/17	AMENDMENTS TO ADDRESS COUNCIL'S REF 1	

Appendix B

BAL Calculations



Calculated December 15, 2017, 5:15 pm (BALc v.4.7)

AKA Kennel Building

Bushfire Attack Level calculator - AS3959-2009 (Method 2)

Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.8 km/h (user defined value)
Vegetation classification	Woodland	Flame length	14.7 m (user defined value)
Surface fuel load	15 t/ha	Flame angle	67 ° (user defined value)
Overall fuel load	25 t/ha	Elevation of receiver	6.77 m (user defined value)
Vegetation height	n/a	Fire intensity	23,250 kW/m
Effective slope	0 °	Transmissivity	0.878
Site slope	0 °	Viewfactor	0.3615 (user defined value)
Distance to vegetation	9 m	Radiant heat flux	24.15 kW/m ²
Flame width	100 m	Bushfire Attack Level	BAL-29
Windspeed	45 km/h		
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire Attack Level calculator

ada accom

Calculated April 20, 2016, 1:03 pm (Flamesol.com.au, BALc version 4.2)

Inputs

Effective slope (°)	5
Site slope (°)	5
Vegetation classification	Woodland
Distance to vegetation (m)	124
Fire danger index (FDI)	100
Surface fuel load (t/ha)	15
Overall fuel load (t/ha)	25
Windspeed (km/h)	45
Heat of combustion (kj/kg)	18600
Flame temperature (K)	1090

Calculations

Rate of spread (km/h)	2.54
Flame length (m)	19.52
Viewfactor	0.0365
Flame angle (°)	87
Elevation of receiver (m)	0
Transmissivity	0.708
Intensity (kW/m²)	32829
Radiant heat flux (kW/m²)	1.96
Bushfire attack level (BAL)	12.5