

GRATED DRAIN TYPE A (GDA) SCALE 1:10

5N12

R10-450

PROVIDE MIN 1%

FALL TO OUTLET

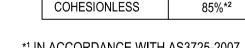
STANDARD STEP IRON DETAILS

SECTION

Recent revision history # Status 01 02 03 04 05 06 07	Description 50% SD ISSUE 80% SD ISSUE FOR COSTING SSDA ISSUE DRAFT 90% SD SD ISSUE 50% ISSUE	Date 13/07/18 31/08/18 25/03/19 15/05/19 29/05/19 14/06/19 01/06/20	Notes Copyright © Woods Bagot 2018 All Rights Reserved No material may be reproduced without prior permission Contractor must verify all dimensions on site before commencing work or preparing shop drawings. Do not scale drawings.	Key Plan RHODES STREET PRIMARY SCHOOL FUTURE REFUTURE RHODES STREET COMMUNITY PLAZA RHODES STREET
		01/06/20 08/07/20	Do not scale drawings.	TAFE GREEN

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TYPE HS1 PIPE BACKFILL DETAIL





SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100-50
2.36	100-30
0.60	50-15
0.075	25-0

COMPACTION REQUIREMENTS

TYPE	MIN STD COMPACTION
COHESIVE	50%* ¹
COHESIONLESS	85%*²

*1 IN ACCORDANCE WITH AS3725-2007



Contractor



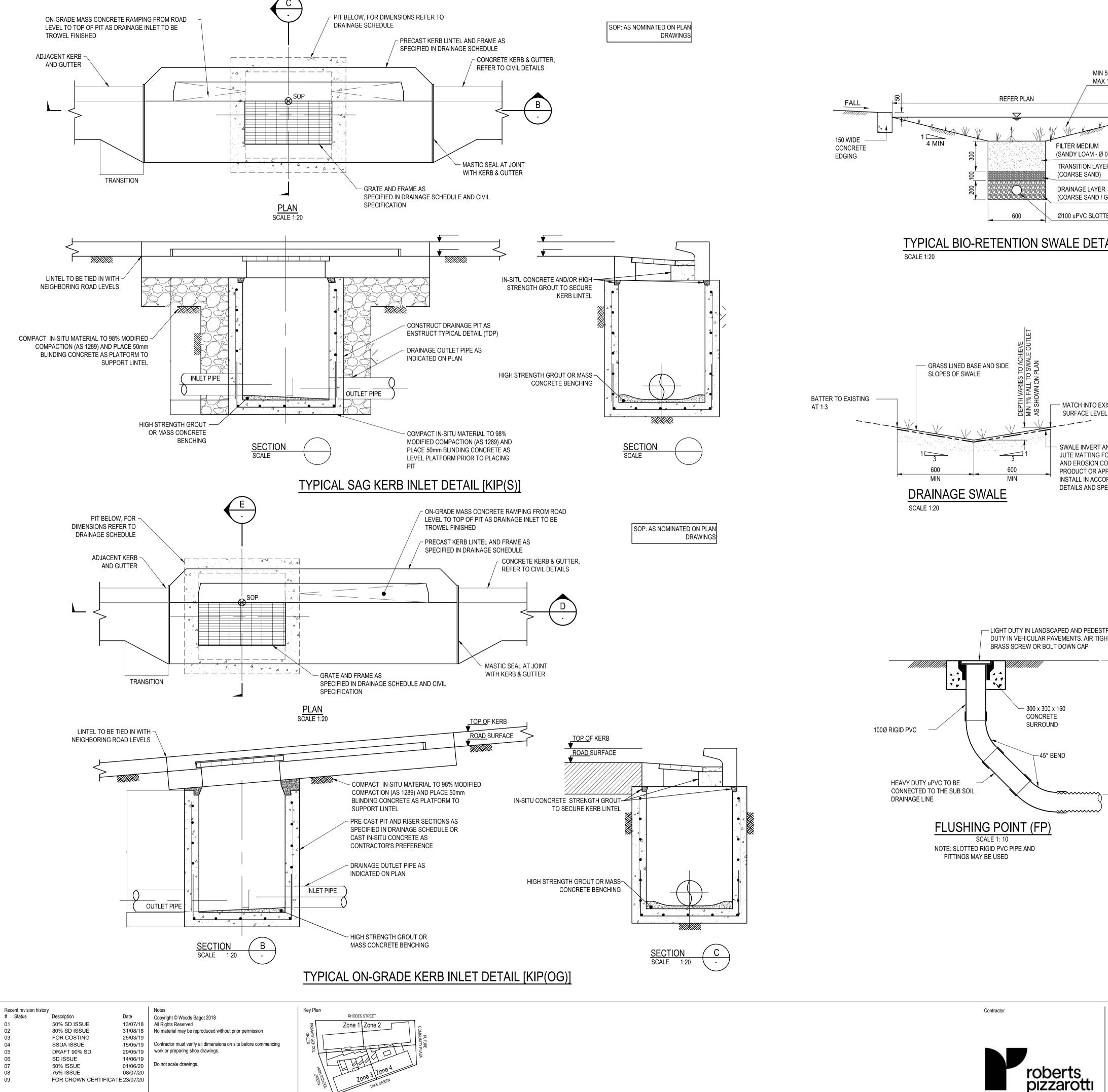
Proiect

- 1. HOLES BROKEN/FORMED IN PRE-CAST PITS FOR THE INSERTION OF PIPES SHALL BE MADE WATERTIGHT AND REINSTATED WITH A STIFF MORTAR (3 CEMENT:1 FINE AGGREGATE) OR EPOXY BASED
- 2. IF PIT DEPTH IS GREATER THAN 1500mm BUT LESS THAN 3000mm,
- WIDTH OF PIT WALL TO BE EXTENDED ACCORDINGLY TO ACCOMMODATE TWIN PIPES. INSITU REINFORCEMENT TO SUIT

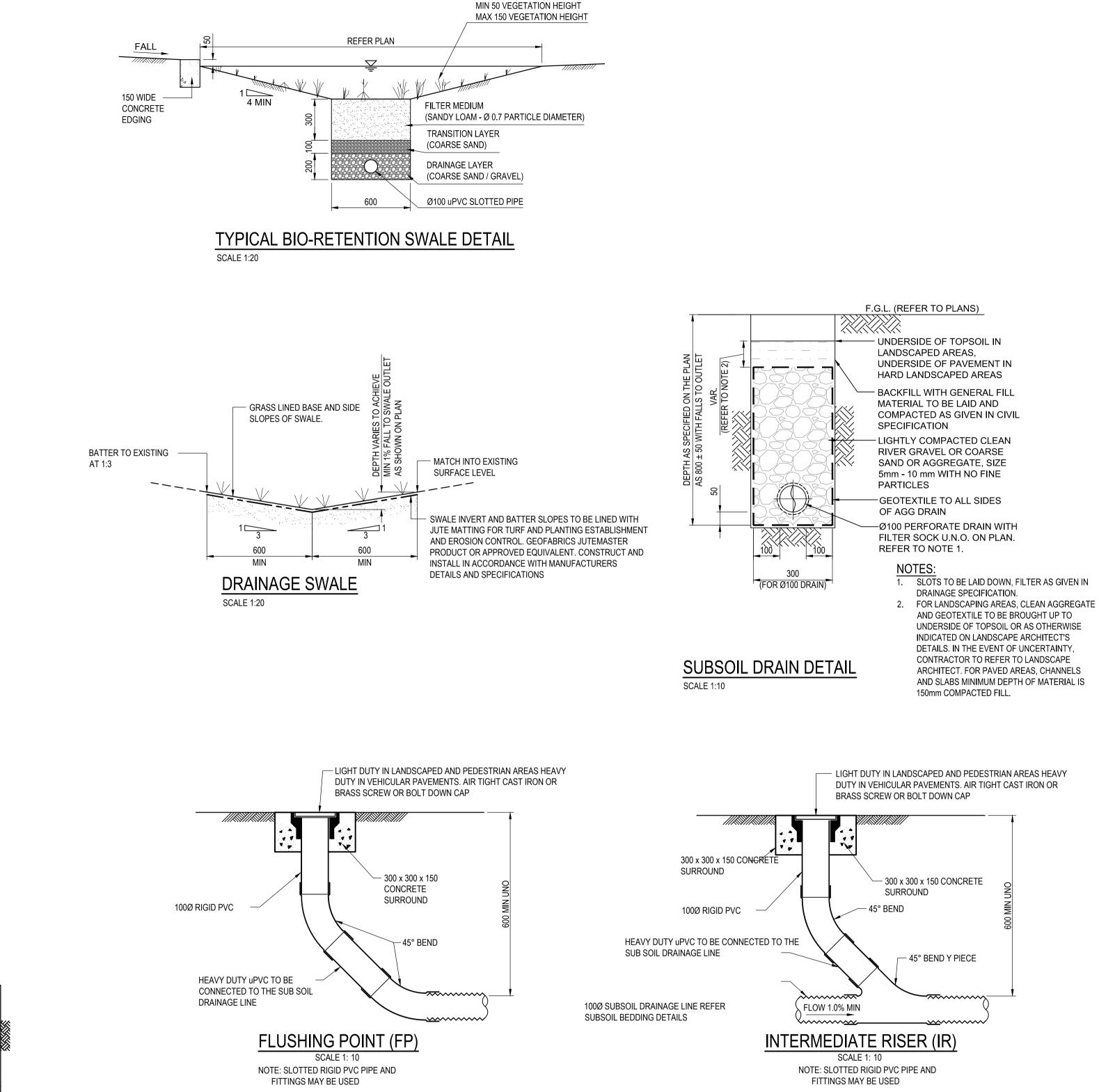
- MASS CONCRETE BENCHING WITHIN PITS MUST BE FORMED SO AS
- 2. BENCHING SHOULD BE ACHIEVE MINIMUM CROSS FALLS WITHIN PITS AS REQUIRED BY ENSTRUCT'S PIT DETAILS AND AUSTRALIAN

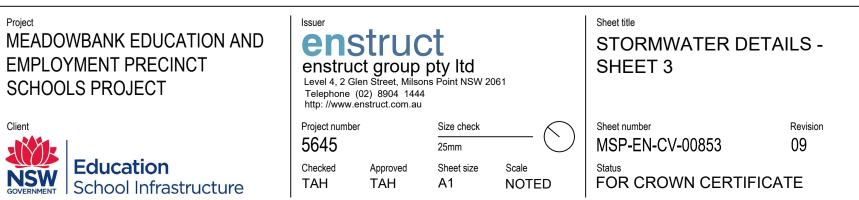
- 1. STEP IRONS TO AS1657 AND EN13101 ARRANGED IN A SINGLE WIDTH TREAD FORMATION (MIN LENGTH 350mm) OR A SINGLE COLUMN, DOUBLE WIDTH TREAD (MIN LENGTH 150mm) STAGGERED DOUBLE COLUMN.
- STEP IRONS TO BE INDUSTRIAL STEP, SURE-STEP OR SIMILAR 2. APPROVED, MINIMUM THICKNESS OF TREAD 20mm WITH UPSTAND HEIGHT 20mm AT EACH END OF THE TREAD TO
- PREVENT LATERAL SLIP. 3. STEPS TO BE CHEMICALLY/PHYSICALLY ANCHORED INTO THE PIT WALLS IN ACCORDANCE WITH THE STEP IRON
- MANUFACTURER'S DETAILS. 4. STEP IRONS TO BE LOCATED SO AS TO BE READY ACCESSIBLE FROM THE COVER. WHERE INTERNAL PIT SIZE EXCEEDS 1200x1200 THE COVER SLAB, FRAME & COVER POSITION SHOULD BE LOCALLY DISPLACED TO SUIT ACCESS TO THE STEP IRONS. REFER TO ENGINEER FOR CLARIFICATION IF REQUIRED.

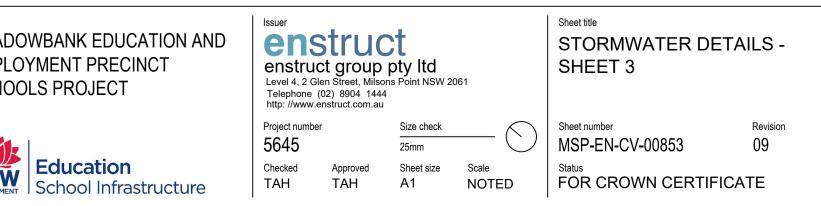
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	Project number 5645	ſ	Size check	-	Sheet number MSP-EN-CV-00852	Revision 09	
tion Infrastructure	Checked MD	Approved PR	Sheet size A1	Scale NOTED	Status FOR CROWN CERTIFIC	ATE	



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OUNDATIONS

approval

The contractor shall obtain a copy of the site geotechnical report and adhere to the recommendations of that report

Critical Line

Footing Excavation

- All foundation works shall be inspected and approved by the geotechnical engineer. The contractor shall allow for these costs in the tender. Refer to the site geotechnical report for allowable bearing pressures and founding levels. The contractor shall report founding levels to the engineer prior to pouring footings. No excavation shall fall within the zone of influence of any adjacent foundation without prior
- Refer to the architectural documents for all setting out dimensions. Any discrepancies shall be reported to the architect. The documents describe the as completed structure. The contractor shall be responsible for the stability of the structure during erection. No part of the structure is to be overstressed during construction. The contractor shall provide a proposed construction sequence prior to the commencement of works. A submission of a proposed method of construction by the contractor and acceptance by the engineer does not absolve the contractor from accepting full responsibility for the submitted document. If required by the engineer, the contractor shall submit calculations justifying the adequacy of the structure to carry the loads from construction

Structural drawings to be read in conjunction with the structural specification and all documents

When considering discrepancies between drawings, notes and specifications, the drawings shall

take precedence over the notes and specifications and the notes shall take precedence over the 3.

The contractor shall obtain a copy of the enstruct Safety in Design report and adhere to the

- procedures The engineer shall be given the opportunity to inspect all structural works prior to their
- concealment; 48 hours notice for inspection shall be provided. The contractor remains esponsible for the works notwithstanding any inspection by the engineer.
- All workmanship and material shall be in accordance with the current Australian Standards and Codes of Practice. Any variation to the structure, as described in the documents, shall be via a written request,
- copied to the architect, and work related to the variation shall not proceed prior to the receipt of written approval. Any changes to the structural drawings required by the contractor including but not limited to
- changes to the building services, architectural design or detailing will be charged at the applicable hourly rate.
- Should the contractor require the engineer to provide advice on temporary works, buildability, construction sequencing, temporary loading on alternate materials, applicable hourly rate charges will apply.
- The engineer will provide periodic site attendance to confirm the design intent shown on the drawings is being carried out on site (excluding floor plates It is the contractors responsibility to carry out a pre-pour inspection of reinforcement and confirm in writing that the reinforcement is installed in accordance with the drawings prior to the
- engineers inspection. Rectification work required to be carried out by the engineer where the ntractors works are defective will be charged at the applicable hourly rate. Full services design including fully dimensioned shop drawings showing all service penetrations or holes is required prior to pouring concrete. Any request for approval to core hole will be
- charges at the applicable hourly rate. All Precast elements are to be designed and detailed by the precast supplier
- All dimensions are expressed in millimetres. All levels are expressed in metres. No contract work is to commence until formal approval is received from the relevant authorities.
- Drawing status noted on the drawings must be 'FOR CONSTRUCTION' before being used for permanent works.
- The structural drawings do not show all relevant fixings, cleats, openings, etc. necessary for the completion of the works, including work by other trades. 19. The tender price must allow for all details necessary for the completion of the works, whether shown on the drawings or not.
- 20. All loading applied to the structure during construction requiring assessment by the engineer,whether shown on the drawings or not, shall be liable for charging by the engineer at current hourly rates. Submission of items for approval must be made a minimum of 7 working days before incorporation in the works.
- Design of all formwork and falsework shall remain the responsibility of the contractor and shall comply with the relevant Australian Standards Finish to formed and unformed surfaces shall be described by the architect and in accordance
- with AS 3610. 23. The use of proprietary products shall be in strict accordance with manufacturer's
- recommendations and instructions and is subject to engineer's approval where relevant. All materials and workmanship shall be in accordance with Australian standards and codes of practice except where varied by the specification and/or drawings. The applicable Standards shall be the referenced Standards current at commencement of construction. These Standards
- for this project shall be determined by reference to the document history on the Standards Australia website. This determination of applicable Standards shall be carried out during the Tender period and any queries relating to the appropriate Standard shall be raised with Enstruct during this period. Works shall be carried out in accordance with all Work cover requirements and the Work Health
- and Safety Act and the Work Health and Safety regulation. Structure has not been designed to be water retaining. All waterproofing is the responsibility of
- he Architect and the Contractor 27. The structural engineer is not responsible for the design of bracing as per NCC requirements for non-structural elements

GENERAL

produced by all other consultants.

ecommendations of that report.

pecifications.

1.

- All loadings have been assessed in accordance with AS1170.0 and the National Construction Code of Australia (NCC)
- Refer to loading diagrams for the structural components designed for. The design wind criteria to AS1170.2 are as follows:
 - Design Life: 50 years

Region: A2 Importance Level: 3 Terrain Category: 3

- 4. The design earthquake criteria to AS1170.4 are as follows: Importance Level: 3 robability Factor, kp: 1 Hazard Factor, Z: 0.08 Site Subsoil Class: Ce
- Earthquake Design Category (EDC): III Do not place or store building materials on concrete members without the contract
- administrator's approval.
- ELECTROLYSIS
- Refer to power earth electrolysis report No. 4413REP010101 Revision 0 Dated 8/7/20 for
- electrolysis requirements for the project. Provide electrical connections and reinforcement welds/ties to achieve electrical continuity
- of reinforcement in accordance with the electrolysis report.
- Refer to aconex correspondence RobPiz-Gcor-000965 for additional electrical connections required where movement joints exist between slab-on-grade and footings/columns.
- Electrolysis requirements are designed by others and are not to reduce the durability of the

- Natural Subgrade shall be proof-rolled with a roller of 80 kN minimum static weight, (minimum of 10 passes), unless otherwise stated in the site geotechnical report, to detect soft or loose areas. Such areas should be treated in accordance with the eotechnical engineer's recommendation All proof rolling should be completed in the presence of an experienced geotechnical engineer or geotechnician. Where soft or heaving zones are identified they should be excavated down to a sound base and replaced with engineered fill as described
- Where fill is placed against slopes, such as the backfilling of temporary batters associated with the realignment of the stormwater system, benches should be formed in the batter slopes. This will allow the fill to be compacted as described below in <u>Engineered Fill.</u>
- Unless otherwise specified the subgrade below base courses for slabs shall be suitable density material compacted to 100% std as determined by test AS 1289.5.1.1 or 70% minimum index for cohesionless soils.
- Sub-base: Unless otherwise specified Base shall be approved well graded slag aggregate or crushed rock (maximum size of 40mm)spread and compacted to 98% mod as determined by test AS 1289.5.2.1 or 80% minimum density index for cohesionless soils.

	Slab
	Vapour Barrier/Damp
80404040404040	proof membrane
	Sub-base
	Subgrade

- Cohesive (Loamey and Clayey) Soils: Underside of footings to be a minimum of 600mm below natural ground level. Excavate to firm ground and maintain the excavation in a dry condition Remove any
- soft ground as directed by the geotechnical engineer.
- Where over-excavation in soft ground is required, filling to the correct level shall be with concrete of f'c = 15 MPa.
- Blinding of 50mm concrete (f'c = 15 MPa) to be placed in footing excavations as soon as the foundations have been inspected by the geotechnical engineer.
- Non-Cohesive (Sandv) Soils: Compaction under footings and slabs to be measured using a penetrometer in accordance with AS 1289.F3.2 or AS 1289.F3.3. Compaction under footings and slabs to be 10 blows per 300mm measured from 150mm to 750mm deep. Results to
- be submitted to the geotechnical engineer. Penetrometer testing to be carried out as follows:Under pad footings : One per ten square metres or one per pad. Under strip footings : One per five metre length. Under slabs : One per twenty square metres

ORMWORK

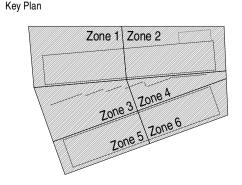
- The contractor shall be fully responsible for the design of all formwork, unless a product is specified on the drawings as being the responsibility of the engineer e.g.. a profiled steel decking acting compositely with the concrete, such as Bondek, Condek or Kingflor.
- All formwork shall be designed in accordance with AS 3600 and AS 3610. Formwork shall remain in place undisturbed for the following minimum periods
- Slab edges 2 days Beams and slabs - 7 days
- Backprops to beams and slabs 28 days In multi-level construction, the contractor shall take into account the age of the floors previously cast, necessary to support the weight of the wet concrete along with any applied load due to be placed on the freshly cast concrete, before the slab achieves sufficient strength to contribute to carry load. A minimum concrete strength of 32 MPa is required before the slab can contribute to carry load
- The contractor shall submit for review by the engineer, full details of the propping system proposed to be used. This shall include the weight of the formwork system to be used and any heavy loading such as reinforcement bundles or bins to be placed on the slab. Review by the engineer does not diminish the contractors full responsibility for the design of the formwork system. Details submitted shall indicate the means by which formwork is to be raised to the required position and transported across the freshly cast slab, including the weight of equipment proposed to be used for that purpose.
- The contractor shall be liable for the engineers costs associated with assessing the impact of any construction loading on the structure, including inspection of works required by the engineer arising from the review. These costs will be charged at current hourly rates. All exposed formed edges shall have 20mm x 20mm timber fillets or chamfers added to
- formed or cast edges, unless noted on the architectural drawings. All drip grooves required as noted on the architectural drawings shall be constructed а. with reinforcement adjusted to ensure correct minimum cover is maintained across the drip groove. Refer to concrete notes for cover requirements.

Description

Date

Recent revision history

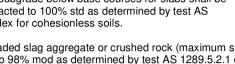
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CONCRETE

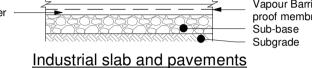
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13.



Backfill trench or

other excavation



All works to be in accordance with AS 3600. AS 3610 and the specification. Beam dimensions on the documents indicate the depth first, width second. Normal downturn beam depth includes slab thickness. Upstand beam depth includes slab depth. Dimensions for all concrete elements do not include thickness of applied finishes.

- Refer to drawings for notes on cambers. Construction joints, where not indicated on the drawings, shall be approved by the engineer.
- Remove all formwork, to engineer's approval, prior to the construction of masonry above. Concrete shall conform to the following unless noted otherwise:
- Cement : Type SL to AS 3972 Ready-mixed concrete : AS 1379
- Concrete aggregates : AS 2758.1 Slump: 80mm
- Maximum aggregate size: 20mm Maximum drying shrinkage strain (to AS 1012 Part 13) less than 650 microstrain at 56 days. Strength Grades: S32, S40 or S50 as shown on the drawings. All concrete is to be properly cured using an approved method within 2 hours of finishing. Curing shall be 8.
- continuous for 7 days by one of the following methods: Ponding with water or continuous spraying with water
- Use of continuous absorptive cover, such as hessian, kept continuously wet Coating with an approved curing compound compatible with any applied finish
- Use of an approved impervious covering to the whole of the surface of the concrete, securely kept in position to prevent passage of air between the concrete and the covering. The covering

is to remain undisturbed in place for the duration of the curing period. If plastic shrinkage of the concrete is observed due to rapid drying shrinkage or other conditions, apply a single spray coat of aliphatic alcohol evaporation retardant after the initial rough screed, while the concrete is still wet (Masterkure 111CF-Confilm by Master Builders or approved equivalent). Any cast in elements, such as conduits and piping, not indicated on the structural drawings, are to be

approved by the engineer. Where pipes and conduits are cast in slabs and walls, these are to be placed in the mid third depth of the member in between the layers of reinforcement. Where conduits are to be cast in slabs on ground and there is only one layer of reinforcement, the minimum gap between the conduit and the reinforcement is to be 50mm. Formwork for all external corners of exposed concrete shall incorporate a 20 by 20 fillet, unless noted

otherwise. Unless noted otherwise, the characteristic strength and clear cover to the reinforcement, including fitments shall be as follows

ELEMENT	EXTERNAL	INTERNAL
	Grade (MPa)	Grade (MPa)
Blinding and mass concrete	N25	N25
Footings	S40	S40
Slabs and beams	S40	S40
Columns	S50	S50
Stairs	S40	S40
Retaining walls	S40	S40
Non-Non-Ioad bearing precast walls	S40	S40

ELEMENT		EX	POSURE CONDITION	
	CAST AGAINS	T FORMS (mm)	CAST AGAINST FORMS WATERPROOF MEMBRANE	CAST AGAINST
	INTERNAL	EXTERNAL	(mm)	GROUND (mm)
Footings	50	50	50	75
Slab on ground				
Тор	25	40		
Bottom			30	75
Columns	30	40		
Walls	30	40		
Beams	30	40	40	75
Suspended slabs	S			
Тор	30	35		
Bottom	30	35	40	

No brickwork or partition walls are to be constructed on suspended slabs until all propping is removed and the slab has undertaken its dead load deflection. All concrete, including slabs on ground, shall be deposited in place using approved methods, in uniform layers and shall be compacted using mechanical means such as insertion vibrators. Insertion vibrators shall not be used to move concrete in the forms. A spare vibrator shall be kept on site at all times during concrete pours.

All concrete surfaces required to receive additional concrete from subsequent pours shall be suitable roughened by mechanical means to remove laitance and other soft material. Oil or any other deleterious product spilt on the surface of concrete shall be remove to the satisfaction of the engineer.

Provide 2 layers of full width slip joint material such as Alcor or galvanised strip on top of masoni required to support the concrete. The slip joint material shall be properly secured in place to ensure it is not dislodged during concreting

Penetrations through concrete shall be made using percussion drilling. The use of diamond coring for penetrations shall not be permitted without written permission from the engineer. No reinforcement is to be cut in making any penetration without written approval from the engineer. The use of ground penetrating radar is suggested as one means of locating reinforcement and post tensioning ducts in slabs of normal thickness.

Requests for approval for any penetration or chasing of concrete shall be submitted to the engineer on a 17. 'Request for Penetration' form and shall describe fully the location and size of the penetration. No penetration shall be made without a 'Request for Penetration' form being signed by he engineer, a copy of which must be kept on the person carrying out the work. A register of 'Request for Penetration' forms must be kept on site for the duration of the works. If coring of the structure is approved by the engineer, the extracted cores are to be logged and kept on site for the duration of the works for review, if deemed 21 necessary by the engineer. Approval to create penetrations through the structure relates only to structural 22 adequacy and does not address other services that may be buried in the concrete. The contractor is to 23 make all necessary enquiries regarding safety for the drilling operator before commencing any drilling or

Refer to the specification for placement of concrete during periods of extreme heat or cold. If the concrete strength specified for the floor system is less than 0.75 times that specified for the column, the column shall be mushroomed through the floor with concrete strength greater than or equal to 0.75 times that specified for the column U.N.O. Slurry used to lubricate the pump lines shall not be used in any structural member.

- PILING Piles and piling to be in accordance with AS 2159 and are to be designed by the specialist sub-contractor, engaged by the contractor. The contractor shall investigate the presence of any existing services in the ground likely to be affected by the piling operations. Confirmation of the investigation and the final design drawings shall be forwarded to the engineer, in CAD form, prior to commencement of any piling on site Refer geotechnical information note for site investigation informatio The contractor is responsible for the set out of the piles. Maximum acceptable deviation from correct position of piles is 75mm. Maximum acceptable deviation form vertical alignment is 1 in 100.
- Piles are to be designed for the loads indicated on the engineer's drawings and shall incorporate the maximum out of position eccentricity of 75mm in addition to a lateral stability load of 2.5% of the maximum vertical load in the pile, applied at the top of the pile. Piling is to be designed, constructed and certified in accordance with the specification and requirements set out on the drawings. Details of each pile type and capacity are to be submitted to the superintendent as required
- before any piling is commenced All piles are to be inspected by a qualified geotechnical engineer to verify design bearing pressures. All pile borings are to be inspected to ensure they are cleaned and free of loose material and water prior to pouring concrete, which should be with minimal delay and on the same day as boring
- The inspection should ensure adequate roughness is achieved in the pile shaft to guarantee shaft adhesion, the use of a roughening tool is recommended Some groundwater seepage into piles can be expected. Water should be pumped from the piles immediately prior to pouring concrete, Tremie methods should be used if depth of water exceeds 1000mm.
- Obstructions may be expected when drilling through existing fill. Concrete cover to piles to be 75mm
- Concrete strength to be 40 MPa.

The contractor should make all necessary site investigations to confirm the accuracy or otherwise of the geotechnical report. Tender to nominate unit rates for variation in pile lengths from estimated values. On completion of piling, a drawing prepared by a registered surveyor shall be prepared giving the position of the piles relative to their nominated position and the level of the top of the piles. The drawing shall be forwarded to the engineer for approval before any further work associated with the piles commences The contractor shall be responsible for the design and rectification of any work associated with the use of piles exceeding the above tolerances.

- This shall include the following:
- Design checking by the engineer Assessment by the engineer of any rectification proposals
- Design of any rectification works Inspection by the engineer of any rectification works Costs for any work associated with these activities shall be payable by the contractor to the engineer at

current hourly rates MASONRY

- All materials and workmanship to be in accordance with AS 3700, AS4455 and AS4773. Minimum durability classification of built in components to be R3 unless noted otherwise to AS 4773.
- Minimum cover to reinforcement and tendons in grouted cavities or cores to be 30mm unless noted otherwise, measured from inside face of block core.

Strengths of bricks, class of blocks, type of mortar and maximum joint spacing shall be as follows:Bricks shall be solid or perforated to a maximum of 25%. The contractor shall submit to the engineer, before construction ommences, expected moisture expansion characteristic values for the bricks to be used on the project.

ELEMENT	MATERIAL	Strength (f,uc)	Mortar classifi- cations	Mortar Mix C : L : S	Maximum joint spacing
Reinforced Blockwork	Concrete Block	15 MPa	M4	1 : 0.5 : 4.5	10
Unreinforced Blockwork External face finished, rendered and or painted	Concrete Block	15 MPa	M3	1:1:6	7
Unreinforced Blockwork External with openings more than 900mm in height	Concrete Block	15 MPa	M3	1:1:6	5
Unreinforced Blockwork Internal face finished or sheeted	Concrete Block	15 MPa	M3	1:1:6	6
Unreinforced Blockwork Internal rendered and or painted	Concrete Block	15 MPa	M3	1:1:6	5
Load-bearing Brickwork	Brick	20 MPa	М3	1:1:6	6

Load-bearing masonry shall have full bedded joint unless noted otherwise. All mortar joints to be finished with standard tooling rods to produce compacted joints to a maximum depth of 3mm. Perpends shall be fully filled. Mortar admixtures shall not be used without the written approval of the engineer. All masonry supporting or supported by concrete floors shall be provided with vertical joints to match any

control joints in the concrete. For joint locations in brickwork and blockwork, refer to architectural drawings Joints in straight continuous walls shall not exceed the values given in Note 4. Joints to be 10mm wide unless noted otherwise. No horizontal or diagonal chasing of walls will be allowed. Maximum depth of vertical chasing in core filled blockwork to be 20mm. Chasing of load bearing masonry shall only be permitted where shown on engineering

Slabs that are to support masonry are not be de-propped for 28 days.

- Do not load masonry units onto a supporting slab until the slab is de-propped.
- Load all masonry pallets onto the slab prior to laying and finishing head details. Do not load pallets on cantilevered slabs.
- Only load-bearing masonry is indicated on the drawings. Refer to architectural drawings for extent of masonr elements. All masonry is to be tied to abutting steel or concrete columns and where relevant provide head restraints
- attached to underside of structure above. For wall ties and head restraints refer to the specification. Ties to be heavy duty galvanised unless noted otherwise.
- Grout for core filling, where required, shall have a nominal composition of C1 : S3 : A2 (10mm coarse aggregate). The grout shall have a slump of 230mm plus or minus 30mm and a compressive strength of 25 MPa minimum
- Walls to be full height before grouting cores. Clean out openings to be provided at bottom course in all cores.
- Before placing vertical reinforcement, if any, cores are to be cleaned of all mortar fins and droppings through clean out openings, which are not be closed until inspected by the engineer. Maximum continuous pour height of grout to be 3600mm.
- Backfill to retaining walls to be free draining granular material unless otherwise noted.
- Provide subsoil drain to falls or weep holes as noted. Refer also to Note 23. Retaining walls (other than cantilever walls) shall not be backfilled until the (floor) construction at the top and bottom has been completed and has attained adequate strength. Cantilever walls shall not be backfilled until
- they have attained adequate strength Ensure free draining backfill and drainage lines to falls (or weep holes) are in place. Refer to architectural drawings for location of all joints in masonry. Control joints to be at 6 metre centres
- maximum. Vertical control joints are to be as described in AS 4773.1 or as indicated on the drawings. Joints shall be maintained to be free of all non-compressible material.
- Vertical control joints shall be 20mm wide and be provided with flexible masonry anchors across the joint. placed in accordance with manufacturer's recommendations. Joints are to be treated at the outside using an approved flexible polyurethane base caulking sealant jointing material placed against a 25mm diameter closed
- llular polythene foam backing rod. The following conditions must also be satisfied:

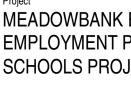
26.

27.

- Fire rating Sound insulation
- Waterproofing Non-load bearing masonry shall be constructed to within 20mm of the underside of the structure or shelf 29. angles over.
- Gaps are to be built to a tolerance of -0mm, +3mm. Mortar and other material shall not be allowed to fall into cavities or remain in control ioints.
- Place polystyrene foam in all vertical joints during construction to ensure mortar droppings do not fall into the 32.
- The contractor shall submit the names of all proprietary products proposed to be used in masonry construction 33. before commencement of the works.
- Where masonry abuts to the underside of any member, sloping or horizontal, provide flexible perpend fixings at 3 masonry units spacing. Perpend fixings shall be equivalent to M.E.T. 4-3 and shall be secured to the structure over using 2 x 6mm diameter Ramset head drive pins (or approved equivalent) Fixing of masonry ties to steelwork shall be designed by the contractor and shall have load capacity not less
- than that specified by the manufacturer of the ties. In cavity construction, ties between skins of the masonry shall be rated for the width of the cavity. Spacing of ties shall be designed by the contractor for the wind pressure to which the wall will be subjected. Cavity ties shall be heavy duty, spaced at 600mm x 600mm centres maximum. At control joints, door and window openings the spacing shall be at 300mm centres maximum
- In solid masonry construction, ties between contiguous leaves shall be heavy duty spaced at 400mm x 400mm 37. In hollow block construction, grout fill end blocks (or use solid blocks) at control joints, door or window
- 38. 39. All fixings, drive pins, nails, screws, bolts, nuts and washers into masonry shall be galvanised to R2 level in accordance with AS 3700 and AS 269
- All steelwork built into or abutting masonry shall be hot dip galvanised. Where needling and propping of openings is required, the builder shall provide all details to the engineer for 41
- review before the work commences. In reinforced masonry all reinforcement is to be continuous, fully lapped and anchored. Minimum ap/anchorage length to be 40 x bar diameter. Provide continuous horizontal reinforcement at all 'T' and 'L'
- unctions as required. 43. Minimum reinforcement in blockwork nominated as core filled to be as follows U.N.O.: 140 Blockwork - N12-400 each way, central
 - 190 Blockwork N16-400 each way, central
 - 290 Blockwork N16-400 each way, each face

Contractor







POST TENSIONING

10

15.

Post tensioning slab system is to be used throughout unless noted otherwise. All strands to be either: 12.7mm diameter, super grade strand, stress relieved with a minimum breaking load of 184 kN. Relaxation 2.5% maximum after 1000 hours at 70% of breaking load unless noted otherwise or 15.2mm diameter, super grade strand, stress relieved with a minimum breaking load of 250 kN. Relaxation 2.5% maximum after1000 hours at 70% of breaking load unless noted otherwise. Duct: flat duct 70mm x 19mm, $\mu = 0.2 / = 0.020$

Dead ends to be onion heads with metal spacers. Procedure

a. Stress all tendons to 25% ultimate tensile stress at approximately 24 hours after completion of pour. Fully stress tendons when concrete attains: f'c = 22 MPa for 12.7mm diameter strand and f'c = 25 MPa for 15.2mm diameter strand Jack tendons to 85% minimum breaking load 156.4 kN for 12.7mm diameter strand and lock off 212.5 kN for 15.2mm diameter strand and lock off

Tendon profile points are from the slab soffit to underside of duct. Offset points are indicated over supports and at mid span unless noted otherwise. At the end points profile offsets are from the slab soffit to the centre of the anchor Tendon profiles shall be parabolic between high and low points. Jack central tendons first and work progressively outwards on each side of structural elements (alternating). Tendon positions shall be marked on slab soffits by the use of embedded plastic buttons at grid and mid-grid locations; proposed arrangement to be submitted for approval.

Stressing equipment calibration records, including jack and gauge numbers, shall be forwarded to the engineer prior to stressing operations commencing. Cables shall be positioned and secured in accordance with the design documents produced by the specialist sub-contractor and profiled to a vertical tolerance of plus or minus 4mm. Cables shall be supported on suitable chairs at 1000mm maximum centres along the full length to prevent the cable from being displaced laterally or vertically during concreting The specialist contractor shall ensure that experienced workers shall be on site ensuring the proper treatment of post tensioning ducts during all relevant concrete

Ducts shall be rigid enough to withstand treatment during concreting and shall be securely taped at joints to ensure slurry does not enter the ducts. Duct profiles shall take precedence over any reinforcement or conduit within the concrete. Any interference with reinforcement positioning shall be brought to the attention of the engineer for review during placing operations.

Top reinforcement shall not be laid until after tendons have been placed. Typical anchorage reinforcement details shown on the drawings are for pricing purposes only and the final anchorage reinforcement details shall be the responsibility of the pre-stressing sub-contractor. Distribution reinforcement shall not displace post tensioning ducts from achieving the required drape. Particular care shall be taken during placement and compaction of concrete, especially around post tensioning anchorage locations. All concrete shall be vibrated using insertion vibrators. The use of reduced aggregate size, as well as the inclusion of superplasticiser additives in the concrete to assist placement may be appropriate 14. Care shall be taken to ensure all grout tubes and cable ducts are not damaged

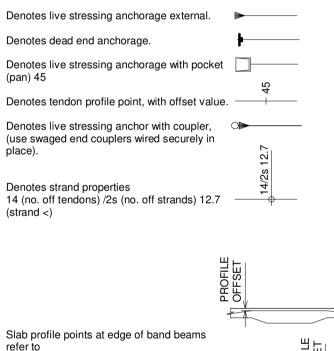
during concreting Concrete cylinder compressive strength values taken during placement of concrete shall be provided to the engineer before stressing of the strands

commences. Concrete test cylinders shall be representative of the area where strands are to be loaded are situated. 16. The sequencing of applying load to the post tensioning strands shall be

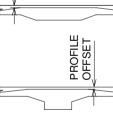
determined by the post tensioning sub-contractor, taking into account the loads that are to be transferred to the formwork system. The formwork designer and post tensioning sub-contractor shall coordinate to ensure the formwork is sufficient to withstand the applied loads from post tensioning operations. Strand extensions determined during stressing shall be forwarded to the engineer

for review within 24 hours of stressing. No strand shall be cut without the approval of the engineer. The engineer may direct additional stressing of strands, or other actions, if the recorded extensions are acceptable Cables shall not be trimmed without written approval from the design engineer.

Grouting of ducts shall be completed within 48 hours of written acceptance of strand extensions. Written confirmation of satisfactory completion of grouting to ducts shall be forwarded to the engineer.



points at the intersection of slab soffit and band side



CONCRETE REQUIREMENTS FOR POST TENSIONING

All suspended floors shall be f'c = 40 MPa unless noted otherwise All concrete test cylinders shall be site cured under conditions consistent with the concrete pour Maximum shrinkage strain at 56 days, measured in accordance with AS 1012 part 13, shall be 650 microstrains. To prevent damage to stressing tendons and reinforcement, concrete pump lines shall be adequately restrained and supported on stools or timber blocks ndependent of the reinforcement. Pump lines shall not be restrained from lateral movement by tying reinforcement due to be covered during the pour. Slurry used to lubricate the pump lines shall not be used in any structural member. To minimise the propping requirements the suspended floor shall achieve minimum concrete strength f'c = 32 MPa at 7 days.

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REINFORCEMENT Symbols

- R: Structural grade plain bars to AS/NZS 4671, ductility class N (250MPa) N: Deformed bar to AS/NZS 4671, ductility class N (500 MPa) TM: Hard drawn steel trench mesh to AS/NZS 4671, ductility class L (500 MPa)
- SL: Square rib mesh AS/NZS 4671, ductility class L (500 MPa) RL: Rectangular rib mesh AS/NZS 4671, ductility class L (500 MPa)
- All reinforcement bars to be Type N unless noted otherwise.
- Distribution bars to main reinforcement bars in slabs shall be N12 at 300mm centres unless noted otherwise. Refer to reinforcement lap schedule for lap lengths.
- Minimum lap for fabric shall be one mesh plus 25mm. Welding of reinforcement is not allowed without prior approval.
- Top and bottom reinforcement shall be supported in both directions at maximum centres
- The minimum clear spacing between conduits as per AS3600 but not less than three 7 diameters. Conduits in slabs to be placed above the bottom reinforcement and below
- the top reinforcement. All re-entrant corners and service holes are to have trimmer bars placed diagonally at corners using two bars (1600mm long), one tied to the underside of top reinforcement and the other tied to the top of the bottom reinforcement. Trimmer bars to be N12 for
- slabs not thicker than 120mm and N16 for slabs not thicker than 180mm, Where not shown bars to be N20 unless noted otherwise. Abbreviations used for reinforcement:
 - BB = Bottom Bottom B = Bottom

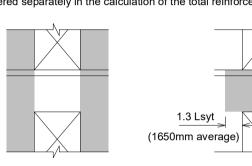
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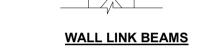
- TT = Top Top
- T = Top EF = Each Face
- EW = Each Wav F = Near Face
- FF = Far Face
- At least 95% of all reinforcing bar and mesh meets or exceeds 500 MPa strength grade, 11. and at least 60% of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually)
- 12 At least 95% of all reinforcing steel meets or exceeds 500 MPa strength grade, and at least 15% (by mass) of all reinforcing steel is assembled using off site optimal fabrication techniques detailed in Table 2 (Mat-6 Steel, Green Building Council of Australia).

REINFORCEMENT RATES

- 1. Floor plate reinforcement rates make no allowance for construction joints or typical penetration
- trimming reinforcement. 2. Wall reinforcement rates make no allowance for typical penetration trimming reinforcement. 3. Reinforcement rates provided do not allow for site wastage or construction related
- reinforcement such as but not limited to safety mesh, alimak and crane reaction reinforcement or screen and railing reinforcement 4. In the instance where members such as beams overlap, both beam areas shall be considered separately in the calculation of the total reinforcement and post-tensioning tonnage

1.3 Lsyt

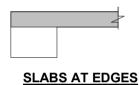




1.3 Lsyt

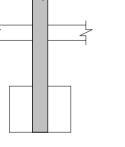
(1650mm average)

WALLS



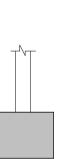
EDGE BEAMS





WALL/COLUMNS

SLABS AT BEAMS



FOOTINGS

TYPICAL REINFORCEMENT AREAS For reinforcement quantities required refer to tables.

Denotes areas to be used when determining reinforcement quantities for kg/m³ values only.

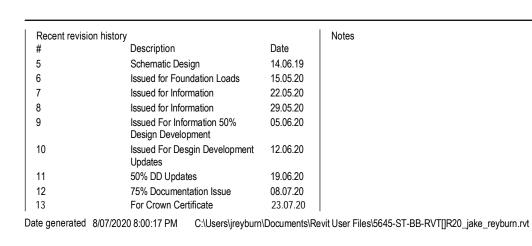
REINFORCEMENT RATES					
ELEMENT	LEVEL	RATE			
ELEMENT	LEVEL	REINF.			
PILE CAPS	TYPICAL	180	kg/m3		
CORE BASE	TYPICAL	195	kg/m2		
CORE WALLS	TYPICAL	195	kg/m3		
LINK BEAMS	TYPICAL	195	kg/m3		
SHEAR WALL AT GRID 15		250	kg/m3		
COLUMNS AT ENDS OF SHEAR	WALL AT GRID 15	300	kg/m3		
STAIRS	TYPICAL	150	kg/m3		
CORE LIDS	TYPICAL	175	kg/m3		
PAD FOOTINGS	TYPICAL	190	kg/m3		

TRANSFER BEAM REINFORCEMENT + PT RATES

		RATE		
TRANSFER BEAM TAG	LEVEL	REINF.	PT	
		kg/m3	kg/m2	
TB1	GROUND	175	75	
TB2	LEVEL 2	175	75	
ТВЗ	LEVEL 2	145	75	

NOTE:

- REINFORCEMENT RATES DO NOT INCLUDE ANTIBURST, CONSTRUCTION JOINT REINFORCEMENT, SAFETY MESH, ROLLING MARGINS OR ANY PROPRIETARY PRODUCTS AND ASSOCIATED ADDITIONAL REINFORCEMENT COSTS.



TRUCTURAL STEELWORK

All workmanship and materials in accordance with AS 4100 and AS 4600.

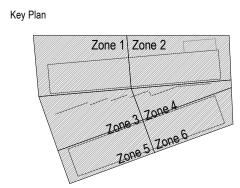
Ste	Steel shall have the following minimum properties unless noted otherwise:					
	COMPONENT	STANDARD	GRADE			
	Plates	AS 3678	350			
	Hot rolled sections	AS 3679	300			
	CHS	AS 1163	C350			
	RHS and SHS	AS 1163	C450			
	Welded beams and columns	AS 3679	300			
	Flat bars and Rods	AS 3679	300			
	Purlins and grits	AS 1397	450			

- All bolts shall be M20 Grade 8.8/s in 22mm diameter holes with a minimum of two bolts per connection unless noted otherwise. A washer shall be placed under the nut in all cases and where the head of the bolt is to be tightened and additional washer is to be placed under the bolt head.
- Where slotted or oversize holes are permitted, a hardened plate washer of 8mm minimum thickness shall be 4 placed under the nut and the bolt head to completely cover the slot. Unless noted otherwise, the washer shall
- be 6mm continuous fillet welded to the element containing the slot.
- After tightening bolts shall project beyond the nut a minimum of 1 full thread. All welding is to be in accordance with AS 1554, special purpose (SP) using E48XXX electrodes in
- accordance with AS1553. All welding shall be carried out by suitable qualified personnel. Testing of velds to be carried out by qualified testers in accordance with AS 2214 and notes on the drawings. Minimum fillet welds to be 6mm continuous fillet. All butt welds to be full penetration with non-destructive testing in accordance with the specification unless noted otherwise.
- The following refers to bolting procedures 4.6/S - Commercial bolts (or black bolts), Grade 4.6 to AS 1111, tightened to snug tight condition using а.
- a standard wrench. 8.8/S - High strength bolts (or structural bolts), Grade 8.8 to AS 1252, tightened to snug tight condition using a standard wrench.
- 8.8/TF High strength bolts (or structural bolts), Grade 8.8 to AS 1252, fully tensioned to AS 4100, designed as a friction type joint 8.8/TB - High strength bolts (or structural bolts), Grade 8.8 to AS 1252, fully tensioned to AS 4100, d.
- designed as a bearing type joint. Contact surfaces in connections incorporating 'TF' bolts shall be left unpainted unless noted otherwise. Bolts in 'TF' and 'TB' connections shall be tightened using the part-turn method or load indicating washers. A hardened washer is to be placed under the nut or bolt head, whichever is to be rotated. Bolts that have been fully tensioned shall not be re-used.
- Shop drawings are to be submitted for approval a minimum of 3 weeks prior to fabrication. No steelwork shall be fabricated until final approval of the shop detail drawings has been received by the
- builder and all review comments on the workshop drawings have been resolved to the engineer's satisfaction. All plates to be 10mm thick unless noted otherwise.
- All axial member connections (compression or tension) shall be capable of transferring a force equal to the member capacity.
- All hollow sections to be sealed with a 3mm plate unless noted otherwise.
- Corrosion protection: Refer to the specification
- All members in external masonry walls shall be hot dip galvanised in accordance AS 1650 with a minimum coating of 600 grams per square metre.
- Bolts, nuts and washers to be hot dip galvanised to manufacturer's specifications Exterior, fully exposed pin connection components to be hot dip galvanised with a minimum coating of 600 grams per square metre.
- In addition to the specified finish, steelwork in contact with the ground is to be coated with Interzone 954 or approved equivalent, to a minimum thickness of 0.4mm. steelwork encased in concrete shall be covered with a minimum thickness of 50mm and be wrapped in
- SL41 galvanised mesh with 1N12 bars inside the 4 corners of the mesh. Lap mesh 150mm minimum. Lap N12 bars 400mm minimum. All sealed hollow sections to be galvanised shall have vent holes as per manufacturer's Grout under base plates to be high strength cementitious non-shrink grout (Masterflow 870 by Master Builders
- or approved equivalent). 17 All chemical fixings to existing structure to be formed using Epcon C8 (or equivalent approved in writing) All chemical anchors to existing concrete structure to be site drilled and surveyed prior to steelwork
- fabrications. Coring of existing structure for anchors is not permitted/ Connection of steelwork to concrete or masonry using chemical anchors through steel plates shall have the gap between the bolt holes in the plate and the bolts fully filled with epoxy mortar prior to installing the bolt 19. washers and nuts.
- 20. Purlins and Girts: Cleats to be as per purlin manufacturer's specifications. For purlin top flange greater than 250mm above top of supporting steelwork, use 75x75x8 angle unless noted otherwise.
 - Bridging as per manufacturer's specifications. Bridging to wall girts commence from supporting structure under (slab) and be continuous up to eaves line. Bridging to purlins to be continuous across roof ridges. Ceiling systems, ductwork etc, to be suspended from purlins web via hook bolts. Bolts supporting
- services off the bottom flange of purlins will not be permitted. All steelwork connections not indicated in the documentation to be assumed to be standard cleat and end plate
- 21 member connections in accordance with the Australian Steel Institute design guides for simple connections. All steelwork to be fire protected by approved spray or board to architects details U.N.O
- 22 All secondary steelwork for support of facade, internal partitions, acoustic panels, balustrades etc. are to the 23.
- contractors design and detail. Contractor to submit details to engineer prior to fabrication. 24. Bracing turnbuckles must be capable of carrying the full capacity of the brace.

SHOTCRETE

3.

- General The concrete in the panels of retaining walls may be placed by the shotcreting process. 1. 2.
- Definitions The following definitions explain the meaning of certain words and terms as used in this specification
- Sprayed concrete is a mixture of cement, aggregate and water projected at high velocity from a а. nozzle into place to produce a dense homogenous mass.
- Shotcrete is a term used for sprayed concrete where the maximum aggregate size is not more than
- Rebound is a term used for all material having passed through the nozzle which does not conform to the definition of spraved concrete Nozzle is the attachment at the end of the material hose from which the material is jetted at high velocity.
- Nozzleman is the workman who manipulates the nozzle, contains consistency and makes the final disposition of the material. Mix Design - Mix proportions shall be designed by the contractor and shall be to the approval of the engineer. All concrete shall be obtained from an approved concrete supplier and shall be premixed and delivered to site in
- accordance with AS 1379. Where admixtures are approved by the engineer for addition to the mix to speed the setting rate of the cement, the following setting times and strengths shall apply unless otherwise stated: Initial set of cement/admixture paste : 3 minutes Final set of cement/admixture paste : 12 minutes 8 hour strength of concrete : 3 MPa
- 24 hour strength of concrete : 10 MPa All constituents shall be uniformly dispersed throughout the mix.
- Qualifications of Operators All operators shall be to the approval of the engineer prior to commencement of spraving. The contractor shall certify to the engineer that the foreman, nozzleman and delivery equipment operatives have completed satisfactory work in similar capacities elsewhere. Where required by the engineer. the operator shall spray pre-construction panels which shall be approved by the engineer before the operators are employed on the works. Such panels may also be used by the engineer to assess the competence of operators or trainees for whom such certification is not available.
- Plant The contractor shall state the numbers and type of plant which he proposes to use for the construction of he works Substrate Preparation - The surface shall be compacted, tined and graded as required and dampened before the application of sprayed concrete. Natural surfaces must be sufficiently cohesive to prevent erosion when the
- sprayed concrete is applied. Spraying Procedure - No concrete shall be sprayed in air temperatures less than 1° Celsius. Freshly sprayed concrete shall be protected from rain or water until the surface is of sufficient hardness to prevent damage. Spraying shall be discontinued if wind or air currents cause separation of the nozzle stream during placement. During starting or stopping of the spraying operation or whenever spraying is irregular, the nozzle shall be directed away from the works, all corners and any areas where rebound cannot escape or be blown free, shall be filled prior to general spraving. Rebound shall not be worked into the construction or reused in the works. Guides shall be set up to establish finished surfaces. These guides shall be to the approval of the engineer prior to spraving. Spraved concrete shall be applied so that it neither sags nor slumps. Spraved concrete shall be troweled to a smooth surface. Maximum deviation from a 1 metre straight edge shall be 10mm. Full records of all materials delivered to the sprayed concrete mixer shall be kept and made available to the construction manager. <u>Joints</u> - The position and type of all construction joints shall be approved by the engineer. Quality Control - Testing of shotcrete shall be carried out in accordance with the sprayed concrete manual ommended Practice : Sprayed Concrete' Clause A12 of the reference specification prepared by the



Concrete Institute of Australia.

RMANENT / TEMPORARY GROUND ANCHORS

- All ground anchor loads nominated are minimum long term ultimate residual loads. Ground anchors are to be designed to withstand the working load as shownon the drawings. All workmanship and materials shall be in accordance with AS 3600, AS 1310, AS 1311, AS 1313 and AS 1314. The design and details are to be certified by an independent engineer prior to commencement of works.
- Anchors shall consist of low relaxation stress relieved super grade strand to AS 1313 and anchorages shall conform to AS 1314. The contractor shall determine the ground anchor type, size and lengths required. The contractor shall be required to verify anchor lengths by two test anchors and to proof load each anchor as noted below. The actual minimal number of test anchors is to be
- determined by the engineer on site. Details of the proposed anchor system shall be forwarded to the engineer for review and shall include assumptions used in designing the anchors, including fixed anchor length or grouted length, free anchor length soil or rock assumptions and corrosion protection. Prior to any drilling operations, the contractor shall acquaint themselves with all adjacent underground services and ensure that none of these are disrupted by ground anchors.
- All appropriate approval, permits and agreements shall be obtained before commencement of the work. Services locations shown on the drawings are indicative Anchors shall be stressed at the appropriate stages of the construction sequence,
- provided that the bond anchorage grout has reached the required strength. Sufficient strands shall be left projecting from the anchorage to \ enable any subsequent re-Proof testing of anchors shall be advised prior to construction for permanent anchors.
- As a minimum, temporary anchors shall be tested as follows jack to required working load, check and record the load after a minimum period of 24 hours then gradually jack to the test load (1.5 times the working load) and hold for a minimum period of 5 minutes.
- Slowly de-stress to the working load, should the ground anchor fail to hold the test load for minimum period, it shall be rejected
- and another constructed as specified. Failure is determined by more than 5% drop in load.
- Re-check and record the ground anchor load not less than 3 days after the initial check and again at 21 days.
- If the load is greater than 90% of the working load, the anchors d. shall be stressed back to the working load. If the load is less than 90% of the working load, the anchors shall be rejected and another constructed as specified.
- The contractor shall maintain on site an adequate supply of anchor cables, grout and such equipment as necessary for emergency use. 10. Anchors holes shall be drilled to the line shown on the drawings and tolerances specified. Casings shall be provided when necessary to prevent collapse of the hole during construction of the anchor. On completion of drilling, all holes shall be cleared
- out and suitably plugged or otherwise protected to prevent entry of foreign matter. Under no circumstances shall holes be water jetted. 11. At the designated stage of the construction sequence, temporary anchors shall be
- de-stressed, anchor heads removed and surfaces made good. All drilled holes shall be fully grouted including those rejected after anchors have been de-stressed. The contractor shall keep accurate records of the ground anchors in a logbook on site 12. which shall be kept up to date as work proceeds.

The following data shall be recorded:

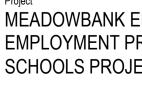
- Ground anchor identification Drilled date, total anchor length and angle Grouted date and grouted length Working load and date applied
- Test load and date applied
- 3 day load check and date 21 day load check and date
- Wedge and barrel identification numbers

GREEN STAR

1. To achieve the nominated green star points for the project the following is required. At least 95% of all reinforcing bar and mesh meets or exceeds 500MPa a. strength grade, and at least 60% of all reinforcing steel is produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually) and at least 15% (by mass) of all reinforcing steel is assembled using off site optimal fabrication techniques as defined by the GBCA.

Contractor

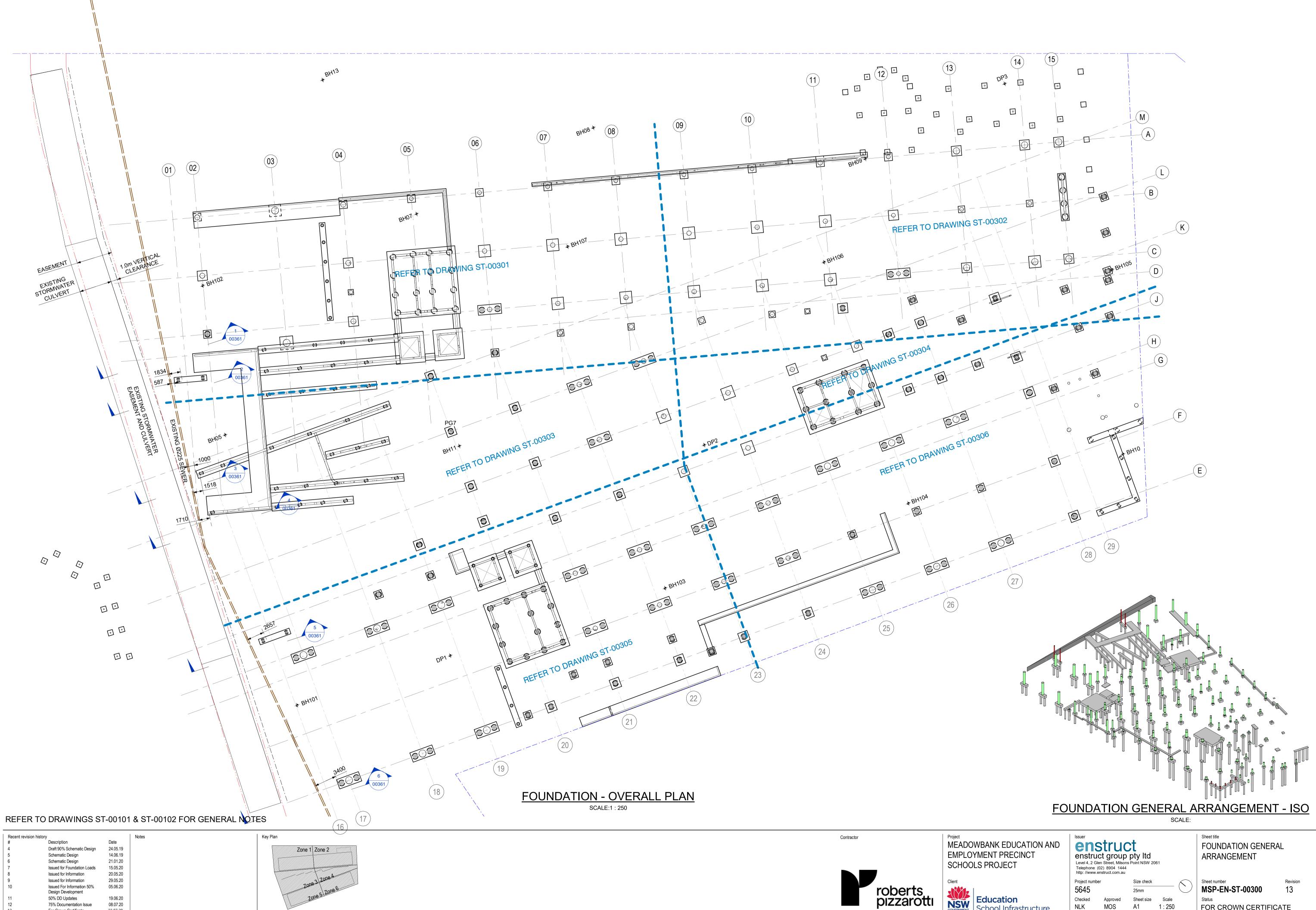




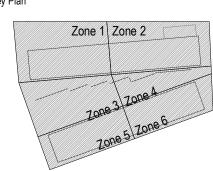
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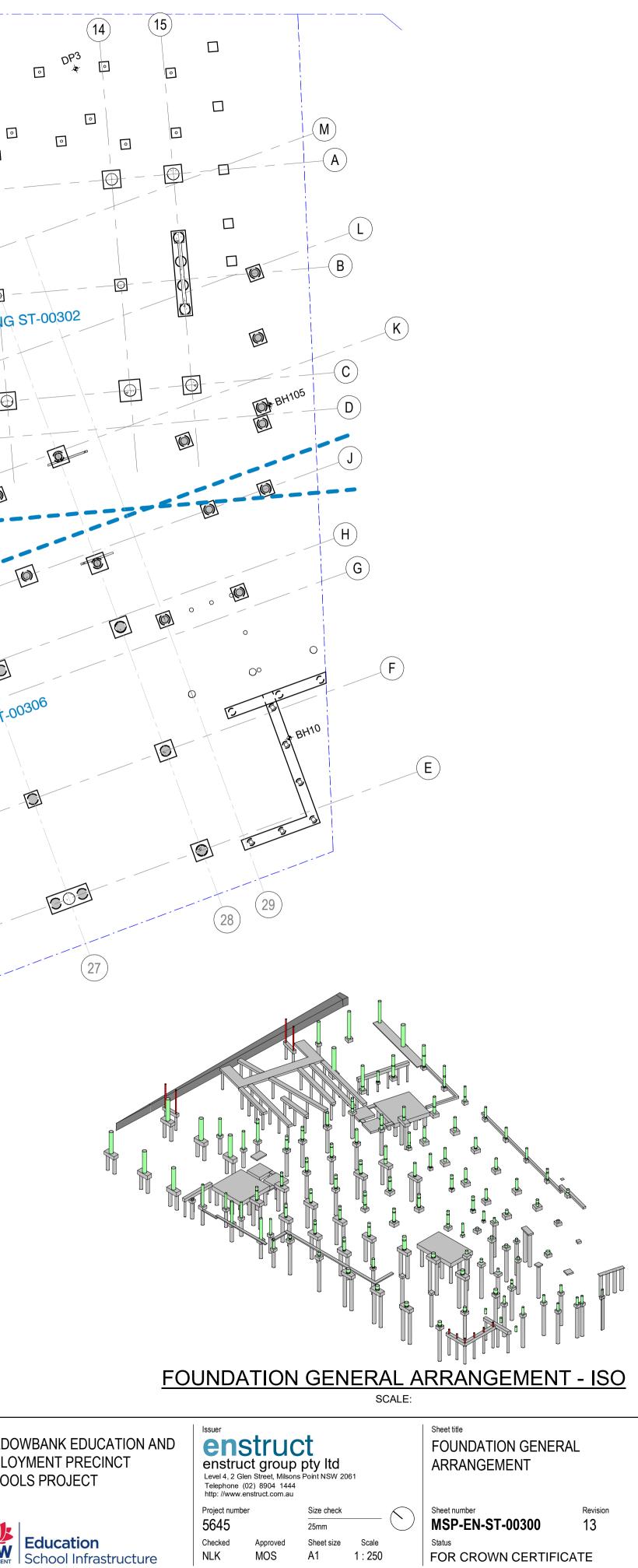
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Recent revisio	,		Notes
#	Description	Date	
4	Draft 90% Schematic Design	24.05.19	
5	Schematic Design	14.06.19	
6	Schematic Design	21.01.20	
7	Issued for Foundation Loads	15.05.20	
8	Issued for Information	20.05.20	
9	Issued for Information	29.05.20	
10	Issued For Information 50% Design Development	05.06.20	
11	50% DD Updates	19.06.20	
12	75% Documentation Issue	08.07.20	
13	For Crown Certificate	23.07.20	





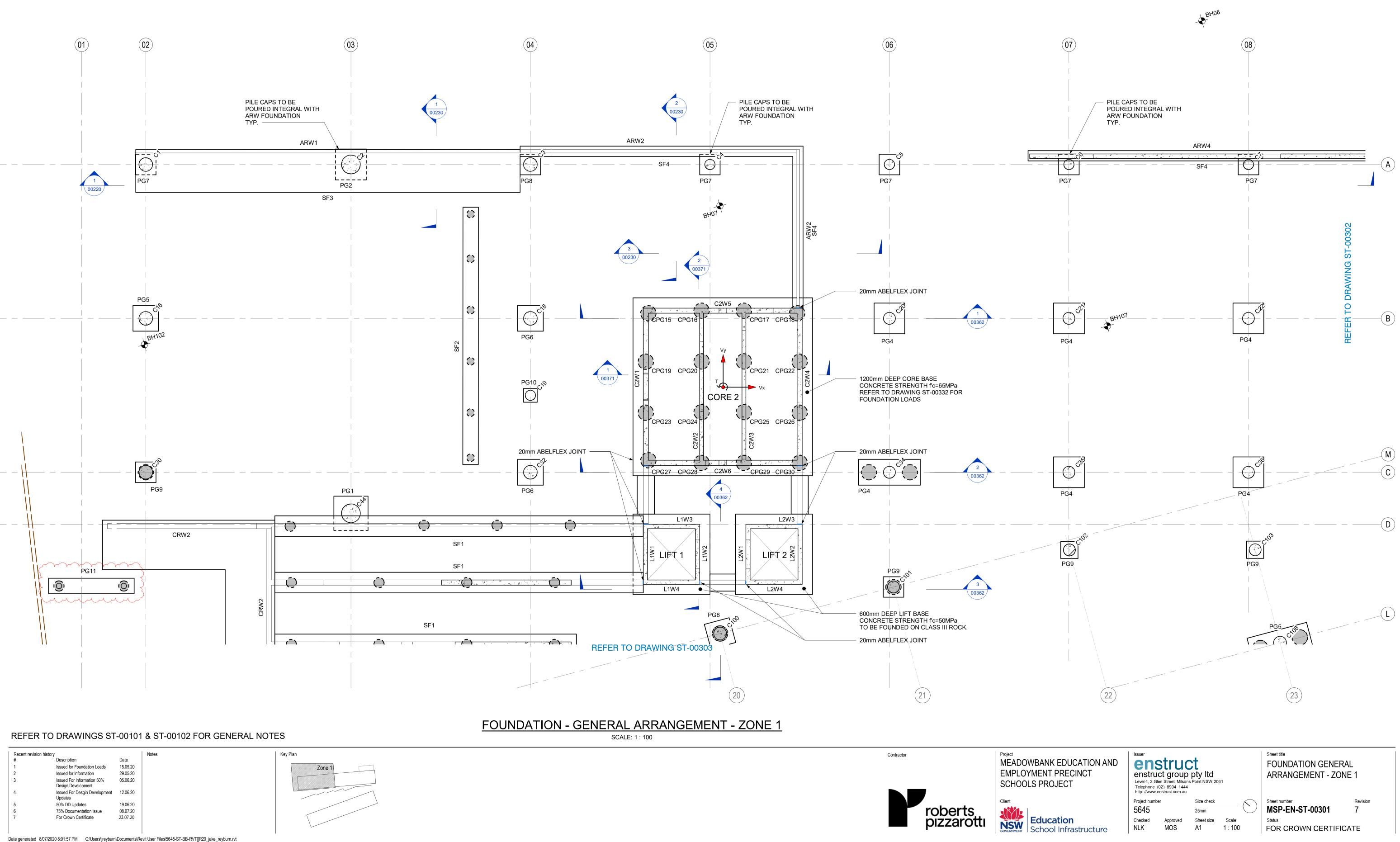


- **NOTES:** 1. GROUP PILE LOADS TO BE RESISTED BY PILES DIRECTLY BENEATH EACH CORE. VERTICAL ACTIONS ARE NOT TO BE SHARED BETWEEN PILE GROUPS.
- 2. SHEAR FORCES CAN BE DISTRIBUTED BETWEEN PILES THAT ARE CONNECTED BY A
- RIGID PILE CAP OR SUSPENDED SLAB. 3. DISTRIBUTION OF FORCES AND MOVEMENTS IN FOUNDATIONS SHALL BE COMPATIBILE WITH THE FORCES AND MOVEMENTS IN THE STRUCTURE ABOVE.
- 4. CORE PADS AND PILE CAPS ARE TO BE POURED HARD AGAINST IN-SITU ROCK.
- 5. THE TENSION CONNECTION BETWEEN PILES AND CORE RAFTS IS TO DEVELOP THE FULL TENSION FORCE WITHIN 200MM OF THE TOP OF THE RAFT. DETAIL TO BE COORDINATED WITH THE PILING CONTRACTOR.
- 6. PILES WITHIN THE ZONE OF INFLUENCE OF THE EXISTING CULVERT ARE NOT TO APPLY ANY LATERAL OR VERTICAL LOAD ONTO THE EXISTING CULVERT 7. CORE PILE LOADS ARE TO BE CONFIRMED FOLLOWING CONFIRMATION OF PILE SIZE,
- DENOTES BORE HOLES. REFER GEOTECHNICAL REPORTS

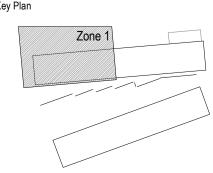
SETOUT AND STIFFNESS BY THE PILING CONTRACTOR.

NOTES (cont.):

- 8. FOR PAD FOOTING AND STRIP FOOTING DETAILS AND NOTES REFER TO ST-00331 TO ST-00351 9. FOR FOUNDATION SECTIONS REFER TO DRG. ST-00361
- 11. FOR PILE SCHEDULE AND NOTES REFER DRG. ST-00331 12. CURRENT SELECTION OF FOUNDATION TYPE HAS BEEN BASED UPON AN INTERPRETATION OF THE
- CURRENT GEOTECHNICAL REPORTS. THE CONTRACTOR SHOULD REVIEW THE AVAILABLE INFORMATION IN THE GEOTECHNICAL REPORTS AND MAKE THEIR OWN ASSESSMENT.
- 13. REFER TO DRAWING ST-00561 TO ST-00570 FOR RC WALL ELEVATIONS 14. REFER TO DRAWING ST-00501 TO ST-00502 FOR COLUMN SCHEDULE
- 15. REFER TO DRAWING ST-00331 & ST-00332 FOR LATERAL FOUNDATION LOADS 16. REFER TO DRAWING ST-00331 & GENERAL NOTES FOR GROUND ANCHOR NOTES
- 17. REFER TO DRAWING ST-00331 FOR CORE WALL GRAVITY LOADS 18. DEPTH OF FOUNDATION TO BE CO-ORDINATED WITH IN-GROUND SERVICES



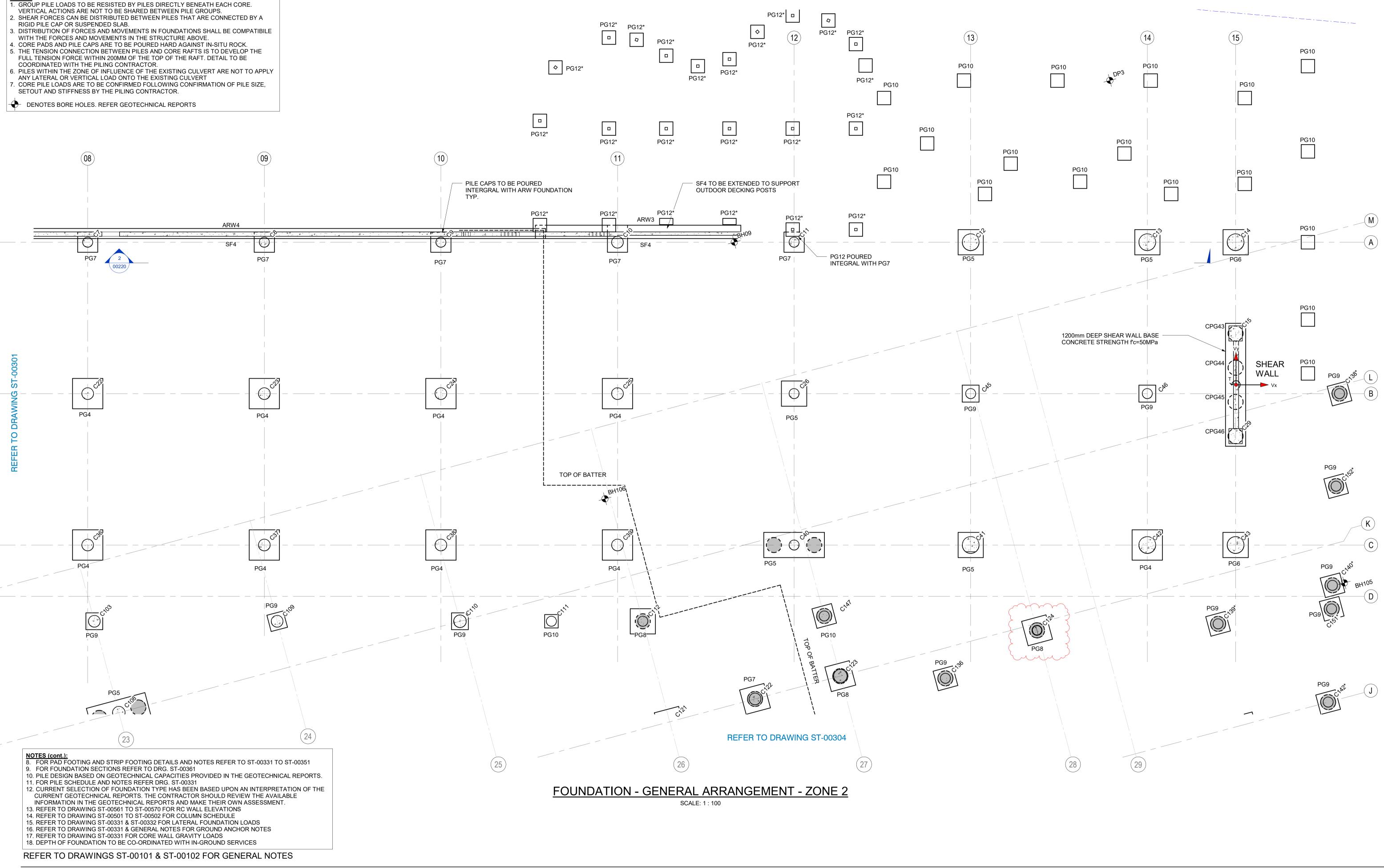
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#	Description	Date	
1	Issued for Foundation Loads	15.05.20	
2	Issued for Information	29.05.20	
3	Issued For Information 50% Design Development	05.06.20	
4	lssued For Desgin Development Updates	12.06.20	
5	50% DD Updates	19.06.20	
6	75% Documentation Issue	08.07.20	
7	For Crown Certificate	23.07.20	



10. PILE DESIGN BASED ON GEOTECHNICAL CAPACITIES PROVIDED IN THE GEOTECHNICAL REPORTS.



- **<u>NOTES:</u>** 1. GROUP PILE LOADS TO BE RESISTED BY PILES DIRECTLY BENEATH EACH CORE. VERTICAL ACTIONS ARE NOT TO BE SHARED BETWEEN PILE GROUPS. RIGID PILE CAP OR SUSPENDED SLAB.
- 4. CORE PADS AND PILE CAPS ARE TO BE POURED HARD AGAINST IN-SITU ROCK.
- FULL TENSION FORCE WITHIN 200MM OF THE TOP OF THE RAFT. DETAIL TO BE



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#	Description	Date		
1	Issued for Foundation Loads	15.05.20		Zone
2	Issued for Information	29.05.20		
3	Issued For Information 50% Design Development	05.06.20		
4	50% DD Updates	19.06.20		
5	50% DD Updates	24.06.20		
6	75% Documentation Issue	08.07.20		
7	For Crown Certificate	23.07.20		
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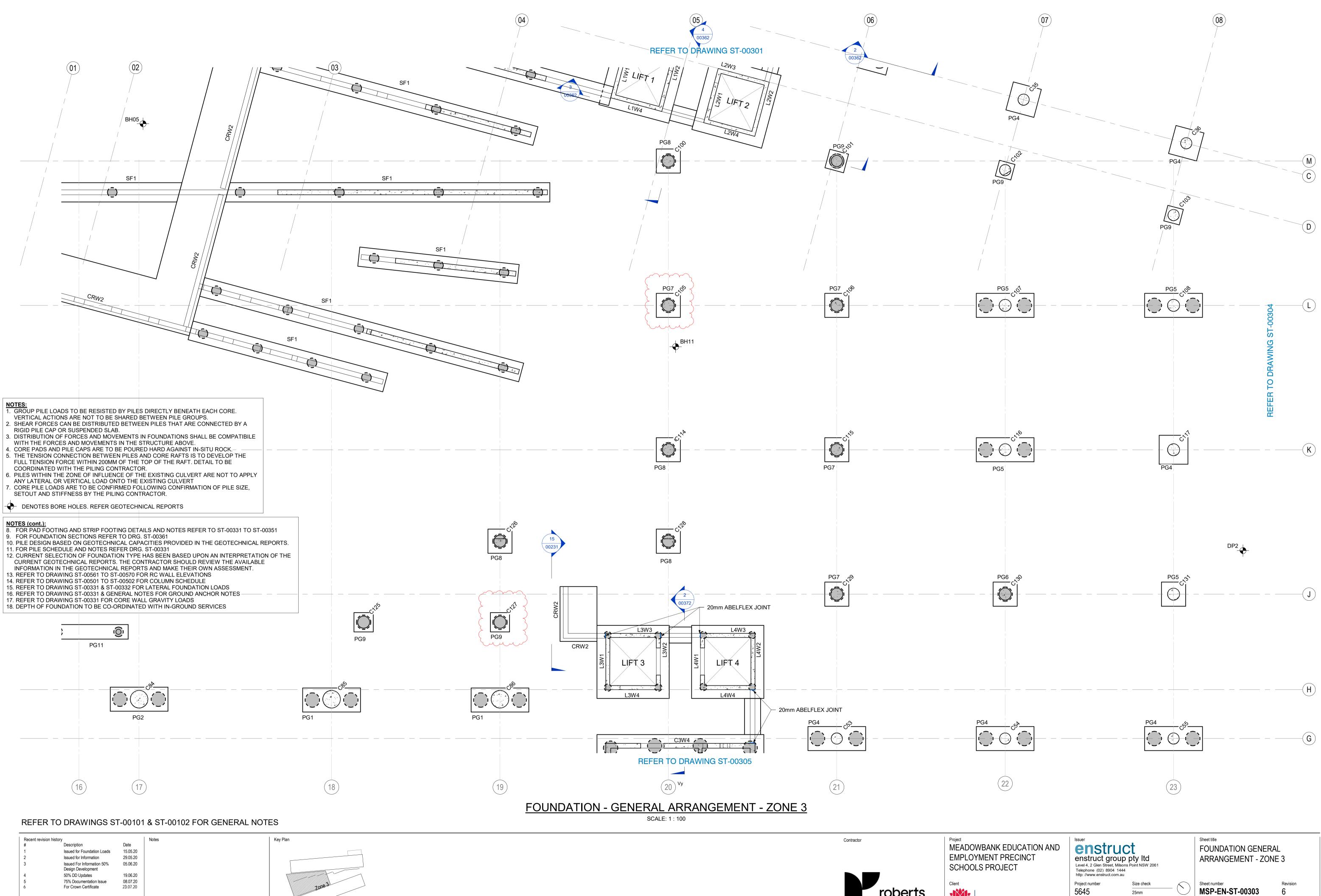


Contractor



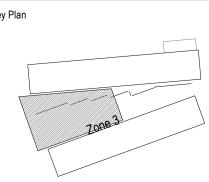
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EDUCATION AND RECINCT ECT	Issuer enstruct group pty Itd Level 4, 2 Glen Street, Milsons Point NSW 2061 Telephone (02) 8904 1444 http: //www.enstruct.com.au			Sheet title FOUNDATION GENERA ARRANGEMENT - ZONI			
	Project numbe	r	Size check	(\sum	Sheet number MSP-EN-ST-00302	Revision 7
ion nfrastructure	Checked NLK	Approved MOS	Sheet size A1	Scale 1:100		Status FOR CROWN CERTIFICA	ATE



1Issued for Foundation Loads15.05.202Issued for Information29.05.203Issued For Information 50% Design Development05.06.20450% DD Updates19.06.20575% Documentation Issue08.07.20	Recent revision	2		Notes
2Issued for Information29.05.203Issued For Information 50%05.06.20Design Development19.06.20450% DD Updates19.06.20575% Documentation Issue08.07.20	#	Description	Date	
3Issued For Information 50% Design Development05.06.20 19.06.20450% DD Updates19.06.20575% Documentation Issue08.07.20	1	Issued for Foundation Loads	15.05.20	
Design Development450% DD Updates19.06.20575% Documentation Issue08.07.20	2	Issued for Information	29.05.20	
5 75% Documentation Issue 08.07.20	3		05.06.20	
	4	50% DD Updates	19.06.20	
6 For Crown Certificate 23.07.20	5	75% Documentation Issue	08.07.20	
	6	For Crown Certificate	23.07.20	

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School Infrastructure

Checked

NLK

Approved

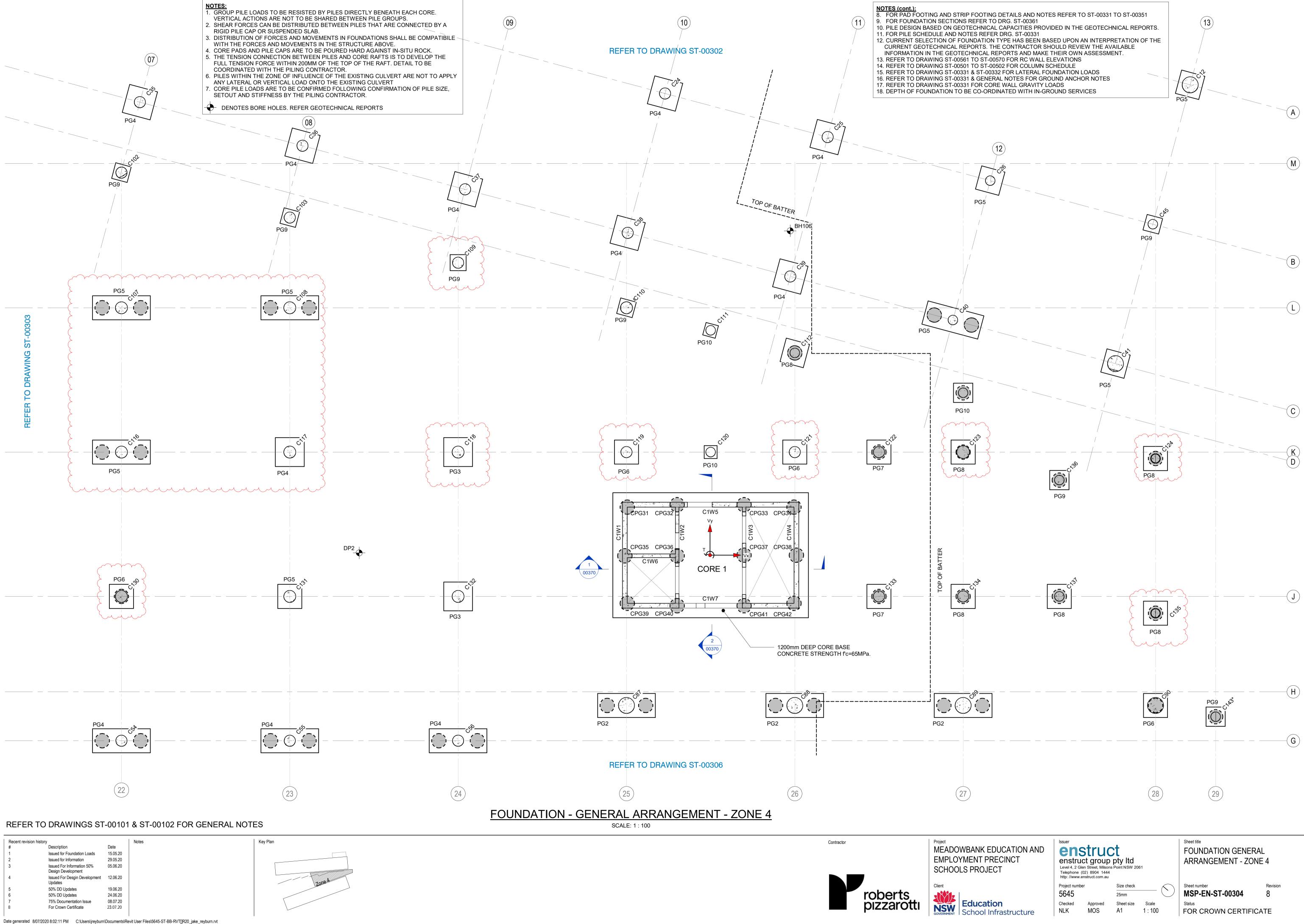
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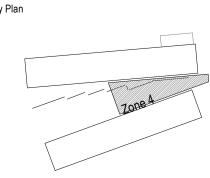
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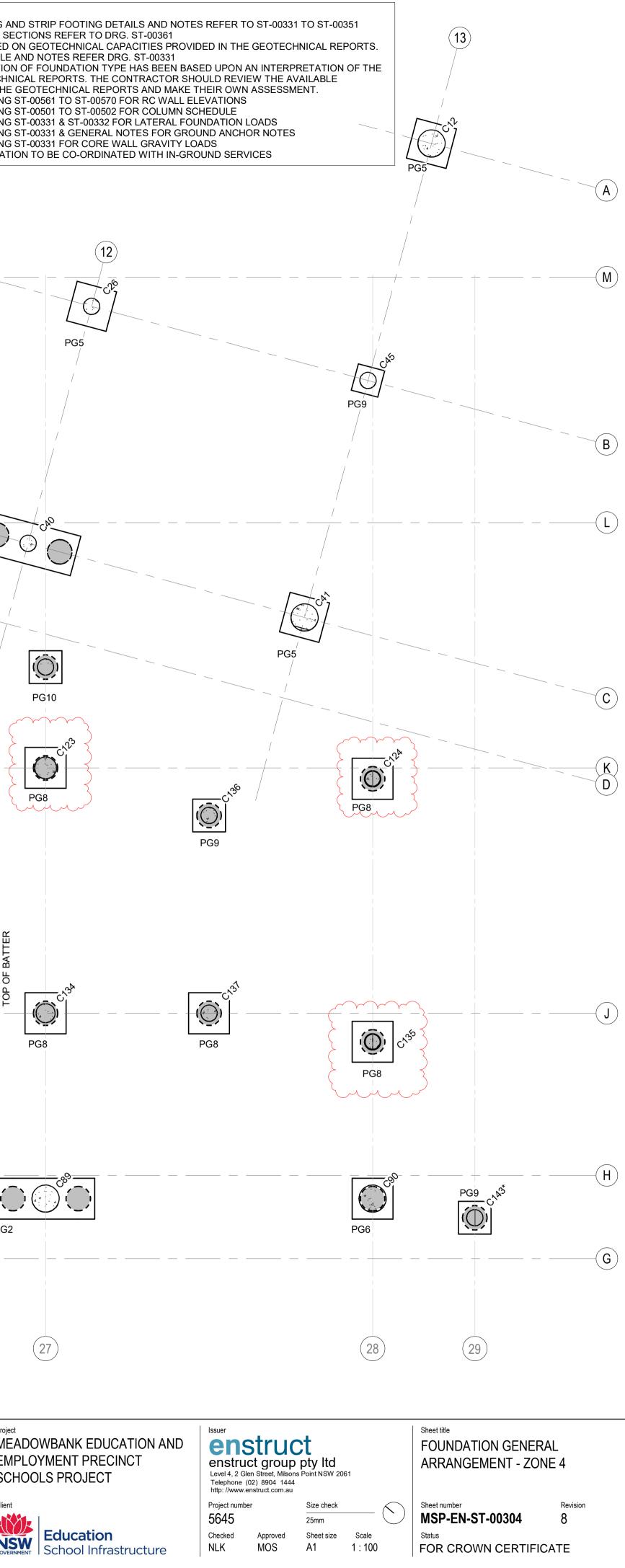
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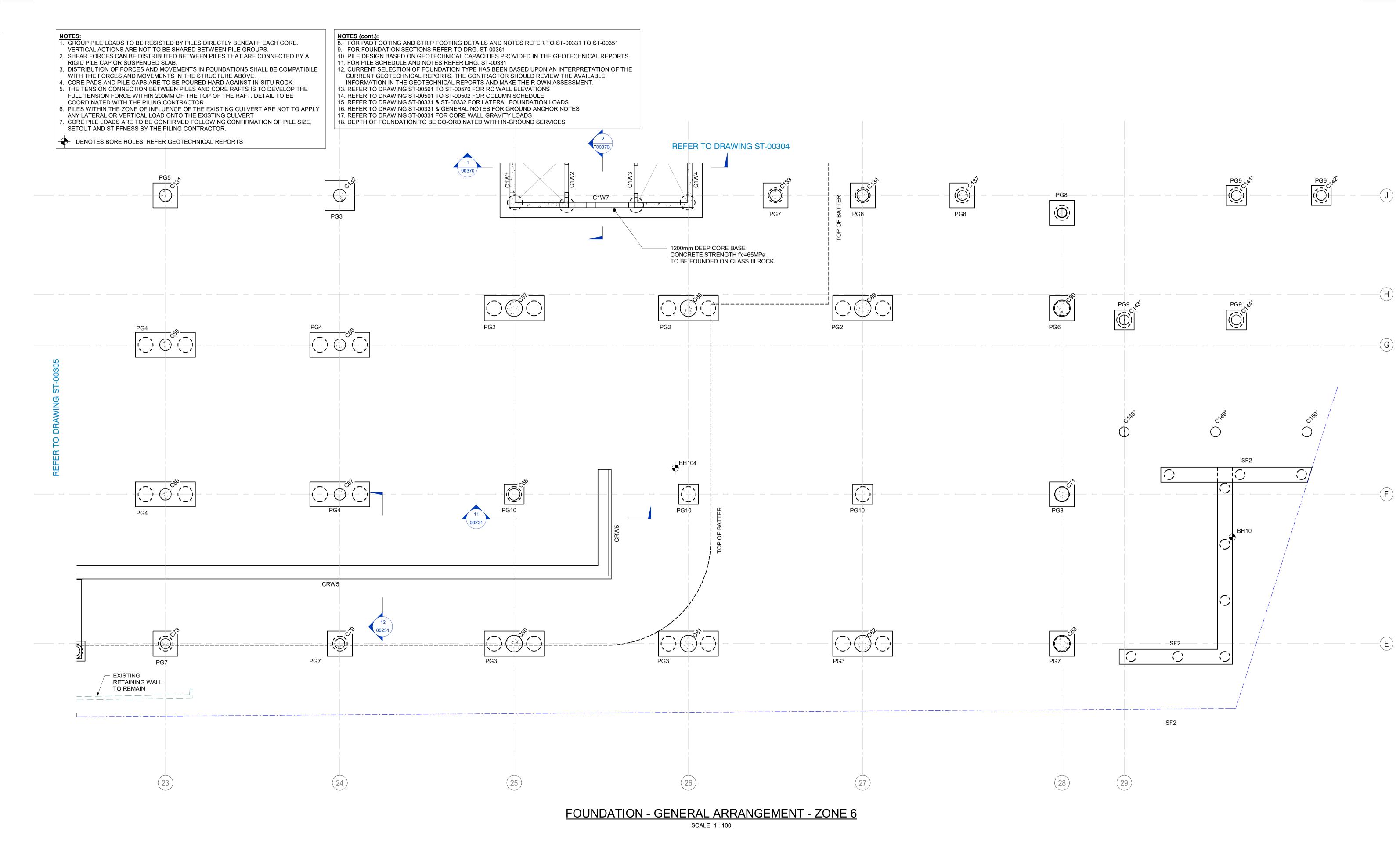


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#	Description	Date	
1	Issued for Foundation Loads	15.05.20	
2	Issued for Information	29.05.20	
3	Issued For Information 50% Design Development	05.06.20	
4	lssued For Desgin Development Updates	12.06.20	
5	50% DD Updates	19.06.20	
6	50% DD Updates	24.06.20	
7	75% Documentation Issue	08.07.20	
8	For Crown Certificate	23.07.20	





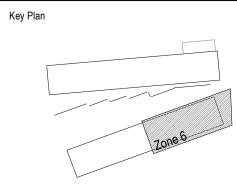




REFER TO DRAWINGS ST-00101 & ST-00102 FOR GENERAL NOTES

#	Description	Date	
1	Issued for Foundation Loads	15.05.20	
2	Issued for Information	29.05.20	
3	Issued for Information	02.06.20	
4	Issued For Information 50% Design Development	05.06.20	
5	50% DD Updates	19.06.20	
6	50% DD Updates	26.06.20	
7	75% Documentation Issue	08.07.20	
8	For Crown Certificate	23.07.20	

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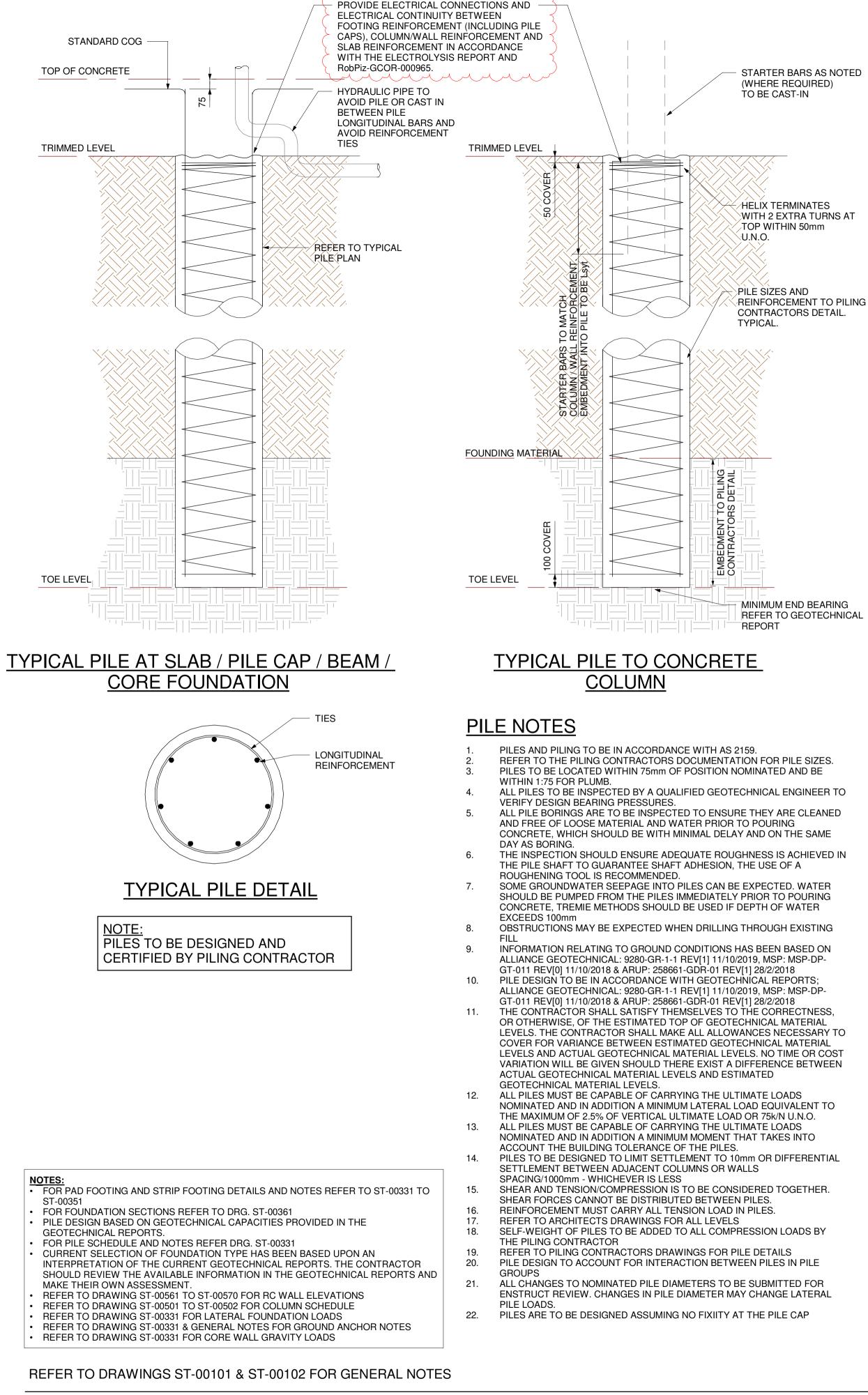


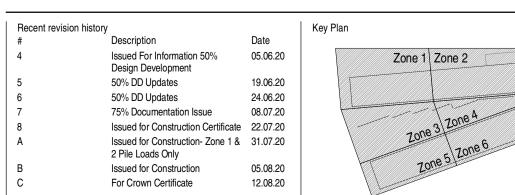


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	Project numbe	r	Size check	(\sum	Sheet number MSP-EN-ST-00306	Revision 8
tion Infrastructure	Checked NLK	Approved MOS	Sheet size A1	Scale 1:100		Status FOR CROWN CERTIFIC	ATE





Notes

		ζ		FOUNDATION OPTION TABLE												
		5					PAD FOOT	ING OPTION	l							
тао	WORKING LOAD	ULTIMATE LOAD	f'c	DEPTH	ABP = 3500kPa					ABP = 6000kPa						
TAG	Nw	N*			WIDTH	LENGTH		REINFO	RCEMENT		WIDTH	LENGTH		REIN	FORCEMENT	
	kN	kN	MPa	mm	mm	mm	'B1'	'B2'	'T1'	'T2'	mm	mm	'B1'	'B2'	'T1'	'T2'
PG0	13000	15500	50	1500	2500	2500	8N28	8N28	N16-200	N16-200	1800	1800	7N28	7N28	N16-200	N16-200
PG1	12000	14500	50	1200	2000	2000	8N28	8N28	N16-200	N16-200	1800	1800	7N28	7N28	N16-200	N16-200
PG2	10500	13000	50	1000	1800	1800	8N28	8N28	N16-200	N16-200	1500	1500	6N28	6N28	N16-200	N16-200
PG3	9000	11000	50	1000	1800	1800	8N28	8N28	N16-200	N16-200	1500	1500	6N28	6N28	N16-200	N16-200
PG4	8000	10000	50	1000	1800	1800	7N28	7N28	N16-200	N16-200	1500	1500	6N28	6N28	N16-200	N16-200
PG5	7000	9000	50	900	1500	1500	6N28	6N28	N16-200	N16-200	1200	1200	6N24	6N24	N16-200	N16-200
PG6	6000	8000	50	900	1500	1500	7N24	7N24	N16-200	N16-200	1200	1200	6N24	6N24	N16-200	N16-200
PG7	5000	6500	50	900	1200	1200	6N24	6N24	N16-200	N16-200	1100	1100	6N24	6N24	N16-200	N16-200
PG8	4000	5000	40	800	1200	1200	5N24	5N24	N16-200	N16-200	1000	1000	4N24	4N24	N16-200	N16-200
PG9	2500	3000	40	800	1000	1000	4N24	4N24	N16-200	N16-200	800	800	4N24	4N24	N16-200	N16-200
PG10	1500	2000	40	600	800	800	3N24	3N24	N16-200	N16-200	800	800	4N24	4N24	N16-200	N16-200
PG11		(}				REFER	TO PILED C	PTION			·				
PG12*	100	150	40	450	900	900	4N20	4N20	N16-200	N16-200						
	kN/m	kN/m														
SF1	250	300	40	800	800						N1/A					
SF2	100	150	40	800	600						N/A					

* PG12 FOUNDATIONS CAN BE FOUNDED ON MATERIAL WITH REDUCED ALLOWABLE BEARING PRESSURE OF 150kPa. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER ON SITE. ᠂ᡝ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ᠇ᢉ

PILED OPTION WORKING ULTIMATE PILE DIMENSIONS PILE CAP DIMENSIONS LOAD LOAD TAG Nw N* PILE DIAMETER SOCKET LENGTH LENGTH WIDTH DEPTH f'c # PILES kΝ kΝ MPa mm mm mm mm mm PG0 13000 900 2500 3600 1200 1500 15500 PG1 3600 1500 12000 900 2000 1200 14500 65 PG2 1500 10500 13000 900 1500 3600 1200 65 PG3 1000 3600 1200 1500 9000 11000 900 65 PG4 3600 1500 8000 10000 900 500 1200 PG5 1500 7000 900 3600 1200 9000 PG6 1500 900 6000 8000 900 2000 1500 PG7 1200 1500 1500 900 900 5000 6500 PG8 500 1500 1500 4000 5000 900 50 900 1200 PG9 2500 1200 1200 900 600 3000 50 PG10 1500 2000 600 1200 1200 900 50 900 900 450 4700 PG11 2000 50 3000 PG12 REFER TO PAD FOOTING OPTION kN/m kN/m SF1 900 250 300 600 @ MAX 6M SPACING 900 300 SF2 900 900 100 150 450 @ MAX 6M SPACING 300 50

NOTES

- FINAL PILE DESIGN AND CERTIFICATION BY CONTRACTOR. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW THE AVAILABLE INFORMATION IN THE GEOTECHNICAL REPORTS AND MAKE THEIR OWN ASSESSMENT. - CURRENT SELECTION OF THE FOUNDATION TYPES SHOWN ON THE PLANS HAS BEEN BASED ON AN INTERPRETATION OF THE CURRENT GEOTECHNICAL ADVICE. REFER TO GEOTECHNICAL REPORTS. PADS AND PILES OF THE SAME TAG ARE INTERCHANGEABLE. THE SELECTED TYPE IS DEPENDENT ON THE ACTUAL GROUND CONDITIONS ON SITE AND THE DEPTH OF ROCK. **GEOTECHNICAL REPORTS:**

ARUP: 258661-GDR-01 REV[1] 28/2/2018

MSP: MSP-DP-GT-011 REV[0] 11/10/2018 ALLIANCE GEOTECHNICAL: 9280-GR-1-1 REV[1] 11/10/2019

CONTAMINATION REPORT:

ALLIANCE GEOTECHNICAL: 7179-ER-1-2 REV[3] 4/04/2019

- ALL LOADS PROVIDED IN THE ABOVE TABLE SHOULD BE APPLIED AT THE TOP OF A FOUNDATION GROUP. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE NUMBER OF PILES AND SIZE IS APPROPRIATE. - ALL LOADS SPECIFIED ABOVE DO NOT INCLUDE SELF WEIGHT OF PAD, PILE CAP OR PILE. - PADS TO BE FOUNDED ON CLASS III (ABP = 6000kPa) OR CLASS IV (ABP = 3500kPa) ROCK AS DEFINED IN THE GEOTECHNICAL REPORTS

- ALL PILES TO BE FOUNDED IN CLASS III ROCK OR GREATER.

- CLASS III ROCK TO HAVE ALLOWABLE BEARING PRESSURE OF 6000kPa OR GREATER REFER TO GEOTECHNICAL REPORT FOR TESTING REQUIREMENTS. - PILE LENGTHS ARE MINIMUM LENGTHS IN CLASS III ROCK AND DO NOT INCLUDE ROCK TRANSITION ZONE. REFER TO GEOTECHNICAL REPORT FOR MINIMUM EMBEDMENT DEPTHS. - ASSUMED GEOTECHNICAL ULTIMATE FACTOR $\phi g = 0.6$ FOR ULTIMATE PILE CAPACITY

- ALL FOUNDATIONS TO BE REVIEWED BY THE GEOTECHNICAL ENGINEER TO CONFIRM ALLOWABLE BEARING PRESSURE HAS BEEN ACHIEVED.

- ALL PILE REINFORCEMENT CAGES ARE TO CONTINUE TO THE TOP OF THE PILE CAP AND BE COGGED AS PER AS3600. - STRIP FOOTINGS WITH LINE LOADS AS SPECIFIED ABOVE MUST HAVE A PILE AT EACH END OF INDIVIDUAL STRUCTURAL ELEMENT

- STRIP FOOTINGS SUPPORTING COLUMNS MUST HAVE PILES UNDER EACH COLUMN.

- PILES AT THE END OF STRIP FOOTINGS MUST HAVE CENTRELINES THAT ARE MIN 300mm BEYOND END OF STRUCTURAL ELEMENT ABOVE. - ACTUAL GROUND CONDITIONS MAY VARY AND NUMBER OF PILES REQUIRED COULD INCREASE WITH FURTHER SITE INVESTIGATION - LIGHTWEIGHT FAÇADE ASSUMED FOR LIBRARY CONCRETE FAÇADE WALLS NOT INCLUDED UNDER REVIEW

ELECTROLYSIS NOTES: 1. REFER TO POWER EARTH ELECTROLYSIS

REPORT NO. 4413REP010101 REVISION 0 DATED 8/7/20 FOR ELECTROLYSIS REQUIREMENTS FOR THE PROJECT.

PROVIDE REINFORCEMENT WELDS/TIES AND ELECTRICAL CONNECTIONS IN ACCORDANCE WITH THE ELECTROLYSIS REPORT.

REFER TO ACONEX CORRESPONDENCE RobPiz-GCOR-000965 FOR ADDITIONAL ELECTRICAL CONNECTIONS REQUIRED WHERE MOVEMENT JOINTS EXIST BETWEEN SLAB-ON-GRADE AND FOOTINGS/COLUMNS.

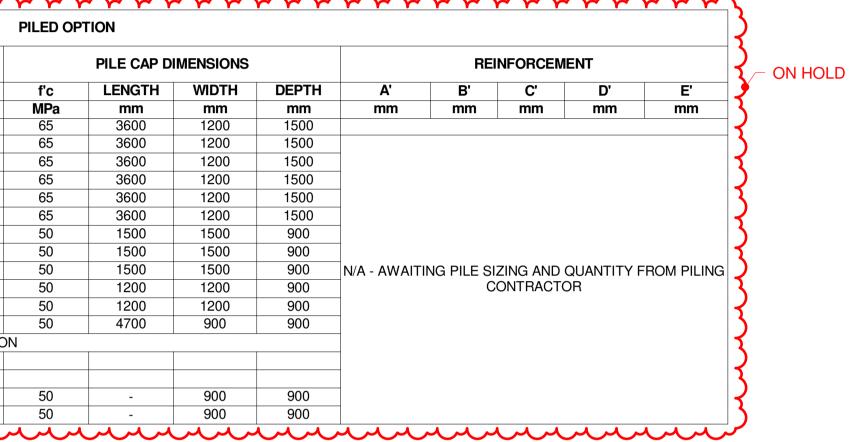


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DUCATION AND RECINCT CT	enstru Level 4, 2 G Telephone	Struc Ict group ilen Street, Milson (02) 8904 1444 .enstruct.com.au	pty Itd s Point NSW 20	61		TYPICAL PILE DETAIL	S - SHEET 1
	Project numb 5645	Der	Size check 25mm	(\sum	Sheet number MSP-EN-ST-00331	Revision C
on nfrastructure	Checked NLK	Approved MOS	Sheet size A1	Scale 1:20		FOR CROWN CE	RTIFICATE

LATERAL FOUNDATION LOADS

TAG	ULTIMATE COMPRESSION	ULTIMATE TENSION	WORKING COMPRESSION	WORKING TENSION
	[kN]	[kN]	[kN]	[kN]
CPG1	10,000	7,250	3,000	0
CPG2	8,500	5,750	2,500	0
CPG3	10,500	7,250	3,000	0
CPG4	10,000	7,250	3,000	0
CPG5	7,000	4,500	2,500	0
CPG6	3,500	1,500	1,500	0
CPG7	6,500	4,250	2,500	0
CPG8	7,500	4,250	3,000	0
CPG9	3,500	1,250	2,000	0
CPG10	7,500	4,500	2,500	0
CPG11	10,000	7,250	3,000	0
CPG12	8,500	5,250	3,000	0
CPG13	12,500	8,250	4,000	0
CPG14	10,000	7,250	3,000	0
CPG15	10,500	6,750	4,500	250
CPG16	9,500	5,250	4,500	0
CPG17	9,000	5,250	4,000	0
CPG18	10,500	6,750	4,500	250
CPG19	7,000	4,500	3,000	250
CPG20	2,500	750	1,500	0
CPG21	2,500	750	1,500	0
CPG22	7,500	4,750	3,500	250
CPG23	7,000	4,500	3,000	250
CPG24	2,500	750	1,500	0
CPG25	2,500	750	1,500	0
CPG26	7,500	4,750	3,500	250
CPG27	10,500	6,750	4,500	250
CPG28	8,000	5,000	3,000	250
CPG29	7,500	4,750	3,000	500
CPG30	10,500	6,750	4,500	250
CPG31	11,000	8,250	3,000	250
CPG32	9,500	6,000	3,500	0
CPG33	8,500	5,250	3,000	0
CPG34	11,000	8,250	3,000	250
CPG35	9,000	5,500	3,000	0
CPG36	1,500	250	1,000	0
CPG37	1,500	0	1,000	0
CPG38	9,000	5,750	3,000	0
CPG39	11,000	8,250	3,000	250
CPG40	8,500	4,750	3,500	0
CPG40 CPG41	9,000	5,500	3,500	0
CPG41 CPG42	11,000	8,250	3,000	250
CPG42 CPG43	10,500	8,250	3,000	1,000
CPG43 CPG44	2,500	1,750	1,000	250
CPG44 CPG45	2,500	1,750	1,000	250
CPG45 CPG46	10,500	8,750	3,000	1,000

	CORE 1 - SI	HEAR AND TORSION LOAD) SCHEDULE		CORE 2 - SHEAR AND TORSION LOAD SCHEDULE		
	Vx	Vy	Т		Vx	Vy	Т
	[kN]	[kN]	[kNm]		[kN]	[kN]	[kNm]
ULTIMATE WIND - DIRECTION 1	250	2,000	500	ULTIMATE WIND - DIRECTION 1	250	5,250	6,250
ULTIMATE WIND - DIRECTION 2	1,000	250	250	ULTIMATE WIND - DIRECTION 2	1,250	250	500
EARTHQUAKE - DIRECTION 1	16,000	23,000	31,500	EARTHQUAKE - DIRECTION 1	3,500	24,750	57,750
EARTHQUAKE - DIRECTION 2	39,000	9,250	30,500	EARTHQUAKE - DIRECTION 2	24,750	3,750	17,000
WORKING WIND - DIRECTION 1	250	1,500	500	WORKING WIND - DIRECTION 1	250	3,750	4,500
WORKING WIND - DIRECTION 2	750	250	250	WORKING WIND - DIRECTION 2	1,000	250	250
					_,		
	CORF 3 - SI	HEAR AND TORSION LOAD			SHFAR W	ALL - SHEAR AND TORSION	N LOAD SCHEDUL

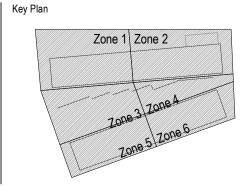
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	Vx Vy T			Vx	Vy	Т		
	[kN]	[kN]	[kNm]		[kN]	[kN]	[kNm]	
ULTIMATE WIND - DIRECTION 1	250	2,500	500	ULTIMATE WIND - DIRECTION 1	250	1,750	250	
ULTIMATE WIND - DIRECTION 2	250	250	250	ULTIMATE WIND - DIRECTION 2	250	250	250	
EARTHQUAKE - DIRECTION 1	8,250	35,250	28,000	EARTHQUAKE - DIRECTION 1	250	10,500	250	
EARTHQUAKE - DIRECTION 2	18,500	17,000	16,500	EARTHQUAKE - DIRECTION 2	250	2,500	250	
WORKING WIND - DIRECTION 1	250	1,750	250	WORKING WIND - DIRECTION 1	250	1,250	250	
WORKING WIND - DIRECTION 2	250	250	250	WORKING WIND - DIRECTION 2	250	250	250	

1. ALL EARTHQUAKE ACTIONS ARE TO BE CONSIDERED TO ACT IN THE POSITIVE OR NEGATIVE DIRECTION, WHICHEVER IS WORSE FOR THE CONBINATION BEING... 2. WHEN AN EARTHQUAKE ACTION IN ONE DIRECTION IS BEING CONSIDERED, 30% OF THE EARTHQUAKE ACTION IN THE OTHER DIRECTION IS TO BE CONSIDERED ... 3. GLOBAL EARTHQUAKE FORCES ARE TO BE COMBINED IN ACCORDANCE WITH AS/NZS 1170.1 AND AS1170.4. 4. EARTHQUAKE LOADS PROVIDED ARE ULTIMATE LOADS. 5. FORCES ARE SUBJECT TO CHANGE AS THE DESIGN DEVELOPS AND STRUCTURAL LOADS AND CORE WALL PENETRATIONS ARE FINALISED. 6. GEOTECHNICAL ADVICE ON THE LATERAL STIFFNESS OF PILES IS TO BE PROVIDED ONCE PILE SIZES AND NUMBER OF PILES ARE CONFIRMED BY THE PILING... 7. THE LOADS ABOVE INCLUDE NO ALLOWANCE FOR GRAVITY LOADS. REFER TO CORE WALL GRAVITY LOAD SCHEDULUE FOR GRAVITY LOADS. 8. SHEAR FORCE IS TO BE DISTRIBUTED BETWEEN ALL PILES CONNECTED BY A RIGID CAP ACCORDING TO AN ELASTIC DISTRIBUTION . 9. FOLLOWING RECEIPT OF PROPOSED PILE SIZES AND LOCATIONS FROM THE PILING CONTRACTOR, LOADS FOR INDIVIDUAL PILES WILL BE PROVIDED. 10. WORKING WIND LOADS CAN BE CALCULATED BY APPLYING A FACTOR OF 0.72 TO THE LOADS ABOVE.

REFER TO DRAWINGS ST-00101 & ST-00102 FOR GENERAL NOTES

Recent revisi #	Description	Date	Notes
1	50% DD Updates	19.06.20	
2	75% Documentation Issue	08.07.20	
3	For Crown Certificate	23.07.20	

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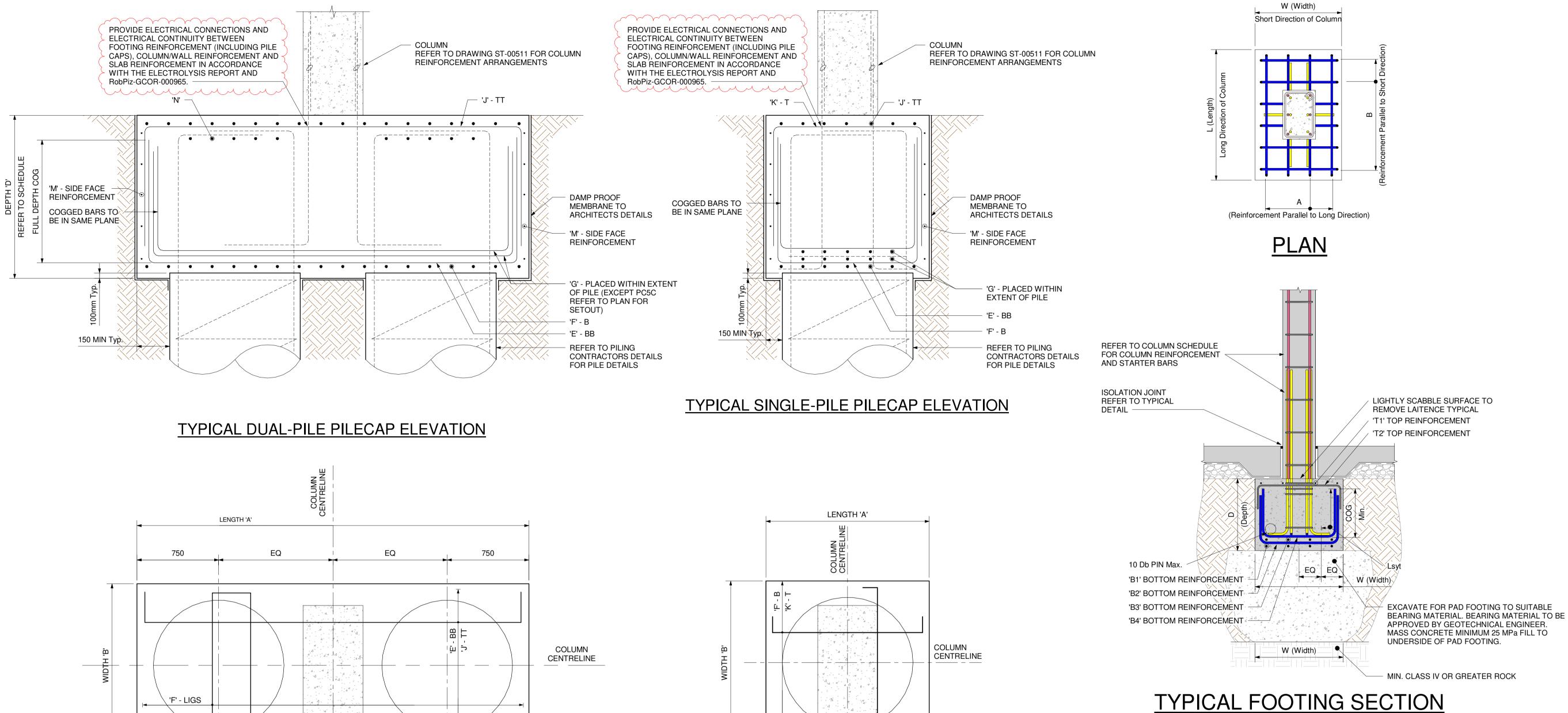
CORE 3 - SHEAR AND TORSION LOAD SCHEDULE						
Vx	Vv	Т				

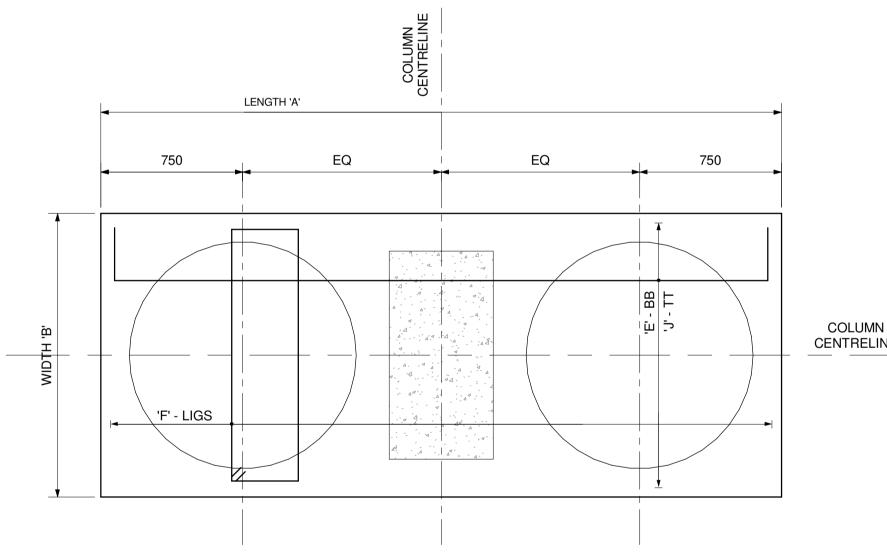


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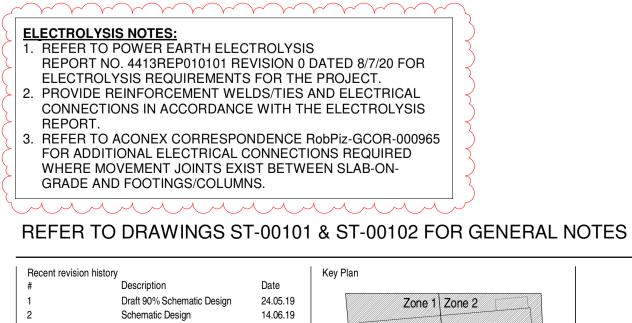
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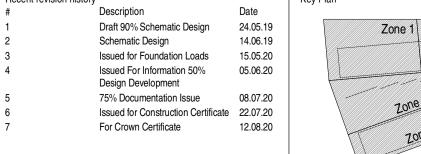
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	Project numbe	r	Size check		\bigcirc	Sheet number MSP-EN-ST-00332	Revision 3		
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TYPICAL DUAL-PILE PILECAP PLAN SCALE = 1:20



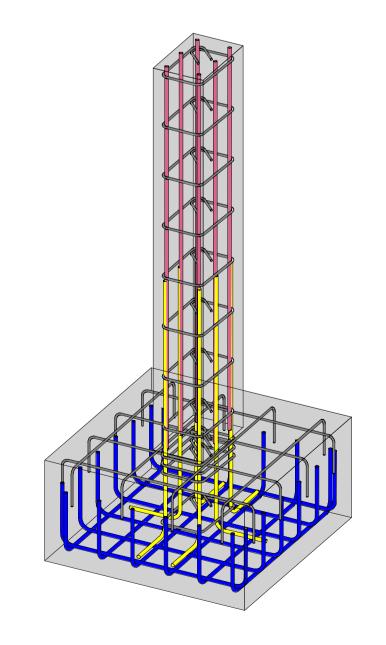


Zone 3 Zone 4 Zone 5 Zone 6

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'E' - BB 'J' - TT

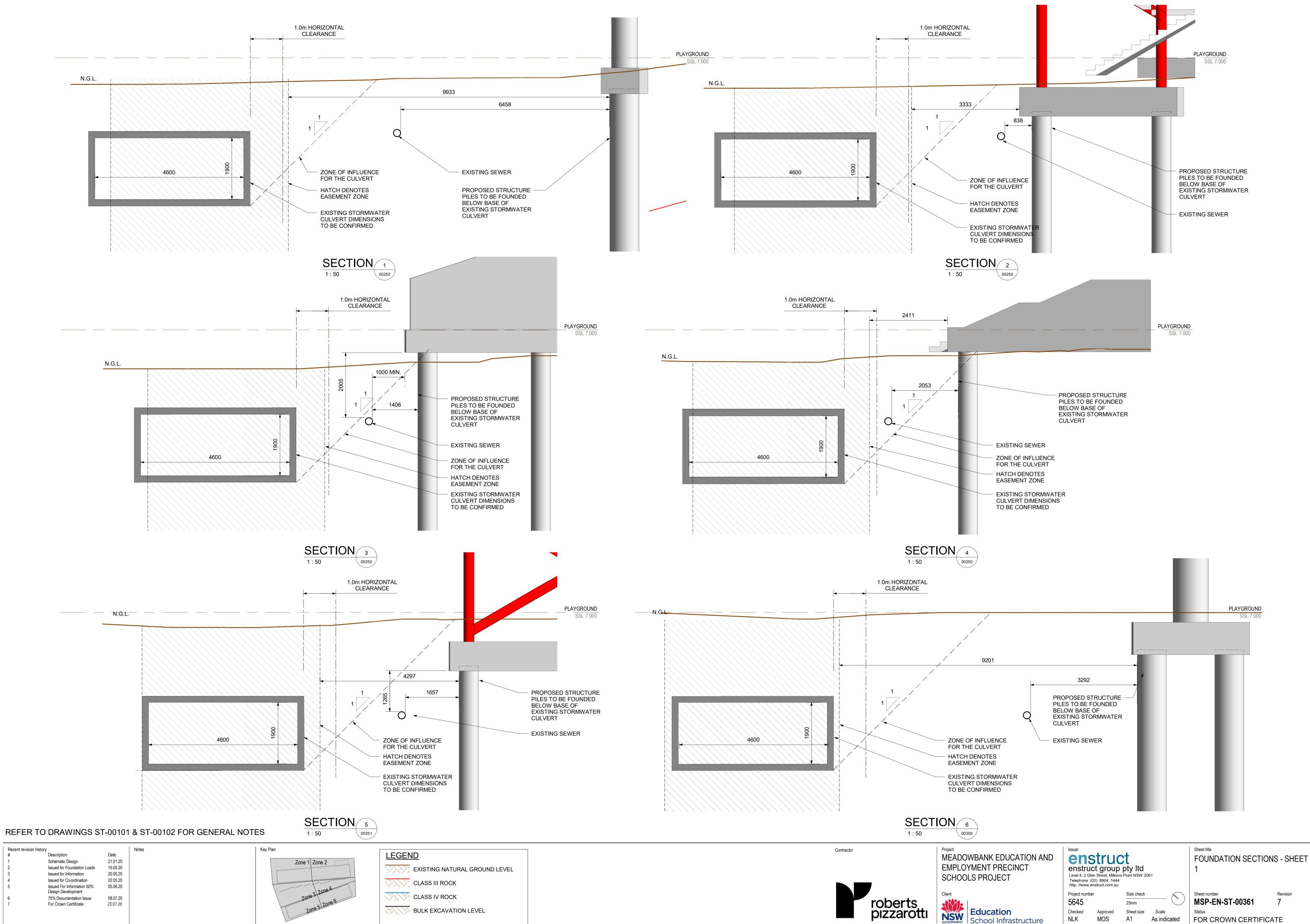




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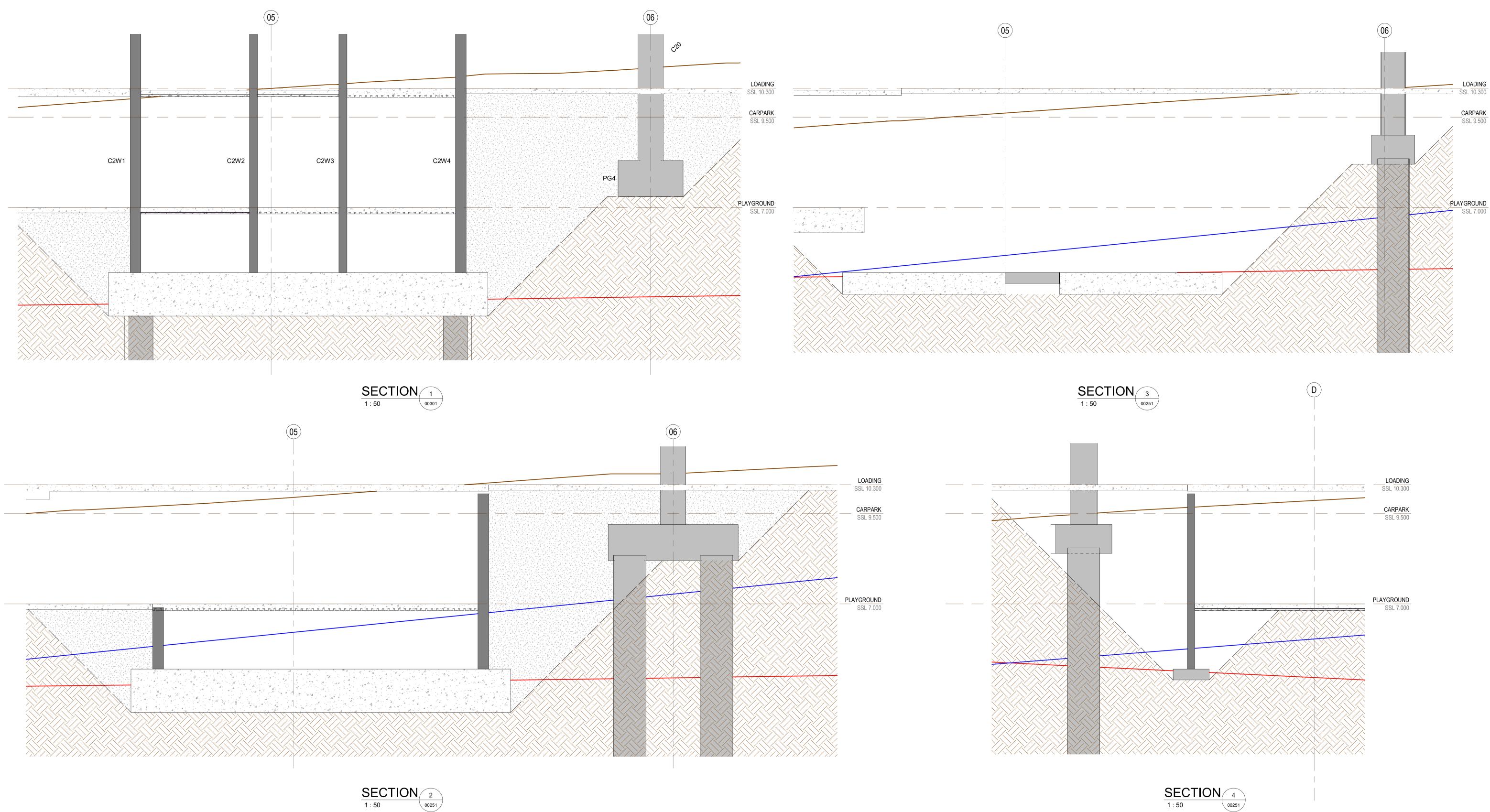


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Client Education School Infrastructure	Project number 5645 Checked Approved NLK MOS	Size check25mmSheet sizeScaleA11:20	Sheet number MSP-EN-ST-00351 Status FOR CROWN CER	Revision 7 TIFICATE



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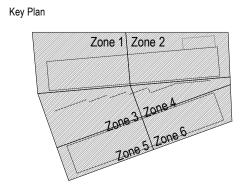
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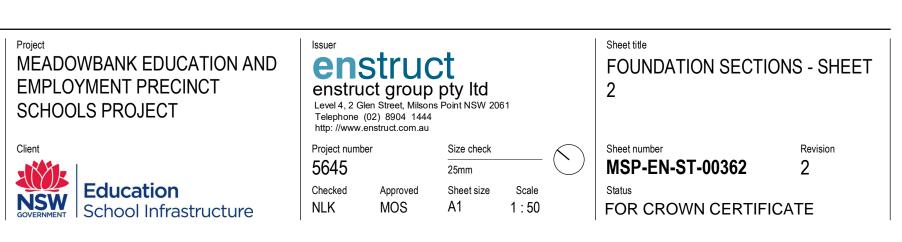
REFER TO DRAWINGS ST-00101 & ST-00102 FOR GENERAL NOTES

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1	75% Document	ation Issue	08.07.20	
2	For Crown Cert	ificate	23.07.20	
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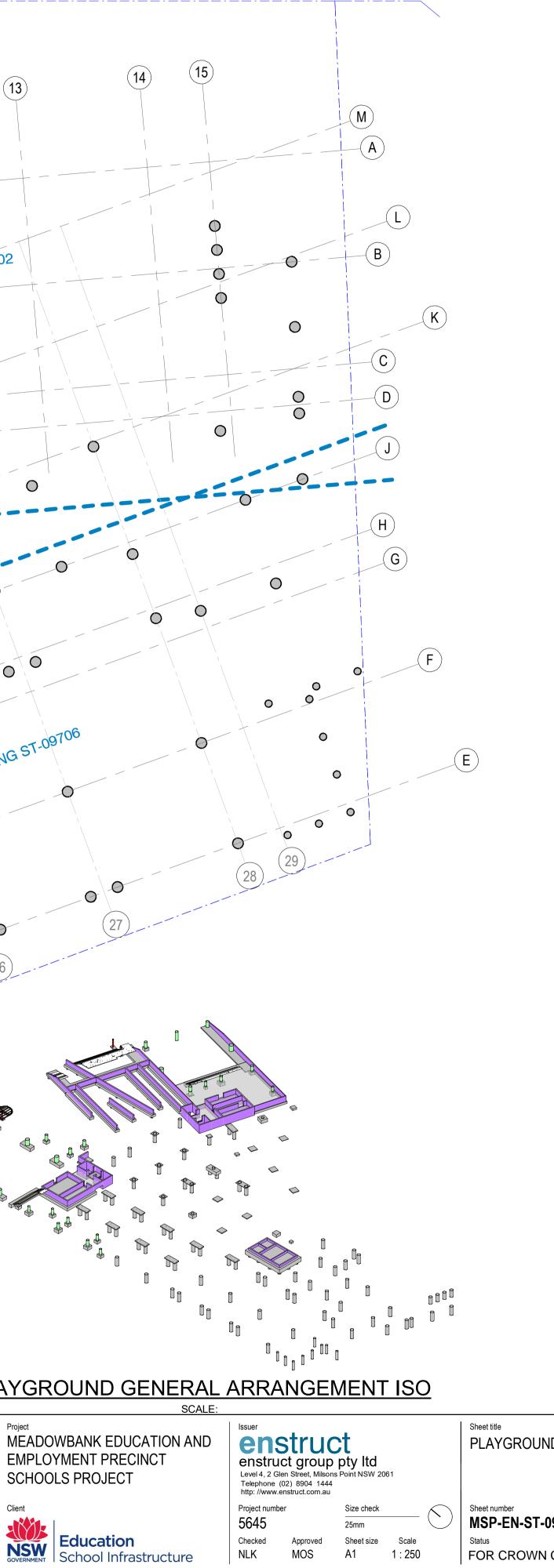


Recent revision histor	ry	
#	Description	Date
1	Schematic Design	14.06.19
2	Issued for Information	22.05.20
3	Issued for Information	29.05.20
4	Issued For Information 50% Design Development	05.06.20
5	50% DD Updates	19.06.20
6	75% Documentation Issue	08.07.20
7	For Crown Certificate	23.07.20

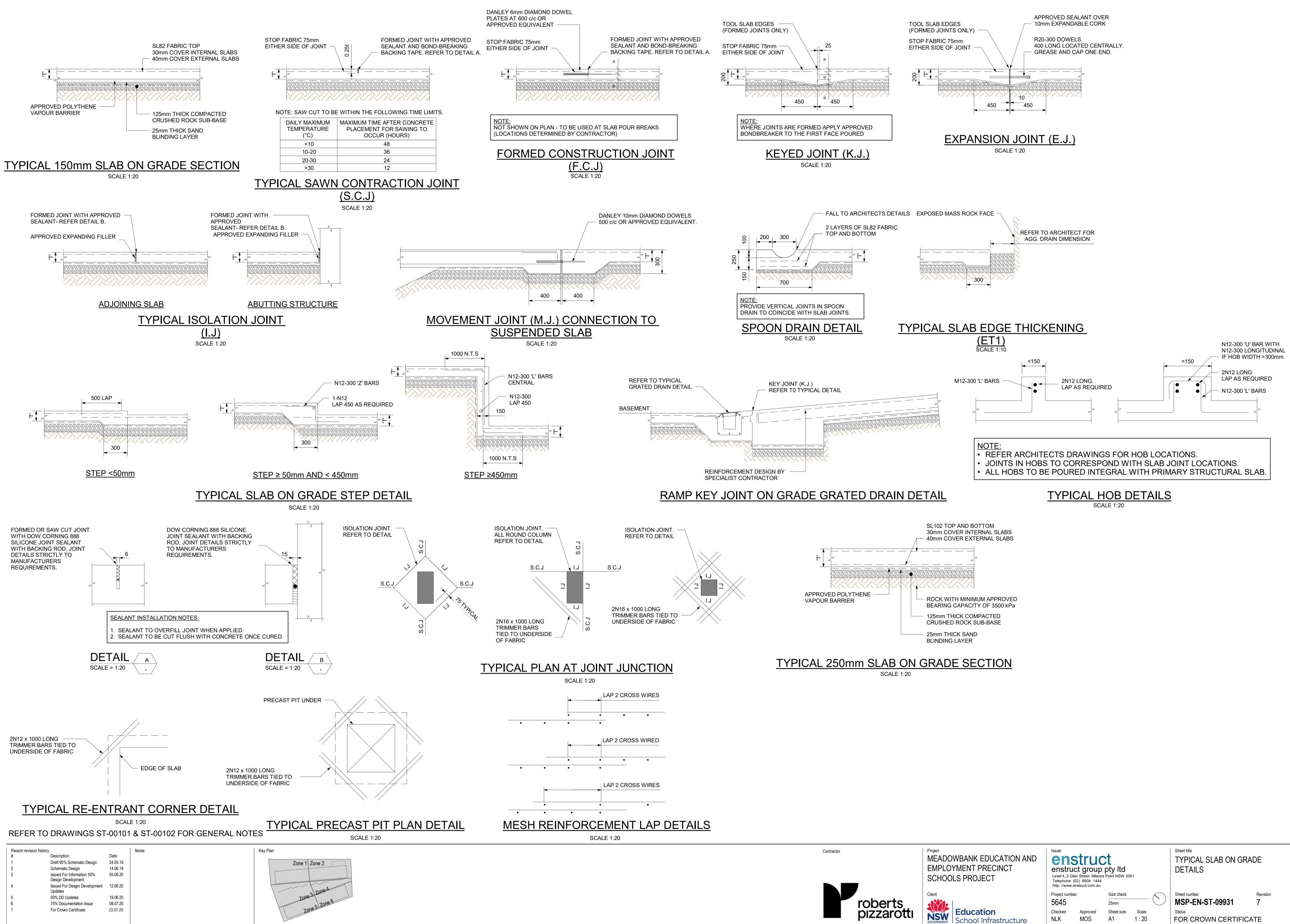
Zone 1	Zone 2
700	33 Zone 4
70	one 5 Zone 6

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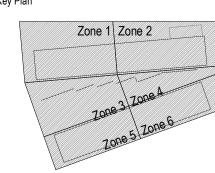


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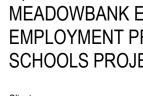
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ion Infrastructure	Checked NLK	Approved MOS	Sheet size A1	Scale 1:20		Status FOR CROWN CERTIFI	CATE



Recent revision	,		Notes
#	Description	Date	
1	Issued For Information 50% Design Development	05.06.20	
2	50% DD Updates	19.06.20	
3	75% Documentation Issue	08.07.20	
4	For Crown Certificate	23.07.20	

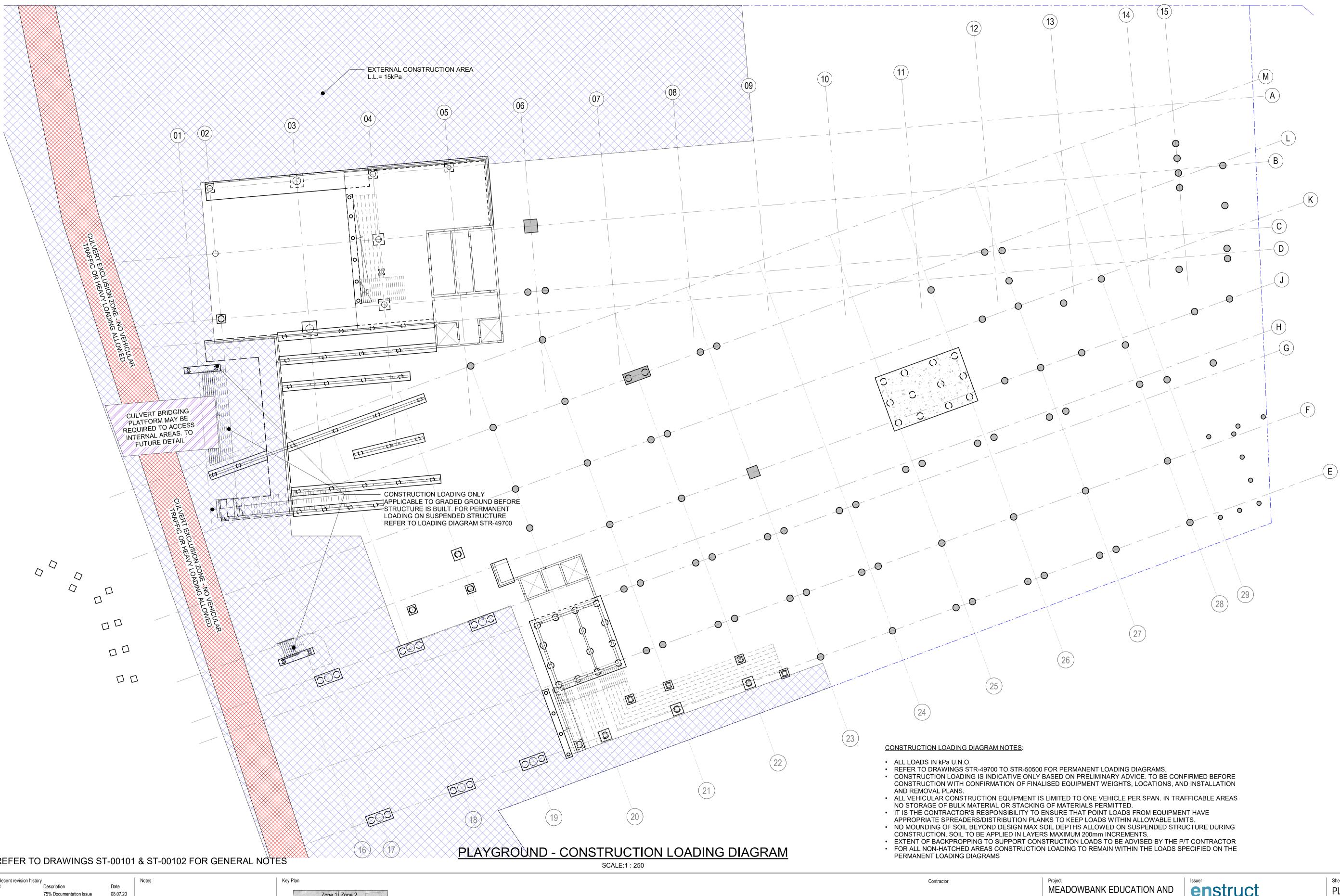






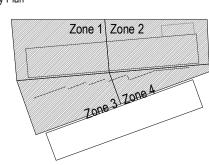
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	Project numbe 5645	r	Size check	(\mathbf{S}	Sheet number MSP-EN-ST-49700	Revision 4
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REFER TO DRAWINGS ST-00101 & ST-00102 FOR GENERAL NOTES

Recent revisi			Notes
#	Description	Date	
1	75% Documentation Issue	08.07.20	
2	For Crown Certificate	23.07.20	







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