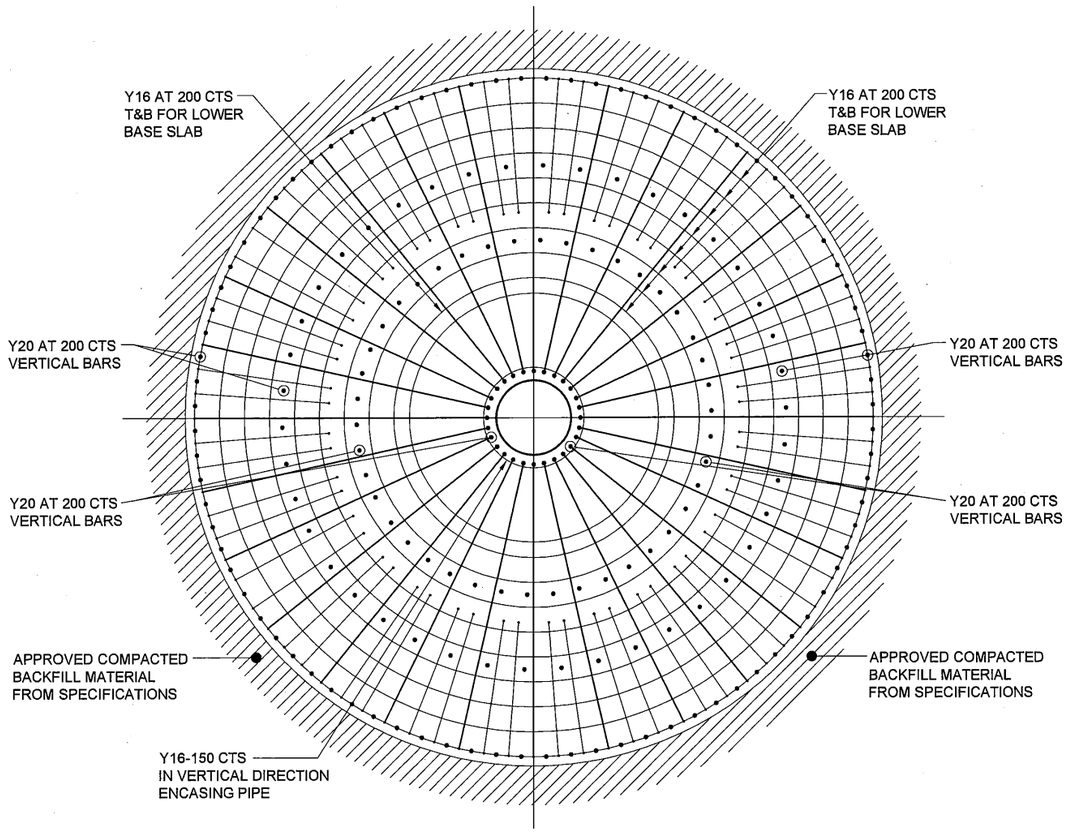
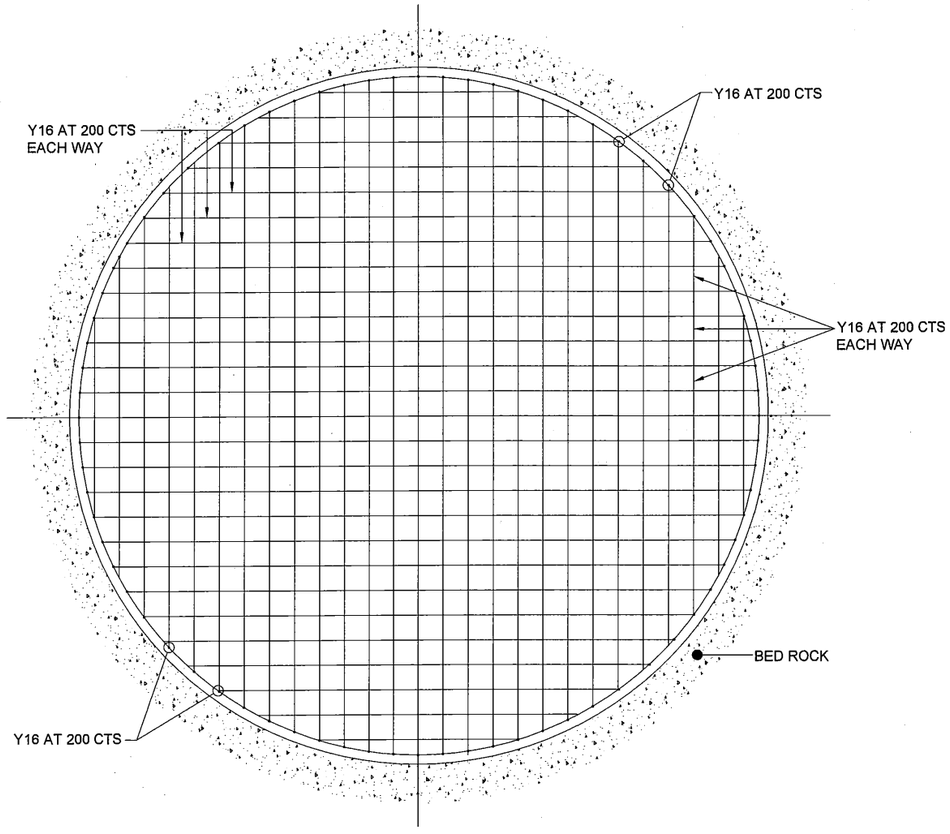


SECTION e S004
SCALE 1:50

TOP LAYER RADIAL REINFORCEMENT DETAIL FOR LOWER BASE SLAB



SECTION f S004
SCALE 1:50

BOTTOM LAYER RADIAL REINFORCEMENT DETAIL FOR LOWER BASE SLAB

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT-FINAL SEDIMENTATION TANK	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S005

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	LKT

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.

2) Cerificates and results of any tests already carried out.

3) Details of tests to be carried out both on and off site.

4) Location of any testing to be carried out off site.

5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 28m/sec
Terrain Category 1

2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982 Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS	: 75mm
PEDESTAL	: 75mm
GROUND SLABS	: 30mm TOP
SUSPENDED SLABS	: 30mm TOP
BEAMS	: 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS	: 75mm IN GROUND, 65mm ABOVE GROUND
SHEARWALLS	: 75mm IN GROUND, 65mm ABOVE GROUND

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 2305 to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Foundations	40	0.55
Suspended Slabs	32	0.55
Base Slabs	40	0.55
Concrete Topping	32	0.55
Mass Concrete	15	0.55
Beams Concrete	32	0.55
Columns	32	0.55

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

C20 Control Joints in the ground floor slab shall be provided at 6m centres U.N.O.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B9 Grout for corefilling shall comply with AS 1475, Part 1, Section 2.
Characteristic compressive strength F'c = 15 MPa Slump 225. Batching by volume is not permitted.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD:	0.3 kPa
LIVE LOAD:	0.25 kPa

GROUND FLOOR LEVEL

DEAD LOAD:	25 kPa
LIVE LOAD:	
- STAIRS	4.0 kPa

BASEMENT FLOOR LEVEL

DEAD LOAD:	25 kPa
LIVE LOAD:	
- STAIRS	4.0 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. SLUDGE PUMP ROOM - STRUCTURAL NOTES SHEET 1 OF 2

CLIENT: IPBC INDEPENDENT PUBLIC BUSINESS CORPORATION
INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU)
JICA JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

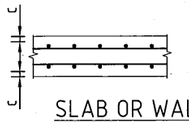
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

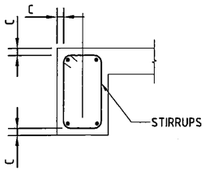
APPROVED by PMU: Project Director Lot G.Zauya
DATE: 1. Dec 2011
SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji
DATE: 1. Dec 2011
DRAWING NO.: STP-S001

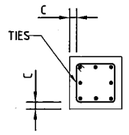
MINIMUM CONCRETE COVER



SLAB OR WALL

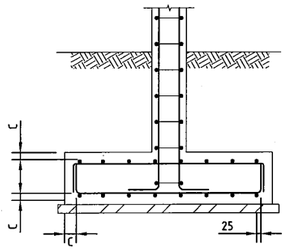


GIRDER OR BEAM

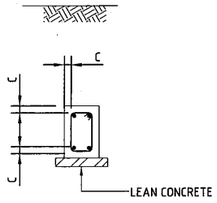


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc	- 75mm
- OTHER STRUCTURE	- 65mm

THE REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

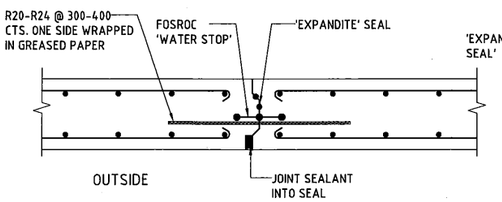
a) CONCRETE PIPES
- AS PER MANUFACTURER'S STANDARD.

b) FIREPROOFING (WITH GALVANISED WIRE MESH)

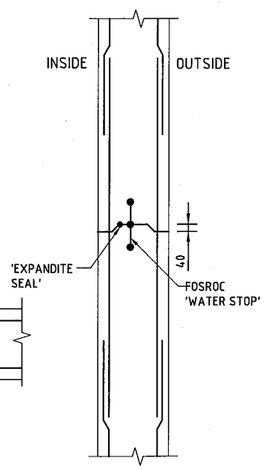
c) DITCH LINING/ SLOPE PROTECTION

d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

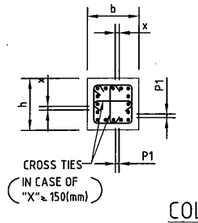


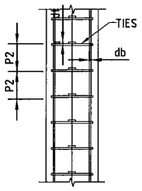
RECTANGULAR STRUCTURES



TYPICAL EXPANSION JOINT DETAIL FOR CIRCULAR LIQUID RETAINING STRUCTURE

SPACING LIMITS

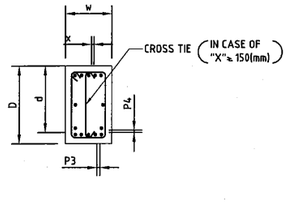


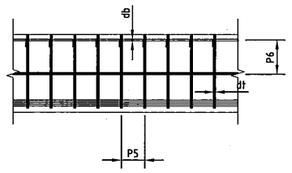


COLUMN

P1 ≥ hagg x 4/3 (mm)
1.5db,
40 (mm)
WHICHEVER IS GREATER

P2 ≤ 15 db or 300(mm) or
SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
WHICHEVER IS SMALLER





P3 ≥ hagg x 4/3 (mm)
db
WHICHEVER IS GREATER
hagg = 20(mm)

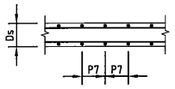
P4 ≥ 25(mm)

P5 ≤ D/2 or 300mm
WHICHEVER IS SMALLER

P6 ≤ 300(mm)

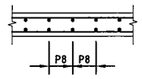
GIRDER AND BEAM

PRIMARY REINFORCEMENT



P7 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SECONDARY REINFORCEMENT



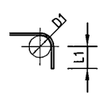
P8 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SLAB

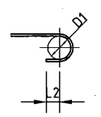
STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT

90° HOOK OR BEND



180° HOOK

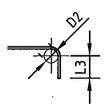


(mm)

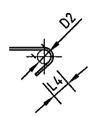
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2
N12	60	120	70
N16	80	135	70
N20	100	160	80
N24	120	195	100
N28	140	225	115
N32	160	260	130
N36	180	290	145
N40	200	320	160

FOR TIES AND STIRRUPS REINFORCEMENT

90° HOOK

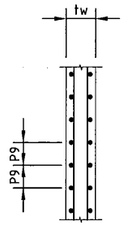


135° HOOK

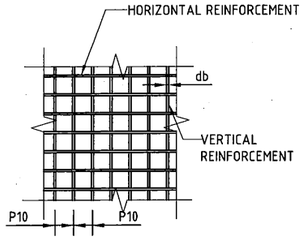


(mm)

BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
N10	40	135	100
N12	50	160	120



P9 ≤ 350(mm)
≥ 2.5tw
≥ 4db



P10 ≤ 350(mm)
≥ 2.5tw
≥ 4db

WALL

NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTAL REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. S001.

2. LEGEND
- hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
- d : EFFECTIVE DEPTH
- db : SIZE OF LONGITUDINAL BARS (mm)
- N : BAR SYMBOL
- dt : SIZE OF TIES
- s : SPACING
- D : BEAM HEIGHT
- w : BEAM WIDTH
- b,h : COLUMN SECTION
- tw : THICKNESS OF WALL

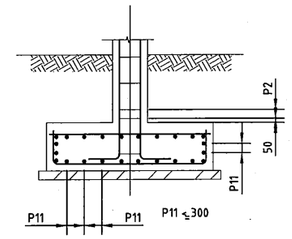
3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
- -15db
- -SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
- -300mm

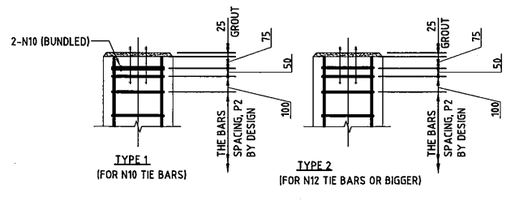
} WHICHEVER IS SMALLER

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
- -D/2
- -15db
- -300mm

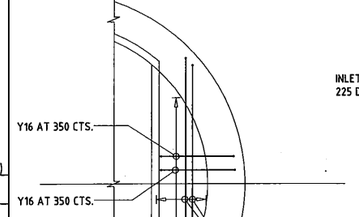
} WHICHEVER IS SMALLER



FOOTING



STIRRUP DETAIL FOR TOP OF PEDESTAL



DETAIL 1
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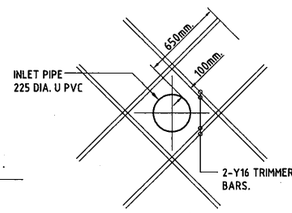
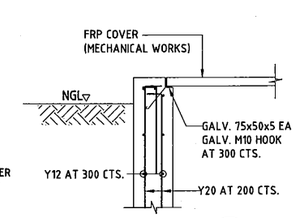


TYP. DETAIL
SCALE 1:50



DETAIL 2
SCALE 1:50

This drawing is certified to comply with the Structural Engineering previsions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. SLUDGE PUMP ROOM - STRUCTURAL NOTES SHEET 2 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

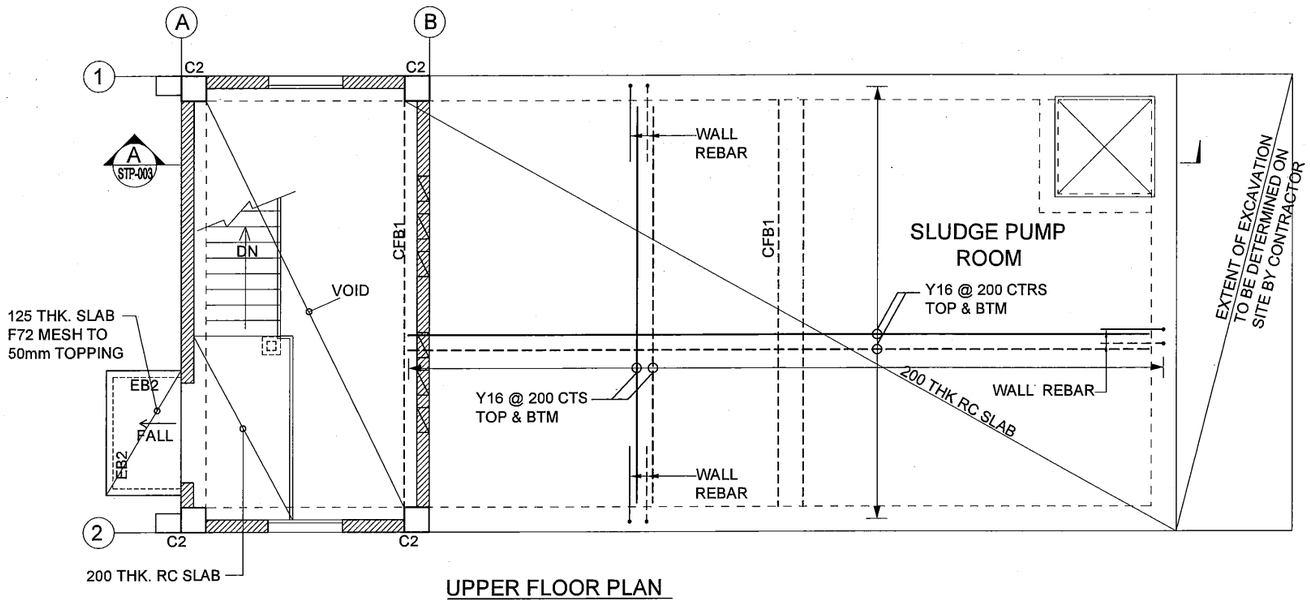
NOTES :

REVISIONS

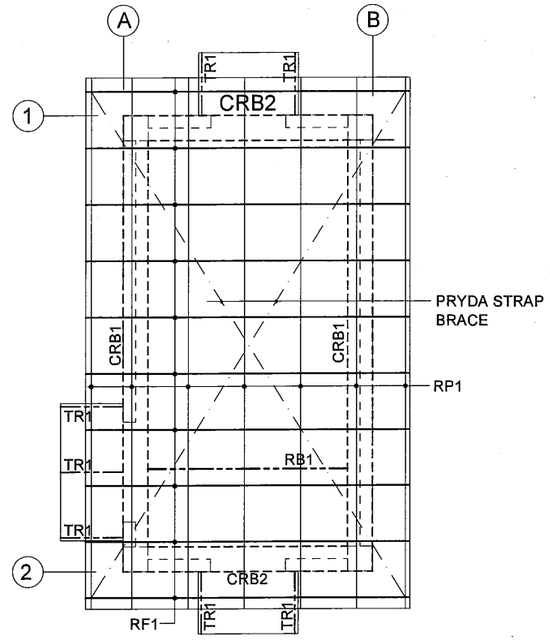
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

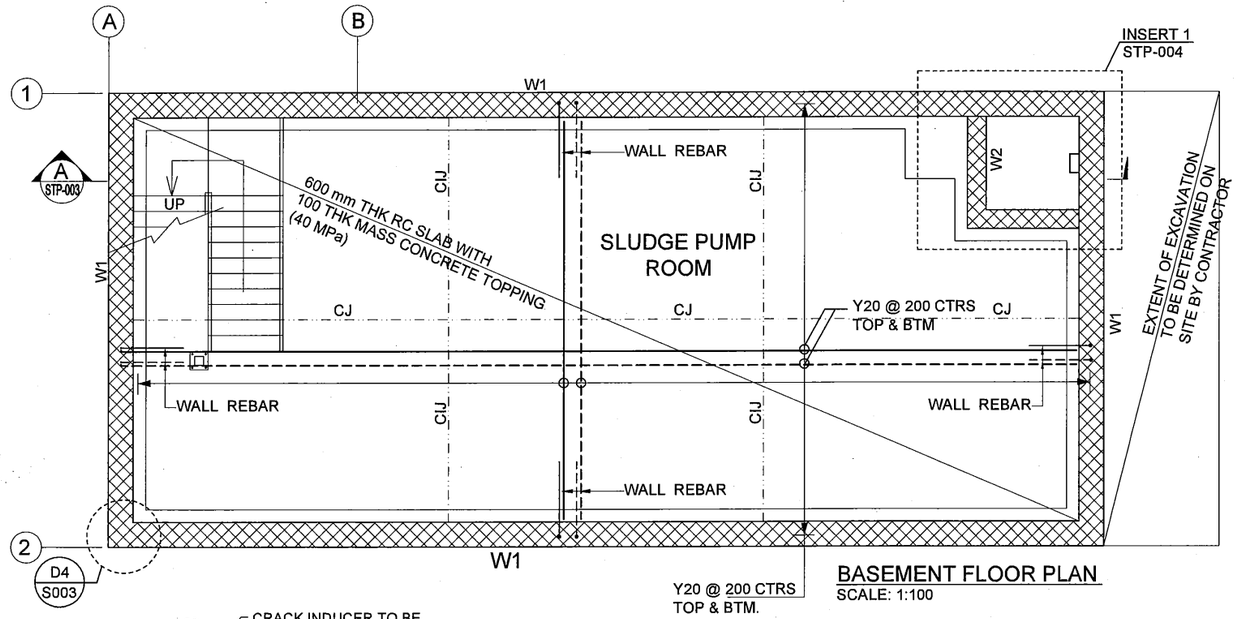
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001a



UPPER FLOOR PLAN
SCALE: 1:100



ROOF FRAMING PLAN
SCALE: 1:100



BASEMENT FLOOR PLAN
SCALE: 1:100

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
BASEMENT LEVEL				
C1	150 x 150 x 6 THK.			STEEL COLUMN
W1	400 THK.			REINF. CONC. WALL
W2	300 THK			REINF. CONC. WALL
GROUND LEVEL				
C2	400 x 400	4Y20	Y12-200 CTS.	RC COLUMN
EB1	250 DP x 200 WD	2-Y16 T&B	Y12-300 CTS.	EDGE BEAM
CFB1	500 DP x 400 WD	REFER SHT. STP-006		RC FLOOR BEAM
ROOF LEVEL				
RB1	360 UB 45			STEEL HOIST BEAM
RF1	150 x 75 HWD.			ROOF RAFTERS @ 900 CTRS
RP1	100 x 50 HWD.			ROOF PURLINS @ 600 CTRS
CRB1	350 DP x 350 WD	REFER SHT. STP-006		RC ROOF BEAM
CRB1	350 DP x 350 WD	REFER SHT. STP-006		RC ROOF BEAM

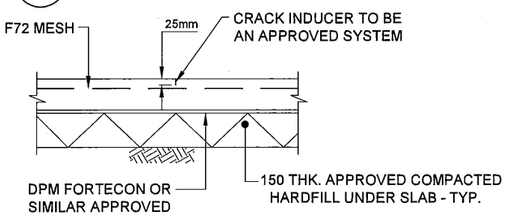
NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT
   LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE 200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMUM DEPTH OF 1000mm TYP. FROM NGL. UNLESS HARD ROCK ENCOUNTED BEFORE THAT IN WHICH FOOTING TO BE FOUNDED ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE VARIFIED ON SITE DURING EXCAVATION.
6. ALL PROPRIETRY SYSTEM SHALL BE INSTALLED IN STRICT ADHERENCE TO THEMANUFACTURES SPECIFICATION

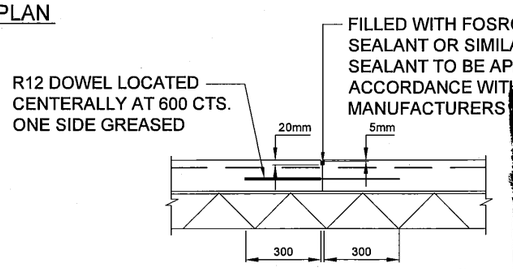
LEGEND:

- DENOTES RC WALL
- DENOTES NON LOAD BEARING BLOCKWALL
- DENOTES ARCHITECTURAL STUDWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

NGL -DENOTES NATURAL GROUND LEVEL
CIJ -DENOTES CRACK INDUCED JOINT
CJ -DENOTES CONSTRUCTION JOINT
WJ -DENOTES WALL JOINT
EW -DENOTES EACH WAY
BF -DENOTES BOTH FACE



TYP. CRACK INDUCED JOINT (CIJ)
SCALE 1:25



CONSTRUCTION JOINT (CJ)
SCALE 1:25

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP-THICKEN SLUDGE PUMP ROOM - FLOOR PLAN

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

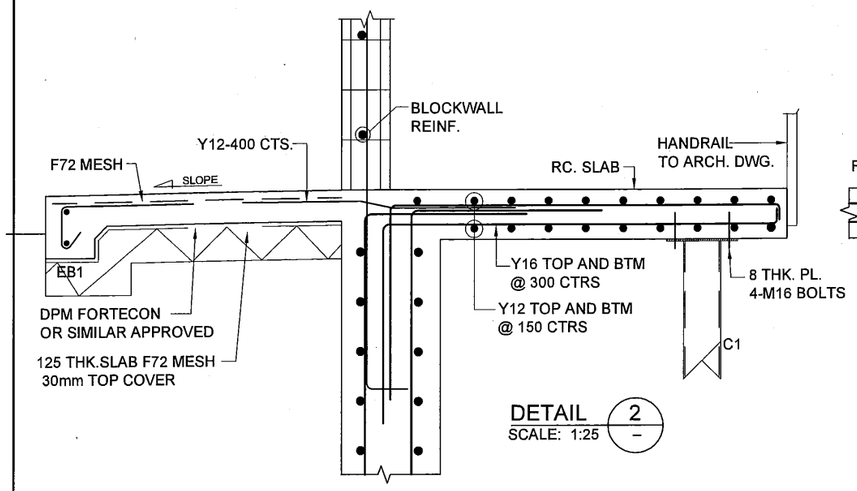
NOTES:

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S002



DETAIL 2
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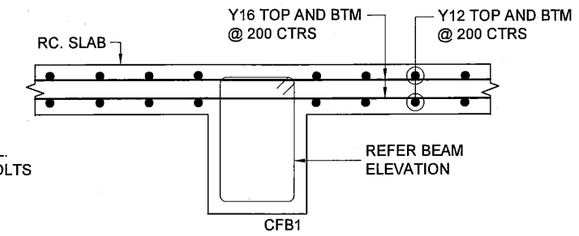

DETAIL 3
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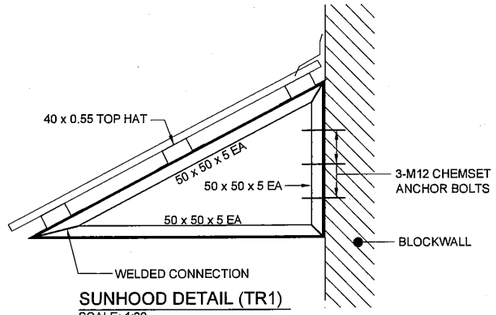
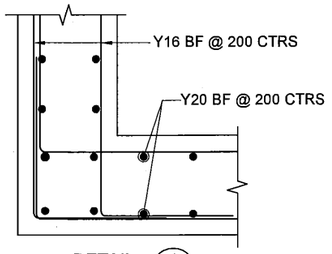
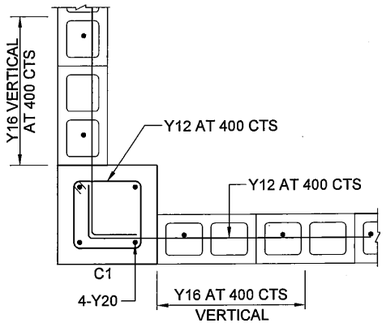


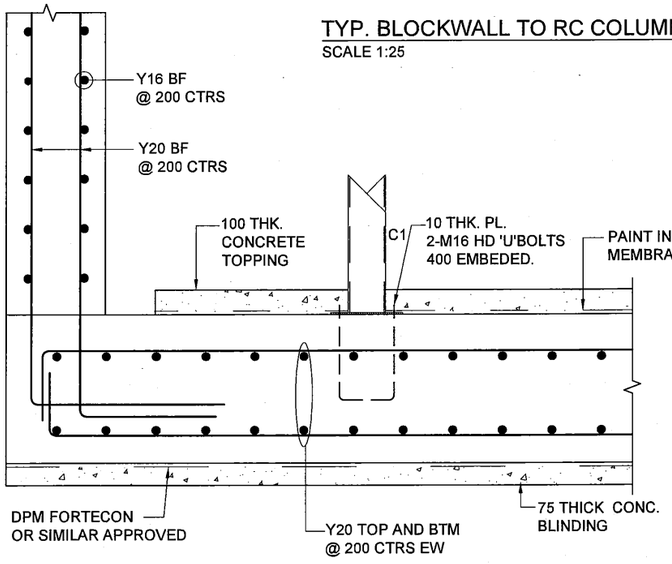
SUNHOOD DETAIL (TR1)
SCALE: 1:20



DETAIL 4
SCALE: 1:20



TYP. BLOCKWALL TO RC COLUMN DETAIL
SCALE 1:25



DETAIL 1
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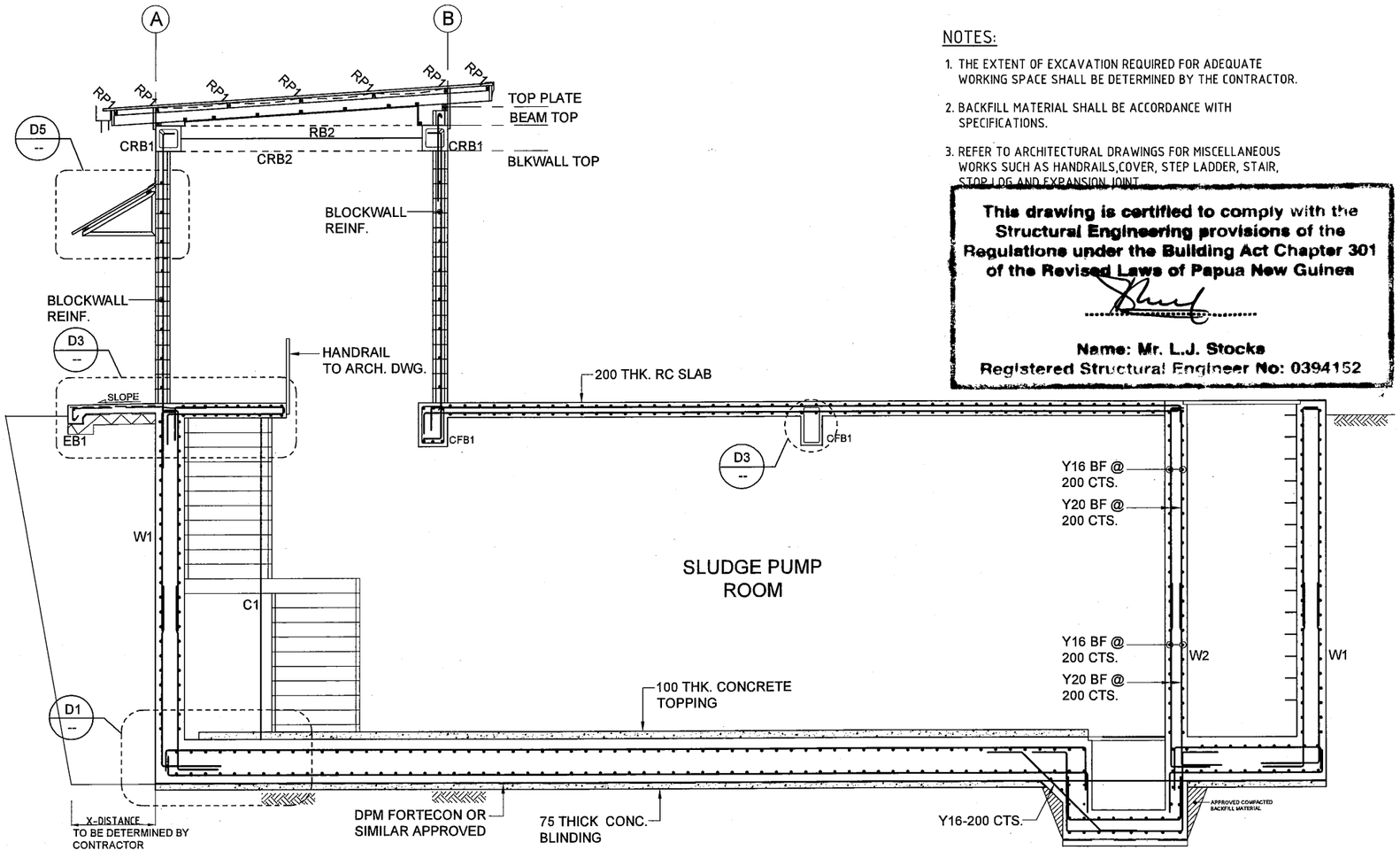

SECTION A
SCALE.1:75
C001

NOTES:

1. THE EXTENT OF EXCAVATION REQUIRED FOR ADEQUATE WORKING SPACE SHALL BE DETERMINED BY THE CONTRACTOR.
2. BACKFILL MATERIAL SHALL BE ACCORDANCE WITH SPECIFICATIONS.
3. REFER TO ARCHITECTURAL DRAWINGS FOR MISCELLANEOUS WORKS SUCH AS HANDRAILS,COVER, STEP LADDER, STAIR, STOP LOG AND EXPANSION JOINT.

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP- THICKEN SLUDGE PUMP ROOM - CROSS SECTION

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

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ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
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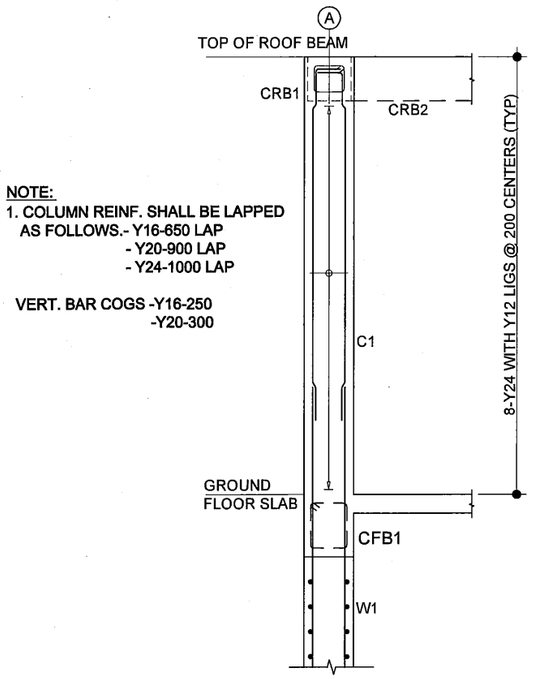
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

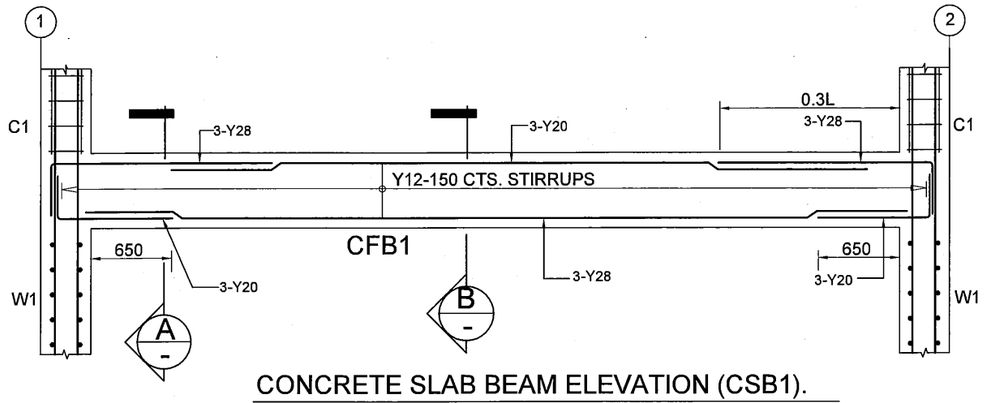
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S003



NOTE:
1. COLUMN REINF. SHALL BE LAPPED AS FOLLOWS.- Y16-650 LAP
- Y20-900 LAP
- Y24-1000 LAP

VERT. BAR COGS -Y16-250
-Y20-300

COLUMN (C1) ELEVATION
SCALE: 1:50



CONCRETE SLAB BEAM ELEVATION (CSB1).
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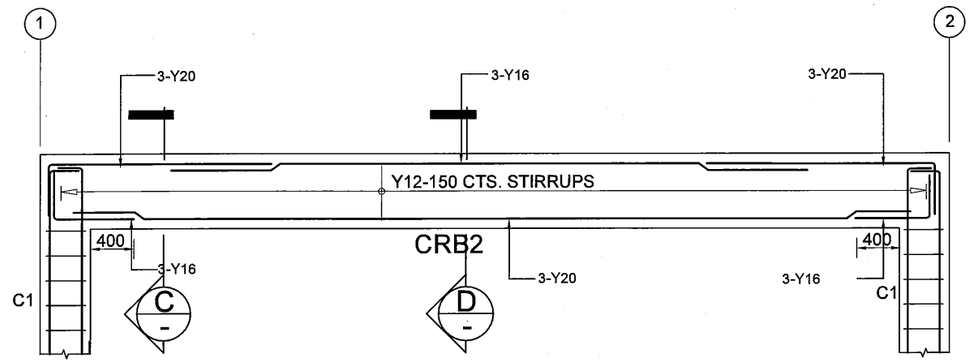
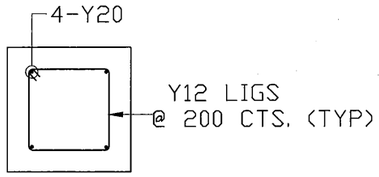
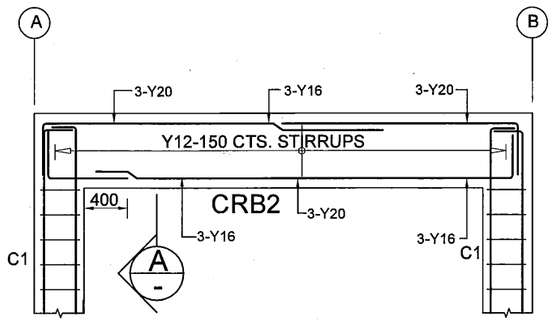


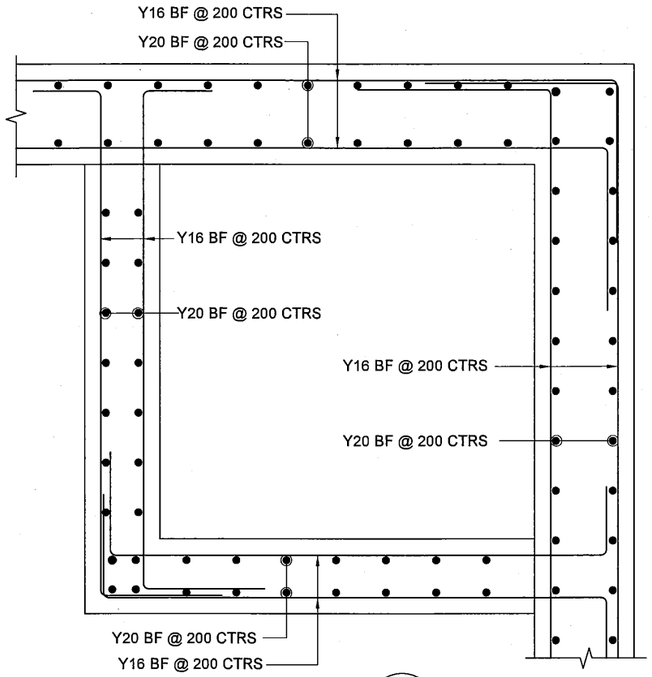
TYPICAL ROOF BEAM ELEVATION (CRB1). CRB2 REINFT.SIMILAR
SCALE: NTS (350W x 350DP)



C1 - 400 x 400
SCALE: 1:20



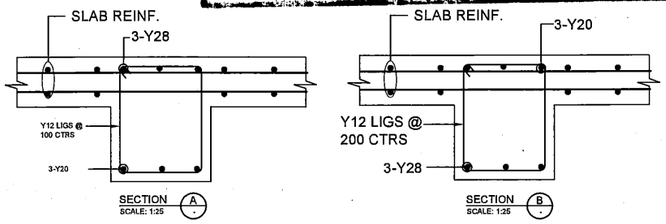
TYPICAL ROOF BEAM ELEVATION (CRB2).
SCALE: NTS (350W x 350DP)

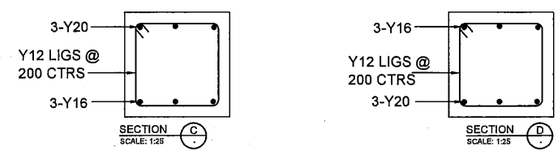


INSERT 1
SCALE:1:25 STP-002

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152





TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila STP-THICKEN SLUDGE PUMP ROOM - COLUMN & BEAM ELEVATIONS	
CLIENT: IPBC INDEPENDENT PUBLIC BUSINESS CORPORATION; INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU); JICA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	APPROVED by PMU: Project Director Lot G.Zauya; DATE: 1. Dec 2011; SCALE: N.T.S.
			CHECKED by CONSULTANT Project Manager T.Fuji; DATE: 1. Dec 2011; DRAWING NO.: STP-S004

REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.

2) Cerificates and results of any tests already carried out.

3) Details of tests to be carried out both on and off site.

4) Location of any testing to be carried out off site.

5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 28m/sec
Terrain Category 1

2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982
Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS	: 75mm
PEDESTAL	: 75mm
COVER SLABS	: 75mm
BEAMS	: 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS	: 75mm IN GROUND, 65mm ABOVE GROUND
RC WALLS	: 75mm IN GROUND, 65mm ABOVE GROUND

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 2305 to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Base Slab	40	0.55
Base Wall	40	0.55
Cover Slabs	40	
Concrete Topping	40	
Mass Concrete	15	0.55
Beams Concrete	32	0.55
Columns	32	0.55

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

C20 Control Joints in the ground floor slab shall be provided at 6m centres U.N.O.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B9 Grout for corefilling shall comply with AS 1475, Part 1, Section 2.
Characteristic compressive strength F'c = 15 MPa Slump 225. Batching by volume is not permitted.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD: 0.4 kPa

LIVE LOAD: 0.25 kPa

GROUND FLOOR LEVEL

DEAD LOAD: 10 kPa

BASEMENT FLOOR LEVEL

DEAD LOAD: 20 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. UV DISINFECTION ROOM - STRUCTURAL NOTES SHEET 1 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

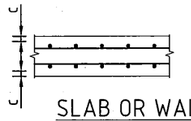
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

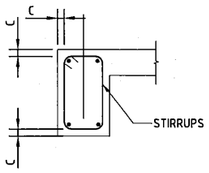
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001

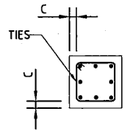
MINIMUM CONCRETE COVER



SLAB OR WALL

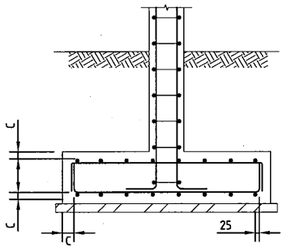


GIRDER OR BEAM

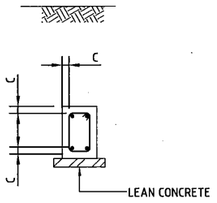


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc	- 75mm
- OTHER STRUCTURE	- 65mm

THE REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

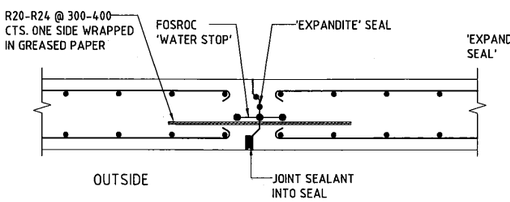
a) CONCRETE PIPES
- AS PER MANUFACTURER'S STANDARD.

b) FIREPROOFING (WITH GALVANISED WIRE MESH)

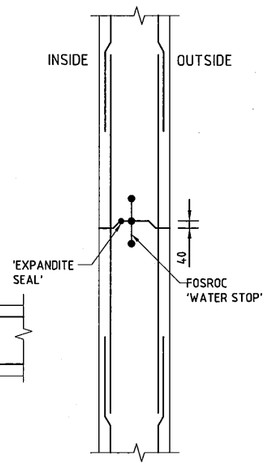
c) DITCH LINING/ SLOPE PROTECTION

d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

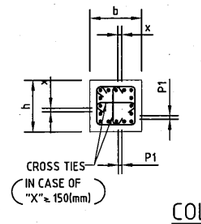


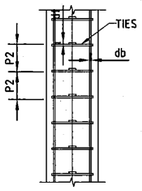
RECTANGULAR STRUCTURES



TYPICAL EXPANSION JOINT DETAIL FOR CIRCULAR LIQUID RETAINING STRUCTURE

SPACING LIMITS

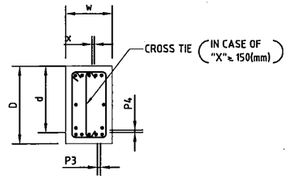


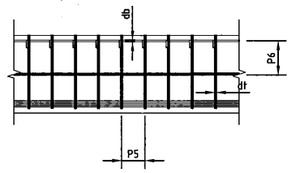


P1 ≥ hagg x 4/3 (mm)
1.5db,
40 (mm)
WHICHEVER IS GREATER

P2 ≤ 15 db or 300(mm) or
SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
WHICHEVER IS SMALLER

COLUMN





P3 ≥ hagg x 4/3.(mm)
db
WHICHEVER IS GREATER
hagg = 20(mm)

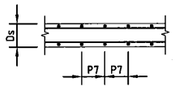
P4 ≥ 25(mm)

P5 ≤ D/2 or 300mm
WHICHEVER IS SMALLER

P6 ≤ 300(mm)

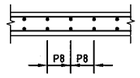
GIRDER AND BEAM

PRIMARY REINFORCEMENT



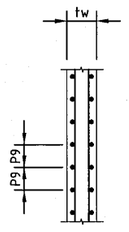
P7 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SECONDARY REINFORCEMENT

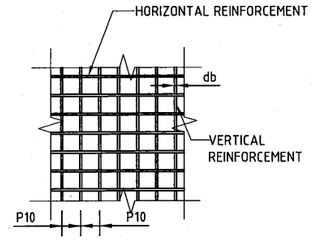


P8 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SLAB



P9 ≤ 350(mm)
tw
2.5tw
4db



P10 ≤ 350(mm)
tw
2.5tw
4db

WALL

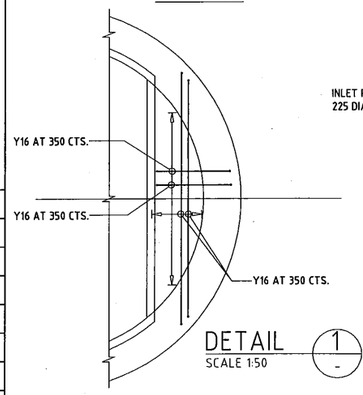
NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTAL REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

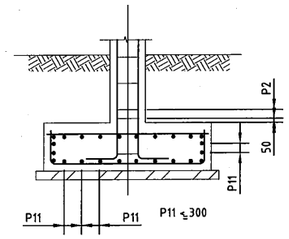
STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT				FOR TIES AND STIRRUPS REINFORCEMENT			
90° HOOK OR BEND / 180° HOOK				90° HOOK / 135° HOOK			
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2	BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
				N10	40	135	100
N12	60	120	70	N12	50	160	120
N16	80	135	70				
N20	100	160	80				
N24	120	195	100				
N28	140	225	115				
N32	160	260	130				
N36	180	290	145				
N40	200	320	160				

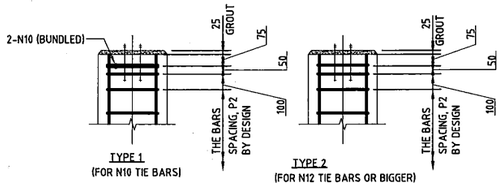
(mm)



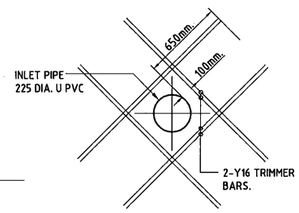
DETAIL 1 / SCALE 1:50



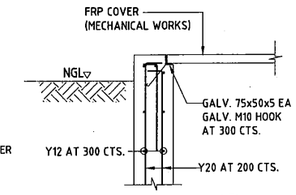
FOOTING



STIRRUP DETAIL FOR TOP OF PEDESTAL



TYP. DETAIL
SCALE 1:50



DETAIL 2 / SCALE 1:50

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. PGLN-YK-CSZZZ-900100.

2. LEGEND
hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
d : EFFECTIVE DEPTH
db : SIZE OF LONGITUDINAL BARS (mm)
N : BAR SYMBOL
dt : SIZE OF TIES
s : SPACING
D : BEAM HEIGHT
w : BEAM WIDTH
b,h : COLUMN SECTION
tw : THICKNESS OF WALL

3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
- 15db
- SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
- 300mm

} WHICHEVER IS SMALLER

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
- D/2
- 15db
- 300mm

} WHICHEVER IS SMALLER

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. UV DISINFECTION ROOM - STRUCTURAL NOTES SHEET 2 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

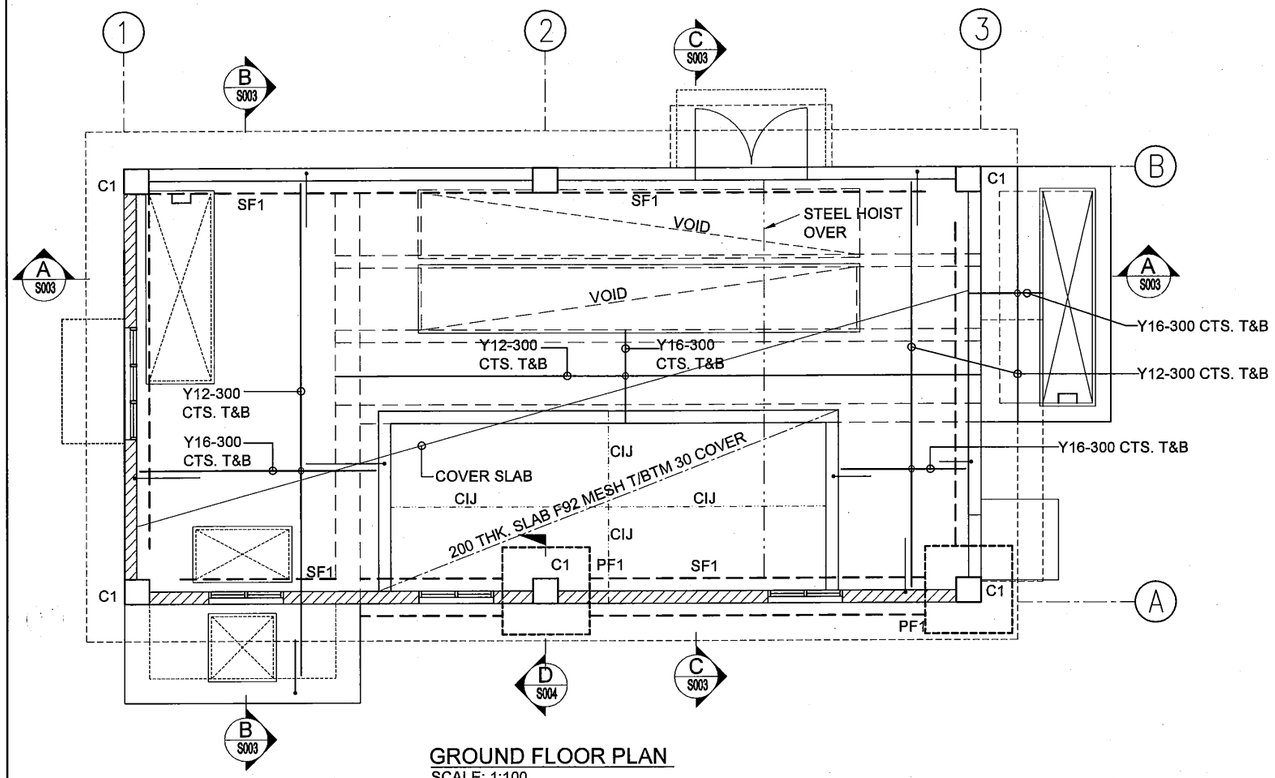
NOTES :

REVISIONS

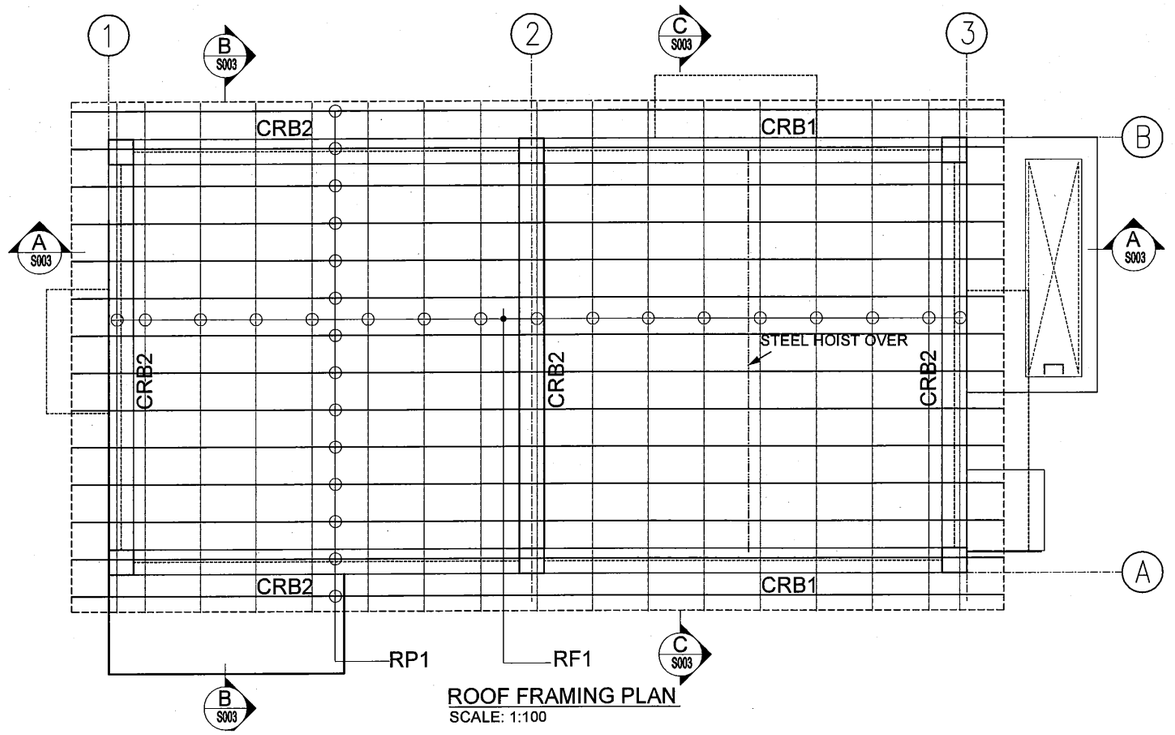
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

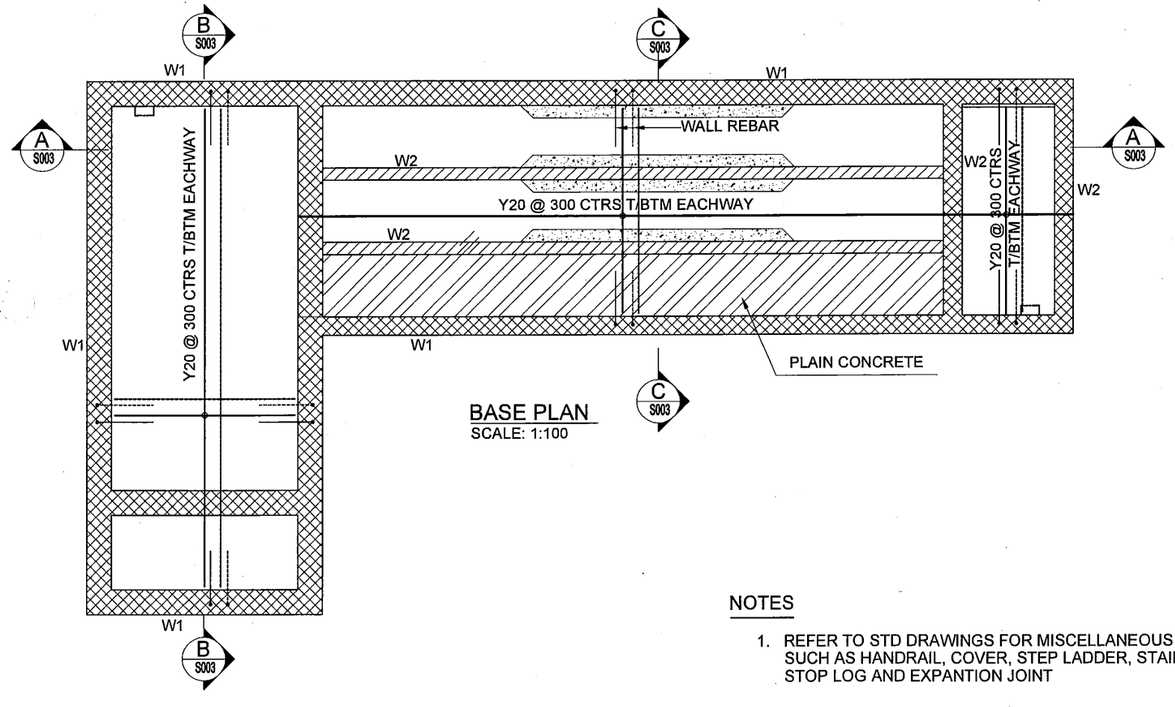
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001a



GROUND FLOOR PLAN
SCALE: 1:100



ROOF FRAMING PLAN
SCALE: 1:100



BASE PLAN
SCALE: 1:100

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
BASEMENT LEVEL				
W1	400 THK.	Y12-200 CTS.	Y20-300 CTS.	REINF. CONC. WALL
W2	300 THK	Y12-300 CTS.	Y16-300 CTS.	REINF. CONC. WALL
GROUND LEVEL				
C1	400 x 400 SQ	8-Y20	Y12-200 CTS.	REINF. CONC. COLUMN
EB1	200 THK / 150 THK	REFER SHT. STP-TW-S003		EDGE BEAM
SF1	400 DP x 600 WD	R10-300 CTS.	4-Y16 T&B	STRIP FOOTING
PF1	400 DP x 1400 SQ	5-Y20 T&B	5-Y20 T&B	PAD FOOTING
ROOF LEVEL				
CRB1	400 DP x 400 WD	REFER SHT. STP-TW-S002		RC ROOF BEAM
CRB2	300 DP x 300 WD	REFER SHT. STP-TW-S002		RC ROOF BEAM
RF1	200DP x 50 HWD			ROOF RAFTERS @ 900 CTRS
RP1	75DP x 50 HWD			ROOF PURLINS @ 600 CTRS

NOTES

1. REFER TO STD DRAWINGS FOR MISCELLANEOUS WORKS SUCH AS HANDRAIL, COVER, STEP LADDER, STAIR, STOP LOG AND EXPANTION JOINT

NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT
   LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE 200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMIUM DEPTH OF 1000mm TYP. FROM NGL. UNLESS HARD ROCK ENCOUNTED BEFORE THAT IN WHICH FOOTING TO BE FOUNDED ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE VARIFIED ON SITE DURING EXCAVATION.
6. ALL PROPRIETRY SYSTEM SHALL BE INSTALLED IN STRICT ADHERENCE TO THEMANUFACTURES SPECIFICATION

LEGEND:

- DENOTES RC WALL
- DENOTES NON LOAD BEARING BLOCKWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

NGL - DENOTES NATURAL GROUND LEVEL
CIJ - DENOTES CRACK INDUCED JOINT
CJ - DENOTES CONSTRUCTION JOINT
WJ - DENOTES WALL JOINT

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

CONSTRUCTION ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: Kila Kila STP - UV DISINFECTION ROOM and TREATED WATER TANK PLAN

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

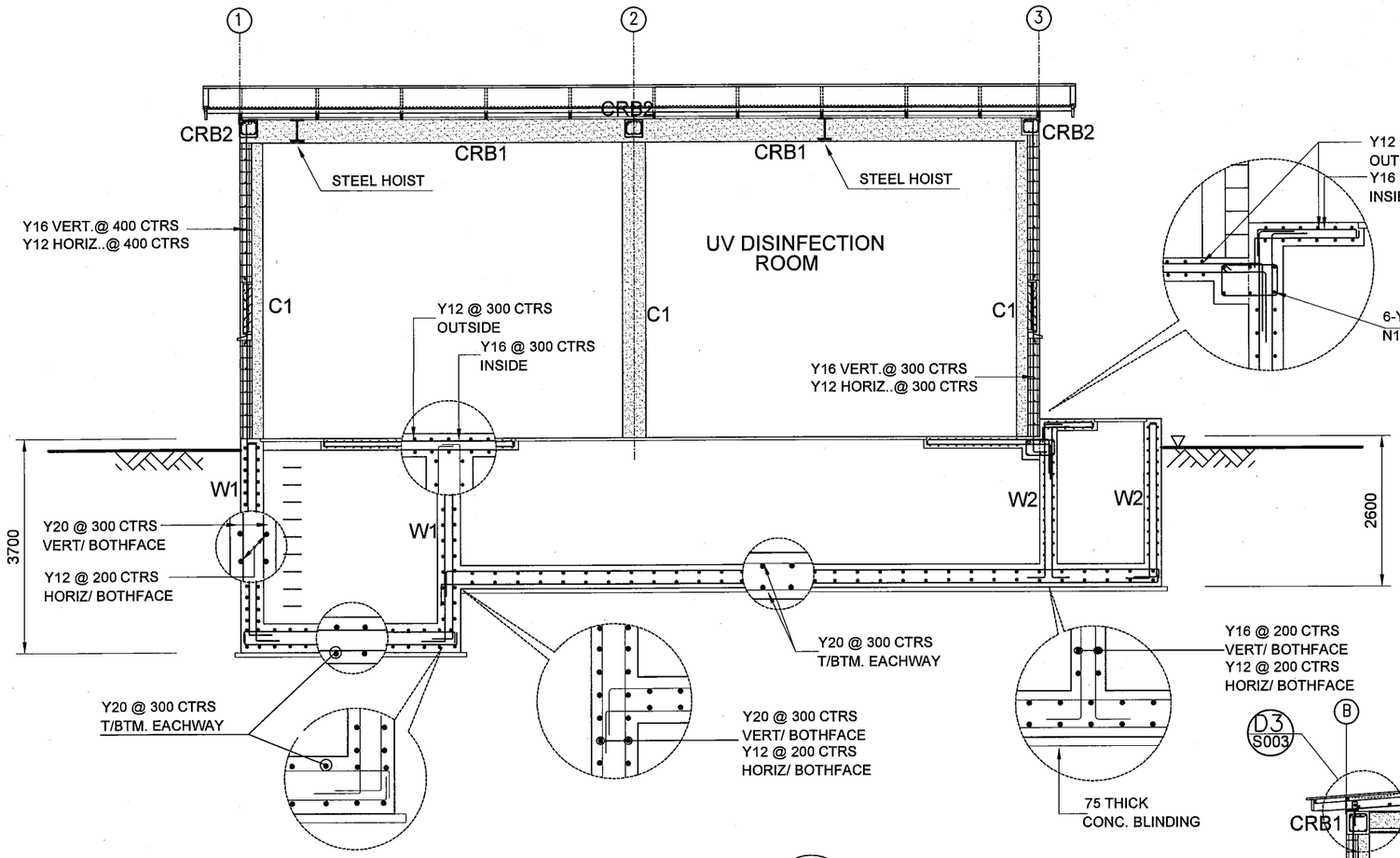
CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

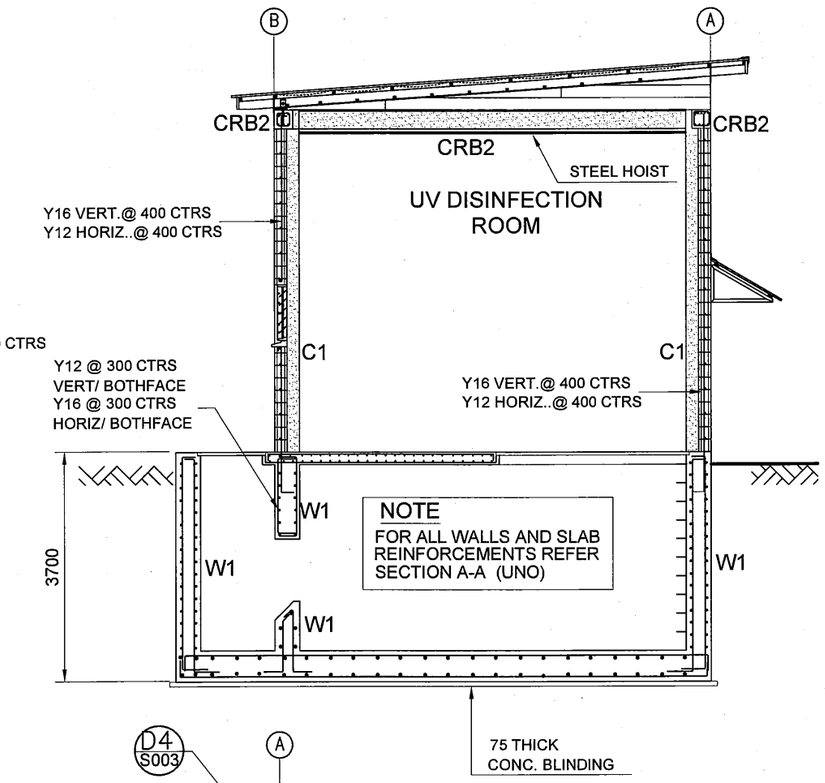
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	SDK

APPROVED by PMU: Project Director Lot G.Zauya
DATE: 1. Dec 2011
SCALE: 1/150
CHECKED by CONSULTANT Project Manager T.Fuji
DATE: 1. Dec 2011
DRAWING NO.: STP-TW-S002



SECTION A–A
SCALE 1:150 — S001



SECTION B–B
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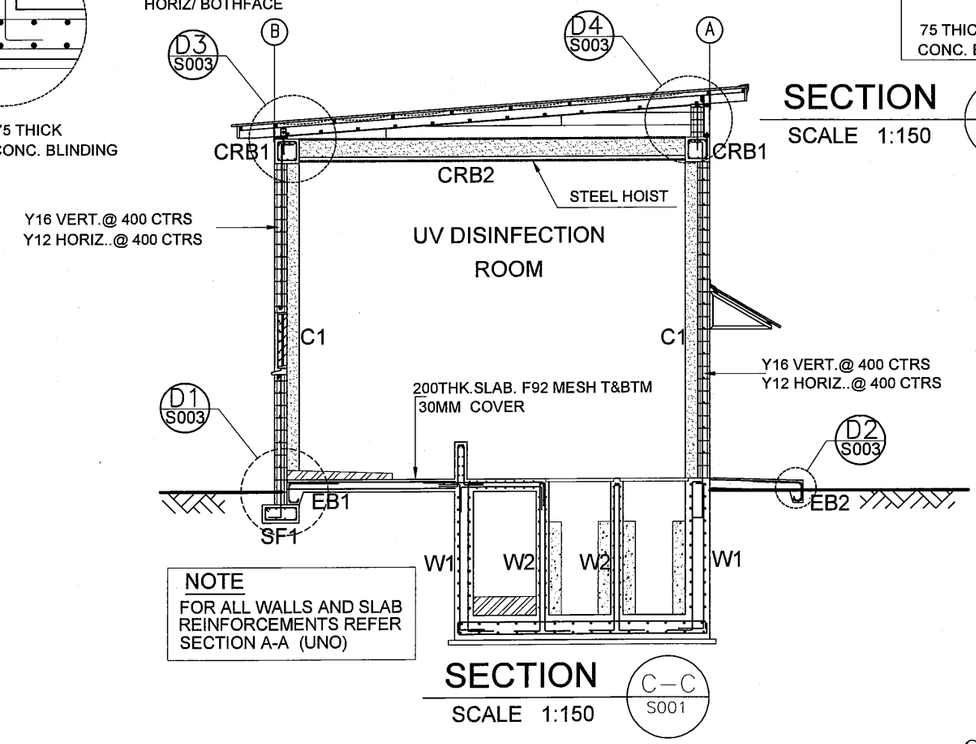


SECTION C–C
SCALE 1:150 — S001

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

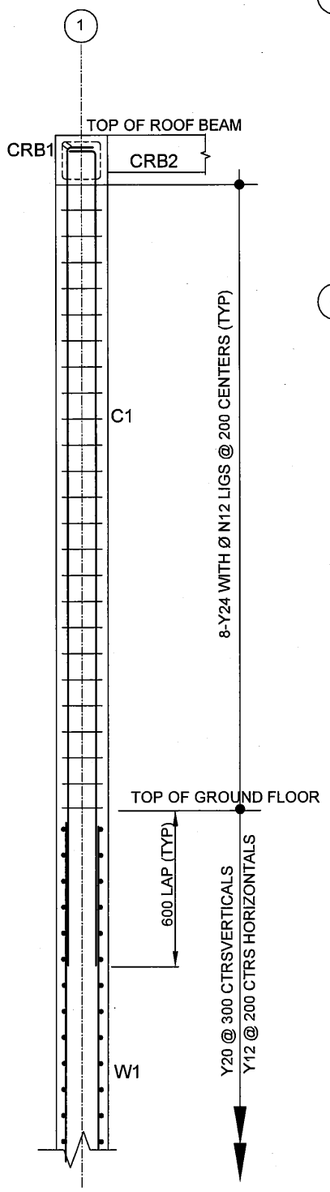
CONSTRUCTION ISSUE

PROJECT:	PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)
TITLE:	Kila Kila STP - UV DISINFECTION ROOM and TREATED WATER TANK SECTION
CLIENT:	INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANTS:	NJS CONSULTANTS CO., LTD. - JAPAN
NOTES:	

REVISIONS

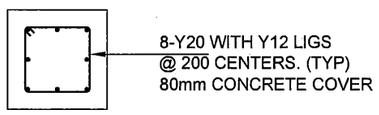
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	SDK

APPROVED by PMU: Project Director Lot G.Zauya	DATE: 1. Dec 2011	SCALE: 1/150
CHECKED by CONSULTANT Project Manager T.Fuji	DATE: 1. Dec 2011	DRAWING NO.: STP-TW-S003



COLUMN C1. & WALL W1. ELEVATION

SCALE: 1:50



C1. 400X400
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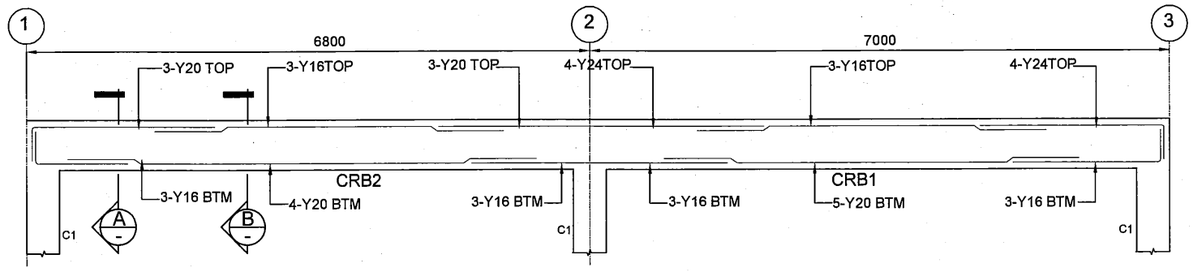
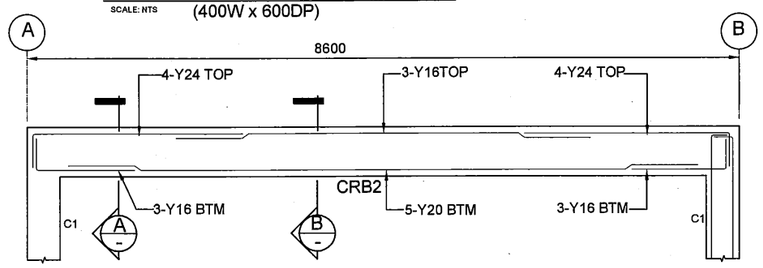
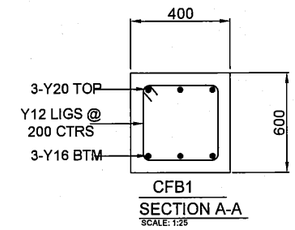
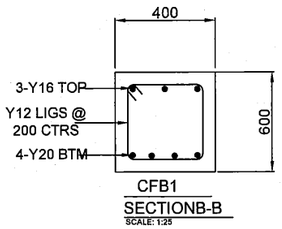


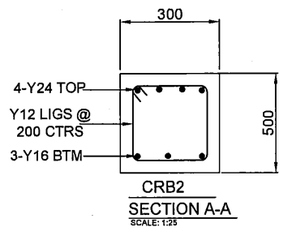
TYPICAL ROOF BEAM ELEVATION (CRB1)
SCALE: NTS (400W x 600DP)

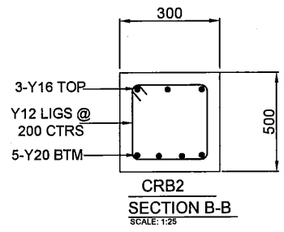


TYPICAL ROOF BEAM ELEVATION (CRB2)
SCALE: NTS (300W x 500DP)



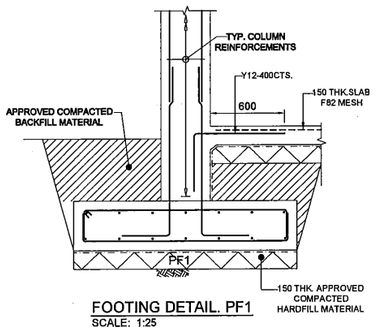




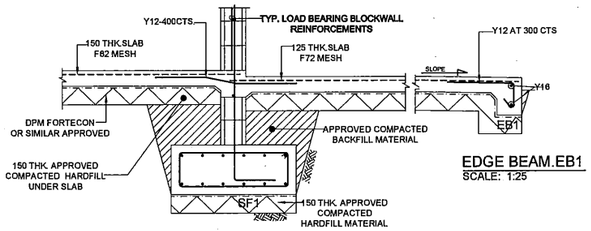


This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

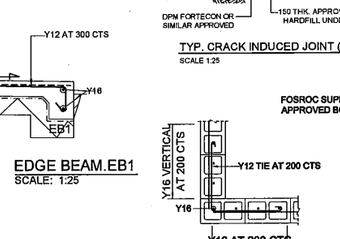
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



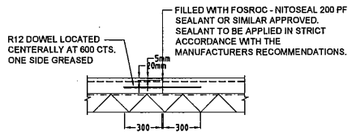
FOOTING DETAIL. PF1
SCALE: 1:25



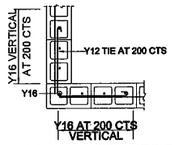
STRIP FOOTING.SF1
SCALE: 1:25



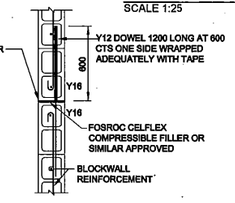
TYP. CRACK INDUCED JOINT (CIJ)
SCALE 1:25



CONSTRUCTION JOINT (CJ)
SCALE 1:25



TYP. WALL CORNER DETAIL
SCALE 1:25



TYP. WALL JOINT DETAIL (WJ)
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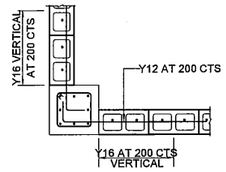
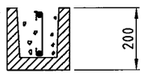
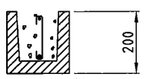


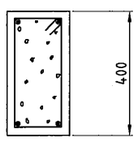
TYP. BLOCKWALL TO RC COLUMN DETAIL
SCALE 1:25



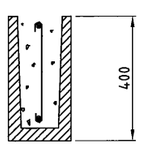
TYPE B2
2-Y16 WITH R10 @ 100 CTS
FOR LINTELS AND 300 CTS
FOR BOND BEAMS



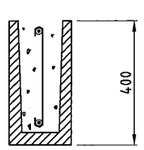
TYPE B1
2-Y12 WITH R10 @
100 CTS



TYPE B5
4-Y16 WITH R10 @ 150 CTS.



TYPE B3
2-Y16 WITH R10 @ 150 CTS.



TYPE B4
2-Y20 WITH R10 @ 150 CTS.

MAX. ALLOWABLE SPANS FOR 200mm WIDE LINTELS			
	LINTELS SUPPORTING		
MAXIMUM LINTEL SPAN (mm)	LIGHT ROOF WITH OR WITHOUT CEILING	LIGHT ROOF, LIGHT TIMBER FRAMED WALL AND TIMBER FLOOR	LIGHT ROOF, MASONRY WALL AND TIMBER FLOOR
1000	B1	B1	B2
1600	B1	B3	B3
2000	B2	B3	B4
2600	B3	B4	B5
3000	B3	B5	B5
3600	B3	B5	-

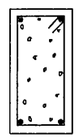
NOTES
(1) Bond beams (Type B2) must be provided at the top of all walls and at the level of suspended floors.
(2) Lintels must be provided over all openings such as doors and windows and must have a minimum 200mm bearing at the supports.

BLOCKWORK / LINTEL SCHEDULE - U.N.O.

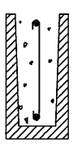
ITEMS	SIZE	REINFORCEMENT
RETAINING BLOCKWALLS:-	200 BLOCK	Y16 - 400 VERT. Y12 - 400 HORIZ.
LINTELS:- OPENING UP TO 1000	200 DP. BLOCK	Y12 TOP & BOTTOM R6 LIGS - 200 CTS.
OPENING UP TO 2000	400 DP. BLOCK	Y16 TOP & BOTTOM R6 LIGS - 200 CTS.
OPENING UP TO 3600	600 DP. BLOCK	Y16 TOP & BOTTOM R6 LIGS - 200 CTS.
SUPPORTING ROOF BEAMS	400 DP. CONC.	2 - Y12 TOP & BOTTOM R6 LIGS - 200 CTS.

TYPE B2
2-Y16 WITH R10 @ 100 CTS
FOR LINTELS AND 300 CTS
FOR BOND BEAMS

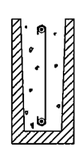
TYPE B1
2-Y12 WITH R10 @
100 CTS



TYPE B5
4-Y16 WITH R10 @ 150 CTS.



TYPE B3



TYPE B4
2-Y20 WITH R10 @ 150 CTS.

TENDER ISSUE

PROJECT:
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE:
Kila Kila STP - UV DISINFECTION ROOM and TREATED WATER TANK ELLEVATIONS & DETAILS

CLIENT:
INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS :
NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	SDK

APPROVED by PMU: Project Director Lot G.Zauya
DATE: 1. Dec 2011
SCALE: AS SHOWN
CHECKED by CONSULTANT Project Manager T.Fuji
DATE: 1. Dec 2011
DRAWING NO.: STP-TW-S003

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.
2) Cerificates and results of any tests already carried out.
3) Details of tests to be carried out both on and off site.
4) Location of any testing to be carried out off site.
5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 25m/sec
   Terrain Category 1
2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982 Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS	: 75mm
PEDESTAL	: 75mm
GROUND SLABS	: 30mm TOP
SUSPENDED SLABS	: 30mm TOP
BEAMS	: 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS	: 75mm IN GROUND, 65mm ABOVE GROUND
SHEARWALLS	: 75mm IN GROUND, 65mm ABOVE GROUND

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 2305 to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Foundations	40	0.55
Ground & Suspended Slabs	32	0.55
Beams Concrete	32	0.55
Columns	32	0.55
RC Walls	40	0.55

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B9 Grout for corefilling shall comply with AS 1475, Part 1, Section 2. Characteristic compressive strength F'c = 15 MPa Slump 225. Batching by volume is not permitted.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD:	0.9 kPa
LIVE LOAD:	0.25 kPa

UPPER FLOOR LEVEL

DEAD LOAD:	4.7 kPa
LIVE LOAD:	
- TOILETS	2.0 kPa
- KITCHEN	2.0 kPa
- STORAGE	5.2 kPa
- STAIRS	4.0 kPa

GROUND FLOOR LEVEL

DEAD LOAD:	4.7 kPa
LIVE LOAD:	
- TOILETS	2.0 kPa
- STORAGE	5.2 kPa
- STAIRS	4.0 kPa
- KITCHEN	2.0 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - STRUCTURAL NOTES SHEET 1 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

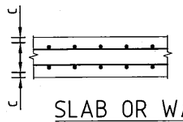
NOTES :

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

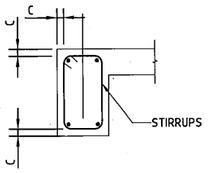
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001

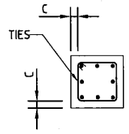
MINIMUM CONCRETE COVER



SLAB OR WALL

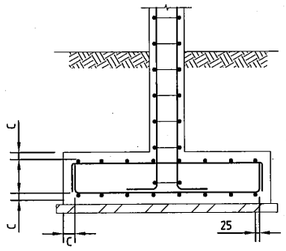


GIRDER OR BEAM

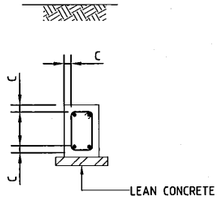


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc - 75mm
- OTHER STRUCTURE - 65mm

THE REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

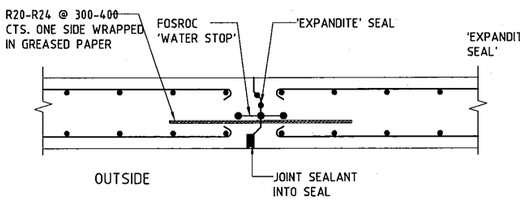
a) CONCRETE PIPES
- AS PER MANUFACTURER'S STANDARD.

b) FIREPROOFING (WITH GALVANISED WIRE MESH)

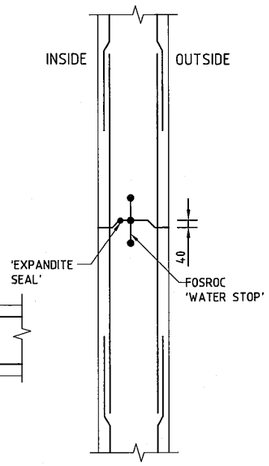
c) DITCH LINING/ SLOPE PROTECTION

d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

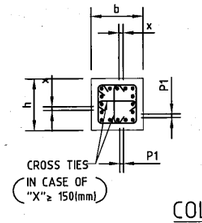


RECTANGULAR STRUCTURES

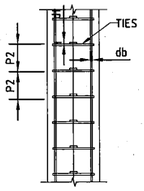


TYPICAL EXPANSION JOINT DETAIL FOR CIRCULAR LIQUID RETAINING STRUCTURE

SPACING LIMITS

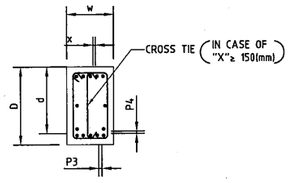


COLUMN



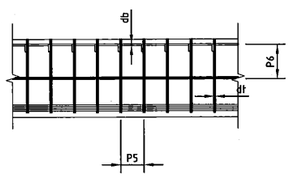
P1 ≥ hagg x 4/3 (mm)
1.5db,
40 (mm)
WHICHEVER IS GREATER

P2 ≤ 15 db or 300(mm) or SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN WHICHEVER IS SMALLER



P3 ≥ hagg x 4/3 (mm)
db
WHICHEVER IS GREATER
hagg = 20(mm)

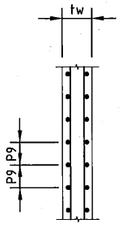
P4 ≥ 25(mm)



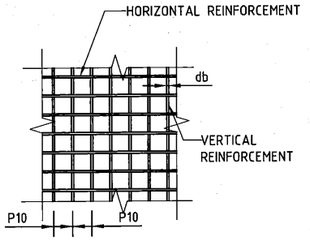
P5 ≤ D/2 or 300mm
WHICHEVER IS SMALLER

P6 ≤ 300(mm)

GIRDER AND BEAM



P9 ≤ 350(mm)
≤ 2.5tw
≤ 4db



P10 ≤ 350(mm)
≤ 2.5tw
≤ 4db

WALL

NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTA REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. PGLN-YK-CSZZZ-900100.

2. LEGEND
   - hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
   - d : EFFECTIVE DEPTH
   - db : SIZE OF LONGITUDINAL BARS (mm)
   - N : BAR SYMBOL
   - dt : SIZE OF TIES
   - s : SPACING
   - D : BEAM HEIGHT
   - w : BEAM WIDTH
   - b,h : COLUMN SECTION
   - tw : THICKNESS OF WALL

3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

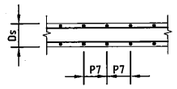
3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
- -15db
- -SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
- -300mm

(WHICHEVER IS SMALLER)

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
- -D/2
- -15db
- -300mm

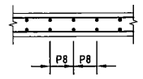
(WHICHEVER IS SMALLER)

PRIMARY REINFORCEMENT



P7 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SECONDARY REINFORCEMENT



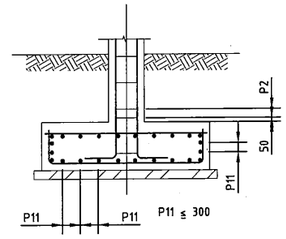
P8 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SLAB

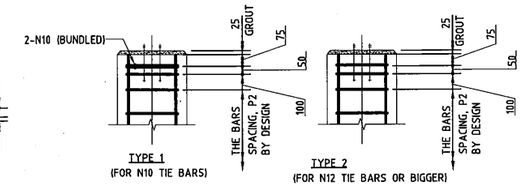
STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT				FOR TIES AND STIRRUPS REINFORCEMENT			
90° HOOK OR BEND / 180° HOOK				90° HOOK / 135° HOOK			
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2	BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
				N10	40	135	100
N12	60	120	70	N12	50	160	120
N16	80	135	70				
N20	100	160	80				
N24	120	195	100				
N28	140	225	115				
N32	160	260	130				
N36	180	290	145				
N40	200	320	160				

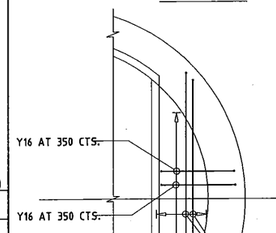
(mm)



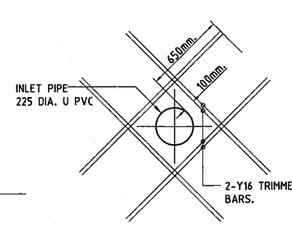
FOOTING



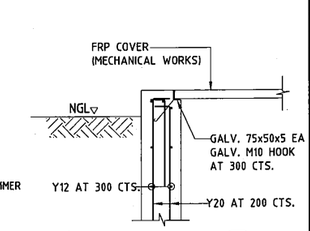
STIRRUP DETAIL FOR TOP OF PEDESTAL



DETAIL 1 / SCALE 1:50



TYP. DETAIL
SCALE 1:50



DETAIL 2 / SCALE 1:50

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT:	PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)
TITLE:	KilaKila STP. SLUDGE TREATMENT BUILDING - STRUCTURAL NOTES SHEET 2 OF 2
CLIENT:	INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANTS :	NJS CONSULTANTS CO., LTD. - JAPAN
NOTES :	

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya	DATE: 1. Dec 2011	SCALE: N.T.S.
CHECKED by CONSULTANT Project Manager T.Fuji	DATE: 1. Dec 2011	DRAWING NO.: STP-S001a

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
C1	400 x 400	8-Y24	Y12-200 CTS.	RC COLUMN
PF1	400 DP x 1800 x 1800	7-Y20 T&B	7-Y20 T&B	RC PAD FOOTING
PF2	800 DP x 400 x 400	3-Y12 T&B	3-Y12 T&B	RC PAD FOOTING
SF1	400 DP x 1000 WD	6-Y16 T&B	Y12-300 CTS.	RC STRIP FOOTING
TB1	400 DP x 400 WD	2-Y20 T&B	Y12-250 CTS.	RC TIE BEAM
EB1	300 DP x 250 WD	2-Y16 T&B	Y12-300 CTS.	EDGE BEAM
TH	300 DP x 400 WD	2-Y16	R10-300 CTS.	THICKENING

NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE 200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMUM DEPTH OF 1000mm TYP. FROM NGL. UNLESS HARD ROCK ENCOUNTED BEFORE THAT IN WHICH FOOTING TO BE FOUNDED ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE VARIFIED ON SITE DURING EXCAVATION.
6. U.N.O. ALL INTERNAL WALL SHALL BE STUD TO ARCH. DETAILS.
7. U.N.O. BLOCKWALL REINFORCEMENT NON LOAD BEARING:
   VERTICAL -Y12-400 CTS
   HORIZONTAL -Y12-400 CTS
8. U.N.O. ALL INTERNAL WALL SHALL BE STUD TO ARCH. DETAILS.
9. THE THICKNESS OF THE SHALLOW DRAIN SHALL BE 200mm FOR BOTH BASE AND WALL.
10. AWNING PURLINS SHALL BE C100 16 AT 600 CTS.

LEGEND:

- DENOTES LOAD BEARING BLOCKWALL
- DENOTES NON LOAD BEARING WALL
- DENOTES ARCHITECTURAL STUDWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

NGL - DENOTES NATURAL GROUND LEVEL
CIJ - DENOTES CRACK INDUCED JOINT
CJ - DENOTES CONSTRUCTION JOINT
WJ - DENOTES WALL JOINT
EW - DENOTES EACH WAY

MEMBER SCHEDULE

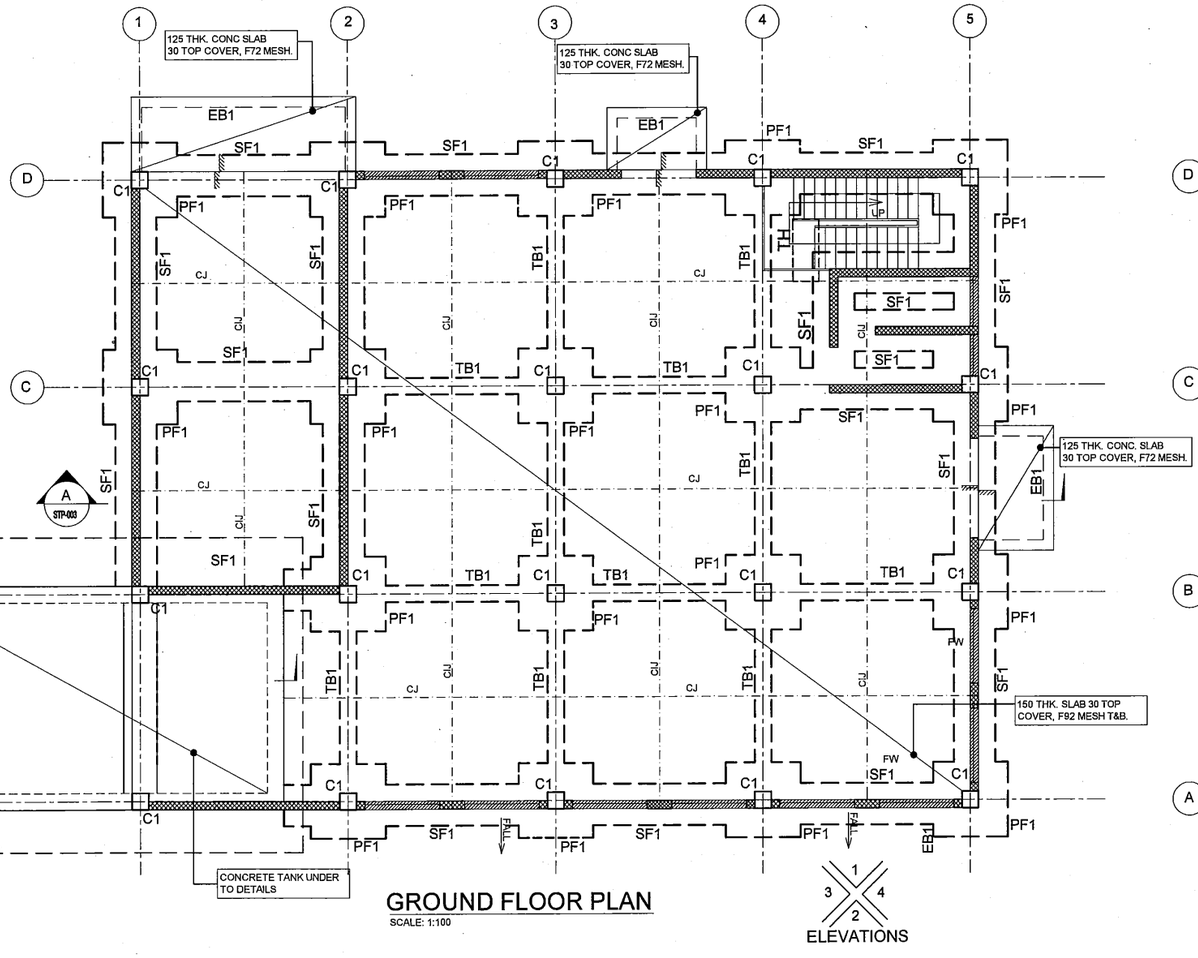
MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
C1	400 x 400 SQR	8-Y24	Y12-200 CTS.	RC COLUMN
C2	100 x 5 CHS			STEEL COLUMN
CFB1	500 DP x 400 WD	REFER SHT. STP-006		RC FLOOR BEAM
CFB2	500 DP x 400 WD	REFER SHT. STP-006		RC FLOOR BEAM
CFB3	360 UB 45			STEEL HOIST
TR2	TRUSS ELEVATION	REFER SHT. STP-003		TIMBER TRUSS

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

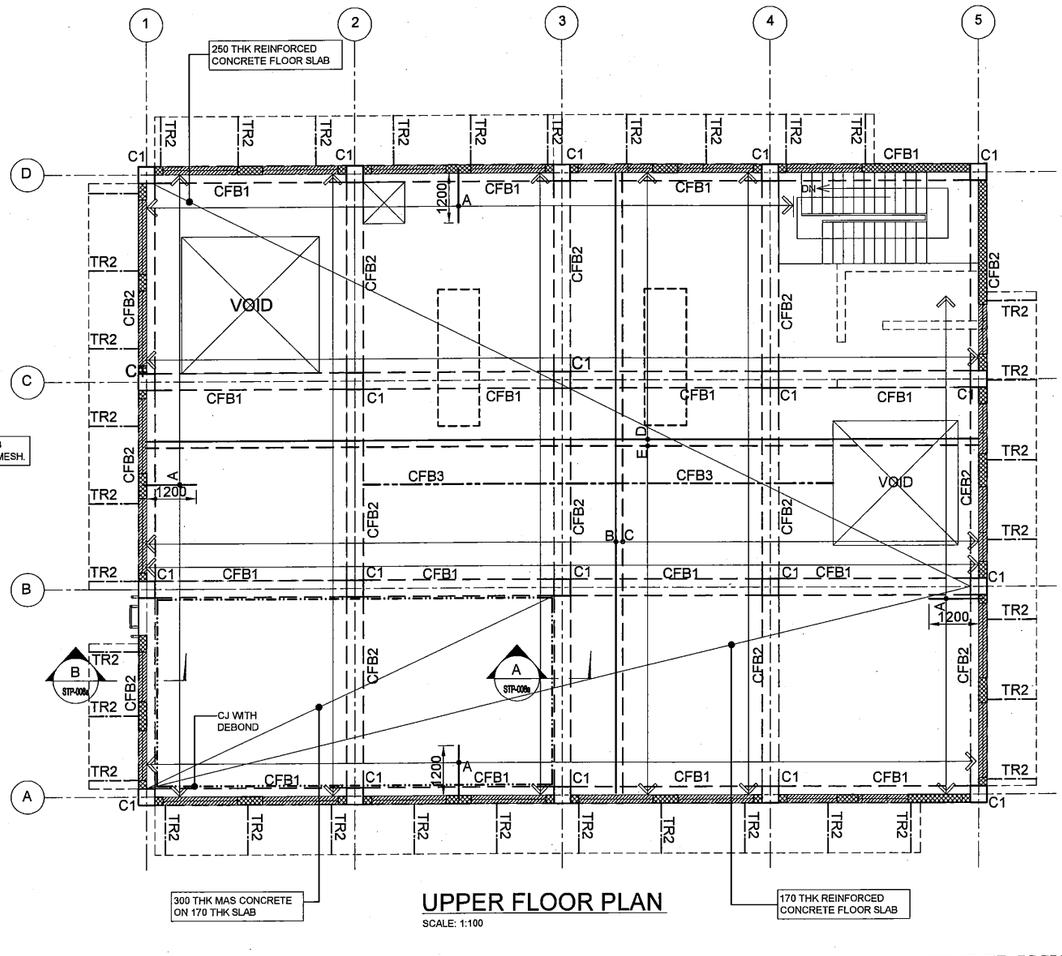
SLAB REINFORCEMENT SCHEDULE

BAR	MARK	REINFORCEMENT	REMARKS
	A	Y16 - 200 CTS.	STARTER BARS (TOP)
	B	Y12 - 200 CTS.	TT
	C	Y16 - 300 CTS.	BB
	D	Y12 - 200 CTS.	TB
	E	Y12- 300 CTS.	BT



GROUND FLOOR PLAN
SCALE: 1:100

ELEVATIONS



UPPER FLOOR PLAN
SCALE: 1:100

TENDER ISSUE

PROJECT:
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE:
KilaKila SPT. SLUDGE TREATMENT BUILDING - GROUND FLOOR & UPPER FLOOR PLANS

CLIENT:
INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS :
NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

REVISIONS

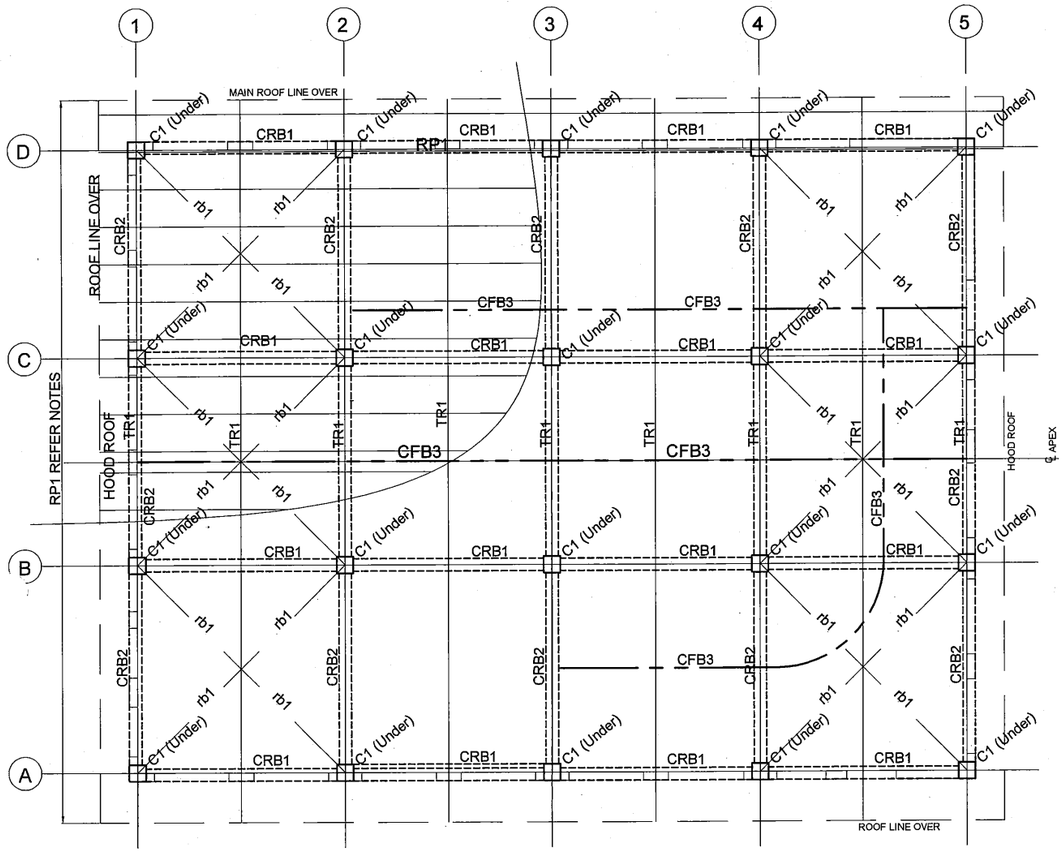
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU:
Project Director
Lot G.Zauya
DATE: 1. Dec 2011

CHECKED by CONSULTANT
Project Manager
T.Fuji
DATE: 1. Dec 2011

SCALE: 1/100

DRAWING NO.: STP-S002



ROOF FRAMING PLAN

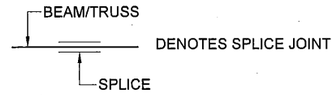
SCALE: 1:100

SCHEDULE		
MARK	SIZE	REMARKS
C1	400 x 400 SQR.	RC. COLUMN
CRB1	300 DP x 300 WD	RC.ROOF BEAM
CRB2	300 DP x 300 WD	RC.ROOF BEAM
TR1	TIMBER TRUSS @ 2500 CTS.	SEE TYP.TRUSS DETAIL
RP1	100 x 75 HWD. @ 600 CTS.	TIMBER ROOF PURLINS
TC	150 x 75 HWD	TRUSS TOP CHORD
BC	150 x 75 HWD.	TRUSS BTM CHORD
V1	100 x 75 HWD.	TRUSS DAIGONAL WEB
rb1	PRYDA STRAP BRACE	ROOF BRACE

NOTES:

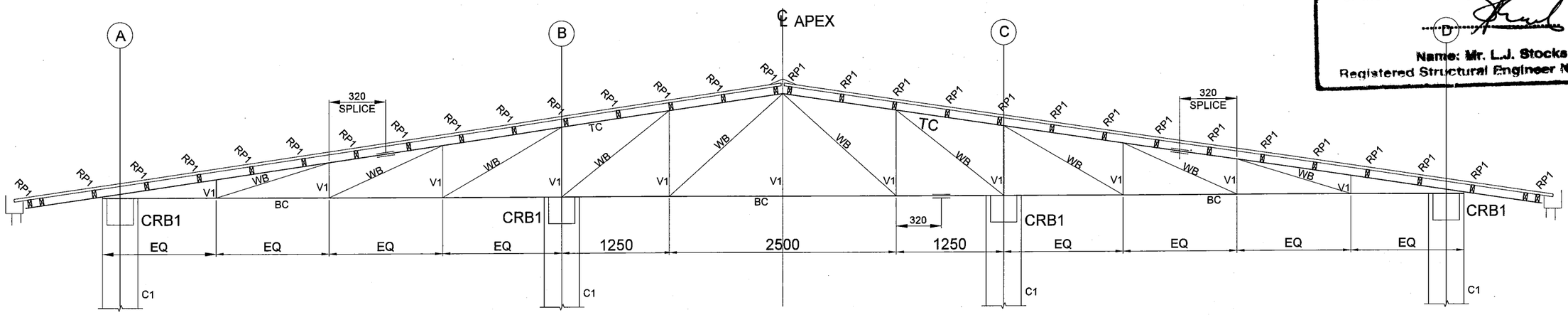
1. STRUCTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.
2. BUILDER TO CONFIRM ALL SPAN LENGTHS & PITCHES ETC, PRIOR TO FABRICATION
3. RP1. FIXING TO BE NAIL FIXED TO TOP CHORD
4. ROOF BRACING SHALL BE PRYDA STRAP BRACING INSTALLED ACCORDING TO PRYDA SPECIFICATION.

LEGEND:



This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



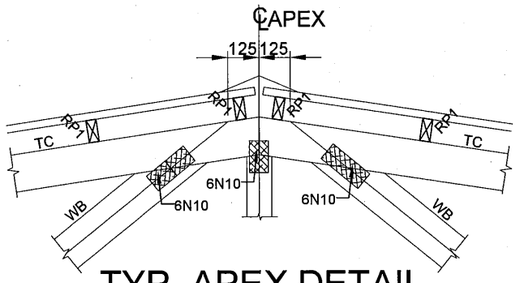
TYPICAL ROOF TRUSS DETAIL (TR1)

SCALE: 1:50

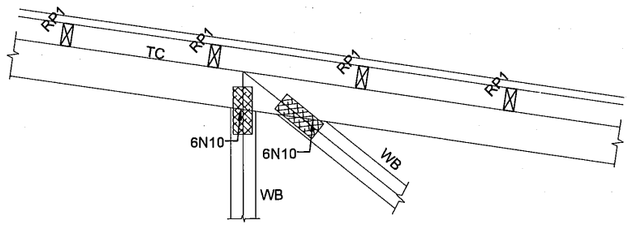
TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - ROOF PLAN & TRUSS ELEVATION	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES :	APPROVED by PMU: Project Director Lot G.Zauya DATE: 1. Dec 2011 SCALE: AS SHOWN CHECKED by CONSULTANT Project Manager T.Fuji DATE: 1. Dec 2011 DRAWING NO.: STP - S003

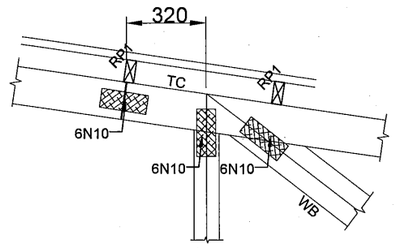
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM



TYP. APEX DETAIL
SCALE: 1:25



TYP. TC & WB DETAIL
SCALE: 1:25



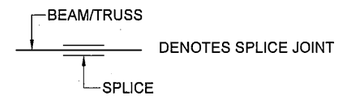
TYP. TC-SPLICE DETAIL
SCALE: 1:25

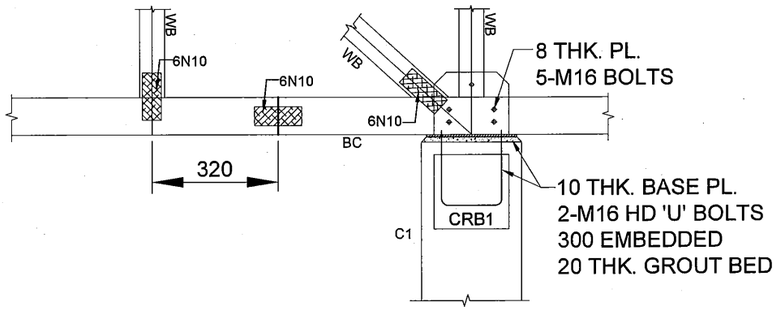
SCHEDULE		
MARK	SIZE	REMARKS
C1	400 x 400 SQR.	RC. COLUMN
CRB1	300 DP x 300 WD	RC.ROOF BEAM
CRB2	300 DP x 300 WD	RC.ROOF BEAM
TR1	TIMBER TRUSS @ 2500 CTS.	SEE TYP.TRUSS DETAIL
RP1	100 x 75 HWD. @ 600 CTS.	TIMBER ROOF PURLINS
TC	150 x 75 HWD	TRUSS TOP CHORD
BC	150 x 75 HWD.	TRUSS BTM CHORD
V1	100 x 75 HWD.	TRUSS DAIGONAL WEB
rb1	PRYDA STRAP BRACE	ROOF BRACE

NOTES:

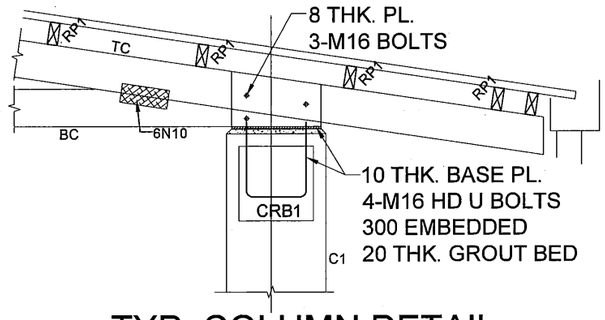
1. STRUCTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.
2. BUILDER TO CONFIRM ALL SPAN LENGTHS & PITCHES ETC, PRIOR TO FABRICATION
3. RP1. FIXING TO BE NAIL FIXED TO TOP CHORD
4. ROOF BRACING SHALL BE PRYDA STRAP BRACING INSTALLED ACCORDING TO PRYDA SPECIFICATION.

LEGEND:





TYP. BC-SPLICE DETAIL
SCALE: 1:25



TYP. COLUMN DETAIL
SCALE: 1:25

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - TRUSS DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

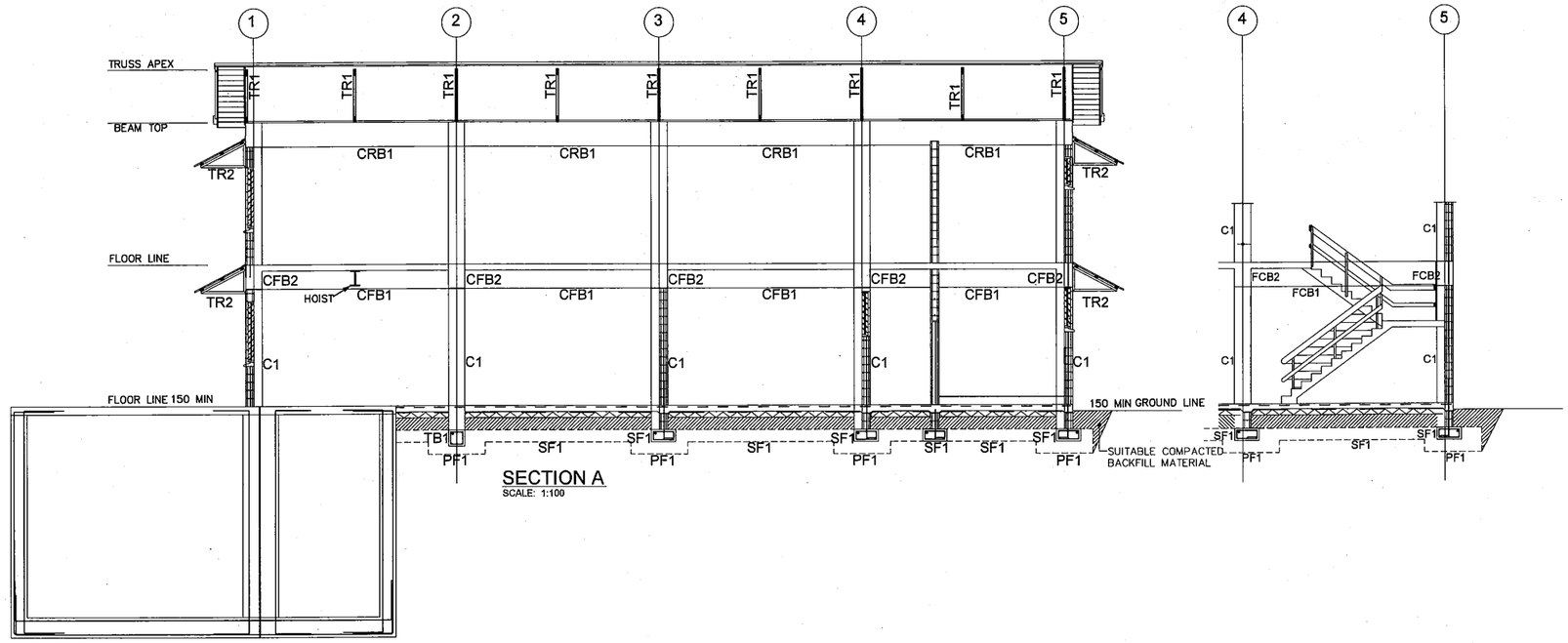
CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

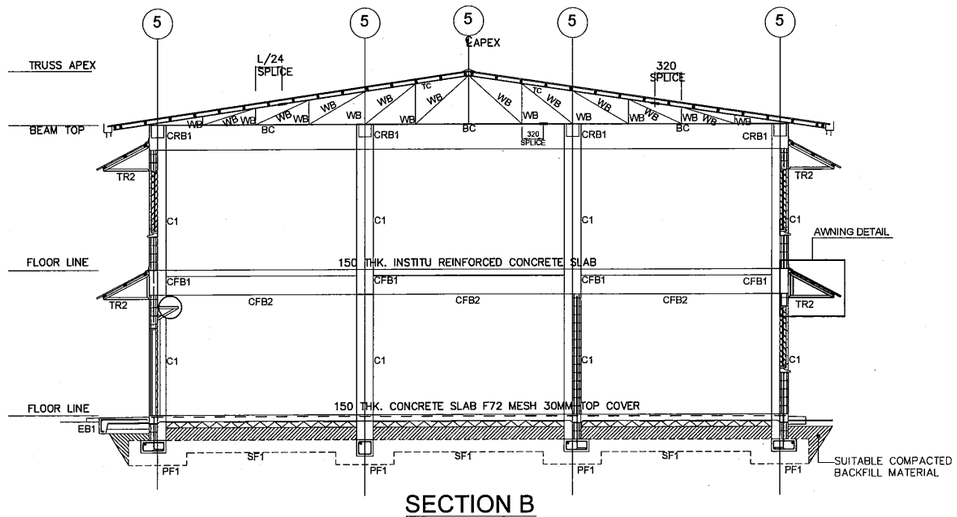
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

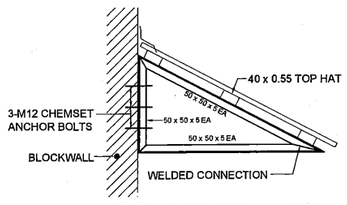
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S004



SECTION A
SCALE: 1:100



SECTION B
SCALE: 1:100



SUNHOOD DETAIL (TR3)
SCALE: 1:20

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

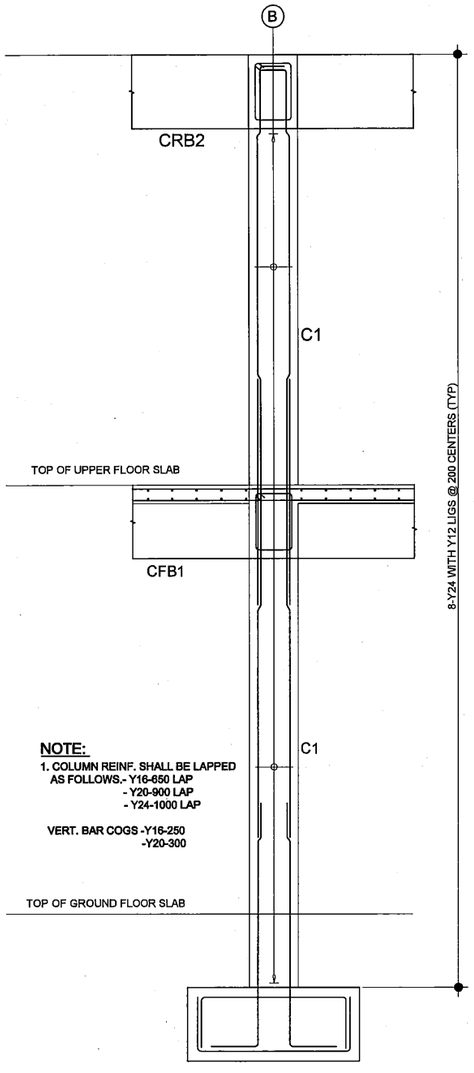
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - BUILDING SECTIONS	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	

REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya	DATE: 1. Dec 2011	SCALE: 1/500
CHECKED by CONSULTANT Project Manager T.Fuji	DATE: 1. Dec 2011	DRAWING NO.: STP - S005



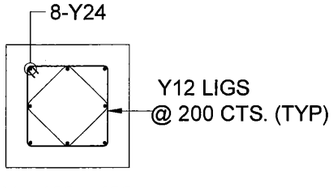
NOTE:

1. COLUMN REINF. SHALL BE LAPPED AS FOLLOWS.- Y16-650 LAP
   - Y20-900 LAP
   - Y24-1000 LAP

VERT. BAR COGS -Y16-250
-Y20-300

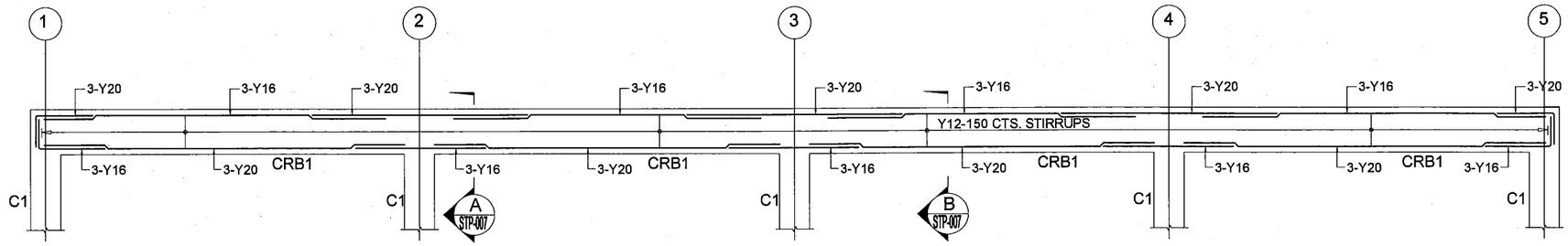
COLUMN C1. ELEVATION

SCALE: 1:50



C1 - 400 x 400

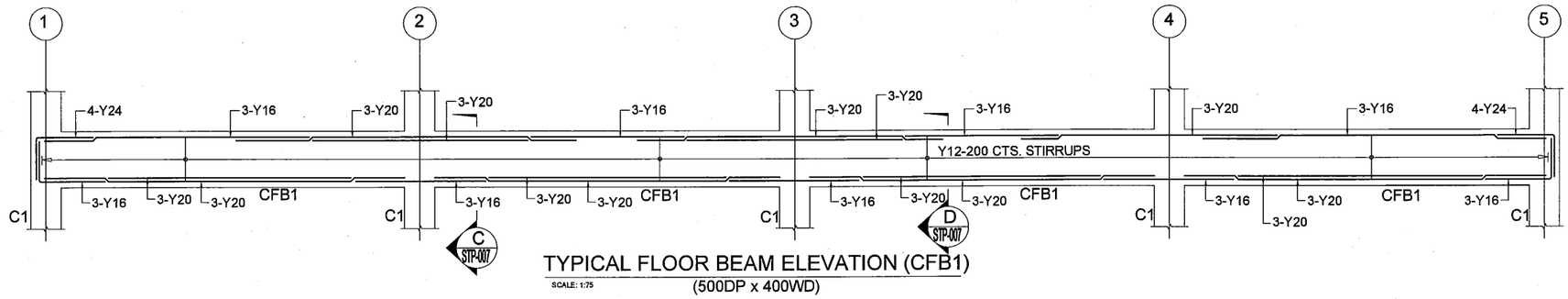
SCALE: 1:20



TYPICAL ROOF BEAM ELEVATION (CRB1)

SCALE: 1:75

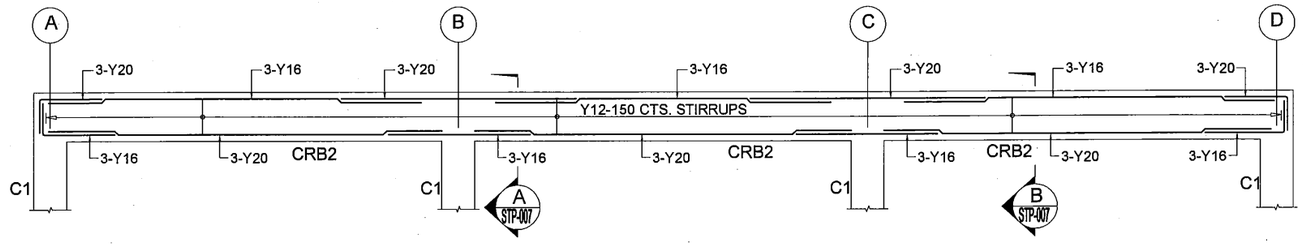
(300DP x 300WD)



TYPICAL FLOOR BEAM ELEVATION (CFB1)

SCALE: 1:75

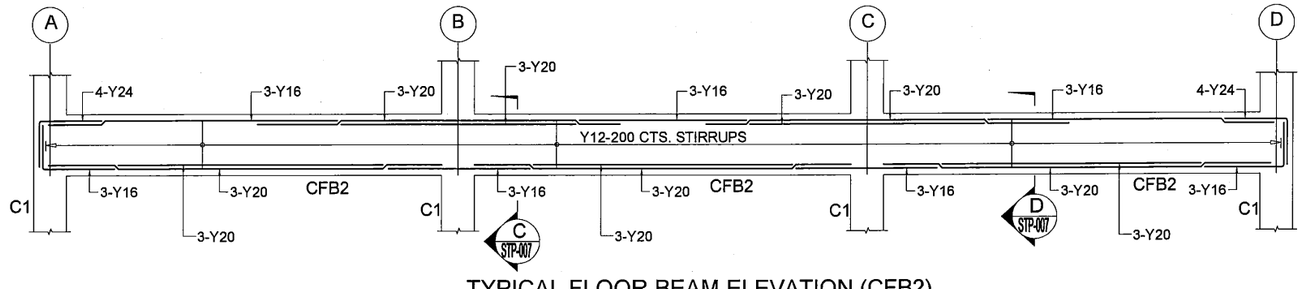
(500DP x 400WD)



TYPICAL ROOF BEAM ELEVATION (CRB2)

SCALE: 1:75

(300DP x 300WD)



TYPICAL FLOOR BEAM ELEVATION (CFB2)

SCALE: 1:75

(500DP x 400WD)

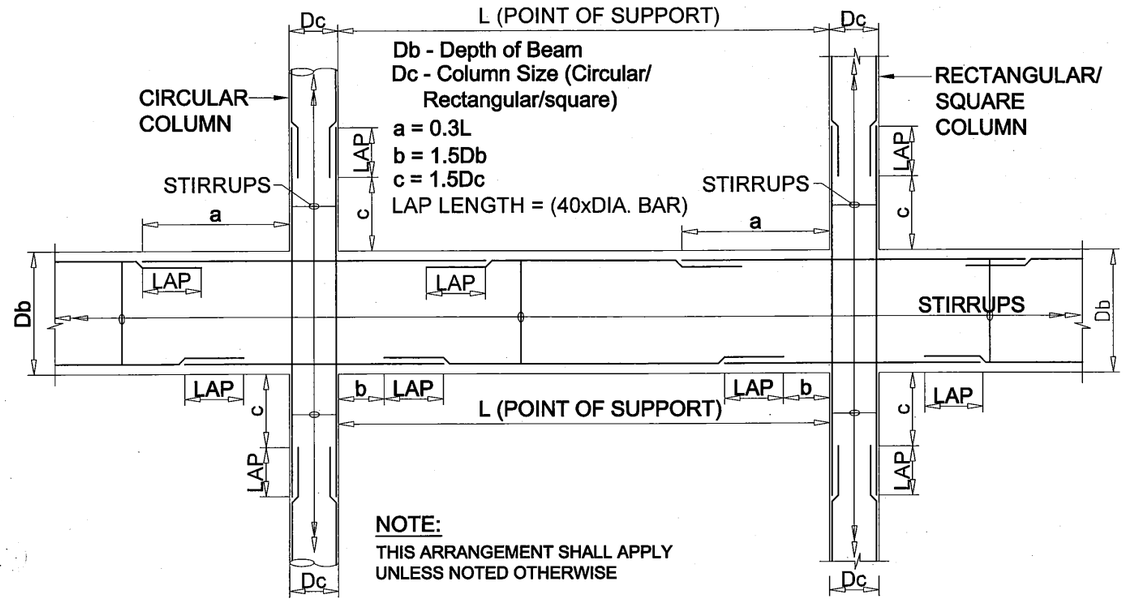
This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

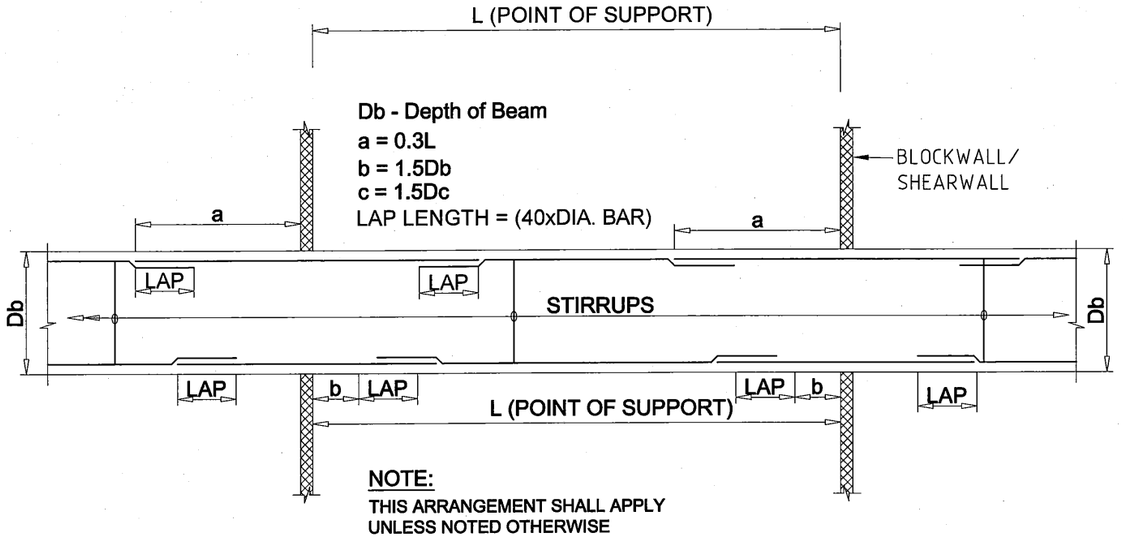
TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - BEAM/COLUMN ELEVATIONS	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES :	APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S006

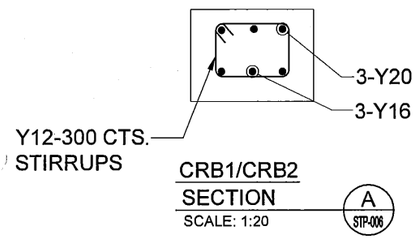
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM



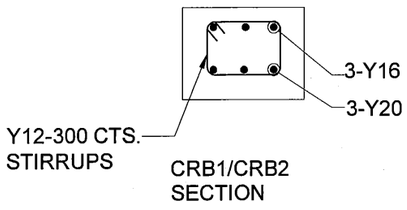
REINFORCEMENT CURTAILMENT TYPICAL REQUIREMENTS
(RC BEAM & BLOCKWALL)
H. 1: 100 V. 1: 25



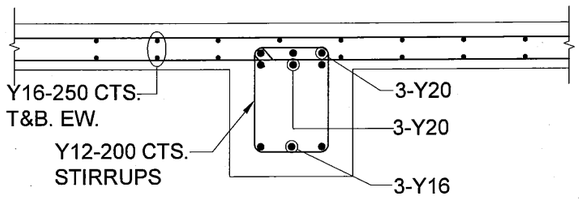
REINFORCEMENT CURTAILMENT TYPICAL REQUIREMENTS
(RC BEAM & BLOCKWALL)
H. 1: 100 V. 1: 25



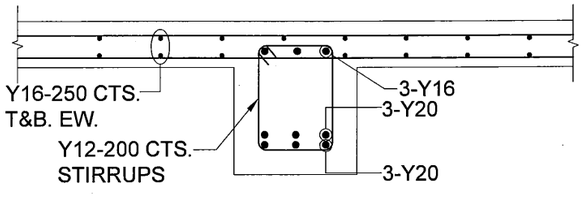
CRB1/CRB2
SECTION
SCALE: 1:20
A STP-006



CRB1/CRB2
SECTION



CFB1/CFB2
SECTION
SCALE: 1:20
C STP-006



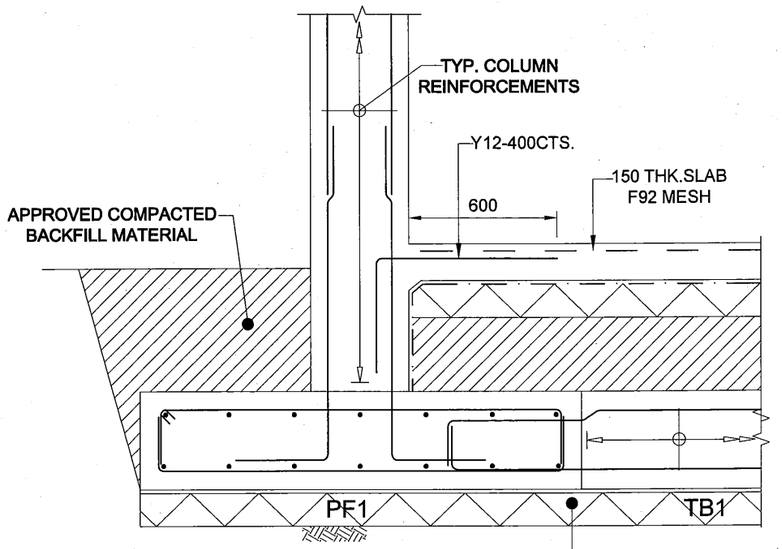
CFB1/CFB2
SECTION
SCALE: 1:20
D STP-006

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

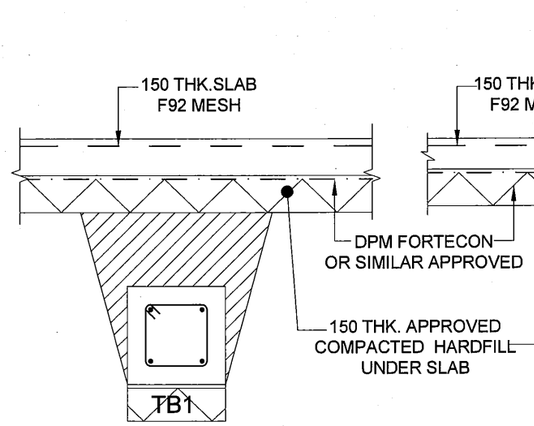
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

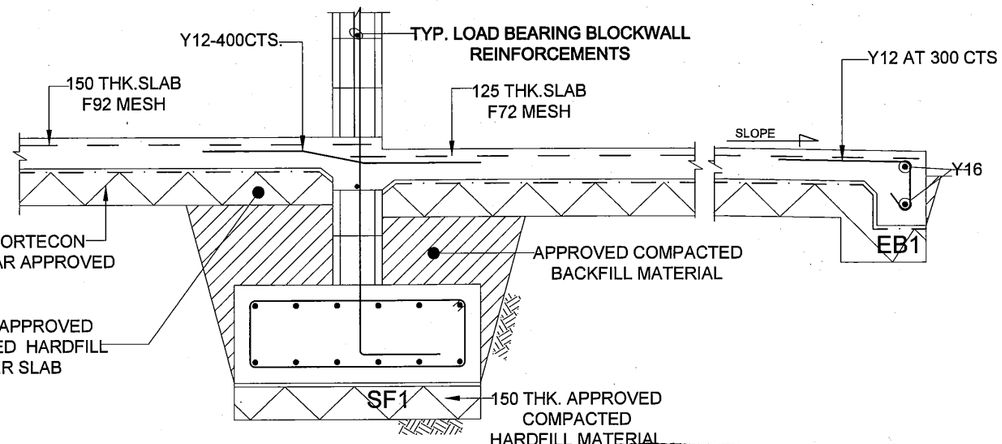
PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - TYP. BEAM ELEVATION & SECTIONS	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN
		REVISIONS: ISSUE: TENDER; REV.: -; DATE: 14/11/2011; CHKED: TT; DESCRIPTION: ISSUE FOR TENDER; BY: CM	CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S007



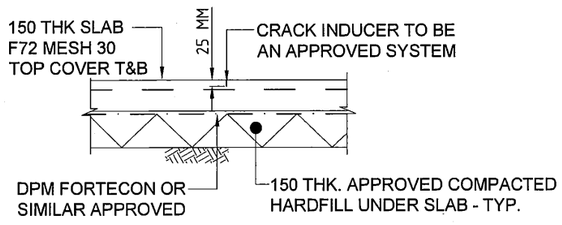
FOOTING DETAIL. PF1
SCALE: 125



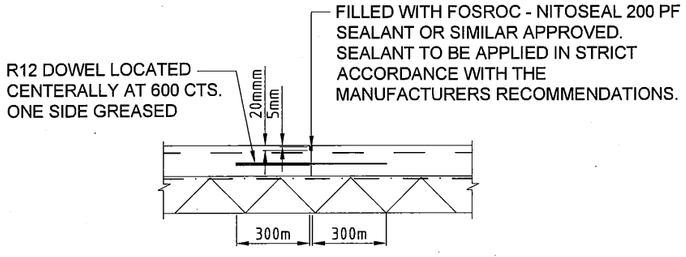
TIE BEAM DETAIL.TB1
SCALE: 1:25



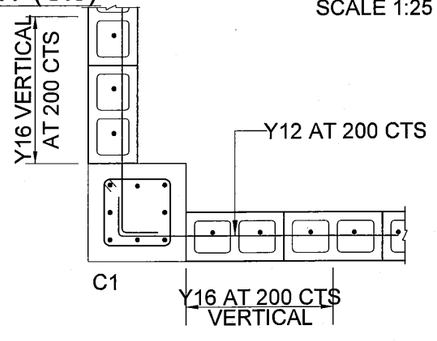
STRIP FOOTING.SF1
SCALE: 1:25



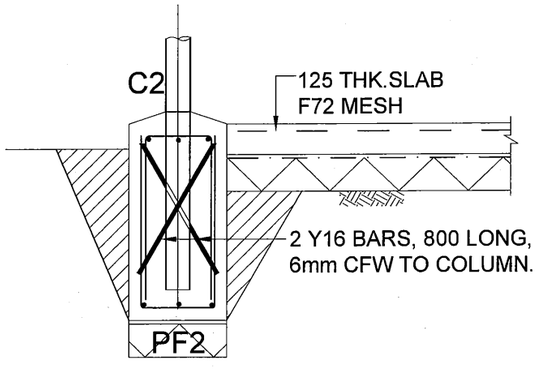
TYP.CRACK INDUCED JOINT (CIJ)
SCALE 1:25



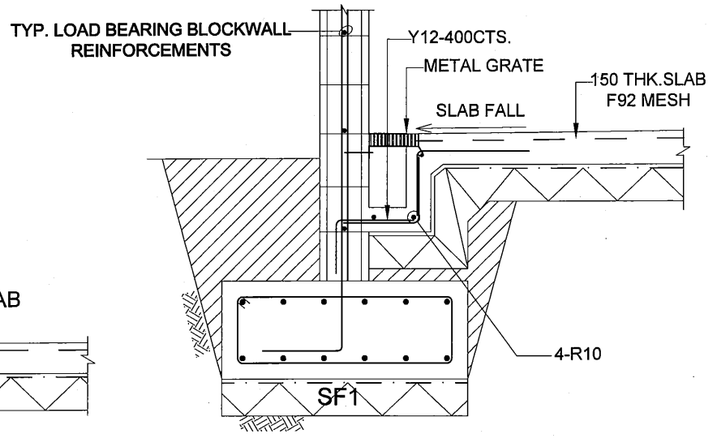
CONSTRUCTION JOINT (CJ)
SCALE 1:25



TYP. BLOCKWALL TO RC COLUMN DETAIL
SCALE 1:25



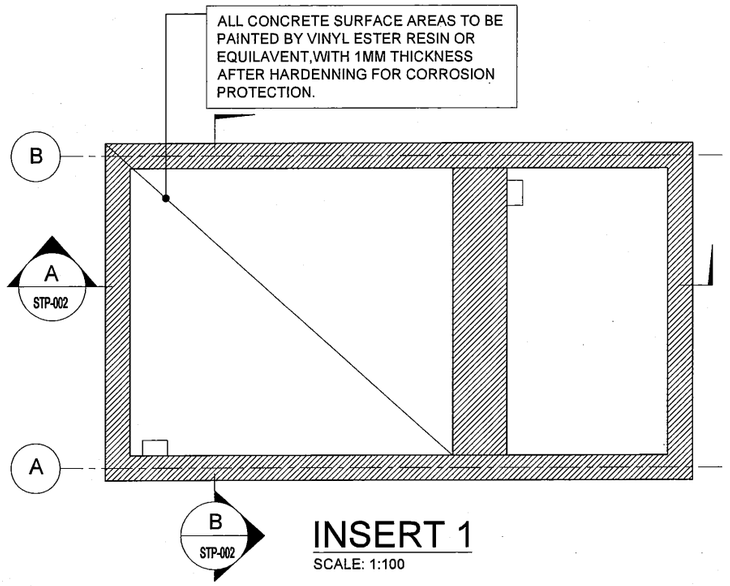
FOOTING DETAIL. PF2
SCALE: 1:25



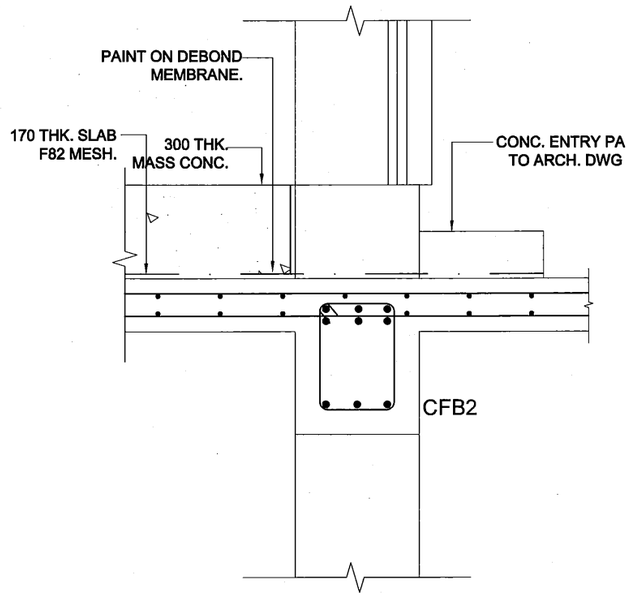
STRIP FOOTING.SF1
SCALE: 1:25

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)							TITLE: KilaKila SPT.SLUDGE TREATMENT BUILDING - DETAILS		
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES :	REVISIONS						APPROVED by PMU: Project Director Lot G.Zauya	DATE: 1. Dec 2011	SCALE: AS SHOWN
			ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY	CHECKED by CONSULTANT Project Manager T.Fuji	DATE: 1. Dec 2011	DRAWING NO.: STP - S008
			TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM			



INSERT 1
SCALE: 1:100



NOTES:

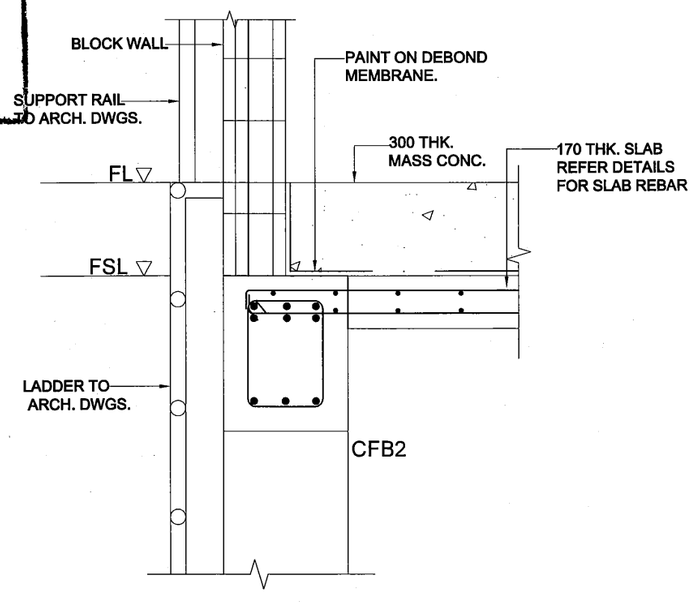
1. THE EXTENT OF EXCAVATION REQUIRED FOR ADEQUATE WORKING SPACE SHALL BE DETERMINED BY THE CONTRACTOR.
2. REFER TO ARCHITECTURAL DRAWINGS FOR MISCELLANEOUS WORKS SUCH AS HANDRAILS,COVER, STEP LADDER, STAIR, STOP LOG AND EXPANSION JOINT.
3. CONCRETE GRADE: F'C = 40 MPa
4. MINIMUM COVER TO BE REINFORCED
   WALL - 75mm
   SLAB ON GROUND - 75mm
   SUSPENDED SLABS - 65mm
5. THE ELECTRO MAGNETIC-FLOW METER WITH THE FLEXIBLE PIPE COUPLING SHALL BE SUPPLIED AND INSTALLED BY THE INSTRUMENTATION SUB-CONTRACTOR THROUGH CLOSE COORDINATION WITH THE MAIN CONTRACTOR TO MAKE THE FLOW METER COMPLETE.
6. BACKFILL MATERIAL SHALL BE ACCORDANCE WITH SPECIFICATIONS.

SECTION A
SCALE 1:20
S002

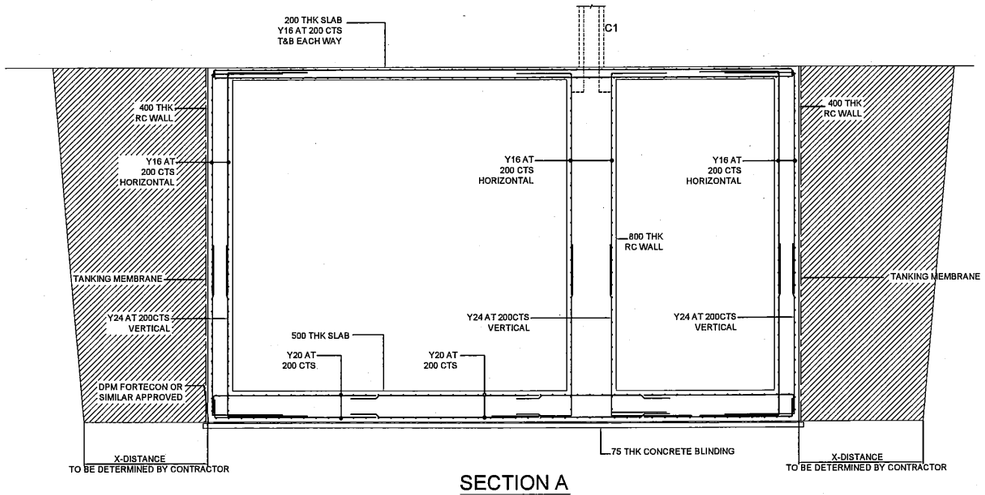
This drawing is certified to comply with the Structural Engineering previsions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

.....

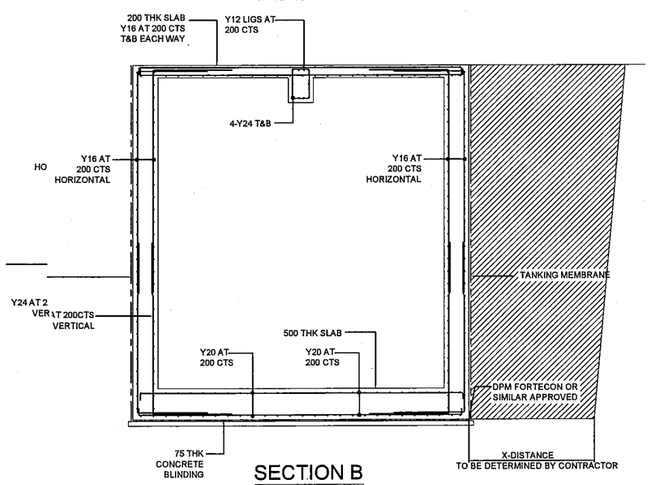
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



SECTION B
SCALE 1:20
S002



SECTION A
SCALE: 1:50

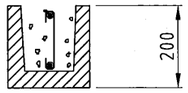


SECTION B
SCALE: 1:50

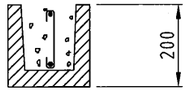
TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - GROUND FLOOR & UPPER FLOOR PLANS	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES :	APPROVED by PMU: Project Director Lot G.Zauya / DATE: 1. Dec 2011 / SCALE: 1/100
			CHECKED by CONSULTANT Project Manager T.Fuji / DATE: 1. Dec 2011 / DRAWING NO.: STP-S008a

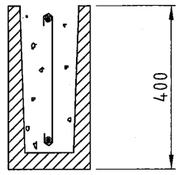
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM



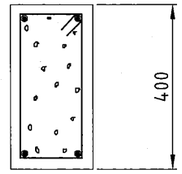
TYPE B2
2-Y16 WITH R10 @ 100 CTS FOR LINTELS AND 300 CTS FOR BOND BEAMS



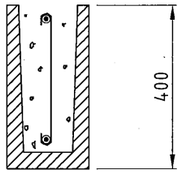
TYPE B1
2-Y12 WITH R10 @ 100 CTS



TYPE B3
2-Y16 WITH R10 @ 150 CTS.



TYPE B5
4-Y16 WITH R10 @ 150 CTS.



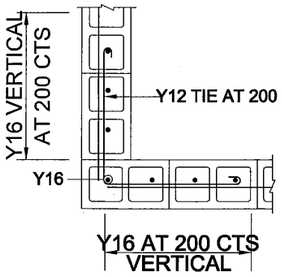
TYPE B4
2-Y20 WITH R10 @ 150 CTS.

MAX. ALLOWABLE SPANS FOR 200mm WIDE LINTELS

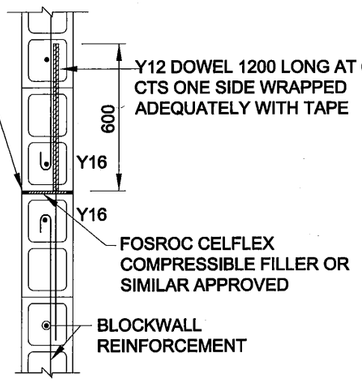
MAXIMUM LINTEL SPAN (mm)	LINTELS SUPPORTING		
	LIGHT ROOF WITH OR WITHOUT CEILING	LIGHT ROOF, LIGHT TIMBER FRAMED WALL AND TIMBER FLOOR	LIGHT ROOF, MASONRY WALL AND TIMBER FLOOR
1000	B1	B1	B2
1600	B1	B3	B3
2000	B2	B3	B4
2600	B3	B4	B5
3000	B3	B5	B5
3600	B3	B5	-

NOTES

(1) Bond beams (Type B2) must be provided at the top of all walls and at the level of suspended floors.
(2) Lintels must be provided over all openings such as doors and windows and must have a minimum 200mm bearing at the supports.

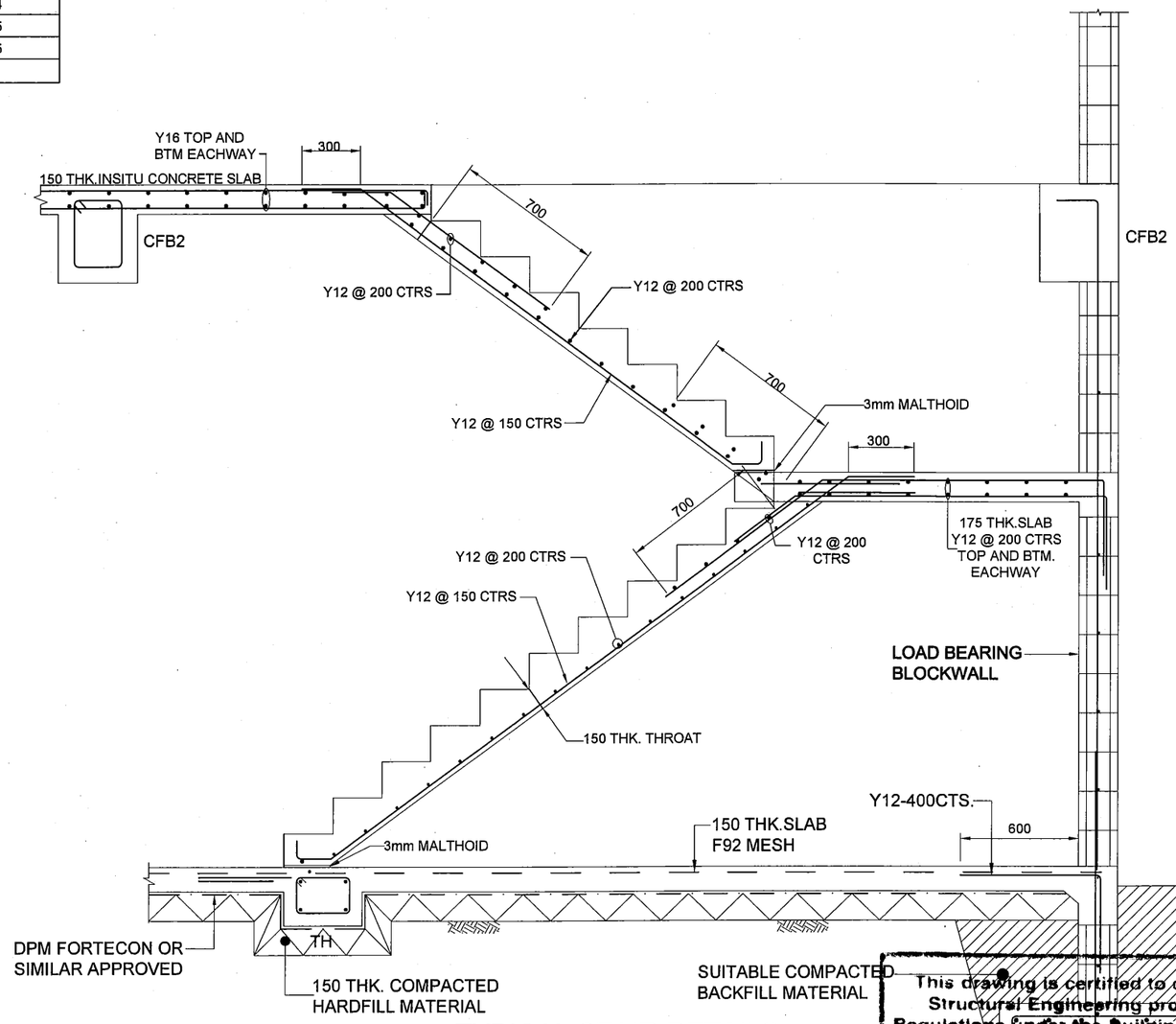


TYP. WALL CORNER DETAIL
SCALE 1:25



TYP. WALL JOINT DETAIL (WJ)
SCALE 1:25

TYPICAL BLOCKWALL DETAILS



TYPICAL STAIR DETAILS
SCALE. 1:25

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. SLUDGE TREATMENT BUILDING - TYPICAL BLOCKWALL AND STAIR DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S009

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.
2) Cerificates and results of any tests already carried out.
3) Details of tests to be carried out both on and off site.
4) Location of any testing to be carried out off site.
5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 25m/sec
Terrain Category 1
2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982
Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS : 75mm
PEDESTAL : 75mm
GROUND SLABS : 40mm TOP

BEAMS : 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS : 75mm IN GROUND, 65mm ABOVE GROUND & EXPOSED

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 230S to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Foundations	40	0.55
Ground & Suspended Slabs	32	0.55
Beams Concrete	32	0.55
Columns	32	0.55
Mass Concrete	15	0.50

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

C20 Control Joints in the ground floor slab shall be provided at 6m centres U.N.O.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD:	0.9 kPa
LIVE LOAD:	0.25 kPa

UPPER FLOOR LEVEL

DEAD LOAD:	4.7 kPa
LIVE LOAD:	
- TOILETS	2.0 kPa
- KITCHEN	2.0 kPa
- STORAGE	5.2 kPa
- STAIRS	4.0 kPa

GROUND FLOOR LEVEL

DEAD LOAD:	4.7 kPa
LIVE LOAD:	
- TOILETS	2.0 kPa
- STORAGE	5.2 kPa
- STAIRS	4.0 kPa
- KITCHEN	2.0 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ELECTRICAL SUB-STATION - STRUCTURAL NOTES SHEET 1 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

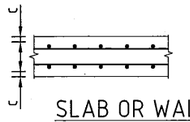
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

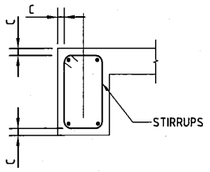
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001

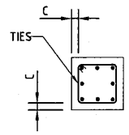
MINIMUM CONCRETE COVER



SLAB OR WALL

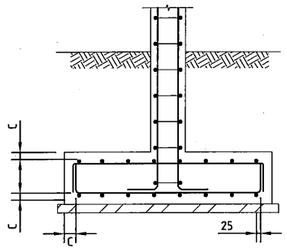


GIRDER OR BEAM

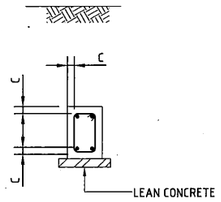


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

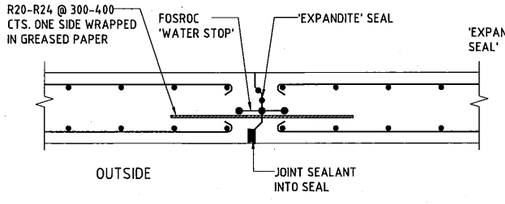
THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc - 75mm
- OTHER STRUCTURE - 65mm

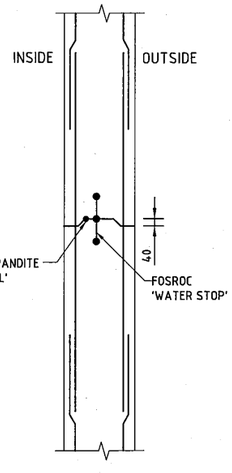
THE REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

a) CONCRETE PIPES
   - AS PER MANUFACTURER'S STANDARD.
b) FIREPROOFING (WITH GALVANISED WIRE MESH)
c) DITCH LINING/ SLOPE PROTECTION
d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

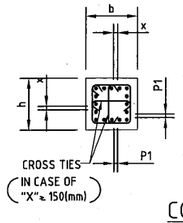


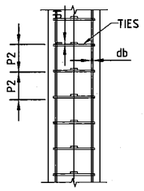
RECTANGULAR STRUCTURES



TYPICAL EXPANSION JOINT DETAIL FOR CIRCULAR LIQUID RETAINING STRUCTURE

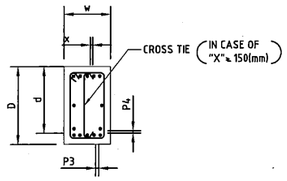
COLUMN

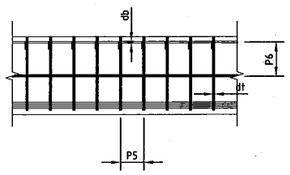




P1 ≥ hagg x 4/3 (mm)
1.5db,
40 (mm)
WHICHEVER IS GREATER

P2 ≤ 15 db or 300(mm) or SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN WHICHEVER IS SMALLER





P3 ≥ hagg x 4/3 (mm)
db
WHICHEVER IS GREATER
hagg = 20(mm)

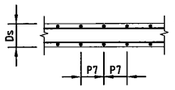
P4 ≥ 25(mm)

P5 ≤ D/2 or 300mm WHICHEVER IS SMALLER

P6 ≤ 300(mm)

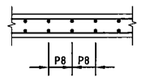
GIRDER AND BEAM

PRIMARY REINFORCEMENT



P7 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SECONDARY REINFORCEMENT



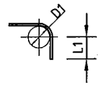
P8 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SLAB

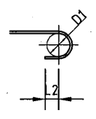
STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT

90° HOOK OR BEND



180° HOOK

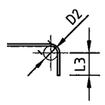


(mm)

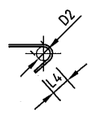
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2
N12	60	120	70
N16	80	135	70
N20	100	160	80
N24	120	195	100
N28	140	225	115
N32	160	260	130
N36	180	290	145
N40	200	320	160

FOR TIES AND STIRRUPS REINFORCEMENT

90° HOOK



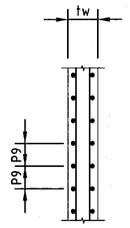
135° HOOK



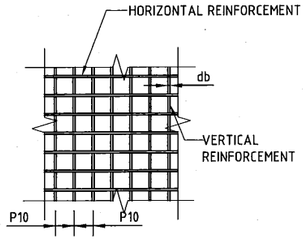
(mm)

BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
N10	40	135	100
N12	50	160	120

SPACING LIMITS



P9 ≤ 350(mm)
≤ 2.5tw
≤ 4db



P10 ≤ 350(mm)
≤ 2.5tw
≤ 4db

WALL

NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTAL REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. PGLN-YK-CSZZZ-900100.

2. LEGEND
   hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
   d : EFFECTIVE DEPTH
   db : SIZE OF LONGITUDINAL BARS (mm)
   N : BAR SYMBOL
   dt : SIZE OF TIES
   s : SPACING
   D : BEAM HEIGHT
   w : BEAM WIDTH
   b,h : COLUMN SECTION
   tw : THICKNESS OF WALL

3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
- -15db
- -SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
- -300mm

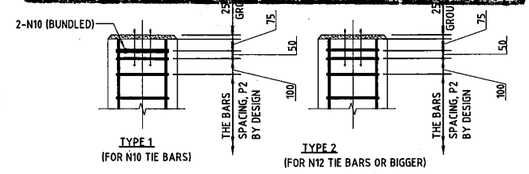
WHICHEVER IS SMALLER

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
- -D/2
- -15db
- -300mm

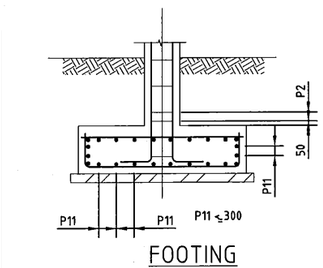
WHICHEVER IS SMALLER

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

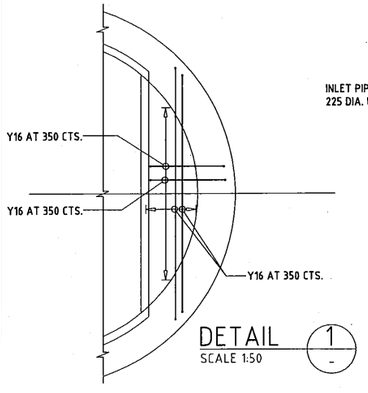
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



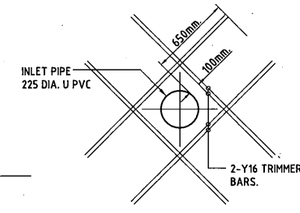
STIRRUP DETAIL FOR TOP OF PEDESTAL



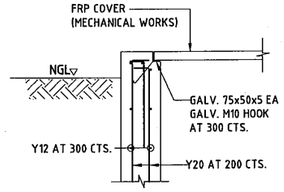
FOOTING



DETAIL 1 / - SCALE 1:50



TYP. DETAIL
SCALE 1:50



DETAIL 2 / - SCALE 1:50

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila STP. ELECTRICAL SUB STATION - STRUCTURAL NOTES SHEET 2 OF 2	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN	NOTES :	APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.
			CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001a

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	LJS	ISSUE FOR TENDER	CM

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
SF1	400 DP x 600 WD	R10-300 CTS	4-Y16 T&B	RC STRIP FOOTING
EB1	300 DP x 200 WD	R10-300 CTS	1-Y12 T&B	RC EDGE BEAM
TH	300 DP x 400 WD	3-Y16 T&B	Y12 STIRRUPS AT 300 CTS	THICKENING
RF1	150 x 50 HWD			TIMBER RAFTER
RB1	200 x 75 HWD			TIMBER BEAM
RP1	75 x 50 HWD			TIMBER PURLIN
rb	PRYDA STRAP BRACING			ROOF BRACING
fr	50 x 50 x 5 SHS			STEEL FRAME

NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT
   LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE 200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMUM DEPTH OF 1000mm TYP. FROM NGL.
   UNLESS HARD ROCK ENCOUNTED BEFORE THAT IN WHICH FOOTING TO BE FOUNDED ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE VARIFIED ON SITE DURING EXCAVATION.
6. PRYDA STRAP BRACING TO BE INSTALLED IN STRICT ADHERENCE TO PRYDA SPECIFICATIONS.
7. AWNING PURLINS SHALL BE 50x50 HWD TIMBER AT 600mm CTS.

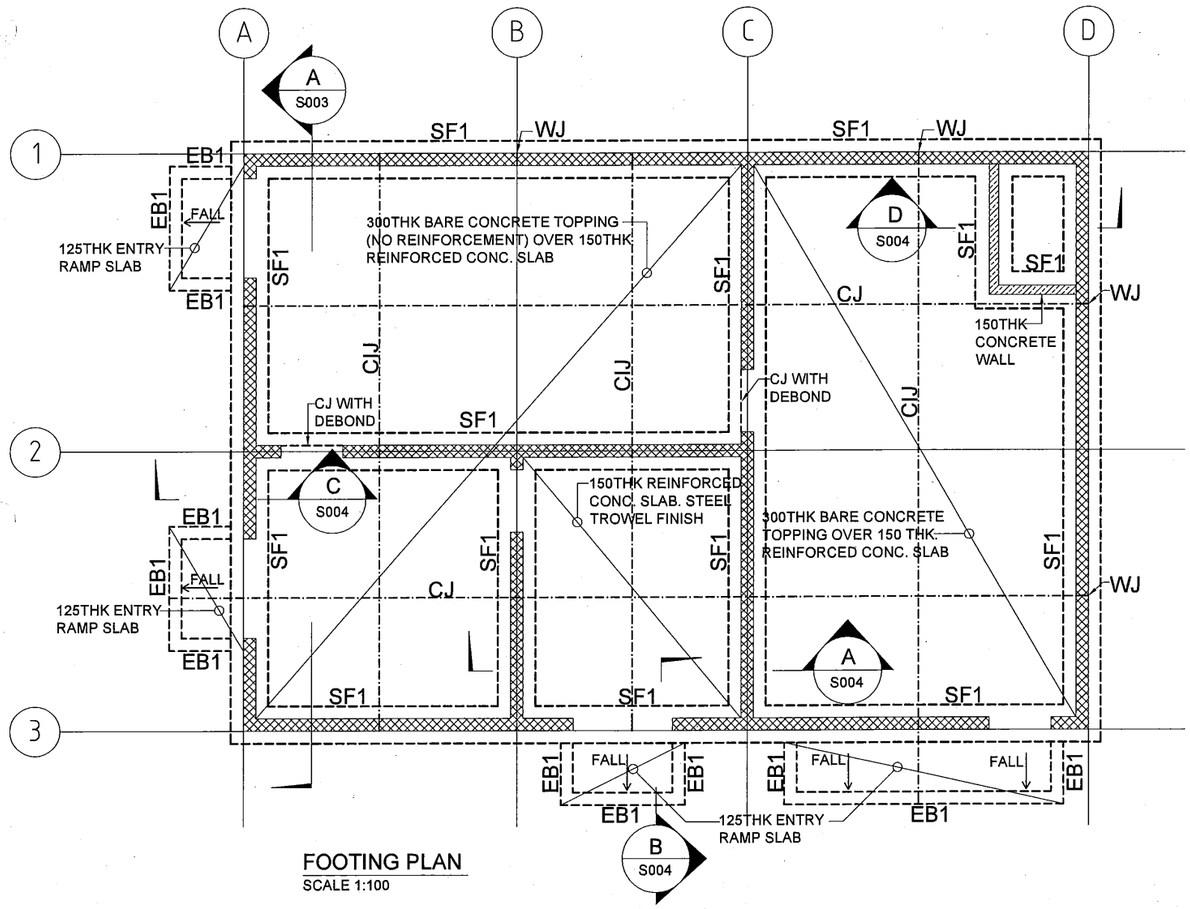
LEGEND:

- DENOTES LOAD BEARING BLOCKWALL
- DENOTES NON LOAD BEARING WALL
- DENOTES ARCHITECTURAL STUDWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

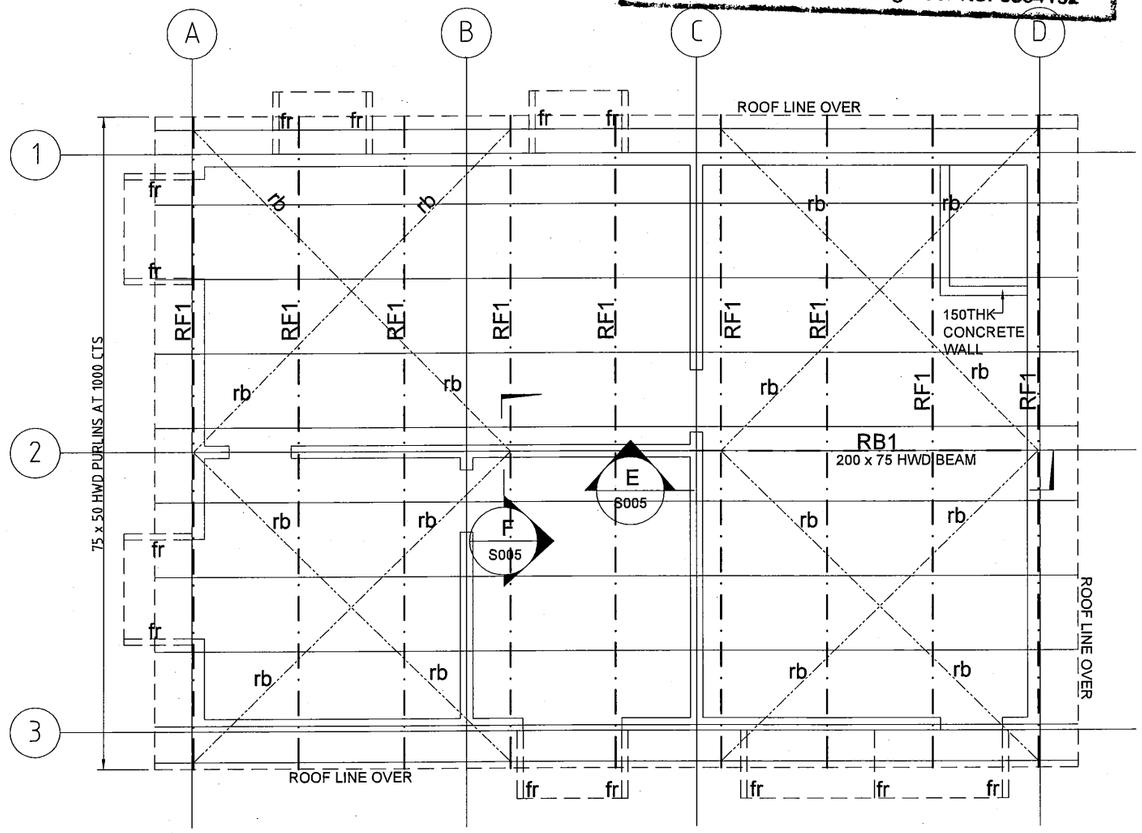
NGL - DENOTES NATURAL GROUND LEVEL
CIJ - DENOTES CRACK INDUCED JOINT
CJ - DENOTES CONSTRUCTION JOINT
WJ - DENOTES WALL JOINT

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



FOOTING PLAN
SCALE 1:100



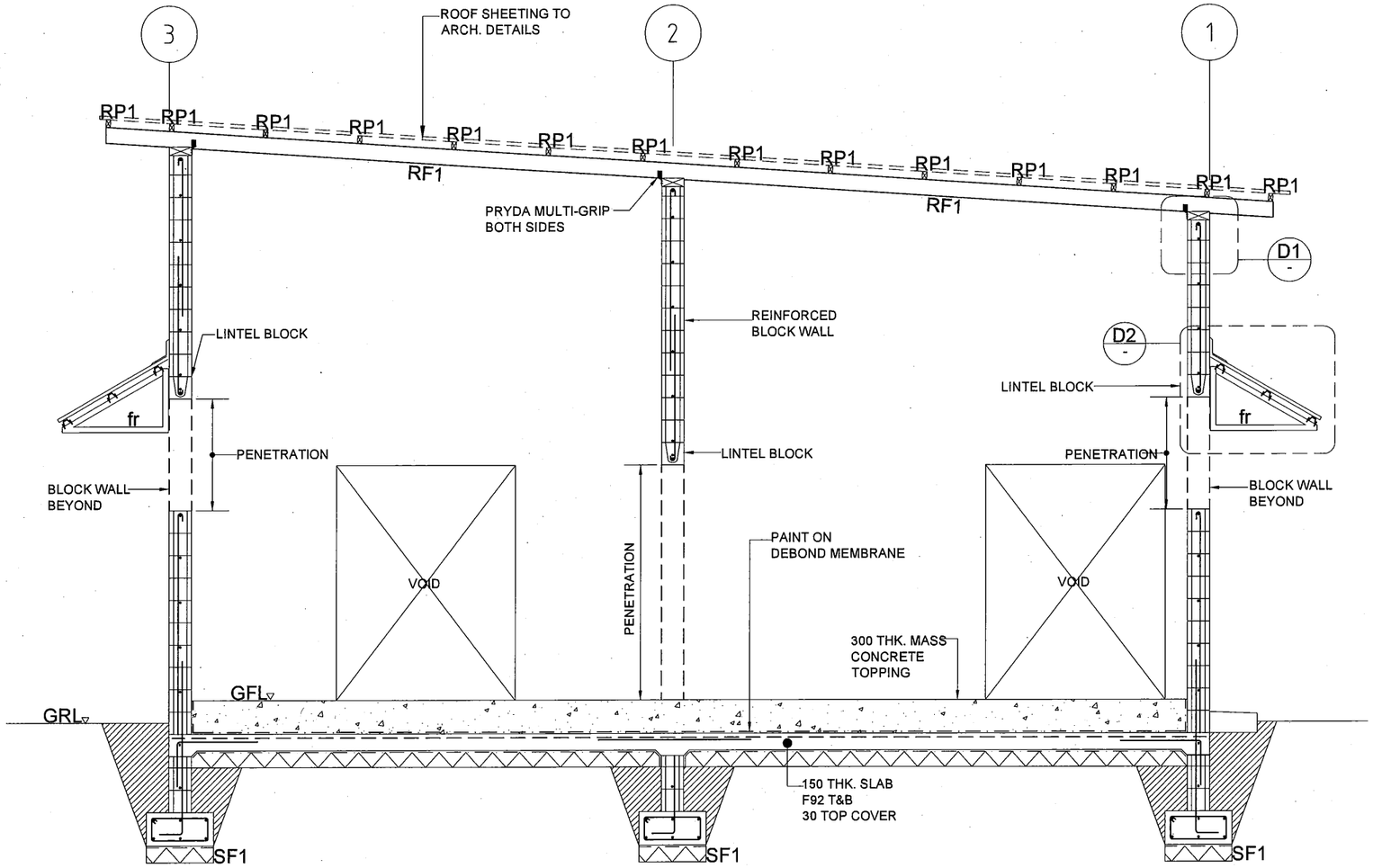
ROOF PLAN
SCALE 1:100

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. ELECTRICAL SUB-STATION FOOTING AND ROOF LAYOUT PLAN	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	APPROVED by PMU: Project Director Lot G.Zauya CHECKED by CONSULTANT Project Manager T.Fuji
			DATE: 1. Dec 2011 DATE: 1. Dec 2011
			SCALE: AS SHOWN DRAWING NO.: STP-S002

REVISIONS

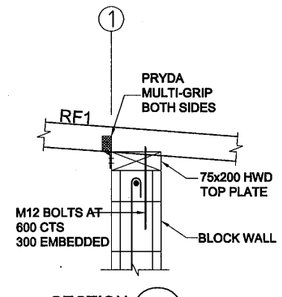
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM



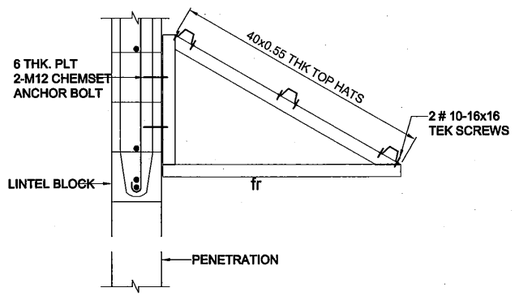
SECTION A
SCALE 1:50
S002

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REMARK
RF1	150 x 50 HWD	TIMBER RAFTER
RB1	200 x 75 HWD	TIMBER BEAM
RP1	75 x 50 HWD	TIMBER PURLIN
fr	50 x 50 x 5 SHS	STEEL FRAME
SF1	400 DP x 600 WD	RC STRIP FOOTING



SECTION D1
SCALE 1:20
-



SECTION D2
SCALE 1:20
-

NOTE:
300 THK. MASS CONCRETE SLAB TO INCLUDE SERVICES CONDUITS AND PLINTH TO SUPPORT MECHANICAL EQUIPMENT AS PER MECH. AND ELECT. DWGS.

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ELECTRICAL SUB-STATION CROSS SECTION A-A

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
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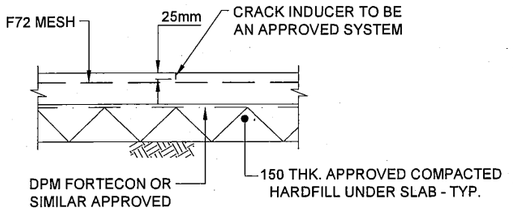
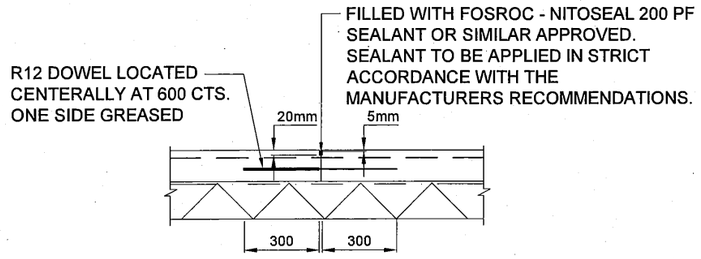
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S003



TYP. CRACK INDUCED JOINT (CIJ)

SCALE 1:25

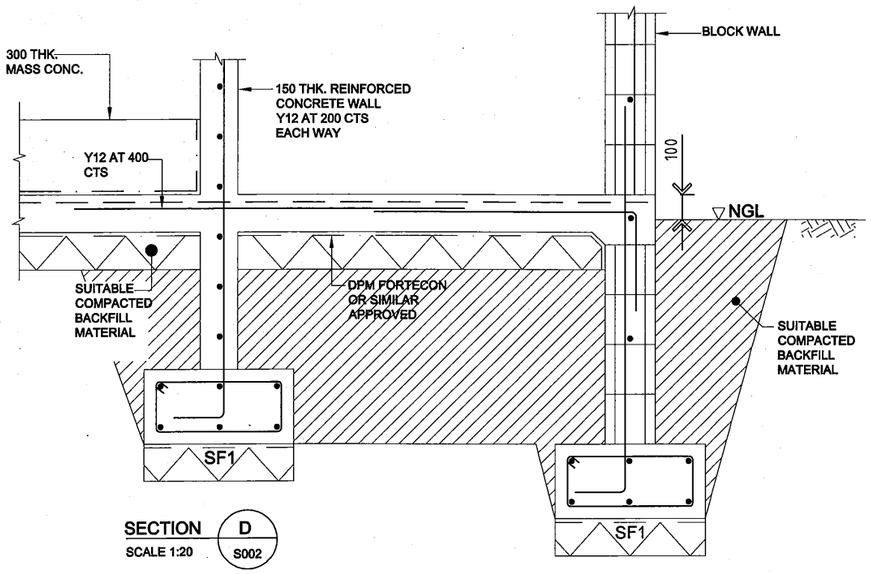


CONSTRUCTION JOINT (CJ)

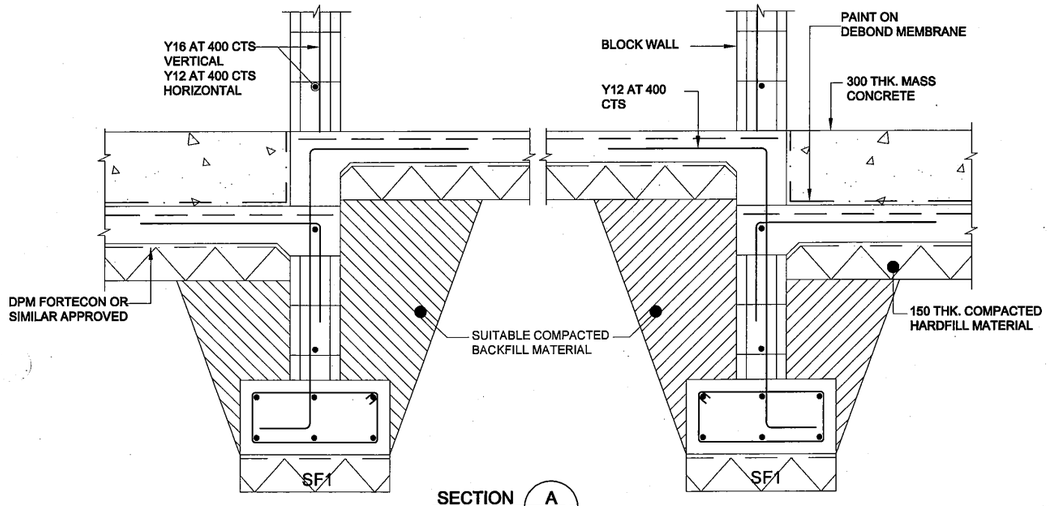
SCALE 1:25

NOTE:

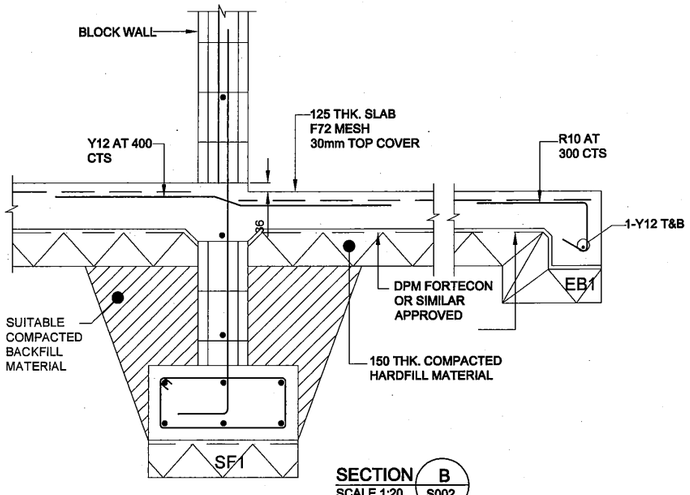
SJ SHALL BE INTRODUCED AS EARLY AS POSSIBLE WITHOUT DAMAGING OR DISFIGURING THE SURFACE AND EDGES OF CUT CONCRETE.



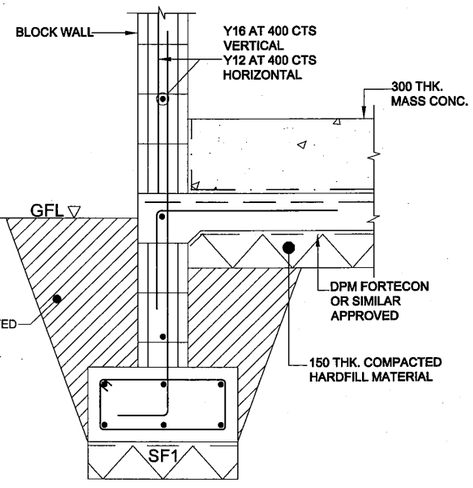
SECTION D / S002
SCALE 1:20



SECTION A / S002
SCALE 1:20



SECTION B / S002
SCALE 1:20



SECTION C / S002
SCALE 1:20

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ELECTRICAL SUB-STATION FOOTING AND BLOCKWORK DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

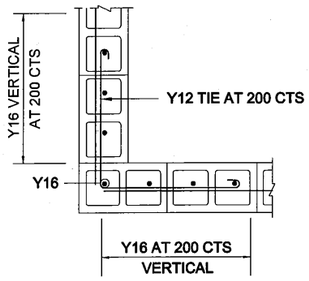
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S004

MEMBER SCHEDULE

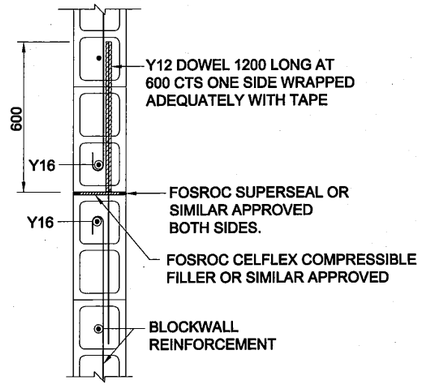
MARK	SIZE/DESCRIPTION	REMARK
RF1	150 x 50 HWD	TIMBER RAFTER
RB1	200 x 75 HWD	TIMBER BEAM
RP1	75 x 50 HWD	TIMBER PURLIN

MAX. ALLOWABLE SPANS FOR 200mm WIDE LINTELS

MAXIMUM LINTEL SPAN (mm)	LINTELS SUPPORTING		
	LIGHT ROOF OR WITHOUT CEILING	LIGHT ROOF, LIGHT TIMBER FRAMED WALL & TIMBER FLOOR	LIGHT FLOOR, MANSORY WALL & TIMBER FLOOR
1000	B1	B1	B2
1600	B1	B3	B3
2000	B2	B3	B4
2600	B3	B4	B5
3000	B3	B5	B5
3600	B3	B5	-

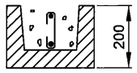


TYP. WALL CORNER DETAIL
SCALE 1:25

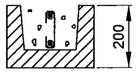


TYP. WALL JOINT DETAIL (WJ)
SCALE 1:25

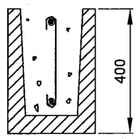
TYPICAL BLOCKWALL DETAILS



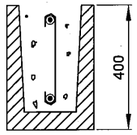
TYPE B1
2-Y12 WITH R10 @ 150 CTS FOR



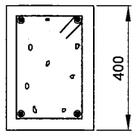
TYPE B2
2-Y16 WITH R10 @ 150 CTS FOR LINTELS AND 300 CTS FOR BOND BEAMS



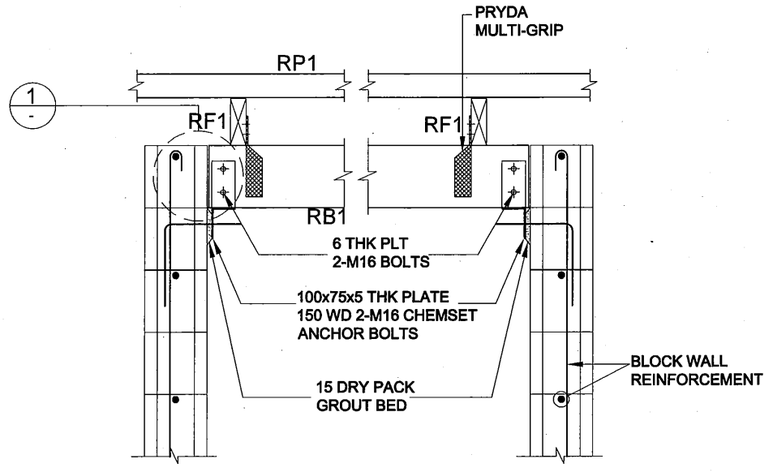
TYPE B3
2-Y16 WITH R10 @ 150 CTS.



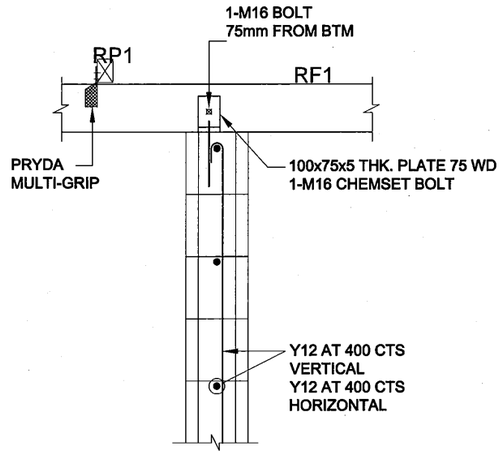
TYPE B4
2-Y20 WITH R10 @ 150 CTS.



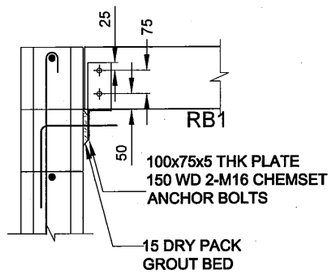
TYPE B5-RC
4-Y16 WITH R10 @ 150 CTS.



SECTION E
SCALE 1:20 S002



SECTION F
SCALE 1:20 S002



DETAIL 1
SCALE 1:20 -

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guines

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ELECTRICAL SUB-STATION BLOCKWALL AND ROOF DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S005

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.

2) Cerificates and results of any tests already carried out.

3) Details of tests to be carried out both on and off site.

4) Location of any testing to be carried out off site.

5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 25m/sec
Terrain Category 3

2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982 Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS : 75mm
PEDESTAL : 75mm
GROUND SLABS : 30mm TOP
SUSPENDED SLABS : 30mm TOP
BEAMS : 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS : 75mm IN GROUND, 65mm ABOVE GROUND
SHEARWALLS : 75mm IN GROUND, 65mm ABOVE GROUND

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 2305 to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Foundations	40	0.55
Ground & Suspended Slabs	32	0.55
Beams Concrete	32	0.55
Columns	32	0.55

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

C20 Control Joints in the ground floor slab shall be provided at 6m centres U.N.O.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B9 Grout for corefilling shall comply with AS 1475, Part 1, Section 2. Characteristic compressive strength F'c = 15 MPa Slump 225. Batching by volume is not permitted.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD: 0.9 kPa

LIVE LOAD: 0.25 kPa

UPPER FLOOR LEVEL

DEAD LOAD: 4.7 kPa

LIVE LOAD:
- TOILETS 2.0 kPa
- KITCHEN 2.0 kPa
- STORAGE 5.2 kPa
- STAIRS 4.0 kPa

GROUND FLOOR LEVEL

DEAD LOAD: 4.7 kPa

LIVE LOAD:
- TOILETS 2.0 kPa
- STORAGE 5.2 kPa
- STAIRS 4.0 kPa
- KITCHEN 2.0 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - STRUCTURAL NOTES SHEETS 1 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

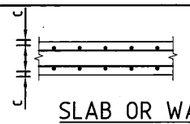
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

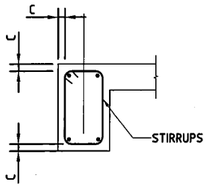
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001

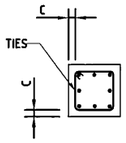
MINIMUM CONCRETE COVER



SLAB OR WALL

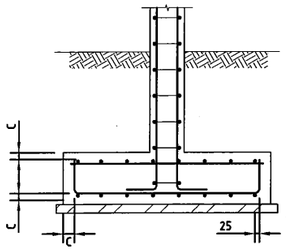


GIRDER OR BEAM

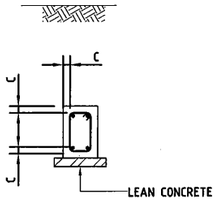


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

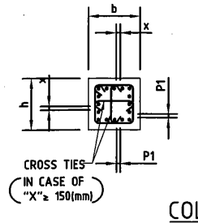
- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc - 75mm
- OTHER STRUCTURE - 65mm

REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

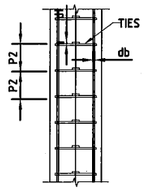
a) CONCRETE PIPES
 - AS PER MANUFACTURER'S STANDARD.
b) FIREPROOFING (WITH GALVANISED WIRE MESH)
c) DITCH LINING/ SLOPE PROTECTION
d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

SPACING LIMITS

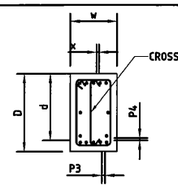


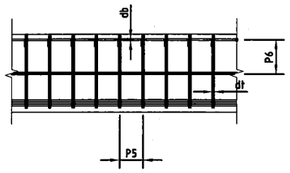
COLUMN



P1 ≥ hagg x 4/3 (mm)
1.5db,
40 (mm)
WHICHEVER IS GREATER

P2 ≤ 15 db or 300(mm) or
SMALLEST CROSS SECTIONAL
DIMENSION OF COLUMN
WHICHEVER IS SMALLER





P3 ≥ hagg x 4/3 (mm)
db
WHICHEVER IS GREATER
hagg = 20(mm)

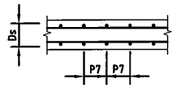
P4 ≥ 25(mm)

P5 ≤ D/2 or 300mm
WHICHEVER IS SMALLER

P6 ≤ 300(mm)

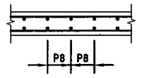
GIRDER AND BEAM

PRIMARY REINFORCEMENT



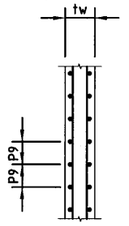
P7 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

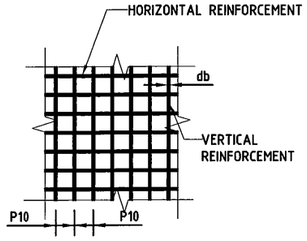
SECONDARY REINFORCEMENT



P8 ≤ 2Ds or 300 (mm)
WHICHEVER IS SMALLER

SLAB





P9 ≤ 350(mm)
≤ 2.5tw
≤ 4db

P10 ≤ 350(mm)
≤ 2.5tw
≤ 4db

WALL

NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

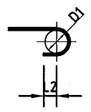
FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTAL REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT				FOR TIES AND STIRRUPS REINFORCEMENT			
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2	BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
				N10	40	135	100
N12	60	120	70	N12	50	160	120
N16	80	135	70				
N20	100	160	80				
N24	120	195	100				
N28	140	225	115				
N32	160	260	130				
N36	180	290	145				
N40	200	320	160				

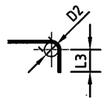
90° HOOK OR BEND

180° HOOK



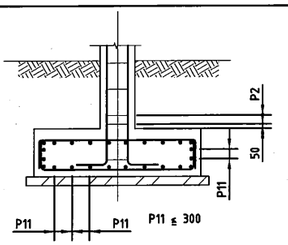
(mm)

90° HOOK

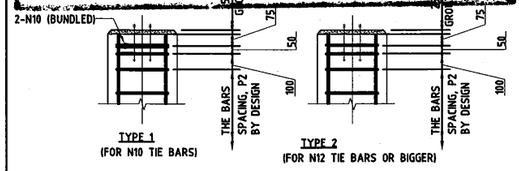


135° HOOK

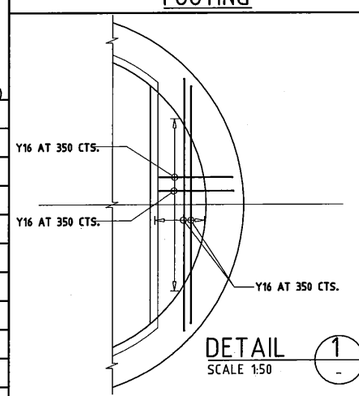
(mm)



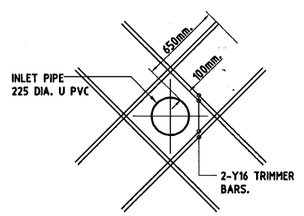
FOOTING



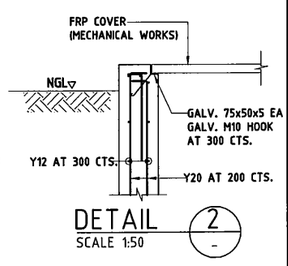
STIRRUP DETAIL FOR TOP OF PEDESTAL



DETAIL 1
SCALE 1:50



TYP. DETAIL
SCALE 1:50



DETAIL 2
SCALE 1:50

TENDER ISSUE

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. PGLN-YK-CSZZZ-900100.

2. LEGEND
 hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
 d : EFFECTIVE DEPTH
 db : SIZE OF LONGITUDINAL BARS (mm)
 N : BAR SYMBOL
 dt : SIZE OF TIES
 s : SPACING
 D : BEAM HEIGHT
 w : BEAM WIDTH
 b,h : COLUMN SECTION
 tw : THICKNESS OF WALL

3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
 -15db
 -SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
 -300mm
 } WHICHEVER IS SMALLER

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
 -D/2
 -15db
 } WHICHEVER IS SMALLER

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. ADMINISTRATION BUILDING - STRUCTURAL NOTES SHEETS 2 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001a

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
C1	400 x 400	8-Y24	Y12-200 CTS.	RC COLUMN
C2	100 x 5 CHS			STEEL COLUMN
PF1	400 DP x 1800 x 1800	7-Y20 T&B	7-Y20 T&B	RC PAD FOOTING
PF2	800 DP x 400 x 400	3-Y12 T&B	3-Y12 T&B	RC PAD FOOTING
SF1	400 DP x 1000 WD	6-Y16 T&B	Y12-300 CTS.	RC STRIP FOOTING
TB1	400 DP x 400 WD	2-Y20 T&B	Y12-250 CTS.	RC TIE BEAM
EB1	300 DP x 250 WD	2-Y16 T&B	Y12-300 CTS.	EDGE BEAM
TH	300 DP x 400 WD	2-Y16	R10-300 CTS.	THICKENING

NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT
   LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE 200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMUM DEPTH OF 1000mm TYP. FROM NGL. UNLESS HARD ROCK ENCOUNTED BEFORE THAT IN WHICH FOOTING TO BE FOUNDED ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE VARIFIED ON SITE DURING EXCAVATION.
6. U.N.O. ALL INTERNAL WALL SHALL BE STUD TO ARCH. DETAILS.
7. U.N.O. BLOCKWALL REINFORCEMENT NON LOAD BEARING:
   VERTICAL -Y12-400 CTS
   HORIZONTAL -Y12-400 CTS
8. U.N.O. ALL INTERNAL WALL SHALL BE STUD TO ARCH. DETAILS.
9. THE THICKNESS OF THE SHALLOW DRAIN SHALL BE 200mm FOR BOTH BASE AND WALL.
10. ENTRY CANOPY PURLINS SHALL BE 75 x 50 HWD. AT 600 CTS.

LEGEND:

- DENOTES LOAD BEARING BLOCKWALL
- DENOTES NON LOAD BEARING WALL
- DENOTES ARCHITECTURAL STUDWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

NGL - DENOTES NATURAL GROUND LEVEL
CIJ - DENOTES CRACK INDUCED JOINT
CJ - DENOTES CONSTRUCTION JOINT
WJ - DENOTES WALL JOINT
EW - DENOTES EACH WAY
TT - DENOTES TOP-TOP
BB - DENOTES BOTTOM- BOTTOM
TB - DENOTES TOP OF BOTTOM
BT - DENOTES BOTTOM OF TOP

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

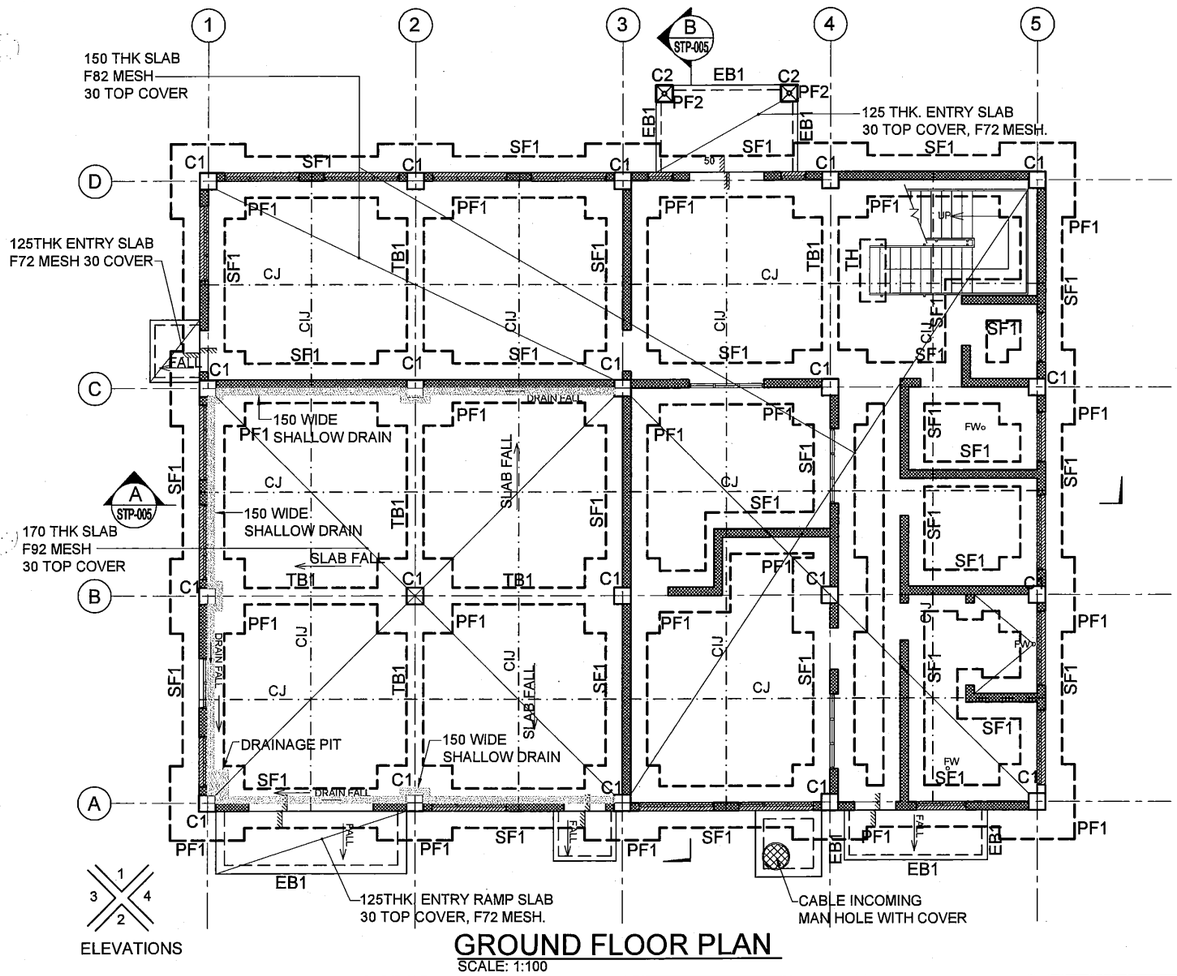
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
C1	400 x 400 SQR	8-Y24	Y12-200 CTS.	RC COLUMN
C2	100 x 5 CHS			STEEL COLUMN
CFB1	500 DP x 400 WD	REFER SHT. STP-006		RC FLOOR BEAM
CFB2	500 DP x 400 WD	REFER SHT. STP-006		RC FLOOR BEAM
CFB3	360 UB 45			STEEL HOIST BEAM
CFB4	150 x 75 HWD			TIMBER BEAM
CFB5	300 DP x 400 WD			RC FLOOR BEAM
TR2	TRUSS ELEVATION	REFER SHT. STP-003		TIMBER TRUSS
TR3	TRUSS ELEVATION	REFER SHT. STP-003		TIMBER TRUSS

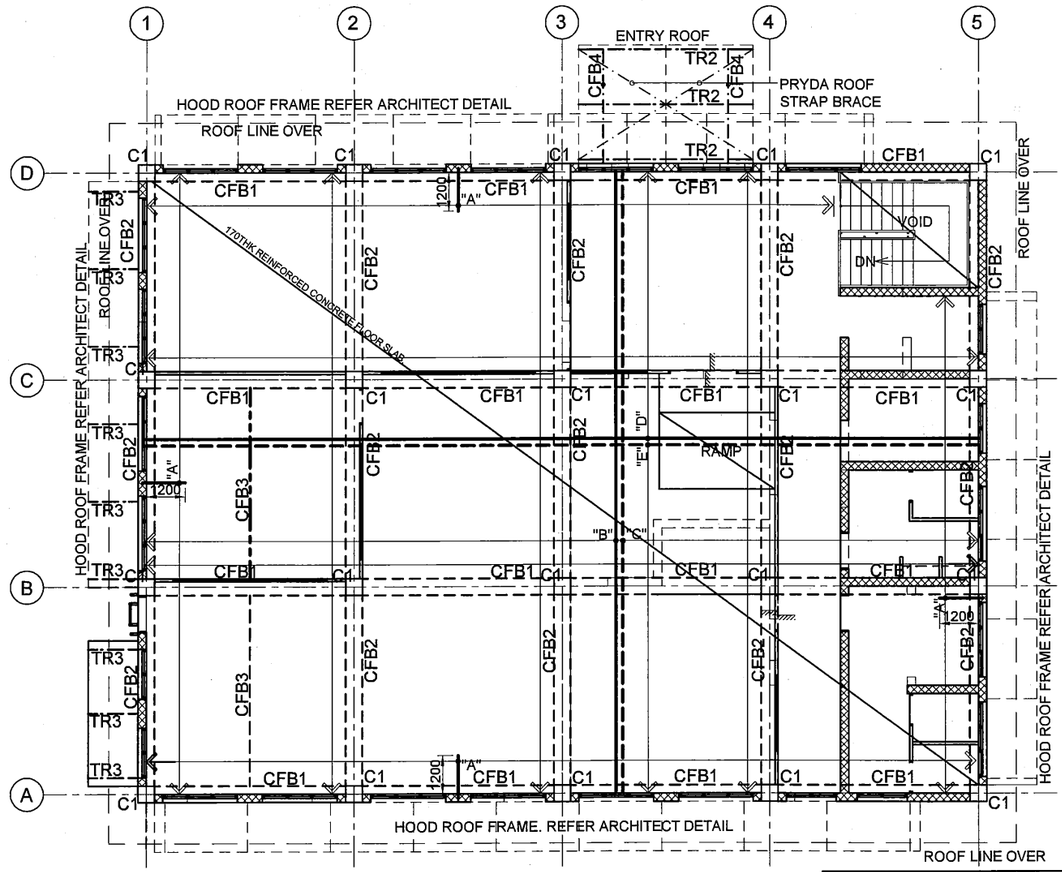
SLAB REINFORCEMENT SCHEDULE

BAR	MARK	REINFORCEMENT	REMARKS
	A	Y16 - 200 CTS.	STARTER BARS (TOP)
	B	Y12 - 200 CTS.	TT
	C	Y16 - 300 CTS.	BB
	D	Y12 - 200 CTS.	TB
	E	Y12- 300 CTS.	BT



GROUND FLOOR PLAN

SCALE: 1:100



UPPER FLOOR PLAN

SCALE: 1:100

NOTE:
LAPS IN TOP AND BOTTOM REBAR SHALL BE LOCATED AT ¼ OF THE SPAN.

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - GROUND FLOOR & UPPER FLOOR PLANS

CLIENT:
INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

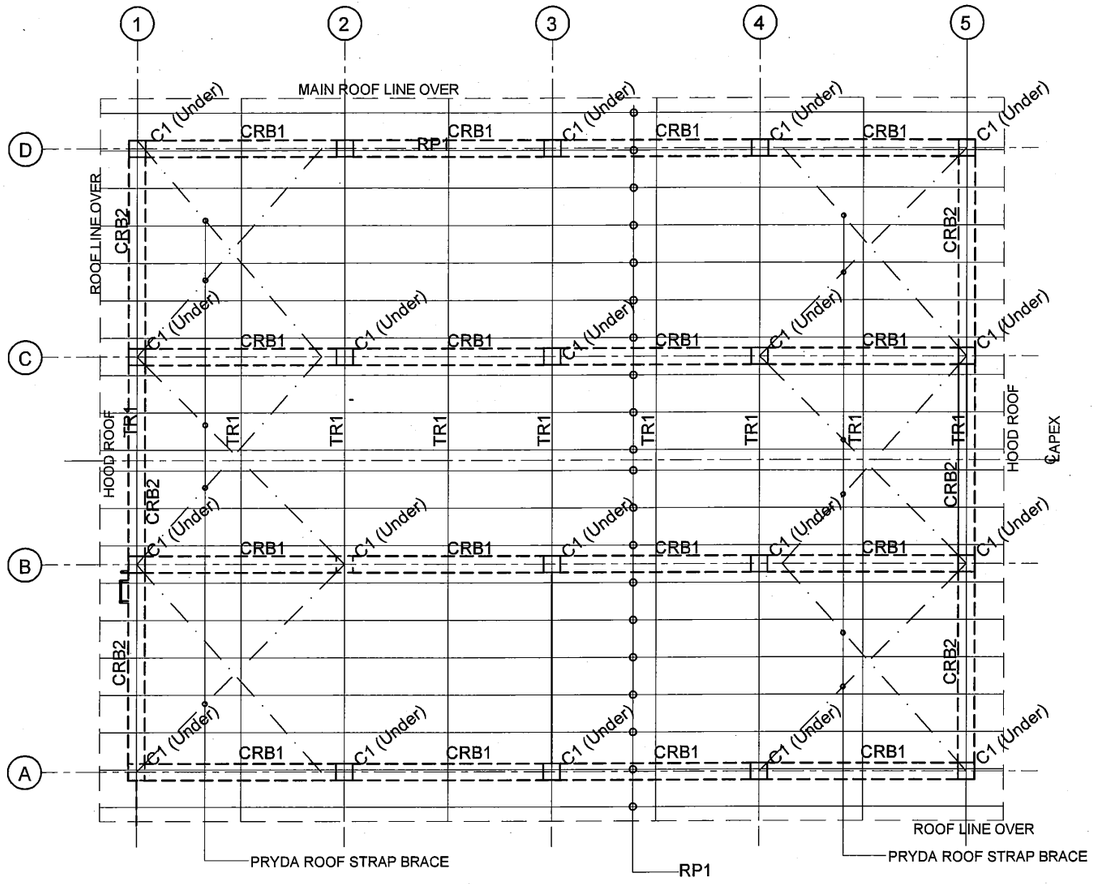
NOTES:

REVISIONS

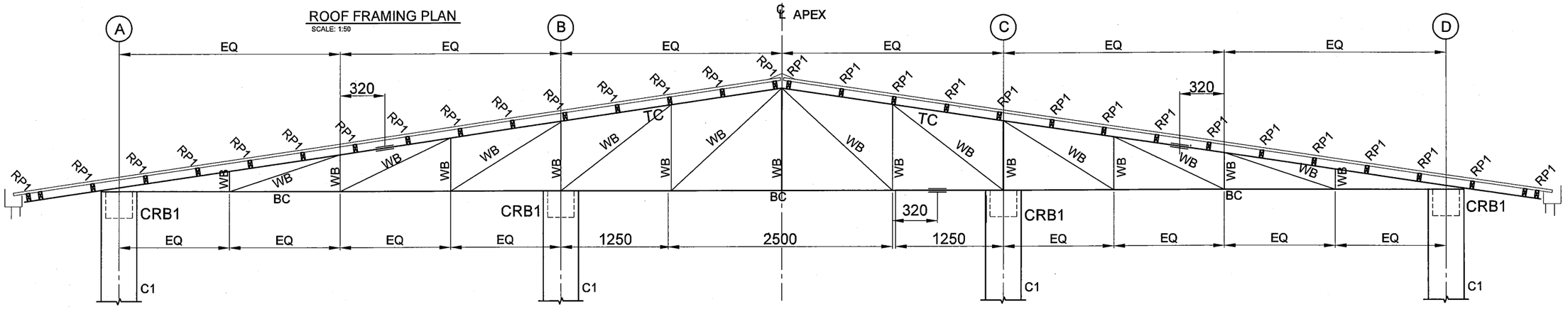
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S002



ROOF FRAMING PLAN
SCALE: 1:50



TYPICAL ROOF TRUSS DETAIL (TR1)
SCALE: 1:50

SCHEDULE		
MARK	SIZE	REMARKS
C1	400 x 400 SQR.	RC. COLUMN
CRB1	300 DP x 300 WD	RC.ROOF BEAM
CRB2	300 DP x 300 WD	RC.ROOF BEAM
TR1	TIMBER TRUSS @ 1250 CTS.	SEE TYP.TRUSS DETAIL
RP1	100 x 75 HWD. @ 600 CTS.	TIMBER ROOF PURLINS
TC	150 x 75 HWD	TRUSS TOP CHORD
BC	150 x 75 HWD.	TRUSS BTM CHORD
WB	100 x 75 HWD.	TRUSS DIAGONAL WEB

NOTES:

1. STRUCTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.
2. BUILDER TO CONFIRM ALL SPAN LENGTHS & PITCHES ETC, PRIOR TO FABRICATION
3. RP1. FIXING TO BE NAIL FIXED TO TOP CHORD
4. ROOF BRACING SHALL BE PRYDA STRAP BRACING INSTALLED ACCORDING TO PRYDA SPECIFICATION.

LEGEND:

BEAM/TRUSS — DENOTES SPLICE JOINT

SPLICE

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - ROOF PLAN & TRUSS ELEVETION

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

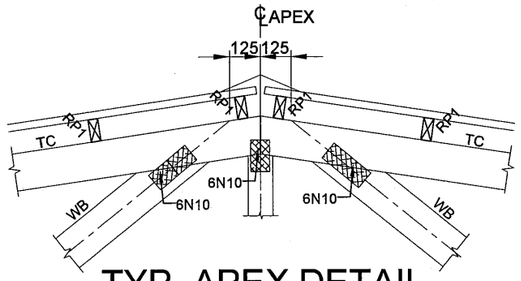
CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

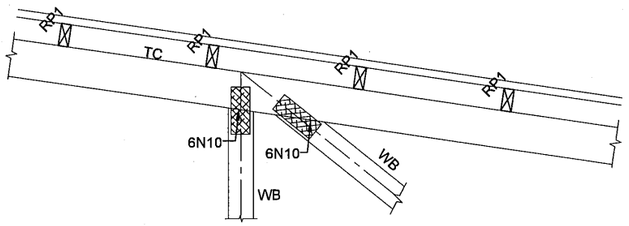
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: 1:50

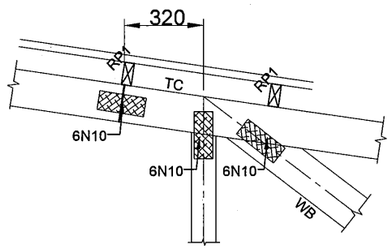
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S003



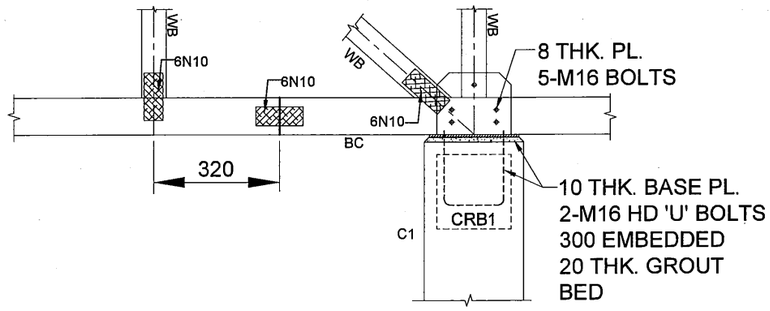
TYP. APEX DETAIL
SCALE: 1:25



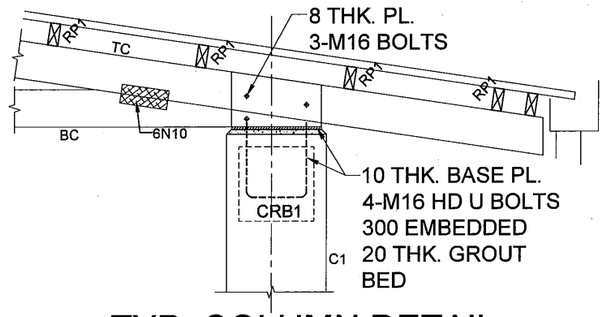
TYP. TC & WB DETAIL
SCALE: 1:25



TYP. TC-SPLICE DETAIL
SCALE: 1:25



TYP. BC-SPLICE DETAIL
SCALE: 1:25



TYP. COLUMN DETAIL
SCALE: 1:25

SCHEDULE		
MARK	SIZE	REMARKS
C1	400 x 400 SQR.	RC. COLUMN
CRB1	300 DP x 300 WD	RC.ROOF BEAM
CRB2	300 DP x 300 WD	RC.ROOF BEAM
TR1	TIMBER TRUSS @ 1250 CTS.	SEE TYP.TRUSS DETAIL
RP1	100 x 75 HWD. @ 600 CTS.	TIMBER ROOF PURLINS
TC	150 x 75 HWD	TRUSS TOP CHORD
BC	150 x 75 HWD.	TRUSS BTM CHORD
WB	100 x 75 HWD.	TRUSS DIAGONAL WEB

NOTES:

1. STRUCTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.
2. BUILDER TO CONFIRM ALL SPAN LENGTHS & PITCHES ETC, PRIOR TO FABRICATION
3. RP1. FIXING TO BE NAIL FIXED TO TOP CHORD
4. ROOF BRACING SHALL BE PRYDA STRAP BRACING INSTALLED ACCORDING TO PRYDA SPECIFICATION.

LEGEND:

BEAM/TRUSS
SPLICE — DENOTES SPLICE JOINT

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - TRUSS DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

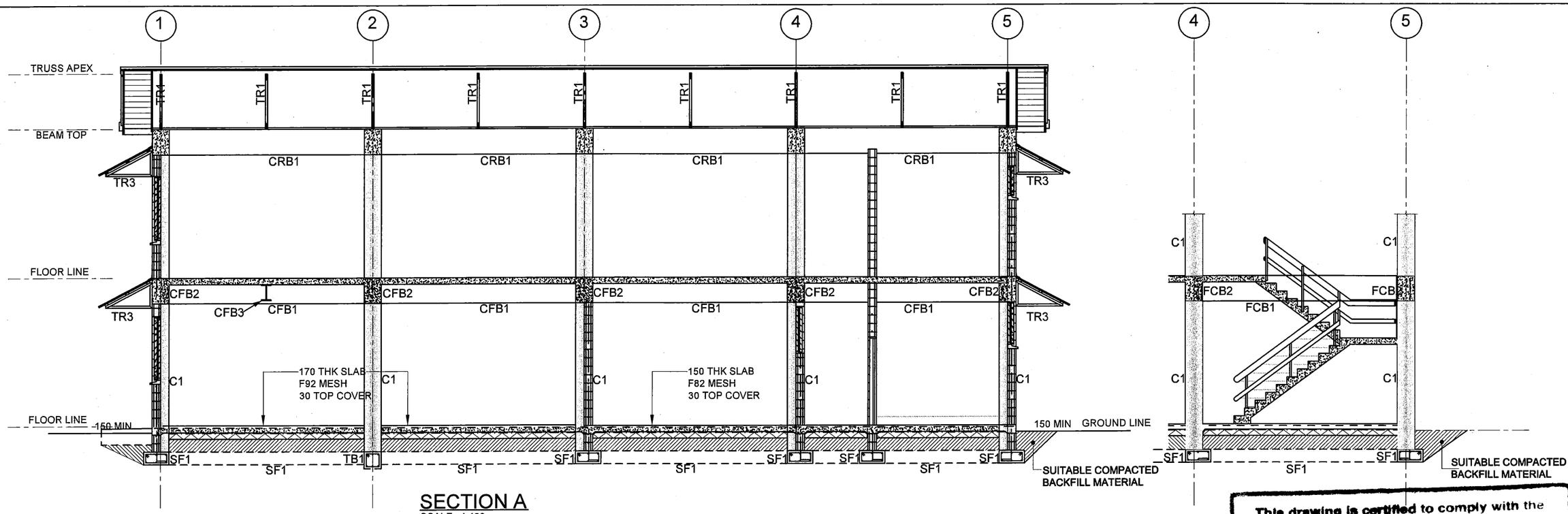
CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

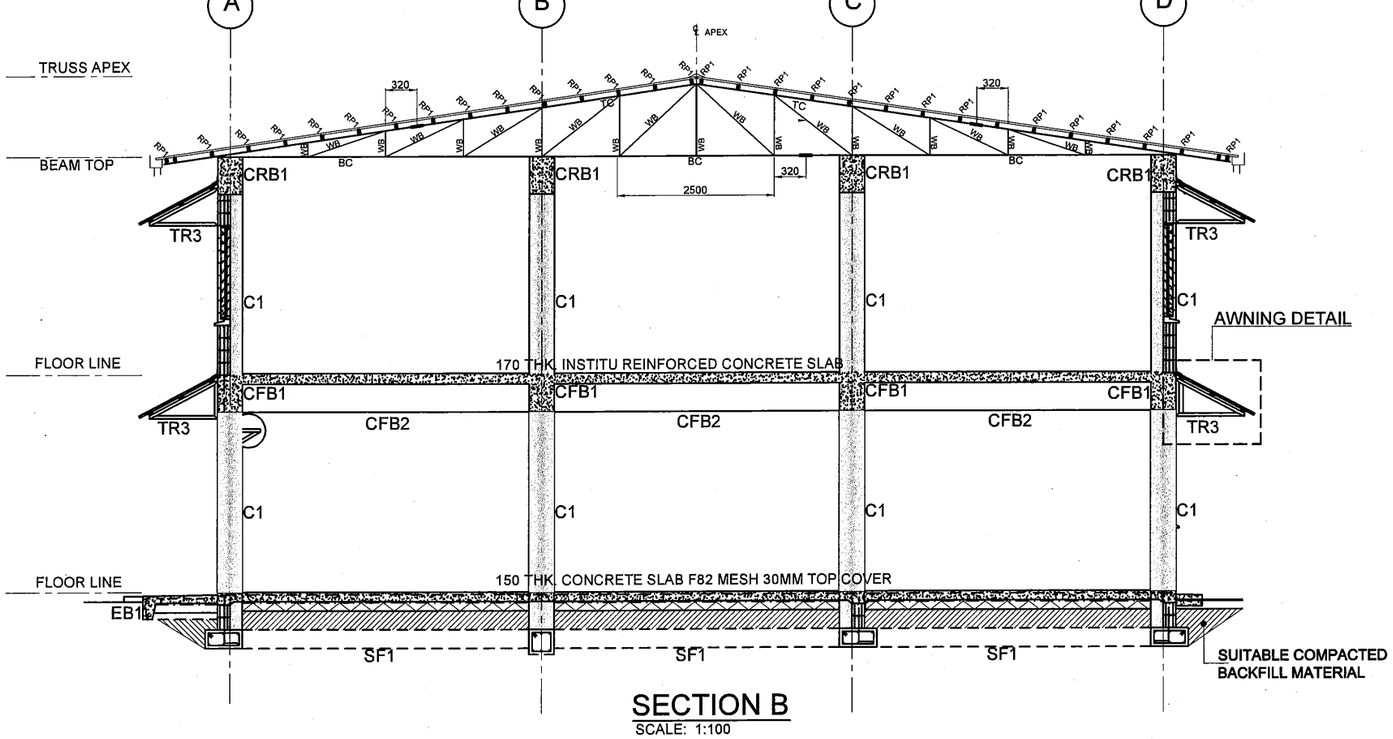
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: 1:25

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S004



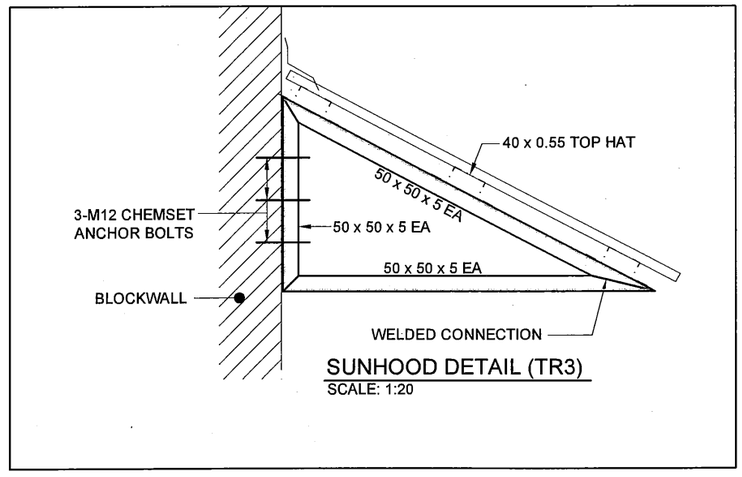
SECTION A
SCALE: 1:100



SECTION B
SCALE: 1:100

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



SUNHOOD DETAIL (TR3)
SCALE: 1:20

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - BUILDING SECTIONS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

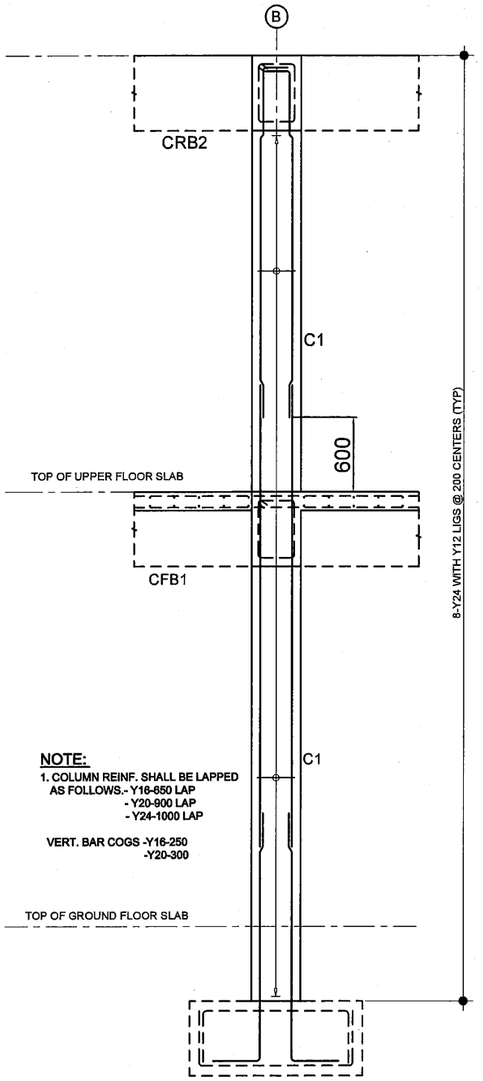
CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S005



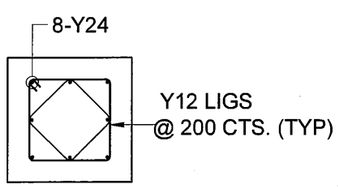
NOTE:

1. COLUMN REINF. SHALL BE LAPPED AS FOLLOWS.- Y16-650 LAP
   - Y20-900 LAP
   - Y24-1000 LAP

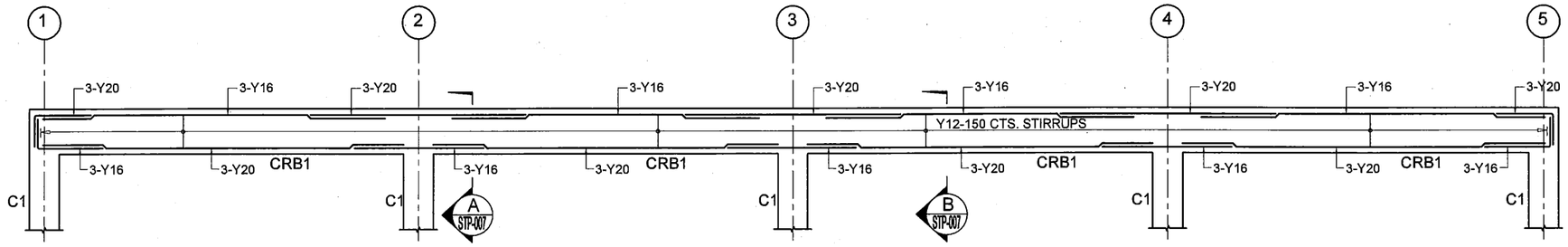
VERT. BAR COGS -Y16-250
-Y20-300

COLUMN C1. ELEVATION

SCALE: 1:50



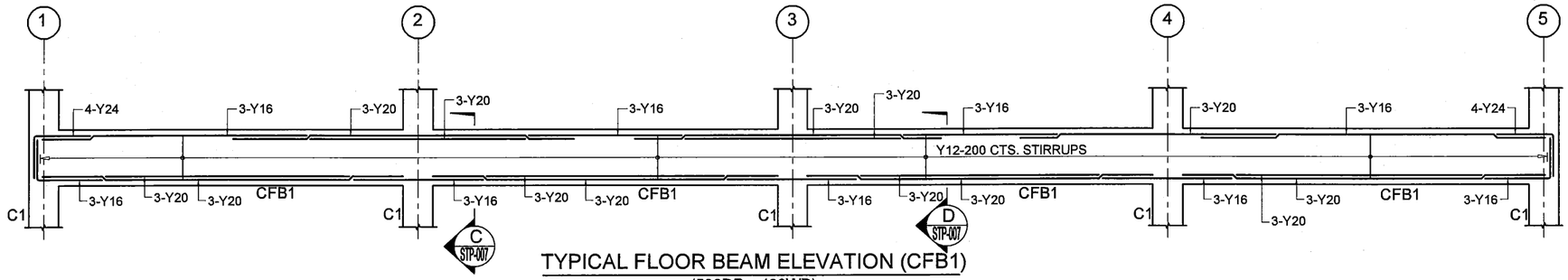
C1 - 400 x 400
SCALE: 1:20



TYPICAL ROOF BEAM ELEVATION (CRB1)

SCALE: 1:75

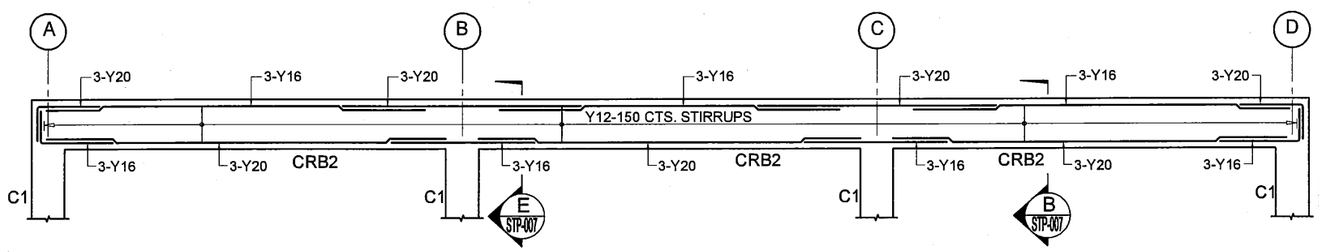
(300DP x 300WD)



TYPICAL FLOOR BEAM ELEVATION (CFB1)

SCALE: 1:75

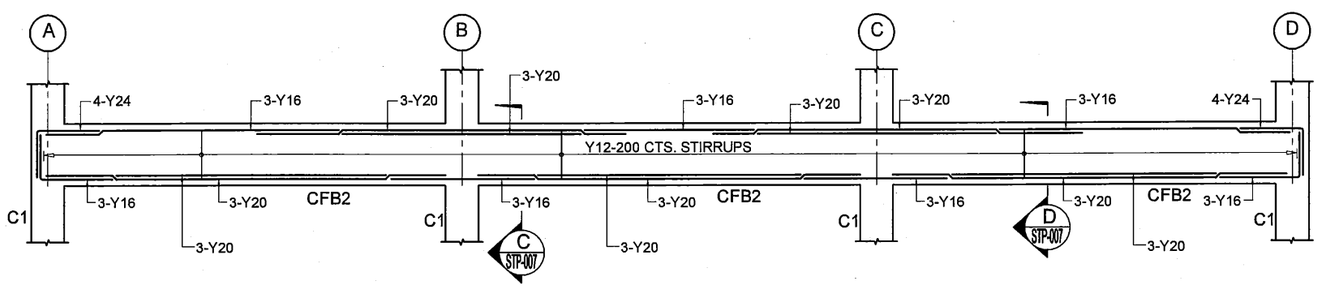
(500DP x 400WD)



TYPICAL ROOF BEAM ELEVATION (CRB2)

SCALE: 1:75

(300DP x 300WD)



TYPICAL FLOOR BEAM ELEVATION (CFB2)

SCALE: 1:75

(500DP x 400WD)

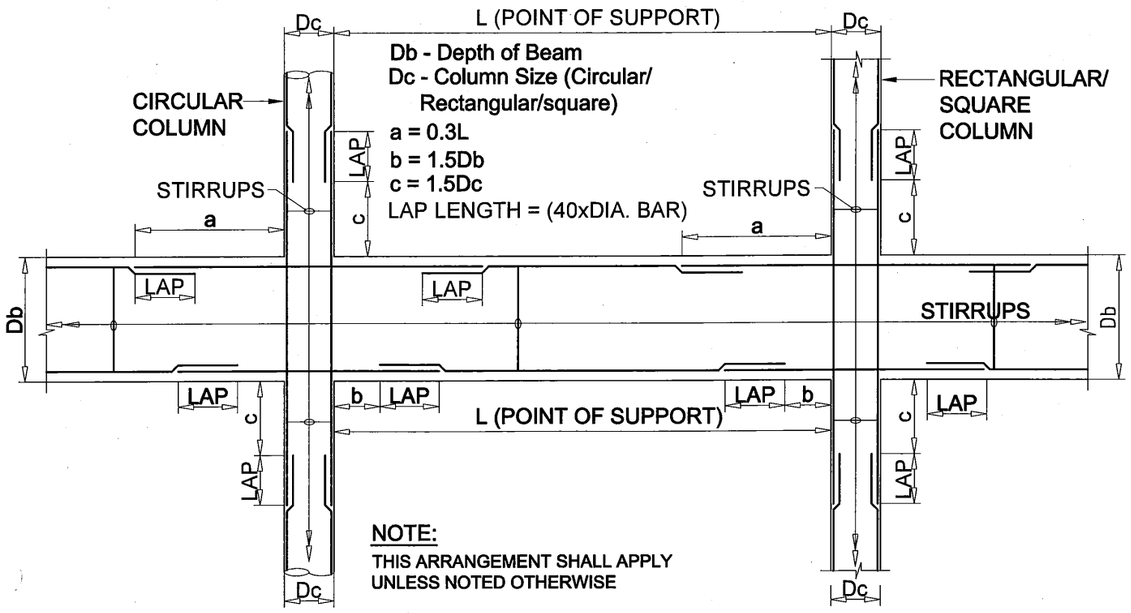
This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

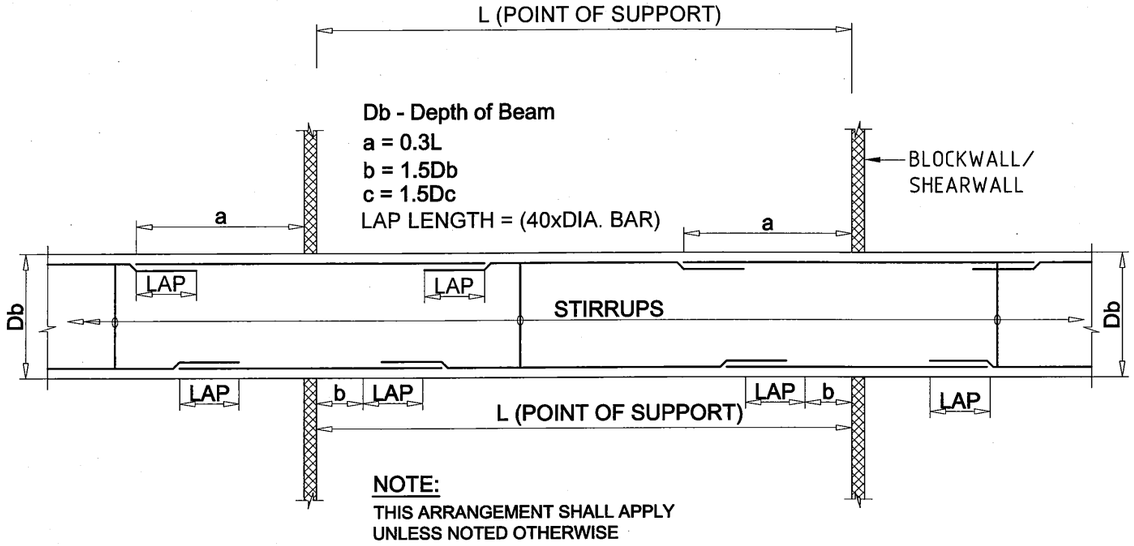
TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)		TITLE: KilaKila SPT. ADMINISTRATION BUILDING - BEAM/COLUMN ELEVATIONS	
CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN	NOTES:	APPROVED by PMU: Project Director Lot G.Zauya DATE: 1. Dec 2011 SCALE: AS SHOWN CHECKED by CONSULTANT Project Manager T.Fuji DATE: 1. Dec 2011 DRAWING NO.: STP - S006

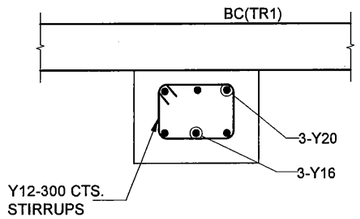
REVISIONS					
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM



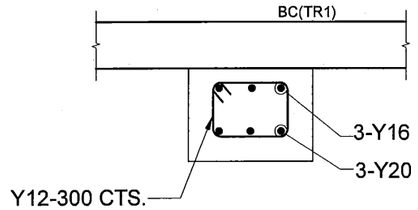
REINFORCEMENT CURTAILMENT TYPICAL REQUIREMENTS
(RC BEAM & BLOCKWALL)
H. 1: 100 V. 1: 25



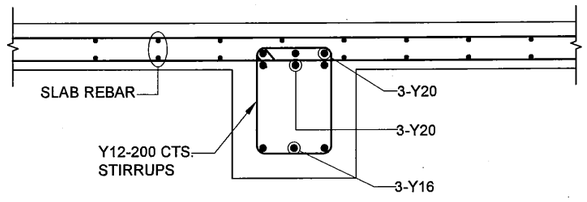
REINFORCEMENT CURTAILMENT TYPICAL REQUIREMENTS
(RC BEAM & BLOCKWALL)
H. 1: 100 V. 1: 25



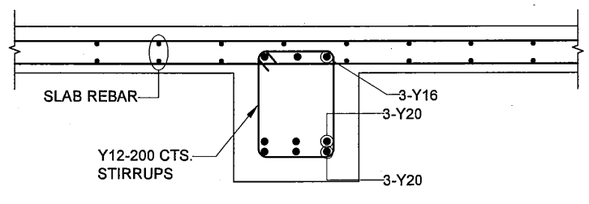
CRB1/CRB2
SECTION A STP-006
SCALE: 1:20



CRB1/CRB2
SECTION B STP-006
SCALE: 1:20



CFB1/CFB2
SECTION C STP-006
SCALE: 1:20



CFB1/CFB2
SECTION D STP-006
SCALE: 1:20

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - TYPICAL BELEVATION & SECTIONS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

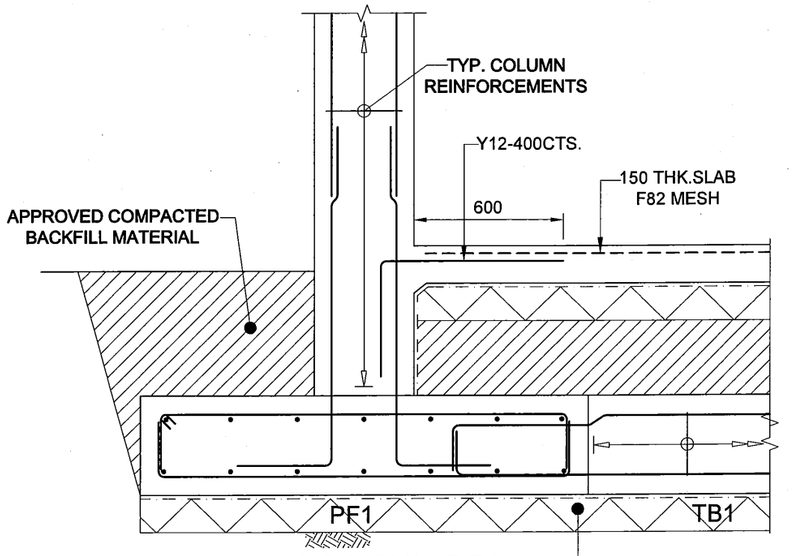
NOTES :

REVISIONS

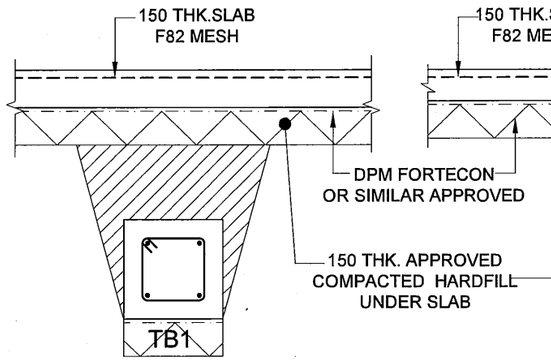
ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: AS SHOWN

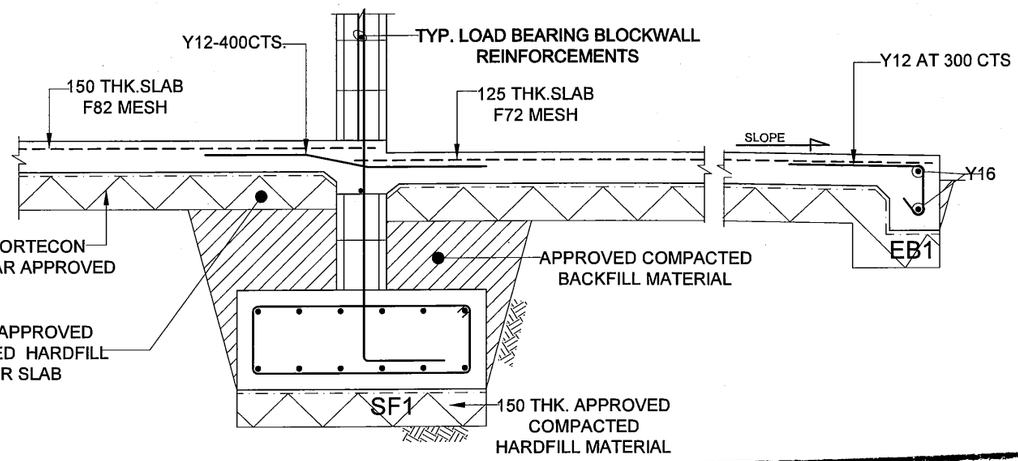
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S007



FOOTING DETAIL. PF1
SCALE: 125



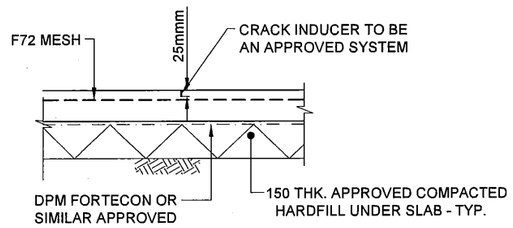
TIE BEAM DETAIL.TB1
SCALE: 1:25



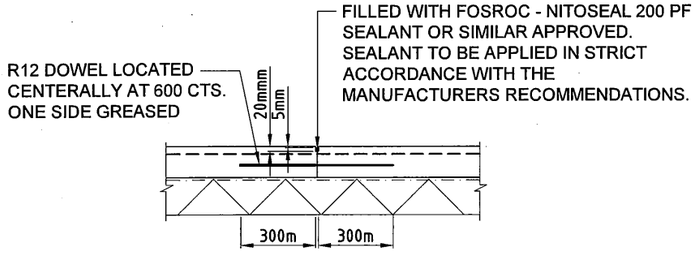
STRIP FOOTING.SF1
SCALE: 1:25

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

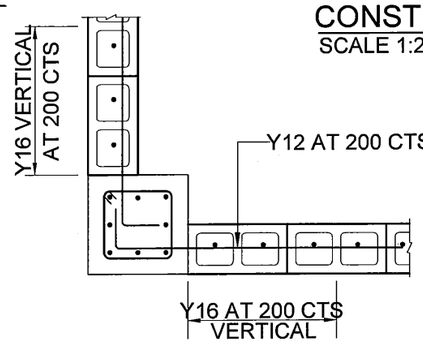
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



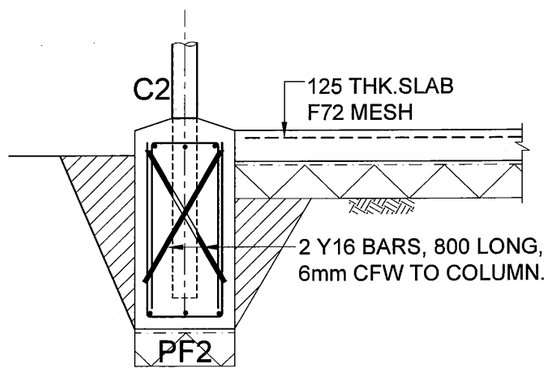
TYP. CRACK INDUCED JOINT (CIJ)
SCALE 1:25



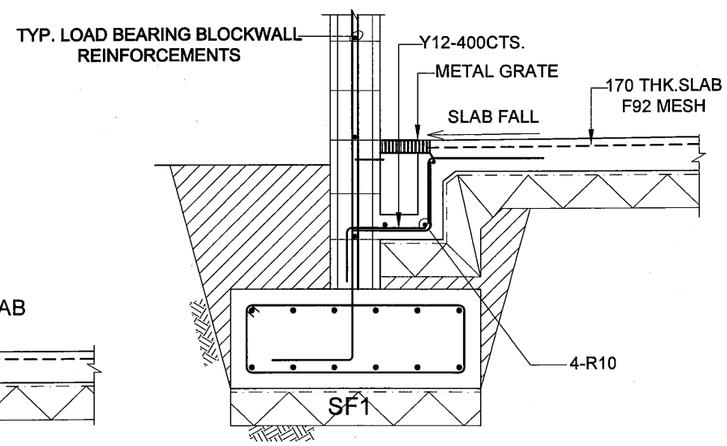
CONSTRUCTION JOINT (CJ)
SCALE 1:25



TYP. BLOCKWALL TO RC COLUMN DETAIL
SCALE 1:25



FOOTING DETAIL. PF2
SCALE: 1:25



STRIP FOOTING.SF1
SCALE: 1:25

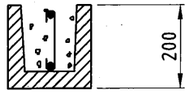
TENDER ISSUE

PROJECT:	PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)
TITLE:	KilaKila SPT. ADMINISTRATION BUILDING - DETAILS
CLIENT:	INDEPENDENT PUBLIC BUSINESS CORPORATION PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT PROJECT MANAGEMENT UNIT (PMU) JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANTS :	NJS CONSULTANTS CO., LTD. - JAPAN
NOTES :	

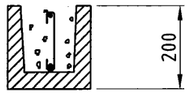
REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

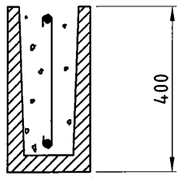
APPROVED by PMU: Project Director Lot G.Zauya	DATE: 1. Dec 2011	SCALE: AS SHOWN
CHECKED by CONSULTANT Project Manager T.Fuji	DATE: 1. Dec 2011	DRAWING NO.: STP - S008



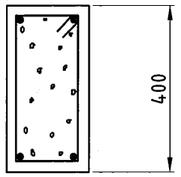
TYPE B2
2-Y16 WITH R10 @ 100 CTS FOR LINTELS AND 300 CTS FOR BOND BEAMS



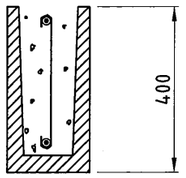
TYPE B1
2-Y12 WITH R10 @ 100 CTS



TYPE B3
2-Y16 WITH R10 @ 150 CTS.



TYPE B5
4-Y16 WITH R10 @ 150 CTS.



TYPE B4
2-Y20 WITH R10 @ 150 CTS.

MAX. ALLOWABLE SPANS FOR 200mm WIDE LINTELS

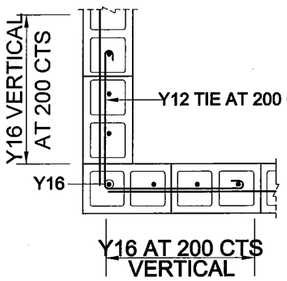
MAXIMUM LINTEL SPAN (mm)	LINTELS SUPPORTING		
	LIGHT ROOF WITH OR WITHOUT CEILING	LIGHT ROOF, LIGHT TIMBER FRAMED WALL AND TIMBER FLOOR	LIGHT ROOF, MASONRY WALL AND TIMBER FLOOR
1000	B1	B1	B2
1600	B1	B3	B3
2000	B2	B3	B4
2600	B3	B4	B5
3000	B3	B5	B5
3600	B3	B5	-

NOTES

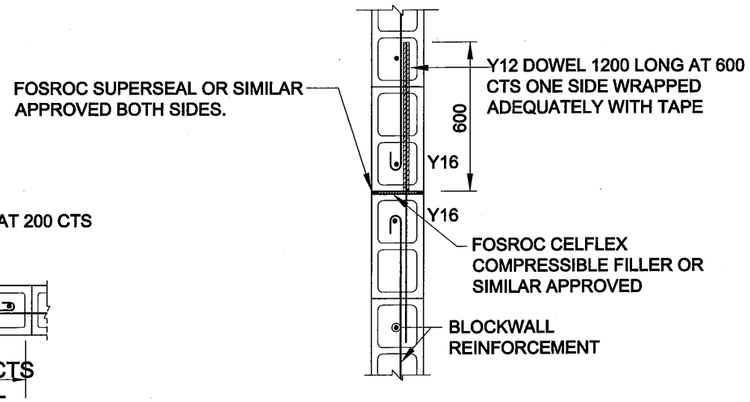
(1) Bond beams (Type B2) must be provided at the top of all walls and at the level of suspended floors.
(2) Lintels must be provided over all openings such as doors and windows and must have a minimum 200mm bearing at the supports.

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

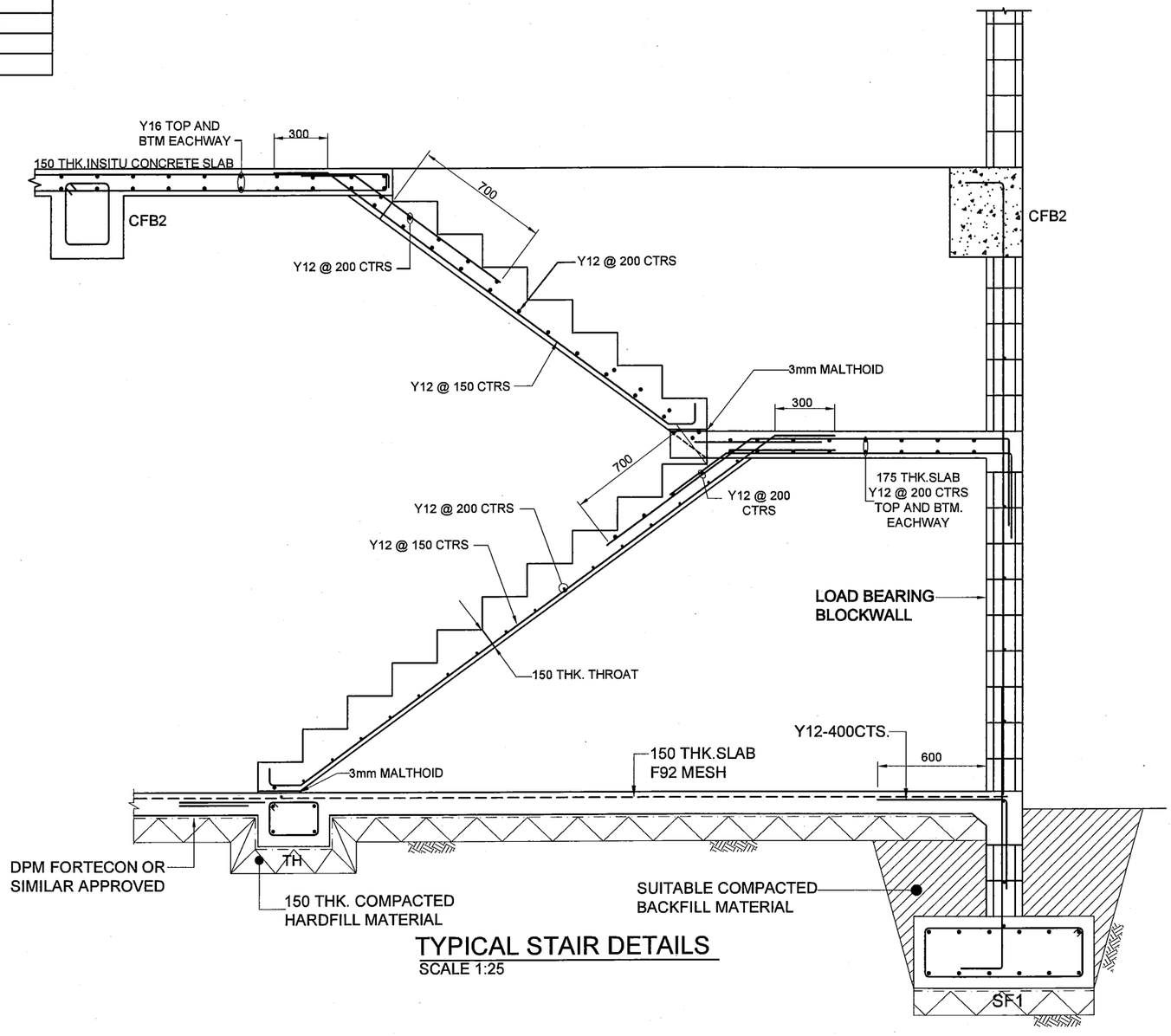


TYP. WALL CORNER DETAIL
SCALE 1:25



TYP. WALL JOINT DETAIL (WJ)
SCALE 1:25

TYPICAL BLOCKWALL DETAILS



TYPICAL STAIR DETAILS
SCALE 1:25

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. ADMINISTRATION BUILDING - TYPICAL BLOCKWALL AND STAIR DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

NOTES:

REVISIONS

ISSUE	REV.	DATE	CHKED	DESCRIPTION	BY
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: NTS

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP - S009

GENERAL

G1 This building is situated in an earthquake zone and has been designed and detailed to resist seismic forces. Any variation to either structural or non-structural elements may significantly alter the eartquake response of the building and impair its safety.

ANY PROPOSED ALTERATIONS MUST BE REFERRED TO THE STRUCTURAL DESIGN ENGINEER.

G2 These drawings shall be read in conjunction with all Architectural and other consultants Drawings and Specifications and with such other written instructions as may be issued during the course of contract. All discrepancies shall be referred to Superintendant for decision before proceeding with the work.

G3 All dimensions relevant to setting out and off-site works shall be verified by the Contractor before construction and fabrication is commenced. The Engineers drawings shall not be scaled.

G4 During construction the contractor shall be responsible for maintaining the structure in a stable condition and ensuring no part shall be overstressed under construction activities.

G5 Workmanship and materials are to be in accordance with the relevant current PNGS and SAA standards including all amendments and the local statutory Authorities, except where varied by the the contract documents.

G6 Requirements to comply with a particular code or standard is deemed to refer to the latest edition with all relevant amendments and to include all other codes or standards associated with or referred to in the noted code or standard.

G7 No holes or chases other than those indicated on the structural drawings shall be made without the approval of the Superintendant.

G8 Prior to ordering materials or carrying out any work that may be affected, the Contractor shall submit the following information for approval in accordance with the drawings and specification. These proposals shall include all information neccessary for approval including the following:

1) Source and supplier of materials and products.

2) Cerificates and results of any tests already carried out.

3) Details of tests to be carried out both on and off site.

4) Location of any testing to be carried out off site.

5) Details of any seperate labratory, authority or other body to carry out tests.

The approval of substitution of materials shall be sought from the Superintendant.

All dimensions are in millimetres unless stated otherwise. All levels are expressed in metres.

G9 All props and formwork for beams and slabs shall be removed before construction of any masonry walls or partitions on the floor.

G10 All Non-Load Bearing Walls shall be kept clear of the underside of beams and slabs clearance shall not be less than 20mm unless otherwise shown.

G11 Where proprietary products are specified they shall be manufactured and used in accordance with the manufacturer's specifications and recommendations.

G12 Design loads to Papua New Guinea Standard 1001.

1) Wind - Basic Design Velocity 25m/sec
Terrain Category 1

2) Seismic - Zone 4

FOUNDATION

F1 Founding levels are provisional and are subject to the Superintendant's approval of the bearing strata.

F2 Anticipated bearing material: Undisturbed Natural Ground.

F3 Required allowable bearing strength of foundation material 550 kPa

F4 All water and loose material shall be removed from the base prior to pouring any concrete.

F5 Compacted fill under slabs and minor strip footings shall comply with the following:

a) Material shall be selected from an approved source, shall be free of vegetable matter and ball of clay, and shall comply with the following requirements.

(i) CBR value after 4 days soaking, not less than 25 when compacted to at least 95% maximum dry density as determined by AS1289 Test No. E1.1

(ii) Maximum linear shrinkage 6%

(iii) Grading

SIEVE SIZE (mm)	BY WEIGHT PASSING
37.5	100
19.0	60 - 100
9.5	40 - 80
4.75	30 - 60
2.36	20 - 45
0.425	15 - 30
0.075	3 - 15

(iv) The fraction passing the 75 micron sieve shall not exceed 2/3 that passing the 425 micron sieve.

(v) The fraction retained on the 2.36mm sieve shall consist of hard durable particles or fragments of stone, gravel or sand and shall not include any material that breaks up when alternately wetted and dried.

(vi) The fraction passing the 425 micron sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than 10.

F6 Over excavating under footings shall be made good with 10 MPa mass concrete.

CONCRETE

C1 All workmanship and material shall be in accordance with PNG 1002.

C2 Minimum cover (mm) to all reinforcement unless otherwise shown shall be as follows:

REINFORCEMENT COVERS

Minimum reinforcement cover requirements to be in accordance with PNGS1002 - 1982 Exposure condition listed below:

Exterior faces of members (above ground) : 3
Interior faces of members : 3
Members below ground : 3

In addition reinforcement cover shall not be less than :

FOOTINGS	: 75mm
PEDESTAL	: 75mm
GROUND SLABS	: 30mm TOP
SUSPENDED SLABS	: 30mm TOP
BEAMS	: 65mm EXPOSED FACE, INTERIOR FACE 40mm
COLUMNS	: 75mm IN GROUND, 65mm ABOVE GROUND
SHEARWALLS	: 75mm IN GROUND, 65mm ABOVE GROUND

C3 Sizes of concrete elements do not include thickness of applied finishes.

C4 Reinforcement is represented diagrammatically and not neccessarily shown.

C5 Splices in reinforcement shall be made only in the positions shown or as otherwise approved by the Superintendant.

C6 Welding of reinforcement shall not be permitted.

C7 All reinforcement shall be securely supported in its correct position during concreting by approved bar chains, spacers or support bars.

C8 Reinforced symbols:
"Y" denotes hot rolled deformed bars grade 410Y to AS 1302
"S" denotes deformed bars grade 2305 to AS 1302.
"R" denotes plain round bars grade 230R to AS 1302.

C9 Laps, unless noted otherwise, shall be : 40 x bar diameter for rounds and 350mm for fabric.

C10 Bending radii, unless noted otherwise, shall be to PNGS 1002.

C11 Cover will be maintained during casting concrete by the use of plastic chairs and/or mortar blocks 1:2 mix at maximum 500mm centres in each directions. For work in contact with the ground chairs are to be supported on sheet plates.

C12 Reinforcement shall not be exposed for prolonged periods such as to permit the development of scale

C13 Reinforcement and formwork are to be checked by the Superintendant prior to pouring. The Superintendant is to be given 24 hours notice for a check and a futher 24 hours for any remedial work required prior to concrete placement.

C14 All conduits to be placed above bottom reinforcement and below top reinforcement - minimum spacing between conduits 25mm.

C15 Formwork shall be designed and constructed in accordance with AS 3610.

C16 Concrete components and quality shall be as follows, unless noted otherwise;

Element	F'c (MPa)	Water/Cement Ratio
Foundations	40	0.55
Ground	32	0.55

C17 Three test cylinders are to be taken from each sample (sampling in accordance with PNGS 1002.) One cylinder to be tested at seven days, the other two at 20 days. Where ready mix concrete is supplied each truck will constitute a batch in applying PNGS 1002.

C18 The Contractor shall submit for approval his proposals for curing of all insitu concrete work, at least 7 days prior to any pour taking place.

C19 Construction Joints to be cleaned of all loose and foreign materials, scabbled and wetted immediately before continuing the following concreting. Construction Joints other than those indicated on the drawing shall not be made without approval.

CONCRETE MASONRY

B1 All concrete block masonry is to be executed in accordance with the current edition of:

PNGS 1004 - Reinforced Masonry Structures Code.
AS 2733 - Concrete Masonry Units.

B2 Concrete masonry blocks shall have characteristics compressive strength of F'b = 12 MPa and 16 MPa at specific locations denoted as SW1 - SW39.

B3 All blocks shall be laid dry and wetting shall not be permitted during or after laying.

B4 Channel stretcher blocks and lintel blocks shall be used to form bond beams and lintels respectively. Top groove blocks shall be used elsewhere where horizontal reinforcement is required. Otherwise blocks shall conform to AS 2733.

B5 All blocks must be cured for minimum of 28 days before transportation to site.

B6 Clean out blocks are to be used for core filled cavities and all mortar droppings are to be removed from the bottom cavities before grouting.

B7 Mortar shall comply with AS 1475. Part 1, Appendix A. The mix proprtions of table A1 shall be adjusted to give an average compressive strength of 8 MPa.

B8 Mortar joints to be 10mm thick with blocks fully bedded and perpends filled.

B9 Grout for corefilling shall comply with AS 1475, Part 1, Section 2. Characteristic compressive strength F'c = 15 MPa Slump 225. Batching by volume is not permitted.

B10 Corefilling is to be placed for the full height in lifts of not more than 1200mm in height. A minimum delay period of one hour and max, three hours shall be observed between lifts. All cores are to be filled unless noted otherwise.

B11 Corefilling shall be thoroughly compacted into place with the aid of small immersion vibrators.

B12 The corefilling at the top of each lift shall be kept down at a distance of 25mm from the top of the blockwork and this surface shall be thoroughly scabbled before any further blocks are laid or concrete poured.

B13 Masonry walls shall be cured for at least three (3) days before corefilling is placed.

B14 All masonry must be approved by the Superintendant before corefilling takes place.

B15 Vertical reinforcement at any level shall be correctly positioned and securely tied to starters projecting from construction below prior to placing blocks.

B16 Reinforcement is to be left undisturbed for at least 12 hours after corefilling. Any reinforcement showing signs of seperation from the corefilling may render that section of the wall liable to rejection.

B17 Minimum cover to reinforcement : 12mm from inside face of block.

B18 Vertical bars shall be placed with laps at not less than 1600mm centres, unless noted otherwise.

B19 Laps, unless noted otherwise, shall be : 40 x bar diameter.

B20 All bars are to be cogged around openings and openings are to have a bond beam over them.

B21 At the completion of a day's work and during wet weather top and sides of all walls shall be covered to prevent rain penetration to cores or wetting of blocks.

B22 Control joints in blockwork to be at 4m maximum spacing.

STRUCTURAL STEELWORK

S1 All workmanship and materials shall be in accordance with PNGS 1003.

S2 Steel grade - 300 MPa.

S3 Plates, unless noted otherwise, shall be 8mm thick.

S4 Bolts, unless noted otherwise, shall be 16mm diameter, Grade 4.6/s, bolts 20mm diameter and greater shall be Grade 8.8/s.

S5 Welds, unless noted otherwise, shall be 6mm continuous fillet weld.

S6 Welding electrodes shall be class E 41XX.

S7 WElding shall be performed by an experienced qualified operator in accordance with PNGS 1016.

S8 The contractor shall verify that all members can be assembled and erected properly, prior to erection on site.

S9 Before fabrication is commenced the Contractor shall submit copies of the shop drawings to the Superintendant for review. Review does not include checking of dimensions.

S10 Reference shall be made to the Architect's drawings for additional drillings, cleats, fixings, etc.

S11 The contractor shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is neccessary to stabilise the structure during erection.

S12 The ends of all tubular members are to be sealed with nominal thickness plates and continuous fillet weld unless otherwise shown.

S13 Unless otherwise specified all steelwork shall be sand blasted to remove all rust and scaled and painted one shop coat of inorganic zinc silicate primer min. 40 micron thickness. Members encased in concrete, fire spray or HSTF bolted connections must not be painted.

S14 All base plates shall be temporarily supported and dry pack grouted with 3:1 sand cement grout in a just wet condition.

S15 Cold formed steelwork shall comply with AS 1530, roll formed from hot-dipped zinc-rolled steel grade G450-Z200 to AS 1397.

S16 All steelwork exposed to the weather including bolts and fixings shall be hot dipped galvanised unless noted otherwise.

TIMBER

T1 Timber materials and workmanship shall comply with AS 1720.

T2 Timber shall be seasoned to moisture content not exceeding 15%, unless noted otherwise.

T3 Where unseasoned timber is specified, in no case shall timber be used having a moisture content exceeding 30% at the time of fabrication.

T3 Timber shall have strength properties not less than that shown below:

Stress Grade - F11
Strength Group - SD4
Joint Group - J3

In the absence of mechanical stress, grading timber shall be visually stress graded in accordance with AS 2082.

T4 The Contractor is required to submit details of the proposed species of timber for approval. If unidentified species are proposed, evidence must be provided from the Papua New Guinea Office of Forestry of identification and compliance with the specified properties.

T5 All sizes quoted are the final dressed sizes of finished timber unless noted otherwise.

T6 The Contractor shall verify that all members can be assembled and erected properly.

T7 Any variations shall be referred to the Superintendant for approval.

T8 Steel Components shall comply with PNGS 1003 Steel grade 250.

T9 Bolt holes are to be of same nominal diameter as bolts, drilled through assembled timber.

T10 Washers, unless noted otherwise, shall be provided under all bolt heads and nuts as follows:
Against timber, 65 x 65 x 5 square washers.
Against steel, standard round washers.

T11 All bolts, nuts and washers shall be galvanised in accordance with AS 1214.

T12 All bolts shall be retightened at completion of construction.

T13 Where neccessary timber shall be chamfered locally to just clean fillet welds connection plates, etc.

T14 Preservative treatment is to be provided as follows : dip diffused.

DESIGN LOADS

ROOF LEVEL:

DEAD LOAD:	0.9 kPa
LIVE LOAD:	0.25 kPa

GROUND FLOOR LEVEL

DEAD LOAD:	4.7 kPa
LIVE LOAD:	
- TOILETS	2.0 kPa
- STORAGE	5.2 kPa

This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. GUARD HOUSE - STRUCTURAL NOTES SHEETS 1 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

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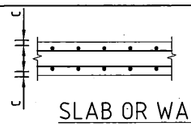
TENDER	-	14/11/2011	TT	ISSUE FOR TENDER	CM

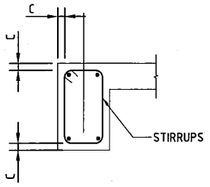
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001

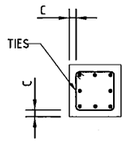
MINIMUM CONCRETE COVER



SLAB OR WALL

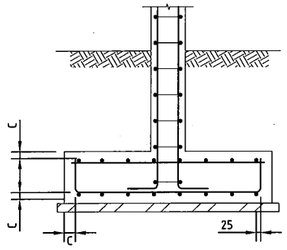


GIRDER OR BEAM

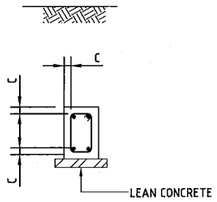


COLUMN OR PEDESTAL

ABOVE GRADE CONCRETE



FOOTING



GRADE BEAM

FOUNDATION

THE MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE AS INDICATED BELOW.

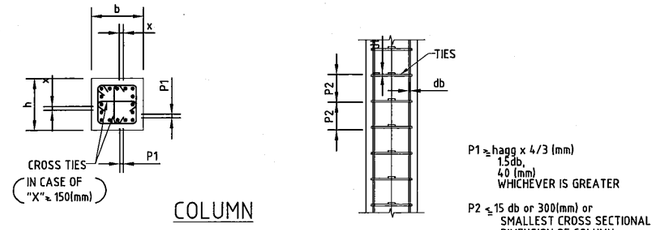
- ELEMENT EXPOSED TO WATER/SPILLAGE (CATCH BASIN/MANHOLE/SPILL BASIN etc - 75mm
- OTHER STRUCTURE - 65mm

REQUIREMENTS STIPULATED ABOVE SHALL NOT BE APPLIED TO THE FOLLOWING REINFORCED CONCRETE ITEMS :

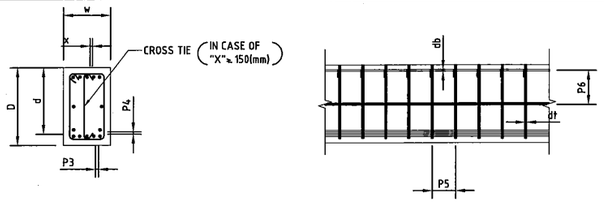
a) CONCRETE PIPES
 - AS PER MANUFACTURER'S STANDARD.
b) FIREPROOFING (WITH GALVANISED WIRE MESH)
c) DITCH LINING/ SLOPE PROTECTION
d) CONCRETE PAVING

NOTE: FOR CONCRETE CAST AGAINST GROUND (WITHOUT FORMWORK) MINIMUM CONCRETE COVER (C) SHALL BE 75mm.

SPACING LIMITS

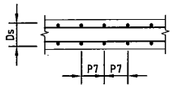


COLUMN

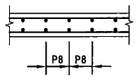


GIRDER AND BEAM

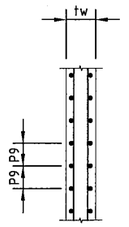
PRIMARY REINFORCEMENT

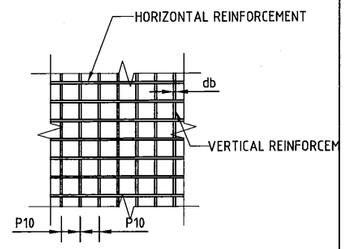


SECONDARY REINFORCEMENT



SLAB





WALL

NOTE : VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS NOT GREATER THAN 0.01 TIMES GROSS CONCRETE AREA, OR WHERE VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR WALLS GREATER THAN 200mm THICK, THE VERTICAL AND HORIZONTAL REINFORCEMENT SHALL BE PROVIDED IN TWO GRIDS, ONE NEAR EACH FACE OF THE WALL.

NOTES:

1. FOR GENERAL NOTES, SEE DWG No. PGLN-YK-CSZZZ-900100.

2. LEGEND
 hagg : NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
 d : EFFECTIVE DEPTH
 db : SIZE OF LONGITUDINAL BARS (mm)
 N : BAR SYMBOL
 dt : SIZE OF TIES
 s : SPACING
 D : BEAM HEIGHT
 w : BEAM WIDTH
 b,h : COLUMN SECTION
 tw : THICKNESS OF WALL

3. SPACING OF TIES AND STIRRUPS SHALL BE IN ACCORDANCE WITH AS 3600-2001

3-1 TIES SPACING (P2)
MAXIMUM TIE SPACING SHALL NOT EXCEED THE FOLLOWING VALUE
 -15db
 -SMALLEST CROSS SECTIONAL DIMENSION OF COLUMN
 -300mm
 ] WHICHEVER IS SMALLER

3-2 STIRRUP SPACING (P5)
MAXIMUM STIRRUP SPACING SHALL NOT EXCEED THE FOLLOWING VALUE:
 -D/2
 -15db
 -300mm
 ] WHICHEVER IS SMALLER

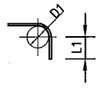
This drawing is certified to comply with the Structural Engineering provisions of the Regulations under the Building Act Chapter 301 of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

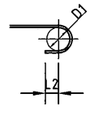
STANDARD HOOKS AND BENDS

FOR MAIN REINFORCEMENT

90° HOOK OR BEND



180° HOOK

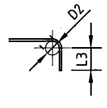


(mm)

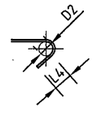
BAR SIZE	MIN.BEND DIA. D1	MIN.EXTENSION L1	MIN.EXTENSION L2
N12	60	120	70
N16	80	135	70
N20	100	160	80
N24	120	195	100
N28	140	225	115
N32	160	260	130
N36	180	290	145
N40	200	320	160

FOR TIES AND STIRRUPS REINFORCEMENT

90° HOOK

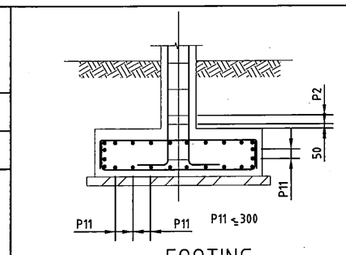


135° HOOK

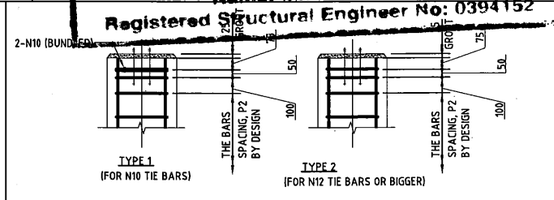


(mm)

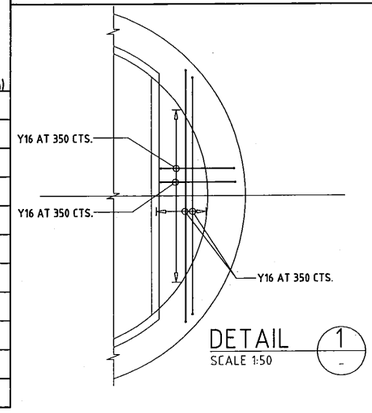
BAR SIZE	MIN.BEND DIA. D2	MIN.EXTENSION L3	MIN.EXTENSION L4
N10	40	135	100
N12	50	160	120



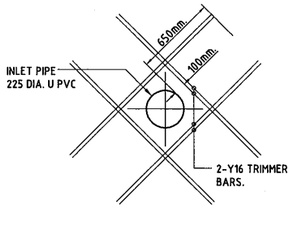
FOOTING



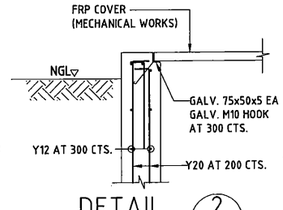
STIRRUP DETAIL FOR TOP OF PEDESTAL



DETAIL 1
SCALE 1:50



TYP. DETAIL
SCALE 1:50



DETAIL 2
SCALE 1:50

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. GUARD HOUSE - STRUCTURAL NOTES SHEETS 2 OF 2

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

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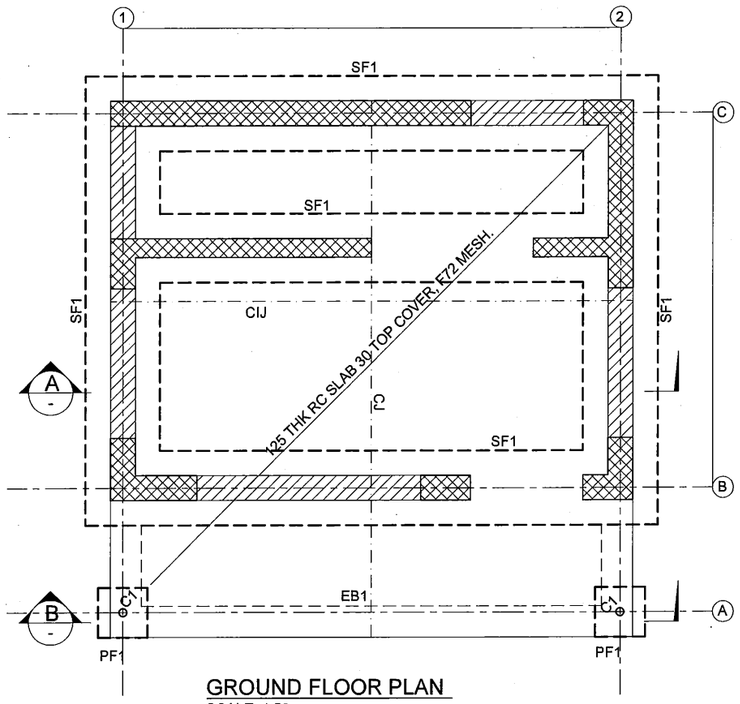
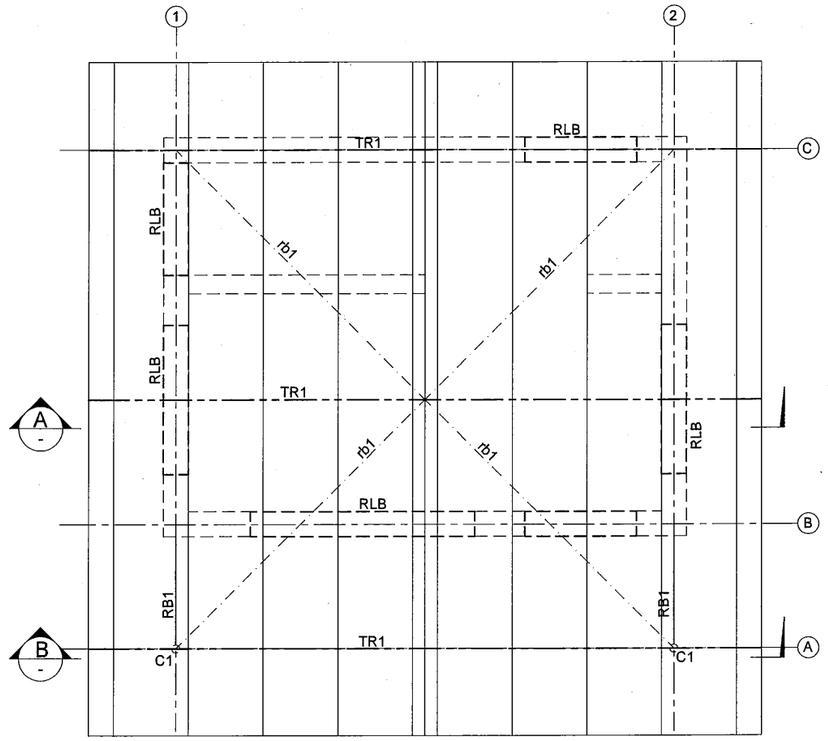
APPROVED by PMU: Project Director Lot G.Zauya — DATE: 1. Dec 2011 — SCALE: N.T.S.

CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S001a



GROUND FLOOR PLAN
SCALE: 1:50



ROOF PLAN
SCALE: 1:50

MEMBER SCHEDULE

MARK	SIZE/DESCRIPTION	REINFORCEMENT		REMARK
		LENGTHWISE	WIDTHWISE	
C1	100 x 5 CHS			STEEL COLUMN
PF1	600 DP x 400 x 400	3-Y12 T&B	3-Y12 T&B	RC PAD FOOTING
SF1	400 DP x 600 WD	3-Y16 T&B	Y12-200 CTS.	RC STRIP FOOTING
EB1	300 DP x 250 WD	2-Y16 T&B	Y12-200 CTS.	EDGE BEAM
ROOF				
C1	65 x 5 CHS			STEEL COLUMN
RLB	REFER LINTEL DETAIL			ROOF LINTEL BEAM
RB1	150 x 75 HWD.			ROOF BEAM
RB1	150 x 75 HWD.			ROOF BEAM
br1	75 x 50 HWD.			ROOF BRACE
TR1	REFER TRUSS ELEV.			ROOF TRUSS
TC	100 x 50 HWD.			TOP CHORD
BC	150 x 50 HWD.			BOTTOM CHORD
V1	75 x 50 HWD.			VERTICAL MEMBER

NOTES:

1. U.N.O. BLOCKWALL REINFORCEMENT
   LOAD BEARING:
   VERTICAL -Y16-400 CTS
   HORIZONTAL -Y12-400 CTS
2. U.N.O. ALL BLOCKWALL SHALL BE
   200 min U.N.O.
3. U.N.O. LAP LENGTHS:
   Y12-500 min COG = 200 EMBEDMENT = 250
   Y16-650 min COG = 300 EMBEDMENT = 300
   WITH STD. HOOK
4. U.N.O. MINIMIUM DEPTH OF 1000mm TYP. FROM NGL.
   UNLESS HARD ROCK ENCOUNTED BEFORE THAT
   IN WHICH FOOTING TO BE FOUNDED
   ON HARD ROCK
5. ALL FOOTING FOUNDING LEVELS ARE TO BE
   VARIFIED ON SITE DURING EXCAVATION.
6. STRUCTURAL DRAWINGS TO BE
   READ IN CONJUNCTION WITH
   ARCHITECTURAL DRAWINGS.
7. BUILDER TO CONFIRM ALL SPAN
   LENGTHS & PITCHES ETC, PRIOR
   TO FABRICATION
8. ROOF BRACING SHALL BE PRYDA STRAP
   BRACING INSTALLED ACCORDING TO PRYDA
   SPECIFICATION.

LEGEND:

- DENOTES LOAD BEARING BLOCKWALL
- DENOTES STEP DOWN REFER ARCH. DWGS.

NGL - DENOTES NATURAL GROUND LEVEL
CIJ - DENOTES CRACK INDUCED JOINT
CJ - DENOTES CONSTRUCTION JOINT
WJ - DENOTES WALL JOINT

BEAM/TRUSS
DENOTES SPLICE JOINT
SPLICE

This drawing is certified to comply with the
Structural Engineering provisions of the
Regulations under the Building Act Chapter 301
of the Revised Laws of Papua New Guinea

Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. GUARD HOUSE - GROUND FLOOR & ROOF PLANS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

NOTES :

REVISIONS					
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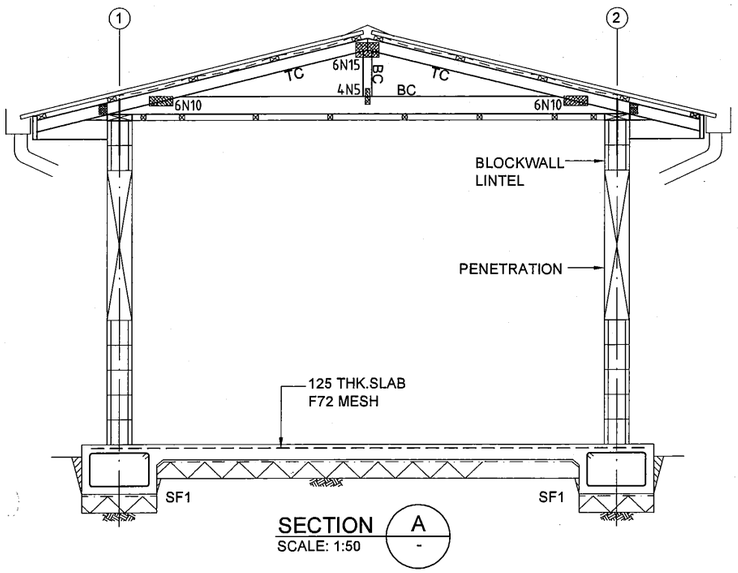
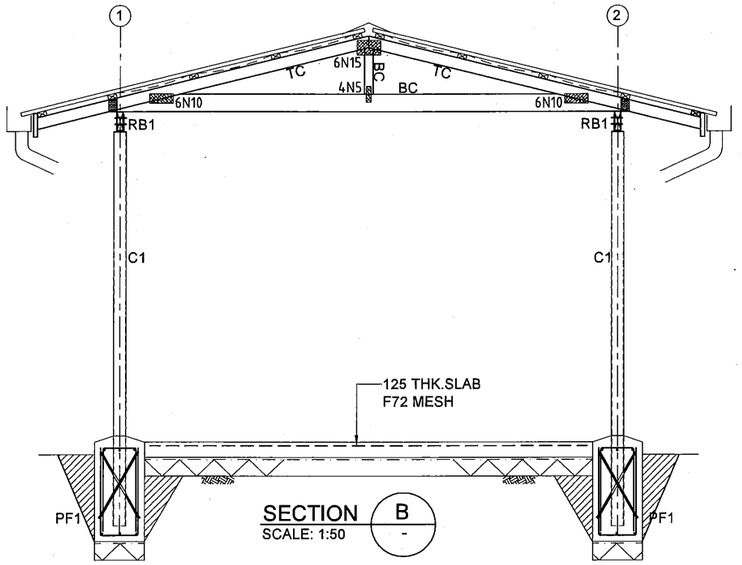
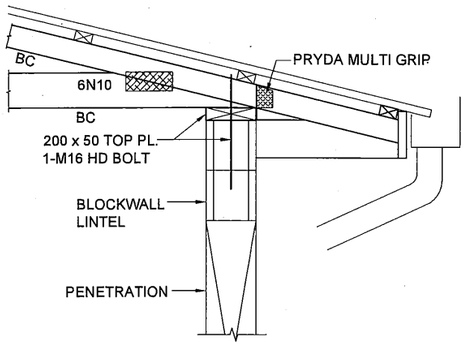
CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S002



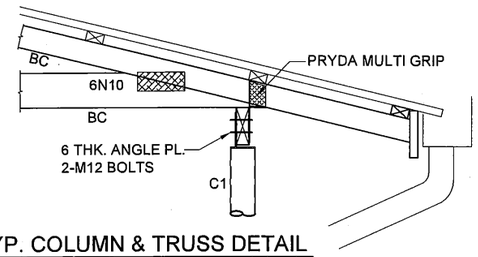
SECTION A
SCALE: 1:50



SECTION B
SCALE: 1:50



TYP. BLOCKWALL & TRUSS DETAIL
SCALE: 1:25



TYP. COLUMN & TRUSS DETAIL
SCALE: 1:25

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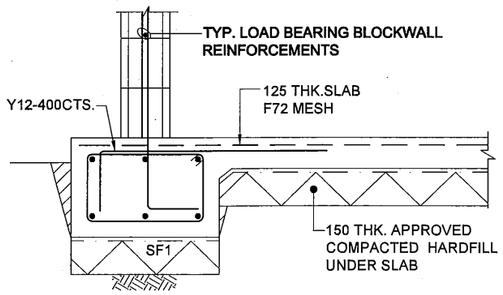
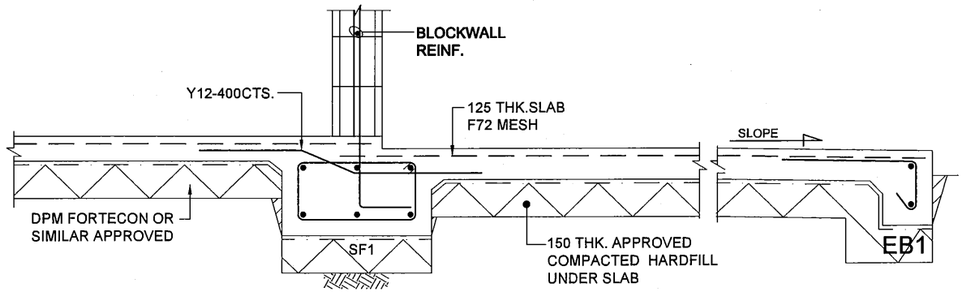
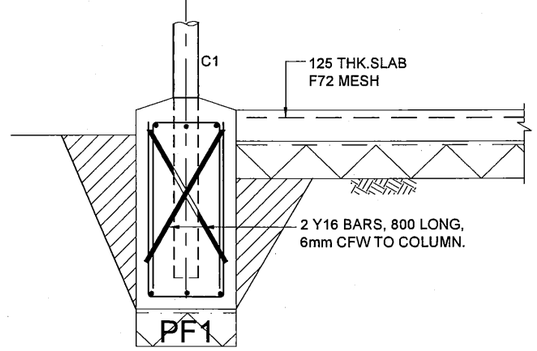
Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152



TYP. STRIP FOOTING
SCALE: 1:25



TYP. STEP DOWN DETAIL
SCALE: 1:25



TYP. FOOTING DETAIL
SCALE: 1:25

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila SPT. GUARD HOUSE - SECTIONS & DETAIL

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS: NJS CONSULTANTS CO., LTD. - JAPAN

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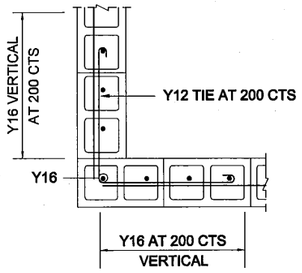
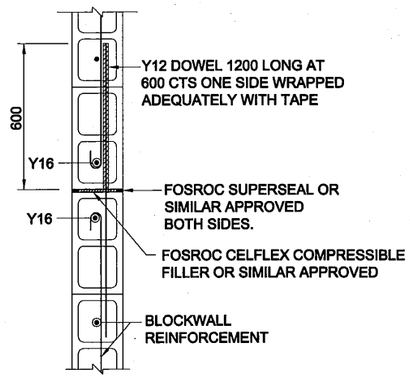
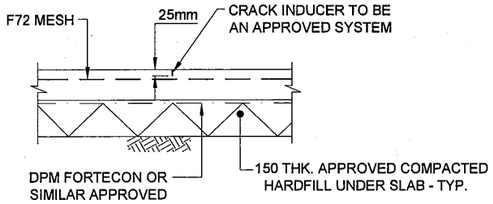


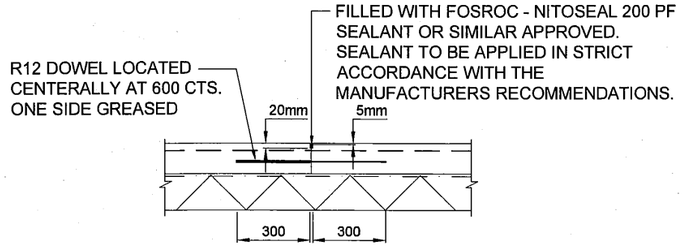
TYP. WALL CORNER DETAIL
SCALE 1:25



TYP. WALL JOINT DETAIL (WJ)
SCALE 1:25

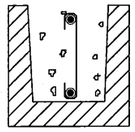


TYP. CRACK INDUCED JOINT (CIJ)
SCALE 1:25



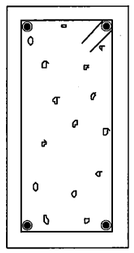
CONSTRUCTION JOINT (CJ)
SCALE 1:25

TYPICAL BLOCKWALL DETAILS



TYPE B2
2-Y16 WITH R10 @ 100 CTS FOR LINTELS AND 300 CTS FOR BOND BEAMS

TYPE B1
2-Y12 WITH R10 @ 100 CTS

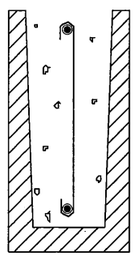


TYPE B5
4-Y16 WITH R10 @ 150 CTS.

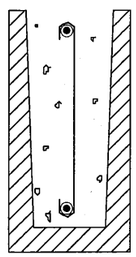
MAX. ALLOWABLE SPANS FOR 200mm WIDE LINTELS			
MAXIMUM LINTEL SPAN (mm)	LINTELS SUPPORTING		
	LIGHT ROOF WITH OR WITHOUT CEILING	LIGHT ROOF, LIGHT TIMBER FRAMED WALL AND TIMBER FLOOR	LIGHT ROOF, MASONRY WALL AND TIMBER FLOOR
1000	B1	B1	B2
1600	B1	B3	B3
2000	B2	B3	B4
2600	B3	B4	B5
3000	B3	B5	B5
3600	B3	B5	-

NOTES

(1) Bond beams (Type B2) must be provided at the top of all walls and at the level of suspended floors.
(2) Lintels must be provided over all openings such as doors and windows and must have a minimum 200mm bearing at the supports.



TYPE B3
2-Y16 WITH R10 @ 150 CTS.



TYPE B4
2-Y20 WITH R10 @ 150 CTS.

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Name: Mr. L.J. Stocks
Registered Structural Engineer No: 0394152

TENDER ISSUE

PROJECT: PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT (POMSSUP)

TITLE: KilaKila STP. GUARD HOUSE - MISCELLANEOUSE DETAILS

CLIENT: INDEPENDENT PUBLIC BUSINESS CORPORATION
PORT MORESBY SEWERAGE SYSTEM UPGRADING PROJECT
PROJECT MANAGEMENT UNIT (PMU)
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS : NJS CONSULTANTS CO., LTD. - JAPAN

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CHECKED by CONSULTANT Project Manager T.Fuji — DATE: 1. Dec 2011 — DRAWING NO.: STP-S004