TOPOGRAPHICAL SURVEY
SITE LAYOUT
SCALE 1:200

ELRAM CADASTRAL AREA

- GROUND LEVEL OF PUMPING STATION BUILDING = +1277.50m
- DO NOT SCALE FROM THIS DRAWING
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
- ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED
- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

TOPOGRAPHICAL LEGEND

CULVERT/BRIDGE		RETAINING WALL	
Spr.	SPRING	RAILWAY	
WELL		CHANNEL	Channel
DECIDUOUS/PINE TREE		TERRACE	
ROCKS		FENCE	
BUSHES		STREAM/RIVER	
MH S	MANHOLE SEWER	PYL	PYLON
MH W	MANHOLE WATER	EL S.S	ELECTRIC SUB STATION
MH T	MANHOLE TELEPHONE	EP/TP	ELECTRIC POLE/TELEGRAPH POLE
MH NI	MANHOLE NOT IDENTIFIED		OVERGROUND WATER PIPE
LP	LIGHTING POLE		UNDERGROUND WATER PIPE
	BUILDING	1160.12	SPOT HEIGHT
U/C	FOUNDATION/BUILDING UNDER CONSTRUCTION		TRAVERSING STATION
	ROAD		TRIANGULATION POINT
	TRACK		BENCH MARK
	REFERENCE LINE	384	LOT No
side walk	SIDE WALK		BOUNDARY
			CIRCONSCRIPTION BOUNDARY
			CONCESSION LIMIT

Rev.	Date	Dsgn.	Drwn.	Chk'd	Appr'd

REPUBLIC OF LEBANON
MINISTRY OF ENERGY WATER
COUNCIL FOR DEVELOPMENT RECONSTRUCTION

BUREAU TECHNIQUE POUR LE DEVELOPPEMENT
JALL ED DIB – HAJAL Bldg
P.O.BOX:70492 – ANTELIAS
TEL:(04) 712157 / 712158
FAX: (04) 712159

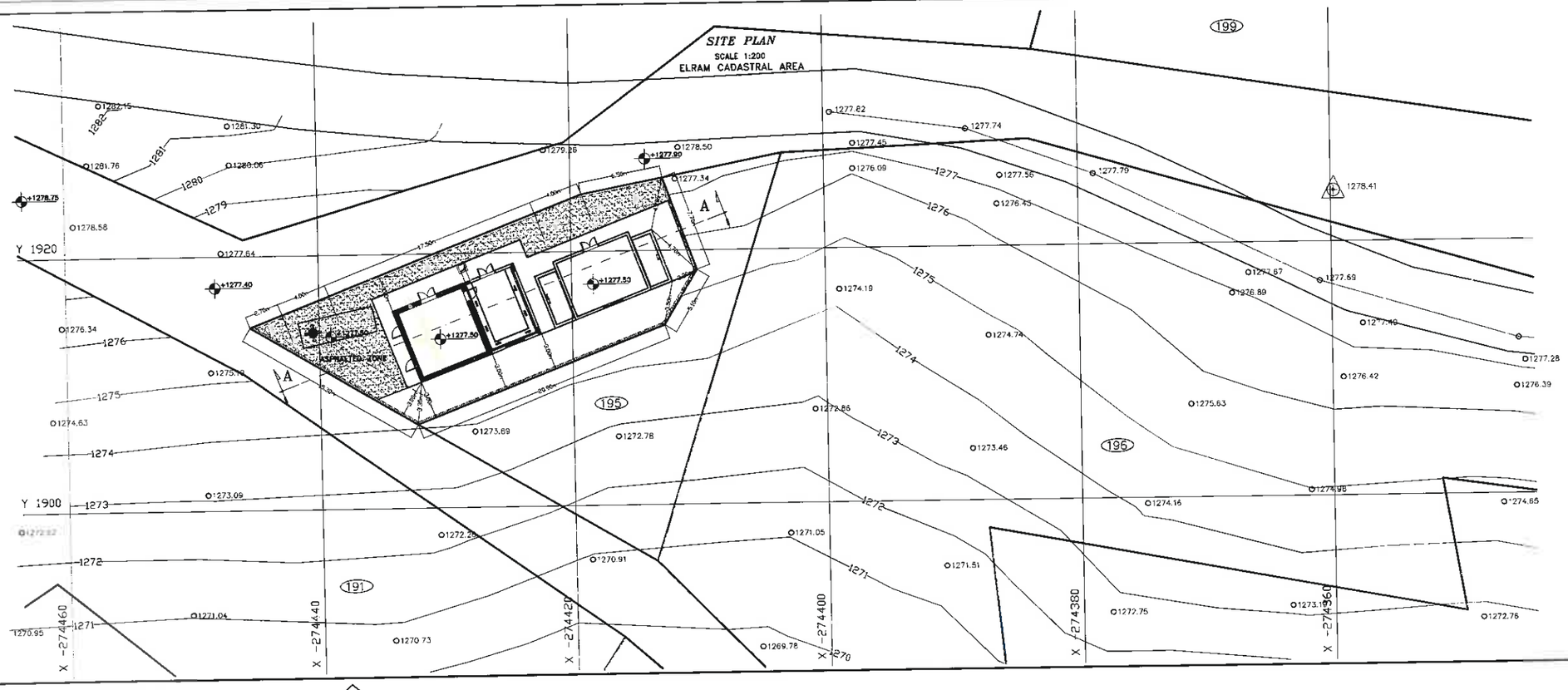
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	TOPOGRAPHICAL SURVEY SITE LAYOUT

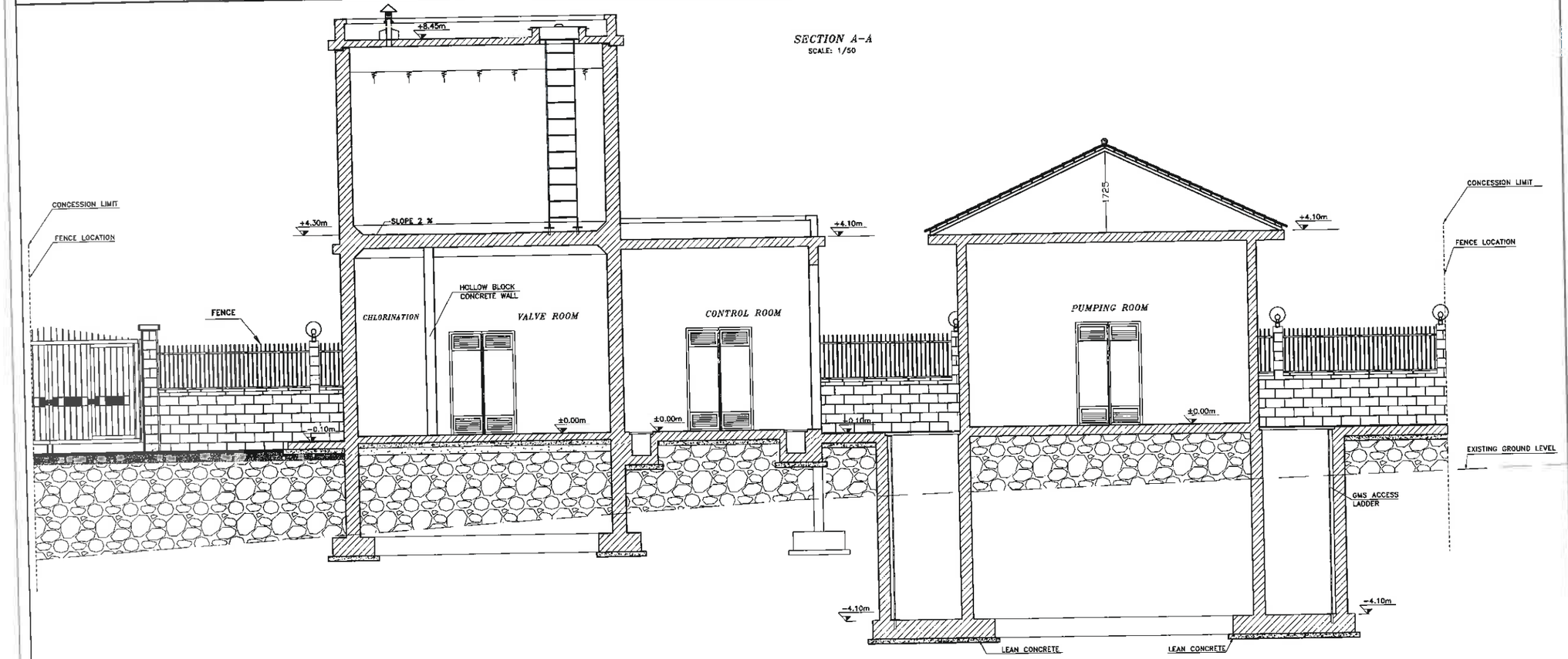
DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S01	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:200	1/13	01

SITE PLAN
SCALE 1:200
ELRAM CADASTRAL AREA



SECTION A–A
SCALE: 1/50



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- ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED
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TOPOGRAPHICAL LEGEND

	CULVERT/BRIDGE		RETAINING WALL
Spr	SPRING		RAILWAY
	WELL	channel	CHANNEL
			TERRACE
	DECIDUOUS/PINE TREE		FENCE
	ROCKS		STREAM/RIVER
	BUSHES		
MH S	MANHOLE SEWER	Pyl.	PYLON
MH W	MANHOLE WATER	E.L.S.S	ELECTRIC SUB STATION
MH T	MANHOLE TELEPHONE	EP/TP	ELECTRIC POLE/TELEGRAPH POLE
MH NI	MANHOLE NOT IDENTIFIED		OVERGROUND WATER PIPE
LP	LIGHTING POLE		UNDERGROUND WATER PIPE
	BUILDING	+ 1160.12	SPOT HEIGHT
U/C	FOUNDATION/BUILDING UNDER CONSTRUCTION		TRAVERSING STATION
			TRIANGULATION POINT
	ROAD		BENCH MARK
	TRACK		ML
	REFERENCE LINE	384	LOT No
side walk	SIDE WALK		BOUNDARY
			CIRCONSCRIPTION BOUNDARY
			CONCESSION LIMIT

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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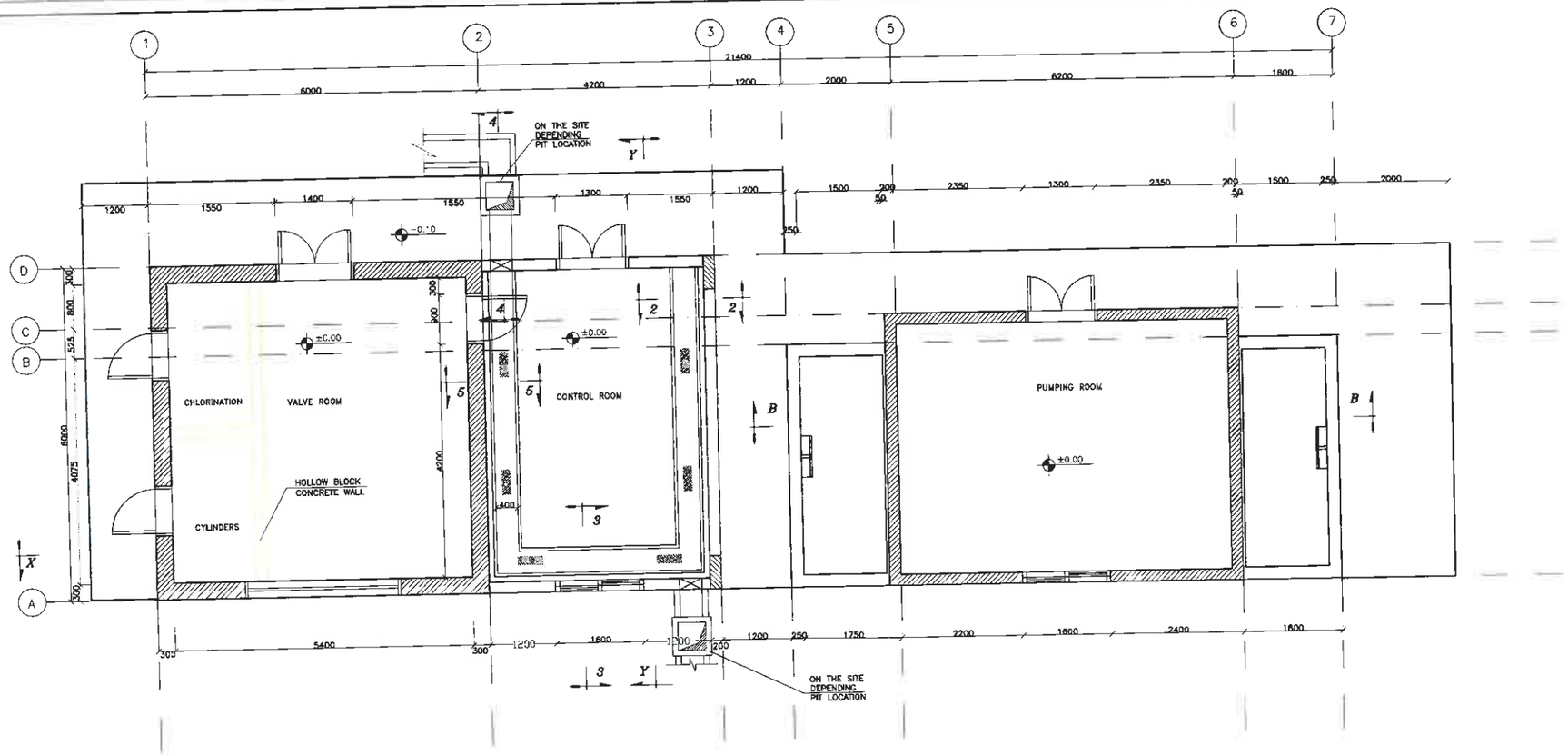
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE
100M3 BREAK TANK
AND PUMPING STATION

SITE PLAN
SECTION A–A

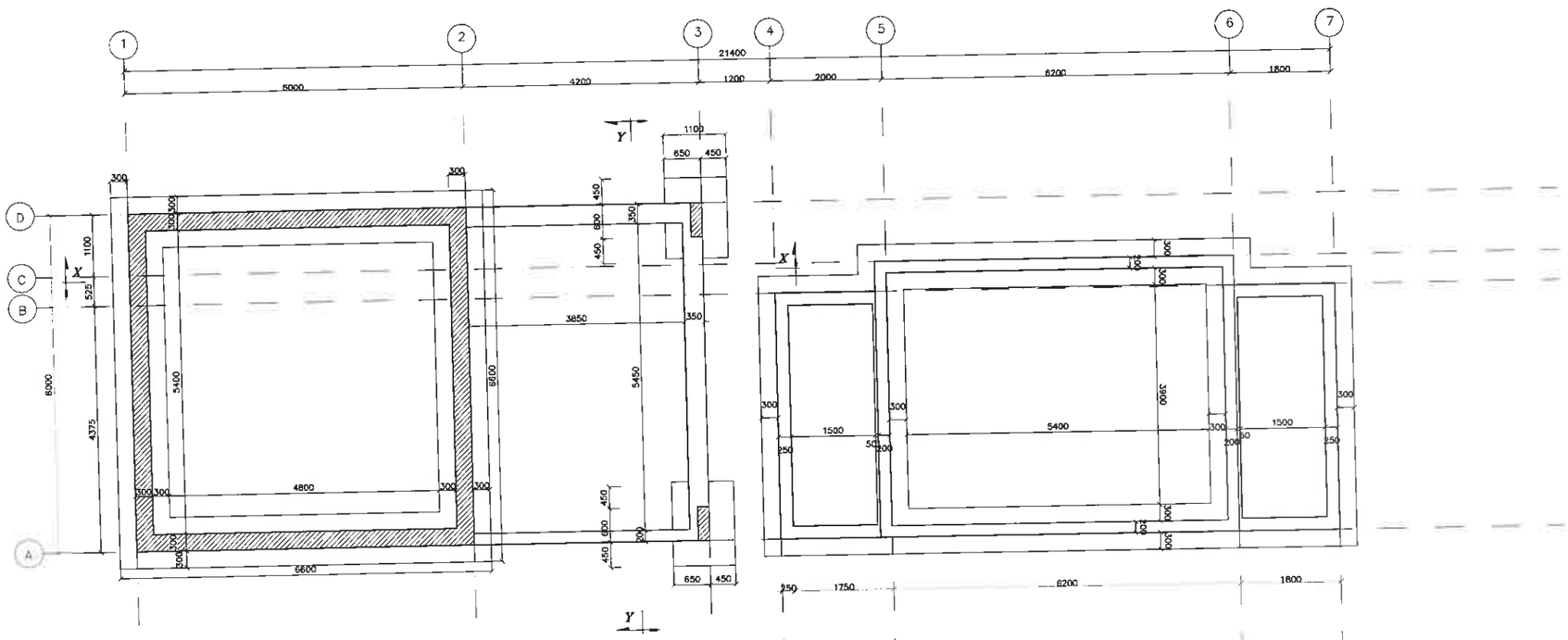
DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S–04S02	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:200 – 1:50	2/13	02



GROUND FLOOR PLAN

SCALE 1:50



FOUNDATION PLAN

SCALE 1:50

NOTES:

FINISHING SCHEDULE			
ROOM	FLOOR	WALLS	CEILING
CHLORINATION	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CYLINDERS	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CONTROL ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
VALVE ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
PUMPING ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
EXTERNAL FACE OF EXTERIOR WALLS	ACCORDING TO DRAWINGS		

EXTERIOR DOORS	WINDOWS	PROTECTION BARS FOR EXTERIOR WINDOWS
STEEL PANELS 3mm THICK (ACCORDING TO DRAWINGS)	ALUMINIUM (ACCORDING TO DRAWINGS)	STEEL SQUARE BARS 10x10 (ACCORDING TO DRAWINGS)

N.B.

- SCALING FROM THIS DRAWING IS NOT ALLOWED.
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  ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
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- THE TRENCH LOCATION COULD BE MODIFIED ACCORDING TO THE EQUIPMENT TO BE INSTALLED.

  INTERNAL SURFACES OF WALLS, GROUND SLAB AND INTERNAL FACE OF THE ROOF SHALL BE WATERPROOFED (WATERPROOFING TREATMENT WORKS SHALL BE SUITABLE FOR CHLORINED POTABLE WATER)
- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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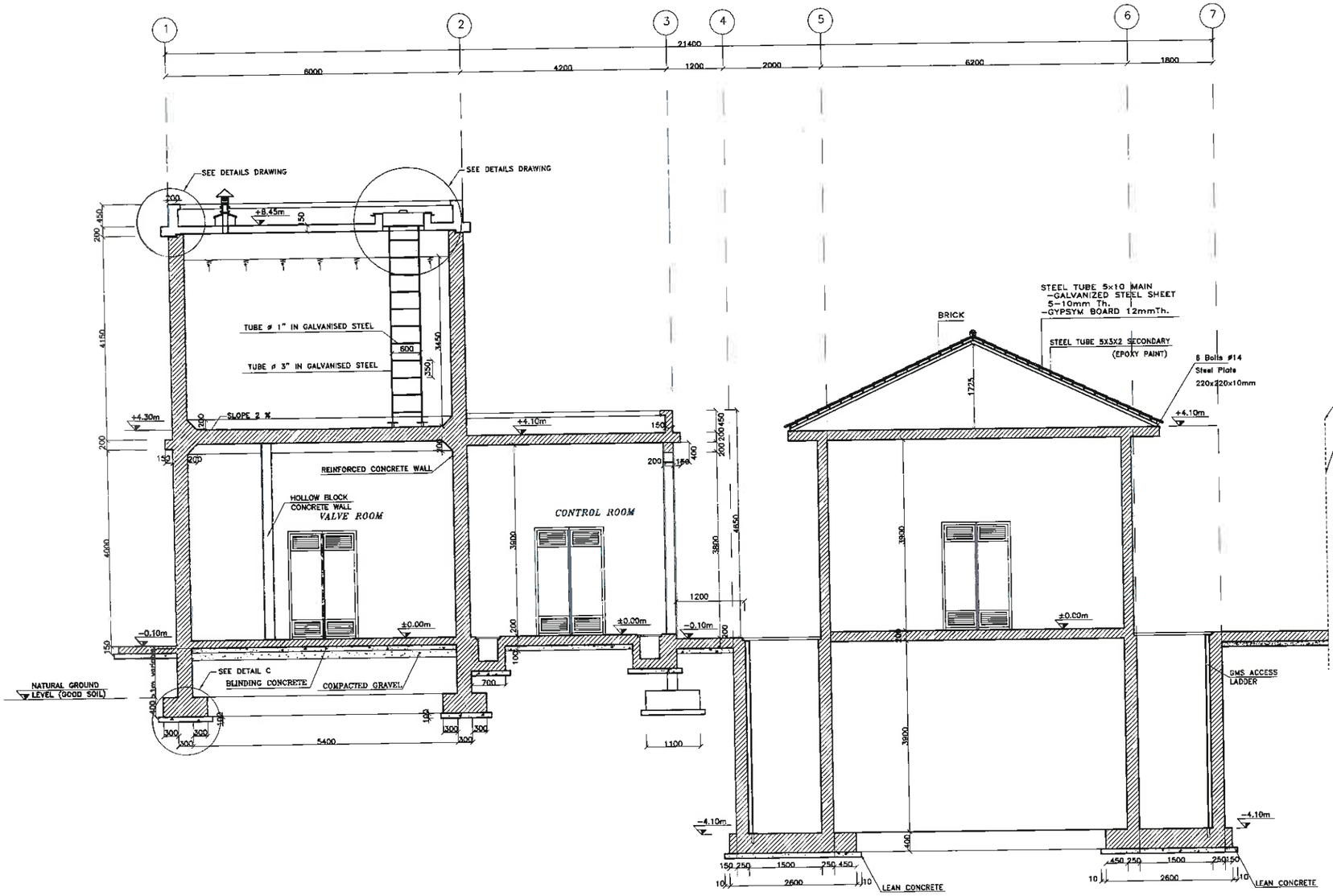
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	PLANS – SECTION

472S-04S03	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

JULY 2019	1:50	3/13	03

SECTION A-A
SCALE: 1/50



NOTES:

FINISHING SCHEDULE			
ROOM	FLOOR	WALLS	CEILING
CHLORINATION	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CYLINDERS	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CONTROL ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
VALVE ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
PUMPING ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
EXTERNAL FACE OF EXTERIOR WALLS	ACCORDING TO DRAWINGS		

EXTERIOR DOORS	WINDOWS	PROTECTION BARS FOR EXTERIOR WINDOWS
STEEL PANELS 3mm THICK (ACCORDING TO DRAWINGS)	ALUMINIUM (ACCORDING TO DRAWINGS)	STEEL SQUARE BARS 10x10 (ACCORDING TO DRAWINGS)

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- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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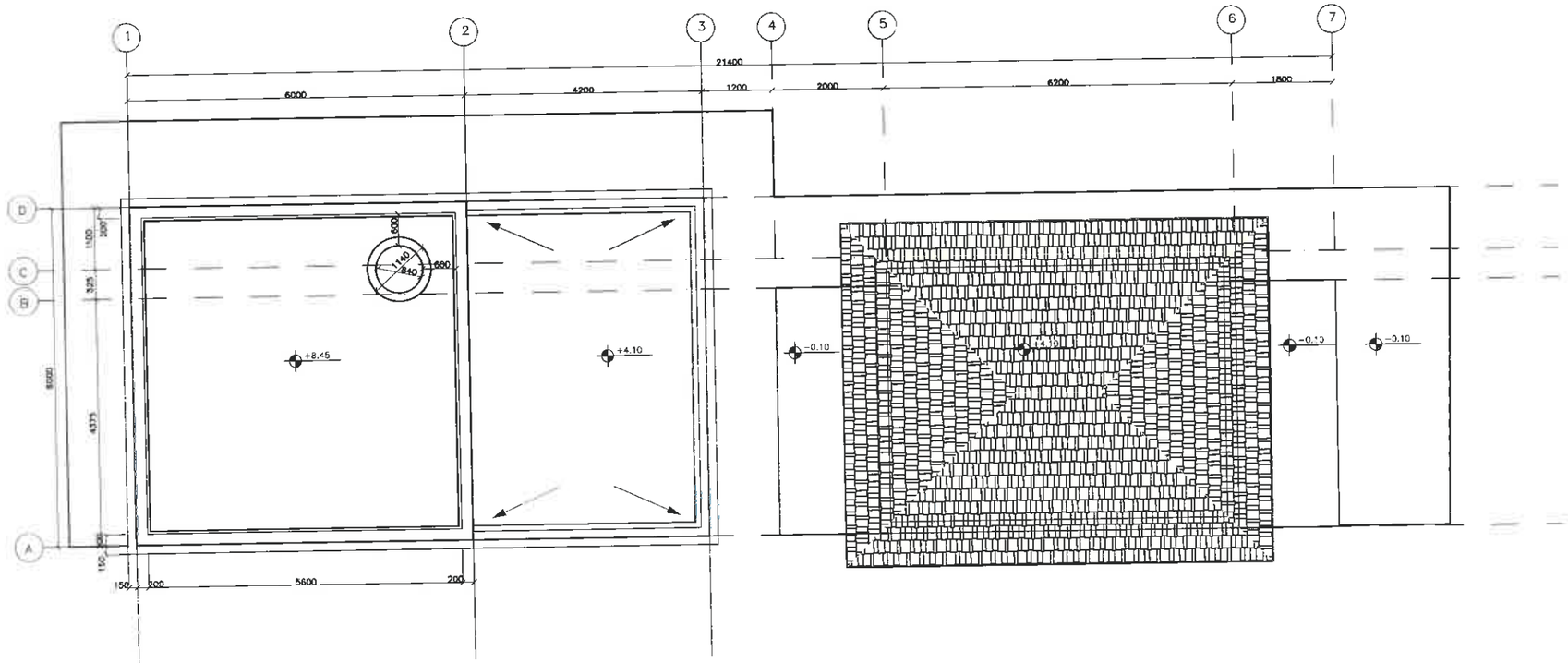
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	SECTION A-A

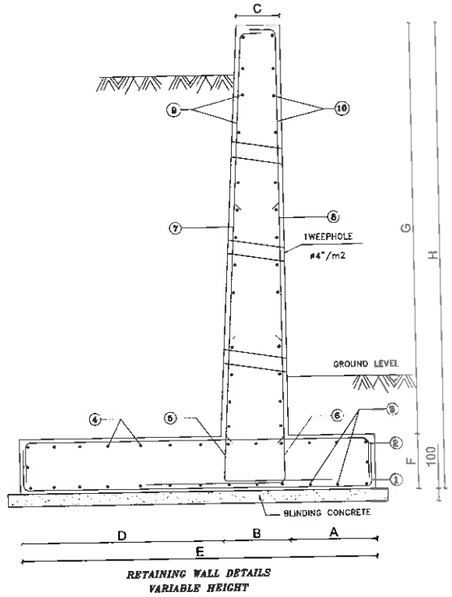
472S-04S04	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE
JULY 2019	1:50	4/13	04

ROOF PLAN
SCALE 1:50



PLAN LEVEL: -0.10,+4.10,+8.45

RETAINING WALL SECTION



RETAINING WALL DETAILS
VARIABLE HEIGHT

DIMENSIONS DETAILS

DIMENSIONS / TYPE No	FORMWORK SCHEDULE							
	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
TYPE I (1000)	200	200	200	400	800	200	1000	1200
TYPE II (1500)	200	200	200	700	1100	200	1500	1700
TYPE III (2000)	300	200	200	1000	1500	200	2000	2200
TYPE IV (2500)	300	250	200	1300	1850	250	2500	2750
TYPE V (3000)	400	300	200	1500	2200	300	3000	3300
TYPE VI (3500)	400	350	200	1800	2550	350	3500	3850
TYPE VII (4000)	400	400	200	2100	2900	400	4000	4400

REINFORCEMENT DETAILS

REINFORCEMENT / HEIGHT (mm)	1	2	3	4	5	6	7	8	9	10
TYPE I (1000)	T12 @200 L=1000	T12 @20 L=1000	T12 @200 L=8000	T12 @200 L=8000	T12 @200 L=1500	T12 @200 L=1500			T12 @200 L=8000	T12 @200 L=8000
TYPE II (1500)	T12 @200 L=1250	T12 @200 L=1250	T12 @200 L=8000	T12 @200 L=8000	T12 @200 L=2000	T12 @200 L=2000			T12 @200 L=8000	T12 @200 L=8000
TYPE III (2000)	T12 @200 L=1750	T12 @200 L=1750	T12 @200 L=8000	T12 @200 L=8000	T12 @200 L=2500	T12 @200 L=2500			T12 @200 L=8000	T12 @200 L=8000
TYPE IV (2500)	T12 @200 L=2250	T14 @200 L=2250	T12 @200 L=5000	T12 @200 L=8000	T14 @200 L=2000	T12 @200 L=2000	T14 @200 L=2500	T12 @200 L=2500	T12 @200 L=8000	T12 @200 L=8000
TYPE V (3000)	T12 @165 L=2500	T14 @165 L=2500	T12 @200 L=5000	T12 @200 L=8000	T14 @165 L=2000	T12 @165 L=2000	T14 @165 L=3000	T12 @165 L=3000	T12 @200 L=8000	T12 @200 L=8000
TYPE VI (3500)	T14 @165 L=3000	T16 @165 L=3000	T12 @200 L=8000	T12 @200 L=8000	T16 @165 L=2500	T14 @165 L=2500	T16 @165 L=3500	T12 @165 L=3500	T12 @200 L=8000	T12 @200 L=8000
TYPE VII (4000)	T14 @140 L=3500	T16 @140 L=3500	T12 @200 L=8000	T12 @200 L=8000	T16 @140 L=2500	T14 @140 L=2500	T16 @140 L=4000	T12 @140 L=4000	T12 @200 L=8000	T12 @200 L=8000

NOTES:

FINISHING SCHEDULE			
ROOM	FLOOR	WALLS	CEILING
CHLORINATION	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CYLINDERS	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
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EXTERNAL FACE OF EXTERIOR WALLS	ACCORDING TO DRAWINGS		

EXTERIOR DOORS	WINDOWS	PROTECTION BARS FOR EXTERIOR WINDOWS
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Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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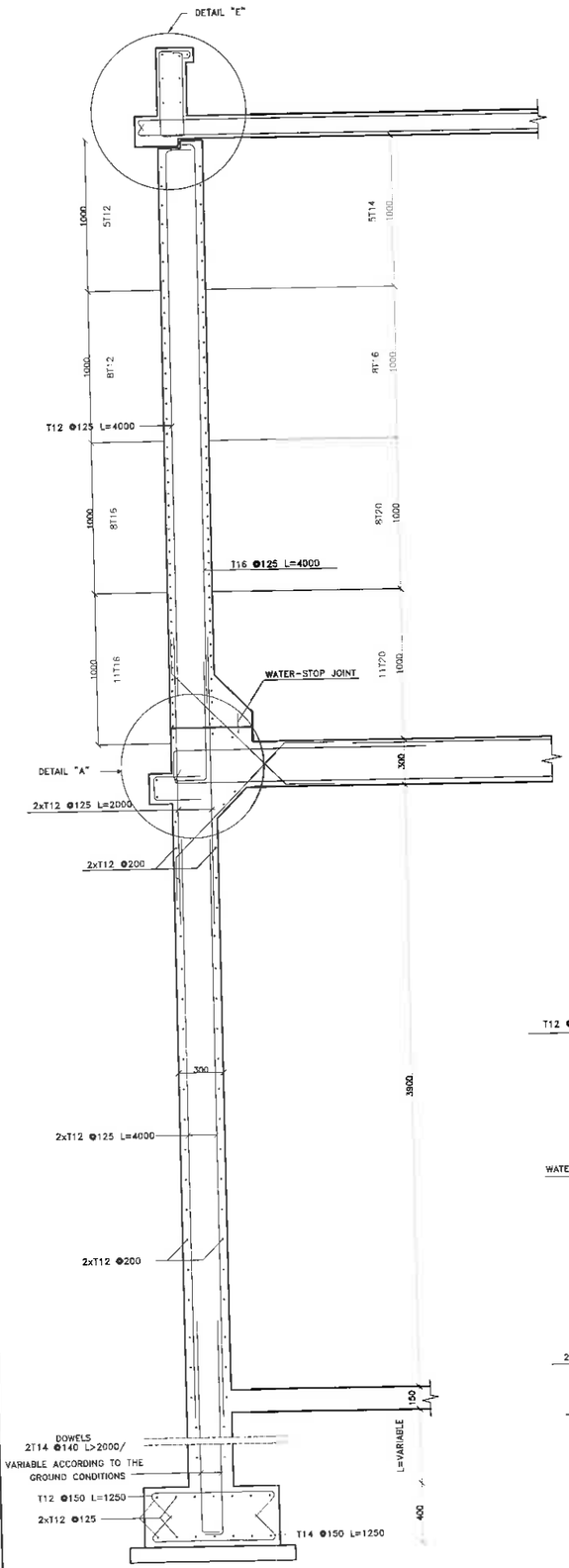
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	ROOF PLAN RETAINING WALL

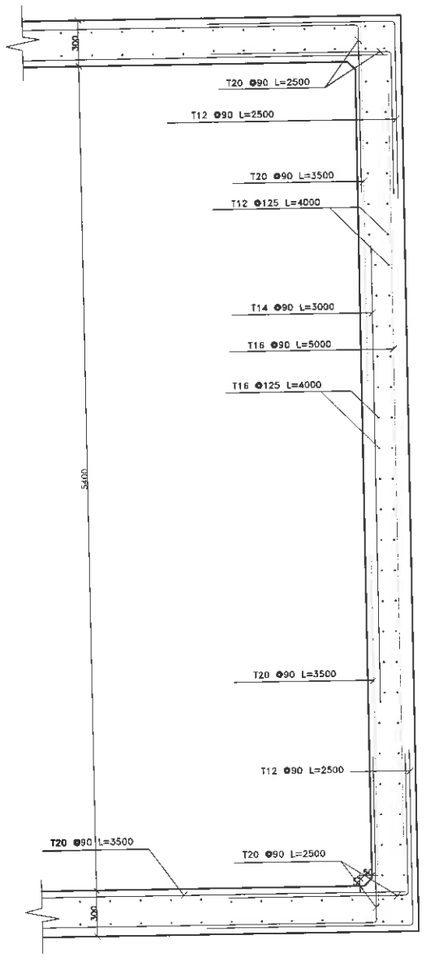
472S-04S05	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

JULY 2019	1:50	5/13	05

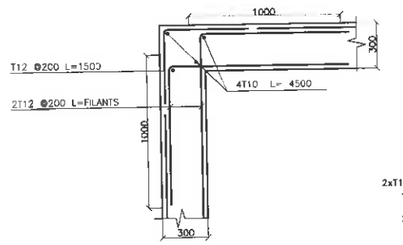
LONGITUDINAL SECTION OF SHEAR WALLS
SCALE: 1:20



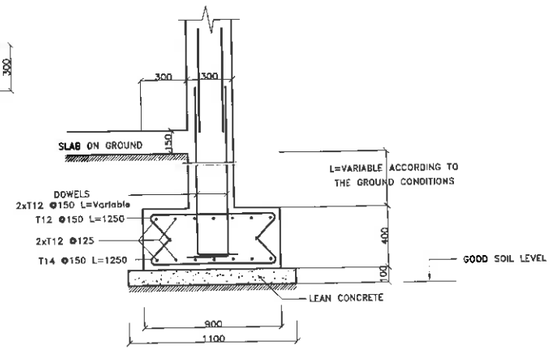
HORIZONTAL SECTION OF WALLS
SCALE: 1:20



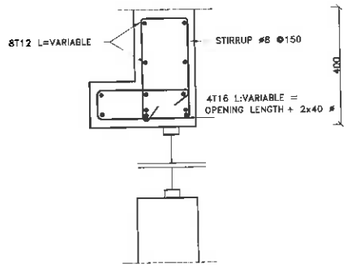
TYPICAL WALL-WALL JOINT
SCALE: 1:20



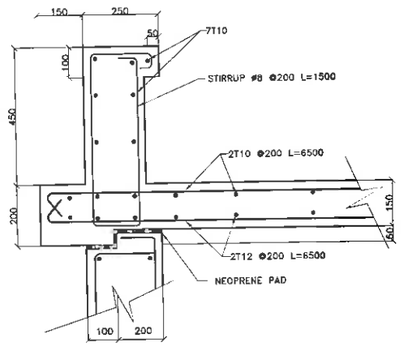
FOUNDATION DETAIL "C"
SCALE: 1:20



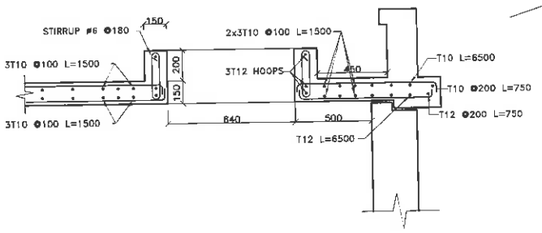
REINFORCEMENT SECTION X-X
SCALE: 1:20



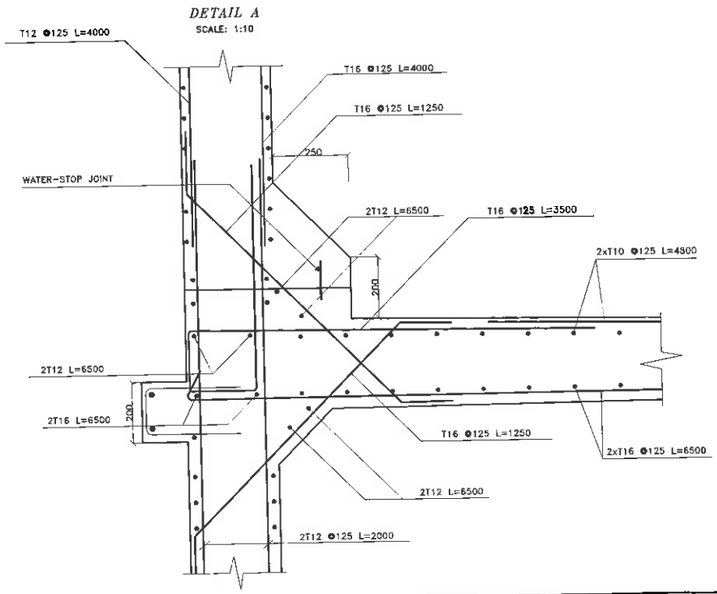
DETAIL E
SCALE: 1:10



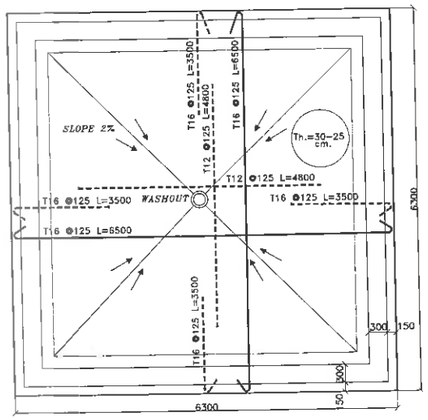
OPENING REINFORCEMENT IN THE WALL
SCALE: 1:20



DETAIL A
SCALE: 1:10



REINFORCEMENT PLAN
RESERVOIR GROUND FLOOR
SCALE: 1:50



NOTES:

REINFORCED CONCRETE:
ORDINARY PORTLAND CEMENT, CONCRETE GRADE C30.
DOSING 400 Kg/m3 FOR WALLS, FLOOR SLAB AND THE RESERVOIR COVER:
350 kg/m3 ELSEWHERE.

LEAN CONCRETE/CYCLOPEAN CONCRETE:
ORDINARY PORTLAND CEMENT, GRADE C20.
DOSING 250 kg/m3.

REINFORCEMENT:
DEFORMED HIGH STRENGTH STEEL BARS: SYMBOL T YIELD STRESS: Fy=400 N/mm2.
MILD STEEL BARS : SYMBOL ø YIELD STRESS: Fy=215 N/mm2.

STRESSES:
SEVERE CONTROL.
CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS:
- ON A CUBE, a= 150mm :30N/mm2
- ON A CYLINDER ø=150mm, h=300mm :25N/mm2
CONCRETE TENSILE STRENGTH AT 28 DAYS :2.1N/mm2
MAXIMUM POURING HEIGHT :1500mm

CONSTRUCTION JOINTS:
PROHIBITED IN RESERVOIR WALLS.
REDUCED TO THE STRICT MINIMUM ELSEWHERE PROVIDED THAT NECESSARY PRECAUTIONS ARE TAKEN, SUCH AS: SETTING RETARDERS, BONDING MATERIALS, WATER-STOP JOINTS.
WATER-STOP JOINTS SHALL BE USED IN EACH CONSTRUCTION JOINT CONTINUOUSLY.
(CONFORMING TO THE PRODUCT'S TECHNICAL SHEET).

ADMIXTURES:
SETTING RETARDERS (CONSTRUCTION JOINTS).
WATERPROOFING ADMIXTURE (TO IMPROVE WATERPROOFNESS OF WALLS, FLOOR SLAB AND RESERVOIR).
THE USE OF CHLORINE BASED ADMIXTURES IS NOT ALLOWED.
EVERY ADMIXTURE SHALL BE APPROVED BY THE ADMINISTRATION.

CONCRETE COVER:
CLEARANCE BETWEEN THE EXTERNAL GENERATRIX OF BARS AND THE FACINGS SHALL BE 40 mm FOR THE RESERVOIR FLOOR SLAB AND WALLS, 30 mm ELSEWHERE.

OVERLAPPING:
LAPS SHALL NOT BE LESS THAN FIFTY TIMES THE BAR DIAMETER.
WHERE SPLICE BARS ARE USED, THEIR LENGTH SHALL NOT BE LESS THAN 2x50ø.
(ø= BAR NOMINAL DIAMETER).
LAPS SHALL BE STAGGERED FROM ONE HOOP TO THE OTHER AND/OR ONE BAR TO THE OTHER IN ORDER TO REDUCE THE NUMBER OF LAPS IN THE SAME SECTION.
PINS ø8 SHALL BE USED ON EACH LAP.

BENDING:
ø > 12mm MECHANICAL.
ø ≤ 12mm MANUAL (POSSIBLY).
STRAIGHTENING OF BENDED BARS IS NOT ALLOWED.

FORMWORK:
ALL EXECUTED CONCRETE SHALL BE FAIR FACED CONCRETE.
DOUBLE THREADED WATERPROOF CONNECTION SLEEVES SHALL BE USED FOR RESERVOIR FORMWORKS TIE-RODS.
THE USE OF ø8mm BARS AS TIE-RODS IS NOT ALLOWED.
HOLES MADE BY TIE-RODS SHALL BE FILLED WITH A NON SHRINK GROUT BY MEANS OF SPECIAL INJECTION METHODS.

DRAWINGS CONSIDERATION:
---------- TOP BARS
———— BOTTOM BARS

REMARKS:
- ALL THE DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
- SCALING FROM THESE DRAWINGS IS NOT ALLOWED.
- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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MINISTRY OF ENERGY WATER
COUNCIL FOR DEVELOPMENT RECONSTRUCTION

BUREAU TECHNIQUE POUR LE DEVELOPPEMENT
JALL ED DIB – HAJAL Bldg
P.O.BOX:70492 – ANTELIAS
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CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE
100M3 BREAK TANK
AND PUMPING STATION

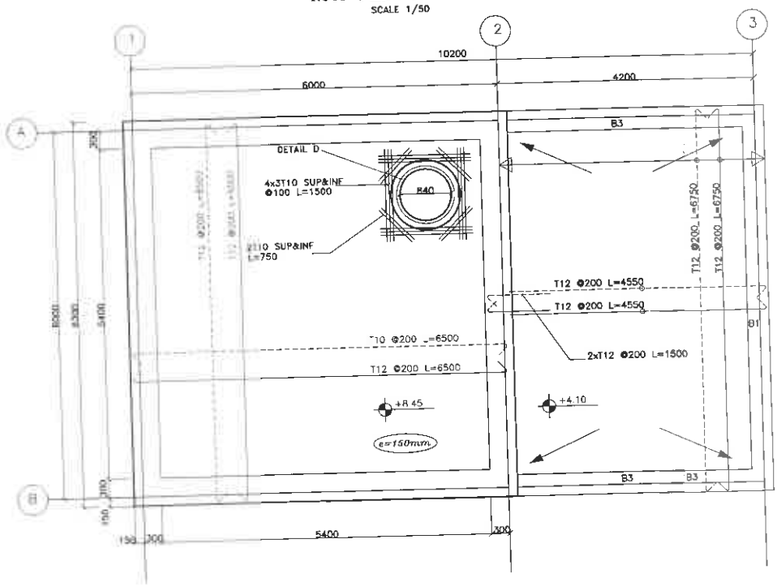
REINFORCEMENT DETAILS

DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S06	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:10-1:20-1:50	6/13	06

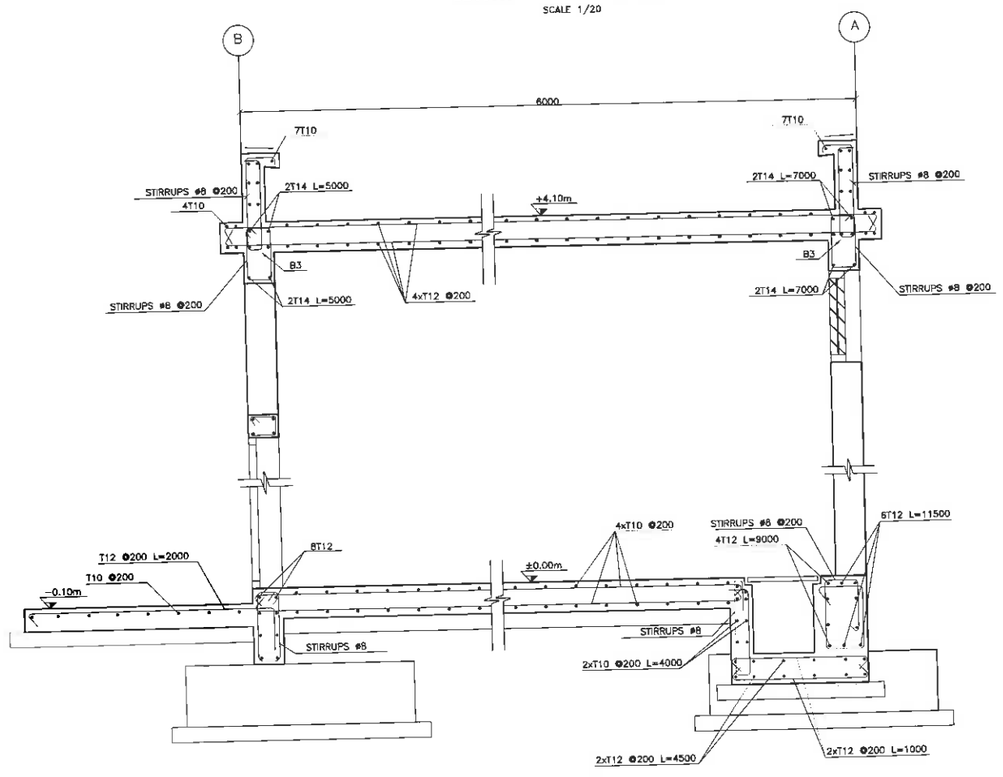
ROOF PLAN: R.C. DETAIL

SCALE 1/50



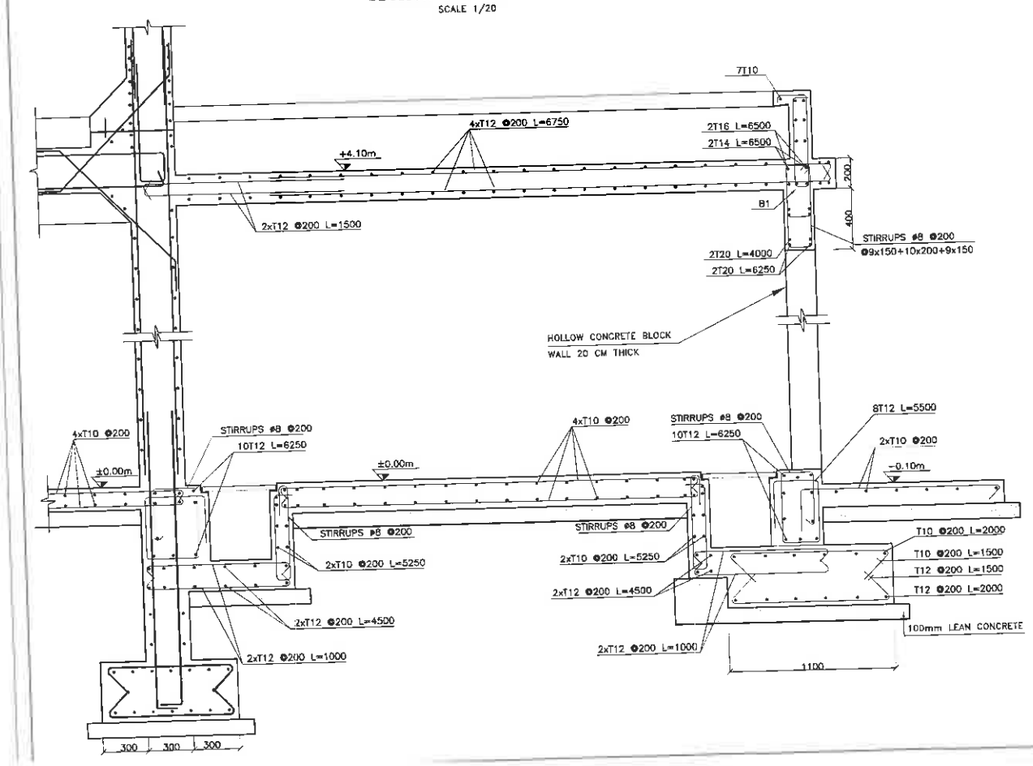
SECTION Y-Y: R.C. DETAIL

SCALE 1/20



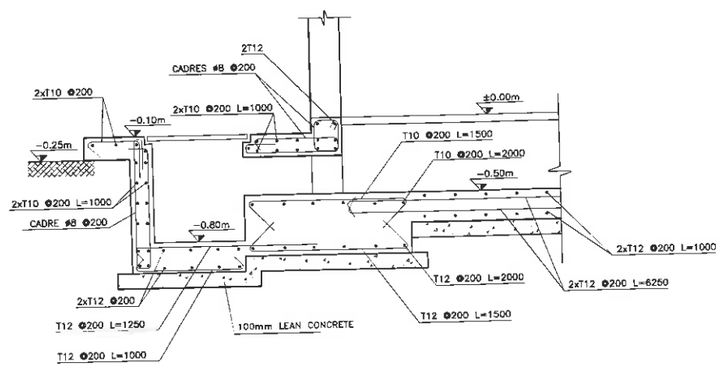
SECTION X-X: R.C. DETAIL

SCALE 1/20



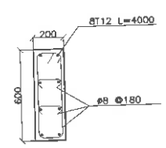
SECTION 4-4: R.C. DETAIL

SCALE 1/20



TYPICAL BEAM SECTION

SCALE 1/20



NOTES:

REINFORCED CONCRETE:
ORDINARY PORTLAND CEMENT, CONCRETE GRADE C30.
DOSING 400 Kg/m3 FOR WALLS, FLOOR SLAB AND THE RESERVOIR COVER;
350 kg/m3 ELSEWHERE.

LEAN CONCRETE/CYCLOPEAN CONCRETE:
ORDINARY PORTLAND CEMENT, GRADE C20.
DOSING 250 kg/m3.

REINFORCEMENT:
DEFORMED HIGH STRENGTH STEEL BARS: SYMBOL T YIELD STRESS: Fy=400 N/mm2.
MILD STEEL BARS : SYMBOL ø YIELD STRESS: Fy=215 N/mm2.

STRESSES:
SEVERE CONTROL.
CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS:
- ON A CUBE, a= 150mm :30N/mm2
- ON A CYLINDER ø=150mm, h=300mm :25N/mm2
CONCRETE TENSILE STRENGTH AT 28 DAYS :2.1N/mm2
MAXIMUM POURING HEIGHT :1500mm

CONSTRUCTION JOINTS:
PROHIBITED IN RESERVOIR WALLS.
REDUCED TO THE STRICT MINIMUM ELSEWHERE PROVIDED THAT NECESSARY PRECAUTIONS ARE TAKEN, SUCH AS: SETTING RETARDERS, BONDING MATERIALS, WATER-STOP JOINTS.
WATER-STOP JOINTS SHALL BE USED IN EACH CONSTRUCTION JOINT CONTINUOUSLY.
(CONFORMING TO THE PRODUCT'S TECHNICAL SHEET).

ADMIXTURES:
SETTING RETARDERS (CONSTRUCTION JOINTS).
WATERPROOFING ADMIXTURE (TO IMPROVE WATERPROOFNESS OF WALLS, FLOOR SLAB AND RESERVOIR).
THE USE OF CHLORINE BASED ADMIXTURES IS NOT ALLOWED.
EVERY ADMIXTURE SHALL BE APPROVED BY THE ADMINISTRATION.

CONCRETE COVER:
CLEARANCE BETWEEN THE EXTERNAL GENERATRIX OF BARS AND THE FACINGS SHALL BE 40 mm FOR THE RESERVOIR FLOOR SLAB AND WALLS, 30 mm ELSEWHERE.

OVERLAPPING:
LAPS SHALL NOT BE LESS THAN FIFTY TIMES THE BAR DIAMETER.
WHERE SPLICE BARS ARE USED, THEIR LENGTH SHALL NOT BE LESS THAN 2x50ø.
(ø= BAR NOMINAL DIAMETER).
LAPS SHALL BE STAGGERED FROM ONE HOOP TO THE OTHER AND/OR ONE BAR TO THE OTHER IN ORDER TO REDUCE THE NUMBER OF LAPS IN THE SAME SECTION.
PINS #8 SHALL BE USED ON EACH LAP.

BENDING:
ø > 12mm MECHANICAL.
ø ≤ 12mm MANUAL (POSSIBLY).
STRAIGHTENING OF BENDED BARS IS NOT ALLOWED.

FORMWORK:
ALL EXECUTED CONCRETE SHALL BE FAIR FACED CONCRETE.
DOUBLE THREADED WATERPROOF CONNECTION SLEEVES SHALL BE USED FOR RESERVOIR FORMWORKS TIE-RODS.
THE USE OF ø6mm BARS AS TIE-RODS IS NOT ALLOWED.
HOLES MADE BY TIE-RODS SHALL BE FILLED WITH A NON SHRINK GROUT BY MEANS OF SPECIAL INJECTION METHODS.

DRAWINGS CONSIDERATION:
----------TOP BARS
——————BOTTOM BARS

REMARKS:
- ALL THE DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
- SCALING FROM THESE DRAWINGS IS NOT ALLOWED.

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

REPUBLIC OF LEBANON
MINISTRY OF ENERGY WATER
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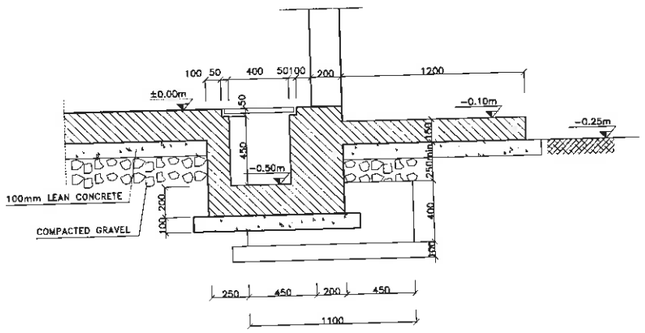
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

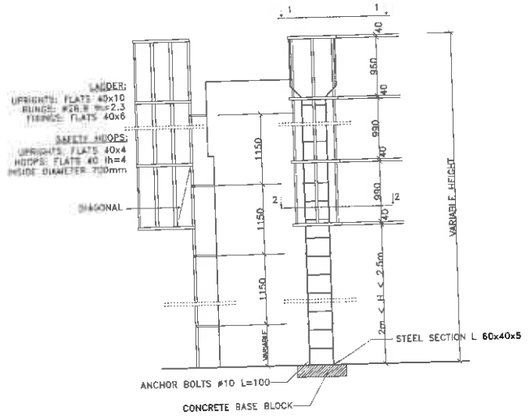
RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	REINFORCEMENT DETAILS

DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S07	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

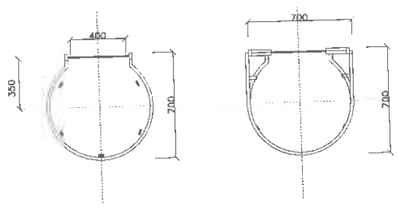
DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:20 – 1:50	7/13	07

SECTION 3–3
SCALE: 1:20





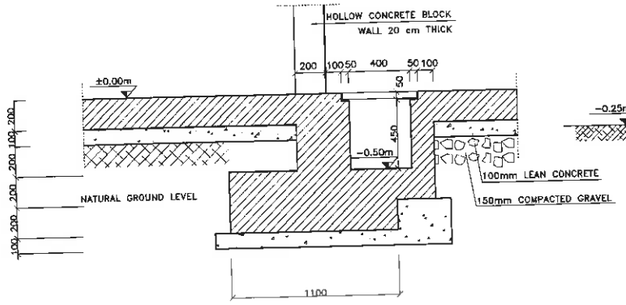
EXTERIOR STEEL LADDER DETAIL
SCALE: 1:50

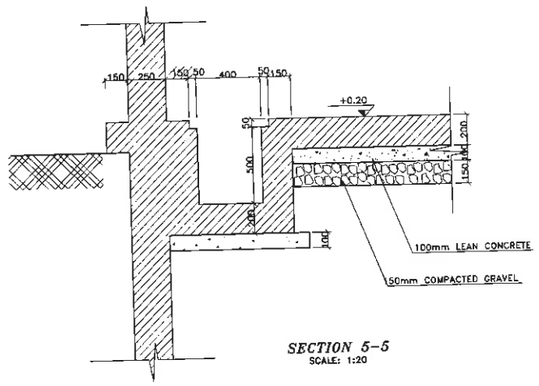


VIEW 2–2
SCALE: 1:10

VIEW 1–1
SCALE: 1:10

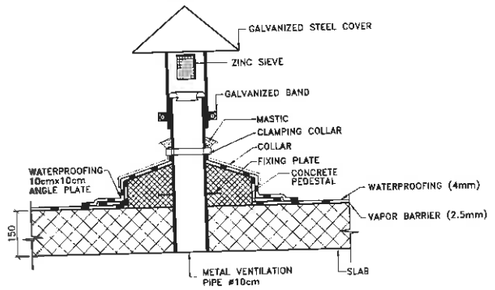
SECTION 2–2
SCALE: 1:20



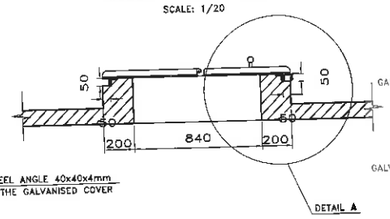


SECTION 5–5
SCALE: 1:20

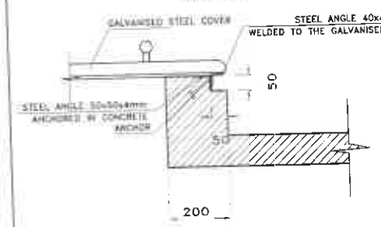
ROOF VENTILATION PIPE DETAIL
SCALE: 1:10



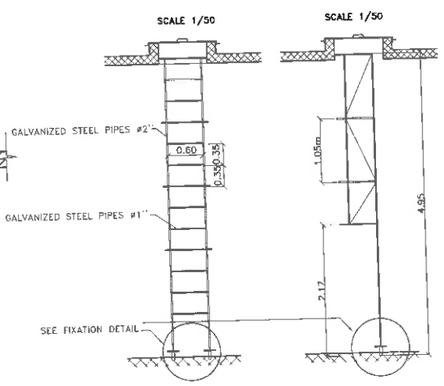
ACCESS OPENING DETAIL
SCALE: 1/20



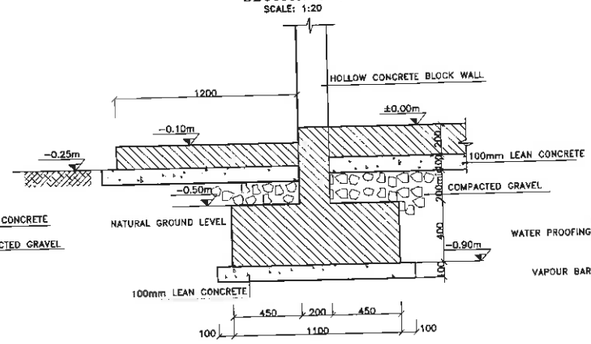
DETAIL A
SCALE 1:10



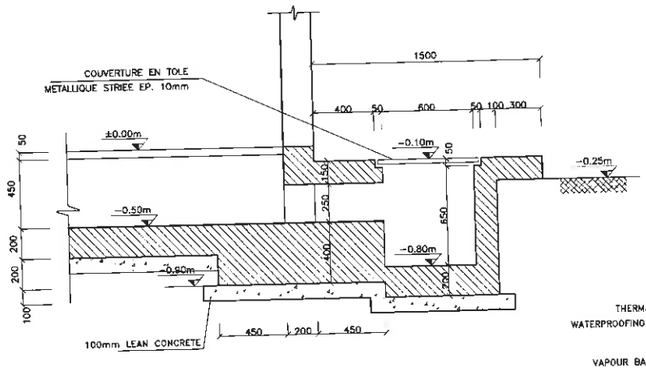
INTERIOR STEEL LADDER DETAIL



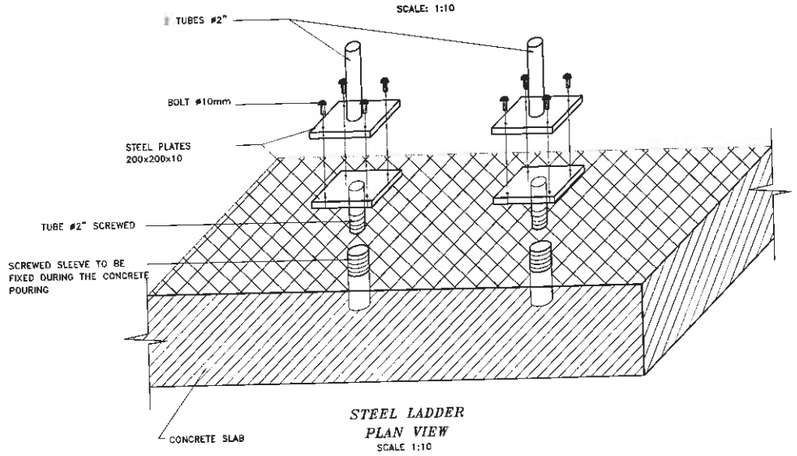
SECTION 1–1
SCALE: 1:20



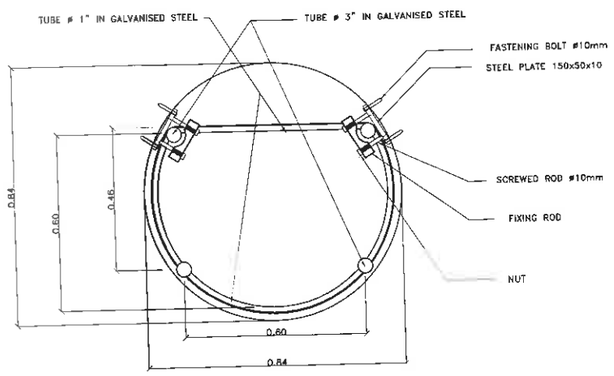
SECTION 4–4
SCALE: 1/20



FIXATION OF THE INTERIOR METALLIC LADDER
SCALE: 1:10



STEEL LADDER PLAN VIEW
SCALE 1:10



WATERPROOFING DETAIL
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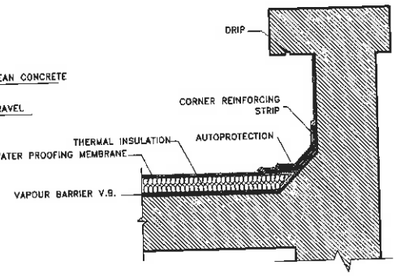
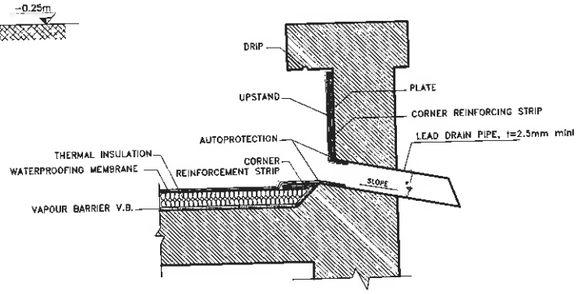


DETAIL RAIN WATER DRAINAGE
SCALE: 1:10



Rev.	Date	Dsgn.	Drwn.	Chk'd	Appr'd

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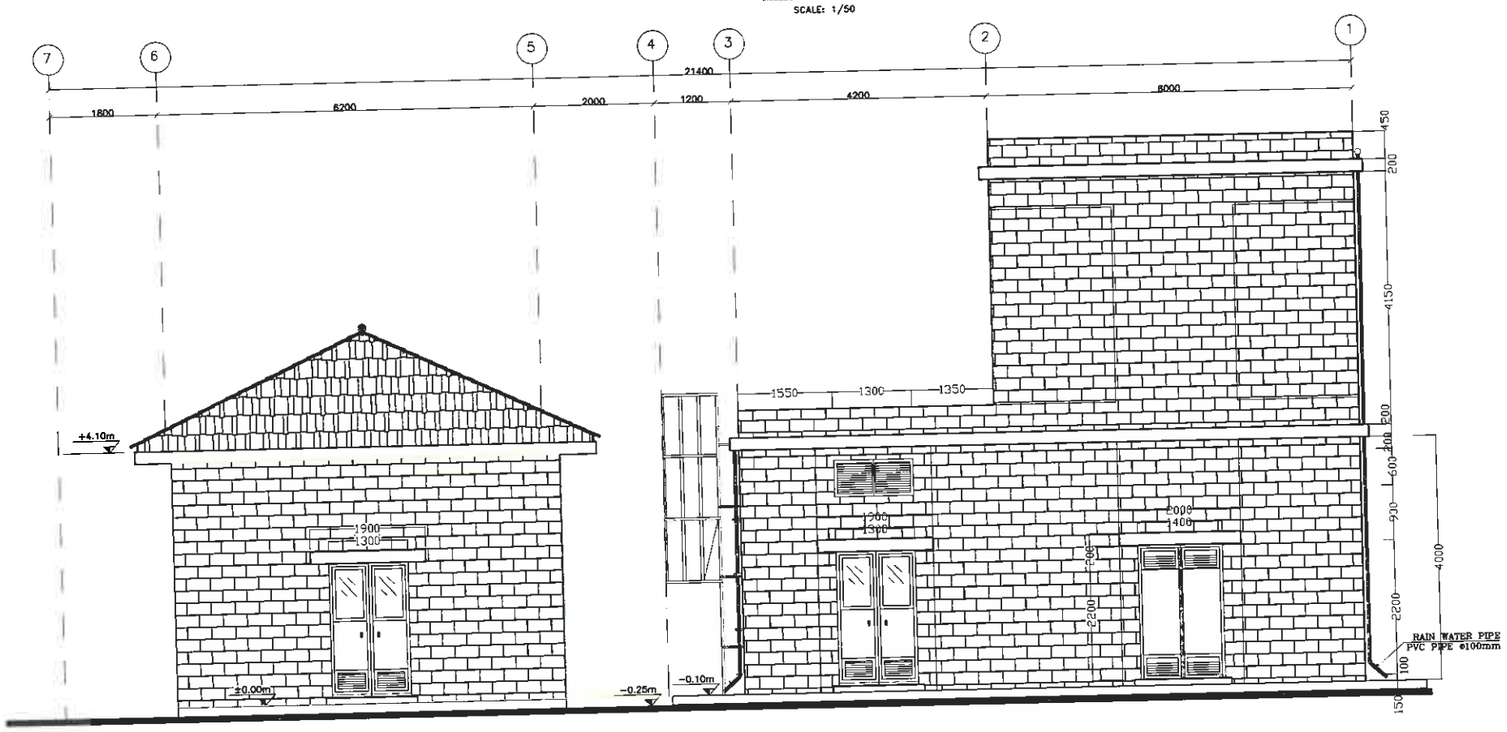
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	FORMWORK DETAILS

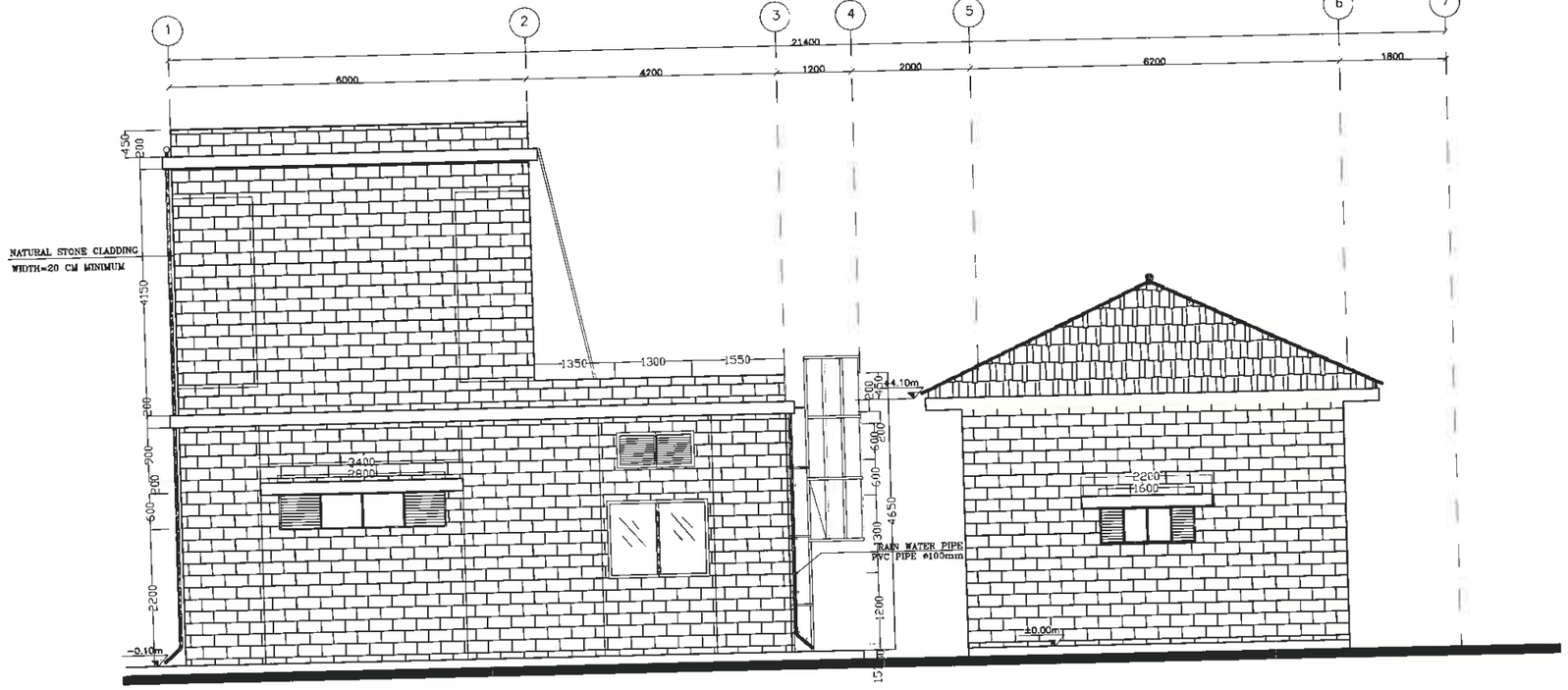
DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S08	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:10–1:20–1:50	8/13	08

MAIN ELEVATION
SCALE: 1/50



LATERAL ELEVATION
SCALE: 1/50



NOTES:

FINISHING SCHEDULE			
ROOM	FLOOR	WALLS	CEILING
CHLORINATION	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CYLINDERS	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CONTROL ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
EXTERNAL FACE OF EXTERIOR WALLS	ACCORDING TO DRAWINGS		

EXTERIOR DOORS	WINDOWS	PROTECTION BARS FOR EXTERIOR WINDOWS
STEEL PANELS 3mm THICK (ACCORDING TO DRAWINGS)	ALUMINUM (ACCORDING TO DRAWINGS)	STEEL SQUARE BARS 10x10 (ACCORDING TO DRAWINGS)

N.B.

- SCALING FROM THIS DRAWING IS NOT ALLOWED
  ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED.
  ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- THIS DESIGN HAS BEEN FOUNDED ON AN HYPOTHESIS STATING THAT THE SOIL IN THE PROJECT AREA IS CONSTITUTED COMPLETELY OF A HARD AND CONTINUOUS LIMESTONE FORMATION. IF DURING EXECUTION A CONTRADICTORY REALITY APPEARS, THE DESIGN SHALL BE REVISED TO COMPLY WITH THE EVENTUAL NEW DATA REVEALED.
- THE TRENCH LOCATION COULD BE MODIFIED ACCORDING TO THE EQUIPMENT TO BE INSTALLED.
- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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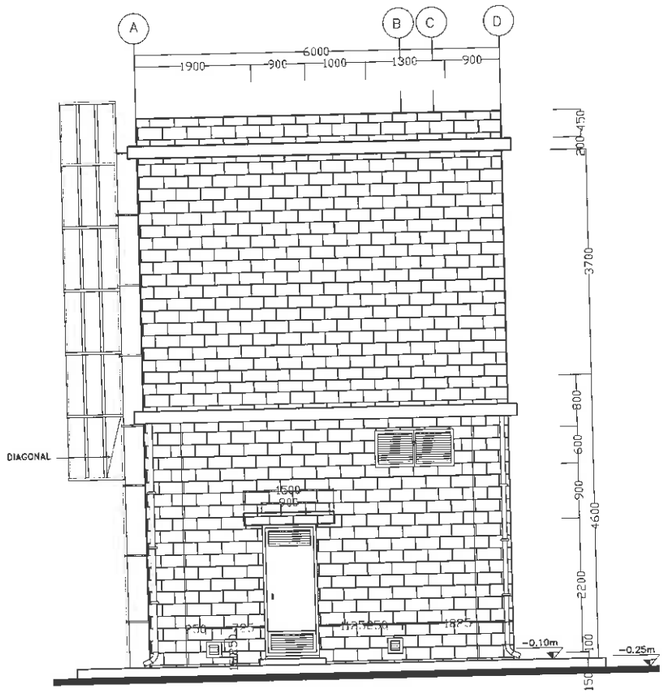
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	ELEVATIONS – SECTION

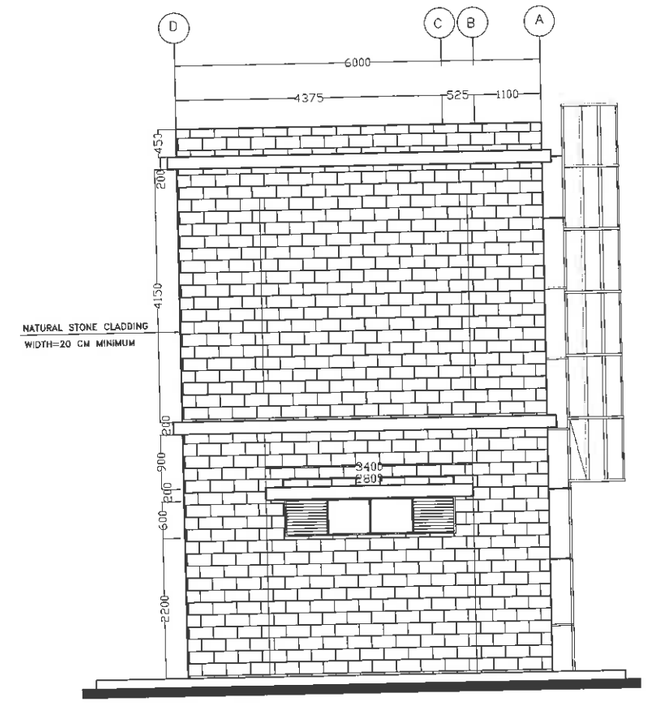
FILE	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S09	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	DRAWING No.
JULY 2019	1:50	9/13	09

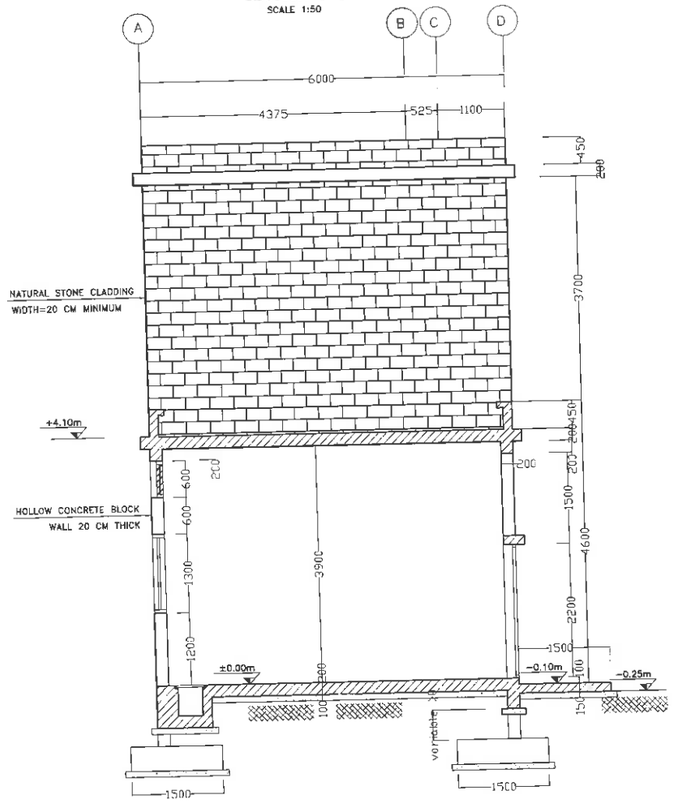
LATERAL ELEVATION
SCALE 1:50



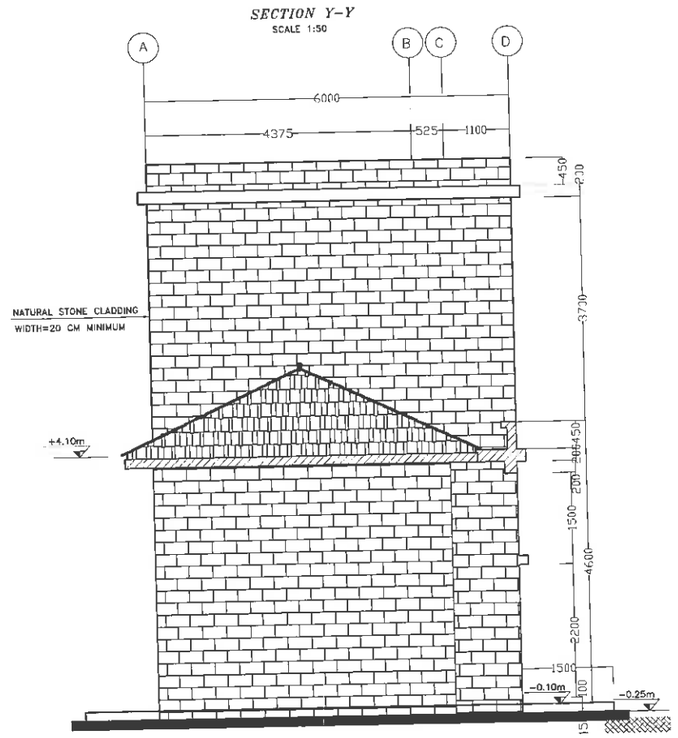
LATERAL ELEVATION
SCALE 1:50



SECTION Y-Y
SCALE 1:50



SECTION Y-Y
SCALE 1:50



NOTES:

FINISHING SCHEDULE			
ROOM	FLOOR	WALLS	CEILING
CHLORINATION	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CYLINDERS	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
CONTROL ROOM	INDUSTRIAL RESIN	INTERNAL USE COATING, WASHABLE	INTERNAL USE COATING, WASHABLE
EXTERNAL FACE OF EXTERIOR WALLS	ACCORDING TO DRAWINGS		

EXTERIOR DOORS	WINDOWS	PROTECTION BARS FOR EXTERIOR WINDOWS
STEEL PANELS 3mm THICK (ACCORDING TO DRAWINGS)	ALUMINIUM (ACCORDING TO DRAWINGS)	STEEL SQUARE BARS 10x10 (ACCORDING TO DRAWINGS)

N.B.

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  ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
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- THE TRENCH LOCATION COULD BE MODIFIED ACCORDING TO THE EQUIPMENT TO BE INSTALLED.
- THE LEVEL ±0.00 IS EQUIVALENT TO +1277.50m

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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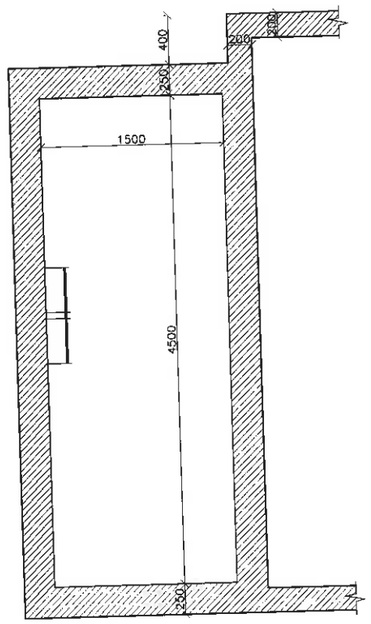
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE
100M3 BREAK TANK
AND PUMPING STATION

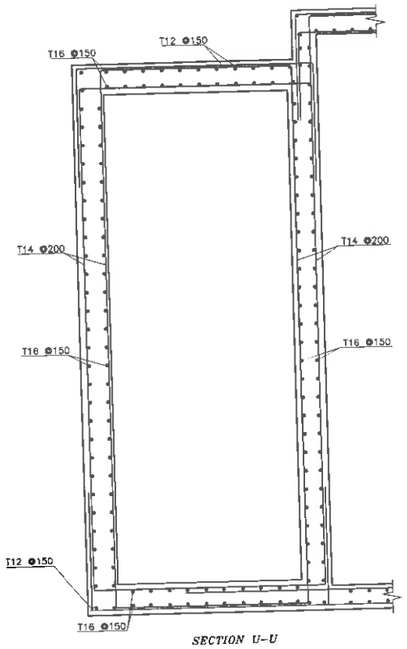
ELEVATIONS – SECTION

FILE	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S10	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

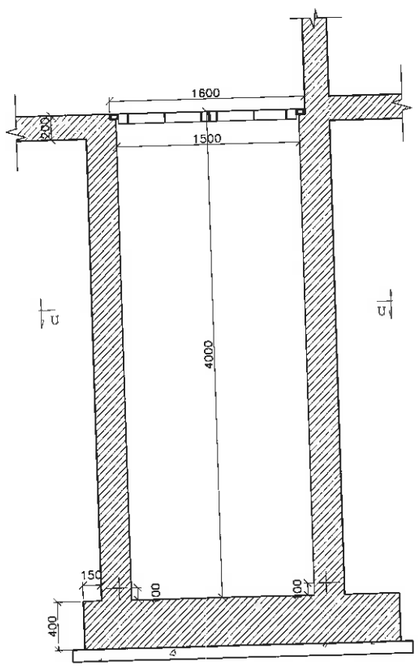
DATE	SCALE	SHEET No.	DRAWING No.
JULY 2019	1:50	10/13	10



SECTION U-U
FORMWORK OF HORIZONTAL SECTION
SCALE: 1:20



SECTION U-U
REINFORCEMENT OF HORIZONTAL SECTION
SCALE: 1:20



FORMWORK OF VERTICAL SECTION
SCALE: 1:20

- GROUND LEVEL OF PUMPING STATION BUILDING = +1277.50m
- DO NOT SCALE FROM THIS DRAWING
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
- ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED

TOPOGRAPHICAL LEGEND

CULVERT/BRIDGE	RETAINING WALL
SPRING	RAILWAY
WELL	CHANNEL
	TERRACE
DECIDUOUS/PINE TREE	FENCE
	STREAM/RIVER
ROCKS	
BUSHES	
MH S MANHOLE SEWER	PYL PYLON
MH W MANHOLE WATER	El. S.S ELECTRIC SUB STATION
MH T MANHOLE TELEPHONE	EP/TP ELECTRIC POLE/TELEGRAPH POLE
MH NI MANHOLE NOT IDENTIFIED	OVERGROUND WATER PIPE
LP LIGHTING POLE	UNDERGROUND WATER PIPE
	1160.12 SPOT HEIGHT
U/C BUILDING FOUNDATION/BUILDING UNDER CONSTRUCTION	TRAVERSING STATION
	TRIANGULATION POINT
	BENCH MARK
ROAD	
TRACK	384 LOT No
REFERENCE LINE	BOUNDARY
SIDE WALK	CIRCONSCRIPTION BOUNDARY

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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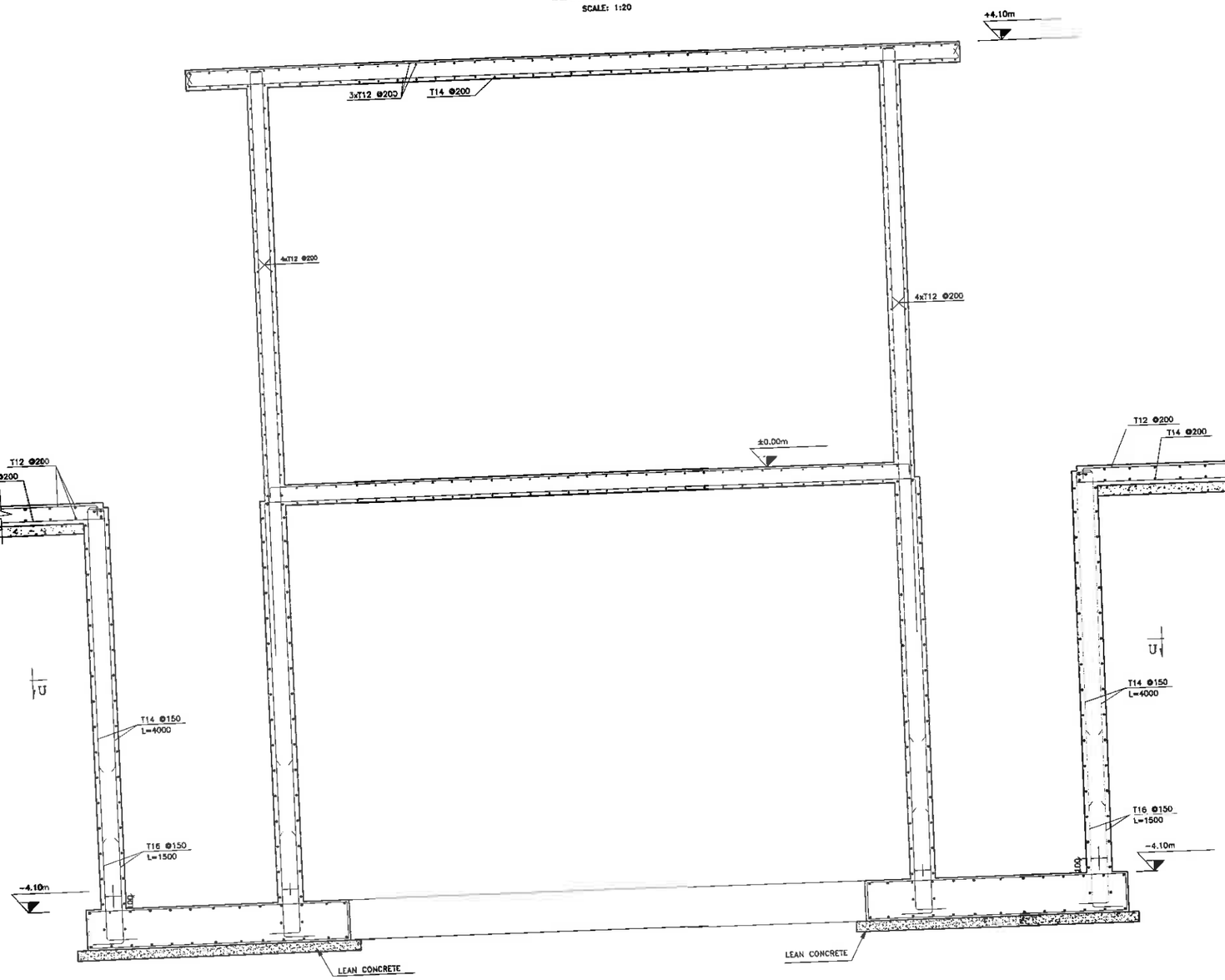
RAM BOREHOLE
100M3 BREAK TANK
AND PUMPING STATION

REINFORCEMENT DETAILS

DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S11	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:20	11/13	11

SECTION B–B
SCALE: 1:20



- GROUND LEVEL OF PUMPING STATION BUILDING = +1277.50m
- DO NOT SCALE FROM THIS DRAWING
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
- ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED

TOPOGRAPHICAL LEGEND

CULVERT/BRIDGE	RETAINING WALL
SPRING	RAILWAY
WELL	CHANNEL
DECIDUOUS/PINE TREES	TERRACE
ROCKS	FENCE
BUSHES	STREAM/RIVER
MANHOLE SEWER	PYLON
MANHOLE WATER	ELECTRIC SUB STATION
MANHOLE TELEPHONE	ELECTRIC POLE/TELEGRAPH POLE
MANHOLE NOT IDENTIFIED	OVERGROUND WATER PIPE
LIGHTING POLE	UNDERGROUND WATER PIPE
BUILDING	SPOT HEIGHT
FOUNDATION/BUILDING UNDER CONSTRUCTION	TRAVERSING STATION
ROAD	TRIANGULATION POINT
TRACK	BENCH MARK
REFERENCE LINE	LOT No
SIDE WALK	BOUNDARY
	CONSCRIPTION BOUNDARY

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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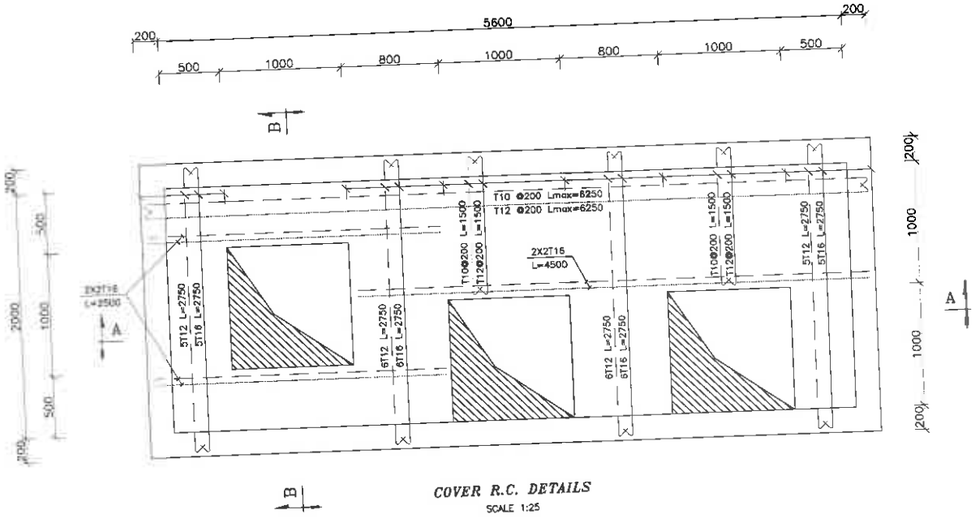
CONSTRUCTION OF PUMPING STATIONS IN TARAYA,
BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE
100M3 BREAK TANK
AND PUMPING STATION

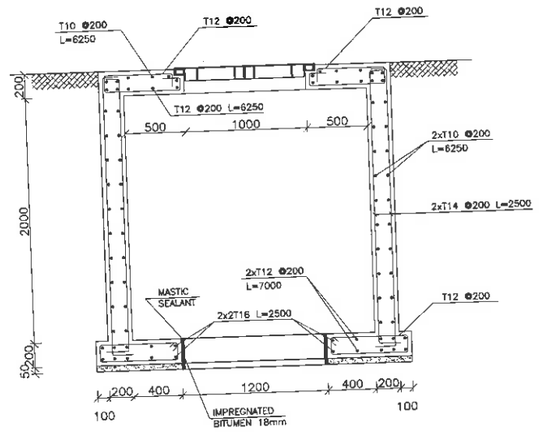
REINFORCEMENT DETAILS

DRAWING No.	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S12	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

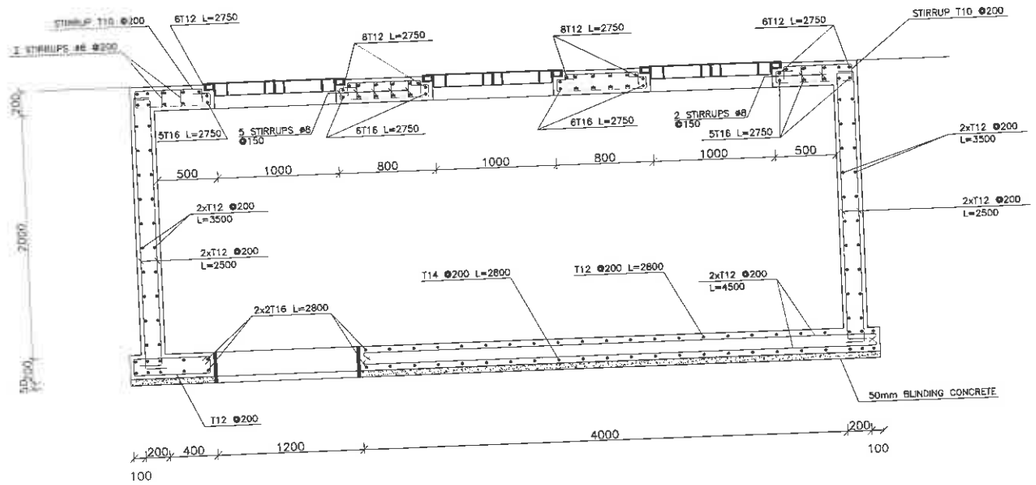
DATE	SCALE	SHEET No.	SEQ. No.
JULY 2019	1:200	12/13	12



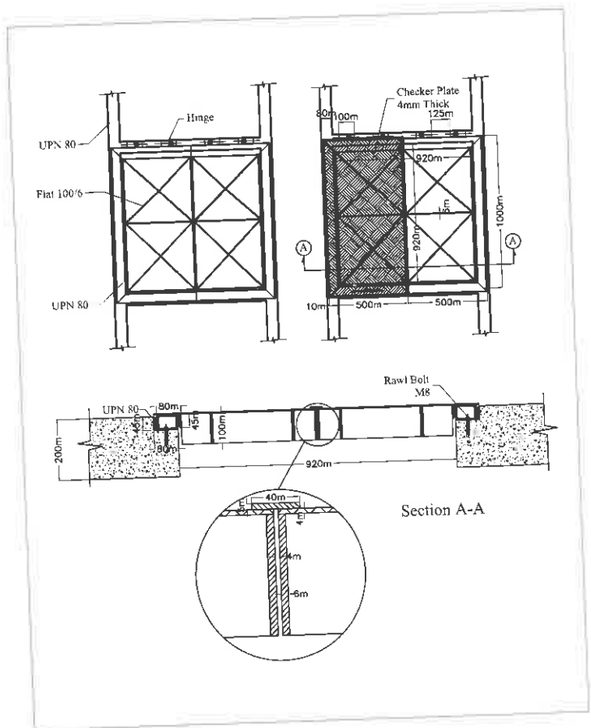
COVER R.C. DETAILS
SCALE 1:25



SECTION B–B : R.C. DETAIL
SCALE 1:25



SECTION A–A : R.C. DETAIL
SCALE 1:25



NOTES:

REINFORCED CONCRETE: CONCRETE GRADE C30 FOR ALL STRUCTURES

MIX ELEMENTS: ORDINARY PORTLAND CEMENT

STRESSES: CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS:
– ON A CUBE, e= 150mm : 30N/mm2
– ON A CYLINDER ø=50mm, h=300mm : 25N/mm2
CONCRETE TENSILE STRENGTH AT 28 DAYS: 2.1N/mm2
MAXIMUM POURING HEIGHT :1500mm.

CONCRETE COVER: CLEARANCE BETWEEN THE EXTERNAL GENERATRIX OF BARS AND THE FACINGS SHALL BE30mm FOR STRUCTURES FLOOR SLAB, WALLS AND COVER.

LEAN CONCRETE (BLINDING) / CYCLOPEAN CONCRETE: MIX MADE WITH ORDINARY PORTLAND CEMENT. 250Kg/m3.

REINFORCEMENT: DEFORMED HIGH STRENGTH STEEL BARS. SYMBOL : T
YIELD STRESS : fy= 420N/mm2
MILD STEEL BARS SYMBOL : ø YIELD-STRESS : Fy= 250N/mm2

OVERLAPPING: LAPS SHALL NOT BE LESS THAN FIFTY TIMES THE BAR DIAMETER
WHERE SPLICE BARS ARE USED, THEIR LENGTH SHALL NOT BE LESS THAN 2x50ø (ø= NOMINAL DIAMETER OF BAR)
LAPS SHALL BE STAGGERED FROM ONE HOOP TO THE OTHER AND/OR ONE BAR TO THE OTHER IN ORDER TO REDUCE THE NUMBER OF LAPS IN A SECTION.
PINS ø8 SHALL BE USED ON EACH LAP.

BENDING: ø> 12mm MECHANICALLY COMPULSORILY
ø< 12mm MANUALLY EVENTUALLY
STRAIGHTENING OF BENDED BARS IS NOT ALLOWED.

DRAWINGS CONSIDERATION:
——— TOP BARS
——— BOTTOM BARS

CONSTRUCTION JOINTS: REDUCED TO THE STRICT MINIMUM IN ALL ELEMENTS PROVIDED THAT NECESSARY PRECAUTIONS ARE TAKEN. SETTING RETARDERS, BONDING MATERIALS

ADMIXTURES: SETTING RETARDERS (CONSTRUCTION JOINTS), PLASTISIZERS,
THE USE OF CHLORINE BASED ADMIXTURES IS NOT ALLOWED.

FORMWORK: ALL EXECUTED INTERIOR CONCRETE SHALL BE FAIR FACE CONCRETE.
TIE RODS HOLES MADE BY THE TIE-RODS SHALL BE FILLED WITH A NON SHRINK GROUT BY MEANS OF SPECIAL INJECTION METHODS.
ALL MATERIALS AND EXECUTION PROCESSES SHOULD BE SUBMITTED FOR APPROVAL.
THE USE OF ø6mm BARS AS TIE-RODS IS NOT ALLOWED.

METALWORKS: DOORS ARE MADE OF 3mm MINIMUM SHEET PLATE AND SHALL BE EPOXY PAINTED (PRIMER AND A MINIMUM OF TWO COATS) OPENINGS AND VENTILATIONS SHALL BE TAKEN INTO CONSIDERATION ACCORDING TO THE EQUIPEMENT TO BE INSTALLED

N.B.
- SCALING FROM THIS DRAWING IS NOT ALLOWED.
- ALL LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

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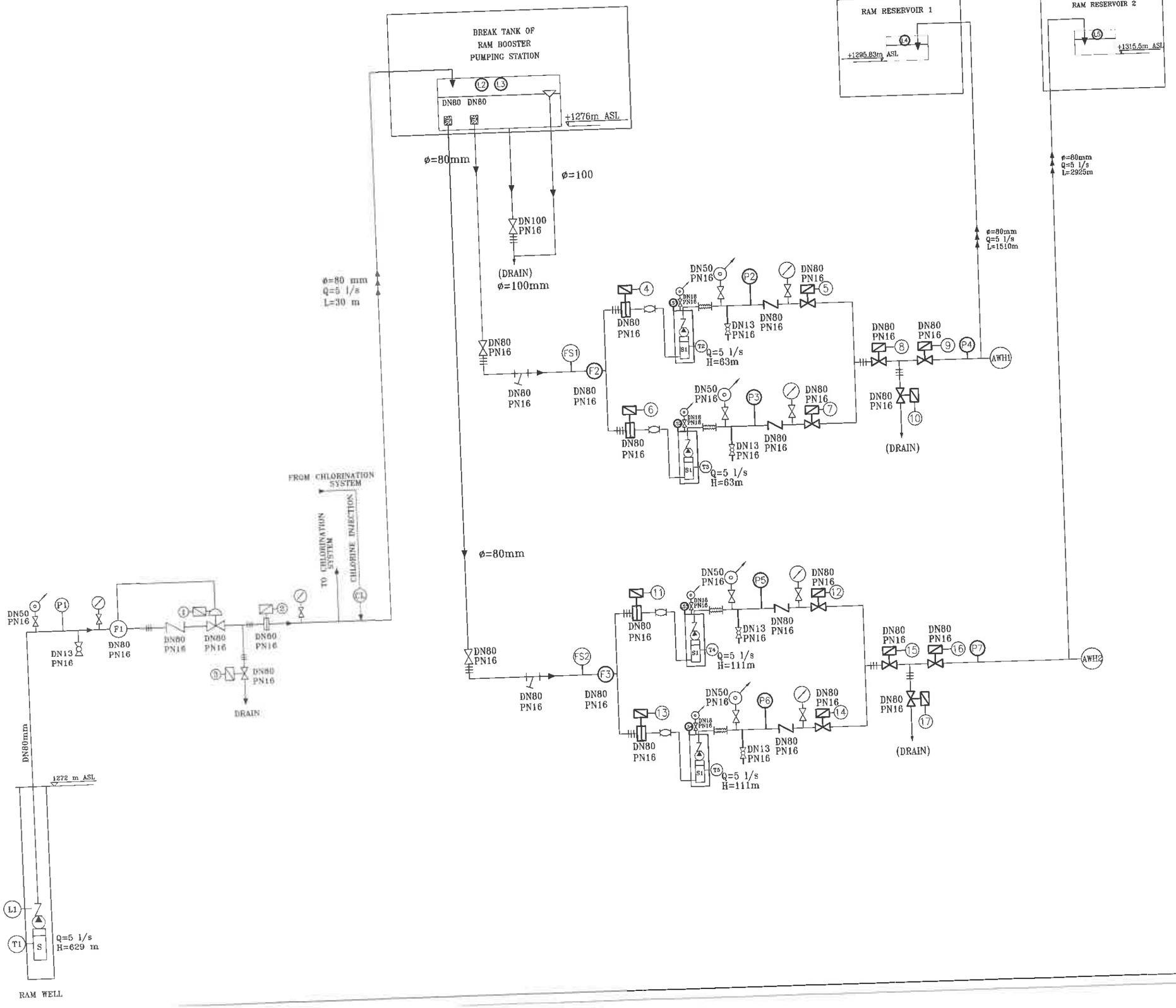
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM BOREHOLE 100M3 BREAK TANK AND PUMPING STATION	HEAD WORK STRUCTURAL DETAILS

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472S-04S13	W. SEIFEDDINE	W. SEIFEDDINE	W. SEIFEDDINE

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	1:25	13/13	13



LEGEND:

- : SUBMERSIBLE PUMP
- DN : NOMINAL DIAMETER
- PN : NOMINAL PRESSURE
- (P) : PRESSURE MEASURMENT
- (FS) : FLOW SWITCH
- (T) : TEMPERATURE MEASURMENT
- (L) : LEVEL MEASURMENT
- (F) : FLOW MEASURMENT
- GLYCERINE FILLED MANOMETER ø100 WITH 3 WAY VALVE.
- (AWH) : SURGE SUPPRESSION EQUIPMENT.
- PIPELINE
- : DOUBLE AIR RELEASE VALVE WITH ISOLATING VALVE.
- ELECTRIC ACTUATOR
- GATE VALVE
- CHECK VALVE (ANTI SLAM TYPE)
- SAMPLING VALVE
- PERFORATED CHECK VALVE
- : DEMOUNTABLE JOINT
- SURGE ANTICIPATION VALVE
- GLOBE VALVE
- : BUTTERFLY VALVE
- PUMPING LINE
- GRAVITY LINE
- : REGULATING VALVE
- : FLEXIBLE JOINT
- (CL) : CHLORINE INJECTION
- : STRAINER
- RUBBER SPHERICAL FLEXIBLE JOINT.
- STAINLESS STEEL FLEXIBLE JOINT.
- (PRV) : PRESSURE REDUCING VALVE
- : Y STRAINER

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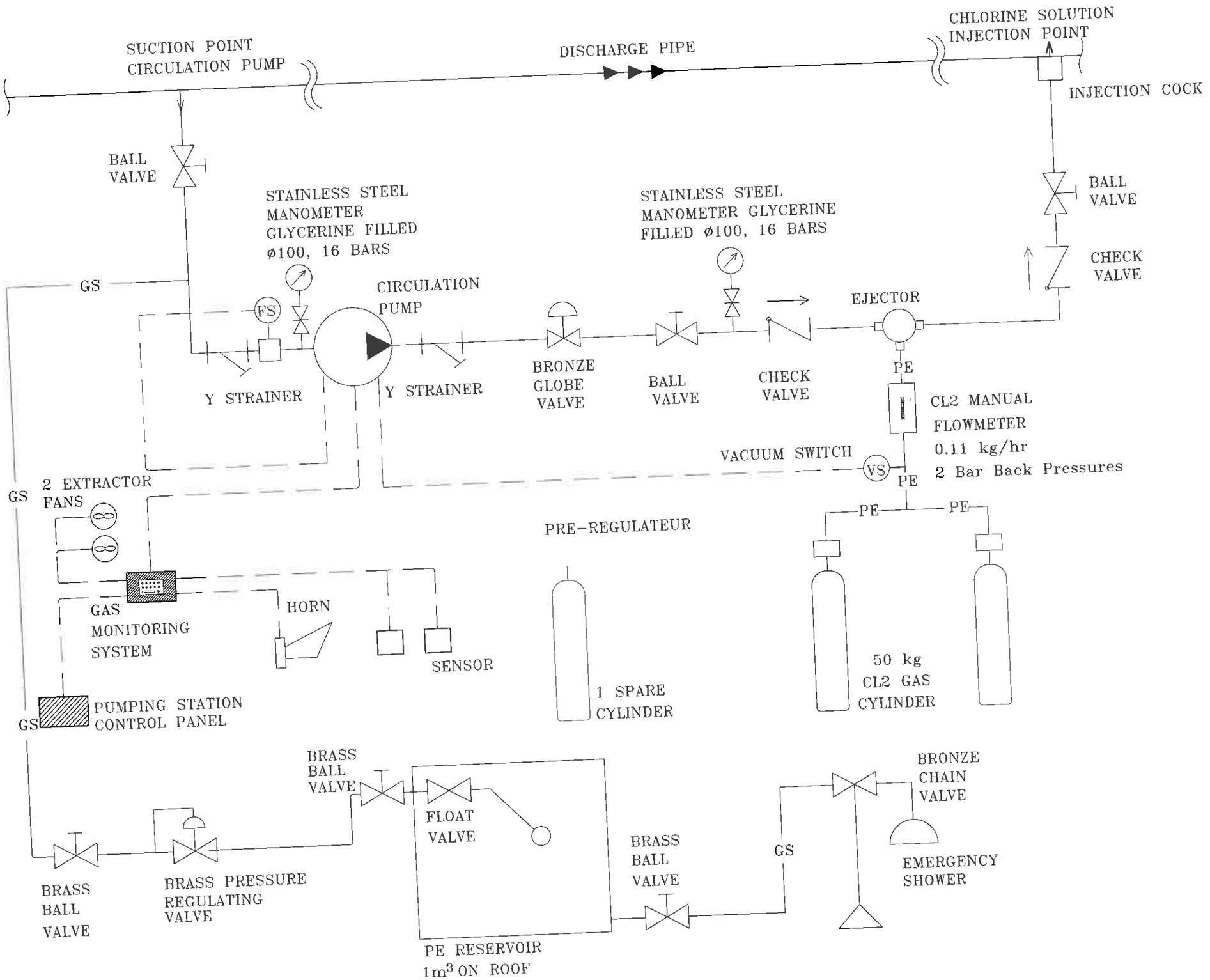
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	HYDRAULIC SCHEMATIC

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-M01	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	-	1/8	14



LEGEND:

—PE— : POLYETHYLENE TUBE

— — : ELECTRIC CONNECTION

—GS— : GALVANIZED STEEL PIPE

: THREE WAY VALVE

FS : FLOW SWITCH

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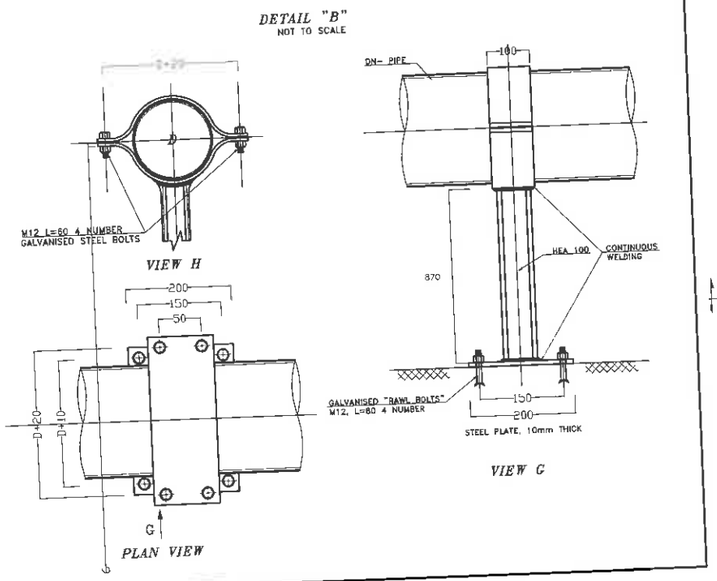
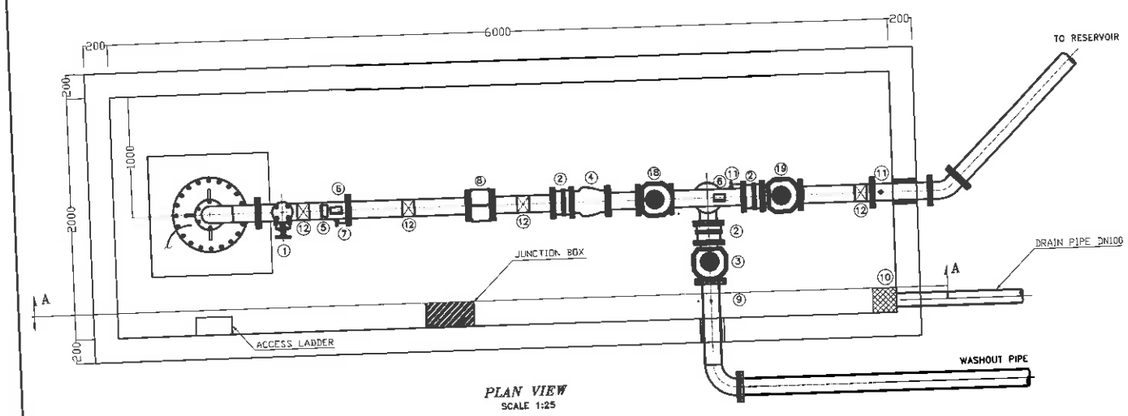
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	CHLORINATION SCHEMATIC

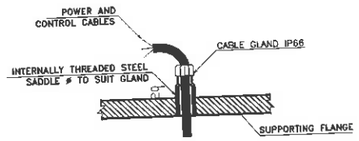
DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-M02	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	–	2/8	15

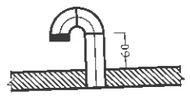




PLAN VIEW
SCALE 1:25

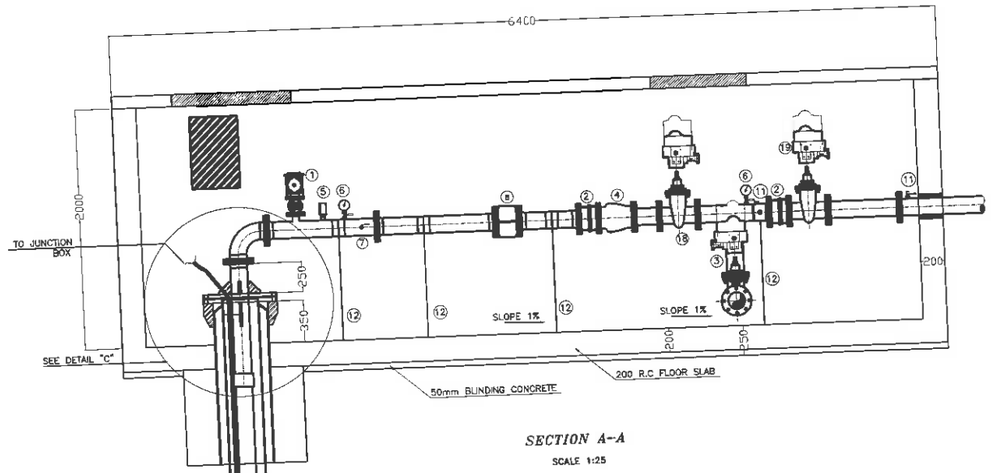


DETAIL D
N.T.S.

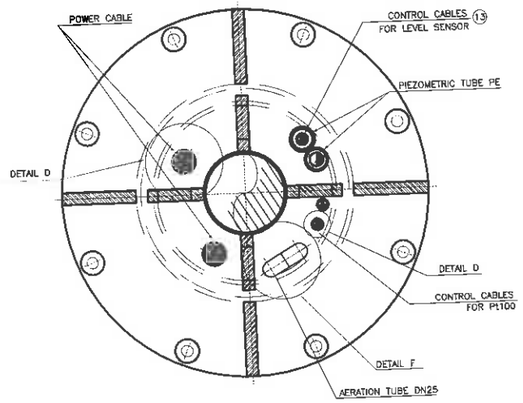


AERATION TUBE DN25 BLACK STEEL PIPE, TERMINATED WITH A SCREEN FOR INSECTS.

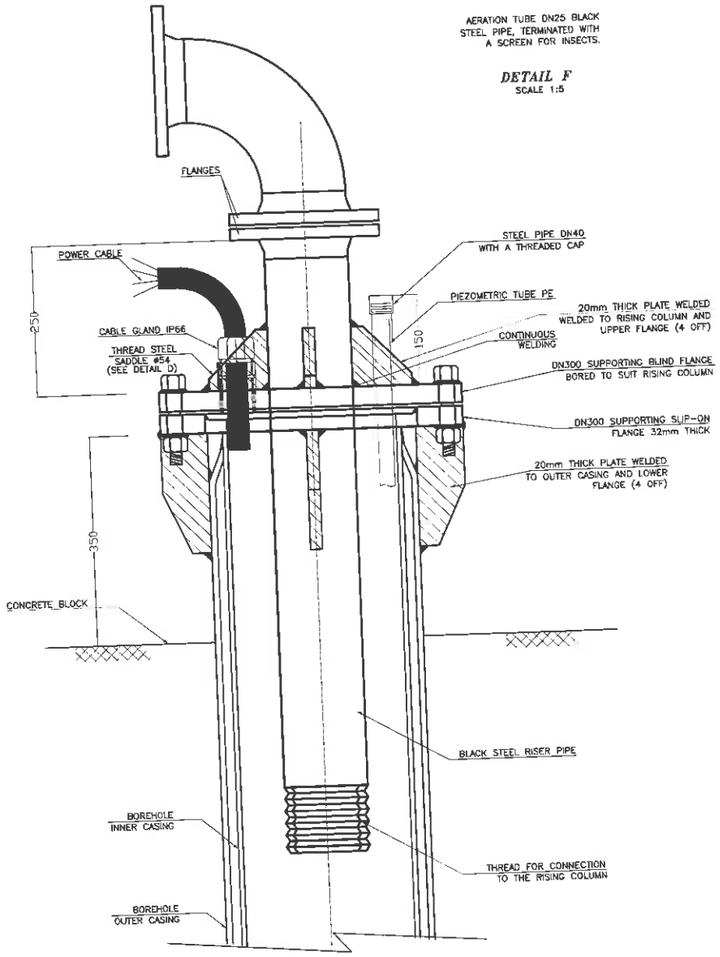
DETAIL F
SCALE 1:5



SECTION A-A
SCALE 1:25



DETAIL C
PLAN VIEW
SCALE 1:5



DETAIL C
SIDE VIEW
SCALE 1:5

LEGEND

1. DOUBLE AIR RELEASE VALVE WITH ISOLATING VALVE
2. DISMANTLING JOINT
3. MOTORISED GATE VALVE
4. NON RETURN VALVE (CHECK-VALVE)
5. PIESORESISTIVE PRESSURE SENSOR
6. MANOMETER WITH THREE WAY ISOLATING VALVE
7. SAMPLING VALVE 1/2"
8. FLOWMETER
9. FLOW SWITCH
10. DRAIN
11. NIPPEL 1" FOR CHLORE
12. PIPE SUPPORT
13. LEVEL SENSOR
14. MANUAL GATE VALVE
15. SURGE ANTICIPATION VALVE
16. REINFORCED PIPE SUPPORT
17. SUCTION STRAINER
18. MOTORIZED GLOBE VALVE
19. MOTORIZED BUTTERFLY VALVE

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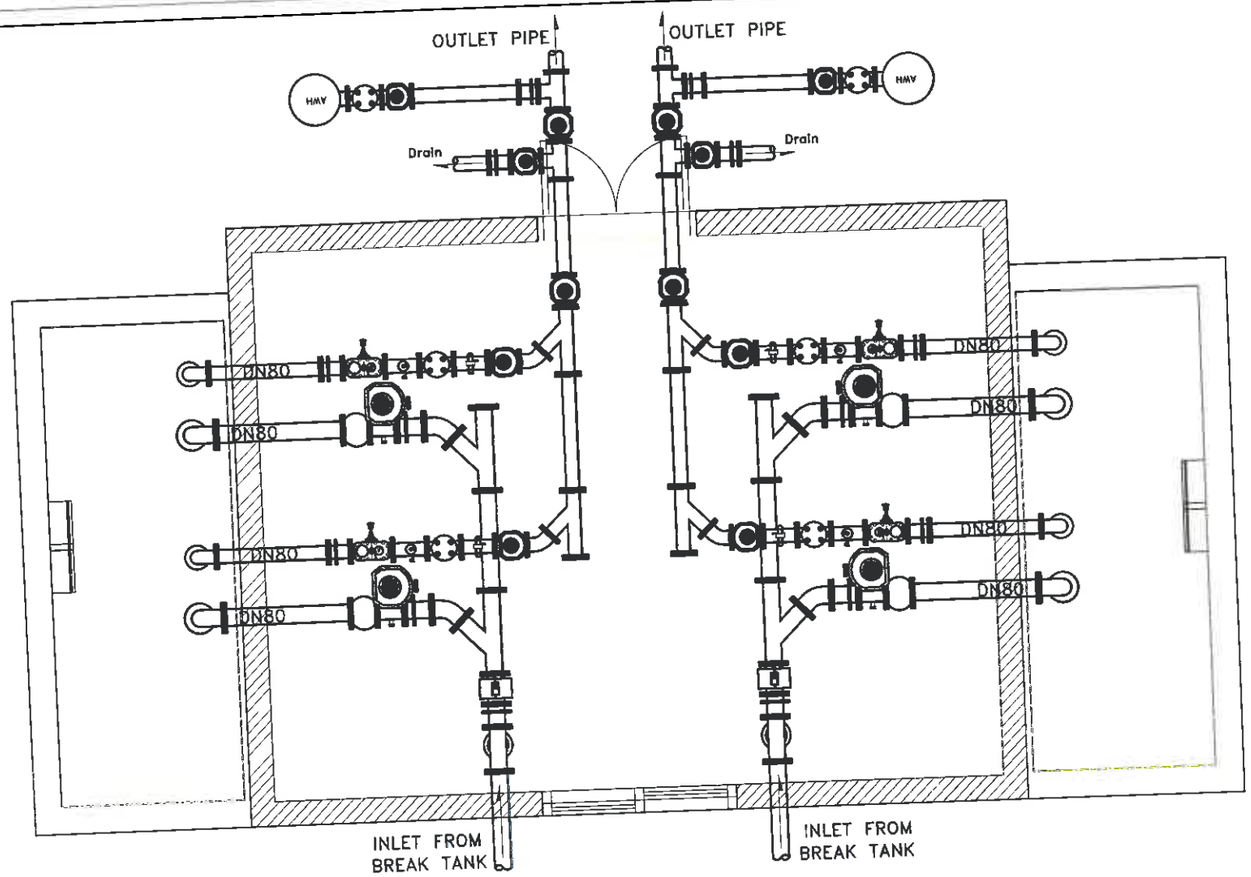
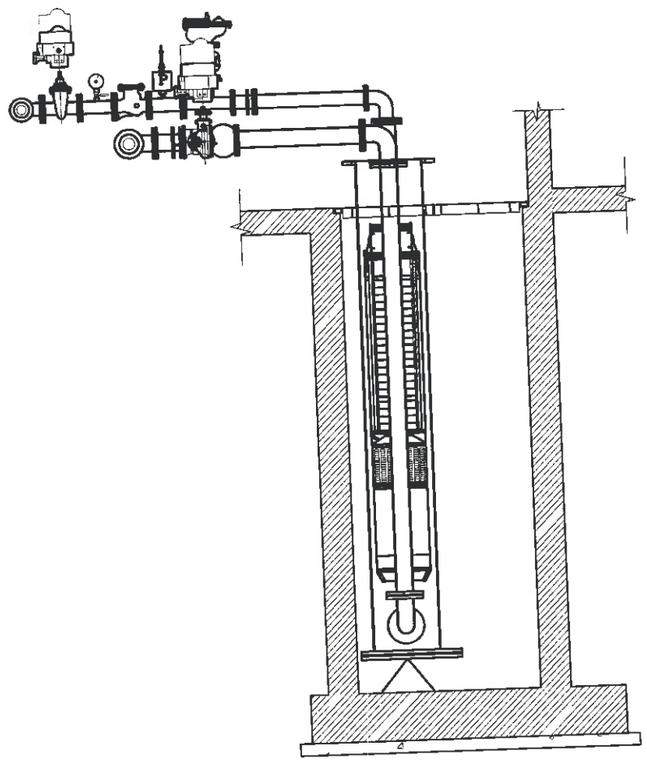
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	MECHANICAL DRAWING FOR WELL HEAD

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-M03	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	-	3/8	16





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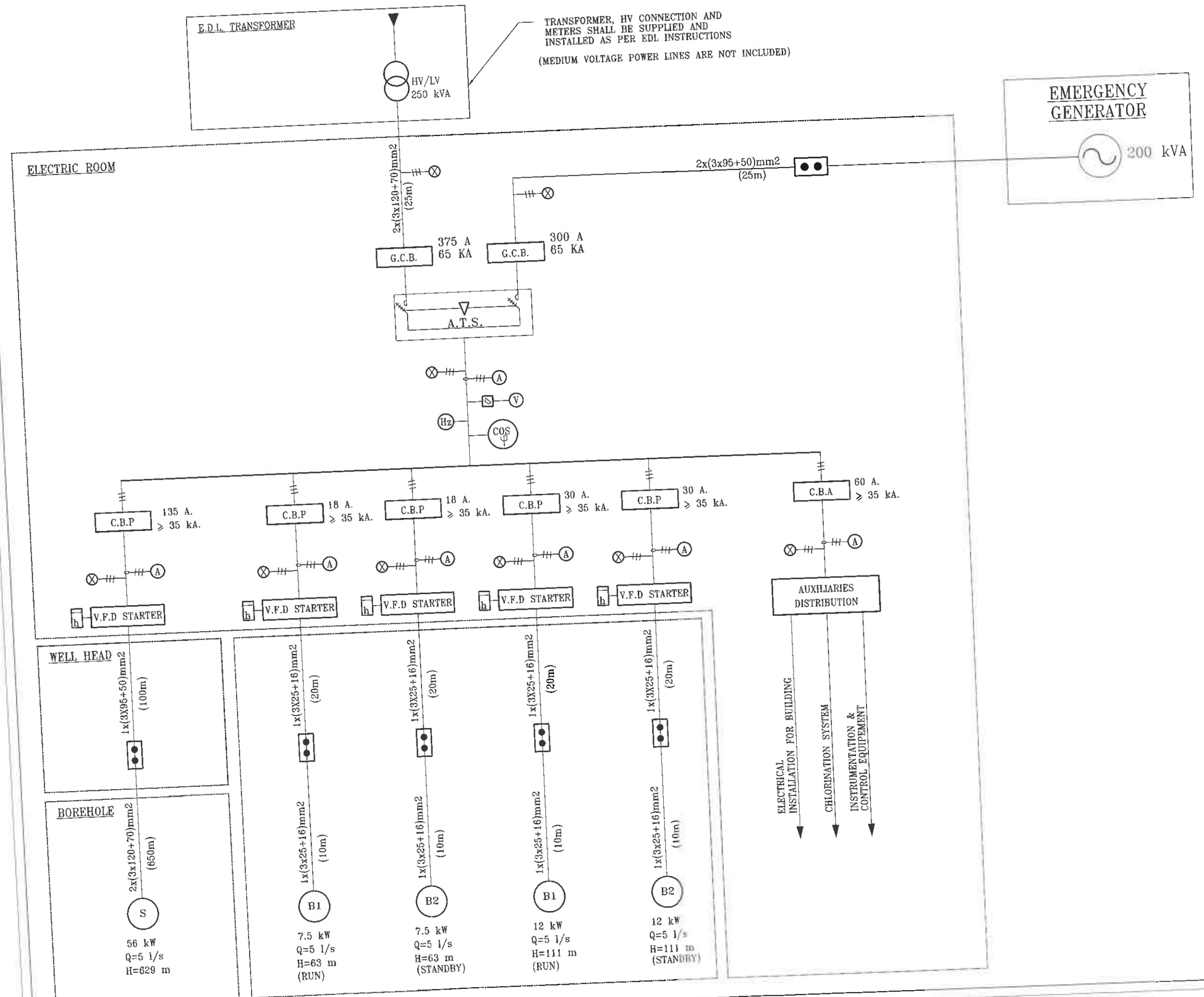
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	MECHANICAL DRAWING

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-M04	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	-	4/8	17



LEGEND

- COS φ : POWER FACTOR MEASURMENT
- ⊗ : INDICATING LAMP
- ⊘ : SELECTOR SWITCH
- Hz : FREQUENCY METER
- V : VOLTMETER
- A : AMPERMETER
- h : HOURMETER
- C.B. : CIRCUIT BREAKER
- : JUNCTION BOX IP67
- : TRANSFORMER HV/LV
- S : SUBMERSIBLE MOTOPUMPSET
- B : SURFACE MOTOPUMPSET
- A.T.S. : AUTOMATIC TRANSFER SWITCH (A.T.S.)
- : EMERGENCY GENERATOR
- C.B.B : GENERAL CIRCUIT BREAKER
- C.B.P : CIRCUIT BREAKER FOR PUMPSET
- C.B.A : CIRCUIT BREAKER FOR AUXILIARIES

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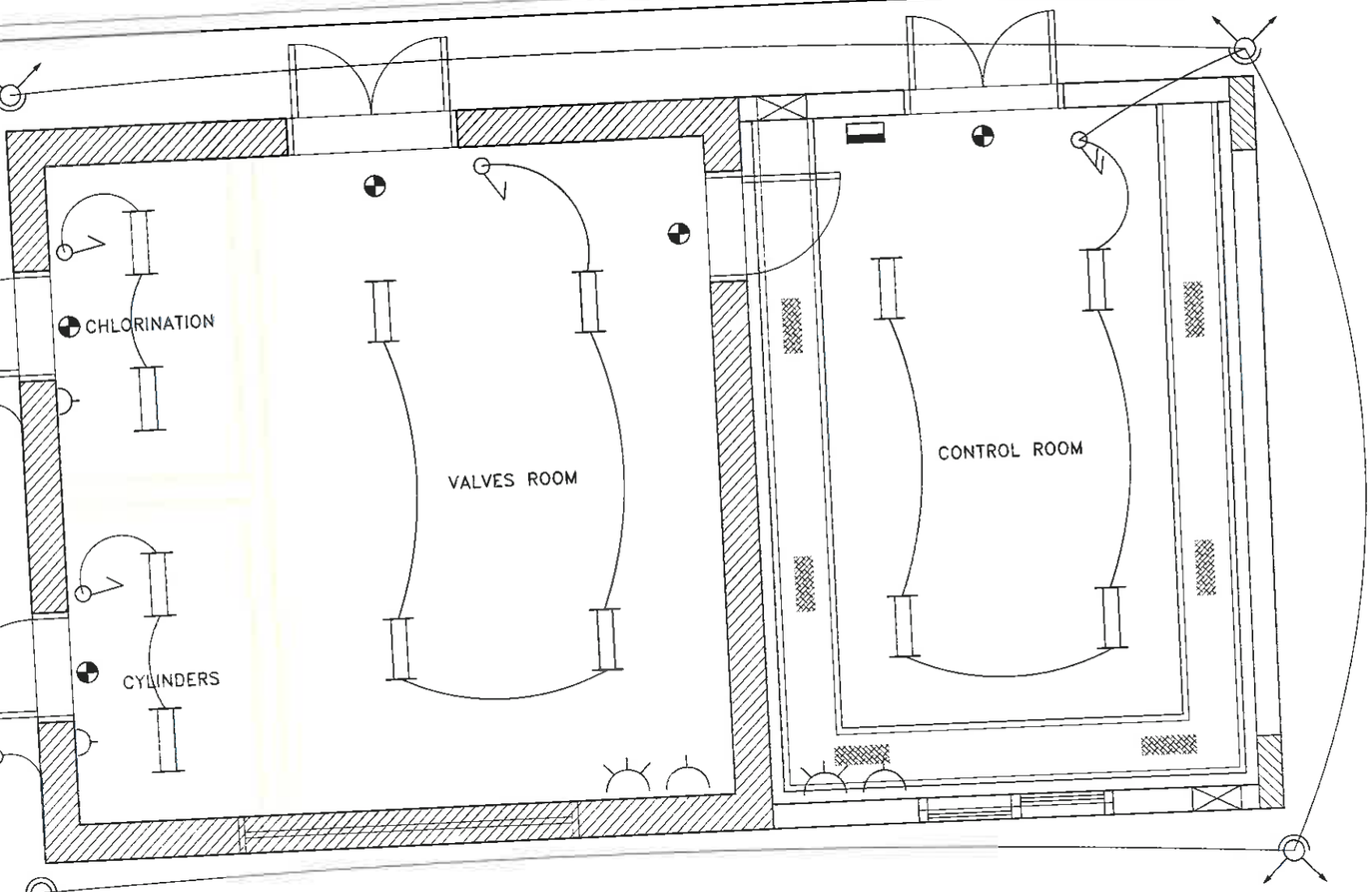
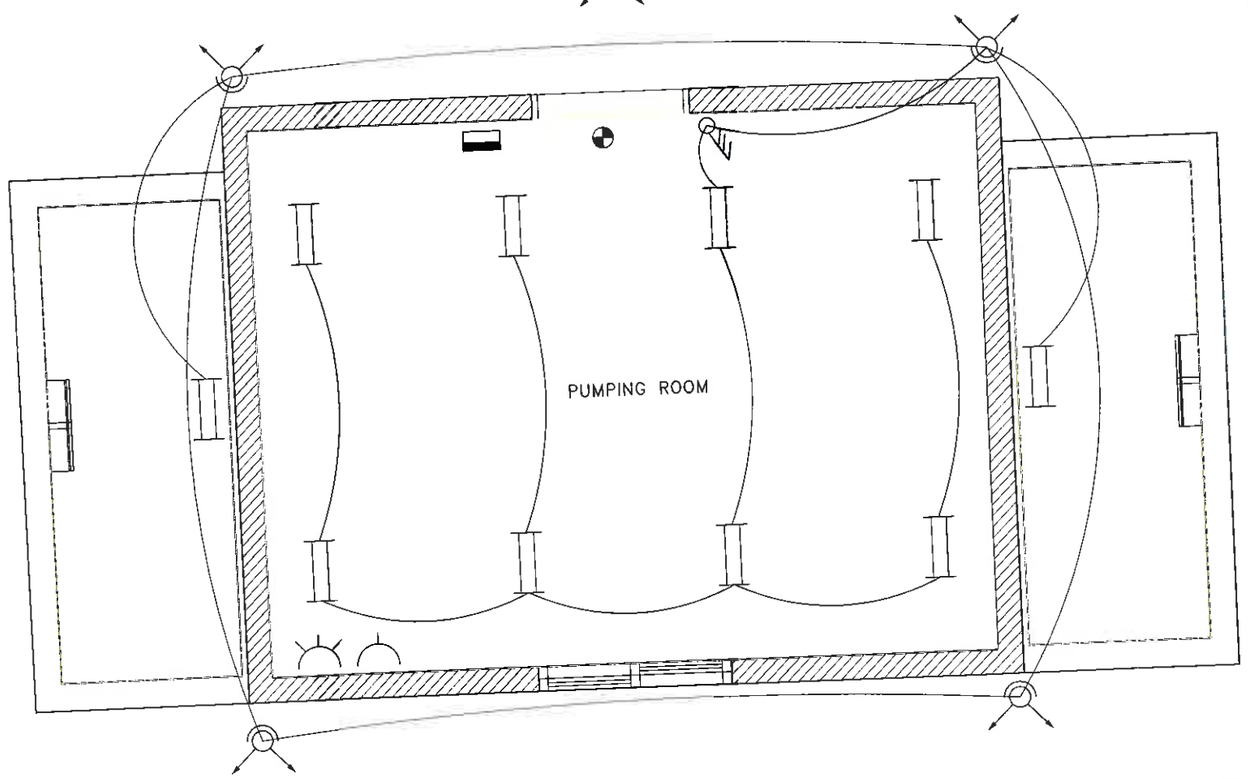
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHIHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	ELECTRICAL SCHEMATIC

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-E01	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	–	5/8	18





ELECTRICAL PANEL (LIGHTING)

60 A MAIN

A A A SS V

SINGLE PHASE POWER OUTLET	16 A VALVES ROOM	16 A CONTROL ROOM	16 A CHLOR & CYLIND ROOM	16 A WELL-HEAD	16 A PUMPING ROOM	16 A SPARE	
THREE PHASE POWER OUTLET	32 A VALVES ROOM	32 A CONTROL ROOM	32 A PUMPING ROOM			32 A SPARE	
INTERNAL LIGHTING	10 A VALVES ROOM	10 A CONTROL ROOM	10 A CHLOR & CYLIND ROOM	10 A WELL-HEAD	10 A PUMPING ROOM	10 A SPARE	
EXTERNAL LIGHTING		16 A EXTERNAL LIGHTS	16 A SPARE				

LEGEND:

- EXHAUST FAN
- SIMPLE SWITCH
- DOUBLE SWITCH
- TRIPPLE SWITCH
- DOUBLE DIRECTION SWITCH
- DOUBLE SWITCH, DOUBLE DIRECTION
- TRIPPLE SWITCH, DOUBLE DIRECTION
- TRIPPLE DIRECTION SWITCH
- SINGLE PHASE POWER OUTLET (1-PH P.O.)
- 3-PHASE POWER OUTLET (3-PH P.O.)
- 220 V_{AC} HANDLAMP OUTLET
- TELEPHONE OUTLET
- ANTENNA OUTLET
- UPS OUTLET
- INCANDESCENT LIGHTING FIXTURE
- FLUORESCENT LIGHTING FIXTURE (2 LAMPS)
- FLUORESCENT LIGHTING FIXTURE (1 LAMP)
- HALOGEN LIGHTING FIXTURE
- EMERGENCY LIGHTING FIXTURE
- HIGH BAY REFLECTORS
- EXTERNAL ROAD LIGHTING FIXTURE
- EXTERNAL WALKWAY LIGHTING FIXTURE
- ELECTRICAL PANEL BOARD-PRINCIPAL OR COMPLETE
- ELECTRICAL PANEL BOARD-SECONDARY
- FLOOR DRAIN (FD)
- VOLTMETER
- AMMETER
- 4-POLE CIRCUIT BREAKER (4P-C.B.)
- 3-POLE CIRCUIT BREAKER (3P-C.B.)
- 2-POLE CIRCUIT BREAKER (2P-C.B.)
- SELECTOR SWITCH
- VENTILATION

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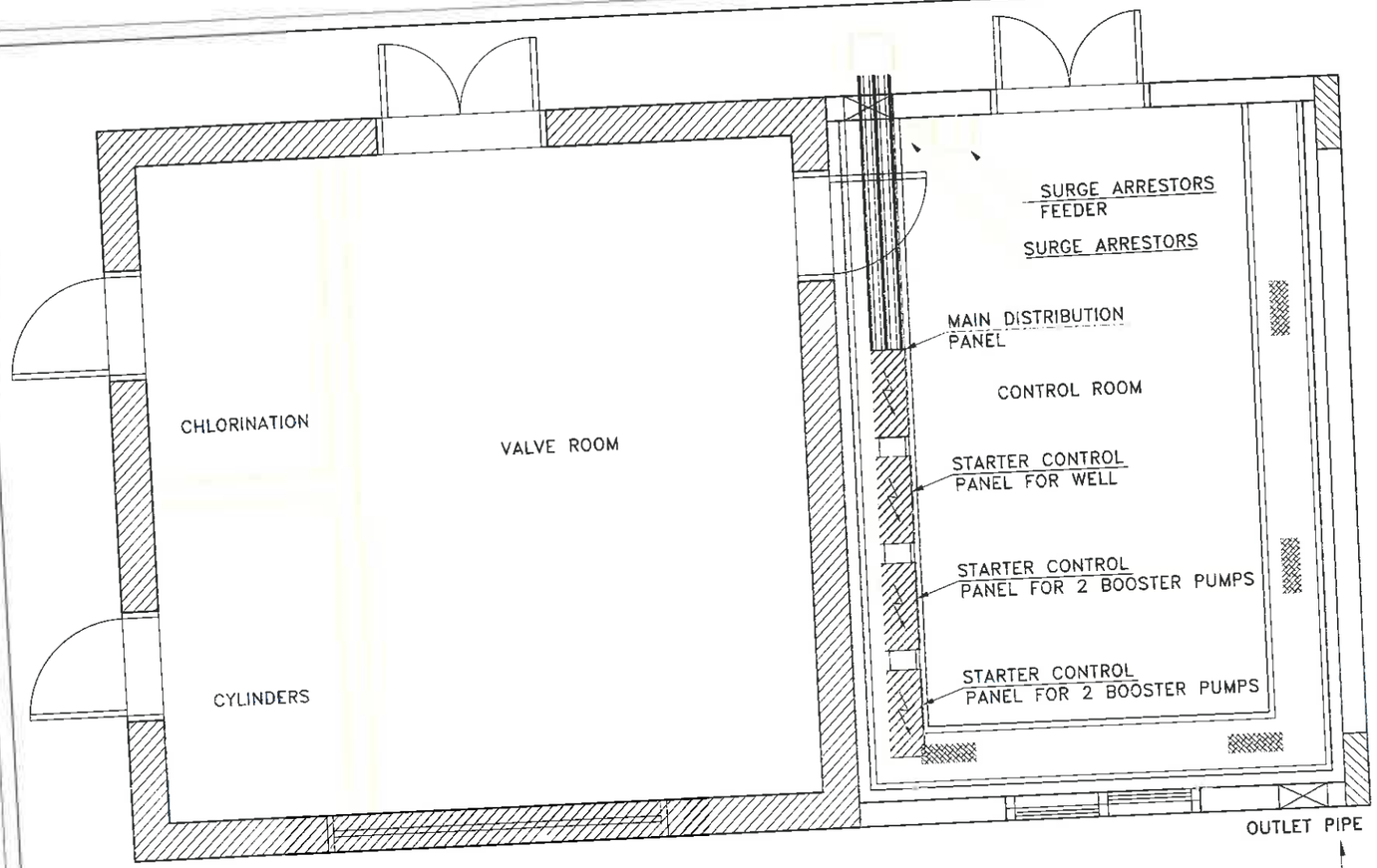
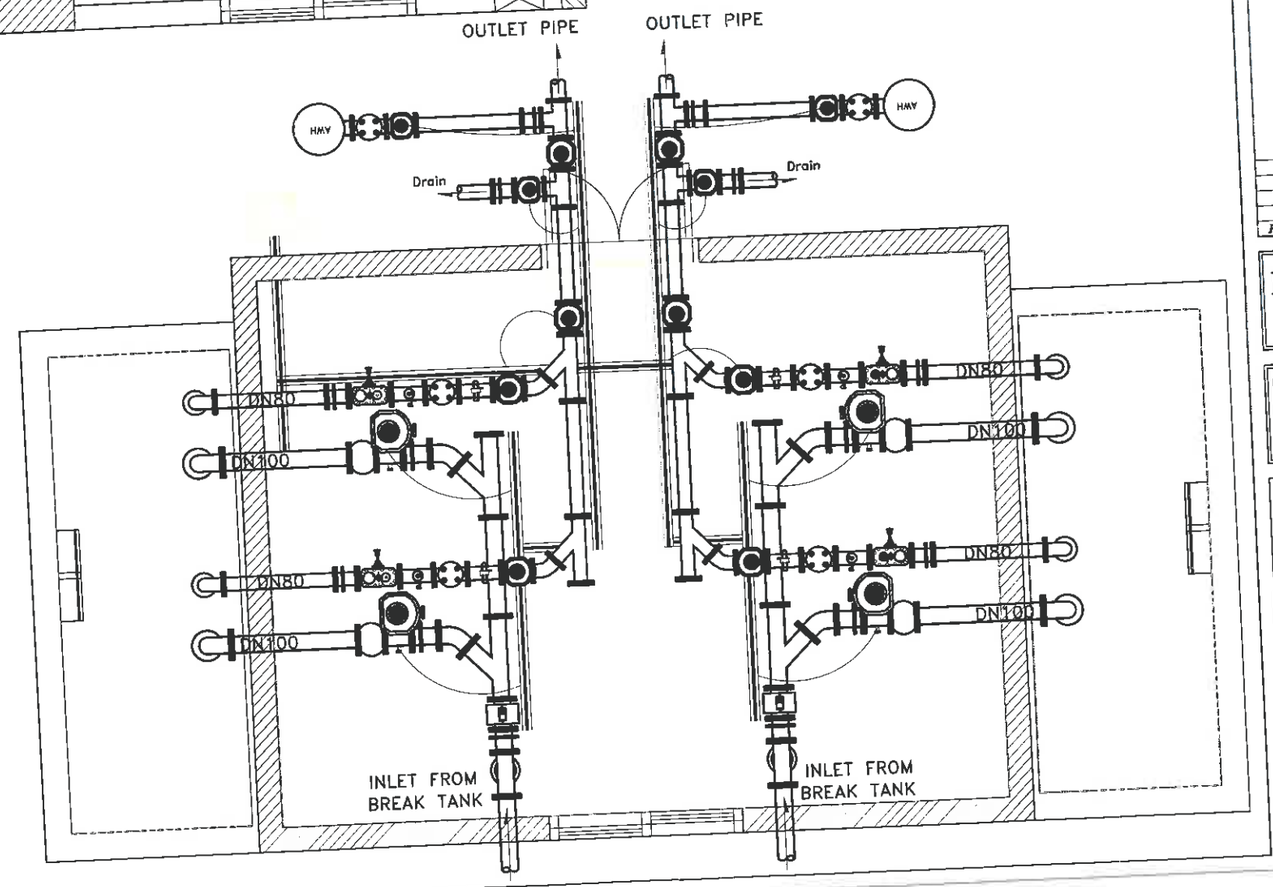
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	DOMESTIC ELECTRICAL INSTALLATION SCHEMATIC

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-E02	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	–	6/8	19





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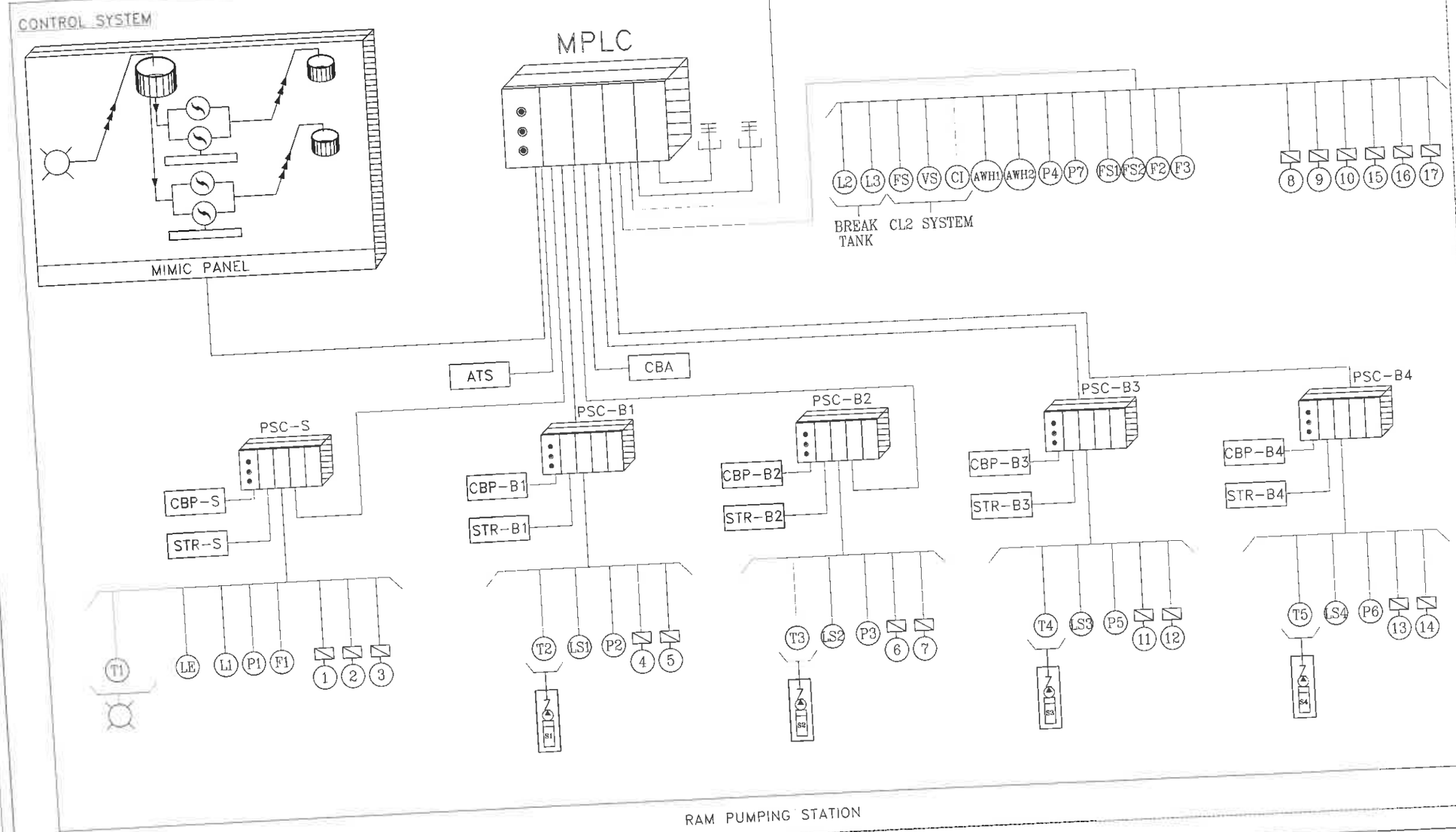
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	ELECTRICAL SCHEMATIC

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-E03	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	–	7/8	20



LEGEND:

- : PROGRAMMABLE LOGICAL CONTROLLER (PLC)
- MPLC : MAIN PLC
- RTU : REMOTE TERMINAL UNIT
- : DATA CABLES
- TC : TELEMETRY CABLE IN CONDUIT
- AWH : ANTI WATER HAMMER
- FS : FLOW SWITCH
- VS : VACUUM SWITCH
- : RESERVOIR
- : BOREHOLE MOTOPUMPSET
- ATS : AUTOMATIC TRANSFER SWITCH
- PSC : PUMPSET CONTROLLER
- F : FLOW MEASUREMENT
- L : LEVEL MEASUREMENT
- P : PRESSURE MEASUREMENT
- T : TEMPERATURE MEASUREMENT
- CL : CHLORINE
- STR : STARTER
- CBP : CIRCUIT BREAKER FOR PUMPSET
- CBA : CIRCUIT BREAKER FOR AUXILIARIES
- GCB : GENERAL CIRCUIT BREAKER
- : SURFACE MOTOPUMPSET
- : ELECTRIC ACTUATOR
- AWH : ANTI WATER HAMMER

Rev.	Date	Dsgn.	Drwn.	Chk'd	Appr'd

REPUBLIC OF LEBANON
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COUNCIL FOR DEVELOPMENT RECONSTRUCTION

BUREAU TECHNIQUE POUR LE DEVELOPPEMENT
JALL ED DIB – HAJAL Bldg
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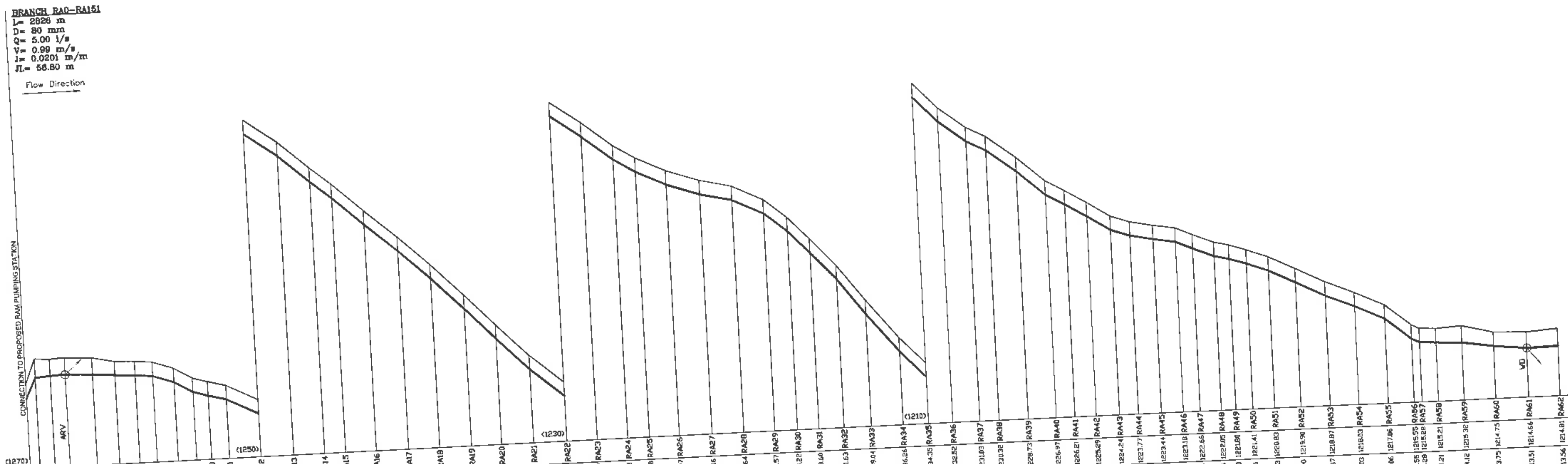
TEL:(04) 712157/712158
FAX:(04) 712159

CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM PUMPING STATION	CONTROL SCHEMATIC

DRAWING No:	DESIGNED BY	DRAWN BY	CHECKED BY
472W-104-I01	T.RMEITY	F.GHANEM	T.RMEITY

DATE	SCALE	SHEET No.	SEQ. No
JULY 2019	–	8/8	21



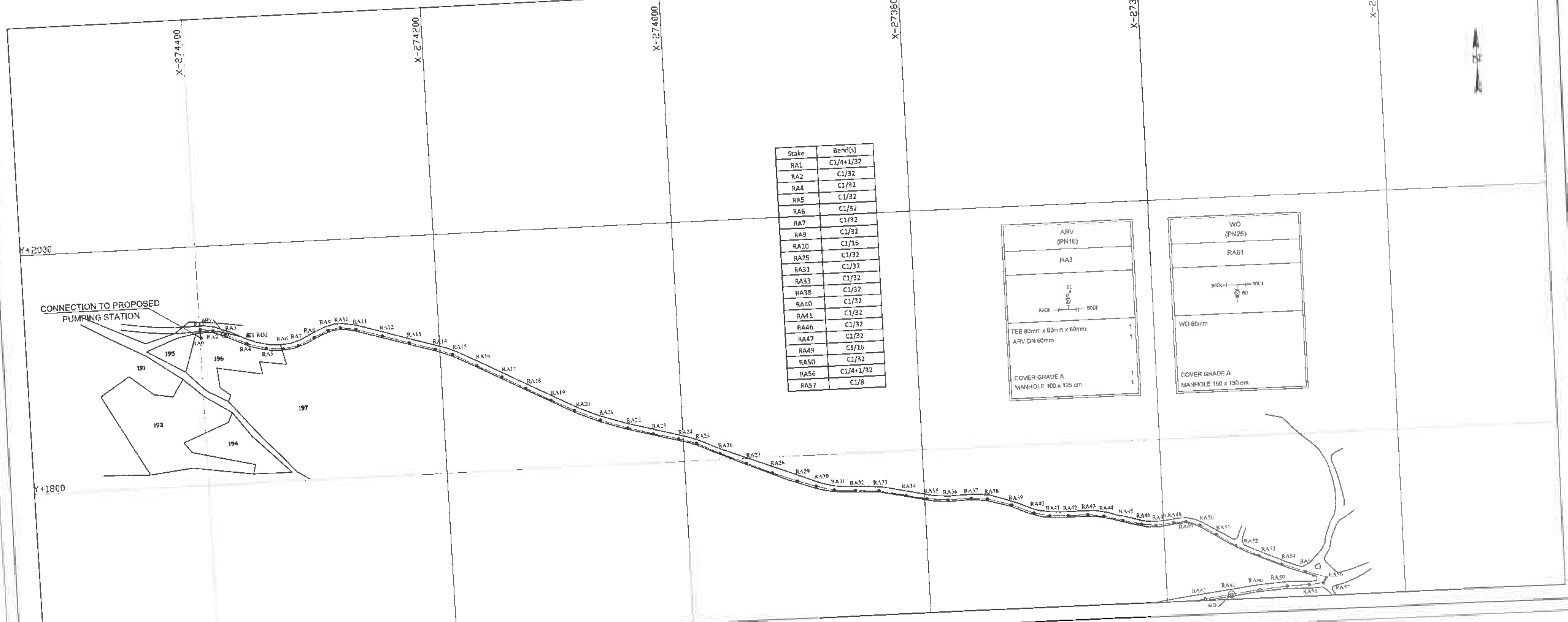
STAKE NUMBER	DATUM LEVEL	GROUND LEVEL	CROWN PIPE ELEVATION	PIEZOMETRIC LEVEL	PRESSURE ON GROUND	PARTIAL DISTANCE	ADD DISTANCE
RA0	(1270)	1276.00	1275.00	1386.00	110.00		0.00
RA1		1277.82	1276.47	1385.85	108.03	7.17	7.17
RA2		1277.74	1276.54	1385.63	107.89	10.80	17.96
RA3		1277.79	1276.59	1385.42	107.63	10.67	28.63
RA4		1277.69	1276.49	1385.02	107.33	19.83	48.46
RA5		1277.36	1276.36	1384.69	107.33	16.34	64.80
RA6		1277.27	1276.27	1384.40	107.13	14.43	79.22
RA7		1277.16	1276.16	1384.15	106.99	12.70	91.92
RA8		1276.64	1275.64	1383.85	107.21	15.00	106.92
RA9		1275.88	1274.88	1383.58	107.70	13.12	120.04
RA10		1275.55	1274.55	1383.37	107.82	10.71	130.75
RA11		1275.22	1274.22	1383.11	107.89	12.95	143.70
RA12	(1250)	1274.09	1273.09	1382.65	108.56	22.75	166.45
RA13		1272.41	1271.41	1382.17	109.76	23.48	189.93
RA14		1270.45	1269.45	1381.72	111.27	22.39	212.32
RA15		1269.21	1268.21	1381.42	112.21	14.96	227.28
RA16		1267.19	1266.19	1380.97	113.78	22.36	249.64
RA17		1265.19	1264.19	1380.50	115.31	23.18	272.82
RA18		1263.11	1262.11	1380.05	116.94	22.49	295.31
RA19		1260.83	1259.83	1379.58	118.75	22.87	318.18
RA20		1258.58	1257.58	1379.15	120.57	21.66	339.84
RA21		1256.27	1255.27	1378.68	122.41	23.12	362.96
RA22	(1230)	1254.24	1253.24	1378.20	123.96	23.71	386.67
RA23		1252.69	1251.69	1377.76	125.07	21.80	408.47
RA24		1250.93	1249.93	1377.32	126.39	22.07	430.54
RA25		1249.98	1248.98	1377.00	127.02	15.51	446.05
RA26		1248.97	1247.97	1376.57	127.60	21.55	467.60
RA27		1248.16	1247.16	1376.10	127.94	23.48	491.08
RA28		1247.64	1246.64	1375.63	127.99	23.03	514.11
RA29		1246.57	1245.57	1375.18	128.61	22.35	536.47
RA30		1245.22	1244.22	1374.86	129.64	16.25	552.72
RA31		1243.60	1242.60	1374.54	130.94	15.56	568.27
RA32		1241.63	1240.63	1374.18	132.55	17.90	586.18
RA33		1239.04	1238.04	1373.78	134.74	19.69	605.87
RA34		1236.26	1235.26	1373.32	137.06	22.70	628.57
RA35	(1210)	1234.35	1233.35	1372.96	138.61	18.00	646.57
RA36		1232.52	1231.52	1372.61	140.09	17.38	663.95
RA37		1231.03	1230.03	1372.21	141.18	19.43	683.37
RA38		1230.32	1229.32	1371.94	141.62	13.65	697.03
RA39		1228.73	1227.73	1371.52	142.79	20.91	717.94
RA40		1226.97	1225.97	1371.11	144.14	20.11	738.05
RA41		1226.21	1225.21	1370.84	144.63	13.51	751.56
RA42		1225.29	1224.29	1370.53	145.24	15.54	767.10
RA43		1224.24	1223.24	1370.19	145.95	16.66	783.76
RA44		1223.77	1222.77	1369.91	146.14	13.75	797.51
RA45		1223.44	1222.44	1369.58	146.14	16.70	814.21
RA46		1223.18	1222.18	1369.26	146.08	15.86	830.08
RA47		1222.66	1221.66	1369.02	146.36	12.12	842.20
RA48		1222.05	1221.05	1368.71	146.66	15.01	857.20
RA49		1221.80	1220.80	1368.50	146.70	10.52	867.72
RA50		1221.41	1220.41	1368.26	146.85	12.21	879.93
RA51		1220.83	1219.83	1367.94	147.11	15.71	895.64
RA52		1219.90	1218.90	1367.56	147.66	18.78	914.41
RA53		1218.87	1217.87	1367.14	148.27	20.85	935.26
RA54		1218.03	1217.03	1366.73	148.70	20.57	955.83
RA55		1217.06	1216.06	1366.31	149.25	20.97	976.80
RA56		1215.55	1214.55	1365.94	150.39	16.38	993.18
RA57		1215.28	1214.28	1365.82	150.54	5.61	1000.79
RA58		1215.21	1214.21	1365.58	150.37	11.91	1012.69
RA59		1215.32	1214.12	1365.21	149.89	18.74	1031.44
RA60		1214.75	1213.75	1364.74	149.99	23.04	1054.48
RA61		1214.66	1213.51	1364.26	149.60	23.85	1078.33
RA62		1214.81	1213.56	1363.81	149.00	22.64	1100.97

PIPE DIAMETER: 80 mm - DI

PIPE DETAILS: C1/32, 60, 80DI; 80DI, 80

HECTOMETER: 0 1 2 3 4 5 6 7 8 9 0

KILOMETER: 0 1



Stake	Bend(s)
RA1	C1/4+1/32
RA2	C1/32
RA4	C1/32
RA5	C1/32
RA6	C1/32
RA7	C1/32
RA9	C1/32
RA10	C1/16
RA25	C1/32
RA31	C1/32
RA33	C1/32
RA38	C1/32
RA40	C1/32
RA41	C1/32
RA46	C1/32
RA47	C1/32
RA49	C1/16
RA50	C1/32
RA56	C1/4+1/32
RA57	C1/8

ARV (PN16)	
RA3	
60, 80DI, 80DI	
TEE 80mm x 60mm x 80mm	1
ARV DN 60mm	1
COVER GRADE A	1
MANHOLE 100 x 125 cm	1

WO (PN25)
RA61
80DI, 80DI, 80
WO 80mm
COVER GRADE A
MANHOLE 150 x 150 cm

HYDRAULIC LEGEND

PIPELINE
FLOW DIRECTION
GATE VALVE
NEEDLE VALVE
TEE
TAPER
PRESSURE REGULATING VALVE (P.R.V)
BEND 1/8 (C1/8)
ARV (DOUBLE AIR VALVE - DAV)
W.O (WASHOUT)
FLANGED ADAPTER
END CAPS
EXISTING PIPE

NOTES

- ALL ALTITUDES ARE TIED TO THE NATIONAL ELEVATION DATUM OF LEBANON.
- HEAD LOSSES HAVE BEEN CALCULATED ACCORDING TO THE COLEBROOK FORMULA WITH AN ABSOLUTE ROUGHNESS K=0.4mm FOR DUCTILE IRON PIPES AND K=0.2mm FOR HDPE PIPES.
- FOR PIPELINE ANCHORS AND SUPPORT DETAILS REFER TO STANDARD DWG Nb 472STDP10.
- FOR PIPELINE TRENCH DETAILS REFER TO STANDARD DWG Nb 472STDP03 AND DWG Nb 472STDP04.
- FOR HORIZONTAL BENDS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP07 AND DWG Nb 472STDP08.
- FOR VERTICAL BENDS AND TAPERS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP09.
- PIPE MATERIAL: DUCTILE IRON CLASS K9
- ALL PIPE FITTINGS AND ACCESSORIES ARE PN16, UNLESS OTHERWISE SPECIFIED
- ALL PIPES SHOULD BE EXECUTED IN PUBLIC OR EXPROPRIATED LAND

TOPOGRAPHICAL LEGEND

BUILDING
PAVED ROAD
CONCRETE ROAD
TRACK
REFERENCE LINE
CHANNEL
TERRACE
FENCE
STREAM/RIVER
CULVERT/BRIDGE
SPRING
WELL
DECIDUOUS/PINE TREE
ROCKS
DownHill
HighHill
MANHOLE SEWER
MANHOLE WATER
MANHOLE TELEPHONE
MANHOLE NOT IDENTIFIED
LIGHTING POLE
TELEPHONE POLE
TRIANGULATION STATION
ELECTRIC SUB STATION (D.S.S)
ELECTRIC POLE/TELEGRAPH POLE
STAKE NUMBER / STAKE POINT (Num)
SPOT HEIGHT (1180.12)
PLOT No (1252)
BOUNDARY
CIRCONSCRIPTION BOUNDARY

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

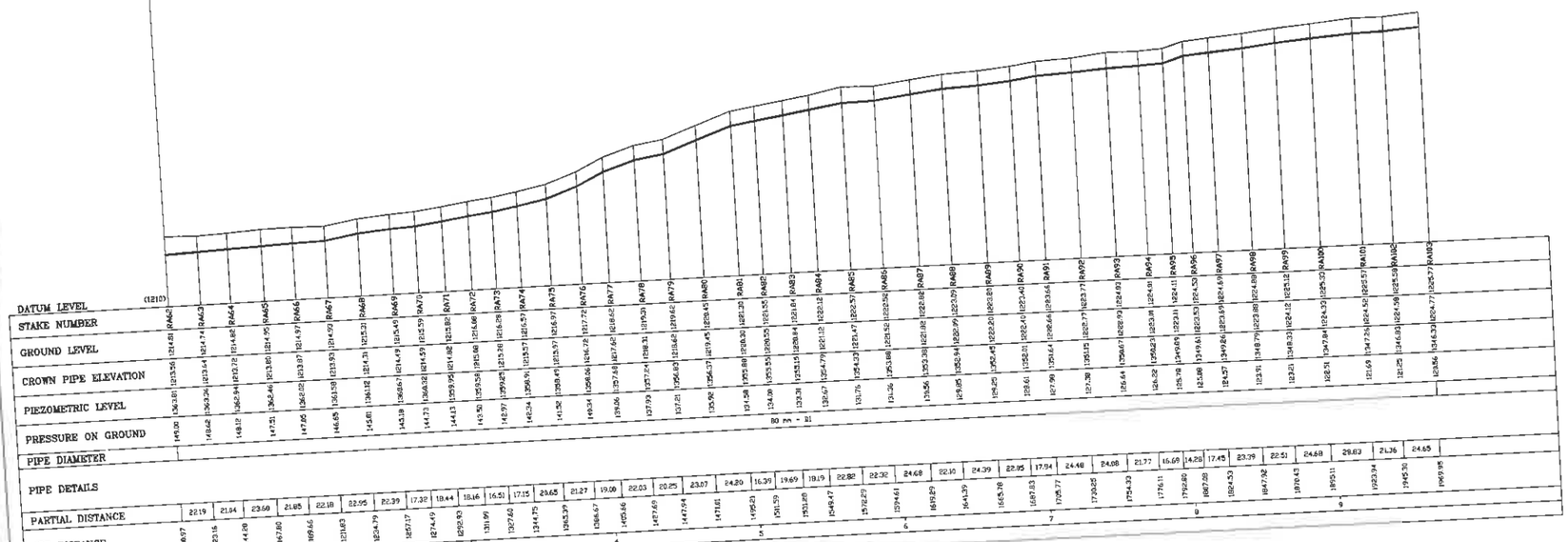
RAM LIFT LINE 1	PLAN + PROFILES

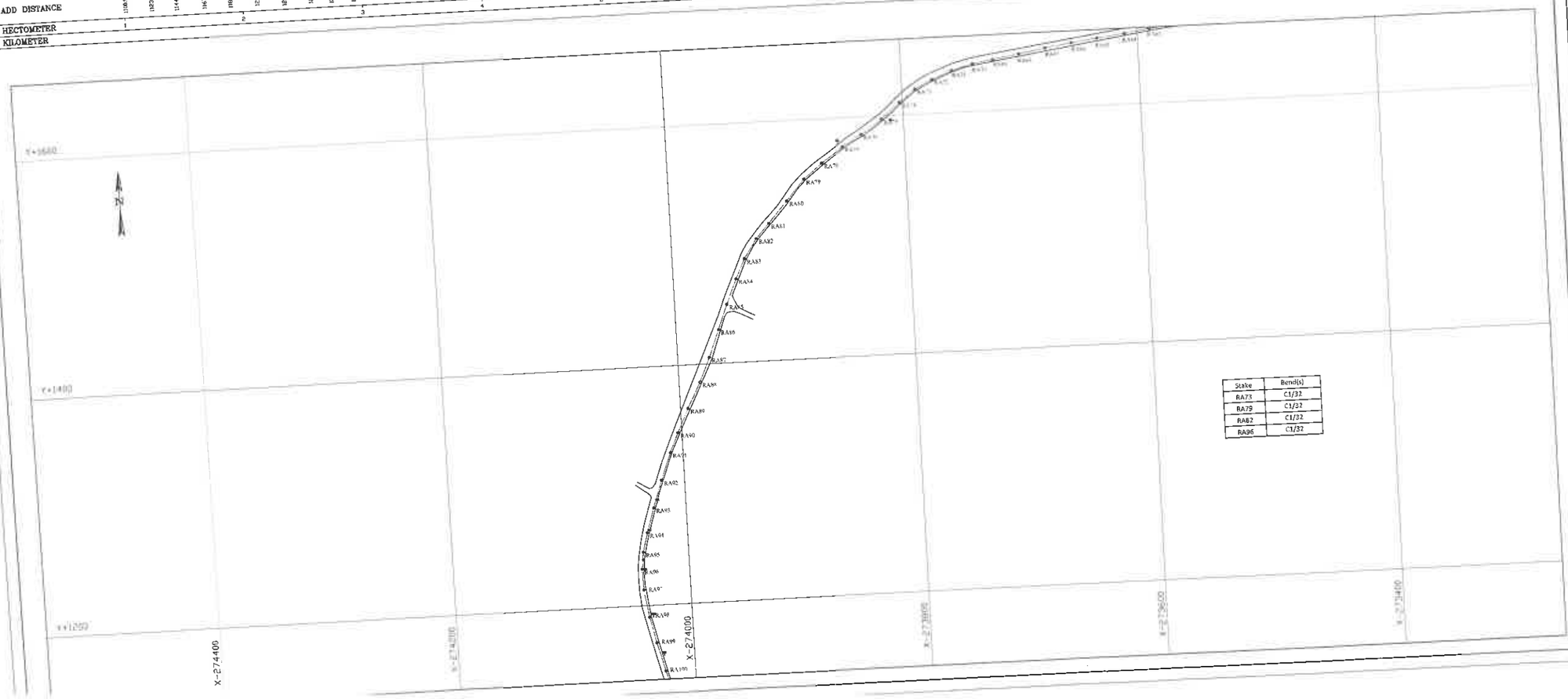
FILE NAME	DESIGNED BY	DRAWN BY	CHECKED BY
472W-TR-04/1P01	J. ZALZAL	J. ZALZAL	T. RMEITY

DATE	SCALE	SHEET No.	DRAWING No
JULY 2019	H = 1/2000 V = 1/200	1/3	22

BRANCH RA0-RA151
L= 2826 m
D= 80 mm
Q= 6.00 l/s
V= 0.99 m/s
I= 0.0201 m/m
FL= 56.60 m

Flow Direction





Stake	Bend(s)
RA73	C1/32
RA79	C1/32
RA82	C1/32
RA96	C1/32

HYDRAULIC LEGEND

PIPELINE		BEND 1/8	C1/8
FLOW DIRECTION		ARV (DOUBLE AIR VALVE - DAV)	
GATE VALVE		W.O (WASHOUT)	
NEEDLE VALVE		FLANGED ADAPTER	
TEE		END CAPS	
TAPER		EXISTING PIPE	
PRESSURE REGULATING VALVE	PRV		

NOTES

- ALL ALTITUDES ARE TIED TO THE NATIONAL ELEVATION DATUM OF LEBANON.
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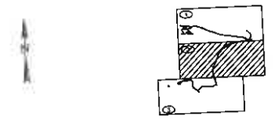
- FOR PIPELINE TRENCH DETAILS REFER TO STANDARD DWG Nb 472STDP03 AND DWG Nb 472STDP04.
- FOR HORIZONTAL BENDS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP07 AND DWG Nb 472STDP08.
- FOR VERTICAL BENDS AND TAPERS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP09.
- PIPE MATERIAL: DUCTILE IRON CLASS K9
- ALL PIPE FITTINGS AND ACCESSORIES ARE PN16, UNLESS OTHERWISE SPECIFIED
- ALL PIPES SHOULD BE EXECUTED IN PUBLIC OR EXPROPRIATED LAND

TOPOGRAPHICAL LEGEND

BUILDING		MANHOLE SEWER	
PAVED ROAD		MANHOLE WATER	
CONCRETE ROAD		MANHOLE TELEPHONE	
TRACK		MANHOLE NOT IDENTIFIED	MH
REFERENCE LINE		LIGHTING POLE	
CHANNEL	Channel	TELEPHONE POLE	TP
TERRACE		TRIANGULATION STATION	
FENCE		ELECTRIC SUB STATION	E.S.S
STREAM/RIVER		ELECTRIC POLE/TELEGRAPH POLE	
CULVERT/BRIDGE		STAKE NUMBER STAKE POINT	Num
SPRING	Spr	SPOT HEIGHT	1160.12
WELL		PLOT No	1262
DECIDUOUS/PINE TREE		BOUNDARY	
ROCKS		OR/CONSCRIPTION BOUNDARY	
Down Hill			
High Hill			



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CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM LIFT LINE 1

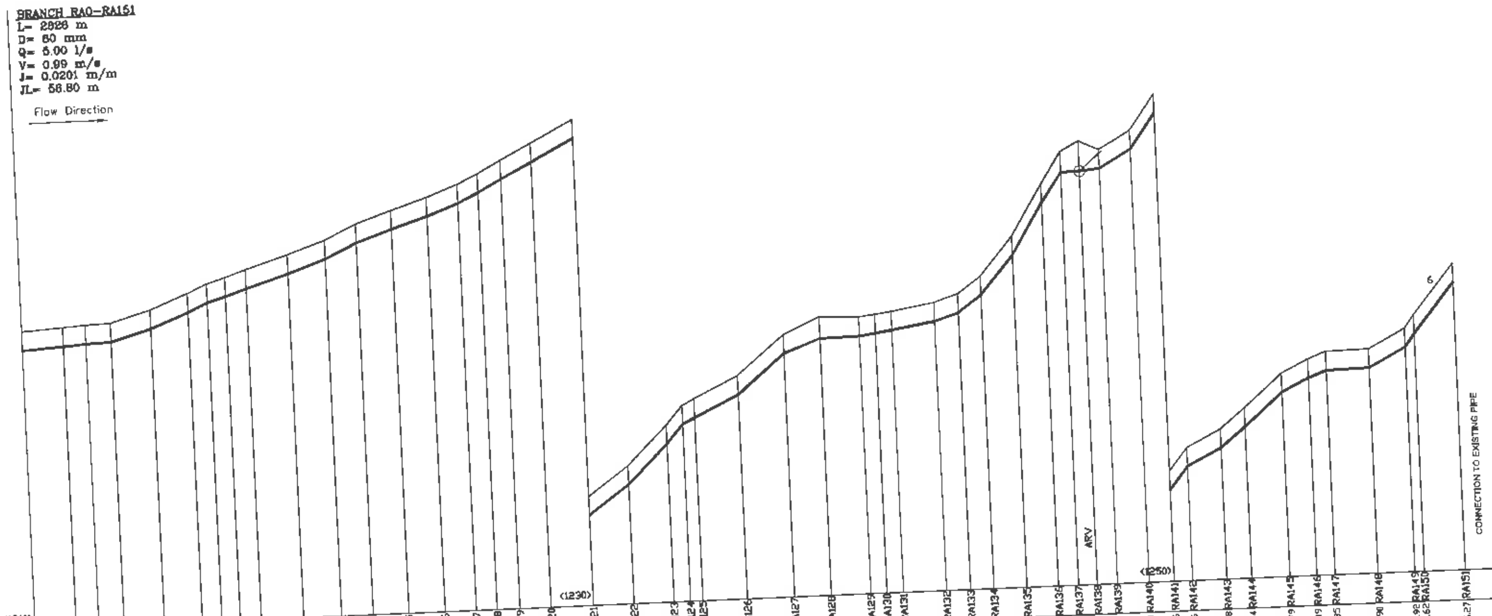
PLAN + PROFILES

FILE NAME	DESIGNED BY	DRAWN BY	CHECKED BY
472W-TR-04/1P02	J. ZALZAL	J. ZALZAL	T. RMEITY

DATE	SCALE	SHEET No.	DRAWING No
JULY 2019	H = 1/2000 V = 1/200	2/3	23

BRANCH RA0–RA151
L= 2826 m
D= 80 mm
Q= 5.00 l/s
V= 0.99 m/s
J= 0.0201 m/m
JL= 56.80 m

Flow Direction



DATUM LEVEL: (1210) / (1230) / (1250)

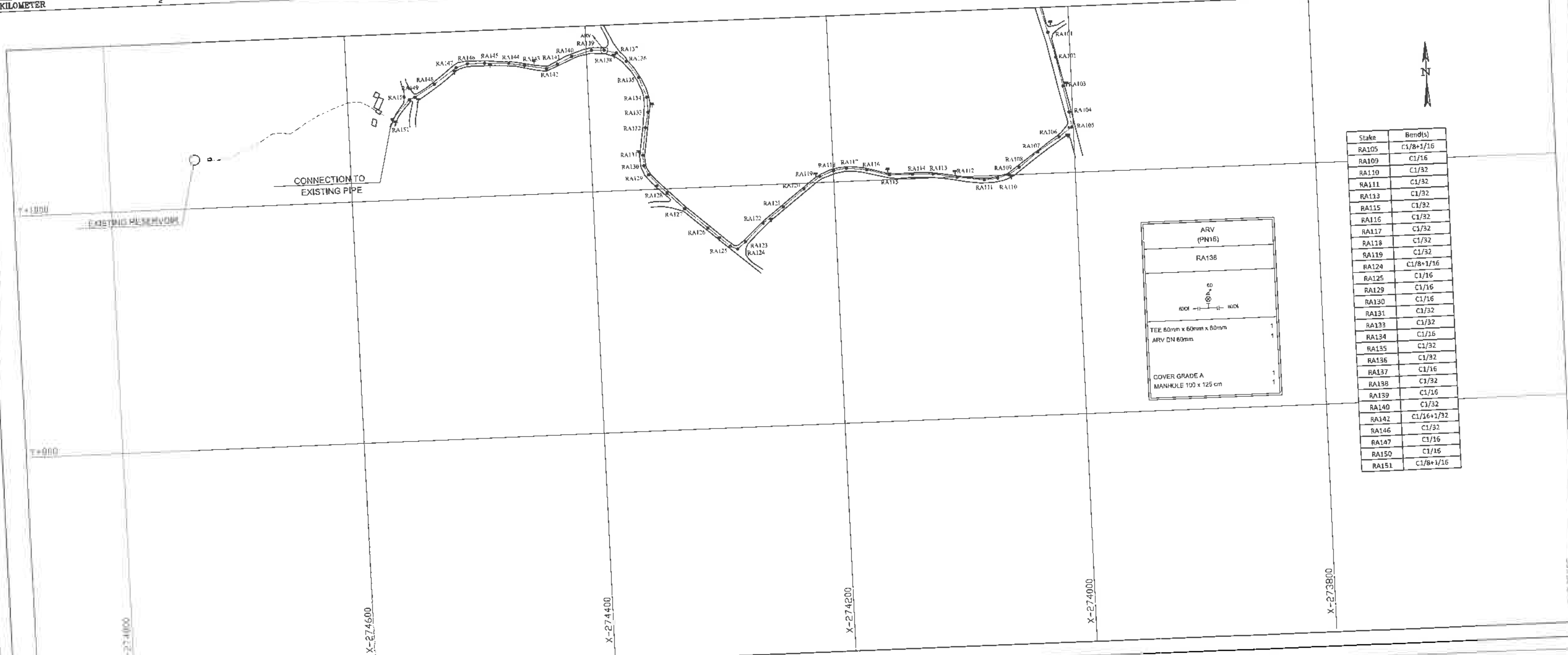
STAKE NUMBER	GROUND LEVEL	CROWN PIPE ELEVATION	PIEZOMETRIC LEVEL	PRESSURE ON GROUND	PARTIAL DISTANCE	ADD DISTANCE
RA103	1225.77	1224.77	1346.33	120.56		1969.95
RA104	1225.90	1224.90	1345.89	119.99	22.10	1992.05
RA105	1225.98	1224.98	1345.64	119.66	12.47	2004.52
RA106	1226.03	1225.03	1345.37	119.34	13.40	2017.92
RA107	1226.64	1225.64	1344.93	118.29	21.61	2039.53
RA108	1227.43	1226.43	1344.53	117.10	20.00	2059.52
RA109	1227.90	1226.90	1344.32	116.42	10.48	2070.01
RA110	1228.19	1227.19	1344.12	115.93	9.85	2079.85
RA111	1228.57	1227.57	1343.90	115.33	11.23	2091.09
RA112	1229.26	1228.26	1343.44	114.18	22.67	2113.75
RA113	1229.96	1228.96	1343.04	113.08	20.11	2133.86
RA114	1230.74	1229.74	1342.69	111.95	16.91	2150.78
RA115	1231.38	1230.38	1342.31	110.93	18.94	2169.72
RA116	1231.98	1230.98	1341.93	109.95	19.30	2189.02
RA117	1232.61	1231.61	1341.59	108.98	16.74	2205.76
RA118	1233.12	1232.12	1341.37	108.25	11.08	2216.84
RA119	1233.78	1232.78	1341.12	107.34	12.26	2229.10
RA120	1234.63	1233.63	1340.78	106.15	16.75	2245.84
RA121	1235.79	1234.79	1340.32	104.53	22.89	2268.73
RA122	1237.33	1236.33	1339.89	102.56	21.55	2290.29
RA123	1239.39	1238.39	1339.45	100.06	21.38	2311.67
RA124	1240.39	1239.39	1339.28	98.89	8.84	2320.50
RA125	1240.73	1239.73	1339.14	98.41	6.60	2327.10
RA126	1241.84	1240.84	1338.67	96.83	23.56	2350.66
RA127	1243.92	1242.92	1338.16	94.24	25.10	2375.76
RA128	1244.79	1243.64	1337.77	92.98	19.52	2395.27
RA129	1244.68	1243.68	1337.34	92.66	21.11	2416.39
RA130	1244.80	1243.80	1337.17	92.37	8.52	2424.91
RA131	1244.92	1243.92	1337.00	92.08	8.76	2433.66
RA132	1245.30	1244.30	1336.54	91.24	22.91	2456.57
RA133	1245.70	1244.70	1336.28	90.58	12.92	2469.49
RA134	1246.59	1245.59	1336.03	89.44	12.45	2481.93
RA135	1248.63	1247.63	1335.67	87.04	17.66	2499.59
RA136	1251.35	1250.35	1335.32	83.97	16.90	2516.50
RA137	1253.00	1251.90	1335.11	82.11	10.71	2527.20
RA138	1253.53	1251.93	1334.90	81.37	10.12	2537.33
RA139	1253.03	1252.03	1334.69	81.66	10.65	2547.97
RA140	1254.00	1253.00	1334.35	80.35	16.98	2564.96
RA141	1255.86	1254.86	1334.07	78.21	13.58	2578.54
RA142	1257.06	1256.06	1333.87	76.81	9.68	2588.22
RA143	1257.98	1256.98	1333.51	75.53	18.34	2606.56
RA144	1259.04	1258.04	1333.24	74.20	13.15	2619.71
RA145	1260.79	1259.79	1332.83	72.04	20.22	2639.92
RA146	1261.49	1260.49	1332.54	71.05	14.36	2654.29
RA147	1261.85	1260.85	1332.35	70.50	9.77	2664.06
RA148	1261.90	1260.90	1331.89	69.99	22.90	2686.96
RA149	1262.92	1261.92	1331.49	68.57	19.60	2706.56
RA150	1263.62	1262.62	1331.39	67.77	5.10	2711.66
RA151	1266.27	1265.27	1330.95	64.68	21.71 / 2.60	2733.37 2735.97

PIPE DIAMETER: 80 mm - DI

PIPE DETAILS: C1/32 ⊗60 80DI — 80DI

HECTOMETER: 0, 1, 2, 3, 4, 5, 6, 7

KILOMETER: 2



ARV (PN16)	
RA138	
60 ⊗ 80DI — 80DI	
TEE 80mm x 60mm x 80mm	1
ARV DN 60mm	1
COVER GRADE A	1
MANHOLE 100 x 125 cm	1

Stake	Bend(s)
RA105	C1/8+1/16
RA109	C1/16
RA110	C1/32
RA111	C1/32
RA113	C1/32
RA115	C1/32
RA116	C1/32
RA117	C1/32
RA118	C1/32
RA119	C1/32
RA124	C1/8+1/16
RA125	C1/16
RA129	C1/16
RA130	C1/16
RA131	C1/32
RA133	C1/32
RA134	C1/16
RA135	C1/32
RA136	C1/32
RA137	C1/16
RA138	C1/32
RA139	C1/16
RA140	C1/32
RA142	C1/16+1/32
RA146	C1/32
RA147	C1/16
RA150	C1/16
RA151	C1/8+1/16

HYDRAULIC LEGEND

PIPELINE
FLOW DIRECTION
GATE VALVE
NEEDLE VALVE
TEE
TAPER
PRESSURE REGULATING VALVE (P.R.V)
BEND 1/8 (C1/8)
ARV (DOUBLE AIR VA…)
W.O (WASHOUT)
FLANGED ADAPTER
END CAPS
EXISTING PIPE

NOTES

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- HEAD LOSSES HAVE BEEN CALCULATED ACCORDING TO THE COLEBROOK FORMULA WITH AN ABSOLUTE ROUGHNESS K=0.4mm FOR DUCTILE IRON PIPES AND K=0.2mm FOR HDPE PIPES.
- FOR PIPELINE ANCHORS AND SUPPORT DETAILS REFER TO STANDARD DWG Nb 472STDP10.
- FOR PIPELINE TRENCH DETAILS REFER TO STANDARD DWG Nb 472STDP03 AND DWG Nb 472STDP04.
- FOR HORIZONTAL BENDS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP07 AND DWG Nb 472STDP08.
- FOR VERTICAL BENDS AND TAPERS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP09.
- PIPE MATERIAL: DUCTILE IRON CLASS K9
- ALL PIPE FITTINGS AND ACCESSORIES ARE PN16, UNLESS OTHERWISE SPECIFIED
- ALL PIPES SHOULD BE EXECUTED IN PUBLIC OR EXPROPRIATED LAND

TOPOGRAPHICAL LEGEND

BUILDING
PAVED ROAD
CONCRETE ROAD
TRACK
REFERENCE LINE
CHANNEL
TERRACE
FENCE
STREAM/RIVER
CULVERT/BRIDGE
SPRING
WELL
DECIDUOUS/PINE TREE
ROCKS
DownHill
HighHill
MANHOLE SEWER
MANHOLE WATER
MANHOLE TELEPHONE
MANHOLE NOT IDENTIFIED
LIGHTING POLE
TELEPHONE POLE
TRIANGULATION STATION
ELECTRIC SUB STATION (ELS.S)
ELECTRIC POLE/TELEGRAPH POLE
STAKE NUMBER STAKE POINT (Num)
SPOT HEIGHT (1150.12)
PLOT No (1262)
BOUNDARY
CIRCONSCRIPTION BOUNDARY

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

REPUBLIC OF LEBANON

MINISTRY OF ENERGY WATER

COUNCIL FOR DEVELOPMENT RECONSTRUCTION

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JALL ED DIB – HAJAL Bldg
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FAX: (04) 712159

CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

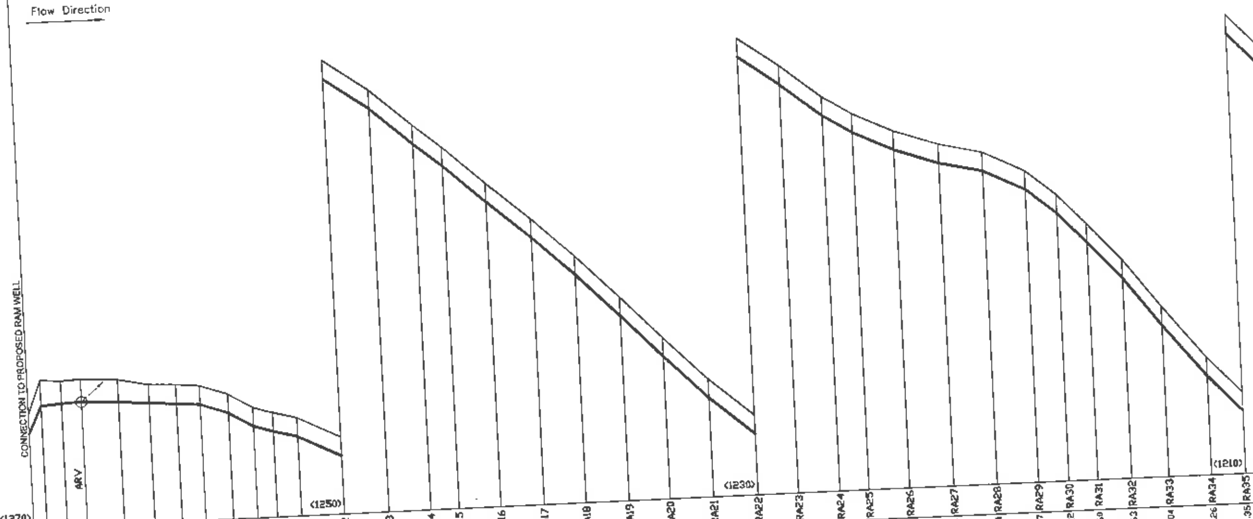
RAM LIFT LINE 1 — PLAN + PROFILES

FILE NAME	DESIGNED BY	DRAWN BY	CHECKED BY
472W-TR-04/1P03	J. ZALZAL	J. ZALZAL	T. RMEITY

DATE	SCALE	SHEET No.	DRAWING No.
JULY 2019	H = 1/2000 V = 1/200	3/3	24

BRANCH RA0–RM31
L= 1462 m
D= 80 mm
Q= 5.00 l/s
V= 0.99 m/s
J= 0.0201 m/m
JL= 29.79 m

Flow Direction



Pipe diameter: 80 mm - DI

Pipe details: C1/32, 80DI

STAKE NUMBER	GROUND LEVEL	CROWN PIPE ELEVATION	PIEZOMETRIC LEVEL	PRESSURE ON GROUND	PARTIAL DISTANCE	ADD DISTANCE
RA0	1276.00	1275.00	1335.00	59.00		0.00
RA1	1277.82	1276.47	1334.85	57.03	7.17	7.17
RA2	1277.74	1276.54	1334.63	56.89	10.80	17.96
RA3	1277.79	1276.59	1334.42	56.63	10.67	28.63
RA4	1277.69	1276.49	1334.02	56.33	19.83	48.46
RA5	1277.36	1276.35	1333.69	56.33	16.34	64.80
RA6	1277.27	1276.27	1333.40	56.13	14.43	79.22
RA7	1277.16	1276.16	1333.15	55.99	12.70	91.92
RA8	1276.64	1275.64	1332.85	56.21	15.00	106.92
RA9	1275.88	1274.88	1332.58	56.70	13.12	120.04
RA10	1275.55	1274.55	1332.37	56.82	10.71	130.75
RA11	1275.22	1274.22	1332.11	56.89	12.95	143.70
RA12	1274.09	1273.09	1331.65	57.56	22.75	166.45
RA13	1272.41	1271.41	1331.17	58.76	23.48	189.93
RA14	1270.45	1269.45	1330.72	60.27	22.39	212.32
RA15	1269.21	1268.21	1330.42	61.21	14.96	227.28
RA16	1267.19	1266.19	1329.97	62.78	22.36	249.64
RA17	1265.19	1264.19	1329.50	64.31	23.18	272.82
RA18	1263.11	1262.11	1329.05	65.94	22.49	295.31
RA19	1260.83	1259.83	1328.58	67.75	22.87	318.18
RA20	1258.58	1257.58	1328.15	69.57	21.66	339.84
RA21	1256.27	1255.27	1327.68	71.41	23.12	362.96
RA22	1254.24	1253.24	1327.20	72.96	23.71	386.67
RA23	1252.69	1251.69	1326.76	74.07	21.80	408.47
RA24	1250.93	1249.93	1326.32	75.39	22.07	430.54
RA25	1249.98	1248.98	1326.00	76.02	15.51	446.05
RA26	1248.97	1247.97	1325.57	76.60	21.55	467.60
RA27	1248.16	1247.16	1325.10	76.94	23.48	491.08
RA28	1247.64	1246.64	1324.63	76.99	23.03	514.11
RA29	1246.57	1245.57	1324.18	77.61	22.35	536.47
RA30	1245.22	1244.22	1323.86	78.64	16.25	552.72
RA31	1243.60	1242.60	1323.54	79.94	15.56	568.27
RA32	1241.63	1240.63	1323.18	81.55	17.90	586.18
RA33	1239.04	1238.04	1322.78	83.74	19.69	605.87
RA34	1236.26	1235.26	1322.32	86.06	22.70	628.57
RA35	1234.35	1233.35	1321.96	87.61	18.00	646.57
RA36	1232.52	1231.52	1321.61	89.09	17.38	663.95
RA37	1231.03	1230.03	1321.21	90.18	19.43	683.37
RA38	1230.32	1229.32	1320.94	90.62	13.65	697.03
RA39	1228.73	1227.73	1320.52	91.79	20.91	717.94
RA40	1226.97	1225.97	1320.11	93.14	20.11	738.05
RA41	1226.21	1225.21	1319.84	93.63	13.51	751.56

DATUM LEVEL / HECTOMETER / KILOMETER

Stake	Bend(s)
RA1	C1/4+1/32
RA2	C1/32
RA4	C1/32
RA5	C1/32
RA6	C1/32
RA7	C1/32
RA9	C1/32
RA10	C1/16
RA25	C1/32
RA31	C1/32
RA33	C1/32
RA38	C1/32
RA40	C1/32
RA41	C1/32

HYDRAULIC LEGEND

PIPELINE	BEND 1/8 (C1/8)
FLOW DIRECTION	ARV (DOUBLE AIR VALVE - DAV)
GATE VALVE	W.O (WASHOUT)
NEEDLE VALVE	FLANGED ADAPTER
TEE	END CAPS
TAPER	EXISTING PIPE
PRESSURE REGULATING VALVE (P.R.V)	

NOTES

- ALL ALTITUDES ARE TIED TO THE NATIONAL ELEVATION DATUM OF LEBANON.
- HEAD LOSSES HAVE BEEN CALCULATED ACCORDING TO THE COLEBROOK FORMULA WITH AN ABSOLUTE ROUGHNESS K=0.4mm FOR DUCTILE IRON PIPES AND K=0.2mm FOR HDPE PIPES.
- FOR PIPELINE ANCHORS AND SUPPORT DETAILS REFER TO STANDARD DWG Nb 472STDP10.
- FOR PIPELINE TRENCH DETAILS REFER TO STANDARD DWG Nb 472STDP03 AND DWG Nb 472STDP04.
- FOR HORIZONTAL BENDS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP07 AND DWG Nb 472STDP08.
- FOR VERTICAL BENDS AND TAPERS THRUST BLOCKS DETAILS REFER TO STANDARD DWG Nb 472STDP09.
- PIPE MATERIAL: DUCTILE IRON CLASS K9
- ALL PIPE FITTINGS AND ACCESSORIES ARE PN16, UNLESS OTHERWISE SPECIFIED
- ALL PIPES SHOULD BE EXECUTED IN PUBLIC OR EXPROPRIATED LAND

TOPOGRAPHICAL LEGEND

BUILDING	MANHOLE SEWER
PAVED ROAD	MANHOLE WATER
CONCRETE ROAD	MANHOLE TELEPHONE
TRACK	MANHOLE NOT IDENTIFIED
REFERENCE LINE	LIGHTING POLE
CHANNEL	TELEPHONE POLE
TERRACE	TRIANGULATION STATION
FENCE	ELECTRIC SUB STATION (E.S.S)
STREAM/RIVER	ELECTRIC POLE/TELEGRAPH POLE
CULVERT/BRIDGE	STAKE NUMBER STAKE POINT (Num)
SPRING (Spr)	SPOT HEIGHT (1160.12)
WELL	PLOT Nb (1262)
DECIDUOUS/PINE TREE	BOUNDARY
ROCKS	CIRCONSCRIPTION BOUNDARY
DownHill	
High-Hill	

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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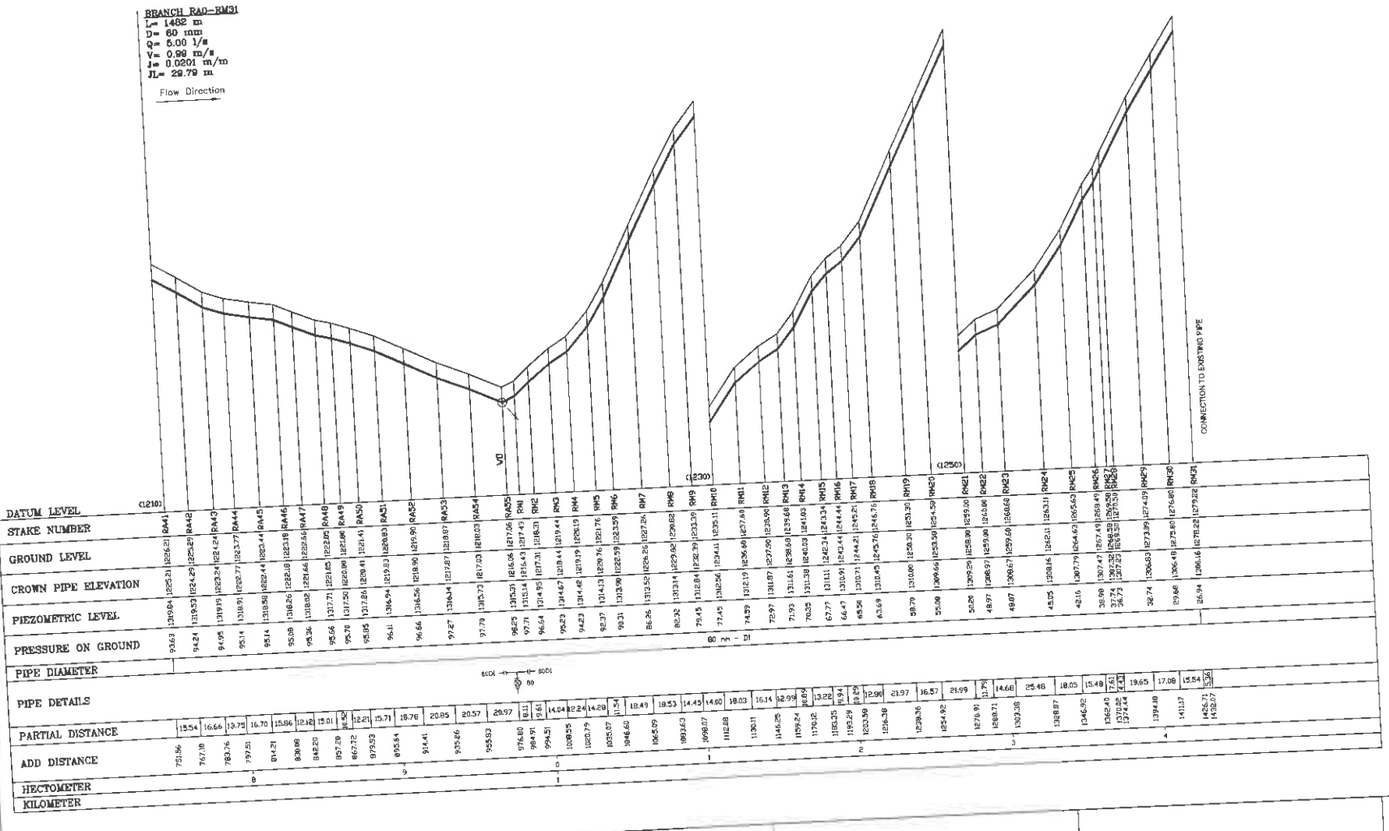
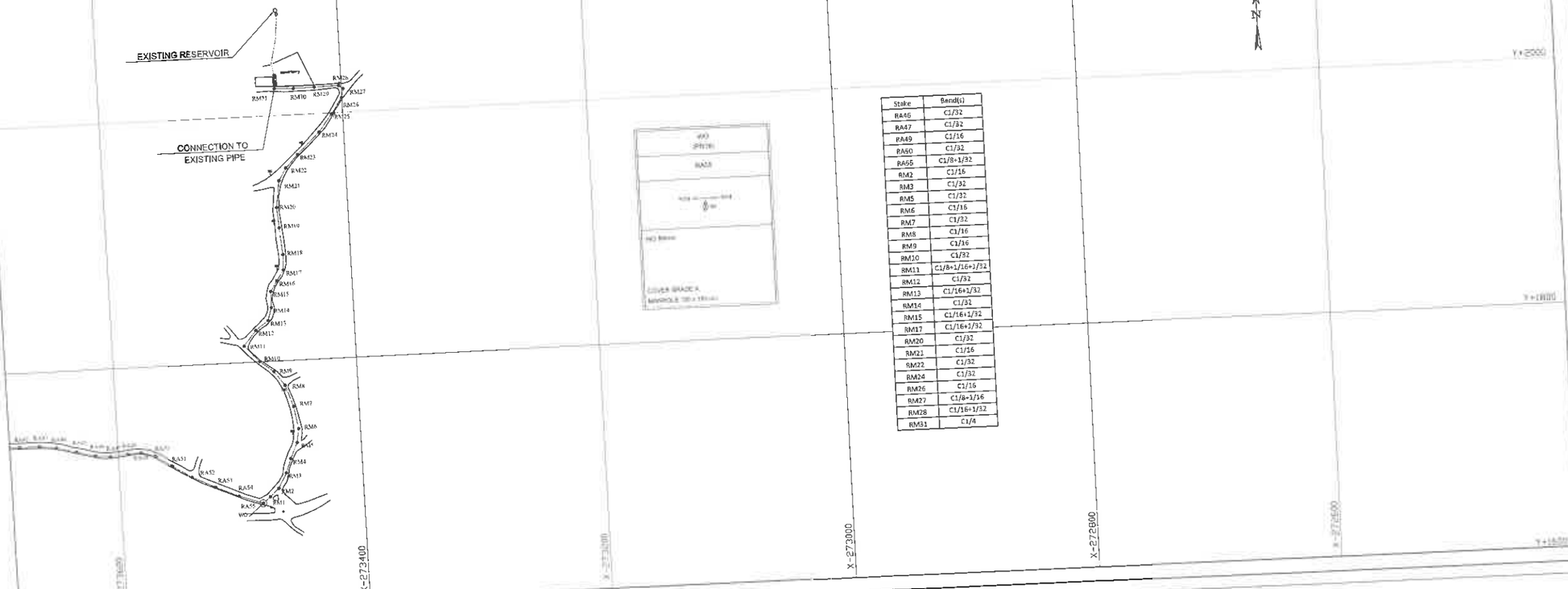
CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM LIFT LINE 2 — PLAN + PROFILES

FILE NAME	DESIGNED BY	DRAWN BY	CHECKED BY
472W-TR-04/2P01	J. ZALZAL	J. ZALZAL	T. RMEITY

DATE	SCALE	SHEET No.	DRAWING No
JULY 2019	H = 1/2000 V = 1/200	1/2	25





Stake	Bend(s)
RA46	C1/32
RA47	C1/32
RA49	C1/16
RA50	C1/32
RA55	C1/8+1/32
RM2	C1/16
RM3	C1/32
RM5	C1/32
RM6	C1/16
RM7	C1/32
RM8	C1/16
RM9	C1/16
RM10	C1/32
RM11	C1/8+1/16+1/32
RM12	C1/32
RM13	C1/16+1/32
RM14	C1/32
RM15	C1/16+1/32
RM17	C1/16+1/32
RM20	C1/32
RM21	C1/16
RM22	C1/32
RM24	C1/32
RM26	C1/16
RM27	C1/8+1/16
RM28	C1/16+1/32
RM31	C1/4

HYDRAULIC LEGEND

PIPELINE		BEND 1/8	C1/8
FLOW DIRECTION		ARV (DOUBLE AIR VALVE - DAV)	
GATE VALVE		W.O (WASHOUT)	
NEEDLE VALVE		FLANGED ADAPTER	
TEE		END CAPS	
TAPER		EXISTING PIPE	
PRESSURE REGULATING VALVE	PRV		

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TOPOGRAPHICAL LEGEND

BUILDING
PAVED ROAD
CONCRETE ROAD
TRACK
REFERENCE LINE
CHANNEL
TERRACE
FENCE
STREAM/RIVER
CULVERT/BRIDGE
SPRING
WELL
DECIDUOUS/PINE TREE
ROCKS
Dom/HB
High/HB

MANHOLE SEWER
MANHOLE WATER
MANHOLE TELEPHONE
MANHOLE NOT IDENTIFIED
LIGHTING POLE
TELEPHONE POLE
TRIANGULATION STATION
ELECTRIC SUB STATION
ELECTRIC POLE/TELEGRAPH POLE
STAKE NUMBER / STAKE POINT
SPOT HEIGHT
PLOT Nb
BOUNDARY
CIRCONSCRIPTION BOUNDARY

Rev.	Date	Dsgn	Drwn	Chk'd	Appr'd

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CONSTRUCTION OF PUMPING STATIONS IN TARAYA, BAALBECK, SHHAYMIEH, RAM AND BTALLOUN VILLAGES

RAM LIFT LINE 2

PLAN + PROFILES

FILE NAME	DESIGNED BY	DRAWN BY	CHECKED BY
472W-TR-04/2P02	J. ZALZAL	J. ZALZAL	T. RMEITY

DATE	SCALE	SHEET No.	DRAWING No
JULY 2019	H = 1/2000 V = 1/200	2/2	26