



**Islamic Relief Worldwide**

**IR-W**

**South Region**

**Kandahar Area Office**

**Shelter Project**

**Water Supply Powered by Solar System with RCC Water Reservoir**

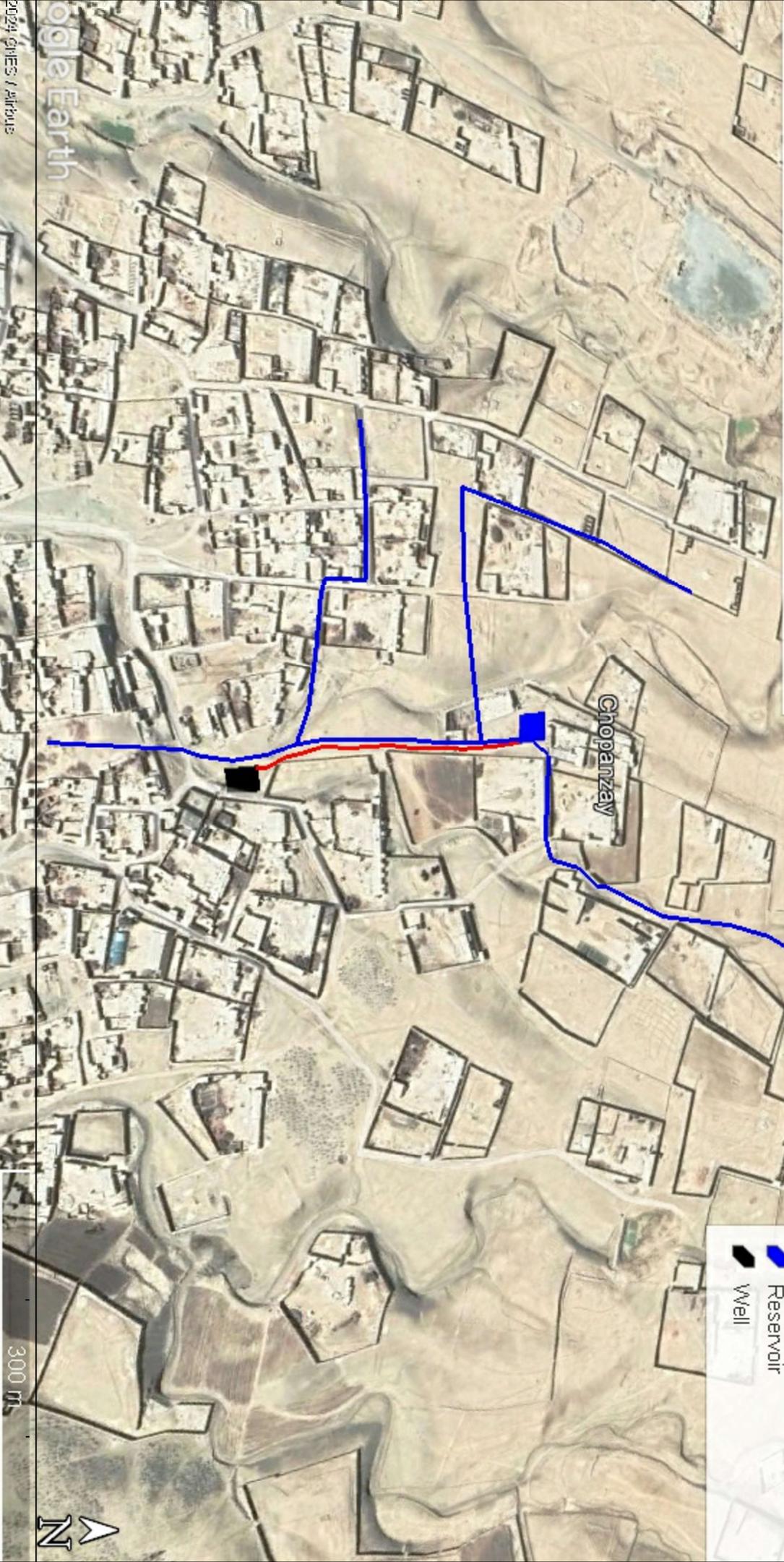
**Khawghani, Arghastan District, Kandahar Province, Afghanistan**

**Submission Date: 12/11/2023**

|

# The Map Of Khawgani Village Water Network

astan District



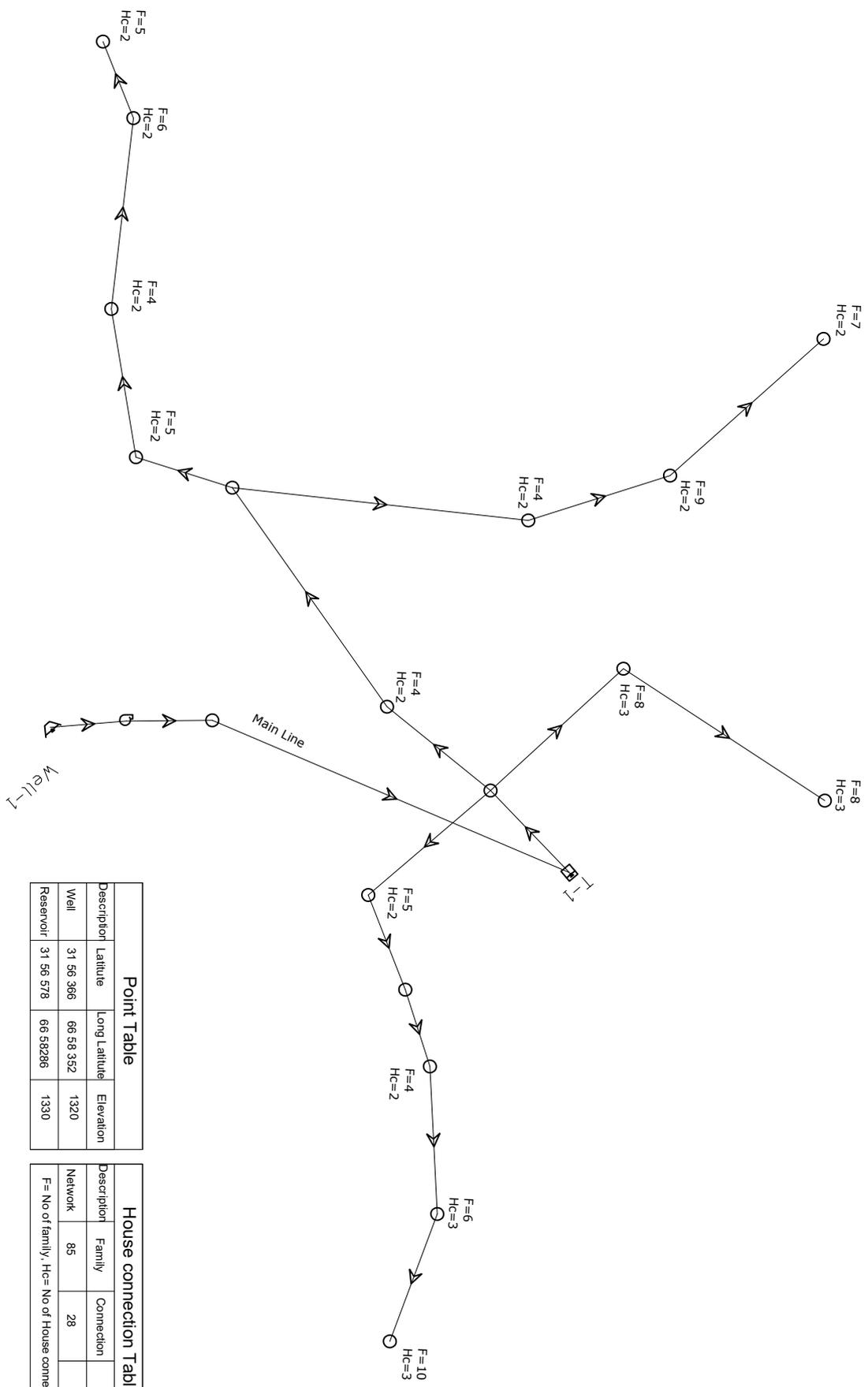
**Legend**

-  Main Pipe
-  Pipe from pump to Reservoir
-  Reservoir
-  Well

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit	
Checkd: By		Eng. Dawod Shafiq		Province		Kandahar		cm	
Approved: By				District		Arghastan		Scale	
				Village		Khawgyami		NO	
								Sheet No	
								0	



# House connection survey



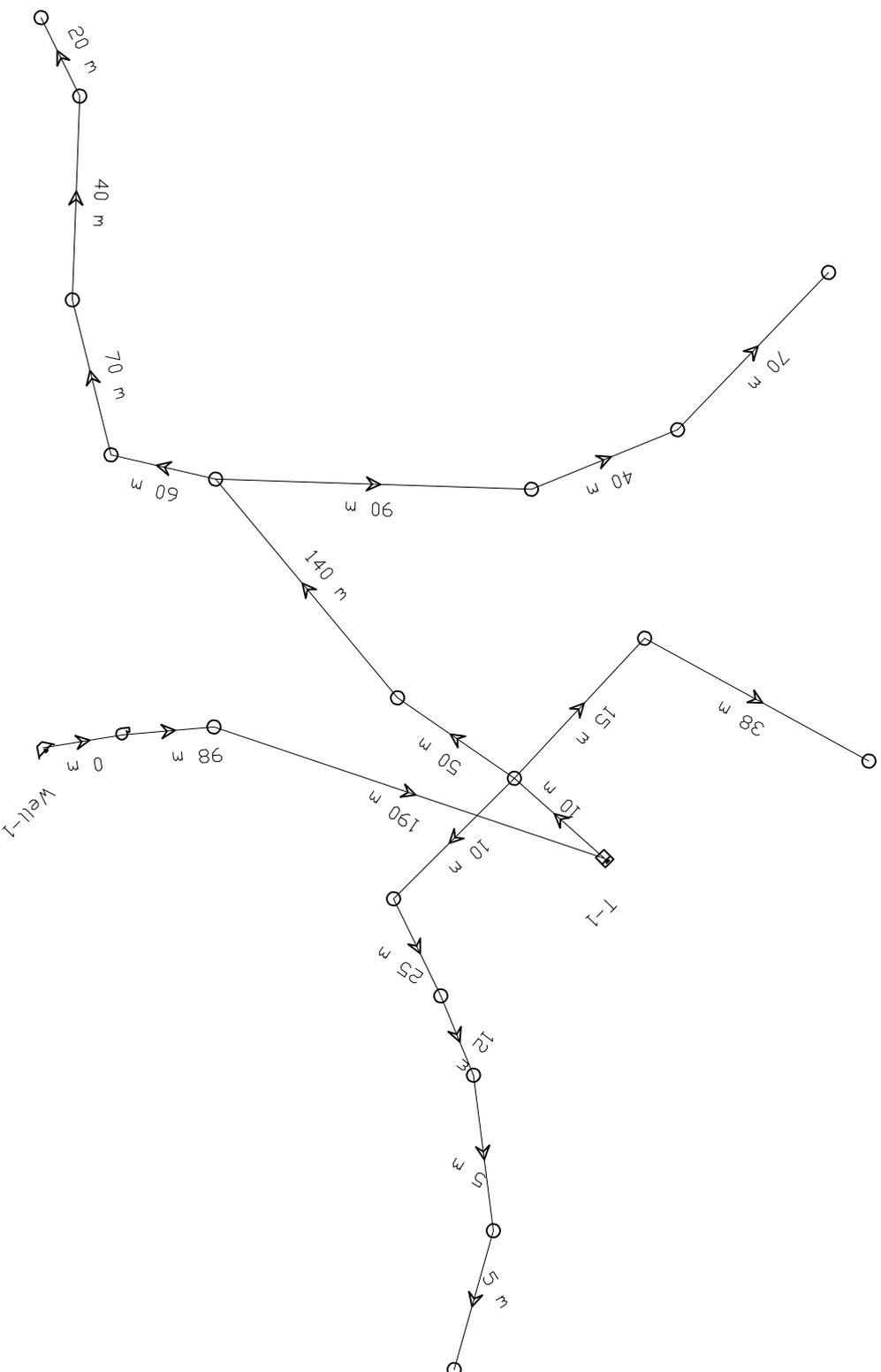
Point Table		
Description	Latitude	Long Latitude
Well	31 56 366	66 58 352
Reservoir	31 56 578	66 58286
		1330

House connection Table		
Description	Family	Connection
Network	85	28
F= No of family, Hc= No of House connection		

## Water Network Project Survey Plan for Families and HHS Connection

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawgyami		

# Pipe Length

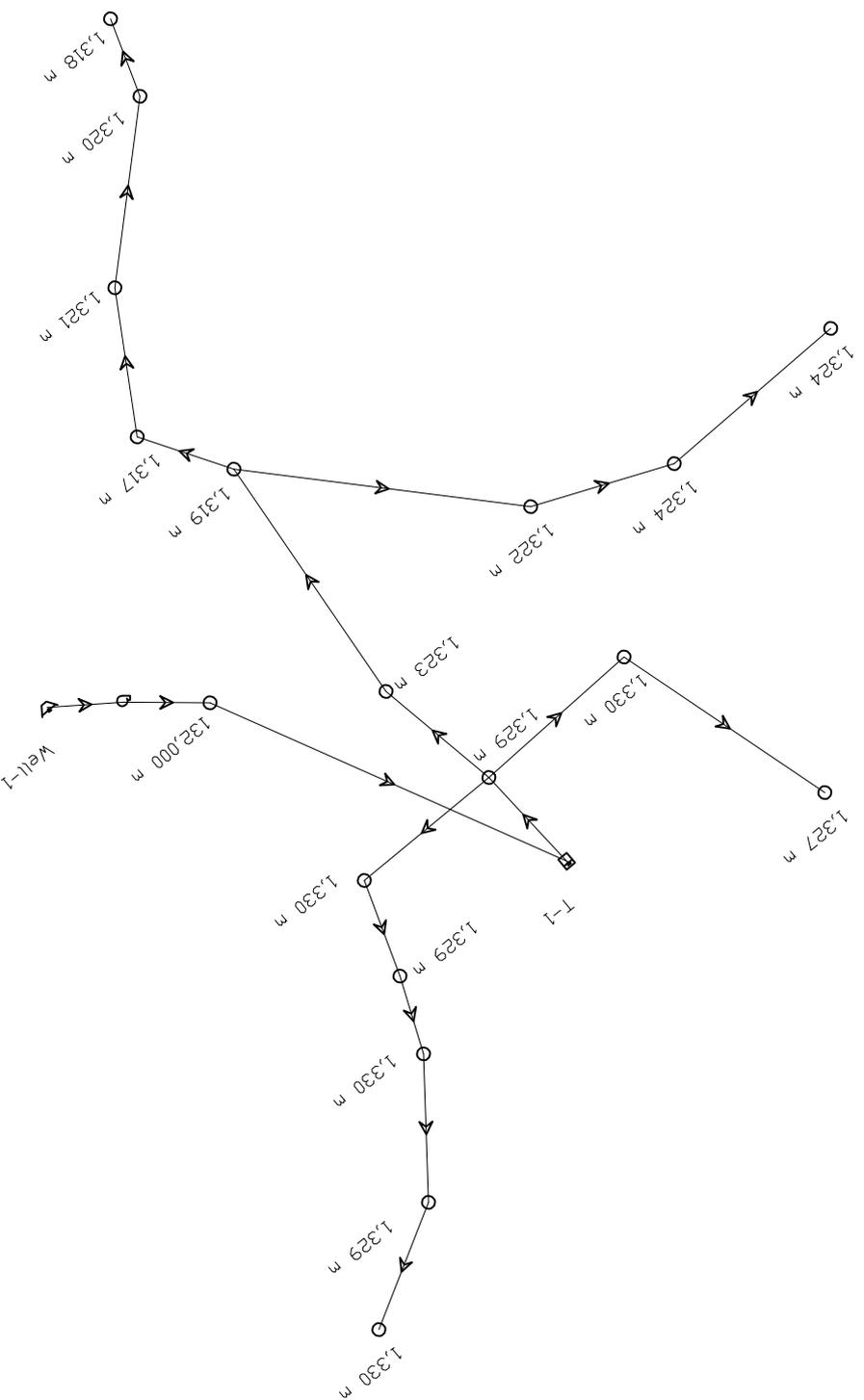


## Water Network Project

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit	
Checked: By		Eng. Dawod Shafag		Province		Kandahar		Scale	
Approved: By				District		Arghastan		Sheet No	
				Village		Khawgyami		0	



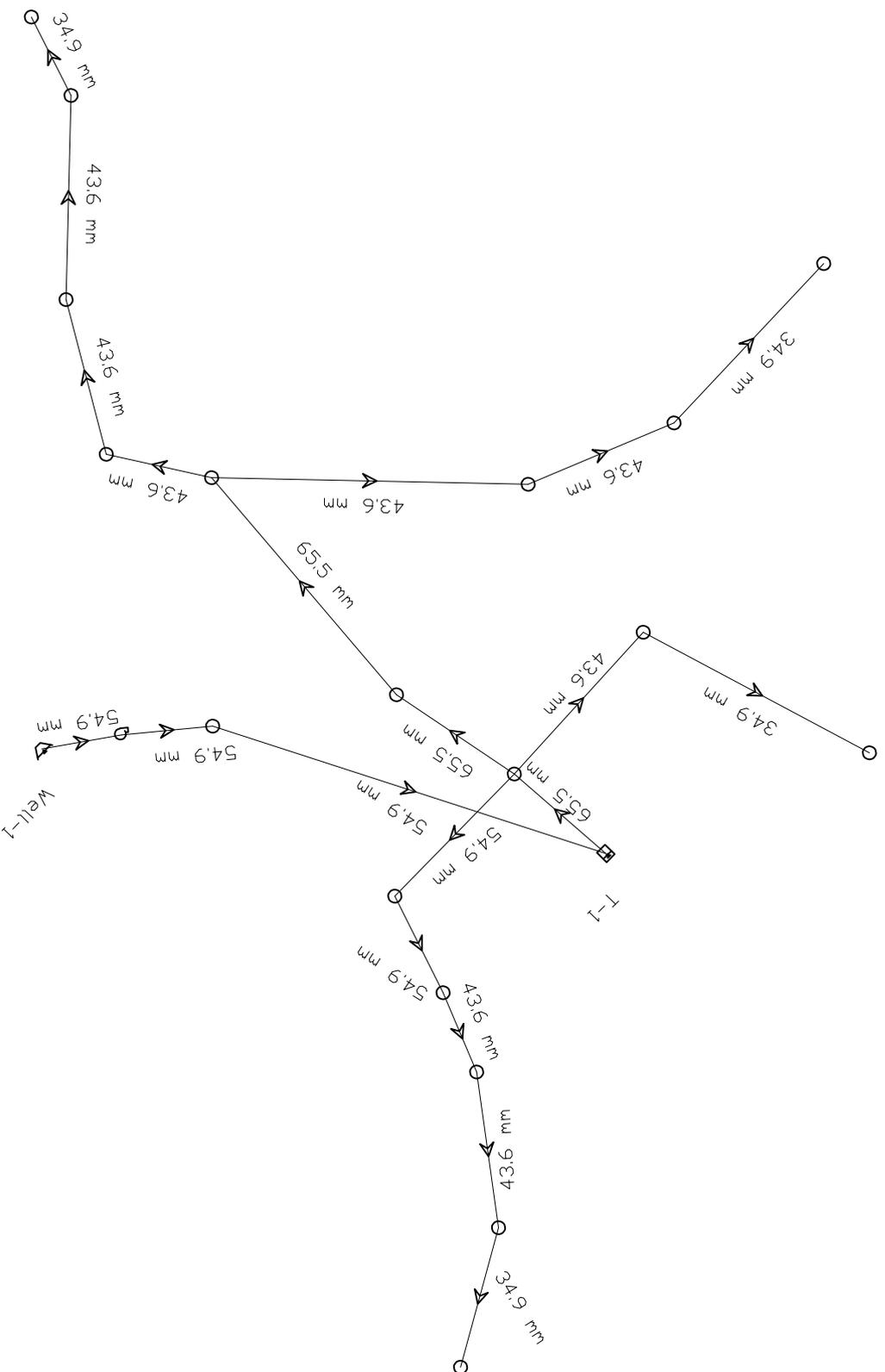
# Elevation



## Water Network Project

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023			
Checked: By		Eng. Dawod Shafaq		Province		Kandahar			
Approved: By				District		Arghastan			
				Village		Khawgyami			
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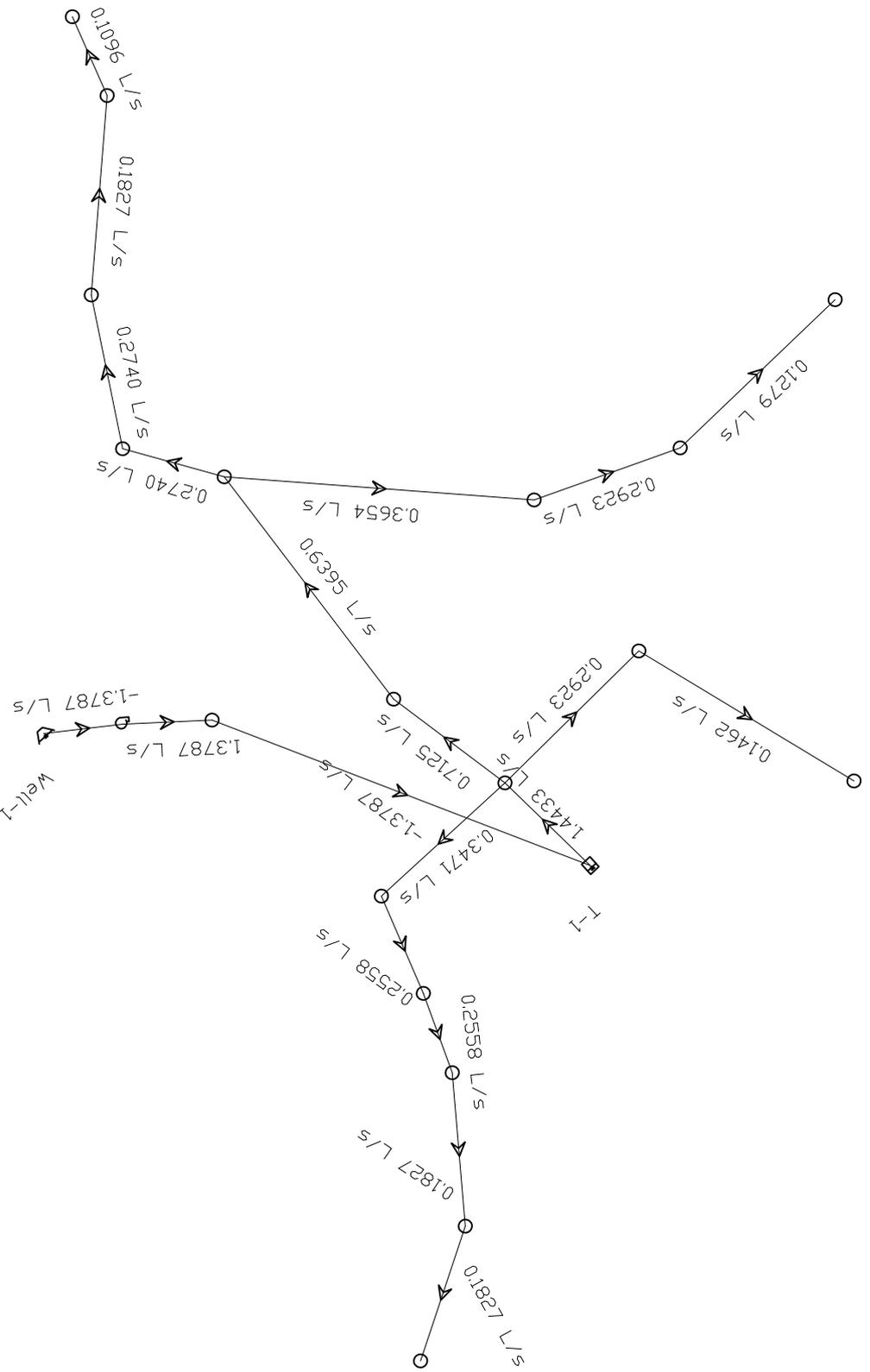
## Water Network Project (Pipe Diameter)



### Water Network Project (Pipe Diameter)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawgyami		

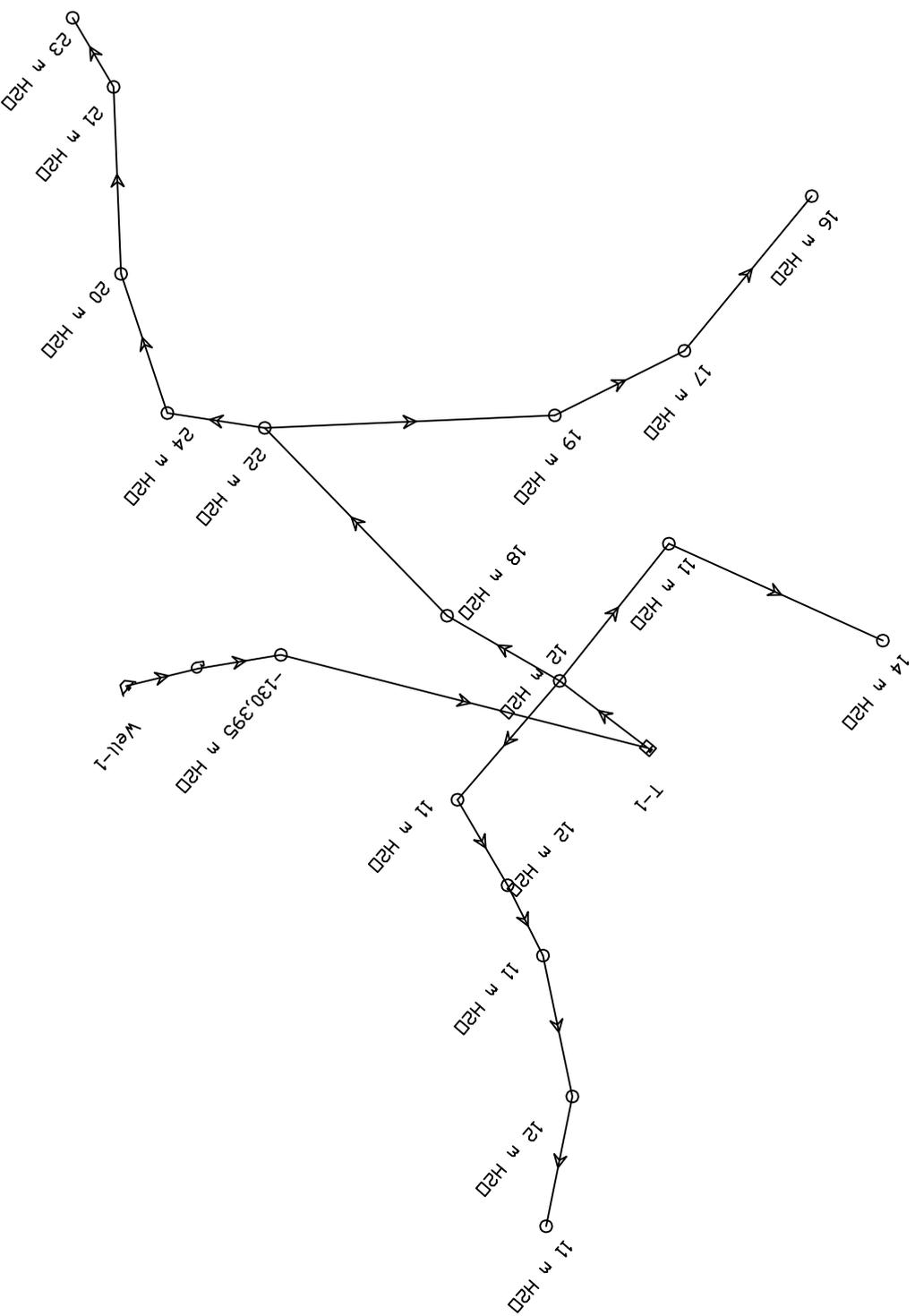
# Flow



## Water Network Project Flow

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit	
Checked: By		Eng. Dawod Shafaq		Province		Kandahar		cm	
Approved: By				District		Arghastan		Scale	
				Village		Khawgyami		NO	
								Sheet No	
								0	
									

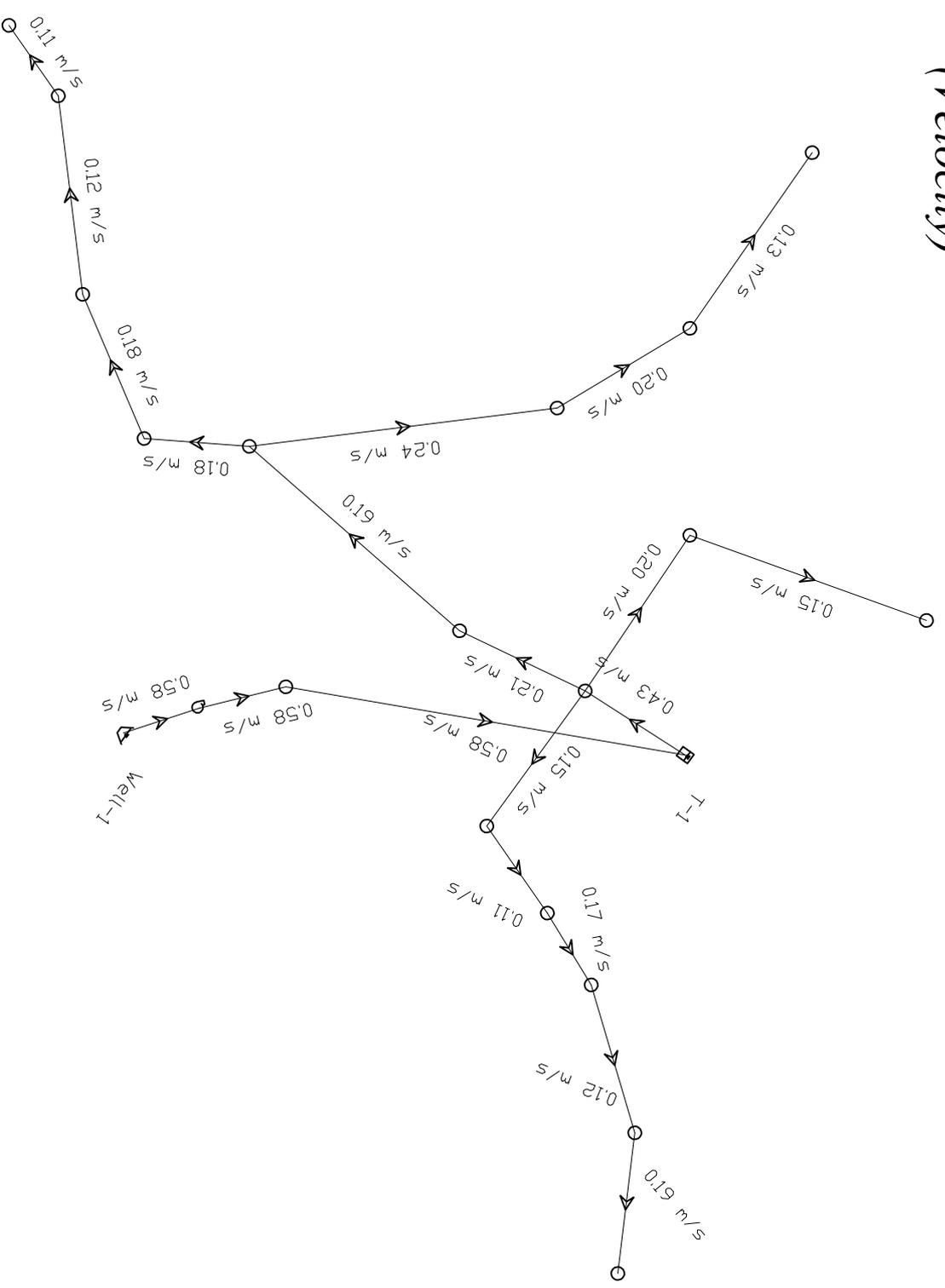
# Water Network Project (Pressure)



## Water Network Project (Pressure)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawgyami		

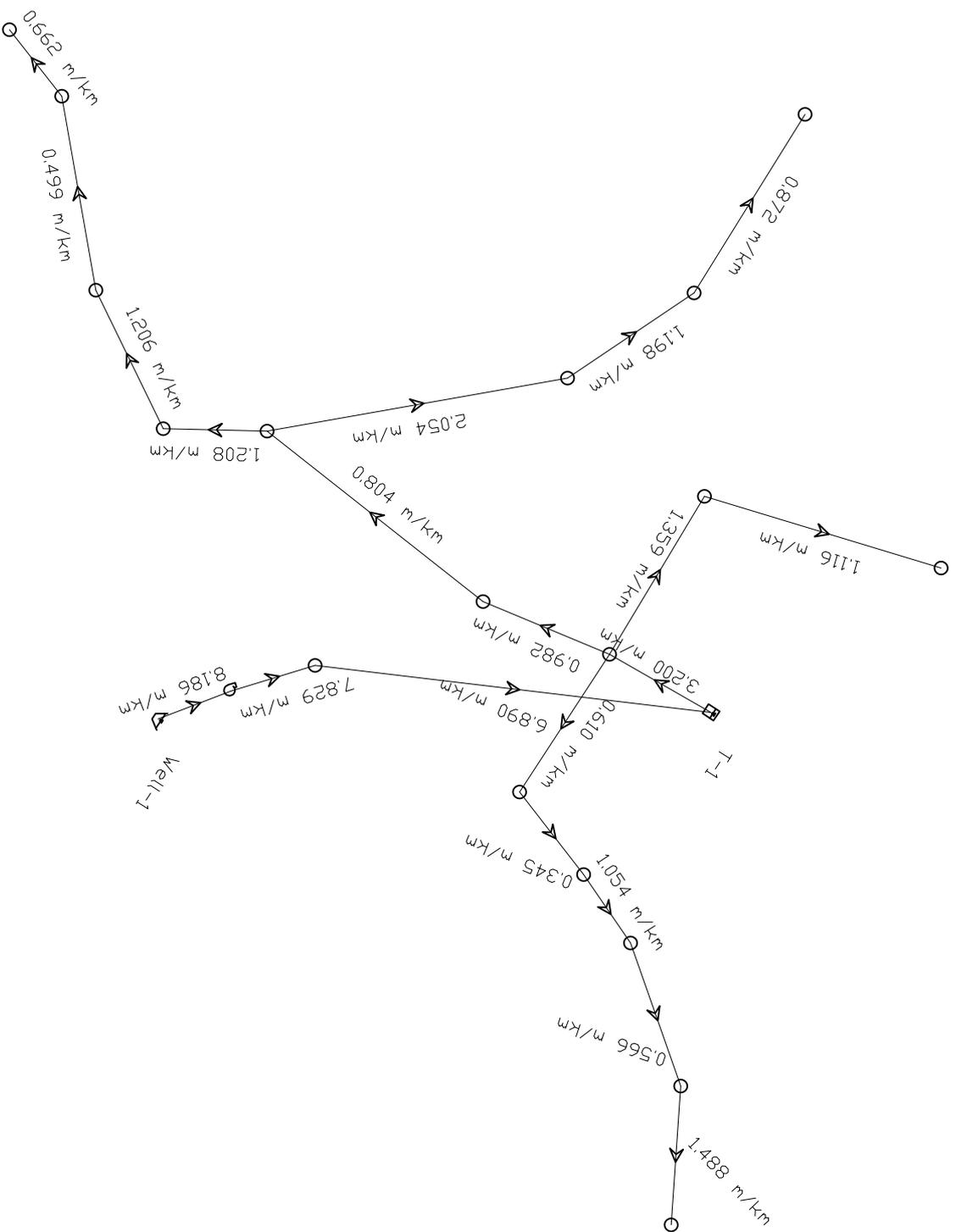
# (Velocity)



## Water Network Project (Velocity)

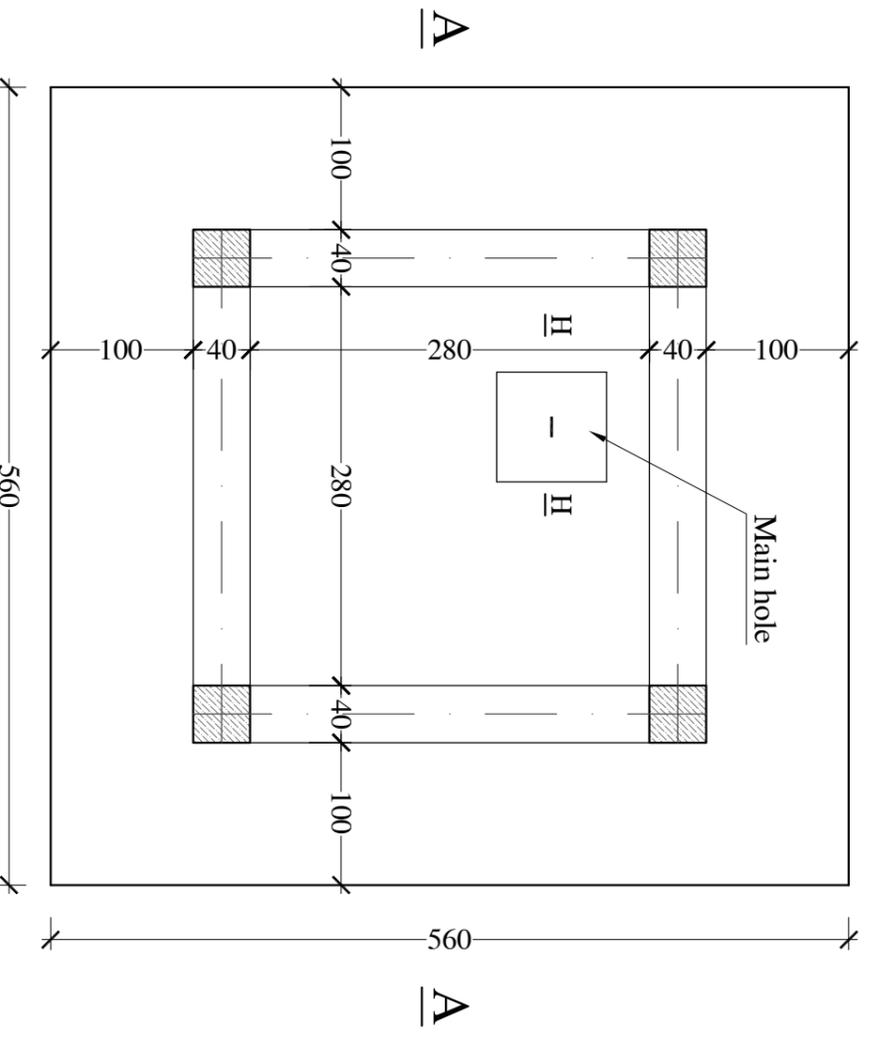
Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawgyami		

# Head Loss

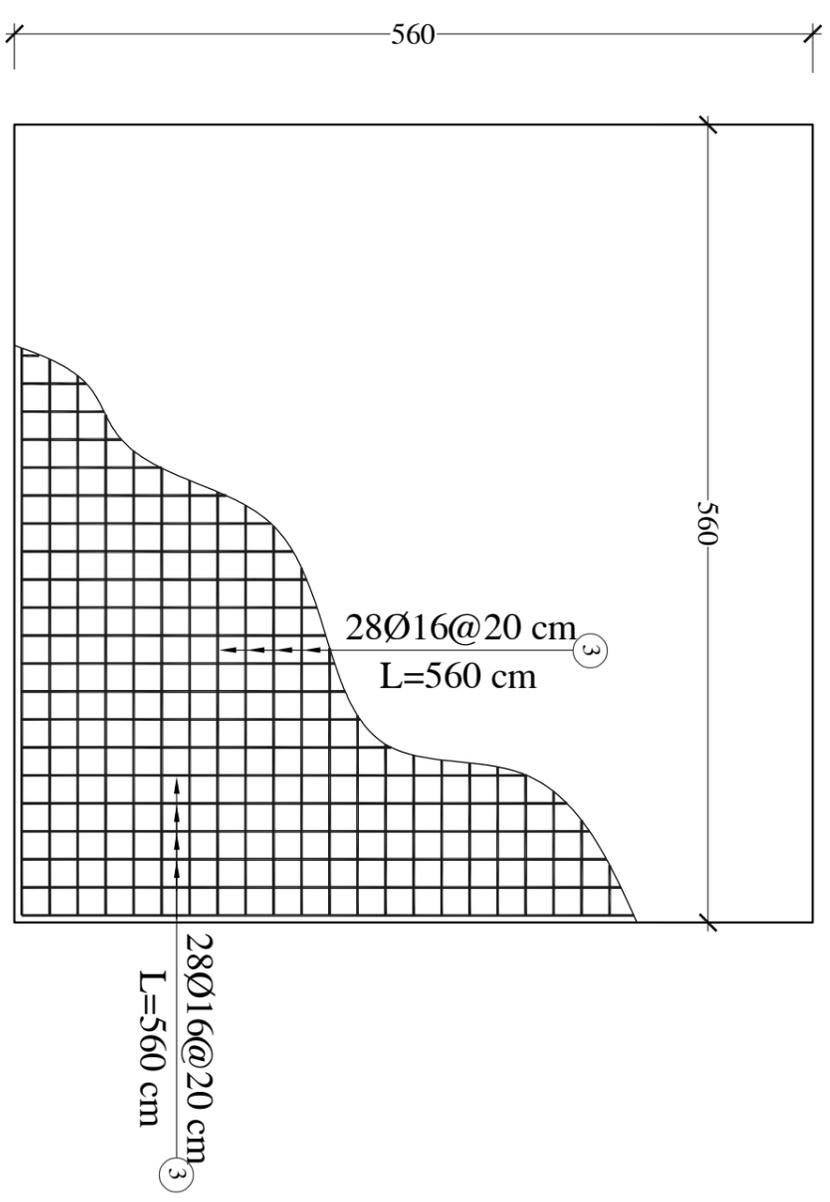


## Water Network Project

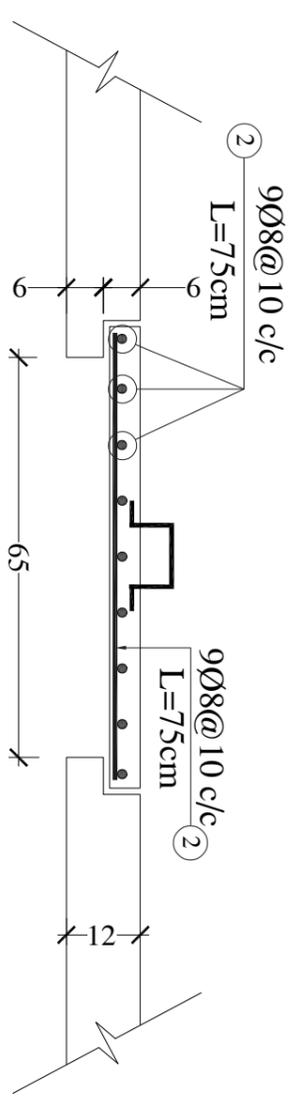
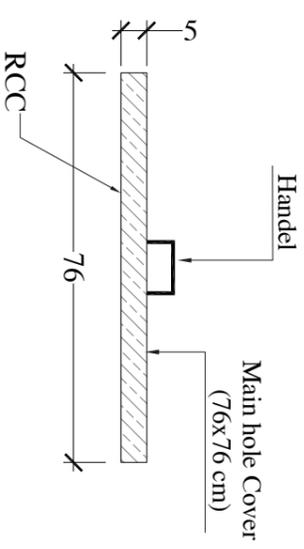
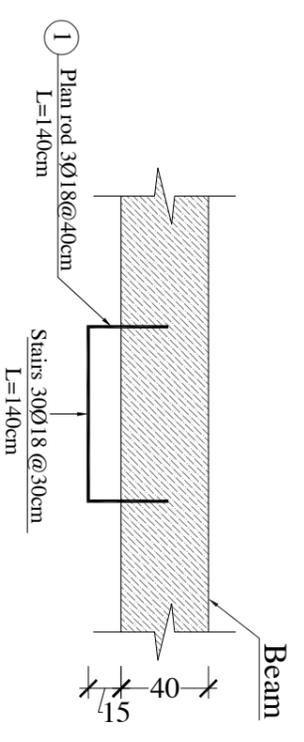
Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit	
Checked: By		Eng. Dawod Shafag		Province		Kandahar		cm	
Approved: By				District		Arghastan		Scale	
				Village		Khawgyami		NO	
								Sheet No	
								0	
									



**Plan**



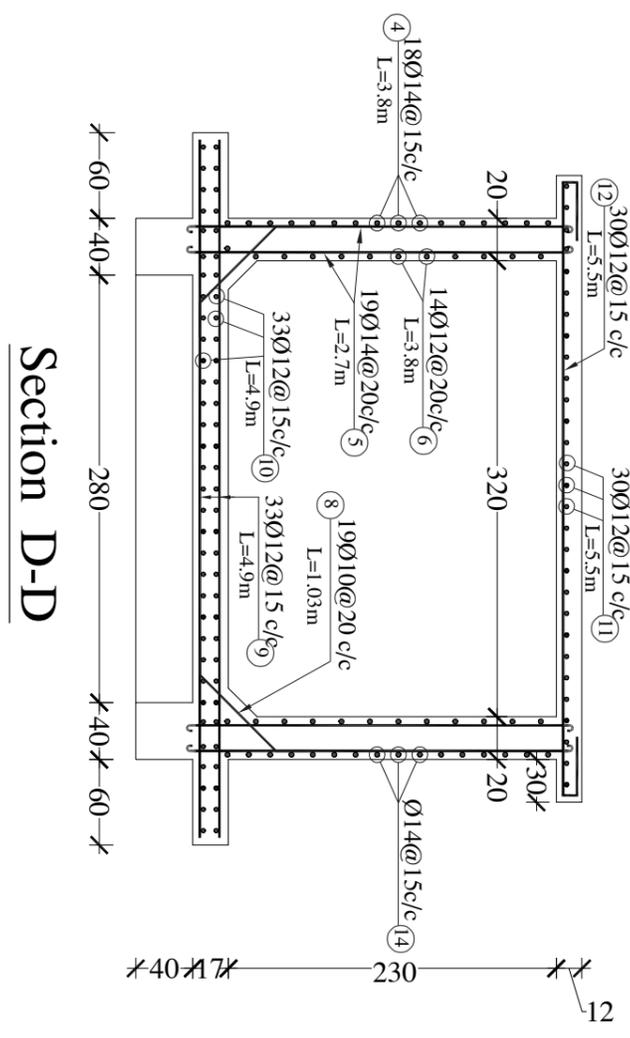
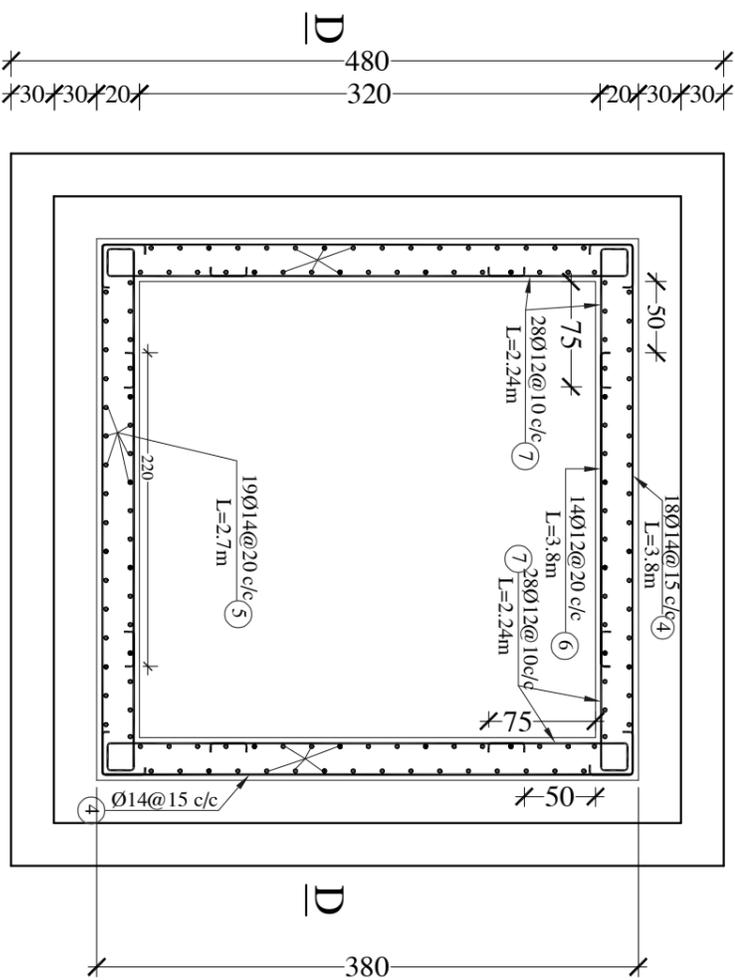
**Reinforcement Plan of Footing**



**Section H-H**

**Detail -1**

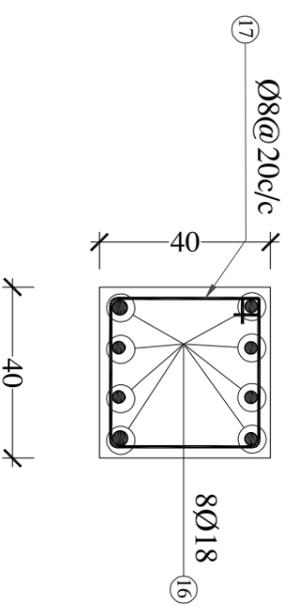
SURVEYED BY		ENG.S.RAUF		CHECKED BY		ENG.NAJIBULLAH "AHMADI"		SCALE	
DESIGNED BY		ENG.SAYED RAUF		REVIEWED BY		ENG.FAZAL OMAR "ZAHID"		DATE	
DRAWN BY		ENG.SAYED RAUF		APPROVED BY		ENG.GHULAM QADER		DRAWING NO.	
PROJECT NAME :		20 Cubic meter RCC Water Tank							
DRAWING TITLE		Plan and Reinforcement plan							
SHEET NO		2		4		PROVINCE		Kandahar	
DISTRICT		Arghastan		VILLAGE		Khawgyani		DATE	
30/01/2021		30/01/2021		30/01/2021		30/01/2021		30/01/2021	



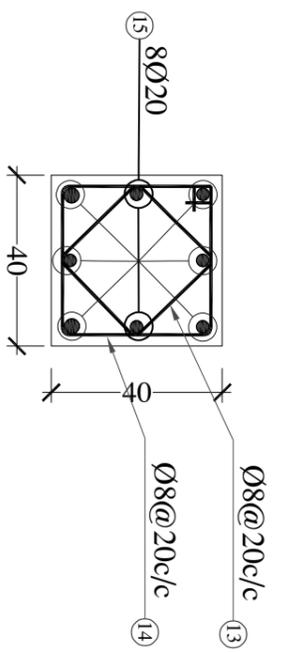
Section D-D

30\*30\*20\* 320 20\*30\*30\* 480

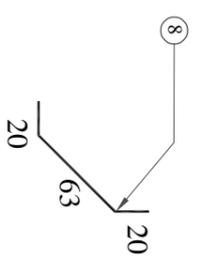
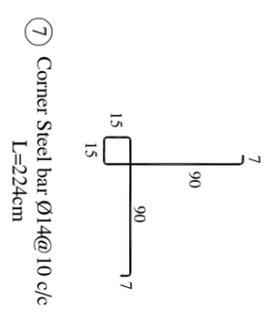
Reinforcement Plan of Water Tank



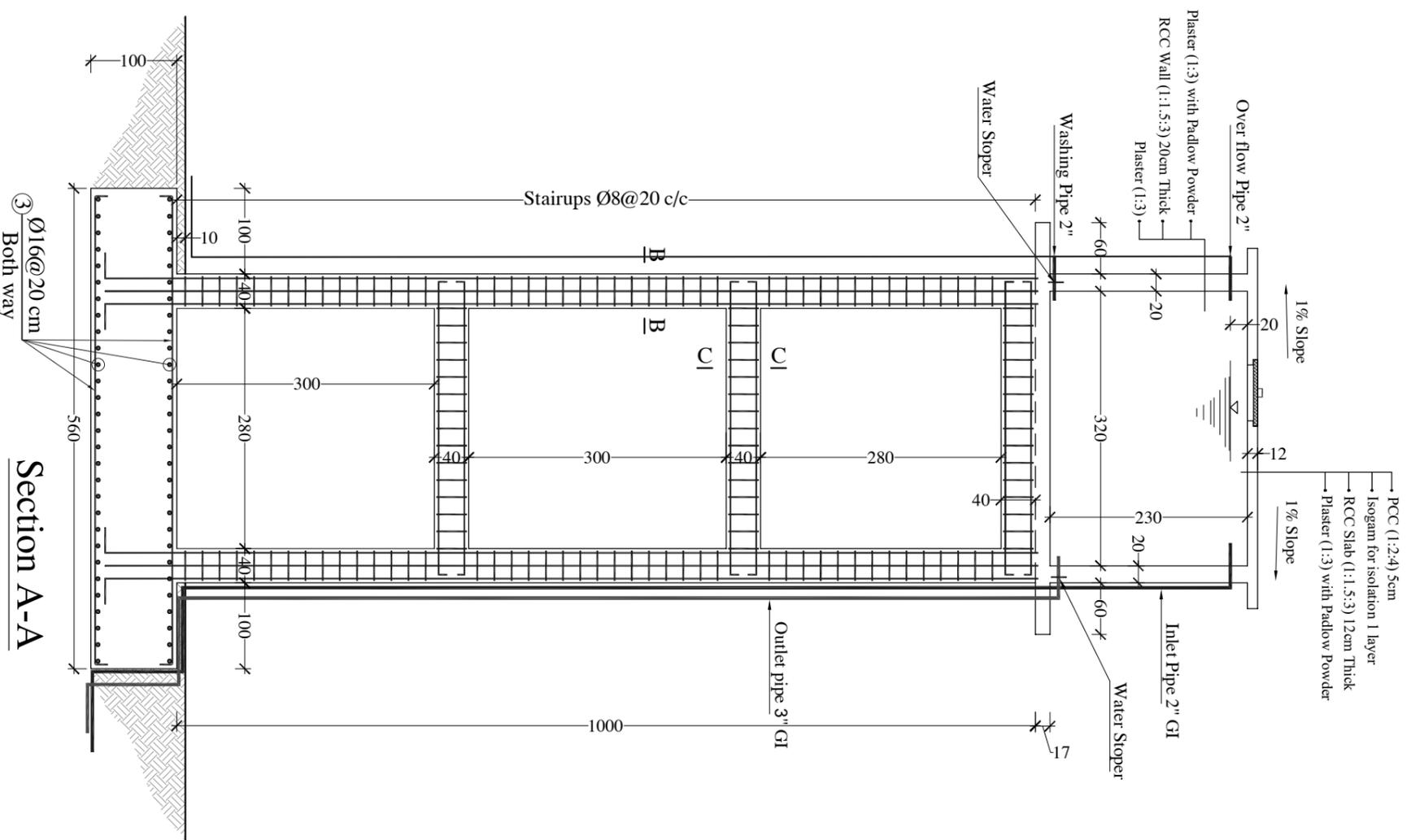
Section C-C



Section B-B



SURVEYED BY		ENG.S.RAUF		CHECKED BY		ENG.NAJIBULLAH "AHMADI"		SCALE		30/01/2021		PROJECT NAME :		20 Cubic meter RCC Water Tank	
DESIGNED BY		ENG.SAYED RAUF		REVIEWED BY		ENG.FAZAL OMAR "ZAHID"		DATE		30/01/2021		DRAWING TITLE		Plan and Reinforcement plan	
DRAWN BY		ENG.SAYED RAUF		APPROVED BY		ENG.GHULAM QADER		DRAWING NO.		SHEET NO		PROVINCE		Kandahar	
										2		DISTRICT		Arghastan	
										4		VILLAGE		Khawgyani	

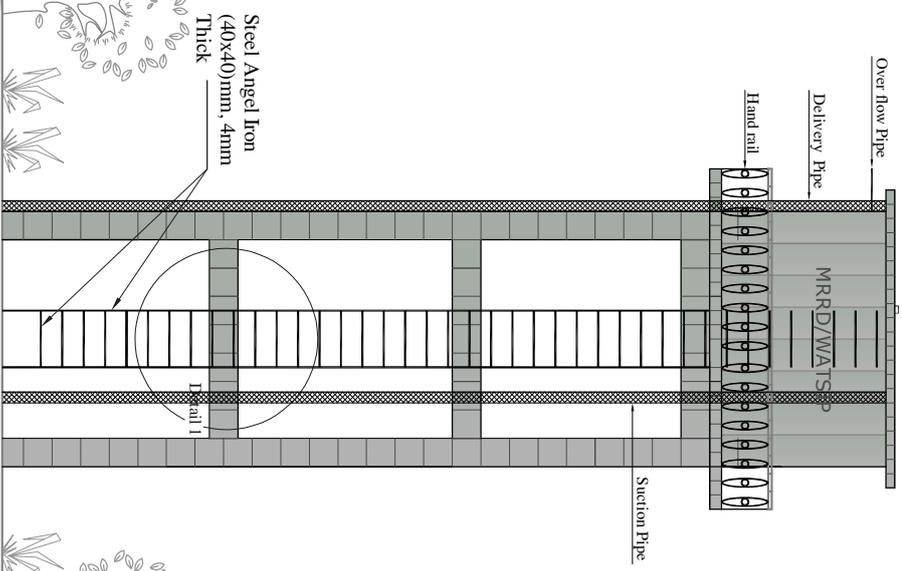
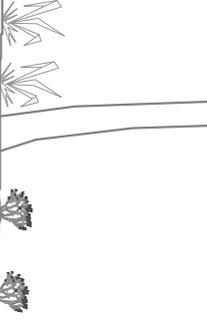
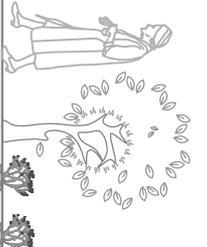
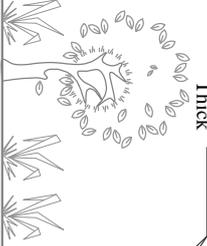
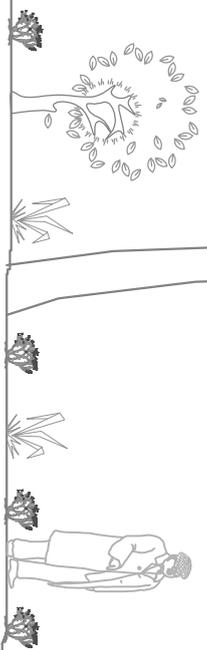
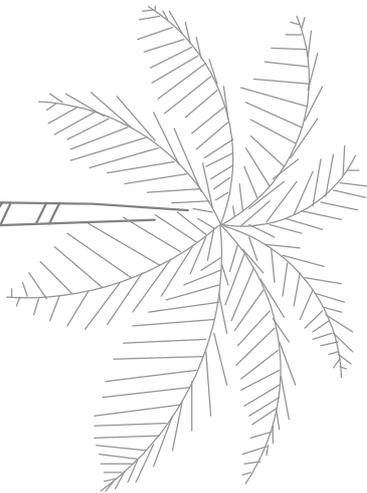
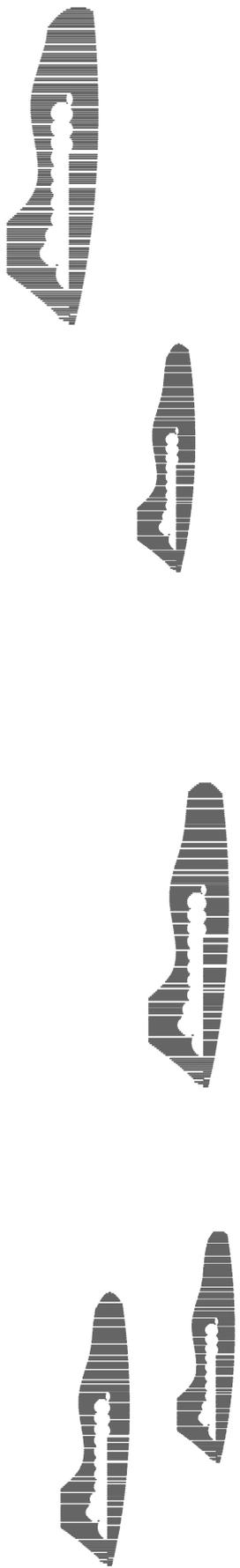


Section A-A

STEEL BAR SCHEDULE FOR 20 CUBIC METER RCC Elevation WATER Tank

Shape of bar	Bar No	Bar Dia (mm)	Number of Bar	Total Number	Length (m)	Total Leng (m)	Weight (kg/m)	Total weight (kg)	Total weight +5% (kg)
—	1	18	3	3	1.4	4.2	1.998	8.4	8.8
—	2	8	9x2	18	0.75	13.5	0.4	5.32	5.6
—	3	16	4x28	112	5.6	627.2	1.579	990.35	1040
—	4	14	4x18	72	3.8	273.6	1.2	328.32	350
—	5	14	8x19	152	2.75	418	1.2	502	530
—	6	12	4x14	56	3.8	212.8	0.888	190	200
—	7	14	4x28	112	2.24	250.9	1.2	301	316
—	8	10	4x19	76	1.03	78.3	0.6166	48.3	50.7
—	9	12	2x33	66	4.9	323.4	0.888	287.2	301.5
—	10	12	2x33	66	4.9	323.4	0.888	287.2	301.5
—	11	12	1x30	30	5.5	165	0.888	146.5	154
—	12	12	1x30	30	5.5	165	0.888	146.5	154
—	13	8	4x46	184	1.6	294.4	0.4	117.7	123.68
—	14	8	4x46	184	1.6	294.4	0.4	117.7	123.68
—	15	20	4x8	32	11.2	358.4	2.467	884.05	928.26
—	16	18	8x12	96	3.5	336	2.0	672	710
—	17	8	15x12	180	1.6	288	0.4	115.2	121

Bar Dia (mm)	Total Length (m)	Weight (kg/m)	Total weight (kg)	Total weight +5% (kg)
8	890.3	0.4	356.1	373.92
10	80	0.6166	50	55
12	1190	0.888	1056	1109
16	627	1.579	990	1040
18	340	1.998	680	714
20	359	2.467	884	930
14	943	1.2	1131	1188

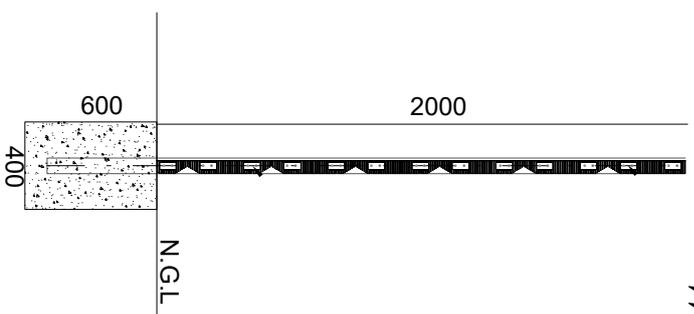


- Note:**
1. All dimension are in cm
  2. Mark of concrete 200 kg/cm<sup>2</sup>
  3. Delivery and Suction pipe should be protected (Isolation)
  4. Assume bearing capacity is 2 kg/cm<sup>2</sup>

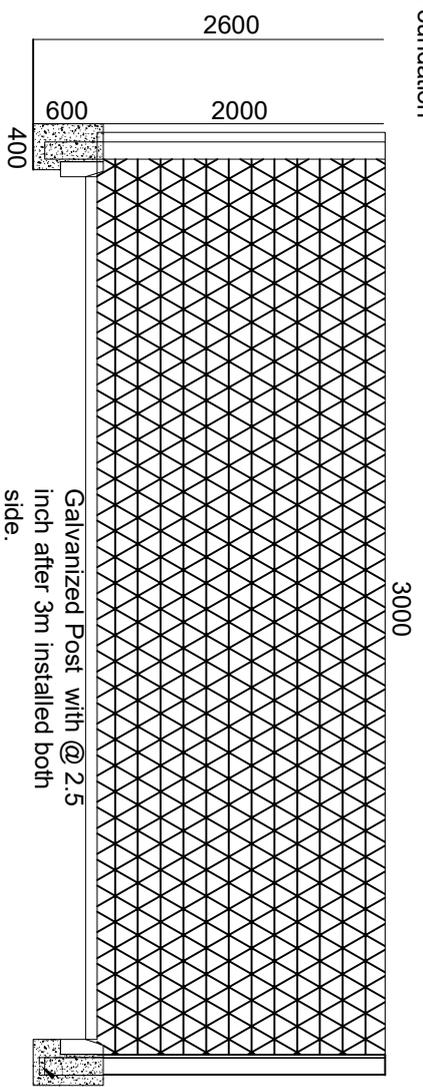
Elevation of Water Tank Tower

		TS AFGHANISTAN Ministry of Rural Rehabilitation and Development <b>WATS/P</b>	
SURVEYED BY	Eng.Sayed Rauf	CHECKED BY	Eng.Najibullah "Ahmad"
DESIGNED BY	Eng.Sayed Rauf	REVIEWED BY	Eng."Faraz Omar" "Zahid"
DRAWN BY	Eng.Sayed Rauf	APPROVED BY	Eng.Ghulam Qader
SCALE		DATE	3/01/2021
SHEET NO.			
PROVINCE			
DISTRICT	Angbistan	PROJECT NAME:	
VILLAGE	Khawayami	Water Supply Project	
		DRAWING TITLE	
		Elevation of RCC Tank	

# Water Network Project (Typical Fence for solar stand)



400x400x600mm 25 Mpa Concrete Foundation  
Galvanized Post with @ 2.5 inch after 3m installed both side.



CLEARVU FENCE SPECIFICATION (This is a Minimum specification required)	
ITEM #	DESCRIPTION
1	PANEL 2m High Security Clearvu or similar approved Galvanized Fence. 76x127mm Mesh aperture. Wire diameter of 3mm Horizontal and 4mm Vertical. 4mm Spacing between panels. Internal Fixures:Anti Vandal/Climb etc
2	POST Galvanized Taper Locking Post sealed with steel Cap 2.5 inch after 3m installed both side.
3	CLAMPS Galvanized Single and Double combo Clamp or similar Approved
4	FOUNDATION Total length of fence 70m

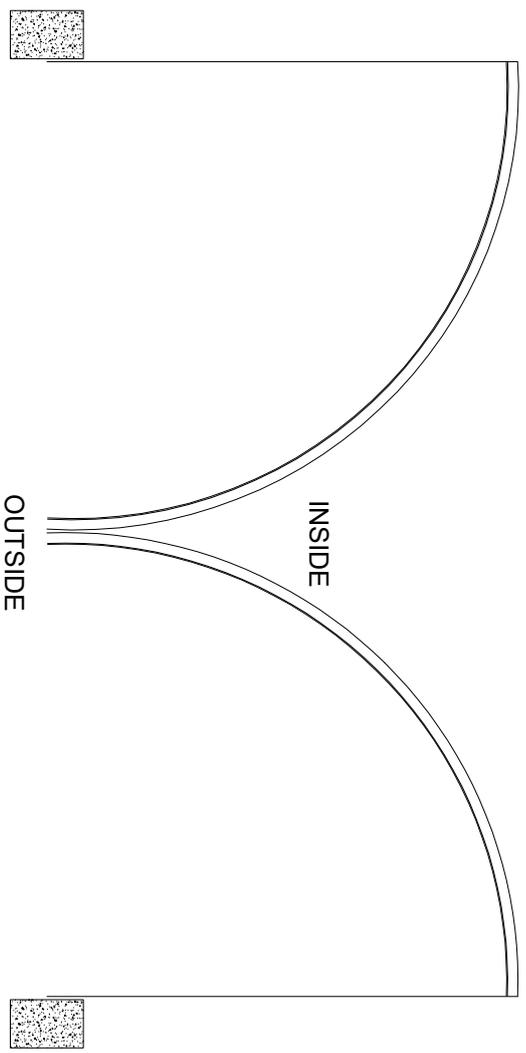
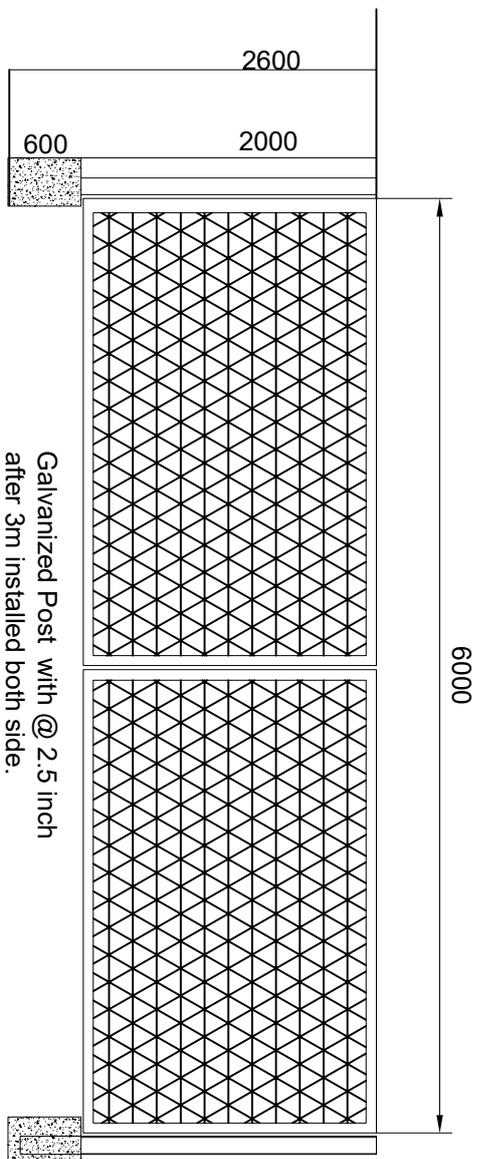
## Water Network Project (Fence for solar stand)

Survey: By	Eng. M.Moaine & M.Mehdi	Project	Shelter
Drawing: By	Eng. M.Mehdi	Section	Water Network
Design : By	Eng. M.Moaine	Date	16/10/2023
Checked: By	Eng. Dawod Shafag	Province	Kandahar
Approved: By		District	Arghastan
		Village	Khawghayni

Islamic Relief Worldwide	IR-W	
Unit	cm	
Scale	NO	
Sheet No	0	

*(Typical door for fence)*

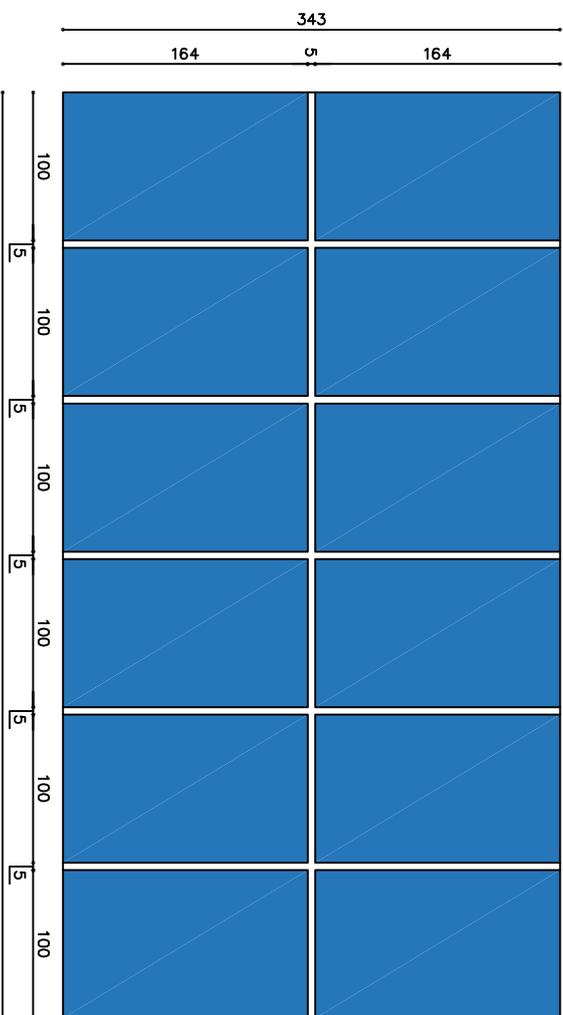


*Water Network Project (Fence)*

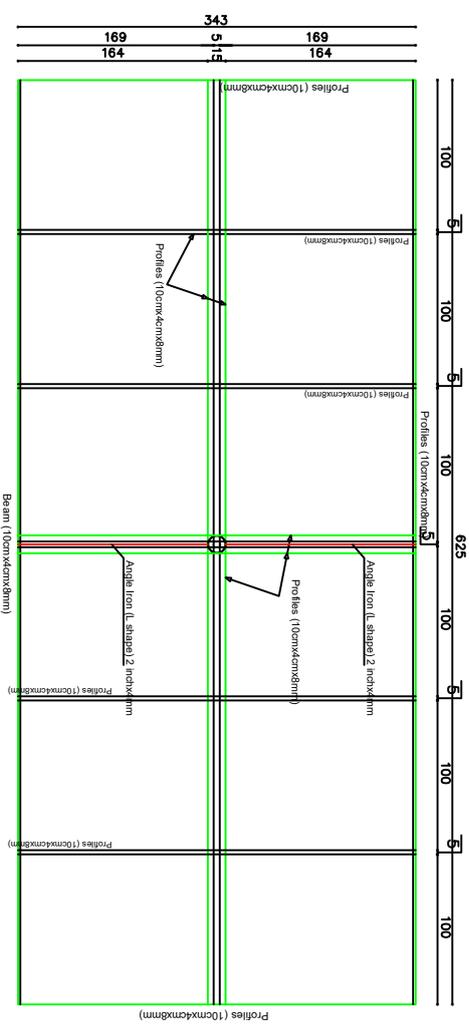
		<i>Islamic Relief Worldwide</i>			
<i>Survey: By</i>	<i>Eng. M. Moaine &amp; M. Mehdi</i>	<i>Project</i>	<i>Shelter</i>		
<i>Drawing: By</i>	<i>Eng. M. Mehdi</i>	<i>Section</i>	<i>Water Network</i>		
<i>Design : By</i>	<i>Eng. M. Moaine</i>	<i>Date</i>	<i>16/10/2023</i>	<i>Unit</i>	<i>cm</i>
<i>Checked: By</i>	<i>Eng. Dawod Shafaq</i>	<i>Province</i>	<i>Kandahar</i>	<i>Scale</i>	<i>NO</i>
<i>Approved: By</i>		<i>District</i>	<i>Arghastan</i>	<i>Sheet No</i>	<i>0</i>
		<i>Village</i>	<i>Khawghyani</i>		

# Typical Solar Panel Frame

plan of solar panels



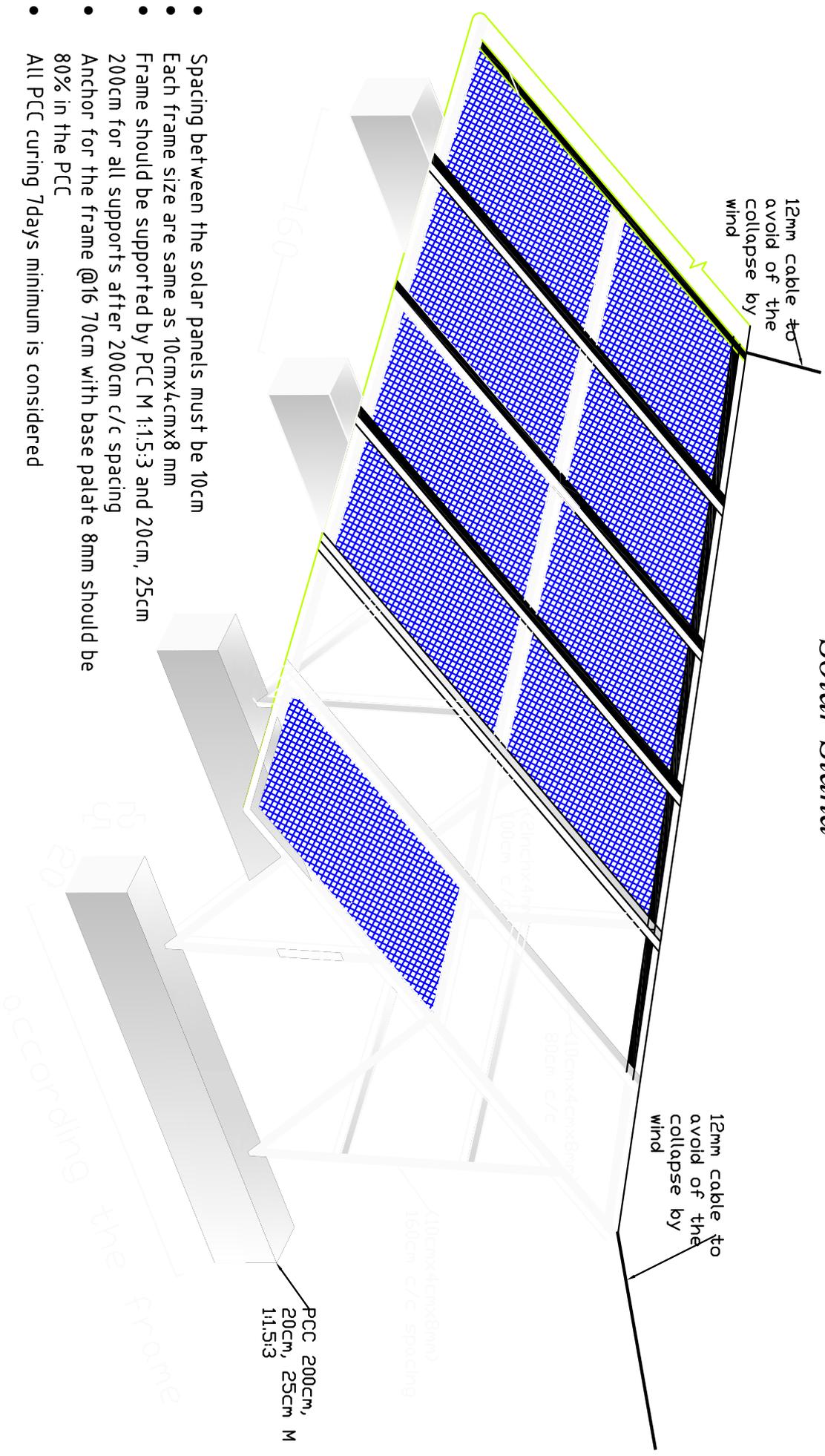
plan of solar panel's frame



## Water Network Project Solar Panel Frame

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawghyani		

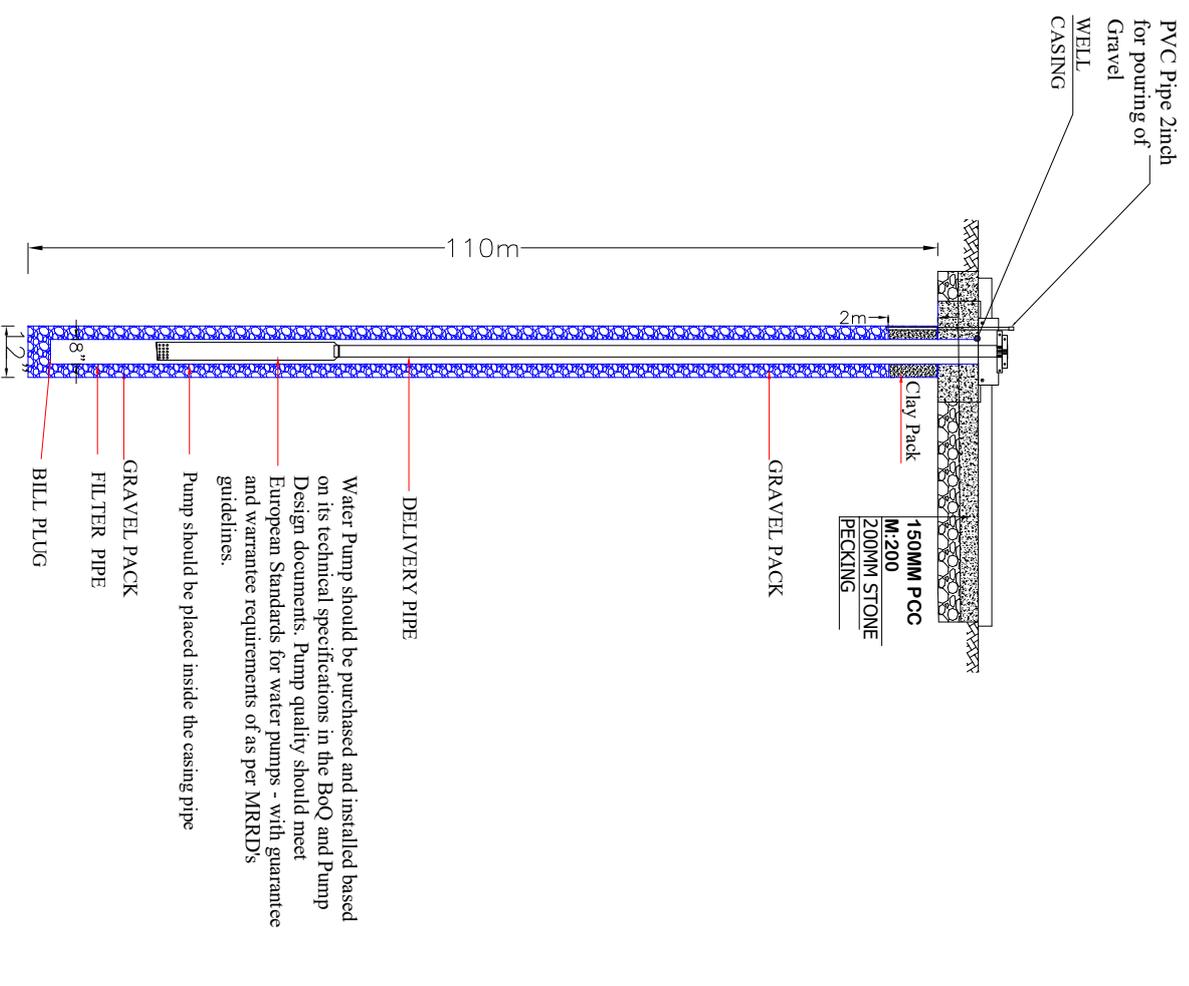
# Solar Stand



- Spacing between the solar panels must be 10cm
- Each frame size are same as 10cmx4cmx8 mm
- Frame should be supported by PCC M 1:1.5:3 and 20cm, 25cm
- 200cm for all supports after 200cm c/c spacing
- Anchor for the frame @16 70cm with base palatte 8mm should be 80% in the PCC
- All PCC curing 7days minimum is considered

## Water Network Project Solar Stand

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide		
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W		
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm	
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO	
Approved: By		District	Arghastan	Sheet No	0	
		Village	Khawghyani			

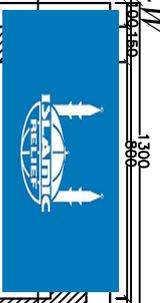


## Notes

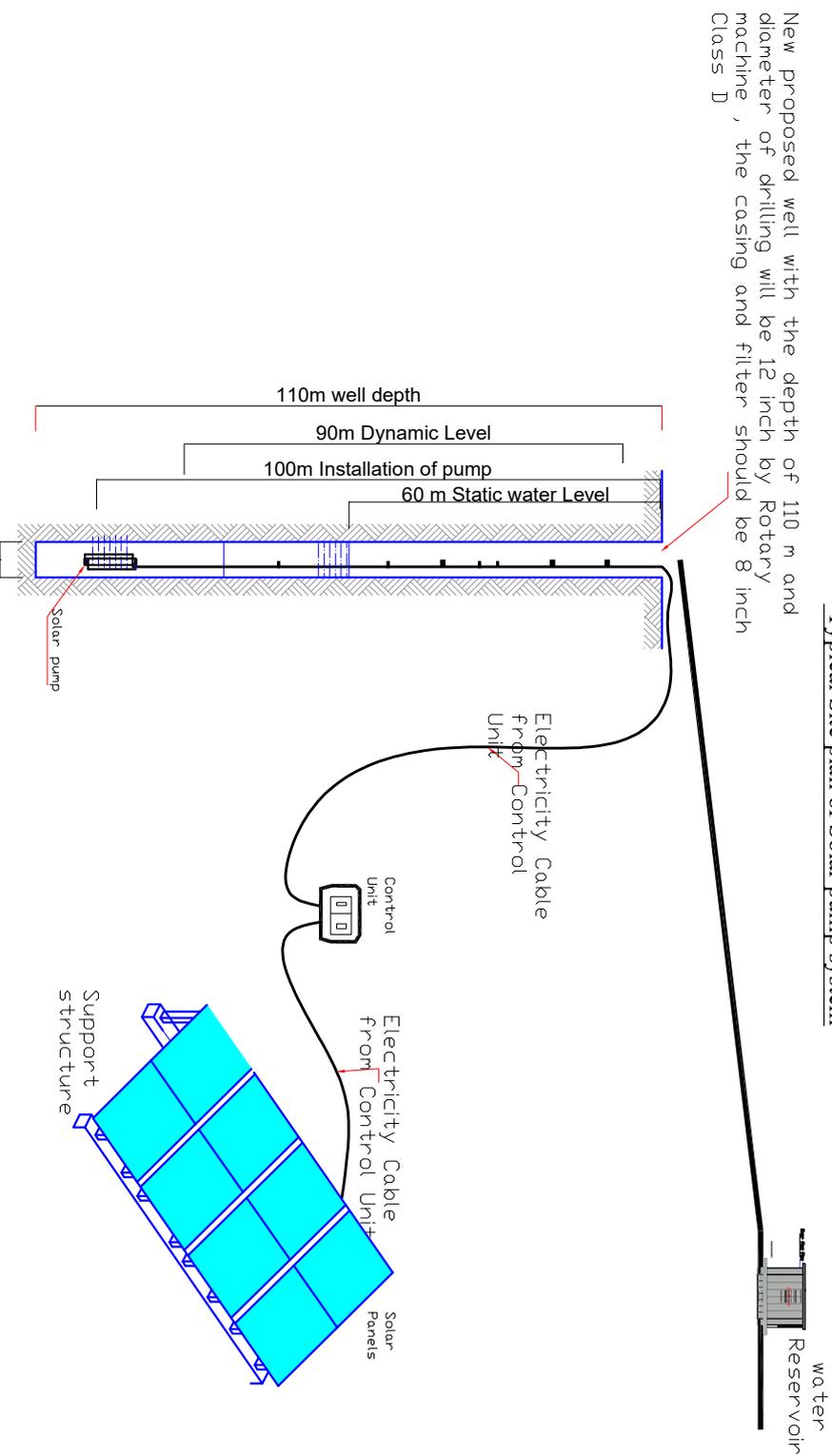
- 1-Well designed by WTSAN department.
- 2-The working pressure for pipes and valves will be 16 or 20 bar ( 290 PSI )
- 3- If the ground stratum are made of bed rocks it no need for installation of casing pipes. if the stratum are made of Loss soil it should be stabilized by installation casing pipes.
- 4-Each drilled strata depth should be noted and soil sample should be kept in a sample box separately.
- 5-Pump test for 8 hours.
- 6-the depth of filter pipe has considered based on the previous experience . the true depth will be determined after well practical drilling.

## Water Network Project Well

Survey: By		Eng. M.Moaine & M.Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng.M.Mehdi		Section		Water Network		IR-W	
Design : By		Eng.M.Moaine		Date		16/10/2023		1001500 1300	
Checked: By		Eng.Dawod Shafag		Province		Kandahar		45	
Approved: By				District		Arghastan		1500	
				Village		Khwyani		1500	
				Sheet No		NO 0		1500	



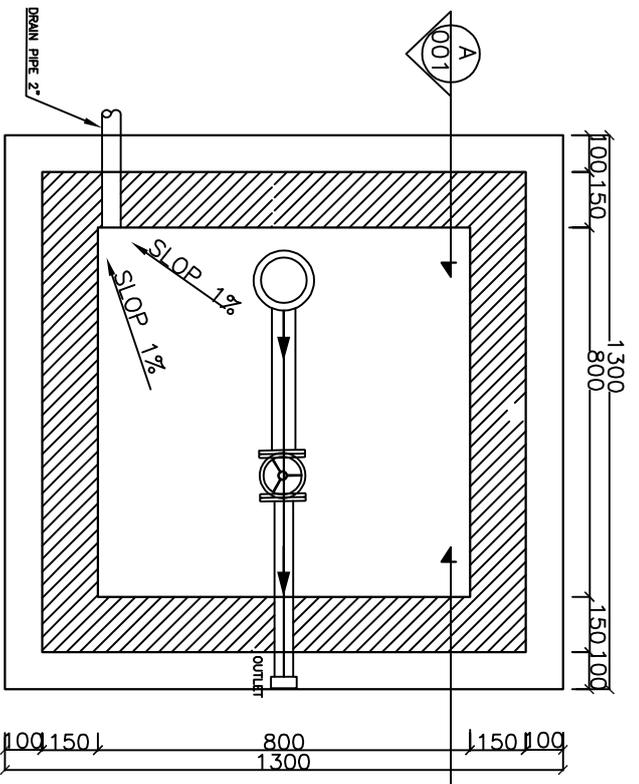
Typical Site plan of Solar pump system



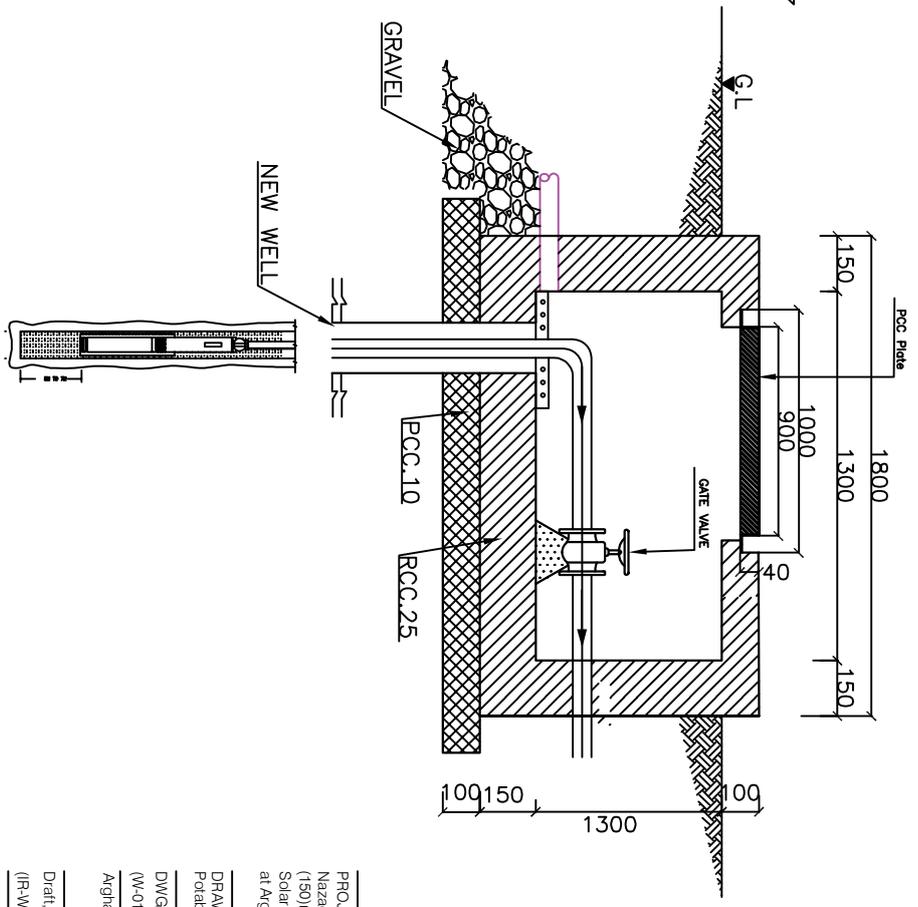
New proposed well with the depth of 110 m and diameter of drilling will be 12 inch by Rotary machine , the casing and filter should be 8 inch Class D

## Water Network Project Well

<i>Islamic Relief Worldwide</i>	
<i>Survey: By</i>	Eng. M.Moaine & M.Mehdi
<i>Drawing: By</i>	Eng. M.Mehdi
<i>Design : By</i>	Eng. M.Moaine
<i>Checked: By</i>	Eng. Dawod Shafag
<i>Approved: By</i>	
<i>Project</i>	<i>Shelter</i>
<i>Section</i>	<i>Water Network</i>
<i>Date</i>	16/10/2023
<i>Province</i>	Kandahar
<i>District</i>	Arghastan
<i>Village</i>	Khwyvani
<i>Unit</i>	cm
<i>Scale</i>	NO
<i>Sheet No</i>	0
<i>IR-W</i>	
	



01 Well Chamber Plan  
SCALE: NTS



02 WELL AND WELL CHAMBER SECTION A-A  
SCALE: NTS

Remarks

PROJECT NAME: Shelter  
Nazad Khil PROJECT  
(150)m Deep Well With Pump and  
Solar System For Each House cantion  
at Aghastan

DRAWING TITLE  
Potable Water Well Plan and Section

DWG NUMBER  
(W-01)

Aghastan District

Draft: Designed & Drawn By  
(IR-W Area Team)

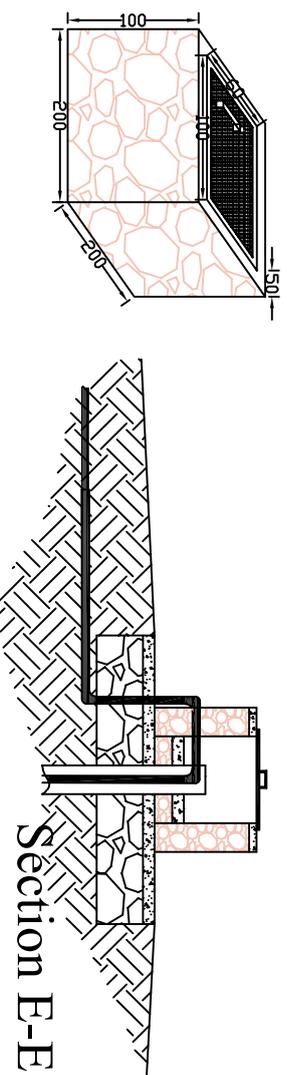
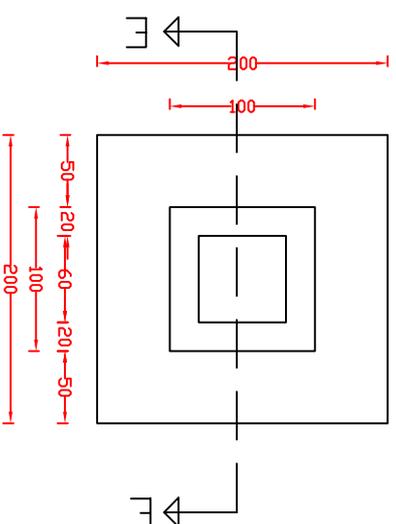
APPROVED BY INDEX

SCALE(NTS) DATE: 04/2023

## Water Network Project Well

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafiq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawghyani		

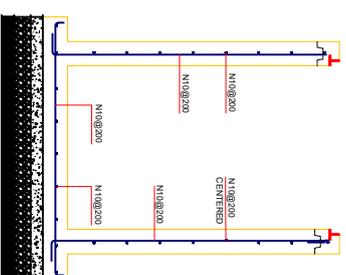
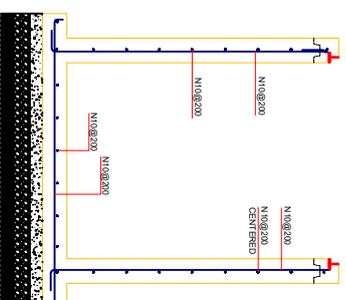
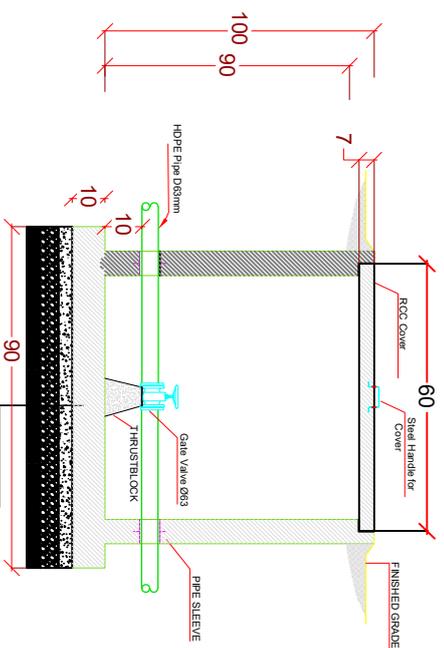
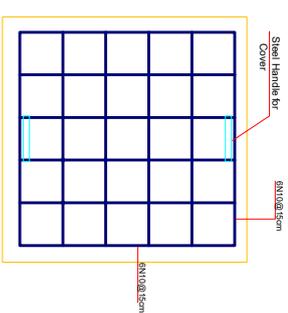
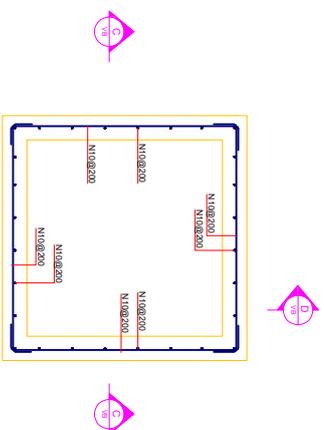
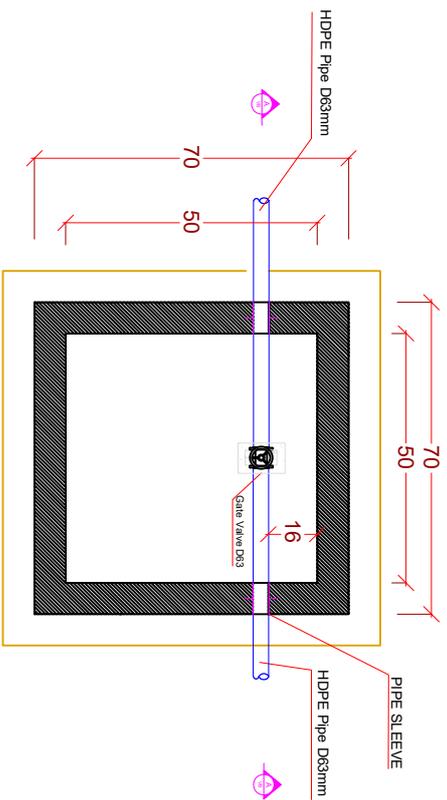
## Plan of Well Apron protection



## Water Network Project Plan of Well Apron

<i>Survey: By</i>	<i>Eng. M.Moaine &amp; M.Mehdi</i>	<i>Project</i>	<i>Shelter</i>	<i>Islamic Relief Worldwide</i> <b>IR-W</b>	
<i>Drawing: By</i>	<i>Eng. M.Mehdi</i>	<i>Section</i>	<i>Water Network</i>		
<i>Design : By</i>	<i>Eng. M.Moaine</i>	<i>Date</i>	<i>16/10/2023</i>	<i>Unit</i>	<i>cm</i>
<i>Checked: By</i>	<i>Eng. Dawod Shafag</i>	<i>Province</i>	<i>Kandahar</i>	<i>Scale</i>	<i>NO</i>
<i>Approved: By</i>		<i>District</i>	<i>Arghastan</i>	<i>Sheet No</i>	<i>0</i>
		<i>Village</i>	<i>Khawghyani</i>		

# Well Manhole

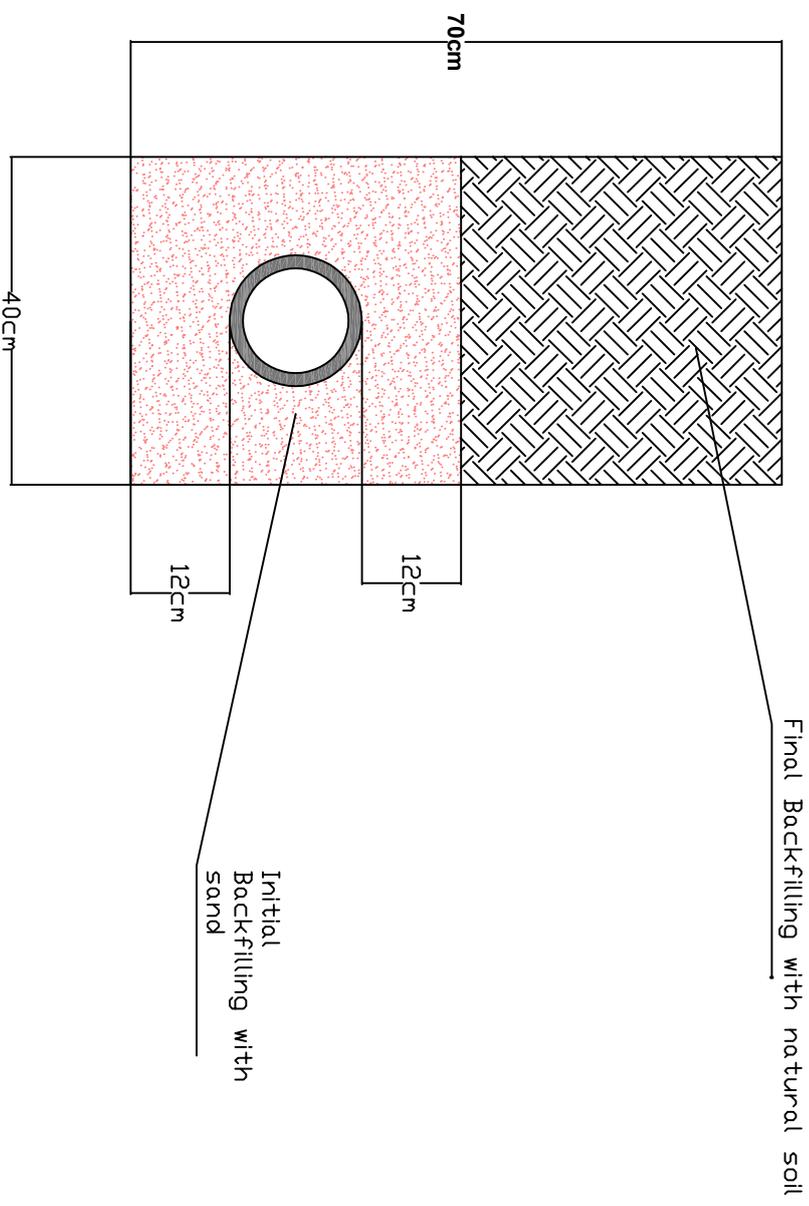


## Water Network Project Well Manhole

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawghyani		



# Trench for Pipe

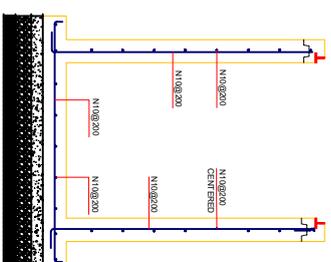
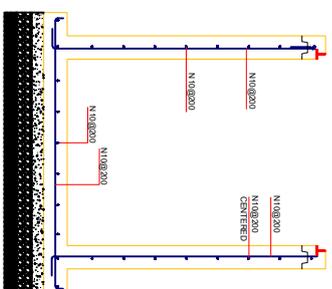
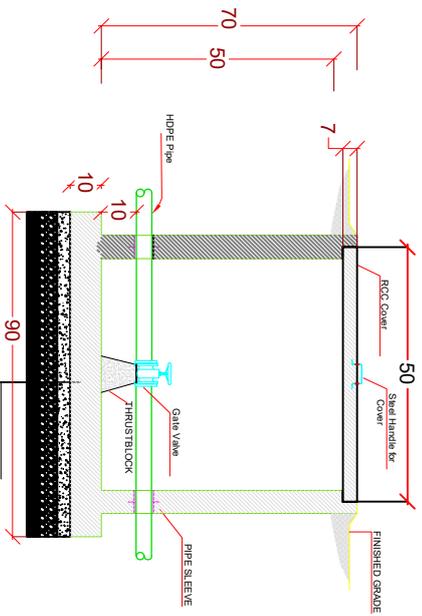
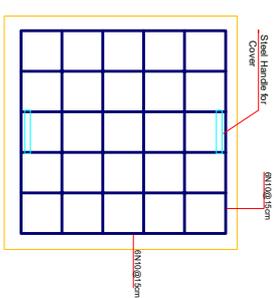
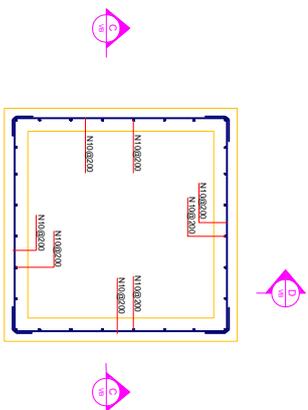
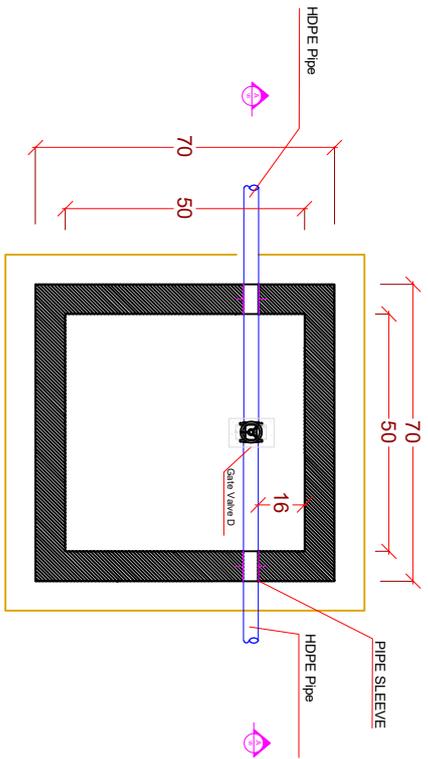


Section of trench for pipe laying

## Water Network Project Trench

		<i>Islamic Relief Worldwide</i>			
		<i>IR-W</i>			
Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter		
Drawing: By	Eng. M. Mehdi	Section	Water Network		
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawghyani		

# Gate Manhole



## Water Network Project Manhole

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Khawghyani		



Islamic Relief Worldwide-Afghanistan  
Kandahar Area Office  
Shelter UK Project  
Solar Pump Water Network Project

Khawgyani Village

دسولر پمپ محاسبوی جدول

ارقام	تشریحات	شماره
595	Population	1 نفوس
85	Family	2 دfamیلونو تعداد
2.2	Population growth/year	3 دنفوس کلنی زیاتوالی
15	Design period	4 د دیزاین زمان
825	Design population	5 دیزاین نفوس
30	Daliy Demend l/c/d	6 په روخ کي دمصرف نورم
24.7	Everage daliy Flow for design population m3/dy	7 ددیزاین شوی نفوس لپاره د متوسطی روخی جریان
1.3	Peak daily factor	8 دروخی اعظمی مصرف ضریب
32.2	Peak daliy flow m3/dy	9 د هغه روخی لپارابه چي مصرف یي اعظمی وی
4.0	Peak horliy flow m3/h= (row9/8)	10 د هغه اوبو اعظمی مقدار چي سولرپمپ یی له څاه څخه په ساعت کي پمپ کوی، د اعظمی ورخی دمصرف تقسیم به ۸ ساعته
100+25+2+1=128 m	TDH=Hds+H loss+1m	11 د واثرپمپ لپاره ارتفاع، دڅاه له دینامیک سطحی تر ذخیری ارتفاع جمعه د فشار ضایعات یو متر دخروج لپاره فشار په متر
128.0	TDH	مجموعی ارتفاع
1.4	Hydraulic power of the pump (kW)	12 هایدرولیکی فشار Ph
1.25	$\eta_p$ Pump efficiency (%). $\eta_p$	13 دپمپ موثریت ۷۵٪
1.8	Shaft power of the pump (kW)=75%Ph	14 دواثرپمپ د شافت قدرت ۷۵٪ Ph
1.24	Coefficient C= (1.1-1.2-1.5-2)	15 د موټور د موثریت ضریب 1.1-1.2-1.5-co= 2
2.2	Power to the Motor (kW)	16 دواثرپمپ د موټور یانصب قدرت Pm
2.2	avalibal	17 دتولید ستندر
0.85	$\eta$ (Inverter)= inverter efficiency85% = 2.6	18 د انورتر موثریت ۸۵٪
0.80	$\eta$ (factor) = emiciency factor is normally 80%	19 د سستم موثریت ۸۰٪
3.2	PV	20 دلمریزو تختو د بریښنا قدرت په کیلووات
3235.3		دلمریزو تختو د بریښنا قدرت په وات
6.5	8.0	دلمریزو تختو تعداد بریښنا قدرت په وات

دشبکی د دیزاین د ارقامو جدول

Khawgyani Village			شماره
ارقام	تشریحات		
595	Population	نفوس	1
85	Famil	د فامیلونو تعداد	2
2.2	Population growth/year	د نفوس کلنی زیاتوالی	3
15	Design period	د دیزاین زمان	4
825	Design population	دیزاین نفوس	5
30	Daliy Demend l/c/d	په روځ کې دمصرف نورم	6
0.3	Everege daliy Flow for design population L/se	د دیزاین شوی نفوس لپاره د متوسطی روځی جریان	7
1.3	Peak daily factor	د روځنی اعظمی مصرف ضریب	8
0.4	Peak daliy flow l/sec	د هغه روځی لپاره اوبه چې مصرف یې اعظمی وی	9
2.5	Peak hourly factor	د په ساعت کې د اعظمی مصرف ضریب	10
0.9	Peak horly flow l/sec	د اعظمی مصرف په ساعت کې لیتر فی ثانیه (دشبکی د دیزاین جریان)	11
1.10	Well water yald= Pumped water l/sec- 4x1000/3600=1.1	د څاه ابدھی لیتر فی ثانیه، د واټر پمپ استخراج لیتر فی ثانیه	12
16	Volume of Reservoir 49% of(32m3)	د نخیزی حجم د اعظمی روځی د مصرف (32 متر مکعب) ۴۹ فیصده په متر مکعب	13

## Technical Specification for Khawghyani Water Supply Pipe Scheme Project

1. Population: The village has 85 families.
2. The project includes the following tasks: - Drilling of tube well with Rotary machine 12" and 8" casing. - Construction of solar panels. - Construction of a 20 cubic meters RCC water Tank. - Construction of 2 valve boxes. - Excavation works, pipe laying, and extension from the Well to the reservoir and from the reservoir to the houses.
3. To regulate the daily water consumption balance, a 20 cubic meter capacity reinforced concrete (RCC) reservoir has been considered.
4. Source: The drinking water well is a rotary -type with a 12-inch diameter and a depth of 110 meters. The perceived static water level is 60 meters. Due to the lack of precise static water level data for the area, the well will be drilled according to specifications, followed by a pump test. Subsequent network actions and will depend on the test results. If the well yield is insufficient, **adjustments to the pump design and the number of solar panels may be necessary, or the project could be canceled.**
5. High Quality- Solar panels 500 to 540watt internationally certified- (meet European standards, and MRRD requirements). The vendor should guarantee PV-Panels 90% efficiency of its productivity for the first 10 years and 85 % efficiency of productivity for the subsequent 15 years.
6. Submersible pump with its Compatible inverter, control box and Fuse box as per BoQ and pump design sheet - Pump quality should meet European Standard for water pumps- with guaranty and warrantee requirements of as per MRRD's guideline).
7. The Site Plan includes the length and diameter of each pipe. Additionally, there is another table called "Pipe and Fittings Table" containing the diameter and length of the pipes.
8. All pipes used in this network are made of polyethylene and have a pressure rating of 10 bar, except for house connection pipes + Supplying main from well to Reservoir which are 16 bars.
9. The network is designed as a house-to-house connection. Each house will have a water meter installed. Therefore, A fabricated meter box and water meter with all necessary accessories are included in the project budget.
10. The total number of house connections in this project is 28.
11. All structures in this project, including the reservoir, brake pressures, collection box, and other structures in the network, as well as the pipe routes, should be accurately positioned according to the provided site plan and coordinates to avoid any future technical issues in the network.
12. The minimum depth of excavation for pipe installation should be 80 centimeters, with a width of 50 centimeters. The cross section is indicated in the relevant plan.

13. Steel bar should not be rusty all reinforced concrete should have a grade of 250, with a ratio of 1:1:2 (cement: coarse aggregate: fine aggregate).

15. All stone works should be done with a mortar ratio of 1:4 (cement: sand).

16. All non-reinforced concrete should have a grade of 60, with M250 for RCC tanks and 200 for other components.

17. All plastering works should have a ratio of 1:3 (cement: sand).

18. All water-resistant plastering works should have a ratio of 1:3 (cement: sand), with a minimum of 1 kilogram of water-resistant powder mixed per cement bag.

19. The reservoir should be plastered on all internal surfaces using water-resistant plastering powder.

20. The top of the reservoir should be covered with waterproofing (ISOGAM) material.

21. The pointing for the stonework should have a ratio of 1:3 (cement: sand).

22. The reservoir should have an entrance gate equipped with a lock to prevent water contamination.

23. The roof of the reservoir and all similar structures should have gutters to prevent rainwater or snow from damaging the buildings.

24. Handrails and vertical access ladders per OSHA recommendations, with adjustments for project site.

25. The water used for construction purposes should be clean and free from impurities.

26. Proper curing and watering of concrete should continue for a minimum of 28 days.

27- All construction materials must be of high quality. The vendor is required to provide samples for inspection and verification by the IRW/MRRD technical team. If any materials do not conform to the specifications in the BoQ and Design documents and are delivered without the technical team's inspection and verification, the vendor must replace them at no additional cost.

29- The workmanship for each aspect of this project must be of the highest quality, meeting the satisfaction and recommendations of the IRW technical team.

30-The vendor/contractor is responsible for all health and safety issues at the project site.

31- The vendor must implement all necessary environmental protection measures during the project. They must also safely dispose of all surplus construction materials in an environmentally responsible manner and ensure the project site is safe and visually acceptable upon completion.

32- Testing Requirements:

1. Concrete Mix Design: Based on selected aggregate properties, the contractor must define the M25 concrete mix design and submit the lab report to IRW before casting RCC elements.
2. Slump Test: To be conducted at the batching plant and at the site before pouring the concrete for each concrete mix.

3. Air Content Test: To be performed at the batching plant for every batch of concrete to ensure the mix design is consistent.
4. Cylinder Test: Three sets of cylinders (6 cylinders) to be cast for each concrete pour. One set to be tested at 7 days and the other set at 28 days for compressive strength.
5. Soil-bearing Capacity Test: To be conducted before foundation works to determine the bearing capacity of the soil and ensure it meets the project requirements.

**Notes:**

- All concrete testing results must meet the specified criteria as per IS 456:2000 or equivalent.
- Tests to be conducted by a certified laboratory and results to be submitted to the project engineer.
- Any deviation in test results must be immediately reported and rectification measures to be discussed and implemented as per engineer's instructions.

**Work plan for the Water Supply ( Khawghyani) Pipe scheme project**

ID-number: KDR-003 Water Network  
 Province: Kandahar  
 District: Aghastan  
 Village:Khawghani  
 Project purpose:Water Supply  
 Date: 11 /01/2024

No.	Activities Description	Duration/days	First Month				Second Month				Third Month				Fourth Month			
			Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4
1	Mobilization of Materials to Site	7	█															
2	Drilling, of well	7	█	█														
3	Supply and installation of solar pump system	21			█	█	█											
4	Construction of solar panels	21			█	█	█											
5	Construction and Installation of 20 Cubic meter RCC Elevated Tank	35			█	█	█	█	█									
6	Excavation, Laying and Backfilling of distribution system	98	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
7	Site Clearance and Hand over	112	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	
8	Reporting	112	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	





### **FIXED LADDER WITH WALK-THRU HANDRAILS:**

Ladders are designed for applications where safe landing access is required. They are one-piece welded assemblies for use in applications less than 20' in vertical height.

#### **CONSTRUCTION FEATURES:**

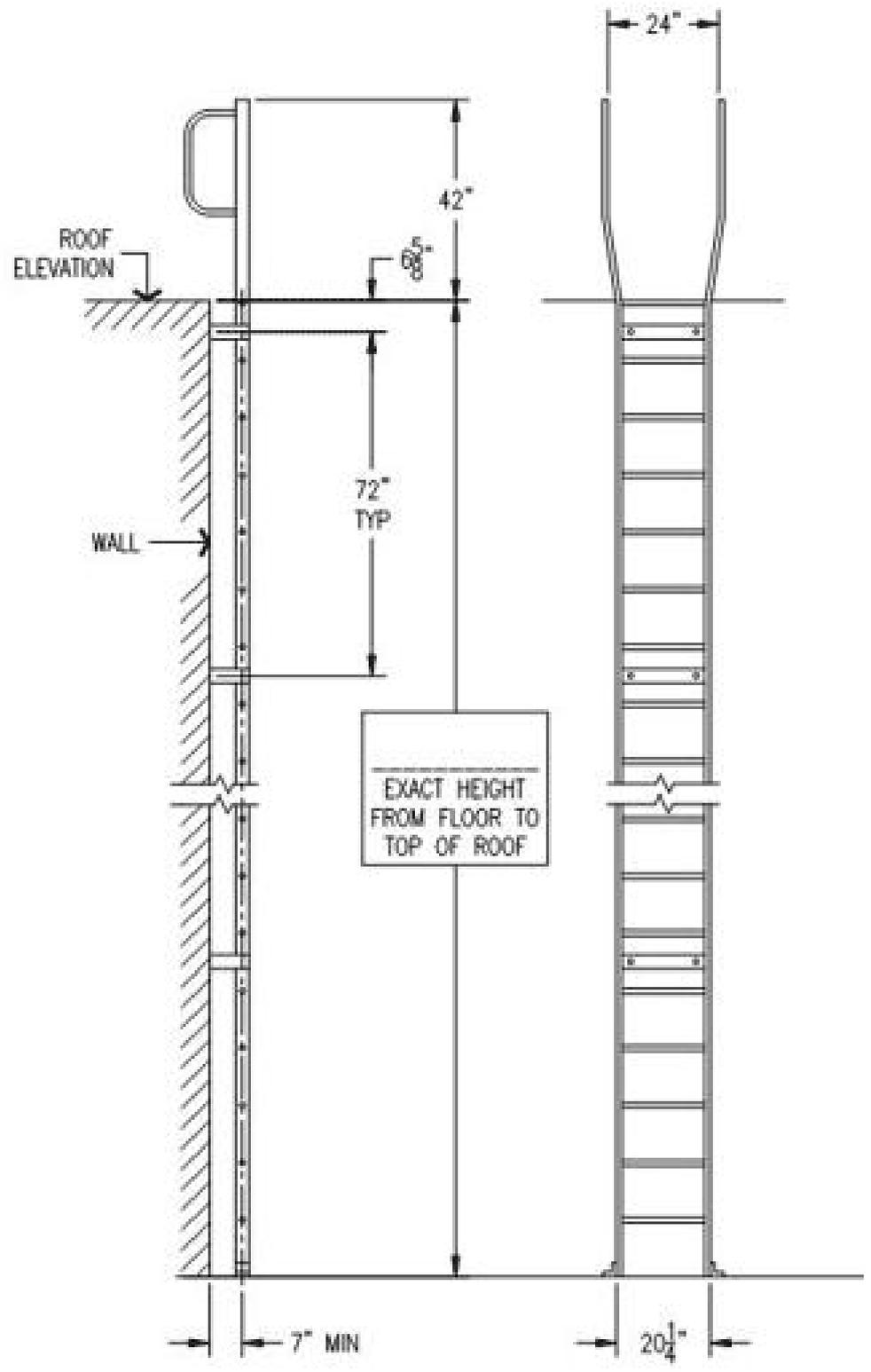
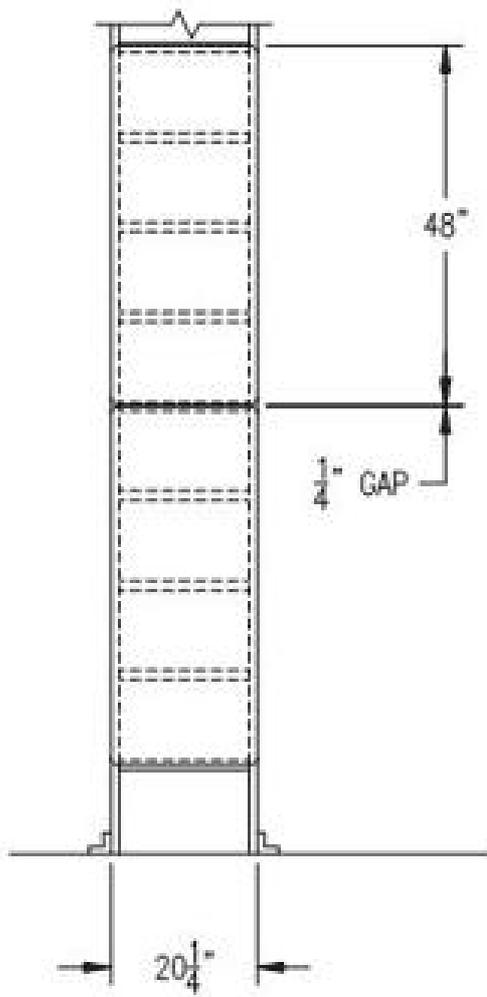
- Side members are  $\frac{1}{4}$ "x2"x2" steel angle.  $\frac{3}{4}$ " corrugated steel round climbing rungs on 12" centers. Stand-off mounting brackets are 7".
- Walk-thru handrails extend 42" above landing surface. Mounting brackets included.
- Welded one-piece, gray powder coat finish, yellow available.

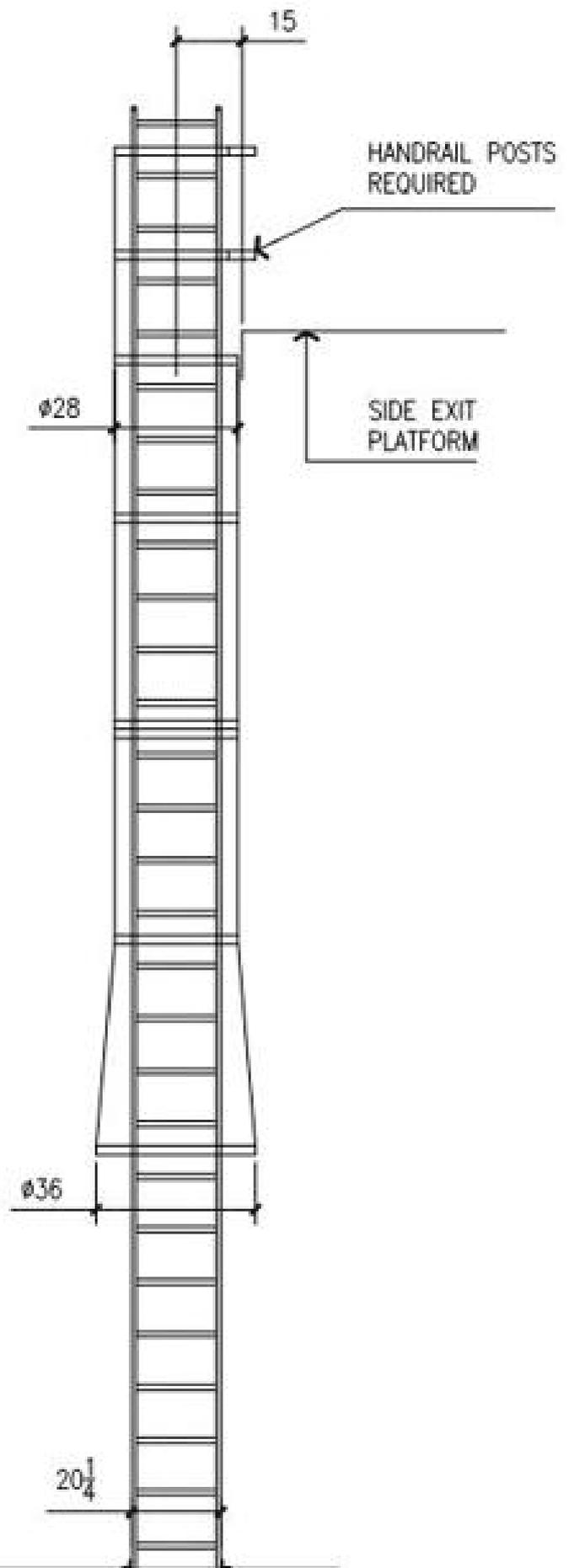
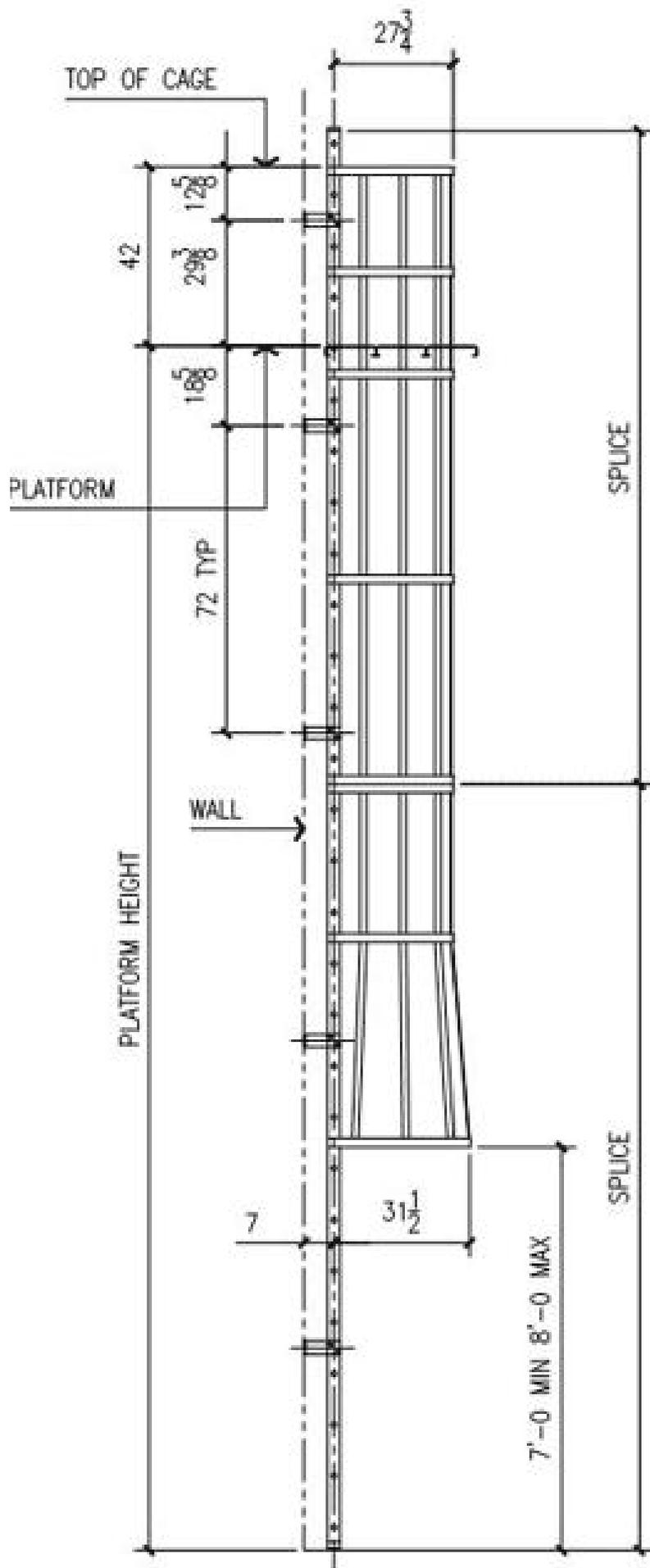
### **FIXED LADDER WITH WALK-THRU HANDRAILS AND SAFETY CAGES:**

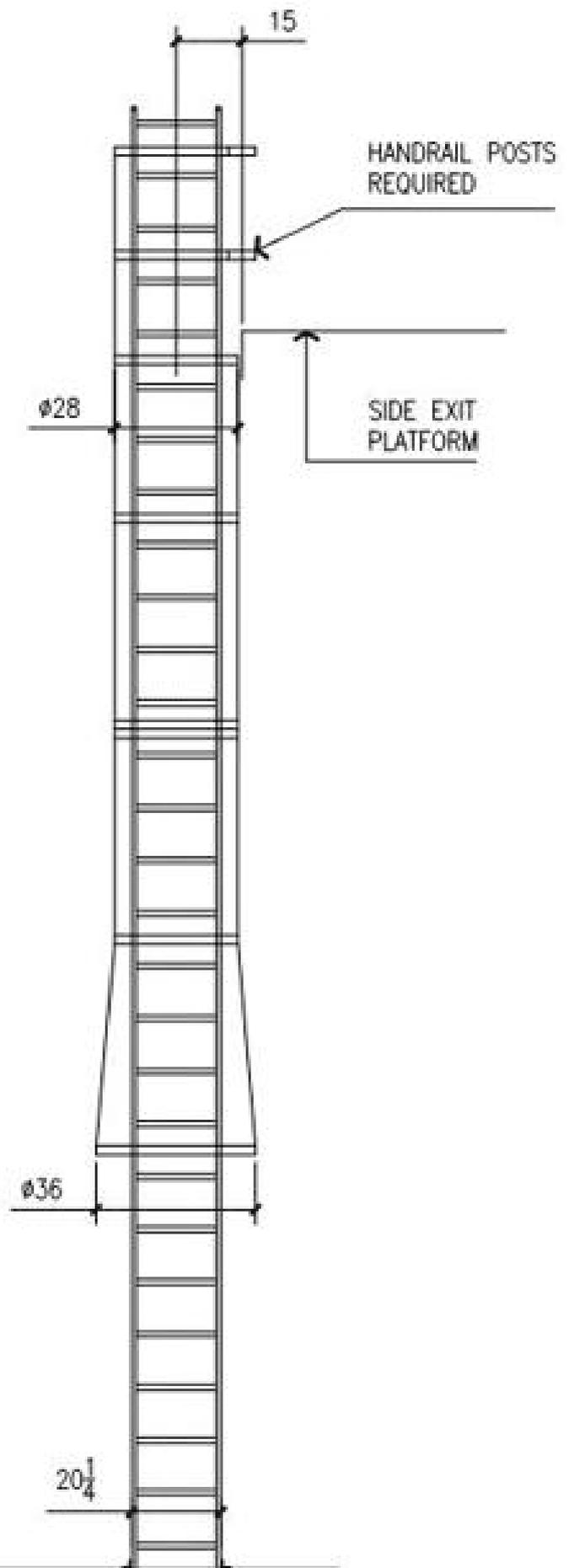
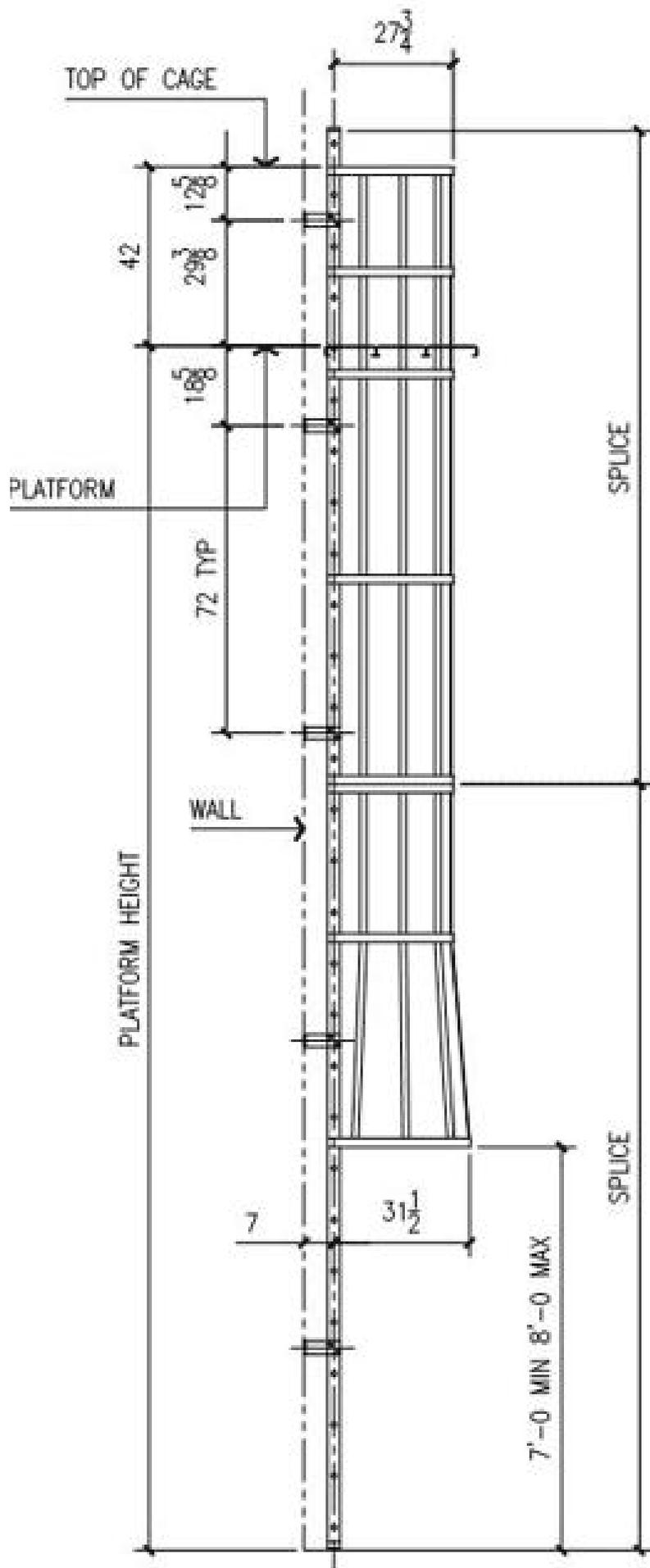
Designed for safe landing access and available from 10' to 29'. Cages and walk-thru handrails extend 42" above landing surface.

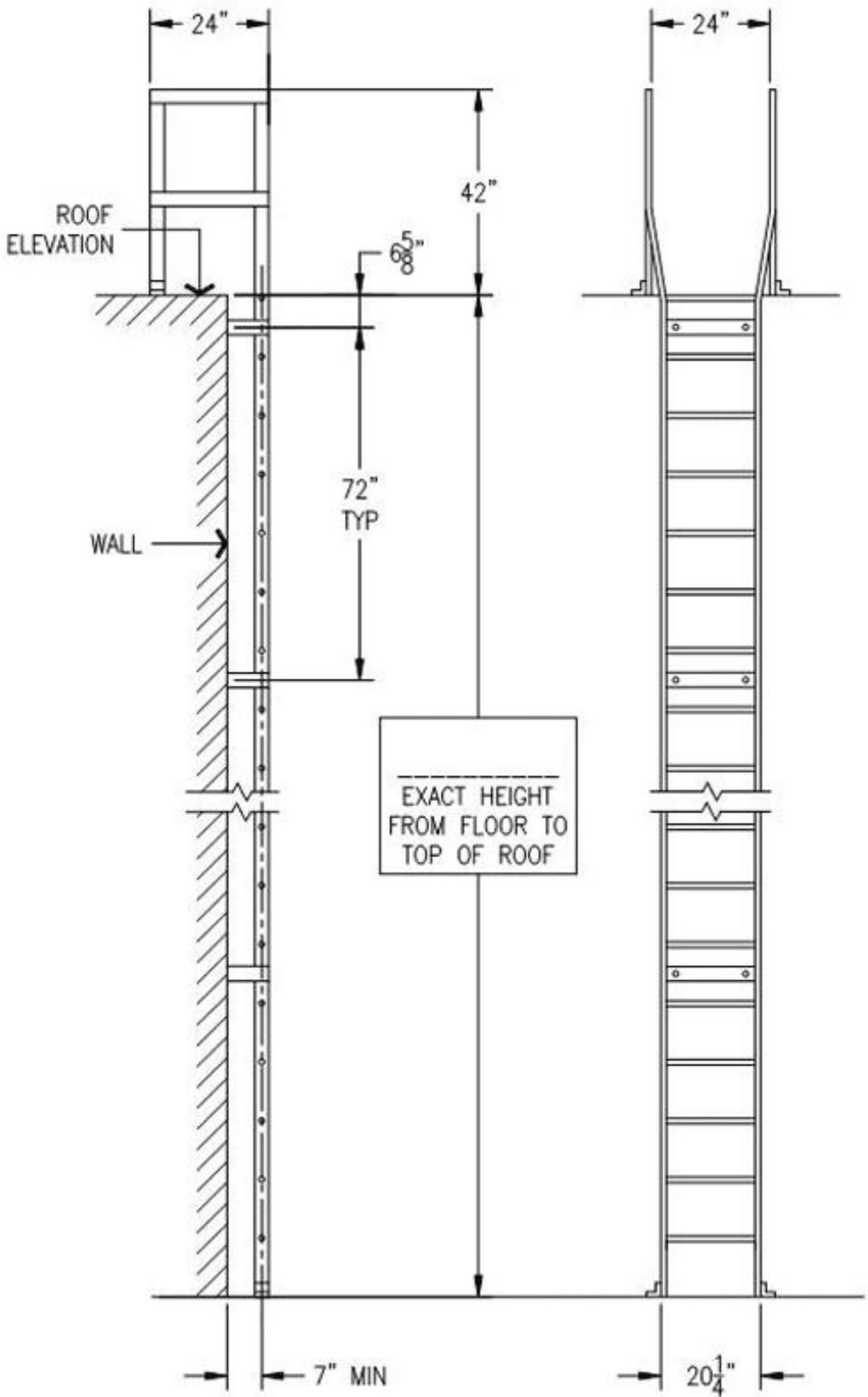
#### **CAGE FEATURES:**

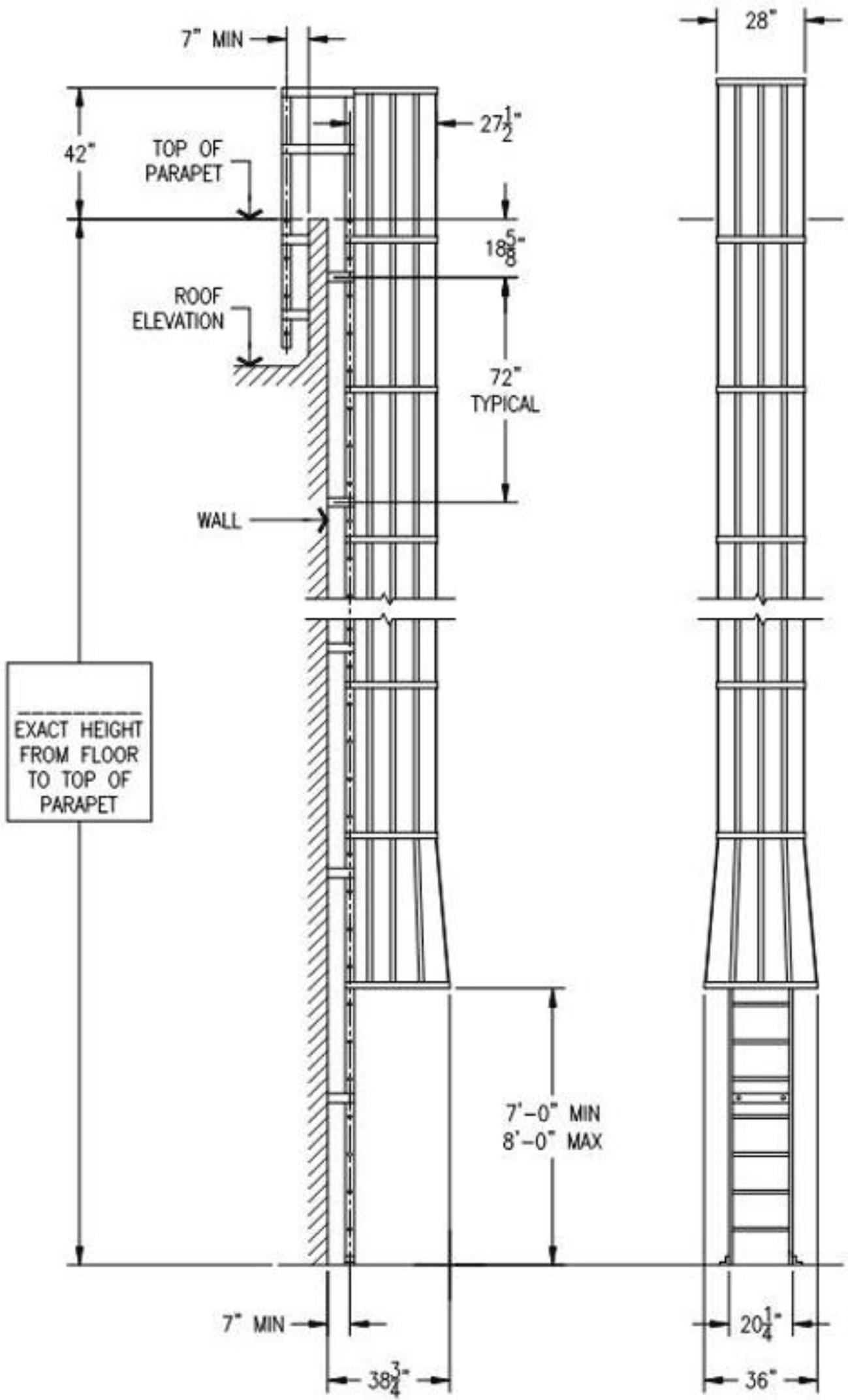
- Safety cages are designed to OSHA specifications with flared bottom opening for easy entry.
- Cage begins 7' from bottom of ladder.
- Gray powder coat finish, yellow available.











# Submittal Data

PROJECT:	UNIT TAG:	QUANTITY:
REPRESENTATIVE: _____	TYPE OF SERVICE:	DATE: _____
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:
	ORDER NO.:	DATE:

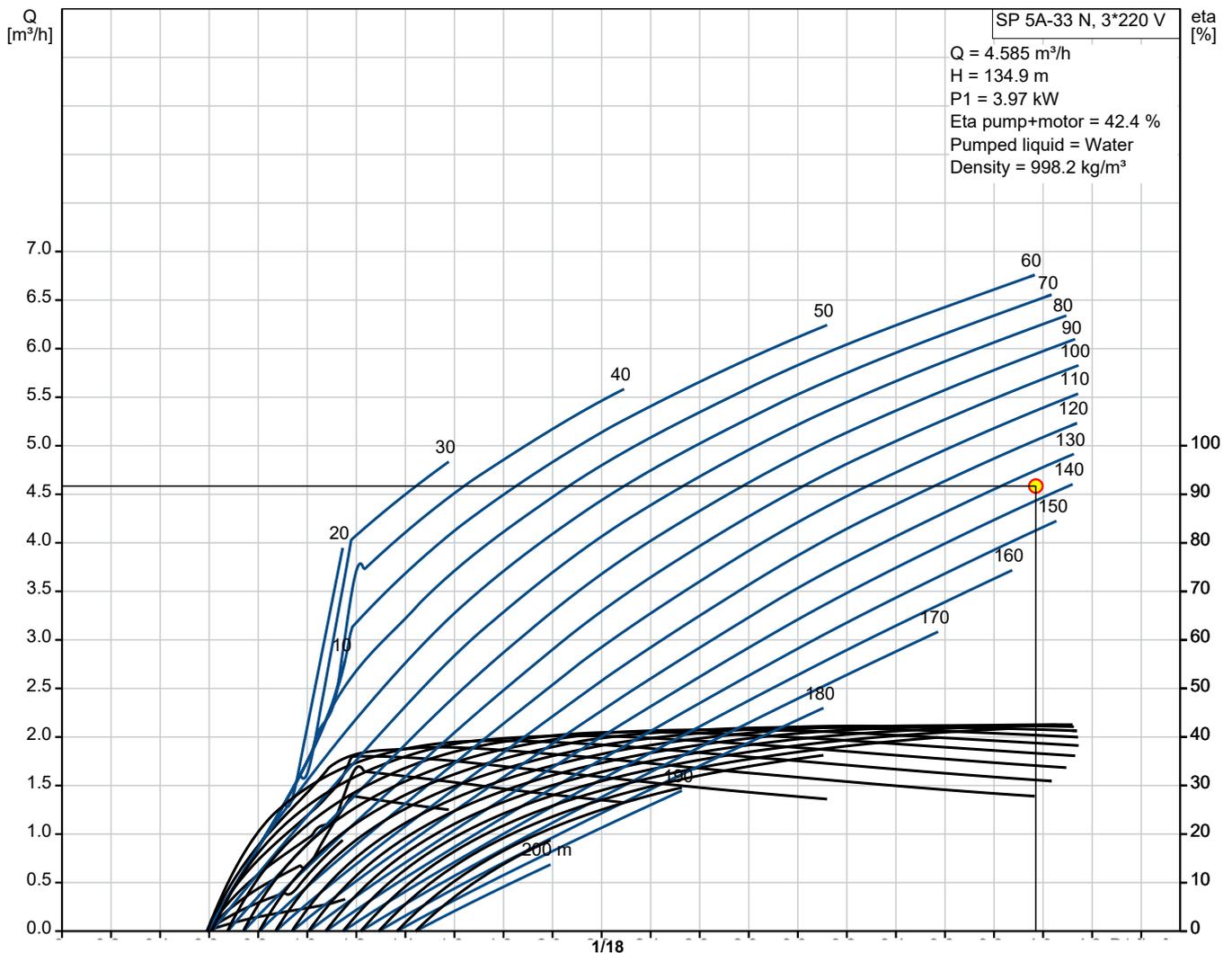


## SP 5A-33 N

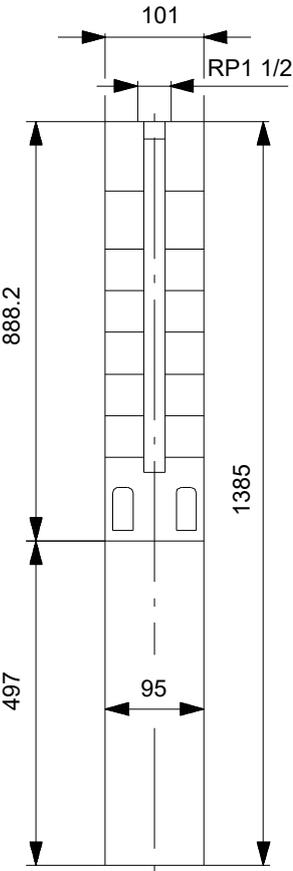
Grundfos SP are submersible borehole pumps, designed for pumping groundwater. Grundfos SP are all stainless-steel pumps, and they are available in 3 material grades. The pumps are suitable for boreholes in sizes ranging from 4" over 6" and 8" to 10". The motor sizes for the pumps are available in 0.37-250 kW.

Note! Product picture may differ from actual product

Conditions of Service	Pump Data	Motor Data
Liquid: Water	Liquid temperature range: -15 .. 40 °C	Mains frequency: 50 Hz
	Product number: On request	Enclosure class: IP68



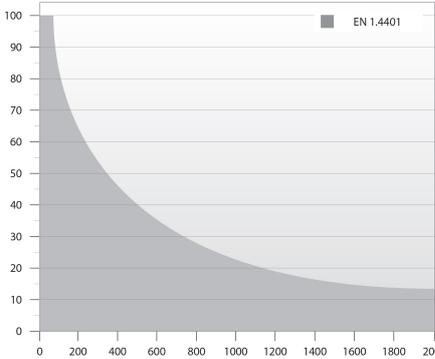
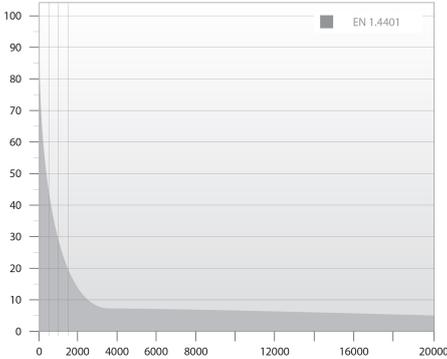
# Submittal Data



**Materials:**  
Impeller: Stainless steel  
Impeller: AISI 316  
Impeller: EN 1.4401

Project:  
Reference Number:

Client:  
Client Number:  
Contact:

Qty.	Description
1	<p data-bbox="204 450 336 477"><b>SP 5A-33 N</b></p> <div data-bbox="384 488 400 819" style="text-align: center;">  </div> <p data-bbox="595 797 1062 819" style="text-align: center;"><b>Note! Product picture may differ from actual product</b></p> <p data-bbox="204 831 478 853">Product No.: On request</p> <p data-bbox="204 891 1406 943">Submersible borehole pump, suitable for pumping clean water. Can be installed vertically or horizontally. All steel components are made in stainless steel, EN 1.4401 (AISI 316), that ensures high corrosive resistance.</p> <p data-bbox="204 981 512 1010"><b>Further product details</b></p> <p data-bbox="204 1014 847 1037">The pump is suitable for applications similar to the following:</p> <ul data-bbox="240 1043 512 1245" style="list-style-type: none"> <li>- raw-water supply</li> <li>- irrigation</li> <li>- groundwater lowering</li> <li>- pressure boosting</li> <li>- fountain applications</li> <li>- mining applications</li> <li>- off-shore applications.</li> </ul> <p data-bbox="204 1252 1358 1303">The Grundfos SP pump is renowned for its high efficiency and already complies with the requirements of the Minimum Efficiency Index, and therefore Grundfos is amongst the best in class within submersible pumps.</p> <div data-bbox="204 1312 312 1447" style="text-align: center;">  </div> <p data-bbox="204 1476 280 1505"><b>Pump</b></p> <p data-bbox="204 1509 1422 1583">All pump surfaces that are in contact with pumped liquids are made in stainless steel which makes them corrosion- and wear-resistant. The corrosion diagram below shows the capabilities of the pump and motor in relation to the temperature in Celsius (y-axis) and the concentration of chloride in ppm (x-axis).</p> <div data-bbox="204 1603 1118 1962" style="display: flex; justify-content: space-around;">   </div>

Project:

Reference Number:

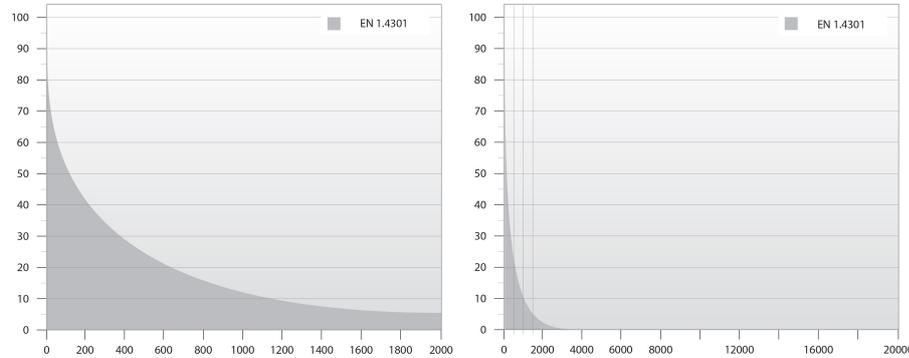
Client:

Client Number:

Contact:

Qty.	Description
------	-------------

1



The elastomer parts in the pump are made of NBR (Nitrile-Butadiene Rubber) and TPU (Thermoplastic Poly-Urethane) which offers good wear resistance and long service intervals.

The suction interconnector is fitted with a strainer to prevent large particles from entering the pump. The suction interconnector is designed to comply with NEMA standards for motor mounting/dimensions.

### Motor

The stator is hermetically encapsulated in stainless steel and the windings are embedded in polymer compound. This results in high mechanical stability, optimum cooling and reduces the risk of short circuits in the windings.

#### Liquid:

Pumped liquid: Water

Liquid temperature range: -15 .. 40 °C

#### Technical:

Pump speed on which pump data are based: 2900 rpm

Rated flow: 5 m<sup>3</sup>/h

Rated head: 135 m

Approvals: CE,EAC,UKCA,SEPRO,MOROCCO

Approvals for motor: CE,EACMOROCCO,UKCA,SEPRO

Curve tolerance: ISO9906:2012 3B

Motor version: T40

Return valve: YES

Specification for shaft end: CYLINDRICAL

#### Materials:

Pump: Stainless steel

EN 1.4401

AISI 316

Impeller:

Stainless steel

EN 1.4401

AISI 316

Motor:

Stainless steel

EN 1.4539

Shaft seal:

SiC/SiC

#### Installation:

Maximum ambient pressure: 60 bar

Maximum operating pressure: 60 bar

Maximum outlet pressure: 21.5 bar

Type of connection: Rp

Size of connection: 1 1/2 inch



Company name:

Created by:

Phone:

Date: 07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

Qty.	Description
1	<p>Motor diameter: 4 inch Minimum borehole diameter: 105 mm</p> <p>Electrical data: Motor type: MS4000 Motor flange design: Grundfos Rated power - P2: 3 kW Power (P2) required by pump: 3 kW Mains frequency: 50 Hz Rated voltage: 3 x 220-230 V Rated current: 14.2-14.6 A Starting current: 440-450 % Cos phi - power factor: 0.77 Rated speed: 2860-2870 rpm Method of start: Direct-on-line (DOL) Enclosure class (IEC 34-5): IP68 Insulation class (IEC 85): F Built-in motor protection: NONE Thermal protection: External Built-in temp. transmitter: Yes Length of cable: 1.7 m Power cable type: FLAT Motor No: 7C103708 Windings: Enameled</p> <p>Others: Minimum efficiency index, MEI <math>\geq</math>: 0.50 Net weight: 30.9 kg Gross weight: 32.6 kg Shipping volume: 0.021 m<sup>3</sup> Environmental approvals: WEEE</p>



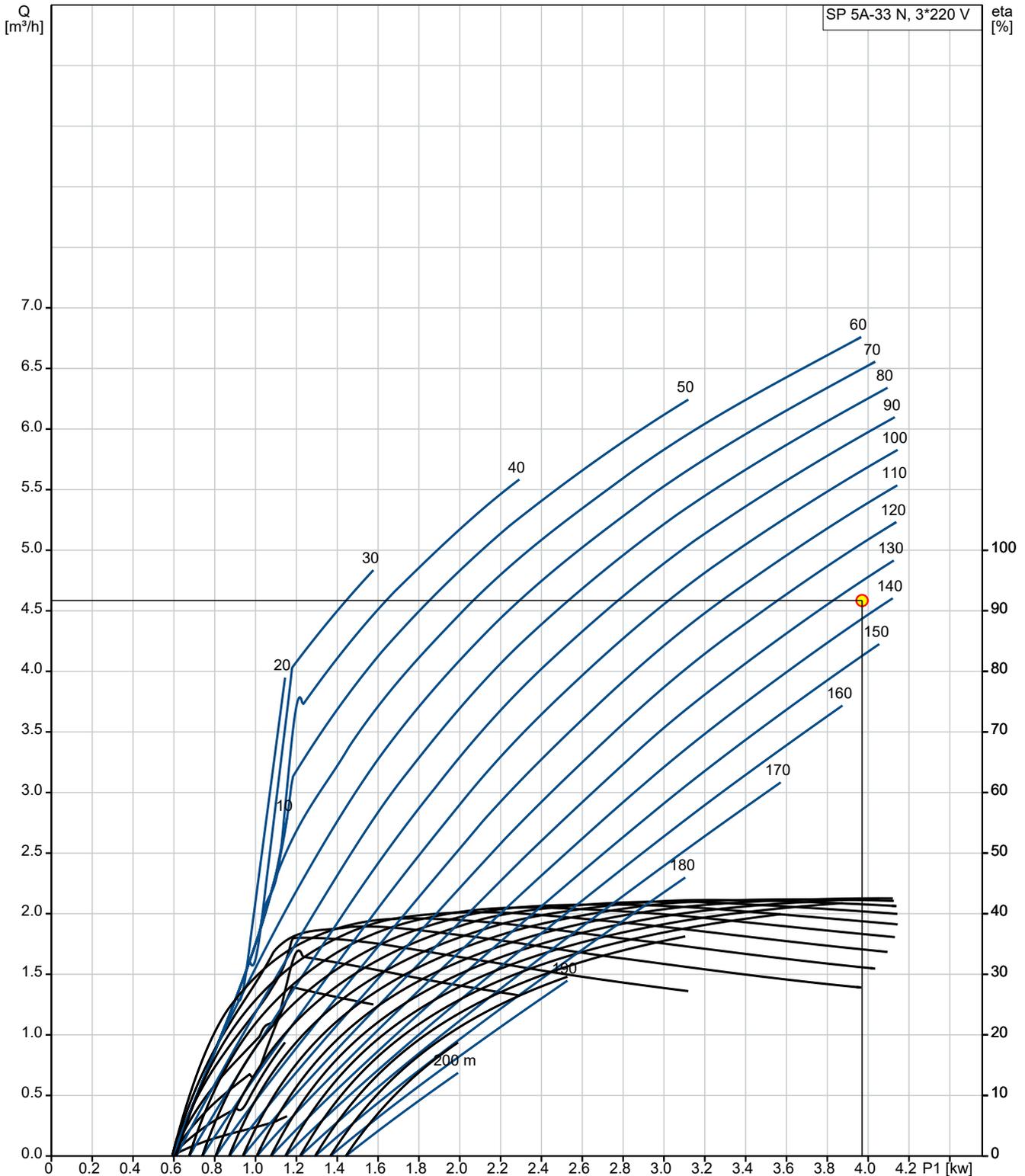
Company name:  
Created by:  
Phone:

Date: 07/07/2024

Project:  
Reference Number:

Client:  
Client Number:  
Contact:

### On request SP 5A-33 N



Q = 4.585 m³/h  
P1 = 3.97 kW  
Pumped liquid = Water

H = 134.9 m  
Eta pump+motor = 42.4 %  
Density = 998.2 kg/m³

**Project:**

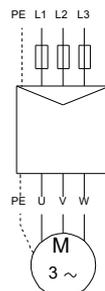
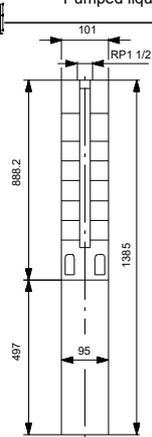
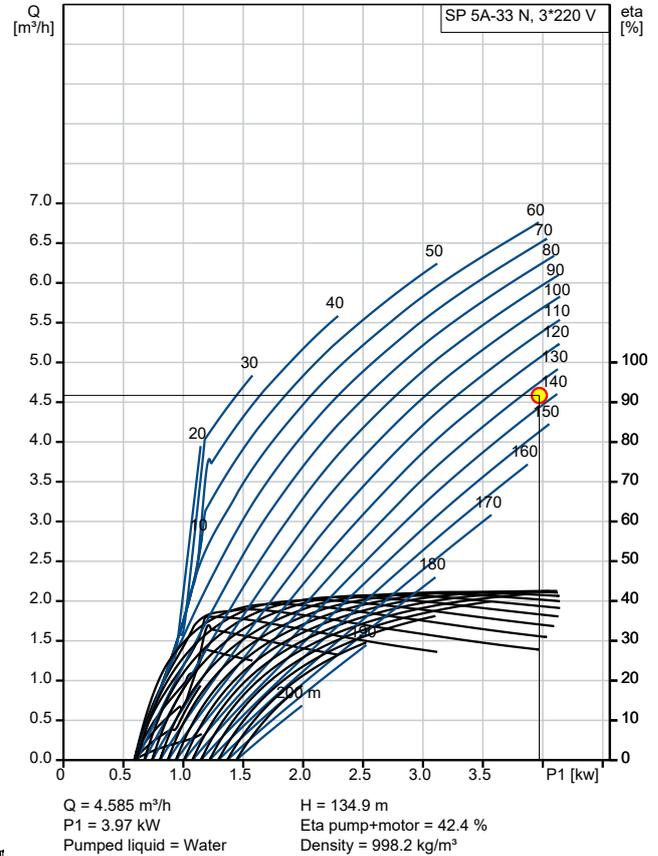
Reference Number:

**Client:**

Client Number:

Contact:

Description	Value
<b>General information:</b>	
Product name:	SP 5A-33 N
Product No:	On request
EAN number:	On request
<b>Technical:</b>	
Pump speed on which pump data are based:	2900 rpm
Rated flow:	5 m <sup>3</sup> /h
Rated head:	135 m
Stages:	33
Number of reduced-diameter impellers:	NONE
Approvals:	CE, EAC, UKCA, SEPRO, MOR OCCO
Approvals for motor:	CE, EAC, MOROCCO, UKCA, S EPRO
Curve tolerance:	ISO9906:2012 3B
Pump No:	05200033
Model:	B
Motor version:	T40
Return valve:	YES
Specification for shaft end:	CYLINDRICAL
<b>Materials:</b>	
Pump:	Stainless steel
Pump:	EN 1.4401
Pump:	AISI 316
Impeller:	Stainless steel
Impeller:	EN 1.4401
Impeller:	AISI 316
Motor:	Stainless steel
Motor:	EN 1.4539
Shaft seal:	SiC/SiC
<b>Installation:</b>	
Maximum ambient pressure:	60 bar
Maximum operating pressure:	60 bar
Maximum outlet pressure:	21.5 bar
Type of connection:	Rp
Size of connection:	1 1/2 inch
Motor diameter:	4 inch
Minimum borehole diameter:	105 mm
<b>Liquid:</b>	
Pumped liquid:	Water
Liquid temperature range:	-15 .. 40 °C
<b>Electrical data:</b>	
Motor type:	MS4000
Motor flange design:	Grundfos
Rated power - P2:	3 kW
Power (P2) required by pump:	3 kW
Mains frequency:	50 Hz
Rated voltage:	3 x 220-230 V
Rated current:	14.2-14.6 A
Starting current:	440-450 %
Cos phi - power factor:	0.77
Rated speed:	2860-2870 rpm
Method of start:	Direct-on-line (DOL)
Enclosure class (IEC 34-5):	IP68





Company name:

Created by:

Phone:

Date: 07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

Description	Value
Insulation class (IEC 85):	F
Built-in motor protection:	NONE
Thermal protection:	External
Built-in temp. transmitter:	Yes
Length of cable:	1.7 m
Power cable type:	FLAT
Motor No:	7C103708
Cable number:	99411278
Windings:	Enameled
<b>Others:</b>	
Minimum efficiency index, MEI $\geq$ :	0.50
Net weight:	30.9 kg
Gross weight:	32.6 kg
Shipping volume:	0.021 m <sup>3</sup>
Environmental approvals:	WEEE



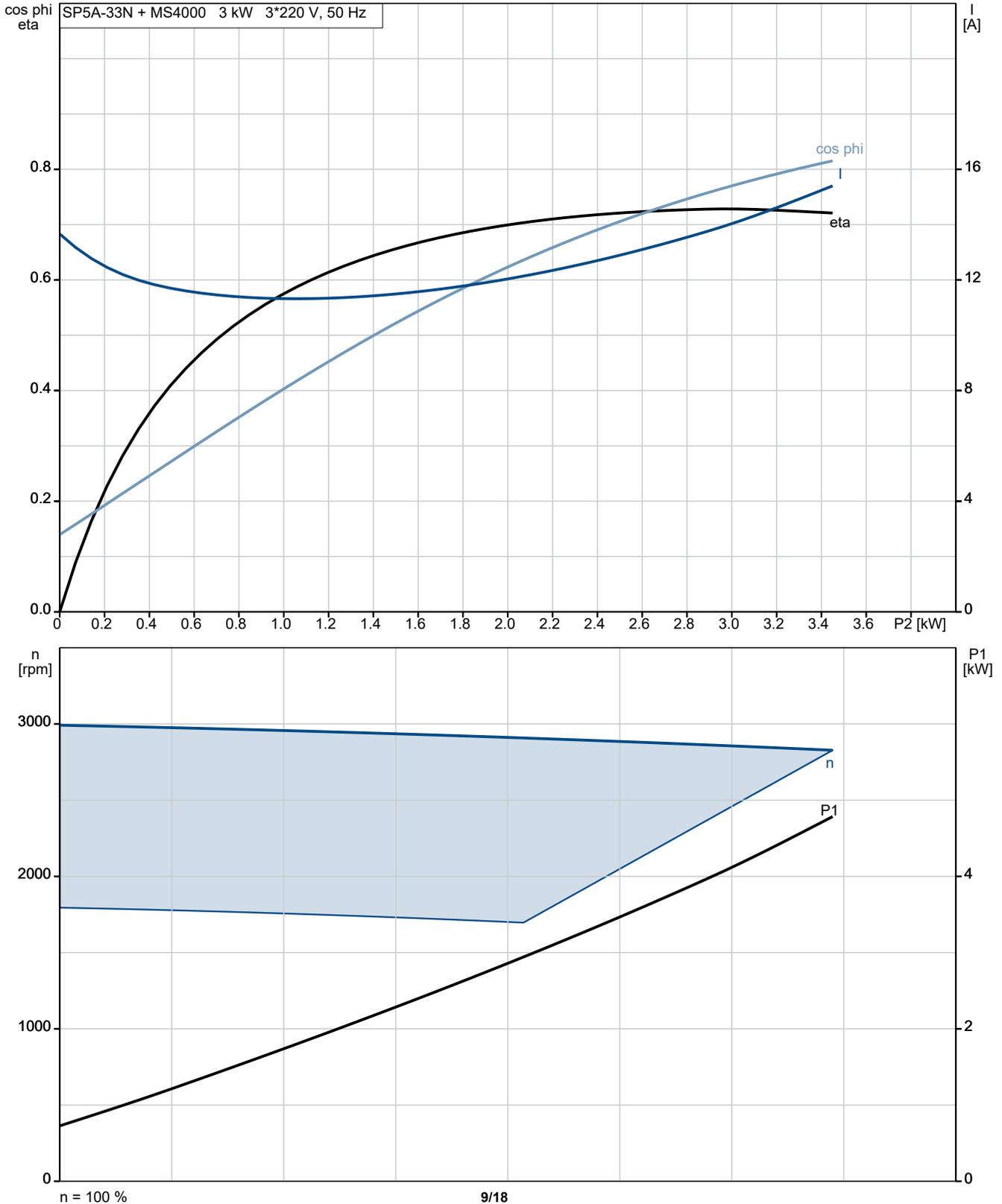
Company name:  
Created by:  
Phone:

Date: 07/07/2024

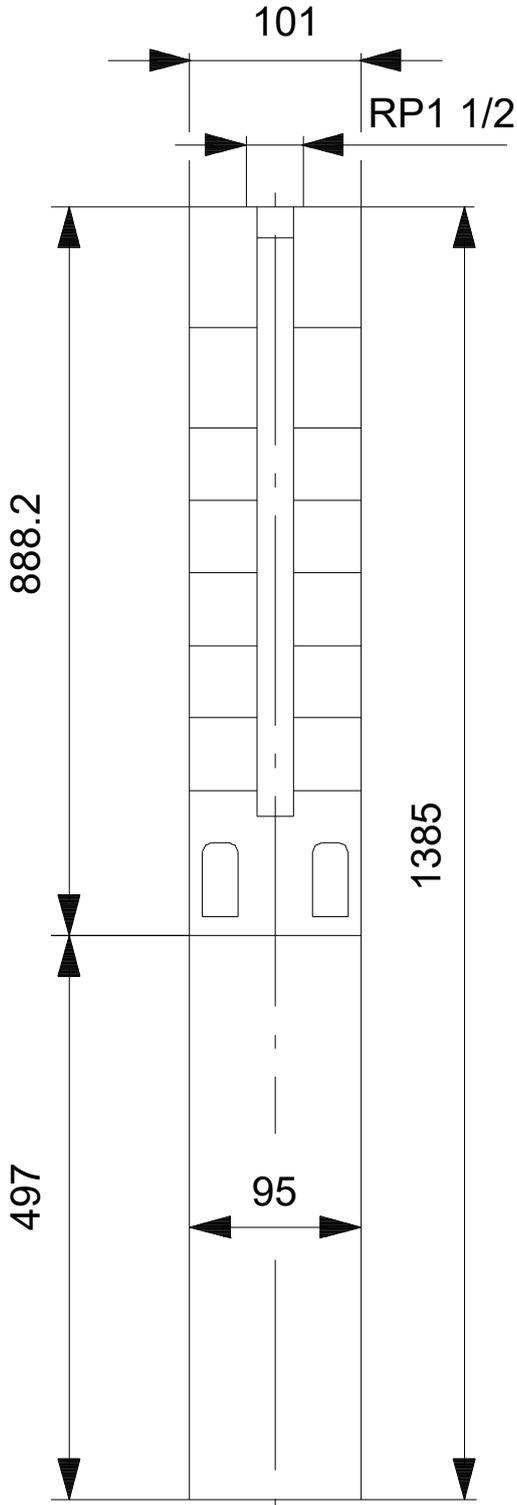
Project:  
Reference Number:

Client:  
Client Number:  
Contact:

### On request SP 5A-33 N

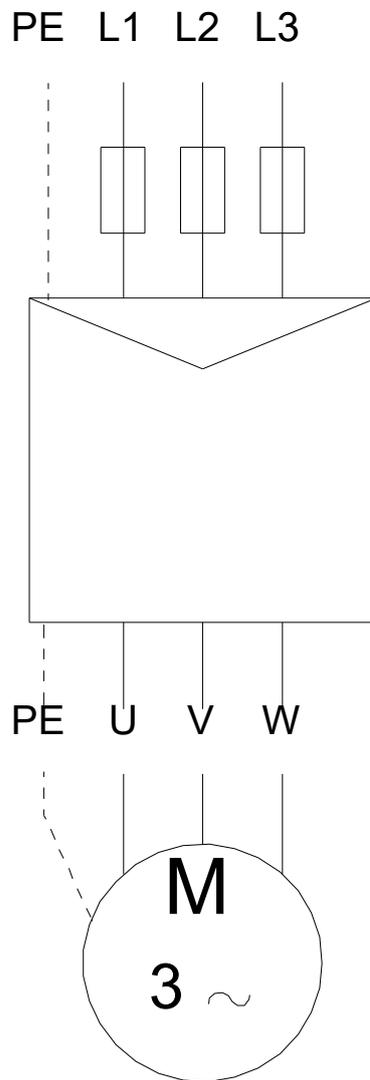


**On request SP 5A-33 N**



Note! All units are in [mm] unless others are stated.  
Disclaimer: This simplified dimensional drawing does not show all details.

## On request SP 5A-33 N





Company name:

Created by:

Phone:

Date:

07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

## On request SP 5A-33 N

### Input - summary

Water volume (max): 32.2 m<sup>3</sup>/day  
Month for sizing: April  
Static lift above ground: 38 m  
Dynamic water level: 90 m  
Sun tracking: No (fixed)  
Location: نانتس غرا, Kandahar, Afghanistan  
Latitude: 31.5629 DD, Longitude: 66.5604 DD

### Products

Pump: SP 5A-33 N, 1 x On request  
Solar module: 20 x GF 270

### Sizing results - summary

#### Water production, Peak flow and Price

Total water production per year: 13000 m<sup>3</sup>  
Avg. water production per day: 35.5 m<sup>3</sup>/day  
Average water production per watt per day: 6.6 l/Wp/day

#### Solar module configuration:

Number of solar modules in series: 10, in parallel: 2  
Solar array rated power: 5.4 kW  
Solar array rated volts: 316 V  
Sun tracking: No (fixed)  
Tilt angle: 31 deg.

#### Typical performance at solar radiation 800 W/m<sup>2</sup>

Flow: 4.6 m<sup>3</sup>/h  
Total head: 134.9 m

#### Cables and pipes:

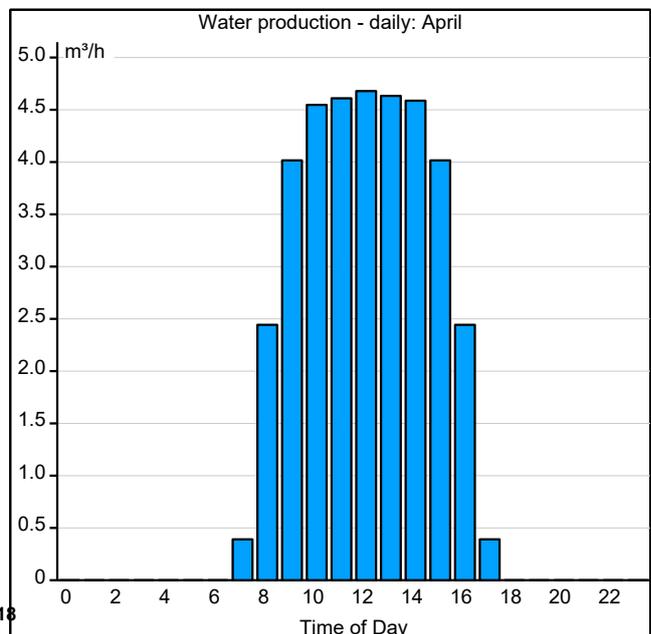
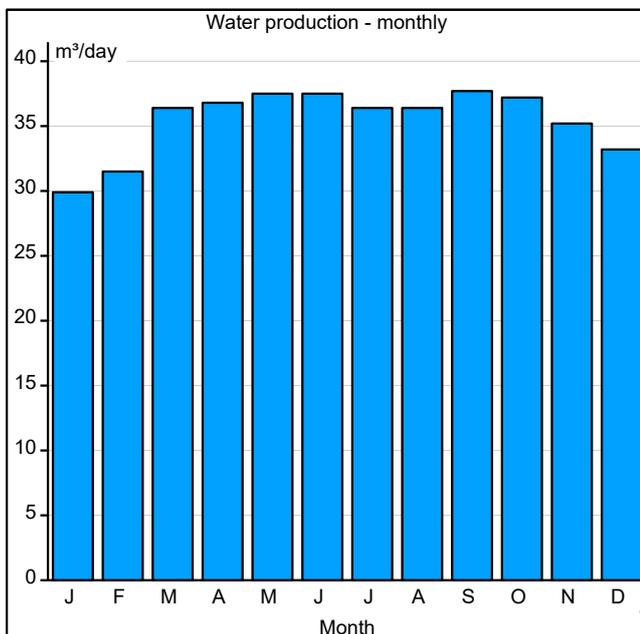
Pump cable length: 230 m  
Pump cable size: 25 mm<sup>2</sup>  
Total cable loss: 1.6 %

Material, riser pipe: PEH  
Pipe length of riser pipe: 90 m  
Friction losses: 6.938 m

### System performance - monthly average

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Water production [m <sup>3</sup> /day]	29.9	31.5	36.4	36.8	37.5	37.5	36.4	36.4	37.7	37.2	35.2	33.2
Energy production Solar [kWh/day]	28.8	30.8	39.5	38.7	39.0	38.4	36.1	37.4	41.6	42.3	38.0	32.3
Radiation horizontal [kWh/m <sup>2</sup> day]	3.6	4.5	6.7	7.8	8.9	9.3	8.6	8.1	7.7	6.4	4.8	3.9
Radiation tilt [kWh/m <sup>2</sup> day]	5.5	6.0	7.8	7.9	8.1	8.1	7.7	7.8	8.6	8.5	7.4	6.5
Avg. Temp. [°C]	1.9	4.3	9.4	15.6	20.3	23.5	24.8	22.9	17.7	11.4	7.2	4.2

Data location: Latitude: 31 DD, Longitude: 67 DD





Company name:

Created by:

Phone:

Date:

07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

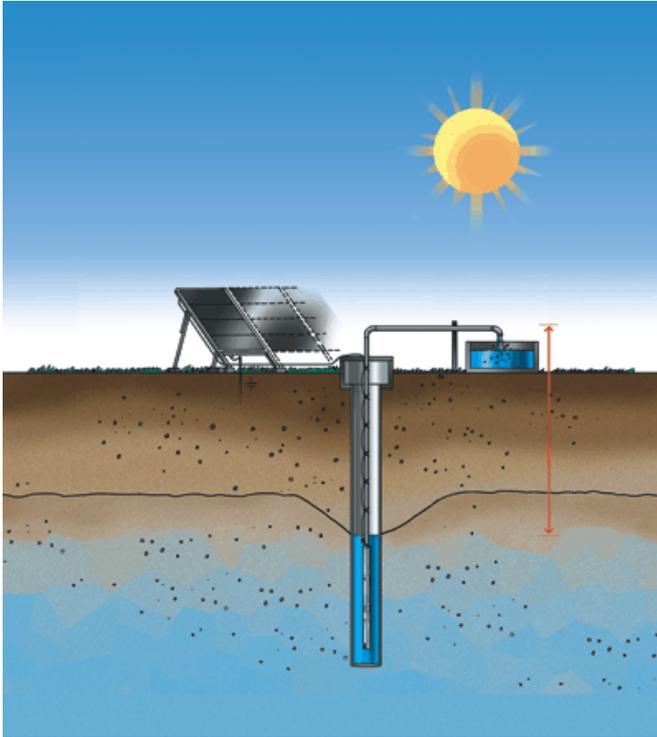
## On request SP 5A-33 N

### Location Map



Location: زارین زای, Kandahar, Afghanistan  
Latitude: 31.5629 DD, Longitude: 66.5604 DD

## Installation and Input



## Sizing Results

### Water production, Peak flow and Price

Total water production per year: 13000 m<sup>3</sup>  
Avg. water production per day: 35.5 m<sup>3</sup>/day  
Average water production per watt per day: 6.6 l/Wp/day

### Solar module configuration:

Number of solar modules in series: 10, in parallel: 2  
Solar array rated power: 5.4 kW  
Solar array rated volts: 316 V  
Sun tracking: No (fixed)  
Tilt angle: 31 deg.

### Typical performance at solar radiation 800 W/m<sup>2</sup>

Flow: 4.6 m<sup>3</sup>/h  
Total head: 134.9 m

### Cables and pipes:

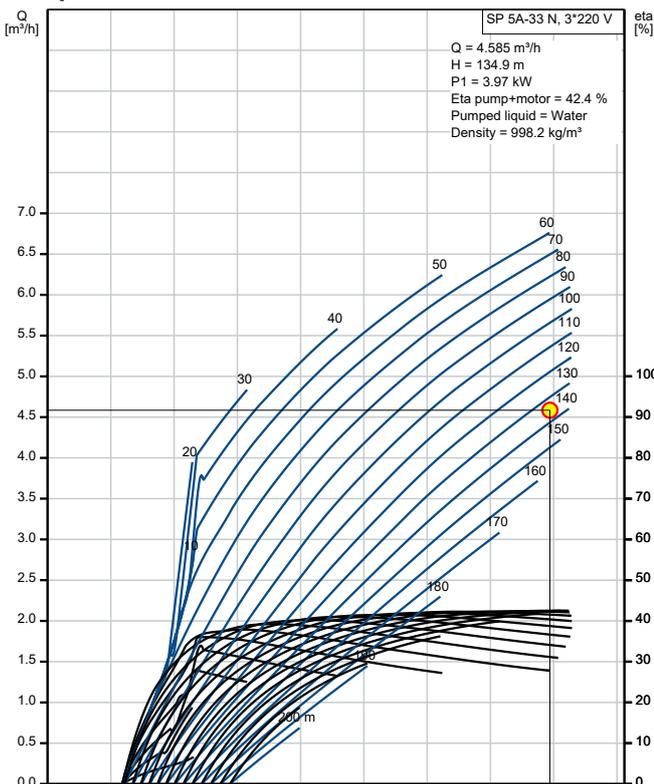
Pump cable length: 230 m  
Pump cable size: 25 mm<sup>2</sup>  
Total cable loss: 1.6 %

### Material, riser pipe: PEH

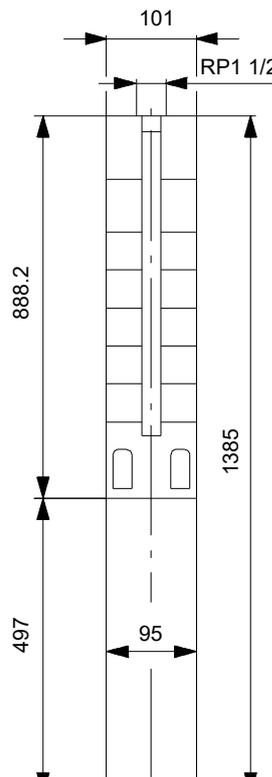
Pipe length of riser pipe: 90 m  
Friction losses: 6.938 m

Location: نانس غرا, Kandahar, Afghanistan  
Latitude: 31.5629 DD, Longitude: 66.5604 DD

## Pump Curve



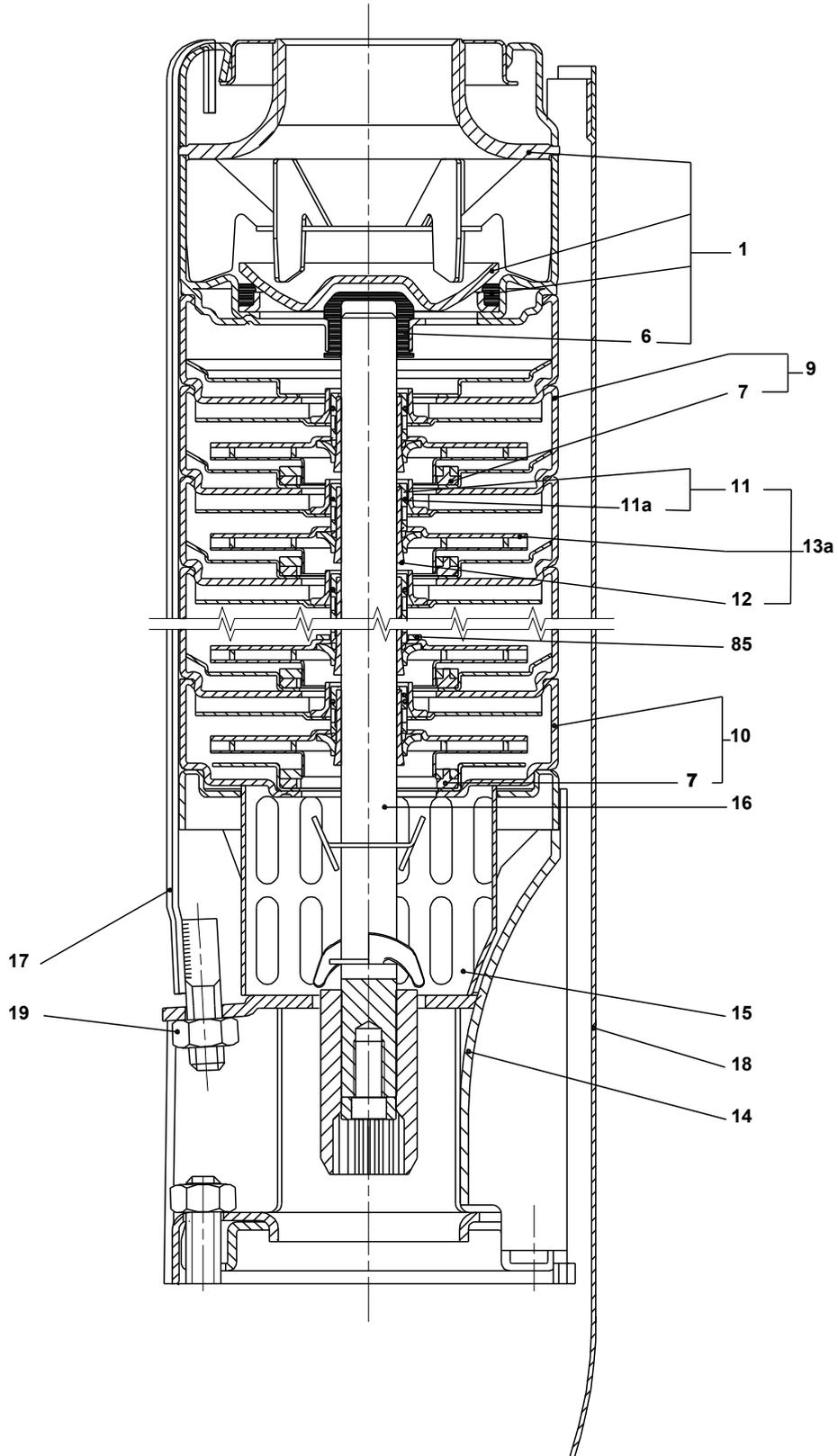
## Dimensional Drawing







(tm008314 3300)





Company name:

Created by:

Phone:

Date: 07/07/2024

Project:  
Reference Number:

Client:  
Client Number:  
Contact:

**Islamic Relief Worldwide-Afghanistan Kandahar Area Office Shelter- UK -Solar powered Pump V**  
**Produced After 2407 (production year and week number)**

Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
-	Pump w/o motor				1	pcs
-	Kit, Wear parts			00105059	1	pcs
6	Bearing				1	pcs
7	Neck ring				39	pcs
	Bulk, Stop ring (10 PC)			96927076	3	pcs
	Bulk, Stop ring (50 PC)			98527989	3	pcs
	Stop ring			96550777	3	pcs
6	Bearing			96550792	1	pcs
7	Bulk, Neck ring (10 PC)			97534360	1	pcs
7	Neck ring			96591921	1	pcs
- 10	Chamber, bottom			99093699	1	pcs
7	Bulk, Neck ring (10 PC)			97534360	1	pcs
7	Neck ring			96591921	1	pcs
- 13a	Bulk, Impeller cpl. (5 PC)			96915592	33	pcs
- 11	Bulk, Split cone nut (10 PC)			96602963	1	pcs
	Bulk, Split cone nut (10 PC)			96602958	1	pcs
11a	O-ring			99113822	1	pcs
12	Bulk, Split cone (10 PC)			96551287	1	pcs
+ 13a	Bulk, Impeller cpl. (10 PC)			96537778	33	pcs
+ 13a	Impeller cpl.			96903196	33	pcs
15	Strainer			99434652	1	pcs
18d	Bulk, Combi Torx screw (4 PC)			98653089	2	pcs
18b	Support for cable guard			96550771	1	pcs
78	Bulk, Nameplate (100 PC)			99534979	1	pcs
	Motor			92960190	1	pcs