



## Design and Estimation of WASH Project

*Project Name: Rehabilitation of Solar Power Water supply network*

**Village:** Chamtala-Block-24

**District:** Khogyana

**Province:** Ningarhar

**Funded by:** LDSCAU

**Implemented by:** International Medical Corps (IMC)

**Implementing Date:** 2024- 2025 Year

### Brief Information

- No. of beneficiaries: 3500 individuals, 500 Families
- Type of ground: 3 to 6
- No. of Stand Posts: 31
- Size & type of existing reservoir: 12.5 m<sup>3</sup> R.C.C Elevated Tank
- Length of Water Supply Network: 2913 m
- Type of Project: Combined Pumping & Gravity System
- Total working days: 60 Days
- Project Location GPS: Latitude, long: 34.340163°, 70.183912°

## Contents of Project:

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### **PROJECT SUMMARY INFORMATION**

**Project Title:** Rehabilitation and extension of existing Solar powered water supply network to Conflict and Natural Disasters affected targeted populations in Ningarhar Province.

**Project Objectives:** Improve access to clean drinking water for populations in Chamtala Block-24 village of Khogyana District, Ningarhar Province.

**Project implementation area:** Chamtala Block-24, Khogyana District of Ningarhar Province Afghanistan.

**Targeted Population:** 500 families that become (3500 individuals)

**Donor:** LATTER-DAY SAINT CHARITIES AUSTRALIA (LDSA)

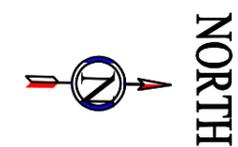
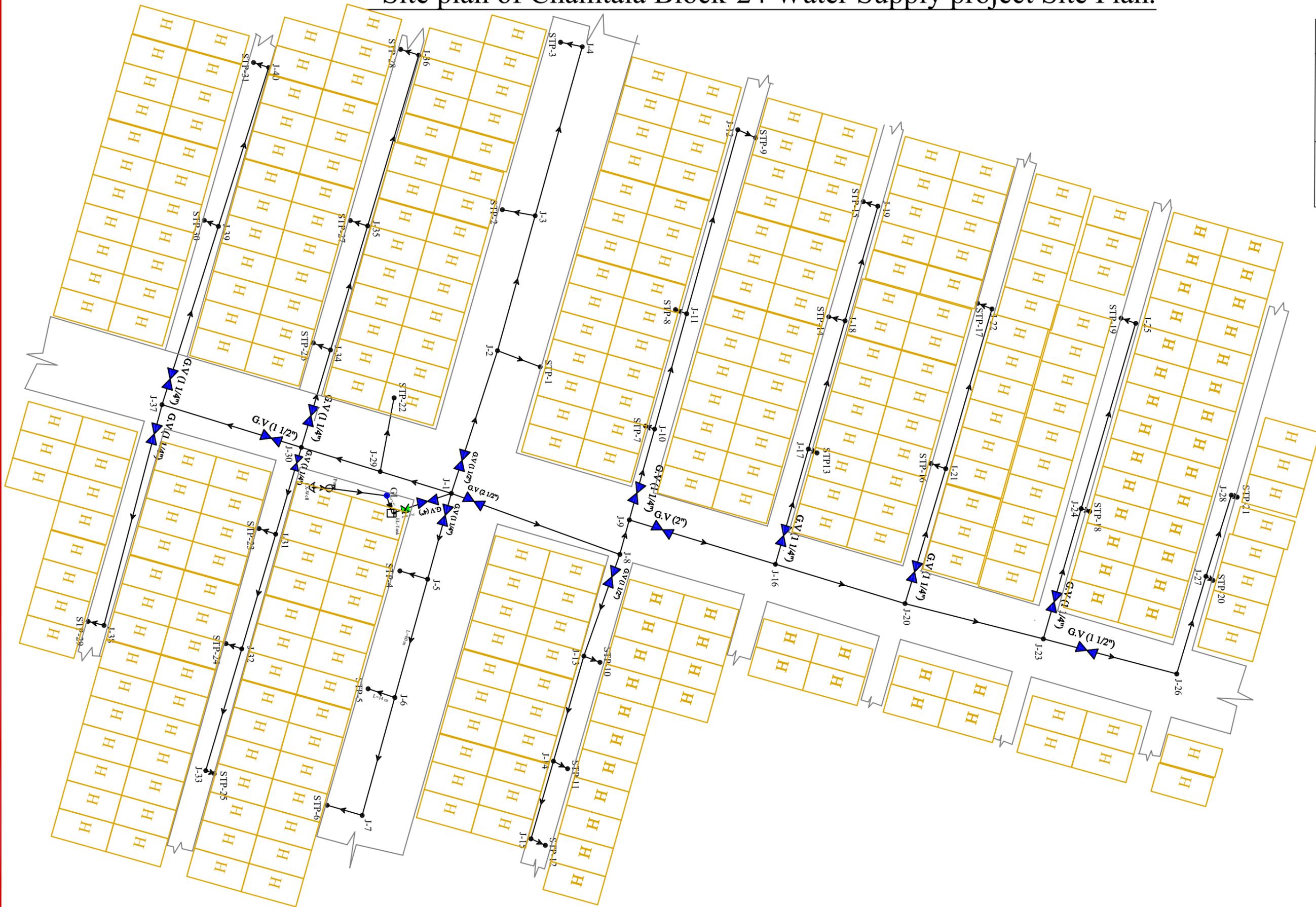
**Project Implementer:** International Medical Corps (IMC)

### **ACTIVITIES DISCRIPTIONS**

1. Pump test: should be done on existing well at least for 8 hours and data should be recorded.
2. Rehabilitation of existing 12.5 M3 elevated R.C.C water tank with all required activities in accordance to the BoQs.
3. Supply and installation of PV system according to the BoQs with all required activities.
4. Rehabilitation of existing well protection box according to the BoQs with all required activities.
5. Construction of 1 Gate valve & flow meter box according to BoQs with all required activities.
6. Construction of 7 Gate valve box according to the BoQ with all required activities.
7. Rehabilitation of of 10 existing stand taps and construction of 10 new sock pit for the existing 10 stand taps according to the BoQs and drawings with all required activities.
8. Construction of 21 new stand taps with its sock pit according to the BoQ and drawings with all required activities.
9. Installation of distribution line from reservoir to stand taps with all required pipes, fittings, excavation and filling according to the BoQ and all required activities.

# Site plan of Chamtala Block-24 Water Supply project Site Plan.

| LEGEND      |   |
|-------------|---|
| Pipe        | — |
| Gate Valve  | ⋈ |
| EX.EL. Tank | ☐ |
| House       | H |
| Joint       | ● |



|            |        |             |                  |             |                    |             |            |  |          |                   |              |   |
|------------|--------|-------------|------------------|-------------|--------------------|-------------|------------|--|----------|-------------------|--------------|---|
| FUNDED BY: | LDSCAU | SURVEYED BY | WASH Design Team | CHECKED BY  | Head of Department | SCALE       | 1:1741/A3  | SHEET NO.<br><div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">1/1</div> | PROVINCE | Ningarhar         | PROJECT NAME |   |
|            |        | DESIGNED BY | WASH Design Team | REVIEWED BY | WASH Advisor       | DATE        | 01.09.2024 |  | DISTRICT | Khogyana          |              | <i>Rehabilitation of Water Supply Project</i> |
|            |        | DRAWN BY    | WASH Design Team | APPROVED BY | WASH Advisor       | DRAWING NO. |            |  | VILLAGE  | Chamtala-24 Block |              | Site Plan                                     |

# Image Site plan of Chamtala Block-24 Water Supply project Site Plan.



| Legend |               |
|--------|---------------|
| 1      | Pipe          |
| 2      | Gate Valve    |
| 3      | Elevated tank |
| 4      | House         |
| 5      | Joint         |



|  |                  |                  |                     |                     |                             |            |                   |   |          |               |              |  |
|--|------------------|------------------|---------------------|---------------------|-----------------------------|------------|-------------------|---|----------|---------------|--------------|--|
| FUNDED BY:   | LDBCAU           | SURVEYED BY      | WASH Design Team    | CHECKED BY          | Eng. Mohammad Yousef Mazhar | SCALE      | 1:1741/A3         | SHEET NO.  | PROVINCE | Ningarhar     | PROJECT NAME | Rehabilitation of Water Supply Project |
| INTERNATIONAL MEDICAL CORPS (IMC) PROGRAM DEPARTMENT WASH UNIT | DESIGNED BY      | WASH Design Team | REVIEWED BY         | Eng. Mohammad Yasir | DATE                        | 01.09.2024 | DISTRICT          |   | Khogyana | DRAWING TITLE | Site Plan    |  |
| DRAWN BY   | WASH Design Team | APPROVED BY      | Eng. Mohammad Yasir | DRAWING NO.         |                             | VILLAGE    | Chamtala-24 Block |   |          |               |              |  |



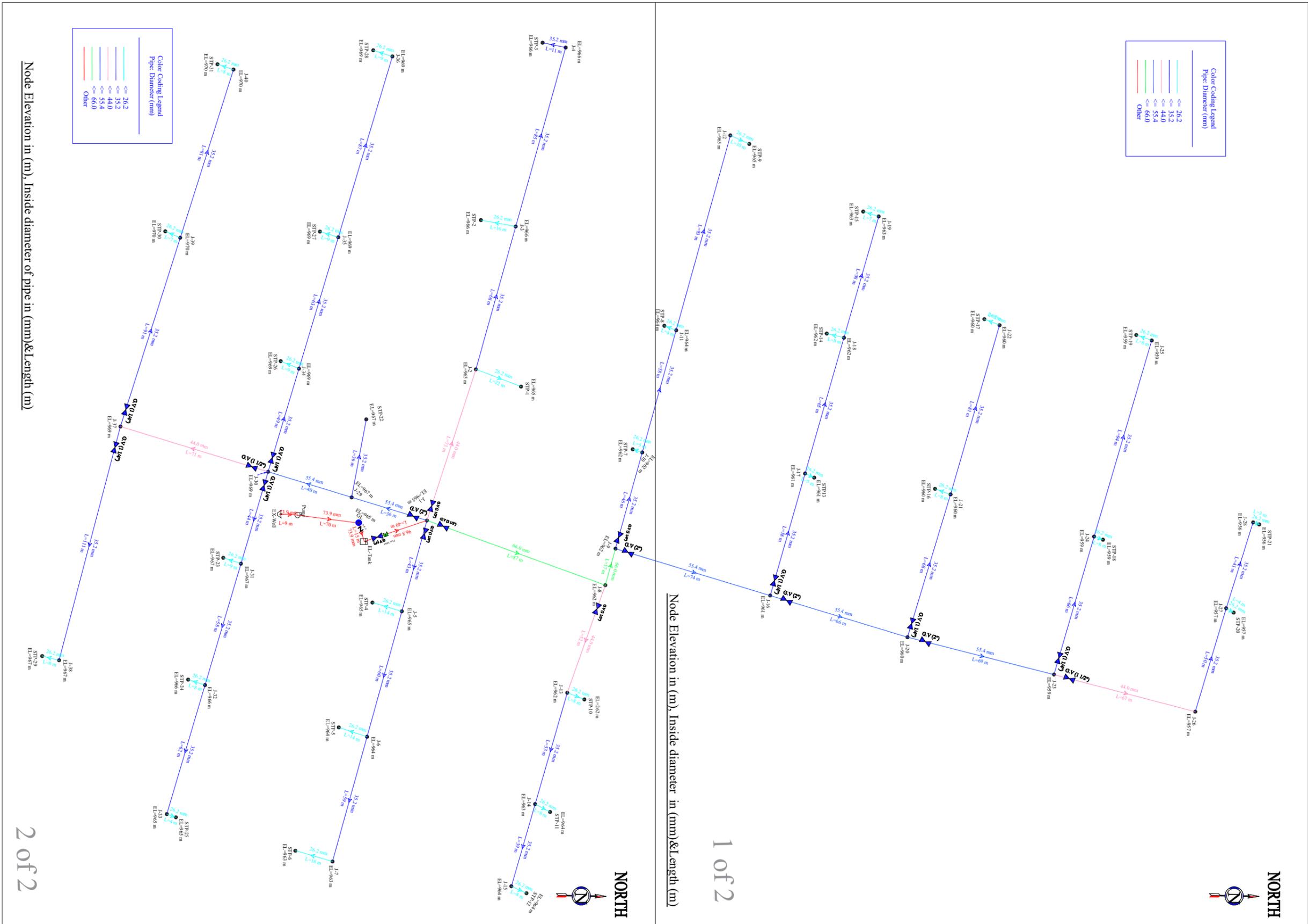
## Water Supply network, Source & Water Pump calculation sheet

|  |                            |                                    |   |
|--|----------------------------|------------------------------------|---|
| <b>Province :</b> Ningarhar  | <b>District :</b> Khogyana | <b>Village :</b> Chamtala Block-24 | <b>Type of project: Combined<br/>(Pumping &amp; gravity system)</b>             |
| Beneficiaries =  | 500                        | House Hold (Families)              |   |
| School students =  | 0                          | person                             |   |
| clinic patients =  | 0                          | Patient                            |   |
| Population Growth =  | 2.2                        | %                                  |   |
| Design Period =  | 15                         | Years                              |   |
| Design population =  | 693.00033                  | Total Beneficiaries =              | 4851 Person <span style="float: right;"><math>P_n = P(1+PG/100)^n</math></span> |
| water demand /Capita =   | 30                         | Lpcd                               |   |
| water demand per Patient =   | 0                          | Lpcd                               |   |
| water demand for student =   | 0                          | Lpcd                               |   |
| Peak Daily coefficient =   | 1.3                        |                                    |   |
| Peak Hourly coefficient =  | 2.5                        |                                    |   |
| Everage daily demadn =   | 145530.069                 | Lit/day =                          | 1.6843758 Lit/Sec   |
| Design water demand =  | 472972.725                 | Lit/day =                          | 5.4742214 Lit/Sec, for network  |
| Discharge of water from source in case of be spring or have power for 24 hr must be:             |                            |                                    | 145.53007 m3/day , 6.064 m3/hr & 1.68438 Lit/Sec                                |
| Discharge of water from source in case of using Solar power for solar irradiation hours must be: |                            |                                    | 145.53 m3/day, 18.191 m3/hr & 5.05313 Lit/Sec                                   |
| Daily average solar Irradiation for current location of the project is                           | 8                          | Hour/day                           | it is depend on location of the project.  |
| Q of Pump for daily average solar irradiation hours of the annual days =                         |                            |                                    | 145.53 m3/day, 18.1913 m3/hour & 5.053127 Lit/Sec                               |
| Demand of water per family for designated period =   |                            |                                    | 945.9455 Lit/day, 0.01095 Lit/sec   |
| Demand of Water for School =   | 0                          | m3/day                             |   |
| Demand of Water for Clinic =   | 0                          | m3/day                             |   |

Note: Before designing and expanding this project, we conducted a pump test on the existing well. After an 8-hour continuous pumping test, it was determined that the well's yield was 5 liters per second. Given the urgent need for drinking water among the residents of Chamtala Block 24 Village, we will utilize the current elevated tank as a balancing reservoir. Balancing reservoirs serve several key purposes, including:

- a) Balancing fluctuations in demand.
- b) Maintaining uniform pressure within the distribution system.
- c) Allowing for convenient pumping hours.
- d) Meeting emergency demands, such as firefighting.
- e) Improving water quality due to storage.
- f) Enhancing the cost-effectiveness of the distribution system.
- g) Simplifying the operation of the distribution system.

# Hydraulic Design of Chamtala 24 Block Village Water Supply rehabilitation Project .

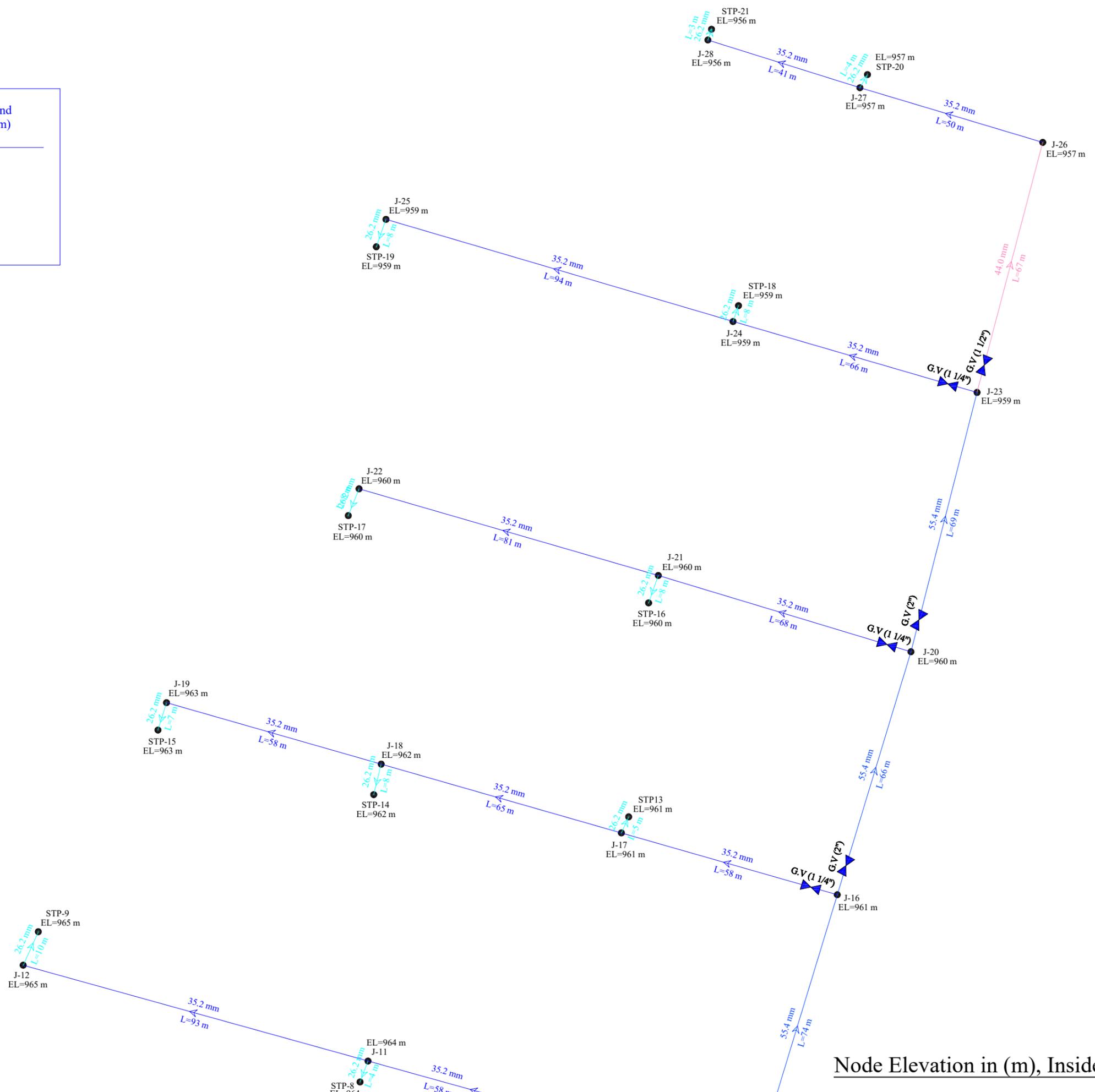


|  |             |                  |                  |              |                    |            |           |                  |                   |               |                  |  |
|--|-------------|------------------|------------------|--------------|--------------------|------------|-----------|------------------|-------------------|---------------|------------------|--|
| FUNDED BY:   | LDSCAU      | SURVEYED BY      | WASH Design Team | CHECKED BY   | Head of Department | SCALE      | 1:1741/A3 | SHEET NO.<br>1/1 | PROVINCE          | Ningarhar     | PROJECT NAME     | Rehabilitation of Water Supply Project |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | WASH Design Team | REVIEWED BY      | WASH Advisor | DATE               | 01.09.2024 | DISTRICT  |                  | Khogyana          | DRAWING TITLE | Hydraulic Design |  |
|  | DRAWN BY    | WASH Design Team | APPROVED BY      | WASH Advisor | DRAWING NO.        |            | VILLAGE   |                  | Chamtala-24 Block |               |                  |  |

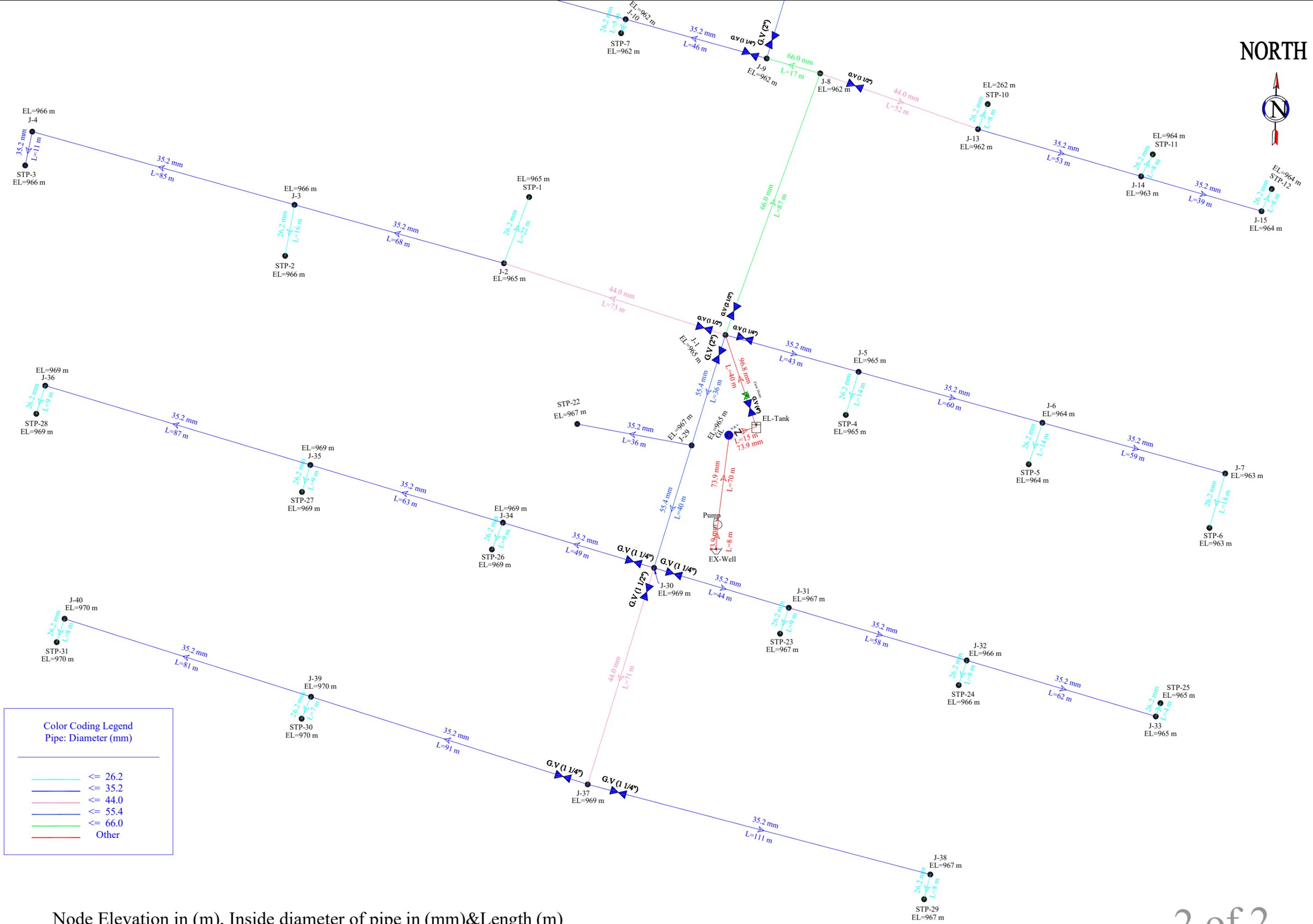
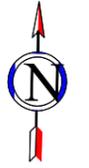


**Color Coding Legend**  
Pipe: Diameter (mm)

|  |         |
|--|---------|
| <span style="color: cyan;">—</span>    | <= 26.2 |
| <span style="color: blue;">—</span>    | <= 35.2 |
| <span style="color: red;">—</span>     | <= 44.0 |
| <span style="color: green;">—</span>   | <= 55.4 |
| <span style="color: magenta;">—</span> | <= 66.0 |
| <span style="color: black;">—</span>   | Other   |



NORTH

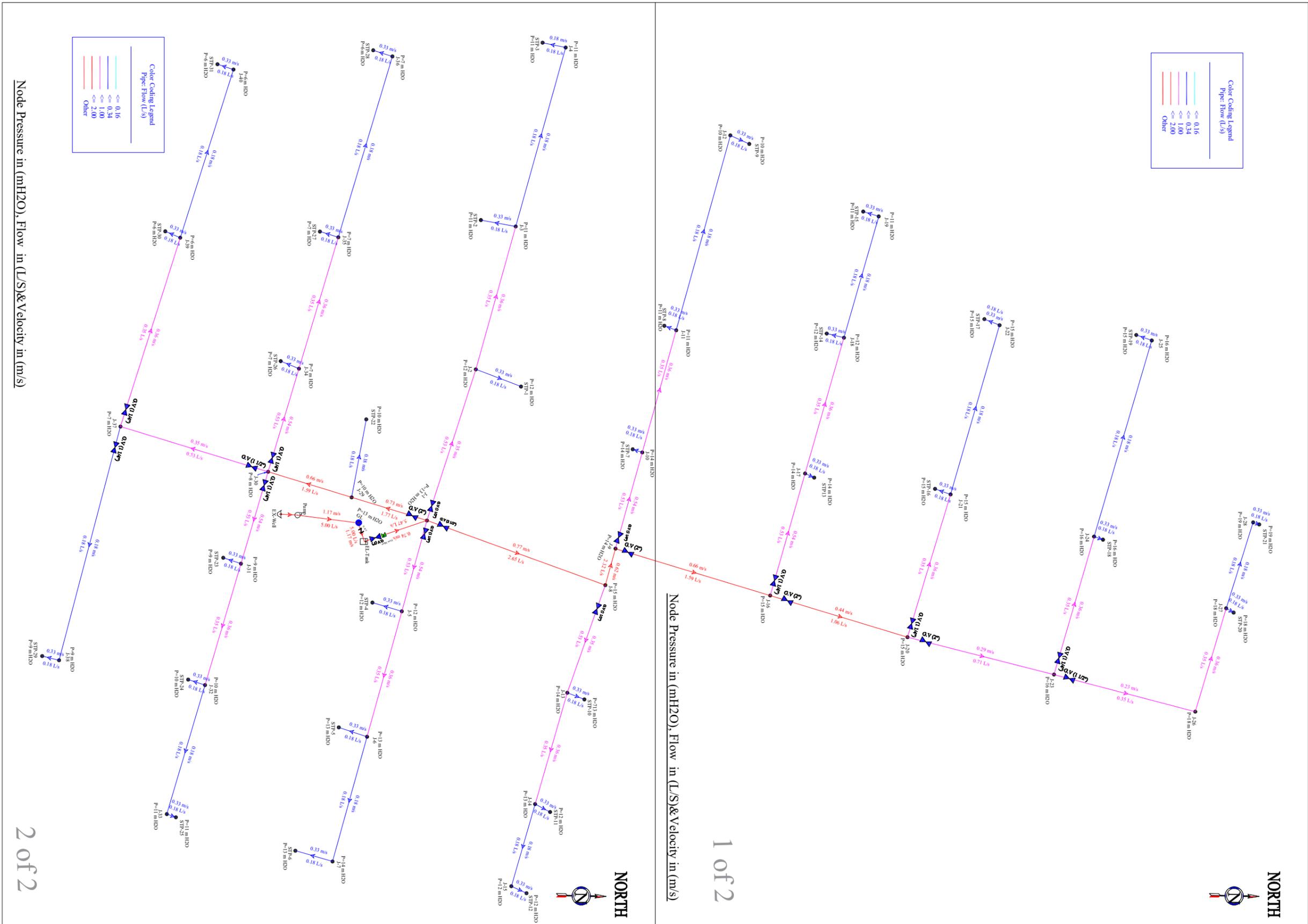


**Color Coding Legend**  
Pipe: Diameter (mm)

|   |        |
|---|--------|
| <span style="color: cyan;">—</span>     | ≤ 26.2 |
| <span style="color: blue;">—</span>     | ≤ 35.2 |
| <span style="color: pink;">—</span>     | ≤ 44.0 |
| <span style="color: darkblue;">—</span> | ≤ 55.4 |
| <span style="color: green;">—</span>    | ≤ 66.0 |
| <span style="color: red;">—</span>      | Other  |

Node Elevation in (m), Inside diameter of pipe in (mm)&Length (m)

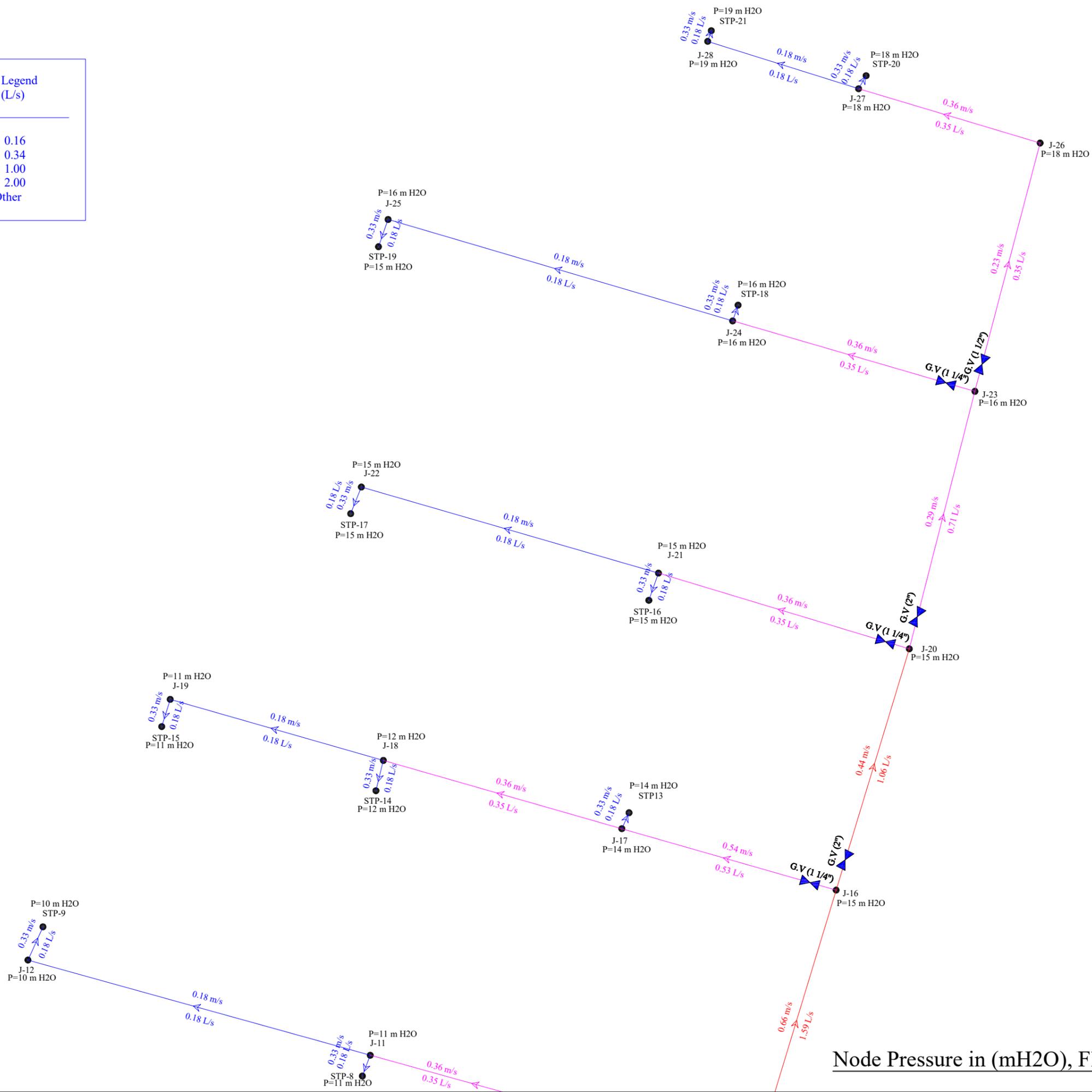
# Hydraulic Design of Chamtala 24 Block Village Water Supply rehabilitation Project .



|  |             |                  |                  |              |                    |            |           |           |                   |               |                  |  |
|--|-------------|------------------|------------------|--------------|--------------------|------------|-----------|-----------|-------------------|---------------|------------------|--|
| FUNDED BY:   | LDSCAU      | SURVEYED BY      | WASH Design Team | CHECKED BY   | Head of Department | SCALE      | 1:1741/A3 | SHEET NO. | PROVINCE          | Ningarhar     | PROJECT NAME     | Rehabilitation of Water Supply Project |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | WASH Design Team | REVIEWED BY      | WASH Advisor | DATE               | 01.09.2024 | DISTRICT  |           | Khogyana          | DRAWING TITLE | Hydraulic Design |  |
|  | DRAWN BY    | WASH Design Team | APPROVED BY      | WASH Advisor | DRAWING NO.        |            | VILLAGE   |           | Chamtala-24 Block |               |                  |  |

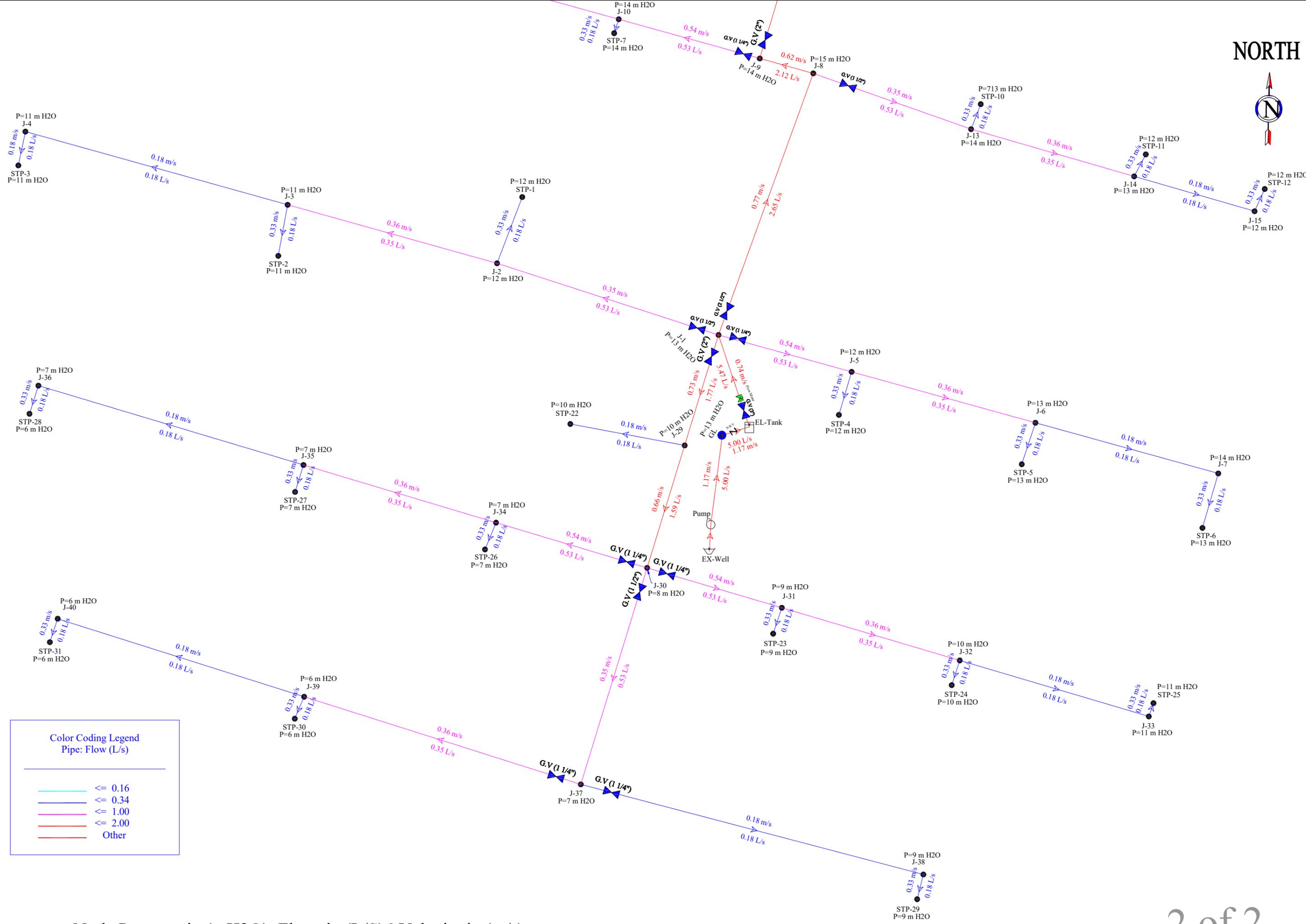
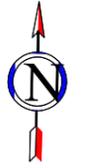


| Color Coding Legend |        |
|---------------------|--------|
| Pipe: Flow (L/s)    |        |
|                     | ≤ 0.16 |
|                     | ≤ 0.34 |
|                     | ≤ 1.00 |
|                     | ≤ 2.00 |
|                     | Other  |



Node Pressure in (mH<sub>2</sub>O), Flow in (L/S)&Velocity in (m/s)

NORTH

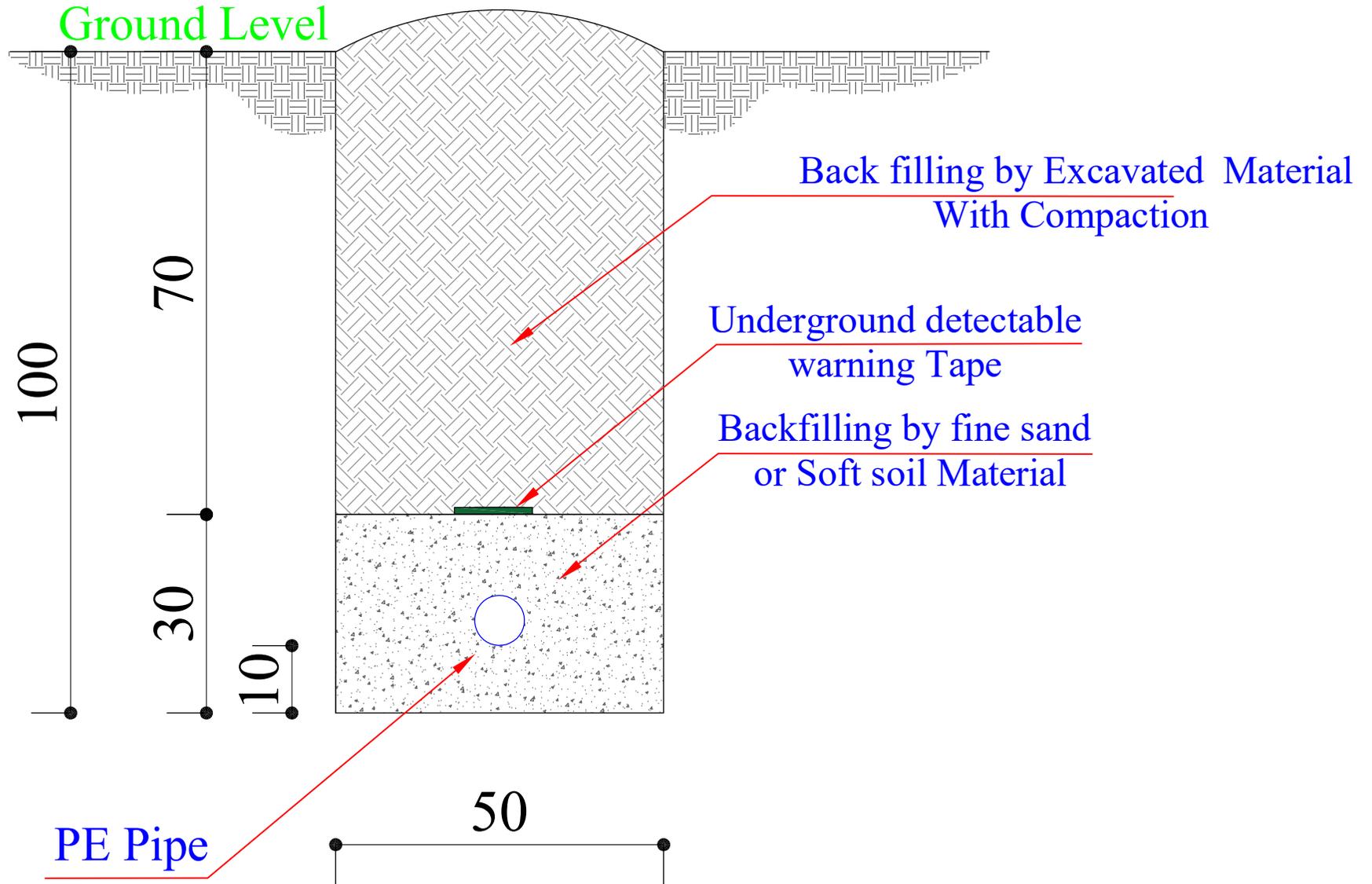


**Color Coding Legend**  
Pipe: Flow (L/s)

|  |        |
|--|--------|
| <span style="color: cyan;">—</span>    | ≤ 0.16 |
| <span style="color: blue;">—</span>    | ≤ 0.34 |
| <span style="color: magenta;">—</span> | ≤ 1.00 |
| <span style="color: red;">—</span>     | ≤ 2.00 |
| <span style="color: orange;">—</span>  | Other  |

Node Pressure in (mH2O), Flow in (L/S)&Velocity in (m/s)

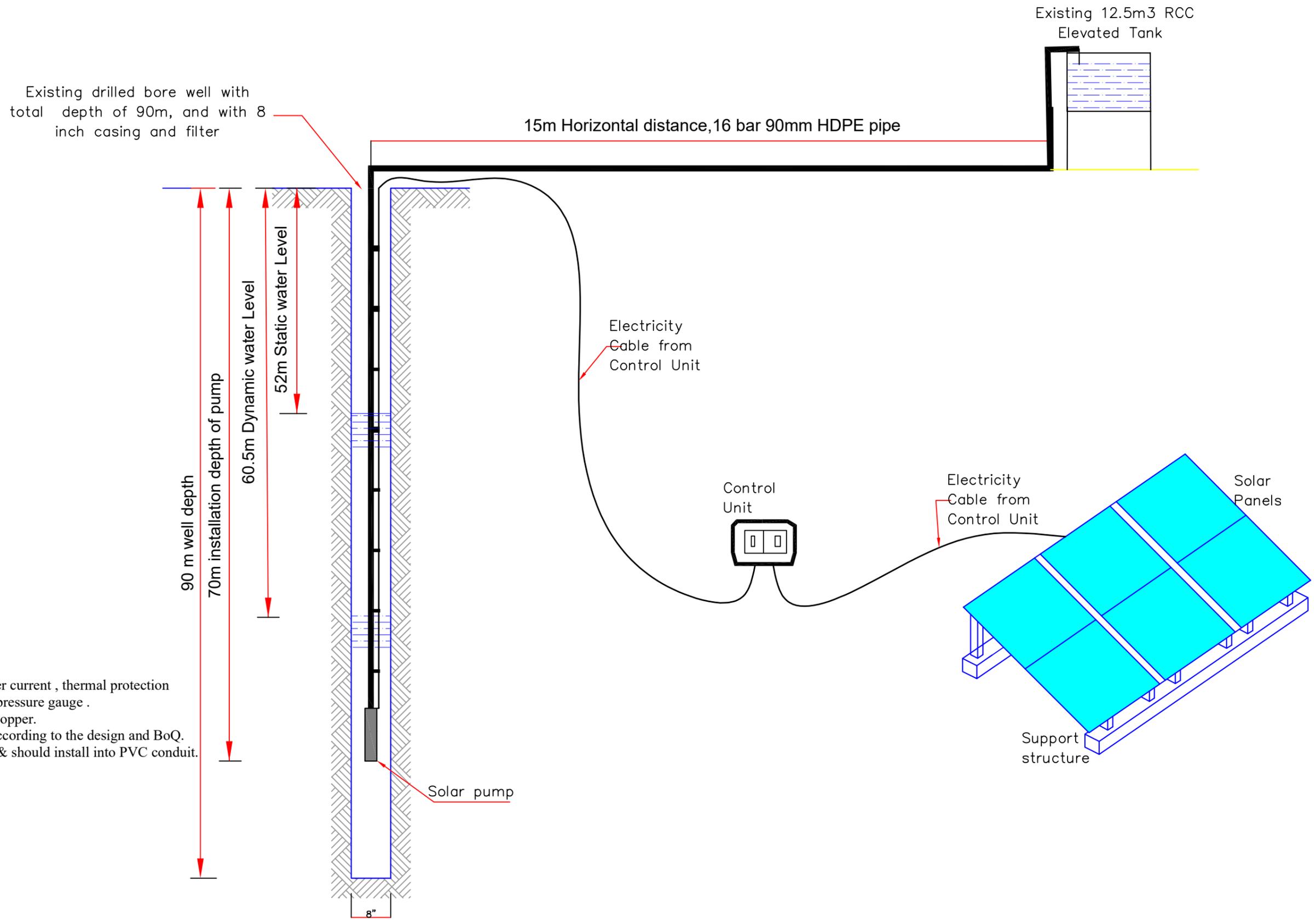
# Pipe -Trench Detail



Note: All dimension are in Cm.

|  |             |             |             |              |                    |            |          |                 |                   |               |              |  |  |
|--|-------------|-------------|-------------|--------------|--------------------|------------|----------|-----------------|-------------------|---------------|--------------|--|--|
| FUNDED BY:   | LDSCAU      | SURVEYED BY | WASH Team   | CHECKED BY   | Head of Department | SCALE      |          | SHEET NO<br>1/1 | PROVINCE          | Ningarhar     | PROJECT NAME | Rehabilitation of Water Supply Project | <br>International Medical Corps |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | WASH Team   | REVIEWED BY | WASH Advisor | DATE               | 01.09.2024 | DISTRICT |                 | Khogyana          | DRAWING TITLE | Pipe Trench  |  |  |
|  | DRAWN BY    | WASH Team   | APPROVED BY | WASH Advisor | DRAWING NO.        |            | VILLAGE  |                 | Chamtala block-24 |               |              |  |  |

# Typical Site plan for existing Water supply network



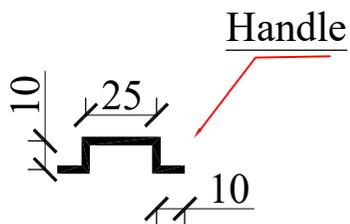
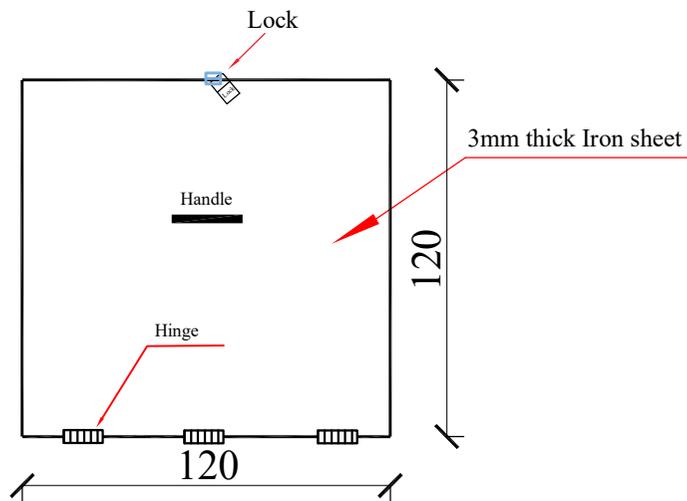
**Note:**

1. The control box must include over current , thermal protection connector for float switch or use pressure gauge .
2. Grounding Rod must be install copper.
3. Type of electrical cable should according to the design and BoQ.
4. Electrical Cable must be copper & should install into PVC conduit.

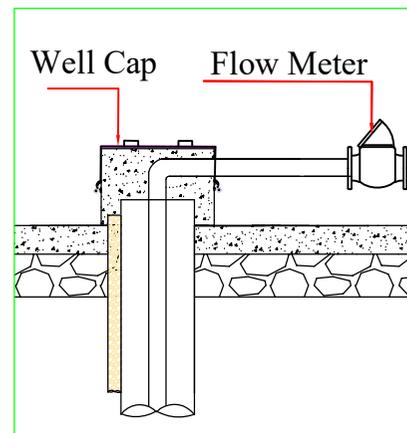
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| FUNDED BY:   | LDSCAU      | SURVEYED BY | WASH Team   | CHECKED BY   | Head of Department | SCALE      |          | SHEET NO. | PROVINCE          | Ningarhar                      | PROJECT NAME                           | International Medical Corps |
| INTERNATIONAL MEDICAL CORPS (IMC) PROGRAM DEPARTMENT WASH UNIT | DESIGNED BY | WASH Team   | REVIEWED BY | WASH Advisor | DATE               | 01.09.2024 | DISTRICT |           | Khogyana          | DRAWING TITLE                  | Rehabilitation of Water Supply Project |                             |
|  | DRAWN BY    | WASH Team   | APPROVED BY | WASH Advisor | DRAWING NO.        |            | VILLAGE  |           | Chamtala block-24 | Site plan of Solar pump system |  |                             |

# Plan of slab & View of Well to rehabilitate

Plan of slab 3mm Iron Sheet



View of well Cap



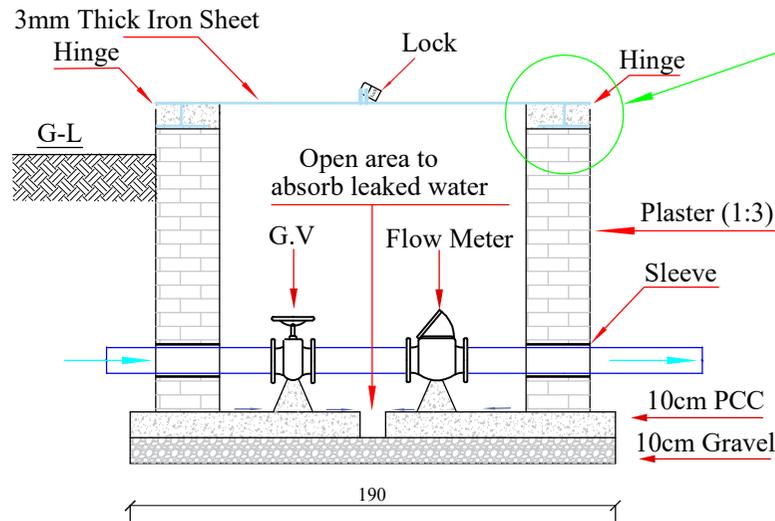
Note: All dimension are in Cm.

|  |             |               |               |              |                    |            |          |                 |                   |                            |              |  |
|--|-------------|---------------|---------------|--------------|--------------------|------------|----------|-----------------|-------------------|----------------------------|--------------|--|
| FUNDED BY:   | LDSCAU      | SURVEYED BY   | IMC WASH Team | CHECKED BY   | Head of Department | SCALE      |          | SHEET NO<br>1/1 | PROVINCE          | Ningarhar                  | PROJECT NAME | Rehabilitation of Water Supply Project |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | IMC WASH Team | REVIEWED BY   | WASH Advisor | DATE               | 01.09.2024 | DISTRICT |                 | Khogyana          | DRAWING TITLE              |              |  |
|  | DRAWN BY    | IMC WASH Team | APPROVED BY   | WASH Advisor | DRAWING NO.        |            | VILLAGE  |                 | Chamtala block-24 | Rehabilitation of well box |              |  |

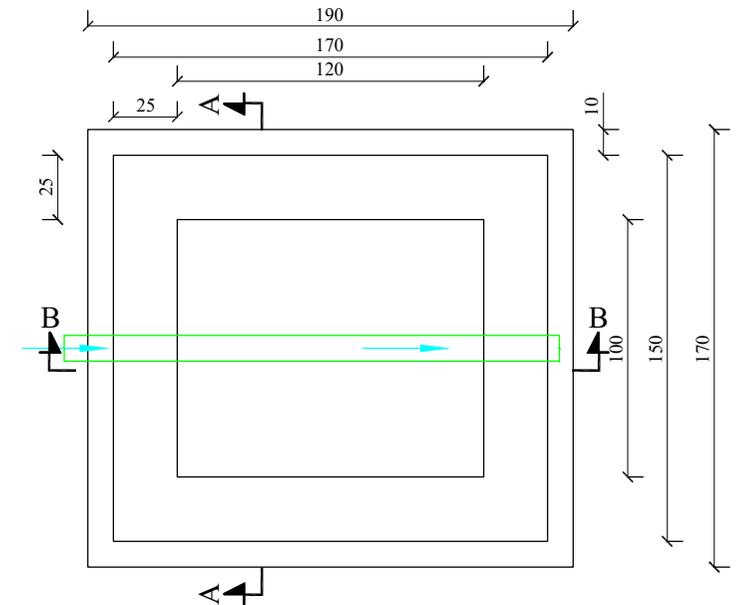


# Design and Details of Flow meter & Gate Valve Box

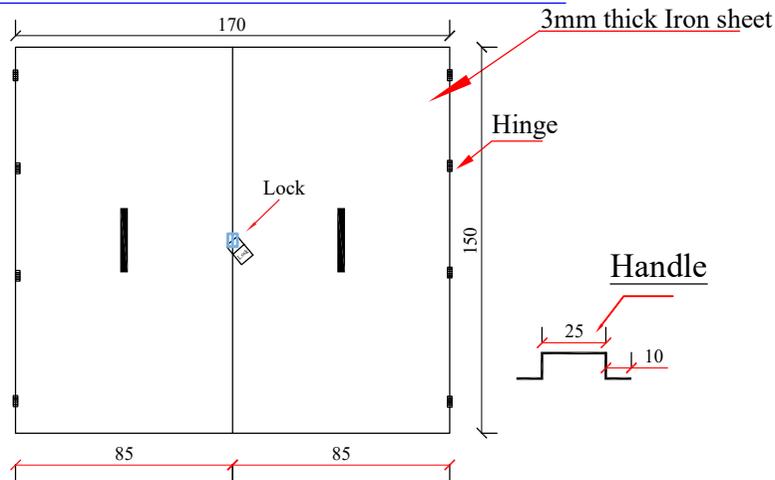
## Section B-B



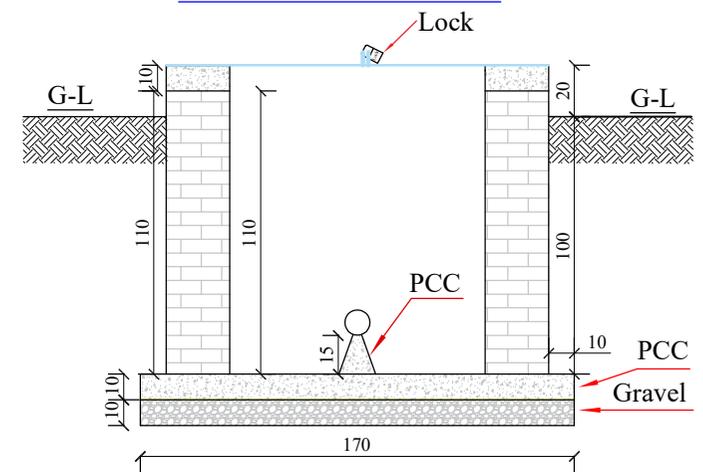
## Plan of G.V & Flow Meter Box



## Plan of slab 3mm Iron Sheet



## Section A-A

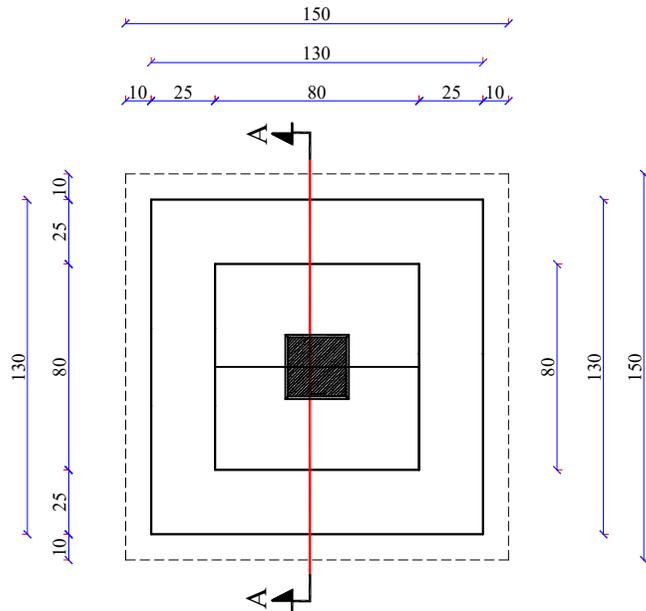


Note: All dimension are in Cm.

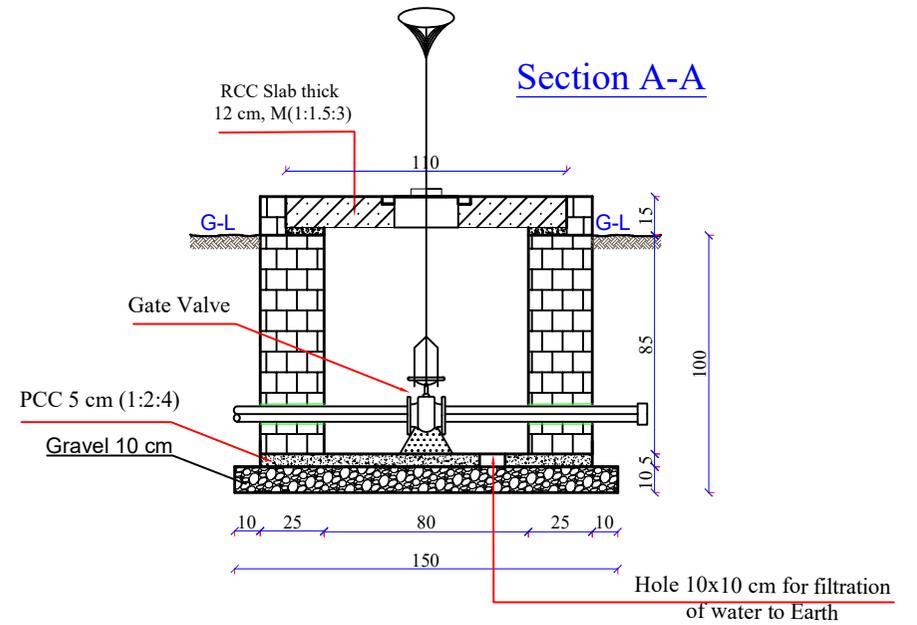
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|--|--------------|---------------|---------------|--------------|--------------------|------------|-----------|------------------|-------------------|----------------|-----------------------------|--|--|
| FUNDED BY:   | LDSCAU       | SURVEYED BY:  | IMC WASH Team | CHECKED BY:  | Head of Department | SCALE:     |           | SHEET NO.<br>1/1 | PROVINCE:         | Ninigarhar     | PROJECT NAME:               | Rehabilitation of Water Supply Project | <br>International Medical Corps |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY: | IMC WASH Team | REVIEWED BY:  | WASH Advisor | DATE:              | 01.09.2024 | DISTRICT: |                  | Khogyana          | DRAWING TITLE: | Flow Meter & Gate Valve Box |  |  |
|  | DRAWN BY:    | IMC WASH Team | APPROVED BY:  | WASH Advisor | DRAWING NO.:       |            | VILLAGE:  |                  | Chantal Block -24 |                |                             |  |  |

# Design and Details of Gate Valve Box

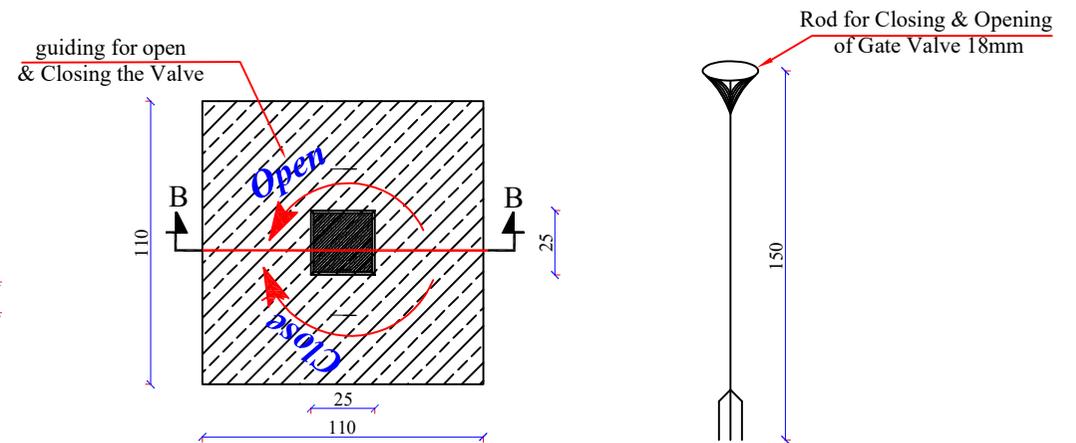
Plan of Gate Valve Box.



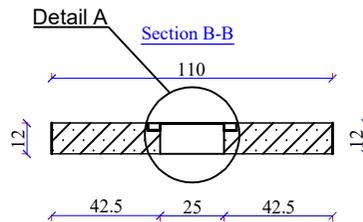
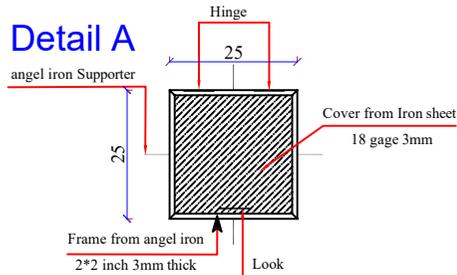
Section A-A



Plan of Slab



Detail A

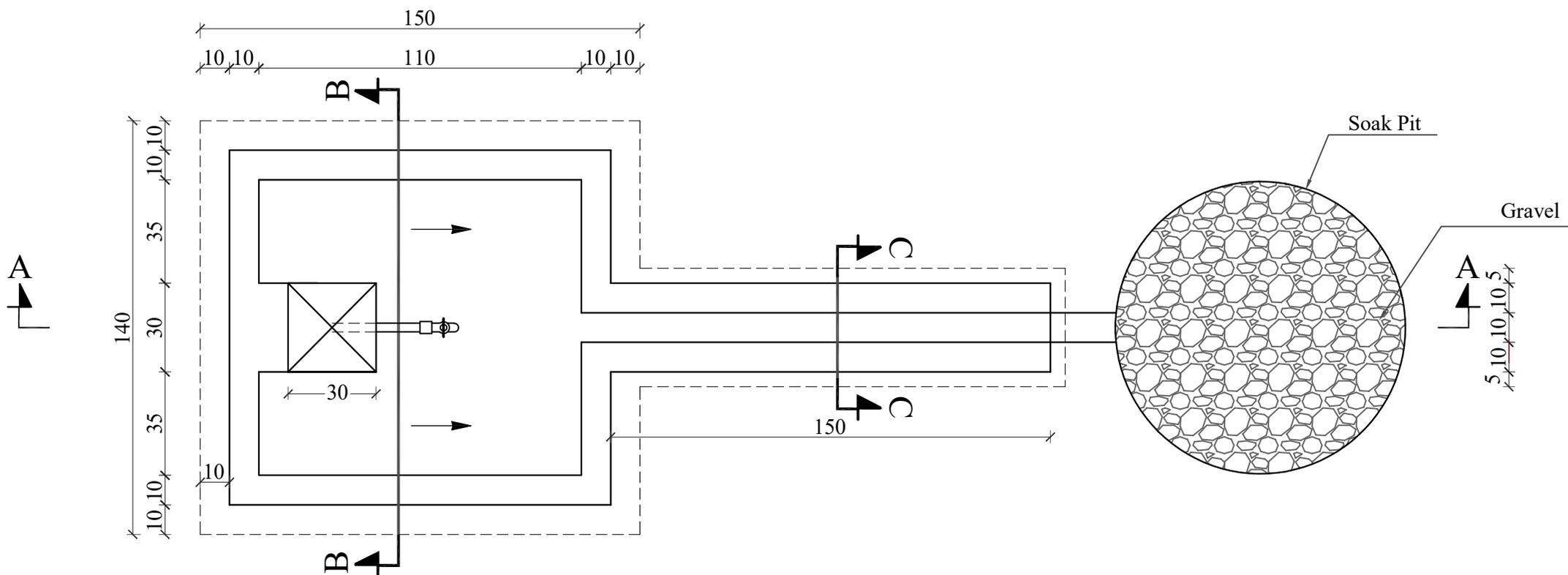


Note: All dimension are in Cm.

|  |             |               |               |              |                    |            |          |                  |                   |               |                |  |
|--|-------------|---------------|---------------|--------------|--------------------|------------|----------|------------------|-------------------|---------------|----------------|--|
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| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | IMC WASH Team | REVIEWED BY   | WASH Advisor | DATE               | 01.09.2024 | DISTRICT |                  | Khogyana          | DRAWING TITLE | Gate Valve Box |  |
|  | DRAWN BY    | IMC WASH Team | APPROVED BY   | WASH Advisor | DRAWING NO.        |            | VILLAGE  |                  | Chamtala-Block-24 |               |                |  |

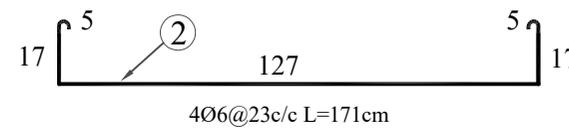
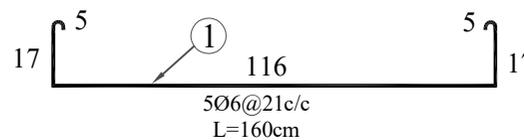
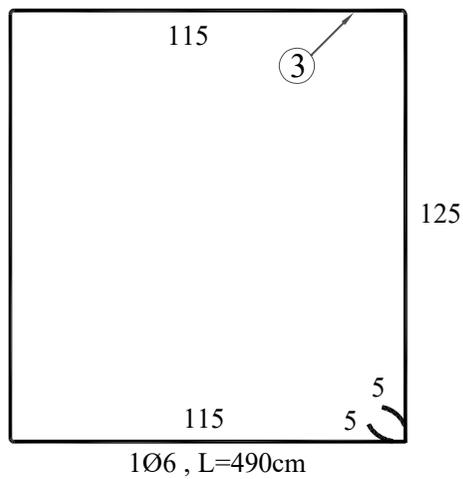
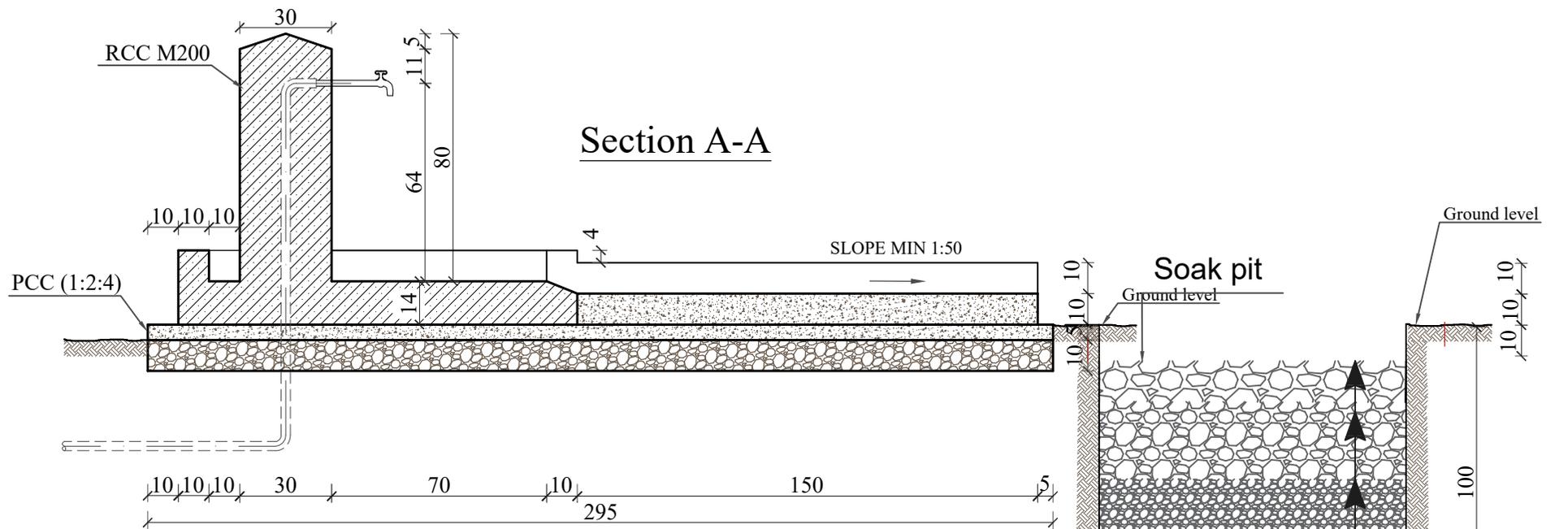


# Stand Tap



|  |             |             |             |              |                    |            |          |                  |                   |               |              |  |  |
|--|-------------|-------------|-------------|--------------|--------------------|------------|----------|------------------|-------------------|---------------|--------------|--|--|
| FUNDED BY:   | LDSCAU      | SURVEYED BY | WASH Team   | CHECKED BY   | Head of Department | SCALE      |          | SHEET NO.<br>1/3 | PROVINCE          | Ningarhar     | PROJECT NAME | Rehabilitation of Water Supply Project | <br>International Medical Corps |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY | WASH Team   | REVIEWED BY | WASH Advisor | DATE               | 01.09.2024 | DISTRICT |                  | Khogyana          | DRAWING TITLE | Stand post   |  |  |
|  | DRAWN BY    | WASH Team   | APPROVED BY | WASH Advisor | DRAWING NO.        |            | VILLAGE  |                  | Chamtala block-24 |               |              |  |  |





Gravel Size from 10 mm to 45 mm

|  |              |              |              |              |                    |            |           |                  |                   |                |               |  |   |
|--|--------------|--------------|--------------|--------------|--------------------|------------|-----------|------------------|-------------------|----------------|---------------|--|---|
| FUNDED BY:   | LDSCAU       | SURVEYED BY: | WASH Team    | CHECKED BY:  | Head of Department | SCALE:     |           | SHEET NO.<br>3/3 | PROVINCE:         | Ningarhar      | PROJECT NAME: | Rehabilitation of Water Supply Project |  |
| INTERNATIONAL MEDICAL CORPS (IMC)<br>PROGRAM DEPARTMENT<br>WASH UNIT | DESIGNED BY: | WASH Team    | REVIEWED BY: | WASH Advisor | DATE:              | 01.09.2024 | DISTRICT: |                  | Khogyana          | DRAWING TITLE: | Stand post    |  |   |
|  | DRAWN BY:    | WASH Team    | APPROVED BY: | WASH Advisor | DRAWING NO.:       |            | VILLAGE:  |                  | Chamtala block-24 |                |               |  |   |

IMC

Rehabilitation of Solar power Water Supply Network Project, Chamtala Block -24 Village, Khogyana District of Ningharhar Province

Pipe and Fitting Schedule

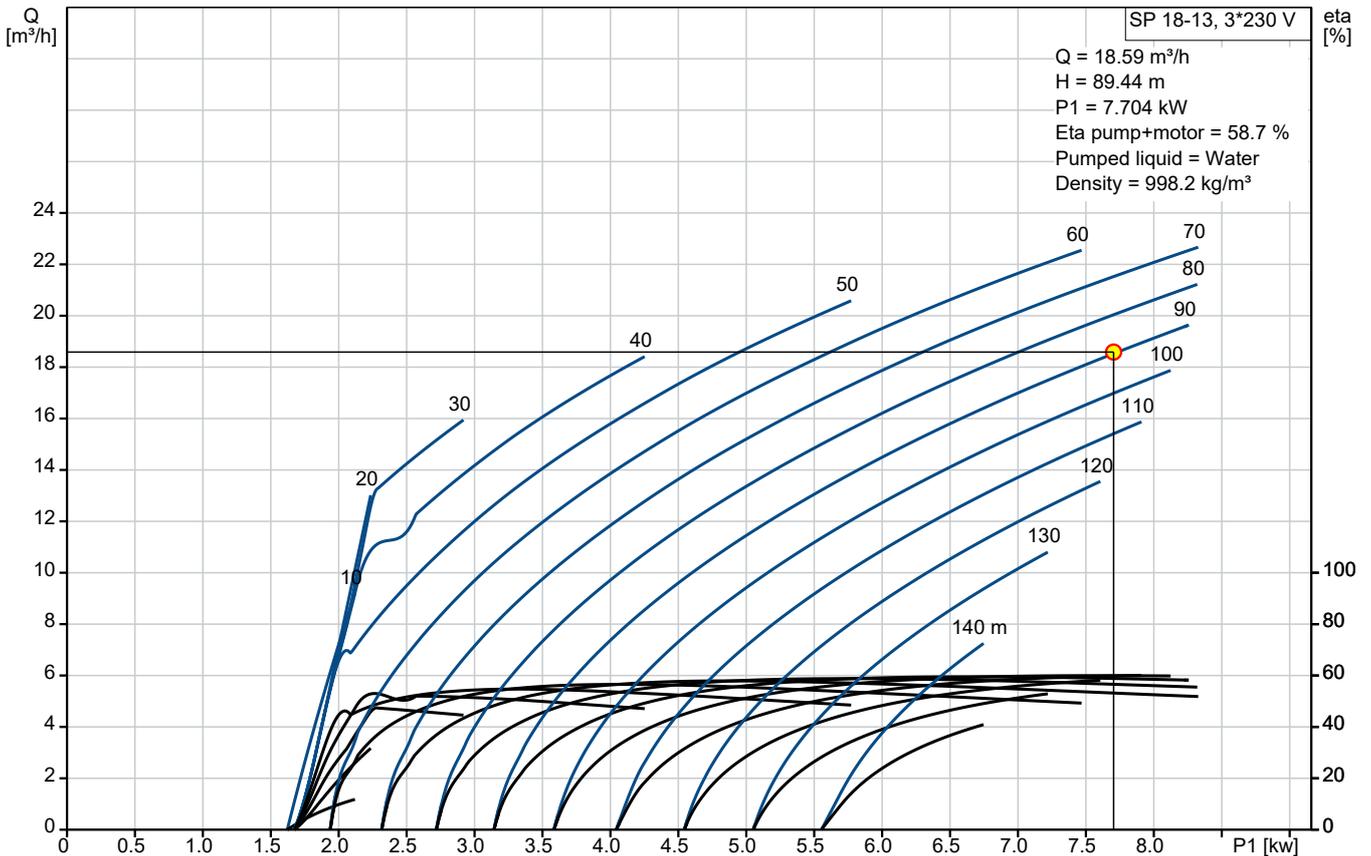
| Pipe   |            |                    |              | Fittings   |            |                  |                  |        |        |       |            |                      |             |            |              | Remarks                  |
|--|------------|--------------------|--------------|------------|------------|------------------|------------------|--------|--------|-------|------------|----------------------|-------------|------------|--------------|--------------------------|
| Location   | Length (m) | Diameter (inch/mm) | Type of pipe | Gate Valve | Flow Meter | Non-Return Valve | Straight Coupler | Socket | Nipple | Union | Elbow/Bend | Reducer              | Tee         | MTA        | Saddle Clamp |                          |
| Main line (from well to Reservoir) and distribution system |            |                    |              |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
| Well -G.L  | 70         | 90                 | PE16 bar     |            |            |                  |                  |        |        |       | 1          |                      |             |            |              | 1 No paddle flange       |
| GL-EL-Tank   | 15         | 90                 | PE16 bar     |            |            | (3")1            |                  | 2      | 2      |       |            |                      |             |            |              |                          |
|  | 15         | 3"                 | GI           |            | (3")1      |                  |                  | 2      | 2      | 2     | 2          |                      |             | (90x3")1   |              | Inlet pipe of Reservoir  |
| El-Tank-J1   | 13         | 4"                 | GI           |            |            |                  |                  |        |        |       |            |                      |             |            |              | Outlet pipe of Reservoir |
|  | 40         | 110                | PE10 bar     | (4")1      | (4")1      |                  |                  | 2      | 2      |       | 2          |                      | (75x63x75)1 | (110x4")1  |              |                          |
| J1-J2  | 73         | 50                 | PE10 bar     | (1 1/2")1  |            |                  |                  |        | 2      |       |            | (75x50)1<br>(50x40)1 | (40x32x40)1 |            |              |                          |
| J2-STP1  | 22         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      | (40x32x40)1 |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       | 2          |                      |             | (25x3/4")1 |              |                          |
| J2-J3  | 68         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |                      | (40x32x40)1 |            |              |                          |
| J3-STP2  | 16         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |                      |             | (25x3/4")1 |              |                          |
| J3-J4  | 85         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |                      | (40x32x40)1 |            |              | End Cup 40mm             |
| J4-STP3  | 11         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |                      |             | (25x3/4")1 |              |                          |
| J1-J5  | 43         | 40                 | PE10 bar     | (1 1/4")1  |            |                  |                  |        | 2      |       |            |                      | (40X32X40)1 |            | (75x40)1     |                          |
| J5-STP4  | 14         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |                      |             | (25x3/4")1 |              |                          |
| J5-J6  | 60         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |                      | (40X32X40)1 |            |              |                          |
| J6-STP5  | 14         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |                      |             | (25x3/4")1 |              |                          |
| J6-J7  | 59         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |                      | (40x32x40)1 |            |              | End Cup 40mm             |
| J7-STP6  | 18         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |
|  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |                      |             | (25x3/4")1 |              |                          |
| J1-J8  | 88         | 75                 | PE10 bar     | (2 1/2")1  |            |                  |                  |        | 2      |       |            |                      | (75x50x75)1 |            |              |                          |
| J8-J9  | 17         | 75                 | PE10 bar     |            |            |                  |                  |        |        |       |            |                      | (75x63x75)1 |            |              |                          |
| J9-J10   | 46         | 40                 | PE10 bar     | (1 1/4")1  |            |                  |                  |        | 2      |       |            |                      | (40x32x40)1 | (75x40)1   |              |                          |
| J10-STP-7  | 5          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |                      |             |            |              |                          |

| Pipe       |            |                    |              | Fittings   |            |                  |                  |        |        |       |            |          |             |                     |              | Remarks      |
|------------|------------|--------------------|--------------|------------|------------|------------------|------------------|--------|--------|-------|------------|----------|-------------|---------------------|--------------|--------------|
| Location   | Length (m) | Diameter (inch/mm) | Type of pipe | Gate Valve | Flow Meter | Non-Return Valve | Straight Coupler | Socket | Nipple | Union | Elbow/Bend | Reducer  | Tee         | MTA                 | Saddle Clamp |              |
| J10-STP-7  | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J10-J11    | 58         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              |              |
| J11-STP-8  | 4          | 32                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J11-J12    | 93         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              | End Cup 40mm |
| J12-STP-9  | 10         | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J8-J13     | 52         | 50                 | PE10 bar     | (2 1/2)"1  |            |                  |                  |        | 2      |       |            |          | (40x32x40)1 | (63x50)1<br>(50x40) |              |              |
| J13-STP-10 | 8          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J13-J14    | 53         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              |              |
| J14-STP-11 | 8          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J14-J15    | 39         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              | End Cup 40mm |
| J15-STP-12 | 8          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            | (63x50)1 | (50x40x50)1 |                     |              |              |
| J9-J16     | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
|            | 74         | 63                 | PE10 bar     | (2)"1      |            |                  |                  |        | 2      |       |            |          | (63x40x63)1 |                     |              |              |
| J16-J17    | 58         | 40                 | PE10 bar     | (1 1/4)"1  |            |                  |                  |        | 2      |       |            |          | (63x40x63)1 |                     |              |              |
| J17-STP-13 | 5          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J17-J18    | 65         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              |              |
| J18-STP-14 | 8          | 32                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J18-J19    | 58         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              | End Cup 40mm |
| J19-STP-15 | 7          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J16-J20    | 66         | 63                 | PE10 bar     | (2)"1      |            |                  |                  |        | 2      |       |            |          | (63x40x63)1 |                     |              |              |
| J20-J21    | 68         | 40                 | PE10 bar     | (1 1/4)"1  |            |                  |                  |        | 2      |       |            |          | (40x32x40)1 |                     |              |              |
| J21-STP-16 | 8          | 32                 | PE16 bar     |            |            |                  |                  |        |        |       |            |          |             |                     |              |              |
|            | 3          | 3/4"               | GI           | (3/4)"1    |            |                  |                  | 2      | 2      |       |            |          |             | (25x3/4)"1          |              |              |
| J21-J22    | 81         | 40                 | PE10 bar     |            |            |                  |                  |        |        |       |            |          | (40x32x40)1 |                     |              | End Cup 40mm |

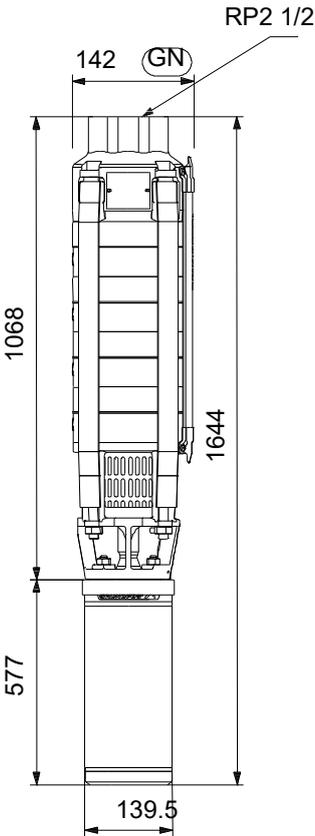


Note! Product picture may differ from actual product

| Conditions of Service | Pump Data  | Motor Data   |
|-----------------------|--|--|
| Liquid: Water         | Liquid temperature range: -15 .. 40 °C<br>Product number: 92951980 | Rated power - P2: 7.5 kW<br>Rated voltage: 220-230 V<br>Mains frequency: 50 Hz<br>Enclosure class: IP68<br>Insulation class: F<br>Motor protection: NONE<br>Thermal protection: EXT.<br>Motor type: MS6000 |



# Submittal Data



- Materials:**
- Impeller: Stainless steel
  - Impeller: AISI 304
  - Impeller: EN 1.4301
  - Motor: Stainless steel
  - Motor: DIN W.-Nr. 1.4301
  - Motor: AISI 304

Qty. Description

1 SP 18-13



Note! Product picture may differ from actual product

Product No.: [92951980](#)

Submersible borehole pump, suitable for pumping clean water. Can be installed vertically or horizontally. All steel components are made in stainless steel, EN 1.4301 (AISI 304), that ensures high corrosive resistance. This pump carries drinking water approval.

The pump is fitted with a 7.5 kW MS6000 motor with sand shield, mechanical shaft seal, water-lubricated journal bearings and a volume compensating diaphragm. The motor is a canned type submersible motor offering good mechanical stability and high efficiency.

The motor is for direct-on-line starting (DOL).

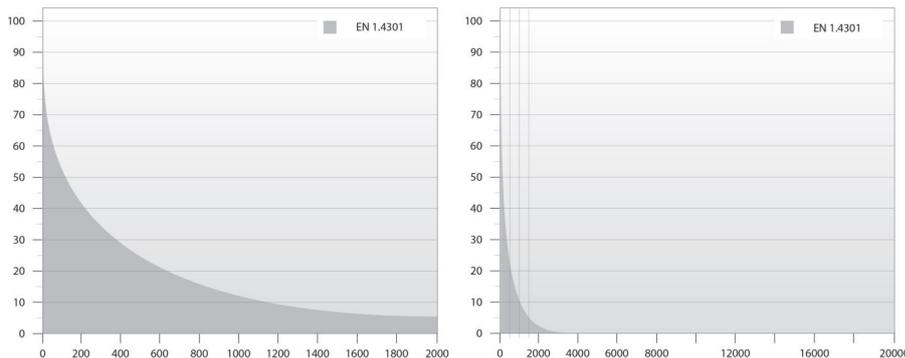
### Further product details

The pump is suitable for applications similar to the following:

- raw-water supply
- irrigation
- groundwater lowering
- pressure boosting
- fountain applications.

### Pump

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).



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.

The shaft seal faces are ceramic/carbon. The material combination provides good dry-running resistance. Together with the shaft seal housing, the sand shield forms a labyrinth seal, which during normal operating conditions prevents penetration of sand particles into the shaft seal.

The motor can be fitted with a Pt100 or Pt1000 sensor that together with a control unit ensures that the maximum operating temperature conditions are not exceeded.

| Qty. | Description   |
|------|---|
| 1    | <p>Liquid:<br/>Pumped liquid: Water<br/>Liquid temperature range: -15 .. 40 °C</p> <p>Technical:<br/>Pump speed on which pump data are based: 2900 rpm<br/>Rated flow: 18 m³/h<br/>Rated head: 99 m<br/>Shaft seal for motor: CER/CARNBR<br/>Approvals: CE,EAC,UKCA,SEPRO,MOROCCO<br/>Approvals for drinking water: ACS,DM174<br/>Curve tolerance: ISO9906:2012 3B<br/>Motor version: T40<br/>Return valve: YES</p> <p>Materials:<br/>Pump: Stainless steel<br/>EN 1.4301<br/>AISI 304<br/>Impeller: Stainless steel<br/>EN 1.4301<br/>AISI 304<br/>Motor: Stainless steel<br/>DIN W.-Nr. 1.4301<br/>AISI 304</p> <p>Installation:<br/>Maximum ambient pressure: 60 bar<br/>Maximum operating pressure: 60 bar<br/>Maximum outlet pressure: 14.4 bar<br/>Type of connection: Rp<br/>Size of connection: 2 1/2 inch<br/>Motor diameter: 6 inch<br/>Minimum borehole diameter: 145 mm</p> <p>Electrical data:<br/>Motor type: MS6000<br/>Motor flange design: Grundfos<br/>Rated power - P2: 7.5 kW<br/>Power (P2) required by pump: 7.5 kW<br/>Mains frequency: 50 Hz<br/>Rated voltage: 3 x 220-230 V<br/>Rated current: 31.0 A<br/>Starting current: 500-530 %<br/>Cos phi - power factor: 0.82-0.79<br/>Rated speed: 2870-2880 rpm<br/>Start. method: DOL<br/>Enclosure class (IEC 34-5): IP68<br/>Insulation class (IEC 85): F<br/>Built-in temp. transmitter: N<br/>Length of cable: 5 m<br/>Power cable type: FLAT<br/>Motor No: 78104512<br/>Windings: Enamelled</p> <p>Others:<br/>Minimum efficiency index, MEI ≥: 0.70<br/>Net weight: 61.6 kg</p> |



Company name:

Created by:

Phone:

Date: 27/08/2024

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

|   |                                       |
|---|---------------------------------------|
| 1 | Gross weight: 91.3 kg                 |
|   | Shipping volume: 0.232 m <sup>3</sup> |
|   | Environmental approvals: WEEE         |

Qty. Description

1 RSI 3x208-240V IP66 7.5kW 31A



Note! Product picture may differ from actual product

Product No.: [99090637](#)

Renewable Solar Inverter RSI is an off-grid solar inverter to enable end-user to use solar power for a wide range of water applications.

RSI is customized specifically to be compatible with Grundfos pumps.

With the built-in MPPT and various protection software, it delivers an efficient and reliable solar system solution.

- 3-phase 208V, 380V or 440V
- Quick setup wizard
- Preconfigured inputs
- Build-in MPPT (Maximum power point tracking)
- AC and DC power source compatible
- Solar solution for up to 250kW

RSI offers the following inputs and output:

- RS-485 Modbus RTU/TCP
- 6 Digital inputs, preconfigured for solar application
- 2 Signal relays, RUN/FAULT

Liquid:

Pumped liquid: Water

Technical:

Approvals and markings: CE

Installation:

Range of ambient temperature: -10 .. 60 °C

Relative humidity: 100 %

Electrical data:

Rated power - P2: 7.5 kW

Mains frequency: 50 / 60 Hz

Rated voltage: 3 x 208 - 240 V

Enclosure class (IEC 34-5): IP66

Rated voltage output AC: 220 V

Voltage input DC: 400 V

Rated current output AC: 31 A

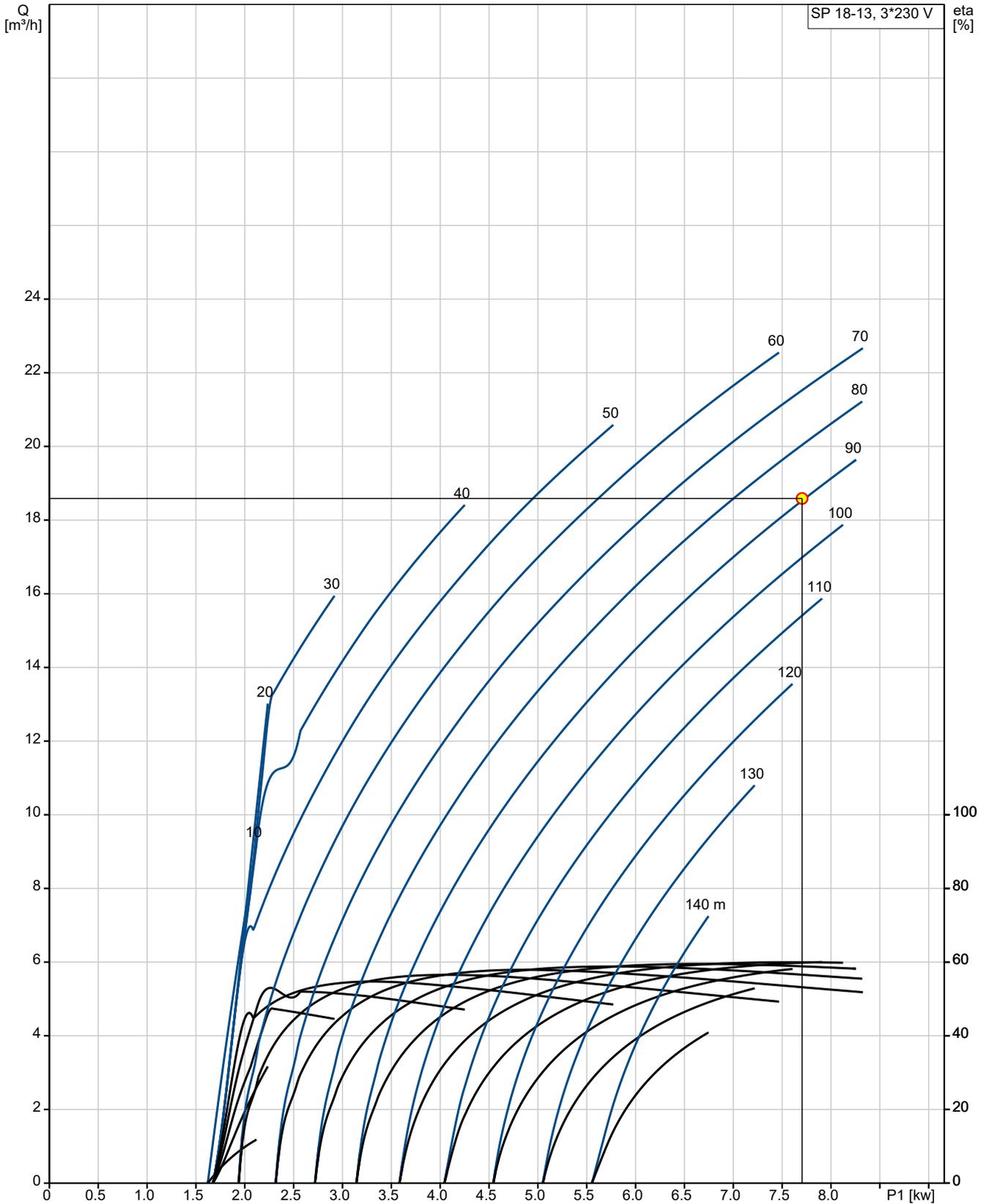
Udc: 230 V

Others:

Net weight: 14.9 kg

Gross weight: 16.3 kg

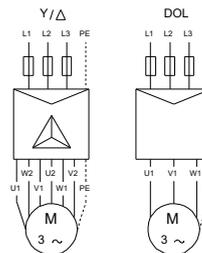
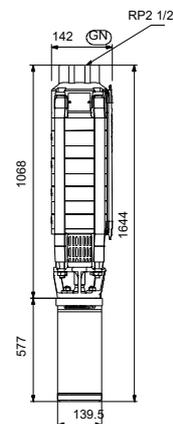
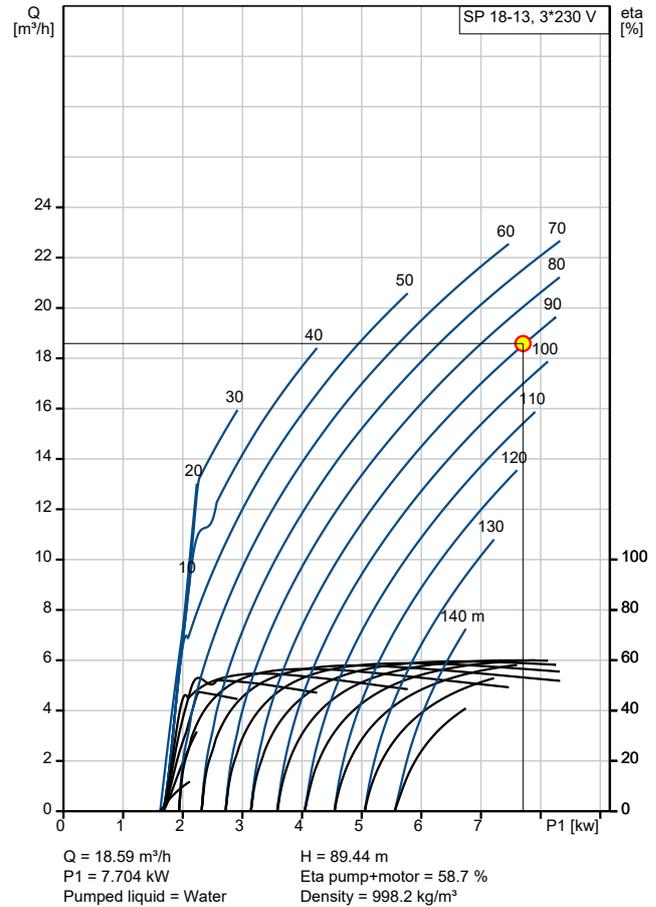
### 92951980 SP 18-13



Q = 18.59 m³/h  
P1 = 7.704 kW  
Pumped liquid = Water

H = 89.44 m  
Eta pump+motor = 58.7 %  
Density = 998.2 kg/m³

| Description                              | Value                      |
|--|----------------------------|
| <b>General information:</b>              |                            |
| Product name:                            | SP 18-13                   |
| Product No:                              | 92951980                   |
| EAN number:                              | 5715122068313              |
| <b>Technical:</b>                        |                            |
| Pump speed on which pump data are based: | 2900 rpm                   |
| Rated flow:                              | 18 m <sup>3</sup> /h       |
| Rated head:                              | 99 m                       |
| Stages:                                  | 13                         |
| Number of reduced-diameter impellers:    | NONE                       |
| Shaft seal for motor:                    | CER/CARNBR                 |
| Approvals:                               | CE,EAC,UKCA,SEPRO,MOR OCCO |
| Approvals for drinking water:            | ACS,DM174                  |
| Curve tolerance:                         | ISO9906:2012 3B            |
| Model:                                   | A                          |
| Motor version:                           | T40                        |
| Return valve:                            | YES                        |
| <b>Materials:</b>                        |                            |
| Pump:                                    | Stainless steel            |
| Pump:                                    | EN 1.4301                  |
| Pump:                                    | AISI 304                   |
| Impeller:                                | Stainless steel            |
| Impeller:                                | EN 1.4301                  |
| Impeller:                                | AISI 304                   |
| Motor:                                   | Stainless steel            |
| Motor:                                   | DIN W.-Nr. 1.4301          |
| Motor:                                   | AISI 304                   |
| <b>Installation:</b>                     |                            |
| Maximum ambient pressure:                | 60 bar                     |
| Maximum operating pressure:              | 60 bar                     |
| Maximum outlet pressure:                 | 14.4 bar                   |
| Type of connection:                      | Rp                         |
| Size of connection:                      | 2 1/2 inch                 |
| Motor diameter:                          | 6 inch                     |
| Minimum borehole diameter:               | 145 mm                     |
| <b>Liquid:</b>                           |                            |
| Pumped liquid:                           | Water                      |
| Liquid temperature range:                | -15 .. 40 °C               |
| <b>Electrical data:</b>                  |                            |
| Motor type:                              | MS6000                     |
| Motor flange design:                     | Grundfos                   |
| Rated power - P2:                        | 7.5 kW                     |
| Power (P2) required by pump:             | 7.5 kW                     |
| Mains frequency:                         | 50 Hz                      |
| Rated voltage:                           | 3 x 220-230 V              |
| Rated current:                           | 31.0 A                     |
| Starting current:                        | 500-530 %                  |
| Cos phi - power factor:                  | 0.82-0.79                  |
| Rated speed:                             | 2870-2880 rpm              |
| Start. method:                           | DOL                        |
| Enclosure class (IEC 34-5):              | IP68                       |
| Insulation class (IEC 85):               | F                          |
| Built-in motor protection:               | NONE                       |
| Thermal protec:                          | EXT.                       |
| Built-in temp. transmitter:              | N                          |
| Length of cable:                         | 5 m                        |



|        |       |
|--------|-------|
| U1, W2 | Brown |
| V1, U2 | Black |
| W1, V2 | Grey  |



Company name:

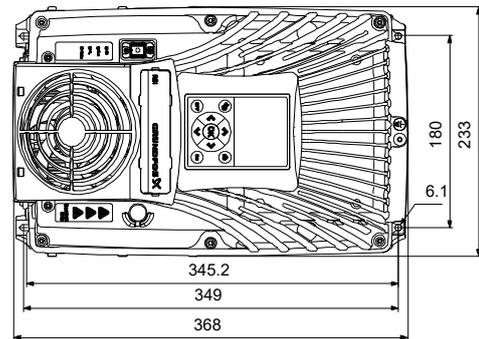
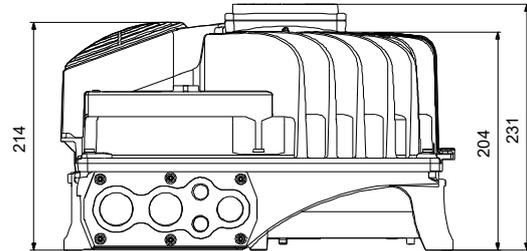
Created by:

Phone:

Date: 27/08/2024

| Description                            | Value                |
|--|----------------------|
| Power cable type:                      | FLAT                 |
| Motor No:                              | 78104512             |
| Cable number:                          | 96164209             |
| Windings:                              | Enamelled            |
| <b>Others:</b>                         |                      |
| Minimum efficiency index, MEI $\geq$ : | 0.70                 |
| Net weight:                            | 61.6 kg              |
| Gross weight:                          | 91.3 kg              |
| Shipping volume:                       | 0.232 m <sup>3</sup> |
| Environmental approvals:               | WEEE                 |

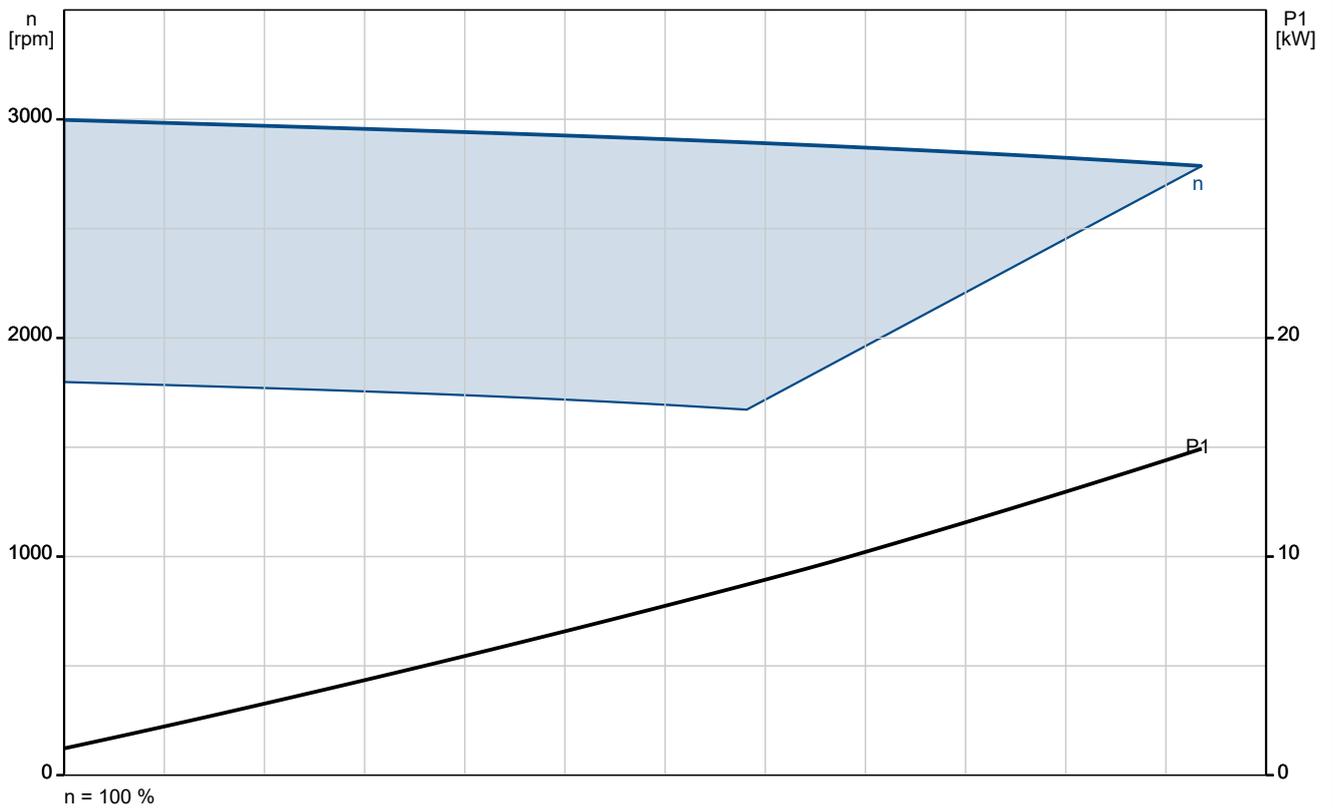
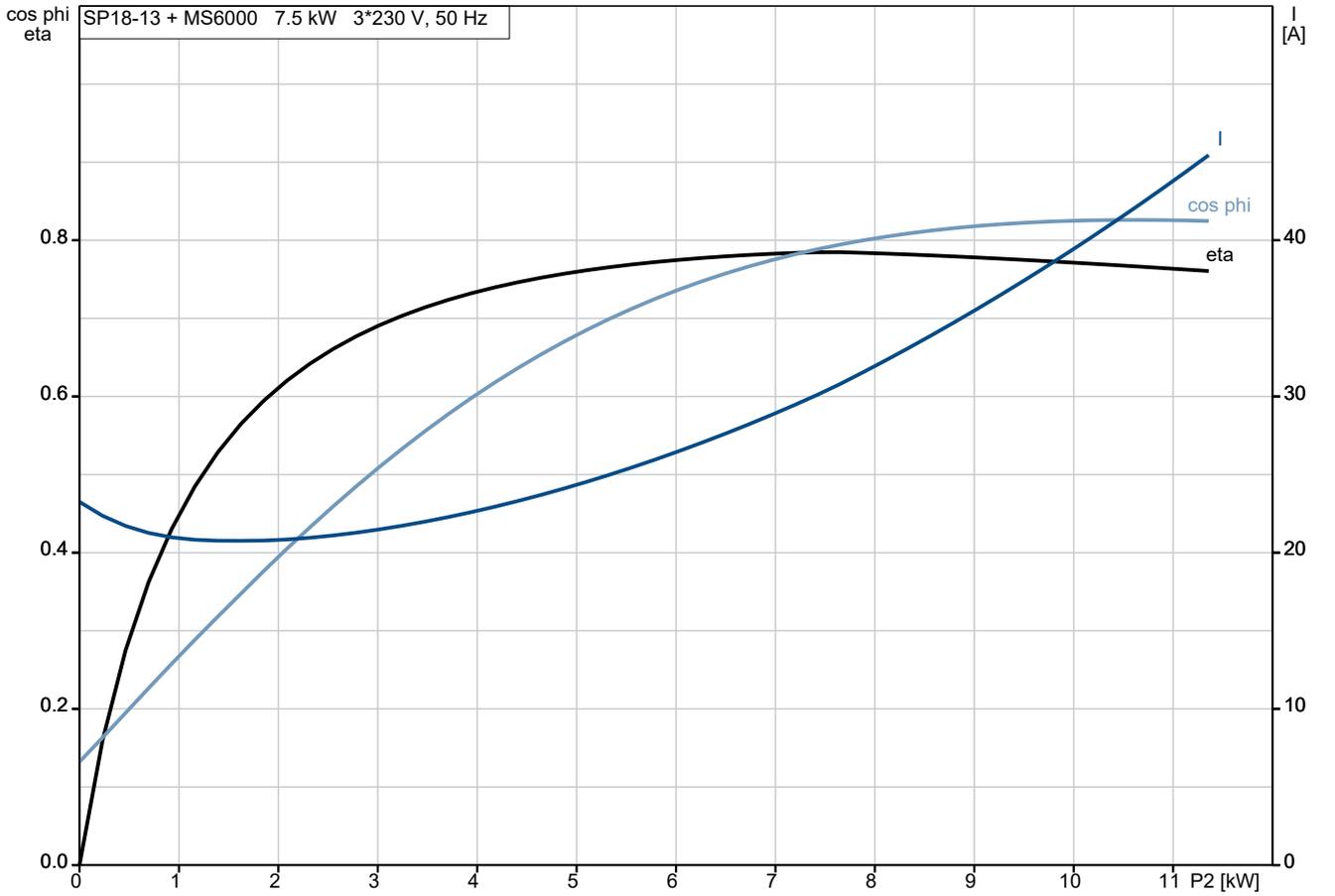
| Description                   | Value                         |
|-------------------------------|-------------------------------|
| <b>General information:</b>   |                               |
| Product name:                 | RSI 3x208-240V IP66 7.5kW 31A |
| Product No:                   | <a href="#">99090637</a>      |
| EAN number:                   | 5712606580453                 |
| <b>Technical:</b>             |                               |
| Approvals and markings:       | CE                            |
| <b>Installation:</b>          |                               |
| Range of ambient temperature: | -10 .. 60 °C                  |
| Relative humidity:            | 100 %                         |
| <b>Liquid:</b>                |                               |
| Pumped liquid:                | Water                         |
| <b>Electrical data:</b>       |                               |
| Rated power - P2:             | 7.5 kW                        |
| Mains frequency:              | 50 / 60 Hz                    |
| Rated voltage:                | 3 x 208 - 240 V               |
| Enclosure class (IEC 34-5):   | IP66                          |
| Rated voltage output AC:      | 220 V                         |
| Voltage input DC:             | 400 V                         |
| Rated current output AC:      | 31 A                          |
| Udc:                          | 230 V                         |
| <b>Others:</b>                |                               |
| Net weight:                   | 14.9 kg                       |
| Gross weight:                 | 16.3 kg                       |



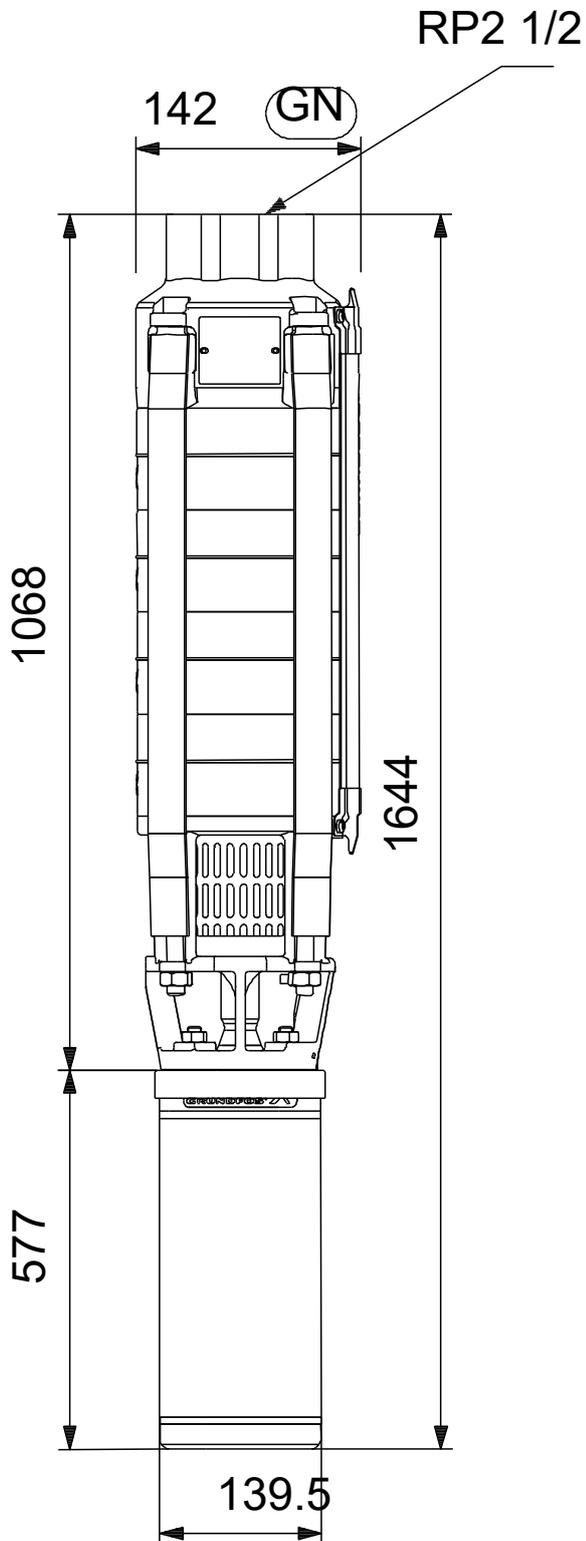
| Description                 | Value                           |
|-----------------------------|---------------------------------|
| <b>General information:</b> |                                 |
| Product name:               | OTDCP16, Circuit Breaker, 16Amp |
| Product No:                 | <a href="#">98341686</a>        |
| EAN number:                 | 5711493289296                   |

| Description                 | Value                              |
|-----------------------------|------------------------------------|
| <b>General information:</b> |                                    |
| Product name:               | OVR PV 40-1000 P, Surge Protection |
| Product No:                 | <a href="#">98341687</a>           |
| EAN number:                 | 5711493289302                      |

### 92951980 SP 18-13

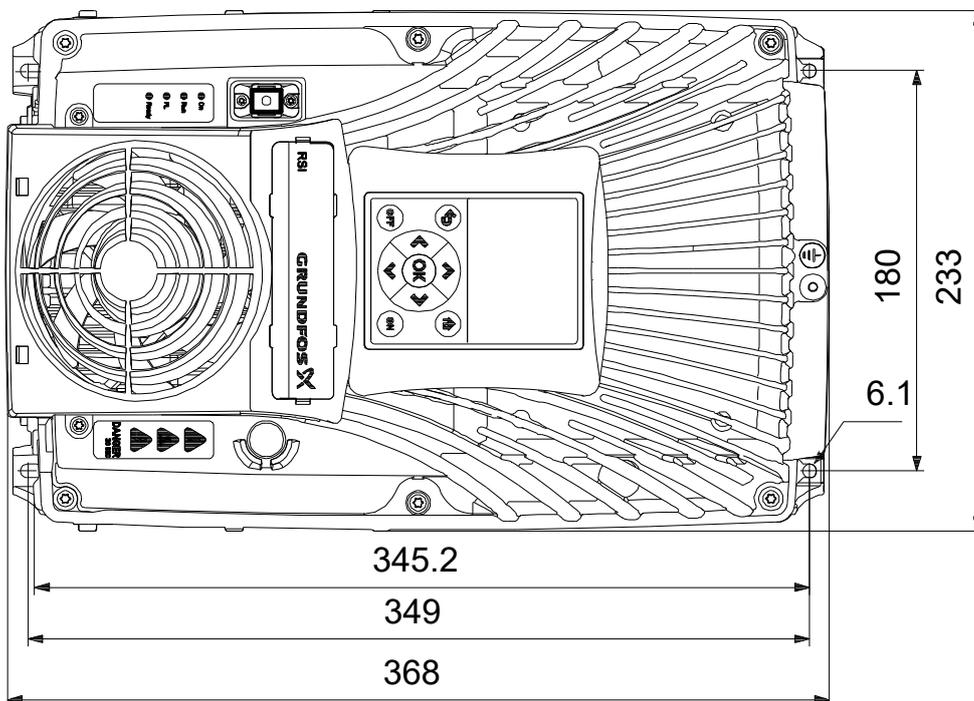
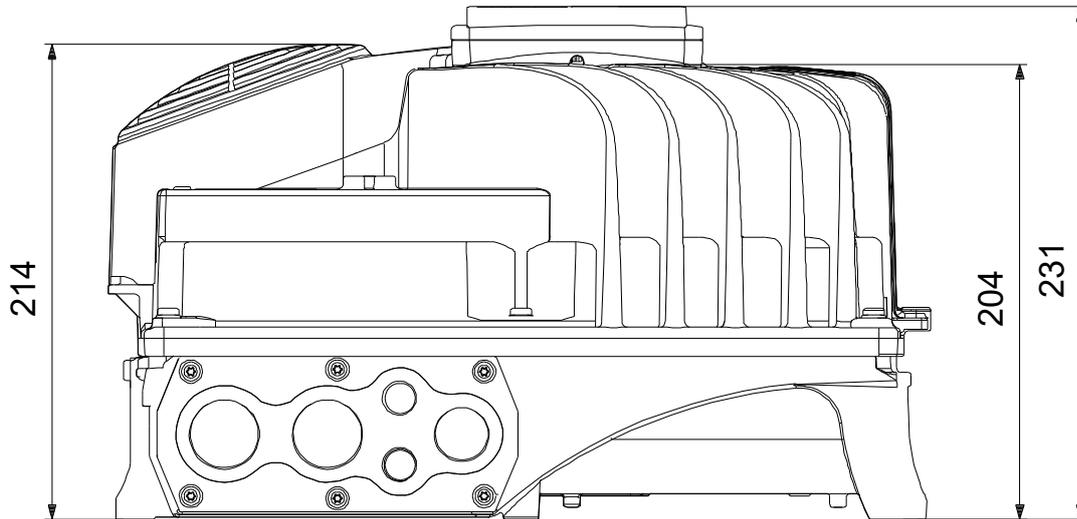


**92951980 SP 18-13**



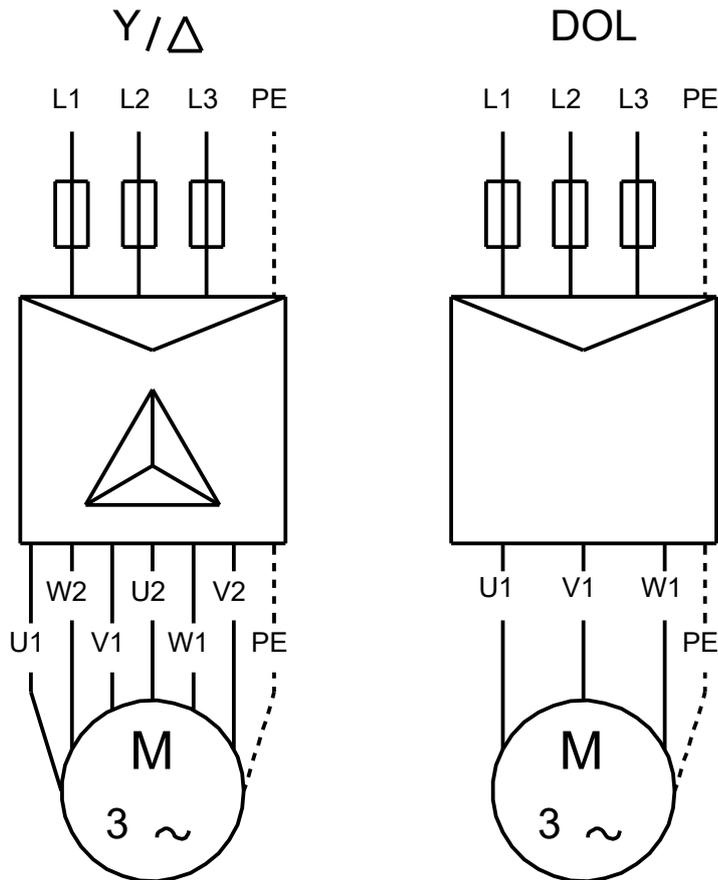
Note! All units are in [mm] unless others are stated.  
Disclaimer: This simplified dimensional drawing does not show all details.

**99090637 RSI 3x208-240V IP66 7.5kW 31A**



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

92951980 SP 18-13



|        |       |
|--------|-------|
| U1, W2 | Brown |
| V1, U2 | Black |
| W1, V2 | Grey  |

## 92951980 SP 18-13

### Input - summary

Water volume (max): 116 m<sup>3</sup>/day  
 Month for sizing: July  
 Static lift above ground: 16 m  
 Dynamic water level: 70 m  
 Sun tracking: No (fixed)  
 Location: مینای گوخ, Nangarhar, Afghanistan  
 Latitude: 56.3859 DD, Longitude: 70.183912 DD

### Products

Pump: SP 18-13, 1 x 92951980  
 Solar module: 28 x NN 390W  
 Switch box / control unit: RSI 3x208-240V IP66 7.5kW 31A, 1 x 99090637  
 Switch box / control unit: OTDCP16, Circuit Breaker, 16Amp, 4 x 98341686  
 Switch box / control unit: OVR PV 40-1000 P, Surge Protection, 1 x 98341687

### Sizing results - summary

#### Water production, Peak flow and Price

Total water production per year: 34300 m<sup>3</sup>  
 Avg. water production per day: 93.9 m<sup>3</sup>/day  
 Average water production per watt per day: 8.6 l/Wp/day

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

Flow: 18.6 m<sup>3</sup>/h  
 Total head: 89.4 m

#### Solar module configuration:

Number of solar modules in series: 7, in parallel: 4  
 Solar array rated power: 10.92 kW  
 Solar array rated volts: 286 V  
 Sun tracking: No (fixed)  
 Tilt angle: 55 deg.

#### Cables and pipes:

Pump cable length: 100 m  
 Pump cable size: 25 mm<sup>2</sup>  
 Total cable loss: 1.7 %

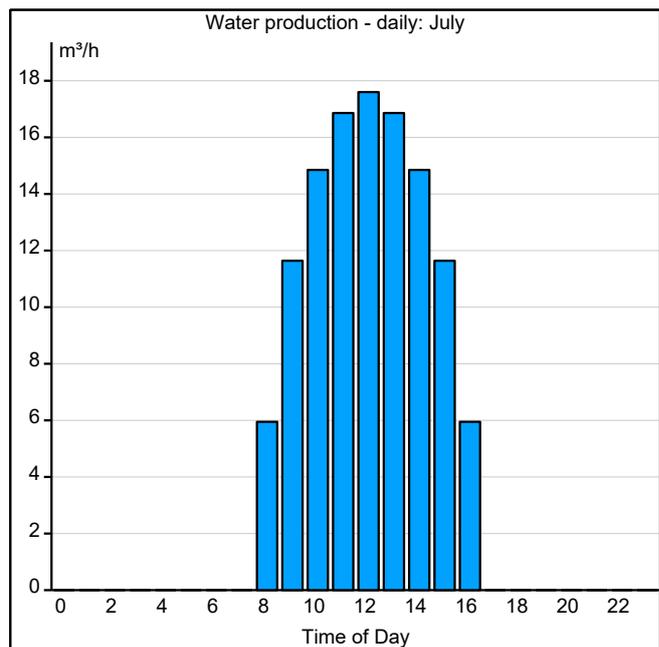
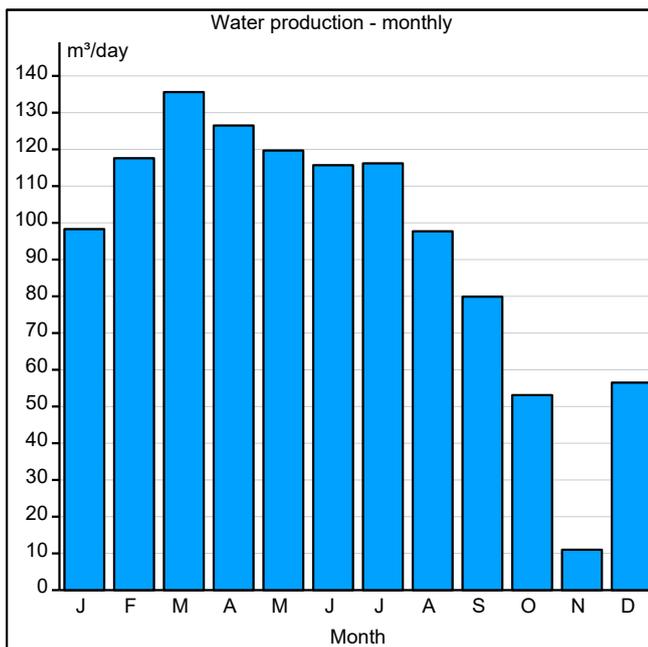
#### Material, riser pipe: PEH

Pipe length of riser pipe: 70 m  
 Friction losses: 3.436 m

### System performance - monthly average

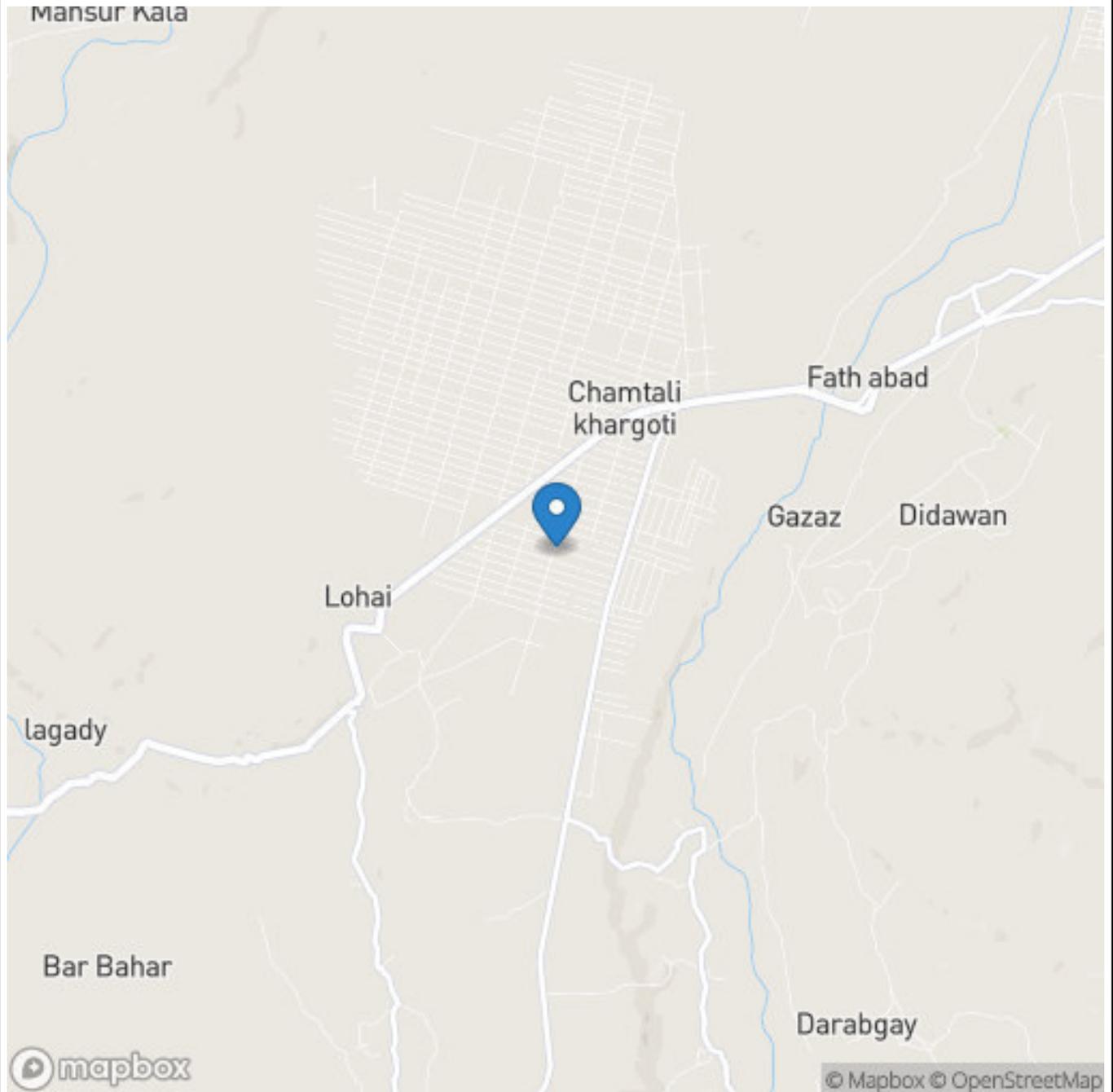
|   | Jan   | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug  | Sep  | Oct  | Nov  | Dec   |
|---|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|
| Water production [m <sup>3</sup> /day]        | 98.3  | 117.6 | 135.6 | 126.5 | 119.7 | 115.7 | 116.2 | 97.7 | 79.9 | 53.1 | 11   | 56.5  |
| Energy production Solar [kWh/day]             | 43.3  | 57.0  | 66.0  | 59.5  | 58.0  | 57.5  | 57.3  | 50.4 | 41.8 | 31.6 | 16.7 | 28.7  |
| Radiation horizontal [kWh/m <sup>2</sup> day] | 1.0   | 2.1   | 3.7   | 4.9   | 5.9   | 6.4   | 6.2   | 4.8  | 3.2  | 1.8  | 0.7  | 0.6   |
| Radiation tilt [kWh/m <sup>2</sup> day]       | 3.6   | 5.0   | 6.1   | 5.7   | 5.8   | 5.9   | 5.9   | 5.1  | 4.1  | 3.0  | 1.5  | 2.3   |
| Avg. Temp. [°C]                               | -14.2 | -12.9 | -6.0  | 3.0   | 12.4  | 17.6  | 19.3  | 16.3 | 10.3 | 4.0  | -6.0 | -12.0 |

Data location: Latitude: 55 DD, Longitude: 69 DD



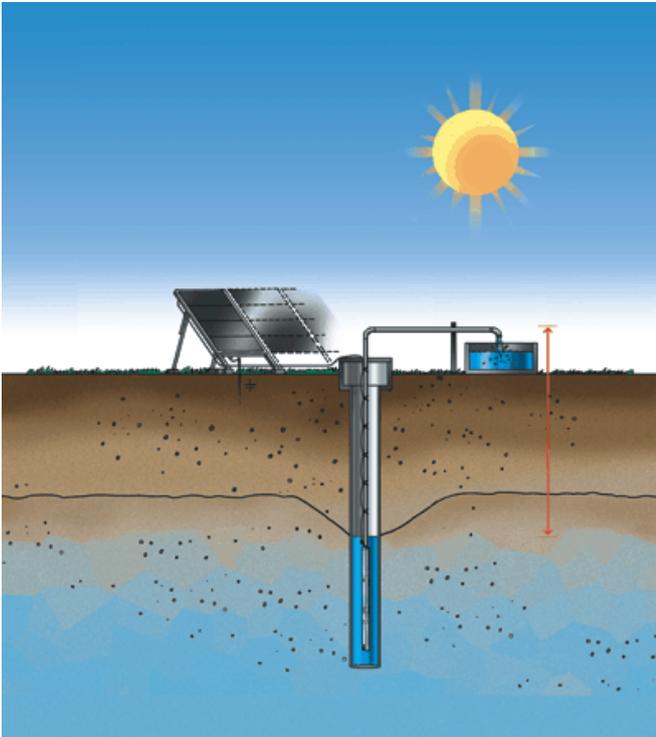
92951980 SP 18-13

Location Map



Location: چنای گوخ, Nangarhar, Afghanistan  
Latitude: 56.3859 DD, Longitude: 70.183912 DD

### Installation and Input



### Sizing Results

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Solar array rated volts: 286 V

Sun tracking: No (fixed)

Tilt angle: 55 deg.

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

Flow: 18.6 m<sup>3</sup>/h

Total head: 89.4 m

**Cables and pipes:**

Pump cable length: 100 m

Pump cable size: 25 mm<sup>2</sup>

Total cable loss: 1.7 %

Material, riser pipe: PEH

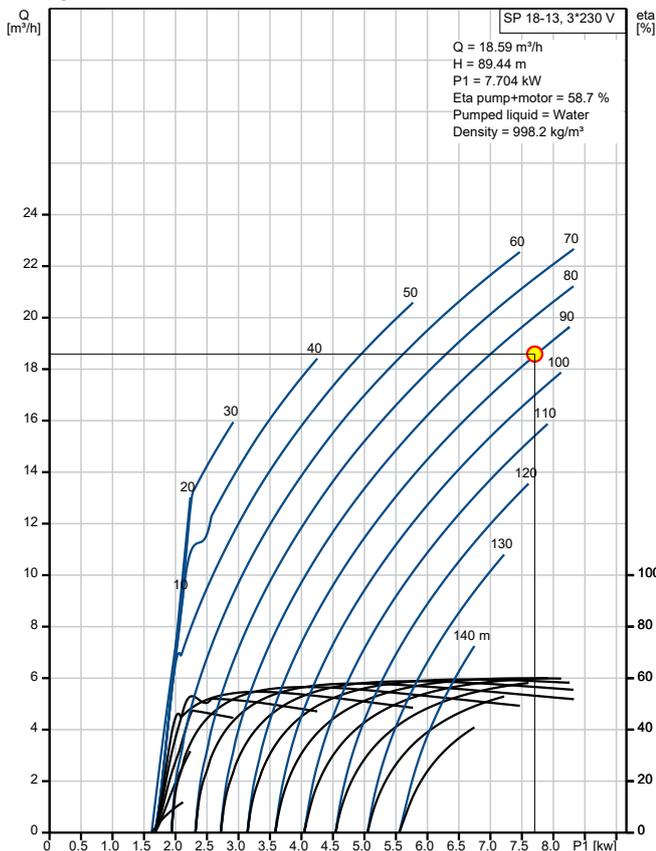
Pipe length of riser pipe: 70 m

Friction losses: 3.436 m

Location: ینای گوخ, Nangarhar, Afghanistan

Latitude: 56.3859 DD, Longitude: 70.183912 DD

### Pump Curve



### Dimensional Drawing

