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Srinagar - 190009

# SUB-PROJECT COMPLETION REPORT


## COMPONENT–III

## RESTORATION OF URBAN FLOOD MANAGEMENT INFRASTRUCTURE

**Prepared By: LEA Associates South Asia Pvt. Ltd.**

**Technical Assistance & Quality Audit Consultants**

# VOLUME-I

## RESTORATION OF URBAN FLOOD MANAGEMENT INFRASTRUCTURE

### UNDER COMPONENT-3


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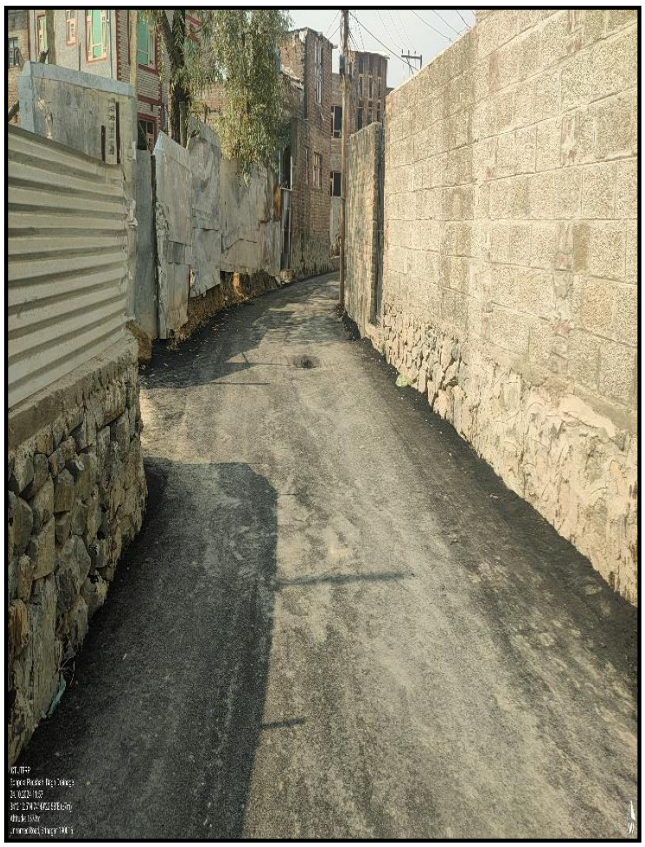

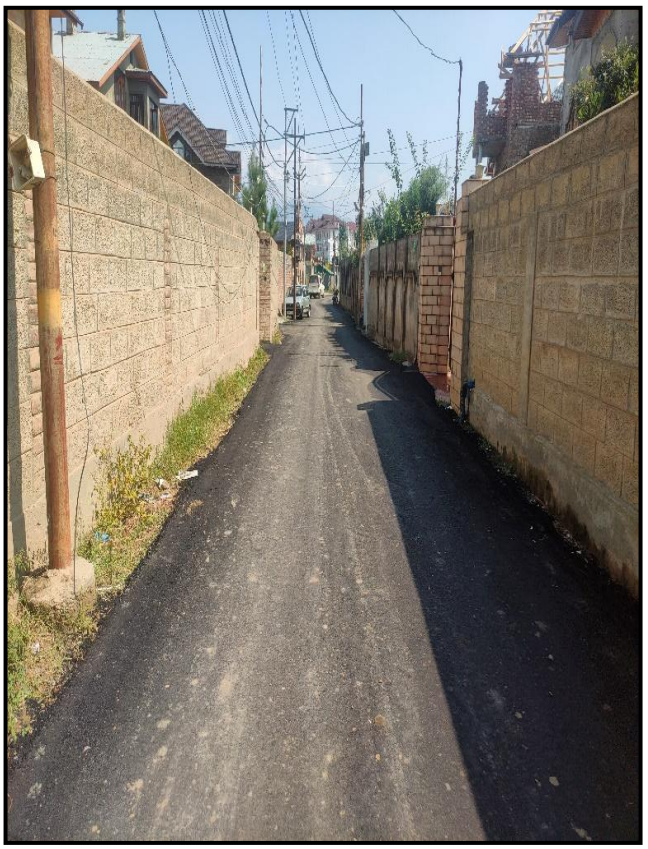

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# 1. INTRODUCTION

## 1.1 Project Background

In September 2014, Jammu & Kashmir was severely impacted by an exceptionally intense monsoon season, which brought unprecedented rainfall and caused widespread flooding and landslides throughout the region. The continuous and torrential rains from September 2 to September 6, 2014, led to the Jhelum and Chenab Rivers, along with numerous other streams and tributaries, surpassing their danger levels and flooding vast areas. The Jhelum River, in particular, breached its banks and inundated many low-lying areas in Kashmir, including the state capital, Srinagar. In numerous districts of Jammu & Kashmir, the rainfall levels exceeded the normal amounts by more than 600%, marking an extraordinary deviation from typical weather patterns.

According to the Indian Meteorological Department (IMD), any rainfall exceeding 244.4 mm in a single day is classified as extremely heavy rainfall. During this period, Jammu & Kashmir received a total of 558 mm of rainfall over the course of the monsoon season, which significantly surpassed the normal rainfall figure of 477.4 mm for the months of June through September. To provide further context, in Qazigund district, rainfall levels reached more than 550 mm over just six days, whereas the historical average for this same period was only 6.2 mm, highlighting the scale of the rainfall anomaly and the extreme nature of the storm system.

As a result of this unprecedented rainfall, the catchment areas—especially those in low-lying regions—experienced extensive flooding that persisted for more than two weeks. In urban areas of Srinagar, the water levels remained elevated for up to 28 days, causing widespread disruption. In many parts of Srinagar, water levels rose as high as 27 feet, submerging homes, roads, and infrastructure, and causing immense damage to property and livelihoods. The excessive rainfall triggered the overflow of the main tributaries of the Jhelum River, namely Brengi Nallah, Vishav Nallah, Lider Nallah, and Sandran Nallah, all of which contributed to the rising water levels in the Jhelum River. As a result, the discharge from the Suran River surged to 200 thousand cusecs, a drastic increase from the normal discharge of around 50 thousand cusecs.

This excess discharge from the Suran River further exacerbated the situation, as it caused significant flooding in the surrounding basin areas and led the river to change its course in multiple locations, damaging villages and agricultural lands within the catchment zone. The rivers of Chenab and Tawi also saw a rise in water levels, flowing above normal levels, which contributed to the overall flood situation in the state. The massive flooding affected nearly 20 districts of Jammu & Kashmir,

resulting in widespread devastation, including the destruction of homes, roads, bridges, and public infrastructure.

In response to the severe flooding, a joint team led by the Department of Economic Affairs (DEA), Government of India, along with representatives from the World Bank, visited Jammu & Kashmir on October 21, 2014, to assess the extent of the damage and determine the immediate needs of the affected regions. Following this initial visit, the Government of India made a formal request to the World Bank on January 5, 2015, to conduct a joint Rapid Damage and Needs Assessment (RDNA) mission to evaluate the situation in detail and develop a comprehensive plan for recovery and rehabilitation. In accordance with this request, the World Bank deployed a mission to the state from February 1 to 6, 2015, with the goal of producing a rapid, multi-sectoral assessment report on the damages and needs caused by the floods.

The RDNA report estimated the total damages and losses caused by the flooding to be approximately INR 211.975 million. The majority of the damages were sustained by key sectors such as housing, livelihoods, transportation infrastructure (roads and bridges), and public services. These sectors combined represented more than 70% of the total damages in terms of their economic value. In addition to the destruction of private property, public service infrastructure—including critical equipment at hospitals, schools, and educational institutions—was also severely impacted, further exacerbating the difficulties faced by residents and public services in the aftermath of the disaster. Many of these public service facilities are still not fully operational, causing ongoing challenges in providing essential services to the affected communities.

This detailed assessment conducted by the World Bank was crucial in guiding the recovery efforts and informing the allocation of resources for rebuilding the affected areas. The scale of the disaster and the significant impact on both the physical infrastructure and the lives of the people in Jammu & Kashmir necessitated a coordinated response from both the central government and international organizations, including the World Bank, to support long-term rehabilitation and resilience-building in the region.

**Based on the Rapid Damage Needs Assessment (RDNA):** Results, restoration works underway and discussion with the GOJ&K, the project will focus on resorting critical infrastructure using international best practice on resilient infrastructure. Given the state's vulnerability to both floods and earthquakes, the infrastructure will be designed with upgraded resilient features and will include contingency planning for further disaster events. Therefore, the project aims at both restoring essential

services disrupted by the floods and improving the design standard and practices in the state to increase resilience.

**1.2 Project Development Objective:** The Project Development Objective (PDO) is to support the recovery and increase disaster resilience in targeted areas of the state and increase the capacity of the state entities to respond promptly and effectively to an eligible crisis or emergency.

### 1.3 Project Components:

The project is comprised of the following seven components:

1. Reconstruction and strengthening of critical infrastructure (US$ 50 million)
2. Reconstruction of Roads and Bridges (US$ 55 million)
3. Restoration of Urban Flood Management Infrastructure (US$ 40 million)
4. Restoration and strengthening of livelihoods (US$ 15 million)
5. Strengthening disaster risk management capacity (US$ 25 million)
6. Contingent Emergency Response (US$ 45 million)
7. Implementation Support (US$ 20 million).

Total Amount is US$ 250 Million.

**Component-3: Restoration of Urban Flood Management Infrastructure (US$ 40 million):-** The objective of this component is (i) to strengthen and reinforce existing weak and vulnerable flood control infrastructure. Investments will primarily include rehabilitation/renovation of storm water pumping stations in Srinagar municipal area, and replacement of the power equipment, switch/ panel boards at elevated places and related investments for improvement and increased resilience; and (ii) assessing urban flood management interventions in other Project Areas.

**Restoration of Urban Flood Management Infrastructure:** Under Component 3, these project areas does not have proper drainage system and was facing surface over flow problem, causing urban flooding / water stagnation in these area, creating nuisance and unhygienic condition for the public. Chances of epidemic are very high because water table is very shallow and submergence was always there. Even small showers of rain cause excessive surface runoff thus causing lot of problems in normal routine life of all the sectors, like businessman, school students, locals etc. Providing of good drainage network in the area was also more important because the slight rainfall / snow fall finds its way to existing compounds / houses of dwellers and people remains in threat of survival all the time, however due to importance of this area, Government decided to improve the drainage system under so that good environmental and hygienic conditions will be obtained.

# 2. EXECUTIVE SUMMARY

**2.1 Objective & Background:** The proposal under discussion is to cover those areas where drainage network system is not available and in some areas existing drains was not connected to respective dewatering pumping stations.

**Summary of Achievement:** The Sector under discussion Urban Flood Management Infrastructure. To cover these areas new network drainage system is constructed along with new pumping stations to avoid flooding in future.

## Background of Drainage System

Few areas have no Storm Water Drainage network and some areas were partially covered and connected to Pumping stations. Few areas needed new pumping stations as natural gradient to the river body was not available and moreover during rains and rise in water levels of river / outfalls back flow happens. Chocked Drains/ sump/silt chamber due to silt accumulation. All Existing Pumping Stations had Machine Floor Level (MFL) below the Highest Flood Level (HFL) as recorded in 2014 floods causing risk of damage during floods. None of the existing pumping stations had submersible pumps which makes them of no use during floods. Lack of Automation, Programmable Logic Control (PLC) & Supervisory Control and Data Acquisition (SCADA) for centralized control during floods will result in increased risk of system failure and potential damages. Under capacity pumps were installed in comparison to actually required after calculation of the flow of catchment. Under capacity sumps at few stations existed in comparison to actually required. Unavailability of portable /vehicle mounted pumps which can be use in floods / and at places which have water logging issue due to any reason, however due to importance of these areas, Govement of J&K decided to improve the drainage system under Jhelum Tawi Flood recovery project (JTFRP) funded by World Bank so that good environmental and hygienic conditions can be obtained.

## 2.2 Project Detail:

The construction of an advanced drainage network system was successfully carried out, with the Machine Floor Level (MFL) set 1 meter above the Highest Flood Level (HFL) as recorded in 2014. This design ensures that the system is resilient to flood events and minimizes the risk of water ingress. In addition to the drainage infrastructure, a new pumping station was also built, designed with the required capacity to efficiently manage water levels during both normal and high-flow conditions. The pumping station is equipped with state-of-the-art Supervisory Control and Data Acquisition (SCADA) systems, integrated automation, and non-clog submersible pumps, which are specifically chosen for their reliability and high performance in managing large volumes of water.
These improvements have had a significant positive impact on the area's drainage capabilities. The newly implemented drainage system has effectively resolved

previous issues such as overflow, urban flooding, water stagnation, and unhygienic conditions that had adversely affected the local population. The enhanced drainage infrastructure ensures that stormwater is efficiently directed away from residential and commercial areas, preventing the buildup of stagnant water and minimizing flood risks, thereby contributing to a healthier, safer environment for residents.

The SCADA (Supervisory Control and Data Acquisition) system plays a vital role in the smooth operation of the dewatering stations. It enables continuous real-time monitoring, control, and automation of the pumps and other associated equipment. The SCADA system is integrated with a network of sensors and field devices, including level transmitters, level transducers, level switches, actuators, and Modbus systems, which continuously provide critical data about the operational status of the system. These devices monitor key parameters such as water levels in the system, pump operational status, and energy consumption, allowing operators to have full visibility and control over the system at all times.

One of the primary advantages of SCADA technology is its ability to remotely control the operation of pumps. This feature allows operators to start, stop, or adjust the pumps based on real-time demand and environmental conditions, ensuring the system is always running at optimal efficiency. SCADA also supports automation features, enabling the system to adjust automatically to changing water levels or weather conditions, which helps to reduce the need for manual intervention and improves overall system efficiency.

The integration of SCADA systems significantly enhances the reliability of the drainage network by minimizing downtime. In case of emergencies, the system allows for centralized control of the pumps from the main control center. Additionally, a backup control center provides redundancy, ensuring that the system remains operational even if the primary control center becomes unavailable. This dual-control setup strengthens the system's resilience, ensuring uninterrupted service during critical conditions, such as heavy rainfall or equipment failures. The redundancy and fail-safes built into the SCADA system further enhance its reliability, ensuring the efficient operation of the drainage and pumping systems under all circumstances.

Overall, the combination of modern drainage infrastructure and advanced SCADA-controlled pumping stations ensures a highly efficient and reliable system, effectively addressing flooding issues and improving the quality of life for residents in the area.

## 2.3 Contract Details:

| S. No. | Identified Activity/Work | Consultant / Contractor Name | Awarded Cost (INR Crore) | Revised Cost (INR Crore) | Completion Cost (INR Crore) | Start Date | Date of Completion | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1 | Construction of Storm Water Drainage Scheme at Bonpora-Padshahi Bagh | M/s Wani Infra Ltd | 28.75 | 40.89 | - | 23-Jun-20 | 31-Dec-24 | Final Payment pending |
| 2 | Construction of Storm Water Drainage Scheme Nadroo, Hyderpora (ERA) | M/s Magray Oasis (JV) | 12.88 | 11.55 | - | 27-Dec-19 | 30-Nov-21 | Final Payment pending |
| 3 | Construction of Storm Water Drainage Scheme, Missing Links Zone-I (ERA) | M/s HRCC Pvt Ltd | 54.7 | 62.29 | - | 27-Jun-20 | 15-Jul-23 | Final Payment pending |
| 4 | Construction of Storm Water Drainage Scheme, Missing Links Zone-II (ERA) | M/s Wani Infra Ltd. | 37.39 | 50.76 | - | 23-Jun-20 | 31-Dec-24 | Final Payment pending |

| | |
|---|---|
| **Project Implementation Unit (PIU).** | **Jammu & Kashmir Economic Reconstruction Agency** |
| **Project Management Unit (PMU)** | **JHELUM TAWI FLOOD RECOVERY PROJECT (JTFRP)** |
| **Funding Agency** | **World Bank** |
| **Total Contract Price** | **145.69 Cr.** |

## 3. RESULTS

**Deliverables:**

- **Construction of Drainage Network for Bonpora-Padshahi Bagh** with Two pump house (MPS and IPS) 11.96 Kms of drainage Network. The population benefited is 33000 souls of adjoining areas of Bonpora, Padshahibagh, Naikbagh and Mehjoor Nagar.The total catchment area is about 121 Hectares.

  **Pumping Capacity for Main Pumping Station (MPS) at Padshahi Bagh:**
  - **5 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
  - **7 Cusec** 2 no's (1 no. working and 1 no. standby on shelf)
  - **10 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
  - **D.G Set:** 400 KVA (1 No.)
  - **Transformer:** 400 KVA (1 No.)
  - **Stabilizer:** 400 KVA (2 No.)

  **Pumping Capacity for Intermediate Pumping Station (IPS) at Bonpora:**
  - **2 Cusecs** 8 no's (4 no. working and 4 no. standby on shelf)
  - **D.G Set:** 200 KVA (1 No.)
  - **Transformer:** 200 KVA (1 No.)
  - **Stabilizer:** 200 KVA (2 No's)

- **Construction of Drainage Network for Nadru (5.90 Kms)** with pump house adjacent to Peer Bagh Bridge near Orbit School. Population benefited is about 9350 souls of adjoining areas of Nadru village, Noorani Colony, Hafiz Colony, Al fazal colony and other adjoining colonies. Total catchment area is about 30.68 Hectares.

  **Pumping Capacity of Nadru Pumping Station:**
  - **5 Cusecs** 4 no's (2 no. working and 2 no. standby on shelf)
  - **2 Cusecs** 4 no's (2 no. working and 2 no. standby on shelf)
  - **D.G Set:** 250 KVA (1 No.)
  - **Transformer:** 250 KVA (1 No.)
  - **Stabilizer:** 250 KVA (2 No.)

- **Construction of Drainage Network for Missing Links Zone – I** of total pipe length of 39.80 Kms with 1400 mm dia pipe size. Population benefited is about 60000 souls of adjoining areas of Bagh-e-Islam, Gulshan Nagar -1, Chanapora, Gousia Colony, Bagh-e-Mehtab, Gulberg Colony Sector 1& 2, Shah Anwar Colony Lane D, D1 & F, Ibrahim Colony Parraypora, Sidique Colony Bemina,

Fruit Mandi left out area on Srinagar Baramulla Road from HMT crossing to Noora Hospital Shalteng and Rathpora.

- **Construction of Drainage Network for Missing Links Zone – II** with Two pump house at Sempora and Palpora & 19.946 Kms of drainage network. The population benefited 30,000 souls & Area benefitted Palpora, bank Colony Palpora, New Colony Palpora, Goripora, Mir Mohalla Goripora, Aali Masjid (Eidgah) Colony and Sempora Area of Srinagar City with total catchment area of 108.53 Hectares.

**Pumping Capacity at Palpora Station:**

- **7 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
- **2 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
- **5 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
- **D.G Set:** 320 KVA (1 No.)
- **Transformer:** 400 KVA (1 No.)
- **Stabilizer:** 400 KVA (2 No's)

**Pumping Capacity at Sempora Station:**

- **5 Cusecs** 2 no's (1 no. working and 1 no. standby on shelf)
- **10 Cusecs** 3 no's (2 no's working and 1 no. standby on shelf)
- **D.G Set:** 320 KVA (1 No.)
- **Transformer:** 400KVA (1 No.)
- **Stabilizer:** 400KVA (2 No's)

## Performance Metrics:

- Timeliness completion of Storm Drainage Network, building for pumping Stations and procurement of machineries.
- Feedback from local public and Srinagar Municipal Corporation (Drainage division) facilities regarding, drainage network, dewatering Station building constructed in these areas and supplied machineries (Submersible pump and other equipments).

**Quality Assurance:** The Third party inspection of the RCC Pipes, Machineries for the Storm Drainage Network at Bonpora-Padshahibagh, Drainage Network for Nadru, Drainage Network for Missing Links Zone – I and Drainage Network for Missing Links Zone – II were witnessed by the TAQAC Engineers and PMU officials in presence of the PIU- at the factories at various places to adhere the quality standards.

## 4. LESSONS LEARNT

- In light of our findings, we analyzed that appropriate legislation is necessary for strategic decision makers and urban planners to follow the development of effective Drainage management strategies. For the benefit of people's welfare and higher level of life, we further recommend that the SMC department take additional essential steps in infrastructure development, particularly with regard to building the remaining drainage system.
- Effective communication among stakeholders and proactive problem-solving minimized project delays. The specifications and requirements for machineries forwarded to the PMU for review to ensure transparency and alignment with concerned department needs before procurement.
- Establishing a strong PMU with a clear mandate and state ownership is crucial. Retaining trained staff for at least three years and providing adequate capacity development support is essential for timely project implementation.
- Active participation and interest from the locals are considered as an important factor to successfully carry out the Drainage work in residential settlements. During construction of pumping stations suitable dialogues were on going for compatibility to neighboring residences.
- In addition to a sufficient land acquisition and rehabilitation policy for individuals impacted by drainage, an upfront environmental clearance is required. Recent projects have addressed these challenges more effectively with more detailed Operational Guidelines.

## 5. CONCLUSION:

**Summary:** The Sector under discussion Storm water Drainage Scheme in Bonpora – Padshahi Bagh, Nadru, Missing Link Zone-1 and Missing Link Zone-II. These areas have now provided proper drainage system and not facing any problem of over flow, urban flooding / water stagnation, nuisance and unhygienic condition for the people residing in these areas.

**Impact:** These subprojects have enhanced the area's drainage infrastructure in a secure and effective way. Effective water drainage from the region has prevented many water-borne illnesses, saving lives and boosting the city's economy. Reducing water logging has important environmental ramifications because it can lead to issues with soil structure. Salinity, water table levels, and soil permeability can all be improved. According to interactions with the people, the installation of these drainage networks has reduced the amount of accidents and possible disputes that take place in the region.

Less flooding during the winter and rainy seasons led to land gains that could be used to improve the area's roads and pedestrian areas, as well as access. In addition to being environmentally and financially sustainable, these safe, dependable, effective, and efficient drainage facilities have best served the requirements of the populace in a way that will assist government initiatives for social and economic growth. For improved connectivity, all of these subprojects' road segments were subsequently appropriately macadamized.

The environment has been made more pedestrian-friendly by the improvement and widening of roads. The subproject area's aesthetics and landscape character have improved as a result of the subprojects' reduction in water logging. These drainage systems will remove the obstacle to the area's growth and redevelopment while also improving long-term drainage management throughout Srinagar city. By eliminating needless traffic delays caused by water logging, the area will now have improved access. These subprojects have helped local roadside businesses, public transportation, and health and education facilities. The storm water drainage systems ensure the rapid evacuation of surface water, which helps maintain the safety of infrastructure like roads, businesses, and residential apartments during heavy rainfall. By preventing flooding, these systems help avoid costly repairs to infrastructure and homes. Additionally, the reduced likelihood of damage to roads and utilities ensures that local economies can continue to function smoothly.

The social, economic, and environmental advantages have been recognized by the local populace. The results made it abundantly evident that there were serious issues with foul odors, water-borne illnesses, water logging, infrastructure damage,

sediment depositions, downstream water pollution, land pollution, air pollution, sound pollution, road damage, traffic congestion, pedestrians' benefits, housing facility, and obstacles to the timely delivery of goods and services prior to the installation of the drainage system. All of them had a negative effect on urban life overall. However, such issues were significantly lessened and rectified following the installation of the drainage system, raising living standards.

A total of 77.6 km of drainage network was installed under these projects, covering an area of about 260.21 hectares. Five dewatering stations were built in addition to the laying of drainage pipes for improved drainage advantages. These drainage projects would directly benefit approximately 1,32,350 people who will get access to improved roads as well.

## 6. PHOTOGRAPHS

**Bonpora Pumping Station (IPS)**

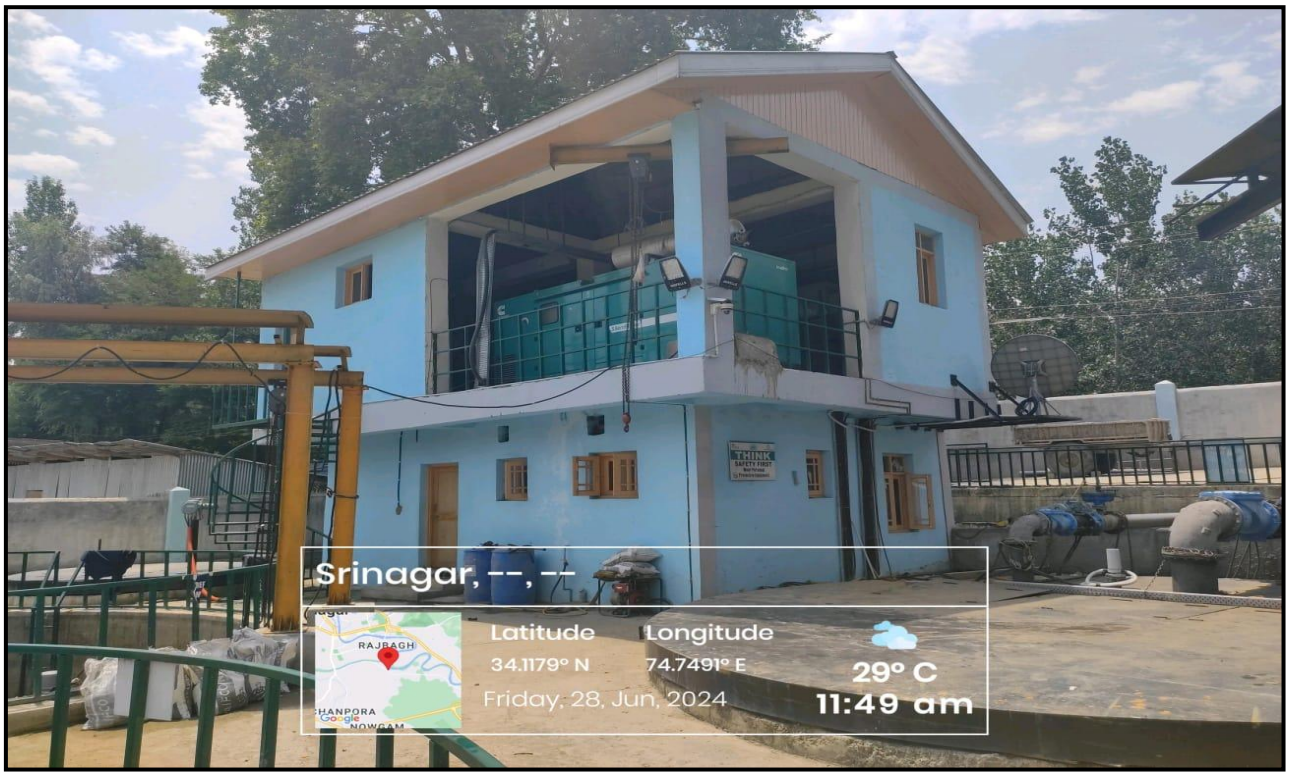
**Padshahi Bagh Pumping Station (MPS)**

**Nadru Pumping Station**


**Missing Links Zone-I**


**Missing Links Zone-I**

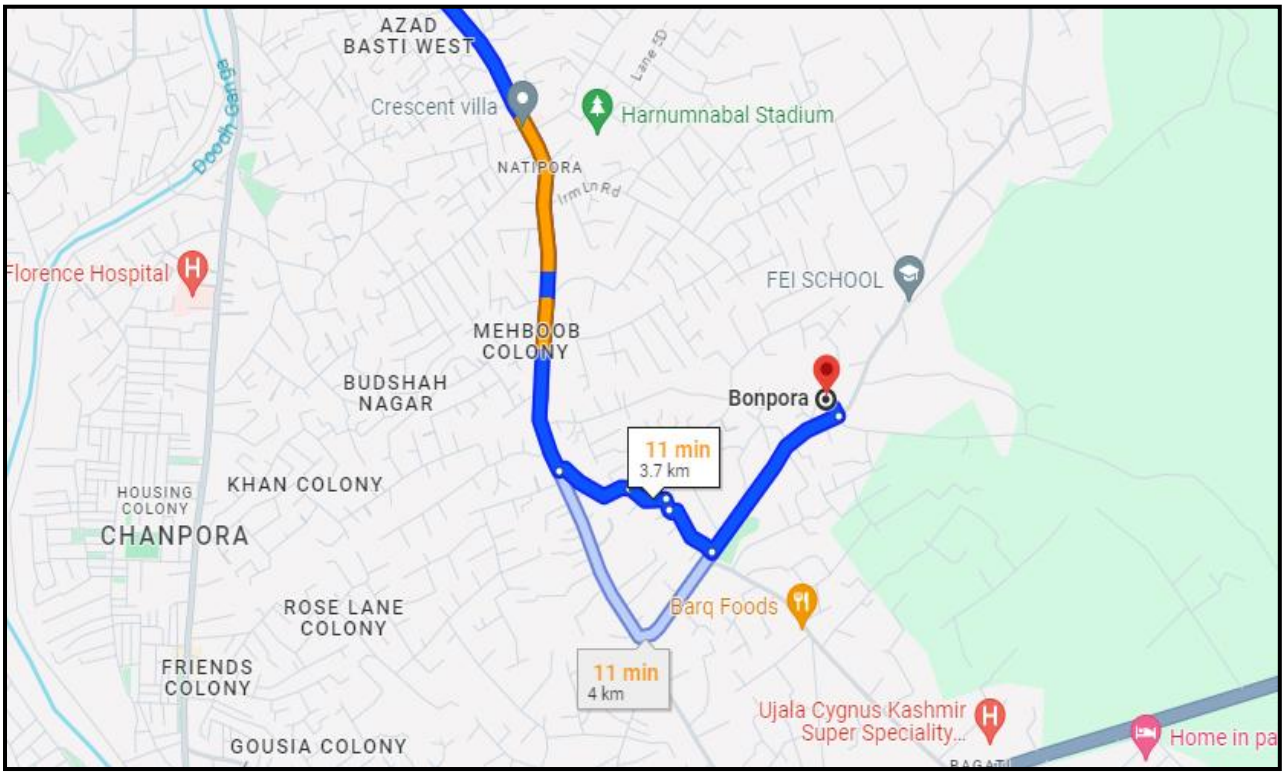

**Missing Links Zone-II (Sempora - Pumping Station)**



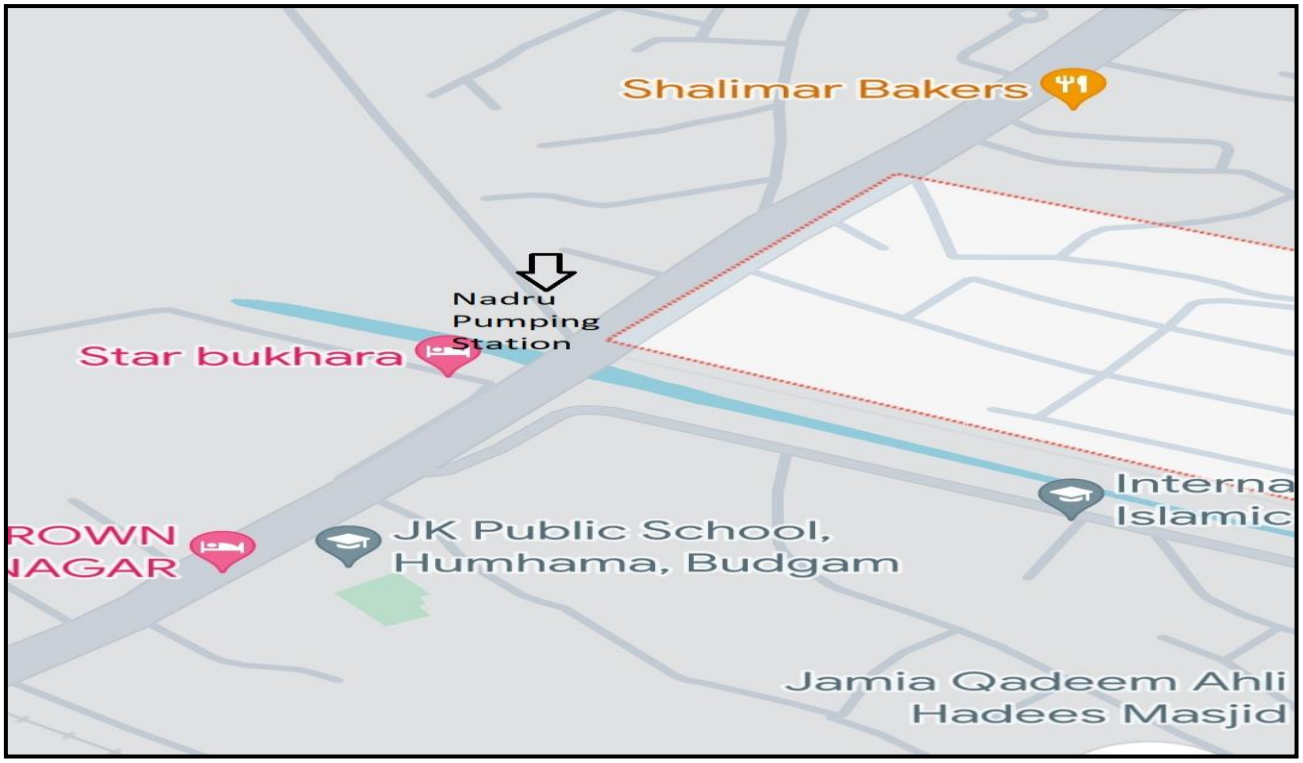

**Missing Links Zone-II (Palpora - Pumping Station)**

## 3. SUB-PROJECT LOCATION MAP

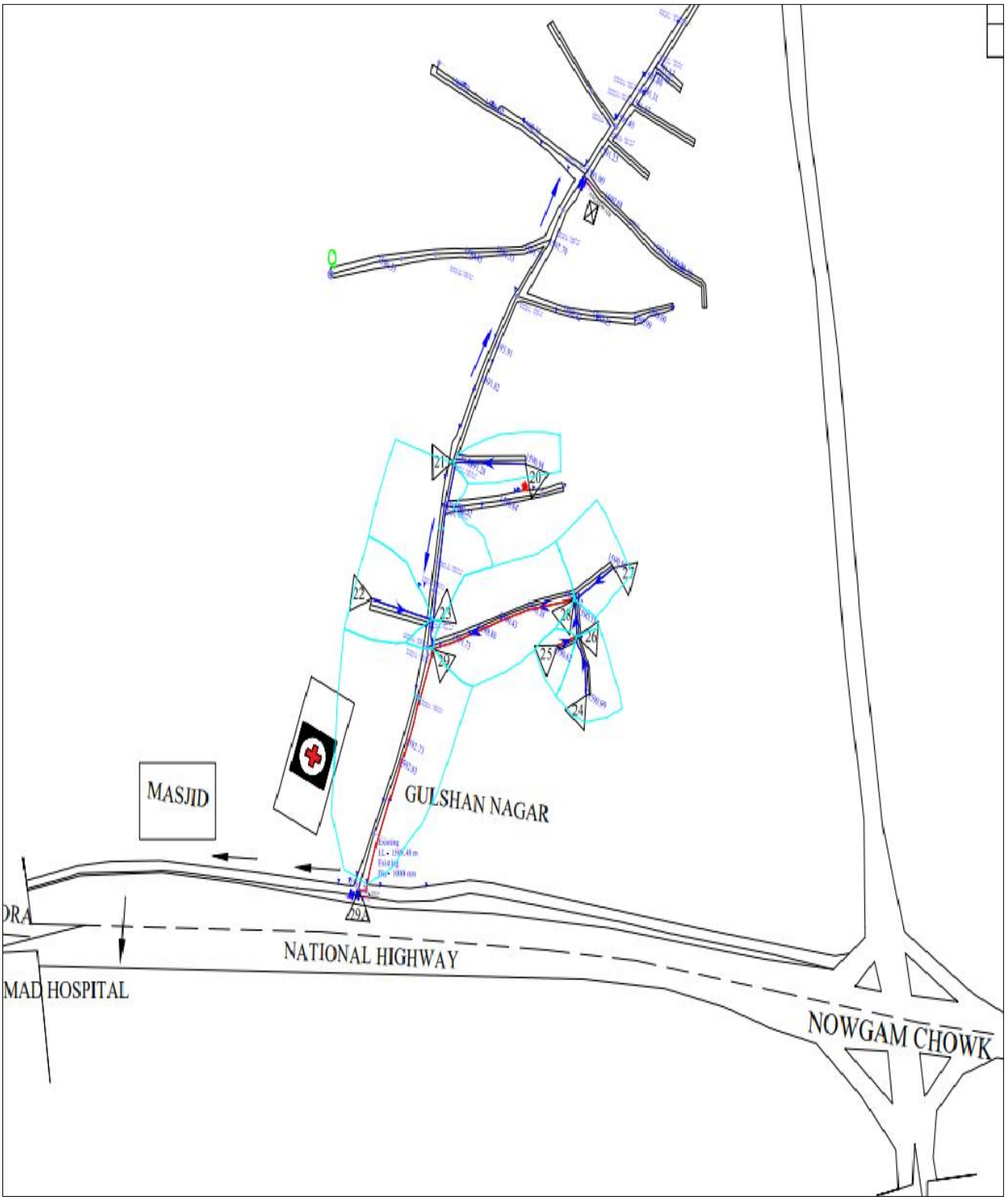

**MPS (Padshahi Bagh)**




**IPS (Bonpora)**




**Nadru Pumping Station**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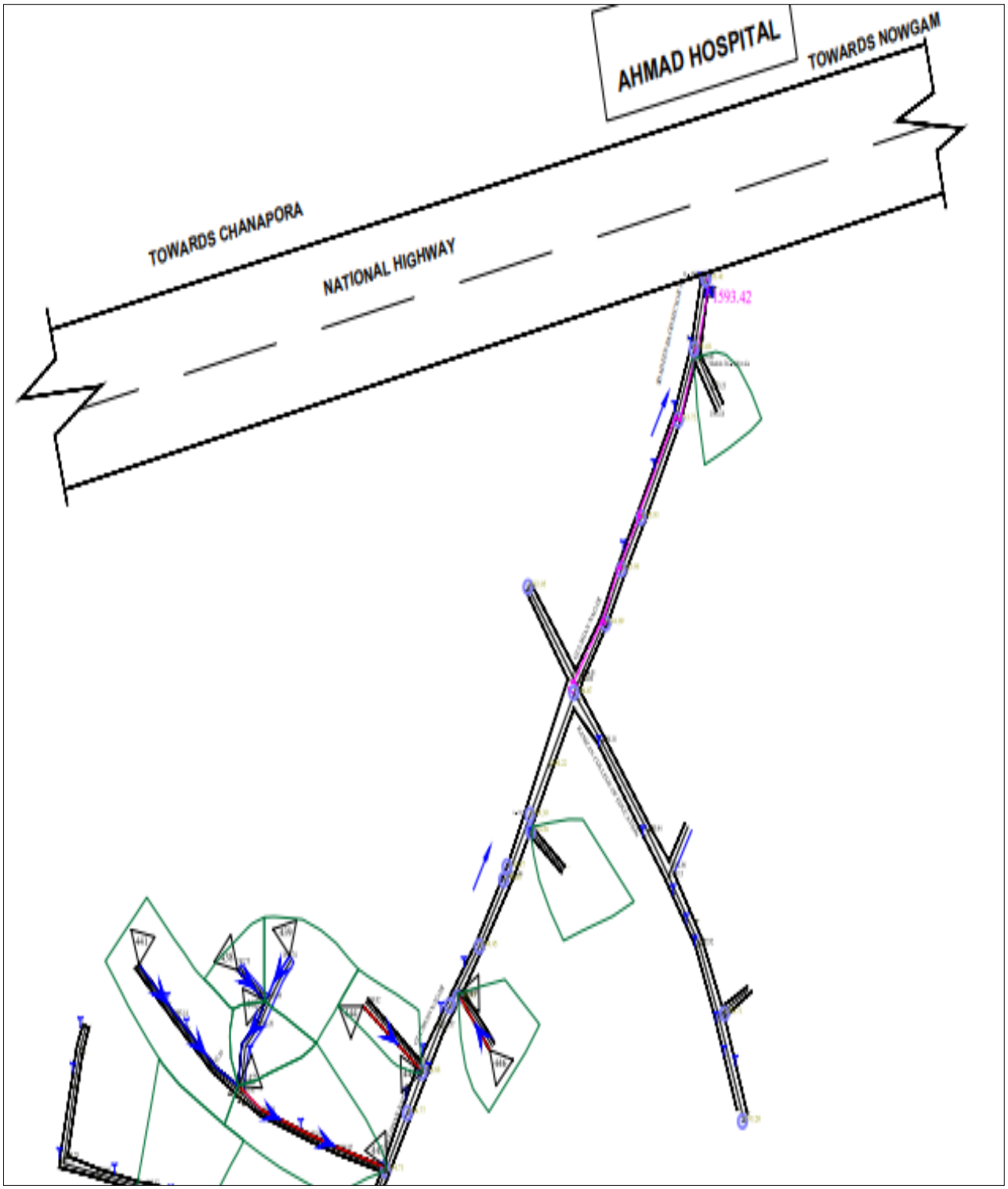
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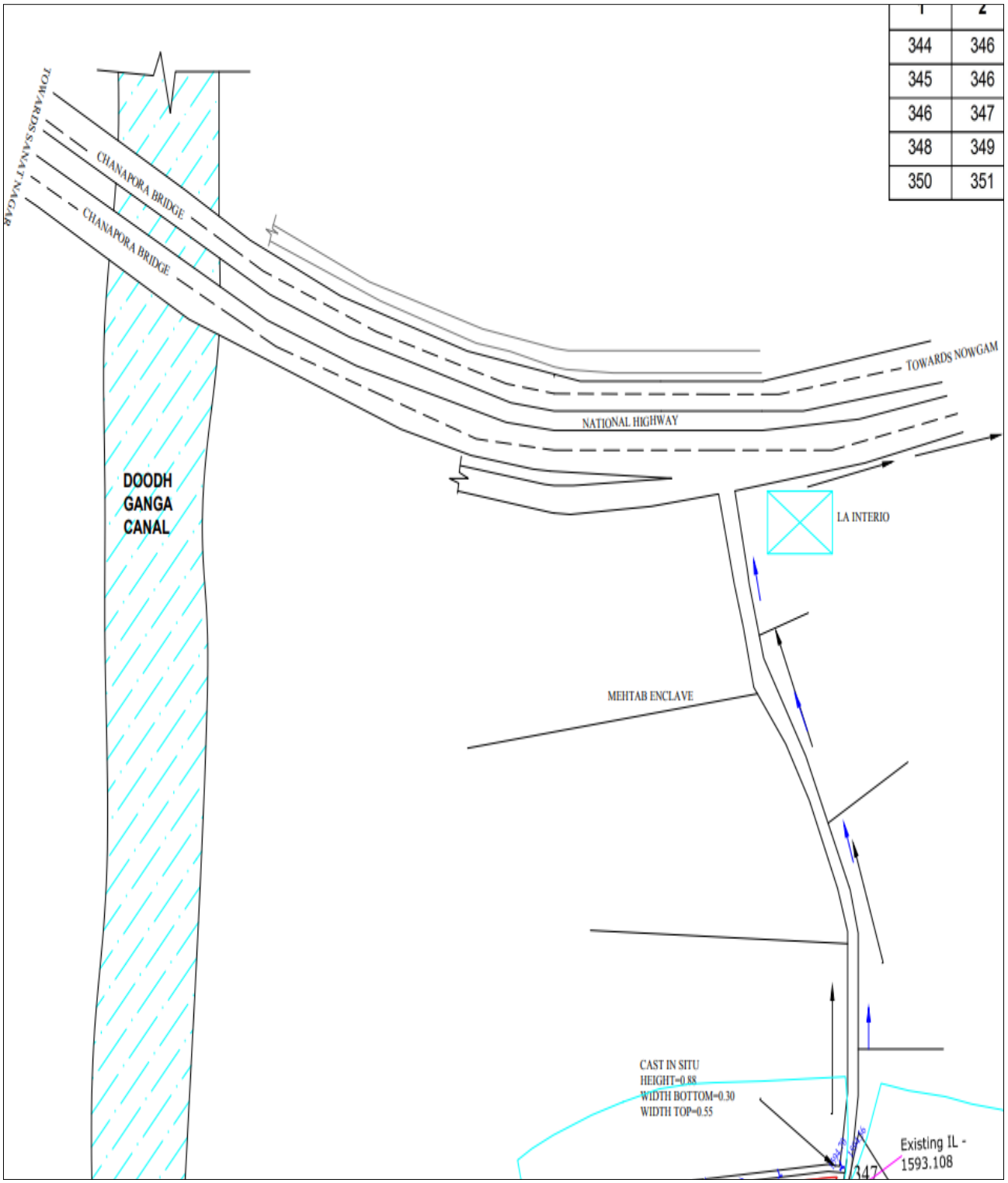
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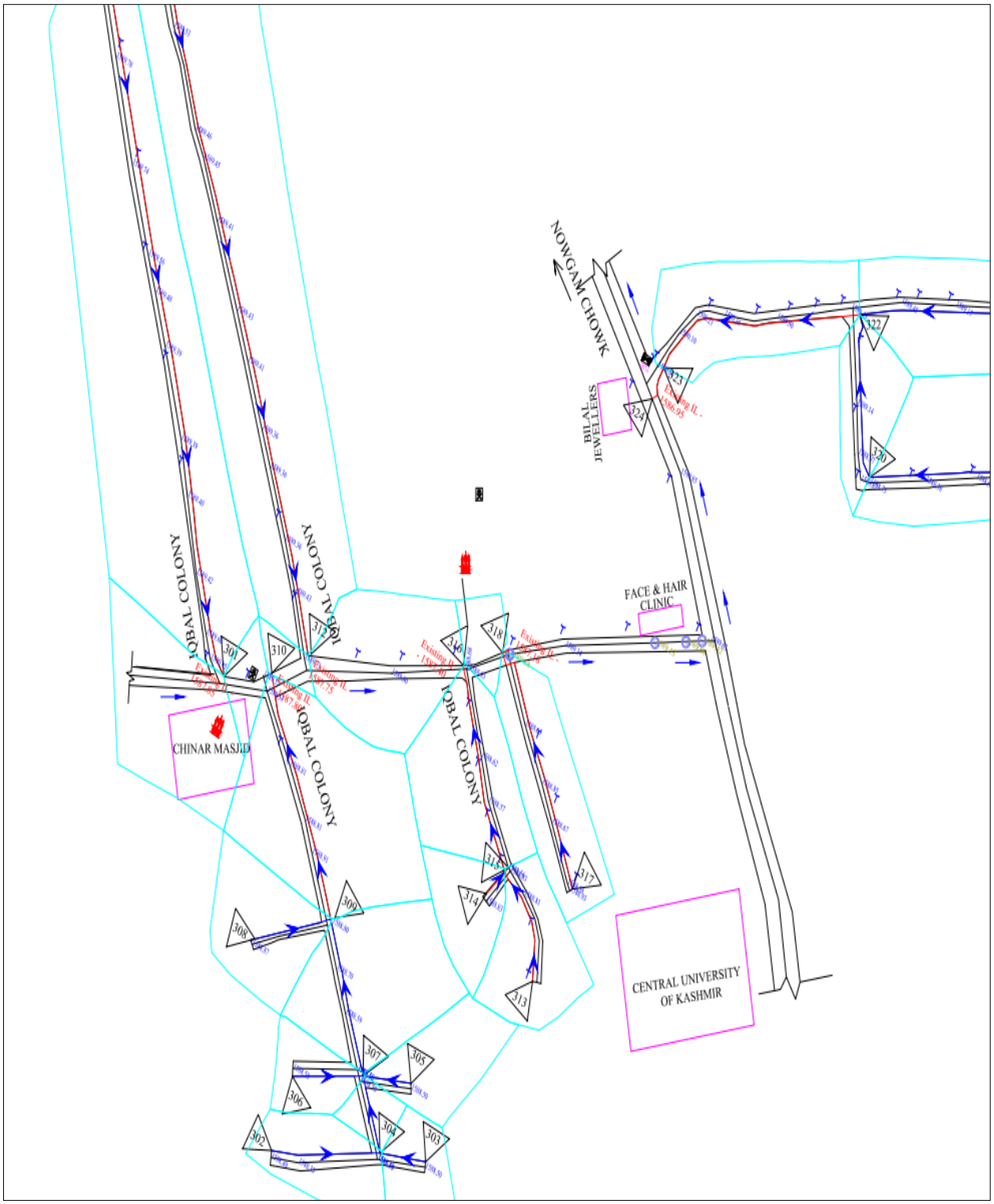
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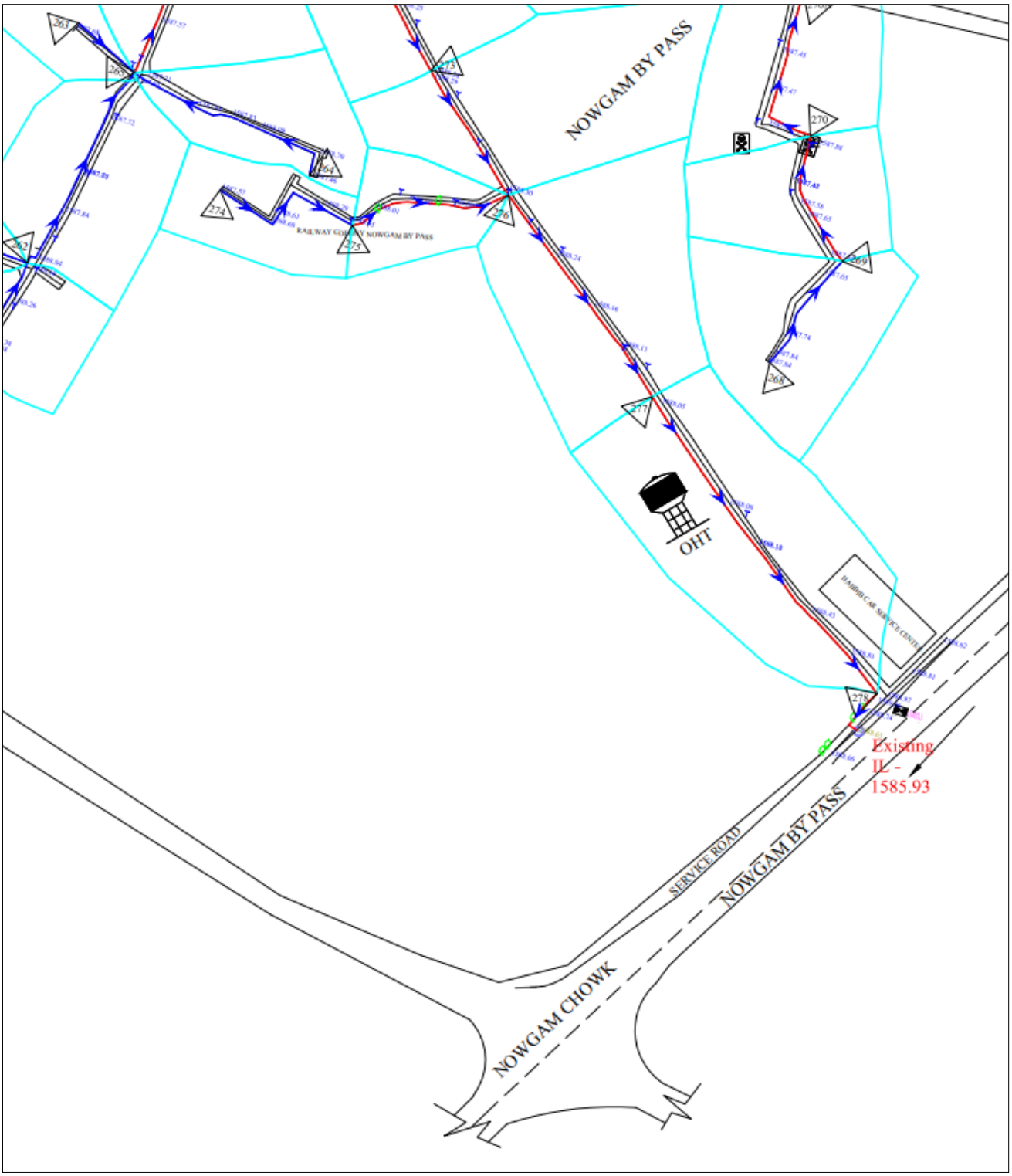
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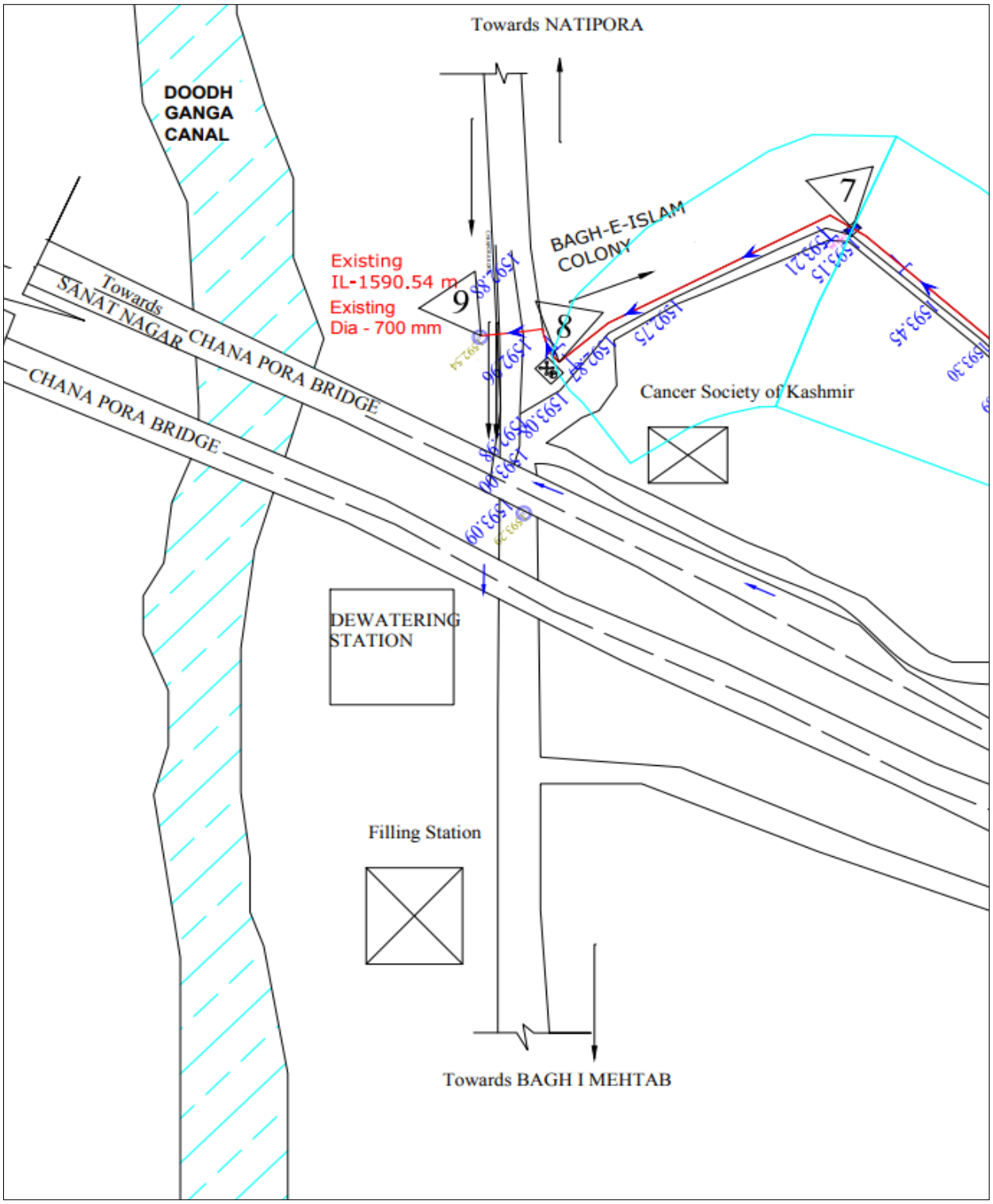
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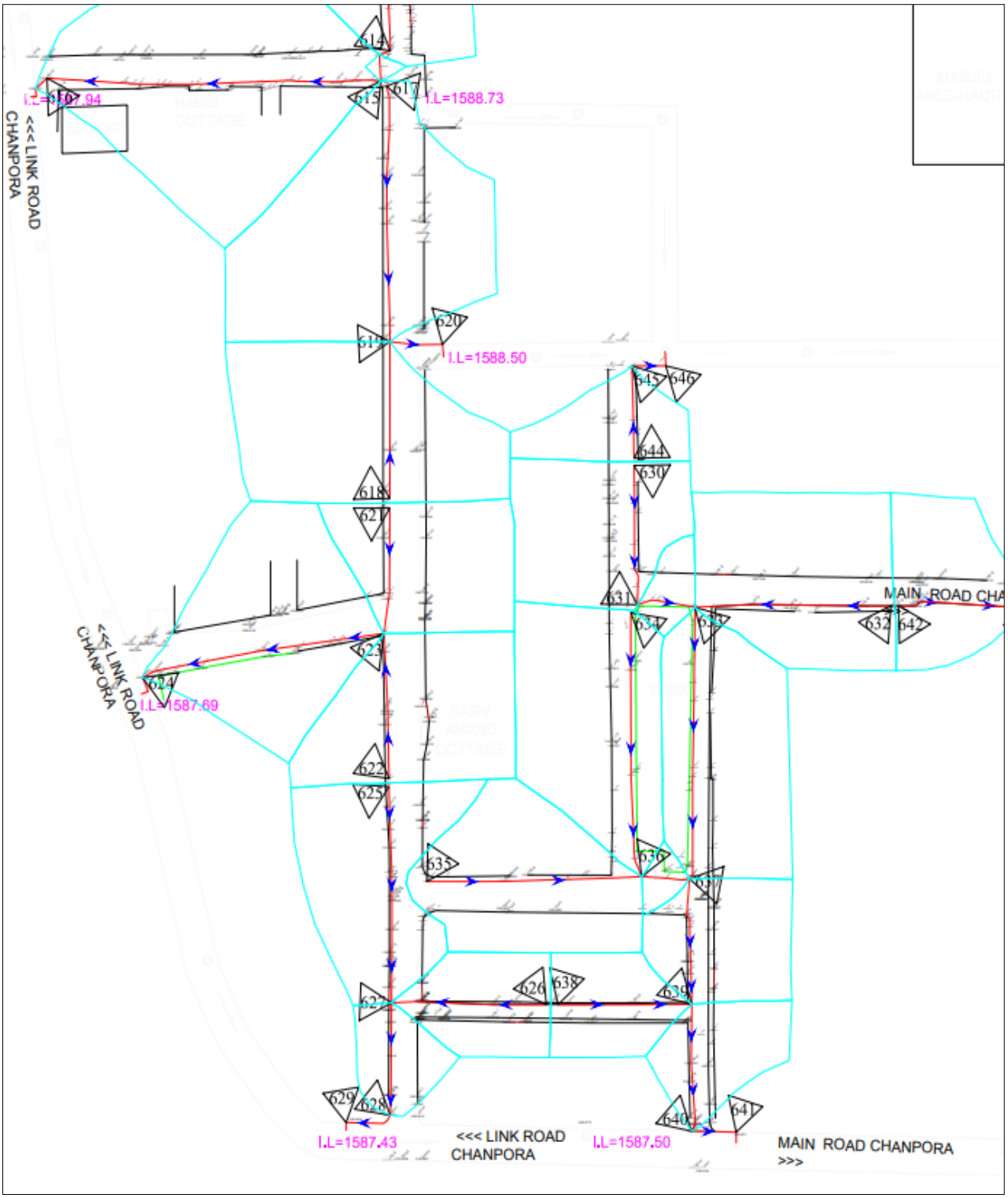
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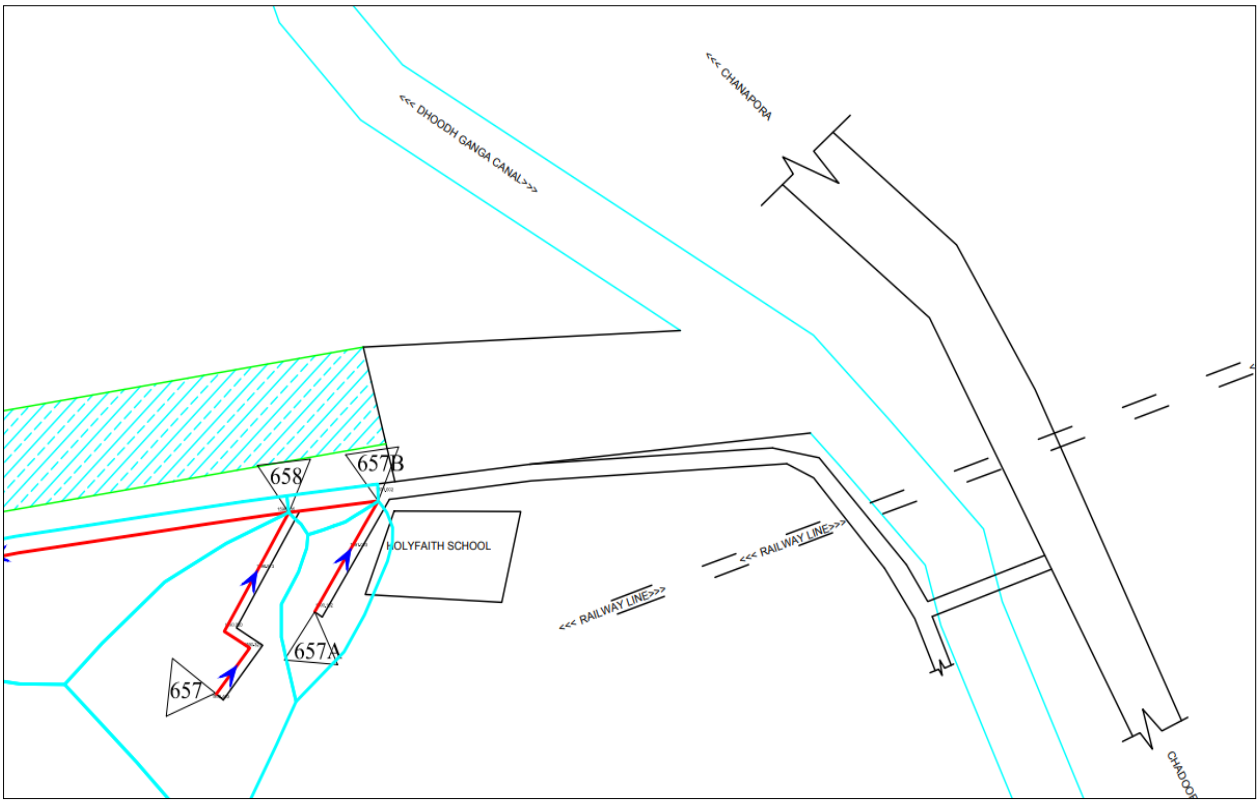
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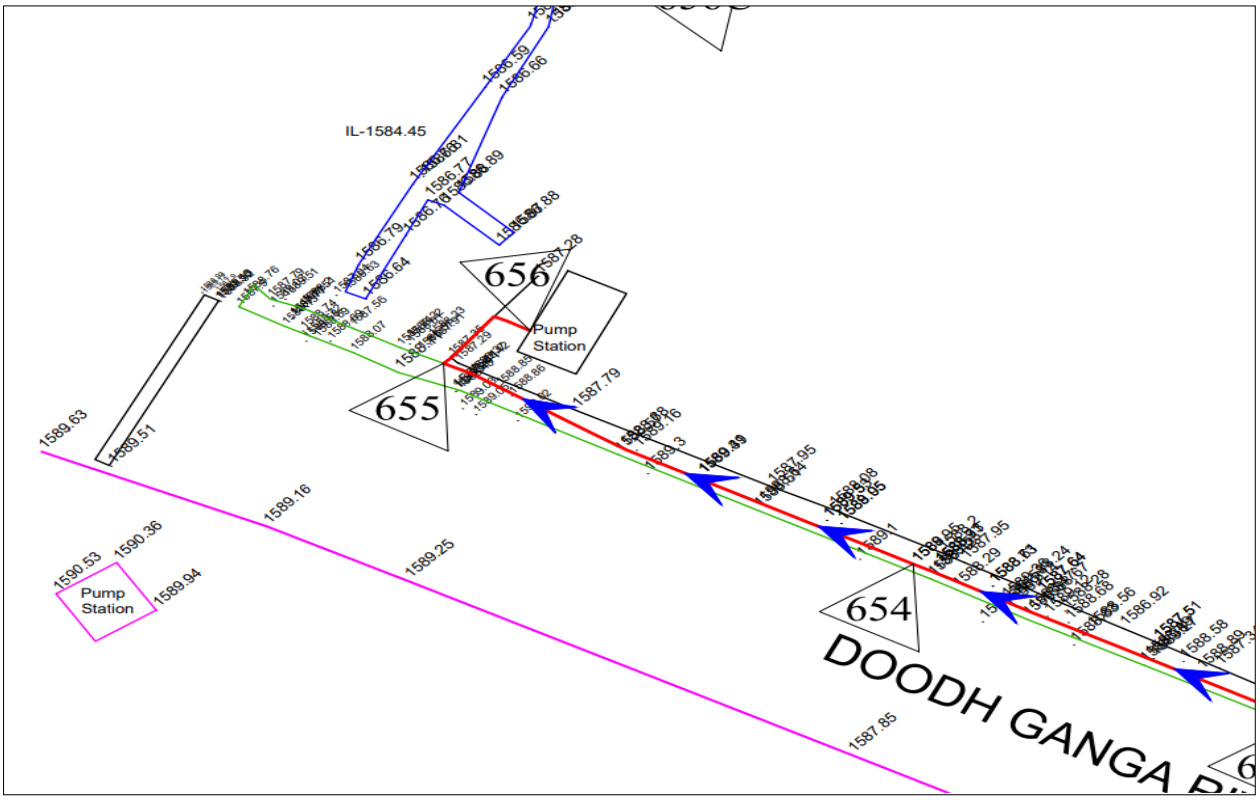
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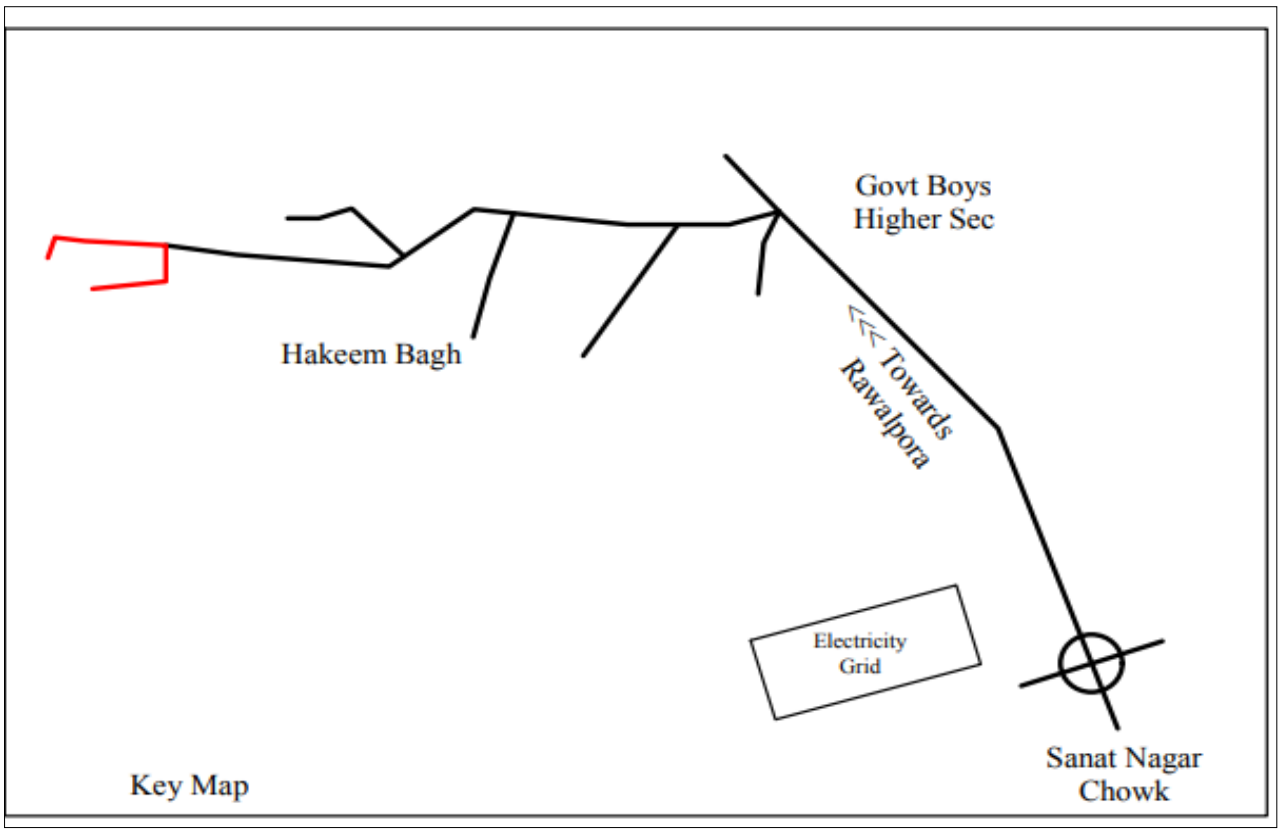
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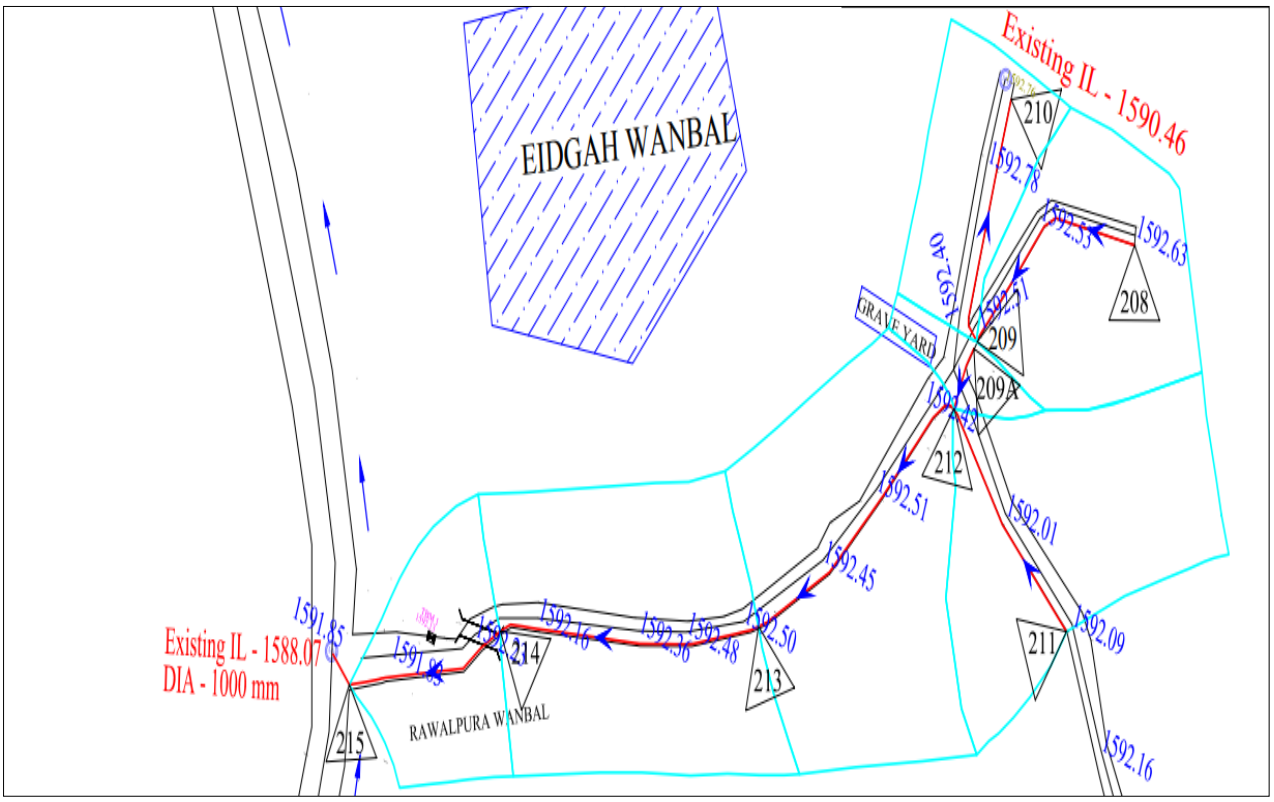
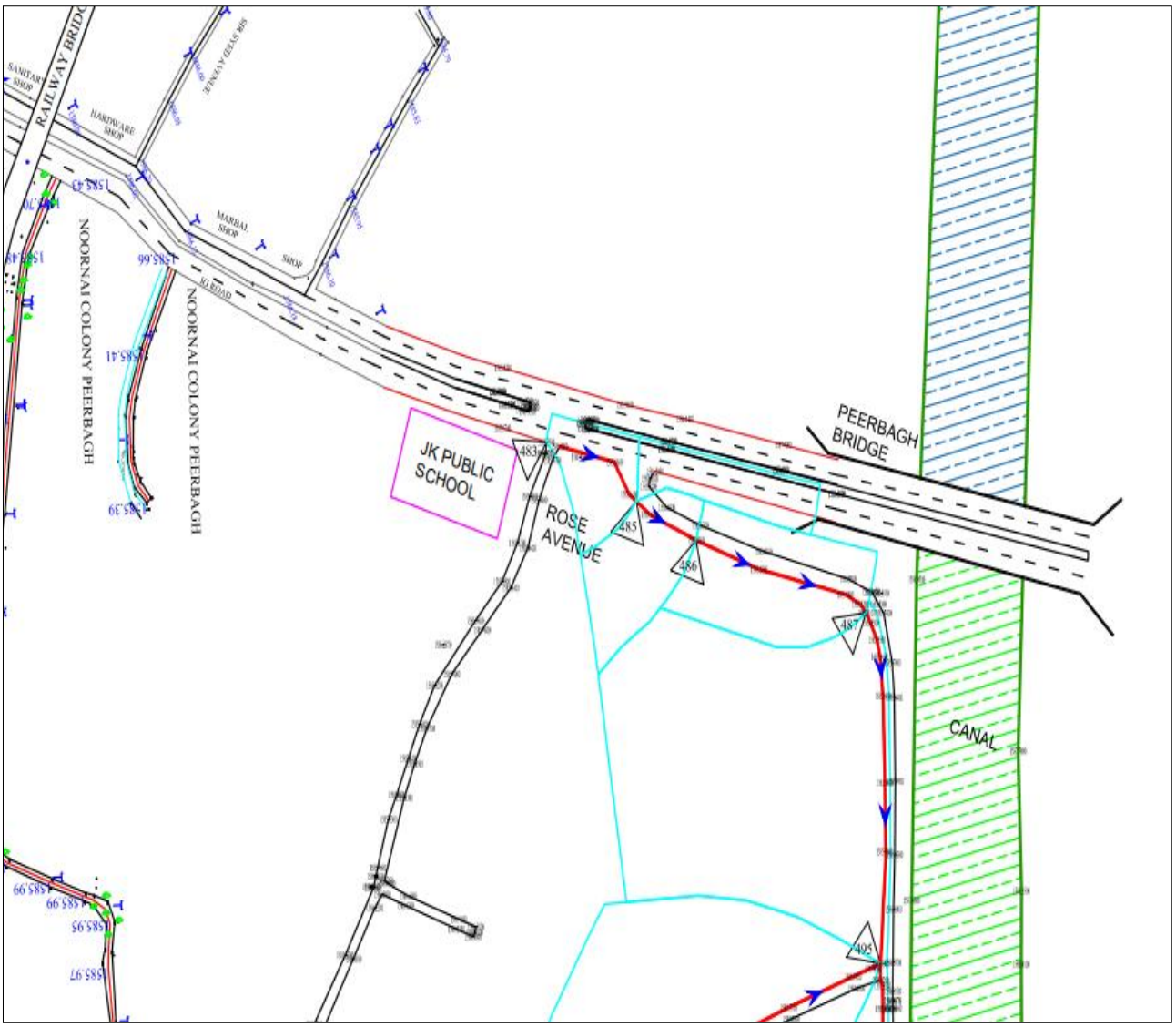
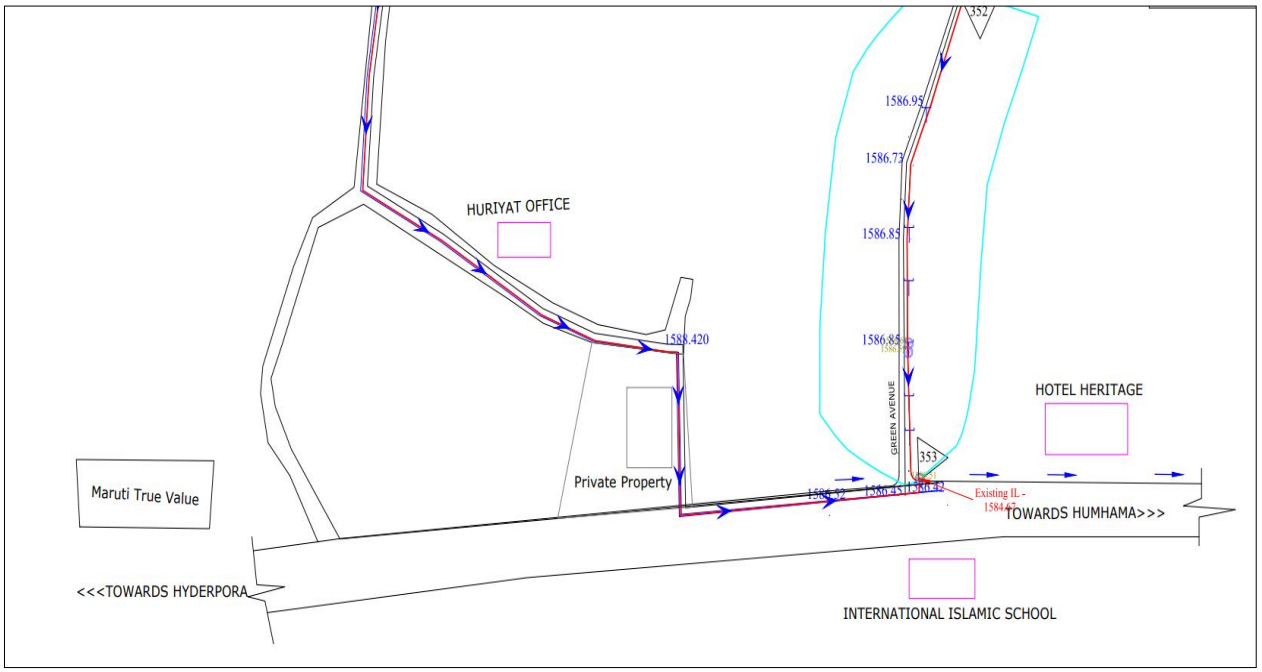
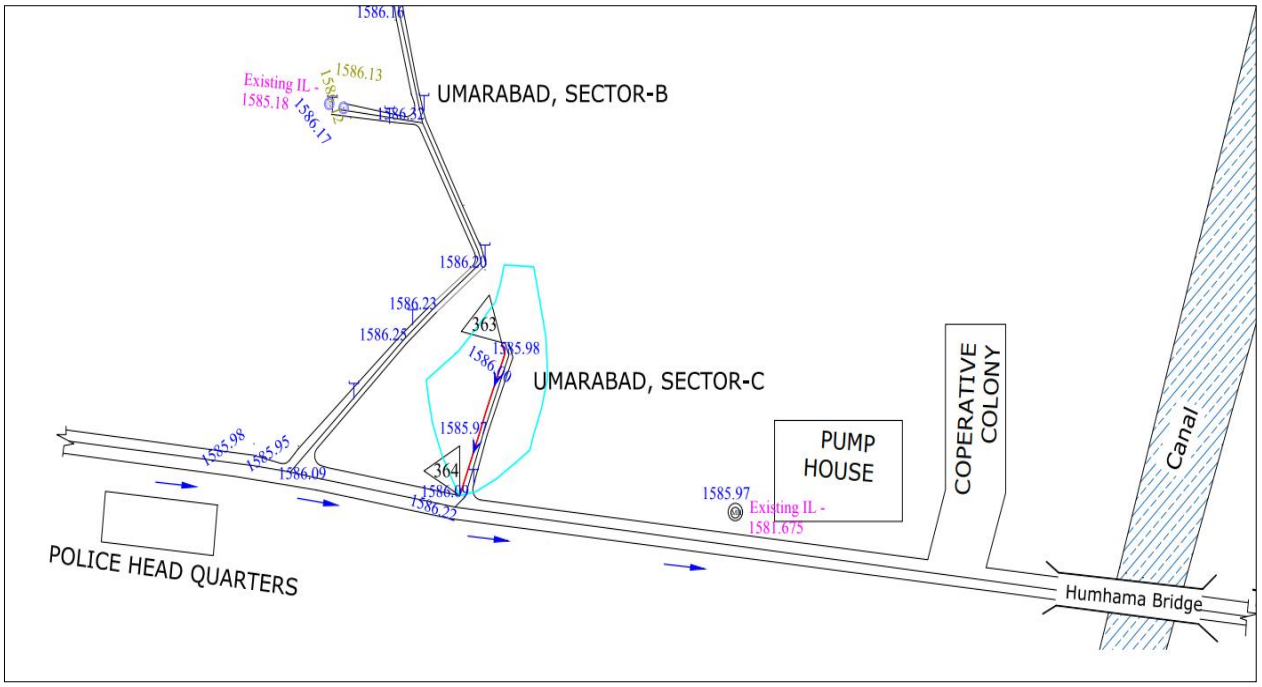
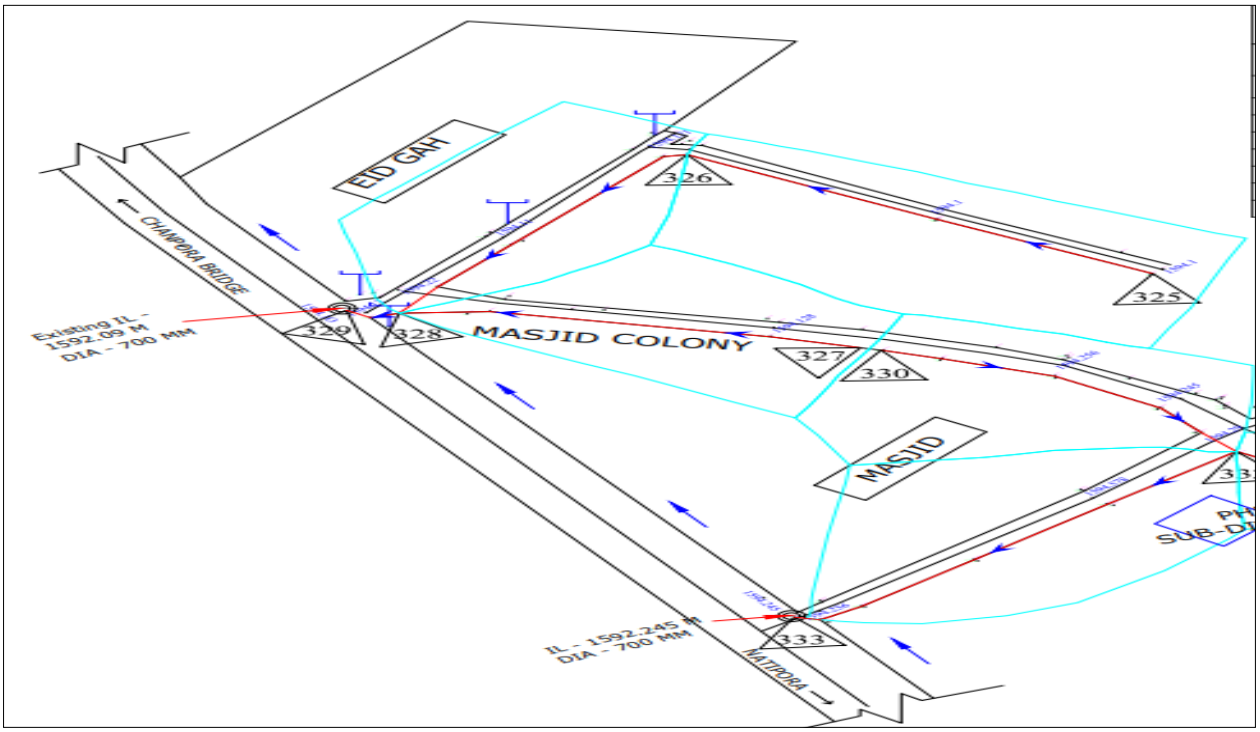
Higher Sec
Hakeem Bagh
Towards
Rawalpora
Electricity
Grid
Sanat Nagar
Chowk
Key Map

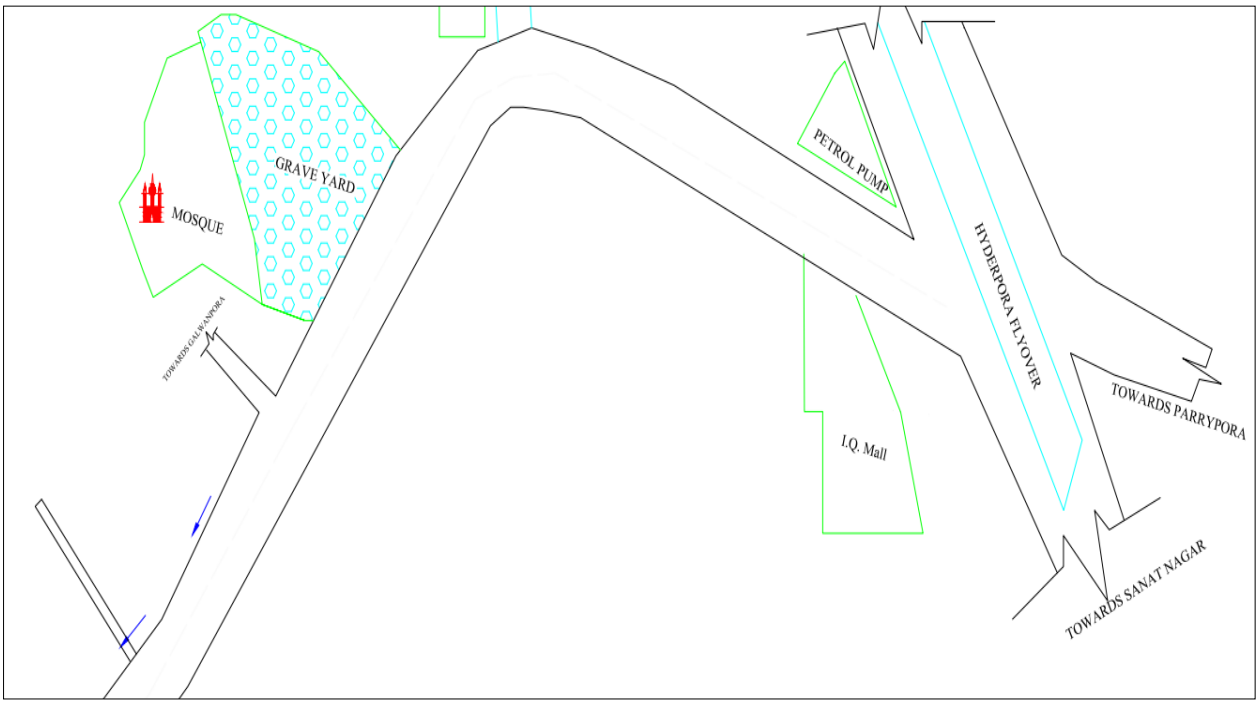

EIDGAH WANBAL
Existing IL - 1590.46
Existing IL - 1588.07
DIA - 1000 mm
RAWALPURA WANBAL
GRAVE YARD
210
208
209
209A
212
211
213
214
215
1592.78
1592.63
1592.51
1592.01
1592.09
1592.16
1592.45
1592.50
1592.48
1592.36
1592.16
1591.85
1591.85

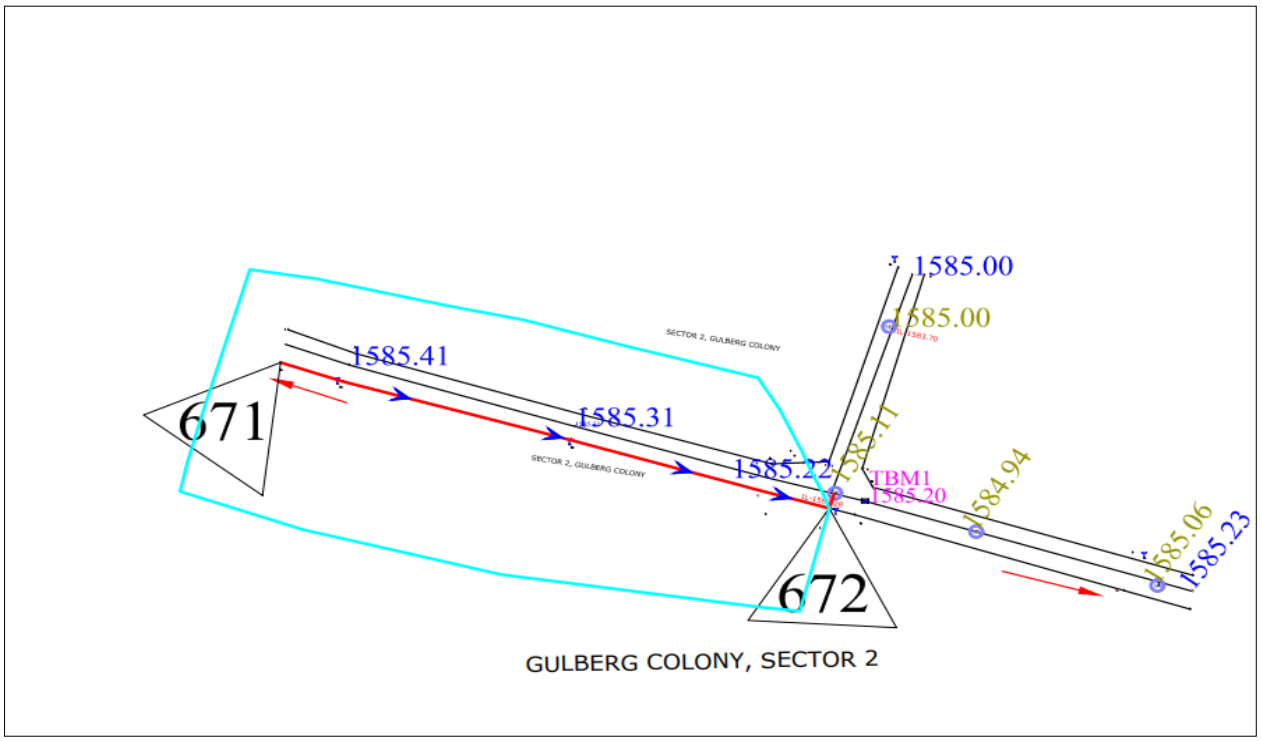

RAILWAY BRIDGE
HARDWARE SHOP
MARBAL SHOP
SHOP
NOORNAI COLONY PEERBAGH
NOORNAI COLONY PEERBAGH
JK PUBLIC SCHOOL
ROSE AVENUE
PEERBAGH BRIDGE
CANAL
483
485
486
487
495

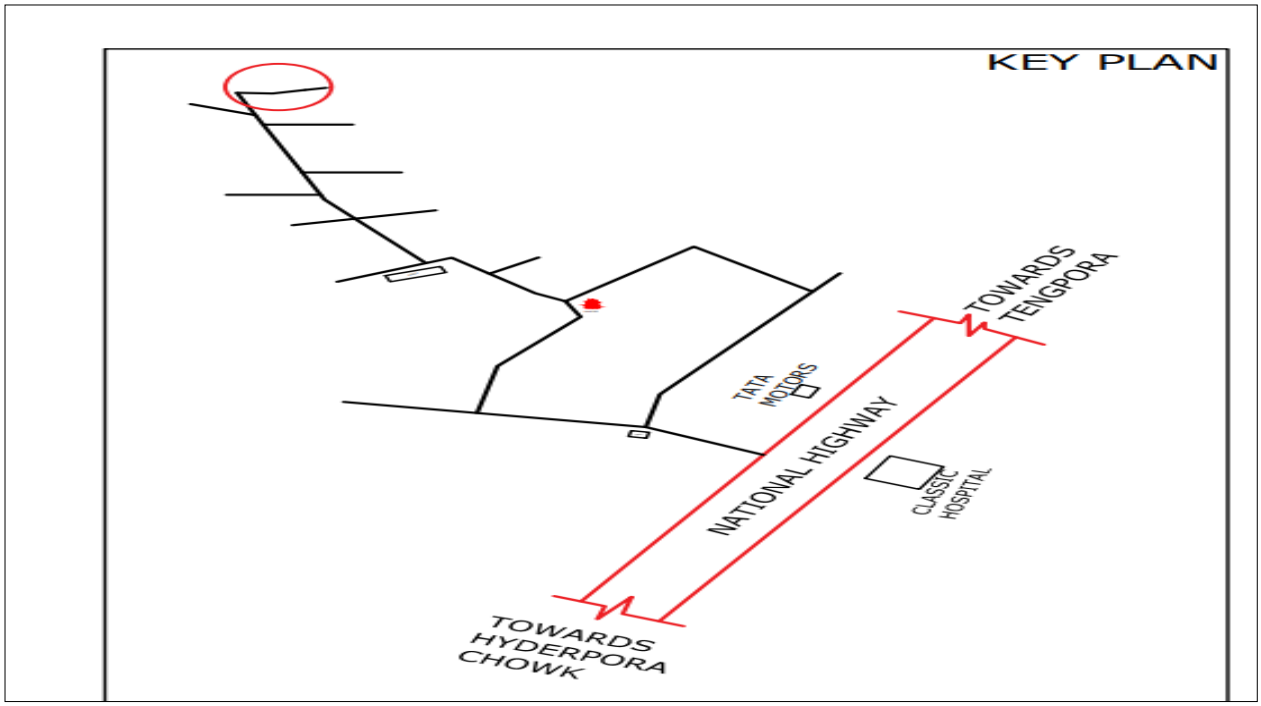

HURIYAT OFFICE
1588.420
Private Property
Maruti True Value
<<<TOWARDS HYDERPORA
HOTEL HERITAGE
GREEN AVENUE
352
353
1586.95
1586.73
1586.85
Existing IL -
TOWARDS HUMHAMA>>>
INTERNATIONAL ISLAMIC SCHOOL

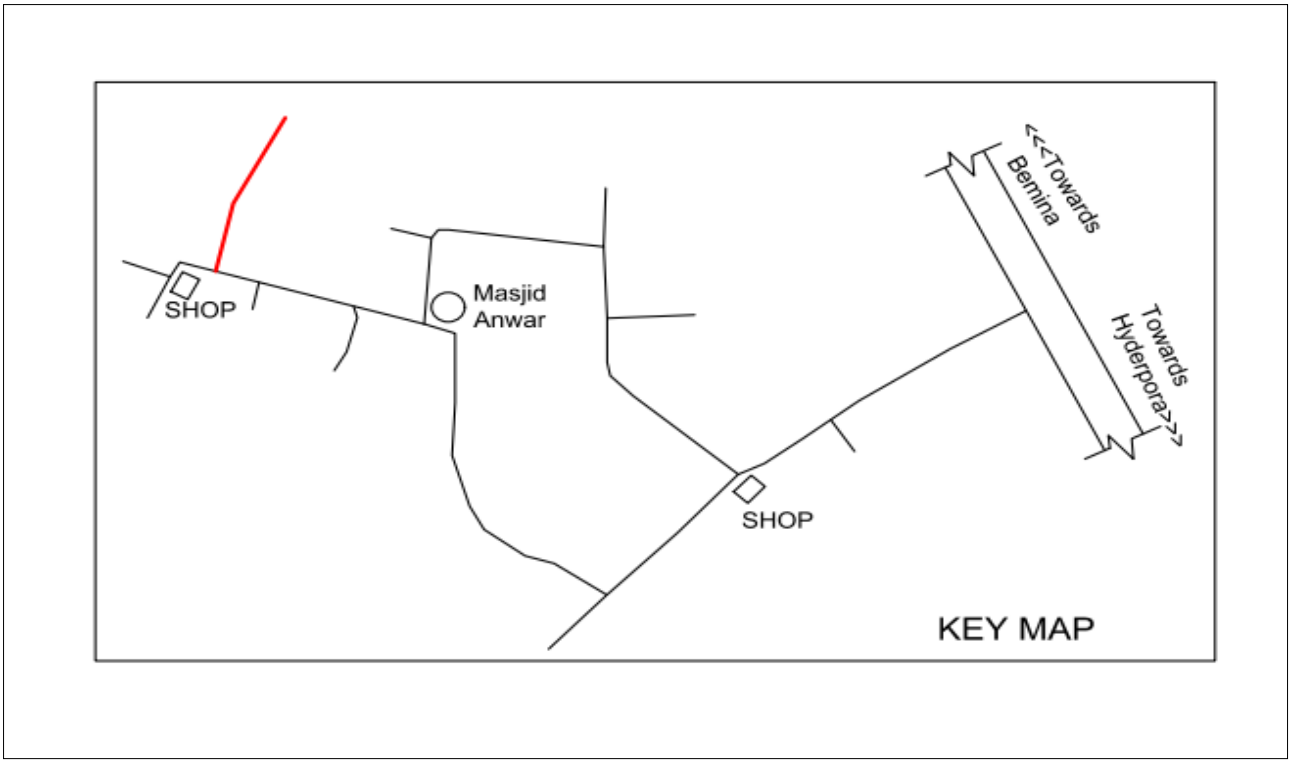

UMARABAD, SECTOR-B
Existing IL -
1585.18
1586.13
1586.17
1586.20
1586.23
1586.25
363
1585.98
UMARABAD, SECTOR-C
1585.97
364
1586.09
1586.22
1585.98
1585.95
POLICE HEAD QUARTERS
PUMP HOUSE
1585.97
Existing IL -
1581.675
COPERATIVE COLONY
Canal
Humhama Bridge

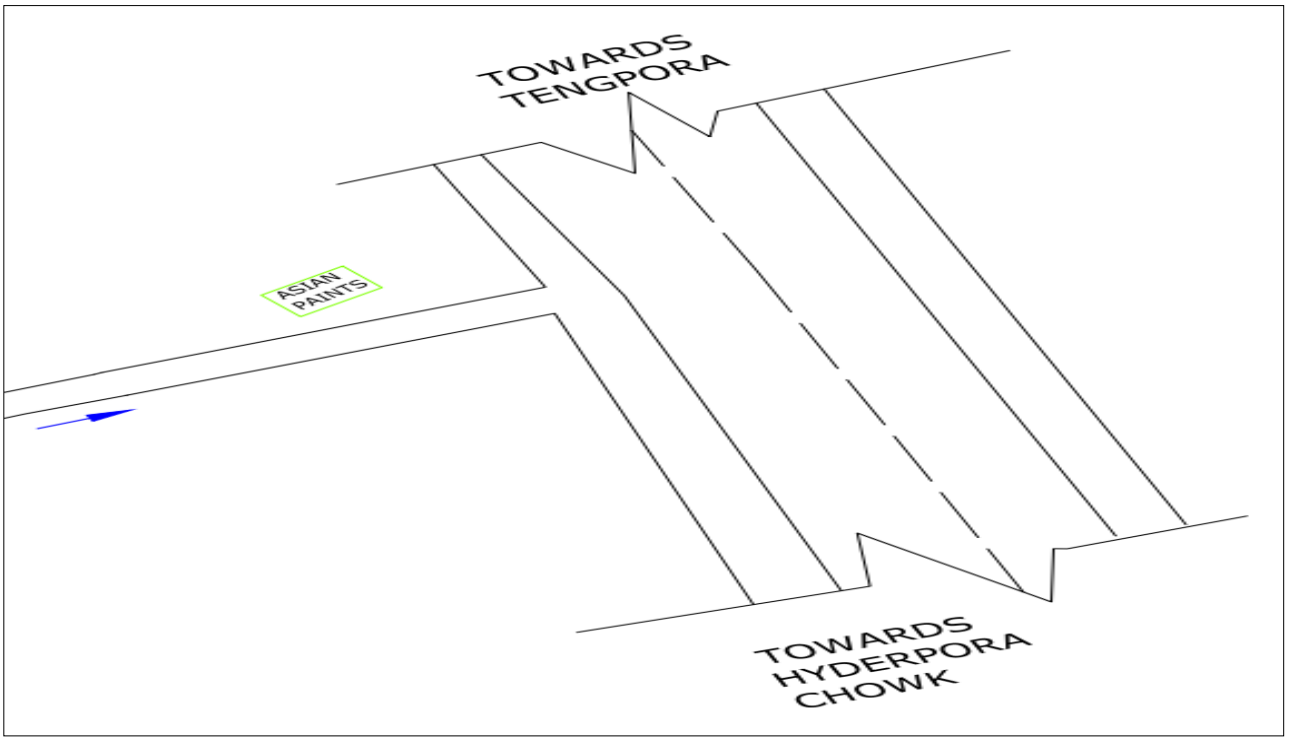

EID GAH
CHAMPORA BRIDGE
Existing IL - 1592.09 M DIA - 700 MM
326
325
329
328
MASJID COLONY
327
330
MASJID
IL - 1592.245 m DIA - 700 MM
333
NAITIPORA

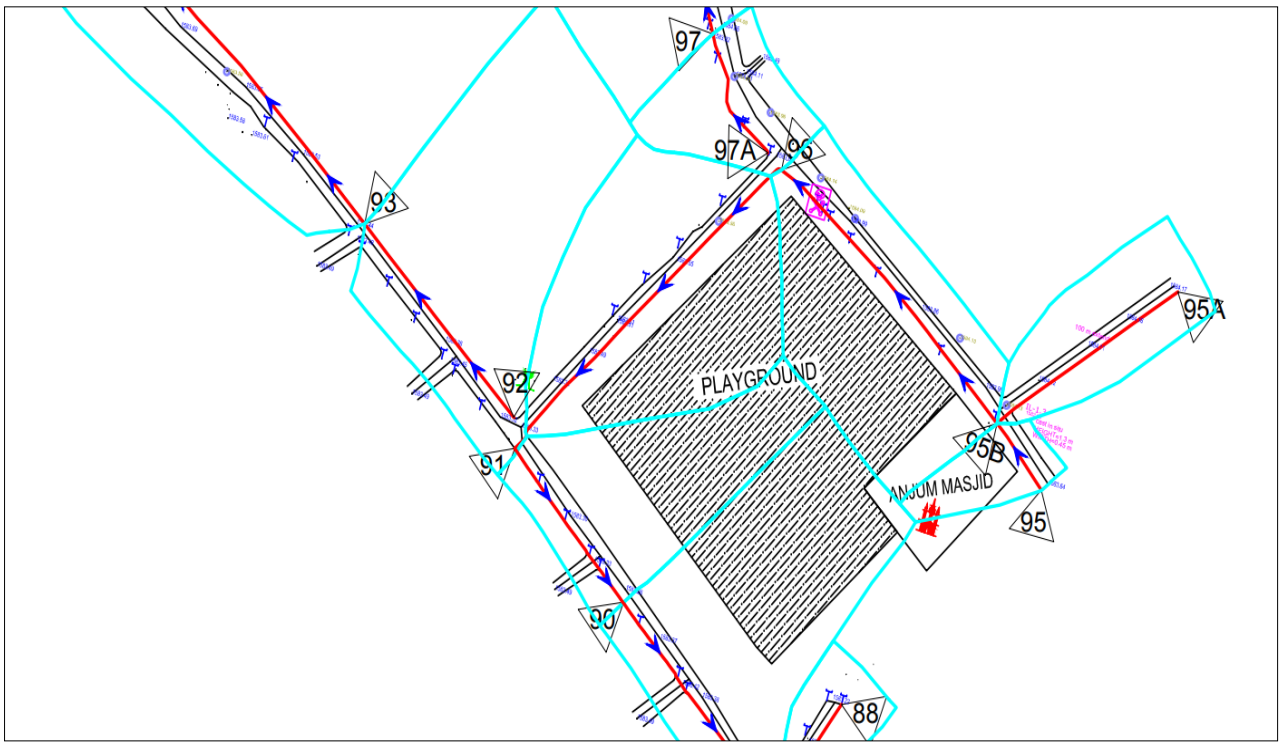

MOSQUE
GRAVE YARD
PETROL PUMP
HYDERPORA FLYOVER
TOWARDS PARRYPORA
I.Q. Mall
TOWARDS SANAT NAGAR

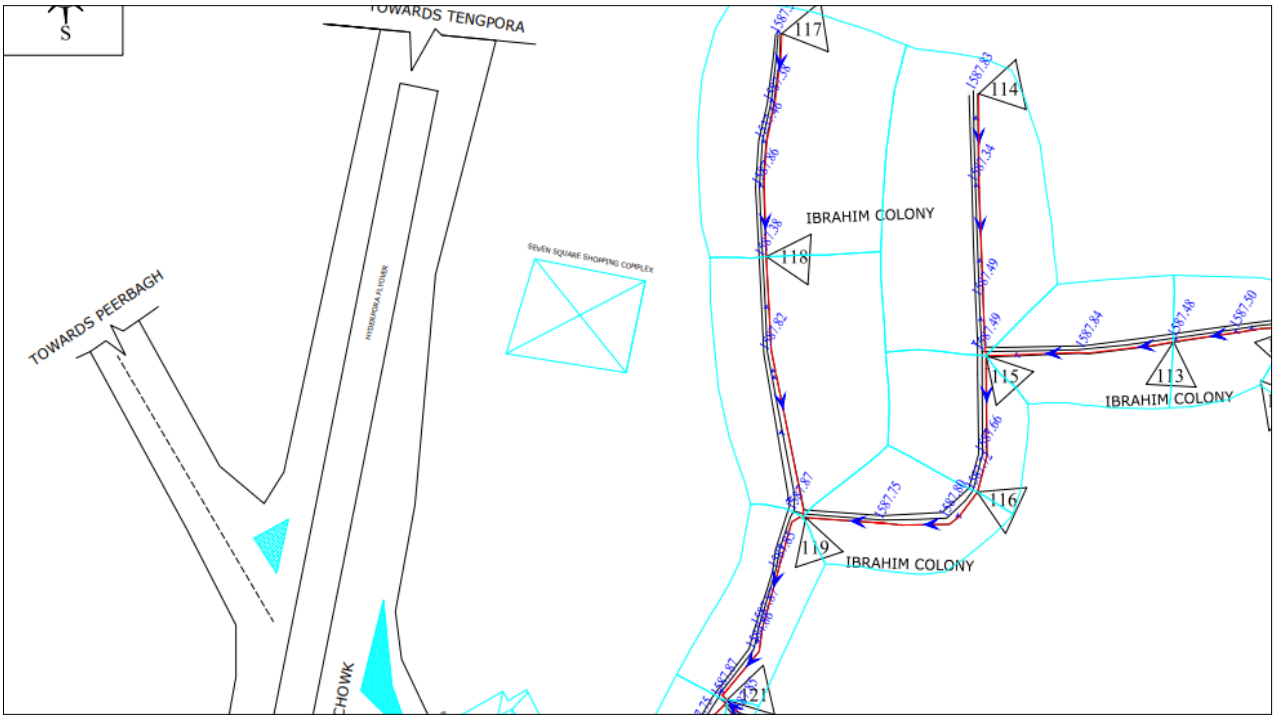

1585.00
1585.00
1585.41
671
1585.31
1585.22
1585.11
TBM1
1585.20
1584.94
1585.06
1585.23
672
GULBERG COLONY, SECTOR 2

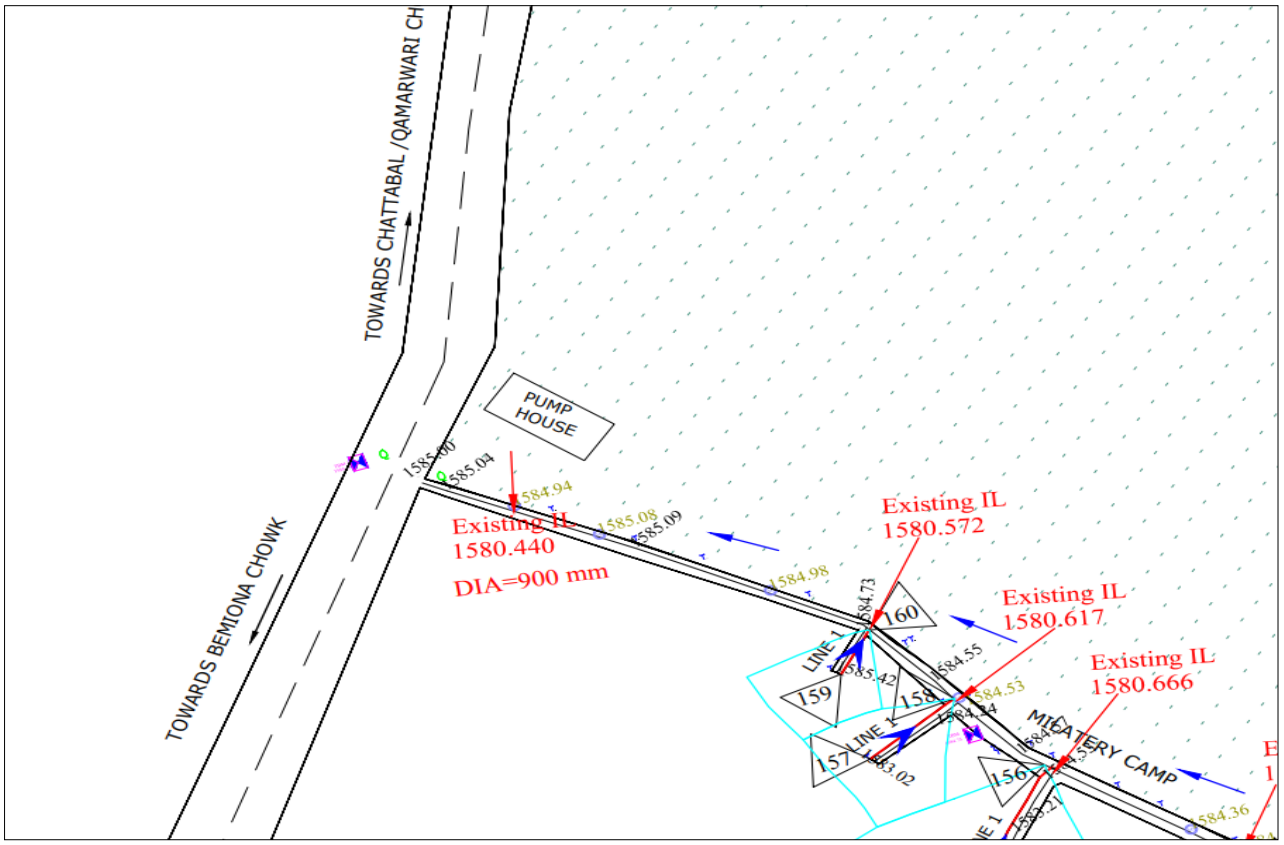

KEY PLAN
TOWARDS TENGPORA
TATA MOTORS
NATIONAL HIGHWAY
CLASSIC HOSPITAL
TOWARDS HYDERPORA CHOWK

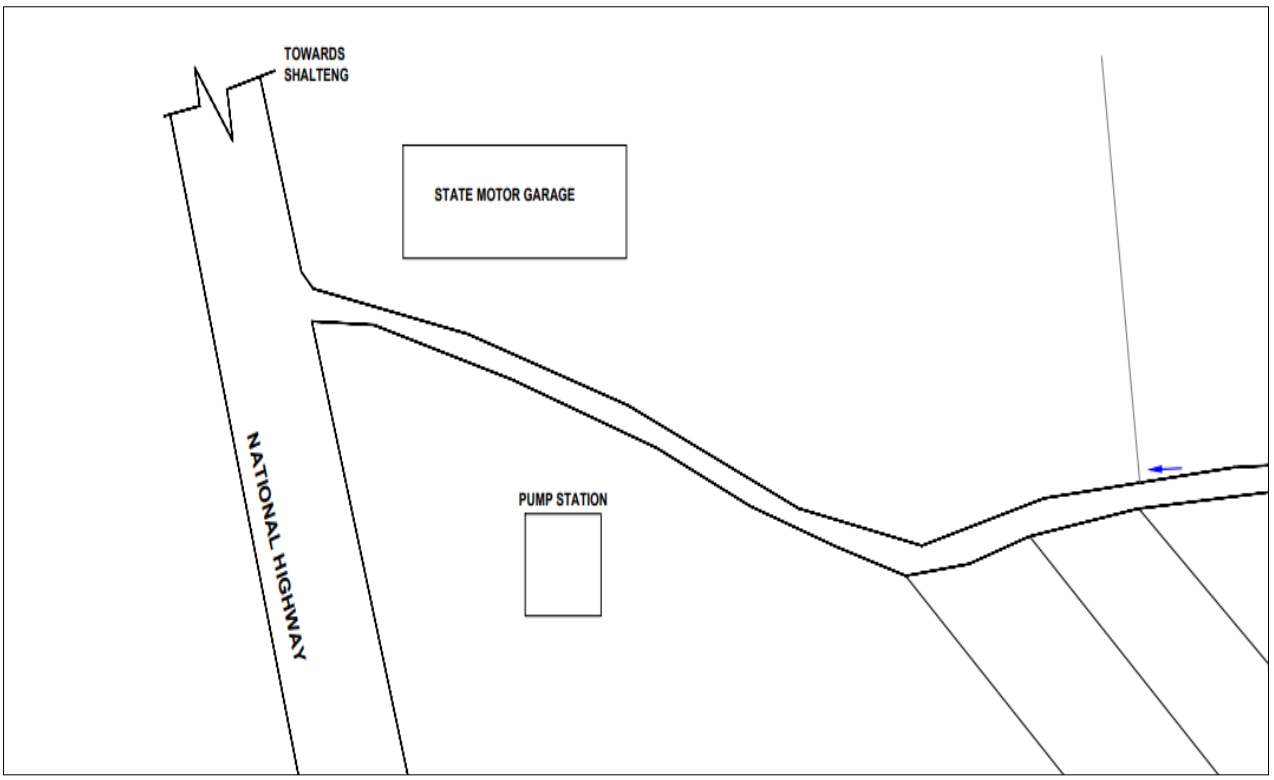

<<<Towards Bemina
Towards Hyderpora>>>
SHOP
Masjid Anwar
SHOP
KEY MAP

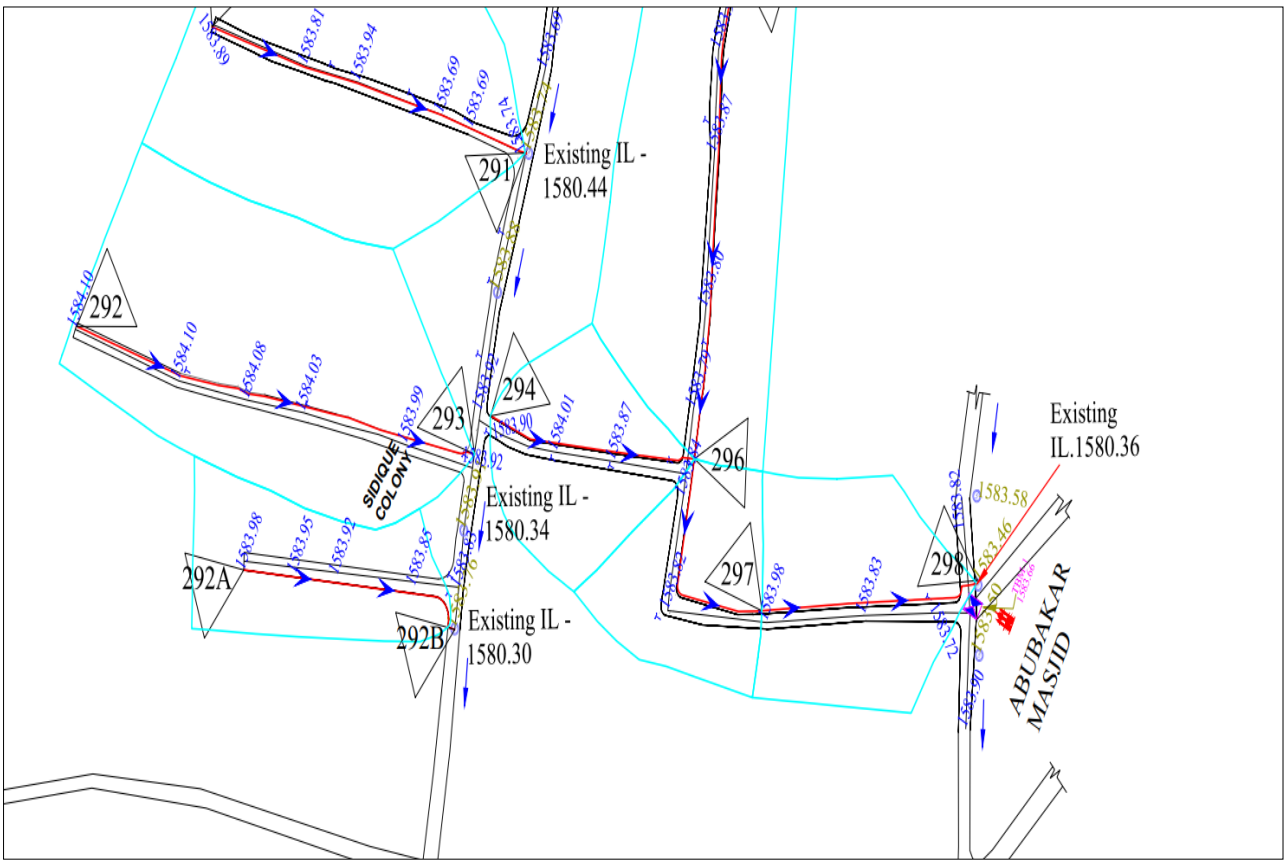

TOWARDS TENGPORA
ASIAN PAINTS
TOWARDS HYDERPORA CHOWK

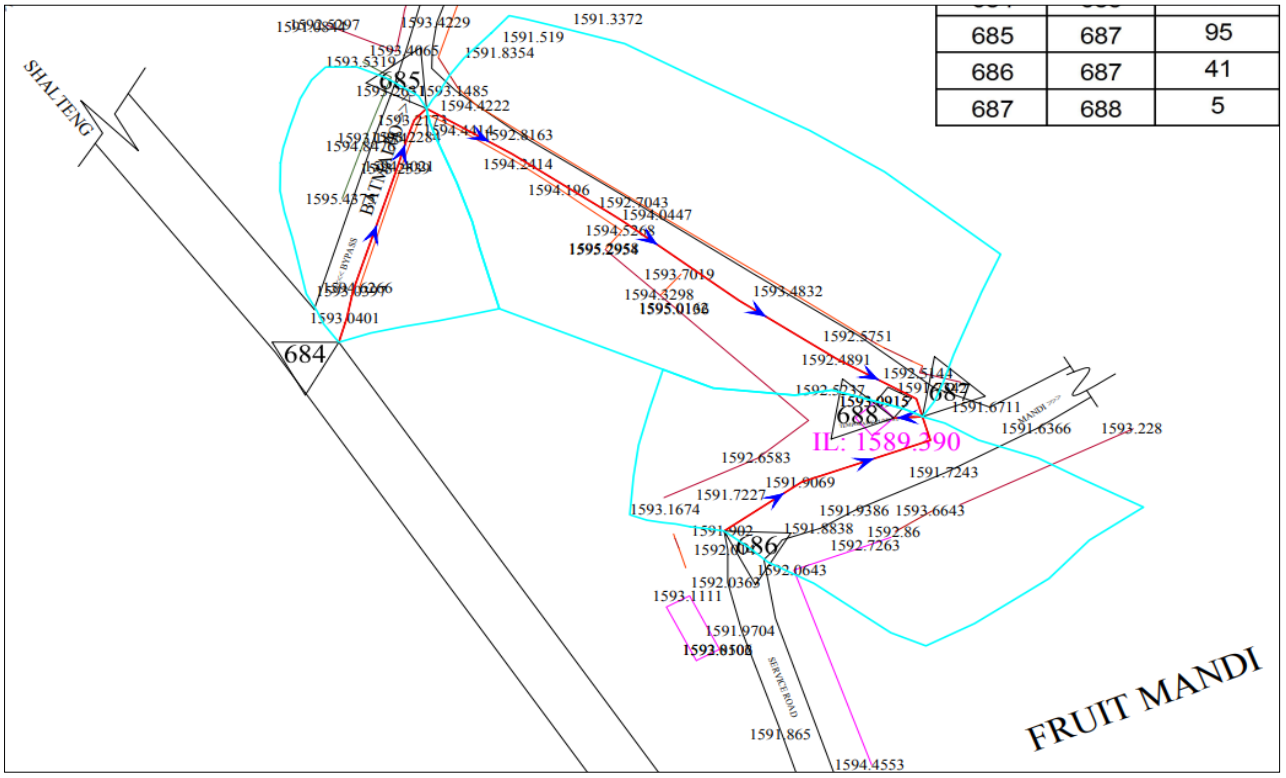

97
97A
96
93
95A
92
PLAYGROUND
91
ANJUM MASJID
95
90
88


S
TOWARDS TENGPORA
TOWARDS PEERBAGH
SEVEN SQUARE SHOPPING COMPLEX
117
114
IBRAHIM COLONY
118
115
113
IBRAHIM COLONY
116
119
IBRAHIM COLONY
121

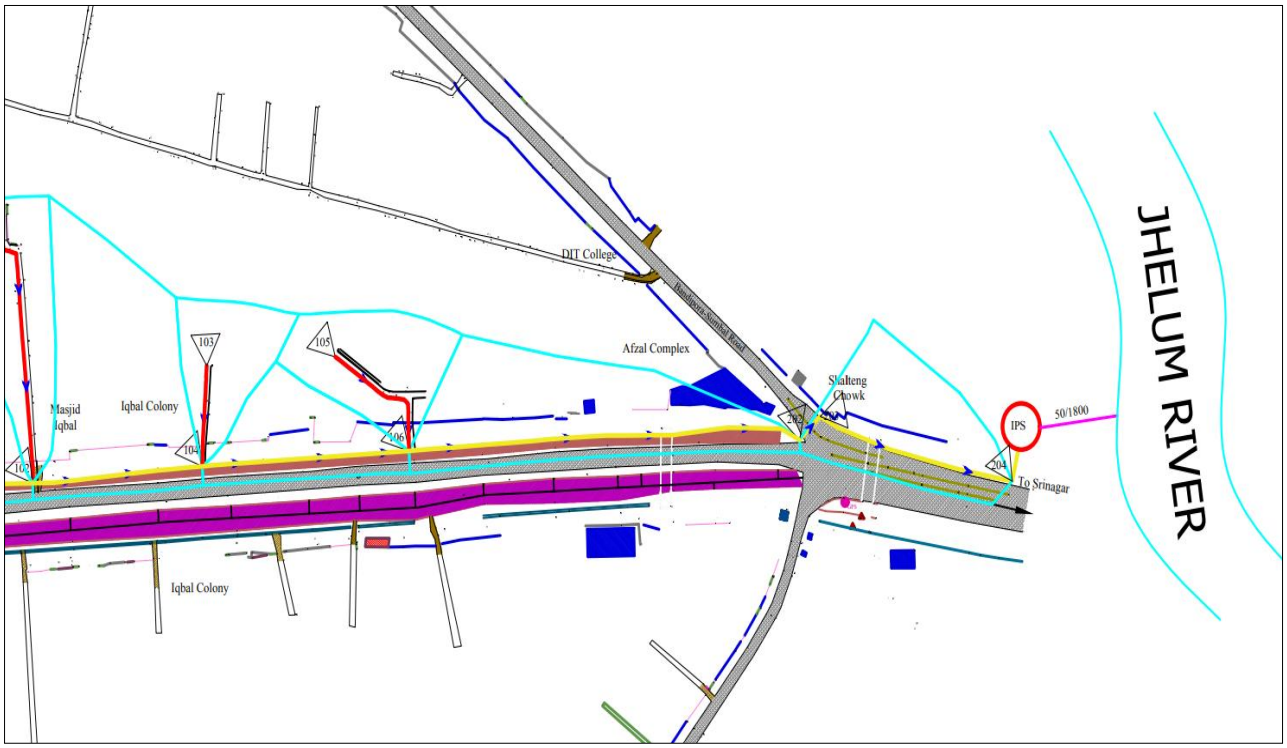

TOWARDS CHATTABAL /QAMARWARI CH
TOWARDS BEMIONA CHOWK
PUMP HOUSE
1585.00
1585.04
1584.94
Existing IL
1580.440
DIA=900 mm
1585.08
1585.09
1584.98
Existing IL
1580.572
1584.73
160
LINE 1
Existing IL
1580.617
159
1585.42
1584.55
158
1584.53
Existing IL
1580.666
LINE 1
157
1583.02
MILITERY CAMP
156
1584.36

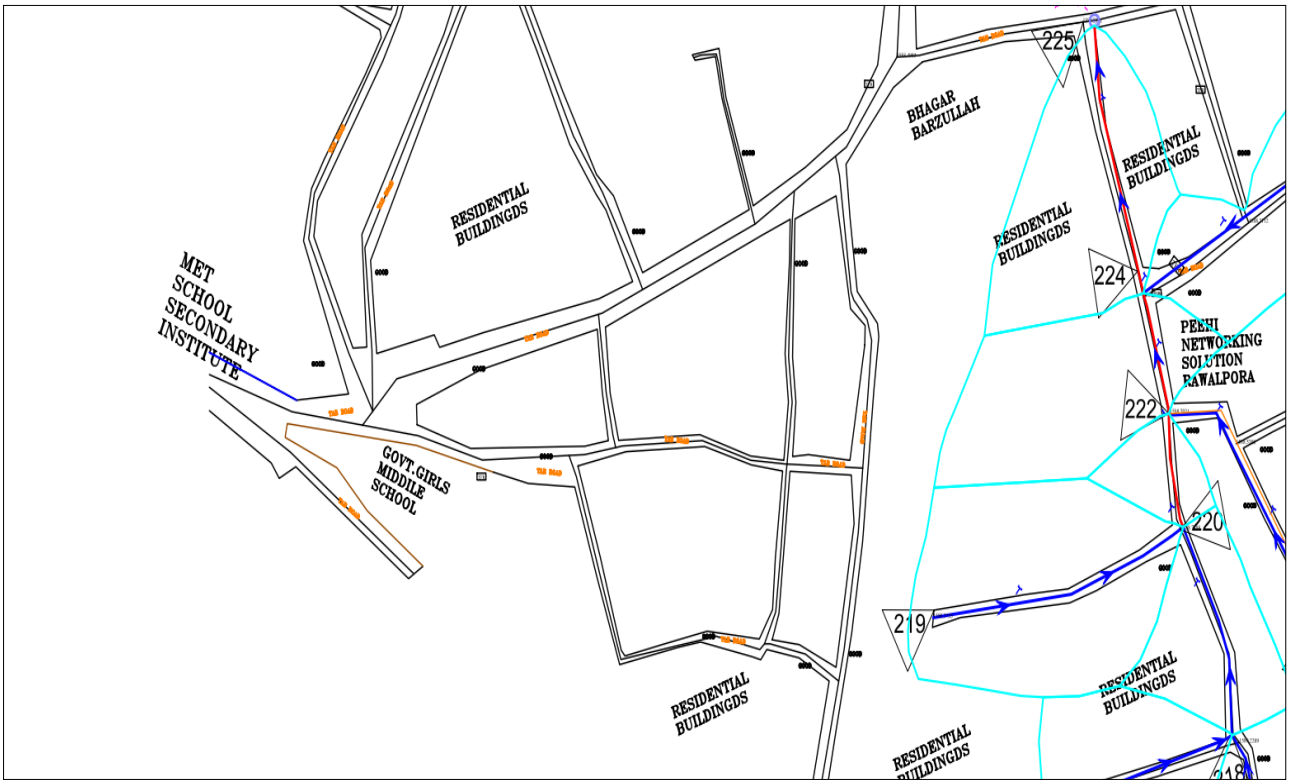

TOWARDS
SHALTENG
STATE MOTOR GARAGE
NATIONAL HIGHWAY
PUMP STATION



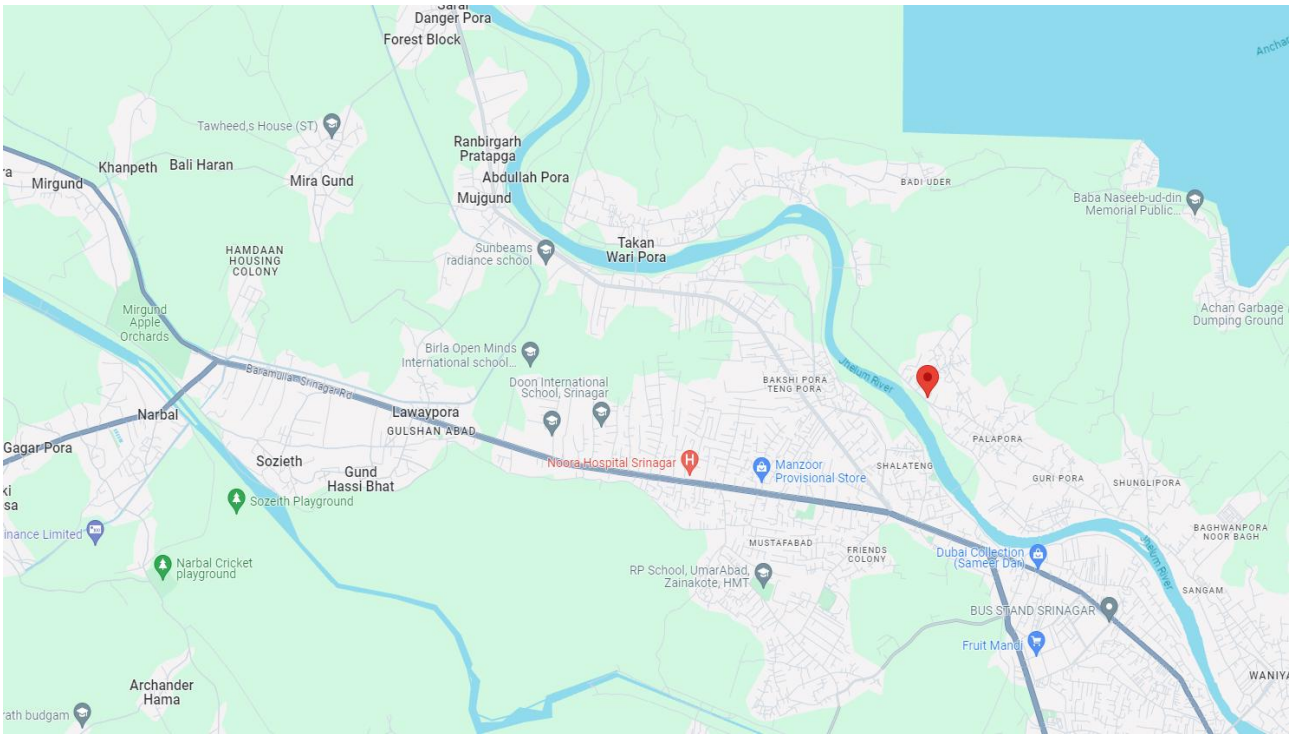




| | | |
|---|---|---|
| 685 | 687 | 95 |
| 686 | 687 | 41 |
| 687 | 688 | 5 |

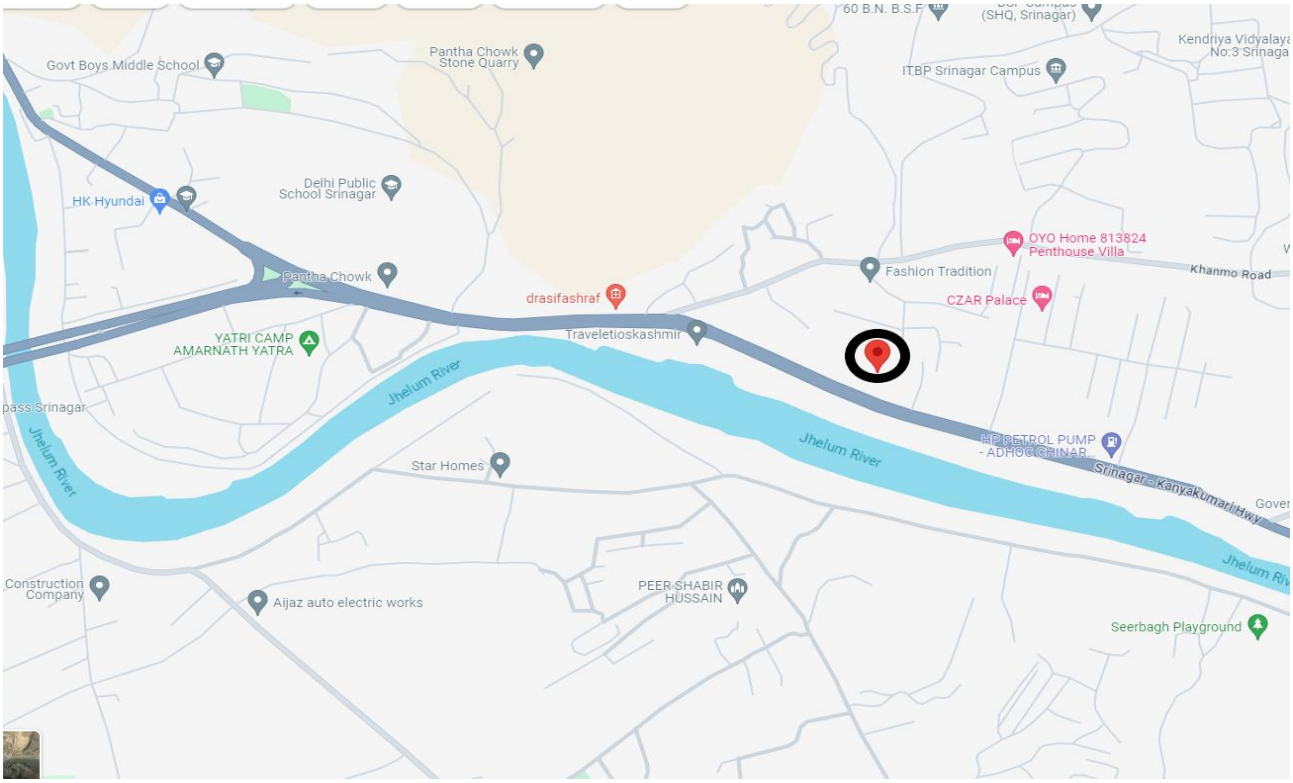



**Missing Links Zone-I**




**Palpora Pumping Station (Zone-II)**




**Sempora Pumping Station (Zone-II)**

# END OF REPORT