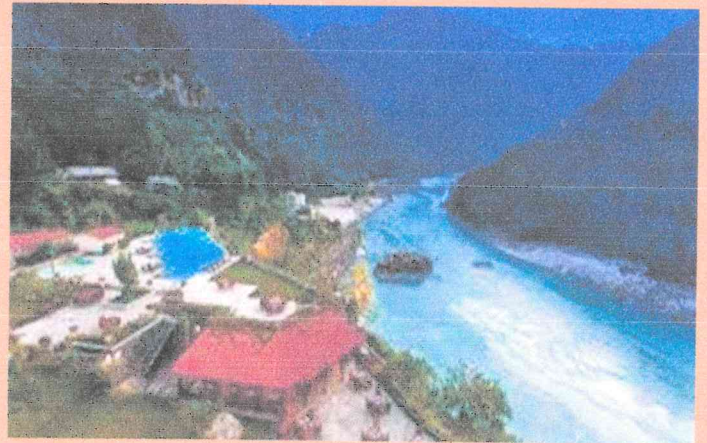




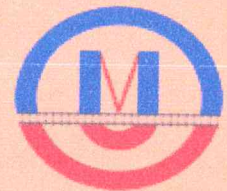
● **FEASIBILITY REPORT ON RISHIKESH TO NEELKANTH
MAHADEV TEMPLE ROPEWAY**



● **22nd January 2022**

Prepared for:

**Uttarakhand Metro Rail, Urban Infrastructure &
Buildings Construction Corporation Limited,
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PREFACE

This feasibility report is updated as per Expenditure Finance Committee(EFC) recommendation held on 30/12/2022 & 15/02/2023, and modifications at Neelkanth Ropeway Station and provision of dedicated path of ropeway has been incorporated accordingly.

(COMPANY SECRETARY)



Disclaimer:

This Feasibility Report has been prepared by Indian Port Rail & Ropeway Corporation Limited (IPRCL) formerly known as Indian Port Rail Corporation Limited with a clear conscience based on our experience with similar projects and should support the project initiators to take the right decisions regarding the development of the ropeway Project for Neelkanth Mahadev Temple. Any future decisions are in the sole responsibility of the project initiators, Indian Port Rail & Ropeway Corporation Limited cannot be made liable for any decisions.

This Feasibility Report has originally been prepared in English language. The current Study displays all the information available at the time of conducting the study.



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INDEX OF ABBREVIATIONS

| | |
|--------------|---|
| IPRCL | Indian Port Rail & Ropeway Corporation Limited |
| STP | Sewerage Treatment Plant |
| PMC | Project Management Consultancy |
| DPR | Detailed Project Report |
| LTP | Lower Terminal Point |
| UTP | Upper Terminal Point |
| ACF | Annual Concession Fee |
| VGf | Viability Gap Funding |
| IRR | Internal Rate of Return |
| CAGR | Compound Annual Growth Rate |
| MDG | Monocable Detachable Gondola |
| EIA | Environmental Impact Assessment |
| BOO | Build- Own - Operate |
| BOOT | Build- Own – Operate – Transfer |
| BOT | Build- Operate- Transfer |
| DBO | Design- Build- Operate |
| DBM | Design – Build – Maintain |
| BDO | Build- Develop- Operate |
| DBFOT | Design – Build – Finance - Operate - Transfer |
| MOU | Memorandum of Understanding |
| LPCD | Litre per capita per day |
| PHPDT | Peak Hour Peak Direction Traffic |



1 ABOUT IPRCL

Indian Port Rail & Ropeway Corporation Limited (IPRCL) formerly known as Indian Port Rail Corporation Limited, a first of its kind Joint Venture Company (JVC) between the Major Ports under the Ministry of Ports, Shipping and Waterways and RVNL with the objective to provide efficient rail evacuation systems to Major Ports and to develop ropeways across India.

- The company was registered on 10th July, 2015 as a Public Limited Company under the Companies Act, 2013. Recently IPRCL has been entrusted upon nationwide development of Ropeway Projects.
- IPRCL will play a strategic role and position itself to act as mentor & coordinator for Major Ports Railway systems and Ropeways.
- IPRCL is an interface with Government departments/ agencies and autonomous bodies on strategic issues and also work with consultants for removing bottlenecks.
- Act as consultant for bringing in best practices in areas of IT, processes, systems and other areas related to evacuation of Cargo and development of Ropeways.
- Develop technical and financial competence for undertaking DPR/PMC work.
- Contribute to the role of a Think-tank to develop scalable, workable models in Ropeways & port infrastructure for evacuation of cargo.
- Effectively interface with State Governments for development of Ropeway Projects. Interface with the Indian Railways for addressing issues such as supply of rakes, pre-project approvals and post-project certifications.
- Attract investors and financial resources for development of Ropeway and port evacuation infrastructure projects.

IPRCL has focused on developing affordable and sustainable rope-based transport infrastructure projects in India for the transport of passengers and cargo in remote and mountainous areas.



1.1 IPRCL IN ROPEWAYS

For Ropeway, IPRCL has built up capacity to offer various services like preparation of Feasibility Report and DPR, Bid Process Management and PMC. IPRCL is presently dealing with many Ropeway projects in India. Some of them are two Ropeway Projects in the State of Manipur, two ropeway projects in Tripura, Berm park to Bhavani Island ropeway in the state of Andhra Pradesh and Ropeway Projects in Kanyakumari, Naina Devi Ji to Anandpur Sahib Ji in Himachal Pradesh and Punjab etc. IPRCL also working with MMRDA to develop urban ropeway in the city of Mumbai.

IPRCL offer following consultation services in respect of Ropeway Projects:

Table 1:1 IPRCL work

| Sr. No. | Name of the Service | No. of Ropeway Project |
|---------|--|------------------------|
| 1 | Preparation of Feasibility Report/ DPR | 29 Nos |
| 2 | Bid Process Management | 10 Nos |
| 3 | PMC | 1 Nos |
| 4 | Safety Certification | 1 Nos |

For Detailed Project Report, IPRCL undertakes reconnaissance survey to fix up the tentative alignment of the Ropeway. The details of service include

- Preliminary survey of Ropeway site by team of IPRCL ropeway experts.
- Identifying suitable locations for lower station and upper station
- Selection of Ropeway Alignment
- Detailed Study of the selected alignment
 - ❖ Traffic Study.
 - ❖ Topography Survey and Geo- Tech investigation
 - ❖ Ropeway System selection based on survey.
 - ❖ Project Cost Estimation
 - ❖ EIA Inputs



❖ Financial Analysis

1.2 CONTACT DETAILS

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2 UTTARAKHAND

Uttarakhand formerly known as 'Uttaranchal' became the 27th state of India on November 09, 2000 carved out from Himalayan and north-western parts of Uttar Pradesh. Today Uttarakhand is also called Devbhumi (Land of Gods) due to the presence of too many Hindu Temples and pilgrimage centers throughout the state. Borders of Uttarakhand state are surrounded by Tibet on its north, Nepal on its east, Uttar Pradesh on its south, Himachal Pradesh on its west & north-west as well and Haryana on its south-west corner. Large number of tourists from other parts of India and abroad as well visit the state every year.



Figure 2:1 Uttarakhand Map

The state of Uttarakhand is broadly divided into two divisions namely (i) Garhwali and (ii) Kumauni and has 13 districts in all with its interim capital as Dehradun. The natives of the state are generally called Uttarakhand and the official language of the state is Hindi. Uttarakhand has a total area of 53,483 sq kms out of which 86% is



mountainous and 65% is covered by forests. Most of the northern parts of the state is covered by high Himalayan peaks and glaciers. Two of most important rivers originate in the region i.e. the Ganges at Gangotri and the Yamuna at Yamunotri.

Uttarakhand lies on the southern slope of the Himalaya range as a result the climate and vegetation vary greatly with elevation from glaciers at the highest elevations to subtropical forests at the lower elevations. Among the prominent local crafts is wood carving, which appears most frequently in the ornately decorated temples of Uttarakhand. Intricately carved designs of floral patterns, deities, and geometrical motifs also decorate the doors, windows, ceilings, and walls of village houses. Paintings and murals are used to decorate both homes and temples. Pahari painting is a form of painting that flourished in the region between the 17th and 19th century. Kumauni art often is geometrical in nature, while Garhwali art is known for its closeness to nature. Other crafts of Uttarakhand include handcrafted gold jewellery, basketry from Garhwal, woollen shawls, scarves, and rugs. The latter are mainly produced by the Bhotiyas of northern Uttarakhand.

The Uttarakhand state is the second fastest growing state in India. Its gross state domestic product (GSDP) (at constant prices) has more than doubled from 24,786 crore in FY2005 to 60,898 crores in FY2012. The real GSDP grew at 13.7% (CAGR) during the FY2005–FY2012 period. Like most of India, agriculture is one of the most significant sectors of the economy of Uttarakhand. Basmati rice, wheat, soybeans, groundnuts, coarse cereals, pulses, and oil seeds are the most widely grown crops. Fruits like apples, oranges, pears, peaches, litchis, and plums are widely grown and important to the large food processing industry.

2.1 Geography

Uttarakhand has a total area of 53,483 km² (20,650 sq mi), of which 86% is mountainous and 65% is covered by forest. Most of the northern part of the state is covered by high Himalayan peaks and glaciers. In the first half of the nineteenth century, the expanding development of Indian roads, railways and other physical infrastructure was giving rise to concerns over indiscriminate logging, particularly in the Himalaya. Two of the most important rivers in Hinduism originate in the glaciers of Uttarakhand, the Ganges at Gangotri and the Yamuna at Yamunotri. They are fed



by myriad lakes, glacial melts and streams. These two along with Badrinath and Kedarnath form the Chota Char Dham, a holy pilgrimage for the Hindus.

The state hosts the Bengal tiger in Jim Corbett National Park, the oldest national park of the Indian subcontinent. The Nanda Devi and Valley of Flowers National Parks, a UNESCO World Heritage Site located in the upper expanses of Bhyundar Ganga near Joshimath in Gharwal region, is known for the variety and rarity of its flowers and plants. One who raised this was Sir Joseph Dalton Hooker, Director of the Royal Botanic Gardens, Kew, who visited the region. As a consequence, Lord Dalhousie issued the Indian Forest Charter in 1855, reversing the previous laissez-faire policy. The following Indian Forest Act of 1878 put Indian forestry on a solid scientific basis. A direct consequence was the founding of the Imperial Forest School at Dehradun by Dietrich Brandis in 1878. Renamed the 'Imperial Forest Research Institute' in 1906, it is now known as the Forest Research Institute.

The model "Forest Circles" around Dehradun, used for training, demonstration and scientific measurements, had a lasting positive influence on the forests and ecology of the region. The Himalayan ecosystem provides habitat for many animals (including bharal, snow leopards, leopards and tigers), plants, and rare herbs.

Uttarakhand lies on the southern slope of the Himalaya range, and the climate and vegetation vary greatly with elevation, from glaciers at the highest elevations to subtropical forests at the lower elevations. The highest elevations are covered by ice and bare rock. Below them, between 3,000 and 5,000 metres (9,800 and 16,400 ft) are the western Himalayan alpine shrub and meadows. The temperate western Himalayan subalpine conifer forests grow just below the tree line. At 3,000 to 2,600 metres (9,800 to 8,500 ft) elevation they transition to the temperate western Himalayan broadleaf forests, which lie in a belt from 2,600 to 1,500 metres (8,500 to 4,900 ft) elevation. Below 1,500 metres (4,900 ft) elevation lie the Himalayan subtropical pine forests. The Upper Gangetic Plains moist deciduous forests and the drier Terai-Duar savanna and grasslands cover the lowlands along the Uttar Pradesh border in a belt locally known as Bhabar. These lowland forests have mostly been cleared for agriculture, but a few pockets remain.



In June 2013 several days of extremely heavy rain caused devastating floods in the region, resulting in more than 5000 people missing and presumed dead. The flooding was referred to in the Indian media as a "Himalayan Tsunami".

2.2 Demography

According to the 2011 Census of India, Uttarakhand has a population of 10,086,292 comprising 5,137,773 males and 4,948,519 females, with 69.77% of the population living in rural areas. The state is the 20th most populous state of the country having 0.83% of the population on 1.63% of the land. The population density of the state is 189 people per square kilometer having a 2001–2011 decadal growth rate of 18.81%. The gender ratio is 963 females per 1000 males.

2.3 Transport

Uttarakhand has 28,508 km (17,714 mi) of roads, of which 1,328 km (825 mi) are national highways and 1,543 km (959 mi) are state highways. The State Road Transport Corporation (SRTC), which has been reorganised in Uttarakhand as the Uttarakhand Transport Corporation (UTC), is a major constituent of the transport system in the state. The Corporation began to work on 31 October 2003 and provides services on interstate and nationalised routes. As of 2012, approximately 1000 buses are being plied by the UTC on 35 nationalised routes along with many other non-nationalised routes. There are also private transport operators operating approximately 3000 buses on non-nationalised routes along with a few interstate routes in Uttarakhand and the neighbouring state of U.P. For travelling locally, the state, like most of the country, has auto rickshaws and cycle rickshaws. In addition, remote towns and villages in the hills are connected to important road junctions and bus routes by a vast network of crowded share jeeps.

The air transport network in the state is gradually improving. Jolly Grant Airport in Dehradun is the busiest airport in the state with six daily flights to Delhi Airport. Pantnagar Airport, located in Pantnagar of the Kumaon region have 1 daily air service to delhi and return too. There government is planning to develop Naini Saini Airport in Pithoragarh, Bharkot Airport in Chinyalisaur in Uttarkashi district and Gauchar Airport in Gauchar, Chamoli district. There are plans to launch helipad service in Pantnagar and Jolly Grant Airports and other important tourist destinations like Ghangaria and Hemkund Sahib.



As over 86% of Uttarakhand's terrain consists of hills, railway services are very limited in the state and are largely confined to the plains. In 2011, the total length of railway tracks was about 345 km (214 mi). Rail, being the cheapest mode of transport, is most popular. The most important railway station in Kumaun Division of Uttarakhand is at Kathgodam, 35 kilometres away from Nainital. Kathgodam is the last terminus of the broad gauge line of North East Railways that connects Nainital with Delhi, Dehradun, and Howrah. Other notable railway stations are at Pantnagar, Lalkuan and Haldwani.

Dehradun railway station is a railhead of the Northern Railways. Haridwar station is situated on the Delhi–Dehradun and Howrah–Dehradun railway lines. One of the main railheads of the Northern Railways, Haridwar Junction Railway Station is connected by broad gauge line. Roorkee comes under Northern Railway region of Indian Railways on the main Punjab – Mughal Sarai trunk route and is connected to major Indian cities. Other railheads are Rishikesh, Kotdwar and Ramnagar linked to Delhi by daily trains.

2.4 Economy

The Uttarakhand state is the second fastest growing state in India. Its gross state domestic product (GSDP) (at constant prices) more than doubled from ₹24,786 crore in FY2005 to ₹60,898 crore in FY2012. The real GSDP grew at 13.7% (CAGR) during the FY2005–FY2012 period. The contribution of the service sector to the GSDP of Uttarakhand was just over 50% during FY 2012. Per capita income in Uttarakhand is ₹ 198738 (FY 2018–19), which is higher than the national average of ₹ 126406 (FY 2018–19). According to the Reserve Bank of India, the total foreign direct investment in the state from April 2000 to October 2009 amounted to US\$46.7 million.

Like most of India, agriculture is one of the most significant sectors of the economy of Uttarakhand. Basmati rice, wheat, soybeans, groundnuts, coarse cereals, pulses, and oil seeds are the most widely grown crops. Fruits like apples, oranges, pears, peaches, lychees, and plums are widely grown and important to the large food processing industry. Agricultural export zones have been set up in the state for lychees, horticulture, herbs, medicinal plants, and basmati rice. During 2010, wheat production was 831 thousand tonnes and rice production was 610 thousand tonnes, while the main cash crop of the state, sugarcane, had a production of 5058 thousand



tonnes. As 86% of the state consists of hills, the yield per hectare is not very high. 86% of all croplands are in the plains while the remaining is from the hills. The state also holds the GI tag for Tejpatta (*Cinnamomum tamala*) or Indian bay leaf, which is known to add flavour to dishes and also possesses several medicinal properties.

Other key industries include tourism and hydropower, and there is prospective development in IT, ITES, biotechnology, pharmaceuticals and automobile industries. The service sector of Uttarakhand mainly includes tourism, information technology, higher education, and banking.[84]

During 2005–2006, the state successfully developed three Integrated Industrial Estates (IIEs) at Haridwar, Pantnagar, and Sitarganj; Pharma City at Selakui; Information Technology Park at Sahastradhara (Dehradun); and a growth centre at Sigaddi (Kotdwar). Also in 2006, 20 industrial sectors in public private partnership mode were developed in the state.

2.5 Flora and fauna

Uttarakhand has a diversity of flora and fauna. It has a recorded forest area of 34,666 km² (13,385 sq mi), which constitutes 65% of the total area of the state. Uttarakhand is home to rare species of plants and animals, many of which are protected by sanctuaries and reserves. National parks in Uttarakhand include the Jim Corbett National Park (the oldest national park of India) in Nainital and Pauri Garhwal District, and Valley of Flowers National Park & Nanda Devi National Park in Chamoli District, which together are a UNESCO World Heritage Site. A number of plant species in the valley are internationally threatened, including several that have not been recorded from elsewhere in Uttarakhand. Rajaji National Park in Haridwar, Dehradun and Pauri Garhwal District and Govind Pashu Vihar National Park & Gangotri National Park in Uttarkashi District are some other protected areas in the state.

Leopards are found in areas that are abundant in hills but may also venture into the lowland jungles. Smaller felines include the jungle cat, fishing cat, and leopard cat. Other mammals include four kinds of deer (barking, sambar, hog and chital), sloth, Brown and Himalayan black bears, Indian grey mongooses, otters, yellow-throated martens, bharal, Indian pangolins, and langur and rhesus monkeys. In the summer, elephants can be seen in herds of several hundred. Marsh crocodiles (*Crocodylus palustris*), gharials (*Gavialis gangeticus*) and other reptiles are also found in the



region. Local crocodiles were saved from extinction by captive breeding programs and subsequently re-released into the Ramganga river. Several freshwater terrapins and turtles like the Indian sawback turtle (*Kachuga tecta*), brahminy river turtle (*Hardella thurgii*), and Ganges softshell turtle (*Trionyx gangeticus*) are found in the rivers. Butterflies and birds of the region include red helen (*Papilio helenus*), the great eggfly (*Hypolimnos bolina*), common tiger (*Danaus genutia*), pale wanderer (*Pareronia avatar avatar*), jungle babbler, tawny-bellied babbler, great slaty woodpecker, red-breasted parakeet, orange-breasted green pigeon and chestnut-winged cuckoo. In 2011, a rare migratory bird, the bean goose, was also seen in the Jim Corbett National Park. A critically endangered bird, last seen in 1876 is the Himalayan quail endemic to the western Himalayas of the state.



Alpine Musk Deer



Golden Mahseer

Evergreen oaks, rhododendrons, and conifers predominate in the hills. sal (*Shorea robusta*), silk cotton tree (*Bombax ciliata*), *Dalbergia sissoo*, *Mallotus philippensis*, *Acacia catechu*, *Bauhinia racemosa*, and *Bauhinia variegata* (camel's foot tree) are some other trees of the region. *Albizia chinensis*, the sweet sticky flowers of which are favoured by sloth bears, are also part of the region's flora. A decade long study by Prof. Chandra Prakash Kala concluded that the Valley of Flowers is endowed with 520 species of higher plants (angiosperms, gymnosperms and pteridophytes), of these 498 are flowering plants. The park has many species of medicinal plants including *Dactylorhiza hatagirea*, *Picrorhiza kurroa*, *Aconitum violaceum*, *Polygonatum multiflorum*, *Fritillaria roylei*, and *Podophyllum hexandrum*. In the summer season of 2016, a large portion of forests in Uttarakhand caught fires and rumbled to ashes during Uttarakhand forest fires incident, which resulted in the damage of forest resources worth billions of rupees and death of 6 people with hundreds of wild animals died during fires.



Brahma Kamal



Burans

About 18,000 plant species have been recognised in the state out of which 1,800 are deemed to be of medicinal value. The government-run Herbal Research and Development Institute carries out research and helps conserve medicinal herbs that are found in abundance in the region. Local traditional healers still use herbs, in accordance with classical Ayurvedic texts, for diseases that are usually cured by modern medicine.

2.6 Tourism

Uttarakhand has many tourist spots due to its location in the Himalayas. There are many ancient temples, forest reserves, national parks, hill stations, and mountain peaks that draw large number of tourists. There are 44 nationally protected monuments in the state. Oak Grove School in the state is on the tentative list for World Heritage Sites. Two of the most holy rivers in Hinduism the Ganges and Yamuna, originate in Uttarakhand. Binsar Devta is a popular Hindu temple in the area.

Uttarakhand has long been called "Land of the Gods" as the state has some of the holiest Hindu shrines, and for more than a thousand years, pilgrims have been visiting the region in the hopes of salvation and purification from sin. Gangotri and Yamunotri, the sources of the Ganges and Yamuna, dedicated to Ganga and Yamuna respectively, fall in the upper reaches of the state and together with Badrinath (dedicated to Vishnu) and Kedarnath (dedicated to Shiva) form the Chota Char Dham, one of Hinduism's most spiritual and auspicious pilgrimage circuits. Haridwar, meaning "Gateway to the God", is a prime Hindu destination. Haridwar hosts the Haridwar Kumbh Mela every twelve years, in which millions of pilgrims take part from all parts of India and the world. Rishikesh near Haridwar is known as the preeminent yoga centre of India. The state has an abundance of temples and



shrines, many dedicated to local deities or manifestations of Shiva and Durga, references to many of which can be found in Hindu scriptures and legends. Uttarakhand is, however, a place of pilgrimage for the adherents of other religions too. Piran Kaliyar Sharif near Roorkee is a pilgrimage site to Muslims, Gurudwara Darbar Sahib, in Dehradun, Gurudwara Hemkund Sahib in Chamoli district, Gurudwara Nanakmatta Sahib in Nanakmatta and Gurudwara Reetha Sahib in Champawat district are pilgrimage centres for Sikhs. Tibetan Buddhism has also made its presence with the reconstruction of Mindrolling Monastery and its Buddha Stupa, described as the world's highest at Clement Town, Dehradun. Auli and Munsiri are well-known skiing resorts in the state.



Rishikesh



Kedarnath

The state has 12 National Parks and Wildlife Sanctuaries, which cover 13.8 percent of the total area of the state. They are located at different altitudes varying from 800 to 5400 metres. The oldest national park on the Indian sub-continent, Jim Corbett National Park, is a major tourist attraction.

Vasudhara Falls, near Badrinath is a waterfall with a height of 122 metres (400 ft) set in a backdrop of snow-clad mountains. The state has always been a destination for mountaineering, hiking, and rock climbing in India. A recent development in adventure tourism in the region has been whitewater rafting in Rishikesh. Due to its proximity to the Himalaya ranges, the place is full of hills and mountains and is suitable for trekking, climbing, skiing, camping, rock climbing, and paragliding. Roopkund is a trekking site, known for the mysterious skeletons found in a lake, which was featured by National Geographic Channel in a documentary. The trek to Roopkund passes through the meadows of Bugyal.



3 Neelkanth and Rishikesh

3.1 Neelkanth

Neelkanth Mahadev Temple (Hindi: नीलकंठ महादेव मंदिर) is a Hindu temple dedicated to Nilkanth, and aspect of Lord Shiva. The temple is situated at a height of 1330 meters and is located about 32 km from Rishikesh in the Pauri Garhwal district of Uttarakhand, India. The temple architecture is very much influenced by the Dravidian style of temple architecture.

The temple is one of the most revered holy shrines dedicated to Lord Shiva and is a prominent Hindu pilgrimage sites. It is surrounded by dense forests and is adjacent to the mountain ranges of Nar-Narayan. It is enveloped between the valleys of Manikoot, Brahmakoot, and Vishnukoot and is located at the confluence of the rivers Pankaja and Madhumati.

According to Hindu sacred texts, the place where the Neelkanth Mahadev Temple currently stands is the sacred location where Shiva consumed the poison that originated from the sea when Devas (Gods) and Asuras (Demons) churned the ocean in order to obtain Amrita. This poison that emanated during the Samudramanathan (churning of the ocean) made his throat blue in color. Thus, Shiva is also known as Neelkanth, literally meaning The Blue Throated One.

Maha Shivaratri is the most prominent festival celebrated in the temple and many devotees flock to the temple during the festival. The devotees who pay a visit to Neelkanth Mahadev make an offering of Bael leaves, coconut, flowers, milk, honey, fruits and water to Lord Shiva. The temple observes two fairs that are held annually on the occasions of Maha Shivratri (Feb-Mar) and Shivratri of Shraavana (month of Hindu calendar) (July-Aug) during which the devotees (Kawarias) trek from Haridwar to Neelkanth Mahadev Temple.

3.2 Rishikesh

Rishikesh is a city governed by Rishikesh Municipal Corporation (since October 2017),[1] and a tehsil in Dehradun district. Located in the foothills of the Himalayas in northern India, it is known as the "Gateway to the Garhwal Himalayas" and "Yoga Capital of the World". It lies approximately 25 km (16 mi) north of the city Haridwar



and 43 km (27 mi) southeast of the state capital Dehradun. According to Census of India, 2011 Rishikesh had a population of 102,138 making it the seventh most populated city in the state of Uttarakhand. It is known as the pilgrimage town and regarded as one of the holiest places to Hindus. Hindu sages and saints have visited Rishikesh since ancient times to meditate in search of higher knowledge.

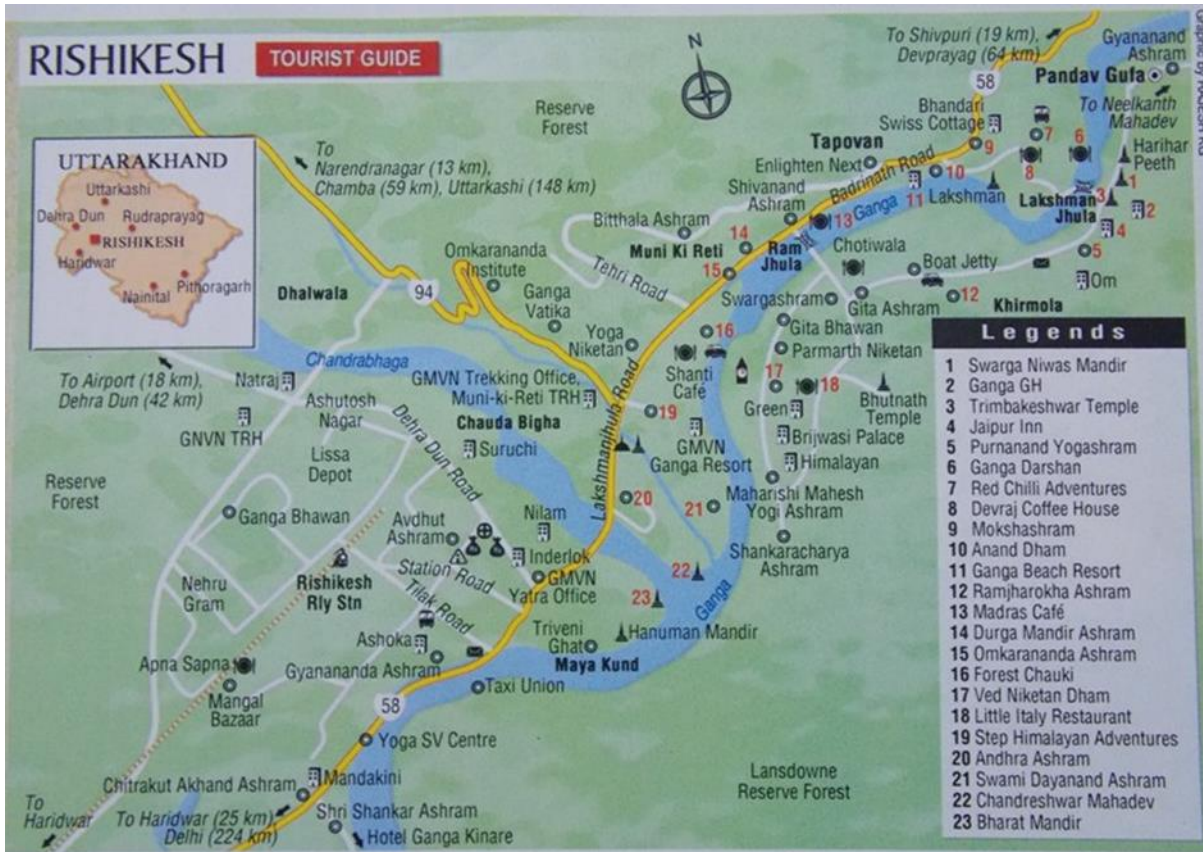


Figure 3:1 Map of Rishikesh

In September 2015, the Union tourism minister Mahesh Sharma announced that Rishikesh and Haridwar will be the first in India to be given the title of "twin national heritage cities". Due to the religious significance of the place, non-vegetarian food and alcohol are strictly prohibited in Rishikesh. The city has hosted the annual International Yoga Festival on the first week of March since 1989.

highest UV index of 12 and January and December have the lowest UV index of 4.

3.2.1 Transport

Rishikesh railway station is the major railway station in the city. The railway station was created in 1939, during the British era. It is connected to Haridwar JN with two reserved mail/express trains 14609/14610(Hemkunt Express) and 24887/24888 (Barmer Express); and four unreserved trains 54471/54472, 54481/54482,



54463/54464 & 54483/54486. This city is connected with state capital Dehradun with rail route via Raiwala JN which is 12 km from the city. A new railway line, connecting Rishikesh with Karnaprayag is under construction. The old Rishikesh railway station (RKSH) is located inside the town, so the railway line could not be extended through densely inhabited areas. Therefore, a new railway line was built from Virbhadra railway station and a new highly-facilitated Yog Nagari Rishikesh railway station (YNRK) was built in 2020. The city is well connected with all major north Indian cities like Delhi, Gurgaon and Noida via bus. Rishikesh has air connectivity with Dehradun Airport at just 15 km from the city center. There are other Travelling Options i.e. Private and Shared Taxis.

3.2.2 Tourist places

There are various temples and ashrams that can be visited in and around Rishikesh like Parmarth Niketan and Gita Ashram. Rajaji Tiger Reserve, situated near Rishikesh is a famous for a wildlife safari. Neelkanth Mahadev Temple, Kunjapuri Temple and Bharat Mandir are also visited by thousand of Devotees.

3.2.2.1 Rafting at Rishikesh



Figure 3:2 Rafting at Rishikesh

Rafting in Rishikesh particularly is hands down the best; one could endeavour in India. From the gifted natural circumstances to the top professional assistance, the place has just the best to offer. There are some certified operators, whose safety arrangements are well in place, and there are customised packages for camping and rafting at Rishikesh.

3.2.2.2 Lakshman Jhula

The Lakshman Jhula is a famous hanging bridge across the river Ganga that connects two villages, Tapovan in the Tehri Garhwal district and Jonk in the Pauri Garhwal district. The entire bridge is made up of iron, is 450 feet long and is situated at the height of 70 feet from the river. The Lakshman Jhula is well-known amongst



tourists because it is believed that Lord Lakshman, the younger brother of Lord Rama, had crossed the river Ganga at this same site, where the bridge now majestically stands for all to see.



Figure 3:3 Lakshman Jhula

The construction of the bridge was completed in the year 1929, and presently, the Lakshman Jhula acts as an adjoining bridge across the river, along with the old route to the sacred shrines of Badrinath and Kedarnath. In the present-day scenario, the Lakshman Jhula is visited by thousands of tourists each year. Grand temples and famous markets have sprung up in the vicinity, and the entire area is a now a particularly renowned attraction in entire Rishikesh.

Important places around the Lakshman Jhula include the Terah Manzil temple, the Lakshman temple, and the Ram Jhula and the entire area resonates with the sounds of the enchanting mantras and shlokas from the temple.

3.2.2.3 Ram Jhula

An iconic landmark, Ram Jhula, built in 1986, is a suspension bridge that runs across the sacred River Ganga connecting Shivananda Nagar to Swargashram. The bridge spans 750 feet and is a splendid work of engineering that connects the religious ashrams situated on both sides of the river and offers a splendid bird's eye view of the mighty Ganges and the serene nature at the foothills of the Himalayas.



Figure 3:4 Ram Jhula

3.2.2.4 Triveni Ghat

Triveni Ghat is situated on the banks of the holy river Ganges, Triveni Ghat is the biggest ghat in Rishikesh. 'Maha Aarti' happens every evening at Triveni Ghat.



Figure 3:5 Triveni Ghat

Triveni Ghat plays an essential role in Hindu Mythology and is also mentioned in the epics Ramayan and Mahabharat. The Triveni Ghat is also where the chattri of Lord Krishna was constructed. In fact, the ghat is considered to be the cremation ground for the great Lord Krishna. Along with the holy dips, the devotees also make offerings to the river in the form of milk, while feeding the fishes in the Ghat too.

Ganga Aarti is the most auspicious and holiest ritual performed on the ghats of Rishikesh in the evening at the time of dusk. Considered to be a major source of tourism boost in the river town, the ceremony is a grand affair. The river bank is lit up with dainty floating diyas and the smoke of the hawans floating the skies. The chiming of the temple bells, the chanting of mantras and the overall ambiance of the place is an experience of a lifetime. Besides being a soulful and peaceful experience, the rituals offers an insight into the Hindu culture.



Although the aarti is performed at several ghats, the most popular ones are performed at Parmath Niketan Ghat and Triveni Ghat. It is performed by Vedic priests, basically students who are studying the Vedas. The prayers are made to Agni - the God of Fire, and the saffron clad pandits hold large bowls of fire which go round and round in front of the river bank. You can either sit as a spectator and enjoy the ambiance from afar or participate in chanting the bhajans and performing the aarti yourself. Pilgrims also offer flowers to the gods that float in the waters along with the diyas.

3.2.2.5 The Beatles Ashram

Initially known as Maharishi Mahesh Yogi Ashram, the Beatles Ashram was named so after the Beatles visited the ashram in 1968 to get trained on the advanced techniques of Transcendental Meditation. The ashram is now an eco-friendly tourist attraction located in the Rajaji National Park and offers a serene ambience located close to the mesmerising River Ganga. It is one of the attractions that is sure to take one close to nature. People, therefore, visit the attraction for soothing nature walks, trekking and bird watching sessions too.

3.2.2.6 Kaudiyala



Figure 3:6 Kaudiyala

At 380 m high, Kaudiyala is a popular rock-climbing destination surrounded by dense forests. It also offers white river rafting tracks, and the sports is organized by the camping facilities around the place.

3.2.2.7 Jadh Ganga Trek

Since past many years, the region and the trail has been able to maintain its raw beauty accompanied by virginity and tranquility of the place. The gushing streams, pristine glaciers and splendid landscape adds charm to the beauty of this already beautiful place.

Regarded as one of the most strenuous and difficult trek of north Uttarakhand, the route of Jadh Ganga Trek was taken by Heinrich Harrer and his companions during



May 1944 while escaping the prison in Dehradun. They traversed the Aglar valley followed by going over Nag Tibba ridge, they ultimately arrived at Nelang in Jadh Ganga. From there on, they proceeded further towards Naga, Sonam, Dosindhu, Tirpani and finally Pulamsunda. They, then ascended upwards along the first tributary of Jadh, the Mendi, to reach Tsangchok La, which they crossed seven after leaving Dehradun.



Figure 3:7 Jadh Ganga Trek

3.2.2.8 Kuari Pass

The alpine meadow of Kuari Pass has been attracting backpackers from around the globe for decades. Being in close proximity to Nanda Devi biosphere, Kuari Pass is at the center of the most remarkable regions of Garhwal known for its unique wild grandeur.

In the background below the valley is the entrance to the formidable Rishi Gorge which until 1934 was considered un-penetrable. Kuari Pass is at a relative moderate altitude of 12,200 feet. The beautiful camping grounds of Gulling, Chitrakantha & Tali are the key attraction of the trek. The trails leading from Tali Top to Kuari Pass gives an impression of doing a full scaled Himalayan alpine expedition in truck loads of snow.

3.2.2.9 Neer Garh Waterfall

Neer Garh Waterfall is a beautiful narrow stream of cool water cascading down a rocky terrain in the midst of a dense green forest. It requires trekking a distance of about a kilometre through the forest and down a cliff to reach the waterfall. The trail is exciting and a perfect activity to do before entering the waters for a cool soothing dip in one of its pools.



Figure 3:8 Neer Garh Waterfall

3.2.2.10 Swarg Ashram

Swarg Ashram is a spiritual abode built in the memory of Swami Vishudhanand who was fondly known as Kali Kamli Wala as he was always seen wearing a black coloured blanket. Located in the lap of nature, along the banks of the majestic and holy Ganges, the ashram is a famous yoga and meditation centre where one can find peace through religious activities, spiritual practises, meditation, holy chants, arti rituals, etc.



Figure 3:9 Swarg Ashram

3.2.2.11 Bharat Mandir, Rishikesh

Founded by Adiguru Shankaracharya in 12th century, the shrine houses Lord Vishnu carved out of a single piece of Saligram. The inner canopy of the temple contains Shree Yantra.

The architecture and interiors of the temple has been detailed in the ancient record of Kearkhand. The present structure was reconstructed on the ruins of the original



temple destroyed by Tamur. Excavations have yielded many old statues, ancient pots and coins from this site.



Figure 3:10 Bharat Mandir, Rishikesh

3.2.2.12 Rishi Kund

Rishi Kund is a natural hot spring pond which is considered as a sacred water body in the town. The pond is believed to be filled with water only after a sage was blessed by River Yamuna. Locals also believe that Lord Rama had bathed in the kund during his exile and that the rivers, Ganges and Yamuna meet each other at this point. No matter what the legend is, the pond has a serene vibe that cannot be missed while here.



Figure 3:11 Rishi Kund

3.2.2.13 Geeta Bhawan

Also popularly known as the Guru Shri Ram Sukh Daasji, the Geeta Bhawan is a vast and spacious complex that is located on the banks of the river Ganga in Swargashram in Rishikesh, at the foothills of the mighty Himalayas. The Ashram is renowned as an important institution that preserves Hindu literature since it houses



the Gita, which symbolizes the Hindu Vedas and epics. The Geeta Bhawan is visited by a large number of people each year, who flock to here to take a dip in the holy waters of the Ganges, listen to the discourses and meditate.

Other than airy and large discourse halls, the ashram also has over one thousand rooms that are available free of cost for the devotees to stay at. The pious devotees are also served with simple vegetarian food and Indian sweets at nominal prices during their stay at the Geeta Bhawan. Be it a mere two-hour visit to the ashram, or a stay there for a few days, the experience imbues the devotee with tranquility, peace and devotion.

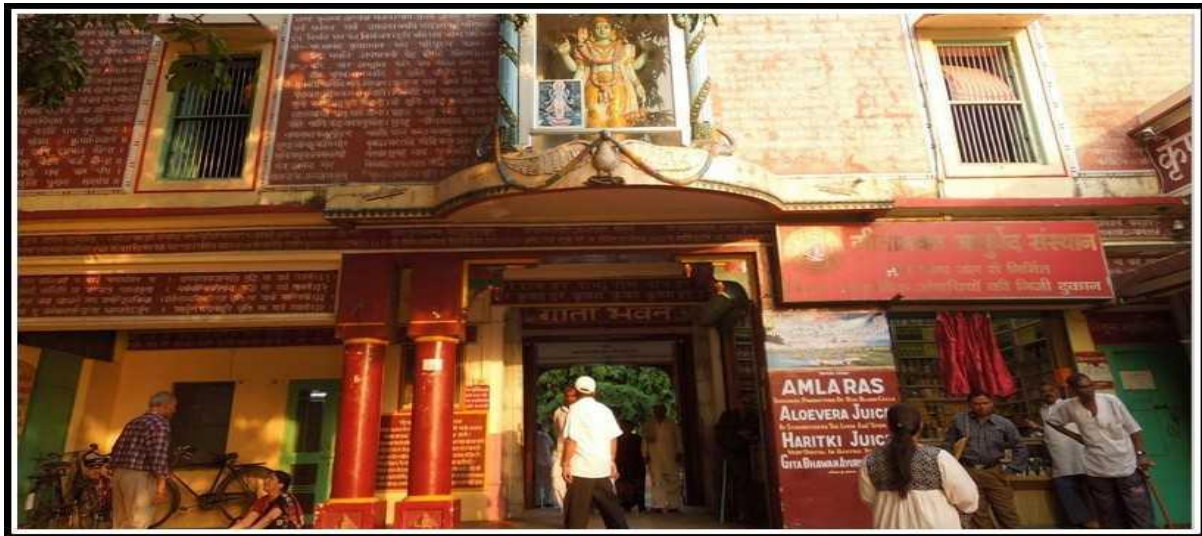


Figure 3:12 Geeta Bhawan

The visitors gladly indulge in the devotion of the River Ganges every evening, and the bathing ghats in front of the Geeta Bhawan offer them with an opportunity to take a holy dip in its waters. The ancient Banyan tree that is located within the complex is also worthy of notice since this spot has been the site of penance for numerous saints. All in all, the Geeta Bhawan comes across as a place that is overflowing with religious fervour and calmness, and is a must visit while in Rishikesh.

3.2.2.14 Munni ki Reti



Figure 3:13 Munni Ki Reti

Muni ki Reti is a religiously important pilgrim centre near Rishikesh considered as the gateway for the pilgrimage of Char Dham. It, therefore, has a number of ashrams providing basic facilities for the pilgrims to help them on their spiritual journey. Muni ki Reti literally means the 'sand of the sages' and is believed to be the place where King Bharat performed penance.

3.2.2.15 Omkarananda Ashram



Figure 3:14 Omkarananda Ashram

It is home to Patanjala Yoga Kendra yoga centre which was established in 1993. Located in the Muni-ki-Reti area of Rishikesh, it holds a magnificent view next to the holy waters of Ganga. The kind of Yoga that is taught here is Iyengar Yoga which is guided by world-renowned Shri Guruji, B.K.S. Iyengar. Guruji's method is based on the Indian tradition of Yoga which focuses on strength and stamina, flexibility and balance, concentration and meditation. In the ashram, there are lectures given on the Bhagavad Gita, and a daily aarti is performed.



The ashram helps its devotees attain peace, solace and tranquility through yoga, meditation, spiritual talks and aartis. The most popular exercise here is Iyengar Yoga. It also has branches spread out as schools, temples and religious institutes, all over Uttarakhand.

3.2.2.16 Tera Manzil Temple

Trimbakeshwar Temple or Tera Manzil Temple is the thirteen storey temple situated on the banks of river Ganges in Rishikesh. Located right opposite the Lakshman Jhula, the temple enshrine several deities under one roof. Popular for its striking architecture, the temple also offers panoramic landscape view from the top of its 13th floor.



Figure 3:15 Tera Manzil Temple

3.2.2.17 Kunjapuri Devi Temple



Figure 3:16 Kunjapuri Devi Temple



Perched atop the Kunjapuri hill, Kunjapuri Devi temple is a revered Hindu place of worship dedicated to Goddess Parvathi. Besides being one of the fifty two Shaktipeeth in Uttarakhand, the shrine is popular for its mesmerising locale which offers a beautiful panoramic view of the Shivalik range and the majestic peaks of Chaukhamba and Bandarpunch.

3.2.2.18 Swami Dayananda Ashram

Swami Dayananda Ashram is situated near Purani Jhadi in Rishikesh, Swami Dayanand Ashram was established in 1960s by Swami Dayanand Saraswati. The centre facilitates yoga and meditation practices and a tiny temple in the complex is meant to offer pooja. The massive yoga hall provides umpteen courses on yoga and meditation.



Figure 3:17 Swami Dayananda Ashram

3.2.2.19 Parmarth Niketan Ashram



Figure 3:18 Parmarth Niketan Ashram

Parmarth Niketan Ashram is a spiritual haven and an abode dedicated to the welfare of all living beings. The Ashram is located on the foothills of the Himalayas along the



banks of the holy Ganges and provides facilities to help pilgrims attain their spiritual goals by making their journey a memorable one through Yoga, Ayurveda, Universal Prayers, Meditation, Satsang, Kirtans, Ganga Arti, Spiritual/ Cultural programs and lectures, etc.

3.2.2.20 Vashista Gufa

Vashishta Gufa is an ancient cave where the human son of Lord Brahma, Sage Vashishta meditated. A legend states that the sage was extremely depressed after losing all his children and decided to commit suicide, but River Ganga didn't allow him to die. He, therefore, decided to stay and meditate in the cave. The cave houses a Shivalinga and is maintained by the Purishottamanand Society.

3.2.3 Geography

Rishikesh is at 30.103368°N 78.294754°E. It has an average elevation of 372 metres (1,220 ft). The town is located in the Tehri Garhwal region of the northern Indian state of Uttarakhand.

After flowing 249 km (155.343 mi) through its narrow Himalayan valley, the Ganges emerges from the mountains at Rishikesh, then debouches onto the Gangetic Plain at the pilgrimage town of Haridwar. Despite the pollution of the Ganges, the water in Rishikesh is relatively unaffected as the major polluting points are down river in the neighbouring state of Uttar Pradesh.

The Tehri Dam is just 86 km (53 mi) and Uttarkashi, a popular yoga destination is 170 km (110 mi) uphill on the way to Gangotri Dham. Rishikesh is the starting point for travelling to the four Chota Char Dham pilgrimage places—Badrinath, Kedarnath, Gangotri, and Yamunotri. It is also a starting point for the Himalayan tourist destinations such as Harsil, Chopta, Auli and famous summer and winter trekking destinations like Dodital, Dayara Bugyal, Kedarkantha, Har Ki Dun for camping and grandeur Himalayan panoramic views.

According to Köppen-Geiger climate classification system, its climate is humid subtropical (Cwa). Average maximum temperature is 40 degrees Celsius (104 degrees Fahrenheit). The average minimum temperature is 7 degrees Celsius. The wettest month is July with highest rainfall of 444mm. The driest month is November with rainfall of 10mm. Months of May, June, July and August has the highest UV index of 12 and January and December have the lowest UV index of 4.



Max, Min and Average Temperature

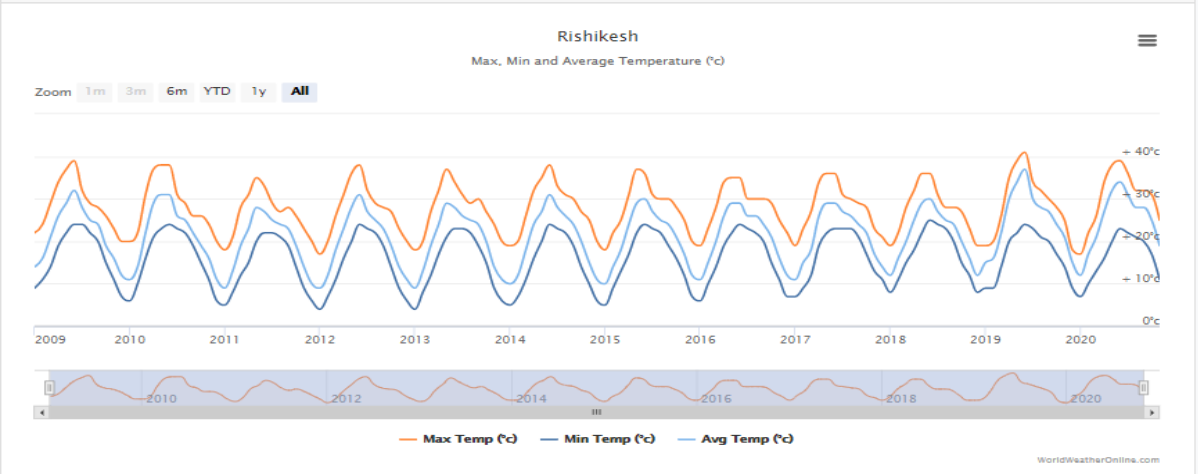


Figure 3:19 Temperature Graph of Rishikesh

Rainfall and Rain Days

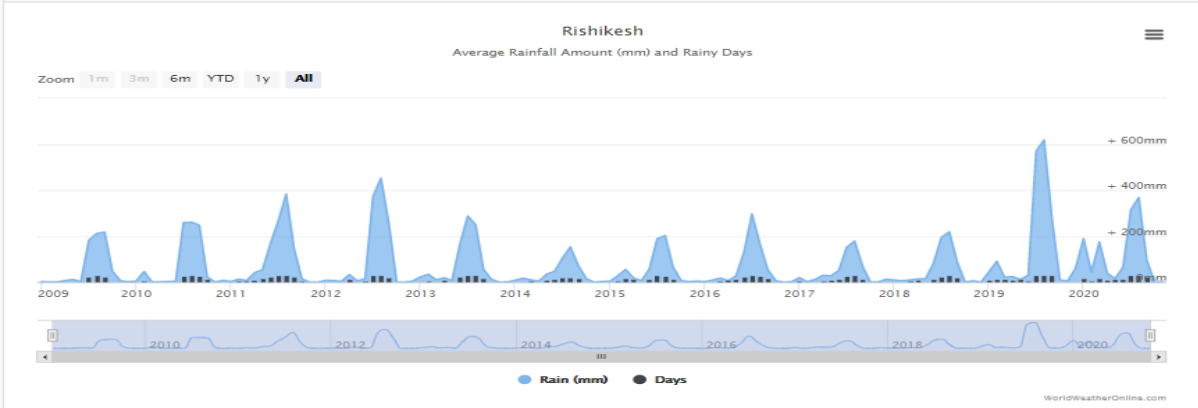


Figure 3:20 Rainfall in Rishikesh

Max and Average Wind Speed and Wind Gust

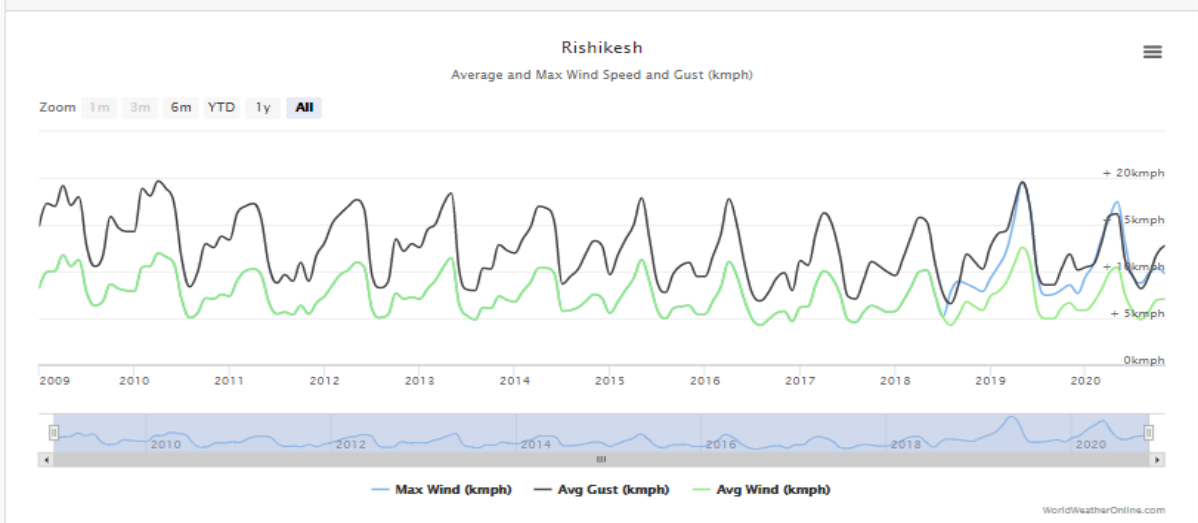


Figure 3:21 Wind Speed in Rishikesh

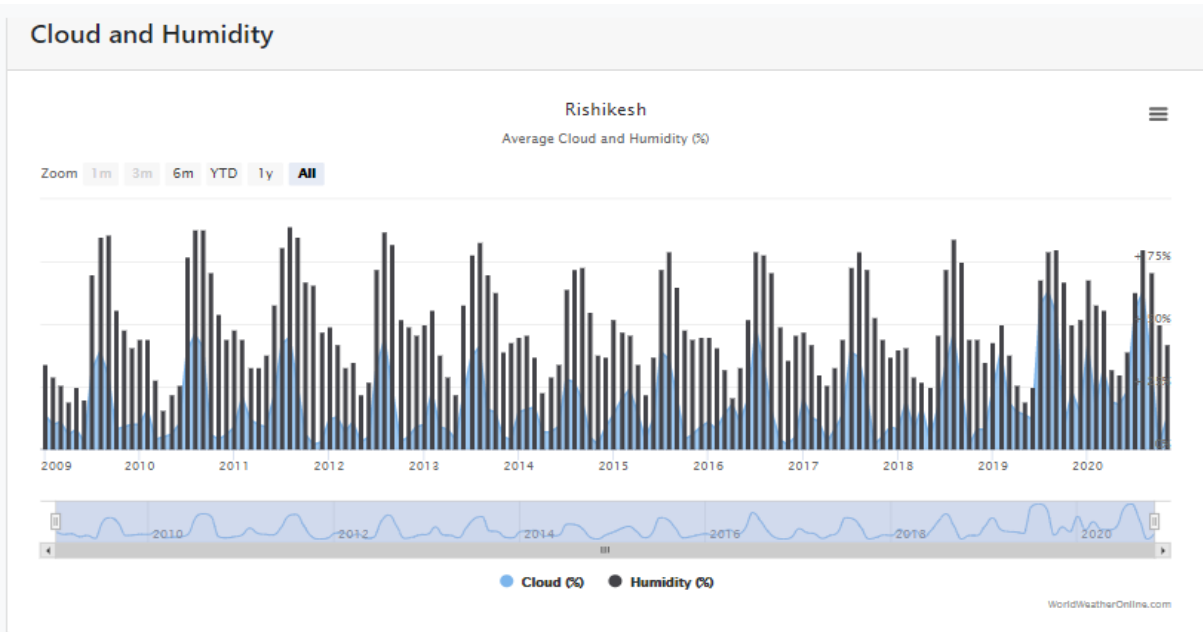


Figure 3:22 Cloud and Humidity in Rishikesah

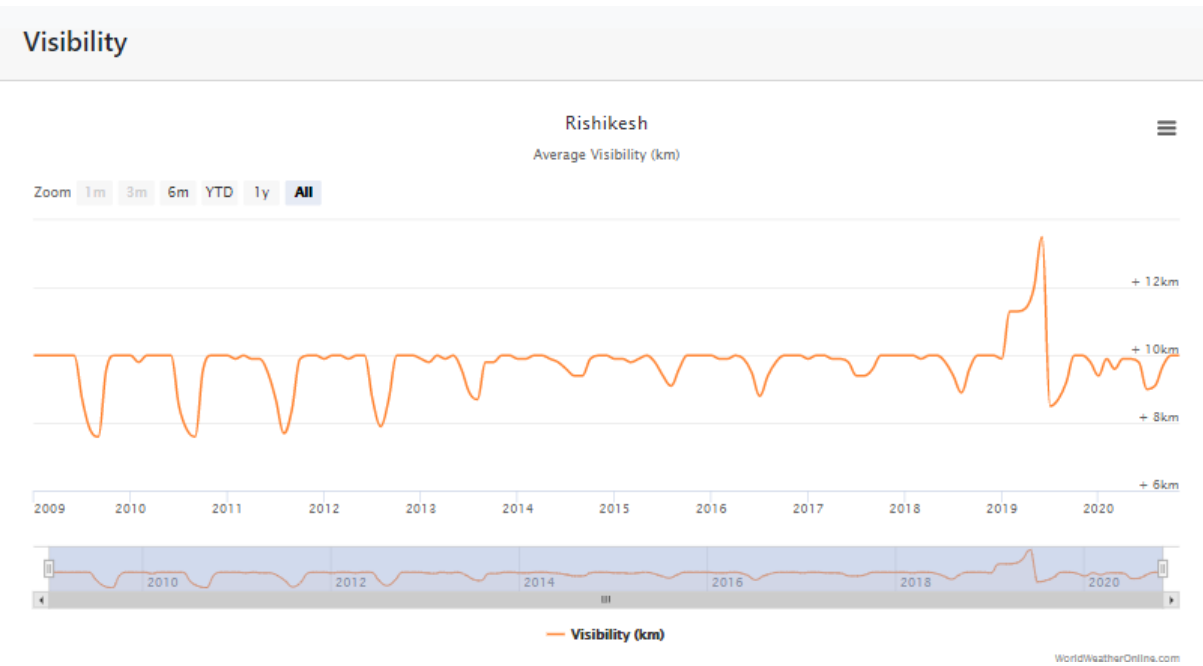


Figure 3:23 Visibility in Rishikesh



3.3 Seismic Zone

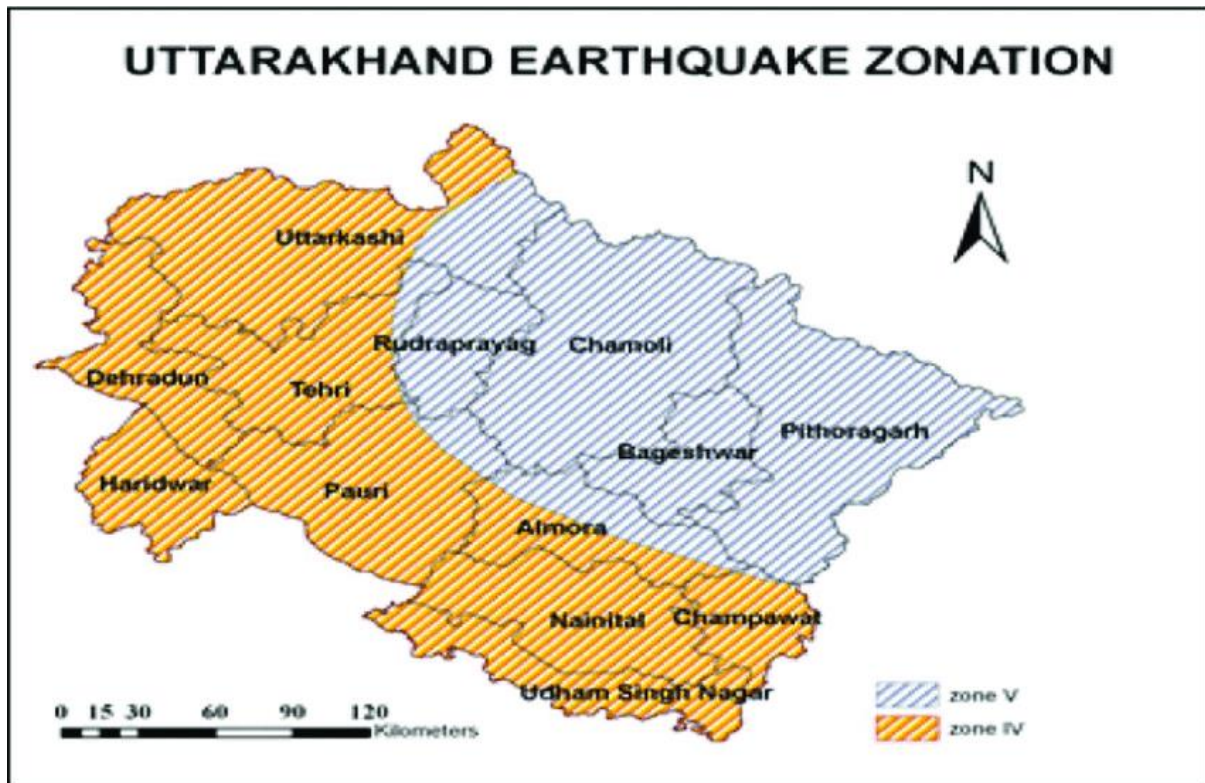


Figure 3:24 Seismic Zone of Rishikesh

The Rishikesh area is within a highly seismic zone i.e. zone IV and subject to seasonal flooding along the Ganga River and other tributaries. These conditions make the region vulnerable to disasters like earthquakes, land slides and flooding.

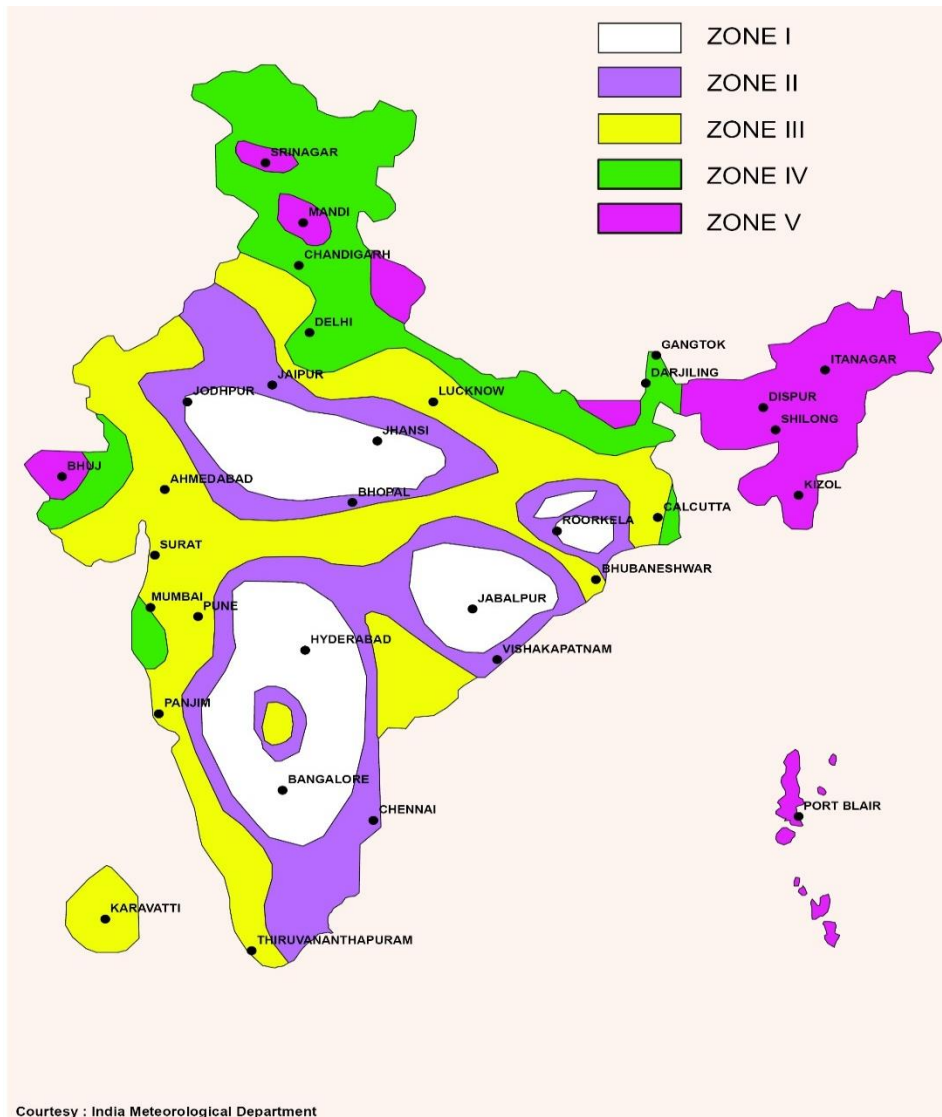


Figure 3:25 Seismic Zone of India

The ropeway system works are in Zone-IV. Hence all the structure shall be designed as per the provisions of the IS Codes as applicable for Zone-IV.



4 The Project

4.1 Need of the Project

Rishikesh has spectacular view of jungle-clad hills. Rishikesh has also confluence of River Ganges and Chandrabhaga. In the ancient time and still so many yogis, rishis, sages and sannyasis attracted to Rishikesh to practice yoga in this peaceful location. Since then, Rishikesh has known as an abode of sages. Rishikesh is a holy town with so many Ashrams and it is famous for the yoga worldwide. Rishikesh is now world famous as a Yoga Capital of the world. Every year during the March month one week long International yoga festival is hosted by Rishikesh.

Rishikesh is also known as **gateway to the Char Dham**. Char Dham is four popular holy temples on the hills (Kedarnath, Badrinath, Gangotri, and Yamunotri) Thousands of people attracted every year to Rishikesh for spiritual relief, peace, learn yoga, adventure and to take a dip for salvation. The famous among them were Beatles, Kate Winslet and many more others celebrities. It is believed that by meditation in Rishikesh one can get "Moksha" (liberation from the cycle of death and rebirth) as well as holy dip in the river Ganges.

Neelkanth Mahadev temple is one of the most revered holy shrines dedicated to Lord Shiva and is a prominent Hindu pilgrimage site. It is surrounded by dense forests and is adjacent to the mountain ranges of Nar-Narayan. According to Hindu sacred texts, the place where the Neelkanth Mahadev Temple currently stands is the sacred location where Shiva consumed the poison that originated from the sea when Devas (Gods) and Asuras (Demons) churned the ocean in order to obtain Amrita. This poison that emanated during the Samudramanthan (churning of the ocean) made his throat blue in color. Thus, Shiva is also known as Neelkanth, literally meaning The Blue Throated One.

Parvati devi temple is located in Rishikesh near Neelkanth temple. It is around 3 km from Neelkanth Mahadev temple. The road to reach Parvati Mata temple is narrow, single-lane kachcha road. There is no complete access to vehicle up to Parvati Mata temple.



Neelkanth Mahadev temple is about 27 kms from Rishikesh and takes one and half hour or sometimes even more time to reach. Neelkanth temple is connected to Rishikesh city by a narrow, single lane ghat road. The condition of the road needs improvement. The streetlights need also be provided.

Therefore, it is desired to provide an alternative, fast and environment friendly transport service like ropeway from Rishikesh to Neelkanth Mahadev Temple and Parvati Mata Temple.

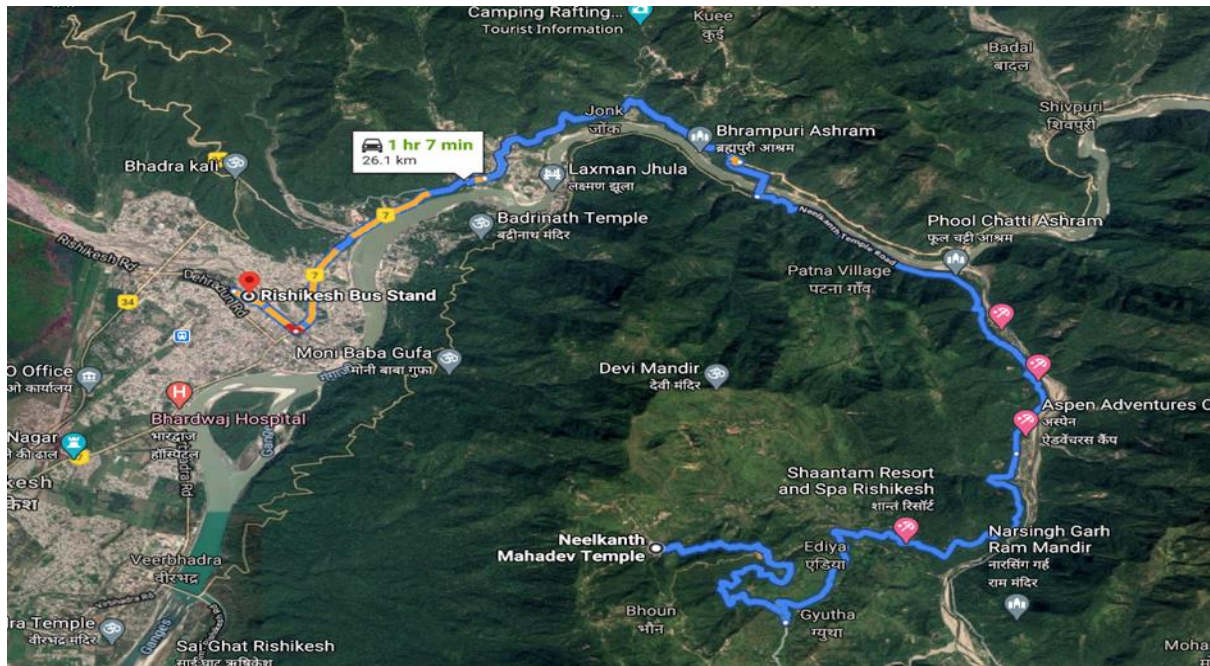


Figure 4:1 Road map to reach Neelkanth from Rishikesh

Tourists visit Neelkanth Mahadev Temple by private car, private-taxis, sharing-taxis, two-wheelers or by walk (trekking). Sharing taxi stand is near ISBT, Ram-Jhula and Laxman-Jhula. Travel time and cost incurred by different mode of transport is given below.

Table 4:1 Cost time analysis of different transport

| Sr. No. | Mode of Transport | Approximate Travel Time (in hours) | Approximate Cost of Transport (in INR) | Remark |
|---------|-------------------|------------------------------------|--|----------------------------------|
| 1 | Car | 1.0 - 1.5 | 300 | Owned car |
| 2 | Sharing Taxi | 1.0 – 2.0 | 150 | Round trip fare per person |
| 3 | Private taxi | 1.0 - 1.5 | 700 | Round trip fare for 4 persons |
| 4 | Two-wheeler | 1.0 - 1.5 | 550 | Rental + fuel cost for 2 persons |

The cost of sharing taxis is INR 100 for one-way trip and INR 150 for round trip. On the other hand, minimum fare of private taxis is INR 700. Tourists also rent two-wheelers in Rishikesh which cost INR 400 for a day and 80 kms. The travel by own car costs about Rs. 300/- approximately. The minimum travel time to reach Neelkanth Mahadev temple is an about 60 to 90 minutes.



Figure 4:2 Neelkanth Mahadev Temple

In order to overcome above difficulties Uttarakhand Metro Rail, Urban Infrastructure & Buildings Construction Corporation Limited (UKMRC) has proposed construction of ropeway from Rishikesh to Neelkanth and Parvati Mata Temple and has intended to prepare a Feasibility Report for the project. Further this project is proposed to develop under PPP mode. IPRCL has been mandated to prepare the Feasibility Report by UKMRC.

It is estimated that the travel time from Rishikesh to Neelkanth Mahadev Temple by ropeway will be reduced to 25 minutes. Apart from reduction in travel time the journey by ropeway will be much more comfortable and enjoyable as compared to road journey. Due to availability of alternative fast and comfortable mode of transport the congestion on the road is expected to reduce considerably and thereby adding comfort to the road users also.



4.2 SCOPE OF Feasibility Report

The scope of the Feasibility Report is as under:-

- Task 1 Preparing a methodology along with a timeframe for the study;
- This stage involves understanding the scope of work, identifying the objective and developing a detailed methodology and detailed work plan for the study by the consultant for preparing the techno-economic feasibility report of Cable car / Rope way for the areas of Haridwar and Rishikesh Municipal Corporation.
- Task 2: Primary Data collection– following are the primary survey that needs to be conducted for the study.
- Reconnaissance Survey
 - Traffic volume count
 - Topographical survey
 - Willingness to pay and shift
 - Origin –Destination Survey
 - Tourist Survey
 - Travel speed survey
 - Any other new surveys required to fill the data gap has to be carried out by Consultant
- Task 3: Secondary data collection:
- Secondary Data collection would include the following:
- Demographic characteristics,
 - Socio-economic characteristics
 - Urban growth scenario
 - Existing and proposed Road network characteristics,
 - Existing and proposed traffic and transport system including the study of existing cable car
 - Travel demand behavior of people(O-D Matrix)



- Land use of land falling in proposed alignment
- Environmental data
- Any other relevant data that consultant feels necessary to collect These data would be collected from Departments like RTO, Municipal Corporation, Development Authorities and other agencies related to transport to understand the existing transport situation of the city.

Task 4: Case study of international cities that has implemented Cable cars / Rope ways outlining Its benefits, technologies used the financial viability and the outcome of the projects.

Task 5: Analysis of data and identification of issues and gaps this stage includes the analysis of data collected and identification of mobility gaps and issues of the city.

Task 6: Identification of potential areas of demand the consultant will have to identify the zones or areas of demand in the city for the successful running of the system based on the data collected from primary and secondary sources.

- All level books and after survey, base record shall be provided.
- Quotation collected for calculation of project cost shall be provided.
- Power availability and tentative requirement of power to be provided.

Task 7: Network plan for the cable car The route plan should consist of three parts:

- Network proposed -The consultant is to study the feasibility of the already proposed network in terms of ridership, revenue collection, accessibility and connectivity to areas in the city in case of Rishikesh.
- Ridership estimation- The consultant should conduct the traffic



volume count, willingness survey data and OD data collected through primary and secondary sources for estimating the ridership in the future years. At least 3 alignments will be studied between two terminal stations and intermediate stations. Different feasible locations for stations will also be worked out. The best network selected and feasible is to be identified by the consultant.

Task 8: Alternative analysis of technology the consultant should study the various technologies used in cable cars in India and abroad and then suggest the best suited technology for the cable cars as per design standards that can be easily integrated with the stations and the city.

Task 9: Institutional and legal framework

This involves identifying the authority and institutional setup for the proposed cable car infrastructure. It also involves the identification of detail functions and structure of the organization. The consultant also needs to specify the legal framework that would mandate the operations and maintenance of the cable car.

Task 10: Environmental Impact and Socio Economic Impact Assessment: A basic environmental impact assessment needs to be done to compare the emissions caused by cable cars and other means of transport. Also a general socio economic impact assessment needs to be carried out to anticipate looking into the requirements laid down by the Ministry of Environment & Forest with regard to projects on cable car and suggesting the framework to be adopted during the project phase.

Task 11: Economical and Financial Viability Plan and proposed method of funding: A financial model should be prepared by consultants to estimate the fiscal implications on the implementing agency (in terms of capital and operating cost) and various ways to decrease the financial risks through various innovative methods of funding like advertisement revenue, third party funding, viability gap



funding etc. The financial viability of the proposed system in terms of Project IRR and Equity IRR should be ascertained. The economic viability would also need to be ascertained to evaluate the economic benefit of moving people via cable car in the region. Consultants will propose various modals/methods of financing and final recommendation. For financial model of design, Built, Finance, Operate & Transfer (DBFOT Project), a period (Concession period) of 30 years may be assigned for arriving financial implications.

Task 12: Implementation plan : working out of the estimated cost for different options and submissions of Detailed CAD drawing and towers of ropeway project, L-section, coordinate drawing of towers location, topography, station plan & typical section plan, Typical integration with local transport modes, ownership land plan of Govt/private, land, species wise list of Trees to be felled, list of utilities appearing in the alignment & option of power availability and regeneration of power like Solar, Wind Mill etc.

Task 13: The Consultant has to submit to UKMRC the Manual containing Specifications and Standards, Design, Manufacture and Installations of Aerial Ropeway System, 3 hard copies and soft copy of each Draft and final Feasibility reports

4.3 METHODOLOGY OF ASSIGNMENT

Site Data collection and evaluation

Identification of suitable locations for terminal stations

Selection of the Ropeway Alignment

Traffic Survey, Topography Survey and Soil Investigation



Analysis of data and Selection of ropeway system

Technical Details of selected ropeway system

Project Cost Estimation and Financial ROR

4.4 Methodology of Preparing Feasibility Report:

Following methodology is adopted for preparation of Feasibility Report for Rishikesh to Neelkanth Mahadev Temple /Parvati Mata Temple Ropeway Project.

- A team of experts was constituted to undertake the study. Experts were deployed to Rishikesh and Neelkanth for undertaking field survey and collect relevant data.
- Secondary traffic data was sought from Uttarakhand Government and UKMRC.
- The willingness to use and pay for the ropeway was assessed through a questionnaire specially designed for the purpose.
- Site visits were made by project team to collect the firsthand information of the project and to assess the tourists potential of the proposed ropeway project.
- IPRCL Survey team and team of local government officials visited the site to fix terminal stations of the alignment.
- Based on the above data, Feasibility Report is prepared and submitted bringing out the traffic potential, cost and financial viability of the project.

4.5 Background of the Project

- Uttarakhand Metro Rail, Urban Infrastructure & Buildings Construction Corporation Limited (UKMRC) issued Letter of Acceptance to Indian Port Rail & Ropeway Corporation Limited (IPRCL) for Neelkanth Ropeway on 04.08.2020.



- In this connection IPRCL representative visited the sites and submitted the Inception Report on 24.08.2020.
- As requested by UKMRC, IPRCL proposed multiple alignments and submitted a revised Inception Report on 10.09.2020. In the revised Inception Report , IPRCL proposed three LTP locations i.e. New Railway Station, ISBT and Triveni Ghat. MD/UKMRC opted for ISBT and Triveni Ghat locations
- In the meeting held on 25.09.2020 with MD/UKMRC, Director/UKMRC, GM/UKMRC and other officers, the revised inception report was discussed. It was decided to do a joint inspection of the site to inspect and finalize station locations suggested in the revised inception report. A joint inspection was organized on 26.09.2020
- Based on site visits by UKMRC and IPRCL on 08.08.2020 and 26,09,2020, Minutes of the Meeting dated 7.10.2020 following potential terminal station locations are identified for Lower Terminal Point (LTP), Intermediate Terminal Station (ITP) & Upper Terminal Point (UTP) as tabulated below –

Table –Lower Terminal Station Locations (LTPs)

| Sr No. | Terminal Station |
|--------|------------------------------|
| 1 | LTP 1 – New Railway Station |
| 2 | LTP 1A – Old Railway Station |
| 3 | LTP 2 – Bus Stand (ISBT) |

Table –Intermediate Terminal Station Locations (ITPs)

| Sr No. | Terminal Station |
|--------|---|
| 1 | LTP 3 – TRIVENI GHAT (Aarti Point) |
| 2 | LTP 3A – TRIVENI GHAT (500m from Aarti Point) |
| 3 | LTP 4 – Muni Ki Reti |

Table –Terminal Station Locations (UTPs)

| Sr No. | Terminal Station |
|--------|--|
| 1 | UTP1 (Neelkanth Mahadev Temple) beside Inter College |
| 2 | UTP2 (Beside Parvati Mata Temple) |
| 3 | UTP1A (Neelkanth Mahadev Temple) |

- The Final Inception report based on the MoM held on 07.10.2020 was submitted on 12.10.2020. As decided therein traffic study was conducted to find out the best alignment.
- Traffic study was conducted on 22.10.2020 to 25.10.2020 at various locations with the objective to determine the originating and intermediate stations of



Neelkanth Mahadev Temple Ropeway at Rishikesh. The traffic survey was re done at Neelkanth to reinforce the finding of the traffic study. As per the findings of the traffic study ISBT-Triveni Ghat- Neelkanth temple- Parvati Mata temple alignment was found to be the best alignment from traffic demand perspective. This alignment was finalized for the ropeway and was taken up for further detailed study.

4.6 Lower Terminal Point (LTP) at ISBT

The Lower Terminal is proposed near ISBT, Rishikesh.

Co-ordinates :- X= 239497.162, Y= 3334334.943

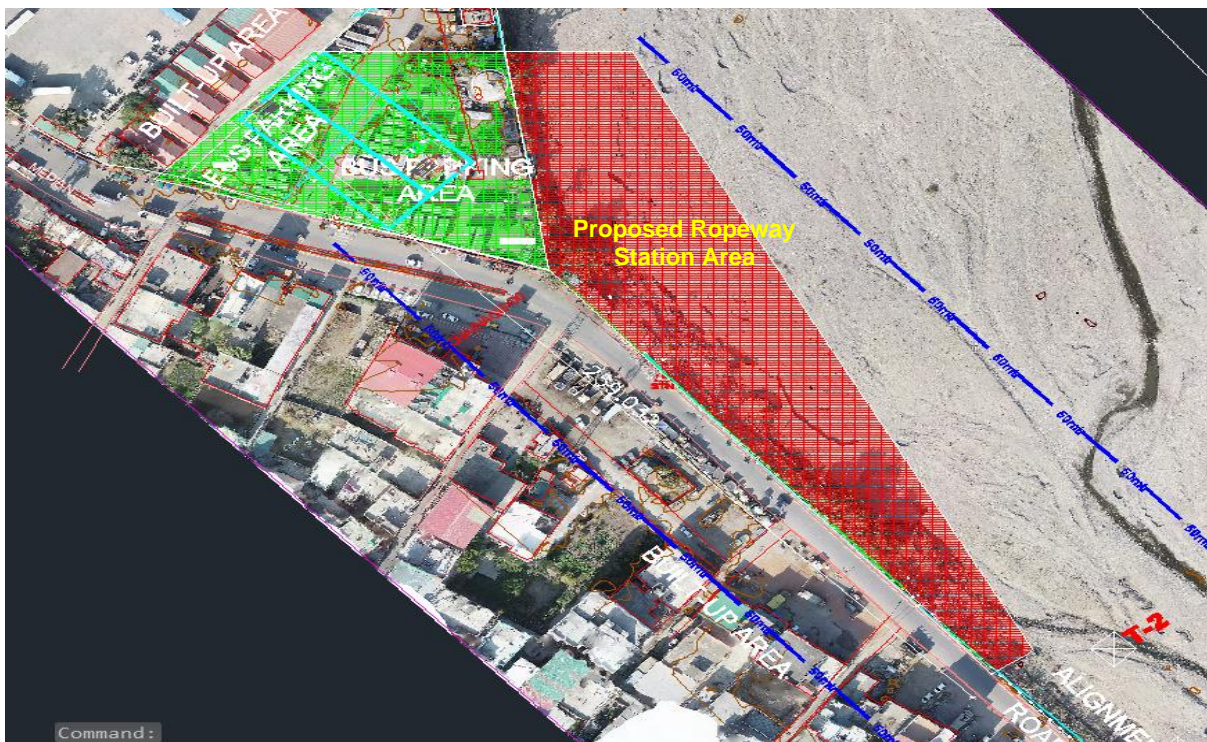


Figure 4:3 Proposed ISBT Station Location

- The tourist coming from different places can directly take ropeway from this station to reach the Neelkanth Mahadev temple.
- Ample space is available for the construction of ropeway station.
- The elevated station is proposed on the exiting road so that the current use of exiting area for parking can be continued.
- The area indicated in red is reclaimed area and area indicated in green is existing land area. The area proposed will be developed.
- Three transformers of 11 KV and two transformers of 440 volts are to be shifted.



- About 300m length of 11 KV and 440V electric line is to be made underground.
- 27 existing shops in the area need be shifted as indicated in station planning.



Shops to be removed



Transformer to be removed

The distances from the different locations to this ropeway station is as under:-

| Sr. No. | Locations | Distance from Proposed Ropeway Station |
|---------|---------------------|--|
| 1 | Old Railway Station | 1.20 KM |
| 2 | New Railway Station | 2.20 KM |
| 3 | Munni Ki Reti | 1.50 KM |

From the above table it is clear that the all the important places are nearby from the proposed ropeway station. It is well connected to important places in the city by the local transport.

- Vehicle parking is also proposed at the ropeway station.

4.7 Intermediate Terminal Station at Triveni Ghat

Coordinates :- X= 240337.640, Y=3333526.782



Figure 4:4 Proposed Triveni Ghat Station Location



- An Intermediate terminal station at Triveni ghat is proposed to capture the traffic from this popular location.
- The proposed ropeway station at Triveni Ghat is adjacent to Chandrabhga River.
- This station is proposed to be constructed at a height of 343 m from MSL keeping in view the highest flood level of Ganga river (HFL= 341.72 m on 05.09.1995).
- Ample space is available for construction of Ropeway Station.

4.8 Upper Terminal Station near Neelkanth Mahadev

- ❖ The proposed ropeway station is besides Intermediate college near Neelkanth Mahadev Mandir.
- ❖ Sufficient space is available for construction of Ropeway Station.
- ❖ The proposed ropeway station is about 300 m from Temple.
- ❖ The proposed ropeway station houses gondola parking also.
- ❖ Pathways are proposed to exit from the ropeway station on the 1st floor and to return to ropeway station from the temple on the ground floor.

Coordinates : X= 243439.508; Y=3331002.405

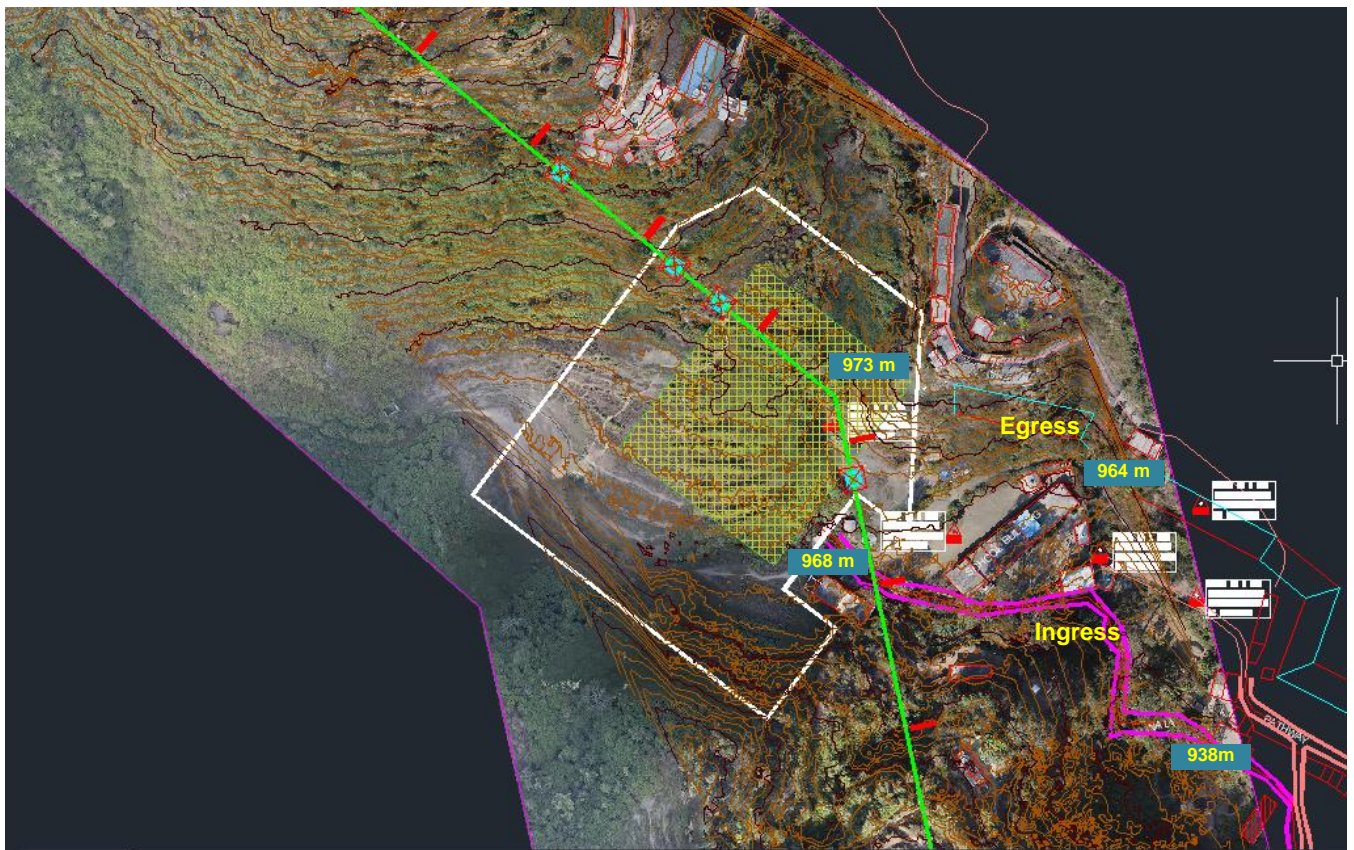


Figure 4:5 Proposed Neelkanth Ropeway Station Location



- ❖ The ramp of 1:20 slope with landing platform of minimum 1.20 width at every 10 m and at turning is proposed in Egress area (shown in green). The length of pathways are 150m and 270 m. Width of the pathways is considered to be 5m for the purpose of cost estimation.
- ❖ Because of height difference in the ingress, it is recommended to provide escalators (5 Nos. of 6m rise, oneway traffic) with transportation capacity of 2000 persons per hours. The cost is considered in the project cost estimation. This is conceptual and it is suggested that the detail design of the path widths/carrying capacity, escalators may be decided in consultation with expert agency in this area.

4.9 Terminal Station at Parvati Mata Temple

- ❖ Ample vacant land is available near mandir to construct Ropeway terminal station.
- ❖ The proposed ropeway station is at about 25 m from Parvati Mata Temple. The approach road for Parvati Mata Temple from the proposed station need be developed.
- ❖ Distributed power line crossing is to be underground.

Coordinates: X=243714.543; Y= 3329709.833

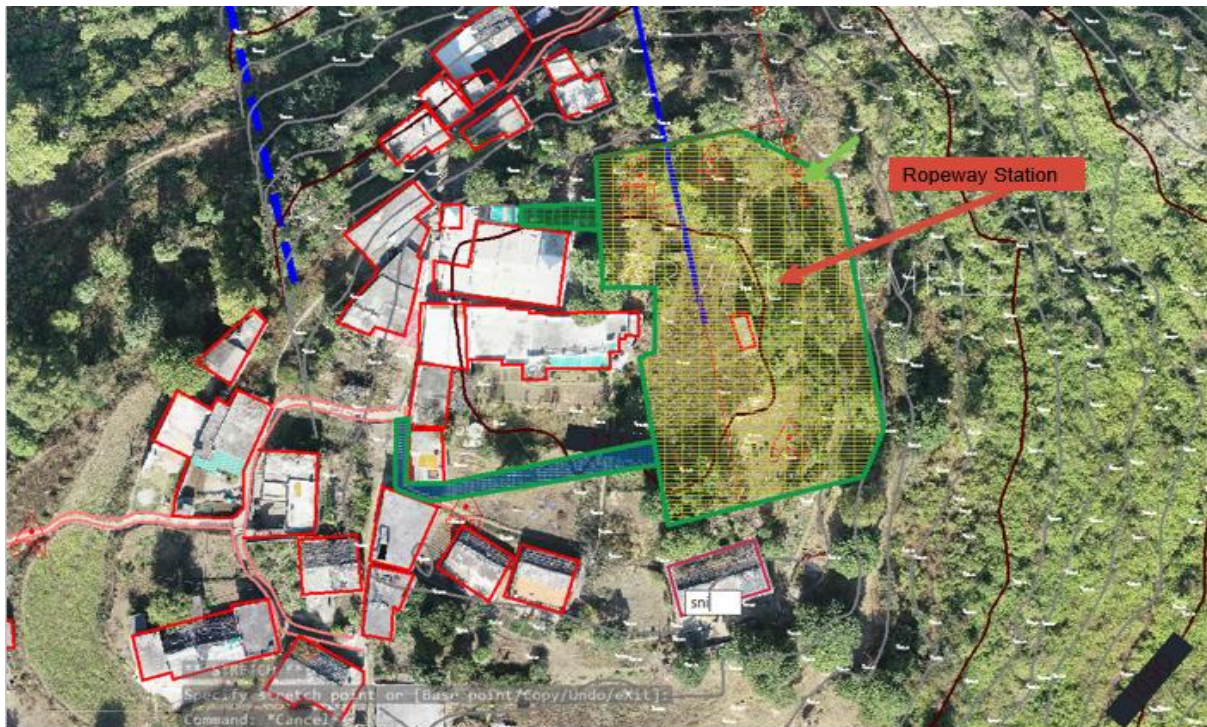


Figure 4:6 Proposed Parvati Mata Station Location

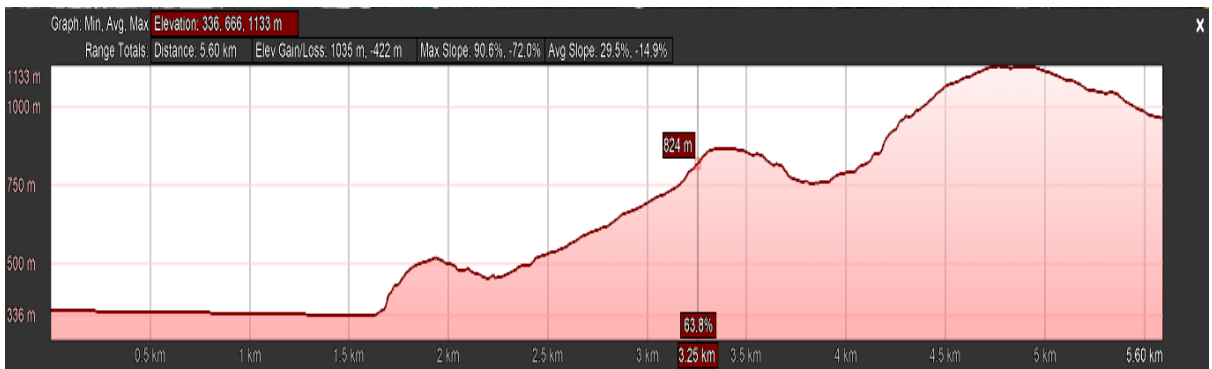
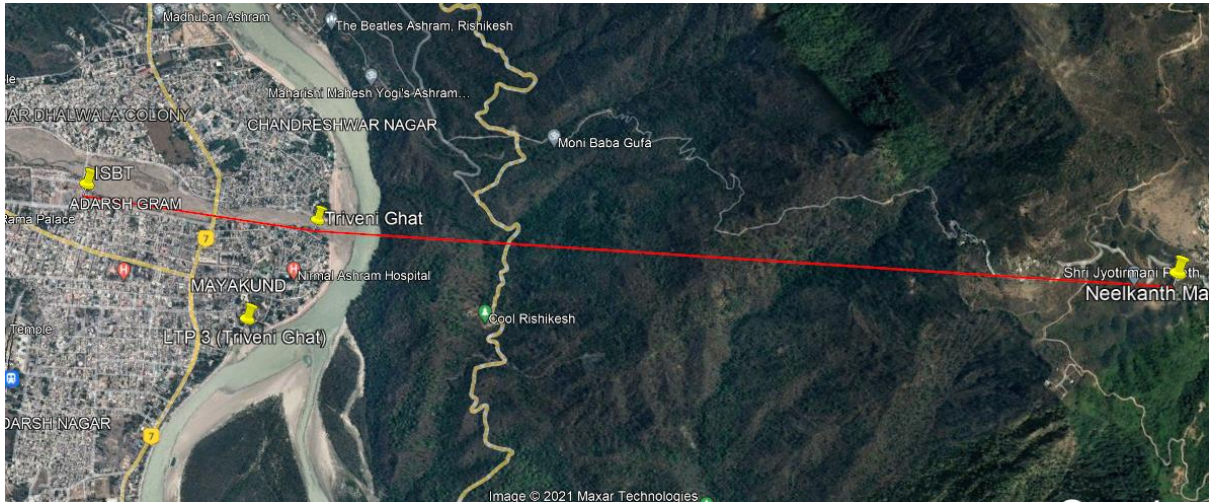
4.10 Ropeway Alignment

The entire ropeway is divided into two sections as described below -



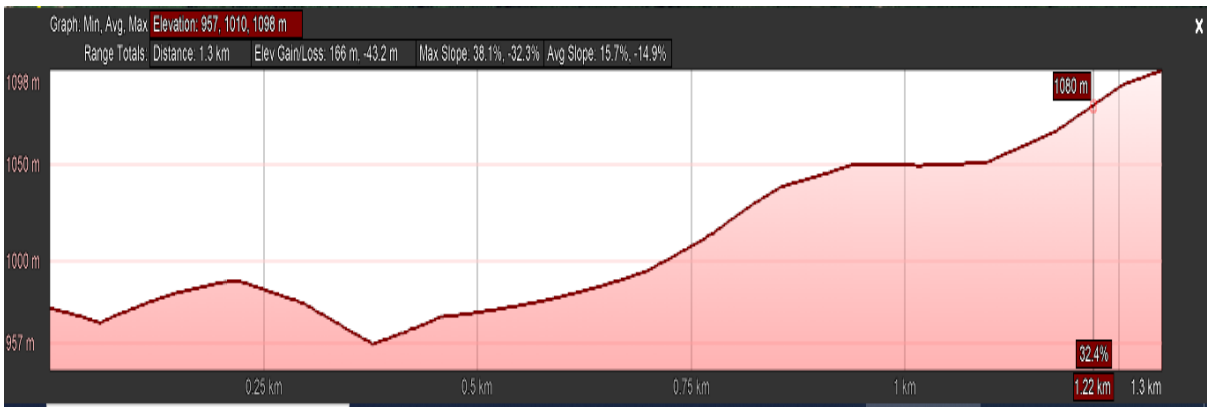
4.10.1 ISBT- Triveni Ghat- Neelkanth Mahadev Section

- The length of this section is about 5.20 Km and vertical rise is 614 m.
- The drive station is proposed at Neelkanth and tension station at ISBT.



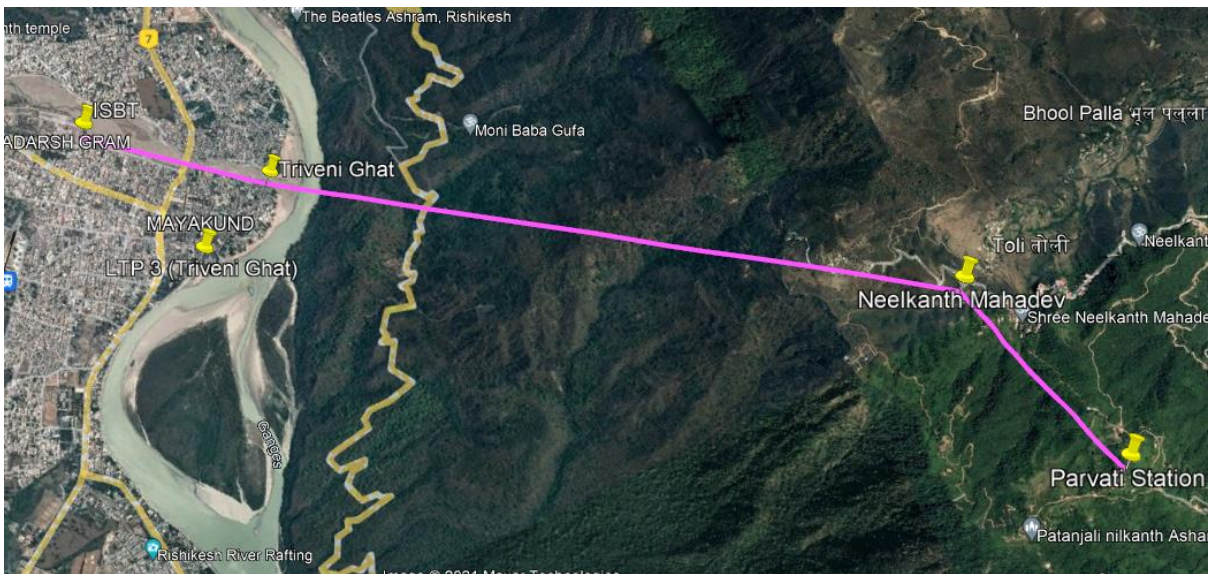
4.10.2 Neelkanth Mahadev- Parvati Mata Temple

- The length of this section is 1.3 km and vertical rise is 141 m.
- The drive station is proposed at Neelkanth Mahadev temple and tension station at Parvati Mata temple.



4.10.3 Proposed Ropeway Alignment

The length of the alignment is 6.45 km with vertical rise of 755 m



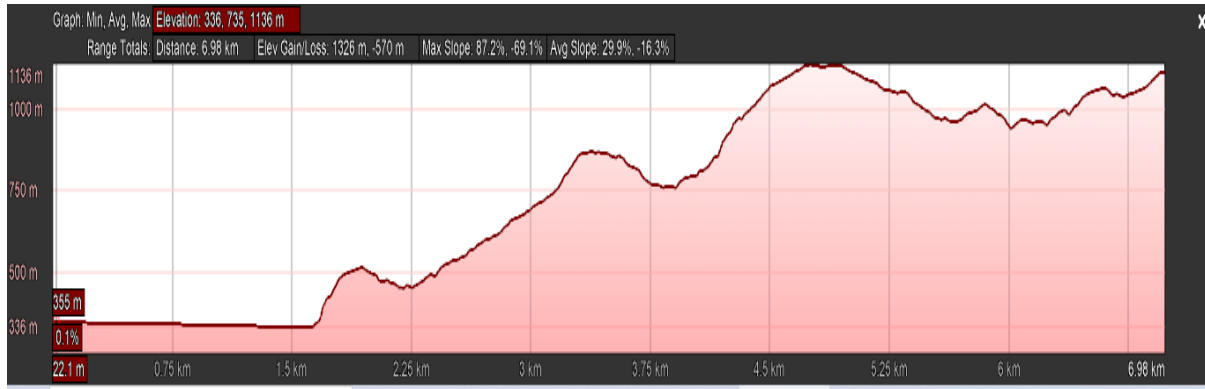


Figure 4:7 Ropeway Alignment

4.11 Tower Location

Table 4:2 Location of Towers

| Sl. No. | Chainage (m) | Coordinates | RL (m) | Tower Detail | Tower Height (m) |
|---------|--------------|-------------------------------|--------|------------------------------|------------------|
| 1 | -50 to 0 | X=239497.162 Y=3334334.943 | 354 | ISBT Ropeway Station | - |
| 2 | 9 m | X=239524.837 Y=3334308.332 | 354 | T-1 | 16.50 |
| 3 | 170 m | X=239640.902 Y=3334196.730 | 349 | T-2 | 30 |
| 4 | 370 m | X=239785.057 Y=3334058.118 | 346 | T-3 | 30 |
| 5 | 560 m | X=239922.014 Y=3333926.427 | 344 | T-4 | 30 |
| 6 | 760 m | X=240066.180 Y=3333787.804 | 342 | T-5 | 30 |
| 7 | 910 m | X=240174.304 Y=3333683.837 | 341 | T-6 | 40 |
| 8 | 1119 m | X=240324.958 Y=3333538.977 | 340 | T-7 | 14 |
| 9 | 1123-1173 | X=240337.640 Y=3333526.782 | 343 | Triveni Ghat Ropeway Station | |
| 10 | 1175 | X=240368.248 Y=3333501.968 | 338 | T-8 | 16 |
| 11 | 1570 | X=240673.877 Y=3333253.312 | 428 | T-9 | 50 |
| 12 | 1658 | X=240742.039 Y=3333197.653 | 487 | T-10 | 50 |
| 13 | 1800 | X=240852.530 Y=3333107.846 | 503 | T-11 | 50 |
| 14 | 2186 | X=241151.552 Y=3332864.362 | 471 | T-12 | 50 |
| 15 | 2470 | X=241371.820 Y=3332685.092 | 588 | T-13 | 30 |
| 16 | 2720 | X=241565.719 | 681 | T-14 | 30 |



| Sl. No. | Chainage (m) | Coordinates | RL (m) | Tower Detail | Tower Height (m) |
|---------|--------------|-------------------------------|--------|-----------------------------------|------------------|
| | | Y=3332527.284 | | | |
| 17 | 3040 | X=241813.908 Y=3332325.289 | 842 | T-15 | 40 |
| 18 | 3180 | X=241922.491 Y=3332236.916 | 841 | T-16 | 45 |
| 19 | 3270 | X=241992.295 Y=3332180.105 | 822 | T-17 | 40 |
| 20 | 3520 | X=242186.193 Y=3332022.297 | 747 | T-18 | 40 |
| 21 | 3755 | X=242368.458 Y=3331873.957 | 802 | T-19 | 40 |
| 22 | 3965 | X=242531.332 Y=3331741.398 | 957 | T-20 | 40 |
| 23 | 4150 | X=242674.817 Y=3331624.620 | 1071 | T-21 | 30 |
| 24 | 4345 | X=242826.057 Y=3331501.530 | 1126 | T-22 | 30 |
| 25 | 4580 | X=243009.091 Y=3331352.573 | 1117 | T-23 | 30 |
| 26 | 4710 | X=243106.595 Y=3331273.243 | 1083 | T-24 | 30 |
| 27 | 4920 | X=243272.040 Y=3331138.591 | 1045 | T-25 | 30 |
| 28 | 5015 | X=243345.705 Y=3331078.603 | 1000 | T-26 | 18 |
| 29 | 5065 | X=243384.484 Y=3331047.042 | 984 | T-27 | 7.3 |
| 30 | 5085 | X=243399.996 Y=3331034.417 | 973 | T-28 | 5.6 |
| 31 | 5088-5160 | X=243439.508 Y=3331002.405 | 968 | Neelkanth Mahadev Ropeway Station | |
| 32 | 5165 | X=243445.564 Y=3330974.397 | 962 | T-29 | 16.3 |
| 33 | 5345 | X=243483.013 Y=3330798.338 | 999 | T-30 | 35 |
| 34 | 5595 | X=243535.079 Y=3330553.826 | 972 | T-31 | 30 |
| 35 | 5835 | X=243585.053 Y=3330319.080 | 992 | T-32 | 30 |
| 36 | 5985 | X=243616.286 Y=3330172.364 | 1030 | T-33 | 30 |
| 37 | 6105 | X=243642.311 Y=3330050.103 | 1045 | T-34 | 35 |
| 38 | 6375 | X=243697.432 Y=3329790.973 | 1095 | T-35 | 22 |
| 39 | 6392 | X=243701.666 Y=3329771.336 | 1106 | T-36 | 10 |
| 40 | 6402-6458 | X=243709.662 Y=3329732.743 | 1109 | Parvati Mata Ropeway Station | |

Note: The details are subject to change as per design of concessionaire. The area proposed for each tower location is $8\text{ m} \times 8\text{ m} = 64\text{ Sqm}$.



5 STATION PLANNING

In this project 4 stations are proposed at ISBT Rishikesh, Triveni Ghat, Neelkanth Mahadev Temple and Parvati Mata Temple. The details of proposed stations are as under:-

Site Parameters

1. The site boundaries have been defined in the survey.
2. The proposed alignment of the ropeway is approved by UKMRC.
3. The ropeway will have total capacity of 2000 persons per hour with an exit from platform within five minutes.
4. Car parking is proposed at ISBT station and Triveni Ghat Station.
5. The station building/ platform are designed as per the carrying capacity of ropeway and which in this case is 2000 per hour.

Architectural Design Considerations:

1. ISBT and Parvati Mata temple are the starting and end stations.
2. ISBT, Rishikesh station provides for –
 - Car parks 77 nos are proposed at ISBT
 - Landscape plaza to act as devotees queuing area.
 - Kiosks and facilities provided in landscape plaza for the use of devotees.
3. Triveni ghat & Neelkanth are the intermediate stations. Car parks of 13 nos are proposed in Triveni Ghat Station
4. The Neelkanth Mahadev Temple Station is designed based on the existing travel path or circulation. It provides for:
 - Separate entry and exit route from and to the station.
 - The exit path from station is proposed to be increased where the facilities for devotees can be planned.
 - The width of the paths is indicative only
 - The detail design of the path widths/carrying capacity to be decided by UKMRC in consultation with expert agency in this area.
5. Parking area for gondolas is provided at Neelkanth Mahadev temple station.



- The platform width and staircase width for the ropeway stations have been designed as per NBC 2016 as defined under Annexure 3 for Metro Stations Clause nos. 6.4.4 considering a capacity of 2000 persons per hour.

5.1.1 ISBT Ropeway Station

The station building is proposed as G+ 2 structure. The station area is planned on 2nd floor. The ground floor area is used only for entry and exit to the station so that the existing use of the area under the station can be continued. The 1st floor area is 1500 sqm. Ticketing, toilets, and retail facilities are provided on this floor. The platform level area is also 1500 sqm and it is used for boarding and deboarding of passengers. The rope level is proposed at 370 m. The total built up area is 3000 sqm. Landscape area of 12000 sqm is proposed for this station

On the ground floor, 4 -wheeler parking (77 Nos.) and 3 kiosks are provided outside the station building, landscape Plaza are planned.

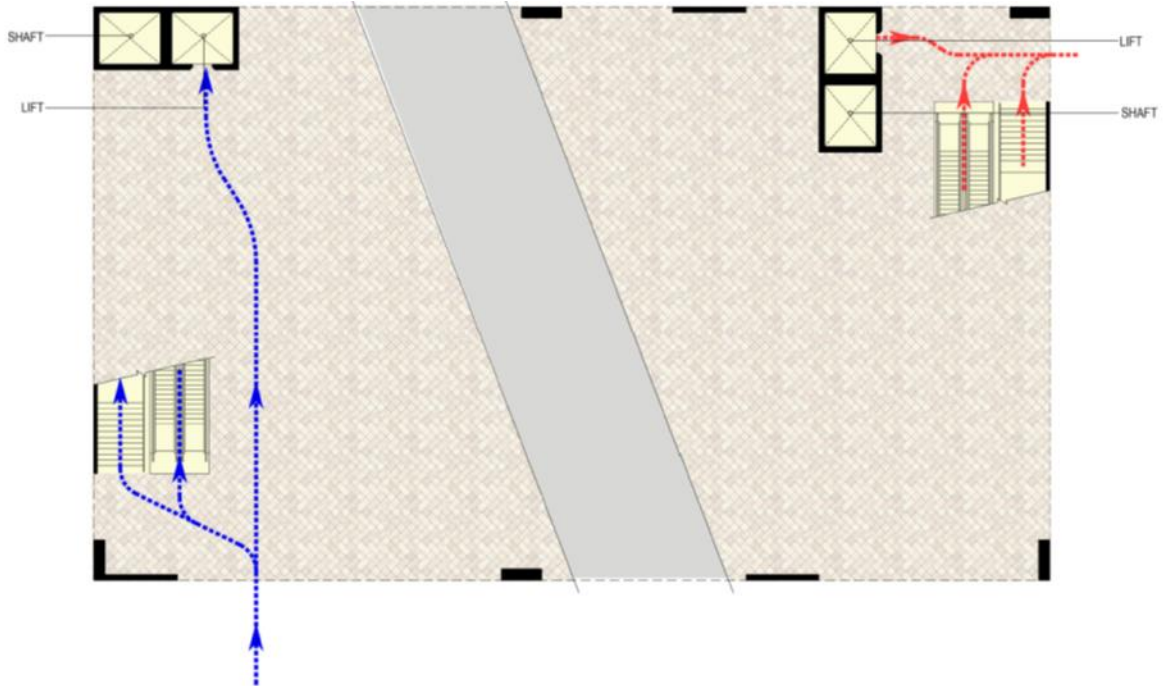
The floor plans of ISBT station are as under.

Site Plan



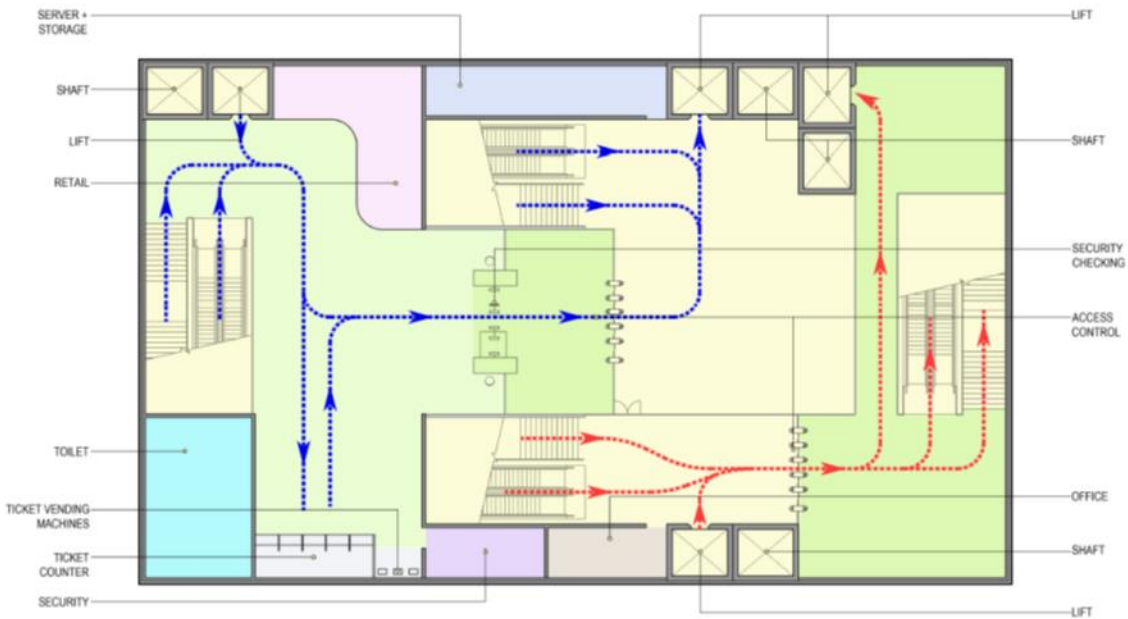


Ground Floor Plan:-



The Ground level is proposed at 354 m from MSL. Which is underpass of 6 m

First Floor Plan:-



The 1st floor level is proposed at 360 m from MSL.



2nd Floor Plan:-

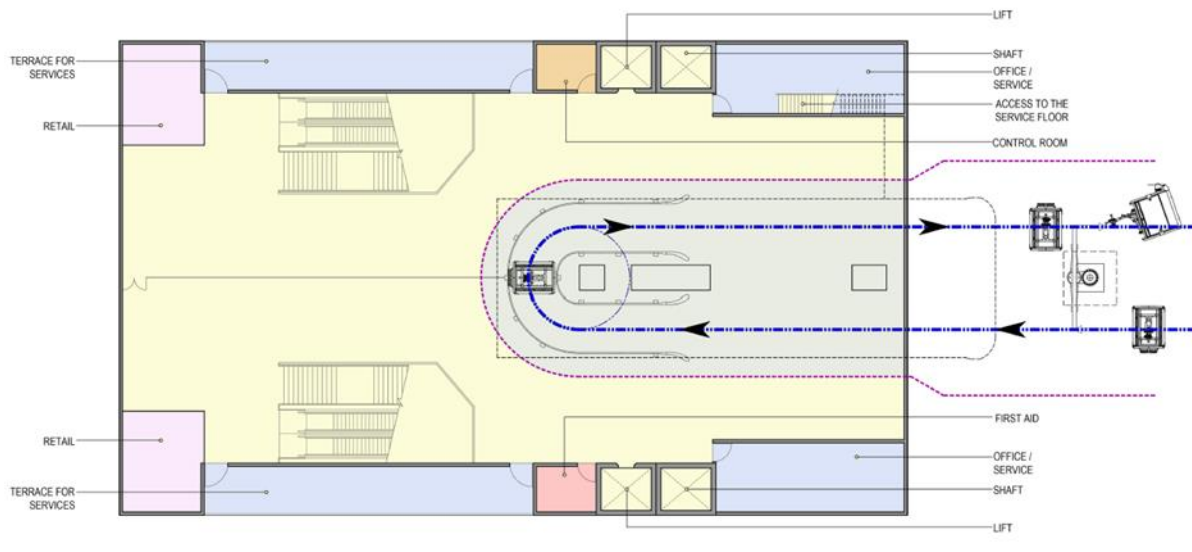


Figure 5:1 ISBT Station Planning

The 2nd floor level is proposed at 365.5 m from MSL.

The breakup of area and preliminary cost estimate of civil work of ISBT ropeway station is as given in following tables: -

| Sr. No. | Space | Area |
|-----------------------------------|---|-----------|
| Ground Floor | | - |
| 1st Floor Level | | |
| 1 | Office | 20 sqm. |
| 2 | Toilet | 56 sqm. |
| 3 | Security room | 20 sqm. |
| 4 | Ticket Counter | 18 sqm. |
| 5 | TVM | 5 sqm. |
| 6 | Retail | 50 sqm. |
| | Services | 40.5 sqm. |
| Platform Level | | |
| 7 | Office / Service / Toilet | 105 sqm. |
| 8 | First Aid Room | 11 sqm. |
| 9 | Control Room | 11 sqm. |
| 10 | Retail | 72 sqm. |
| 11 | Terrace | 125 sqm. |
| 12 | Platform Width | 4 sqm. |
| 13 | 2 No. Lift (29 pax), 2 No. escalator (1000 mm) and 2 No. Staircase (2400 mm width) | |



Note:- It is considered that the landscape Area (4900 Sqm) can be used for installation of solar panel. The cost of installation of solar panel is included in the cost estimation.

| Sr. No. | Space | Area (Sqm) | Rate (INR) | Cost (INR) |
|------------|----------------------------------|------------|-------------|-----------------|
| 1 | Site Area | 12000.00 | | |
| 2 | Ground Level Floor Area | - | | |
| 3 | 1 st Floor level Area | 1500.00 | | |
| 4 | 2 nd floor Level Area | 1500.00 | | |
| 5 | Total Built- up Area | 3000.00 | 48450/Sqm | 14,53,50,000.00 |
| 6 | Landscape Area | 12000.00 | 1.5 Cr/Acre | 4,44,77,390.00 |
| Total Cost | | | | 18,98,27,390.00 |

5.1.2 Triveni Ghat Ropeway Station

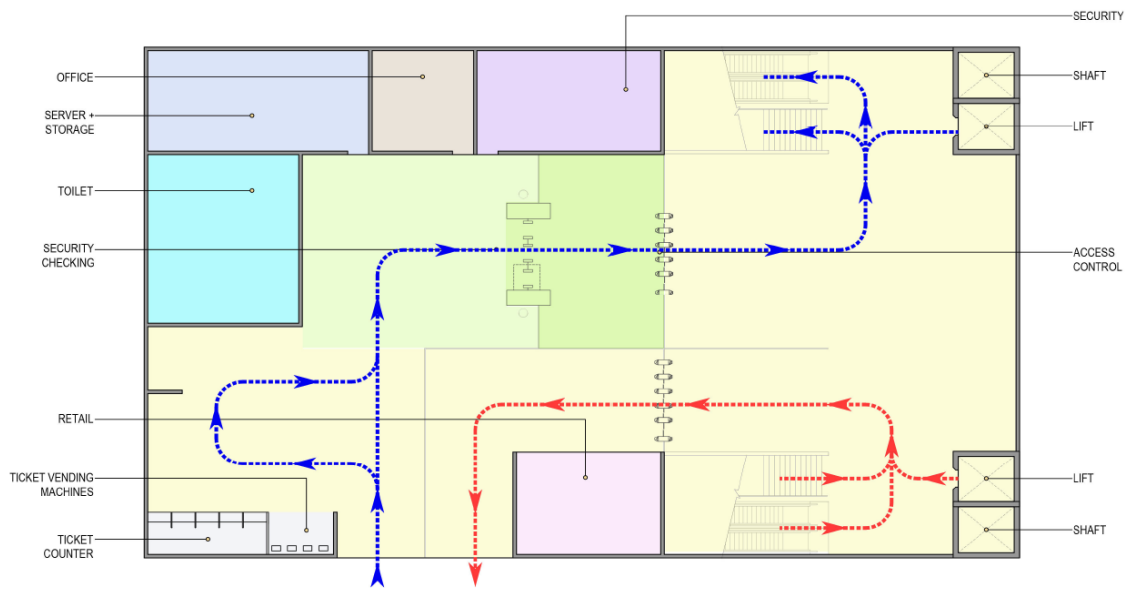
The station building is proposed as G+ 1 structure. The station area is planned on 1st floor. The site area is 4992 sqm. Ground level floor area is 1500 sqm and 1st floor level area is 1500 sqm. The total built up area is 3000 sqm. The rest of area is use for parking and circulation area. –On the ground floor entry/exit, toilets, security checking, retail and ticketing areas are proposed. On the 1st floor station level station area, service/ office area, etc. are planned. The rope level is proposed at 353.4. The floor plans of Triveni Ghat ropeway station are as under: -

Site Plan



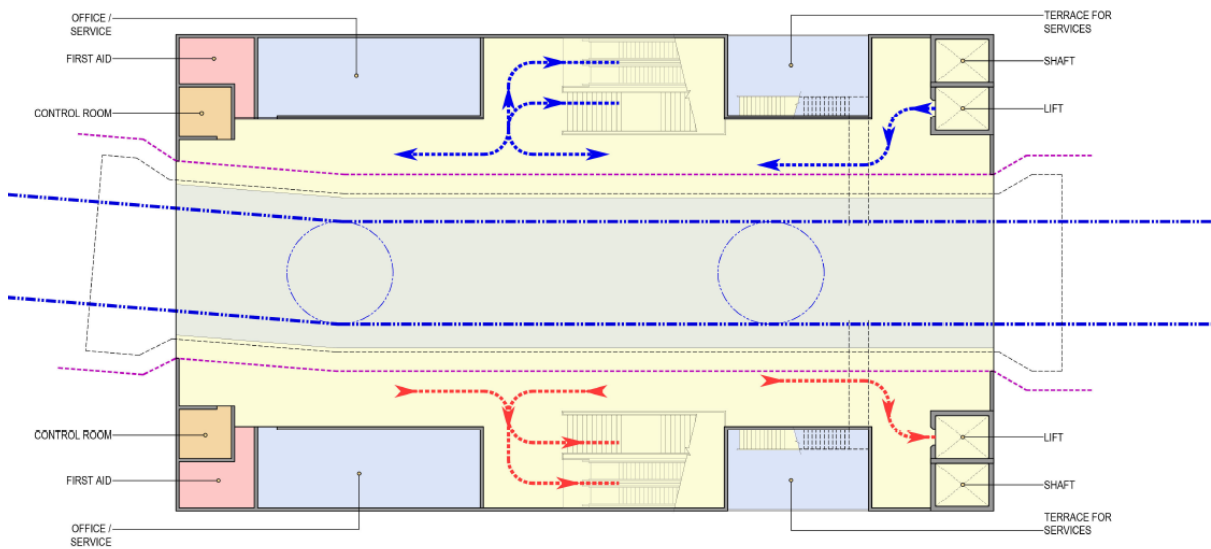


Ground Floor Plan:-



The ground floor level is proposed at 343 m from MSL.

1st Floor Plan:-



The 1st floor level is proposed at 348.5 m from MSL.

Figure 5:2 Triveni Ghat Station Planning

The breakup of area and preliminary cost estimate of civil wok of Triveni Ghat ropeway station is as given in following tables: -



| Sr. No. | Space | Area |
|-----------------------|---|----------|
| Ground Level | | |
| 1 | Office | 35 sqm. |
| 2 | Server + Storage | 75 sqm. |
| 3 | Toilet | 85 sqm. |
| 4 | Retail | 50 sqm. |
| 5 | Security Room | 62 sqm. |
| 6 | Ticket Counter | 17 sqm. |
| 7 | TVM | 7.5 sqm. |
| Platform Level | | |
| 8 | Office/ Services | 135 sqm. |
| 9 | First Aid Room | 32 sqm. |
| 10 | Control Room | 20 sqm. |
| 11 | Platform Width | 4m |
| 12 | Terrace | 86 sqm. |
| 13 | 2 No. Lift (29 pax), 4 No. escalator (1000 mm) and 2 No. Staircase (2400 mm width) | |

| Sr. No. | Space | Area (Sqm) | Rate (INR) | Cost (INR) |
|---------|--|------------|-------------|-----------------|
| 1 | Site Area | 4992.00 | | |
| 2 | Ground Level Floor Area | 1500.00 | | |
| 4 | 1 st floor Level Floor Area | 1500.00 | | |
| 5 | Total Built- up Area | 3000.00 | 48450/Sqm | 14,53,50,000.00 |
| 6 | Landscape Area | 3492.00 | 1.5 Cr/Acre | 1,29,42,920.00 |
| | Total Cost | | | 15,82,92,920.00 |

5.1.3 Neelkanth Mahadev Temple Ropeway Station

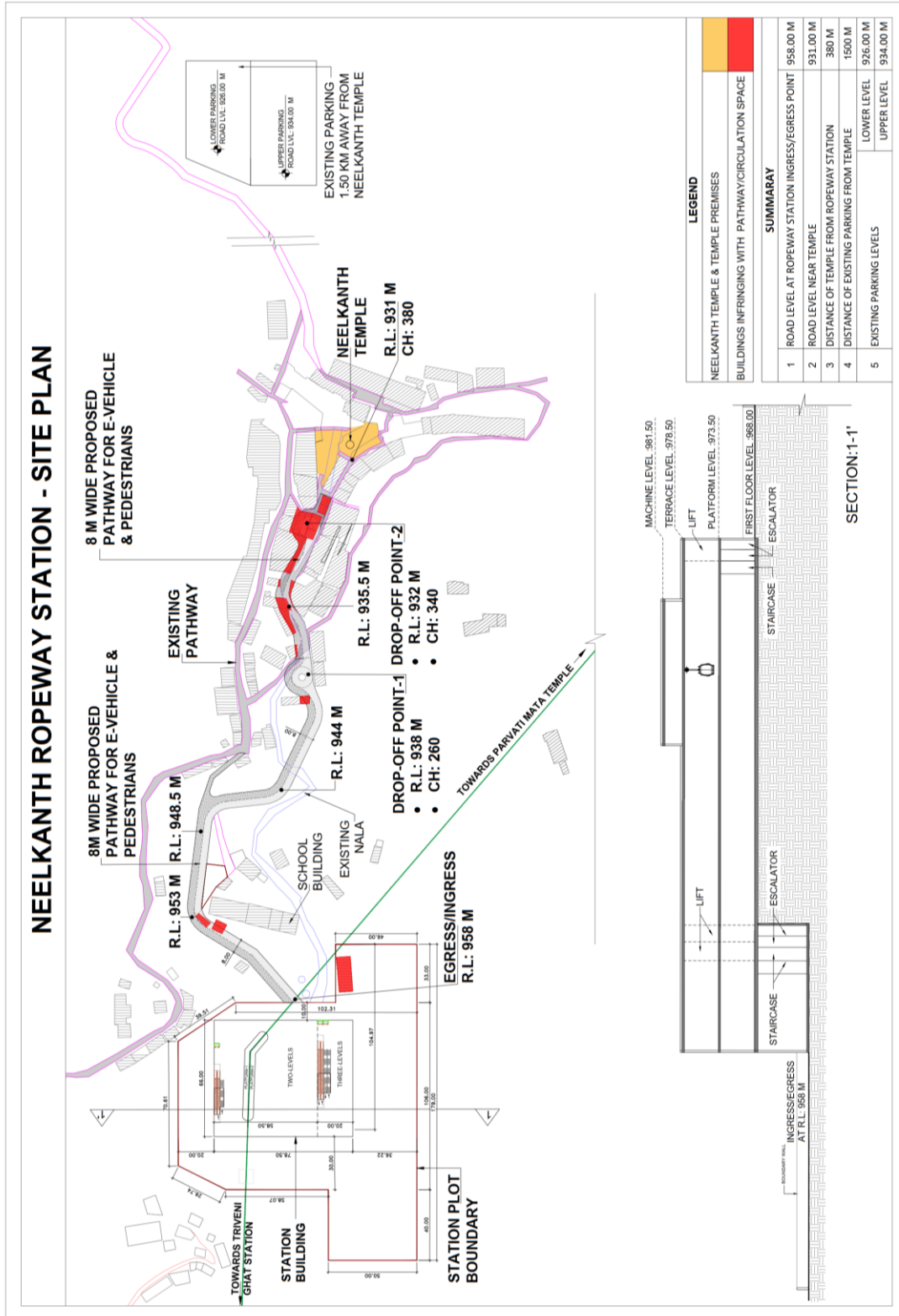
The station building is proposed as G+ 1 structure. The station area is planned on 1st floor. The ground floor area is 5180 sqm and platform level area is 5180 sqm. The total built up area is 10360 sqm. The site area of 15465 sqm is proposed. An additional area of 2000 sqm is added for additional civil work at this Ropeway station, and the cost of development is added separately in estimates. The design of station will be like drawing placed on below and accordingly structure floor areas, levels will get changed. It is proposed to consider remaining area of 10285 sqm for Landscaping around station and 4295 Sqm area will be considered for landscaping development near the station.

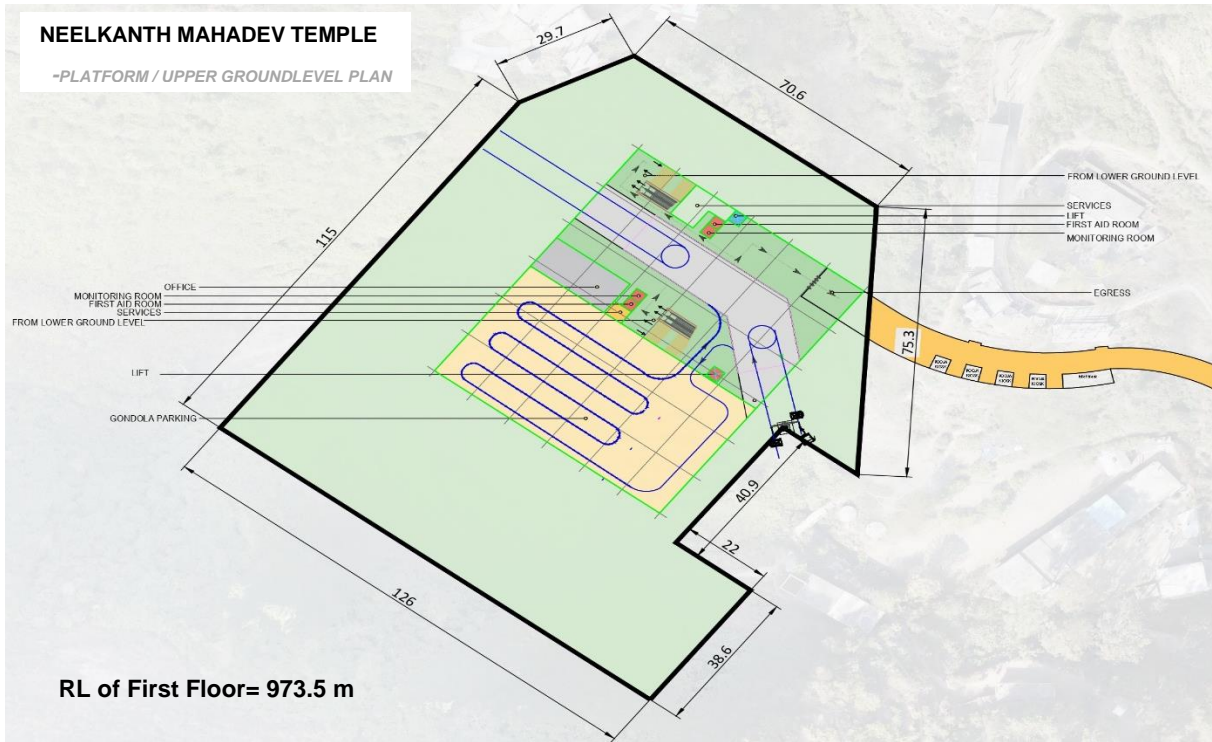
On the ground floor ticket counter, retails, food court, toilet, lift, service area, VIP waiting room and entry to ropeway station are planned. On the 1st floor level station



area, first aid room, monitoring room, gondola parking, service area, office area are planned. The rope level is proposed at 978.4m.

The plans of the Neelkanth Mahadev Temple ropeway station are as under: -





NEELKANTH MAHADEV TEMPLE

-SECTION AA'

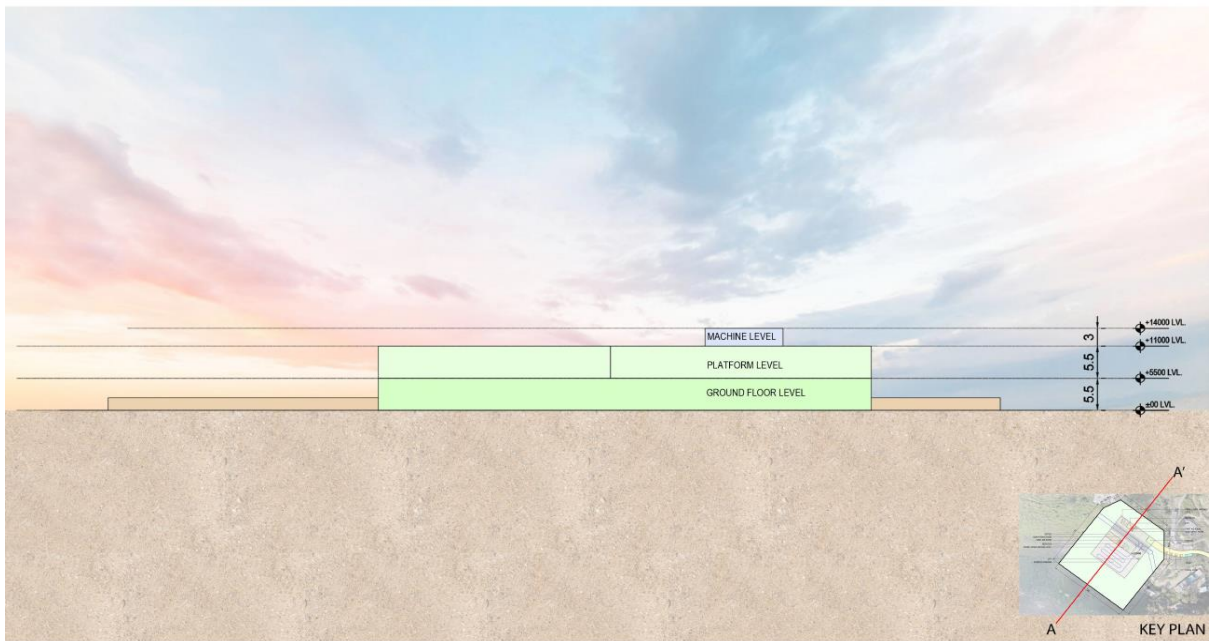


Figure 5:3 Neelkanth Station Area Planning



The breakup of area and preliminary cost estimate of civil work of Neelkanth Mahadev Temple ropeway station is as given in following tables: -

| Sr. No. | Space | Area |
|-----------------------|---|------------|
| Ground Level | | |
| 1 | UKMRC Office | 545 sqm. |
| 2 | Services | 44 sqm. |
| 3 | VIP Waiting Area | 286 sqm. |
| 4 | Ticket Counter | 22.5 sqm. |
| 5 | Retail | 291 sqm. |
| 6 | Toilets | 195 sqm. |
| 7 | Food Court | 1765 sqm. |
| Platform Level | | |
| 8 | Office | 216 sqm. |
| 9 | First Aid Room | 18 sqm. |
| 10 | Monitoring Area | 18 sqm. |
| 11 | Services | 107.5 sqm. |
| 12 | Platform Width | 4m |
| 13 | Egress Area | 107.5 sqm. |
| 14 | Pooja Kiosks | 60 sqm. |
| 15 | Toilet Block | 46.5 sqm. |
| 16 | Parking Area | 2440 sqm. |
| 17 | 2 No. Lift (24 pax), 2 No. escalator (1000 mm) and 2 No. Staircase (2400 mm width) | |

| Sr. No. | Space | Area (Sqm) | Rate (INR) | Cost (INR) |
|---------|---------------------------|------------|--------------|------------------------|
| 1 | Site Area | 15,465.00 | | |
| 2 | Ground Level Floor Area | 5,180.00 | | |
| 3 | Platform Level Floor Area | 5,180.00 | | |
| 4 | Total Built- up Area | 10,360.00 | 48450/Sqm | 50,19,42,000.00 |
| 5 | Landscape Area | 14,580.00 | 1.5 Cr/ Acre | 5,40,40,029.00 |
| | Total Cost | | | 55,59,82,029.00 |

| Sr. No. | Particular | Cost (in Crore) |
|---|---|-----------------|
| 1 | Cost of Additional Floor Plate of Station | 4.40 |
| 2 | Cost of Drain Construction along Boundary | 3.62 |
| 3 | Additional Cost of Escalator (One No) | 1.00 |
| 4 | Cost of Electric Cart for Old People and Children | 1.05 |
| Total Cost of Additional Work at Neelkanth Station | | 10.07 |



5.1.4 Parvati Mata Temple Ropeway Station

The station building is proposed as only ground floor structure. The ground floor area is 1494 sqm. The total built up area is 1494 sqm. The Site area of 2850 sqm is proposed for this station.

The station building station area, ticket counter, ticket vending machine, maintenance and server room, guest house, office, first aid service room, kiosk, toilets are planned.

The floor plans of Parvati Mata Temple ropeway station are as under: -

PARVATI TEMPLE
-GROUND / PLATFORM LEVEL FLOOR PLAN



RL of Ground Floor=1110.0 m



CHAPMAN TAYLOR

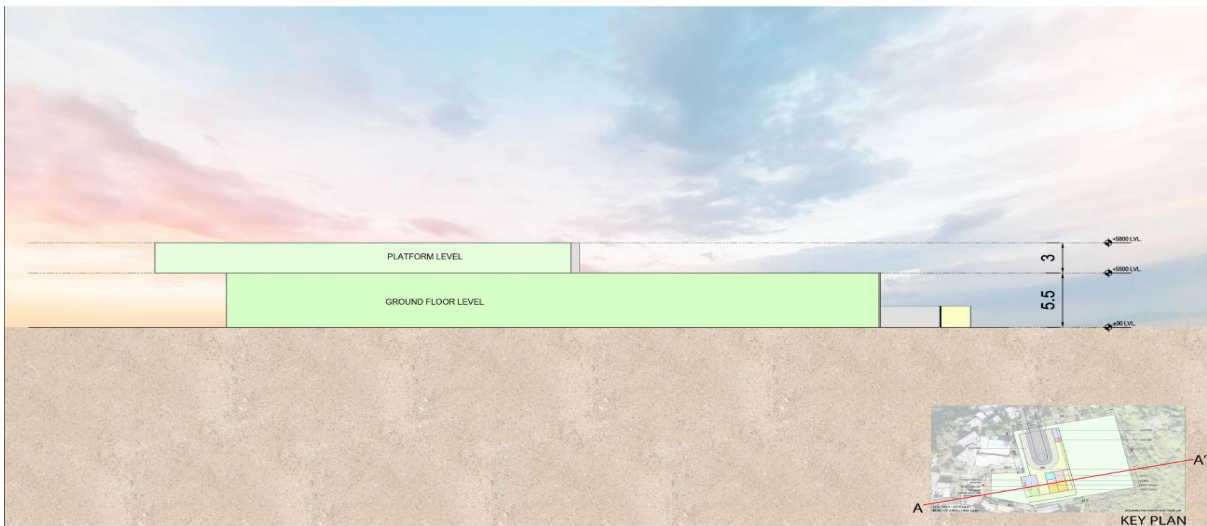


PARVATI TEMPLE
-CIRCULATION



CHAPMAN TAYLOR

PARVATI TEMPLE
-SECTION AA'



CHAPMAN TAYLOR

Figure 5:4 Parvati Mata Station Planning

| Sr. No. | Space | Area |
|---------|--------------------------------------|-----------|
| 1 | Toilets | 30 sqm. |
| 2 | Ticketing Gates | 7.5 sqm. |
| 3 | Security Room + Maintenance + Server | 75.5 sqm. |
| 4 | Retail | 18 sqm. |
| 5 | Office | 50 sqm. |
| 6 | Services | 33.5 sqm. |



| | | |
|---|----------------|-----------|
| 7 | First Aid Room | 12.5 sqm. |
| 8 | Platform Width | 4m |
| 9 | Guest Room | 86.5 sqm. |

| Sr. No. | Space | Area (Sqm) | Rate (INR) | Cost (INR) |
|---------|----------------------|------------|-------------|----------------|
| 1 | Site Area | 2850.00 | | |
| 2 | Ground Coverage | 1,494.00 | | |
| 4 | Total Built- up Area | 1,494.00 | 48450/Sqm | 7,23,84,300.00 |
| 5 | Landscape Area | 1,356.00 | 1.5 Cr/Acre | 50,25,945.00 |
| | Total Cost | | | 7,74,10,245.00 |

The Total cost of four stations is Rs 98.15 Cr as given in the following table: -

| Sr. No. | Name of Station | Cost (in Rs.) |
|---------|--------------------|---------------|
| 1 | ISBT | 18.98 Cr |
| 2 | Triveni Ghat | 15.83Cr |
| 4 | Neelkanth Mahadev* | 55.60 Cr |
| 5 | Parvati Mata | 7.74 Cr |
| | Total Cost | 98.15 Cr |

* Cost of Additional Work at Neelkanth Station is Rs. 10.07 Crore



6 TRAFFIC STUDY

6.1 About Rishikesh City:

Rishikesh, also known as Hrishikesh, is a city governed by Rishikesh Municipal Corporation (since October 2017), and a tehsil in Dehradun district of the Indian state Uttarakhand. Located in the foothills of the Himalayas in northern India, it is known as the "Gateway to the Garhwal Himalayas" and "Yoga Capital of the World". It lies approximately 25 km (16 mi) north of the city Haridwar and 43 km (27 mi) southeast of the state capital Dehradun. According to Census of India, 2011 Rishikesh had a population of 102,138 making it the seventh most populated city in the state of Uttarakhand. It is known as the pilgrimage town and regarded as one of the holiest places to Hindus. Hindu sages and saints have visited Rishikesh since ancient times to meditate in search of higher knowledge. In September 2015, the Union tourism minister Mahesh Sharma announced that Rishikesh and Haridwar will be the first in India to be given the title of "twin national heritage cities". The city has hosted the annual International Yoga Festival on the first week of March since 1989. The map of Rishikesh is shown in Figure 6:1.

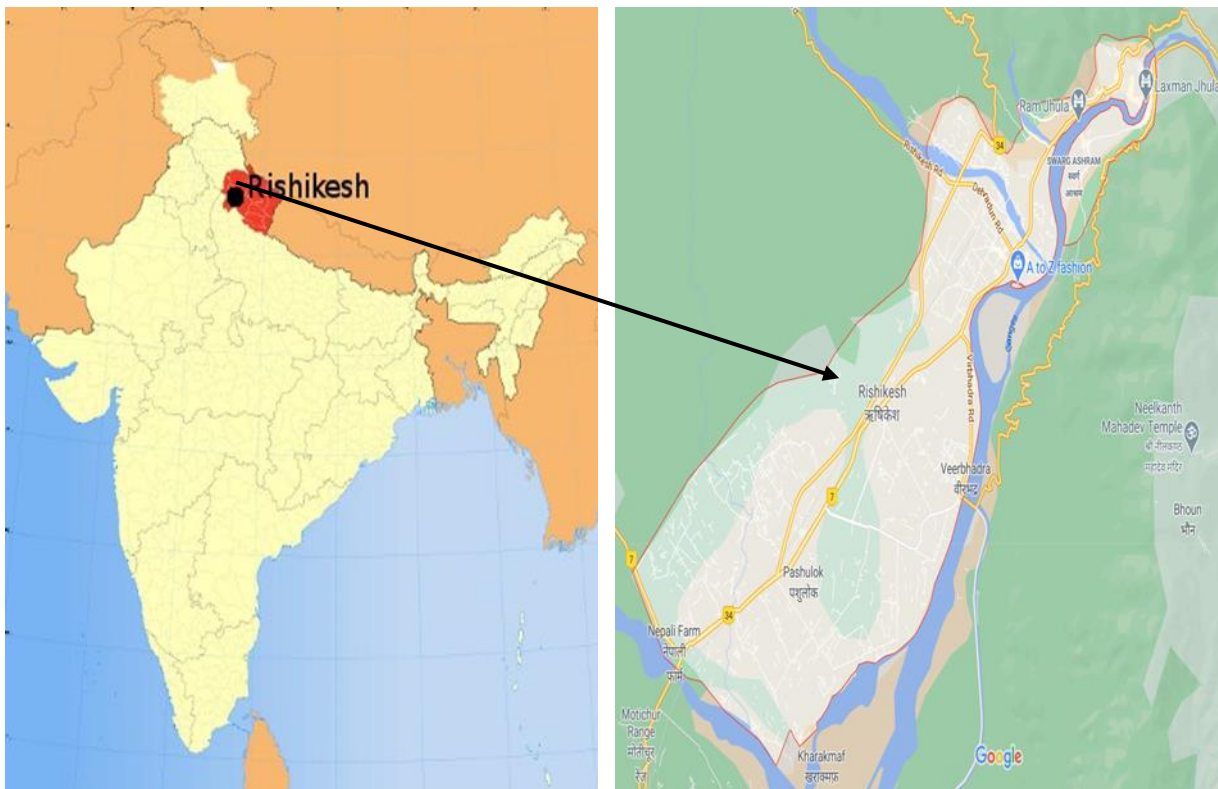


Figure 6:1 Map of Rishikesh



6.1.1 Geography of Rishikesh City:

Rishikesh is at 30.103368°N 78.294754°E. It has an average elevation of 372 meters (1,220 ft). The town is located in the Tehri Garhwal region of the northern Indian state of Uttarakhand. After flowing 249 km (155.343 mi) through its narrow Himalayan valley, the Ganges emerges from the mountains at Rishikesh, then debouches onto the Gangetic Plain at the pilgrimage town of Haridwar. Despite the pollution of the Ganges, the water in Rishikesh is relatively unaffected as the major polluting points are down river in the neighboring state of Uttar Pradesh. The Tehri Dam is just 86 km (53 mi) and Uttarkashi, a popular yoga destination is 170 km (110 mi) uphill on the way to Gangotri Dham. Rishikesh is the starting point for travelling to the four Chota Char Dham pilgrimage places—Badrinath, Kedarnath, Gangotri, and Yamunotri. It is also a starting point for the Himalayan tourist destinations such as Harsil, Chopta, Auli and famous summer and winter trekking destinations like Dodital, Dayara Bugyal, Kedarkantha, Har Ki Dun for camping and grandeur Himalayan panoramic views.

6.1.2 Demography of Rishikesh City:

Rishikesh being the Yoga Capital of India and a pilgrimage town, attracts pilgrims from all over the country. The tourists visiting Rishikesh generally stay for longer duration reaping the benefits of the serene environment the place offers. The city is growing due to its religious importance and also the expanding service and manufacturing sectors. One of the key influential of growth in Rishikesh is the establishment of Indian Drugs and Pharmaceuticals Ltd. The Residential Population of Rishikesh according to the census 2011 is 70,499. With the formation of Municipal Corporation, the area was reduced to 10 sq km from 17.75 sq km. The average Household size is 4.7. About 54% of the Population is male and 45% is female. The Literacy rate is 76%.

6.1.3 Climate of Rishikesh City:

Rishikesh has a pleasant climate for many months of the year as its location is in hilly terrains. Distance from sea gives it continental climate (a relatively dry climate with very hot summers and very cold winters) with prevalence of continental air through major parts of the year. According to Köppen-Geiger climate classification system, Rishikesh climate is humid subtropical. Average maximum temperature is 40 degrees Celsius (104 degrees Fahrenheit). The average minimum temperature is 7 degrees Celsius. There are frequent precipitation that takes place. The annual mean



rainfall in Rishikesh is about 2136.7 mm. Months of May, June, July and August has the highest UV index of 12 and January and December have the lowest UV index of 4.

6.1.4 Connectivity:

Rishikesh is well connected by road and rail-based network, with daily bus services (both private and Govt. owned bus) and trains. The air connectivity is provided by Jolly grant airport located in Dehradun. Rishikesh has an excellent network of buses linking it with all the major cities and towns nearby. Luxury as well as normal deluxe buses are easily available from New Delhi's ISBT Kashmiri Gate at regular intervals. Connectivity via buses is so good that tourists prefer to travel by road, add to this convenience and the fact that buses happen to be more cost-effective and you'll know why this mode of transport is making the others look pale in comparison. Travellers can also consider driving up to Rishikesh via NH 58 from Delhi and other cities. Rishikesh has its own railway station but it is not connected to major Indian cities apart from Haridwar. So, the nearest major railhead is in Haridwar, which is well-connected with cities like Delhi, Mumbai, Lucknow and Varanasi via an extensive network of trains. Some popular trains that run from Delhi to Haridwar include Shatabdi Express, Jan Shatabdi, and Mussoorie Express, among others. The Haridwar railway station is barely 20 km away from Rishikesh and taxis and buses are easily available from outside, which takes less than 40 minutes.

As discussed in the meeting held on 07.10.2020, following four alternative ropeway alignments are possible from Rishikesh to Neelkanth Mahadev temple and Parvati Mata Temple: -

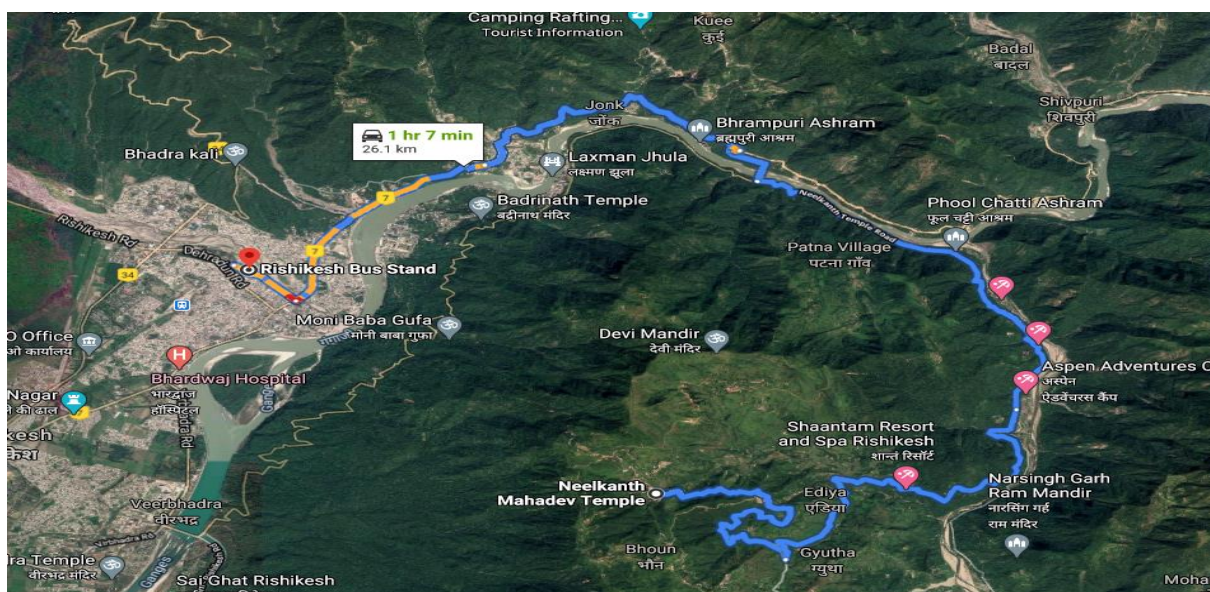
- i. ISBT via Neelkanth Mahadev to Parvati Mandir
- ii. ISBT via Triveni ghat via Neelkanth Mahadev to Parvati Mandir
- iii. ISBT via Muni Ki Reti via Neelkanth Mahadev to Parvati Mandir
- iv. New Railway Station (Yogi Nagri Rishikesh Railway Station) via old Railway Station via ISBT via Neelkanth Mahadev to Parvati Mandir

Based on above ISBT and New Railway Station are probable locations for LTP. Similarly, Triveni Ghat and Muni- Ki- Reti are probable locations for ITP. Accordingly, traffic study is conducted with following objectives: -

6.2 Objectives of Study:

- i. The main objective of traffic study is to determine the originating and intermediate stations of Neelkanth Mahadev Temple Ropeway at Rishikesh for providing fast, environment friendly and hassle-free connectivity from Rishikesh to Neelkanth Mahadev Temple and Parvati Mata Temple based on traffic demand, O-D survey and stated preference survey.
- ii. ISBT, Old Railway station, New Railway Station fall within 1-2 km aerial distances. They are the probable candidates for originating station (LTP). Further Muni Ki Reti and Triveni Ghat are probable candidates for intermediate station (ITP). Neelkanth Mahadev Temple and Parvati Mata Temple are the destination stations (UTP). The candidature of LTP and ITP will be finalized based on traffic study findings exhibiting maximum traffic demand.
- iii. The alignments from originating station to destination via intermediate stations and one alignment directly from originating station to destination are possible. To identify the alignment showing maximum traffic demand out of the three is the main objective.
- iv. Find out present level of traffic flow through classified volume count.
- v. Estimation of the projected traffic demand over the concession period of 30 years to assess financial viability of the project.

Figure 6:2 Access to Neelkanth Mahadev Temple by Road





6.3 Location of the Study:

Seven most prominent places are identified in Rishikesh for location of Ropeway stations whose details are shown below.

* All the Station plot co-ordinates are attached as Annexure G

Table 6:1 Location of the Study

| Sr. No. | Terminal Stations | Coordinates | Station Type |
|---------|--------------------------|----------------------------|--------------|
| 1 | Neelkanth Mahadev Mandir | 30°4'58.70"N 78°20'19.01"E | UTP |
| 2 | Parvati Mata Temple | 30°4'18.95"N 78°20'28.52"E | |
| 3 | Triveni Ghat | 30°6'13.49"N 78°18'17.54"E | ITP |
| 4 | Muni Ki Reti | 30°6'57.37"N 78°18'23.18"E | |
| 5 | ISBT | 30°6'46.71"N 78°17'48.78"E | LTP |
| 6 | Old Railway Station | 30°6'25.81"N 78°17'17.86"E | |
| 7 | New Railway Station | 30°6'36.39"N 78°16'47.88"E | |



Figure 6:3 Location of the Study

6.3.1 Neelkanth Mahadev Temple:

Neelkanth Mahadev Temple (30°4'58.70" N 78°20'19.01"E) is a Hindu temple dedicated to Neelkanth, an aspect of Lord Shiva. The temple is situated at a height of 1330 meters and is located about 27 km from Rishikesh in the Pauri Garhwal district of Uttarakhand, India. The temple architecture is very much influenced by the Dravidian style of temple architecture. The temple is one of the most revered holy



shrines dedicated to Lord Shiva and is a prominent Hindu pilgrimage site. It is surrounded by dense forests and is adjacent to the mountain ranges of Nar-Narayan. It is enveloped between the valleys of Manikoot, Brahmakoot, and Vishnukoot and is located at the confluence of the rivers Pankaja and Madhumati. According to Hindu sacred texts, the place where the Neelkanth Mahadev Temple currently stands is the sacred location where Shiva consumed the poison that originated from the sea when Gods and Demons churned the ocean in order to obtain Nectar. This poison that emanated during the Samudramanathan (churning of the ocean) made his throat blue in color. Thus, Shiva is also known as Neelkanth, literally meaning The Blue Throated One and the temple is known as Neelkanth Mahadev Temple. The temple observes two fairs that are held annually on the occasions of Maha Shivratri (Feb-Mar) and Shivratri of Shraavana (month of Hindu calendar) (July-Aug) during which the devotees (Kawarias) trek from Haridwar to Neelkanth Mahadev Temple. There are three routes often used by tourist to reach Neelkanth Mahadev temple as given below:

- a. From ISBT Road to Neelkanth Mahadev Road via NH-7 by crossing Neelkanth Bridge
- b. Tourist coming from Haridwar take Neelkanth Mahadev Road via Cheela Dam and Barrage bypassing Rishikesh city.
- c. Tourist also trek from Laxman Jhula to Neelkanth Mahadev Temple which is approximately 19 kms.

The temple opens at 5 a.m. and closes at 6 p.m. The photo of Neelkanth Mahadev Temple and Trekking Route of Neelkanth Mahadev Temple from Laxman Jhula is shown in following figure: -



Figure 6:4 Neelkanth Mahadev temple



Figure 6:5 Trekking Route of Neelkanth Mahadev temple

Tourists visit Neelkanth Mahadev Temple by private car, private-taxis, sharing-taxis, two-wheelers or by walk (trekking). Sharing taxi stand is near ISBT, Ram-Jhula and Laxman-Jhula. Travel time and cost incurred by different mode of transport is given below.



Table 6-2 Travel time and Cost for different mode of transport

| Sr. No. | Mode of Transport | Approximate Travel Time (in hours) | Approximate Cost of Transport (in INR) | Remark |
|---------|-------------------|------------------------------------|--|----------------------------------|
| 1 | Car | 1.0 - 1.5 | 300 | Owned car |
| 2 | Sharing Taxi | 1.0 – 2.0 | 150 | Round trip fare per person |
| 3 | Private taxi | 1.0 - 1.5 | 700 | Round trip fare for 4 persons |
| 4 | Two-wheeler | 1.0 - 1.5 | 550 | Rental + fuel cost for 2 persons |

The cost of sharing taxis is INR 100 for one-way trip and INR 150 for round trip. On the other hand, minimum fare of private taxis is INR 700. Tourists also rent two-wheelers in Rishikesh which cost INR 400 for a day and 80 kms. The travel by own car cost about Rs. 300/- approximately.

6.3.2 Parvati Mata Temple:

Parvati Mata temple is 3 kms from Neelkanth Mahadev Temple. The road to reach Parvati Mata temple is narrow, single lane kachcha road. There is no complete access to vehicle up to Parvati Mata temple. Photo of Parvati Mata Temple and Road towards Parvati Mata Temple is shown in following figure: -



Figure 6:6 Parvati Mata Temple



Figure 6:7 Road towards Parvati Mata Temple

6.3.3 Triveni Ghat:

Triveni Ghat ($30^{\circ}6'13.49''\text{N}$ $78^{\circ}18'17.54''\text{E}$), a confluence of three holy important Rivers namely the Ganges, the Yamuna and the Saraswati, is a most revered sacred bathing spot in Rishikesh. Triveni Ghat is just 2 kms away from ISBT, Adarsh Gram, Rishikesh. It is believed that one who takes a dip in water at Triveni ghat washes away all the sins and purifies the soul and will have salvation. Being the most venerated ghat in Rishikesh. Triveni Ghat is even used by devotees to perform the last rites and rituals of their loved ones. Daily in the morning and evening lot of people take bath here and enjoy the Maha Aarti being performed. The sight of oil leaves, filled with diya and petals, which are released by devotees, floating on the pristine Ganga and the traditional aarti is a sight to behold. On the bank of Triveni Ghat, one can visit the Gita Mandir and Lakshminarayan.



Figure 6:8 Triveni Ghat





6.3.4 Muni Ki Reti (Sand of the Sages):

Muni Ki Reti ($30^{\circ}6'57.37''\text{N}$ $78^{\circ}18'23.18''\text{E}$) is a town and a municipal council in Tehri Garhwal district in the Indian state of Uttarakhand. It lies close to the pilgrimage town of Rishikesh and is known for its ashrams, including the Divine Life Society of Sivananda Saraswati. It is just 2 kms away from ISBT, Adarsh Gram, Rishikesh. Muni Ki Reti is traditionally considered the gateway for the Char Dham pilgrimage — Badrinath, Kedarnath, Gangotri, and Yamunotri. According to the 2011 Census of India, Muni Ki Reti had a population of 10,620.



Figure 6:9 Muni Ki Reti

6.3.5 Inter State Bus Terminal (ISBT) Rishikesh:

ISBT Rishikesh ($30^{\circ}6'46.71''\text{N}$ $78^{\circ}17'48.78''\text{E}$) is located in Adarsh Gram area. The buses for hilly regions of Uttarakhand and places like Delhi, Dehradun, etc. are available from here. Rishikesh has two bus stands – one for hilly regions and one for plains. Both the bus stands are located adjacent to each other. This Adarsh Gram



road is Rishikesh city's main road and the route from the city to Neelkanth Mahadev temple goes from this road. This road is also used for transport from the railway station to the temple of Neelkanth Mahadev.

6.3.6 Old Railway Station and New Railway station:

Rishikesh's Old Railway Station (30°6'25.81"N 78°17'17.86"E) (Station Code: RKSH) or Rishikesh Junction is a small railway station which connects Haridwar Railway Station through a branch line. Few trains operate from Rishikesh Railway station. It operates under the Moradabad division of the Northern Railway zone of the Indian Railways.



Figure 6:10 Old Railway Station Rishikesh

The all new Rishikesh Yog-Nagri Railway Station (30°6'36.39"N 78°16'47.88"E) will be a part of the upcoming Rishikesh-Karnaprayag railway line that will help pilgrims cover all important pilgrimages in the state.



Figure 6:11 New Yog- Nagri Railway Station Rishikesh



6.4 Traffic Survey Location:

The list of types of survey and locations is given in Table-6:2. A few photographs captured during the traffic survey conducted are shown in Figure-6:12.

Table 6:2 Type and Location of Survey

| Sr. No. | Type of Survey | Location(s) | No. of location(s) |
|---------|---|--------------------------|--------------------|
| 1 | Classified Traffic Volume count (Through videography method) | Neelkanth Mahadev Temple | 2 |
| | | ISBT | |
| 2 | O-D Survey | Neelkanth Mahadev Temple | 5 |
| | | ISBT | |
| | | Old Railway Station | |
| | | Triveni Ghat | |
| | | Muni Ki Reti | |
| 3 | Preference Survey (Questionnaire) | Neelkanth Mahadev Temple | 1 |





Figure 6:12 Photos of Preference Survey at Different Locations

6.5 Present Traffic:

The classified traffic volume count (CVC) of vehicles near Neelkanth Mahadev Temple and ISBT have been carried out in both directions of travel for four consecutive days and 24 hours a day by videography method. After preliminary observations at site, the location for classified volume count survey was finalized. Classified traffic volume count has been recorded for one hour interval. This traffic data is used for carrying out traffic analysis and forecast.

6.5.1 Average Daily Traffic (ADT):

The classified volume count in both directions for four days was conducted in month of October – 2020. The classified volume count of each day near Neelkanth Mahadev Temple is given in Table-6:3 to Table-6:10. Average ADT for all four days is given in Table 6:11 to Table 6:13.

Table 6:3 Classified Volume Count of Day-1 (Neelkanth to Rishikesh)



| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|-----------|----------|----------|---------------|
| LOCATION : | | Neelkanth Temple | | | Date:- | | 22nd Oct 2020 |
| DIRECTION : | | Neelkantha | To | Rishikesh | Day:- | | Thursday |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 - 07:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:00 - 08:00 | 3 | 2 | 0 | 1 | 0 | 0 | 6 |
| 08:00 - 09:00 | 6 | 5 | 1 | 0 | 0 | 0 | 12 |
| 09:00 - 10:00 | 14 | 14 | 0 | 0 | 0 | 0 | 28 |
| 10:00 - 11:00 | 25 | 13 | 3 | 0 | 0 | 0 | 41 |
| 11:00 - 12:00 | 12 | 20 | 0 | 0 | 0 | 0 | 32 |
| 12:00 - 13:00 | 20 | 25 | 2 | 0 | 0 | 0 | 47 |
| 13:00 - 14:00 | 14 | 21 | 2 | 0 | 0 | 0 | 37 |
| 14:00 - 15:00 | 23 | 24 | 0 | 0 | 0 | 0 | 47 |
| 15:00 - 16:00 | 24 | 16 | 0 | 0 | 0 | 0 | 40 |
| 16:00 - 17:00 | 22 | 35 | 0 | 0 | 0 | 0 | 57 |
| 17:00 - 18:00 | 17 | 11 | 1 | 0 | 0 | 0 | 29 |
| 18:00 - 19:00 | 2 | 7 | 0 | 1 | 0 | 0 | 10 |
| 19:00 - 20:00 | 0 | 8 | 0 | 0 | 0 | 0 | 8 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 182 | 201 | 9 | 2 | 0 | 0 | 394 |



Table 6:4 Classified Volume count of Day-1 (Rishikesh to Neelkanth)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|----------|----------|----------|---------------|
| LOCATION : | | Neelkanth Temple | | | Date:- | | 22nd Oct 2020 |
| DIRECTION : | | To Neelkantha | | | Day:- | | Thursday |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 - 07:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:00 - 08:00 | 11 | 7 | 0 | 1 | 0 | 0 | 19 |
| 08:00 - 09:00 | 11 | 20 | 0 | 0 | 0 | 0 | 31 |
| 09:00 - 10:00 | 16 | 19 | 1 | 0 | 0 | 0 | 36 |
| 10:00 - 11:00 | 21 | 25 | 0 | 0 | 0 | 0 | 46 |
| 11:00 - 12:00 | 19 | 17 | 0 | 0 | 0 | 0 | 36 |
| 12:00 - 13:00 | 20 | 26 | 2 | 0 | 0 | 0 | 48 |
| 13:00 - 14:00 | 19 | 18 | 0 | 0 | 0 | 0 | 37 |
| 14:00 - 15:00 | 19 | 19 | 0 | 0 | 0 | 0 | 38 |
| 15:00 - 16:00 | 12 | 26 | 1 | 0 | 0 | 0 | 39 |
| 16:00 - 17:00 | 10 | 10 | 0 | 0 | 0 | 0 | 20 |
| 17:00 - 18:00 | 19 | 9 | 0 | 0 | 0 | 0 | 28 |
| 18:00 - 19:00 | 2 | 6 | 0 | 0 | 0 | 0 | 8 |
| 19:00 - 20:00 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 179 | 206 | 4 | 1 | 0 | 0 | 390 |

Table 6:5 Classified Volume count of Day-2 (Neelkanth to Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|----------|----------|----------|---------------|
| LOCATION : | | Neelkanth Temple | | | Date:- | | 23rd Oct 2020 |
| DIRECTION : | | To Rishikesh | | | Day:- | | Friday |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 - 07:00 | 2 | 1 | 0 | 0 | 0 | 0 | 3 |
| 07:00 - 08:00 | 4 | 2 | 1 | 0 | 0 | 0 | 7 |
| 08:00 - 09:00 | 5 | 12 | 0 | 0 | 0 | 0 | 17 |
| 09:00 - 10:00 | 15 | 14 | 1 | 0 | 0 | 0 | 30 |
| 10:00 - 11:00 | 24 | 14 | 1 | 0 | 0 | 0 | 39 |
| 11:00 - 12:00 | 22 | 22 | 1 | 0 | 0 | 0 | 45 |
| 12:00 - 13:00 | 15 | 32 | 3 | 0 | 0 | 0 | 50 |
| 13:00 - 14:00 | 24 | 25 | 1 | 0 | 0 | 0 | 50 |
| 14:00 - 15:00 | 23 | 19 | 1 | 0 | 0 | 0 | 43 |
| 15:00 - 16:00 | 29 | 27 | 0 | 0 | 0 | 0 | 56 |
| 16:00 - 17:00 | 20 | 28 | 0 | 0 | 0 | 0 | 48 |
| 17:00 - 18:00 | 10 | 7 | 1 | 0 | 0 | 0 | 18 |
| 18:00 - 19:00 | 2 | 4 | 0 | 0 | 0 | 0 | 6 |
| 19:00 - 20:00 | 0 | 6 | 0 | 0 | 0 | 0 | 6 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 195 | 213 | 10 | 0 | 0 | 0 | 418 |



Table 6:6 Classified Volume count of Day-2 (Rishikesh to Neelkanth)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|------------|----------|----------|---------------|
| LOCATION : | | Neelkanth Temple | | | Date:- | | 23rd Oct 2020 |
| DIRECTION : | | Rishikesh | To | Neelkantha | Day:- | | Friday |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 - 07:00 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 07:00 - 08:00 | 4 | 6 | 0 | 0 | 0 | 0 | 10 |
| 08:00 - 09:00 | 14 | 17 | 0 | 0 | 0 | 0 | 31 |
| 09:00 - 10:00 | 33 | 23 | 0 | 0 | 0 | 0 | 56 |
| 10:00 - 11:00 | 21 | 30 | 1 | 1 | 0 | 0 | 53 |
| 11:00 - 12:00 | 23 | 31 | 3 | 0 | 0 | 0 | 57 |
| 12:00 - 13:00 | 18 | 17 | 0 | 0 | 0 | 0 | 35 |
| 13:00 - 14:00 | 22 | 21 | 1 | 0 | 0 | 0 | 44 |
| 14:00 - 15:00 | 13 | 23 | 0 | 0 | 0 | 0 | 36 |
| 15:00 - 16:00 | 12 | 26 | 0 | 0 | 0 | 0 | 38 |
| 16:00 - 17:00 | 13 | 9 | 1 | 0 | 0 | 0 | 23 |
| 17:00 - 18:00 | 13 | 7 | 1 | 0 | 0 | 0 | 21 |
| 18:00 - 19:00 | 4 | 6 | 2 | 2 | 0 | 0 | 14 |
| 19:00 - 20:00 | 1 | 4 | 0 | 0 | 0 | 0 | 5 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 192 | 222 | 9 | 3 | 0 | 0 | 426 |

Table 6:7 Classified Volume count of Day-3 (Neelkanth to Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|-----------|----------|----------|---------------|
| LOCATION : | | Neelkanth Temple | | | Date:- | | 24th Oct 2020 |
| DIRECTION : | | Neelkantha | To | Rishikesh | Day:- | | Saturday |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 - 07:00 | 3 | 2 | 0 | 0 | 0 | 0 | 5 |
| 07:00 - 08:00 | 8 | 8 | 0 | 0 | 0 | 0 | 16 |
| 08:00 - 09:00 | 20 | 14 | 1 | 0 | 0 | 0 | 35 |
| 09:00 - 10:00 | 11 | 19 | 3 | 0 | 0 | 0 | 33 |
| 10:00 - 11:00 | 36 | 28 | 2 | 0 | 0 | 0 | 66 |
| 11:00 - 12:00 | 30 | 43 | 1 | 0 | 1 | 0 | 75 |
| 12:00 - 13:00 | 34 | 30 | 0 | 0 | 1 | 0 | 65 |
| 13:00 - 14:00 | 25 | 59 | 2 | 0 | 0 | 0 | 86 |
| 14:00 - 15:00 | 20 | 38 | 0 | 0 | 0 | 0 | 58 |
| 15:00 - 16:00 | 36 | 45 | 1 | 0 | 1 | 0 | 83 |
| 16:00 - 17:00 | 19 | 25 | 2 | 0 | 0 | 0 | 46 |
| 17:00 - 18:00 | 4 | 6 | 1 | 0 | 0 | 0 | 11 |
| 18:00 - 19:00 | 3 | 11 | 0 | 0 | 0 | 0 | 14 |
| 19:00 - 20:00 | 3 | 3 | 0 | 0 | 0 | 0 | 6 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 252 | 331 | 13 | 0 | 3 | 0 | 599 |



Table 6:8 Classified Volume count of Day-3 (Rishikesh to Neelkanth)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|------------|----------|---------------|------------|
| LOCATION : | | Neelkanth Temple | | Date:- | | 24th Oct 2020 | |
| DIRECTION : | | Rishikesh | To | Neelkantha | Day:- | Saturday | |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 1 | 3 | 0 | 0 | 0 | 0 | 4 |
| 06:00 - 07:00 | 7 | 8 | 0 | 0 | 0 | 0 | 15 |
| 07:00 - 08:00 | 14 | 15 | 0 | 2 | 0 | 0 | 31 |
| 08:00 - 09:00 | 19 | 30 | 1 | 0 | 0 | 0 | 50 |
| 09:00 - 10:00 | 39 | 19 | 2 | 0 | 1 | 0 | 61 |
| 10:00 - 11:00 | 23 | 44 | 1 | 0 | 1 | 0 | 69 |
| 11:00 - 12:00 | 36 | 37 | 0 | 0 | 0 | 0 | 73 |
| 12:00 - 13:00 | 33 | 50 | 0 | 0 | 0 | 0 | 83 |
| 13:00 - 14:00 | 19 | 36 | 2 | 0 | 0 | 0 | 57 |
| 14:00 - 15:00 | 23 | 34 | 4 | 0 | 1 | 0 | 62 |
| 15:00 - 16:00 | 14 | 29 | 2 | 0 | 0 | 0 | 45 |
| 16:00 - 17:00 | 12 | 13 | 0 | 0 | 0 | 0 | 25 |
| 17:00 - 18:00 | 13 | 12 | 0 | 0 | 0 | 0 | 25 |
| 18:00 - 19:00 | 3 | 3 | 1 | 0 | 0 | 0 | 7 |
| 19:00 - 20:00 | 3 | 2 | 1 | 0 | 0 | 0 | 6 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 259 | 335 | 14 | 2 | 3 | 0 | 613 |

Table 6:9 Classified Volume count of Day-4 (Neelkanth to Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|-----------|----------|---------------|------------|
| LOCATION : | | Neelkanth Temple | | Date:- | | 25th Oct 2020 | |
| DIRECTION : | | Neelkantha | To | Rishikesh | Day:- | Sunday | |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 06:00 - 07:00 | 4 | 1 | 0 | 0 | 0 | 0 | 5 |
| 07:00 - 08:00 | 5 | 32 | 1 | 0 | 0 | 0 | 38 |
| 08:00 - 09:00 | 19 | 31 | 2 | 0 | 0 | 0 | 52 |
| 09:00 - 10:00 | 15 | 38 | 0 | 0 | 0 | 0 | 53 |
| 10:00 - 11:00 | 48 | 77 | 1 | 0 | 1 | 0 | 127 |
| 11:00 - 12:00 | 64 | 57 | 1 | 0 | 1 | 0 | 123 |
| 12:00 - 13:00 | 56 | 70 | 1 | 0 | 2 | 0 | 129 |
| 13:00 - 14:00 | 55 | 59 | 2 | 1 | 0 | 1 | 118 |
| 14:00 - 15:00 | 17 | 19 | 0 | 0 | 0 | 0 | 36 |
| 15:00 - 16:00 | 4 | 16 | 0 | 0 | 0 | 0 | 20 |
| 16:00 - 17:00 | 0 | 2 | 1 | 0 | 0 | 0 | 3 |
| 17:00 - 18:00 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| 18:00 - 19:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19:00 - 20:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 289 | 405 | 9 | 1 | 4 | 1 | 709 |



Table 6:10 Classified Volume count of Day-4 (Rishikesh to Neelkanth)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | |
|-----------------------------|--------------------|-------------------|----------------|----------|----------------------|----------|------------|
| LOCATION : | | Neelkanth Temple | | | Date:- 25th Oct 2020 | | |
| DIRECTION : | | To Neelkantha | | | Day:- Sunday | | |
| TIME (hrs) | Passenger Vehicles | | Goods Vehicles | | | | Total |
| | 2- Wheeler | Car Jeep Van/Taxi | Mini LCV | LCV | Mini Bus | Pvt. Bus | |
| 00:00 - 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 - 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 - 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 - 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 - 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 - 06:00 | 6 | 13 | 0 | 0 | 0 | 0 | 19 |
| 06:00 - 07:00 | 16 | 20 | 0 | 0 | 0 | 0 | 36 |
| 07:00 - 08:00 | 18 | 33 | 1 | 0 | 0 | 0 | 52 |
| 08:00 - 09:00 | 28 | 54 | 0 | 0 | 0 | 0 | 82 |
| 09:00 - 10:00 | 34 | 66 | 1 | 0 | 0 | 0 | 101 |
| 10:00 - 11:00 | 35 | 52 | 1 | 0 | 0 | 0 | 88 |
| 11:00 - 12:00 | 41 | 38 | 1 | 0 | 1 | 0 | 81 |
| 12:00 - 13:00 | 18 | 38 | 1 | 0 | 1 | 0 | 58 |
| 13:00 - 14:00 | 22 | 34 | 0 | 1 | 0 | 1 | 58 |
| 14:00 - 15:00 | 9 | 12 | 2 | 0 | 0 | 0 | 23 |
| 15:00 - 16:00 | 5 | 9 | 1 | 0 | 0 | 0 | 15 |
| 16:00 - 17:00 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 17:00 - 18:00 | 3 | 2 | 0 | 0 | 0 | 0 | 5 |
| 18:00 - 19:00 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 19:00 - 20:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20:00 - 21:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21:00 - 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22:00 - 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23:00 - 00:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 235 | 374 | 8 | 1 | 2 | 1 | 621 |

6.5.2 Summary of the Vehicle Count Survey

Table 6:11 Summary of Vehicle Count Survey from Rishikesh to Neelkanth

| Day | 22.10.2020 | 23.10.2020 | 24.10.2020 | 25.10.2020 | Total | Average |
|--------------------------|------------|------------|------------|------------|-------------|------------|
| 2- Wheeler | 179 | 192 | 259 | 235 | 865 | 216 |
| Car Jeep Van/Taxi | 206 | 222 | 335 | 374 | 1137 | 284 |
| Mini LCV | 4 | 9 | 14 | 8 | 35 | 9 |
| LCV | 1 | 3 | 2 | 1 | 7 | 2 |
| Mini Bus | 0 | 0 | 3 | 2 | 5 | 1 |
| Bus | 0 | 0 | 0 | 1 | 1 | 0 |
| Total | 390 | 426 | 613 | 621 | 2050 | 512 |



Table 6:12 Summary of the Vehicle Count Survey from Neelkanth to Rishikesh

| Day | 22.10.2020 | 23.10.2020 | 24.10.2020 | 25.10.2020 | Total | Average |
|-------------------|------------|------------|------------|------------|-------------|------------|
| 2- Wheeler | 182 | 195 | 252 | 289 | 918 | 230 |
| Car Jeep Van/Taxi | 201 | 213 | 331 | 405 | 1150 | 288 |
| Mini LCV | 9 | 10 | 13 | 9 | 41 | 10 |
| LCV | 2 | 0 | 0 | 1 | 3 | 1 |
| Mini Bus | 0 | 0 | 3 | 4 | 7 | 2 |
| Bus | 0 | 0 | | 1 | 1 | 0 |
| Total | 394 | 418 | 599 | 709 | 2120 | 530 |

Table 6:13 Average Daily Traffic near Neelkanth Mahadev Temple

| Types of Vehicles | Rishikesh to Neelkanth | to Neelkanth to Rishikesh | Average Vehicle at Neelkanth | Vehicle Composition (in %) |
|-------------------|------------------------|---------------------------|------------------------------|----------------------------|
| 2- Wheeler | 216 | 230 | 223 | 42.64% |
| Car Jeep Van/Taxi | 284 | 288 | 286 | 54.68% |
| Mini LCV | 9 | 10 | 10 | 1.91% |
| LCV | 2 | 1 | 2 | 0.38% |
| Mini Bus | 1 | 2 | 2 | 0.38% |
| Bus | 0 | 0 | 0 | 0.00% |
| Total | 512 | 530 | 523 | 100% |

Similarly, the classified volume count of each day near ISBT - Rishikesh is given in Table 6:14 to Table-6:21. Average ADT for all four days is given in Table-6:22 to Table-6:24.



Table 6:14 Classified Volume count of Day-1 at ISBT (Away from Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|------------|----------------|-----------|-----------|-----------|----------|------------------------|----------------------|------------|----------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- 22nd Oct 2020 | | | | | |
| DIRECTION : | | Neelkanth | | | | | Dehradun | | | | | Day:- Thursday | | | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 8 | 2 | 17 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 01:00 - 02:00 | 5 | 1 | 7 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 02:00 - 03:00 | 6 | 2 | 6 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 03:00 - 04:00 | 9 | 4 | 17 | 0 | 5 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 |
| 04:00 - 05:00 | 12 | 5 | 21 | 0 | 7 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 05:00 - 06:00 | 27 | 18 | 20 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| 06:00 - 07:00 | 39 | 31 | 35 | 0 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116 |
| 07:00 - 08:00 | 158 | 28 | 38 | 1 | 6 | 8 | 3 | 2 | 0 | 0 | 9 | 0 | 0 | 0 | 3 | 0 | 256 |
| 08:00 - 09:00 | 266 | 30 | 53 | 1 | 0 | 16 | 7 | 2 | 2 | 0 | 16 | 0 | 0 | 0 | 6 | 0 | 399 |
| 09:00 - 10:00 | 319 | 25 | 50 | 0 | 8 | 18 | 1 | 6 | 1 | 0 | 5 | 0 | 4 | 0 | 5 | 0 | 442 |
| 10:00 - 11:00 | 412 | 26 | 75 | 2 | 9 | 20 | 2 | 8 | 4 | 2 | 7 | 0 | 10 | 0 | 3 | 0 | 580 |
| 11:00 - 12:00 | 432 | 29 | 93 | 2 | 9 | 26 | 1 | 3 | 2 | 1 | 2 | 0 | 3 | 0 | 6 | 0 | 609 |
| 12:00 - 13:00 | 353 | 19 | 102 | 1 | 8 | 15 | 2 | 5 | 1 | 0 | 2 | 0 | 1 | 0 | 4 | 0 | 513 |
| 13:00 - 14:00 | 266 | 21 | 70 | 2 | 10 | 16 | 1 | 4 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 397 |
| 14:00 - 15:00 | 314 | 26 | 9 | 0 | 10 | 18 | 1 | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 389 |
| 15:00 - 16:00 | 287 | 23 | 80 | 2 | 8 | 13 | 0 | 10 | 0 | 0 | 4 | 0 | 2 | 0 | 1 | 0 | 430 |
| 16:00 - 17:00 | 303 | 21 | 73 | 1 | 11 | 18 | 0 | 4 | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 436 |
| 17:00 - 18:00 | 341 | 24 | 74 | 0 | 7 | 19 | 2 | 7 | 0 | 0 | 7 | 0 | 3 | 0 | 2 | 0 | 486 |
| 18:00 - 19:00 | 394 | 23 | 69 | 3 | 1 | 11 | 1 | 5 | 0 | 2 | 3 | 0 | 1 | 0 | 0 | 2 | 515 |
| 19:00 - 20:00 | 326 | 12 | 62 | 1 | 5 | 6 | 1 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 422 |
| 20:00 - 21:00 | 196 | 21 | 37 | 0 | 1 | 5 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 266 |
| 21:00 - 22:00 | 121 | 19 | 32 | 1 | 1 | 1 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 180 |
| 22:00 - 23:00 | 53 | 5 | 33 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 97 |
| 23:00 - 00:00 | 31 | 4 | 13 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| Total | 4678 | 419 | 1086 | 17 | 123 | 233 | 23 | 85 | 12 | 6 | 65 | 0 | 28 | 1 | 34 | 2 | 6812 |

Table 6:15 Classified Volume count of Day-1 at ISBT (Towards Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|------------|----------------|-----------|-----------|-----------|----------|------------------------|----------------------|------------|----------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- 22nd Oct 2020 | | | | | |
| DIRECTION : | | Dehradun | | | | | Neelkanth | | | | | Day:- Thursday | | | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 11 | 3 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 01:00 - 02:00 | 4 | 1 | 6 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 02:00 - 03:00 | 5 | 2 | 13 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 03:00 - 04:00 | 5 | 3 | 8 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 04:00 - 05:00 | 8 | 4 | 11 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 05:00 - 06:00 | 18 | 9 | 29 | 1 | 7 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 |
| 06:00 - 07:00 | 75 | 12 | 38 | 2 | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 143 |
| 07:00 - 08:00 | 162 | 30 | 37 | 0 | 3 | 9 | 0 | 2 | 1 | 0 | 11 | 0 | 4 | 0 | 2 | 0 | 261 |
| 08:00 - 09:00 | 240 | 30 | 61 | 2 | 4 | 14 | 2 | 6 | 2 | 0 | 13 | 0 | 7 | 0 | 2 | 0 | 383 |
| 09:00 - 10:00 | 395 | 39 | 73 | 1 | 7 | 23 | 1 | 3 | 3 | 0 | 10 | 0 | 4 | 0 | 2 | 0 | 561 |
| 10:00 - 11:00 | 437 | 36 | 93 | 2 | 8 | 19 | 0 | 6 | 1 | 0 | 6 | 0 | 3 | 0 | 3 | 1 | 615 |
| 11:00 - 12:00 | 438 | 56 | 107 | 1 | 9 | 24 | 1 | 2 | 1 | 0 | 4 | 0 | 2 | 0 | 1 | 0 | 646 |
| 12:00 - 13:00 | 462 | 33 | 108 | 2 | 7 | 28 | 1 | 2 | 0 | 0 | 11 | 0 | 5 | 0 | 2 | 0 | 661 |
| 13:00 - 14:00 | 402 | 37 | 100 | 0 | 5 | 23 | 2 | 8 | 2 | 0 | 4 | 0 | 5 | 0 | 0 | 0 | 588 |
| 14:00 - 15:00 | 328 | 27 | 101 | 1 | 10 | 25 | 1 | 5 | 0 | 0 | 5 | 0 | 5 | 1 | 1 | 0 | 510 |
| 15:00 - 16:00 | 268 | 37 | 63 | 0 | 9 | 13 | 2 | 9 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 407 |
| 16:00 - 17:00 | 357 | 34 | 93 | 1 | 7 | 25 | 2 | 12 | 0 | 0 | 7 | 0 | 3 | 0 | 2 | 0 | 543 |
| 17:00 - 18:00 | 449 | 40 | 90 | 1 | 8 | 18 | 2 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 619 |
| 18:00 - 19:00 | 543 | 37 | 71 | 0 | 5 | 13 | 1 | 4 | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 683 |
| 19:00 - 20:00 | 391 | 17 | 58 | 0 | 0 | 14 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 487 |
| 20:00 - 21:00 | 244 | 16 | 50 | 2 | 0 | 5 | 1 | 5 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 329 |
| 21:00 - 22:00 | 137 | 16 | 39 | 0 | 3 | 6 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 205 |
| 22:00 - 23:00 | 71 | 10 | 28 | 0 | 2 | 3 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 117 |
| 23:00 - 00:00 | 45 | 2 | 19 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| Total | 5495 | 531 | 1310 | 16 | 112 | 278 | 18 | 75 | 13 | 0 | 99 | 0 | 40 | 1 | 18 | 2 | 8008 |



Table 6:16 Classified Volume count of Day-2 at ISBT (Away from Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|-----------|----------------|-----------|------------|-----------|----------|----------------------|----------------|------------|---------------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- | | 23rd Oct 2020 | | | |
| DIRECTION : | | Neelkanth | | | | | Dehradun | | | | | Day:- | | Friday | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Slow Moving Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 8 | 5 | 16 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 01:00 - 02:00 | 10 | 0 | 5 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 02:00 - 03:00 | 7 | 6 | 9 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 03:00 - 04:00 | 9 | 5 | 10 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 04:00 - 05:00 | 7 | 8 | 15 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 36 |
| 05:00 - 06:00 | 41 | 21 | 22 | 0 | 2 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 92 |
| 06:00 - 07:00 | 100 | 19 | 37 | 0 | 5 | 6 | 0 | 2 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 174 |
| 07:00 - 08:00 | 151 | 23 | 34 | 1 | 4 | 13 | 0 | 4 | 2 | 0 | 8 | 0 | 0 | 1 | 1 | 0 | 242 |
| 08:00 - 09:00 | 255 | 21 | 51 | 0 | 2 | 18 | 0 | 2 | 1 | 0 | 21 | 1 | 2 | 0 | 2 | 1 | 377 |
| 09:00 - 10:00 | 325 | 41 | 65 | 0 | 7 | 23 | 1 | 7 | 0 | 0 | 12 | 8 | 2 | 0 | 4 | 0 | 495 |
| 10:00 - 11:00 | 453 | 36 | 80 | 0 | 2 | 47 | 2 | 8 | 2 | 1 | 3 | 2 | 2 | 0 | 6 | 1 | 645 |
| 11:00 - 12:00 | 455 | 20 | 124 | 0 | 6 | 33 | 3 | 8 | 1 | 0 | 4 | 7 | 1 | 0 | 2 | 0 | 664 |
| 12:00 - 13:00 | 397 | 35 | 101 | 2 | 7 | 27 | 3 | 11 | 1 | 0 | 1 | 15 | 0 | 0 | 3 | 1 | 604 |
| 13:00 - 14:00 | 379 | 43 | 93 | 1 | 5 | 29 | 1 | 7 | 1 | 1 | 4 | 3 | 1 | 0 | 0 | 0 | 568 |
| 14:00 - 15:00 | 345 | 28 | 122 | 2 | 5 | 36 | 0 | 13 | 0 | 1 | 7 | 3 | 1 | 0 | 2 | 0 | 565 |
| 15:00 - 16:00 | 337 | 20 | 145 | 1 | 2 | 36 | 0 | 11 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 557 |
| 16:00 - 17:00 | 359 | 22 | 107 | 2 | 2 | 28 | 0 | 9 | 0 | 0 | 5 | 5 | 0 | 0 | 2 | 0 | 541 |
| 17:00 - 18:00 | 348 | 27 | 137 | 1 | 3 | 24 | 1 | 8 | 4 | 0 | 3 | 2 | 1 | 0 | 1 | 0 | 560 |
| 18:00 - 19:00 | 381 | 14 | 98 | 2 | 1 | 24 | 2 | 12 | 0 | 1 | 4 | 2 | 1 | 0 | 1 | 1 | 544 |
| 19:00 - 20:00 | 325 | 17 | 83 | 1 | 2 | 18 | 0 | 9 | 3 | 1 | 3 | 3 | 0 | 0 | 0 | 0 | 465 |
| 20:00 - 21:00 | 342 | 20 | 66 | 0 | 0 | 10 | 1 | 13 | 0 | 1 | 3 | 3 | 0 | 0 | 0 | 0 | 459 |
| 21:00 - 22:00 | 141 | 12 | 40 | 0 | 2 | 8 | 0 | 6 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 211 |
| 22:00 - 23:00 | 62 | 8 | 32 | 1 | 2 | 2 | 0 | 9 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 117 |
| 23:00 - 00:00 | 22 | 3 | 21 | 0 | 1 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| Total | 5259 | 454 | 1513 | 14 | 74 | 391 | 14 | 146 | 15 | 6 | 86 | 58 | 12 | 1 | 26 | 4 | 8073 |

Table 6:17 Classified Volume count of Day-2 at ISBT (Towards Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|-----------|----------------|-----------|------------|-----------|----------|------------------------|----------------|------------|---------------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- | | 23rd Oct 2020 | | | |
| DIRECTION : | | Dehradun | | | | | Neelkanth | | | | | Day:- | | Friday | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 12 | 2 | 9 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 01:00 - 02:00 | 7 | 0 | 8 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 02:00 - 03:00 | 3 | 4 | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 03:00 - 04:00 | 5 | 3 | 4 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 17 |
| 04:00 - 05:00 | 18 | 10 | 13 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 05:00 - 06:00 | 39 | 14 | 17 | 1 | 3 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 |
| 06:00 - 07:00 | 83 | 23 | 36 | 0 | 4 | 5 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 161 |
| 07:00 - 08:00 | 158 | 26 | 61 | 0 | 0 | 9 | 0 | 8 | 0 | 0 | 6 | 0 | 2 | 0 | 0 | 0 | 270 |
| 08:00 - 09:00 | 243 | 29 | 75 | 3 | 1 | 17 | 1 | 5 | 2 | 1 | 5 | 0 | 1 | 0 | 1 | 0 | 384 |
| 09:00 - 10:00 | 339 | 45 | 82 | 0 | 2 | 25 | 0 | 8 | 1 | 0 | 8 | 1 | 0 | 0 | 4 | 0 | 515 |
| 10:00 - 11:00 | 473 | 52 | 97 | 1 | 3 | 40 | 5 | 9 | 0 | 0 | 8 | 2 | 0 | 0 | 2 | 0 | 692 |
| 11:00 - 12:00 | 446 | 48 | 127 | 1 | 6 | 47 | 2 | 9 | 1 | 0 | 2 | 2 | 2 | 0 | 1 | 0 | 694 |
| 12:00 - 13:00 | 475 | 37 | 122 | 1 | 4 | 40 | 0 | 7 | 0 | 0 | 4 | 13 | 1 | 0 | 0 | 0 | 704 |
| 13:00 - 14:00 | 537 | 51 | 155 | 1 | 5 | 32 | 1 | 18 | 0 | 0 | 3 | 4 | 0 | 0 | 1 | 0 | 808 |
| 14:00 - 15:00 | 372 | 42 | 135 | 0 | 6 | 25 | 2 | 12 | 1 | 0 | 3 | 2 | 3 | 0 | 2 | 0 | 605 |
| 15:00 - 16:00 | 323 | 31 | 99 | 2 | 9 | 28 | 0 | 8 | 1 | 0 | 7 | 5 | 0 | 0 | 2 | 0 | 515 |
| 16:00 - 17:00 | 385 | 32 | 68 | 0 | 4 | 30 | 1 | 7 | 1 | 1 | 9 | 5 | 0 | 0 | 1 | 0 | 544 |
| 17:00 - 18:00 | 475 | 37 | 105 | 0 | 7 | 20 | 1 | 11 | 0 | 1 | 7 | 6 | 0 | 0 | 5 | 0 | 675 |
| 18:00 - 19:00 | 508 | 34 | 93 | 1 | 2 | 20 | 1 | 9 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 676 |
| 19:00 - 20:00 | 340 | 24 | 77 | 0 | 2 | 26 | 1 | 5 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 478 |
| 20:00 - 21:00 | 244 | 20 | 61 | 0 | 2 | 16 | 1 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 352 |
| 21:00 - 22:00 | 162 | 12 | 53 | 0 | 3 | 5 | 0 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 241 |
| 22:00 - 23:00 | 85 | 11 | 34 | 0 | 1 | 4 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 139 |
| 23:00 - 00:00 | 32 | 1 | 15 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| Total | 5764 | 588 | 1556 | 12 | 70 | 398 | 17 | 135 | 13 | 3 | 79 | 45 | 9 | 0 | 22 | 0 | 8711 |



Table 6:18 Classified Volume count of Day-3 at ISBT (Away from Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|------------|----------------|-----------|-----------|-----------|----------|------------------------|----------------|------------|---------------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- | | 24th Oct 2020 | | | |
| DIRECTION : | | Neelkanth | | | | | Dehradun | | | | | Day:- | | Saturday | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 17 | 5 | 14 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 01:00 - 02:00 | 10 | 4 | 14 | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 02:00 - 03:00 | 3 | 5 | 7 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 21 |
| 03:00 - 04:00 | 7 | 3 | 15 | 1 | 6 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 36 |
| 04:00 - 05:00 | 29 | 10 | 6 | 1 | 4 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 |
| 05:00 - 06:00 | 46 | 24 | 28 | 0 | 6 | 3 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 112 |
| 06:00 - 07:00 | 89 | 22 | 32 | 0 | 5 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 158 |
| 07:00 - 08:00 | 152 | 28 | 42 | 4 | 3 | 13 | 4 | 4 | 2 | 0 | 12 | 0 | 2 | 0 | 0 | 0 | 266 |
| 08:00 - 09:00 | 234 | 25 | 49 | 1 | 6 | 1 | 2 | 5 | 1 | 0 | 23 | 4 | 1 | 0 | 5 | 0 | 357 |
| 09:00 - 10:00 | 306 | 42 | 48 | 1 | 5 | 34 | 4 | 2 | 2 | 0 | 17 | 5 | 1 | 0 | 3 | 0 | 470 |
| 10:00 - 11:00 | 348 | 43 | 91 | 0 | 3 | 38 | 6 | 2 | 0 | 0 | 5 | 4 | 1 | 0 | 4 | 0 | 545 |
| 11:00 - 12:00 | 411 | 41 | 106 | 0 | 4 | 23 | 3 | 3 | 1 | 0 | 2 | 7 | 0 | 0 | 0 | 0 | 601 |
| 12:00 - 13:00 | 400 | 38 | 82 | 0 | 6 | 21 | 5 | 4 | 1 | 0 | 8 | 9 | 0 | 0 | 4 | 0 | 578 |
| 13:00 - 14:00 | 368 | 32 | 110 | 1 | 6 | 27 | 6 | 3 | 2 | 1 | 6 | 9 | 0 | 0 | 1 | 0 | 572 |
| 14:00 - 15:00 | 344 | 29 | 124 | 0 | 9 | 21 | 4 | 0 | 0 | 0 | 15 | 4 | 0 | 1 | 4 | 0 | 555 |
| 15:00 - 16:00 | 360 | 23 | 108 | 0 | 8 | 21 | 3 | 4 | 1 | 0 | 5 | 6 | 1 | 0 | 1 | 0 | 541 |
| 16:00 - 17:00 | 356 | 29 | 115 | 0 | 5 | 26 | 5 | 5 | 1 | 2 | 9 | 2 | 1 | 0 | 1 | 0 | 557 |
| 17:00 - 18:00 | 414 | 34 | 126 | 4 | 3 | 21 | 0 | 7 | 2 | 0 | 9 | 5 | 0 | 1 | 2 | 0 | 628 |
| 18:00 - 19:00 | 374 | 42 | 127 | 1 | 6 | 22 | 1 | 12 | 2 | 1 | 6 | 3 | 0 | 0 | 1 | 0 | 598 |
| 19:00 - 20:00 | 307 | 23 | 94 | 1 | 2 | 10 | 1 | 11 | 2 | 0 | 5 | 2 | 0 | 0 | 1 | 0 | 459 |
| 20:00 - 21:00 | 237 | 13 | 82 | 0 | 0 | 11 | 2 | 7 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 359 |
| 21:00 - 22:00 | 140 | 11 | 57 | 0 | 1 | 9 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 223 |
| 22:00 - 23:00 | 94 | 4 | 42 | 0 | 2 | 4 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 152 |
| 23:00 - 00:00 | 50 | 2 | 23 | 0 | 2 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 82 |
| Total | 5096 | 532 | 1542 | 15 | 100 | 316 | 53 | 86 | 21 | 4 | 138 | 60 | 7 | 2 | 27 | 0 | 7999 |

Table 6:19 Classified Volume count of Day-3 at ISBT (Towards Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|-----------|----------------|------------|-----------|----------|----------|------------------------|----------------|------------|---------------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | | Date:- | | 24th Oct 2020 | | | |
| DIRECTION : | | Dehradun | | | | | Neelkanth | | | | | Day:- | | Saturday | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 15 | 4 | 12 | 0 | 1 | 7 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |
| 01:00 - 02:00 | 7 | 2 | 12 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 02:00 - 03:00 | 1 | 1 | 6 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 03:00 - 04:00 | 0 | 0 | 7 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 04:00 - 05:00 | 18 | 10 | 13 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 05:00 - 06:00 | 45 | 22 | 32 | 0 | 3 | 3 | 3 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 112 |
| 06:00 - 07:00 | 85 | 20 | 57 | 1 | 8 | 5 | 2 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 185 |
| 07:00 - 08:00 | 173 | 26 | 70 | 1 | 5 | 17 | 3 | 1 | 1 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 302 |
| 08:00 - 09:00 | 233 | 24 | 63 | 2 | 4 | 20 | 2 | 4 | 0 | 1 | 8 | 1 | 1 | 0 | 4 | 0 | 367 |
| 09:00 - 10:00 | 315 | 39 | 102 | 1 | 1 | 37 | 3 | 3 | 1 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | 512 |
| 10:00 - 11:00 | 398 | 53 | 97 | 1 | 3 | 24 | 6 | 2 | 0 | 1 | 7 | 0 | 1 | 0 | 3 | 0 | 596 |
| 11:00 - 12:00 | 392 | 51 | 124 | 1 | 1 | 33 | 5 | 3 | 0 | 0 | 6 | 6 | 5 | 0 | 2 | 0 | 629 |
| 12:00 - 13:00 | 365 | 48 | 122 | 1 | 5 | 35 | 4 | 1 | 0 | 0 | 9 | 6 | 0 | 0 | 4 | 0 | 600 |
| 13:00 - 14:00 | 374 | 35 | 141 | 1 | 6 | 20 | 10 | 2 | 2 | 1 | 5 | 6 | 1 | 0 | 4 | 0 | 608 |
| 14:00 - 15:00 | 336 | 48 | 138 | 0 | 6 | 18 | 5 | 4 | 0 | 0 | 8 | 6 | 3 | 0 | 5 | 0 | 577 |
| 15:00 - 16:00 | 306 | 27 | 96 | 1 | 5 | 24 | 10 | 3 | 0 | 0 | 7 | 7 | 2 | 1 | 3 | 0 | 492 |
| 16:00 - 17:00 | 351 | 32 | 98 | 0 | 5 | 27 | 8 | 3 | 1 | 0 | 6 | 6 | 1 | 0 | 1 | 0 | 539 |
| 17:00 - 18:00 | 393 | 33 | 105 | 1 | 0 | 33 | 11 | 2 | 0 | 0 | 13 | 5 | 1 | 0 | 1 | 0 | 598 |
| 18:00 - 19:00 | 431 | 37 | 114 | 0 | 1 | 19 | 11 | 4 | 2 | 0 | 10 | 1 | 0 | 0 | 1 | 0 | 631 |
| 19:00 - 20:00 | 342 | 21 | 75 | 0 | 3 | 18 | 5 | 1 | 0 | 0 | 9 | 1 | 1 | 0 | 0 | 0 | 476 |
| 20:00 - 21:00 | 236 | 14 | 64 | 0 | 1 | 10 | 11 | 1 | 0 | 0 | 6 | 3 | 0 | 0 | 0 | 0 | 346 |
| 21:00 - 22:00 | 184 | 12 | 55 | 0 | 2 | 6 | 4 | 3 | 1 | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 274 |
| 22:00 - 23:00 | 112 | 8 | 49 | 0 | 1 | 6 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 179 |
| 23:00 - 00:00 | 70 | 0 | 30 | 0 | 0 | 4 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 107 |
| Total | 5182 | 567 | 1682 | 12 | 65 | 374 | 112 | 44 | 8 | 5 | 118 | 49 | 20 | 1 | 30 | 0 | 8269 |



Table 6:20 Classified Volume count of Day-4 at ISBT (Away from Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|-----------|----------------|-----------|------------|-----------|----------|------------------------|----------------|---------------|----------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | Date:- | | 25th Oct 2020 | | | | |
| DIRECTION : | | Neelkanth | | | Dehradun | | | | | | Day:- | | Sunday | | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 33 | 1 | 31 | 0 | 1 | 5 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 74 |
| 01:00 - 02:00 | 15 | 1 | 14 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| 02:00 - 03:00 | 5 | 3 | 11 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 03:00 - 04:00 | 3 | 4 | 14 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 25 |
| 04:00 - 05:00 | 7 | 8 | 15 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 36 |
| 05:00 - 06:00 | 27 | 20 | 31 | 1 | 3 | 2 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 89 |
| 06:00 - 07:00 | 56 | 18 | 44 | 2 | 6 | 7 | 1 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 138 |
| 07:00 - 08:00 | 166 | 24 | 46 | 2 | 7 | 5 | 0 | 5 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 267 |
| 08:00 - 09:00 | 223 | 25 | 57 | 1 | 3 | 15 | 0 | 3 | 0 | 1 | 8 | 4 | 0 | 0 | 4 | 0 | 344 |
| 09:00 - 10:00 | 321 | 35 | 79 | 0 | 4 | 27 | 1 | 4 | 1 | 0 | 7 | 2 | 1 | 0 | 0 | 0 | 482 |
| 10:00 - 11:00 | 372 | 50 | 99 | 1 | 6 | 32 | 1 | 5 | 0 | 0 | 11 | 5 | 1 | 0 | 2 | 0 | 585 |
| 11:00 - 12:00 | 419 | 46 | 136 | 2 | 4 | 23 | 0 | 7 | 1 | 0 | 9 | 3 | 0 | 0 | 6 | 0 | 656 |
| 12:00 - 13:00 | 422 | 63 | 114 | 1 | 1 | 41 | 1 | 9 | 1 | 3 | 7 | 5 | 4 | 0 | 4 | 0 | 676 |
| 13:00 - 14:00 | 417 | 49 | 121 | 3 | 3 | 21 | 1 | 9 | 1 | 0 | 4 | 7 | 1 | 0 | 2 | 0 | 639 |
| 14:00 - 15:00 | 330 | 37 | 89 | 4 | 1 | 17 | 2 | 13 | 0 | 0 | 5 | 2 | 1 | 0 | 1 | 0 | 502 |
| 15:00 - 16:00 | 301 | 27 | 86 | 3 | 5 | 20 | 0 | 12 | 1 | 0 | 7 | 4 | 0 | 0 | 2 | 0 | 468 |
| 16:00 - 17:00 | 289 | 36 | 96 | 3 | 5 | 12 | 1 | 6 | 1 | 0 | 1 | 7 | 0 | 0 | 1 | 0 | 458 |
| 17:00 - 18:00 | 447 | 40 | 80 | 2 | 3 | 29 | 2 | 8 | 1 | 0 | 7 | 6 | 1 | 0 | 0 | 0 | 626 |
| 18:00 - 19:00 | 529 | 39 | 74 | 1 | 2 | 18 | 1 | 11 | 0 | 0 | 6 | 4 | 0 | 0 | 1 | 0 | 686 |
| 19:00 - 20:00 | 432 | 20 | 82 | 0 | 6 | 11 | 0 | 7 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 562 |
| 20:00 - 21:00 | 359 | 18 | 76 | 2 | 3 | 6 | 0 | 10 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 476 |
| 21:00 - 22:00 | 187 | 15 | 61 | 1 | 2 | 6 | 5 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 280 |
| 22:00 - 23:00 | 102 | 6 | 30 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 23:00 - 00:00 | 53 | 9 | 33 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 100 |
| Total | 5515 | 594 | 1519 | 30 | 71 | 305 | 16 | 118 | 11 | 6 | 97 | 49 | 11 | 0 | 23 | 0 | 8365 |

Table 6:21 Classified Volume count of Day-4 at ISBT (Towards Rishikesh)

| TRAFFIC VOLUME COUNT SURVEY | | | | | | | | | | | | | | | | | |
|-----------------------------|--------------------|------------|---------------|-----------|-----------|----------------|----------|-----------|-----------|-----------|------------------------|----------------|---------------|----------|-----------------|----------|-------------|
| LOCATION : | | ISBT | | | | | | | | | Date:- | | 25th Oct 2020 | | | | |
| DIRECTION : | | Dehradun | | | Neelkanth | | | | | | Day:- | | Sunday | | | | |
| TIME (hrs) | Passenger Vehicles | | | | | Goods Vehicles | | | | | Toll Exempted Vehicles | | | | | | Total |
| | 2-Wheeler | 3 Wheeler | Car/Jeep /Van | Mini Bus | Pvt. Bus | Mini LCV | LCV | 2 Axle | 3 Axle | MAV | Cycle | Cycle Rickshaw | E Rickshaw | Tractor | Tractor Trailer | Others | |
| 00:00 - 01:00 | 30 | 2 | 25 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |
| 01:00 - 02:00 | 18 | 1 | 10 | 0 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 02:00 - 03:00 | 9 | 3 | 13 | 0 | 7 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| 03:00 - 04:00 | 5 | 3 | 10 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 20 |
| 04:00 - 05:00 | 13 | 7 | 6 | 0 | 5 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 05:00 - 06:00 | 29 | 19 | 21 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 74 |
| 06:00 - 07:00 | 79 | 14 | 40 | 0 | 3 | 2 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 144 |
| 07:00 - 08:00 | 143 | 19 | 38 | 0 | 10 | 9 | 0 | 5 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 231 |
| 08:00 - 09:00 | 211 | 15 | 46 | 2 | 7 | 11 | 0 | 7 | 0 | 0 | 13 | 6 | 1 | 0 | 3 | 0 | 322 |
| 09:00 - 10:00 | 286 | 29 | 72 | 2 | 9 | 28 | 1 | 2 | 1 | 1 | 10 | 3 | 0 | 0 | 2 | 0 | 446 |
| 10:00 - 11:00 | 318 | 33 | 106 | 0 | 6 | 27 | 2 | 5 | 0 | 0 | 8 | 6 | 0 | 0 | 4 | 0 | 515 |
| 11:00 - 12:00 | 341 | 35 | 99 | 2 | 2 | 31 | 2 | 4 | 0 | 0 | 5 | 4 | 0 | 0 | 2 | 0 | 527 |
| 12:00 - 13:00 | 386 | 42 | 120 | 2 | 6 | 27 | 1 | 10 | 1 | 1 | 3 | 8 | 2 | 0 | 3 | 0 | 612 |
| 13:00 - 14:00 | 351 | 28 | 88 | 2 | 5 | 19 | 1 | 5 | 2 | 1 | 4 | 3 | 0 | 0 | 1 | 0 | 510 |
| 14:00 - 15:00 | 275 | 30 | 117 | 0 | 6 | 22 | 0 | 5 | 0 | 3 | 4 | 9 | 0 | 0 | 1 | 0 | 472 |
| 15:00 - 16:00 | 286 | 25 | 109 | 0 | 3 | 16 | 0 | 7 | 1 | 1 | 4 | 2 | 1 | 0 | 2 | 0 | 457 |
| 16:00 - 17:00 | 303 | 36 | 146 | 3 | 7 | 18 | 0 | 8 | 1 | 0 | 1 | 3 | 1 | 0 | 4 | 0 | 531 |
| 17:00 - 18:00 | 350 | 24 | 121 | 3 | 4 | 15 | 1 | 9 | 0 | 0 | 11 | 2 | 0 | 0 | 2 | 0 | 542 |
| 18:00 - 19:00 | 395 | 26 | 139 | 2 | 3 | 16 | 0 | 0 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 589 |
| 19:00 - 20:00 | 314 | 22 | 130 | 2 | 3 | 10 | 1 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 491 |
| 20:00 - 21:00 | 269 | 20 | 86 | 0 | 1 | 7 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 387 |
| 21:00 - 22:00 | 115 | 16 | 59 | 1 | 1 | 4 | 0 | 6 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 205 |
| 22:00 - 23:00 | 81 | 11 | 46 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 144 |
| 23:00 - 00:00 | 58 | 7 | 38 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 109 |
| Total | 4665 | 467 | 1685 | 21 | 97 | 272 | 9 | 95 | 12 | 11 | 81 | 49 | 6 | 0 | 25 | 0 | 7495 |



6.5.3 Summary of the Classified Volume count at ISBT

Table 6:22 Summary of the Classified Volume Count at ISBT(Away from Rishikesh)

| Day | 22.10.2020 | 23.10.2020 | 24.10.2020 | 25.10.2020 | Total | Average |
|--------------------|-------------|-------------|-------------|-------------|--------------|-------------|
| 2- Wheeler | 4678 | 5259 | 5096 | 5515 | 20548 | 5137 |
| 3 Wheeler | 419 | 454 | 532 | 594 | 1999 | 500 |
| Car/Jeep /Van | 1086 | 1513 | 1542 | 1519 | 5660 | 1415 |
| Mini Bus | 17 | 14 | 15 | 30 | 76 | 19 |
| Pvt. Bus | 123 | 74 | 100 | 71 | 368 | 92 |
| Mini LCV | 233 | 391 | 316 | 305 | 1245 | 311 |
| LCV | 23 | 14 | 53 | 16 | 106 | 27 |
| 2 Axle | 85 | 146 | 86 | 118 | 435 | 109 |
| 3 Axle | 12 | 15 | 21 | 11 | 59 | 15 |
| MAV | 6 | 6 | 4 | 6 | 22 | 6 |
| Cycle | 65 | 86 | 138 | 97 | 386 | 97 |
| Cycle Rickshaw | 0 | 58 | 60 | 49 | 167 | 42 |
| E Rickshaw | 28 | 12 | 7 | 11 | 58 | 15 |
| Tractor | 1 | 1 | 2 | 0 | 4 | 1 |
| Tractor Trailer | 34 | 26 | 27 | 23 | 110 | 28 |
| Others | 2 | 4 | 0 | 0 | 6 | 2 |
| Total | 6812 | 8073 | 7999 | 8365 | 31249 | 7812 |



Table 6:23 Summary of the Classified Volume count at ISBT (Towards Rishikesh)

| Day | 22.10.2020 | 23.10.2020 | 24.10.2020 | 25.10.2020 | Total | Average |
|--------------------|-------------|-------------|-------------|-------------|--------------|-------------|
| 2- Wheeler | 5495 | 5764 | 5182 | 4665 | 21106 | 5277 |
| 3 Wheeler | 531 | 588 | 567 | 467 | 2153 | 538 |
| Car/Jeep /Van | 1310 | 1556 | 1682 | 1685 | 6233 | 1558 |
| Mini Bus | 16 | 12 | 12 | 21 | 61 | 15 |
| Pvt. Bus | 112 | 70 | 65 | 97 | 344 | 86 |
| Mini LCV | 278 | 398 | 374 | 272 | 1322 | 331 |
| LCV | 18 | 17 | 112 | 9 | 156 | 39 |
| 2 Axle | 75 | 135 | 44 | 95 | 349 | 87 |
| 3 Axle | 13 | 13 | 8 | 12 | 46 | 12 |
| MAV | 0 | 3 | 5 | 11 | 19 | 5 |
| Cycle | 99 | 79 | 118 | 81 | 377 | 94 |
| Cycle Rickshaw | 0 | 45 | 49 | 49 | 143 | 36 |
| E Rickshaw | 40 | 9 | 20 | 6 | 75 | 19 |
| Tractor | 1 | 0 | 1 | 0 | 2 | 1 |
| Tractor Trailer | 18 | 22 | 30 | 25 | 95 | 24 |
| Others | 2 | 0 | 0 | 0 | 2 | 1 |
| Total | 8008 | 8711 | 8269 | 7495 | 32483 | 8121 |




Table 6:24 Average Daily Vehicle count at Rishikesh

| Types of Vehicles | Away from Rishikesh | Towards Rishikesh | Average Vehicle Neelkanth | Vehicle at Composition (in %) |
|-------------------|---------------------|-------------------|---------------------------|-------------------------------|
| 2- Wheeler | 5137 | 5277 | 5207 | 65.36% |
| 3 Wheeler | 500 | 538 | 519 | 6.51% |
| Car/Jeep /Van | 1415 | 1558 | 1487 | 18.66% |
| Mini Bus | 19 | 15 | 17 | 0.21% |
| Pvt. Bus | 92 | 86 | 89 | 1.12% |
| Mini LCV | 311 | 331 | 321 | 4.03% |
| LCV | 27 | 39 | 33 | 0.41% |
| 2 Axle | 109 | 87 | 98 | 1.23% |
| 3 Axle | 15 | 12 | 13 | 0.16% |
| MAV | 6 | 5 | 5 | 0.06% |
| Cycle | 97 | 94 | 95 | 1.20% |
| Cycle Rickshaw | 42 | 36 | 39 | 0.49% |
| E Rickshaw | 15 | 19 | 17 | 0.21% |
| Tractor | 1 | 1 | 1 | 0.01% |
| Tractor Trailer | 28 | 24 | 26 | 0.32% |
| Others | 2 | 1 | 1 | 0.01% |
| Total | 7812 | 8121 | 7967 | 100% |



6.6 Preference Survey (Questionnaire Survey):

A questionnaire was designed to collect information from all types of road users at Neelkanth Mahadev temple. Data was obtained by interviewing 1016 individuals by trained personnel. Data collected from interviews include information such as the origin and destination of trips, how many times people have visited Neelkanth Mahadev Temple, willingness to use the Ropeway system, willingness to pay to use ropeway, etc. The sample questionnaire used in the study is shown below.



PASSENGERS FEEDBACK & SUGGESTIONS

Date: _____ Q. No: _____
 Time: _____
 Location of Survey: _____

| | | | | | |
|---|--|---|---|---|---|
| | | | | | |
| Name | | | Age | Occupancy | Mob. No. |
| | | | | Sex | <input type="checkbox"/> Male <input type="checkbox"/> Female |
| Origin | Destination | | Trip Purpose | | |
| 1. How many times have you visited Neelkanth Mahadev? | <input type="checkbox"/> Once | <input type="checkbox"/> 02 Times | <input type="checkbox"/> 03 Times | <input type="checkbox"/> Almost Every Year | |
| 2. What is the mode of travel to visit Neelkanth Mahadev? | <input type="checkbox"/> By taxi | <input type="checkbox"/> By own car | <input type="checkbox"/> By Two wheeler | <input type="checkbox"/> Others | |
| 3. Would you like to use ropeway to reach Neelkanth Mahadev Temple from Rishikesh | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> May be | | |
| 4. Would you like to use ropeway to reach Parvati Mata Temple | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> May be | | |
| 5. Which alignment will you prefer? | <input type="checkbox"/> ISBT to Neelkanth Mahadev / Parvati Mandir (Direct) | <input type="checkbox"/> ISBT to Neelkanth Mahadev /Parvati Mandir via Triveni Ghat | <input type="checkbox"/> ISBT to Neelkanth Mahadev /Parvati Mandir via Muni Ki Reti | <input type="checkbox"/> Old /New railway Station | <input type="checkbox"/> Any Other |
| 6. Ropeway is proposed to be provided to connect Neelkanth Mahadev temple with Rishikesh. Which of the given option suits you ? | <input type="checkbox"/> Safety | | <input type="checkbox"/> Less time | | <input type="checkbox"/> |
| 7. Indicate the ticket price in Rs. for the Ropeway to reach Neelkanth Mahadev Temple? (Approx. time for travel 20 min) | <input type="checkbox"/> 300 - 400 <input type="checkbox"/> 500 - 600 | | <input type="checkbox"/> 400 - 500 <input type="checkbox"/> More than 600 | | |
| 8. Indicate ticket price in Rs. for the Ropeway to reach Parvati Mata Temple from Neelkanth Mahadev Temple? | <input type="checkbox"/> 100-150 <input type="checkbox"/> 200 - 250 | | <input type="checkbox"/> 150 - 200 <input type="checkbox"/> More than 250 | | |
| 9. Do you visit Neelkanth Mahadev in Savad or any other important religious festival | <input type="checkbox"/> Yes | | | <input type="checkbox"/> No | |
| Any Suggestions for implementing Ropeway Services & facilities: | | | | | |
| Name and Signature of the Surveyor | | | | | |

Figure 6:13 Format of Questionnaire

The analysis of this questionnaire survey is as under: -

- i. The number of times people have visited Neelkanth Mahadev is as under: -



Table 6:25 Percentage of frequency of tourist visited Neelkanth Mahadev

| Frequency of tourist visits to Neelkanth Mahadev Temple | Percentage (%) |
|---|----------------|
| Once | 25 |
| 2 Times | 35 |
| 3 Times | 18 |
| Almost every year | 22 |
| Total | 100 |

- ii. The mode of travel people use to reach Neelkanth Mahadev Temple is shown below: -

Table 6:26 Mode of travel to visit Neelkanth Mahadev Temple (in %)

| Frequency of tourist visits to Parvati Mata Temple | Percentage (%) |
|--|----------------|
| By Taxi | 19 |
| By Own Car | 66 |
| By Two-Wheeler | 14 |
| Others | 1 |
| Total | 100 |

- iii. The willingness of people to use Ropeway system for going to Neelkanth Mahadev Temple is shown below: -

Table 6:27 Willingness to use Rishikesh to Neelkanth Ropeway

| Response | Percentage (%) |
|--------------|----------------|
| Yes | 99 |
| No | 1 |
| Maybe | 0 |
| Total | 100 |

- iv. The willingness of people to use Ropeway system for going to Parvati Mata Temple is shown below: -



Table 6:28 Willingness to use Triveni Ghat to Parvati Mata Ropeway

| Response | Percentage (%) |
|----------|----------------|
| Yes | 85 |
| No | 14 |
| Maybe | 1 |
| Total | 100 |

v. The choice of preferred alignment for ropeway station is shown below: -

Table 6:29 People's Preferred Alignment for Ropeway Station

| Response | Percentage (%) |
|---|----------------|
| ISBT to Neelkanth Mahadev/Parvati Mandir (Direct) | 74 |
| ISBT to Neelkanth Mahadev/Parvati Mandir via Triveni Ghat | 21 |
| ISBT to Neelkanth Mahadev/Parvati Mandir via Muni ki Reti | 3 |
| Old/ New Railway Station | 2 |
| Any Other | 0 |
| Total | 100 |

vi. The reason of using ropeway facility by people is shown below: -

Table 6:30 People's Preferred reason for using Ropeway facility (in %)

| Preferred Location | Percentage (%) |
|--------------------|----------------|
| Safety | 62 |
| Less Time | 35 |
| Other | 3 |
| Total | 100 |

vii. The willingness to pay for ropeway system for visiting Neelkanth Mahadev Temple from Rishikesh is shown below: -

Table 6:31 Willingness to pay for Rishikesh to Neelkanth Ropeway

| Fare Band | Percentage (%) |
|-----------|----------------|
| 300-400 | 23 |
| 400-500 | 25 |



| | |
|---------------|------------|
| 500-600 | 46 |
| More than 600 | 6 |
| Total | 100 |

viii. The willingness to pay for ropeway system for visiting Parvati Mata Temple is shown below: -.

Table 6:32 Willingness to pay for Neelkanth Mahadev to Parvati Mata temple Ropeway

| Fare Band | Percentage (%) |
|---------------|----------------|
| 100-150 | 20 |
| 150-200 | 21 |
| 200-250 | 45 |
| More than 250 | 14 |
| Total | 100 |

ix. People visiting Neelkanth Mahadev in Kavadi or any other important religious festival is shown below:-

Table 6:33 Visit neelkanth Mahadev temple during religious festival

| Response | Percentage (%) |
|--------------|----------------|
| Yes | 78 |
| No | 22 |
| Total | 100 |

6.7 O-D Survey:

6.7.1 Objective:

The objective of the Origin-Destination (O-D) survey is to gather information regarding travel characteristics of different road users. Results of the O-D survey are used to describe the user characteristics of passengers, such as distribution of local and through traffic.



6.7.2 Methodology:

The Origin-Destination Survey was carried out adopting roadside interview method as detailed in IRC 102-1998. The survey was carried out for 3 days at Neelkanth Mahadev Temple.

6.7.3 Trip Purpose:

All the survey sample at Neelkanth Mahadev revealed that only purpose was to visit Neelkanth Mahadev temple and nothing else, as shown in Table-5:34.

Table 6:34 Trip Purpose at Neelkanth Mahadev

| Trip Purpose | Car/ Van/ Jeep | Minibus | Tourist Bus | Two-wheeler |
|-----------------|----------------|---------|-------------|-------------|
| Visiting Temple | 100% | 100% | 100% | 100% |
| Work | 0% | 0% | 0% | |
| Total | 100% | 100% | 100% | 100% |

6.8 Ropeway Ridership Estimation

6.8.1 Estimation from Primary Data

As mentioned above in Table 6:13, “4 days Average 24 Hours Traffic towards Neelkanth Mahadev”, annual tourist footfall at Neelkanth Mahadev Temple, as per Traffic Volume count survey conducted during the period of 22nd October 2020 to 25th October 2020 is shown in Table-6:2.

Table 6:35 Calculation of Total Tourist footfall/day as per Traffic Volume Count Survey

| Type of Vehicle | ADT | Occupancy Considered | Total Tourist footfall per day |
|--------------------------------|-----|-------------------------|--------------------------------|
| 2- Wheeler | 223 | 1 | 223 |
| Car/ Jeep/ Van/Taxi | 286 | 4 | 1144 |
| Mini Bus | 2 | 15 | 30 |
| Bus | 0 | 40 | 0 |
| Total Tourist (Per Day) | | | 1397 |
| Per Year | | | 5,09,905 |



From the above table, it can be inferred that about 5,09,905 devotees visit Neelkanth Mahadev Temple per year. However, this inference is based on the primary data collected during the COVID pandemic period.

6.8.2 Estimation from Secondary Data

6.8.2.1 Use of Tourist Traffic data of Rishikesh

Tourist data of Rishikesh for past 11 years was collected from Uttarakhand Tourism Development Board Office, Pt. Deendayal Upadhyay Paryatan Bhawan Near ONGC Helipad, Garhi Cantt, Dehradun, Uttarakhand. This data is used to study the growth rate of tourists in Rishikesh. The past 11 years tourism data is shown below: -

Table 6:36 Traffic to Rishikesh

| Year | Rishikesh | | |
|------|-------------------|------------------|----------------|
| | Domestic Tourists | Foreign Tourists | Total Tourists |
| 2009 | 581869 | 4550 | 586419 |
| 2010 | 1093164 | 5548 | 1098712 |
| 2011 | 1181535 | 4994 | 1186529 |
| 2012 | 804578 | 5160 | 809738 |
| 2013 | 370216 | 4193 | 374409 |
| 2014 | 328936 | 4052 | 332988 |
| 2015 | 434033 | 3723 | 437756 |
| 2016 | 589653 | 2574 | 592227 |
| 2017 | 673226 | 4815 | 678041 |
| 2018 | 656074 | 6044 | 662118 |
| 2019 | 855798 | 8088 | 863886 |
| CAGR | 3.93% | 5.92% | 3.95% |

From above the Compounded Annual Growth Rate (CAGR) of the tourists in Rishikesh is 3.95% in last 11 years. This CAGR is used for ropeway ridership estimation.



6.8.2.2 Use of Tourist Traffic data of Neelkanth Mahadev Temple

The data of tourists visiting Neelkanth Mahadev Temple in the past 10 years collected from Laxman Jhula Police Chowki vide letter dated 26.10.2020, is summarized as below: -

Table 6:37 Tourist data at Laxman Jhula Police Chowki

| Sr. No | Year | In Kavad Yatra Month | Yearly | Traffic in 11 months excluding Kavad Yatra month |
|--------|---|----------------------|----------|--|
| A | B | C | D | E=D-C |
| 1 | 2010 | 2186000 | 4331197 | 2145197 |
| 2 | 2011 | 2286900 | 4531114 | 2244214 |
| 3 | 2012 | 3195410 | 6331176 | 3135766 |
| 4 | 2013 | 500000 | 990667 | 490667 |
| 5 | 2014 | 2264157 | 4486052 | 2221895 |
| 6 | 2015 | 3700000 | 7330938 | 3630938 |
| 7 | 2016 | 4424785 | 8766979 | 4342194 |
| 8 | 2017 | 1112394 | 2204025 | 1091631 |
| 9 | 2018 | 5691230 | 11276230 | 5585000 |
| 10 | 2019 | 1474677 | 2921828 | 1447151 |
| | Total | 26835553 | 53170206 | 26334653 |
| | | CAGR | -4.28% | -4.28% |
| | Average 11-month Traffic excluding year 2013 & 2018 | | | 2532373 |

It is observed that nearly 50% of annual traffic to Neelkanth Mahadev Temple is during one month itself (Kavad Yatra) i.e., Shravan month (month of July-August). However, it will not be financially viable to provide a ropeway capacity to cater this demand as the ropeway will remain highly underutilized during remaining 11 months of the year. Therefore, ridership estimation including hourly demand of the capacity has been done based on the data of normal 11 months and tourists figure of Kavad



yatra month have not been considered. The ridership during Kavad month has been taken equal to the capacity of ropeway with 20 hours of operation during this month as against 15 hours in remaining 11 months.

As observed, the traffic figures are abruptly high in year 2018 and very low in year 2013 and therefore, the traffic for these two years has not been considered for ropeway ridership estimation. It is also observed that there is wide variation in annual traffic during different years and therefore, the average of last 8 years (excluding 2013 and 2018) annual traffic has been considered for estimation of ridership instead of traffic of latest year 2019. Further, it has been assumed that 90% of tourist registered at Lakshman Jhula Police station are going to Neelkanth /Parvati Mata Temple and remaining 10% might be going to nearby other places like tourist camps, nearby villages or towards Lansdowne town and may not be going to Neelkanth Mahadev/Parvati Mata Temple.

Therefore, average traffic to Neelkanth/Parvati Mata Temple in 11 months is taken as **2279136** (90% of 2532373)

Further, as CAGR for past 10-year traffic to Neelkanth Temple is -4.28%, it has not been used for future projections and instead the CAGR of the tourists in Rishikesh during last 11 years which is 3.95% as shown in Table 6:36 has been used for the ropeway ridership estimation.

6.8.2.3 Conclusion from primary and secondary data

- As per primary survey and secondary data, projected yearly traffic to Neelkanth in the base year 2020 is 5,09,905 and 51,12,914 respectively.
- The yearly traffic as per primary data is 9.97% % of the secondary data which is very low. This reduction in tourist traffic is due to COVID 19 restrictions. Hence the ropeway ridership estimation will be done based on secondary data.

6.8.3 Ropeway Ridership Estimation

6.8.3.1 Ropeway Ridership Estimation:

- i. The yearly traffic calculated from primary data is very low due to COVID 19 restrictions and so it is not considered for ropeway ridership estimation and



- instead of it, yearly traffic at Neelkanth Mahadev Temple obtained from secondary data is used for ropeway ridership estimation.
- ii. The willingness obtained from preference survey of primary data is used for ropeway ridership estimation.
 - iii. The CAGR of the tourists in Rishikesh which is found to be 3.95% in last 11 years is used for traffic projection of next 30 years.
 - iv. The temple timing during normal season is from 5:00 AM to 6:00 PM. Ropeway timing are assumed from 4:00 AM to 7:00 PM. The Temple remains open for 20 hours in Kavad period and therefore it is assumed that the ropeway will be operated for 20 hours in Kavad period.
 - v. 99% passengers have shown their willingness to use ropeway.
 - vi. As per the survey, about 95% tourist will use the ropeway if it is proposed via Triveni Ghat. The percentage of traffic preferring to use alignment between ISBT to Neelkanth and Triveni Ghat to Neelkanth is 74:21 out of total traffic.
 - vii. 100% passengers have shown their willingness to use ropeway if fare is up to Rs 400.

6.8.3.2 Ridership Estimation for Ropeway

Estimation during non *Kavad Yatra* months (11 months)

From the table 6:37, it is clear that the average traffic during non- kavad 11 months (335 days) is 2279136. As per the traffic survey, 99% showed willingness to use ropeway, 95% gave willingness for this alignment, and 100% showed willingness to pay fare up to Rs. 400/-. Based on the above, the ropeway ridership in the base year 2020 will be $2279136 \times 99\% \times 95\% \times 100\% = 2143527$.

Estimation of sectional Load

As per table 6:28, 85% gave their willingness to use ropeway for Parvati Mata Temple. Also, the ridership between ISBT - Neelkanth and Triveni Ghat – Neelkanth is in the ratio of 74:21. Thus, the ridership on three sections in the form of percentage of total ridership will be as under: -

| | | |
|-------|-----------------------------------|---------------------|
| (i) | ISBT to Neelkanth - | 77.9% (74/95) |
| (ii) | Triveni Ghat to Neelkanth - | 100 % (74/95+21/95) |
| (iii) | Neelkanth to Parvati Mata Temple- | 85% |



Ridership projection during normal 11 months over the entire concession period using CAGR of 3.95 % as mentioned in para 6.8.3.2 and accordingly daily and hourly (15 hrs. operation) ridership, are as under: -

Table 6:38 Ridership forecast on ropeway during normal 11 months

| Year | Ridership Forecast for normal 11 months | Per day ridership (335 days) | Per hour ridership (15 hours) |
|------|---|------------------------------|-------------------------------|
| 2020 | 2143527 | 6399 | 427 |
| 2021 | 2228197 | 6651 | 443 |
| 2022 | 2316211 | 6914 | 461 |
| 2023 | 2407701 | 7187 | 479 |
| 2024 | 2502805 | 7471 | 498 |
| 2025 | 2601666 | 7766 | 518 |
| 2026 | 2704432 | 8073 | 538 |
| 2027 | 2811257 | 8392 | 559 |
| 2028 | 2922301 | 8723 | 582 |
| 2029 | 3037732 | 9068 | 605 |
| 2030 | 3157723 | 9426 | 628 |
| 2031 | 3282453 | 9798 | 653 |
| 2032 | 3412110 | 10185 | 679 |
| 2033 | 3546888 | 10588 | 706 |
| 2034 | 3686990 | 11006 | 734 |
| 2035 | 3832626 | 11441 | 763 |
| 2036 | 3984015 | 11893 | 793 |
| 2037 | 4141383 | 12362 | 824 |
| 2038 | 4304968 | 12851 | 857 |
| 2039 | 4475014 | 13358 | 891 |
| 2040 | 4651777 | 13886 | 926 |
| 2041 | 4835522 | 14434 | 962 |
| 2042 | 5026526 | 15005 | 1000 |
| 2043 | 5225073 | 15597 | 1040 |
| 2044 | 5431464 | 16213 | 1081 |
| 2045 | 5646007 | 16854 | 1124 |
| 2046 | 5869024 | 17519 | 1168 |
| 2047 | 6100850 | 18211 | 1214 |
| 2048 | 6341834 | 18931 | 1262 |
| 2049 | 6592336 | 19679 | 1312 |
| 2050 | 6852734 | 20456 | 1364 |
| 2051 | 7123417 | 21264 | 1418 |
| 2052 | 7404792 | 22104 | 1474 |
| 2053 | 7697281 | 22977 | 1532 |



It is proposed to design ropeway for 30% peak capacity over and above normal capacity (1532) in the year 2053 to serve peak hour loads on financial prudence perspective. Therefore, it is proposed to design ropeway for $1532 * 1.30 = 1992$, say 2000 PHPDT.

Capacity of this ropeway with 20 hours operation per day during Kavad Month will be 12,00,000 Passenger per month [2000 X 20 (hours operation in kavad yatra) X 30 (days)].

Though the traffic in Kavad month will be much higher but ridership on ropeway during this month is taken as 12 Lakhs only.

Further, the operation of ropeway is assumed to be 330 days in a year and remaining 35 days are for maintenance. The annual ridership has been reduced on pro-rata basis and the same over the entire concession period is as under: -

Table 6:39 Annual Ridership for Revenue Calculation (12,00,000 Ridership gets added for Kavad Month)

| Year | Ridership excluding Kavad Yatra (335 days) | Annual Ridership of ropeway in a year including Kavad Month (365 days) | Annual Ridership for revenue (330 days) |
|------|--|--|---|
| 2020 | 2143527 | 3343527 | 3022915 |
| 2021 | 2228197 | 3428197 | 3099466 |
| 2022 | 2316211 | 3516211 | 3179040 |
| 2023 | 2407701 | 3607701 | 3261757 |
| 2024 | 2502805 | 3702805 | 3347742 |
| 2025 | 2601666 | 3801666 | 3437123 |
| 2026 | 2704432 | 3904432 | 3530034 |
| 2027 | 2811257 | 4011257 | 3626616 |
| 2028 | 2922301 | 4122301 | 3727012 |
| 2029 | 3037732 | 4237732 | 3831374 |
| 2030 | 3157723 | 4357723 | 3939859 |



| | | | |
|------|---------|---------|---------|
| 2031 | 3282453 | 4482453 | 4052628 |
| 2032 | 3412110 | 4612110 | 4169852 |
| 2033 | 3546888 | 4746888 | 4291707 |
| 2034 | 3686990 | 4886990 | 4418374 |
| 2035 | 3832626 | 5032626 | 4550045 |
| 2036 | 3984015 | 5184015 | 4686917 |
| 2037 | 4141383 | 5341383 | 4829196 |
| 2038 | 4304968 | 5504968 | 4977094 |
| 2039 | 4475014 | 5675014 | 5130835 |
| 2040 | 4651777 | 5851777 | 5290648 |
| 2041 | 4835522 | 6035522 | 5456774 |
| 2042 | 5026526 | 6226526 | 5629462 |
| 2043 | 5225073 | 6425073 | 5808970 |
| 2044 | 5431464 | 6631464 | 5995570 |
| 2045 | 5646007 | 6846007 | 6189540 |
| 2046 | 5869024 | 7069024 | 6391172 |
| 2047 | 6100850 | 7300850 | 6600769 |
| 2048 | 6341834 | 7541834 | 6818644 |
| 2049 | 6592336 | 7792336 | 7045126 |
| 2050 | 6852734 | 8052734 | 7280554 |
| 2051 | 7123417 | 8323417 | 7525281 |
| 2052 | 7404792 | 8604792 | 7779675 |
| 2053 | 7697281 | 8897281 | 8044117 |

6.9 Conclusion

The ropeway stations proposed in this study are located in the most traffic dense tourist places of Rishikesh. The destinations are of religious importance. There is lot of potential in this project as tourists have shown interest in using ropeway system. The recommendations from the study are listed below:

- ISBT-Triveni Ghat- Neelkanth Mahadev Temple- Parvati Mata Temple is the best alignment as it is preferred by 95% passengers (74% + 21%).



- 85% tourists who visit Neelkanth from above alignment further visit Parvati Mata Temple as per table 6.28.
- It is seen that the 1532 PPH capacity is sufficient to handle the traffic in non-Kavad months i.e., 11 months every year during the entire period of concession. This period constitutes 92% of the entire concession period. It is proposed to design ropeway for 30% peak capacity over and above normal capacity to serve peak loads on financial prudence perspective. Therefore, ropeway system is designed for 2000 PPH.



7 ROPEWAY SYSTEM TECHNOLOGY

Aerial Ropeway Transit (ART) is a relatively new transit technology. Understanding how this technology works is essential in order to determine the role that this technology can play for this project. Therefore, this chapter tries to address this by discussing all aspects related to this relatively unknown system in terms of technology components, types, etc. The Chapter begins with an overview of Aerial Ropeway Transit (ART) technologies and the system components of any specific ART system. The available ART technologies and their service characteristics are also discussed in this chapter.

7.1 Ropeway System Components

Almost all ropeway systems have the same basic components, irrespective of the technology used. The basic components of any ropeway system include carriers (cabins), terminals, towers, ropes, and evacuation and rescue system. The following is a discussion of each component.

Cabin & Carriage

The Cabins will be suspended from the Rope through a carriage and hanger. Hanger would be attached to the carriage in such a way that whatever be the slope of the track, the cabin should always remain in a plumb position. Cabins shall be of moulded fiberglass construction. Cabins shall be fully covered, weather-protected, and safety-proof. The top portion of the cabin shall be fitted with transparent sheets for viewing. Quality and factor of safety will maintain as per norms and standards.

Terminal Stations

Generally, ropeway systems have 2 terminals/stations. However, depending upon boarding/ deboarding requirements and negotiation of turns more number stations are added. One is the drive terminal; the other is a return (idler) terminal. For vertical changes, the terminals are referred to as upper and lower terminals. For ski lifts, the terminals are referred to as loading and unloading (or discharge). (Loading/unloading structures between terminals are uncommon now.)



Tension terminal: Either terminal may act as a tension terminal where a tensioning device (for example, counterweights) is located.

Angle station: On materials ropeways that where the line of transport is not straight throughout, an intermediate structure called an angle station can be used to change the otherwise straight alignment of the ropeway.

Towers

Intermediate structures that support carrying and hauling ropes between terminals; sometimes referred to as large pressure frames; rarely referred to as pylons. Towers carry line sheaves (pronounced "shivs") for moving ropes and/or saddles for stationary track ropes.

The towers are built in a robust manner as they have to bear the weight of the vehicles with passengers. The cabins pass on both sides of the tower. The towers are made from tubular steel in a variety of lengths, diameters and wall thicknesses. Depending on the terrain, they can be divided into small sections, transported by helicopter and reassembled on site.

Rope

Formed by the inter-twining of individual wires to form a strand, and the strands to form a rope. Rope variations and processes are chosen for specific applications. Rope for ropeways is generally described by outside diameter and whether it is bicable (both a haulage rope and a track rope) or monocable (serves both functions). For ropeways, wire ropes are made into endless loops by using a "long splice" procedure, or terminated by attaching an end to a carrier, anchor or counterweight using end connections such as sockets.

Steel ropes are made of strands that are twisted around the rope core. Specialized companies are responsible for manufacturing the ropes and installing them on site.

7.2 ART Technology

Aerial Ropeway Transit (ART) is an aerial public transit technology in which cabins (also called carriers, vehicles or cars) are suspended and propelled from above by cables. The underlying technology of ART has been around for almost a century, where it has been applied mostly in terrain-challenged recreational contexts (e.g. Gondolas in ski resorts) to transport skiers and tourists from the bottom to the top of the mountains and vice versa.



ART can be thought of as a member of the broader Cable-Propelled Transit technology (CPT), which also includes rail-supported Cable Cars. CPT can be defined as a transit technology that moves people in motor-less, engine-less vehicles that are propelled by a steel cable. In both the literature and industrial communities, the term “Ropeway” is used to describe a system that is used for transporting materials and/or passengers in carriers suspended from or controlled by ropes or cables, while the term “Aerial Ropeway” refers to any ropeway system that is suspended in the air. The term “Aerial Ropeway Transit” or (ART), on the other hand, describes any type of aerial transportation mode in which passengers are transported in a cabin that is suspended and pulled by cables.

Recently, especially in the past decade, ART has gained increasing attention worldwide as a cost effective and attractive transit mode. As it stands now, an ART system can use one of the following aerial technologies in India: Continuous Movement Monocable ropeway with Fixed grip, Continuous Movement Monocable ropeway with Automatic grip, Continuous Movement Bicable/Tricable ropeway with Detachable grip, Pulsated Movement Monocable Ropeway with fixed Grips, To and Fro (Jig Back) Movement Bi- Cable Ropeways, Jig Back movement monocable ropeway with fixed grip, Chairlifts as well as other technologies.

7.3 About CEN Standards

European Standards are developed by the European Standardization Organizations. The three European Standardization Organizations, CEN, CENELEC and ETSI are officially recognized as competent in the area of voluntary technical standardization. The European Union (EU) Regulation (1025/2012) which settles the legal framework for standardization, has been adopted by the European Parliament and by the Council of the EU, and entered into force on 1 January 2013.

European Standards are based on a consensus which reflects the economic and social interests of 31 CEN Member countries channeled through their National Standards Bodies (NSBs). Most standards are initiated by industry. Other standardization projects can come from consumers, Small and Medium Enterprises or

associations, to name some other sources.



In addition, many standards are developed to support European legislation. 'Reference to standards' within a legislative text is viewed as a more effective means of ensuring that products meet the essential health and safety requirements of legislation than the writing of detailed laws. This allows both processes to support each other, without causing a slowdown.

Besides European Standards, CEN produces other reference documents which can be developed quickly and easily: Workshop Agreements, Technical Specifications, Technical Reports and Guides.

European Standards are drafted in a global perspective. CEN has signed the 'Vienna Agreement' with the International Organization for Standardization (ISO) through which common European and international standards can be developed in parallel. More than 30% of the European Standards adopted by CEN are identical to international standards. These EN/ISO standards have the dual benefits of automatic and identical implementation in 31 CEN Member countries, and global applicability.

There are basically five (5) types of suspended aerial ropeway systems that can be considered as cable Propelled Transit (CPT):

- i. Mono- cable Gondola
- ii. Bi- cable Gondola
- iii. Tri-Cable Gondola
- iv. Pulse Gondola and
- v. Jig-Back/Dual line Tramway

7.4 Mono- Cable Gondola

The Mono-Cable Gondola (1S) is a single cable, detachable grip system where the



Monocable detachable gondola

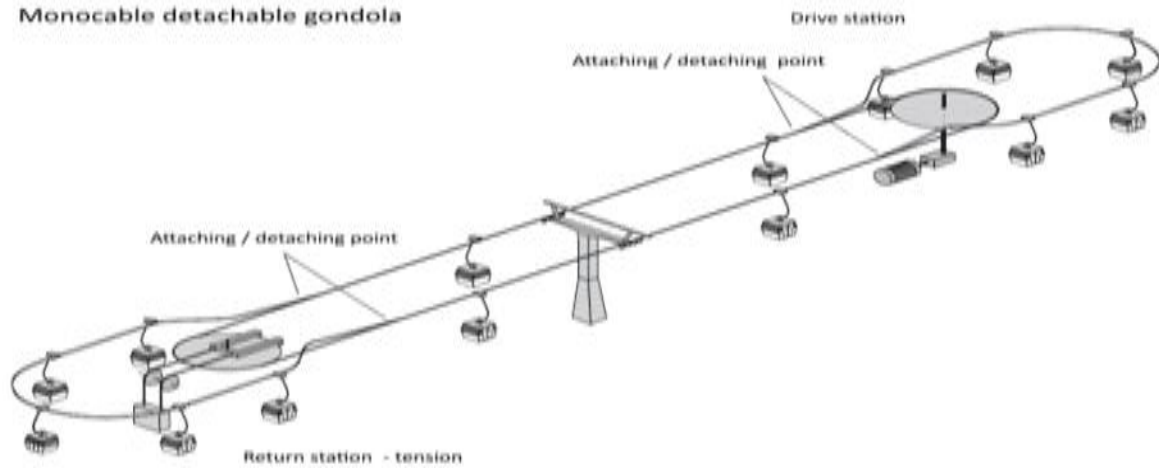


Figure 7:1 MDG System

vehicles (cabins) detach and attach to the moving haul cable (wire rope) in the stations. The tensioned haul cable itself provides the guideway for the vehicles and no support; a track cable is required. The cableway of circulating gondolas has multiple cabins spaced equally along the line. This 1S mode provides for the narrowest system pathway operating in an envelope as narrow as 12m with code mandated lateral clearances.

Carrying Capacity: 1,000 to 4,500 passengers per hour, per direction

Cabin Capacity: 8 to 12 passengers

Headways: 10 to 30 seconds

Max Speed: 21 KMPH

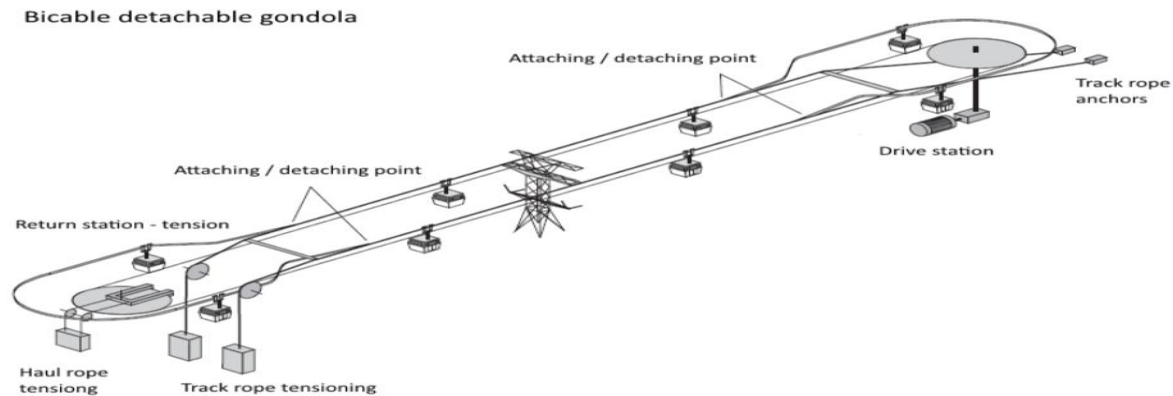
ROW Width: 12m to 18 m



7.5 Bi- Cable Gondola (2S)

The Bi-Cable Gondola (2S) system is the original lift technology used for gondola cabin-type cableways. Here too numerous gondola cabins that are equally spaced along the

Figure 7:2 Bi Cable Ropeway System



cable loop that circulate between the system's stations. To provide support between more widely spaced towers, the cabins travel on a highly tensioned stationary cable on each side of the cableway. Thus, there are two (2) cables per direction, a haul cable and a support track cable. The 2S system allows for higher speeds and larger cabins compared with mono-cable technology.

Carrying Capacity: 1,000 to 5,000 passengers per hour, per direction

Cabin Capacity: 15 to 20 passengers

Headways: 12 to 30 seconds

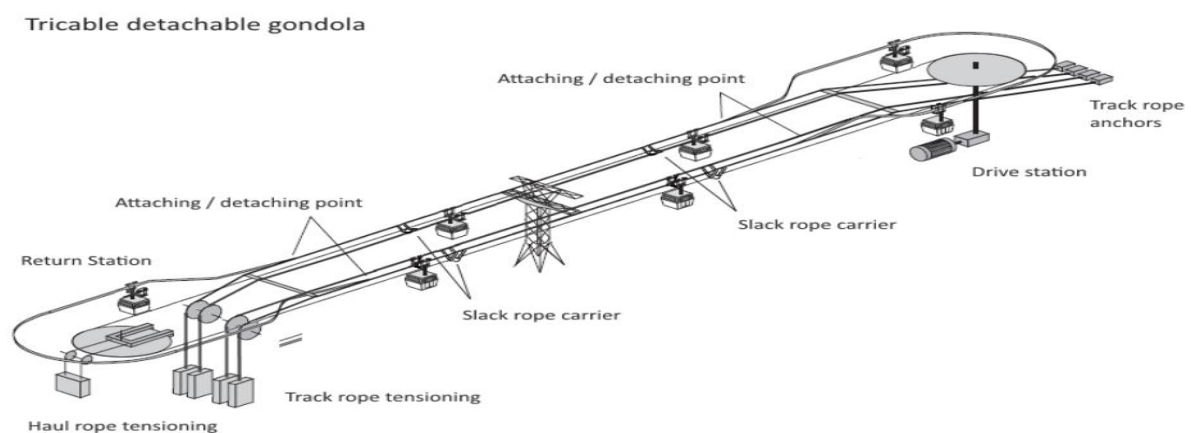
Max Speed: 30 kmph

ROW Width: 15m to 22m



7.6 Tri-Cable Gondola (3S)

The Tri-Cable Gondola (3S) system is a more specialized cableway technology used especially for long spans and high-profile guideways. It is essentially a Bi-Cable Gondola (2S) system with a second fixed track cable on each side for more stability. Typically, the passenger cabins are larger with detachable grip cabins that circulate between the end and inline stations. Compared with the bi-cable the 3S provides for longer spans between towers and larger cabins.



Carrying Capacity: 2,000 to 7,000 passengers per hour, per direction

Cabin Capacity: 20 to 35 passengers

Headways: 15 to 45 seconds

Max Speed: 40 Kmph

ROW Width: 20m to 30m



Figure 7:3Tri Cable Ropeway



7.7 Pulse Gondola

This type of system has limited application due to its relatively low passenger carrying capacities. Pulsed gondolas are fixed-grip Cable Propelled Transit (CPT) systems with cabins grouped together in “pulses” rather than being spaced evenly along the cable. There can be only a haul cable and no track cables, or a single-track cable and single haul cable. This is a fixed grip system where the cabins do not come to a complete stop in the stations, but move slowly through the stations for boarding, without detaching the cabin like Monocable gondola does.

Carrying Capacity: 300 to 700 passengers per hour, per direction

Cabin Capacity: 6 to 10 passengers

Headways: 2 to 5 minutes

Max Speed: 15 kmph

ROW Width: 12m to 20m

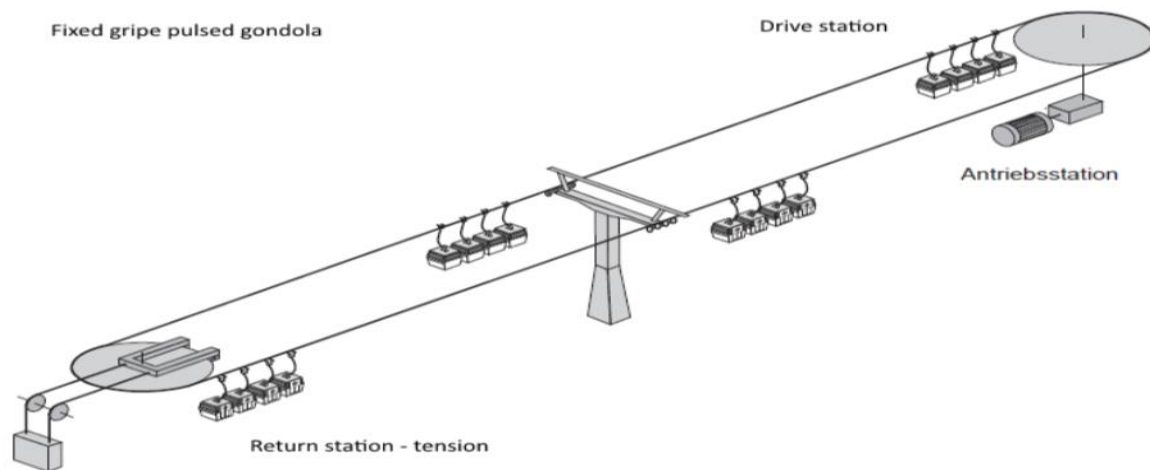




Figure 7:4 Pulse Gondola Ropeway

7.8 Jig-Back and Dual-Line Gondola

The Jig-Back and Dual Line Aerial Tramway system is the original aerial cableway technology used for transit or general public transportation. There are several of these systems that have delivered passenger service continuously for over 100 years. Typically, there are two (2) large cabins on the same haul cable at opposite ends of the loop cable system that go back and forth; they “jig-back” between the stations. The cabins can also run on independent cable loops, a configuration called a “Dual Line,” on which they go back and forth between stations independently. New York City’s Roosevelt Island CPT is a Dual Line Aerial Tramway.

Carrying Capacity: 500 to 2,000 passengers per hour, per direction

Cabin Capacity: 50 to 200 passengers

Headways: 4 to 15 minutes

Max Speed: 40 Kmph

ROW Width: 30m



**Bicable reversible aerial tramway
(one track rope)**

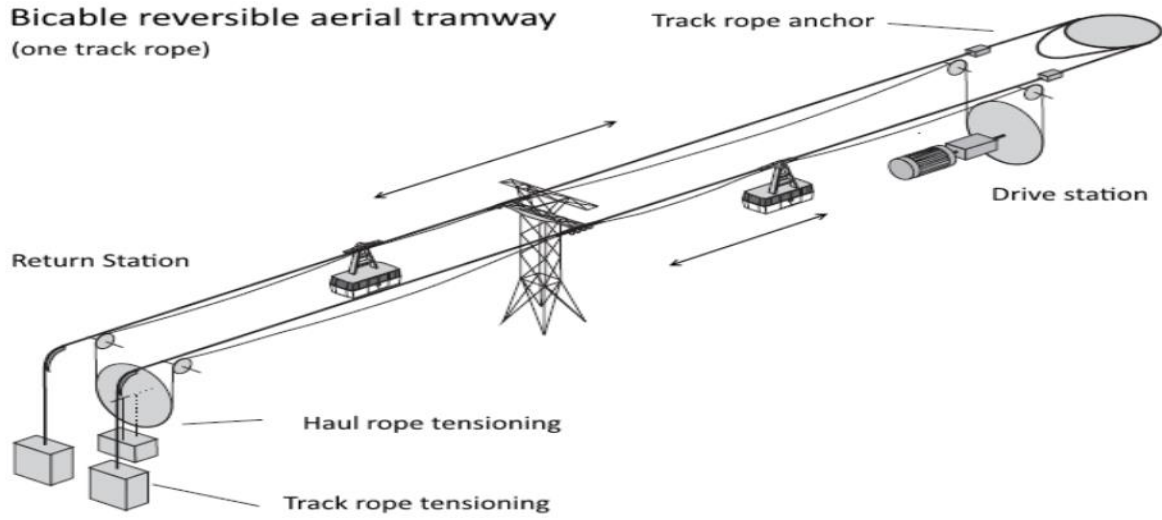


Figure 7:5 Jig Back Ropeway



7.9 PASSENGER ROPEWAYS IN INDIA

In India, Passenger ropeways are used for tourism purpose mainly. Ropeways for tourism are mainly situated at various hill stations and pilgrimage centers in India based on Indian/ CEN standard. The important CEN standard ropeways in India are as under: -

Table 7:1 Ropeways in India

| Sr. No. | Name of Project | Technology | Length (km) | Capacity (PPH) | Tariff (Rs per person-Return trip) |
|---------|-----------------------------|------------|-------------|----------------|------------------------------------|
| 1 | Vaishno Devi, Ropeway | CEN | 0.45 | 800 PPH | Rs. 100 |
| 2 | Patnitop, Ropeway | CEN | 2.60 | 600 PPH | Rs. 1000 |
| 3 | Gulmarg Ropeway (2 stage) | CEN | 2.50 | 1500/600 | Rs. 600/800 |
| 4 | Auli Cable Car, Uttarakhand | CEN | 4.00 | 800 | Rs. 700 |
| 5 | Solang Valley Ropeway | CEN | 1.30 | 1200 | Rs. 500 |

7.10 Indian Case Studies

7.10.1 Gulmarg Gondola, J & K.



Table 7:2 Gulmarg Ropeway Technical Details

| | |
|----------------------------|---|
| Location: | Srinagar, Jammu & Kashmir |
| Route : | 2- Stage Ropeway between Gulmarg resort to Aparwath Peak Station (Stage-1: Gulmarg resort to Kongdori station; Stage-2: Chair car ferries skiers to Apparwath Peak from Kongdori station) |
| Stretch : | Approx. 2500m |
| Standard | CEN |
| Ropeway Type | Stage:1 Detachable grip type Gondola (MDG) Stage:2 Detachable Grip type gondola (MDG) |
| Carrying Capacity | Stage-1 1500 PPH, Stage-2 : 600 PPH |
| Ticket Cost | Stage-1: Rs. 600; Stage 2: Rs. 800 |
| SPV | J & K State cable car Corporation |
| Technology Provider | Technology by POMA |

7.10.2 Auli Cable Car, Uttarakhand





Table 7:3 Auli Cable Car details

| | |
|--------------------------|---|
| Location: | Garwal, Uttarakhand |
| Route : | Auli to Joshimath, offering magnificent view of Himalay |
| Stretch: | Approx. 4000m |
| Standard | CEN |
| Ropeway Type | Hybrid Ropeway- Containing Gondola (2S Detachable) and Chair lift/ Ski lift |
| Carrying Capacity | Gondola: 400 PPH, Chair lift: 400 PPH |
| Ticket Cost | Return fare is Rs. 400-700 |
| SPV | Garhwal Mandal Vikas Nigam Limited |
| Contractor | Damodar Ropeways & Infra Limited GMM (Gimar Montaz Mautino) of France |

7.10.3 Solang valley Ropeway, Himachal Pradesh



Table 7:4 Solang Valley Ropeway Details

| | |
|--------------------------|---------------------------------|
| Location: | Manali, Himachal Pradesh |
| Route : | Solang Valley |
| Stretch : | Approx. 1300m |
| Standard | CEN |
| Ropeway Type | Gondola (2S Detachable) |
| Carrying Capacity | 1200 PPH |
| Ticket Cost | Return fare is Rs. 500/- |
| SPV | Ski Himalayas Ropeway Pvt. Ltd. |
| Contractor | Poma of France |



7.11 Worldwide Passenger Ropeways

7.11.1 Peak 2 Peak Gondola



The Ropeway is located in the Whistler Blackcomb Resort in Whistler, British Columbia, linking Whistler Mountain's Roundhouse Lodge with Blackcomb Mountain's Rendezvous Lodge. It is the first lift to join the two side-by-side mountains. It held the world record for the longest free span between ropeway towers.

Technical Details of Peak-to-Peak Gondola

| | |
|--------------------------|---|
| Location: | Whistler, Canada |
| Route : | Whistler Mountain's Roundhouse Lodge with Blackcomb Mountain's Rendezvous Lodgeingamari |
| Stretch : | 4.4 KM |
| Standard | CEN |
| Ropeway Type | 3S |
| Carrying Capacity | 4100 PPH |
| Ticket Cost | 65\$ |
| Contractor | Doppelmayr Garaventa Group |



7.11.2 La Paz- El Alto Cable Car, Columbia



Mi Teleférico Cable Car, also known as Teleférico La Paz–El Alto (La Paz–El Alto Cable Car), is an aerial cable car urban transit system serving the La Paz–El Alto metropolitan area in Bolivia. As of October 2019, the system consists of 26 stations (36 if transfer stations are counted separately per line) along ten lines: Red, Yellow, Green, Blue, Orange, White, Sky Blue, Purple, Brown, and Silver.

Technical Details of La Paz–El Alto Cable Car

| | |
|--------------------------|----------------------------|
| Location: | Columbia |
| Route : | 10 routes connect the city |
| Stretch : | 30.5 KM total |
| Standard | CEN |
| Ropeway Type | Monocable |
| Carrying Capacity | 2000-4000 PPHPD |
| Ticket Cost | 40 euro for single line |
| Contractor | Doppelmayr Garaventa Group |



7.11.3 Tung Chung Cable Car, Hong Kong



Ngong Ping 360 is a bicable gondola lift on Lantau Island in Hong Kong. Intended to improve tourism to the area, the aerial lift was previously known as Tung Chung Cable Car Project.

Table 7:5 Technical Details of Thun Chung Cable Car

| | |
|--------------------------|--|
| Location: | Hong Kong |
| Route : | North coast of Lantau to central Hong Kong |
| Stretch : | 5.7 KM |
| Standard | CEN |
| Ropeway Type | Bi-Cable |
| Carrying Capacity | 3500 PPHPD |
| Ticket Cost | 68 HKD |
| Contractor | Leitner Group |

8 PROPOSED ROPEWAY SYSTEM

8.1 Monocable Detachable Gondola (MDG)

While selection of right technology, we need to keep few points at back of mind like sustainability, future maintenance support and lower operations cost etc. We recommend Monocable detachable gondola system (1S) to be considered for implementation in this project.

The Circulating **Mono-cable Detachable Gondola System (1S)** based on **CEN Standard** is recommended and it is selected for the following reasons:

- ❖ Ninety percent of all currently operating CPT (Cable Propelled Transit) systems are mono-cable gondolas, because they are least expensive to build and operate.
- ❖ The transportation industry and CPT operators have the most experience with this type of Ropeway technology
- ❖ Requiring the narrowest ROW, it is the most appropriate CPT for built environments using existing roadways



Figure 8:1 Proposed monocable Ropeway

- ❖ The mono-cable gondola is a standard product requiring the least amount of custom architecture and engineering
- ❖ Tower and other components are standard.
- ❖ MDG system is selected for this alignment due to all above reasons and as it can handle the required capacity for this alignment.



The guideway, or line, for a mono-cable gondola CPT system is an aerial rotating steel cable loop driven and tensioned at the end stations and supported and guided by sheave-train rollers mounted on cross arms supported by vertical, steel line towers along the route. The support towers can be constructed along the centerline of the alignment. The height of the towers and cables can range between 15m to 50m depending on numerous clearance factors such as pedestrians below, roadways and traffic below, other transit and stations below, buildings and structures below, obstacle clearance, crossing over waterways, highways and bridges, view corridors, privacy issues of commercial and residential buildings along the route, etc. Schematic diagram of circulating monocable detachable gondola system is shown below.

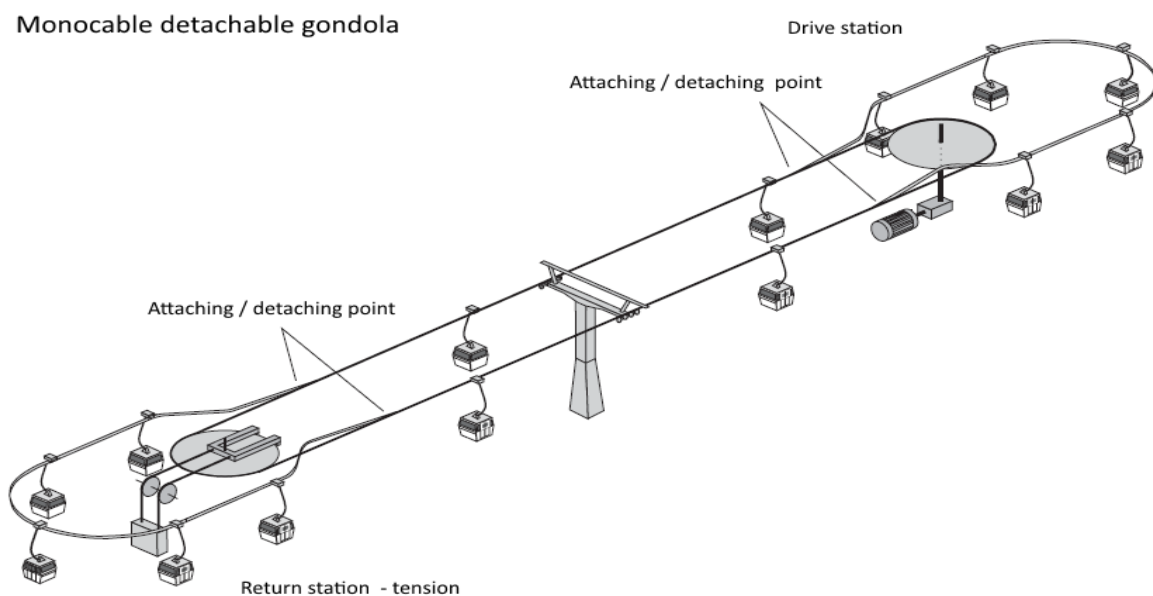


Figure 8:2 Circulating system of Monocable ropeway

In the case of this Ropeway, the spacing of the towers along the alignment depend on factors, such as desirable / undesirable tower base locations, acceptable cable sag, suitability of ground for tower foundations, crossing over river.

In this type of ropeway the vehicles are automatically coupled to the rope on leaving the station and automatically detached on arrival at the station.

8.2 Ropeway System Equipments

All the ropeway systems consist of some basic components. All the ropeway systems have these basic components irrespective of the standards and technology used. A list of basic components of the ropeway system is given below: -



- Bull Wheel
- Main Motor
- Main Gearbox
- Control panel and drive
- Power supply system
- DG set
- Drive sheave assembly with shaft
- Service brake
- Emergency Break
- Earthing system
- Telecommunication units
- Safety systems
- Cabin haulage units
- Track ropes
- Track rope brake
- Hauling rope
- Tensioning system
- Rope splicing details
- Socketing
- Cabins
- Carriage
- Grip
- Hanger
- Saddles
- Line sheaves
- Pedestals
- Mount beams
- Return sheaves assembly with shafts
- Station sheaves
- Grip locking device
- Grip unlocking device
- Security items
- Air compressor
- Auxiliary drive motors
- Lightning protection system
- Transformer
- Emergency Drive
- Wind speed indicator

8.3 System Description

The ropeway system is designed and manufactured on the basis of the latest standards and guidelines of ropeway technology. In this report we have proposed ropeway systems CEN standard based on the discussion with the client and site conditions.

For this ropeway project continuous running Monocable Detachable Gondola system is recommended for the reasons mentioned above in the report.



Monocable Detachable gondola are monocable systems in which the vehicles are detached from the haul cable in the stations. In this system the same rope performs both the functions of haulage as well as supporting the cabins. The entry and exit areas of the gondola platform are traversed at lower speeds, enabling passengers to easily enter and leave the cabins. The entire system provides a very high transport capacity.

These gondola lifts have one rope acting as carrying and hauling rope at the same time. The cabins are available in different designs, e.g., rectangular or round, and always have an aluminum frame. The large windows offer passengers a panoramic view. The seats can also be provided with heating. The cabins of this type of installation transport up to 10 passengers per cabin.

8.3.1 Drive Station

The Drive Terminal Station shall be a overhead drive Structure. Ropeway drive shall be provided at this terminal. Speed of an incoming cabin group on approaching the station shall be automatically retarded and the cabins shall come to a dead halt at a pre-determined area. After disembarking of the passengers, who will arrive after taking the ropeway ride, and after boarding of new incoming passengers waiting in the queue, the station attendant shall communicate to the Drive Operator. The drive operator shall start the drive. Cabins shall proceed towards the next station. A Drive Control Room will be constructed to house control equipment and operate the system.

For this project two overhead drives are proposed at Neelkanth Mahadev Ropeway station for ISBT- Triveni Ghat- Neelkanth Mahadev and Neelkanth Mahadev- Parvati



Mata sections. The main component of drive is drive motor, service brake, safety Brake, gear box, Drive Sheave, emergency drive system. As drive system of both the sections are housed at one station, the construction of remaining three station will be simple and less costly. Further Operating and maintenance cost of the system will be lesser. Gondola parking of 145 capacity is also proposed at this station. The space above the gondola parking can be utilized as commercial purpose.

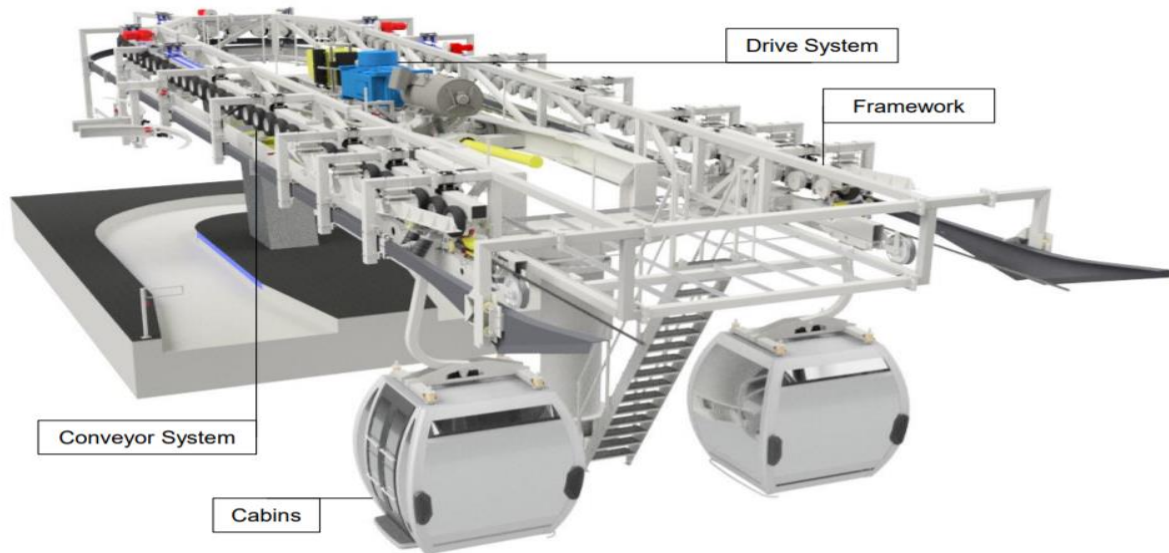


Figure 8:3 Drive Station

8.3.2 Return Station

The Return Station would be an elevated structure. The cabin on this station will negotiate the return sheave and proceed towards the Drive station. Ropeway tensioning devices shall be located at this Terminal to exert the required tension to the Rope.

The Tensioning Device for the Ropeway will be located at tension station at ISBT and Parvati Mata Station. Hydraulically operated Tension Unit with Twin Cylinders complete with acceptable capacity Power pack is proposed for this ropeway system.



Figure 8:4 Return Station

8.3.3 Station Conveyor

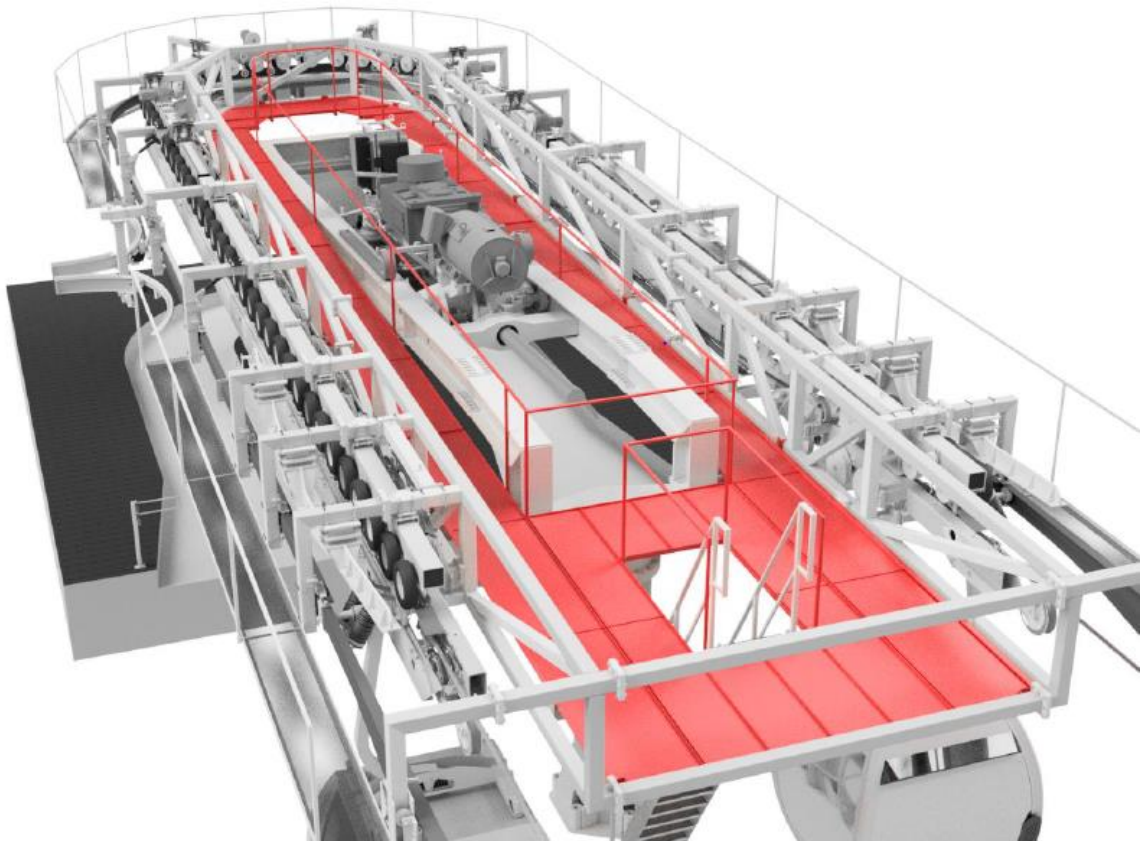


Figure 8:5 Station Conveyor

- Entrance conveyor is driven by a separate power pack and is the area where cabins enter after getting detached from the hauling rope. The cabins once detached from the rope gradually travel on the rail before entering acceleration area.



- When the cabins enter this area at hauling rope speed. Deceleration conveyor reduces the speed of the cabin to station speed which is in the range of in the range of 0.5 m/s- 1 m/s to facilitate boarding and deboarding of the passengers.
- The entry of cabins in garage area or travel further on the rail is decided by the operation of rail switch Rail switches.
- Acceleration conveyor increases speed of cabin to rope speed so that they are attached to the hauling rope without giving any jerk to the passengers.

8.3.4 Detachable / Non-Fixed Grips

Originally all systems were fixed grip systems so all cabins were permanently attached to the cable — when one vehicle had to stop, the entire system came to a halt. Then in 1872 an Austrian fellow named Orbach and he solved the matter by patenting and inventing what would be the world's first detachable grip:



A detachable grip is one that can separate itself from the cable. The detachability allows a cabin to slow or stop within a station, without disrupting the flow of the entire system.

Figure 8:6 Detachable Grip

Upon approaching a stop, a mechanism located at the station opens the grip and the vehicle is slowed by another mechanism. Passengers get on and off, the vehicle is re-accelerated to line speed, and while departing the grip is re-engaged. This process is incredibly fluid, seamless and is virtually invisible to riders.

Since the design of the grip allows it to only open under a constant, targeted, external and specially-designed force, a cabin with a detachable grip would never simply fall of the cable. This force can and is only applied within a station.

Examples of aerial trams that utilize this technology are the monocable detachable gondola (MDG), bicable detachable gondola (BDG), and the 3S, which is essentially a tricable detachable gondola. The additional cable in the second two systems are support cables, which affect speed, capacity, and stability.



8.3.5 Cabin

- Constructed with steel frame galvanized, aluminium shell.
- Cabins shall be fully covered, weather-protected, and safety-proof.
- The top portion of the cabin shall be fitted with transparent sheets for viewing.
- The bottom portion of the cabin can also be provided with transparent sheets for viewing.
- The cabins can be provided with PA system and seat bottom heating arrangement.
- Cabins are provided with hanger and grip.
- The carrying capacity will be 10 passengers.
- Imported modern cabins are proposed in this project for both the standards.



Figure 8:7 Cabin

8.3.6 Towers

The towers are built in a robust manner as they have to bear the weight of the vehicles with passengers. The cabins pass on both sides of the tower. The towers are made from tubular steel in a variety of lengths, diameters and wall thicknesses. Depending on the terrain, they can be divided into small sections, transported by helicopter and reassembled on site.

Special towers are towers more than 30 m in height that are constructed as lattice towers or tubular towers with two or more legs. The towers are made up of hot-dip galvanized tower tube. They are provided with access ladder with anti-fall guard and maintenance platforms. Indigenous manufacture towers are proposed in both the standards to keep the cost minimum.



Figure 8:8 Tower



8.3.7 Rope

The rope (cable) is the heart of any Aerial Ropeway Transit system. The rope is formed by inter-twining individual wires to form a strand and then the strands to form a rope (cable). There are many variations of the processes used in manufacturing ropes and in choosing the appropriate rope for any given application. One critical point is to specify whether the rope is a haulage rope or a track rope (Aerial Tramways) or if one rope supports both functions (Gondolas).

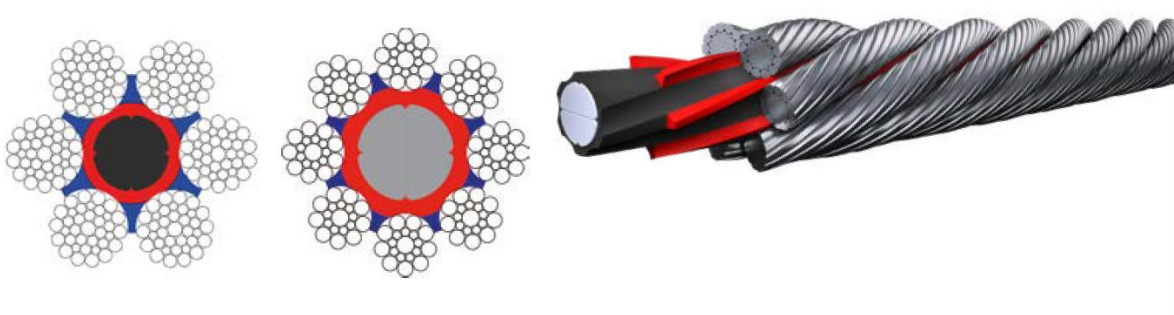


Figure 8:9 Rope

8.3.8 Sheave Assembly

- Necessary Pair, Quadruple, Hexa, or Octamounts consisting of special line sheave/ wheels with Synthetic rubber liners of suitable diameter fitted with grease-packed ball bearings. The wheels shall be supported on built-up steel beams which, in turn, shall be pivotally mounted on a special pedestal.
- The rope catchers are located on the outside of each sheave assembly. The purpose of the rope catcher is to catch a rope that has left the sheave to prevent the rope from falling.

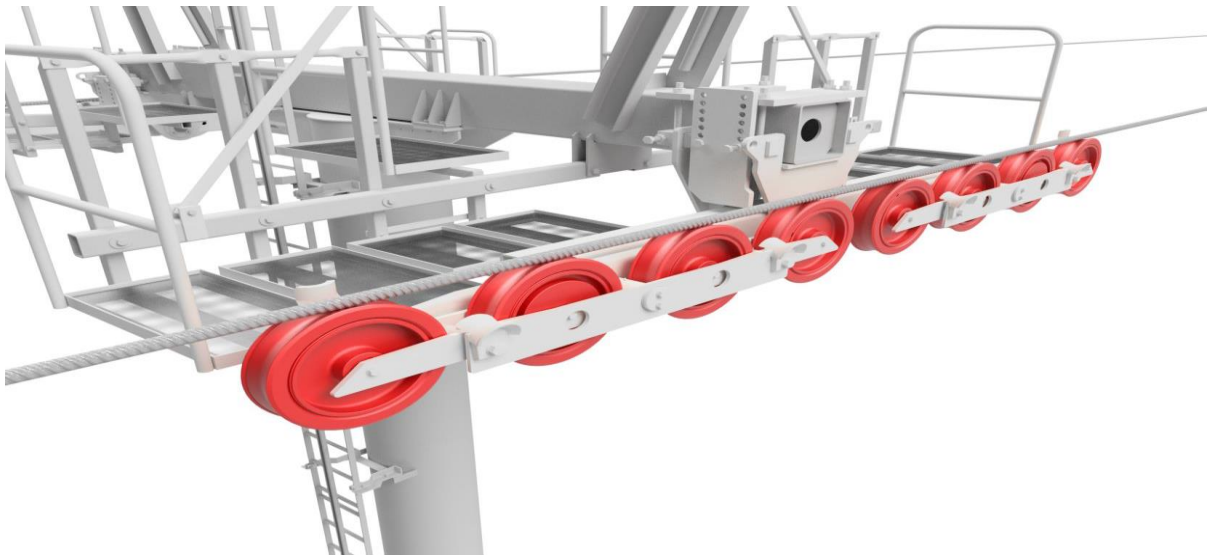


Figure 8:10 Sheave Assembly

- Each sheave assembly is equipped with break fork switches that report the derailment of a hauling rope. If a hauling rope derails, the sheave rocker is unbalanced and a mechanical bracket breaks a metal bar through which a test current flows in normal operating mode. If the current is interrupted, this interruption triggers an automatic shutdown of the ropeway. This shutdown mechanism does not reset itself automatically.

8.3.9 Gondola Parking

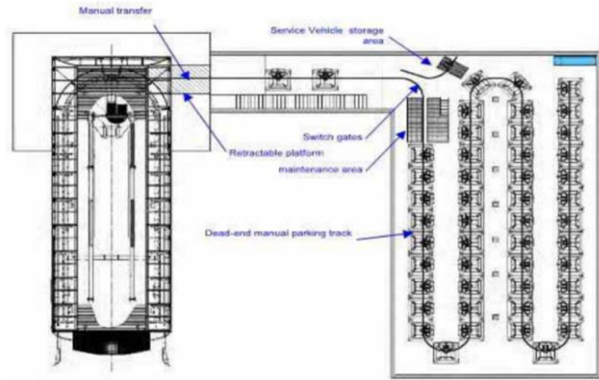
The parking of vehicles of detachable mono-cable ropeways requires a high level of variability, flexibility and adaptability. A wide range of garaging systems solutions are available for various space and financial budgets.

The automatic loop-line garaging system may be provided for maximum comfort as well as easy operation and maintenance. However, the automatic system is costly and is to be judiciously used. In combination with an inclined conveyor, this garaging system can also be used for parking vehicles on different station levels.

The manual version provides a cost-effective alternative. With the station garaging system, vehicles are parked directly in the station turnaround. This system is therefore the best solution if the space or budget required for an additional building is not available. In this project station garaging system is proposed for gondola parking at Neelkanth station which is the drive station for both the sections. Storage capacity of 145 gondolas is proposed.



Figure 8:11 Gondola Parking



8.3.10 Electric Control

The control system monitors the operation and takes care of passenger safety during operation of the system. The operator gets real-time data and information on the control panel necessary for the operation of the ropeway installation. It enables the machine operator to regulate the service as required.

The drive technology controls the travel speed and the response of the installation when it starts and stops. Motor powers are adjusted precisely as per the requirements of the mechanical system by control algorithms. The control system is located at drive station which is Neelkanth Ropeway Station in this case.

The Ropeway shall be operated through a variable voltage variable Frequency Controller. Acceleration, deceleration, and stoppage shall be controlled.





8.4 Technical Details

8.4.1 ISBT (Rishikesh) – Triveni Ghat- Neelkanth Mahadev Section

Table 8:1 Technical Details of ISBT-Triveni Ghat Section

| Sl. No. | Description | Technical Details |
|---------|-------------------|---------------------|
| 1 | Drive Station | Neelkanth Mahadev |
| 2 | Tension Station | ISBT |
| 3 | Middle Station | Triveni Ghat |
| 4 | Horizontal Length | 5175 m |
| 5 | Vertical Rise | 614 m |
| 6 | Speed | 6 m /s |
| 7 | Hourly Capacity | 2000 PPHPD |
| 8 | Cabin spacing | 108 m |
| 9 | Time spacing | 18 Sec |
| 10 | Travel Time | 16.42 min (One Way) |
| 11 | Cabin Capacity | 10 Passenger |
| 12 | No. of Cabins | 110 Nos. |
| 13 | Dia. Of Rope | 44 mm |
| 14 | Rope Length | 11.80 KM |
| 15 | Motors Power | 440 KW |
| 16 | No. of Towers | 28 Nos. |

8.4.2 Neelkanth Mahadev – Parvati Mata Temple Section

Table 8:2 Technical Details of Neelkanth Mahadev- Parvati Mata Temple

| Sl. No. | Description | Technical Details |
|---------|-------------------|---------------------|
| 1 | Drive Station | Neelkanth Mahadev |
| 2 | Tension Station | Parvati Mata mandir |
| 3 | Horizontal Length | 1310 m |
| 4 | Vertical Rise | 141 m |
| 5 | Speed | 6 m/s |
| 6 | Hourly Capacity | 2000 |
| 7 | Cabin spacing | 108 m |
| 8 | Time spacing | 18 Sec |
| 9 | Travel Time | 4.44 mint (one way) |
| 10 | Cabin Capacity | 10 Passenger |
| 11 | No. of Cabins | 33 Nos. |
| 12 | Dia. Of Rope | 44 mm |
| 13 | Rope Length | 3.0 KM |
| 14 | Motors Power | 175 KW |
| 15 | No. of Towers | 8 nos |



8.4.3 Technical Details of Complete Alignment

Table 8:3 Technical Details of Ropeway Alignment

| Sl. No. | Description | Technical Details |
|---------|-------------------|----------------------|
| 1 | Horizontal Length | 6485 m |
| 2 | Vertical Rise | 755 |
| 3 | Speed | 6 m /s |
| 4 | Hourly Capacity | 2000 PPH |
| 5 | Cabin spacing | 108 m |
| 6 | Time spacing | 18 Sec |
| 7 | Travel Time | 23.57 Mint (one way) |
| 8 | Cabin Capacity | 10 pax |
| 9 | No. of Cabins | 143 Nos. |
| 10 | Dia. Of Rope | 44 mm |
| 11 | Rope Length | 14.80 KM |
| 12 | Motors Power | 440 KW and 175 KW |
| 13 | No. of Towers | 36 |

8.5 Land Ownership Details

The Details of Land ownership at station and tower location is as given under: -

| Chainage | Area Used | Ownership | Remark, If any |
|----------------|------------------------------|--------------------------|--|
| -50 to 210 m | For Lower Terminal Station | ISBT and Irrigation Dept | 4194 Sqm land in ISBT 7611 Sqm land to be reclaimed in Chnadrabhaga River. Tree Details are given in Annexure G |
| 5 m – 13 m | Tower-1 at 9 | ISBT Station Area | In ISBT Ropeway Station |
| 13 m -166 | Corridor | | |
| 166 m-174 m | Tower-2 at 170 m | Irrigation Dept | In Chandrabhaga River In ISBT Ropeway Station |
| 174 m – 366 m | Corridor | | |
| 366 m- 374 m | Tower-3 at 370 m | Irrigation Dept | In Chandrabhaga River |
| 374 m – 556 m | Corridor | | |
| 556 m- 564 m | Tower-4 at 560 m | Irrigation Dept | In Chandrabhaga River |
| 564 m- 756 m | Corridor | | |
| 756 m – 764 m | Tower-5 at 760 m | Irrigation Dept | In Chandrabhaga River |
| 764 m- 906 m | Corridor | | |
| 906 m – 914 m | Tower-6 at 910 m | Irrigation Dept | In Chandrabhaga River |
| 914 m – 1115 m | Corridor | | |
| 1115 m- 1123 m | Tower-7 at 1119 m | Irrigation Dept | In Chandrabhaga River |
| 1123 m- 1173 m | Triveni Ghat Ropeway Station | Irrigation Dept | 4992 Sqm in Chandrabhaga River. Tree Details are given in Annexure G |
| 1173 m-1181 m | Tower- 8 at | Irrigation Dept | In Chandrabhaga River |



| | | | | |
|------------------------|----------|----|--|--|
| | 1175 m | | | |
| 1181 m – 1576 m | Corridor | | | |
| 1576 m – 1584 m | Tower- 9 | at | Rajaji National Park | Total 3 trees (other) Girth= 30 cm, 40 cm, 35 cm |
| 1181 m- 1654 m | Corridor | | | |
| 1654 m – 1662 m | Tower-10 | at | Rajaji National Park | - |
| 1662 m- 1796 m | Corridor | | | |
| 1796 m – 1804 m | Tower-11 | at | Rajaji National Park | Total 1 tree (Dhodi) Girth= 100 cm |
| 1804 m- 2182 m | Corridor | | | |
| 2182 m- 2190m | Tower-12 | at | Rajaji National Park | Total 1 tree (Rutma) Girth= 50 cm |
| 2190 m- 2466 m | Corridor | | | |
| 2466 m – 2474 m | Tower-13 | at | Rajaji National Park | Total 2 trees (other) Girth= 65 cm, 100 cm |
| 2474 m- 2716 m | Corridor | | | |
| 2716 m – 2724 m | Tower-14 | at | Rajaji National Park | - |
| 2724 m- 3036 m | Corridor | | | |
| 3036 m – 3044 m | Tower-15 | at | Rajaji National Park | - |
| 3044 m- 3176 m | Corridor | | | |
| 3176 m – 3184 m | Tower-16 | at | Rajaji National Park | Total 1 tree (Rutma) Girth= 45 cm |
| 3184 m- 3266 m | Corridor | | | |
| 3266 m – 3274 m | Tower-17 | at | Rajaji National Park | Total 1 tree (other) Girth= 100 cm |
| 3274 m – 3516 m | Corridor | | | |
| 3516 m – 3524 m | Tower-18 | at | Rajaji National Park | Total 2 trees (Belpattar and other) Total Girth= 50 cm & 180 cm |
| 3524 m- 3751 m | Corridor | | | |
| 3751 m – 3759 m | Tower-19 | at | Rajaji National Park | - |
| 3759 m- 3961 m | Corridor | | | |
| 3961 m – 3969 m | Tower-20 | at | Rajaji National Park | - |
| 3969 m- 4146 m | Corridor | | | |
| 4146 m – 4154 m | Tower-21 | at | Rajaji National Park | - |
| 4154 m- 5341 m | Corridor | | | |
| 4341 m – 4349 m | Tower-22 | at | Private Property | - |
| 4349 m- 4576 m | Corridor | | | |
| 4576 m – 4584 m | Tower-23 | at | Shri Chandra Singh Bisth and Shri Rakesh Singh Rawat | Total 1 tree (Bimal) Girth= 80 cm |
| 4584 m- 4706 m | Corridor | | | |
| 4706 m – 4714 m | Tower-24 | at | Private Property | - |
| 4714 m- 4916 m | Corridor | | | |



| | | | | |
|-----------------|-----------------------------|----|---|---|
| 4916 m – 4924 m | Tower-25 4920 m | at | Private Property | Total 2 trees (Haldu & Dhad) Girth= 83 cm & 75 cm |
| 4924 m- 5011 m | Corridor | | | |
| 5011 m- 5019 m | Tower-26 5015 m | at | Shri Suresh Singh Chauhan S/O Chatar Singh | Total 2 trees (Kukat) Girth= 50 cm & 18 cm |
| 5019 m- 5061 m | Corridor | | | |
| 5061 m – 5069 m | Tower-27 5065 m | at | Shri Rajesh Chauhan | - |
| 5069 m- 5081 m | Corridor | | | |
| 5079 m – 5087 m | Tower-28 5085 m | at | Shri Rajesh Chauhan | - |
| 5058 m- 5200 m | Neelkanth Ropeway Station | | Shri Rajesh Chauhan and others (Private Property) | 17465 Sqm Tree Details are given in Annexure G |
| 5161m -5169 m | Tower-29 5165 m | at | School Property | - |
| 5169 m- 5341 m | Corridor | | | |
| 5341 m – 5349 m | Tower-30 5345 m | at | Ved Prakesh | Total 1 tree (Pulay) Girth= 87 cm |
| 5349 m- 5591 m | Corridor | | | |
| 5591 m – 5599 m | Tower-31 5595 m | at | Government Land | Total 3 trees (2 Other &, Kukat) Girth= 90 cm, 120 cm, 75 cm) |
| 5599 m- 5831 m | Corridor | | | |
| 5831 m – 5839 m | Tower-32 5835 m | at | Government Land | Total 2 trees (Beru & Other) Girth= 45 cm & 92 cm) |
| 5839 m- 5981 m | Corridor | | | |
| 5981 m – 5989 m | Tower-33 5985 m | at | Government Land | Total 2 trees (Beru & Other) Girth= 62 cm & 80 cm) |
| 5989 m- 6101 m | Corridor | | | |
| 6101 m – 6109 m | Tower-34 6105 m | at | Government Land | - |
| 6109 m- 6371 m | Corridor | | | |
| 6371 m – 6379 m | Tower-35 6375 m | at | Prem Singh, Rajendra Singh & Ravindra Singh | Total 1 tree (Pipal) Girth= 180 cm |
| 6379 m- 6388 m | Corridor | | | |
| 6388 m – 6396 m | Tower- 36 6392 m | at | Shri. Bishan Singh | Total 1 tree (Bimal) Girth= 135 cm |
| 6414 m- 6415 m | Corridor | | | |
| 6402-6462 | Parvati Mata Temple Station | | Private Property | 2850 Sqm |



9 Safety and Security Measures

9.1 Introduction

Safety and security may be general terms in our daily life, but the study of these in the transportation sector has been very limited, especially in developing countries. Worldwide, there are estimated to be approximately one million road accident fatalities and ten million people injured annually, many with long-term disabilities. Almost 70% of these occur in the developing or emerging world. Many people agree that the safety and security aspect in public transportation operation is very important, as public transportation closely relates with human lives on a larger scale or in greater numbers as many passengers happen to be riding in one car.

Public transportation provides a mobility service to the user, as well as producing a wide impact on the system. Consequently, it should be operated in such a way as to achieve an efficient and effective transportation system. To achieve this, there is a need to measure the quality of service as a way to evaluate its performance. In that hierarchy of quality determinants, security is defined as the actual degree of safety from crime or accidents and the feeling of security resulting from that and other psychological factors. The security class consists of three aspects, namely

- I. Safety from crime: Staff/police presence; lighting; visible monitoring; layout; identified help points;
- II. Safety from accidents: Presence/visibility of supports; avoidance/visibility of hazards; active safeguarding by staff;
- III. Perceptions of security

9.2 Safety Measures for Ropeways

An adequate number of safety devices are provided in ropeway to monitor all critical assemblies for their normal functioning. In case of any technical abnormality, the safety devices will stop the ropeway.

Service Brake: The disc brake is mounted on the coupling and is located between the gearbox and the electromotor.



It acts when:

- ❖ electric motor stops
- ❖ electric motor over speeds by 10%
- ❖ a safety function is applied
- ❖ a service stop button is pushed

Emergency Brake

A spring-applied calliper – brake acts directly to the drive wheel. The emergency brake is lifted hydraulically and stays open. The braking torque and the lifting gap is variable and can be adjusted separately. The brake shoe is controlled with a safety switch.

The E-brake operates automatically when:

- ❖ One of the emergency stop buttons is (activated)
- ❖ If the pressure is lost in the hydraulic brake-cylinder
- ❖ If speed has surpassed 15% max. design speed

Rope Derailment Detection:

Two break fork switches are installed on each sheave assembly, one on the in- and one on the outgoing side. The switch will be activated through the dropping of the heavy sheave and will break the fork. This will stop the ropeway if the rope should derail. This function will also assure the breaking of the fork should the rope not land in the rope catcher.

Door Closing Control Device:

Prior the cabin is leaving the station; the closing of the door will be checked by two independent checking procedures. In case the system detects on the open door, the ropeway stops immediately.

The doors position is checked:

- ❖ By a limit switch at the door mechanism.
- ❖ By a sensor, if the closing force to door mechanism is too high.



Emergency button:

In case a dangerous situation is observed, an emergency button can be pressed and brings the ropeway immediately to a stop. The emergency button is conspicuously marked in red and yellow colour.

Emergency buttons are installed at following places:

- ❖ Passenger area at the drive station
- ❖ Passenger area at the return station
- ❖ Control room
- ❖ Cableway drive

Normal stoppage button:

Normal stop buttons are provided to stop ropeway normally in the control room.

Wind speed indicators:

Wind speed indicators are installed on towers and station buildings to continuously monitor the wind speed and take precautionary measures accordingly.

Lightning protection:

The advance lightning protection system is installed to avoid any damage due to lightning considering the full coverage of ropeway areas.

Guides at entry & exit of the station:

Guides are provided at entry & exit of stations to restrict cabin movement and ease of boarding & de-boarding for passengers.

Electrical protection:

Various safety features provided in the electrical system are listed below.

- ❖ Speed regulation
- ❖ Over Speed
- ❖ Under / Over Voltage protection
- ❖ Overload / Overcurrent
- ❖ Tension System interlock with system safety
- ❖ Cabin swing at the tower
- ❖ Cabin entry sensing automatically



- ❖ Hydraulic pump healthiness
- ❖ Rope earthing
- ❖ Lightning Protection
- ❖ Over Wind Speed
- ❖ Regenerative power control
- ❖ Phase sequence monitoring
- ❖ Transformer temperature monitoring
- ❖ Motor temperature monitoring

Fault logging is carried out in the drive.

RESCUE AND EMERGENCY

Diesel Generator

In case of power failure, standby Diesel Generator of adequate capacity to handle the load of ropeway system and ropeway station lighting should be available for smooth running of complete ropeway system.

Auxiliary Drive

In case the main motor or its controls are not functioning, a standby electric motor with drive should be provided to run the ropeway at slow speed to move passengers to a terminal for safe evacuation.

Diesel Rescue Engine

In the event of an electric power failure including Diesel Generator or any defect in the drive motor or in auxiliary drive, a Diesel Engine Drive Unit should be provided to run the ropeway at slow speed to move passengers to a terminal for safe evacuation. The engine shall be of reputed make and shall be fitted with independent gearbox, clutch, accelerator, brake mechanism, fuel tank etc. as required.

Vertical Rescue System

In the unlikely event of being unable to move the rope, a manual rescue system is also provided to bring the stranded passengers down to ground.

In this system, Rescuer reaches the stranded cabin with the help of Rescue Carriage and lowers the passengers on the ground with the help of Rescue Chair. Rescue Chair is handled by ground team to lower passengers. The entire operation to evacuate all passengers takes approximately 1-2 hours



9.3 General Safety measures

- ❖ Suitable signboards and information should be displayed at prominent places to instruct and guide public
- ❖ Operating procedures should include safety of staff involved in operation, inspection, examination, testing, maintenance and in emergency procedures.
- ❖ Proper operation manuals, safety certificates, design verification documents shall be obtained from manufacturers
- ❖ Every specified activity of operation of ropeway should be supervised by competent person
- ❖ Safety related to components should be regularly examined.
- ❖ Maintenance records should be maintained and kept available for all the time for any review and troubleshooting.
- ❖ Periodic system safety audits from competent agency should be carried out on yearly basis to continue safe operation of ropeway.

9.4 Security Measures for Ropeways

Off late Ropeway is being considered as a solution for transportation in congested cities, as it has lowest footprint on the ground. The inherent characteristics of Ropeway system make it prone to terrorists and miscreants activities. Ropeway systems are typically open and dynamic systems which carry thousands of passengers. It being the life line of city value, fear, panic and human casual ties poses a great threat to security of inhabitants and the city. Security is a relatively new challenge in the context of public transport. It addresses problems caused intentionally. Security differs from safety which addresses problems caused due to accidents. Security problems or threats are caused by people whose actions aim to undermine or disturb the public transport system and/or to harm passengers or staff.

9.5 Proposed Provisions for Security System

- I. CCTV coverage of all Ropeway stations. With a provision of monitoring in the Station Security Room as well as at a Centralized Security Control Room with video wall, computer with access to internet TV with data connection, printer



and telephone connection (Land Line and EPBX) for proper functioning, cluster viewing for stations.

- II. Minimum one Baggage Scanners on all entry points..
- III. Multi-zone Door Frame Metal Detector (DFMD) minimum three per entry.
- IV. Hand held Metal Detector (HHMD) as per requirement of security agency, minimum two per entry.
- V. Wireless Sets (Static and Hand Held) as per requirement of security agency.
- VI. Dragon light at least one per station and vital installation.
- VII. Mobile phones, land lines and EPBX phone connections for senior security officers and control room etc.



10 Power and Water Requirement

10.1 Power Supply

Each section will have separate power supply for the smooth operation the ropeway. The power requirement for each station is calculated.

Table 10:1 Required Power Supply

| Sr. No. | Station | Requirement of Power | Remark |
|---------|-----------------------------|----------------------|---|
| 1 | ISBT, Rishikesh | 100 -150KW | Power supply is required only for station general requirement. Power supply can be taken from nearby transformers at ISBT |
| 2 | Triveni Ghat | 50-100 KW | Power supply is required only for station general requirement. Power Supply can be taken from the transformer available in the nearby residential area |
| 3 | Neelkanth Mahadev Station | 800 KW- 1 MW | Power supply is required for station general requirement and for drive station. It can be taken from nearby (11KV/33 KV) power line. |
| 4 | Parvati Mata Temple Station | 50-100 KW | Power supply is required only for station general requirement. It can be taken from nearby 3 phase power supply line which is supplying power to village. |

Each station should have independent power supply from the state electricity board. Power availability at the drive terminals of the recommended alignment would not pose a problem because the same could be laid from nearby.

The cost of the installation of this power line is included in project cost estimate. Necessary stepdown transformer is provided to supply LT power for ropeway electrical equipment and lighting at station.

The ropeway system will work on power supply arranged by State Government. Full power backup is required to be provided to run ropeway system in case of power failure at drive station. In case regular power supply fails, the system will operate on standby Diesel Generator (DG) power supply. Therefore, it is recommended to have separate DG set at each station for General Power Supply and separate for each Drive. The DG power system shall be noise-free and air pollution free as per Code



of Practices. A Distribution transformer is also proposed at Neelkanth Mahadev Temple Station.

10.2 Water Supply

Estimation of demand for water is the key parameter in planning a water supply scheme.

10.2.1 Construction Phase: -

During construction water shall be required for curing, ropeway development, and sprinkling purposes. The water shall be taken from the river or civic water supply available.

Water management during construction Phase shall be done as under:

- The solid waste or debris generated shall be properly stored & disposed to avoid slurry discharge in water courses like River in the vicinity.
- Runoff shall be collected & shall be treated for reuse in sprinkling & curing purposes, to minimize the utilization of fresh water.
- Provision of Septic tanks followed by soak pits shall be made to ensure no discharge of wastewater in open or near watercourses..

10.2.2 Operation Phase

As per the maximum peak population load calculation total water requirement has been estimated to be 152.7 KLD for all the terminal station and will be met by bore well water or civic supply. Water shall be used mainly for flushing, drinking, hand washing and miscellaneous purposes

Sewerage Treatment Plant (STP) is mandatory for the project. Therefore, the developer shall adopt the most appropriate and techno economical feasible treatment process technology and shall design the STP ensuring a effluent quality which complies with the effluent discharge and disposal standards as prescribed by the Central Pollution Control Board / Uttarakhand State Pollution Control board as may be applicable as per the law.

The indicative cost related to water supply and STP are incorporated in the civil cost.



11 CEN Codes and Standards

Following codes and standards may be referred for construction of ropeway.

| Standard Number | Standard Description | Application |
|-----------------|---|--|
| EN 1709:2004 | Safety requirements for cableway installations designed to carry persons – Pre-commissioning inspection, maintenance, operational inspection and checks | All types of Aerial Ropeways, Cable Liners |
| EN 1907:2005 | Safety requirements for cableway installations designed to carry persons – Terminology | All types of Aerial Ropeways, Cable Liners |
| EN 1908:2015 | Safety Requirements of cableway installations designed to carry persons –Tensioning devices | All types of Aerial Ropeways, Cable Liners |
| EN 1909:2004 | Safety requirements for cableway installations designed to carry persons – Recovery and evacuation | All types of Aerial Ropeways, Cable Liners |
| EN 12385-8:2002 | Steel wire ropes – Safety – Part 8: Stranded hauling and carrying-hauling ropes for cableway installations designed to carry persons | All types of Aerial Ropeways, Cable Liners |
| EN 12385-9:2002 | Steel wire ropes – Safety – Part 9: Locked coil carrying ropes for cableway installations designed to carry persons | All types of Aerial Ropeways, Cable Liners |
| EN 12397:2004 | Safety requirements for cableway installations designed to carry persons –Operations | All types of Aerial Ropeways, Cable Liners |
| EN 12408:2004 | Safety requirements for cableway installations designed to carry persons –Quality Control | All types of Aerial Ropeways, Cable Liners |
| EN 12927-1:2004 | Safety requirements for cableway installations designed to carry persons- Ropes – Part1: Selection criteria for ropes and their end fixing | All types of Aerial Ropeways, Cable Liners |



| | | |
|-----------------|---|--|
| EN 12927-2:2004 | Safety requirements for cableway installations designed to carry persons- Ropes – Part2: Safety Factor | All types of Aerial Ropeways, Cable Liners |
| EN 12927-3:2004 | Safety requirements for cableway installations designed to carry persons – Ropes – Part 3: Long splicing of 6 strand hauling, carrying hauling and towing ropes | All types of Aerial Ropeways, Cable Liners |
| EN 12927-4:2004 | Safety requirements for cableway installations designed to carry persons – Ropes – Part 4: End fixings | All types of Aerial Ropeways, Cable Liners |
| EN 12927-5:2004 | Safety requirements for cableway installations designed to carry persons – Ropes - Part 5: Storage, transportation, installation and tensioning | All types of Aerial Ropeways, Cable Liners |
| EN 12927-6:2004 | Safety requirements for cableway installations designed to carry persons – Ropes – Part 6: Discard criteria | All types of Aerial Ropeways, Cable Liners |
| EN 12927-7:2004 | Safety requirements for cableway installations designed to carry persons- Ropes – Part 7. Inspection, repair and maintenance | All types of Aerial Ropeways, Cable Liners |
| EN 12927-8:2004 | Safety requirements for cableway installations designed to carry persons-Ropes – Part 8. Magnetic rope testing (MRT) | All types of Aerial Ropeways, Cable Liners |
| EN 12929-1:2015 | Safety requirements for cableway installations designed to carry persons –General Requirements Part1: Requirements for all installations | All types of Aerial Ropeways, Cable Liners |
| EN 12929-2:2015 | Safety requirements for cableway Installations designed to carry persons -General requirements Part 2: Additional requirements for reversible bi-cable aerial ropeways without carrier truck brakes | All types of Aerial Ropeways |



| | | |
|--|--|--|
| EN 12930:2015 | Safety requirements for cableway installations designed to carry persons–Calculations | All types of Aerial Ropeways, Cable Liners |
| EN 13107:2015 | Safety requirements for cableway installations designed to carry persons– Civil engineering works | All types of Aerial Ropeways, Cable Liners |
| EN 13223:2015 | Safety requirements for cableway installations designed to carry persons– Drive systems and other mechanical equipment | All types of Aerial Ropeways, Cable Liners |
| EN 13243:2015 | Safety requirements for cableway installations designed to carry persons – Electrical equipment other than for drive systems | All types of Aerial Ropeways, Cable Liners |
| EN 13796-1:2005 EN 13796-1:2005/AC:2007 | Safety requirements for cableway installations designed to carry persons – Carriers – Part 1: Grips, carrier trucks, onboard brakes, cabins, chairs, carriages, Maintenance carriers, tow- hangers | All types of Aerial Ropeways, Cable Liners (as applicable for ropeway configuration) |
| EN 13796-2:2005 | Safety requirements for cableway installations designed to carry persons – Carriers – Part 2: Slipping resistance test for grips | All types of Aerial Ropeways, Cable Liners |
| EN 13796-3:2005 | Safety requirements for cableway installations designed to carry persons – Carriers – Part 3: Fatigue tests | All types of Aerial Ropeways, Cable Liners |
| EN 15700:2011 | Safety for conveyor belts for winter sport or leisure use | |
| CEN/TR 14819-1 | Safety recommendations for cableway installations designed to carry persons- Prevention and fight against fire – Part 1 Funicular railways in tunnels | All types of Aerial Ropeways, Cable Liners |
| CEN/TR 14819-2 | Safety recommendations for cableway installations designed to carry persons- Prevention and fight against fire Part 2: Other funicular railways and other installations | All types of Cable Liners |



| | | | |
|-------------------------|----|---|--|
| CEN 1709:2004 | EN | Safety requirements for cableway installations designed to carry persons – Recommissioning inspection, maintenance, operational inspection and checks | All types of Aerial Ropeways, Cable Liners |
| CEN 1908:2015 | EN | Safety requirements for cableway installations designed to carry persons – Tensioning Devices | All types of Aerial Ropeways, Cable Liners |
| CEN EN 1909:2004 | | Safety requirements for cableway installations designed to carry persons – Recovery and evacuation | All types of Aerial Ropeways, Cable Liners |
| CEN EN 12385- 8:2002 | | Steel wire ropes – Safety – Part 8: Stranded hauling and carrying – hauling ropes for cableway installations designed to carry persons | All types of Aerial Ropeways, Cable Liners |
| CEN EN 12385- 9:2002 | | Steel wire ropes – Safety – Part 9: Locked coil carrying ropes for cableway installations designed To carry persons | All types of Aerial Ropeways, Cable Liners |
| CEN 12397:2004 | EN | Safety requirements for cableway installations designed to carry persons – Operation | All types of Aerial Ropeways, Cable Liners |
| CEN EN 12927- 1:2004 | | Safety requirements for cableway installations designed to carry persons – Ropes - Part 1: Selection criteria for ropes and their end fixings | All types of Aerial Ropeways, Cable Liners |
| CEN EN 12927-2:2004 | | Safety requirements for cableway installations designed to carry persons – Ropes – Part 2: Safety factors | All types of Aerial Ropeways, Cable Liners |



12 Project Cost Breakup

12.1 Cost to Authority

12.1.1 Land Acquisition Cost

Space requirement for each station and towers is given in the Annexure D. The authority will have to transfer the land at free of cost to the concessionaire for the concession period. The cost of the private land as per circle rate is calculated as under:-

Table 12:1 Land Acquisition Cost

| Sl. No. | Item Description | Area | Land Cost in Rs (in Cr) |
|---------|------------------------|------------|-------------------------|
| 1 | Private Land | 19,595 Sqm | 5.67 |
| 2 | Reclaimed Land | 7,611 Sqm | NIL |
| 3 | Government Land | 15,162 Sqm | NIL |
| | Total Land Requirement | 42,368 Sqm | |

Note: Area under private land includes land required for provision of connecting pathways between Neelkanth Temple and Neelkanth Ropeway Station.

12.1.2 Land (Reclamation) & Pathway Development, Utility Shifting, Rehabilitation and Resettlement, Environment Cost

Table 12:2 Land (Reclamation) & Pathway Development, Utility Shifting, Rehabilitation and Resettlement, Environment Cost

| Sl. No. | Item Description | Cost in Rs (in Cr) |
|---------|---|--------------------|
| 1 | Reclamation of 7,611sqm land at ISBT (Land Development) | 1.34 |
| 2 | Pathway Development at Neelkanth | 0.42 |
| 3 | Shifting of 3 Nos. of 11 KV transformer near ISBT including underground cable near ISBT | 0.30 |
| 4 | Shifting of 2 Nos. of 440 V transformer near ISBT | 0.10 |
| 5 | Cost of underground cable of 11 KV between 4700 m – 4750 m at 4720 m | 0.14 |
| 6 | Cost of undergrounding of 440 V cable at Parvati Mata Temple | 0.10 |
| 7 | Shifting of existing 27 Nos. Shops at ISBT Rishikesh as shown in para 4.6 | 0.20 |



| | | |
|---|--------------------------------|----------------|
| 8 | R&R Work at Neelkanth | 1.51 |
| 9 | Environment Clearance (MOEFCC) | 0.61 |
| | Total Cost | 4.72 Cr |

12.1.3 Pre- construction cost

This cost includes the expenses done by the authority till the finalization of the concessionaire. It includes Detailed Project report charges, tender process fee, consultant fees required for this project etc. The authority can calculate the total cost and the same can be charged from the concessionaire in one or two deposit. This cost can be recovered from the prospective developer in the form of project development cost by making suitable provision in the Bid Documents.

12.2 Project Cost

12.2.1 Civil cost

Civil cost comprises of construction of foundations for ropeway towers, four station buildings, plumbing works, firefighting, security system, landscaping work, STP, etc. Unlike regular commercial projects, the foundation for ropeway terminal building has to be strong to absorb the forces due to ropeway operations. Hence, foundation costs are crucial among the civil construction costs.

The cost of construction of Terminal Building stated above includes Excavation of earth, concreting & steel work (Raft, Foundation of station buildings and tower, column, beam floor slabs, Lift shaft staircases and ramp), Internal masonry/Partitions, W.C. Cubicles, painting, false ceiling, flooring, UPVC window etc.

12.2.2 Electromechanical Cost: -

The cost includes design, drawing, importing of electromechanical equipment for ropeway operations, transportation, erection, commissioning & testing charges.

The ropeway material suppliers will provide complete supply, Installation and commissioning of ropeway equipment and systems, adhering to CEN standards. The concessionaire should endeavor to procure the material from indigenous sources to the maximum extend possible.



12.2.3 Contingencies Charges

Contingency cost has been considered to provide buffer for increase in any planned expenses, covering on unplanned expenses and covering loss due to unforeseen events. The contingency cost is assumed as 3% of gross project cost.

12.3 Project Cost- Capital Expenditure

Table 12:3 Project Cost Breakup

| Sl. No. | Item Description | CEN Standard Amount in INR Cr |
|---------|---|-------------------------------|
| 1 | Design and Engineering | 15.74 |
| 2 | Civil Cost (Station Building including general electrification, interior, furniture, ticketing system, tower foundation etc.) | 105.22 |
| 3 | Ropeway system Cost | |
| 3A | Mechanical Cost (Main and Auxiliary Motor, Gear Unit, Station Conveyor, Rope, Gondola with grip and suspension, rescue system, Bull Wheel, Service Brake, Locking/ unlocking module, hydraulic tension etc. including transportation and other charges) | 133.69 |
| 3B | Electrical and control system Cost (Generator, Transformer for drive, control unit, safety switches, P A System, etc.) | 22.95 |
| 4 | Structural Items (Station frames, towers and other supporting structures, tower mounts etc. including transportation and other charges) (Indigenous) | 37.37 |
| 5 | General Electrical Work (Power Supply Connection, generator for General Electrical Purpose at each station, Solar Rooftop at ISBT station, etc) | 2.70 |
| 6 | Erection and Commissioning cost | 10.83 |
| 7 | Security Equipment (Baggage Scanner, Multi Zone Door Frame Metal Detector, wireless se, Dragon light, Mobile Phone, CCTV Installation etc) | 3.23 |
| | Inland Transportation cost | 2.12 |
| 8 | Total Cost | 333.68 Cr |
| 9 | Consultancy Charges @ 0.5% | 1.67 |
| 10 | Clearance Charges @ 1% | 3.34 |
| 11 | Independent Engineer Charges @ 1.5% | 5.01 |
| | Contingency @ 3% | 10.01 |
| 12 | Additional Civil Work Cost at Neelkanth Station | 10.07 |
| | Project Hard Cost | 363.77 Cr |



13 Selection of Financial Model:

13.1 Introduction

PPPs are used to deliver public services in many countries including India. India's economy is steadily growing following steps toward economic liberalization made in 1991. This level of growth requires rapid improvements and additions to the capacity of economic infrastructure. However, the ability of infrastructure to keep up with the economy's fast expansion has been constrained by the availability of investment. As a means to overcome this challenge, the Government of India initiated a strategy for encouraging private investment in the development of public services, especially in the infrastructure sector, through Public Private Partnerships (PPP).

PPP is a contractual arrangement between a Government or statutory entity on the one side and a private sector company on the other side, for delivering an infrastructure service.

13.2 PPP Models

PPP arrangements are characterized by the identification of risks and their allocation among the parties to the arrangement. On the basis of the risk allocation, the various PPP models are designed. Many variants of PPP models are implemented across different projects essentially differentiated on the basis of the risk allocation framework employed within these projects.

Given below are the basic PPP models that are prevalent in project development.

1. Management Contract
2. Lease Contract
3. Build-Operate-Transfer

13.2.1 Management Contracts

The key feature of management contracts is that the public entity engages a private partner to manage a range of activities for a relatively short duration (3 – 5 years). Management contracts are task specific and tend to focus on inputs rather than outputs. In such contracts, the ownership of assets and investment typically remain with the public entity, although some rehabilitation responsibilities can be transferred to the private partner.



13.2.2 Lease Contracts

In a lease contract, the asset is leased, by the public entity to the private partner. Lease contracts are usually of medium-term length and may involve capital investment by the private partner. In such contracts the collection risk is transferred to the private partner. Usually, the private partner in such cases would require an assurance in terms of tariff levels, increases over term of lease and compensation and review mechanism in case the tariff levels do not meet the estimates. Variants include BLT, BOLT, and BTL. Lease and affermage arrangements have a subtle difference. In both lease and affermage arrangements, the private partner do not receive a fixed fee for his services from the public entity but charges a user fee to consumers. In case of a lease, a portion of the receipts goes to the public entity as the owner of the assets as a lease fee and the remainder is retained by the private partner. In the case of an affermage, the private partner retains the user fee out of the receipts and pays an additional surcharge (also referred to as the affermage fee) that is charged to customers to the public entity to go towards capital investments that the public entity makes/ has made in the infrastructure.

13.2.3 Build-Operate-Transfer (BOT)

BOT typically relates to greenfield asset developments where the risk allocation to the private sector may be significant, including volume risk, finance risk, and potentially price risk. A number of BOT variants are possible depending on the allocation of roles and risk. These include DBO, DBFOT, BOOT, DBOOT, BOO, etc. BOT is one of the most common privatization agreements. In this agreement, the government will hand over the constructing and operating rights to a private sector. This will be given for a pre – determined period of time. Once the period is completed, this will be taken back by the government. One of the flexibility available in BOT is that the private sector can implement the planning and design as per the agreement. Some of the other types of BOT explained below like BOOT, BOO, DBOM, DBOT etc.

The different types of BOT variants:

1. Build Own Operate (BOO)



2. The government grants the right to finance, design, build, operate and maintain a project to a private entity, which retains ownership of the project. The private entity is not required to transfer the facility back to the government.

3. **Build Own Operate Transfer (BOOT)**

As the name tells, the government will hand over the project to the private sector entity to perform:

- To design and build the Project
- To owns and operate the Project
- Transfer to the government or partner

The operation of the project completed must be performed for the specific period of time as stated in the agreement and must be finally transferred to the government. The transferring to the government or the partner is based on the previously agreed price or market price.

4. **Design-Build (DB)**

In this project agreement, a private partner is contracted by the government to design and build the facility based on the requirements performed by the government. Along with the agreement, the government will state the responsibilities in order to perform the operation and the maintenance of the facility. DB is also called as Build – Transfer (BT).

5. **Design-Build-Maintain (DBM)**

This model is similar to Design-Build except that the private sector also maintains the facility. The public sector retains responsibility for operations.

6. **Build-Develop-Operate (BDO)**

The private business buys the public facility, refurbishes it with its own resources, and then operates it through a government contract.

7. **Develop Operate and Transfer (DOT)**

As per the contractual agreement for DOT, the private developer will be given favourable conditions to build the infrastructure project along with the right to develop the property adjoining the same. Hence, the private developer is allowed to enjoy the benefits that is created by the investment. The investment includes rents, property values.



8. Rehabilitate Operate and Transfer (ROT)

In the case of ROT, the private sector is permitted to undergo the following activities on an existing facility,

- Refurbish
- Operate
- Maintain

These activities will be performed for a specific period of time after which the title will be transferred back to the government. ROT can be used to purchase the facility present abroad to undergo its refurbishment, erection etc. The consuming operation is done from the host country.

9. Rehabilitate Own and Operate (ROO)

This type will turn over the existing facility to the private sector to perform the refurbishment. Once the work is complete, the operations can be performed by the private entity without any time limit or ownership. Till the time the franchise is not violated, the facility must be operated permanently.

10. Design-Build-Operate (DBO)

In the case of DBO, the designing and building of the facility is done based on a turn-key basis. After the completion of the facility, it is transferred to the public sector but the private sector will operate the facility for a specific period of time. The DBO can be also referred to as Build Transfer Operate (BTO).

11. Design-Build-Finance-Operate/Maintain – Transfer (DBFOT)

The contractual agreement under this criterion will enable the private sector to perform the following for a new facility

- Design
- Build
- Finance
- Operate
- Maintain
- Transfer

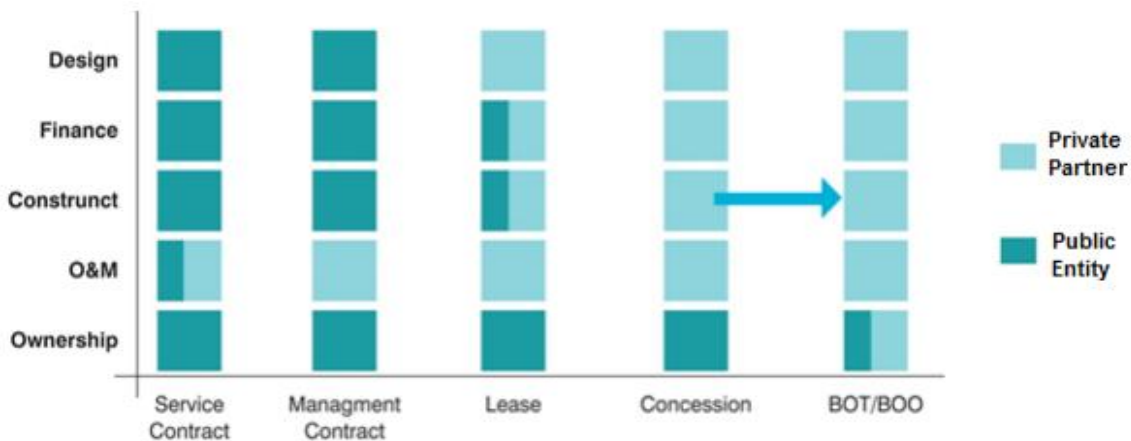
These activities are performed for a particular period of time or a long – term lease. Once the lease time is over, the property is given back to the public sector.



13.3 Transfer of Project Related Risk

It is to be noted that the level of project related risk which is transferred from the public entity to the private partner increases from a service contract to a BOT contract. For instance, in the service contract which is more akin to outsourcing, only a portion of the O&M risk is transferred to the private partner whereas in a management contract, the entire O&M risk including revenue risk is transferred to the private partner. In both cases, the design, finance and construction risk along with the ownership of assets remains with the public entity. In a lease, the public entity transfers the design and O&M risk along with a portion of the financing and construction risk to the private partner. In such an arrangement, the private partner is expected to share a portion of the user fee collected from the consumers/ users as lease fee to the public entity. In both area concessions and BOT, almost every project related risk is transferred to the private partner; the ownership of assets at all times lies with the public entity. It is only in a BOO framework that the ownership of assets gets transferred to the private partner and in a BOOT framework the ownership of assets gets transferred to the private partner for a certain time period.

The transfer of risk from the public entity to the private partner in various PPP models is set out in the diagram below:



13.4 Recommendation

In DBFOT model which is a variant of BOT, the private sector has to perform Design, Build, Finance, Operate, Maintain the newly built asset for a particular period of time and Transfer the asset back to the public sector after lease time is over.



14 FINANCIAL ANALYSIS

The cost estimates of the project have been taken for the purpose of financial analysis. The Interest During Construction component (IDC), SPV charges, Insurance Charges have been added to the estimated project cost, which has been computed on the basis of debt schedule. The revenue calculations have been done based on the ticket fare, willingness to pay for using ropeway and projected traffic estimates. The following key activities were performed by the team for the purpose of performing the financial Analysis:

Cost side analysis

- Project cost estimates.
- The debt-equity schedule was created based on the investment and construction schedule for the 70: 30 and 80:20 ratio.
- Interest during construction is considered on the basis of construction schedule.
- Calculation of the O&M expenses.

Revenue Side

- Forecasting the project revenue based on the ticket fare, willingness to pay for using ropeway and projected traffic estimates.
- Considering the NonFare revenue from Retails Spaces and Advertisement.

Output

- Calculating the financial indicators like IRR (project and equity IRRs) and the projected financial statements (balance sheet, P&L statement and cash flows) based on the above.

14.1 Financial Assumption

Various assumptions used for the financial analysis were taken as per the primary sources, benchmark projects, market rates etc. Details of various financial assumptions are given below:

- The total tenor of the loan has been considered as fifteen years which includes five years of moratorium (three years during construction and 2 year during operation) and ten years of repayment. Further, a sensitivity based on



the reduction in the number of years for moratorium during operations has also been conducted.

- Interest rate = 10.0% p.a. (based on current infrastructure lending norms)
- Condition Precedent Period= 1 year
- Construction Period = three years (three years during construction) Start of Construction = FY22-23
- Total Concession Period = 1 + 3+ 26 = 30 Years
- Y-o-y escalations
 - Capex = 5% p.a.
 - O & M Cost= 5% p.a.
 - Fare = 5% p.a.

14.1.1 Depreciation Assumption

Table 14:1 Depreciation Assumption

| Particulars | Value | Source |
|--|--------------------|---------------------|
| Method of depreciation for calculation of book value of the net fixed Assets | Straight line | Companies Act, 1956 |
| Rates of depreciation for straight line method | | |
| Civil | 1.63% | Companies Act 1956 |
| Electrical | 7.07% | |
| Mechanical | 11.31% | |
| Method of depreciation for tax computations | Written down value | Income Tax India |
| Rates of depreciation for tax computations | | |
| Civil | 5.00% | Income Tax India |
| Electrical | 20.0% | |
| Mechanical | 30.00% | |

14.1.2 Tax Assumption:

Table 14:2 Tax Assumption

| Particulars | Value |
|-----------------|-------|
| Income Tax Rate | 25% |



14.1.3 Construction Schedule:

It has been assumed that approval of feasibility report will get done in this months (March 2022). It will take another 6 months (till September 2022) to finalize the tender process and award of LOA to the concessionaire. After that 1 year will be given to the concessionaire as a condition precedent for financial closure and NOCs required for this project. After financial closure, a project construction period of three years has been taken. The table below shows tentative timelines assumed for financial analysis of this project.

Table 14:3 Construction Schedule

| Phase | Timeline | Time Duration |
|---|--------------------|---------------|
| Finalization of the Feasibility Report and submission of applications for approval, if required | Mar 2022 | 3 Months |
| Tender process, award of LOA & necessary approvals | Apr 2022- Sep 2022 | 6 months |
| Condition Precedent | Oct 2022- Sep 2023 | 1 Year |
| Construction Period | Oct 2023- Sep 2026 | 3 Year |
| Concession Period | Oct 2022- Sep 2052 | 30 Years |

14.2 Capital Expenditure and Investment Schedule

The estimated capital investment schedule has been prepared on the basis of Civil, Electrical and Mechanical cost estimates for construction period alongwith other cost components like Contingency charges, Clearance charges, consultancy charges, Independent Engineer charges, SPV Organizational Charges, Financing charges and Insurance Charges. The IDC of each year is added to the capex requirement. The total of capex and IDC will be raised through debt and equity. The capex which has been considered for the financial analysis is shown in the table below.

Table 14:4 Capital Expenditure and Investment Schedule

| Sl. No. | Item Description | Amount in INR Cr |
|---------|---|------------------|
| 1 | Design and Engineering | 15.74 |
| 2 | Civil Cost (Station Building including general electrification, interior, furniture, ticketing system, tower foundation etc.) | 105.22 |
| 3 | Ropeway system Cost | |
| 3A | Mechanical Cost (Main and Auxiliary Motor, Gear Unit, Station Conveyor, Rope, Gondola with grip and suspension, rescue system, Bull Wheel, Service Brake, Locking/ unlocking module, hydraulic tension etc. including transportation and other charges) | 133.69 |
| 3B | Electrical and control system Cost (Generators, transformer for drive, control unit, safety switches, P A System, etc.) | 22.95 |



| | | |
|----|--|------------------|
| 4 | Structural Items (Station frames, towers and other supporting structures, tower mounts etc. including transportation and other charges) (Indigenous) | 37.37 |
| 5 | General Electrical Work (Power Supply Connection, generator for General Electrical Purpose at each station, Solar Rooftop at ISBT station, etc) | 2.70 |
| 6 | Erection and Commissioning cost | 10.83 |
| 7 | Security Equipment (Baggage Scanner, Multi Zone Door Frame Metal Detector, wireless se, Dragon light, Mobile Phone, CCTV etc) | 3.23 |
| | Inland Transportation cost | 2.12 |
| 8 | Total Cost | 333.68 Cr |
| 9 | Consultancy Charges @ 0.5% | 1.67 |
| 10 | Clearance Charges @ 1% | 3.34 |
| 11 | Independent Engineer Charges @1.5% | 5.01 |
| | Contingency @3% | 10.01 |
| 12 | Cost of Additional Work at Neelkanth Station | 10.07 |
| | Project Hard Cost | 363.77 Cr |

The total project cost including other soft cost component of the project like IDC, Financing Charges, SPV charges etc for debt: equity of 70:30 and 80:20 is as under:

| Description | Debt: Equity (70:30) | Debt: Equity (80:20) |
|---|-------------------------|-------------------------|
| Project Hard Cost in Cr | 363.77 | 363.77 |
| Cost escalation Provision | 53.51 | 53.20 |
| Interest Costs During Construction | 40.71 | 50.46 |
| Financing Charges | 1.59 | 1.86 |
| SPV Charges | 3.34 | 3.34 |
| Insurance Charges | 2.26 | 2.31 |
| Training and Skill Development Charges | 0.50 | 0.50 |
| Total Project Cost in Cr | 465.69 | 475.44 |

The investment schedule for this capital expenditure will follow the phasing schedule as indicated below: -

Table 14.5 Investment Schedule

| Year | Civil | Electrical | Mechanical |
|----------------------|-------------|-------------|-------------|
| 1 st Year | 30% | 10% | 10% |
| 2 nd Year | 40% | 40% | 40% |
| 3 rd Year | 30% | 50% | 50% |
| Total | 100% | 100% | 100% |

14.3 Project Funding Structure: -

For the financial analysis of the project, the following were calculated:

- i. Debt scheduling
- ii. Equity scheduling
- iii. Interest During Construction (IDC)



The project has been assumed to be funded at debt and equity in the ratio of 70%:30% and 80%:20%. Most of the capex in the beginning will be funded via equity. Hence in the overall scheme equity is front loaded with debt being availed after exhaust of equity. This is in line with the funding norms of infrastructure projects. The amount of debt required in a year is based on the investment phasing schedule, so as to ultimately achieve a final debt: equity level of 70:30 or 80:20. As this is the construction of a new project, we have assumed the opening balance for loan in the first year of investment as zero. The rate of Interest has been taken at 10.0%. The calculated project costs using the base costs, their phasing and funding assumptions (as mentioned above) are shown above.

14.4 Revenue Estimate:

The revenue is calculated in two categories, one is fare box revenue and other is non fare box revenue which is from sources like commercial spaces or advertisement etc.

14.4.1 Revenue from Passenger: -

Revenue has been computed on the basis of estimated traffic which is for a fare of Rs 50 for ISBT Rishikesh to Triveni Ghat, Rs 350 for Triveni Ghat to Neelkanth Mahadev Temple and Rs 100 for Neelkanth to Parvati Mata temple. The base fares are assumed from the year of operation i.e., 2026-27.

The calculation of Weighted average fare per passenger in the year 2026-27 is as per para 6.8.3.2 percentage ridership:

| Sr. No. | Section | Percentage of total passenger | Fare | Fare x % passenger |
|---------|--|-------------------------------|-----------|--------------------|
| 1 | ISBT – Triveni Ghat | 77.9% | Rs. 50/- | Rs. 38.95 |
| 2 | Triveni Ghat- Neelkanth Mahadev | 100% (77.9%+22.1%) | Rs. 350/- | Rs. 350 |
| 3 | Neelkanth Mahadev- Parvati Mata Temple | 85% | Rs. 100/- | Rs. 85.00 |
| | Weighted Average Fare per passenger | | | Rs. 473.95 |



The Fare box revenue has been calculated by multiplying the total ridership with weighted average fare per passenger calculated above. Fare box revenue different years is as under:

Table 14:6 Fare Revenue Calculation

| Description | Traffic on Ropeway (in Cr) Ref: Table:6:39 | Fare in Rs. | Revenue from Passengers in Cr. (Rs.) |
|-------------|--|-------------|--------------------------------------|
| Yr 2027-28 | 0.365 | 497.64 | 181.73 |
| Yr 2031-32 | 0.408 | 604.89 | 246.91 |
| Yr 2036-37 | 0.472 | 772.01 | 364.58 |
| Yr 2041-42 | 0.550 | 985.30 | 541.91 |
| Yr 2046-47 | 0.644 | 1257.52 | 810.29 |
| Yr 2051-52 | 0.759 | 1604.95 | 1217.98 |

14.4.2 Non-Fare Box Revenue:

The non-fare revenue can be considered from the retail/ commercial space, advertising and parking from vehicle.

Revenue from these sources is considered at an average of Rs.10/- per passenger from the previous experience.

Table 14:7 Non Fare Revenue Calculation

| Description | Non Fare Revenue |
|-------------|------------------|
| Yr 2027-28 | 3.83 Cr |
| Yr 2031-32 | 5.21 Cr |
| Yr 2036-37 | 7.69 Cr |
| Yr 2041-42 | 11.43 Cr |
| Yr 2046-47 | 17.10 Cr |
| Yr 2051-52 | 25.70 Cr |

14.5 Operation and Maintenance Expenditure

An assessment of the operation and maintenance requirements has been made. This is essential not only to get an indication of the method of working of the system but also to enable proper financial evaluation of the project.

Operation & Maintenance of the ropeway system shall be carried out in accordance with the recommendation of manufacturer of the equipment such as Gear Box, Motors, Coupling, Control Panels, Carriage, Hangers, Cabin & Haulage ropes etc. The basic requirement of manpower for running a Ropeway project should be categorized as follow: -



- a. Technical manpower should cover all operation and maintenance functions and include mechanical, electrical / electronic engineer, operator and fitter etc.
- b. Non- technical manpower should cover the functions of stores, accounts, sale of tickets, checking of tickets.
- c. Leave reserve for the critical post only considered. For security, cleaning, gardening outsourcing option has been considered.

The head of ropeway system should be Resident Manager should be technically qualified with exposure to manage high tech plant & machinery and control over the unit. He may be any one from Mechanical or Electrical engineer. Hence separate provision for this post has not been considered.

The manpower required/ recommended for the smooth running of ropeway is given in detail in following para.

14.5.1 MANPOWER REQUIREMENT

The manpower requirement envisaged would be for the purpose of supervision, basic preventive maintenance and breakdown maintenance, ticketing, accounting and security work for normal and satisfactory maintenance and operation of the ropeway system.

As total 16 hours ropeway operation is considered therefore two shift is considered for operation in a day.

Table 14:8 Manpower Cost

| Sr. No. | Designation | Manpower for two shift | Monthly Salary Per person | Salary per Year in Lakhs |
|--|--|------------------------|---------------------------|--------------------------|
| A. Technical (Operation & Maintenance) Manpower | | | | |
| 1 | Resident Manager | 1 | 100000 | 1200000 |
| 2 | Technical Supervisor cum station in-Charge (Mechanical Engineer) | 12 | 50000 | 7200000 |
| 3 | Mechanical Fitter | 3 | 40000 | 1440000 |
| 4 | Electrical Fitter | 3 | 40000 | 1440000 |
| 5 | Helpers/Semi Skilled | 3 | 20000 | 720000 |
| Sub Total (A) | | | | 12000000 |



B. Administrative Manpower

| | | | | |
|----------------------|---|----|-------|----------------|
| 1 | Booking Clerks cum Cashier for two stations | 24 | 15000 | 4320000 |
| 2 | Accountant | 1 | 30000 | 360000 |
| 3 | Store Keeper | 2 | 15000 | 360000 |
| 4 | Ticket Checker for 4 stations | 24 | 15000 | 4320000 |
| Sub Total (B) | | | | 9360000 |

C. Unskilled Labours for various activity

| | | | | |
|----------------------------|---|----|-------|-----------------|
| 1 | Cleaning: Sweeper (Toilets and general) | 16 | 12000 | 2304000 |
| 3 | Security Staff | 16 | 12000 | 2304000 |
| Sub Total (C) | | | | 4608000 |
| Sub Total (A+ B+ C) | | | | 25968000 |
| Perquisites @ 20% | | | | 5193600 |
| Total | | | | 31161600 |
| Total in Cr | | | | 3.12 |

14.5.2 Annual Operating Cost (Power Fuel and material)

Table 14:9 O & M Cost

| Sr. No. | Expenses | Unit | Rate | Yearly expenses |
|--------------------|---|-----------|------|-----------------|
| 1 | Power Charges for 15- hour operation | Per KW | 6 | 21265200 |
| 2 | 80 Liters Diesel Per day per station for 330 days | Per liter | 100 | 10560000 |
| 3 | Routine Maintenance, Lubricants & Spares | LS | | 600000 |
| 4 | NDT and other test for all ropeway equipment such as WDA, DPT etc | LS | | 500000 |
| 5 | Painting of structural component and Civil maintenance works | LS | | 600000 |
| 6. | Material Cost | LS | | 33368000 |
| 6 | Transit Accommodation, vehicle hire (annual rent) | LS | | 1200000 |
| 7 | Insurance of Assets | LS | | 8342000 |
| 8 | Insurance of Passengers | LS | | 2860000 |
| 9 | other charges like water charges, Advertisement, licensing etc. | LS | | 1000000 |
| Total | | | | 80295200 |
| Total in Cr | | | | 8.03 Cr |



14.5.3 Miscellaneous Cost

Table 14:10 Other Cost

| Sr. No. | Expenses | Cost in Rs. (in Cr) |
|---------|---|--|
| 1 | Rope Changes Cost | 27.69 Cr for every 10 th year |
| 2 | Annual Inspection Charges @1% of the project cost | 3.34 Cr |

The operation and maintenance cost during the concession period is calculated as under: -

| Description | Cost in Rs. (in Cr) |
|-------------|---------------------------|
| Yr 2020-21 | 3.12 +8.03+3.34 =14.48 Cr |
| Yr 2026-27 | 16.77 Cr |
| Yr 2031-32 | 21.40 Cr |
| Yr 2036-37 | 27.31 Cr |
| Yr 2041-42 | 34.85 Cr |
| Yr 2046-47 | 44.48 Cr |
| Yr 2051-52 | 56.77 Cr |

14.6 Result of Financial Analysis

The projected financial statements of the project are provided below.

14.6.1 Output of Financial analysis

Following are the financial indicators of the project for a concession period of 30 years.

14.6.1.1 Minimum Return Criteria for the Project

For any project to be viable under PPP or any of its variant, the minimum return criteria for the project is assumed based on experience and present trends in Ropeway projects. This is to ensure the attractiveness of the project and to ensure returns to the concessionaire as per the sector trends.

Following Minimum Return Criteria for the Project has been adopted:

Table 14:11 Assumption of Financial Analysis

| Sr. No. | Description | Assumptions |
|---------|-------------|-------------------------------------|
| 1 | Project IRR | 15%- 18% |
| 2 | Equity IRR | 18%-22% |
| 3 | Cash Flow | Positive from Starting of Operation |

The base fare of ISBT Rishikesh to Parvati Mata Temple is considered to be Rs. 500/- in year 2026-27.

The sensitivity analysis of financial indicators of the project have also been reported with +/-5 and +/- 10 % changes in the projected traffic, capital cost, O&M costs. These sensitivities have been shown below:



14.6.1.2 Sensitivity Analysis for 70%:30% of Debt: Equity

W.r.to Variation in Capital Cost

| Change in Capex | -10% | -5% | 0% | 5% | 10% |
|-----------------|-------|-------|-------|-------|-------|
| Project IRR | 30.0% | 29.0% | 28.1% | 27.3% | 26.5% |
| Equity IRR | 44.9% | 43.3% | 41.8% | 40.4% | 39.1% |

W.r to Change in Traffic

| Change in Traffic | -10% | -5% | 0% | 5% | 10% |
|-------------------|-------|-------|-------|-------|-------|
| Project IRR | 26.2% | 27.2% | 28.1% | 29.0% | 29.9% |
| Equity IRR | 38.6% | 40.2% | 41.8% | 43.3% | 44.8% |

W.r.to Change in O & M cost

| Change in O & M Cost | -10% | -5% | 0% | 5% | 10% |
|----------------------|-------|-------|-------|-------|-------|
| Project IRR | 28.3% | 28.2% | 28.1% | 28.0% | 27.9% |
| Equity IRR | 42.1% | 42.0% | 41.8% | 41.6% | 41.5% |

14.6.1.3 Sensitivity Analysis for 80%:20% of Debt: Equity

W.r.to Variation in Capital Cost

| Change in Capex | -10% | -5% | 0% | 5% | 10% |
|-----------------|-------|-------|-------|-------|-------|
| Project IRR | 29.6% | 28.7% | 27.8% | 27.0% | 26.2% |
| Equity IRR | 51.1% | 49.2% | 47.5% | 45.9% | 44.4% |

W.r.to Change in Traffic

| Change in Traffic | -10% | -5% | 0% | 5% | 10% |
|-------------------|-------|-------|-------|-------|-------|
| Project IRR | 25.9% | 26.9% | 27.8% | 28.7% | 29.6% |
| Equity IRR | 43.7% | 45.7% | 47.5% | 49.3% | 51.0% |

W.r.to Change in O & M cost

| Change in O & M cost | -10% | -5% | 0% | 5% | 10% |
|----------------------|-------|-------|-------|-------|-------|
| Project IRR | 28.0% | 27.9% | 27.8% | 27.7% | 27.6% |
| Equity IRR | 47.9% | 47.7% | 47.5% | 47.3% | 47.1% |



14.6.2 Result of Financial Analysis

Table 14:12 Result of Financial Analysis

| Sr. No. | Description | CEN | |
|---------|----------------|---------|---------|
| | | 70:30 | 80:20 |
| 1 | Project IRR | 28.1% | 27.8% |
| 2 | Equity IRR | 41.8% | 47.5% |
| 3 | Payback Period | 5 Years | 5 Years |

14.7 RECOMMENDATIONS

- Monocable Detachable Gondola System (MDG) is recommended for implementation for this alignment.
- The project is viable under PPP mode (DBFOT) without viability gap funding from government.



Annexure-A

Financial Statements

For Debt : Equity = 70:30

Project Cost= 465.69 Cr Fare= Rs.500/- Project IRR=28.10% Equity IRR=41.8%

P&L Statement

| All Figures in INR Crore | | | | | | | | | | | | | | | |
|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Ridership for ropeway | 0.328 | 0.337 | 0.346 | 0.355 | 0.365 | 0.375 | 0.386 | 0.397 | 0.408 | 0.420 | 0.432 | 0.445 | 0.458 | 0.472 | 0.487 |
| Maximum Fare (ticket per unit) - Rs | | | | | | | | | | | | | | | |
| Revenue from only ropeway | - | - | - | 83.53 | 181.73 | 196.11 | 211.70 | 228.59 | 246.91 | 266.78 | 288.32 | 311.70 | 337.06 | 364.58 | 394.46 |
| Tariff escalation | 1.00 | 1.00 | 1.00 | 1.00 | 1.05 | 1.10 | 1.16 | 1.22 | 1.28 | 1.34 | 1.41 | 1.48 | 1.55 | 1.63 | 1.71 |
| Effective tariff due to escalation | 473.95 | 473.95 | 473.95 | 473.95 | 497.64 | 522.53 | 548.65 | 576.09 | 604.89 | 635.13 | 666.89 | 700.24 | 735.25 | 772.01 | 810.61 |
| Non fare revenue | - | - | - | 1.76 | 3.83 | 4.14 | 4.47 | 4.82 | 5.21 | 5.63 | 6.08 | 6.58 | 7.11 | 7.69 | 8.32 |
| Total Revenue | - | - | - | 85.29 | 185.56 | 200.25 | 216.16 | 233.42 | 252.12 | 272.41 | 294.41 | 318.27 | 344.17 | 372.27 | 402.78 |
| Cost escalation | 1.00 | 1.05 | 1.10 | 1.16 | 1.22 | 1.28 | 1.34 | 1.41 | 1.48 | 1.55 | 1.63 | 1.71 | 1.80 | 1.89 | 1.98 |
| Annual O&M cost of the project | - | - | - | 17.03 | 17.88 | 18.77 | 19.71 | 20.70 | 21.73 | 22.82 | 23.96 | 25.16 | 26.42 | 27.74 | 29.12 |
| Annual concession fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Premium Concession % | - | - | - | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Premium Concession Fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gondola and Rope Change Cost | - | - | - | - | - | - | - | - | - | - | - | - | 49.73 | - | - |
| Total expenses | - | - | - | 17.03 | 17.88 | 18.77 | 19.71 | 20.70 | 21.73 | 22.82 | 23.96 | 25.16 | 26.42 | 27.74 | 29.12 |
| EBITDA | - | - | - | 68.27 | 167.68 | 181.47 | 196.45 | 212.72 | 230.39 | 249.59 | 270.45 | 293.11 | 268.03 | 344.54 | 373.66 |
| Depreciation | - | - | - | 16.64 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 14.80 | 4.88 | 4.88 |
| Interest paid | - | - | - | 17.60 | 36.47 | 34.65 | 31.00 | 27.36 | 23.71 | 20.06 | 16.41 | 12.77 | 9.12 | 5.47 | 1.82 |
| PBT | - | - | - | 34.03 | 97.65 | 113.27 | 131.89 | 151.81 | 173.12 | 195.97 | 220.48 | 246.79 | 244.11 | 334.18 | 366.95 |
| Tax | - | - | - | 1.46 | 13.25 | 22.43 | 30.83 | 38.48 | 45.71 | 52.80 | 59.91 | 67.21 | 62.38 | 82.81 | 91.30 |
| PAT | - | - | - | 32.57 | 84.40 | 90.84 | 101.06 | 113.33 | 127.41 | 143.17 | 160.56 | 179.58 | 181.73 | 251.37 | 275.65 |

| All Figures in INR Crore | | | | | | | | | | | | | | | |
|-------------------------------------|--------|--------|--------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Ridership for ropeway | 0.502 | 0.517 | 0.533 | 0.550 | 0.567 | 0.586 | 0.604 | 0.624 | 0.644 | 0.666 | 0.688 | 0.710 | 0.734 | 0.759 | 0.785 |
| Maximum Fare (ticket per unit) - Rs | | | | | | | | | | | | | | | |
| Revenue from only ropeway | 426.89 | 462.11 | 500.36 | 541.91 | 587.05 | 636.09 | 689.39 | 747.32 | 810.29 | 878.76 | 953.20 | 1,034.16 | 1,122.20 | 1,217.98 | 1,322.17 |
| Tariff escalation | 1.80 | 1.89 | 1.98 | 2.08 | 2.18 | 2.29 | 2.41 | 2.53 | 2.65 | 2.79 | 2.93 | 3.07 | 3.23 | 3.39 | 3.56 |
| Effective tariff due to escalation | 851.14 | 893.70 | 938.38 | 985.30 | 1,034.57 | 1,086.30 | 1,140.61 | 1,197.64 | 1,257.52 | 1,320.40 | 1,386.42 | 1,455.74 | 1,528.53 | 1,604.95 | 1,685.20 |
| Non fare revenue | 9.01 | 9.75 | 10.56 | 11.43 | 12.39 | 13.42 | 14.55 | 15.77 | 17.10 | 18.54 | 20.11 | 21.82 | 23.68 | 25.70 | 27.90 |
| Total Revenue | 435.90 | 471.86 | 510.92 | 553.35 | 599.44 | 649.51 | 703.94 | 763.09 | 827.39 | 897.30 | 973.31 | 1,055.98 | 1,145.88 | 1,243.68 | 1,350.07 |
| Cost escalation | 2.08 | 2.18 | 2.29 | 2.41 | 2.53 | 2.65 | 2.79 | 2.93 | 3.07 | 3.23 | 3.39 | 3.56 | 3.73 | 3.92 | 4.12 |
| Annual O&M cost of the project | 30.58 | 32.11 | 33.71 | 35.40 | 37.17 | 39.03 | 40.98 | 43.03 | 45.18 | 47.44 | 49.81 | 52.30 | 54.92 | 57.66 | 60.54 |
| Annual concession fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Premium Concession % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Premium Concession Fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gondola and Rope Change Cost | - | - | - | - | - | - | - | 81.00 | - | - | - | - | - | - | - |
| Total expenses | 30.58 | 32.11 | 33.71 | 35.40 | 37.17 | 39.03 | 40.98 | 124.03 | 45.18 | 47.44 | 49.81 | 52.30 | 54.92 | 57.66 | 60.54 |
| EBITDA | 405.32 | 439.75 | 477.21 | 517.95 | 562.27 | 610.49 | 662.96 | 639.06 | 782.21 | 849.86 | 923.50 | 1,003.68 | 1,090.97 | 1,186.02 | 1,289.53 |
| Depreciation | 4.88 | 4.88 | 3.97 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 |
| Interest paid | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| PBT | 400.44 | 434.87 | 473.24 | 515.66 | 559.98 | 608.20 | 660.67 | 636.77 | 779.92 | 847.57 | 921.21 | 1,001.39 | 1,088.68 | 1,183.73 | 1,287.24 |
| Tax | 99.89 | 108.68 | 118.18 | 128.47 | 139.64 | 151.77 | 164.95 | 159.03 | 194.86 | 211.82 | 230.27 | 250.35 | 272.20 | 295.99 | 321.90 |
| PAT | 300.54 | 326.20 | 355.06 | 387.19 | 420.34 | 456.43 | 495.72 | 477.74 | 585.06 | 635.75 | 690.94 | 751.04 | 816.48 | 887.73 | 965.34 |



Balance Sheet Statement

All Figures in INR Crore

| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|----------|
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Networth | | | | | | | | | | | | | | | |
| Equity Share capital | 70.14 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 |
| Retained earnings | - | - | - | 32.57 | 116.97 | 207.81 | 308.87 | 422.20 | 549.62 | 692.79 | 853.35 | 1,032.93 | 1,214.66 | 1,466.03 | 1,741.68 |
| Grants | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Long term borrowings | - | 102.39 | 313.69 | 331.58 | 331.58 | 298.42 | 265.26 | 232.10 | 198.95 | 165.79 | 132.63 | 99.47 | 66.32 | 33.16 | -0.00 |
| Total liabilities | 70.14 | 244.50 | 455.79 | 506.25 | 590.65 | 648.33 | 716.24 | 796.41 | 890.67 | 1,000.68 | 1,128.09 | 1,274.51 | 1,423.08 | 1,641.29 | 1,883.79 |
| Fixed assets | | | | | | | | | | | | | | | |
| Net fixed assets | - | - | - | 457.04 | 423.48 | 389.93 | 356.37 | 322.81 | 289.25 | 255.70 | 222.14 | 188.58 | 173.78 | 168.90 | 164.01 |
| CWIP | 70.14 | 244.50 | 455.79 | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 70.14 | 244.50 | 455.79 | 457.04 | 423.48 | 389.93 | 356.37 | 322.81 | 289.25 | 255.70 | 222.14 | 188.58 | 173.78 | 168.90 | 164.01 |
| Working capital | | | | | | | | | | | | | | | |
| Net Working Capital (€) | - | - | - | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 |
| Cash/OD | - | - | - | 38.53 | 156.49 | 247.72 | 349.19 | 462.92 | 590.73 | 734.31 | 895.27 | 1,075.25 | 1,238.62 | 1,461.71 | 1,709.09 |
| Total liabilities | 70.14 | 244.50 | 455.79 | 506.25 | 590.65 | 648.33 | 716.24 | 796.41 | 890.67 | 1,000.68 | 1,128.09 | 1,274.51 | 1,423.08 | 1,641.29 | 1,883.79 |

All Figures in INR Crore

| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
|-----------------------------|----------|----------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Networth | | | | | | | | | | | | | | | |
| Equity Share capital | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 | 142.10 |
| Retained earnings | 2,042.23 | 2,368.42 | 2,723.48 | 3,110.67 | 3,531.01 | 3,987.44 | 4,483.2 | 4,960.9 | 5,546.0 | 6,181.7 | 6,872.7 | 7,623.7 | 8,440.2 | 9,327.9 | 10,293.2 |
| Grants | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Long term borrowings | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.0 | -0.0 | -0.0 | - | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 |
| Total liabilities | 2,184.33 | 2,510.53 | 2,865.59 | 3,252.77 | 3,673.11 | 4,129.5 | 4,625.3 | 5,103.0 | 5,688.1 | 6,323.8 | 7,014.8 | 7,765.8 | 8,582.3 | 9,470.0 | 10,435.3 |
| Fixed assets | | | | | | | | | | | | | | | |
| Net fixed assets | 159.13 | 154.25 | 150.28 | 147.99 | 145.70 | 143.4 | 141.1 | 138.8 | 136.5 | 134.3 | 132.0 | 129.7 | 127.4 | 125.1 | 122.8 |
| CWIP | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 159.13 | 154.25 | 150.28 | 147.99 | 145.70 | 143.4 | 141.1 | 138.8 | 136.5 | 134.3 | 132.0 | 129.7 | 127.4 | 125.1 | 122.8 |
| Working capital | | | | | | | | | | | | | | | |
| Net Working Capital (€) | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 |
| Cash/OD | 2,014.52 | 2,345.60 | 2,704.63 | 3,094.10 | 3,516.73 | 3,975.5 | 4,473.5 | 4,953.5 | 5,540.8 | 6,178.9 | 6,872.1 | 7,625.4 | 8,444.2 | 9,334.2 | 10,301.9 |
| Total liabilities | 2,184.33 | 2,510.53 | 2,865.59 | 3,252.77 | 3,673.11 | 4,129.5 | 4,625.3 | 5,103.0 | 5,688.1 | 6,323.8 | 7,014.8 | 7,765.8 | 8,582.3 | 9,470.0 | 10,435.3 |



Cash Flow Statement

All Figures in INR Crore

| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
|--|--------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Net Income | - | - | - | 32.57 | 84.40 | 90.84 | 101.06 | 113.33 | 127.41 | 143.17 | 160.56 | 179.58 | 181.73 | 251.37 | 275.65 |
| Depreciation | - | - | - | 16.64 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 33.56 | 14.80 | 4.88 | 4.88 |
| Interest payment | | | | | | | | | | | | | | | |
| Increase in working capital (excl Cash/OD) | 0.00 | 0.00 | 0.00 | -10.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Operations | 0.00 | 0.00 | 0.00 | 38.53 | 117.96 | 124.40 | 134.62 | 146.89 | 160.97 | 176.73 | 194.12 | 213.14 | 196.53 | 256.25 | 280.53 |
| Capital expenditure | -70.14 | -174.36 | -211.29 | -17.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Investment Activities | -70.14 | -174.36 | -211.29 | -17.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Debt | | | | | | | | | | | | | | | |
| Drawdown | 0.00 | 102.39 | 211.29 | 17.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repayment | - | - | - | - | - | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 |
| Drawdown (Investment) | 70.14 | 71.96 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grants Received | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash flow from Financing Activities | 70.14 | 174.36 | 211.29 | 17.89 | 0.00 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 | -33.16 |
| Increase in net cash balances | - | - | - | 38.53 | 117.96 | 91.24 | 101.46 | 113.73 | 127.81 | 143.57 | 160.96 | 179.98 | 163.37 | 223.10 | 247.38 |

All Figures in INR Crore

| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Net Income | 300.54 | 326.20 | 355.06 | 387.19 | 420.34 | 456.43 | 495.72 | 477.74 | 585.06 | 635.75 | 690.94 | 751.04 | 816.48 | 887.73 | 965.34 |
| Depreciation | 4.88 | 4.88 | 3.97 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 | 2.29 |
| Interest payment | | | | | | | | | | | | | | | |
| Increase in working capital (excl Cash/OD) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Operations | 305.43 | 331.08 | 359.03 | 389.48 | 422.63 | 458.72 | 498.01 | 480.03 | 587.35 | 638.04 | 693.23 | 753.33 | 818.77 | 890.02 | 967.63 |
| Capital expenditure | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Investment Activities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Debt | | | | | | | | | | | | | | | |
| Drawdown | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repayment | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Drawdown (Investment) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grants Received | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash flow from Financing Activities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Increase in net cash balances | 305.43 | 331.08 | 359.03 | 389.48 | 422.63 | 458.72 | 498.01 | 480.03 | 587.35 | 638.04 | 693.23 | 753.33 | 818.77 | 890.02 | 967.63 |



Annexure B

For Debt : Equity = 80:20

Project Cost= 475.44 Cr Fare= Rs.500/- Project IRR=27.8% Equity IRR=47.5%

P&L Statement

| All Figures in INR Crore | | | | | | | | | | | | | | | |
|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Ridership for ropeway | 0.328 | 0.337 | 0.346 | 0.355 | 0.365 | 0.375 | 0.386 | 0.397 | 0.408 | 0.420 | 0.432 | 0.445 | 0.458 | 0.472 | 0.487 |
| Maximum Fare (ticket per unit) - Rs | | | | | | | | | | | | | | | |
| Revenue from only ropeway | - | - | - | 83.53 | 181.73 | 196.11 | 211.70 | 228.59 | 246.91 | 266.78 | 288.32 | 311.70 | 337.06 | 364.58 | 394.46 |
| Tariff escalation | 1.00 | 1.00 | 1.00 | 1.00 | 1.05 | 1.10 | 1.16 | 1.22 | 1.28 | 1.34 | 1.41 | 1.48 | 1.55 | 1.63 | 1.71 |
| Effective tariff due to escalation | 473.95 | 473.95 | 473.95 | 473.95 | 497.64 | 522.53 | 548.65 | 576.09 | 604.89 | 635.13 | 666.89 | 700.24 | 735.25 | 772.01 | 810.61 |
| Non fare revenue | - | - | - | 1.76 | 3.83 | 4.14 | 4.47 | 4.82 | 5.21 | 5.63 | 6.08 | 6.58 | 7.11 | 7.69 | 8.32 |
| Total Revenue | - | - | - | 85.29 | 185.56 | 200.25 | 216.16 | 233.42 | 252.12 | 272.41 | 294.41 | 318.27 | 344.17 | 372.27 | 402.78 |
| Cost escalation | 1.00 | 1.05 | 1.10 | 1.16 | 1.22 | 1.28 | 1.34 | 1.41 | 1.48 | 1.55 | 1.63 | 1.71 | 1.80 | 1.89 | 1.98 |
| Annual O&M cost of the project | - | - | - | 17.03 | 17.88 | 18.77 | 19.71 | 20.70 | 21.73 | 22.82 | 23.96 | 25.16 | 26.42 | 27.74 | 29.12 |
| Annual concession fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Premium Concession % | | | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Premium Concession Fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gondola and Rope Change Cost | - | - | - | - | - | - | - | - | - | - | - | - | 49.73 | - | - |
| Total expenses | - | - | - | 17.03 | 17.88 | 18.77 | 19.71 | 20.70 | 21.73 | 22.82 | 23.96 | 25.16 | 26.42 | 27.74 | 29.12 |
| EBITDA | - | - | - | 68.27 | 167.68 | 181.47 | 196.45 | 212.72 | 230.39 | 249.59 | 270.45 | 293.11 | 268.03 | 344.54 | 373.66 |
| Depreciation | - | - | - | 16.96 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 15.08 | 4.97 | 4.97 |
| Interest paid | - | - | - | 20.59 | 42.67 | 40.54 | 36.27 | 32.00 | 27.74 | 23.47 | 19.20 | 14.94 | 10.67 | 6.40 | 2.13 |
| PBT | - | - | - | 30.71 | 90.80 | 106.73 | 125.97 | 146.51 | 168.44 | 191.91 | 217.03 | 243.97 | 242.28 | 333.17 | 366.56 |
| Tax | - | - | - | 0.49 | 11.32 | 20.68 | 29.31 | 37.17 | 44.59 | 51.86 | 59.15 | 66.62 | 61.95 | 82.55 | 91.19 |
| PAT | - | - | - | 30.22 | 79.48 | 86.05 | 96.66 | 109.34 | 123.85 | 140.05 | 157.88 | 177.35 | 180.32 | 250.62 | 275.36 |

| All Figures in INR Crore | | | | | | | | | | | | | | | |
|-------------------------------------|--------|--------|--------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Ridership for ropeway | 0.502 | 0.517 | 0.533 | 0.550 | 0.567 | 0.586 | 0.604 | 0.624 | 0.644 | 0.666 | 0.688 | 0.710 | 0.734 | 0.759 | 0.785 |
| Maximum Fare (ticket per unit) - Rs | | | | | | | | | | | | | | | |
| Revenue from only ropeway | 426.89 | 462.11 | 500.36 | 541.91 | 587.05 | 636.09 | 689.39 | 747.32 | 810.29 | 878.76 | 953.20 | 1,034.16 | 1,122.20 | 1,217.98 | 1,322.17 |
| Tariff escalation | 1.80 | 1.89 | 1.98 | 2.08 | 2.18 | 2.29 | 2.41 | 2.53 | 2.65 | 2.79 | 2.93 | 3.07 | 3.23 | 3.39 | 3.56 |
| Effective tariff due to escalation | 851.14 | 893.70 | 938.38 | 985.30 | 1,034.57 | 1,086.30 | 1,140.61 | 1,197.64 | 1,257.52 | 1,320.40 | 1,386.42 | 1,455.74 | 1,528.53 | 1,604.95 | 1,685.20 |
| Non fare revenue | 9.01 | 9.75 | 10.56 | 11.43 | 12.39 | 13.42 | 14.55 | 15.77 | 17.10 | 18.54 | 20.11 | 21.82 | 23.68 | 25.70 | 27.90 |
| Total Revenue | 435.90 | 471.86 | 510.92 | 553.35 | 599.44 | 649.51 | 703.94 | 763.09 | 827.39 | 897.30 | 973.31 | 1,055.98 | 1,145.88 | 1,243.68 | 1,350.07 |
| Cost escalation | 2.08 | 2.18 | 2.29 | 2.41 | 2.53 | 2.65 | 2.79 | 2.93 | 3.07 | 3.23 | 3.39 | 3.56 | 3.73 | 3.92 | 4.12 |
| Annual O&M cost of the project | 30.58 | 32.11 | 33.71 | 35.40 | 37.17 | 39.03 | 40.98 | 43.03 | 45.18 | 47.44 | 49.81 | 52.30 | 54.92 | 57.66 | 60.54 |
| Annual concession fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Premium Concession % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Premium Concession Fee | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gondola and Rope Change Cost | - | - | - | - | - | - | - | 81.00 | - | - | - | - | - | - | - |
| Total expenses | 30.58 | 32.11 | 33.71 | 35.40 | 37.17 | 39.03 | 40.98 | 124.03 | 45.18 | 47.44 | 49.81 | 52.30 | 54.92 | 57.66 | 60.54 |
| EBITDA | 405.32 | 439.75 | 477.21 | 517.95 | 562.27 | 610.49 | 662.96 | 639.06 | 782.21 | 849.86 | 923.50 | 1,003.68 | 1,090.97 | 1,186.02 | 1,289.53 |
| Depreciation | 4.97 | 4.97 | 4.04 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 |
| Interest paid | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PBT | 400.35 | 434.79 | 473.17 | 515.62 | 559.94 | 608.16 | 660.64 | 636.74 | 779.89 | 847.54 | 921.18 | 1,001.35 | 1,088.64 | 1,183.69 | 1,287.20 |
| Tax | 99.87 | 108.66 | 118.16 | 128.45 | 139.62 | 151.75 | 164.94 | 159.02 | 194.85 | 211.81 | 230.26 | 250.34 | 272.19 | 295.99 | 321.89 |
| PAT | 300.48 | 326.13 | 355.01 | 387.17 | 420.32 | 456.41 | 495.70 | 477.72 | 585.03 | 635.73 | 690.92 | 751.01 | 816.45 | 887.71 | 965.31 |



Balance Sheet Statement

All Figures in INR Crore

| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Networth | | | | | | | | | | | | | | | |
| Equity Share capital | 70.14 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 |
| Retained earnings | - | - | - | 30.22 | 109.70 | 195.74 | 292.40 | 401.74 | 525.59 | 665.64 | 823.53 | 1,000.88 | 1,181.20 | 1,431.82 | 1,707.18 |
| Grants | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Long term borrowings | - | 150.14 | 366.99 | 387.92 | 387.92 | 349.13 | 310.34 | 271.55 | 232.75 | 193.96 | 155.17 | 116.38 | 77.58 | 38.79 | - |
| Total liabilities | 70.14 | 247.12 | 463.97 | 515.13 | 594.60 | 641.86 | 699.72 | 770.27 | 855.33 | 956.58 | 1,075.68 | 1,214.23 | 1,355.77 | 1,567.60 | 1,804.16 |
| Fixed assets | | | | | | | | | | | | | | | |
| Net fixed assets | - | - | - | 467.94 | 433.73 | 399.52 | 365.31 | 331.10 | 296.89 | 262.68 | 228.47 | 194.26 | 179.18 | 174.21 | 169.24 |
| CWIP | 70.14 | 247.12 | 463.97 | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 70.14 | 247.12 | 463.97 | 467.94 | 433.73 | 399.52 | 365.31 | 331.10 | 296.89 | 262.68 | 228.47 | 194.26 | 179.18 | 174.21 | 169.24 |
| Working capital | | | | | | | | | | | | | | | |
| Net Working Capital (€) | - | - | - | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 |
| Cash/OD | - | - | - | 36.50 | 150.19 | 231.65 | 323.73 | 428.49 | 547.76 | 683.22 | 836.52 | 1,009.29 | 1,165.90 | 1,382.70 | 1,624.24 |
| Total liabilities | 70.14 | 247.12 | 463.97 | 515.13 | 594.60 | 641.86 | 699.72 | 770.27 | 855.33 | 956.58 | 1,075.68 | 1,214.23 | 1,355.77 | 1,567.60 | 1,804.16 |

All Figures in INR Crore

| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
|-----------------------------|----------|----------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Networth | | | | | | | | | | | | | | | |
| Equity Share capital | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 | 96.98 |
| Retained earnings | 2,007.66 | 2,333.80 | 2,688.81 | 3,075.98 | 3,496.30 | 3,952.71 | 4,448.4 | 4,926.1 | 5,511.2 | 6,146.9 | 6,837.8 | 7,588.8 | 8,405.3 | 9,293.0 | 10,258.3 |
| Grants | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Long term borrowings | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total liabilities | 2,104.65 | 2,430.78 | 2,785.79 | 3,172.96 | 3,593.28 | 4,049.7 | 4,545.4 | 5,023.1 | 5,608.1 | 6,243.9 | 6,934.8 | 7,685.8 | 8,502.3 | 9,390.0 | 10,355.3 |
| Fixed assets | | | | | | | | | | | | | | | |
| Net fixed assets | 164.28 | 159.31 | 155.27 | 152.95 | 150.62 | 148.3 | 146.0 | 143.7 | 141.3 | 139.0 | 136.7 | 134.4 | 132.0 | 129.7 | 127.4 |
| CWIP | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 164.28 | 159.31 | 155.27 | 152.95 | 150.62 | 148.3 | 146.0 | 143.7 | 141.3 | 139.0 | 136.7 | 134.4 | 132.0 | 129.7 | 127.4 |
| Working capital | | | | | | | | | | | | | | | |
| Net Working Capital (€) | 10.68 | 10.68 | 10.68 | 10.68 | 10.68 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 |
| Cash/OD | 1,929.69 | 2,260.79 | 2,619.84 | 3,009.33 | 3,431.97 | 3,890.7 | 4,388.7 | 4,868.8 | 5,456.1 | 6,094.2 | 6,787.4 | 7,540.8 | 8,359.5 | 9,249.6 | 10,217.2 |
| Total liabilities | 2,104.65 | 2,430.78 | 2,785.79 | 3,172.96 | 3,593.28 | 4,049.7 | 4,545.4 | 5,023.1 | 5,608.1 | 6,243.9 | 6,934.8 | 7,685.8 | 8,502.3 | 9,390.0 | 10,355.3 |



Cash Flow Statement

All Figures in INR Crore

| Year Start Date | Apr-23 | Apr-24 | Apr-25 | Apr-26 | Apr-27 | Apr-28 | Apr-29 | Apr-30 | Apr-31 | Apr-32 | Apr-33 | Apr-34 | Apr-35 | Apr-36 | Apr-37 |
|--|--------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year End Date | Mar-24 | Mar-25 | Mar-26 | Mar-27 | Mar-28 | Mar-29 | Mar-30 | Mar-31 | Mar-32 | Mar-33 | Mar-34 | Mar-35 | Mar-36 | Mar-37 | Mar-38 |
| Net Income | - | - | - | 30.22 | 79.48 | 86.05 | 96.66 | 109.34 | 123.85 | 140.05 | 157.88 | 177.35 | 180.32 | 250.62 | 275.36 |
| Depreciation | - | - | - | 16.96 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 34.21 | 15.08 | 4.97 | 4.97 |
| Interest payment | | | | | | | | | | | | | | | |
| Increase in working capital (excl Cash/OD) | 0.00 | 0.00 | 0.00 | -10.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Operations | 0.00 | 0.00 | 0.00 | 36.50 | 113.69 | 120.26 | 130.87 | 143.55 | 158.06 | 174.26 | 192.09 | 211.56 | 195.41 | 255.59 | 280.33 |
| Capital expenditure | -70.14 | -176.98 | -216.85 | -20.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Investment Activities | -70.14 | -176.98 | -216.85 | -20.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Debt | | | | | | | | | | | | | | | |
| Drawdown | 0.00 | 150.14 | 216.85 | 20.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repayment | - | - | - | - | - | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 |
| Drawdown (Investment) | 70.14 | 26.84 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grants Received | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash flow from Financing Activities | 70.14 | 176.98 | 216.85 | 20.93 | 0.00 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 | -38.79 |
| Increase in net cash balances | - | - | - | 36.50 | 113.69 | 81.46 | 92.08 | 104.76 | 119.27 | 135.47 | 153.30 | 172.77 | 156.61 | 216.80 | 241.54 |

All Figures in INR Crore

| Year Start Date | Apr-38 | Apr-39 | Apr-40 | Apr-41 | Apr-42 | Apr-43 | Apr-44 | Apr-45 | Apr-46 | Apr-47 | Apr-48 | Apr-49 | Apr-50 | Apr-51 | Apr-52 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Year End Date | Mar-39 | Mar-40 | Mar-41 | Mar-42 | Mar-43 | Mar-44 | Mar-45 | Mar-46 | Mar-47 | Mar-48 | Mar-49 | Mar-50 | Mar-51 | Mar-52 | Mar-53 |
| Net Income | 300.48 | 326.13 | 355.01 | 387.17 | 420.32 | 456.41 | 495.70 | 477.72 | 585.03 | 635.73 | 690.92 | 751.01 | 816.45 | 887.71 | 965.31 |
| Depreciation | 4.97 | 4.97 | 4.04 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 | 2.32 |
| Interest payment | | | | | | | | | | | | | | | |
| Increase in working capital (excl Cash/OD) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Operations | 305.45 | 331.10 | 359.05 | 389.49 | 422.64 | 458.73 | 498.02 | 480.04 | 587.36 | 638.05 | 693.24 | 753.34 | 818.77 | 890.03 | 967.63 |
| Capital expenditure | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cash flow from Investment Activities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Debt | | | | | | | | | | | | | | | |
| Drawdown | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repayment | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Drawdown (Investment) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grants Received | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash flow from Financing Activities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Increase in net cash balances | 305.45 | 331.10 | 359.05 | 389.49 | 422.64 | 458.73 | 498.02 | 480.04 | 587.36 | 638.05 | 693.24 | 753.34 | 818.77 | 890.03 | 967.63 |



Annexure-C

Proposed Timelines from March 2022 – October 2026

| Sl. No. | Activity | Duration | M6 | M12 | M 18 | M 20 | M 25 | M 30 | M 35 | M 45 | M 54 | M 55 |
|---------|--|-----------|----|-----|------|------|------|------|------|------|------|------|
| 1 | Tender Process | 6 months | | | | | | | | | | |
| 2 | Condition Precedent | 12 Months | | | | | | | | | | |
| 3 | Financial Closure | 12 Months | | | | | | | | | | |
| 4 | Concept Design | 6 Months | | | | | | | | | | |
| 5 | Schematic design | 6 Months | | | | | | | | | | |
| 6 | Detail Design & GFC | 6 Months | | | | | | | | | | |
| 7 | Geotechnical Investigations | 6 Months | | | | | | | | | | |
| 8 | Approvals and clearances | 12 months | | | | | | | | | | |
| 9 | Construction | 36 Month | | | | | | | | | | |
| 10 | Commissioning, trial run and System Safety Certification | 3 Month | | | | | | | | | | |
| 11 | Commercial date of Operation | | | | | | | | | | | |



15 STAKEHOLDER MEETING

Stakeholder meeting was conducted on 09.02.2021 in Rishikesh and Neelkanth for this project.

15.1 Minutes of the Stakeholder Meeting at Rishikesh

Minutes of Meeting of Stakeholders for the work "Appointment of Technical Consultant to Prepare Feasibility Report for Construction of Ropeway from Rishikesh to Neelkanth in Uttarakhand State.

As per the clause no. 5.6 of the Contract with M/s Indian Port Rail Corporation Ltd (IPRCL), one of the activity was to hold a Stake Holder meeting.

Meeting Held on: Date: 09.02.2021, starting time 11:00 hrs at Rishikesh.

Venue: Conference Hall, Nagar Nigam, Rishikesh.

Attendance : As per the Annexure – 'A'

Photography: As per the Annexure – 'B'

A meeting of all stakeholders was organized under the chairmanship of Director (Project & Planning), Uttarakhand Metro Rail, Urban Infrastructure & Building Construction Corporation Limited. The object of the meeting was to apprise all stakeholders about the project and take their valuable inputs for making the project more useful and acceptable. Chairman welcomed the representatives of various departments, attending the Stakeholder Consultation meeting. He explained the background and objective of the meeting, explaining that M/s Indian Port Rail Corporation Ltd (IPRCL), has been engaged for the above noted work and explained it's importance i.e. to provide seamless connectivity to Tourists / Pilgrims directly from Rishikesh to Neelkanth Mandir and Parvati Mandir and also to decongest the traffic of Rishikesh. He also narrated that M/s Indian Port Rail Corporation Ltd (IPRCL) has conducted survey work for the whole site and various options have been considered for the alignment of Rope way. Further, Mr. Sanjiv Mhetre, GM/Mech from M/s Indian Port Rail Corporation Ltd (IPRCL) gave a Power Point Presentation and the team explained the alignment.

UKMRC wrote letters to various Stake Holder departments with a request to attend the meeting vide letter no. 653 /UKMRC/2020/176/Civil/Ropeway/2020-21 dated 25-01-2021 as follows :-

A. Stakeholder meeting at Conference hall, Nagar Nigam, Rishikesh

1. सचिव, प्रदूषण नियंत्रण बोर्ड, देहरादून।
2. कमिश्नर, आयकर विभाग, ऋषिकेश।
3. मेयर, नगर निगम, ऋषिकेश।
4. नगर आयुक्त, नगर निगम, ऋषिकेश।
5. मुख्य अभियन्ता/कार्यकारी अधिकारी जन स्वास्थ्य विभाग, देहरादून।
6. मुख्य अभियन्ता, सिंचाई विभाग, देहरादून।
7. महाप्रबन्धक, आई.डी.पी.एल, ऋषिकेश।
8. मुख्य रोपवे निरीक्षक, ब्रिडकुल, देहरादून।
9. मुख्य अभियन्ता, सीमा सड़क संगठन, ऋषिकेश।
10. निदेशक, भारतीय विभाग पत्तन, देहरादून।
11. अधीक्षण अभियन्ता, यू0पी0सी0एल, ऋषिकेश।
12. मुख्य प्रशासनिक अधिकारी, उत्तराखण्ड पर्यटन विकास परिषद, देहरादून।
13. अधिशासी अधिकारी, नगर पालिका परिषद, ऋषिकेश।
14. अधिशासी अभियन्ता, अस्थायी खण्ड, ऋषिकेश।
15. खण्ड विकास अधिकारी, (वी0डी0ओ0), ऋषिकेश।
16. क्षेत्रीय परिवहन अधिकारी, ऋषिकेश।
17. प्रभागीय वनाधिकारी, नई टिहरी।

Sanjiv Mhetre

UKMRC



18. सीओओ, यातायात, ऋषिकेश।
19. सीओओ, पुलिस ऋषिकेश।
20. तहसीलदार, ऋषिकेश।
21. पार्श्व दालवाला, ऋषिकेश।
22. खण्ड विकास अधिकारी, टिहरी गढ़वाल।
23. पर्यटन विभाग, ऋषिकेश।
24. अध्यक्ष, गंगा सभा, ऋषिकेश।
25. परमार्थ निकेतन (ट्रस्ट), ऋषिकेश।
26. स्वर्गाश्रम (ट्रस्ट), ऋषिकेश।
27. गीता आश्रम (ट्रस्ट), ऋषिकेश।
28. काली कमली आश्रम, ऋषिकेश।
29. त्रीवेणी घाट (ट्रस्ट), ऋषिकेश।
30. उपजिलाधिकारी, ऋषिकेश।

Following are the comments and observations received during the Presentation from the stakeholders at Rishikesh:

| S.No | Observation Made | Response | Action to be Taken |
|------|---|---|--|
| 1 | Director (P&P) explained that the ISBT location is best suitable place for Lower Terminal Station. | All Stakeholder agreed for the location of Lower Terminal at ISBT Rishikesh. | No action is Required. |
| 2 | Sh. Anubhav Nautiyal, AE/Irrigation Dept. pointed out that the Flood level of Chandrabhaga River should be checked and the station at Trivent Ghat should be designed accordingly. As the RVNL had recently constructed the Railway bridge crossing Chandrabhaga River so the HFL & discharge data of Chandrabhaga River may be taken from RVNL. He also added that the Construction of Ropeway is permissible in Chandrabhaga River taking due care of the Tower Foundations as per the Govt. Notification considering the HFL & Discharge parameters. | The data of HFL & Discharge will be collected from RVNL as well as Irrigation Dept. and the same will be considered while preparing the Feasibility Report. | M/s IPRCL was instructed to collect the requisite data and to incorporate in their Feasibility Report. |
| 3 | Sh. Vinod Lal, SNA/Nagar Nigam, suggested that the Parking area at Lower Terminal near ISBT may be identified. | The Joint Inspection will be carried out with Nagar Nigam for Parking Location | UKMRC along with Nagar Nigam representative will jointly identify the Parking area near ISBT |

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| S.No | Observation Made | Response | Action to be Taken |
|------|--|---|---|
| 4 | Representative of Bridcul, suggested that the Triveni Ghat may be the intermediate Station of Ropeway which will benefit the tourist coming to Triveni Ghat. | Triveni Ghat as an Intermediate Station can be considered as suggested by Stakeholders. | M/s IPRCL to mark the tower locations in the residential area adjoining to the Triveni Ghat, |
| 5 | Representative of Nagar Nigam suggested that the Triveni Ghat may be the intermediate Station of Ropeway as Ganga Darshan can be done by Pilgrims while coming from Neelkanth temple. | Triveni Ghat as an Intermediate Station can be considered as suggested by Stakeholders. | thereafter to hold a joint inspection with Municipal Officers to ascertain the Floor Area Ratio (FAR) of such buildings coming in the effective width of Ropeway alignment. Height f buildings is to be considered while deciding the Ropeway R.L. so that a clear height shall be maintained for safety and operation reasons. |
| 6 | Representative of Kali Kamli also suggested that the Triveni Ghat may be the intermediate Station of Ropeway where the Pilgrims can board and deboard as Triveni Ghat is a religious place and lots of Pilgrims visit that place . | Triveni Ghat as an Intermediate Station can be considered as suggested by Stakeholders. | |
| 7 | Representative of State Pollution Board (SPB). Suggested that eco-sensitive zone of 100 m from centre of river may be kept in view while finalizing the station location at Triveni Ghat. | Suggestion will be kept in view | M/s IPRCL is advised to collect the circulars of State Pollution Board (SPC). The location of the station shall be in compliance with such guidelines. |

Meeting ended with a vote of thanks to all the participants.

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15.1.1 Action on Stakeholder Meeting point

| SN-1 | No Action is Required |
|--------------------|--|
| SN-2 | The HFL level of Ganga River at Triveni Ghat is 341.72m which is provided by CWC & Irrigation Department, Uttarakhand. |
| SN-3 | Open Parking is proposed in the station area at ISBT, Rishikesh. |
| SN-4 & SN-5 & SN-6 | The Marking of Ropeway tower was done. The height of tower is considered in this manner so that the minimum clearances from bottom of Gondola to the top of building should be 10m. |
| SN-7 | As per letter संख्या 1995/V-2-2017-58(आटो) / 2014 dated 29.11.2017, para no. क (2) other infrastructure facilities development work and related construction is permissible within 100m. |



15.2 Minutes of the Stakeholder Meeting at Neelkanth



Minutes of Meeting of Stakeholders for the work "Appointment of Technical Consultant to Prepare Feasibility Report for Construction of Ropeway from Rishikesh to Neelkanth in Uttarakhand State.

As per the clause no. 5.6 of the Contract with M/s Indian Port Rail Corporation Ltd (IPRCL), one of the activity was to hold a Stake Holder meeting.

Meeting Held on: Date: 09.02.2021, starting time 16:00 Hrs at Neelkanth.

Venue: Neelkanth Mahadev Temple.

Attendance : As per the Annexure – 'A'

Photography: As per the Annexure – 'B'

A meeting of all stakeholders was organized under the chairmanship of Director (Project & Planning), Uttarakhand Metro Rail, Urban Infrastructure & Building Construction Corporation Limited. The object of the meeting was to apprise all stakeholders about the project and take their valuable inputs for making the project more useful and acceptable. Chairman welcomed the representatives of various departments, attending the Stakeholder Consultation meeting. He explained the background and objective of the meeting, explaining that M/s Indian Port Rail Corporation Ltd (IPRCL), has been engaged for the above noted work and explained its importance i.e. to provide seamless connectivity to Tourists / Pilgrims directly from Rishikesh to Neelkanth Mandir and Parvati Mandir and also to de-congest the traffic of Rishikesh. He also narrated that M/s Indian Port Rail Corporation Ltd (IPRCL) has conducted survey work for the whole site and various options have been considered for the alignment of Rope way. Further, Mr. Sanjiv Mhetre, GM/Mech from M/s Indian Port Rail Corporation Ltd (IPRCL) gave a Power Point Presentation and the team explained the alignment.

UKMRC wrote letters to various Stake Holder departments with a request to attend the meeting vide letter no. 656/UKMRC/2020/176 /Civil/ Ropeway/2020-21 dated 25-01-2021 as follows :-

A. Stakeholder meeting at Neelkanth Mahadev Temple.

1. जिलाधिकारी, पौड़ी गढ़वाल।
2. निदेशक, राजाजी राष्ट्रीय टाईगर रिजर्व पार्क, देहरादून।
3. उपजिलाधिकारी, कैम्प कार्यालय, लक्ष्मण झूला, ऋषिकेश, पौड़ी गढ़वाल।
4. अधीक्षक अभियन्ता, यू0पी0सी0एल, ऋषिकेश।
5. प्रभागीय वनाधिकारी, पौड़ी गढ़वाल।
6. महाप्रबन्धक, वी0एस0एन0एल, ऋषिकेश।
7. प्रभागीय वनाधिकारी, लैंसडौन, पौड़ी गढ़वाल।
8. प्रभागीय वनाधिकारी, पौड़ी गढ़वाल।
9. खण्ड विकास अधिकारी, यमकेश्वर, पौड़ी गढ़वाल।
10. त्हरीलदार, यमकेश्वर, कैम्प कार्यालय, लक्ष्मण झूला, पौड़ी गढ़वाल।
11. उत्तराखण्ड पाँचर वॉरपोरेशन, पौड़ी गढ़वाल।
12. पर्यटन विभाग, पौड़ी गढ़वाल।
13. थानाध्यक्ष, लक्ष्मण झूला, पौड़ी गढ़वाल।

R. J. Singh
Am/cont

UHP
Gm/IC



14. अध्यक्ष, टैवरी यूनिवर्सिटी, नीलकण्ठ महादेव, पौड़ी गढ़वाल।
15. अध्यक्ष, टैवरी यूनिवर्सिटी, ऋषिकेश।
16. ग्राम प्रधान, पुन्द्रासू, पौड़ी गढ़वाल।
17. ग्राम प्रधान, नीलकण्ठ, पौड़ी गढ़वाल।
18. ग्राम प्रधान, गाऊन, पौड़ी गढ़वाल।
19. महंता नीलकण्ठ मंदिर ट्रस्ट, पौड़ी गढ़वाल।
20. पार्वती मन्दिर ट्रस्ट, पौड़ी गढ़वाल।
21. अध्यक्ष गंगा प्राधिकरण, ऋषिकेश/हरिद्वार।

Following are the comments and observations received during the Presentation from the stakeholders at Neelkanth Mandir:

| S.No. | Observation Made | Response | Action to be Taken |
|-------|--|---|---|
| 1 | At Neelkanth Gram Pradhan/Touli has submitted his written representation having following points: | | |
| a | The appropriate land compensation and Job to one of the family member of each family giving their land for Proposed Ropeway Station at Neelkanth should be provided. | . The Compensation to the land owners will be given as per the prevailing provisions of compensation of Land by Govt. of Uttarakhand. During Discussion it was explained that this project is being planned on PPP model, Hence the provision of Employment is not possible. | |
| b | There should be relaxation on fare or discounted passes should be provided to the Villagers using Ropeway. | This project will be done on PPP model, Hence the provision of relaxation in fares cannot be done. However, provision of keeping a monthly pass at discounted fare will be considered. | M/s IPRCL may provide such provision in the Feasibility Report. |
| c | An Intermediate station should be made at Pundrasu Village which is approximately 1.5 Kms from Neelkanth Temple so that the villagers can be benefitted. | It was also explained that Intermediate station cannot be provided at Pundrasu Village as the Project will be done on PPP model and the Concessionaire may not be interested. | |
| d | Villagers are willing to provide their land for free for the pathway between Neelkanth Ropeway Station to Neelkanth Mandir. | As discussed with the villagers during meeting, they have given their willingness for giving the land for this pathway free of cost subject to fencing is not provided along the pathway. | |

R. K. Pant

J. P. Pant



| S.No | Observation Made | Response | Action to be Taken |
|------|---|--|--|
| e | No Fencing should be done along the pathway between Neelkanth Ropeway Station to Neelkanth Mandir. | Agreed, Fencing will not be provided at all locations except railing which is required for safety consideration. | |
| f | The appropriate Compensation should be given to the land owners whose land is falling below the alignment of the Ropeway. | This will be examined and action as per law will be taken. | |
| 2 | The Three locations of Neelkanth Ropeway terminal (one in front of Govt. Intercollege and two behind the Govt. Intercollege) were shown to all Stakeholders. For two locations Behind the Govt Intercollege, Pradhan & Up-Pradhan have agreed, accordingly location will be marked in white lime at site. Tehsildaar & Patwari were present in the Meeting. Patwari agreed to provide Khasra no. & Khatauni within 2 days for the marked area of the Ropeway terminal at Neelkanth. | UKMRC will decide one of the two agreed locations of the other side of the College and will demarcate. | M/s IPRCL to give the layout of the land required for the station with reference to Alignment. |

Note- The Villagers advised that they were not knowing that project will be done on PPP model. They have given the representation considering that Govt. of Uttarakhand is constructing the Ropeway on their own cost. If work is being done on PPP Model then above mentioned letter and its items are not required to be discussed.

Meeting ended with a vote of thanks to all the participants.

P. J. Pantwal

UKMRC



15.2.1 Action on Stakeholder Meeting point

| SN-1 (a) | No Action is Required |
|----------|--|
| SN-1 (b) | The provision of Monthly pass and relaxation for local people will be kept in the tender document. |
| SN-1 (c) | No Action is Required |
| SN-1 (d) | No Action is Required |
| SN-1 (e) | No Action is Required |
| SN-1 (f) | No Action is Required |
| SN-7 | The land required for the station is attached with this report. |



Annexure-D

| S. NO. | TOWER ID | NAME OF THE OWNER | OWNERSHIP TYPE PRIVATE / GOVERNMENT | OPEN AREA (IN SQM) |
|--------|--------------|------------------------------------|--|-----------------------|
| 1 | ISBT STATION | ISBT PROPERTY | GOVERNMENT PROPERTY | 4194 |
| | | IRRIGATION DEPARTMENT | RECLAIMED | 7611 |
| 2 | T-1 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 3 | T-2 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 4 | T-3 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 5 | T-4 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 6 | T-5 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 7 | T-6 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 8 | T-7 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 9 | | TRIVENI GHAT STATION | GOVERNMENT PROPERTY | 4992 |
| 10 | T-8 | IRRIGATION DEPARTMENT | GOVERNMENT PROPERTY | 64 |
| 11 | T-9 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 12 | T-10 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 13 | T-11 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 14 | T-12 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 15 | T-13 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 16 | T-14 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 17 | T-15 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 18 | T-16 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 19 | T-17 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |



| | | | | |
|----|------|--|--|-------|
| 20 | T-18 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 21 | T-19 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 22 | T-20 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 23 | T-21 | RAJAJI NATIONAL PARK TIGER RESERVE | GOVERNMENT PROPERTY | 64 |
| 24 | T-22 | | PRIVATE PROPERTY | 64 |
| 25 | T-23 | SHRI CHANDRA SINGH BISTH AND SHRI RAKESH SINGH RAWAT | PRIVATE PROPERTY | 64 |
| 26 | T-24 | UNKNOWN | PRIVATE PROPERTY | 64 |
| 27 | T-25 | UNKNOWN | PRIVATE PROPERTY | 64 |
| 28 | T-26 | SHRI SURESH SINGH CHAUHAN S/O CHATAR SINGH | PRIVATE PROPERTY | 64 |
| 29 | T-27 | SHRI RAJESH CHAUHAN | PRIVATE PROPERTY | 64 |
| 30 | T-28 | SHRI RAJESH CHAUHAN | PRIVATE PROPERTY | 64 |
| 31 | | NEELKANTH MAHADEV TEMPLE | GOVERNMENT PROPERTY AND PRIVATE PROPERTY | 17465 |
| 32 | | PATHWAY | GOVERNMENT PROPERTY AND PRIVATE PROPERTY | 3399 |
| 33 | T-29 | GOVT. SCHOOL | GOVERNMENT PROPERTY | 64 |
| 34 | T-30 | VED PRAKASH | PRIVATE PROPERTY | 64 |
| 35 | T-31 | GOVERNMENT LAND | GOVERNMENT PROPERTY | 64 |
| 36 | T-32 | GOVERNMENT LAND | GOVERNMENT PROPERTY | 64 |
| 37 | T-33 | GOVERNMENT LAND | GOVERNMENT PROPERTY | 64 |
| 38 | T-34 | GOVERNMENT LAND | GOVERNMENT PROPERTY | 64 |
| 39 | T-35 | PREM SINGH, RAJENDRA SINGH & RAVINDRA SINGH | PRIVATE PROPERTY | 64 |
| | | PATHWAY | GOVERNMENT LAND | |
| 40 | T-36 | SHRI BISHAN SINGH | PRIVATE PROPERTY | 64 |
| 41 | | PARVATI MATA TEMPLE STATION | PRIVATE PROPERTY | 2850 |



Implementation Plan

Following are the major steps in implementation of a passenger ropeway:

- 1) Preparation of Feasibility Report/
- 2) Preparation of Bid Documents
- 3) Bid Evaluation and Award of contract
- 4) Condition Precedent Period
- 5) Construction Period
- 6) Operation and Maintenance during the concession period.

1. Preparation of Feasibility Report:

The detailed Project report must be prepared. Following should be the main contents of the DPR:

- Preliminary survey of ropeway site
- Identifying suitable locations for lower station and upper station
- Selection of ropeway alignment
- Topographic survey of selected ropeway alignment
- Traffic study
- Ropeway system selection based on traffic study and topographic inputs
- Geotechnical Investigation as per requirement
- Detailed Cost Estimation
- Inputs on environmental impact of the project due to land use, power supply, water supply, atmospheric emission, solid and hazardous waste generation and its mitigation.
- Financial ROR
- Suggesting financial models for execution of the project.

2. Preparation of Bid Documents:



Bid Documents consists of RFP (Request for Proposal) and DCA (Draft Concession Agreement) for PPP mode Project.

3. Bid Evaluation and Award of Contract

NIT is issued for inviting tenders offline/ Online. This is generally followed by Pre-Bid wherein prospective bidders are invited to get their queries clarified from the authority. The Bid Documents are modified by issuing Corrigendum for the accepted queries. Finally the Bids submitted are opened on a specified date and eligible bids are evaluated in the light of bidding parameter before awarding the contract.

4. Condition Precedent Period

Following activities are carried out during this period: -

- Acquisition and transfer of land earmarked for the project.
- Securing clearance for the project such as Forest Clearances, Environment Clearances, Wildlife Clearances etc.
- Getting all local clearances and NOCs to start construction activities.
- Detailed Design of the Ropeway System. The Concessionaire may undertake important surveys like Geo- Tech Investigation, Traffic Survey, Topography Surveys etc. required for design of the system.
- Financial closure.
- Shifting of Utilities, if required.
- Any other compliance as per RFP and DCA.

5. Construction Period

This covers all activities in detail for the design and construction of a Passenger Ropeway Project. This period can be divided into following three phases -

- i. Design checking of the Ropeway.
- ii. Quality check during execution phase.



- iii. System testing for commissioning of the system, whereby, after the internal tests of the supplier, the notified and accredited inspection body, will do the final safety tests on the installation and issue safety certification to the installation to open it for public use.:

6. O & M of Ropeway System

The ropeway system is to be operated and maintained as per the maintenance schedules prescribed by system supplier. For long term trouble-free and safe operation of ropeways, preventive maintenance schedule are prescribed by OEMs. OEMs supply the maintenance manual at the time of supply of the equipments. All the equipments should be strictly maintained as given in the maintenance manual. The concessionaire shall plan the maintenance as per the standard schedules and employ the qualified maintenance personnel to undertake the maintenance activities and also ensure adequate availability of spare parts.

7. Facilities required:

Facilities are required for easy and smooth operation of the ropeway system. These facilities are required for passengers and operating staff. Following facilities are proposed for this ropeway project: -

- Adequate space for Boarding and Deboarding for passenger
- Ticket Counters, Ticket Vending Machines
- Basic Public Utilities
- Vehicle Parking
- Queue Area
- Control Room at each station
- Maintenance Room
- Gondola parking
- Service Area
- Restaurant and Food Court
- Retail Area
- First Aid Room



Institutional and Legal Framework

1. Concessioneing Authority

A concession or concession agreement is a grant of rights, land or property by a government, local authority, corporation, individual or other legal entity to a private company. In this case the authority which has the right to grant rights, land, properties to a developer is the Concessioneing Authority.

2. Concessionaire

In PPP project model, the developer is selected through competitive bidding. The developer such selected is the concessionaire who Design, Build, Operate, Finance and Maintain (DBFOT) the facility. In turn he gets the rights to collect revenue from the operation of the facility for a pre-defined period of years.

3. Uttarakhand has Uttarakhand Ropeways Act, 2014 to authorize, facilitate and regulate the construction, operations and maintenance of ropeways in the State. The Ropeway will be administered according to the provision of this act.

Ropeway Stations Plot Co-ordinates and Tree Details

ISBT Ropeway Station Plot Co-ordinates and Tree Details:



| Co-ordinates | |
|--------------|----------------------------|
| Point -1 | X=239657.187 Y=3334161.688 |
| Point -2 | X=239667.721 Y=3334169.358 |
| Point -3 | X=239568.142 Y=3334360.541 |
| Point -4 | X=239489.605 Y=3334360.549 |
| Point -5 | X=239450.253 Y=3334319.692 |
| Point -6 | X=239547.594 Y=3334290.954 |

| Tree Details at ISBT Rishikesh | | |
|--------------------------------|-----------------|----------------------|
| S.no | Species of Tree | Girth of Tree (in m) |
| 1 | Pipal | 2.50 |
| 2 | Pipal | 0.70 |
| 3 | Kanju | 0.90 |
| 4 | Pipal | 2.45 |
| 5 | Pipal | 0.85 |
| 6 | Kanju | 0.60 |
| 7 | Sheelam | 0.85 |
| 8 | Pipal | 2.40 |
| 9 | Pipal | 0.80 |
| 10 | Pipal | 0.80 |
| 11 | Pipal | 0.50 |
| 12 | Other Kanju | 0.80 |
| 13 | Other Kanju | 0.55 |
| 14 | Other Kanju | 1.50 |



Triveni Ghat Ropeway Station Co-ordinates and Tree Details:

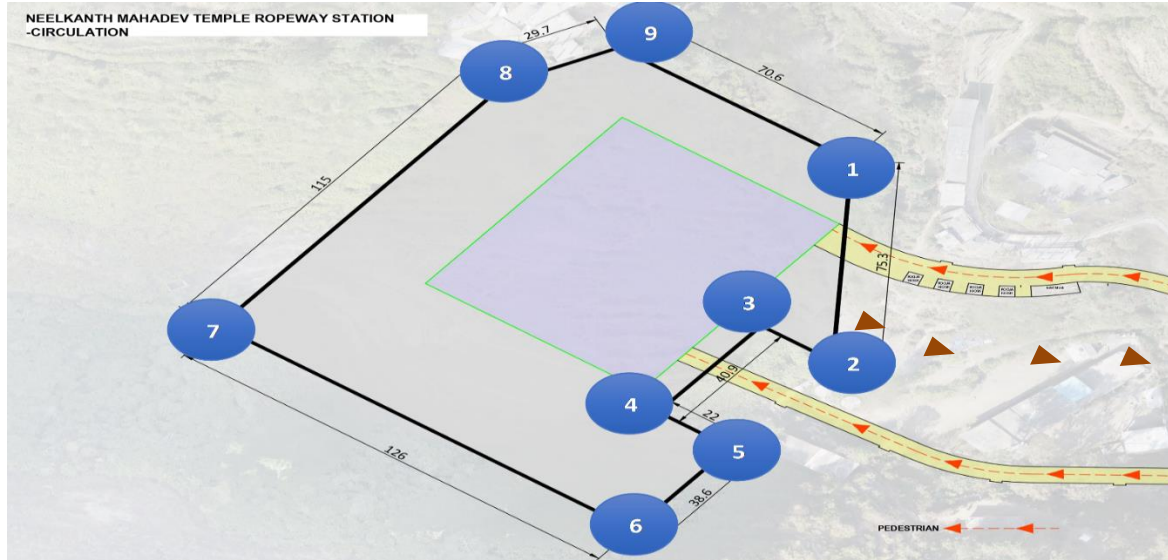


| Co-ordinates: | |
|---------------|----------------------------|
| Point -1 | X=240342.767 Y=3333473.622 |
| Point -2 | X=240379.817 Y=3333519.145 |
| Point -3 | X=240266.703 Y=3333611.206 |
| Point -4 | X=240257.593 Y=3333601.256 |
| Point -5 | X=240288.097 Y=3333568.495 |
| Point -6 | X=240329.561 Y=3333473.622 |

| Tree Details at Triveni Ghat | | |
|------------------------------|-----------------|--------------------|
| S.no | Species of Tree | Girth of Tree in m |
| 1 | Pipal | 2.00 |
| 2 | Eucalyptus | 1.10 |
| 3 | Eucalyptus | 1.20 |
| 4 | Kanju | 0.80 |
| 5 | Pipal | 2.90 |
| 6 | Harudai | 0.30 |
| 7 | Gooler | 1.00 |
| 8 | Gooler | 1.05 |
| 9 | Gooler | 1.10 |
| 10 | Amrood | 0.50 |
| 11 | Sahjan | 0.90 |
| 12 | Kukat | 0.70 |
| 13 | Bargad | 2.50 |
| 14 | Sahjan | 0.70 |
| 15 | Pipal | 1.20 |
| 16 | Pipal | 2.60 |



Neelkanth Mahadev Temple Ropeway Station Co-ordinates and Tree Details:



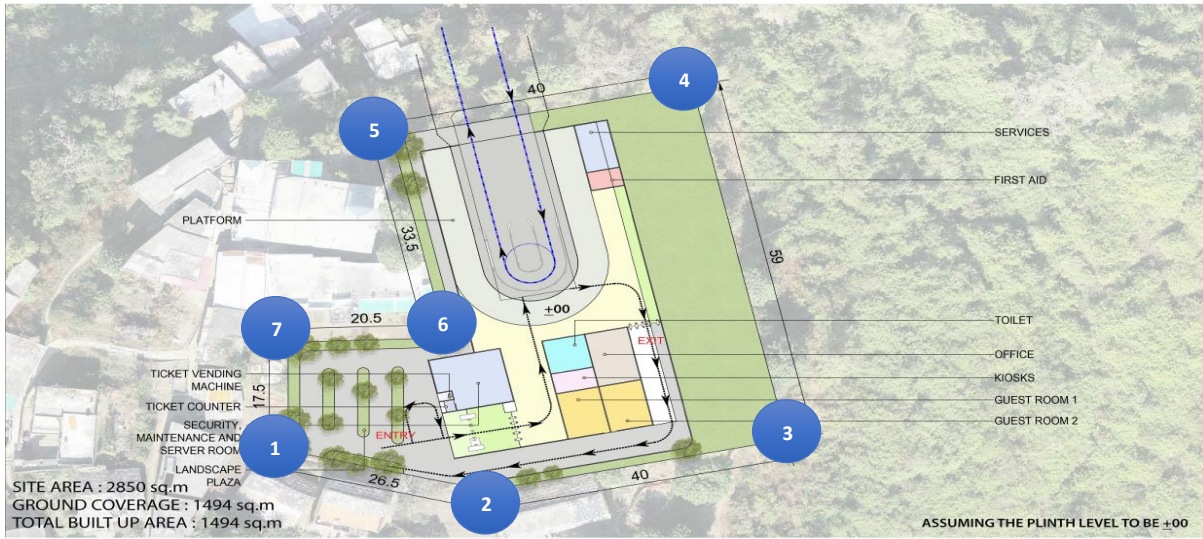
| Co-ordinates | |
|--------------|----------------------------|
| Point -1 | X=243468.753 Y=3331031.323 |
| Point -2 | X=243464.235 Y=3330956.013 |
| Point -3 | X=243446.762 Y=3330969.381 |
| Point -4 | X=243421.923 Y=3330936.915 |
| Point -5 | X=243439.436 Y=3330923.600 |
| Point -6 | X=243416.030 Y=3330892.855 |
| Point -7 | X=243315.832 Y=3330969.252 |
| Point -8 | X=243385.564 Y=3331060.709 |
| Point -9 | X=243412.293 Y=3331073.722 |

| Tree Details at Neelkanth station including Tower no 27 & 28 | | |
|--|-----------------|--------------------|
| S.no | Species of Tree | Girth of Tree in m |
| 1 | Bimal | 0.85 |
| 2 | Beru/sagon | 0.75 |
| 3 | Beru/sagon | 0.40 |
| 4 | Alwal | 0.50 |
| 5 | Sisum | 0.70 |
| 6 | Bukon | 0.25 |
| 7 | Amaltus | 0.30 |
| 8 | Kukat | 0.80 |
| 9 | Bimal | 0.30 |
| 10 | Kukat/Pipal | 0.80 |
| 11 | Bimal | 0.30 |
| 12 | Bimal | 0.40 |
| 13 | Kukat | 0.30 |
| 14 | Bimal | 0.65 |
| 15 | Other | 0.70 |
| 16 | Bimal | 0.60 |
| 17 | Timla | 0.70 |
| 18 | Redi | 0.35 |
| 19 | Bimal | 0.30 |
| 20 | Kukat | 0.70 |
| 21 | Bimal | 0.65 |
| 22 | Other | 0.30 |
| 23 | Bedo | 0.45 |
| 24 | Other | 0.30 |
| 25 | Other | 0.35 |



Parvati Mata Temple Ropeway Station Co-ordinates:

PARVATI TEMPLE
-GROUND / PLATFORM LEVEL FLOOR PLAN



CHAPMAN TAYLOR

| Co-ordinates | |
|--------------|----------------------------|
| Point -1 | X=243677.200 Y=3329707.961 |
| Point -2 | X=243703.031 Y=3329701.485 |
| Point -3 | X=243742.042 Y=3329709.770 |
| Point -4 | X=243729.738 Y=3329767.699 |
| Point -5 | X=243690.683 Y=3329759.391 |
| Point -6 | X=243697.681 Y=3329726.417 |
| Point -7 | X=243677.200 Y=3329725.708 |

| Tree Details at Parvati station | | |
|---------------------------------|-----------------|--------------------|
| S.no | Species of Tree | Girth of Tree in m |
| 1 | Bimal | 1.10 |
| 2 | Bimal | 1.60 |
| 3 | Bimal | 0.75 |
| 4 | Timlu | 0.93 |
| 5 | Bimal | 2.30 |
| 6 | Other | 0.90 |
| 7 | Timlu | 1.30 |
| 8 | Timlu | 1.65 |
| 9 | Other | 0.45 |
| 10 | Timlu | 1.20 |
| 11 | Other | 1.10 |
| 12 | Khadi | 0.85 |
| 13 | Bimal | 0.90 |
| 14 | Other | 0.84 |
| 15 | Bimal | 0.42 |
| 16 | Bimal | 0.45 |
| 17 | Bimal | 0.90 |
| 18 | Other | 1.45 |
| 19 | Bimal | 1.50 |
| 20 | Other | 0.44 |
| 21 | Other | 1.00 |
| 22 | Other | 0.54 |