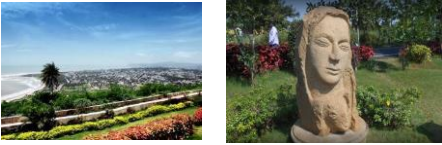


ENVIRONMENTAL ASSESSMENT REPORT



CONSULTANCY SERVICES FOR PREPARATION OF MASTER PLAN, DETAILED DESIGN AND SUPERVISION OF WORKS FOR THE RESTORATION AND REDEVELOPMENT OF 380 ACRE KAILASAGIRI HILL TOP PARK AT VISAKHAPATNAM



CONSULTANCY SERVICES FOR PREPARATION OF MASTER PLAN, DETAILED DESIGN AND SUPERVISION OF WORKS FOR THE RESTORATION AND REDEVELOPMENT OF 380 ACRE KAILASAGIRI HILL TOP PARK AT VISAKHAPATNAM

IDENTIFICATION TABLE

Client/Project owner	VISAKHAPATNAM URBAN DEVELOPMENT AUTHORITY, ANDHRA PRADESH
Project	CONSULTANCY SERVICES FOR PREPARATION OF MASTER PLAN, DETAILED DESIGN AND SUPERVISION OF WORKS FOR THE RESTORATION AND REDEVELOPMENT OF 380 ACRE KAILASAGIRI HILL TOP PARK AT VISAKHAPATNAM
Type of document	ENVIRONMENTAL ASSESSMENT REPORT
Confidentiality	YES
Language	ENGLISH
Number of pages	77

DISCLAIMER

All rights reserved. The report and maps have been prepared as part of the, Consultancy Services For Preparation Of Master Plan, Detailed Design And Supervision Of Works For The Restoration And Redevelopment Of 380 Acre Kailasagiri Hill Top Park At Visakhapatnam, Andhra Pradesh No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of Visakhapatnam Urban Development Authority, Andhra Pradesh.

The designations employed and the presentation of the material in the report, maps or any part of the document prepared for the Consultancy Services For Preparation Of Master Plan, Detailed Design And Supervision Of Works For The Restoration And Redevelopment Of 380 Acre Kailasagiri Hill Top Park At Visakhapatnam, do not imply the expression of any opinion whatsoever on part of Vishakhapatnam Urban Development Authority, Andhra Pradesh. Or SAI Consulting Engineers Private Limited concerning the legal status of any state, territory, city or area, or of its authorities, or concerning delimitation of its boundaries, or regarding the degree of data and development. The analysis, conclusions and recommendations of the report do not necessarily reflect the views of Visakhapatnam Urban Development Authority, Andhra Pradesh. or SAI Consulting Engineers Private Limited.

TABLE OF CONTENTS

1.	INTRODUCTION	8
1.1	PROJECT BACKGROUND	8
1.2	OBJECTIVES	9
1.3	PROJECT LOCATION	9
1.4	DISASTER & NATURAL CALAMITIES	12
1.5	EXISTING LANDUSE AND PERMISSIBLE USES	12
1.6	MASTER PLAN FOR REDEVELOPMENT OF KILASAIRI	13
1.6.1	PROPOSED COMPONENTS OF MASTER PLAN	14
2.	PROJECT DESCRIPTION	15
2.1	FINAL MASTER PLAN	15
2.2	DESIGN IMPETUS	16
2.3	PROPOSED PROJECT	17
2.3.1	AMPHITHEATRE & EVENT AREA	17
2.3.2	AMUSEMENT & GAMING ARENA	17
2.3.3	CHILDREN'S PLAY AREA	18
2.3.4	FOOD JOINTS	19
2.3.4.1	Food Joint – 1 (FJ1)	20
2.3.4.2	Food Joint – 2 (FJ2)	20
2.3.5	GARDEN RESTAURANT	21
2.3.6	REST SHELTERS	22
2.3.7	SITTING AREA	23
2.3.8	STAFF REST AREA & ADMINISTRATIVE BUILDING	23
2.3.9	TERRACE GARDEN	24
2.3.10	PARKING IMPROVEMENT	25
2.3.11	PROPOSED PARKING SITES	25
2.3.12	GHAT ROAD DEVELOPMENT	27
2.3.13	VIEW POINTS	28
2.3.13.1	Proposed View Point -1 (VP1)	28
2.3.13.2	Proposed View Point – 2 (VP2)	28
2.3.13.3	Proposed View Point – 3 (VP3)	28
2.3.14	VIEWING GALLERY	29
3.	LEGAL POLICY & ADMINSTRATIVE FRAMEWORK	30
3.1	ENVIRONMENTAL LAWS, ACTS & RULES	30
3.1.1	EIA NOTIFICATION, 2006 (AS AMENDED IN 2009)	30
3.1.2	THE FOREST (CONSERVATION) ACT, 1980	30
3.1.3	WILD LIFE PROTECTION ACT, 1972	30
3.1.4	COASTAL REGULATION ZONE (CRZ) NOTIFICATION, 2011 (AMENDED IN 2018)	31
3.1.5	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000	31
3.1.6	WATER PREVENTION & CONTROL OF POLLUTION ACT, 1974	31
3.1.7	AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981	31
3.1.8	ANDHRA PRADESH WATER, LAND & TREE ACT, 2002 (APWALTA-2002)	31
3.1.9	SOLID WASTE MANGEMENT RULES, 2016	31
3.1.10	CONSTRUCTION & DEMOLITION WASTE MANAGEMENT RULES, 2016	32
3.1.11	WORLD BANK POLICIES	32
3.1.11.1	Environmental Assessment (OB/BP 4.01)	32

3.1.11.2	Natural Habitats (OB/BP 4.04)	32
3.1.11.3	Physical Cultural Resources (OB/BP 4.11)	32
3.1.11.4	Forest (OB/BP 4.36)	32
4.	DESCRIPTION OF ENVIRONMENT	33
4.1	CLIMATE	33
4.2	CYCLONE	35
4.3	RAINFALL	36
4.4	FLORA & FAUNA	36
4.5	SOIL	36
4.6	MINERALS	36
4.7	DEMOGRAPHY	37
4.8	LAND-USE	37
4.9	DRAINAGE	38
4.10	DISASTER MANAGEMENT	38
4.11	KAILASAGIRI HILL PARK	38
4.11.1	GENERAL CHARACTER	38
4.11.2	PUBLIC AMENITIES & UTILITIES	39
4.11.3	PARKING	39
4.11.4	SAFETY & SURVEILLANCE	39
4.12	CONCLUSION	40
5.	ENVIRONMENTAL IMPACT & MITIGATION MEASURES	41
5.1	ENVIRONMENTAL SCREENING REPORT	41
5.2	IDENTIFICATION OF LIEKLY IMPACTS	41
5.2.1	IMPACTS DURING CONSTRUCTION PHASE	41
5.2.1.1	LANDUSE & LANDSCAPE OF THE SITE	41
5.2.1.2	AIR QUALITY	42
5.2.1.3	NOISE LEVELS	42
5.2.1.4	WATER QUALITY	42
5.2.1.5	OCCUPATIONAL HEALTH AND SAFETY	42
5.2.1.6	ECOLOGY	42
5.2.1.7	FLORA & FAUNA	43
5.2.1.8	SOIL & GEOLOGY	43
5.2.1.9	WEATHER & CLIMATE	43
5.2.2	MITIGATION MEASURES	43
5.2.2.1	LANDUSE & LANDSCAPE OF THE SITE	43
5.2.2.2	AIR QUALITY	43
5.2.2.3	NOISE LEVELS	43
5.2.2.4	WATER QUALITY	44
5.2.2.5	OCCUPATIONAL HEALTH AND SAFETY	44
5.2.3	MONITORING	44
5.2.4	IMPACTS DURING OPERATION PHASE	48
5.2.5	POTENTIAL POSITIVE ENVIRONMENTAL IMPACTS OF THE PROJECT	49
6.	ENVIRONMENTAL MANAGEMENT PLAN	50
6.1	OBJECTIVES	50

6.2	ENVIRONMENTAL MANAGEMENT ACTION PLAN	50
6.3	COST ESTIMATE FOR ENVIRONMENTAL MANAGEMENT PROGRAM	66
7.	CONCLUSION	67
8.	ANNEXURE-01	68

LIST OF FIGURES

Figure 1.	Location Map of Kailasagiri Hill Park	10
Figure 2.	Entrance to Kailasagiri Hill park	10
Figure 3.	Approach Road to Kailasagiri Hill park	10
Figure 4.	Battery Operated Vehicles for visitors	10
Figure 5.	Rope Way	10
Figure 6.	Toy Train	11
Figure 7.	Toy Train Track	11
Figure 8.	Shiv Parvathi Idol	11
Figure 9.	Various Sculptures in Hill Park	11
Figure 10.	Floral Clock	11
Figure 11.	Park Area	11
Figure 12.	Children's Play Area	11
Figure 13.	Children's Play Equipment's	11
Figure 14.	Existing Amusement park	12
Figure 15.	Children's Park Sculptures	12
Figure 16.	Existing Land Use of Visakhapatnam City	13
Figure 17.	Base Map of Kailasagiri Hill Park	15
Figure 18.	Proposed Master Plan	16
Figure 19.	Amphitheatre	17
Figure 20.	Amusement & Gaming Arena	18
Figure 21.	Children's Park	19
Figure 22.	Food Court 1	20
Figure 23.	Food Court 2	21
Figure 24.	Garden Restaurant	22
Figure 25.	Rest Shelter	23
Figure 26.	Sitting Area	23
Figure 27.	Administrative Building	24
Figure 28.	Terrace Garden	25
Figure 29.	Parking	26
Figure 30.	Ghat Road	27
Figure 31.	View Point Type-1	28
Figure 32.	View Point Type-2	28
Figure 33.	View Point Type-3	29
Figure 34.	Viewing Gallery	29
Figure 35.	Average Temperature & Precipitation for Vishakhapatnam	33
Figure 36.	Cloudy, Sunny & Precipitation Days for Vishakhapatnam	34
Figure 37.	Maximum recorded temperatures for Vishakhapatnam	34
Figure 38.	Precipitation Amount for Vishakhapatnam	35
Figure 39.	Wind Rose Diagram for Vishakhapatnam	35
Figure 40.	Hud Hud Landfall at Peak Strength- Eastern Coast of India	35
Figure 41.	Open Spaces	38
Figure 42.	Natural Jungle	38
Figure 43.	Landscape in Garden Areas	39
Figure 44.	Landscape in Sculpture Park	39
Figure 45.	Lack of Parking Area at Peak times during holidays	39

LIST OF TABLES

Table 1	Demographic Details	37
Table 2	Land Use Details	37
Table 3	Environmental Monitoring Plan	44
Table 5	Environmental Management Action Plan	50
Table 6	Cost for EMP	66

1. INTRODUCTION

Vishakhapatnam city is known for its pristine beaches, natural beauty and scenic landscape along with a rich cultural and historical heritage. The city is blessed with rich flora & fauna, scenic beaches made up of small hills, religious and cultural significance as well as a dynamic past. It's a great place to experience all types of activities from bird watching to enjoying a dynamic natural terrain, churches, temples and so on. It has beaches along the Bay of Bengal, only made more picturesque by the surrounding vegetation. The city is blessed with ample public spaces like Venkateshwara Temple, Baba Ishaq Madina Dargah, Church of the Virgin Mary, VUDA Park, Kailasagiri Hill Park and many other within the city and along the beachfronts. These key characteristics of the city attracts a lot of tourists, both local and national to various destinations within the city of Vizag.

Kailasagiri is a famous tourist attraction point in the city. It was established by Vishakhapatnam Urban Development Authority and was announced plastic-free zone. The park is located at 360 feet high hill offering a panoramic view of the serene surroundings. Kailasagiri is emerging as picnic spot and weekends getaways. It spans over 129 hectares of land having lush green grass and tropical shrubs & trees. The Vishakhapatnam city and forests are easily visible on the other edges. The main focal point in the park is a statue of Lord Shiva and Parvati. The exquisite is made of white marble and has a height of about 40 feet. The park got its name from this statue of Lord Shiva. The Floral watch of the park is another appealing attraction. It has a huge diameter of 10 feet and has an elegant framework. Other nearby attractions are Shanti Ashram, Seven wonders of Vishakhapatnam, Titanic view point, Jungle trails, Telegu Musuem, Shanku chakra Naama and many more. The tourists can also take the ropeway service to reach the hills. It is estimated that the hill top park is visited by around ten lakh tourists every year. The government of Andhra Pradesh awarded Kailasagiri as best Tourist Spot in 2003.

1.1 PROJECT BACKGROUND

The City of Visakhapatnam was hit by Hud-hud cyclone on 12th & 13th October 2014. The city suffered massive devastation. Winds during severe cyclonic storm damaged public and private properties and importantly majority of the green cover in the city almost disappeared. Kailasagiri, also bore the brunt of Hud-hud's devastating blow. Greenery atop the picturesque hill was wiped out and the ropeway from the foot to the top of the hill also got damaged. The Joy train also got derailed. In view of the devastation suffered by the Hill park the custodian of the park, VMRDA decided to redevelop the same to bring it back to its old glory.

The Government of India has received a Loan from the World Bank towards the cost of Andhra Pradesh Disaster Recovery Project (APDRP) in Andhra Pradesh, India and intends to apply a part of the proceeds for consulting services. The Visakhapatnam Metropolitan Region Development Authority (VMRDA), a Project Implementation Unit for the project has selected 'SAI Consulting Engineers, Systra Group' in JV with Abha Narain Lambah Associates, Mumbai (consultants) for Project Management Consultancy Services "for Master Planning, Detailed Engineering and Construction Management" of Kailasagiri Hill Park at Visakhapatnam including preparation of bidding documents of works contracts as per World Bank guidelines and support in procurement process.

Through APDRP, Government of Andhra Pradesh intends to redevelop & restore Kailasagiri Hill park for recreational purpose through introduction of various recreational activities, improving infrastructure facilities available on Kailasagiri Hill Top along with its resilience of infrastructure and its environs from disasters of similar nature.

The entire project of Restoration & Redevelopment of Kailasagiri Hill Top Park is sub divided into two stages: -

Wherein various sub-tasks identified for Design Phase are as follows: -

1. Preparation of Master Plan
2. Feasibility Studies
3. Detailed Design Report &
4. Bid Documents

This report is part of the detailed design report stage, in which the consultants assess the environmental factors pertaining to the existing conditions, proposed project and its influence on the project area and adjoining surroundings during construction and operation phase of the proposed project. This environmental assessment report is focused on identifying the environmental impacts and proposing effective management measures to be adopted for overall protection and improvement of the quality of environment in the project area. It also aims at aligning the proposed development works are in compliance with environmental & social management framework of APDRP along with other statutory & policy requirements of World Bank.

1.2 OBJECTIVES

The main objective of environmental assessment of the project is to understand, identify & mitigate the potential environmental impacts, health & safety aspects of the project implementation and operation.

1.3 PROJECT LOCATION

The Kailasagiri Hill is around 20 km from Vishakhapatnam Airport and 15 km from Vishakhapatnam Railway station. It is located on the eastern coast of India in Visakhapatnam District in the State of Andhra Pradesh. The extent of project site which is around 129 Ha, is shown in the figure along with its location map. The site is accessed through Kailasagiri Ghat road from Police quarters road on the northern part of the hill, which further connects the beach road on the eastern side of the hill.



Figure 1. Location Map of Kailasagiri Hill Park

Project location features are illustrated in the figure below.



Figure 2. Entrance to Kailasagiri Hill park



Figure 3. Approach Road to Kailasagiri Hill park



Figure 4. Battery Operated Vehicles for visitors



Figure 5. Rope Way



Figure 6. Toy Train



Figure 7. Toy Train Track



Figure 8. Shiv Parvathi Idol



Figure 9. Various Sculptures in Hill Park



Figure 10. Floral Clock



Figure 11. Park Area



Figure 12. Children's Play Area



Figure 13. Children's Play Equipment's



Figure 14. Existing Amusement park



Figure 15. Children's Park Sculptures

1.4 DISASTER & NATURAL CALAMITIES

Cyclones are a recurrent phenomenon observed in Vishakhapatnam due to its proximity to Bay of Bengal. Tropical cyclones generally occur during pre-monsoon (April-May) and Post Monsoon (October-December). Total 44 cyclones have passed at a wind speed of 150 kmph speed from Visakhapatnam city (1877-2013) (UNDP, July). Cyclones are accompanied by heavy rains and tidal waves which inundate coastal areas causing huge loss to human life, huts, houses, crops, cattle, irrigation, roads and public and private buildings. The city experienced a very severe cyclonic storm "Hudhud" with a wind speed of about 200 kmph and a wave height of 3 m. The maximum storm surge reported at Visakhapatnam was 1.4 m above the astronomical tide. The cyclone made a landfall on 12th October 2014 near Visakhapatnam affecting the agriculture, horticulture, fisheries, livestock, infrastructure like roads, communication, buildings, water supply, etc. Although early prediction helped evacuating nearly 1.35 lakh people from the low-lying areas, the damage to infrastructure couldn't be prevented and resulted in loss of livelihood, uprooting of trees, damaged electric and mobile towers, loss of roofs tops, damage to crops, disruption to rail & road traffic, etc. (Sheethal, Sammaiah, & Devi, 2014)

The cyclonic wind hazard analysis of historical cyclone tracks carried out by United Nations Development Program based on its characteristics (both severity and frequency) as a part of the Hazard Risk and Vulnerability Analysis (HRVA) in July 2014 shows that before Hud-Hud, the city has experienced severely cyclonic winds particularly in the recent past.

- Very Severe Cyclonic Storm of November 1998, 143 kmph
- Severe Cyclonic Storm of Oct 1985, 93 kmph
- Cyclonic Storm of June 1996, 84 kmph

1.5 EXISTING LANDUSE AND PERMISSIBLE USES

As per the approved zonal development plan 2021 for Visakhapatnam Metropolitan Region, Kailasagiri Hill located in Chinna Gadili village survey number 150 is designated as recreational land use.

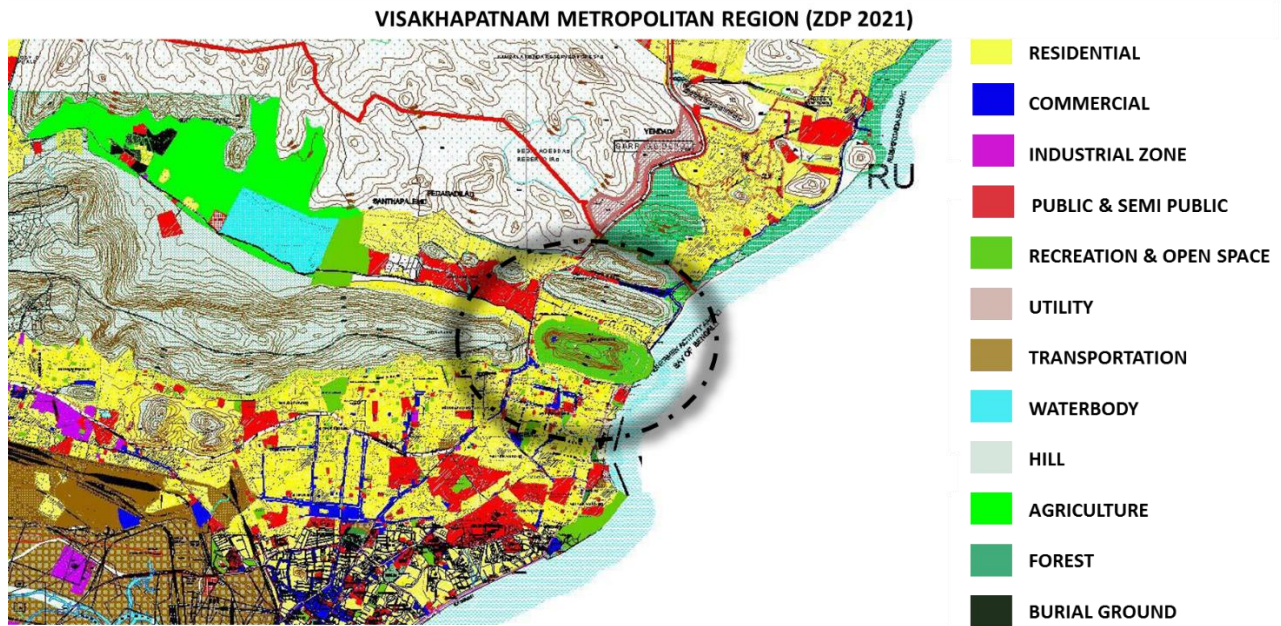


Figure 16. Existing Land Use of Visakhapatnam City

1.6 MASTER PLAN FOR REDEVELOPMENT OF KAILASAIRI

Based on site assessment, existing site conditions, studies of data from primary & secondary sources and stakeholder consultation, discussions with various line departments, VMRDA technical committee, the consultants have formulated the master plan for redevelopment of Kailasagiri Hill Top Park.

The master plan formulated is a mix of active and passive recreation facilities which will engage and attract park users of all age group. During the master plan formulation process, it was evident from various discussions and stakeholder consultations that there is a strong desire among the key stakeholders to make Kailasagiri Hill Park a world class destination and at the same time there was also a suggestion not to change the existing character of the Hill Park and to retain it while introducing new facilities. Keeping these important point of views, the Kailasagiri hill park master plan is derived as a facility which have a lots of nature zones to relax from the hustle of a City like Vishakhapatnam and at the same time have attraction for adventure and entertainment seeking tourist to spend a fun filled day and enjoy the hospitality of Vishakhapatnam. The master plan consists of various development project aimed at improving the recreational and infrastructure facilities at Kailasagiri Hill Park for making the experience of visiting the Hill park a memorable experience for the visitors and also a boost to the local economy.

As part of the redevelopment & restoration master plan prepared by the consultant, it is proposed to develop recreational facilities focusing on landscape improvements and developing activities which require minimum construction and building developments. Majority of the development activities proposed to enhance the tourism experience at Kailasagiri hill park are eco-friendly activities. As per the Development Control Regulation of VMRDA, recreational land use has a permissible built-up of 10%, the master plan proposes a total built-up percentage of 1.1%. The consultants have focused on providing recreational activities for local and tourist visiting parks through eco-friendly means by reducing the requirement of large-scale construction activities and focus was mainly of landscape improvements and utilization of existing plantations and green areas to create nature friendly recreational activities. The overall restoration and redevelopment efforts are predominantly focused on design features that are environmentally friendly and suited to the needs of women children, elderly and differently-abled persons. Major efforts are put in place to have proper water supply system, drainage, irrigation, solid waste management, lighting, and other utilities.

Based on the studies, surveys, analysis, and feedbacks from client & stakeholders including the funding agency, the consultants have formulated the Final Master Plan keeping the following criteria's: -

- Reorganizing & maximizing the parking area to regulate the traffic systematically
- Distribution of additional utilities
- Introduction of new activities along the movement route
- Improvement of existing activities
- Removing existing eye sore
- Redistribution of new improved facilities throughout the park area

1.6.1 PROPOSED COMPONENTS OF MASTER PLAN

Major components of the proposed and approved master plan

- Parking
- Pathways
- View Points
- Gardens
- Toilets
- Drinking Water Facilities
- Water Fountains
- Seating Areas
- Gaming Arena
- Administration Building
- Food Courts
- Kiosks
- Restaurant
- Children's Play Area
- Ghat Road Development
- Amphitheatre
- Access Control
- CCTV Surveillance & PA
- Architectural Lighting

2. PROJECT DESCRIPTION

The proposed project aims to redevelop Kailasagiri Hill Park as a world class tourist destination with good recreational opportunities supported by infrastructure facilities which will complement the hill park area.

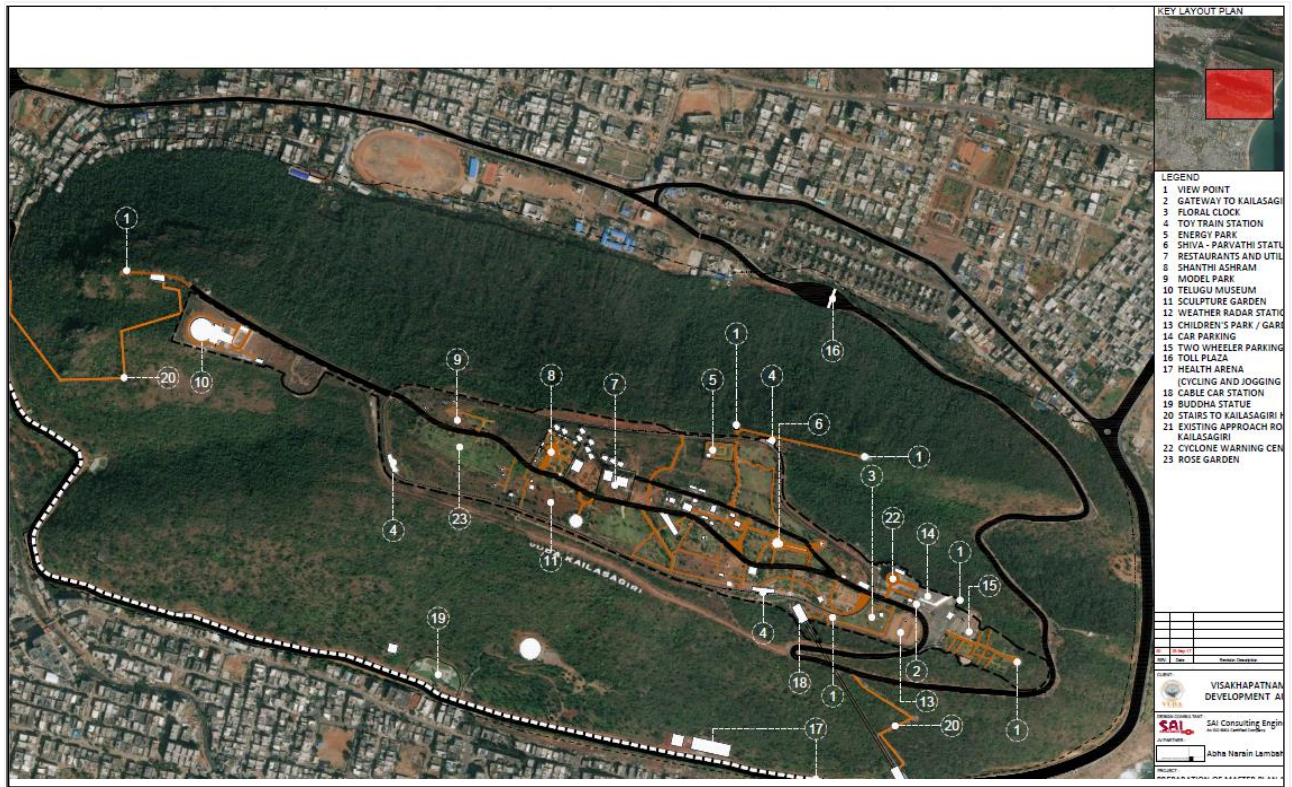


Figure 17. Base Map of Kailasagiri Hill Park

From the detailed study carried out by the consultants it is evident that the main design characteristics of Kailasagiri is that of a natural landscape area with haphazard development, minimum public utilities & amenities for tourists visiting the hill park. Also, the absence of recreational activities for all age group is evident the tourist finding it difficult to spend more time at the Hill Park.

The development strategies devised for the redevelopment of Kailasagiri Hill Park focus on improving the above-mentioned shortcomings with both primary and secondary interventions. Primary focus of the master planning efforts was to put in place the public amenities like toilets, rest areas, shelters, drinking water facilities, parking etc. Main focus of secondary interventions is at bringing more recreational opportunities for tourists along with improving the core infrastructure like water supply, drainage system, irrigation, wastewater treatment system, improvement in electricity network and circulation system. The master plan implementation will open up a secondary entrance from the western side which will be critical in controlling traffic movement and visitor movement at the hill park.

2.1 FINAL MASTER PLAN

The master plan formulated is a mix of active and passive recreation facilities which will engage and attract park users of all age groups. During the master plan formulation process, it was evident from various discussions and stakeholder consultations that there is a strong desire among the key stakeholders to make Kailasagiri Hill Park a world class destination and at the same time there was also a suggestion not to change the existing character of the Hill Park and to retain it while introducing new facilities. Keeping these important points of view, the Kailasagiri hill park master plan is derived as a facility which has a lot of nature zones to relax from the hustle of a city like Vishakhapatnam and at the same time have attraction for adventure and entertainment seeking tourists to spend a fun-filled day and enjoy the hospitality of Vishakhapatnam.



Figure 18. Proposed Master Plan

2.2 DESIGN IMPETUS

Detailed design for buildings in Kailasagiri Hill park is derived from many concepts working in tandem, like organizational concepts, material concepts, functional concepts, structural concept and formal concepts. This is also guided by the practical constraints which are assessed from the existing parameters which primarily consists of following information's: -

○ Site Information

- Climate
- Solar aspect
- Vegetation
- Neighbouring structures, if any
- Building context
- Site history and
- Unique liabilities or opportunity
- Legal framework
- Zoning Classifications

○ Client & Stakeholder Information

- Vision
- Preferences
- Agenda
- Program (Space, Size & list of requirements)
- Budget

○ Typology Information

- Purpose & Utility
- Type of Building
- Issues faced in similar buildings

From these the possibilities for building concepts or parti (prendre parti) is arrived at. Buildings were designed to interpret their surroundings and reformulate in a way to enhance the experience of tourists and visitors visiting Kailasagiri Hill Park.

2.3 PROPOSED PROJECT

2.3.1 Amphitheatre & Event Area

This is the area proposed where Entertainment programs like Music Shows, Theatre Talks, Poetry, Documentary Screening, Language Festivals, Art Competitions can be held. The approximate area of the Amphitheatre & Event Area is proposed to be 1,460 sq.mt. Administrative block and toilet block are also provided for better user experience. Ticket window is accommodated in the administrative building. Toilet block is proposed in the vicinity of the Amphitheatre so that it can be utilized during events/evening programs. Food court with open air seating facility is also proposed in front of Amphitheatre to enhance the usage and integrated landscaped setting.

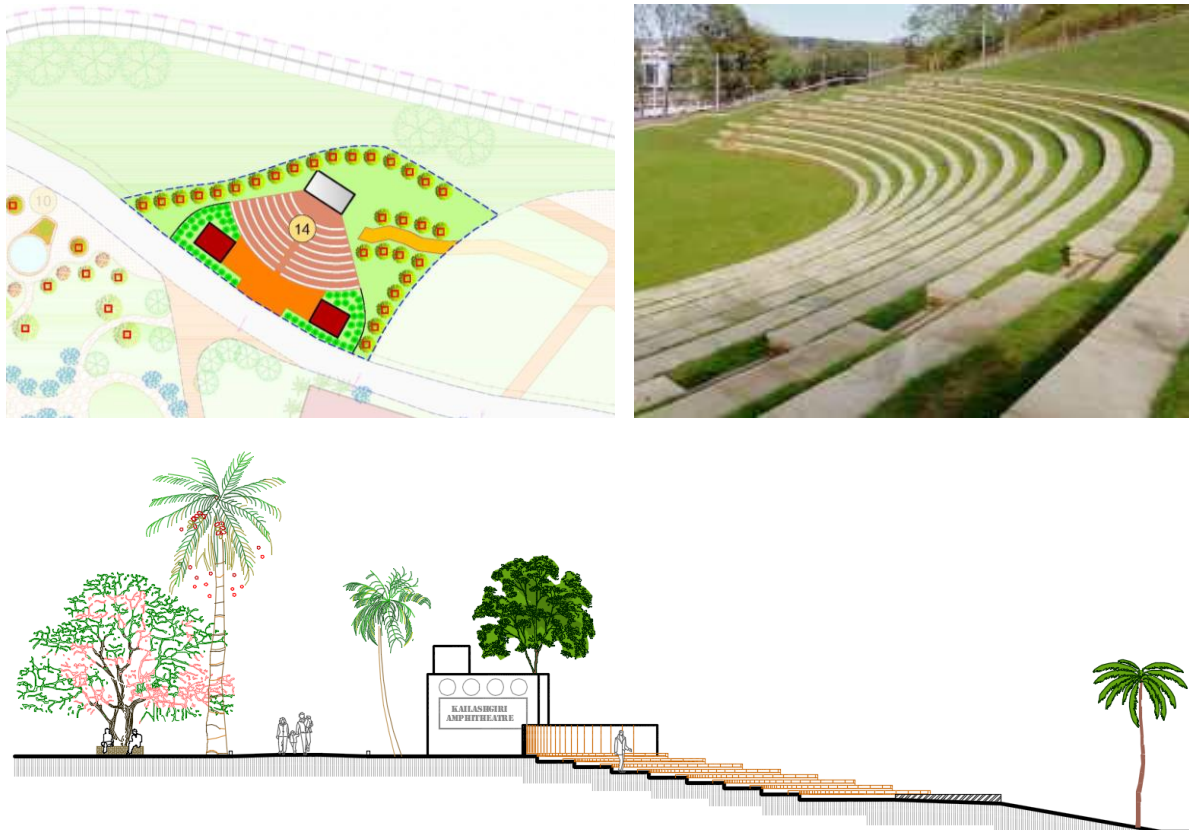


Figure 19. Amphitheatre

2.3.2 Amusement & Gaming Arena

Amusement & Gaming Arena comprise of Indoor games, 7 D adventure hall, Haunted house. Indoor Games can be Coin Operated Helicopter Game, Outrun Car Video Game, Basket Ball Game Machine, Toy Catcher Twins, Drivers Arcade Game, Video Gun Shooting, Lase Balloon Game, Booze Ball Game, King Hammer, VR Battle Game, 9D Reality Game. The approximate area of the Amusement & Gaming Arena is proposed to be 7,554 sq.mt. out of which area of Gaming Arena is 400 sq.mt (20m x 20m). NBC standards for Assembly Buildings are followed for crowd/visitors' movement.

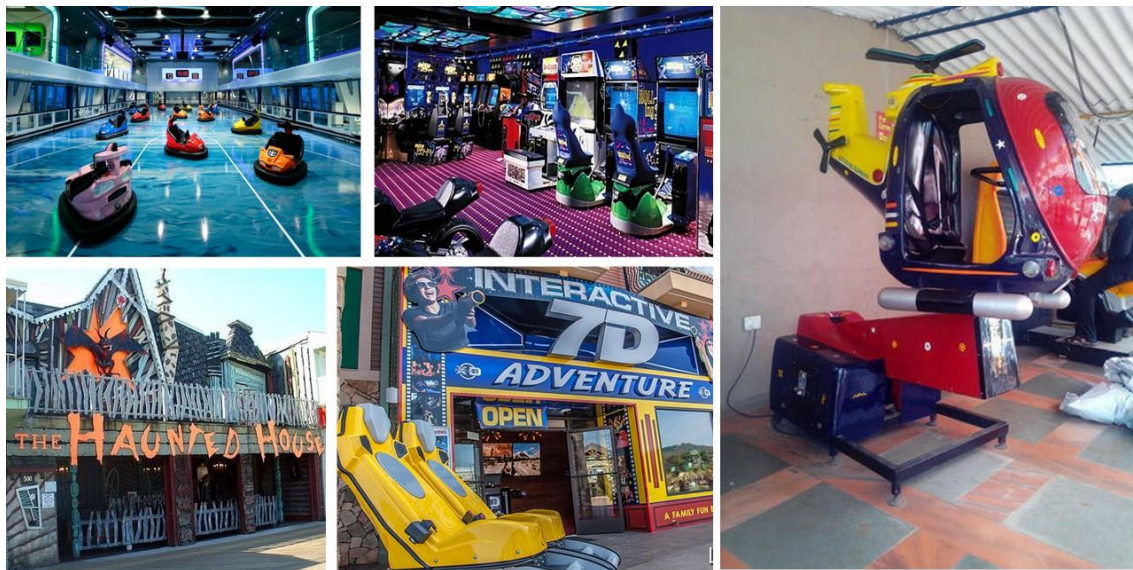


Figure 20. Amusement & Gaming Arena

2.3.3 Children's Play Area

Children's Play Area comprises of Triple Slide, Spiral Slide, Merry Go Round, Rope Climber, Multiply System, Climbing Walls, Sand Pits, Children's 3-Wheel Scooter & Cycle Track, Balancing Bridge, Log Roller, Garden Sculptures, Trampoline with safety net. The approximate area of the Children's Play Area is proposed to be 6,747 sq.mt. this area is divided in to three age groups i.e. below 5 years, 5-8 years and 8-15 years. This area is provided with two arrival zones to provide a generous setting for peak days and crowd management. Fire station and train area are well segregated from Children's Play area to avoid congestion. Food joint is also proposed in the vicinity of this area to enhance its user related benefit.



Figure 21.Children's Park

2.3.4 Food Joints

There are two types of Food Joints proposed. These Food Joints are designed by keeping in mind that existing food vendors can be accommodated within these food courts. Also, these food Joints are spacious and have provisions for accommodating more vendors through internal partitions if VMRDA deems this necessary, based on requirement or application by stakeholders. The space in Food Joints can be segregated for the existing vendors. There are around 42 vendors currently active within the hill park.

2.3.4.1 Food Joint – 1 (FJ1)

The approximate area of the Food Court 1 is proposed to be 396 sq.mt. out of which only 206 sq.mt. area is

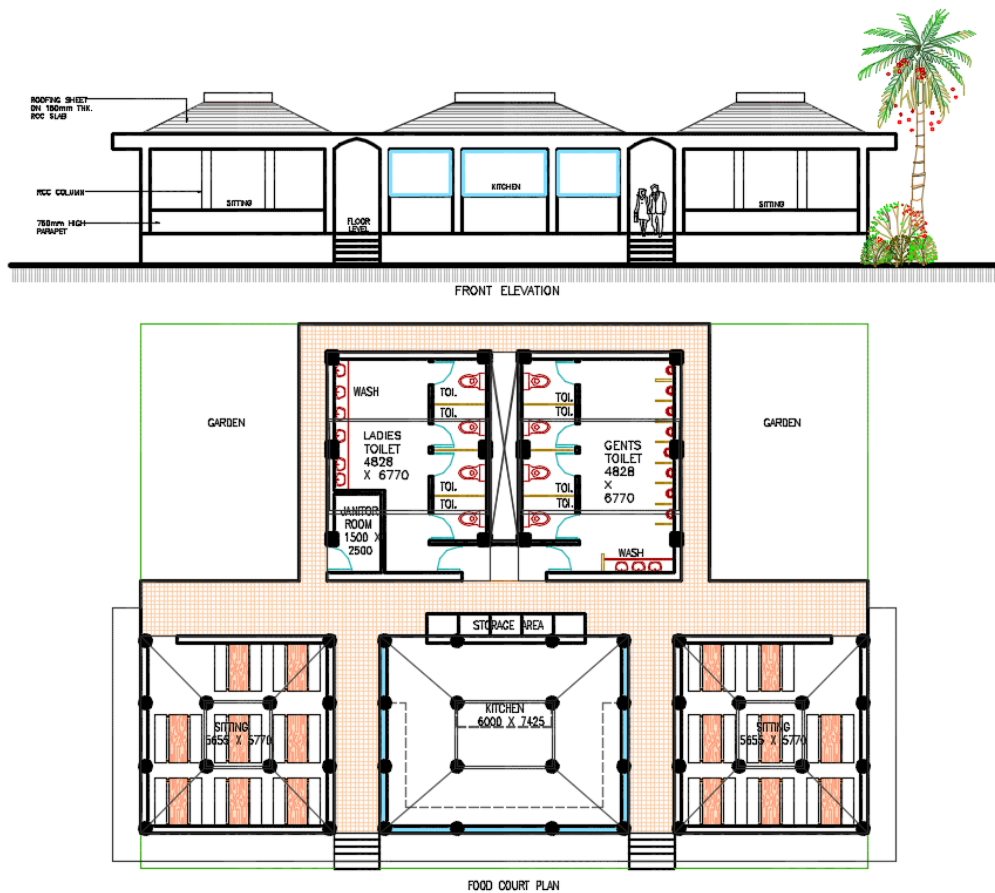


Figure 22. Food Court 1

built up. Rest of the area is provided as green area and paved area/circulation. The sitting capacity of this Food Court is around 96 visitors at a time.

2.3.4.2 Food Joint – 2 (FJ2)

The approximate area of the Food Court 2 is proposed to be 950 sq.mt. out of which only 171 sq.mt. area is built up to reduce the visual impact of further new construction on a predominantly green hill character. Rest of the area is provided for semi covered sitting. The sitting capacity of this Food Court is around 288 visitors at a time.

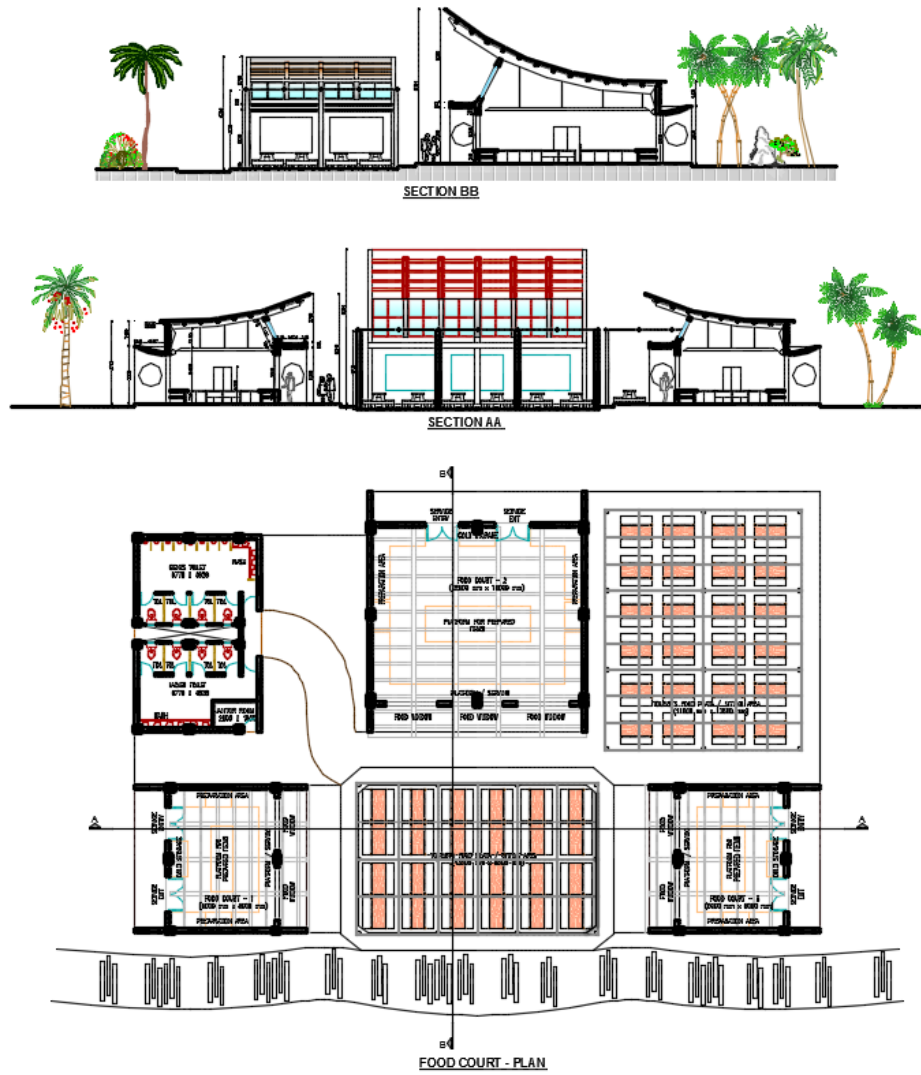


Figure 23. Food Court 2

2.3.5 Garden Restaurant

The approximate area of the Garden Restaurant is proposed to be 168 sq.mt. The seating capacity of the Garden Restaurant is around 50 visitors at a time. This restaurant is designed by keeping in mind that the integration between built up and nature. Instead of parapet wall, Bamboo railing is provided on all for sides. Instead of providing wall and enclosing the space, Slopping RCC roof is supported only on round columns.

Thatch will be provided above RCC roof to give a natural aesthetic view of the restaurant. This restaurant is not just a concrete and brick cube, but an example of well-integrated building with nature.



Figure 24. Garden Restaurant

2.3.6 Rest Shelters

The Rest Shelters are proposed on the pathways with adequate intervals. The visitors can sit and rest in this semi covered shelters with Marine wood pergolas. The visitor can have a connected feel with the nature while resting in this Shelter. This Rest shelter is 10 m long and width is based on the width of the pathway. This Rest Shelter can accommodate around 35-40 visitors at a time. Total 10 nos. of Rest Shelters are proposed in Kailasagiri Hill Park



Figure 25. Rest Shelter

2.3.7 Sitting Area

This sitting area is designed in such a way that it can perfectly fit in to contoured area on site. This sitting is proposed where natural contour is available. The sitting area is proposed with semi circular shaped bench and retaining wall in the back side to retain the stepped sitting. The semicircular bench can accommodate 5 persons to sit at a time.

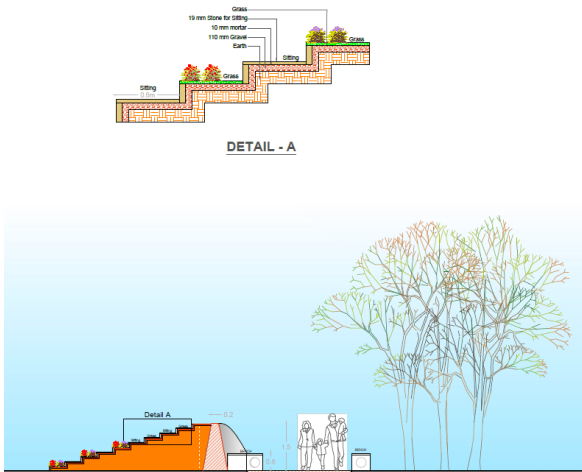


Figure 26. Sitting Area

2.3.8 Staff Rest Area & Administrative Building

This building sizes around 20m x 20m. and area of 400 sq.mt. with the introduction of new facilities, surveillance system, monitoring of the hill park area needs considerable man power and a office for general administration as well as for central control of all facilities. Hence it is proposed to have an administrative building within the park. This building comprises of Monitoring and Administrative area where entire area of the Kailasagiri Hill will be monitored through the CCTV cameras. The monitoring of proposed infrastructure can also be done through this building. This premises is also having staff and security rest area where utility staff can rest and facilities such as washrooms, area for sitting, pantry, dinning and dormitory is provided.



Figure 27. Administrative Building

2.3.9 Terrace Garden

Approximate area of the Terrace Garden is around 1,924 sq.mt. this Terrace Garden is proposed on the eastern side of the Hill Park and it is proposed for the landscape improvement. The semicircular steps are redesigned based on the contour intervals on which visitors can sit while enjoying the nature as some of the bigger trees are already existing on site. The Terrace Garden is proposed with the proper landscape design. Apart from the existing trees, flowering trees are proposed in the terrace garden. The details of the trees are mentioned in the next chapter. The central steps in the terrace garden are leading to the View Point to have beautiful view of the Ocean.



Figure 28. Terrace Garden

2.3.10 Parking Improvement

Parking improvement is proposed to organize the existing parking facility to accommodate more vehicles and to provide public amenities for tourist visiting by both public and private transportation. This parking area accommodates 53 Cars & 5 Buses. It is observed that the drivers remain on the site at least for 3-4 hours while visitors visit the park. Hence it required to have the parking area with wash rooms, drivers' rest room and tourist information centre. These structures are just 3m high to not to obstruct the Titanic View Point. This area is designed with respect to pedestrian friendly arrival. The visitors can drop down from the bus at the bus stop and can lead to tourist information centre as well as ticket counter and clock room on the pedestrian pathway. Shuttle stop for public transportation is also provided at the entrance. The parking road widths are provided based on IRC:SP:12-2015. This parking area is having proper Landscape design rather than just a road surface to have a feel of nature park at the entrance itself.

2.3.11 Proposed Parking Sites

This proposed Parking site accommodates around 90 Cars & 20 Buses at a time. This will ease out the parking pressure on the top of the hill. The proposed parking site is also having kiosks so that visitors can have food immediately if they want after dropping out from the vehicles. This parking sites are designed as per standards of National Building Code.

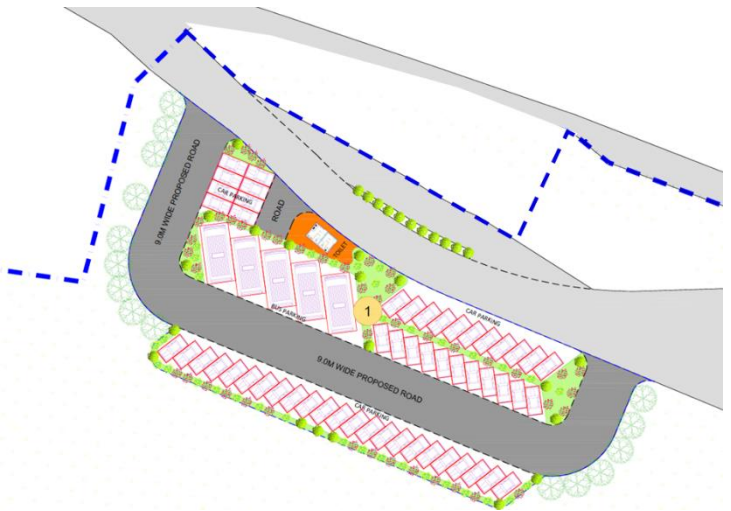


Figure 29. Parking

2.3.12 Ghat Road Development

The Ghat road improvement is proposed for the stretch of around 850m. VMRDA had taken up the formation work of Ghat Road previously. As part of this project it is proposed to complete the Ghat road development. Along with flexible pavement, concrete road option is also proposed to minimize the overall maintenance cost and increase the durability of the proposed road, VMRDA will take a final call between rigid pavement and flexible pavement option. The retaining wall for this Ghat Road is structurally designed so that it does not affect the stability of the hill slope. Storm water management and run off are taken into consideration while designing the Ghat Road. Street Lights for proper lighting are properly placed on the land side. Appropriate slope protection is also taken into consideration.

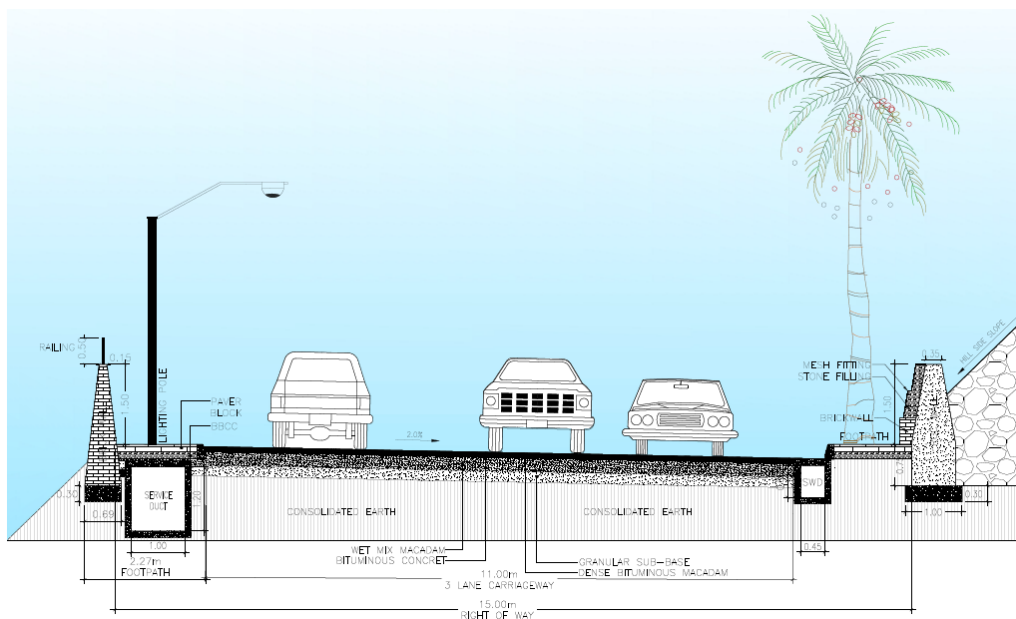


Figure 30. Ghat Road

2.3.13 View Points

There are 11 nos. of existing view points on the Kailasagiri Hill. All of them are proposed to be improved in terms of Plastering, painting, provision of railing and benches. There are 3 new View Points proposed. All these View Points are proposed to be located at a strategic location on the Kailasagiri Hill to get the scenic View of the Beach, Sea and the city of Visakhapatnam.

2.3.13.1 Proposed View Point -1 (VP1)

This view point is of “S” shaped in plan. View Point – 1 (VP1) has the built-up area of around 80 sq.mt. This is a structure of flat RCC roof supported on round columns. Informative boards are provided so that visitors can get the enough information regarding the place. Railing is proposed as a safety feature. Benches are also provided so that visitors can have a scenic view while sitting.



Figure 31.View Point Type-1

2.3.13.2 Proposed View Point – 2 (VP2)

This view point is just in a rectangular shape. The built-up area of this view point is around 32 sq.mt. (8m x 4m). Roof is given at two different levels just for an aesthetic purpose. The roof above 4m x 4m grid is at 4.3m level and roof on rest of the grid is below than that at 3.3m level.

2.3.13.3 Proposed View Point – 3 (VP3)

This view point is in a “Y” shape. The built-up area of this view point is around 55 sq.mt. Sitting with plantation is proposed in the center of the view point.



Figure 32.View Point Type-2

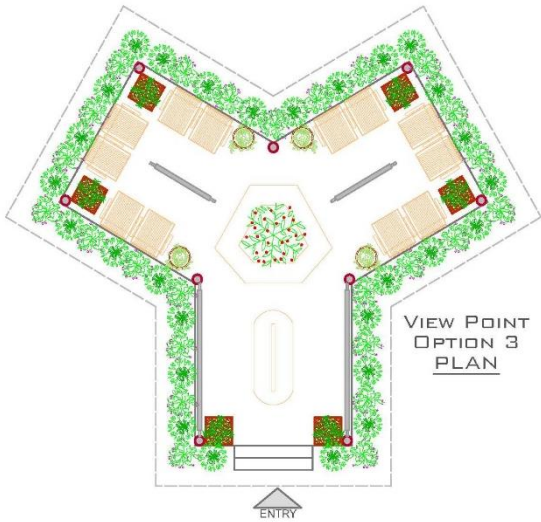


Figure 33.View Point Type-3

2.3.14 Viewing Gallery

Viewing Gallery is designed to get the scenic view of the beach and sea from the height of almost 6m from the ground level at Kailasagiri hill top. There are two platforms provided, one is at 3m and another is at 6m. A bell on the top of the viewing gallery and a clock is kept on the back side for an aesthetic point of view. The visitors can walk through out beneath the view gallery. This though out approach is designed for easy circulation around the viewing gallery. Sitting area with plantation & fountain is given at the ground level for resting purpose.

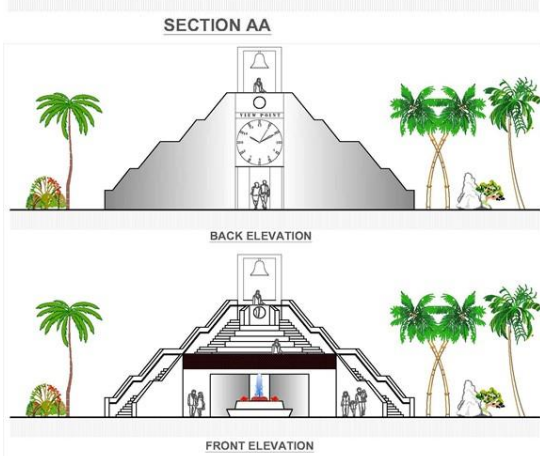
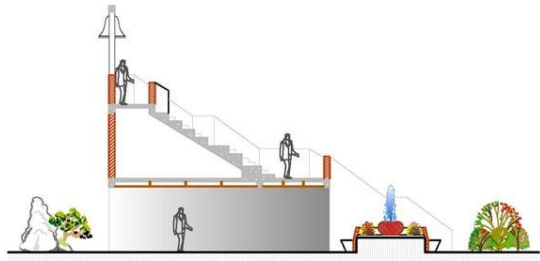
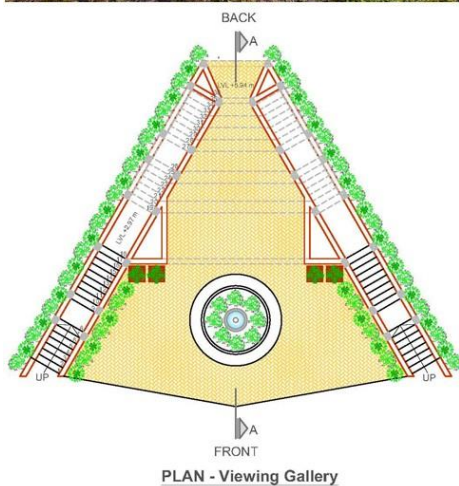


Figure 34.Viewing Gallery

3. LEGAL POLICY & ADMINISTRATIVE FRAMEWORK

It is important to note that project area is a designated public recreational park with a list of permissible activities as mentioned in the chapter-1. This section illustrates the applicable legislation with respect to state & national level along with World Bank policies and other regulatory clearances required for the implementation of Master Plan for redevelopment of Kailasagiri Hill Park.

3.1 ENVIRONMENTAL LAWS, ACTS & RULES

Environment Protection Act 1986 is an umbrella legislation that supplements existing Enron deliberations aimed at reduction in pollution and protection of natural resources some of the salient features of the act as following:

- Section 6 empowers the Government of India to make rules to regulate environmental pollution by stipulating standards and maximum allowable limits to air water noise soil and other environmental pollutants
- Section 7 prohibits operations that emit pollutants in excess of standards
- Section 9 calculates handling of hazardous substances and identifies persons responsible for discharges and pollution prevention.

The environmental Laws and Acts applicable to project implementation and illustrated below.

3.1.1 EIA NOTIFICATION, 2006 (as amended in 2009)

The notification specifies that prior environmental clearance is required for the projects listed in the schedule of the notification before any construction work, or preparation of land by the project management expect for securing the land, is started on the project or activity. The schedule of the notification lists eight broad categories of projects that require prior environmental clearance. These projects are categorized in to Category “A” and Category “B” based on the magnitude and environmental impacts of the project. Clearance is to be obtained from the Ministry of Environment and Forest for Category “A” projects and from the State Environment Impact Assessment Authority (SEIAA) for category “B” projects. Category “B” projects will be further classified into Category “B1” and Category “B2” based on their magnitude and environmental impacts. Category “B2” projects do not require an EIA study. The scope and TOR of the EIA study for Category “A” and Category will be decided by the MOEF and the SEIAA respectively.

Even though proposed project involves construction activities, EIA clearance is not required for the proposed projects since it doesn’t fall in sub-categories of projects which require mandatory EIA clearance.

3.1.2 THE FOREST (CONSERVATION) ACT, 1980

Forest (conservation) Act 1980 was enacted to avert a rapid deforestation and governments cannot de-reserve forest land or direct that to be used for non-forest purpose invincible projects with activities a research forest area need clearance from MOEF. The project site is owned by VMRDA and it is a designated public recreational use as per the statutory master plan in force in Visakhapatnam Metropolitan Region Area. The project focus is on area development of the hill top park, approximately 24 Ha, rest of Hill area with green cover is not disturbed as part of the Kailasagiri Hill Top Redevelopment Master Plan. The Forest (Conservation) Act, 1980 is not applicable since no Forest Land or Eco Sensitive Zones is involved in the proposed project development.

3.1.3 WILD LIFE PROTECTION ACT, 1972

This act seeks to protect wildlife by creating protected areas and controlling trade in wildlife products the proposed project activities do not crossover into any of the protected areas. The wildlife protection act is not applicable since the proposed intervention do not involve the designated wildlife protected areas.

3.1.4 COASTAL REGULATION ZONE (CRZ) NOTIFICATION, 2011 (AMENDED IN 2018)

This notification under Environment (Protection) Act, 1986 supplements the law on site clearance by declaring certain zones as CRZ and regulates activities in these zones. The CRZ Notification, 2011 clearly lists out the areas that fall within the categories of I, II, III and IV of CRZ-I and the permissible and non-permissible activities in each zone. The main objectives of the Coastal Regulation Zone Notification, 2011 are:

- To ensure livelihood security to the fishing communities and other local communities living in the coastal areas;
- To conserve and protect coastal stretches and;
- To promote development in a sustainable manner based on scientific principles, taking into account the dangers of natural hazards in the coastal areas and sea level rise due to global warming. Projects attracting this notification shall obtain CRZ clearance for implementation from the State Level or the National Level as required.

The proposed project site does not fall in CRZ zones as per the latest draft CRZ notification, 2018.

3.1.5 NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

Use of construction equipment DG sets, breakers including vocals will generate noise during the construction phase. Construction activity noise levels have to be controlled using suitable barriers and by the use of latest and well maintained equipment which have limited noise pollution effects. Also do care have to be taken to comply to all the applicable rules and regulations of the concerned authorities with rest to noise pollution.

3.1.6 WATER PREVENTION & CONTROL OF POLLUTION ACT, 1974

This law seeks to control pollution of water and enhance the quality of water. Under this law, it is mandatory to obtain consent for discharge of effluents for any municipal projects causing water pollution. Under the proposed it is identified to have a Sewage Treatment Plant (STP) with zero discharge to underground sewerage network. Implementation of the STP will attract the provision of water prevention and control of pollution act 1974. It is required to get consent for establishment prior for establishing camp sites and construction off STP's also it is required to get consent for operation prior to the commencement of operation off camp sites and STP.

3.1.7 AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981

This law addresses the prevention and control of air pollution. Under section 21 of this Act, it is mandatory to obtain consent from Pollution Control Board to establish or operate any industrial operation. This Act is applicable for construction phase due to movement of construction vehicle, operation of construction machinery and construction activities. It is required to get Consent of Establish is to be obtained prior to establishing camp site, along with Consent for Operate prior to commencement of operations of camp sites.

3.1.8 ANDHRA PRADESH WATER, LAND & TREE ACT, 2002 (APWALTA-2002)

Cutting of Trees will attract the provisions of this act, proposed project doesn't involve cutting of tress other than general site clearance and grubbing activities. In case of any cutting of trees concerned Forest Officer have to be duly consulted and required clearances have to be taken.

3.1.9 SOLID WASTE MANGEMENT RULES, 2016

This rule is applicable to all types of solid waste generated at project site during construction and operation phase of the project. Andhra Pradesh Pollution Control Board enforces these rules, and it's part of the Consent for Establish and Consent for Operate which have to be obtained for camp sites.

3.1.10 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT RULES, 2016

This rule shall be applicable to waste resulting from excavation of earth, demolition of structures, operations such as excavated payment material other construction debris and rubble etc. Construction waste management plan prior to commencement of construction of sight to be practiced minimizing any impact arising from construction and demolition waste.

3.1.11 WORLD BANK POLICIES

3.1.11.1 *Environmental Assessment (OB/BP 4.01)*

The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. This policy is partially applicable and through this report all potential impacts due to the proposed projects during construction and operational phase are identified, assessed and necessary mitigation measures are suggested.

3.1.11.2 *Natural Habitats (OB/BP 4.04)*

The Bank promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats. The main aim of this policy to avoid financing of projects that degrade critical habitats and make sure acceptable mitigation measures are in place for projects that effect non-critical habitats in case no alternatives are available. This policy is not applicable to the proposed projects implementation and operation.

3.1.11.3 *Physical Cultural Resources (OB/BP 4.11)*

Physical cultural resources may not be known or visible; therefore, it is important that a project's potential impacts on physical cultural resources be considered at the earliest possible stage of the project planning cycle. This policy aims to ensure that projects identified does not affect the physical cultural resources available in the region. The proposed projects do not affect historical, archeological, cultural property resources. This policy is not applicable to the proposed projects implementation and operation.

3.1.11.4 *Forest (OB/BP 4.36)*

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. The proposed projects are earmarked for developed areas on the hill top and it does not affect the Forest areas. This policy is not applicable to the proposed projects implementation and operation.

4. DESCRIPTION OF ENVIRONMENT

4.1 Climate

Visakhapatnam has a tropical climate. When compared with winter, the summers have much more rainfall. The climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth. They give good indications of typical climate patterns and expected conditions (temperature, precipitation, sunshine and wind). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornadoes.

The "mean daily maximum" (red line) shows the maximum temperature of an average day for every month for Visakhapatnam. Likewise, "mean daily minimum" (blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years

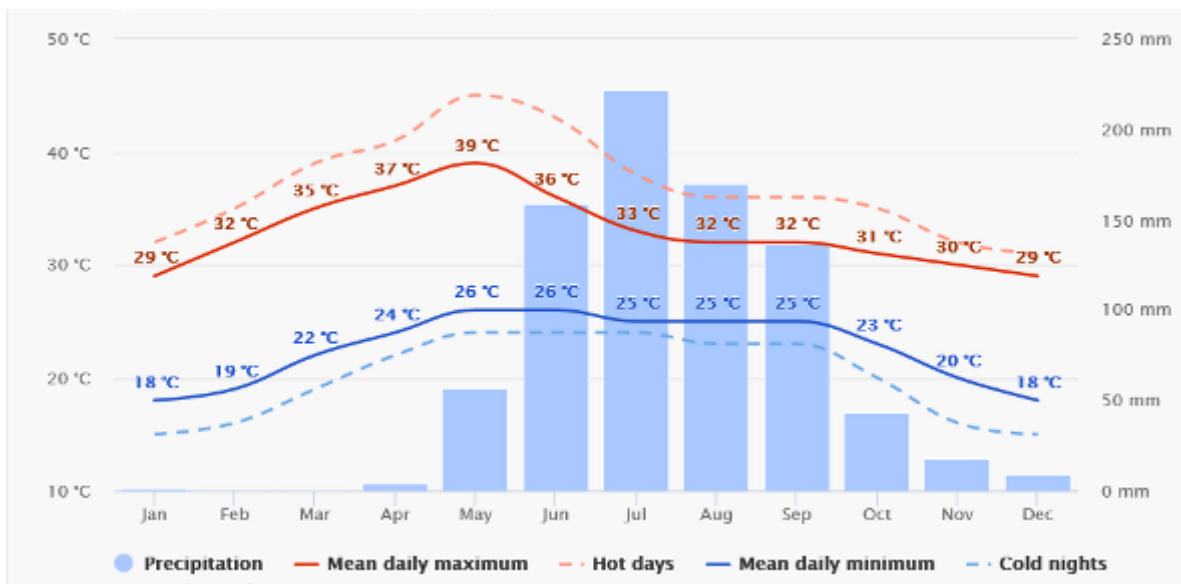


Figure 35. Average Temperature & Precipitation for Vishakhapatnam

It is observed that the month of May records higher temperature, during day time the highest mean temperature is 26°C and during night, the highest mean temperature is 39°C. The month of January & December records minimum mean day & night time temperature of 29°C & 18°C respectively.

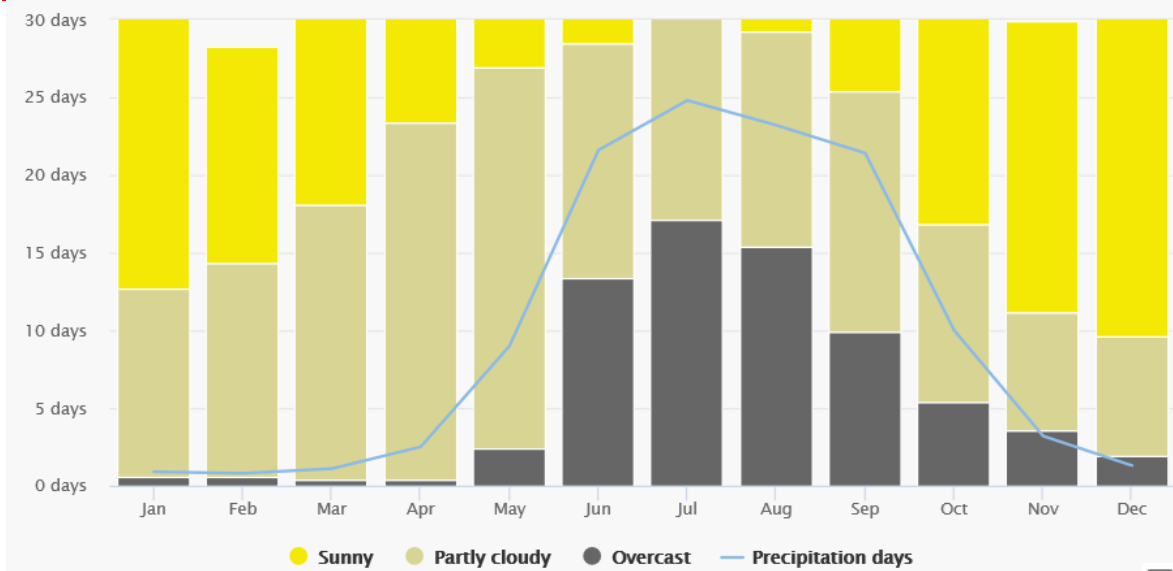


Figure 36. Cloudy, Sunny & Precipitation Days for Vishakhapatnam

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast. City of Vishakhapatnam observes maximum sunny days in the months of January, February, November & December. The maximum precipitation days were recorded in the month of June, July & August and least precipitation days are observed in the month of January, February, March & April.

The graph below shows the average maximum recorded temperature in each month of the year for Vishakhapatnam city. March, April, May & June records highest temperatures whereas January & December records lowest temperature and July to October records moderate temperature.

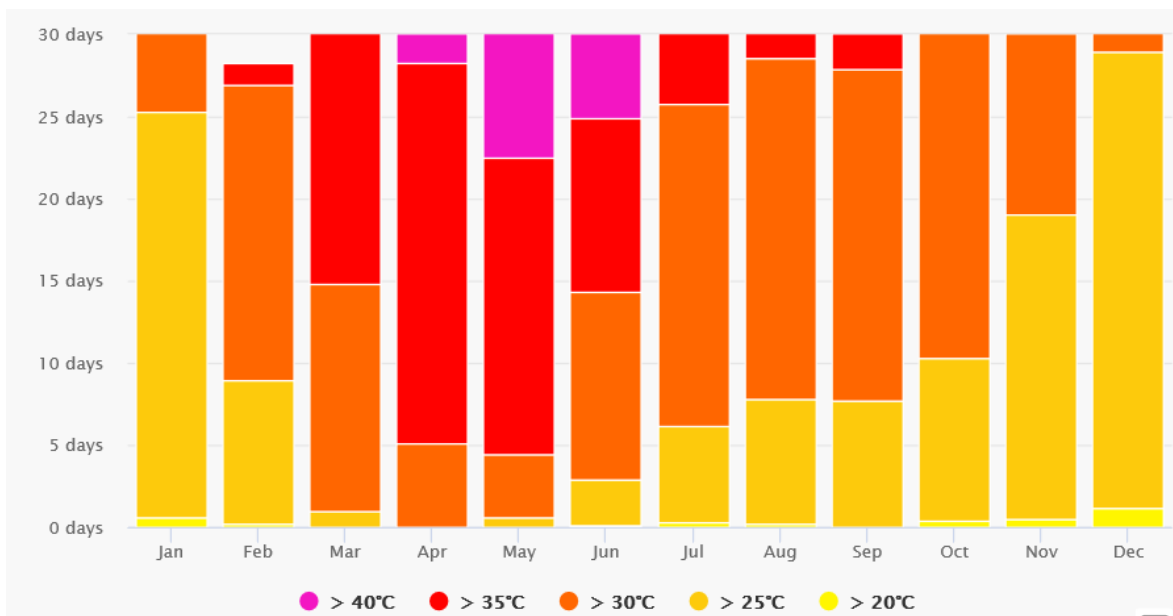


Figure 37. Maximum recorded temperatures for Vishakhapatnam

The precipitation diagram for Vishakhapatnam is given below and it shows on how many days per month, certain precipitation amounts are reached. The wettest days are observed in the month of June, July August & September and Dry days observed in the months of January, March & December.

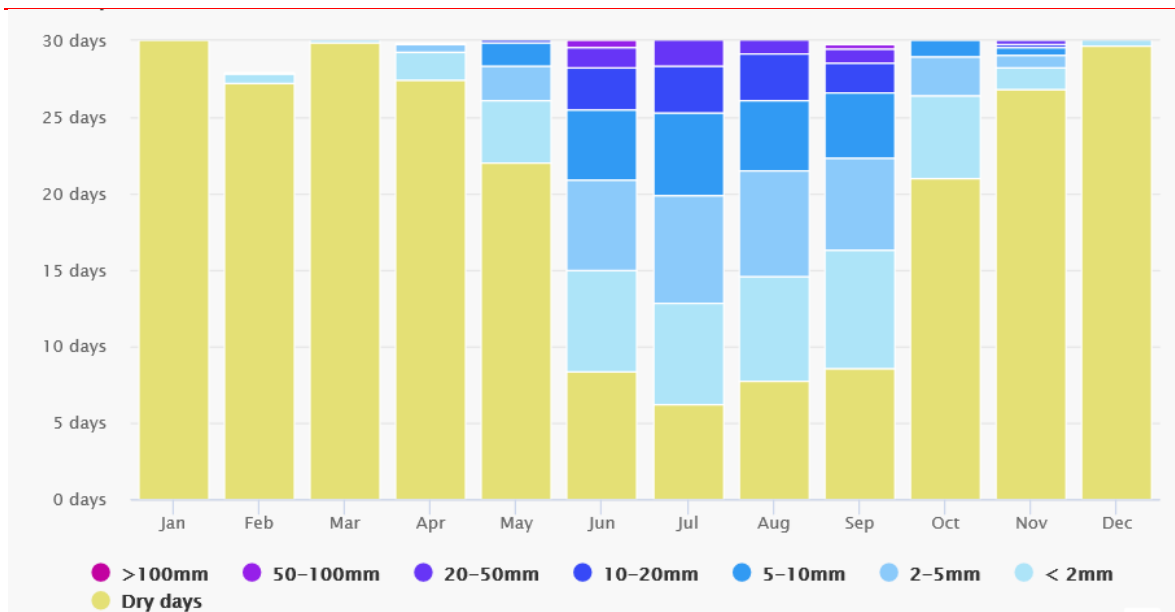


Figure 38. Precipitation Amount for Vishakhapatnam

The average wind speed recorded during each month is illustrated in the graph below and the wind rose diagram for Visakhapatnam city is given in figure. Higher wind speed is observed in the months of April, May, June and July. Predominant wind direction is towards the south & South-west. Under normal weather conditions the city observes wind speeds up to 30 km/h in the southern direction.

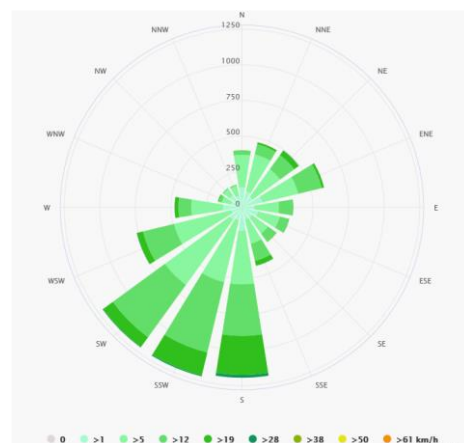


Figure 39. Wind Rose Diagram for Vishakhapatnam

4.2 Cyclone

The city of Vishakhapatnam has observed several



Figure 40. Hud-Hud Landfall at Peak Strength- Eastern Coast of India

cyclones which affects the eastern coast of the country. Tropical cyclones are frequent in this coastal district due to the impact of variations in land and sea breezes. According to the Indian Meteorological Department, the speed of the winds in the form of storms reach 70-80 kmph gusting to 90 kmph would prevail in the district causing much damage to life and property. The severity of the winds even exceeds 170-180 kmph gusting to 195 kmph.

The extremely severe cyclone storm Hud-Hud hit the eastern coast of the country in October 2014. The cyclone hit the city of Vishakhapatnam with wind speed reaching up to 185 km/h. It caused massive destruction to the city and neighboring districts of Vizianagaram and Srikakulam of Andhra Pradesh

4.3 Rainfall

The rainy season commences with onset of the South-west monsoon in the latter part of June. The rainfall in the district in general increases from the East towards the West. The normal rainfall of the district is 1202mm. The highest amount of rainfall of 4102.1 mm is received during the year 2007–2008, while the least amount of rainfall of 703 mm is recorded during the year 2002–2003. The total rain fall received during the decade is 13,482.1mm as against the normal rainfall of 12020mm; with a rainfall deviation of 10.84 %. During the South-west monsoon season for the decade, the district received only 7111.8 mm as against the normal rainfall of 7120 of rainfall; with a rainfall deviation of -0.11%, while North-east monsoon was very weak. Generally, July is the rainiest month.

4.4 Flora & Fauna

More than the one third of the area in the District is covered by forest. The forests are of moist and dry deciduous type. The common species available in them are Guggilam, Tangedu, Sirimanu, Kamba, Yagisa, Nallamaddi, Gandra, Vepa etc. Bamboo shrubs are sparsely scattered. But forest area in the district has been showing a quiescent decline since 1955-56 perhaps due to podu practice, indiscriminate grazing and browsing. To stem this, regeneration programmes are being carried out. Chinthapalli Teak Plantation is an off shoot of this. The latest caper in this regeneration programme is rising of Teak, Silver trees, coffee plantations, as the agency areas are found suitable agronomically for coffee growth. Coffee plantations have been raised in about 10000 Acres in Chinthapalli, Minimuluru, Devarapalli and Ananthagiri regions by different agencies for different purposes. By the forest Department to conserve soil, by the Coffee board to evolve cultures suited to on-traditional areas and by the Girijan Corporation and the I.T.D.A. to wean out tribals from the pernicious practices of "Podu Cultivation."

Regarding fauna the district has a livestock of 12.02 lakhs as per 2003 livestock Census. In the Livestock, Cattle 29.4% Buffaloes 34.8% Sheep 16.5% and Goats 17.3% about wild fauna Boars and Bisons are found in Forest areas of the district and isolated instances of Cheetas and tigers.

Birds that occurred commonly are Jungle fowls, peafowl, pigeon and myna. Besides migratory birds like ducks, teals also are found in the district. Among snakes, the pythons are seen in thick forest while common snakes like Nagupamu, Katlapamu and Penjeri are also found. Many kinds of fishes are also seen. The beautiful golden coloured fish is found in a Nachakundam pool about 10 km. away from Paderu which is an attraction to the visitors.

4.5 Soil

The project area is located in Visakhapatnam district which have predominate Red Loamy soils coverage in 69.9% of the villages of the district. The Soils are poor textured and easily drained. Sandy loamy soils come next with 19.2% villages coverage, largely confined to the coastal areas of Nakkapalli, Payakaraopeta, S.Rayavaram, Rambilli, Atchutapuram, Paravada, Visakhapatnam, Pedagantyada, Gajuwaka and Bheemunipatnam Mandals and to certain stretches in the interior Mandals of Chodavaram, Narsipatnam, K.Kotapadu and Madugula. Black cotton soils come up next having sizeable chunks of area in K.Kotapadu, Devarapalli, Cheedikada, Paderu and Hukumpeta Mandals. 45% of the soils in the district are low in organic content and 55% in Phosphorous content.

4.6 Minerals

Visakhapatnam has rich deposits of Bauxite, Apatite, Vermiculite, Calcite, Crystalline Limestone and Quarlzite. Heavy rare earth minerals like illiminite, Monazite, Zircon, Rutile, Siliminite occur in beach sands. Workable deposits of Laterite, White clay, Mica, Graphite are also available. The occurrence of semi-precious stones has been recently identified both in agency and plains. Crysoxryl (Cats eye), Alexandrite, Moonstones and Silminite (Cats eye) are the semi precious stones available in the district. Beryl, Aquamarine, Zircon, Topaz,

Tourmaline are also reported to occur associated with Crysoberyl (Cats eye). Alexandrite the most prized variety of crysoberyl occurs in few areas like Chintapaka, Pedamadina villages of Butchayyapeta Mandal and Karaka village of Golugonda Mandal. Most of the mineral deposits are found in tribal tracts.

4.7 Demography

The demographic details of the city in which the project site is located is illustrated in the table below. As per 2011 census of India Visakhapatnam had a population of 42,90,589 of which male population was around 21,38,910 and female population was around 21,51,679. The population density of Visakhapatnam is approximately 384 persons per sq.km. The city records a literacy rate of 66.91% with a total literate population of 25,68,249 in which males account for 14,22,878 and females account for 11,45,371.

Table 1 Demographic Details

DESCRIPTION	NUMBERS
Total Population	42,90,589
Total Household	10,91,723
Total Male Population	21,38,910
Total Female Population	21,51,679
Density	384 Persons per Sq. Km
Literacy Rate	66.91%
Sex Ratio	1,006

4.8 Land-use

The total geographical area of the district is 11.16 lakh hectares of this 36.45% alone is arable area while 39.53% is forest area. The rest is distributed among "Barren and uncultivable land" about 11.7% and "Land put to non agricultural uses" about 9.0%. Out of the arable area, the net area sowed form 27.2% while cultivable waste and fallow (current and old) lands constitute about 9.2% during 2006-2007.

Table 2 Land Use Details

LANDUSE	PERCENTAGE (2006-2007)
Total District Area	(11.16 Lakh Ha) 100%
Agriculture	(4.06 Lakh Ha) 36.45 %
Non-Agricultural	(1.00 Lakh Ha) 9.0 %
Forest Land	(4.41 Lakh Ha) 39.53%
Barren & Uncultivated Land	(1.30 Lakh Ha) 11.70 %

4.9 Drainage

The District is drained by Sileru, Machkund and Patal rivers on the Northern side and by Sarada, Peddaeru, Thandavan and Varaha rivers and Meghadrigedda and Gambharangedda rivulets in the Coastal area.

4.10 Disaster Management

The City Disaster Management Plan has been prepared under USAIDGOI- UNDP project in 2013. The main objective of the disaster plan is to build safer and disaster resilient city. The initial deliberations were held by CDMP, Hazard Risk and Vulnerability Analysis (HRVA), Capacity Building, Early Warning System (EWS), sectoral plans to mainstream Disaster Risk Reduction (DRR) and knowledge management (GVMC, 2013).

4.11 Kailasagiri Hill Park

The Kailasagiri Hill is around 20 km from Vishakhapatnam Airport and 15 km from Vishakhapatnam Railway station. It is located on the eastern coast of India in Visakhapatnam District in the State of Andhra Pradesh. The extent of project site which is around 129 Ha, is shown in the figure along with its location map. The site is accessed through Kailasagiri Ghat road from Police quarters road on the northern part of the hill, which further connects the beach road on the eastern side of the hill. The Kailasagiri Hill park can be divided into two parts, the developed hill park area on top of the hill which is around 23.69 Ha and rest of the hilly terrain covered with thick tree cover. The highest point of Kailasagiri hill located around the center of the park is approximately 180m above sea level. The northern side of the Kailasagiri hill the slope is less steeper compared to other three sides which have a steep gradient.

4.11.1 General Character



Figure 41. Open Spaces



Figure 42. Natural Jungle



Figure 43.Landscape in Garden Areas

Figure 44.Landscape in Sculpture Park

The character and form Kailasagiri is similar to any urban recreational park with minimal activities. Landscaping within Kailasagiri hill park can be found in both organized and unorganized manner. Most part of the park have some kind of landscaping efforts carried out and it is evident that its quality had declined over the period. Landscaping within Shiv Parvathi Statue area, R K Lawn and gardens opposite to Shanthi Ashram have a well-defined landscape pattern. Rest of the park area the landscaping is not defined, or it is not reflective of a tourist destination which will attract a large number of tourists from across the country.

4.11.2 Public Amenities & Utilities

Public utilities like public toilets, rest rooms, drinking water facilities are necessity of a tourist destination like Kailasagiri. At Kailasagiri Hill park it is observed that these utilities are more of an eye soar and maintained in a pathetic manner. Public toilet blocks are spread in different location.

4.11.3 Parking

Parking area is provided very close to the gateway to Kailasagiri Hill park. Currently the point of arrival is not well defined, and it negatively affects the image of Kailasagiri hill park due to incoherent infrastructure around the parking area. It was observed that the parking facility provided currently at park is inadequate to handle peak parking requirement. During weekends and holidays especially in during evening period parking facility get full and leads to chaotic situation around the entrance this need to be addressed as part of the master plan efforts.



Figure 45.Lack of Parking Area at Peak times during holidays

Current fragmented parking facility along with lack of proper organization of the parking facility and poor traffic management often lead to queuing of vehicles along the approach road leading to an unpleasant situation for the visitors. This leads to creation of negative perception in the mind of the visitors about Kailasagiri.

4.11.4 Safety & Surveillance

Currently there are no safety measures at the rail road crossing for protection of pedestrians with conflicts with toy train at two crossing points. Also there are multiple entry points to the Hill park, main access road, rope way, two steps from foot till on either sides, none of these entries are covered with surveillance cameras. Public address systems is also absent in the park area. Also there are no system which will enable the park administration to control the crowd movement.

4.12 CONCLUSION

The baseline assessment it is evident that the park area needs interventions for improving its public amenities, utilities and recreational opportunities for visiting tourists as well as for the local population of Visakhapatnam who depends on the park areas as a social recreational park. The landscape is not systematic, public amenities are not planned or maintained, recreational options are minimal. Development activities can be proposed on the developed part of the hill park making optimum utilization of land without disturbing the nature, surrounding flora or fauna in the slope terrain of the Kailasagiri hill. Any proposal focused on the hill top will not alter the current land-use pattern and proposals should also focus on improvising the infrastructure to support the tourist foot fall, irrigation system for existing and proposed landscape and also improved recreational facilities.

5. ENVIRONMENTAL IMPACT & MITIGATION MEASURES

The Environmental Assessment (EA) process generally begins with the Environmental screening of project at the time of identification. It identifies environmental consequences (positive and negative) of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action. The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

This section identifies and assesses the potential changes in the environment that could be expected from the proposed project. The impacts have been predicted for the proposed activities assuming that the impact due to the existing activities has already been covered under base line environmental monitoring and continue to remain same till the operation of the project. The proposed project activities would create impact on the environment in two distinct phases i.e., construction and operation phases. Impacts are identified, predicted and evaluated based on the analysis of the information collected from following and as discussed in the earlier chapters of this report:

- Project information; and
- Baseline information & site visits of the study area

This section also describes mitigation measures, which have been suggested for the adverse impacts likely to be caused due to activities of both construction and operation phases of the project. The identification of likely impacts during construction and operational phases of the proposed project has been done based on likely activities having their impact on one or another environmental parameter. The details of the activities and their impacts have been worked out in the following sections.

5.1 ENVIRONMENTAL SCREENING REPORT

Report is annexed in appendix No 01.

5.2 IDENTIFICATION OF LIKELY IMPACTS

Every activity and operation have either adverse or beneficial impacts on the environment. The environmental impact identification has been done based on proposed project activities. All the activities from construction phase to operational phases of the project have been broadly covered. The activities and operations are considered on the basis of proposed process as described in the project description chapter.

5.2.1 IMPACTS DURING CONSTRUCTION PHASE

5.2.1.1 LANDUSE & LANDSCAPE OF THE SITE

The project is scheduled for completion in 18 months from the time of finalization and award of tender to the contractor. The proposed development is in land owned by VMRDA which is classified as recreational land-use under statutory master plan and does not involve any Land Acquisition or conversion of land use. The project site does not fall in Eco-Sensitive Zones or No Development Zones nor any Heritage/Archaeological sites. Implementation of the proposed projects will bring following changes like:

- Temporary Excavated stuff stock piles around the site, stacking of construction materials like metal, bricks, steel, cement etc., may make temporary changes in aesthetic.
- Movement of construction vehicles like excavators, pay loaders, trucks, other vehicles for bringing construction material and construction work may bring minor temporary change in the land use in and around the site by parking the vehicles on the open spaces and roads near the site.

-
- Installation of utility buildings will bring permanently change the land use of the site selected for utilities.

5.2.1.2 AIR QUALITY

- Air quality in and around the project site would be affected to some extent due to construction and construction related activities.
- During site levelling, excavation, construction material handling etc., the likely emissions from construction activities Fugitive dust emissions from excavation work, digging, stacking of soils, filling etc.,
- Fugitive and other emissions due to the construction activities will most likely remain localized and confined to the project area, are to be mitigated by sprinkling of water on unpaved roads at the construction site and planned movement of vehicles.
- The impact of emissions both from tyre movements and vehicular exhaust emissions required to be minimized by proper maintenance of vehicles.
- There are no significant impact on air quality envisaged due to construction and related activities. Any impact on air quality will likely be restricted within those part of the park area where construction activity takes place. Application of adequate mitigation measures by better construction management practices, impacts on air quality can further be reduced.

5.2.1.3 NOISE LEVELS

- In general noise generation disturbs the community residing nearby the site, in case of the proposed projects the construction activity is within the park area. The main sources of noise in the process of construction and demolition activities are pulverizing, noise from excavators, road rollers, rock breakers, mixer machines, compressors and several other machineries.

5.2.1.4 WATER QUALITY

- Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate nearby surface water quality.
- The proposed project components like underground drainage system and zero discharge wastewater treatment system will improve the ground water quality since currently soak pits and open discharge is practiced at the hill top.
- Controlled use of water during compaction of back fill can be ensured with proper compaction technique to reduce the impact on water usage. If availability of treated water is there than treated water can also be used for compaction operation after checking its treated water quality parameters and can reduce the use of fresh water.
- Implementation of project will reduce the dependency on fresh water through use of treated water for irrigation.

5.2.1.5 OCCUPATIONAL HEALTH AND SAFETY

- Occupational hazards which can arise during work, accidents etc.

5.2.1.6 ECOLOGY

- The proposed site is located within a designated recreational park and proposed projects are focused within the already developed areas of the park.
- As such no direct Ecological impact like felling or cutting of trees. In addition to this, site is not located within any designated Ecological Sensitive Zone, Wetlands, Protected Areas or Important Bird Areas thus have no ecological impacts.
- Kambalakonda Wildlife Sanctuary & Indira Gandhi Zoological Park are approximately 2 kms from the proposed project area.

5.2.1.7 FLORA & FAUNA

- The proposed projects have identified on sites without tree cover, site clearance and grubbing activities for proposed project construction does not involve cutting for trees.
- Proposed project includes development of plantation zones with local spices, small water bodies to attract birds and landscape proposals focus on spices which are non-invasive.
- Development activities is concentrated on already developed hill park area and hence it does disturb the fauna of the region.

5.2.1.8 SOIL & GEOLOGY

- There are no significant impacts on the soil or geology of the area due to implementation of the project.
- During construction phase minor disturbance to topsoil might occur by site clearance activities, demolition and reconstruction of food courts, toilets etc. These are temporary disturbance which will be restored with adequate landscape measures through implementation of proposed projects.

5.2.1.9 WEATHER & CLIMATE

- There are no significant impact on the weather and climate of Visakhapatnam.

5.2.2 MITIGATION MEASURES

5.2.2.1 LANDUSE & LANDSCAPE OF THE SITE

- I. Prepare and implement Waste Management Plan;
- II. Avoid stockpiling of excess excavated soils;
- III. Coordinate with VMRDA for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- IV. Recover used oil and lubricants and reuse or dispose from the sites through registered vendor for disposal;
- V. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- VI. Remove all wreckage, rubbish; and
 - I. Request VMRDA to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

5.2.2.2 AIR QUALITY

- I. Consult with VMRDA on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
- II. Damp down exposed soil and any stockpiled-on site by spraying with water when necessary during dry weather;
- III. Use tarpaulins to cover sand and other loose material when transported by trucks; and
- IV. Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

5.2.2.3 NOISE LEVELS

- I. Plan activities in consultation with VMRDA so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- II. Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
- III. Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

5.2.2.4 WATER QUALITY

- I. Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- II. Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with VMRDA on designated disposal areas;
- III. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- IV. Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- V. Dispose any wastes generated by construction activities in designated sites; and
- VI. Conduct surface quality inspection according to the Environmental Management Plan (EMP).

5.2.2.5 OCCUPATIONAL HEALTH AND SAFETY

- I. Develop and implement site-specific Health and Safety (H&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) H&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- II. Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- III. Provide medical insurance coverage for workers;
- IV. Secure all installations from unauthorized intrusion and accident risks;
- V. Provide supplies of potable drinking water and hygienic welfare facilities (e.g. toilets and shower facilities);
- VI. Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- VII. Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- VIII. Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- IX. Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- X. Ensure moving equipment is outfitted with audible back-up alarms;
- XI. Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- XII. Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
- XIII. Access restriction to all general public during construction activities with coordination with VMRDA authorities.

5.2.3 MONITORING

Table below show the proposed environmental monitoring program for this project. It includes all relevant environmental parameters, location, responsibility of mitigation and monitoring, method of monitoring and frequency of monitoring. Monitoring activities during the detailed engineering design stage will from part of the baseline conditions of the project location and will be used as the reference for acceptance of restoration works by the construction contractors.

Table 3 Environmental Monitoring Plan

SR. NO.	FIELD	LOCATION	RESPONSIBLE FOR MITIGATION	MONITORING OF MITIGATION	METHOD OF MITIGATION	INDICATORS/STANDARDS	FREQUENCY
1	Sources of Materials	Quarries and sources of materials	Construction Contractor	Construction Contractor documentation	(i) Checking of records; (ii) visual inspection of sites	(i) Sites are permitted; (ii) Report submitted by construction contractor monthly (until such time there is excavation work)	Monthly submission by construction contractor As needed for DSMC
2	Air Quality	Construction sites and areas designated for stockpiling of materials	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices; (iv) vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NO _x), carbon monoxide (CO), and hydrocarbons (HC)	(i) Checking of records; (ii) visual inspection of sites (iii) allowing only Hired vehicles with valid PUC certificate	(i) Stockpiles on designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) air pollution control devices working properly; (iv) GOI Vehicular Emission Standards for SO ₂ , NO _x , CO and HC.	Monthly for checking records
3	Surface Water Quality	(i) Construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials;	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of surface water quality inspection; (iv) effectiveness of water management measures	visual inspection	(i) Designated areas only; (ii) Installation and functioning of silt traps; (iii) no noticeable increase in suspended solids and silt from construction activities	Monthly
4	Noise Levels	(i) Construction sites; (ii) areas for stockpiles, storage of	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-	(i) Checking of records; (ii) visual inspection	(i) Complaints from sensitive receptors satisfactorily addressed; (ii) silencers in noise-producing equipment functioning as design; and	Monthly

SR. NO.	FIELD	LOCATION	RESPONSIBLE FOR MITIGATION	MONITORING OF MITIGATION	METHOD OF MITIGATION	INDICATORS/STANDARDS	FREQUENCY
		fuels and lubricants and waste materials; (iii) work camps		producing equipment and sound barriers; (iii) Equivalent day and night time noise levels (iv) Ear muffs / protector to the construction workers		(iii) sound barriers installed where necessary (iv) regular noise monitoring especially during night hours	
5	Existing Utilities and Infrastructure	Construction sites	Construction Contractor	(i) Existing Utilities Contingency Plan	(i) Checking of records; (ii) visual inspection	Implementation according to Utilities Contingency Plan	As needed
6	Landscape and Aesthetics	(i) Construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) VMRDA to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	(i) Checking of records; (ii) visual inspection	(i) No accumulation of solid wastes on-site; (ii) implementation of Waste Management Plan; (iii) complaints from sensitive receptors satisfactorily addressed.	Monthly
7	Accessibility	(i) Construction sites;	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject locations. (iv) Tool Box Talk to all construction staff and safety orientation to all visitors (v) installation of adequate barriers and sign boards	Visual inspection	(i) Implementation of Traffic Management Plan, if required; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) signages visible and located in designated areas (iv) walkways, ramps, and metal sheets provided (v) ensure proper installation of barriers	Monthly

SR. NO.	FIELD	LOCATION	RESPONSIBLE FOR MITIGATION	MONITORING OF MITIGATION	METHOD OF MITIGATION	INDICATORS/STANDARDS	FREQUENCY
8	Socio-Economic - Income	Construction sites	Construction Contractor	<p>(i) Complaints from sensitive receptors;</p> <p>(ii) ensure equality in employment of site workers and their wages as per government rules</p> <p>(ii) number of walkways, signages, and metal sheets placed at subproject location.</p>	Visual inspection	<p>(i) Complaints from sensitive receptors satisfactorily addressed;</p> <p>(ii) walkways, ramps, and metal sheets provided</p> <p>(iii) signages visible and located in designated areas</p>	Quarterly
9	Socio-Economic - employment	construction sites	Construction Contractor	<p>(i) Employment records;</p> <p>(ii) records of sources of materials</p>	Checking of records	Number of employees from Visakhapatnam equal or greater than 50% of total workforce	Quarterly
10	Occupational Health and Safety	construction sites	Construction Contractor	<p>(i) Site-specific Health and Safety (H and S) Plan;</p> <p>(ii) Equipped first-aid stations;</p> <p>(iii) Medical insurance coverage for workers;</p> <p>(iv) Number of accidents;</p> <p>(v) Supplies of potable drinking water;</p> <p>(vi) Clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) record of H and S orientation trainings</p> <p>(viii) personal protective equipment's;</p>	<p>(i) Checking of records;</p> <p>(ii) visual inspection</p>	<p>(i) Implementation of H and S plan;</p> <p>(ii) number of work-related accidents;</p> <p>(iii) % usage of personal protective equipment;</p> <p>(iv) number of first-aid stations, frequency of potable water delivery, provision of clean eating area, and number of sign boards are according to approved plan;</p> <p>(v) % of moving equipment outfitted with audible back-up alarms</p>	Quarterly

SR. NO.	FIELD	LOCATION	RESPONSIBLE FOR MITIGATION	MONITORING OF MITIGATION	METHOD OF MITIGATION	INDICATORS/STANDARDS	FREQUENCY
				(ix) % of moving equipment outfitted with audible back-up alarms; (x) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.			
11	Community Health and Safety	Construction sites	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors	Visual inspection	(i) Implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed	Quarterly
12	Work Camps	Work camps	Construction Contractor	(i) Complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) VMRDA report in writing that the camp has been vacated and restored to pre-project conditions	Visual inspection	(i) Designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed	Quarterly
13	Chance Finds	Construction sites	Construction Contractor	Records of chance finds	Checking of records	Implementation of Chance Finds Protocol	As needed

5.2.4 IMPACTS DURING OPERATION PHASE

During the operational phase of the project, traffic in the area will increase. Some of the potential direct and indirect negative impacts of the project during operation phase are the following.

- Increased noise pollution at the project area
- Pollution of water bodies and impacts on its ecosystem if hazardous chemical or oil spill into the canals and streams
- Disturbance to the wildlife in the forests on the sides of the project area

5.2.5 POTENTIAL POSITIVE ENVIRONMENTAL IMPACTS OF THE PROJECT

The positive impacts of the project are:

- Development & Improved of recreational facilities at Kailasagiri Hill Top Park.
- Development & Improved aesthetics of the park area.
- Development of plantation & avenue plantation etc.
- Development of waterbodies to improve the micro climate of the immediate surroundings.
- Improved Access Control System & Crowd Management.
- Improved Safety & Surveillance.
- Improved Public Address System
- Additional plantation and trees will enhance the micro-climate.
- Zero Discharge.
- Solid Waste Management System

6. ENVIRONMENTAL MANAGEMENT PLAN

6.1 OBJECTIVES

The main objective of an Environmental Management Plan (EMP) is to manage environmental impacts from the proposed project and to ensure sustainable development in the study area. In proposed project pollution control measures should be taken right at the designing, planning, technology selection, raw material sourcing and also in form of maximum reuse/recycling of materials within proposed intra units.

In addition to above measures, Project Authority should also follow the-end-of-pipe treatment approach to minimize emission/discharge of pollutants in to the environment. Site-specific EMP is formulated to mitigate adverse environmental impacts that are identified and quantified in the process of baseline and impact assessment. An EMP also ensures that the resources are utilized to maximum extent, waste generation is minimized, residuals treated adequately and by-products are recycled to the extent possible.

6.2 ENVIRONMENTAL MANAGEMENT ACTION PLAN

Environmental mitigation measures will be incorporated within the design process, including the avoidance of potential impacts. Appropriate measures have also been identified for action in the construction and operational phases. Prevention or avoidance of impact is better than mitigation of impact. Hence, avoidance and reduction of adverse impacts approaches were adopted during the design stage through continued interaction between the design and environmental teams. This is reflected in the designs of the horizontal & vertical alignment, cross sections adopted, construction methods and construction materials. In-depth site investigations have been carried out so that sensitive environmental resources are effectively avoided, leading to the environmentally best-fit alignment option. Environmental Management Plan (EMP) deals with the implementation procedure of the guidelines and measures recommended to avoid, minimize and mitigate environmental impacts of the project. It also includes management measures suggested for enhancement of the environmental quality of the project area. The Environmental Management Action Plan (EMAP) is a plan of action for mitigation / management / avoidance of the negative impacts of the project and enhancement of the project area

Table 4 Environmental Management Action Plan

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
		Mitigation Measures for Impacts on Land and Water		
	Clearing, grubbing and stripping, cutting of earth, filling, demolition		Topsoil conservation should be undertaken as per STANDARD guidelines to prevent its loss.	Contractor
			Relocation of trees @ three times the number of trees cut should be planted	Contractor
			The plants should be provided with adequate protection from animals, regular watering and proper monitoring shall be carried out to ensure their survival and growth.	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			Avoid dumping of excavated soil and debris into canals, drainage channels and water bodies. Earth, stone or any other construction material shall be properly disposed off safely so that the flow of water in cross drainage channels is not blocked. Construction and Demolition Waste Management Rule (2016) should be complied wherever applicable.	Contractor
			As far as possible avoid earthworks construction activity during monsoon.	Contractor
			If any existing irrigation and drainage system ponds are damaged, they shall be suitably repaired.	Contractor
		Mitigation Measures for Impacts on Air and Noise		
			Water should be sprinkled to suppress dust during any dust generating activity.	Contractor
			Machinery and vehicles should be well-maintained to keep their noise to a minimum.	Contractor
			High noise and dust generating operations will not be conducted during the peak times	Contractor
		Mitigation Measures for Socio-Economic Impact		
			At least 50% of unskilled labourers should be hired from the nearby villages Construction materials and other purchase to the labour camps should be made from the local shops	Contractor
		Mitigation Measures for Impact on Land and Water		

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
	Operation of construction camp	Impact on the productivity of the soil, spillage of fuel, lubricants and hazardous chemicals.	Proper maintenance of vehicles and machineries should be carried out to minimize the spillage of oil. Maintenance should be carried out on impervious platforms with spill collection provisions. Oil and grease waste generated from garages in construction camps should be drained out through catch drains and oil interceptors. Vehicle maintenance and refueling should be confined to areas in construction camps designed to contain spilled lubricants and fuels.	Contractor
Sanitation facilities, storm water drainage, catch drains and oil interceptors should be maintained properly.			Contractor	
Management plans (Construction camp, labour camp, Quarry area and crusher unit) prepared for all project facilities and approved by the VMRDA should be strictly adhered to.				
Mitigation Measures for Impact on Land and Water				
		Surface water pollution due to runoff and waste water / sewage disposal from camps	Sanitation facilities, storm water drainage, catch drains and oil interceptors should be maintained properly.	Contractor
			Water Quality monitoring should be conducted as per Environmental Monitoring Plan so that appropriate remedial measures can be taken	

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			<p>Management plans (Construction camp, labour camp, Quarry area and crusher unit) prepared for all project facilities and approved by the VMRDA should be strictly adhered to.</p>	Contractor
Mitigation Measures for Impacts on Air				
		<p>Increase in air pollution due to operation of machineries</p>	<p>Emission levels of all vehicles, plants and machineries should be well within the prescribed limits. PUC certificates of all vehicles and machineries should be renewed at required intervals.</p> <p>Mixing equipment should be well sealed, and be equipped with a dust-removal device. Filtering mechanisms like air filter and water filter should be operational.</p>	Contractor
			<p>Water sprinkling should be undertaken for dust suppression. Provide sufficient water storage facility for 2 days use.</p>	Contractor
			<p>LPG should be provided for cooking and use of fire wood for cooking or any other purpose should be strictly banned.</p>	Contractor
			<p>Air quality monitoring should be conducted at hot mix plant, quarry site and crusher location as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement of pollution. Monitoring</p>	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			results should be compared with NAAQS	
			Management plans (Construction camp, labour camp, Quarry area and crusher unit) prepared for all project facilities and approved by the VMRDA should be strictly adhered to.	Contractor
Mitigation Measures for Impacts on Noise				
		Increase in noise level due to operation of machineries in construction camp	Diesel generator and Vehicles used for construction activities should be maintained well, so as to ensure that the noise and emission levels continues to be within the standards set by Central Pollution Control Board .	Contractor
			At construction camps within 150 m of human settlements, noisy construction activities should be stopped between 10:00 pm and 6:00 am.	Contractor
		Increase in noise level due quarrying, excavation in roack and crushing operations	Controlled blasting techniques should be adopted in quarries. Conduct quarrying in a skillful, scientific and systematic manner. Follow a routine and preventive maintenance procedure for the DG set in consultation with the DG set manufacturer. The stack height of the DG set has to be adequate as per the guidelines of CECB or other competitive agency.	Contractor
			Workers shall not be exposed to sound of more	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			<p>than 85 dB for more than eight hours a day and shall be provided with ear plugs.</p> <p>Noise level monitoring should be conducted at sensitive receptor locations as well as hot mix plant, quarry site and crusher location as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement of pollution.</p> <p>Monitoring results should be compared with NAAQS for Noise.</p>	
Mitigation Measures for Impacts on Biological Environment				
		Loss of vegetation	Saplings planted for green belt development should be properly taken care of and protected to ensure their survival and growth.	
			If the camp is located near the forest or private plantations, orient the laborer's to refrain from any activities involving poaching, NTFP collection or spread of forest fire.	
Mitigation Measures for Socio Economic Impacts				
		Occupational Health and Safety impacts for workers	Provision of safe drinking water and access to sanitation services should be continued at satisfactory service levels.	Contractor
			Construction workers should use the personal protective equipment provided to them and it shall be replaced if necessary. Firefighting equipment like fire extinguishers provided in the camp should be maintained well.	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			Fencing of the construction / labour camp to prevent trespassing of humans and animals into the camp should be maintained properly.	Contractor
			Other provisions to ensure worker's safety shall be followed as per guidelines.	Contractor
			On occurrence of any accident or injury, the safety officer should submit an accident report to the VMRDA in the prescribed format.	Contractor
			Traffic Management Plan shall be prepared to reduce the disruption of traffic.	Contractor
			Compliance to the statutory regulations like Dock Workers (Safety, Health and Welfare) Rules, 1990 & Act 1986; The building and other construction workers (Regulation of Employment and condition of service) Act 1996 etc as and where applicable.	Contractor
		Increase in communicative diseases.	Toilets, sewage collection system and septic tanks provided in the labor camps should be properly maintained.	Contractor
		Increase in crime rate indulgence in hunting and collection of forest producers	Information dissemination should be undertaken to generate awareness among the migrant laborer's about the sensitivities of the region.	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			Warning boards should be installed in Hindi and local language of the labourers	
		Mitigation Measures for Impacts due to Solid Waste Generation		
		Unscientific and unsafe disposal of debris and waste	<p>Waste petroleum and lubricants should be collected and sold out to the approved oil recycling agencies.</p> <p>Other solid wastes should be collected and taken at the approved disposal sites, according to State, Central laws and regulations and SPCB guidelines.</p> <p>Provision of separate waste bins for bi-degradable, non-degradable and domestic hazardous waste should be implemented</p>	Contractor
			<p>Periodical maintenance of waste handling space should be undertaken in construction camp and labour camp.</p> <p>All types of solid waste should be collected and disposed of frequently as per Comprehensive Waste Management Plan.</p> <p>Debris / solid waste should be disposed in debris disposal site approved by VMRDA.</p> <p>Guidelines of Construction and Demolition waste Management Rules 2016 should be followed.</p>	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
	Extraction of Surface / Ground water	Mitigation measured for impacts on Water		
		Over exploitation of Surface / Ground water	Water should be drawn from only those sources that have got prior approval of local bodies and VMRDA. Over extraction of surface water should be avoided.	Contractor
		Mitigation measured socio – economic impacts		
		Reduction in water available for agriculture and other domestic purposes	Over extraction of surface water should be avoided. There should not be any conflict on water use with the villagers regarding the availability of water for their drinking or irrigating purpose.	Contractor
		Mitigation Measures for Impacts on Land		
	Transportation of materials	Spillage of fuel, lubricants and hazardous chemicals	Vehicles and machinery should be maintained and refilled in such a fashion that fuel spillage does not contaminate the soil and their emission levels are as per norms of state PCB. Fuel storage and refilling sites should be kept away from cross drainage structures and important water bodies.	Contractor
		Damage to existing haul road due to over usages	Black topping and maintenance should be undertaken regularly to reduce the damage due to over use and for easy plying of construction vehicles as	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			well as regular local commuters.	
		Mitigation Measures for Impacts on Water		
		Contamination of water due to washing of vehicles, construction equipment's and machineries	Washing of vehicles, construction equipment and machineries near/inside the water bodies should be prohibited to prevent water contamination.	Contractor
			To reduce the flooding and water logging, the cross-drainage structures should be provided where ever required and shall be regularly maintained to remove any blockages	Contractor
			Water Quality monitoring shall be conducted along the project stretch as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement of pollution. Monitoring should be compared with the surface and ground water standards.	Contractor
		Mitigation Measures for Impacts on Air		
		Increase in air pollution due to fugitive dust	All vehicles should have PUC certificates. Dust covers/ tarpaulins should be provided to cover construction material loaded on trucks.	Contractor
			Idling of delivery trucks or other equipment shall not be permitted during periods of unloading or when they are not active.	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			Sprinkling of water should be carried out along the haul road at least twice a day on a regular basis during the entire construction period especially in the winter and summer seasons.	Contractor
			Air quality monitoring shall be conducted along project stretch as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement to pollution. Monitoring should be compared with NAAQs	Contractor
		Mitigation Measures for Socio-Economic Impacts		
		Inconvenience to the local people, vehicles and pedestrians	The work schedule should be informed to the public in advance through newspapers and public boards	Contractor
		Occupational health and safety of workers	Workers shall be provided with Personal Protection Equipment such as helmet, protective shoes, high visibility jackets and ear plugs and mufflers.	Contractor
		Inconvenience to public due to disruption to traffic	Traffic Management Plan should be implemented.	Contractor
		Mitigation Measures for Impacts on Land		
	Compacting earth and laying of sub-base course, base course,	Contamination of land	Vehicles, machinery and equipment used in construction should be maintained and refilled in such a fashion that fuel	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			<p>spillage does not contaminate the soil or water.</p> <p>Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation.</p>	
			<p>All construction operators, drivers and workshop personal should be trained well so that they can take immediate measures for the spill of contaminate.</p> <p>All spills and construction debris should be disposed off in the sites identified for the same as per guidelines and the site should be fully cleaned before handing over.</p>	Contractor
			<p>Soil Quality monitoring should be conducted as per the Environmental Monitoring Plan so that appropriate measures can be taken up towards the abatement of pollution</p>	Contractor
Mitigation Measures for Impacts on Water				
			<p>Fuel storage and refilling sites should be kept away from cross drainage structures and important water bodies.</p>	Contractor
		Pollution of water bodies and deteriorating the water quality	<p>All construction operators, drivers and workshop personal should be trained well so that they can take immediate measures for the spill of contaminate.</p> <p>All spills and construction debris should be disposed</p>	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			off in the sites identified for the same as per guidelines and the site should be fully cleaned before handing over.	
			Construction of foundation of bridges/ culverts during monsoon season should be avoided.	Contractor
			Adopt necessary measures to prevent the wastewater produced during construction from entering directly into water bodies.	Contractor
			Water Quality monitoring should be conducted as per the Environmental Monitoring Plan so that appropriate measures can be taken up towards the abatement of pollution	Contractor
Mitigation Measures for Impacts on Air				
		Increase in air pollution	Road surface should be cleaned with air compressor and vacuum cleaners prior to the construction works. Manual labour using brooms and blowing of air should be avoided.	Contractor
			Sprinkling of water on site to aid compaction of the material and for dust suppression.	Contractor
			Air Quality monitoring should be conducted as per the Environmental Monitoring Plan so that	Contractor

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			appropriate measures can be taken up towards the abatement of pollution	
Mitigation Measures for Impacts on noise				
		Increase in ambient noise level	Construction contract shall clearly specify the use of equipment emitting noise of not greater than 80 dB (A) for the eight hour operation shift.	Contractor
			For protection of construction workers from noise hazards, earplugs shall be provided to those working very close to the noise generating machinery.	Contractor
			At construction sites within 150 m of human settlements, noisy construction shall be stopped between 10:00 pm and 6:00 am	Contractor
			Near sensitive receptors use temporary noise barriers and avoid work at night. Public will be informed about the regulations on noise of vehicles. Proper signboards should be erected near sensitive receptors.	Contractor
			Noise level monitoring should be conducted as per the Environmental Monitoring Plan so that appropriate measures can be taken up towards the abatement of pollution	Contractor
Mitigation Measures for Impacts due to Solid Waste Generation				

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
		Impact on the surrounding and inconvenience to the public due to improper handling of construction wastes	Debris shall be collected in a scientific manner and to be disposed off in the sites identified for the same and as per the Construction and Demolition Waster Management Rule (2016)	Contractor
	Debris disposal	Mitigation Measures for Impacts on Land		
		Soil erosion, Land contamination due to unscientific debris disposal.	As far as possible, use the debris to interior unpaved road or the approach roads / haul roads to strengthen it. It can also be used for filling of low lying grounds etc. Disposal of debris should comply with conditions given in Construction and Demolition Waste Management Rules (2016)	Contractor
		Mitigation Measures for Impacts due to Solid Waste Generation		
		Soil erosion, Land contamination due to unscientific debris disposal.	Provide proper drainage facility so that the sites do not contaminate any water sources, rivers etc.	Contractor
	Safety of the Visitors	Mitigation Measures for Impacts at Operation Stage		
		Accident or unsafe behavior of public	<p>VMRDA to give clear instruction through Dos and Donts through instruction boards at every activity and main entrance</p> <p>Employment of security staff members and technological equipment (e.g. CCTV cameras etc) for monitoring of activities and mischiefs</p>	VMRDA

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
	Operation of Proposed STPs	In absence of regular maintenance of STPs poor treatment quality of the treated water, impact on landscape irrigation	O&M contract can be awarded to the agency expertise in maintaining STPs with imparting training to VMRDA staff for capacity building	VMRDA
	Traffic Congestion, Noise and Air Pollution	Improper traffic management	<p>VMRDA to manage traffic during operation phase for proper access and egress of different vehicles during operation phase.</p> <p>Installation of Air Quality monitoring equipment</p>	VMRDA
	Solid Waste Management	Improper disposal of Waste	<p>VMRDA to provide two separate bin system for bio degradable and non-biodegradable wastes. Bio degradable waste to dispose at municipal composting site and non-biodegradable / recyclable waste to disposed through registered recycler</p> <p>VMRDA to provide clear sign boards for educating general public for segregation of waste at source</p> <p>Stricter rules for food court outlets for management of solid waste so as comply the Solid Waste Management Rules</p>	VMRDA
	Wastage of Resources like Water Electricity	Improper use of resources	<p>VMRDA to put proper instruction sign boards for avoiding wastage of natural resources</p> <p>VMRDA to maintain all the utilities and storage</p>	VMRDA

SR. NO.	ACTIVITY	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE FOR MITIGATION
			structures to avoid any leakage or wastage	

6.3 COST ESTIMATE FOR ENVIRONMENTAL MANAGEMENT PROGRAM

Cost estimates break up for Environmental Management Plan as shown in below table

Table 5 Cost for EMP

SL NO	DESCRIPTION	UNIT	COST (LAKHS)
1	EMP During Construction Phase		
	Site Clean Up & Waste Removal	LS	10
	Hard barricading and other site safety measures	LS	15
	Dust mitigation measures	LS	2
	Cautionary Signages	LS	1
	Restoration of cut open trenches	LS	10
	Total		38.00

7. CONCLUSION

Environmental impacts caused are in two phases one is during construction and second one is during operation. No significant / potential adverse impacts are anticipated on the environment due to the proposed project and there are no ecological sensitive issues of concern in the site. The project site is clearly outside notified wetland, densely habitated mangrove areas, and areas of archeological importance. Although no such permanent negative or adverse environmental impacts were identified, there are certain temporary impacts during construction phase and very mild negative effects during operation are identified and for these effects appropriate mitigation plans have been suggested in the mitigation chapters. The Environmental management plan narrates the likely impacts during Construction stage and Operation stage. Identified or likely impacts have been listed out, mitigation measures are suggested along with agency responsible.

In the case of this hilltop park project:

- (i) Most of the individual elements are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant;
- (ii) Most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving construction and earth movements; and
- (iii) Project being located in the Visakhapatnam city limits, will not cause direct impact on biodiversity values. The project will be in properties held by the local government and access to the project locations is through public rights-of-way and existing roads only hence, land acquisition and encroachment on private property will not occur.

The benefits of the siting at the proposed location far outweighs the demerits. In fact, construction of hilltop park in these selected locations would only support and not negate the spirit and objective of the Environmental Protection. There are no rehabilitation, resettlement and loss of livelihood involved since there is no inhabitants on the park. The Positive Social Impacts are an improved recreational opportunity for local population, generation of employment, improvement of local economy due to higher tourist footfall. There are no endangered species of flora and fauna in the project affected area.

Further, general public, Associations, civic societies and other government departments are informed about the project proposal, Focus group discussion and stakeholders consultations are organized. PowerPoint presentations about the project components are briefed in the meeting. Stake holders attended the meeting have applauded the effort of VMRDA towards providing infrastructure & recreational facilities at Kailasagiri Hill Park, all kind of support during Planning and implementation. Hence, it is concluded that negative impacts due to the project is only generic and purely of temporary in nature. Good construction and O&M practices and implementation of mitigation measures would definitely provide solution to negative impacts.

8. ANNEXURE-01

SR. NO	COMPONENTS	DETAILS
1	Brief description of the project proposal	Study, analyze, plan, design and to prepare master plan & DPR for restoration & redevelopment of Kailasagiri Hill Park at Visakhapatnam
2	Number of project sites and Project components	<p>Total Kailasagiri Hill Area-129.5 ha Hill Park Development Area-13 ha Proposed Projects:-</p> <ol style="list-style-type: none"> 1. Recreational Activities 2. Public Amenities 3. Traffic Related 4. Environmental Improvements & Landscaping 5. Existing Infrastructure Improvement Works
3	Details of Component	<p>Location Map & Detailed Design Drawing along with components is given with this report.</p> <ol style="list-style-type: none"> 1. Recreational Activities <ol style="list-style-type: none"> a. Adventure Park b. Amphitheater c. Indoor Amusement & Gaming Arena d. Childrens Park e. Zorbing Park f. Zipline 2. Public Amenities <ol style="list-style-type: none"> a. Food Court b. Garden Restaurant c. Washroom d. Drinking Water Fountains e. Kiosks 3. Traffic Related <ol style="list-style-type: none"> a. Parking Improvements b. Proposed Parking c. Eco-Friendly Vehicles Parking & Charging Facility d. Existing Ghat Road Development 4. Environmental Improvements & Landscaping <ol style="list-style-type: none"> a. Terrace Garden b. Tree Park, Preservation Zones & Green Avenues c. Butterfly Park d. Solar Street Lighting e. Rain Water Harvesting-Water Body Creation f. Sewage Treatment & Recycle System 5. Existing Infrastructure Improvement Works <ol style="list-style-type: none"> a. View Points b. Main Entrance c. Water Supply, Drainage & SWM d. Irrigation e. Main Entrance f. Signages

SR. NO	COMPONENTS	DETAILS
5	Location of the Project Sites & Current Use (Provide information for all sites involved in the project)	Base map along with land use map covering area boundary, project sites, locations of proposed development is attached with this report.

SR. NO.	COMPONENTS	YES	NO	DETAILS
---------	------------	-----	----	---------

1.	BIOLOGICAL ENVIRONMENT			
-----------	-------------------------------	--	--	--

	Is the project adjacent to any of the following (Provide information for all sites)			
--	---	--	--	--

1.1.	Cultural Heritage site	√		Activities of recreation or construction activities at project site wont have any adverse impact on the cultural sites nearby.
------	------------------------	---	--	--

1.2.	Reserved / Protected Forest within 10km radius (Boundary to boundary distance)	√		Hill park area or its activities don't have any direct impact on Natural Forests since the project site is well bifurcated from the reserved forest areas of Seetakonda & Kambalakonda with well developed residential colonies and National Highway abutting the hill park area.
------	--	---	--	---

1.3.	Wet Land/ Mangrove/ Estuarine Region	√		Hill park area or its activities don't have any direct impact on wet lands or mangroves
------	--------------------------------------	---	--	---

1.4.	Natural Forests	√		Hill park area or its activities don't have any direct impact on Natural Forests since the project site is well bifurcated from the reserved forest areas of Seetakonda & Kambalakonda with well developed residential colonies and National Highway abutting the hill park area.
------	-----------------	---	--	---

1.5.	Introduction of alien species?	√		<table border="1" style="width: 100%;"> <tr><td>Syzygium Malaccense (Jamba)</td></tr> <tr><td>Grevillia Robusta (Silver Oak)</td></tr> <tr><td>Cinnamon Tree</td></tr> <tr><td>Eucalptyus Tree</td></tr> <tr><td>Garcinia Cambogia(Malabar Tamarind)</td></tr> <tr><td>Plumeria Alba (Champa)</td></tr> <tr><td>Dwarf Bamboo</td></tr> <tr><td>Plumeria Rubra</td></tr> <tr><td>Bombax Ceiba</td></tr> <tr><td>Erythrina Variegata / Indica</td></tr> <tr><td>Bahunea Purpurea</td></tr> <tr><td>Dellenia Pentagynia</td></tr> <tr><td>Michellia Champaca</td></tr> </table>	Syzygium Malaccense (Jamba)	Grevillia Robusta (Silver Oak)	Cinnamon Tree	Eucalptyus Tree	Garcinia Cambogia(Malabar Tamarind)	Plumeria Alba (Champa)	Dwarf Bamboo	Plumeria Rubra	Bombax Ceiba	Erythrina Variegata / Indica	Bahunea Purpurea	Dellenia Pentagynia	Michellia Champaca
Syzygium Malaccense (Jamba)																	
Grevillia Robusta (Silver Oak)																	
Cinnamon Tree																	
Eucalptyus Tree																	
Garcinia Cambogia(Malabar Tamarind)																	
Plumeria Alba (Champa)																	
Dwarf Bamboo																	
Plumeria Rubra																	
Bombax Ceiba																	
Erythrina Variegata / Indica																	
Bahunea Purpurea																	
Dellenia Pentagynia																	
Michellia Champaca																	

SR. NO	COMPONENTS	DETAILS																		
				<table border="1"> <tr><td>Cassia Fistula (Amaltas)</td></tr> <tr><td>Ficus Benjamina</td></tr> <tr><td>Lagistromia Indica</td></tr> <tr><td>Hydrangea</td></tr> <tr><td>Assorted Bougainvillea</td></tr> <tr><td>Jasmine</td></tr> <tr><td>Tall Grass Pennisetum Red</td></tr> <tr><td>Caladium Shrub</td></tr> <tr><td>Anthurium</td></tr> <tr><td>Fittonia</td></tr> <tr><td>Catharanthus Rosea</td></tr> <tr><td>Plumbago</td></tr> <tr><td>Allamanda Cathartica</td></tr> <tr><td>Lantana</td></tr> <tr><td>Catharanthus Hybrid</td></tr> <tr><td>Zypheranthus Lutia</td></tr> </table>	Cassia Fistula (Amaltas)	Ficus Benjamina	Lagistromia Indica	Hydrangea	Assorted Bougainvillea	Jasmine	Tall Grass Pennisetum Red	Caladium Shrub	Anthurium	Fittonia	Catharanthus Rosea	Plumbago	Allamanda Cathartica	Lantana	Catharanthus Hybrid	Zypheranthus Lutia
Cassia Fistula (Amaltas)																				
Ficus Benjamina																				
Lagistromia Indica																				
Hydrangea																				
Assorted Bougainvillea																				
Jasmine																				
Tall Grass Pennisetum Red																				
Caladium Shrub																				
Anthurium																				
Fittonia																				
Catharanthus Rosea																				
Plumbago																				
Allamanda Cathartica																				
Lantana																				
Catharanthus Hybrid																				
Zypheranthus Lutia																				
1.6.	Loss of native species or genetic diversity?		√																	
1.7.	Other Sensitive Environmental Components as listed in ESMF		√																	
1.8.	Residences, schools, hospitals etc		√																	
1.9.	Drinking water source, upstream and downstream uses of rivers etc		√																	
1.10.	Low lying areas prone to flooding / areas of Tidal Influence (CRZ)		√																	
1.11.	Impact on Surrounding Environmental Conditions	√		Positive impact on local environment through improved landscaping and plantation activities																
1.12.	Degradation of land / eco-systems		√																	
1.13.	Loss or impacts on Cultural / heritage properties		√																	
1.14.	Water Resource Problems		√																	
1.15.	Pollution of Water bodies / ground water		√																	
1.16.	Cutting of Trees / Loss of Vegetation	√		Consultants have identified areas within the developed park area with low tree density for proposed developments. Trees having girth more																

SR. NO	COMPONENTS			DETAILS
				than 30 cm are retained. Some small trees under development area will be cut; however, 3 times the trees cut will be planted in the proposed landscape plan.
1.17.	Health & Safety Risks in the neighborhood	√		During construction H&S risk may be posed to workers & park visitors. Steel Barricading to be done to separate the construction areas from visitors zone. Cost included in the block cost estimates.
1.18.	Potential risk of habitat fragmentation due to the clearing activities? (e.g. Hindrance to the local bio diversity like disturbing the migratory path of animals/ birds etc.)	√		None – Proposed sites is already an Urban Park and consultants have restricted the proposals to already developed area of the park. Considering the project site location and taking the fact that it is surrounded by development of colonies on southern & northern side, National Highway-16 on the western side the risk of habitat fragmentation is very minimum or nil since the project site is already disconnected from probable wildlife habitat.
2.	PHYSICAL ENVIRONMENT			
2.1.	Creation of new land uses?		√	No Change in Land Use, Urban Park with recreation as predominant use. The same will be maintained
2.2.	Pre-construction investigations e.g. bore houses, soil testing ?	√		Soil Testing at the foot print location to know soil strata for design of structures and quantity estimation for excavation
	Construction works?	√		Public Utility Buildings, Landscape development, parking area development will be constructed & carried out on preidentified and approved locations.
2.3.	Road blocking and increased traffic flow due to vehicle movement for construction activities, Inconvenience to the local community. Dust and noise from construction activities.	√		Work will be planned in a manner in which major tourist movement areas and main road traversing the Hill Park site is kept uninterrupted. Construction material shall be stockpiled to minimize traffic blockages. Frequent water sprinkling program will undertake to suppress the dust, if any Proper and sturdy barricading proposed to avoid any H&S risks.
2.4.	Disturbance to informal commercial activities during construction.	√		Food Courts, Kiosks and other vendors will be temporarily relocated and reinstated to new premises when the work is completed
2.5.	Demolition works?		√	Minor pathways and utility buildings which are dilapidated

SR. NO	COMPONENTS	DETAILS		
2.6.	Will the project affects the River flow pattern, stream pattern or any other irrigation canal?		√	The location of the proposed water feature is between with primary drain which drains directly to sea along the beach road. Hence no other natural stream or irrigation canal will be affected by such a proposal.
2.7.	Offshore structures?		√	
2.8.	Production or manufacturing process?		√	
2.9.	Facilities for treatment or disposal of solid waste or liquid effluents?	√		Mini STP to be proposed to attain zero discharge park.
2.10.	New road, rail or sea traffic during construction or operation?		√	Formation and layering of existing road along with retaining wall for safety.
2.11.	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?		√	Work will be planned in a manner that traffic movements are not affected during execution of project. This can be planned in phased manner to ascertain the minimum disruption
2.12.	New or diverted transmission lines or pipelines?		√	
2.13.	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?		√	No proposals for realignment of culverts or hydrology of watercourses or aquifers.
2.14.	Highway crossing and/or Stream crossings?		√	
2.15.	Transportation of personnel or materials for construction, operation or decommissioning ?	√		Construction materials and precast items will be transported to project site. Also, excessive excavated earth to be transported for disposal from project site.
2.16.	Long term dismantling or decommissioning or restoration works?		√	
2.17.	Ongoing activity during decommissioning which could have an impact on the environment?		√	
2.18.	Water quantity? Estimated usage of water quantity for the project	√		Water used only for compaction, dust control, curing and concrete preparation.

SR. NO	COMPONENTS			DETAILS
2.19.	Estimated energy consumption for the project activities	√		Only use of diesel for construction machineries is anticipated.
2.20.	Any other resources proposed to be utilized for project activity? (e.g., ground water)		√	Water supply available at park facility to be used
3.	GEOLOGY/SOILS			
3.1.	Land specially undeveloped or agricultural land(Ha)		√	Developed Park Area already in use for recreational purpose
3.2.	Construction Material-stone, aggregates and/or soil (expected source-MT)	√		Cement, concrete, aggregates, brick, steel etc construction material to be used in construction.
3.3.	Forest and timber(source-MT)		√	
3.4.	Does the project activity involve cutting and filling/ blasting etc.?	√		Soil cutting filling activities will be carried out for site development and grading activity Since the project area is within the city limits blasting operation will not be allowed
3.5.	Will the project cause physical changes in the project area (e.g., changes to the topography) due to excavation, earthwork etc...?		√	No change in topography anticipated.
3.6.	Will the project involve any quarrying/ mining etc?		√	
4.	POLLUTION			
4.1.	Spoil, overburden or mine wastes		√	Park Design is carried out with careful assessment of contours and taking advantage of the same.
4.2.	Municipal waste (domestic and or commercial waste)		√	
4.3.	Hazardous waste(as per Hazardous Waste Management Rules)		√	
4.4.	Construction or demolition wastes	√		Demolition will be limited to dilapidated platforms and minor structures like benches, Construction debris, which is to be disposed to suitable locations
4.5.	Redundant machinery or equipment		√	
4.6.	Contaminated soil or other materials		√	

SR. NO	COMPONENTS			DETAILS
4.7.	Agricultural wastes		√	
4.8.	Other industrial process wastes		√	
4.9.	Surplus product		√	
4.10.	Sewage sludge or other sludge from effluent treatment		√	Mini STP with recycle of water for landscaping
4.11.	Will the project use or store dangerous substances (e.g., large quantities of hazardous chemicals/ materials like Chlorine, Diesel, Petroleum products etc...)?		√	
4.12.	Changes in occurrence of diseases or affect disease vectors (e.g. insect or water borne diseases)		√	
4.13.	Affect the welfare of people e.g. by changing living conditions?	√		The park area don't have any inhabitants, the proposed project will improve the recreational opportunity for the local residents (especially women and children's), provide better facilities for vendors to operate their business and provide hygienic and aesthetically appealing public utilities for visitors (especially women) and vendors of the hill park.
4.14.	Will the project cause air pollution or increase in emission of pollutants?		√	Negligible increase dust particles may occur during construction phase which well be controlled with proper dust control measures e.g. water spray
4.15.	Will the project generate or increase noise?	√		During Construction surrounding noise level will increase marginally but will not affect the tourist visiting the park
4.16.	Will the project generate water pollution (water bodies/ groundwater)?		√	Currently soak pits are employed in the park area, having a Mini STP as part of the project it will reduce the water pollution.
4.17.	Will the project cause construction Hazard to workers/ residents		√	Proper barricading and site safety measures shall be proposed during construction.
4.18.	Is there a potential for release of toxic gases or accident risks	√		Accident risk - Contractor will provide proper site barricading, signs and proper information regarding construction activities. Also, Insurance, Personnel protective equipment for labours working is to be insisted.
4.19.	Nuisance due to		√	

SR. NO	COMPONENTS			DETAILS
	leakage/ overflowing of sewers?			
4.20.	Nuisance due to mosquito breeding and bad odors from STP		√	The proposed mini STP will employ latest technology Proper landscaping with local trees will be provided to ensure aesthetic environment.
4.21.	Potential pollution of agricultural fields		√	Recycle
4.22.	Mixing of non-municipal wastewater may interfere with the treatment process.		√	Only Sewage from public toilets and kitchen waste water from food courts are anticipated.
5.	O & M IMPACTS			
5.1.	Any operational waste streams?		√	
5.2.	Any occupational health and safety issues?	√		For O&M for park area and other facilities, competent personnel to be deployed to avoid any H&S issues. All personnel to be issued with suitable Personal Protective Equipment (PPE).
5.3.	Pollution due to improper sludge disposal methods.	√		Part of O & M & sludge management plans.
5.4.	Odour nuisance		√	
5.5.	Impacts due to illegal tapping of sewage for irrigation purpose from trunk sewers		√	
5.6.	Nuisance and pollution of ground/surface water due to over flowing/choking of sewers		√	Regular maintenance will avoid over flowing/choking
5.7.	Pollution and health risks due to improper handling and disposal of sludge from Sewage treatment plants		√	
6.	GENERAL			
6.1.	Please indicate whether any other features of the project that could influence ambient environment		√	Plantations, preservation of trees and development of green avenues will enhance the micro environment.
6.2.	Has any consultation with the public or stakeholders been conducted?		√	Stakeholder consultation for project appreciation and collection of inputs for preparation of master plan is carried out.

SR. NO	COMPONENTS	DETAILS		
7.	ENVIRONMENTAL ENHANCEMENT & SAFETY MEASURES			
7.1.	Is the project design considering energy conservation measures/energy recovery options?	√		Solar Street Lighting is proposed throughout the park area to conserve energy and promote green energy among the tourist.
7.2.	Is the project considering waste minimization or waste reuse/recycle options?	√		
7.3.	Has the project design considered RWH or any other environmental enhancement measure?	√		Proposed recreational activities are energy efficient, also energy efficient pump sets, reuse of treated wastewater for landscaping etc. can be implemented on successful execution of the proposed projects.
7.4.	Has the project design considered extreme events, drought, flood, natural disasters?		√	Cyclone resilient design and structures are proposed
7.5.	Public and worker safety	√		Provide caution and other signboards. Personal protection equipment such as gloves, boots, hard hats shall be provided to the workers. Hard barricading, Danger lighting, Shoring strutting timbering during excavation, if any, will be provided.