Contents

1. Project and Study Area
2. State of Pune’s Rivers
3. Objectives
4. Master Plan
5. Project Implementation
6. Next Steps
Project Chronology

- Work order to consultant: 30 Jan
- Kick off Meeting: 03 Feb
- Signing of Agreement: 21 Mar
- Meeting with Stakeholders: 27 Apr
- Geotechnical Investigation Report: 09 Jun
- Topographic Survey: 16 Aug
- Concept Master Plan: 24 Aug
- Hydrology and Hydraulics Report: 12 Sep
- Preliminary Base Map: 05 Dec
- Application for EIA: 20 Apr 2017
- Draft Master Plan: 12 May 2017
- Detailed Project Report – Draft: 25 Jan 2018
1. Project and Study Area
Project area – along 44kms of Mula, Mutha and Mula-Mutha
Study area – entire catchment upstream of Pune and impacted downstream areas
Topographical Survey

Cantonment Area

Mula River near Under Construction Bridge

Check Dam near Cantonment Area

Mula River near Shanti Nagar Bridge
Topographical Survey

Survey Map for Mula, Mutha and Mula Mutha Rivers.
The various details that were mapped in topographical survey have been enlisted below:

**River bed**
- Spot levels
- Contours
- River bottom and top edge
- Location and details of piped outfalls, drainage pipelines and manholes
- Culverts
- Bridge column details, bridge top level, soffit level
- Check dam
- Weir
- Barrage
- Ghats & steps
- Temple, Visarjan tanks and Otlas

**Surrounding area**
- Spot Levels
- Contours
- Building Height
- Permanent structures/buildings/otla/shed
- Fences
- Retaining walls/embankment wall
- Compound walls
- Footpath
- Location of nallas
- Location of manholes
- Trees – type and diameter of trunk
- Light poles
- Electric poles
- Sub station
- High tension lines
- Road
- Railway Tracks
Geo Technical Investigation - Bore Hole Locations
Geo Technical Investigation - Sample Collection and Analysis

Site Work near Mula River on April 13, 2016

Site Work near Mula River on April 11, 2016

Checking of Bore Log Samples

Specific Gravity Test
The investigation data, findings and recommendations have been incorporated in the report submitted on **June 11, 2016**.
Hydrology and Hydraulics Study - Meeting with Irrigation Department and CWPRS Officials

Meeting with CWPRS on 13th February, 2017

Meeting with CWPRS and Irrigation Department on 15th June, 2016

Meeting with Irrigation department on 5th December, 2016

Meeting with CWPRS on 1st February, 2017

Meeting with CWPRS on 13th February, 2017
Riverfront Development Plan for
Mula, Mutha and Mula-Mutha Rivers
Hydrology and Draft Hydraulic Report

Date: September 12, 2016

CLIENT:
Pune Municipal Corporation (PMC), Pune

CONSULTANT:
BCP Design, Planning and Management Pvt. Ltd., Ahmedabad

TECHNICAL CONSULTANT:
Advance Engineering Consultants

Hydrology and Hydraulics Study – Approval by CWPRS, Pune
Baseline Monitoring

Noise monitoring done for EIA

Air monitoring done for EIA

Image showing collection of water samples

Image showing air monitoring
Public Consultation
Meetings held with various stakeholders

Meeting on 9 March, 2016 with SE, Irrigation Dept.
Meeting on 11 June, 2016 with MLA
Meeting on 11 June, 2016 with Press Media
Meeting on 18 Aug, 2016 with NGOs
Meeting on 5 July, 2017 with Standing Committee
Meeting on 31 July, 2017 with NGO
## Public Consultation

Meetings held with various stakeholders

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Feb-16</td>
<td>Kick off meeting with PMC, Irrigation department, PCPMC</td>
<td>Regarding brief of project, project timeline and deliverables</td>
</tr>
<tr>
<td>29-Feb-16</td>
<td>Meeting with PCMC</td>
<td>Regarding brief of project, project timeline and deliverables, regarding permission letter in PCMC area</td>
</tr>
<tr>
<td>9-Mar-16</td>
<td>Meeting with Superintending Engineer (WRD), Irrigation Department</td>
<td>Regarding brief of project and data needed for feasibility study</td>
</tr>
<tr>
<td>21-Mar-16</td>
<td>Meeting with Commandant, KCB - Bombay Engineer Group</td>
<td>Regarding brief of project, project timeline and deliverables</td>
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<tr>
<td>12-Apr-16</td>
<td>Meeting with PMC-Mr. Srinivas Bonala along with EIA consultant</td>
<td>Regarding submission of forms-1,1A for review</td>
</tr>
<tr>
<td>27-Apr-16</td>
<td>Meeting with Commissioner, Collector Office, Irrigation Department, CWPRS and PCMC officials</td>
<td>To get a status update, discuss regarding the topographic surveys and approvals for environment.</td>
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<tr>
<td>11-Jun-16</td>
<td>Meeting with Members of Parliament and Members of Legislative Assembly and Commissioner</td>
<td>To discuss the Concept Master Plan and get suggestions</td>
</tr>
<tr>
<td>11-Jun-16</td>
<td>Meeting with Press Media</td>
<td>To discuss the Concept Master Plan and get suggestions</td>
</tr>
<tr>
<td>15-Jun-16</td>
<td>Meeting with CWPRS and CEO, Irrigation Department</td>
<td>To discuss and review the methodology adopted for preparation of hydrology and hydraulics scenario</td>
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<tr>
<td>18-Aug-16</td>
<td>Meeting with NGO representatives and HCPDM</td>
<td>To discuss the project brief, its need and the objectives</td>
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<tr>
<td>1-Sep-16</td>
<td>Meeting with Municipal Commissioner, PMC and Settlement Commissioner, Land Records Dept</td>
<td>Regarding preparation of base map and land records with Geographics</td>
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<tr>
<td>14-Sep-16</td>
<td>Meeting with Slum Rehabilitation Authority (SRA)</td>
<td>Regarding data collection and to understand the process of rehabilitation of the slums in Maharashtra</td>
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<tr>
<td>5-Dec-16</td>
<td>Meeting with Irrigation Department</td>
<td>For discussion of Hydrology and Draft Hydraulics Report</td>
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<tr>
<td>7-Dec-16</td>
<td>Meeting with Municipal Commissioner, PMC and Settlement Commissioner, Land Records Dept</td>
<td>To discuss the draft preliminary base map and further process for finalization of the base map.</td>
</tr>
<tr>
<td>9-Jan-17</td>
<td>Meeting of CWPRS, PMC and HCPDM</td>
<td>For discussion of Hydrology and Draft Hydraulics Report and their inputs.</td>
</tr>
<tr>
<td>1-Feb-17</td>
<td>Meeting of Director, CWPRS, PMC and HCPDM</td>
<td>For technical vetting to be carried out by CWPRS</td>
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<tr>
<td>13-Feb-17</td>
<td>Meeting of CWPRS, PMC and HCPDM</td>
<td>Regarding their observations and issues about the study of the Hydrology and Draft Hydraulics</td>
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<tr>
<td>1-Mar-17</td>
<td>Meeting with Deputy Director, Land Records Dept.</td>
<td>Regarding further steps for Mojani Procedure</td>
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<tr>
<td>8-Mar-17</td>
<td>Meeting with Hon. Municipal Commissioner, PMC</td>
<td>Regarding Cost of Project, Priority Projects, Implementation strategies, Funding mechanism for the project</td>
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<tr>
<td>9-Mar-17</td>
<td>Meeting with CWPRS</td>
<td>Regarding discussion of observations and issues about the study of the Hydrology and Draft Hydraulics for the Pune Riverfront Project</td>
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<tr>
<td>17-Mar-17</td>
<td>Meeting with PMC, Hon. Municipal Commissioner, DIP Cell</td>
<td>Regarding status update, revenue generation, further steps for ground truthing, finance mechanism</td>
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<td>29-Jun-17</td>
<td>Meeting with Expert Appraisal Committee, MOEFCC</td>
<td>A presentation to committee for seeking Terms of Reference (TOR) for EIA procedure</td>
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<tr>
<td>4-Jul-17</td>
<td>Meeting with Members of Standing Committee of PMC and PCMC</td>
<td>To give a discuss the Draft Master Plan and get suggestions</td>
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<tr>
<td>5-Jul-17</td>
<td>Meeting with Mayor, PMC and PCMC and the Members of Legislative Assembly</td>
<td>To discuss the Draft Master Plan and get suggestions</td>
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<tr>
<td>31-Jul-17</td>
<td>Meeting with Parineeta Dandekar, NGO representative</td>
<td>To discuss the Draft Master Plan and get suggestions</td>
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<tr>
<td>29-Aug-17</td>
<td>Meeting with DSLR, Land Records dept</td>
<td>Regarding the status of Final base map</td>
</tr>
<tr>
<td>7-Sep-17</td>
<td>Meeting with Director, CWPRS</td>
<td>For the approval of the draft hydrology and hydraulics report</td>
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</table>
The combined approved base map prepared by HCPDPM and submitted to Departments of Land Records for review, verification and approval.
Base Map Preparation
Meeting with Land Record Department Officials on 1\textsuperscript{st} September, 2016

Discussion with Mr. M.B. Patil, District Superintendent of Land Records on December 28, 2016 for next steps of finalization of base map
2. State of Pune’s Rivers
Pune’s rivers – a place for dumping garbage
Pune’s rivers – fed by sewage and garbage from nallas
Pune's rivers – around 252 MLD of untreated sewage
Pune’s rivers – piecemeal, haphazard infrastructure
Pune’s rivers – a place for dumping construction debris
Pune’s rivers – uncoordinated bridge construction
Pune’s rivers – a flood hazard for the city
Pune’s rivers – where the edges are private and the banks are inaccessible
Pune’s rivers – a barrier that divides Pune
Pune’s rivers – dry most of the year
Pune’s rivers – a neglected asset that the city has turned its back to
Problems and Causes

1. Pollution and flooding
   i. The river is polluted because of incomplete sewerage network and inadequate sewage treatment.
   ii. The river floods because of inadequate flood protection measures

Completion of sewage, sewage treatment and flood protection works is urgently needed
Problems and Causes

2. Garbage/debris dumping and encroachment
   i. Lack of public access along the entire length of the rivers makes it easy to misuse the rivers - garbage dumping, encroachment, crime, parking, etc.
   ii. Lack of clear boundaries makes it difficult to monitor the rivers

For a well managed river, creating a public realm along the river is absolutely essential
City has expanded into areas not inundated by the normal monsoon flow
Periodic threat of flooding
Understanding the threat of flooding
Understanding the threat of flooding
Threat of flooding

[Map showing the threat of flooding along the river with different intensity levels indicated by colors and distances marked in kilometers.]
River land boundary as per revenue records
100 year and 25 year inundation lines
Land owner’s do not agree – they accept the flood risk and want flood protection measures

Mutha river near Vitthalwadi, Pune
Land that will be inundated in a 100yr peak flood is in many places privately owned (1238 Ha.)
Problems and Causes

4. 1238 Ha. privately owned land (351 Ha. of it developed) within red/blue inundation boundaries
   i. Land that will be inundated in a 100yr peak flood is in many places privately owned (1238 Ha.)
   ii. Some people want all such land to remain undeveloped or to be acquired
   iii. Land owner’s do not agree – they accept the flood risk and want flood protection measures
   iv. Dismantling existing developments in inundation areas is very difficult
   v. Acquiring all private properties within inundation lines is a huge financial and governance challenge

The overlap of privately owned land and land within inundation boundaries should be removed without the use of acquisition and without lowering the flood carrying capacity of Pune’s rivers
Problems and Causes

5. Piecemeal approach to river development

i. Uncoordinated, piecemeal bridge, weir, check-dam and embankment building has reduced the flood carrying capacity of the river

ii. Un-thoughtful channelization in Mutha river has marred Pune’s rivers

iii. Exposed interceptor sewage lines and manholes obstruct floods, appear unhygienic and are easily damaged

iv. Uncoordinated piecemeal development of ghats and gardens have done little to improve the condition of Pune’s rivers

v. Un-thoughtful use of river banks for streets/ parking have marred Pune’s rivers

Development of Pune’s rivers requires a comprehensive planning approach that:

• Tackles causes not symptoms
• Is phased and financially viable
3. Objectives
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
4. Retain water
5. Improve city’s access to the riverfront
6. Integrate heritage structures, current activities, parks and gardens
1. Complete sewerage network – existing nallas and piped outfalls connecting to the river
1. Complete sewerage network – existing sewer lines
1. Complete sewerage network – sewer lines proposed under JICA

- Nallas without existing sewer line
- Piped outfalls without existing sewer lines
- Sewer lines proposed under JICA
Approximately 23 km of Trunk lines need to be constructed along the river to curb the existing piped outfalls.
2. Improve interceptor sewer – multiple sewer lines along the river
2. Improve interceptor sewer – existing condition

Existing Pipeline
Existing Manholes

River Land

Private land
2. Improve interceptor sewer – shift sewer lines closer to the edge of river land
3. Augment treatment capacity – untreated sewage discharged into the river
3. Augment treatment capacity – existing sewage treatment plants

<table>
<thead>
<tr>
<th>Existing STP</th>
<th>0</th>
<th>0.5</th>
<th>1</th>
<th>2</th>
<th>KM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>30 MLD</td>
<td>40 MLD</td>
<td>50 MLD</td>
<td>8 MLD</td>
<td>18 MLD</td>
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</tbody>
</table>
3. Augment treatment capacity – proposed STP under JICA and NRCD
3. Augment treatment capacity – proposed STP under riverfront development
3. Augment treatment capacity – tertiary treatment - phytorid beds

Schematic diagram of the Phytorid system

Phytorid beds at Rainbow Drive, Sarjapura Road, Bangalore
3. Augment treatment capacity – location of tertiary treatment facility for STPs
3. Augment treatment capacity – treatment locations of major nallas

Proposed Outfall treatment

KM

0 0.5 1 2
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
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5. Improve city’s access to the riverfront
6. Integrate heritage structures, current activities, parks and gardens
Area inundated under peak flood – obstructions to the flow of water
Area inundated under peak flood – obstructions to the flow of water

Obstructions to the flow of water (as identified in the Final Hydrology and Hydraulics Report approved by CWPRS, Pune):
- Water Retention structures - weirs, check dams
- Low level bridges
- Structures like visarjan tanks
- Infrastructure elements like manholes, pipelines, etc.
- Rocky protrusions
- Silt and construction debris
- Low lying roads within the river bed
Removal of obstructions - reducing HFL

River land boundary

Existing HFL

Lowered HFL

Inundation area

Private land

River Land

Private land
Defining Embankment Types

A. Sparsely developed areas – Rural Riparian Embankment
B. Moderately developed areas – Urban Riparian Embankment
C. Intensely developed areas – Engineered Embankment
Sparsely developed surrounding areas
Rural Riparian Embankment – Existing

- Private Property
- Inaccessible public land
- Barren edge
- Polluted water
- Sewage
Rural Riparian Embankment – Examples

River Teme, United Kingdom

South Waterfront park, Portland

Merri creek trail, Melbourne, Australia
Moderately developed surrounding areas

- CQAE office
- Spicer Adventist College
- Blue Line
- Red Line
Urban Riparian Embankment – Existing

- Private property
- Inaccessible banks
- Sewage outfalls
- Polluted water
Urban Riparian Embankment – Proposed

- Private property
- Continuous public access
- Lower level walkway
- Access steps
- Green edge
- Clean and retained water
Urban Riparian Embankment – Examples

Kamo river, Kyoto

Tronvski pristan, Ljubljaana

Yanweizhou riparian wetlands, Jinhua city, China
Urban Riparian Embankment Type III – Proposed

- Private property
- Lower level walkway
- Pitching
- Access steps
- Clean and retained water
Intensely developed surrounding areas
Urban Section – Existing

- Private Property
- Existing retaining wall
- Existing drainage manhole
- Inaccessible land
- Narrow channel
- Polluted water
Urban Section – Examples

Tiber river, Rome

Seine, Paris

Schyulkill trail, Philadelphia
Embankment Types

<table>
<thead>
<tr>
<th>Embankment Type</th>
<th>Length</th>
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<tbody>
<tr>
<td>Rural Riparian</td>
<td>33.9 km (37%)</td>
</tr>
<tr>
<td>Urban Riparian</td>
<td>38.8 km (42%)</td>
</tr>
<tr>
<td>Engineered Section</td>
<td>19.8 km (21%)</td>
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</tbody>
</table>

79% green embankments
1. Tall grass near the river bed
2. Grass on the pitching

1. Tall Grass near the river bed: Saccharum Spontaneum
2. Grass on the pitching: Vetiver Grass in just 90 days after planting
1. Trees on the pitching (slope 1:3) preferably along trails
2. Shrubs at the junction of promenade and pitching
1. Trees on Upper Promenade
   Mangifera indica Tree
   Canopy height 10-12 mts Canopy dia. 6-8 mts

2. Trees on Lower Promenade
   Cananga odorata Tree
   Canopy height 6-8 mts Canopy dia. 4-5 mts
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
4. Retain water
5. Improve city’s access to the riverfront
6. Integrate heritage structures, current activities, parks and gardens
Neglected banks
Continuous public realm

Rural Riparian

Urban Riparian

Urban Section

- Upper Promenade
- Pedestrian Path
- Upper Promenade
- Lower Promenade
- Upper Promenade
- Lower Promenade
Continuous public realm along the river through embankment
Continuous public realm – proposed

Cleaned water retained by check dams

Upper Level Promenade
Pitching/ with Green cover
Accessible Banks
Lower Level Promenade
Jetty

Continuous public realm – proposed
Continuous public realm – proposed
Continuous public realm – example

Seine, Paris

Paris Plages

Brush Creek, Kansas city
Visarjan tanks – existing

- Visarjan Tank near Aundh Ravet bridge, Mula
- Visarjan Tank at Mahtoba Garden, Mula
- Visarjan Tanks near Bund Garden bridge, Mula-Mutha
- Visarjan Tanks near S.M Joshi Bridge
Existing Immersion Tanks

Proposed Immersion Tanks

Visarjan tanks – proposed

Proposed Visarjan tanks: 39
Visarjan tanks – proposed
Existing condition

- Huge manholes
- Existing Pipeline
- Existing Road
- Narrow polluted water channel
Visarjan tanks - proposed

- Upper Level Promenade
- Engineered section retaining wall
- Lower Level Promenade
- Clean retained water
Ghats – existing

Dnyaneshwar Ghat, Khadki cantonment - Mula river

Ahilyabai Holkar Ghat, Sangam - Mutha River

Ghats near Alka Talkies - Mutha River

Ghat near Z Bridge, Mutha river
Ghats – existing

Visarjan ghat near Kharadi

Ganpati Visarjan near Baba Bhide bridge - Mutha, September 2016

Visarjan ghat near Kharadi

Ganesh Visarjan in Mula-Mutha River

Ganesh Visarjan - September 2016
Ghats – existing

Existing ghats: 20

Existing ghats:
Ghats – proposed

Proposed ghats: 50

Existing ghats

Proposed ghats:

Mula

Mula-Mutha

Mutha

Pawana
Ghats

Upper Promenade
Ghats
Access Steps
Lower Promenade

Upper Promenade
Ghats
Access Steps
Lower Promenade

Upper Promenade
Ghats
Access Steps
Lower Promenade

Upper Promenade
Ghats
Access Steps
Lower Promenade
Dyaneshwar ghat – existing
Dnyaneshwar ghat – Ganesh visarjan activity
Ghats – existing

- Underutilized banks
- Omkareshwar temple
- Narrow polluted water channel
Ghats – proposed
Access – existing

Access steps near Shinde bridge, Mutha river

Access steps near Dengale bridge, Mutha river

Access near Z Bridge, Mutha river

Access ramp near Dengale bridge, Mutha river
Existing access points: 53
Existing Access Points

0

0.5

1

2

Proposed Access Points

Proposed access points: 270
Access – proposed

Upper Promenade
Sloped Walkway
Lower Promenade

Upper Promenade
Access Steps
Lower Promenade

Upper Promenade
Ramp
Lower Promenade
Access Steps

Upper Promenade
Historic Wall
Lower Promenade

Access – proposed
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
4. Retain water
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6. Integrate heritage structures, current activities, parks and gardens
Dry – Mutha river looking towards Z bridge
Dry - Mula-Mutha River from Kalyaninagar bridge
Water retention structures – existing
Near KT weir
Near Bund Garden
Near Garware bridge

Existing Weir/ Check dam/ Barrage to be upgraded
Proposed Barrage
Water retention structures – proposed
Longitudinal section – existing Mula, Mutha and Mula-Mutha river

- Confluence of Pawana and Mula River
- Confluence of Mula and Mutha River
- Confluence of Mula and Mutha River

- Mula River: 22.2 km
- Mula-Mutha River: 11.8 km
- Mutha River: 11.8 km
- 10.4 km

Key Map:
- Wadgaon Bypass Bridge
- K.T. Weir, Kharadi
Longitudinal section – proposed Mula, Mutha and Mula-Mutha river

Confluence of Pawana and Mula River

Mula River
22.2 km

Mula-Mutha River
11.8 km

Confluence of Mula and Mutha River

Mutha River
11.8 km

Confluence of Mula and Mutha River

Proposed Blue Line

Proposed Red Line

Proposed Embankment Line

Existing Bridge

Proposed Bridge

Existing Bridge to be removed/ upgraded

Barrage

Key Map
Boating facilities – existing

Annual Regatta Boating Festival organized at Royal Connaught Boat Club, Sangamvadi, Pune by COEP Students

Existing boating facilities:

- Mula
- Mula-Mutha

Existing boating facilities: 2
Boating facilities – proposed

Proposed boating facilities: 16
Cleaning, Aeration and Maintenance

Example - Trash Skimmer, Example – Yamuna river

Figure 4.80: Images showing examples for cleaning, aeration and maintenance
Boating facilities – proposed

Sambhaji baug, Mutha
Kalyani nagar bridge, Mula- Mutha
Shantinagar, Mula
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
4. Retain water
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6. Integrate heritage structures, current activities, parks and gardens
Bridges

Maharshi Shinde Bridge - Mutha River

Kakasaheb Gadgil Bridge (Z Bridge) - Mutha River

Shivaji Bridge - Mutha River

New Yerwada Bridge - Mula Mutha River
Bridges – existing

- Railway Bridge
- Vehicular Bridge
- Pedestrian Bridge
- 2-Wheeler Bridge

Distances:
- 2.5 km
- 3.12 km
- 3.15 km
Upgradation of Bridges

- Proposed Bridge
- Existing Bridges
- Lifting of Bridges as per hydraulic study
- Proposed pedestrian bridges
- Proposed Bridge

Bridges – proposed

Distance (KM):
- 0
- 0.5
- 1
- 2
Roads to be removed and alternative roads to be strengthened

Low-lying River side road along Mutha River

Low-lying Road along Mutha River (August, 2016)

Low-lying road getting submerged during monsoon along Mutha River near Omkareshwar Temple (August, 2016)
Roads to be removed and alternative roads to be strengthened
Objectives

1. Clean the River and make it pollution free
2. Reduce risk of flooding
3. Create a continuous public realm along the river
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Heritage structures – existing

Shivaji Bridge

Holkar Bridge on Mula River

Nanasheb Peshwa Samadhi on Mutha River

Shanivanwada

Shanivarwada
Heritage structures – existing
Ghorpade ghat – existing
Ghorpade ghat – morning view with yoga and jogging activity
Integrating heritage structures – view of historic wall from Dengale bridge

- Existing Heritage wall
- Huge manholes
- Narrow polluted water channel
- Neglected banks
- Existing Ramp
Integrating heritage structures – view of historic wall from Dengale bridge

- Green areas
- Cycle track
- Ghats
- Clean retained water
- Boating facilities
- Pitching
- Lower level Promenade
- Access steps
- Integration of Historic wall
Integrating heritage structures – view of historic wall from Dengale bridge
Integrating heritage structures – view of historic wall from Dengale bridge

- Green areas
- Cycle track
- Ghats
- Clean retained water
- Boating facilities
Integrating heritage structures – view of historic wall from Dengale bridge
Integrating heritage structures – view of historic wall from Dengale bridge
Gardens – existing

- Bund Garden along Mula-Mutha River
- Nana Nani Udyan along Mutha River
- Botanical Garden along Mula river
- Sambhaji Garden along Mutha river
The total area of existing gardens is **82.45Ha.**
Integrating existing gardens with the riverfront project
Integrating gardens – existing

Existing red line
Existing blue line
River

River Land

Public land

Botanical garden
Integrating gardens – proposed

Proposed red line
Proposed blue line

River
Rural riparian
Promenade
Botanical garden

River Land
Public land
Sambhaji udyan – existing
Sambhaji udyan – extended garden up to river
Religious places – existing

- Temple near Rajiv Gandhi bridge, Mula River
- Omkareshwar Temple, Mutha River
- Vriddheswar Temple, Mutha River
- Vitthalwadi Temple, Mutha River
Religious places – existing

Existing temples: 18
Omkareshwar Temple – existing
Omkareshwar Temple – morning activities along the proposed ghat and temple access
Crematoriums and burial grounds - existing

Crematorium near Mumbai Pune Bypass - Mutha River

Crematorium near Shivaji Maharaj Bridge - Mula River

Burial Ground, Khadki cantonment - Mula River

Crematorium Near Wakad ByPass Mula River
Crematoriums and burial grounds – existing

Existing crematoriums and burial ground: 18
Crematoriums and burial grounds – existing

- Existing Crematorium
- Sewage Outfalls
- Existing steps leading to the river
- Polluted Water
Improved steps and ghats leading to the river

Clean and retained water

Lower Walkway

Upper Walkway

Existing Crematorium

Crematoriums and burial grounds – existing
Eateries – existing

Eateries near Z-Bridge
Existing Eateries: 5
Eateries – proposed

Proposed Eateries: 11
Z Bridge – existing eateries
Z Bridge – organized eateries
Eateries – existing

Inaccessible banks

Dry River Bed
Eateries – proposed

- Clean retained water
- Plantation
- Lower Level Promenade
- Pitching with Green cover
- Upper level promenade
- Accessible banks
4. Master Plan
<table>
<thead>
<tr>
<th>Description</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Land</td>
<td>687 Ha</td>
</tr>
<tr>
<td>River Section</td>
<td>526 Ha</td>
</tr>
<tr>
<td>Total area under Embankment</td>
<td>180 Ha</td>
</tr>
<tr>
<td>Minimum land to be acquired to ensure continuous embankments</td>
<td>81 Ha</td>
</tr>
<tr>
<td>Balance land for Public amenities</td>
<td>62 Ha</td>
</tr>
<tr>
<td>Project Area</td>
<td>768 Ha</td>
</tr>
</tbody>
</table>
River section

- River Land: 687 Ha
- River Section: 526 Ha
- Total area under Embankment: 180 Ha
- Minimum land to be acquired to ensure continuous embankments: 81 Ha
- Balance land for Public amenities: 62 Ha
- Project Area: 768 Ha
<table>
<thead>
<tr>
<th>Description</th>
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<tr>
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</table>
Area acquired for embankment continuity

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</tbody>
</table>
Balance land for Public Amenities

<table>
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<th>Area</th>
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<tbody>
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</tr>
</tbody>
</table>
There is not much land available for further development...
Proposed greens – Gardens, Urban forests, Open grounds

Percentage of remaining land under proposed greens – gardens, urban forests, open ground 74 %
Example of urban forest in Portland, Oregon
Strategy for Parks and Gardens

Example of riverfront park: Georgetown Waterfront Park Washington DC, United States
Strategy for Open Grounds

Example of open grounds: Corregidor Island, Philippines
Proposed amenities – temple ghats, visarjan, parking facility, public plaza, food courts

Percentage of remaining land under proposed greens – gardens, urban forests, open ground

74%

Percentage of remaining land under amenities – ghats, visarjan, parking facility, public plaza, food courts

26%
5. Project Implementation
Status of Work

Kick off meeting
Task Review+
Project Scheduling

Topographical Survey
Geotechnical Investigation
Hydrology & Hydraulics
Area Assessment
Environmental Monitoring

Vision & Objectives Identification

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Draft EIA

Draft DPR

Final EIA

Final DPR

Statutory Approvals

SPV Formation

PART 1 – FEASIBILITY STUDY

PART 2 – DETAILED DESIGN AND IMPLEMENTATION OF PROJECT
Priority Project Stretches

- **Project Stretch – 1**
  Aundh Baner Smart City Area - 6.32 km
  Cost: 153Cr.

- **Project Stretch – 2**
  Kharadi Area – 7.2 km
  Cost: 290Cr.

- **Project Stretch – 3**
  Sangam to Lakadi Pul Area – 5.3 km
  Cost: 80Cr.

- **Project Stretch – 4**
  Bund Garden Area – 6.54 km
  Cost: 119Cr.
# Summary of Project Cost

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Particular</th>
<th>Amount (in Rs. Crores)</th>
<th>% of Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>River-Edge Protection</td>
<td>1,245</td>
<td>48</td>
</tr>
<tr>
<td>B</td>
<td>Interceptor Sewage Network</td>
<td>98</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>Water Replenishment</td>
<td>287</td>
<td>11</td>
</tr>
<tr>
<td>D</td>
<td>Promenade Finishing Works</td>
<td>377</td>
<td>14</td>
</tr>
<tr>
<td>E</td>
<td>Public Access and Ghats</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>Landscape</td>
<td>114</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>Public Amenities</td>
<td>117</td>
<td>4</td>
</tr>
<tr>
<td>H</td>
<td>Roads and Bridges</td>
<td>117</td>
<td>4</td>
</tr>
<tr>
<td>I</td>
<td>Urban Infrastructure</td>
<td>91</td>
<td>3</td>
</tr>
<tr>
<td>J</td>
<td>Sub Total of A to I</td>
<td><strong>2,533</strong></td>
<td><strong>97</strong></td>
</tr>
<tr>
<td>K</td>
<td>Considering 3% Contingencies over J</td>
<td>87</td>
<td>3</td>
</tr>
<tr>
<td>L</td>
<td>Total Cost</td>
<td><strong>2,619</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
## Cost break up for rivers

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Particular</th>
<th>Amount (in Rs. Crores)</th>
<th>% of Total Cost</th>
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<tbody>
<tr>
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<td></td>
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<td>52.9</td>
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<td>Public Access and Ghats</td>
<td>93</td>
<td>4</td>
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<td>F</td>
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<td>114</td>
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<td>30</td>
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<td>33</td>
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<td>L</td>
<td>Total Cost</td>
<td>2,619</td>
<td>100%</td>
<td>1,145</td>
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<tr>
<td></td>
<td></td>
<td>PMC</td>
<td>PCMC</td>
<td>Defense</td>
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<td></td>
</tr>
</tbody>
</table>
Project Finance

- To assess the possibility of the project being self-sustained
- To explore the various components for generating the finance
## Project Finance

### Revenue Sources

<table>
<thead>
<tr>
<th>Components</th>
<th>By statutory classification</th>
<th>By Status of development</th>
<th>By ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Within blue line</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between blue and red line</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outside Red Line between Influence line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change of Restrictive Zone / use</td>
<td></td>
<td>Developed land</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undeveloped land</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PMC Land</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PCMC land</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cantonment land</td>
<td></td>
</tr>
</tbody>
</table>

- **Impact Fee**: 
  - Between blue and red line: ✔️
  - Outside Red Line between Influence line: ✔️
  - Change of Restrictive Zone / use: ✔️
  - Developed land: ✔️
  - Undeveloped land: ✔️
  - PMC Land: ✔️
  - PCMC land: ✔️
  - Cantonment land: ✔️

- **Planning Fee**: 
  - Between blue and red line: ✔️
  - Outside Red Line between Influence line: ✔️
  - Change of Restrictive Zone / use: ✔️
  - Developed land: ✔️
  - Undeveloped land: ✔️
  - PMC Land: ✔️
  - PCMC land: ✔️
  - Cantonment land: ✔️

- **FSI/ TDR Import**: 
  - Between blue and red line: ✔️
  - Outside Red Line between Influence line: ✔️
  - Change of Restrictive Zone / use: ✔️
  - Developed land: ✔️
  - Undeveloped land: ✔️
  - PMC Land: ✔️
  - PCMC land: ✔️
  - Cantonment land: ✔️

- **Change of restrictive zones / use**: 
  - Between blue and red line: ✔️
  - Outside Red Line between Influence line: ✔️
  - Change of Restrictive Zone / use: ✔️
  - Developed land: ✔️
  - Undeveloped land: ✔️
  - PMC Land: ✔️
  - PCMC land: ✔️
  - Cantonment land: ✔️

- **Property Tax**: 
  - Between blue and red line: ✔️
  - Outside Red Line between Influence line: ✔️
  - Change of Restrictive Zone / use: ✔️
  - Developed land: ✔️
  - Undeveloped land: ✔️
  - PMC Land: ✔️
  - PCMC land: ✔️
  - Cantonment land: ✔️

- **Land Development Rights**: 73 Ha that is available has been taken even though about 50% of it is Government land

*Above is based on preliminary assessment – indicative only*
Project Finance

Expenditure

- The total time line for the project is envisaged for 10 years
- Three phases for capital expenditure, starting in Year 1, Year 4 and Year 7 respectively
- First two phases (Year 1 & Year 4) are three years each. Last phase (Year 7) is four years
- 10% of the capital cost is incurred in each year of the capital expenditure
- 1% per year is incurred on maintenance expenditure
- Annual escalation of 4% on the cost of capital expenditure and O & M expenditure
Project Finance

Approach

- Phase I to be financed by PMC+PCMC and borrowing
- Project completion will increase attractiveness of land sale and drive up the rates
- Land development right from Year 4 will finance Phase II expenditure
- Revenues from levies will meet operating costs and start generating surplus to finance
- Phase III; any borrowing for Phase III can be repaid through future surplus
- Guiding Principle – PMC + PCMC support is less than 100 crores per year
Project Finance

Financing

• PMC & PCMC support the project in proportion to the capital cost and potential revenue share in their respective areas
• Equity contribution – in proportion to share of urban infrastructure, bridges, access and ghat works (common areas and facilities for whole city)
• Contribution of land proceeds as equity – ULB/ Govt land will be provided as equity
• Annual grant – Rs 100 crores per year from year 4 for eight years. If land proceeds or revenue growth is better than assumed, this support will not be necessary.
• Interest rate assumed at 10% p.a
6. Next Steps
Kick off meeting
Task Review+
Project Scheduling

Topographical Survey✔️
Geotechnical Investigation✔️
Hydrology & Hydraulics✔️
Area Assessment✔️
Environmental Monitoring✔️
Vision & Objectives Identification✔️
Public Consultation-1 (Opinion Survey)✔️

Draft Master Plan✔️
Base Map✔️
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Concept Master Plan✔️

Draft EIA✔️
Draft DPR✔️
Final EIA✔️
Final DPR✔️

Statutory Approvals
SPV Formation

PART 1 – FEASIBILITY STUDY
Existing Condition Analysis
Master Plan
DPR
Statutory Approvals

PART 2
DETAILED DESIGN AND IMPLEMENTATION OF PROJECT

Status of Work
Next Steps

1. Clearance from Irrigation department
2. Final base map
3. Final EIA
4. SPV formation
5. Land transfer
SPV formation
Formation and Structure

Following are the steps for formation of the SPV

1. Identification of Board of Directors
2. Application for Director’s Identification Number (DIN)
3. Application for name of Company
4. Memorandum of Association and Articles Association
5. Registration for various taxes
6. Obtaining the Certificate of Incorporation
SPV formation
Formation and Structure

Example organization chart identifying selected board of directors for Special Purpose Vehicle for Sabarmati Riverfront Development Project.
SPV formation
Formation and Structure

Example organization chart identifying selected board of directors for Special Purpose Vehicle for Sabarmati Riverfront Development Project.

Suggested sample organization chart identifying board of directors for Special Purpose Vehicle for Pune Riverfront Development Project.
Approvals required from Hon. Standing Committee, PMC and Hon. General Body, PMC

1. Approval of the DPR – Draft
2. Formation of SPV
3. Land Transfer to SPV
4. Empowerment of SPV to raise financial capital for execution and maintenance
Thank you