Annexure 3c

NEERI's Action Plan for the Proposed Khumbha Mela at Nashik during July to September 2015 Revised

1. Preamble

NEERI has undertaken "Studies on rejuvenation of River Godavari and Integrated action plan for improvement of Environmental status for Nashik region, Maharashtra" as per the directions of the Hon'ble Bombay High court in May 2013. The main objective of the project was to improve the status of Holy River Godavari well before the proposed mega even of Khumbhmela scheduled during July –September 2015.

Major issues of concern for rejuvenation of river Godavari were identified for critical evaluation. Following major issues need immediate attention for rectification so that the river water quality will improve and meet the stipulated A-II class standards.

- Inadequate collection of domestic waste water and its disposal in river or its catchment.
- Discharge of untreated and treated effluents from domestic waste water treatment plants and non point sources into the river without due consideration of assimilative capacity of the river.
- Status of Interceptor sewer lines within and across the river bed through left bank at specific locations like Chikhali nalla, chopda lawns and other places.
- Upgradation and proper maintenance of all the sewage treatment plants.
- Discharge of industrial effluent, untreated or partially treated into the river directly or through land application.
- Use of Godavari river banks as common places for washing, cleaning, bathing etc.
- Discharge of human body ash at Asthi Visarjan and biodegradable organic material during dashakriya vidhi performed at the bank near Ramkund,
- Mass bathing by devotees and disposal of Nirmalaya in the river.
- Open defecation in slums located at the banks of river.
- Disposal of municipal solid waste at different locations near the river banks.

Based on the observations and study by the NEERI team during Preliminary survey, Interim recommendations were made to initiate immediate action: NEERI's recommendations were accepted by the Hon'ble Bombay High Court and NMC was directed to initiate immediate action. The immediate action was meant to address the existing condition of river and possible implementation.

2. Current Status of Execution of NEERI's Recommendations till Dec 2014

The existing status of the implementation of major recommendations is presented in **Table 1.**

Table 1 : Status of Implementation of NEERI's Recommendations

NEERI's Recommendations	Current Status
In the light of minimum availability of flow in the river, the expected dilution, dispersion and decomposition of the treated wastewater is not occurring. This has resulted in non compliance of the	MPCB has made the changes in the consent to operate WWTF with reduction in BOD standard from 30 mg/L to 10 mg/L. NMC has requested to provide time since major modifications in the

water quality standards for designated use as A-II. More stringent standards for discharge of treated effluent should be imposed by MPCB.	treatment technology at STP are essential to achieve the targeted standards.
NEERI's Recommendations	**Current Status**
Allotment of water from Gangapur dam should be rescheduled so that the minimum ecological or environmental flow is maintained downstream of the dam. The amount of water to be released from Gangapur dam has been computed by NEERI in its report submitted on 21st Nov 2014 as an interim recommendation **Water release needed from Gangapur dam for maintenance of A-II water quality** should be **November to January : 41.6 cusecs for 8 days** **For February to June : 125 cusecs for 10 day**	Information from Irrigation department is sought for releases of water from Gangapur Dam to achieve ecological/Environmental flow in the river. **Divisional Commissioner, Nashik has appointed a five member sub committee to study the issue of Environmental flow.**
Effective collection of wastewater and its transfer to STPs should be taken up on priority basis. In highly polluted areas in Nallas tributaries or river with marginal flows, a recent technology of "Phytorid" or "Floating wetland" can be adopted to restrict entry of pollutants in the river.	Work on Diversion of Nalla flows carrying untreated sewage to the intercepting sewers and then to STP has been initiated. **The work on few nallas have been completed and the nallas have been diverted to Tapovan STP.** NMC shall undertake a joint survey with NEERI to ascertain the location and stretches where natural technology can be implemented within next one month. Repairs of sewerage network have also been started at major places like Chopda lawns, Annandwalli nalla, etc.
Recycle and reuse of treated effluents from STPs for irrigation and transfer the equivalent flow into the river is recommended. The treated effluent from the STPs should be reused either by industries or for irrigation. By improving the quality of effluent, the water can also be used for gardening and other related activities. This will also restrict the inputs of pollutants in the river stream.	The recommendation of use of treated effluent for irrigation and release of equivalent flow from Gangapur dam into the downstream part of river Godavari will require significant energy to power lift the effluent to land under irrigation. **It has been proposed that M/s Indiabulls Power Ltd should lift the water directly from STP outlet instead of lifting from the barrage constructed in the river.** **Indiabulls is yet to file the affidavit regarding the feasibility of the idea on their side.**
Efforts to stop misuse of river by people for washing of clothes or vehicle should be strengthened.	Action for appointment of more staff to minimise the misuse of river by people for washing of clothes or vehicle has been initiated with special sanction for filling the required posts. The formation of separate "Environmental Cell" has been approved by the competent authority. the informatory and warning boards have been erected along the bank of river. Police force has been appointed along the stretch of the river to take actions against persons polluting river.

Till date four compliance reports have been submitted in the Hon'ble High Court by Implementation committee stating the current status on implementation of other NEERI's recommendations.

3. Action Plan prepared by NMC for successful execution of various activities envisaged For the proposed Khumbhamela

In light of the proposed Khumbhamela, large congregation of devotees will be visiting Nashik and also the holy places like Trimbak and temples along the river stretch of river Godavari. There will be massive and high pressure on the NMC's management for the provision of basic amenities such as shelter, water, sanitation, transport arrangements, medical facilities, electricity, fire brigade arrangements, information cell, land acquisition for various activities, recreation, deployment of police forces, participation of volunteers for persuasive activities for visiting pilgrims to follow the eco friendly methods to conserve environment shall also be major activities. Utmost precautionary measures are essential to avoid any epidemic and damage of environment.

NMC has prepared "Area wise proposal documents" on all the topics mentioned above covering the time frame to complete the activities, financial requirement and also the current status. This proposal was presented to the Hon'ble Chief Minister of Maharashtra on 17th October 2013 and it was approved in principle.

The motto of the organizers is to adopt effective implementation strategies for making the event a grand success similar to recent Allahabad Khumbhmela which was called as "Green Event".

Preparation of the action plan for Green Kumbh Mela 2015 had initially involved few private organization for the event. As the proposals were not found suitable, therefore these organizations are now replaced by Government organizations.

Few of Government organizations currently involved in preparation of Action plan for Green Kumbh 2015-16 are

- **Deputy Director, Education dept.,**
- **Divisional Commissioner, Nashik**
- **Regional officer, MPCB**
- **Police Commissioner, NMC.**
- **Chief Officer, Trimbak Municipal Corporation**
- **Administrative officer, NMC.**
- **Education officer, NMC Education Board.**
- **Deputy Director Public Health Dept**
- **Proper disposal of plastic wastes under**
- **Nehru Yuva centre, Co-ordinator**
- **Co-ordinator, Security; Railway Dept. and others.**

Every department has been assigned with different but specific activities such as

- **Management of plastic wastes and biodegradable wastes including nirmalya**
- **Ban on activities such as washing of clothes, vehicles, cattle on river banks.**
- **Cleaning of surrounding areas, environment awareness, and tree plantation drive.**
- **Rain water harvesting, wastewater management.**
- **Awareness using posters, banners. Street plays.**

Copy of Action Plan for Green Kumbh has been submitted in the Hon'ble High Court on 12th Nov. 2014 and the same is enclosed

4. Summary of Action plan prepared by Nashik Municipal Corporation for the proposed Khumbhamela event and NEERI's additional recommendations/Suggestions

All the aspects for the said event are planned by NMC in two stages. One of the group of devotees will be the "Sadhus" who will be staying for a period of about three months. A separate land is demarcated for their stay and all the infrastructure facilities required are considered in the "Proposed Action Plan" The other group of devotees will be the people who will visit Nashik in large number particularly on important days of "Shahi Snan" from all corners of the country. Major components are summarized below:

4.1 Water Supply Arrangements

NMC has planned the water supply to the Sadhugram through pipelines laid along the roads with separate connections for toilets, bathrooms and drinking purposes. Expected water requirement for this group of about 3,00,000 sadhus is about 30 MLD.

Drinking water to floating population will be made available through tanks of 2000, 3000 or 5000 litres capacity installed on the erected platforms at prime locations for large crowd of devotees, at Shahi Procession Marg, major squares and important places with a supply of safe treated water through pipe connections. A total 70 MLD additional water supply is estimated on five Shahi Parvani Days. Provision of tanker services will be made available in emergency.

A new Water Treatment Plant of 50 MLD is proposed to be constructed at Panchavati with a source of water from Gangapur Dam. Augmentation of WTP capacity at Nashik Road plant by 18 MLD is also proposed. The treated water will be supplied through two overhead service reservoirs at Nilgiribag and Lunge Mangal Karyalaya erected to provide 24 hours supply for Sadhugram. Floating population will get safe drinking water though erected plastic tanks

NEERI's Recommendations / suggestions:

- Provision of Additional disinfection practices as and when required to ensure the quality of water supply and control the chances of contamination vis a vis epidemic, if any, through Electrolytic chlorinators, ozonators in ESR at Nilgiribag and Lunge Mangal Karyalaya.
- Provision of alternative disinfectant if the shortage of chlorine cylinders is faced during the special event such as Sodium dichloroisocyanurate (NaDCC), Sodium hypochlorite and sodium troclosene, are different types of chlorine that are available.
- Electrolytic chlorinators may be provided at the tanks erected for floating population or for the supply by the tankers.

- Purification of water source generated through "NEERI ZAR" technology developed by NEERI as a batch portable arrangement for supplying safe drinking water to the group of people gathering in the areas of temporary settlements. This will minimize the quantitative load on conventional treatment facilities planned in multiple places.

4.2 Wastewater Treatment Facilities

The existing waste water treatment capacity for Nashik city is 200 MLD and the work is in progress for additional 160 MLD (total 360 mld is the proposed waste water treatment capacity). At Agartakli WWTF, 70 MLD ASP is under dry run. 40 MLD and MBBR is proposed to be constructed at the same place. Based on the water supply projections of 472.50 MLD, the expected waste water generation on special days is expected to be 378 MLD. This will result in 5% overload of all the plants. However, the WWTF Plants at Gangapur and Pimpalgaon Kham (About total 50 MLD) will be completed only if the land is acquired in scheduled period and plants are made functional before the event.

NMC has taken up following major jobs to meet the requirements for additional pressure during kumbhmela.

- Construction of 25 MLD capacity sewage pumping station at Gangapur road
- Laying of 700 mm diameter DIK 9- sewer line from wall chamber of Gangapur road pumping station to Makhamalabad pumping station chamber.
- Cleaning trunk sewer and branch sewers along right & left bank of Godavari river & its tributaries through equipments like Combi jet, three bucket machine, high capacity, high suction high pressure jetting machines etc
- Providing, lowering, laying & joining RCC sewer pipe lines for new developing areas, also maintaining repairing & restoration of old pipe lines along right & left bank of Godavari & its tributaries.

NEERI's Recommendations / suggestions

- There is some dispute and delay in acquiring land for proposed WWTF at Gangapur and Pimpalgaon. Moreover the waste water generated in Sadhugram (about 24 MLD) is planned to reach Tapovan STP through old and new Kapila SPS. This will result in overloading the Tapovan WWTF which is presently running at its full capacity. This may also lead to malfunctioning and current problem of foam formation and pollution of river can become acute.
- Hence construction of new WWTF is recommended which will avoid further overloading of existing WWTF at Tapovan and also produce the effluent which will meet the recommended MPCB standard of BOD less than or equal to 10 mg/L. In-situ Nalla WWTF should be implemented to restrict input of pollutants at multiple places along the river stretch deteriorating the river water quality.
- To achieve better effluent quality from the existing WWTF, and meet the recent MPCB consent of 10 mg/L BOD, eco friendly technologies like wetland, phytorid can be added as polishing or as a tertiary stage treatment. Experiments have already been initiated by NEERI at Tapovan WWTF to establish its viability. Preliminary results show that the lower standards of 10 mg/L of BOD can be achieved along with problem solving of foam formation.

- In-situ treatment system should be implemented as a temporary measure for nallas carrying untreated waste water eg. Lendi Nalla, Chopda lawns nalla, Someshwar nalla etc. till these sources are joined to WWTF.
  The work of In-situ treatment of nallas using constructed wetland system has been initiated at Gangapur Gaon nalla.

4.3 Sanitation

NMC has taken up major activity of joining of the nallas carrying untreated wastewater to the sewer lines. Major jobs to meet the requirements for additional pressure of sanitation during kumbhmela, following activities are proposed by NMC for Kumbh Mela 2015.

i) For providing toilets for defecation, various schemes are designed

- In Sadhugram, it is proposed to provide temporary construction of 4800 toilets and 6000 bathrooms in 160 acres plot and 5600 toilets and 7000 bathrooms in 163 acres plot. A RCC pipe line of 200 mm dia will be installed to carry the waste material (Night soil) from toilets along with the wastewater from bathrooms and other sources.
- For the floating population, installation of 80 units of 20 seats each of Sulabh Souchalaya at various places in Nashik as toilets for pilgrims has been proposed. 25 moving toilets at heavily populated places will also be made available
- At identified areas for vehicle parking out side city, and along the path of Shahi Miravnuk (Procession), provision of 10000 toilet seats will be made.

NEERI's Recommendations / suggestions:

- Instead of construction of new sewer line for combined collection of human waste from, sulabh souchyalaya, temporary toilets, mobile toilets generating night soil and the waste water from bathrooms, waste can be separately collected as gray water and night soil.
- Use of Bio-Digester, IIT technology of NG-SEPCLEAN for treatment of night soil from moving toilets, sulabh souchyalaya and temporary toilets should be undertaken. The effluent from these digesters can be further treated through "Phytorid" technology as polishing step and then dispose into the river. This will minimize the additional load on WWTF which will malfunction due to high loads.
- Safe and ecologically-friendly toilets are developed and available in the market, which are nearly maintenance-free and are efficient without dependence on conventional energy sources. The effluent of Toilet is clear, virtually pathogen-free, and can be used as an excellent fertilizer.
- The concept of eco –friendly toilets was used in Allahabad Kumbh mela.

4.4 Solid Waste Management

Current status of solid waste management in Nashik:

- Nashik city has door to door collection system for solid waste. The solid waste is collected using vehicles called "Ghantagadi".
- Around 1000 workers have been appointed by NMC for solid waste collection and few workers are provided by Private contractor.
- According to the information provided by NMC, the Ghntagadis carry the solid waste to Solid waste management site at Pathardi.

Fig 1: River Godavari at Amardham

Fig 2: River Godavari near bridge before Kapila- Goda confluence

Fig 3: River Godavari near Prabodhankar Thakre Marg

Fig 4: River Godavari at Kapila- Goda confluence

- The photographs given above were taken during the visits of NEERI officials in the month of November 2014. The solid waste was observed lying at the banks of river Godavari at many places in the city indicating the lacunae in the collection system for Municipal solid waste.
- The solid waste dumping was also observed at the banks of River Nasardi which is a tributary of river Godavari.

Fig 5: River Nasardi

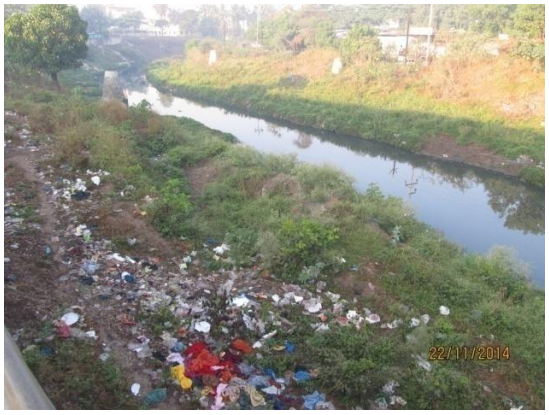

Fig 6: River Nasardi opp to Bhabha nagar Jogging track

- In few areas of the city it is observed that the Ghantagadis visit every alternate days leading to waste lying unattended.
- The workers engaged in MSW are highly unorganized and have been seen to neglect the work in many areas. Despite NMC's efforts , these workers have not been delivering the desired efficiency of service.
- It has been also observed at few places that the collected solid waste is burnt in the city instead of carrying it to the Solid waste management site. This will lead to hazardous emissions.

ii) For maintaining hygienic and clean environmental conditions, NMC proposes following arrangements

- Hiring of adequate number of personnel for cleaning of important places like Ramkund, Sadhugram, Shahimarg, and parking lots.. Adequate stock of modern machineries for cleaning the roads, Nirmalya Kalash for disposal of flowers and disinfectants will be made available.
- Measures like vehicle mounted fogging, spraying of insecticides, pesticides etc. for control and to avoid spread of diseases like malaria, dengue due to Mosquito menace.
- River cleaning operations through boats for removal of water weed, water hyacinth, Nirmalya, plastic bags, floating matter, etc. will be strengthened.
- Nets will be erected on the sides of bridges for preventing throwing of nirmalya and plastic bags in the river Godavari.
- Solid waste thus generated will be collected efficiently and will be transported to solid waste dumping site near Pathardi. To make kumbhmela 'Garbage free' 10000 to 20000 green volunteers will be arranged by Women society Environment Culture and Education.
- For a cleaner and safer Kumbh, the industrial units generating significant pollution will be closely monitored and their discharges shall be treated in the industry as well as the nalla using in- situ method.

NEERI's Recommendations / suggestions

- Prohibiting all devotees visiting holy places for short duration from carrying Nirmalya beyond parking place. NirmalyaKalash should be installed at the parking areas to the entry way for public transport along with volunteers to implement the scheme. Carrying of any Nirmalya ahead of parking areas should be banned. This will also avoid disposal of plastic carry bags used to carry Nirmalya up to water course.
- Placing of nets across the river flow downstream of holi places such as Ramkund, Tapovan to collect Floating Nirmalya disposed by the devotees. Volunteers should be available for effective collection and disposal of such material.
- The nirmalya collected from various places can be segregated and processed separately for its medicinal use (Hibiskas flowers for medicinal oil preparation) and vermicomposting instead of disposing it along with domestic solid waste.
- Use of plastic should be banned and use of jute or paper bags must be promoted.
- Though the solid waste management site is quite away from the city and river as well, the inefficient collection of municipal solid waste eventually leads to entry of solid waste in the river Godavari. Hence there is need to establish the MSW collection system with 100% efficiency. The collection efficiency can be increased by zone wise collection of solid waste. NMC can involve few private agencies and every agency can be allotted a particular zone. The agency will be responsible for 100% solid waste collection of that particular zone.

- The use of GPS tracking for Ghantagadis will help in ensuring that the solid waste finally reaches the solid waste management site at Pathardi.
- NMC should take proactive actions to avoid burning of solid waste in the city.
- The schemes providing extra incentives to workers on following the rules enforced by NMC should be implemented. This will encourage the workers to follow the rules and work in coordination with NMC.
- Residential complexes should have composting units to deal with the wet waste generated in the complex. This will help to reduce the load on common composting site at Pathardi.
- Segregation of Dry and wet waste at the source or in Ghantagadi will help in proper management of solid waste. The dry waste should be directly sent for recycling and the wet waste should be transported to composting site.
- Appropriate personal protective equipments should be made available and awareness programs should be conducted to convey their importance.

5. Social Awareness

As regards the social awareness and adoption of new ideas, different committees are formed. It is suggested that the approach adopted by the devotees at **Allahabad Kumbh** should be implemented.

NEERI's Recommendations / suggestions:

A set of guidelines/instructions should be developed and promoted to encourage devotees to reduce the adverse environmental impact of the holy and sacred event of proposed Khumbhamela. It should be publicised effectively among the visiting devotees.

- Temple authorities, private organisations, NGOs school children and individuals should be encouraged to form their own group having enthusiasm and creativity to develop and execute their themes of awareness, publicity and promotion. Young people should be involved in this work.
- Promote a protective attitude in society towards the planet eg. Minimize water consumption, implement Environment related projects in schools like collection of house hold Nirmalya and handing over to school authorities for proper disposal, preparation of paper , cloth bags to replace plastic ones.
- High-profile individuals and celebrities should be approached to endorse the Plan.
- Adopt Sustainable practices:
  A) Bio-degradable plates and cups for serving food while dining
  B) Use recycled paper for printing promotional materials
- Hoardings, posters, banners, etc. with environmental messages and knowledge for the masses should be put up all over the Kumbha area in Nashik.
- Mass awareness campaign and communication should be adopted through Web media, printed materials and advertisements, local announcements and television clips. Each state of India should be sent with promotional video, printed matter etc. so that at least 6 months before the event, the care for water and Kumbh traditions are shared with pilgrims. Messages in all Indian languages should be shared on each railway station, bus stand and public places.
- To keep the Kumbh Mela site -free from polythene and plastic litters, Paper or cotton bags should be handed over to visitors and tourists with logo of green event.

- Train a group of people of story tellers and highlight stories relating to the environment with the aim of an increased understanding of Hindu perspectives on the environment: The group can include Hindu priests who can be more influential in convincing the devotees and exhibit new angles of vision to stimulate the current significance of traditional kathas.
- Inclusion of ecological awareness and standards in temple worship will generate positive impact, over time, influence and change the practice of those who worship at home.
- Seek corporates to adopt river stretches for maintenance and awareness as a part of CSR.

6. Development Guidelines for the floodplain of River

The intent in formulating guidelines for floodplain is to encourage an ecosystem based development approach that not only takes into consideration the environmental impacts of urbanization but also ensures enhancement of the River's inherent eco-service providing potential. The development paradigm for a city on the banks of a river needs a different way of use of river and respect for its functionality. The guidelines include activities prohibited and permitted in the different regions of floodplain

6.1 Ecologically Defined Stream Channel (at normal water surface elevation)

- This area should be protected by banning the activities such as diverting the flow of water in watercourse, construction of dams, constructions for storing water. No concrete channelling of the Rivers is permissible. Intensive Agricultural cultivation in close proximity to the River bed

Permissible Restorative Activities and Recommended Approach

- Pollution abatement by limiting the pollutant input.
- Erosion control using Stream channel embankment, where prone to erosion ought to be strengthened using eco-engineering techniques or vegetative methods
- In channel biodiversity enhancement
- In stream water quality management using low impact methods like eco-restructuring to facilitate aeration, plantation management through select species and any such natural methods such as creation of artificial constructed wetland for enhancing the ecosystem services. It may be noted that introduction of indigenous and native species is only permitted.

6.2 100 Year Floodway or "No-Development" Zone

The floodway is subject to high variability of impacts due to climate change. Left natural, it serves as an extended drainage area protecting from risks due to flooding. Development, in form of built structures or any kind of impermeable cover like concretization in the form or roads or pathways is not permissible within the 100year floodway boundary. The developmental activities leading to alteration of the floodplain should not be under taken in this area. The activities such as extensive landscaping, land reclamation, backfilling, construction of interceptor sewers should be strictly avoided. Urban Agriculture plots, the use of pesticides is to be banned in this region.

Permissible Development and Activities

- Development of ecological buffers around 10mts along the edge of the River to provide habitat for flora and fauna. Buffer is expected to provide other benefits such as water quality improvement of point or diffuse sources of pollution, stream bank and erosion protection from the hydrological impacts

- Development of pedestrian pathways using biodegradable material

6.3 100 Year Flood Fringe Area

The activities such backfilling, construction of leeves, concrete channels and industrial development should not be permitted in this area. No concrete channelling of rivers should be permitted merely to accommodate a development proposal Urban Agriculture plots, the use of pesticides is to be banned in this region.

Recommended Development Approach

- 0mt to 10mts from the flood fringe line: The land may be developed for Urban agriculture; Urban forestry; soft landscaped public garden.
- Cycling tracks & pedestrian pathways as access ways must be permeable allowing water infiltration for ground aquifer re-charge.
- Any natural steep slope susceptible to landslide must be form stabilized or terraced using eco-engineering techniques. Concretizing is not to be allowed.
- Areas with potential subsidence due to undermining or reworked ground must be avoided for siting the structures
- The most suitable terrain conditions for urban development is surface gradient with slope less than 12 degrees. This can be developed with less effect on erosion. Areas with a high erosion potential should be developed at lower densities, with more permeable surfaces.
- A plotted development would be permissible, no hard division of land with compound walls would be permissible
- The layout plan should make provision for an appropriate level of on - site sanitation treatment system
- Single houses and low density residential development may be permitted provided the development impact is estimated not to increase the water level more than 1 fit 300mm above the base flood elevation level. Buildings must be located above the appropriate flood level on the upper extremities of the property and must front or provide views onto the watercourse to ensure adequate visual surveillance and integration of the system into the fabric of the development and the City as a whole.
- Where maintenance access is required for the River front, this must also be incorporated in the Sale Contract of the Owner.
- All built structures if unavoidable must be on stilts allowing free flow of water below and around the structures. The structures should be designed along the Flood protection guidelines.
- Perimeter fencing & landscape features must be visually permeable from ground level allowing the free flow of water and movement of aquatic fauna in flood events (e.g. Storm water drainage; fish ladder & palisade fencing)
- For Floodplains with base flood elevations being provided, but no defined floodway: When the flood hazard map designates base flood elevations (100-year flood heights) but no floodway is delineated, the cumulative effect of the proposed development, when combined with all other existing and anticipated floodplain development, must demonstrate it would not increase the water surface elevation of the 100-year flood more than one foot (300mm) at any location.

6.4 Development Beyond the 100 Year River Floodplain

- **Prevention of Ground Water Aquifer Pollution**

Ground water extraction: Bore wells and wells ought to be planned at minimum separation distance of 200mts from River edge

The activities polluting the groundwater such as landfill leachate, storm water runoffs should be taken care off and special precautionary measures should be taken with regard to their location.

- **Groundwater Aquifer Recharge**

It is recommended that contemporary approach towards Water Sensitive Urban Design be adopted for all development beyond floodplain level. This would hugely decrease loads on the floodplains and the River inturn.

- Treated City sewer soak away drain fields may be located at a minimum distance 10 mts to 15 mts from the floodplain.
- Temporary Septic Tank; treated intermittent sewer manhole location may be permitted at a minimum distance of 10mts from the flood fringe line as delineated on the Flood Hazard Map of the area.
- For conventional wastewater treatment plant a buffer of 30mts is to be maintained from the flood fringe line or a 10year recurrent flood line.
- Liquid effluent discharge is to be located 50mts away from wells & bore wells supplying water for domestic use and 500mts away from the flood fringe line.
- Solid and animal waste landfill sites are to be located beyond 500mts of flood fringe line.
- Roads and parking lots be provided with bioswales and rain gardens
- It is recommended that there must be separate storm water and sewer line, however there is a need to study the whole storm and sewer network integration through proper simulation and modelling for future development.
- Treated Wastewater Discharge into River

The outfall line of discharge should be above surface water level thus avoiding stagnation of pollutants in the stream stretch. Disposal line should not be near the bank of river.

Recommended Land-uses, Setbacks and Separation Distances

Setback distances are provided from water bodies (both above and below ground) to prevent pollution

Buffer distances for waste landfill operations are provided to prevent problems of litter, water pollution

Buffers or separation distances are not an alternative to source control and cleaner production methods. They are a means of reducing the effects of residual emissions

The distances quoted in the document should not be adopted as absolute criteria, but rather as indicative distances which may be adjusted having regard to specific site circumstances.

NMC should form a committee to define the control regulations for the Nashik region which shall help in overall preservation of the whole region.