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Storm Water Management

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Abstract: ***Over the past years, rapid growth due to urbanization and industrialization, the changes in Land over and land use patterns have resulted in permanent environmental pollution to the hydrological processes. The hydrological cycle in cities is seriously affected due to increasing impervious areas as a result of urban development which has enhanced the risk of urban flooding. The increase in the impermeable area decreases infiltration, increases the runoff and reduces the time of concentration. Hence, for a given amount of rainfall, greater flooding is generated.***
Understanding the scope and limitation of sustainable stormwater management techniques detailed literature review is carried out. Site suitability is based on spatial analysis of data like geomorphology, slope, recharge condition, landuse and Landover map. Then analyzing local site conditions possible techniques that could be used to manage stormwater runoff are recommended and conclusions are drawn on the same.
Key-Words: Storm Water, Soak Ways, Green Roof, Rain Garden, Retention pond, Bio retention swales.

I. INTRODUCTION

Water running from surfaces in urban areas is Stormwater. It is one of the key causes of pollution and the reason for the declining health of our waterways. Urban development is a reason why the proportion of impervious surfaces in our catchment areas increases. This also leads to an increase in the velocity and amount of water running flooding and changing natural flow systems, with associated ecological damage. It also releases more pollutants into our streams, further impacting water body health. Sustainable stormwater management is also an important component of integrated water management and can contribute to multiple benefits such as enhancing livability.
Structural management measures include storage reservoirs, drainage channels, anti-erosion works, flood embankments, channel improvement works, retention and detention basins and non-structural measures include flood forecasting, flood plain zoning, disaster preparedness, floodproofing, etc. Urban drainage includes two types of fluids. Wastewater and stormwater, wastewater is that after the use for life support, the process from the industry this needs to be collected and transported without causing any hazardous issues but on the opposite hand stormwater is that the runoff which caused thanks to precipitation. Both stormwater also as wastewater must be considered for the system planning and style.

II. METHODOLOGY

A. Literature Review

We have studied some research Paper, Books related to Stormwater, Retention pond, Green roof, Bioswales, etc.

B. Case Study

To Study about the Stormwater I have Studied this Case Studies:
Sustainable stormwater
Handling at kvarnholmen

C. Analysis

In this work, I receiving that the stormwater recharge potential in a given area is affected by several parameters. Each parameter influences the recharge potential and the relative influence of each parameter is different. The current multi-parametric approach using GIS is holistic. This will help the planners in identifying suitable site-specific stormwater recharge techniques on a regional also as local scale, thus enabling quick decision-making for sustainable stormwater management.

III. SUSTAINABLE WATER SENSITIVE URBAN DESIGN TECHNIQUES SUGGESTED

A combination of measures is suggested which are site-specific. Techniques used are Soak ways, Green roof, Rain garden, Infiltration Trenches, and open flow canals.

A. Soakways

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Soakaway systems simply allow water to "soakaway" with minimal storage. They can be below or above ground systems. Soak ways are suggested for minimum plot areas mainly bungalows and private properties that can take care of and maintenance of such service.

Soak ways are suggested for small residential plots mainly bungalows so that roof and surface runoff generated in the area is less as a storage capacity of soak ways is minimum. These are easy to install and can be constructed by the individual property owner.

B. Green Roof

Green roof areas can be designed to capture the entire Stormwater Retention Volume (SWR v). In some cases, they could be designed to capture larger design storm volumes as well. So green roofs area suggested for structures with larger and flat roof areas mostly above 250 sq. m. The calculation for green roofs volume reduction is enclosed in the annexure.

C. Rain Garden

A rain garden that captures water from the lawn, roofs, runoff from the driveway, parking lots, could be implemented on large plots as well as small plots. This area has simple gardens which could be constructed by individual homeowners as well. These are artificial gardens that are constructed to capture runoff from less than 1000 sq. m. area.

D. Retention Pond

Retention ponds can store water throughout, this ponds area is preferable to install in societies with recreational spaces or public open spaces.

E. Bioretention Swales

Bio retention swales provide both flow conveyance and storage in the swale and water quality treatment through the bio-retention area in the base of the swale. The bio-retention area provides maximum water quality treatment efficiencies for small to modest flow rates.

Limited flow detention capacity can also be provided if the cross-section of the swale is large, relative to the flow. The nalla banks were mostly sandy, so any rapid flow in the drainage would lead to erosion. Flowing stormwater added to the nalla from the adjacent residential properties causes the erosion to increase, especially in areas with no vegetation or where the area lacks stabilization.

IV. CONCLUSION

From all this study I conclude that,

A. Water management is extremely critical for the expansion and development of any economy.

B. This study presents the appliance of this system to urban areas for managing stormwater sustainably. The potential stormwater recharge zone map presents the delineation of the Selected Ahmednagar drainage basin into various classes.

C. This rainwater is often managed at source by using Low Impact Development (LID) techniques that promote recharge.

D. This type of study can be used as a decision support tool in managing stormwater sustainably in dense urban areas of developing countries.

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REFERENCES

[1] Newman, P. and Kenworthy, J. (1999). Sustainability and cities: Overcoming automobile dependence. (Washington, D.C.: Island Press)

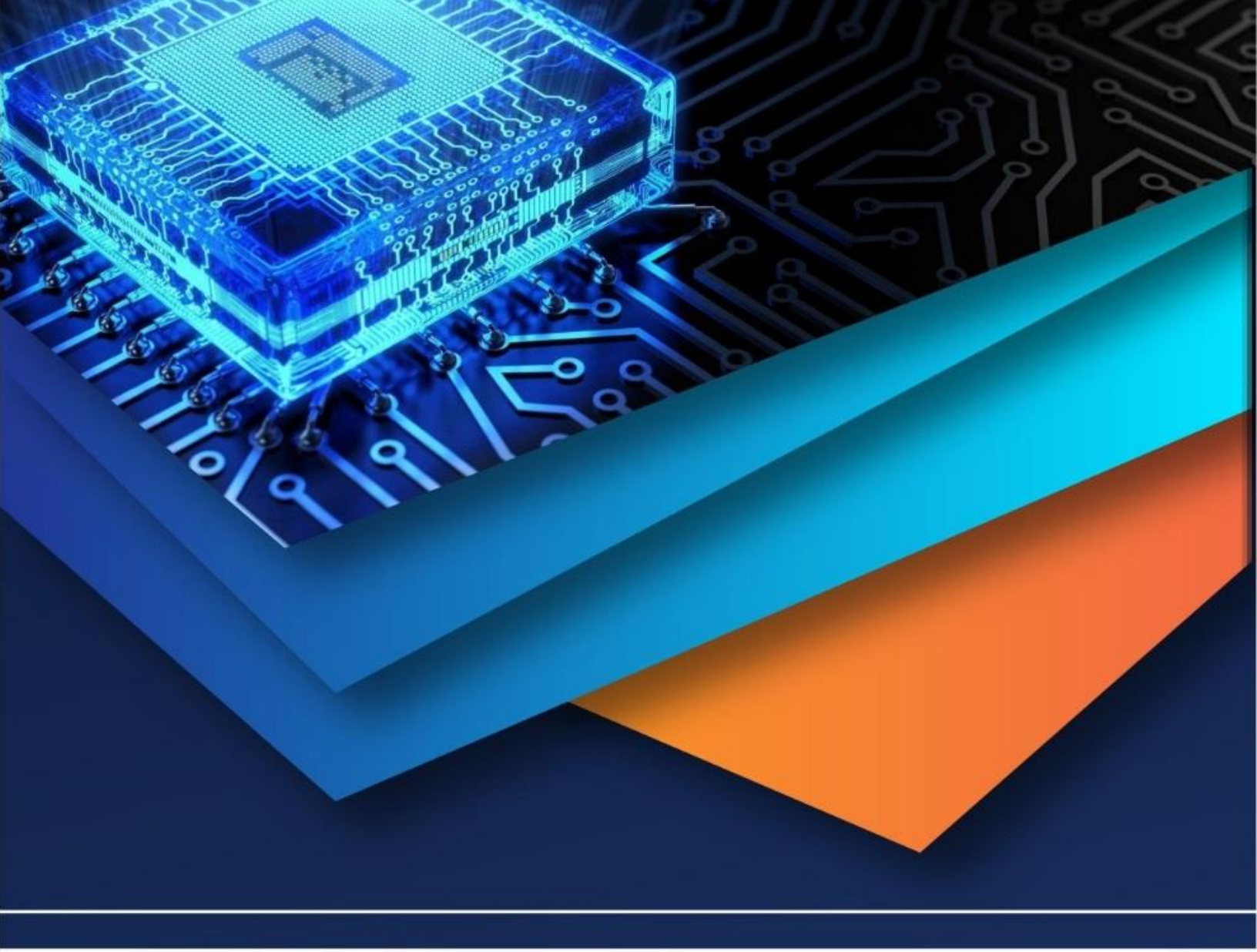
[2] Identification of Potential Stormwater Recharge Zones in Dense Urban Context: A Case Study from Pune city (Gogate, N. G and Raval, P. M.)

[3] Stormwater Management a Case Study of Gandhinagar City Sanjay B. Parmar1, Prof. Vikash D. Bhavsar, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 04 Issue: 12 | Dec-2017 www.irjet.net

[4] Reliability Assessment of a Storm Water Drain Network R. L. Gouri* and V. V. Srinivas. Shipton, M.D. and Somenahalli, S.V.C. (2010). Locating, appraising, and optimizing urbanstorm water harvesting sites. Retrieved September 7, 2014, from http://www.esri.com/news/arcnews/spring10articles/locating-appraising.html.

[5] Singh, S., Samaddar, A. B., Srivastava, R. K. and Pandey, H. K. (2014). Ground WaterRecharge in Urban Areas – Experience of Rain Water Harvesting. Journal GeologicalSociety of India, 83, 295-302.

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