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LITERATURE PAPER ON STORM WATER DRAINAGE IN AHMEDABAD CITY UNDER-PASS

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Abstract: Shahibaug underpass is one of the main underpass in Ahmedabad city. The Shahibaug underpass are waterlogged every year during monsoon due to which the whole traffic systems gets jammed for hours. Shahibaug underpass has a major issues such as traffic, water logging in nearby areas, spreading diseases by water, blockage of drainage (storm drain) & backflow of suction valve. Adjacent topography, Road gradient, population data, rainfall data of previous year, sewer network analysis, and upgrade in pump capacity is obligatory to crack this problem. Imperfection in current circumstances of underpass will overcome by using Google earth pro software and AutoCAD.

Keywords: Storm, Sewage, Drainage, kerb drain, underpass

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INTRODUCTION

Storm water is water that originates during precipitation process & snow melt. In natural landscape such as forest, soil absorb much of the storm water & plant help to hold it[1]. But unmanaged storm water can create two major issues such as flooding (runoff water) & water pollution related to potential contaminants [2].

A tunnel is a passage way that carries people or vehicle to across a destination that have obstruction or to shorten the travelling time [3].

An underpass is a road or path that goes underneath a railway or another road [4].

A storm drain, storm sewer (U.S. and Canada), surface water drain/sewer (United Kingdom), or storm water drain (Australia and New Zealand) is designed to drain excess rain and ground water from impervious surfaces such as paved streets, car parks, parking lots, footpaths, sidewalks, and roofs. Storm drains vary in design from small residential dry wells to large municipal systems [5].

The different types of storm like ice storm, blizzard, snowstorm, thunderstorm, hail storm, tornado, tropical cyclone etc [6].

There is different types of drainage system like kerb drainage system, grate drainage etc.



FIGURE 1 STORM WATER (SOURCE : <http://media.al.com/wire/photo/tropical-storm-debby-in-florida-ea8d563aab8f622f.jpg>)

PROBLEM STATEMENT

The shahibaug underpass is waterlogged every year during monsoon due to which the whole traffic system gets blocked for hours. A main problem is underpass having a small size of storm drain filtration channel so it cannot filter bulk of runoff storm-water. Lack of inspection of filtration channel its causes Blockage of storm drainage and backflow of suction valve. Due to heavily waterlogged in underpass and near surrounding areas, act as a breeding places of mosquitoes. There is some topography difference (gravity) in land difference between surrounding areas and underpass due to which it can makes the water logging condition

directly/indirectly manner[7]. So the numbers of people in Shahibaug area are suffered with diseases like malaria and dengue.



FIGURE 2 SHAHIBAUG UNDERPASS



FIGURE 3 SHAHIBAUG UNDERPASS

Study Area



FIGURE 4 INDIA



FIGURE 5 GUJARAT



FIGURE 6 SHIBAUG UNDERPASS

(source: google image /google map)

Ahmedabad has a hot, semi-arid climate with slightly less rain than required for a tropical savanna climate.

Sabarmati River spits city into two parts. Ahmedabad city have many well-known underpasses such as Akhbarnagar underpass, Naranpura underpass, Incometex underpass, Mithakhadi

underpass, Thaltej underpass, Parimal garden underpass, Shahibaug underpass are major underpasses of the city.

Generally Ahmedabad city is located near the line of tropic of cancer and far from the coastal area due to which the cities have their normal temperature is 38°C and during rainy season the humidity is affect the city due to which there is normal/heavy rainfall takes place.

Shahibaug Underpass lies at 23.058°N 72.593°E in western India at 53 meters (174 ft.) above sea level on the banks of the Sabarmati River, in north-central Gujarat[8].

OBJECTIVE

The various objectives as shown in below:

- To identify problems and location of repetitive water logging at Shahibaug underpass.
- To understand study of flood prone areas and to assess impact of water logging.
- To crack traffic problematic of underpass waterlogged during storm water.
- To improve the backflow of storm water drainage.
- To detect topography and slop of our study area.
- To recommend Engineering Solutions for Stopping water logging in underpass.
- To make a geo reference image of our study area.
- Use of Quantum GIS and Global Mapper to analysis existing drainage system & topography of study area.

SCOPE OF WORK

The different possibility as shown in below:

- To crack problematic of jam of water in storm drain.
- To crack traffic problematic caused by stock water in underpass.
- To decrease spreading of disease at adjacent areas.
- To implement natural disaster impacts.
- To develop sewer network system of adjacent areas and underpass.
- To collect the storm water from the storm drain and use for irrigation purpose.

REAL PROBLEAM OF OUR SITE

A main problem is underpass having a small size of storm drain filtration channel so it cannot filter bulk of runoff rain water. It causes such as heavy traffic & also water logging in nearby areas. Due to water logging act as a breeding places of mosquitoes. So the numbers of people in Shahibaug area are suffered with diseases like malaria and dengue. Sometimes blockage and

backflow occur in sewer line and it is a main causes. Water logging and damaged roads are a major cause of increasing accidents during monsoon[9].



Fig : Real site location Ahmadabad

METHODOLOGY

- Step 1 : To recognize which type of problems occur in our study area
- Step 2 : To recognize objectives and which type of solution already use in our study area
- Step 3 : To identify different paper related our topic
- Step 4 : To recognize different problem related our topic
- Step 5 : To collect a different type of data like topography of our study area, rainfall data etc
- Step 6 : To recognize our paper methodology
- Step 7 : to use Google earth pro, global mapper software for data decomposition
- Step 8 : To use different software to design our solution like AutoCAD etc.
- Step 8 : To provide a recognize outcome and conclusion

PROBABLE SOLUTION

Kerb drain system is a one of the most significant possible solution for preventing jam of underpass due to storm water. It's usually providing on edges of walkway. kerb has to be designed as it collect water simply and supply forward by gravity itself. As per users requirement we can design its pattern, size, hole diameter, height, width, etc. 39% problem will solve by increasing number of storm drain filtration channel towards underpass and centre of carriageway of underpass. Maintenance of different levels of foremost chambers at underpass and there nearby areas.



FIGURE: KERB DRAIN (Source :
<http://www.designcurial.com/Uploads/Product/3993/images/258316/large/kerbdrain2.JPG>)

RAINFALL DATA COLLECTION

Table-1 Rainfall data collection

Year	Month	Rainfall in mm
2014	July	176 mm
	August	55 mm
	September	96 mm
2015	June	87 mm
	July	140 mm
	August	120 mm
2016	June	36 mm
	July	104 mm
	August	125 mm

CONCLUSION

Water logging has develop a foremost problem in this mega city Ahmedabad by which population are effected Badly. Shahibaug underpass has a huge problem of water logging due to storm water. To overcome this problem we will provide kerb drainage system at Shahibaug underpass. 35% problem will solve if AMC team provide more storm drain filter channel. AMC had provided recommendation for setting up new pumping station and maintaining the drainage and sewerage system. It can reduce the problem up to 25%.

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