OPERATION BREAKTHROUGH - PROGRESS REPORT

During the incessant rains on October 20 and 21st 2019, the major roads in Kochi city such as MG road, Shanmugham road, Banerjee road, Bypass road along with prominent locations like South Railway Station, North Railway Station, KSRTC bus stand premises etc were fully flooded and normal public life was disrupted. Several polling booths of bye election held on these dates had to be shifted. Following these incidents, Hon. District Collector decided to implement Operation Breakthrough Project and to formulate projects to avoid such a situation in future.

Kochi city being surrounded by lakes on three sides and due to its immediate proximity to sea, the canals in the city are subjected to routine tidal inflow and outflow. Hence heavy rains cannot be said as the only reason for flooding in the city. Due to rapid urbanisation and consequent need for road development, the canals were encroached as a result of which, width of many canals got reduced and many ceased to exist. As a part of road development, many unscientific constructions were done across these canals. The bed of many natural canals were concreted thus making infiltration of flood water through canal bed impossible. Revamping works of drains along major roads done without providing sufficient inlet sizes has also been a reason for flooding the city roads. In short, the paths through which rain falling in city area is supposed to drain into adjoining lakes, are all blocked.

Flood zone maps based on satellite images of rainfall during October 2019 were used for conducting studies in extremely flooded areas, especially the major canals in the city and site inspections were carried out to assess the problems causing floods in each canal. Each work was formulated as a solution to these problems. Importance was given to clear obstructions to effective drainage of rain water to Kayal. The Kayal mouths of many canals were in fully blocked condition. Steps were taken to desilt the major canals in the city so as to increase their water carrying capacity and to effect smooth drainage to Kayal.

The Project was implemented in two Phases. In the first phase, the drains in the city were renovated to avoid flooding. A total amount of Rs. 10 Crores was utilized for implementing Phase 1 works.

Phase 2 works were mainly concentrated on clearing the Kayal mouths
and obstructions in major canals in the city. The details of each work in Phase 2 are explained below.

1. **Desilting of Thevara Kayal mouth**

   While assessing the reasons for flooding in the South west portions of Kochi city, the extremely silted Thevara Kayal mouth was identified as a major cause. The runoff water from Kadavanthra, Panampilly Nagar, Thevara and Kochu Kadavanthra areas drain to Kayal through Thevara-Perandoor canal and Koithara canal through Thevara Kayal mouth. Due to tidal inflow and outflow, the Thevara Kayal mouth was fully silted up and blocked. Due to this, the flood water which should drain through this Kayal mouth used to flow back through Thevara-Perandoor Canal and after traversing 12.5 km exits into Kayal through its northern mouth. The Thevara-Perandoor canal is unable to accommodate this excess flood water, thus causing flooding. After desilting Thevara Kayal mouth, the water from the southern reaches of Thevara-Perandoor canal and Koithara canal can drain off to Kayal quickly. This Project is expected to be a solution to flooding in Kadavantra, Panampilly Nagar and Thevara areas. The work is completed and water flow is restored in the canal.

2. **Renovation of Koithara Canal**

   Koithara canal is a major canal which starts from Thevara-Perandoor canal near Panampilly Nagar and passes through Koithara area and finally merges to Thevara canal. Due to construction of a Railway Overbridge in Koithara, free water flow through this canal was blocked.
for over 30 years. For the construction of Ernakulam –Alappuzha Rail overbridge, an existing culvert was brought beneath the waterway and about 72cm thick concrete slab was casted over this to form roadway. As a result, this canal was fully blocked. Also a pile cap forming part of Rail Overbridge was constructed across this canal, thus worsening the condition of this canal. During rains, the adjacent areas of canal get completely submerged. The Project was envisaged to open up the blocked canal. Provisions were included in the Project to clear the vegetation blocking water flow in canal, desilt and clean the canal and to clear the deposited concrete debris in the canal and to demolish and reconstruct the blocked culvert. About 70% of work is completed. As the blockage is removed, water flow is restored in the canal. The water through this canal reaches Kayal mouth through Thevara Canal. The Project will help to mitigate flooding problem in nearby areas.

3. **Removal of blockage in Chilavannoor Kayal**

Chilavannoorlake is a major lake in Kochi city. The major canals in Central area of Kochi city such as Karanakodam, Punchathodu, Rail Nagar thodu, branches of Thevara- Perandoor canal etc drain to this lake at its northern end( behind Elamkulam Metro Station) and finally drains to Vembanad lake at southern end of lake beneath Chilavannoor bund road bridge. Apart from this exit, Chilavannor lake drains to Vembanad lake through Ambanattuchira and Pandarachira areas.

Beneath the 30m long Chilavannoor bund road bridge, there are remnants of old damaged concrete sluices (originally intended preventing salt water intrusion)
blocking smooth drainage of water from Chilavannoor lake to Vembanad lake. As this exit is blocked, water from Chilavannoor lake flows back to Karanakodam and Rail Nagar thodu during rainy season. This Project is envisaged to remove concrete blockage under Chilavannor bund road bridge and to desilt the mouth to Vembanad Lake. Desilting works are completed successfully and water flow is restored in the canal.

4. **Mullassery Canal renovation**

As per flood zone map, another major flooding location is the area near South Railway Station and KSRTC bus stand. This area is located to the western central area of Kochi City. Mullassery canal starts from Thevara-Perandoor canal near KSRTC bus stand. This 1 km long canal drains rain runoff water in this area to Kayal. Recently the adjacent areas of this canal are subjected to flooding. During detailed case study, it was observed that under AMRUT Scheme in which canals were being covered with concrete slabs, the bed of this canal was concreted. There is 4m water depth in the area where Mullassery Canal joins Thevara-Perandoor Canal. Originally Mullassery canal had 4m depth. Under AMRUT Scheme, the bed of this canal was raised by 2.5m for a length of 400m and covered with concrete slabs. This work caused destruction of this canal and flooding in nearby South railway station and KSRTC bus stand areas. It is envisaged to dismantle this concrete construction and to make the bed of this canal at the same level with that of Thevara-Perandoor canal for a length of 400m. This Project is estimated to cost Rs.2 crores. As 30 days period post Lockdown is not sufficient to complete this work before upcoming rainy season, it is decided to implement this Project after rainy season.

5. **Karanakodamthodu renovation**

Karanakodamthodu is a major drainage canal in Central area of Kochi city starting from area near Kaloor Metro rail station to Chilavannoor lake through rail yard. Before construction of Metro station, this thodu was connected to Changadampokku thodu. This thodu and Changadampokku thodu was together known as Chilavannoor thodu. Due to extreme siltation in this canal, flooding was caused in Kaloor Stadium, Thammanam, Katrikadavu areas. The desilting work is
completed now. Visible positive differences are observed due to opening up of this canal.

6. **Changadampokkuthodu**

The significance of Changadampokku thodu caught attention when the KSEB sub-station area was submerged in the floods and the city was plunged into darkness. 4km long Changadampokku thodu drains into Kayal through Perandoor river near Amrita Hospital. As the name indicates, this thodu was once the mode of conveyance by *Changadams* and was about 16m wide. The thodu was earlier a continuation of Karanakodam thodu and this connectivity was broken during the construction of Kaloor Metro station. The width of the thodu got reduced to 2m near KSEB premises. Approx 200m length of slab is covered with slabs in this area. The obstructions in this canal causes flooding in Sub-station area. As the width is less, the chances of getting obstructed are high. KSEB authorities have been intimated to remove the cover slabs and widen this thodu in their compound, but no action has been taken so far. However, the canal is desilted through Operation Breakthrough.

As per Flood zone map, water is seen increasing from Chilavannoor lake towards Kaloor Metro Station. As the mouth of Chilavannor lake to Vembanad lake is obstructed, when water rises uncontrollably in Chilavannoor lake, it tends to flow back to Kaloor Metro Station through Karanakodamthodu. As the connectivity to Changadampokkuthodu is...
lost, this excess water will flood the low lying Sub-station area. Due to encroachment, the width of thodu in initial stretches is only 2.5m which is in silted up condition. The mouth of canal near Perandoorriver is also silted up and blocked.

At the portion of Rail line crossing at Elamakkara, the flow was almost fully blocked by old concrete pipes and remnants of earthen bund and damaged concrete piles used in the construction of rail bridge. As part of Operation Breakthrough the obstructions in this canal were cleared including the mouth portion. Now, the work is completed and there is evident increase in water flow. KMRL authorities have been directed to restore connectivity between Changadampokku thodu and Karanakodamthodu at Kaloor Metro Station area and the work is progressing.

7. Renovation of Link canals between TP Canal and Kayal

In the western area of the city between Vaduthala and Thevara, there were cross canals connecting TP Canal and Kayal. 21 cross canals have been located. Out of this 12 main cross canals between Vaduthala and Thevara have been chosen for rejuvenation under three Projects in Operation Breakthrough. However, following the delay due to Covid Lock Down, only one Project is under execution stage now i.e the rejuvenation of link canals between North Railway station and Vaduthala. Steps are being taken for implementing the Project for rejuvenation of link canals between Vaduthala and Amrita. On completion of these Projects, the rain runoff water will directly reach Kayal, thus reducing the load in Thevara-Pernadoor Canal. The rejuvenation of these cross canals is expected to bring an end to flooding in this area.
8. **Renovation of Edapallythodu**

Another important identified Project is the rejuvenation of Edapallythodu between Muttarriver and Champakara canal. The canal flowing along the eastern boundary of Kochi Corporation will drain off significant amount of rain water to Kayal through Muttarriver. The removal of obstructions in the 10 km stretch of canal and restoration of smooth water flow will help to relieve flooding in eastern area.

9. **Thevara- Perandoor Canal**

About 12.5 km long Perandoor canal starts from Thevara Canal and drains into Kayal through Chitturriver near Perandoor. At the middle stretch of this canal near CBI quarters, the canal is passing through 3 pipe culverts of 1m dia. As this portion is completely blocked, flooding is experienced in nearby areas. Kochi Corporation is executing the rejuvenation work of TP Canal under AMRUT Scheme. Operation Breakthrough has not undertaken any works connected to this canal.

Kochi Corporation is concreting the bed of many natural canals and has been covering it with concrete slabs under AMRUT Scheme. Presently, a similar work is being carried out in Changadampokkuthodu near Ammu Sahib road. These type of works will cause flooding in adjacent areas. This is also a clear violation of Central Water Commission orders. Such works undertaken by Corporation need to be controlled.

Although 28 Projects were identified under Phase 2, only 17 Projects were selected for execution before rainy season. During the meeting held on 04.05.2020, Disaster Management Authority decided to start Projects after Covid Lockdown. By special permission, works were started on 08.05.20 and completed successfully.
Report on the Effect of Rain and Subsequent Water – Logging in the City of Kochi on 29.07.2020

This report is with respect to the events that took place in the city of Kochi in the month of October 2019 and then subsequently on 29.07.2020. In the month of October 21st 2019, the city received a rainfall which amounted to almost 199 mm and on 29th July 2020, the city received a rainfall of 154.5 mm at 8.00 am and in the evening it was over 200 mm. Also, in 2019, in the event of heavy rain in the State, the city of Kochi was dragged into flood and darkness. But it can be very well be pointed out that unlike the flooding that took place in 2019 whereby a large number of areas were flooded as a result of the heavy rains, this year, the flooding and other water logging did not take place at all. The events that took place on 29th July 2020 are thereby mentioned below.

On 29th Oct 2020, in the morning from around 6 am to 12:45 pm, there was a rise in the tides of the sea which was nearly around 80 cm compared to the normal tide of 40 cm. Also there was a torrential rain on 29.07.2020 in the hours of the morning starting at 1.00 a.m till 9.00 am. When upon examining these events, it can be likely concluded that the happenings were similar to that which happened in the year 2019.

As stated aforesaid, at the time there were strong tides in the sea, there were heavy rains in the city of Kochi and once the tides lowered in the sea, the water which logged the city swept out into the backwaters around 2.00 pm. In the floods that happened in 2019, there was water logging in the city for almost more than 48 hours but 29th Oct, the water drained out back into the backwaters in the event of the low tides is really unprecedented.

Places Which Were Water – Logged

- Operation Break Through (OBT) was aimed at renovating all the canals and backwater mouths which were there in the city and in the second phase of OBT, there canal mouths and other small canals were to be cleared of silt in order to ensure free flow of water. In OBT, the Thevara Perandoor Canal was not included. Last rain, the places where water logging took place were mainly around Panampilly Nagar, Railway Station, KSRTC Bus Station, Kammattipadam, Udaya Colony, P & T Colony which are located within the precincts of the Thevara Perandoor Canal and the 84 families which were relocated were living in the aforementioned areas. In the morning hours, no flooding was detected in Koithara, Changadanpokku, Karanakodam, Chilavanoor as there was a strong flow of water from these canals and if any place reported water logging, the same place became normal within the afternoon itself.
• There are two drainages that are connected to the Changadanpokku canal from the restricted area compound area of the Kaloor substation of the Kerala State Electricity Board which are totally blocked. During site visit, the same was brought to the notice of the KSEB Officials and since the same fell within the area of the Board, it is usually made to be cleaned by the Civil Wing of the KSEB. Since the drainage was not cleaned, due to the heavy rain, the substation yet again faced water logging. Also the Changadanpokku thodu which passes by the KSEB Substation compound has only a width below 2 m’s. The canal does not possess enough capacity to carry the water that drain out from the areas surrounding it in the event of a heavy rain. The aforesaid things have already been notified to the Board Officials.

• Moreover the above, had the Changadapokkku and Karnakodam canals been properly connected by KMRL at Kaloor, then the water logging at the KSEB Substation could have been reduced. After the substation, the Changadanpokku canal has a length of 3.7 kms only and this time water logging was found in those areas where the width of the canal was less. It was only in 2019 that such water logging happened in 16 areas whereas on 29.07.2020 water logging was seen at only those places where the width of canal was less and if there even happened to be water logging, the same drained out by the afternoon due to the low tide.

• Yet another place where water logging was heavy was at the Ernakulam South Railway Station, KSRTC Bus Stand Karikkamuri and Kammattipadam. It is from the KSRTC Bus Stand that the Mullassery Canal starts from the TP Canal and continues on to the backwaters. Due to the level difference between the Mullassery Canal and the TP Canal, there arises the problem of obstruction of flow of water. The unscientific construction over the Mullassery Canal was done Corporation through Amrit Project. And as per the OBT Proposal, it was proposed that 400 metres of the 990 metre long Mullassery Canal be reconstructed and made in the same level of TP canal. Due to the lockdown which was imposed, the said work could not be completed before the onset of the monsoon and therefore it was decided by the DMA that the said work will be completed post monsoon.

Upon a joint decision by the District Administration and Cochin Corporation, the upkeeping of the roadside drainages and ensuring the flow of rain water from these drainages to the main canals is the responsibility of Cochin Corporation and KMRL. The responsibility of ensuring the flow of water from the main canals except the TP canal to the backwaters is that of the OBT Team. There were instances reported of blocked drainages from a few places. The Flooding effected at Ravipuram and MG road near Central Square Mall are because of obstructions in the road side drainage nearby. In 2019 entire MG road was flooded.
over 24 hour. Yet all the canals which were included under OBT saw the flow of water into the backwaters and if any place reported water logging, the same place became normal within the afternoon itself.

In order to rectify certain identified issues, it is pertinent that the below mentioned steps be taken as soon as possible which are as follows:

1. **Mullassery canal** has to be renovated at the earliest. *(KSRTC Bus Stand, Karikkamuri, Kammattipadam and South Railway Station* water logging issues can be rectified).

2. **The silt which is present in the TP Canal has to be removed properly.** Also the length between the Perandroor Railway Bridge and backwaters which has a width of almost 30m is to be cleared and it also has to be ensured that the water from TP canal reaches the backwaters without any obstructions. And more over at the beginning of TP canal the flow towards Kayal mouth to be ensured.(This will be a permanent solution for the water logging in Panampilly Nagar, Udaya Colony, Kammattipadam and P & T Colony).

3. The link canals which originate from Atlantis Hotel to Vaduthala leading to backwaters has to be immediately opened to ensure that water logging does not happen in these areas. *(This kind of link canals have opened at Lourd Hospital area and no flooding reported on that location)*

4. **KareeThodu Renovation**

    Kareethodu, which runs parallel to the By Pass Road has to be renovated so that water logging can be reduced By pass and surrounding area.

5. Renovation of **Punchathodu**

    The said thodu brings water from Kathrikadavu area to Chilavanoor lake and therefore it is important that the silt be removed from this thodu.

6. Connection of **Changadampokku and Karanakkodam at Kaloor Metro station.**

    The Hon’ble High Court has already been directed to the KMRL to reconnect the above Canals properly, but the they failed to do so. Proper directions to be issued to do Connecting works by KMRL, so that further flooding can be reduced at KSED substation area.

More over the above , most of the canals were encroached for road construction or by private parties. And Corporation is also promoting bed level concreting and covering the canal with concrete slabs which leads to reducing the canal sizes as well as the flow through the canals. This types of activities cannot maintain the drainage system properly in the Corporation area, so if there is heavy rain, which will leads to further floods in some of the area. In the MG Road
area, most of the drains are leading to TP Canal direction, this has to be diverted to Kayal directly.

**Operation Break Through** has been a success as the places which have been identified and worked upon have not faced any issues unlike the last year. If the aforesaid directions are implemented at the earliest and if the roadside drainages are properly maintained and at some particular place eg. Judges Avenue the drainages are rearranged then it will be a relief the existing identified issues.

On completion of Projects such as *Rejuvenation of Mullassery canal* under Phase 2, the Mission undertaken by Government is expected to finish successfully.

This Mission could be accomplished under the leadership of Irrigation department with the whole hearted cooperation of officials under Irrigation, PWD, GCDA and LSGD wings. All steps have been taken under Operation Breakthrough to ensure that in the upcoming rainy season rain water reaches Kayal. The Mission was finished successfully in 30 days by the full support of Monitoring Committee (Appointed by Hon’ble High Court), MPs, MLAs and Corporation Council members.

The Mission started by Hon. Chief Minister, Kerala under the leadership of Hon District Collector Sri.S.Suhas IAS is being successfully completed through Irrigation department. Rs 25 crores fund has been allotted for this Mission under Phase 1 and 2 through Disaster Management Authority by Kerala State Govt.

Following the milestone Operation Breakthrough Project undertaken by State Govt. in Kochi, Irrigation department has already decided to implement similar Projects in other five Corporations in the State. The works undertaken in Kochi Operation Breakthrough Mission is expected to finish completely within one week.

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