

**MINUTES OF REVIEW MEETING ON 3<sup>RD</sup> DELIVERABLE OF 'HYDRO-METEOROLOGICAL RESILIENT ACTION PLAN (HmRAP)' HELD ON 10.08.2021 AT 11:00 AM THROUGH VC IN OPS ROOM, NDMA BHAWAN, NEW DELHI.**

A review meeting on 'Creation of DEM/DTM map and GIS data of the study area through survey methods (total station and DGPS) with 30 cm vertical resolution having 95% accuracy level within the area covered' (3<sup>rd</sup> Deliverable) of the study 'Hydro-meteorological Resilient Action Plan (HmRAP)' was held through VC under the Chairmanship of Ms. Sreyasi Chaudhuri, JS (Admin) & Project Director, NCRMP, NDMA on 10<sup>th</sup> August, 2021 at 11:00 AM in Ops. Room, NDMA, New Delhi. The meeting was attended by officials from NDMA and the World Bank, PD (NCRMP-SPIU) of project States, nominated City Nodal Officers, Experts and Consultant (M/s Royal HaskoningDHV JV). The list of participants is attached at **Annexure-1**.

2. The meeting started with a welcome note from the JS (Admin) & Project Director, NCRMP, NDMA. A presentation was made by the Consultant Team on the 3<sup>rd</sup> Deliverable under HmRAP, including the Process for creation of DEM/DTM was deliberated.

3. Prof. A K Gosain, IIT Delhi sought clarity on the process/method of drainage system analysis conducted while creation of DEM/DTM. As the analysis of cross-sections of natural drains in the survey is crucial for hydraulic modeling to ascertain the adequacy/inadequacy of the drainage system and to predict the inundation. The Consultant Team Leader explained that the sub-surface survey of the drainage system is not proposed in the consultancy, and alternate approaches are adopted in the next deliverables on hazard assessment. This will be adequate to identify whether the CPHEEO guidelines are satisfied by the current system capacity, how much additional capacity needs to be planned at the city level, and broad recommendations on which sub-system within the city needs to be augmented.

4. Sh. Brijendra Mishra, GIS expert, NDMA, stated that there were meetings held on 9<sup>th</sup> July 2021 and 12<sup>th</sup> July 2021 with the Consultant team and NDMA experts in order to discuss the quality of data. However, as decided in the meeting, Consultant had not submitted the proper data till the review meeting.

Before the review meeting on Deliverable 3, it was advised to explain the DEM/DTM maps on the 'ArcGIS platform' which could not be displayed during the meeting due to technical error.

5. Sh. Ajay Katuri, HRV Expert, NDMA, has mentioned that the 3<sup>rd</sup> Deliverable is not complete. Only, half of the 3<sup>rd</sup> Deliverable is submitted and the other half is not yet received. Hence, no

review can happen in the absence of the same. He urged the Consultant to submit the 3<sup>rd</sup> Deliverable fully for review.

6. Sh. Anup Karanth, Task Team Leader, World Bank has advised to adhere to the Terms of Reference on this deliverable and needs to approve this deliverable in order to move forward on subsequent activities with an scheduled time.

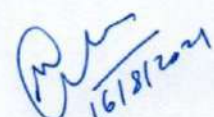
7. The JS (Admn) & PD (NCRMP). NDMA advised concluding the review of Deliverable 3 Report by 13<sup>th</sup> August 2021 on subject to the recommendation & satisfactory remarks by experts of review committee, in view of closing action and moving forward to subsequent deliverables to adhere to schedule and the target date for the conclusion of HmRAP.

8. The main objective of 3<sup>rd</sup> Deliverable is creation of DEM/DTM. Sh. Piyush Mahendra Shah (Consultant's GIS Specialist) was advised to be physically present in the review meeting. But, he has joined the meeting through online.

9. After deliberation involving views/suggestions of participants, the following actions were agreed to:

- i. Since some gaps/discrepancies were noticed on the DEM/DTM data, Deliverable 3 in the present form is not acceptable.
- ii. The consultant shall submit complete set of data of Deliverable 3 to NDMA by 10<sup>th</sup> August 2021. To expedite the process of verification of data, a meeting to be held between NDMA experts and GIS team of Consultant. Observations on the data supplied are attached as Annexure-2 which needs to be clarified/complied by the consultant before acceptance of Deliverable 3.
- iii. There is a delay in submission of 3<sup>rd</sup> Deliverable. Other Deliverables to be completed within the Contract timeline.
- iv. HmRAP portal to be updated with DTM of Kochi city and other project data.
- v. Data of Deliverable 3 to be hosted on GIS lab of NDMA.
- vi. Subsequent deliverables can be reviewed/accepted only after acceptance of Deliverable # 3. Therefore, consultant to submit revised version of Deliverable # 3 duly complied all observation at the earliest.

10. Meeting ended with thanks to the chair and all the participants.



(Mehul Padharia)  
Technical Specialist  
NCRMP, NDMA

Sl. No.	Name of Officials with Designation	Organization
1	Ms. Sreyasi Chaudhuri	Project Director- NCRMP, NDMA
2	Sh. Samir Kumar	Deputy Project Director, NCRMP, NDMA
3	Dr. Sanjay Sharma	Environment Specialist, NCRMP, NDMA
4	Sh. Mehul Padharia	Technical Specialist, NCRMP, NDMA
5	Sh. Vijay Sharma	IT Manager, NCRMP, NDMA
6	Sh. Ajay Katuri	Vulnerability Specialist, NCRMP, NDMA
7	Sh. Brijendra Mishra	GIS Expert, NDMA
8	Sh. Anup Karanth	The World Bank
9	Dr. A K Gosain	IIT, Delhi
10	Sh. Akshy Sridhar	Mangalore
11	Sh. Pramod Badami	Project Director, NCRMP, SPIU-Goa
12	Mr Dattatray Bhadakawad	Resident Deputy Collector, Ratnagiri
13	Sh. Ajay Suryavanshi	District Disaster Management Office, Ratnagiri
14	Sh. Afsana Perveen	District Development Commissioner, Ernakulum
15	Dr. Sreeja M U	DEOC, Ernakulum
16	Sh. Arjun S	City Associate, Kochi
17	Sh. Akshy Sridhar	Commissioner, Mangaluru
18	Sh. Pramod Badami	CE, Water Resources, Goa
19	Sh. Sanjay Kumar	Secretary Revenue, Goa
20	Sh. Satyajit Sen	Special Secretary, Disaster Management, West Bengal
21	Sh. Sumitava Mukherjee	Superintending Engineer, SPIU, West Bengal
22	Sh. M K Joshi	RAC, Porbandar
23	Sh. Likun Patra	DPO, Porbandar
24	Ms. Neha	Executive Magistrate, Disaster Management
25	Sh. Muzakkir Bheda	City Associate, Porbandar
26	Sh. Srinivasan Thiruvengadachari	Team Leader, RHDHV
27	Consultant team	RHDHV

**Observation on Deliverable-3 (HmRAP)**

Following are the observations:-

1. The deliverables as per contract are creation of Digital Elevation Model (DEM) and Digital Terrain Model (DTM) for 6 cities. However, the Consultant has submitted only DEMs of 6 cities. When asked for the DTMs of the 6 cities, the information provided in the portal as well as on the digital copies available with the representatives of the Consultant, DTM were absent. The Consultant has included some files under the heading DTM on the portal. However, they are mere random files and do not constitute the requirement of DTM. So the submission deemed to be incomplete.
2. In a detailed discussion with the representative of the consultant, the method of survey, collection of Bench Marks (BM), establishing Temporary Bench Marks (TBM) in each cities, collection of Ground Control Points (GCPs) in each cities, process of continuing the survey on the next day, accuracy of various survey outputs were examined and observations on quality of DEMs are as under:-
  - i) The DEM should include the waterbodies in each cities. However, it was observed that (e.g., Kolkata – Salt lake) the waterbodies also showing similar topography as the adjacent areas, i.e., 3m height. This is observed with other cities as well, where waterbodies and streams are present. During the meeting on 10 August 2021, Prof. A.K. Gosain also pointed out this discrepancy on the provided DEMs.
  - ii) As requested by the Consultant, the accuracy check was conducted on the files submitted for review. The following are the observations on the accuracy checks of the submitted data (screenshots of the errors found during the QC review are attached):-
    - a) For Ratnagiri city, out of the 8 points submitted for accuracy check, 4 points have accuracy less than the required, as per the ToR. The deviation was 50% where the allowed deviation was 5%.
    - b) For Porbandar city, deviation was observed in 19 points out of 78 points submitted, again more than the allowed limit. The deviation was 24% whereas the allowed deviation is 5%.
    - c) For Bidhannagar city, 5 points out of 57 have deviation more than allowed limit. The deviation was 8.7% whereas the allowed deviation is 5%.
    - d) It was observed that the Consultant manipulated the survey points deliberately to show more number of points collected, than the actual survey. It is observed, in

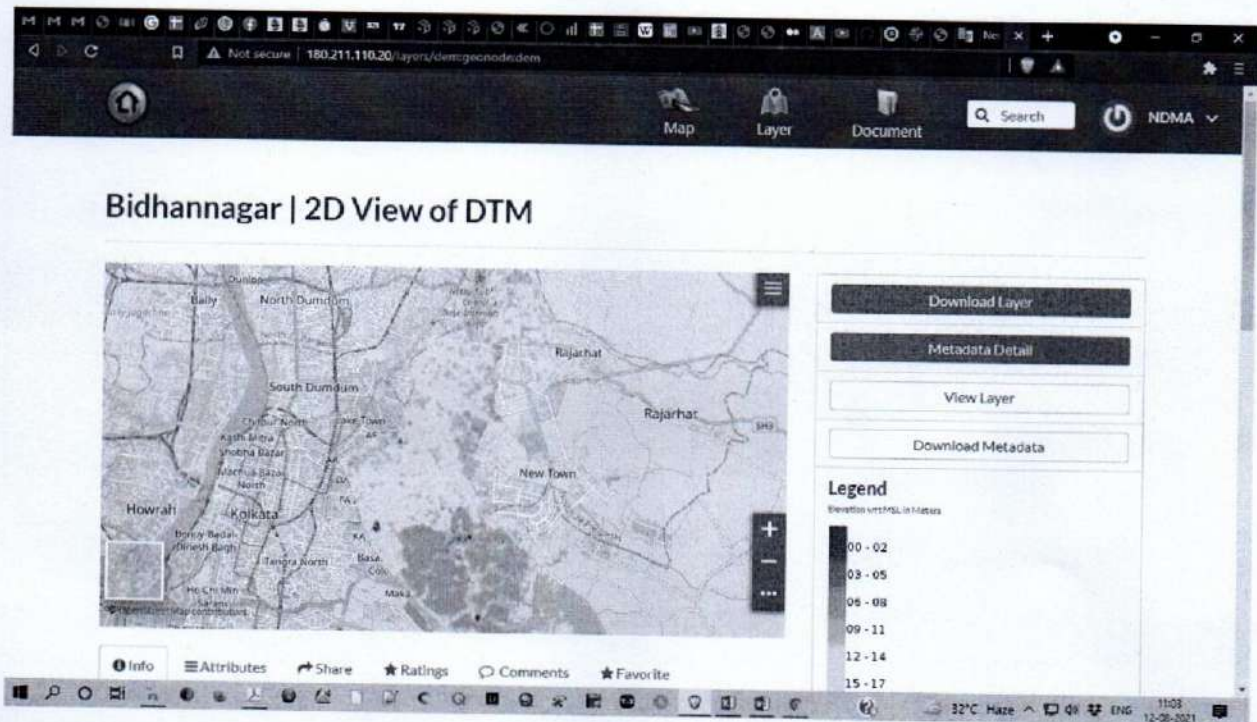
the case of Mangalore, that 14.34% (38127 points out of 265843) of points are duplicated to increase the number of points, which was shown as the density of the points in each city. This may be considered as lack of seriousness and professionalism on the part of Consultant. In case of Ratnagiri, more than 5% (676 points out of 13019) of the data points are duplicated deliberately. In the case of Kochi, 7.4% (65644 points out of 886202) have been duplicated deliberately. Similarly in Porbandar, 2.35% (1308 points out of 55496) were duplicated deliberately. In the case of Bidhannagar, 1.2% (269 points out of 21245) points are duplicated. In the case of Panaji, 2.69% (646 points out of 23933) are duplicated deliberately. The summary is presented in the following table.

Sr.No	Name of the city	Duplicate points	Total points	Percentage of duplicates
1	Bidhannagar	269	21245	1.26
2	Porbandar	1308	55496	2.35
3	Ratnagiri	676	13019	5.19
4	Panjim	646	23933	2.69
5	Kochi	65644	886202	7.40
6	Mangalore	38127	265843	14.34
	Overall	106670	1265738	Average 5.54

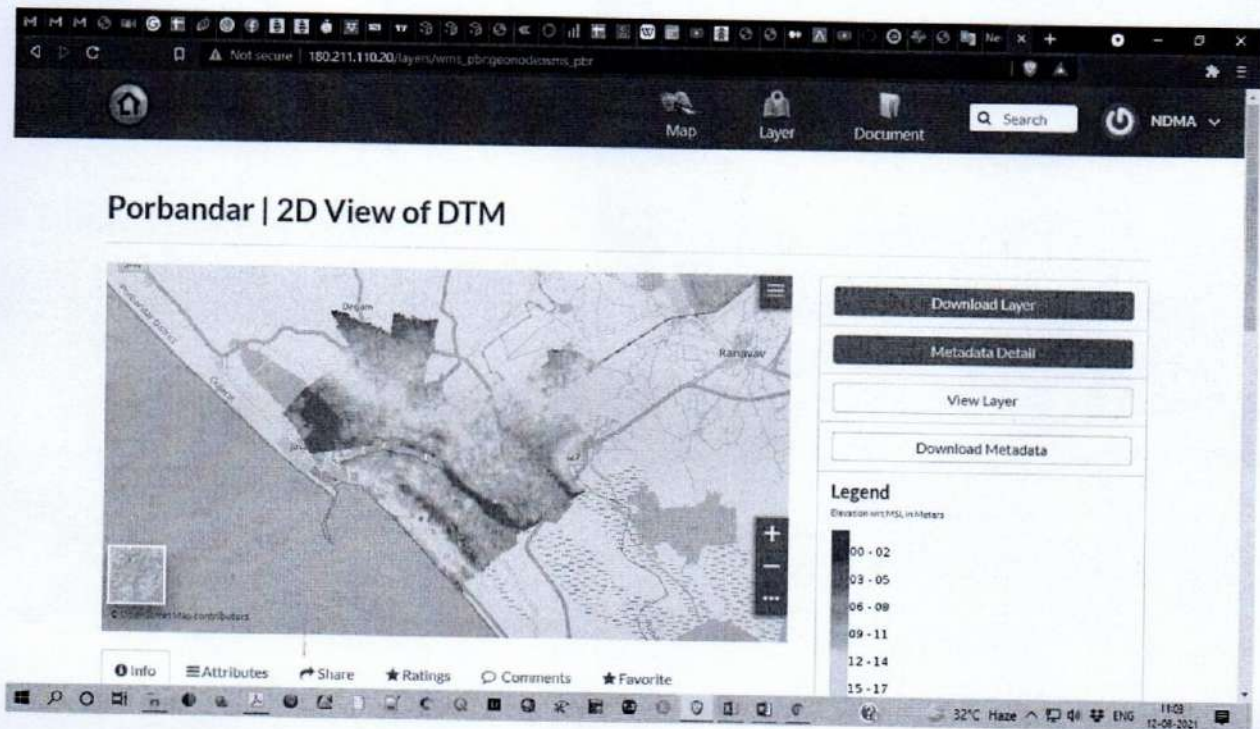
- iii) The above mentioned errors will lead to more discrepancy in the creation of DEM, which will further distort the creation of the Resilience Action Plans (RAPs).
3. The data presented and submitted to NDMA as part of the DEL-3 is utterly erroneous and cannot be used further.
4. In view of the above, Consultant to rectify these observations & submit the revised version of Deliverable # 3 duly compiled/clarified above observations at the earliest.

## Screenshots of the errors found during the QC review

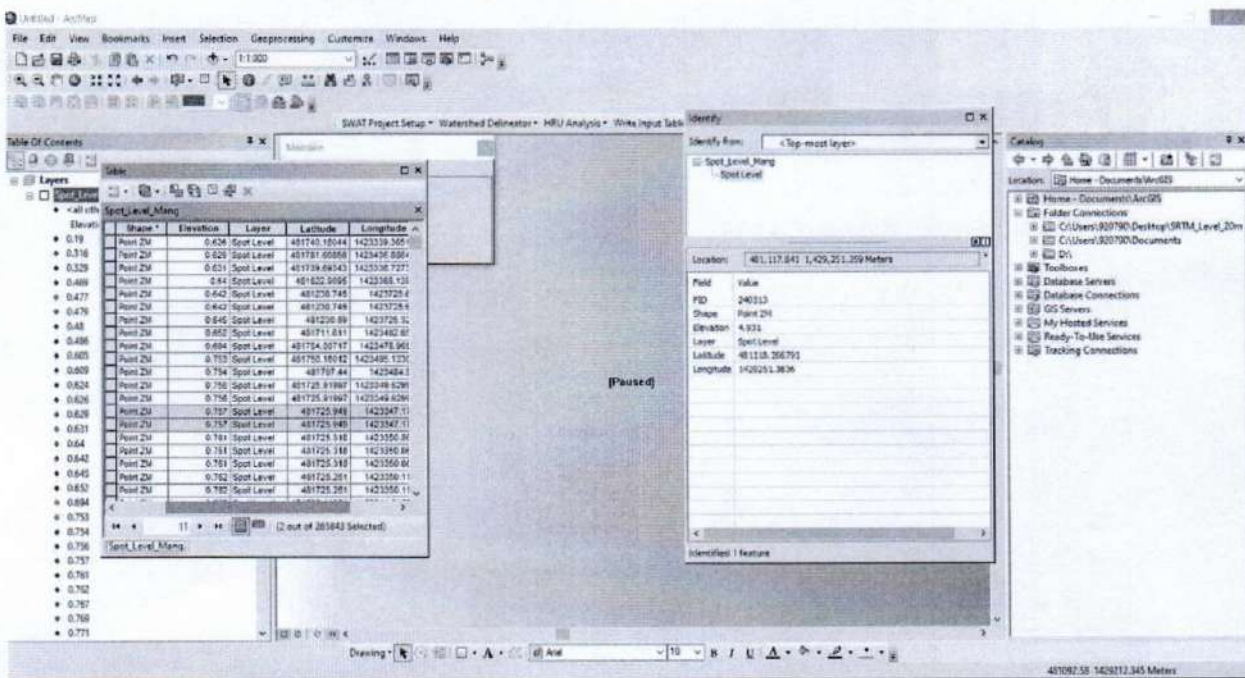
### Misleading DTM submitted on portal -1



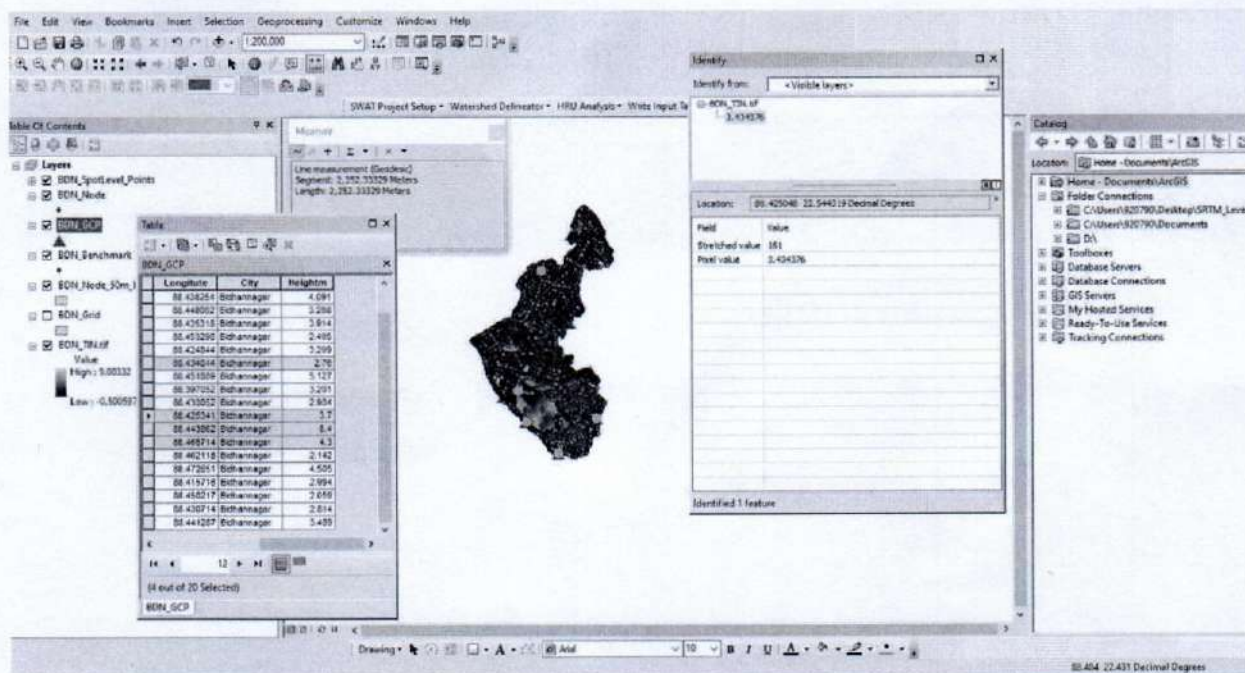
### Misleading DTM submitted on portal 2



## Duplicate points from City of Mangalore



## Discrepancy in accuracy of GCP decimal points – Bidhannagar



## Varying spot levels within a same pixel of a DEM

