



FEMA

TMAC

Technical Mapping Advisory Council Meeting August 4-5, 2015

TMAC Members

Juliana Blackwell
Nancy Blyler
Mark DeMulder
John Dorman
Leslie Durham
Scott Edelman
Steve Ferryman
Gale Fraser
Carrie Grassi

Chris Jones
Howard Kunreuther
Wendy Lathrop
David Mallory*
Robert Mason
Sally McConkey
Javier Ruiz
Christine Shirley
Cheryl Small*

Subcommittee Members

Doug Bellomo, U.S. Army Corps of Engineers
Ken Ashe, Amec Foster Wheeler
Dwayne Bourgeois, North Lafourche Conservation,
Levee, and Drainage District

Maria Honeycutt, NOAA
Doug Marcy, NOAA
Andy Neal, FEMA
Patrick Sacbibit, FEMA
Jonathan Westcott, FEMA

Government Attendees

Kathleen Boyer, FEMA, TMAC ADFO
Mark Crowell, FEMA, TMAC DFO
Christine Gallagher, NOAA
Michael Godesky, FEMA, TMAC ADFO

Victoria Hill, DHS
Paul Huang, FEMA
Lynda Pilgrim, FEMA

Registered Public Attendees

David Conrad, Water Resources Policy
Ivan DeLoatch, FGDC
Steve Fitzgerald, HCFCD
Christine Gallagher, NOAA
John Hair, NAMIC
Katie Hermann, Dewberry
Gilbert Jones, Dewberry

John Mahoney, FGDC
Tim McCormick, ATCS
Emma Schlosser, Resilience Action Partners
Velma Smith, PEW
Jeff Sparrow, Michael Baker International
Owen Thomas, Senator Mark Warner's Office
Danielle Walter, CERC

Support Staff

Angela Bidnick, Booz Allen Hamilton
Kirsten Folkedal, Booz Allen Hamilton
Laura Karnas, Booz Allen Hamilton
Jen Marcy, Atkins Global
Michelle McQueeney, J-M Global

Krista Bethune Melnar, AECOM
Kimberly Rodgers, LeapFrog Solutions
Meredith Tull, Booz Allen Hamilton
Adam Warfield, Booz Allen Hamilton

Purpose

The purpose of the meeting was to allow the Technical Mapping Advisory Council (TMAC) members to (1) present and deliberate on draft narrative and recommendations concerning the future conditions methods and considerations that will be incorporated into both the 2015 Annual Report and the Future Conditions Report; and (2) identify and coordinate next steps of the TMAC report development.

Day 1: August 4, 2015

Welcome/ Call to Order/ Roll Call

Mr. Mike Godesky, TMAC Alternate Designated Federal Officer (ADFO), welcomed members to the meeting. He then introduced Mr. Mark Crowell, Federal Emergency Management Agency (FEMA), and Ms. Kathleen Boyer, FEMA, who serve as the TMAC DFO and ADFO, respectively. Mr. Godesky provided an overview of the conference facility and proceeded with a roll call of TMAC members. Mr. Godesky reminded everyone of the *Federal Advisory Committee Act (FACA)* compliance provisions. Following his remarks, Mr. Godesky made a motion to convene the meeting, which Mr. John Dorman, TMAC Chair, seconded.

Meeting Objectives/Process Schedule

Mr. Dorman provided an overview of the agenda and discussed the meeting's objectives, including: (1) presentation and deliberation on draft narrative and recommendations concerning the future conditions methods and considerations that will be incorporated into both the 2015 Annual Report and the Future Conditions Report; and (2) identification and coordination of next steps of the TMAC report development.

Mr. Dorman discussed the schedule for report production, noting that the subcommittee is currently in the report creation phase and that the report will be distributed at the end of October 2015. He explained that the TMAC will adopt the recommendations by report section. He also noted that the TMAC will meet in person at the end of October to adopt the reports and kick off the 2016 report effort.

Previous Tasks – Status

Mr. Dorman also reviewed the status of previous action items from the June 2015 TMAC Meeting and noted that three items were still outstanding:

1. Mr. Scott Edelman, TMAC member, and Mr. Dorman will complete the task of filling out a subcommittee issue form on a representative issue for members.
2. TMAC members will create a series of definitions and important terms in order to use them consistently throughout the report.
3. TMAC members will complete the recommendation proof template for the annotated markups.

2015 Draft Recommendations

Future Conditions Report

Mr. Scott Edelman, Future Conditions Subcommittee Chair, thanked subcommittee members for their contributions to the report. He explained that the report currently has too many recommendations and recommended that the subcommittee develop findings and have five or six overarching recommendations on topics such as uncertainty, coastal, riverine, special communications risk, and phasing. Mr. Howard Kunreuther, TMAC member, recommended that the subcommittee link the findings to recommendations.

Annual Report

Ms. Leslie Durham, TMAC member and Annual Report lead, reviewed the results of a member survey, noting that nine respondents scored the 42 draft recommendations based on if they agree (one point), agree with modifications (two points), disagree (three points), and unknown (four points). Those proposed recommendations that scored 2 points or more required the greatest discussion. Ms. Durham explained that the draft recommendations were grouped into four categories: (1) standards, guidance, best practices; (2) program changes; (3) other Federal agencies; and (4) statutory. She also noted that the proposed recommendations could likely be further condensed and revised. Ms. Durham noted that

while the subcommittee has developed overarching recommendations, they have not aligned their 42 draft recommendations with the overarching recommendations as yet.

Next, TMAC members reviewed the 2015 Annual Report draft recommendations.

Draft Recommendation 40: *As products are developed consideration should be given to data management standards that allow for ready use by industry developed software and applications such as mobile phone applications, open source mapping tools;* **Draft Recommendation 15:** *FEMA should develop a web-based delivery to display, extract and distribute data from the single integrated relational database that includes automated production of all flood study components;* **Draft Recommendation 18:** *FEMA should provide public access to all data used to develop a flood risk project by way of an easy-to-use platform.*

Ms. Sally McConkey, TMAC member, noted that recommendation 40 was about how to package data for ease of use. Mr. Mark DeMulder, TMAC member, suggested that having a single and relational database may be too constraining. Mr. Edelman agreed, noting that the database does not have to be single; however, it should be a relational database. Mr. Edelman said that it is important to show proof demonstrating when something is better or more efficient. He noted that data should be available for open source mapping tools and iPhone applications. He further explained that for mobile applications, there are pre-computations already completed that create a smaller dataset for speed. Ms. Nancy Blyler, TMAC member, said that the TMAC should not prescribe a specific solution.

Mr. Dorman said that the Council should continue to press for digital, database driven data. He said that for efficient production and communication, FEMA should move away from the cartographic environment. Mr. Dorman said that the TMAC could recommend that FEMA move away from the cartographic environment to database driven display environment. Mr. Chris Jones, TMAC member, noted that it is important for people to be able to access the source data. Ms. Durham said that this recommendation may be related to the National Flood Hazard Layer (NFHL). Ms. Durham noted that recommendations could be consolidated under current access portals (e.g., NFHL, GeoPortal, etc.).

Draft Recommendation 7: *FEMA should include Mass-LOMAs (Letters of Map Amendment), specifically inadvertent inclusions and out as shown properties, as a mapping deliverable of the flood mapping process.*

Participants noted that FEMA has completed several pilot projects on the issue. Mr. Godesky said that when a study is completed and LIDAR is incorporated, a line is drawn on the map. He questioned how you adjust the line and what additional data may be needed in a mass letters of map amendment (LOMA) effort. Mr. Steve Ferryman, TMAC member, noted that the property owner has to pay money for a surveyor when there is a LOMA. Sometimes the margin of error is very small and there should be a mechanism to handle this.

Mr. Edelman said that this is related to affordability and that FEMA should be behind the rating of all of the policies. He noted that different institutions code FEMA's tables differently, leading to different rates. He explained that if there was a central repository, you could get the same answer, regardless of the agent. Mr. Edelman also cautioned against doing this on the structure level. Mr. Dorman said that there might be value in this recommendation but noted that data engineering and insurance may support this recommendation and that FEMA may make progress on mass LOMAs that might require some standards.

Draft Recommendation 6: *FEMA should re-evaluate how they prioritize funding to incorporate factors such as large number of NFIP policies, CNMS information, and repetitive loss properties, supported by locally identified priorities.*

Ms. McConkey said that FEMA should not forget places where there is development pressure and no adequate mapping. Mr. Jones said that this recommendation is related to unmapped areas and questioned if it precludes or reduces the chance that FEMA will address the unmapped area. Mr. Edelman said that the TMAC should still have a recommendation to map to the unmapped areas. In addition, he noted that the TMAC should consider land use in the recommendation. Mr. Kunreuther noted that affordability must be addressed, including who is paying and who will benefit.

Mr. Dorman said that this recommendation defines the mechanism used to prioritize. He said that it may be a subcategory for an overall recommendation that FEMA construct a five year lifecycle management plan based on different sets of data. In addition, he noted that FEMA may need to identify a method of prioritization. Ms. Durham noted that this recommendation was originally intended to be about the use of business plans as many Cooperating Technical Partners (CTP) use business plans to help prioritize study needs. Mr. Dorman said that this recommendation should be revised to read as a high level recommendation regarding FEMA creating a national maintenance planning process and a methodology for how to prioritize. Mr. Edelman said that the plan should be a rolling five-year plan and that the results should be published in a format similar to that of the Multi-Year Flood Hazard Identification Plan. Ms. McConkey also stressed the importance of partner input and Ms. Durham informed participants that the CNMS is being updated to all of partners to provide updates.

Draft Recommendation 13: *FEMA should (1) complete the effort to modernize all existing flood maps in the nation and (2) develop a strategy to identify flood hazards in unmapped areas of the nation capitalizing on the ability to create and disseminate flood hazard delineations for non-regulatory approximate zones in a database derived digital display environment*

Mr. Edelman recommended including phased 3D Elevation Program (3DEP) into this recommendation. He noted that FEMA could leverage this as detailed topography is pushed across the United States. Mr. DeMulder said that FEMA could influence the direction of the 3DEP program. Mr. Jones suggested that the TMAC recommend the development of a strategy to secure necessary information to identify flood hazards. Mr. Gale Fraser, TMAC member, will work with the section authors to further develop recommendation 13.

Draft Recommendation 8: *FEMA should conduct a systematic evaluation of its flood risk assessment products and reports.*

Mr. Edelman questioned if the TMAC could assign a timeframe for the recommendations. In addition, he questioned if the TMAC should focus on this in 2016. Mr. Jones said that it is not TMAC's responsibility to provide the evaluation criteria, rather there should be a survey to gather this information from users. Mr. Kunreuther said that this recommendation could fall under risk communication. Mr. Godesky questioned what the TMAC is asking FEMA to do and said that the Council should be clear on what it requests of FEMA. Mr. Dorman recommended that this recommendation be moved to stakeholders and users. Participants also agreed that there should be unified definitions for terms including flood hazard and flood risk.

Draft Recommendation 9: *FEMA should focus on flood hazard identification. Any flood risk assessments it produces should be planning level assessments performed at a large scale. If communities or States want more detailed flood risk assessments, they should undertake them (level of FEMA participation TBD).*

Mr. Jones said that FEMA should focus on the hazard and physical flood characteristics and should develop flood information. Another partner organization should be dealing with the individual structure. FEMA likely will not be able to create an up-to-date nationwide database of structures. Mr. Ferryman said that the Federal Government needs to better define risk so that it can understand the various choices for disaster assistance. Mr. Jones said that FEMA should be developing flood

hazard information required to identify insurance rates and that it should come out of the hazard mapping process.

Mr. Edelman said that the TMAC could recommend that FEMA do things on a scale appropriate to the data that exists. Mr. Dorman said that the TMAC should recommend that FEMA move towards a flood risk analysis at the structural level if the data is available. Mr. Fraser noted that FEMA should not be performing system maintenance but that the system should be set up so that it can accept data from the community.

Ms. McConkey noted that there is a difference between insurance rates and risk. She said that insurance rates are set through bell curves. If FEMA provides better data and incentivizes communities for detailed information, insurance rates might be better. Ms. Wendy Lathrop, TMAC member, said that FEMA should not move to structure based because of the maintenance issue. Mr. Jones proposed combining recommendations 9 and 10. He said that a system should allow individual structure assessments. FEMA should focus on getting hazards correct and working with its partners to improve risk delineation. Mr. David Mallory, TMAC member, noted that this is an opportunity to form a partnership with the community. Participants agreed that this recommendation needs further refinement.

Draft Recommendation 10: *The digital mapping platform must allow for structure level flood risk analysis based on national data sets, Risk MAP products, and locally available data.*

Mr. Ferryman said that in terms of mitigation plans, having a structure level database would help people to write the plans and meet the Federal requirements. It would also lead to an easier cost-benefit analysis. Ms. McConkey stressed the importance of understanding the cost impact prior to making a recommendation. Mr. Jones said that there should be a dialogue between those who create the maps and those who create the rates.

Draft Recommendation 11: *FEMA should modify the flood study work process to culminate in a single deliverable of an integrated relational database with flood, risk, mitigation and insurance data.*

Mr. Jones noted that migrating data into a single location is a key point. Mr. Robert Mason, TMAC member, said that it implies data is held in a single location, which is not always the case. Mr. Jones said that the study process should support the database and any owner of a structure should be able to view the database, see the flood hazard information, how much it would cost, and how much they would save by mitigating the risk, and how flood insurance premiums would change.

Mr. Dorman said that in North Carolina, mitigation projects and RPO have been geocoded. He said that with this recommendation, the TMAC may be moving towards a suite of data tables that integrate hazard, risk, mitigation, and insurance. Participants agreed that this recommendation should be revised and potentially tied with the overall database recommendations.

Draft Recommendation 15: *FEMA should develop a web-based delivery to display, extract and distribute data from the single integrated relational database that includes automated production of all flood study components.*

The TMAC members agreed to consolidate this recommendation with recommendation 11.

Draft Recommendation 16: *FEMA should measure program success by defining and evaluating program metrics at a granular level without metric limits within a geographic area.*

Mr. DeMulder said that the TMAC may want to clarify what is meant by “metric limits.” Mr. Edelman said that he could develop additional language regarding the percent of the population that has modernized maps. He noted that the metrics must be easily understood by the public. The TMAC could recommend that FEMA develop these easily understandable metrics. Mr. Edelman will assist in drafting this section. Mr. Dorman said that FEMA should develop metrics that support its goals.

This will allow them to support metrics that the TMAC can respond and comment on. Mr. Kunreuther asked if FEMA has existing metrics. Mr. Godesky noted that FEMA has action metrics and inventory metrics.

Draft Recommendation 17: *FEMA should align and integrate the Risk MAP study timeline and the Hazard Mitigation Plan update timeline.*

Ms. Durham questioned if this recommendation could be reworded so that hazard mitigation plans reference mapping and the Risk MAP process. Ms. Shirley said that this could apply more towards Risk MAP products but not necessarily regulatory products. Ms. Carrie Grassi, TMAC member, added that it would be hard to align because things would not happen on a regular cycle and it may delay the mitigation plan to wait for map updates.

Mr. Edelman suggested that the TMAC note that within six months of the release date, an addendum should be produced for a hazard mitigation plan. Participants agreed to focus on mitigation in 2016.

Draft Recommendation 18: *FEMA should provide public access to all data used to develop a flood risk project by way of an easy-to-use platform.*

Mr. Mason recommended including something about FEMA working with other agencies to provide access. Mr. Dorman said that this recommendation should be more about data. He noted that FEMA should construct and leverage other data sources to provide the most available data. Mr. Edelman noted that FEMA does not generate data but it provides the Web service.

Draft Recommendation 19: *FEMA should provide communities capabilities and incentives to upload supporting GIS data into the National Flood Hazard Layer base map.*

Mr. Edelman noted that different agencies have different purposes. He said that FEMA's purpose includes things such as the one percent boundary line and base flood elevation. Mr. Edelman said that USGS would likely be responsible for aerial maps and topography.

Mr. DeMulder said that USGS is leading a digital integration project on behalf of the mapping community regarding the national map that includes roads, topography, geographic names, among others. He said that this recommendation could refer to the existing USGS effort; however FEMA should not recreate the national map. Ms. Shirley noted that local data is not included in the national map and said that it would be beneficial to have that information uploaded. Mr. Javier Ruiz, TMAC member, said that FEMA should explore existing vehicles that allow for the distribution of data.

Mr. Ferryman said that the TMAC should advocate for a system that allows flexibility for data at the structure level and noted that it would make sense to use an existing platform. Mr. DeMulder recommended that the TMAC investigate what the United States Census Bureau is doing with regards to jurisdictions.

Mr. Dorman said that there are several databases and FEMA should not be a repository. He suggested consolidating recommendation 18 and 19 and recommending that FEMA explore and implement a database and methodology that leverages federation and Web service platform technologies.

Draft Recommendation 28: *Identify efficient and cost-effective ways to extend the utility of detailed (but expensive and time-consuming) 2D coastal storm surge and wave modeling into areas where additional modeling may be needed, or to increase confidence in model results.*

Mr. Jones noted that most of the storm surge, offshore, and near shore modeling is 2D. However, most on land modeling is 1D. Mr. Fraser noted that the way the recommendation is worded implies that FEMA is using detailed models to extend it to a different area and it is unclear as to how this

increases confidence. Mr. Jones noted that FEMA can take existing 2D models and run an event and then use a simpler, less expensive, and faster 1D model to validate it. This 1D model could be run in-between 2D storms. Participants agreed to delete the term “detailed” from the recommendation.

Draft Recommendation 33: *FEMA should develop ways to quantify, incorporate and effectively communicate uncertainty in its risk analysis and risk reduction products, as well as in its explanations of the flood insurance rating process.*

Mr. Jones reminded participants that the TMAC discussed combining recommendation 33 and 36. Ms. Grassi said that it is important to address the implications of talking about uncertainty when the public may want certainty. She explained that for people to have confidence in the maps, uncertainty has to be carefully communicated to the public. Ms. Grassi noted that the community rating system (CRS) could be used to incentivize action regarding uncertainty.

Mr. Dorman noted that there is a level of expected uncertainty; however, uncertainty should be discussed in detail in the TMAC’s 2016 report. Mr. Edelman said that if the TMAC provides enough detail in its 2015 report, it could influence the Reauthorization Bill; however, he agreed that the Council could spend more time focusing on the issue in the 2016 report.

Draft Recommendation 36: *Frame risk messages so that individuals will pay attention to the flood risk by stretching the time horizon and developing worst case scenarios. These messages can be complemented with economic incentives that lead individuals to undertake cost-effective risk reduction measures.*

Mr. Jones noted said that in structural engineering there are ways to determine a structure’s reliability. This takes into consideration the nature of the hazard and the uncertainty associated with specifications. Topic authors will continue to refine the section surrounding recommendation 36.

Draft Recommendation 39: *FEMA should formally establish a CTP program. The CTP Program should consist of a framework of progressive delegated authority that CTPs can request and attain from FEMA. The program needs to expand delegation and validate CTPs’ contributions on a regular basis.*

Mr. Dorman explained that the CTP program is not written into statute and that CTP capabilities differ greatly. Ms. Lathrop recommended rephrasing this recommendation to add clarity. Mr. Mallory said that FEMA should not codify the program. He noted that the Administrator has the authority to enter into grants with CTPs. Mr. Mallory said that the CTPs on the TMAC represent successful partnerships; however not all CTPs are successful. Ms. Grassi noted that it is important not to put pressure on CTPs to become something that they do not want to become.

Draft Recommendation 47: *FEMA should work with CTPs to establish performance metrics to measure capabilities and success of delegation authority.*

Mr. Edelman suggested reworking this recommendation to include something about expanding and contracting the metric. Ms. Lathrop noted that not every CTP may want to take a next step and questioned if a CTP takes on tasks, did they adequately meet the goal.

Mr. Fraser recommended that the TMAC simplify this recommendation to state that FEMA should work with CTPs to establish metrics. Mr. Dorman said that it is also important for FEMA to understand a CTP’s competency before delegating authority. Mr. Jones suggested that the Council revise the recommendation to state that FEMA should work with CTPs to establish metrics to measure capabilities.

Draft Recommendation 45: *Provide more incentives to current and performing CTPs to increase partner participation and quality.*

Mr. Kunreuther said that the TMAC could develop a broad recommendation about expanding the role of CTPs and this could be an element underneath that recommendation. Mr. Edelman said that the recommendation could be revised to read “better achieve FEMA’s goals for the program” instead of “increase partner participation and authority.” Participants agreed to continue modifying this recommendation and possibly combine it with recommendation 47.

Draft Recommendation 43: *Provide continuing appropriations to support expiring inventory (5 year shelf life) each year with map maintenance. In addition, the mapping of new flooding sources due to anticipated or ongoing development patterns.*

Mr. Edelman suggested that the TMAC recommend that the Administrator request funding. Ms. Lathrop said that the TMAC should say something about the Council’s strong support for Congressional appropriations to meet mapping needs rather than asking for money. Ms. Blackwell expressed concern with telling FEMA to ask for additional funding. She suggested that the TMAC phrase the recommendation allocating funds as opposed to requesting funds. Mr. Kunreuther also questioned if the TMAC should focus on this in 2016.

Draft Recommendation 44: *Develop and implement a suite of strategies to incentivize communities and non-governmental organizations / private sector stakeholders increase partnering and subsequent contributions for flood hazard risk updates and maintenance.*

Mr. Fraser commented that this recommendation should not be limited to CTPs. Participants discussed combining this with other CTP recommendations 47 and 45.

Draft Recommendation 20: *TMAC endorses the NAPA recommendations 6, 7, 8 and 9 and will use them to develop more detailed interagency and intergovernmental recommendations on data and program related activities that can be more effectively leveraged in support of flood plain mapping.*

Participants discussed if it would be helpful for the TMAC to concur with the NAPA recommendations. Ms. Blyler said that it could be included. Mr. Jones noted that the TMAC would have to preface its endorsement. Participants said that this recommendation should not be consolidated with other recommendations. Ms. Blyler will revise this recommendation.

Draft Recommendation 24: *The USGS streamgauge network is critical to developing models and estimating flood-frequencies and should be expanded.*

Mr. Edelman noted that TMAC should define the phrase “to be expanded” on the end of this recommendation. Mr. Kunreuther said that it could be tied to a broader theme of needing to improve quality with better data. Mr. Edelman also questioned where the funding was from. He explained that it takes at least 10 years before new gage data for streams is derived. He questioned if this was the best investment rather than investing in other advancements in technology. Ms. McConkey noted that the data is valuable when there is a flood. She also explained that this recommendation is directed to an outside agency, not FEMA. Mr. Dorman suggested that FEMA coordinate with other Federal agencies to identify where there are gaps in gage information and what needs to be maintained. He said that there should be a recommendation regarding funding to support data outside of study data and that it would require coordination with other partners. Mr. Edelman suggested that the TMAC also address the perspective of regulated watersheds versus unregulated watersheds and how this is weighed with regard to dams versus gages where there is no upstream regulated structure. Ms. Grassi also noted that the Future Conditions Report contains a similar recommendation and the Council should ensure there is consistency across both reports.

Draft Recommendation 12: *FEMA should transition from identifying the one-percent annual chance floodplain boundary as the source for regulatory determinations to a centric flood-frequency determination approach.*

Participants discussed moving towards structure centric or building centric flood frequency determination. Mr. Kunreuther said that that structure approach is about moving away from “in versus out.” Mr. Edelman recommended that the write up include that this is a big change on the engineering side.

Mr. Jones asked if this recommendation could be combined with recommendation 10. He expressed concern that things should be frequency based rather than structure based. Mr. Dorman suggested revising the recommendation to say that “FEMA should transition from identifying the one-percent annual chance floodplain boundary as the source of regulatory determinations to a flood frequency approach.” Participants also discussed how this recommendation may affect building codes. Mr. Jones said that this recommendation is of particular importance because it will enable building codes to change, risk assessments to be made on a structure by structure basis, and allow FEMA to change how they determine premium rates. Mr. Kunreuther said that it will put pressure on everyone to get elevation certificates and opens a door to specifying building codes. Participants agreed to modify this recommendation.

Draft Recommendation 32: *A new approach to identifying the floodplain area which must remain unobstructed to ensure flooding is not exacerbated by floodplain development is needed and studies should be initiated to assess current practice and new standards and tools explored to ensure that development in the floodplain does not result increased flooding.*

Ms. McConkey said that this recommendation is about getting to the point that floodway is a tool that was developed when there was limited technology. Mr. Kunreuther said that this recommendation could be condensed. A new approach to identifying the floodplain area should include an initiative to assess current practices and ensure that development in the floodplain does not result in an increase of flooding.

Mr. Edelman stated that he supported a floodway type of definition and that the minimum base flood elevation would be the floodway. Mr. Jones noted that current building codes may refer to floodways so this could also impact building codes. Mr. Fraser questioned if the TMAC wanted to recommend that people build to the floodway elevation and Ms. McConkey said that it could get States to adopt higher standards. Participants agreed to address this topic in 2016.

Draft Recommendation 14: *FEMA should expand the NFHL digital database to align all effective study data with revisions and amendments in one flood mapping product, allowing parcel boundaries and/or structure footprints affected by LOMRs, LOMR-Fs and LOMAs to be displayed in a unified display.*

Mr. Dorman explained that this recommendation is about how FEMA would communicate changes in procedures and guidance. Ms. Durham said that this recommendation may already be covered by FEMA’s contracting process. Participants agreed to talk with the recommendation’s author and follow up on this recommendation in the future.

Public Comment Period

Mr. Godesky announced that, per FACA, members of the public were invited to provide written comments on the issues to be considered by the TMAC. One comment was provided, displayed as received below:

1. TO: TMAC DFO
Date: July 29, 2015
From Kermit Kubitz

The projection of future flooding or inundation levels should reflect the complexity of shoreline conditions, weather, sea level, and tidal forces affecting inundation potential. See the enclosed discussion of potential shoreline inundation in the San Francisco Bay Area, reflecting high tides, baseline sea level conditions (and future baseline sea level changes) tidal changes, weather and

wind, all combining to produce higher potential inundation levels than any one factor alone.

<http://mavensnotebook.com/2015/07/28/projecting-inundation-in-the-san-francisco-bay-sea-level-and-tides/>

In addition, the failure of levees or seawalls under the stress, or higher than anticipated sea and wave levels resulting from the combination of the factors above must be considered in developing a realistic assessment of future inundation.

Finally, the potential for tsunami after earthquake on the Pacific Northwest, from Washington and Oregon to Northern California must also be considered in developing potential flooding or inundation projections for the future. There are a number of sources for recent tsunami threat assessment for the area, including the work of Professors at University of Oregon and USGS.

Mr. Godesky asked for additional public comments and none were received.

Clarification on TMAC proposals

Mr. Dorman introduced Ms. Lynda Pilgrim, FEMA, to provide clarification and information to the TMAC members, as a fulfillment of an action item from the last meeting to obtain more information from the FEMA attorneys and the Department of Homeland Security's Committee Management Office regarding information that members may release to their organizations. She explained that a subcommittee is subject to the same requirements as the parent committee. Although subcommittees are not subject to FACA, their delegated responsibilities come from the parent committee. She said that once any information is made publicly available, the information can be disseminated to anyone. TMAC members agreed that draft recommendations should not be circulated widely, as things may significantly change, and there should be version control on the reports.

Adjournment

Mr. Godesky thanked participants for the discussion and said that the meeting was to reconvene at 8:00 a.m. on August 5, 2015.

Day 2: August 5, 2015

Call to Order/ Roll Call

Mr. Godesky opened the second day of the TMAC Meeting with a facilities reminder and a TMAC member roll call. He then turned the meeting over to Mr. Dorman, who welcomed the group and asked that they keep an open mind when discussing the proposed recommendations.

2015 Draft Recommendations

Annual Report

Ms. Durham led the members in a continued discussion of the draft recommendations for the 2015 Annual Report.

Draft Recommendation 30: *Community of Users and Uses: Establish a process for ensuring the needs of key users are well understood and considered before updates to mapping and product standards or practices are made.*

Members noted that this draft recommendation was originally meant to be about conducting a survey for users, but it was recrafted to give FEMA more leeway to determine the means. Mr. Godesky informed the group that the Operating Partners Meeting has a set agenda that directs collaboration

between the Operating Partners and other groups, but that the Operating Partners are only one stakeholder group. He continued that this proposed recommendation's aims are much broader and reach a lot more people, going down to the homeowner and community level. Members emphasized how important it is to ensure that NFIP services and products are useful and readily available to all types of stakeholders, and that the services and products are well communicated.

Draft Recommendation 21: *Data Management and Leverage: FEMA should require that every flood study be accompanied by detailed metadata identifying how each stream and coastline reach was studied and what methods were used to identify the magnitude and extent of the flood hazard and to produce the map.*

Members discussed if this proposed recommendation is necessary given that there are new standards in place that already require communication to communities on which models are used for the maps and why they are used. They noted that the term "metadata" could be too specific; however, members agreed that it would be valuable for users to have the ability to digitally download this type of information for easy use and understanding of the maps by users.

Draft Recommendation 22: *Data Management and Leverage: FEMA should reference all stream and coastal studies within its Mapping Information Platform to the USGS National Hydrography Dataset (NHD).*

Members discussed whether this recommendation is too premature, as the hydrology dataset does not have all of the necessary information at this time. They noted that this proposed recommendation would help to make the studies available to other communities by linking them to the NHD, allowing others to utilize existing FEMA studies.

Draft Recommendation 25: *Flood Hazard Identification – Core Data, Models and Methodologies: Federal agencies should collect and maintain data according to Federal standards and best practices.*

Several members expressed the difficulty of enforcing a recommendation like this, and suggested that compiling all data together in one place would water down the data set. Mr. Kunreuther noted that this type of recommendation would also entail the need for a complementary budget and personnel in order to enforce it. Mr. Dorman suggested that FEMA advocate for and incentivize partners for data collection, noting that standards should be a separate recommendation and that FEMA can address the functional requirements necessary.

Draft Recommendation 27: *Flood Hazard Identification – Core Data, Models and Methodologies: FEMA should evaluate the proposed "Bulletin 17C, Federal Guidelines for Computing Flood Flow Frequencies", as soon as possible for possible adoption as a standard for floodplain mapping.*

Several members discussed if this recommendation is necessary considering the water gages that have already been sampled and the process of approval that is already in place. Ms. McConkey noted that the point of this proposed recommendation is that USGS might adopt Bulletin 17C, but that does not mean FEMA will. Therefore this recommendation directs FEMA to evaluate it for adoption as a standard.

Draft Recommendation 29: *Flood Hazard Identification - Core Data, Models and Methodologies: Review and update existing coastal event-based erosion methods for open coasts, and develop erosion methods for other coastal geomorphic settings.*

Mr. Jones informed the Council that coastal analysis will need to be done in order to achieve this recommendation. He explained that if FEMA is moving toward a risk-based analysis where they are looking at flood hazards and risks over multiple frequencies, then erosion needs to be calculated into the events being modeled.

Draft Recommendation 30: *Flood Hazard Identification: Core Data, Models, and Methodology: Review and update regularly, publically available coastal and riverine hydrologic and hydraulic models for flood hazard identification; listing acceptable models, preparing guidelines and best practices for selection of appropriate models, as well as supporting performance and dissemination of comparative analyses and parameter ranges for models for a range of geographic conditions.*

Ms. McConkey said that there need to be best practices developed to provide guidance on determining the appropriate models. Mr. Godesky added that the current acceptable model was developed prior to the plethora of models that are currently available and that more models are coming out every day. Mr. Kunreuther mentioned that there needs to be a means of addressing the uncertainty in the models and recognition of the difference in models. Ms. McConkey noted that FEMA should be firm about what the standards for models are and what is allowed because that will save time on the back end of the appeals process. She suggested that the TMAC recommend establishing a decision-making process for communities to demonstrate which model is the appropriate choice for specific circumstances. Ms. McConkey explained that this will help communities feel comfortable choosing which model to utilize.

Draft Recommendation 31: *Flood Hazard Identification: Core Data, Models and Methodologies: Ensure that coastal flood models provide the information needed for accurate risk assessments.*

Members came to the consensus that this proposed recommendation can be combined with another section.

Draft Recommendation 35: *Uncertainty: Risk assessments should be undertaken such that the following factors are considered: the likelihood of events occurring, the impacts of those events, and the uncertainties associated with the data, analyses and results.*

Mr. Kunreuther said that likelihood and impacts should be separated out, but that this recommendation can be combined with another recommendation on uncertainty.

Draft Recommendation 48: *Cooperating Technical Partners: FEMA should improve or enhance communication tools to include a national committee/forum for better communication between FEMA and CTPs.*

Mr. Dorman said that this proposed recommendation could be expanded to include FEMA Operating Partners group and additional stakeholders to ensure that all parties are involved. Ms. McConkey questioned whether this should recommend an entirely new group or if the Council should recommend that FEMA expands an existing group. She said that the idea is that there are a lot of segmented conversations happening, and the idea is to prioritize discussion to review ongoing efforts and the data available to better drive mapping decisions. Mr. Godesky noted that Mr. Paul Rooney, FEMA, sits on a geospatial coordinating body and he will follow up with him to obtain information about this organization. Participants noted that this proposed recommendation would be incorporated into the topic of Interagency Coordination that will be primarily focused on in Fiscal Year 2016.

Future Conditions Report

Mr. Edelman led the TMAC members in a discussion on the ongoing efforts surrounding the Future Conditions Report. He informed that group that the proposed recommendations have been organized into seven overarching themes regarding: (1) digital future conditions information; (2) uncertainty; (3) future conditions for coastal; (4) future conditions for riverine environment; (5) risk communications for future events; (6) timing and prioritization of studies; and (7) data. Sub-recommendations have been organized under each theme. Mr. Edelman plans to lead the group through each overarching recommendation and gather initial feedback on each.

Draft Recommendation #1 – *FEMA should provide digital Future Conditions Information: FEMA should provide information about future conditions flood hazards (likelihood) and risks (impacts), incorporating considerations for future population and development, land use, long-term erosion, and climate change. Future conditions should be defined as 50-years into the future. Communities should be encouraged to look at the expected life of the structure when making floodplain management decisions.*

Mr. Crowell said that it might be important to specifically call out sea level rise. Mr. Doug Marcy, NOAA, questioned whether the information FEMA is being asked to provide is related only to maps or more than that and asked if this proposed recommendation refers to maps or Risk MAP information.

Members discussed how far into the future this recommendation should reflect. Mr. Ferryman said that it might be beneficial to align this recommendation with existing literature, such as the National Climate Assessment, that already has a dates assigned to it. Several members voiced a concern around defining future conditions as 50 years into the future. Some suggestions to mitigate this concern included: having 50 years out from when a study is performed as a bounding timeframe, having the timeframe align with the communities' long range comprehensive land use plans, and having several choices of time depending on what is needed. Several members reminded the group that this is part of a non-regulatory product, so it is for information purposes only. Ms. Shirley noted that NOAA's expectation for the Future Conditions Report is that they will use the 2100 year standard. Members discussed whether it would make sense to have this differ from community to community as FEMA is running a national program.

Members discussed if it is appropriate for the TMAC to include a recommendation around the life of the structure. Mr. Mason suggested that this concept could be included in a proposed recommendation surrounding human risk. Mr. Kunreuther emphasized that there needs to be some mention of the length of time that structures are in existence, as it is important for risk communication and impact decisions that people make.

Members discussed what the Council is recommending regarding what FEMA is to provide for future conditions considerations. Members noted that FEMA provides information to users, but does not state how the information should be used. Other members reminded the Council that a regulatory line is something that FEMA has to have because of insurance purposes. A non-regulatory line would be useful if it evolved into a tool that communities could use to evaluate the economic consequences of their decision-making. For instance, if a community maps future conditions and they choose to stay out of the hazard area, then they will not have to build flood control basins and dams, but if they do, then they will have to put the money in to make that area reasonably safe. Therefore, future conditions information would need to be tailored to the individual community. Members discussed the extent to which maps are used for regulatory purposes and to what extent they can include information that is recommended for consideration, but not required.

Draft Recommendation #2: - *Uncertainty should be identified/quantified, communicated and taken into account for design criteria: With all future conditions products generated, FEMA should quantify and include information about the aleatory and epistemic uncertainty associated with that product and encourage design criteria that take into account the uncertainty of the calculations.*

Mr. Marcy noted that there is no current method to quantify information about uncertainty. He also said that the Council needs to be consistent with the definition of epistemic uncertainty, and suggested that they use the term "natural variability" instead. Other members concurred that layman's terms would be more appropriate in discussing uncertainty. Members agreed that this recommendation is not necessary to stand alone, and the various aspects of uncertainty can be incorporated into other recommendations to which uncertainty pertains.

Draft Recommendation #3: *Future coastal conditions should be generated: Provide a non-regulatory future flood hazard and risk data for coastal areas that includes long-term shoreline erosion, sea level rise and climate change. Major elements are:*

- *Use existing current conditions flood hazard analyses as the base condition*
- *Future coastal elevations should use linear superposition approach for delineation of future conditions for two different sea level rise scenarios (likely and conservative) and utilize historical trends.*
- *Long term erosion should be based on historical trends or best available science.*
- *If future conditions indicates a decrease in flood hazard, then the existing conditions should be mapped as future conditions.*
- *Inland waves should be calculated on the future water surface elevation.*
- *Adapt future coastal standards as the science is improved.*

Mr. Crowell provided commentary on the topic of regulatory versus non-regulatory products and suggested that if risk data is non-regulatory, the data might not have the rigorous and robust study and analysis that is utilized in regulatory products. The Council might want to have the future flood hazard and risk data for coastal areas be regulatory in the future. Mr. Marcy suggested that adding climate change is not necessary for coastal area, but more so for riverine areas. He explained that pilot studies need to be done to determine the cost and benefit versus the accuracy due to the nuances between linear, non-linear and dynamic approaches. Mr. Marcy said that the TMAC should take into account that most States have their own method of collecting erosion data and regulate according to that, so if FEMA has a national standard, states may not use it.

Members also discussed the need to determine if these recommendations pertain to regulatory or non-regulatory products, and the need for a strategy on prioritizing implementation of the recommendations. Mr. Jones noted that there are a lot of unresolved technical issues in existing studies, and future conditions should not be added to regulatory maps. He suggested that the Council should recommend establishing a baseline based on historical trends for Sea Level Rise and erosion. Communities can map beyond that baseline if they want. Members discussed whether using historical trends is appropriate, and whether scenarios for low, medium and high end scenarios is necessary. Council members suggested that a tool needs to be created for communities to understand the various scenarios. Mr. Marcy added that there are various agencies that already use scenario approaches, and the TMAC could suggest working with these agencies to develop regional scenarios.

Members also discussed the “how” component in recommendations and whether or not the Council should be very prescriptive in their proposed recommendations. Mr. Jonathan Westcott, FEMA, noted that with regard to prescriptiveness, it is better to be less prescriptive in order to allow for innovation, efficiency and flexibility.

Draft Recommendation 4: *Future riverine conditions should be generated: Provide non-regulatory future conditions flood hazard and risk data for riverine areas including the impacts of future development and land use change, erosion, and climate change impacts. Major elements are:*

- *A single, nationwide method may not be feasible at this time, though a watershed-based approach based on observed riverine trends may be appropriate.*
- *Local land use or zoning maps should be used to compute future conditions hydrology with a unit hydrograph model.*
- *Climate change impacts at a site specific watershed is not supported by current science and a factor of safety should be used to take into account this unknown. This should be based on historical trends.*
- *Future condition erosion should be incorporated when supported by science.*
- *FEMA should also develop associated guidance/ standards/ specifications and support related research.*

- *Adapt future riverine standards as the science is improved.*

Mr. Marcy asked several questions of the group for clarification regarding this recommendation, including: (1) is the risk data a product or a map; (2) would it be more appropriate to suggest a free board approach instead of specifying a factor of safety; and (3) is there a finding that supports the bullet regarding future conditions hydrology?

Ms. McConkey responded to Mr. Marcy, noting that the risk data provided is data that can be spatially displayed, not creation of printed maps. She noted that having a baseline of future conditions using land use maps could be very complicated as the maps can be coded in many different ways and it would become expensive to model using land maps. She suggested that another way to approach it would be to utilize population projections, as they extend far out and are defensible. Population projections would also consistently update with future conditions. Ms. McConkey noted that it will be important to be in consultation with communities, from whom the population projection would come, to remain credible.

Mr. Edelman added that the Council has not addressed areas of residual risk and they need to draft a recommendation in the Future Conditions Subcommittee and bring back to the Council for discussion on this topic.

Draft Recommendation 5: *Risk Communication, including the fact that flood insurance costs are a part of the communication about risk. Risk messages, including flood insurance premiums, should be developed so that individuals will pay attention to future flood risk from a regulatory and a design perspective. Messages should be tailored to different stakeholders as a function of their values and agendas.*

Mr. Kunreuther noted that flood insurance premiums are an important component to consider and that this recommendation could be tailored to risk messages including the use of risk insurance premiums, so that people pay attention to future risk. He said that this is an opportunity to bring the insurance aspect into the report.

Draft Recommendation 6: *Timing and prioritizing future studies: FEMA should perform three demonstration projects that represent the various hazards across the nation and develop guidelines that are efficient in generating the future conditions data. Based on the demonstration projects, a strategy should be developed to incorporate future conditions as counties or watersheds are updated.*

Mr. Marcy suggested that the Council avoid dictating specific studies. Several members expressed the frustration with studies that perform “patchwork” analysis and only analyze a small portion of an area and claim that it is done. However, as there is not enough funding to analyze an entire watershed, it would be premature to require future conditions to require this type of study (considering they cannot keep up with current studies). Mr. Dorman suggested that the TMAC revise the recommendation to requiring FEMA to do a demonstration test to determine the cost and availability of the data. He said that if the Council suggests this, then the TMAC will also need to develop an idea of how to proceed.

Draft Recommendation 7: *Data: The credibility of the future conditions data is based on the existing conditions data and analysis. Existing conditions analysis must be based on credible data. Future conditions data includes planning and zoning documents, planned heavy civil construction projects, planned ecosystem restoration projects, beach re-nourishment plans and any local or regional data that would impact future condition elevations.*

Members agreed that the list of sub-recommendations included in this overarching recommendation is overwhelming and needs to be narrowed down so that people can digest it. They noted that many of the proposed recommendations also need justifications to support them. Mr. Jones suggested the Council focus on finalizing what is regulatory and non-regulatory, how to incorporate local information and specifically local information on erosion, what scenarios the Council suggests should be run for

future conditions analysis, the residual risk issue, and how future conditions affect accuracy and uncertainty.

Public Comment

Mr. Godesky announced that, per FACA, members of the public were invited to provide written comments on the issues to be considered by the TMAC. No additional written comments were provided to the TMAC. Mr. Godesky invited members of the public to make any additional comments.

Mr. David Conrad, Water Resources Policy, provided the following comment:

Thank you to the TMAC for your service to America. I am continually in awe of the issues you are taking on. My name is David Conrad, I am the groupie of the committee and I have an ecological background. I appreciate the increased discussion of this morning around non-regulatory products, particularly those that would be designed to support land-use planning and regulation by states, local governments, tribes, and other federal agencies in siting decisions. Yesterday as I was reviewing the draft recommendations and listening to the discussion, I was particularly concerned that the needs for improved risk assessment, including risk assessments of likely future climate change, SLR and future land condition changes are possibly being short-changed in the recommendations and may not wind up well serving the many users and stakeholders, beyond FEMA and the rating and provision of flood insurance, who will need this information.

In my view, it has been a long-term problem that the land use and controls and mitigation elements of the NFIP have remained a step-child to the insurance purposes, and at least yesterday's discussion of the annual report left me with that impression at least for the purposes of that report, that its emphasis might continue to lack balance.

In particular, one of the substantial risks to be assessed from climate change and Sea Level Rise will be the ecological and natural and beneficial functions, risks, and impacts. I have long hoped that the new potential of an enhanced digital environment mapping could bring together hazard assessment for the built and yet to be built environment with key ecological data to assist in critical local, state, and regional land use planning.

At present, neither of these drafts seem to seriously address this ecological aspect- at least as these were talked about in TMAC meetings a few months ago. In particular, this whole area and its potential contribution especially to local governments' planning and how the CRS program seeks to incentivize these considerations in flood planning and management still deserves further consideration in geospatial data and display and potential hazards management.

I would recommend this for Annual Report 4.2 Considerations for further study and also recommend that any survey conducts of stakeholders and user groups, for at least non-regulatory map products, include study of demand for this type of coordinated data collection and display.

No additional comments were made.

Report Subcommittee Breakout – Logistics

Annual Report

Ms. Durham led the Annual Report breakout session. She explained that the topic leaders have developed one-pagers that provide insights on the various topics. Ms. Durham said that she will review the recommendations to help determine what needs to be consolidated and send a revised list out to subcommittee members,

Ms. Durham recommended that subcommittee members contact the topic author if specific comments have yet to be addressed. In addition, subcommittee members should contact Ms. Durham if they need a

graphic in their section of the Annual Report. Discussing the report format, Ms. Durham said that the recommendations will be compiled at the end of the report. Mr. Mason questioned if the report would contain findings. Ms. Durham responded that it would contain findings; however, the subcommittee will have to determine how to incorporate them into the report.

Ms. Durham noted that there are many recommendations and questioned if the TMAC can incorporate them all into the 2015 Annual Report. Ms. Lathrop recommended that information that does not contain supporting documentation can become findings and the TMAC could potentially develop it into a recommendation in 2016. Participants discussed the need for a glossary and Mr. Godesky said that he will send the TMAC a FEMA glossary. Ms. Durham concluded the session by informing members that the recommendations will be placed into the White Team folder on the SharePoint site by August 6, 2015.

Future Conditions Report

Mr. Edelman led the Future Conditions Report Subcommittee breakout session. He asked for volunteers to take the lead on each of the overarching recommendations in order to incorporate the comments from the Council and circulate the updated recommendations throughout the subcommittee in order to achieve more consensus before the next TMAC Meeting.

The following members volunteered to take lead on the overarching recommendations:

- Digital Future Conditions: Mr. Ferryman
- Uncertainty: Mr. Jones
- Coastal: Mr. Marcy and Mr. Crowell
- Riverine: Mr. Edelman and Mr. Ruiz
- Risk Communication: Mr. Kunreuther
- Timing and Prioritization: Mr. Westcott
- Data: Mr. Mallory

Mr. Edelman explained that the subcommittee is now moving toward the “white” version of the documents. Each section author will work with their subsection authors to modify the narrative as appropriate. The subcommittee plans to meet in two weeks to finalize the overarching recommendations and start on writing assignments.

New Business

Mr. Dorman opened the Council session for any motions that Council Members wished to make. Mr. Fraser made the first motion to revisit, and as appropriate re-word the adopted goals for incorporation in the 2015 reports.

The motion was seconded by Mr. Jones and discussed as a Council. Mr. Edelman stated that it is very late in the process to change the goals, and suggested that the Council revisit this motion at the TMAC’s October meeting. Mr. Jones noted that every word of the TMAC Reports will be scrutinized and it is very important to be clear. Ms. Grassi noted that if the Council wishes to revisit the goals, it needs to happen before the Reports are released. Mr. Kunreuther added that revisiting the goals is relevant as the Council has held detailed discussion of the proposed recommendations and clarified them; the goals might also need to be clarified as a result. Ms. Lathrop suggested that the Council can modify the language of the goals as the Council evolves as long as they keep the overall mission statement intact. As the Council learns new things, the goals will need to change over the next few years, but they do not need to be revised right now. David Mallory offered that the Council should “reword” the goals instead of “revisit” the goals in order to match the same intent of the original goals, but achieve a more concise version. Mr. Dorman said that the potential discussion for revisiting the goals would have to occur during the next

TMAC Public Meeting and a small subcommittee would have to be formed to address the goals between now and the September meeting.

Mr. Dorman called for a vote on the motion, which was denied by a vote of 7 in favor, 9 opposed.

A second motion was made by Ms. Lathrop to revisit the adopted goals at the October 2015 TMAC meeting, for incorporation in the 2016 reports.

The motion was seconded by Mr. Mason. Members noted that discussing the goals in October would be too late. Mr. Dorman called for a vote on the motion, which was denied by a vote of 8 in favor, 9 opposed. No other motions were made by Council members.

Next Steps

Mr. Dorman announced the dates for the upcoming TMAC public meetings, including:

- TMAC Virtual Meeting: September 9, 2015
- TMAC Virtual Meeting: September 29, 2015
- TMAC In-Person Meeting: October 20-21, 2015

Adjournment

Mr. Dorman thanked the members for their participation. Mr. Godesky, ADFO, called for a motion to adjourn the meeting, which members unanimously approved.

Action Items

- Mr. Edelman and Mr. Dorman will complete subcommittee issue form on a representative issue for members.
- TMAC members will create a series of definitions and important terms in order to use them consistently throughout the report.
- TMAC members should complete the recommendation proof template for the AMUs.
- Mr. Fraser will work with the section authors to further develop recommendation 13.
- Topic authors will continue to refine the section surrounding recommendation 36.
- Mr. Godesky will contact Mr. Rooney to obtain information about the geospatial coordinating body.
- Ms. Durham will review the 2015 Annual Report recommendations to help determine what needs to be consolidated and send a revised list out to subcommittee members.
- Annual Report subcommittee members should contact Ms. Durham if they need a graphic in their section of the Annual Report.
- Mr. Godesky will send the TMAC an existing FEMA glossary.
- The Future Conditions Subcommittee will draft a proposed recommendation regarding residual risk to bring back to the full Council for deliberation next public meeting.

Certification

I hereby certify that, to the best of my knowledge, the foregoing minutes are accurate and complete.

A handwritten signature in black ink that reads "John Dorman". The signature is written in a cursive style with a long, sweeping tail on the letter "n".

John Dorman
TMAC Chair