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BALTIMORE HARBOR ANCHORAGES AND CHANNELS, MARYLAND
DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Ladies and Gentlemen:

These comments will extend those in my letter of February 21, 2001 to Col. Fiala, which, although it predated the issuance of the Draft Supplemental Environmental Assessment (EA) on March 7, 2001, should be viewed as my initial comments (and questions) on that document.

My prior letter (Feb. 21, 2001) focused on some of the serious inadequacies and errors attending the economic justification of the specific project outlined in the Integrated Feasibility Report of March 1997 (IFR). That letter concluded those problems were of sufficient magnitude to obviate the claimed Benefit to Cost Ratio (BCR) and I requested that the process be 'paused' while those substantive issues were resolved. [Obviously, that request was denied.]

This letter provides additional comments on the economic justification of the same proposed project as described in the IFR. These supplemental comments follow from, and are based on the vessel traffic simulation model input/output (I/O) files provided by the District (March 19, 2001) in response to my Email request of February 23. That information had NOT been included in the IFR. Careful review of the I/O files has now uncovered multiple additional errors and inconsistencies. Specific findings, comments and questions are appended.

Unfortunately, it appears that the benefits calculation is very badly flawed and that the project is without sufficient economic merit. Even if one assumes the model calculates correctly, proper mathematical treatment of those model outputs leads to a BCR <1.0 (details appended). Consequently, I believe that careful, thoughtful review of the concerns raised both previously and herein will substantiate that conclusion. I am therefore communicating the same concerns to both CENAD and HQUSACE via copies of this letter. (This continues the pattern initiated with my letter of February 21.) I request that any decision to proceed with implementation of the project be deferred until ALL economic concerns can be resolved – and it is clear that the proposed activity is indeed economically justified – correctly and honestly.

Finally, via the EA, the proposed project has been modified from the recommended plan of the IFR and the Record of Decision. However, no quantitative basis whatsoever for the claimed economic benefits was provided in the EA for the revised project proposal. Therefore, I hereby formally request an extension of the filing deadline until at least two weeks after I am provided the economic justification information that I requested in my Email of March 8, 2001 to the District (Ms. Claire O'Neill, project manager). At that time I anticipate submitting a supplemental technical critique of the claimed economic benefits attending the proposed modifications to the Baltimore harbor anchorages and channel system.

I look forward to answers to my questions and timely resolution of the concerns raised.

Sincerely,

John M. Williams

John M. Williams, PhD

Copy: Congressman Wayne T. Gilchrest
Ms. Claudia L. Tornblom, Deputy ASA, Pentagon
Mr. Thomas F. Caver, Acting Deputy Director (CW), HQUSACE
Dr. James F. Johnson, Planning and Policy, HQUSACE
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Mr. Samuel P. Tosi, Planning and Policy, CENAD

ADDITIONAL COMMENTS ON ECONOMIC JUSTIFICATION OF BALTIMORE HARBOR ANCHORAGES AND CHANNELS PROJECT

Ref: *Baltimore Harbor Anchorages and Channels, Maryland and Virginia; Integrated Feasibility Report and Environmental Impact Statement*, March 1997. (IFR); *Baltimore Harbor Anchorages and Channels, Maryland and Virginia; Draft Supplemental Environmental Assessment*, March 2001. (EA)

Environmental Issues:

1. Cumulative Impacts:

The discussions of cumulative impacts of the proposed dredging and spoil disposal activities account for less than one page in both the IFR and the EA. This appears to be woefully inadequate.

Federal regulations would seem to call for a much more thorough and extensive discussion; specifically

> An Environmental Impact Statement should consider any cumulative impacts of the proposed action. [40 CFR 1508.25(c)]
>
> and
>
> "Cumulative impact " is defined as "the impact on the environment which results from the incremental impact of the action **when added to other past, present, and reasonably foreseeable future actions** regardless of what agency ... undertakes such other actions." [40 CFR 1508.7]

Consequently, a true consideration of cumulative impacts would examine the environmental effects that have occurred in the last 75-100 years as the Baltimore harbor and Patapsco River has been repeatedly dredged to provide numerous channels and anchorages with depths up to 50 ft (plus advanced maintenance plus overdepth). For example, the cumulative dredging and deepening has exacerbated the low dissolved oxygen problems in the harbor. Similarly, the cumulative dredging has released considerable nitrogen (N) into the waters of the Chesapeake Bay (about 50,000 #N/mcy dredged).

Please explain why the District provided such a limited discussion of 'cumulative impacts' and what the District intends to do to address this shortcoming.

General:

2. No substantiation of claimed economic benefits:

Unfortunately there is no substantiation in the EA (or in the IFR) of the economic benefits claimed to accrue from the revised project configuration of enlarged anchorages and channels. Consequently there is no assurance that the claimed benefits and BCR are correct.

3. Inadequate Consideration of Non-structural Alternatives:

No significant attention was devoted in the IFR (or EA) to non-structural changes in the management of Port of Baltimore harbor traffic that could have alleviated the "claimed" harbor congestion. Why was not a vessel traffic management system (VTMS), such as used in the Houston-Galveston shipping channel system, given a detailed

assessment instead of only proposing construction of larger anchorages and channels ... and having to consume valuable dredge spoils disposal capacity in the process?

4. Future maintenance of channels:

Why does this project oblige future Federal maintenance of the "spur channels" servicing the containership terminals in the Port of Baltimore? Why should any spur channels be Federally maintained? Why not include all of the other spur channels (e.g., Curtis Bay, Ferry Bar, East Channel or West Channels)? What is the rationale and justification for obliging federal taxpayers (e.g., in Iowa and Montana) to maintain the access channels to Maryland Port Administration marine terminals?

5. Limited Reevaluation Report:

Will an LRR be issued? The District advised on October 5, 2000 (letter to me) that an LRR would be issued in December 2000 ... and erroneously reported that as "March 2001" in the EA, pg. 26. What is the correct schedule?

Questions Related to Supplemental Environmental Assessment:

6. Basis for Estimating Benefits:

The benefits and benefit-to-cost ratio of Appendix A, Table 1 are based on estimates for only the years 2000 and 2010. Why is that? Is it because the simulation model was somehow so 'corrupted' that it computed negative, or other nonsensical, values for project benefits in years 2020 (and thereafter)? [See comment #12 of Feb. 21 letter and tabulations in IFR, Appendix C.] It would be fraud if the District arbitrarily discarded the irrational, computed values for years 2020 (and thereafter) and thus sought to mislead agencies, and the public, into believing that the simulation model actually predicted positive benefits for a 50-year time horizon.

Exactly how were the project benefits cited in Table 1 (appendix A) determined? No basis was provided. Were there really any additional model simulations performed to compute benefits for the revised anchorages and configuration cited in the EA? (Note: this would include a new Anchorage #3B and a 35 ft deep Anchorage #4. These possibilities were not mentioned in the IFR nor were there any simulations or benefit determinations for such alternative improvements included in the IFR and its appendices.)

7. Comparison of "No Action" Alternative (EA) with "Recommended Plan" (IFR):

The "recommended plan" of the IFR is the "no action" alternative in the EA; they are the same combination of anchorage and channel 'improvements'. Why are the values for the estimated yardage to be dredged so different in the two reports? The IFR (Table 6.4) reports 4,398,200 cy and the EA (Appendix A, Table 1) reports 3,771,279 cy.

8. Comparison of "No Action" Alternative (EA) with "Recommended Plan" (IFR):

The "recommended plan" of the IFR is the "no action" alternative in the EA; they are the same combination of anchorage and channel 'improvements'. Why are the "First Costs" of the "no action" alternative different from those of the 'recommended plan' improvements of Plan 5 (IFR: alternatives D-1, SL-1, S-3, A3-3 and A4-6 as summarized in Table 6.1)? The totals (exclusive of Mob/Demob) are $16,179,257 and $26,843,923, respectively. That is a big discrepancy.

Errors or Problems Associated with the Traffic Simulation Model:

9. Wrong Input Values to Model: ("garbage in = garbage out")

A. Wrong Channel Width: The channel widths for the Cape Henry channel employed in the simulations were wrong. More significantly, they were inconsistent between the simulations for the "existing condition" and the "recommended plan". The Cape Henry channel, which accounts for 89% of the length of the modeled system, was specified as being 500 ft wide in the "existing condition" and 1000 ft wide in the "recommended plan". (Neither value is correct.) This disparity would inappropriately reduce any vessel congestion and reduce the number and magnitude of 'vessel 'slowdowns' computed for the recommended plan – providing apparent significant economic benefits when none actually exist in the Cape Henry channel.

B. Wrong Channel Width: The wrong channel width for the Fort McHenry channel was employed in the simulations for the "recommended plan"; a value of 700 ft was input for the "recommended plan" simulation runs whereas a value of only 600 ft was used for the "existing condition" simulation of the Baltimore harbor system. [cells 4-13, of model] As in 'A', this disparity would inappropriately reduce any vessel congestion in the Fort McHenry channel and reduce the number and magnitude of 'vessel 'slowdowns' computed under the recommended plan – providing apparent significant economic benefits when none actually exist. This is another serious error leading to overestimated project benefits.

C. No Allowance for C&D Canal Route Traffic: The simulation model (SMOOTH.dat 'seasonal' input file) does not account for any traffic entering or departing the harbor system via the C&D Canal route – but forces all vessel traffic to use the Cape Henry route to and from the ocean. Because approx. 18% of the total in and out traffic at the Port of Baltimore uses the C&D route, this error overestimates the probability of a ship-ship meeting ... the primary source of increased system operating costs ... and thus further overestimates benefits for the "recommended plan".

Further, the model constructed to simulate the harbor channel system (BST.dat 'structure' input file) incorrectly has the C&D Canal connecting to the system at the head of the Fort McHenry channel (deep in the harbor). [The connection to 'cell #15' should be to 'cell #2'.] ("garbage in = garbage out")

D. Wrong Channel Depths: The depth for the C&D Canal segment (cell #17) should be 35 ft, not 50 ft. The depth for the West Channel segment (cell #26) should be 40 ft, not 50 ft. The depth of Anchorage 4 (Riverview #2) is input at 25 ft, whereas the IFR (pg. 2-14) gives the depth as 30 ft. Fortunately, these improper depth inputs to the simulation model should not make any significant difference in the computed results. However, they do evidence that the model inputs were not checked very carefully.

E. Pilotage: The unit costs for pilotage utilized as model inputs are all wrong. The tabulated values do not correctly account for the exact vessel sizes for each vessel type. For example, for a type A2 vessel, the number of pilotage units would be about 280 ... and the pilotage would be about $530/hr ... not the $141.4 of the BST.dat file. This is

yet another error evidencing the inadequate attention to detail and 'quality control' with respect to the simulation model.

F. Anchorage Location in Model System: The specification of the location for Anchorage 1 (Ft. McHenry anchorage) in the 'seasonal' input file, SMOOTH.dat, is wrong. The input indicates that the anchorage is located in 'cell #10', whereas it should be in model 'cell #12'. This is not expected to significantly change any computations ... but adds to evidence that the computational scheme is flawed.

G. Vessel Speed Limits: In the harbor system simulation, the speeds with which vessels can move through the harbor channels are restricted to 3 knots by model inputs. There is no substantiation for these critical constraints in either the IFR or EA. If the speed limits are too low, and do not represent reality, it will lead to unrealistic, apparent congestion and inaccurate system costs via longer vessel residence times and an associated elevated number of ship-ship meetings.

Please provide the justification and rationales for the imposed speed limits.

H. Vessel Slowing: According to the simulation model, when vessels meet in the harbor channel system they must slow their forward speeds. A strict mathematical relationship is imposed to cause slowing – but no specifics of any justifying substantiation is provided in either the IFR or EA. This slowing is the principal "delay" that leads to a differential in system operating costs between the 'existing' and 'project' conditions ... consequently it is a critical matter that must be appropriate, realistic and correct.

It's not clear in the IFR, but the slowing criteria appear to be based upon vessel design draft ... (not sailing draft) ...whereas simple logic would suggest that the beam widths of the opposing vessels would be the significant parameter. Also, there is no indication in the IFR discussion and appendices of how vessels resume their forward speed after meeting and passing. If these criteria are incorrect – it may explain the unreasonably low average speeds computed in the Brewerton channel (see Feb 21 letter; item #9).

Please provide the specifics and justification for the vessel speed changes used in the simulation model.

I. Length of "Cape Henry Channel": The Cape Henry channel is modeled as being 54 miles long (and either 500 or 1000 ft wide; Item A, above). In reality, it is the combination of the several Craighill channels with a total length of about 8-9 miles. Below that length the channels width is unrestricted – and so any ship-ship meetings should not be obliged to cause slowing of either of the vessels. This inaccuracy in model input unnecessarily increases apparent system operating costs ... with concomitant overestimates of project benefits.

Is this another model input error which 'inadvertently' generates apparent project benefits?

10. Anchorage Usage:

Based on the discussion in IFR (pg. 3-3) there would seem to be significant use of anchorages by vessels arriving at the Port of Baltimore. However, the simulation model output files ('existing condition'; years 2000 and 2010) show only Anchorage #1 (Ft. McHenry) receiving any usage. Significantly, this anchorage is the furthest from the

ocean and vessels would have to pass all other anchorages to reach it. The model output does not indicate any vessels using the Annapolis Anchorage (or any other anchorage other than #1) before proceeding to their berths in the 'existing condition'. If the project justification is predicated on reducing the time waited by vessels in anchorages (IFR, pg. 3-3), please explain this apparent anomaly. Where are the "savings" in the model simulation if no vessels are found to be waiting?

11. Model Output Perplexities:

A. For a given simulation (e.g., existing condition, 2000), the average model-computed operating costs for vessels which go into and out of Baltimore harbor is about $35,000 for vessels that complete the circuit. However, for vessels that do not complete the in/out circuit, the model computes average system operating costs of $300,000 to $600,000 per trip! How can vessels that have only traveled about half as far into and out of the system have computed operating costs 10X higher? Something appears to be wrong with the model!

B. For some 'unfinished trips', the simulation model computes vessel operating costs of >$1,000,000 per vessel! (and sometimes, >$4 million) How can such a value be generated ... or rationalized? It appears that the model computes unrealistic values in this category, as well. Did anyone check the 'realism' of the model outputs?

C. The model computes "System Delays" for each channel segment ... and a weighted average delay time for the entire modeled system. However the computed values do not seem to be realistic. The model computes that the weighted average delay in the system is 15-17 hours per vessel, both inbound and outbound (for each of the different simulation runs)! How can every vessel get delayed an average of 16 hours while attempting to travel a distance of approximately 60 miles? Note that, on average, each vessel entering or exiting the Port encounters only one other vessel in the system. Something appears to be very wrong with the model.

Inconsistencies Between IFR and Simulation Model Output Files (provided by CENAB; 03/19/01):

12. The 'output file' depicted in Figure 4.5 (IFR) for the 'existing condition 2000' should have been one of the files provided (03/19/01). However, there is no match in the set. Further, the output file should correspond to one of the runs in Figure 4.6 (IFR); however, it does not. Finally, the example file of Figure 4.5 does not correspond with any of the files reproduced in Appendix C (IFR). Please explain this discrepancy. If the run were valid and germane, why wasn't it included in the analyses to improve the precision of the determinations?

13. The computer output file (provided in the 03/19/01 set) for the "recommended plan, year 2000" (p5x condition rand1) appears to have the same input conditions as the IFR example (Appendix C, pg 1036-41; "Sample Output/Baltimore Harbor"). The two runs were made with the same "seeds" and run on the same day (01/28/97) ... but were run about 3 hours apart. They generated the same simulated fleet calling at the Port of Baltimore – but different vessel performance (meetings, passings, etc.). More importantly, the two other wise replicate runs generated different System Operating

Costs. The two values for the system operating costs are different by 6.3% ... $44,759,094 vs. $47,792,851. How can that occur? Why do apparently replicate runs, with the same input, and performed only hours apart, produce a $3.03 million difference in operating costs? [For comparison purposes, the difference in <u>average</u> system operating costs between the "existing condition" and the "recommended plan" is about $1.4-1.5 million.] Again... something seems to be very wrong with the model.

Calculation of BCR <u>Assuming</u> Model Outputs are Valid:

14. BCR Calculation:

First... ASSUME that the model works perfectly and that its computed outputs reflect reality. This might be true if NONE of the foregoing, or preceding, comments were correct. Then, use the available information to compute and confirm the claimed project BCR:

Even though insufficient economic information was provided in either the IFR or EA to confirm the claimed BCR values for the various project alternatives, it is possible to make an estimate of the BCR using the model output files provided by CENAB (information set of 03/19/01). Those output files for simulation runs were for the years 2000 and 2010, and for both the "existing condition" and the "recommended plan" of the IFR. Five runs had been performed for each condition.

The model-computed System Operating Costs and number of vessels for each of the 150-day simulation runs are tabulated in Table 1 (below). From those values, the average System Operating Cost/Vessel Call is calculated ... and the difference between the "existing" and "recommended" scenarios is determined. The yearly values are computed by multiplying the 'benefit/vessel' by the <u>assumed</u> number of vessel calls in each of years 2000 and 2010.

Next the "Annual Benefit" can be calculated from the individual yearly benefits ... making the same assumption as in the EA (that the yearly values for the period beyond 2010 will all be the same as that for 2010; see pg. 5 of EA). Thus the "Annual Benefit" calculates as $1,469,262.

Total annual project costs for the recommended plan .. or "no action" alternative ...are $1,841,262 (per EA; Appendix A, Table 1; Alternative 1). Hence **the BCR is 0.80!**

Table 1. Computation of Benefits; Recommended Plan

Data from Output files provided by CENAB; 3/19/01

Calculated per methodology below:

SYSTEM OPERATING COSTS

EXISTING PROJECT CONDITION

Run Number	Year 2000	Vessel Calls	Cost/ Call	Year 2010	Vessel Calls	Cost/ Call
1	47734621	1444	33057	64353057	1936	33240
2	41528546	1306	31798	64371220	1810	35564
3	44984522	1402	32086	63842704	1903	33548
4	39870853	1258	31694	62619736	1837	34088
5	46841959	1401	33435	69368823	1936	35831
Average	44192100	1362	32414	64911108	1884	34454

RECOMMENDED PLAN; P-5

Run Number	Year 2000	Vessel Calls	Cost/ Call	Year 2010	Vessel Calls	Cost/ Call
1	44759094	1459	30678	64992395	1936	33570
2	43603762	1267	34415	69306188	1971	35163
3	43882556	1402	31300	63887924	1866	34238
4	40935628	1302	31441	69920134	1962	35637
5	45598149	1401	32547	63347583	1993	31785
Average	43755838	1366	32076	66290845	1946	34079
Difference			337.9			375.7
Benefit			$1,159,109			$1,810,779

Methodology: For each run, Compute System Cost/vessel call;
Calculate average Cost/Call for each 'scenario;
Determine difference in Cost/Callwhich is "due" to Project;
Multiply by No.of vessels/year to get Benefit.
[2000: 3430 vessels; 2020: 4820 vessels]

CALCULATION OF ANNUAL BENEFITS

Case: Benefits from Output files: 03/19/01;
Annual benefits fixed at 2010 values per EA

Discount Rate= 7.38% Federal Interest Rate
0.070699 =CRF

Project Year	Gross Benefits ($)	Discounted Benefit (2000$)
2000	1159109	1159109
2001	1159109	1079496
2002	1159109	1005351
2003	1159109	936299
2004	1159109	871990
2005	1159109	812098
2006	1159109	756319
2007	1159109	704372
2008	1159109	655992
2009	1159109	610936
2010	1810779	888861
2011	1810779	827810
2012	1810779	770952
2013	1810779	718000
2014	1810779	668684
2015	1810779	622756
2016	1810779	579982
2017	1810779	540146
2018	1810779	503047
2019	1810779	468495
2020	1810779	436317
2021	1810779	406349
2022	1810779	378439
2023	1810779	352446
2024	1810779	328238
2025	1810779	305693
2026	1810779	284697
2027	1810779	265143
2028	1810779	246932
2029	1810779	229971
2030	1810779	214176
2031	1810779	199465
2032	1810779	185765
2033	1810779	173006
2034	1810779	161123
2035	1810779	150056
2036	1810779	139750
2037	1810779	130151
2038	1810779	121212
2039	1810779	112886
2040	1810779	105133
2041	1810779	97912
2042	1810779	91187
2043	1810779	84924
2044	1810779	79091
2045	1810779	73658
2046	1810779	68599
2047	1810779	63888
2048	1810779	59499
2049	1810779	55413
2050		
2051		

Present Values:

PV= 20,781,813 =SUM(K9:K58)

Avg Value: (Annual Benefit)

Avg. V= $1,469,262 =PV x CRF

NOTE: