US Army Corps of Engineers

FEASIBILITY REPORT FORMAT AND CONTENT GUIDE

Version 1.0 – October 2021

October 2021

USACE Planning Team,

I am excited to share with you this *Feasibility Report Format and Content Guide*, a resource intended to help ensure the feasibility reports we deliver are well-written, consistent, and perhaps most importantly – that they effectively tell the story about the USACE recommendation to the public, our non-federal partners, our leadership, and the Administration.

Multidisciplinary USACE teams working on all types of feasibility reports are encouraged to refer to the *Feasibility Report Format and Content Guide* early and often. While the Guide does not address every possible scenario a study team may need to address, it provides a solid starting point for report format and content regardless of mission area or scale of the recommendation.

I hope you find the *Feasibility Report Format and Content Guide* a useful resource that allows your study team to use its time more effectively and to focus on delivering a quality and compelling product. I look forward to the tips and examples your team will develop and share with the USACE Planning Community in the future.

Essayons!

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How to Use this Guide

The guide has been written to provide general recommendations for the format and content of U.S. Army Corps of Engineers (USACE) feasibility reports with an integrated Environmental Assessment (EA) or Environmental Impact Statement (EIS). The guide can be used a starting point for nearly all feasibility reports and may be solely sufficient for simple reports that require limited plan formulation. It is appropriate for use by entry-level to senior planners and also as a reference by policy reviewers and technical specialists. The format described is not mandatory, and adherence is expected to be variable; however, it was assembled by experienced report authors and policy reviewers from different levels of the USACE vertical team and is highly recommended for use. The user should understand that all feasibility reports are different due to business lines and complexity.

This guide breaks the report into three areas: main report, appendices, and working files. We have provided a basic report format and notes regarding what content should be included in the main report and appendices. For the working files, the main report can provide district contact information for requests of background data, detailed engineering drawings, and the like.

Who is Your Audience?

The most important thing to understand in writing a feasibility report is the audience, which includes the Policy and Legal Compliance Review Team, the non-federal sponsor, the Assistant Secretary of the Army (Civil Works) (ASA(CW)), and the Office of Management and Budget. But, most importantly, the public is also the audience. Understanding that many studies are extremely technical and complex, we should make every effort to make our document concise, logical, and understandable. A good main report should not require the reader to have expertise in a certain discipline. If a reviewer can't understand what you've written, then the public will certainly not be able to do it.

Telling the Story

As planners, we've all heard we need to "tell the story" in our reports. This doesn't just apply to the plan formulation portion of the document; the entire report needs to flow and proceed through a logical, step-by-step process to tell the reader how and why a decision was made. That said, the story is not a logbook of every action taken by the Project Delivery Team (PDT). It does not discuss every dead-end path that the team went down unless those paths are absolutely necessary to explain why an alternative was not pursued for National Environmental Policy Act (NEPA) reasons or other purposes. Plan formulation can many times be an iterative, complex process, but report writing requires us to narrow the focus down to those parts that are necessary to explain how a plan was selected.

For most reports, there is a tremendous amount of background data and other information that is used to screen measures and display and evaluate alternatives. While we want to document how we made a decision for a proposed project, a lot of this information does not need to be displayed in the main report or even an appendix. Most often, this information can be kept on file at the district office and produced upon request. Our reports are not a catalog of everything spoken or written about the study; the feasibility report is a document that supports the Chief of Engineers Report and allows the Chief to make an informed decision on whether to support a project recommended by the study.

Language and Writing Style

There is a big difference in language and writing style in a USACE feasibility report. One of the biggest errors in reports is the use of emotive phrases to explain decisions. Often, you'll read that "the PDT *decided* to pursue a certain path" or "the sponsor *thought* a measure was too expensive." These types of phrases don't convey what the actual reason for the decision was and are not defensible if someone were to question the conclusions. We should avoid emotive phrases as a rule and always ensure that all our conclusions are substantiated. For example, it's not enough in a report to say that a PDT *concluded* that an alternative best met the objectives. We need to explain "why" that alternative best met the objectives.

Writing style is typically defined by the author of a certain section. In general, reviewers and supervisors should not correct or "word smith" your products for writing style; the focus should be on ensuring that we have produced and documented logical, fact-based decisions throughout the report. However, it is beneficial for the Project Manager or Planning Lead to review a report and ensure that the document flows in regard to readability. Not everyone on a PDT is an accomplished writer; we have many excellent engineers and scientists that can provide data and background information for our studies. It is up to the person that controls the document to ensure it reads as one report, rather than several reports that were pasted together.

Number of Pages

Excessive information wastes agency and feasibility study resources though unnecessary writing and reviews and can confuse the audience to the point that the report is not readable. In this guide, we have provided a suggested number of pages for each section for a goal of a 100-page main report. That said, we want to emphasize that the number of overall pages is a goal and not a requirement. There are instances where your report may be less than or exceed the suggested number.

A good rule is that anything you write in the report should be used to inform the decision being made. The Project Manager and/or Planning Lead as well as the District Quality Control Team should ensure that the report is concise and does not contain extraneous information.

The easier it is for a reviewer to read a document and understand how a decision was made, the less likely policy review comments are made because the reviewer could not find or understand the logic for decisions. Better attention to the format and content of the report will create a concise document that will require minimal revision.

Although the 100-page main report is a goal, the most recent Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Rule does have specific page requirements for our environmental documents. The CEQ rule requires Environmental Assessments (EAs) to not be over 75 pages and Environmental Impact Statements (EISs) that do not have an unusual scope or complexity to not be over 150 pages. An EIS with an unusual scope and high level of complexity can go up to 300 pages. For the purposes of NEPA, note that not all of the integrated Feasibility Report/NEPA document pages are counted. Refer to Exhibit 1 of EP 1105-2-62, Planning Studies, Reports and Programs (formerly Appendix G of the Planning Guidance Notebook) to determine which sections are counted. Exceedances of these NEPA Rule page limitations require ASA(CW) approval.

The Feasibility Report

Cover Page (not to exceed 1 page)
Only required when report includes an Environmental Impact Statement

When a feasibility report includes an Environmental Impact Statement (EIS), it must include a cover page that incorporates an abstract of the report.

This cover page should not exceed one page and must include the following, at a minimum:

- *The name of the lead agency and any cooperating agencies.*
- *Agency contact information.*
- *The title of the proposed action and its location.*
- *A paragraph abstract of the EIS.*
- *End date of the review period.*
- *A cost estimate for NEPA document (EIS) preparation.*

The regulations at 40 CFR 1502.11 provide the specific content requirements of the abstract. If the integrated feasibility report does not include an EIS, you do not need the Cover Page or abstract. (Reference 40 CFR 1502.11)

Executive Summary (3-5 pages)

The Executive Summary is meant to give the reader a quick snapshot of the study details and conclusions in the main report. The Executive Summary may be the only part of the report that a senior leader or congressional staffer has time to read, so think about what the audience must know if they will not have the opportunity to read your entire report. The Executive Summary is different than the Report Summary that is required by ER 1105-2-100, Appendix H, Exhibit H-11, and should be much shorter as it does not include a cost summary or cost/benefit table. The Executive Summary should be a very high-level, concise description of the study that focuses on only the most significant information.

There are nine common areas that should be included in the Executive Summary.

1. ***Introduction*** *– Briefly discuss the basic project background and provide a succinct description of the report. Include a map of the study/project area. Indicate the non-federal sponsor.*
2. ***Purpose and Need*** *– Provide a brief discussion of why the project is needed and what it will do. The need for the study should include a concise description of the future without project condition to inform the reader of what will occur without the project in place. We should not list out the problems, opportunities, objectives, and constraints. These are already in the main report.*
3. ***Plan Formulation*** *– This section should provide general detail on the planning framework, the focused array of alternatives, and a summary of the approach used to evaluate and compare plans. An exhaustive description of the entire 6-step process that was followed is not necessary. We do not need to discuss how we formulated or screened measures in this section. Detailed maps/drawings of each alternative do not need to be included.*
4. ***Recommended Plan*** *– Describe the recommended plan's features/components, benefits, impacts/adverse effects, cost estimate, and cost-sharing/apportionment. This section should be on par with what is included in a Chief's Report (examples of Chief's Reports are available on the Planning Community Toolbox webpage). Do not include cost tables. You should include the Benefit-Cost Ratio and note any residual risk if applicable. Ecosystem Restoration studies should have a brief qualitative discussion of the project benefits. An example Executive Summary recommended plan description from a coastal storm risk management (CSRM) study has been included in Annex 1 of this guide.*
5. ***Significant Resources/Environmental Considerations*** *– Provide a concise description of significant resources in the area and any significant adverse effects that may occur. Additionally, this section should provide the results of any Endangered Species Act Section 7 consultation and note if there are any National Historic Preservation Act Section 106 agreements. Note any coordination or consultation that has been deferred to the Pre-Construction Engineering and Design phase.*
6. ***Plan Implementation*** *- If there is an implementation plan, briefly describe it here. How long will construction last? When will the project begin operation? Is there special construction sequencing? Are there any major risks moving forward that could impede or derail approval or construction? Does the non-federal sponsor support the project?*
7. ***Views of the Public, Agencies, Stakeholders, and Tribes*** *– This should typically be no more than a single paragraph that summarizes main points, similar to what is included in the Report Summary. Do not copy and paste all the comments from the public review section of the report.*
8. ***Reviews*** *– Briefly note which technical reviews, Independent External Peer Review (IEPR) if applicable, legal and policy reviews, and other external reviews, such as by academia, have been performed on the report and when they were closed. Do not summarize comments in the Executive Summary.*

9. ***Unresolved Issues/Areas of Controversy*** *– Most issues are resolved for a final report and this section can typically be deleted. However, if issues or controversy persist, describe it briefly and indicate the risk that will be carried forward and how it will be managed, if not mitigated.*

Section 1 Introduction (10 pages)

1.1 Introduction – The introduction should be one to two paragraphs that gives the reader the initial details of the feasibility study that is being conducted. It should include who is conducting the study, which USACE district and the non-federal sponsor, and why the study is being conducted.

1.2 USACE Planning Process – Describe the structure of our report and how we plan studies to the reader. Here, you should include a paragraph that explains the 6-step process and indicate to the reader that your document will mirror that process, beginning with defining the problems and opportunities and culminating in the selection and description of a Recommended Plan. This is essentially a roadmap that the reader will follow through the report. It should also note whether the report will include an integrated EA or EIS and how National Environmental Policy Act (NEPA) processes are interwoven into the integrated report to accomplish respective requirements. This section should be no more than two paragraphs in total. We do not need to go into detail here about how we formulated or screened measures in this section, or list arrays of alternatives. A description of the general themes of the planning process, such as a focus on expanding stream reaches for migratory fish and stabilization of spawning habitat, are fine in this section as help to focus the reader on the goals of the study. (Reference ER 1105-2-100, Chapter 2, Section 2-3.a.-f.)

1.3 Study Authority – Include the full text of the resolution or other authority. (Reference ER 1105-2-100, Exhibit G-7). State whether the report is an interim or final response to the study authority. (Reference ER 1105-2-100, Exhibit G-7)

1.4 Study Area (Planning Area) – The study area should be adequately described to ensure the reader can identify the geographic siting and boundary and also be informed of major geographic features, resources, and critical infrastructure. A good map is imperative for the study area section. Study area maps usually have an embedded map showing the general location within a state(s) and then a more detailed map with the boundary of the study area clearly delineated, not just circled. A good rule to go by is if you mention a river, hospital, roadway, or other feature anywhere in the Introduction (Section 1), it should be labeled and identified on the map – that will allow the reader to refer back to the study area map as they examine the purpose and need or the problems and opportunities. Many times, different versions of the same map will be used throughout the report for consistency, whether to display critical infrastructure or to depict the features of different alternatives.

1.5 Background and History – Discuss the background as it relates to the current study. This section will inform the reader of relevant prior reports, studies, and projects. Have conditions changed in the area that have led to the need for a study? Has there been recent loss of life from storm events? Only include relevant reports and studies and describe what is important. Note, a list of every project and study in the area may not be the most beneficial. This information will set the stage for the problems and opportunities. (Reference ER 1105-2-100, Chapter 2, Section 2-4.h.)

1.6 Purpose and Need – One or two paragraphs that briefly specify the underlying purpose and need for the study. (Reference 40 CFR 1502.13)

1.7 Problems and Opportunities – List out the problem statement(s) and then, as necessary for support, briefly develop and elaborate on the nature, cause, location, and significance of the problem(s) in

the report text. Conduct a similar process for the opportunities. (Reference ER 1105-2-100, Chapter 2, Section 2-3.a.(1)-(2))

1.8 Objectives and Constraints – The objectives of the study should be listed and then clearly indicate the effect, subject, location, timing, and duration for each objective. The objectives convey the intended purpose of the study. You will use the objectives to compare each alternative and select a plan based partially on its effectiveness in meeting the objectives. Thus, objectives must be measurable. Each objective should have a corresponding metric which will be used for formulation, evaluation, and comparison of alternatives. If you're not using an objective to distinguish the merit of an alternative, then you probably don't need it. For constraints, there are typically very few for a study. You should list out the study-specific constraints, making sure to distinguish between a constraint and a "consideration." There is no need to list out universal constraints, as these are included in nearly every planning study. (Reference ER 1105-2-100, Chapter 2, Section 2-3.a.(4)-(5))

1.9 Study Scope – The scope will guide what the study "will do" and what the study "will not do." For instance, a study may examine the deepening of a federal navigation channel, but it may not include an analysis of widening or additional anchorages. Defining the scope of the project is extremely critical, as improper scope is a leading cause of policy exceptions for additional study time and cost. The scope will reflect the objectives and constraints and will guide the level of detail for each discipline in the study.

Section 2 Existing and Future Without Project Conditions (20 pages)

This chapter provides both the existing conditions (a baseline), as well as a forecast of the "Future Without Project (FWOP)" conditions, which together provide the basis for plan formulation. The existing conditions provide a description of the human environment, which is subdivided into the natural, physical, economic, and built environments.

Under NEPA regulations, the human environment is also considered the "affected environment," and therefore this section avoids duplication and reduces page size in an integrated document. The integrated report should make note that the Existing Conditions section also represented the Affected Environment for NEPA purposes. The FWOP condition is typically the same as the No Action Alternative for the NEPA analysis, although they could be different in rare circumstances.

The specific subsections in the affected environment/FWOP conditions (and later the environmental effects and consequences) section(s) of the NEPA document will depend on the specific resources affected by the project. Each parameter or attribute in the affected environment/FWOP conditions, such as forested wetlands or salinity, should have a corresponding part in Chapter 4.0, Environmental Effects and Consequences chapter and vice versa.

NEPA regulations are very clear about the need to produce concise, focused documents that are analytic, not encyclopedic. With respect to the affected environment the regulations state: "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The description shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Agencies shall avoid useless bulk in statements and shall concentrate effort and attention on important issues. Verbose descriptions of the affected environment are themselves no measure of the adequacy of an environmental impact statement." This direction also holds true for writing an EA.

NEPA regulations direct writers to focus on information relevant to the decision and eliminate background information that does not affect the project decision. For instance, information on climate, geology, and soils is often provided in far more detail than is needed and rarely has a bearing on the decision. Sometimes, these sections are not needed at all. It is not necessary to include extraneous information as a hedge against review comments or legal action. The need for brevity, however, must always be balanced by the requirement to rigorously explore and objectively evaluate all reasonable alternatives.

Environmental documents should include clear, concise information in the main report, written in a style that is accessible to a high school educated audience. Include appendices with a higher level of more detailed technical information generated for the study and web links to background information that is tangentially related or supplemental to project evaluation. Detailed species descriptions and similar information that is not necessary to evaluate and understand project effects (i.e., not analytic) is usually available on web sites for which a link can be provided and incorporated by reference.

2.1 Period of Analysis - Define the period of analysis. Indicate if there are special circumstances that would shorten or extend the period from 50 years. (Reference ER 1105-2-100, Chapter 2, Section 2-4.j)

For sections 2.2 – 2.6, each resource, subject, or attribute should be first described for the Existing Conditions (NEPA: Affected Environment) and then the FWOP conditions (NEPA: No Action Alternative), if applicable.

2.2 General Setting - The General Setting is a very brief, general description of the study area that includes location information and any other study specific features. If the general setting is not expected to change under the Future Without Project condition, the resource descriptions below may apply to both existing and Future Without Project conditions (the No Action Alternative discussed in Chapter 4) and the document should make note. This holds true for the natural, physical, built, and economic environment as well.

2.3 Natural Environment - The natural environment section should include descriptions of wetlands, endangered species, vegetation, and other relevant attributes. Social environment attributes can be included under this heading or can be broken out into another subsection if too numerous.

2.4 Physical Environment - The physical environment should include environmental or human-related factors and the role that these factors contribute to the study area. Possible subjects include geology, wind, waves, currents, sea level change (SLC), tides, storm surge, water quality, Hazardous, Toxic, and Radioactive Wastes (HTRW), air quality, cultural resources, and other data specific to the mission area. *Note: If SLC will be discussed in a different section, make a note of that under this heading.*

2.5 Built Environment - The built environment describes existing and/or planned federal and local projects. In addition, Operations and Maintenance of projects may need to be described.

2.6 Economic Environment - The economic environment is a discussion of the existing economic conditions as wells as assumptions used to generate the FWOP conditions. Subjects may include economic models (if applicable), environmental justice, and economic trends.

Section 3 Plan Formulation and Evaluation (15 pages)

The plan formulation section of the Feasibility Report is always the most variable regarding format and content. The plan formulation section will mirror the NEPA alternatives analysis. This guide lays out a basic framework for a plan formulation section, but it is most likely that the final document will have slight to substantial differences that reflect the specific study planning strategy and the iterative process that was followed to arrive at a recommended plan.

The most important factor in writing a plan formulation section is ensuring the reader understands how USACE developed, evaluated, and selected a plan. As mentioned earlier, the report does not need to include everything that the PDT considered, only what is necessary to tell the story.

There are numerous approaches your study may have taken for plan formulation and evaluation. For example, a very simple planning study may have one set of alternatives that is then evaluated and compared to select a plan. In that instance, there is only one array of alternatives and no preliminary screening is conducted. Additional complexity in studies may lead to an initial array of alternatives that is then screened to a focused array before evaluation and comparison. For even more complex studies, such as those in the central Everglades, the building and screening of alternatives may consist of numerous steps that require multiple phases of evaluation. There really is no specific "initial array," just a focused array that is built through an intricate process of numerous iterations that include ecological performance rankings, operational scenarios, and regional system model runs.

There are many paths to a recommended plan. This part of the guide does not attempt to explain each possible course of action, as that will be determined by the PDT; rather, this guide is focused on ensuring that the quality of the plan formulation section is sufficient and also that all necessary analyses and exercises are included and documented.

In developing a plan formulation section there are certain qualities or characteristics that all well written reports will display:

- ***Structured and Sequential*** *– The report must follow a planning strategy and be structured in a way that is easy to follow. Each step that is described in the plan formulation process must be connected to the next one.*
- ***Transparent and Understandable*** *– The report should be written clearly and in a manner that would allow a high school graduate to comprehend the planning process and technical aspects of the study; screening techniques, trade-off analyses, and decisions should be clearly and concisely described. A reader who is not familiar with the project should be able to "connect the dots" from problem definition to recommended solution.*
- ***Objective and Logical****– The plan formulation must clearly indicate that an impartial and unbiased decision is being made that is based on fact and supported by sound reason; the report will clearly describe the criteria used to make decisions and the results of the evaluation. The criteria should be based on the documented problems, opportunities, objectives, and constraints.*
- ***Policy Compliant and Documented*** *– The report must include all the requirements for plan evaluation and comparison from USACE policy as well as applicable laws and regulations. The report should only include additional information necessary to support the decision being made.*

3.1 Planning Framework – The beginning and most important part of the plan formulation and evaluation section is the planning framework, as it serves as a guide for the reader to follow and essentially an executive summary of the plan formulation process. This section will build on Section 1.2, Planning Process, that lays the groundwork. The planning framework should provide a simple road map that outlines and explains your logic and the reasoning used to build and select a plan. A simple flow chart or graphic that depicts the study-specific process will also help guide the reader and is strongly encouraged. The "Plan Formulation Rationale" section, occasionally carried over from previous feasibility reports, should be eliminated and replaced with the Planning Framework section.

3.2 Assumptions – This section, if necessary, should briefly list or describe the assumptions that were used in the planning process. Use this section to inform them about some of the decisions that were made to establish the conditions for plan formulation. The study risk register should provide most of the information you need for this section.

3.3 Management Measures – The first task in this section is to briefly define what a management measure is and how measures are used to build alternatives. Next, the report should elaborate on the approach that was used to formulate measures and then list and provide a brief description of each one. If the measures are too numerous, use common sense in deciding what is necessary in the main report versus an appendix. Also, you may want to provide a map that shows the location of a certain measure(s). Management measures will include those developed from the scoping process and public involvement.

Next, the report should describe how the measures were evaluated and screened. Here, it is imperative to first list and describe the evaluation criteria used to screen measures to be carried forward. The evaluation criteria can be any combination of the project objectives and/or constraints, Principles and Guidelines for Water and Land Related Resources Implementation Studies (P&G) Criteria, or other factors produced by the PDT. It is extremely important to indicate why these criteria were selected for use. They should not just be random but should have been specifically selected to test the merits of each measure.

Subsequently, you will describe the actual screening process that was conducted. If the screening included preliminary analyses, such as rough order of magnitude costs, environmental performance, or a siting analysis, that should also be described. The screening process and decision to either eliminate or retain measures must be supported by rational and logical conclusions. A simplified graphic or table is extremely helpful to summarize the process that was followed and to also display which measures were eliminated or retained and why. Additional information supporting the screening graphic or table should be included in a plan formulation appendix.

3.4 Arrays of Alternatives – The report should first briefly describe the process and formulation strategies that were used to assemble or combine measures into alternative plans. For example, the formulation strategies you used to combine measures may be focused on linking system dependencies for ecosystem restoration, non-structural versus structural plans for a coastal study, or different dredging depths and anchorages for a deep draft navigation study. This array of alternatives should be listed in the main report with a brief description of each plan.

Alternatives suggested by the public, including cooperating and resource agencies, need to be included in the array. Note the entity that made the suggested alternative(s). Graphics may be included, but we should only include information in the main report necessary for the reader to understand the main features of

each of the alternatives and especially the differences that affect cost and performance. Again, refer the reader to additional information in an appendix if necessary.

Frequently, the initial array of alternatives is screened down to a more manageable number of alternatives into a "focused" or "final" array. In this case, it is imperative to document the screening process that was conducted. For example, the PDT may have examined different aspects of each alternative (e.g., environmental performance, operational costs, or cost effectiveness) to eliminate plans that were clearly inefficient or those with high environmental impacts. Similar to the evaluation of the measures in the section above, the reader must fully understand how and why certain alternatives were screened out and also why other alternatives were carried forward. If alternatives were combined or features removed or added at any point during the process, those steps should also be described and documented.

Initial plans do not need to be described in great detail. Detail increases as you describe the focused array, as this is the set of alternatives that will be rigorously evaluated and compared to select a recommended plan. Plan descriptions for the focused array should still be as concise as possible and must emphasize the differences between similar alternatives. Typically, you will want to depict each alternative either on single or multiple drawings, whichever most effectively and efficiently displays the plans. A half page written description of each plan is usually adequate unless it includes numerous components, or it is one that covers a large, geographical area. Never include fold-out drawings or maps in a report; only 8.5 x 11-inch paper should be used.

Note: The plan formulation section should be written as the study proceeds in order to properly document each step and preserve details. One mistake that is often made in documenting the plan formulation process that occurred during a study is including references to study meetings or milestones, recording the process exactly as it occurred, documenting what happened at in-progress reviews (IPRs) or milestones. This information is unnecessary to tell the story; in fact, it can be extremely confusing for someone to see references to an "Agency Decision Milestone" or "Senior Leaders Briefing" when they are unfamiliar with these events.

3.5 Plan Evaluation - After a focused array has been identified and described, each alternative plan is evaluated by projecting and comparing the with project and without project conditions. The projection of these conditions typically includes hydraulic modeling, habitat assessments, or other analyses. This section will briefly describe how those actions were performed. Calculation of alternative costs should also be described, with special attention paid to any variables that should be noted, such as high contingencies. The bulleted sections below are required by policy and must be included in every feasibility report or general reevaluation report (GRR). The best method to tell the planning story will guide exactly how these items are displayed in your report. (Reference ER 1105-2-100, Section 2-3.d.(2))

- **Federal Objective** – This section will include a display of costs and benefits for National Economic Development (NED) or National Ecosystem Restoration (NER) plan evaluation.
- **Contribution to Objectives and Avoidance of Constraints –** This exercise is similar to documenting "effectiveness" in the P&G criteria (see next bullet) and may be somewhat repetitive. Ensure that you adequately describe whether or not the alternatives meet the objectives and how they meet the objectives. In this subsection, rank the alternatives in regard to objective achievement.
- **P&G Criteria** – Effectiveness, Efficiency, Acceptance, and Completeness. (Reference ER 1105-2-100, Chapter 2, Section 2-3.c.(2))

- **System of Accounts** –Display the NED, environmental quality (EQ), regional economic development (RED), and other social effects (OSE) accounts. Note: The EQ account displays and integrates information on the effects of alternative plans on significant resources and attributes of the NEPA human environment, as defined in 40 CFR 1507.14, that is essential to a reasoned choice among alternative plans. There is generally some confusion regarding what information should be contained in the EQ Account versus information required in the report under NEPA regulations (40 CFR Parts 1500-1508). The EQ account should rely on and make use of, rather than duplicate, analyses and documentation for the evaluation of environmental consequences. Simply put, the analysis of significant resources and attributes contained in Section 4 of this Guide is concisely summarized in the EQ account. Refer the reader to Section 4 as necessary. (Reference ER 1105-2-100, Chapter 2, Section 2-3.d.(3).)
- **Risk and Uncertainty** – Discuss the different degrees of risk and uncertainty associated with each alternative. This will typically only contain information from the study's risk register that was considered "high risk." If the risk and uncertainty did not affect the selection of the recommended plan, this section should be kept to a minimum. (Reference ER 1105-2-100, Chapter 2, Section 2-4.g.)
- **Significance of Outputs** (only for ecosystem restoration) – Here you should discuss significance of ecosystem outputs for aquatic ecosystem restoration (AER) projects. The significance of expected ecosystem restoration outputs is used in conjunction with information from cost effectiveness and incremental cost analyses to help determine whether an alternative should be recommended. (Reference ER 1105-2-100, Chapter 2, Section 2-4.m.(1-2); ER 1105-2-100, Appendix E, E-37)

There may be additional, project-specific analyses, such as those required by programmatic regulations in the Comprehensive Everglades Restoration Plan program. Some analyses may only apply to certain business lines, such as a life safety analysis for a flood risk management project; other analyses may only be conducted depending on the project location, such as an evaluation of sea level change scenarios for a CSRM project. If any analyses will be used to compare alternatives, then they should be included in the Plan Evaluation subsection. If the analyses are only focused on the recommended plan after it has been selected, then they should only be included in Section 6 – "The Recommended Plan."

Section 4 Environmental Effects and Consequences (20 pages)

4.1 Affected Environment (40 CFR 1502.15) and Environmental Consequences (40 CFR 1502.16) - The NEPA regulations in 40 CFR 1502.16 describe the types of impacts and information that should be included in integrated feasibility reports / environmental documents (e.g., incomplete or unavailable information, unavoidable adverse impacts, irreversible and irretrievable commitments of resources, energy requirements, and conservation potential). It's not necessary to address these topics as separate sections of the report; they should be considered in evaluating project effects in the environmental consequences section and carried through the plan formulation and comparison sections.

The environmental consequences should also describe any reports, modeling, or surveys that are pertinent to the resource category. For example, the U.S. Fish and Wildlife Service (FWS) Biological Assessment (BA) and/or Biological Opinion (BO) should be the supporting documentation for any threatened or endangered species discussion. USACE effects determination and the results of consultation with the State Historic Preservation Officer, Tribes, consulting parties, the public, and any resolution for adverse effects, if identified, should be discussed here in the cultural resources subsection. Any water quality modeling or sampling should be discussed when describing impacts to water quality. A wetland delineation and Section 404(b)(1) analysis should support the Clean Water Act Sections 401 and 404 discussions. The Hazardous, Toxic, and Radioactive Waste discussion should be supported by a Phase I Environmental Baseline Survey.

All habitat assessments, population surveys, and other supporting materials not required in the report by regulation should all be included in the working files at the district office.

4.2 Mitigation, Monitoring, and Adaptive Management – Summarize the mitigation requirements, including compensatory mitigation and modifications made to project features to avoid and minimize effects, with reference to the laws and regulations driving the requirement. Monitoring and adaptive management measures should briefly be discussed in this section. (Reference 40 CFR 1508.1(s))

The mitigation requirements must also have been described in the preceding or following sections of the report (plan formulation and evaluation, recommended plan, and environmental consequences).

If a mitigation plan is developed, then it should be referenced here, and then be physically located within the environmental appendix. If a Section 106 agreement is developed, its stipulations should be summarized, and the agreement should be included as an appendix. Any monitoring and adaptive management plan should be referenced in this section and placed in an appendix.

Section 5 Plan Comparison and Selection (7 pages)

The Plan Comparison and Selection section must demonstrate to the reader that you have compared all relevant attributes and effects of the alternatives that are needed to make a decision. Section 5.1, Plan Comparison, should utilize information from both Plan Evaluation (Section 3.5) and Environmental Effects and Consequences (Section 4). The Recommended Plan must be shown to be preferable to the No Action Alternative as well as the other alternatives in your final or focused array. It is not enough just to rank the plans in Section 5.1, why a specific plan was selected must be documented in Section 5.3. The reader should be able to fully understand why USACE is recommending a certain plan for authorization.

5.1 Plan Comparison – The plan comparison section will contrast and judge the alternatives based on performance. A sample table that can be used for plan comparison is presented on pages 161-163 of the Planning Manual (IWR Report 96-R-21). Although the display table is an excellent tool, it is sometimes inadequate for fully comparing plans, especially if the most cost-effective plan does not perform best in regard to other factors. For instance, a flood risk management (FRM) alternative may produce the highest net NED benefits, but it may cause induced flooding and significant environmental impacts.

ER 1105-2-100 requires that the output of the comparison step be a ranking of plans. The most difficult part of this process is weighing non-commensurate factors and impacts, and the PDT must decide which factors are more important than others and document the rationale. In the example cited above, the FRM alternative that induces flooding and causes environmental impacts may also reduce the most risk to critical infrastructure, such as hospitals and retirement homes. There may be other factors to consider, such as increased robustness, resiliency, or redundancy.

Ecosystem restoration study alternatives are also sometimes difficult to compare. For example, a best buy plan may best meet the majority of the project objectives, but a cost-effective plan may restore an area of institutional significance. In that instance, the PDT may need to make the case that the best buy plan should not be rated as highly as the other plan.

Risk and uncertainty can also be a major factor in comparing plans. For example, there may be a best buy plan that produces substantial NER benefits but rates extremely high in risk and uncertainty. Conversely, there may be a cost-effective plan that produces average NER benefits, but rates very low in risk and uncertainty. In that case, the PDT will weigh all of the relevant factors and make the case for whether the additional risk and uncertainty is worth the additional benefits.

There will almost certainly be tradeoffs in plan comparison, and these must be identified and explained. Some of this step may seem like a repetition of the plan evaluation step; however, the plan comparison step must result in conclusions about the performance of each alternative compared to one another. These conclusions must be stated in the text; it is not enough to leave it to the reader to make those determinations on their own.

The bottom line is that there is no strictly defined format for plan comparison; do whatever is necessary to tell the story of why the PDT ranked the alternatives in a certain order.

5.2 Identification of the NED or NER Plan (1/2 page) – You must indicate which plan is the NED plan, NER plan, or a combination of both. Identification of the NED plan is often simple, as it is typically

the plan with the highest net benefits. Identification of the NER plan is usually much more complex and will often require a greater amount of text to explain the rationale for why it was chosen.

5.3 Plan Selection - After the plans have been compared using the P&G criteria, four accounts, environmental consequences, and other relevant criteria in Section 5.1, and the NED, NER, or combined plan has been identified, the report must indicate which plan was selected and why. If there is a Locally Preferred Plan (LPP), or if a plan other than the NED was selected, identify it here. (Reference ER 1105-2-100, Chapter, 2, Section 2-3.f.)

5.4 Deviations from the NED or NER Plan - This section is only necessary if a plan other than the NED plan or NER plan, including an LPP, was selected (Section 5.3). It should describe the plan differences and present two tables, one with a comparison of total annual costs and benefits, and another with a comparison of cost apportionment. (Reference ER 1105-2-100, Chapter, 2, Section 2-3.f(4))

Section 6 The Recommended Plan (13 pages)

Section 6 should contain sufficient information for the reader to understand the Recommended Plan from a physical and construction standpoint, in terms of the project's up to date (current Fiscal Year (FY)) cost and benefits (both monetary and non-monetary), associated risks, and the responsibilities of the federal government and sponsor before, during, and after project construction. This section will generally be relied upon to develop the Chief's Report, Director's Report, briefing materials, and fact sheets. All information contained in this section should be current, accurate, and consistent (when applicable) with the rest of the main report and appendices. Section 6 should total around 13 pages in length for an average study, and typical lengths for the numerous subsections have been broken down further below.

6.1 Plan Accomplishments (2-4 pages) - This section should fully describe the monetary and non-monetary benefits of the project. The description of the project's NED benefits should be described quantitatively, to include the average annual cost, average annual benefits, and Benefit Cost Ratio (BCR) calculated at the current fiscal year discount rate. Benefits in non-NED categories should be described quantitatively, if possible, but at a minimum a qualitative discussion of these benefits should be included. If the project includes separable elements, include a breakout of project performance for each element.

Don't just list the net benefits or habitat units; explain what will result from implementation of the project. Are there FRM improvements in areas where loss of life has occurred? Will a project reduce the risk of critical infrastructure flooding? Would a navigation project improve safety where groundings or collisions have previously occurred? These examples are critical to make the case for authorization and construction.

6.2 Plan Components (1-3 pages) - Include a detailed description of all project features, along with any relevant pictures and design drawings. List any required mitigation. Clearly indicate if any features are to be considered separable elements (Reference ER 1105-2-100, Appendix G, Exhibit G-7; ER 1105-2-100, App E, E-3.c.(2)).

6.3 Cost Estimate (1 page) - List the "Project First Cost" at the current fiscal year price level, as well as a breakdown, at a minimum, of Pre-construction Engineering and Design (PED), mitigation costs, Lands, Easements, Rights-of-Way, Relocations, and Disposal (LERRDs), and construction. If the project includes separable elements, include a breakdown of the cost for each element.

6.4 Lands, Easements, Rights-of-Way, Relocations, and Disposal (1 page) - Describe the LERRDs needed for the project as well as the estimated cost of LERRDs. If non-standard estates are being utilized, describe them here.

6.5 Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) (1/2 page) - Describe the OMRR&R requirements for the project, as well as the estimated cost of those activities.

6.6 Project Risks (1-2 pages) - Describe any risks related to implementation of the project and/or any elements of the project performance as described in the previous sections, as well as how those risks are to be or have been managed. If relevant, describe any residual risks that would remain after project implementation. (Reference ER 1105-2-100, Chapter 2, Section 2-4(g))

6.7 Cost Sharing (1 page) - List both the percentage and the amount of the federal and non-federal share of the "Project First Cost" in a tabular format. The table, at a minimum, should break out federal and non-federal costs for project construction and LERRDs, including any applicable crediting if the non-federal cost for LERRDs exceeding their statutory total project cost share, as well as any required non-federal cash contributions (FRM) or payments over time (Deep Draft Navigation (DDN)). Separately show any "associated costs" that are 100% non-federal responsibilities, but are not part of the "Project First Cost." (Reference R 1105-2-100, Chapter 2, Section 2-8)

6.8 Design and Construction (1 page) - Include the estimated design and construction schedule as well as any applicable timing constraints that may affect the schedule (e.g., dredging windows, LERRD acquisition). Include information on monitoring and adaptive management, if applicable.

6.9 Environmental Commitments (1/2 page) - Include a concise description of all commitments made to comply with project requirements. The summarized requirements must be clear to study reviewers and project designers to ensure they are included in the project plans and specifications. Add Fish and Wildlife Coordination Act Report (CAR) recommendations and how we addressed them. If a Section 106 agreement is developed, these commitments should be summarized here. Include best management practices (BMPs) that were described in the Environmental Consequences section in order to avoid, minimize, rectify, reduce, or eliminate adverse impacts.

6.10 Project-Specific Considerations (1/2 page) - Any other items that are relevant for project implementation, that are not covered by the previous sections, should be documented in this subsection.

6.11 Environmental Operating Principles (EOP) (1/2 page) - Include a brief discussion of how the Recommended Plan meets the USACE Environmental Operating Principles. (Reference ER 200-1-5; https://www.usace.army.mil/Missions/Environmental/Environmental-Operating-Principles)

6.12 Views of the Non-Federal Sponsor (1/2 page) – Provide a concise narrative from the non-federal sponsor regarding support and implementation of the Recommended Plan as well as any agency that has implementation responsibilities (Reference ER 1105-2-100, Exhibit G-7).

Section 7 Environmental Compliance (5 pages)

7.1 Environmental Compliance Table –List all relevant environmental laws, regulations, and executive orders (EOs) with a brief statement summarizing how the project will comply with the requirements. Include the status of all federal permits, licenses, and other authorizations that must be obtained in implementing the project and any issues preventing full compliance with any of the laws, regulations, and EOs. Note the date of the letter from the cooperating agency(ies) that states the project is in compliance (Reference ER 1105-2-100, Chapter 2, Section 2-7).

7.2 Public Involvement

7.2.1 Scoping - Briefly summarize the scoping process (e.g., number, location, and dates of meetings and attendance) and the nature and level of intensity of public and agency concerns.

7.2.2 Agency Coordination - Summarize the agency coordination processes, including – but not limited to – NEPA coordination and cooperating agency involvement; Fish and Wildlife Coordination Act (FWCA)) with specific references to the requirements of Section 1001 and 1005 of Water Resources Reform and Development Act (2014) (WRRDA). Describe the level of involvement of cooperating and participating agencies and other stakeholders. Use tables as appropriate to minimize text. Summarize the 90-day interagency meeting.

7.2.3 Tribal Consultation - If applicable, summarize the Tribal consultation undertaken regarding study scope, alternative development and evaluation, and plan selection. This section must also indicate how the study decisions considered comments from Tribes.

7.2.4 List of Statement Recipients – Refer the reader to an appendix that includes a list of the agencies, organizations, and persons to whom USACE sent copies of the draft report for review.

7.2.5 Public Comments Received and Responses - Briefly categorize and summarize the substantial comments received through the public involvement process and actions taken to involve the public and agencies (e.g., number, location, and dates of meetings and attendance) and the nature and level of intensity of public and agency comments, consolidating similar topics in the text.

Section 8 District Engineer Recommendation (5 pages)

For content, see ER 1105-2-100, Appendix G, Section G-9.i.

The description of the plan being recommended for implementation, including mitigation, must be provided and should be consistent with the Executive Summary and Chief's Report. Do not refer to the plan as described "herein the report."

The following paragraph must be included: "The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to higher authority as proposals for authorization and implementation funding. However, prior to transmittal to higher authority, the sponsor, the states, interested federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further."

The Recommendations section MUST be signed by the District Commander (only for the Final Report).

Section 9 List of Preparers

This section cannot be shortened so do not be concerned with the number of pages.

It is recommended, but not required that reviewers to the report, including district quality control, be included in this section to ensure that the report is of high quality.

9.1 List of Preparers - Briefly list the names and qualifications of all individuals, including contractors, involved in preparation of the document and significant supporting information.

Appendices

Appendices may be used when information must be a part of the report and cannot be relegated to external supporting documentation. The list below represents the general appendices that are applicable to most feasibility reports and includes technical details that are recommended. Some studies may include additional appendices for modeling, adaptive management plans, monitoring plans, or project operating manuals, depending on the recommendation. (Reference ER 1105-2-100 Appendix G, Section G-9.h.)

In general, information provided in the report appendices serves to validate and support statements and decisions made in the main report. An appendix should include a title page and table of contents, but it does not need to repeat basic study details, such as study purpose and authority, or contain a separate executive summary from the main report. In addition to those listed in this section, a Plan Formulation Appendix may be included. Appendices will be dependent upon the information generated by the study, and effort should be taken to avoid duplication of information in the main report.

When scoping the study, the vertical team can aid in determining what information is critical to have in the main report, what to include in the respective technical appendix, what can be incorporated by reference, or what to simply have on record at the district office in working files. Although the main report needs to be written so that the general public can follow the process of identifying a solution for the problem(s) that were identified, it is understood that the appendices will contain more technical information. That said, the appendices should still be written and assembled with readability in consideration.

In order to fit a feasibility report into a three-inch three-ring binder, the main report and the associated technical appendices must be less than 1200 pages (double-sided). The following subsections give general page number targets to meet this goal. Actual appendix length will vary based on project purpose, complexity, and other factors.

A-1 Engineering Appendix (200 pages)

This appendix may include engineering detail on the project features, hydrology, hydraulics, geotechnical, mechanical, and electrical engineering products as well as the operations and maintenance of the project. Engineering and Construction Bulletin 2019-3, Risk Informed Decision Making for Engineering Work During Planning Studies, provides additional context for risk and uncertainty and appropriate level of engineering detail during each phase of planning studies. (Reference ER 1110-2-1150, Engineering and Design for Civil Works Program)

A-2 Cost Engineering Appendix (40 pages)

The Cost Engineering Appendix typically includes planning-level estimates, required analyses and outputs by the Cost Engineering Community of Practice (Micro-computer Aided Cost Engineering System (MCACES) Second Generation (MII)), and the Total Project Cost Summary. The cost estimates are developed to help inform what factors affect the feasibility of the alternatives and the Recommended Plan and also document the level of confidence in the costs. (Reference ER 1110-2-1302 Civil Works Cost Engineering)

A-3 Environmental Appendix (375-450 pages)

To the extent practicable, surveys, contracted work, and other pertinent data should be analyzed and summarized to support the assertions made in the main report. (Reference EP 1105-2-60, formerly Appendix C of ER 1105-2-100.)

The Coordination Act Report, Section 404(b)(1) evaluation, Section 401 water quality certification, compliance documentation, the Monitoring and Adaptive Management Plan, and potentially information related to the ecological model should be included.

The public notice announcing scoping and public review of the draft report should be included.

The BA should be included in the appendix; the main report should summarize effects to endangered and threatened species. If formal consultation is necessary, include the BO in the environmental appendix. This is a technical document that must be part of the record and needs to be available in case the public or review team makes a request to see it.

Reports that are published and publicly available should be referenced in the report and not included in the appendix.

Cultural resources information is typically included in the Environmental Appendix unless it is voluminous, which in that case a separate appendix may be warranted. Information should supplement the discussion within the main report with regard to the initiation of the Section 106 process, the identification of historic properties, the assessment of adverse effects, and the resolution of adverse effects if identified. The appendix can be used to provide greater detail on relevant letters demonstrating State Historic Preservation Office (SHPO) consultation and concurrence, Tribal consultation conducted under Section 106 (36 CFR 800.2(2)), and comments of consulting parties. It is not necessary to include entire cultural resources survey reports or similar documents prepared as part of the study, these may be included in working files retained at the district office. This appendix should include the executed Section 106 agreement: the Memorandum of Agreement (MOA) or programmatic agreement (PA).

A-4 Real Estate Appendix (30 pages)

The Real Estate Appendix should include an analytic summary of crediting considerations, flooding analysis, estate analysis, tables, and graphics necessary to support analyses and the recommended plan. (Reference ER 405-1-12, Real Estate Handbook)

A-5 Economic and Social Considerations Appendix (30-50 pages)

Detailed economic data and analysis to support plan formulation, forecasts, and detailed explanation of benefits should be provided in the Economic and Social Considerations Appendix. This information includes a summary of strategies, assumptions, development, and results from navigation, flood risk, and CSRM models. Hard data and spreadsheets can be kept as working files available at the district office. (Reference EP 1105-2-59, formerly Appendix D of ER 1105-2-100)

A-6 Recreation Appendix (20 pages)

In general, using methodologies outside of Unit Day Value (UDV) can be complex and require additional explanation in the Recreation Appendix. Summarized information gathered and synthesized from survey results and other available statistics can help supplement added benefits to the Recommended Plan.

A-7 Public Involvement

In a USACE study, the public involvement strategy, communications plan, and documentation of these engagements are critical for not only understanding the problems, but also for creating collaborative solutions and garnering public support for the recommendations. Comment letters, received from scoping and the public review of the draft report, or a comment matrix, with the comments and responses summarized, are included in this appendix. Cooperating agency request letters and their response letters are also included. (Reference 40 CFR 1506.6; Engineering Pamphlet 1105-2-57, Stakeholder Engagement, Collaboration, and Coordination, formerly Appendix B of ER 1105-2-100)

Working Files

Working files may be kept at the district office and made available upon request. These files usually contain background information and data, such as wetland functional assessment data sheets and geotechnical core borings. Although it is highly unlikely that this information will be requested, the working files should be noted in the feasibility report with contact information at the district office in case the files are needed.

Annex 1: Example of Recommended Plan description in Executive Summary

The Recommended Plan for the City of Norfolk Coastal Storm Risk Management Study includes the following structural and non-structural features:

Pretty Lake Storm Surge Barrier: This structural feature would be a 114 linear foot storm surge barrier with a pump and power station. The feature would tie into 5,642 linear feet of floodwall.

Lafayette River Storm Surge Barrier: This structural feature would be a 6,634 linear foot storm surge barrier with a power station. The feature would tie into 1,535 linear feet of constructed earthen levee. Three tide gates would be constructed and operated.

The Hague / Downtown Storm Surge Barrier: This structural feature would be a 600 linear foot storm surge barrier with a pump and power station. The surge barrier would tie into 27,236 linear feet of constructed floodwall and 2,582 linear feet of earthen levee. Three pump stations would also be constructed and operated for interior drainage.

Broad Creek Storm Surge Barrier: This feature would be a 1,291 linear foot storm surge barrier with four operational tide gates and a power station. The surge barrier would tie into approximately 8,787 linear feet of flood wall. One pump station would also be constructed and operated for interior drainage.

Nonstructural features: Nonstructural features would be constructed in neighborhoods outside of a structural system alignment to include the following:

a. Basement fills – 176 properties
b. Basement fills plus elevation – 89 properties
c. Basement fills plus dry floodproofing – 1 property
d. Elevation – 624 properties
e. Dry floodproofing – 54 properties
f. Acquisition – 76 properties

Natural and Nature-based Features (NNBF): These CSRM features would include approximately 0.3 acres of oyster reef and approximately 8.9 acres of living shoreline to increase resiliency.

The Recommended Plan would have some adverse impacts to the environment and mitigation is required. Approximately 2.5 acres of wetlands, 2 acres of mudflats, and 20 acres of open water will be impacted. All impacts will be mitigated by the construction of living shoreline oyster reef and wetland in the study area. The Recommended Plan would implement the environmental compensatory mitigation plan and associated monitoring and adaptive management plan.

The estimated project first cost of construction is $1,361,810,000 which includes the cost of constructing structural, nonstructural, and NNBF measures along with the value of lands, easements, rights-of-way, relocations, and disposal areas (LERRDs). Total LERRD is estimated to be $125,990,000. The additional annual cost of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) for the Recommended Plan is estimated to be $1,780,000. The non-federal sponsor will be responsible for 100 percent of the cost of project OMRR&R. The cost share of construction is split 65% federal and 35% non-federal.

The estimated federal and non-federal shares of the project first cost are $885,180,000 and $476,630,000 respectively. The non-federal sponsor will receive credit for the costs of LERRD toward the non-federal

share. Based on a 2.875 – percent discount rate and a 50-year period of analysis, the equivalent average annual benefits and costs are estimated at $177,700,000 and $55,650,000 respectively. The project is estimated to provide annual net benefits of $122,050,000 and a benefit-to-cost ratio of 3.2.

Include a discussion of residual risk if identified for the study.