Catalog

APPENDIX A

USFWS CONSULTATION

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SUMMARY

Informal consultation for this BA was initiated with the U.S. Fish and Wildlife Service (USFWS) Bloomington Field Office (BFO) by the Indiana National Guard (INNG) and a meeting was held on 12 December 2006. Attendees of the meeting included representatives from the Joint Forces Headquarters (JFHQ) of Indiana, CAJMTC, USFWS and AMEC Earth & Environmental, Inc. (AMEC). Comments and concerns discussed at this meeting were incorporated into the preliminary draft Biological Assessment (BA). The intent of this BA is to be programmatic, and to eliminate continuous informal consultation efforts for routine actions as well as to address known future activities. This programmatic BA per USFWS's request is to include routine military and land management activities, and any known upcoming projects. Therefore, the Proposed Action encompasses multiple projects and activities.

At the start of the project, the USFWS provided INNG with three guidance documents to use when developing the BA document. The guidance documents included: BA/Biological Evaluation Outline; BA/Biological Evaluation Contents; and Common Flaws in Determining an Effect Determination. The BA was organized and prepared in accordance with these USFWS guidance documents.

The USFWS also provided the INNG with a copy of ECS3152 Developing a BA, which was prepared by USFWS National Conservation Training Center. Chapter 11 addresses streamlining tools recommended by the USFWS to expedite consultations and increase consistency. Per USFWS's request, this Programmatic BA was developed using two streamlining tools, which include batching projects and program-level consultations.

Batching is recommended when the actions are similar in time frame, type or geographic area; they affect the same species; and for similar actions within, or between two or more agencies. The benefit of this streamlining tool is more projects in a single consultation/time frame can be addressed. Examples of projects addressed in this programmatic BA include a Multi-Purpose Machine Gun (MPMG) Range, tank trail relocation, trail upgrades, etc.

Program-level consultations are used to address broad activities or programs routinely implemented over large areas. This streamlining tool was used per USFWS's request to eliminate the need for informal consultation for routine military and land management activities that occur on a regular basis at CAJMTC (i.e., tree removal, certain types of training).

Upon completion of the preliminary draft BA, the INNG provided the USFWS with the opportunity to review and comment on the document. Comments were received from the USFWS. These comments were addressed and incorporated into this draft BA. The draft BA has been sent to USFWS for further review and comment.

Previous correspondence with USFWS has included informal consultation for the CAJMTC Integrated Natural Resources Management Plan (INRMP) and its subsequent revisions, the Endangered Species Management Plan (ESMP) for the Indiana bat, and various discussions for routine military and land management activities over the years between the USFWS and the Conservation Director at CAJMTC. Formal consultation was initiated in 1998 to assess the effects of construction and operation of a proposed multi-purpose training range (MPTR) at CAJMTC on the Indiana bat. The BO was issued for the construction and operation of the MPTR by the USFWS BFO on 04 December 1998. The USFWS concluded in this BO that the construction and operation of the MPTR, as proposed, would not likely jeopardize the continued existence of the Indiana bat. No critical habitat has been designated for the Indiana bat in the action area; therefore, none will be affected. A copy of the BO is maintained in the Natural Resources Office at CAJMTC. Copies of past correspondence, when available, were included in this Appendix.

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CONTENTS

BA Consultation

Past Consultation

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Agency Meeting Summary – 12 December 2006

Attendees

LTC Rick Jones – INARNG
Brad Schneck – INARNG
COL McGowen – INARNG
COL McAllister – INARNG
Andrew King – USFWS BFO
Marty Marchaterre – AMEC
Jennifer Warf – AMEC

Meeting Notes

MUTC

- COL McAllister wants Purdue to manage the forest. Funds for ARNG would be used for this. Purdue and MUTC are contiguous forests.

- COL McGowen needs to determine if it will be federal property or federally supported. This has not been officially determined to date. It could be State owned or potentially owned by the Indiana Department of Natural Resources (IDNR).

- Need to identify federal nexus – federal troops, land or funds

- Activities

    - Along Lake – No clearcutting, no construction, maybe dock area, maybe group cuttings by Purdue for research puposes
    - Doing very little forest training at CAJMTC and probably little to none at MUTC.
    - Training – walking in the woods, smoke, not throwing live fragmentary grenades, some CS. Mostly in urban areas though.
    - 35-meter restriction near forested areas during summer roosting as done at CAJMTC
    - Will mostly be in and around urban area
    - Fencing – need to clearcut – EA must be done before fencing – maintain fence line afterwards – maybe some round up application, grubbing or periodic mowing.

CAJMTC

- No major training changes, just more of it, but not in the wooded areas. No longer doing tank training.
- Trying to improve trails everywhere. Upgrading many trails to gravel roads. Existed already; just hardening them. Erosion control is improved.

- Haul roads – approximately one haul road/year is upgraded – Brad and ITAM coordinator work together to identify the one to upgrade.
- A Roost tree figure will not be included in the BA, but information will be provided to USFWS.
- Most roost trees occur in the northern glaciated area of site.
- Should a specific frequency of emergent counts and mist netting/telemetry be established? Assuming take will occur, the USFWS will likely require some monitoring as a component of the BO.
    - A proposed conservation effort measure could be included to offset impacts of take, such as:
        - Survey every so many years; annual emergent counts
        - However, if certain measures are not met it may require new consultation.

Activities and Other things to Consider

Could result in take:

- MPMG – anticipated construction activity – may have to work outside bat timeline
- Existing MPTR – Now convoy live fire (was originally tanks and tank rounds); noise will be less, SDZ is smaller; Vehicles will stay on trails; potential erosion issues reduced
- Smoke – potential inhaling/exposure on fur)
- Noise – particularly near roost trees.
- Tree cutting – provide firewood to troops. Use only deadfall.
- Roadside maintenance (larger than 3 inches) – Andy King (3-inch tree along roadside ≠ take). Possibly take, but estimate small. Put it in as insurance. If maintenance is continued, this issue will not be a problem.
- If you foresee doing any activity during the summer that may result in take. We need to count them to avoid modifications to the BA.
- Increased opportunity for fire. Prescribed burning outside window. Wildland fires will occur. No take for prescribed burns.
- Training and Indirect Effects (e.g., wildland fire – provide average/year for quantity). Emergency consultation for wildland fires. USFWS could establish protocol to minimize take and provide guidance for wildland fires.
- FOB pond – dredging is not a concern – no take
- Stream restoration – stabilizing banks that are causing erosion – gabion walls – day work
- Bridge replacements – USFWS would want to know. No plans right now, but possibly in the future. No take likely to occur from this activity.
- Pesticide use list for outdoors – mention policy.
- Hazard trees near bivouac areas (ideal areas for bats). Actively remove them in winter (not a direct take, but indirect – could be primary maternity roost tree taken). Note designated bivouac areas – are there any sidebars to where these areas can or can not occur?

- Ongoing Research – Could this cause indirect & cumulative impacts? Technically these activities are handled under the take permit, but could add up.
- Invasive species clearing with bobcat and following up with fire.
- Radio high frequency research work – If it comes in contact with skin, it heats up moisture between skin layers and causes the person to feel like they hives. DoD went to FAA to consult, but should consult with USFWS. DoD's action – they should be lead – they are funding the research.
- Mention helicopter use – noise and wind – could be used at night.

UFFWS Comments

- Problem with past document – loose language
- Need to quantify activities: Time period, season, day, night, time, amount (RFMSS can provide some of this information – ex. Day event at range X, number of convoys, number of vehicles).
- Risk Assessment – Exposure analysis – Are bats in area? How many? What is the possibility for them to be impacted? Trying to quantify the number that may be harmed or killed. For example, timber harvest acreages could be used to quantify impacts.
- Three BOs out with quantity
- Make sure to mention educational and environmental awareness efforts done to prevent take.
- USFWS has lots of literature on the Indiana bat that AMEC can use. Chemical effects literature is limited. There is a contaminant biologist in the Bloomington office that has the best set of research for bats.
- Draft Revision of the Recovery Plan – due for public review shortly.
- Even if you don't think it will lead to take, mention it and say your rationale for no take.
- Exposure Analysis Report and I-69 BA; and USFWS BA outline/content information – Andy King will send AMEC.
- Need to know # of bats and maternity colonies (around five colonies).

General

- Each training area will be analyzed separately within the same BA.
- Habitat Conservation Plan (HCP) – USFWS rewarded state grant to Indiana State University. Will cover all state land, but has not happened yet. Ask Jack about this for more detail?
- Action Area – Footprint of CAJMTC and MUTC; Any effects outside of these boundaries? Siltation?
- Include Ft. Leonard Wood studies and USGS aquatic macrointertebrate/water quality study.
- Ft Knox – helicopter and bat study
- Put Matrix table in BA to analyze the effects of activities at CAJMTC and MUTC.
    - Activity, time/season, day/night, take or exposure, determination.

BIOLOGICAL ASSESSMENT / BIOLOGICAL EVALUATION OUTLINE

(Information to Include in a Complete Initiation Package)

A. Cover letter - Include project title, purpose, and effect determinations for each listed species and designated critical habitat (i.e., no effect; may affect, not likely to adversely affect; and/or, may affect, likely to adversely affect).

B. Project description - Describe the proposed action and the project area. Be specific and quantify whenever possible. Include maps, drawings, photographs, and any other materials that may help the reviewer understand the project.

C. Species and suitable habitat and critical habitat description(s)
   For each species:
   1. Describe the affected environment (quantify whenever possible)
   2. Describe the species biology
   3. Describe current conditions for each species
      a. Rangewide
      b. In the project area/action area
      c. Cumulative effects of State and private actions in the project area
      d. Other consultations of federal actions in the area to date
   4. Describe critical habitat (if applicable)

D. Effects of the proposed action - Describe effects of the proposed action on each species and/or designated critical habitat, including:
   1. Direct effects
   2. Indirect effects
   3. Effects of interrelated and interdependent actions
   4. Cumulative effects

E. Conservation measures - Describe conservation measures, or actions, that are committed to be completed, taken to benefit or promote the recovery of listed species that are included as an integral part of the proposed action (protective measures to minimize or compensate for effects to each species).

F. Conclusion(s) - Provide effect determinations for each species and/or critical habitat.

G. Literature Cited - Provide a list of literature cited or data referenced.

H. List of Preparers - Provide a list of preparers and contacts, as well as their affiliations and qualifications.

Prepared by (rev. 12/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
919/856-4520
http://nc-es.fws.gov

BIOLOGICAL ASSESSMENT / BIOLOGICAL EVALUATION CONTENTS

(Information to Include in a Complete Initiation Package)

When you prepare a biological assessment or biological evaluation to request Service concurrence with a "may affect, not likely to adversely affect" determination or initiate formal consultation, keep in mind that the people who read or review your document may not be familiar with the proposed action or the project area. Your document should present a clear line of reasoning that explains the proposed action and how you determined the effects of the proposed action on each of the threatened and endangered species and critical habitats that may be affected. Try to avoid technical jargon that is not readily understandable to people outside your agency or area of expertise. Following is a discussion of some of the things to consider and include, as appropriate, in a biological assessment or biological evaluation.

A. COVER LETTER

Describe the type of Federal action involved (e.g., federal permit, federal funding, federal action, etc.) and letter of designation if you are the federal agency's non-federal representative. Include the proposed action (project) title and purpose. Make a determination for each listed species and designated critical habitat. There are three options: (1) "no effect" determination; (2) request Service concurrence with a "may affect, not likely to adversely affect" determination; or, (3) request formal consultation with the Service for a "may affect, likely to adversely affect" determination. For a proposed species or critical habitat, determine whether the proposed action "is likely to jeopardize the continued existence of" proposed species or "adversely modify" proposed critical habitat.

B. PROJECT DESCRIPTION

Describe what you are proposing to do. Provide the location of the proposed action including state, county, and township, range and section(s) in which the proposed action occurs. Describe the action area, which includes all areas to be affected directly or indirectly and not merely the footprint of the proposed action. Consider the perspective of listed species when delineating the action area. The Service may assist you in defining the action area.

Provide a location map showing proposed action location and major roads and drainages. Provide a vicinity map showing the area of the proposed action. Provide a site map showing all of the project activities including the project site, staging areas, access routes, restoration sites, and/or compensation areas. Scales should be adequate to orient someone unfamiliar with the project and project area. Provide an aerial map or blue-line showing the project boundaries and an area surrounding the project (vicinity map). Photographs may be helpful.

Provide a detailed description of the proposed action, including secondary project features such as staging areas, access roads, power lines, drainage ponds, etc.

Describe construction and operation activities and maintenance activities and the expected timing of these activities. Describe types of equipment that will be used, when it will be used (time of day, week, year), and duration of use (number of years). Discuss equipment features that minimize impacts, such as rubber tires, mufflers, or tailgate bumpers.

C. SPECIES, SUITABLE HABITAT, AND CRITICAL HABITAT DESCRIPTION(S)

Provide a list of threatened, endangered, and proposed species observed or expected to be present on-site or in the project area, including either seasonal or temporary use. Generally, it is prudent to err on the side of the species and be as inclusive as possible to ensure that all species potentially affected by the proposed action are included in the analysis.

Provide a description of the habitat and/or plant communities on-site and within the project vicinity. Provide a description of methods used to classify and identify the habitats and species occurrences. Provide a description of the typical habitat requirements for listed species. Descriptions of life histories of species are not necessary for the assessment.

Discuss surveys for species that are known to occur or thought to occur or for which species' habitat is present in the project area. Provide a description of survey methods, intensity, timing, and survey results for listed, proposed, or candidate species or their habitat that were conducted for the proposed action. This discussion should follow accepted formats for published literature. You may consider consulting a species researcher or use survey methods described in published literature to design surveys. Discuss limitations and how surveys or assumptions were adjusted to account for such limitations. Survey methods must be site-specific and species-specific and in sufficient detail to determine absence of the species or the species is assumed to be present on the site. Describe the background, training, and experience level of those conducting the surveys.
Listed species may use habitat within the project area even if they are not detected during surveys; therefore, surveys must be carefully designed and carried out. You may need a permit to survey for some species.

Provide background information on the threatened and endangered species or designated critical habitat in the project area. Provide a description of the overall range and population status of the listed species. Describe population size and status and what part and size of the range/population that will be affected by the proposed action.

Discuss the habitat and/or plant communities associated with the listed species found on-site and within the project vicinity that would potentially be affected by the action. Discuss natural disturbances, such as the types and frequencies of natural fires, floods, or erosion events. Describe any current management actions that affect the proposed action site and vicinity.

Describe the critical habitat present and the constituent elements, or physical or

biological features essential to the conservation of the species, of the critical habitat.

Describe current baseline conditions which include past and present impacts of all federal, State, or private actions and other human activities in the action area. Describe actions that have already occurred that are affecting the project area, the anticipated effects of all federal actions that have already been consulted on in the action area, and the effects of all State and/or private actions which are contemporaneous with the consultation in process.

Provide information obtained from biologists and other local sources (county, state, and federal agencies, local researchers, etc.) that are familiar with the areas/species being assessed.

D. EFFECTS OF THE PROPOSED ACTION

Logically describe the biological rationale to support a conclusion that the proposed action will have no effect on listed species or designated critical habitat (i.e., no direct or indirect, beneficial or adverse effect) for the administrative record. For example, an effects analysis for a proposed action in which the action area is not within the range and does not effect the range of any listed species or designated critical habitat may support a “no effect” determination.

Describe how the proposed action will effect each threatened and endangered species and their associated habitat and designated critical habitat. Effects can be positive or negative and may include habitat modification (e.g., change in plant communities, change in edge and fragmentation, hydrological changes), disturbance (e.g., visual, auditory, etc.), and physical changes (e.g., water or soil chemistry, air quality, etc.). Describe measures taken to avoid or reduce adverse effects to each species. Discuss how each species will likely respond to changes to habitat suitable for that species. Quantify the amount and distribution of effects (e.g., acres of habitat affected by basin or watershed, location and number of individuals or percent of population affected). Describe and quantify the effects to designated critical habitat.

Direct and Indirect Effects:

Describe effects of actions that are already affecting the primary action area. The cumulative effects of past actions are part of the baseline conditions from which this proposed action is assessed.

Describe and analyze the effects of the action that would have a direct effect on the species (e.g., actions that would immediately remove or convert habitat or displace animals or plants, or that would effect individuals such as noise disturbance or chemical applications, or that would alter hydrology).

Describe and analyze the effects of the action that would indirectly effect the species (e.g., effects to individuals or habitat that would occur later in time).

Interdependent and Interrelated Actions:

Describe and analyze the effects of interdependent actions. These are actions that have no independent utility apart from the primary action. An example of an interdependent action for a residential development may include the construction, maintenance, and use of a road required to access the development.

Describe and analyze the effects of interrelated actions. These are actions that are part of the primary action and dependent upon that primary action for their justification. An example of an interrelated action for a residential development may include the power line.

Both the interdependent and interrelated activities are assessed by applying the "but for"' test, which asks if any action and its associated impacts would occur "but for the proposed action."

Cumulative Effects:

Describe and analyze the effects of actions that are cumulative to the primary action. Cumulative effects include the effects of unrelated future state and/or private activities, not involving federal activities, that are reasonably certain to occur within the project area. An example of an action that could be considered cumulative to the primary action would be a future housing development located adjacent to the federal activity of building a highway. A future activity is "reasonably certain to occur" if it is likely to occur considering economic, administrative, or legal considerations; implementation of the activity need not be guaranteed. An analysis of cumulative effects includes discussing assumptions, quantifying amount and location of effects, and discussing the likely response of listed species to these cumulative effects.

Any research findings that are used in the analysis of the effects of an action should be cited. This adds to the credibility of the analysis.

E. CONSERVATION MEASURES

Describe actions incorporated into the design of the proposed action to avoid or reduce adverse effects to and incidental take of listed species. Once you have completed an analysis of effects, additional actions may be identified to avoid or reduce adverse effects or incidental take. Conservation measures are actions that, when implemented by the federal agency or applicant, would reduce the adverse impacts of the proposed activity.

Conservation measures may be alterations in the proposed activity such as timing restrictions, access closures, or changes in project features or location. The measures should be as specific as possible. Conservation measures may be developed with the assistance of the Service with the objective of reducing significant project impacts. These conservation measures would assist in compliance under the Act through the informal section 7 process.

F. CONCLUSIONS

Document your decision. The finding or determination of effect is the conclusion of the assessment and indicates the overall effect of the proposed activity to listed species or critical habitat. This finding must be supported by the documentation presented in the biological analysis. The analysis presented should lead the reviewer through a logical, biological rationale of effects that leads to a well-supported conclusion. Do not assume that Service staff reviewing your document are familiar with your proposed action or action area. If there is little or no connection or rationale provided to lead the reviewer from the project description to the effect determination, the Service cannot assume conditions not presented in the analysis. If there is a difference of opinion, the Service must err on the side of the species.

The finding of effect is made by the federal action agency. A recommended finding may be presented to the federal action agency by the non-federal representative. The Service may ask the federal action agency to revisit its decision or provide more data if the conclusion is not adequately supported by the biological rationale.

The federal action agency may make only one of the following effect determinations for each listed species or designated critical habitat:

1. **No effect** – A "no effect" determination means that there are absolutely no effects from the proposed action, positive or negative, to listed species. A "no effect" determination does not include effects that are insignificant (small in size), discountable (extremely unlikely to occur), or beneficial. "No effect" determinations do not require written concurrence from the Service unless the National Environmental Policy Act analysis is an Environmental Impact Statement. However, the Service may request copies of no effect assessments for our files.

2. **May affect, not likely to adversely affect** – A "may affect, not likely to adversely affect"determination may be reached for a proposed action where all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat (i.e., there cannot be a "balancing," where the benefits of the proposed action would be expected to outweigh the adverse effects - see below). Insignificant effects relate to the size of the effects and should not reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. This conclusion is usually reached through the informal consultation process, and written concurrence from the Service exempts the proposed action from formal consultation. The federal action agency's written request for Service concurrence should accompany the biological assessment/biological evaluation.

3. **May affect, likely to adversely affect** – A "may affect, likely to adversely affect" determination means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect" even if the net effect is neutral or positive. Section 7 of the Endangered Species Act requires that the federal action agency request initiation of formal consultation with the Service

when a “may affect, likely to adversely affect” determination is made. A written request for formal consultation should accompany the biological assessment/biological evaluation.

The determination for proposed species or proposed critical habitat may be:

“Likely to jeopardize proposed species/adversely modify proposed critical habitat” - This is the appropriate conclusion when the federal action agency or the Service identifies a situation where the proposed action is likely to jeopardize the proposed species or adversely modify the proposed critical habitat. If this conclusion is reached, a conference is required. A written request for a conference should accompany the biological assessment or biological evaluation. The Service is available to assist the federal action agency with their determination for proposed species or critical habitat.

To jeopardize is to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species.

The destruction or adverse modification of critical habitat is a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.

G. LITERATURE CITED

Provide a list of supporting documentation that you used to reach your conclusion. Be sure to include any agency reports or data that may not be available to the Service.

H. LIST OF PREPARERS

List the preparers and the species experts you contacted when preparing the biological assessment/biological evaluation. Avoid making statements that place the responsibility of the decision or determination on the shoulders of species experts or any other contact. The decision is made by the federal action agency.

COMMON FLAWS IN DEVELOPING AN EFFECT DETERMINATION

Federal agencies may, through informal consultation, utilize the expertise of the Service to evaluate the agencies assessment of potential effects. The Service may provide written concurrence that the project is “not likely to adversely affect” listed species or critical habitat if the federal agency’s assessment identifies only beneficial, insignificant, or discountable effects and formal consultation is not required. Service concurrence is contingent upon the biological analysis providing an adequate justification for the effect determination. Quite often, the Service must decide whether to concur with an effect determination without adequate supporting information. The determination may be correct, but the Service cannot make the “leap of faith” to accept it without supporting evidence and rationale. This is an important point that often delays the informal consultation process.

Quite frequently, effect determinations aren’t necessarily wrong, they simply aren’t justified in the federal action agency’s analysis. The analysis should lead the reviewer through a discussion of effects to a logical, well-supported conclusion. For example, certain arguments might justify a “may affect, not likely to adversely affect" determination, but do not support a “no effect” determination. It is important to remember that “no effect” means literally no effect, not a small effect or an effect that is unlikely to occur. If effects are insignificant (in size) or discountable (extremely unlikely), a "may affect, not likely to adversely affect” determination is probably appropriate. Examples of inappropriate arguments commonly used to justify effect determinations follow.

The “Displacement” Approach: This relates to the argument that removal of habitat or disturbance of individuals results in a “not likely to adversely affect” or a “no effect” determination because individuals can simply go elsewhere. Except possibly for wide-ranging species, this argument is usually unacceptable. Generally other suitable habitats will already be occupied by other individuals of that species who would then also be affected, probably adversely so, by the proposed action. When the argument is properly used, some rationale must be provided to indicate there are adequate refugia available and the impact will not occur during denning or nesting periods. In any case, a “no effect" call in these situations is usually not appropriate. The species will be affected but, depending on the situation, perhaps not adversely.

The “Not Known To Occur Here” Approach: The operative word here is known. Unless adequate surveys have been conducted or adequate information sources have been referenced, this statement is difficult to interpret. It begs the questions “Have you looked?” and "How have you looked?” Always reference your information sources. Have you queried the North Carolina Wildlife Resources Commission and/or the North Carolina Natural Heritage Program database? Species occurrence information that is generated through one day/year surveys or “wildlife observation records” (which more closely reflect the location of people, for example) are usually inadequate to justify species absence. For some species, nest sites are surveyed yearly. In situations

where wide-ranging species are difficult to census, however, it may be advisable to assume species presence if the habitat is present. The timing of surveys is also important. Consider the life history of the species when scheduling surveys. For example, many plants are only identifiable while flowering.

The “We’ll Deal With It Later” Approach: This approach may be used when consultation needs to be completed quickly (e.g., to secure federal funds) before adequate surveys are conducted or biological analyses are completed. This approach may be used to justify a “no effect” or a “may affect, not likely to adversely affect” determination. Basically, the approach is that if the Service will concur with a “no effect” or a “not likely to adversely affect” determination now, the federal agency will promise to coordinate if listed species are located and do whatever the Service wants to protect them. This approach offers little to no assurance that the species will not be affected by the project prior to being “discovered,” is not consistent with consultation procedures, and Service concurrence is seldom given. Although we try to review projects in a timely manner, generally each Service biologist is reviewing a number of projects from a variety of federal agencies at any one time. Federal agencies need to front load project planning to include adequate time to conduct/require surveys, gather information, complete analyses, and conduct interagency consultation. Federal agencies that have coordinated project review through informal consultation to identify conservation measures and to avoid or reduce adverse effects generally receive more timely Service concurrence and, if necessary, biological opinions.

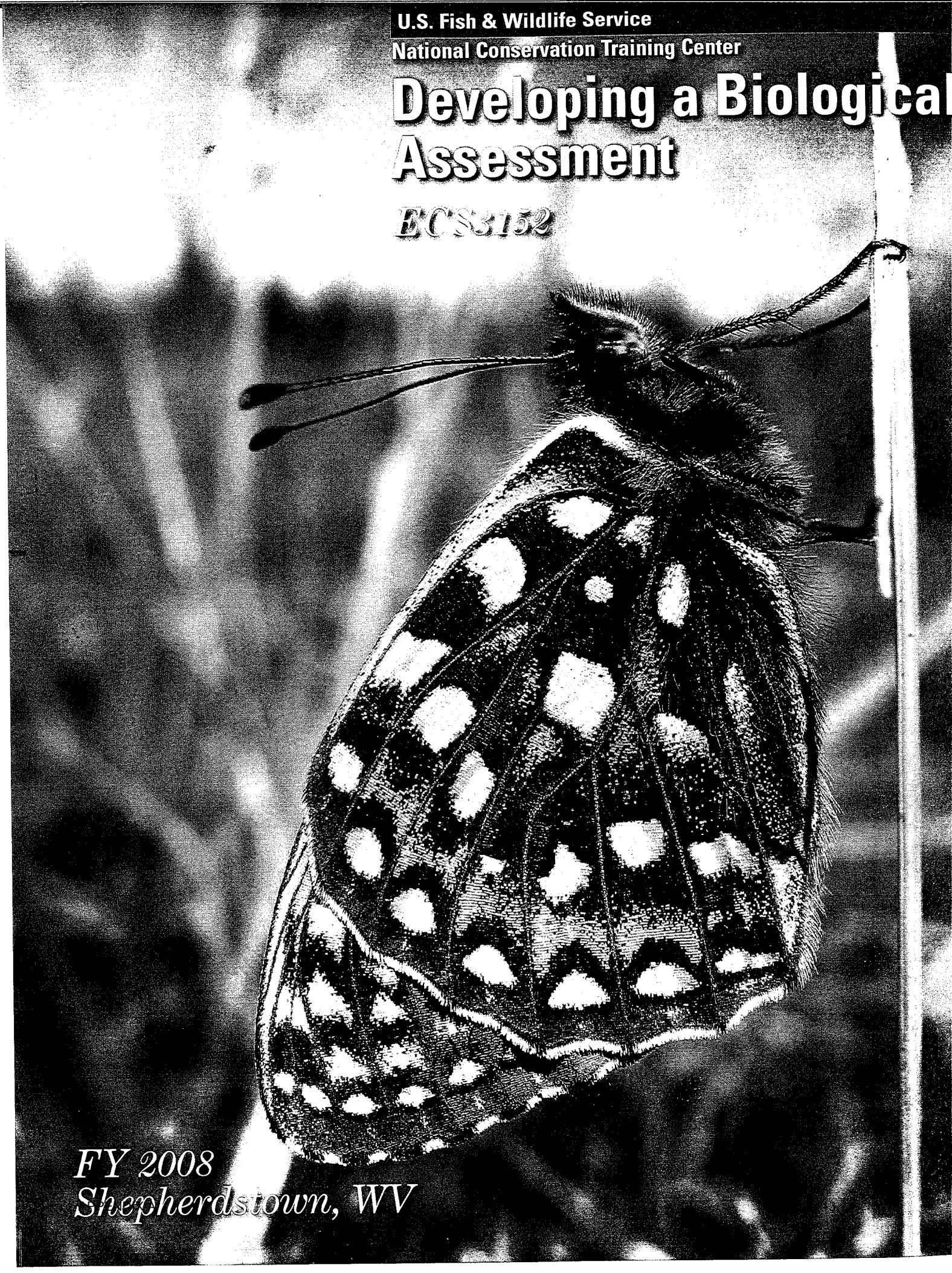
The "Leap of Faith" Approach: This refers to the assumption that the Service reviewer is familiar with the project and/or its location, and there is no need to fully explain the impact the project may have on listed species. Usually, there is little or no connection or rationale provided to lead the reader from the project description to the effect determination. We cannot assume conditions that are not presented in the analysis. Doing so would leave both the project proponent and the Service at risk of challenge by third parties that do not necessarily share in or trust our good working relationship. Analyses must logically lead the reviewer from current conditions, through potential effects of project implementation on listed species/critical habitat, to an effect determination.

U.S. Fish & Wildlife Service

National Conservation Training Center

Developing a Biological Assessment

ECS3152



FY 2008
Shepherdstown, WV

"Streamlining" Tools

Goals

- Encourage conservation benefits to listed species
- Expedite consultations
- Increase consistency and certainty for action agencies and applicants

"Streamlining" Tools

Objectives:

- Describe different approaches to streamlining consultations
- List benefits and costs associated with streamlining tools

"Streamlining" Tools

- Batching projects
- Project Design Criteria
- Guidance Criteria
- Consultation agreements
- Incorporation by reference
- Program-level consultations
- Other tools

Batching

Definition:

Putting several specific, planned projects together into one consultation – a "batch" of projects

Batching (cont.)

Characteristics of Actions:

- Similar in time frame or type, or geographic area
- Details are completely described (where, who, what, when, how, & why)
- Affecting the same species, or having similar effects

Batching (cont.)

- Similar actions within, or between two or more offices or agencies

Benefits:

- More projects in a single consultation / time frame

Batching Examples

- Road maintenance in 3 locations in X mountains
- A bridge, power line, and prescribed burn in southwestern willow flycatcher habitat near Y River
- Term grazing permits issued in year X on Y national forest

Project Design Criteria

Best Management Practices to:

- Avoid adverse effects
- Minimize or reduce adverse effects
- Incorporate conservation needs/ environmental commitments

Guidance Criteria

(for making effect determinations)

- Sets of conditions that, when met, guide you to a particular effect determination.
- Sometimes called "screens"
- May look like dichotomous "keys"
- Contain indicators of effects to :
  - Habitat
  - Individuals

Guidance Criteria (for making effect determinations) (cont.)

- The "keys" or indicators will guide you to familiar categories:
  - No effect
  - May affect, not likely to adversely affect or
  - May affect, likely to adversely affect

Consultation Agreements

- Definition:
  - A commitment between the action agency and the consulting agency
  - Identifies and resolves conflicts that may slow or block the process before they occur

Objectives of a Consultation Agreement

- To identify :
  - scope of the proposed action
  - the analysis steps that will be followed
  - appropriate level of signature
  - scale of the analysis necessary to complete program-level consultation or any consultation

Objectives of a Consultation Agreement (cont.)

- Designate staff and responsibilities
- Determine necessary timelines for completion of the consultation
- Initiate early interagency coordination
- Establish a dispute resolution process

Southwest Consultation Agreement Examples

- Lower Colorado River Operations – Bureau of Reclamation
- Land & Resource Management Plan Amendment for Species Other Than Mexican Spotted Owl, 1996 – USFS
- Yuma, Arizona Resource Management Plan Consultation Agreement

Incorporation by Reference
50 CFR 402.12(g)

Stipulations for fulfilling BA requirement

- Previously prepared BA
- Proposed action identical or very similar
- Add additional pertinent supporting data in certification document

Incorporation (cont.)

Certification Requirements

- Similar effects to same species in same geographic area
- No new species listed or proposed
- No new critical habitat designated or proposed for action area
- Original BA supplemented with relevant information changes

Program-level Consultations

Definition:

Consultations on programs that guide implementation of future actions by establishing standards, guidelines, or governing criteria to which future actions must adhere.

Program-level Consultations (cont.)

Incorporating species and habitat needs into the design phase of project development can greatly expedite the consultation process.

Program-level Consultations (cont.)

- Address broad activities or programs routinely implemented over large areas

Program-level Consultations (cont.)

Identify the types of programs you are dealing with.

- Forest timber harvest program
- Ongoing road maintenance
- Stream habitat improvement program
- Army Corps' wetland fill permitting program
- Grazing authorization program

Program-level Consultations (cont.)

- Describe parameters within which a type of routine action would occur
- Often include guidelines for protection or avoidance of effects

Program-level Consultations (cont.)

- Two-step analysis:
  - individual-level – evaluating effects to individuals of the species
  - landscape-level – evaluating effects to the landscape of the whole program

Program-level Consultations (cont.)

Identify what you ***don't know***, but focus on ***what you do know***.

Program-level Consultations (cont.)

Where uncertainty regarding future actions exists, the Services must project the potential effects of future actions while providing the benefit-of-the-doubt to the species

Program-level Consultations (cont.)

- If an action does not fit within the parameters of the program-level, separate consultation is needed
- Requires thinking together with the FWS ahead of time to clearly envision how this type of streamlining can work for a program

Program-level Consultations (cont.)

- Individual actions that "may affect" can still require site-specific consultation (project-level documentation)
- Enables quantification of and exemption for incidental take

Project-level Documentation

- Evaluates consistency with the program and program-level review
- Provides any additional information that is specific to the individual project

Project-level Documentation (Cont.)

- Tiers to the program-level documentation
- May incorporate information from the program-level documents through incorporation by reference

Program-level Consultations (cont.)

- Inci dental take is generally quantified at the program-level, but exempted at the project-level

Program-level Consultations (cont.)

Incidental take cannot be exempted at the program-level unless there is sufficient information to allow identification of the specific take that is reasonably certain to occur

Program-level Examples

- Sacramento Office Vernal Pool (COE)
- Military Training Route Overflights (USAF)
- AZ Strip Forest Health Treatments (BLM)
- Wild-Urban Interface Batched & Program-level Consultation (Fire): 2001 (USFS)
- 2003 USBR/CORPS Consultation on Middle Rio Grande Water Operations and Maintenance

Program-level Benefits

- Added predictability
- Less project level documentation is required
- Guidance criteria or conservation measures can be drawn from these for future use

Program-level Costs

- Early coordination requires significant staff commitments
- Shifts some of the workload to the action agency; however, this will pay off in the long run
- Frequent and effective communication is essential

Program-level Consultation Tip

- Project-level design must be consistent with, and within the side boards established by the program-level consultation
- Read and understand the program-level consultation

Interim Program-level Guidance

Status

Warf, Jennifer E

From: Andrew_King@fws.gov
Sent: Thursday, February 07, 2008 2:54 PM
To: Warf, Jennifer E; Eubank, Christopher T Mr NGIN
Cc: Scott_Pruitt@fws.gov
Subject: RE: FW: Indiana National Guard - BA for Indiana Bat
Attachments: CAJFMTC_dBA_27SEP07 BFO Comments.doc

Jennifer and Todd,

I've completed my review of the Draft BA and have included my edits/comments in the attached file. Overall, I found the BA to be very well written and well organized. Good job. As I see it, one of the biggest issues that needs to be addressed is the Service's need for each activity to be specifically quantified in some logical fashion. We need to put better "side boards" on what you are proposing to do into the future (not just what use levels have been in recent years) at CAJMTC each year or over some set period of time (say the next 10 years). Otherwise, we cannot conduct an adequate effects analysis or establish annual/decadal limits of take in an incidental take statement. We will also need a lot more site-specific details regarding habitat impacts from development of the MPMG range.

After you have had a chance to read through my comments, please let me know if you any questions and/or would like to schedule a conference call to discuss things more thoroughly.

Sorry for all the red edits/comments in the BA, it really wasn't in as bad shape as it may at first appear.

Thanks for the opportunity to review the draft BA and sorry for the delay.

Andy

_____
R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

02/06/2008 09:53 AM

To <Andrew_King@fws.gov>
cc
Subject RE: FW: Indiana National Guard - BA for Indiana Bat

Andy,

No problem. I completely understand.

Thanks for the update.

Jen

From: Andrew_King@fws.gov [mailto:Andrew_King@fws.gov]
Sent: Tuesday, February 05, 2008 10:33 AM
To: Warf, Jennifer E
Subject: RE: FW: Indiana National Guard - BA for Indiana Bat

Sorry for the delay. Over the past two weeks I pretty much had to drop everything to coordinate efforts to address the white nose syndrome that is killing thousands of bats in the NY and VT and may be spreading.

http://www.fws.gov/midwest/Endangered/mammals/inba/BatAilment.html

I will send you BA comments asap, hopefully later today.

R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

02/04/2008 05:47 PM

To <Andrew_King@fws.gov>
cc
Subject RE: FW: Indiana National Guard - BA for Indiana Bat

Andy,

I wanted to check in with you on the status of the BA comments. I should be around all week if you need to reach me.

Thanks,
Jen Warf

Jennifer E. Pyzoha Warf
Environmental Planner
AMEC Earth & Environmental, Inc.
960 Kingsmill Parkway Suite 104
Columbus, OH 43229

Office: 614.430.0487
Fax: 614.430.0488
jennifer.pyzoha@amec.com

From: Andrew_King@fws.gov [mailto:Andrew_King@fws.gov]
Sent: Thursday, January 24, 2008 3:17 PM
To: Warf, Jennifer E
Subject: RE: FW: Indiana National Guard - BA for Indiana Bat

Overall, I think you've done a very good job. There are a few global issues though. For example, I am going to need a better estimate or quantification of activities or impacted acres of forest habitat before I can attempt to set limits of incidental take in an incidental take statement.

Last September, we changed the allowable tree cutting dates for Indiana bats in the State of Indiana to 1 April to 1 October. So, you will need change these dates throughout the BA.

So, no huge problems. Just some more clarification and more concrete quantification is needed (this may have to be maximum estimates/worst-case scenarios), especially for the activities in Table 20 that you have determined are likely to adversely affect the bat.

I found the BA very easy to read. Good Job.

I'll try to get my comments inserted into the BA and back to you and CAJMTC by the end of the day tomorrow. Then we should probably plan to discuss things over the phone.

Thanks,

Andy

R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

01/24/2008 02:54 PM

To <Andrew_King@fws.gov>
cc
Subject RE: FW: Indiana National Guard - BA for Indiana Bat

Out of curiosity. Are we in fairly decent shape?

I want to discuss the radio frequency research with you and whether we should include it or not. I am having no luck getting information on it. It is not an INARNG activity. It is a DoD activity (through the Crane Naval Station I believe). You may recall the discussion about it from our meeting way back when. Anyway maybe we can chat about this. I would like to get your take on how to deal with it.

Thanks.
Jen

From: Andrew_King@fws.gov [mailto:Andrew_King@fws.gov]
Sent: Thursday, January 24, 2008 2:47 PM
To: Warf, Jennifer E
Subject: RE: FW: Indiana National Guard - BA for Indiana Bat

Awesome. Thanks.

R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

01/24/2008 02:37 PM

To <Andrew_King@fws.gov>
cc
Subject RE: FW: Indiana National Guard - BA for Indiana Bat

Andy,

Here you go.

Jen

From: Andrew_King@fws.gov [mailto:Andrew_King@fws.gov]
Sent: Thursday, January 24, 2008 2:36 PM
To: Warf, Jennifer E
Subject: Re: FW: Indiana National Guard - BA for Indiana Bat

Jennifer - I've finally completed my review of the Draft BA. Is there anyway you could send me an electronic version of the document? That way I could highlight things and insert my comments much easier.

Thanks,

Andy

R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

01/09/2008 09:32 AM

To <Andrew_King@fws.gov>
cc
Subject FW: Indiana National Guard - BA for Indiana Bat

Andy,

I hope you got a chance for some relaxation over the holidays.

I know when we last spoke you were pretty busy due to computer issues. I wanted to check in with you to see if you had gotten a chance to look over the preliminary BA for the Indiana National Guard.

Please feel free to give me a call if you would like to discuss or have any questions.

Jen

****

Jennifer E. Pyzoha Warf
Environmental Planner
AMEC Earth & Environmental, Inc.
960 Kingsmill Parkway Suite 104
Columbus, OH 43229

Office: 614.430.0487
Fax: 614.430.0488
jennifer.pyzoha@amec.com

From: Andrew_King@fws.gov [mailto:Andrew_King@fws.gov]
Sent: Monday, November 26, 2007 9:43 AM
To: Warf, Jennifer E
Subject: Re: Indiana National Guard - BA for Indiana Bat

Hi Jennifer.

Yes, I will be looking over the preliminary BA for our office. I appreciate your clarification. My PC has been down for 3 weeks and I'm finally getting my new one configured today. So, I have some catching up to do, but I hope to get to the BA later this week.

Thanks,

Andy

_____

R. Andrew King
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Bloomington Field Office
620 S. Walker Street
Bloomington, IN 47403
Phone: 812-334-4261 x216
Fax: 812-334-4273

"Warf, Jennifer E" <jennifer.pyzoha@amec.com>

11/26/2007 09:04 AM

To <Andrew_King@fws.gov>
cc
Subject Indiana National Guard - BA for Indiana Bat

Andy,

I heard that the Indiana Army National Guard (INARNG) sent you a copy of the internal draft BA for the Indiana bat. I wanted to make sure that you knew you did not have to thoroughly review this draft. The INARNG sent it to you to give you the opportunity for a cursory review. We suggested this might be a good idea considering the problems in the past. This way any glaring issues could be addressed before formal consultation. Hopefully, this BA is closer to what the agency is looking for.

Will you be the one reviewing the BA or is I-69 taking up the majority of your time?

Thanks,
Jen

Jennifer E. Pyzoha Warf
Environmental Planner
AMEC Earth & Environmental, Inc.
960 Kingsmill Parkway Suite 104
Columbus, OH 43229

Office: 614.430.0487
Fax: 614.430.0488
jennifer.pyzoha@amec.com

[attachment "CAJFMTC_dBA_27SEP07.doc" deleted by Andrew King/R3/FWS/DOI]

Warf, Jennifer E

Subject: FW: Ongoing Mission Consultation (UNCLASSIFIED)

-----Original Message-----
From: Scott_Pruitt@fws.gov [mailto:Scott_Pruitt@fws.gov]
Sent: Thursday, July 30, 2009 12:21 PM
To: Jones, Richard W LTC NGIN
Cc: Andrew_King@fws.gov; Peterkin, Michael D CIV NGIN
Subject: RE: Ongoing Mission Consultation

Dear LTC. Jones,

As we have discussed and have communicated to your staff over the years(1), Camp Atterbury has not yet completed a comprehensive endangered species consultation with our office regarding potential adverse affects from its ongoing military training exercises since the Indiana bat (Myotis sodalis) was first documented on the base in 1997. Section 7 of the Endangered Species Act (ESA) requires all federal agencies to consult with the U.S. Fish and Wildlife Service on any activity that may directly or indirectly affect a federally listed species. To date, we have completed one formal consultation for the construction and operation of the Multi-Purpose Training Range (MPTR) and numerous informal consultations on a project-by-project basis. However, Camp Atterbury has not yet taken a big-picture or programmatic approach of its full compliment of ongoing activities or analyzed whether the cumulative effects of these activities and other projects may individually or cumulatively cause adverse effects or lead to "incidental take" of the Indiana bat. To be in full compliance with the ESA, any anticipated incidental take of bats from ongoing mission activities, must be authorized by an Incidental Take Statement issued by the Service, provided that such take will not jeopardize the continued existence of the listed species.
Therefore, if some level of take is anticipated (e.g., death of one or more bats), it is in Camp Atterbury's best interest to complete a formal consultation with our office to analyze any impacts stemming from the ongoing mission and to avoid and minimize any anticipated incidental take of Indiana bats.

At this point, we anticipate using either an "appended" or "tiered" programmatic consultation approach when completing our biological opinion (BO) for Atterbury's ongoing mission (OGM). The Service and federal agencies (e.g., National Forests, Fed. Highway Administration/State DOTs) have successfully used both of these programmatic approaches for many years to meet their ESA requirements. We previously provided you with a copy of the Biological Assessment (BA) prepared for the I-69 extension project in Indiana as an example of a programmatic-level consultation format. Additional information on Section 7 consultation is contained in he Service's Consultation Handbook (available for downloading at http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm). The following website contains some additional guidance related to programmatic consultations. This guidance was specifically developed for transportation projects administered under the Federal Highway Administration. So, while not all the information would apply to Camp Atterbury's situation, the programmatic consultation process and key concepts are addressed.
<http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm>
http://www.fws.gov/endangered/consultations/DOT-guidance.html
<blockedhttp://www.fws.gov/endangered/consultations/DOT-guidance.html>

A particular issue that we would like the Atterbury BA to attempt to address is the numerous, regularly occurring/routine activities and projects. While many of these are often small in size/scale, their cumulative impacts on Indiana bat habitat need to be addressed through time. The programmatic consultation will analyze all of these individual impacts in concert with one another. Once the programmatic-level consultation for the OGM has been completed, future projects will continue to be reviewed by our office to see if their impacts are consistent with those that were anticipated and included in the types of

projects and activities that were addressed in the OGM (i.e., a consistency analysis will be completed). If impacts and any associated take are found to be consistent with those analyzed in the OGM BA/BO then those projects and any associated take will be quantified and accounted for in a spreadsheet and "appended" or "tiered" to the programmatic BO. In short, this process will expedite future projects that individually or cumulatively will result in take of bats. Future projects that will not cause take will continue to receive a concurrence letter from our office.

Once the biological assessment for the ongoing mission is completed, a determination on the need for formal consultation will be made by the Service. Formal consultation is required when a Federal action is likely to adversely affect listed species. When it is determined that an action may affect, but is not likely to adversely affect listed species, the consultation between the action agency and the Service may be handled informally (see 50 CFR §402.11 for further information on the informal or early consultation process). If formal consultation is necessary, a programmatic biological opinion will be developed by the Service in consultation with Camp Atterbury. The programmatic biological opinion will:
(1) describe all of the proposed/ongoing projects/activities; (2) contain suggested avoidance/minimization measures, placed in the project description, if appropriate; (3) describe the status and environmental baseline of listed,

proposed, and candidate species in the project area; (4) reiterate potential effects of the project actions as evaluated in the biological assessment; and, (5) possibly describe limits to the amount of project impacts, take, and habitat affected and/or lost. A jeopardy analysis will be completed to determine whether the ongoing mission would jeopardize the Indiana bat's future existence.

The Service will evaluate the appropriateness of providing an incidental take statement at the programmatic versus the site-specific level. Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibits the take of endangered and threatened species, respectively, without special exemption. Take is defined by the Act as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.
Additionally, an action may destroy or adversely modify designated critical habitat. Per 50 CFR §402.02, "destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.
Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical."
In accordance with these sections of the Act and Federal regulations, in the programmatic consultation, it may be important to set limits on the level of impact, number of individuals of a listed species taken, or the amount of habitat affected or lost. Recovery plans, regional guidance and other programmatic biological opinions should indicate the necessity for setting these limits.
These limits will be used to determine whether future on-site projects/activities at Camp Atterbury fit within the programmatic framework.

The consultation must have a monitoring component if the programmatic consultation authorizes incidental take. Additionally, if incidental take is not authorized at the programmatic level, the programmatic consultation should provide a framework for monitoring and reporting incidental take that
may be authorized for individual projects in the future. A database containing an interactive means of reporting and updating incidental take (or its surrogate measure, e.g., acres of forest lost/affected) is crucial to the success of the programmatic consultation process. Agencies requesting formal consultation for projects involving the incidental take of a listed species must monitor the impacts of incidental take as required by the Act: agencies "must report the progress of the action and its impact on the species" (50 CFR §402.14(i)(3)). This monitoring is important in tracking actions assessed within the programmatic biological opinion. Monitoring provides the Service FO with information essential to assessing the effects of the various actions on listed species and designated critical habitat. The information should be used to amend, as appropriate, the programmatic biological opinion and site-specific biological opinions, RPAs, reasonable and prudent measures (RPMs), terms and conditions, and to make any necessary adjustments to the baseline.

Project monitoring will be designed to do the following: (a) detect the adverse effects resulting from the proposed action; (b) detect when the level of anticipated incidental take is approached; (c) raise a red flag if the level of anticipated incidental take is exceeded; and, (d) determine the effectiveness of RPMs. The date for the Agencies to transmit monitoring reports will be negotiated during the programmatic consultation process.
Minimally, the monitoring reports will be due annually (same as for the MPTR now).

Should you have any questions or require additional information/clarification, please feel free to contact me or Andy King.

Sincerely,

Scott Pruitt

(1) This language was included in several concurrence letters that were issued to Camp Atterbury dating back to at least 2002...
"While we believe the removal of four snags (i.e., suitable bat roost trees) and 17 live trees is in itself an insignificant effect (i.e., size of the impact does not reach the scale where take of habitat occurs), we emphasize that the Service does not encourage the removal of suitable bat habitat as a means of avoiding take, and will not consider this as a viable approach for larger scale projects. As previously indicated, we believe Camp Atterbury will need to initiate formal section 7 consultation with the Service to address incidental take of Indiana bats associated with the aggregate or cumulative effects of day-to-day projects and other programmatic activities that are required to met the installation's ongoing mission. Having said this, we authorize the clearing of trees in these three areas to proceed provided that the condition mentioned above is met (i.e., trees will be cut between 15 Sept. and 15 April)." Excerpt from a letter dated 12 December
2002 sent to Lara C. Coutinho.

Classification: UNCLASSIFIED
Caveats: NONE

DEPARTMENT OF THE ARMY
CAMP ATTERBURY JOINT MANEUVER TRAINING CENTER
PO Box 5000
Edinburgh, Indiana 46124-5000

REPLY TO
ATTENTION OF

CAJMTC-ENV 22 February 2008

Scott E. Pruitt
United States Department of Interior
Fish and Wildlife Service
Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121

Dear Mr. Pruitt:

Camp Atterbury Joint Maneuver Training has received the revised forest management guidelines dated 14 February 2008.

Camp Atterbury JMTC will follow the new guidelines with regards to forest management and prescribed fire activities to help aid with the recovery of the Indiana bat.

The following page is an errata sheet that is to be placed in the front of our INRMP to reflect changes with respect to the new guidelines.

Feel free to contact me at anytime with any questions or concerns with these activities at Camp Atterbury JMTC.

Sincerely,

Todd Eubank
Conservation Director

Errata Sheet
Camp Atterbury JMTC Integrated Natural Resource Management Plan
2007 Revision
22-Feb-08

Item #	Description	Location	Rationale
1	Remove: cutting and smoke use restrictions and replace with: prescribed fire guidelines.	Chapter 6.3 page 10 paragraph 2 line 5	Better fit.
2	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.6 page 24 paragraph 1 Bullitt 3	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
3	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.6 page 24 paragraph 4 Bullitt 2 line 2	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
4	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.6 page 24 paragraph 5 line 3	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
5	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.8 page 36 paragraph 2 line 6 & 7	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
6	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.8 page 41 paragraph 6 line 1 & 2	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
7	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Chapter 6.8 page 46 paragraph 1 Bullitt 5 line 1	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
8	Replace old guidelines with new ones.	Appendix E	New guidelines to replace old ones.
9	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 2.24 page 24 paragraph 2 line 7	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
10	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 3.0 page 29 Bullitt 1 & 2	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
11	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 4.1.1 page 31 #6 line 1	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
12	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 4.1.2 page 32 paragraph 3 Bullitt 2.1	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
13	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 4.1.3 page 32 paragraph 1 Bullitt 2 line 2	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
14	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 4.1.3 page 32 paragraph 3 line 3	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.
15	Remove: 15 April and 15 September and replace with: 1 April and 30 September	Appendix D section 4.1.6 page 34 paragraph 8 line 3	New data showing Indiana bats arrive at summer habitat earlier and leave later than previous dates.

United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

12 December 2007

Todd Eubank
Camp Atterbury JMTC
Building #609, Gatling Street
PO BOX 5000
Edinburgh, IN 46124

RE: Proposed used of three new herbicides at Camp Atterbury JMTC: ForeFront™ R&P,

Dear Mr. Eubank:

We received your letter at the Bloomington Field Office (BFO) of the U.S. Fish and Wildlife Service (Service) on 18 October 2007 detailing the proposed action referenced above. We have evaluated the provided information to assess whether we concur with your determination that the proposed project is not likely to adversely affect federally endangered Indiana bats (*Myotis sodalis*). These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (l6 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of l969, the Endangered Species Act of l973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

ForeFront™ R&P - We understand that Camp Atterbury is proposing to allow its lessee to apply ForeFront™ R&P to control undesired broadleaves within the five agricultural lease areas on the base. These lease areas are being used for hay production and Carolina horsenettle and common milkweed and other broadleaves have become a "major problem." The active ingredient in ForeFront R&P is 2,4-D, which has a low toxicity to mammals.

Butyrac® 200 and **Poast Plus®** - We understand that Camp Atterbury is proposing to use these two herbicides to maintain wildlife plantings (primarily planted to clover) on firebreaks and other open areas such as landing zones and firing points. Butyrac 200 contains 2,4-D and is used to control broadleaves. The active ingredient in Poast Plus is sethoxydim, which is used as a selective, broad spectrum, postemergence herbicide for controlling annual and perreniel grasses. Both of these herbicides were chosen because they are compatible with and useful for maintaining clover-based food plots.

Restrictions to Herbicide Use - We understand that Camp Atterbury intends to follow the same guidelines that the BFO developed for use at Newport Chemical Depot. In short, these

guidelines required the following:

- No aerial applications,
- No pesticide applications within a 66-foot buffer zone around any forested area,
- No pesticide applications in gusty winds or when wind speeds exceed 5 mph,
- No applications that may cause drift, and
- Pesticide applications will be limited to between 30 minutes after sunrise and 30 minutes before sunset.

In addition to the restrictions above, the BFO requests that the following guidelines be followed:

Restriction for all 3 Herbicides (ForeFront R&P, Butyrac 200, and Poast Plus)

- A minimum buffer from surface water of 150 feet will be maintained

Restrictions for 2,4-D Herbicides (ForeFront R&P and Butyrac 200)

- Pesticide will not be applied on gravel, sand, or sandy loam soils
- Pesticide will not be applied on sites where groundwater is less than 10 feet from surface.

Because (1) these three pesticides have generally low toxicity to mammals, (2) protective buffers will established around forested areas and surface waters (e.g., Sugar Creek, Drift Wood River, Nineveh Creek and Tribs.), and (3) protective restrictions and all label directions will be followed any adverse affects to Indiana bats will be insignificant or discountable. Therefore, we concur with your determination that the proposed use of these herbicides is not likely to adversely affect Indiana bats, and may be used as proposed.

This precludes the need for further consultation on the use of these herbicides as required under section 7 of the Endangered Species Act of 1973, as amended. If, however, new information on endangered species within the proposed project area becomes available or if significant changes are made to the proposed uses, then please contact Andy King at (812) 334-4261 ext. 216 or Andrew_King@fws.gov for further consultation.

Sincerely,

Michael S. Pruitt

Scott E. Pruitt
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

IN REPLY REFER TO:
FWS/AF

AUG 10 2001

Lieutenant Colonel Rick Jones
Military Department of Indiana
2002 South Holt Road
Indianapolis, Indiana 46241-4839

Dear Lieutenant Colonel Jones:

This letter of mutual agreement is provided in response to a July 13, 2001, letter from the Tetra Tech, Incorporated, requesting U.S. Fish and Wildlife Service concurrence on the Camp Atterbury Integrated Natural Resource Management Plan (Atterbury INRMP) they prepared on your behalf.

Our Bloomington Field Office has worked closely with your staff in the preparation of the Atterbury INRMP and we fully support their recommendation to concur with the Atterbury INRMP. We appreciate your efforts to conserve natural resources on military lands while fulfilling the military mission and your willingness to work collaboratively with the Service.

Please contact Brian Lubinski, at (612) 713-5114, if we can be of further assistance.

Sincerely,

Marvin E. Moriarty
Acting Regional Director

IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, Indiana 47403-2121
(812) 334-4261 FAX 334-4273

May 7, 2001

Michael P. McGowen
LTC, GS, INARNG
Post Commander
Headquarters Camp Atterbury
Maneuver Training Center
Edinburgh, Indiana 46124

Dear Lieutenant Colonel McGowen:

This is the U.S. Fish and Wildlife Service's (Service) response to the April 16, 2001 request for comments on the Integrated Natural Resources Management Plan (INRMP) and Endangered Species Management Plan (ESMP) for Camp Atterbury, Indiana. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, as amended (ESA), and Service Mitigation Policy.

The INRMP is thorough and provides a good framework for the management of natural resources on the facility. The Service particularly wants to commend the Army for efforts to conserve the Federally-endangered Indiana bat (*Myotis sodalis*) on the facility. Camp Atterbury supports one of the highest known concentrations of Indiana bat maternity colonies known in the State of Indiana. Since the discovery of Indiana bats at Camp Atterbury in 1997, the Service's Bloomington Field Office (BFO) has worked closely with Camp Atterbury to insure that activities on the base were in compliance with the ESA. The INRMP reflects that the Army is not only committed to meeting ESA requirements, but also to the long-term conservation of the Indiana bat at Camp Atterbury.

Specific comments, referenced by page number, follow. Page references refer to the INRMP unless otherwise noted.

INRMP Comments

1. In the August 1998 Biological Assessment: Effects to Indiana Bats and Bald Eagles from the Construction and Operation of the Proposed Multi-Purpose Training Range, the Military

Department of Indiana proposed to set aside 270 ha of Indiana Bat Management Zones (IBMZs) to minimize the impacts of clearing required for the Multi-Purpose Training Range (MPTR) on Indiana bats. The Service incorporated the establishment of IBMZs into the Biological Opinion which was issued on December 4, 1998. The Service amended the Biological Opinion on November 6, 2000 to allow for additional tree clearing that was required for the construction of the MPTR. As the result of this amendment, an additional IBMZ was established, bringing the total acreage of IBMZs on the facility to 314.6 ha.

Throughout both the INRMP and the ESMP there are references to the IBMZs that have been established on Camp Atterbury. Some of these references fail to reflect the changes in the IBMZs that were made in conjunction with the November 6, 2000 amendment to the Biological Opinion. For example, maps on pages 4-20 and 5-104 do not include the IBMZ added in November 2000, and they also do not reflect the portions of the existing IBMZs that were cleared for MPTR construction. There are also references in the text (e.g., page 4-22 of the INRMP and page 4-4 of the ESMP) that 667 acres have been set aside for IBMZs; this figure does not reflect the changes resulting from the November 6, 2000 amendment.

2. Page 5-23 states: "Snags and dead trees will be removed if they interfere with landscape objectives or if their presence endangers personnel, roadways, power lines, buildings, training structures, or high-use areas such as bivouac areas." We recommend that this statement be modified to reflect that Atterbury will continue to consult with the Service, to the extent practical, regarding potential impacts to the Indiana bat when removing snags.

3. Page 5-24. In order to maximize the value of wood duck boxes on Camp Atterbury, we recommend that you carefully consider placement of boxes. If present, natural tree cavities are preferred over nest boxes. Placement of boxes has been shown to affect intra specific brood parasitism rates (Semel and Sherman 1995). Bellrose and Holm (1994) provide guidance on wood duck nest box placement. Summaries of these references are enclosed. The Waterfowl Biologist from the Indiana Department of Natural Resources, Division of Fish and Wildlife, may be able to provide additional guidance on this point.

4. Page 5-25. Times designated for burning (March to early April and October to November) occur outside the Indiana bat maternity roosting season (April 15 - September 15). Therefore, potential impacts on roosting bats are avoided. It should be noted that if burning occurs during the maternity roost season that the Service would be contacted regarding potential impacts on Indiana bats.

5. Figures 5-3 and 5-4 provide information on the density and distribution of mature trees. This information is helpful in evaluating the quality of Indiana bat habitat. However, the light blue shading (which covers the bulk of the map) is not represented in the legend; does that area have no mature trees? Is any tree of the species listed on page 5-43 considered a "potential bat roosting tree" (as used in Figure 5-3) regardless of the diameter of the tree?

6. The description of the roosting habitat needs of Indiana bats in section 5.10.1.1 (pages 5-80-81) includes the statement: "The colonies may consist of more than of 100 adult females, and in one season, the bats may use two to four different roost trees." Research has demonstrated that the number of roost trees used by one maternity colony varies across the range of the species, and among years, but most colonies that have been studied have used in excess of four roost trees during a maternity roosting season. For example, research conducted on Camp Atterbury in 1998 suggested that the most intensely studied maternity colony used two primary roosts (used by more than 30 bats on more than one occasion) and nine alternate roosts (used less frequently and by fewer bats). Another study conducted in central Indiana in 1999 revealed that one maternity colony used one primary and 12 alternate roosts. It should be pointed out that these numbers represent the minimum number of roosts used by the colonies; this is the number of roosts in which radio-tagged bats were known to be located. Almost certainly, additional roosts were used by the colony and not detected.

The major point that should be emphasized in the discussion of roosting habitat is that a maternity colony of Indiana bats requires a large number of roost trees which provide a variety of roosting conditions within the range of the colony. Therefore, the emphasis of roost tree management should not be on individual trees, but rather on providing a good supply of suitable roost trees and managing to sustain the supply of roost trees over time. This, in fact, is the approach that is being applied at Camp Atterbury.

7. Page 5-81 indicates that the USFWS issued a Biological Opinion on the MPTR in 1999. The Opinion was issued on December 4, 1998.

8. Page 5-86 indicates that "an Indiana bat monitoring program will be established and conducted yearly." (Pages 5-122 and 5-129 also contain references to an annual monitoring program). We recommend noting that the monitoring program is currently being developed in consultation with the Service.

9. Page 5-110 includes the statement: "There has been no documented use of snags on Camp Atterbury." There has been documented use of snags by Indiana bats.??

10. Page 5-120 indicates that 778 acres has been set aside as IBMZs on Camp Atterbury, which we agree is the correct acreage. However, the statement that 630 acres of the IBMZs are forested may not be accurate. It is not clear to us that this figure reflects the additional clearing done in 2000, which included a portion (8.9 ha) of an existing IBMZ that was forested (reference September 19, 2000 and October 13, 2000 letters from Camp Atterbury to the Service's Bloomington Field Office).

11. Extensive comments on state and federal status of species listed in Appendices D and E were provided in the Service's comments on the Draft INRMP (this letter is included in Appendix A of the INRMP), but corrections were not incorporated into the INRMP. We recommend that these corrections be incorporated, particularly with reference to Federal Candidate species.

ESMP Comments

1. Section 2.2.2 Distribution. Updated information is available on hibernacula in Indiana. Based on 1999 hibernacula counts, the largest hibernacula in the State was located in Greene County, approximately 60 km southwest of Camp Atterbury. During the 1999 hibernacula count, Indiana bats that had been banded at Camp Atterbury during the summer of 1998 were documented in that cave. This cave is now a Priority 1 hibernacula.

2. Section 2.2.3 Habitat Requirements. Some of the information in the INRMP was derived from the 1999 Draft Indiana Bat Recovery Plan. Unfortunately, portions of this draft plan misrepresented some of the information on Indiana bat summer habitat requirements. These portions of the plan will be revised. The draft plan includes comments regarding Indiana bat use of "highly altered landscapes" and the potential that Indiana bats may benefit from "habitat disturbance." There is no scientific evidence to support the contention that Indiana bats respond positively to habitat disturbance. These are generalizations that do not accurately portray the current state of understanding of Indiana bat summer habitat. These comments suggest that because Indiana bats have been found in altered landscapes that these are preferred, and do not account for the fact that most forested habitat remaining within the range of Indiana bats has been "disturbed." The draft plan also does not account for the role of philopatry in roost tree selection by Indiana bats on sites that have been altered. As noted in the draft recovery plan, it is well documented that Indiana bats exhibit fidelity to their summer home range. An Indiana bat maternity colony on a disturbed or altered site may be selected not so much on the basis of habitat suitability as site fidelity. The fact that bats are found in an area that is altered does not necessarily indicate a preference on the part of the bats or that the area provides high quality habitat. Potentially, it may just be an artifact of site fidelity; the bats return to the area even if the alteration has lowered the habitat quality of the site.

The highest densities of Indiana bat maternity colonies found to date in the State of Indiana have been associated with relatively large blocks of mature to over-mature forests. Camp Atterbury is an excellent example of such a site.

Another example of "disturbance" discussed in the draft plan that is referenced in the INRMP is cutting down a maternity roost tree. The following statement occurs in the draft plan:

> "A couple of maternity colonies, including the first discovered maternity roost in Indiana, were found when a tree was cut down and the bats moved to another tree. These observations suggest that the Indiana bat may be a more adaptable species than previously thought."

We cannot conclude from this statement that trees containing Indiana bat maternity colonies can be cut down, while the bats are present, without harm to the colony. The observation of displaced bats moving to another tree certainly does not provide evidence that the bats were not harmed. The bats would be expected to flee when the tree was cut down; the alternative would

be for the bats to remain in the tree throughout the disturbance caused by the cutting and felling of the roost tree. The ultimate fate of those bats, not their immediate reaction to the cutting of the tree, is the issue. Possibly, the bats simply moved to another tree and survived, although there is documentation of direct mortality of Indiana bats associated with the cutting of a roost tree. In addition, it is also probable that some bats in a felled tree may survive the felling of the roost, but subsequently experience stress-related mortality, decreased productivity, or other potential forms of harm related to the loss of the maternity roost.

3. Section 4.1.1 Forest Management. The INRMP incorporates the Bloomington Field Office forest management guidance for Indiana bats. It should be noted that this guidance was designed to avoid take of Indiana bats associated with forest management activities. If this guidance is followed during forest management activities, the Service has determined that the activity is not likely to adversely affect the Indiana bat, and therefore further consultation is not required. For activities that cannot be conducted within the scope of this guidance, then additional consultation will be required. For example, as noted in the INRMP, the Service will be consulted regarding TSI activities on cottonwood trees within 100 feet of a perennial stream or 50 feet of an intermittent stream. Similarly, it should be noted that harvest of trees for road maintenance projects during the Indiana bat reproductive season will also require consultation on a case-by-case basis (unless consultation on these activities is covered during the consultation on training and mission-related activities).

4. Section 4.1.2 Indiana Bat Management Zones. Page 4-4: total area of IBMZs on the facility is not accurate. Page 4-5 discusses management measures that will be implemented in the IBMZs. The Biological Opinion issued on the MPTR states: "Silvicultural manipulation in Indiana Bat Management Zones will be limited to activities intended to enhance summer habitat for Indiana bats, and will be developed in consultation with and approved by the Service." The Opinion further states that management prescriptions to be implemented in the IBMZs will be cooperatively developed by the Service and the Army based on information collected during habitat evaluations that will be conducted in the bat management zones. Until procedures for habitat evaluation are developed and implemented, management prescriptions should not be initiated.

5. Section 4.1.8 Annual Report to the U.S. Fish and Wildlife Service. The following Term and Condition from the December 1999 Incidental Take Statement should be included in the information required in the annual report:

"Camp Atterbury will use results of biomonitoring conducted at Fort Leonard Wood, Missouri to evaluate potential toxicological effects of M18 colored smoke grenades to Indiana bats. During January through March 1999-2003, Camp Atterbury will review results presented in annual reports prepared by Fort Leonard Wood and submitted to the Service as required by the Terms and Conditions in the Biological Opinion/Take Statement for Base Realignment and Closure activities at Fort Leonard Wood. Chemical analyses of surrogate bat tissue (whole body analyses), gross anatomical and histopathological tissue analyses of surrogate bat lung tissue,

chemical analyses of guano, and chemical analyses of fish and sediment shall be reviewed. If detectable amounts of terephthalic acid (TPA) or lung damage are noted in samples collected at Fort Leonard Wood, but not in samples collected at reference sites, Camp Atterbury shall initiate an investigation to assess the potential for M18 colored smoke grenades to cause injury to Indiana bats at Camp Atterbury. A draft study plan for investigating effects of M18 colored smoke grenades shall be submitted to and approved by the Service at least 60 days prior to initiation of the proposed study."

6. Section 4.2 Monitoring. "Species" should be added to the minimum information required for each bat captured.

We appreciate the opportunity to comment on the Camp Atterbury INRMP and look forward to continued cooperation with the Army in the completion of the plan. This plan reflects that endangered, threatened and rare species are valued for their contributions to the unique natural heritage of Camp Atterbury, and the Service fully supports the Army's goal of protecting those resources. If you have any questions or require additional technical assistance, please contact Lori Pruitt at (812) 334-4261, extension 211.

Sincerely yours,

Scott E. Pruitt
Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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IN REPLY REFER TO:

November 6, 2000

Michael P. McGowen
LTC, GS, INARNG
Post Commander
Headquarters Camp Atterbury
Maneuver Training Center
Edinburgh, Indiana 46124

Dear Lieutenant Colonel McGowen:

This letter constitutes the U.S. Fish and Wildlife Service's (Service) amendment to the December 4, 1998, Biological Opinion on the Construction and Operation of the Multi-Purpose Training Range (MPTR) at the Camp Atterbury Army National Guard Training Site, located in Edinburgh, Indiana (Bartholomew, Johnson, and Brown Counties). This amendment has been prepared in response to your letter of October 13, 2000, which detailed additional tree clearing that will be required for the construction of the MPTR that was not considered in the Army's August 1998 Biological Assessment: Effects to Indiana Bats and Bald Eagles from Construction and Operation of the Proposed Multi-Purpose Training Range (hereafter referred to as the biological assessment), or in the subsequent biological opinion prepared by the Service's Bloomington Field Office (BFO). In addition to your letter of October 13, additional sources of information used to prepare this amendment included: 1) your letter dated September 19 (requesting guidance from the Service on how to proceed with consultation); 2) phone calls with your Environmental and Natural Resources staff; 3) a site visit to Atterbury by a BFO biologist, accompanied by Nancy McWhorter of your staff, on October 26, 2000.

The 1998 Final Environmental Impact Statement for the Proposed Upgrade of Training Areas and Facilities and the biological assessment indicated that construction and operation of the MPTR would result in the clearing of 99.7 hectares of forested habitat suitable for summering Indiana bats (*Myotis sodalis*). Tree clearing was conducted from January to April 1999. No trees were felled within the MPTR construction boundaries during the Indiana bat reproductive season (April 15 through September 15) to avoid injuring or killing bats by felling a roost tree when bats were present. To minimize the impacts of habitat loss to Indiana bats, Camp Atterbury set aside 270 hectares, of which 201 acres were forested, for Indiana Bat Management Zones (BMZs). Management of the BMZs is limited to activities that will enhance the value of the areas for Indiana bats. BMZs were located adjacent to the proposed MPTR to provide habitat for individual

bats that would experience habitat loss associated with the construction and operation of the MPTR.

As a result of the Army updating Tank and Gunnery Standards, upon which the MPTR was designed and is being built, additional tree clearing is needed to complete construction of the MPTR. Specifically, an additional 21.3 ha of trees need to be cleared to allow for targets to be relocated and to accomplish the line of sight to accommodate the change in target locations. Of that 21.3 ha, 8.9 ha are in the BMZ, to the north of the original construction boundary, and the remaining 12.4 ha are areas adjacent to the construction boundary in the southern portion of the MPTR. A map of the areas to be cleared (enclosure 2 in your October 13 letter) is hereby incorporated by reference.

The Army will take the following steps to avoid and minimize take associated with the additional clearing that is required:

1. None of the additional clearing will be done during the Indiana bat reproductive season (April 15 through September 15).

2. The Army will establish an additional 53.5 ha of BMZ in the northeastern corner of the installation. The map of this area (provided in your October 13 letter) is hereby incorporated by reference. With the 261.1 ha of BMZ that will remain to the north of the MPTR, this will bring the total acreage of BMZs on the facility to 314.6 ha.

3. Within the 261.1 ha of BMZ that is adjacent to the MPTR to the north, the Army will establish permanent water sources (small ponds) to provide additional drinking water and foraging habitat for Indiana bats. The lack of open water areas has been identified as a potential limiting factor to bats in this area. The Army will establish at least 1 acre of open water (total of at least one acre can be in one or more ponds) in the BMZ prior to the April 15, 2002.

The above avoidance and minimization procedures are expected to offset the negative effects of the additional clearing that will be required to complete the MPTR, and may potentially result in a net benefit for Indiana bats. The 21.3 ha of forested habitat that will be cleared (including 8.9 ha of BMZ) will be replaced with an additional 53.5 ha of BMZ. The replacement BMZ is in a portion of the base that gets minimal use for training, and the level of disturbance in this area is low. The area is also known to be used by Indiana bats. Indiana bats were caught in this area during both 1997 and 1998 surveys. In 1998, 3 alternate maternity roost trees were located in or immediately adjacent to this area. This is a higher level of use than was documented in the existing BMZ. Sugar Creek, a perennial stream, runs through the replacement BMZ parcel; this permanent source of water enhances the value of this parcel for Indiana bats. This parcel is frequently flooded which has resulted in a sparse understory, which likely enhances the value of the area for foraging bats. It is expected that insect production in this parcel is relatively high, although no data are available to document this. Portions of the parcel are not well stocked with trees, likely due to frequent flooding, and this is reflected in the forest survey data provided by Atterbury. However, some portions contain adequate numbers of large diameter live trees and snags, including eastern cottonwood, white ash, and silver maple, to provide quality roosting habitat for Indiana bats. Research has suggested that large cottonwoods appear to be particularly

important to roosting bats at Atterbury.

It should be noted that much of the information used for the above analysis was collected during a 1998 mist netting and telemetry study at Atterbury. This study was conducted at the discretion of the Army as the result of a **CONSERVATION RECOMMENDATION** that was made in conjunction with the December 1998 biological opinion. The Army is to be commended for funding this research, the results of which have already been applied to efforts to conserve Indiana bats on the installation.

Indiana bat roosting and foraging habitat will be lost in the area where the additional clearing for the MPTR occurs. Previous analyses (discussed in the biological assessment and the biological opinion) suggest that 1 maternity colony of Indiana bats likely utilized the area originally cleared for the MPTR. It is assumed that this maternity colony relocated to an adjacent portion of the base and utilizes the habitat in the existing BMZ, but this has not been verified. The lack of permanent open water sources has been identified as a potential limiting factor to bats in this portion of the base. The establishment of one or more permanent water sources in the existing BMZ will enhance habitat quality in this area and directly benefit bats in this portion of the base.

AMENDED INCIDENTAL TAKE STATEMENT

Unless specifically noted here, the analyses on the amount and effect of take, reasonable and prudent measures, and terms and conditions of the December 1998 Incidental Take Statement remain unchanged.

AMOUNT OR EXTENT OF TAKE

The following sentence occurs in the December 1998 Incidental Take Statement: "Therefore, the anticipated level of take is expressed as the permanent loss of 99.7 ha of forest, as designated in the biological assessment, that is currently suitable summer roosting and foraging habitat for Indiana bats and that will be cleared for the construction and operation of the MPTR at Camp Atterbury." Because an additional 21.3 ha of clearing is now required for completion of the MPTR, under this amendment the level of take will now be expressed as the permanent loss of 121 ha of forest that was suitable summer roost and foraging habitat for Indiana bats.

REASONABLE AND PRUDENT MEASURES

All reasonable and prudent measures from the December 1998 Incidental Take Statement are unchanged. In addition, the 3 avoidance and minimization features discussed above (seasonal restriction on tree clearing, establish additional 53.5 ha of BMZ, and establish permanent water sources in existing BMZ) are incorporated as additional reasonable and prudent measures under this amendment.

TERMS AND CONDITIONS

All terms and conditions from the December 1998 Incidental Take Statement are unchanged. Term and condition 2 includes a requirement for the Army to establish procedures for evaluating

bat habitat quality in the BMZs. Some progress has been made on the development of these procedures, but the Army has requested technical assistance from the Service to complete this task. The Service's BFO hereby commits to working closely with the Environmental and Natural Resources staff at Atterbury to develop these habitat assessment procedures. The Army, in consultation with the Service, will establish draft procedures to evaluate bat habitat quality within the BMZs by March 31, 2001.

Camp Atterbury supports one of the highest known concentrations of Indiana bat maternity colonies within the entire range of the species. Since the discovery of Indiana bats at the facility in 1997, Camp Atterbury has worked closely with the Service's BFO to conserve Indiana bats. The Military Department of Indiana and the staff of Camp Atterbury have demonstrated a firm commitment to Indiana bat conservation, and we look forward to continued cooperation to protect this precious resource.

Please contact Lori Pruitt at (812) 334-4261 x 211 if you have questions or comments related to this amendment or other issues relative to Indiana bats at Camp Atterbury.

Sincerely yours,

Scott E. Pruitt
Acting Supervisor

November 1, 2000

Nancy McWhorter
Camp Atterbury Army National Guard Training Site
Indiana National Guard
Edinburgh, IN 46129

Dear Ms. McWhorter:

The U.S. Fish and Wildlife Service's Bloomington Field Office has developed draft Endangered Species Act Section 7 guidance on the impact of clearing small-diameter trees on Indiana bat habitat in Indiana. Seasonal restrictions on the clearing of small-diameter trees, resulting from Section 7 consultation, have created management concerns on several military installations in Indiana, including Camp Atterbury. In response to those concerns, we have evaluated the potential impacts of clearing small-diameter trees on Indiana bats and developed the attached draft guidance which we hope may address some of the management concerns raised by natural resource managers on military areas, and at the same time avoid take of Indiana bats.

If the natural resources staff at Camp Atterbury has comments or suggestions on this draft guidance, we would value their input. If you have any questions please contact Lori Pruitt at (812) 334-4261, extension 211. If you have comments on the draft guidance, please provide those comments prior to December 15, 2000.

Sincerely yours,

Scott E. Pruitt
Acting Supervisor

DRAFT IN PROGRESS - NOVEMBER 2000

BLOOMINGTON FIELD OFFICE SECTION 7 GUIDANCE ON THE IMPACT OF CLEARING SMALL DIAMETER TREES ON INDIANA BAT HABITAT

These guidelines are currently under development and have not been adopted by the U.S. Fish & Wildlife Service (FWS) on a rangewide basis. This guidance is being provided to help land managers avoid take of Indiana bats and to anticipate the FWS response to proposed small-diameter tree clearing projects. Endangered Species Act (ESA) Section 7 consultation will be required even when these guidelines are followed, but it is anticipated that the consultation will be "informal" (as defined in the ESA).

During summer, female Indiana bats form colonies, typically under the bark of trees, where they bear and raise their young. The trees used by female bats and their young are called maternity roost trees. Indiana bat primary maternity colony roost trees (used by more than 30 bats on more than one occasion) are typically 11" d.b.h. or greater (most are actually much larger). Most colonies also utilize a number of alternate roost trees (used by smaller number of bats and less regularly). Alternate roost trees can be a range of diameters, but are also typically large diameter trees. The smallest known alternate maternity roost tree was 5.5" d.b.h. Male Indiana bats typically roost alone, and frequently change trees between nights. Male bats appear less selective in choosing roost sites. Male Indiana bats have been found roosting in trees as small as 3" d.b.h. In addition to providing roosting habitat, forested areas also provide foraging habitat and travel corridors for Indiana bats.

The fact that male bats have been found roosting in trees as small as 3" d.b.h. has raised the issue of whether or not clearing of small-diameter trees has the potential to result in take of bats, as defined by the Endangered Species Act of 1973, as amended (ESA). Projects which frequently require the clearing of small diameter trees include small-scale construction projects and maintenance of powerline right-of-way (ROWs), fencelines, and roads. The purpose of this guidance is to aid a land manager in determining whether or not a project involving the clearing of small-diameter trees is likely to affect Indiana bats. This guidance should not be used for projects involving the clearing of trees in stream or river corridors, or around other permanent water bodies. For purposes of this guidance, the following definitions will be used:

- **Linear maintenance projects** involve clearing along a linear feature. Examples include pipeline, roadway, and powerline ROWs. Total width of clearing must be $\leq$ 75 feet.

- **Small-scale construction projects** require the clearing of $\leq$ 1 acre of land.

- A **wooded landscape** is defined as having $\geq$ 50% wooded canopy cover. To determine % wooded canopy cover, center the project in a 2.5 mile radius circle and determine if $\geq$50% of the area covered by the circle is wooded. A 2.5 mile radius is the typical maximum foraging range of an Indiana bat maternity colony.

If you anticipate the clearing of small diameter trees (i.e., under 5" d.b.h.), the following steps should aid you in predicting Section 7 consultation requirements:

1. If you know that the project area is considered suitable Indiana bat habitat proceed to Step 2. If you are not sure that your project area is considered suitable Indiana bat habitat, contact the

Bloomington Field Office for help in making that determination.

2. Take of Indiana bats will be held to the insignificant or discountable level (i.e., should not require formal consultation under Section 7) for linear maintenance projects or small-scale construction projects that only remove woody vegetation < 3" d.b.h. No seasonal tree clearing restrictions are anticipated.

3. **In areas within wooded landscapes**: It is anticipated that there will be a better supply of current and future roost trees for Indiana bats in wooded landscapes, compared to areas that do not meet this definition. Therefore, restrictions on the clearing of small-diameter trees are typically less stringent in wooded landscapes. As indicated in Step 2, no restrictions are anticipated for clearing woody vegetation < 3" d.b.h. In addition, larger trees ($\geq$ 3" d.b.h. but $\leq$ 5" d.b.h.) can also be cleared for linear maintenance projects or small-scale construction projects in wooded landscapes. However, 3-5" trees can only be cleared if there is wooded habitat contiguous to the clearing that is at least as large (in area) as the clearing. (The purpose of this criterion is to protect isolated blocks of wooded habitat, particularly those that may be important as travel corridors for bats. For example, if a wooded fenceline bisects a non-wooded area, that fenceline may be particularly important to bats, even though the total wooded area involved is small).

4. For clearing of trees over 5" d.b.h., informal Section 7 consultation will likely require procedures to avoid take of Indiana bats. In many cases, seasonal tree clearing restrictions (i.e., no tree clearing from April 15 through September 15) will be sufficient to avoid take of bats. However, measures that will be needed to avoid take will vary among projects and will be determined through informal consultation with the FWS. If take cannot be avoided, formal Section 7 consultation will be required.

These are general guidelines and site specific conditions, cumulative impacts, indirect effects, etc. may dictate deviation from them. Additionally, knowledge of the Indiana bat population on a particular site must be considered. As previously noted, even if a land manager is certain that a project meets the definition of a linear maintenance project or a small-scale construction project, as defined in this guidance, consultation with the Bloomington Field Office is still required.

United States Department of the Interior

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IN REPLY REFER TO:

July 13, 2000

Michael P. McGowen
LTC, GS, INARNG
Post Commander
Headquarters Camp Atterbury
Maneuver Training Center
Edinburgh, Indiana 46124

Dear Lieutenant Colonel McGowen:

These are the U.S. Fish and Wildlife Service's (Service) comments on your letter, received July 12, 2000, regarding the potential for the cutting of trees at Camp Atterbury to affect the Federally-endangered Indiana bat, *Myotis sodalis*. Specifically, you questioned guidance from the Service's Bloomington Field Office (BFO) stating that the removal of trees 3 inches in diameter or larger has the potential to impact Indiana bats. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and are consistent with the intent of the National Environmental Policy Act of 1969 and the Endangered Species Act of 1973 (ESA).

Until receiving your letter, BFO had not received a request for comments on the specific activities discussed in your letter. The issue of road maintenance requiring the clearing of small diameter trees had been raised in an E-mail message on June 15, 2000 from Mr. Eric Dohner, a consultant working on the ongoing consultations at Camp Atterbury. This message contained no specific information on the scope of clearing to be done or the location of proposed maintenance activities. A biologist from BFO responded to the E-mail later that same day. We noted that the clearing of trees down to 3 inches in diameter has the potential to impact Indiana bats, and that several options were available on how to proceed. Most important, we specifically noted that additional information was needed before we could respond adequately on this issue. We never received any additional information until receiving your letter. BFO was not made aware that this guidance was a particular cause for concern for Camp Atterbury. Now that we have been made aware of this issue, we can move forward with addressing your concerns.

The basis for our guidance regarding the need to consider Indiana bat impacts when cutting trees 3 inches or greater in diameter is that the best scientific data available has shown that this is the smallest diameter tree known to provide roosting habitat for Indiana bats. Because there is

documented evidence of Indiana bats roosting in trees this size, we are required under the ESA to consider potential impacts of cutting trees this size. The Service is required to consider potential impacts to a species unless "all of the reasonably expected effects of the proposed action will be beneficial, insignificant, or discountable." In the case of cutting of trees 3 inches or greater in diameter (during summer) we cannot discount the possibility that bats could be roosting in these small trees, unless we have data to support that decision. This same criterion is used uniformly for all Section 7 consultations in the State of Indiana.

Situations similar to that described in your letter, involving the clearing of relatively small diameter trees in an area dominated by mature forests, have arisen previously in Indiana. Typically, these situations have been resolved by clearing the trees during the period September 16 - April 14, when bats are not present. You have already noted that this is not practical in the case of your maintenance activities. Other options are available. We do not have sufficient details on the proposed project to assess which of these options would be feasible and fulfill Camp Atterbury's Section 7 requirements. After reviewing these potential options, please contact us with additional details on the proposed clearing and to discuss options for accomplishing the required maintenance activities:

1) A qualified wildlife biologist could conduct a site inspection of the area to be cleared to determine if any of the trees within the area proposed for clearing provide potential roosting habitat. BFO biologists could assist Camp Atterbury with this task and/or provide guidance for your natural resources staff to make this determination. If potential roost trees were identified, these could be individually marked. All trees and brush other than the individually marked trees could be cleared during the period when troop labor is available. Individually marked trees could be cleared during the period September 16 - April 14. Our experience suggests that we would find few 3 inch trees that provided potential Indiana bat roost sites.

2) All brush and trees less than 3 inches in diameter could be cleared during summer. Trees 3 inches in diameter or greater could be left and cleared during the period September 16 - April 14.

3) Conduct formal Section 7 consultation and receive an incidental take permit for potential take of Indiana bats associated with maintenance activities.

As noted in your letter, Camp Atterbury is currently preparing an Integrated Natural Resources Management Plan, an Endangered Species Management Plan for the Indiana bat (*Myotis sodalis*), and a Biological Assessment to evaluate the impacts of ongoing and proposed military training activities on the Indiana bat. The consultation on the cutting of small diameter trees for routine maintenance projects could be incorporated into these ongoing consultations with minimal additional effort. We previously discussed, with your consultant, the possibility that endangered species consultation for many of the "small" tree clearing projects required at Camp Atterbury could be incorporated into the ongoing consultations. It was our impression, based on our phone logs, that the decision had been made to proceed with this approach. Many of the tree clearing projects that currently require individual consultation under ESA could be handled collectively within the ongoing consultation. We still think this is a logical approach and will offer our technical assistance to Camp Atterbury in assessing how this approach could best work for you.

Your letter references the **Bloomington Field Office Indiana Bat Management Guidelines**. We wish to clarify that this guidance refers to Camp Atterbury's timber management program. As noted in the guidance, the objective of the leave tree restrictions is to maintain a component of large, over-mature trees in the stand, because these trees are considered essential to supply Indiana bat maternity roost sites (that is, roosts containing reproductively active females and their young). This guidance is not a reference to the minimum size tree that will be used by any roosting Indiana bat.

We hope that this letter clarifies BFO's guidance on the cutting of small diameter trees with reference to potential impacts to Indiana bats. Camp Atterbury supports one of the highest known concentrations of Indiana bat maternity colonies within the entire range of the species. Since the discovery of Indiana bats at the facility in 1997, Camp Atterbury has work closely with the Service's BFO to conserve Indiana bats. The Military Department of Indiana and the staff of Camp Atterbury have demonstrated a firm commitment to Indiana bat conservation, and we look forward to continued cooperation to protect this precious resource.

Please contact me at (812) 334-4261 x 217 if you want to discuss these issues further.

Sincerely yours,

Scott E. Pruitt
Acting Supervisor

cc: Charlie Wooley, Assistant Regional Director, U.S. Fish and Wildlife Service, Region 3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, Indiana 47403-2121
(812) 334-4261 FAX 334-4273

IN REPLY REFER TO

June 13, 1997

Mr. Ronald E. Moore
Natural Resources Manager
Camp Atterbury
Building #1, Hospital Road
Edinburgh, IN 46124-1096

Dear Mr. Moore:

This is the U.S. Fish and Wildlife Service's (FWS) response to your letter of 16 May 1997. In that letter, you requested: 1) specific recommendations on management of the Federally endangered Indiana bat (*Myotis sodalis*) on Camp Atterbury to incorporate into the Camp Atterbury Integrated Natural Resources Management Plan; 2) FWS comments on the potential to use the Record of Environmental Decision and Army National Guard Environmental Checklist as a basis for determining whether or not threatened and endangered species consultation is required under Section 7 of the Endangered Species Act (ESA) for construction projects on Camp Atterbury; and 3) comments on the draft Cooperative Plan, outlining cooperation between the Army, the Indiana Department of Natural Resources (IDNR), and the FWS, that will be incorporated into the Integrated Natural Resources Management Plan.

FWS response to items 1 and 3 are covered in this letter. We can not yet respond to item 2 (as we have already informed you on the phone), as the copies of the Record of Environmental Decision and Army National Guard Environmental Checklist which you originally forwarded for review were not complete. Complete copies of these documents were received at the FWS Bloomington Field Office (BFO) this week; we will forward our review when it is completed.

In addition to the aforementioned requests, during the meeting between the Army, IDNR, and FWS on 14 May, Major Newlin, Camp Atterbury Facility Engineer, requested that the FWS review the bat survey specifications prepared by the Camp Atterbury staff. Our review of that document is also included in this letter.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and FWS Mitigation Policy.

INDIANA BAT GUIDELINES FOR FOREST MANAGEMENT ON CAMP ATTERBURY

These are the guidelines discussed during the 14 May meeting on Camp Atterbury. A group of FWS biologists from throughout the range of the Indiana bat are currently developing Indiana bat management guidelines for Federal agencies which carry out large scale forest management programs (e.g. U.S. Forest Service, Bureau of Land Management, Military areas). The following interim guidance is largely the result of that ongoing process.

The following interim guidelines for Camp Atterbury are recommended until a comprehensive bat survey of the installation is completed and more detailed management recommendations are possible.

Percent Overstory Canopy Cover

At least 60% canopy cover should be maintained after any timber harvest activities.

Roost Tree Densities

1. No harvest of shagbark hickory (*Carya ovata*) or shellbark hickory (*Carya laciniosa*) trees.

2. No harvest of trees > or = 9" diameter at breast height (dbh) that have 10% or more exfoliating bark.

3. If criteria 2 results in less than 14 trees per hectare (ha), the difference should be made up by live trees > 16" dbh of the following species:

silver maple (*Acer saccharinum*)
bitternut hickory (*Carya cordiformis*)
green ash (*Fraxinus pennsylvanica*)
white ash (*Fraxinus americana*)
eastern cottonwood (*Populus deltoides*)
northern red oak (*Quercus rubra*)
post oak (*Quercus stallata*)
white oak (*Quercus alba*)
slippery elm (*Ulmus rubra*)
American elm (*Ulmus americana*)
black locust (*Robinia pseudoacacia*)

Riparian Corridor

1. No cutting within 100 feet on both sides of a perennial stream and within 50 feet on both sides of an intermittent stream.

2. Do not girdle trees to create snags in the riparian corridor.

In addition to these timber management considerations, we also need to discuss the Camp Atterbury firewood program, which we have not previously discussed. Firewood cutting programs can impact Indiana bats because trees selected for firewood frequently have potential as Indiana bat roost trees.

BAT SURVEY REVIEW

During our meeting on 14 May, Major Newlin, Camp Atterbury Facility Engineer, requested that the FWS review the bat survey specifications prepared by the Camp Atterbury staff. Our review of that document follows.

Under the **REQUIREMENTS** section of the bat survey specifications, we recommend that you reference the Indiana Bat Recovery Team's "Guidelines for Netting Bats," which we previously provided (another copy is attached). The survey should be conducted according to the recovery team's recommended methodology, and should conform to the "minimum level of effort" guidelines.

We recommend that item "G" in the **REQUIREMENTS** section of the bat survey specifications, referring to the collection of voucher specimens, be dropped. Collection of voucher specimens of Federally threatened or endangered species will not be permitted, and we discourage the routine collection of voucher specimens of any species during bat surveys.

We recommend that you incorporate provisions for radio tracking if Indiana bats are captured on the base. Radio telemetry could be used to track the bats and delineate roosting and foraging habitat. Information on roosting and foraging habitat would be extremely valuable in assessing the impacts of the proposed activities on the base.

If you have additional questions regarding survey specifications or Federal permitting requirements, contact Scott Pruitt at BFO ((812) 334-4261 x 217). Potential contractors may also contact Scott if they have questions.

COMMENTS ON THE DRAFT COOPERATIVE PLAN

Our major comment on the draft of the cooperative plan is that we recommend clarification regarding threatened and endangered species. Army Regulation 200-3, Chapter 11, Endangered/Threatened Species Guidance states: "The Army is committed to being a national leader in conserving listed species. DA personnel at all levels must ensure that they carry out mission requirements in harmony with the requirements of the Endangered Species Act (ESA) of 1973, sections 1531 to 1544, title 16, United Stated Code (16 USC 1531-1544). Mission requirements do not justify actions violating the ESA. All Army land uses, including military training, testing, timber harvesting, recreation, and grazing, are subject to ESA requirements for the protection of listed species and critical habitat."

Item 3 in the draft Cooperative Plan for Camp Atterbury outlines discretionary programs "for the development and management of fish and wildlife resources on Camp Atterbury," that will be "subject to the requirement of the military mission at Camp Atterbury and associated agricultural outleasing and timber management programs...". We recommend that this section of the plan should reflect a distinction between discretionary programs for fish and wildlife management, versus programs that address threatened and endangered species concerns, as mandated by the ESA and Army regulation.

BEAVER POND MANAGEMENT

In addition to the aforementioned responses to your requests for information, also enclosed is an article on "The Clemson Beaver Pond Leveler," as discussed at the meeting and tour of Camp Atterbury on 14 May. The technique outlined in this article has been effective in many situations in Indiana. It may allow you to reduce flooding problems associated with beaver ponds at Camp Atterbury, while maintaining some of the benefits derived from the beaver-created wetlands.

If you have any questions or require additional technical assistance, please contact Lori Pruitt at (812) 334-4261, extension 211.

Sincerely yours,

David C. Hudak
Supervisor

2 attachments

Use this copy. 9/98

DRAFT

WORKING NOTES ON INDIANA BAT GUIDELINES FOR FOREST MANAGEMENT

Note that these guidelines will result in habitat that is **suitable but generally less than optimal** for Indiana bats.

FOREST MANAGEMENT GUIDELINES

1. At least 60% canopy cover (on a stand-by-stand basis, depending on size of stands) maintained after any timber harvest activities

2. Shagbark hickory (*Carya ovata*) or shellbark hickory (*Carya laciniosa*) trees shall not be harvested or manipulated during timber stand improvement (TSI) activities.

3. No snag removal, except where they pose a serious human safety hazard.

4. The following species of trees have been identified as having relatively high value as potential Indiana bat roost trees:

shagbark hickory (*Carya ovata*)
shellbark hickory (*Carya laciniosa*)
bitternut hickory (*Carya cordiformis*)
silver maple (*Acer saccharinum*)
green ash (*Fraxinus pennsylvanica*)
white ash (*Fraxinus americana*)
eastern cottonwood (*Populus deltoides*)
northern red oak (*Quercus rubra*)
post oak (*Quercus stallata*)
white oak (*Quercus alba*)
slippery elm (*Ulmus rubra*)
American elm (*Ulmus americana*)
black locust (*Robinia pseudoacacia*)

(This list is based on review of literature and data on Indiana bat roosting requirements. Possibility of adding other species as identified).

At least 3 live trees per acre > 20" dbh (of the species listed above) should always be maintained in the stand. (A tree with < 10% live canopy should be considered a snag). These should be the largest trees of these species remaining in the stand. An additional 6 live trees per acre > 11" dbh (of the species listed above) should also be maintained. (The "per acre" requirement can be expressed as the average per acre on a stand-wide basis, depending on the definition of a stand).

If there are no trees > 20" dbh to leave, then 16 live trees per acre should be left, and these should include the largest specimens of the preferred species remaining in the stand.

(THE OBJECTIVE OF THESE "LEAVE TREE" RESTRICTIONS IS TO MAINTAIN A COMPONENT OF LARGE, OVER MATURE TREES, IN THE STAND. THESE TREES ARE A VALUABLE COMPONENT OF INDIANA BAT HABITAT. THERE IS FLEXIBILITY IN THESE "LEAVE TREE" RESTRICTIONS IF IT CAN BE DEMONSTRATED THAT THE SAME OBJECTIVE CAN BE ACHIEVED IN A MANNER MORE EASILY INCORPORATED INTO THE TIMBER MANAGEMENT PROGRAM.).

5. No harvest or TSI activities within 100 feet on both sides of a perennial stream and within 50 feet on both sides of an intermittent stream.

6. No harvest of trees during the Indiana bat reproductive season (April 15 through September 15).

APPENDIX B

CAJMTC DETAILED TRAINING SITE USAGE BY LOCATION & RANGE SUMMARY

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CONTENTS

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SUMMARY OF CAJMTC SITE UTILIZATION DATA PRESENTED IN THIS APPENDIX

In order to provide a better summary of overall training site utilization throughout the CAJMTC, usage data were gathered for each facility type/location. Data were gathered by total number of personnel trained and by total training hours for the period between April 1st and October 1st (i.e., Indiana bat roosting season). **Tables B-1** and **B-2** provide the total number personnel trained and training hours by location, respectively, for all training that occurred between 2003 and 2009 during the roosting season. **Figures B-1** and **B-2** provide a spatial representation of this data to illustrate where training is more or less concentrated within the CAJMTC. These figures also depict known roost tree locations (standing and down) to demonstrate the correlation between training site usage and roost trees at the CAJMTC. Finally, **Tables B-3** and **B-4** provide a summary of the total number of personnel trained and training hours by year, respectively. **Table B-5** provides a summary of the CAJMTC ranges and the types of munitions used at these ranges.

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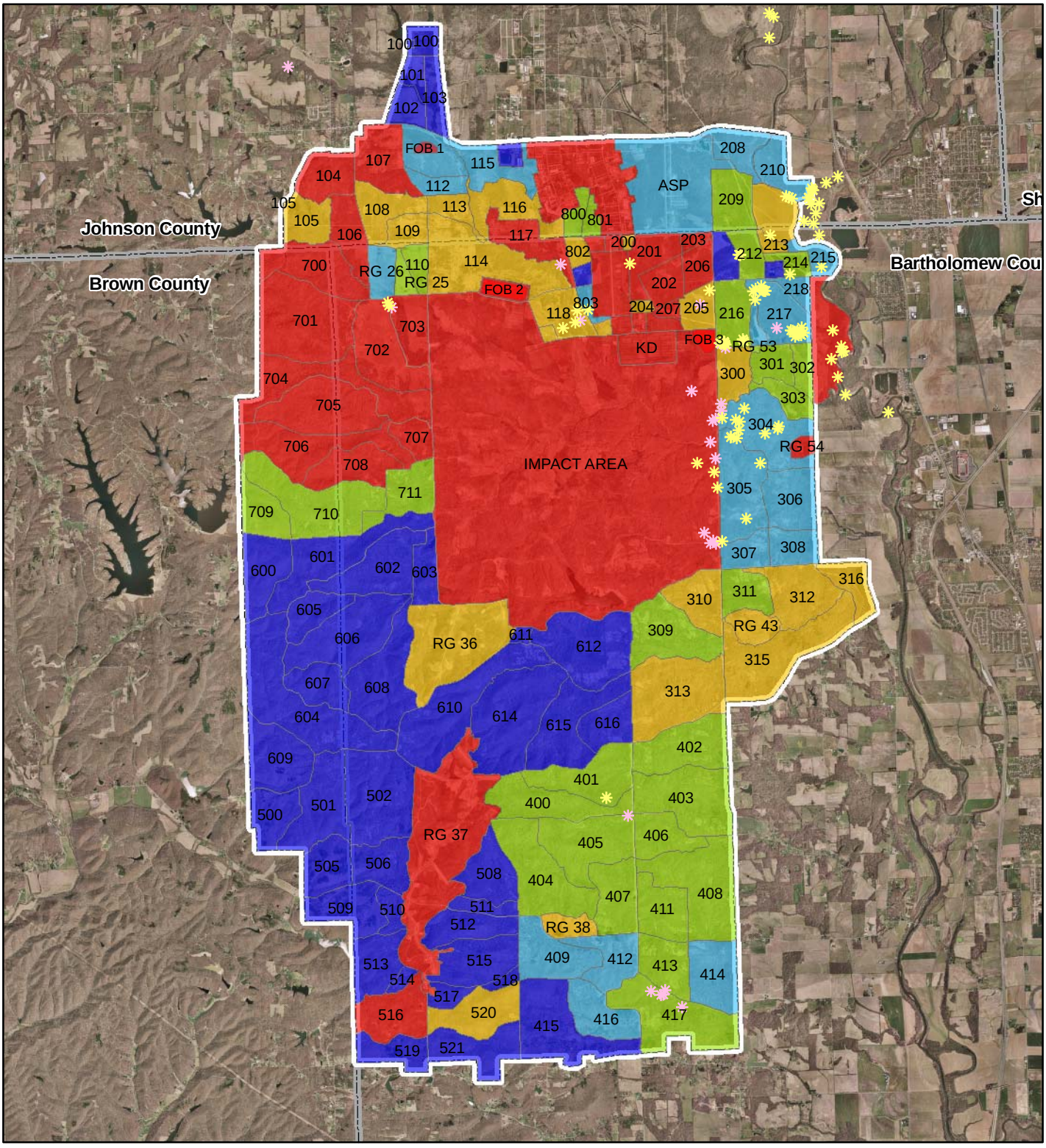

Legend

CAJMTC Boundary

Indiana Bat Roost Trees

Standing

Down

# of Personnel Trained

0 - 1000

1001 - 2000

2001 - 4000

4001 - 10000

10001 - 100000

FIGURE B-1
PERSONNEL TRAINED BY LOCATION (2003 - 2009)

Biological Assessment for the Indiana Bat

Camp Atterbury Joint Manuever Training Center
Brown, Bartholomew and Johnson Counties, Indiana

Prepared for:

Indiana National Guard

N W E S

Prepared by:

amec

Columbus, Ohio

0 1 2 Miles

Source Data: USGS Nineveh, New Bellsville, Edinburgh,& Franklin Quadrangles
Projection: NAD 1983 UTM Zone 16N

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Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
0 to 1,000 Personnel	
IMS RACE AIRSPACE	0
LANDFILL (East of TA 206)	10
RG048	32
RG049	48
RG015	49
RG040 and AFP 601	76
AFP 601	*14*
RG029	122
RG047	185
TA 601	220
TA 602	220
TA 604	220
TA 609	220
TA 600	221
TA 608	222
TA 603	224
RG028	259
TA 615	265
TA 614	269
AVAIL AREA	284
TA 501	290
TA 505	290
TA 506	290
TA 502	293
RG032	294
TA 610 and AFP 605	297
AFP 605	63
RG058	333
TA 510	360
TA 512	360
RG033 and OP6	400
OP 6	*12*
TA 616	401
TA 500	403
TA 606 and former TA 607	440

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
Former TA 607	*220*
RG160	505
RG039	520
TA 103	554
TA 100	630
TA 101	643
TA 521	650
TA 102	674
TA 513 and former TA 514	720
Former TA 514	*360*
TA 519	720
TA 508 and former TA 511	797
Former TA 511	*366*
RG035	800
TA 509	813
RG016	821
TA 612 and former TA 611	865
Former TA 611	*620*
TA 520 and former TA 518	870
Former TA 518	*220*
TA 515 and former TA 517	910
Former TA 517	*550*
TA 415	911
38TH ID TRAIL (Road through TA 705 AND TA 706)	925
1,001 to 2,000 Personnel	
ROUGH_DRIVE (Road around TA 107)	1015
TA 218	1113
TA 308	1147
TA 516	1220
TA 306	1248
ENGINEER TRAINING SITE (Between TA 216 and TA 217)	1288
RG057	1292
TA 208	1333
RG026 and AFP 115	1338
AFP 115	*0*

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
TA 307 and AFP 301& 310	1395
AFP 301	*55*
AFP 310	*0*
TA 414 and AFP 452	1447
AFP 452	*0*
TA 210	1450
TA 803	1498
TA 115	1510
TA 305	1575
RG007	1592
RG044	1612
RG017	1615
TA 112	1631
RG07A	1664
TA 416	1673
DZ LARKIN	1706
TA 215	1709
TA 412	1734
RG008	1789
RG023	1831
DZ SMITH	1870
RG030	1874
FOXFIRE (North of TA 612 in Impact Area)	1921
RG050	1924
TA 217	1936
TA 304	1939
TA 211 (Now part of the Western ASP blast arc)	1970
TA 409	1988
2,001 to4,000 Personnel	
TA 413 and AFP 453	2050
AFP 453	*0*
TA 209	2115
TA 402	2138
TA 709	2159
TA 406	2256
TA 301	2291
TA 800	2294

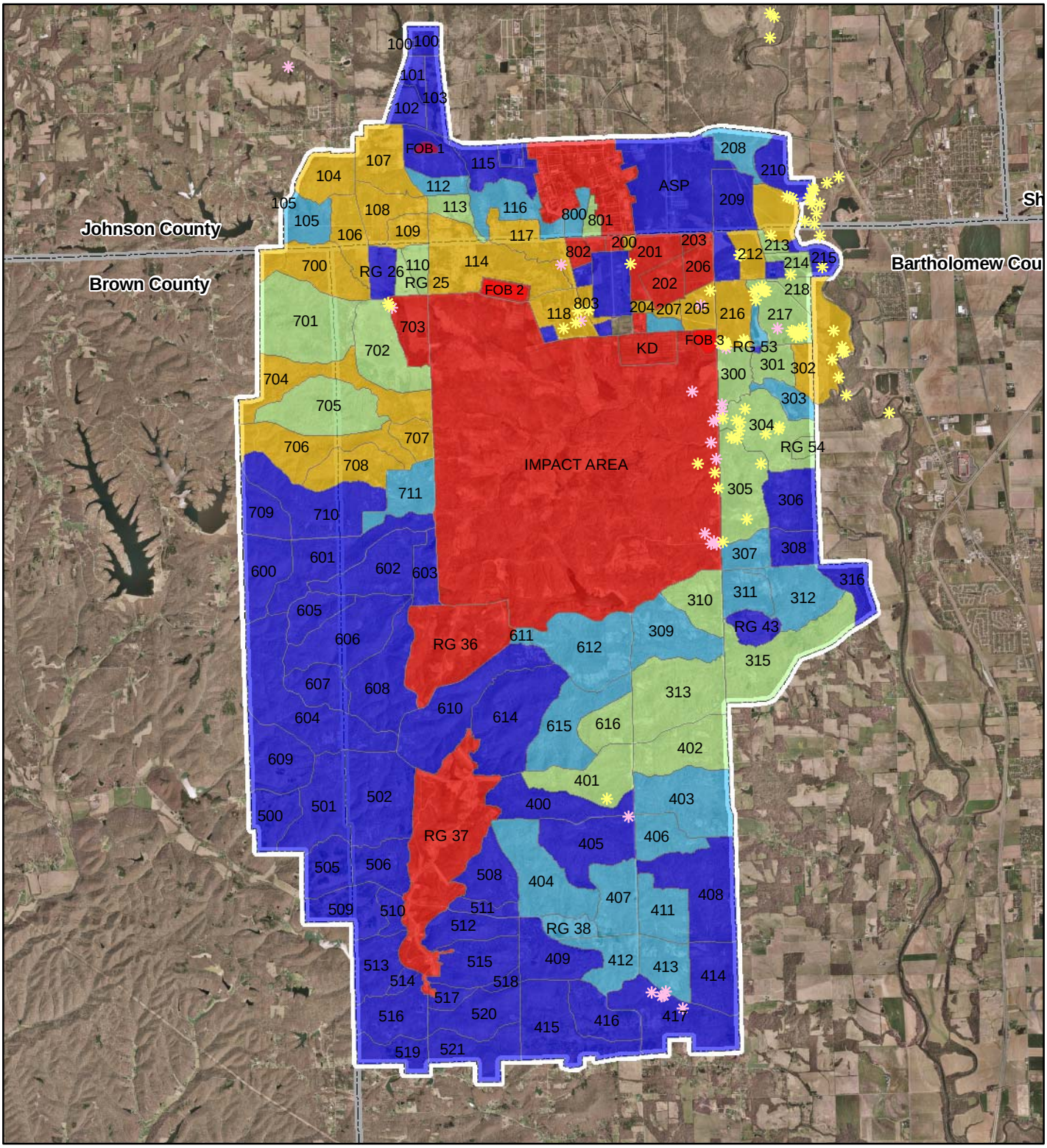
Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
RG053	2304
TA 309 and AFP 330& 336	2331
AFP 330	*0*
AFP 336	*0*
TA 408	2343
TA 407 and AFP 454	2374
AFP 454	*21*
TA 311 and AFP 303& 304	2523
AFP 303	*0*
AFP 304	*0*
RG061_IED	2580
TA 303 and AFP 313 &352	2721
AFP 313	*0*
AFP 352	*408*
TA 411	2740
TA 710 and 7B-120	2754
7B-120 (MFP)	*36*
TA 417	2890
TA 801	2930
TA 403	3094
TA 212	3159
RG031	3176
TA 400	3187
RG024 and RG 24A	3284
RG024 A	*1147*
TA 711	3357
TA 401	3569
TA 405	3600
TA 214 and AFP 230	3679
AFP 230	*1525*
TA 110	3709
TA 216	3726
LANDNAV7B (Foot-Traffic in TA 201, TA 202, TA 203, TA 205, TA 206)	3817
TA 404	3821
TA 302 and AFP 311& 351	3989
AFP 311	*567*
AFP 351	*255*

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
RG025	3998
4,001 to10,000 Personnel	
RG038 and AFP 405& 455	4185
AFP 405	*434*
AFP 455	*45*
RG009	4197
SAR_ACADEMY (Search and Rescue Facility)	4284
RG002	4307
TA 114 and AFP 116	4315
AFP 116	*0*
RG056	4408
DRIVE_100 (Roads around TA 107, TA 108, TA 109, TA 110)	4503
TA 312 and former TA 316	4516
Former TA 316	*2111*
TA 310	4996
RG051 and Z RG051	5265
Z RG051	*1785*
TA 204	5698
RG020	5771
TA 200	5802
TA 116	6062
TA 300	6146
RG034	6155
TA 313	6299
TA 113	6385
TA 109	6759
RG021 and RG 21A	6844
RG021 A	*1159*
RG036	7272
TA 105	7600
RG043 and AFP 325, 326, 327, 328	7627
AFP 325	*33*
AFP 326	*223*
AFP 327	*92*
AFP 328	*0*
TA 205	8034

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
TA 315	8124
TA 802	8448
TA 213	8968
TA 108 and OP2	9244
OP 2	*282*
TA 118 and Admin BIV 2&3	9607
ADMIN BIVOUAC 2	*715*
ADMIN BIVOUAC 3	*3322*
DZ KLEIBER	9709
RG001	9747
10,001 to 90,000 Personnel	
RG055	10126
RG042 and RG BLDGS	10139
RG042 Buildings	*3996*
KLEIBER_DRIVE (Roads through Klieber DZ and TA 213, TA 214)	10143
TA 701	10186
TA 106	10233
RG054	10385
TA 706 and former TA 708	10570
Former TA 708	*4852*
RG013	10705
TA 700	10733
TA 107	11397
TA 206 and AFP 241&242	11528
AFP 241	*0*
AFP242	*0*
TA 203	12329
LANDNAV15 (Foot-Traffic in DNR Property East of TA 218, TA 217, TA 302)	12345
RG022	12364
RG005	12366
RG010	12772
TA 705	12890
RG006	12932
RG011	13187
TA 702	15366

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
RG003	15638
RG004	16892
TA 117 and IED Lanes, NBC North&South	16950
IED Lane (Road along the northern boundary of TA 117)	*3993*
NBC NORTH	*1545*
NBC SOUTH	*4713*
TA 207 and Admin BIV 1	17063
ADMIN BIVOUAC 1	*12616*
TA 104	17114
TA 707 and former TA 704, OP 5	17548
Former TA 704	*10519*
OP 5	*545*
TA 202	18112
RG019	18860
TA 703 and OP 4	19963
OP 4	*8668*
RG018	20759
RG014	26232
TA 201and LITTER, RAPPEL ST & WD	27732
LITTER Course	317
Steel Rappel Tower	11127
Wooden Rappel Tower	58
RG037 and RG BLDGS, AFP 500& 513	32618
RG037 Buildings	*5196*
AFP 500	*121*
AFP 513	*76*
AIRFIELD and all items below	36070
East Ramp	*882*
West Ramp	*6490*
Hanger	*1279*
Airfield Classroom	*1841*
Conditioning Course	*8016*
Confidence Course	*9211*
Leadership Readiness Course	*8362*
Drop Zone-Anderson (DZ Andy)	*1198*
RG012	44056
FOB_2_TTB and OP1	46056

Table B-1. Total Number of Personnel Trained during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Number of Personnel**
OP 1	*164*
FOB_3_TTB	46426
CANTONMENT and all items below	54508
Classroom 614	*23101*
HEAT Device	*11321*
Pool	*1512*
TO 803	*1108*
TO 804	*1772*
TO 805	*6261*
TO 806	*10645*
FOB_1_TTB	89512



Legend

CAJMTC Boundary

Indiana Bat Roost Trees

Standing

Down

# of Training Hours

0 - 1000

1001 - 2000

2001 - 3000

3001 - 5000

5001 - 27000

FIGURE B-2
TOTAL TRAINING HOURS BY LOCATION (2003 - 2009)

Biological Assessment for the Indiana Bat

Camp Atterbury Joint Manuever Training Center
Brown, Bartholomew and Johnson Counties, Indiana

Prepared for:

INDIANA NATIONAL GUARD

N W E S

Prepared by:

amec

Columbus, Ohio

0 1 2 Miles

Source Data: USGS Nineveh, New Bellsville, Edinburgh,& Franklin Quadrangles
Projection: NAD 1983 UTM Zone 16N

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Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
0 to 1,000 Hours	
IMS RACE AIRSPACE	<0.1
RG049	21.3
TA 602	24.5
RG048	30.3
TA 608	47.2
RG035	53.7
LANDFILL (East of TA 206)	55.5
TA 603	61.5
RG029	66.8
TA 609	72.4
RG015	73.5
RG058	80.0
TA 601	85.6
TA 606 and former TA 607	87.2
Former TA 607	*59.2*
TA 610 and AFP 605	88.7
AFP 605	*19.8*
TA 521	89.0
RG040 and AFP 601	92.3
AFP 601	*29.7*
RG032	92.4
TA 100	104.3
TA 505	111.4
TA 501	111.7
TA 604	112.6
TA 500	115.4
TA 519	115.8
TA 506	117.8
RG028	120.7
TA 516	138.0
TA 502	141.9
TA 512	144.7
TA 510	145.4
TA 600	146.9
TA 614	183.4

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
RG033 and OP6	189.0
OP 6	*11.2*
TA 103	191.6
RG047	198.2
AVAIL AREA	211.0
TA 101	225.8
TA 520 and former TA 518	231.0
Former TA 518	*115.3*
TA 102	238.3
TA 515 and former TA 517	281.7
Former TA 517	*137.1*
TA 508 and former TA 511	286.8
Former TA 511	*140.0*
TA 513 and former TA 514	289.9
Former TA 514	*145.3*
TA 509	298.3
TA 210	333.6
TA 211 (Now part of the Western ASP blast arc)	340.4
TA 115	360.2
RG016	375.7
DZ SMITH	399.8
TA 415	432.1
RG026 and AFP 115	434.5
AFP 115	*16.3*
TA 209	438.0
RG039	448.5
TA 400	452.5
RG160	470.7
DZ LARKIN	482.2
TA 215	483.8
TA 306	494.8
RG057	506.9
TA 308	526.8
TA 416	589.0
RG017	593.6
TA 405	605.4
TA 414 and AFP 452	632.6

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
AFP 452	*1.7*
TA 408	644.7
RG053	672.7
RG061_IED	686.5
TA 409	708.0
TA 709	724.6
RG050	770.4
LANDNAV7B (Foot-Traffic in TA 201, TA 202, TA 203, TA 205, TA 206)	799.9
38TH ID TRAIL (Road through TA 705 AND TA 706)	811.2
RG043 and AFP 325, 326, 327, 328	823.7
AFP 325	*16.2*
AFP 326	*118.4*
AFP 327	*29.2*
AFP 328	*1.3*
ROUGH_DRIVE (Road around TA 107)	874.3
RG07A	901.8
RG023	912.0
TA 417	926.4
TA 710 and 7B-120	944.3
7B-120 (MFP)	*35.8*
RG044	956.2
1,001 to 2,000 Hours	
TA 208	1006.0
TA 312 and former TA 316	1012.8
Former TA 316	*320.9*
FOXFIRE (North of TA 612 in Impact Area)	1013.1
RG030	1036.3
DRIVE_100 (Roads around TA 107, TA 108, TA 109, TA 110)	1108.5
TA 309 and AFP 330& 336	1215.4
AFP 330	*1.8*
AFP 336	*1.8*
SAR_ACADEMY (Search and Rescue Facility)	1219.9
TA 711	1300.7
TA 615	1335.6
RG007	1378.5
TA 116	1395.7
ENGINEER TRAINING SITE (Between TA 216 and TA 217)	1455.7

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
RG038 and AFP 405& 455	1461.6
AFP 405	*85.8*
AFP 455	*12.4*
TA 303 and AFP 313 &352	1471.7
AFP 313	*5.6*
AFP 352	*180.3*
TA 403	1476.2
TA 105	1527.5
TA 612 and former TA 611	1533.6
Former TA 611	*145.3*
RG024 and RG 24A	1542.6
RG024 A	*474.0*
RG031	1579.8
TA 406	1615.9
TA 112	1655.1
TA 407 and AFP 454	1676.7
AFP 454	*35.6*
RG008	1744.4
TA 404	1748.4
TA 311 and AFP 303& 304	1758.5
AFP 303	*2.2*
AFP 304	*0.3*
TA 412	1787.1
TA 413 and AFP 453	1830.8
AFP 453	*1.5*
RG056	1836.3
TA 800	1842.1
TA 411	1846.0
TA 307 and AFP 301& 310	1895.5
AFP 301	*0.3*
AFP 310	*1.8*
RG034	1964.4
2,001 to 3,000 Hours	
TA 304	2033.5
TA 305	2082.9
TA 310	2085.1
TA 300	2155.0

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
TA 705	2157.9
TA 214 and AFP 230	2172.7
AFP 230	*399.6*
RG020	2225.4
TA 801	2256.7
TA 616	2324.8
TA 401	2413.8
TA 402	2429.4
RG025	2454.2
TA 313	2493.3
RG009	2498.5
KLEIBER_DRIVE (Roads through Klieber DZ and TA 213, TA 214)	2554.1
TA 218	2579.0
TA 113	2611.4
TA 315	2642.7
TA 110	2659.5
TA 701	2661.3
TA 702	2707.3
RG054	2761.8
TA 301	2767.2
TA 213	2872.0
TA 217	2984.7
3,001 to 5,000 Hours	
TA 109	3061.0
TA 803	3062.8
TA 104	3108.1
TA 107	3176.3
RG051 and Z RG051	3213.8
Z RG051	*2024.2*
TA 216	3223.4
TA 114 and AFP 116	3242.7
AFP 116	*3.8*
TA 212	3246.5
RG002	3274.8
TA 706 and former TA 708	3363.7
Former TA 708	*1574.6*
TA 108 and OP2	3365.4

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
OP 2	*326.1*
TA 204	3401.1
TA 302 and AFP 311& 351	3403.0
AFP 311	*135.3*
AFP 351	*15.2*
TA 207 and Admin BIV 1	3564.2
ADMIN BIVOUAC 1	*1538.0*
RG042 and RG BLDGS	3569.2
RG042 Buildings	*1259.9*
DZ KLEIBER	3610.2
RG021 and RG 21A	3680.8
RG021 A	*433.1*
TA 700	3781.1
RG001	3817.7
TA 200	3867.3
TA 707 and former TA 704, OP 5	3949.5
Former TA 704	*1189.5*
OP 5	*408.9*
RG055	4045.9
LANDNAV15 (Foot-Traffic in DNR Property East of TA 218, TA 217, TA 302)	4118.5
TA 205	4260.7
TA 106	4436.4
TA 117 and IED Lanes, NBC North&South	4725.3
IED Lane (Road along the northern boundary of TA 117)	*1065.0*
NBC NORTH	*531.0*
NBC SOUTH	*816.9*
TA 118 and Admin BIV 2&3	4909.0
ADMIN BIVOUAC 2	*268.1*
ADMIN BIVOUAC 3	*374.5*
5,001 to 27,000 Hours	
RG019	5115.0
FOB_3_TTB	5250.9
TA 703 and OP 4	5289.3
OP 4	*3034.9*
TA 802	5313.4
RG013	5355.7

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
TA 206 and AFP 241&242	5713.4
AFP 241	*0.1*
AFP242	*0.1*
RG018	5822.5
RG010	5855.0
TA 203	6177.1
RG014	7534.5
TA 202	7826.9
RG037 and RG BLDGS, AFP 500& 513	7971.8
RG037 Buildings	*885.8*
AFP 500	*14.6*
AFP 513	*15.0*
FOB_2_TTB and OP1	8256.0
OP 1	*326.1*
RG036	8411.0
RG022	8550.8
FOB_1_TTB	8854.7
RG011	9570.5
RG012	9940.0
TA 201and LITTER, RAPPEL ST & WD	10827.4
LITTER Course	*64.8*
Steel Rappel Tower	*3303.0*
Wooden Rappel Tower	*64.9*
CANTONMENT and all items below	11009.8
Classroom 614	*1902.3*
HEAT Device	*2418.8*
Pool	*275.2*
TO 803	*1103.2*
TO 804	*2248.7*
TO 805	*2561.8*
TO 806	*762.3*
AIRFIELD and all items below	16119.8
East Ramp	*1073.0*
West Ramp	*2739.3*
Hanger	*1496.4*
Airfield Classroom	*1495.6*
Conditioning Course	*2568.6*

Table B-2. Total Number of Training Hours during the Roosting Season by Location between 2003 and 2009	
Facility Description	**Total Training Hours**
Confidence Course	*3150.1*
Leadership Readiness Course	*2907.9*
Drop Zone-Anderson (DZ Andy)	*620.9*
KD Range Complex (includes RG003, RG004, RG005 and RG006)	26273.3
RG003	*5671.1*
RG004	*5100.4*
RG005	*5279.1*
RG006	*10222.7*

Table B-3. Total Number of Personnel Trained during the Roosting Season by Year	
Year	**Number of Personnel**
2003	134,999
2004	134,723
2005	128,349
2006	158,484
2007	217,575
2008	212,743
2009	211,088

Table B-4. Total Number of Training Hours during the Roosting Season by Year	
Year	**Total Training Hours**
2003	19,133
2004	33,810
2005	37,527
2006	35,857
2007	54,089
2008	100,506
2009	148,796

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Table B–5. Ranges and Munitions Used at CAJMTC	
Range Number (if listed) and Name	**Weapons Used**
1. Woodhill Multi-use	M16 25m Zero, M16 25M Alt Crs "C" M16 NBC, M16 Night Fire, M60 10m Zero, M249 10m Zero, Pistol, .38 cal, 45 cal & 9mm
2. Woodfill Police	45 Cal & 9mm Police Tactics, 5.56 Police Tactics Shotgun Practice, Swat House Tactics
3. Woodfill KD-1	M16 25m Zero M15 30m Zero M16 Army/Marine Courses Shotgun Practice M24/M86 Sniper Practice, Sniper Snaps & Movers NRA High Power Matches
4. Woodfill KD-2	M16 25m Zero, M16 30m BZO, M16 Army/Marine Courses Shotgun Practice, M24/M86 Sniper Practice Sniper Snaps & Movers NRA High Power Matches 81mm SRTR
5. Woodfill KD-3	M16 Army/Marine Courses, Shotgun Practice, M24/M86 Sniper Practice Sniper Snaps & Movers NRA High Power Matches 81mm SRTR
6. Woodfill KD-4	M16 Army/Marine Courses Shotgun Practice M25/M86 Sniper Practice Sniper Snaps & Movers NRA High Power Matches Sniper Unknown Distance M60 LMG
7. Woodfill 203-TP	40mm TP Practice 40mm TP Qualify
8. Woodfill 203-HE	40mm HE Practice
9. Michael Pistol East	45 Cal & 9mm 25m AQPC, 45 Cal & 9mm 7/15/25yd Shotgun Practice M3 Machine gun

Table B–5. Ranges and Munitions Used at CAJMTC	
Range Number (if listed) and Name	**Weapons Used**
10. Michael Combat Pistol	45 Cal & 9mm Combat Course Night Fire Course
11. Michael Multi-Purpose MG	M249/M60/M2 Training Practice/Qualification M24 Sniper Practice/Qualification Sniper Unknown Distance M249/M60 Night Practice/Qualification
12. Michael Multi-Use	M16 25m Zero M16 25mm Alt Crs "C" M16 NBC M16 Night Fire M60 10m Zero M249 10m Zero 45 Cal & 9mm, 25m AQPC
13. Michael 3	M16 25m Zero M16 25 m Alt Crs "C" M16 NBC M16 Night Fire 9 (adjusted) M60 10m Zero M249 10m Zero M2 10m Zero 45 Cal & 9mm 25m AQPC
14. Michael Record Fire	M16 Record Fire Qual M16 Battle Site Zero M16 Auto Fire M16 Feedback 75/175/300
15. McGee 81mm Sabot	81mm Sabot Practice
16. McGee Subcal Light Antiarmor Weapon (LAW)	35mm SubCal Practice
17. Practice Hand Grenade	Hand Grenade Qualification (TP only)
18. McGee Record Fire	M16 Record Fire Qualification M16 Battle Site Zero M16 Auto Fire M16 Feedback 75/175/300 M16 Night Fire
19. McGee Light MG	M16 25m Zero M16 25m Alt Crs "C" M16 NBC M60 20m Zero M249 10m Zero M2 10m Zero (Plastic) 45 Cal & 9mm 25m AQPC Shotgun Practice

Table B–5. Ranges and Munitions Used at CAJMTC	
Range Number (if listed) and Name	**Weapons Used**
20. McGee Heavy MG	M16 25m Zero M16 25m Alt Crs "C" M16 NBC M16 Night Fire (adjusted) M60 10m Zero M2 10m Zero 45 Cal & 9mm, 25m AQPC 60mm Mortar (track & ground) 25mm Bradley Practice Shotgun Practice
21. McGee 10/25	M16, 25m Zero M16 25m Alt Crs "C" M16 NBC M16 Night Fire (adjusted) M60 10m Zero M249 10m Zero 45 Cal & 9mm 25 m AQPC 60mm Mortar (track & ground) Shotgun Practice
22. McGee Recoilless Rifle	M16, 25m Zero M16 25m Alt Crs "C" M16 NBC, M16 Night Fire (adjusted) M60 10m Zero M249 10m Zero 45 Cal & 9mm 25 m AQPC 60mm Mortar (track & ground) Shotgun Practice 84mm AT-4 Practice 66mm LAW & 202 Flash Practice 83mm SMAW Practice 105/155/203 Arty direct fire 165m CEV TP Only Dragon MK-19 40mmm HE & TP
23. McGee LAW	Claymore 84mmm At-4 Practice 66mm LAW & 202 Flash Practice 83mm SAW Practice 40mm M203 HE Practice
24. McGee Heli-gunship	20mm & 30mm Helicopter guns 40mm TP nose cannon 2.75 rockets TP 7.62mm mini-gun Claymore Aerial TOW

Table B–5. Ranges and Munitions Used at CAJMTC	
Range Number (if listed) and Name	**Weapons Used**
25. Wilder Machine Gun	M60 Trans Practice/Qualification M24 Sniper Practice/Qualification Sniper Unknown Distance M60 Night Practice/Qualification
26. Tipton Tank	Tipton Tank 105/29mm (TP) 50 Cal Field Fire Mounted Inbore .50 Cal (Table VII) MK-19 40mm (TP only) 1200m Zero Sniper Unknown Distance
30. MP-15	TOW TP (ground & vehicle) Dragon MK-16 40mm HE & TP Squad Defense live fire M16, M60, M203, LAW, Flash
37. MPTR	9mm pistol, M16, M4 carbine, Squad Automatic Weapon (SAW), M60 MG, Cal .50 MG, TOW (Practice), 105mm(TP)/120mm(TP) tank. Note: Tanks have not used the range since around 2001 and we have no tank units in the state and none that train here anymore. The range is almost exclusively used for convoy live fire training.
38. Hickham Door Gunner Range	M60 Door-gunner Practice M134 Minigun Side-mount Day & Night
43. Lick Creek Platoon Assault	M16 M60 M203 TP 3.5 Subcal LAW
44. Heavy Demolition	40lb Max charge, elect & non-elect charged
52. Light Demolition	1 1/5lb Max charge, elect & non-elect charged
53. Practice Hand Grenade	Hand Grenade Qualification (TP only)
54. Live Hand Grenade	M67 Fragmentation Practice (HE)
SRTR Range	81mm SRTR
Squad Technique of Fire	M16 M60 M203 TP 3.5 Subcal LAW/99mm AT4 TT

Table B–5. Ranges and Munitions Used at CAJMTC	
Range Number (if listed) and Name	**Weapons Used**
3B Squad Assault	M16 M60 M203 TP
4B Squad Assault	3.5 Subcal LAW/9mm AT4 TT
6BW Squad Assault	M16 M60 M203 TP
6BE Squad Assault	M16 M60 M203 TP
Source: INARNG, 2009; SAIC, 1998	

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APPENDIX C

USFWS BLOOMINGTON FIELD OFFICE

FOREST MANAGEMENT GUIDELINES FOR INDIANA BATS

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BFO Forest Management Guidelines for Informal Section 7 Consultations on Indiana Bats (*Myotis sodalis*) within the State of Indiana

These guidelines were developed by the Bloomington Field Office (BFO) of the U.S. Fish and Wildlife Service (FWS) to conserve the federally endangered Indiana bat (*Myotis sodalis*) and its summer habitat within the State of Indiana. Adherence to these guidelines will result in forest habitat that is suitable for Indiana bat use, but may not represent optimal habitat. Maintaining or creating optimal Indiana bat maternal habitat typically would require more intensive management practices than provided here. This is a working document and periodically will be revised as new data warrant.

Because the risk of incidental take of Indiana bats in forest stands managed in accordance with these guidelines is discountable or insignificant, the BFO typically will provide written concurrence letters to managers seeking Section 7 compliance (i.e., informal consultation will suffice). However, if these management guidelines cannot be followed or conflict with other management goals or directives, then forest managers are strongly encouraged to contact the BFO to discuss all of their options (e.g., greater management flexibility may be achieved via formal Section 7 consultation).

FOREST MANAGEMENT GUIDELINES

1. At least 60% canopy cover (on a stand-by-stand basis, depending on size of stands) shall be maintained after any timber harvest activities.

2. Shagbark hickory (*Carya ovata*) or shellbark hickory (*C. laciniosa*) trees shall not be harvested or manipulated during timber stand improvement (TSI) activities, unless the combined density of these species exceeds 16 trees/acre. If present, at least 16 live shagbark and shellbark hickory (combined) >11" dbh must be maintained per acre.

3. Standing snags shall not be felled/removed, except where they pose a serious human safety hazard (a tree with <10% live canopy should be considered a snag). Snags that have no remaining bark and no visible cracks, splits, or hollows may be felled as well as any snags leaning more than 45º from vertical.

4. The following species of trees have been identified as having relatively high value as potential Indiana bat maternity roost trees:

shagbark hickory (*Carya ovata*)	eastern cottonwood (*Populus deltoides*)
shellbark hickory (*Carya laciniosa*)	northern red oak (*Quercus rubra*)
bitternut hickory (*Carya cordiformis*)	post oak (*Quercus stallata*)
silver maple (*Acer saccharinum*)	white oak (*Quercus alba*)
sugar maple (*Acer saccharum*)	slippery elm (*Ulmus rubra*)
green ash (*Fraxinus pennsylvanica*)	American elm (*Ulmus americana*)
white ash (*Fraxinus americana*)	black locust (*Robinia pseudoacacia*)

(Tree species based on literature and unpublished roosting data).

On average, at least 3 live trees per acre >20" dbh (of the high-value species listed above) shall always be maintained in the stand (a tree with <10% live canopy should be considered a snag). These “leave trees” must be the largest trees of the listed species remaining in the stand. An additional 6 live trees per acre >11" dbh (of the species listed above) must also be maintained. The "per acre" requirement can be expressed as the average per acre on a stand-wide basis, depending on the definition of a stand.

If there are no trees >20" dbh to leave, then 16 live trees per acre must be left, and these must include the largest specimens of the listed species remaining in the stand.

5. No timber harvest or TSI activities shall occur within 100 feet of a perennial stream or within 50 feet of an intermittent stream.

6. No felling of trees >3” dbh while Indiana bats may be present from 1 April through 30 September (i.e., trees may be felled from 1 October through 31 March).

PRESCRIBED FIRE GUIDELINES

1. Prescribed burns shall not be conducted from 15 April through 15 September in burn areas containing potential bat roost trees/snags >3” dbh.

2. Temporary fire breaks shall be created/maintained around any known Indiana bat primary maternal roost trees that fall within a proposed burn area prior to the burn.

NOTE: If any of these guidelines cannot be followed or additional clarification is needed, then please contact the BFO.

NOTE: If proposed forest/timber management actions or prescribed burns will occur within a 5-mile radius of a known Indiana bat hibernaculum, then please contact the BFO for additional guidance. Indiana bat hibernacula in Indiana are known to occur in Crawford, Greene, Harrison, Lawrence, Martin, Monroe, Orange, and Washington counties.

APPENDIX D

COMPENSATORY MITIGATION PLAN FOR SECTION 404/401 WATER QUALITY CERTIFICATION

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Compensatory Mitigation Plan for:
Section 404 Permit/Section 401 Water Quality Certification

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for:

Camp Atterbury Joint Maneuver Training Center
Multi-Purpose Machine Gun Range
Bartholomew County, Indiana
COE ID#: LRL-2009-349-LCL

project sponsors:

Indiana Army National Guard

prepared by:

Randy Jones
AquaTerra Consulting, Inc.

August, 2009

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Compensatory Mitigation Plan

Prepared by: AquaTerra Consulting, Inc.

EXECUTIVE SUMMARY

The Indiana Army National Guard proposes the development of a Multi-Purpose Machine Gun Range (MPMG) on an approximately 90 acre project site on the Camp Atterbury Joint Maneuver Training Center (CAJMTC) property. The site contains approximately 5,000 linear feet of intermittent channels and approximately 6.52 acres of adjacent forested wetlands.

Development includes construction of firing lanes, targets, access roadways, and utilities. The purpose of the project is to facilitate construction of a Multi-Purpose Machine Gun Range to improve training and readiness capabilities of CAJMTC.

Proposed mitigation will consist of a combination of: developing wetlands at an off-site location, re-planting/enhancing wetlands & channels temporarily disturbed at the MPMG site, stream channel rehabilitation/enhancement at an off-site location, and enhancement of existing wetland functions at an off-site location.

Proposed Impact Summary		
Type	**Description**	**Acres/lin ft**
Wetland	Fill (permanent loss)	1.64 acres
Wetland	Clear Only (conversion PFO to PSS)	3.28 acres
Wetland	Clear Only (conversion PFO to PEM)	0.72 acres
Wetland	No-Impact (undisturbed)	0.88 acres
Intermittent Channel	Relocated to Culvert	655 lin ft
Intermittent Channel	Relocated to Open Channel	595 lin ft
Intermittent Channel	Clear Only	2,760 lin ft
Intermittent Channel	Temporary (utility crossing)	52 lin ft
Intermittent Channel	No-Impact (undisturbed)	950 lin ft

Table 1 Proposed Impact Summary

Proposed Mitigation Summary		
	Acres	**Linear Feet**
Wetland Mitigation	10.56	
Wetland Enhancement	3.7	
Upland Buffer *(Wetland Enhancement)*	1.8	
Stream Restoration (*Daylight Channel)*	1.65	655’
Stream Enhancement *(Wetland Outlet Channels)*	0.1	700’
On-Site *(Wetland Conversion Areas)*	4	
On-Site (*Open Channel Relocation*)	0.3	595
On-Site (*Existing Channel Clear*)	1.25	2,760
Upland Buffer *(Wetland Mitigation)*	0.7	
TOTALS:	24.06	1,355’

Table 2 Proposed Mitigation Summary

1. INTRODUCTION

A. Applicant/Agent:

Company Name:
Indiana Army National Guard
Joint Forces Headquarters
Indiana- JFHQ-IN-FMO-EN
Contact Person: LTC Richard Jones
Address: 3764 W Morris Street
City: Indianapolis **State:** IN **Zip:** 46241
Phone: 317/ **Fax:**

Agent: AquaTerra Consulting, Inc.
Contact Person: Randy Jones
Address: 151 North Home Avenue
City: Franklin **State:** IN **Zip:** 46131
Phone: 317/ 502-7897 **Fax:** 866/ 827-5608
Email: Randy@aquaterracons.net

B. Purpose & Objectives:

To compensate for wetland/stream uses lost at the MPMG impact site through a combination of off-site wetland and stream channel development and careful consideration of on-site resources .

C. Impact Description

Creation of the MPMG range requires clearing of existing forested vegetation to establish line-of-sight for firing lanes, installation of target structures, access roads, and utilities. Fill in wetland and stream areas was limited to road crossings and target placement, where avoidance was not possible.

D. Alternatives- Avoidance/Minimization of Impacts

The MPMG Range planners have undertaken a comprehensive and exhaustive approach to avoiding and minimizing the required impacts to wetlands and streams at the project site. Supplemental information, including the Benham "Project Planning Documentation Charrette"[1], and the AMEC wetland delineation

[1] The Benham Companies, LLC. " *Multi-Purpose Machine Gun Range Project Planning Documentation Charrette*" May 25, 2007

of the project site[2], demonstrate the extraordinary steps taken to site and plan the MPMG Range around existing waterbodies.

Every attempt to avoid & minimize impacts to existing waters was considered and pursued during site selection and design, including: relocation and redesign of the original site to the north to avoid potential impacts to over 32 acres of wetlands identified in the area, reduction of the original range footprint, and intensive site design to limit wetland/stream fill and clearing to that which is absolutely essential to provide for range functionality. Specific changes made following the 60% design submittal include:

- Moved entire range 150 feet easterly toward Mauxferry Road and rotated it to reduce the environmental impact on wetlands. The rotation of the range essentially moved the 800 meter target line about 1,000' to the north.
- Eliminated the 900 meter and 1000 meter targets to reduce the overall size of the range.
- Reduced the number of targets from 124 to 80 consisting of 10 double Stationary Infantry Targets (SIT's) and 70 single SIT's.
- Reduced the different kinds of targets to just single and double SIT's.
- Eliminated the latrine and covered mess shelter.
- Moved the location of some of the targets and trails to reduce the environmental impact on the wetlands and water courses.
- The earthwork required to achieve line-of-sight to each target was greatly optimized and significantly reduced.
- The 60% review meeting also suggested eliminating the down-range data lines to save money. This suggestion has not been incorporated, and the project currently fits within budget. Benham recommends leaving the targets hard-wired for data if it continues to stay within budget.

A comprehensive discussion is included in the *Alternatives Analysis* in the appendices.

2. PROPOSED IMPACT SITE

A. Location

County: Bartholomew
Civil Township: German **Section:** 18, 19
Township: 10 North **Range:** 5 East
Quad: Nineveh, IN **Lat/Long:** 39.202663° N -86.012298° W
8-Digit HUC: Driftwood River- 05120204

[2] AMEC Earth & Environmental, Inc. "*Wetland/Waterbody Delineation Report*" January 2008. *Addendum*, April 11, 2008, *Addendum*, November 11, 2008.

Directions: Northwest corner of Bearrs Road and Mauxferry Road on Camp Atterbury Joint Maneuver Training Center (CAJMTC) property.

B. Surrounding Land Use

Land-use in the surrounding areas is predominantly undeveloped and forested with deciduous trees. The proposed site for the MPMG facility is approximately 90 acres in size and is situated within the impact area of Camp Atterbury. The Infantry Squad Battle course is located to the southwest of the proposed site.

The land to the south and west of the original footprint was a training range constructed for use around the second world war. The site is located in the central range area and is collocated with thirty other training ranges.

The CAJMTC property comprises approximately 33,760 acres and includes portions of Bartholomew, Brown, and Johnson Counties.

C. Classification (Wetlands & Streams)

The waterbodies present in the proposed MPMG Range area include:

SITE/Series #	CLASS	ESTIMATED AMOUNT OF AQUATIC RESOURCE IN REVIEW AREA	JURISDICTION
A/F	PFO- 26.32(a) PSS- 0.64 (a) PEM- 0.07 (a)	27.03 (ACRES)	404-WETLAND
B	PFO- 0.67 (a)	0.67 (ACRES)	404-WETLAND
C	PFO- 5.15 (a) PSS- 2.1 (a) PEM- 0.04 (a)	7.29 (ACRES)	404-WETLAND
D	PEM- 0.07 (a)	0.07 (ACRES)	404- WETLAND
H	PFO- 1.29 (a)	1.29 (ACRES)	404-WETALND
I	PFO- 2.18 (a) PSS- 0.05 (a)	2.23 (ACRES)	404- WETLAND
J	PFO- 0.65 (a)	0.65 (ACRES)	404- WETLAND
Stream 1	intermittent	2,128 lin ft.	404- tributary
Stream 2	intermittent	966 lin. ft.	404- tributary
Stream 3	intermittent	1,937 lin. ft.	404- tributary
Road Ditch (A)	intermittent	646 lin. ft.	404- tributary
Road Ditch (B)	intermittent	406 lin. ft.	404- tributary
Drainage Ditch	ephemeral	113 lin ft.	404- tributary
Stream 4	intermittent	1,934 lin. ft.	404- tributary
Stream 5	intermittent	947 lin. ft.	404- tributary
		Total PFO: 36.26 acres	
		Total PSS: 2.79 acres	
		Total PEM: 0.18 acres	
		Total Wetlands: 39.23 acres	
		Total Intermittent/ephemeral channel (lin. ft.): 9,077'	

Table 3 Original Impact Site Waterbodies

The original site alignment was shifted to avoid the majority of these wetlands/stream channels identified above. In the current/final site layout, the following waterbodies are present:

Wetland/Stream ID	CLASS	ESTIMATED AMOUNT OF AQUATIC RESOURCE IN REVIEW AREA	JURISDICTION
A/F	PFO	4.3 (ACRES)	404-WETLAND
H	PFO	0.07 (ACRES)	404-WETLAND
I	PFO/PSS	2.14 (ACRES)	404-WETLAND
Stream 1	intermittent	1638 Lin ft	404- TRIBUTARY
Stream 3	intermittent	552 Lin ft	404- TRIBUTARY
Stream 4	intermittent	1842 Lin ft	404- TRIBUTARY
Stream 5	intermittent	981 Lin ft	404- TRIBUTARY
		Total Wetlands:	**6.51 acres**
		Total intermittent Channel:	**5013 lin ft**

Table 4 Final Impact Site Waterbodies

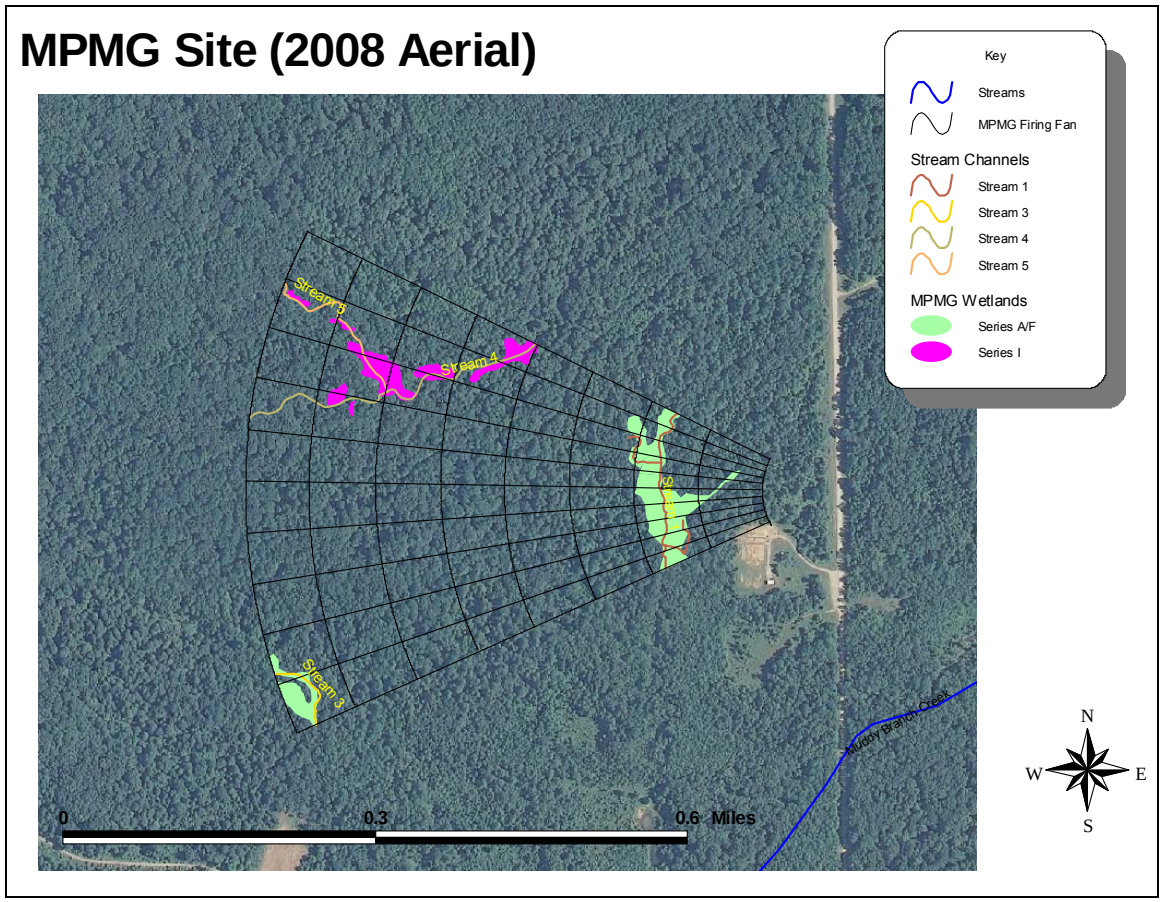


Figure 1 MPMG Site Wetlands/Streams

D. Existing Conditions- Landscape Setting/Ecosystem Context

The existing intermittent stream channels and associated forested wetlands are situated in relatively flat areas between hills and form headwaters of two, separate 14-digit watersheds (Nineveh Creek & Muddy Branch Creek) which both feed the Driftwood River. The topography is fairly steep, with adjacent slopes up to 50%.

Surface water runoff from adjacent hillsides and possibly shallow groundwater movement down-gradient, provide a source of hydrology for the wetlands and stream channels. Although no hydric soils are mapped in the vicinity, conditions observed in the wetlands indicate saturated conditions for a duration sufficient to form hydric features in the upper extent.

The plant community in the wetlands, along stream channels, and in the associated uplands, is dominated by a mature forest community.

E. Field Observations- data sheets

See included "Delineation Report"[3]

[3] AMEC Earth & Environmental, Inc. "*Wetland/Waterbody Delineation Report*" January 2008. *Addendum*, April 11, 2008, *Addendum*, November 11, 2008.

Photo 1 Typical intermittent channel at MPMG Site

Photo 2 Typical forested wetland at MPMG Site

F. Climate[4]

WETS Station : COLUMBUS, IN1747 Creation Date: 01/22/2003
Latitude: 3913 Longitude: 08554 Elevation: 00630
State FIPS/County(FIPS): 18005 County Name: Bartholomew
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.)			Precipitation (Inches)				
					30% chance will have		avg # of days w/.1 or more	avg total snow fall
	avg daily max	avg daily min	avg	avg	less than	more than		
January	36.4	18.9	27.6	2.66	1.66	3.30	5	4.9
February	41.6	22.2	31.9	2.63	1.63	3.40	5	3.4
March	52.4	31.0	41.7	3.66	2.50	4.16	7	1.8
April	63.7	40.7	52.2	4.36	2.85	5.08	8	0.0
May	73.7	51.5	62.6	4.63	3.38	5.42	8	0.0

[4] ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/in/18005.txt

June	82.1	61.0	71.6	3.45	2.26	4.27	6	0.0
July	85.9	64.9	75.4	4.02	2.58	4.60	6	0.0
August	84.4	62.5	73.5	3.75	2.63	4.74	5	0.0
September	78.3	54.3	66.3	3.06	1.77	3.82	5	0.0
October	66.7	42.0	54.3	2.78	1.80	3.22	5	0.1
November	53.3	33.7	43.5	3.75	2.59	4.43	6	0.5
December	41.3	24.3	32.8	3.16	2.29	4.06	6	2.6
Annual	-----	-----	-----	------	38.42	45.58	--	----
Average	63.3	42.3	52.8	3.49	------	------	--	----
Total	-----	-----	-----	41.92	------	------	72	13.3

GROWING SEASON DATES

	Temperature		
Probability	24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *	3/24 to 11/11 232 days	4/ 5 to 10/30 208 days	4/17 to 10/17 183 days
70 percent *	3/19 to 11/16 242 days	4/ 1 to 11/ 3 216 days	4/13 to 10/21 191 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

Table 5 Climate table

G. Water Quality- 303(d)

The Driftwood River is listed on the Indiana Department of Environmental Management *2008 Approved 303(d) list of Impaired Waterways*[5], for impairments due to E. coli bacteria contamination.

H. Functional Assessment Tool

No formal functional assessment was conducted on the wetlands or stream channels. Due to the location in mature forest habitat and relatively undisturbed contributing watersheds, the areas are assumed to be of high quality. Additionally, site access to the MPMG is limited due the potential presence of un-exploded ordinance, with the location being in the CAJMTC Impact Area.

[5] http://www.in.gov/idem/files/303d_list_2008_approved.xls

Site reconnaissance inspections of the wetland and stream channel area did not display any visual signs of impairment, encroachment, or dominance of invasive species.

3. PROPOSED MITIGATION SITES

A. Site Selection

Selection of a mitigation site was limited to available areas on CAJMTC property, in the interest of timing and cost. Seventeen potential mitigation sites were identified using off-site parameters including: available size, presence of hydric soils, proximity to receiving stream, proximity to National Wetland Inventory areas, existing land cover, 8-digit watershed area, existing drainage features, and existing or potential use by CAJMTC.

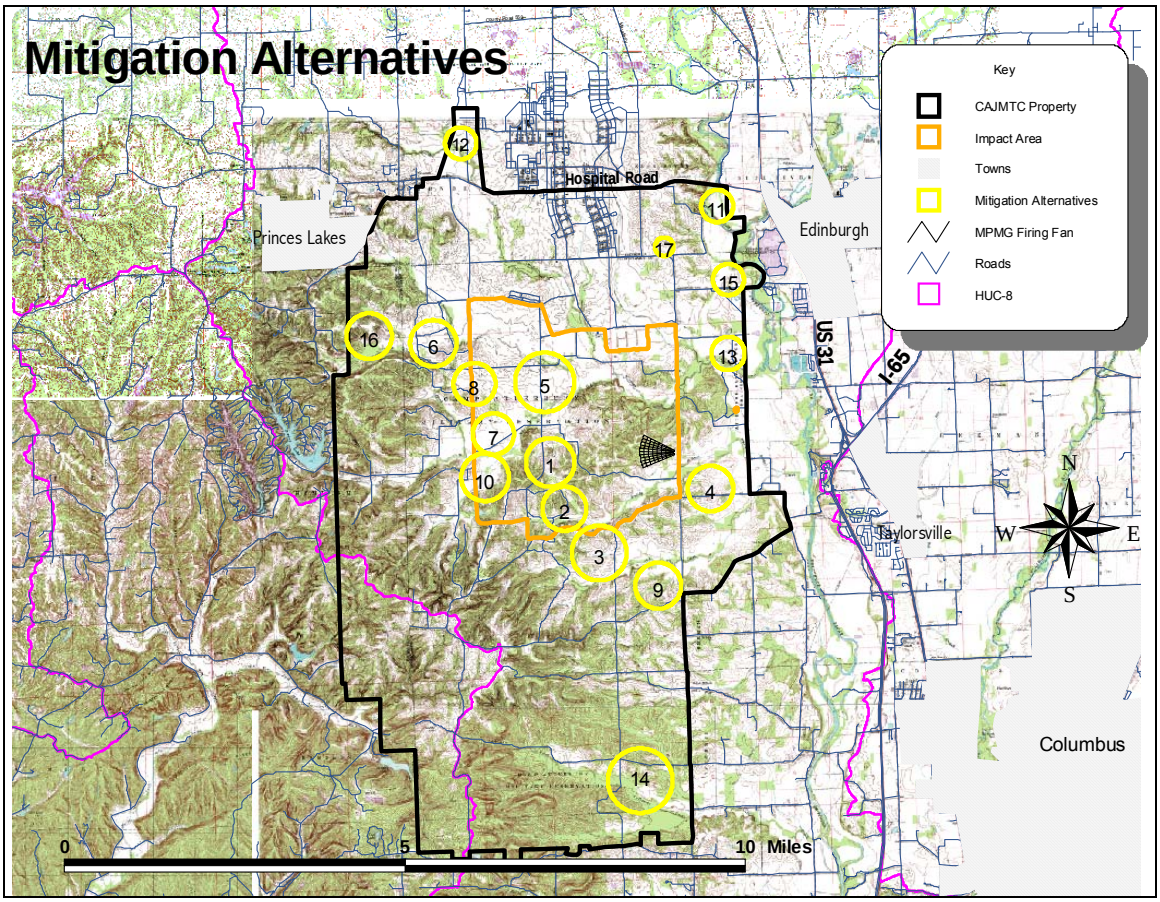


Figure 2 Mitigation Alternatives

A field reconnaissance of preferable sites was conducted to evaluate site conditions to determine suitability. Many of the candidate sites were excluded from further consideration due to presence of existing wetlands or forested communities, location in the CAJMTC Impact Area or in areas of heavy training use, or lack of suitable topography, soils and/or hydrologic features.

A list of nine potential Courses of Action (COA) was established by Indiana National Guard personnel and presented in a Decision Brief[6] to key decision-makers at a meeting conducted on May 5, 2009. Through a series of defined screening criteria, the list of eligible COA's was limited to three viable alternatives. The remaining three COA's received further consideration using a set of four quantifiable evaluation criteria, including: Compatible Use, Future Expansion, Training Value, and Construction Cost.

Based on the evaluation criteria, COA #2 emerged as the preferred site. Consensus was reached by the decision-making team to select COA #2 as the most viable site on which to conduct wetland mitigation activities.

In an effort to reduce required mitigation ratios associated with wetland conversion from forested wetland communities to scrub-shrub or emergent wetland communities resulting from un-avoidable clearing activities at the MPMG site, a multi-faceted mitigation approach was developed.

B. Mitigation Description

The integrated mitigation approach includes:

- Development of approximately 10.56 acres of forested wetland at Site #12 (COA #2), also including approximately 0.7 acres of upland grassed buffer.
- Development of approximately 655 linear feet of stream channel restoration by day-lighting an existing tile and establishing 50' riparian buffers at Site #12 (COA #2).
- Enhancement of approximately 700 linear feet of intermittent channels downstream of the proposed wetland outlet structures at Site #12 (COA#2) by eliminating head-cut erosion and establishing check dams in the channels bottoms to further reduce erosion and sedimentation and promote habitat diversity.
- Functional enhancement of approximately 3.7 acres of existing wetlands at Site #12 (COA #8) plus an additional 1.8 acres of buffers (50' wide).
- MPMG on-site mitigation of cleared/converted wetlands and stream channels, including emergent and/or scrub-shrub plantings on approximately 5.55 acres. Includes:

[6] See included *Decision Brief* PowerPoint presentation.

- 3.28 acres wetland shrub plantings (w/ herbaceous wetland understory seeding)
- 0.72 acres emergent wetland seeding
- 595' open channel relocation- wetland seeding and shrub planting on approx. 0.3 acres.
    - One row low-growing shrubs on 8' spacing on both sides of new channel
- 2,760' existing channel tree clearing- wetland seeding and shrub planting on approx. 1.25 acres.
    - One row low-growing shrubs on 8' spacing on both sides of new channel

C. Location

Training Area 101 Mitigation Site (COA#2)
County: Johnson
Civil Township: Nineveh **Section:** NE ¼ 27
Township: 11 North **Range:** 4 East
Quad: Nineveh, IN **Lat/Long**: 39.370321°N -86.068066°W
8-Digit HUC: Driftwood River- 05120204
Directions: West side of Stonearch Road, approx. ½ mile north of Hospital Road.

WWTP/Training Area 214 Enhancement Site (COA#8)
County: Bartholomew
Civil Township: German **Section:** 5
Township: 10 North **Range:** 5 East
Quad: Edinburgh, IN **Lat/Long**: 39.339447°N -86.995847°W
8-Digit HUC: Driftwood River- 05120204
Directions: North side of Hendricks Ford Rd. approx. 1/2 mile east of CR 500 E

D. Existing Conditions

The approximately 56 acre Training Area (TA 101), on which the proposed wetland mitigation project site will be located, is situated in an area dominated by public recreational land in the Atterbury Fish and Wildlife Area, which is managed by the Indiana Department of Natural Resources (IDNR).

Significant land use in immediate watershed includes a mix of woods and meadows managed for wildlife, numerous constructed lakes and ponds, scattered rural residences and farmsteads, the town of Nineveh to the west, and Camp Atterbury to the south and east.

The channel of perennial Nineveh Creek forms the southern border of the mitigation site; the western border is formed by un-named intermittent tributaries to Nineveh Creek. Both channels contain existing wooded corridors. No existing wetlands are located at the proposed wetland/stream mitigation site. Fields are drained with a network of sub-surface tiles, which will be disrupted to restore wetland hydrology to the area.

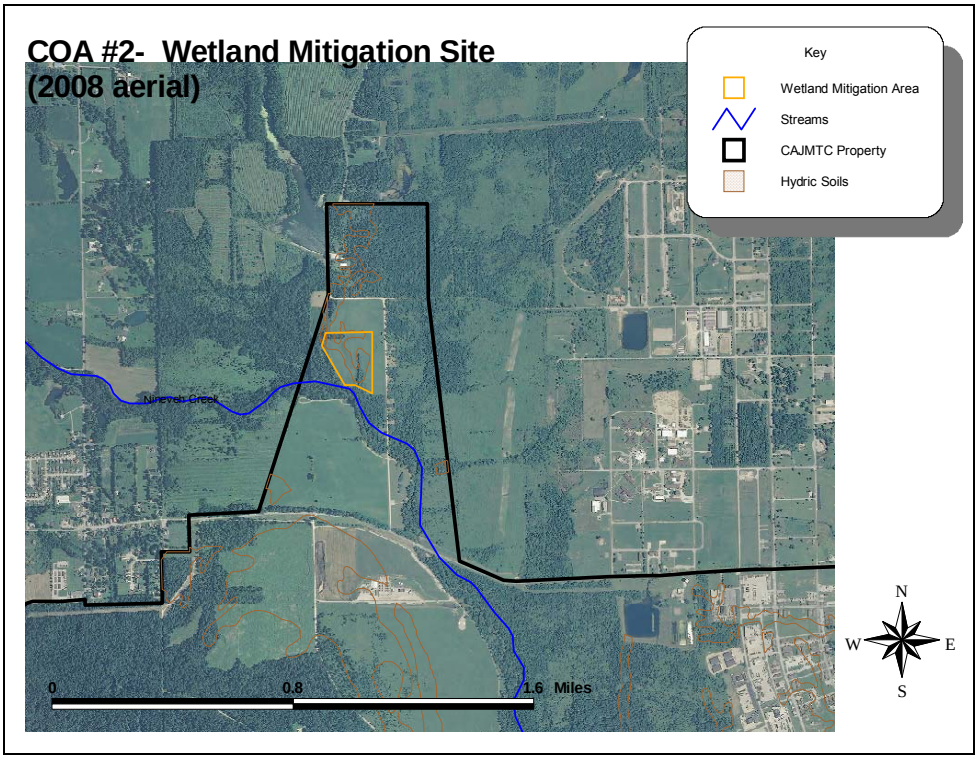


Figure 3 TA 101 Wetland Mitigation Site

Along the north-western portion of the site, an existing brush line indicates the location of a natural drainage swale underlain with an existing approximately 4" clay drainage tile. The tile runs from north to south along this draw for approximately 700 feet before escaping through blow-hole and forming a small surface channel contributing to a tributary to Nineveh Creek.

Photo 3 Tile exposed tile outlet from swale

Photo 4 Start of un-named trib. from tile outlet.

Current mitigation site conditions function as a quasi-habitat area, but are limited by hay production and drainage tiles. Topography is flat to somewhat rolling, rising approximately 10 feet in elevation from the south to the north.

Two depressional features, which contain the hydric *Brookston* soil, are located on the south side of the site, both of which contain functioning drainage tiles. The tile outlets for these areas have formed intermittent channels leading to the receiving stream, Nineveh Creek, resulting from head-cutting. The channels continue to erode and contribute sediment to the stream as the clay tile disintegrates upstream.

Photo 5 Gully w/ exposed tile (east side)

Photo 6 Gully w/ exposed tile (west side)

The wooded riparian zone along Nineveh Creek functions as a corridor for wildlife movement, connecting large areas of woods, ponds, and meadows on IDNR property, to the interior of Camp Atterbury habitat areas.

The site is currently enrolled in an agriculture lease for hay production. Existing tiles are present and visible in several locations. The tiles are functioning and provide drainage to the area for agricultural production. Three representative sample points were established to characterize typical conditions in proposed mitigation areas. See *Appendices* for data sheets.

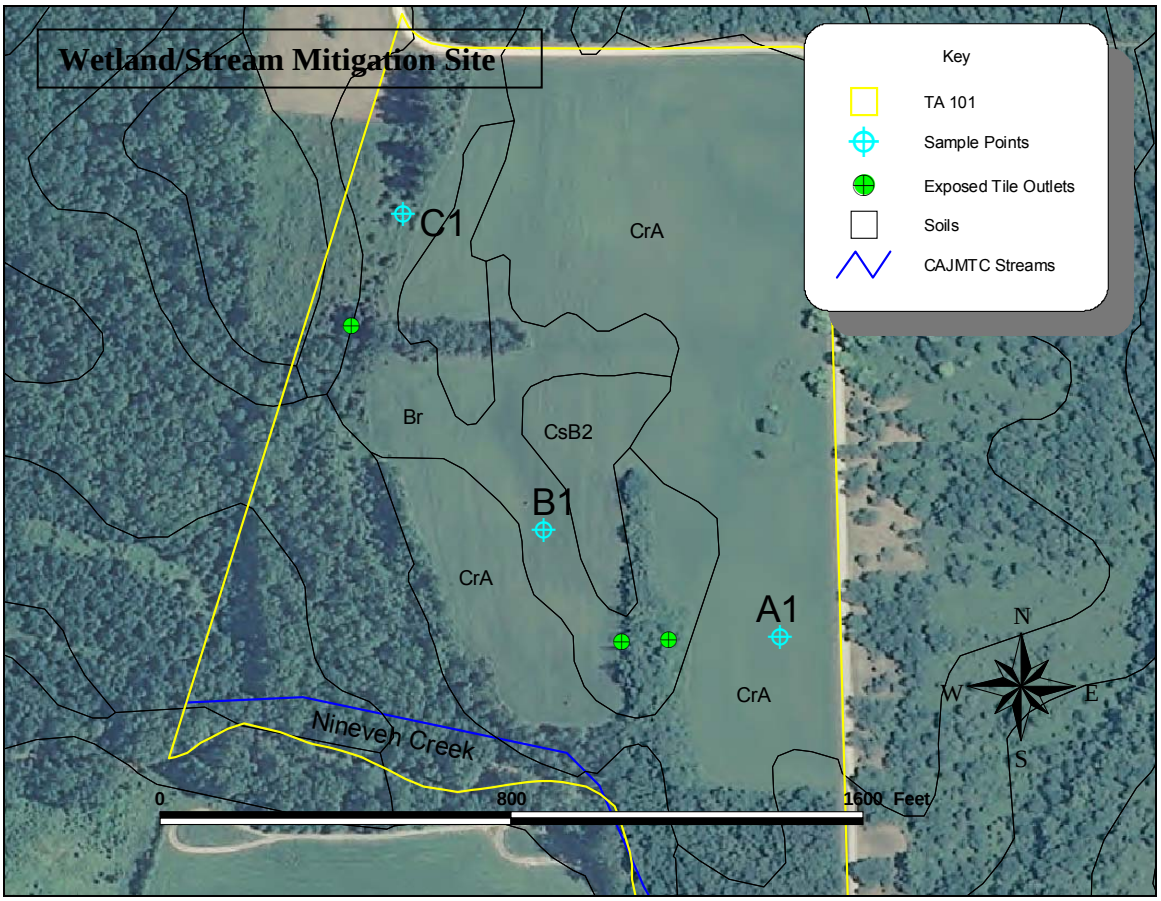


Figure 4- TA 101 Wetland/Stream Mitigation Area- Delineation Map

Existing conditions at the proposed Wetland Enhancement Area at the Waste Water Treatment Plant /Training Area 214 site are dominated by an existing palustrine forested wetland, approximately 4 acres in size. This wetland is depressional, with natural flow to the south impeded by the existing road. Areas of seasonal saturation and inundation to approximately one foot are present.

Species diversity is fairly homogenous, with the existing large trees and scant shrub layer dominated by Green Ash, Silver Maple, and Box Elder. Emergent understory is present along the transitional edges of the depression and in areas of slightly higher elevation in the interior. Emergent species include: Stinging Nettle, White Panicled Aster, Riverbank Rye, and Garlic Mustard. Invasive Bush Honeysuckle has established in scrub areas on the wetland perimeter. Areas surrounding the wetland area on the north and east sides are enrolled in an agricultural lease, currently in cool season grasses managed for hay production. The west side is a fallow area of grasses and few trees associated with the waste water treatment plant. The forested wetland complex extends to the south (across Hendricks Ford Road), where it eventually joins with the Driftwood River, approximately ½ mile to the southeast. The entire Wetland Enhancement Area is mapped in flood zone AE, according to DFIRM.

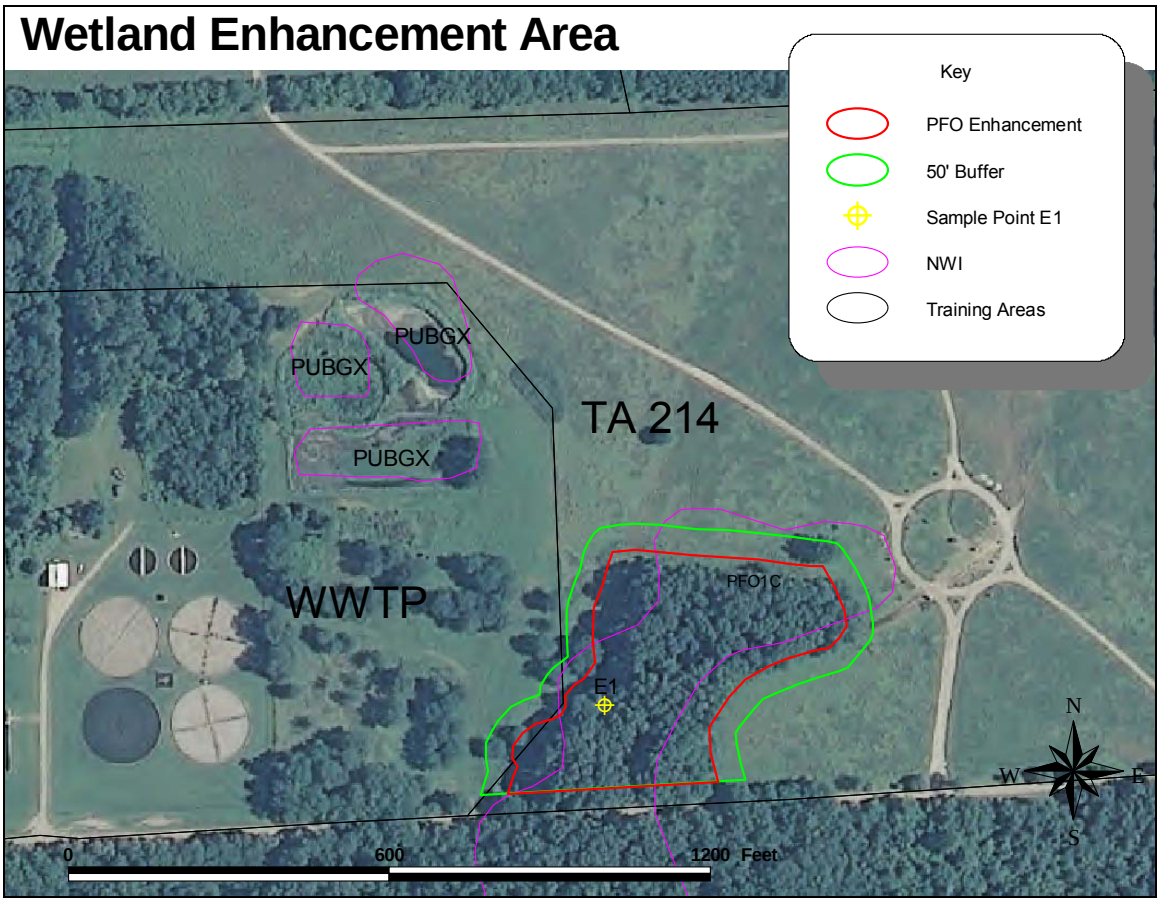


Figure 5 Wetland Enhancement Area

Photo 7 Existing PFO- microtopography for plantings

Photo 8 Existing buffers- hay managed

Photo 9 Bush Honeysuckle invader

Photo 10 Existing well/easement

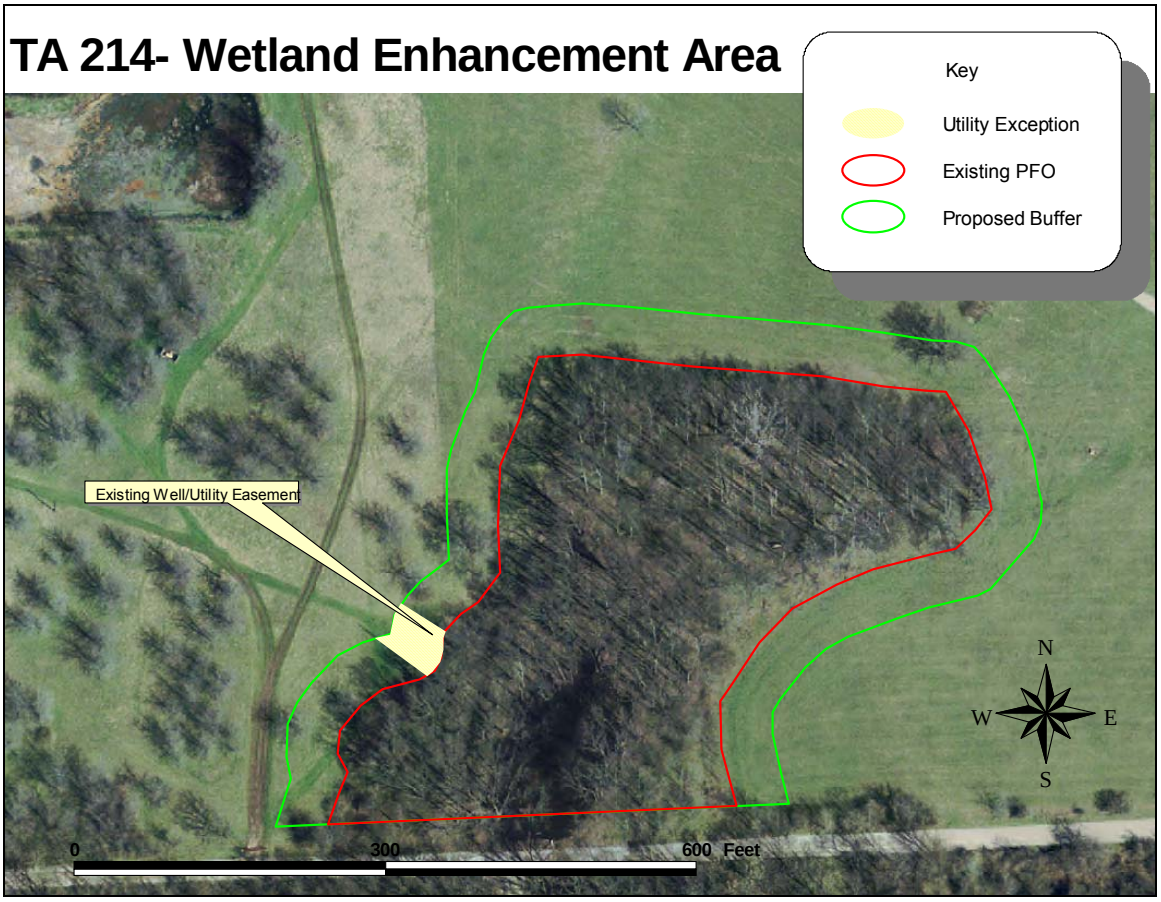


Figure 6 Wetland Enhancement Area at TA 214

E. Climate

Climate is similar to the MPMG site described in *Section 2F* above.

F. Water Quality- 303(d)

The Driftwood River is listed on the Indiana Department of Environmental Management *2008 Approved 303(d) list of Impaired Waterways*[7], for impairments due to *E. coli* bacteria contamination.

G. Functional Assessment Tool

No formal functional assessment to was used to evaluate existing wetlands at the wetland mitigation site; none are present.

4. GOALS & OBJECTIVES OF PROPOSED MITIGATION SITE

A. Determination of Credits

Credits for mitigation were determined by applying standard mitigation ratios based on community type, and through early coordination with the regulatory agencies. The following credit rationale is proposed:

- For permanent fill of forested wetlands, a replacement ratio of 4:1 is proposed.
- For clearing/conversion of forested wetlands to scrub-shrub wetlands, a mitigation ratio of 1.5:1 is proposed, of which, 1:1 will consist of wetland development and 0.5:1 of wetland enhancement.
- For clearing/conversion of forested wetlands to emergent wetlands, a mitigation ratio of 2.5:1 is proposed, of which, 1:1 will consist of wetland development and 1.5:1 of wetland enhancement.
- For placement of 655 linear feet of intermittent stream into culverts, 1:1 stream restoration/enhancement is proposed.
- On-Site clearing and conversion of wetland type- 1:1 on-site.

[7] http://www.in.gov/idem/files/303d_list_2008_approved.xls

B. Functional Replacement

In-kind functional replacement of wetland and stream functions is proposed. Wetlands to be filled at the MPMG site are Palustrine Forested with a seasonally saturated hydrological regime. The wetlands are hydrologically connected to intermittent channels and provide for downstream benefits to water quality and aquatic life. The proposed wetland mitigation area will be developed to provide similar functionality, with increased replacement acreage to compensate for the loss of temporal functions associated with mature forested systems.

The impacts to intermittent stream channels at the MPMG site resulting from culverting with be functionally replaced through the enhancement of approximately 700 linear feet of outlet channels at the wetland mitigation area, and creation of 655 feet of open intermittent channel, with an associated riparian buffer area, along the alignment of an existing sub-surface tile drain. On-site mitigation seeding/plantings will ensure continues aquatic functionality at the MPMG site.

Functional improvement at the wetland enhancement area is proposed through a combination of methods designed to increase species diversity and wildlife habitat, as well as ensure long-term viability of wetland functions, including:

- Designation of a 50' wide permanent buffer around the existing PFO. Much of the existing area is enrolled in an agricultural lease and is currently managed for hay production. Haying will cease and signs will be posted around the perimeter designating the area as a protected wetland.
- Create openings in the existing canopy by girdling existing trees of marginal quality (including Box-Elder, Green Ash and Silver Maple). Creation of snags will also increase wildlife habitat diversity.
- Installation of more desirable mast producing tree species (oaks & hickories) and wildlife shrubs in the wetland interior.
- Removal and chemical treatment of existing Bush Honeysuckle in the wetland interior and perimeter. Target spraying of garlic Mustard.
- Installation of herbaceous wetland plantings to enhance species diversity in the understory.

C. Potential Challenges

Potential challenges associated with wetland mitigation always include the potential for colonization by invasive species. No wetland invasive species were observed in the vicinity, however, Bush Honeysuckle and Garlic Mustard are prevalent in the wooded areas adjacent to Nineveh Creek and tributaries.

An additional concern is the potential for loss of establishing vegetation resulting from predation by deer, rabbit, geese, and other wildlife species. This concern is somewhat exacerbated by the location near IDNR wildlife property.

Although no evidence has been directly observed in the vicinity, beaver activity in the tree planting areas of the wetland may also be a challenge.

D. Environmental Goals & Objectives

Develop a forested wetland complex and stable stream channel that will grow, succeed, and fully replace the functions and uses of the aquatic areas lost at he development site.

5. MITIGATION WORK PLAN

A. Site Preparation

Site erosion control measures will be installed prior to any land-disturbing activity and maintained, per any required stormwater permit.

Mitigation site limits will be marked in the field to prevent accidental encroachment on the existing riparian corridor and/or off-site areas.

B. Soils/Substrate

The soils in the proposed wetland and stream mitigation areas consist of *Brookston* silty clay loam (hydric soil) and *Crosby* silt loam. Soils are currently drained with clay tiles, which outlet to Nineveh Creek to the south.

To provide a suitable planting medium in the wetland basins, the upper approximately one foot of topsoil will be scraped and stockpiled on-site and be re-distributed over the final site elevations, which will be over-excavated by 6”-12”.

Spoil material will be stock-piled on the north side of the property, adjacent to existing roadways, to establish suitable building pads.

Soils at the wetland enhancement area consist of *Martinsville* loam (0-2% slope, rarely flooded)), and *Stonelick* fine sandy loam (0-2% slopes, frequently flooded, brief duration). No disturbance of existing soils is proposed in this area.

C. Hydrology

Wetland Mitigation- Wetland hydrology will be achieved by excavating a series of flat-bottomed basins with a stable outlet established to provide for saturated

conditions only; no sustained inundation is proposed. The basins will be constructed with a minimum of 5:1 side-slopes and will utilize existing topography as much as possible, in order to minimize the amount of excavation required. Sources of wetland hydrology include: seasonal high water table, disrupted tile lines, and surface runoff from contributing watershed.

Two series of consecutive wetland basins will be established along natural draws, which are underlain with drainage tiles, on either side of an existing shrub line that extends to the north from the Nineveh Creek riparian zone. This shrub line contains existing tile head-cuts where the historic tile lines have been eroding back from their original outlet locations to cause the formation of entrenched gullies. At these locations, the tiles will be un-earthed and replaced with stable outlet structures, including Agri-Drain structures to provide for water elevation control in the wetland basins. This will eliminate future head-cutting and a significant source of sedimentation to Nineveh Creek. Existing tiles will be broken and rendered inoperational where encountered in the wetland basins during excavation.

Water levels in the forested wetland areas are expected to have seasonally saturated soil conditions under normal conditions, but are expected to vary seasonally, including brief inundation following storm events and dry conditions during summer months.

Stream Restoration- Along the north-western portion of the site, an existing brush line indicates the location of a natural drainage swale underlain with an existing approximately 4" clay drainage tile. The tile runs from north to south along this draw for approximately 700 feet before escaping through a blow-hole and forming a small surface channel contributing to a tributary to Nineveh Creek. As stream channel mitigation for unavoidable impacts to intermittent tributaries at the MPMG site, the applicant proposes to remove the existing drainage tile and create a small surface channel along approximately 700 linear feet.

Periodic flow across/under Stonearch Road to the north forms the headwaters of this swale. The existing clay tile will be located by excavation and will be removed or rendered inoperational by completely un-earthing or destroying sections along the constructed channel reach. A new channel will be constructed within an approximately 60 foot corridor, on roughly the same alignment, and will be approximately 2-3 feet deep and have an approximately 3-5 foot bottom width with 3:1 side-slopes. The new channel will contain several meanders along the constructed reach and will be hydrologically driven by flow from the contributing drainage area to the north, the disrupted tile line, and surface water from surrounding fields. The flow regime is expected to be intermittent, based on tile flow events observed during the spring of 2009. The new channel will connect with the headwaters of the existing intermittent tributary, near the location of the observed blow-hole.

Stream Enhancement (Wetland Outlet Channels)- Downstream of the proposed wetland control structures (AgriDrains), approximately 700 linear feet of intermittent channels are present. The channels currently provide a significant source of sediment to Nineveh Creek from the head-cut resulting from the

Wetland Enhancement Area- No manipulation of existing wetland hydrology is proposed at the wetland enhancement site.

MPMG On-Site- Existing wetland and stream hydrology will be maintained, to the greatest extent practicable. Relocated channel segments will be created with similar capacity to existing conveyances.

D. Planting Plan

Wetland Mitigation- The wetland basin areas will be planted with a diverse mix of native trees and shrubs on a 10' x 10' grid pattern to establish a forested wetland community. An herbaceous species understory, including grasses, forbs, sedges, and rushes will be included to promote habitat diversity and to encourage rapid colonization of target species and minimize potential for invasive/non-target species establishment. Annual grass species of Seed Oats and Annual Rye will be included as a cover/nurse crop and for erosion control.

The basin side-slopes will be planted with a slope stabilization mix, including native grasses and temporary/nurse species, as a buffer to the wetlands and for additional wildlife habitat. A 50' buffer extending east to west along the north side of the proposed wetland mitigation area will also be seeded with the slope-stabilization mix to minimize incidental erosion and sedimentation of the wetlands.

Stream Restoration- The area is currently overgrown with Autumn and Russian Olive, and Bush Honeysuckle shrubs. The construction corridor will be cleared of brush during tile removal and channel construction; a few large (≥ 3" dbh) existing trees (primarily Cottonwood) will be avoided by construction activities and left intact.

A 50 foot buffer on both sides of the restored channel will be established. This buffer zone, along with the channel bottom and side-slopes (approx. 1.65 acre in total), will be seeded with a Swale Seed Mix. Four rows of shrubs (700 total) will be planted on 8' centers within each 50' buffer.

Wetland Enhancement-
Functional improvement at the wetland enhancement area is proposed through a combination of methods designed to increase species diversity and wildlife habitat, as well as ensure long-term viability of wetland functions, including:

- Designation of a 50' wide permanent buffer around the existing PFO. Much of the existing area is enrolled in an agricultural lease and is currently managed for hay production. Haying will cease and signs will be posted around the perimeter designating the area as a protected wetland. Existing grass and forb community will remain, but will not be harvested as hay.
- Create openings in the existing canopy by girdling a minimum of ten (10) existing trees of marginal quality (including Box-Elder, Green Ash and Silver Maple). Creation of snags will also increase wildlife habitat diversity.
- Installation of a minimum of more desirable mast producing tree species (oaks & hickories) and wildlife shrubs in the wetland interior (min. 200 container stock). See *Planting Plan* for species, stock, and numbers.
- Removal and chemical treatment of existing Bush Honeysuckle in the wetland interior and perimeter. Target spraying of Garlic Mustard.
- Installation of herbaceous wetland plantings to enhance species diversity in the understory. See *Planting Plan* for species, stock, and numbers.

Tree, shrub, and herbaceous understory planting areas within the wetland enhancement area will be selected at the time of planting based on microtopography, water elevations, and canopy openings. Final planting locations will be documented in the as-built report.

MPMG On-Site Plantings-

The final component of mitigation involves the preservation of existing wetland and stream channels functions at the MPMG site. All wetland areas affected by clearing and conversion from a forested plant community to an emergent or scrub-shrub community will be seeded with the wetland swale mix to encourage species diversity and wetland functionality. All relocated and cleared stream channels will be seeded with a the swale seed mix for stability and to promote species richness.

Low growing wildlife shrubs will be planted in suitable areas. Plantings in this area include:

- 3.28 acres wetland shrub plantings (w/ herbaceous wetland understory seeding) in existing PFO areas to be converted to PSS
- 0.72 acres emergent wetland seeding in existing PFO areas to be converted to PEM
- 595' open channel relocation- wetland seeding and shrub planting on approx. 0.3 acres.
    - One row low-growing shrubs on 8' spacing on both sides of new channel

- 2,760’ existing channel tree clearing- wetland seeding and shrub planting on approx. 1.25 acres.
    - One row low-growing shrubs on 8’ spacing on both sides of remaining channels.

Mix compositions are included in the appendices (*Planting Plan*). Any variation from proposed lists, due to availability or other issues, will be documented in the as-built report.

E. Buffers

Buffers at the wetland mitigation area are naturally present on the south and west sides, due the location of the Nineveh Creek riparian areas. The east side of the proposed site is bordered by Stonearch Road; a 50’ set-back from the road is required to provide for future road and utility maintenance. This area will be maintained in existing grass cover and will continue to be mowed. A 50’ wide buffer (approx. 0.7 acres) running from east to west along the north side of the wetland area is proposed to provide a buffer to the wetlands.

The stream channel restoration includes the installation of 50’ wide riparian buffers along both sides of the created channel.

Permanent 50’ wide buffers will be established around the north, east, and west sides of the approximately 3.7 acre existing PFO at the Wetland Enhancement Area.

F. Schedule

Work on the Mitigation Areas is planned for Fall, 2010, or Spring, 2011, (as budget allows) with planting to follow in the appropriate seeding/planting window. The mitigation site will be completed within one year of completion of wetland/stream impacts at the MPMG site. In the event of scheduling delays due to timing, budgets, weather, or other unforeseeable events, a request for time extension may be submitted to the regulatory agencies.

Excavation and planting of the wetland basins may be completed in phases, if needed, to coordinate with available resources. Phased construction will begin with the installation of the stable outlet structures, beginning at the lowest elevations and working up-slope.

G. Construction Monitoring

It is recommended that the installation of the mitigation measures be monitored by qualified wetland professionals during construction and planting activities.

6. MAINTENANCE PLAN

A. Exotic & Undesirable Species Control

Exotic and undesirable species infestation is expected to be a minimal concern with the proposed mitigation, however, Reed Canary Grass (*Phalaris arundinacea*), cattail (*Typha lattifolia*), Purple Loosestrife (*Lythrum salicaria*) and *Phragmites australis* are the most likely intruders. Any invasive populations of these species in the mitigation areas will be documented during annual monitoring activities, and appropriate actions to eliminate and/or minimize establishment will be taken as necessary.

Methods for controlling undesirable species following installation may include mowing, burning, manual removal, and/or targeted application of appropriate herbicide. All invasive species control events will be documented in the annual reports. Re-planting of target species in some areas may be necessary following herbicide application to reduce collateral damage.

B. Predation

Some loss of planted tree species due to predation from wildlife, including deer, rabbit, geese, and beaver is anticipated at the site. Re-planting of target species will occur if excessive predation results in loss levels which threaten final numbers detailed in the Performance Standards section below.

7. PERFORMANCE STANDARDS

A. Project Specific Success Criteria

The following minimum measurable success criteria shall be established for the Mitigation Site:

(1) The wetland mitigation areas, as measured by the final wetland delineation, shall total no less than 10.56 acres.

(2) The hydrology in the wetland mitigation area shall meet the wetland hydrology criteria contained in the US Army Corps of Engineers Wetland Delineation Manual, Mid-West Regional Supplement (or acceptable equivalent).

(3) Greater than 50% of the dominant vegetation species in the wetland mitigation area shall have a wetland indicator status of FAC (facultative) or wetter.

(4) The herbaceous understory in the forested wetland mitigation area and in the MPMG on-site mitigation areas shall meet a minimum of 50% cover, and no single species shall constitute more than 25% of the recorded herbaceous plant community.

(5) Planted woody vegetation in the wetland mitigation area and in the MPMG on-site mitigation areas shall meet a minimum of 75% survivability at the conclusion of the monitoring activities. A minimum of 325 living woody stems per acre shall be present, with representation from at least 75% of species planted.

(6) *AgriDrain* outlet control structures shall be installed at two locations at the upper end of both of the existing outlet channels to stop head-cut erosion and downstream sedimentation; a minimum of three (3) rock-check dams will be installed in each outlet channel to further reduce downstream sedimentation and promote hydrological heterogeneity within the existing channels, resulting in the functional improvement of approximately 700 linear feet of existing stream channels.

(7) Constructed open stream channel shall have a minimum of 655 linear feet.

(8) Hydrology in the restored channel will support ephemeral to intermittent flow, as evidenced by direct observation of flow events or through the observed presence of scouring, sediment sorting, shelving, rack lines, or other indications of flow.

(9) The herbaceous community in the buffer zones and on channel banks of the stream restoration area shall contain a minimum of 70% cover, and no single species shall constitute more than 25% of the recorded herbaceous plant community.

(10) Shrubs planted on the restored channel banks of the stream restoration area shall meet a minimum of 75% survivability at the conclusion of monitoring activities. A minimum of 525 living stems shall be present, with representation from at least 75% of species planted.

(11) The plant community in the wetland mitigation area and stream restoration buffer planting areas shall be free *of Lythrum salicaria, Phragmites australis,* and *Myriophyllum spicatum*.

(12) *Phalaris arundinacea* shall not have an aerial coverage of more than 15% of the wetland mitigation area and stream restoration buffer planting areas.

(13) *Typha spp*. shall not have an aerial coverage of more than 20% in the wetland mitigation area and stream restoration buffer planting areas.

(14) Contiguous areas of open water and/or bare ground shall not comprise more than 10% aerial coverage in the wetland mitigation area and stream restoration buffer planting areas.

(15) A minimum of ten (10) existing Green Ash, Silver Maple, or Box-Elder trees will be girdled within the interior of the existing PFO at the Wetland Enhancement Area.

(16) Permanent 50' wide buffers (totaling approximately 1.8 acres) will be established around the north, east, and west sides of the approximately 3.7 acre existing PFO at the Wetland Enhancement Area. The existing agricultural lease will be amended to exclude hay production from these areas. A 50'x 50'exception for an existing utility easement in the vicinity of an existing well will be included to provide for continued access/maintenance of the existing utilities. The buffer will be identified by the placement of a minimum of five (5) signs around the perimeter stating "Wetland Protection Area", or similar.

(17) At least twenty (20) existing Bush Honeysuckle shrubs in the interior and perimeter of the existing PFO at the Wetland Enhancement Area will be cut, removed, and have stumps treated with herbicide.

(18) Trees and shrubs planted in the existing PFO at the Wetland Enhancement Area shall meet a minimum of 75% survivability at the conclusion of monitoring activities. A minimum of 150 living stems shall be present, with representation from at least 75% of species planted.

(19) Herbaceous plantings in the existing PFO at the Wetland Enhancement Area shall have a minimum of 50% cover in the planting areas, with representation from at least 60% of the species planted. As-built plans will indicate areas within the existing PFO that have been planted, and monitoring stations will be located in a

representative number of these areas to document applicable success criteria.

B. Wetland Delineation

During the final annual monitoring event, a wetland delineation, in accordance with acceptable Corps of Engineers practices at the time, shall be conducted at the wetland mitigation site to verify final wetland acreage and minimum performance standards.

8. MONITORING

A. As-Built Conditions

Following completion of all mitigation activities and plantings, an As-Built report will be conducted and submitted to USACE and IDEM. The report will describe construction methods, final elevations, planting numbers and species, and will detail any minor deviations from the original mitigation plan.

B. Annual Reporting

All mitigation areas shall be monitored annually for a minimum of five consecutive years until the Performance Standards specified above have been reached. Monitoring activities shall be conducted within the same month of the growing season each calendar year. Monitoring activities shall commence the first full growing season following installation. Annual monitoring reports will be submitted to the applicant, USACE, and IDEM by December 31st of each monitoring year.

C. Methods

A representative number of permanent 30 foot diameter sample plots will be semi-randomly established in the first year of monitoring in the Wetland Mitigation Area, the Stream Restoration corridor, and the Wetland Enhancement Area . Plot locations will be determined in order to best capture variable features within the mitigation area, such as: interior areas, near outlets, along slope bases, transitional areas, etc. GPS coordinates and photo stations for each sampling point will be established and mapped and included in the annual reports.

Random transect lines will be established each year in all mitigation areas to document and record the presence of any exotic/undesirable species, note the presence of any severe erosion, and to note any other potential problems.

D. Documentation

The annual monitoring report will include a discussion of the progress of vegetation growth/establishment, hydrology, soil characteristics, and any problems requiring attention.

Soils- Soil test pits will be dug in each of the sample plot areas, primarily to identify hydrological features. Soil characteristics will be noted in the annual monitoring report.

Vegetation- All living, woody stems present in the 30' plots will be recorded, by species. This number of all woody stems present in the sample plots will be averaged, then extrapolated to obtain a "trees per acre" number for comparison against the success criteria.

Two one-square meter quadrants will be randomly sampled each year within each 30' sample plot to determine percent cover of the vegetative community according to the "Braun-Blanquet" classification system, which will be used to evaluate success criteria for the Mitigation Areas. All vegetation present will be noted and classified according to percent composition, wetness, and native/non-native. Coefficients of Conservatism will also be identified; Mean C and Floristic Quality Index (FQI) scores for the Mitigation Areas will be determined.

Rating	Number of Plants	Area Occupied by Species
+	Sparsely or very sparsely present	Very Small
1	Plentiful	Small
2	Very Numerous	10-25%
3	Any Number	25-50%
4	Any Number	50-75%
5	Any Number	>75%

Table 6 Braun-Blanquet Cover Abundance Scale

Hydrology- Sample pits will be dug in each plot to evaluate and record the proximity of seasonal water table. Any areas of inundation will be measured and recorded. Evidence and extent of flow will be noted and recorded in the stream restoration area.

Water Quality- No analysis of water quality in the mitigation area is proposed, however, obvious signs of impairment, including sheen, odor, algal bloom, etc, will be noted.

Remediation- If a success criterion is not met for all or any portion of the mitigation areas in any year, and/or if the success criteria are not satisfied, an analysis of the cause(s) of failure will be prepared and submitted to the regulatory agencies in the annual monitoring report, indicating recommended steps for adaptive management/remedial action.

D. Assessment of Function/Value Replacement

Annual monitoring results will include a section describing how the mitigation areas are progressing toward replacing the functions and values lost at the impact site. This description may include discussion on: species diversity, growth rates/patterns, wildlife use, insects/macro-invertebrates, hydrology, etc.

E. Release from Monitoring

Once the mitigation areas have achieved all of the specified success criteria, a request for release from monitoring will be submitted to the regulatory agencies.

Following an indication from the regulatory agencies that the mitigation sites have met the success criteria and will be released from further monitoring requirements, a Deed Restriction, Conservation Easement, and/or Restrictive Covenant will be recorded and submitted to the agencies.

F. Wetland Delineation

During the final annual monitoring event, a wetland delineation of the wetland mitigation site, in accordance with acceptable Corps of Engineers practices at the time, shall be conducted to verify final wetland acreage and minimum performance standards. This delineation will be submitted along with the request for release from further monitoring requirements.

G. Responsibility

Preparation and submittal of required annual monitoring reports shall be the responsibility of the Indiana Army National Guard.

9. LONG TERM MANAGEMENT

A. Responsible Parties

The Indiana Army National Guard, or subsequent designee, will assume responsibility for the completion of construction and monitoring activities until released by the agencies. The Indiana Army National Guard, or designee may contract with wetland professionals to provide for monitoring data collection, analysis, submission of annual reports, etc..

B. Proposed Mitigation Site- Ownership/Easements

The mitigation area is currently owned by the United States Department of the Army, leased to the State of Indiana, which will maintain ownership during construction, monitoring, and through the foreseeable future.

C. Site Protection

Upon notification by the regulatory agencies that the mitigation areas have met the specified success criteria and will be released for further monitoring requirements, the owner will prepare an appropriate protective instrument ensuring long-term protection of the wetland/stream mitigation site and the wetland enhancement area, and their associated buffers.

A Deed Restriction or Conservation Easement document, for submittal to the Johnson County Recorder's Office, may be utilized. The Deed Restriction or Conservation Easement will limit use of the mitigation area to only those uses compatible with long-term maintenance as a natural, functioning wetland/stream corridor area.

Because the mitigation areas will be located on government property, the Indiana National Guard may choose to provide long-term protection of the mitigation site by way of a federal facility management plan or integrated natural resource management plan. The Indiana National Guard shall select the appropriate long-term protective mechanism at the conclusion of required monitoring activities.

A draft Deed Restriction, Conservation Easement, or other protective instrument may be submitted to the agencies for review and comment prior to finalization.

10. ADAPTIVE MANAGEMENT

During the developmental phase of a wetland mitigation area, regular maintenance of the site is critical for success and must be anticipated for in planning and budgeting. Adaptive management techniques (such as

supplemental plantings, weed control, erosion control, hydrology control, predation control etc.) will be recommended each year to ensure attainment of success criteria.

A. Exotic & Undesirable Species Control

Techniques for controlling the establishment and spread of exotic, or nuisance species may include any combination of the following: herbicide application, mowing, prescribed burning, hand removal, manipulation of hydrology, excavation, or other acceptable practices.

*B. Hydrological Control*s

Hydrology of the wetland mitigation site will be maintained through the use of an Agri-Drain in-line tile control structure. The structure will provide for a stable outlet to the wetland basins, utilizing Nineveh Creek as the primary receiving stream. The outlet will also maintain a discrete connection of the wetlands to downstream waters.

The use of the AgriDrain structures will also provide for the opportunity to adjust water levels in the wetland basins during the establishment period, if necessary. This may be important if invasive species must be aggressively managed.

11. SUSTAINABILITY

The mitigation site has been designed, to the greatest extent practicable, to be self sustaining once the target wetland hydrology and associated plant communities have become established. Following the attainment of success criteria and release from further monitoring requirements, the *AgriDrain* hydrological control structure will be pad-locked to prevent future misuse. Keys shall be retained by CAJMTC and the Joint Forces Headquarters Facility and Engineering Division. Any required future maintenance of the structure resulting from damage or wear, will be the responsibility of the Indiana National Guard.

12. FINANCIAL ASSURANCES

A. Financial Assurance

The Indiana Army National Guard, or subsequent designee, will assume responsibility toward attainment of the specified Performance Standards until the mitigation site is released from further monitoring requirements by the Corps of Engineers and IDEM. The Indiana Army National Guard is committed to the

continued success of the mitigation site and will ensure adequate resources are available to cover any contingencies.

13. CONTINGENCY PLAN

A. Reporting Protocol

If a success criterion is not met for all or any portion of the mitigation areas in any year, and/or if the success criteria are not satisfied, an analysis of the cause(s) of failure will be prepared and submitted to the regulatory agencies in the annual monitoring report, along with recommended steps for adaptive management/remedial actions.

B. Response to Unsuccessful Mitigation

If a success criterion is not met for all or any portion of the mitigation areas at the conclusion of the monitoring period, and/or if the success criteria are not satisfied, an analysis of the cause(s) of failure will be prepared and submitted to the regulatory agencies, along with a request for remedial action for pre-approval.

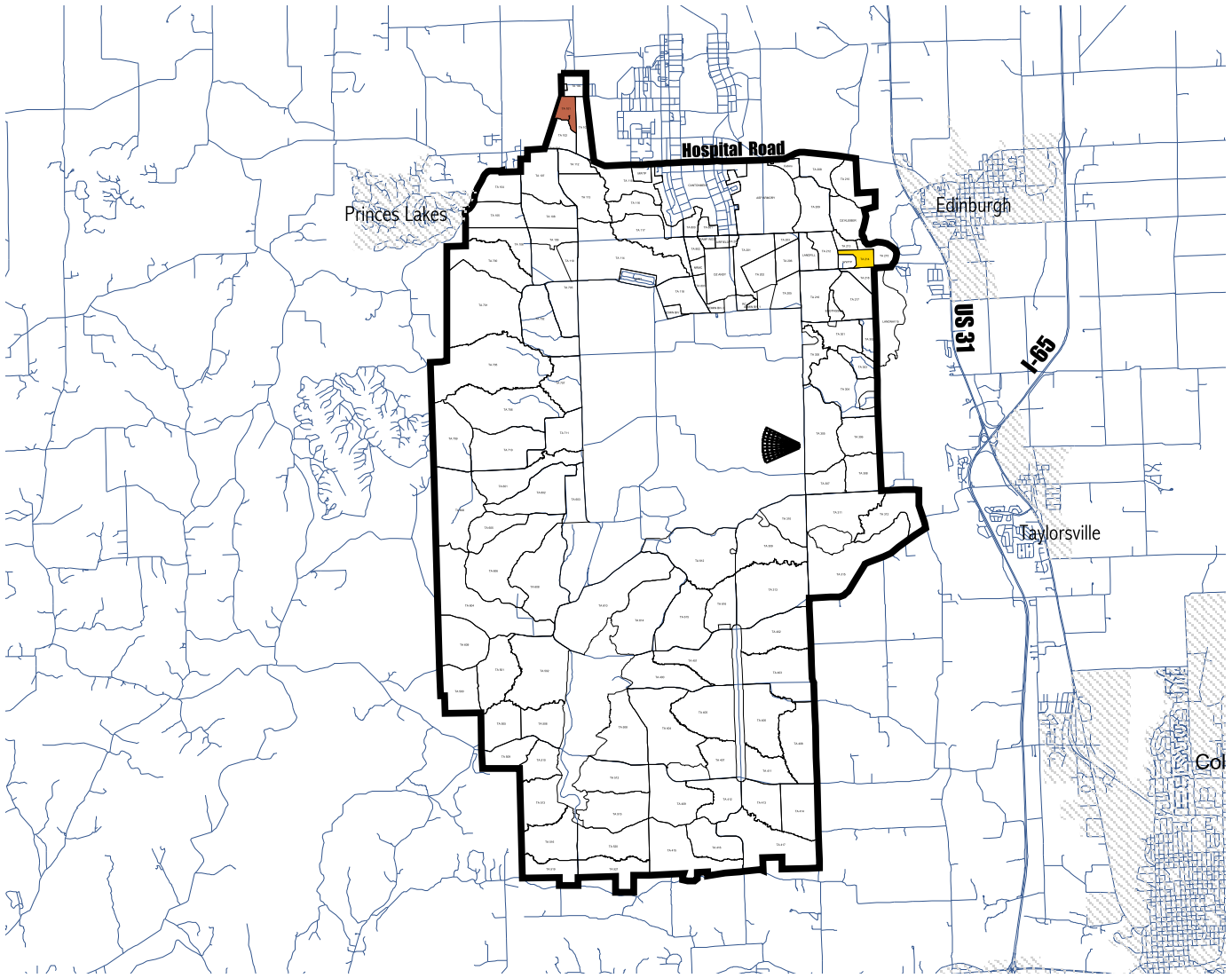
If after remedial alternatives have been exhausted, and the regulatory agencies determine that the proposed mitigation cannot be successfully achieved at the intended site, an alternative site will be located and new plan developed.

16. APPENDICES

1. Location Map
2. Wetland/Stream Mitigation Topo-NWI-DFIRM Map
3. Wetland/Stream Mitigation- 2008 Aerial Photo-Soil Map
4. Wetland/Stream Mitigation Site Map (2005 Aerial)
5. Wetland Enhancement Area- Topo-NWI Map
6. Wetland Enhancement Area- 2008 Aerial-Soil Map
7. Wetland Enhancement Area- Site Map (2005 Aerial)
8. Planting Plan
9. Site Plans
10. Wetland Data Forms
11. Alternatives Analysis
12. PowerPoint Decision Brief
13. Benham MPMG Charette (electronic copy on CD)

APPENDICES

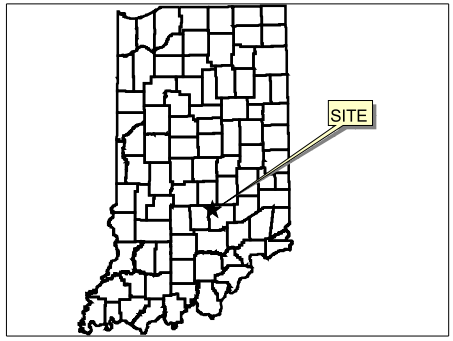
Location Map



Mitigation Sites

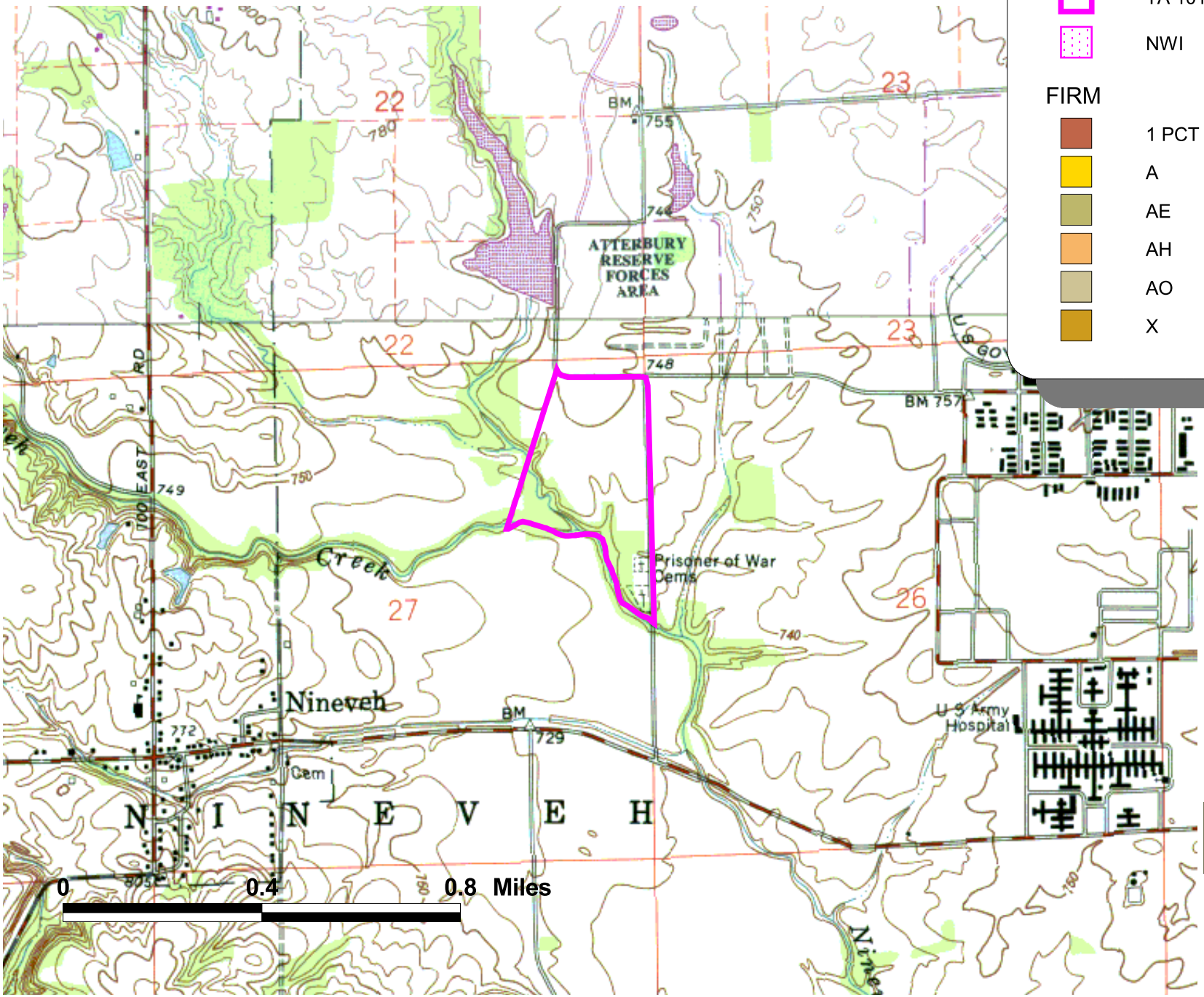
- TA 101
- TA 214
- Towns
- CAJMTC Property
- Training Areas
- MPMG Firing Fan
- Roads

N
W
E
S



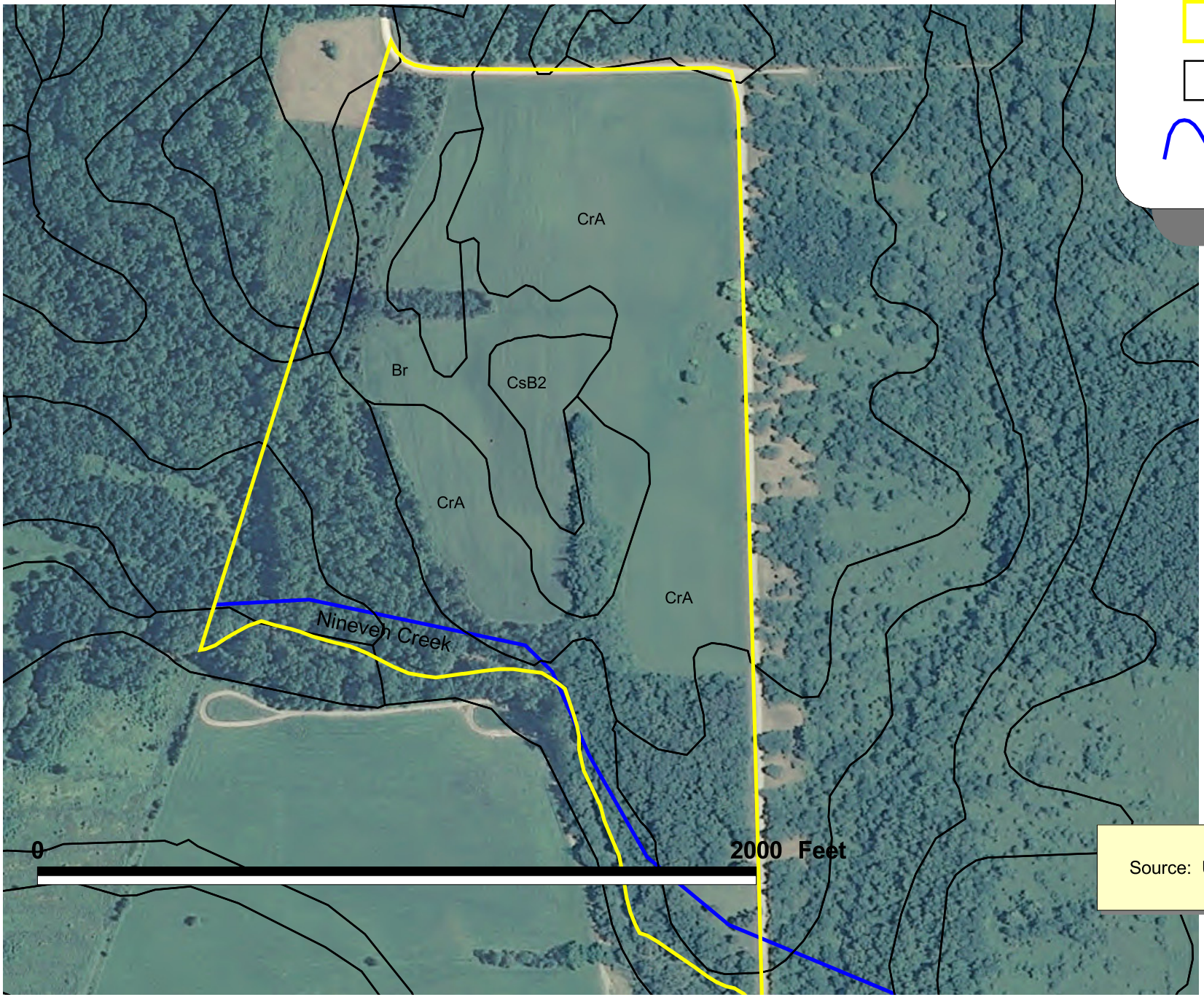
4 0 4 8 Miles

TA 101 Mitigation Site
Topo/NWI/FIRM Map



Source: IndianaMap

TA 101 Mitigation Site
2008 Aerial/Soil Map



Key

TA 101

Soils

Streams

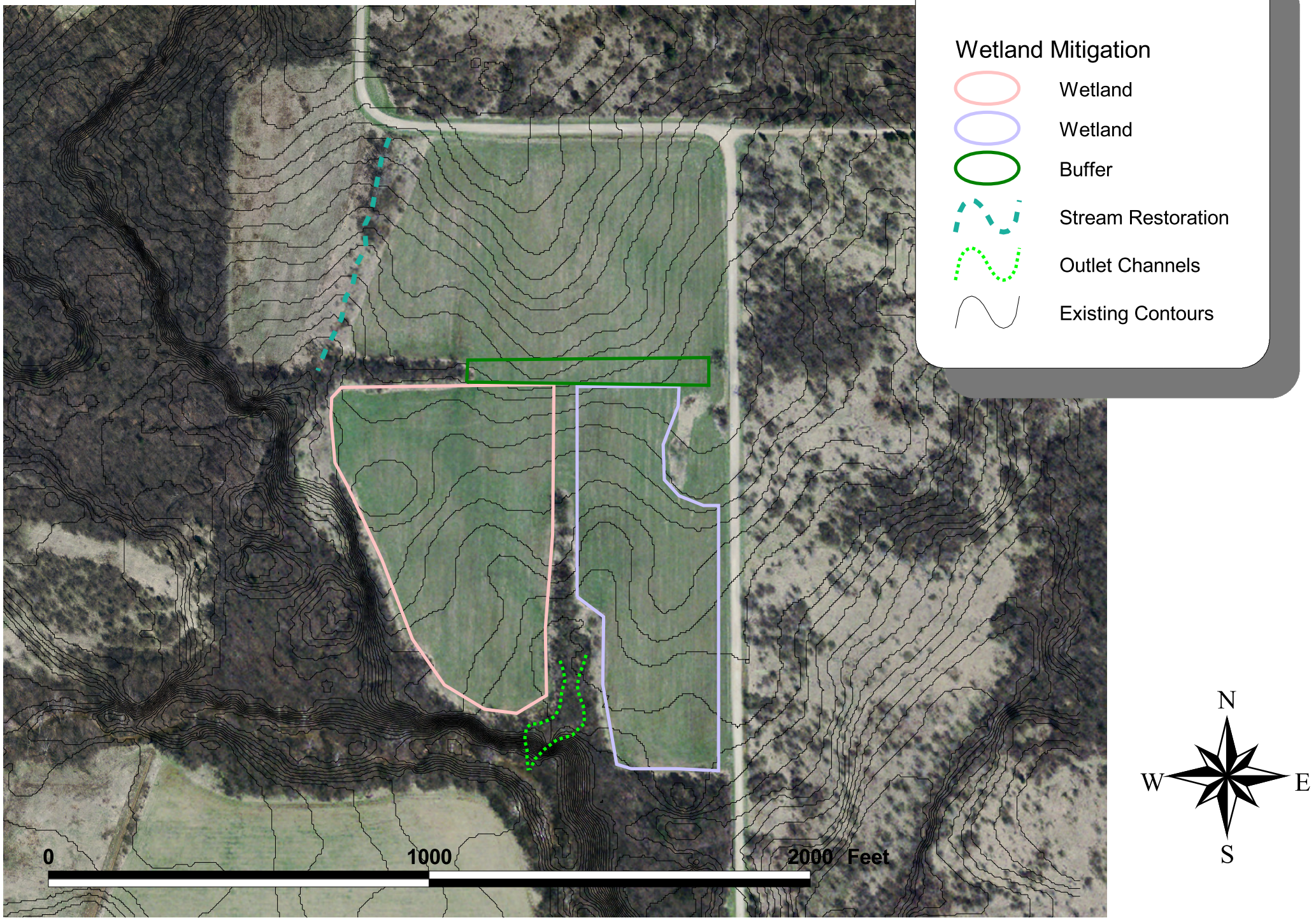
N

W E

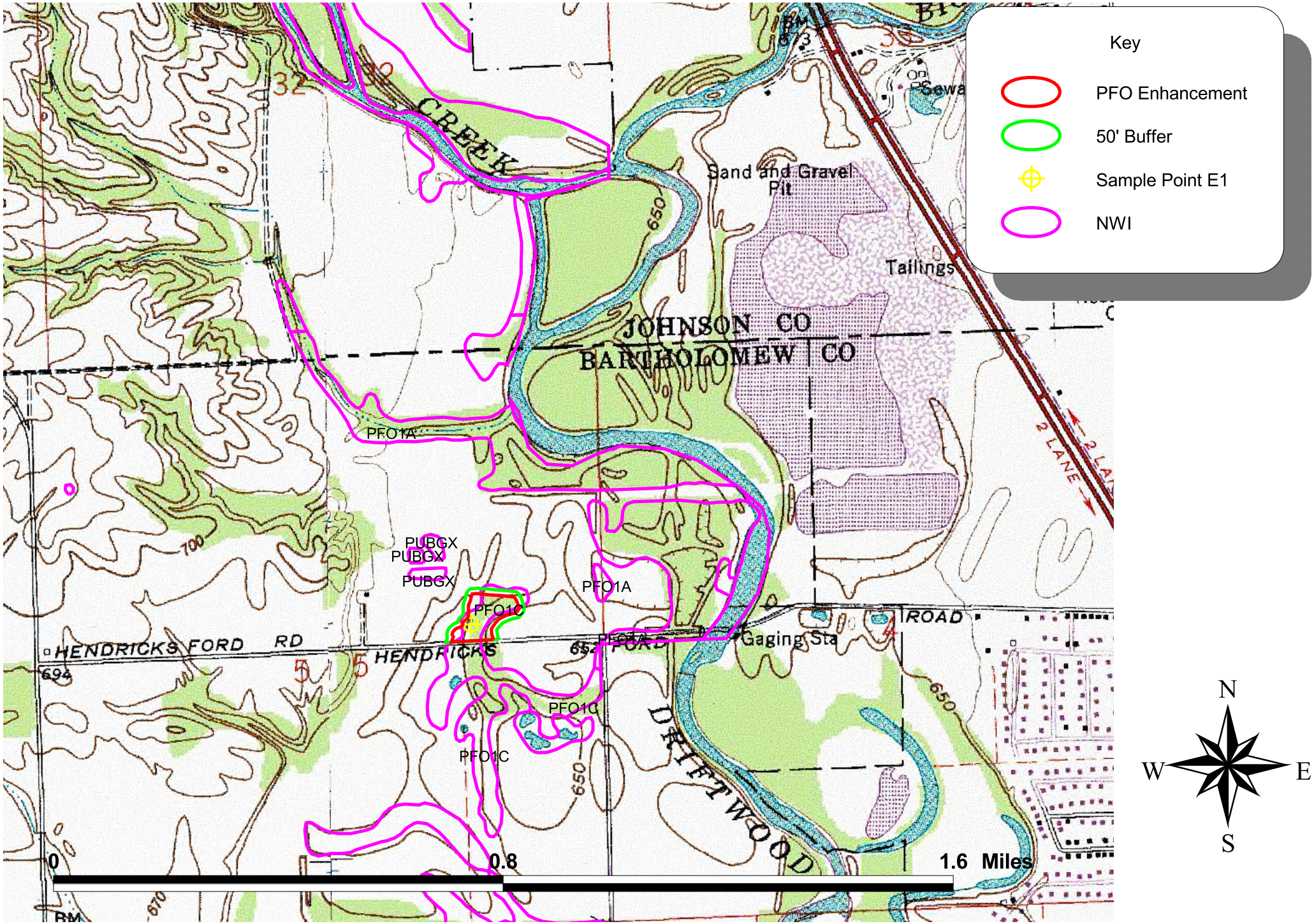
S

Source: USDA Geospatial Datagateway

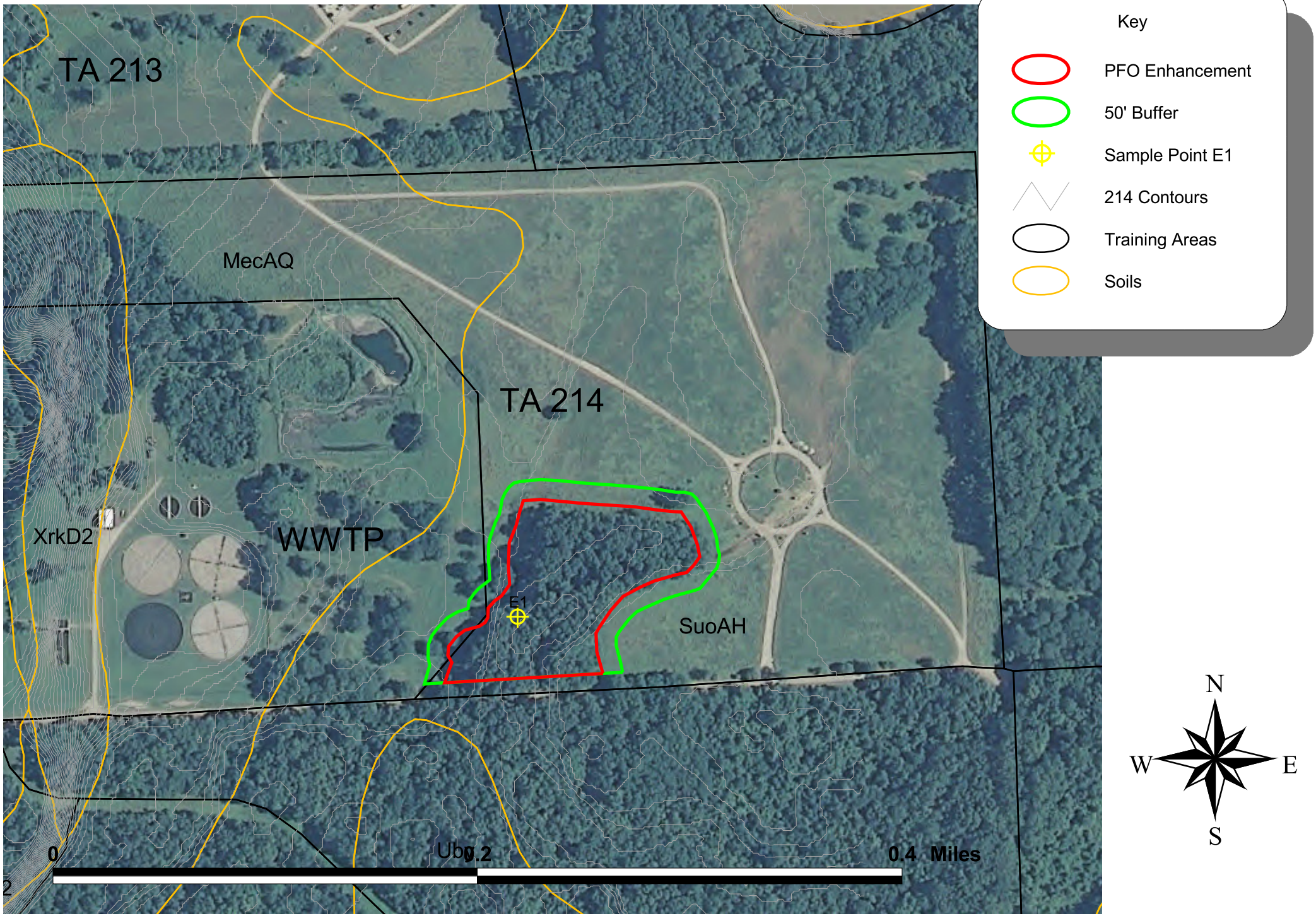
Wetland/Stream Mitigation- TA 101



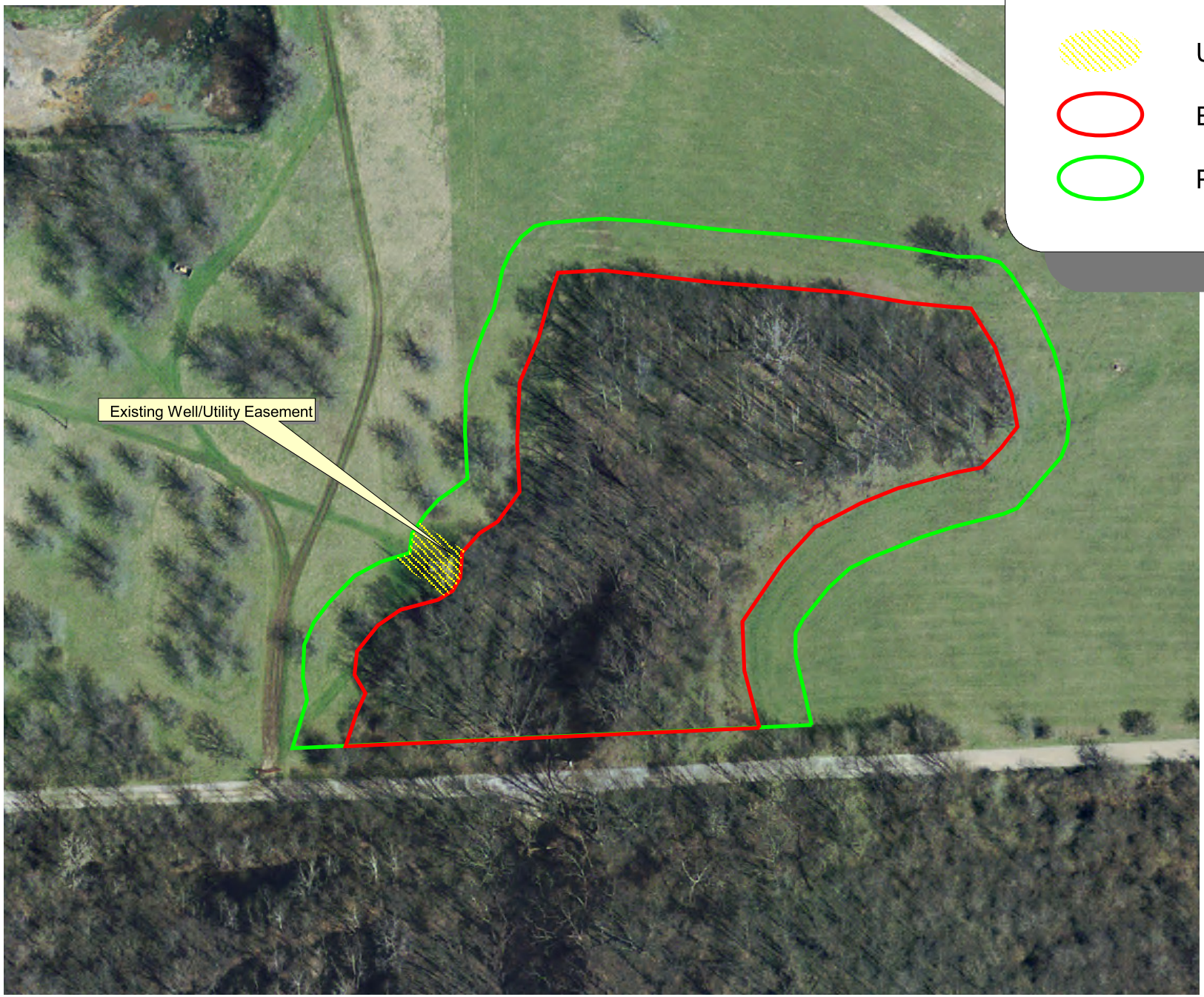
Wetland Enhancement Area- TA 214



Wetland Enhancement Area- TA 214



TA 214- Wetland Enhancement Area



Key

Utility Exception

Existing PFO

Proposed Buffer

N

W E

S

0 300 600 Feet

PLANTING PLAN

Mix A:

Wooded Wetland Establishment Seed Mix
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use in wetland basins.
Approx. 11 acre total.

Wooded Wetland Establishment Seed Mix. (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Bluejoint Grass	*Calamagrostis canadensis*	1
Fringed Sedge	*Carex crinita*	2
Common Hop Sedge	*Carex lupulina*	4
Bottlebrush Sedge	*Carex lurida*	1.5
Rough-Clustered Sedge	*Carex sparganioides*	1.5
Narrow-Leaved Cattail Sedge	*Carex squarrosa*	2
Common Cattail Sedge	*Carex typhina*	2
Brown Fox Sedge	*Carex vulpinoidea*	4
Virginia Wildrye	*Elymus virginicus*	20
Fowl Manna Grass	*Glyceria striata*	2
Rice cut Grass	*Leersia oryzoides*	2
Dark Green Rush	*Scirpus atrovirens*	2
Prairie Cordgrass	*Spartina pectinata*	1
Water Plantain	*Alisma spp*	3
Great Angelica	*Angelica atropurpurea*	1
Bristly Aster	*Aster puniceus*	.75
Flat-Top Aster	*Aster umbellatus*	.25
Nodding Bur Marigold	*Bidens cernua*	2.5
Tall Bellflower	*Campanula americana*	.25
Buttonbush	*Cephalanthus occidentalis*	.5
Sneezeweed	*Helenium autumnale*	2
Cow Parsnip	*Heracleum lanatum*	.75
Swamp Rose Mallow	*Hibiscus moscheutos*	2
Great Blue Lobelia	*Lobelia siphilitica*	1.5
Monkey Flower	*Mimulus ringens*	1.25
Wild Goldenglow	*Rudbeckia lacinaa*	.75
Wingstem	*Verbesina alternifolia*	2
Includes Temporary Nurse Species:		
Oats	*Avena sativa… 33.56 lbs/acre*	
Annual Rye	*Lolium multiflorum… 7 lbs/acre*	
55.47% forbs – 48.52% sedge/grass/rush mix… by weight		
Plant at a rate of 44.53 lbs/acre (sold in 1 acre & ¼ acre increments)		

Mix B:

Slope-Stabilization Seed Mix
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use on: - Side-slopes separating wetland basins. Approx. 2 acre total.
- Buffer at Wetland Mitigation Site. Approx. 0.7 acres

Slope Stabilization Mix- (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Big Bluestem	*Andropogon gerardii*	48
Side-Oats Grama	*Bouteloua curtipendula*	32
Rough-Clustered Sedge	*Carex sparganioides*	4
Canada Wildrye	*Elymus canadensis*	32
Switchgrass	*Panicum virgatum*	8
Little Bluestem	*Schizachyrium scoparium*	32
Indian Grass	*Sorghastrum nutans*	32
Additional Nurse Species:		
Oats	*Avena sativa… 32 lbs/acre*	
Annual Rye	*Lolium multiflorum… 14.9 lbs/acre*	
100% grass/sedge mix… by weight		
Plant at a rate of 57.63 lbs/acre (sold in 1 acre & ¼ acre increments)		

Mix C:

Forested Wetland Plantings
Potential Source: *IDNR State Nursery (812) 358-3621*
Bare Root Seedlings on 10' x 10' spacing
Approx. 11 acre total- 5,500 trees

Bare Root Seedlings- 2 yr or 1 yr		
Scientific Name	**Common Name**	**#**
Tree Species:		
*Carya lacinosa**	Shellbark Hickory	600
Carya illinoinensis	Pecan	500
Quercas palustris	Pin Oak	600
Liquidambar styraciflua	Sweetgum	500
Quercus shumardii	Shumard Oak	600
Quercus michauxii	Swamp Chestnut Oak	600
Quercus bicolor	Swamp White Oak	600
Liquidambar styraciflua	Sweetgum	500
Taxodium distichum	Bald Cypress	500
	Total Trees:	5,000
Alternate Tree Species:	*Quercas macrocarpa*	Bur Oak
	Fraxinus pennsylvanica	Green Ash

Shrub Species:		
Cephalanthus occidentalis	Buttonbush	100
Sambucus canadensis	Elderberry	100
Asimina triloba	Pawpaw	100
*Lindera benzoin**	Spicebush	200
	Total Shrubs:	500
Alternate Shrub Species:	*Physocarpus opilufolius*	Ninebark
	Cornus amomum	Silky Dogwood
	Photonia melanocarpa	Black Chokeberry

* species typically unavailable from IDNR State Nursery. Seek alternate source.

Mix D:

Swale Seed Mix

Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use on: - Stream restoration area. Approx. 1.65 acre total.
- Disturbed or cleared stream channels and wetland areas at the MPMG site. Approx. 5.5 acres total.

Swale Seed Mix. (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Big Bluestem	*Andropogon gerardii*	12
Bristly Sedge	*Carex comosa*	2
Crested Oval Sedge	*Carex cristatella*	2
Bottlebrush Sedge	*Carex lurida*	2.5
Rough-Clustered Sedge	*Carex sparganioides*	3
Brown Fox Sedge	*Carex vulpinoidea*	3
Virginia Wildrye	*Elymus virginicus*	8
Fowl Manna Grass	*Glyceria striata*	1
Switchgrass	*Panicum virgatum*	2
Dark Green Rush	*Scirpus atrovirens*	2
Woolgrass	*Scirpus cyperinus*	.5
Prairie Cordgrass	*Spartina pectinata*	2.5
Water Plantain	*Alisma spp*	1
Swamp Milkweed	*Asclepias incarnate*	2
New England Aster	*Aster novae-angliae*	.5
Tall Coreopsis	*Coreopsis tripteris*	2
Spotted Joe-Pye Weed	*Eupatorium maculatum*	.25
Blue Flag	*Iris virginica*	3
Marsh Blazing Star	*Liatris spicata*	2
Cardinal Flower	*Lobelia cardinalis*	.25
Great Blue Lobelia	*Loblia siphilitica*	.5
Common Arrowhead	*Sagittaria lattifolia*	.75
Prairie Dock	*Silphium terebinthinaceum*	1
Blue Vervain	*Vebena hastata*	1
Golden Alexanders	*Zizia aurea*	.75
Includes Temporary Nurse Species:		

Oats	*Avena sativa… 22.6 lbs/acre*	
Annual Rye	*Lolium multiflorum… 1.75 lbs/acre*	
31.68% forbs –68.32% sedge/grass/rush mix… by weight		
Plant at a rate of 27.72 lbs/acre (sold in 1 acre & ¼ acre increments)		

Mix E:

Stream Restoration Buffer Plantings
Potential Source: *IDNR State Nursery (812) 358-3621*
Bare Root Seedlings- 4 rows each side of restored channel. 8' spacing between shrubs
Approx. 1.5 acre total- 700 trees

Bare Root Seedlings		
Scientific Name	**Common Name**	**#**
Shrub Species:		
Cephalanthus occidentalis	Buttonbush	200
Sambucus canadensis	Elderberry	600
Physocarpus opilufolius	Ninebark	100
Cornus amomum	Silky Dogwood	200
	Total:	*700*
Alternate Species:	*Cornus racemosa*	Gray Dogwood
	Asimina triloba	Pawpaw

Mix F:

Wetland Enhancement Woody Plantings
Potential Source: *Woody Warehouse* 866/766-8367
200- 3 gallon container stock

3 gallon Container Stock		
Scientific Name	**Common Name**	**#**
Carya illinoesis	Northern Pecan	25
Carya lacinosa	Shellbark Hickory	25
Carya cordiformis	Bitternut Hickory	25
Quercus bicolor	Swamp White Oak	50
Quercus palustris	Pin Oak	25
Asimna triloba	Paw-Paw	25
Cephalanthus occidentalis	Buttonbush	25
	Total:	*200*
Alternate Species:	*Quercas michauxii*	Swamp Chestnut Oak
	Lindera benzoin	Spicebush

Mix G:

Wetland Enhancement Emergent Plantings
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

Live Plant Plugs		
Scientific Name	**Common Name**	**#**
Caltha palustris	Marsh Marigold	76
Carex frankii	Bristly Cattail Sedge	38
Carex stipata	Fox Sedge	38
Cinna arundinacea	Stout Woodreed	38
Elymus hystrix	Bottlebrush Grass	38
Elymus virginicus	Virginia Wildrye	38
Rudbeckia lacinata	Goldenglow	38
Iris virginica	Blue Flag	38
Lobelia siphilitica	Great Blue Lobelia	38
Saururus cernus	Lizards Tail	*76*
Verbesina alternafolia	Wingstem	*38*
	Total:	*494*
Alternate Species:	*Carex crinita*	Fringed Sedge
	Elymus riparius	Riverbank rye

Planting Instructions:

Trees/Shrubs:
(Recommended Planting Dates: April 15 – June 30, October 1 – November 30)

Trees & shrubs should be spaced approximately 15' apart. Stagger placement of trees between rows. Cluster species in groups of 3-4.

- Prepare hole slightly larger than the root mass diameter.
- Loosen or prune any spiraling roots.
- Place the tree in the hole wherein the root collar is no deeper than ½ inch below the ground line.
- Backfill loose soil around the root mass and firmly pack to eliminate air pockets.
- Do not plant when soil is excessively wet or frozen.
- A support stake may be warranted if the tree is tall or in an exposed site.
- Keep the root mass moist at all times.
- Plant so the main stem is vertical.

Seed Mixes:
(Recommended Planting Dates: October 1 – June 1)

Site Preparation: Use appropriate equipment to level disturbed area and return to original grade. Avoid compaction by placing equipment on mats to access wet or moist areas.

Seed Prep: Thoroughly mix your seed prior to planting as many of the heavier seeds may have settled during shipping. Mixing seed with an inert carrier (such as sawdust, sand, vermiculite, etc.) at a rate of 10 parts carrier to 1 part seed is recommended.

Planting: Broadcast seed mix evenly over the planting area. Rake, roll, or compact the seed to cover approximately 1/8 -1/4 inch. Do not roll if soil conditions are saturated. Application of fertilizer is not recommended. Apply light oat or wheat straw mulch, so that some of the soil is

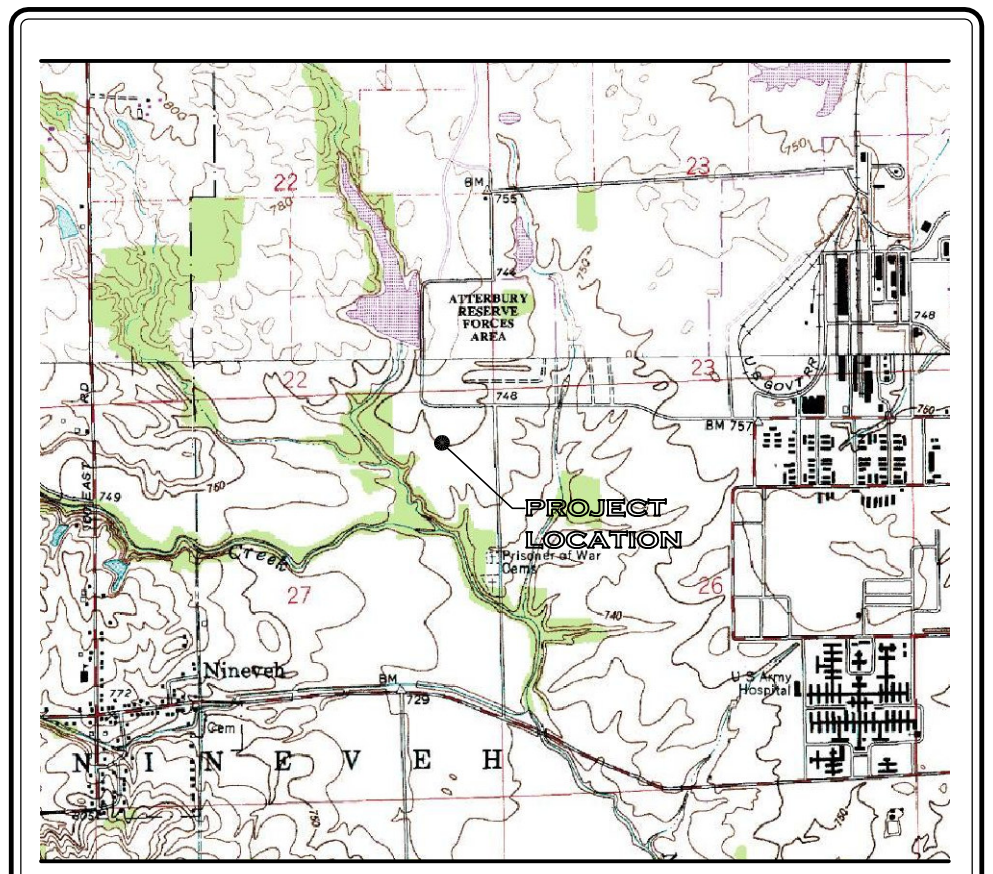
visible through the mulch. To avoid weed contamination, do not use hay mulch. Water thoroughly if site conditions are dry and no rain is expected within 48 hours.

Live Plants/Tubers/Rootstock:
(Recommended Planting Dates: April 15 – June 30 *or* October 1 – July 15)

- Select water depth appropriate for planting selected species. Plant in areas of the site where water depths range from 0" to 6".
- Prepare hole slightly larger than the root mass diameter.
- Loosen or prune any spiraling roots.
- Place the plant in the hole wherein the root collar is no deeper than ½ inch below the ground line.
- Backfill loose soil around the root mass and firmly pack to eliminate air pockets.
- Keep the root mass moist at all times.
- Plant so the main stem is vertical.
- For tubers, drop weighted tubers at appropriate water depth, or tamp gently into saturated soils.
- Cluster by species, where appropriate. Plant live plugs and/or tubers no closer than 1 square foot apart.

WETLAND MITIGATION PLAN

CAMP ATTERBURY JOINT MANEUVER TRAINING CENTER (CAJMTC)
MULTI–PURPOSE MACHINE GUN RANGE (MPMG)
CORPS OF ENGINEERS ID#: LRL–2009–349–LCL



VICINITY MAP
NOT TO SCALE

PLAN SHEET INDEX:

PLAN RECORD

REV	DATE	DESCRIPTION	REV BY	CKD BY
––	05.20.09	INITIAL SUBMITTAL ~ ROUGH LAYOUT PHASE	BPO	R.JONES
1	06.10.09	INITIAL DESIGN SUBMITTAL	BPO	R.JONES
2	08.28.09	IDEM COMMENTS	BPO	R.JONES

EROSION CONTROL CONTACT:
DAN PEREZ
ENVIRONMENTAL SPECIALIST
CAMP ATTERBURY JMTC, BLDG 609
EDINBURGH, IN 46124
812.526.1249
DSN 569.2249
812.526.1329 FAX

OWNER:
UNITED STATES ARMY
LICENSED TO INDIANA ARMY
NATIONAL GUARD

WETLAND CONSULTANT:
AQUA TERRA CONSULTING
Randy Jones 317.502.7897
randy@aquaterracons.net

MAIN STREET
CONSULTING COMPANY
675 North Main Street
Franklin, Indiana 46131
PH: 317.736.0579
FAX: 317.534.3029
www.mainstreetconsulting.com

TITLE SHEET
WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

DRAWING: 0.0TS.DWG
DATE: 08.28.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE:

TITLE

SHEET NO.:
C0.0

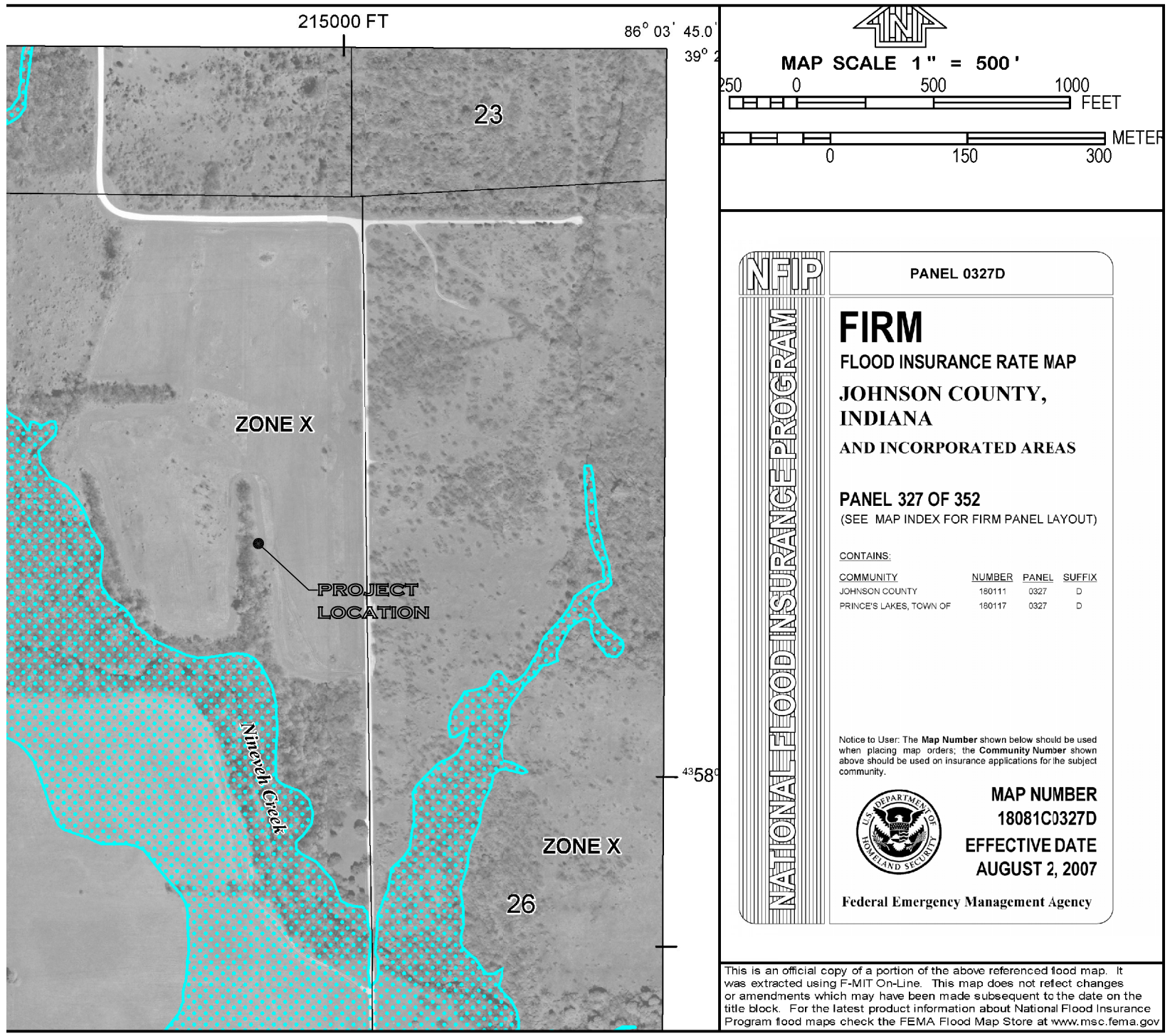
GRADING NOTES

1. ALL CONSTRUCTION METHODS AND MATERIALS MUST CONFORM TO CURRENT STANDARDS AND SPECIFICATIONS OF THE FEDERAL, STATE, COUNTY, CITY OR LOCAL REQUIREMENTS, WHICHEVER HAS JURISDICTION.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO STARTING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIELD DIMENSIONS. IF ANY DISCREPANCIES ARE FOUND IN THESE PLANS FROM THE ACTUAL FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.
3. THE EXCAVATING CONTRACTOR MUST TAKE PARTICULAR CARE WHEN EXCAVATING IN AND AROUND EXISTING UTILITY LINES AND EQUIPMENT. VERIFY COVER REQUIREMENTS BY UTILITY CONTRACTORS AND/OR UTILITY COMPANIES SO AS NOT TO CAUSE DAMAGE.
4. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES 72 HOURS BEFORE CONSTRUCTION IS TO START, TO VERIFY IF ANY UTILITIES ARE PRESENT ON SITE. ALL VERIFICATIONS (LOCATION, SIZE AND DEPTH) SHALL BE MADE BY THE APPROPRIATE UTILITY COMPANIES. WHEN EXCAVATING IS AROUND OR OVER EXISTING UTILITIES, THE CONTRACTOR MUST NOTIFY THE UTILITY COMPANY SO A REPRESENTATIVE OF THAT UTILITY COMPANY CAN BE PRESENT TO INSTRUCT AND OBSERVE DURING CONSTRUCTION.
5. ALL PROPOSED SPOT ELEVATIONS ARE THE FINAL GRADE ELEVATIONS.
6. SEE APPROPRIATE DETAILS TO DETERMINE SUBGRADE ELEVATIONS BELOW FINISH GRADE ELEVATIONS INDICATED.

FLOOD ZONE DESIGNATION:

THIS PROJECT AREA LIES MOSTLY IN FLOOD HAZARD ZONE X AS SCALED FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY PANEL NUMBER 18081 C 0327 D MAP EFFECTIVE DATE AUGUST 2, 2007.

Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1–percent chance of being equaled or exceeded in any given year. The 1–percent annual chance flood is also referred to as the base flood or 100–year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1–A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1–A30, Zone AR/A, Zone V, Zone VE, and Zones V1–V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2–percent–annual–chance (or 500–year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2–percent–annual–chance flood, are labeled Zone C or Zone X (unshaded).



UTILITY STATEMENT:

The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantees that the underground utilities comprise all such utilities in the area, either in–service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although the surveyor does certify that they are located as accurately as possible from information available. The surveyor has not physically located the underground utilities.

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NOTE SHEET

WETLAND MITIGATION PLAN

CAJMTC – MPMG

CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

0.0TS.DWG
06.10.2009
09.011
BPO
GIS

DRAWING:
DATE:
PROJ. NO.:
DRAWN BY:
SURVEYED BY:
SCALE:

NOTES

SHEET NO.:
C0.1

CONSTRUCTION SEQUENCE PLAN:

INSTALLATION OF THE OUTLET CONTROL STRUCTURES (AGRIDRAIN) WILL BE CONDUCTED FIRST TO PROVIDE FOR A STABLE OUTLET. EXCAVATION OF TIERED WETLAND BASINS MAY BE STAGED, BEGINNING WITH THE LOWEST BASINS AND COMMENCING UP–SLOPE.

SEEDING TO BE CONDUCTED IMMEDIATELY AFTER EXCAVATION. SPECIFIED MIXES INCLUDE BOTH PERMANENT PERENNIAL SPECIES AND TEMPORARY NURSE CROP SPECIES.

FOLLOW THIS GENERAL STEP BY STEP PLAN

1 – STRIP TOPSOIL FROM PROJECT LIMITS & PLACE IN TEMPORARY TOPSOIL STOCKPILE(S)

2 – MASS EXCAVATION OF EXISTING SUBSOIL TO FINAL GRADES

3 – OVER EXCAVATE EXISTING SUBSOIL BELOW FINAL GRADE TO A DEPTH GENERALLY EQIVALENT TO THAT DEPTH OF TOPSOIL DISCOVERED ON SITE DURING STRIPPING

3.5 DISPOSE OF EXCESS SPOIL IN DESIGNATED ON–SITE AREA.

4 – REPLACE THE OVER EXCAVATION AREAFROM STEP "3" WITH THE TOPSOIL STOCKPILED DURING STEP "1"

SITE EARTHWORK:

WINDING STREAM RECONSTRUCTION

		CUT	FILL	NET
		627 CY ±	104 CY ±	524 CY ±

SITE EARTHWORK:

11 ACRE WETLAND SITES

	STEP	CUT	FILL	NET
STRIP TOPSOIL (ASSUME 6")	1	8,873 CY ±	0	0
CUT TO FINAL GRADE	2	7,199 CY ±	3,743 CY ±	3,456 CY ± Cut
OVER CUT (ASSUME 6")	3	8,873 CY ±	0	0
REPLACE "3 " WITH "1"	4	0	8,873 CY ±	0
TOTAL NET EXCAVATION		**24,945 CY± C**	**12,616 CY± F**	**12,329 CY ± Cut**

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CONSTRUCTION ELEMENTS

WETLAND MITIGATION PLAN
CAJMTC – MPMG
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DATE: 06.10.2009
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SCALE:

NOTES

SHEET NO.:
C0.2

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E

± LINE OF "COUNTY ROAD"
700 SOUTH (GRAVEL ROAD)

(grass/hay field)

(woods)

(grass/hay field)

(woods)

(woods)

approximate location
of exist tile blow~out

(woods)

approximate location
of exist tile blow~out

(woods)

approximate location
of exist tile blow~out

outlet channel

(woods)

(grass/hay field)

outlet
channel

± LINE OF "COUNTY ROAD"
200 EAST (GRAVEL ROAD)

NINEVEH CREEK

NINEVEH CREEK

(woods)

26.5± AC FUTURE POTENTIAL

0 100 200 400

Scale 1" = 200'

EXISTING LEGEND:

DESCRIPTION:	
⌖	APPROX TILE BLOW~OUT
~~	EDGE OF WOODS
—···—	FLOWLINE
748	CONTOUR ELEVATION (GIS)
TBM	TEMPORARY BENCHMARK

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EXISTING TOPOGRAPHY

WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

DRAWING: 1.0TP.DWG
DATE: 08.28.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=200'

TOPO

SHEET NO.:
C1.0

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E

(woods)

approximate location of exist tile blow~out

(woods)

± LINE OF "COUNTY ROAD" 200 EAST (GRAVEL ROAD)

approximate location of exist tile blow~out

(woods)

approximate location of exist tile blow~out

outlet channel

(grass/hay field)

outlet channel

NINEVEH CREEK

NINEVEH CREEK

(woods)

26.5± AC FUTURE POTENTIAL WETLAND MITIGATION AREA

26.5± AC FUTURE POTENTIAL WETLAND MITIGATION AREA

0 100 200 400

Scale 1" = 200'

EXISTING LEGEND:

	DESCRIPTION:
⊕	APPROX TILE BLOW~OUT
~~	EDGE OF WOODS
— · · · —	FLOWLINE
748	CONTOUR ELEVATION (GIS)
TBM	TEMPORARY BENCHMARK

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EXISTING TOPOGRAPHY

WETLAND MITIGATION PLAN

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SCALE: 1"=200'

TOPO

SHEET NO.:

C1.1

PLANTING PLAN

Mix A:

Wooded Wetland Establishment Seed Mix
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use in wetland basins.
Approx. 11 acre total.

Wooded Wetland Establishment Seed Mix. (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Bluejoint Grass	*Calamagrostis canadensis*	1
Fringed Sedge	*Carex crinita*	2
Common Hop Sedge	*Carex lupulina*	4
Bottlebrush Sedge	*Carex lurida*	1.5
Rough-Clustered Sedge	*Carex sparganioides*	1.5
Narrow-Leaved Cattail Sedge	*Carex squarrosa*	2
Common Cattail Sedge	*Carex typhina*	2
Brown Fox Sedge	*Carex vulpinoidea*	4
Virginia Wildrye	*Elymus virginicus*	20
Fowl Manna Grass	*Glyceria striata*	2
Rice cut Grass	*Leersia oryzoides*	2
Dark Green Rush	*Scirpus atrovirens*	2
Prairie Cordgrass	*Spartina pectinata*	1
Water Plantain	*Alisma spp*	3
Great Angelica	*Angelica atropurpurea*	1
Bristly Aster	*Aster puniceus*	.75
Flat-Top Aster	*Aster umbellatus*	.25
Nodding Bur Marigold	*Bidens cernua*	2.5
Tall Bellflower	*Campanula americana*	.25
Buttonbush	*Cephalanthus occidentalis*	.5
Sneezeweed	*Helenium autumnale*	2
Cow Parsnip	*Heracleum lanatum*	.75
Swamp Rose Mallow	*Hibiscus moscheutos*	2
Great Blue Lobelia	*Lobelia siphilitica*	1.5
Monkey Flower	*Mimulus ringens*	1.25
Wild Goldenglow	*Rudbeckia lacinaa*	.75
Wingstem	*Verbesina alternifolia*	2
Includes Temporary Nurse Species:		
Oats	*Avena sativa… 33.56 lbs/acre*	
Annual Rye	*Lolium multiflorum… 7 lbs/acre*	
55.47% forbs – 48.52% sedge/grass/rush mix… by weight		
Plant at a rate of 44.53 lbs/acre (sold in 1 acre & ¼ acre increments)		

Mix B:

Slope-Stabilization Seed Mix
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use on: - Side-slopes separating wetland basins. Approx. 2 acre total.
- Buffer at Wetland Mitigation Site. Approx. 0.7 acres

Slope Stabilization Mix- (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Big Bluestem	*Andropogon gerardii*	48
Side-Oats Grama	*Bouteloua curtipendula*	32
Rough-Clustered Sedge	*Carex sparganioides*	4
Canada Wildrye	*Elymus canadensis*	32
Switchgrass	*Panicum virgatum*	8
Little Bluestem	*Schizachyrium scoparium*	32
Indian Grass	*Sorghastrum nutans*	32
Additional Nurse Species:		
Oats	*Avena sativa… 32 lbs/acre*	
Annual Rye	*Lolium multiflorum… 14.9 lbs/acre*	
100% grass/sedge mix… by weight		
Plant at a rate of 57.63 lbs/acre (sold in 1 acre & ¼ acre increments)		

Mix G:

Wetland Enhancement Emergent Plantings
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

Live Plant Plugs		
Scientific Name	**Common Name**	**#**
Caltha palustris	Marsh Marigold	76
Carex frankii	Bristly Cattail Sedge	38
Carex stipata	Fox Sedge	38
Cinna arundinacea	Stout Woodreed	38
Elymus hystrix	Bottlebrush Grass	38
Elymus virginicus	Virginia Wildrye	38
Rudbeckia lacinata	Goldenglow	38
Iris virginica	Blue Flag	38
Lobelia siphilitica	Great Blue Lobelia	38
Saururus cernus	Lizards Tail	*76*
Verbesina alternafolia	Wingstem	*38*
	Total:	*494*
Alternate Species:	*Carex crinita*	Fringed Sedge
	Elymus riparius	Riverbank rye

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PLANTING PLAN
WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

2.0PP.DWG
DRAWING:
08.28.2009
DATE:
09.011
PROJ. NO.:
BPO
DRAWN BY:
GIS
SURVEYED BY:
SCALE:

PLANT

SHEET NO.:
C2.0

Mix C:

Forested Wetland Plantings
Potential Source: *IDNR State Nursery (812) 358-3621*
Bare Root Seedlings on 10' x 10' spacing
Approx. 11 acre total- 5,500 trees

Bare Root Seedlings- 2 yr or 1 yr		
Scientific Name	**Common Name**	**#**
Tree Species:		
*Carya lacinosa**	Shellbark Hickory	600
Carya illinoinensis	Pecan	500
Quercas palustris	Pin Oak	600
Liquidambar styraciflua	Sweetgum	500
Quercus shumardii	Shumard Oak	600
Quercus michauxii	Swamp Chestnut Oak	600
Quercus bicolor	Swamp White Oak	600
Liquidambar styraciflua	Sweetgum	500
Taxodium distichum	Bald Cypress	500
	Total Trees:	5,000
Alternate Tree Species:	*Quercas macrocarpa*	Bur Oak
	Fraxinus pennsylvanica	Green Ash
Shrub Species:		
Cephalanthus occidentalis	Buttonbush	100
Sambucus canadensis	Elderberry	100
Asimina triloba	Pawpaw	100
*Lindera benzoin**	Spicebush	200
	Total Shrubs:	500
Alternate Shrub Species:	*Physocarpus opilufolius*	Ninebark
	Cornus amomum	Silky Dogwood
	Photonia melanocarpa	Black Chokeberry

* species typically unavailable from IDNR State Nursery. Seek alternate source.

Mix D:

Swale Seed Mix
Potential Source: *JF New Nurseries, Inc. (574) 586-2412*

For use on: - Stream restoration area. Approx. 1.65 acre total.
- Disturbed or cleared stream channels and wetland areas at the MPMG site. Approx. 5.5 acres total.

Swale Seed Mix. (or comparable)		
Common Name	**Scientific Name**	**Oz./Acre**
Big Bluestem	*Andropogon gerardii*	12
Bristly Sedge	*Carex comosa*	2
Crested Oval Sedge	*Carex cristatella*	2
Bottlebrush Sedge	*Carex lurida*	2.5
Rough-Clustered Sedge	*Carex sparganioides*	3
Brown Fox Sedge	*Carex vulpinoidea*	3
Virginia Wildrye	*Elymus virginicus*	8
Fowl Manna Grass	*Glyceria striata*	1
Switchgrass	*Panicum virgatum*	2
Dark Green Rush	*Scirpus atrovirens*	2
Woolgrass	*Scirpus cyperinus*	.5
Prairie Cordgrass	*Spartina pectinata*	2.5
Water Plantain	*Alisma spp*	1
Swamp Milkweed	*Asclepias incarnate*	2
New England Aster	*Aster novae-angliae*	.5
Tall Coreopsis	*Coreopsis tripteris*	2
Spotted Joe-Pye Weed	*Eupatorium maculatum*	.25
Blue Flag	*Iris virginica*	3
Marsh Blazing Star	*Liatris spicata*	2
Cardinal Flower	*Lobelia cardinalis*	.25
Great Blue Lobelia	*Loblia siphilitica*	.5
Common Arrowhead	*Sagittaria lattifolia*	.75
Prairie Dock	*Silphium terebinthinaceum*	1
Blue Vervain	*Vebena hastata*	1
Golden Alexanders	*Zizia aurea*	.75
Includes Temporary Nurse Species:		
Oats	*Avena sativa… 22.6 lbs/acre*	
Annual Rye	*Lolium multiflorum… 1.75 lbs/acre*	
31.68% forbs –68.32% sedge/grass/rush mix… by weight		
Plant at a rate of 27.72 lbs/acre (sold in 1 acre & ¼ acre increments)		

WETLAND CONSULTANT:
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PLANTING PLAN
WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

2.0PP.DWG
DRAWING:
08.28.2009
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PLANT

SHEET NO.:
C2.1

Mix E:

Stream Restoration Buffer Plantings
Potential Source: *IDNR State Nursery (812) 358-3621*
Bare Root Seedlings- 4 rows each side of restored channel. 8' spacing between shrubs
Approx. 1.5 acre total- 700 trees

Bare Root Seedlings		
Scientific Name	**Common Name**	**#**
Shrub Species:		
Cephalanthus occidentalis	Buttonbush	200
Sambucus canadensis	Elderberry	600
Physocarpus opilufolius	Ninebark	100
Cornus amomum	Silky Dogwood	200
	Total:	*700*
Alternate Species:	*Cornus racemosa*	Gray Dogwood
	Asimina triloba	Pawpaw

Mix F:

Wetland Enhancement Woody Plantings
Potential Source: *Woody Warehouse* 866/766-8367
200- 3 gallon container stock

3 gallon Container Stock		
Scientific Name	**Common Name**	**#**
Carya illinoesis	Northern Pecan	25
Carya lacinosa	Shellbark Hickory	25
Carya cordiformis	Bitternut Hickory	25
Quercus bicolor	Swamp White Oak	50
Quercus palustris	Pin Oak	25
Asimna triloba	Paw-Paw	25
Cephalanthus occidentalis	Buttonbush	25
	Total:	*200*
Alternate Species:	*Quercas michauxii*	Swamp Chestnut Oak
	Lindera benzoin	Spicebush

Planting Instructions:

Trees/Shrubs:
(Recommended Planting Dates: April 15 – June 30, October 1 – November 30)

Trees & shrubs should be spaced approximately 15' apart. Stagger placement of trees between rows. Cluster species in groups of 3-4.

- Prepare hole slightly larger than the root mass diameter.
- Loosen or prune any spiraling roots.
- Place the tree in the hole wherein the root collar is no deeper than ½ inch below the ground line.
- Backfill loose soil around the root mass and firmly pack to eliminate air pockets.
- Do not plant when soil is excessively wet or frozen.
- A support stake may be warranted if the tree is tall or in an exposed site.
- Keep the root mass moist at all times.
- Plant so the main stem is vertical.

Seed Mixes:
(Recommended Planting Dates: October 1 – June 1)

Site Preparation: Use appropriate equipment to level disturbed area and return to original grade. Avoid compaction by placing equipment on mats to access wet or moist areas.

Seed Prep: Thoroughly mix your seed prior to planting as many of the heavier seeds may have settled during shipping. Mixing seed with an inert carrier (such as sawdust, sand, vermiculite, etc.) at a rate of 10 parts carrier to 1 part seed is recommended.

Planting: Broadcast seed mix evenly over the planting area. Rake, roll, or compact the seed to cover approximately 1/8 -1/4 inch. Do not roll if soil conditions are saturated. Application of fertilizer is not recommended. Apply light oat or wheat straw mulch, so that some of the soil is visible through the mulch. To avoid weed contamination, do not use hay mulch. Water thoroughly if site conditions are dry and no rain is expected within 48 hours.

Live Plants/Tubers/Rootstock:
(Recommended Planting Dates: April 15 – June 30 *or* October 1 – July 15)

- Select water depth appropriate for planting selected species. Plant in areas of the site where water depths range from 0" to 6".
- Prepare hole slightly larger than the root mass diameter.
- Loosen or prune any spiraling roots.
- Place the plant in the hole wherein the root collar is no deeper than ½ inch below the ground line.
- Backfill loose soil around the root mass and firmly pack to eliminate air pockets.
- Keep the root mass moist at all times.
- Plant so the main stem is vertical.
- For tubers, drop weighted tubers at appropriate water depth, or tamp gently into saturated soils.
- Cluster by species, where appropriate. Plant live plugs and/or tubers no closer than 1 square foot apart.

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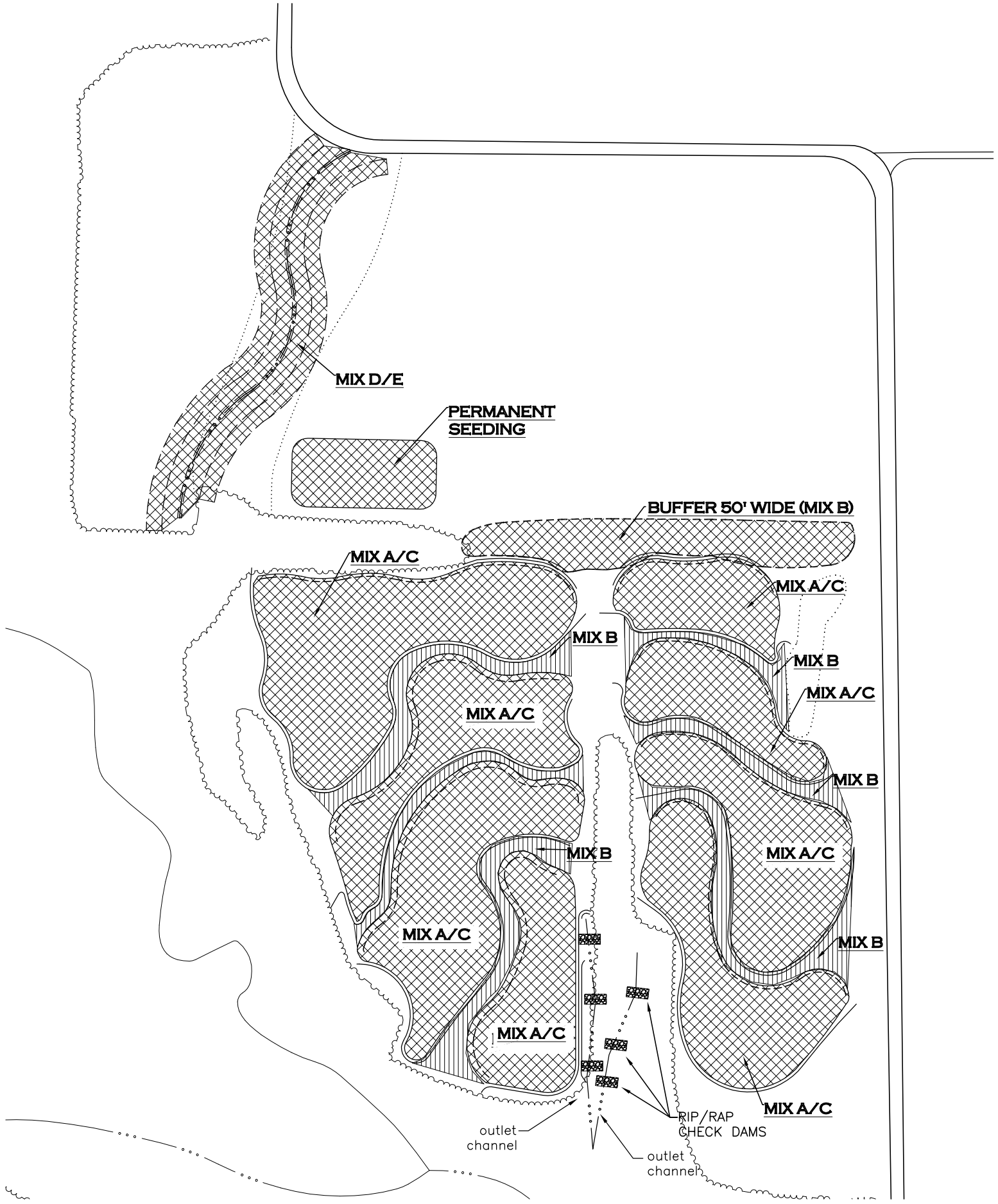
C2.2



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PLANTING PLAN SHEET

WETLAND MITIGATION PLAN
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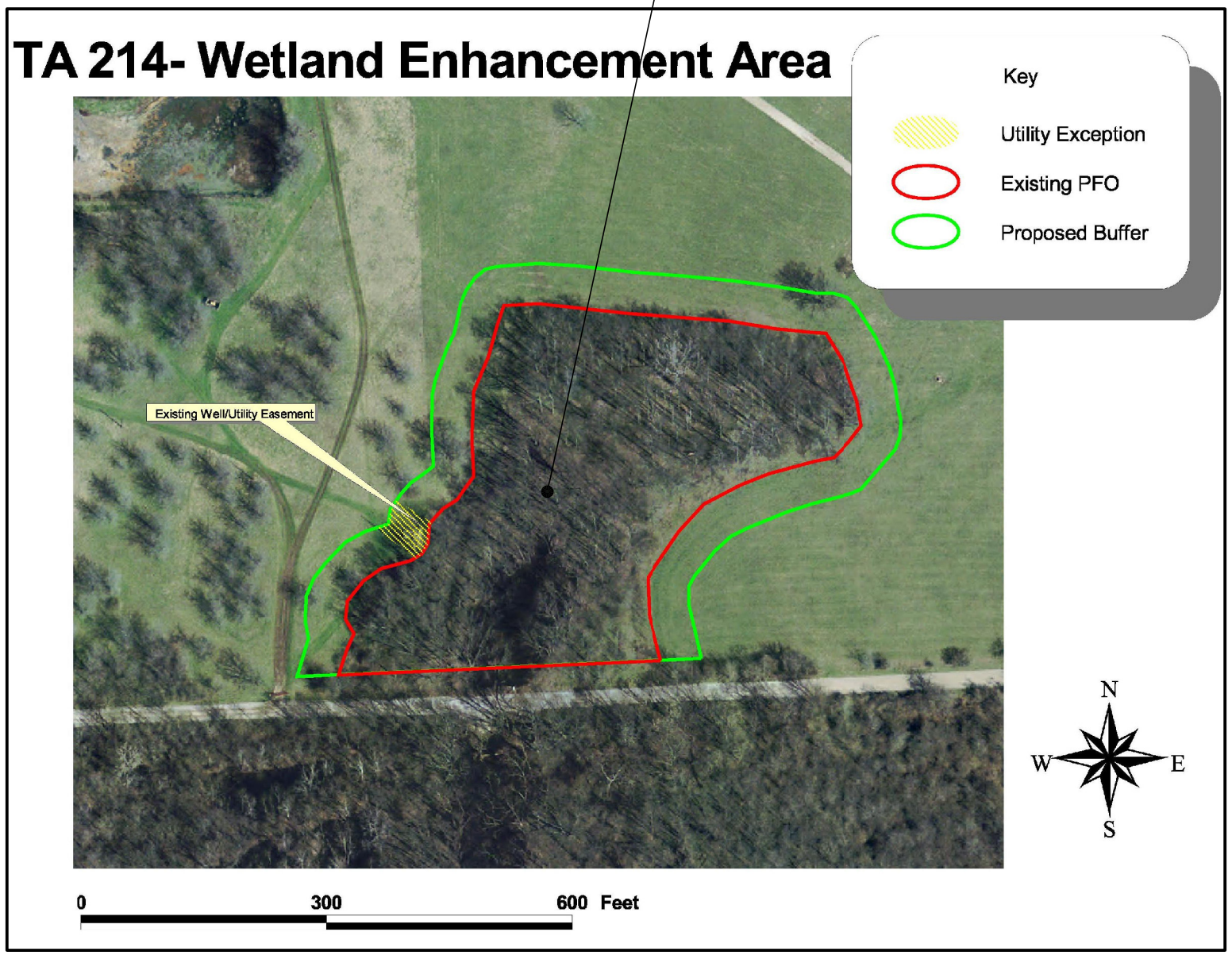
PLANT

SHEET NO.:
C2.3

WETLAND ENHANCEMENT ~ MIX F & G



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WETLAND ENHANCEMENT

WETLAND MITIGATION PLAN

CAJMTC – MPMG

CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

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DATE: 08.28.2009
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SCALE:

PLANT

SHEET NO.:
C2.4

10 of 24

WETLAND CONSULTANT:
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CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E

WEST C5.0

EAST C5.1

GRASS BUFFER
±50' WIDE

(woods)

744.5 BREAKLINE

(grass/hay field)

± 2.3 ACRES
745 CONTOUR

± 0.7 ACRES
745 CONTOUR

50'

742.5 BREAKLINE

± 0.8 ACRES
743 CONTOUR

± 1.3 ACRES
743 CONTOUR

± LINE OF "COUNTY ROAD"
200 EAST (GRAVEL ROAD)

740.5 BREAKLINE

± 1.8 ACRES
741 CONTOUR

approximate location of exist tile blow-out

738.5 BREAKLINE

(*) PROPOSED AGRI-DRAIN

± 1.1 ACRES
739 CONTOUR

± 1.5 ACRES
741 CONTOUR

± 1.5 ACRES
739 CONTOUR

outlet channel

RIP/RAP CHECK DAMS

744 745 744 743 742 741 740 739 738 737

0 50 100 200

Scale 1" = 100'

(*) COORDINATE SPECIFIC ELEVATIONS & LOCATIONS OF AGRIDRAINS WITH ON-SITE WETLANDS CONSULTANT TO MATCH EXSITING FIELD & TILE CONDITIONS AS ENCOUNTERED

GRADING LEGEND:

DESCRIPTION:	
⌖	APPROX TILE BLOW OUT
(*)	PLACE NEW AGRI DRAIN (*)
770	PROPOSED CONTOUR
800	EXISTING CONTOUR
	PROPOSED GRADE BREAK
	PROPOSED FLOWLINE

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GRADING PLAN

WETLAND MITIGATION PLAN

CAJMTC – MPMG

CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

DRAWING: 3.0GP.DWG
DATE: 08.28.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=100'

GRADING

SHEET NO.:

C3.0

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E

± LINE OF "COUNTY ROAD"
700 SOUTH (GRAVEL ROAD)

(grass/hay field)

±699LF WINDING STREAM
RECONSTRUCTION TO BE
IN ACCORDANCE WITH THE
DIRECTION OF THE WETLAND
CONSULTANT ON–SITE (SEE TYP
CROSS SECTION DETAIL C5.2)
REMOVE / DESTROY EXISTING
CLAY FIELD TILE ALONG STREAM

±10 ACRES
TO REMAIN
UNDISTURBED

(grass/hay field)

(woods)

approximate location
of exist tile blow~out

WEST
C5.0

(woods)

744.5 BREAKLINE

± 2.3 ACRES
745 CONTOUR

(grass/hay field)

GRASS BUFFER
±50' WIDE

EAST
C5.1

744.5 BREAKLINE
(grass/hay field)

± 0.7 ACRES
745 CONTOUR

(*) COORDINATE SPECIFIC ELEVATIONS & LOCATIONS OF AGRIDRAINS WITH ON–SITE WETLANDS CONSULTANT TO MATCH EXSITING FIELD & TILE CONDITIONS AS ENCOUNTERED

0 50 100 200
Scale 1" = 100'

GRADING LEGEND:

DESCRIPTION:	
⊕	APPROX TILE BLOW OUT
(*)	PLACE NEW AGRI DRAIN (*)
770	PROPOSED CONTOUR
800	EXISTING CONTOUR
	PROPOSED GRADE BREAK
	PROPOSED FLOWLINE

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GRADING PLAN

WETLAND MITIGATION PLAN

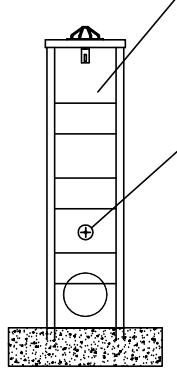
CAJMTC – MPMG

CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

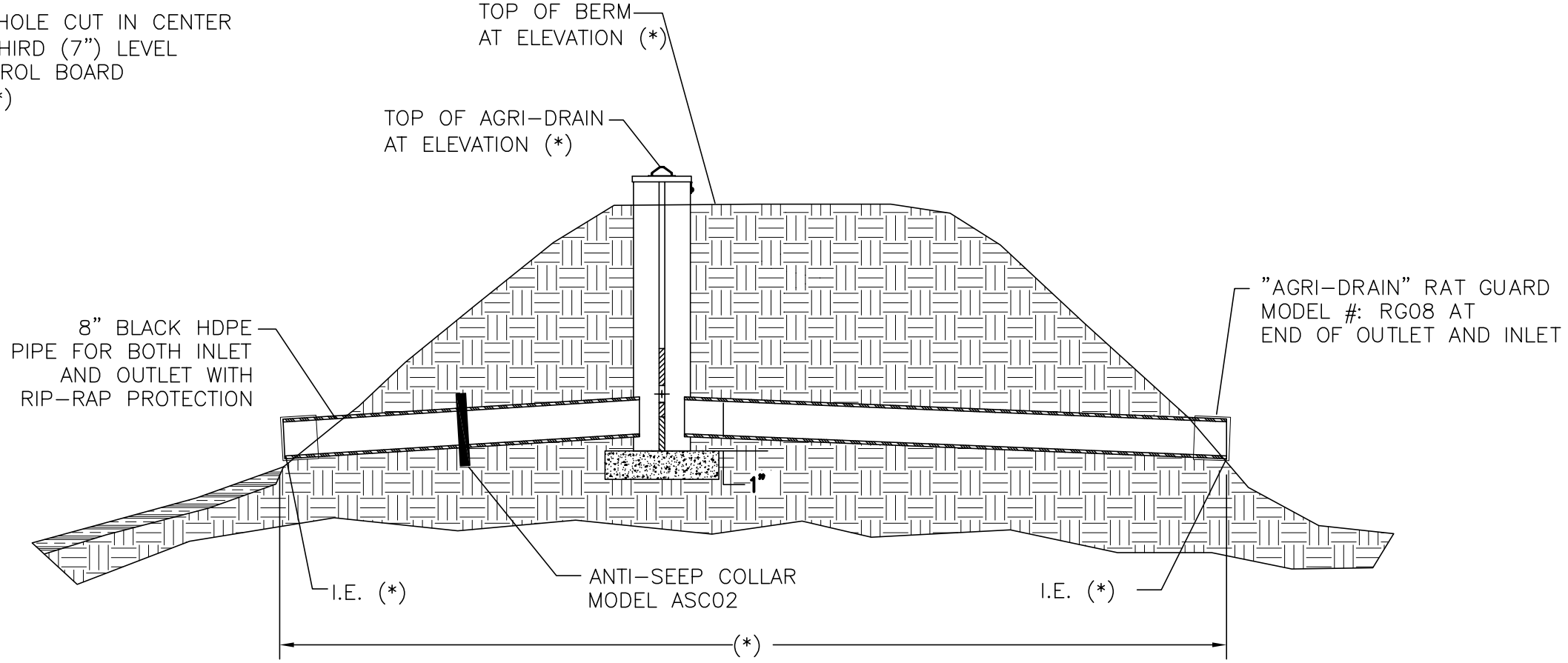
DRAWING: 3.06P.DWG
DATE: 08.28.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=100'

GRADING

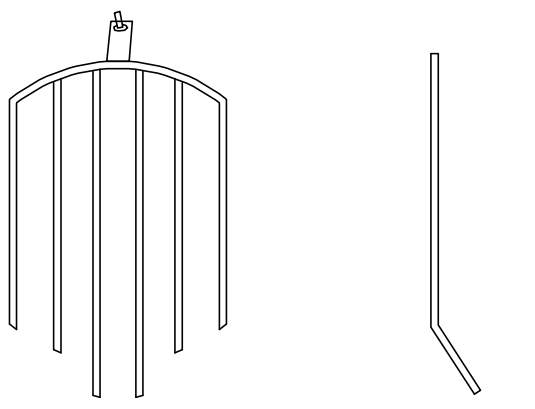
SHEET NO.:
C3.1



WETLAND AGRI–DRAIN
MODEL #: INLINE04X8P
FRONT VIEW
(NOT TO SCALE)



AGRI–DRAIN
SECTIONED SIDE VIEW
(NOT TO SCALE)



8" STEEL–ZINC COATED AGRI–DRAIN
RODENT GUARD MODEL #: RG08

(*) COORDINATE SPECIFIC ELEVATIONS & LOCATIONS OF AGRIDRAINS WITH ON–SITE WETLANDS CONSULTANT TO MATCH EXSITING FIELD & TILE CONDITIONS AS ENCOUNTERED

WETLAND CONSULTANT:
AQUA TERRA CONSULTING
Randy Jones 317.502.7897
randy@aquaterracons.net

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AGRI DRAIN DETAILS

WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL–2009–349–LCL

DRAWING: 3.0GP.DWG
DATE: 06.10.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: .

AGDRAIN

SHEET NO.:
C3.2

EROSION CONTROL PLAN

WETLAND MITIGATION PLAN

CAUMTC – MPMG

CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

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DRAWING: 4.0ECP.DWG
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PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=100'

ECP-PLAN

SHEET NO.: C4.0 A

14 OF 24

GRADING LEGEND:

DESCRIPTION:	
APPROX TILE BLOW OUT	◆
PROPOSED CONTOUR	770
EXISTING CONTOUR	—800—
PROPOSED GRADE BREAK	- - - - - -
PROPOSED FLOWLINE	—··—··—

Scale 1" = 100'

0 50 100 200

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E

±2,770LF PROPOSED SILT FENCE (SEE DETAIL)

PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH PLANTING PLAN

PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH PLANTING PLAN

PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH PLANTING PLAN

PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH PLANTING PLAN

RIP/RAP OUTLET PROTECTION

approximate location of exist tile blow-out

approximate location of exist tile blow-out

RIP/RAP CHECK DAMS

outlet channel

outlet channel

±2,770LF PROPOSED SILT FENCE (SEE DETAIL)

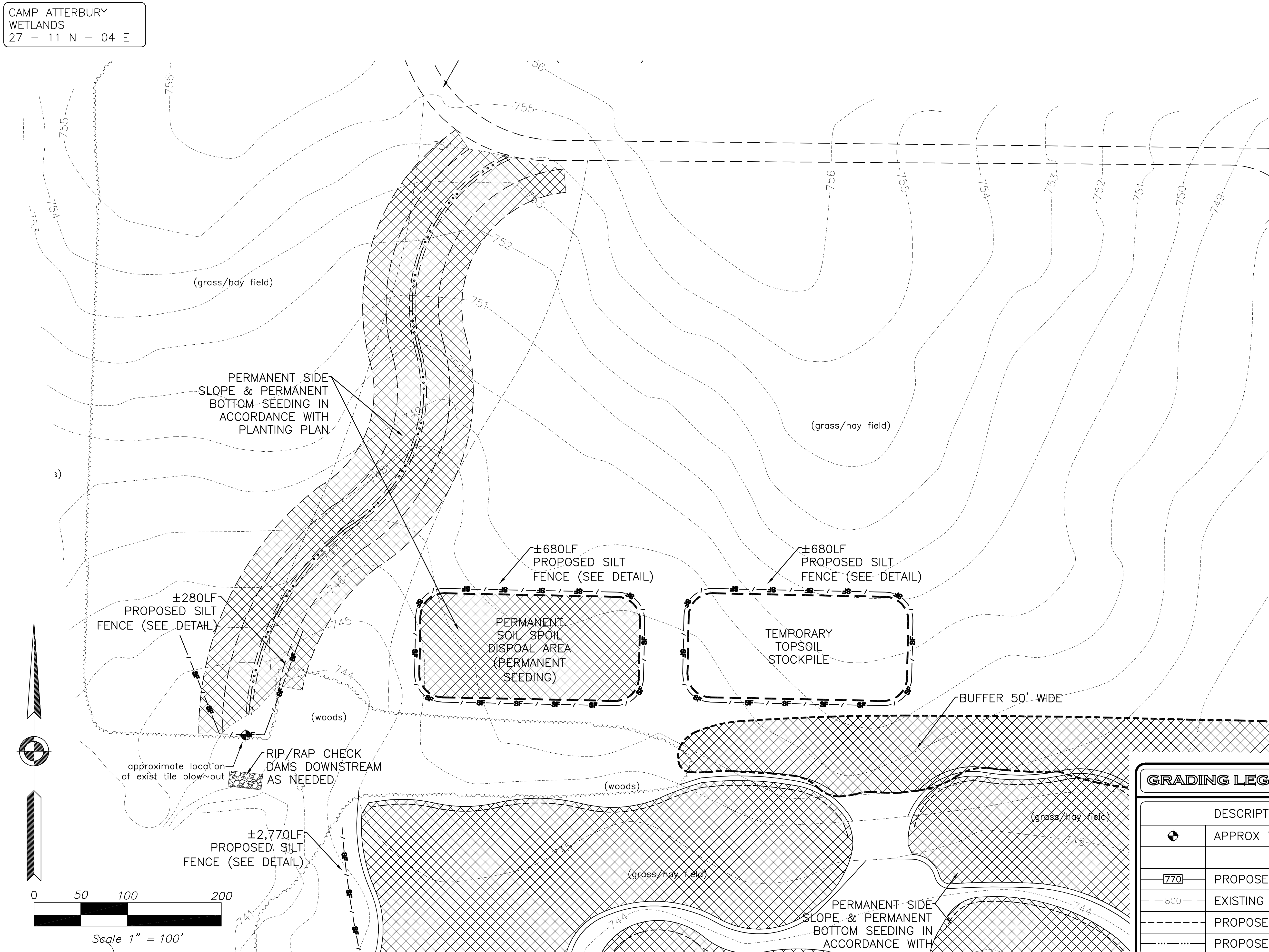
± LINE OF "COUNTY ROAD" 200 EAST (GRAVEL ROAD)

PROPOSED CONSTRUCTION ENTRANCE

50'

(grass/hay field)

(woods)


CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E
(grass/hay field)
PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH PLANTING PLAN
(grass/hay field)
±680LF PROPOSED SILT FENCE (SEE DETAIL)
±680LF PROPOSED SILT FENCE (SEE DETAIL)
±280LF PROPOSED SILT FENCE (SEE DETAIL)
PERMANENT SOIL SPOIL DISPOAL AREA (PERMANENT SEEDING)
TEMPORARY TOPSOIL STOCKPILE
BUFFER 50' WIDE
(woods)
approximate location of exist tile blow~out
RIP/RAP CHECK DAMS DOWNSTREAM AS NEEDED
(woods)
±2,770LF PROPOSED SILT FENCE (SEE DETAIL)
(grass/hay field)
(grass/hay field)
PERMANENT SIDE SLOPE & PERMANENT BOTTOM SEEDING IN ACCORDANCE WITH
0 50 100 200
Scale 1" = 100'

GRADING LEGEND:

	DESCRIPTION:
⊕	APPROX TILE BLOW OUT
770	PROPOSED CONTOUR
—800—	EXISTING CONTOUR
- - - -	PROPOSED GRADE BREAK
—···—	PROPOSED FLOWLINE

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EROSION CONTROL PLAN

WETLAND MITIGATION PLAN

CAJMTC – MPMG

CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

DRAWING:	4.0ECP.DWG
DATE:	08.28.2009
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DRAWN BY:	BPO
SURVEYED BY:	GIS
SCALE:	1"=100'

EC-PLAN

SHEET NO.:

C4.0 B

EROSION CONTROL NOTES

1. ALL CONSTRUCTION METHODS AND MATERIALS MUST CONFORM TO CURRENT STANDARDS AND SPECIFICATIONS OF THE FEDERAL, STATE, COUNTY, CITY OR LOCAL REQUIREMENTS, WHICHEVER HAS JURISDICTION.

2. LAND ALTERATION WHICH STRIPS THE LAND OF VEGETATION, INCLUDING REGRADING, SHALL BE DONE IN A WAY THAT WILL MINIMIZE EROSION.

3. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SOIL SEDIMENT FROM LEAVING THE SITE. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON-SITE INSPECTION.

4. SEDIMENT LADEN WATER SHALL BE DETAINED BY EROSION CONTROL PRACTICES AS NEEDED TO MINIMIZE SEDIMENTATION IN THE RECEIVING STREAM. NO STORM WATER SHALL BE DISCHARGED FROM THE SITE IN A MANNER THAT CAUSES EROSION AT THE POINT OF DISCHARGE.

5. WASTES AND UNUSED BUILDING MATERIALS SHALL NOT BE ALLOWED TO BE CARRIED FROM THE SITE BY STORMWATER RUNOFF. PROPER DISPOSAL OF ALL WASTES AND UNUSED BUILDING MATERIALS IS REQUIRED.

6. SEDIMENT BEING TRACED ONTO PUBLIC OR PRIVATE ROADWAYS SHALL BE MINIMIZED. CLEARING OF ACCUMULATED SEDIMENT SHALL NOT INCLUDE FLUSHING WITH WATER. CLEARED SEDIMENT SHALL BE RETURNED TO THE SITE FOR DISPOSAL.

7. SOIL WHICH HAS ACCUMULATED NEXT TO EROSION CONTROL DEVICES SHALL BE COLLECTED AND REDISTRIBUTED ON SITE AFTER EACH RAINFALL EVENT, AND AT LEAST ONCE A WEEK.

8. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.

9. ALL EXISTING STRUCTURES, FENCING, TREES AND ETC., WITHIN CONSTRUCTION AREA SHALL BE REMOVED AND DISPOSED OF OFF SITE. BURNING IS NOT ALLOWED ON-SITE.

10. SCHEDULE OF EARTHWORK ACTIVITIES:

    a) THE DURATION OF TIME WHICH AN AREA REMAINS EXPOSED SHALL BE KEPT TO A PRACTICAL MINIMUM. THE AREA SHALL BE STABILIZED SOON AS POSSIBLE. TEMPORARY VEGETATION OR MULCHING SHALL BE USED TO PROTECT EXPOSED AREAS IF PERMANENT VEGETATION CANNOT BE SEEDED WITHIN 14 DAYS OR ACTIVITY CEASES FOR MORE THAN 21 DAYS OR AS DIRECTED BY THE ENGINEER.

    b) TOPSOIL REPLACEMENT SHALL TAKE PLACE FROM MARCH 1 TO OCTOBER 31. STOCKPILE TOPSOIL AT ALL OTHER TIME OF THE YEAR. PERMANENT AND FINAL VEGETATION AND STRUCTURAL EROSION CONTROL DEVICES SHALL BE INSTALLED WITHIN SEVEN (7) DAYS AFTER FINAL GRADING OR AS SOON AS POSSIBLE.

ASSESSMENT OF CONSTRUCTION PLAN ELEMENTS (Section A)

A1 INDEX SHOWING LOCATIONS OF REQUIRED PLAN ELEMENTS
SEE SHEET C4.0

A2 11"X17" PLAT OF BUILDING LOT NUMBERS/BOUNDARIES AND ROADS
INCLUDED WITH SUBMITTAL

A3 NATURE AND PURPOSE OF PROJECT
WETLAND MITIGATION

A4 PROJECT SITE VICINITY MAP
SEE SHEET C0.0

A5 LEGAL DESCRIPTION OF PROJECT SITE
LATTITUDE/LONGITUDE: 39.370321° N – 86.068066° W
LEGAL DESCRIPTION IS PART OF 27 – 11 N – 04 E

A6 LOTS AND PROPOSED SITE IMPROVEMENTS
SEE SITE PLAN SHEET C3.0

A7 HYDROLOGIC UNIT CODE (14 DIGIT)
HYDROLOGIC UNIT CODE: 05120204100020 (Mud Creek–Prince Creek)

A8 STATE OR FEDERAL WATER QUALITY PERMITS
CONSTRUCTION IN A FLOODWAY (IDNR): N/A
401 WATER QUALITY CERTIFICATION (IDEM): N/A
SECTION 404 PERMIT (USACOE): N/A

A9 POINTS OF STORMWATER DISCHARGE FROM SITE
SEE GRADING PLAN SHEET C3.0

A10 ADJACENT WETLANDS, LAKES AND WATER COURSES
NONE KNOWN

A11 RECEIVING WATERS
NINEVEH CREEK

A12 POTENTIAL DISCHARGES TO GROUND WATER
NONE KNOWN

A13 FLOODPLAINS, FLOODWAYS AND FLOODWAY FRINGES
NOT LOCATED NEAR A FLOODPLAIN AREA.

A14 PRE-CONSTRUCTION/POST-CONSTRUCTION PEAK DISCHARGE
10–YEAR, PRE–DEVELOPED PEAK DISCHARE: 107 CFS
100–YEAR, POST–DEVELOPED PEAK DISCHARGE = 190 CFS

A15 ADJACENT LAND USE
NORTH – AGRICULTURAL
SOUTH – AGRICULTURAL
EAST – AGRICULTURAL
WEST – AGRICULTURAL

A16 CONSTRUCTION LIMITS
SEE EROSION CONTROL PLAN SHEET C4.0

A17 EXISTING VEGETATIVE COVER
THE SITE IS CURRENTLY A GRASS MEADOW USED FOR HAY PRODUCTION

A18 SOILS MAP AND SOIL DESCRIPTIONS
EXISTING SOIL TYPES & DESCRIPTION

Bs BROOKSTON SILTY CLAY LOAM

CrA CROSBY SILT LOAM, 0 TO 3 PERCENT SLOPES

MsC3 MIAMI CLAY LOAM, 6 TO 12 PERCENT SLOPES, SEVERELY ERODED

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EROSION CONTROL NOTES

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SCALE: .

EC-NOTE

SHEET NO.:
C4.1

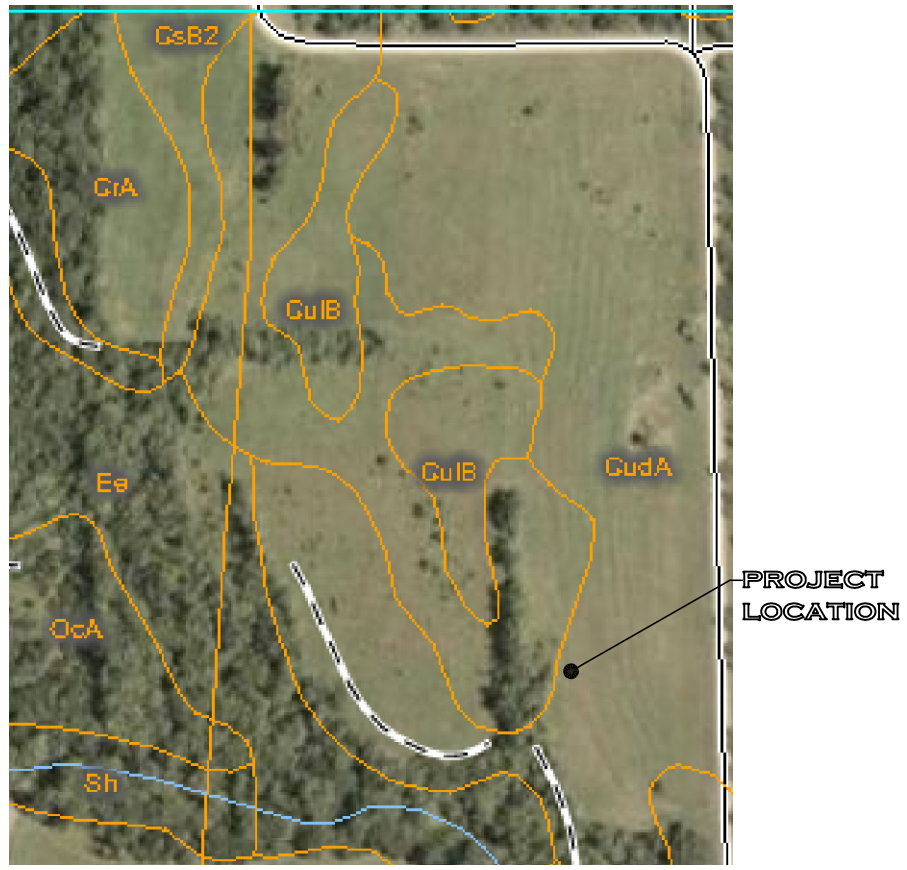
A18 SOILS MAP AND SOIL DESCRIPTIONS

EXISTING SOIL TYPES & DESCRIPTION

Bs BROOKSTON SILTY CLAY LOAM

CrA CROSBY SILT LOAM, 0 TO 3 PERCENT SLOPES

MsC3 MIAMI CLAY LOAM, 6 TO 12 PERCENT SLOPES, SEVERELY ERODED



A19 PROPOSED STORMWATER SYSTEMS

SEE GRADING PLAN SHEET C3.0 FOR MEASURES, LOCATIONS AND DETAILS

A20 OFF-SITE CONSTRUCTION ACTIVITIES

NONE.

A21 PROPOSED SOIL STOCKPILES

SEE EROSION CONTROL PLAN SHEET C4.0 FOR LOCATION(S)

A22 SITE TOPOGRAPHY

SEE GRADING PLAN SHEET C3.0

A23 FINAL SITE TOPOGRAPHY

SEE GRADING PLAN SHEET C3.0

EROSION CONTROL PLAN - CONSTRUCTION COMPONENT (Section B)

B1 POTENTIAL POLLUTANT SOURCES ASSOCIATED WITH CONSTRUCTION ACTIVITIES

THE MATERIALS AND SUBSTANCES LISTED BELOW ARE EXPECTED ON-SITE

- PAINTS, THINNERS AND SOLVENTS
  ENSURE THAT CONTAINERS HAVE LIDS SO THAT THEY CAN BE COVERED BEFORE PERIODS OF RAIN, AND KEEP CONTAINERS IN DRY, COVERED AREA WHENEVER POSSIBLE.

- BATTERIES
  STORE ONSITE IN DRY COVERED AREA AND DISPOSE OF PER MANUFACTURER'S RECOMMENDATIONS IN CONJUNCTION WITH STATE, LOCAL AND FEDERAL REGULATIONS

- AEROSOL SPRAY PRODUCTS
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- ADHESIVES
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- BIOLOGICAL SOLID WASTE
  TRAP IN CONTAINERS, CLEANED REGULARLY, AND DISPOSED OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY. SCHEDULE WASTE COLLECTION MORE FREQUENTLY TO PREVENT CONTAINERS FROM OVERFILLING. UNTREATED, RAW SEWAGE OR SEPTAGE SHOULD NEVER BE DISCHARGED OR BURIED ONSITE.

- REGULATED PCB MATERIAL
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- MOTOR OIL
  STORE PETROLEUM PRODUCTS FOR VEHICLES IN COVERED AREAS WITH LEAK-PROOF HEAVY DUTY PLASTIC LINER ON THE GROUND WITH DIKES IN PLACE TO CONTAIN AND SPILLS. IMMEDIATELY CONTAIN AND CLEAN UP ANY SPILLS WITH ABSORBENT MATERIALS. MOTOR OIL SHOULD BE CHANGED IN A DESIGNATED AREA WITH A METAL CATCH PAN OF 4'X4'X8" MIN. AND PROPERLY DISPOSED OF.

- ANTIFREEZE
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- FUEL
  STORE FUEL FOR VEHICLES IN COVERED AREAS WITH LEAK-PROOF HEAVY DUTY PLASTIC ON THE GROUND WITH DIKES IN PLACE TO CONTAIN AND SPILLS. IMMEDIATELY CONTAIN AND CLEAN UP ANY SPILLS WITH ABSORBENT MATERIALS.

B1 POTENTIAL POLLUTANT SOURCES ASSOCIATED WITH CONSTRUCTION ACTIVITIES (continued from previous column)

- BRAKE FLUIDS
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- HYDRAULIC FLUIDS
  STORE IN APPROVED CONTAINERS, AND DISPOSE OF ACCORDING TO LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS OR OTHER PUBLIC AGENCY.

- RUBBLE-ASPHALT/CONCRETE
  DISPOSE OF IN PROPER CONTAINERS AND RECYCLE PER LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS.

- LAND CLEARING DEBRIS
  RECYCLE APPROPRIATELY IN APPROPRIATELY MARKED CONTAINERS AND SCHEDULE REGULAR PICKUP BEFORE OVERFILLING OCCURS.

- WASTE
  ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED APPROVED CONTAINER. ALL TRASH AND NON-RECYCLABLE MATERIALS SHALL BE DEPOSITED IN THE DUMPSTER DAILY. THE DUMPSTER SHOULD EMPTIED PERIODICALLY AND NOT ALLOWED TO OVERFILL. DO NOT THROW TRASH ON GROUND OR BURY MATERIALS ON SITE.

- UNUSED BUILDING MATERIALS
  ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED APPROVED CONTAINER. ALL RECYCLABLE MATERIALS SHALL BE DEPOSITED IN THE DUMPSTER DAILY. THE DUMPSTER SHOULD EMPTIED PERIODICALLY AND NOT ALLOWED TO OVERFILL. DO NOT BURY MATERIALS ON SITE.

- CONCRETE TRUCK WASHOUT
  CONCRETE WASHOUT AREAS SHOULD A BERMED, SELF CONTAINED AREA APPROXIMATELY 10'X10'X3' IN PLACE TO CONTAIN THE CONCRETE, BUT ALLOW THE WATER TO INFILTRATE THE GROUND. DRIED MATERIAL SHALL BE REMOVED AND DISPOSED OF PROPERLY. THE CONCRETE WASHOUT AREA SHALL BE LOCATED IN AN AREA WHERE FUTURE PAVEMENT WILL BE INSTALLED, BUT AWAY FROM STORMWATER STRUCTURES AND WATER BODIES. SEE DETAIL.

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EROSION CONTROL NOTES

WETLAND MITIGATION PLAN

CAJMTC - MPMG

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EC-NOTE

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C4.2

- FERTILIZERS/PESTICIDES/DETERGENTS
  FERTILIZERS AND PESTICIDES WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS RECOMMENDED BY THE MANUFACTURER. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT THE EXPOSURE TIME TO STORM WATER. STORAGE WILL BE IN A COVERED SHED. THE CONTENTS OF ANY PARTIALLY USED BAG OF FERTILIZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS. THE ORIGINAL LABEL AND SAFETY INFORMATION WILL BE RETAINED. STORAGE AREAS SHALL BE BERMED TO CONTAIN SPILL FROM RUNNING INTO GROUNDWATER OR STORM SYSTEM.

B2 SEQUENCE OF EROSION CONTROL MEASURES IMPLEMENTATION

SEE SHEET C4.0 AND CHART B2/C2 BELOW

B3 CONSTRUCTION ENTRANCE LOCATION

SEE EROSION CONTROL PLAN SHEET C4.0 FOR LOCATION; SEE DETAIL SHEET C4.2

B4 SEDIMENT CONTROL MEASURES FOR SHEET FLOW AREAS

SILT FENCE, TEMPORARY AND PERMANENT SEEDING;
SEE PLAN SHEET C4.0 FOR LOCATIONS; SEE DETAILS ON SHEET C4.2

B5 CONTROL MEASURES FOR CONCENTRATED FLOW AREAS

NONE NEEDED.

B6 INLET PROTECTION MEASURE LOCATIONS AND SPECIFICATIONS

INLETS WILL BE PROTECTED INITIALLY WITH STRAW BALE INLET PROTECTION UNTIL AREAS ARE PAVED, THEN SANDBAG INLET PROTECTION FOR INLETS IN PAVED AREAS.

B7 RUNOFF CONTROL MEASURES

SILT FENCE AND SEEDING ARE PROPOSED.

B8 STORM WATER OUTLET PROTECTION SPECIFICATIONS

RIP RAP OUTLET PROTECTION & D/S ROCK CHECK DAMS PER PLAN

B9 GRADE STABILIZATION STRUCTURES

NONE NEEDED.

B10 CONSTRUCTION DETAILS FOR STORMWATER MEASURES

SEE EROSION CONTROL PLAN SHEET C4.0 FOR LOCATIONS AND DETAIL SHEET C4.2

B11 TEMPORARY SURFACE STABILIZATION METHODS

1. TEMPORARY SEEDING SHALL UTILIZE SEED SPECIES, APPLICATION RATES, AND DATES SET FORTH IN THE CHARTS DETAIL 06/C4.2.

2. THE DURATION OF TIME WHICH AN AREA REMAINS EXPOSED SHALL BE KEPT TO A PRACTICAL MINIMUM. THE AREA SHALL BE STABILIZED SOON AS POSSIBLE. TEMPORARY VEGETATION OR MULCHING SHALL BE USED TO PROTECT EXPOSED AREAS IF PERMANENT VEGETATION CANNOT BE SEEDED WITHIN 15 DAYS OR ACTIVITY CEASES FOR MORE THAN 15 DAYS OR AS DIRECTED BY THE ENGINEER.

3. TOPSOIL REPLACEMENT SHALL TAKE PLACE FROM MARCH 1 TO OCTOBER 31. STOCKPILE TOPSOIL AT ALL OTHER TIME OF THE YEAR. PERMANENT AND FINAL VEGETATION AND STRUCTURAL EROSION CONTROL DEVICES SHALL BE INSTALLED WITHIN SEVEN (7) DAYS AFTER FINAL GRADING OR AS SOON AS POSSIBLE.

B12 PERMANENT SURFACE STABILIZATION METHODS

1. AT THE PROPER TIME, WITH APPROVAL FROM THE OWNER, AND ONLY AFTER NOTIFYING THE SWCD AGENT, THE CONTRACTOR SHALL DISMANTLE THE REMAINING EROSION CONTROL ELEMENTS ONLY AS REQUIRED TO FINISH ALL GRADING. CONTRACTOR SHALL NOTIFY THE SWCD IN ADVANCE AND ARRANGE FOR THE LANDSCAPING CONTRACTOR TO FOLLOW UP IMMEDIATELY WITH REVEGETATION OF THE REMAINING AREAS.

2. ANY BARE DISTRUBED AREAS WILL BE GRADED, SEEDED AND MULCHED OR OTHERWISE REVEGETATED OR STABILIZED, AS PER THE EROSION CONTRL PLAN. PERMANENT SEEDING WILL BE ACCORDING TO THE SEED SPECIES, RATES AND DATES SHOWN IN THE CHARTS OF DETAIL 06 SHEET C4.2.

3. FINAL STABILIZATION WILL BE CONSIDERED ACHIEVED WHEN PERENNIAL VEGETATIVE COVER HAS A DENSITY OF SEVENTY PERCENT (70%) ON ALL UNPAVED AREAS OR AN EQUIVALENT PERMANENT STABILIZATION MEASURE HAS BEEN UTILIZED. IMPLEMENTATION AND MAINTENANCE WILL BE ACCORDING TO SECTIONS C2 AND C5 BELOW.

B13 MATERIAL HANDLING AND SPILL PREVENTION PLAN

1. THE PROPER MANAGEMENT AND DISPOSAL OF WASTES SHOULD BE PRACTICED ON SITE AT ALL TIMES TO REDUCE POLLUTION STORM WATER RUNOFF. HAZARDOUS WASTE SHOULD ALWAYS BE DISPOSED OF THROUGHA DESIGNATED HAZARDOUS WASTE MANAGEMENT OR RECYCLING FACILITY. HAZARDOUS WASTE SHOULD NOT BE DISPOSED OF WITH ORDINARY GARBAGE, OR POURED INTO THE SANITARY SEWER SYSTEM OR ONTO THE GROUND.

2. DESIGNATE A WASTE COLLECTION AREA ON-SITE THAT DOES NOT RECEIVE A SUBSTANTIAL AMOUNT OF RUNOFF FROM UPLAND AREAS AND DOES NOT DRAIN DIRECTLY INTO A WATER BODY.

3. KEEP PRODUCTS IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT RE-SEALABLE, THEN ORIGINAL LABEL AND MATERIAL SAFETY DATA WILL BE RETAINED. IF A PRODUCT DOES NOT HAVE ITS ORIGINAL LABEL, LABEL IT YOURSELF IF YOU ARE SURE OF CONTENTS. MAKE SURE PRODUCTS ARE PROPERLY SEALED TO PREVENT LEAKS AND SPILLS AND STORED IN A WEATHER PROOF SELF CONTAINED AREA AWAY FROM HEAT, SPARKS AND FLAMES.

4. A PROGRAM FOR RECYCLING OR DISPOSAL OF MATERIALS ASSOCIATED WITH OR FROM THE PROJECT SITE SHALL BE ESTABLISHED. ALL RECYCLING CONTAINERS WILL BE CLEARLY LABELED.

5. ALL CONSTRUCTION ACTIVITIES TO BE MONITORED AND MAINTAINED BY THE CONTRACTOR. AS EACH NEW SUB-CONTRACTOR COMES ON-SITE, THE CONTRACTOR WILL CONDUCT AND DOCUMENT A MEETING TO ENSURE AWARENESS OF THE POLLUTANT PREVENTION PROGRAM. GUIDELINES FOR PROPER HANDLING, STORAGE AND DISPOSAL OF CONSTRUCTION SITE WASTES SHOULD BE POSTED IN STORAGE AND USE AREAS AND WORKERS SHOULD BE TRAINED IN THESE PRACTICES TO ENSURE EVERYONE IS KNOWLEDGEABLE ENOUGH TO PARTICIPATE.

6. IN AN EMERGENCY, THE CONTRACTOR WILL CALL 911. IN THE EVENT OF A SPILL THAT POSES NO IMMEDIATE THREAT, THE CONTRACTOR WILL CONTACT THE PERRY TOWNSHIP FIRE DEPARTMENT AT (317)788-4813 AND IDEM EMERGENCY RESPONSE AT (888) 233-7745 WITHIN 24 HOURS OF THE SPILL. EMERGENCY PHONE NUMBERS AND PROCEDURES SHALL BE PROMINATELY DISPLAYED AT THE WORK SITE WHERE SPILLS MAY OCCUR, SUCH AS STAGING/REFUELING AREAS.

7. CLEAN UP SPILLS IMMEDIATELY. FOR HAZARDOUS MATERIALS FOLLOW CLEANUP INSTRUCTIONS ON THE PACKAGE. USE ABSORBENT MATERIAL SUCH AS SAWDUST OR KITTY LITTER TO CONTAIN THE SPILL. PROPER SAFETY MATERIALS SHOULD BE STORED ON SITE IN CASE OF ACCIDENT OR SPILL WHICH SHOULD INCLUDE BUT NOT LIMITED TO BROOMS, DUST PANS, MOPS, RAGS, GLOVES, GOGGLES, AND PLASTIC AND METAL TRASH CONTAINERS SPECIFICALLY FOR THAT PURPOSE. SPILL AREAS SHOULD BE WELL VENTILATED.

8. DURING THE DEMOLITION PHASE OF CONSTRUCTION, PROVIDE EXTRA CONTAINERS AND SCHEDULE MORE FREQUENT PICKUPS FOR RECYCLABLES AND GARBAGE. COLLECT, REMOVE, AND DISPOSE OR ALL CONSTRUCTION SITE WASTES AT AUTHORIZED DISPOSAL AREAS. CONTACT LOCAL ENVIRONMENTAL AGENCY TO IDENTIFY DISPOSAL SITES OR AUTHORIZED CONTRACTORS.

9. CONSTRUCTION VEHICLES SHOULD BE INSPECTED FOR LEAKS DAILY AND REPAIRED IMMEDIATELY IN A SELF CONTAINED AREA DESIGNATED FOR VEHICLE MAINTENANCE AND REPAIR. THE VEHICLE MAINTENANCE AREA SHOULD BE CONDUCTED ON AN AREA THAT IS TO BECOME FUTURE PAVEMENT. THIS AREA WILL BE DESIGNED TO MINIMIZE CONTACT BETWEEN EQUIPMENT ACTIVITIES AND RAINFALL OR RUNOFF. SPILLS MUST BE CLEANED UP AND MATERIALS DISPOSED OF IMMEDIATELY.

10. CONTAINERS OR EQUIPMENT THAT MAY MALFUNCTION AND CAUSE LEAKS OR SPILLS SHOULD BE IDENTIFIED THROUGH REGULAR INSPECTION AND STORAGE OF USE AREAS. EQUIPMENT AND CONTAINERS SHOULD BE INSPECTED REGULARLY FOR LEAKS, CORROSION, SUPPORT OR FOUNDATION FAILURE, OR ANY OTHER SIGNS OF DETERIORATION AND SHOULD BE TESTED FOR SOUNDNESS. ANY FOUND TO BE DEFECTIVE SHOULD BE REPAIRED OR REPLACED IMMEDIATELY.

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EROSION CONTROL NOTES

WETLAND MITIGATION PLAN

CAJMTC - MPMG

CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

DRAWING: 4.1ECN.DWG
DATE: 06.10.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: .

EC-NOTE

SHEET NO.:
C4.3

B14 MONITORING AND MAINTENANCE GUIDELINES

A TRAINED INDIVIDUAL SHALL PERFORM A WRITTEN EVALUATION OF THE PROJECT SITE:

- BY THE END OF THE NEXT BUSINESS DAY FOLLOWING EACH 1/2 STORM EVENT; AND
- A MINIMUM OF ONE (1) TIME PER WEEK.

THE EVALUATION WILL:

- ADDRESS THE MAINTENANCE OF EXISTING EROSION CONTROL MEASURES TO ENSURE PROPER FUNCTIONING; AND
- IDENTIFY ANY ADDITIONAL MEASURES NECESSARY TO MEET THE REQUIREMENTS OF THE EROSION CONTROL PLAN.

WRITTEN EVALUATION REPORTS INCLUDE:

- THE NAME OF THE INDIVIDUAL PERFORMING THE EVALUATION;
- THE DATE OF THE EVALUATION;
- PROBLEMS IDENTIFIED AT THE PROJECT SITE; AND
- DETAILS OR CORRECTIVE ACTIONS RECOMMENDED AND COMPLETED.

ALL WRITTEN EVALUATION REPORTS FOR THE PROJECT SITE WILL BE MAINTAINED BY THE CONSTRUCTION SUPERINTENDENT THROUGHOUT THE TERM OF THE PROJECT CONSTRUCTION AND MADE AVAILABLE TO THE SWCD OR OTHER INSPECTING AUTHORITY WITHIN 48 HOURS OF A REQUEST.

MAINTENANCE OF SPECIFIC EROSION CONTROL MEASURES SHALL BE ACCORDING TO THE FOLLOWING:

SEEDING OF DISTURBED AREAS

1. DISTURBED AREAS WILL BE SEEDED AND MULCHED FOR TEMPORARY OR PERMANENT STABILIZATION AS PHASES OF THE PROJECT CONSTRUCTION ARE COMPLETED.
2. UN-VEGETATED AREAS SCHEDULED OR LIKELY TO BE LEFT INACTIVE FOR FIFTEEN (15) DAYS OR MORE WILL BE TEMPORARILY OR PERMANENTLY STABILIZED WITH MEASURES APPROPRIATE FOR THE SEASON TO MINIMIZE EROSION POTENTIAL.
3. SEEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEEDED AS NEEDED.

SILT FENCE MAINTENANCE REQUIREMENTS:

1. INSPECT THE SILT FENCE PERIODICALLY AND AFTER EACH STORM EVENT.
2. IF FENCE FABRIC TEARS, STARTS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE AFFECTED PORTION IMMEDIATELY.
3. REMOVE DEPOSITED SEDIMENT WHEN IT REACHES HALF THE HEIGHT OF THE FENCE AT ITS LOWEST POINT OR IS CAUSING THE FABRIC TO BULGE.
4. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEAN OUT.
5. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE FENCE AND SEDIMENT DEPOSITS, BRING THE DISTURBED AREA TO GRADE, AND STABILIZE.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE MAINTENANCE REQUIREMENTS:

1. INSPECT ENTRANCE PAD AND SEDIMENT DISPOSAL AREA WEEKLY AND AFTER STORM EVENTS OR HEAVY USE.
2. RESHAPE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.
3. TOP DRESS WITH CLEAN STONE AS NEEDED.
4. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED IF THE WATER IS CONVEYED INTO A SEDIMENT TRAP OR BASIN.
5. REPAIR ANY BROKEN ROAD PAVEMENT IMMEDIATELY.

B15 EROISION AND SEDIMENT CONTROL SPECIFICATIONS FOR INDIVIDUAL BUILDING LOTS

NOT APPLICABLE

EROSION CONTROL PLAN
POST-CONSTRUCTION COMPONENT (Section C)

C1 POTENTIAL POLLUTANT SOURCES FROM PROPOSED LAND USE

THE GREATEST AMOUNT OF POST CONSTRUCTION POLLUTANTS EXPECTED FROM THIS PROJECT WILL COME FROM THE VEHICLES THAT UTILIZE THE SITE. POTENTIAL POLLUTANTS FROM VEHICLES INCLUDE: GREASE, OIL, GASOLINE, DIESEL, ANTIFREEZE, BRAKE FLUID, METALS, RUBBER FRAGMENTS AND OTHER HYDROCARBONS. ALSO SAND AND GRAVEL FROM ROADWAY SURFACES AND ROAD WEATHER TREATMENTS ARE ASSUMED. BACTERIA AND OTHER BIOLOGICAL AGENTS FROM DUMPSTER AREAS AND LITTERING ARE ALSO CONSIDERED POTENTIAL POLLUTANTS.

C2 SEQUENCE OF EROSION CONTROL MEASURES IMPLEMENTATION

SEE 'EROSION CONTROL SCHEDULE' CHART BELOW.

C3 PROPOSED STORMWATER QUALITY MEASURES

WEEKLY PARKING LOT CLEANING AND DAILY LITTER CLEAN UP WILL BE PERFORMED.

FINAL LANDSCAPING AND SEEDING WILL BE DONE AFTER FINAL GRADING.

FERTILIZING WILL BE MINIMAL SINCE THERE IS VERY LITTLE TURF ON THE SITE. THE LANDSCAPE PLANTINGS WERE CHOSEN FOR THE LOW DEPENDENCY UPON FERTILIZERS AND PESTICIDES. THEY ALSO REQUIRE VERY LITTLE IRRIGATION SO TO MINIMIZE THE FERTILIZER AND PESTICIDE RUNOFF FROM THE SITE. VEGETATED AREAS ALSO HELP FILTER OTHER POLLUTANTS FROM STORMWATER RUNOFF PRIOR TO ENTERING THE STORM SEWER SYSTEM.

C4 CONSTRUCTION DETAILS AND SPECIFICATIONS

SEE DETAIL SHEET C4.2

C5 MAINTENANCE GUIDELINES FOR STORMWATER MEASURES

SEE B14 ABOVE AND CHART BELOW.

ESTIMATED START: SEPTEMBER 1, 2010

ESTIMATED COMPLETION OF SITE DEVELOPMENT: FALL, 2010

CONTACT PERSON:

AQUA TERRA CONSULTING
Randy Jones 317.502.7897
randy@aquaterracons.net

THE FOLLOWING ARE THE CONTACTS IN THE EVENT THAT A SPILL OCCURS.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
100 SENATE AVENUE
INDIANAPOLIS, IN 46207-7060
(317) 232-8706

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EROSION CONTROL NOTES

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CAJMTC - MPMG
CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

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DRAWN BY: BPO
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SCALE: .

EC-NOTE

SHEET NO.:
C4.4

B2/C2 EROSION CONTROL SCHEDULE

EROSION CONTROL MEASURE	MAINTENANCE	INSTALLATION SEQUENCE
STONE ENTRANCE	AS NEEDED	PRIOR TO CLEARING AND GRADING
SILT FENCE	WEEKLY, AFTER STORM EVENTS AND AS NEEDED	PRIOR TO CLEARING AND GRADING
TEMPORARY SEEDING	WATER AS NEEDED	AFTER ROUGH GRADING
INLET PROTECTION	WEEKLY, AFTER STORM EVENTS AND AS NEEDED	AFTER EACH INLET IS PLACED
PERMANENT SEEDING	WATER AS NEEDED	AFTER FINISH GRADING
REMOVAL OF INLET PROTECTION	N/A	AFTER ALL AREAS DRAINING TO THESE AREAS ARE STABILIZED
REMOVAL OF SILT FENCE	N/A	AFTER ALL AREAS DRAINING TO THESE AREAS ARE STABILIZED

C5 EROSION CONTROL SCHEDULE POST CONSTRUCTION

MEASURE	MAINTENANCE/MONITORING ACTIVITY	SCHEDULE	INSTALLATION SEQUENCE
PERMANENT SEEDING	• WATERING ONCE ESTABLISHED & THROUGH DROUGHTS • MOWING AND LITTER DEBRIS REMOVAL • STABILIZATION OF ERODED SLOPES • NUTRIENT AND PESTICIDE USE MANAGEMENT • DETHATCHING AND REMOVAL OF THATCHING • DISCING OR AERATION	ANNUAL OR AS NEEDED	AFTER FINAL GRADING
	• SEEDING/SODDING TO RESTORE GROUND COVER (USE PROPER EROSION AND SEDIMENT CONTROL)	5-YEAR CYCLE	

CONSTRUCTION SEQUENCE PLAN:

EXCAVATION OF THE WETLAND BASINS SHALL BE CONDUCED FIRST, WITH THE EXCAVATION OF INLET/OUTLET CONNECTIONS TO THE CREEK CHANNEL TO BE COMPLETED AT THE END OF CONSTRUCTION ACTIVITIES, TO MINIMIZE POTENTIAL FOR OFF-SITE SEDIMENT MIGRATION.

SEEDING TO BE CONDUCTED IMMEDIATELY AFTER EXCAVATION. SPECIFIED MIXES INCLUDE BOTH PERMANENT PERENNIAL SPECIES AND TEMPORARY NURSE CROP SPECIES.

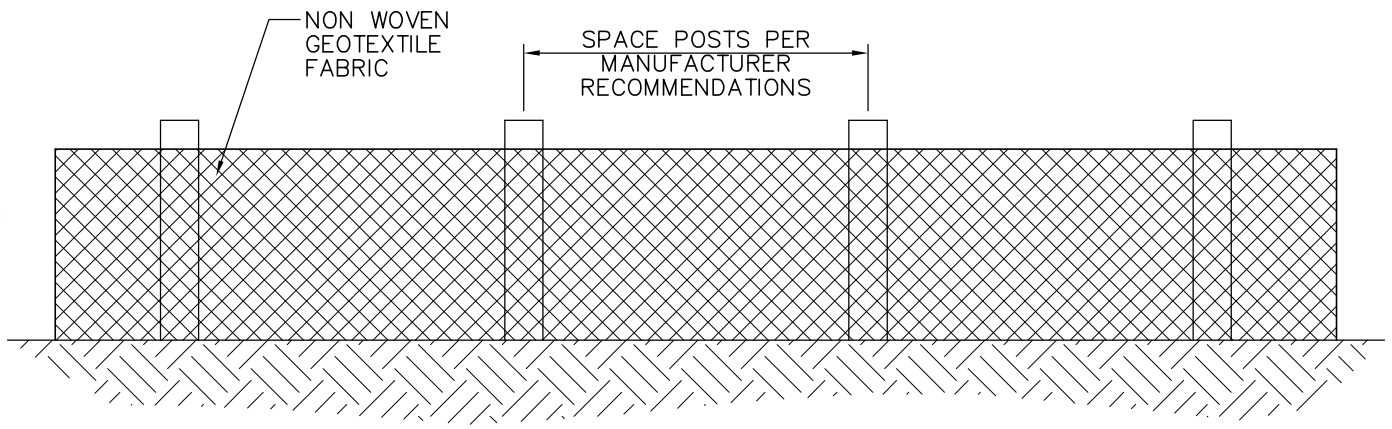
FOLLOW THIS GENERAL STEP BY STEP PLAN

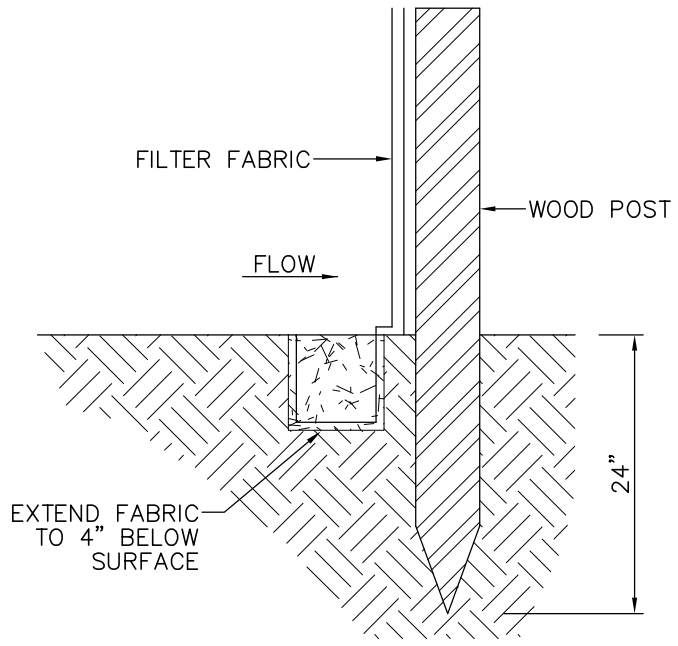
A – STRIP TOPSOIL FROM PROJECT LIMITS & PLACE IN TEMPORARY TOPSOIL STOCKPILE(S)

B – MASS EXCAVATION OF EXISTING SUBSOIL TO FINAL GRADES

C – OVER EXCAVATE EXISTING SUBSOIL BELOW FINAL GRADE TO A DEPTH GENERALLY EQIVALENT TO THAT DEPTH OF TOPSOIL DISCOVERED ON SITE DURING STRIPPING

D – REPLACE THE OVER EXCAVATION AREA "C" WITH THE TOPSOIL STOCKPILED DURING STEP "A"





NOTE:
POSTS SHALL HAVE A MINIMUM LENGTH OF 36 INCHES PLUS BURIAL DEPTH. POST MATERIAL SHALL BE WOOD, STEEL, OR SYNTHETIC, AND SHALL BE OF SUFFICIENT STRENGTH TO RESIST DAMAGE DURING INSTALLATION AND TO SUPPORT APPLIED LOADS.

FABRIC SHALL BE A WOVEN GEOTEXTILE FABRIC CONSISTING OF STRONG, ROT RESISTANT, MATERIALS RESISTANT TO DETERIORATION FROM ULTRAVIOLET AND HEAT EXPOSURE.

SILT FENCE CONSTRUCTION 06 C4.5
NOT TO SCALE

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EROSION CONTROL NOTES
WETLAND MITIGATION PLAN
CAJMTC – MPMG
CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

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EC-NOTE

SHEET NO.:
C4.5

Contract Language for Construction Storm Water Pollution Prevention Plans

- The contractor shall be responsible for obtaining or verifying that all permits and approvals are obtained from the respective city, county, or state agencies prior to starting and construction. Specifically a Rule 5 (327 IAC 15-5) Permit and the filing of a Notice of Intent.
- It shall be the contractor's responsibility to determine the exact location of all utilities in the vicinity of the construction area prior to starting any construction.
- It shall be the contractor's responsibility for notification and coordination of all construction with the respective utility companies prior to starting any construction.
- All erosion control measures indicated on the Rule 5 Storm Water Pollution Prevention Plan (SWPPP) shall be maintained by the contractor and owner. The Camp Atterbury DPW or Environmental office has the right to require additional erosion control measures in the field as conditions warrant.
- All erosion control practices shall be in accordance with the IDEM Storm Water Quality Manual dated October 2007 and the NRCS Field Office Technical Guide.
- At the completion of construction all excess soil and other material shall be removed from the site. To ensure proper water quality the site and its storm water conveyance facilities shall be inspected at regular intervals and after all major rain events. The storm water conveyance systems shall be kept free of debris and fluids that could potentially pollute storm water runoff.
- The project site owner or their representative, knowledgeable in erosion and sediment control, shall inspect the site for storm water pollution prevention deficiencies at least weekly and again within 24 hours of every ½ inch rain event.
- All hazardous materials used during the construction of the site shall be handled at all times according to recommendations in the Material Safety Data Sheets provided by the manufacturer. The site contractor will implement a spill prevention plan prior to start of construction.
- The erosion control measures included in the SWPPP shall be installed prior to initial land disturbance activities or as soon as practical. Sediment shall be prevented from discharging from the project site by installing and maintaining the erosion control measures as stated in the SWPPP.
- Except as prevented by inclement weather conditions or other circumstances beyond the control of the contractor/developer appropriate erosion control practices will be initiated within 7 days of the last land disturbing activity at the site. The site shall be stabilized by seeding, sodding, mulching, covering, or by other equivalent erosion control measures.
- The SWPPP shall be implemented on all disturbed areas within the construction limits. All measures involving erosion control practices shall be installed under the guidance of a qualified personnel experienced in erosion control and following the SWPPP specifications.
- During the period of construction activity all erosion control measures shall be maintained by the contractor. At the completion of construction the contractor shall coordinate the transfer of required maintenance responsibilities to Camp Atterbury.
- Roadways shall be kept cleared of accumulated sediment. Bulk clearing of accumulated sediment shall not include flushing the area with water. Cleared sediment shall be returned to the point of likely origin or other suitable location.
- The contractor shall control waste, garbage, debris, wastewater, and other substances on the site in such a way that they shall not be transported from the site by the action of winds, stormwater runoff, or other forces. Proper disposal or management of all wastes and unused building materials appropriate to the nature of the waste or material is required.

Contract Language for Construction Storm Water Pollution Prevention Plans

- DPW will enforce this policy through contractor oversight and project planning.
- Camp Atterbury staff has the authority to conduct inspections of site activities as needed, to ensure compliance with the above cited plan and permit.
- Potential sanctions for contractor violations may include, but are not limited to:

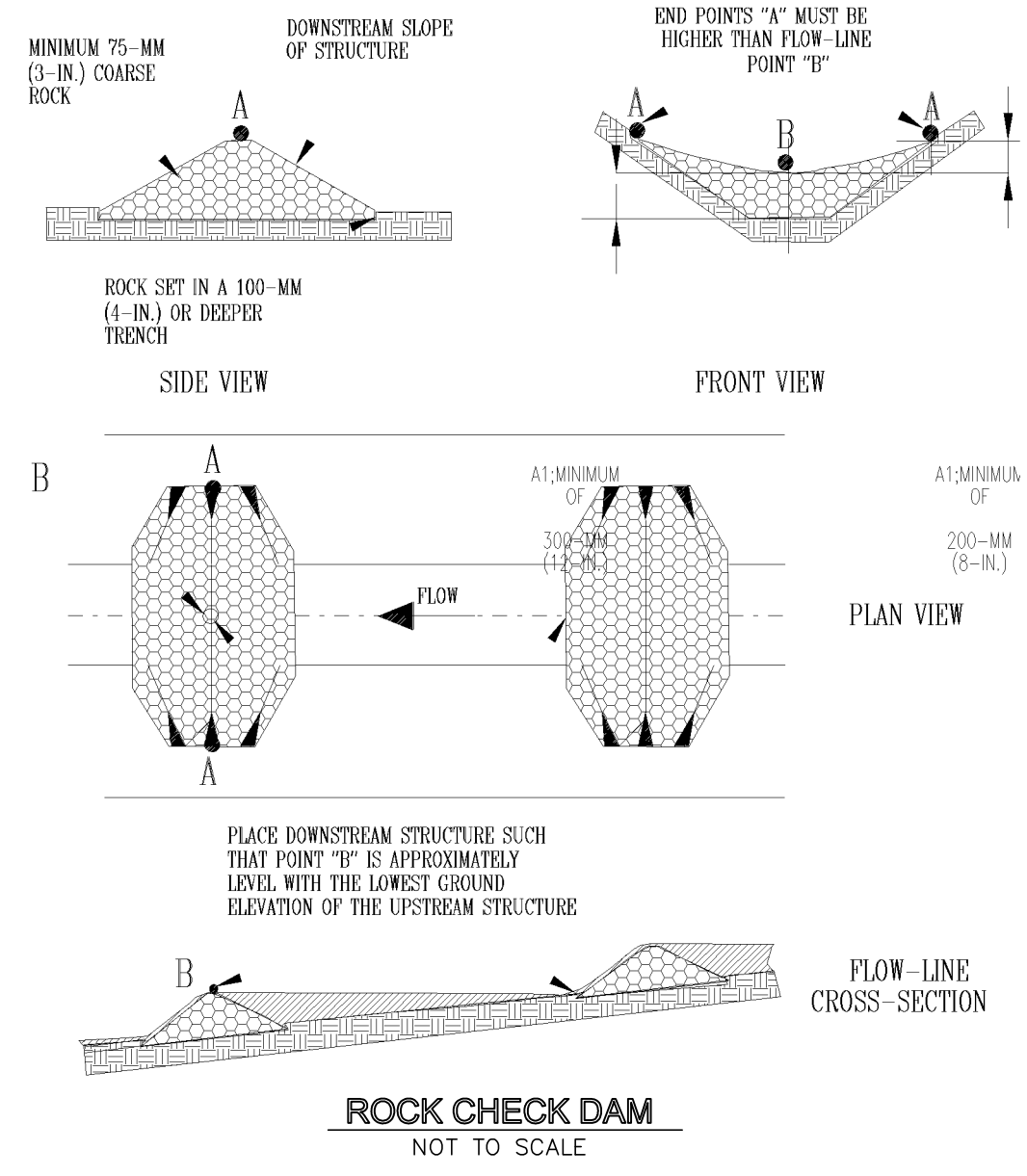
(1) Contract payment withholding, liquidated damages, setoff, or equitable adjustment;

(2) Indemnification of Government costs due to administrative enforcement and litigation;

(3) Contract termination;

D_{50} OF ROCK (MM)	DOWNSTREAM SLOPE OF STRUCTURE 35 % 30 % 25 % 20 % 15 % 10 % MAXIMUM FLOW DEPTH ON ROCK (MM)					
75	15	18	20	25	33	50
150	30	36	40	50	66	100

SUGGESTED ROCK DIAMETER & FLOW DEPTHS



ROCK CHECK DAM
NOT TO SCALE

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SWPPP RULE 5 NOTES

WETLAND MITIGATION PLAN

CAJMTC – MPMG

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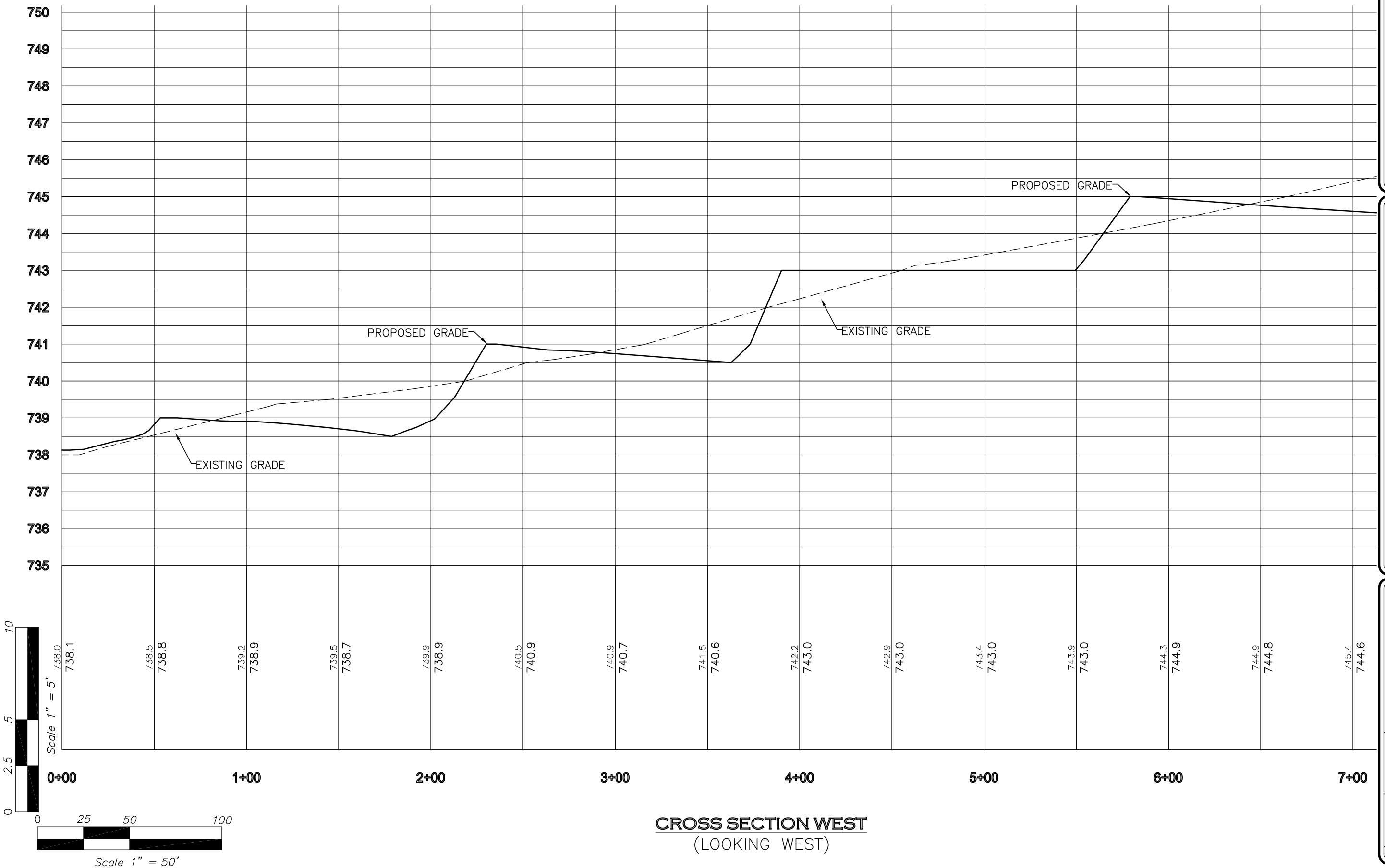
SCALE: .

EC-NOTE

SHEET NO.:
C4.6

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E



CROSS SECTION WEST
(LOOKING WEST)

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WEST CROSS SECTION

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CAJMTC – MPMG
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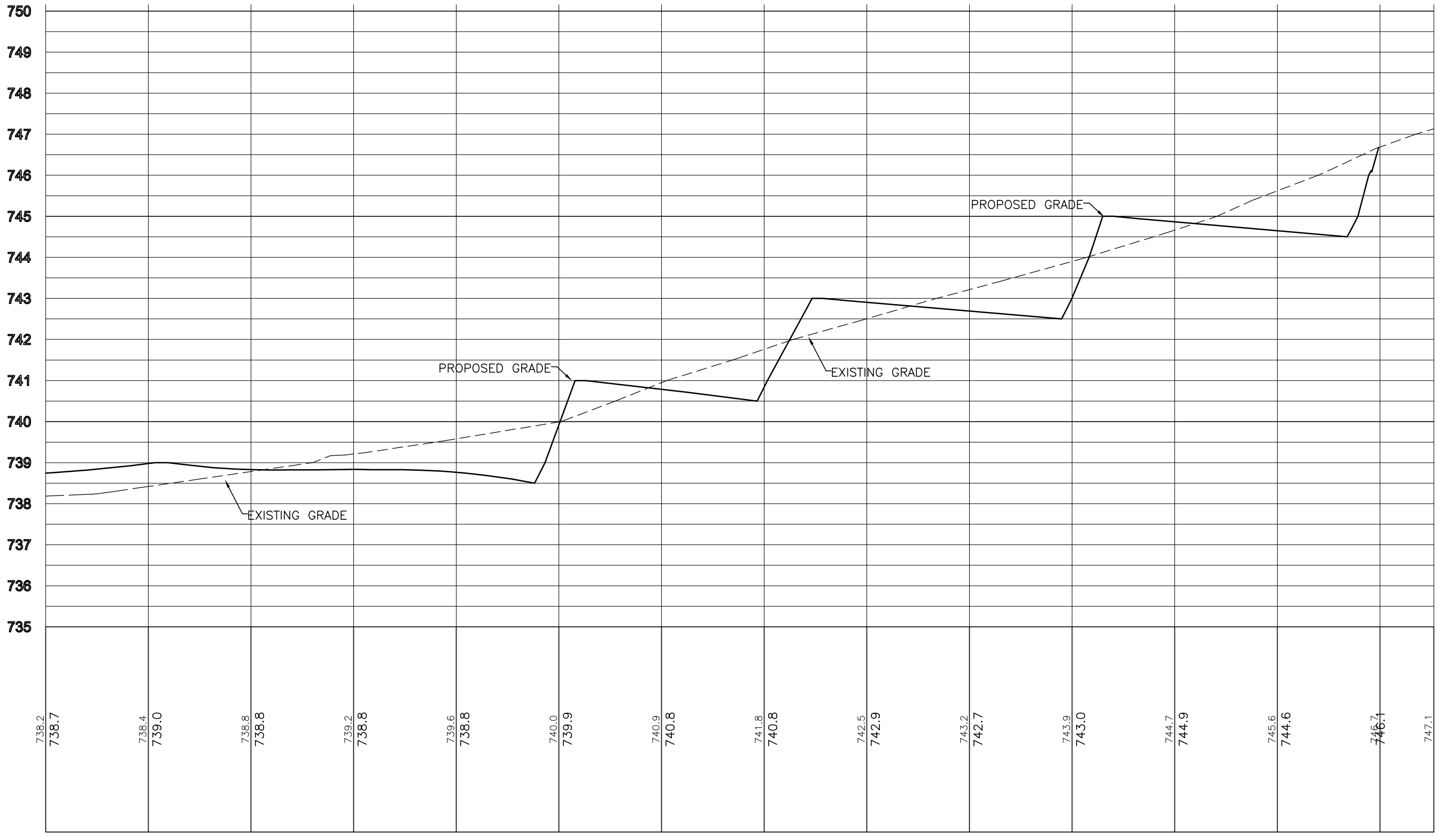
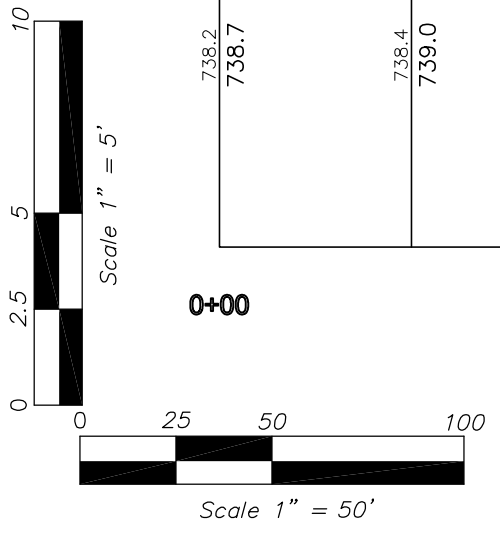
DRAWING: 5.0XS.DWG
DATE: 06.10.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=50'

X-SEC

SHEET NO.:
C5.0

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E





CROSS SECTION EAST
(LOOKING WEST)

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EAST CROSS SECTION

WETLAND MITIGATION PLAN
CAJMTC – MPMG
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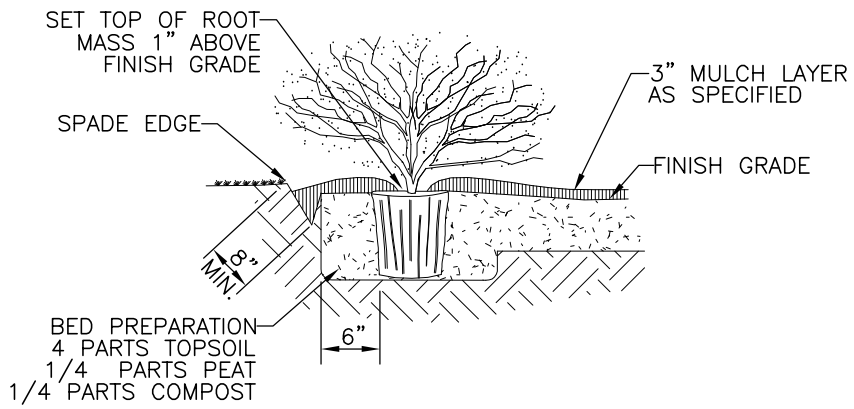
DATE: 06.10.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=50'

X-SEC

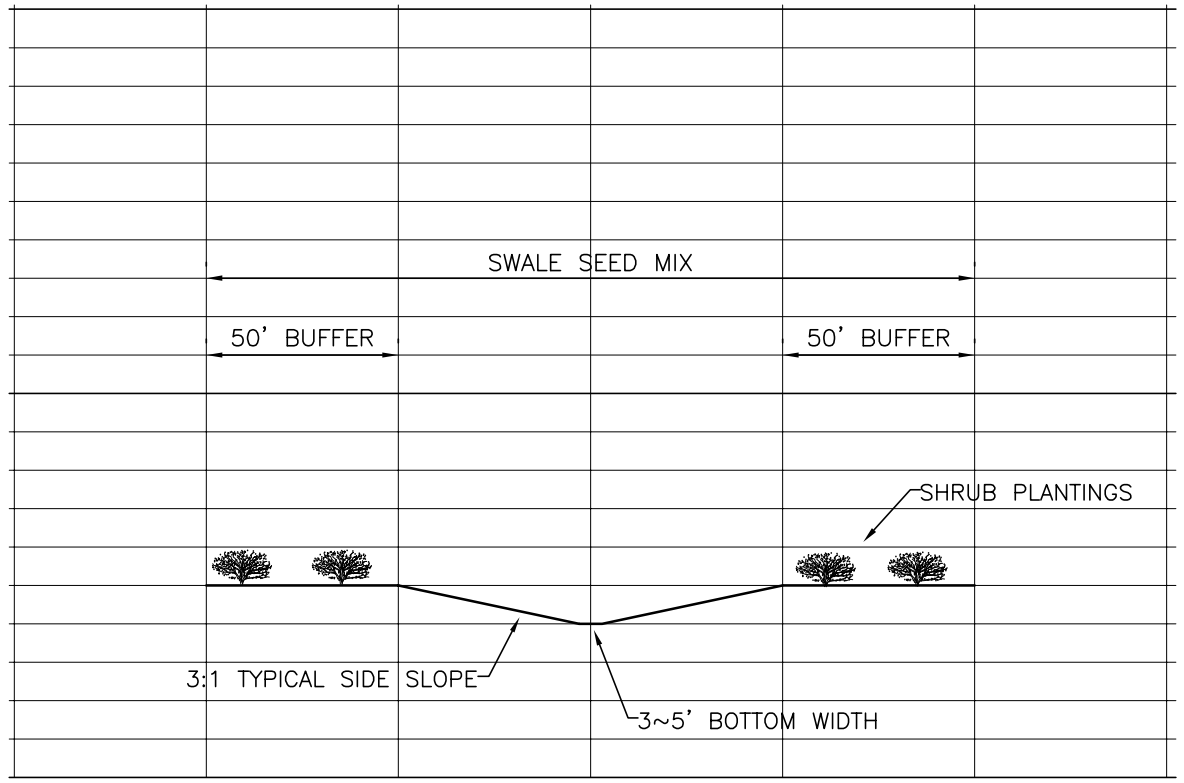
SHEET NO.:
C5.1

CAMP ATTERBURY
WETLANDS
27 – 11 N – 04 E



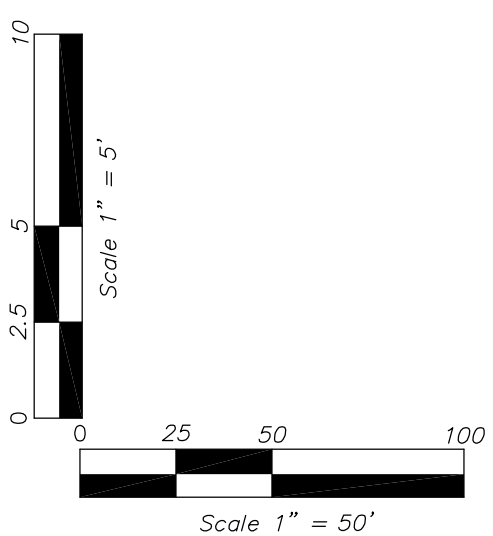
SHRUB AND SMALL TREE PLANTING DETAIL

NOT TO SCALE



TYPICAL STREAM CROSS-SECTION

(LOOKING UPSTREAM)



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STREAM TYPICAL SECTION

WETLAND MITIGATION PLAN
CAMTC – MPMG
CORPS OF ENGINEERS ID#: LRL-2009-349-LCL

DRAWING: 5.0XS.DWG
DATE: 08.28.2009
PROJ. NO.: 09.011
DRAWN BY: BPO
SURVEYED BY: GIS
SCALE: 1"=50'

X-SEC

SHEET NO.:
C5.2

WETLAND DETERMINATION DATA FORM – Midwest Region (PEER REVIEW DRAFT)

Project/Site: MPMG Mitigation Area	City/County: Nineveh, Johnson		Sampling Date: 5/29/09
Applicant/Owner: IN National Guard	State: Indiana		Sampling Point: A1
Investigator(s): Randy Jones	Section, Township, Range:		
Landform (hillslope, terrace, etc.): terrace	Local relief (concave, convex, none): rolling		
Slope %: 0-2% Lat: 39° 22′ 12.925″N	Long: 86° 04′ 00.561″W		Datum: 1983
Soil Map Unit Name: Crosby silt loam (CrA)			NWI Classification: None
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in Remarks.)			Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed?	Are "Normal circumstances" present?		Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic?	(If needed, explain in Remarks.)		

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☐	No	☒	**Is the Sampled Area within a Wetland?** YES ☐ NO ☒
Hydric Soil Present?	Yes	☐	No	☒	
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks:
Site conditions were fairly wet, due to recent rainfall over the 3-4 days preceding the inspection, however, typical for this time of year.
Site is managed as a hay field, had not been cut yet this year.

VEGETATION – Use scientific names of plants.

Tree Stratum *plot size:* 30′ radius	*Absolute % Cover*	*Dominant Species?*	*Indicator Status?*
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			
Sapling/Shrub Stratum *plot size:* 30′ radius			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Festuca arundinacea*	30	Yes	FACU
2. *Poa pratensis*	20	Yes	FAC
3. *Scleria pauciflora*	20	Yes	FACU
4. *Trifolium pratense*	10	No	FACU
5. *Melilotus officinalis*	10	No	FACU
6.			
7.			
8.			
9.			
Total Cover: 90%			
Woody Vine Stratum *plot size:* 30′ radius			
1.			
2.			
3.			
Total Cover:			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		*Multiply by:*
OBL species		X1=
FACW species		X2=
FAC species		X3=
FACU species		X4=
UPL species		X5=
Column Totals:	*(A)*	*(B)*

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%
☐ Prevalence Index is ≤ 3.0
☐ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation (Explain)

Hydrophytic Vegetation Present? YES ☐ NO ☒

Remarks: (Include photo numbers here or on a separate sheet.)

Open meadow managed for hay.

SOIL Sampling Point: A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (in.)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc	Texture	
0-6	10 YR 5/2						SiLm	
6-16	10 YR 4/3						SiLm	Consistent w/ mapped *Crosby*

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				**Indicators for Problematic Hydric Soils:**	
	Histosol (A1)		Sandy Gleyed Matrix (S4)		Coast Prairie Redox (A16)
	Histic Epipedon (A2)		Sandy Redox (S5)		Iron-Manganese Masses (F12)
	Black Histic (A3)		Stripped Matrix (S6)		Other (Explain in Remarks)
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)	Indicators of hydrophytic vegetation and wetland hydrology must be present.	
	Stratified Layers (A5)		Loamy Gleyed Matrix (F2)		
	2 cm Muck (A10)		Depleted Matrix (F3)		
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		
	5 cm Mucky Peat or Peat (S3)				

Restrictive Layer (if observed):	**Hydric Soil Present?**	☐ **YES** ☒ **NO**
Type:		
Depth (in.):		

Remarks:
Features observed consistent w/ mapped *Crosby* silt loam.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)			**Secondary Indicators** (minimum of two required)
Surface Water (A1)		Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
High Water Table (A2)		Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)		True Aquatic Plants (B14)	Dry-Season Water Table (C2)
Water Marks (B1)		Hydrogen Sulfide Odor (C1)	Crayfish Burrows (C8)
Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)	Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced Iron (C4)	Geomorphic Position (D2)
Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)	FAC-Neutral Test (D5)
Iron Deposits (B5)		Thin Muck Surface (C7)	
Inundation Visible on Aerial Imagery (B7)		Gauge or Well Data (D9)	
Sparsely Vegetated Concave Surface (B8)		Other (Explain in Remarks)	

Field Observations:

Surface Water Present?	Yes		No	X	Depth (in.):		**Wetland Hydrology Present?**
Water Table Present?	Yes		No	X	Depth (in.):		
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (in.):		☐ **YES** ☒ **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area is being drained by sub-surface tiles. Confirmed presence through visual observation.

Sample Point A1 Photos

Sample Point A1

View from Sample Point A1.
Facing north.

Exposed drainage tile & associated head-cut outlet.

WETLAND DETERMINATION DATA FORM – Midwest Region (PEER REVIEW DRAFT)

Project/Site: MPMG Mitigation Area	City/County: Nineveh, Johnson		Sampling Date: 5/29/09
Applicant/Owner: IN National Guard	State: Indiana		Sampling Point: B1
Investigator(s): Randy Jones	Section, Township, Range:		
Landform (hillslope, terrace, etc.): terrace	Local relief (concave, convex, none): rolling		
Slope %: 0-2% Lat: 39° 22′ 10.480″N	Long: 86° 04′ 07.415″W		Datum: 1983
Soil Map Unit Name: Brookston silty clay loam (Br)			NWI Classification: None
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in Remarks.)			Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed?	Are "Normal circumstances" present?		Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic?	(If needed, explain in Remarks.)		

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☐	No	☒	**Is the Sampled Area within a Wetland?** YES ☐ NO ☒
Hydric Soil Present?	Yes	☐	No	☒	
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks:
Site conditions were fairly wet, due to recent rainfall over the 3-4 days preceding the inspection, however, typical for this time of year.
Site is managed as a hay field, had not been cut yet this year.

VEGETATION – Use scientific names of plants.

Tree Stratum *plot size:* 30′ radius	*Absolute % Cover*	*Dominant Species?*	*Indicator Status?*
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Sapling/Shrub Stratum *plot size:* 30′ radius			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Festuca arundinacea*	30	Yes	FACU
2. *Poa pratensis*	20	Yes	FAC
3. *Trifolium pratense*	15	Yes	FACU
4. *Melilotus officinalis*	10	No	FACU
5. *Dichanthelium clandestinium*	5	No	FACW
6. Achillea millefolium	5	No	FACU
7. Oxalis europaea	2	No	FACU
8.			
9.			
Total Cover: 87%			
Woody Vine Stratum *plot size:* 30′ radius			
1.			
2.			
3.			
Total Cover:			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		*Multiply by:*
OBL species		X1=
FACW species		X2=
FAC species		X3=
FACU species		X4=
UPL species		X5=
Column Totals:	*(A)*	*(B)*

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%
☐ Prevalence Index is ≤ 3.0
☐ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation (Explain)

Hydrophytic Vegetation Present? YES ☐ NO ☒

Remarks: (Include photo numbers here or on a separate sheet.)

Open meadow managed for hay.

SOIL Sampling Point: B1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (in.)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc	Texture	
0-4	10 YR 5/2						SiLm	
6-14	10 YR 4/2						SiClLm	
14-18	10 YR 5/3						SiClLm	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				**Indicators for Problematic Hydric Soils:**	
	Histosol (A1)		Sandy Gleyed Matrix (S4)		Coast Prairie Redox (A16)
	Histic Epipedon (A2)		Sandy Redox (S5)		Iron-Manganese Masses (F12)
	Black Histic (A3)		Stripped Matrix (S6)		Other (Explain in Remarks)
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)	Indicators of hydrophytic vegetation and wetland hydrology must be present.	
	Stratified Layers (A5)		Loamy Gleyed Matrix (F2)		
	2 cm Muck (A10)		Depleted Matrix (F3)		
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		
	5 cm Mucky Peat or Peat (S3)				

Restrictive Layer (if observed):	**Hydric Soil Present?**	☐ **YES** ☒ **NO**
Type:		
Depth (in.):		

Remarks:
No hydric features observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)				**Secondary Indicators** (minimum of two required)	
	Surface Water (A1)		Water-Stained Leaves (B9)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Fauna (B13)		Drainage Patterns (B10)
	Saturation (A3)		True Aquatic Plants (B14)		Dry-Season Water Table (C2)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Crayfish Burrows (C8)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)		Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)		FAC-Neutral Test (D5)
	Iron Deposits (B5)		Thin Muck Surface (C7)		
	Inundation Visible on Aerial Imagery (B7)		Gauge or Well Data (D9)		
	Sparsely Vegetated Concave Surface (B8)		Other (Explain in Remarks)		

Field Observations:

Surface Water Present?	Yes		No	X	Depth (in.):		**Wetland Hydrology Present?**
Water Table Present?	Yes		No	X	Depth (in.):		
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (in.):		☐ **YES** ☒ **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area is being drained by sub-surface tiles. Confirmed presence through visual observation.

Sample Point B1 Photos

Sample Point B1

View from Sample Point B1. Facing NW.

Exposed drainage tile & associated head-cut outlet.

WETLAND DETERMINATION DATA FORM – Midwest Region (PEER REVIEW DRAFT)

Project/Site: MPMG Mitigation Area	City/County: Nineveh, Johnson	Sampling Date: 5/29/09
Applicant/Owner: IN National Guard	State: Indiana	Sampling Point: C1
Investigator(s): Randy Jones	Section, Township, Range:	
Landform (hillslope, terrace, etc.): swale	Local relief (concave, convex, none): rolling	
Slope %: 0-2% Lat: 39° 22′ 20.167″N	Long: 86° 04′ 11.299″W	Datum: 1983
Soil Map Unit Name: Brookston silty clay loam (Br)		NWI Classification: None
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in Remarks.)		Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed?	Are "Normal circumstances" present?	Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic?	(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☐	No	☒	**Is the Sampled Area within a Wetland?** YES ☐ NO ☒
Hydric Soil Present?	Yes	☐	No	☒	
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks:
Site conditions were fairly wet, due to recent rainfall over the 3-4 days preceding the inspection, however, typical for this time of year.
Site is managed as a hay field, had not been cut yet this year.

VEGETATION – Use scientific names of plants.

Tree Stratum *plot size:* 30′ radius	*Absolute % Cover*	*Dominant Species?*	*Indicator Status?*
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover: 0%			
Sapling/Shrub Stratum *plot size:* 30′ radius			
1. *Elaeagnus umbellata*	30	Yes	UPL
2. *Gleditsia triacanthos*	30	Yes	FAC
3. *Rubus flagellaris*	10	No	FACU
4. *Toixcodendron radicans*	5	No	FAC
5.			
Total Cover: 75%			
Herb Stratum			
1. *Solidago altissima*	50	Yes	FACU
2. *Poa pratensis*	20	Yes	FAC-
3. *Festuca arundinacea*	10	No	FACU
4. *Dactylis glomerata*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
Total Cover: 85%			
Woody Vine Stratum *plot size:* 30′ radius			
1.			
2.			
3.			
Total Cover:			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		*Multiply by:*
OBL species		X1=
FACW species		X2=
FAC species		X3=
FACU species		X4=
UPL species		X5=
Column Totals:	*(A)*	*(B)*

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%
☐ Prevalence Index is ≤ 3.0
☐ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation (Explain)

Hydrophytic Vegetation Present? YES ☐ NO ☒

Dominance test = 50%

Remarks: (Include photo numbers here or on a separate sheet.)

Scrubby field border; swale.

SOIL Sampling Point: C1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (in.)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc	Texture	
0-4	10 YR 5/2						SiLm	
6-14	10 YR 4/2						SiClLm	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				**Indicators for Problematic Hydric Soils:**	
	Histosol (A1)		Sandy Gleyed Matrix (S4)		Coast Prairie Redox (A16)
	Histic Epipedon (A2)		Sandy Redox (S5)		Iron-Manganese Masses (F12)
	Black Histic (A3)		Stripped Matrix (S6)		Other (Explain in Remarks)
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)	Indicators of hydrophytic vegetation and wetland hydrology must be present.	
	Stratified Layers (A5)		Loamy Gleyed Matrix (F2)		
	2 cm Muck (A10)		Depleted Matrix (F3)		
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		
	5 cm Mucky Peat or Peat (S3)				

Restrictive Layer (if observed):	**Hydric Soil Present?**	☐ **YES** ☒ **NO**
Type:		
Depth (in.):		

Remarks:
No hydric features observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)				**Secondary Indicators** (minimum of two required)	
	Surface Water (A1)		Water-Stained Leaves (B9)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Fauna (B13)		Drainage Patterns (B10)
	Saturation (A3)		True Aquatic Plants (B14)		Dry-Season Water Table (C2)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Crayfish Burrows (C8)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)		Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)		FAC-Neutral Test (D5)
	Iron Deposits (B5)		Thin Muck Surface (C7)		
	Inundation Visible on Aerial Imagery (B7)		Gauge or Well Data (D9)		
	Sparsely Vegetated Concave Surface (B8)		Other (Explain in Remarks)		

Field Observations:

Surface Water Present?	Yes		No	X	Depth (in.):		**Wetland Hydrology Present?**
Water Table Present?	Yes		No	X	Depth (in.):		
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (in.):		☐ **YES** ☒ **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area is being drained by sub-surface tiles. Confirmed presence through visual observation.

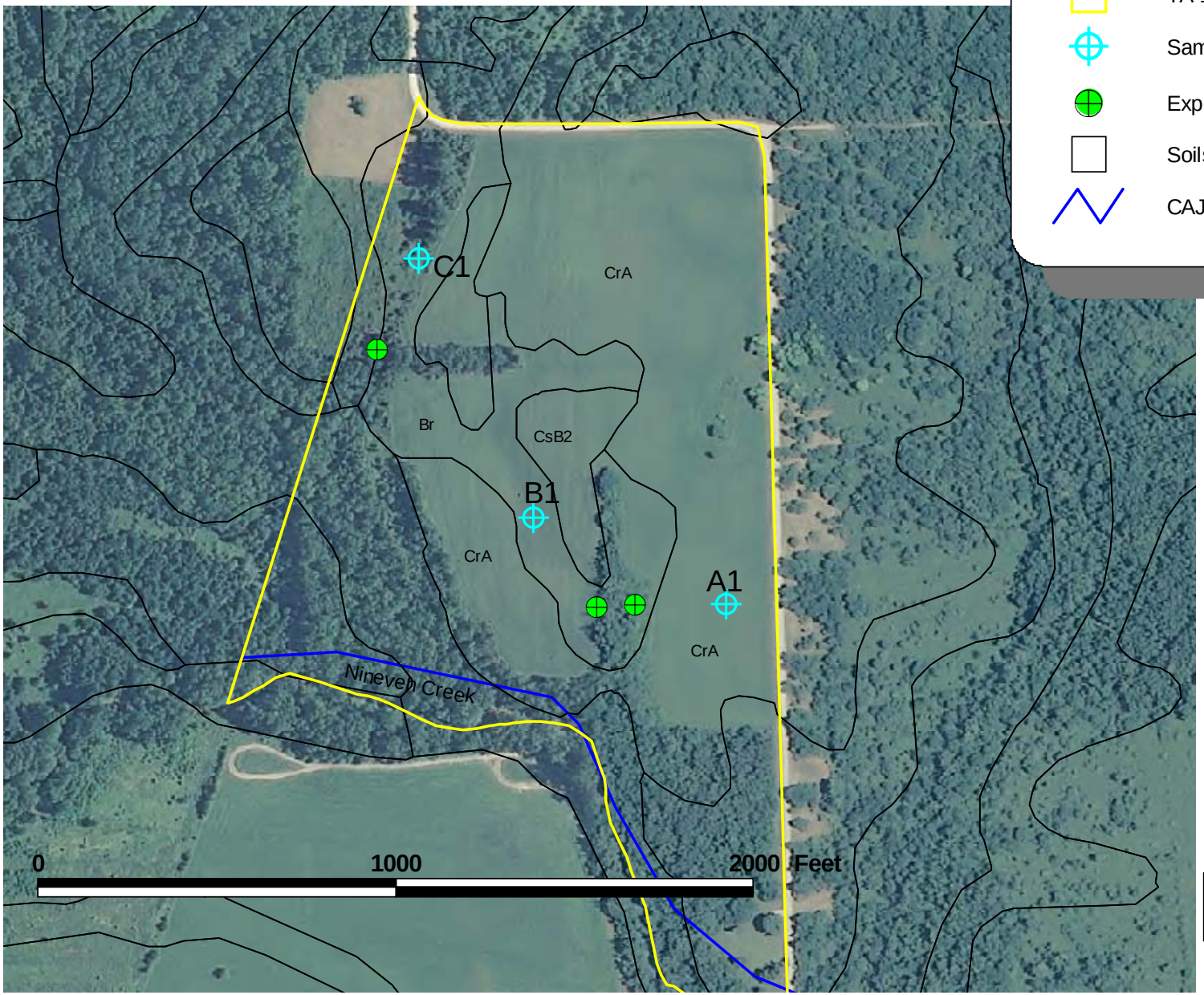
Sample Point C1 Photos

Sample Point C1

Sample Point C1 facing SW

View of stream restoration area from NW site corner, facing south.

Training Area 101 Mitigation Site
2008 Aerial/Soil Map



Key

- TA 101
- Sample Points
- Exposed Tile Outlets
- Soils
- CAJMTC Streams

N
W
E
S

Source: NAIP 2008

WETLAND DETERMINATION DATA FORM – Midwest Region (PEER REVIEW DRAFT)

Project/Site: MPMG Enhancement Area	City/County: Edinburgh, Bartholomew		Sampling Date: 8/14/09
Applicant/Owner: IN National Guard	State: Indiana		Sampling Point: E1
Investigator(s): Randy Jones	Section, Township, Range: 10 N 5 E Sec. 5		
Landform (hillslope, terrace, etc.): terrace	Local relief (concave, convex, none): depressional		
Slope %: 0-2% Lat: 39.339447N	Long: 86.995847W		Datum: 1983
Soil Map Unit Name: Stonelick fine sandy loam			NWI Classification: None
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in Remarks.)			Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed?	Are "Normal circumstances" present?		Yes ☒ No ☐ (see remarks)
Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic?	(If needed, explain in Remarks.)		

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☐	No	☒	**Is the Sampled Area within a Wetland?** YES ☒ NO ☐
Hydric Soil Present?	Yes	☐	No	☒	
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks:
Site conditions were fairly wet, due to recent rainfall, however, typical for this time of year.

VEGETATION – Use scientific names of plants.

Tree Stratum *plot size:* 30' radius	*Absolute % Cover*	*Dominant Species?*	*Indicator Status?*
1. *Fraxinus pennsylvanicum*	45	Yes	FACW
2. *Acer saccharinum*	18	Yes	FACW
3. *Acer negundo*	5	No	FACW
4.			
5.			
6.			
Total Cover: 68%			
Sapling/Shrub Stratum *plot size:* 30' radius			
1. *Fraxinus pennsylvanicum*	7	Yes	FACW
2. *Acer negundo*	7	Yes	FACW
3.			
4.			
5.			
Total Cover: 14%			
Herb Stratum			
1. *Urtica dioca*	20	Yes	FAC
2. *Elymus riparius*	10	No	FACW
3. *Aster simplex*	30	Yes	FACW
4. *Allaria petiolata*	2	No	FACW
5.			
6.			
7.			
8.			
9.			
Total Cover: 62%			
Woody Vine Stratum *plot size:* 30' radius			
1.			
2.			
3.			
Total Cover:			

Dominance Test Worksheet:		
Number of Dominant Species That Are OBL, FACW, or FAC:	6	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:		
Total % Cover of:		*Multiply by:*
OBL species		X1=
FACW species		X2=
FAC species		X3=
FACU species		X4=
UPL species		X5=
Column Totals:	*(A)*	*(B)*
Prevalence Index = B/A =		

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤ 3.0
- ☐ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation (Explain)

Hydrophytic Vegetation Present? YES ☒ NO ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Existing PFO.

SOIL Sampling Point: E1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (in.)	Matrix		Redox Features					
	Color (moist)	%	Color (moist)	%	Type	Loc	Texture	Remarks
0-6	10 YR 4/3	80					SaLm	
6-10	10 YR 4/2	75	10 YR 5/4	5	C	M	SiLm	
10-16	10 YR 5/2	70	10 YR 5/6	15	C	M	SiLm	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				**Indicators for Problematic Hydric Soils:**	
	Histosol (A1)		Sandy Gleyed Matrix (S4)		Coast Prairie Redox (A16)
	Histic Epipedon (A2)		Sandy Redox (S5)		Iron-Manganese Masses (F12)
	Black Histic (A3)		Stripped Matrix (S6)		Other (Explain in Remarks)
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)	Indicators of hydrophytic vegetation and wetland hydrology must be present.	
	Stratified Layers (A5)		Loamy Gleyed Matrix (F2)		
	2 cm Muck (A10)	X	Depleted Matrix (F3)		
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		
	5 cm Mucky Peat or Peat (S3)				

Restrictive Layer (if observed):	**Hydric Soil Present?**	☒ **YES** ☐ **NO**
Type:		
Depth (in.):		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)				**Secondary Indicators** (minimum of two required)	
X	Surface Water (A1)		Water-Stained Leaves (B9)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Fauna (B13)		Drainage Patterns (B10)
X	Saturation (A3)		True Aquatic Plants (B14)		Dry-Season Water Table (C2)
X	Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Crayfish Burrows (C8)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)	X	FAC-Neutral Test (D5)
	Iron Deposits (B5)		Thin Muck Surface (C7)		
	Inundation Visible on Aerial Imagery (B7)		Gauge or Well Data (D9)		
	Sparsely Vegetated Concave Surface (B8)		Other (Explain in Remarks)		

Field Observations:

Surface Water Present?	Yes	X	No		Depth (in.):	+6	**Wetland Hydrology Present?**
Water Table Present?	Yes	X	No		Depth (in.):	0	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (in.):	0	☒ **YES** ☐ **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

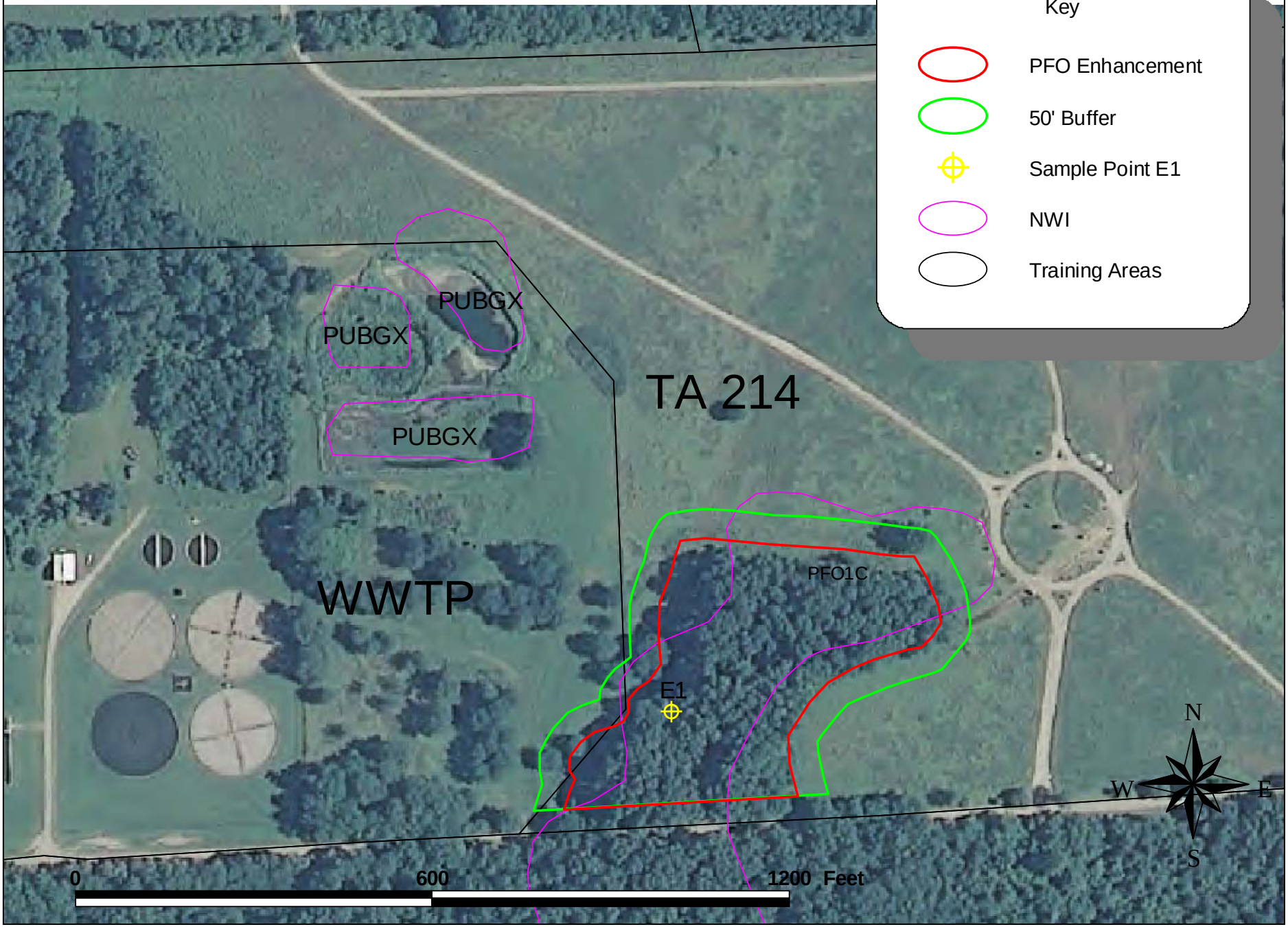
Depressional area seasonally saturated/inundated.

Sample Point E1 Photos

Existing PFO wetland at Sample Point E1

Hydric soil indicators at Sample Point E1

Wetland Enhancement Area



AquaTerra

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Randy@aquaterracons.net

Mr. Laban Lindley
US Army Corps of Engineers
9799 Billings Road
Indianapolis, IN 46216-1055

Jul 17, 2009

Re: MPMG Range- CAJMTC
Alternatives Analysis
ID#: LRL-2009-349-LCL

Dear Mr. Lindley:

Attached is the *Alternatives Analysis* which was prepared to demonstrate compliance with the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

This *Alternatives Analysis* is submitted as supplemental information to the previously submitted application on behalf of the Indiana Army National Guard requesting Section 404 authorization for the proposed development of a Multi-Purpose Machine-Gun Range on the Camp Atterbury Joint Maneuver Training Center.

This *Alternatives Analysis* has been consistently developed with the *Environmental Assessment for Construction and Operation of the Multi-Purpose Machine Gun Range*[1].

Please let me know if you require additional information or have any questions at this time.

Sincerely,

Randy Jones
AquaTerra Consulting, Inc.

Attachment- Alternatives Analysis

[1] AMEC Earth & Environmental, Inc. "*Environmental Assessment for Construction and Operation of a Multi-Purpose Machine Gun (MPMG) Range at Camp Atterbury Joint Maneuver Training Center*" DRAFT- July 2009.

Alternatives Analysis

Section 404 Individual Permit Application
Indiana Army National Guard
Camp Atterbury Joint Maneuver Training Center
Multi-Purpose Machine Gun Range
ID#: LRL-2009-349-LCL

1.0 INTRODUCTION

The Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material, at 40 CFR Part 230, indicate that:

> "except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."

In order to demonstrate compliance with the 404(b)(1) Guidelines, an Alternatives Analysis must be prepared to evaluate all practicable alternatives to the proposed discharge site. Accordingly, this document will evaluate the practicability of available and unavailable alternatives, including: 1) No-Action Alternative, 2) Alternative Methods/Designs, 3) Other Sites. This Alternatives Analysis has been prepared consistent with the *Environmental Assessment for Construction and Operation of the Multi-Purpose Machine Gun Range*[2].

According to 40 CFR part 230.3(q), the term "practicable" means *available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose*.

2.0 PROPOSED ACTION

The Proposed Action includes construction and operation of a 10-lane Multi-Purpose Machine Gun (MPMG) Range at the Camp Atterbury Joint Maneuver Training Center (CAJMTC) in Bartholomew County, Indiana to meet the Indiana Army National Guard's (INARNG) training requirements. The MPMG Range would include: Stationary Infantry Targets (SITs), moving infantry target emplacements, stationary armor targets, and 10 firing lanes with targets ranging from 100 meters (330 feet) to 800 meters (2,625 feet). Land development activities would include land clearing, road improvements, general site improvements, and extending utilities to serve the project areas, notably the Range Operations Control Area (ROCA) facilities and target locations.

3.0 PURPOSE & NEED

The purpose of the Proposed Action is to provide the INARNG and other CAJMTC users with adequate, doctrinally correct, throughput capability for two classes of light machinegun, M-249 and M-240b. The proposed MPMG Range would provide marksmanship training for units training at the

[2] AMEC Earth & Environmental, Inc. "*Environmental Assessment for Construction and Operation of a Multi-Purpose Machine Gun (MPMG) Range at Camp Atterbury Joint Maneuver Training Center*" DRAFT- July 2009.

CAJMTC, and allow them to attain Standards in Training Commission (STRAC) pre-mobilization readiness requirements.

The Proposed Action is needed to ensure the INARNG provides complete training facilities for its units, ensure attainment and maintenance of a full readiness posture, and meet mission training objectives with sufficient land area as defined in TC 25-1[3]. CAJMTC currently has a five-lane MPMG Range for light machinegun qualification training. In February 2003, CAJMTC was designated as a Power Generation Platform (PGP) to support OPERATION NOBLE EAGLE/ENDURING FREEDOM//IRAQI FREEDOM. This range was at 87 percent capacity prior to the CAJMTC PGP mission, which has significantly increased range requirements. As a result of this increased need for light machinegun qualification, the INARNG and other users of CAJMTC are not able to adequately meet their basic marksmanship training.

4.0 SCREENING CRITERIA

The INARNG applied the following criteria to screen and evaluate possible alternatives for the proposed MPMG Range. The INARNG identified a "practicable" alternative as one that would meet the majority, if not all, of the following criteria:

1) Be located within an existing INARNG facility, preferably on property owned by the INARNG
2) Avoid excessive travel times and cost for INARNG units to be trained
3) Be within reasonable distance to populated areas in adjacent states to facilitate regional usage
4) Retain all standard Surface Danger Zones (SDZs) within the installation's boundaries
5) Achieve a shared impact area with the existing range SDZs to the extent possible
6) Be proximate to existing, related facilities, including the roadway network, and buildings (i.e., logistical considerations)
7) Have reasonable access to electric and telephone utilities
8) Be within a sufficient distance from population centers to limit off-Post noise and dust concerns
9) Be within areas with few existing known environmental constraints, notably wetlands and streams
10) Have a sufficient amount of relatively level land, preferably previously disturbed or cleared
11) Be compatible with other current and approved future uses on site
12) Ensure no net loss in the capacity of the installation to support the military mission
13) Comply with existing laws, regulations, Executive Orders (Eos), and Army policy

[3] Department of the Army, *Training Circular 25-1*, Training Land.

5.0 NO-ACTION ALTERNATIVE

5.1 Discussion

Under this alternative, the Proposed Action would not be implemented and would result in no adverse impact to the aquatic ecosystem, including the existing un-named tributaries and their adjacent wetlands.

Current installation operations would continue and throughput requirements would not be met. Under the No-Action Alternative, INARNG units would not have sufficient facilities to meet the increased need for light machinegun qualification. As a result, the INARNG and other users of CAJMTC would not be able to meet their basic marksmanship training. This alternative would limit the capability of the INARNG to carry out its assigned mission to provide adequate training facilities, and would not meet the purpose of or need for the Proposed Action.

6.0 ALTERNATIVE METHODS/DESIGNS

(On-Site Avoidance & Minimization of Impacts to Aquatic Resources)

6.1 Standard MPMG Range Design

The standard MPMG Range design per TC 25-8[4] was examined, but eliminated, because the INARNG was unable to configure it to avoid the large quantities of wetland and stream impacts within the proposed MPMG Range location. The standard 10-lane MPMG Range is comprised of four 1,500-meter (4,920 feet) lanes and six 1,000-meter (3,280 feet) lanes. It was determined the purpose of and need for the Proposed Action could still be met if the MPMG Range design was modified to include 10 lanes extending only 800 meters.

6.2 Avoidance/Minimization

Every attempt to avoid & minimize impacts to existing aquatic resources was considered and pursued under the resulting modified design, including:

- Relocation and re-design of the original site to the north to avoid potential impacts to over 32 acres of wetlands identified in the area.
- Reduction of the original range footprint.
- Intensive site design to limit wetland/stream fill and clearing to that which is absolutely essential to provide for range functionality and meet INARNG purpose and need.

Specific changes made following 60% original range design include:

- Moved entire range 150 feet easterly toward Mauxferry Road and rotated it to reduce the environmental impact on wetlands. The rotation of the range essentially moved the 800 meter target line about 1,000' to the north.
- Eliminated the 900 meter and 1000 meter targets to reduce the overall size of the range.
- Reduced the number of targets from 124 to 80 consisting of 10 double Stationary Infantry Targets (SIT's) and 70 single SIT's.
- Reduced the different kinds of targets to just single and double SIT's.
- Eliminated the latrine and covered mess shelter.

[4] Department of the Army, *Training Circular 25-8*, Training Ranges.

- Moved the location of some of the targets and trails to reduce the environmental impact on the wetlands and water courses.
- The earthwork required to achieve line-of-sight to each target was greatly optimized and significantly reduced.
- Tree clearing techniques in wetlands and along stream channels were limited to cut/removal, rather than mechanized stump removal, to minimize disturbance to existing soil profiles.

6.3 Reduced Scale Alternative

A reduced-scale alternative was also evaluated for practicability under on-site methods and design. However, modifying the MPMG Range design further would result in failure to meet the INARNG's specified training requirements. For this reason, a reduced-scale alternative was determined to be not-practicable, and was not further considered. The reduced-scale alternative does not meet Screening Criteria #11, as outlined in Section 4.0.

6.4 Conclusion

No other practicable on-site alternatives to the proposed method/design exist, as they would result in greater adverse impacts to the aquatic ecosystem and/or result in failure to meet INARNG purpose and need.

7.0 OTHER SITES

7.1 Use of Other Existing INARNG Training Sites

Through application of the site screening criteria and subsequent analysis described in Section 4.0, the INARNG determined no other suitable location within the State of Indiana is currently available to satisfy the purpose of and need for this Proposed Action. The INARNG has two large training sites: Muscatatuck Urban Train Training Center (MUTC) and CAJMTC. The 935-acre MUTC does not meet Screening Criteria #4, #5, and #8-12 as outlined in Section 4.0. The majority of MUTC training land is either developed or unable to be developed (i.e., comprised of old Muscatatuck State Developmental Center campus area and the Brush Creek Reservoir).

The INARNG determined the CAJMTC was the only facility within the state that could provide sufficient land for the required range footprint, SDZs, infrastructure, and other support requirements needed for this type of training.

7.2 Construction of New Training Site/Un-Available Sites

This alternative requires the acquisition of new property currently unavailable for INARNG use for the development of a new training facility. This alternative was examined and eliminated, because the Department of Defense (DoD) is eliminating and/or consolidating many installations throughout the U.S. as a primary component of Base Realignment and Closure.

Overall, it was determined sufficient existing DoD property is not available within the DoD Real Property inventory to accommodate additional ranges without acquiring additional real property. The INARNG determined, in accordance with DoD directives and vision, acquiring new property and establishing a new training site was not practicable. In addition, because CAJMTC is used by all INARNG units, traveling to a different location for machinegun qualification training would add to various units' travel time and cost. This alternative does not meet Screening Criteria #1 and #2, as outlined in Section 4.

7.3 Alternate Location for MPMG Range at CAJMTC

Through application of the site screening criteria in Section 4.0, the INARNG determined the Proposed Action location was the only practicable site for the MPMG Range within the CAJMTC. As a result of the rigorous siting analysis that the INARNG undertook in 2007/2008, it was determined the Impact Area[5] was the best location at CAJMTC to sufficiently meet Screening Criteria #4-7, #11 and #12, as outlined in Section 4.0.

The INARNG examined three locations within the CAJMTC Impact Area, which were eliminated due to various on-site constraints.

- The proposed MPMG Range was initially sited in the north-west portion of the Impact Area. However, this site was eliminated because of conflicts with other ranges and ANG use. This alternative was not further considered because it was determined to not be logistically practicable and failed to meet INARNG Screening Criteria #11 and #12 of Section 4.0.

- The second location, situated along Mauxferry Road slightly north of the Proposed Action location, was eliminated because of the topography of the site. It was determined sufficient funding was unavailable to design and construct the MPMG Range within this location.

- The third site was also situated along Mauxferry Road, but slightly south of the Proposed Action location. As a result of the jurisdictional wetland delineation in 2008, this location was eliminated from further consideration because approximately 35 acres of wetland and 5,400 linear feet of stream were identified within this location (AMEC, 2008). Development of this site would lead to greater adverse impacts to aquatic ecosystems.

7.4 Conclusion

No other practicable site alternatives to the Proposed Action site exist, as they would result in adverse logistical situations, greater costs, or greater adverse impacts to the aquatic ecosystem.

8.0 CONCLUSION

Based on the evaluation of the Screening Criteria outlined in Section 4.0 against available and un-available alternatives, there does not appear to be a practicable alternative to the Proposed Action site that would result in less adverse impacts to aquatic resources.

[5] **Definition:** (DOD) An area having designated boundaries within the limits of which all ordnance will detonate or impact.

MPMG Wetland Challenge

Decision Brief

LTC Steve Hines
5 May 2009

PURPOSE

To gain decision on where to create a 16+ Acre wetland on CAJMTC.

PROBLEM

The most suitable site to construct a much needed MPMG Range at CAJMTC, negatively impacts portions of an existing wetland and IDEM/USACE (FEDERAL LAW), requires construction of a new wetland as offset, generally anywhere from a 2:1 to 4:1 ratio in acreage.

RECOMMENDATION

Recommendation: Construct a new wetland in Training Area 101, just south of the POW Chapel and adjacent to the Nineveh Creek, of approximately 16 Acres.

PRIOR COORDINATION

Prior Coordination:

- **Informed senior leadership of the challenge resulting from the construction of the MPMG; JFHQ-IN, NGB-ARI, NGB-ART and NGB-ARE.**
- **Conducted several consults with USACE to determine and fully understand the ruling and permitting process**
- **Conducted several consults with IDEM to determine and fully understand their role as it relates to our actions and USACE's role to gain permits**
- **Conducted consults with the A&E of record for the MPMG; changed range location twice to reduce impact on wetlands, final impact estimated to be roughly 8 acres**
- **Dialogued and began working with USFW and DNR to support range development; tree clearing, bat habitat, etc…**
- **Dialogued with JFHQ-IN-CA-DPTM to gain their concurrence on environmental findings and determine potential sites for Offset**
- **Contracted with a third designer to develop a mitigation plan= development plan of the offset area to create wetlands**

Unsolicited Stakeholders:

- **None**

OUTLINE/AGENDA

- BACKGROUND
  - FACTS
  - ASSUMPTIONS
  - DISCUSSION
- COURSES OF ACTION (COAs)
- SCREENING CRITERIA APPLICATION
- SURVIVING COAs
- EVALUATION CRITERIA
- ANALYSIS OF COAs
- COMPARISON OF COAs
- CONCLUSION
- RECOMMENDATION

BACKGROUND

FACTS:

• CAJMTC requires increase in MPMG range capacity IOT support; mobilization training, PMTs and INNG IDTs/ATs

•Several areas were looked at for construction of the new MPMG to mitigate; SDZs conflicts, Environ Impact, Cost, etc…Oct-Feb 08

•Best site for range was determined and later adjusted to further minimize environmental impact, Feb 09

•Design is currently 75% and is expected to be at 100% by 1Aug09, concurrently EA requirements are being executed that foster wetland mitigation, tree harvest/clearing, and bat habitat

•Wetland data was collected including; proximity to stream channel, proximity to National Wetland Inventory, Soil make-up, topography, hydrology and current and potential land use

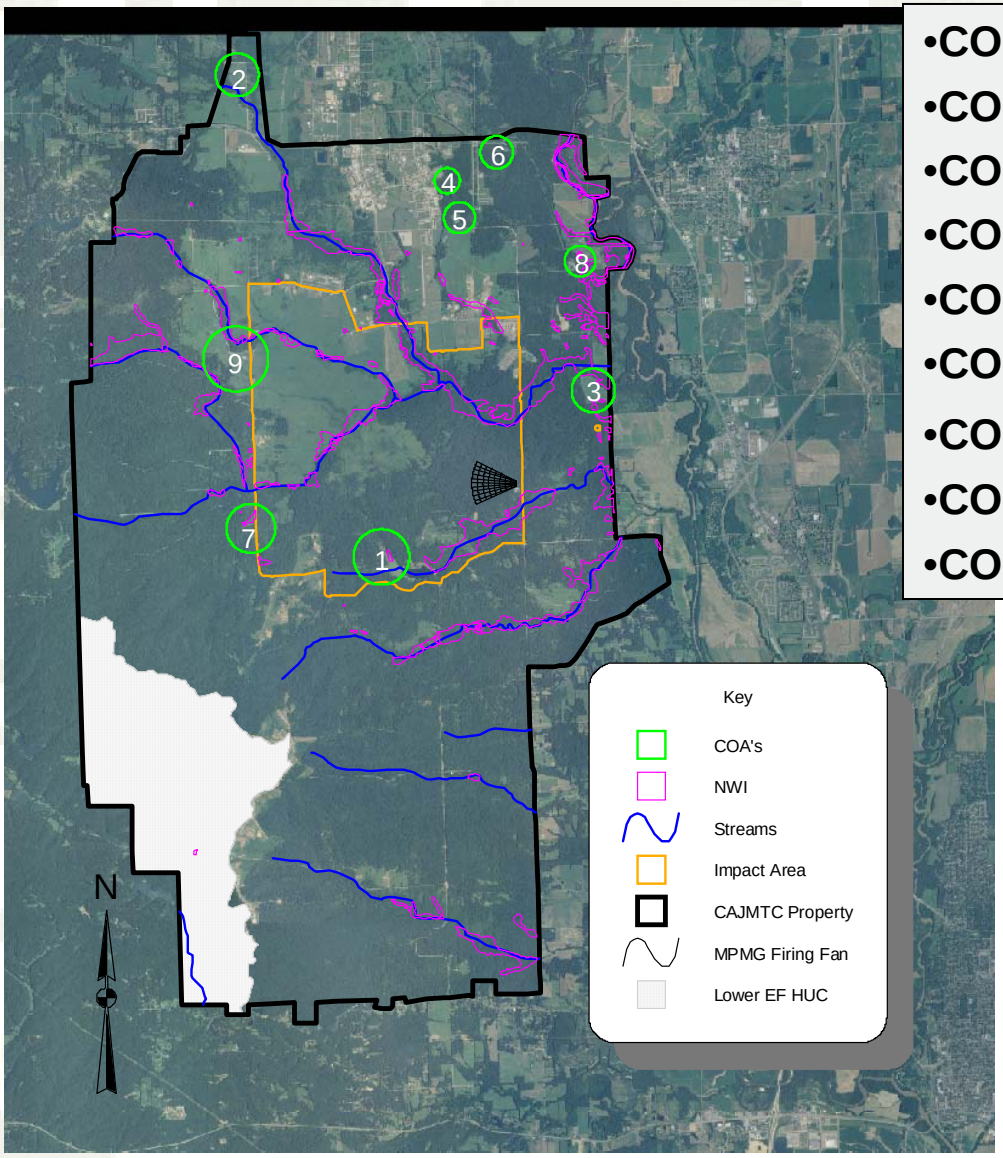
•Field observations were made for each of the COAs to confirm data or further provide information

BACKGROUND

ASSUMPTIONS:

- **Selected site will be constructed and a Deed Restriction will be executed that will severely limit future use of the selected site.**
- **Off-Site mitigation is not an option due to cost ($40,000 to 75,000 per acre) and decision making complexity of involving another entity (Johnson County Parks, INDR)**
- **Construction costs will be driven by site characteristics such as (topography) excavation cost, cost of hydrological controls**

COURSES OF ACTION (COA'S)

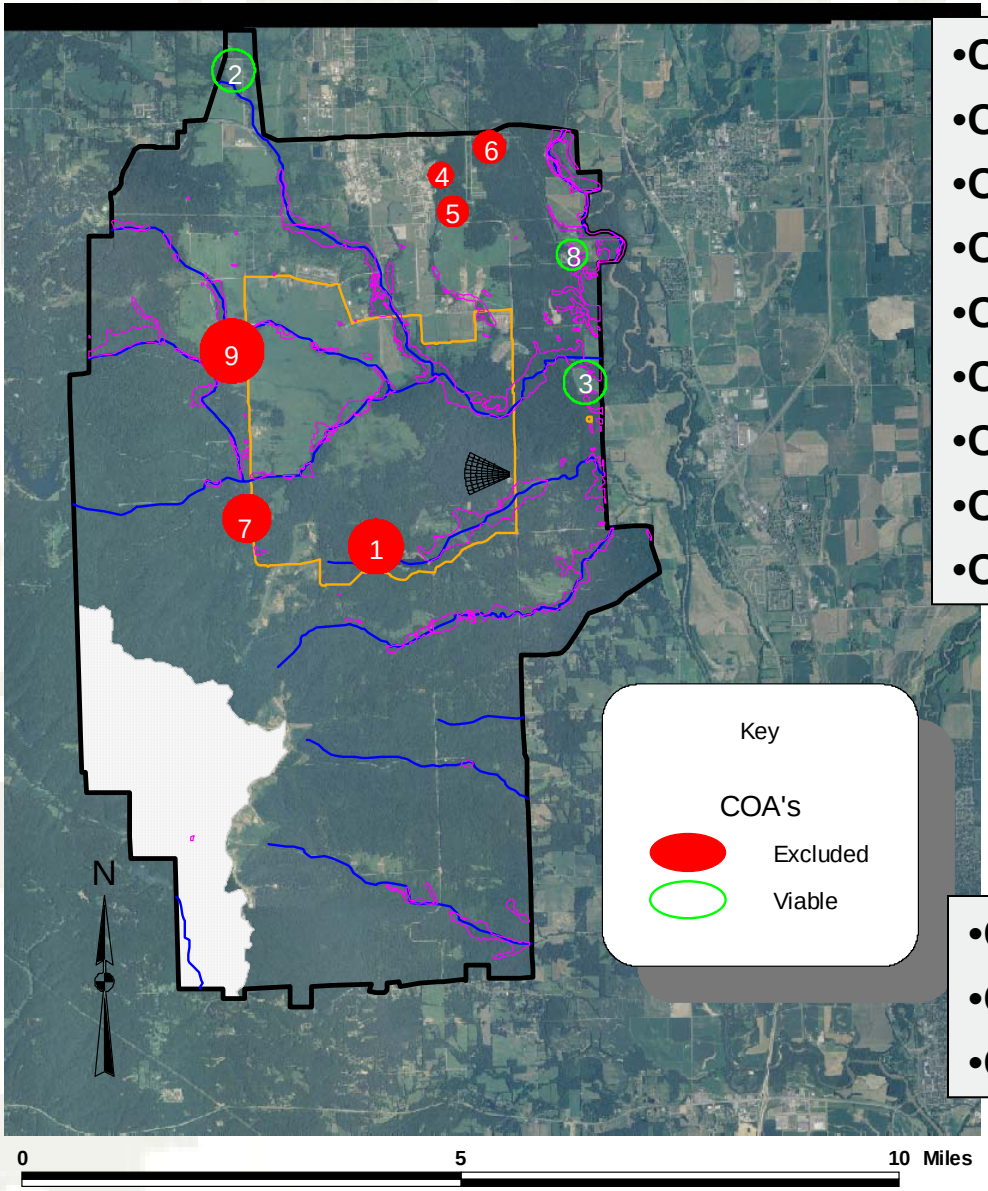


- COA 1, Impact Area SE, vic Puff Lake
- COA 2, Tng Area 101, vic POW Chapel
- COA 3, Tng Area 303, vic FP 301
- COA 4, ASP Buffer, vic Camp Ground
- COA 5, ASP Buffer, vic Tng Area 201
- COA 6, ASP Buffer, vic Cabins
- COA 7, Impact Area SW, vic Tng Area 603
- COA 8, Tng Area 214, vic Sewage Trt Plant
- COA 9, Tng Area 702, vic Punch Bowl

SCREENING CRITERIA

1. **Site must be within same water shed**
2. **Site cannot already be considered a wetland**
3. **Site must be at least 16 to 20 Acres**
4. **Site must contain at least suitable soils (hydric to floodplain soils)**
5. **Site must have less than 10% tree coverage (low quality existing habitat)**
6. **Site must be within 50m of stream channel and/or provide adequate outlet for water level control**
7. **Site must be accessible for both construction and routine maintenance**
8. **Construction and Maintenance of site cannot impact training ranges**

RESULTS OF SCREENING CRITERIA APPLICATION



- COA 1, (6,7,2)
- COA 2, Tng Area 101, vic POW Chapel
- COA 3, Tng Area 303, vic FP 301
- COA 4, (3, 5)
- COA 5, (3, 5)
- COA 6, (3, 5)
- COA 7, (5, 2, 8)
- COA 8, Tng Area 214, vic Sewage Trt Plant
- COA 9, (2, 8)

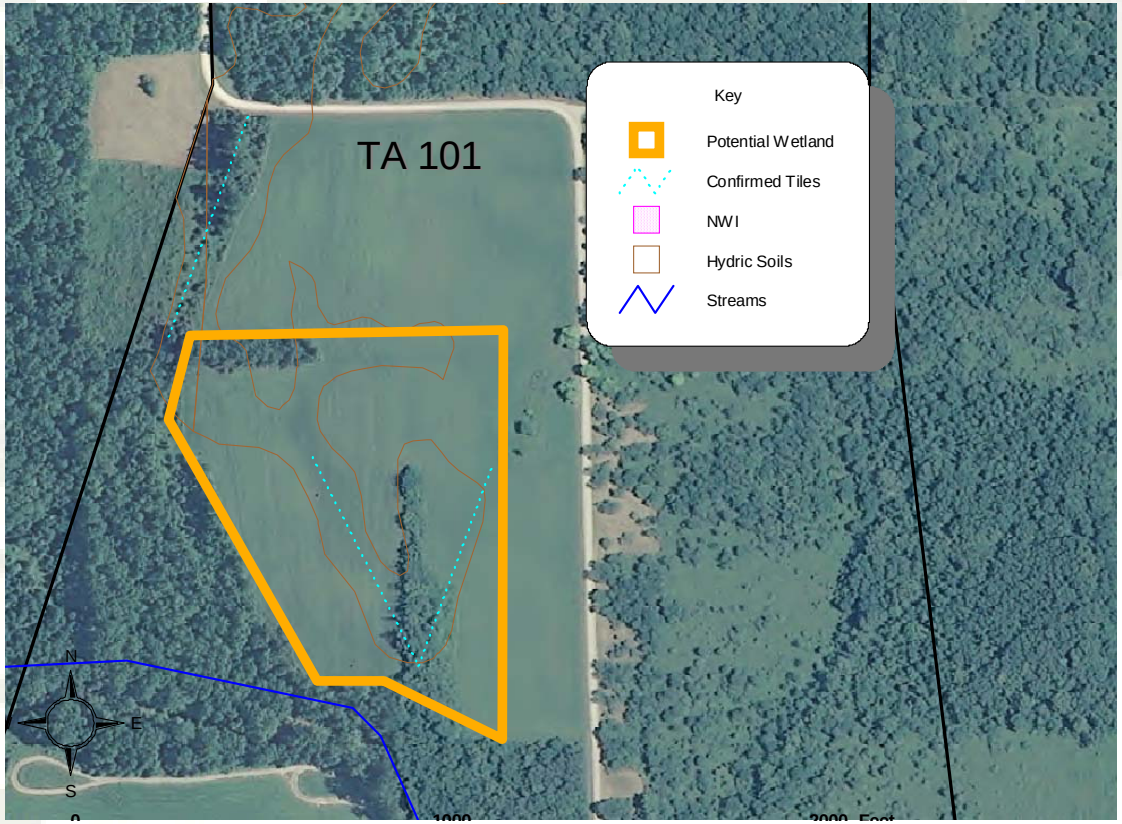
SURVIVING COAs

- COA 2, Tng Area 101, vic POW Chapel
- COA 3, Tng Area 303, vic FP 301
- COA 8, Tng Area 214, vic Sewage Trt Plant

EVALUATION CRITERIA

1. **Compatible Use (Successful future wetland) = Site has soil most likely to produce long term success, hydric soils to flood plain, measured in percentage of hydric soils compared to suitable soils; hydric and poorly drained soils are better; 1, 2, 3**
2. **Future Expansion=Site is greater than 20 Acres, measured in acres adjacent land, rank by acreage; 1, 2, 3**
3. **Training Value=Site is not a range or heavily used training area, rank training days, 1, 2, 3 (less days is better)**
4. **Construction Cost=Rank sites inversely by cost, 1, 2, 3; cheaper is better**

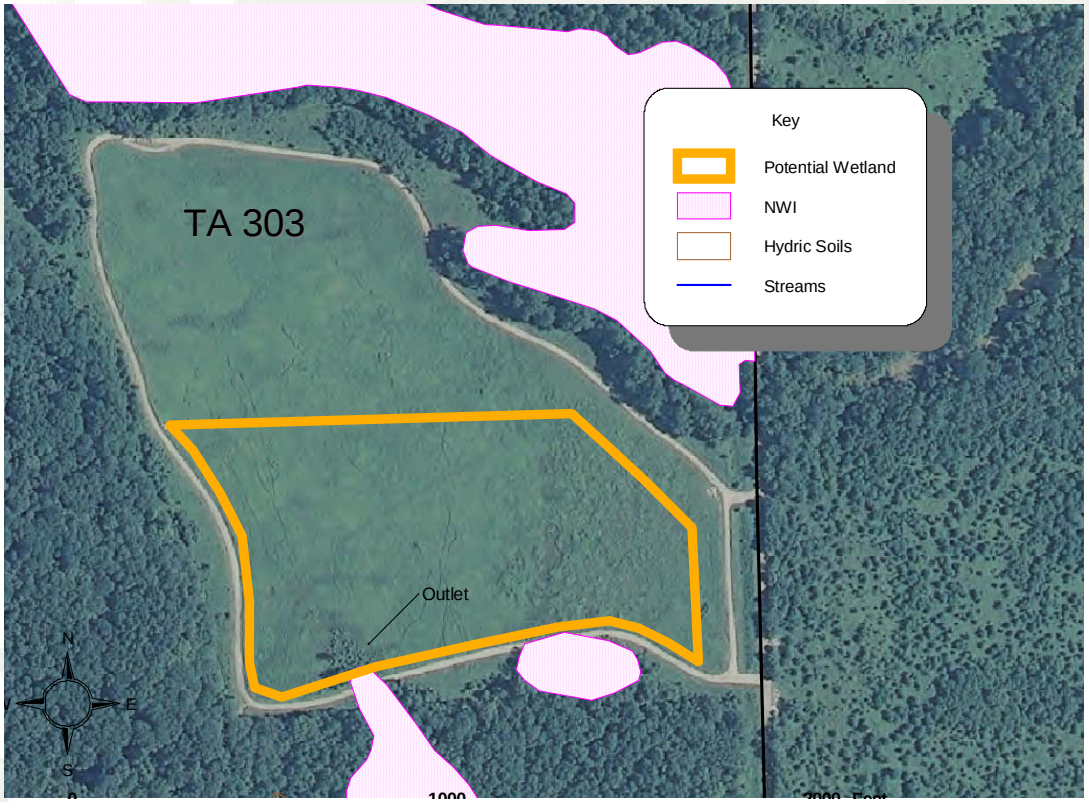
COA 2, EVALUATION CRITERIA ANALYSIS



- ✓23% hydric soils with 76% some what poorly drained soils - indicate likelihood of success
- ✓30 acres open field- expandable
- ✓Confirmed tile outlets (hydrology present)
- ✓Potential for on-site stream mitigation
- ✓No floodplain permit
- ✓On site soil storage during construction
- ✓Within 20 meter of Nineveh Creek
- ✓Outlet available

- COA 2, Tng Area 101, vic POW Chapel
  - Compatible Use= 23% hydric soils, poorly drained, 76% somewhat poorly drained soils
  - Future Expansion= 14 acres contiguous without trees
  - Training Value= 3 Training Days
  - Constr Cost= $250k

COA 3, EVALUATION CRITERIA ANALYSIS



- ✓Flood Plain soil (suitable soil) – indicate likelihood of success
- ✓Adjacent to NWI areas - indicate likelihood of success
- ✓34 acres open field- expandable
- ✓Within 100m of Nineveh Creek
- ✓Outlet available
- ✓Located w/in 100 yr floodplain

- •COA 3, Tng Area 303, vic FP 301
  - •Compatible Use= 0% hydric soil and 100% floodplain soils, well drained
  - •Future Expansion= 18 acres contiguous without trees
  - •Training Value= 33 Training Days
  - •Constr Cost= $265k

COA 8, EVALUATION CRITERIA ANALYSIS

- ✓Floodplain soil (suitable soil)- indicate likelihood of success
- ✓Adjacent to NWI areas - indicate likelihood of success
- ✓42 acres open field- expandable
- ✓Expansion limited by existing wetlands, wood-lines, access requirements, & WWTP infrastructure
- ✓Within 150m of Driftwood River
- ✓Located w/in 100 yr floodplain

- **COA 8, Tng Area 214, vic Sewage Trt Plant**
  - **Compatible Use= 0% hydric soils and 100% floodplain soils, well drained**
  - **Future Expansion= 26 acres contiguous without trees**
  - **Training Value= 90 Training Days**
  - **Constr Cost= $600k**

ANALYSIS OF COAs

1. **Compatible Use=Site soil to produce success, hydric soils, poorly drained, to flood plain soils well drained, measured in percentage; 1, 2, 3 (higher % hydric better, poorly drained better): 1,2 ,3**
   - **COA 2= 99% hydric, soils, or some what poorly drained = 1**
   - **COA 3= 100% flood plain soils, poorly drained = 2**
   - **COA 8= 100% flood plain soils, well drained = 2**
2. **Future Expansion=Site is greater than 20 Acres, measured in useable acres adjacent land, rank by acreage; 1, 2, 3**
   - **COA 2= 30acres= 2**
   - **COA 3= 34acres= 1**
   - **COA 8= 26acres= 3**
3. **Training Value=Site is not a range or heavily used training area, rank training days, 1, 2, 3 (less days is better)**
   - **COA 2= 3 days= 1**
   - **COA 3= 33 days= 2**
   - **COA 8= 90 days= 3**
4. **Construction Cost=Rank sites inversely by cost, 1, 2, 3; (cheaper is better)**
   - **COA 2= $225k= 1**
   - **COA 3= $265k= 2**
   - **COA 8= $600k= 3**

COMPARISON OF COAs

Criteria / COAs	Compatible Use x 3 Rank	Score	Expansion x 2 Rank	Score	Tng Value x 4 Rank	Score	Constr Cost x 1 Rank	Score	**Total**	**Rank**
COA #2, Tng Area 101	1	**3**	2	**4**	1	**4**	1	**1**	12	**1**
COA #3, Tng Area 303	2	**6**	1	**2**	2	**8**	2	**2**	18	**2**
COA #8, Tng Area 214	2	**6**	3	**6**	3	**12**	3	**3**	27	**3**

CONCLUSION

Going into this process, goal was to utilize land that is not used for training; ASP Buffer Zone, land near tng area 210, and we found that those sites are not conducive at all to new wetland development.

Ultimately the results indicate that courses of action two is superior to the others, additionally the following is observed;

COA 2 has growth capacity and ultimately would be easier to maintain and secure

RECOMMENDATION

COA 2 is recommended due to:

- **Least training conflict**
- **Most likely to be successful wetland**
- **Expansion potential**
- **Least costs**
- **Ease of access, maintenance and security**

APPENDIX E

MPMG RANGE TIMBER HARVEST SCHEDULE AND DETAILED INFORMATION BY STAND

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Proposed Timber Harvest Schedule for the MPMG Range

Based on inventory data for the construction site we estimate 1,310 snags 6" DBH and greater with a rough estimate of 52,072 Board Feet (BF) based on the Doyle log rule. Based on this information and data collected to represent snags in the 4" DBH size class we estimate 1.5-2 weeks to clear snags.

Based on the cruise data collected using the variable radius plot method an estimated 75% of the sale volume is made up of Yellow Poplar. Of the remaining timber, 5.87% is composed of species "…identified as having relatively high value as potential Indiana bat maternity roost trees" in the February 14, 2008 revision of the "BFO Forest Management Guidelines for informal Section 7 Consultations on Indiana Bats (*Myotis sodalis*) within the state of Indiana" These species include:

- White Ash
- Green Ash
- Bitternut Hickory
- Northern Red Oak
- Shagbark Hickory
- Silver Maple
- Sugar Maple
- White Oak
- Elm *spp.*

This 5.87% represents 48,254 BF. This volume of high value timber could be reasonably expected to be removed in 4-5 days or one 5 day work week. Using this information the most favorable habitat could reasonably be removed in three weeks.

From here we estimate the remaining 94.13% of the timber from schedule B represents 772,988 BF, which could reasonably be removed in 77 days or 15.5 weeks (assuming a 5 day work week).

Harvest timeline is as follows:

15 Dec 2009	Assume BO issuance
1 Feb 2010	Assume FNSI issuance for EA

Advertise timber sale for 10 days as an emergency salvage harvest:

11 Feb 2010	Award contract
18 Feb 2010	Commence harvest
11 Mar 2010	Complete Harvest of all preferable roost trees (snags and preferred spp)
30 June 2010	Complete harvest of remaining timber.

***The proposed schedule is designed to minimize effects to the Indiana bat.

***All estimates are based on a harvest rate of 10,000 BF/day which is considered to be fairly conservative, but may be warranted due to the complexity of the sale. This is a reduction from the 12,000 BF/day assumed in prior timeline estimates.

***These estimates do not take into consideration down time resulting from inoperable weather conditions or equipment failure. These types of delays are common, but can not be estimated as to where in the timeline they may occur.

***Logging slash will remain on site and is to be wind-rowed to facilitate burning of the slash as site prep work continues. Dates for the burning of stumps and logging slash to continue the construction of the range are negotiable.

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CA-ENV (200-1) 16 June 2009

MEMORANDUM THRU Military Department of Indiana, The Adjutant General's Office,
ATTN: MDI-FE, Facilities Management Officer (acting), LTC Steven R. Hines, ING-JFHQ 2002 South Holt Road, Indianapolis, IN 46241-0326

FOR Army National Guard Readiness Center, Environmental Programs Directorate
(ATTN: NGB-ARE-C Ms. Lisa Greenfeld), 111 S. George Mason Dr., Arlington, VA 22204-1382

SUBJECT: **Timber Availability for Emergency Salvage and Disposal** at Camp Atterbury, Edinburgh, Indiana 46124-1096

1. This timber availability is an emergency salvage harvest for the construction of a multi-purpose machinegun range within the Impact Area (IA).

2. The following stands are of mixed hardwoods which encompass an estimated 96 acres. A total of approximately 821,242 bdft (Doyle Log Rule) have been marked for harvest, in accordance with AR 200-1, effective 27 December 2007, and the 2007–2011 INRMP with associated EA and FONSI. A summary of the areas follows:

Compartment IA, Stand 1 (23 acres marked in BLUE Paint)

Species	# Trees	Volume	% Volume	Estimated Proceeds
American Beech	60	8,401	3.9%	$924.11
Ash Spp.	55	8,185	3.8%	$900.35
Bigtooth Aspen	12	2,264	1.0%	$249.04
Bitternut Hickory	14	2,928	1.3%	$322.08
Black Cherry	3	732	0.3%	$80.52
Blackgum	15	2,735	1.3%	$300.85
Black Oak	52	21,305	9.8%	$2,343.55
Elm Spp.	9	479	0.2%	$52.69
Northern Red Oak	44	12,130	5.6%	$1,334.3
Pignut Hickory	5	966	0.4%	$106.26
Red Maple	8	2,029	0.9%	$223.19
Sassafras	23	2,855	1.3%	$314.05
Shagbark Hickory	18	1,931	0.9%	$212.41
Silver Maple	4	624	0.3%	$68.64
Sugar Maple	37	5,040	2.3%	$554.4
Yellow-poplar	529	144,994	66.6%	$15,949.34
Total	**888**	**217,600**	**100.0%**	**$23,936.00**

CA-ENV (200-1)
SUBJECT: **Timber Availability for Emergency Salvage and Disposal** at Camp Atterbury, Edinburgh, Indiana 46124-1096

Compartment IA, Stand 2 (46 acres marked in BLUE Paint)

Species	# Trees	Volume	% Volume	Estimated Proceeds
American Sycamore	13	1,403	0.3%	$154.33
Ash Spp.	31	3,629	0.8%	$399.19
Bigtooth Aspen	13	1,739	0.4%	$191.29
Black Cherry	43	5,147	1.1%	$566.17
Blackgum	27	2,593	0.5%	$285.23
Black Oak	307	57,554	12.1%	$6,330.94
Eastern Red Cedar	8	416	0.1%	$45.76
Northern Red Oak	25	657	0.1%	$72.27
Pignut Hickory	29	2,465	0.5%	$271.15
Red Maple	13	1,538	0.3%	$169.18
Sassafras	16	1,035	0.2%	$113.85
Silver Maple	29	3,328	0.7%	$366.08
Sugar Maple	22	888	0.2%	$97.68
White Oak	19	5,152	1.1%	$566.72
Yellow-poplar	1,625	387,031	81.6%	$42,573.41
	0			
Total	**2,219**	**474,577**	**100.0%**	**$52,203.47**

Compartment IA, Stand 3 (18 acres marked in BLUE Paint)

Species	# Trees	Volume	% Volume	Estimated Proceeds
Blackgum	10	940	1.7%	$103.4
Black Oak	35	1,585	2.8%	$174.35
Eastern Red Cedar	10	504	0.9%	$55.44
Sugar Maple	10	732	1.3%	$80.52
Sweetgum	78	5,937	10.6%	$653.07
Yellow-poplar	248	46,501	82.7%	$5,115.11
Total	**389**	**56,200**	**100.0%**	**$6,182.00**

Compartment IA, Stand 4 (9 acres marked in BLUE Paint)

Species	# Trees	Volume	% Volume	Estimated Proceeds
Ash Spp.	5	685	0.9%	$75.35
Blackgum	6	476	0.7%	$52.36
Black Oak	7	4,088	5.6%	$449.68
Eastern Red Cedar	3	630	0.9%	$69.3
Northern Red Oak	4	538	0.7%	$59.18
Pignut Hickory	7	1,550	2.1%	$170.5
Pin Oak	56	13,894	19.1%	$1,528.34
Red Maple	14	684	0.9%	$75.24
Silver Maple	8	1,328	1.8%	$146.08
Sweetgum	16	4,889	6.7%	$537.79
Yellow-poplar	230	44,103	60.5%	$4,851.33
Total	**356**	**72,865**	**100.0%**	**$8,015.15**