

Final Report

Revised January 23, 2006



Supplemental Training Program for Controlling Erosion and Sediment at Construction Sites in Kentucky

Grant #: C9994861-00 (FY 2000 Reobligation Funds #00-25) NPS Section 319(h) Project

Submitted by Tetra Tech (Tt Project # 15643)

January 1, 2005 – June 30, 2005

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Acknowledgements

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Cover Photo

Attendees at a project workshop discuss erosion and sediment control BMPs needed at a site pictured in the group exercise handouts. Workshops were sponsored by the KY Division of Conservation, Division of Water, UK Extension Service, Sanitation District # 1 (Northern KY), and the cities of Cynthiana, Madisonville, Winchester, Campbellsville, and Frankfort.

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Executive Summary

This project consisted of two primary components:

- Conducting at least three (3) workshops on erosion and sediment control at construction sites
- Reprinting and distributing 2,000 ESC Field Guides and Technical Manuals

The project actually conducted six (6) workshops – for a total of 237 attendees – and reprinted and distributed 2,000 ESC Field Guides. The Technical Manual, which was completed with support from this project, is being posted on the KY DOW and KY DOC web sites pending final publication. This 150 page document contains technical information on best management practices for controlling sediment and other polluted runoff from construction sites. It is designed for planners, engineers, and others involved in providing design and other technical services, and is intended to serve as a primary reference statewide. Workshops conducted under this project consisted of three initially, but expanded to six due to cost savings in the original project, additional funds provided by an amendment to the project, and the high demand for workshops among cities and towns across the state.

The project has been successful in nearly all aspects: the Field Guide has been widely recognized as one of the best such guidance documents in the country, and has been featured by Stormwater magazine and lauded by organizations including several states, federal agencies – including the US EPA Office of Water, and private sector organizations, such as the Kentucky Waterways Alliance, the Upper Chattahoochee Riverkeeper, and a variety of BMP vendors and suppliers.

The workshops have likewise been well received and successful. A total of six workshops were conducted under this project, double the number originally promised. The workshop format piloted during the 2002-2004 project – 3.5 hours of classroom instruction in the morning, followed by 2-3 hours of field trip observation in the afternoon – proved to be a good, workable approach for teaching the basics of sediment runoff controls. Finally, the Technical Manual which is being finalized under this project promises to be a great asset for developers, engineers, ESC plan preparers, and other technicians. This document was produced and reviewed but not circulated, due to the longer than expected review process and the lack of funding for reproduction.

Introduction and Background

This project was conceived in 2004, when Tetra Tech partnered with the Kentucky Division of Conservation and Division of Water to conduct two dozen workshops on the control of sediment, and other polluted runoff from construction sites in Kentucky. At the time, Kentucky was far behind surrounding states regarding construction site BMP selection, installation, maintenance, and compliance assistance/assurance. A new ESC Field Guide and Technical Manual were developed, published, and distributed by Tetra Tech as part of a KY DOW Nonpoint Source 319 project during 2002-2004, but demand for the ESC Field Guide and workshops had overwhelmed staffs the KY Division of Conservation, Division of Water, and Tetra Tech. The initial printing of 5,000 ESC Field Guides was depleted within a few months after publication in 2004; demand, however, was increasing.

In order to capitalize on the momentum created by the 2002-2004 erosion and sediment control training project, Tetra Tech requested funding from the KY Division of Conservation and Division of Water to continue the training program. Both agencies coordinated with Tetra Tech in reviewing Tetra Tech's

request for FY 2000 reobligated 319 funds. After consultation, funding application preparation, and review by state and federal agencies, the proposed project was approved in early January, 2005. Tetra Tech immediately began contacting cities, towns, and other potential sponsors who had inquired about hosting a workshop with the news that additional funding had been received. As a result, six workshops were scheduled during the first half of 2005, an additional 2,000 ESC Field Guides were published and scheduled for distribution at the workshops and through other venues, and further review of the Technical Manual – which was developed in draft form under the 2002-2004 project – continued.

This project responded to the need for erosion and sediment control training for construction site personnel, a need which the 2002-2005 project addressed in part. Problems with contaminated construction site runoff in the state are widespread and well-known. Control of sediment and erosion at construction sites has been generally under local jurisdiction, but few cities and counties have had the regulatory or educational infrastructure to develop comprehensive programs to address the issue. Urbanized areas in the state and construction sites of more than one acre in size are now required to develop and implement water quality programs under federal and state storm water control regulations. However, past experience has shown that technology transfer to the thousands of affected parties in Kentucky's 120 counties has been slow due to the lack of adequate resources to conduct training statewide. In addition, the proliferation of small homebuilders – those constructing one or two homes per year on small (i.e., <1 acre) lots – has meant that the regulatory program would not be addressing perhaps thousands of home building sites across the state.

Information and feedback collected from the workshops conducted during 2002-2004 led to discussions among state agency staff, Tetra Tech staff, and other parties regarding the need for additional workshops and ESC Field Guides for construction site personnel. Tetra Tech applied for and received support under this project to continue the very successful 2002-2004 training program. Support for the Section 319 contract was supplemented by in-kind contributions (i.e., cash, materials, time) from a wide variety of project supporters, including erosion and sediment control BMP vendors and suppliers, the University of Kentucky Transportation Center, the Kentucky Transportation Cabinet, several cities and towns, and other interested parties.

The project has been successful in nearly all aspects: the Field Guide has been widely recognized as one of the best such guidance documents in the country, and has been featured by Stormwater magazine and lauded by organizations including several states, federal agencies – including the US EPA Office of Water, and private sector organizations, such as the Kentucky Waterways Alliance, the Upper Chattahoochee Riverkeeper, and a variety of BMP vendors and suppliers.

The workshops have likewise been well received and successful. A total of six workshops were conducted under this project, double the number originally promised. The workshop format piloted during the 2002-2004 project – 3.5 hours of classroom instruction in the morning, followed by 2-3 hours of field trip observation in the afternoon – proved to be a good, workable approach for teaching the basics of sediment runoff controls. Finally, the Technical Manual which is being finalized under this project promises to be a great asset for developers, engineers, ESC plan preparers, and other technicians. This document was produced and reviewed but not circulated, due to the longer than expected review process and the lack of funding for reproduction.

Materials and Methods

This project was designed to address the need for construction industry training resources by reprinting and distributing training products, holding training workshops, and improving overall awareness and knowledge of sediment and erosion problems and potential solutions. The development of sediment and erosion control training resources complemented a larger statewide effort to reduce pollutant loadings into surface waters of Kentucky.

According to the *Kentucky Report to Congress on Water Quality*, siltation has been the second leading cause of impairment to rivers and streams in the state. Suspended solids, also attributable in part to construction site runoff, has been cited as the third leading cause of lake impairments. Nutrient loading, which can be caused or worsened by construction site runoff, was cited as the third leading cause of river and stream impairment and the second leading cause of lake impairment.

Training products distributed under this project included the 100 page color and laminated ESC Field Guide, targeted at job site supervisors and construction personnel. This document, which was produced under the 2002-2004 training project, features overview planning and other information, detailed graphics, installation practices, and operation/maintenance tasks. The Technical Manual targets design engineers and developers, and contains design specifications and other technical information needed to select and site runoff controls at construction sites. Both guidance documents contain BMP summary and technical information, graphics, and basic tips on controlling sediment, preventing erosion, protecting riparian areas, staging/phasing construction activities, and preserving existing vegetation where possible.

Table 1: Costs for Printing Field Guides (From Post Printing in Lexington)

We are pleased to confirm our quotation to you as follows:

Description: **Field Guide**
 Size/Pages : **4 x 9, 100 pages, self-cover**
 Composition: **Exact reprint**
 Paper : **65# Lynx Cover throughout**
 Inks : **4-color process**
 Bleeds : **Pages 1 & 100 only**
 Fold/Bind : **Laminate all pages 2 sides, spiral bind on 9" side using**
 Fold/Bind : **black coil**
 Packaging : **Bulk in cartons**
 FOB : **Lexington**
 Estimator : **bg**

| <u>Quantity</u> | <u>Price</u> |
|-----------------|--------------|
| 3,000 | \$16,788.00 |
| 4,000 | \$21,001.00 |
| 5,000 | \$25,207.00 |

This quote does not include desktop publishing time on customer furnished files. Files that need intervention will incur additional charges.

Workshops delivered under this project included six training workshops based on the revised sediment and erosion control BMP guidance documents cited above and approaches endorsed by the Center for

Watershed Protection and other technical centers. Training workshop scheduling and delivery were coordinated with project partners and included a section on planning and staging of activities and detailed information on BMP selection, application, installation, and operation/maintenance information.

Local field trip hosts were recruited to lead observational outings during the afternoon, and discuss unique regional conditions and issues, including local planning, zoning, and regulatory issues. Slides used during the workshops were developed under the 2002-2004 project, and featured more than one hundred photographs of excellent, good, and poor applications of erosion/sediment best management practices. These photographs, which were supplied by the Kentucky Transportation Cabinet, the Upper Chattahoochee Riverkeeper, Tetra Tech, and project staff, proved to be an extremely valuable teaching tool.

Training products included the revised PowerPoint presentations containing graphics and slides used in the training workshops, case studies, handouts, and lists of contacts/resources. Primary partners engaged in co-hosting the local training workshops included county soil and water conservation offices, county extension offices, local/regional planning and/or area development district offices, local units of state colleges and technical schools, and professional associations for industry representatives and public agency officials. Copies of the Field Guide, the Technical Manual, and a disk containing all the slides used in the workshops are appended to this Final Report. The tables which follow provide information on scheduling activities for each workshop and details regarding each of the workshops.

Table 2: Activity schedule for each workshop.

| Activity | Responsible party | Notes |
|--|---------------------------------------|---|
| Select workshop site and select the date | Project manager | Work with KY DOC and DOW to determine regional needs. 3 months prior to workshop. |
| Solicit local host/sponsor | Project manager | Contact local soil and water conservation offices, universities. 2 months prior to workshop. |
| Identify target audience | Project manager, local host/sponsor | Target audience will determine workshop focus, i.e., developers, site superintendents, equipment operators, construction workers. 2 months prior to workshop. |
| Develop and distribute promotional materials | Project manager, local host/sponsor | A mailed brochure, an e-mailed notice, and a newspaper notice will be developed and distributed for each workshop. 2 months prior to workshop. |
| Register prospective attendees | Project manager or local host/sponsor | Maximum attendees at each workshop will be 60-70, depending on facility. 0-2 months prior to workshop. |
| Conduct workshop | Project manager, speakers | See proposed agenda. |
| Evaluate workshops | Project staff, project manager | Evaluations consisted of consultation with workshop attendees and sponsors |

Table 3: Workshops Conducted During January 1 – June 30, 2005 With Matching Information

| Workshop Details | Match Source | Actual or Estimated Match |
|--|---------------------|----------------------------------|
| Northern KY Workshop: March 15th | | |
| Planning time (advertising, logistics, etc.) | Sponsor in-kind | 25 hrs x \$25/hr = \$625 |
| Projector, screen, power strip, cords, etc. | Estimated cost | Estimated cost = \$125 |
| Meeting room space, support donations, etc | Estimated cost | Estimated cost = \$200 |
| Attendee time/travel for 73 attendees | Travel, session | 73 x 6 hrs x \$25/hr = \$10,950 |
| Workshop total | | \$11,900 |
| Cynthiana Workshop: March 23rd | | |
| Planning time (advertising, logistics, etc.) | Sponsor in-kind | 15 hrs x \$25/hr = \$375 |
| Projector, screen, power strip, cords, etc. | Estimated cost | Estimated cost = \$75 |
| Meeting room space, support donations, etc | Estimated cost | Estimated cost = \$100 |
| Attendee time/travel for 30 attendees | Travel, session | 30 x 6 hrs x \$25/hr = \$4,500 |
| Workshop total | | \$5,050 |
| Winchester Workshop: April 8th | | |
| Planning time (advertising, logistics, etc.) | Sponsor in-kind | 6 hrs x \$25/hr = \$150 |
| Projector, screen, power strip, cords, etc. | Estimated cost | Estimated cost = \$75 |
| Meeting room space, support donations, etc | Estimated cost | Estimated cost = \$100 |
| Attendee time/travel for 21 attendees | Travel, session | 21 x 6 hrs x \$25/hr = \$3,150 |
| Workshop total | | \$3,475 |
| Madisonville Workshop: April 26th | | |
| Planning time (advertising, logistics, etc.) | Actual cost | 23.5 hours = \$584 |
| Projector, screen, power strip, cords, etc. | Estimated cost | Estimated cost = \$75 |
| Meeting room space, support donations, etc | Actual cost | Actual cost = \$491 |
| Attendee time/travel for 43 attendees | Travel, session | 43 x 6 hrs x \$25/hr = \$4,500 |
| Workshop total | | \$5,650 |
| Frankfort Workshop: March 2nd | | |
| Planning time (advertising, logistics, etc.) | Actual cost | 10 hrs x \$25/hr = \$250 |
| Projector, screen, power strip, cords, etc. | Actual cost | Estimated cost = \$75 |
| Meeting room space, support donations, etc | Estimated cost | Estimated cost = \$425 |
| Attendee time/travel for 50 attendees | Travel, session | 50 x 6 hrs x \$25/hr = \$7,500 |
| Workshop total | | \$8,250 |
| Campbellsville Workshop: March 2nd | | |
| Planning time (advertising, logistics, etc.) | Sponsor in-kind | 15 hrs x \$25/hr = \$375 |
| Projector, screen, power strip, cords, etc. | Estimated cost | Estimated cost = \$75 |
| Meeting room space, support donations, etc | Estimated cost | Estimated cost = \$100 |
| Attendee time/travel for 20 attendees | Travel, session | 20 x 6 hrs x \$25/hr = \$3,000 |

| | | |
|--|-------------|-----------|
| Workshop total | | \$3,550 |
| Total Matching Support | | \$37,875 |
| Adjustment to Matching Support Total | (Overmatch) | -\$11,261 |
| Total Matching Support for This Period | | \$26,614 |

Results and Discussion

This training project was a continuation of the 2002-2004 *Statewide Training Program for Controlling Erosion and Sedimentation at Construction Sites in Kentucky*. As such, readers of this Final Report are referred to the “Results and Discussion” section of the Final Report for that project, which is summarized below. The discussion below summarizes issues related to the overall project by breaking the effort down into its three primary components – the Field Guide, the Workshop series, and the Technical Manual. By way of introduction, it should be noted that the project was extremely successful overall. Working with the many members of the Technical Committee did create a bit of a lag for producing the documents, but overall their input on the content, “look and feel,” and other elements of the documents proved extremely valuable. Coordinating product reviews with the KY Division of Conservation and Division of Water also tended to involve some time, but we were prepared for that and scheduled adequate review time into our schedule for most major projects and products delivered. Overall, execution of all deliverables went very well.

Field Guide

The Kentucky Erosion Protection and Sediment Control Field Guide evolved from a three-ring binder, black and white publication concept into a full color, 4” x 9” laminated booklet due to a variety of factors. Tetra Tech reviewed more than 16 state and local erosion and sediment control field guides during the early stages of the project. In general, the primary audience for the Field Guide were construction laborers, equipment operators, job site supervisors, and others responsible for daily placement, installation, and maintenance of erosion and sediment controls. Convening target audience members, regulators, and a technical advisory committee who supported the project led to several conclusions that significantly altered the final format of the Field Guide. These conclusions were:

- Some existing field guides are “too engineering” — the BMP drawings are too technical, the information is too detailed, and the text is too dense for field personnel to understand.
- In many cases, erosion and sediment control guidance documents assume that field personnel know where BMPs should be placed. Little guidance is found that presents a conceptual overview of where things go on the ground. For example, silt fences should be installed below bare soil areas; concentrated flows should be intercepted where possible; and small sediment traps can be installed on a temporary basis where needed.
- Pictures of good and bad BMP installations are preferred over drawings, tables, and text.
- Simple color drawings of basic concepts and practices are easier to understand than detailed technical information presented via table and text.

- Regulatory and compliance information is typically full of detail, complex text, caveats, and jargon. Such information should be simplified, summarized, and moved back to the appendices, not placed in the front of the document.
- The final document should fit into a pocket, be waterproof, and be easy to browse for specific information.

A fold-up laminated field guide produced by the Upper Chattahoochee Riverkeeper program (<http://www.chattahoochee.org>) to support an innovative citizen-volunteer monitoring program for construction site ESC compliance provided a good model for the “look and feel” preferences expressed by review committee members, developers, and construction workers. The guide contains summary information on ESC and presents three color photographs of each of the 10 most widely used BMPs, labeled as grade A, C, or F. When project staff from Tetra Tech passed sample field guides around to target audience members and other stakeholders, the Riverkeeper guide always stirred the most interest despite (or partly because of) its brevity and very basic approach.

The information collected from technical committee members and the target audience provided a good working framework for producing the *Field Guide*. A decision was made to present the various topics via an “uphill-to-downhill” format, to provide a site-based, topographic flow to which BMPs go where on the job. The distinction between “erosion protection” and “sediment control,” which generates involved discussion in a number of guidance documents, was omitted to avoid confusion over semantics. Chapters on preconstruction planning (such as preserving existing vegetation, fitting the project to the site, and identifying existing and future drainage) and construction phase operations (such as installing controls before earth disturbance, project phasing, construction entrances, and dewatering) were added to the front of the document. Appendices include basic state and local National Pollutant Discharge Elimination System (NPDES) requirements, Clean Water Act Section 404 and 401 provisions, floodplain regulations, and additional details for state transportation projects. The last two appendices are a field BMP site checklist and inspection report form similar to the one used by state NPDES inspectors.

In summary, the stakeholder process was extremely useful in defining what the target audience wanted in terms of a useful, effective Field Guide. Having the target audience review existing guides and identify what elements they liked and did not like helped the Tetra Tech staff focus on what kind of guide was needed. For example, reviewers liked the smaller, spiral-bound and laminated format of the Colorado Department of Transportation’s Field Guide, and the color photographs in the Upper Chattahoochee Riverkeeper’s volunteer monitor pamphlet. They did not like the engineering-style drawings and technical text of many field manuals they reviewed, or the large and somewhat clumsy format of an 8.5” x 11” three-ring binder document. Using a full color, laminated format greatly increased the cost, but the cash contributed by the partner organizations helped to defray the full production cost and made the preferred format possible. Final publication costs were just over \$5 per printed copy.

Workshop Series

The educational framework, basic approach, and graphics (photos and drawings) used in the *Field Guide* were field-tested before final production during a series of workshops across Kentucky. The timing of the workshops — late 2003 to mid 2004 — provided a huge boost to workshop attendance due to the increasing focus on construction site runoff by towns and cities in Kentucky. Earlier workshops conducted in 2001 and 2002 were attended by 25 to 40 people. However, as information on the new construction site focus on erosion and sediment controls was circulated, attendance at the workshops skyrocketed. Participation topped 100 and more in some locations across Kentucky, as hosts from local Phase II cities sought to bring local contractors up to speed on BMPs. Workshop sponsors included

public and private organizations in Henderson, Bowling Green, Lexington, Louisville, Florence, Winchester, Prestonsburg, and Somerset, and ranged from city public works agencies to the Kentucky Waterways Alliance, a statewide citizens advocacy group for water quality. The Kentucky Transportation Cabinet requested a round of special workshops for contractors and agency staff involved in the “Grading Level II” certification program. These workshops provided regional training for smaller groups of people and focused on ways to apply BMPs to highway projects and specific provisions adopted by the state transportation agency (for example, inspections required after 0.1 inch of rain, rather than 0.5 inch).

The workshops featured 3.5 hours of classroom training in the morning — with lots of photo slides on BMP installations — and a 2-hour field trip to an active construction site identified by local hosts during the afternoon. Workshop sponsors at some locations provided refreshments and even catered lunches: Watching equipment operators and construction site workers in worn jeans and scuffed boots sitting in a carpeted meeting room and eating fine pastries and hot meals from china plates on cotton tablecloths during a PowerPoint presentation was one of the more gratifying experiences of the entire project.

Bringing in contractors to help plan, sponsor, and deliver training and outreach products was been a big plus for the workshops and project overall. ESC product vendors were invited to set up displays of their wares during the workshops, which helped attendees sort through the various blankets, mats, and other products. Vendors were also instrumental in letting attendees know they were not alone – construction site runoff was a priority in surrounding states, not just Kentucky. The information exchange between vendors and contractors was valuable in assuring Kentucky firms that everyone else in the nation is “in the same boat” regarding ESC requirements, and that poor past practice regarding BMP selection and placement should give way to a more informed and aggressive approach.

Challenges regarding the workshop series were few, but some issues bear noting. Part of the project match requirement involved finding local hosts that would provide a training site, a field trip location, audio/visual equipment (e.g., projector and large screen, microphone for larger groups), and support for registration, drinks and snacks (coffee and pastries were found to be indispensable aids in keeping contractors happy), and reproduction for handouts and materials. Some local hosts had very limited staff, and providing the needed support was difficult for them. Also, finding appropriate field trip sites was also challenging. We requested an active construction site with variable topography (i.e., at least some slopes), bare soil areas, and a willing owner/developer to host the field trips.

Some local contractors were very nervous about letting the class view practices at their sites. Others, however, welcomed the group as “free consultants” who could discuss what they saw and make recommendations. One thing we found was that it did not matter whether or not the site had good BMPs or not – in fact, sites that were lacking in proper practices provided excellent field trip locations, because attendees could witness first-hand the impacts of erosion, sediment loss, and downstream impacts.

Another adjustment in the workshop series should also be noted. Early in the project, Tetra Tech provided three staff members to cover the various topics, to prevent audience burn-out from listening to the same speaker for 3.5 hours. This approach proved to be very costly, however. After the first six workshops, Tetra Tech elected to send one staff member to each workshop to deliver the presentations. The burnout factor was ameliorated by taking two short breaks during the morning classroom sessions, having the local public works staff deliver short presentations on local issues during the workshop, and adding a group exercise. The exercise consisted of dividing the attendees into groups of 3-5 people, and giving each small group a large (i.e., 17” x 11”) color photograph of selected aspects of a construction site. Each photograph depicted several BMPs – or lack thereof. The groups were asked to comment on the practices they saw (or didn’t see) in each photograph, and make notes of their observations. At the end of the exercise, the photographs were projected onto the screen via PowerPoint slides, and a member

of each small group reported their findings. This activity proved to be very popular with attendees, because it gave them a chance to make observations, discuss their findings among themselves, and tell the larger group how they judged each aspect in the photograph. During the exercises group members were observed thumbing through their Field Guides to refresh their memories on the material covered earlier in the workshop, which helped familiarize attendees with the topics and their order in the Field Guide.

Technical Manual

Production of the Technical Manual proved to be the most challenging component of the project. Tetra Tech used the 1994 *Kentucky Best Management Practices for Construction Activities* document as the starting point for the new Technical Manual. This manual was based on older state manuals and other information that, in some cases, did not reflect the availability of new products, approaches, and practices developed over the past 11 years. In addition, the old guide did not contain much in the way of graphics, drawings, and other visual aids to help users navigate BMP selection, installation, and maintenance.

Using the 1994 manual, Tetra Tech developed a new Technical Manual that reflected current approaches and practices. This process was very laborious: we consulted a number of federal, state, and local publications to check out technical content, design and installation specifications, and new material that was not included in the 1994 manual. As a result of this somewhat lengthy process, the Technical Manual produced by the project was completed in June 2005, but not fully reviewed and formatted for publication. A copy of the draft Technical Manual is included with this report. Tetra Tech has completed work on the review and final format, and has submitted a print-ready copy of the manual and PDF files for posting on the Tetra Tech and KY DOW and KY DOC websites. All project partners are working a process for printing several hundred copies of the final manual later in 2006.

Summary

The ESC Field Guide reprinted and distributed under this project was the same as the one produced under the 2002-2004 project, with no changes. The decision to forego editing of that document was based on the overwhelmingly positive reception received from users of that document, the cost of editing, the additional layout and print costs for revising the publication files, and the lack of any significant (or even minor) suggestions for improving the 2002-2004 ESC Field Guide. The format of the workshops and approach for scheduling workshops – requiring local hosts to handle most logistical and other duties – was also unchanged from the 2002-2004 approach, due to similar success. The slides used in the workshops, however, were revised somewhat, due to the availability of more and better photographs of certain erosion and sediment control best management practices, such as construction period controls for sediment pond outlet risers, use of blankets and turf mats, and other BMPs. Some minor editing of the slides was executed after each workshop, to incorporate items of interest, tips, and other information derived from workshop hosts, attendees, and other parties during the workshop evaluation discussions.

Due to the sheer amount of information, the technical detail involved, and the amount of time needed to appropriately investigate engineering references and practices, work on the Technical Manual was slow. This part of the project has been more resource-intensive than project staff initially anticipated, resulting in more development and review time than planned for. Tetra Tech used the 1994 *Kentucky Best Management Practices for Construction Activities* document as the starting point for the new Technical Manual during the 2002-2004 project. This manual was based on older state manuals and other information that, in some cases, did not reflect the availability of new products, approaches, and practices developed over the past 11 years. In addition, the old guide did not contain much in the way of graphics, drawings, and other visual aids to help users navigate BMP selection, installation, and maintenance.

Using the 1994 manual, Tetra Tech developed a draft Technical Manual that reflected current approaches and practices. This process was very laborious: we consulted a number of federal, state, and local publications to check out technical content, design and installation specifications, and new material that was not included in the 1994 manual. As a result of this somewhat lengthy process, the Technical Manual produced by the project was completed in June 2005, and was reviewed in late 2005. A copy of the final draft Technical Manual, with comments and edits incorporated, is included with this report. Tetra Tech has provided the electronic files for posting the document on the KY DOW and KY DOC web sites. Project partners will be supporting publication of the manual under a separate project in 2006.

Conclusions

This project addressed a significant need – the lack of training on nonpoint source controls at construction sites – at a fairly comprehensive level, i.e., the development and delivery of six additional workshops, reproduction of 2,000 Field Guides, and production of an updated Technical Manual.

Approximately 237 non-federal personnel were trained at the workshops, plus approximately 34 federal employees (from NRCS, US FWS, USFS, TVA, and USACE). Average attendance at the workshops was about 45 people. As was the case during the 2002-2004 project, workshop attendees were reluctant to travel more than 15 miles to a workshop – most attendees were from the general vicinity of the host town, with few “outsiders.”

Adequate resources were available to reprint the ESC Field Guides and host twice as many workshops as Tetra Tech committed to under the Memorandum of Agreement, with sufficient resources to update the slide presentations as needed. Production of the Technical Manual was more challenging, as previously noted. In retrospect, Tetra Tech should have requested additional funding for producing the Technical Manual, due to the significant level of effort required to research technical information, engage reviewers, and produce the draft document.

In summary, Tetra Tech appreciated the opportunity to develop and execute this project, and hopes that the services rendered and products delivered meet with the approval of the KY Division of Water, KY Division of Conservation, and the other entities and individuals who supported the project through their technical assistance and provision of in-kind services.

Literature Cited

Center for Watershed Protection. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Published for USEPA OWOW and Region V. Ellicott City, MD.

Georgia Soil and Water Conservation Commission. 1997. Field Manual for Erosion and Sediment Control in Georgia. Third Edition. Athens, GA.

Indiana Department of Natural Resources. 1992. Indiana Handbook for Erosion Control in Developing Areas. Division of Soil Conservation, USDA, Purdue University, IASWCD, IDEM, USEPA.

Kentucky Division of Water, Kentucky Division of Conservation. 1994. Kentucky Best Management Practices for Construction Activity. Natural Resources and Environmental Protection Cabinet, Frankfort KY.

Kentucky Division of Water, Kentucky Division of Conservation. Undated. Field Handbook: Erosion and Sediment Control on Construction Sites. Natural Resources and Environmental Protection Cabinet.

Kentucky Division of Water. 1998. Kentucky Report to Congress on Water Quality. Natural Resources and Environmental Protection Cabinet. <http://water.nr.state.ky.us/305b/>.

Tetra Tech. 2004. Kentucky Erosion Protection and Sediment Control Field Guide. Posted at http://www.watershedtraining.net/pdf/esc_guide.pdf.

Tetra Tech. 2005. Kentucky Best Management Practices for Controlling Pollutant Runoff at Construction Sites. Tetra Tech, Fairfax VA.

USDA, 1995. Water Management and Sediment Control for Urbanizing Areas. Soil Conservation Service, Lexington KY.

USEPA. 1994. Developing Successful Runoff Control Programs for Urbanized Areas. Office of Water, EPA 841-K-94-003. Washington, DC.

Appendix A: Financial and Administrative Closeout

Workplan Outputs

The primary outputs for this project workplan were reprinting 2,000 ESC Field Guides, conducting six ESC workshops, and continuing work on the draft Technical Manual. The detailed workplan activities are summarized in the table below:

Project Milestones Summary: All Milestones Achieved; All Project Activities Completed

| Milestone | Projected Begin Date | Projected End Date | Actual Begin Date | Actual End Date |
|--|----------------------|--------------------|-------------------|-----------------|
| 1. Contact all project partners to discuss and coordinate workshops; meet with project partners to review project and mutual needs | 1/1/05 | 1/15/05 | 1/1/05 | 1/1/05 |
| 2. Identify and contact local training workshop co-sponsors; coordinate mutual workshop support; schedule workshops | 1/1/05 | 5/1/05 | 1/1/05 | 3/1/05 |
| 3. Update PowerPoint presentations and other training workshop materials | 1/1/05 | 1/15/05 | 1/1/05 | 3/1/05 |
| 4. Advertise, promote, and convene training workshops at selected locations with designated co-sponsors statewide | 1/1/05 | 10/1/05 | 1/1/05 | 3/1/05 |
| 5. Distribute Field Guides and Technical Manuals to workshop attendees and other interested parties (note: Technical Manual still in draft form) | 1/14/05 | 6/30/06 | 1/14/05 | 6/30/05 |
| 6. Submit all draft materials to the Cabinet for review and approval. | Duration | Duration | Duration | 1/15/05 |
| 7. Submit advanced written notice on all workshops, demonstrations, and/or field days to the Cabinet. | Duration | Duration | Duration | Duration |
| 8. Upon request of the Division of Water, submit Annual Report and/or participate in the Cabinet sponsored biennial NPS Conference. | Duration | Duration | Duration | 6/30/05 |
| 9. Submit three copies of the Final Report and submit three copies of all products produced by this project. | 4/1/06 | 6/30/06 | TBD | 9/30/05 |

Budget Summary

Original Project Budget By Category

| | BMP Implement- ation | Project Management | Public Education | Monitoring | Technical Assistance | Other | Total |
|--------------------|----------------------------|-----------------------|---------------------|------------|-------------------------|-------|--------|
| Personnel | | 2,990 | | | 26,910 | | 29,900 |
| Supplies | | 400 | | | 2,300 | | 2,700 |
| Equipment | | | | | | | |
| Travel | | 300 | | | 2,533 | | 2,833 |
| Contractual | | | | | | | |
| Operating Costs | | 290 | | | 2,610 | | 2,900 |
| Other | | | | | 14,000 | | 14,000 |
| Total | | 3,980 | | | 48,353 | | 52,333 |

Original Project Budget by Funding Source

| Budget Categories | Section 319(h) | Non-Federal Match | Total |
|------------------------|----------------|-------------------|--------|
| Personnel | 12,900 | 17,000 | 29,900 |
| Supplies | 700 | 2,000 | 2,700 |
| Equipment | | | |
| Travel | 900 | 1,933 | 2,833 |
| Contractual | | | |
| Operating Costs | 2,900 | | 2,900 |
| Other (printing costs) | 14,000 | | 14,000 |
| Total (\$) | 31,400 | 20,933 | 52,333 |
| Total (%) | 60 | 40 | 100 |

Actual Project Expenses for January 1, 2005 – June 30, 2005

| Budget Categories | Actual Costs | Non-Federal Match | Final Expenditures |
|-------------------------------|---------------------|--------------------------|---------------------------|
| Personnel | 12,359 | 25,248 | 37,607 |
| Supplies | 0 | 0 | 0 |
| Equipment | 0 | 0 | 0 |
| Travel | 773 | 0 | 773 |
| Contractual | 0 | 0 | 0 |
| Operating Costs | 2,651 | 1,366 | 4,017 |
| Other (Guide Printing) | 9,936 | 0 | 9,936 |
| Total (\$) | 25,719 | 26,614 | 52,333 |

Note: All dollars were spent for this project; there were no excess project funds to reallocate. It should be noted that the budget summary above does not include \$11,261 in overmatch.