

The Capital Improvement Plan Environmental Assessment Process

by Mike Lyday, Senior Environmental Scientist, Environmental Resources Management Division

ABSTRACT

This report outlines the current requirements for Environmental Assessments (EAs) performed for compliance with the City of Austin Land Development Code (LDC) as they are applied in City Capital Improvement Plan (CIP) projects. Much of this information is not currently documented in either the Environmental Criteria Manual (ECM) or other material readily available to Public Works Project Managers. An overview of the Environmental Assessment process is provided along with the goals for CIP assessments, methods for review and completion of assessments, and recommendations for improving the City processes. Attachments to this report include pertinent LDC citations, the form in use for project identification, a suggested process for conducting and reviewing assessments a scope of work for staff or consultants performing assessments, and photographic summaries of critical environmental features to be protected in accordance with the LDC in City as well as private projects. Also, a flowchart of the EA review process and a brief summary of assessments of past projects are included in the attachments. The information is provided as a precursor to the expansion of the current ECM section on Environmental Assessments in Section 1.3.0 and for consideration by the Public Works Department and other Project Managers for early review of environmental impacts, leading to better CIP projects..

INTRODUCTION

The Capital Improvement Plan (CIP) is a program that provides the means of scheduling, coordinating, and funding public facility construction. Projects are funded by revenue bonds or general obligation bonds. Revenue bonds are financed through revenues generated by the service offered such as the airport, or the electric, water, wastewater, and drainage utilities. General obligation bonds are financed by tax dollars distributed to various City departments including Public Works, Parks, Library, and General Government.



The Watershed Protection and Development Review Department's (WPDR) Environmental Resource Management Division (ERM) serves a role in the CIP process by reviewing the concept of a project and determining whether an environmental assessment (EA) is required during the planning phase of the project. Environmental assessments are triggered by the City's Land Development Code (LDC) for projects that occur in sensitive areas such as the Edwards Aquifer Recharge Zone, near waterways, or on steep slopes (see Attachment 1, LDC, Section 25-8-121). EAs may also be required for other State and Federal permits, including a U.S. Army Corps of Engineers 404 permit (Clean Water Act), a U.S. Fish and Wildlife 10a permit (Endangered Species Act), an Environmental Protection Agency NPDES permit for stormwater discharges, a Texas Commission on Environmental Quality Edwards Aquifer Protection Program Water Pollution Abatement Plan, or a Texas Historical Commission Antiquities Code permit. These regulations have specific requirements for compliant EAs, and the appropriate state or federal guidance should be consulted for each.

Ideally, ERM makes a determination whether or not an EA is required by reviewing an Environmental Data Sheet (EDS) submitted to ERM for each new project by the sponsoring department (see Attachment 2, EDS form). Due dates for submittal of all budget-related worksheets, including the EDS, are set by the Budget Office during the budget planning process (early spring of each year). A completed EDS, with the EA status determined, should be completed by ERM and submitted to the Budget Office before a project can be added to the Capital Plan. Therefore, before a project's completed budget package is sent to the Budget Office by the sponsoring department, a copy of the reviewed and signed EDS form is in theory returned to the sponsoring department to inform the project manager if an EA is required. This gives the project manager the opportunity to budget for the services required to complete an EA. In addition, potential mitigation costs caused by the construction of the project can also be budgeted for at this time. For example, tree replacement, cave protection, or ecological restoration may be needed to mitigate impacts to environmentally sensitive areas. However, this process depends on submittal of an EDS by CIP project managers to ERM.

All CIP projects are listed in the Budget Office's Plan Document. The **Environmental Review Status** is shown in the upper right-hand corner of each project's plan page. If the status is "**EA Not Required**", no further review of this project is needed by ERM. However, some of these projects may still require an environmental permit through the Environmental Review and Inspection Division (ERI), WPDR. If the status is "**EA Required**", the project manager can consult with ERM staff during the early planning stages to determine the scope of the EA for a particular project. The scope may include recommendations from ERM for alternative analyses (see Attachment 3, Suggested Process and Scope for City of Austin Environmental Assessments).

GOALS

The goal of an EA is to avoid losses of important natural resources or degradation of water quality resulting from the construction of a Capital Improvement Project. If impacts to environmental resources and water quality cannot be avoided, then alternatives should be considered to minimize these impacts. Finally, unavoidable losses of important resources should be mitigated or compensated for. A good EA should not only identify important natural

resources in the project area but also analyze feasible alternatives to avoid impacting these resources or it should suggest methods to mitigate impacts or compensate for losses.

The LDC requires an assessment for proposed development in the following sensitive areas:

- over or draining to a karst aquifer (the Northern and Southern Edwards Aquifer)
- in a floodplain, critical water quality zone (CWQZ), or water quality transition zone (WQTZ)
- on a tract with a gradient of more than 15 % (steep slopes)

Resources in these areas to be identified and protected or restored include the following:

- critical environmental features (CEFs) such as caves, sinkholes, significant recharge fractures, springs, rimrocks, bluffs, and wetlands (see Attachments 4a, b, c, and d)
- environmentally sensitive areas such as priority riparian and upland woodlands, remnant prairies, and the natural character and integrity of hillsides and streamways (see Attachments 5 and 6)
- trees over eight inches in diameter and native plant buffers around CEFs and stream courses
- endangered species, locally rare fauna and flora, and other species of concern

METHODS

Besides the Budget Office's requirement for a completed and reviewed EDS, two other documents help ensure compliance by reminding the CIP project manager to complete the EDS: (1) The Department of Public Works and Transportation Procedures Manual for Project Managers, and (2) The City of Austin Sustainable Building Guidelines. In addition, training by ERM and Environmental Review and Inspection (ERI) staff on the CIP Environmental Assessment process is available to staff of all City departments.

Attachment 7 shows a flowchart that begins with the EDS and ends with support for the CIP project by Watershed Protection Department (ERM and ERI) staff. Intermediate steps include assistance to the project manager by environmental staff with the EA scope, alternatives, and mitigation measures. After the environmental assessment is completed, ERM reviews the EA and provides comments and recommendations to the project manager and ERI reviewer/permittee as to the preferred alternative, recommended resource restoration, or suggested compensation for unavoidable natural resource losses. If these recommendations are not feasible from a budgetary standpoint, the project can be referred to the Environmental Board for its consideration, which may begin the process of acquiring additional funds to complete the project in the most environmentally sensitive manner.

Reviews by ERM are most effective in the early planning stages to ensure that projects are designed and constructed in the most environmentally sensitive manner. Furthermore, environmental review by ERM staff during the early planning stage is necessary so that engineering plans are not drafted for projects where variances are required but not supported during the permitting phase with ERI. Variances may not meet the "findings of fact" for code compliance if options exist to avoid the variance. If environmental recommendations are made by ERM early, before engineering design is complete, these pitfalls can be minimized, and permitting should be facilitated without redesign. If no option exists to avoid a necessary

variance, ERM staff may support the variance if appropriate mitigation or compensation is included in the project plan.

RECOMMENDATIONS

Currently, EDS forms are not always completed soon enough for ERM to return the forms in time for the CIP project managers to modify their budgets to include the environmental assessment or potential mitigation costs, such as tree replacement. The forms should be sent to ERM early enough for consideration in the budget of the project (months before a department's CIP coordinator sends the final costs into the Budget Office). Currently, the forms are returned to the project managers about the same time project managers are submitting their completed budget package.

Many projects submitted to the Budget Office are combined into one plan page. For instance, most Water and Wastewater projects are submitted as a package like "1985 Wastewater Improvements Prop. 13" or "1982 Water Improvements Prop. 7". ERM is simply listing the environmental status for these packages as "EA Required" since it is likely that some of these projects will trigger an EA. However, ERM has also held meetings with the CIP coordinator of the W&WW Department to review the list of individual projects included in each of these packages.

Another collaboration between the W&WW Department and ERM has been the Austin Clean Water Program (ACWP). The ACWP teams W&WW, ERM review staff, ERI review staff, and consulting firms during the planning stages for projects and allows for administrative variances and expedited reviews and permits. This type of collaboration needs to be formalized with other departments and scheduled at the beginning of the budget process (early spring), so that a list can be provided to the department, informing project managers which individual projects actually require an EA.

At this time a single City rotation list is not funded for environmental consulting firms whose services could be employed expediently without going through the bidding process. In practice there are several rotation lists sponsored by different departments, with firms that range widely in expertise in this area. ERM recommends that a single rotation list be developed by an interdepartmental committee and managed by ERM to provide the services needed to City departments for efficient and timely completion of environmental assessments. Direction and training can also be provided to these firms through ERM to regulate the quality and scope of the EA for various CIP projects.

ERM should conduct an annual workshop for all departments' CIP project managers. This workshop should cover details of the EA process, including examples of sensitive environmental resources, COA environmental permitting requirements, Federal and State environmental permitting requirements, and examples of mitigation, restoration, and compensation for resource impacts.

The CIP environmental review process is improving, especially with projects sponsored by WPDR. This improvement has come about as a result of the Watershed Engineering Division (formerly with the Public Works Department) merging with the Environmental Resource Management Division (formerly with the Environmental and Conservation Services Department) under WPDR. Examples of successfully coordinated projects are included in Attachment 8.

However, no mechanism is currently available to ensure early planning stage review of other departments' projects, including the departments of Parks, Water and Wastewater, Public Works and Transportation, and the Electric Utility. ERM suggests a work session with an Environmental Board subcommittee to discuss potential solutions, including a mandatory review process for all projects whose status is "EA Required" in the Budget Office's Plan Document. If the above recommendations are implemented, the CIP EA review process could be made more effective and comprehensive.

However, if these changes are not made, the following problems will continue to exist:

- CIP project managers may be unaware of the EA requirement and the need to budget for an EA or costs of mitigation. Therefore, an EA requirement following planning and design may cause the project to be over budget and/or may return the project to the design phase.
- ERM will provide a service that project managers will not request, or only sporadically, when variances are at issue. The "path of least resistance" is often taken to meet project deadlines, resulting in a loss of important environmental resources.
- ERI will get CIP projects for permit review without EAs. These projects will be planned without environmental input or an analysis of alternatives to protect or compensate for the loss of valuable natural resources.

Attachment 1 Land Development Code Excerpts

§ 25-8-121 ENVIRONMENTAL ASSESSMENT REQUIREMENT.

(A) An applicant shall file an environmental assessment with the director for proposed development located:

- (1) over a karst aquifer;
- (2) within an area draining to a karst aquifer or reservoir;
- (3) in a water quality transition zone;
- (4) in a critical water quality zone;
- (5) in a flood plain; or
- (6) on a tract with a gradient of more than 15 percent.

(B) An environmental assessment must:

- (1) identify critical environmental features and propose protection measures for the features;
- (2) provide an environmental justification for spoil disposal locations or roadway alignments;
- (3) propose methods to achieve overland flow and justify enclosed storm sewers; and
- (4) describe proposed industrial uses and the pollution abatement program.

(C) An environmental assessment must include:

- (1) a hydrogeologic report in accordance with Section 25-8-122 (Hydrogeologic Report);
- (2) a vegetation report in accordance with Section 25-8-123 (Vegetation Report); and
- (3) a wastewater report in accordance with Section 25-8-124 (Wastewater Report).

(D) The director may permit an applicant to exclude from an environmental assessment information required by this section after determining that the information is unnecessary because of the scope and nature of the proposed development.

Source: Section 13-7-28; Ord. 010329-18.

**Attachment 2
Environmental Data Sheet Form**

Environmental Data Sheet

Sponsoring Dept: _____ Contact/Ext.: _____

C.I.P. Project No.: _____ Estimated project cost: _____

Project title: _____

Project address/description: _____

- Yes** **No**
 Is this a construction project that includes land disturbance?
 If the following questions are not applicable to the proposed project, please check this box and forward the data sheet to Mike Lyday at the Environmental Resource Management Division (ERM).

Environmental Assessment Criteria

Check any of the following conditions which are known to occur in the proposed project area:

- | | |
|---|--|
| <input type="checkbox"/> Drainage to the Edwards Aquifer Recharge Zone or a contributing zone | <input type="checkbox"/> Water Quality Transition Zone |
| <input type="checkbox"/> Floodplain (100 yr.) | <input type="checkbox"/> Slopes in excess of 15% grade |
| <input type="checkbox"/> Critical Water Quality Zone | <input type="checkbox"/> Drains to a reservoir |

To Be Completed By ERM Staff

- Environmentally sensitive areas (as defined by the ERM Biological Resource Protection Maps)
- Critical environmental features (such as caves, sinkholes, springs, wetlands, or rimrock)
- Endangered species habitat
- Other: _____

Note: If any of the above criteria apply, in accordance with C.O.A. Land Development Code (Sec. 25-8-121) an environmental assessment must be submitted for review by ERM during the initial project planning stages.

To Be Completed By ERM Staff

Environmental Resource Management C.I.P. Review Status

- No Environmental assessment required.
- Environmental assessment required
(CIP Project Manager must budget for an environmental assessment and mitigation costs determined from project scope).

(For Additional Information Contact Mike Lyday at 499-2956).

ERM Staff Reviewer

Date

Attachment 3

Suggested Process and Scope for Environmental Assessments

Applicable Ordinance Citation:

According to the City of Austin Land Development Code Section §25-8.121 - Environmental Assessment, “An Environmental Assessment shall be required for all development located over karst aquifers or within areas draining to a karst aquifer or a reservoir. In addition, an environmental assessment is required for all proposed development on tracts which include slopes in excess of 15%, water quality transition zones, critical water quality zones, or floodplains.”

Also, as stated in Environmental Criteria Manual Section 1.7.7 A, any alteration in the floodplain should retain the integrity of protected riparian areas and minimize damage to the physical and biological characteristics of such areas and for other alterations not listed in 1.7.7 B. Alternatives should be evaluated and the preferred alternative shall be the least environmentally damaging feasible alternative.

Process Considerations:

Conceptual Phase- Before Budgeting CIP Projects

- During conceptual design, the budget for a CIP project is estimated including environmental assessment and mitigation.
- As recommended in “Red Team” report (the guidance document for CIP Project Managers) a “Feasibility Study” would benefit any project and determine major constraints of conceptual design.
- Environmental constraints to be addressed in a Feasibility Study (or equivalent planning document) are broadly identified on the environmental data sheets during the conceptual design phase.
- Within the Watershed Protection and Development Review Department (WPDRD), Environmental Resource Management (ERM) and Development Review (DR) staff can provide guidance in this phase (prior to budget development) on the environmental sensitivity of project area, alternatives to evaluate, and sources of baseline environmental information (vegetative cover, tributary locations, habitat quality, geologic features, applicable code restrictions, etc.).

Preliminary Phase – Alternatives Evaluation, Preliminary Engineering, and Environmental Assessment.

- During preliminary engineering, the conceptual design alternatives are developed and a formal environmental assessment should be performed if required.
- The earlier the alternatives are considered in the project planning, the easier it is to plan mitigation that will benefit the project later in site plan and variance approval stages.
- ERM and Development Review staff can provide guidance in this phase on the appropriate scope and focus of the environmental assessment, additional alternatives to consider, potential variance requirements for various alternatives, other land development code requirements, state and federal permit requirements, and suggested mitigation depending on project and location characteristics.
- ERM will review the EA at the end of this phase when provided by the CIP Project Manager, make recommendations on alternatives, and assist in consultation with the Environmental Board upon request.
- The Environmental Board has requested that ERM review all EAs for CIP projects. Early review of assessments (partial or draft) in this preliminary phase can greatly improve the process of approval during design/permitting, especially if variance approval by the Environmental Board is necessary.

Design Phase – Site Plan, Detailed Environmental Assessment, Tree Surveys

- This phase is the most familiar and is detailed in the development review submittal requirements documentation for a site development permit.
- At this phase of the project the EA is submitted to Development Review for approval
- Board hearings on variances are required at this stage and any surprises can be costly.
- Detailed tree surveys are required as are other considerations for PARD projects.
- Redesign due to any environmental constraints not previously discovered can impede the project progress in this phase and result in cost overruns through additional preliminary or design phase engineering services.
- Project construction cost estimate changes at this phase can result in stalled projects due to inadequate bond approvals or operating budget constraints.

Suggested Scope of Work for City of Austin Environmental Assessments

1. Project Description and Need

- Describe the problem to be solved by the proposed project and identify the current need for the project in the particular location.
- Describe the location and approximate boundaries of the proposed project area in relation to readily identifiable landmarks.
- Describe the general type and physical characteristics of the project proposed and how it functions or operates in a technical context
- Describe ancillary goals of the project, including recreational, economic, educational, or community goals.
- Describe any history in project planning including previous public meetings, feasibility studies, preliminary engineering reports, board actions, council resolutions, involvement of other governmental entities, or citizen correspondence to sponsoring department.

2. Initial Alternative Development

- Itemize alternatives considered in the project preliminary engineering report or other studies and reference report or describe alternatives in detail if not documented elsewhere
- Identify differences in alternatives in relation to the project goals, ancillary goals, reliability of function, cost, and public acceptance.
- Identify alternative preferences of local citizens, boards and commissions, or City Council expressed through project planning history.
- If only one alternative is proposed in initial planning, continue through screening level for alternative development.

3. Documentation of Resources – Description of the Affected Environment at Screening/Alternative Level

Hydrogeologic Element

Topography

- Provide a topographic map of the project site from recent data. City of Austin 2-ft contour maps are preferable; however, USGS 7.5 minute quadrangle maps are acceptable if 2ft contours are unavailable for the project area. This is not designed to prompt a new “on-the-ground” survey, but to use data available from standard sources. The Capital Area Planning Council flyover performed in 1996 can provide detailed topographic data in GIS format.
- Identify and evaluate topographical considerations for the proposed project type.

Soils

- Provide a soils map of the project area from literature sources (eg., Travis County Soil Survey)
- Field verify general soil types and consistency with map in project area. Initial mapping for alternative routes can be spot checked in the field without an extensive soil type boundary delineation survey.
- Identify soils limitations for proposed project type.

Geology

- Provide a geologic map showing the topography and locations of the underlying rock units from literature sources. Pertinent maps are available from local, state, and regional agencies such as the Barton Springs/Edwards Aquifer Conservation District or the Bureau of Economic Geology.
- Field verify general geologic characteristics from outcrops and/or available boring logs without additional subsurface investigation. This can be done for alternative routes/ sites stage through spot checking and use of standard resource maps.
- Indicate the constraints or limitations of local geology for the proposed project type.

Springs

- Identify and evaluate springs or seeps in the proposed project area from field reconnaissance and literature sources.
- Locate all springs and seeps on the geologic map.
- If possible, approximately delineate drainage areas to springs and seeps.

Recharge Features

- Identify and evaluate any recharge features such as caves, sinkholes, fractures, or solution cavities within the project area from literature sources and onsite investigation.
- Field locate features and identify on the geologic map showing proximity to proposed project areas and alternatives. If a site has been identified, a field survey can be performed by walking 50-ft transects in a grid across the site. In heavy underbrush, transect width should be reduced.
- Identify previous studies mapping interior portions of caves or sinkholes located on site. Consideration should be made for conducting interior mapping studies of caves discovered in the planning area during site investigations. Such studies will be necessary in site plan or construction if significant voids are encountered.
- Caves listed in the BCCP 10(a) permit with the U.S. Fish and Wildlife Service should be located on recharge feature maps.

Drainage Patterns.

- Identify and document the pre-project drainage patterns within one mile of the project area. Document proposed changes due to project alternatives. This can be identified by showing flow paths, natural detention, and minor tributary conveyances on topographic maps.
- Document existing modified drainage features such as channelization, gabion construction, floodwalls, dams, ponds, diversions, or culvert enclosures of the streambed within one mile upstream and downstream of the project area. Document proposed changes due to the project alternatives.
- Document stormsewer alterations of natural drainage patterns within the project area and all storm sewer outfalls directly impacting the project area. Document proposed changes due to the project alternatives.
- Document current levels of bank stability and status of channel erosion in the project area from previous reports, literature sources, and/or field investigation. Document proposed changes due to the project alternatives.

Vegetative Element

- Describe the regional vegetative setting of the project area from literature documentation
- Provide the results of a field survey documenting general vegetation types in the affected area. This is not designed to be a boundary survey delineating vegetative types, but a field check of information obtained through literature and aerial photograph documentation.

- Evaluate the vegetation features with respect to public access and use considerations and proximity to greenbelts and recreational areas.
- Document and map priority riparian and upland woodland areas in the project area. Evaluate the beneficial uses of these resources.

Wastewater Element

- Describe drainfield or wastewater irrigation areas if employed in project including all design calculations.
- Provide environmental justification for sewer line locations in Critical Water Quality Zones including a complete discussion of all alternative routes, equipment or structure placements, pumping designs, and construction techniques that would not require such location.
- Describe construction techniques and standards to be employed for wastewater lines.
- Describe alternative wastewater disposal systems if used in the project over the Edwards Aquifer Recharge Zone.
- Discuss on-site collection and treatment systems if used in the project including their treatment levels, design standards, and potential impacts on receiving watercourses including the Edwards Aquifer.

Critical Environmental Features Elements

- Provide maps locating Critical Environmental Features, Environmentally Sensitive Areas, Critical Water Quality Zones, Flood Plains, and Steep Slopes (>15%) from literature sources (ERM Biological Resource Maps, floodplain maps, cave maps, topography, and creek maps).
- Field verify available maps. Environmental Resource Management staff are also available to provide direction based on field knowledge in the project area.

Additional LDC Requirements

- Provide environmental justification for spoil disposal locations or roadway alignments.
- Determine if an Integrated Pest Management Plan is required for the project.
- Provide methods proposed to achieve overland flow, and justification to use enclosed storm sewers, where proposed.
- If applicable, provide a pollution abatement plan. Description of industrial uses only if applicable
- Describe potential variances to the Land Development Code.

Other State or Federal Permitting Requirements

- Determine permits necessary for compliance with Section 404 of the Clean Water Act including impacts from dredge and fill of navigable waters and loss of jurisdictional wetlands in the project area.
- Determine permit requirements necessary for compliance with NPDES General Permit for Construction Activities. Contact ERM NPDES coordinator (974-1918) with questions about current requirements and compliance.
- Consult the Texas Historical Commission and Department of Antiquities Protection to determine applicability of Antiquities Code of Texas: Chapter 26. This code requires cities to consider the effect of any of their development projects on cultural resources (historic or prehistoric).
- Identify endangered species habitat locations within 1 mile from project area from TPWD files, BCCP data, priority cave locations, or other literature source. Determine if existing City of Austin USFWS permit covers project (such as BCCP 10a permit); otherwise, pursue Section 7 consultation for potential take of endangered species from U.S. Fish and Wildlife, as appropriate.

- Water Pollution Abatement Plans (and Organized Sewer Collection System plans for wastewater lines) are required for all projects within the Edwards Aquifer recharge zone as defined and regulated by TNRCC.

4. Environmental Impact Assessment

- Describe and itemize elements above detrimentally impacted by all alternatives.
- Describe the level of impacts to each element listed above unique to each alternative considered and potential or actual losses of resources for each alternative. Include impacts to parks or scenic lands, impacts to creek or lake hydrology, and impacts from location or transportation of hazardous substances
- Describe impacts in terms of construction, operation, and maintenance impacts.
- Describe variances necessary because of impacts to Critical Water Quality Zones, Water Quality Transition Zones, CEFs, construction on slopes, cut and fill, etc.
- Determine on basis of element impacted any additional site specific information necessary to evaluate alternatives.

5. Evaluation of Alternatives

- Describe beneficial components of each alternative and contrast to losses identified above.
- Rank previously considered alternatives using matrix of environmental impacts to resources documented above versus benefits of alternative.
- If not previously considered in project planning studies, describe the impacts of a no-action alternative.
- Evaluate the degree of each alternative's impacts in terms of resource loss, loss of natural and traditional character, and consideration of mitigation proposals.
- If unmitigated loss of resources is predicted from all alternatives, the EA consultant should recommend development of additional alternatives to the sponsoring department Project Manager.
Note: Environmental Resource Management Division staff are available to assist early evaluation of alternatives. Currently, Development Review staff see these EAs at the development permit process stage and the Environmental Board and Planning Commission are only consulted if variances are required; however, this is usually too late to effectively evaluate alternatives. Therefore, if the need for such alternatives can be foreseen in the planning stages during EA development, such projects should be referred to the Environmental Board for a recommendation at this point.
- If necessary, coordinate development of additional alternatives through sponsoring department to determine engineering constraints, costs and characteristics in order to make valid comparison to previously developed alternatives
- If necessary, re-evaluate alternatives including modified or new low impact alternatives.
- Recommend a selected alternative as the least costly environmentally sensitive project that reasonably meets project goals.

6. Project/Site Level Documentation for Selected Alternative (Development Permit Submittal Requirements)

Detailed Vegetative Element

Provide tree survey of all trees with a diameter of 8 inches measured 4.5 ft above the natural grade within limits of construction. Make a general description of all significant plant materials on site, demonstrating that the design of the plan has been accomplished to preserve to the greatest extent reasonable any

significant trees and vegetation on the site and to provide maximum erosion control and overland flow benefits from such vegetation. Quantify lost resources (for example: number of protected size trees, cumulative gross diameter of trees \geq 8 inches in diameter/ \geq 4.5 feet in height, acres of habitat and natural character lost). Include a map showing the effective woodland areas. Mitigation for loss of resources should be proposed for each alternative considered. Aerial photography can be used to substitute for a tree survey if the photography is recently taken between the months of April and November, complete 9"x9" pairs of photographs are submitted for stereomage interpretation, and the photographs are reviewed and approved for use by the City Arborist. Consult Development Review staff for approvals for any variance to information requirements for tree surveys.

Special Requirements for PARD projects.

Tree Survey

- When suitable alignment has been decided, a detailed tree survey of the construction and access easements is required. The survey is to include those trees adjacent to the easement whose driplines come within the easement.
- The survey is to show all Class 2 or Class 3 trees whose diameter is larger than four inches and all Class 1 trees, regardless of size. Particular attention should be paid to identifying Class 1 trees with a view to transplanting.

The survey is to show:

- The location of the tree.
- The diameter of the trunk at 4.5 ft above natural grade.
- The approximate crown size of the large tree.
- The species and/or common name of the tree.

Trees to be removed should be indicated and the locations approved by the Parks and Recreation Department. All trees that are to be retained are to be protected with tree protection fences. The tree protection fences are to be shown on the construction drawings.

Tree Evaluation

A tree evaluation is required to establish value of the trees that will be removed or impacted by construction works. These evaluations will provide the basis for replacement of those trees removed or to assign a monetary value to them.

Disturbed Natural Areas

Natural areas within the PARDs jurisdiction are greenbelts, wilderness parks and nature preserves. Any areas that are disturbed within these natural parkland areas will require restoration to ensure that their character as natural areas are maintained.

Attachment 4a

ENVIRONMENTAL ASSESSMENTS ENSURE PROTECTION of Critical Environmental Features: CAVES and SINKHOLES are karstic features that may serve as important points of recharge for the Edwards Aquifer. Some sinkholes in the Austin area are quite large and are avenues for significant recharge. Formations like flowstone, seen below, result from recharge into area caves.



Attachment 4b

SIGNIFICANT RECHARGE FEATURES are found in upland areas as well as fractures in creekbeds. Groundwater emerges around the Austin area as **SPRINGS**, another critical environmental feature. All critical environmental features are protected with buffers or setbacks up to 150 feet. Quality caves and sinkholes with drainage areas greater than 150 feet can receive additional setbacks up to 300 feet.



Attachment 4c



Canyon heads may be circumscribed by outcrops of resistant limestone layers called **RIMROCKS** (above, right and left), which commonly form the slope break between flatter uplands and steep canyons. Wild columbine and xeric fern species like lipferns and cliffbrake characterize these environments.

Runoff from construction sites and addition of impervious cover can multiply erosional forces acting on rimrocks and the higher steep **BLUFFS** (lower left photo), to the point where massive slope wasting may occur. This is why these features are also considered critical environmental features, and protected with vegetated buffers.



Attachment 4d



WETLANDS are also critical environmental features for their function and value as water quality controls. Small wetland areas may be found along most Austin streams. Wetlands function as stormwater filters (top photo). They also act as erosion controls by slowing fast moving stormwater. Roadway pollution is absorbed below culverts by wetland vegetation (center photo). Many existing stock ponds function as water quality ponds, treating runoff from large watersheds (bottom photo). The fringe of wetland emergent vegetation, coupled with the deep water in the middle, act together to trap and filter sediment and other pollutants.

Attachment 5



ENVIRONMENTALLY SENSITIVE AREAS are defined as areas of sensitive environmental resources that are of high priority for preservation and special land use consideration. They include:

Priority Riparian Woodlands
Priority Upland Woodlands
and Priority Remnant Prairies.



Protection of these areas preserves the **NATURAL CHARACTER** of Austin's diverse ecology, where disappearing prairie habitats meet the biotic provinces of wooded canyonlands.



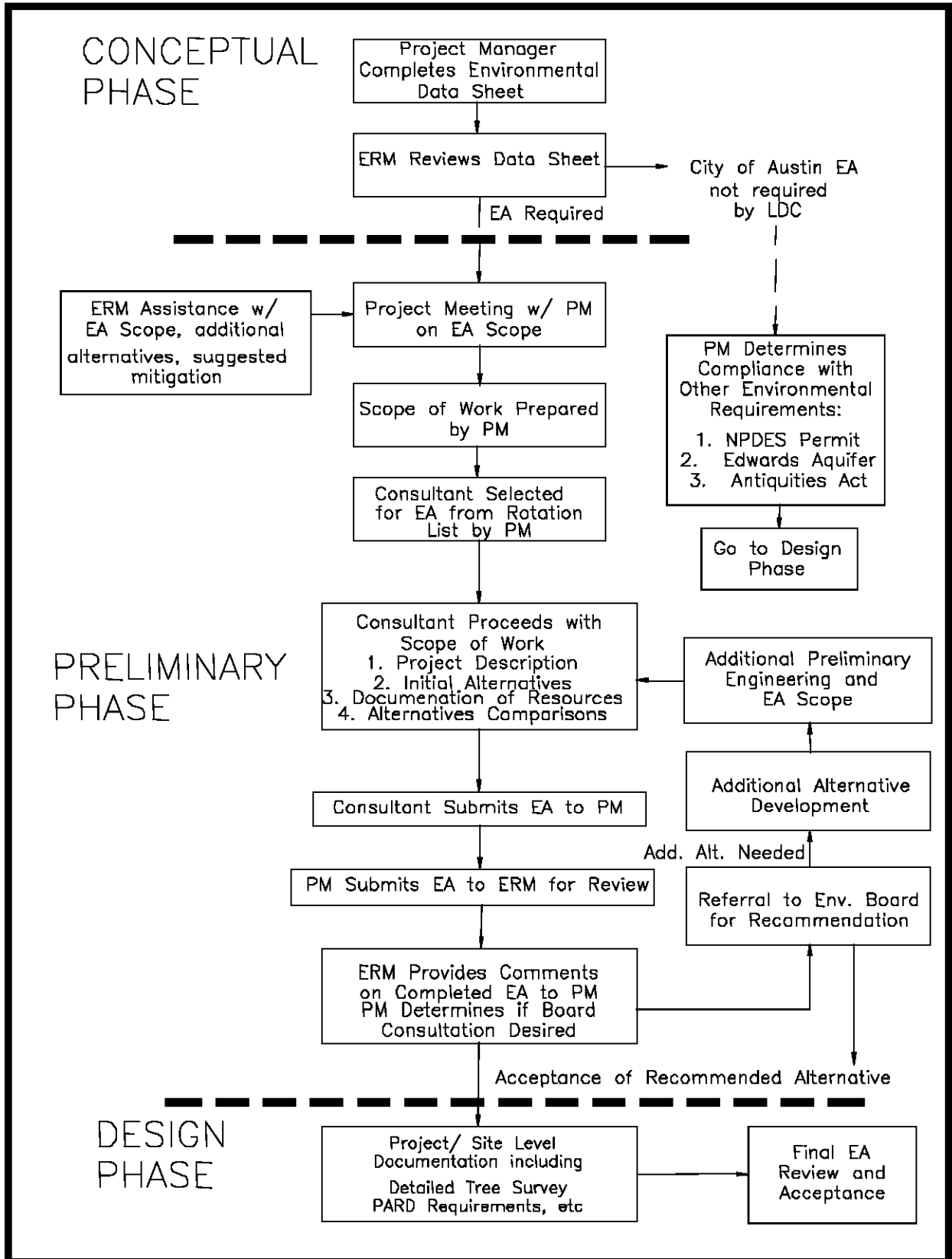
Attachment 6



NATURAL CHARACTER and WATER QUALITY can be preserved and protected by examining alternatives during the environmental assessment process. Wastewater lines can usually be located away from creeks (photos above and below). **OPTIONS** are also available to avoid destruction of natural streamways to solve flood and erosion problems. Upland detention, flood protection berms, and bioengineered stream restoration methods are alternatives to concrete and gabion lined channels (photos to the left).



Attachment 7 Flowchart of EA Review Process



Attachment 8

RESULTS OF CIP PROJECT ENVIRONMENTAL REVIEW

All projects listed in the Budget Office's Plan Document now have an "Environmental Status". Projects requiring environmental assessments include the following case-types: various erosion control projects, regional water quality and detention ponds, flood control projects, road expansions, lift stations, fire stations, utility lines, and parks trail development. Of these projects, the following have had some form of review by ERM since 1996:

Beckett Meadows Wet Pond

Sponsor: Watershed Protection Department (WPD)

Date: August, 1996

Environmental Assessment (EA): EA by ERM staff with early planning stage environmental input

Results: Wetland and sinkhole (Old Farm Sink) CEF protection

Spicewood Springs Park Trail Improvements

Sponsor: Parks and Recreation Department (PARC)

Date: August, 1996

EA: None

Results: No planning stage review. ERM reviewed during permitting stage with ERI. Revision of recommendations for fencing around a sinkhole and at the observation deck. Chain link fence installed to protect cave entrance.

Skunk Hollow Wastewater Relief Line

Sponsor: Water and Wastewater Department (W&WW)

Date: November 1996

EA: Requested by Council

Results: ERM review. Protection of bluff and rimrock CEFs from spoil disposal

Lower Little Walnut Creek Relief Interceptor, below Hwys 290 and 183. Phase 2 & 3

Sponsor: W&WW

Date: November 1996

EA: None

Results: ERM reviewed during the permitting stage with ERI. ERM asked for alternative assessment to keep wastewater line out of the creek. Five spring CEFs identified. Neighborhood organization asked for alternative as well. Submitted design not approved by ERI for permit.

Skunk Hollow Wastewater Line Realignment

Sponsor: W&WW

Date: December 1996

EA: None

Results: ERM geology staff reviewed during permitting stage with ERI. Bluff CEF protected.

Shoal Creek - ISTEUA Urban Trails. Bridge at 34th, 29th, 3rd streets

Sponsor: PARC

Date: December 1996

EA: None

Results: ERM staff reviewed during permitting stage with ERI. Spring CEF protected.

Zilker Park Loop Trail

Sponsor: Parks and Recreation Department

Date: December, 1996

EA: None

Results: No planning stage review. ERM reviewed during the permitting stage with ERI. Spring CEFs were within 150' of the proposed project, and endangered species were associated with the springs. The proposed project negatively impacted the natural character of Barton Creek below the pool by placing gabion (rock and wire) structures along the creek, above the proposed trail improvements. ERM recommended bioengineering techniques to replace gabions, 150' construction setbacks from the springs, and some trail realignment.

Brodie Lane Wastewater Line

Sponsor: Water and Wastewater

Date: March 1997

EA: None

Results: Reviewed by ERM staff during permitting stage with ERI. No changes.

Convict Hill Road Expansion

Sponsor: Public Works and Transportation (PW&T)

Date: May 1997

EA: Scope set with ERM. To be reviewed by ERM when complete.

Results: EA not sent to ERM. Project status unknown.

Loyola Lane Expansion

Sponsor: PW&T

Date: June 1997

EA: None

Results: Reviewed by ERM during permitting phase with ERI. Proposed channelization of Walnut Creek. CEFs and Priority Riparian Woodlands identified in area of proposed channelization. Alternative analysis requested. Project to be redesigned without channelization and coordinated with Crystal Brook Flood Control CIP using berm (floodwall) alternative instead of channelization. Protection of over 1000 linear feet of priority riparian woodlands along a stream reach.

Brodie Lane Electrical Substation

Sponsor: Electric Utility

Date: February 1998

EA: None

Results: Reviewed by ERM during permitting phase. Blowing Sink CEF within 500 feet of proposed substation. No changes.

Wastewater Line Off of Spicewood Springs Road

Sponsor: W&WW

Date: March 1998

EA: Partial by ERM at consulting engineering firm's request.

Results: Reviewed by ERM during planning stage. No changes.

Deep Eddy Pedestrian Ramp

Sponsor: PARD

Date: May 1998

EA: Partial by ERM at PARD request.

Results: No CEFs identified on site.

Four Points Fire Station

Sponsor: Fire/PW&T

Date: June 1998

EA: None

Results: ERM reviewed during permitting phase with ERI. Cave nearby in drainage (Disbelievers Cave). Fire station is on BCP land. Perot Cave cluster nearby also. CEF setback protection. Septic system inspections required.

Spicewood Springs Fire Station

Sponsor: Fire/PW&T

Date: October 1998

EA: ERM input on scope.

Results: ERM reviewed during planning stage at request of project manager. Tanglewood Spring, a wetland, a seep/spring found downstream of fire station site. One dugout sink found on site. One shallow sink cluster found onsite. Further investigation of the sinks recommended. Karst survey required.

51st Street Wastewater Reclamation Line

Sponsor: W&WW

Date: October 1998

EA: ERM input on scope.

Results: ERM walked preferred alignment and discussed mitigation to pursue for tree losses. Geotechnical borings to be drilled. Concerns include pipe leakage to alluvial aquifer in vicinity of Walnut Creek, pipe integrity in shrink/swell clays, spring on west bank of Tannehill Creek.

Jollyville Main Transmission

Sponsor: W&WW

Date: October 1998

EA: ERM input on scope.

Results: Borings indicated voids in 2 locations with a possibility of hitting cave conduits. Recommended karst survey and preparation of void mitigation plan.

Balcones Wastewater Line Phase I

Sponsor: W&WW

Date: October 1998

EA: None

Results: ERM reviewed projects during permitting phase with ERI. Void inspection and mitigation plan review. 5 ft x 5 ft x 2 ft cave conduit popped open in manhole borepit flooded pit. Void was exposed for 30 days prior to being reported.

Cat Mountain Lift Station Wastewater Relief Interceptor

Sponsor: PW&T

Date: October 1998

EA: None

Results: Project manager asked for ERM review. ERM sent recommendation to conduct inspections of ROW and drainages to look for PRFs, springs, rimrock, and bluffs.

Oak Hill Regional Detention Pond

Sponsor: WPD

Date: October 1998

EA: ERM input on scope.

Results: ERM recommendations included selection of site for dam, tree loss mitigation of \$28,000 to PARD for general tree planting around Austin.

Mabel Davis Park Drainage Improvements/Landfill Remediation

Sponsor: PW&T

Date: November 1998

EA: ERM input on scope.

Results: ERM recommendations included bioengineering techniques for bank stabilization, restoration with native plants, and use of vegetated gabions.

Mesa/Greystone Water Line

Sponsor: W&WW

Date: November 1998

EA: ERM input on scope.

Results: ERM sent recommendation to conduct inspection of drainages to look for CEFs, springs, rimrock, and warned about salamander habitat in Stillhouse Hollow and Barrow Preserve Springs.

Reilly Regional Detention

Sponsor: WPD

Date: January 1999

EA: ERM input on scope.

Results: ERM recommendations included wetland preservation and native plant bank restoration.

Pole Yard Bank Stabilization

Sponsor: WPD

Date: February 1999

EA: ERM input on scope.

Results: ERM recommendations included bioengineered bank stabilization methods, natural character preservation, and native plant restoration.

Loyola Lane Expansion

Sponsor: PW&T

Date: March 1999

EA: None

Results: ERM reviewed during permitting phase with ERI. Proposed alternative would remove over 1000 feet of priority riparian woodlands. Requested analysis of alternative coordinated with Crystal Brook flood control berm to avoid channelization.

Beckett Meadows Water Quality Pond

Sponsor: Watershed Protection Department (WPD)

Date: March 1999

EA: ERM input on scope.

Results: ERM comments and recommendations included wetland/sinkhole protection, tree loss mitigation, karst survey/borings, and selection of most sensitive alternative.

Givens Park Streambank Stabilization

Sponsor: WPD

Date: March 1999

EA: ERM input on scope.

Results: ERM recommendations included alternative selection of bioengineered methods, and U.S. Army Corps coordination and permit.

William Cannon Road Improvements

Sponsor: PW&T

Date: March 1999

EA: ERM input on scope.

Results: ERM recommendations included alternative analysis to avoid loss of priority upland woodlands. ERM never saw an EA. Project proceeded without an ERI permit and was red tagged. Status unknown.

Gilleland Golf Course

Sponsor: PARD

Date: May 1999

EA: ERM input on scope.

Results: Wetland identification by ERM staff. Recommendations included wetland protection and/or mitigation for losses. Further comments pending on completion of EA.

Walnut Creek Regional Detention

Sponsor: WPD

Date: August 1999

EA: ERM input on scope.

Results: ERM recommendations included site selection, tree impact analysis and research, continued planning stage involvement.

Watershed Protection Department Masterplan

Sponsor: WPD

Date: September 1999

EA: ERM input on scope.

Results: EA included in masterplanning process for WPD projects.

Giles Lane Expansion

Sponsor: PW&T

Date: September 1999

EA: ERM input on scope.

Results: ERM recommendations included wetland loss mitigation, wet pond water quality, and tree loss mitigation.

Dittmar Road Improvements

Sponsor: PW&T

Date: October 1999

EA: ERM input on scope.

Results: ERM recommendations included selection of most sensitive alternative alignment, and tree loss mitigation.

Convention Center 66" Water Transmission Line Relocation

Sponsor: W&WW

Date: December 1999

EA: ERM input on scope.

Results: ERM recommendations included relocation of line out of CWQZ, provide tree mitigation, restoration of Waller Creek banks.

Ullrich Water Line

Sponsor: W&WW

Date: 1999

EA: ERM input on scope.

Results: ERM recommendations included bioengineered bank restoration on Johnson Creek where pipe is trenched. Sediment containment measures insured.

Crystal Brook Flood Control

Sponsor: WPD

Date: January 2000

EA: ERM input on scope.

Results: ERM recommendations included analysis of new alternatives (berm) to avoid channelization of priority riparian areas, tree loss mitigation, revegetation of berm and disturbed areas with native plants.

Barton Creek Rightsizing Project

Sponsor: W&WW

Date: January 2000

EA: ERM input on scope.

Results: ERM recommendations included tree protection and mitigation, native plant revegetation of disturbed areas, endangered species protection (construction timing for birds, 10a for salamander), erosion/sedimentation control precautions, and pollution abatement plan.

Scenic Brook Regional Detention

Sponsor: WPD

Date: January 2000

EA: ERM input on scope.

Results: ERM recommendations included site specific alignment of dam, 10a permit coordination with U.S. Fish and Wildlife, and support of alternative at neighborhood meeting.

Creek Bend Phase II

Sponsor: WPD

Date: April 2000

EA: ERM input on scope.

Results: ERM recommendations included alternative selection to avoid channelization of priority riparian area, tree loss mitigation, native vegetation and limestone boulder on berm, restoration of bridge area with bioengineering and native vegetation, and vegetation of Phase I gabions.

Gardens At Bull Creek Regional Detention

Sponsor: WPD

Date: May 2000

EA: ERM input on scope.

Results: ERM recommendations included site selection for dam, U.S. Army Corps and Fish and Wildlife permits and coordination, tree loss mitigation, endangered species protection measures, native vegetation restoration on dam and other disturbed areas, support for project at Environmental Board meeting, oversight during construction.

South Austin Wastewater Treatment Plant Expansion

Sponsor: W&WW

Date: May 2000

EA: ERM input on scope.

Results: CEF springs located and CEF setbacks required. Berm redesigned out of CEF setback. Plug and abandon well per state requirements. Comments on EA provided to ERI reviewer with information on FEMA and 404 requirements.

Emergency Response Communications Center

Sponsor: PW&T

Date: June 2000

EA: ERM input on scope.

Results: ERM recommendations included CEF buffer around wetland feature.

Light Rail

Sponsor: PW&T

Date: June 2000

EA: ERM input on scope.

Results: Pending on completion of EA.

Lodge At Walnut Creek Regional Detention Pond

Sponsor: WPD

Date: June 2000

EA: ERM input on scope.

Results: Recommendations included 10a endangered species compliance, karst CEF protection, native flora and character preservation, and restoration with native plants.

Fenton Drive Water Main

Sponsor: W&WW

Date: July 2000

EA: ERM input on scope.

Results: ERM recommendations included alternative selection, 10a permit, and tree loss mitigation.

Lamar Pedestrian Bridge

Sponsor: PW&T

Date: July 2000

EA: Unknown

Results: ERM asked to comment on lowering lake for construction. ERM not involved in EA scope or review of EA. 404 permits would be required for work in navigable waters of the U.S.