

DRAFT
WAKARUSA WATER RECLAMATION FACILITY STUDY

EXECUTIVE SUMMARY

Prepared for

Lawrence, Kansas
March 9, 2006
Updated May 3, 2006

By



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ENERGY WATER INFORMATION GOVERNMENT

I. Purpose

The purpose of this project is to conduct an evaluation to determine viable locations for a future water reclamation facility (WRF) to serve the western and southern portions of the City of Lawrence's planned Urban Growth Area (UGA). The treatment facility options were planned and sized to meet the land and facility requirements for ultimate build-out of the watersheds identified in the 2003 Wastewater Master Plan Study. Viable treatment facility locations were identified, screened, and evaluated in order to determine the most suitable location meeting the stakeholders' goals for the future facility. This report is provided to the governing body for decision-making purposes.

II. Public Outreach

Encouraging public participation and input was a significant driver behind the structure of the Wakarusa WRF Study. All aspects of the project process were designed to allow interested citizens the opportunity to become informed on the goals and direction of the project, as well as to provide their input into the decision-making process. Two broad citizen groups were considered during the Wakarusa WRF project - the Public Advisory Committee (PAC) and the interested citizens-at-large.

A. Public Advisory Committee Role

The PAC Group consisted of various individuals representing entities or community organizations that have a focused area of interest regarding the siting of the Wakarusa WRF. This group of 20 individuals was selected by the City; invitations for their participation were extended by the Mayor. The PAC Group members and the organizations represented are listed as follows:

- Mr. Charles Jones
Douglas County - Board of County Commissioners
Chairman, 1st District Commissioner
- Mr. Roger Pine
State of Kansas Senate
3rd District Senator/Farmer
- Dr. Terry Riordan, MD
Lawrence/Douglas County Planning Commission
Chair
- Ms. Carrie Lindsey
League of Women Voters
Lawrence/Douglas County President
- Ms. Alison Reber
Kaw Valley Heritage Alliance
Kansas StreamLink Program
Executive Director
- Ms. Bobbie Flory
Lawrence Home Builders Association
Executive Director

- Mr. Tom Bracciano
Lawrence Public Schools
Facilities and Operations Planning
Division Director
- Mr. Warren Corman
University of Kansas - Business and
Financial Planning
University Architect
- Mr. Rod Geisler
KDHE, Bureau of Water, Municipal
Programs
Chief
- Mr. Lavern Squier
Lawrence Chamber of Commerce
President and CEO
- Mr. Michael Campbell
Kansas Sierra Club (Wakarusa
Group)
Chair
- Ms. Mary Lynn Stuart
Lawrence Preservation Alliance
Secretary
- Mr. Michael Caron
Save the Wakarusa Wetlands
President
- Ms. Laura Calwell
Kansas Riverkeeper
Friends of the Kaw
- Mr. Michael Almon
Interested Citizen
- Mr. John Craft
Neighbor to Kaw WWTP
- Mr. Charles Hawkins
Haskell Indian Nations University
- Mr. Mike Rundle
Lawrence City Commission
Commissioner
- Mr. Mike Amyx
Lawrence City Commission
Vice-Mayor
- Mr. Mike Bowman
Interested Citizen

The members of the PAC Group focused on the siting issues related to the ability to construct a facility generally one mile north and south of the Wakarusa River from Clinton Dam to East 1950 Road. The PAC input drove the project direction, including public acceptability factors, aesthetic fit with the site location, and potential site utilization with the general public. The major focus of this group was to advise the project team on what aspects would or would not be acceptable at a certain site from a public point of view.

The PAC actively participated in five meetings. Throughout these meetings, the PAC members were provided with project and process background. The PAC offered their input on the site selection criteria. The PAC also provided input into the rankings of the potential sites and facility footprints against the selected criteria and were actively involved in all project decisions as a group.

B. Public Engagement

In addition to the utilization of the PAC group, citizens-at large were also encouraged to provide their input through two primary methods. General citizens were invited to attend two public meetings through open invitation on the City's website and other press releases. The meetings covered general project and process information as well as review of the PAC's criteria recommendations and rankings. Attendance at the first public meeting was fairly geographically diverse; attendance at the second public meeting was more specific to those that lived in the project study area.

During the first public meeting, attendees were asked to respond to a short survey. The results of the survey indicate that a greater number of the respondents are willing to pay more in wastewater rates to allow the existence of a community amenity around the WRF. The top amenities indicated were:

- green space,
- wetlands,
- walking/bike trails.

Public concerns about the facility focused on:

- odor control,
- aesthetics/architectural character,
- and impacts of truck traffic.

In addition to the public meetings, additional public input was gathered through a process of stakeholder interviews. In order to capture a diverse picture of the thoughts on the WRF, interview participants were of varied backgrounds, including elected officials, property owners, business owners, neighborhood representatives, environmental groups, higher education representatives, and Lawrence City staff. Thirty-five people were interviewed in twenty-five separate interviews conducted over a two- to three-week period. All interviewees were previously aware of the recommendation to build a second wastewater treatment facility within the Lawrence area. Interviewees also understood that Lawrence was growing faster than anticipated and might reach a population of 100,000 before 2011 as previously projected. The concerns most frequently voiced by the respondents about the wastewater facility were:

- protection of environmental and historical resources,
- odor control,
- aesthetics,
- and project fit with its surroundings.

A comprehensive public outreach program including mailings, utility bill inserts, and the placement of community kiosks is in progress to further disseminate information about this project.

III. Capacity Evaluation

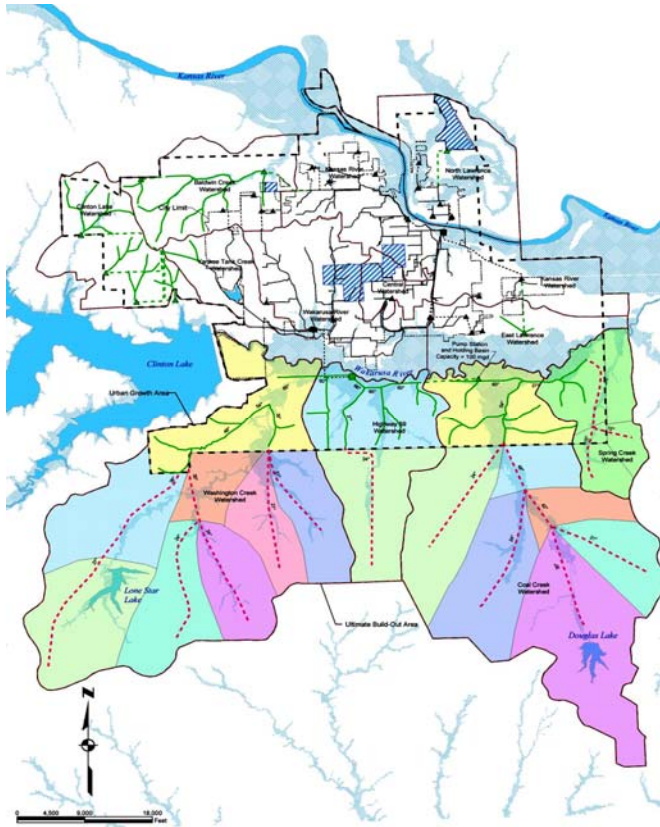


Figure 1. City of Lawrence Ultimate Build-Out Area

As evident by Figure 1 on the left, significant acreage within the watersheds that are touched by the UGA, actually fall outside the UGA boundaries. This additional future service area acreage represents the ultimate build-out scenario. Ultimate build-out should be considered when siting the Wakarusa WRF for long-range planning purposes. While treatment capacity is not currently needed for this area, the City of Lawrence desires to consider the spatial needs for the treatment facility to service this area in the future.

Various methods of determining the future wastewater flow from the full build-out area were investigated. Future land

use plans indicate a greater residential than industrial development growth within the complete build-out area. Utilizing a 50-year planning horizon for the build-out acreage outside of the UGA, it was determined that the minimum treatment capacity required to service the build-out area, including areas within and outside of the UGA, is 50 mgd.

IV. Study Area Considered

The study area considered for the siting of the Wakarusa WRF extends from roughly Clinton Dam on the west to E 1950 Rd. on the west and for approximately 1 mile north and south of the Wakarusa River. The west and east bounds of the study area were set by the bounds of the UGA. The northern and southern boundaries were set by proximity to

the Wakarusa River in accordance with the recommendations of the 2003 Wastewater Master Plan. The Master Plan found that building a new treatment facility that would discharge into the Wakarusa River was a more economical option to provide additional treatment capacity than the expansion of the existing Kansas River Plant.

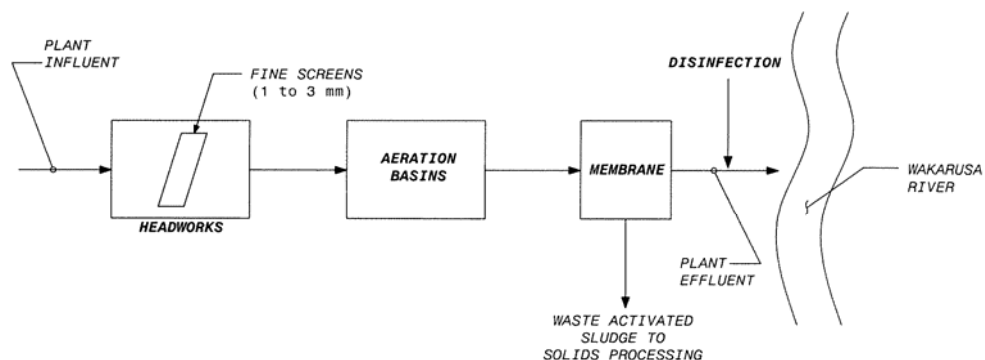
Consultants and City Staff drove the study area to view potential site areas identified by a desk-top study utilizing topographical and other mapping resources. Throughout the driving tour, the Staff and Consultants performed a visual screening of the potential sites. Various factors were considered during the screening process, including: location outside of the floodway, while maintaining a low elevation to allow maximum drainage by gravity, proximity of homes or historic buildings, and shape, size, and usability of the site. By considering these factors, City Staff and Consultants were able to narrow the potential sites to eight general areas; further map work indicated that one of the sites was owned by KDOT for potential construction of a future South Lawrence Trafficway. This site was removed from consideration, leaving seven general remaining areas. These areas were randomly assigned color designations.

The PAC Members were invited to attend a bus tour of the seven general areas for potential consideration in siting the Wakarusa WRF. PAC Member comments about each of the generalized areas were summarized in a memorandum. This bus tour memorandum was utilized by the Consulting team to assist in making the initial rankings of each of the sites against the selected criteria; this process will be discussed in more detail later in this document.

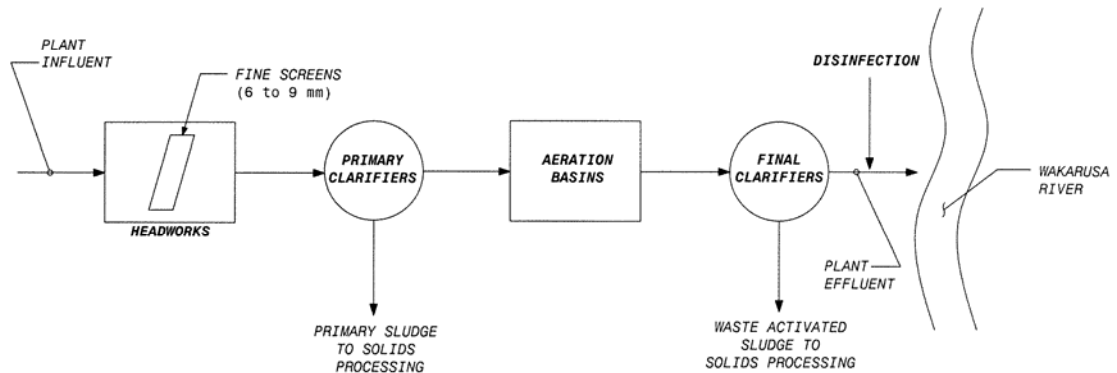
V. Process Considerations

The main categories of process alternatives that will be considered for the Wakarusa WRF will be classified as **small, medium, and large** footprint technologies. Each of these categories of alternatives will be evaluated at each general site location. The **small** alternative will utilize small-footprint, high-end treatment processes to provide for a large volume of treatment capacity in a small space. The **medium** alternative will occupy the acreage required for a conventional mechanical plant, similar to Lawrence's existing Kansas River Wastewater Treatment Plant (WWTP). The **large** alternative will combine the treatment technology represented by the medium footprint alternative, followed by polishing treatment with an outdoor constructed wetlands. General process schematics of each of the process footprint option considered are given below.

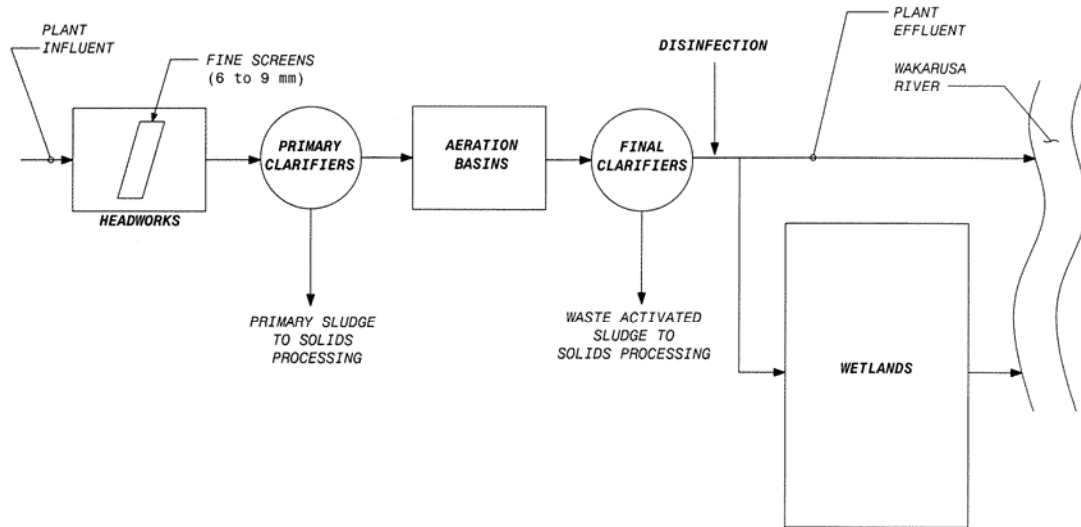
SMALL FOOTPRINT



MEDIUM FOOTPRINT



LARGE FOOTPRINT



High-level process investigations were completed to allow the estimation of a required area for a 50 mgd facility of each of the footprint sizes. Each of the area requirements includes a 1000 foot buffer on all sides for all treatment processes, excluding the wetland treatment portion of the large alternative. Additionally, each area also includes space for handling wet-weather flows as well as solids management. The calculated areas were then superimposed onto the general areas under consideration. Evaluation of each of these footprint alternatives was completed at each of the seven general sites. The footprint requirement for the each of the alternatives is given in Table 1 below.

Table 1. Acreage requirements by process footprint alternative

| Footprint Alternative | Acreage required (acres) |
|------------------------------|-------------------------------------|
| Small | 235 |
| Medium | 300 |
| Large | 1,000 |

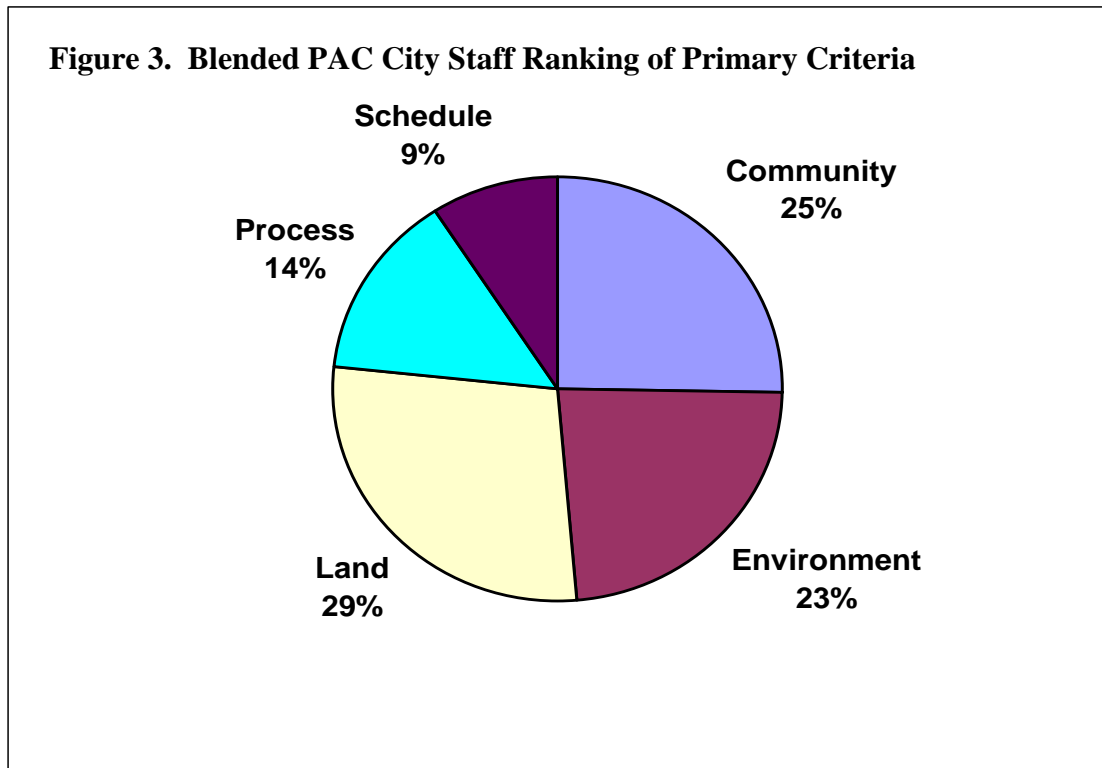
VI. Siting Factors

In order to evaluate each of the sites in relation to all of the process alternatives, a set of criteria was determined. In addition to establishing the criteria, weights of the criteria's relative importance were established for evaluation purposes. Criteria were divided into primary and sub categories. Primary criteria must be met to ensure the overall goal of the project is satisfied. Sub-criteria provide some granularity of the issues which make up the broader primary topics. The Consultants developed a preliminary set of criteria and distributed it to City Staff and the PAC members for individual comment and relative weighting. City Staff and PAC comments were compiled and presented to the group during a PAC meeting. The entire group discussed the results and suggested changes, which included adding additional criteria at both the primary and secondary levels. The survey form was revised to incorporate the comments from the PAC meeting. Results from the second version of the survey were collected and compiled; the criteria, as well as their definitions, and relative weights, are presented below.

Primary Criteria

- i. Community
- ii. Environment
- iii. Land
- iv. Process
- v. Schedule

The blended results of the PAC and City Staff's weightings of the primary criteria are shown in Figure 3 below.

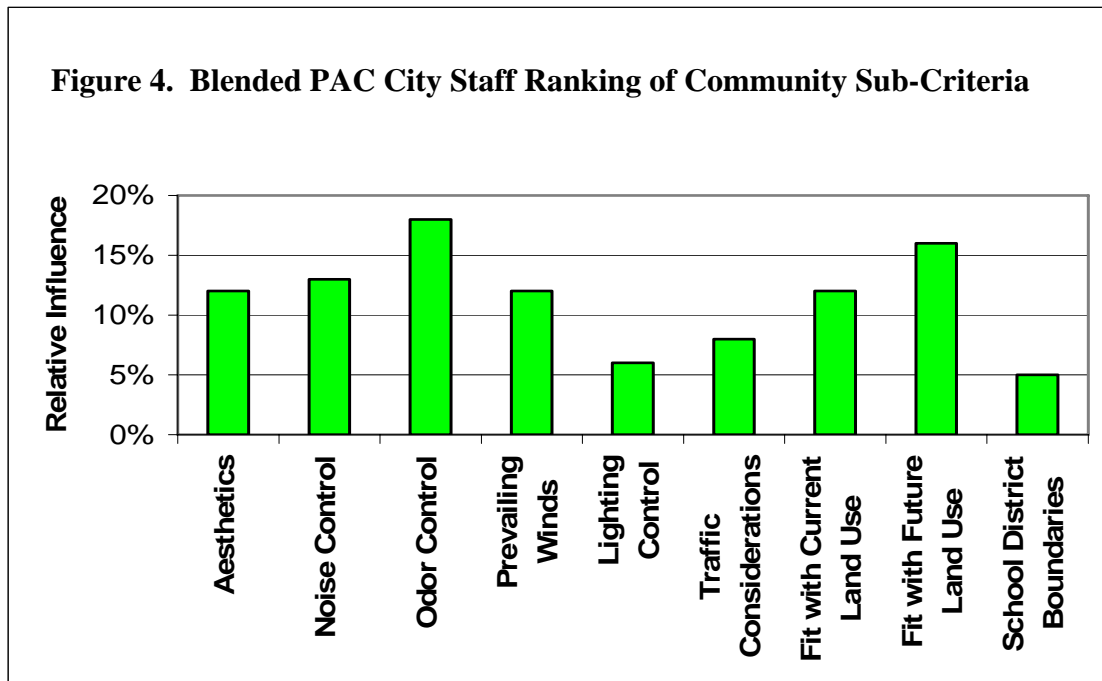


Sub-Criteria

Community

- **Aesthetics** – architectural or landscaping modifications to make site acceptable to the public
- **Noise Control** – additional technologies or buffer space to control off-site noise impacts
- **Odor Control** – technology or buffer to reduce fence-line odor impacts on a calm day
- **Prevailing Winds** – considers disposition of odors carried by winds to the northeast
- **Lighting Control** – additional technologies or buffer space to control offsite lighting impacts
- **Traffic Considerations** – length of route to highway and area traveled through
- **Fit with Current Land Use** – considers site with current property use
- **Fit with Future Land Use** – considers site with future property use from City 2025 Land Use Plan
- **School District Boundaries** – considers facility locations as it influences population growth outside of the UGA and the relationship to school district boundaries

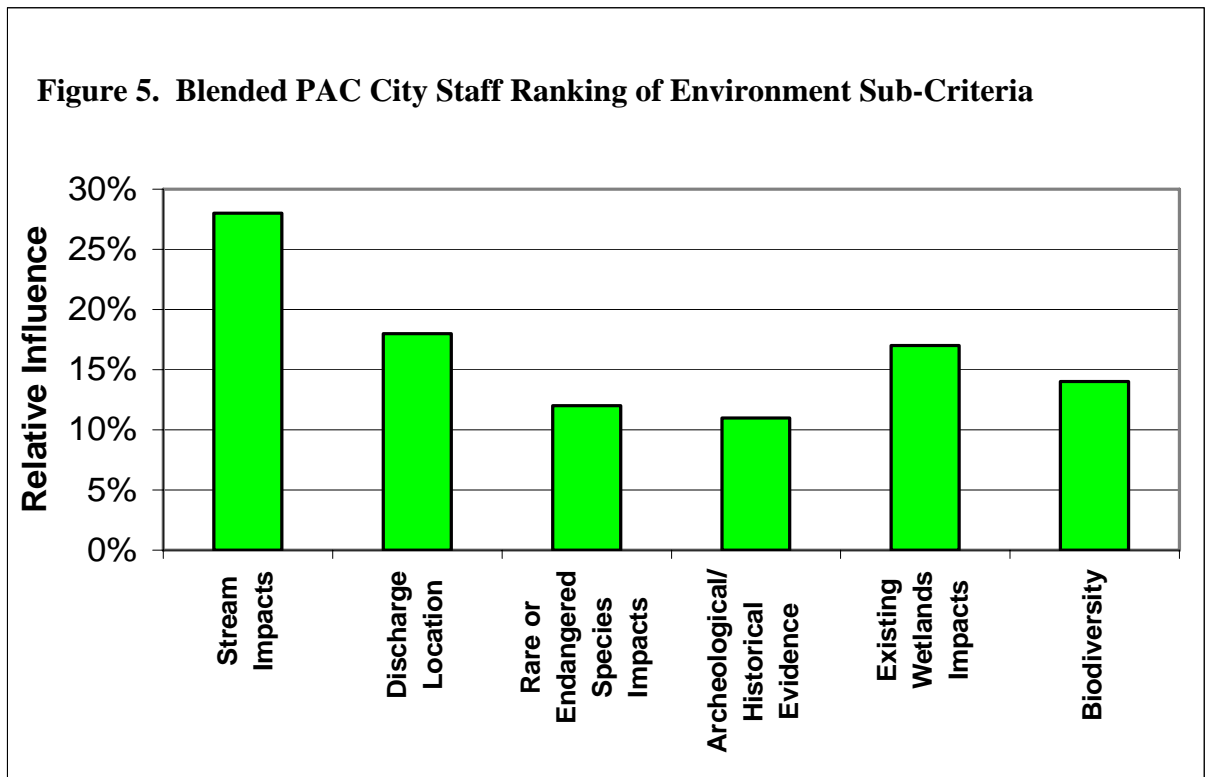
The blended results of the PAC and City Staff’s weightings of the Community Sub-criteria are shown in Figure 4 below.



Environment

- **Stream Impacts** – considers water quality from facility, all technologies assumed to meet permit requirements
- **Discharge Location** – addresses issues regarding stream relationship between facility and the Haskell-Baker Wetlands
- **Rare or Endangered Species Impacts** – considers how site impacts rare and/or endangered species, relates to proposed facility footprint
- **Archeological/Historical Evidence** – considers previously identified archeological/historical evidence, includes consideration of local history
- **Existing Floodplain/Wetlands Impacts** – considers impacts on existing hydric soils and/or floodplain
- **Biodiversity** – considers impacts on flora and fauna of area, relates to proposed facility footprint

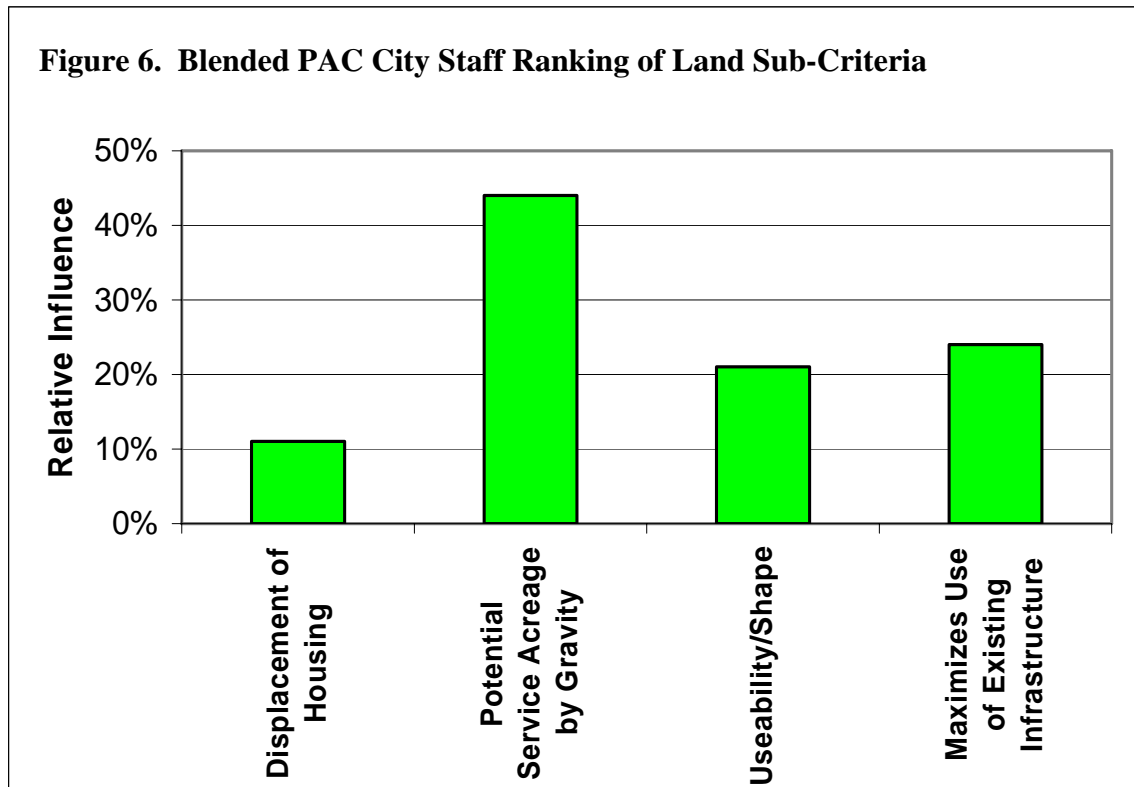
The blended results of the PAC and City Staff’s weightings of the Environment Sub-criteria are shown in Figure 5 below.



Land

- **Displacement of Housing** – number of houses that would be displaced by facility in a given area
- **Potential Service Acreage by Gravity** – increased service area by gravity will reduce future build-out costs by reducing pumping requirements for future expansion
- **Usability/Shape** – topography and shape of site related to how well the site may be utilized now and in the future, greater usability provides greater flexibility
- **Maximizes Use of Existing Infrastructure** – considers proximity to existing collections system connection as well as existing wastewater treatment plant for flexibility in solids disposal

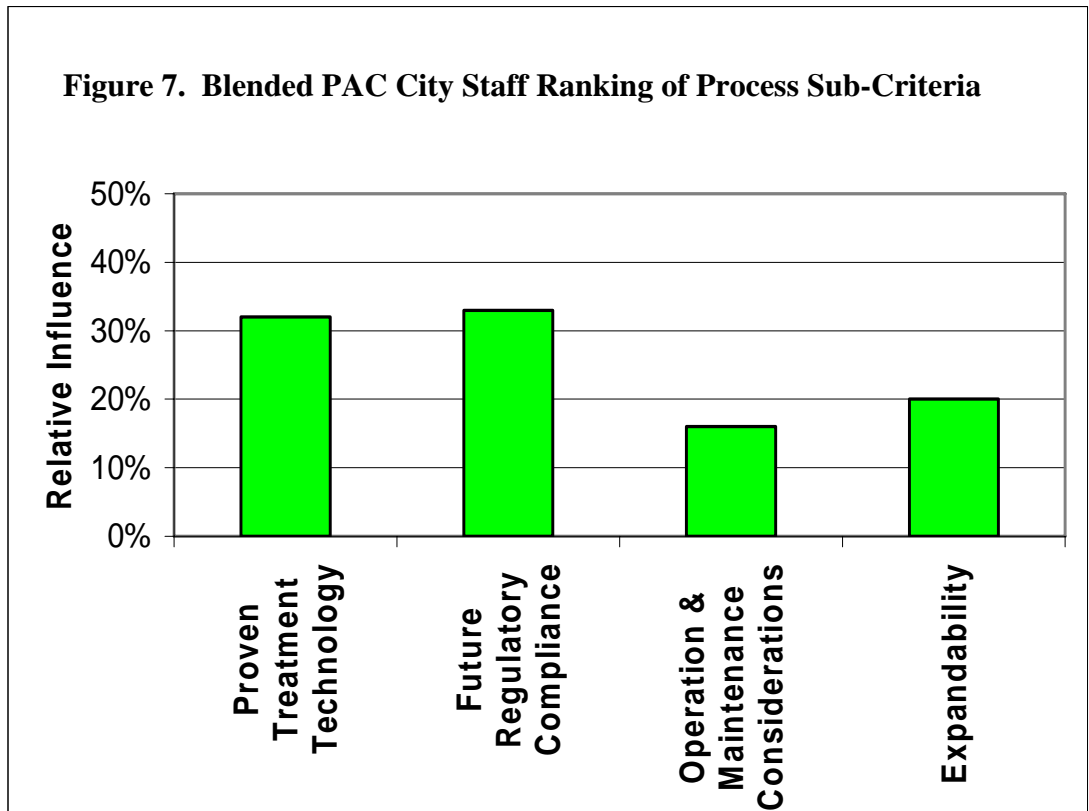
The blended results of the PAC and City Staff’s weightings of the Environment Sub-criteria are shown in Figure 6 below.



Process

- **Proven Treatment Technology** – considers national and state numbers of installations as well as consistency of performance
- **Future Regulatory Compliance** – considers ability to meet future regulatory requirements
- **Operations & Maintenance Considerations** – considers ease of operation and maintenance and staff familiarity with process
- **Expandability** – considers ease with which facility could be expanded to accommodate future growth within service area, including space requirements and flexibility in increasing facility capacity

The blended results of the PAC and City Staff’s weightings of the Environment Sub-criteria are shown in Figure 7 below.



Schedule

- **Land Acquisition** – duration and ease with which necessary land to fit facility footprint may be acquired
- **Permitting** – considers duration and ease of permitting, including agency familiarity with technology, impacts on rare and endangered species, and historical resources
- **Design/Construction** – amount of time necessary for design and construction of desired process within the given area

The blended results of the PAC and City Staff’s weightings of the Environment Sub-criteria are shown in Figure 8 below.

