

**PERFORMANCE AUDIT**  
OF THE GULICK AVENUE RELIEF SEWER PROJECT  
DEPARTMENT OF WASTEWATER MANAGEMENT



OFFICE OF

**COUNCIL  
SERVICES**

City and County of Honolulu  
STATE OF HAWAII

# PERFORMANCE AUDIT

OF THE GULICK AVENUE RELIEF SEWER PROJECT  
DEPARTMENT OF WASTEWATER MANAGEMENT

FEBRUARY 1998



# PERFORMANCE AUDIT HIGHLIGHTS

February 1998

## AUDIT OF THE GULICK AVENUE RELIEF SEWER PROJECT DEPARTMENT OF WASTEWATER MANAGEMENT

---

### Findings

The Gulick Avenue sewer line, which serves Kalihi Valley, was begun in 1990 by what is now the Department of Wastewater Management to remedy the sewer line's inadequate capacity. The Gulick project is nearing the end of the design phase; construction is to be completed in Year 2001.

We found that while the department has recently made significant improvements in the way it manages projects, there are a number of areas where the department's management of the Gulick Avenue sewer project, and its management of capital projects in general, could be improved:

- (1) Following approval of the original budget, the scope of the project increased significantly in size, complexity, and cost. A project that initially was to relieve 1,800 feet of sewer line at cost of \$1.1 million now is expected to require 8,800 feet of sewer line work and construction of a new bridge at a cost in excess of \$11 million.
- (2) Construction funding for the project was requested without an adequate understanding of the work to be performed. No visual inspection or other detailed assessment of the Gulick Avenue sewer line was performed prior to obtaining the initial construction funding.
- (3) To date, funds for project construction have twice been requested, appropriated, and allowed to lapse. Over \$2 million has lapsed so far. It appears that the appropriations lapsed because they were prematurely requested.
- (4) The department did not keep track of all of the project appropriations and expenditures that were made since the project's inception.
- (5) Although changes in project engineers assigned to oversee capital projects are foreseeable, there are no written guidelines defining

the responsibilities of project engineers. Given the number of times a capital project may change hands among project engineers during the life of the project, it would be prudent for the department to clearly set forth the roles and responsibilities of project engineers in writing. The Gulick Avenue project has had four different project engineers since the project's inception, and it will be turned over to a fifth engineer when the project moves into the construction phase.

- (6) Project files are disorganized and incomplete. The department was unable to produce any records documenting why the Gulick Avenue project was initiated, how the project's initial scope was identified, how the project's initial budget was estimated, or why certain project appropriations were allowed to lapse.
- (7) There are no departmental guidelines governing the organization and content of project files. There are no guidelines as to what types of records should be included in the file, nor any guidelines specifically assigning the responsibility to maintain the file.

## **Recommendations and Response**

The department needs to review and revise its capital budgeting process to more accurately determine the scope of work and cost of a proposed project before including construction funding for it in the capital program and budget. When a general problem with a part of the wastewater system is first identified, we suggest that the next appropriate step is to conduct a reconnaissance study, not to request funds to construct an undefined project. The study would specify the nature and extent of the problem identified, develop a detailed assessment of field conditions at the proposed project site(s), and identify remedial alternatives and their associated costs. Until the results of such a study have been obtained, budget requests to design and construct proposed projects should be deferred.

We also recommend that the department develop written guidelines governing the responsibilities of project engineers and the organization and content of project files.

*The Department of Wastewater Management generally agreed with the recommendations made in this report. It also provided a number of other comments to which we responded. A few clarifications were made to the draft report in response to the department's comments.*

## I. INTRODUCTION

Capital improvement projects for the repair and new construction of the City's wastewater collection and treatment system require a large investment of public dollars. For Fiscal Year 1997-1998, the Department of Wastewater Management's (hereinafter "department"<sup>1</sup>) capital projects were appropriated \$109.5 million. Spending on wastewater projects also represent a significant share of the City's total capital budget. Over the last five fiscal years, capital projects for the department totaled \$378,300,500, which represents over 25 percent of the City's total capital budget for the period.

In June 1997, the Council Chair, pursuant to a request of the Council Budget Committee Chair, authorized two audits of selected wastewater projects as a means of monitoring the use of capital improvement project budget funds. This audit of the Gulick Avenue Relief Sewer project represents the first of the two wastewater project audits.

### A. OBJECTIVES OF THE AUDIT

This audit had three objectives:

- Report on the project history, project management and use of contractors, and the status of the project's implementation.
- Determine the project's conformance with the initial plans and budget.
- Identify and make recommendations concerning any discrepancies or problems found.

### B. SCOPE AND METHODOLOGY

The audit section of the Office of Council Services selected the Gulick Avenue Relief Sewer project for this audit because of the substantial amount of funding provided for this project over the years, the concerns expressed by Councilmembers regarding the project, the length of time the project has continued since it was first funded in 1990, and the fact that the project has not yet been completed.

---

<sup>1</sup>When the Gulick Avenue Relief Sewer project was begun in 1990, the City's wastewater operations were administered by the Division of Wastewater Management under the Department of Public Works. Effective July 1, 1993, wastewater operations were placed under a new Department of Wastewater Management pursuant to ratification of a charter amendment by voters. In this report, "department" refers to both the Division of Wastewater Management with respect to the period prior to July 1, 1993, and to the Department of Wastewater Management thereafter.

In order to meet the objectives of this audit, documents pertaining to the project through November 30, 1997 were reviewed, including consultant contracts, consultant reports, department project records, City budget ordinances and budget documents, and the City's financial reports.

### C. BACKGROUND

The Gulick sewer line is a critical juncture in the wastewater collection system serving both lower and upper Kalihi Valley. (See Map I). Sewage flows from Kalihi Valley pass through the Gulick line, follows Makuahine Street to School Street to the Awa pump station and on to the Sand Island treatment plant. The Gulick Avenue sewer line serves about 1,300 "Equivalent Single Dwelling Units"<sup>2</sup> (ESDUs) in lower Kalihi Valley and 650 ESDUs in upper Kalihi Valley.

Capacity problems in Kalihi Valley's wastewater collection system have been documented in the records of the department. Since 1989, 44 applications to subdivide property in Kalihi Valley in the area served by the Gulick line were denied connection to the City's sewage collection system due to inadequate sewer capacity.<sup>3</sup>

The Gulick Avenue Relief Sewer project was reportedly being designed to meet the requirements of the City's development plan for the Kalihi Valley area. However, even after the Gulick project is completed, the department staff anticipate that the City will still be unable to serve landowners in upper Kalihi Valley who wish to expand existing dwellings or to subdivide and add new units. According to the department, 34 of the 44 Kalihi Valley subdivision applications that have been denied connection to the City sewer system since 1989 would continue to be refused sewer connection even after completion of the Gulick project. This limitation on Kalihi Valley subdivision applications would continue until sewer rehabilitation is continued beyond the Gulick project to upper Kalihi Valley. The project to serve upper Kalihi Valley, known as the Kalihi Valley Reconstructed Sewer project (also described by the department as "Gulick Phase 2") will complete the rehabilitation of the wastewater collection system serving all of Kalihi Valley. The department's staff report that they plan to request funding for the Kalihi Valley Reconstructed Sewer project as part of the Mayor's capital budget request for Fiscal Year 1998-99.

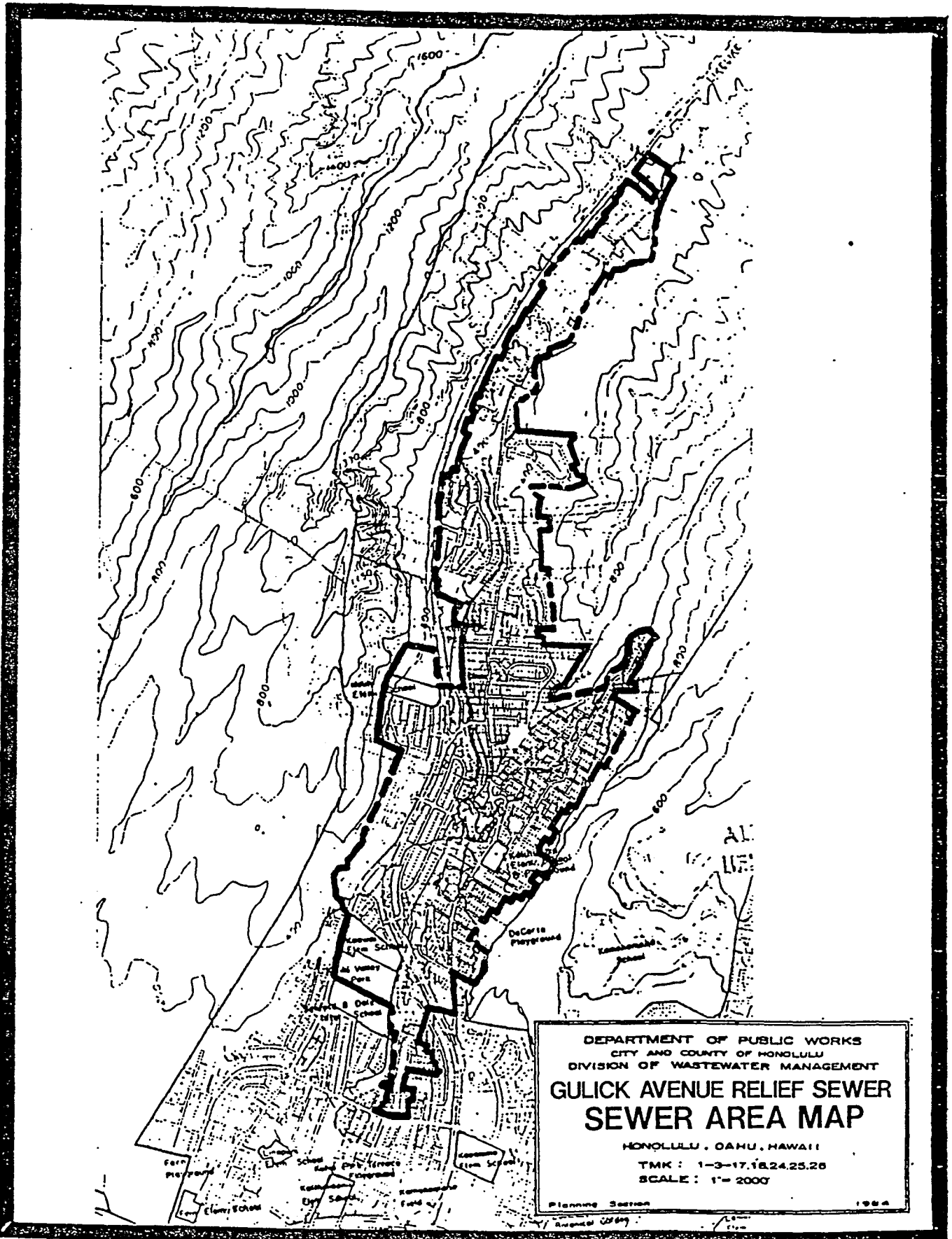
In the meantime, as an alternative to denial of a subdivision application, the City may offer to certain applicants for new subdivisions in Kalihi Valley approval of their applications if

---

<sup>2</sup>According to departmental staff, the project actually encompasses 1,297 parcels and 1,342 "laterals", a segment of a sewer line that is split to serve multiple lots. Since there are more houses in the area than is represented by the figure for parcels and each lateral does not correspond to a single house, the department has developed "Equivalent Single Dwelling Units" as a unit of measurement to more accurately estimate the number of homes served.

<sup>3</sup>Through May 1997.

MAP I



SOURCE: PRELIMINARY ENGINEERING REPORT FOR GULICK AVENUE RELIEF SEWER, OCTOBER 1994

they install wastewater holding tanks<sup>4</sup> at their own expense. Since 1970, two Kalihi Valley subdivision applicants who proposed to subdivide single family lots were required to install holding tanks.

The current scope of the Gulick Avenue Relief Sewer project consists of the installation and rehabilitation of five sewer lines (See Map II):

Line A: 4,815 linear feet of new 24-inch pipe along portions of School and Makuahine Streets and Likelike Highway to Wilson Street.

Line B: 1,695 linear feet of new 10-inch pipe to replace an existing 8-inch line along a portion of Kalihi Street from Likelike Highway to Maliu Street.

Lines C, D, & E: Rehabilitation of existing 8-inch and 24-inch lines.

In addition, 11 manholes will be replaced and a bridge will be constructed to support the new sewer line across Kalihi Stream. To minimize disturbance of affected roadways such as the Likelike Highway and of any adjoining properties, the Gulick project will utilize micro-tunneling to install new sections of sewer pipes.<sup>5</sup>

A total of \$14,808,000 has been appropriated for the project through November 30, 1997. Of this amount, \$623,290 has been expended, \$351,710 has been encumbered, \$2,325,000 has lapsed, and \$10,780,000 has been newly appropriated and remains unallotted.<sup>6</sup> If all of the new appropriation is expended, the total cost of the project will be \$11,755,000.

At this writing, the Gulick Avenue Relief Sewer project has completed the planning phase and is currently nearing the end of the design phase which began near the end of Fiscal Year 1995. Construction is anticipated to start in the latter part of 1998 and be completed in September 2001.

---

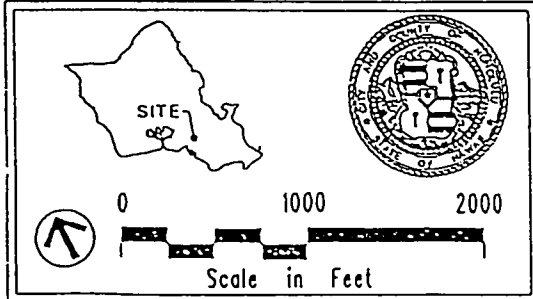
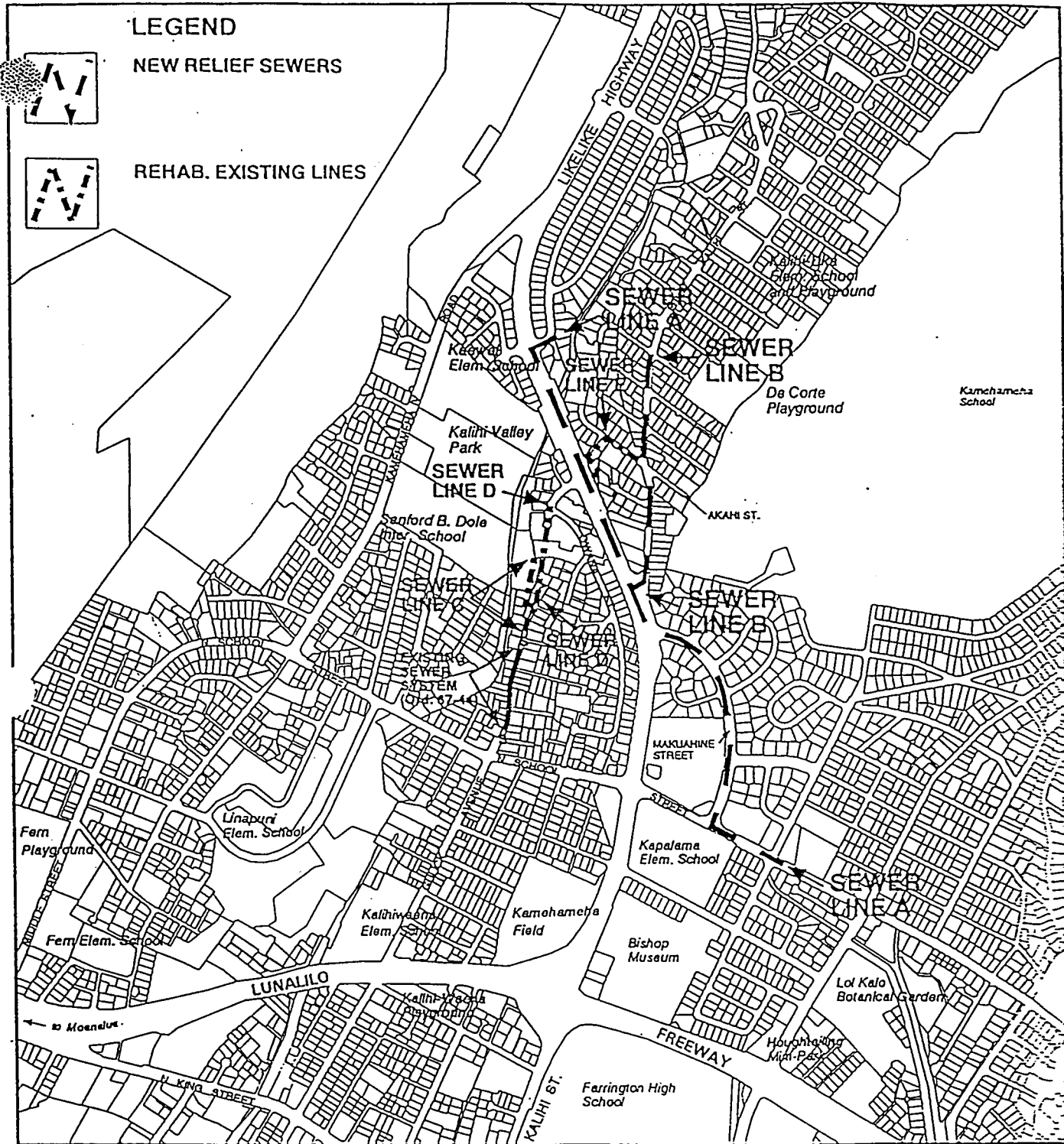
<sup>4</sup>Sewage holding tanks are underground storage tanks which hold wastewater and prevents it from entering the City's collection system until the low sewage flow period from 1:00 a.m. to 4:00 a.m. WWM policy allows holding tanks only for residential projects. Approval of the use of holding tanks is contingent on the absence of sewage backup problem reports by the department's Maintenance Branch. The cost of installing holding tanks and regulating the release of sewage from the tanks into the City system, estimated to run in the thousands of dollars, is the responsibility of the individual landowner.

<sup>5</sup>Micro tunneling involves drilling access pits along the planned route and tunneling underground between the pits. Generally, micro tunneling is a more costly technique than trenching, the traditional method for installing sewer pipes by making an open cut in the roadway. However, micro tunneling is less disruptive to the surrounding area than trenching, and its use can be less costly as in cases where a line runs through a number of backyards, requiring obtaining easements and incurring the risk of property damage. Although the method has been used by other states and jurisdictions for a number of years, the City has only recently begun its use.

<sup>6</sup>A table of appropriations is contained in the Appendix.



MAP II



**LOCATION MAP**  
**GULICK AVENUE RELIEF SEWER**  
 TAX MAP KEY: PORS. OF 1-3-17, 18, 25, 26, 27 and 28  
 FOLDER NO.: 96/PUC-1001 (IC)

## II. FINDINGS

The Department of Wastewater Management reports that it has recently taken several steps to improve the reliability of its budgeting process and the project management skills of its staff. WWM reports that more preliminary design work is being required as part of the project planning phase, so that when projects are initiated, project descriptions and cost estimates are more detailed and reliable. It further reports that project costs and timetables are being reviewed and updated as projects proceed, and that staff has received training on project scheduling and cost estimation. As a result, the department claims that the amount of lapsed appropriations over the last five years has been reduced. Nevertheless, we found a number of areas where the department's management of the Gulick Avenue sewer project, and its management of capital projects in general, could be improved.

### FINDING NUMBER ONE:

#### **SINCE APPROVAL OF ITS ORIGINAL BUDGET, THE GULICK AVENUE SEWER PROJECT HAS INCREASED SIGNIFICANTLY IN SIZE, COMPLEXITY, AND COST.**

The first budget request for the Gulick Avenue Relief Sewer project was provided in the Mayor's Executive Program and Budget for Fiscal Year 1990-91. The request was for \$1.1 million, consisting of \$300,000 for planning and engineering<sup>7</sup> and \$800,000 for construction. The scope of the project was described as relieving<sup>8</sup> 1,800 feet of 24-inch pipe in Gulick Avenue between School and Ulana Streets in Kalihi. We found that the scope and the total cost of the project has since increased considerably compared to the initial budget request.

In December 1992, the department contracted with a planning consultant<sup>9</sup> to assess actual field conditions, determine the precise scope of the problem, and recommend remedial

---

<sup>7</sup>Prior to FY 1994-95, the initial work phase for capital appropriations was "planning and engineering," a term which combined both conceptual, pre-development studies, and the drafting of detailed engineering drawings required for actual construction. Beginning in FY 1994-95, however, the Budget Department separated the phase into "planning," covering conceptual, pre-development studies, and "design," covering the drafting of detailed engineering drawings required for actual construction. To date, the Budget Department has not issued any written definitions of these terms.

<sup>8</sup> As used by WWM, "to relieve" a sewer line usually means to address a problem with an existing line that is found to be over-capacity by installing a new and often larger and longer line parallel to it. The existing line remains in place as part of the wastewater collection system and may or may not require repair.

<sup>9</sup>Contract No. F11252(A).

alternatives. Included in the assessment to be performed by the consultant was a TV inspection of the Gulick Avenue line. The consultant's TV inspection revealed more extensive cracks in the line than had been originally anticipated by the department. In addition, the consultant found that Gulick Avenue was too narrow to accommodate an additional sewer line. Thus, the department learned from the consultant that the project required construction of a new sewer line outside of Gulick Avenue and that, consequently, project costs would be significantly higher.

In fact, the Preliminary Engineering Report produced by the planning consultant estimated the cost of construction to be \$10,847,000. Adding this to the cost of the planning and design work boosts the present estimate of total project cost to more than \$11 million.

At this writing, the Gulick Avenue project is in the design phase, during which detailed engineering plans are drawn to guide actual construction. The specifications in the design consultant's contract<sup>10</sup>, which were prepared by the planning consultant, state that the Gulick Avenue Relief Sewer project requires the construction of 4,400 feet of 15-, 18-, and 24-inch sewer lines from Kono Street to Kapalama Avenue via Likelike Highway, Makuahine Street, and School Street, and 1,800 feet of 8- and 10-inch gravity sewer lines from Maliu Street to Likelike Highway via Kalihi Street. In addition, 700 feet of 8-inch and 1,200 feet of 24-inch existing sewer line from Puukapu Street to Owawa Street via Gulick Avenue, and 700 feet of 8-inch line from Likelike Highway to Kalihi Street via Akahi Street is to be replaced or repaired. The replacement of eleven manholes is also required, as well as the construction of a bridge to support the new sewer line across Kalihi Stream.

Thus, since the project's inception in 1990, the scope of the Gulick Avenue project has grown from relieving 1,800 feet of 24-inch sewer lines at a cost of \$1.1 million, to the repair or installation of a total of 8,800 feet of lines of various sizes, and the construction of a bridge, for a total cost of more than \$11 million.

#### **FINDING NUMBER TWO:**

#### **FUNDING TO CONSTRUCT THE GULICK AVENUE SEWER PROJECT WAS REQUESTED WITHOUT AN ADEQUATE UNDERSTANDING OF THE WORK TO BE PERFORMED.**

As we later find in this report (in Finding Number Six), WWM has no documentation of how the Gulick Avenue Relief Sewer began. However, the available evidence indicates that the initial Gulick Avenue project budget was prepared and funds for both planning and construction were requested without an adequate understanding of the condition of the Gulick

---

<sup>10</sup>Contract No. F37255(A), Special Provisions.

sewer line, the conditions surrounding the proposed project site, and therefore what needed to be done to correct the problems that the project was to address.

The department's staff believe that the Gulick Avenue project probably began the way most sewer line projects now do under current WWM policy (ADM 115, effective April 30, 1996). This policy provides that the need for a capital project is typically identified by a facilities plan, an overall assessment study, or reports from an operations division. In the case of the Gulick Avenue project, the department believes that the project originated in the 1990 Islandwide Sewer Adequacy study and in the 1993 East Mamala Bay Facilities Plan.

However, the Gulick Avenue project was initiated before the East Mamala Bay Facilities Plan was begun. The project was never mentioned in the 1990 Islandwide Sewer Adequacy study; instead, the study describes the sewer tributary of the Hart Street Wastewater Pump Station as being over-capacity. The Gulick Avenue sewer line is part of that tributary. However, that fact alone does not provide a sufficient basis to initiate a construction project. In particular, that information does not necessarily imply that the Gulick Avenue sewer line requires work, nor does it allow the department to determine how much work is necessary to increase the capacity of that line, nor to estimate the cost of the needed work.

We also found that no visual inspection or other detailed assessment of the Gulick Avenue sewer line was performed prior to obtaining the initial construction funding. This is not uncommon. According to the department's staff, after the need for a project is established, the project is assigned to a project engineer in the Planning Branch, who makes an initial assessment of the extent of the problem and develops a rough scope of remedial action and a preliminary cost estimate for the project based on the engineer's professional knowledge and experience. According to the department, budgetary and personnel limitations prevent it from conducting in-house a more detailed assessment of actual field conditions, a more detailed determination of the precise scope of a problem, and a more accurate preliminary identification of remedial alternatives. WWM believes it must first obtain funding for a capital project and hire a consultant in the planning phase of the project to get such information. However, in order to engage a planning consultant, WWM must first secure appropriations from the Council for the project. Thus, when a new capital project is first presented to the Council for its approval, the scope of the proposed project and its cost as presented to the Council may be based solely on the department's in-house estimate, and may have been prepared without benefit of any detailed field assessment.

The department's staff recall that during its initial in-house assessment of the Gulick Avenue project, consideration was given to use the department's in-house television camera inspection unit to visually inspect the line, but that due to the unit's workload, such inspection was not performed. Nevertheless, the department moved forward with the Gulick Avenue project, including the project in its capital program and requesting both planning and construction funds for Fiscal Year 1990-91. That appropriation request was approved by the Council.

In pointing out that no detailed assessment of the problem was performed by the department prior to requesting construction funds for the Gulick Avenue project, we do not dispute that in 1990, the capacity of the sewer line was inadequate. Rather, we would argue that more and better information should have been accumulated before construction funding for the Gulick Avenue project was included in the department's capital program and budget.

**FINDING NUMBER THREE:**

**TO DATE, FUNDS FOR PROJECT CONSTRUCTION WERE TWICE REQUESTED, APPROPRIATED, AND ALLOWED TO LAPSE.**

Through November 30, 1997, a total of \$2.3 million in design and construction appropriations for the Gulick Avenue Relief Sewer project have lapsed (\$800,000 for construction, FY 1991; \$500,000 for design and \$1 million for construction, FY 1995). It appears that the appropriations lapsed because they were prematurely requested.

As stated in Finding Number One, the Mayor's first capital budget request for the project in Fiscal Year 1990-91 included \$1.1 million for planning, engineering and construction. In order for this appropriation for planning, engineering, and construction work to have been fully utilized by the department, the following would have had to been achieved in the eighteen months through December 31, 1991 that the appropriation would be in effect:<sup>11</sup> (1) engaging the planning consultant(s); (2) starting and completing the planning work; (3) engaging the engineering consultant(s); (4) starting and completing the engineering work; and (5) engaging the construction contractor(s) and starting construction.

Such an expectation is highly optimistic and probably unrealistic. As stated above in Finding Number Two, the department requested construction funding for the Gulick Avenue project without an adequate understanding of the scope of work required for the project. The repairs, reconstruction, or new construction for Gulick could only be started after obtaining the necessary results of the planning work. Further, the planning work necessary for the Gulick project was itself complex.

Our conclusion that this expectation is highly optimistic was confirmed by actual events. Three months into the fiscal year of the appropriation (October 1990), the department submitted a request to the personnel department for approval to engage the planning

---

<sup>11</sup>In the City's budget cycle, the Mayor must submit the City's proposed capital budget for the coming fiscal year to the City Council in March for Council approval. If approval is given, then after the start of the fiscal year on July 1, City departments have eighteen months until December 31 of the next calendar year to encumber the appropriated capital funds. An encumbrance for planning, design, or construction work is made by obtaining a formal commitment to spend the money (e.g., by executing an interim or final contract). If an encumbrance is not made by that date, the funds lapse; i.e., the money is no longer available and the Mayor must submit a new funding request to the City Council.

consultant. The department's request included an estimate that the planning and engineering contract for the Gulick project would not be completed until July 1992, well after the project's construction appropriation would lapse. By then, at least, it should have been clear that construction could not be initiated by December 1991. In fact, on December 31, 1991, all of the \$800,000 appropriated by the Council for construction of Gulick Avenue sewers for Fiscal Year 1990-91 lapsed.

Three years later, after the extent of the required planning work was better understood, the Mayor requested, and the Council appropriated, an additional \$700,000 for Fiscal Year 1993-94 to complete planning and engineering for the project. This time, the funds were used.

However, in the next year, the Mayor requested \$1.5 million (\$500,000 for design and \$1 million for construction) for the Gulick Avenue project for Fiscal Year 1994-95. The Council appropriated the funds requested. It appears that as early as three months into the fiscal year (October 1994), the department was advised by the planning consultant that the project entailed much more work than the department had originally envisioned and that much more funding to complete construction was required. The entire \$1.5 million design and construction appropriation lapsed on December 31, 1995.

The department states that it is difficult to estimate construction cost for a project until the design phase has been substantially completed. However, in the case of the Gulick Avenue project, it appears that a reasonable cost estimate was obtained through the planning phase. The Preliminary Engineering Report produced by the planning consultant contract in October 1994 estimated the cost of construction to be \$10,847,000. That estimate is close to the \$10,000,000 appropriated for construction for Fiscal Year 1997-98.

The department also believes that to defer a budget request for construction until planning is completed would delay projects. However, the department's past practice of prematurely requesting appropriations that ultimately lapse also does not expedite the completion of projects.

#### **FINDING NUMBER FOUR:**

#### **THE DEPARTMENT DID NOT KEEP TRACK OF ALL OF GULICK PROJECT APPROPRIATIONS AND EXPENDITURES.**

WWM requires multiple layers of review and approval to make progress payments to a consultant pursuant to a contract. In this review, the department monitors the expenditures made under each contract. However, we found that the department did not keep track of all of the appropriations and expenditures for the Gulick Avenue project since its inception. WWM had to make a special effort to compile the appropriations and expenditure information we requested for this audit.

We believe it is important to keep track of project appropriations and expenditures throughout the full term of a project, which usually spans a number of phases and entails several contracts. To keep track of the full history of appropriations and expenditures enables the department to keep abreast of all of the budget authorizations and the full cost of the project to date. Upon completion of the project, the department can then accurately report to the Council and to the public how closely it implemented the budget authorizations and what was the full amount of public resources that were invested in the project. In short, taxpayers are entitled to know what was the total cost of each completed project.

The department states that it has recently begun to track these appropriations and expenditures over the full term of projects. So far, however, only new projects are being tracked.

#### **FINDING NUMBER FIVE:**

#### **ALTHOUGH CHANGES IN PROJECT ENGINEERS ASSIGNED TO OVERSEE CAPITAL PROJECTS ARE FORESEEABLE, THERE ARE NO WRITTEN GUIDELINES DEFINING THE RESPONSIBILITIES OF PROJECT ENGINEERS.**

In the Department of Wastewater Management, the primary responsibility for the day-to-day management of each ongoing wastewater construction projects falls to a project engineer. The department assigns a project engineer to each project from among the engineers in the branch responsible for the work phase that the project is in. That is, a project in the planning phase is assigned a project engineer from the ranks of the department's planning branch; when that project enters the design phase, it is assigned a different project engineer who works in the design branch. Even while the project is within the same branch, however, there can be more than one project engineer assigned over time due to staff turnover.

The Gulick project has had four different project engineers since the project's inception in 1990. There have been two different project engineers while the project was under the administration of the department's Planning Branch, and two different project engineers while the project has been under the administration of the department's Collection System Design Section. When the design phase is completed and the project moves into the construction phase, a fifth project engineer from the Construction Section will assume management of the project.

The department's staff verbally describe the project engineer's role as follows:

- Preparing the project description form, including scope of work and cost estimate, for budgetary and contract negotiation purposes.
- Coordinating the engagement of a consultant.

- Monitoring the project's schedule, scope and costs.
- Reviewing the consultant's work product submittals under the contract and recommending progress payments.
- Collecting comments from staff of other relevant departmental sections on a consultant's work product submittals and transmitting the comments to the consultant.
- Reviewing the consultant's final work product.

However, the department has no written description of the role and responsibilities of project engineers in overseeing capital projects. Given the number of times a capital project may change hands among project engineers during the life of the project, it would be prudent for the department to clearly set forth in writing the roles and responsibilities of project engineers.<sup>12</sup> This would help to ensure continuity and consistency in transmitting critical information when the project engineer changes, regarding such subjects as the City's directions to project consultants and the history behind problems encountered or changes in project scope, cost, or timetable. Such continuity and consistency would also facilitate a smooth transition for the project as it moves from one work phase to another.

**FINDING NUMBER SIX:**

**THE FILES FOR THE GULICK AVENUE PROJECT WERE DISORGANIZED AND INCOMPLETE.**

In conducting the fieldwork for this audit, we found that the department's project files for the Gulick Avenue project were disorganized and incomplete. In particular, the department was unable to produce any records documenting why the Gulick Avenue project was initiated, how the project's initial scope was identified, how the project's initial budget was estimated, or why certain project appropriations were allowed to lapse. Neither was the department's staff able to recall those determinations and events.

Ideally, the department's records should document:

- How the initial problem was brought to the department's attention;
- What was done to investigate and identify the scope of the problem;

---

<sup>12</sup>According to the department, it has taken measures to increase training in project management, and is currently developing standard operating procedures for management of capital projects.



- What options were considered to address the problem;
- How the initial cost estimate of the proposed project was determined;
- The criteria and process by which the project was given priority for funding over other potential capital projects;
- The rationale for subsequent funding requests;
- An explanation for any lapses of funds; and
- A complete record of payments made to and work products received from the consultant.

None of these were provided in full in the department's files for the Gulick Avenue project.<sup>13</sup>

The poor condition of the project files is of concern because of the many changes in project engineers that may be encountered in a long-running project such as Gulick. It is also unrealistic to rely on the recollection of the department's staff regarding the fundamental aspects of the Gulick Avenue project.

#### **FINDING NUMBER SEVEN:**

#### **THERE ARE NO WRITTEN GUIDELINES GOVERNING THE ORGANIZATION AND CONTENT OF PROJECT FILES.**

As a general practice, the department's project engineers keep a file on each project to which they are assigned, but the organization and content of the file is left to the discretion of the individual engineer. There are no departmental guidelines as to what types of records should be included in the file, nor any guideline specifically assigning the responsibility to maintain the file. Given the level of turnover of project engineers that seems likely during the life of a capital project, accurate and complete data on such subjects as the basis for each project's scope, cost, and timetable estimates should be developed and maintained for the department's project files, at least for the larger and more complex capital projects.

---

<sup>13</sup>The department was initially able to produce only the final, twelfth billing invoice from the consultant for the planning contract. According to the department staff, the billing invoice is the basis upon which the department authorizes progress payments to the consultant. Without all twelve billing invoices, we could not review whether all progress payments made to the consultant were in accordance with the provisions of the contract. Immediately before this report was to be submitted for printing, the missing invoices were found and provided to our office. The invoices appeared to comply with the contract. However, the fact remains that those invoices were not part of the project file.

Responsibility for establishing and maintaining these files should also be clearly assigned and set forth in writing.

### III. RECOMMENDATIONS

The findings in this report document the need for the department to review and revise its capital budgeting process to more accurately determine the scope of work and cost of a proposed project before construction funding for the project is included in its capital program and budget. Therefore, when a general problem area is first identified and the problem and the work required to address it are not yet adequately understood, we suggest that the next appropriate step for WWM is to request planning phase appropriations to conduct a reconnaissance study, not to request funds to construct a still undefined capital project. The funding of a reconnaissance study can be accomplished through either the operating budget or the capital budget.

The purpose of the recommended reconnaissance study would be to obtain the information necessary to formulate a realistic and reasonably accurate scope of work for a later construction project. The study would specify the nature and extent of the problem identified, develop a detailed assessment of field conditions at the subject site(s), and identify alternative remedies and their associated costs. In the particular case of problems that appear to require the repair or replacement of a sewer line, TV inspections and other detailed facility and site assessments should be included in the study.

We recognize that this is the scope of work WWM currently requires of its planning consultants for new capital projects. Thus, we are recommending that the work currently performed in the initial phase of capital projects be more accurately labeled as a reconnaissance study and, for budgeting purposes, that such a study be separated from any construction project.

The significance of the recommended change in labeling is greater than might be apparent at first glance. The change in label also requires a change in the development thought process. By commissioning a study, an implication is created in the minds of all who review the capital budget that the problem to be addressed, the characteristics of the subject site(s), and the availability and relative merits of alternative remedies are not yet adequately understood. In contrast, when funds are requested for a construction project, one may be misled to assume that those issues have already been resolved, or that there is at least a reasonable assurance that those issues can be resolved. Therein lies the danger. To budget and commit funds to a construction project without an adequate understanding of those issues would clearly court failure.

We suggest that the budgeting of construction funds to a project represents a real commitment to the project. The budgeting of planning funds may not appear to be much of a commitment. However, once paired with the budgeting of construction funds, that

commitment can quickly grow. Once construction funds are budgeted and construction is underway, it becomes virtually impossible to withdraw that commitment, even in the face of massive cost overruns and missed project objectives. The larger the project, the higher the stakes in that commitment.

To this end, we further recommend that the department consider deferring capital budget requests for design and construction of proposed projects until the results of the reconnaissance study have been obtained. Only when the problem to be addressed has been detailed and alternative remedial actions have been laid out can an informed decision be made whether to fund a recommended construction project. That is because only then can reasonably accurate information be provided to decision makers, namely the members of the City Council, on the recommended construction project's scope, funding requirements, and timetable.

Other specific recommendations are as follows:

- The department should develop written guidelines defining the responsibilities of project engineers concerning the capital projects to which they are assigned, especially the information to be transferred when the project engineer changes.
- The department should establish written guidelines governing the organization and types of documentation to be contained in its project files. The written guidelines should also clearly assign to specified staff the responsibility for establishing and maintaining these files.

## IV. AGENCY RESPONSE

The Department of Wastewater Management generally agreed with the recommendations made in this report. First, the department stated that it already conducts a reconnaissance study to define the scope of a proposed project. Second, it stated that it already schedules budget requests for design and construction in fiscal years that follow the appropriation for planning. Third, it stated that it has begun preparation of guidelines defining the responsibilities of project engineers. Finally, it stated that it is establishing written guidelines governing the organization and types of documents to be contained in project files and assigning responsibility for the files. The full written response of the department is attached.

The department makes a number of other points in its response which require our further comment:

- (1) That this audit report implies that if reconnaissance work was performed by the department itself, rather than by consultants, then costs and delays would be reduced.

The report does not state this anywhere. The report does state, in Finding Number Two and Three, that the department's request for construction funding without an adequate understanding of the scope of work required resulted in changes in and expansion of the project scope, requirements for more appropriations, and lapses of prior appropriations.

- (2) That the report implies that the Gulick Avenue project will not have sufficient capacity to accommodate flows from upper Kalihi Valley.

The report does not state this anywhere. The report does state, on pages I-2 and -3, that subdivision applicants in upper Kalihi Valley cannot be accommodated by the wastewater system until the Kalihi Valley Reconstructed Sewer project is completed, and that funds to begin that project are planned for the FY 1998-99 budget.

- (3) That the report implies the City has been committed to cost overruns as a result of changes in project scope.

The report does not state this anywhere. The report does state, on page III-1, that to commit funds to a construction project without an adequate understanding of the problem to be addressed, the characteristics of the subject site(s), and the availability and merits of alternative remedies is to court

failure. The department argues that construction funds have not been encumbered for the Gulick Avenue project. We do not dispute this. But as we state on page III-1, only with such an understanding of the recommended project can an informed decision be made as to its funding. Funding decisions are ultimately made by the City Council. Nevertheless, achieving an adequate understanding prior to budget approval would benefit the Administration, as well as the Council. We further suggest that obtaining an adequate understanding prior to funding construction would have helped to avoid previous cost overruns in City projects.

- (4) That the report recommends creation of a new funding phase called Reconnaissance Study.

The report does not state this anywhere. The report does state, on page III-1, that work performed in the initial phase of capital projects be more accurately **labelled** as a reconnaissance study, and that such a study be separated from any construction project for budgeting purposes. No change in the organization or labelling of the work phases used in the City's capital budgets is being recommended.

- (5) That Council approval of a capital budget only represents an anticipated use of funds, and so lapses of appropriations have "very little true financial loss."

These issues are beyond the scope of this audit and are not discussed in the report. In brief response, we suggest that an evaluation of the effectiveness of a department's or a municipality's capital budgeting process would include an assessment of how much of the appropriations approved in the budget are implemented. In this regard, significant lapses of appropriations may be a symptom of ineffective budgeting practices. Also, as part of the decision making that occurs during the budgeting process, some projects are necessarily deferred in favor of other projects that are eventually included in the budget. If those approved projects are then not implemented, while there may be no financial loss, the City incurs an opportunity cost for the projects deferred.

In response to the department's statements, we made a few minor clarifications in the wording of our report.

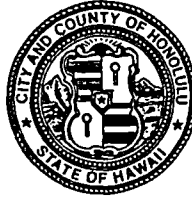
DEPARTMENT OF WASTEWATER MANAGEMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET • HONOLULU, HAWAII 96813  
PHONE: (808) 527-6663 • FAX: (808) 527-6675

RECEIVED

'98 FEB 18 P5:00

JEREMY HARRIS  
MAYOR



KENNETH E. SPRAGUE, P.E., PH.D.  
DIRECTOR  
OFFICE OF COUNCIL SERVICES  
CITY COUNCIL  
HONOLULU, HAWAII  
CHERYL K. OKUMA-SEPE, ESQ.  
DEPUTY DIRECTOR

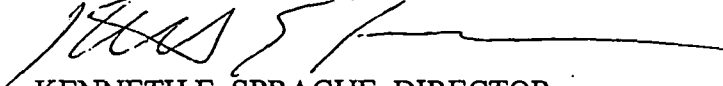
DIR 98-05

February 13, 1998

MEMORANDUM

TO: MR. IVAN KAISAN, LEGISLATIVE AUDITOR  
OFFICE OF COUNCIL SERVICES

VIA: MS. DIANE E. HOSAKA, Esq.  
DIRECTOR, OFFICE OF COUNCIL SERVICES

FROM:   
KENNETH E. SPRAGUE, DIRECTOR  
DEPARTMENT OF WASTEWATER MANAGEMENT

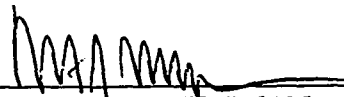
SUBJECT: *AUDIT OF GULICK AVENUE RELIEF SEWER PROJECT --FINAL DRAFT.*

Please find attached your table, "Performance Audit of the Gulick Avenue Relief Sewer Project, Department of Wastewater Management" with our responses to your specific questions included per your request. We found that comments addressing issues outside the constraints of your table were necessary and these have also been attached.

We wish to thank your staff for consideration of our previous comments and their cooperative spirit in working with us as they prepared this audit. However, there are still some issues which we feel may not be wholly understood and therefore would like to meet with your staff again to discuss these.

Please contact Mr. Ed Pier at extension 6665 if you have any questions on this matter.

APPROVED :

  
ROBERT J. FISHMAN  
Managing Director

Attachment.

APPENDIX A

cc: Ben Lee, Chief of Staff

**Performance Audit of the Gulick Avenue Relief Sewer Project  
Department of Wastewater Management**

RECOMMENDATION	AGREE/ DISAGREE	ACTION TO BE TAKEN	WHEN TO BE COMPLETED
<p>When a problem is first identified, conduct a reconnaissance study to define the scope of a proposed project.</p>	<p>Agree</p>	<p>This procedure is already typically followed by WWM. Since, in the past, staffing and equipment have been limited, this work has typically been contracted out to consultants as the Planning phase of a project. The Planning phase provides the investigatory work necessary to define a project's scope of work.</p> <p>With analyses now available through our GIS database and the anticipated procurement of additional TV equipment, WWM's ability to perform more reconnaissance work in-house in the initial phase of project definition has been improved. It is anticipated that more reconnaissance work will be performed in- house.</p>	<p>Already part of WWM procedures.</p>
<p>Until the results of such a study have been obtained, defer budget requests for design and construction of proposed projects.</p>	<p>Agree so long as design and construction are not unduly delayed.</p>	<p>WWM typically schedules design money for fiscal years following the appropriation of planning money and schedules construction money for years following the appropriation of design money. Money for services during bidding and construction (SDBC) may often be requested as design-phase money in the same year as construction money.</p> <p>Depending on the nature of some projects--e.g. their degree of simplicity or urgency--and the timing of their design or construction effort, it may be appropriate to schedule funding of different phases in the same fiscal year.</p>	<p>Already part of WWM procedures.</p>



**Performance Audit of the Gulick Avenue Relief Sewer Project  
Department of Wastewater Management**

RECOMMENDATION	AGREE/ DISAGREE	ACTION TO BE TAKEN	WHEN TO BE COMPLETED
Develop written guidelines defining the responsibilities of project engineers.	Agree	WWM initiated this process in its project management training. Guidelines are currently being prepared in by both our Planning and Engineering Divisions.	June 30, 1998
Establish written guidelines governing the organization and types of documents to be contained in project files, and assigning responsibility for the files.	Agree	Planning Division has completed and is reviewing a set of draft procedures to this end. Our Engineering and Construction Division is also engaged in preparing these procedures.	March 1998 for Planning Division. June 1998 for Engineering Division.

**Comments on Final Draft Audit  
of Gulick Avenue Relief Sewer Project**  
by  
Department of Wastewater Management  
February 13, 1998

1. **General Comments**

**In brief, the audit implies that as a result of inadequate preconstruction reconnaissance, excessive funds were expended and delays incurred.** The assumption behind this implication seems to be that more reconnaissance *performed by Department of Wastewater Management (WWM) Staff* would have provided a more precisely defined scope of work and thereby reduced costs and delays.

WWM maintains that planning was conducted for this project. WWM also maintains that, while, in retrospect, programming of funding appropriations (as opposed to funding commitments) may have been better coordinated, money has not been misspent on this project.

The project was initiated as a result of capacity analyses first calculated by the WWM's Service Control branch (responsible for reviewing and approving sewer connection applications), and later evaluated in the Islandwide Sewer Adequacy Project (ISAP) (Hart St. Basin by Park Engineering, Inc.) and the East Mamala Bay Facilities Plan (by Belt Collins and Assoc.). In that WWM did not have the staff or equipment available to perform appropriate field reconnaissance of the project, a consultant was retained to perform these functions and prepare a scope of work for the design and construction of the project. In order to obtain funding for the consultant, appropriation of funds were required. In order to appropriate funds, a description of the project scope and a six year projection of funding needs was required. In other words, before WWM could proceed to adequately determine what work would be required, the department had to make it's best estimate of that work and project the design and construction needs over the next six years.

Once the planning work was done (the reconnaissance called for by the audit), the scope of work was determined to be larger than the first estimate and revisions to the funding requests were made and approved by both the City Administration and City Council based on the new information provided. Although estimates for the project increased as planning and design have become more complete, the end result would have been essentially the same if the reconnaissance and planning had been performed by WWM staff instead of consultants.

Some of the money spent on consultant services for the planning effort may have been saved by performing the work in-house. However, expenditures would still have been required to provide the resources needed for WWM to perform the task.

2. **BACKGROUND p. I-2**

- a. paragraph 3. The audit seems to imply that the Gulick Avenue Relief Sewer project will not have adequate capacity to accommodate flows from the upper Kalihi Valley area.

The Gulick Ave. project has been sized to accommodate flows projected from the City's development plan for the upper Kalihi Valley area. It is constraints in the upper Kalihi Valley system that, at present, prevent the area from being fully served by the Gulick Ave. project.

The upper Kalihi Valley phase of improvements for this area was not initiated with the Gulick Ave. Relief Sewer project for several reasons. First, the upper Valley involves sewer lines with easements that pass through the backs of private lots on steep slopes and are anticipated to require more difficult design solutions and more expensive construction than the lower half of the project. Second, budget limitations and the need to execute other higher priority City projects prevented the entire Valley from being done at one time. Third, any improvements to the upper Valley without improvements in the downstream leg of Gulick Ave. Relief Sewer would be useless.

3. **Finding Number One, p. II-1-2--Project has Increased Significantly in Size, Complexity and Cost.**

- a. See comments under item 1 above para. 3-4.  
b. p. II-2 para. 4, The original scope of work was to relieve 1,800 feet of 24-inch sewer, not necessarily to replace it.

4. **Finding Number Two, pp. II-2-3--Project was Initiated Without an Adequate Understanding of the Work to be Performed.**

- a. See comments under item 1 above para. 3-4.  
b. p. II-2. Documents found since the draft audit include a memo from our Service Control branch alerting WWM's Planning branch of potential inadequacy of the lines on Gulick Ave. and parts of Kalihi Valley. This memo predates the ISAP and East Mamala Bay Facilities Plans, both of which support the need for relief in the Gulick Ave.-Kalihi Valley area.

A minor note--the portion of the ISAP analysis that addresses the Hart Street Drainage was done by Park Engineering, Inc., not Belt Collins & Assoc.

- c. p II-3, para. 5. The argument is presented that more and better information should have been accumulated before the Gulick Ave. project was included in the Dept's capital program. As described in item 1 above, the primary purpose in requesting funds was to conduct a study to provide a proper description for the project. Although at the time, the Dept. recognized the need for more information it did not have the in-house resources to conduct a reconnaissance study.

5. **Finding Number Three, pp.II-4 through 5--Funds for Project were Twice Requested Appropriated and Allowed to Lapse.**

It is true that the original appropriation schedule for this project--putting planning, engineering and construction funds in the same fiscal year--was highly optimistic. This seems especially so in hindsight. However, at the time, there was both a strong desire on the City's part to expedite the project and the appearance of a good chance that it would be a fairly straightforward project with the opportunity to move quickly from planning to design and construction or even design-build.

6. **Finding Number 4, pp. II-5 through 6--Dept. didn't Keep Track of all of the Project's Appropriations and Expenditures.**

Accounting of a project's appropriations and expenditures are kept by Dept. of Finance's, Fiscal and Accounting Divisions. In the past, WWM relied upon FIN for reports, as requested, on the status of these items and has provided them to Council on request in the past. In addition, the project engineer keeps copies of invoices processed through FIN for payment.

Full accounting of appropriations and total expenditures was obtained from FIN and provided to the auditors. Copies of all invoices for the planning contract were also provided once requested by the auditors.

7. **Finding Number 5, pp. II-6 through 7--No Written Guidelines Defining the Responsibilities of Project Engineers.**

- a. Concur
- b. As noted in the Audit, the Department has developed an extensive administrative directive outlining departmental roles and responsibilities for the CIP process. As a result of Project Management Training, Planning and Engineering Divisions are preparing specific guidelines for project engineers' responsibilities. The guidelines are scheduled to be completed in June 1998.

8. **Finding Number 6, pp. II-7-8--Project Files were Disorganized and Incomplete.**

- a. Generally concur.
- b. para. 2--copies of all invoices were available and provided to the auditors once project engineers knew they were desired. However, they were not specifically attached in the Gulick project files for easy and immediate access.
- c. Beginning during our Project Management training, the department has begun

drafting a set of guidelines for the organization and maintenance of files.

9. **Finding Number 7, p. II-8--No Written Guidelines Governing the Organization and Content of Project Files.**

- a. Concur. Per comment "c" to Finding Number 6, WWM's Planning division has completed a draft set of guidelines to this end with finalization expected in March 1998. Our Engineering and Construction Division is working on similar guidelines with anticipated completion in June 1998.

10. **Recommendations, pp.III-1 through 2.**

This section of the audit highlights several important suggestions to improve WWM CIP procedures with which we concur and are moving to implement. However, the section also projects an inappropriately general criticism of the department's procedures on all CIP projects based on the findings of only one. In fact, as discussed previously, many of the improvements recommended by the audit have long been part of WWM's procedures and are typically carried out on other projects.

More important, a conclusion is implied, though not supported by actual events, that the City has been irreversibly committed to construction cost overruns as a result of changes in scope during the planning process. Further, it is implied that these changes and overruns could have been avoided if in-house reconnaissance had been performed.

While the audit acknowledges that WWM does indeed conduct reconnaissance as part of the planning phase, it insists on the need to conduct reconnaissance by WWM personnel in order to avoid a premature commitment of construction funds. The audit appears to try to make the case that, due to inadequate planning, major changes have taken place in the contract that have led, or will lead, to significant cost overruns. In fact, the only changes that have taken place in the project scope have occurred exactly where they should have, in the planning and design stage. No construction money has been encumbered on this project. Encumbrance of construction funds has been deferred during the life of this project, while the planning and design to properly define the scope of construction work is completed.

The major changes that were identified in this project would have been discovered, at essentially the same points in the process, whether it was City personnel or a consultant that was doing the planning (inclusive of reconnaissance). While the City may have saved some lesser amounts of consultant fees had in-house personnel been able to perform the planning work prior to requesting CIP funding for this project, insufficient resources were available in-house to do so. It must also be recognized that as a requirement for requesting CIP money to perform the necessary planning, a six year projection of funding needs for all phases anticipated for the project must be submitted--whether the final estimate is known with certainty or not.

WWM agrees that it is undesirable to schedule funds prematurely, primarily because other City projects that might have been scheduled for a given fiscal year are then deferred. But scheduling funds, or budgeting them, does not automatically commit those funds to use. When Council approves a CIP Budget it accepts and authorizes an *anticipated* use of funds to a particular end--a plan of improvements with a not-to-exceed cost. The actual commitment or encumbrance of funds and their expenditure by a department are later specifically authorized by the departments of Budget and Finance. There is very little true financial loss to the City in the lapsing of funds when they are not needed for fiscal year in which they were appropriated. At the same time, it is necessary for the City's long range budgeting purposes to have some idea, even if preliminary, of all the costs anticipated for a project. What must be understood is that until design is done, project construction costs will be preliminary and subject to change.

Since by definition the planning phase of a CIP project includes reconnaissance study, the audit's recommendation to create yet another funding phase (Reconnaissance Study) to clarify to Council the preliminary state of a project may be better served by another approach. WWM agrees that there should be a mechanism to make Council more aware of the preliminary status of a project during its initial stages. This is especially true if circumstances occasionally require the budgeting of construction funds in the same fiscal year as design and planning funds. Therefore, WWM suggests that the preliminary nature of a project being initiated into the CIP program be identified in the "I-line", or funding line, of the budget's project description. The "I-line" is the portion of the budget description that identifies the specific use of the funds requested for that fiscal year. .

The audit correctly points out that there were several lapses of funds, that the planning and design phase have taken far longer than originally anticipated, and that improvements are needed in formalizing project engineering responsibilities and project file organization. These are important observations for this project and, as described earlier in these comments, WWM is taking appropriate steps for improvement.

However, although important, the above are secondary concerns that do not necessarily address the audit's central issue--that inadequate in-house planning by WWM has caused significant cost overruns. Contrary to the audit's implication, WWM *has* conducted a significant degree of planning and design prior to encumbering construction funds and truly committing the City to the major expenditures associated with construction. Consequently there has been no irreversible commitment to expenditure of construction funds as implied by the audit.

## APPENDIX B

### HISTORY OF APPROPRIATIONS FOR GULICK AVENUE RELIEF SEWER PROJECT

(through 11/30/97)

FY	ORD	APPROPRIATIONS						USE OF APPROPRIATIONS AS OF 11/30/97				
		LAND	PLAN	DESIGN	CONSTRUC	INSPECT	TOTAL	UNALLOT	EXPEND	ENCUMB	LAPSED	TOTAL
1990-91	90-53	\$0	\$300,000	\$0	\$800,000	\$0	\$1,100,000	\$0	\$297,327	\$2,673	\$800,000	\$1,100,000
1993-94	93-49	\$0	\$700,000	\$0	\$0	\$0	\$700,000	\$0	\$325,963	\$349,037	\$25,000	\$700,000
1994-95	94-42	\$0	\$0	\$500,000	\$1,000,000	\$0	\$1,500,000	\$0	\$0	\$0	\$1,500,000	\$1,500,000
1997-98	97-38	\$25,000	\$0	\$55,000	\$10,000,000	\$700,000	\$10,780,000	\$10,780,000	\$0	\$0	\$0	\$10,780,000
TOTAL W/O FY 1998		\$0	\$1,000,000	\$500,000	\$1,800,000	\$0	\$3,300,000	\$0	\$623,290	\$351,710	\$2,325,000	\$3,300,000
TOTAL W/ FY 1998		\$25,000	\$1,000,000	\$555,000	\$11,800,000	\$700,000	\$14,080,000	\$10,780,000	\$623,290	\$351,710	\$2,325,000	\$14,080,000

Sources: Ordinances 90-53, 93-49, 94-42, 97-38; Finance Dept. CIFIS-93-P: Statement of Appropriations, Expenditures, and Encumbrances, Final June reports for FY 1990-91, 1991-92, 1992-93, 1993-94, 1994-95, 1995-96; 1996-97, and report for November 1997.

